SPIE. OPTICS + PHOTONICS

CONNECTING MINDS.
ADVANCING LIGHT.

2014

OPTICS + PHOTONICS TECHNICAL PROGRAM.

OPTICAL ENGINEERING + APPLICATIONS

NANOSCIENCE + ENGINEERING

ORGANIC PHOTONICS + ELECTRONICS

SOLAR ENERGY + TECHNOLOGY

WWW.SPIE.ORG/OP

San Diego Convention Center
San Diego, California, USA

Exhibition: 19–21 August 2014

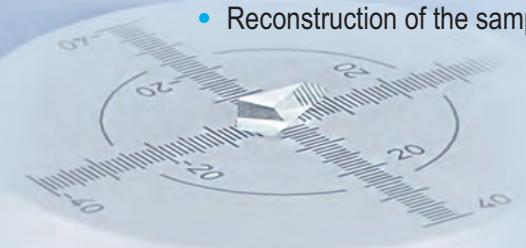
Conferences & Courses: 17–21 August 2014

NEW

PrismMaster® 300 HR

For easy and reliable high precision angle measurements

- Outstanding absolute accuracy (0.2 arcsec) achieved with a single measurement
- Robust design featuring all granite and steel frame for highest mechanical and thermal stability
- Large variety of sample sizes including microprisms
- Fully automatic measurement process for standard samples
- Software Features:
  - Automated sample tilt compensation
  - Prism configurator for easy definition of non-standard and compound prisms
  - Ray Tracing provides classification and selection of detected images, incl. automatic evaluation of internal reflections
  - Refractive index calculation and measurement of deflection angles in reflection
  - Reconstruction of the sample geometry



Visit us at booth #528

TRIOPTICS

www.trioptics.com

SPIE. OPTICS+ PHOTONICS NANOSCIENCE+ ENGINEERING

Metamaterials, plasmonics, CNTs, graphene, thin films, spintronics, nanoengineering, optical trapping

SPIE. OPTICS+ PHOTONICS SOLAR ENERGY+ TECHNOLOGY

Thin films, concentrators, reliability, next generation cell technologies, materials processing

SPIE. OPTICS+ PHOTONICS ORGANIC PHOTONICS+ ELECTRONICS

OLEDs, OTFTs, OPVs, liquid crystals, organic materials, organic semiconductors

SPIE. OPTICS+ PHOTONICS OPTICAL ENGINEERING+ APPLICATIONS

Optical engineering, lens design, metrology, x-ray, solid state lighting, remote sensing, atmospheric and space optical systems

Contents

Floor Plans 2–5
Conference Index 6–7
Events Schedule 8
Plenary Presentations 9–14
Sponsors. 16

SOCIAL, TECHNICAL, AND NETWORKING EVENTS

- Technical. 15, 17
- Industry. 19
- Membership. 20
- Social Networking 20–21
- Student 23
- Professional Development 23, 25

Exhibition 26–27
SPIE Award Winners 28–35
2014 SPIE Fellows. 36–39
Daily Course Schedule. 40–45
Course Index 46–47

TECHNICAL CONFERENCES

NanoScience + Engineering 48–104
Solar Energy + Technology 105–118
Organic Photonics + Electronics 119–139
Optical Engineeringing + Applications. . . . 140–239
Index of Authors, Chairs, and Committee Members 240–277

GENERAL INFORMATION

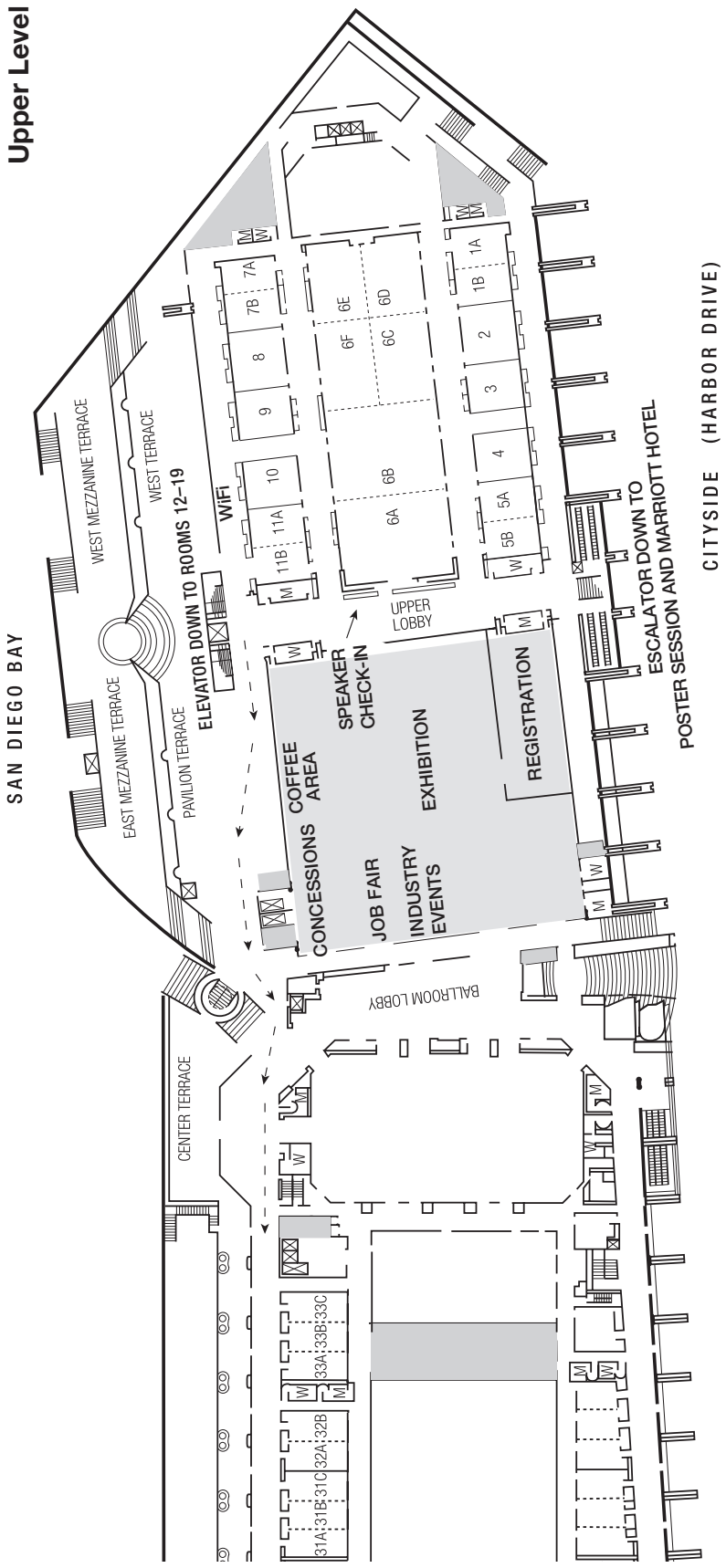
Registration · Author/Presenter Information Policies · Onsite Services 279–285
Proceedings of SPIE. 286–287

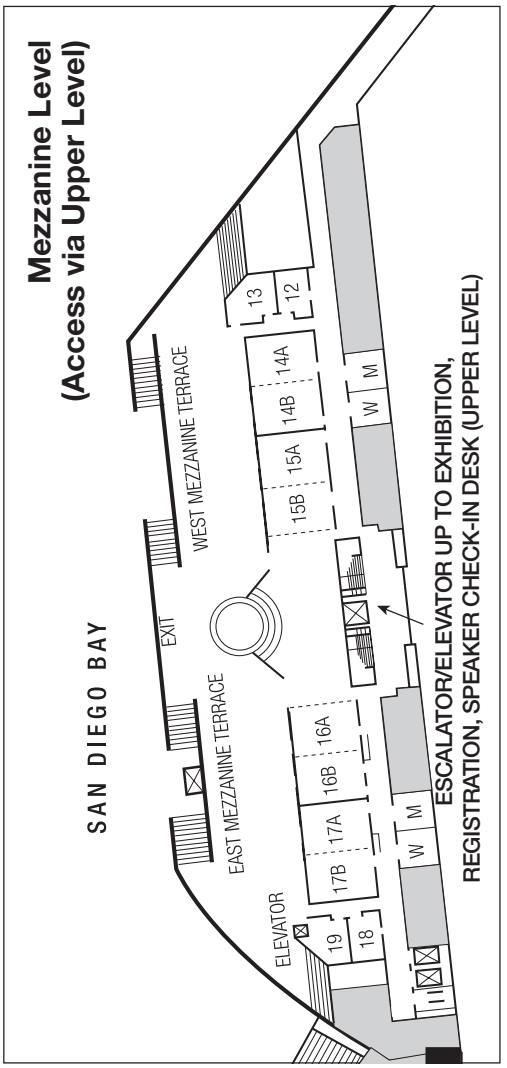
SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, session chairs, and authors who have so generously given their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

SAN DIEGO CONVENTION CENTER, SECOND LEVEL AND MEZZANINE

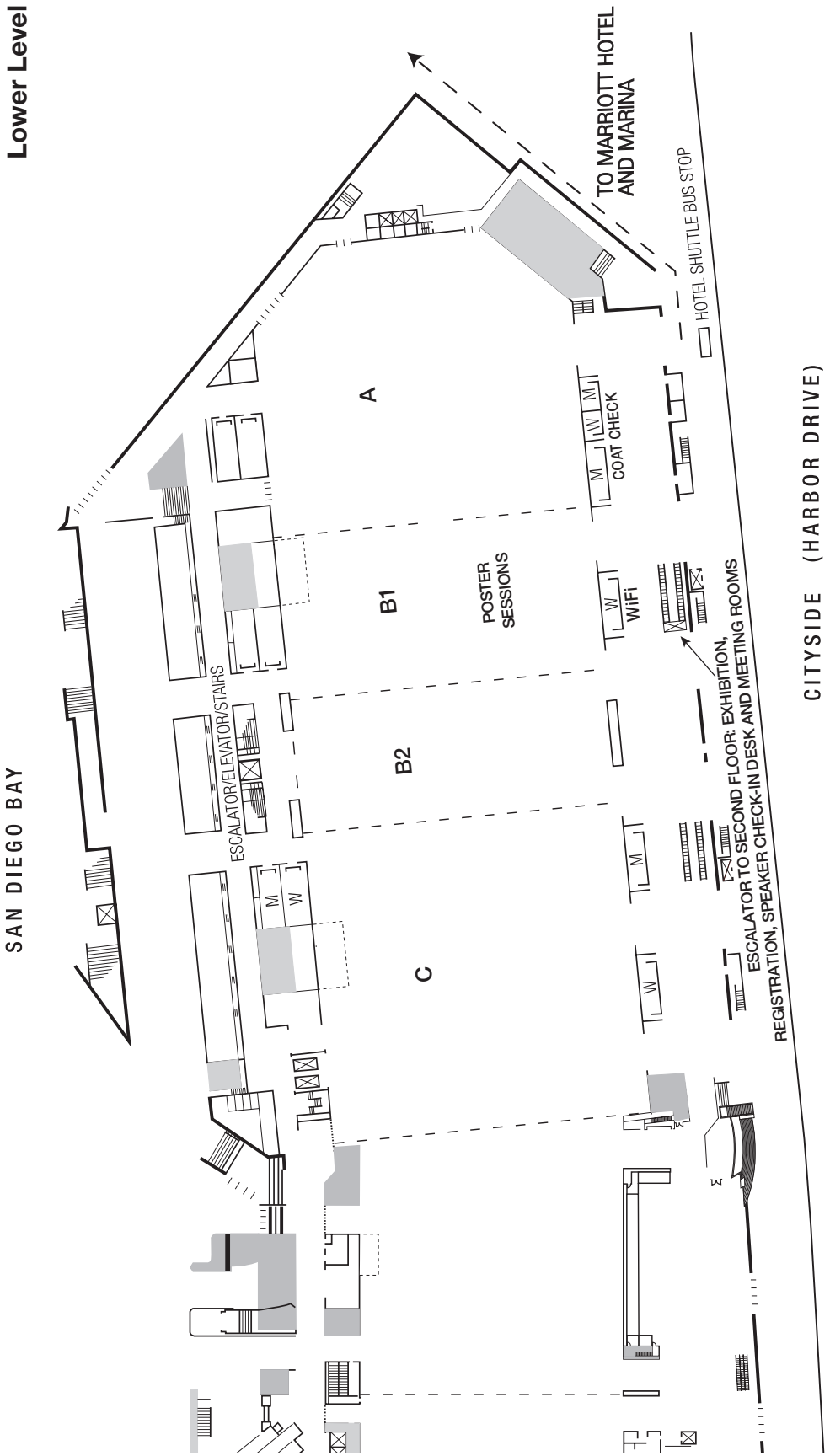
Registration, Exhibition, Speaker Check-in Desk and Meeting Rooms





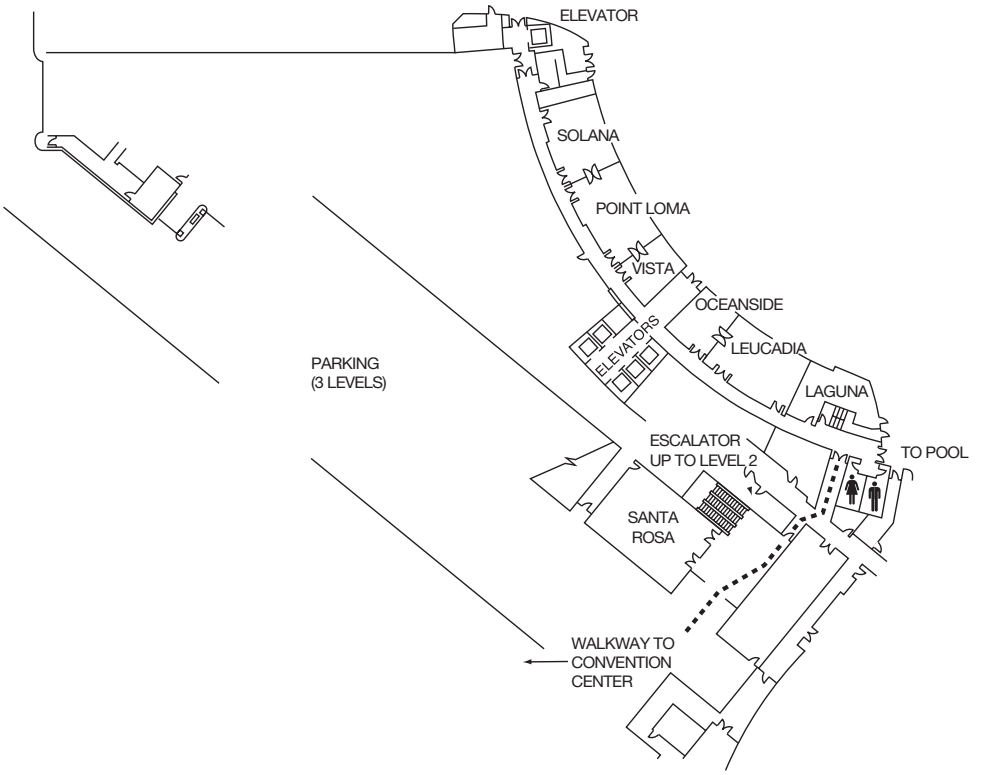
SAN DIEGO CONVENTION CENTER, GROUND LEVEL

Poster Sessions

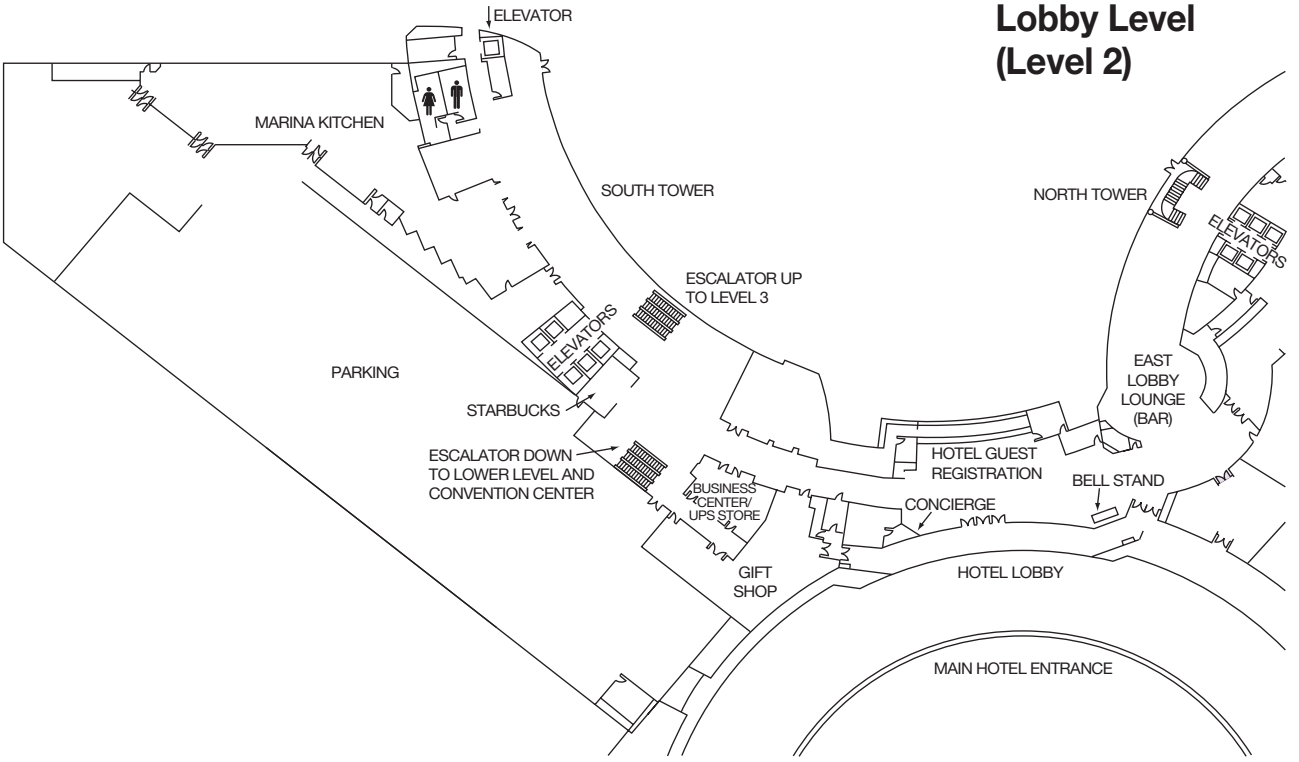


SAN DIEGO MARRIOTT MARQUIS AND MARINA MEETING ROOMS

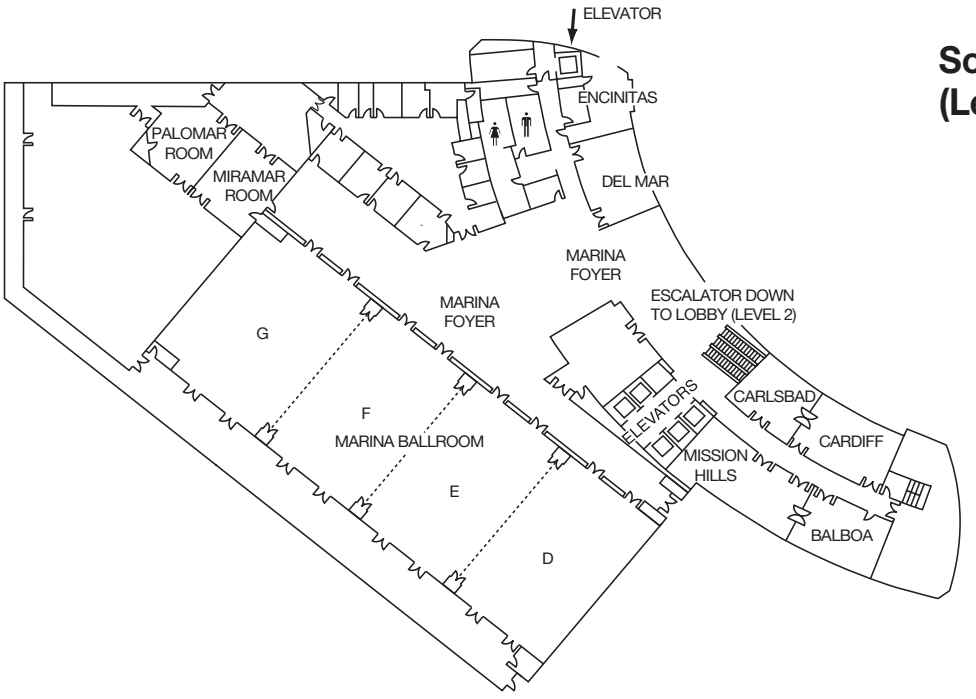
South Tower Pool Level (Level 1)



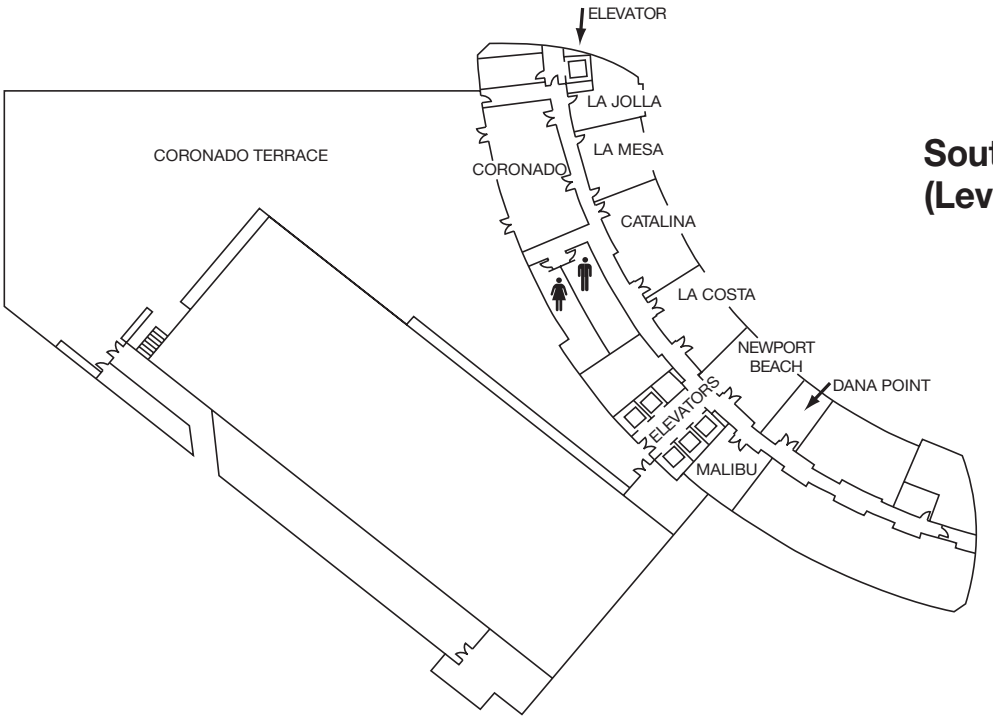
South Tower Lobby Level (Level 2)



SAN DIEGO MARRIOTT MARQUIS AND MARINA MEETING ROOMS



South Tower (Level 3)



South Tower (Level 4)

CONFERENCE INDEX

NanoScience + Engineering

Symposium Chair
Satoshi Kawata,
Osaka Univ. (Japan)

Symposium Chair
Manijeh Razeghi,
Northwestern Univ. (USA)

Symposium Co-chair
David L. Andrews,
Univ. of East Anglia Norwich
(United Kingdom)

Symposium Co-chair
James G. Grote,
Air Force Research Lab. (USA)

NANOSCIENCE

9160 **Metamaterials, Metadevices, and Metasystems 2014** *(Engheta/Noginov/Zheludev)* . . . . . p. 51
9161 **Nanophotonic Materials XI** *(Cabrini/Lérondel/Schwartzberg/Mokari)* . . . . . p. 56
9162 **Active Photonic Materials VI** *(Subramania/Foteinopoulou)* . . . . . p. 58
9163 **Plasmonics: Metallic Nanostructures and Their Optical Properties XII** *(Boardman)* . . . . . p. 62
9164 **Optical Trapping and Optical Micromanipulation XI** *(Dholakia/Spalding)* . . . . . p. 68
9165 **Physical Chemistry of Interfaces and Nanomaterials XIII** *(Banerji/Hayes/Silva)* . . . . . p. 74
9166 **Biosensing and Nanomedicine VII** *(Mohseni/Agahi/Razeghi)* . . . . . p. 78
9167 **Spintronics VII** *(Drouhin/Wegrowe/Razeghi)* . . . . . p. 81
9168 **Carbon Nanotubes, Graphene, and Associated Devices VII** *(Razeghi/Lee/Ghazinejad)* . . . . . p. 88
9169 **Nanoimaging and Nanospectroscopy II** *(Verma/Egner)* . . . . . p. 90

NANOENGINEERING

9170 **Nanoengineering: Fabrication, Properties, Optics, and Devices XI** *(Campo/Dobisz/Eldada)* . . . . . p. 92
9171 **Nanobiosystems: Processing, Characterization, and Applications VII** *(Kobayashi/Ouchen/Rau)* . . . . . p. 95
9172 **Nanostructured Thin Films VII** *(Lakhtakia/Mackay/Suzuki)* . . . . . p. 97
9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek/Orji)* . . . . . p. 100
9174 **Nanoepitaxy: Materials and Devices VI** *(Kobayashi/Talin/Davydov/Islam)* . . . . . p. 102
9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur)* . . . . p. 109
9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima/Conibeer)* . . . . . p. 113
9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor/Cardimona/Pirich/Prasad)* . . . . . p. 237

Solar Energy + Technology

Symposium Chair
Oleg V. Sulima,
GE Global Research (USA)

9175 **High and Low Concentrator Systems for Solar Energy Applications IX** *(Plesniak, Pfefferkorn)* . . . . . p. 107
9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur)* . . . . p. 109
9177 **Thin Films for Solar and Energy Technology VI** *(Eldada, Heben)* . . . . . p. 111
9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima, Conibeer)* . . . . . p. 113
9179 **Reliability of Photovoltaic Cells, Modules, Components, and Systems VII** *(Dhere, Wohlgemuth, Jones-Albertus)* . . . . . p. 115
9180 **Laser Processing and Fabrication for Solar, Displays, and Optoelectronic Devices III** *(Reutzel, Kar, Hwang, Molpeceres)* p. 117
9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel)* . . . . . p. 131
9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

Organic Photonics + Electronics

Symposium Chair
Zakya H. Kafafi,
National Science Foundation, ret (USA)

9181 **Light Manipulating Organic Materials and Devices** *(Nunzi/Schuller/Jakubiak/Eich)* . . . . . p. 121
9182 **Liquid Crystals XVIII** *(Khoo)* . . . . . p. 124
9183 **Organic Light Emitting Materials and Devices XVIII** *(So, Adachi)* . . . . . p. 127
9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel)* . . . . . p. 131
9185A **Organic Field-Effect Transistors XIII** *(Bao, McCulloch)* p. 135
9185B **Organic Semiconductors in Sensors and Bioelectronics VII** *(Shinar, Kymissis)* . . . . . p. 138

Optical Engineering + Applications

SPECIAL PROGRAM

9186 **Fifty Years of Optical Sciences at The University of Arizona** *(Barrett, Greivenkamp, Dereniak)* . . . . . p. 144
9187 **The Nature of Light: Light in Nature V** *(Liang, Shaw)* . p. 146
9188 **Optics Education and Outreach III** *(Gregory)* . . . . . p. 147

9189 **Photonic Innovations and Solutions for Complex Environments and Systems (PISCES) II** *(Lakhtakia, Todd)* . . p. 149

ILLUMINATION ENGINEERING

Program Chair: **Ian T. Ferguson,** The Univ. of North Carolina at Charlotte (USA)

9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang)* . . . . . p. 150
9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

OPTICAL DESIGN AND SYSTEMS ENGINEERING

Program Chairs: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA) and **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA)

9192 **Current Developments in Lens Design and Optical Engineering XV** *(Johnson, Mahajan, Thibault)* . . . . . p. 154
9193 **Novel Optical Systems Design and Optimization XVII** *(Gregory, Davis)* . . . . . p. 157
9194 **Laser Beam Shaping XV** *(Forbes, Lizotte)* . . . . . p. 161
9195 **Optical System Alignment, Tolerancing, and Verification VIII** *(Sasián, Youngworth)* . . . . . p. 164
9196 **Systems Contamination: Prediction, Control, and Performance** *(Carosso, Egges)* . . . . . p. 166
9197 **An Optical Believe It or Not: Key Lessons Learned III** *(Kahan)* . . . . . p. 168
9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

PHOTONIC DEVICES AND APPLICATIONS

Program Chairs: **Shizhuo Yin,** The Pennsylvania State Univ. (USA) and **Ruyan Guo,** The Univ. of Texas at San Antonio (USA)

9198 **Ultrafast Nonlinear Imaging and Spectroscopy II** *(Liu, Khoo, Psaltis)* . . . . . p. 169
9199 **Terahertz Emitters, Receivers, and Applications V** *(Razeghi, Baranov, Zavada, Pavlidis)* . . . . . p. 171
9200 **Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications VIII** *(Yin, Guo)* . . . . p. 173
9201 **Optical Data Storage 2014** *(Katayama, Milster)* . . . . . p. 176
9202 **Photonic Applications for Aviation, Aerospace, Commercial, and Harsh Environments V** *(Kazemi, Kress, Mendoza, Murshid, Javahiraly, Ishihara)* . . . . . p. 178
9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang)* . . . . . p. 150
9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza)* . . . . . p. 225

ADVANCED METROLOGY

Program Chair: **Katherine Creath,** Optineering (USA) and The Univ. of Arizona (USA)

9203 **Interferometry XVII: Techniques and Analysis** *(Creath, Burke, Schmit)* . . . . . p. 181
9204 **Interferometry XVII: Advanced Applications** *(Furlong, Gorecki, de Groot, Novak)* . . . . . p. 184
9205 **Reflection, Scattering, and Diffraction from Surfaces IV** *(Hanssen)* . . . . . p. 186
9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek, Orji)* . . . . . p. 100
9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi)* . . . . . p. 186

X-RAY, GAMMA-RAY, AND PARTICLE TECHNOLOGIES

Program Chairs: **Carolyn A. MacDonald,** Univ. at Albany (USA) and **Ralph B. James,** Brookhaven National Lab. (USA)

9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi)* . . . . . p. 186
9207 **Advances in X-Ray/EUV Optics and Components IX** *(Morawe, Khounsary, Goto)* . . . . . p. 190
9208 **Adaptive X-Ray Optics III** *(O'Dell, Khounsary)* . . . . . p. 193
9209 **Advances in Computational Methods for X-Ray Optics III** *(Sanchez del Rio, Chubar)* . . . . . p. 195
9210 **X-Ray Free-Electron Lasers: Beam Diagnostics, Beamline Instrumentation, and Applications II** *(Hau-Riege, Moeller, Yabashi)* . . . . . p. 198
9211 **Target Diagnostics Physics and Engineering for Inertial Confinement Fusion III** *(Bell, Grim)* . . . . . p. 200
9212 **Developments in X-Ray Tomography IX** *(Stock)* . . . . . p. 202
9213 **Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XVI** *(Burger, Franks, James, Fiederle)* . . . . . p. 205
9214 **Medical Applications of Radiation Detectors IV** *(Barber, Furenlid, Roehrig)* . . . . . p. 209
9215 **Radiation Detectors: Systems and Applications XV** *(Grim, Barber)* . . . . . p. 211

SIGNAL, IMAGE, AND DATA PROCESSING

Program Chair: **Khan M. Iftekharuddin,** Old Dominion Univ. (USA)

9216 **Optics and Photonics for Information Processing VIII** *(Awwal, Iftekharuddin, Matin, Márquez)* . . . . . p. 213
9217 **Applications of Digital Image Processing XXXVII** *(Tescher)* . . . . . p. 216

REMOTE SENSING

Program Chair: **Allen H.-L. Huang,** Univ. of Wisconsin-Madison (USA)

9218 **Earth Observing Systems XIX** *(Butler, Xiong, Gu)* . . . . . p. 219
9219 **Infrared Remote Sensing and Instrumentation XXII** *(Strojnik Scholl, Páez)* . . . . . p. 223
9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza)* . . . . . p. 225
9221 **Remote Sensing and Modeling of Ecosystems for Sustainability XI** *(Gao, Chang, Wang)* . . . . . p. 227
9222 **Imaging Spectrometry XIX** *(Mouroulis, Pagano)* . . . . . p. 229
9223 **Remote Sensing System Engineering V** *(Ardanuy, Puschell)* . . . . . p. 231

ATMOSPHERIC AND SPACE OPTICAL SYSTEMS

Program Chairs: **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA) and **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

9224 **Laser Communication and Propagation through the Atmosphere and Oceans III** *(van Eijk, Davis, Hammel)* . . . . p. 232
9225 **Quantum Communications and Quantum Imaging XII** *(Meyers, Shih, Deacon)* . . . . . p. 235
9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor, Cardimona, Pirich, Prasad)* . . . . . p. 237
9227 **Unconventional Imaging and Wavefront Sensing X** *(Dolne, Karr, Gamiz, Dayton)* . . . . . p. 239

EVENTS SCHEDULE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Professional Skills Workshop, 9:00 AM to 12:30 PM, p. 23	**Fifty Years of Optical Sciences at The University of Arizona,** 8:10 AM to 5:40 PM, p. 142	10:00 AM to 5:00 PM	**Exhibition, p. 24-25** 10:00 AM to 5:00 PM	10:00 AM to 2:00 PM
How to Persuade Others, 1:30 to 5:00 PM, p. 25	**Guest Hospitality Suite,** 8:30 to 10:00 AM, p. 20	**Job Fair,** 10:00 AM to 5:00 PM, p. 19		**Guest Hospitality Suite,** 8:30 to 10:00 AM, p. 20
Symposium-wide Plenary Session, 5:45 to 7:35 PM, p. 9	**Plenary: Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites,** (Campo) 9:15 to 10:00 AM, p. 10	**Guest Hospitality Suite,** 8:30 to 10:00 AM, p. 20	**SPIE Senior Member Breakfast,** 8:00 to 9:00 AM, p. 20	**Industry Update Presentation,** (Stahl/Lieberman/Anderson) 9:00 AM to 10:00 AM, p. 19
Bringing Star Power to Earth, (Dunne), 5:50 to 6:25 PM, p. 9; **The Europa Clipper Mission Concept: Exploring a Potentially Habitable World** (Pappalardo) 6:25 to 7:00 PM, p. 9; **The Road Ahead for Wearables,** (Parviz) 7:00 to 7:35 PM, p. 10	**Plenary: Nanoscale Silicon as an Optical Material,** (Fauchet) 10:30 to 11:15 AM, p. 10	**Student Chapter Poster Exhibit,** 10:00 AM to 5:00 PM, p. 23	**Guest Hospitality Suite,** 8:30 to 10:00 AM, p. 20	**Workshop on Software for Modeling X-ray Sources, Optics, and Scattering,** (Sanchez del Rio) 2:10 PM to 3:10 PM, p. 17
Optics Outreach Games, 7:30 to 9:30 PM, p. 20	**Plenary: Nanoscale Engineering Optical Nonlinearities and Nanolasers,** (Fainman), 11:15 AM to 12:00 PM, p. 11	**SPIE Fellows Luncheon,** 12:00 PM to 1:30 PM, p. 20	**Plenary: Materials and Devices for Bioresorbable Electronics,** (Rogers) 10:30 to 11:00 AM, p. 13	**Panel Discussion: Activities of International PV Module Quality Assurance Forum** (Ramu) 3:45 PM to 4:30 PM, p. 17
	Lunch with the Experts—A Student Networking Event, 12:30 to 1:30 PM, p. 23	**Career Advancement through SPIE Involvement,** 1:00 to 2:00 PM, p. 23	**Plenary: Organic Electronic Bio-devices,** (Torsi) 11:00 to 11:30 AM, p. 14	
	IYL Regional Activities Panel Discussion, 1:30 to 2:20 PM, p. 25	**Plenary: Data-adaptive Filtering and the State of the Art in Image Processing,** (Milanfar) 1:30 to 2:30 PM, p. 12	**Announcement of the Organic Photonics + Electronics Best Student Paper Award Winner,** 11:30 to 11:45 AM, p. 14	
	Student Chapter Info Session, 2:30 to 3:00 PM, p. 23	**Getting Hired in 2014 and Beyond,** 2:00 to 3:00 PM, p. 19	**Plenary: Charge and Spin Transport Physics of Organic Semiconductors,** (Sirringhaus) 11:45 AM to 12:15 PM, p. 14	
	Plenary: CPV: Lessons from the First 100MW and the Explosion of Next Generation Technologies, (Plesniak) 2:00 to 2:25 PM, p. 11	**Student Chapter Exhibit Mixer,** 3:30 to 5:00 PM, p. 21	**More than Money? Salary, Satisfaction, and Workload in Optics and Photonics,** 4:00 to 5:00 PM, p. 19	
	Plenary: The Renaissance of CdTe-based Photovoltaics, (Huber) 2:25 to 2:50 PM, p. 11	**Plenary: Information Content of a Photon in Optical Imaging, Quantum Imaging, and Radiology,** (Barrett, Myers) 4:05 to 4:45 PM, p. 13	**Speed Networking Social,** 5:00 to 6:30 PM, p. 21	
	Plenary: Organic Solar Cells: From a Lab Curiosity to a Serious Photovoltaic Technology, (Leo) 2:50 to 3:15 PM, p. 11	**Plenary: Recent Trends in Optical Components in the Mobile Industry**, (Lee), 4:45 to 5:25 PM, p. 13	**POSTER SESSION: Nano, Solar, Organic Photonics + Electronics, and Illumination Engineering,** 5:30 to 7:30 PM, p. 17	
	Plenary: Hot Carrier Solar Cell Absorbers: Materials, Mechanisms and Nanostructures, (Conibeer) 3:45 to 4:10 PM, p. 12	**Plenary: Optical Design for Consumer Products,** (Gupta) 5:25 to 6:05 PM, p. 13	**SPIE 2014 Annual Awards Banquet,** 7:30 PM, p. 21	
	Plenary: International PV QA Task Force's Proposed Comparative Rating System for PV Modules, (Wohlgemuth, Kurtz) 4:10 to 4:35 PM, p. 12	**Annual General Meeting of the SPIE Corporation,** 6:00 to 7:00 PM, p. 20		
	Women in Optics Presentation and Reception, 5:00 to 6:30 PM, p. 20	**SPIE Members Reception,** 7:00 to 8:30 PM, p. 20		
	POSTER SESSION: Optical Engineering + Applications, 5:30 to 7:30 PM, p. 15	**Lens Design Technical Event,** (Pfisterer) 8:00 to 10:00 PM, p. 15		
	All-Conference Welcome Reception and Star Party, 7:00 to 8:30 PM; 8:30 to 9:00 PM p. 20	**Optomechanical/Instrument Technical Group Event,** (Hatheway) 8:00 to 10:00 PM, p. 17		
	Illumination Technical Event, (Jacobsen) 8:00 to 10:00 PM, p. 15	**Penetrating Radiation Technical Event,** (Baciak) 8:00 to 10:00 PM, p. 17		
		The Care and Cleaning of Optics Panel Discussion, (Schalck) 8:00 to 10:00 PM, p. 17		
		Workshop on X-Ray Mirrors, (Khounsary) 8:00 to 10:00 PM, p. 17		

Symposium-wide Plenary Session

Sunday 17 August 2014, 5:45 PM to 7:35 PM
Convention Center, Room 6A

5:45 to 5:50 PM:

WELCOME AND OPENING REMARKS

5:50 to 6:25 PM:

BRINGING STAR POWER TO EARTH

Mike Dunne
Lawrence Livermore National Lab. (USA)

Abstract: The National Ignition Facility (NIF) in California is the world's largest and most energetic laser system. The NIF's 192 beams recently exceeded their design specification to deliver 1.8-megajoule, 500-terawatt ultraviolet laser light in highly reproducible and precisely controlled conditions. This represents over 60 times more energy than any previous laser system, and has been designed to generate (in miniature) conditions that match or exceed those found at the center of the Sun. The ability to create temperatures of more than 100 million degrees and pressures more than 100 billion times Earth's atmospheric pressure is used to drive the "fusion" of hydrogen into helium, releasing copious amounts of energy. The NIF is designed to compress fusion targets to the conditions required for "ignition", liberating more energy than is required to initiate the fusion reaction (i.e., net production of energy). When achieved, this will mark the culmination of over 50 years of effort across the world. This talk will discuss the current status of the campaign to achieve ignition, presenting the most recent experimental results, and a look ahead to how this approach could be adopted to generate gigawatt levels of electrical power from a laser-driven source of fusion neutrons based on these demonstration experiments. Such a source is attractive because it will be inherently safe, generate no greenhouse gases or other environmental pollutants, provide security of fuel supply with fuel that will last for millennia, generate large-scale baseload power, be able to make use of the existing grid, have no need for geological waste disposal (unlike nuclear power or carbon sequestration), and will not require enrichment or reprocessing of nuclear material that could present a proliferation risk.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Biography: **Mike Dunne** joined Lawrence Livermore National Laboratory in 2010 as Director for Laser Fusion Energy, charged with developing a revolutionary source of safe, secure, carbon-free baseload electricity. Mike's role is to ensure full advantage is taken of the US National Ignition Facility (NIF), a $3.5 billion investment designed to demonstrate the proof of principle of laser fusion. NIF works by directing the world's largest laser system to "ignite" a small mass of fuel to release copious amounts of energy. The process marks the culmination of over 50 years of research. Laser fusion energy has been pursued throughout this time because it is inherently safe, releases no greenhouse gases, has no long-lived waste and is based on widely available sources of fuel that will last for millennia. Previously, Mike was the International Project Leader for the European laser fusion project 'HiPER' (www.hiper-laser.org). He created a consortium of 26 institutions across 10 countries to develop one of the few Giga-Euro scale facility opportunities accepted onto the "European roadmap" of future research infrastructures (ESFRI), as well as onto the UK Large Facilities Roadmap. Mike held the post of Director of the United Kingdom's Central Laser Facility (CLF) for five years, based at the Rutherford Appleton Laboratory. This is home to the world's most intense laser facilities, with science programmes ranging from biomedical research, to the study of astrophysics in the laboratory, and the development of a new generation of miniaturized particle accelerators.

He obtained his doctorate in laser fusion and laboratory astrophysics research from Imperial College, London, where he is now a visiting Professor. He is a Fellow of the Royal Society for the encouragement of Arts, Manufacturers and Commerce (FRSA), and a member of the American Association for the Advancement of Science, American Physical Society, European Physical Society, Institute of Physics, and the International Society for Optical Engineering. He has received a number of international awards and is the author of over 180 technical papers, over 50 invited talks and numerous press and media reports.

6:25 to 7:00 PM:

THE EUROPA CLIPPER MISSION CONCEPT: EXPLORING A POTENTIALLY HABITABLE WORLD

Robert T. Pappalardo
Jet Propulsion Lab., California Institute of Technology (USA)

Abstract: Galileo spacecraft data suggest that an ocean likely exists beneath the icy surface of Jupiter's moon Europa and that the "ingredients" necessary for life (liquid water, chemistry, and energy) could exist there today. A NASA-appointed Science Definition Team (SDT), working closely with a technical team from the Jet Propulsion Laboratory (JPL) and the Applied Physics Laboratory (APL), recently considered options for a future strategic mission to Europa, with the stated science goal: Explore Europa to investigate its habitability. The favored architecture consists of a spacecraft in Jupiter orbit making many close flybys of Europa, concentrating on remote sensing of the moon. The mission would also include the capability to perform reconnaissance for a future lander, with the Reconnaissance goal: Characterize scientifically compelling sites to prepare for a future landed mission to Europa. Innovative mission design would use gravitational perturbations of the spacecraft trajectory to permit flybys at a wide variety of latitudes and longitudes, enabling globally distributed regional coverage of Europa's surface, with nominally 45 close flybys at altitudes of 25 – 100 km. I will present the science and reconnaissance goals and objectives, a mission design overview, and the notional spacecraft for this concept known as the Europa Clipper.

Biography: **Robert Pappalardo** is a Senior Research Scientist at the Jet Propulsion Laboratory of the California Institute of Technology in Pasadena, California. He is currently the Pre-Project Scientist for the Europa Clipper mission concept and has served as the Project Scientist for the Cassini Equinox (first extended) Mission at Saturn. He has served as a member of the National Research Council's Space Studies Board and Co-Chair of its Committee on the Origins and Evolution of Life, and he is a recipient of NASA's Exceptional Service Medal. Pappalardo's research focuses on processes that have shaped the icy satellites of the outer solar system, especially Europa and the role of its probable subsurface ocean.

Education: B.A. in Geological Sciences from Cornell University; Ph.D. in Geology from Arizona State University.

PLENARY SESSIONS

7:00 to 7:35 PM:

THE ROAD AHEAD FOR WEARABLES

Babak Parviz
Amazon Inc. (USA)

Abstract: Exponential progress of computing and the associated technologies as manifested by Moore's Law have enabled extreme miniaturization, low power operation, and multi-function integration. These trends and new capabilities are creating opportunities for building devices that interact with the user and the environment in novel ways. Examples of such devices include Google Glass, smart watches, body monitors, and the forward looking smart contact lenses.

A pioneering device has been Google Glass which is a communication and computing device in an unconventional form factor that enables entirely new ways of interacting with computing systems and the environment. It integrates a number of sophisticated components including display, camera, multiple sensors, and much more in a compact form factor and offers very rapid access to information.

This brief presentation provides the background and some of the reasoning for why developing wearable devices including Glass might have reached a tipping point.

Biography: **Babak Parviz** is a Vice President at Amazon. He is the creator of Google Glass and a pioneer of building contact lens microsystems. He received his BA in Literature from University of Washington, BS in Electronics from Sharif University of Technology, MS degrees in Electrical Engineering and Physics from University of Michigan, PhD in Electrical Engineering from Univ. of Michigan; and completed his postdoctoral fellowship in Chemistry and Chemical Biology at Harvard. His research and engineering interests span novel computing and communication paradigms, high-tech with social impact, bionanotechnology, bioengineering, MEMS, and photonics. His work has been put on display at the London Museum of Science and has received numerous recognitions and awards including NSF Career Award, MIT TR35, Time magazine's best invention of the year (2008 and 2012), Your Health Top 10 Medical advance of the year, and About.com top invention and has been reported on in thousands of articles worldwide. In 2012 he was selected by Ad Age as one of the 50 most creative people in the United States.

INTERNATIONAL YEAR OF LIGHT 2015

United Nations declared 2015 as the International Year of Light and Light-based Technologies. Visit our booth in the registration area for more information and to find out how your organization can become more involved.

www.spie.org/iyl

NanoScience + Engineering Plenary Session

Monday 18 August 2014, 9:15 AM to 12:00 PM
Convention Center, Room 6A

Session Chairs: **James G. Grote,** Air Force Research Lab. (USA); **Satoshi Kawata,** Osaka Univ. (Japan)

9:15 to 10:00 AM:

NON-COVALENT INTERACTIONS OF CARBON NANOTUBES IN POLYMER COMPOSITES

Eva M. Campo
Bangor Univ. (United Kingdom) and Univ. of Texas at San Antonio (USA)

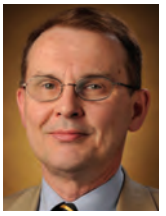
Abstract: Despite much effort to control dispersion, alignment, and overall processing of Carbon Nanotubes, both their surface chemistry and distribution in polymer matrices remain an active topic of research. Growth and processing can yield local defects along the graphitic structure to become effective latching sites conducive to polymeric interaction; a prelude to dispersion. With all, the possibility of controlled surface chemistry paves the way of CNTs towards supramolecular chemistry. In this scheme, π-π and CH-π interactions play an important role in time-evolved bonding dynamics; which in turn, is exhorted by both chemistry and processing. We will engage in an exploration that provides insights into bonding in nanocomposites, offering invaluable information towards the synthesis-structure-property paradigm.

Biography: **Professor Eva Campo** leads the Laboratory for Matter Dynamics, holding appointments at Bangor University (UK) and the University of Texas at San Antonio (TX). She was the founder of FP7-NMP-22896, promoting her research interests in nanocomposites, electrospinning, and advanced materials characterization. She is an SPIE Senior Member.

Coffee Break 10:00 to 10:30 am

10:30 to 11:15 AM:

NANOSCALE SILICON AS AN OPTICAL MATERIAL



Philippe M. Fauchet
Vanderbilt Univ. (USA)

Abstract: As the material at the core of all microelectronic devices, silicon has fueled most technological revolutions in the 20th century. It is abundant and, among inorganic materials, inexpensive. Due to extremely large industrial investments over the past decades, it was tamed like no other material before. However, with the possible exception of the photovoltaic industry, silicon has until recently been used by a single industry. The situation started changing over 20 years ago when advances in the manufacture of nanometer-size objects (e.g., quantum dots, wires, sheets) and devices with deep submicron features (e.g., photonic crystals) allowed researchers to manipulate the properties of bulk silicon and to exploit the unusual optical properties of nanoscale silicon structures. In this presentation, the history, including the most recent developments, of nanoscale silicon as an optical material will be reviewed with a special emphasis on active and biosensing structures.

Biography: **Philippe Fauchet** is the dean of the School of Engineering at Vanderbilt University. He received a Ph.D. from Stanford University and a master's degree from Brown University. Fauchet uses nanoscale silicon for photonic, biosensing and energy applications. He has founded a successful startup, over 400 publications, and is a Fellow of SPIE, OSA, IEEE, APS, and MRS.

11:15 am to 12:00 PM:

NANOSCALE ENGINEERING OPTICAL NONLINEARITIES AND NANOLASERS

Shaya Fainman

Univ. of California, San Diego (USA)

Abstract: Dense photonic integration requires miniaturization of materials, devices and subsystems, including passive components (e.g., engineered composite metamaterials, filters, etc.) and active components (e.g., lasers, modulators, detectors). This paper discusses passive and active devices that recently have been demonstrated in our laboratory, including monolithically integrated short pulse compressor utilized with silicon on insulator material platform and design, fabrication and testing of nanolasers constructed using metal-dielectric-semiconductor resonators confined in all three dimensions.

Biography: **Shaya Fainman** is a Cymer and Distinguished Professor of ECE at UCSD. He is directing research of the Ultrafast and Nanoscale Optics group and made significant contributions to near field optical phenomena, meta-materials, nanophotonics and plasmonics. His a Fellow of the OSA, IEEE, and SPIE, and a recipient of numerous awards including SPIE's Gabor Award. He contributed over 230 manuscripts in peer review journals and over 450 conference papers.

Solar Energy Plenary Session

Monday 18 August 2014, 2:00 PM - 4:35 PM
Convention Center, Room 6A

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

2:00 to 2:25 PM:

CPV: LESSONS FROM THE FIRST 100MW AND THE EXPLOSION OF NEXT GENERATION TECHNOLOGIES

Adam Plesniak

Arzon Solar, LLC (USA)

Abstract: The past decade has seen concentrator photovoltaics (CPV) technology transition from a few backyard experiments to an installed global capacity of well over 100 MW. With several utility scale power plants in commercial operation, the presentation will first focus on history and quality of performance since commissioning and overall customer satisfaction. Critical lessons learned from the process of designing, manufacturing and installing product for the utility scale renewable generation market are discussed. The presentation will reflect on how lessons thus far will guide CPV innovators through the flowering of Next Generation CPV technologies, from spectrum splitting optics to five junction solar cells, currently underway throughout the industry. Overall, CPV continues to serve as a robust platform for the new ideas and research needed to mature the higher performance and lower cost technologies critical for continued competitiveness of CPV in the renewable generation marketplace.

Biography: **Adam Plesniak** is currently the Sr. Director of R&D at Arzon Solar, LLC, (formerly Amonix) the world's leading concentrator photovoltaics design and manufacturing company. At over 70MW, Arzon Solar, LLC, (formerly Amonix) is the most installed CPV technology in the world and currently holds the world record for photovoltaic module efficiency measured at 35.9% CSTC by NREL. Prior to Amonix, Adam was the Engineering and Design Lead on the Boeing Phantomworks Solar Program where his team developed the XR700 concentrator with partnership from DOE. Adam has a MS in Electrical Engineering from Stanford and a BS in Mechanical Engineering from Rensselaer.

2:25 to 2:50 PM:

THE RENAISSANCE OF CDTE-BASED PHOTOVOLTAICS

William H. Huber

GE Global Research (USA)

Abstract: Over the past several years, CdTe-based photovoltaics have undergone a revolution. CdTe is a mature PV technology, spanning more than 55 years. Steady advancements in CdTe module manufacturing, coupled with CdTe's inherent manufacturing simplicity, have driven down the cost of commercial CdTe modules to under $0.55/W at present. Until recently however, CdTe module efficiencies have lagged behind competing technologies. For a decade, CdTe record efficiencies remained dormant, far behind poly Si as well as the competing thin film PV technology, $CuIn_xGa_{1-x}Se_2$ (CIGS). Over the past several years, CdTe record cell efficiencies have dramatically increased and are nearly at parity with poly Si and CIGS. Given the recent trajectory, CdTe is poised to become the most efficient polycrystalline PV technology in the very near future. This talk will highlight the advantages of CdTe for PV, key advancements in the field and opportunities for further improvements.

Biography: **Dr. William Huber,** a senior scientist at GE Global Research, is leading the Efficiency improvement program. While at GE, he has conducted applied research on a variety of different topics including photovoltaics, surgical navigational systems, hybrid manufacturing and medical imaging. Prior to joining GE, Dr. Huber was a post-doc at NIST, researching noise in nanoelectronic devices.

2:50 to 3:15 PM:

ORGANIC SOLAR CELLS: FROM A LAB CURIOSITY TO A SERIOUS PHOTOVOLTAIC TECHNOLOGY

Karl Leo

Technische Univ. Dresden (Germany) and King Abdullah Univ. of Science and Technology (KAUST) (Saudi Arabia)

Abstract: Carbon-based organic semiconductors have many potential advantages like easy large-area preparation on flexible substrates, large variety of materials, and low cost. Organic solar cells have recently achieved significant progress and have crossed the 10% efficiency mark. In this talk, I will present an overview over the key features of solid-state organic solar cells and recent developments in the field. One central research area is the design of the bulk heterojunction active layer, requiring a nanoscale phase separation and optimized morphology to achieve efficient operation. I will also discuss highly efficient tandem structures with optimized electrical and optical properties, having the potential for approx. 20%.

Biography: **Karl Leo** obtained a Diplomphysiker degree and PhD degree from the Universities of Freiburg and Stuttgart, respectively. After postdocs at AT&T Bell Labs and RWTH Aachen, he became in 1993 full professor at TU Dresden. Currently, he is visiting professor at KAUST, Saudi-Arabia. His main interests are novel semiconductor systems like semiconducting organic thin films. He is cofounder of several companies, including Heliatek GmbH.

Coffee Break 3:15 to 3:45 PM

3:45 to 4:10 PM:

HOT CARRIER SOLAR CELL ABSORBERS: MATERIALS, MECHANISMS AND NANOSTRUCTURES

Gavin Conibeer
Australian Ctr. for Advanced Photovoltaics, Univ. of New South Wales (Australia)

Abstract: The Hot Carrier solar cell is a Third Generation device that aims to tackle the carrier thermalisation loss after absorption of above band-gap photons. It is theoretically capable of efficiencies very close to the maximum thermodynamic limit. It relies on slowing the rate of carrier cooling in the absorber from ps to ns. This challenge can be addressed through nanostructures and modulation of phonon dispersions. The mechanisms of carrier cooling are discussed and methods to interrupt this process investigated to give a list of properties required of an absorber material. Quantum well or nano-well structures and large mass difference compounds with phonon band gaps are discussed in the context of enhancing phonon bottleneck and hence slowing carrier cooling. Materials for these structures are discussed and potential combined structures to maximize phonon bottleneck and slow carrier cooling are suggested.

Biography: Professor **Gavin Conibeer** leads the Third Generation Photovoltaics research group at the University of New South Wales. He received his BSc degree from London University and PhD from Southampton University, UK, in III-V semiconductors for tandem PV cells. He has worked on a wide range of materials and nanostructures for photovoltaics at Monash, Southampton, Cranfield and Oxford Universities. He is currently an Australian Research Council Future Fellow at UNSW.

4:10 to 4:35 PM:

INTERNATIONAL PV QA TASK FORCE'S PROPOSED COMPARATIVE RATING SYSTEM FOR PV MODULES

John Wohlgemuth
and **Sarah Kurtz,** National Renewable Energy Lab. (USA)

Abstract: The International PV Quality Assurance Task Force is developing a rating system that provides comparative information about the relative durability of PV modules. Development of accelerated stress tests that can provide such comparative information is seen as a major step toward being able to predict PV module service life. This paper will provide details of the ongoing effort to determine the format of such an overall module rating system. The latest proposal is based on using three distinct climate zones as defined in IEC 60721-2-1 for two different mounting systems. Specific stresses beyond those used in the qualification tests are being developed for each of the selected climate zones.

Biography: **Dr. Wohlgemuth** joined the National Renewable Energy Laboratory as Principal Scientist in PV Reliability in 2010. He is responsible for establishing and conducting research programs to improve the reliability and safety of PV modules. Before joining NREL he worked at Solarex/BP Solar for more than 30 years. Dr. Wohlgemuth has been convenor of working group 2, the module working group within IEC TC-82 for more than 10 years.

Signal, Image, and Data Processing Plenary Session

Tuesday 19 August 2014, 1:30 PM - 2:30 PM
Convention Center, Room 6A

Session Chair: **Khan M. Iftekharuddin,** Old Dominion Univ. (USA)

1:30 to 1:35 PM:

WELCOME AND INTRODUCTIONS

1:35 to 2:30 PM:

DATA-ADAPTIVE FILTERING AND THE STATE OF THE ART IN IMAGE PROCESSING

Peyman Milanfar
Univ. of California, Santa Cruz (USA)

Abstract: The most effective recent approaches to processing and restoration of images and video are ones that flexibly adapt themselves to the content of these signals. These high performance methods have come about through the convergence of several powerful ideas from different science and engineering disciplines. Examples include Moving Least Square (from computer graphics), the Bilateral Filter and Anisotropic Diffusion (from computer vision), Boosting and Spectral Methods (from Machine Learning), Non-local Means and Bregman Iterations (from Applied Math), Kernel Regression and Iterative Scaling (from Statistics). These approaches are deeply connected; and in this talk, I will present a framework for understanding many common underpinnings of these ideas. This has led us to new insights and algorithms, yielding both deeper theoretical analysis, and state of the art results in practice.

Biography: **Peyman Milanfar** received his undergraduate education in electrical engineering and mathematics from the University of California, Berkeley, and the MS and PhD degrees in electrical engineering from the Massachusetts Institute of Technology. Until 1999, he was at SRI International, Menlo Park, California, and a consulting Professor of CS at Stanford. He has been on the EE faculty at UC Santa Cruz since 1999, having served as Associate Dean of the School of Engineering from 2010-12. Since 2012 he has been on leave at Google-X, where he was recruited to work on computational photography and more specifically, on the imaging pipeline for Google Glass. He won a National Science Foundation Career award in 2000, and the best paper award from the IEEE Signal Processing Society in 2010. He is a fellow of the IEEE.

Optical Engineering Plenary Session

Tuesday 19 August 2014, 4:00 PM - 6:05 PM
Convention Center, Room 6A

Session Chairs: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel,** Photon Engineering LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA)

4:00 to 4:05 PM:

WELCOME AND OPENING REMARKS

4:05 to 4:45 PM:

INFORMATION CONTENT OF A PHOTON IN OPTICAL IMAGING, QUANTUM IMAGING, AND RADIOLOGY

Harrison H. Barrett

College of Optical Sciences, The Univ. of Arizona (USA);

Kyle J. Myers

Ctr. for Devices and Radiological Health, U.S. Food and Drug Administration (USA)

Abstract: A fundamental way of describing a quantum-limited imaging system is in terms of a Poisson random process in spatial, angular and wavelength variables. The mean of this random process is the spectral radiance. The principle of conservation of radiance then allows a full characterization of the noise in the image (conditional on viewing a specified object). Radiance can be defined in terms of geometrical optics, physical optics, or quantum optics as well as for x-rays or gamma-rays, so a unified treatment of noise in imaging can be developed. Combined with well-established theories for task-based assessment of image quality, these concepts allow a rigorous definition of the information content of a photon.

Biography: Dr. **Harrison Barrett** received degrees in physics from VPI, MIT, and Harvard, and he is a Regents Professor at the University of Arizona. His research is in the area of image science, and his book on that subject, coauthored with Kyle J. Myers, was awarded the J.W. Goodman Book Writing Award from OSA and SPIE in 2006. He was the 2011 recipient of the IEEE Medal for Innovations in Healthcare Technology and also the 2011 recipient of the SPIE Gold Medal of the Society. In 2014 he was elected to the National Academy of Engineering.

Biography: Dr. **Kyle J. Myers** received a bachelor's degree in mathematics and physics from Occidental College in 1980 and a Ph.D. in optical sciences from the Univ. of Arizona in 1985. Since 1987 she has worked for the Center for Devices and Radiological Health of the U.S. Food and Drug Administration, where she is currently the Director of the Division of Imaging and Applied Mathematics in the Office of Science and Engineering Laboratories. She is a fellow of the Optical Society (OSA), SPIE, AIMBE, and a member of the Medical Image Perception Society. Along with Harrison H. Barrett, she is the coauthor of "Foundations of Image Science," published by John Wiley and Sons in 2004 and winner of the First Biennial J.W. Goodman Book Writing Award from OSA and SPIE.

4:45 to 5:25 PM:

RECENT TRENDS IN OPTICAL COMPONENTS IN THE MOBILE INDUSTRY

Ung-Beom Lee

LG Innotek (Korea, Republic of)

Abstract: The mobile industry of today shows rapid growth through the innovation of optical components. Such innovation of optical components can be achieved by fundamental and systematic approach on innovation of material, design, and module package. Ultra-slim, ultra-light components have overcome the design limitations of mobile devices to produce multifunctional high-performance components, thereby turning our imagination into reality. In this presentation, we aim to show and share the development trends of mobile cameras and high-power, high-color, reproduction LEDs from an industry perspective.

Biography: **Ung-Beom Lee** is president and CEO of LG Innotek since 2012. He joined LG group in 1983, and in 2000 became executive director in Recording Media Operations of LG Electronics. He received his MBA from McGill Univ. in Canada in 2003. He moved and led PCB Operation of LG Electronics from 2002 until 2005, and in 2006 he led Production of Mobile Communication Operation in LG Electronics. He moved to LG Innotek in 2010 as an executive vice president and head of Parts and Materials Business.

5:25 to 6:05 PM:

OPTICAL DESIGN FOR CONSUMER PRODUCTS

Anurag Gupta

Google (USA)

Abstract: Engineers often focus the design parameters to meet certain well defined targets. Such approach assumes that the specifications they have are largely non-negotiable which is not always true and can result in sub optimal solutions or expensive multiple design iterations. A broader, product engineering focused, approach is needed to foster the most leveraged design. Optical engineering is somewhat unique considering a fragmented manufacturing base and limited understanding of optics in an engineering context in most teams and as a result, optics in a product is more vulnerable to changes. Understanding the product complexities that may impact the optical design can be quite useful.

Biography: **Anurag Gupta** heads the Optical Engineering Group for Google Glass at Mountain View. He received his PhD. from The University of Arizona in Tucson and has since worked on more than 50 optics related projects in industries ranging from toys to medical and defense. His professional interests include developing product centric approaches for optical design besides software and hardware tools for rapid design and implementation of optical systems integrated with their environment.

Organic Photonics + Electronics Plenary Session

Wednesday 20 August 2014, 10:30 AM - 12:15 PM
Convention Center, Room 6A

Session Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

10:30 to 11:00 AM:

MATERIALS AND DEVICES FOR BIORESORBABLE ELECTRONICS

John A. Rogers

Univ. of Illinois at Urbana-Champaign (USA)

Abstract: A remarkable feature of the modern integrated circuit is its ability to operate in a stable fashion, with almost perfect reliability. Recently developed classes of electronic materials create an opportunity to engineer the opposite outcome, in the form of devices that dissolve completely in water, with harmless end products. The enabled applications range from 'green' consumer electronics to bio-resorbable medical implants—none of which would be possible with technologies that exist today. This talk summarizes recent work on this physically 'transient' type of electronics, from basic advances in materials chemistry, to fundamental studies of dissolution reactions, to engineering development of complete sets of device components, sensors, and integrated systems. An 'electroceutical' bacteriocide designed for treatment of surgical site infections provides an application example.

Biography: Professor **John A. Rogers** obtained BA and BS degrees in chemistry and in physics from the University of Texas, Austin, in 1989. From MIT, he received SM degrees in physics and in chemistry in 1992 and the PhD degree in physical chemistry in 1995. From 1995 to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. He joined Bell Laboratories as a Member of Technical Staff in the Condensed Matter Physics Research Department in 1997, and served as Director of this department from the end of 2000 to 2002. He is currently Swanlund Chair Professor at University of Illinois at Urbana/Champaign, with a primary appointment in the Department of Materials Science and Engineering. He is also Director of the Seitz Materials Research Laboratory. Rogers' research includes fundamental and applied aspects of materials and patterning techniques for unusual electronic and photonic devices, with an emphasis on bio-integrated and bio-inspired systems. He has published more than 400 papers and is inventor on over 80 patents, more than 50 of which are licensed or in active use. Rogers is a Fellow of the IEEE, APS, MRS and AAAS, and he is a member of the National Academy of Engineering. His research has been recognized with many awards, including a MacArthur Fellowship in 2009, the Lemelson-MIT Prize in 2011 and the MRS Mid-Career Researcher Award in 2013.

11:00 to 11:30 AM:

ORGANIC ELECTRONIC BIO-DEVICES

Luisa Torsi

Univ. of Bari "Aldo Moro" (Italy)

Abstract: Bio-systems interfaced to an electronic device are presently one of the most challenging research activities that has relevance not only for fundamental studies but also for the development of highly performing bio-sensors. Indeed, electronic detection of biologically relevant species performed by means of disposable organic electronic devices has the potential to revolutionize the current approach to strip testing. To this end, completely novel approaches involving different organic field effect-transistor devices have been proposed worldwide. The specific features of the most relevant configurations as well as their performances in terms of device operation, selectivity, and sensitivity will be presented. Besides, these studies provide insights into biological relevant phenomena involving interfacial modifications that can be electronically detected.

Biography: **Luisa Torsi,** a physicist with a PhD in Chemistry, was post-doctoral fellow at Bell Labs. In 2010 she was awarded with the H. E. Merck prize this marking the first time the award is given to a woman. Principal scientific contributions are in the fields of advanced materials and electronic devices mostly for sensing applications.

11:30 to 11:45 AM:

ANNOUNCEMENT OF THE ORGANIC PHOTONICS + ELECTRONICS BEST STUDENT PAPER AWARD WINNER

Sponsored by

ALDRICH Materials Science Polyera

11:45 am to 12:15 PM:

CHARGE AND SPIN TRANSPORT PHYSICS OF ORGANIC SEMICONDUCTORS

Henning Sirringhaus

Cavendish Lab., Univ. of Cambridge (United Kingdom)

Abstract: Over recent years there has been tremendous progress in discovering new organic semiconductors that provide high charge carrier mobilities for both n-type and p-type device operation, good operational stability and other functionalities such as efficient electroluminescene, sensing or memory functions. These materials allow addressing an increasingly broad range of flexible and printed electronic applications based on controlled manufacturing of flexible plastic substrates by a combination of solution processing and direct printing. One of the sources of improvement in performance has been the versatility of organic chemistry to provide a broad range of new molecular structures and the ability to assemble these molecules into ordered structure with minimum degree of disorder. We will review recent insights into the device and charge transport physics of solution-processible small molecule as well as conjugated polymer organic semiconductors, with a particular focus on the microscopic processes that limit the field-effect mobility in these systems. We are also interested in understanding the spin transport physics of these materials and the relationship between molecular structure, microstructure and spin diffusion. Organic semiconductors may enable realisation of long spin relaxation times and long spin diffusion lengths due to the weak spin-orbit coupling in these carbon-based materials. We will present recent measurements of spin-transport in different molecular and polymeric semiconductors.

Biography: Prof. **Henning Sirringhaus,** FRS is the Hitachi Professor of Electron Device Physics at the Cavendish Laboratory and works on the charge transport, photo- and device physics of polymer and molecular semiconductors. He is co-founder of the spin-off companies, Plastic Logic and Eight-19 Ltd, commercializing organic transistor and organic solar cell technology, respectively.

SOCIAL, TECHNICAL, AND NETWORKING EVENTS.

- TECHNICAL
- INDUSTRY
- MEMBERSHIP
- SOCIAL NETWORKING
- STUDENT
- PROFESSIONAL DEVELOPMENT

Technical Events

POSTER SESSION: Optical Engineering + Applications

Monday 18 August 2014 · 5:30 PM - 7:30 PM
Convention Center, Exhibition Hall B1

Conference attendees are invited to attend the poster session on Monday evening. Come view the collection of Optical Engineering + Applications poster presentations. Enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, see page 281 for set-up instructions.

Illumination Technical Event

Monday 18 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Marina F

Chair: **Jake Jacobsen,** Synopsys, Inc. (USA)

Please join us for an evening of stimulating discussion. Since we last discussed this topic five years ago, solar energy production in the US has seen substantial growth. What is the state of solar technology and what is coming down the road? Join us for an evening of discussion of the current state of solar energy production and a look into the future. At the end of the planned event, time permitting, any member of the audience may present information within the broad field of illumination. Light refreshments will be served.

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS®

Lens Design Technical Event

Tuesday 19 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Marina D

Session Chair: **Rich Pfisterer,** Photon Engineering, LLC (USA)

"Let's Give 'Em Something to Talk About!"

Lens designers! Join us for our annual gathering to meet and discuss... lens design! Let's talk about what we're designing, how we're going about doing it (what materials, software, techniques, etc.), and which problems we're encountering. We'll also explore current technical and commercial trends in the marketplace. This year's invited speaker will be Josh Cobb from Corning. The title of his presentation is "Étendue and what you can Étendue with it." Illumination engineers use the étendue for numerous radiometry calculations and optical designers use the optical invariant as an aid to system design. This talk is intended to review the concepts and present a wide variety of examples that show tips, tricks, and back-of-the-envelope calculations that can put a different perspective on system design.

Josh Cobb has been designing, building, and testing optical systems for over 25 years. He has worked for IBM, Eastman Kodak, and currently is with Corning in Fairport, NY and is an Adjunct Professor of Optics at Monroe Community College. He is the co-author of "Light Action! Amazing Experiments with Optics," a children's book that has been in print for over 20 years. He is an inventor of over 60 issued patents and has a BS and MS in Optics from the Univ. of Rochester.

Cosponsored by: Photon ENGINEERING illuminating ideas

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS®

SPIE THANKS OUR SPONSORS

Conference Bag Insert

IDEX OPTICS & PHOTONICS MARKETPLACE

marketplace.idexco.com · Booth #331

AMERICAN ELEMENTS

www.americanelements.com

Exhibitor Lounge

physics today

www.physicstoday.org · Booth #713

Floor Plan Logo

TRIOPTICS

www.trioptics.com · Booth #528

Lanyards

TRIOPTICS

www.trioptics.com · Booth #528

Meter Board

Photon ENGINEERING *Illuminating Ideas*

www.photonengr.com · Booth #330

Featured Exhibitor

RMI

www.rmico.com · Booth #418

SUTTER INSTRUMENT

www.sutter.com · Booth #614

TRIOPTICS

www.trioptics.com · Booth #528

PROMOTIONAL PARTNERS

Electro Optics Magazine
IOP Publishing Ltd.
Laser Focus World
Nature Publishing Group
optics.org
Photonics Media
Photonics Online
Physics Today
Society of Vacuum Coaters, (SVC)
Solar Novus Today
The Optronics Company, Ltd.

Optomechanical/Instrument Technical Group Event

Tuesday 19 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Marina F

Session Chair: **Alson E. Hatheway,** Alson E. Hatheway Inc. (USA)

This is the annual West Coast meeting of the premier group of optomechanical engineers who design and analyze the world's most advanced optical instruments and systems. The gathering is open to all attendees of SPIE Optics + Photonics.

This year's speaker will be Tony Hull, Adjunct Professor of Astronomy at the University of New Mexico. Before joining the University he was Director and Program Manager at L-3Com for the fabrication of the James Webb Space Telescope primary mirror suite. His subject will be:

Spaceborne Telescopes: Primary mirror material selection drives architecture decisions which define cost and complexity

For competed missions, payload costs are often the discriminate of whether or not outstanding science can be selected to fly. Optical Telescope Assemblies (OTAs) encompass a significant fraction of the payload cost, and mirror aperture and stability are usually are key to the science merit. The selection of the primary mirror approach drives architecture decisions for the rest of the OTA and even payload. We look at the ways OTA architecture is affected by the PM selection, and specifically at the benefits of selecting a low expansion material, recognizing that this is not the only strategy. Recent advances in ZERODUR® lightweight fabrication make this low-expansion material relevant in situations where affordable, lightweight mirrors can enable the apertures needed for science merit. We hope our optomechanics community will identify further pivotal OTA design decisions which drive mission costs, and support dialog on increasing the affordability of going to space.

Following Tony Hull's presentation, the floor will be open for other agenda items and our traditional 'Problems and Solutions Workshop' session. Be prepared to present some challenges to the Group. Anyone wishing to put an item on the agenda should contact the Chair, Al Hatheway, at aeh@aehinc.com.

Penetrating Radiation Technical Event

Tuesday 19 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Balboa

Chair: **James E. Baciak,** Univ. of Florida (USA)

This event brings together technologists and scientists with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications. This year's speaker is Dr. Todd Hossbach from Pacific Northwest National Lab. His presentation will be Radiation Detector Development to Enable Ultra-Sensitive Measurements: How Basic and Applied Research Can Work Together.

Panel Discussion on the Care and Cleaning of Optics

Tuesday 19 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Marina E

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton,** Photonic Cleaning Technologies (USA); **Robert Sherman,** Applied Surface Technologies (USA); **Ray Williamson,** Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

Workshop on X-Ray Mirrors

Tuesday 19 August 2014 · 8:00 PM - 10:00 PM
Marriott Marquis, Cardiff

Chair: **Ali M. Khounsary,** X-ray Optics, Inc, (USA) and Illinois Institute of Technology (USA)

The X-ray Mirror Working Group provides an informal setting for the interested engineers and scientists to meet and discuss issues related to the design, analysis, cooling, fabrication, and metrology of x-ray mirrors. Topics for discussion can be e-mailed to the organizer, Dr. Ali Khounsary (amk@iit.edu), prior to the meeting.

POSTER SESSION: Nano, Solar, Organic Photonics + Electronics, and Illumination Engineering

Wednesday 20 August 2014 · 5:30 PM - 7:30 PM
Convention Center, Exhibition Hall B1

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the collection of posters within the topics of Nano, Solar, Organic Photonics + Electronics, and Illumination Engineering. Enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, see page 281 for set-up instructions.

Workshop on Software for Modeling X-ray Sources, Optics, and Scattering

Thursday 21 August 2014 · 2:10 PM - 3:10 PM
Convention Center, Room 6C

Chairs: **Manuel Sanchez del Rio,** European Synchrotron Radiation Facility (France); **Oleg Chubar,** Brookhaven National Lab. (USA)

This workshop will have a three-fold aim: i) show live demonstrations of the codes and developments presented in the Advances in Computational Methods for X-Ray Optics III conference; ii) summarize and discuss collaborations targeting to standardize and exchange data, models, and codes among different packages; iii) organize the development of a new Python-based software infrastructure allowing to perform virtual experiments by running different interconnected codes and libraries that simulate emission by relativistic particles, propagate the radiation through optics, model scattering on samples, and perform experimental data processing. Speakers to be announced. Discussion and summary will follow.

Panel Discussion on the Activities of International PV Module Quality Assurance Forum

Thursday 21 August 2014 · 3:45 PM - 4:30 PM
Convention Center, Room 18

Moderator: **Govind Ramu,** SunPower Corp. (USA)

Panelists: **John Wohlgemuth,** National Renewable Energy Lab. (USA); **Nancy Phillips,** 3M Co. (USA); **Michael Köhl,** Fraunhofer-Institut für Solare Energiesysteme (Germany); **Neelkanth G. Dhere,** Univ. of Central Florida (USA)

SPIE Press Room

SPIE registration area
Open daily 8:00 AM to close of registration

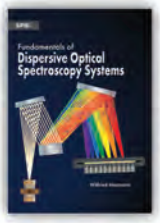
For registered press only. The press room provides meeting space, refreshments, access to exhibitor press releases, and Internet connections.

Press are urged to register before the meeting by emailing name, contact information, and name of publication to media@spie.org.

BROWSE THESE BOOKS AND MORE AT THE BOOKSTORE

Interferometry for Precision Measurement
Peter Langenbeck
Vol. TT94
SPIE Member $56
Nonmember $66

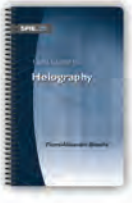
The Wonder of Nanotechnology: Quantum Optoelectronic Devices and Applications
Manijeh Razeghi, Leo Esaki, and Klaus von Klitzing
Vol. PM238
SPIE Member $123
Nonmember $145



Fundamentals of Dispersive Optical Spectroscopy Systems
Wilfred Neumann
Vol. PM242
SPIE Member $56
Nonmember $66

Field Guide to Displacement Measuring Interferometry
Jonathan D. Ellis
Vol. FG30
SPIE Member $36
Nonmember $42

Solid State Lasers: Tunable Sources and Passive Q-Switching Elements
Yehoshua Y. Kalisky
Vol. PM243
SPIE Member $47
Nonmember $55

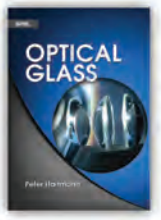


Field Guide to Holography
Pierre-Alexandre J. Blanche
Vol. FG31
SPIE Member $36
Nonmember $42

Strength Properties of Glass and Ceramics
John W. Pepi
Vol. PM244
SPIE Member $41
Nonmember $48

Fundamentals of Geometrical Optics
Virendra N. Majahan
Vol. PM245
SPIE Member $75
Nonmember $88

Pyroelectric Materials: Infrared Detectors, Particle Accelerators, and Energy Harvesters
Ashok K. Batra and Mohan D. Aggarwal
Vol. PM231
SPIE Member $56
Nonmember $66

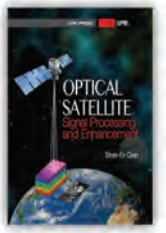


Optical Glass
Peter Hartmann
Vol. PM249
SPIE Member $53
Nonmember $62

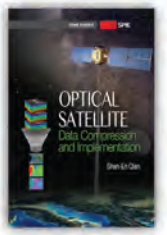
Free shipping when you order today:

Field Guide to Digital Micro-Optics
Bernard C. Kress
Vol. FG33
SPIE Member $36
Nonmember $42

Fiber Optic Sensors: Fundamentals and Applications
David A. Krohn
Vol. PM247
SPIE Member $73
Nonmember $86



Optical Satellite Signal Processing and Enhancement
Shen-En Qian
Vol. PM230
SPIE Member $89
Nonmember $105



Optical Satellite Data Compression and Implementation
Shen-En Qian
Vol. PM241
SPIE Member $78
Nonmember $92

Buy both and save 15% on the set:

Optical Satellite Signal Processing
Vol. PM910
SPIE Member $142; Nonmember $167

Visit the onsite Bookstore or order online today:
www.spie.org/books

SPIE.

Industry Events

Job Fair

Tuesday–Wednesday 19–20 August 2014 · 10:00 AM - 5:00 PM
Convention Center, Sails Pavilion

Whether you're looking for a better job, re-entering the workforce or just starting out, plan to visit the Job Fair at Optics + Photonics. Come prepared to discuss your skills and talents with industry leaders.

All SPIE services are free to individuals seeking employment.

Post your resume today! Visit the Career Center: www.SPIECareerCenter.org. More information: www.spie.org/OPJobFair

Getting Hired in 2014 and Beyond

Tuesday 19 August 2014 · 2:00 PM - 3:00 PM
Convention Center, Sails Pavilion, Industry Events Area

Join us for a panel discussion on careers in optics and photonics outside the academic world. Learn about the process of getting hired at tech-based companies and non-academic jobs directly from professionals in the optics and photonics sector.

More than Money? Salary, Satisfaction, and Workload in Optics and Photonics

Wednesday 20 August 2014 · 4:00 PM - 5:00 PM
Convention Center, Sails Pavilion, Industry Events Area

Moderator:

Adam Resnick, PhD, Marketing Analyst, SPIE

Panelists:

Maryellen Giger, PhD, A.N. Pritzker Professor of Radiology, the Committee on Medical Physics, and the College Vice-Chair for Basic Science Research, Department of Radiology, University of Chicago

Dr. James G. Grote, Principal Electronics Research Engineer, Air Force Research Laboratory

Bob Hainsey, PhD, Technology Strategist, SPIE

A lively round table discussion of compensation, satisfaction, and workload with leaders from industry and academia. Highlights from the SPIE 2014 Global Salary Report. Beverages and snacks provided.

Sponsored by **SPIE Career Center**

Industry Update Presentation

Thursday 21 August 2014 · 9:00 AM - 10:00 AM
Convention Center, Sail Pavilion

OPENING REMARKS

Philip Stahl, NASA Marshall Space Flight Center (USA), SPIE 2014 President

NATIONAL PHOTONICS INITIATIVE (NPI) UPDATE

Robert Lieberman, Intelligent Optical Systems (USA)

NPI—The National Photonics Initiative is a collaborative alliance among industry, academia and government seeking to raise awareness of photonics and drive US funding and investment. SPIE NPI Steering Committee member Robert Lieberman will provide an update on recent activities including the Department of Defense Request for Information regarding a photonics Institute for Manufacturing Innovation.

PHOTONICS INDUSTRY UPDATE: MEASURING THE MARKET

Stephen G. Anderson, SPIE (USA)

A new look at the worldwide marketplace for core photonics components is based on an in-depth year-long evaluation by a team of SPIE analysts of more than 3,000 companies that are active in the global optics and photonics industry. This presentation will showcase the results of this novel approach to assessing the photonics industry, which has yielded a unique profile of the firms that serve the optics and photonics marketplace and their impact on the global economy.

Membership Events

SPIE Fellows Luncheon

Tuesday 19 August 2014 · 12:00 PM - 1:30 PM
Marriott Marquis, Marina G

All SPIE Fellows are invited to join your colleagues for this SPIE-hosted luncheon. The new Optics and Photonics fellows will be introduced and receive their fellow plaques and pins. Please join us for this informal gathering and a chance to interact with other fellows. Fellows planning to attend are asked to RSVP to Brent Johnson, BrentJ@spie.org.

Annual General Meeting of the SPIE Corporation

The Society of Photo-Optical Instrumentation Engineers (SPIE)

Tuesday 19 August · 6:00 PM to 7:00 PM
Marriott Marquis, Marina E

Agenda

1. 2014 Election Results
2. Report on the "State of the Society"
3. Treasurer's Report
4. Q & A with SPIE Officers

This is the general business meeting of the Society. All SPIE members are welcome and encouraged to attend. This is your forum for expressing your ideas about the Society. Results of the 2014 election will be announced and the President and CEO will report on the "State of the Society." This meeting will be followed by the Members Reception. Both events are open to members only.

SPIE Members Reception

Tuesday 19 August 2014 · 7:00 PM - 8:30 PM
Marriott Marquis, Coronado Terrace

For SPIE Members Only. All SPIE Members are invited to this reception in their honor. Come relax and talk with your colleagues. Refreshments will be served. Please note: this reception is limited to SPIE Members only. Membership cards or invitations will be requested at the entrance. If you join SPIE onsite, please bring your registration receipt. Dress is casual or business attire. (Membership will be checked at the entrance for admission.)

SPIE Senior Member Breakfast

Wednesday 20 August 2014 · 8:00 AM - 9:00 AM
Marriott Marquis, Marina G

All SPIE Senior Members are invited to join your colleagues for this fourth annual SPIE-hosted buffet breakfast. Please join us for this informal gathering and a chance to interact with other Senior Members. Please plan to wear your yellow Senior Member ribbon issued from the registration area for entry into this event.

Social Networking Events

Optics Outreach Games

Sunday 17 August 2014 · 7:30 PM to 9:30 PM
Marriott Marquis, Marina D and E

View optics and photonics demonstrations from Student Chapters worldwide while enjoying refreshments and networking in a casual atmosphere. Students, relax and hang out with peers while engaging in friendly competitions and the ever-popular student social.

Check out demonstration videos from last year's Games!
www.SPIE.org/OutreachGames

Guest Hospitality Suite

Monday-Thursday, 18-21 August 2014 · 8:30 AM to 10:00 AM
Marriott Marquis, Suite #2518, North Tower

Guests of attendees are invited to meet, relax, and enjoy a cup of coffee and light breakfast in the SPIE Guest Hospitality Suite. This suite is for guests of attendees only. The hotel concierge will be available during a portion of this time to answer travel, shopping, and tourist questions.

Women in Optics Presentation and Reception

Monday 18 August 2014 · 5:00 PM - 6:30 PM
Marriott Marquis, Marina F

Speaker: Prof. **Ana Maria Cetto,** Instituto de Fisica, Universidad Nacional Autónoma de México

Light Matters: The making of the Museum of Light, and preparing for the International Year of Light 2015

Join us for an early evening of networking and inspiration. The presentation will be followed by a reception, offering the opportunity to meet the speaker and connect with your peers. Light refreshments will be served.

All-Conference Welcome Reception and Star Party

Monday 18 August 2014 · 7:00 PM - 8:30 PM
Convention Center, Upper Level Terrace

All registered conference attendees are invited to relax, socialize, and enjoy refreshments. Please remember to wear your SPIE registration badge (required). Dress is casual. Guest badge may be purchased during the registration process or at the registration desk on site.

The International Year of Light 2015 will celebrate Light for the Future. Let's start early and celebrate the role light plays in our fascination with the worlds beyond our planet. Through the physics of telescopes and optics and photonics technologies, we can peer into the past—or first—light.

Stay out a little later and see the magic of the San Diego sky from 7:30 to 9:00 pm. Volunteers from the San Diego Astronomy Club will set up a variety of telescopes. It's open to all registered attendees who want to view the wonders of the night sky, learn about different telescopes, and share their interest in astronomy. Bring a jacket.

Student Chapter Exhibit Mixer

Tuesday 19 August 2014 · 3:30 PM - 5:00 PM
Convention Center, Sails Pavilion, Student Poster Area

Join us for refreshments and a late-afternoon mixer in the Student Chapter section of the Exhibition Hall. Meet our amazing students and learn about the innovative activities of some of the best and brightest Student Chapters across the globe!

Speed Networking Social

Wednesday 20 August 2014 · 5:00 PM - 6:30 PM
Hilton San Diego Bayfront Hotel, Fox Sports Grill

It is the next generation of networking. Add a new contact to your network every three minutes while enjoying appetizers at an off-site venue. Bring plenty of business cards, practice your pitch, and prepare to expand your network.

SPIE 2014 Annual Awards Banquet

Wednesday 20 August 2014 · 7:30 PM
Marriott Marquis, Marina Ballrooms

SPIE President **H. Philip Stahl** will preside over the 2014 Awards Banquet that will include the presentation of the 2014 Society awards.

Enjoy an evening of honoring colleagues, socializing with friends, and laughing along with the "technically funny" Don McMillan!

Tickets for the banquet may be ordered on the registration form or purchased on site at the SPIE Cashier Desk until 12 noon on Tuesday 19 August, space permitting. Cost $90.

SPIE Career Center Job Fair

Meet. Discuss. Impress.

Talk with representatives from companies currently looking to hire.

Job Fair is Two Days Only

Tuesday 19 August · 10:00 am to 5:00 pm
Wednesday 20 August · 10:00 am to 5:00 pm
Convention Center, Sails Pavilion

More than Money? Salary, Satisfaction, and Workload in Optics and Photonics

Wednesday 20 August 2014 · 4:00 PM - 5:00 PM
Convention Center, Sails Pavilion, Industry Events Area

A lively round table discussion of compensation, satisfaction, and workload with leaders from industry and academia. Highlights from the SPIE 2014 Global Salary Report. Beverages and snacks provided.

Sponsored by SPIE Career Center

Job Fair
Participating Companies

ABRISA TECHNOLOGIES
APPLE
COMPOUND PHOTONICS
GoPro Be a HERO.
L3 communications
LOGOS Technologies
Microsoft
Newport Experience | Solutions
THORLABS

Job Advertising and Exhibitor Opportunities Available

CONTACT: Sara Liebert for more information.
Call 360.685.5600 or email JobSales@spie.org

SPIE. CAREER CENTER
Booth # 743
www.SPIECareerCenter.org

Student Events

Student Chapter Leadership Workshop

Saturday 16 August 2014 · 8:00 AM - 5:00 PM
Marriott Marquis, Marina D and E

Open to SPIE Student Chapter Members

Participate in the SPIE Student Chapter Leadership Workshop with 200 other student chapter leaders from around the world! This all day event features a professional development session as well as an interactive student chapter best practices discussion with student services staff and chapter alumni facilitators.

Please email students@spie.org for more information.

Lunch with the Experts - A Student Networking Event

Monday 18 August 2014 · 12:30 PM - 1:30 PM
Marriott Marquis, Marina D and E

Open to Student Attendees. Enjoy a casual meal with colleagues at this engaging networking opportunity. This event features experts willing to share their experience and wisdom on career paths in optics and photonics and an awards presentation for Newport travel grant winners and SPIE scholarships. Seating is limited and will be granted on a first-come, first-served basis.

Sponsored by: **Newport**

NEWPORT RESEARCH EXCELLENCE TRAVEL AWARDS

The Newport Research Excellence Travel Awards Program provides financial support for university students to attend the two largest SPIE meetings in order to present their research. These travel grants are open to any student who has an accepted paper for presentation at Photonics West or Optics + Photonics. Recipients will be selected based on both the quality of the original research described in the submitted paper(s) and financial need.

For application information for this and other SPIE travel grants visit Scholarships and Grants online at spie.org/scholarships

Learn more about Newport at www.Newport.com

Student Chapter Info Session

Monday 18 August 2014 · 2:30 PM - 3:00 PM
Marriott Marquis, Encinitas

Interested in starting a Student Chapter or just want to learn more about the program and its benefits? Get your questions answered at this informal information session hosted by SPIE Student Services.

Student Chapter Poster Exhibit

Tuesday 19 August 2014 · 10:00 AM - 5:00 PM
Convention Center, Sails Pavilion, Student Poster Area

Discover the research of some of the brightest SPIE student groups and the programs they have developed to increase science awareness and literacy in their regions.

Professional Development Events

Professional Skills Workshop

Sunday 17 August 2014 · 9:00 AM - 12:30 PM
Marriott Marquis, Marina D and E

Open to all Students and Early Career Professionals. Join us for an exciting panel discussion and break-out sessions focusing on education and professional skills development. Come ready to share your thoughts and ideas!

9:00 AM - 10:15 AM

Career Choices Panel Discussion

What are the critical career choices and decisions that face new graduates in optics and photonics? What are some strategies for navigating the transition from student to professional? Get a perspective from our panelists in this wide-ranging discussion.

10:30 AM - 11:30 PM

Working efficiently during your PhD

Jean-luc Doumont, Principiae

Unless you know how to squeeze more than 24 hours in a day, you are probably open to advice on how to achieve more in the time you have. Rather than adding to the long lists of tips already available elsewhere, this lecture proposes a simple but solid framework to help you decide what is worth doing (and what is not). It then discusses how to manage your time and space in order to actually do it.

10:30 AM - 11:30 AM

Starting Your Own Company: an entrepreneurial case study of Laser Tissue Fusion

Michael Larson, El Pomar Chair of Engineering and Innovation, University of Colorado

Professor Michael Larson has founded four companies. His most recent start-up is based on medical photonics research he developed at, and then licensed from, his university. Michael will discuss the joys of: designing products, securing capital, working with vendors, suing, being sued, marketing, etc., to help you decided if you would like to become your own boss and a captain of industry.

11:30 AM - 12:30 PM

Scientific Publishing

David Andrews, Univ. of East Anglia

This talk examines the procedures involved in scientific publishing. Focusing on the most important considerations for the author, the aim is to help identify strategies for success and high impact, by reflecting on the perspectives of the journal editor and the reviewers involved at each stage in the opinion-forming and decision processes.

11:30 AM - 12:30 PM

Science Communication Illuminated

Dianna Cowern, Univ. of San Diego

How to craft an effective educational science video to reach a broad audience. Uncover the creative process from idea and design to dissemination

PRESENT TO THE ROOM, PUBLISH TO THE WORLD.

Publish your work in SPIE Proceedings.
Be found. Be cited. Be remembered.

In 2013, SPIE Proceedings had 6.4 million page views and 2.1 million downloads from around the world.

www.spie.org/proceedings

SPIE. Proceedings

How to Persuade Others

Sunday 17 August 2014 · 1:30 PM - 5:00 PM
Marriott Marquis, Balboa

Being able to persuade others is an essential skill for a successful career: we must convince employers to hire us, persuade our boss to let us start a project, or get our coworkers to help us out for a given job. This workshop shows how to use personal/organizational power, how to deploy tactics, and how to harness social influences so we get other people to accede more easily to our requests.

Facilitator: **Jean-luc Doumont**

International Year of Light Regional Activities Panel Discussion

Monday 18 August 2014 · 1:30 PM - 2:30 PM
Marriott Marquis, Marina D and E

Learn about activities planned to celebrate the International Year of Light 2015 (IYL) around the world at this informative panel discussion. After a global overview, regional leaders from Australia, Mexico, Taiwan, and India will discuss events in their area, followed by a time for audience questions.

Krisinda Plenkovich (Moderator), is the Director for Education and Community Services at SPIE. In addition to leading SPIE's International Year of Light activities, she is national node lead and serves on the IYL Steering Committee.

Halina Rubinsztein-Dunlop, is a Councillor for the Australian Optical Society. Her research is in quantum atom optics, optical micromanipulation and Biophotonics. She is currently Director of the Quantum Science Laboratory, School of Mathematics and Physics at the University of Queensland. She is also a program manager of one of the scientific programs of the Australian Research Council Centre of Excellence for Engineered Quantum Systems.

Cristina Solano is the Outreach Activities Coordinator for the Centro de Investigaciones en Optica (CIO) where she established the Center's Science Museum and leads the Science Club for kids 5 to 15. She also helps organize the Women in Science Symposia and is a founding member of the Academia Mexicana de Óptica (AMO)

Ching-Cherng Sun, is the Director of the Optical Sciences Center at National Central University and the Chair Professor for the Department of Optics and Photonics. He serves as the Vice Chair of the Taiwan Photonics Society, Director of Supervisor of Taiwan Information Storage Industry Association, and as a Director of Taiwan Illumination Society.

Rajib Chakraborty, is an Associate Professor in the Department of Applied Optics & Photonics at Calcutta University specializing in integrated optics, micro photonic device fabrication, fiber optic sensors, nanophotonics, and surface modification. He is an SPIE member and serves at Treasurer for the Optical Society of India.

Career Advancement through SPIE Involvement

Tuesday 19 August 2014 · 1:00 PM - 2:00 PM
Convention Center, Sails Pavilion

Get plugged in to the SPIE community. SPIE has volunteer opportunities at all levels of the organization. Come to this informal session to learn what opportunities best match your interests and career plans.

Courses and Workships

These Workshops are free to Students: WS897, WS908, WS1059.

Half price for Students: WS1142, WS1141, WS1115, and all Courses.

See all Course and Workshop descriptions and register onsite at the registration desk.

E.
EXHIBITION

Visit the Exhibition

Make time for the Free Exhibition showcasing the newest products, latest innovations, and cutting-edge technologies.

TECHNOLOGIES

- Optical components
- Detectors, sensors, and cameras
- Lasers and accessories
- Computer hardware and software
- Imaging equipment
- Test and analysis equipment
- Optical fabrication and design services
- Materials and chemicals
- Lenses
- Fiber optics
- Electronics and signal-analysis equipment
- Displays
- Positioning systems
- Vibration-isolation equipment

JOB FAIR

Sponsored by SPIE Career Center

Whether you're looking for a better job, re-entering the workforce or just starting out, plan to visit the Job Fair in the Exhibition Hall. Come prepared to discuss your skills and talents with our industry leaders.

EXHIBITION HOURS

Tuesday 19 August · 10:00 am to 5:00 pm
Wednesday 20 August · 10:00 am to 5:00 pm
Thursday 21 August · 10:00 am to 2:00 pm

San Diego Convention Center
Sails Pavilion, 2nd Level
San Diego, California, USA

See these companies:

As of 7/16/14

4D Technology
Abet Technologies, Inc.
AccuCoat Inc.
Accumold
ACS Publications
ADIT Electron Tubes
AdLOptica Optical Systems GmbH
AdTech Ceramics
Advanced Abrasives Corporation
Aerotech, Inc.
Agilent Technologies
AIP Publishing
ALIO Industries
AMETEK-Taylor Hobson & Luphos
Andover Corporation
Applied Surface Technologies
ASE Optics, LLC.
Asphera Incorporated
attocube systems Inc.
Avantes
B&W Tek, Inc.
BCC Research
Berliner Glas KGaA Herbert Kubatz GmbH & Co.
Boulder Nonlinear Systems
Breault Research Organization, Inc
Chroma Technology
Clemex Technologies
CoorsTek Technical Ceramics
CRC Press
CytoViva, Inc.
DataRay Inc.
Deposition Sciences, Inc.
Diamond USA
Diateq Labs, LLC
Diverse Optics Inc.
Edmund Optics
Electro Optics Magazine
Element Six
Elite Engineering Corp.
Empire West, Inc.
Energetiq Technology, Inc.
Epner Technology Inc.
ESDI
Excillum AB
Federal Laboratory Consortium
Fianium
Fiberguide Industries
Firebird Sensors, Inc.
FJW Optical Systems, Inc.
Fotofab
Fresnel Technologies Inc.
General Ruby & Sapphire Co.
GPD Optoelectronics Corp.
G-S Plastic Optics
Gulf Photonics, Inc.
Hamamatsu Corporation

Heidelberg Instruments Inc.
Hellma USA
Heraeus Quartz America LLC
High Speed Interconnects
Hinds Instruments, Inc.
HIWIN Corp.
HORIBA Scientific
IDEX Optics & Photonics Marketplace
Impetux
IOP Publishing
iOptics
Isuzu Glass, Inc.
J.A. Woollam Co., Inc.
JENOPTIK Optical Systems
JTEC Corporation
Kaufman & Robinson
Kyocera America, Inc.
Lake Shore Cryotronics
Lambda Research Corporation
Laser Focus World
Laser Quantum Inc
Mad City Labs., Inc.
Market Tech
MaxEmil Photonics Corporation
Meadowlark Optics, Inc.
Micro Laser Systems, Inc.
Midwest Optical Systems
Mildex, Inc.
Mindrum Precision
Minus K Technology
MOXTEK, Inc.
MPNICS Co. Ltd.
National Aperture, Inc.
National Instrument Technology Research Center
National Reconnaissance Office
Natsume Optical Corp. JAPAN
Nature Publishing Group
Navitar
Newport Corporation
Newport Thin Film Laboratory
NiPro Optics, Inc.
NKT Photonics Inc.
nPoint, Inc.
Ocean Optics, Inc.
Ohara Corporation
Ontar Corporation
Optical Perspectives Group, LLC
Optical Support, Inc.
Optics Technology, Inc.
optics.org
Optiforms Inc
Optikos Corporation
Optimax
OptiPro Systems
OptiWorks, Inc.
OptoSigma Corporation
OSELA
Otto Trading Inc.
OZ Optics Ltd.
PerkinElmer
PHASICS Corp.
Photon Engineering LLC
Photonic Cleaning Technologies
Photonics Media
Photonics Online
Physics Today
PI
Piezosystem Jena
PIXELTEQ
Precision Asphere, Inc.
Precision Glass & Optics
Precision Optical
Pure Photonics
Quartus Engineering Inc.
Rocky Mountain Instrument Co. (RMI)
RPMC Lasers, Inc.
SAFINA Materials, Inc.
Schrödinger
Sensors Unlimited - UTC Aerospace Systems
Sierra Precision Optics
Silicon Quest International
Siskiyou Corporation
Society of Vacuum Coaters
Special Optics, A Navitar Company
Spectral Instruments
Spectrogon US, Inc.

SPIE Career Center
Stanford Research Systems
StellarNet, Inc.
Surface Optics Corporation
Sutter Instrument
SwissOptic AG
Synopsys, Inc.
Syntec Optics
TDK-Lambda Americas-HP Division
tec 5 usa
TECNISCO, LTD.
The Optronics Co., Ltd.
Thermo Scientific - CIDTEC
Thorlabs
Topsil Semiconductor Materials A/S
TRIOPTICS GmbH
TwinStar Optics
University of Arizona, College of Optical Sciences
University of California, Irvine Extension
Vincent Associates
Vital Materials Co., Limited
Volpi
Wordingham Technologies
Xenics
Z & Z Optoelectronics Tech. Co., Ltd.
Z Microsystems
ZC Optoelectronic Technologies, Ltd.
Zemax, LLC
Zurich Instruments AG
Zygo Corporation

Contact SPIE Sales representative Teresa Roles-Meier
Teresar@spie.org

SPIE Gold Medal 2014

Rutgers' James Harrington

SPIE Gold Medal recipient honored for pioneering research in fiber optics and IR optical materials.

James Harrington's 30 years of pioneering R&D in specialty fiber optics and IR optical materials has been difficult and distinguished, but often unrecognized, according to SPIE Fellow M. J. Soileau, vice president of research and commercialization at the University of Central Florida (USA).

Harrington's work has led to the development of IR transmissive fiber optics and similar applications in spectroscopy, laser power delivery, medicine, chemical and thermal sensing, and defense. The hollow-glass waveguides (HGW) he developed more than a decade ago with students at the Rutgers University Laboratory for the Development of Specialty Fiber Optics (USA) are one of the university's most actively licensed technologies.

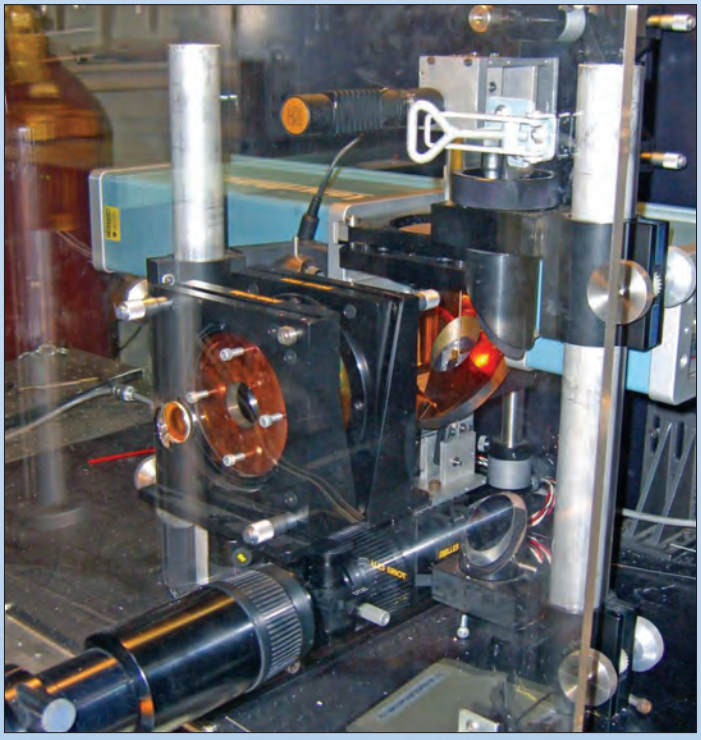
In recognition of his innovative work, Harrington will receive the 2014 SPIE Gold Medal at SPIE Optics + Photonics in August.

Harrington, an SPIE Fellow and the 2002 SPIE president, is also being honored for growing single-crystal sapphire fibers using a laser-heated pedestal and for developing diffusing-tip silica fibers for photodynamic therapy and prostate surgery and IR fibers for use in military-warning receivers.

Sapphire fiber.

The hollow-glass waveguide as it appears within the femtosecond laser amplifier system.

Image courtesy of the University of Colorado and NSF.



Rutgers' LHPG System

Harrington's work "has been a major factor in the successful application of infrared lasers to medicine and national defense," Soileau notes.

The HGWs are a perfect example of that. An attractive alternative to other solid-core IR fibers, they have a relatively simple structure and potential low cost. A key feature of HGWs is their ability to transmit wavelengths well beyond 20 μm and their air core, which allows for high-power laser delivery.

HGWs were originally intended for the delivery of CO_2 laser radiation in laser surgery, but they have found use as fiber links in spectroscopic and thermometric applications, such as the identification of chemical species and the measurement of temperature radiation.

SAFEGUARDING DUAL-USE TECHNOLOGIES

In 2005, Harrington received a Jefferson Science Fellowship from the US State Department and worked for one year as a science adviser in the Bureau of International Security and Nonproliferation. There he assisted in establishing controls for dual-use technologies such as lasers and detectors, which are used in both military and commercial goods.

In an interview with *Rutgers Magazine*, Harrington pointed out that laser-equipped machines that carve contact lenses could, with slight modifications, be used to shape missile parts.

"Before licensing these kinds of technologies for export, the government needs to ensure safeguards to block such modifications," he said.

Other technologies Harrington reviewed for the State Department included photodetectors, such as those used in night-vision cameras, and superconductors used in scientific instrumentation and high-energy physics research.

After returning to Rutgers, Harrington remained a State Department consultant for another six years, as stipulated by the fellowship program.

SERVICE TO SPIE, IR COMMUNITY

Over the years, Harrington has served in many SPIE leadership roles, including on the Board of Directors; the Ethics Committee; and the Publications and the Engineering, Science, and Technology Policy (ESTeP) committees, which he chaired for several years.

Harrington has also served as a SPIE course instructor, SPIE Student Chapter adviser, and editor for the SPIE Press Tutorial Text series.

"Jim has a great understanding of SPIE that has developed during his many years of service and his views always reflect a rational and well-thought-out perspective," says SPIE Fellow and Board Member John Greivenkamp of the University of Arizona (USA). "Jim has had significant impact on SPIE and this impact continues even though it has been a few years since his term as SPIE president."

In the early 1990s, Harrington became an SPIE representative to the International Commission for Optics (ICO). In 2008, the same year he received the 2008 SPIE Directors' Award, he was elected treasurer of the ICO, a position he maintains today.

In the 1980s, Harrington helped organize the first conference on IR fiber optics at an SPIE meeting in California (USA). The conference continues today, having morphed into "Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications" at Photonics West.

"I will always remember the warm welcome and support that we received from SPIE," he says. "And it is still true after all these years." ■

–Karen Thomas, SPIE staff.

Nominate a Colleague

SPIE presents several annual awards that recognize individual and team technical accomplishments in optics and photonics and service to the Society.

Nominations may be made through 1 October and remain active for three years from the submission date, except for the SPIE Early Career Achievement Award and the Goodman Book Writing Award.

See www.spie.org/awards for details.

Nominations must be accompanied by:

- Nomination form
- Citation stating the accomplishments of nominee
- Description of the significant aspects of nominee's career
- Curriculum vitae listing educational background, positions held, publications, awards, honors, activities, and offices held within SPIE
- At least two letters of reference, not from the nominator

Annual awards

Pramod Rastogi

DENNIS GABOR AWARD

SPIE Fellow Pramod Rastogi of the Federal Institute of Technology (ETH Zürich) in Switzerland received the 2014 Dennis Gabor Award at SPIE Photonics Europe in April in recognition of his outstanding accomplishments in diffractive wavefront technologies.

Rastogi was honored for his groundbreaking research in the development of high-resolution and multi-component parametric phase formulation methods for the simultaneous estimation of multiple phases and their derivatives from holographic interference patterns.

"I consider Rastogi one of the undisputed leaders in the field of holography and optical metrology," said SPIE Fellow Pietro Ferraro of the Istituto Nazionale di Ottica (Italy).

Rastogi has served as symposium, conference, and session chair at SPIE events, and he authored an extensive trilogy dedicated to optics in Switzerland in three 1995 issues of the SPIE journal *Optical Engineering*. He is also co-author of the 1996 SPIE Milestone Series book, *Selected Papers on Electronic Speckle Pattern Interferometry,* and has edited several notable books on optical metrology, including holography.

"The numerous books authored/edited by Professor Rastogi will influence the future development of optical metrology techniques," said SPIE Fellow Mahendra Kothiyal of the Indian Institute of Technology, Madras.

His commitment to science and technology in building bridges at the institutional and international levels is reflected in the active role he played in laying groundwork for Switzerland's collaboration with the Indian institutions of science and technology and serving as scientific adviser in a delegation accompanying the Swiss president's 2003 visit to India. ■

SPIE President H. Philip Stahl (left) presents the Dennis Gabor Award to Pramod Rastogi.

Jeff Squier

HAROLD E. EDGERTON AWARD

SPIE member Jeff Squier of the Colorado School of Mines (USA) is the recipient of the 2014 Harold E. Edgerton Award in recognition of his seminal contributions to femtosecond lasers and amplifiers, laser filamentation, ultrafast spectroscopy, femtosecond micromachining, ophthalmic procedures with ultrafast lasers, and high-speed nonlinear optical microscopy.

"Working with Jeff was like watching an optics magician work miracles even though we knew it was based on his rigorous training in femtosecond-laser technology, combined with keen intelligence and a driving curiosity to explore new frontiers in optics," said Paul Wiseman of McGill University (Canada), who worked with Squier at University of California, San Diego (USA). "Jeff is not just a brilliant scientist, but also a very supportive mentor who really cared for the people who worked for him."

His scientific achievements include demonstrating the first ti:sapphire-based regenerative amplifier for high-energy, ultrashort-pulse generation at the University of Rochester (USA). His work at UC San Diego featured the first demonstration of time-resolved x-ray diffraction using a femtosecond-laser-produced plasma source and pioneering studies of multiphoton microscopy for bioimaging. Squier also made significant contributions to nonlinear optical imaging by introducing a method to simultaneously capture nonlinear optical images from multiple depths.

Squier served on the program committee for the Commercial and Biomedical Applications of Ultrafast Lasers conference at SPIE Photonics West for several years. He has also served on the SPIE Awards Committee and has been published in the SPIE *Journal of Biomedical Optics.* ■

Arizona student wins Kidger scholarship

SPIE member Brian Wheelwright will receive the 2014 Michael Kidger Memorial Scholarship in Optical Design.

Wheelwright is a third-year PhD student at the College of Optical Sciences, University of Arizona (USA), and a graduate research associate in the Steward Observatory Solar Lab, which performs research in the field of concentrating photovoltaics (CPV).

This scholarship is supported by the Michael Kidger Memorial Scholarship Fund with additional support in 2014 from Qioptiq, in memory of optical designer David Lingwood.

Matthew 'Chuck' Rimmer

A.E. CONRADY AWARD

SPIE member Matthew "Chuck" Rimmer, retired chief scientist with Optical Research Associates (now Synopsys) (USA), is the recipient of the 2014 A.E. Conrady Award in recognition of his contributions to optical design algorithm development, including his work in the area of wavefront differential tolerancing.

Rimmer has played a central role in the development of optical-design software for 50 years, said SPIE Fellow David Williamson of Nikon Research Corp. (USA). "His work permeates the Code V optical design program, which is widely considered to be the most accurate and powerful commercial software."

Rimmer has been an influential theoretician and algorithm developer for optical design and analysis software since the beginning of computer-aided simulation. He is best known for his clarification and programming in Fortran the fifth-order transverse aberration coefficients of Buchdahl, which have since become the basis for computing the wave-aberration coefficients of H.H. Hopkins.

Rimmer was a key resource for the optical design and analysis tools in Itek's CORONA program, although much of his work at Itek was unpublished. His most widely recognized contributions to the field have been through Synopsys' Code V software, including modulation-transfer-function (MTF) optimization and tolerancing features, computer-aided alignment, relative illumination calculations, raytracing through inhomogeneous media, and partially coherent imaging.

"Chuck was always so clever and fast at these developments and so modest that he never received the recognition he deserved," said SPIE Fellow James Wyant of University of Arizona (USA). "He deserves an award such as the SPIE Conrady Award."

Rimmer has taught student courses at SPIE events, including Optical MEMS for Lightwave Networks. ■

James Bock

GEORGE W. GODDARD AWARD

James Bock, a principal scientist at NASA's Jet Propulsion Laboratory and a professor of physics at the California Institute of Technology (USA), is the 2014 recipient of the SPIE George W. Goddard Award in recognition of his development of sensitive bolometer arrays for studies of distant, dusty galaxies and cosmic microwave background radiation.

The instruments have been used on the Spectral and Photometric Imaging Receiver (SPIRE) on the Herschel Space Telescope, on the High Frequency Instrument (HFI) on the Planck Surveyor spacecraft, and a radiotelescope at the South Pole.

Measurements from the Background Imaging of Cosmic Extragalactic Polarization 2 (BICEP2) at the South Pole led to NASA's announcement in March that it had detected the earliest signals from the Big Bang, telltale patterns of gravitational waves in the primordial microwave radiation.

"Although the field of astronomical instrumentation development is full of brilliant minds, I can think of no one more deserving of this award than Professor Bock," said Jason Glenn of the Center for Astrophysics and Space Astronomy at University of Colorado at Boulder (USA). "He has led the development of a generation of detectors for submillimeter and millimeter astronomy that have led to fundamental cosmological measurements, with numerous spinoffs into other areas of astrophysics."

Bock developed and refined the "spider-web bolometer," a sensitive detector used in the millimeter-wave through far-infrared wavelength bands.

"The precise measurements of the structure of the cosmic microwave background, which Jamie's spider-web bolometers have made possible, have been instrumental in ushering in a new era" of cosmology, said Michael Werner of JPL ■

Georgia Tech researcher named Guenther Fellow

Georgia Institute of Technology researcher and science education advocate Ariel Marshall has been selected as the 2014-2015 Arthur H. Guenther Congressional Fellow.

Marshall will serve a one-year term working as a special legislative assistant on the staff of a US congressional office or committee in Washington, DC.

Marshall, who expects to receive her PhD in chemistry this summer, focuses her research on the structural, electronic, and optical properties of organic, conjugated, small-molecule and polymer systems with promising applications in electronics, photonics, and photovoltaics.

In 2013, she examined policies pertaining to renewable energy and education in science, technology, engineering, and math (STEM) and received the Graduate Certificate of Public Policy from the School of Public Policy at Georgia Tech.

As a Guenther Congressional Fellow, Marshall said she hopes to work on issues pertaining to renewable energy and education.

SPIE and OSA sponsor the fellowship program to bring science and engineering perspectives to Congress.

KINGSLAKE MEDAL AWARDED FOR *OPTICAL ENGINEERING* PAPER ON NEW TUNABLE MICROLENS

APPLICATIONS IN ARTIFICIAL MUSCLES, SCIENTIFIC AND INDUSTRIAL APPLICATIONS

Wei Zhang of the National University of Singapore and **Hans Zappe** and **Andreas Seifert** of the University of Freiburg have been selected as the 2013 winners of the Rudolf Kingslake Medal and Prize for their paper titled "Polyacrylate membranes for tunable liquid-filled microlenses." The Kingslake Medal is awarded annually to the most noteworthy original paper in *Optical Engineering,* published by SPIE, the international society for optics and photonics, and includes a $2,000 honorarium.

The winning paper, published in the April 2013 issue of *Optical Engineering,* details a new, simplified process for fabrication of tunable liquid-filled lenses using polyacrylate as a new membrane material. The new process provides a useful approach for achieving stable and predictable focal properties, researchers said. Potential applications are in artificial muscles, solid-state linear actuators for scientific or industrial applications, or other applications in which large deformations are needed.

Tomasz Tkaczyk, chair of the Kingslake Award committee, said the committee members selected the paper because it is a comprehensive study of the properties of the proposed material along with a discussion of the long-term dependencies of mechanical and chemical properties on system performance, which together create a foundation to develop a new class of tunable components. "The authors' findings can be used by other designers of active optical systems to manufacture robust and dependable active optical devices," Tkaczyk said.

Wei Zhang studied mechanical engineering at Northwestern Polytechnical University in China, where she finished her master's degree on the design of a microscope for testing microfluidics. In 2008, she joined Dr. Zappe's group in the Micro-Optics Lab at the University of Freiburg, researching tunable microlens and imaging systems, where she completed her PhD. She recently became a postdoctoral fellow at the National University of Singapore.

Hans Zappe is professor of micro-optics and associate dean of engineering in the Department of Microsystems Engineering at the University of Freiburg. He earned his bachelor's and master's degrees at the Massachusetts Institute of Technology and his PhD from the University of California, Berkeley, all in electrical engineering. After pursuing research activities in electronics, integrated optics, and semiconductor lasers at IBM, the Fraunhofer Institute for Applied Solid State Physics, and the Centre Suisse d'Electronique et de Microtechnique, he joined the University of Freiburg in 2000. His current research interests focus on tunable micro-optics, optical microsystems for medical applications, and novel nano-optics.

Andreas Seifert received his PhD in physics from the University of Freiburg, and subsequently worked at Carl Zeiss in Oberkochen, managing projects in EUV-lithography and being responsible for scientific optical components, such as synchrotron and space optics. Since 2007 he has been group leader in the Department of Microsystems Engineering at the University of Freiburg. His current research topics are tunable micro-optics and micro-optical systems for biomedical applications. ■

APPLY NOW

PRISM AWARDS 2015

Call for Entries

PrismAwards.org

Participate in an international competition that recognizes cutting-edge products that break conventional ideas, solve problems, and improve life through photonics.

Apply online by 10 October 2014: PrismAwards.org

Cristina Solano

SPIE EDUCATOR AWARD

SPIE Senior Member Cristina Solano of Centro de Investigaciones en Optica (CIO) in Mexico is the recipient of the 2014 SPIE Educator Award in recognition of outstanding contributions in optics education and outreach.

"Cristina has truly championed reaching out to children and teenagers through science by organizing workshops, lectures, editing books, and many other volunteer activities," said Marta de la Fuente, an SPIE Senior Member and member of the SPIE Scholarship Committee. "This selfless work personifies the dedicated scientist/educator who gives back to the community."

Solano has held several roles at CIO and was responsible for the creation of the center's science museum in 2007. She is currently outreach activities coordinator and leads the center's Science Club for kids aged 5 to 15. The club's workshops has expanded to rural public schools in Mexico and last year reached 3000 students ages 10-12.

At the college level, Solano has directed five PhD theses and dozens of master's and undergraduate students in their research work.

Solano has served on the SPIE Education Committee, Scholarship Committee, and subcommittees for SPIE Education Outreach Grants and Senior Member election. She is a program committee member for the Optics Education and Outreach conference at SPIE Optics + Photonics 2014 and has judged several SPIE student events, including the SPIE Optics Outreach Games.

"Cristina cares deeply about photonics education, and I've seen it most in her dedication to photonics outreach to bring more young people into our field," said SPIE Senior Member Marc Nantel, a former chair of the SPIE Education Committee. ■

Jeremy Munday

SPIE EARLY CAREER ACHIEVEMENT AWARD

Jeremy Munday, an assistant professor at the University of Maryland (USA), is the recipient of the 2014 Early Career Achievement Award in recognition of his innovative experimental and theoretical work on photonic engineering for solar-energy devices and Casimir forces.

"Jeremy is an outstanding talent with a proven track record of accomplishment in fundamental and applied science," said Harry Atwater of the California Institute of Technology. Munday has "the intellectual capacity, presence, and energy to define new scientific frontiers," Atwater said, especially in renewable energy.

Munday's seminal experiment, the first experimental demonstration of a repulsive Casimir force, was featured as a cover article in *Nature* in 2009. This led him and his colleagues to consider how this phenomenon could be applied to ultra-low-static friction devices and sensors and to consider how rotations and torques could be generated by quantum fluctuations between anisotropic materials. That work has been cited over 450 times in peer-reviewed journals.

In the field of solar-energy conversion, Munday was one of the pioneers of incorporating photonic and plasmonic elements in photovoltaic converters.

Munday received the 2012 NASA Early Career Faculty Space Technology Research Award for creative applications of metamaterials to space technology, specifically in solar sails. Munday and Atwater were among authors receiving an SPIE Green Photonics Award at Photonics West in 2012 for a paper on renewable-energy generation. ■

Shalaev, Cai to receive Goodman Award for book writing

SPIE Fellow Vladimir Shalaev and Wenshan Cai are the 2014 recipients of the Joseph W. Goodman Book Writing Award for *Optical Metamaterials: Fundamentals and Applications*, published by Springer Press in 2010.

The authors will accept the award in August at SPIE Optics + Photonics.

The Goodman Book Writing Award, co-sponsored by SPIE and OSA, is a biennial award funded by Joseph and Hon Mai Goodman to recognize authorship of an outstanding book in the field of optics and photonics.

Shalaev is the scientific director for nanophotonics at the Birck Nanotechnology Center and a distinguished professor of electrical and computer engineering at Purdue University (USA).

Cai is an associate professor in electrical and computer engineering and materials science and engineering at the Georgia Institute of Technology (USA).

J. Scott Tyo

G.G. STOKES AWARD

SPIE Fellow J. Scott Tyo, a professor of optical sciences and electrical and computer engineering at University of Arizona (USA) is the recipient of the 2014 G.G. Stokes Award in recognition of his contributions to the theory of polarimeter optimization, the characterization and calibration of polarimeters, and to the understanding of microgrid polarimeter data processing. Most modern thought in these areas is influenced by his contributions to the field.

José Jorge Gil of Universidad de Zaragoza (Spain), recipient of the 2013 Stokes Award, called Tyo "an essential figure and a world reference in all scientific forums concerning polarimetry."

Gil cited Tyo's "exceptional set of contributions in this field, covering both the design of original instruments, which combine the most advanced optical technologies, and the latest techniques of exploitation of polarimetric measurements with applications in the optical range as well as in remote sensing."

Tyo is the adviser to the SPIE Student Chapter at UA and has served on program committees at SPIE DSS and SPIE Optics + Photonics. He was a fellow of the University of Arizona's Academic Leadership Institute in 2011-2012 and received the US Defense Intelligence Agency Chief Scientist's Award for Excellence in 2007.

"Tyo can best be described as a 'fireball' in research and scholarship," said SPIE Fellow and past SPIE President Eustace Dereniak. "His capability to implement the physics/optics theories into the practical domain is uncanny and creative. Most people do not have the capability to both develop new theories and implement these theories into practice." ■

Rajpal Sirohi

CHANDRA S. VIKRAM AWARD IN OPTICAL METROLOGY

SPIE Fellow Rajpal Sirohi of Tezpur University (India), whose first PhD student in 1970 at the Indian Institute of Technology was the late Chandra S. Vikram, is the recipient of the 2014 Chandra S. Vikram Award in Optical Metrology.

SPIE established the Vikram Award to honor the expert in speckle metrology, holography, interferometry, and optical logic shortly after he died in 2007.

Sirohi and Vikram published a dozen papers together on phase amplification using phase holograms, exposure reduction, and effect of non-linearity on hologram efficiency.

Sirohi, who is being recognized for his contributions to applied optics, is a senior editor of the SPIE journal, *Optical Engineering*, and has served on SPIE education, membership, and conference program committees.

"Sirohi's research work in different areas of metrology and involvement in education together with his successful management career is highly recognized worldwide," said SPIE Fellow Hans Tiziani of University of Stuttgart (Germany), who received the Vikram Award in 2012.

Sirohi was awarded membership in the International Order of Holo-Knights in 2005, and he received the SPIE Dennis Gabor Award in 2009, the Humboldt Research Award in 1996, and the International Commission for Optics' Galileo Galilei Award in 1995. He was previously a Distinguished Scholar at Rose-Hulman Institute of Technology and professor at the Indian Institute of Technology.

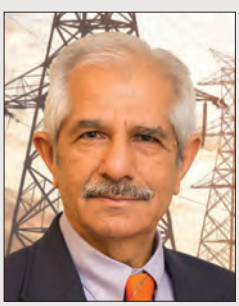
"Professor Sirohi is very clearly recognized as extraordinary and holds international prominence among the world's leading experts in our field," added Ryszard Pryputniewicz of Worcester Polytechnic Institute (USA). ■

Rajendra Singh

SPIE TECHNOLOGY ACHIEVEMENT AWARD

Rajendra Singh, director of the Center for Silicon Nanoelectronics at Clemson University (USA), is the 2014 recipient of the SPIE Technology Achievement award in recognition of his efforts in the elucidation and exploitation of photonic effects in rapid thermal processing (RTP) for semiconductor manufacturing and his technical leadership of photovoltaic technology.

Singh pioneered RTP of silicon, which has been critical to reducing the thermal budgets of furnace processing, reducing costs and production timelines. The RTP-related semiconductor equipment manufacturing industry is valued at over $1 billion per year.



His innovations also include the development of (rapid) photothermal processing where light (typically ultraviolet) is used in concert with heat to facilitate annealing.

SPIE Fellow John Ballato, director of the Center for Optical Materials Science and Engineering Technologies (COMSET) at Clemson and the university's vice president for economic development, called Singh, "not only a pioneer, but a visionary," noting that Singh "predicted 30 years ago that silicon would remain the dominant photovoltaic material, which has proven to be true." ■

Halas selected for 2014 SPIE Biophotonics Technology Innovator Award

SPIE Fellow Naomi Halas, director of the Rice Quantum Institute and founding director of the Laboratory for Nanophotonics at Rice University (USA), has received the 2014 SPIE Biophotonics Technology Innovator Award.

The award recognizes Halas for her invention of biocompatible nanoparticles and their innovative applications in imaging, diagnostics, and photothermal cancer therapy.

Halas is the Stanley C. Moore Professor of Electrical and Computer Engineering and professor of biomedical engineering, chemistry, physics, and astronomy at Rice, where "nanorice" was invented in 2006. Nanorice is similar in form to the nanoshell, a spherical nanoparticle Halas invented in 1998.

The nanosystems have been used as therapeutic agents with various potential payload delivery opportunities, and specifically as a local photothermal necrosis agent for tumors. The development of the core-shell plasmonic nanoparticle has allowed the use of a single particle to concentrate optical electromagnetic fields, a process that normally requires complex structures or aggregates of two or more particles.

The SPIE Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in biology, medicine, and biomedical optics.

SPIE President H. Philip Stahl presented the award at the BiOS Hot Topics session at SPIE Photonics West in February. ■

SPIE President H. Philip Stahl (left) presents the SPIE Biophotonics Technology Innovator Award to Naomi Halas.

Brian Wilson receives Britton Chance Award

SPIE member Brian C. Wilson of the Ontario Cancer Institute (Canada) is the 2014 recipient of the SPIE Britton Chance Biomedical Optics Award. Wilson received the award in recognition of 30 years of contributions to biomedical optics.

Wilson, who accepted the award at SPIE Photonics Europe in Brussels in April, performed pioneering work in photodynamic therapy (PDT). His contributions include the novel concepts of PDT beacons, metronomic PDT, and nanotechnology-enabled PDT as well as unique technology development and clinical trials in the brain, prostate, and metastatic bone lesions.

Wilson's groundbreaking research in multimodality endoscopic detection/assessment of early tumors draws on the complementary strengths of fluorescence, Raman, diffuse reflectance, and optical-coherence-tomography effects.

In addition to innovative work in the gastrointestinal tract, these platforms are now being extended to detection and differential diagnosis of lung and head and neck cancers, including the development of cancer-specific targeting contrast agents to enhance efficacy.

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high-impact technologies. The award honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. ■

SPIE Education Outreach grants

As part of its education outreach mission, SPIE provides support for optics- and photonics-related education outreach projects all over the world.

Not-for-profit organizations such as universities, optics centers, science centers, primary and secondary schools, youth clubs, and industry associations are eligible for project support.

Applications are judged on their potential to impact students and increase optics awareness. The next deadline for the competitive award process is 31 January.

More information: spie.org/outreach. ■

Rothschild receives Zernike Award

The 11th Frits Zernike Award for advances in optical microlithography was presented to Mordechai Rothschild of MIT Lincoln Lab (USA) at SPIE Advanced Lithography in February.

Rothschild's instrumental work in the field includes leading programs that have enabled the advancement of nanolithography in the deep-UV (248nm and 193nm) and the vacuum-UV (157nm and 121nm). He directed sub-micron technology and nanoscale technologies groups at Lincoln Lab that pioneered the use of much of the lithography materials and systems used today for excimer-laser technology.

Rothschild also managed programs in micro- and nano-fabrication, photonics, resist processing, and standoff sensing of trace chemicals.

SPIE presents the Frits Zernike Award for Microlithography annually for outstanding accomplishments in microlithographic technology, especially those furthering the development of semiconductor lithographic imaging solutions.

SPIE Fellow nominations

The SPIE Fellows Committee will accept nominations for the next class of SPIE Fellows through 15 September.

Nominees will be evaluated on their technical accomplishments in optics, photonics, and imaging, including publications and patents; service to the general optics community in the form of volunteer work at science fairs, service as an editor or technical reviewer, etc.; and service to SPIE.

Eligibility requires 10 years of cumulative SPIE membership, excluding student membership.

Nominations of members working in industry are encouraged.

Nomination materials for candidates who are not elected the first time they are nominated are automatically considered in the next two years.

More information: **spie.org/fellows**

SPIE names 76 new Fellows

SPIE has named 76 new Fellows of the Society this year, recognizing the significant scientific and technical contributions of each in optics, photonics, and imaging.

SPIE Fellows are honored for their technical achievements, for their service to the general optics community, and their service to SPIE in particular.

The 2014 Fellows exemplify the full diversity of the photonics community and represent 18 different countries on five continents.

Their affiliations "encompass the full range of academia, industry, and government labs and institutes," said SPIE Fellows Committee chair Majid Rabbani of Eastman Kodak Research Labs and Rochester Institute of Technology. Rabbani noted that the expertise of the new Fellows spans the fields of astronomy, biomedicine, electronic imaging, holography, lasers, optoelectronics, smart materials, nanomaterials, nonlinear optics and more. "Congratulations to them all for their outstanding contributions," he said.

SPIE President H. Philip Stahl, senior optical physicist at NASA Marshall Space Flight Center, also extended personal congratulations to each of the new SPIE Fellows for their exceptional professional achievements, outstanding contributions to the optics community, and service to SPIE.

"They are our society's role models and mentors," Stahl said. "As a graduate student and junior engineer, I looked up to those with the Fellow ribbon below their name badge at conferences, and I continue to admire the accomplishments of SPIE Fellows and appreciate their contributions. I welcome our 76 newest Fellows."

This year's honorees include the first female Fellow from Taiwan, Ray-Hua Horng of National Chung Hsing University who is being recognized for achievements in optoelectronic applied science and engineering. At left is SPIE President-Elect Toyohiko Yatagai.

Fellows are recognized at SPIE meetings of their choice throughout the year. This year, new Fellows are being inducted at SPIE Photonics West, SPIE Medical Imaging, SPIE Advanced Lithography, and SPIE Smart Structures/NDE. They are also scheduled to be honored at SPIE DSS, SPIE Photonics Europe, SPIE Astronomical Telescopes + Instrumentation, and SPIE Optics + Photonics.

Frank Abboud
Intel Corp. (USA)

Robert Boyd
University of Ottawa (Canada)

Fow-Sen Choa
University of Maryland Baltimore County (USA)

Bahman Anvari
University of California, Riverside (USA)

Jes Broeng
Technical University of Denmark (Denmark)

Mark Clampin
NASA Goddard Space Flight Center (USA)

Ramendra Bahuguna
San José State University (USA)

Alexander Cartwright
University at Buffalo (USA)

Brian Cullum
University of Maryland Baltimore County (USA)

Alberto Diaspro
Istituto Italiano di Tecnologia (Italy)

Alexander Heisterkamp
Friedrich-Schiller-Universität Jena (Germany)

Xinbing Liu
Panasonic Boston Laboratory (USA)

David Dickensheets
Montana State University (USA)

Henry Helvajian
Aerospace Corp. (USA)

Alexander Loui
Eastman Kodak Co. (USA)

Keith Doyle
MIT Lincoln Laboratory (USA)

Ray-Hua Horng
National Chung Hsing University (Taiwan)

Hai-Han Lu
National Taipei University of Technology (Taiwan)

Allen Earman
AOptix Technologies (USA)

Weilin Hou
Naval Research Laboratory (USA)

Christopher Lynch
University of California, Los Angeles (USA)

Augustus Fountain
Army Edgewood Chemical Biological Center (USA)

Jian-Jang Huang
National Taiwan University (Taiwan)

Misoon Mah
US Air Force, Asian Office of Aerospace Research and Development (Japan)

Thomas George
Zyomed Corp. (USA)

Bahram Jalali
University of California, Los Angeles (USA)

Gary Matthews
Exelis (USA)

Maryellen Giger
University of Chicago (USA)

Ursula Keller
ETH Zürich (Switzerland)

Colin McKinstrie
Alcatel-Lucent Bell Laboratories (USA)

Simonetta Grilli
Istituto Nazionale di Ottica (Italy)

Rainer Leitgeb
Medizinische Universität Wien (Austria)

Igor Meglinski
University of Otago (New Zealand)

Peter Hartmann
SCHOTT (Germany)

Ai-Qun Liu
Nanyang Technological University (Singapore)

Carmen Menoni
Colorado State University (USA)

SPIE FELLOWS

Kenneth Moore
Radiant ZEMAX (USA)

Gabriel Popescu
University of Illinois at Urbana-Champaign (USA)

Piet Schwering
TNO Defence, Safety and Security (Netherlands)

Ignacio Moreno
Universidad Miguel Hernández de Elche (Spain)

Salil Prabhakar
DigitalPersona (USA)

Jeffrey Shapiro
Massachusetts Institute of Technology (USA)

Asger Mortensen
DTU Fotonik (Denmark)

Min Qiu
Zhejiang University (China)

John Sheridan
University College Dublin (Ireland)

Bert Müller
Basel University Hospital (Switzerland)

Jianan Qu
Hong Kong University of Science and Technology (Hong Kong)

Gabriel Spalding
Illinois Wesleyan University (USA)

Mark Neifeld
University of Arizona (USA)

Azizur Rahman
City University London (UK)

Ove Steinvall
Swedish Defence Research Agency (Sweden)

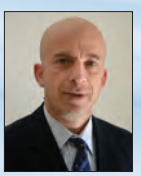
Takanori Nomura
Wakayama University (Japan)

Yun-Jiang Rao
University of Electronic Science and Technology of China (China)

Larry Stepp
Thirty Meter Telescope Observatory (USA)

Stephen O'Dell
NASA Marshall Space Flight Center (USA)

Detlev Ristau
Laser Zentrum Hannover (Germany)



Adrian Stern
Ben Gurion University of the Negev (Israel)

C. Kumar Patel
Pranalytica (USA)

Joseph Robichaud
L-3 Communications IOS-SSG (USA)

Mark Stockman
Georgia State University (USA)

Stephen Payne
Lawrence Livermore National Lab (USA)

Devendra Sadana
IBM Thomas J. Watson Research Center (USA)

Sarun Sumriddetchkajorn
National Electronics and Computer Technology Center (Thailand)

Frank Szmulowicz
University of Dayton Research Institute (USA)

Vladislav Yakovlev
Texas A&M University (USA)

Song Zhang
Iowa State University (USA)

Frank Tittel
Rice University (USA)

Yang Yang
University of California, Los Angeles (USA)

Xi-Cheng Zhang
University of Rochester (USA)

Li-Wei Tu
National Sun Yat-Sen University (Taiwan)

John Zavada
National Science Foundation (USA)

Qifa Zhou
University of Southern California (USA)

Xunbin Wei
Shanghai Jiao Tong University (China)

Mourad Zghal
SUP'COM (Tunisia)

Wenwu Zhu
Tsinghua University (China)

Norman Wereley
University of Maryland, College Park (USA)

Visit the SPIE International Year of Light Booth at SPIE Optics + Photonics

INTERNATIONAL YEAR OF LIGHT 2015

Location: Registration area

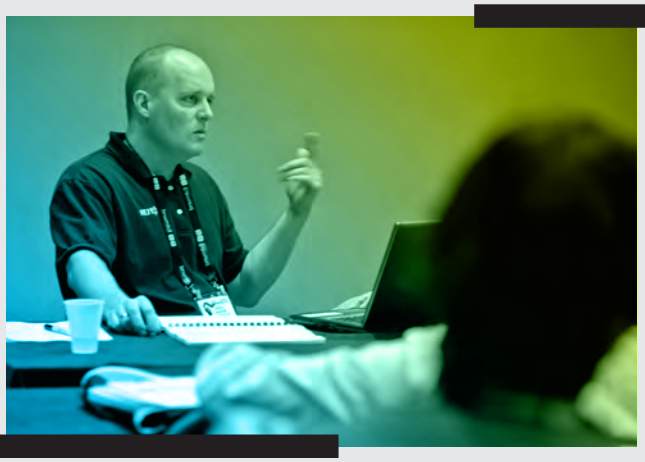
The United Nations declared 2015 as the International Year of Light and Light-based Technologies.

The focus of International Year of Light 2015 is to promote improved public and political understanding of the central role of light in the modern world and celebrate significant scientific anniversaries occurring in 2015.

www.spie.org/iyl

www.mathieuyoung.com

The Kamworks lantern uses energy-efficient LED bulbs and is powered by a small solar cell.



34
SPIE COURSES & WORKSHOPS

SPIE STUDENT MEMBERS GET 50% OFF COURSES—SEE DETAILS ONLINE

Take advantage of instruction from some of the biggest names in industry and research. Make the most of your time at SPIE Optics+Photonics.

Get training and access to professional development courses to stay competitive and advance your career. With over 40 half- and full-day courses and workshops offered, you can find those that meet your specific needs and earn CEUs to fulfill ongoing professional education requirements.

COURSE TRACKS

Optical Design and Systems Engineering

Optomechanics and Optical Manufacturing

Advanced Metrology

Atmospheric and Space Optical Systems

Detectors and Imaging Devices

Illumination Engineering

NanoEngineering

NanoScience

Photonic Devices and Applications

Remote Sensing

Signal, Image, and Data Processing

Solar Energy + Technology

X-Ray, Gamma-Ray, and Particle Technologies

NEW COURSES

SC1140 Surface Nanoplasmonics

SC1143 Component-Level Calibration: Sources, Detectors, and Measurement Hardware

SC454 Fabrication Technologies for Micro- and Nano-Optics

SC1085 Optomechanical Systems Engineering

SC218 Advanced Composite Materials for Optomechanical Systems

SC781 Optomechanical Analysis

www.spie.org/education

MONEY-BACK GUARANTEE

We are confident that once you experience an SPIE course for yourself you will look to us for your future education needs. However, if for any reason you are dissatisfied, we will gladly refund your money. We just ask that you tell us what you did not like; suggestions for improvement are always welcome.

CONTINUING EDUCATION UNITS

SPIE has been approved as an authorized provider of CEUs by IACET, The International Association for Continuing Education and Training (Provider #1002091). In obtaining this approval, SPIE has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice.

SPIE reserves the right to cancel a course due to insufficient advance registration.

Optical Design and Systems Engineering

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
SC835 **Infrared Systems - Technology & Design** *(Daniels)* 8:30 am to 5:30 pm, $1,230 / $1,485		SC156 **Basic Optics for Engineers** *(Boreman)* 8:30 am to 5:30 pm, $645 / $760	SC1112 **Introduction to Electro-Optical Systems Design** *(Stotts)* 8:30 am to 5:30 pm, $665 / $780	SC003 **Practical Optical System Design** *(Youngworth)* 8:30 am to 5:30 pm, $690 / $805
SC690 **Optical System Design: Layout Principles and Practice** *(Greivenkamp)* 8:30 am to 5:30 pm, $635 / $750	SC912 **Intermediate Lens Design** *(Bentley)* 8:30 am to 5:30 pm, $635 / $750	SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430	SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer** *(DeGroote Nelson)* 8:30 am to 12:30 pm, $375 / $430	
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500		
	SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475	SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850		
		SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430		
		SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430		
		SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430		

Optomechanics and Optical Manufacturing

SC213 **Introduction to Interferometric Optical Testing** *(Creath)* 8:30 am to 12:30 pm, $410 / $465	SC218 **Advanced Composite Materials for Optomechanical Systems** *(Zweben)* 8:30 am to 5:30 pm, $600 / $715	SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430	SC796 **Allowable Stresses in Glass and Engineering Ceramics** *(Pepi)* 8:30 am to 12:30 pm, $375 / $430	SC1019 **Mounting of Optical Components** *(Kasunic)* 8:30 am to 5:30 pm, $685 / $800
	SC015 **Structural Adhesives for Optical Bonding** *(Daly)* 8:30 am to 12:30 pm, $375 / $430	SC1085 **Optomechanical Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $715, p. 206	SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer** *(DeGroote Nelson)* 8:30 am to 12:30 pm, $375 / $430	SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715,
	SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475	SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430	SC781 **Optomechanical Analysis** *(Hatheway)* 8:30 am to 5:30 pm, $600 / $715	

COURSES

Advanced Metrology

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
SC213 **Introduction to Interferometric Optical Testing** *(Creath)* 8:30 am to 12:30 pm, $410 / $465	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500		SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715
		SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850		
		SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430		

Atmospheric and Space Optical Systems

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430	SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770	
	SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475	SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430		

Detectors and Imaging Devices

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC504 **Introduction to CCD and CMOS Imaging Sensors and Applications** *(Janesick)* 8:30 am to 5:30 pm, $740 / $855	SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770	
		SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430	SC194 **Multispectral and Hyperspectral Image Sensors** *(Lomheim)* 1:30 pm to 5:30 pm, $455 / $510	
		SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430		

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Illumination Engineering				
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430		
NanoEngineering				
SC1082 **Nanophotonics and Metaphotonics** *(Baev)* 1:30 pm to 5:30 pm, $375 / $430		SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430		SC1140 **Surface Multiplasmonics** *(Faryad, Lakhtakia)* 8:30 am to 5:30 pm, $720 / $835
		SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500		
NanoScience				
SC1082 **Nanophotonics and Metaphotonics** *(Baev)* 1:30 pm to 5:30 pm, $375 / $430		SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430		SC1140 **Surface Multiplasmonics** *(Faryad, Lakhtakia)* 8:30 am to 5:30 pm, $720 / $835
Photonic Devices and Applications				
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430			

See course descriptions onsite and register at the Registration Desk.

Courses are available to SPIE Student Members at half price.

COURSES

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Remote Sensing				
SC835 **Infrared Systems - Technology & Design** *(Daniels)* 8:30 am to 5:30 pm, $1,230 / $1,485		SC156 **Basic Optics for Engineers** *(Boreman)* 8:30 am to 5:30 pm, $645 / $760	SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770	
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC504 **Introduction to CCD and CMOS Imaging Sensors and Applications** *(Janesick)* 8:30 am to 5:30 pm, $740 / $855	SC194 **Multispectral and Hyperspectral Image Sensors** *(Lomheim)* 1:30 pm to 5:30 pm, $455 / $510	
		SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430		
		SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430		
Signal, Image, and Data Processing				
		SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850	SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770	
Solar Energy + Technology				
	SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500		
		SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430		
		SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430		

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY

X-Ray, Gamma-Ray, and Particle Technologies

SC213 **Introduction to Interferometric Optical Testing** *(Creath)* 8:30 am to 12:30 pm, $410 / $465

SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715

Professional Development

WS897 **Effective Technical Presentations** *(Doumont)* 8:30 am to 12:30 pm, $150 / $200

WS908 **Effective Scientific Papers** *(Doumont)* 1:30 pm to 5:30 pm, $150 / $200

WS1059 **Resumes to Interviews: Strategies for a Successful Job Search** *(Lawson, Krinsky)* 1:30 pm to 5:30 pm, $125 / $175

Workshops for Optics Educators

WS1142 **It's Elementary -- Light and Optics for Kids** *(DeHarpporte)* 8:30 am to 10:30 am, $25 / $50

WS1141 **Problem-Based Learning for Teaching STEM** *(Donnelly)* 10:30 am to 12:30 pm, $10 / $15

WS1115 **Learning How Light Works: Reflection** *(Magnani)* 1:30 pm to 3:30 pm, $10 / $15

See course descriptions onsite and register at the Registration Desk.

Courses are available to SPIE Student Members at half price.

COURSE INDEX

34
SPIE COURSES & WORKSHOPS

OPTICAL DESIGN AND SYSTEMS ENGINEERING

Sun-Mon SC835 **Infrared Systems - Technology & Design** *(Daniels)* 8:30 am to 5:30 pm, $1,230 / $1,485

Sun SC690 **Optical System Design: Layout Principles and Practice** *(Greivenkamp)* 8:30 am to 5:30 pm, $635 / $750

Mon SC912 **Intermediate Lens Design** *(Bentley)* 8:30 am to 5:30 pm, $635 / $750

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Mon SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475

Tue SC156 **Basic Optics for Engineers** *(Boreman)* 8:30 am to 5:30 pm, $645 / $760,

Tue SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430

Tue SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

Tue SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

Tue SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

Wed SC1112 **Introduction to Electro-Optical Systems Design** *(Stotts)* 8:30 am to 5:30 pm, $665 / $780

Wed SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer** *(DeGroote Nelson)* 8:30 am to 12:30 pm, $375 / $430

Thu SC003 **Practical Optical System Design** *(Youngworth)* 8:30 am to 5:30 pm, $690 / $805

OPTOMECHANICS AND OPTICAL MANUFACTURING

Sun SC213 **Introduction to Interferometric Optical Testing** *(Wyant)* 8:30 am to 12:30 pm, $410 / $465

Mon SC218 **Advanced Composite Materials for Optomechanical Systems** *(Zweben)* 8:30 am to 5:30 pm, $600 / $715

Mon SC015 **Structural Adhesives for Optical Bonding** *(Daly)* 8:30 am to 12:30 pm, $375 / $430

Mon SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475

Tue SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430

Tue SC1085 **Optomechanical Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $715

Tue SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

Wed SC796 **Allowable Stresses in Glass and Engineering Ceramics** *(Pepi)* 8:30 am to 12:30 pm, $375 / $430

Wed SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer** *(DeGroote Nelson)* 8:30 am to 12:30 pm, $375 / $430

Wed SC781 **Optomechanical Analysis** *(Hatheway)* 8:30 am to 5:30 pm, $600 / $715

Thu SC1019 **Mounting of Optical Components** *(Kasunic)* 8:30 am to 5:30 pm, $685 / $800

Thu SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715

ADVANCED METROLOGY

Sun SC213 **Introduction to Interferometric Optical Testing** *(Wyant)* 8:30 am to 12:30 pm, $410 / $465

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

Tue SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850

Tue SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

Thu SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715

ATMOSPHERIC AND SPACE OPTICAL SYSTEMS

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Mon SC1114 **The Proper Care of Optics: Cleaning, Handling, Storage and Shipping** *(Schalck)* 1:30 pm to 5:30 pm, $420 / $475

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

Tue SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430

Wed SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770

DETECTORS AND IMAGING DEVICES

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC504 **Introduction to CCD and CMOS Imaging Sensors and Applications** *(Janesick)* 8:30 am to 5:30 pm, $740 / $855

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

Tue SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430

Wed SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770

Wed SC194 **Multispectral and Hyperspectral Image Sensors** *(Lomheim)* 1:30 pm to 5:30 pm, $455 / $510

ILLUMINATION ENGINEERING

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

NANOENGINEERING

Sun SC1082 **Nanophotonics and Metaphotonics** *(Baev)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430

Tue SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

Thu SC1140 **Surface Multiplasmonics** *(Faryad, Lakhtakia)* 8:30 am to 5:30 pm, $720 / $835

NANOSCIENCE

Sun SC1082 **Nanophotonics and Metaphotonics** *(Baev)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430

Thu SC1140 **Surface Multiplasmonics** *(Faryad, Lakhtakia)* 8:30 am to 5:30 pm, $720 / $835

PHOTONIC DEVICES AND APPLICATIONS

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

REMOTE SENSING

Sun-Mon SC835 **Infrared Systems - Technology & Design** *(Daniels)* 8:30 am to 5:30 pm, $1,230 / $1,485

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC156 **Basic Optics for Engineers** *(Boreman)* 8:30 am to 5:30 pm, $645 / $760

Tue SC504 **Introduction to CCD and CMOS Imaging Sensors and Applications** *(Janesick)* 8:30 am to 5:30 pm, $740 / $855

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

Tue SC567 **Introduction to Optical Remote Sensing Systems** *(Shaw)* 1:30 pm to 5:30 pm, $375 / $430

Wed SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770

Wed SC194 **Multispectral and Hyperspectral Image Sensors** *(Lomheim)* 1:30 pm to 5:30 pm, $455 / $510

SIGNAL, IMAGE, AND DATA PROCESSING

Tue SC017 **Principles of Fourier Optics and Diffraction** *(Gaskill)* 8:30 am to 5:30 pm, $735 / $850

Wed SC916 **Digital Camera and Sensor Evaluation Using Photon Transfer** *(Janesick)* 8:30 am to 5:30 pm, $655 / $770

SOLAR ENERGY + TECHNOLOGY

Mon SC1143 **Component-Level Calibration: Sources, Detectors, and Measurement Hardware** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430

Tue SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

Tue SC915 **Radiometry Revealed** *(Shaw)* 8:30 am to 12:30 pm, $375 / $430

Tue SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

X-RAY, GAMMA-RAY, AND PARTICLE TECHNOLOGIES

Sun SC213 **Introduction to Interferometric Optical Testing** *(Wyant)* 8:30 am to 12:30 pm, $410 / $465

Tue SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 8:30 am to 12:30 pm, $445 / $500

Tue SC492 **Predicting, Modeling, and Interpreting Light Scattered by Surfaces** *(Germer)* 1:30 pm to 5:30 pm, $375 / $430

Thu SC211 **Practical Interferometry and Fringe Analysis** *(Creath)* 8:30 am to 5:30 pm, $600 / $715

PROFESSIONAL DEVELOPMENT

Mon WS897 **Effective Technical Presentations** *(Doumont)* 8:30 am to 12:30 pm, $150 / $200

Mon WS908 **Effective Scientific Papers** *(Doumont)* 1:30 pm to 5:30 pm, $150 / $200

Wed WS1059 **Resumes to Interviews: Strategies for a Successful Job Search** *(Lawson, Krinsky)* 1:30 pm to 5:30 pm, $125 / $175

WORKSHOPS FOR OPTICS EDUCATORS

Tue WS1142 **It's Elementary -- Light and Optics for Kids** *(DeHarpporte)* 8:30 am to 10:30 am, $25 / $50

Tue WS1141 **Problem-Based Learning for Teaching STEM** *(Donnelly)* 10:30 am to 12:30 pm, $10 / $15

Tue WS1115 **Learning How Light Works: Reflection** *(Magnani)* 1:30 pm to 3:30 pm, $10 / $15

See course descriptions and register onsite.

NanoScience + Engineering

- **CNTS/GRAPHENE**
- **OPTICAL TRAPPING**
- **METAMATERIALS**
- **PLASMONICS**
- **NANOENGINEERING**

Symposium Chair
Satoshi Kawata,
Osaka Univ. (Japan)

Symposium Chair
Manijeh Razeghi,
Northwestern Univ. (USA)

Symposium Co-chair
David L. Andrews,
Univ. of East Anglia Norwich
(United Kingdom)

Symposium Co-chair
James G. Grote,
Air Force Research Lab. (USA)

NanoScience

9160 **Metamaterials, Metadevices, and Metasystems 2014** *(Engheta/Noginov/Zheludev)* . . . . . p. 51
9161 **Nanophotonic Materials XI** *(Cabrini/Lérondel/Schwartzberg/Mokari)* . . . . . p. 56
9162 **Active Photonic Materials VI** *(Subramania/Foteinopoulou)* . . . . . p. 58
9163 **Plasmonics: Metallic Nanostructures and Their Optical Properties XII** *(Boardman)* . . . . . p. 62
9164 **Optical Trapping and Optical Micromanipulation XI** *(Dholakia/Spalding)* . . . . . p. 68
9165 **Physical Chemistry of Interfaces and Nanomaterials XIII** *(Banerji/Hayes/Silva)* . . . . . p. 74
9166 **Biosensing and Nanomedicine VII** *(Mohseni/Agahi/Razeghi)* . . . . . p. 78
9167 **Spintronics VII** *(Drouhin/Wegrowe/Razeghi)* . . . . . p. 81
9168 **Carbon Nanotubes, Graphene, and Associated Devices VII** *(Razeghi/Lee/Ghazinejad)* . . . . . p. 88
9169 **Nanoimaging and Nanospectroscopy II** *(Verma/Egner)* . . . . . p. 90

Nanoengineering

9170 **Nanoengineering: Fabrication, Properties, Optics, and Devices XI** *(Campo/Dobisz/Eldada)* . . . . . p. 92
9171 **Nanobiosystems: Processing, Characterization, and Applications VII** *(Kobayashi/Ouchen/Rau)* . . . . . p. 95
9172 **Nanostructured Thin Films VII** *(Lakhtakia/Mackay/Suzuki)* . . . . . p. 97
9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek/Orji)* . . . . . p. 100
9174 **Nanoepitaxy: Materials and Devices VI** *(Kobayashi/Talin/Davydov/Islam)* . . . . . p. 102
9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur)* . . . . p. 109
9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima/Conibeer)* . . . . . p. 113
9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor/Cardimona/Pirich/Prasad)* . . . . . p. 237

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Symposium-wide Plenary Session, 5:45 to 7:35 PM, p. 9	**NanoScience + Engineering Plenary Session,** 9:15 AM to 12:00 PM, p. 10		**Poster Session,** 5:30 to 7:30 PM, p. 17	

NANOSCIENCE

9160 **Metamaterials, Metadevices, and Metasystems 2014** *(Engheta/Noginov/Zheludev),* p. 51

9161 **Nanophotonic Materials XI** *(Cabrini/Lérondel/Schwartzberg/Mokari),* p. 56

9162 **Active Photonic Materials VI** *(Subramania/Foteinopoulou),* p. 58

9163 **Plasmonics: Metallic Nanostructures and Their Optical Properties XII** *(Boardman),* p. 62

9164 **Optical Trapping and Optical Micromanipulation XI** *(Dholakia/Spalding),* p. 68

9165 **Physical Chemistry of Interfaces and Nanomaterials XIII** *(Banerji/Hayes/Silva),* p. 74

9166 **Biosensing and Nanomedicine VII** *(Mohseni/Agahi/Razeghi),* p. 78

9167 **Spintronics VII** *(Drouhin/Wegrowe/Razeghi),* p. 81

9169 **Nanoimaging and Nanospectroscopy II** *(Verma/Egner),* p. 90

9168 **Carbon Nanotubes, Graphene, and Associated Devices VII** *(Razeghi/Lee/Ghazinejad),* p. 88

NANOENGINEERING

9170 **Nanoengineering: Fabrication, Properties, Optics, and Devices XI** *(Campo/Dobisz/Eldada),* p. 92

9171 **Nanobiosystems: Processing, Characterization, and Applications VII** *(Kobayashi/Ouchen/Rau),* p. 95

9172 **Nanostructured Thin Films VII** *(Lakhtakia/Mackay/Suzuki),* p. 97

9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek/Orji),* p. 100

9174 **Nanoepitaxy: Materials and Devices VI** *(Kobayashi/Talin/Davydov/Islam),* p. 102

9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur),* p. 109

9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima/Conibeer),* p. 113

9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor/Cardimona/Pirich/Prasad),* p. 237

CONNECT WITH SPIE OPTICS + PHOTONICS

Schedule your time in the conferences…make new connections with a free conference App.

SPIE Conference App

Search topics, people, papers, courses, networking events. Create your schedule with the SPIE Conference App for iPhone and Android. The mobile app is available at spie.org/mobile and at the Android Market and AppStore.

Available on the App Store

Google play

Courtesy of

SPIE.

CONFERENCE 9160

LOCATION: CONV. CTR. ROOM 9

Sunday–Thursday 17–21 August 2014 • Proceedings of SPIE Vol. 9160

Metamaterials, Metadevices, and Metasystems 2014

Conference Chairs: **Nader Engheta,** Univ. of Pennsylvania (USA); **Mikhail A. Noginov,** Norfolk State Univ. (USA); **Nikolay I. Zheludev,** Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore)

Program Committee: **Andrea Alù,** The Univ. of Texas at Austin (USA); **David L. Andrews,** Univ. of East Anglia Norwich (United Kingdom); **Pierre Berini,** Univ. of Ottawa (Canada); **Alexandra Boltasseva,** Purdue Univ. (USA); **Igal Brener,** Sandia National Labs. (USA); **Mark Brongersma,** Standford Univ. (USA); **Che Ting Chan,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Hongsheng Chen,** Zhejiang Univ. (China); **Jennifer A. Dionne,** Stanford Univ. (USA); **Harald W. Giessen,** Univ. Stuttgart (Germany); **Yuri S. Kivshar,** The Australian National Univ. (Australia); **Jacob B. Khurgin,** Johns Hopkins Univ. (USA); **Uriel Levy,** The Hebrew Univ. of Jerusalem (Israel); **Natalia M. Litchinitser,** Univ. at Buffalo (USA); **Martin W. McCall,** Imperial College London (United Kingdom); **Albert Polman,** FOM Institute for Atomic and Molecular Physics (Netherlands); **Gennady B. Shvets,** The Univ. of Texas at Austin (USA); **David R. Smith,** Duke Univ. (USA); **Costas M. Soukoulis,** Iowa State Univ. (USA); **Mark I. Stockman,** Georgia State Univ. (USA); **Sergei Tretyakov,** Aalto Univ. School of Science and Technology (Finland); **Din Ping Tsai,** National Taiwan Univ. (Taiwan); **Augustine M. Urbas,** Air Force Research Lab. (USA); **Martin Wegener,** Karlsruher Institut für Technologie (Germany); **Xiang Zhang,** Univ. of California, Berkeley (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 9 . . . . SUN 8:35 AM TO 10:25 AM

Metamaterial Devices and Systems

Session Chair: **Mikhail A. Noginov,** Norfolk State Univ. (USA)

8:35 am: **Coherent control in metamaterials for device and system applications** *(Keynote Presentation)*, Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore); Kevin F. MacDonald, Eric Plum, Xu Fang, Univ. of Southampton (United Kingdom). . . . . [9160-1]

9:20 am: **Actively tunable metadevices** *(Invited Paper)*, Mark L. Brongersma, Geballe Lab. for Advanced Materials (GLAM) (USA). . . . . [9160-2]

9:45 am: **Natural computing with cognitive photonic networks** *(Invited Paper)*, Cesare Soci, Nanyang Technological Univ. (Singapore). . . . . [9160-3]

10:10 am: **Image quality assessments of metamaterial-based microwave remote sensing systems**, Steve T. Kacenjar, Lockheed Martin Corp. (USA); David Thomas Crouse, The City College of New York (USA); Igor Bendoym, Tamelia Ali, Phoebus Optoelectronics, LLC (USA); Paul Okun, Lockheed Martin Corp. (USA) . . . . . [9160-4]

Coffee Break . . . . . Sun 10:25 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 9 . . . SUN 10:50 AM TO 12:40 PM

Metasurfaces

Session Chair: **Vladimir M. Shalaev,** Purdue Univ. (USA)

10:50 am: **Gap plasmon-based metasurfaces: fundamentals and applications** *(Invited Paper)*, Sergey I. Bozhevolnyi, Michael G. Nielsen, Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark) . . . . . [9160-5]

11:15 am: **Nonlocal polarization approach to metasurfaces** *(Invited Paper)*, Viktor A. Podolskiy, Christopher M. Roberts, Sandeep Inampudi, Univ. of Massachusetts Lowell (USA). . . . . [9160-6]

11:40 am: **Broadband phase delay and frequency conversion with metasurfaces**, Vincent Ginis, Vrije Univ. Brussel (Belgium); Philippe Tassin, Chalmers Univ. of Technology (Sweden); Thomas Koschny, Ames Lab. (USA); Costas M. Soukoulis, Iowa State Univ. (USA) and Foundation for Research and Technology-Hellas (Greece) . . . . . [9160-7]

11:55 am: **Performance and stability analysis of nonlocal polarization approach to the optics of metasurfaces**, Christopher M. Roberts, Sandeep Inampudi, Viktor A. Podolskiy, Univ. of Massachusetts Lowell (USA) . . . . . [9160-8]

12:10 pm: **High-transmittance all-dielectric Huygens' metasurfaces**, Isabelle Staude, Manuel Decker, The Australian National Univ. (Australia); Matthias Falkner, Friedrich-Schiller-Univ. Jena (Germany); Jason Dominguez, Sandia National Labs. (USA); Dragomir N. Neshev, The Australian National Univ. (Australia); Igal Brener, Sandia National Labs. (USA); Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany); Yuri S. Kivshar, The Australian National Univ. (Australia) . . . . . [9160-9]

12:25 pm: **Metasurfaces inner symmetries: from square lattices to quasicrystalline layouts**, Sergey S. Kruk, The Australian National Univ. (Australia); Alexander Poddubny, Ioffe Physico-Technical Institute (Russian Federation); Christian Helgert, Friedrich-Schiller-Univ. Jena (Germany); Manuel Decker, Isabelle Staude, The Australian National Univ. (Australia); Christoph Menzel, Christoph Etrich, Carsten Rockstuhl, Friedrich-Schiller-Univ. Jena (Germany); David A. Powell, The Australian National Univ. (Australia); Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany); Dragomir N. Neshev, Yuri S. Kivshar, The Australian National Univ. (Australia). . . . . [9160-10]

Lunch Break . . . . . Sun 12:40 pm to 2:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 9 . . . . . SUN 2:00 PM TO 3:30 PM

Hyperbolic Metamaterials I

Session Chair: **Viktor A. Podolskiy,** Univ. of Massachusetts Lowell (USA)

2:00 pm: **Single-photon source based on NV center in nanodiamond coupled to TiN-based hyperbolic metamaterial** *(Invited Paper)*, Vladimir M. Shalaev, Mikhail Y. Shalaginov, Purdue Univ. (USA); V. V. Vorobyov, Photonic Nano-Meta Technologies (Russian Federation); A. V. Akimov, Russian Quantum Ctr. (Russian Federation); Alexei Lagutchev, Purdue Univ. (USA); Vasily V. Klimov, P.N. Lebedev Physical Institute (Russian Federation); Alexander V. Kildishev, Alexandra Boltasseva, Purdue Univ. (USA) . . . . . [9160-11]

2:25 pm: **Nonlinear vortex and solitonic behaviour in hyperbolic metamaterial applications** *(Invited Paper)*, Allan D. Boardman, Peter Egan, Univ. of Salford (United Kingdom). . . . . [9160-12]

2:50 pm: **Photonic hyper-crystals** *(Invited Paper)*, Evgenii Narimanov, Purdue Univ. (USA) . . . . . [9160-13]

3:15 pm: **Self-assembled tuneable photonic hyper-crystals**, Vera N. Smolyaninova, Bradley Yost, David Lahneman, Towson Univ. (USA); Evgenii Narimanov, Purdue Univ. (USA); Igor I. Smolyaninov, Univ. of Maryland, College Park (USA) . . . . . [9160-14]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

CONFERENCE 9160
LOCATION: CONV. CTR. ROOM 9

SESSION 4

LOCATION: CONV. CTR. ROOM 9 . . . . . SUN 4:00 PM TO 5:50 PM

Hyperbolic Metamaterials II

Session Chair: **Allan D. Boardman,** Univ. of Salford (United Kingdom)

4:00 pm: **Hyperbolic metamaterials: Kronig Penney approach** *(Invited Paper)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9160-15]

4:25 pm: **Enhanced spontaneous emission from the inside of a multilayer hyperbolic metamaterial**, Lorenzo Ferrari, Dylan Lu, Dominic Lepage, Zhaowei Liu, Univ. of California, San Diego (USA) . . . . . [9160-16]

4:40 pm: **Experimental realization of broadband super absorber based on rainbow trapping in hyperbolic metamaterials**, Dengxin Ji, Haomin Song, Xie Zeng, Hai-feng Hu, Kai Liu, Nan Zhang, Qiaoqiang Gan, Univ. at Buffalo (USA) . . . . . [9160-17]

4:55 pm: **Optical characterization of multilayered hyperbolic metamaterials**, Thejaswi U. Tumkur, Yuri A. Barnakov, Mikhail A. Noginov, Norfolk State Univ. (USA); Vladimir Liberman, MIT Lincoln Lab. (USA) . . . . . [9160-18]

5:10 pm: **Design of hyperbolic metamaterials by genetic algorithm**, Ian A. Goforth, Hossein Alisafaee, Daniel B. Fullager, Christopher Rosenbury, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) . . . . . [9160-19]

5:25 pm: **Non-elastic light scattering in hyperbolic medium** *(Invited Paper)*, Alexander Poddubny, Ioffe Physico-Technical Institute (Russian Federation) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Ivan V. Iorsh, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Pavel Ginzburg, Anatoly V. Zayats, King's College London (United Kingdom); Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Yuri S. Kivshar, The Australian National Univ. (Australia) . . . . [9160-20]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:55 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 9 . . . . . MON 1:55 PM TO 3:00 PM

Graphene and 2D Systems

Session Chair: **Natalia M. Litchinitser,** Univ. at Buffalo (USA)

1:55 pm: **Graphene enabled nanoantenna based opto-electro-mechanical biosensor** *(Invited Paper)*, Ertugrul Cubukcu, Univ. of Pennsylvania (USA)[9160-22]

2:20 pm: **Graphene in electromagnetic metamaterials** *(Invited Paper)*, Philippe Tassin, Chalmers Univ. of Technology (Sweden); Nian-Hai Shen, Ames Lab. (USA) and Iowa State Univ. (USA); Maria Kafesaki, Foundation for Research and Technology-Hellas (Greece); Thomas Koschny, Iowa State Univ. (USA); Costas M. Soukoulis, Iowa State Univ. (USA) and Foundation for Research and Technology-Hellas (Greece) and Ames Lab. (USA). . . . . [9160-23]

2:45 pm: **Infrared nano-imaging and nano-spectroscopy of graphene plasmons**, Zhe Fei, Univ. of California, San Diego (USA); Aleksandr S. Rodin, Boston Univ. (USA); Wenzhong Bao, Univ. of Maryland, College Park (USA); Zeng Zhao, Univ. of California, Riverside (USA); Martin Wagner, Siyuan Dai, Mengkun Liu, Alexander S. McLeod, Univ. of California, San Diego (USA); Gerardo Dominguez, California State Univ., San Marcos (USA); Alex Zettl, Univ. of California, Berkeley (USA); Antonio H. Castro Neto, National Univ. of Singapore (Singapore); Mark Thiemens, Univ. of California, San Diego (USA); Fritz Keilmann, Ludwig Maximilian Univ. of Munich (Germany); Chun Ning Lau, Univ. of California, Riverside (USA); Michael M. Fogler, Dimitri N. Basov, Univ. of California, San Diego (USA) [9160-24]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 9 . . . . . MON 3:30 PM TO 5:20 PM

Novel Phenomena I

Session Chair: **Philippe Tassin,** Chalmers Univ. of Technology (Sweden)

3:30 pm: **Functional optical metamaterials employing spatial dispersion and absorption** *(Invited Paper)*, Andriy Shevchenko, Patrick Grahn, Matti Kaivola, Aalto Univ. School of Science and Technology (Finland). . . . . [9160-25]

3:55 pm: **Light filaments based free space metamaterial components** *(Invited Paper)*, Natalia M. Litchinitser, Zhaxylyk A. Kudyshev, Scott Will, Univ. at Buffalo (USA); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9160-26]

4:20 pm: **Plasmonic and metamaterial devices based on opto-mechanical interactions**, Pavel Ginzburg, Alexey V. Krasavin, King's College London (United Kingdom); Alexander S. Shalin, Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Yuri S. Kivshar, The Australian National Univ. (Australia); Anatoly V. Zayats, King's College London (United Kingdom) . . . . . [9160-27]

4:35 pm: **Tailoring dispersion by strong coupling**, Thejaswi U. Tumkur, Guohua Zhu, Devon Courtwright, Mikhail A. Noginov, Norfolk State Univ. (USA) . . [9160-28]

4:50 pm: **Extraordinary optical transmission in the scope of nonlocality**, Johan Christensen, Christin David, N. Asger Mortensen, DTU Fotonik (Denmark)[9160-29]

5:05 pm: **On the electrodynamics of moving permanent dipoles in external electromagnetic fields**, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9160-30]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 9 . . . . TUE 8:30 AM TO 10:30 AM

Thermal and IR Metamaterials

Session Chair: **Jennifer A. Dionne,** Stanford Univ. (USA)

8:30 am: **Plasmonic vibrational sensing in the mid-infrared** *(Invited Paper)*, Frank Neubrech, Harald Giessen, Univ. Stuttgart (Germany) . . . . . [9160-31]

8:55 am: **Experimental verification of heat flux bending in multilayered thermal metamaterials**, Krishna K. Vemuri, Prabhakar Bandaru, Univ. of California, San Diego (USA). . . . . [9160-32]

9:10 am: **Infrared absorption by coupled surface plasmon modes in an ultra-thin metamaterial**, Peter A. Hobson, QinetiQ Ltd. (United Kingdom); Piers Andrew, Nokia Research Ctr. (United Kingdom); Benny T. Hallam, Imerys Minerals Ltd. (United Kingdom); Chris R. Lawrence, QinetiQ Ltd. (United Kingdom). . . . [9160-33]

9:25 am: **Thermal radiation control: enhancement of solar cell performance and daytime radiative cooling** *(Invited Paper)*, Shanhui Fan, Sunil Sandhu, Stanford Univ. (USA); Zongfu Yu, Univ. of Wisconsin-Madison (USA); Aaswath P. Raman, Linxiao Zhu, Marc Anoma, Stanford Univ. (USA). . . . . [9160-34]

9:50 am: **Vanadium dioxide: a tunable disordered metamaterial and applications** *(Invited Paper)*, Federico Capasso, Mikhail A. Kats, Shriram Ramanathan, Harvard School of Engineering and Applied Sciences (USA)[9160-35]

10:15 am: **Thermal instability in plasmonics**, Andrey K. Sarychev, Institute for Theoretical and Applied Electrodynamics (Russian Federation); Alexei L. Bogdanov, Western Digital Corp. (USA); Gennady Tartakovsky, Advanced Systems & Technologies, Inc. (USA); Sergey Vergeles, L.D. Landau Institute for Theoretical Physics (Russian Federation); Vladimir Parfenyev, Ilya A. Fedorov, Moscow Institute of Physics and Technology (Russian Federation) . . . . . [9160-36]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 8

LOCATION: CONV. CTR. ROOM 9 . . . . TUE 11:00 AM TO 12:20 PM

Active Control I

Session Chair: **Isabelle Staude,** The Australian National Univ. (Australia)

11:00 am: **Manipulating phase and power flow with electromagnetic metamaterials** *(Invited Paper)*, Anthony Grbic, Gurkan Gok, Univ. of Michigan (USA) . . . . . [9160-37]

11:25 am: **Guiding, switching, and sensing with nanorod metamaterials** *(Invited Paper)*, Gregory A. Wurtz, Wayne Dickson, Pavel Ginzburg, Alexey V. Krasavin, Anatoly V. Zayats, King's College London (United Kingdom). . . . . [9160-38]

11:50 am: **Voltage tunable mid-infrared metamaterials based on strong light-matter coupling**, Alexander Benz, Ines Montano, John F. Klem, Igal Brener, Sandia National Labs. (USA) . . . . . [9160-39]

12:05 pm: **Mechanical tuning of metasurface made from stand-up split ring resonators**, Fan Zhou, Chen Wang, Biqin Dong, Xiangfan Chen, Cheng Sun, Northwestern Univ. (USA) . . . . . [9160-40]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 2:00 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 9 . . . . . TUE 2:00 PM TO 3:30 PM

All Dielectric Metamaterials

Session Chair: **Federico Capasso,** Harvard School of Engineering and Applied Sciences (USA)

2:00 pm: **Extreme plasmonics in atomically thin materials** *(Keynote Presentation)*, Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain); Alejandro Manjavacas, Rice Univ. (USA) . . . . . [9160-21]

2:45 pm: **Localized surface phonon polariton resonances in cuboidal silicon carbide nanopillar arrays**, Chase T. Ellis, Joseph G. Tischler, Orest J. Glembocki, U.S. Naval Research Lab. (USA); Francisco J. Bezares, U.S. Naval Research Lab. (USA) and American Society for Engineering Education (USA); Richard Kasica, National Institute of Standards and Technology (USA); Loretta Shirey, Joshua D. Caldwell, U.S. Naval Research Lab. (USA) . . . . . [9160-42]

3:00 pm: **Non-steady-state organic plasmonics and its application to optical control of Coulomb blocking in nanojunctions**, Boris D. Fainberg, Holon Institute of Technology (Israel) and Tel Aviv Univ. (Israel); Alexander J. White, Michael Galperin, Univ. of California, San Diego (USA) . . . . . [9160-43]

3:15 pm: **Superdirective dielectric resonator antenna**, Alexandr E. Krasnok, Dmitry S. Filonov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Constantin R. Simovski, Aalto Univ. School of Electrical Engineering (Finland); Yuri S. Kivshar, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and The Australian National Univ. (Australia); Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . [9160-45]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 9 . . . . . TUE 4:00 PM TO 5:35 PM

Controlling Physical Phenomena with Metamaterials

Session Chair: **Anthony Grbic,** Univ. of Michigan (USA)

4:00 pm: **Is there a metamaterial route to high temperature superconductivity?** *(Invited Paper)*, Igor I. Smolyaninov, BAE Systems (USA); Vera N. Smolyaninova, Towson Univ. (USA). . . . . [9160-46]

4:25 pm: **Visualizing catalytic reactions and light-matter interactions in plasmonic materials and metamaterials with sub-nanometer-scale resolution** *(Invited Paper)*, Jennifer A. Dionne, Stanford Univ. (USA). . . . . [9160-47]

4:50 pm: **Settling the controversy of Forster energy transfer (FRET)**, Cristian L. Cortes, Zubin Jacob, Univ. of Alberta (Canada) . . . . . [9160-48]

5:05 pm: **Effect of rotation symmetry on the optical activity using planar meta-nanostructures**, Eng Huat Khoo, A*STAR Institute of High Performance Computing (Singapore) . . . . . [9160-49]

5:20 pm: **Demonstration of the magnetic Purcell effect in wire metamaterials**, Alexey P. Slobozhanuk, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Alexander Poddubny, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Ioffe Physical-Technical Institute (Russian Federation); Alexandr E. Krasnok, Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9160-51]

WEDNESDAY 20 AUGUST

SESSION 11

LOCATION: CONV. CTR. ROOM 9 . . . WED 8:05 AM TO 10:25 AM

Novel Material Platforms

Session Chair: **Uriel Levy,** The Hebrew Univ. of Jerusalem (Israel)

8:05 am: **Linear and nonlinear properties of all-dielectric metamaterials** *(Invited Paper),* Dragomir N. Neshev, Isabelle Staude, The Australian National Univ. (Australia); Maxim Shcherbakov, Lomonosov Moscow State Univ. (Russian Federation); Andrey E. Miroshnichenko, Manuel Decker, The Australian National Univ. (Australia); Andrey A. Fedyanin, Lomonosov Moscow State Univ. (Russian Federation); Igal Brener, Sandia National Labs. (United States); Yuri S. Kivshar, The Australian National Univ. (Australia) . . . . . [9160-41]

8:30 am: **Developing ceramic materials for practical plasmonics** *(Invited Paper)*, Alexandra Boltasseva, Nathaniel Kinsey, Urcan Guler, Jongbum Kim, Purdue Univ. (USA); Gururaj V. Naik, Stanford Univ. (USA); Vladimir M. Shalaev, Purdue Univ. (USA) . . . . . [9160-52]

8:55 am: **Manufacturing of bulk nanoplasmonic materials and metamaterials by micro-pulling down method** *(Invited Paper)*, Dorota A. Pawlak, Katarzyna Sadecka, Marcin Gajc, Karolina Korzeb, Pawel Osewski, Andrzej Klos, Barbara Surma, Institute of Electronic Materials Technology (Poland); Alessandro Belardini, Grigore Leahu, Concita Sibilia, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [9160-53]

9:20 am: **Nanoarrays for the generation of complex optical wave-forms** *(Invited Paper)*, David L. Andrews, Univ. of East Anglia (United Kingdom) . . . . . [9160-54]

9:45 am: **Tunable linear and nonlinear optical properties of transparent conductive oxides for Si-compatible active nanoplasmonics**, Antonio Capretti, Boston Univ. (USA) and CNR-SPIN (Italy); Yu Wang, Boston Univ. (USA); Nader Engheta, Univ. of Pennsylvania (USA); Luca Dal Negro, Boston Univ. (USA) . . . . . [9160-55]

10:00 am: **Experimental demonstration of negative refractive index in principally homogeneous materials (magnetic semiconductors)** *(Invited Paper)*, Adil-Gerai Kussow, Alkim Akyurtlu, Yassine Ait El Aoud, Hamzeh M. Jaradat, Univ. of Massachusetts Lowell (USA). . . . . [9160-56]

Coffee Break . . . . . Wed 10:25 am to 10:55 am

CONFERENCE 9160

LOCATION: CONV. CTR. ROOM 9

SESSION 12

LOCATION: CONV. CTR. ROOM 9 . . . WED 10:55 AM TO 12:00 PM

Active Control II

Session Chair: **Alexandra Boltasseva,** Purdue Univ. (USA)

10:55 am: **Field effect frequency tunable metamaterials** *(Invited Paper)*, Harry A. Atwater Jr., Victor W. Brar, Georgia T. Papadakis, Ho Wai Lee, Michelle Sherrott, California Institute of Technology (USA) . . . . . [9160-57]

11:20 am: **Materials and fields at the nanoscale: design and engineering of active photonic-plasmonic nanostructures** *(Invited Paper)*, Luca Dal Negro, Boston Univ. (USA) . . . . . [9160-58]

11:45 pm: **Bilayer four-fold rotationally symmetric subwavelength nanostructures for chirality switching**, Yew Li Hor, A*STAR Institute of High Performance Computing (Singapore) . . . . . [9160-60]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:50 pm

SESSION 13

LOCATION: CONV. CTR. ROOM 9 . . . . . WED 1:50 PM TO 3:40 PM

Novel Phenomena II

Session Chair: **Alexandros Selimis,** Foundation for Research and Technology-Hellas (Greece)

1:50 pm: **Guiding waves around the corners: topologically protected photonic transport** *(Invited Paper)*, Gennady B. Shvets, Tzuhsuan Ma, S. Hossein Mousavi, The Univ. of Texas at Austin (USA); Alexander B. Khanikaev, Queens College (USA) . . . . . [9160-61]

2:15 pm: **Anisotropic metamaterials to enhance ring imaging Cherenkov detection**, Vincent Ginis, Vrije Univ. Brussel (Belgium); Philippe Tassin, Chalmers Univ. of Technology (Sweden); Thomas Koschny, Iowa State Univ. (USA); Costas M. Soukoulis, Iowa State Univ. (USA) and Foundation for Research and Technology-Hellas (Greece) . . . . . [9160-62]

2:30 pm: **Fluctuational forces in metamaterials**, Cristian L. Cortes, Zubin Jacob, Univ. of Alberta (Canada) . . . . . [9160-63]

2:45 pm: **Singular evanescent wave resonances** *(Invited Paper)*, Yu Guo, Zubin Jacob, Univ. of Alberta (Canada) . . . . . [9160-64]

3:10 pm: **Optical spin Hall effect in two-dimensional phase gradient complementary metasurface**, Jeong-Weon Wu, Yeon Ui Lee, Ewha Womans Univ. (Korea, Republic of) . . . . . [9160-65]

3:25 pm: **Optical phenomena in multi-periodic plasmonic multilayers**, Alexey A. Orlov, Anastasia K. Krylova, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Sergei V. Zhukovsky, Viktoriia E. Babicheva, Technical Univ. of Denmark (Denmark); Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9160-66]

Coffee Break . . . . . .Wed 3:40 pm to 4:00 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 9 . . . . WED 4:00 PM TO 5:45 PM

Fabrication

Session Chair: **Zubin Jacob,** Univ. of Alberta (Canada)

4:00 pm: **Direct laser writing: principles, materials, and applications** *(Invited Paper)*, Alexandros Selimis, George Kenanakis, Angelos Xomalis, Maria Kafesaki, Maria Farsari, Foundation for Research and Technology-Hellas (Greece) . [9160-67]

4:25 pm: **Design, fabrication, and characterization of plasmonic and dielectric metamaterials** *(Invited Paper)*, Uriel Levy, Meir Grajower, Boris Desiatov, Liron Stern, Avner Yanai, The Hebrew Univ. of Jerusalem (Israel). . . . . [9160-68]

4:50 pm: **High-throughput nanofabrication of planar chiral metamaterials fabricated using nanospherical-lens lithography** *(Invited Paper)*, Yun-Chorng Chang, Academia Sinica (Taiwan) and National Cheng Kung Univ. (Taiwan); Chang-Han Wang, Yu-Min Huang, Fu-Tian Tseng, National Cheng Kung Univ. (Taiwan) . . . . . [9160-69]

5:15 pm: **Layer-by-layer assembled colloidal silver nanoparticle films for SERS applications**, Hung-Ying Chen, Meng-Hsien Lin, Shangjr Gwo, National Tsing Hua Univ. (Taiwan) . . . . . [9160-70]

5:30 pm: **Temperature dependent surface modification of silica spheres with methacrylate**, Kwang-Sun Kang, Kyungil Univ. (Korea, Republic of) . . . . [9160-71]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . . WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Realization of negative index in second-order dispersive metamaterials using standard dispersion models for electromagnetic parameters, Monish R. Chatterjee, Tarig A. Algadey, Univ. of Dayton (USA). . . . . [9160-88]

Metamaterials for invisble using, Hongwei Sun, Fei Yan, Jiangsu Automation Research Institute (China) . . . . . [9160-89]

Anderson localization for discretely disordered metamaterials: effect of polarization and off-axis incidence, Glen J. Kissel, Univ. of Southern Indiana (USA) . . . . . [9160-90]

Design of periodic plasmonic photocoupler for infrared optoelectronics, Zhenghua An, Fudan Univ. (China) . . . . . [9160-91]

Reflected metasurface for polarization-controlled hologram application, Pin Chieh Wu, Wei Ting Chen, Kuang-Yu Yang, National Taiwan Univ. (Taiwan); Chih-Ming Wang, National Dong Hwa Univ. (Taiwan); Yao-Wei Huang, National Taiwan Univ. (Taiwan); Greg Sun, Univ. of Massachusetts Boston (USA); Shulin Sun, Lei Zhou, Fudan Univ. (China); Ai Qun Liu, Nanyang Technological Univ. (Singapore); Din Ping Tsai, National Taiwan Univ. (Taiwan) . . . . . [9160-92]

Calculating magnetic permeability response from a conducting square ring structure, Ahmad Khayyat Jafari, Jiangfeng Zhou, Univ. of South Florida (USA) . . . . . [9160-93]

Nonreciprocal manipulation of light propagation in 2D-photonic crystals with cylindrical metamaterials consisting of arrayed SWNTs with helical DC, Koichi Fukushima, Osaka Prefecture Univ. (Japan); Tatsuya Nakajima, Tohoku Univ. (Japan); Atsushi Syouji, Yamanashi Univ. (Japan); Hajime Ishihara, Osaka Prefecture Univ. (Japan) . . . . . [9160-94]

Scattering and coupling between subwavelength resonators, Morteza Karami, Steven Kitchin, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) . . . . . [9160-96]

Enhanced radiation from dipolar sources in proximity of subwavelength hyperbolic metamaterial resonators, Caner Guclu, Univ. of California, Irvine (USA); Ting-Shan Luk, George T. Wang, Michael B. Sinclair, Sandia National Labs. (USA); Filippo Capolino, Univ. of California, Irvine (USA) . . . . . [9160-97]

Plasmonic color filters to decrease ambient light errors on active type double band infrared image sensors, Hong-Kun Lyu, Hui-Sup Cho, Young-Jin Park, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of); Sung-Hyun Jo, Hee-Ho Lee, Jang-Kyoo Shin, Kyungpook National Univ. (Korea, Republic of) . . . . . [9160-98]

Characterization of ferromagnetic/dielectric systems for metamaterials applications, Brittany Bates, Nicole Greene, Natalia Noginova, Norfolk State Univ. (USA) . . . . . [9160-99]

Anisotropy modeling of polarization dependent terahertz metamaterials, Hyunseung Jung, Hojin Lee, Soongsil Univ. (Korea, Republic of) . . . . . [9160-100]

Excitation of surface waves in the photonic crystal / graphene structure for terahertz frequency range, Alaudi K. Denisultanov, Mikhail K. Khodzitskiy, Solveyga E. Azbite, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9160-101]

Titanium nitride as nonmetallic metamaterial component: gyroidal self-assembly and nonlinear optical response, Srujana Prayakarao, Norfolk State Univ. (USA); Spencer Robbins, Cornell Univ. (USA); Nathaniel Kinsey, Purdue Univ. (USA); Devon Courtwright, Norfolk State Univ. (USA); Alexandra Boltasseva, Vladimir M. Shalaev, Purdue Univ. (USA); Ulrich B. Wiesner, Cornell Univ. (USA); Vladimir I. Gavrilenko, Carl E. Bonner Jr., Mikhail A. Noginov, Norfolk State Univ. (USA) . . . . . [9160-103]

THURSDAY 21 AUGUST

SESSION 15

LOCATION: CONV. CTR. ROOM 9 . . . .THU 8:20 AM TO 10:00 AM

Nonlinear Phenomena

Session Chair: **Robert Schittny,** Karlsruher Institut für Technologie (Germany)

8:20 am: **Microwave interaction with visible light**, Alexey P. Slobozhanuk, Polina V. Kapitanova, Dmitry S. Filonov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); David A. Powell, Ilya V. Shadrivov, The Australian National Univ. (Australia); Mikhail Lapine, The Univ. of Sydney (Australia); Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Ross C. McPhedran, The Univ. of Sydney (Australia); Yuri S. Kivshar, The Australian National Univ. (Australia). . . . . [9160-72]

8:35 am: **Backward phase matching for second harmonic generation in negative index materials**, Wenshan Cai, Georgia Institute of Technology (USA) . . . . . [9160-73]

8:50 am: **From unidirectional scattering to nonlinear unidirectional generation: leveraging magneto-electric interference**, Ekaterina Poutrina, Air Force Research Lab. (USA); Alec Rose, Duke Univ. (USA); Dean Brown, Air Force Research Lab. (USA); David R. Smith, Duke Univ. (USA); Augustine M. Urbas, Air Force Research Lab. (USA) . . . . . [9160-74]

9:05 am: **Second harmonic generation from asymmetric plasmonic nanoparticle dimers**, Augustine M. Urbas, Vitaliy N. Pustovit, Richard Vaia, Sushmita Biswas, Kyoungweon Park, Dhriti Nepal, Air Force Research Lab. (USA) . . . . . [9160-75]

9:20 am: **Electrically controlled nonlinear optical phenomena in photonic metamaterials** *(Invited Paper)*, Wenshan Cai, Georgia Institute of Technology (USA) . . . . . [9160-76]

9:45 am: **Subpicosecond relaxation of the third-order nonlinear susceptibility in fishnet metamaterials**, Alexander Shorokhov, Maxim Shcherbakov, Lomonosov Moscow State Univ. (Russian Federation); Jörg Reinhold, Friedrich-Schiller-Univ. Jena (Germany); Andrey A. Fedyanin, Lomonosov Moscow State Univ. (Russian Federation); Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany) . . . [9160-77]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 16

LOCATION: CONV. CTR. ROOM 9 . . . THU 10:30 AM TO 12:05 PM

THz Metamaterials

Session Chair: **Wenshan Cai,** Georgia Institute of Technology (USA)

10:30 am: **THz polarization control using chiral metamaterials** *(Invited Paper)*, Maria Kafesaki, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); George Kenanakis, Eleftherios N. Economou, Costas M. Soukoulis, Foundation for Research and Technology-Hellas (Greece). . . . [9160-78]

10:55 am: **Theory and modeling of self-induced transparency in Terahertz graphene metamaterials** *(Invited Paper)*, Sang Soon Oh, Joachim M. Hamm, Andreas Pusch, Ortwin Hess, Imperial College London (United Kingdom) [9160-79]

11:20 am: **Manipulating terahertz waves with photo-imprinted diffraction gratings**, Philippe Tassin, Chalmers Univ. of Technology (Sweden); Ioannis Chatzakis, Liang Luo, Iowa State Univ. (USA); Nian-Hai Shen, Ames Lab. (USA); Lei Zhang, Iowa State Univ. (USA); Jigang Wang, Ames Lab. (USA); Thomas Koschny, Costas M. Soukoulis, Iowa State Univ. (USA). . . . . [9160-80]

11:35 am: **Design, simulation, and fabrication of a novel reconfigurable graphene terahertz filter**, Kai Yang, Sara Arezoomandan, Berardi Sensale-Rodriguez, The Univ. of Utah (USA) . . . . . [9160-81]

11:50 am: **Tunable frequency converter for terahertz frequency range based on space-time transformation**, Egor A. Gurvitz, Anna V. Vozianova, Mikhail K. Khodzitskiy, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9160-82]

Lunch/Exhibition Break . . . . . Thu 12:05 pm to 2:05 pm

SESSION 17

LOCATION: CONV. CTR. ROOM 9 . . . . . .THU 2:05 PM TO 4:10 PM

Imaging and Cloaking

Session Chair: **Maria Kafesaki,** Foundation for Research and Technology-Hellas (Greece)

2:05 pm: **Polarization controlled colorful images reconstructed by reflective meta-hologram** *(Invited Paper)*, Din Ping Tsai, Academia Sinica (Taiwan); Pin Chieh Wu, Wei Ting Chen, National Taiwan Univ. (Taiwan); Kuang-Yu Yang, Academia Sinica (Taiwan); Chih-Ming Wang, National Dong Hwa Univ. (Taiwan); Yao-Wei Huang, National Taiwan Univ. (Taiwan); Greg Sun, Univ. of Massachusetts Boston (USA); Shulin Sun, Lei Zhou, Fudan Univ. (China); Ai Qun Liu, Nanyang Technological Univ. (Singapore) . . . . . [9160-83]

2:30 pm: **Numerically stable reconstruction of wavelength-scale objects with sub-wavelength resolution**, Sandeep Inampudi, Univ. of Massachusetts Lowell (USA); Nicholas A. Kuhta, Oregon State Univ. (USA); Viktor A. Podolskiy, Univ. of Massachusetts Lowell (USA). . . . . [9160-84]

2:45 pm: **Invisibility cloaking in the diffusive-light limit** *(Invited Paper)*, Robert Schittny, Muamer Kadic, Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9160-85]

Coffee Break . . . . . Thu 3:10 pm to 3:40 pm

3:40 pm: **Design of homogeneous coatings for the cloaking of arbitrarily-shaped objects**, Carlo Forestiere, Luca Dal Negro, Boston Univ. (USA); Giovanni Miano, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [9160-86]

3:55 pm: **Optimization of aberrations in transformation optics inspired lenses**, Saul Wiggin, Queen Mary, Univ. of London (United Kingdom) . . . . . [9160-87]

LOCATION: CONV. CTR. ROOM 9 . . . . . 4:10 PM TO 4:15 PM

Closing Remarks

Session Chair: **Mikhail A. Noginov,** Norfolk State Univ. (USA)

CONFERENCE 9161

LOCATION: CONV. CTR. ROOM 5B

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9161

Nanophotonic Materials XI

Conference Chairs: **Stefano Cabrini,** Lawrence Berkeley National Lab. (USA); **Gilles Lérondel,** Univ. de Technologie Troyes (France); **Adam M. Schwartzberg,** Lawrence Berkeley National Lab. (USA); **Taleb Mokari,** Ben-Gurion Univ. of the Negev (Israel)

Program Committee: **David L. Andrews,** Univ. of East Anglia (United Kingdom); **Angus J. Bain,** Univ. College London (United Kingdom); **Mireille H. Blanchard-Desce,** Univ. de Rennes 1 (France); **Robert W. Boyd,** Univ. of Rochester (USA); **Zeno Gaburro,** Univ. degli Studi di Trento (Italy); **Aaron W. Harper,** The Univ. of Southern California (USA); **Ghassan E. Jabbour,** Arizona State Univ. (USA); **François Kajzar,** Univ. Politehnica of Bucharest (Romania); **Dmitri I. Kovalev,** Univ. of Bath (United Kingdom); **Paras N. Prasad,** Univ. at Buffalo (USA); **Dmitri Talapin,** The Univ. of Chicago (USA); **Younan Xia,** Georgia Institute of Technology (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 5B . . . WED 8:20 AM TO 9:50 AM

Quantum Confinement

Session Chair: **Gilles Lerondel,** Univ. de Technologie Troyes (France)

8:20 am: **A new and fast numerical method for the determination of the optical properties of quantum structures**, François Thierry, Judikaël Le Rouzo, Institut Matériaux Microélectronique Nanosciences de Provence (France); François R. Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Ecole Centrale Marseille (France) . . . . . [9161-2]

8:40 am: **Influence of core-shell interfaces in exciton and multi-exciton dynamics of CdSe-CdZnS quantum dots**, Alessandro Minotto, Francesco Todescato, Raffaella Signorini, Univ. degli Studi di Padova (Italy); Jacek J. Jasieniak, Commonwealth Scientific and Industrial Research Organisation (Australia); Renato Bozio, Univ. degli Studi di Padova (Italy) . . . . . [9161-3]

9:00 am: **Investigation of CdS nanowire lasing emission**, Robert Röder, Max Riediger, Friedrich-Schiller-Univ. Jena (Germany); Daniel Ploss, Arian Kriesch, Robert Buschlinger, Ulf Peschel, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Carsten Ronning, Friedrich-Schiller-Univ. Jena (Germany) . . . . [9161-4]

9:20 am: **Engineering bright sub-10-nm upconverting nanocrystals for single-molecule imaging** *(Invited Paper)*, Emory Chan, The Molecular Foundry (USA) . . . . . [9161-5]

Coffee Break . . . . . Wed 9:50 am to 10:20 am

SESSION 2

LOCATION: CONV. CTR. ROOM 5B . . WED 10:20 AM TO 12:10 PM

Material for Plasmonics

Session Chair: **Stefano Cabrini,** The Molecular Foundry (USA)

10:20 am: **Novel materials and nanostructures for near-field engineering** *(Invited Paper)*, Luca Dal Negro, Boston Univ. (USA) . . . . . [9161-6]

10:50 am: **Surface-enhanced infrared spectroscopy using metal oxide plasmonic nanoantennas**, Otto L. Muskens, Yudong Wang, Martina Abb, Cornelis H. de Groot, Univ. of Southampton (United Kingdom) . . . . . [9161-7]

11:10 am: **Facile synthesis of Cu2S nanoarchitectures in application of surface Raman enhanced scattering**, Shih-Yu Fu, Hao-Syuan Jhang, Yu-Kuei Hsu, National Dong Hwa Univ. (Taiwan); Yan-Gu Lin, National Synchrotron Radiation Research Ctr. (Taiwan) . . . . . [9161-8]

11:30 am: **Dark-field scattering spectroscopy of single Au/TiO_2 core-shell nanowires**, Jeongyong Kim, Sungkyunkwan Univ. (Korea, Republic of) . . . [9161-9]

11:50 am: **Self-assembled nanoplasmonic structures with symmetry-breaking**, Sui Yang, Xiaobo Yin, Boubacar Kante, Peng Zhang, Jia Zhu, Yuan Wang, Xiang Zhang, Univ. of California, Berkeley (USA) . . . . . [9161-10]

Lunch/Exhibition Break . . . . . Wed 12:10 pm to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 5B . . . . WED 1:40 PM TO 3:30 PM

Optical Properties of Oxides

Session Chair: **Adam M. Schwartzberg,** Lawrence Berkeley National Lab. (USA)

1:40 pm: **Hybrid materials: a bottom-up approach for nanotechnology applications** *(Invited Paper)*, Giovanna Brusatin, Univ. degli Studi di Padova (Italy) . . . . . [9161-11]

2:10 pm: **Enhanced stimulated emission in ZnO thin films using microdisk top-down structuring**, Komla Nomenyo, Univ. de Technologie Troyes (France); Abde-Sattar Gadallah, Univ. de Technologie de Troyes (France) and Cairo Univ. (Egypt); Sergei Kostcheev, Univ. de Technologie Troyes (France); Dave J. Rogers, Nanovation (France); Gilles Lerondel, Univ. de Technologie Troyes (France) . . . . . [9161-12]

2:30 pm: **Synthesis of high purity metal oxide nanoparticles for optical applications**, Colin Baker, Woohong R. Kim, E. Joseph Friebele, Guillermo Villalobos, Jesse Frantz, L. Brandon Shaw, Bryan Sadowski, Jas S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9161-13]

2:50 pm: **Ultrafast dynamics of coherent exciton-polaritons in ZnO/ZnMgO multiple quantum wells**, Minfeng Chen, Academia Sinica (Taiwan); Yia-Chung Chang, Academia Sinica (Taiwan) and National Chiao Tung Univ. (Taiwan); Ja-Hon Lin, Yi-Kai Shen, Hsuan-Ching Lin, National Taipei Univ. of Technology (Taiwan); Wei-Ren Liu, Chia-Hung Hsu, National Synchrotron Radiation Research Ctr. (Taiwan); Chin-Chia Kuo, Wen-Feng Hsieh, National Chiao Tung Univ. (Taiwan) . . . . . [9161-14]

3:10 pm: **Effect of annealing on the structural and optical properties of ZnO and AZO films prepared by sol-gel spin coating method**, Sanjeev Kumar, Anil Kumar, Univ. of Delhi South Campus (India); Udaibir Singh, Univ. of Delhi (India); Fouran Singh, Inter Univ. Accelerator Ctr. (India); Avinashi Kapoor, Univ. of Delhi (India) . . . . . [9161-15]

Coffee Break . . . . . Wed 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 5B . . . WED 4:00 PM TO 5:50 PM

Energy-Related Materials

Session Chair: **Taleb Mokari,** Ben-Gurion Univ. of the Negev (Israel)

4:00 pm: **Monitoring interfacial charge dynamics via FSRS** *(Invited Paper)*, Adam M. Schwartzberg, Lawrence Berkeley National Lab. (USA); David Hoffman, Univ. of California, Berkeley (USA); Sibel Liblibici, The Molecular Foundry (USA); Richard A. Mathies, Univ. of California, Berkeley (USA) . . . . . [9161-16]

4:30 pm: **Highly crystalline urchin-like ordered arrays of ultra-thin zinc oxide nanowires: towards solar cell fabrication**, Anisha Gokarna, Romain Parize, Hind Kadiri, Komla Nomenyo, Univ. de Technologie Troyes (France); Gilles Patriarche, Lab. de Photonique et de Nanostructures (France); Patrice Miska, Univ. of Lorraine (France); Gurpreet S. Selopal, Riccardo Milan, Isabella Concina, Alberto Vomiero, Univ. degli Studi di Brescia (Italy); Gilles Lerondel, Univ. de Technologie Troyes (France) . . . . . [9161-17]

4:50 pm: **Nanocavity enhanced absorption of ultra-thin films**, Haomin Song, Univ. at Buffalo (USA); Luqing Guo, Zhejun Liu, Fudan Univ. (China); Kai Liu, Xie Zeng, Dengxin Ji, Nan Zhang, Univ. at Buffalo (USA); Hai-feng Hu, Northeastern Univ. (China); Suhua Jiang, Fudan Univ. (China); Qiaoqiang Gan, Univ. at Buffalo (USA) . . . . . [9161-18]

5:10 pm: **Aluminum and copper plasmonics for enhancing internal quantum efficiency of core-shell and core-multishell nanowire photoelectrodes**, Sarath Ramadurgam, Chen Yang, Purdue Univ. (USA) . . . . . [9161-19]

5:30 pm: **Mixed ZnO nanoparticles as buffer layers of organic solar cells**, Young-Kuk Kim, Kyu-Chae Choi, Youn-Kyung Baek, Eun-Jin Lee, Korea Institute of Materials Science (Korea, Republic of) . . . . . [9161-20]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Impact of hydrogen bonding in solvent for dispersion of ZnO nanocrystals on photovoltaic properties of organic solar cells, Young-Kuk Kim, Kyu-Chae Choi, Youn-Kyung Baek, Eun-Jin Lee, Korea Institute of Materials Science (Korea, Republic of) . . . . . [9161-32]

Highly transparent and conducting graphene embedded ZnO films with enhanced photoluminescence fabricated by aerosol synthesis, Sung Jin An, Kumoh National Institute of Technology (Korea, Republic of); Jong-Young Kim, Korea Institute of Ceramic Engineering and Technology (Korea, Republic of) . . . . . [9161-34]

Coatable chromonic liquid crystal polarizer, Yu-Jin Choi, Dae-Yoon Kim, Pureun Im, Won-Jin Yoon, Ji-Tae Kim, Hui-Su Kim, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-35]

Fullerene patterns in the elastically anisotropic cholesteric liquid crystals, Won-Jin Yoon, Pureun Im, Dong-Gue Kang, Yu-Jin Choi, Ji-Tae Kim, Hui-Su Kim, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-36]

Surface-induced phase transition behaviors of the rod-disc molecule, Won-Jin Yoon, Dae-Yoon Kim, Yu-Jin Choi, Sang-A Lee, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-37]

Reversible actuation of an azobenzene-based photochromic liquid crystalline polymer, Yu-Jin Choi, Dae-Yoon Kim, Won-Jin Yoon, Sang-A Lee, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-38]

Synthesis and characterization of highly luminescent CuInS2/ZnS quantum dots for near-infrared bio-imaging, Hyung Seok Choi, Jae Chul Park, Youngsun Kim, Mi Hwa Oh, Duk Young Jeon, Yoon Sung Nam, KAIST (Korea, Republic of) . . . . . [9161-39]

Luminescence studies on solid and nanostructured SiO_2:Eu^{3+} spheres obtained by sol-gel route, Jorge A. Garcia-Macedo, Univ. Nacional Autónoma de México (Mexico); Estrella Terán-Hinojosa, Univ. Nacional Autónoma de Mexico (Mexico); Afredo Franco, Univ. Tecnológica Fidel Velázquez (Mexico). . . . [9161-40]

Type-I InAs quantum dots covered by GaAsSb strain reducing layer, Martin Pokorný, Martin Kozák, Frantisek Trojánek, Charles Univ. in Prague (Czech Republic); Jirí Pangrác, Alice Hospodková, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9161-41]

Three-dimensional branched nanowire heterostructures as efficient light-extraction layer in light-emitting diodes, Jeong Min Baik, Joonmo Park, Byeong-Uk Ye, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9161-42]

Optical attenuation of plasmonic Au-PDMS nanocomposite thin-film devices, Gregory T. Forcherio, Donald K. Roper, Univ. of Arkansas (USA) . . . . . [9161-43]

Optical properties of solutions and thin films of silver and gold nanoparticles with hyaluronic acid, Vasyl J. Syrvatka, Yurij I. Slyvchuk, Ivan I. Gevkan, Ivan I. Rozgoni, Iryna O. Matyukha, Oksana V. Shtapenko, Institute of Animal Biology NAAS (Ukraine) . . . . . [9161-44]

Fabrication of chromonic nanofiber embedding self-assembled discotic sunset-yellow FCF dyes, Dong-Gue Kang, Dae-Yoon Kim, Pureun Im, Won-Jin Yoon, Yu-Jin Choi, Ji-Tae Kim, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-45]

Synthesis and characterization of a tetrathiafulvalene-based polymer, Pureun Im, Dong-Gue Kang, Ji-Tae Kim, Min-Wook Park, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-46]

Hierarchical structures from the asymmetric amphiphilic tetrathiafulvalene molecule, Pureun Im, Dae-Yoon Kim, Soon-Chun Park, Sang-A Lee, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9161-47]

Characteristics of YAG-doped ZnO/ITO deposited by spraying methed, Wun Wei Lin, National Taipei Univ. of Technology (Taiwan) . . . . . [9161-48]

Nonlinear properties of IGZO thin films prepared by RF magnetron sputtering, Sanal K. Kozhiparambil, Vishnu K., Shijeesh M. R., Madambi K. Jayaraj, Cochin Univ. of Science & Technology (India). . . . . [9161-49]

THURSDAY 21 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 5B . . . THU 8:20 AM TO 10:10 AM

Applications of Oxides

Session Chair: **Stefano Cabrini,** The Molecular Foundry (USA)

8:20 am: **Metal oxide and metal-metal oxide hybrid nanostructures for applications of catalysis and smart windows** *(Invited Paper)*, Taleb Mokari, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9161-21]

8:50 am: **Sensors based on facet dielectric metamaterial**, Andrey K. Sarychev, Institute for Theoretical and Applied Electrodynamics (Russian Federation); Andrey N. Lagarkov, Institute for Theoretical and Applied Electromagnetics (Russian Federation); Ilya A. Ryzhikov, Alexander V. Vaskin, Konstantin N. Afanasiev, Irina A. Boginskaya, Igor V. Bykov, Institute for Theoretical and Applied Electrodynamics (Russian Federation); Ilya S. Kurochkin, Lomonosov Moscow State Univ. (Russian Federation); Igor A. Budashov, N.M. Emanuel Institute of Biochemical Physics (Russian Federation) . . . . . [9161-22]

9:10 am: **High temperature ceramics based nanophotonic structures**, Manfred Eich, Technische Univ. Hamburg-Harburg (Germany) . . . . . [9161-23]

9:30 am: **Direct printing of planar photonic circuits with high refractive index**, Carlos A. Pina-Hernandez, abeam Technologies, Inc. (USA); Aleksandr Polyakov, Lucas Digianantonio, The Molecular Foundry (USA); Giuseppe Calafiore, Sergey Babin, abeam Technologies, Inc. (USA); Stefano Cabrini, The Molecular Foundry (USA); Christophe Peroz, abeam Technologies, Inc. (USA); Alexander Koshelev, Alexey Bugrov, Alexander Goltsov, Nano-Optic Devices (USA) . . . . . [9161-24]

9:50 am: **Sub-wavelength nano-engineering metal oxide nanomaterials for optical sensing**, Zsolt L. Poole, Univ. of Pittsburgh (USA); Paul R. Ohodnicki Jr., National Energy Technology Lab. (USA); Rongzhang Chen, Univ. of Pittsburgh (USA); Shaymaa Riyadh, Univ. of Bagdhad (Iraq); Yuankun Lin, Univ. of North Texas (USA); Kevin P. Chen, Univ. of Pittsburgh (USA). . . . . [9161-25]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 6

LOCATION: CONV. CTR. ROOM 5B . . THU 10:40 AM TO 12:30 PM

Controlling Optical Properties

Session Chair: **Luca Dal Negro,** Boston Univ. (USA)

10:40 am: **Polymer based nanocomposites with tailorable optical properties** *(Invited Paper)*, Roberto Simonutti, Univ. degli Studi di Milano-Bicocca (Italy) . . . . . [9161-26]

11:10 am: **Multi-physics modeling of photonic and excitonic properties of DNA-based nanostructures**, Étienne Boulais, Massachusetts Institute of Technology (USA); Nicolas Sawaya, Harvard Univ. (USA); Keyao Pan, Massachusetts Institute of Technology (USA); Alán Aspuru-Guzik, Harvard Univ. (USA); Mark Bathe, Massachusetts Institute of Technology (USA) . . . . . [9161-27]

11:30 am: **Spatially adjusted spontaneous emissions from photonic crystals embedded light-emitting diodes**, Yu-Feng Yin, Yen-Chen Lin, National Taiwan Univ. (Taiwan); Yi-Chen Liu, Hai-Pang Chiang, National Taiwan Ocean Univ. (Taiwan); Jian-Jang Huang, National Taiwan Univ. (Taiwan). . . . . [9161-28]

11:50 am: **Ultrahigh-contrast and large-bandwidth thermal rectification in near-field electromagnetic thermal transfer between nanoparticles**, Linxiao Zhu, Clayton R. Otey, Shanhui Fan, Stanford Univ. (USA) . . . . . [9161-29]

12:10 pm: **Heating processes in plasmonic resonances: a non-linear temperature dependent permittivity model**, Alessandro Alabastri, Francesco De Angelis, Remo Proietti Zaccaria, Istituto Italiano di Tecnologia (Italy) . . . . [9161-30]

CONFERENCE 9162

LOCATION: CONV. CTR. ROOM 3

Sunday–Thursday 17–21 August 2014 • Proceedings of SPIE Vol. 9162

Active Photonic Materials VI

Conference Chairs: **Ganapathi S. Subramania,** Sandia National Labs. (USA); **Stavroula Foteinopoulou,** Univ. of Exeter (United Kingdom)

Program Committee: **Koray Aydin,** Northwestern Univ. (USA); **Paul V. Braun,** Univ. of Illinois at Urbana-Champaign (USA); **Kurt Busch,** Humboldt-Univ. zu Berlin (Germany); **Allan Chang,** Lawrence Livermore National Lab. (USA); **Shanhui Fan,** Stanford Univ. (USA); **Didier Felbacq,** Univ. Montpellier 2 (France); **Alexander V. Kildishev,** Purdue Univ. (USA); **Yuri S. Kivshar,** The Australian National Univ. (Australia); **Michal F. Lipson,** Cornell Univ. (USA); **Cefe López,** Consejo Superior de Investigaciones Científicas (Spain); **Michelle L. Povinelli,** The Univ. of Southern California (USA); **Jörg Schilling,** Martin-Luther-Univ. Halle-Wittenberg (Germany); **Andrey A. Sukhorukov,** The Australian National Univ. (Australia); **Ralf B. Wehrspohn,** Fraunhofer-Institut für Werkstoffmechanik (Germany); **Daniel M. Wasserman,** Univ. of Illinois at Urbana-Champaign (USA); **William Whelan-Curtin,** Univ. of St. Andrews (United Kingdom)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 3 . . . . . 8:25 AM TO 8:30 AM

Introductory Remarks

Session Chair: **Ganapathi S. Subramania,** Sandia National Labs. (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 3 . . . . . SUN 8:30 AM TO 10:30 AM

Quantum Emitters in Patterned EM Environment

Session Chair: **Marian Florescu,** Univ. of Surrey (United Kingdom)

8:30 am: **Purcell factors and other interesting quantum optical effects with nanoplasmonic resonators** *(Invited Paper)*, Stephen Hughes, Queen's Univ. (Canada) . . . . . [9162-1]

9:00 am: **Modal representation of light-matter interactions in plasmonic nanoresonators** *(Invited Paper)*, Christophe Sauvan, Jean-Paul Hugonin, Philippe Lalanne, Institut d'Optique Graduate School (France) . . . . . [9162-2]

9:30 am: **Characterization of the de-excitation of a quantum emitter near a resonant metasurface by means of a modal expansion of the crossed density of states**, Didier Felbacq, Emmanuel Rousseau, Univ. Montpellier 2 (France); Emmanuel Kling, Sagem (France) . . . . . [9162-3]

9:45 am: **Spontaneous emission dynamics of quantum emitters coupled to epsilon-near-zero metamaterials**, Ruzan Sokhoyan, Georgia T. Papadakis, Ho Wai Lee, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . [9162-4]

10:00 am: **Advanced emission manipulation in quantum-dot metamaterials** *(Invited Paper)*, Manuel Decker, Isabelle Staude, Sergey S. Kruk, Dragomir N. Neshev, Yuri S. Kivshar, The Australian National Univ. (Australia) . . . . . [9162-5]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 3 . . . . .SUN 11:00 AM TO 12:30 PM

Non-Classical Light Sources I

Session Chair: **Edo Waks,** Univ. of Maryland, College Park (USA)

11:00 am: **Fabrication of InGaN quantum dots for use as active photonic emitters** *(Invited Paper)*, Arthur J. Fischer, Xiaoyin Xiao, Ganapathi S. Subramania, Jeffrey Y. Tsao, Daniel D. Koleske, Ping Lu, Jeremy B. Wright, Sheng Liu, George T. Wang, Sandia National Labs. (USA) . . . . . [9162-6]

11:30 am: **Physics of local quantum states in carbon nanotubes for photonic applications** *(Invited Paper)*, Yuhei Miyauchi, Kazunari Matsuda, Kyoto Univ. (Japan). . . . . [9162-7]

12:00 pm: **Yellow single-photon emission from nitrogen impurity centers in AlAs** *(Invited Paper)*, Masafumi Jo, RIKEN (Japan) and National Institute for Materials Science (Japan); Takaaki Mano, Takashi Kuroda, Yoshiki Sakuma, Kazuaki Sakoda, National Institute for Materials Science (Japan) . . . . . [9162-8]

Lunch Break . . . . . Sun 12:30 pm to 1:45 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 3 . . . . . .SUN 1:45 PM TO 3:00 PM

Photonic Quantum Information Platforms

Session Chair: **Ganapathi S. Subramania,** Sandia National Labs. (USA)

1:45 pm: **Realizing a quantum transistor using a quantum dot strongly coupled to a cavity** *(Invited Paper)*, Edo Waks, Hyochul Kim, Ranojoy Bose, Tao Cai, Shuo Sun, Univ. of Maryland, College Park (USA); Glenn S. Solomon, National Institute of Standards and Technology (USA) . . . . . [9162-9]

2:15 pm: **Large-alphabet quantum key distribution using time-energy entangled photons**, Dirk R. Englund, Catherine Lee, Jacob Mower, Zheshen Zheng, Franco N. C. Wong, Jeffrey H. Shapiro, Massachusetts Institute of Technology (USA) . . . . . [9162-10]

2:30 pm: **Generation of photon pairs with reconfigurable entanglement on a nonlinear chip** *(Invited Paper)*, Andrey A. Sukhorukov, James G. Titchener, Che Wen Wu, Alexander S. Solntsev, Dragomir N. Neshev, The Australian National Univ. (Australia). . . . . [9162-11]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 3 . . . . . SUN 3:30 PM TO 4:45 PM

Non-Classical Light Sources II

Session Chair: **Arthur J. Fischer,** Sandia National Labs. (USA)

3:30 pm: **Quantum dots with engineered multi-carrier interactions for light-emitting diodes** *(Invited Paper)*, Victor I. Klimov, Los Alamos National Lab. (USA) . . . . . [9162-12]

4:00 pm: **Positioning of single quantum dots on nanoscale areas of metal-free substrates**, Isabelle Staude, The Australian National Univ. (Australia); Varun K. A. Sreenivasan, Macquarie Univ. (Australia); Ivan Shishkin, Kirill Samusev, Ioffe Physico-Technical Institute (Russian Federation) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Manuel Decker, Dragomir N. Neshev, The Australian National Univ. (Australia); Andrei V. Zvyagin, Macquarie Univ. (Australia); Yuri S. Kivshar, The Australian National Univ. (Australia). . . . . [9162-13]

4:15 pm: **Photons-on-demand: synthesis and integration strategies for non-blinking giant quantum dots** *(Invited Paper)*, Jennifer A. Hollingsworth, Han Htoon, Krishna Acharya, Niladri S. Karan, Mathew R. Buck, Farah Dawood, Hue M. Nguyen, Aaron M. Keller, Los Alamos National Lab. (USA) . . . . . [9162-14]

SESSION 5

LOCATION: CONV. CTR. ROOM 3 . . . . . SUN 4:45 PM TO 6:00 PM

Novel Nanophotonic Structures and Methods

Session Chair: **Stavroula Foteinopoulou,** Univ. of Exeter (United Kingdom)

4:45 pm: **Isotropic band gaps, optical cavities, and freeform waveguides in hyperuniform disordered photonic solids** *(Invited Paper)*, Marian Florescu, Univ. of Surrey (United Kingdom); Weining Man, San Francisco State Univ. (USA); Ruth Ann Mullen, Etaphase Inc. (USA); Milan M. Milosevic, Timothy Amoah, Univ. of Surrey (United Kingdom); Paul M. Chaikin, New York Univ. (USA); Salvatore Torquato, Paul Steinhardt, Princeton Univ. (USA). . . . . [9162-15]

5:15 pm: **Qualitative models in nanophotonics**, Arkadi Chipouline, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9162-16]

5:30 pm: **Beam shaping and manipulation in photonic crystal structures** *(Invited Paper)*, Anna C. Tasolamprou, Foundation for Research and Technology-Hellas (Greece); Lei Zhang, Iowa State Univ. (USA); Maria Kafesaki, Foundation for Research and Technology-Hellas (Greece); Thomas Koschny, Costas M. Soukoulis, Iowa State Univ. (USA) . . . . . [9162-17]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 3 . . . . . MON 1:30 PM TO 3:30 PM

Tunable Photonic Materials and Modulators

Session Chair: **Richard M. De La Rue,** Univ. of Glasgow (United Kingdom)

1:30 pm: **CMOS integrated plasmonics: interconnects and modulators** *(Invited Paper)*, Alexandra Boltasseva, Nathaniel Kinsey, Marcello Ferrera, Purdue Univ. (USA); Viktoriia E. Babicheva, DTU Fotonik (Denmark); Gururaj V. Naik, Stanford Univ. (USA); Alexander V. Kildishev, Vladimir M. Shalaev, Purdue Univ. (USA) . . . . . [9162-18]

2:00 pm: **Printing high-quality tunable porous silicon microcavities** *(Invited Paper)*, Paul V. Braun, Neil A. Krueger, Hailing Ning, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9162-19]

2:30 pm: **Metal oxides as tunable photonic materials** *(Invited Paper)*, Otto L. Muskens, Univ. of Southampton (United Kingdom) . . . . . [9162-20]

3:00 pm: **Strong coupling of delocalized and localized resonances in voltage tunable terahertz 2D plasmonic crystals** *(Invited Paper)*, Gregory C. Dyer, Sandia National Labs. (USA); Gregory R. Aizin, Kingsborough Community College (USA) and The City College of New York (USA); S. James Allen Jr., Univ. of California, Santa Barbara (USA); Albert D. Grine, Don Bethke, John L. Reno, Eric A. Shaner, Sandia National Labs. (USA) . . . . . [9162-21]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 3 . . . . . MON 4:00 PM TO 5:15 PM

Controlling and Exploiting Non-Linear Optical Properties

Session Chair: **Demetrios N. Christodoulides,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

4:00 pm: **Dielectric and metallic nanosuspesions with tunable optical nonlinearities** *(Invited Paper)*, Zhigang Chen, Nankai Univ. (China) and San Francisco State Univ. (USA); Demetrios N. Christodoulides, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9162-22]

4:30 pm: **Ultrafast reconfigurable photonic devices using dynamic wavefront shaping**, Otto L. Muskens, Thomas Strudley, Roman Bruck, Univ. of Southampton (United Kingdom) . . . . . [9162-23]

4:45 pm: **Nonlinear frequency generation from Si/Chalcogenide glass hybrid waveguides by degenerate four wave mixing**, Jörg Schilling, Martin-Luther-Univ. Halle-Wittenberg (Germany); Peter W. Nolte, Martin-Luther-Univ. Halle-Wittenberg (Germany) and Fraunhofer-Institut für Werkstoffmechanik (Germany); Georg von Freymann, Technische Univ. Kaiserslautern (Germany); Mark McMillen, Queen's Univ. Belfast (United Kingdom) . . . . . [9162-24]

5:00 pm: **Medium-dependent resonance energy transfer: a controlling role for three-centre upconversion**, Jamie M. Leeder, David L. Andrews, Univ. of East Anglia (United Kingdom) . . . . . [9162-25]

TUESDAY 19 AUGUST

SESSION 8

LOCATION: CONV. CTR. ROOM 3 . . . . .TUE 8:00 AM TO 10:00 AM

Nanophotonic Architectures for Devices

Session Chair: **Sajeev John,** Univ. of Toronto (Canada)

8:00 am: **Novel phenomena in nano-photonic systems of macroscopic sizes** *(Invited Paper)*, Marin Soljacic, Massachusetts Institute of Technology (USA) . . . . . [9162-26]

8:30 am: **Nanophotonics with nanomaterials: a route for functional photonic integration** *(Invited Paper)*, Atsushi Yokoo, M. D. Birowosuto, Masaya Notomi, NTT Basic Research Labs. (Japan) . . . . . [9162-27]

9:00 am: **Fabrication and characterization of optical cavities and integrated photonics structures on GaN-based photonic crystal membranes grown on silicon for visible and near infra-red applications** *(Invited Paper)*, Romuald Houdré, Noelia Vico Triviño, Ulagalandha Dharanipathy, Jean-François Carlin, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9162-28]

9:30 am: **Diamond photonics** *(Invited Paper)*, Marko Loncar, Harvard School of Engineering and Applied Sciences (USA); Michael J. Burek, Birgit M. Hausmann, Harvard Univ. (USA); Vivek Venkataraman, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9162-29]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 9

LOCATION: CONV. CTR. ROOM 3 . . . . TUE 10:30 AM TO 12:00 PM

Photonics with Carbon and Atomically Thin Materials I

Session Chair: **Frank H. Koppens,** ICFO - Institut de Ciències Fotòniques (Spain)

10:30 am: **Graphene plasmons: properties and applications** *(Invited Paper)*, Phaedon Avouris, Damon B Farmer, Marcus Freitag, IBM Thomas J. Watson Research Ctr. (USA); Yielei Li, Columbia University (USA); Tony Low, Hugen Yan, Han Wang, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9162-30]

11:00 am: **2D nano-optoelectronics** *(Invited Paper)*, Thomas Mueller, Andreas Pospischil, Marco M. Furchi, Technische Univ. Wien (Austria) . . . . . [9162-31]

11:30 am: **Short-pulse fiber lasers mode-locked by carbon nanotube and graphene** *(Invited Paper)*, Shinji Yamashita, The Univ. of Tokyo (Japan) . . [9162-32]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

CONFERENCE 9162

LOCATION: CONV. CTR. ROOM 3

SESSION 10

LOCATION: CONV. CTR. ROOM 3 . . . . . TUE 1:30 PM TO 3:30 PM

Photonics with Carbon and Atomically Thin Materials II

Session Chair: **Phaedon Avouris,** IBM Thomas J. Watson Research Ctr. (USA)

1:30 pm: **Quantum plasmonics: plasmon induced processes** *(Invited Paper)*, Peter Nordlander, Rice Univ. (USA). . . . . [9162-33]

2:00 pm: **Hybrid graphene-silicon photonic integrated circuits** *(Invited Paper)*, Dirk R. Englund, Ren-Jye Shiue, Cheng Peng, Massachusetts Institute of Technology (USA) . . . . . [9162-34]

2:30 pm: **Plasmon-phonon coupling in graphene nanostructures** *(Invited Paper)*, N. Asger Mortensen, DTU Fotonik (Denmark). . . . . [9162-35]

3:00 pm: **2D materials for strong light-matter interactions at nanometer lengthscales and ultra-fast timescales** *(Invited Paper)*, Frank H. Koppens, ICFO - Institut de Ciències Fotòniques (Spain). . . . . [9162-36]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 11

LOCATION: CONV. CTR. ROOM 3 . . . . . TUE 4:00 PM TO 5:45 PM

Asymmetric and Chiral Structures for Sensing Applications

Session Chair: **Otto L. Muskens,** Univ. of Southampton (United Kingdom)

4:00 pm: **Molecular bond Fano resonances in organic thin films enhanced by (A)SRR arrays** *(Invited Paper)*, Richard M. De La Rue, Ifeoma G. Mbomson, Saima I. Khan, Graham J. Sharp, Basudev Lahiri, Nigel P. Johnson, Univ. of Glasgow (United Kingdom); Henrique Vilhena, Scott G. McMeekin, Glasgow Caledonian Univ. (United Kingdom) . . . . . [9162-37]

4:30 pm: **Spectrally selective chiral silicon metasurfaces based on infrared fano resonances** *(Invited Paper)*, Gennady B. Shvets, The Univ. of Texas at Austin (USA) . . . . . [9162-38]

5:00 pm: **Complex chiral colloids for visible and ultraviolet plasmonics** *(Invited Paper)*, David J. Norris, ETH Zürich (Switzerland). . . . . [9162-39]

5:30 pm: **Shear ordering of densely packed core-shell spheres in super viscoelastic medium for making 3D photonic crystals**, Qibin Zhao, Andrew I. Haines, David R. E. Snoswell, Univ. of Cambridge (United Kingdom); Chris E. Finlayson, Aberystwyth Univ. (United Kingdom); Christian Schaefer, Darmstadt Univ. of Technology (Germany); Peter Spahn, CACI International, Inc. (USA); Lars O. Herrmann, Jeremy J. Baumberg, Univ. of Cambridge (United Kingdom) . . [9162-75]

WEDNESDAY 20 AUGUST

SESSION 12

LOCATION: CONV. CTR. ROOM 3 . . . . WED 8:00 AM TO 10:00 AM

Extreme Absorption Management and Energy Harvesting I

Session Chair: **Eli Yablonovitch,** Univ. of California, Berkeley (USA)

8:00 am: **Light trapping and solar energy harvesting in thin-film photonic crystals** *(Keynote Presentation)*, Sajeev John, Univ. of Toronto (Canada) . [9162-40]

8:45 am: **Absorption in photonic crystals: from order to disorder** *(Invited Paper)*, Christian Seassal, Loic Lalouat, Emmanuel Drouard, He Ding, Guillaume Gomard, Romain Peretti, Thierry Deschamps, Institut des Nanotechnologies de Lyon (France); Alain Fave, Institut National des Sciences Appliquées de Lyon (France) . . . . . [9162-41]

9:15 am: **All-semiconductor IR broadband superabsorbers**, G. Chinna R. Devarapu, Stavroula Foteinopoulou, Univ. of Exeter (United Kingdom) . . . [9162-42]

9:30 am: **Optimized multi-dielectric stacks sustaining giant optical fields** *(Invited Paper)*, Aude L. Lereu, Myriam Zerrad, Claude Amra, Institut Fresnel (France) . . . . . [9162-43]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 13

LOCATION: CONV. CTR. ROOM 3 . . . . WED 10:30 AM TO 12:45 PM

Extreme Absorption Management and Energy Harvesting II

Session Chair: **Sanjay Krishna,** The Univ. of New Mexico (USA)

10:30 am: **The opto-electronic physics which just broke the efficiency record in solar cells** *(Keynote Presentation)*, Eli Yablonovitch, Univ. of California, Berkeley (USA); Owen D. Miller, Massachusetts Institute of Technology (USA) . . . . [9162-44]

11:15 am: **Light management and imaging for efficient light emitting and absorbing devices** *(Invited Paper)*, Kai-Ming Ho, Iowa State Univ. (USA). [9162-45]

11:45 am: **Controlling and creating plasmonic absorption processes in graphene nanostructures**, Victor W. Brar, California Institute of Technology (USA) and Kavli Nanoscience Institute (USA); Min S. Jang, Seoul National Univ. (Korea, Republic of); Michelle Sherrott, Seyoon Kim, Laura Kim, California Institute of Technology (USA); ManSoo Choi, Seoul National Univ. (Korea, Republic of); Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9162-46]

12:00 pm: **Plasmoelectric potentials in Au nano-hole arrays**, Matthew T. Sheldon, California Institute of Technology (USA); Jorik van de Groep, FOM Institute for Atomic and Molecular Physics (Netherlands); Ana M. Brown, California Institute of Technology (USA); Albert Polman, FOM Institute for Atomic and Molecular Physics (Netherlands); Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9162-47]

12:15 pm: **Theory of absorption-induced transparency** *(Invited Paper)*, Sergio G. Rodrigo, Centro Univ. de la Defensa (Spain) and Instituto de Ciencia de Materiales de Aragón (Spain) . . . . . [9162-48]

Lunch/Exhibition Break . . . . . .Wed 12:45 pm to 1:45 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 3 . . . . . WED 1:45 PM TO 3:30 PM

Infrared and Thermal Phenomena

Session Chair: **Susumu Noda,** Kyoto Univ. (Japan)

1:45 pm: **Meta-detectors for 4th generation infrared imagers** *(Invited Paper)*, Sanjay Krishna, Ctr. for High Technology Materials (USA) . . . . . [9162-49]

2:15 pm: **Design of highly directional and narrowband infrared emitters**, Christopher H. Granier, Louisiana State Univ. (USA); Francis O. Afzal, Truman State Univ. (USA) and Louisiana State Univ. (USA); Changjun Min, Nankai Univ. (China) and Louisiana State Univ. (USA); Jonathan P. Dowling, Georgios Veronis, Louisiana State Univ. (USA). . . . . [9162-50]

2:30 pm: **Unusual thermal emission from a 3D metallic photonic crystal: quasi-equilibrium limit** *(Invited Paper)*, Mei-Li Hsieh, National Chiao Tung Univ. (Taiwan); Rajeev V. Shenoi, Shawn-Yu Lin, Rensselaer Polytechnic Institute (USA) . [9162-51]

3:00 pm: **Tensilely strained germanium nanomembranes for direct-bandgap infrared light emission** *(Invited Paper)*, Roberto Paiella, Cicek Boztug, Boston Univ. (USA); Jose Sanchez-Perez, University of Wisconsin - Madison (USA); Jian Yin, Boston Univ. (USA); Max G Lagally, University of Wisconsin - Madison (USA) . . . . . [9162-52]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 15

LOCATION: CONV. CTR. ROOM 3 . . . . . WED 4:00 PM TO 6:00 PM

Nanophotonic Lasing

Session Chair: **Kai-Ming Ho,** Iowa State Univ. (USA)

4:00 pm: **Recent progress in photonic crystals and their applications** *(Invited Paper)*, Susumu Noda, Kyoto Univ. (Japan) . . . . . [9162-53]

4:30 pm: **Multi-color nanowire photonic crystal laser pixels** *(Invited Paper)*, Ganapathi S. Subramania, Jeremy B. Wright, Sheng Liu, George T. Wang, Qiming Li, Alexander Benz, Daniel D. Koleske, Ping Lu, Sandia National Labs. (USA); Huiwen Xu, Luke F. Lester, The Univ. of New Mexico (USA); Ting-Shan Luk, Igal Brener, Sandia National Labs. (USA) . . . . . [9162-54]

5:00 pm: **Active nanophotonics technology** *(Invited Paper)*, Yeshaiahu Fainman, Univ. of California, San Diego (USA) . . . . . [9162-55]

5:30 pm: **Nanopillars for new device functionality** *(Invited Paper)*, Diana L. Huffaker, Univ. of California, Los Angeles (USA). . . . . [9162-56]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Light self-trapping in an array of sub wavelength waveguides, Gregorio Mendoza González, Erwin A. Martí Panameño, Benemérita Univ. Autónoma de Puebla (Mexico). . . . . [9162-71]

Third-harmonic generation enhancement in polymer-dispersed liquid crystal grating, Surawut Wicharn, Prathan Buranasiri, King Mongkut's Institute of Technology Ladkrabang (Thailand) . . . . . [9162-72]

Cooperative behavior of quantum emitters coupled to plasmonic waveguides near frequency cutoff, Ruzan Sokhoyan, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9162-73]

Gold nanoplates can serve as mirrors to enhance nanoparticle electrodynamics, Zijie Yan, Ying Bao, Uttam Manna, Raman Shah, Norbert F. Scherer, The Univ. of Chicago (USA) . . . . . [9162-74]

THURSDAY 21 AUGUST

SESSION 16

LOCATION: CONV. CTR. ROOM 3 . . . . . THU 8:00 AM TO 10:15 AM

Non-Reciprocal and PT Symmetric Platforms

Session Chair: **Kazuaki Sakoda,** National Institute for Materials Science (Japan)

8:00 am: **Photonic gauge field induced by dynamic modulation** *(Invited Paper)*, Shanhui Fan, Kejie Fang, Stanford Univ. (USA) . . . . . [9162-57]

8:30 am: **Nonlinear optical phononics: Inducing and harnessing stimulated Brillouin scattering in nanoscale photonic circuit waveguides** *(Invited Paper)*, Benjamin J. Eggleton, The Univ. of Sydney (Australia) . . . . . [9162-58]

9:00 am: **PT-symmetric synthetic materials and structures** *(Invited Paper)*, Demetrios N. Christodoulides, Mohammad-Ali Miri, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9162-59]

9:30 am: **Single mode PT symmetric large area lasers**, Hossein Hodaei, Mohammad-Ali Miri, Matthias Heinrich, Demetrios N. Christodoulides, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9162-60]

9:45 am: **Unidirectional lasing emerging from frozen light in nonreciprocal cavities** *(Invited Paper)*, Hamidreza Ramezani, Univ. of California, Berkeley (USA); Ilya Vitebskiy, Air Force Research Lab. (USA); Tsampikos Kottos, Wesleyan Univ. (USA) . . . . . [9162-61]

Coffee Break . . . . . Thu 10:15 am to 10:45 am

SESSION 17

LOCATION: CONV. CTR. ROOM 3 . . . . . THU 10:45 AM TO 11:45 AM

Exotic Photonic States and Symmetry I

Session Chair: **Manfred Eich,** Technische Univ. Hamburg-Harburg (Germany)

10:45 am: **Isotropic Dirac cones in the Brillouin-zone center of photonic crystals and metamaterials** *(Invited Paper)*, Kazuaki Sakoda, National Institute for Materials Science (Japan) and Univ. of Tsukuba (Japan); Hiroyuki Takeda, National Institute for Materials Science (Japan) . . . . . [9162-62]

11:15 am: **Photonic analog of graphene: novel functions inspired by condensed matter physics** *(Invited Paper)*, Tetsuyuki Ochiai, National Institute for Materials Science (Japan) . . . . . [9162-63]

Lunch/Exhibition Break . . . . . Thu 11:45 am to 1:15 pm

SESSION 18

LOCATION: CONV. CTR. ROOM 3 . . . . . THU 1:15 PM TO 3:30 PM

Slow Light Physics and Applications

Session Chair: **Benjamin J. Eggleton,** The Univ. of Sydney (Australia)

1:15 pm: **Nonlinear evolution of slow light pulses** *(Invited Paper)*, Kobus Kuipers, FOM Institute for Atomic and Molecular Physics (Netherlands) . . . . . [9162-64]

1:45 pm: **True stopping of light: a new regime for nanophotonics** *(Invited Paper)*, Kosmas Tsakmakidis, Xiang Zhang, Univ. of California, Berkeley (USA); Ortwin Hess, Imperial College London (United Kingdom) . . . . . [9162-76]

2:15 pm: **Slow-light metawaveguides**, Stavroula Foteinopoulou, Univ. of Exeter (United Kingdom). . . . . [9162-65]

2:30 pm: **Optically induced indirect photonic transitions in a slow light photonic crystal waveguide** *(Invited Paper)*, Manfred Eich, Michel Castellanos Munoz, Alexander Y. Petrov, Technische Univ. Hamburg-Harburg (Germany); Liam O'Faolain, Univ. of St. Andrews (United Kingdom); Juntao Li, Univ. of St. Andrews (United Kingdom) and Sun Yat-Sen Univ. (China); Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) and The Univ. of York (United Kingdom). . . . . [9162-66]

3:00 pm: **Theory and experimental demonstration of enhanced gain in slow light photonic crystal waveguides** *(Invited Paper)*, Jesper Mørk, Yaohui Chen, Per Lunnemann Hansen, Sara Ek, Elizavetta S. Semenova, Kresten Yvind, Technical Univ. of Denmark (Denmark) . . . . . [9162-67]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 19

LOCATION: CONV. CTR. ROOM 3 . . . . . THU 4:00 PM TO 5:30 PM

Exotic Photonic States and Symmetry II

Session Chair: **Didier Felbacq,** Univ. Montpellier 2 (France)

4:00 pm: **Generation and control of vortex beams using twisted nonlinear photonic crystals** *(Invited Paper)*, Ady Arie, Tel Aviv Univ. (Israel) . . . . . [9162-68]

4:30 pm: **The topological photonic states in gyrotropic microstructured materials** *(Invited Paper)*, Yanfeng Chen, Minghui Lu, Cheng He, Nanjing Univ. (China) . . . . . [9162-69]

5:00 pm: **Topological feature in silicon photonics** *(Invited Paper)*, Mohammad Hafezi, Joint Quantum Institute (USA). . . . . [9162-70]

LOCATION: CONV. CTR. ROOM 3 . . . . . 5:30 PM TO 5:35 PM

Closing Remarks

Session Chair: **Stavroula Foteinopoulou,** Univ. of Exeter (United Kingdom)

CONFERENCE 9163

LOCATION: CONV. CTR. ROOM 6B

Sunday–Thursday 17–21 August 2014 • Proceedings of SPIE Vol. 9163

Plasmonics: Metallic Nanostructures and Their Optical Properties XII

Conference Chair: **Allan D. Boardman,** Univ. of Salford (United Kingdom)

Program Committee: **Martin Aeschlimann,** Technische Univ. Kaiserslautern (Germany); **Harry A. Atwater Jr.,** California Institute of Technology (USA); **David J. Bergman,** Tel Aviv Univ. (Israel); **Harald W. Giessen,** Univ. Stuttgart (Germany); **Jean-Jacques Greffet,** Institut d'Optique Graduate School (France); **Naomi J. Halas,** Rice Univ. (USA); **Martti Kauranen,** Tampere Univ. of Technology (Finland); **Satoshi Kawata,** Osaka Univ. (Japan); **Fritz Keilmann,** LASNIX (Germany); **Dai-Sik Kim,** Seoul National Univ. (Korea, Republic of); **Laurens K. Kuipers,** FOM Institute for Atomic and Molecular Physics (Netherlands); **Olivier J. F. Martin,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Peter Nordlander,** Rice Univ. (USA); **Lukas Novotny,** Univ. of Rochester (USA); **Vahid Sandoghdar,** ETH Zurich (Switzerland); **George C. Schatz,** Northwestern Univ. (USA); **Tigran V. Shahbazyan,** Jackson State Univ. (USA); **Vladimir M. Shalaev,** Purdue Univ. (USA); **Gennady B. Shvets,** Institute for Fusion Studies (USA); **Din Ping Tsai,** National Taiwan Univ. (Taiwan); **Niek F. van Hulst,** ICFO - Institut de Ciències Fotòniques (Spain); **Hongxing Xu,** Institute of Physics (China); **Nikolay I. Zheludev,** Univ. of Southampton (United Kingdom); **Joseph Zyss,** Ecole Normale Supérieure de Cachan (France)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 6B . . . . . 8:30 AM TO 8:50 AM

Introduction by Conference Chair

Session Chair: **Allan D. Boardman,** Univ. of Salford (United Kingdom)

SESSION 1

LOCATION: CONV. CTR. ROOM 6B . . . SUN 8:50 AM TO 10:20 AM

Towards the Future

Session Chair: **Allan D. Boardman,** Univ. of Salford (United Kingdom)

8:50 am: **Bringing metamaterials to real applications** *(Invited Paper)*, Vladimir M. Shalaev, Alexander V. Kildishev, Alexandra Boltasseva, Purdue Univ. (USA)[9163-1]

9:35 am: **Graphene plasmonics and nanophotonics** *(Invited Paper)*, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9163-2]

Coffee Break . . . . . Sun 10:20 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6B . . SUN 10:40 AM TO 12:55 PM

Active, Gain, Spasing, and Applications

Session Chair: **Federico Capasso,** Harvard School of Engineering and Applied Sciences (USA)

10:40 am: **Topological insulator for broadband switchable metamaterials** *(Invited Paper)*, Jun-Yu Ou, Jin-Kyu So, Univ. of Southampton (United Kingdom); Giorgio Adamo, Zilong Wang, Jun Yin, Venkatram Nalla, Stefano Vezzoli, Azat Sulaev, Lan Wang, Handong Sun, Cesare Soci, Nanyang Technological Univ. (Singapore); Nikolay I. Zheludev, Optoelectronics Research Ctr. (United Kingdom) and Nanyang Technological Univ. (Singapore) . . . . . [9163-3]

11:25 am: **Yttrium hydride nanoantennas for active plasmonics**, Nikolai Strohfeldt, Andreas Tittl, Martin Schäferling, Frank F. Neubrech, Univ. Stuttgart (Germany); Uwe Kreibig, RWTH Aachen (Germany); Ronald Griessen, Vrije Univ. Amsterdam (Netherlands); Harald W. Giessen, Univ. Stuttgart (Germany) . . [9163-4]

11:45 am: **Electrodynamic description of spasers: multipolar modes, universal figures of merit, and minimal gain threshold**, Nikita Arnold, Calin Hrelescu, Thomas A. Klar, Johannes Kepler Univ. Linz (Austria) . . . . . [9163-5]

12:05 pm: **Active plasmonic devices** *(Invited Paper)*, Uriel Levy, Liron Stern, Boris Desiatov, Meir Grajower, Alexandros Emboras, The Hebrew Univ. of Jerusalem (Israel) . . . . . [9163-6]

12:35 pm: **Plasmonic black metal polarizers for ultra-short laser pulses**, Thomas M. Sondergaard, Esben Skovsen, Aalborg Univ. (Denmark); Christoph Lemke, Christian-Albrechts-Univ. zu Kiel (Germany); Tobias Holmgaard, Mekoprint A/S (Denmark); Till Leißner, Christian-Albrechts-Univ. zu Kiel (Germany); René L. Eriksen, Jonas Beermann, Univ. of Southern Denmark (Denmark); Michael K. Bauer, Christian-Albrechts-Univ. zu Kiel (Germany); Kjeld Pedersen, Aalborg Univ. (Denmark); Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark). . [9163-7]

Lunch Break . . . . . Sun 12:55 pm to 1:55 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6B . . . . . SUN 1:55 PM TO 3:15 PM

Nonlinearity, Strings, and Models

Session Chair: **Gennady B. Shvets,** The Univ. of Texas at Austin (USA)

1:55 pm: **Giant nonlinear response from plasmonic metasurfaces coupled to intersubband transitions** *(Invited Paper)*, J. Lee, M. Tymchenko, Christos Argyropoulos, Pengyuan Chen, Feng Lu, The Univ. of Texas at Austin (USA); Frederic Demmerle, Gerhard Böhm, Markus-Christian Amann, Walter Schottky Institut (Germany); Andrea Alu, Mikhail A. Belkin, The Univ. of Texas at Austin (USA) . . . . . [9163-8]

2:25 pm: **High accuracy models of sources in FDTD computations for subwavelength photonics design simulations**, James B. Cole, Univ. of Tsukuba (Japan). . . . . [9163-9]

2:45 pm: **Plasmonic nanoparticle strings: threading nanoparticle chains with light** *(Invited Paper)*, Lars O. Herrmann, Ventsislav K. Valev, Univ. of Cambridge (United Kingdom); Christos Tserkezis, Centro de Fisica de Materiales (Spain); Jonathan S. Barnard, Univ. of Cambridge (United Kingdom); Setu Kasera, Melville Lab. for Polymer Synthesis (United Kingdom); Oren A. Scherman, Univ. of Cambridge (United Kingdom); Javier Aizpurua, Centro de Fisica de Materiales (Spain); Jeremy J. Baumberg, Univ. of Cambridge (United Kingdom) . . . . [9163-10]

Coffee Break . . . . . Sun 3:15 pm to 3:45 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 6B . . . . SUN 3:45 PM TO 6:05 PM

Graphene Plasmonics

Session Chair: **Harry A. Atwater Jr.,** California Institute of Technology (USA)

3:45 pm: **Graphene as a platform for dynamically controlled plasmonics** *(Invited Paper)*, Alexandra Boltasseva, Naresh K. Emani, Ting-Fung Chung, Alexander V. Kildishev, Yong P. Chen, Vladimir M. Shalaev, Purdue Univ. (USA). . . . . [9163-11]

4:15 pm: **Mid-infrared nanosplasmonics on graphene: broadband antennas, detectors, and modulators** *(Invited Paper)*, Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9163-12]

4:45 pm: **Deep modulation of mid-infrared light using plasmonic fano-resonant meta-surfaces integrated with graphene** *(Invited Paper)*, Gennady B. Shvets, The Univ. of Texas at Austin (USA) . . . . . [9163-13]

5:15 pm: **Exciton-plasmon interactions in graphene-semiconductor structures** *(Invited Paper)*, Tigran V. Shahbazyan, Jackson State Univ. (USA); Kirill A. Velizhanin, Los Alamos National Lab. (USA) . . . . . [9163-14]

5:45 pm: **Plasmons in inhomogeneously doped graphene nanostructures**, Iván Silveiro, Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9163-15]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 6B . . . . MON 1:30 PM TO 3:25 PM

Spasing, Sensors, and Waveguide

Session Chair: **Joel Bellessa,** Univ. Claude Bernard Lyon 1 (France)

1:30 pm: **The spasing and loss compensation in plasmonic nanoshell laser** *(Invited Paper)*, Vitaliy N. Pustovit, Air Force Research Lab. (USA); Arkadi Chipouline, Friedrich-Schiller-Univ. Jena (Germany); Dean P. Brown, Air Force Research Lab. (USA); Tigran V. Shahbazyan, Jackson State Univ. (USA); Augustine M. Urbas, Air Force Research Lab. (USA). . . . . [9163-16]

2:15 pm: **Plasmonic nanowire sensors and lasers** *(Invited Paper)*, Limin Tong, Guo Xia, Xiaoqin Wu, Yipei Wang, Zhejiang Univ. (China) . . . . . [9163-17]

2:45 pm: **Plasmonic waveguide filter based on metal-insulator-metal structure and its slow light effects**, Jicheng Wang, Lin Sun, Yueke Wang, Jiangnan Univ. (China) . . . . . [9163-18]

3:05 pm: **Lossless surface plasmon polariton guiding in electrically driven nanowaveguides**, Dmitry Y. Fedyanin, Moscow Institute of Physics and Technology (Russian Federation); Alexey V. Krasavin, King's College London (United Kingdom); Aleksey V. Arsenin, Moscow Institute of Physics and Technology (Russian Federation); Anatoly V. Zayats, King's College London (United Kingdom) . . . . . [9163-19]

Coffee Break . . . . . Mon 3:25 pm to 3:55 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 6B . . . . MON 3:55 PM TO 5:25 PM

Meta Outcomes

Session Chair: **Allan D. Boardman,** Univ. of Salford (United Kingdom)

3:55 pm: **Isotropic infrared metamaterials** *(Invited Paper)*, Takuo Tanaka, RIKEN (Japan); Atsushi Ishikawa, Okayama Univ. (Japan); Che-Chin Chen, Instrument Technology Research Ctr. (Taiwan); Din Ping Tsai, National Taiwan Univ. (Taiwan) . . . . . [9163-20]

4:25 pm: **Three-dimensional metamaterials: from split ring resonator to toroidal metamolecule** *(Invited Paper)*, Yao-Wei Huang, Wei Ting Chen, Pin Chieh Wu, Chun Yen Liao, National Taiwan Univ. (Taiwan); Vassili A. Fedotov, Vassili Savinov, Nikolay I. Zheludev, Univ. of Southampton (United Kingdom); Din Ping Tsai, National Taiwan Univ. (Taiwan). . . . . [9163-22]

4:55 pm: **Where is next metamaterials moving forward?** *(Invited Paper)*, Ai Qun Liu, Nanyang Technological Univ. (Singapore); Din Ping Tsai, National Taiwan Univ. (Taiwan); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) . . [9163-23]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 6B . . . TUE 8:00 AM TO 10:30 AM

Plasmons, Control, and Tunability I

Session Chair: **Uriel Levy,** The Hebrew Univ. of Jerusalem (Israel)

8:00 am: **Mode conversion and spin-control of propagating surface plasmons in nanophotonic networks** *(Invited Paper)*, Hongxing Xu, Institute of Physics (China) . . . . . [9163-25]

8:30 am: **Confined Tamm plasmons lasers** *(Invited Paper)*, Joel Bellessa, Clementine Symonds, Guillaume L'Heureux, Univ. Claude Bernard Lyon 1 (France); Jean-Jacques Greffet, Jean-Paul Hugonin, Institut d'Optique Graduate School (France); Pascale Senellart, Aristide Lemaître, Lab. de Photonique et de Nanostructures (France) . . . . . [9163-26]

9:00 am: **Surface plasmon mediated inverse polarization transmission through metallic gratings**, Guoguo Kang, Jianjie Dong, Beijing Institute of Technology (China) . . . . . [9163-27]

9:20 am: **Highly tunable ultra-narrow-resonances with optical nanoantenna phased arrays in the infrared**, Shiqiang Li, Robert P. H. Chang, Northwestern Univ. (USA) . . . . . [9163-28]

9:40 am: **Controlling the optics of sub-nanometer plasmonic cavities with graphene and other 2D atomic-sized layers**, Christos Tserkezis, Centro de Fisica de Materiales (Spain); Jan Mertens, Daniel O. Sigle, Anna L. Eiden, Univ. of Cambridge (United Kingdom); Fumin Huang, Queen's Univ. Belfast (United Kingdom); Antonio Lombardo, Univ. of Cambridge (United Kingdom); Zhipei Sun, Aalto Univ. (Finland); Ravi S. Sundaram, Univ. of Cambridge (United Kingdom); Alan Colli, Nokia Research Ctr. UK (United Kingdom); Silvia Milana, Andrea C. Ferrari, Univ. of Cambridge (United Kingdom); Javier Aizpurua, Centro de Fisica de Materiales (Spain); Jeremy J. Baumberg, Univ. of Cambridge (United Kingdom) . . . . . [9163-29]

10:00 am: **Helium-ion beam modification and tunable gap loading of plasmonic nanoantennas** *(Invited Paper)*, Otto L. Muskens, Univ. of Southampton (United Kingdom) . . . . . [9163-30]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 8

LOCATION: CONV. CTR. ROOM 6B . . . TUE 11:00 AM TO 12:50 PM

Coupling and Nonlinearity

Session Chair: **Ewold Verhagen,** FOM Institute for Atomic and Molecular Physics (Netherlands)

11:00 am: **Voltage-controlled strong coupling with metamaterial nanocavities: fundamentals and applications** *(Invited Paper)*, Igal Brener, Alexander Benz, Sandia National Labs. (USA) . . . . . [9163-31]

11:30 am: **Comparison of third-order nonlinear optical properties of colloidal gold nanoshells and nanorods**, Marta Gordel, Wroclaw Univ. of Technology (Poland) and Ecole Normale Supérieure de Cachan (France); Joanna Olesiak-Banska, Radoslaw Kolkowski, Katarzyna Matczyszyn, Marek J. Samoc, Wroclaw Univ. of Technology (Poland) . . . . . [9163-32]

11:50 am: **Field enhanced plexitonic coupling between InAs quantum dot and silver film: highly sensitive plasmonic composite**, Venus Dillu, Preeti Rani, Ravindra K. Sinha, Delhi Technological Univ. (India). . . . . [9163-33]

12:10 pm: **Ultrafast silicon nanoplasmonic barristor**, Shawn R. Greig, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9163-34]

12:30 pm: **Hybrid plasmonic platform for integrated nonlinear optical applications**, Stefano Palomba, Fernando J. Diaz, The Univ. of Sydney (Australia); T. Hatakeyama, Junsuk Rho, Alessandro Salandrino, Kevin O'Brien, Univ. of California, Berkeley (USA); Xiang Zhang, Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA) . . . . . [9163-138]

Lunch/Exhibition Break . . . . . Tue 12:50 pm to 2:00 pm

CONFERENCE 9163

LOCATION: CONV. CTR. ROOM 6B

SESSION 9

LOCATION: CONV. CTR. ROOM 6B . . . . TUE 2:00 PM TO 3:20 PM

Nanoscale Activity I

Session Chair: **Greg Sun,** Univ. of Massachusetts Boston (USA)

2:00 pm: **Coupling between silver nanowire and single quantum dots and loss compensation for propagating surface plasmons** *(Invited Paper)*, Hong Wei, Institute of Physics (China) . . . . . [9163-35]

2:30 pm: **Nanoplasmonic hydrogen sensing** *(Invited Paper)*, Carl Wadell, Svetlana Syrenova, Christoph Langhammer, Chalmers Univ. of Technology (Sweden) . . . . . [9163-36]

3:00 pm: **Observing charge transfer plasmons in nanocuboid dimers with large gaps**, Ping Bai, A*STAR Institute of High Performance Computing (Singapore); Shu Fen Tan, National Univ. of Singapore (Singapore); Lin Wu, A*STAR Institute of High Performance Computing (Singapore); Michel Bosman, A*STAR Institute of Materials Research and Engineering (Singapore); Christian A. Nijhuis, National Univ. of Singapore (Singapore). . . . . [9163-37]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 6B . . . . .TUE 3:50 PM TO 5:45 PM

Nanoscale Activity II

Session Chair: **Alexander Benz,** Sandia National Labs. (USA)

3:50 pm: **Simultaneous detection of nanoscale electric and magnetic fields** *(Invited Paper)*, Laurens K. Kuipers, FOM Institute for Atomic and Molecular Physics (Netherlands) . . . . . [9163-38]

4:35 pm: **Imaging of rectified plasmonic fields on nanoantennas with single nanometer precision**, Curtis J. Firby, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9163-39]

4:55 pm: **Laser-directed deposition of silver nanostructures**, Anatoliy O. Pinchuk, Ke Jiang, Kathrin Spendier, Univ. of Colorado at Colorado Springs (USA) . . . . . [9163-40]

5:15 pm: **Plasmonic optoelectronics on Si** *(Invited Paper)*, Pierre Berini, Anthony Olivieri, Univ. of Ottawa (Canada) . . . . . [9163-41]

WEDNESDAY 20 AUGUST

SESSION 11

LOCATION: CONV. CTR. ROOM 6B . . WED 8:00 AM TO 10:20 AM

Plasmons, Control, and Tunability II

Session Chair: **Tigran V. Shahbazyan,** Jackson State Univ. (USA)

8:00 am: **Plasmonic enhancement of charge carrier photogeneration in conjugated polymers** *(Invited Paper)*, Zilong Wang, Nanyang Technological Univ. (Singapore); Jun Zhao, Bettina Frank, Univ. Stuttgart (Germany); Qiandong Ruan, Nanyang Technological Univ. (Singapore); Giorgio Adamo, Univ. of Southampton (Singapore); Harald W. Giessen, Univ. Stuttgart (Germany); Cesare Soci, Nanyang Technological Univ. (Singapore) . . . . . [9163-42]

8:30 am: **3D-FEM analysis of SPP excitation through nanoholes in asymmetric metal-insulator-metal structure at tip of circular truncated conical fiber**, Yasushi Oshikane, Osaka Univ. (Japan); Kensuke Murai, National Institute of Advanced Industrial Science and Technology (Japan); Motohiro Nakano, Osaka Univ. (Japan) . . . . . [9163-43]

8:50 am: **Surface plasmon decay in nanostructured systems** *(Invited Paper)*, Prineha Narang, Ravishankar Sundararaman, Adam S. Jermyn, William A. Goddard III, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9163-44]

9:20 am: **Tunable plasmons in atomically thin gold nanodisks**, Alejandro Manjavacas, Rice Univ. (USA); Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9163-45]

9:40 am: **Optical nanogap matrices for plasmonic enhancement applications**, Stephen J. Bauman, Desalegn T. Debu, Avery M. Hill, Eric Novak, Univ. of Arkansas (USA); Douglas Natelson, Rice Univ. (USA); Joseph B. Herzog, Univ. of Arkansas (USA) . . . . . [9163-46]

10:00 am: **Plasmon-enhanced photothermal response in heterogeneous metallic trimers**, Seyfollah Toroghi, Pieter G. Kik, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9163-47]

Coffee Break . . . . . .Wed 10:20 am to 10:40 am

SESSION 12

LOCATION: CONV. CTR. ROOM 6B . .WED 10:40 AM TO 12:50 PM

On the Nanoscale Again

Session Chair: **Laurens Kobus Kuipers,** FOM Institute for Atomic and Molecular Physics (Netherlands)

10:40 am: **Nanomechanical transduction in plasmonic systems** *(Invited Paper)*, Ewold Verhagen, FOM Institute for Atomic and Molecular Physics (Netherlands) . . . . . [9163-48]

11:10 am: **Nano-scale patterns of molybdenum on glass substrate for use in super-resolution imaging with metamaterials**, Han Li, Andrew M. Sarangan, Partha P. Banerjee, Univ. of Dayton (USA) . . . . . [9163-49]

11:30 am: **Dirac-like surface plasmons in metallic honeycomb lattices with directional edge states** *(Invited Paper)*, Siying Peng, Sondra L. Hellstrom, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9163-50]

12:00 pm: **Theory of the resonance shift of plasmonic nanoresonators for dielectric sensing** *(Invited Paper)*, Weihua Zhang, Nanjing Univ. (China) . [9163-51]

12:30 pm: **Plasmonic nanostructuring through direct laser interference patterning**, Yuanhai Lin, Tianrui Zhai, Xinping Zhang, Beijing Univ. of Technology (China) . . . . . [9163-52]

Lunch/Exhibition Break . . . . . .Wed 12:50 pm to 2:00 pm

SESSION 13

LOCATION: CONV. CTR. ROOM 6B . . . . WED 2:00 PM TO 3:15 PM

About Nanoparticles

Session Chair: **Christos Tserkezis,** Centro de Fisica de Materiales (Spain)

2:00 pm: **Plasmonic enhancement of optical absorption, electroluminescence, florescence, and Raman scattering by metal nanoparticles: limits and comparison** *(Invited Paper)*, Greg Sun, Univ. of Massachusetts Boston (USA) . . . . . [9163-53]

2:45 pm: **Effect of nanoscale surface roughness on surface-tuned nanoparticle plasmon resonances** *(Invited Paper)*, Chatdanai Lumdee, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Binfeng Yun, Southeast Univ. (China); Pieter G. Kik, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9163-54]

Coffee Break . . . . . .Wed 3:15 pm to 3:45 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 6B . . . . WED 3:45 PM TO 5:45 PM

Plasmons, Nanostructures, and Modeling

Session Chair: **Otto L. Muskens,** Univ. of Southampton (United Kingdom)

3:45 pm: **Eigenvector expansion of discrete-dipole approximation: application to the simulation of optical extinction and electron energy-loss spectroscopies of coupled metallic nanoparticles**, Stéphane-Olivier Guillaume, Univ. of Namur (Belgium); Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) and Institució Catalana de Recerca i Estudis Avançats (Spain); Luc Henrard, Univ. of Namur (Belgium) . . . . . [9163-55]

4:05 pm: **Enhanced up-conversion in nanocrystals coupled to silver nanowires**, Dawid Piatkowski, Nicolaus Copernicus Univ. (Poland); Nicolai Hartmann, Ludwig-Maximilians-Univ. München (Germany); Maria Olejnik, Nicolaus Copernicus Univ. (Poland); Marcin Nyk, Wroclaw Univ. of Technology (Poland); Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland); Achim Hartschuh, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9163-56]

4:25 pm: **Superradiance effect in multiple plasmonic resonators**, Zongfu Yu, Univ. of Wisconsin-Madison (USA) . . . . . [9163-57]

4:45 pm: **Generation and characterization of plasmonic nanostructures in glass surfaces by means of excimer and solid state laser irradiation**, Manfred Dubiel, Maximilian Heinz, Martin Stiebing, Martin-Luther Univ. Halle-Wittenberg (Germany); Jörg Meinertz, Jürgen Ihlemann, Laser-Lab. Göttingen e.V. (Germany); Thomas Rainer, boraident GmbH (Germany) . . . . . [9163-58]

5:05 pm: **Quantum nonlocal effects in individual and interacting graphene nanoribbons**, Iván Silveiro, Juan Manuel Plaza Ortega, Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9163-59]

5:25 pm: **Large chemically synthesized silver crystals for low-loss and active plasmonics**, Chun-Yuan Wang, Hung-Ying Chen, Yu-Jung Lu, Shangjr Gwo, National Tsing Hua Univ. (Taiwan); Liuyang Sun, Xiaoqin Li, The Univ. of Texas at Austin (USA) . . . . . [9163-60]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Enhanced transient absorption of organic dyes induced by surface plasmons of silver nanoparticles, Ausra Gustainyte, Ctr. for Physical Sciences and Technology (Lithuania); Domantas Peckus, Center for Physical Sciences and Technology (Lithuania) and Institute of Materials Science of Kaunas University of Technology (Lithuania); Marius Franckevicius, Vidmantas Gulbinas, Ctr. for Physical Sciences and Technology (Lithuania); Sigitas Tamulevicius, Institute of Materials Science of Kaunas University of Technology (Lithuania) . . . . . [9163-82]

High sensitivity refractive index sensing in gold nanoslit arrays, Qiang Kan, Jun Yuan, Zhaoxin Geng, Yiyang Xie, ChunXia Wang, Hongda Chen, Institute of Semiconductors (China) . . . . . [9163-85]

Mode parity-controlled Fano and Lorentz resonances in plasmonic nanorods, Niels Verellen, Katholieke Univ. Leuven (Belgium) and IMEC (Belgium); Fernando López-Tejeira, Univ. de Zaragoza (Spain); Ramón Paniagua-Domínguez, Instituto de Estructura de la Materia (Spain); Dries Vercruysse, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); Denitza Denkova, Katholieke Univ. Leuven (Belgium); Liesbet Lagae, Pol Van Dorpe, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); Victor V. Moshchalkov, Katholieke Univ. Leuven (Belgium); José A. Sánchez-Gil, Instituto de Estructura de la Materia (Spain) . . . . . [9163-86]

Plasmon coupling in upright magnetic SRR metamolecules, Wei-Lun Hsu, Pin Chieh Wu, Wei Ting Chen, Yao-Wei Huang, Chun Yen Liao, National Taiwan Univ. (Taiwan); Ai Qun Liu, Nanyang Technological Univ. (Singapore); Greg Sun, Univ. of Massachusetts Boston (USA); Din Ping Tsai, Academia Sinica (Taiwan) . . [9163-88]

Optimizing the quantum dot-plasmon interaction in a nano gap waveguide, Chamanei S. Perera, Kristy C. Vernon, Queensland Univ. of Technology (Australia) . . . . . [9163-89]

Transient plasmon-like modes in multi-level quantum emitter systems, Martin J. Gentile, William L. Barnes, Univ. of Exeter (United Kingdom) . . . . . [9163-90]

Tailoring plasmonic field within two-color laser using asymmetric metallic nanostructure for the generation of high harmonics and isolated attosecond pulses, Ying-Ying Yang, Institute of Semiconductors (China); Qian-Guang Li, Hubei Univ. of Engineering (China); Ling Zhang, Xue-Chun Lin, Institute of Semiconductors (China) . . . . . [9163-91]

Optical spectra of noble metal nanoparticles supported on zeolites, Catalina B. Lopez, Elena Smolentseva, Roberto Machorro, Vitalii P. Petranovskii, Univ. Nacional Autónoma de México (Mexico) . . . . . [9163-92]

Controlling light with the near-field interference, Pavel Ginzburg, King's College London (United Kingdom); Polina V. Kapitanova, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Francisco J. Rodríguez-Fortuño, Univ. Politècnica de València (Spain); Daniel P. O'Connor, Giuseppe Marino, King's College London (United Kingdom); Dmitry S. Filonov, Pavel M. Voroshilov, Alexander Poddubny, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Gregory A. Wurtz, King's College London (United Kingdom); Pavel A. Belov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Yuri S. Kivshar, The Australian National Univ. (Australia); Anatoly V. Zayats, King's College London (United Kingdom) . . . . . [9163-93]

Optical properties of amorphous diamond like carbon nanocomposite films doped with Ag and Cu nanoparticles, Tomas Tamulevicius, Kaunas Univ. of Technology (Lithuania); Domantas Peckus, Ctr. for Physical Sciences and Technology (Lithuania); Asta Tamuleviciene, Andrius Vasiliauskas, Arvydas Ciegis, Sarunas Meskinis, Sigitas Tamulevicius, Kaunas Univ. of Technology (Lithuania) . . . . . [9163-94]

Metal-all-around nitride semiconductor plasmonic nanolasers, Yu-Jung Lu, Shangjr Gwo, National Tsing Hua Univ. (Taiwan) . . . . . [9163-95]

Tunable plasmonic metamaterials composed of colloidal gold(core)/ silver(shell) nanoparticles, Meng-Hsien Lin, National Tsing Hua Univ. (Taiwan) . . . . . [9163-96]

Energy transfer from single nanocrystals to P3HT polymer, Kamil Ciszak, Justyna K. Grzelak, Nicolaus Copernicus Univ. (Poland); Marcin Nyk, Wroclaw Univ. of Technology (Poland); Dawid Piatkowski, Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9163-97]

Using remote excitation-surface enhanced Raman scattering (RE-SERS) to study the influence of nanoparticle properties on hot-spots and spectra, Bart M. Kenens, Hiroshi Uji-I, Katholieke Univ. Leuven (Belgium) . . . . . [9163-98]

Emergence of same-sign super-chiral electromagnetic fields in chiral clusters of achiral plasmonic particles, Hossein Alizadeh, Björn M. Reinhard, Boston Univ. (USA) . . . . . [9163-99]

Surface plasmon amplification in Ag/InGaAsP hybrid nano-structures, Seunghyun Kim, Tae-Young Jeong, Seungwon Seo, Chungnam National Univ. (Korea, Republic of); Kwang-Jun Ahn, Seoul National Univ. (Korea, Republic of); Ki-Ju Yee, Chungnam National Univ. (Korea, Republic of) . . . . . [9163-100]

Background-suppressed surface-enhanced molecular detection by metamaterial infrared absorber, Atsushi Ishikawa, Okayama Univ. (Japan) and RIKEN (Japan); Takuo Tanaka, RIKEN (Japan) and Hokkaido Univ. (Japan) . . . . . [9163-101]

Observation of optical domino modes in arrays of non-resonant plasmonic nanoantennas, Ivan S. Sinev, Anton K. Samusev, Pavel M. Voroshilov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Ivan S. Mukhin, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and St. Petersburg Academic Univ. (Russian Federation); Andrey I. Denisyuk, Michael E. Guzhva, Pavel A. Belov, Constantin R. Simovski, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9163-102]

The contribution of plasmon-enhanced photoluminescence to the SERS background, Loan Le Thi Ngoc, Justyna Wiedemair, Univ. Twente (Netherlands) and MESA+ Institute for Nanotechnology (Netherlands); Albert van den Berg, Univ. Twente (Netherlands); Edwin Carlen, Univ. of Tsukuba (Japan) . . . . . [9163-103]

Visible light responsive TiO_2 photoanodes based on plasmonic meta-structures, Jeong Min Baik, Joonmo Park, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9163-104]

Coherence changes of partially coherent beams in transmission through subwavelength metallic gratings, Hanna Lajunen, Toni Saastamoinen, Univ. of Eastern Finland (Finland) . . . . . [9163-105]

Super long-range surface plasmons in a silver nano-slab waveguide, Mai Higuchi, Osaka Univ. (Japan) . . . . . [9163-106]

Optical and structural properties of graphene oxide/ noble metal bilayers, Paola Zuppella, IFN-CNR Padova (Italy); Francesca Gerlin, CNR-IFN UOS Padova (Italy); Sara Zuccon, IFN-CNR Padova (Italy); Marco Nardello, Univ. degli Studi di Padova (Italy); Enrico Tessarolo, CNR-IFN UOS Padova (Italy); Alain J. Corso, IFN-CNR Padova (Italy); Simone Silvestrini, Michele Maggini, Univ. degli Studi di Padova (Italy); Maria G. Pelizzo, IFN-CNR Padova (Italy) . . . . . [9163-107]

Photothermal reshaping of single gold nanorods below melting point driven by surface diffusion, James W. M. Chon, Adam B. Taylor, Arif M. Siddiquee, Swinburne Univ. of Technology (Australia) . . . . . [9163-108]

Plasmonic response of different metals for specific applications, Sara Zuccon, Paola Zuppella, IFN-CNR LUXOR Lab. (Italy); Simone Silvestrini, Univ. degli Studi di Padova (Italy); Alain J. Corso, Francesca Gerlin, IFN-CNR LUXOR Lab. (Italy); Michele Maggini, Univ. degli Studi di Padova (Italy); Maria G. Pelizzo, IFN-CNR LUXOR Lab. (Italy) . . . . . [9163-109]

High resolution characterization of plasmon resonances in silver nanostructures, Edson P. Bellido, David Rossoud, Gianluigi A. Botton, McMaster Univ. (Canada) . . . . . [9163-110]

Asymmetric reduction of gold nanoparticles into thermoplasmonic polydimethylsiloxane thin films, Jeremy Dunklin, Gregory T. Forcherio, Donald K. Roper, Keith Berry Jr., Univ. of Arkansas (USA) . . . . . [9163-111]

Increased upconversion quantum yield in plasmonic structures, Christopher Lantigua, William Hayenga, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Mathieu Lessard-Viger, Adah Almutairi, Univ. of California, San Diego (USA); Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9163-112]

Geometric optics of gold nanoparticle-polydimethylsiloxane thin film systems, Jeremy Dunklin, Gregory T. Forcherio, Donald K. Roper, Univ. of Arkansas (USA) . . . . . [9163-113]

Second-order coherence properties of nanoscale coaxial lasers, Nicholas Nye, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9163-114]

Optical conductivity of a two-dimensional electron gas with Rashba and Dresselhaus spin-orbit coupling, Jesus A. Maytorena, Catalina B. Lopez, Elmer M. Cruz, Univ. Nacional Autónoma de México (Mexico) . . . . . [9163-115]

Nonlinear plasmonics for nanoscale light manipulation and imaging, Alexey V. Krasavin, Paulina Segovia Olvera, Pavel Ginzburg, Anatoly V. Zayats, King's College London (United Kingdom) . . . . . [9163-116]

Plasmon-mediated photo-reactions on gold and silver nanostructures, Hans D. Robinson, Brenden A. Magill, Erich M. See, Xi Guo, Roberto L. Reyes, Richey M. Davis, Webster L. Santos, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9163-117]

CONFERENCE 9163

LOCATION: CONV. CTR. ROOM 6B

Field effect frequency-tunable epsilon-near-zero metamaterial in the visible, Georgia T. Papadakis, Howard Lee, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9163-118]

Localized and non-localized plasmon resonance modes and enhanced optical absorption in patterned metal-insulator-metal nanostructures, Wonkyu Kim, The Univ. of Alabama in Huntsville (USA); Blake S. Simpkins, James P. Long, U.S. Naval Research Lab. (USA); Boyang Zhang, Junpeng Guo, The Univ. of Alabama in Huntsville (USA). . . . . [9163-119]

Roughness induced leakage and visualization of surface plasmon-polaritons, Elena Tchaikina, Eduardo Pisano, Ivan Avilés, Eugenio R. Méndez, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico). . . . . [9163-120]

Localized surface plasmon resonances in transformed spaces, Veronica Perez-Chavez, Eugenio R. Méndez, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9163-121]

Wafer-scale aluminum nano-plasmonics, Matthew C. George, Rumyana Petrova, James Frasier, Eric W. Gardner, MOXTEK, Inc. (USA) . . . . . [9163-122]

The field enhancement and optical sensing in array of almost adjoining metal and dielectric nanorods *(Invited Paper)*, Andrey Ivanov, R&D Co. VICHEL (High-Frequency Systems) (Russian Federation); Alexander N. Shalygin, R&D Co. VICHEL (High-Frequency Systems) (Russian Federation); Andrey N. Lagarkov, Institute for Theoretical and Applied Electromagnetics (Russian Federation); Alexander Vaskin, Moscow Institute of Physics and Technology (Russian Federation); Andrey K. Sarychev, Institute for Theoretical and Applied Electrodynamics (Russian Federation) . . . . . [9163-123]

Investigation of optical limiting properties of aluminium nanoparticles prepared by laser ablation in different carrier media, K. Mayank S. Sharma, Pranam Prakash, Cochin Univ. of Science & Technology (India) and Univ. of Hyderabad (India) . . . . . [9163-124]

Exciton-plasmon interaction in core/shell spherIcal nanoparticles, Anton V. Zasedatelev, National Research Nuclear Univ. MEPhI (Russian Federation); Alexey B. Karpo, A. M. Prokhorov General Physics Institute (Russian Federation); Vitaly I. Krasovskii, A. M. Prokhorov General Physics Institute (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation); Ivan N. Feofanov, P.N. Lebedev Physical Institute (Russian Federation); Alexander A. Chistyakov, National Research Nuclear Univ. MEPhI (Russian Federation). . . . . [9163-125]

Study of plasmonic coupling between InAs quantum dots and ErAs nanoparticles in an epitaxial matrix, Luke J. Bissell, Kurt G. Eyink, Elizabeth H. Steenbergen, Joshua R. Hendrickson, Frank Szmulowicz, Krishnamurthy Mahalingam, Lawrence Grazulis, Daniel Esposito, Andrew Aronow, Jeremy A. Massengale, Madelyn Hill, Air Force Research Lab. (USA). . . . . [9163-126]

Tunable sensitivity and wide dynamic range phase detection of multichannel grating-coupled SPR sensor, Wen-Kai Kuo, National Formosa Univ. (Taiwan) . . . . . [9163-127]

Optical properties of magnetic-plasmonic nanoparticle multilayers, Ward Brullot, Thierry Verbiest, Katholieke Univ. Leuven (Belgium) . . . . . [9163-128]

Ultra-broadband polarization manipulation and spin-orbit angular momentum conversion based on dispersion engineered metamaterials, Mingbo Pu, Xiangang Luo, Institute of Optics and Electronics (China) . . . . . [9163-130]

An ultra-broadband nano-plasmonic reflector with an asymmetric nano-ring resonator, Yuhsin Chang, Chyong-Hua Chen, National Chiao Tung Univ. (Taiwan). . . . . [9163-131]

Design of an active terahertz polarizer based on chiral metamaterial, Xiaoliang Ma, Mingbo Pu, Xiangang Luo, Institute of Optics and Electronics (China)[9163-132]

Focusing of surface plasmons with a plasmonic lens, Thanh Phong Vo, Alireza Maleki, James E. Downes, David W. Coutts, Judith M. Dawes, Macquarie Univ. (Australia). . . . . [9163-133]

Dark and bright modes manipulation for plasmon-triggered optical switching, Simone Panaro, Andrea Toma, Adnan Nazir, Carlo Liberale, Hai Wang, Francesco De Angelis, Remo Proietti Zaccaria, Istituto Italiano di Tecnologia (Italy); Enzo Di Fabrizio, King Abdullah Univ. of Science and Technology (Saudi Arabia) and Univ. degli studi Magna Græcia di Catanzaro (Italy) . . . . . [9163-134]

Nonlocal quantum effect on optical scattering form small metallic nanoparticles on multilayer films, Huai-Yi Xie, P. Ching-Hang Chien, Yia-Chung Chang, Academia Sinica (Taiwan). . . . . [9163-135]

Polarizability extraction for rapid computation of Fano resonance in nanoring lattices, Gregory T. Forcherio, Drew DeJarnette, Phillip Blake, Donald K. Roper, Univ. of Arkansas (USA) . . . . . [9163-136]

Broadband, tunable, lattice plasmon resonances with high quality factors, Yi Hua, Claire Deeb, Northwestern Univ. (USA); Gary P. Wiederrecht, Argonne National Lab. (USA); Teri W. Odom, Northwestern Univ. (USA) . . . . . [9163-137]

Computational electromagnetic study of plasmonic effects in interdigital arrays, Avery M. Hill, Ahmad I. Nusir, Paul Nguyen, M. Omar Manasreh, Joseph B. Herzog, Univ. of Arkansas (USA). . . . . [9163-139]

Kerr effect from single gold nanoparticles, Emeric Bergmann, Anthony Maurice, Emmanuel Benichou, Christian Jonin, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) . . . . . [9163-140]

THURSDAY 21 AUGUST

SESSION 15

LOCATION: CONV. CTR. ROOM 6B . . . THU 8:20 AM TO 10:30 AM

Plasmons, Control, and Sensing I

Session Chair: **Vitaliy N. Pustovit,** Air Force Research Lab. (USA)

8:20 am: **Transmission characterization and control of metallic nanohole arrays by sub 5 fsec laser light pulses**, Kellie Pearce, Ludwig-Maximilians-Univ. München (Germany) and Max-Planck-Institut für Quantenoptik (Germany); Jürgen Schmidt, Christian Späth, Ludwig-Maximilians-Univ. München (Germany); Huaihai Pan, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Hassan M. Ouacha, Abdallah M. A. Azzeer, King Saud Univ. (Saudi Arabia); Ulf Kleineberg, Ludwig-Maximilians-Univ. München (Germany) and Max-Planck-Institut für Quantenoptik (Germany) . . . . . [9163-61]

8:40 am: **Engineering plasmonic interactions in three dimensional nano-structured systems**, Haobijam J. Singh, Ambarish Ghosh, Indian Institute of Science (India). . . . . [9163-62]

9:00 am: **Charge transfer and quantum coherence in solar cells and artificial light harvesting system** *(Invited Paper)*, Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9163-64]

9:30 am: **Mechanism of plasmon enhanced upconversion processes in $NaYF_4$:Yb^{3+},Er^{3+} nanoparticles**, Dawei Lu, Suehyun K. Cho, Sungmo Ahn, Univ. of Colorado at Boulder (USA); Loic Brun, Christopher J. Summers, Georgia Institute of Technology (USA); Wounjhang Park, Univ. of Colorado at Boulder (USA) . [9163-65]

9:50 am: **Experimental demonstration of plasmonic resonant guided wave network**, Howard Lee, Stanley P. Burgos, California Institute of Technology (USA); Arian Kriesch, Max-Planck-Institut für die Physik des Lichts (Germany); Eyal Feigenbaum, Ryan M. Briggs, California Institute of Technology (USA); Ulf Peschel, Harry A. Atwater Jr., Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9163-66]

10:10 am: **Near-field vector analysis of plasmonic structures enhancement on infrared photodetectors**, Guiru Gu, Xuejun Lu, Univ. of Massachusetts Lowell (USA) . . . . . [9163-67]

Coffee Break . . . . . Thu 10:30 am to 10:45 am

SESSION 16

LOCATION: CONV. CTR. ROOM 6B . . . THU 10:45 AM TO 12:35 PM

Plasmons, Control, and Sensing II

Session Chair: **Christoph Lienau,** Carl von Ossietzky Univ. Oldenburg (Germany)

10:45 am: **Chirality enables unusual optical force** *(Invited Paper)*, Shubo Wang, Che Ting Chan, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9163-68]

11:15 am: **Polarimetric analysis of the extraordinary optical transmission through subwavelength hole arrays**, Oriol Arteaga, Univ. de Barcelona (Spain); Shane Nichols, New York Univ. (USA); Ben Maoz, Gil Markovich, Tel Aviv Univ. (Israel); Bart Kahr, New York Univ. (USA) . . . . . [9163-69]

11:35 am: **ZnO as a tuneable metal: new types of surface plasmon polaritons at infrared wavelengths**, Sascha Kalusniak, Sergey Sadofev, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany). . . . . [9163-70]

11:55 am: **Enhancement in conversion efficiency of organic photovoltaic devices by plasmonic nanostructure**, Wakana Kubo, RIKEN (Japan) and Japan Science and Technology Agency (Japan); Takuo Tanaka, RIKEN (Japan) and Hokkaido Univ. (Japan) . . . . . [9163-71]

12:15 pm: **Far-field and near-field analysis of gold nanoantennas in Kretschmann configuration**, Kuo-Ping Chen, Yi-Hsun Chen, National Chiao Tung Univ. (Taiwan) . . . . . [9163-72]

Lunch/Exhibition Break . . . . . Thu 12:35 pm to 2:05 pm

SESSION 17

LOCATION: CONV. CTR. ROOM 6B .... THU 2:05 PM TO 3:45 PM

Pathways to Applications I

Session Chair: **Siying Peng,** California Institute of Technology (USA)

2:05 pm: **Near-field, back-action cooling and amplification**, Iman Hassani Nia, Hooman Mohseni, Northwestern Univ. (USA) . . . . . [9163-73]

2:25 pm: **Polarization manipulation with subwavelength nano apertures**, Jasper J. Cadusch, Timothy James, The Univ. of Melbourne (Australia); Timothy J. Davis, Commonwealth Scientific and Industrial Research Organisation (Australia); Ann Roberts, Amir H. Djalalian-Assl, The Univ. of Melbourne (Australia) . . . . . [9163-74]

2:45 pm: **Observation of quantum interference in the plasmonic Hong-Ou-Mandel effect**, Yannick Sonnefraud, Ctr. National de la Recherche Scientifique (France); Giuliana Di Martino, Imperial College London (United Kingdom); Mark S. Tame, Univ. of KwaZulu-Natal (South Africa); Stéphane Kéna-Cohen, Frederik Dieleman, Imperial College London (United Kingdom); Sahin K. Ozdemir, Washington Univ. in St. Louis (USA); Myungshik Kim, Stefan A. Maier, Imperial College London (United Kingdom) . . . . . [9163-75]

3:05 pm: **Plasmon hybridization in ITO/Ag core shell nanoarrays**, Akram A. Amooali, Palash Gangopadhyay, Robert A. Norwood, The Univ. of Arizona (USA) . . . . . [9163-76]

3:25 pm: **Plasmonic black metals in resonant nanocavities**, Mihail Bora, Elaine M. Behymer, Jerald A. Britten, Cindy C. Larson, Allan Chang, Hoang T. Nguyen, Tiziana Conese Bond, Lawrence Livermore National Lab. (USA) . . . . . [9163-77]

Coffee Break . . . . . Thu 3:45 pm to 4:00 pm

SESSION 18

LOCATION: CONV. CTR. ROOM 6B .... THU 4:00 PM TO 5:40 PM

Pathways to Applications II

Session Chair: **Carl Wadell,** Chalmers Univ. of Technology (Sweden)

4:00 pm: **Quantum-coherence-enhanced plasmonic nanostructures for near-field spectroscopy and control**, Dmitri V. Voronine, Texas A&M Univ. (USA) . . . . . [9163-78]

4:20 pm: **RF-based optical patch antenna design and analysis**, G. Seda Unal, M. I. Aksun, Koç Univ. (Turkey) . . . . . [9163-79]

4:40 pm: **Plasmon-induced hot carriers in metallic nanoparticles**, Alejandro Manjavacas, Jun Liu, Vikram V. Kulkarni, Peter Nordlander, Rice Univ. (USA) . . . . . [9163-80]

5:00 pm: **Optical properties gold-silver alloy nanoparticles and their biomedical applications**, David Rioux, Mikaël Simard, Eric Bergeron, Sergiy V. Patskovsky, Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9163-81]

5:20 pm: **Self-assembled nano-antennas by placing metallic nanoparticles on DNA-origami for enhancing the fluorescence intensity and photostability**, Guillermo P. Acuna, Friederike M. Möller, Phil Holzmeister, Anastasiya Puchkova, Technische Univ. Braunschweig (Germany); Jesica Pellegrotti, Ctr. de Investigaciones in Bionanociencias “Elizabeth Jares-Erijman” (Argentina); Birka Lalkens, Technische Univ. Braunschweig (Germany); Fernando D. Stefani, Ctr. de Investigaciones in Bionanociencias “Elizabeth Jares-Erijman” (Argentina); Philip Tinnefeld, Technische Univ. Braunschweig (Germany) . . . . . [9163-83]

CONFERENCE 9164

LOCATION: CONV. CTR. ROOM 6D

Sunday–Thursday 17–21 August 2014 • Proceedings of SPIE Vol. 9164

Optical Trapping and Optical Micromanipulation XI

Conference Chairs: **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom); **Gabriel C. Spalding,** Illinois Wesleyan Univ. (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6D . . . .SUN 8:10 AM TO 10:10 AM

Toward (Or In) the Quantum Limit of Opto-Mechanics

Session Chair: **Michael Mazilu,** Univ. of St. Andrews (United Kingdom)

8:10 am: **Optical tweezing in a slow light medium**, Ebrahim Karimi, Univ. degli Studi di Napoli Federico II (Italy); Israel De Leon, Univ. of Ottawa (Canada); Mahammad Zahirul Alam, Univ. of Ottawa (Canada); Robert W. Boyd, Univ. of Ottawa (Canada) . . . . . [9164-1]

8:30 am: **Cavity cooling a trapped nanosphere**, Peter F. Barker, Piergiacomo Z. G. Fonseca, James Millen, Tania S. Monteiro, Univ. College London (United Kingdom) . . . . . [9164-2]

8:50 am: **Doppler cooling microspheres**, Peter F. Barker, Li Ying, Univ. College London (United Kingdom) . . . . . [9164-3]

9:10 am: **Parametric stabilization and cooling of levitated graphene microparticles**, Pavel Nagornykh, Bruce E. Kane, Univ. of Maryland, College Park (USA) . . . . . [9164-4]

9:30 am: **Dynamics of optically trapped microparticles in vacuum**, Yoshihiko Arita, Michael Mazilu, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) . . . . . [9164-5]

9:50 am: **On-chip optical trapping for atomic applications**, Maximillian A. Perez, Evan Salim, Dan Farkas, Janet Duggan, Dana Z. Anderson, ColdQuanta, Inc. (USA) . . . . . [9164-6]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6D . . SUN 10:40 AM TO 12:00 PM

Foundations of the Electromagnetic Theory of Force and Momentum

Session Chair: **Gabriel C. Spalding,** Illinois Wesleyan Univ. (USA)

10:40 am: **Quantum mechanics compatible Maxwell's stress tensor**, Michael Mazilu, Univ. of St. Andrews (United Kingdom) . . . . . [9164-7]

11:00 am: **Calculating the optical gradient and scattering force and the creation of conservative optical force field**, Jack Ng, Junjie Du, Isaac Yuen, Hong Kong Baptist Univ. (Hong Kong, China); Zhifang Lin, Fudan Univ. (China); Che Ting Chan, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9164-8]

11:20 am: **Momentum measurements with holographic optical tweezers for exploring force detection capabilities on irregular samples**, Frederic Català,Univ. de Barcelona (Spain); Ferran Marsà Samper, Arnau Farré Flaquer, Mario Montes-Usategui, Impetux Optics, S.L. (Spain) and Univ. de Barcelona (Spain); Estela Martin-Badosa, Univ. de Barcelona (Spain) . . . . . [9164-9]

11:40 am: **Electromagnetic force and torque in Lorentz and Einstein-Laub formulations: the problem of hidden momentum**, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9164-10]

Lunch Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6D . . . . . SUN 1:30 PM TO 3:10 PM

Beam Shaping and Aberration/Wavefront Correction

Session Chair: **Gabriel C. Spalding,** Illinois Wesleyan Univ. (USA)

1:30 pm: **Optical vault: a reconfigurable bottle beam based on conical refraction of light**, Wieslaw Z. Krolikowski, The Australian National Univ. (Australia) and Texas A&M Univ. at Qatar (Qatar); Alejandro Turpin, Univ. Autònoma de Barcelona (Spain); Vladlen G. Shvedov, Cyril Hnatovsky, The Australian National Univ. (Australia); Yurii V. Loika, Univ. of Dundee (United Kingdom); Jordi Mompart, Univ. Autònoma de Barcelona (Spain) . . . . . [9164-11]

1:50 pm: **Shaping self imaging optical bottles with modified quasi-Bessel beams**, Woei-Ming Lee, The Australian National Univ. (Australia); Li Li, Xiangsheng Xie, Sun Yat-Sen Univ. (China); Wieslaw Z. Krolikowski, Andrei V. Rode, The Australian National Univ. (Australia); Jianying Zhou, Sun Yat-Sen Univ. (China) . . . . . [9164-12]

2:10 pm: **Focusing and imaging with increased numerical apertures through multimode fibers with micro-fabricated optics**, Silvio Bianchi, Univ. degli Studi di Roma La Sapienza (Italy); Vijayakumar Rajamanickam, Carlo Liberale, Lorenzo Ferrara, Istituto Italiano di Tecnologia (Italy); Enzo Di Fabrizio, King Abdullah Univ. of Science and Technology (Saudi Arabia); Roberto Di Leonardo, Consiglio Nazionale Ricerche (Italy) . . . . . [9164-13]

2:30 pm: **Controlling light in multimode waveguides: new challenges**, Tomas Cizmar, Univ. of Dundee (United Kingdom); Tomas Tyc, Masaryk Univ. (Czech Republic); Martin Ploschner, Univ. of Dundee (United Kingdom) . . . . . [9164-14]

2:50 pm: **Engineering particle trajectories in microfluidic flows using speckle light fields**, Giorgio Volpe, Lisa Kurz, Institut Langevin (France); Giovanni S. Volpe, Bilkent Univ. (Turkey); Sylvain Gigan, Institut Langevin (France) . . . . . [9164-15]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 6D . . . . SUN 3:40 PM TO 5:30 PM

Helicity and Optical Angular Momentum

Session Chair: **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom)

3:40 pm: **Observation of the rotational Doppler effect from an optically trapped micro-particle**, David B. Phillips, Michael P. Lee, Stephen M. Barnett, Univ. of Glasgow (United Kingdom); Stephen H. Simpson, Univ. of Bristol (United Kingdom); Martin P. Lavery, Fiona C. Speirits, Miles J. Padgett, Graham M. Gibson, Univ. of Glasgow (United Kingdom) . . . . . [9164-16]

4:00 pm: **Optical trapping with a perfect vortex beam**, Mingzhou Chen, Michael Mazilu, Yoshihiko Arita, Univ. of St. Andrews (United Kingdom); Ewan M. Wright, College of Optical Sciences, The Univ. of Arizona (USA); Kishan Dholakia, Univ. of St. Andrews (United Kingdom) . . . . . [9164-17]

4:20 pm: **Microparticles behaviour in a tightly focused optical vortex beam**, Pavel Zemánek, Lukáš Chvátal, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); Alejandro V. Arzola, Univ. Nacional Autónoma de Mexico (Mexico); Petr Jákl, Martin Siler, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . . . . . [9164-18]

4:40 pm: **Interesting manifestations of spin orbit interaction and spin Hall shift of light in an optical trap**, Basudev Roy, Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India); S. Dutta Gupta, Univ. of Hyderabad (India); Ayan Banerjee, Indian Institute of Science Education and Research Kolkata (India) . . . . . [9164-19]

5:00 pm: **Helicity-dependent optomechanics of chiral microparticles** *(Invited Paper)*, Etienne Brasselet, Georgiy V. Tkachenko, Univ. Bordeaux 1 (France) . . . . . [9164-20]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:50 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 6D . . . . MON 1:50 PM TO 3:30 PM

Optically Driven Microrheology and Mechanical Properties

Session Chair: **Gabriel C. Spalding,** Illinois Wesleyan Univ. (USA)

1:50 pm: **Measurement of interparticle force between nematic colloids by optical tweezers**, Yasuyuki Kimura, Kyushu Univ. (Japan) . . . . . [9164-21]

2:10 pm: **Optical tweezers rotational microrheology: achieving viscoelastic measurements in confined geometries**, Lachlan Gibson, Daryl C. Preece, Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) . . . . . [9164-22]

2:30 pm: **Anti-reflection coated particles for biophysical measurements**, Derek Craig, Igor Andreyev, Yoshihiko Arita, Michael Mazilu, David C. Hamilton, Peter Pogorzelec, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) . . . . [9164-23]

2:50 pm: **Quantifying change in stiffness heterogeneity in 3D around cells embedded in natural ECMs over time**, Abhishek Kurup, Mark Keating, Univ. of California, Irvine (USA); Martha B. Alvarez-Elizondo, Technion-Israel Institute of Technology (Israel); Elliot L. Botvinick, Univ. of California, Irvine (USA) . . . [9164-24]

3:10 pm: **Temporal response of biological cells to high-frequency optical jumping and vibrating tweezers**, Lingyao Yu, Yunlong Sheng, Univ. Laval (Canada) . . . . . [9164-26]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 6D . . . MON 4:00 PM TO 6:50 PM

Using the Photonic Toolbox to Study Cells and Their Organelles

Session Chair: **Michael W. Berns,** Univ. of California, San Diego (USA)

4:00 pm: **Local probing and stimulation of neuronal cells by optical manipulation** *(Invited Paper)*, Danut-Adrian Cojoc, CNR-IOM (Italy) . . . . . [9164-27]

4:30 pm: **MicroTsunamis: a method for high-throughput screening of cellular mechanotransduction using laser microbeam generated cavitation bubbles**, Jonathan Compton, Justin Luo, Huan Ma, Vasan Venugopalan, Elliot L. Botvinick, Univ. of California, Irvine (USA) . . . . . [9164-28]

4:50 pm: **Force measurements with optical tweezers inside living cells**, Josep Mas, Univ. de Barcelona (Spain) and Univ. of Saint Andrews (United Kingdom); Arnau Farré Flaquer, Impetux Optics, S.L. (Spain) and Univ. de Barcelona (Spain); Jordi Sancho-Parramon, Institut Ruder Boškovic (Croatia); Estela Martín-Badosa, Univ. de Barcelona (Spain); Mario Montes-Usategui, Univ. de Barcelona (Spain) and Impetux Optics S.L. (Spain) . . . . . [9164-29]

5:10 pm: **Measuring local viscosities near membranes of living cells with photonic force microscopy**, Felix Jünger, Alexander Rohrbach, Albert-Ludwigs-Univ. Freiburg (Germany) . . . . . [9164-30]

5:30 pm: **Structuring bacterial biofilms on the single-cell level using optical trapping**, Vernita Gordon, Jaime Hutchison, Christopher Rodesney, Karishma Kaushik, Henry Le, Daniel Hurwitz, Yasuhiko Irie, The Univ. of Texas at Austin (USA) . . . . . [9164-31]

5:50 pm: **Tailored manipulation of rod-shaped bacteria and adhesive cellular clusters with tug-of-war optical tweezers**, Anna S. Bezryadina, San Francisco State Univ. (USA); Daryl C. Preece, The Univ. of Queensland (Australia); Zhigang Chen, Joseph C. Chen, San Francisco State Univ. (USA) . . . . . [9164-32]

6:10 pm: **A portable microscope for optogenetics**, Anna Linnenberger, Univ. of Colorado (USA); Rafael Yuste M.D., Darcy Peterka, Columbia Univ. (USA) [9164-33]

6:30 pm: **Discrete and local membrane permeation induced by local melting of Giant Unilamellar lipid Vesicles (GUVs)**, Thomas Andersen, Anders Kyrsting, Poul M. Bendix, Univ. of Copenhagen (Denmark) . . . . . [9164-34]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 6D . . . TUE 8:00 AM TO 10:10 AM

Enhanced Sensitivity and Resolution of Optical Force Actuators

Session Chair: **Giovanni S. Volpe,** Bilkent Univ. (Turkey)

8:00 am: **Quad stereomicroscopy**, Rebecca F. Hay, Graham M. Gibson, Michael P. Lee, David B. Phillips, Miles J. Padgett, Univ. of Glasgow (United Kingdom) . . . . . [9164-35]

8:20 am: **Enabling accurate photodiode detection of multiple optical traps by spatial filtering**, Dino Ott, Niels Bohr Institute (Denmark); S. Nader S. Reihani, Sharif Univ. of Technology (Iran, Islamic Republic of) and Niels Bohr Institute (Denmark); Lene B. Oddershede, Niels Bohr Institute (Denmark) . . . . . [9164-36]

8:40 am: **A force measurement instrument for optical tweezers based on the detection of light momentum changes**, Arnau Farré Flaquer, Ferran Marsà Samper, Mario Montes Usategui, Impetux Optics, S.L. (Spain) and Univ. de Barcelona (Spain) . . . . . [9164-37]

9:00 am: **Optical tweezers escape forces**, Ann A. M. Bui, Alexander B. Stilgoe, The Univ. of Queensland (Australia); Nima Khatibzadeh, Beckman Laser Institute and Medical Clinic (USA); Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Michael W. Berns, Univ. of California, Irvine (USA) . . . . . [9164-38]

9:20 am: **A new technique for high sensitive detection of rotational motion in optical tweezers by a differential measurement of backscattered intensity**, Basudev Roy, Sudipta K. Bera, Argha Mondal, Ayan Banerjee, Indian Institute of Science Education and Research Kolkata (India) . . . . . [9164-39]

9:40 am: **Optical tweezers calibration with Bayesian inference** *(Invited Paper)*, Maximilian U. Richly, Silvan C. Türkcan, Ecole Polytechnique (France); Antoine LeGall, Nicolas Fiszman, Lab. Charles Fabry (France); Jean-Baptiste Masson, Institut Pasteur (France); Nathalie Westbrook, Karen Perronet, Lab. Charles Fabry (France); Antigoni Alexandrou, Ecole Polytechnique (France) . . . . . [9164-40]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 8

LOCATION: CONV. CTR. ROOM 6D . . TUE 10:40 AM TO 11:40 AM

Single-Molecule Manipulation and Study

Session Chair: **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom)

10:40 am: **STED nanoscopy combined with optical tweezers reveals protein dynamics on densely covered DNA**, Iddo Heller, Gerrit Sitters, Onno D. Broekmans, Géraldine Farge, Vrije Univ. Amsterdam (Netherlands); Carolin Menges, Wolfgang Wende, Justus-Liebig-Univ. Giessen (Germany); Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany); Erwin J. G. Peterman, Gijs J. Wuite, Vrije Univ. Amsterdam (Netherlands) . . . . . [9164-41]

CONFERENCE 9164

LOCATION: CONV. CTR. ROOM 6D

11:00 am: **DNA origami based assembly of gold nanoparticle dimers for surface-enhanced Raman scattering**, Vivek Thacker, Lars O. Herrmann, Daniel O. Sigle, Univ. of Cambridge (United Kingdom); Tao Zhang, Tim Liedl, Ludwig-Maximilians-Univ. München (Germany); Jeremy J. Baumberg, Ulrich F. Keyser, Univ. of Cambridge (United Kingdom) . . . . . [9164-42]

11:20 am: **Optical tweezers for free-solution label-free single bio-molecule studies**, Abhay Kotnala, Ahmed Al-Balushi, Reuven Gordon, Univ. of Victoria (Canada) . . . . . [9164-43]

SESSION 9

LOCATION: CONV. CTR. ROOM 6D . . . TUE 11:40 AM TO 12:40 PM

Alternative Methods

Session Chair: **Hiroshi Masuhara,** National Chiao Tung Univ. (Taiwan)

11:40 am: **The electrostatic fluidic trap: a new approach to the spatial control and manipulation of matter at the nanometer scale**, Madhavi Krishnan, ETH Zürich (Switzerland). . . . . [9164-44]

12:00 pm: **Metal/dielectrique structures fabrication using the photomechanical properties of azobenzene molecule**, Nicolas Desboeufs, Anh-Duc Vu, Thierry Gacoin, Jacques Peretti, Yves Lassailly, Khalid Lahlil, Ecole Polytechnique (France) . . . . . [9164-45]

12:20 pm: **Micron-scale motions from molecular-scale photochemistry**, Christopher J. Bardeen, Univ. of California, Riverside (USA); Rabih Al-Kaysi, King Abdulaziz City for Science and Technology (Saudi Arabia) and King Abdullah International Medical Research Ctr. (Saudi Arabia); Lingyan Zhu, Taehyung Kim, Univ. of California, Riverside (USA). . . . . [9164-46]

Lunch/Exhibition Break . . . . . Tue 12:40 pm to 2:10 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 6D . . . . . TUE 2:10 PM TO 3:10 PM

Photonic Devices for Optically Induced Forces

Session Chair: **Masud Mansuripur,** College of Optical Sciences, The Univ. of Arizona (USA)

2:10 pm: **On-chip photonic tweezers: integrated tools for optical trapping, self-assembly and micromanipulation**, Christophe Pin, Claude Renaut, CEA Grenoble (France) and Univ. de Bourgogne (France); Emmanuel Picard, CEA Grenoble (France); David Peyrade, Ctr. National de la Recherche Scientifique (France); Emmanuel Hadji, CEA Grenoble (France); Frédérique de Fornel, Ctr. National de la Recherche Scientifique (France) and Univ. de Bourgogne (France); Benoit Cluzel, Univ. de Bourgogne (France). . . . . [9164-47]

2:30 pm: **Investigations of the dynamics of resonantly trapped nanospheres in a hollow photonic crystal cavity**, Mario Tonin, Nicolas Descharmes, Ulagalandha Dharanipathy, Romuald Houdré, Flavio M. Mor, Sylvia Jeney, László Forró, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9164-48]

2:50 pm: **Inducing forced and auto oscillations in one-dimensional photonic crystals with light**, J. Eduardo Lugo, Rafael Doti, Jocelyn Faubert, Univ. de Montréal (Canada). . . . . [9164-49]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 11

LOCATION: CONV. CTR. ROOM 6D . . . . TUE 3:40 PM TO 6:20 PM

Near-Field Micromanipulation, Plasmonic, and Nanoparticle Trapping

Session Chair: **Romuald Houdré,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

3:40 pm: **New techniques in optical trapping and sensing**, Lulu Liu, Harvard School of Engineering and Applied Sciences (USA); Alexander J. Woolf, Harvard Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9164-50]

4:00 pm: **Optical trapping of nanoscale plasmonic optical lattice in microfluidic environments**, Ya Tang Yang, Jer-Shing Huang, Chia Chun Hung, National Tsing Hua Univ. (Taiwan). . . . . [9164-51]

4:20 pm: **Promoting optofluidic actuation of microparticles by plasmonic nanoparticles tagging**, Jean-Pierre Delville, Julien Burgin, Univ. Bordeaux 1 (France); Satyabrata Si, Council for Scientific and Industrial Research (India); Marie Helene Delville, Institut de Chimie de la Matière Condensée de Bordeaux (France) . . . . . [9164-52]

4:40 pm: **Using dark field spectroscopy to measure dynamics and coupling of multiple nanoparticles in a single optical trap**, Ana Andres-Arroyo, Wen Jun Toe, Scott Kemp, Fan Wang, Peter J. Reece, The Univ. of New South Wales (Australia). . . . . [9164-53]

5:00 pm: **Dynamic plasmonic trapping and manipulation of metallic particles for SERS application**, Changjun Min, Wei Shi, Yuquan Zhang, Junfeng Shen, Xiaocong Yuan, Nankai Univ. (China) . . . . . [9164-54]

5:20 pm: **Photothermal heating of silicon nanowires in a single-beam laser trap**, Paden B. Roder, Bennett E. Smith, E. James Davis, Peter J. Pauzauskie, Univ. of Washington (USA). . . . . [9164-55]

5:40 pm: **Anomalous dynamic behaviour of optically trapped high aspect ratio nanowires**, Wen Jun Toe, Ignacio Ortega Piwonka, Christopher Angstmann, The Univ. of New South Wales (Australia); Hark Hoe Tan, Chennupati Jagadish, The Australian National Univ. (Australia); Bruce I. Henry, Peter J. Reece, The Univ. of New South Wales (Australia) . . . . . [9164-56]

6:00 pm: **Optical trapping with pillar bowtie nanoantennas**, Hao Chen, Qing Ding, Brian J. Roxworthy, Abdul M. Bhuiya, Kimani C. Toussaint Jr., Univ. of Illinois at Urbana-Champaign (USA). . . . . [9164-57]

WEDNESDAY 20 AUGUST

SESSION 12

LOCATION: CONV. CTR. ROOM 6D . . WED 8:00 AM TO 10:10 AM

Studies of Active Swimmers/Hydrodynamics

Session Chair: **Vernita Gordon,** The Univ. of Texas at Austin (USA)

8:00 am: **Active matter transport on complex landscapes**, Cynthia J. Olson Reichhardt, Los Alamos National Lab. (USA); Dipanjan Ray, Los Alamos National Lab. (USA) and Univ. of Notre Dame (USA); Charles M. Reichhardt, Los Alamos National Lab. (USA) . . . . . [9164-58]

8:20 am: **Targeted delivery of colloids by swimming bacteria**, Roberto Di Leonardo, Nikolaos Koumakis, Consiglio Nazionale delle Ricerche (Italy); Alessia Lepore, Univ. degli Studi di Roma Tre (Italy); Claudio Maggi, Univ. degli Studi di Roma La Sapienza (Italy). . . . . [9164-59]

8:40 am: **Collective behavior of the optically driven particles on a circular path**, Shogo Okubo, Yasuyuki Kimura, Kyushu Univ. (Japan) . . . . . [9164-60]

9:00 am: **Hydrodynamic synchronisation in arrays of optically controlled rotors** *(Invited Paper)*, Simon Hanna, Luke J. Debono, Stuart J. Box, Stephen H. Simpson, Univ. of Bristol (United Kingdom); David B. Phillips, Univ. of Glasgow (United Kingdom) . . . . . [9164-61]

9:30 am: **Optical trapping and lifting of plasmonic Janus microparticles**, Spas N. Nedev, Paul Kühler, Ludwig-Maximilians-Univ. München (Germany); Sol Carretero-Palacios, Ludwig-Maximilians-Univ. München (Germany) and Instituto de Ciencia de Materiales de Sevilla (Spain); Lindsey L. Anderson, Theobald Lohmüller, Jochen Feldmann, Ludwig-Maximilians-Univ. München (Germany). . . . . [9164-62]

9:50 am: **3-axis digital holographic microscopy for high speed volumetric imaging**, Filippo Saglimbeni, Silvio Bianchi, Univ. degli Studi di Roma La Sapienza (Italy); Roberto Di Leonardo, Consiglio Nazionale delle Ricerche (Italy) . . . [9164-63]

Coffee Break . . . . . Wed 10:10 am to 10:40 am

SESSION 13

LOCATION: CONV. CTR. ROOM 6D . . WED 10:40 AM TO 11:50 AM

Statistical Mechanics of Small Systems

Session Chair: **Roberto Di Leonardo,** Univ. degli Studi di Roma La Sapienza (Italy)

10:40 am: **Maxwell´s demon with optical tweezers**, Regina K. Schmitt, Heiner Linke, Jonas Johansson, Lund Univ. (Sweden). . . . . [9164-64]

11:00 am: **Spatial measurement of spurious forces with optical tweezers**, Ignacio A. Bordeu, Univ. de Concepción (Chile); Giovanni S. Volpe, Bilkent Univ. (Turkey); Juan Pablo Staforelli, Univ. de Concepción (Chile) . . . . . [9164-66]

11:20 am: **Einstein's osmotic equilibrium of colloidal suspensions in conservative force fields** *(Invited Paper)*, Daniel H. Ou-Yang, Jinxin Fu, Lehigh Univ. (USA) . . . . . [9164-67]

Lunch/Exhibition Break . . . . . Wed 11:50 am to 2:00 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 6D . . . WED 2:00 PM TO 3:20 PM

Optical Manipulation of Matter through Gaseous Media

Session Chair: **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom)

2:00 pm: **Micro-rheology and interparticle interactions in aerosols probed with optical tweezers**, Jonathan P. Reid, Rory M. Power, Chen Cai, Stephen H. Simpson, Univ. of Bristol (United Kingdom) . . . . . [9164-68]

2:20 pm: **The study of thin films on solid aerosol particles using optical trapping and Mie scattering from a broadband white LED**, Stephanie H. Jones, Univ. of London (United Kingdom); Andrew D. Ward, Rutherford Appleton Lab. (United Kingdom); Martin D. King, Univ. of London (United Kingdom) . . . . [9164-69]

2:40 pm: **Aerosol optical chromatography and measurements of light extinction by single particles**, Jonathan P. Reid, Bernard J. Mason, Michael I. Cotterell, Thomas C. Preston, Andrew Orr-Ewing, Univ. of Bristol (United Kingdom) . . . . . [9164-70]

3:00 pm: **Microparticle conveyor belt and particle-based sensing in hollow-core photonic crystal fiber**, Tijmen G. Euser, Oliver A. Schmidt, Max-Planck-Institut für die Physik des Lichts (Germany); Dmitry S. Bykov, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Philip St. John Russell, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9164-71]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 15

LOCATION: CONV. CTR. ROOM 6D . . . . WED 3:50 PM TO 6:10 PM

Optical Sorting, Optical Lab-on-a-Chip, and Microfluidics

Session Chair: **Simon Hanna,** Univ. of Bristol (United Kingdom)

3:50 pm: **Ordering and dynamics of colloids with competing interactions on one-dimensional periodic substrates**, Charles M. Reichhardt, Los Alamos National Lab. (USA); D. McDermott, Univ. of Notre Dame (USA); Cynthia J. Olson Reichhardt, Los Alamos National Lab. (USA) . . . . . [9164-73]

4:10 pm: **Hybrid optical and acoustic force based sorting**, Paul O'Mahoney, Institute for Medical Science & Technology (United Kingdom); Graham W. Brodie, Univ. of Dundee (United Kingdom); Han Wang, Christine E. M. Demore, Sandy Cochran, Institute for Medical Science & Technology (United Kingdom); Gabriel C. Spalding, Illinois Wesleyan Univ. (USA); Michael P. MacDonald, Institute for Medical Science & Technology (United Kingdom) . . . . . [9164-74]

4:30 pm: **Advanced optical particle manipulation on an integrated optofluidic platform**, Holger Schmidt, Kaelyn D. Leake, Damla Ozcelik, Univ. of California, Santa Cruz (USA); Brian S. Phillips, Aaron Hawkins, Brigham Young Univ. (USA) . . . . . [9164-75]

4:50 pm: **Real-time and high-throughput mechanical phenotyping of suspended cells**, Oliver Otto, Philipp Rosendahl, Stefan Golfier, Alexander Mietke, Salvatore Girardo, Technische Univ. Dresden (Germany); Stefano Pagliara, Ulrich F. Keyser, Univ. of Cambridge (United Kingdom); Jochen R. Guck, Technische Univ. Dresden (Germany) and Univ. of Cambridge (United Kingdom) . . . . . [9164-76]

5:10 pm: **Optical deformation of red blood cells trapped on a narrow waveguide**, Balpreet S. Ahluwalia, Peter McCourt, Univ. of Tromsø (Norway); James S. Wilkinson, Univ. of Southampton (United Kingdom); Thomas R. Huser, Univ. Bielefeld (Germany); Olav G. Hellesø, Univ. of Tromsø (Norway) . . . [9164-77]

5:30 pm: **Optoelectronic cell lysis**, Steven L. Neale, Christian Witte, Alasdair W. Clark, Julien Reboud, Jonathan M. Cooper, Univ. of Glasgow (United Kingdom) . . . . . [9164-78]

5:50 pm: **Pulsed laser activated cell sorter (PLACS) for high-throughput fluorescent mammalian cell sorting**, Yue Chen, Ting-Hsiang Wu, Univ. of California, Los Angeles (USA); Aram Chung, Rensselaer Polytechnic Institute (USA); Michael A. Teitell, Dino Di Carlo, Pei-Yu E. Chiou, Univ. of California, Los Angeles (USA) . . . . . [9164-79]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Dynamics of two atoms undergoing collisions and molecule formation in an optical microtrap, Yin Hsien Fung, Pimonpan Sompet, Alicia V. Carpentier, Mikkel F. Andersen, Univ. of Otago (New Zealand) . . . . . [9164-94]

Computational toolbox for optical tweezers in geometrical optics, Agnese Callegari, Mite Mijalkov, A. Burak Gököz, Giovanni S. Volpe, Bilkent Univ. (Turkey) . . . . . [9164-95]

Micro-particles self-arrangement in shapeable counter-propagating beams, Oto Brzobohaty, Jan Kaňka, Lukas Chvatal, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); Daniel H. Ou-Yang, Lehigh Univ. (USA) . . . . . [9164-96]

Rapid fabrication of polymeric micro lenses for optical fiber trapping and beam shaping, Ana Rita S. Rodrigues Ribeiro, Raquel B. Queirós, INESC TEC (Portugal); Carole Ecoffet, Ecole Nationale Supérieure de Chimie de Mulhouse (France); Olivier Soppera, Institut de Sciences des Matériaux de Mulhouse (France); Abel González Oliva, Instituto de Tecnologia Química e Biológica (Portugal); Ariel R. Guerreiro, Univ. do Porto (Portugal) and INESC TEC (Portugal); Pedro A. S. Jorge, INESC TEC (Portugal) . . . . . [9164-97]

Generation of shock waves in a medium with absorbing particles, Vira R. Besaga, Oleg V. Angelsky, Andrew P. Maksimyak, Peter P. Maksimyak, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9164-98]

Viscoelasticity measurements inside liposomes, Shu Zhang, Lachlan Gibson, Daryl C. Preece, Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia). . . . . [9164-99]

Natural user interface as a supplement of the holographic Raman tweezers, Zoltan Tomori, Institute of Experimental Physics (Slovakia); Jan Kaňka, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); Peter Kesa, Institute of Experimental Physics (Slovakia) and P. J. Safarik Univ. (Slovakia); Petr Jákl, Mojmir Sery, Silvie Bernatova, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); Marian Antalik, Institute of Experimental Physics (Slovakia) and P. J. Safarik Univ. (Slovakia); Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . . . . . [9164-100]

Laser tweezers for determining liquid crystal properties under the influence of external stimuli, David Wei, Helen F. Gleeson, Mark R. Dickinson, The Univ. of Manchester (United Kingdom). . . . . [9164-101]

Anomalous diffusion of active brownian particles in random potentials, Giorgio Volpe, Institut Langevin (France); Sabareesh K. P. Velu, Ercag Pince, Bilkent Univ. (Turkey); Sylvain Gigan, Institut Langevin (France); Giovanni S. Volpe, Bilkent Univ. (Turkey) . . . . . [9164-102]

Simulation of active brownian particles in optical potentials, Giorgio Volpe, Sylvain Gigan, Institut Langevin (France); Giovanni S. Volpe, Bilkent Univ. (Turkey) . . . . . [9164-103]

Multiplexed spectroscopy with holographic optical tweezers, David H. McIntyre, Matthew A. Cibula, Oregon State Univ. (USA) . . . . . [9164-104]

Numeric modeling approximation of the fluid dynamics in an optical fiber trap, Héctor H. Cerecedo-Nuñez, Univ. Autonoma Veracruzana (Mexico); Jenny E. Hernández-Zavala, Marco O. Vigueras Zuñiga, Patricia Padilla-Sosa, Univ. Veracruzana (Mexico) . . . . . [9164-105]

Holographic generation of vector beams with upper-bound diffraction efficiency, Rafael Páez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Guadalupe Méndez, Maximino L. Arroyo-Carrasco, Benemérita Univ. Autónoma de Puebla (Mexico); Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [9164-106]

Studying biofuel aerosol evaporation rates with single particle manipulation, Stella Corsetti, Univ. of Aberdeen (United Kingdom) and Univ. of Dundee (United Kingdom); Rachael Miles, Jonathan P. Reid, Univ. of Bristol (United Kingdom); Johannes Kiefer, Univ. of Aberdeen (United Kingdom); David McGloin, Univ. of Dundee (United Kingdom) . . . . . [9164-107]

Optical nanofiber integrated into an optical tweezers for particle manipulation and in situ fiber probing, Ivan Gusachenko, Okinawa Institute of Science and Technology (Japan); Mary Frawley, Univ. College Cork (Ireland); Viet Giang Truong, Síle G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan). . . . . [9164-109]

CONFERENCE 9164

LOCATION: CONV. CTR. ROOM 6D

Towards polarization-sensitive trapping of metal nanoparticles in double nanohole apertures, Ivan Gusachenko, Viet Giang Truong, Síle G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan) . . . . . [9164-110]

Multi scale manipulation of microbubbles employing simultaneous optical and acoustical trapping, Chris Fury, National Physical Lab. (United Kingdom) and Univ. College London (United Kingdom); Philip H. Jones, Univ. College London (United Kingdom); Gianluca Memoli, National Physical Lab. (United Kingdom) . . [9164-111]

Micro- and nano-particle trapping using fibered optical nano-tweezers, Jean-Baptiste Decombe, Serge Huant, Institut NÉEL (France); Géraldine Dantelle, Ecole Polytechnique (France) and Institut NÉEL (France); Thierry Gacoin, Ecole Polytechnique (France); Francisco J. Valdivia-Valero, Lab. Interdisciplinaire Carnot de Bourgogne (France); Gérard Colas des Francs, Univ. de Bourgogne (France); Jochen Fick, Institut NÉEL (France) . . . . . [9164-112]

Object-adapted trapping and shape-tracking to probe a bacterial protein chain motor, Matthias Koch, Julian Roth, Albert-Ludwigs-Univ Freiburg (Germany); Alexander Rohrbach, Albert-Ludwigs-Univ. Freiburg (Germany) . . . . . [9164-113]

Visco-elastic properties of artificial cytoskeletal networks with optically trapped anchor points, Matthias Koch, Dominic Ruh, Alexander Rohrbach, Albert-Ludwigs-Univ. Freiburg (Germany) . . . . . [9164-114]

Holographic optical tweezers: microassembling of shape-complementary 2PP building blocks, Sarah Isabelle Ksouri, Jannis Köhler, Andreas Aumann, Reza Ghadiri, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) . . . . . [9164-115]

Microfluidic chip for cell sorting, Mojmír Šerý, Zdeněk Pilát, Jan Ježek, Jan Kaňka, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . . . . . [9164-116]

Force dependence of phagosome trafficking in retinal pigment epithelial cells, David Altman, Rebekah Daniel, Willamette Univ. (USA) . . . . . [9164-117]

Optical trapping of superparamegnetic particles in 3D, Martin Siler, Oto Brzobohatý, Vitezslav Karasek, Petr Jákl, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . . . . . [9164-118]

Sub-micron optical manipulation through phase tuning of light, Jisu Kim, Jung H. Shin, KAIST (Korea, Republic of) . . . . . [9164-119]

Singular optics in tractor beams, Dongliang Gao, Tianhang Zhang, Cheng-Wei Qiu, National Univ. of Singapore (Singapore) . . . . . [9164-121]

Beam-splitting waveguides induced in nanocolloids, Karen P. Volke-Sepúlveda, Luis A. López-Peña, Cristian R. Velasco-Gutiérrez, Emma C. Brambila-Tamayo, Univ. Nacional Autónoma de México (Mexico); Roland A. Terborg, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9164-122]

Generation of hollow optical beams for optical manipulation, Alexey P. Porfirev, Samara State Aerospace Univ. (Russian Federation) and Image Processing Systems Institute (Russian Federation); Roman V. Skidanov, Image Processing Systems Institute (Russian Federation) and Samara State Aerospace Univ. (Russian Federation) . . . . . [9164-124]

Plasmonic Archimedes spiral for selective optical trapping and rotation of optically isotropic particles, Wei-Yi Tsai, Jer-Shing Huang, Chen-Bin Huang, National Tsing Hua Univ. (Taiwan). . . . . [9164-125]

Trapping and manipulation using Rayleigh convection generated by laser-induced heating of an absorbing thin film, Susana A. Torres-Hurtado, INAOE (Mexico); Eddy Flores-Flores, Benemérita Univ. Autónoma de Puebla (Mexico); Steven L. Neale, Univ. of Glasgow (United Kingdom); Julio Ramirez-San-Juan, Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [9164-126]

Various superpositions of Bessel beams for capture and controlled rotation of microobjects, Roman V. Skidanov, Andrey A. Morozov, Alexey P. Porfirev, Mikhail A. Rykov, Image Processing Systems Institute (Russian Federation); Sofia V. Ganchevskaya, Samara State Aerospace Univ. (Russian Federation) . . . [9164-127]

Study of light extraction efficiency of QWIP-LED enhanced by photonic crystal slab based on simulation, Yihe Hou, Dongdong Zhang, Shanghai Institute of Technical Physics (China) . . . . . [9164-128]

THURSDAY 21 AUGUST

SESSION 16

LOCATION: CONV. CTR. ROOM 6D . . . THU 9:30 AM TO 10:30 AM

Optically Bound Matter

Session Chair: **Gabriel C. Spalding,** Illinois Wesleyan Univ. (USA)

9:30 am: **Photonic clusters: potential energy surfaces and reaction pathways for optical assembly of nanoparticles**, Zijie Yan, The Univ. of Chicago (USA); Stephen K. Gray, Argonne National Lab. (USA); Norbert F. Scherer, The Univ. of Chicago (USA) . . . . . [9164-80]

9:50 am: **Optical binding between nanoparticles of complex shape**, Simon Hanna, Stephen H. Simpson, Univ. of Bristol (United Kingdom) . . . . . [9164-81]

10:10 am: **Waveguides in colloidal nanosuspensions**, Karen P. Volke-Sepúlveda, Luis A. López-Peña, Yadira Salazar-Romero, Univ. Nacional Autónoma de México (Mexico); Roland A. Terborg, Institute of Photonic Sciences (Spain); Juan Hernández-Cordero, Univ Nacional Autónoma de México (Mexico); Juan P. Torres, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9164-82]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 17

LOCATION: CONV. CTR. ROOM 6D . . THU 11:00 AM TO 12:00 PM

Optofluidics and Optically Shaped Structures

Session Chair: **Etienne Brasselet,** Univ. Bordeaux 1 (France)

11:00 am: **Formation and manipulation of L-phenylalanine crystal by a laser beam focused at a solution surface**, Ken-ichi Yuyama, National Chiao Tung Univ. (Taiwan); Teruki Sugiyama, Instrument Technology Research Ctr. (Taiwan); Hiroshi Masuhara, National Chiao Tung Univ. (Taiwan) . . . . . [9164-83]

11:20 am: **Manipulation of particles by laser tweezers-induced gradient of order in the nematic liquid crystal**, Igor Musevic, Jožef Stefan Institute (Slovenia); Miha Skarabot, Univ. of Ljubljana (Slovenia); Natan Osterman, Ziga Lokar, Jožef Stefan Institute (Slovenia) . . . . . [9164-84]

11:40 am: **The break-up dynamics of liquid threads revealed by laser radiation pressure and optocapillarity**, Jean-Pierre Delville, Univ. Bordeaux 1 (France); Julien Petit, Technische Univ. Darmstadt (Germany); Matthieu Robert de Saint Vincent, Univ. de Rennes 1 (France); David Rivière, Hamid Kellay, Univ. Bordeaux 1 (France) . . . . . [9164-85]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 2:00 pm

SESSION 18

LOCATION: CONV. CTR. ROOM 6D . . . . THU 2:00 PM TO 3:00 PM

Optically Manipulated Robotics and Novel Samples

Session Chair: **Graham M. Gibson,** Univ. of Glasgow (United Kingdom)

2:00 pm: **Dynamic motion of semicircular optical wings**, Alexandra B. Artusio-Glimpse, Daniel G. Schuster, Mario W. Gomes, Grover A. Swartzlander Jr., Rochester Institute of Technology (USA) . . . . . [9164-86]

2:20 pm: **Optical field interactions with non-spherical optical particles**, David M. Carberry, Vincent L. Y. Loke, Daryl C. Preece, Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) . . . . . [9164-87]

2:40 pm: **Optical tweezers as manufacturing and characterization tool in microfluidics**, Jannis Köhler, Reza Ghadiri, Sarah Isabelle Ksouri, Evgeny L. Gurevich, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) . . . . . [9164-88]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 19

LOCATION: CONV. CTR. ROOM 6D . . . . THU 3:30 PM TO 4:00 PM

In Memory of Dmitri Petrov

Session Chair: **Danut-Adrian Cojoc,** Lab. Nazionale TASC (Italy)

3:30 pm: **Dmitri Petrov: optical tweezers, Raman spectroscopy, and statistical physics** *(Invited Paper)*, Giovanni S. Volpe, Bilkent Univ. (Turkey) . . . . . [9164-91]

SESSION 20

LOCATION: CONV. CTR. ROOM 6D . . . . THU 4:00 PM TO 5:00 PM

The Final Session

Session Chair: **Karen P. Volke-Sepúlveda,** Univ. Nacional Autónoma de México (Mexico)

4:00 pm: **Spontaneous revolution of micro-swimmers in a spherically aberrated optical trap**, Basudev Roy, Argha Mondal, Soumyajit Roy, Ayan Banerjee, Indian Institute of Science Education and Research Kolkata (India) . . . . . [9164-92]

4:20 pm: **Measurements of motor-driven viral DNA packaging with optical tweezers: Evidence that the packaged DNA indirectly modulates motor function**, Douglas E. Smith, Zachary Berndsen, Nicholas A. Keller, Damian J. delToro, Univ. of California, San Diego (USA) . . . . . [9164-93]

4:40 pm: **Optical trapping of isolated mammalian chromosomes**, Nima Khatibzadeh, Beckman Laser Institute and Medical Clinic (USA); Ann A. M. Bui, Alex B. Stilgoe, The Univ. of Queensland (Australia); Yesenia Rocha, Gladys Cruz, Beckman Laser Institute and Medical Clinic (USA); Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Michael W. Berns, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9164-123]

CONFERENCE 9165

LOCATION: CONV. CTR. ROOM 6F & JOINT SESSION ROOM 8

Sunday–Wednesday 17–20 August 2014 • Proceedings of SPIE Vol. 9165

Physical Chemistry of Interfaces and Nanomaterials XIII

Conference Chairs: **Natalie Banerji,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Sophia C. Hayes,** Univ. of Cyprus (Cyprus)

Conference Co-Chair: **Carlos Silva,** Univ. de Montréal (Canada)

Program Committee: **John B. Asbury,** The Pennsylvania State Univ. (USA); **Jenny Clark,** Univ. of Cambridge (United Kingdom); **Gitti Frey,** Technion-Israel Institute of Technology (Israel); **Alexandre Fürstenberg,** Univ. de Genève (Switzerland); **Oleg V. Prezhdo,** Univ. of Rochester (USA); **Sergei Tretiak,** Los Alamos National Lab. (USA); **Lauren Webb,** The Univ. of Texas at Austin (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6F . . SUN 9:00 AM TO 10:00 AM

Singlet Exciton Fission in Organic Semiconductors

Session Chair: **Eric R. Bittner,** Univ. of Houston (USA)

9:00 am: **Ultrafast and two-dimensional electronic spectroscopy of singlet exciton fission in nanoparticle dispersions of functionalized pentacene derivatives** *(Invited Paper)*, Ryan D. Pensack, Andrew J. Tilley, Tia S. Lee, Dong Gao, Univ. of Toronto (Canada); Marcia M. Payne, John E. Anthony, Univ. of Kentucky (USA); Dwight S. Seferos, Gregory D. Scholes, Univ. of Toronto (Canada) . . [9165-1]

9:30 am: **How molecular packing affects the rate of singlet exciton fission**, Christopher J. Bardeen, Univ. of California, Riverside (USA); Katharina Broch, Eberhard Karls Univ. Tübingen (Germany); Valerie Nichols, Geoffrey Piland, Univ. of California, Riverside (USA); Frank Schreiber, Eberhard Karls Univ. Tübingen (Germany) . . . . . [9165-2]

9:45 am: **Singlet fission in organic thin films of 1,3-diphenylisobenzofuran and cibalackrot**, Joseph Ryerson, National Renewable Energy Lab. (USA) and Univ. of Colorado at Boulder (USA); Joel N. Schrauben, National Renewable Energy Lab. (USA); Arthur J. Nozik, National Renewable Energy Lab. (USA) and Univ. of Colorado at Boulder (USA); Josef Michl, Univ. of Colorado at Boulder (USA); Justin C. Johnson, National Renewable Energy Lab. (USA) . . . . . [9165-3]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6F . . SUN 10:30 AM TO 12:00 PM

Charge Generation at Organic Interfaces I

Session Chair: **Natalie Banerji,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

10:30 am: **Towards determining the factors controlling photocurrent generation in low bandgap polymer/fullerene solar cells** *(Invited Paper)*, Stoichko D. Dimitrov, Imperial College London (United Kingdom) . . . . . [9165-4]

11:00 am: **The roles of bulk and interfacial molecular orientations in determining the performance of organic bilayer solar cells**, Guy O. Ngongang Ndjawa, King Abdullah Univ. of Science and Technology (Saudi Arabia); Kenneth R. Graham, King Abdullah Univ. of Science and Technology (Saudi Arabia) and Stanford Univ. (USA); Sarah Conron, Patrick Erwin, The Univ. of Southern California (USA); Ruipeng Li, King Abdullah Univ. of Science and Technology (Saudi Arabia); Kang Wei Chou, Lawrence Berkeley National Lab. (USA); George Burkhard, Stanford Univ. (USA); Lethy Krishnan Jagadamma, King Abdullah Univ. of Science and Technology (Saudi Arabia); Eric T. Hoke, Michael D. McGehee, Stanford Univ. (USA); Mark E. Thompson, The Univ. of Southern California (USA); Aram Amassian, King Abdullah Univ. of Science and Technology (Saudi Arabia). . . . . [9165-5]

11:15 am: **Consequence of thermal annealing on PCDTBT-based solar cells performance and composition profile**, Olesia Synooka, Kai-Rudi Eberhardt, Chetan R. Singh, Gernot Ecke, Technische Univ. Ilmenau (Germany); Bernhard Ecker, Elizabeth von Hauff, Albert-Ludwigs-Univ. Freiburg (Germany); Gerhard Gobsch, Harald Hoppe, Technische Univ. Ilmenau (Germany). . . . . [9165-6]

11:30 am: **Charge separation and recombination dynamics in organic semiconducting photovoltaic systems: role quantum tunneling, delocalization and spin statistics** *(Invited Paper)*, Eric R. Bittner, Univ. of Houston (USA) [9165-7]

Lunch Break . . . . . Sun 12:00 pm to 1:45 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6F . . . . .SUN 1:45 PM TO 3:30 PM

Charge Generation at Organic Interfaces II

Session Chair: **David S. Ginger,** Univ. of Washington (USA)

1:45 pm: **New insights on the nature of two-dimensional polarons in semiconducting polymers: infrared absorption in poly(3-hexylthiophene)** *(Invited Paper)*, Frank C. Spano, Chris M. Pochas, Temple Univ. (USA). . . . [9165-8]

2:15 pm: **Influence of acceptor structure and aggregation on mechanisms of charge generation at organic interfaces**, John B. Asbury, The Pennsylvania State Univ. (USA) . . . . . [9165-9]

2:30 pm: **Charge separation in an n-p-n triad forming Lamellar structure**, Damien Rolland, Lucia Hartmann, Natalie Banerji, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Martin Brinkmann, Institut Charles Sadron (France); Holger Frauenrath, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . [9165-10]

2:45 pm: **X-ray photoemission spectroscopy study of vertical phase segregation in polymer: PDI blends**, Alberto Brambilla, Alberto Calloni, Politecnico di Milano (Italy); Eduardo Aluicio-Sardui, Istituto Italiano di Tecnologia (Italy); Giulia Berti, Politecnico di Milano (Italy); Zhipeng Kan, Istituto Italiano di Tecnologia (Italy); Serge Beaupré, Mario Leclerc, Univ. Laval (Canada); Hans-Jürgen Butt, Max-Planck-Institut für Polymerforschung (Germany); George Floudas, Univ. of Ioannina (Greece); Panagiotis E. Keivanidis, Istituto Italiano di Tecnologia (Italy); Lamberto Duò, Politecnico di Milano (Italy) . . . . . [9165-11]

3:00 pm: **What structural features do charge transfer states depend on?** *(Invited Paper)*, Natalie Stingelin, Imperial College London (United Kingdom) . . . . . [9165-12]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 6F . . . . SUN 4:00 PM TO 5:30 PM

Charge Transfer Across Device Interfaces

Session Chair: **Natalie Stingelin,** Imperial College London (United Kingdom)

4:00 pm: **Charge recombination in organic and hybrid solar cells: probing buried interfaces** *(Invited Paper)*, David S. Ginger, Univ. of Washington (USA) . . . . . [9165-13]

4:30 pm: **Charge separation and energy transfer at inorganic/organic semiconductor interfaces: a case study with ZnO**, Francesco Bianchi, Sylke Blumstengel, Stefan Hecht, Fritz Henneberger, Björn Kobin, Norbert Koch, Raphael Schlesinger, Mino Sparenberg, Humboldt-Univ. zu Berlin (Germany) . . . . [9165-14]

4:45 pm: **Interfacial charge-transfer processes in polymeric organic nitroxy-radical energy storage materials**, Madison Martinez, Barbara K. Hughes, Wade A. Braunecker, Ross Larsen, Heather Platt, Thomas Gennett, National Renewable Energy Lab. (USA) . . . . . [9165-15]

5:00 pm: **Photoluminescence investigation of fundamental charge transfer processes in stable nitroxyl radical-containing polymers**, Barbara K. Hughes, Andrew J. Ferguson, Wade A. Braunecker, Thomas Gennett, National Renewable Energy Lab. (USA) . . . . . [9165-16]

5:15 pm: **Nano-multilayer V/ZnO transparent conduction thin films**, Yu Shan Wei, Yen-Shuo Liu, Cheng-Yi Liu, National Central Univ. (Taiwan) . . . . . [9165-17]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:45 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 6F . . . . MON 1:45 PM TO 3:30 PM

Spectroscopic Techniques to Probe Kinetics of Energy and Charge Transfer at Interfaces

Session Chair: **Jeanne L. McHale,** Washington State Univ. (USA)

1:45 pm: **Exciton hopping in carbon nanotube solar cells studied with 2D white-light spectroscopy** *(Invited Paper)*, Martin T. Zanni, Univ. of Wisconsin-Madison (USA). . . . . [9165-18]

2:15 pm: **Direct measurement of energy transport in organic nanosystems** *(Invited Paper)*, Katie Clark, Katherine Koen, Emma L. Krueger, David A. Vanden Bout, The Univ. of Texas at Austin (USA) . . . . . [9165-19]

2:45 pm: **The optical properties of conjugated materials and their aggregates: towards imaging films and devices**, Linda A. Peteanu, Carnegie Mellon Univ. (USA); Jiyun Hong, Carnegie Mellon Univ. (USA) and Northwestern Univ. (USA); SuKyung Jeon, Janice Kim, Diane Devi, Carnegie Mellon Univ. (USA); Jurjen Wildeman, Zernike Institute for Advanced Materials (Netherlands); Matthew Y. Sfeir, Brookhaven National Lab. (USA); James H. Werner, Los Alamos National Lab. (USA); Andrew P. Shreve, The Univ. of New Mexico (USA) . . . . . [9165-20]

3:00 pm: **Carrier injection and dynamics from photoexcited transition metal containing porphyrins** *(Invited Paper)*, Charles A. Schmuttenmaer, Rebecca L. Milot, Yale Univ. (USA); Gary F. Moore, Lawrence Berkely National Lab (USA) and Joint Ctr. for Artificial Photosynthesis (USA); Christian F. A. Negre, Victor S. Batista, Robert H. Crabtree, Gary W. Brudvig, Yale Univ. (USA) . . . . . [9165-21]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 6F . . . MON 4:00 PM TO 5:30 PM

Photophysics at Hybrid Interfaces

Session Chair: **David A. Vanden Bout,** The Univ. of Texas at Austin (USA)

4:00 pm: **Two-electron photo-oxidation of betanin on titanium dioxide and potential for improved dye-sensitized solar energy conversion** *(Invited Paper)*, Jeanne L. McHale, Fritz J. Knorr, Washington State Univ. (USA); Arianna Marchioro, Jacques E. Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9165-22]

4:30 pm: **The fate of photoinduced excitons and free carriers at carbon nanotube-fullerene interfaces**, Andrew J. Ferguson, Anne-Marie Dowgiallo, Kevin S. Mistry, Bryon W. Larson, Jeffrey L. Blackburn, National Renewable Energy Lab. (USA); Dominick J. Bindl, Meng-Yin Wu, Michael S. Arnold, Univ. of Wisconsin-Madison (USA); Tyler T. Clikeman, Olga V. Boltalina, Steven H. Strauss, Colorado State Univ. (USA). . . . . [9165-23]

4:45 pm: **Ultrafast electron transfer from low band gap conjugated polymer to quantum dots in hybrid photovoltaic materials** *(Invited Paper)*, Elsa Couderc, Matthew J. Greaney, Richard L. Brutchey, Stephen E. Bradforth, The Univ. of Southern California (USA) . . . . . [9165-24]

5:15 pm: **Quantum confinement-tunable ultrafast charge transfer at the PbS quantum dot and PCBM Fullerene interface**, Omar F. Mohammed Abdelsaboor, King Abdullah Univ. of Science and Technology (Saudi Arabia). . . . . [9165-25]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 6F . . . TUE 8:30 AM TO 10:00 AM

Hybrid and Inorganic Nanomaterials I

Session Chair: **Patrycja Paruch,** Univ. de Genève (Switzerland)

8:30 am: **Optical studies on metal oxide nanoparticles**, Muneeswaran Muniyandi, National Institute of Technology, Tiruchirappalli (India); Mohammed Ghouse Munavary, Giridharan N.V, Department of Physics, National Institute of Technology, Tiruchirappalli (India) . . . . . [9165-26]

8:45 am: **Local densification and entrapment of the core electrons and valence charge polarization at the surfaces of Ag and Cu nanoclusters: effect of the shorter and stronger bonds**, Shideh Ahmadi, Xi Zhang, Nanyang Technological Univ. (Singapore); Yinyan Gong, China Jiliang Univ. (China); Changqing Sun, Nanyang Technological Univ. (Singapore) . . . . . [9165-27]

9:00 am: **Spectroelectrochemical photoluminescence of titanium dioxide nanosheets and nanoparticles in aqueous and nonaqueous environments**, Riley E. Rex, Jeanne L. McHale, Fritz J. Knorr, Washington State Univ. (USA) . . . . . [9165-28]

9:15 am: **Charge trapping and intraband relaxation in colloidal quantum dot and perovskite photovoltaic materials** *(Invited Paper)*, Artem A. Bakulin, FOM Institute for Atomic and Molecular Physics (Netherlands); Zhuoying Chen, Ctr. National de la Recherche Scientifique (France) and Ecole Supérieure de Physique et de Chimie Industrielles (France) . . . . . [9165-29]

9:45 am: **Band-edge photophysics of emerging organic-inorganic photovoltaic materials**, Robert J. Stewart, John B. Asbury, The Pennsylvania State Univ. (USA) . . . . . [9165-30]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

CONFERENCE 9165

LOCATION: CONV. CTR. ROOM 6F & JOINT SESSION ROOM 8

SESSION 8

LOCATION: CONV. CTR. ROOM 6F . . TUE 10:30 AM TO 12:00 PM

Properties and Applications of Novel Perovskite-based Nanomaterials I

Session Chair: **Nripan Mathews,** Nanyang Technological Univ. (Singapore)

10:30 am: **Time-resolved spectroscopy insights into charge transfer processes in organo-lead iodide perovskite solar cells** *(Invited Paper)*, Jacques Moser, Arianna Marchioro, Ahmad A. Oskouei, Arun A. Paraecattil, Adrian Pulgarin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9165-31]

11:00 am: **Ferroelectric domain walls as nanoscale pathways to novel functional properties** *(Invited Paper)*, Patrycja Paruch, Univ. de Genève (Switzerland) . . . . . [9165-32]

11:30 am: **The photophysics of perovskite solar cells** *(Invited Paper)*, Tze Chien Sum, Nanyang Technological Univ. (Singapore) . . . . . [9165-33]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 8 . . . . . TUE 1:30 PM TO 3:00 PM

NOTE ROOM CHANGE

Charge Transfer at the Organic Heterojunction I

Joint Session with Conferences 9165 and 9184

Session Chair: **Barry P. Rand,** Princeton Univ. (USA)

1:30 pm: **Photoexcitations and charge photogeneration in donor-acceptor blends based on low bang-gap polymers for OPV applications** *(Invited Paper)*, Tek P. Basel, Uyen Huynh, Z. Valy Vardeny, The Univ. of Utah (USA) . . . . [9165-34]

1:55 pm: **Spatially resolving ultrafast exciton dynamics in organic semiconducting thin films** *(Invited Paper)*, Naomi S. Ginsberg, Cathy Y. Wong, Benjamin L. Cotts, Samuel B. Penwell, Hao Wu, Rodrigo J. Noriega-Manez, Univ. of California, Berkeley (USA) . . . . . [9184-10]

2:20 pm: **Exciton dynamics in disordered molecular environments** *(Invited Paper)*, Adam P. Willard, Massachusetts Institute of Technology (USA) . . [9165-70]

2:45 pm: **Using Monte Carlo modeling to reconcile conflicting experimental reports of the origin of efficient charge generation in organic solar cells**, Timothy M. Burke, Michael D. McGehee, Stanford Univ. (USA) . . . . . [9184-82]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 8 . . . . . TUE 3:30 PM TO 5:30 PM

NOTE ROOM CHANGE

Charge Transfer at the Organic Heterojunction II

Joint Session with Conferences 9165 and 9184

Session Chair: **Z. Valy Vardeny,** The Univ. of Utah (USA)

3:30 pm: **Charge recombination in solution-processed small molecule bulk heterojunction solar cells** *(Invited Paper)*, Thuc-Quyen Nguyen, Univ. of California, Santa Barbara (USA) . . . . . [9184-11]

3:55 pm: **Photoinduced charge separationp processes: from natural photosynthesis to organic photovoltaic cells**, Oleg G. Poluektov, Argonne National Lab. (USA) . . . . . [9165-36]

4:10 pm: **Hot photocarrier dynamics in organic semiconductors studied by ultrafast terahertz photoconductivity and transient absorption** *(Invited Paper)*, Paul A. Lane, Paul D. Cunningham, Joseph S. Melinger, U.S. Naval Research Lab. (USA); Edwin J. Heilweil, National Institute of Standards and Technology (USA) . . . . . [9184-12]

4:35 pm: **Transport of hot carriers in polymer-based organic solar cells**, Almantas Pivrikas, The Univ. of Queensland (Australia) . . . . . [9184-13]

4:50 pm: **Understanding electronic and optical properties of organic semiconductors from first principles** *(Invited Paper)*, Leeor Kronik, Weizmann Institute of Science (Israel); Sahar Sharifzadeh, Lawrence Berkeley National Lab. (USA); Sivan Refaely-Abramson, Weizmann Institute of Science (Israel); Jeff B. Neaton, Lawrence Berkeley National Lab. (USA) and Univ. of California, Berkeley (USA) . . . . . [9165-37]

5:15 pm: **Using Forster resonance energy transfer to extend spectral harvesting in polymer solar cells**, Erik D. Klump, Tzung-han Lai, Franky So, Univ. of Florida (USA) . . . . . [9184-14]

WEDNESDAY 20 AUGUST

SESSION 11

LOCATION: CONV. CTR. ROOM 6F . . WED 8:30 AM TO 10:00 AM

Emerging Experimental Tools for Biophysics

Session Chair: **Luigi Bonacina,** Univ. de Genève (Switzerland)

8:30 am: **Detection, tracking, and manipulation of individual biomolecules at interfaces** *(Invited Paper)*, Jens Ehrig, Susann Spindler, Marek Piliarik, Ji Tae Kim, Vahid Sandoghdar, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9165-38]

9:00 am: **Super-resolution imaging reveals cooperativity and dynamics in live bacteria** *(Invited Paper)*, Yi Liao, Krishanthi Karunatilaka, Julie S. Biteen, Univ. of Michigan (USA) . . . . . [9165-39]

9:30 am: **Studies of structure and dynamics of protein-DNA complexes by single molecule and two-dimensional fluorescence spectroscopy (2DFS)** *(Invited Paper)*, Andrew H. Marcus, Univ. of Oregon (USA) . . . . . [9165-40]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 12

LOCATION: CONV. CTR. ROOM 6F . . WED 10:30 AM TO 12:15 PM

Hybrid and Inorganic Nanomaterials II

Session Chair: **Artem A. Bakulin,** FOM Institute for Atomic and Molecular Physics (Netherlands)

10:30 am: **Harmonic nanoparticles for nonlinear imaging and photo-interaction** *(Invited Paper)*, Luigi Bonacina, Univ. de Genève (Switzerland) . . . . . [9165-41]

11:00 am: **Effect of solvent environment on colloidal quantum dot solar cell manufacturability and performance**, Ahmad R. Kirmani, King Abdullah Univ. of Science and Technology (Saudi Arabia); Graham H. Carey, Univ. of Toronto (Canada); Buyi Yan, Maged Abdelsamie, Dongkyu Cha, King Abdullah Univ. of Science and Technology (Saudi Arabia); Lisa R. Rollny, Univ. of Toronto (Canada); Xiaoyu Cui, Canadian Light Source Inc. (Canada); Edward H. Sargent, Univ. of Toronto (Canada); Aram Amassian, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9165-42]

11:15 am: **Exciton and carrier dynamics in quantum confined materials** *(Invited Paper)*, Xiaoyang Zhu, Columbia Univ. (USA) . . . . . [9165-43]

11:45 am: **Quantum dots: using the known as well as exploring the unknown** *(Invited Paper)*, Ron Tenne, Osip Schwartz, Ayelet Teitelboim, Pazit Rukenstien, Maria Dyshel, Weizmann Institute of Science (Israel); Taleb Mokari, Ben-Gurion Univ. of the Negev (Israel); Dan Oron, Weizmann Institute of Science (Israel) . . . . . [9165-44]

Lunch/Exhibition Break . . . . . Wed 12:15 pm to 1:45 pm

SESSION 13

LOCATION: CONV. CTR. ROOM 6F . . . . .WED 1:45 PM TO 3:15 PM

Properties and Applications of Novel Perovskite-based Nanomaterials II

Session Chair: **Jacques E. Moser,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

1:45 pm: **High efficiency Perovskite solar cells based on organolead iodide** *(Invited Paper)*, Nam-Gyu Park, Sungkyunkwan Univ. (Korea, Republic of) [9165-45]

2:15 pm: **P-contact metal oxide in efficient $CH_3NH_3PbI_3$ perovskite/PCBM planar-heterojunction hybrid solar cells**, Tzung-Fang Guo, Peter Chen, Jun-Yuan Jeng, Kuo-Cheng Chen, Tsung-Yu Chiang, Pei-Ying Lin, National Cheng Kung Univ. (Taiwan) . . . . . [9165-46]

2:30 pm: **Quantum-chemical calculations of hybrid inorganic-organic perovskites**, Wichard J. D. Beenken, Mezhoura Oussadou, Harald Hoppe, Erich Runge, Technische Univ. Ilmenau (Germany) . . . . . [9165-47]

2:45 pm: **Progress and fundamental insights into perovskite solar cells** *(Invited Paper)*, Nripan Mathews, Nanyang Technological Univ. (Singapore) . . . . . [9165-48]

Coffee Break . . . . . .Wed 3:15 pm to 3:45 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 6F . . . .WED 3:45 PM TO 5:30 PM

Physical Understanding of Biological Systems

Session Chair: **Sophia C. Hayes,** Univ. of Cyprus (Cyprus)

3:45 pm: **Drug/protein interactions studied by time-resolved fluorescence spectroscopy** *(Invited Paper)*, Thomas L. Gustavsson, Dimitra Markovitsi, Lab. Francis Perrin (France); Ignacio Vayá, Maria-Consuelo Jiménez, Miguel A. Miranda, Univ. Politècnica de València (Spain) . . . . . [9165-49]

4:15 pm: **Protein structure following adsorption on nanoparticles: importance for cellular binding and uptake** *(Invited Paper)*, Christine K. Payne, Georgia Institute of Technology (USA) . . . . . [9165-50]

4:45 pm: **Interfacial self-assembly of the bacterial hydrophobin BslA** *(Invited Paper)*, Cait MacPhee, Keith Bromley, Ryan Morris, Giovanni Brandani, Laura Hobley, The Univ. of Edinburgh (United Kingdom); Nicola Stanley-Wall, Univ. of Dundee (United Kingdom) . . . . . [9165-51]

5:15 pm: **Photoluminescence, photostability, and photocytotoxicity of bio-compatible semiconductor nanocrystals coated with glutathione using low laser power**, Salwa Ali Ibrahim, National Institute of Laser Enhanced Sciences (Egypt); Wafaa Ahmed, Cairo Univ. (Egypt); Tareq Youssef, National Institute of Laser Enhanced Sciences (Egypt) . . . . . [9165-71]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Contribution of weak localization and electron-electron interaction in corrective term mT1/2 of the metallic conductivity in p-type 70Ge:Ga, Abdelhamid El Kaaouachi, Mohamed Errai, Univ. Ibn Zohr (Morocco); Hassan El Idrissi, Jamal Hemin, Univ. Hassan II Mohammedia - Casablanca (Morocco) . . . . . [9165-53]

Crossover from Efros-Shklovskii to Mott variable range hopping in amorphous thin NixSi1-x films, Jamal Hemine, Univ. Hassan II Mohammedia - Casablanca (Morocco); Mohamed Errai, Abdelhamid El Kaaouachi, Univ. Ibn Zohr (Morocco); Hassan El Idrissi, Univ. Hassan II Mohammedia - Casablanca (Morocco) . [9165-54]

Transport phenomenon in two dimensional hole gas GaAs/AlGaAs, Hassan El Idrissi, Asmaa Chakhmane, Univ. Hassan II Mohammedia - Casablanca (Morocco); Abdelhamid El Kaaouachi, Univ. Ibn Zohr (Morocco) . . . . . [9165-55]

Synthesis, Mössbauer spectroscopy and magnetic measurements of $FeGa_2O_4$ nanoparticles, Chun-Rong Lin, National Pingtung Univ. of Education (Taiwan); N. E. Gervits, I. S. Lyubutin, Russian Academy of Sciences (Russian Federation); Yaw-Teng Tseng, National Pingtung Univ. of Education (Taiwan) . . . . . [9165-56]

Theoretical study in energy absorption in the systems zinc-macrocycles-nanocluster of TiO_2 in solar-cells, Fernando Mendizabal, Univ. de Chile (Chile) . . . . . [9165-57]

A striking mobility improvement of C_{60} OFET by inserting diindenoperylene layer between C_{60} and SiO_2 gate insulator, Jinpeng Yang, Keiichiro Yonezawa, Alexander Hinderhofer, Fabio Bussolotti, Satoshi Kera, Nobuo Ueno, Chiba Univ. (Japan) . . . . . [9165-58]

Preparation of flexible TiO_2 photoelectrodes for dye-sensitized solar cells, Wen-Ren Li, National Central Univ. (Taiwan); Hsiu-Hsuan Wang, National Ilan Univ. (Taiwan); Chaochin Su, National Taipei Univ. of Technology (Taiwan) . . . . [9165-59]

The influence of harmful gases on pentacene complexes, Luciano Leal, Univ. de Brasília (Brazil) . . . . . [9165-60]

Geometrical functionalization of carbon nanotubes, Jonathan Teixeira, Univ. de Brasília (Brazil) and Federal Institute of Brasilia (Brazil); Wiliam F. Cunha, Pedro Oliveira Neto, Ricardo G. Gargano, Geraldo Magela, Univ. de Brasília (Brazil) . . . . . [9165-61]

Silver nanoparticles on titanium dioxide through Linker molecules and its photocatalytic performance, Lorena Barrientos, La Univ. Pedagógica de Chile (Chile) . . . . . [9165-62]

The ESR and MCD studies of spinel $CuCr_2Se_4$ nanocrystals, Chun-Rong Lin, Tzu-Fang Hsu, Hua-Shu Hsu, Yaw-Teng Tseng, National Pingtung Univ. of Education (Taiwan) . . . . . [9165-63]

Ultrafast carrier trapping of metal-doped titanium dioxide semiconductor revealed with femtosecond transient absorption spectroscopy, Jafar I. Khan, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9165-64]

The preparation of Pt nanoparticle counter electrode for dye-sensitized solar cells, Chaochin Su, National Taipei Univ. of Technology (Taiwan); Hsiu-Hsuan Wang, National Ilan Univ. (Taiwan); Wen-Ren Li, National Central Univ. (Taiwan) . . . . . [9165-65]

Interfacial electronic structure of colloidal PbS quantum dots, Tae Gun Kim, Korea Research Institute of Standards and Science (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of); Hyekyoung Choi, Sohee Jeong, Korean Institute of Machinery & Materials (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of); Jeong Won Kim, Korea Research Institute of Standards and Science (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of) . . . . . [9165-66]

Functionalized BNNTs as candidates to gas sensors, Wiliam F. Cunha, Univ. de Brasília (Brazil) . . . . . [9165-67]

Dynamics of exciton diffusion in organic semiconductors, Pedro H. Neto, Wiliam F. Cunha, Guilherme M. Carvalho, Univ. de Brasília (Brazil) . . . . . [9165-68]

Optical tunability of magnetic polaron stability in single-Mn doped bulk GaAs and GaAs/AlGaAs quantum dots, Fabio V. Moura, Univ. de Brasília (Brazil); Fanyao Q. Qu, Univ. de Brasilia (Brazil); Ricardo G. Gargano, Univ. de Brasília (Brazil); Damaso D. Ribeiro, Univ. de Brasilia (Brazil) . . . . . [9165-69]

CONFERENCE 9166

LOCATION: CONV. CTR. ROOM 5A

Sunday–Wednesday 17–20 August 2014 • Proceedings of SPIE Vol. 9166

Biosensing and Nanomedicine VII

Conference Chairs: **Hooman Mohseni,** Northwestern Univ. (USA); **Massoud H. Agahi,** Harbor-UCLA Medical Ctr. (USA), Cedars-Sinai Medical Ctr. (USA); **Manijeh Razeghi,** Northwestern Univ. (USA)

Program Committee: **Gert Cauwenberghs,** Univ. of California, San Diego (USA); **Philippe M. Fauchet,** Vanderbilt Univ. (USA); **Guilhem Gallot,** Ecole Polytechnique (France); **Ryan M. Gelfand,** Univ. of Victoria (Canada); **David H. Gracias,** Johns Hopkins Univ. (USA); **Kimberly S. Hamad-Schifferli,** Massachusetts Institute of Technology (USA); **Keon Jae Lee,** KAIST (Korea, Republic of); **Yu-Hwa Lo,** Univ. of California, San Diego (USA); **Ryan McClintock,** Northwestern Univ. (USA); **Omer G. Memis,** Northwestern Univ. (USA); **Masoud Panjehpour,** Thompson Cancer Survival Ctr. (USA); **Adam T. Woolley,** Brigham Young Univ. (USA); **John M. Zavada,** National Science Foundation (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 5A . . . SUN 8:20 AM TO 12:30 PM

Nano Drug Delivery

Session Chair: **Hooman Mohseni,** Northwestern Univ. (USA)

8:20 am: **Some emerging directions in 21st century medicine** *(Invited Paper)*, Massoud H. Agahi, Harbor-UCLA Medical Ctr. (USA); Farnaz Haji, Midwestern Univ. (USA) . . . . . [9166-1]

8:50 am: **Intracellular delivery of p53 gene, siRNAs against oncogenes and anti-cancer drugs using pH-sensitive inorganic nanoparticles for induction of apoptosis in breast cancer cells**, Tahereh Fatemian, Monash Univ. (Malaysia). . . . . [9166-2]

9:10 am: **Incorporation of photosenzitizerhypericin into reconstituted lipoprotein molecules and largeunilamellar vesicles with different content of cholesterol**, Jaroslava Joniova, Pavol Jozef Šafárik Univ. in Kolšice (Slovakia) and Univ. Pierre et Marie Curie (France); Ludmila Blascakova, Pavol Jozef Šafárik Univ. in Kolšice (Slovakia); Juraj Kronek, Polymer Institute (Slovakia); Daniel Jancura, Zuzana Nadova, Pavol Jozef Šafárik Univ. in Kolšice (Slovakia) and Ctr. for Interdisciplinary Biosciences (Slovakia); Franck Sureau, Univ. Pierre et Marie Curie (France); Pavol Miškovský, Pavol Jozef Šafárik Univ. in Kolšice (Slovakia) and Ctr. for Interdisciplinary Biosciences (Slovakia) . . . . . [9166-3]

9:30 am: **Targeting hepatocellular carcinoma with aptamer-functionalized PLA-PEG nanoparticles** *(Invited Paper)*, Shannon E. Weigum, Melissa Sutton, Eugenia Barnes, Texas State Univ. (USA); Sarah Miller, New Braunfels High School (USA); Tania Betancourt, Texas State Univ. (USA). . . . . [9166-4]

10:00 am: **Nanotechnology-based treatment for chemotherapy-resistant cancer**, Abraham H. Abouzeid, Niravkumar R. Patel, Northeastern Univ. (USA); Ilya M. Rachman, Sean Senn, Immix Biopharma, LLC (USA); Vladimir Torchilin, Northeastern Univ. (USA) . . . . . [9166-5]

Coffee Break . . . . . Sun 10:20 am to 10:50 am

10:50 am: **Feedback-mediated cancer therapy: a FRET-based nanoreporter approach**, Suproteem K. Sarkar, Conestoga High School (USA) and Brigham and Women's Hospital (USA); Yashika Khater, Brigham and Women's Hospital (USA); Ashish Kulkarni, Shiladitya Sengupta, Harvard Medical School (USA). . . . . [9166-6]

11:10 am: **Gold nanorods coupled with upconversion phosphors for simultaneous bladder cancer detection and treatment**, Suehyun K. Cho, Univ. of Colorado at Boulder (USA); Lih-Jen Su, Xiaoping Yang, Thomas W. Flaig, Univ. of Colorado Denver (USA); Wounjhang Park, Univ. of Colorado at Boulder (USA) . . . . . [9166-8]

11:30 am: **Plasmonic enhanced pulsed laser induced optoporation and transfection of cells** *(Invited Paper)*, Michel Meunier, Ecole Polytechnique de Montréal (Canada). . . . . [9166-9]

12:00 pm: **Controlling the intracellular fate of nano-bioconjugates: pathways for realizing nanoparticle-mediated theranostics** *(Invited Paper)*, James B. Delehanty III, Christopher M. Spillmann, Jawad Naciri, Kimihiro Susumu, Michael H. Stewart, Alan Huston, U.S. Naval Research Lab. (USA); Philip E. Dawson, Juan B. Blanco Canosa, The Scripps Research Institute (USA); Igor L. Medintz, U.S. Naval Research Lab. (USA). . . . . [9166-10]

Lunch Break . . . . . Sun 12:30 pm to 2:00 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 5A . . . . SUN 2:00 PM TO 5:20 PM

Biosensing I

Session Chair: **Massoud H. Agahi,** Harbor-UCLA Medical Ctr. (USA)

2:00 pm: **Probing protein-nanoparticle interactions using a plasmon waveguide resonance**, Farshid Bahrami, Univ. of Toronto (Canada); Mathieu Maisonneuve, Michel Meunier, Ecole Polytechnique de Montréal (Canada); Arthur O. Montazeri, Yujin Kim, Nazir P. Kherani, James S. Aitchison, Mohammad Mojahedi, Univ. of Toronto (Canada). . . . . [9166-11]

2:20 pm: **Redox colorimetric-polyaniline nanoindicator for in-situ trafficking of intracellular transport**, Seo Ryung Bae, Jihye Choi, Hyun-Ouk Kim, Byunghoon Kang, Myeong-Hoon Kim, Jong-Woo Lim, Yonsei Univ. (Korea, Republic of); Jin-Suck Suh, Yong-Min Huh, Yonsei Univ. College of Medicine (Korea, Republic of); Seungjoo Haam, Yonsei Univ. (Korea, Republic of) . . . . . [9166-12]

2:40 pm: **Amyloid protein fibers show multi-photon absorption**, Piotr Hanczyc, Wroclaw Univ. of Technology (Poland) . . . . . [9166-13]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

3:30 pm: **Novel nano-optical concepts for sensing and driving helical micro-biological objects**, Silke R. Kirchner, Lindsey L. Anderson, Ludwig-Maximilians-Univ. München (Germany); Debora Schamel, Max-Planck Institut für Intelligente Systeme (Germany); Spas N. Nedev, Sol Carretero-Palacios, Andreas Mader, Madeleine Opitz, Theobald Lohmüller, Ludwig-Maximilians-Univ. München (Germany); Peer Fischer, Max-Planck Institut für Intelligente Systeme (Germany) and Univ. Stuttgart (Germany); Jochen Feldmann, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9166-14]

3:50 pm: **Transfer of electronic excitation energy in determining of structural changes in nanoscale biosystems under the influence of surfactants**, Andrey G. Melnikov, Irina V. Alonova, Gennady V. Melnikov, Saratov State Technical Univ. (Russian Federation) . . . . . [9166-15]

4:10 pm: **Portable biosensor based on plasmonic interferometer array**, Xie Zeng, Dengxin Ji, Nan Zhang, Haomin Song, Qiaoqiang Gan, Univ. at Buffalo (USA) . . . . . [9166-16]

4:30 pm: **Label free detection of phospholipids by infrared absorption spectroscopy**, Tahsin Ahmed, Erick Foster, Genevieve Vigil, Aamir A. Khan, Paul W. Bohn, Scott S. Howard, Univ. of Notre Dame (USA) . . . . . [9166-17]

4:50 pm: **Advanced terahertz imaging and spectroscopy systems based on plasmonic terahertz optoelectronics** *(Invited Paper)*, Mona Jarrahi, Univ. of California, Los Angeles (USA) . . . . . [9166-61]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA). . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . .Mon 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 5A . . . . MON 1:30 PM TO 6:00 PM

Biosensing II

Session Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

1:30 pm: **Computational microscopy, sensing, and diagnostics** *(Invited Paper)*, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9166-18]

2:00 pm: **Electron optics of nanoplasmonic metamaterials in bio/opto theranostics** *(Invited Paper)*, Donald K. Roper, Univ. of Arkansas (USA) and National Science Foundation (USA) . . . . . [9166-19]

2:30 pm: **Silicon photonic devices for use in label-free biosensing**, Shon A. Schmidt, Univ. of Washington (USA). . . . . [9166-20]

2:50 pm: **Novel 3D plasmonic nano-electrodes for intracellular investigations and neural interfaces**, Mario Malerba, Michele Dipalo, Alessandro Simi, Hayder Amin, Luca Berdondini, Francesco De Angelis, Istituto Italiano di Tecnologia (Italy) . . . . . [9166-21]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

3:40 pm: **A nanoplasmonic-photonic hybrid whispering gallery mode biosensor for label-free virus and protein detection** *(Invited Paper)*, Stephen Holler, Fordham Univ. (USA); Venkata R. Dantham, Stephen Arnold, Polytechnic Institute of New York Univ. (USA); Vasily Kolchenko, New York City College of Technology (USA); David Keng, Polytechnic Institute of New York Univ. (USA); Brigid Mulroe, Milan Paspaley-Grbavac, Fordham Univ. (USA) . . . . . [9166-22]

4:10 pm: **Innovative optic sensing concepts towards applications in biotechnology and medicine** *(Invited Paper)*, Joerg Opitz, Thomas Härtling, Susan Derenko, Carola E. Gerich, Manuela Reitzig, Olaf Roeder, Fraunhofer IKTS-MD (Germany) . . . . . [9166-23]

4:40 pm: **A portable surface plasmon resonance biosensor capable of phase interrogation in a large dynamics range** *(Invited Paper)*, How-Foo Chen, Hsin-Yuan Chuang, National Yang-Ming Univ. (Taiwan) . . . . . [9166-24]

5:10 pm: **Optofluidic cellular immunofunctional analysis by localized surface plasmon resonance** *(Invited Paper)*, Katsuo Kurabayashi, Univ. of Michigan (USA) . . . . . [9166-25]

5:40 pm: **Elucidation of protein-small molecule interactions using a single particle aperture optical trap**, Ryan M. Gelfand, Ahmed Al-Balushi, Abhay Kotnala, Skylar Wheaton, Reuven Gordon, Univ. of Victoria (Canada) . . . . [9166-26]

TUESDAY 19 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 5A . . . TUE 8:00 AM TO 12:30 PM

Biosensing III

Session Chair: **Hooman Mohseni,** Northwestern Univ. (USA)

8:00 am: **Nanoscale fiber tip probe for biomedical sensing** *(Invited Paper)*, Qimin Quan, Wooyoung Hong, Harvard Univ. (USA); Feng Liang, Diane Schaak, The Rowland Institute at Harvard (USA); Marko Loncar, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9166-27]

8:30 am: **Portable optical sensors imaging systems for biomedical applications** *(Invited Paper)*, Ofer Levi, Univ. of Toronto (Canada) . . . . . [9166-28]

9:00 am: **Biologically inspired materials** *(Invited Paper)*, Alon Gorodetsky, Univ. of California, Irvine (USA). . . . . [9166-29]

9:30 am: **Nanocrystal optical sensors and multimodal optical imaging for quantitative nanomedicine** *(Invited Paper)*, Jeeseong Hwang, National Institute of Standards and Technology (USA). . . . . [9166-30]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

10:30 am: **Silicon nano-photonic devices optimized for label-free biosensing applications** *(Invited Paper)*, Lukas Chrostowski, The Univ. of British Columbia (Canada); Shon A. Schmidt, Univ. of Washington (USA); Jonas Flueckiger, Sahba Talebi Fard, The Univ. of British Columbia (Canada); Valentina Donzella, The Univ. of British Columbia (Italy); Samantha M. Grist, The Univ. of British Columbia (Canada); WenXuan Wu, Qian Wang, Pavel Kulik, James Kirk, Daniel Ratner, Univ. of Washington (USA) . . . . . [9166-31]

11:00 am: **Plasmonic nanosensors for molecular and functional cancer imaging and therapy** *(Invited Paper)*, Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA). . . . . [9166-32]

11:30 am: **Probing the nano-bio interface with nanoplasmonic optical probes** *(Invited Paper)*, Björn M. Reinhard, Boston Univ. (USA) . . . . . [9166-33]

12:00 pm: **A prism coupled light sheet microscope for single molecule super-resolution imaging** *(Invited Paper)*, Hu Cang, The Salk Institute (USA). . . [9166-34]

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Effect of amine functionalized polyethylene on clay-silver dispersion for polyethylene nanocomposites: mechanical and antimicrobial properties, Saul Sanchez, Centro de Investigacion en Quimica Aplicada (Mexico) . . . . . [9166-35]

Generation of reactive oxygen species from 5-aminolevulinic acid and glutamate in cooperation with excited CdSe/ZnS QDs, Hong Dinh Duong, Jee Won Lee, Jong Il Rhee, Chonnam National Univ. (Korea, Republic of) . . . [9166-36]

Enhancement of singlet oxygen production based on FRET between Coumarin tri-compound and CdSe/ZnS QDs, Hong Dinh Duong, Jee Won Lee, Jong Il Rhee, Chonnam National Univ. (Korea, Republic of). . . . . [9166-37]

Chemical sensors of biopolymers and hydrogen-containing components on the basis of nanodimensional porous Si, Liubomyr S. Monastyrsky, Ivan Franko National Univ. of L'viv (Ukraine) . . . . . [9166-38]

Multivariate system of orientational tomography of biological crystals birefringence networks, Natalia I. Zabolotna, Vinnytsia National Technical Univ. (Ukraine); Alexander G. Ushenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-39]

System of the phase tomography of optically anisotropic polycrystalline films of biological fluids, Natalia I. Zabolotna, Vinnytsia National Technical Univ. (Ukraine); Alexander G. Ushenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-40]

Laser system of the autofluorescence polarimetry of cytologic layers at an early stage of cancer detection, Yuriy A. Ushenko, Maxim Sidor, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-41]

CONFERENCE 9166

LOCATION: CONV. CTR. ROOM 5A

Fluorescent biopsy of biological tissues in differentiation of benign and malignant tumors of prostate, Yuriy A. Ushenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); Taras M. Boychuk, Bukovinian State Medical Univ. (Ukraine) . . . . . [9166-42]

Statistical and fractal analysis of autofluorescent myocardium images in posthumous diagnostics of acute coronary insufficiency, Taras M. Boychuk, Bukovinian State Medical Univ. (Ukraine) . . . . . [9166-43]

Polarization-correlation analysis of maps of optical anisotropy biological layers, Olexander V. Dubolazov, Yuriy A. Ushenko, Artem Karachevtsev, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-44]

Proton-dependent multi-drugs release using CD44 targeted nanoparticles for the induction of biliary cancer cell death, Ilkoo Noh, Jihye Choi, Hyun-Ouk Kim, Yonsei Univ. (Korea, Republic of); Jin-Suck Suh, Yong-Min Huh, Yonsei Univ. College of Medicine (Korea, Republic of); Seungjoo Haam, Yonsei Univ. (Korea, Republic of) . . . . . [9166-45]

Optical pre-clinical diagnostics of the cervical tissues malignant changing, Sergey B. Yermolenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-46]

Diagnostic value spectropolarimetry of blood plazma in patients with breast cancer, Alexander G. Prydiy, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-47]

Absorption spectra of adenocarcinoma and squamous cell carcinoma cervical tissues, Pavlo V. Ivashko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-48]

Dynamics of blood plazma by spectropolarimetry and biochemical techniques, Sergey B. Yermolenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9166-49]

Light-scattering properties of bacteria Desulfuromonas acetoxidans under the influence of nano silver particles, Oleksandr I. Bilyi, Ivan O. Bordun, Taras Z. Grechukh, Olga D. Maslovska, Svitlana O. Hnatush, Ivan Franko National Univ. of L'viv (Ukraine) . . . . . [9166-51]

Synthesis and characterization of fluorene-based NIR fluorescent dyes for in-vivo imaging, ShinJae Woo, Pusan National Univ. (Korea, Republic of); Sungmin Park, Korea Institute of Science and Technology (Korea, Republic of); Han Young Woo, Pusan National Univ. (Korea, Republic of) . . . . . [9166-52]

Cationic water-soluble fluorescent probe with 15 crown-5 for potassium ion detection, Hyejin Choi, Bao-Lam Nguyen, Van Sang Le, Han Young Woo, Pusan National Univ. (Korea, Republic of) . . . . . [9166-53]

Graphene/ruthenium nanoparticles as tool for sensor development, Ausra Gustainyte, Ctr. for Physical Sciences and Technology (Lithuania); Isabel Pastoriza-Santos, Elisa Gonzalez- Romero, Univ. de Vigo (Spain) . . . . . [9166-54]

Optimization of synthesis of nanosilica fillers for experimental dental nanocomposites, Maedeh Sharifzadeh Baei, Islamic Azad Univ. (Iran, Islamic Republic of) . . . . . [9166-55]

A high-sensitivity ellipsometric biosensor under a liquid immersion micro flow paths environment, Hyun Mo Cho, Won Chegal, Yong Jai Cho, Korea Research Institute of Standards and Science (Korea, Republic of); Yong Hee Yoon, Yoon Ho Seo, Dae Suk Kim, Chonbuk National Univ. (Korea, Republic of); Woong Jeong, Jae Heung Jo, Hannam Univ. (Korea, Republic of); Sang Won O, Se-Hwan Paek, Korea Univ. (Korea, Republic of) . . . . . [9166-56]

Self-assembled clusters of gold nanoparticles for cancer-targeted photothermal therapy, Mi Hwa Oh, Insu Kim, Jeong Heon Yu, Shinyoung Choi, Yoon Sung Nam, KAIST (Korea, Republic of) . . . . . [9166-57]

Optical printing and injection of gold nanoparticles into living cells, Miao Li, Theobald Lohmüller, Jochen Feldmann, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9166-59]

Synthesis of eco-friendly silver nanoparticles using plant extracts and assessment of their antimicrobial activity, Mohamed M. Ibrahim, Alexandria Univ. (Saudi Arabia) and King Saud Univ. (Saudi Arabia); Amal A. Hazzani, Afaf I. Shehata, Gehan A. El-Gaaly, King Saud Univ. (Saudi Arabia). . . . . [9166-60]

CONFERENCE 9167

LOCATION: CONV. CTR. ROOM 15A AND CONV. CTR. ROOM 14B

Sunday–Thursday 17–21 August 2014 • Proceedings of SPIE Vol. 9167

Spintronics VII

Conference Chairs: **Henri-Jean Drouhin,** Ecole Polytechnique (France); **Jean-Eric Wegrowe,** Ecole Polytechnique (France); **Manijeh Razeghi,** Northwestern Univ. (USA)

Program Committee: **Franco Ciccacci,** Politecnico di Milano (Italy); **Russell P. Cowburn,** Univ. of Cambridge (United Kingdom); **Scott A. Crooker,** Los Alamos National Lab. (USA); **Vincent Cros,** Unité Mixte de Physique CNRS/Thales (France); **Hanan Dery,** Univ. of Rochester (USA); **Rogério de Sousa,** Univ. of Victoria (Canada); **Michel I. Dyakonov,** Univ. Montpellier 2 (France); **Michael E. Flatté,** The Univ. of Iowa (USA); **Jean-Marie George,** Unité Mixte de Physique CNRS/Thales (France); **Erez Hasman,** Technion-Israel Institute of Technology (Israel); **Henri Jaffrès,** Unité Mixte de Physique CNRS/Thales (France); **Tomás Jungwirth,** Institute of Physics of the ASCR, v.v.i. (Czech Republic); **Giti A. Khodaparast,** Virginia Polytechnic Institute and State Univ. (USA); **Mathias Klaui,** Univ. Konstanz (Germany); **Xavier Marie,** INSA - Univ. of Toulouse (France); **Laurens W. Molenkamp,** Julius-Maximilians-Univ. Würzburg (Germany); **Hiro Munekata,** Tokyo Institute of Technology (Japan); **Yoshichika Otani,** The Univ. of Tokyo (Japan); **Dafiné Ravelosona,** Institut d'Électronique Fondamentale (France); **Georg Schmidt,** Martin-Luther-Univ. Halle-Wittenberg (Germany); **Jing Shi,** Univ. of California, Riverside (USA); **Luc Thomas,** Headway Technology (USA); **Evgeny Tsymbal,** Univ. of Nebraska-Lincoln (USA); **Olaf M. J. van 't Erve,** U.S. Naval Research Lab. (USA); **Joerg Wunderlich,** Hitachi Cambridge Lab. (United Kingdom); **Igor Zutic,** Univ. at Buffalo (USA)

SUNDAY 17 AUGUST

Sessions 1a and 1b run concurrently.

SESSION 1A

LOCATION: CONV. CTR. ROOM 15A . . SUN 8:30 AM TO 10:00 AM

Spin Laser

Session Chair: **Henri Jaffrès,** Unité Mixte de Physique CNRS/Thales (France)

8:30 am: **Spin-lasers: from optical gain to high-frequency operation** *(Invited Paper)*, Paulo Eduardo Faria, Univ. at Buffalo (USA); Guilherme M. Sipahi, Univ. de São Paulo (Brazil); Jeongsu Lee, Igor Zutic, Univ. at Buffalo (USA) . . . . . [9167-1]

9:00 am: **Polarization dynamics in spin-polarized vertical-cavity surface-emitting lasers** *(Invited Paper)*, Nils C. Gerhardt, Henning Höpfner, Markus Lindemann, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) . . . . . [9167-2]

9:30 am: **Control of light polarization using spin-injected opto-electronic devices with vertical geometries** *(Invited Paper)*, Julien Frougier, Unité Mixte de Physique CNRS/Thales (France); Tiantian Zhang, Institut National des Sciences Appliquées de Toulouse (France); Shiheng Liang, Institut Jean Lamour (France); Phillipe Barate, Pierre Renucci, Xavier Marie, Institut National des Sciences Appliquées de Toulouse (France); Ghaya Baili, Thales Research & Technology (France); Mehdi Alouini, Univ. de Rennes 1 (France) and Thales Research & Technology (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France); Arnaud Garnache, Institut d'Électronique Fondamentale (France); Yuan Lu, Univ. Henri Poincaré Nancy (France); Henri Jaffrès, Unité Mixte de Physique CNRS/Thales (France); Jean-Marie George, Unité Mixte de Physique CNRS/Thales (France) . . . . . [9167-3]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 1B

LOCATION: CONV. CTR. ROOM 14B . . SUN 8:30 AM TO 10:30 AM

Spin Coherence in Quantum Dots

Session Chair: **Jean J. Heremans,** Virginia Polytechnic Institute and State Univ. (USA)

8:30 am: **Ultrafast adiabatic rapid passage in a single semiconductor quantum dot** *(Invited Paper)*, Kimberley C. Hall, Reuble Mathew, Eric Dilcher, Angela Gamouras, Ajan Ramachandran, Dalhousie Univ. (Canada); Sabine Freisem, Dennis Deppe, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9167-4]

9:00 am: **Thermoelectric transport through nano-devices: interplay between resonance spin scattering and strong spin-orbit interaction** *(Invited Paper)*, Mikhail Kiselev, The Abdus Salam International Ctr. for Theoretical Physics (Italy) . . . . . [9167-5]

9:30 am: **Room-temperature initialization, dynamics, and measurement of coherent electron spins in strongly confined quantum dots** *(Invited Paper)*, Jesse Berezovsky, Ahmad K. Fumani, Michael Wolf, Case Western Reserve Univ. (USA) . . . . . [9167-6]

10:00 am: **Epitaxial growth of CdMnTe quantum dots directly on Si(111)** *(Invited Paper)*, Marielle H. Lage, Sukarno O. Ferreira, Univ. Federal de Viçosa (Brazil); Angelo S. Malachias, Univ. Federal de Minas Gerais (Brazil) . . . . . [9167-7]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

Sessions 2a and 2b run concurrently.

SESSION 2A

LOCATION: CONV. CTR. ROOM 15A . SUN 10:30 AM TO 12:30 PM

Optical Pumping I

Session Chair: **Takashi Kuroda,** National Institute for Materials Science (Japan)

10:30 am: **Optical spin orientation and depolarization in Ge: from near infrared to visible** *(Invited Paper)*, Christian Rinaldi, Matteo Cantoni, Stefano Bertoli, Cristian Manzoni, Marco Marangoni, Giulio Cerullo, Massimiliano Bianchi, Roman Sordan, Riccardo Bertacco, Politecnico di Milano (Italy) . . . . . [9167-8]

11:00 am: **Optical orientation of electron spins in GaAs L-valleys** *(Invited Paper)*, Andrea Balocchi, Phillipe Barate, Tiantian Zhang, Thierry Amand, Pierre Renucci, Hélène Carrère, Bernhard Urbaszek, Xavier Marie, Institut National des Sciences Appliquées de Toulouse (France) . . . . . [9167-9]

11:30 am: **Demonstration of the spin solar cell effect** *(Invited Paper)*, Dominique Bougeard, Bernhard Endres, Mariusz Ciorga, Maximilian Schmid, Martin Utz, Dieter Weiss, Günther Bayreuther, Christian H. Back, Univ. Regensburg (Germany) . . . . . [9167-10]

12:00 pm: **Spin-dependent transport as a consequence of Pauli blockade in a degenerate electron gas** *(Invited Paper)*, Fabian Cadiz, Daniel Paget, Alistair Rowe, Ecole Polytechnique (France). . . . . [9167-11]

Lunch Break . . . . . Sun 12:30 pm to 1:30 pm

SESSION 2B

LOCATION: CONV. CTR. ROOM 14B . . SUN 11:00 AM TO 12:30 PM

Spin Coherence II

Session Chair: **Kimberley C. Hall,** Dalhousie Univ. (Canada)

11:00 am: **Spin-orbit interaction and spin coherence in narrow-gap semiconductor and semimetal wires** *(Invited Paper)*, Jean J. Heremans, Virginia Polytechnic Institute and State Univ. (USA); Michael B. Santos, The Univ. of Oklahoma (USA); Willem Van Roy, Gustaaf R. Borghs, IMEC (Belgium) . . [9167-12]

11:30 am: **Electron and hole spin transport in InSb nanowire quantum dots** *(Invited Paper)*, Vlad S. Pribiag, S. Nadj-Perge, J. W. G. van den Berg, S. M. Frolov, I. van Weperen, Kavli Institute of Nanoscience Delft (Netherlands); S. R. Plissard, Erik P. A. M. Bakkers, Eindhoven Univ. of Technology (Netherlands); Leo P. Kouwenhoven, Kavli Institute of Nanoscience Delft (Netherlands) . . . . . [9167-13]

12:00 pm: **High magnetic field spectroscopy of silicon donors for quantum information applications** *(Invited Paper)*, Benedict Murdin, Ellis Bowyer, Univ. of Surrey (United Kingdom) . . . . . [9167-14]

Lunch Break . . . . . Sun 12:30 pm to 2:00 pm

CONFERENCE 9167

LOCATION: CONV. CTR. ROOM 15A AND CONV. CTR. ROOM 14B

Sessions 3a and 3b run concurrently.

SESSION 3A

LOCATION: CONV. CTR. ROOM 15A . . . .SUN 1:30 PM TO 3:30 PM

Spin Photonics

Session Chair: **Sophia E. Hayes,** Washington Univ. in St. Louis (USA)

1:30 pm: **Postselection-free entangled photons from highly symmetric quantum dots grown by droplet epitaxy** *(Invited Paper)*, Takashi Kuroda, Takaaki Mano, Kazuaki Sakoda, National Institute for Materials Science (Japan); Bernhard Urbaszek, Institut National des Sciences Appliquées de Toulouse (France); Xavier Marie, Thierry Amand, Univ. de Toulouse (France); Hideaki Nakajima, Hidekazu Kumano, Ikuo Suemune, Hokkaido Univ. (Japan). . . . . [9167-15]

2:00 pm: **Spin and energy relaxation in germanium** *(Invited Paper)*, Fabio Pezzoli, Univ. degli Studi di Milano-Bicocca (Italy); Lan Qing, Univ. of Rochester (USA); Anna Giorgioni, Univ. degli Studi di Milano-Bicocca (Italy); Giovanni Isella, Politecnico di Milano (Italy); Emanuele Grilli, Mario Guzzi, Univ. degli Studi di Milano-Bicocca (Italy); Hanan Dery, Univ. of Rochester (USA) . . . . . [9167-16]

2:30 pm: **Photonic spin Hall effect for precision metrology** *(Invited Paper)*, Xinxing Zhou, Shizhen Chen, Yachao Liu, Hailu Luo, Shuangchun Wen, Hunan Univ. (China) . . . . . [9167-17]

3:00 pm: **On the charge-magnet paradoxes of classical electrodynamics** *(Invited Paper)*, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9167-18]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 3B

LOCATION: CONV. CTR. ROOM 14B . . . SUN 2:00 PM TO 3:00 PM

Spin Coherence and Magnetic Polarons

Session Chair: **Benedict Murdin,** Univ. of Surrey (United Kingdom)

2:00 pm: **Individual cobalt and manganese ions in semiconductor quantum dots and photonic structures** *(Invited Paper)*, Wojciech Pacuski, Univ. of Warsaw (Poland) . . . . . [9167-19]

2:30 pm: **Conventional versus unconventional magnetic polarons: ZnTe/(Zn,Mn)Se and (Zn,Mn)Te/ZnSe quantum dots** *(Invited Paper)*, Biplob Barman, Athos Petrou, Yutsung Tsai, Thomas A. Scrace, James M. Pientka, Joseph R. Murphy, Alexander N. Cartwright, Igor Zutic, Bruce D. McCombe, Univ. at Buffalo (USA); Rafal Oszwaldowski, Andre Petukhov, South Dakota School of Mines and Technology (USA); Ian R. Sellers, The Univ. of Oklahoma (USA); Wu-Ching Chou, W. C. Fan, National Chiao Tung Univ. (Taiwan); C. S. Yang, Tatung Univ. (Taiwan) . . . . . [9167-21]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

Sessions 4a and 4b run concurrently.

SESSION 4A

LOCATION: CONV. CTR. ROOM 15A . . .SUN 4:00 PM TO 6:00 PM

Optical Pumping II

Session Chair: **Christian Rinaldi,** Politecnico di Milano (Italy)

4:00 pm: **Direct observation of non-thermal influence in the process of photo-induced ferromagnetic resonance in (Ga,Mn)As** *(Invited Paper)*, Takashi Matsuda, Kazuhiro Nishibayashi, Hiro Munekata, Tokyo Institute of Technology (Japan). . . . . [9167-22]

4:30 pm: **Modeling optically pumped NMR and spin polarization in GaAs/AlGaAs quantum wells** *(Invited Paper)*, Christopher J. Stanton, Dipta Saha, Ryan Wood, Clifford R. Bowers, Univ. of Florida (USA); Erika L. Sesti, Sophia E. Hayes, Washington Univ. in St. Louis (USA) . . . . . [9167-23]

5:00 pm: **Experimental measurements of optically pumped NMR and spin polarization in bulk GaAs and AlGaAs/GaAs quantum wells** *(Invited Paper)*, Sophia E. Hayes, Erika L. Sesti, Washington Univ. in St. Louis (USA); Dipta Saha, Ryan Wood, Clifford R. Bowers, Christopher J. Stanton, Univ. of Florida (USA) . . . . . [9167-24]

5:30 pm: **Deviation from the Landau-Lifshitz-Gilbert equation in the inertial regime of the magnetization** *(Invited Paper)*, Enrick Olive, Univ. de Tours (France) . . . . . [9167-25]

SESSION 4B

LOCATION: CONV. CTR. ROOM 14B . . . SUN 3:30 PM TO 6:30 PM

Multiferroics, Half Metals, and Oxides

Session Chair: **Vlad S. Pribiag,** Kavli Institute of Nanoscience Delft (Netherlands)

3:30 pm: **Domain walls in multiferroic oxides as nanoscale functional elements** *(Invited Paper)*, Jan Seidel, The Univ. of New South Wales (Australia) . . . . [9167-26]

4:00 pm: **Resonant Raman scattering in $BiFeO_3$** *(Invited Paper)*, Mads Weber, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg) and Univ. du Luxembourg (Luxembourg); Mael Guennou, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg); Constance Toulouse, Maximilien Cazayous, Univ. Paris 7-Denis Diderot (France); Jens Kreisel, Ctr. de Recherche Public - Gabriel Lippmann (Luxembourg) and Univ. du Luxembourg (Luxembourg) . . . . . [9167-27]

4:30 pm: **Low-dimensional antiferromagnetic transition metal oxides coupled to magnetic substrates** *(Invited Paper)*, Alberto Brambilla, Andrea Picone, Michele Riva, Alberto Calloni, Giulia Berti, Gianlorenzo Bussetti, Marco Finazzi, Lamberto Duò, Franco Ciccacci, Politecnico di Milano (Italy) . . . . . [9167-28]

5:00 pm: **Magnetization dynamics and Gilbert damping properties of Co_2FeAl film grown by molecular beam epitaxy** *(Invited Paper)*, Shuag Qiao, Shuaihua Nie, Institute of Semiconductors (China); Yan Huo, Yizheng Wu, Fudan Univ. (China); Jianhua Zhao, Xinhui Zhang, Institute of Semiconductors (China) . . . . . [9167-29]

5:30 pm: **Ultra-low-energy straintronics using multiferroic composites** *(Invited Paper)*, Kuntal Roy, Purdue Univ. (USA) . . . . . [9167-30]

6:00 pm: **Persistent optically induced magnetism in oxygen-deficient strontium titanate** *(Invited Paper)*, William D. Rice, Los Alamos National Lab. (USA); Palak Ambwani, Univ. of Minnesota (USA); M. Bombeck, Technische Univ. Dortmund (Germany); Joe D. Thompson, Los Alamos National Lab. (USA); Greg Haugstad, Univ. of Minnesota, Twin Cities (USA); Chris Leighton, Univ. of Minnesota (USA); Scott A. Crooker, Los Alamos National Lab. (USA) . . . . . [9167-31]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:00 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 15A . . . MON 1:00 PM TO 3:30 PM

Skyrmions

Session Chair: **Wolfgang Weber,** Institut de Physique et Chimie des Matériaux de Strasbourg (France)

1:00 pm: **Dynamics and topological mass of skyrmionic spin structures** *(Invited Paper)*, Christoforos Moutafis, Paul Scherrer Institut (Switzerland); Felix Büttner, Johannes Gutenberg Univ. Mainz (Germany) and Technische Univ. Berlin (Germany); Andre Bisig, Johannes Gutenberg Univ. Mainz (Switzerland); Benjamin Krüger, Johannes Gutenberg Univ. Mainz (Germany); C. A. F. Vaz, Paul Scherrer Institut (Switzerland) and Johannes Gutenberg Univ. Mainz (Germany); Michael Foerster, Mohamad-Assaad Mawass, Johannes Gutenberg Univ. Mainz (Germany); Michael Schneider, Christian Gunther, Technische Univ. Berlin (Germany); Jan Geilhufe, Technische Univ. Eindhoven (Germany); C. von Korff Schmising, J. Mohanty, B. Pfau, Stefan Schaffert, Technische Univ. Berlin (Germany); Tomek Schulz, Johannes Gutenberg Univ. Mainz (Germany); Markus Weigand, Max-Planck Institut für Intelligente Systeme (Germany); Henk J. M. Swagten, Technische Univ. Eindhoven (Netherlands); Jörg Raabe, Paul Scherrer Institut (Switzerland); Mathias Kläui, Johannes Gutenberg Univ. Mainz (Germany); Stefan Eisebitt, Technische Univ. Berlin (Germany) and Helmholtz-Zentrum Berlin fur Materialien und Energie GmbH (Germany). . . . . [9167-32]

1:30 pm: **Micromagnetics with Dzyaloshinskii-Moriya interaction: from domain walls to skyrmions** *(Invited Paper)*, Stanislas Rohart, Univ. Paris-Sud 11 (France) . . . . . [9167-33]

2:00 pm: **Writing and deleting single magnetic skyrmions** *(Invited Paper)*, Niklas Romming, Christian Hanneken, Matthias Menzel, Jessica E. Bickel, Boris Wolter, Kirsten von Bergmann, André Kubetzka, Roland Wiesendanger, Univ. Hamburg (Germany) . . . . . [9167-34]

2:30 pm: **Skyrmions and helicoids in epitaxial thin film helical magnets** *(Invited Paper)*, Theodore L. Monchesky, Murray N. Wilson, Dalhousie Univ. (Canada); Filipp N. Rybabov, Institute of Metal Physics (Russian Federation); Anna B. Butenko, Alexei B. Bogdanov, Ulrich K. Rossler, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany); Helmut Fritzsche, Canadian Neutron Beam Centre (Canada); Kathryn Krycka, Brian J. Kirby, National Institute of Standards and Technology (USA); James C. Loudon, Univ. of Cambridge (United Kingdom); Michael D. Roberston, Acadia Univ. (Canada); Simon Meynell, Eric A. Karhu, David Lake, Andrew S. Quigley, Dalhousie Univ. (Canada); Charles F. Majkrzak, National Institute of Standards and Technology (USA). . . . . [9167-35]

3:00 pm: **Interaction between vortex walls and asymmetric notches in Permalloy nanowires** *(Invited Paper)*, Luiz Sampaio Lima, Centro Brasileiro de Pesquisas Físicas (Brazil) . . . . . [9167-36]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 15A . . MON 4:00 PM TO 6:00 PM

Helical Order and Organics

Session Chair: **Luiz Sampaio Lima,** Centro Brasileiro de Pesquisas Físicas (Brazil)

4:00 pm: **Current-driven dynamics of chiral domain walls** *(Invited Paper)*, Geoffrey S. Beach, Massachusetts Institute of Technology (USA) . . . . . [9167-37]

4:30 pm: **Helical order in one dimensional semiconductors** *(Invited Paper)*, Peter Stano, RIKEN (Japan) . . . . . [9167-38]

5:00 pm: **Direct observation of a highly spin-polarized organic spinterface at room temperature** *(Invited Paper)*, Wolfgang Weber, Fatima Djeghloul, Fatima Ibrahim, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Matteo Cantoni, Politecnico di Milano (Italy); Martin Bowen, Loic Joly, Samy Boukari, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Philippe Ohresser, Francois Bertran, Patrick Lefevre, Synchrotron SOLEIL (France); Pardeep Thakur, ESRF - The European Synchrotron (France); Fabrice Scheurer, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Toshio Miyamachi, Karlsruher Institut für Technologie (Germany); Richard Mattana, Pierre Seneor, Unité Mixte de Physique CNRS/Thales (France); Ali Jaafar, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Christian Rinaldi, Politecnico di Milano (Italy); Saquib Javaid, Jacek Arabski, Jean-Paul Kappler, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Wulf Wulfhekel, Karlsruher Institut für Technologie (Germany); Nicholas B. Brookes, ESRF - The European Synchrotron (France); Riccardo Bertacco, Politecnico di Milano (Italy); Amina Taleb, Synchrotron SOLEIL (France); Mebarek Alouani, Eric Beaurepaire, Institut de Physique et Chimie des Matériaux de Strasbourg (France) . . . . . [9167-39]

5:30 pm: **Molecular nanomagnetics for spintronic devices** *(Invited Paper)*, Marco Affronte, Univ. degli Studi di Modena e Reggio Emilia (Italy) . . . . . [9167-40]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 15A . . TUE 8:00 AM TO 10:00 AM

Magnetooptics and Landé Factor

Session Chair: **Christopher J. Stanton,** Univ. of Florida (USA)

8:00 am: **Cyclotron resonance in ferromagnetic semiconductors at ultrahigh magnetic fields** *(Invited Paper)*, Yasuhiro H. Matsuda, The Univ. of Tokyo (Japan). . . . . [9167-41]

8:30 am: **Magneto-optical spectroscopy of narrow gap ferromagnetic semiconductors** *(Invited Paper)*, Giti A. Khodaparast, Virginia Polytechnic Institute and State Univ. (USA); Yasuhiro H. Matsuda, The Univ. of Tokyo (Japan); Dipta Saha, Gary D. Sanders, Christopher J. Stanton, Univ. of Florida (USA); Bruce W. Wessels, Northwestern Univ. (USA) . . . . . [9167-42]

9:00 am: *g* -factor anisotropy driven spin relaxation in germanium *(Invited Paper)*, Pengke Li, Univ. of Maryland (USA) . . . . . [9167-43]

9:30 am: **Time resolved magneto-optical studies of InAsP ternary alloys** *(Invited Paper)*, Brenden A. Magill, Michael A. Meeker, Travis R. Merrit, Giti A. Khodaparast, Virginia Polytechnic Institute and State Univ. (USA); Stephen A. McGill, National High Magnetic Field Lab. (USA); Chris J. Palmstrom, Univ. of California, Santa Barbara (USA) . . . . . [9167-44]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 8

LOCATION: CONV. CTR. ROOM 15A . . TUE 10:30 AM TO 12:30 PM

Magnetic RAM I

Session Chair: **Luc Thomas,** Headway Technologies, Inc. (USA)

10:30 am: **Properties of CoFeB-MgO magnetic tunnel junctions down to 11 nm** *(Keynote Presentation)*, Hideo Ohno, Tohoku Univ. (Japan) . . . . . [9167-45]

11:30 am: **Characterization of retention times and critical currents of STT-MRAM cells** *(Invited Paper)*, Alexey Khvalkovskiy, Volodymyr Voznyuk, Sebastian Schafer, Dmytro Apalkov, Robert Beach, Vladimir Nikitin, SAMSUNG Electronics Co., Ltd. (USA). . . . . [9167-46]

12:00 pm: **Status and outlook of STT-MRAM development** *(Invited Paper)*, Tai Min, IMEC (Belgium) . . . . . [9167-47]

Lunch/Exhibition Break . . . . . Tue 12:30 pm to 1:30 pm

CONFERENCE 9167

LOCATION: CONV. CTR. ROOM 15A AND CONV. CTR. ROOM 14B

SESSION 9

LOCATION: CONV. CTR. ROOM 15A . . . . TUE 1:30 PM TO 3:30 PM

Magnetic RAM II

Session Chair: **Hideo Ohno,** Tohoku Univ. (Japan)

1:30 pm: **Progresses on STT-MRAM technlogy and normally-off system** *(Invited Paper)*, Hiroaki Yoda, Toshiba Corp. (Japan) . . . . . [9167-48]

2:00 pm: **Perpendicular magnetic tunnel junction material optimization for MRAM cells and spin transfer torque field and bias dependence** *(Invited Paper)*, Ricardo C. Sousa, Lea Cuchet, Bernard Rodmacq, Stéphane Auffret, Bernard Dieny, Commissariat à l'Énergie Atomique (France) . . . . . [9167-49]

2:30 pm: **Materials challenges in perpendicular magnetic tunnel junctions for embedded spin-transfer-torque MRAM** *(Invited Paper)*, Kangho Lee, Jimmy Kan, Qualcomm Inc. (USA); Matthias Gottwald, Qualcomm Inc. (Belgium); Chando Park, Seung Kang, Qualcomm Inc. (USA) . . . . . [9167-50]

3:00 pm: **Characteristics of orthogonal spin transfer magnetic tunnel junction devices** *(Invited Paper)*, Mustafa Pinarbasi, Spin Transfer Technologies, Inc. (USA) . . . . . [9167-51]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 15A . . . .TUE 4:00 PM TO 6:00 PM

Magnetic RAM and Logic Devices

Session Chair: **Hiroaki Yoda,** Toshiba Corp. (Japan)

4:00 pm: **Properties of CoFeB/MgO systems with perpendicular anisotropy** *(Invited Paper)*, Jean-Paul Adam, Karin Garcia, Adrien Le Goff, Rémy Soucaille, Capucine Burrowes, Nicolas Vernier, Dafiné Ravelosona, Joo-Von Kim, Thibaut Devolder, Univ. Paris-Sud 11 (France); Stéphane Guilet, Lab. de Photonique et de Nanostructures (France); Berthold Ocker, SINGULUS TECHNOLOGIES AG (Germany) . . . . . [9167-52]

4:30 pm: **Switching time distributions of orthogonal spin transfer devices at nanosecond time scales** *(Invited Paper)*, Georg Wolf, Gabriel D. Chaves-O'Flynn, Andrew D. Kent, New York Univ. (USA); Bartek Kardasz, Spin Transfer Technologies, LLC (USA); Steve Watts, Mustafa Pinarbasi, Spin Transfer Technologies, Inc. (USA) . . . . . [9167-53]

5:00 pm: **Time-resolved magnetization dynamics in perpendicular STT-MRAM devices** *(Invited Paper)*, Luc Thomas, Guenole Jan, Son Le, Yuan-Jen Lee, Huanlong Liu, Jian Zhu, Ru-Ying Tong, Keyu Pi, Yu-Jen Wang, Tom X. Zhong, Terry Torng, Po-Kang Wang, Headway Technologies, Inc. (USA) . . . . . [9167-54]

5:30 pm: **High-performance computing based on spin-diode logic** *(Invited Paper)*, Joseph S. Friedman, Bruce W. Wessels, Northwestern Univ. (USA); Damien Querlioz, Univ. Paris-Sud 11 (France); Alan V. Sahakian, Northwestern Univ. (USA) . . . . . [9167-55]

WEDNESDAY 20 AUGUST

SESSION 11

LOCATION: CONV. CTR. ROOM 15A . WED 8:00 AM TO 10:00 AM

Spin Caloric Transport I

Session Chair: **Jean-Eric Wegrowe,** Ecole Polytechnique (France)

8:00 am: **Magnon Hall effect: A theoretical investigation** *(Invited Paper)*, Ingrid Mertig, Martin-Luther Univ. Halle-Wittenberg (Germany) and Max-Planck-Institut für Mikrostrukturphysik (Germany); Alexander Mook, Martin-Luther Univ. Halle-Wittenberg (Germany); Juergen Henk, Max-Planck-Institut für Mikrostrukturphysik (Germany) . . . . . [9167-56]

8:30 am: **Various methods of spin current generation and manipulation** *(Invited Paper)*, Sadamichi Maekawa, Japan Atomic Energy Agency (Japan). . . . . [9167-57]

9:00 am: **Anomalous spin and charge Seebeck effect in a quantum well with spin orbit interaction** *(Invited Paper)*, Catalina Marinescu, Clemson Univ. (USA); Andrei Manolescu, Reykjavik Univ. (Iceland); Jeremy Capps, Clemson Univ. (USA) . . . . . [9167-58]

9:30 am: **Spin-caloritronics in magnetic nanodevices** *(Invited Paper)*, Santiago Serrano-Guisan, International Iberian Nanotechnology Lab. (Portugal); Niklas Liebing, Patryk Krysteczko, Xiukun Hu, Physikalisch-Technische Bundesanstalt (Germany); Karsten Rott, Gunter Reiss, Univ. Bielefeld (Germany); Judith Kimling, Tim Böhnert, Kornelius Nielsch, Univ. Hamburg (Germany); Michael Czerner, Christian Heiliger, Justus-Liebig-Univ. Giessen (Germany); Hans-Werner Schumacher, Physikalisch-Technische Bundesanstalt (Germany). . . . . [9167-59]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 12

LOCATION: CONV. CTR. ROOM 15A WED 10:30 AM TO 12:00 PM

Spin Caloric Transport II

Session Chair: **Sadamichi Maekawa,** Japan Atomic Energy Agency (Japan)

10:30 am: **Anisotropic magneto-thermal transport: theory and experiments** *(Invited Paper)*, Jean-Eric Wegrowe, Do Chung Pham, Henri-Jean Drouhin, Ecole Polytechnique (France); Daniel Lacour, Michel Hehn, Univ. Henri Poincaré Nancy (France) . . . . . [9167-60]

11:00 am: **Spin-dependent thermoelectric transport in magnetoresistive nanowires** *(Invited Paper)*, Kornelius Nielsch, Univ. Hamburg (Germany) . [9167-61]

11:30 am: **Probing fundamental physics and materials properties of spincaloritronic systems with suspended thermal platforms** *(Invited Paper)*, Barry L. Zink, Univ. of Denver (USA) . . . . . [9167-62]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:00 pm

SESSION 13

LOCATION: CONV. CTR. ROOM 15A . . .WED 1:00 PM TO 3:00 PM

Spin Transfer and Spin-Orbit Interaction

Session Chair: **Igor Zutic,** Univ. at Buffalo (USA)

1:00 pm: **Chiral spin torque at magnetic domain walls** *(Keynote Presentation)*, Stuart S. P. Parkin, IBM Research - Almaden (USA). . . . . [9167-63]

2:00 pm: **Spin-orbit torques in ferromagnetic heterostructures: fundamentals and applications** *(Invited Paper)*, Kevin Garello, Can Onur Avci, ETH Zürich (Switzerland); Mihai Miron, Olivier Boulle, SPINTEC (France); Frank Freimuth, Forschungszentrum Jülich GmbH (Germany); Yuriy Mokrousov, Stefan Blügel, Max-Planck-Institut für Festkörperforschung (Germany) and Forschungszentrum Jülich GmbH (Germany); Gilles Gaudin, SPINTEC (France); Pietro Gambardella, ETH Zürich (Switzerland). . . . . [9167-64]

2:30 pm: **Spin orbit torques and chiral magnetic texture in magnetic heterostructures** *(Invited Paper)*, Masamitsu Hayashi, National Institute for Materials Science (Japan) . . . . . [9167-65]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 14

LOCATION: CONV. CTR. ROOM 15A . . .WED 3:30 PM TO 6:30 PM

Spin Transfer and Domain Walls

Session Chair: **Ingrid Mertig,** Martin-Luther Univ. Halle-Wittenberg (Germany)

3:30 pm: **New Heusler compounds for spin transfer torque** *(Invited Paper)*, Claudia Felser, Daniel Ebke, Max-Planck-Institut für Chemische Physik Fester Stoffe (Germany); Gerhard H. Fecher, Max-Planck-Institut für Chemische Physik Fester Stoffe (Germany) and Johannes Gutenberg Univ. (Germany); Siham Ouardi, Ajaya K. Nayak, Max-Planck-Institut für Chemische Physik Fester Stoffe (Germany) . . . . . [9167-66]

4:00 pm: **A simple and highly efficient in-line magnetic domain wall injector** *(Invited Paper)*, Timothy Phung, Aakash Pushp, Luc Thomas, Charles T. Rettner, See-Hun Yang, Kwang-Su Ryu, John Baglin, Brian Hughes, Stuart S. P. Parkin, IBM Research - Almaden (USA) . . . . . [9167-67]

4:30 pm: **Theory of spin injection from a half-metal at finite temperatures** *(Invited Paper)*, Kirill D. Belashchenko, James K. Glasbrenner, Univ. of Nebraska-Lincoln (USA); Aleksander L. Wysocki, Univ. of Nebraska-Lincoln (USA) . [9167-68]

5:00 pm: **Synchronous domain wall motion in ferromagnetic nanowires achieved via out-of-plane field pulses** *(Invited Paper)*, June-Seo Kim, Johannes Gutenberg Univ. Mainz (Germany) and Technische Univ. Eindhoven (Netherlands); Mohamad-Assaad Mawass, Johannes Gutenberg Univ. Mainz (Germany) and Max-Planck Institut für Intelligente Systeme (Germany); Andre Bisig, Benjamin Krüger, Robert M. Reeve, Tomek Schulz, Felix Büttner, Johannes Gutenberg Univ. Mainz (Germany); Markus Weigand, Hermann Stoll, Max-Planck Institut für Intelligente Systeme (Germany); Jungbum Yoon, Chun-Yeol You, Inha Univ. (Korea, Republic of); Gisela Schütz, Max-Planck Institut für Intelligente Systeme (Germany); Henk J. M. Swagten, Bert Koopmans, Technische Univ. Eindhoven (Netherlands); Stefan Eisebitt, Technische Univ. Berlin (Germany) and Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Mathias Kläui, Johannes Gutenberg Univ. Mainz (Germany) . . . . . [9167-69]

5:30 pm: **Correlation between spin structure oscillations and domain wall velocities** *(Invited Paper)*, Andre Bisig, IBM Research – Zürich (Switzerland) and Johannes Gutenberg Univ. Mainz (Germany) and Max-Planck Institut für Intelligente Systeme (Germany); Martin Stärk, Univ. Konstanz (Germany); Mohamad-Assaad Mawass, Johannes Gutenberg Univ. Mainz (Germany) and Max-Planck Institut für Intelligente Systeme (Germany); Christoforos Moutafis, Paul Scherrer Institute (Switzerland); Jan Rhensius, Paul Scherrer Institute (Switzerland) and Univ. Konstanz (Germany); Jakoba Heidler, Paul Scherrer Institute (Switzerland); Felix Büttner, Johannes Gutenberg Univ. Mainz (Germany) and Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) and Technische Univ. Berlin (Germany); Matthias Noske, Markus Weigand, Max-Planck Institut für Intelligente Systeme (Germany); Stefan Eisebitt, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) and Technische Univ. Berlin (Germany); Tolek Tyliszczak, Lawrence Berkeley National Lab. (USA); Bartel van Waeyenberge, Univ. Gent (Belgium); Hermann Stoll, Gisela Schütz, Max-Planck Institut für Intelligente Systeme (Germany); Mathias Kläui, Johannes Gutenberg Univ. Mainz (Germany) and Univ. Konstanz (Germany) . . . . . [9167-70]

6:00 pm: **Kondo physics in nanoscopic metallic non-local spin transport devices** *(Invited Paper)*, L. O'Brien, Univ. of Minnesota (USA) and Univ. of Cambridge (United Kingdom); M. J. Erickson, D. Spivak, Univ. of Minnesota (USA); Haile Ambaye, Rick Goyette, Valeria Lauter, Oak Ridge National Lab. (USA); Paul A Crowell, Univ. of Minnesota, Twin Cities (USA); Chris Leighton, Univ. of Minnesota (USA) . . . . . [9167-71]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Magnetic field effects and nodal ground states in InP nanowires, Tiago de Campos, Univ. de São Paulo (Brazil), Paulo Eduardo de Faira Jr., Univ. de São Paulo (Brazil) and Univ. at Buffalo (United States); Guilherme M. Sipahi, Univ. de São Paulo (Brazil); Igor Zutic, Univ. at Buffalo (United States) . . . . . .[9167-106]

THURSDAY 21 AUGUST

Sessions 15a and 15b run concurrently.

SESSION 15A

LOCATION: CONV. CTR. ROOM 15A . . THU 8:00 AM TO 10:30 AM

Spin-Orbit Coupling

Session Chair: **Giti A. Khodaparast,** Virginia Polytechnic Institute and State Univ. (USA)

8:00 am: **New directions for engineering quantum spin states: ultracold atomic gases with optically induced synthetic spin-orbit coupling** *(Invited Paper)*, Vito Scarola, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9167-72]

8:30 am: **Spin control and manipulation in (110) and (111) GaAs quantum wells** *(Invited Paper)*, Paulo V. Santos, Alberto Hernández-Mínguez, Klaus Biermann, Rudolf Hey, Paul-Drude-Institut für Festkörperelektronik (Germany) . . . . . [9167-73]

9:00 am: **Spin-orbit induced currents and g-factors in semiconductor quantum dots** *(Invited Paper)*, Andrei Silov, Joost van Bree, Paul M. Koenraad, Technische Univ. Eindhoven (Netherlands); Michael E. Flatté, The Univ. of Iowa (USA) [9167-74]

9:30 am: **Spin injection and spin-orbit coupling in low-dimensional semiconductor nanostructures** *(Invited Paper)*, Sebastian Heedt, Isabel Wehrmann, Thomas Gerster, Forschungszentrum Jülich GmbH (Germany); Paul Wenk, Univ. Regensburg (Germany); Stefan Kettemann, Jacobs Univ. Bremen (Germany); Kamil Sladek, Hilde Hardtdegen, Jürgen Schubert, Andreas Bringer, Natalia Demarina, Detlev Grützmacher, Thomas Schäpers, Forschungszentrum Jülich GmbH (Germany) . . . . . [9167-75]

10:00 am: **Spin orbit interaction in semiconductor heterostructures** *(Invited Paper)*, Makoto Kohda, Tohoku Univ. (Japan) . . . . . [9167-76]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 15B

LOCATION: CONV. CTR. ROOM 14B . . THU 8:00 AM TO 10:00 AM

Optical and Electrical Control

Session Chair: **Ewelina Hankiewicz,** Julius-Maximilians-Univ. Würzburg (Germany)

8:00 am: **All optical control of magnetic thin films and nanostructures** *(Invited Paper)*, Eric E. Fullerton, Univ. of California, San Diego (USA) . . . . . [9167-77]

8:30 am: **Voltage controlled barriers in tunneling anisotropic magnetoresistance devices** *(Invited Paper)*, Georg Schmidt, Martin-Luther-Univ. Halle-Wittenberg (Germany) . . . . . [9167-78]

9:00 am: **Electric-field modulation of spin-wave phase in yttrium iron garnet film** *(Invited Paper)*, Tianyu Liu, The Univ. of Iowa (USA); Xufeng Zhang, Hong Tang, Yale Univ. (USA); Michael E. Flatté, The Univ. of Iowa (USA) . . . . . [9167-79]

9:30 am: **Recent progress in III-V based ferromagnetic semiconductors: N-type (In,Fe)As and its heterostructures** *(Invited Paper)*, Masaaki Tanaka, Pham Nam Hai, Le Duc Anh, The Univ. of Tokyo (Japan) . . . . . [9167-80]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

CONFERENCE 9167

LOCATION: CONV. CTR. ROOM 15A AND CONV. CTR. ROOM 14B

Sessions 16a and 16b run concurrently.

SESSION 16A

LOCATION: CONV. CTR. ROOM 15A . . THU 11:00 AM TO 12:30 PM

Spin Pumping I

Session Chair: **Masashi Shiraishi,** Osaka Univ. (Japan)

11:00 am: **Spin pumping and inverse spin Hall effect in Platinum and other 5d metals: the essential role of spin memory loss at metalic interfaces** *(Invited Paper)*, Nicolas Reyren, III-V Lab. (France) and Ctr. National de la Recherche Scientifique (France); Juan-Carlos Rojas-Sánchez, III-V Lab. (France); Piotr Laczkowski, III-V Lab. (France) and Ctr. National de la Recherche Scientifique (France); Williams Savero, Univ. Joseph Fourier (France) and CEA-INAC (France); Jean-Philipe Attané, Commissariat à l'Énergie Atomique (France); Cyrile Deranlot, Unité Mixte de Physique CNRS/Thales (France); Matthieu Jamet, Commissariat à l'Énergie Atomique (France); Jean-Marie George, Unité Mixte de Physique CNRS/Thales (France); Laurent Vila, Commissariat à l'Énergie Atomique (France); Henri Jaffrès, Unité Mixte de Physique CNRS/Thales (France) and Forschungszentrum Jülich GmbH (Germany) . . . . . [9167-81]

11:30 am: **Spin-current transfer between YIG and Pt: effects on the dynamical properties** *(Invited Paper)*, Olivier Klein, Commissariat à l'Énergie Atomique (France) . . . . . [9167-82]

12:00 pm: **Phase-sensitive detection of spin pumping via the ac inverse spin Hall effect** *(Invited Paper)*, Mathias Weiler, National Institute of Standards and Technology (USA) . . . . . [9167-83]

Lunch/Exhibition Break . . . . . Thu 12:30 pm to 1:30 pm

SESSION 16B

LOCATION: CONV. CTR. ROOM 14B . THU 10:30 AM TO 12:30 PM

Ultrafast Optical Control and Topological Insulators I

Session Chair: **Peter Stano,** RIKEN (Japan)

10:30 am: **Ultrafast sub-diffraction all-optical control of magnetization in rare-earth transition metals samples** *(Invited Paper)*, Matteo Savoini, Radboud Univ. Nijmegen (Netherlands) . . . . . [9167-84]

11:00 am: **Ultrafast spin dynamics in metallic layers and strongly correlated oxides** *(Invited Paper)*, Ettore Carpene, Fabio Boschini, Hamoon Hedayat, Claudia Dallera, Ezio Puppin, Politecnico di Milano (Italy) . . . . . [9167-85]

11:30 am: **Weak-localization and weak antilocalization of surface electrons in topological insulators** *(Invited Paper)*, Shun-Qing Shen, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9167-86]

12:00 pm: **Weak antilocalisation in topological insulators with strong spin-orbit scattering** *(Invited Paper)*, Dimitrie Culcer, Weizhe Liu, The Univ. of New South Wales (Australia); Pierre Adroguer, Julius-Maximilians-Univ. Würzburg (Germany); Xintao Bi, Univ. of Science and Technology of China (China); Ewelina Hankiewicz, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [9167-87]

Lunch/Exhibition Break . . . . . Thu 12:30 pm to 1:30 pm

Sessions 17a and 17b run concurrently.

SESSION 17A

LOCATION: CONV. CTR. ROOM 15A . . . . THU 1:30 PM TO 3:30 PM

Spin Pumping II

Session Chair: **Antonio Azevedo,** Univ. Federal de Pernambuco (Brazil)

1:30 pm: **Room temperature spin transport in condensed matters induced by spin pumping** *(Invited Paper)*, Masashi Shiraishi, Kyoto Univ. (Japan); Yuichiro Ando, Osaka Univ. (Japan) . . . . . [9167-88]

2:00 pm: **Spin current generated by magnetization dynamics** *(Invited Paper)*, Kazuya Ando, Keio Univ. (Japan) . . . . . [9167-89]

2:30 pm: **Spin pumping and spin-orbit effects in Si and Ge** *(Invited Paper)*, Matthieu Jamet, Commissariat à l'Énergie Atomique (France); Simon Oyarzun, Fabien Rortais, Commissariat à l'Énergie Atomique (France) and Univ. Joseph Fourier (France); Juan-Carlos Rojas-Sánchez, Piotr Laczkowski, Nicolas Reyren, Unité Mixte de Physique CNRS/Thales (France); Céline Vergnaud, Laurent Vila, Jean-Philippe Attané, Cyrille Beigné, Commissariat à l'Énergie Atomique (France) and Univ. Joseph Fourier (France); Clarisse Ducruet, Crocus Technology (France); Gérard Desfonds, Serge Gambarelli, Alain Marty, Commissariat à l'Énergie Atomique (France) and Univ. Joseph Fourier (France); Henri Jaffrès, Jean-Marie George, Unité Mixte de Physique CNRS/Thales (France). . . . . [9167-90]

3:00 pm: **Probing the influence of interfaces in spin pumping** *(Invited Paper)*, P. Chris Hammel, Ohio State Univ. (USA) . . . . . [9167-91]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 17B

LOCATION: CONV. CTR. ROOM 14B . . . . THU 1:30 PM TO 3:30 PM

Topological Insulators and Majorana Fermions

Session Chair: **Fabio Pezzoli,** Univ. degli Studi di Milano-Bicocca (Italy)

1:30 pm: **Novel quantum anomalous Hall effect for spintronics** *(Invited Paper)*, Xiao Hu, National Institute for Materials Science (Japan) . . . . . [9167-92]

2:00 pm: **Unconventional superconductivity in topological insulators: in search for Majorana fermions** *(Invited Paper)*, Ewelina Hankiewicz, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [9167-93]

2:30 pm: **A quantum dot coupled to a topological nanowire: a suitable structure to study Majorana bound states** *(Invited Paper)*, Edson Vernek, Univ. de São Paulo (Brazil) and Univ. Federal de Uberlândia (Brazil); Poliana H. Penteado, Univ. de São Paulo (Brazil); Antonio C. Seridonio, Univ. Estadual Paulista (Brazil); José Carlos Egues, Univ. de São Paulo (Brazil) . . . . . [9167-94]

3:00 pm: **Direct electrical detection of spin-momentum locking in the topological insulator Bi_2Se_3** *(Invited Paper)*, Connie H. Li, Olaf M. J. van 't Erve, Jeremy T. Robinson, U.S. Naval Research Lab. (USA); Ying Liu, Lian Li, Univ. of Wisconsin-Milwaukee (USA); Berend T. Jonker, U.S. Naval Research Lab. (USA) . . . . . [9167-95]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

Sessions 18a and 18b run concurrently.

SESSION 18A

LOCATION: CONV. CTR. ROOM 15A . . . THU 4:00 PM TO 6:30 PM

Spin Pumping and Spin Noise

Session Chair: **Olivier Klein,** Commissariat à l'Énergie Atomique (France)

4:00 pm: **Experimental observation of a large ac-spin Hall effect** *(Invited Paper)*, Georg Woltersdorf, Martin-Luther Univ. Halle-Wittenberg (Germany); Christian H. Back, Dahai H. Wei, Martin Obstbaum, Univ. Regensburg (Germany) . . . . [9167-96]

4:30 pm: **Insight about spin Hall effects from spin pumping** *(Invited Paper)*, Axel Hoffmann, Wei Zhang, Argonne National Lab. (USA); Vincent Vlaminck, Univ. San Francisco de Quito (Ecuador) and Argonne National Lab. (USA); John E. Pearson, Samuel D. Bader, Ralu Divan, Argonne National Lab. (USA); Lihui Bai, Paul Hyde, Yongsheng Gui, Can-Ming Hu, Univ. of Manitoba (Canada) . . . . . [9167-97]

5:00 pm: **Generation and detection of spin currents in magnetic hybrid structures** *(Invited Paper)*, Antonio Azevedo, Obed Alves-Santos, Gabriel A. Fonseca-Guerra, Joaquim B. Mendes, Rafael O. Cunha, Univ. Federal de Pernambuco (Brazil); Roberto L. Rodriguez-Suarez, Pontificia Univ. Católica de Chile (Chile); Sergio M. Rezende, Univ. Federal de Pernambuco (Brazil) . . [9167-98]

5:30 pm: **Spin noise spectroscopy in semiconductors: from a billion down to single spins** *(Invited Paper)*, Jens Hübner, Ramin Dahbashi, Fabian Berski, J. Wiegand, Hendrik Kuhn, Michael Oestreich, Leibniz Univ. Hannover (Germany) . . . . . [9167-99]

6:00 pm: **Comparison of spin accumulation from FMR-driven spin pumping and DC spin injection within a single silicon-based MOS heterostructure** *(Invited Paper)*, Ezekiel Johnson-Helperin, The Ohio State Univ. (USA) . . [9167-100]

SESSION 18B

LOCATION: CONV. CTR. ROOM 14B . . . THU 4:00 PM TO 6:30 PM

Graphene and Chalcogenides

Session Chair: **Eric E. Fullerton,** Univ. of California, San Diego (USA)

4:00 pm: **Graphene spintronics: spin injection and proximity effects from first principles** *(Invited Paper)*, Igor Zutic, Univ. at Buffalo (USA); Guilherme M. Sipahi, Univ. de São Paulo (Brazil); Predrag Lazic, Institut Ruder Boškovic (Croatia); Roland K. Kawakami, The Ohio State Univ. (USA) . . . . . [9167-101]

4:30 pm: **Valley polarization by optical pumping on MoS_2 monolayer** *(Invited Paper)*, Baoli Liu, Gang Wang, Chuanrui Zhu, Institute of Physics (China); L. Bouet, Univ. de Toulouse (France); Bernhard Urbaszek, Institut National des Sciences Appliquées de Toulouse (France); Thierry Amand, Xavier Marie, Univ. de Toulouse (France) . . . . . [9167-102]

5:00 pm: **Spin dynamics in bilayer graphene, MoS_2, and cold atoms** *(Invited Paper)*, Ming-Wei Wu, Univ. of Science and Technology of China (China)[9167-103]

5:30 pm: **Charge and spin transport across graphene-ferromagnet junctions** *(Invited Paper)*, Enrique Cobas, Adam L. Friedman, Olaf M. J. van 't Erve, Jeremy T. Robinson, Berend T. Jonker, U.S. Naval Research Lab. (USA) . . . . . [9167-104]

6:00 pm: **Gap opening in zigzag graphene nanoribbons: direct experimental determination of the onset of spin-spin interactions of edge states** *(Invited Paper)*, Lian Li, Univ. of Wisconsin-Milwaukee (USA) . . . . . [9167-105]

CONFERENCE 9168

LOCATION: CONV. CTR. ROOM 2

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9168

Carbon Nanotubes, Graphene, and Associated Devices VII

Conference Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Young Hee Lee,** Sungkyunkwan Univ. (Korea, Republic of); **Maziar Ghazinejad,** California State Univ., Fresno (USA)

Program Committee: **Paolo Bondavalli,** Thales Research & Technology (France); **Jia Choi,** Sigma-Aldrich Co. (USA); **Costel-Sorin Cojocaru,** Ecole Polytechnique (France); **Kenji Hata,** National Institute of Advanced Industrial Science and Technology (Japan); **Mark C. Hersam,** Northwestern Univ. (USA); **Seong Chan Jun,** Yonsei Univ. (Korea, Republic of); **Horacio Lamela Rivera,** Univ. Carlos III de Madrid (Spain); **Seung Hee Lee,** Chonbuk National Univ. (Korea, Republic of); **Annick Loiseau,** ONERA (France); **Ryan McClintock,** Northwestern Univ. (USA); **William I. Milne,** Univ. of Cambridge (United Kingdom); **Philip W. T. Pong,** The Univ. of Hong Kong (Hong Kong, China); **Seunghyun Baik,** Sungkyunkwan Univ. (Korea, Republic of)

Cosponsored by ALDRICH Materials Science

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 2 . . . . . WED 1:10 PM TO 3:20 PM

Synthesis and Characterization I

Session Chair: **Maziar Ghazinejad,** California State Univ., Fresno (USA)

1:10 pm: **Biomimetic multi-length scale manufacturing in carbon** *(Invited Paper)*, Marc J. Madou, Univ. of California, Irvine (USA) . . . . . [9168-1]

1:40 pm: **Characterization of plasmon propagation in graphene on PZT substrates via infrared nano-imaging**, Michael D. Goldflam, Univ. of California, San Diego (USA); Guangxin Ni, Univ. of California, San Diego (USA) and National Univ. of Singapore (Singapore); Zhe Fei, Alexander S. McLeod, Univ. of California, San Diego (USA); Barbaros Özyilmaz, Antonio H. Castro Neto, National Univ. of Singapore (Singapore); Michael M. Fogler, Dmitri N. Basov, Univ. of California, San Diego (USA) . . . . . [9168-2]

2:00 pm: **Optical impedance transformer for transparent conducting electrode**, Ken X. Wang, Shanhui Fan, Stanford Univ. (USA) . . . . . [9168-3]

2:20 pm: **Microwave impedance microscopy (MIM) of aligned single walled carbon nanotubes: imaging electronic nanotube character at the nanoscale**, Eric Seabron, Scott MacLaren, Univ. of Illinois (USA); Slava V. Rotkin, Lehigh Univ. (USA); William L. Wilson, Univ. of Illinois (USA). . . . . [9168-4]

2:40 pm: **Mapping charge transport in chirality-selected carbon nanotube networks by electroluminescence and Raman microscopy**, Florian Jakubka, Stefan B. Grimm, Stefan P. Schiessl, Florentina Gannott, Jana Zaumseil, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9168-5]

3:00 pm: **Non-linear optical and electrical conductivity properties of carbon nanotubes (CNT) doped in sol-gel matrix**, Raz Gvishi, Soreq Nuclear Research Ctr. (Israel); Mariana Pokrass, Soreq Nuclear Research Ctr. (Israel) and Tel Aviv Univ. (Israel); Zeev Burshtein, Ben-Gurion Univ. of the Negev (Israel); Raphi Dror, Soreq Nuclear Research Ctr. (Israel); Doron Azulay, Isaac Balberg, The Hebrew Univ. of Jerusalem (Israel); Nurit Atar, Soreq Nuclear Research Ctr. (Israel) and Tel Aviv Univ. (Israel); Menachem Nathan, Tel Aviv Univ. (Israel) . . . . . [9168-13]

SESSION BREAK

LOCATION: CONF. CTR. ROOM 2 . . . . . WED 3:20 PM TO 3:50 PM

Coffee Break sponsored by **Aldrich Materials Science**

Stay for refreshments and learn more about Aldrich Materials Science and how they can assist your nano-carbon research.

SESSION 2

LOCATION: CONV. CTR. ROOM 2 . . . . . WED 3:50 PM TO 5:50 PM

Devices I

Session Chair: **Mark C. Hersam,** Northwestern Univ. (USA)

3:50 pm: **Electronics and optoelectronics based on carbon nanomaterial heterostructures** *(Invited Paper)*, Mark C. Hersam, Northwestern Univ. (USA) . . . . . [9168-6]

4:20 pm: **Femtomolar molecular detection with CNT based SERS substrate** *(Invited Paper)*, Ali Ozhan Altun, ETH Zürich (Switzerland); Tiziana C. Bond, Lawrence Livermore National Lab. (USA); Hyung Gyu Park, ETH Zürich (Switzerland) . . . . . [9168-7]

4:50 pm: **Atomically thin optoelectronics: the ideal semi-metal and the insurmountable insulator**, Nathaniel M. Gabor, Univ. of California, Riverside (USA) . . . . . [9168-8]

5:10 pm: **Graphene nanoobjects (GNOs) tailored by interference lithography**, Alireza Kazemi, The Univ. of New Mexico (USA); Xiang He, Center for High Technology Materials, University of New Mexico (USA); Javad Ghasemi, The Univ. of New Mexico (USA); Seyed Hamidreza Alaie, Mechanical Engineering, University of New Mexico (USA); Noel Mayur Dawson, Nanoscience and Microsystems Engineering, University of New Mexico (USA); Brianna Klein, Terefe Habteyes, Steven R. J. Brueck, Center for High Technology Materials, University of New Mexico (USA); Sanjay Krishna, The Univ. of New Mexico (USA) . . . . . [9168-9]

5:30 pm: **Formation of Fabry-Perot cavity in one-dimensional and two-dimensional GaAs nanostructures**, Shermin Arab, The Univ. of Southern California (USA); P. Duke Anderson, Univ. of California, Los Angeles (USA); Maoqing Yao, Chun-Yung Chi, Michelle L. Povinelli, P. Daniel Dapkus, Stephen B. Cronin, The Univ. of Southern California (USA). . . . . [9168-32]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Single-wall carbon nanotube using electrophoresis to separate semiconducting and metallic types, Hsi-Chao Chen, National Yunlin Univ. of Science and Technology (Taiwan); Chih-Feng Yen, Chang Gung Memorial Hospital (Taiwan); Guan-Jhen Chen, National Yunlin Univ. of Science and Technology (Taiwan); Tzu-Ti Hsiao, Chang Gung Memorial Hospital (Taiwan); Kuo-Ting Huang, Wan-Ting Yang, National Yunlin Univ. of Science and Technology (Taiwan) . . . . . [9168-10]

Fabrication and characterization of 3D gaphene composited metal oxide for energy storage device, Duyoung Choi, Cihan Kurua, Serdar Yavuz, Sungho Jin, Univ. of California, San Diego (USA) . . . . . [9168-25]

Ab-initio analysis of carbon nanotube based ammonia gas sensor, Anurag Srivastava, Vikash Sharma, Kamalpreet Kaur, Indian Institute of Information Technology and Management (India); Rajeev Ahuja, Uppsala Univ. (Sweden); Vepa K. Rao, Defence Research & Development Establishment (India) . . . . . [9168-26]

Solar powered UAV using graphene supercapacitors capable of 24/7 flight, Charles Welch, Daniel Roseguo, James Chavez, Daneilla Alvarez, Art Lomibao, Sean Matthews, California State Polytechnic Univ., Pomona (USA) . . . . . [9168-27]

Thermal dissipation of photonic crystal defect cavity by the single-layer graphene, Min-Hsiung Shih, Academia Sinica (Taiwan) . . . . . [9168-28]

Mechanical properties and applications of nano carbon-based materials, Shervin Zoghi, California State Univ., Fresno (USA); Davood Askari, Wichita State Univ. (USA); Maziar Ghazinejad, California State Univ., Fresno (USA) . . . . [9168-31]

THURSDAY 21 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 2 . . . . . THU 8:30 AM TO 10:40 AM

Synthesis and Characterization II

Session Chair: **Maziar Ghazinejad,** California State Univ., Fresno (USA)

8:30 am: **Large-scale characterization of graphene and 2D materials** *(Invited Paper)*, Maziar Ghazinejad, California State Univ., Fresno (USA) . . . . . [9168-11]

9:00 am: **Ultrafast carrier dynamics in graphene quantum dots**, Hyojung Kim, Jihee Kim, Sungkyunkwan Univ. (Korea, Republic of); Junichiro Kono, Pulickel M. Ajayan, Rice Univ. (USA); Mun Seok Jeong, Sungkyunkwan Univ. (Korea, Republic of) . . . . . [9168-12]

9:20 am: **Titanium carbide coated graphite: a unique material combination**, Vilupanur A. Ravi, Mehrdad Haghi, California State Polytechnic Univ., Pomona (USA) . . . . . [9168-30]

9:40 am: **Semiconducting 2D TMDCs: synthesis and characterization**, Zafer Mutlu, Mihrimah Ozkan, Cengiz S. Ozkan, Univ. of California, Riverside (USA) . . . . . [9168-14]

10:00 am: **Simulation of Maxwell-Dirac equations in graphene nanostructures**, Xuecang Zhang, Huawei Technologies Co., Ltd.. (China). . . . . [9168-15]

10:20 am: **Electron dynamics in graphite studied by femtosecond two-color pump-probe spectroscopy**, Seungwon Seo, Chungnam National Univ. (Korea, Republic of); Ho Jong Kim, Su Yong Jeong, Korea Research Institute of Standards and Science (Korea, Republic of); Kwang-Jun Ahn, Seoul National Univ. (Korea, Republic of); Ki-Ju Yee, Chungnam National Univ. (Korea, Republic of) . . [9168-16]

Coffee Break . . . . . Thu 10:40 am to 11:00 am

SESSION 4

LOCATION: CONV. CTR. ROOM 2 . . . . . THU 11:00 AM TO 12:50 PM

Devices II

Session Chair: **Maziar Ghazinejad,** California State Univ., Fresno (USA)

11:00 am: **Graphene materials for advanced energy storage** *(Invited Paper)*, Cengiz S. Ozkan, Univ. of California, Riverside (USA) . . . . . [9168-17]

11:30 am: **Thermoelectric, electro-thermal, and opto-thermal characterization of thin film CNT devices consisting of dense, aligned, and macroscopically long SWCNTs**, Kristopher J. Erickson, Sandia National Labs. (USA); Xiaowei He, Rice Univ. (USA); A. Alec Talin, Bernice Mills, Sandia National Labs. (USA); Robert H. Hauge, Junichiro Kono, Rice Univ. (USA); François Léonard, Sandia National Labs. (USA) . . . . . [9168-18]

11:50 am: **Intrinsic regime of exciton photophysics in ultra-clean carbon nanotubes bridging an air gap**, Ibrahim Sarpkaya, Stevens Institute of Technology (USA); Zhengyi Zhang, Columbia Univ. (USA); William Walden-Newman, Stevens Institute of Technology (USA); James Hone, Chee Wei Wong, Columbia Univ. (USA); Stefan Strauf, Stevens Institute of Technology (USA) . . . . . [9168-19]

12:10 pm: **Pillared graphene nanostructure for ultrafast charge and discharge energy storage devices**, Wei Wang, Mihrimah Ozkan, Cengiz S. Ozkan, Univ. of California, Riverside (USA) . . . . . [9168-20]

12:30 pm: **Cu surface morphology affects on self-limiting single layer growth of graphene films by chemical vapor deposition**, Isaac Ruiz, Zafer Mutlu, Robert Ionescu, Mihrimah Ozkan, Lauro Zavala, Cengiz S. Ozkan, Univ. of California, Riverside (USA) . . . . . [9168-33]

Lunch/Exhibition Break . . . . . Thu 12:50 pm to 2:00 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 2 . . . . . THU 2:00 PM TO 3:40 PM

Devices III

Session Chair: **Hamed Hosseini Bay,** Univ. of California, Riverside (USA)

2:00 pm: **Cross-linked carbon nanotube thick films**, Gregory A. Konesky, K-Plasma Ltd. (USA) . . . . . [9168-21]

2:20 pm: **Nanoporous graphene sponge for supercapacitor electrodes**, Hamed Hosseini Bay, Daisy Patino, Zafer Mutlu, Paige Romero, Mihrimah Ozkan, Cengiz S. Ozkan, Univ. of California, Riverside (USA). . . . . [9168-22]

2:40 pm: **Enhanced D- and G-band signals from silver-dressed carbon nanotubes**, Paul Dawson, Queen's Univ. Belfast (United Kingdom); Jose A. Duenas, Univ. de Huelva (Spain); William I. Milne, Univ. of Cambridge (United Kingdom); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9168-23]

3:00 pm: **Nano porous graphene room temperature field effect transistor fabricated using self-assembled mask technique**, Duyoung Choi, Cihan Kurua, Sungho Jin, Univ. of California, San Diego (USA) . . . . . [9168-24]

3:20 pm: **A comparative study of thermal interface materials with graphene, carbon nanotube, and boron nitride fillers**, Fariborz Kargar, Univ. of California, Riverside (USA); S. Legedza, Quantum Seed LLC (USA); R. Salgado, P. Goli, Univ. of California, Riverside (USA); J. Renteria, Quantum Seed LLC (USA); Alexander A. Balandin, Univ. of California, Riverside (USA) and Quantum Seed LLC (USA) . . . . . [9168-29]

CONFERENCE 9169

LOCATION: CONV. CTR. ROOM 4

Sunday–Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9169

Nanoimaging and Nanospectroscopy II

Conference Chairs: **Prabhat Verma,** Osaka Univ. (Japan); **Alexander Egner,** Laser-Lab. Göttingen e.V. (Germany)

Program Committee: **Joerg Bewersdorf,** Yale School of Medicine (USA); **Alberto Diaspro,** Istituto Italiano di Tecnologia (Italy); **Christian Eggeling,** Univ. of Oxford (United Kingdom); **Joerg Enderlein,** Georg-August-Univ. Göttingen (Germany); **Katsumasa Fujita,** Osaka Univ. (Japan); **Stefan W. Hell,** Max-Planck-Institut für Biophysikalische Chemie (Germany); **Samuel Hess,** Univ. of Maine (USA); **Bo Huang,** Univ. of California, San Francisco (USA); **Satoshi Kawata,** Osaka Univ. (Japan); **Alfred J. Meixner,** Eberhard Karls Univ. Tübingen (Germany); **Peter Nordlander,** Rice Univ. (USA); **Bruno Pettinger,** Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); **Markus B. Raschke,** Univ. of Colorado at Boulder (USA); **Bin Ren,** Xiamen Univ. (China); **Vahid Sandoghdar,** Max-Planck-Institut für die Physik des Lichts (Germany); **Markus Sauer,** Julius-Maximilians-Univ. Würzburg (Germany); **Yung Doug Suh,** Korea Research Institute of Chemical Technology (Korea, Republic of); **Din Ping Tsai,** National Taiwan Univ. (Taiwan); **Renato Zenobi,** ETH Zürich (Switzerland); **Xiaowei Zhuang,** Harvard Univ. (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 4 . . . . . SUN 1:30 PM TO 3:20 PM

Super Resolution Techniques

Session Chair: **Alexander Egner,** Laser-Lab. Göttingen e.V. (Germany)

1:30 pm: **Sub-Abbe resolution in STED lithography and bio-applications** *(Invited Paper)*, Thomas A. Klar, Johannes Kepler Univ. Linz (Austria) . . . . . [9169-1]

2:00 pm: **Nanoparticle-assisted STED, theory, and experimental demonstration** *(Invited Paper)*, Yannick Sonnefraud, Institut NÉEL (France); Yonatan Sivan, Ben-Gurion Univ. of the Negev (Israel); Hugo G. Sinclair, Christopher W. Dunsby, Mark A. Neil, Paul M W. French, Stefan A. Maier, Imperial College London (United Kingdom) . . . . . [9169-2]

2:30 pm: **Breaking diffraction limit: integrated hybird-superlens hyperlens for diffraction limit** *(Invited Paper)*, Din Ping Tsai, Academia Sinica (Taiwan) . [9169-3]

3:00 pm: **Conical diffraction as a versatile building block to implement new imaging modalities for superresolution in fluorescence microscopy**, Clément Fallet, Julien Caron, Stephane Oddos, Bioaxial (France); Jean-Yves Tinevez, Institut Pasteur (France); Lionel Moisan, René Descartes Univ. (France); Gabriel Y. Sirat, Philippe O. Braitbart, Bioaxial (France); Spencer L. Shorte, Institut Pasteur (France) . . . . . [9169-4]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 4 . . . . . SUN 3:50 PM TO 5:30 PM

Surface-Enhanced Spectroscopy I

Session Chair: **Prabhat Verma,** Osaka Univ. (Japan)

3:50 pm: **Correlation studies between localized surface plasmons and surface-enhanced Raman scattering of heterodimeric nanostructures with ~0.9-nm nanogap at the single-molecule level** *(Invited Paper)*, Haemi Lee, Korea Research Institute of Chemical Technology (Korea, Republic of); Yung Doug Suh, Korea Research Institute of Chemical Technology (Korea, Republic of) and Sungkyunkwan Univ. (Korea, Republic of) . . . . . [9169-5]

4:20 pm: **3D plasmonic nano imaging and spectroscopy of a living cell with a gold nanoparticle** *(Invited Paper)*, Satoshi Kawata, Katsumasa Fujita, Nicholas I. Smith, Osaka Univ. (Japan); Jun Ando, RIKEN (Japan); Kazuki Bando, Osaka Univ. (Japan); Kai-Chih Huang, National Taiwan Univ. (Taiwan) . . . . . [9169-6]

4:50 pm: **Residual pesticide detection on food with particle-enhanced Raman scattering**, Bikas Ranjan, Huang LiChuan, Kyoko Masui, Yuika Saito, Prabhat Verma, Osaka Univ. (Japan) . . . . . [9169-7]

5:10 pm: **Multi-wavelength surface-enhanced Raman scattering metasurface with broadband absorption over large area**, Nan Zhang, Kai Liu, Haomin Song, Xie Zeng, Dengxin Ji, Qiaoqiang Gan, Univ. at Buffalo (USA). . . . . [9169-8]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA). . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 4 . . . . . MON 1:00 PM TO 3:10 PM

Super Resolution Microscopy I

Session Chair: **Thomas A. Klar,** Johannes Kepler Univ. Linz (Austria)

1:00 pm: **Superresolution microscopy through thick tissue using adaptive optics** *(Invited Paper)*, Brian R. Patton, Robert Vrees, Daniel Burke, Univ. of Oxford (United Kingdom); Travis J. Gould, Joerg Bewersdorf, Yale School of Medicine (USA); Martin J. Booth, Univ. of Oxford (United Kingdom) . . . . . [9169-9]

1:30 pm: **Adaptive optics STED microscopy in thick biological tissue** *(Invited Paper)*, Mary Grace M. Velasco, Travis J. Gould, Edward Allgeyer, Emil Kromann, Yale Univ. (USA); Daniel Burke, Martin J. Booth, Univ. of Oxford (United Kingdom); Joerg Bewersdorf, Yale Univ. (USA) . . . . . [9169-10]

2:00 pm: **Size matters: STED imaging of functional neuroanatomy** *(Invited Paper)*, Valentin Nägerl, Univ. Bordeaux Segalen (France) and CNRS (France) . . . . . [9169-11]

2:30 pm: **Three-dimensional optical nanoscopy with opposing lenses**, Alexander Egner, Laser-Lab. Göttingen e.V. (Germany) . . . . . [9169-12]

2:50 pm: **Parallelized STED nanoscopy with optical lattices**, Bin Yang, Jean-Baptiste Trebbia, Brahim Lounis, Institut d'Optique Graduate School (France) . . . . . [9169-13]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 4 . . . . .MON 3:40 PM TO 6:20 PM

Tip-Enhanced Spectroscopy/Microscopy

Session Chair: **Haemi Lee,** Korea Research Institute of Chemical Technology (Korea, Republic of)

3:40 pm: **In-situ plasmon-driven chemical reactions revealed by high vacuum tip-enhanced Raman spectroscopy** *(Invited Paper)*, Hongxing Xu, Institute of Physics (China) . . . . . [9169-14]

4:10 pm: **Extending the capabilities of scanning near-field optical microscopy** *(Invited Paper)*, Anke Horneber, Marius F. van den Berg, Jan Rogalski, Kai Braun, Alfred J. Meixner, Dai Zhang, Eberhard Karls Univ. Tübingen (Germany) . [9169-20]

4:40 pm: **Tip-enhanced Raman investigation of "x-shaped" carbon nanotube**, Prabhat Verma, Yoshito Okuno, Yuika Saito, Satoshi Kawata, Osaka Univ. (Japan). . . . . [9169-15]

5:00 pm: **The origin of interferometric effect in scattering near-field scanning optical microscopy**, Yan Li, Nan Zhou, Purdue Univ. (USA); Edward C. Kinzel, Missouri Univ. of Science and Technology (USA); Xifeng Ren, Univ. of Science and Technology of China (China); Xianfan Xu, Purdue Univ. (USA) . . . . . [9169-16]

5:20 pm: **Aperture-SNOM reveals plasmonic magnetic near-fields**, Niels Verellen, Katholieke Univ. Leuven (Belgium) and IMEC (Belgium); Denitza Denkova, Katholieke Univ. Leuven (Belgium); Alejandro V. Silhanek, Univ. de Liège (Belgium); Ventsislav K. Valev, Univ. of Cambridge (United Kingdom); Pol Van Dorpe, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium); Victor V. Moshchalkov, Katholieke Univ. Leuven (Belgium) . . . . . [9169-17]

5:40 pm: **Development of a plasmonic tip for the localized studies of magnetic materials**, Joshua F. Einsle, Alexander Amy, Queen's Univ. Belfast (United Kingdom); Thomas H. J. Loughran, Euan Hendry, Robert J. Hicken, Univ. of Exeter (United Kingdom); Robert M. Bowman, Paul Dawson, Queen's Univ. Belfast (United Kingdom) . . . . . [9169-18]

6:00 pm: **Effect of metal tip localized surface-plasmon mode on exciton transport in and radiation emission properties in carbon nanotubes**, Andrei Piryatinski, Oleksiy Roslyak, Los Alamos National Lab. (USA); Charles Cherqui, Univ. of Washington (USA); David H. Dunlap, The Univ. of New Mexico (USA) . . . . . [9169-19]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 4 . . . . TUE 8:20 AM TO 10:00 AM

Super Resolution Microscopy II

Session Chair: **Peter Nordlander,** Rice Univ. (USA)

8:20 am: **Sensitivity, resolution, and speed in detection and tracking of biomolecules** *(Invited Paper)*, Jens Ehrig, Marek Piliarik, Susann Spindler, Siegfried Weisenburger, Vahid Sandoghdar, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9169-21]

8:50 am: **Nanoscale imaging of neurotoxic proteins** *(Invited Paper)*, Clemens Kaminski, Univ. of Cambridge (United Kingdom) . . . . . [9169-22]

9:20 am: **Optimization of image acquisition parameters for high-speed single molecule switching nanoscopy**, Yu Lin, Joerg Bewersdorf, Jane Long, Fang Huang, Whitney Duim, Yale Univ. (USA) . . . . . [9169-23]

9:40 am: **High speed fluorescence photoactivation localization microscopy imaging**, Andrew J. Nelson, Mudalige S. Gunewardene, Samuel T. Hess, Univ. of Maine (USA). . . . . [9169-24]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 4 . . . .TUE 10:30 AM TO 12:20 PM

Surface-Enhanced Spectroscopy II

Session Chairs: **Prabhat Verma,** Osaka Univ. (Japan); **Alexander Egner,** Laser-Lab. Göttingen e.V. (Germany)

10:30 am: **Plasmon enhanced spectroscopies** *(Invited Paper)*, Peter Nordlander, Rice Univ. (USA) . . . . . [9169-25]

11:00 am: **Surface enhancement in UV with variety of nanostructures** *(Invited Paper)*, Yuika Saito, Satoshi Kawata, Osaka Univ. (Japan); Atsushi Tagushi, Tokyo Univ. of Agriculture and Technology (Japan); Yasuaki Kumamoto, RIKEN (Japan); Mitsuhiro Honda, Prabhat Verma, Osaka Univ. (Japan) . . . . . [9169-26]

11:30 am: **Optical antennas for nanoscale materials characterization** *(Invited Paper)*, Joanna Atkin, Univ. of Colorado at Boulder (USA) . . . . . [9169-28]

12:00 pm: **Long range plasmon enhanced Raman and fluorescence spectroscopy using quasi free-standing Au nanorod and nanotube arrays within different environments**, Signe Damm, Frances Lordan, Univ. College Dublin (Ireland); Antony P. Murphy, Robert J. Pollard, Queen's Univ. Belfast (United Kingdom); James H. Rice, Univ. College Dublin (Ireland) . . . . . [9169-27]

Lunch Break . . . . . Tue 12:20 pm to 1:40 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 4 . . . . . .TUE 1:40 PM TO 3:00 PM

Super Resolution Microscopy III

Session Chair: **Clemens Kaminski,** Univ. of Cambridge (United Kingdom)

1:40 pm: **Super-resolution confocal micrsocopy using optical saturation** *(Invited Paper)*, Katsumasa Fujita, Nicholas I. Smith, Osaka Univ. (Japan); Shi-Wei Chu, National Taiwan Univ. (Taiwan); Satoshi Kawata, Osaka Univ. (Japan)[9169-29]

2:10 pm: **Optical nanoscopy of a living cell** *(Invited Paper)*, Balpreet S. Ahluwalia, Univ. of Tromsø (Norway); Deanna L. Wolfson, Frank Y. S. Chuang, Univ. of California, Davis (USA); Thomas R. Huser, Univ. Bielefeld (Germany) . . . . [9169-30]

2:40 pm: **Localized plasmon assisted structured illumination microscopy**, Joseph L. Ponsetto, Feifei Wei, Zhaowei Liu, Univ. of California, San Diego (USA) . . . . . [9169-31]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 4 . . . . . TUE 3:30 PM TO 4:50 PM

Other Spectroscopies at Nanoscale

Session Chair: **Katsumasa Fujita,** Osaka Univ. (Japan)

3:30 pm: **Polarization analysis of the liquor films autofluorescence images to diagnose the time of death**, Taras M. Boychuk, Bukovinian State Medical Univ. (Ukraine) . . . . . [9169-32]

3:50 pm: **Tunable phonon polaritons in van der Waals crystal of boron nitride**, Siyuan Dai, Zhe Fei, Univ. of California, San Diego (USA); Qiong Ma, Massachusetts Institute of Technology (USA); Aleksandr S. Rodin, Boston Univ. (USA); Martin Wagner, Alexander S. McLeod, Mengkun Liu, Univ. of California, San Diego (USA); Will Gannett, Will Regan, Univ. of California, Berkeley (USA); Kenji Watanabe, Takashi Taniguchi, National Institute for Materials Science (Japan); Gerardo Dominguez, California State Univ., San Marcos (USA); Mark Thiemens, Univ. of California, San Diego (USA); Antonio H. Castro Neto, National Univ. of Singapore (Singapore); Alex Zettl, Univ. of California, Berkeley (USA); Fritz Keilmann, Ludwig-Maximilians-Univ. München (Germany); Pablo Jarillo-Herrero, Massachusetts Institute of Technology (USA); Michael M. Fogler, Dmitri N. Basov, Univ. of California, San Diego (USA). . . . . [9169-33]

4:10 pm: **Gas-metallic nanoparticle surface interaction characterized with in situ electron energy loss spectroscopy**, John M. Kohoutek, Pin Ann Lin, National Institute of Standards and Technology (USA) and Univ. of Maryland, College Park (USA); Jonathan Winterstein, Henri Lezec, Renu Sharma, National Institute of Standards and Technology (USA) . . . . . [9169-34]

4:30 pm: **Fourier-Stokes polarymetry of linear and circular birefringence of woman reproduction system tissues**, Artem Karachevtsev, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9169-35]

CONFERENCE 9170

LOCATION: CONV. CTR. ROOM 11A

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9170

Nanoengineering: Fabrication, Properties, Optics, and Devices XI

Conference Chairs: **Eva M. Campo,** Bangor Univ. (United Kingdom); **Elizabeth A. Dobisz,** HGST (USA); **Louay A. Eldada,** Quanergy, Inc. (USA)

Program Committee: **André-Jean Attias,** Univ. Pierre et Marie Curie (France); **Irene Fernandez-Cuesta,** Lawrence Berkeley National Lab. (USA); **Sarah Haigh,** The Univ. of Manchester (United Kingdom); **Sondra Hellstrom,** California Institute of Technology (USA); **Ghassan E. Jabbour,** Arizona State Univ. (USA); **Robert Magnusson,** The Univ. of Texas at Arlington (USA); **Balaji U. Panchapakesan,** Univ. of Louisville (USA); **Won Park,** Univ. of Colorado at Boulder (USA); **Dorota A. Pawlak,** Institute of Electronic Materials Technology (Poland); **Jun Tanida,** Osaka Univ. (Japan); **Richard Tiberio,** Stanford Univ. (USA); **Chee Wei Wong,** Columbia Univ. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 11A . . . TUE 8:00 AM TO 10:30 AM

Nanophotonics for Energy

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

8:00 am: **High-sensitivity silicon nanowire phototransistors** *(Invited Paper)*, Siew Li Tan, Xingyan Zhao, Yaping Dan, Univ. of Michigan-Shanghai Jiao Tong Univ. Joint Institute (China). . . . . [9170-1]

8:30 am: **Thermo-active behaviour of ethylene vinyl-acetate | MWCNT composites examined by in situ NEXAFS**, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9170-2]

8:50 am: **Light extraction enhancement of vertical LED by growing ZnO nano-rods on tips of n-GaN pyramids and polarization dependent measurement of nano-structure**, Yen-Ju Wu, Cheng-Yi Liu, Chin-Han Liao, National Central Univ. (Taiwan) . . . . . [9170-3]

9:10 am: **PbS quantum dot sensitized InGaZnO metal oxide hybrid phototransistor for near infrared detection**, Do Kyung Hwang, Korea Institute of Science and Technology (Korea, Republic of); Hee Sung Lee, Yonsei Univ. (Korea, Republic of); Yun Jae Lee, Won Kook Choi, Korea Institute of Science and Technology (Korea, Republic of); Seongil Im, Yonsei Univ. (Korea, Republic of) . . . . . [9170-4]

9:30 am: **Heterojunction of nano-poly (O-toluidine) on silicon nanowires is investigated as a candidate heterojunction diode**, Salah E. El-Zohary, Univ. of Tokushima (Japan) and Tanta Univ. (Egypt); Mohamed Shenashen, Akinori Tsuji, Toshihiro Okamoto, Masanobu Haraguchi, Univ. of Tokushima (Japan) . . . [9170-5]

9:50 am: **Transparent self-assembled InGaZnO thin film transistors with SiO_2-based solid electrolyte dielectric**, Yuanjie Li, Xi'an Jiaotong Univ. (China); Yanghui Liu, Ningbo Institute of Materials Technology & Engineering (China); Wenci Sun, Xi'an Jiaotong Univ. (China) . . . . . [9170-6]

10:10 am: **Characteristic temperature analysis for PbSe/PbSrSe multiple quantum well structure**, Majed Khodr, American Univ. of Ras Al Khaimah (United Arab Emirates) . . . . . [9170-7]

Coffee Break . . . . . Tue 10:30 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 11A . . .TUE 10:50 AM TO 12:30 PM

Nanomechanical Nanofluidic Devices

Session Chair: **Eva M. Campo,** Bangor Univ. (United Kingdom)

10:50 am: **Mechanical behavior of microelectromechanical microshutters**, Devin E. Burns, Justin S. Jones, Mary J. Li, NASA Goddard Space Flight Ctr. (USA) . . . . . [9170-8]

11:10 am: **Nanotube liquid crystal-elastomers: birefringence, flexible energy conversion, and photomechanical response**, Balaji U. Panchapakesan, Xiaoming Fan, Univ. of Louisville (USA) . . . . . [9170-9]

11:30 am: **Photothermal nanopositioners based on graphene composites**, Balaji U. Panchapakesan, Univ. of Louisville (USA) . . . . . [9170-10]

11:50 am: **Progress towards a MEMS tunable infrared filter using porous silicon**, Dmitry A. Kozak, National Research Council (USA); Todd H. Stievater, Marcel W. Pruessner, William S. Rabinovich, U.S. Naval Research Lab. (USA) . . . . . [9170-11]

12:10 pm: **Mid-infrared opto-nanofluidics for label-free on-chip sensing**, Pao T. Lin, Massachusetts Institute of Technology (USA); Sen W. Kwok, Hao-Yu Lin, Harvard Univ. (USA); Vivek Singh, Lionel C. Kimerling, Massachusetts Institute of Technology (USA); George M. Whitesides, Harvard Univ. (USA); Anuradha Agarwal, Massachusetts Institute of Technology (USA) . . . . . [9170-12]

Lunch/Exhibition Break . . . . . Tue 12:30 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 11A . . . . . TUE 1:30 PM TO 3:30 PM

Nanostructure Properties and Devices

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

1:30 pm: **Keeping x-ray eyes on nanoparticles synthesis in the solution: in-situ diffraction and absorption studies** *(Invited Paper)*, Dorota Koziej, ETH Zürich (Switzerland) . . . . . [9170-13]

2:00 pm: **Optical characterization of CMOS compatible micro optics fabricated by mask-based and mask-less hybrid lithography**, Sunglin Wang, Chris Summitt, Lee Johnson, Melissa A. Zaverton, Thomas D. Milster, Yuzuru Takashima, The Univ. of Arizona (USA) . . . . . [9170-14]

2:20 pm: **High efficiency photonic hierarchical nanostructures self-assembled from the gas phase**, Luca Passoni, Luigino Criante, Istituto Italiano di Tecnologia (Italy) and Politecnico di Milano (Italy); Francesco Fumagalli, Istituto Italiano di Tecnologia (Italy); Francesco Scotognella, Istituto Italiano di Tecnologia (Italy) and Politecnico di Milano (Italy); Guglielmo Lanzani, Fabio Di Fonzo, Istituto Italiano di Tecnologia (Italy) . . . . . [9170-15]

2:40 pm: **Near-edge x-ray absorption fine structure studies of electrospun poly(dimethylsiloxane)/poly(methyl methacrylate)/multiwall carbon nanotube composites** *(Invited Paper)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9170-16]

3:10 pm: **Rate-dependent viscoelastic contact of polymeric materials in transfer printing**, Seyoung Im, Jaeshin Park, KAIST (Korea, Republic of); Jae-Hyun Kim, Hak-Joo Lee, Korea Institute of Machinery & Materials (Korea, Republic of) . . . . . [9170-17]

Coffee Break . . . . . Tue 3:30 pm to 3:50 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 11A . . . . .TUE 3:50 PM TO 5:30 PM

Subwavelength Structures

Session Chair: **Elizabeth A. Dobisz,** HGST (USA)

3:50 pm: **Power delivery and self-heating in plasmonic nanoscale devices**, Nan Zhou, Luis M. Traverso, Xianfan Xu, Purdue Univ. (USA) . . . . . [9170-18]

4:10 pm: **Directly deposited plasmonic metasurface for omnidirectional visible super absorption**, Kai Liu, Xie Zeng, Univ. at Buffalo (USA); Suhua Jiang, Fudan Univ. (China); Dengxin Ji, Haomin Song, Nan Zhang, Qiaoqiang Gan, Univ. at Buffalo (USA) . . . . . [9170-19]

4:30 pm: **Effects of different wetting layers on the growth of smooth ultra-thin silver thin films**, Chuan Ni, Piyush J. Shah, Andrew M. Sarangan, Univ. of Dayton (USA) . . . . . [9170-20]

4:50 pm: **Simulation of a film of random particulate medium containing aggregates of metal nanospheres**, Saswatee Banerjee, Sumitomo Chemical Co., Ltd. (Japan) . . . . . [9170-22]

5:10 pm: **Spin Hall effect of light reflected from an air-magnetic thin film interface**, Jinli Ren, Yan Li, Yida Lin, Yi Qin, Rui Wu, Jianbo Yang, Yun-Feng Xiao, Hong Yang, Qihuang Gong, Peking Univ. (China). . . . . [9170-23]

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 11A . . WED 8:00 AM TO 10:20 AM

Nanophotonic Devices

Session Chair: **Elizabeth A. Dobisz,** HGST (USA)

8:00 am: **Monolithic mode-locked lasers based on high finesse silicon ring resonators**, Milad Akhlaghi Bouzan, William Hayenga, Peter J. Delfyett Jr., Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9170-24]

8:20 am: **Optimization of mode pattern and transmission analysis of GaN LED with ITO grating**, Juliet Chico, Gabriela Aleman, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA) . . . . . [9170-25]

9:00 am: **Construction of germanium nanowire and nanotube arrays by electrodeposition from an ionic liquid**, Jiupeng Zhao, Xusong Liu, Yao Li, Harbin Institute of Technology (China) . . . . . [9170-27]

9:20 am: **Multi-cell design for III-N avalanche photodiodes**, Puneet Suvarna, Jack Bulmer, Jeffrey M. Leathersich, Jonathan Marini, Fatemah S. Shahedipour-Sandvik, SUNY College of Nanoscale Science and Engineering (USA); L. Douglas Bell, John Hennessy, Shouleh Nikzad, Jet Propulsion Lab. (USA) and California Institute of Technology (USA) . . . . . [9170-28]

9:40 am: **Enhancement of laser damage resistance of high- and anti-reflective optical multilayers by tailoring the electric field distribution and post annealing**, Gülgün H. Aydogdu, Haci Batman, Alp Eren Sinan Özhan, ASELSAN Inc. (Turkey). . . . . [9170-29]

10:00 am: **VLSI photonics for lidar sensors**, Louay A. Eldada, Quanergy Systems, Inc. (USA). . . . . [9170-30]

Coffee Break . . . . . .Wed 10:20 am to 10:40 am

SESSION 6

LOCATION: CONV. CTR. ROOM 11A . . WED 10:40 AM TO 12:10 PM

Nanofabrication of Optical Elements

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

10:40 am: **Ultra-high aspect ratio nanostructure fabrication using vertical directionality controlled metal assisted chemical etching** *(Invited Paper)*, Anne Sakdinawat, Chieh Chang, SLAC National Accelerator Lab. (USA); Richard C. Tiberio, Stanford Univ. (USA); Michael J. Rooks, Yale Univ. (USA); Raymond Leung, Carl Zeiss X-ray Microscopy, Inc. (USA); Johanna L. Nelson Weker, SLAC National Accelerator Lab. (USA) . . . . . [9170-31]

11:10 am: **Nano fabrication of compound bifocal zone plate for x-ray optics**, Armen V. Kuyumchyan, American Nanoscience and Advanced Medical Equipment, Inc. (USA); Alexey Y. Suvorov, Japan Synchrotron Radiation Research Institute (Japan). . . . . [9170-32]

11:30 am: **A spiral focusing vortex lens: shaping scalable orbital angular momentum of light**, Hong Liu, A*STAR Institute of Materials Research and Engineering (Singapore); Muhammad Q. Mehmood, Kun Huang, National Univ. of Singapore (Singapore); Karen L. Ke, A*STAR Institute of Materials Research and Engineering (Singapore); Huapeng Ye, National Univ. of Singapore (Singapore); Patrice Genevet, Harvard School of Engineering and Applied Sciences (USA); Mingsheng Zhang, A*STAR - Data Storage Institute (Singapore); Cheng-Wei Qiu, National Univ. of Singapore (Singapore); Jinghua Teng, A*STAR Institute of Materials Research and Engineering (Singapore) . . . . . [9170-33]

11:50 am: **Omnidirectional wavelength selective emitters/absorbers based on dielectric-filled anti-reflection coated two-dimensional metallic photonic crystals**, Yi Xiang Yeng, Jeffrey Chou, Massachusetts Institute of Technology (USA); Veronika Rinnerbauer, Johannes Kepler Univ. Linz (Austria); Veronika Stelmakh, Yichen Shen, Sang-Gook Kim, Massachusetts Institute of Technology (USA); John D. Joannopoulos, MIT Institute for Soldier Nanotechnologies (USA); Marin Soljacic, Ivan Celanovic, Massachusetts Institute of Technology (USA) . . . . . [9170-34]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:20 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 11A . . . . WED 1:20 PM TO 2:50 PM

Innovative Patterning

Session Chair: **Won Park,** Univ. of Colorado at Boulder (USA)

1:20 pm: **A versatile platform for sp2-carbon substrate non-covalent functionalization by supramolecular self-assembly: towards applications in nanophotonics** *(Invited Paper)*, André-Jean Attias, Ping Du, David Kreher, Fabrice Mathevet, Univ. Pierre et Marie Curie (France); Fabrice Charra, Commissariat à l'Énergie Atomique (France) . . . . . [9170-35]

1:50 pm: **Laser-assisted biosynthesis for noble nanoparticles production**, Nickolai V. Kukhtarev, Tatiana V. Kukhtareva, Vernessa M. Edwards, Sherita Moses, Alabama A&M Univ. (USA) . . . . . [9170-36]

2:10 pm: **Fabrication of nano-imprinted metal wiregrid polarizers using SU8 as an intermediate film**, Junxin Wang, Andrew M. Sarangan, Univ. of Dayton (USA) . . . . . [9170-37]

2:30 pm: **Breaking the diffraction limit with photoinhibited superresolution lithography**, Darren L. Forman, Robert R. McLeod, Univ. of Colorado at Boulder (USA) . . . . . [9170-38]

Coffee Break . . . . . .Wed 2:50 pm to 3:30 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 11A . . . .WED 3:30 PM TO 5:30 PM

Nanoparticle Properties

Session Chair: **Eva M. Campo,** Bangor Univ. (United Kingdom)

3:30 pm: **Computational analysis of noble ZnO/MgO branched nanorod structure on V-LED with finite-difference time-domain method**, Jae Yong Park, HyungWon Cho, Pohang Univ. of Science and Technology (Korea, Republic of); Byeong-Uk Ye, Jeong Min Baik, Ulsan National Institute of Science and Technology (Korea, Republic of); Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of). . . . . [9170-40]

3:50 pm: **Polarized light emission by deposition of aligned semiconductor nano rods**, Mohammad Mohammadimasoudi, Lieven Penninck, Univ. Gent (Belgium); Tangi Aubert, Raquel Gomes, Zeger Hens, Univ. Gent (Belgium); Filip Strubbe, Kristiaan Neyts, Univ. Gent (Belgium) . . . . . [9170-41]

4:10 pm: **Design of single-polarisation single-mode photonic nanowire**, Amira Baili, Rim Cherif, Amine Ben Salem, SUP'COM (Tunisia); Than Singh Saini, Ajeet Kumar, Ravindra K. Sinha, Delhi Technological Univ. (India); Mourad Zghal, SUP'COM (Tunisia) . . . . . [9170-42]

4:30 pm: **Generation of ZnSSe and CdZnS nanoparticles by laser ablation in liquids**, Maarif A. Jafarov, Baku State Univ. (Azerbaijan) . . . . . [9170-43]

4:50 pm: **Deep UV microsphere nanolithography to achieve sub-100 nm feature size**, Alireza Bonakdar, Hooman Mohseni, Northwestern Univ. (USA). . . . [9170-44]

5:10 pm: **Optimizing computer control ball polishing of spherical surfaces**, Rasool Koosha, Peiman Mosaddegh, Hosein Hashemi, Isfahan Univ. of Technology (Iran, Islamic Republic of) . . . . . [9170-45]

CONFERENCE 9170

LOCATION: CONV. CTR. ROOM 11A

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Fabrication of 320nm period silicon gratings with ultrahigh aspect ratio by interference lithography and anisotropic etch technique, Yanchang Zheng, Yong Chen, Keqiang Qiu, Xiangdong Xu, Shaojun Fu, Univ. of Science and Technology of China (China) . . . . . [9170-47]

Fabrication and microscopic analysis of sheath-core structured TiO_2 nanofibers, Dong-Gue Kang, Dae-Yoon Kim, Min-Wook Park, Soon-Chun Park, Won-Jin Yoon, Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) . . . . . [9170-48]

Transparent conducting ZnO nanorods for nanoelectrodes as a reverse tunnel junction of GaN light emitting diode applications, Sung Jin An, Kumoh National Institute of Technology (Korea, Republic of) . . . . . [9170-49]

Nonlinear ultrasound formation in semiconductor structures under its pulse laser irradiation, Mykola Melnichenko, Mykola Isaiev, Oleg V. Lyashenko, National Taras Shevchenko Univ. of Kyiv (Ukraine); Oleksandr I. Vlasenko, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Andrey Kuzmich, National Taras Shevchenko Univ. of Kyiv (Ukraine); Vitaliy P. Veleshchuk, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Roman Burbelo, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9170-50]

Surface potential and field effect in structures with Ge-nanoclusters grown on SiO_2/Si surface, Yurii Hyrka, Sergiy V. Kondratenko, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9170-51]

Comparison of triangular and squared ITO nano-grating of GaN LEDs, Ashli Behill, Tattiana K. C. Davenport, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA) . . . . . [9170-52]

Large strain lead-free ceramics for piezoelectric actuators with nanoscale ceramic-ceramic composite structures, Jae-Shin Lee, Hyun-Young Lee, Jin-Kyu Kang, Univ. of Ulsan (Korea, Republic of); Soon-Jong Jeong, Korea Electrotechnology Research Institute (Korea, Republic of) . . . . . [9170-53]

Lightfast optical current in dielectric by plasmonically induced local field, Seungchul Kim, Pohang Univ. of Science and Technology (Korea, Republic of) and Max Planck Ctr. for Attosecond Science (Korea, Republic of); Ojoon Kwon, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9170-54]

Preparation of Bi-based lead-free ceramic multilayer actuators, Jae-Shin Lee, Jin-Kyu Kang, Young Hwan Hong, Dae-Jun Heo, Dong-Wook Lee, Univ. of Ulsan (Korea, Republic of) . . . . . [9170-55]

Graphene based multi-cavity terahertz absorbers, Jeong Min Woo, Hyunwoong Kim, Sungbae J. Lee, Jae-Hyung Jang, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9170-56]

Formation of sub-wavelength pitch regular structure employing a motorized multiple exposure Lloyd's mirror holographic lithography setup, Dainius Virganavicius, Tomas Tamulevicius, Linas Simatonis, Asta Tamuleviciene, Ausrine Jurkeviciute, Nerijus Armakavicius, Sigitas Tamulevicius, Kaunas Univ. of Technology (Lithuania) . . . . . [9170-57]

InP nanowires with axial/radial junctions for applications as light emitting diodes and photodetectors, Ali Nowzari, Lund Univ. (Sweden); Vishal Jain, Lund Univ. (Sweden) and Halmstad Univ. (Sweden); Magnus Heurlin, Kristian Storm, Magnus T. Borgström, Lund Univ. (Sweden); Håkan Pettersson, Lund Univ. (Sweden) and Halmstad Univ. (Sweden); Lars Samuelson, Lund Univ. (Sweden) . . . . . [9170-59]

CONFERENCE 9171

LOCATION: CONV. CTR. ROOM 10

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9171

Nanobiosystems: Processing, Characterization, and Applications VII

Conference Chairs: **Norihisa Kobayashi,** Chiba Univ. (Japan); **Fahima Ouchen,** Air Force Research Lab. (USA); **Ileana Rau,** Polytechnical Univ. of Bucharest (Romania)

Program Committee: **Carrie M. Bartsch,** Air Force Research Lab. (USA); **Liming Dai,** Case Western Reserve Univ. (USA); **Ananth Dodabalapur,** The Univ. of Texas at Austin (USA); **James G. Grote,** Air Force Research Lab. (USA); **Emily M. Heckman,** Air Force Research Lab. (USA); **Kuniharu Ijiro,** Hokkaido Univ. (Japan); **Jung-Il Jin,** Korea Univ. (Korea, Republic of); **Francois Kajzar,** Polytechnical Univ. of Bucharest (Romania); **Sang Nyon Kim,** Air Force Research Lab. (USA); **Oksana Krupka,** Univ. d'Angers (France); **Charles Y. C. Lee,** Air Force Office of Scientific Research (USA); **Misoon Y. Mah,** Asian Office of Aerospace Research and Development (Japan); **Naoya Ogata,** Chitose Institute of Science and Technology (Japan); **Bruce H. Robinson,** Univ. of Washington (USA); **Anna Samoc,** The Australian National Univ. (Australia); **Marek J. Samoc,** Wroclaw Univ. of Technology (Poland); **Niyazi Serdar Sariciftci,** Johannes Kepler Univ. Linz (Austria); **Kristi M. Singh,** Air Force Research Lab. (USA); **Andrew J. Steckl,** Univ. of Cincinnati (USA); **Morley O. Stone,** Air Force Research Lab. (USA); **Perry P. Yaney,** Univ. of Dayton (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

Lunch Break . . . . . Mon 12:00 pm to 1:00 pm

SESSION 1

LOCATION: CONV. CTR. ROOM 10 . . . . . MON 1:00 PM TO 3:10 PM

Miscellaneous I

Session Chair: **Norihisa Kobayashi,** Chiba Univ. (Japan)

1:00 pm: **Natural and nature-inspired semiconductors for biocompatible electronics** *(Keynote Presentation)*, Eric D. Glowacki, Niyazi Serdar Sariciftci, Johannes Kepler Univ. Linz (Austria) . . . . . [9171-1]

1:40 pm: **Electrical conductivity and impedance behaviour of hydrogel materials** *(Invited Paper)*, Marc in het Panhuis, Univ. of Wollongong (Australia) . . . . . [9171-2]

2:10 pm: **Effective bioimaging by using organic chromophores and nanoparticles** *(Invited Paper)*, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of) . . . . . [9171-3]

2:40 pm: **Organic semiconductor biophotonics** *(Invited Paper)*, Ashu K. Bansal, Shuoben Hou, Olena Kulyk, Andrew McNeill, Eric Bowman, Univ. of St. Andrews (United Kingdom); James Ferguson, Ninewells Hospital and Medical School (United Kingdom); Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom) . . . . . [9171-4]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 10 . . . . . MON 3:40 PM TO 5:50 PM

DNA Photonics I

Session Chair: **François Kajzar,** Univ. Politehnica of Bucharest (Romania)

3:40 pm: **The synthesis and bio/nano applications of DNA brushes** *(Invited Paper)*, Kuniharu Ijiro, Hokkaido Univ. (Japan) . . . . . [9171-5]

4:10 pm: **Deoxyribonucleic acid-Ag nanoparticles for EMI Shielding: the effect of nanoparticle size and shape on the shielding effectiveness**, Fahima Ouchen, Perry P. Yaney, James G. Grote, Air Force Research Lab. (USA) . . . . . [9171-6]

4:30 pm: **Metal array structures on the stimuli-responsive gel** *(Invited Paper)*, Hideyuki Mitomo, Naonobu Shimamoto, Kenta Horie, Yasutaka Matsuo, Kenichi Niikura, Kuniharu Ijiro, Hokkaido Univ. (Japan) . . . . . [9171-7]

5:00 pm: **A thylakoid layer-by-layer assembly for stable cell-free photosynthesis devices**, Bong Sup Shim, Yuran Shon, Hongsup Hwang, Hyun Kim, Inha Univ. (Korea, Republic of) . . . . . [9171-8]

5:20 pm: **Electrochemical properties of some DNA based materials** *(Invited Paper)*, Ileana Rau, Gratiela Tihan, Mihaela Mîndroiu, Roxana Zgarian, François Kajzar, Univ. Politehnica of Bucharest (Romania); Lucas Marinho Nobrega de Assis, F. Sentanin, Agnieszka Pawlicka, Univ. de São Paulo (Brazil) . . . . . [9171-9]

TUESDAY 19 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 10 . . . . TUE 8:00 AM TO 10:30 AM

DNA Photonics II

Session Chair: **Donna M. Joyce,** Air Force Research Lab. (USA)

8:00 am: **Optics and nanophotonics enabled by genetically-engineered short peptides** *(Keynote Presentation)*, Mehmet Sarikaya, Univ. of Washington (USA) . . . . . [9171-10]

8:40 am: **Investigation of a DNA nucleobase as a gate dielectric for potential application in a graphene-based field effect transistor**, Adrienne Williams, Fahima Ouchen, Steve S. N. Kim, Yen H. Ngo, Air Force Research Lab. (USA); Said Elhamri, Univ. of Dayton (USA); Shin Mou, Air Force Research Lab. (USA); Henry D. Young, Wright State Univ. (USA); Rajesh R. Naik, James G. Grote, Air Force Research Lab. (USA) . . . . . [9171-11]

9:00 am: **Nonlinear optical properties of chromophore functionalized DNA-surfactant complexes** *(Invited Paper)*, François Kajzar, Ana-Maria Manea, Univ. Politehnica of Bucharest (Romania); Valentin I. Vlad, National Institute for Lasers, Plasma and Radiation Physics (Romania); Adrian Petris, National Institute for Laser, Plasma and Radiation Physics, Department of Lasers, (Romania); Tatiana Bazaru Rujoiu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Alexandrina Tane, Ileana Rau, Univ. Politehnica of Bucharest (Romania) . [9171-12]

9:30 am: **Hyperpolarizability of biomolecules and additive models** *(Invited Paper)*, Anthony Maurice, Emmanuel Benichou, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) . . . . . [9171-13]

10:00 am: **Summary report on AFRL studies of the optical and electrical properties of biopolymers using salmon DNA** *(Invited Paper)*, Perry P. Yaney, Univ. of Dayton (USA); Fahima Ouchen, James G. Grote, Air Force Research Lab. (USA) . . . . . [9171-32]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

CONFERENCE 9171
LOCATION: CONV. CTR. ROOM 10

SESSION 4

LOCATION: CONV. CTR. ROOM 10 . . . . . TUE 11:00 AM TO 1:00 PM

DNA Photonics III

Session Chair: **Pierre-François Brevet,** Univ. Claude Bernard Lyon 1 (France)

11:00 am: **Light amplification and lasing from dyes doped in DNA-complex thin films prepared by soaking method** *(Invited Paper)*, Yutaka Kawabe, Takemasa Suzuki, You Iisaka, Chitose Institute of Science and Technology (Japan) . [9171-14]

11:30 am: **Random lasing in dye doped bio-organic based systems: experimental and stochastic approach** *(Invited Paper)*, Antoni C. Mitus, Grzegorz Pawlik, Jaroslaw Mysliwiec, Lech Sznitko, Konrad Cyprych, Adam Szukalski, Andrzej Miniewicz, Wroclaw Univ. of Technology (Poland); François Kajzar, Ileana Rau, Univ. Politehnica of Bucharest (Romania). . . . . [9171-15]

12:00 pm: **Natural materials for nano bio systems** *(Invited Paper)*, James G. Grote, Air Force Research Lab. (USA). . . . . [9171-16]

12:30 pm: **BioTFT memory with DNA gate dielectric and its thermal property** *(Invited Paper)*, Norihisa Kobayashi, Kazuki Nakamura, Chiba Univ. (Japan); Sei Uemura, Toshihide Kamata, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9171-17]

Lunch/Exhibition Break . . . . . Tue 1:00 pm to 2:10 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 10 . . . . . TUE 2:10 PM TO 3:30 PM

DNA Photonics IV

Session Chair: **Fahima Ouchen,** Air Force Research Lab. (USA)

2:10 pm: **DNA film on the surface and inside the capillary for optoelectronic and photonic applications** *(Invited Paper)*, Kyunghwan K. Oh, Seongil Im, Yeonjin Yi, Jae Hoon Kim, Yonsei Univ. (Korea, Republic of); Juhiuk Son, The Univ. of Seoul (Korea, Republic of); Sung Ha Park, Sungkyunkwan Univ. (Korea, Republic of); Dong Ki Yoon, Yoon Sung Nam, KAIST (Korea, Republic of); Woohyun Jung, Bjorn Paulson, Inchul Shin, Ji-Hyung Hwang, Yonsei Univ. (Korea, Republic of) [9171-18]

2:40 pm: **Photobleaching for DNA-based photonic devices** *(Invited Paper)*, Bjorn Paulson, Inchul Shin, Reza Khazaeinezhad, Sahar Hosseinzadeh Kassani, Woohyun Jung, Kyunghwan K. Oh, Yonsei Univ. (Korea, Republic of). . . . . [9171-19]

3:10 pm: **Modified polymer thin film device architecture for increased energy density**, Donna M. Joyce, Fahima Ouchen, James G. Grote, Air Force Research Lab. (USA) . . . . . [9171-20]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 10 . . . . . TUE 4:00 PM TO 6:10 PM

Miscellaneous II

Session Chair: **Ileana Rau,** Univ. Politehnica of Bucharest (Romania)

4:00 pm: **Photo Seebeck effect of conjugated polymers** *(Invited Paper)*, Eunkyoung Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9171-21]

4:30 pm: **Micro and nanostructuration of polymer materials and applications** *(Invited Paper)*, Ngoc Diep Lai, Ecole Normale Supérieure de Cachan (France) . . . . . [9171-22]

5:00 pm: **Diatom frustule photonic crystal geometric and optical characterization**, Jonathan Mishler, Phillip Blake, Andrew J. Alverson, Donald K. Roper, Joseph B. Herzog, Univ. of Arkansas (USA) . . . . . [9171-23]

5:20 pm: **Fluorescent push-pull pH-responsive probes for ratiometric detection of intracellular pH**, Ipuy Martin, Ecole Normale Supérieure de Lyon (France); Cyrielle Billon, Univ. de Lyon (France); Guillaume Micouin, Ecole Normale Supérieure de Lyon (France); Jacques Samarut, Univ. de Lyon (France); Chantal Andraud, Ecole Normale Supérieure de Lyon (France); Bretonniere Yann, Ecole Normale Supérieure de Lyon (France). . . . . [9171-24]

5:40 pm: **Non-volatile organic memory with extreme flexibility** *(Invited Paper)*, Cheolmin Park, Yonsei Univ. (Korea, Republic of) . . . . . [9171-33]

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Hyper Rayleigh and hyper Raman of aqueous solutions: a study of the geometrical configuration, Anthony Maurice, Emmanuel Benichou, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) . . . . . [9171-25]

Energy transfer within sub-nanoscale arrangements of DNA-templated chromophores and lipid-DNA nanocomplexes, Ho Yeon Son, KAIST (Korea, Republic of) . . . . . [9171-26]

Viral-templated nanocrystalline Pd nanowires for chemiresistive hydrogen (H_2) sensors, Chung Hee Moon, Yiran Yan, Miluo Zhang, Nosang V. Myung, Elaine D. Haberer, Univ. of California, Riverside (USA) . . . . . [9171-27]

Physicochemical characterization of silver nanoparticles synthesize using Aloe Vera (Aloe Barbadensis), Abiola J. Kuponiyi, Lamin Kassama, Tatiana V. Kukhtareva, Alabama A&M Univ. (USA) . . . . . [9171-28]

Chemiresistive ammonia (NH3) gas sensor based on viral-templated gold nanoparticles embedded in polypyrrole nanowires, Yiran Yan, Chung Hee Moon, Heng Chia Su, Nosang V. Myung, Elaine D. Haberer, Univ. of California, Riverside (USA) . . . . . [9171-29]

Morphology manipulation of M13 bacteriophage template for nanostructure assembly, Tam-Triet Ngo-Duc, Mohammed S. Zaman, Elaine D. Haberer, Univ. of California, Riverside (USA) . . . . . [9171-30]

Second harmonic generation from silver nanoparticles in aqueous solution with different protective agents, Minh Hoang Ngo, Isabelle Ledoux-Rak, Ecole Normale Supérieure de Cachan (France) . . . . . [9171-31]

Investigations of molecular nonlinear optical polarizabilities of azobenzenes substituted with strong acceptor groups, Valentin Victor Jerca, "Costin D. Nenitescu" Institute of Organic Chemistry (Romania) and Univ. Politehnica of Bucharest (Romania); Florica Adriana Jerca, "Costin D. Nenitescu" Institute of Organic Chemistry (Romania); Ileana Rau, Univ. Politehnica of Bucharest (Romania); François Kajzar, Univ. Politehnica of Bucharest (Romania) and Institut des Sciences et Technologies Moléculaires d'Angers, CNRS, Univ. d' Angers (France); Dan Sorin Vasilescu, Univ. Politehnica of Bucharest (Romania); Dumitru Mircea Vuluga, "Costin D. Nenitescu" Institute of Organic Chemistry (Romania) . . . . . [9171-34]

CONFERENCE 9172

LOCATION: CONV. CTR. ROOM 4

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9172

Nanostructured Thin Films VII

Conference Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Tom G. Mackay,** The Univ. of Edinburgh (United Kingdom); **Motofumi Suzuki,** Kyoto Univ. (Japan)

Program Committee: **Bharat Bhushan,** The Ohio State Univ. (USA); **Pankaj K. Choudhury,** Univ. Kebangsaan Malaysia (Malaysia); **Didier Felbacq,** Univ. Montpellier 2 (France); **Flavio Horowitz,** Univ. Federal do Rio Grande do Sul (Brazil); **Yi-Jun Jen,** National Taipei Univ. of Technology (Taiwan); **H. Angus Macleod,** Thin Film Center, Inc. (USA); **Raúl J. Martín-Palma,** Univ. Autónoma de Madrid (Spain); **Anders Kristensen,** Technical Univ. of Denmark (Denmark); **Sidney J. Ribeiro,** Univ. Estadual Paulista (Brazil); **Geoffrey B. Smith,** Univ. of Technology, Sydney (Australia)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA). . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

WEDNESDAY 20 AUGUST

LOCATION: CONV. CTR. ROOM 4 . .WED 8:30 AM TO 9:30 AM

Keynote Session

Session Chair: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA)

8:30 am: **Low dimensional optics** *(Keynote Presentation)*, François R. Flory, Ludovic Escoubas, Institut Matériaux Microélectronique Nanosciences de Provence (France); Gerard Berginc, Thales Optronique S.A.S. (France); Cheng-Chung Lee, National Central Univ. (Taiwan). . . . . [9172-1]

SESSION 1

LOCATION: CONV. CTR. ROOM 4 . . . WED 9:30 AM TO 10:30 AM

Functional Nanostructures I

Session Chair: **Motofumi Suzuki,** Kyoto Univ. (Japan)

9:30 am: **Collective resonant modes at a metasurface**, Didier Felbacq, Univ. Montpellier 2 (France); Emmanuel Kling, Sagem (France); Emmanuel Rousseau, Richard Razafindrakoto, Univ. Montpellier 2 (France). . . . . [9172-2]

9:50 am: **Design a symmetrical film stack as a negative index metamaterial**, Yi-Jun Jen, Wei-Chih Liu, Ci-Yao Jheng, National Taipei Univ. of Technology (Taiwan) . . . . . [9172-3]

10:10 am: **Lateral patterned ion beam modification of vanadium dioxide for optical applications**, Jura Rensberg, Sebastian Vatterodt, Friedrich-Schiller-Univ. Jena (Germany); Mikhail A. Kats, Shuyan Zhang, You Zhou, Harvard School of Engineering and Applied Sciences (USA); Ronny Nawrodt, Christian Schwartz, Marcel Hopfe, Tim Barth, Friedrich-Schiller-Univ. Jena (Germany); Shriram Ramanathan, Federico Capasso, Harvard School of Engineering and Applied Sciences (USA); Carsten Ronning, Friedrich-Schiller-Univ. Jena (Germany) [9172-4]

Coffee Break . . . . . .Wed 10:30 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 4 . . . WED 11:00 AM TO 12:30 PM

Functional Nanostructures II

Session Chair: **François R. Flory,** Institut Matériaux Microélectronique Nanosciences de Provence (France)

11:00 am: **Nanostructured thin films and their macrobehaviors** *(Invited Paper)*, Cheng-Chung Lee, Mei-Ling Lo, National Central Univ. (Taiwan) . . . . . [9172-5]

11:30 am: **Nano-structures for high intensity fiber laser applications**, Andrew C. Y. Ngo, A*STAR Institute of Materials Research and Engineering (Singapore); Liying Hong, DSO National Labs. (Singapore); E. H. Khoo, Z. Liu, E. P. Li, A*STAR Institute of High Performance Computing (Singapore); J. H. Teng, A*STAR Institute of Materials Research and Engineering (Singapore) . . . . . [9172-7]

11:50 am: **Optically transparent, mechanically durable, nanostructured superhydrophobic/omniphobic/anti-fogging glass thin films**, Tolga Aytug, Liu Tao, Andrew R. Lupini, Ilia N. Ivanov, Parans M. Paranthaman, David K. Christen, Oak Ridge National Lab. (USA) . . . . . [9172-8]

12:10 pm: **PbS nano-sculptured thin films and their effect on liquid crystals alignment**, Ashok Chaudhary, Matvei Klebanov, Ibrahim Abdulhalim, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9172-43]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 2:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 4 . . . . WED 2:00 PM TO 3:30 PM

Towards Applications I

Session Chair: **Cheng-Chung Lee,** National Central Univ. (Taiwan)

2:00 pm: **New physics and applications of apertures in thin metal films** *(Invited Paper)*, Reuven Gordon, Ahmed A Al Balushi, Abhay Kotnala, Ryan Gelfand, Skylar Wheaton, Univ. of Victoria (Canada); Shuwen Chen, Shilong Jin, National University of Defense Technology (China) . . . . . [9172-9]

2:30 pm: **Nanostructured refractory thin films for solar applications**, Emmanuel Ollier, Helga Szambolics, Nicolas Dunoyer, Olivier Dellea, CEA-LITEN (France) . . . . . [9172-10]

2:50 pm: **Ni/NiCrOx nanocomposite cermet as ideal candidate for solar thermal applications**, Lucie Gaouyat, Univ. of Namur (Belgium); Zambing He, Univ. Antwerpen (Belgium); Jean-François Colomer, Philippe Lambin, Univ. of Namur (Belgium); Frederic Mirabella, CRM Group - AC&CS (Belgium); Dominique Schryvers, Univ. Antwerpen (Belgium); Olivier Deparis, Univ. of Namur (Belgium) . . . . . [9172-11]

3:10 pm: **Stretchable conducting materials with multi-scale hierarchical structures for biomedical applications**, Hyun Kim, Bong Sup Shim, Inha Univ. (Korea, Republic of). . . . . [9172-12]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

CONFERENCE 9172
LOCATION: CONV. CTR. ROOM 4

SESSION 4

LOCATION: CONV. CTR. ROOM 4 .... WED 4:00 PM TO 5:50 PM

Theoretical and Numerical Studies

Session Chair: **Reuven Gordon,** Univ. of Victoria (Canada)

4:00 pm: **Engineering wavefront with Huygens, Fermat, Bragg, Friedel, and Fresnel laws** *(Invited Paper)*, Zeno Gaburro, Univ. degli Studi di Trento (Italy) . . . . . [9172-13]

4:30 pm: **Computer-based numerical simulations of adsorption in nanostructures**, Diana Khashimova, Technische Univ. Hamburg-Harburg (Germany) . . . . . [9172-14]

4:50 pm: **Waves in tape helix loaded liquid crystal optical fiber**, Masih Ghasemi, Pankaj K. Choudhury, Univ. Kebangsaan Malaysia (Malaysia) . . . . . [9172-15]

5:10 pm: **Shift happens**, Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA) . . . . . [9172-16]

5:30 pm: **Electrical control over Voigt wave propagation in particulate composite materials**, Tom G. Mackay, The Univ. of Edinburgh (United Kingdom) . . . . . [9172-17]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Direct light-induced surface patterning on thin films of amorphous chalcogenide, Ugis Gertners, Zanda Gertnere, Univ. of Latvia (Latvia). . . [9172-35]

Deposition condition influence on optical properties of indium tin oxide, Taras Ganulia, Olga Lopatynska, Vasyl Lendel, Leonid Poperenko, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9172-36]

Construction of 3D ordered macroporous thin films and their applications, Yao Li, Jiupeng Zhao, Harbin Institute of Technology (China) . . . . . [9172-37]

Self-cleaning antireflective film for solar module glass, Wen Ding, Feng Yun, Deyang Xia, Jin Wang, Zhongxiao Song, Jinhai Si, Xi'an Jiaotong Univ. (China) . . . . . [9172-38]

Effect of aging with partial discharges on the remnant breakdown strength of polypropylene films with natural and synthetic nanofillers, Md. A. Rab, Rohitha Dhara, Prathap Basappa, Norfolk State Univ. (USA); Zahid Hasan Mahmood, Dhaka Univ. (Bangladesh) . . . . . [9172-39]

Ion beam sputtered Y_2O_3 anti-reflection coatings for far-infrared optics, Hongxiang Liu, Institute of Optics and Electronics (China); Ruzhen Liu, Institute of Optics and Electronics (China) . . . . . [9172-40]

Gas sensing properties of ZnO nanoparticles decorated reduced graphene oxide composites synthesized by hydrothermal method, Gwiy-Sang Chung, Univ. of Ulsan (Korea, Republic of) . . . . . [9172-41]

Quantum mechanical investigation of Fermi energy under dimension quantization with thin films in nanostructured materials, Subhamoy Singha Roy, JIS College of Engineering (India) . . . . . [9172-42]

THURSDAY 21 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 4 .... THU 8:40 AM TO 10:10 AM

Characterization

Session Chair: **Qiaoqiang Gan,** Univ. at Buffalo (USA)

8:40 am: **Local field enhancement effects for dielectric coatings on silver nanorod arrays** *(Invited Paper)*, Yi-Jun Jen, Meng-Jie Lin, Ci-Yao Jheng, Wei-Chih Liu, National Taipei Univ. of Technology (Taiwan) . . . . . [9172-18]

9:10 am: **Study of partial discharge characteristics of nano filled polypropylene films according to the variation in electric field distribution on the sample**, Md. A. Rab, Rohitha Dhara, Prathap Basappa, Norfolk State Univ. (USA); Zahid Hasan Mahmood, Dhaka Univ. (Bangladesh). . . . . [9172-19]

9:30 am: **Ultra-thin metal oxide based light controlled converter for sensing surface chemicals**, Arunas Šetkus, Virginijus Bukauskas, Audruzis Mironas, Šarunas Vaškelis, Ctr. for Physical Sciences and Technology (Lithuania) . [9172-20]

9:50 am: **Magnetic, magnetooptical, and magnetotransport properties of Ti-substituted Co_2Fe)Ga thin films**, Vladimir Khovaylo, National Univ. of Science and Technology "MISiS" (Russian Federation); Valeria Rodionova, Immanuel Kant State Univ. of Russia (Russian Federation); Elena Gan'shina, Lomonosov Moscow State Univ. (Russian Federation); Alexei Bozhko, A. M. Prokhorov General Physics Institute (Russian Federation); Ryosuke Kainuma, Tohoku Univ. (Japan). . [9172-21]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 6

LOCATION: CONV. CTR. ROOM 4 ....THU 10:40 AM TO 12:10 PM

Functional Nanostructures III

Session Chair: **Yi-Jun Jen,** National Taipei Univ. of Technology (Taiwan)

10:40 am: **Plasmonic and nanophotonic enhanced organic photovoltaics: breaking the power conversion efficiency barrier** *(Invited Paper)*, Qiaoqiang Gan, Univ. at Buffalo (USA); Filbert J. Bartoli, Zakya H. Kafafi, Lehigh Univ. (USA) . . . . . [9172-22]

11:10 am: **An investigation into the effect of space charge on the surface erosion of synthetic and natural organoclay nanofilled PP films**, Rohitha Dhara, Md. A. Rab, Norfolk State Univ. (USA) . . . . . [9172-23]

11:30 am: **Optical properties of porphyrin (J-Aggregates): graphene composites**, Harsha Vardhan Reddy Maraka, Rusul M. Al-Shammari, Nebras Al-Attar, Univ. College Dublin (Ireland); Sergio Lopez, Tia E. Keyes, Dublin City Univ. (Ireland); James H. Rice, Univ. College Dublin (Ireland) . . . . . [9172-24]

11:50 am: **High angular tolerant color filters based on subwavelength grating structures**, Chenying Yang, Weidong Shen, Yueguang Zhang, Xu Fang, Beishi Chen, Xu Liu, Zhejiang Univ. (China). . . . . [9172-25]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:40 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 4 . . . . . THU 1:40 PM TO 3:30 PM

Towards Applications II

Session Chair: **Tom G. Mackay,** The Univ. of Edinburgh (United Kingdom)

1:40 pm: **Nanocrystalline cellulose thin films for optical encryption** *(Invited Paper)*, Mark P. Andrews, McGill Univ. (Canada); Yu Ping Zhang, Blu-O Technologies (Canada); Vamsy P. Chodavarapu, McGill Univ. (Canada) . . [9172-26]

2:10 pm: **Optical elaboration of nanostructure porous silica layer**, Nicolas Desboeufs, Theirry Gacoin, Jacques Peretti, Ecole Polytechnique (France); Jean-Pierre Boilot, Laboratoire Physique de la Matière Condensée, ecole Polytechnique (France); Khalid Lahlil, Anh-Duc Vu, Lucio Martinelli, Yves Lassailly, Ecole Polytechnique (France) . . . . . [9172-27]

2:30 pm: **Optical, electrical, and structural study of metallic nano-structured thin films fabricated by oblique angle deposition**, Sung Jun Jang, Alireza Bonakdar, Hooman Mohseni, Northwestern Univ. (USA) . . . . . [9172-28]

2:50 pm: **A solution to adhesion problem of oxide thin films on zinc selenide optical substrates**, Mustafa B. Cosar, Başak Yazgan, Gülgün H. Aydogdu, ASELSAN Inc. (Turkey) . . . . . [9172-29]

3:10 pm: **Mimumes for SUBTLE applications**, Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA). . . . . [9172-30]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 4 . . . . . THU 4:00 PM TO 5:20 PM

Fabrication

Session Chair: **Mark P. Andrews,** McGill Univ. (Canada)

4:00 pm: **Bottom-up fabrication of non-close packed nanopillar arrays for photonic applications**, Motofumi Suzuki, Shinta Suganuma, Yasuyuki Kaneko, Kyoto Univ. (Japan) . . . . . [9172-31]

4:20 pm: **Nanosculptured thin films of tungsten oxide**, Tomas Tolenis, Ramutis Drazdys, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9172-32]

4:40 pm: **The effect of the substrate temperature and the acceleration potential drop on the structural and physical properties of SiC thin films deposed by TVA method**, Victor Ciupina, Univ. Ovidius Constanta (Romania) and Univ. of Bucharest (Romania) and Romanian Academy of Science (Romania); Cristian P. Lungu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Rodica Vladoiu, Univ. Ovidius Constanta (Romania); Gabriel Prodan, Univ. Ovidius Constanta (Romania) and Institute for Nanotechnology and Alternative Energy Sources (Romania); Stefan Antohe, Univ. of Bucharest (Romania); Eugeniu Vasile, Univ. Politehnica of Bucharest (Romania); Marius Belc, Corneliu Porosnicu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Iuliana M. Stanescu, Univ. Ovidius Constanta (Romania); Ionut Jepu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Sorina Iftimie, Univ. of Bucharest (Romania); Virginia Nicolescu, Ceronav (Romania); Valer N. Zarovski, National Institute for Lasers, Plasma and Radiation Physics (Romania); Madalina D. Prodan, Aurelia Mandes, Virginia Dinca, Univ. Ovidius Constanta (Romania) . . . . . [9172-33]

5:00 pm: **Tunable stoichiometry of SiOx-BaTiOy-BOz fabricated by multi-target PLD**, John G. Jones, Jonathan T. Goldstein, Air Force Research Lab. (USA); Lirong Sun, General Dynamics Information Technology (USA); Jason C. Anders, Wright State Univ. (USA); Steven R. Smith, Gerald R. Landis, Univ. of Dayton Research Institute (USA); Chad M. Holbrook, Neil R. Murphy, Air Force Research Lab. (USA); Gregory Kozlowski, Wright State Univ. (USA); Rachel Jakubiak, C. E. Stutz, Air Force Research Lab. (USA). . . . . [9172-34]

CONFERENCE 9173

LOCATION: CONV. CTR. ROOM 1A

Wednesday 20–20 August 2014 • Proceedings of SPIE Vol. 9173

Instrumentation, Metrology, and Standards for Nanomanufacturing VIII

Conference Chair: **Michael T. Postek,** National Institute of Standards and Technology (USA)

Conference Co-Chair: **Ndubuisi G. Orji,** National Institute of Standards and Technology (USA)

Program Committee: **Bryan M. Barnes,** National Institute of Standards and Technology (USA); **Bernd Bodermann,** Physikalisch-Technische Bundesanstalt (Germany); **Khershed P. Cooper,** U.S. Naval Research Lab. (USA); **Aaron Cordes,** SEMATECH Inc. (USA); **Shouhong Tang,** KLA-Tencor Corp. (USA); **Vladimir A. Ukraintsev,** Nanometrology International, Inc. (USA); **Xianfan Xu,** Purdue Univ. (USA); **Wei Zhou,** Rudolph Technologies, Inc. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . . MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA). . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 1A . . WED 9:00 AM TO 10:40 AM

Nanomanufacturing Metrology I

Session Chairs: **Michael T. Postek,** National Institute of Standards and Technology (USA); **Ndubuisi G. Orji,** National Institute of Standards and Technology (USA)

9:00 am: **Metrology for cellulose nanomaterials: update** *(Invited Paper)*, Michael T. Postek, National Institute of Standards and Technology (USA) . . . . . [9173-1]

9:30 am: **Development of a comprehensive metrology platform dedicated to dimensional measurements of CD atomic force microscopy tips**, Johann Foucher, POLLEN Technology S.A.S. (France); Sebastian W. Schmidt, nanotools GmbH (Germany); Jérome Hazart, Aurelien Labrosse, Axel Largent, POLLEN Technology S.A.S. (France); Sandra Bos, CEA-LETI (France); Sebastian Schade, Bernd Irmer, nanotools GmbH (Germany). . . . . [9173-2]

9:50 am: **Recent advances of the metrological AFM at INRIM**, Gian Bartolo Picotto, Roberto Bellotti, Istituto Nazionale di Ricerca Metrologica (Italy) . . [9173-3]

10:10 am: **Techniques for AFM tip characterization** *(Invited Paper)*, Ndubuisi G. Orji, Ronald G. Dixson, National Institute of Standards and Technology (USA); Hiroshi Itoh, Chunmei Wang, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9173-4]

Coffee Break . . . . . .Wed 10:40 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 1A . . . WED 11:00 AM TO 12:10 PM

Tools for Nanomanufacturing Metrology

Session Chairs: **Bryan M. Barnes,** National Institute of Standards and Technology (USA); **Michael T. Postek,** National Institute of Standards and Technology (USA)

11:00 am: **Nanomanufacturing concerns about measurements made in the SEM Part III: Vibration and drift** *(Invited Paper)*, Michael T. Postek, András E. Vladár, National Institute of Standards and Technology (USA); Petr Cizmar, Physikalisch-Technische Bundesanstalt (Germany). . . . . [9173-5]

11:30 am: **Developing detection efficiency standards for atom probe tomography**, Ty J. Prosa, Brian P. Geiser, Dan Lawrence, David Olson, David J. Larson, CAMECA Instruments, Inc. (USA) . . . . . [9173-6]

11:50 am: **Recent advances in scanning microwave impedance microscopy (sMIM) for nano-scale measurements and industrial applications**, Stuart Friedman, Oskar Amster, PrimeNano, Inc. (USA) . . . . . [9173-7]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 1A . . . . . WED 1:50 PM TO 3:10 PM

Nanomanufacturing Metrology II

Session Chairs: **Ndubuisi G. Orji,** National Institute of Standards and Technology (USA); **John F. Valley,** SunEdison (USA)

1:50 pm: **Standardization of methods for extracting statistics from surface profile measurements** *(Invited Paper)*, Peter Z. Takacs, Brookhaven National Lab. (USA) . . . . . [9173-8]

2:20 pm: **Improved quality control of silicon wafers using novel off-line air pocket image analysis** *(Invited Paper)*, John F. Valley, SunEdison (USA); M. Cristina Sanna, SunEdison Italy (Italy) . . . . . [9173-9]

2:50 pm: **Interferometric measurement of dimensional and thermal stability of joints**, Hagen Lorenz, René Schödel, Physikalisch-Technische Bundesanstalt (Germany) . . . . . [9173-10]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 1A . . . WED 3:40 PM TO 5:00 PM

Nanomanufacturing Metrology III

Session Chairs: **Shouhong Tang,** KLA-Tencor Corp. (USA); **Ndubuisi G. Orji,** National Institute of Standards and Technology (USA)

3:40 pm: **Refractometry of turbid nanoparticle suspensions and applications**, Augusto García-Valenzuela, Humberto Contreras-Tello, Univ. Nacional Autónoma de México (Mexico) . . . . . [9173-12]

4:00 pm: **Study of internal energy flows of a coma affected singular beam by Helmholtz Hodge decomposition**, Monika Bahl, P. Senthilkumaran, Indian Institute of Technology Delhi (India) . . . . . [9173-13]

4:20 pm: **Mass sensing AlN sensors for waste water monitoring**, Ryan Porrazzo, Graham Potter, Leigh K. Lydecker IV, Z. Foraida, Suhasini Gattu, Natalya Tokranova, James Castracane, SUNY College of Nanoscale Science and Engineering (USA) . . . . . [9173-14]

4:40 pm: **Shack-Hartmann waveffront sensor non-null testing off-axis aspheric mirror on axis**, Jinping Zhang, Shanghai Institute of Technical Physics (China); Zhongyu Zhang, Xue-jun Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China) . . . . . [9173-16]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

High-resolution optical measurement technique for diffraction gratings by using a variable angle phase modulation ellipsometer, Kyongseok Kim, Bo Ram Kim, Sung-Ho Lee, Seung-Han Park, Yonsei Univ. (Korea, Republic of) . . [9173-15]

Quantifying ellipsometric data uncertainties for multichannel rotating-element ellipsometers, Yong Jai Cho, Won Chegal, Hyun Mo Cho, Korea Research Institute of Standards and Science (Korea, Republic of) . . . . . [9173-17]

Scatterometric characterization of diffractive optical elements, Toni Saastamoinen, Univ. of Eastern Finland (Finland); Hannu Husu, MIKES Mittatekniikan keskus (Finland); Janne Laukkanen, Univ. of Eastern Finland (Finland); Samuli Siitonen, Nanocomp Oy Ltd. (Finland); Jari Turunen, Univ. of Eastern Finland (Finland); Antti Lassila, MIKES Mittatekniikan keskus (Finland) . . . . . [9173-18]

Precision analysis of three polarizer spectroscopic ellipsometer, Won Chegal, Yong Jai Cho, Hyun Mo Cho, Korea Research Institute of Standards and Science (Korea, Republic of) . . . . . [9173-19]

CONFERENCE 9174

LOCATION: CONV. CTR. ROOM 5A

Tuesday–Thursday 19–21 August 2014 • Proceedings of SPIE Vol. 9174

Nanoepitaxy: Materials and Devices VI

Conference Chairs: **Nobuhiko P. Kobayashi,** Univ. of California, Santa Cruz (USA); **A. Alec Talin,** Sandia National Labs. (USA); **Albert V. Davydov,** National Institute of Standards and Technology (USA); **M. Saif Islam,** Univ. of California, Davis (USA)

Program Committee: **Kristine A. Bertness,** National Institute of Standards and Technology (USA); **Necmi Biyikli,** Virginia Commonwealth Univ. (USA); **Shadi A. Dayeh,** Los Alamos National Lab. (USA); **Supratik Guha,** IBM Thomas J. Watson Research Ctr. (USA); **Jung Han,** Yale Univ. (USA); **Muhammad M. Hussain,** King Abdullah Univ. of Science and Technology (Saudi Arabia); **Chennupati Jagadish,** The Australian National Univ. (Australia); **Francois Leonard,** Sandia National Labs., California (USA); **Samuel S. Mao,** Lawrence Berkeley National Lab. (USA); **Tariq Manzur,** Naval Undersea Warfare Ctr. (USA); **Nezih Pala,** Florida International Univ. (USA); **Samuel T. Picraux,** Los Alamos National Lab. (USA); **Sharka M. Prokes,** U.S. Naval Research Lab. (USA); **Zhifeng Ren,** Boston College (USA); **Atsuhito Sawabe,** Aoyama Gakuin Univ. (Japan); **Loucas Tsakalakos,** GE Global Research (USA); **Emanuel Tutuc,** The Univ. of Texas at Austin (USA); **Lionel Vayssieres,** Xi'an Jiaotong Univ. (China); **George T. Wang,** Sandia National Labs. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A .. MON 9:15 AM TO 12:00 PM

NanoScience + Engineering Plenary Session

Session Chairs: **James G. Grote**, Air Force Research Lab. (USA); **Satoshi Kawata**, Osaka Univ. (Japan)

9:15 am: **Non-Covalent Interactions of Carbon Nanotubes in Polymer Composites** *(Plenary)*, Eva M. Campo, Bangor Univ. (United Kingdom) . . . . . [9160-500]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Nanoscale Silicon as an Optical Material** *(Plenary)*, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9160-501]

11:15 am: **Nanoscale Engineering Optical Nonlinearities and Nanolasers** *(Plenary)*, Shaya Fainman, Univ. of California, San Diego (USA) . . . . . [9160-502]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 5A .....TUE 1:00 PM TO 3:05 PM

Group III-V and IV Nanostructures I

Session Chair: **Nobuhiko P. Kobayashi,** Univ. of California, Santa Cruz (USA)

1:00 pm: **Formation of vertical MnAs/InAs heterojunction nanowires** *(Invited Paper)*, Shinjiro Hara, Hiromu Fujimagari, Shinya Sakita, Hokkaido Univ. (Japan) . . . . . [9174-1]

1:25 pm: **Nanoprobe electrical measurements of single nanowire structures** *(Invited Paper)*, Simon Watkins, Simon Fraser Univ. (Canada) . . . . . [9174-2]

1:50 pm: **Van der Waals epitaxy of InAs nanostructures on graphene** *(Invited Paper)*, Young Joon Hong, Sejong Univ. (Korea, Republic of); Takashi Fukui, Hokkaido Univ. (Japan) . . . . . [9174-3]

2:15 pm: **Direct band gap wurtzite GaP nanowires for LEDs and quantum devices** *(Invited Paper)*, Simone Assali, Technische Univ. Eindhoven (Netherlands); Erik P. A. M. Bakkers, Technische Univ. Delft (Netherlands) . . . . . [9174-4]

2:40 pm: **Development of III-V compound semiconductor nanowire array solar cells** *(Invited Paper)*, Lan Fu, Q. Gao, Yesaya C. Wenas, Z. Li, Yu-Heng Lee, Fan Wang, Sudha Mokkapati, Hark Hoe Tan, Chennupati Jagadish, The Australian National Univ. (Australia) . . . . . [9174-5]

Coffee Break . . . . . Tue 3:05 pm to 3:35 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 5A .....TUE 3:35 PM TO 4:50 PM

1D Nanostructures I

Session Chair: **Sharka M. Prokes,** U.S. Naval Research Lab. (USA)

3:35 pm: **Silicon epitaxy in nanoscale for photovoltaic applications** *(Invited Paper)*, Jinkyoung Yoo, Los Alamos National Lab. (USA); Shadi A. Dayeh, Univ. of California, San Diego (USA); Wei Tang, Univ. of California, Los Angeles (USA); Norman C. Bartelt, Sandia National Labs. (USA); Alp T. Findikoglu, Samuel T. Picraux, Los Alamos National Lab. (USA) . . . . . [9174-6]

4:00 pm: **ZnO nanostructures: from material to systems** *(Invited Paper)*, Mehdi F. Anwar, Univ. of Connecticut (USA) . . . . . [9174-7]

4:25 pm: **Structural and electro-optical properties of one-dimensional CdSe-InP heterojunctions** *(Invited Paper)*, Babak Nikoobakht, National Institute of Standards and Technology (USA) . . . . . [9174-8]

WEDNESDAY 20 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 5A ... WED 8:00 AM TO 11:15 AM

Group III-Nitride Nanostructures

Session Chair: **M. Saif Islam,** Univ. of California, Davis (USA)

8:00 am: **Fabrication of GaN n-core/p-shell nanopillar arrays for optoelectronic applications**, Albert V. Davydov, Sergiy Krylyuk, Ratan Debnath, Jong-Yoon Ha, Baomei Wen, Abhishek Motayed, National Institute of Standards and Technology (USA) . . . . . [9174-9]

8:15 am: **Vertical type GaN nanowire/thin film p-n junction light-emitting diodes** *(Invited Paper)*, Young Joon Hong, Sejong Univ. (Korea, Republic of); Sung Jin An, Kumoh National Institute of Technology (Korea, Republic of) . . . . [9174-10]

8:40 am: **Nanomaterials and nanostructures for LEDs: advanced nano-scale correlation of structural and optical properties of GaN nanorods** *(Invited Paper)*, Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9174-11]

9:05 am: **P-type III-nitride nanowires: epitaxial growth, surface charge properties, and novel device applications** *(Invited Paper)*, Zetian Mi, McGill Univ. (Canada) . . . . . [9174-12]

9:30 am: **Top-down III-nitride nanowires: from LEDs to lasers** *(Invited Paper)*, George T. Wang, Qiming Li, Jeremy B. Wright, Sandia National Labs. (USA); Huiwen Xu, The Univ. of New Mexico (USA); Jonathan J. Wierer Jr., Daniel D. Koleske, Jeffrey J. Figiel, Sandia National Labs. (USA); Antonio Hurtado, Luke F. Lester, Changyi Li, Steven R. J. Brueck, The Univ. of New Mexico (USA); Ting-Shan Luk, Igal Brener, Sandia National Labs. (USA) . . . . . [9174-13]

Coffee Break . . . . . Wed 9:55 am to 10:25 am

10:25 am: **Simulatenous optical and structural investigation of extended defects in nitride nanorods** *(Invited Paper)*, Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9174-14]

10:50 am: **Bulk GaN and its application as substrate in building quantum nanostructures for some electronic and optoelectronic devices** *(Invited Paper)*, Michal Bockowski, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland) . . . . . [9174-15]

Lunch/Exhibition Break . . . . . Wed 11:15 am to 1:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 5A . . . . WED 1:00 PM TO 2:05 PM

2D Nanostructures and Devices I

Session Chair: **A. Alec Talin,** Sandia National Labs. (USA)

1:00 pm: **Van der Waals epitaxy of Bi_2Se_3 via hybrid physical-chemical vapor deposition for topological insulator applications** *(Invited Paper)*, Joan M. Redwing, Joseph E. Brom, The Pennsylvania State Univ. (USA) . . . . . [9174-16]

1:25 pm: **Growth of crystalline Al_2O_3 via low temperature thermal ALD: nanomaterial substrate phase stabilization** *(Invited Paper)*, Sharka M. Prokes, U.S. Naval Research Lab. (USA); Michael Katz, NRC (USA); Mark E. Twigg, U.S. Naval Research Lab. (USA) . . . . . [9174-17]

1:50 pm: **Aluminum titanium oxide films for optical encapsulation and broadband optical coupling**, Juan J. Diaz Leon, Univ. of California, Santa Cruz (USA) and Nanostructured Energy Conversion Technology and Research (USA); Ernest Demaray, Demaray, LLC (USA) and Antropy, Inc. (USA); David M. Fryauf, Junce Zhang, Kate J. Norris, Univ. of California, Santa Cruz (USA) and Nanostructured Energy Conversion Technology and Research (USA); Mark Johnson, Tango Systems, Inc. (USA); Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (USA) and Nanostructured Energy Conversion Technology and Research (USA) . . . . . [9174-18]

SESSION 5

LOCATION: CONV. CTR. ROOM 5A . . . . WED 2:05 PM TO 3:20 PM

Organic-Inorganic Integration

Session Chair: **A. Alec Talin,** Sandia National Labs. (USA)

2:05 pm: **Insights into enhanced MOF growth mechanisms on fibrous mats** *(Invited Paper)*, Sarah D. Shepherd, RTI International (USA); Junjie Zhao, Mark D. Losego, Paul C. Lemaire, Philip S. Williams, Christopher J. Oldham, North Carolina State Univ. (USA); Howard J. Walls, RTI International (USA); Gregory W. Peterson, U.S. Army Edgewood Chemical Biological Ctr. (USA); Gregory N. Parsons, North Carolina State Univ. (USA) . . . . . [9174-19]

2:30 pm: **Molecule meets MOF: bridging the gap between organic and inorganic electronic materials** *(Invited Paper)*, Mark D. Allendorf, A. Alec Talin, Michael E. Foster, Vitalie Stavila, François Léonard, Sandia National Labs. (USA) . . . . . [9174-20]

2:55 pm: **Organic-inorganic hybrid films using molecular-atomic layer deposition (MALD)** *(Invited Paper)*, Jiyoung Kim, The Univ. of Texas at Dallas (USA) . . . . . [9174-21]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 5A . . . . WED 3:50 PM TO 5:20 PM

Group III-V and IV Nanostructures II

Session Chair: **Joan M. Redwing,** The Pennsylvania State Univ. (USA)

3:50 pm: **Unconventional growth methods of indium phosphide nanowires on non-single crystal surfaces for thermoelectric devices**, Kate J. Norris, Junce Zhang, David M. Fryauf, Juan J. Diaz Leon, Univ. of California, Santa Cruz (USA); Elane Coleman, Gary S. Tompa, Structured Materials Industries, Inc. (USA); Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (USA) . . . . . [9174-22]

4:05 pm: **Magnetic doping of Ge-quantum dots: a growth study exploring the feasibility of modulating QD properties** *(Invited Paper)*, Petra Reinke, Univ. of Virginia (USA). . . . . [9174-23]

4:30 pm: **GaAs-AlGaAs core-shell nanowire arrays: MOVPE growth and luminescence properties** *(Invited Paper)*, Paola Prete, Istituto per la Microelettronica e Microsistemi (Italy); Nico Lovergine, Univ. del Salento (Italy) . . . . . [9174-24]

4:55 pm: **Fluctuations of the surface potential and photoconductivity in nanoheterostructures Si/Ge with SiGe nanoislands** *(Invited Paper)*, Darina P. Storozhuk, Sergey V. Kondratenko, National Taras Shevchenko Univ. of Kyiv (Ukraine); Yuriy N. Kozyrev, Chuiko Institute of Surface Chemistry (Ukraine) . . . . . [9174-25]

THURSDAY 21 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 5A . . . THU 8:30 AM TO 11:30 AM

2D Nanostructures and Devices II

Session Chair: **Ekaterina Pomerantseva,** Drexel Univ. (USA)

8:30 am: **TiO_2 nanocrystal evolution in high-temperature atomic layer deposition and its application in solar energy harvesting** *(Invited Paper)*, Xudong Wang, Univ. of Wisconsin-Madison (USA) . . . . . [9174-26]

8:55 am: **Nanoelectronic synaptic devices and materials for brain-inspired computational architectures** *(Invited Paper)*, Rashmi Jha, The Univ. of Toledo (USA) . . . . . [9174-27]

9:20 am: **Investigation on resistive switching characteristics of ZnO thin film** *(Invited Paper)*, Min Wei, Univ. of California, Santa Cruz (USA); Chunfu Li, Fan Yang, Hong Deng, Univ. of Electronic Science and Technology of China (China) [9174-28]

9:45 am: **Nano electronics with 2D layered semiconductors** *(Invited Paper)*, Saptarshi Das, Argonne National Lab. (USA) . . . . . [9174-29]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

10:40 am: **Continued development of dual-gated bilayer graphene devices** *(Invited Paper)*, Stephen W. Howell, Thomas E. Beechem, Allister B. Hamilton, Taisuke Ohta, Khalid M. Hattar, Sandia National Labs. (USA) . . . . . [9174-30]

11:05 am: **Effect of interlayer orientation on electronic structure of 2D layered materials** *(Invited Paper)*, Abbas Ebnonnasir, Univ. of California, Los Angeles (USA) and Colorado School of Mines (USA); Cristian V. Ciobanu, Colorado School of Mines (USA); Suneel Kodambaka, Univ. of California, Los Angeles (USA). [9174-31]

Lunch/Exhibition Break . . . . . Thu 11:30 am to 1:10 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 5A . . . . . THU 1:10 PM TO 3:20 PM

1D Nanostructures II

Session Chair: **Albert V. Davydov,** National Institute of Standards and Technology (USA)

1:10 pm: **High-precision transfer-printing of vertically oriented 1D semiconductor arrays and integration into flexible devices**, Mark Triplett, Univ. of California, Davis (USA); François Léonard, Sandia National Labs. (USA); M. Saif Islam, Univ. of California, Davis (USA). . . . . [9174-32]

1:25 pm: **Carbon nanotube terahertz detector** *(Invited Paper)*, Francois Leonard, Sandia National Labs. (USA) . . . . . [9174-33]

1:50 pm: **Acid-leached α-MnO_2 nanowires for electrochemical energy storage** *(Invited Paper)*, Bryan Byles, Drexel Univ. (USA); Arunkumar Subramanian, Virginia Commonwealth Univ. (USA); Ekaterina Pomerantseva, Drexel Univ. (USA) [9174-34]

2:15 pm: **Analyzing the evolution of microstructural disorder in thermally annealed bismuth telluride nanowires using a combined STEM/CBED approach** *(Invited Paper)*, Kristopher J. Erickson, Steven J. Limmer, William G. Yelton, Caitlin Rochford, Michael P. Siegal, Douglas L. Medlin, Sandia National Labs. (USA) . . . . . [9174-35]

2:40 pm: **SAD-GLAD core-shell nanorod arrays for fuel cell, photodetector, and solar cell electrode applications**, Tansel Karabacak, Univ. of Arkansas at Little Rock (USA) . . . . . [9174-36]

2:55 pm: **Recombination-induced migration and reactions of hydrogen in SiC** *(Invited Paper)*, Yaroslav Koshka, Mississippi State Univ. (USA) . . . . . [9174-37]

Coffee Break . . . . . Thu 3:20 pm to 3:50 pm

CONFERENCE 9174

LOCATION: CONV. CTR. ROOM 5A

SESSION 9

LOCATION: CONV. CTR. ROOM 5A . . . . . THU 3:50 PM TO 5:10 PM

3D Heterogeneous Materials and Device Integration

Session Chair: **Nobuhiko P. Kobayashi,** Univ. of California, Santa Cruz (USA)

3:50 pm: **Understanding and optimization of the sensitivity of nanoscale FET-based biosensors** *(Invited Paper)*, Chi On Chui, Kaveh Shoorideh, Univ. of California, Los Angeles (USA) . . . . . [9174-38]

4:15 pm: **Compound and alloyed contacts to Ge/Si and InGaAs nanowires and FinFETs** *(Invited Paper)*, Shadi A. Dayeh, Univ. of California, San Diego (USA); Binh-Minh Nguyen, Los Alamos National Lab. (USA); Renjie Chen, Univ. of California, San Diego (USA); Wei Tang, Univ. of California, Los Angeles (USA) . . . . . [9174-39]

4:40 pm: **On-chip integrated 3D lithium ion batteries**, Dmitry Ruzmetov, Andrei A. Kolmakov, Paul M. Haney, National Institute of Standards and Technology (USA); A. Alec Talin, Sandia National Labs. (USA) . . . . . [9174-40]

4:55 pm: **3D gate-all-around field effect transistors enabled by bridging nanowires**, Jin Yong Oh, Univ. of California, Davis (USA); Hyun-June Jang, Won-Ju Cho, Kwangwoon Univ. (Korea, Republic of); Jong-Tae Park, Univ. of Incheon (Korea, Republic of); M. Saif Islam, Univ. of California, Davis (USA). . . . . [9174-41]

Solar Energy + Technology

- THIN FILMS
- CONCENTRATORS
- RELIABILITY
- CELL TECHNOLOGIES
- SOLAR HYDROGEN
- MATERIALS PROCESSING
- NONIMAGING OPTICS
- OPVS

Symposium Chair
Oleg V. Sulima,
GE Global Research (USA)

Solar Energy + Technology

9175 **High and Low Concentrator Systems for Solar Energy Applications IX** *(Plesniak, Pfefferkorn)* . . . . . p. 107

9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur)*. . . . p. 109

9177 **Thin Films for Solar and Energy Technology VI** *(Eldada, Heben)* . . . . . p. 111

9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima, Conibeer)*. . . . . .p. 113

9179 **Reliability of Photovoltaic Cells, Modules, Components, and Systems VII** *(Dhere, Wohlgemuth, Jones-Albertus)* . . . . . .p. 115

9180 **Laser Processing and Fabrication for Solar, Displays, and Optoelectronic Devices III** *(Reutzel, Kar, Hwang, Molpeceres)* p. 117

9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel)*. . . . . .p. 131

9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

Solar Energy + Technology

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Symposium-wide Plenary Session, 5:45 to 7:35 PM, p. 10	**Solar Energy Plenary Session,** 2:00 PM to 4:35 PM, p. 11		**Poster Session,** 5:30 to 7:30 PM, p. 17	

SOLAR ENERGY + TECHNOLOGY

9177 **Thin Films for Solar and Energy Technology VI** *(Eldada, Heben),* p. 111

9175 **High and Low Concentrator Systems for Solar Energy Applications IX** *(Plesniak, Pfefferkorn),* p. 107

9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon),* p. 152

9176 **Solar Hydrogen and Nanotechnology IX** *(Mathur),* p. 109

9178 **Next Generation Technologies for Solar Energy Conversion V** *(Sulima, Conibeer),* p. 113

9179 **Reliability of Photovoltaic Cells, Modules, Components, and Systems VII** *(Dhere, Wohlgemuth, Jones-Albertus),* p. 115

9180 **Laser Processing and Fabrication for Solar, Displays, and Optoelectronic Devices III** *(Reutzel, Kar, Hwang, Molpeceres),* p. 117

9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel),* p. 131

GREEN PHOTONICS

SPIE Optics + Photonics is a leading conference on green photonics technologies such as energy, sustainability, conservation, and environmental monitoring.

CONFERENCE 9175

LOCATION: CONV. CTR. ROOM 18

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9175

High and Low Concentrator Systems for Solar Energy Applications IX

Conference Chairs: **Adam P. Plesniak,** Arzon Solar, LLC (USA); **Candace Pfefferkorn,** SunShot Initiative, U.S. Dept. of Energy (USA)

Program Committee: **Harry A. Atwater Jr.,** California Institute of Technology (USA); **Daniel J. Friedman,** National Renewable Energy Lab. (USA); **Noel C. Giebink,** The Pennsylvania State Univ. (USA); **Raymond K. Kostuk,** The Univ. of Arizona (USA); **Andru J. Prescod,** SunShot Initiative, U.S. Dept. of Energy (USA), ManTech International Corp. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . MON 2:00 PM TO 4:35 PM

Solar Energy Plenary Session

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

2:00 pm: **CPV: Lessons from the First 100MW and the Explosion of Next Generation Technologies** *(Plenary)*, Adam P. Plesniak, Arzon Solar, LLC (USA) . . . . . [9175-301]

2:25 pm: **The Renaissance of CdTe-based Photovoltaics** *(Plenary)*, William Huber, GE Global Research (USA) . . . . . [9177-302]

2:50 pm: **Organic Solar Cells: From a Lab Curiosity to a Serious Photovoltaic Technology** *(Plenary)*, Karl Leo, Technische Univ. Dresden (Germany) and King Abdullah Univ. of Science and Technology (KAUST) (Saudi Arabia) . . . . . [9184-303]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

3:45 pm: **Hot Carrier Solar Cell Absorbers: Materials, Mechanisms and Nanostructures** *(Plenary)*, Gavin Conibeer, Australian Ctr. for Advanced Photovoltaics, The Univ. of New South Wales (Australia) . . . . . [9178-304]

4:10 pm: **International PV QA Task Force's Proposed Comparative Rating System for PV Modules** *(Plenary)*, John H. Wohlgemuth, Sarah Kurtz, National Renewable Energy Lab. (USA) . . . . . [9179-305]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 18 . . . . . TUE 9:00 AM TO 9:10 AM

Introductory Remarks

Candace Pfefferkorn, SunShot Initiative, U.S. Dept. of Energy (USA); **Adam P. Plesniak,** Arzon Solar, LLC (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 18 . . . . .TUE 9:10 AM TO 10:10 AM

Cross-cutting Topics of Interest to CPV and CSP Session I

Session Chair: **Adam P. Plesniak,** Arzon Solar, LLC (USA)

9:10 am: **300 sun light engine for high concentrator application studies**, Anderson Chen, Richard Jarzebiak, John Degroff, Katy Zadrovicz, John H. Park, Oriel® Instruments, a Newport Corp. Brand (USA) . . . . . [9175-2]

9:30 am: **Rugate fibers for solar concentration**, Esmaeil Hooman Banaei, Apurva Jain, Hesam E. Arabi, Flex Optronix Technologies, LLC (USA); Amador Menéndez-Velázquez, ITMA Materials Technology (Spain) . . . . . [9175-3]

9:50 am: **Freeform solar concentrator with a highly asymmetric acceptance cone**, Brian M. Wheelwright, College of Optical Sciences, The Univ. of Arizona (USA); J. Roger P. Angel, The Univ. of Arizona (USA); Blake M. Coughenour, Kimberly N. Hammer, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9175-4]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 18 . . . TUE 10:40 AM TO 11:40 AM

CSP Systems and Optics

Session Chair: **Candace Pfefferkorn,** U.S. Dept. of Energy (USA)

10:40 am: **Reduction of radiative heat losses for solar thermal receivers**, Clifford K. Ho, Joshua M. Christian, Jesus Ortega, Julius Yellowhair, Sandia National Labs. (USA) . . . . . [9175-8]

11:00 am: **A small-scale concentrating solar thermal system**, Ran Huang, Yuxiao Liu, Christi K. Madsen, Texas A&M Univ. (USA) . . . . . [9175-6]

11:20 am: **Design and laboratory tests of a prototype molten salt receiver for linear Fresnel CSP**, Philip Gleckman, AREVA Solar, Inc. (USA) . . . . . [9175-7]

Lunch/Exhibition Break . . . . . Tue 11:40 am to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 18 . . . . . TUE 1:40 PM TO 3:00 PM

Cross-cutting Topics of Interest to CPV and CSP Session II

Session Chair: **Noel C. Giebink,** The Pennsylvania State Univ. (USA)

1:40 pm: **Plasmonic nanoparticle based spectral fluid filters for concentrating PV/T collectors**, Todd Otanicar, Nick Brekke, Parameswar Hari, Kenneth Roberts, The Univ. of Tulsa (USA); Aaron E. Saunders, nanoComposix, Inc. (USA); Ratson Morad, Cogenra Solar, Inc. (USA); Drew DeJarnette, The Univ. of Tulsa (USA) . . . . . [9175-9]

2:00 pm: **Sun to fibers (S2F): massively scalable collection and transmission of concentrated solar light for efficient energy conversion and storage**, Juan Jose Diaz Leon, Univ. of California, Santa Cruz (USA), Nanostructured Energy Conversion Technology and Research (USA); Ernest Demaray, Antropy Inc. (USA), Demaray, LLC (USA); Roger W. Anderson, Univ. of California, Santa Cruz (USA); Allan Lewandowski, Allan Lewandowski Solar Consulting, LLC (USA); Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (USA), Nanostructured Energy Conversion Technology and Research (USA) . . . . . [9175-10]

2:20 pm: **Shaping solar concentrator mirrors by radiative heating**, J. Roger P. Angel, Thomas E. Stalcup Jr., The Univ. of Arizona (USA) and REhnu, Inc. (USA); Brian M. Wheelwright, Stephen H. Warner, Kimberly N. Hammer, The Univ. of Arizona (USA) . . . . . [9175-11]

2:40 pm: **Demonstration of a self-tracking phase change concentration device**, Volker Zagolla, Eric J. Tremblay, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9175-12]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

CONFERENCE 9175

LOCATION: CONV. CTR. ROOM 18

SESSION 4

LOCATION: CONV. CTR. ROOM 18 . . . . . TUE 3:30 PM TO 4:40 PM

Spectrum Splitting Concentrators Session I

Session Chair: **Adam P. Plesniak,** Arzon Solar, LLC (USA)

3:30 pm: **Ray trace optimization of light trapping filtered concentrator**, John Lloyd, Emily D. Kosten, Emily C. Warmann, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9175-13]

3:50 pm: **Diffractive spectrum splitting module using high-contrast gratings** *(Invited Paper)*, Sunita Darbe, Emily C. Warmann, Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9175-14]

4:20 pm: **Positional irradiance measurement: characterization of spectrum-splitting and concentrating optics for photovoltaics**, Cristofer A. Flowers, Sunita Darbe, Carissa N. Eisler, California Institute of Technology (USA); Junwen He, Univ. of Illinois at Urbana-Champaign (USA); Harry A. Atwater Jr., California Institute of Technology (USA) . . . . . [9175-15]

SESSION 5

LOCATION: CONV. CTR. ROOM 18 . . . . . TUE 4:40 PM TO 5:40 PM

Spectrum Splitting Concentrators Session II

Session Chair: **Harry A. Atwater Jr.,** California Institute of Technology (USA)

4:40 pm: **Design of folded holographic spectrum-splitting photovoltaic systems for direct and diffused illumination conditions**, Yuechen Wu, Juan M. Russo, The Univ. of Arizona (USA); Shelby D. Vorndran, College of Optical Sciences, The Univ. of Arizona (USA); Raymond K. Kostuk, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9175-16]

5:00 pm: **Analysis of dispersive spectrum splitting systems**, Juan M. Russo, The Univ. of Arizona (USA); Shelby D. Vorndran, College of Optical Sciences, The Univ. of Arizona (USA); Yuechen Wu, Raymond K. Kostuk, The Univ. of Arizona (USA) . . . . . [9175-17]

5:20 pm: **Two-axis spectral splitting optical concentrator based on single injection molded plastic element**, Marco Stefancich, Carlo Maragliano, Harry Apostoleris, Matteo Chiesa, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9175-18]

WEDNESDAY 20 AUGUST

SESSION 6

LOCATION: CONV. CTR. ROOM 18 . . . WED 9:00 AM TO 10:20 AM

CSP Optics and Coatings

Session Chair: **Andru J. Prescod,** SunShot Initiative, U.S. Dept. of Energy (USA), ManTech International Corp. (USA)

9:00 am: **Low cost anti-soiling coatings for CSP collector mirrors and heliostats**, Scott R. Hunter, D. Barton Smith, Georgios Polizos, Daniel Schaeffer, Dominic F. Lee, Panos G. Datskos, Oak Ridge National Lab. (USA) . . . . . [9175-19]

9:20 am: **Optical and adhesive properties of dust deposits on solar mirrors and their effects on specular reflectivity and electrodynamic cleaning of solar collectors for mitigating energy-yield loss**, Malay Mazumder, Boston Univ. (USA); Julius Yellowhair, Sandia National Labs. (USA); Jeremy Stark, Calvin Heiling, John N. Hudelson, Zhonkai Xu, Hannah Gibson, Mark N. Horenstein, Boston Univ. (USA) . . . . . [9175-20]

9:40 am: **Anti-oxidation, high-performance solution-processed Ni plasmonic nanochain-SiO_x selective solar thermal absorbers**, Xiaobai Yu, Xiaoxin Wang, Thayer School of Engineering at Dartmouth (USA); Qinglin Zhang, Univ. of Kentucky (USA); Jifeng Liu, Thayer School of Engineering at Dartmouth (USA) . . . . [9175-21]

10:00 am: **The end of the road for carbon-based metal oxide matrices for selective solar absorbers?**, Patricia B. Forbes, Musa Kunene, Univ. of Pretoria (South Africa); Kittessa T. Roro, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9175-22]

Coffee Break . . . . . Wed 10:20 am to 10:50 am

SESSION 7

LOCATION: CONV. CTR. ROOM 18 . . . WED 10:50 AM TO 12:10 PM

CPV Systems and Optics

Session Chair: **Raymond K. Kostuk,** The Univ. of Arizona (USA)

10:50 am: **First demonstration of a novel 2D-waveguiding solar concentrator**, Ran Huang, Yuxiao Liu, Christi K. Madsen, Texas A&M Univ. (USA) . . . . . [9175-23]

11:10 am: **Field performance of CPV systems using different Fresnel lenses**, Mingguo Liu, William Bagienski, Robert B. Gordon, Adam P. Plesniak, Vahan Garboushian, Arzon Solar, LLC (USA). . . . . [9175-24]

11:30 am: **Electroluminescence imaging of Morgan Solar's 4th generation CPV technology for in-line quality control and optical efficiency estimation**, Michael Sinclair, Pascal Dufour, Kristine M. C. Drew, John Paul Morgan, Morgan Solar, Inc. (Canada) . . . . . [9175-25]

11:50 am: **On-sun performance of a commercial dish-based HCPV system**, Blake M. Coughenour, The Univ. of Arizona (USA); Thomas E. Stalcup Jr., REhnu, Inc. (USA); Brian M. Wheelwright, Andrew Geary, Kimberly N. Hammer, The Univ. of Arizona (USA); J. Roger P. Angel, REhnu, Inc. (USA) and The Univ. of Arizona (USA) . . . . . [9175-26]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Analysis of a hybrid solar combined cycle in Algeria, Mohammed Laissaoui, Ctr. de Développement des Energies Renouvelables (Algeria) . . . . . [9175-27]

Luminescent optical epoxies for solar concentrators, Anni Partanen, Aapo Harju, Jarkko Mutanen, Hanna Lajunen, Tuula Pakkanen, Markku Kuittinen, Univ. of Eastern Finland (Finland) . . . . . [9175-28]

High temperature concentrator solar cells for hybrid energy convertors, Jonathan Grandidier, Bill J. Nesmith, Subbarao Surampudi, Jet Propulsion Lab. (USA) . . . . . [9175-29]

CONFERENCE 9176

LOCATION: CONV. CTR. ROOM 15B

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9176

Solar Hydrogen and Nanotechnology IX

Conference Chair: **Sanjay Mathur,** Univ. zu Köln (Germany)

Program Committee: **Hironori Arakawa,** Tokyo Univ. of Science (Japan); **Jan Augustynski,** Univ. of Warsaw (Poland); **Michael Grätzel,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Jinghua Guo,** Lawrence Berkeley National Lab. (USA); **Hicham Idriss,** SABIC (Saudi Arabia); **Yosuke Kanai,** The Univ. of North Carolina at Chapel Hill (USA); **Claude Levy-Clement,** Ctr. National de la Recherche Scientifique (France); **Frank E. Osterloh,** Univ. of California, Davis (USA); **David Prendergast,** Lawrence Berkeley National Lab. (USA); **Yasuhiro Tachibana,** RMIT Univ. (Australia); **John A. Turner,** National Renewable Energy Lab. (USA); **Lionel Vayssieres,** Xi'an Jiaotong Univ. (China); **Heli Wang,** National Renewable Energy Lab. (USA); **Gunnar Westin,** Uppsala Univ. (Sweden); **Upul Wijayantha,** Loughborough Univ. (United Kingdom); **Jin Zhang,** Univ. of California, Santa Cruz (USA)

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 15B . . . TUE 8:45 AM TO 9:00 AM

Introduction

Sanjay Mathur, Univ. zu Köln (Germany)

SESSION 1

LOCATION: CONV. CTR. ROOM 15B . . . TUE 9:00 AM TO 12:10 PM

Solar Hydrogen & Nanotechnology I

Session Chair: **Sanjay Mathur,** Univ. zu Köln (Germany)

9:00 am: **Surface science investigations of hematite-based photoelectrocatalysts** *(Keynote Presentation)*, Bruce E. Koel, Peng Zhao, Coleman X. Kronawitter, Princeton Univ. (USA) . . . . . [9176-1]

9:40 am: **The role of fast charge dynamics in the water oxidation reaction** *(Invited Paper)*, Tanja Cuk, Univ. of California, Berkeley (USA). . . . . [9176-2]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

10:40 am: **Interfacial electronic structure and confinement effects for low-cost solar water splitting** *(Keynote Presentation)*, Lionel Vayssieres, Xi'an Jiaotong Univ. (China) . . . . . [9176-3]

11:20 am: **The chemistry of adsorbed water on semiconductor surfaces for aqueous photoelectrochemistry** *(Invited Paper)*, Coleman X. Kronawitter, Bruce E. Koel, Princeton Univ. (USA). . . . . [9176-4]

11:50 am: **Development of a low cost, portable solar hydrogen generation device**, Kyle D. Rose, Manmohan D. Aggarwal, Ashok K. Batra, Alabama A&M Univ. (USA); Dennis Wingo, Skycorp Inc. (USA) . . . . . [9176-5]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 15B . . . . TUE 1:40 PM TO 3:40 PM

Solar Hydrogen & Nanotechnology II

Session Chair: **Lionel Vayssieres,** Xi'an Jiaotong Univ. (China)

1:40 pm: **Visible light active materials for efficient photoelectrochemical hydrogen production** *(Keynote Presentation)*, Sanjay Mathur, Univ. zu Köln (Germany); Leonhard Mayrhofer, Fraunhofer-Institut für Werkstoffmechanik (Germany); Markus Niederberger, ETH Zürich (Switzerland); Jan Augustynski, Univ. of Warsaw (Poland); Joan Ramon Moranted, Institut de Recerca en Energia de Catalunya (Spain); Helge J. Lemmetyinen, Tampere Univ. of Technology (Finland); Davide Barreca, Univ. degli Studi di Padova (Italy); Volkmar Lüthen, Siemens AG (Germany); Bernd Proft, Sachtleben Pigment GmbH (Germany) . . . . . [9176-6]

2:20 pm: **Homogeneous and heterogenized iridium water oxidation catalysts** *(Invited Paper)*, Alceo Macchioni, Univ. degli Studi di Perugia (Italy) . . . . . [9176-7]

2:50 pm: **N-doped ZnO nanorod arrays with gradient band structure for photoelectrochemical water splitting** *(Invited Paper)*, Shaohua Shen, Liang Zhao, Xi'an Jiaotong Univ. (China) . . . . . [9176-8]

3:20 pm: **Investigation of solar hydrogen generation from the GaN and InGaN thin films**, Peifen Zhu, Takahiro Toma, Chee-Keong Tan, Nelson Tansu, Lehigh Univ. (USA) . . . . . [9176-9]

Coffee Break . . . . . Tue 3:40 pm to 4:10 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 15B . . . . TUE 4:10 PM TO 5:20 PM

Solar Hydrogen & Nanotechnology III

Session Chair: **Zetian Mi,** McGill Univ. (Canada)

4:10 pm: **Charge transfer dynamics at semiconductor quantum dot interface for solar energy conversion** *(Keynote Presentation)*, Yasuhiro Tachibana, RMIT Univ. (Australia) . . . . . [9176-10]

4:50 pm: **A novel Co-Pi capped pyramidal $BiVO_4$ nanorod arrays with enhanced solar water oxidation** *(Invited Paper)*, Jinzhan Su, Yankuan Wei, Liejin Guo, Xi'an Jiaotong Univ. (China) and International Research Ctr. for Renewable Energy (China) . . . . . [9176-11]

WEDNESDAY 20 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 15B . WED 9:00 AM TO 10:00 AM

Solar Hydrogen & Nanotechnology IV

Session Chair: **Bruce E. Koel,** Princeton Univ. (USA)

9:00 am: **Solution synthesis of advanced materials for solar hydrogen** *(Keynote Presentation)*, Gunnar Westin, Uppsala Univ. (Sweden) . . . . . [9176-13]

9:40 am: **Flux-assisted synthesis of $SnNb_2O_6$ for tuning photocatalytic properties**, Dalal A. Noureldine, Kazuhiro Takanabe, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9176-14]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 5

LOCATION: CONV. CTR. ROOM 15B WED 10:30 AM TO 12:00 PM

Solar Hydrogen & Nanotechnology V

Session Chair: **Gunnar Westin,** Uppsala Univ. (Sweden)

10:30 am: **High efficiency and highly stable water splitting on InGaN nanowire arrays under visible light irradiation** *(Keynote Presentation)*, Zetian Mi, Md. G. Kibria, Bandar M. Alotaibi, McGill Univ. (Canada). . . . . [9176-15]

11:10 am: **Electronic structure and interfacial phenomena in the generation of solar fuel characterized by In situ x-ray spectroscopy** *(Invited Paper)*, Chung-Li Dong, National Synchrotron Radiation Research Ctr. (Taiwan); Jinghua Guo, Lawrence Berkeley National Lab. (USA) . . . . . [9176-16]

11:40 am: **Hierarchical TiO_2/In_2S_3 nano-heterostructures for high efficiency photoelectrochemical hydrogen generation**, Mehrdad Balandeh, Alessandro Mezzetti, Fabio Di Fonzo, Istituto Italiano di Tecnologia (Italy) . . . . . [9176-17]

Lunch/Exhibition Break . . . . . Wed 12:00 pm to 1:30 pm

CONFERENCE 9176

LOCATION: CONV. CTR. ROOM 15B

SESSION 6

LOCATION: CONV. CTR. ROOM 15B . . . WED 1:30 PM TO 3:40 PM

Solar Hydrogen & Nanotechnology VI

Session Chair: **Chung-Li Dong,** National Synchrotron Radiation Research Ctr. (Taiwan)

1:30 pm: **Functionalization of Ag nanoparticles using local hydrophilic pool segment designed on their particle surface** *(Invited Paper)*, Motoyuki Iijima, Yokohama National Univ. (Japan); Aki Kurumiya, Junki Esashi, Hayato Miyazaki, Hidehiro Kamiya, Tokyo Univ. of Agriculture and Technology (Japan) . . . . [9176-18]

2:00 pm: **Plasmonic Ag nanoparticles-decorated p-type Si wire array as photocathode for water splitting**, Chih-Jung Chen, National Taiwan Univ. (Taiwan) . . . . . [9176-19]

2:20 pm: **Nanoporous GaN for enhanced solar hydrogen production**, Jonathan D. Benton, Jie Bai, Tao Wang, The Univ. of Sheffield (United Kingdom) . . [9176-20]

2:40 pm: **Nanostructured $Cu_2O/SrTiO_3$ heterojunction for solar hydrogen production: experimental and first-principles analysis**, Dipika Sharma, Anuradha Verma, Anamika Banerjee, Vibha R. Satsangi, Rohit Shrivastav, Dayalbagh Educational Institute (India); Umesh V. Waghmare, Jawaharlal Nehru Ctr. for Advanced Scientific Research (India); Sahab Dass Kaura, Dayalbagh Educational Institute (India) . . . . . [9176-21]

3:00 pm: **Plasma-enhanced CVD of visible-light active metal oxide nanostructures: growth, modification, and device applications**, Andreas Mettenbörger, Thomas Fischer, Yakup Gönüllü, Ashish Lepcha, Sanjay Mathur, Univ. zu Köln (Germany) . . . . . [9176-22]

3:20 pm: **Facile synthesis of p-type Zn-doped A-Fe_2O_3 films for solar water splitting**, Chun-Lin Kuo, National Dong Hwa Univ. (Taiwan) . . . . . [9176-23]

Coffee Break . . . . . .Wed 3:40 pm to 4:10 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 15B . . . WED 4:10 PM TO 5:30 PM

Solar Hydrogen & Nanotechnology VII

Session Chair: **Heli Wang,** National Renewable Energy Lab. (USA)

4:10 pm: **Materials for photoelectrochemical water splitting: The U.S. Department of Energy PEC working group** *(Invited Paper)*, Heli Wang, National Renewable Energy Lab. (USA); Thomas F. Jaramillo, Stanford Univ. (USA); Eric L. Miller, U.S. Dept. of Energy (USA). . . . . [9176-24]

4:40 pm: **Efficient and durable solar-driven hydrogen production with branched nanowire heterostructures**, Alireza Kargar, Chulmin Choi, Univ. of California, San Diego (USA); Sung Joo Kim, Xiaoqing Pan, Univ. of Michigan (USA); Sungho Jin, Deli Wang, Univ. of California, San Diego (USA). . . . . [9176-25]

5:00 pm: **Synthesis and photo-induced charge and energy transfer in novel luminescent CdSe QD: metal oxide composite heterostructures** *(Invited Paper)*, Jinkyu Han, Brookhaven National Lab. (USA); Lei Wang, Stony Brook Univ. (USA); Stanislaus S. Wong, Brookhaven National Lab. (USA) and Stony Brook Univ. (USA) . . . . . [9176-26]

CONFERENCE 9177

LOCATION: CONV. CTR. ROOM 15B

Sunday–Wednesday 17–20 August 2014 • Proceedings of SPIE Vol. 9177

Thin Films for Solar and Energy Technology VI

Conference Chairs: **Louay A. Eldada,** Quanergy Systems, Inc. (USA); **Michael J. Heben,** The Univ. of Toledo (USA)

Program Committee: **Bulent Basol,** EncoreSolar, Inc. (USA); **Howard M. Branz,** National Renewable Energy Lab. (USA); **Paola Delli Veneri,** ENEA (Italy); **David S. Ginley,** National Renewable Energy Lab. (USA); **Ivan Gordon,** IMEC (Belgium); **William N. Shafarman,** Univ. of Delaware (USA); **Ayodhya N. Tiwari,** EMPA (Switzerland)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 15B . SUN 10:30 AM TO 11:50 AM

Testing and Characterization

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

10:30 am: **IR-imaging and non-destructive loss analysis on thin film solar modules and cells**, Jens Adams, Frank W. Fecher, Felix Hoga, Claudia Buerhop-Lutz, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Christoph J. Brabec, ZAE-Bayern (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9177-1]

10:50 am: **Test and analysis of thin film photovoltaic (TFPV) for UAV application**, Sayem Zafar, Mohammad Gadalla, American Univ. of Sharjah (United Arab Emirates) . . . . . [9177-2]

11:10 am: **Synchronized thermography for multi-layer thin film characterization**, Kimmo K. Leppänen, Juha M. Saarela, Tapio E. J. Fabritius, Univ. of Oulu (Finland) . . . . . [9177-3]

11:30 am: **Photoluminescence of hydrogenated silicon with amorphous/nanocrystalline mixed phase**, Andrey Emelyanov, Russian Research Ctr. Kurchatov Institute (Russian Federation); Pavel Forsh, Russian Research Ctr. Kurchatov Institute (Russian Federation) and Lomonosov Moscow State Univ. (Russian Federation); Mark Khenkin, Andrei G. Kazanskii, Lomonosov Moscow State Univ. (Russian Federation); Pavel Kashkarov, Russian Research Ctr. Kurchatov Institute (Russian Federation) and Lomonosov Moscow State Univ. (Russian Federation) . . . . . [9177-4]

Lunch Break . . . . . Sun 11:50 am to 1:40 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 15B . . . SUN 1:40 PM TO 3:00 PM

Thin-film Absorbers

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

1:40 pm: **CIGS/organic single-junction and tandem hybrid solar cells**, Manuel Reinhard, Uli Lemmer, Alexander Colsmann, Karlsruher Institut für Technologie (Germany) . . . . . [9177-5]

2:00 pm: **Effects of sputtering technique on quaternary sputtered Cu(In,Ga)Se_2 films**, Jason D. Myers, Jesse A. Frantz, U.S. Naval Research Lab. (USA); Robel Y. Bekele, U.S. Naval Research Lab. (USA) and Univ. Research Foundation (USA); Vinh Q. Nguyen, Jas S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9177-6]

2:20 pm: **Fabrication of ultra-thin (~1 μm) CdTe layer by close spaced sublimation (CSS) techniques for CdTe/CdS solar cell application**, Mohammad Rezaul Karim, King Saud Univ. (Saudi Arabia) . . . . . [9177-8]

2:40 pm: **Influence of the heat treatment temperature on the crystal structure of $CuInS_2$ thin films prepared by non-vacuum technology**, Xiaoping Hu, Advance Technology & Materials Co., Ltd. (China) . . . . . [9177-9]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 15B . . . SUN 3:30 PM TO 4:50 PM

Perovskites and Advanced Concepts

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

3:30 pm: **Enhancement of perovskite-based solar cells employing core shell metal nanoparticles**, Michael Saliba, Henry J. Snaith, Univ. of Oxford (United Kingdom) . . . . . [9177-10]

3:50 pm: **Systematic study of metal-insulator-metal diodes with a native scale oxide**, Evgeniy Donchev, Imperial College London (United Kingdom); Peter M. Gammon, The Univ. of Warwick (United Kingdom); Jing S. Pang, Peter K. Petrov, Neil M. Alford, Imperial College London (United Kingdom) . . . . . [9177-12]

4:10 pm: **New donor-acceptor type fluorinated quinoxaline-based polymer solar cells with prominent air stability and efficiency**, Jan Kai Chang, National Taiwan Univ. (Taiwan) and California Institute of Technology (USA); Wei-Hsuan Tseng, Hsieh-Chih Chen, Chih-I Wu, Chien-Liang Liu, Chih Ting Yeh, National Taiwan Univ. (Taiwan) . . . . . [9177-13]

4:30 pm: **Microcrystalline silicon oxides for silicon-based solar cells: impact of the O/Si ratio on the electronic structure**, David E. Starr, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Andreas Lambertz, Forschungszentrum Jülich GmbH (Germany); Regan G. Wilks, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Bernhard Holländer, Forschungszentrum Jülich GmbH (Germany); Jan-Hendrick Alsmeier, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Lothar Weinhardt, Karlsruher Institut für Technologie (Germany) and Univ. of Nevada, Las Vegas (USA); Monika Blum, Univ. of Nevada, Las Vegas (USA); Mihaela Gorgoi, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Wanli Yang, Lawrence Berkeley National Lab. (USA); Clemens Heske, Karlsruher Institut für Technologie (Germany) and Univ. of Nevada, Las Vegas (USA); Marcus Baer, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) and Univ. of Nevada, Las Vegas (USA) and Brandenburgische Technische Univ. Cottbus-Senftenberg (Germany) . . . . . [9177-14]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

CONFERENCE 9177
LOCATION: CONV. CTR. ROOM 15B

MONDAY 18 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 15B . MON 8:20 AM TO 10:00 AM

Hydrogen Generation and Contacts

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

8:20 am: **Strain dependence of the optical properties and band gap of transparent conducting $BaSnO_3$ and $SrSnO_3$**, David J. Singh, Oak Ridge National Lab. (USA); Qiang Xu, Khuong P. Ong, A*STAR Institute of High Performance Computing (Singapore) . . . . . [9177-15]

8:40 am: **Development of transparent and conductive Al doped $Zn_{1-x}Mg_xO$ thin film by sol-gel process with two-step annealing**, Lei Meng, Shinsuke Miyajima, Makoto Konagai, Tokyo Institute of Technology (Japan) . . . . . [9177-16]

9:00 am: **High temperature annealed SnO_2/Sn-Ag/ITO window electrodes for dye sensitized solar cells**, Sheng-Hui Chen, Chun-Ko Chen, National Central Univ. (Taiwan) . . . . . [9177-17]

9:20 am: **Metal nanowire-graphene composite transparent electrodes**, Trent Mankowski, Zhaozhao Zhu, The Univ. of Arizona (USA); Kaushik Balakrishnan, College of Optical Sciences, The Univ. of Arizona (USA); Farid Touati, Mohieddine Benammar, Qatar Univ. (Qatar); Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA); Charles M. Falco, The Univ. of Arizona (USA) [9177-18]

9:40 am: **Transparent conducting electrodes based on narrow, ultra-long copper nanowires and graphene nanocomposites**, Zhaozhao Zhu, Trent Mankowski, The Univ. of Arizona (USA); Kaushik Balakrishnan, College of Optical Sciences, The Univ. of Arizona (USA); Farid Touati, Mohieddine Benammar, Qatar Univ. (Qatar); Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA); Charles M. Falco, The Univ. of Arizona (USA) . . . . . [9177-19]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 5

LOCATION: CONV. CTR. ROOM 15B . MON 10:30 AM TO 12:30 PM

Anti-reflection and Light Trapping

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

10:30 am: **Optimization of hybrid antireflection structure integrating surface texturing and multi-layer interference coating**, Shigeru Kubota, Kensaku Kanomata, Takahiko Suzuki, Fumihiko Hirose, Yamagata Univ. (Japan) . . [9177-20]

10:50 am: **Improving thin film amorphous silicon photovoltaic cell efficiency using plasmonic structures**, Keyur K. Gandhi, Michail J. Beliatis, Simon J. Henley, S. Ravi P. Silva, Univ. of Surrey (United Kingdom) . . . . . [9177-21]

11:10 am: **Light trapping in thin-film solar cells: the role of guided modes**, Thomas M. Sondergaard, Yao-Chung Tsao, Thomas G. Pedersen, Kjeld Pedersen, Aalborg Univ. (Denmark) . . . . . [9177-22]

11:30 am: **Light trapping in photonic crystals**, Ken X. Wang, Shanhui Fan, Stanford Univ. (USA) . . . . . [9177-23]

11:50 am: **Bilayer structures optimization as antireflective coating for silicon solar cells**, Sara Zuccon, Paola Zuppella, Alain J. Corso, Maria G. Pelizzo, IFN-CNR LUXOR Lab. (Italy) . . . . . [9177-24]

12:10 pm: **Si nanowire array antireflection layers for ultrathin crystalline Si solar cells**, Minji Gwon, Yunae Cho, Dongwook Kim, Ewha Womans Univ. (Korea, Republic of) . . . . . [9177-25]

Lunch Break . . . . . Mon 12:30 pm to 2:00 pm

LOCATION: CONV. CTR. ROOM 6A . MON 2:00 PM TO 4:35 PM

Solar Energy Plenary Session

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

2:00 pm: **CPV: Lessons from the First 100MW and the Explosion of Next Generation Technologies** *(Plenary)*, Adam P. Plesniak, Arzon Solar, LLC (USA) . . . . . [9175-301]

2:25 pm: **The Renaissance of CdTe-based Photovoltaics** *(Plenary)*, William Huber, GE Global Research (USA) . . . . . [9177-302]

2:50 pm: **Organic Solar Cells: From a Lab Curiosity to a Serious Photovoltaic Technology** *(Plenary)*, Karl Leo, Technische Univ. Dresden (Germany) and King Abdullah Univ. of Science and Technology (KAUST) (Saudi Arabia) . . . . . [9184-303]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

3:45 pm: **Hot Carrier Solar Cell Absorbers: Materials, Mechanisms and Nanostructures** *(Plenary)*, Gavin Conibeer, Australian Ctr. for Advanced Photovoltaics, The Univ. of New South Wales (Australia) . . . . . [9178-304]

4:10 pm: **International PV QA Task Force's Proposed Comparative Rating System for PV Modules** *(Plenary)*, John H. Wohlgemuth, Sarah Kurtz, National Renewable Energy Lab. (USA) . . . . . [9179-305]

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Effects of steel counter electrode on performances of dye-sensitized solar cells, Jae-Ryung Lee, Young Jun Park, Je Hoon Bak, POSCO (Korea, Republic of) . . . . . [9177-26]

Fabrication of ZnS buffer layer for CIGS solar cells by highly deposited rate chemical bath deposition process, Wei-Tse Hsu, Shih-Cheng Chang, Sheng-Wen Chan, Chien-Chih Chiang, Lih-Ping Wang, Chou-Cheng Li, Jen-Chuan Chang, Song-Yeu Tsai, Industrial Technology Research Institute (Taiwan) . . . . . [9177-27]

CONFERENCE 9178

LOCATION: CONV. CTR. ROOM 17B

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9178

Next Generation Technologies for Solar Energy Conversion V

Conference Chairs: **Oleg V. Sulima,** GE Global Research (USA); **Gavin Conibeer,** The Univ. of New South Wales (Australia)

Program Committee: **Amanda J. Chatten,** Imperial College London (United Kingdom); **Andrew J. Ferguson,** National Renewable Energy Lab. (USA); **Alberto Salleo,** Stanford Univ. (USA); **Sean E. Shaheen,** Univ. of Colorado at Boulder (USA); **Wilfried G. J. H. M. van Sark,** Utrecht Univ. (Netherlands); **Xianfan Xu,** Purdue Univ. (USA)

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 17B . . . TUE 9:00 AM TO 10:20 AM

Photon Up and Down Conversion in PV

Session Chair: **Gavin Conibeer,** The Univ. of New South Wales (Australia)

9:00 am: **Recent developments in luminescent solar concentrators** *(Invited Paper)*, Wilfried G. J. H. M. van Sark, Utrecht Univ. (Netherlands) . . . . . [9178-1]

9:30 am: **Singlet fission by novel chromophores in various molecular assemblies** *(Invited Paper)*, Justin C. Johnson, Joel N. Schrauben, Joseph Ryerson, National Renewable Energy Lab. (USA); Josef Michl, Univ. of Colorado at Boulder (USA); Arthur J. Nozik, National Renewable Energy Lab. (USA) and Univ. of Colorado (USA) . . . . . [9178-2]

10:00 am: **Luminescent down-shifting layers with Eu^{2+} and Eu^{3+} doped strontium compound particles for photovoltaics**, Anastasiia Solodovnyk, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Erlangen Graduate School in Advanced Optical Technologies (Germany); Andre Hollmann, Andres Osvet, Karen K. Forberich, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Edda Stern, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Miroslaw Batentschuk, Robin Klupp Taylor, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Christoph J. Brabec, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Erlangen Graduate School in Advanced Optical Technologies (Germany) . . . . . [9178-3]

Coffee Break . . . . . Tue 10:20 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 17B . . . TUE 10:50 AM TO 11:40 AM

Novel Materials and Designs for Solar Energy Conversion I

Session Chair: **Sean E. Shaheen,** Univ. of Colorado at Boulder (USA)

10:50 am: **2D honeycomb semiconductors with Dirac-type electrons and holes: fabrication, electronic structure, and possible applications** *(Invited Paper)*, Daniel Vanmaekelbergh, Utrecht Univ. (Netherlands) . . . . . [9178-4]

11:20 am: **Coherence-limited solar power conversion: the fundamental thermodynamic bounds and the consequences for solar rectennas**, Jeffrey M. Gordon, Heylal Mashaal, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9178-5]

Lunch/Exhibition Break . . . . . Tue 11:40 am to 1:45 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 17B . . . . . TUE 1:45 PM TO 2:55 PM

Novel Materials and Designs for Solar Energy Conversion II

Session Chair: **Andrew J. Ferguson,** National Renewable Energy Lab. (USA)

1:45 pm: **Wrinkles and folds as photonics structures in polymer photovoltaics** *(Invited Paper)*, Yueh-Lin Loo, Princeton Univ. (USA) . . . . . [9178-8]

2:15 pm: **Electrowetting based stationary sun tracking optics**, Marco Stefancich, Harry Apostoleris, Carlo Maragliano, Matteo Chiesa, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9178-9]

2:35 pm: **Highly efficient selective solar absorbers/emitters based on 2D metallic photonic crystals**, Veronika Rinnerbauer, Johannes Kepler Univ. Linz (Austria) and Massachusetts Institute of Technology (USA); Veronika Stelmakh, Yi Xiang Yeng, Yichen Shen, Jay J. Senkevich, John D. Joannopoulos, Marin Soljacic, Ivan Celanovic, Massachusetts Institute of Technology (USA) . . . . . [9178-10]

Coffee Break . . . . . Tue 2:55 pm to 3:25 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 17B . . . . . TUE 3:25 PM TO 5:35 PM

Quantum Dot PV

Session Chair: **Xianfan Xu,** Purdue Univ. (USA)

3:25 pm: **Enhanced carrier multiplication in quantum dots through controlled intraband cooling** *(Invited Paper)*, Victor I. Klimov, Los Alamos National Lab. (USA) . . . . . [9178-11]

3:55 pm: **Exciton transport in colloidal quantum dot solids** *(Invited Paper)*, William A. Tisdale, Massachusetts Institute of Technology (USA) . . . . . [9178-12]

4:25 pm: **Recent progress in colloidal quantum dot photovoltaics** *(Invited Paper)*, Alexander H. Ip, Edward H. Sargent, Univ. of Toronto (Canada) . . [9178-13]

4:55 pm: **Ultrafast spectroscopy of CuInSeS colloidal quantum dots: Auger recombination, carrier multiplication, and electron transfer**, Nikolay S. Makarov, Hunter McDaniel, Istvan Robel, Victor I. Klimov, Los Alamos National Lab. (USA) . . . . . [9178-14]

5:15 pm: **Energy materials: core/shell structural photoelectrodes assembled with quantum dots for solar cells**, Jianjun Tian, Shengen Zhang, Univ. of Science and Technology Beijing (China) . . . . . [9178-15]

CONFERENCE 9178

LOCATION: CONV. CTR. ROOM 17B

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 17B . . WED 8:30 AM TO 10:00 AM

Nanostructures for Light Management

Session Chair: **Wilfried G. J. H. M. van Sark,** Utrecht Univ. (Netherlands)

8:30 am: **Plasmonic structures to enhance light-harvesting in organic photovoltaic devices** *(Invited Paper)*, Wounjhang Park, Univ. of Colorado at Boulder (USA) . . . . . [9178-16]

9:00 am: **Scattering of long wavelengths into thin silicon photovoltaic films by silver nanoparticles**, Richard M. Osgood, Katherine M. Bullion, U.S. Army Natick Soldier Research, Development and Engineering Ctr. (USA); Vladimir Liberman, Richard P. Kingsborough, MIT Lincoln Lab. (USA); Stephen Giardini, Michael Ghebrebrhan, Peter J. Stenhouse, Joel B. Carlson, U.S. Army Natick Soldier Research, Development and Engineering Ctr. (USA); Mordechai Rothschild, MIT Lincoln Lab. (USA); Steven E. Kooi, MIT Institute for Soldier Nanotechnologies (USA); Frank Jeffrey, Steven Braymen, PowerFilm, Inc. (USA); John D. Joannopoulos, Owen D. Miller, MIT Institute for Soldier Nanotechnologies (USA); Hardeep S. Gill, Jayant Kumar, Univ. of Massachusetts Lowell (USA). . . . [9178-17]

9:20 am: **Plasmonic rear reflectors for thin-film solar cells: design principles from electromagnetic modelling**, Claire E. R. Disney, Supriya Pillai, Craig M. Johnson, Martin A. Green, Qi Xu, The Univ. of New South Wales (Australia). . . . . [9178-18]

9:40 am: **Enhancing solar cell efficiency by lenses on the nano- and microscale**, Martina Schmid, Phillip Manley, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9178-19]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 17B . . WED 10:30 AM TO 12:10 PM

Si Nanowires for PV

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

10:30 am: **Minority carrier lifetime of thin polycrystalline silicon nanowires films on polycrystalline silicon layer prepared by aluminum-induced crystallization**, Tatsuya Yamazaki, Tokyo Institute of Technology (Japan); Shinya Kato, Japan Science and Technology Agency (Japan); Shinsuke Miyajima, Makoto Konagai, Tokyo Institute of Technology (Japan). . . . . [9178-20]

10:50 am: **Influence of substrates and film deposition techniques on formation of polycrystalline silicon nanowires films**, Shinya Kato, Japan Science and Technology Agency (Japan); Tatsuya Yamazaki, Shinsuke Miyajima, Makoto Konagai, Tokyo Institute of Technology (Japan). . . . . [9178-21]

11:10 am: **Effect of tapered shape on performance of silicon nanowire solar cells**, Yasuyoshi Kurokawa, Tokyo Institute of Technology (Japan); Shinya Kato, Japan Science and Technology Agency (Japan); Makoto Konagai, Tokyo Institute of Technology (Japan) and Japan Science and Technology Agency (Japan). [9178-22]

11:30 am: **Fabrication of nano-walls for solar cell application**, Yukimi Ichikawa, Hiroshi Tomizawa, Japan Science and Technology Agency (Japan); Makoto Konagai, Tokyo Institute of Technology (Japan). . . . . [9178-23]

11:50 am: **Properties of Si/SiO_2 superlattice nanodisc array prepared by nanosphere lithography**, Takaya Higa, Tokyo Institute of Technology (Japan); Ryousuke Ishikawa, Japan Science and Technology Agency (Japan); Shinsuke Miyajima, Makoto Konagai, Tokyo Institute of Technology (Japan) . . . . . [9178-24]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Enhanced near-infrared response of CdS/CdTe solar cell using Tm^{3+} and Yb^{3+} co-doped upconverting glass phosphors, Zhengda Pan, Don Whyte, Steven H. Morgan, Fisk Univ. (USA); Jiaojiao Li, Abdulaziz Alasward, Joseph D. Beach, Colin A. Wolden, Colorado School of Mines (USA) . . . . . [9178-25]

Development of nanostructured luminophore coating for broadening of solar cell absorption spectrum, Andriy Kryuchyn, Institute for Information Recording (Ukraine); Ievgen V. Beliak, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9178-27]

Photovoltaic properties of copper containing and silver containing diamond like carbon nanocomposites, Sarunas Meskinis, Arvydas Ciegis, Andrius Vasiliauskas, Kestutis Slapikas, Tomas Tamulevicius, Sigitas Tamulevicius, Kaunas Univ. of Technology (Lithuania). . . . . [9178-28]

CONFERENCE 9179

LOCATION: CONV. CTR. ROOM 19

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9179

Reliability of Photovoltaic Cells, Modules, Components, and Systems VII

Conference Chair: **Neelkanth G. Dhere,** Univ. of Central Florida (USA)

Conference Co-Chairs: **John H. Wohlgemuth,** National Renewable Energy Lab. (USA); **Rebecca Jones-Albertus,** U.S. Dept. of Energy (USA)

Program Committee: **David S. Albin,** National Renewable Energy Lab. (USA); **Glenn Alers,** Univ. of California, Santa Cruz (USA); **Ward I. Bower,** Sandia National Labs. (USA); **Leila R. O. Cruz,** Instituto Militar de Engenharia (Brazil); **Takuya Doi,** National Institute of Advanced Industrial Science and Technology (Japan); **Fernando Fabero,** Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); **Vivek S. Gade,** Jabil Circuit, Inc. (USA); **William J. Gambogi Jr.,** DuPont (USA); **Werner Herrmann,** TÜV Rheinland Group (Germany); **Stephen J. Hogan,** Spire Corp. (USA); **Michael Köhl,** Fraunhofer-Institut für Solare Energiesysteme (Germany); **Ralf Leutz,** Concentrator Optics GmbH (Germany); **Xavier Mathew,** Ctr. de Investigación en Energia (Mexico); **Robert McConnell,** Arzon Solar, LLC (USA); **Yoichi Murakami,** Japan Electrical Safety & Environment Technology Labs. (Japan); **F. J. John Pern,** Sunshine Sci-Tech LLC (USA); **Laure-Emmanuelle Perret-Aebi,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Shirish Pethe,** Applied Materials, Inc. (USA); **Marianne Rodgers,** Univ. of Central Florida (USA); **Ivan Sinicco,** Oerlikon Solar Ltd. (Switzerland); **Oleg V. Sulima,** GE Global Research (USA); **Bolko von Roedern,** von Roedern & Associates LLC (USA)

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 19 . . . . WED 8:30 AM TO 11:50 AM

PV Module Testing

Session Chair: **Nancy Phillips,** 3M Co. (USA)

8:30 am: **The importance of reliability to the SunShot Initiative** *(Invited Paper)*, Shubhra Bansal, Rebecca Jones-Albertus, U.S. Dept. of Energy (USA) . . . [9179-1]

9:00 am: **Overview of the activities of the International PV Module Quality Assurance Task Group 3 on humidity, temperature, and voltage** *(Invited Paper)*, John H. Wohlgemuth, Michael D. Kempe, Peter Hacke, National Renewable Energy Lab. (USA) . . . . . [9179-2]

9:30 am: **Japanese Task Group 8 activities in international PV module quality assurance** *(Invited Paper)*, Keiichiro Sakurai, Akihiro Takano, Masaaki Yamamichi, Hiroko Saito, Masahiko Tomita, Akira Terakawa, Hisanobu Yokoyama, Tadashi Obayashi, Keizou Asaoka, Mika Kambe, Hideki Yoshikawa, Michihiro Takayama, Yuna Koizumi, Shuuji Tokuda, Masayoshi Takani, Michio Kondo, Photovoltaic Power Generation Technology Research Association (Japan) . . . . . [9179-3]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

10:30 am: **Statistical analysis of degradation modes and mechanisms in various thin-film photovoltaic module technologies**, Eric Schneller, Narendra S. Shiradkar, Camila L. Pereira, Neelkanth G. Dhere, Univ. of Central Florida (USA) . . . . . [9179-4]

10:50 am: **Analysis of the degradation and aging of a commercial photovoltaic installation**, Alexander Z. Bradley, William J. Gambogi, Babak Hamzavytehrany, DuPont (USA) . . . . . [9179-5]

11:10 am: **Comparison of environmental degradation in Hanwha 295 W and SunPower 320 W photovoltaic modules via accelerated lifecycle testing**, Kelly Simmons-Potter, Teh Lai, Ryan P. Biggie, Wei-Jie Huang, Barrett G. Potter Jr., The Univ. of Arizona (USA) . . . . . [9179-6]

11:30 am: **Methodology and outdoor performance of CIGS modules in different climates**, Kristopher Toivola, Paul F. Robusto, Ajay Saproo, Bill Kessler, MiaSolé HT (USA) . . . . . [9179-7]

Lunch/Exhibition Break . . . . . Wed 11:50 am to 1:30 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 19 . . . . . WED 1:30 PM TO 3:40 PM

PV Module Reliability: Simulation and Modeling

Session Chair: **Michael D. Kempe,** National Renewable Energy Lab. (USA)

1:30 pm: **Effect of shading on different PV technologies and how to minimize the impact**, Yutao Zong, Arizona State Univ. (USA). . . . . [9179-9]

1:50 pm: **Finite element model simulations for studying the impact of shunts on thin film modules**, Frank W. Fecher, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Claudia Buerhop-Lutz, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9179-10]

2:10 pm: **Effect of shading on the switching of bypass diodes in PV modules**, Narendra S. Shiradkar, Eric Schneller, Neelkanth G. Dhere, Univ. of Central Florida (USA); Vivek S. Gade, Jabil Circuit, Inc. (USA) . . . . . [9179-11]

2:30 pm: **Angle of incidence effects on soiled PV modules**, Jim Joseph John, Indian Institute of Technology Bombay (India) and Arizona State Univ. (USA); Vidyashree Rajasekar, Sravanthi Boppana, Sai Tatapudi, Govindasamy Tamizhmani, Arizona State Univ. (USA) . . . . . [9179-12]

2:50 pm: **Comparison of outdoor-measurement and modeling of the leakage current for potential induced degradation**, Michael Köhl, Stephan Hoffmann, Fraunhofer-Institut für Solare Energiesysteme (Germany) . . . . . [9179-13]

3:10 pm: **Numerical simulation of wind flow over a photovoltaic solar panel using RANS equations** *(Invited Paper)*, Andre L. T. Rezende, Leandro F. Chaves, Instituto Militar de Engenharia (Brazil); Neelkanth G. Dhere, Univ. of Central Florida (USA) . . . . . [9179-8]

Coffee Break . . . . . Wed 3:40 pm to 4:10 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 19 . . . . . WED 4:10 PM TO 5:40 PM

Reliability of PV Cells, Modules, Systems, and Components I

Session Chair: **John H. Wohlgemuth,** National Renewable Energy Lab. (USA)

4:10 pm: **Research, test, and development activities performed by junction box bypass diode task force # 4** *(Invited Paper)*, Vivek S. Gade, Jabil Circuit, Inc. (USA) . . . . . [9179-14]

4:40 pm: **The impact of sodium and potassium incorporation on the degradation of CIGS solar cells**, Mirjam Theelen, TNO (Netherlands) and Technische Univ. Delft (Netherlands); Nicolas Barreau, Institut des Matériaux Jean Rouxel (France); Henk Steijvers, Zeger Vroon, TNO (Netherlands); Miro Zeman, Technische Univ. Delft (Netherlands) . . . . . [9179-15]

CONFERENCE 9179

LOCATION: CONV. CTR. ROOM 19

5:00 pm: **Thermal performance of microinverters on dual-axis trackers**, Mohammad A. Hossain, Timothy J. Peshek, Yifan Xu, Case Western Reserve Univ. (USA); Liang Ji, Underwriters Labs. Inc. (USA); Alexis Abramson, Roger H. French, Case Western Reserve Univ. (USA). . . . . [9179-16]

5:20 pm: **The influence of water and atmospheric gases on the degradation of aluminum doped zinc oxide layers**, Mirjam Theelen, TNO (Netherlands) and Technische Univ. Delft (Netherlands); Zeger Vroon, TNO (Netherlands); Nicolas Barreau, Institut des Matériaux Jean Rouxel (France); Miro Zeman, Technische Univ. Delft (Netherlands) . . . . . [9179-17]

THURSDAY 21 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 19 . . . .THU 8:00 AM TO 10:40 AM

Encapsulant, Backsheet, and Packaging Materials

Session Chair: **Michael Köhl,** Fraunhofer-Institut für Solare Energiesysteme (Germany)

8:00 am: **Quantifying PV module microclimates, and translation into accelerated weathering protocols** *(Invited Paper)*, Nancy Phillips, David M. Burns, 3M Co. (USA); Kurt P. Scott, Atlas Material Testing Technology (USA) . . . [9179-18]

8:30 am: **Investigation of the cross-linking of EVA using photoluminescence spectroscopy** *(Invited Paper)*, Beate Röder, Rojonirina M. Ralaiarisoa, Jan C. Schlothauer, Humboldt-Univ. zu Berlin (Germany) . . . . . [9179-19]

9:00 am: **Predicting edge seal field performance from accelerated testing**, Kedar Y. Hardikar, MiaSolé (USA); Daniel J. Vitkavage, Lam Research Corp. (USA); Ajay Saproo, Todd A. Krajewski, MiaSolé (USA). . . . . [9179-20]

9:20 am: **Effect of UV aging on degradation and adhesion strength of ethylene-vinyl acetate (EVA) as encapsulant material in photovoltaic (PV) modules**, Amir Badiee, Xuesheng Chen, Ricky D. Wildman, Ian A. Ashcroft, The Univ. of Nottingham (United Kingdom). . . . . [9179-21]

9:40 am: **Optical properties of PV backsheets: key indicators of module performance and durability**, William J. Gambogi Jr., Thomas C. Felder, James G. Kopchick, DuPont (USA); Steven W. MacMaster, Dupont Display Solutions (USA); Alexander Z. Bradley, Babak Hamzavytehrany, DuPont (USA); Yushi Heta, DuPont K.K. (Japan); Lucie A. G. Garreau-Illes, DuPont International Operations Sarl (Switzerland); T. John Trout, DuPont (USA) . . . . . [9179-22]

10:00 am: **Device to analyze leakage current pathways in photovoltaic modules in real-time**, Neelkanth G. Dhere, Narendra S. Shiradkar, Eric Schneller, Univ. of Central Florida (USA). . . . . [9179-23]

10:20 am: **Chemical depth profiling of photovoltaic backsheets after accelerated laboratory weathering**, Chiao-Chi Lin, Peter J. Krommenhoek, Stephanie S. Watson, Xiaohong Gu, National Institute of Standards and Technology (USA) . . . . . [9179-24]

Coffee Break . . . . . Thu 10:40 am to 11:05 am

SESSION 5

LOCATION: CONV. CTR. ROOM 19 . . . . THU 11:05 AM TO 12:15 PM

Reliability of PV Cells, Modules, Systems, and Components II

Session Chair: **John H. Wohlgemuth,** National Renewable Energy Lab. (USA)

11:05 am: **Junction box wiring and connector durability issues in photovoltaic modules** *(Invited Paper)*, Juris P. Kalejs, American Capital Energy, Inc. (USA) . . . . . [9179-25]

11:35 am: **Above 3000 h outdoor stability analysis of organic solar cells applying water-based V_2O_5 hole transport layer**, Gerardo Teran-Escobar, Raphael K. Arfaoui, Anderson de Souza Lima, Monica Lira-Cantu, Institut Català de Nanotecnologia (Spain) and Consejo Superior de Investigaciones Científicas (Spain) . . . . . [9179-26]

11:55 am: **Combined-environment influence on microcrack evolution in mono-crystalline silicon**, Wei-Jie Huang, Barrett G. Potter Jr., Kelly Simmons-Potter, Jian Liu, Haitao Liao, The Univ. of Arizona (USA) . . . . . [9179-27]

Lunch/Exhibition Break . . . . . Thu 12:15 pm to 1:45 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 19 . . . . . THU 1:45 PM TO 3:15 PM

Metrology and Quality Management Tools for Improved Reliability

Session Chair: **Shubhra Bansal,** U.S. Dept. of Energy (USA)

1:45 pm: **Overview of PV module manufacturing quality management system** *(Invited Paper)*, Govind Ramu, SunPower Corp. (USA). . . . . [9179-28]

2:15 pm: **A novel combined micro- and electro-luminescence characterization platform for PV materials and devices**, Francis Ndi, Eric Teboul, HORIBA Scientific (USA) . . . . . [9179-30]

2:35 pm: **The vital role of manufacturing quality in the reliability of PV modules**, Peter Rusch, SolarBuyer, LLC (USA) . . . . . [9179-31]

2:55 pm: **A review of manufacturing metrology for improved reliability of silicon photovoltaic modules**, Kristopher O. Davis, U.S. Photovoltaic Manufacturing Consortium (USA) and Univ. of Central Florida (USA) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Joseph Walters, U.S. Photovoltaic Manufacturing Consortium (USA) and Univ. of Central Florida (USA); Marianne P. Rodgers, Univ. of Central Florida (USA); Hubert P. Siegneur, U.S. Photovoltaic Manufacturing Consortium (USA) and Univ. of Central Florida (USA); R. Paul Brooker, Nahid Mohajeri, Neelkanth G. Dhere, Univ. of Central Florida (USA); John H. Wohlgemuth, National Renewable Energy Lab. (USA); Eric Schneller, Narendra S. Shiradkar, Univ. of Central Florida (USA); Andrew C. Rudack, U.S. Photovoltaic Manufacturing Consortium (USA) and SEMATECH Inc. (USA); Winston V. Schoenfeld, U.S. Photovoltaic Manufacturing Consortium (USA) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9179-32]

Coffee Break . . . . . Thu 3:15 pm to 3:45 pm

PANEL DISCUSSION

LOCATION: CONV. CTR. ROOM 18 . .THU 3:45 PM TO 4:30 PM

Discussion on the Activities of International PV Module Quality Assurance Forum

Moderator: **Govind Ramu**, SunPower Corp. (USA)

Panelists:

John Wohlgemuth, National Renewable Energy Lab. (USA)

Nancy Phillips, 3M Co. (USA)

Michael Köhl, Fraunhofer-Institut für Solare Energiesysteme (Germany)

Neelkanth G. Dhere, Univ. of Central Florida (USA)

CONFERENCE 9180

LOCATION: CONV. CTR. ROOM 17B

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9180

Laser Processing and Fabrication for Solar, Displays, and Optoelectronic Devices III

Conference Chair: **Edward W. Reutzel,** Applied Research Lab., The Pennsylvania State Univ. (USA)

Conference Co-Chairs: **Aravinda Kar,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **David Jae-Seok Hwang,** Stony Brook Univ. (USA); **Carlos Molpeceres,** Univ. Politécnica de Madrid (Spain)

Program Committee: **Christoph J. Brabec,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Douglas B. Chrisey,** Tulane Univ. (USA); **Corey M. Dunsky,** AEOS Consulting (USA); **Mool Chandra Gupta,** Univ. of Virginia (USA); **Anthony P. Hoult,** IPG Photonics Corp. (USA); **Samuel S. Mao,** Lawrence Berkeley National Lab. (USA), Univ. of California, Berkeley (USA); **Jan Nekarda,** Fraunhofer Institute for Solar Energy Systems (Germany); **Michael A. Scarpulla,** The Univ. of Utah (USA)

SOLAR

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 17B . . . . WED 1:45 PM TO 3:25 PM

Laser Processing for Solar, Displays, and Optoelectronics

Session Chair: **Edward W. Reutzel,** Applied Research Lab., The Pennsylvania State Univ. (USA)

1:45 pm: **Overview of laser processing in solar cell fabrication** *(Invited Paper)*, Neelkanth G. Dhere, Eric Schneller, Univ. of Central Florida (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9180-1]

2:10 pm: **The role of lasers in the display manufacturing industry** *(Invited Paper)*, Gyoowan Han, Alexander Voronov, SAMSUNG SDI Co., Ltd. (Korea, Republic of) . . . . . [9180-2]

2:35 pm: **Laser processing of glass for consumer electronics: opportunities and challenges** *(Invited Paper)*, Anping Liu, Corning Incorporated (USA) . . [9180-3]

3:00 pm: **Laser microprocessing technologies for automotive, flexible electronics, and solar energy sectors** *(Invited Paper)*, Suwas Nikumb, National Research Council Canada (Canada); Ravi N. Bathe, International Advanced Research Ctr. for Powder Metallurgy and New Materials (India); George K. Knopf, Western Univ. Canada (Canada) . . . . . [9180-4]

Coffee Break . . . . . .Wed 3:25 pm to 3:55 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 17B . . . . WED 3:55 PM TO 5:40 PM

Laser Texturing

Session Chair: **Carlos Molpeceres,** Univ. Politécnica de Madrid (Spain)

3:55 pm: **New strategies in laser processing of TCOs for light management improvement in thin-film silicon solar cells** *(Invited Paper)*, Sara Lauzurica, Isabel Sánchez-Aniorte, Miguel Morales, Carlos Molpeceres, Univ. Politécnica de Madrid (Spain); Marta Lluscà, Julian López-Vidrier, Sergi Hernández, Joan Bertomeu, Univ. de Barcelona (Spain) . . . . . [9180-8]

4:20 pm: **Influence of surface modification by laser beam interference ablation on characteristics of p-Si solar cells**, Simonas Indrisiunas, Bogdan Voisiat, Alfonsas Reza, Irena Simkiene, Regina Mazeikiene, Algirdas Selskis, Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9180-5]

4:40 pm: **Laser doping and microtexturing of germanium for photodetector applications**, Keye Sun, Yiliang Bao, Univ. of Virginia (USA); Nibir K. Dhar, Defense Advanced Research Projects Agency (USA); Mool C. Gupta, Univ. of Virginia (USA) . . . . . [9180-6]

5:00 pm: **Formation of periodic structures on silicon by laser beam interference ablation technique for light control in solar cells**, Bogdan Voisiat, Simonas Indrisiunas, Rasa Suzanoviciene, Irena Simkiene, Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9180-7]

5:20 pm: **Near-field assisted nanoscale patterning for improved absorption in thin film silicon solar cell**, Vadakke Matham Murukeshan, Nanyang Technological Univ. (Singapore) . . . . . [9180-22]

THURSDAY 21 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 17B . . . THU 8:30 AM TO 11:40 AM

Modeling and Innovative Techniques

Session Chair: **Aravinda Kar,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

8:30 am: **Using numerical modeling to improve the laser processing of photovoltaic devices** *(Invited Paper)*, Todd A. Palmer, Ashwin S. Raghavan, Jared J. Blecher, The Pennsylvania State Univ. (USA); Edward W. Reutzel, Pennsylvania State Univ. (USA); Tarasankar DebRoy, The Pennsylvania State Univ. (USA)[9180-9]

8:55 am: **Large-scale atomistic simulations of the structural transformations and microstructure development in short pulse laser processing of metals** *(Invited Paper)*, Leonid V. Zhigilei, Univ. of Virginia (USA) . . . . . [9180-10]

9:20 am: **Laser processing and in situ diagnostics for crystallization: from thin films to nanostructures** *(Invited Paper)*, Costas P. Grigoropoulos, Univ. of California, Berkeley (USA) . . . . . [9180-11]

9:45 am: **Rapid sintering of copper nano ink for thin film transistor application using a laser in air environment** *(Invited Paper)*, Jun Ho Yu, Jun Young Hwang, Heuiseok Kang, Kyung-Tae Kang, Korea Institute of Industrial Technology (Korea, Republic of) . . . . . [9180-12]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

10:40 am: **Sub-bandgap laser annealing of room temperature deposited polycrystalline CdTe**, Brian J. Simonds, Sudhajit Misra, The Univ. of Utah (USA); Naba Paudel, The Univ. of Toledo (USA); Koen Vandewal, Alberto Salleo, Stanford Univ. (USA); Christos S. Ferekides, Univ. of South Florida (USA); Michael A. Scarpulla, The Univ. of Utah (USA) . . . . . [9180-13]

11:00 am: **Laser transfer process for optoelectronic device applications**, Mool C. Gupta, Univ. of Virginia (USA) . . . . . [9180-14]

11:20 am: **Silicon PV module customization using laser technology for new BIPV applications**, Juan J. García-Ballesteros, Sara Lauzurica, Miguel Morales, Univ. Politécnica de Madrid (Spain); Teodosio del Caño, Daniel Valencia, Leonardo Casado, ONYX Solar (Spain); Carlos Molpeceres, Univ. Politécnica de Madrid (Spain) . . . . . [9180-15]

Lunch/Exhibition Break . . . . . Thu 11:40 pm to 1:30 pm

CONFERENCE 9180

LOCATION: CONV. CTR. ROOM 17B

SESSION 4

LOCATION: CONV. CTR. ROOM 17B . . . . . THU 1:30 PM TO 3:15 PM

Patterning and Scribing

Session Chair: **Corey M. Dunsky,** AEOS Consulting (USA)

1:30 pm: **Selective laser patterning in organic solar cells** *(Invited Paper)*, Andreas Ostendorf, Susana Fernandes, Stella Maragkaki, Ruhr-Univ. Bochum (Germany) . . . . . [9180-16]

1:55 pm: **Femtosecond laser processing for mobile display manufacturing**, Eric P. Mottay, Clemens Hönninger, Amplitude Systèmes (France); Laurie Wilpliez, ALPhANOV (France); Jiyeon Choi, Sung-Hak Cho, Korea Institute of Machinery & Materials (Korea, Republic of) . . . . . [9180-17]

2:15 pm: **The effect of film properties and laser processing parameters on the laser ablation of molybdenum thin films**, Eric Schneller, Rafael Rodrigues, Neelkanth G. Dhere, Univ. of Central Florida (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9180-18]

2:35 pm: **Laser-assisted processing of current and next generation transparent electrodes**, David J. Hwang, Pyung-Cho Han, Hwan Lee, Andrew Mann, Tao Zhang, Stony Brook Univ. (USA) . . . . . [9180-19]

2:55 pm: **Patterning of OPV modules by ultrafast laser**, Peter Kubis, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Luca Lucera, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Fei Guo, George Spyropolous, Monika M. Voigt, Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9180-20]

Organic Photonics + Electronics

Symposium Chair
Zakya H. Kafafi,
National Science Foundation, ret (USA)

- **OLEDS**
- **OTFTS**
- **OPVS**
- **LIQUID CRYSTALS**
- **LARGE-SCALE FABRICATION**
- **ORGANIC SEMICONDUCTORS**

Organic Photonics + Electronics

9181 **Light Manipulating Organic Materials and Devices** *(Nunzi/Schuller/Jakubiak/Eich)* . . . . . p. 121

9182 **Liquid Crystals XVIII** *(Khoo)* . . . . . p. 124

9183 **Organic Light Emitting Materials and Devices XVIII** *(So, Adachi)* . . . . . p. 127

9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel)* . . . . . p. 131

9185A **Organic Field-Effect Transistors XIII** *(Bao, McCulloch)* p. 135

9185B **Organic Semiconductors in Sensors and Bioelectronics VII** *(Shinar, Kymissis)* . . . . . p. 138

Organic Photonics + Electronics

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Symposium-wide Plenary Session, 5:45 to 7:35 PM, p. 10			**Organic Photonics + Electronics Plenary Session,** 10:30 AM to 12:15 PM, p. 13	
			Poster Session, 5:30 to 7:30 PM, p. 17	

ORGANIC PHOTONICS + ELECTRONICS

9182 **Liquid Crystals XVIII** *(Khoo),* p. 124

9181 **Light Manipulating Organic Materials and Devices** *(Nunzi, Schuller, Jakubiak, Eich),* p. 121

9183 **Organic Light Emitting Materials and Devices XVIII** *(So, Adachi),* p. 127

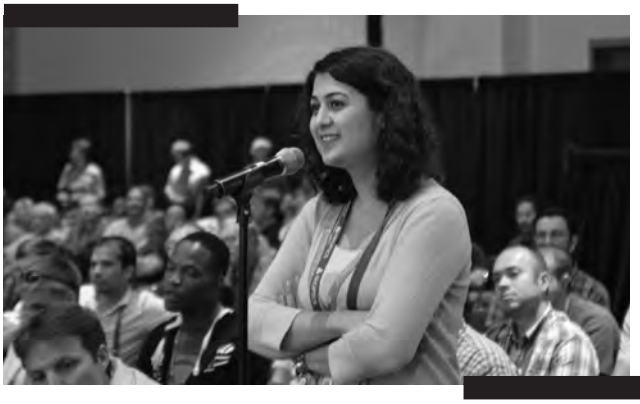
9184 **Organic Photovoltaics XV** *(Kafafi, Lane, Samuel),* p. 131

9185A **Organic Field-Effect Transistors XIII** *(Bao, McCulloch),* p. 135

9185B **Organic Semiconductors in Sensors and Bioelectronics VII** *(Shinar, Kymissis),* p. 138

Organic Photonics + Electronics Best Student Paper Awards sponsored by

ALDRICH Materials Science Polyera



CONFERENCE 9181

LOCATION: CONV. CTR. ROOM 7B

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9181

Light Manipulating Organic Materials and Devices

Conference Chair: **Jean-Michel Nunzi,** Queen's Univ. (Canada)

Conference Co-Chairs: **Jon A. Schuller,** Univ. of California, Santa Barbara (USA); **Rachel Jakubiak,** Air Force Research Lab. (USA); **Manfred Eich,** Technische Univ. Hamburg-Harburg (Germany)

Program Committee: **Dean R. Evans,** Air Force Research Lab. (USA); **Theodore G. Goodson III,** Univ. of Michigan (USA); **Mark G. Kuzyk,** Washington State Univ. (USA); **Charles Y. C. Lee,** Air Force Office of Scientific Research (USA); **Kwang-Sup Lee,** Hannam Univ. (Korea, Republic of); **Aristides Marcano,** Delaware State Univ. (USA); **André P. Persoons,** Katholieke Univ. Leuven (Belgium); **Jayan Thomas,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Naoto Tsutsumi,** Kyoto Institute of Technology (Japan)

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 7B . . . WED 8:00 AM TO 9:50 AM

Nonlinear Absorption Effects

Session Chair: **Kwang-Sup Lee,** Hannam Univ. (Korea, Republic of)

8:00 am: **Nonlinear absorption and refraction spectroscopic tools** *(Invited Paper)*, Eric W. Van Stryland, Honghua Hu, Trenton R. Ensley, Matthew C. Reichert, Manuel R. Ferdinandus, David J. Hagan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9181-1]

8:25 am: **Thermal lensing characterization of absorption in nanodiamonds** *(Invited Paper)*, Aristides Marcano, Gour S. Pati, Renu Tripathi, Yury Y. Markushin, Junwei Meng, Michael J. Williams, Delaware State Univ. (USA). . . . . [9181-2]

8:50 am: **Engineering the ground- and excited-state absorption spectra of broadband reverse saturable absorbers**, Timothy M. Pritchett, Michael J. Ferry, William M. Shensky III, Andrew G. Mott, U.S. Army Research Lab. (USA); Chengkui Pei, Wenfang Sun, North Dakota State Univ. (USA) . . . . . [9181-3]

9:10 am: **Novel molecular wrapping approach to photoresponsive fullerenyl hybrid triads with dual NIR-2PA characteristics**, Long Chiang, Seaho Jeon, Taizoon Canteenwala, Min Wang, Univ. of Massachusetts Lowell (USA); Loon-Seng Tan, Thomas M. Cooper, Air Force Research Lab. (USA). . . . . [9181-4]

9:30 am: **Entangled two-photon absorption and virtual-state spectroscopy in diatomic molecules**, Leslie Upton, Theodore G. Goodson III, Univ. of Michigan (USA) . . . . . [9181-5]

Coffee Break . . . . . Wed 9:50 am to 10:30 am

LOCATION: CONV. CTR. ROOM 6A . . WED 10:30 AM TO 12:15 PM

Organic Photonics + Electronics Plenary Session

Session Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

10:30 am: **Materials and Devices for Bioresorbable Electronics** *(Plenary)*, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9185-401]

11:00 am: **Organic Electronic Bio-devices** *(Plenary)*, Luisa Torsi, Univ. of Bari "Aldo Moro" (Italy) . . . . . [9183-402]

11:30 am: **Announcement of the Organic Photonics + Electronics Best Student Paper Award Winner**

Sponsored by ALDRICH Materials Science Polyera

11:45 am: **Charge and Spin Transport Physics of Organic Semiconductors** *(Plenary)*, Henning Sirringhaus, Cavendish Lab., Univ. of Cambridge (United Kingdom) . . . . . [9184-403]

Lunch/Exhibition Break . . . . . Wed 12:15 pm to 2:00 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 7B . . . . WED 2:00 PM TO 3:35 PM

Dynamics of Light-Matter Interactions

Session Chair: **Eric W. Van Stryland,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

2:00 pm: **Exciton fission in organic semiconductors** *(Invited Paper)*, Xiaoyang Zhu, Columbia Univ. (USA) . . . . . [9181-6]

2:25 pm: **Ultrafast infrared spectroscopy of charge generation and transport in organic photovoltaic materials** *(Invited Paper)*, John B. Asbury, Adam D. Rimshaw, The Pennsylvania State Univ. (USA). . . . . [9181-7]

2:50 pm: **Molecular pixel system for full-color fluorescence generation** *(Invited Paper)*, Soo Young Park, Seoul National Univ. (Korea, Republic of). . . . . [9181-8]

3:15 pm: **Quantifying singlet fission in novel organic materials using nonlinear optics**, Erik Busby, Jianlong Xia, Omer Yaffe, Bharat Kumar, Timothy Berkelbach, Columbia Univ. (USA); Qin Wu, John Miller, Brookhaven National Lab. (USA); Colin P. Nuckolls, Xiaoyang Zhu, David R. Reichman, Luis Campos, Columbia Univ. (USA); Matthew Y. Sfeir, Brookhaven National Lab. (USA). . . . . [9181-9]

Coffee Break . . . . . Wed 3:35 pm to 4:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 7B . . . WED 4:00 PM TO 5:25 PM

Organic Photorefractive Materials

Session Chair: **André P. Persoons,** Katholieke Univ. Leuven (Belgium)

4:00 pm: **Ferroelectric liquid crystalline columns towards paintable organic ferroelectrics as characterized by nonlinear optics** *(Invited Paper)*, Fumito Araoka, Daigo Miyajima, RIKEN (Japan); Takuzo Aida, The Univ. of Tokyo (Japan); Hideo Takezoe, Tokyo Institute of Technology (Japan) . . . . . [9181-10]

4:25 pm: **Enhanced photoconductivity by melt quenching method for amorphous organic photorefractive materials**, Sho Tsujimura, Kyoto Institute of Technology (Japan) and RIKEN (Japan); Takashi Fujihara, Takafumi Sassa, RIKEN (Japan); Kenji Kinashi, Wataru Sakai, Kyoto Institute of Technology (Japan); Koji Ishibashi, RIKEN (Japan); Naoto Tsutsumi, Kyoto Institute of Technology (Japan). . . . . [9181-11]

4:45 pm: **Large optical second harmonic generation in a low-bandgap polymer**, Stefaan Vandendriessche, Pieter Willot, Guy Koeckelberghs, Thierry Verbiest, Katholieke Univ. Leuven (Belgium) . . . . . [9181-12]

5:05 pm: **Dynamic amplification of light signals in photorefractive ferroelectric liquid crystals**, Takeo Sasaki, Yumiko Naka, Tokyo Univ. of Science (Japan). . . . . [9181-13]

CONFERENCE 9181

LOCATION: CONV. CTR. ROOM 7B

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Photo-patterning system investigating acrylate-based resin viscosity versus polymerized structure resolution, Callie I. Fiedler, Univ. of Colorado at Boulder (USA) . . . . . [9181-33]

Self-actuated origami in an optically pre-patterned two-stage photopolymer, David J. Glugla, Robert R. McLeod, Univ. of Colorado at Boulder (USA). . [9181-34]

Design, synthesis, and optical properties of porphyrin-peptoid conjugates, Jiwon Seo, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9181-35]

A toy model for the nonlinear optical response of molecules with modulated conjugation, Javier Perez-Moreno, Surbhi Hablani, Quanhang Chen, Jie Li, Skidmore College (USA) . . . . . [9181-36]

Design and simulation of metal-insulator-metal nanoresonators for color filter applications, Saswatee Banerjee, Sumitomo Chemical Co., Ltd. (Japan) [9181-37]

Light transmission with self-assembly DNA monolayers through D-shaped optical fiber, Woohyun Jung, Yonsei Univ. (Korea, Republic of); Jun Young Son, Sungkyunkwan Univ. (Korea, Republic of); Bjorn Paulson, Byung-Joo Kong, Yonsei Univ. (Korea, Republic of); Sung Ha Park, Sungkyunkwan Univ. (Korea, Republic of); Kyunghwan K. Oh, Yonsei Univ. (Korea, Republic of). . . . . [9181-39]

Miniaturized sub-volt electro-optic modulator based on silicon integrated nanophotonics and organic polymers, Xingyu Zhang, Amir Hosseini, The Univ. of Texas at Austin (USA); Jingdong Luo, Alex K. Y. Jen, Univ. of Washington (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9181-40]

Investigation of optical propagation loss in electrospun polymer nanofibers, Yuya Ishii, Shota Satozono, Ryohei Kaminose, Mitsuo Fukuda, Toyohashi Univ. of Technology (Japan) . . . . . [9181-41]

Characterization of the assembly self-assembled chiral molecules in thin films by nonlinear optical microscopy and second-harmonic generation, Maarten K. Vanbel, Thierry Verbiest, Katholieke Univ. Leuven (Belgium) . . . . . [9181-42]

Improving optical limiting of cw lasers with fullerene functionalized gold nanoparticles, Maria Chiara Frare, Verena Weber, Christian Corrado De Filippo, Raffaella Signorini, Michele Maggini, Renato Bozio, Univ. degli Studi di Padova (Italy) . . . . . [9181-43]

Strong photoluminescence characteristics of sulforhodamine B attached on photonic crystal, Kwang-Sun Kang, Kyungil Univ. (Korea, Republic of). . [9181-45]

THURSDAY 21 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 7B . . .THU 8:00 AM TO 10:05 AM

Light-Triggered and Light-Actuated Materials

Session Chair: **Jon A. Schuller,** Univ. of California, Santa Barbara (USA)

8:00 am: **Nanopatterning of azo-polymers: light polarization and film thickness effects** *(Invited Paper)*, Zouheir Sekkat, Moroccan Foundation for Advanced Science, Innovation and Research (Morocco) . . . . . [9181-14]

8:25 am: **Arbitrary 2D GRIN lens fabrication in diffusive photopolymers**, Adam C. Urness, Univ. of Illinois at Urbana-Champaign (USA); William L. Wilson, Univ. of Illinois (USA) and Univ. of Illinois at Urbana-Champaign (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA). . . . . [9181-15]

8:45 am: **Tunable non-pixelated spatial polarization shaping including an integrated optical addressing unit**, Frederik Schaal, Institut für Technische Optik (Germany); Michael Rutloh, Fraunhofer-Institut für Angewandte Polymerforschung (Germany); Susanne Weidenfeld, Univ. Stuttgart (Germany); Joachim Stumpe, Fraunhofer-Institut für Angewandte Polymerforschung (Germany); Wolfgang Osten, Institut für Technische Optik (Germany) . . . . . [9181-16]

9:05 am: **Morphology-dependent optical properties of polymer and small molecule materials**, Steven J. Brown, Ruth A. Schlitz, Univ. of California, Santa Barbara (USA); Carlos M. Monton, Univ. of California, San Diego (USA); Richard R. Grote, Jeffrey B. Driscoll, Columbia Univ. (USA); Michael L. Chabinyc, Univ. of California, Santa Barbara (USA); Ivan K. Schuller, Univ. of California, San Diego (USA); Richard M. Osgood Jr., Columbia Univ. (USA); Jon A. Schuller, Univ. of California, Santa Barbara (USA) . . . . . [9181-17]

9:25 am: **Nonlinear solid-state filter based on photochromism induced by 2-photon absorption in a dye-doped sol-gel**, Raz Gvishi, Soreq Nuclear Research Ctr. (Israel); Peng Zhao, Honghua Hu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Galit Strum, Amir Tal, Shmuel Grinvald, Galit Bar, Soreq Nuclear Research Ctr. (Israel); Laura Beker, Vladimir Lokshin, Vladimir Khodorkovsky, CINaM - Ctr. Interdisciplinaire de Nanoscience de Marseille (France); Mark Sigalov, Ben-Gurion Univ. of the Negev (Israel); David J. Hagan, Eric W. Van Stryland, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9181-18]

9:45 am: **Light to work to electricity in azobenzene-functionalized linear polyimide copolymers**, Jeong Jae Wie, Air Force Research Lab. (USA) and Azimuth Corp. (USA); David H. Wang, Air Force Research Lab. (USA) and UES, Inc. (USA); Vincent P. Tondiglia, Air Force Research Lab. (USA) and SAIC (USA); Nelson V. Tabiryan, Rafael O. Vergara-Toloza, BEAM Engineering for Advanced Measurements Co. (USA); Loon-Seng Tan, Timothy J. White, Air Force Research Lab. (USA) . . . . . [9181-19]

Coffee Break . . . . . Thu 10:05 am to 10:30 am

SESSION 5

LOCATION: CONV. CTR. ROOM 7B . . .THU 10:30 AM TO 11:50 AM

Magneto-Chiral Interactions

Session Chair: **Zouheir Sekkat,** Moroccan Foundation for Advanced Science, Innovation and Research (Morocco)

10:30 am: **Molecular magneto-optics** *(Keynote Presentation)*, André P. Persoons, Katholieke Univ. Leuven (Belgium) . . . . . [9181-20]

11:00 am: **Magneto-optical properties of highly regioregular polythiophenes with different architectures** *(Invited Paper)*, Nicolas Delbosc, Olivier Coulembier, Philippe Dubois, Univ. de Mons (Belgium); André P. Persoons, Katholieke Univ. Leuven (Belgium). . . . . [9181-21]

11:25 am: **Chiral supramolecular assemblies from achiral molecules investigated by second harmonic generation at the air-water interface** *(Invited Paper)*, Aurélie Bruyère, Univ. de Claude Bernard Lyon 1 (France); Emmanuel Benichou, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France). [9181-22]

Lunch/Exhibition Break . . . . . Thu 11:50 am to 1:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 7B . . . . . THU 1:30 PM TO 3:25 PM

Enhanced Optical Interactions

Session Chair: **Alex K. Y. Jen,** Univ. of Washington (USA)

1:30 pm: **All-organic plasmonics** *(Invited Paper)*, Mikhail A. Noginov, Guohua Zhu, Lei Gu, John K. Kitur, Norfolk State Univ. (USA); Viktor A. Podolskiy, Univ. of Massachusetts Lowell (USA); Evgenii E. Narimanov, Purdue Univ. (USA); Jarrett Vella Jr., Augustine M. Urbas, Air Force Research Lab. (USA) . . . . . [9181-23]

1:55 pm: **Optical properties of Alq_3 films and Alq_3/plasmonic heterostructures** *(Invited Paper)*, Hans-Peter Wagner, Niranjala D. Wickremasinghe, Masoud Kaveh, Milhan Ajward, Xiaosheng Wang, Univ. of Cincinnati (USA); Heidrun Schmitzer, Xavier Univ. (USA); Qiang Gao, Chennupati Jagadish, The Australian National Univ. (Australia) . . . . . [9181-24]

2:20 pm: **Plasmonic mode amplification using organic semiconductor gain media** *(Invited Paper)*, Deirdre M. O'Carroll, Sarah Goodman, Jesse Kohl, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9181-25]

2:45 pm: **Enabling enhanced emission and low threshold lasing of organic molecules using special Fano resonances of macroscopic photonic crystals**, Bo Zhen, Song-Liang Chua, Jeongwon Lee, Massachusetts Institute of Technology (USA); Alejandro W. Rodriguez, Princeton Univ. (USA); Xiangdong Liang, Steven G. Johnson, John D. Joannopoulos, Marin Soljacic, Ofer Shapira, Massachusetts Institute of Technology (USA) . . . . . [9181-26]

3:05 pm: **Nonlinear optical photovoltaics**, Jean-Michel Nunzi, Somayeh M. A. Mirzaee, Queen's Univ. (Canada) . . . . . [9181-32]

Coffee Break . . . . . Thu 3:25 pm to 3:50 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 7B . . . . THU 3:50 PM TO 5:20 PM

Engineering of the Linear and Nonlinear Optical Properties of Organics

Session Chair: **Pierre-François Brevet,** Univ. Claude Bernard Lyon 1 (France)

3:50 pm: **New frontier of organic electro-optic (EO) materials and devices: from molecular engineering to technology innovations** *(Invited Paper)*, Alex K. Y. Jen, Univ. of Washington (USA) . . . . . [9181-28]

4:15 pm: **Design and fabrication strategies for high transparency polymer nanocomposites with dynamic tunable optical response** *(Invited Paper)*, Michael R. Bockstaller, Carnegie Mellon Univ. (USA) . . . . . [9181-29]

4:40 pm: **Small bending loss of thiacyanine polariton nanofibers**, Hiroyuki Takeda, National Institute for Materials Science (Japan); Kazuaki Sakoda, National Institute for Materials Science (Japan) and Univ. of Tsukuba (Japan) . . . . [9181-30]

5:00 pm: **Detuning of polar whispering gallery modes in polystyrene microspheres**, Heidrun Schmitzer, Xavier Univ. (USA); Julie Lutti, Paola Borri, Wolfgang Langbein, Cardiff Univ. (United Kingdom); Hans-Peter Wagner, Univ. of Cincinnati (USA) . . . . . [9181-31]

CONFERENCE 9182

LOCATION: CONV. CTR. ROOM 8

Sunday–Wednesday 17–20 August 2014 • Proceedings of SPIE Vol. 9182

Liquid Crystals XVIII

Conference Chair: **Iam Choon Khoo,** The Pennsylvania State Univ. (USA)

Program Committee: **Timothy J. Bunning,** Air Force Research Lab. (USA); **Shaw-Horng Chen,** Univ. of Rochester (USA); **Neil Collings,** Univ. of Cambridge (United Kingdom); **Jean-Pierre Huignard,** Jphopto (France); **Tomiki Ikeda,** Chuo Univ. (Japan); **Oleg D. Lavrentovich,** Kent State Univ. (USA); **Francesco Simoni,** Univ. Politecnica delle Marche (Italy); **David M. Walba,** Univ. of Colorado at Boulder (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 8 . . . . . SUN 8:30 AM TO 10:10 AM

LC Photonics

Session Chair: **Iam Choon Khoo,** The Pennsylvania State Univ. (USA)

8:30 am: **Large range reflection notch tuning in polymer stabilized cholesteric liquid crystals** *(Keynote Presentation)*, Timothy J. White, Air Force Research Lab. (USA); Kyung Min Lee, Air Force Research Lab. (USA) and Azimuth Corp. (USA); Vincent P. Tondiglia, Air Force Research Lab. (USA) and SAIC (USA); Timothy J. Bunning, Air Force Research Lab. (USA) . . . . . [9182-1]

8:55 am: **Vertical cavity surface emitting laser with liquid crystal external cavity**, Yi Xie, Jeroen Beeckman, Univ. Gent (Belgium); Krassimir Panajotov, Vrije Univ. Brussel (Belgium); Kristiaan Neyts, Univ. Gent (Belgium) . . . . . [9182-2]

9:10 am: **Light-induced effects in dye-doped liquid crystals: role of space charges** *(Invited Paper)*, Francesco Simoni, Liana Lucchetti, Univ. Politecnica delle Marche (Italy) . . . . . [9182-3]

9:30 am: **Laser effect within an optical spatial soliton in nematic liquid crystals** *(Invited Paper)*, Jean-François Henninot, Univ. d'Artois (France); Mardia Ouali, Univ des Sciences et Technologies de Lille (France); Jean-François Blach, Univ. d'Artois (France); Majid Taki, Univ. des Sciences et Technologies de Lille (France) . [9182-4]

9:50 am: **Full-color luminescence from a single liquid-crystalline gold complex** *(Invited Paper)*, Osamu Tsutsumi, Osama M. Younis, Masakazu Tamaru, Sho Tamai, Nana Sugimoto, Kaori Fujisawa, Ritsumeikan Univ. (Japan) . . . . . [9182-5]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 8 . . . . SUN 10:40 AM TO 12:20 PM

Novel LC Materials and Photonics

Session Chair: **Timothy J. White,** Air Force Research Lab. (USA)

10:40 am: **Light-emitting liquid-crystal displays constructed from AIE luminogens** *(Keynote Presentation)*, Dongyu Zhao, Hong Kong Univ. of Science and Technology (Hong Kong, China); Anjun Qin, South China Univ. of Technology (China); Ben Zhong Tang, Hong Kong Univ. of Science and Technology (Hong Kong, China) and South China Univ. of Technology (China); Wai Tung Leung, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9182-6]

11:05 am: **Fast computational models of liquid crystal composites** *(Invited Paper)*, Giampaolo D'Alessandro, Yogesh Murugesan, Univ. of Southampton (United Kingdom). . . . . [9182-7]

11:25 am: **Molecular dynamics in azobenzene liquid crystal polymer films studied by transient grating technique** *(Invited Paper)*, Kenji Katayama, Shota Kuahara, Tomoki Ikeda, Chuo Univ. (Japan). . . . . [9182-8]

11:45 am: **Mechanoresponsive change in photoluminescent color of rod-like liquid-crystalline compounds and control of molecular orientation on photoaligned layer** *(Invited Paper)*, Mizuho Kondo, Kentaro Okumoto, Seiya Miura, Mayuko Hashimoto, Ryohei Fukae, Nobuhiro Kawatsuki, Univ. of Hyogo (Japan). . . . . [9182-9]

12:05 pm: **Large aperture and polarizer-free liquid crystal lenses for ophthalmic applications**, Yi-Hsin Lin, Hung-Shan Chen, Yu-Jen Wang, Chia-Ming Chang, National Chiao Tung Univ. (Taiwan) . . . . . [9182-36]

Lunch Break . . . . . Sun 12:20 pm to 1:45 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 8 . . . . . SUN 1:45 PM TO 3:30 PM

Photonics and Complex Phenomena

Session Chair: **Oleg D. Lavrentovich,** Kent State Univ. (USA)

1:45 pm: **Imaging and visualization of complex nematic fields** *(Keynote Presentation)*, Slobodan Žumer, Univ. of Ljubljana (Slovenia) and Jožef Stefan Institute (Slovenia); Miha Čančula, Univ. of Ljubljana (Slovenia); Simon Čopar, Univ. of Ljubljana (Slovenia) and Jožef Stefan Institute (Slovenia); Miha Ravnik, Univ. of Ljubljana (Slovenia) . . . . . [9182-11]

2:10 pm: **Liquid crystal hyperbolic metamaterial for wide-angle negative-positive refraction and reflection** *(Invited Paper)*, Grzegorz Pawlik, Wroclaw Univ. of Technology (Poland); Wiktor Walasik, Aix-Marseille Univ. (France); Karol Tarnowski, Antoni C. Mitus, Wroclaw Univ. of Technology (Poland); Iam-Choon Khoo, The Pennsylvania State Univ. (USA) . . . . . [9182-12]

2:30 pm: **Optical vortex modulated by liquid crystal Q-plate fabricated via photo-alignment** *(Invited Paper)*, Andy Y. G. Fuh, Yao-Han Huang, Ming-Shian Li, National Cheng Kung Univ. (Taiwan). . . . . [9182-13]

2:50 pm: **Tunable refractive index in an optically isotropic liquid crystal phase** *(Invited Paper)*, Mamatha Nagaraj, The Univ. of Manchester (United Kingdom); Verena Gortz, Lancaster Univ. (United Kingdom); John W. Goodby, The Univ. of York (United Kingdom); Helen F. Gleeson, The Univ. of Manchester (United Kingdom) . . . . . [9182-14]

3:10 pm: **Harnessing optical vortex lattices in nematic liquid crystals** *(Invited Paper)*, Marcel G. Clerc, Univ. de Chile (Chile); Stefania Residori, Umberto Bortolozzo, Institut Non Linéaire de Nice Sophia Antipolis (France); Raouf Barboza, Estefania Vidal, Univ. de Chile (Chile) . . . . . [9182-15]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 8 . . . . . SUN 4:00 PM TO 5:40 PM

Novel LC Materials I

Session Chair: **David M. Walba,** Univ. of Colorado at Boulder (USA)

4:00 pm: **Ultrahigh sensitivity in liquid-crystal-based immunodetection by surface modification of the alignment layer** *(Invited Paper)*, Mon-Juan Lee, Chang Jung Christian Univ. (Taiwan); Hui-Wen Su, Shih-Hung Sun, Wei Lee, National Chiao Tung Univ. (Taiwan) . . . . . [9182-16]

4:20 pm: **Contact angle measurements as a means of probing the surface alignment characteristics of liquid crystal materials on photoalignment layers** *(Invited Paper)*, Kenneth L. Marshall, Oleg Didovets, Debra J. Saulnier, Univ. of Rochester (USA) . . . . . [9182-17]

4:40 pm: **Nanoparticles forming liquid crystals** *(Invited Paper)*, Ewa Gorecka, Univ. of Warsaw (Poland) . . . . . [9182-18]

5:00 pm: **Investigation of host liquid crystal composition on polymer stabilised blue phase properties** *(Invited Paper)*, Suhana B. Mohd Said, Univ. of Malaya (Malaysia). . . . . [9182-19]

5:20 pm: **How the physical anisotropy affects the bacteria movement** *(Invited Paper)*, Tigran V. Galstian, Ismaël Duchesne, Simon Rainville, Univ. Laval (Canada) . . . . . [9182-21]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 8 . . . . . MON 8:00 AM TO 9:55 AM

Novel LC Materials II

Session Chair: **Kenneth L. Marshall,** Univ. of Rochester (USA)

8:00 am: **Liquid crystal polymer dispersed liquid crystals** *(Keynote Presentation)*, Nelson V. Tabiryan, Olena Uskova, Luciano De Sio, Uladzimir Hrozhyk, Rafael O. Vergara-Toloza, BEAM Engineering for Advanced Measurements Co. (USA); Timothy J. White, Timothy J. Bunning, Air Force Research Lab. (USA) . . . [9182-22]

8:25 am: **Liquid crystal phases and charge carrier mobilities for a series of monoalkoxy-ethyloxycarbonyl derivatives of the tetracyclic oligothiophene BTTT**, Michael T. Springer, Rebecca A. Callahan, Renfan Shao, Yongqiang Shen, Univ. of Colorado at Boulder (USA); Garry Rumbles, National Renewable Energy Lab. (USA); Noel A. Clark, David M. Walba, Univ. of Colorado at Boulder (USA) . . . . . [9182-23]

8:40 am: **Electrooptics of nematics formed by molecular dimers** *(Invited Paper)*, Oleg D. Lavrentovich, Jie Xiang, Sergij V. Shiyanovskii, Kent State Univ. (USA); Corrie Omrie, Univ. of Aberdeen (United Kingdom); Volodymyr Borshch, Young-Ki Kim, Afsoon Jamali, Kent State Univ. (USA); Georg H. Mehl, Maria-Gabriela Tamba, The Univ. of Hull (United Kingdom) . . . . . [9182-24]

9:00 am: **Helical nanofilaments of bent-core liquid crystals with a second twist** *(Invited Paper)*, Antal I. Jakli, Cuiyu Zhang, Nicholas J. Diorio, Oleg D. Lavrentovich, Kent State Univ. (USA) . . . . . [9182-25]

9:20 am: **Tailored liquid crystal devices for specific imaging applications** *(Invited Paper)*, Avner Safrani, Asi Solodar, Iftach Klapp, Marwan Abuleil, Sivan Isaacs, Ibrahim Abdulhalim, Miri Gelbaor Kirzhner, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9182-26]

9:40 am: **Infrared reflector based on liquid crystal polymers and its impact on thermal comfort conditions in buildings**, Hitesh Khandelwal, Technische Univ. Eindhoven (Netherlands) and Dutch Polymer Institute (Netherlands); Franziska Roberz, Roel C. G. M. Loonen, Jan L. M. Hensen, Cees W. M. Bastiaansen, Dick J. Broer, Michael G. Debije, Albert P. H. J. Schenning, Technische Univ. Eindhoven (Netherlands) . . . . . [9182-27]

Coffee Break . . . . . Mon 9:55 am to 10:25 am

SESSION 6

LOCATION: CONV. CTR. ROOM 8 . . . . MON 10:25 AM TO 12:00 PM

Switches, Filters, Control, Display

Session Chair: **Francesco Simoni,** Univ. Politecnica delle Marche (Italy)

10:25 am: **Micro-second electro-optic modulation in polymer/liquid-crystal nanocomposite films** *(Keynote Presentation)*, Masanori Ozaki, Osaka Univ. (Japan); Yo Inoue, Kyoto Univ. (Japan); Hoe-Kyeong Kim, Hiroyuki Yoshida, Osaka Univ. (Japan) . . . . . [9182-28]

10:50 am: **Ultrafast all-optical switching with transparent liquid crystals**, Shuo Zhao, Iam Choon Khoo, The Pennsylvania State Univ. (USA) . . . . . [9182-29]

11:05 am: **Liquid crystal tunable THz wave plates** *(Invited Paper)*, Yan-Qing Lu, Wei Hu, Nanjing Univ. (China) . . . . . [9182-30]

11:25 am: **Liquid crystal claddings for passive temperature stabilization of silicon photonics**, Joanna N. Ptasinski, Space and Naval Warfare Systems Ctr. Pacific (USA) and Univ. of California, San Diego (USA); Iam-Choon Khoo, The Pennsylvania State Univ. (USA); Yeshaiahu Fainman, Univ. of California, San Diego (USA) . . . . . [9182-31]

11:40 am: **Glass-free 3D display with LCD: technique challenges, approaching solutions, and prospect** *(Invited Paper)*, Jianying Zhou, Sun Yat-Sen Univ. (China) . . . . . [9182-32]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 8 . . . . . MON 1:30 PM TO 3:10 PM

Laser, Display, and Tunable Optics

Session Chair: **Nelson V. Tabiryan,** BEAM Engineering for Advanced Measurements Co. (USA)

1:30 pm: **Lasing and waveguiding in smectic A liquid crystal optical fibers** *(Keynote Presentation)*, Igor Musevic, Jožef Stefan Institute (Slovenia) . . . [9182-33]

1:55 pm: **Rea-time holographic display using doped liquid crystals** *(Invited Paper)*, Yikai Su, Shanghai Jiao Tong Univ. (China) . . . . . [9182-34]

2:15 pm: **Cholesteric liquid crystals with wide-band reflection properties** *(Invited Paper)*, Huai Yang, Lanying Zhang, Peking Univ. (China) . . . . . [9182-35]

2:35 pm: **Color sequential TFT-LCD toward an eco display, from perspective of liquid crystal and TFT driving** *(Invited Paper)*, Han-Ping D. Shieh, National Chiao Tung Univ. (Taiwan) . . . . . [9182-37]

2:55 pm: **New developments in SmAPF materials**, Eva D. Korblova, Maria Kolber, Joseph E. Maclennan, Matthew A. Glaser, Renfan Shao, Yongqiang Shen, Noel A. Clark, David M. Walba, Univ. of Colorado at Boulder (USA) . . . . . [9182-40]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 8 . . . . . MON 3:40 PM TO 5:25 PM

Photovoltaic and Novel LC

Session Chair: **Iam Choon Khoo,** The Pennsylvania State Univ. (USA)

3:40 pm: **The helical nanofilament phase for organic photovoltaics** *(Keynote Presentation)*, Rebecca A. Callahan, Michael T. Springer, Eva D. Korblova, Renfan Shao, Univ. of Colorado at Boulder (USA); David Coffey, Garry Rumbles, National Renewable Energy Lab. (USA); Noel A. Clark, David M. Walba, Univ. of Colorado at Boulder (USA) . . . . . [9182-38]

4:05 pm: **Photoinduced deformation of uncrosslinked liquid crystal polymers** *(Invited Paper)*, Yanlei Yu, Jiu-an Lv, Yuyun Liu, Fudan Univ. (China) . . . . [9182-39]

4:25 pm: **Physics of scattering texture of novel siloxane based smectic A liquid crystal materials** *(Invited Paper)*, Mykhaylo N. Pivnenko, Daping Chu, Univ. of Cambridge (United Kingdom) . . . . . [9182-41]

4:45 pm: **Photo-aligned ferroelectric liquid crystals for modern photonics** *(Invited Paper)*, Abhishek K. Srivastava, Vladimir G. Chigrinov, Hoi Sing Kwok, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9182-42]

5:05 pm: **Topogical diversity of localized metastable states in chiral liquid crystals** *(Invited Paper)*, Etienne Brasselet, Charles Loussert, Univ. Bordeaux 1 (France) . . . . . [9182-43]

CONFERENCE 9182

LOCATION: CONV. CTR. ROOM 8

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Photonic density of states of a stack of cholesteric liquid crystals and isotropic medium layers, Koryun B. Oganesyan, Yerevan Physics Institute (Armenia); Ashot H. Gevorgyan, Yerevan State Univ. (Armenia); Ruben V. Karapetyan, A. M. Prokhorov General Physics Institute (Russian Federation); Gagik A. Vardanyan, Nanoclusters, Nanomaterials & Nanoscience Inc. (USA). . . [9182-44]

Dependence of the electrooptical properties of polymer-dispersed vertical aligned liquid crystals on the surface affinity of the liquid crystal and monomer, Hyojin Lee, Ji-Hoon Lee, Chonbuk National Univ. (Korea, Republic of); Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of). . . . . [9182-45]

Effect of UV curing conditions on polymerized tunable chiral nematic liquid crystals, Mohammad Mohammadimasoudi, Jeroen Beeckman, Kristiaan Neyts, Univ. Gent (Belgium) . . . . . [9182-46]

On a photonic density of states of cholesteric liquid crystal cells, Koryun B. Oganesyan, Alikhanyan National Science Lab. (Armenia); Ashot H. Gevorgyan, Yerevan State Univ. (Armenia); Ruben V. Karapetyan, A. M. Prokhorov General Physics Institute (Russian Federation); Gagik A. Vardanyan, Nanoclusters, Nanomaterials & Nanoscience Inc. (USA) . . . . . [9182-47]

Optical, electro-optical, and dielectric spectroscopy of polymer stabilized ferroelectric liquid crystals, Jamal Hemine, Univ. Hassan II Mohammedia - Casablanca (Morocco); Abdetylah Daoudi, Univ. du Littoral Côte d'Opale (France); Abdelhamid El Kaaouachi, Univ. Ibn Zohr (Morocco); Mimoun Ismaili, Univ. des Sciences et Technologies de Lille (France); Redouane Douali, Christiane Legrand, Univ. du Littoral Côte d'Opale (France). . . . . [9182-48]

Dielectric and phase behaviors with blue phase liquid crystals, Sheng-Chieh Chen, Wei Lee, National Chiao Tung Univ. (Taiwan); Giovanni Barbero, Politecnico di Torino (Italy). . . . . [9182-49]

Effect of hybrid polyimides on electro-optical performance of optically compensated bend display mode, Guan-Jhong Lin, National Taiwan Univ. (Taiwan); Tien-Jung Chen, Bo-Rung Lin, Jin-Jei Wu, National Taipei Univ. of Technology (Taiwan); Ying-Jay Yang, National Taiwan Univ. (Taiwan). . . . [9182-50]

Dielectric characterizations of electroclinic effect near to N*-SmA-SmC* multicritical point, Abdelhamid El Kaaouachi, Univ. Ibn Zohr (Morocco); Jamal Hemine, Univ. Hassan II Mohammedia - Casablanca (Morocco); Abdetylah Daoudi, Univ. du Littoral Côte d'Opale (France); Christiane Legrand, Univ. des Sciences et Technologies de Lille (France). . . . . [9182-51]

Fast-response Fabry-Perot wavelength-tunable filter using vertical-alignment polymer-stabilized liquid crystal with a curing voltage, Yan-Min Li, Wing-Kit Choi, National Taiwan Univ. (Taiwan) . . . . . [9182-52]

CONFERENCE 9183

LOCATION: CONV. CTR. ROOM 6C

Sunday–Wednesday 17–20 August 2014 • Proceedings of SPIE Vol. 9183

Organic Light Emitting Materials and Devices XVIII

Conference Chair: **Franky So,** Univ. of Florida (USA)

Conference Co-Chair: **Chihaya Adachi,** Kyushu Univ. (Japan)

Program Committee: **Malte C. Gather,** Technische Univ. Dresden (Germany); **Hisao Ishii,** Chiba Univ. (Japan); **Hironori Kaji,** Kyoto Univ. (Japan); **Jang-Joo Kim,** Seoul National Univ. (Korea, Republic of); **Jaewon Lee,** LG Display (Korea, Republic of); **Mathew K. Mathai,** Apple, Inc. (USA); **Jongwook Park,** The Catholic Univ. of Korea (Korea, Republic of); **Yong-Jin Pu,** Yamagata Univ. (Japan); **Ifor D. W. Samuel,** Univ. of St. Andrews (United Kingdom); **Joseph Shinar,** Iowa State Univ. (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6C . . .SUN 8:30 AM TO 10:00 AM

Novel Materials I

Session Chairs: **Mathew K. Mathai,** Apple Inc. (USA); **Jang-Joo Kim,** Seoul National Univ. (Korea, Republic of)

8:30 am: **Concepts for the material development for solution processable phosphorescent polymers and their application in PLEDs**, Silvia Janietz, Hartmut Krueger, Armin Wedel, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) . . . . . [9183-1]

8:45 am: **Continuous synthesis of device-grade semiconducting polymers in droplet-based microreactors** *(Invited Paper)*, John C. de Mello, Imperial College London (United Kingdom) . . . . . [9183-2]

9:10 am: **Polydopamine and melanin: nature's conjugated polymers** *(Invited Paper)*, Alexander J. C. Kuehne, Tatjana Repenko, DWI an der RWTH Aachen e.V. (Germany) . . . . . [9183-3]

9:35 am: **The development of macromolecules for light-emitting diodes** *(Invited Paper)*, Paul L. Burn, Ross D. Jansen-van Vuuren, Renjie Wang, Soniya D. Yambem, Shih-Chun Lo, Paul Meredith, Ebinazar B. Namdas, The Univ. of Queensland (Australia). . . . . [9183-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6C . . .SUN 10:30 AM TO 12:35 PM

Novel Materials II

Session Chairs: **Mathew K. Mathai,** Apple Inc. (USA); **Jang-Joo Kim,** Seoul National Univ. (Korea, Republic of)

10:30 am: **Development of new organic semiconducting materials for organic light-emitting diodes** *(Invited Paper)*, Yun-Hi Kim, Gyeongsang National Univ. (Korea, Republic of). . . . . [9183-5]

10:55 am: **Efficient cyclometalated Pt complexes for displays and lighting applications** *(Invited Paper)*, Jian Li, Arizona State Univ. (USA) . . . . . [9183-6]

11:20 am: **Bright coppertunities: efficient OLED devices with Cu(I)I-PyrPHOS-emitters** *(Invited Paper)*, Daniel Volz, Charlotte Fléchon, Thomas Baumann, cynora GmbH (Germany). . . . . [9183-7]

11:45 am: **Synthesis and electroluminescence properties of highly efficient dual core chromophores with side groups for blue emission** *(Invited Paper)*, Jongwook Park, Hayoon Lee, Beomjin Kim, Seungho Kim, Joonghan Kim, Jaehyun Lee, Hwangyu Shin, The Catholic Univ. of Korea (Korea, Republic of). . . . . [9183-8]

12:10 pm: **Unusually high efficiency in blue fluorescence OLEDs with large delta E (S1-T1) molecules** *(Invited Paper)*, Yong-Jin Pu, Yamagata Univ. (Japan). . . . . [9183-9]

Lunch Break . . . . . Sun 12:35 pm to 2:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6C . . . . SUN 2:00 PM TO 3:20 PM

Mechanisms and Physics I

Session Chairs: **Bernard Kippelen,** Georgia Institute of Technology (USA); **Russell J. Holmes,** Univ. of Minnesota, Twin Cities (USA)

2:00 pm: **Surface analytical investigation on organometal triiodide perovskite** *(Invited Paper)*, Yongli Gao, Univ. of Rochester (USA) . . . . . [9183-10]

2:25 pm: **Bulk transport and interfacial disorders of amorphous organic semiconductors in a thin film transistor configuration**, Harrison Ka Hin Lee, Cyrus Yiu Him Chan, Shu Kong So, Hong Kong Baptist Univ. (Hong Kong, China) . . . . . [9183-11]

2:40 pm: **Differences between vacuum-deposited and spin-coated amorphous films of OLED materials** *(Invited Paper)*, Daisuke Yokoyama, Maki Shibata, Yamagata Univ. (Japan) . . . . . [9183-12]

3:05 pm: **Effect of molecular orientation in OLED electron and hole transport layers and its effect on device performance**, Kenneth L. Kearns, The Dow Chemical Co. (USA); Hong-Yeop Na, The Dow Chemical Co. (Korea, Republic of); Hunter Woodward, Dean M. Welsh, Timothy De Vries, David Devore, Peter Trefonas III, Liang Hong, The Dow Chemical Co. (USA) . . . . . [9183-13]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 6C . . . . SUN 3:50 PM TO 5:35 PM

Mechanisms and Physics II

Session Chairs: **Bernard Kippelen,** Georgia Institute of Technology (USA); **Russell J. Holmes,** Univ. of Minnesota, Twin Cities (USA)

3:50 pm: **Recent developments in optically and electrically detected magnetic resonance (ODMR and EDMR, respectively) of luminescent ∏-conjugated materials and OLEDs** *(Invited Paper)*, Joseph Shinar, Iowa State Univ. (USA); Ying Chen, Univ. of Florida (USA) . . . . . [9183-14]

4:15 pm: **Degradation of blue phosphorescent organic LEDs analyzed by solution NMR spectroscopy** *(Invited Paper)*, Tatsuya Fukushima, Hajime Suzuki, Kyoto Univ. (Japan); Hiroto Ito, Shinya Ootsu, Kunimasa Hiyama, Hiroshi Kita, Konica Minolta, Inc. (Japan); Hironori Kaji, Kyoto Univ. (Japan). . . . . [9183-15]

4:40 pm: **Exciton-induced degradation of interfaces in OLEDs and other organic optoelectronic devices** *(Invited Paper)*, Hany Aziz, Qi Wang, Graeme M. Williams, Yingjie Zhang, Univ. of Waterloo (Canada) . . . . . [9183-16]

5:05 pm: **Theoretical investigation of the degradation mechanisms in host and guest molecules used in OLED active layers**, Paul Winget, Minki Hong, Jean-Luc Brédas, Georgia Institute of Technology (USA). . . . . [9183-17]

5:20 pm: **Improving the lifetime of the solution-processed organic light-emitting diodes by alleviating solvent effect and interfacial degradation**, Shuyi Liu, Ying Chen, Franky So, Univ. of Florida (USA) . . . . . [9183-18]

CONFERENCE 9183

LOCATION: CONV. CTR. ROOM 6C

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 6C . . . . MON 8:15 AM TO 9:55 AM

Mechanisms and Physics III

Session Chairs: **Malte C. Gather,** Univ. of St. Andrews (United Kingdom); **Dongge Ma,** Changchun Institute of Applied Chemistry (China)

8:15 am: **The photophysics of intramolecular charge transfer molecules and TADF: effects of CT singlet triplet coupling** *(Invited Paper)*, Andrew P. Monkman, Durham Univ. (United Kingdom) . . . . . [9183-20]

8:40 am: **Host engineering for high quantum efficiency in green thermally activated delayed fluorescent device** *(Invited Paper)*, Yirang Im, Bo Seong Kim, Oh Young Kim, Jun Yeob Lee, Dankook Univ. (Korea, Republic of). . . . . [9183-21]

9:05 am: **TADF for singlet harvesting: next generation OLED materials based on brightly green and blue emitting Cu(I) and Ag(I) compounds** *(Invited Paper)*, Hartmut Yersin, Markus J. Leitl, Rafal Czerwieniec, Univ. Regensburg (Germany) . . . . . [9183-22]

9:30 am: **Unusual photoemission by lower photon energy than ionization energy for organic EL materials with giant surface potential** *(Invited Paper)*, Hiroumi Kinjo, Hyunsoo Lim, Yusuke Ozawad, Tomoya Sato, Yasuo Nakayama, Hisao Ishii, Chiba Univ. (Japan). . . . . [9183-23]

Coffee Break . . . . . Mon 9:55 am to 10:25 am

SESSION 6

LOCATION: CONV. CTR. ROOM 6C . . MON 10:25 AM TO 12:20 PM

Mechanisms and Physics IV

Session Chairs: **Malte C. Gather,** Univ. of St. Andrews (United Kingdom); **Dongge Ma,** Changchun Institute of Applied Chemistry (China)

10:25 am: **Langevin and trap assisted recombination in small molecular based phosphorescent OLEDs (PhOLEDs)**, Jeong-Hwan Lee, Sunghun Lee, Seung-Jun Yoo, Kwon-Hyeon Kim, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of) . . . . . [9183-24]

10:40 am: **Device design for optimal exciton harvesting** *(Invited Paper)*, Zhenghong Lu, Univ. of Toronto (Canada) . . . . . [9183-25]

11:05 am: **Exciplex forming co-hosts for efficient fluorescent and phosphorescent OLEDs** *(Invited Paper)*, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of). . . . . [9183-26]

11:30 am: **Engineering efficiency roll-off in organic light-emitting devices** *(Invited Paper)*, Russell J. Holmes, Univ. of Minnesota, Twin Cities (USA). [9183-27]

11:55 am: **Circularly polarized light emitting OLEDs via a solution-processed electroluminescent polymer: chiral small molecule blend** *(Invited Paper)*, Alasdair J. Campbell, Ying Yang, Rosenildo Correa da Costa, Imperial College London (United Kingdom); Detlef M. Smilgies, Cornell Univ. (USA); Matthew J. Fuchter, Imperial College London (United Kingdom) . . . . . [9183-28]

Lunch Break . . . . . Mon 12:20 pm to 1:50 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 6C . . . . MON 1:50 PM TO 3:30 PM

Solution-Processed OLEDs I

Session Chairs: **Daisuke Yokoyama,** Yamagata Univ. (Japan); **Hany Aziz,** Univ. of Waterloo (Canada)

1:50 pm: **Towards highly transparent conducting electrodes for organic flexible devices** *(Invited Paper)*, Illhwan Lee, Sungjun Kim, Juyoung Ham, Bola Lee, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9183-29]

2:15 pm: **Highly efficient flexible organic light emitting diodes** *(Invited Paper)*, Qibing Pei, Lu Li, Jiajie Liang, Charlotte Chou, Xiaodan Zhu, Xiaofan Niu, Zhibin Yu, Univ. of California, Los Angeles (USA) . . . . . [9183-30]

2:40 pm: **Utilizing PEDOT:PSS as a versatile conductive low-index layer for efficiency improvement in OLEDs** *(Invited Paper)*, Seunghyup Yoo, Hyunsu Cho, Eunhye Kim, KAIST (Korea, Republic of). . . . . [9183-31]

3:05 pm: **Universal flexible polymeric anodes for simplified organic optoelectronics** *(Invited Paper)*, Su-Hun Jeong, Seong-Hoon Woo, Tae-Hee Han, Min-Ho Park, Tae-Woo Lee, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9183-32]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 6C . . . . MON 4:00 PM TO 5:25 PM

Solution-Processed OLEDs II

Session Chairs: **Daisuke Yokoyama,** Yamagata Univ. (Japan); **Hany Aziz,** Univ. of Waterloo (Canada)

4:00 pm: **Transient electroluminescence and current responses of organic light-emitting diodes under high current density in microsecond scale**, Kou Yoshida, Hajime Nakanotani, Kyushu Univ. (Japan) and ERATO, JST (Japan); Le Zhang, Kyushu Univ. (Japan); Chihaya Adachi, Kyushu Univ. (Japan) and ERATO, JST (Japan) . . . . . [9183-91]

4:15 pm: **Light-emitting electrochemical cells by gravure printing: from ink formulation to device**, Gerardo Hernandez-Sosa, Serpil Tekoglu, Ralph Eckstein, Sebastian Stolz, Karlsruher Institut für Technologie (Germany); Manuel Hamburger, Ruprecht-Karls-Univ. Heidelberg (Germany); Norman Mechau, Uli Lemmer, Karlsruher Institut für Technologie (Germany). . . . . [9183-34]

4:30 pm: **Fabrication of the 14 inch OLED prototype by inkjet printing process** *(Invited Paper)*, Ze Liu, Gang Wang, Qing Dai, Hui-Feng Wang, Hui-Ting Shih, Ying Cui, Shou-Lei Shi, Jing-Wen Yin, Rui Xu, Chen Zhang, Yong-Wei Tu, BOE Technology Group Co., Ltd. (China) . . . . . [9183-35]

4:55 pm: **Towards fully spray coated organic light emitting devices**, Koen Gilissen, Jeroen Stryckers, Jean Manca, Wim Deferme, Univ. Hasselt (Belgium) . . . . . [9183-36]

5:10 pm: **Fully solution processed, white emitting tandem OLEDs**, Stefan Höfle, Alexander Schienle, Christoph Bernhard, Uli Lemmer, Alexander Colsmann, Karlsruher Institut für Technologie (Germany). . . . . [9183-37]

TUESDAY 19 AUGUST

SESSION 9

LOCATION: CONV. CTR. ROOM 6C . . . TUE 8:00 AM TO 10:30 AM

Novel Applications

Session Chairs: **Hartmut Yersin,** Univ. Regensburg (Germany); **Jian Li,** Arizona State Univ. (USA)

8:00 am: **Orbital angular momentum in organic microlasers** *(Invited Paper)*, Noel C. Giebink, The Pennsylvania State Univ. (USA). . . . . [9183-38]

8:25 am: **Organic semiconductor lasers for Raman spectroscopy** *(Invited Paper)*, Uli Lemmer, Xin Liu, Karlsruher Institut für Technologie (Germany) [9183-39]

8:50 am: **Diode-pumped polymer lasers: photophysics of long pulse operation** *(Invited Paper)*, Graham A. Turnbull, Guy L. Whitworth, Yue Wang, Univ. of St. Andrews (United Kingdom); Alexander Kanibolotsky, Peter J. Skabara, Univ. of Strathclyde (United Kingdom); Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom) . . . . . [9183-40]

9:15 am: **Electrospun conjugated polymer nanofibers as miniaturized light sources: control of morphology, optical properties, and assembly** *(Invited Paper)*, Andrea Camposeo, Consiglio Nazionale delle Ricerche (Italy) and Istituto Italiano di Tecnologia (Italy); Vito Fasano, Univ. del Salento (Italy) and Istituto Italiano di Tecnologia (Italy); Maria Moffa, Alessandro Polini, Consiglio Nazionale delle Ricerche (Italy); Daniela Di Camillo, Fabrizio Ruggieri, Sandro Santucci, Luca Lozzi, Univ. degli Studi dell'Aquila (Italy); Luana Persano, Consiglio Nazionale delle Ricerche (Italy) and Istituto Italiano di Tecnologia (Italy); Dario Pisignano, Univ. del Salento (Italy) and Consiglio Nazionale delle Ricerche (Italy) and Istituto Italiano di Tecnologia (Italy) . . . . . [9183-41]

9:40 am: **Color conversion in polychromatic organic light-emitting field-effect transistors: optical filtering versus reemission** *(Invited Paper)*, Heinz von Seggern, Technische Univ. Darmstadt (Germany); Christian Melzer, Univ. Heidelberg (Germany) . . . . . [9183-42]

10:05 am: **Near-infrared electroluminescence from low-voltage ambipolar field-effect transistors** *(Invited Paper)*, Jana Zaumseil, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9183-43]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 10

LOCATION: CONV. CTR. ROOM 6C . . . TUE 11:00 AM TO 12:20 PM

Solid State Lighting I

Session Chairs: **Hartmut Yersin,** Univ. Regensburg (Germany); **Jian Li,** Arizona State Univ. (USA)

11:00 am: **Concentration effect on the optical absorption and luminescence properties of disperse red-13 in silica spheres**, Kwang-Sun Kang, Kyungil Univ. (Korea, Republic of). . . . . [9183-44]

11:15 am: **High-speed visible light communication using a conjugated polymer color converter** *(Invited Paper)*, Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom); Hyunchae Chun, Univ. of Oxford (United Kingdom); Pavlos Manousiadis, Univ. of St. Andrews (United Kingdom); Sujan Rajbhandari, Univ. of Oxford (United Kingdom); Dimali Amarasinghe, Univ. of St. Andrews (United Kingdom); Grahame E. Faulkner, Univ. of Oxford (United Kingdom); Dobroslav Tsonev, The Univ. of Edinburgh (United Kingdom); Jonathan J. D. McKendry, Martin D. Dawson, Univ. of Strathclyde (United Kingdom); Graham A. Turnbull, Univ. of St. Andrews (United Kingdom); Harald Hass, The Univ. of Edinburgh (United Kingdom); Dominic C. O'Brien, Univ. of Oxford (United Kingdom). . . . . [9183-45]

11:40 am: **Recent advances in stacked inverted top-emitting organic electrophosphorescent diodes** *(Invited Paper)*, Bernard Kippelen, Keith A. Knauer, Ehsan M. Najafabadi, Yinhua Zhou, Canek Fuentes-Hernandez, Georgia Institute of Technology (USA) . . . . . [9183-46]

12:05 pm: **Pseudo natural lights for lighting based on high band-number organic light-emitting diodes and light-emitting diodes**, Jwo-Huei Jou, Kun-Yi Chou, Ching-Heng Hsieh, Fu-Chin Yang, National Tsing Hua Univ. (Taiwan) . . . . . [9183-47]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 1:50 pm

SESSION 11

LOCATION: CONV. CTR. ROOM 6C . . . . . TUE 1:50 PM TO 3:30 PM

Solid State Lighting II

Session Chairs: **Noel C. Giebink,** The Pennsylvania State Univ. (USA); **Tae-Woo Lee,** Pohang Univ. of Science and Technology (Korea, Republic of)

1:50 pm: **Brighter, better, whiter, more: recent advances in white-emitting OLEDs** *(Invited Paper)*, Malte C. Gather, Univ. of St. Andrews (United Kingdom) and Technische Univ. Dresden (Germany). . . . . [9183-48]

2:15 pm: **High efficiency hybrid white OLEDs** *(Invited Paper)*, Dongge Ma, Changchun Institute of Applied Chemistry (China) . . . . . [9183-49]

2:40 pm: **High performance hybrid white OLEDs based on new platinum complexes and new blue fluorescence host** *(Invited Paper)*, Chin-Ti Chen, Academia Sinica (Taiwan) . . . . . [9183-50]

3:05 pm: **High performance white OLED with organic and inorganic nanostructure for display application** *(Invited Paper)*, Nam Sung Cho, Joohyun Hwang, Doo-Hee Cho, Seung Koo Park, Jonghee Lee, Jaehyun Moon, Jin-Wook Shin, Chul Woong Joo, Hye Yong Chu, Jeong-Ik Lee, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9183-51]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 12

LOCATION: CONV. CTR. ROOM 6C . . . . TUE 4:00 PM TO 5:25 PM

Solid State Lighting III

Session Chairs: **Noel C. Giebink,** The Pennsylvania State Univ. (USA); **Tae-Woo Lee,** Pohang Univ. of Science and Technology (Korea, Republic of)

4:00 pm: **Light management in flexible OLEDs** *(Invited Paper)*, Stephan Harkema, Holst Ctr. (Netherlands). . . . . [9183-52]

4:25 pm: **Highly efficient organic light emitting diodes fabricated on corrugated high refractive index substrates**, Wooram Youn, Jinhyung Lee, Minfei Xu, Chaoyu Xiang, Rajiv K. Singh, Franky So, Univ. of Florida (USA) . . . . . [9183-53]

4:40 pm: **Light manipulation in organic light-emitting devices by integrating micro/nano patterns**, Jing Feng, Qi-Dai Chen, Hong-Bo Wang, Yi Zhao, Hong-Bo Sun, Jilin Univ. (China). . . . . [9183-54]

4:55 pm: **High index polymer substrates with built-in scattering properties for low cost, flexible OLEDs with improved efficiency**, Eunhye Kim, Seunghyup Yoo, Hyunsu Cho, Jin Chung, Jaeho Lee, Eungjun Kim, KAIST (Korea, Republic of) . . . . . [9183-55]

5:10 pm: **Light extraction from solution processed organic light emitting diodes**, Srinivas P. Sista, Xiaolei Shi, Jie Liu, Kevin H. Janora, GE Global Research (USA) . . . . . [9183-56]

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Organic light-emitting devices based on organic single crystals by improved contact between the metallic electrodes and the crystal, Ran Ding, Yu-Kun Wu, Ping-Rui Yan, Hong-Bo Wang, Yi Zhao, Qi-Dai Chen, Jing Feng, Hong-Bo Sun, Jilin Univ. (China) . . . . . [9183-57]

Broadband light extraction from white organic light-emitting devices by employing corrugated metallic electrodes with dual periodicity, Yan-Gang Bi, Yu-Kun Wu, Ping-Rui Yan, Hong-Bo Wang, Yi Zhao, Qi-Dai Chen, Jing Feng, Hong-Bo Sun, Jilin Univ. (China). . . . . [9183-58]

The application of high efficient yellow phosphorescent material to white OLEDs, Jin-Sheng Lin, Chun-Neng Ku, Meng-Hao Chang, Jian-Chiun Liou, Mei-Rurng Tseng, Industrial Technology Research Institute (Taiwan) . . . . . [9183-60]

CONFERENCE 9183

LOCATION: CONV. CTR. ROOM 6C

The profiling of planar illuminative patterns using multiple white organic light-emitting diodes, Henglong Yang, Lih-Jeih Chen, Yu-Chen Lien, National Taipei Univ. of Technology (Taiwan) . . . . . [9183-61]

Two-color emission from three-layer heterostructure OLETs, Karoliina Jokinen, Alexander V. Bykov, Tapio E. J. Fabritius, Risto Myllylä, Univ. of Oulu (Finland) . . . . . [9183-62]

Recent progress in pixel patterning techniques for high resolution OLED displays, Yoshitaka Kajiyama, Thomas Borel, Hany Aziz, Univ. of Waterloo (Canada) . . . . . [9183-63]

All-solution processed transparent organic light emitting diodes with graphene as top cathodes, Jung Hung Chang, Po Chuan Wang, Wei Hsiang Lin, Chih-I Wu, National Taiwan Univ. (Taiwan) . . . . . [9183-64]

Exciton-polaron-induced aggregation of wide-bandgap organic semiconductors and its primary role in the degradation of phosphorescent organic light-emitting devices, Qi Wang, Hany Aziz, Univ. of Waterloo (Canada) . . . . . [9183-65]

Exciton-induced degradation in simplified phosphorescent organic light-emitting devices, Yingjie Zhang, Qi Wang, Hany Aziz, Univ. of Waterloo (Canada) . . . . . [9183-66]

Stability of transition metal oxide doped organic semiconductors, Jae-Hyun Lee, Min-Hoi Kim, Hanbat National Univ. (Korea, Republic of). . . . . [9183-67]

Development of donor-acceptor-donor type TADF molecules for highly efficient OLEDs, Kenichi Goushi, Yuta Sagara, Chihaya Adachi, Kyushu Univ. (Japan). . . . . [9183-68]

Achieving efficient transparent organic light-emitting diodes: the effect of phase changes associated with a capping layer design, Jin Chung, Hyunsu Cho, Eunhye Kim, Jaeho Lee, Seunghyup Yoo, KAIST (Korea, Republic of)[9183-69]

Blue phosphorescent emitters with high quantum efficiency, Wook Kim, Miyoung Chae, Dal Ho Huh, Nam-Heon Lee, Hyun Jung Kim, Cheil Industries Inc. (Korea, Republic of); Changho Noh, Samsung Advanced Institute of Technology (Korea, Republic of); Kang Mun Lee, Samsung Electronics Co., Ltd. (Korea, Republic of) . . . . . [9183-70]

Surface plasmon polariton modification in top-emitting organic light-emitting diodes for enhanced light outcoupling, Cornelius Fuchs, Tobias Schwab, Martin Wieczorek, Technische Univ. Dresden (Germany); Malte C. Gather, Technische Univ. Dresden (Germany) and Univ. of St. Andrews (United Kingdom); Simone Hofmann, Karl Leo, Reinhard Scholz, Technische Univ. Dresden (Germany) . . . . . [9183-71]

Characterization, synthesis of solution processable a red phosphorescent iridium(III) complex, Bona Yang, Dongmyung Shin, Hongik Univ. (Korea, Republic of) . . . . . [9183-72]

Position isomerism as a means to increase the triplet energy in organic host materials for blue phosphorescence, Eung-Gun Kim, Dankook Univ. (Korea, Republic of) . . . . . [9183-73]

Characterization of delay fluorescence in Rhodamine 6G and ATTO-532, Murat Aydemir, Andrew P. Monkman, Durham Univ. (United Kingdom). . . . . [9183-74]

Enhancing light extraction in flexible OLEDs using micro lens arrays and scattering layers, Uli Lemmer, Amos Egel, Tobias Bocksrocker, Guillaume Gomard, Karlsruher Institut für Technologie (Germany) . . . . . [9183-75]

Synthesis and characterization of heteroatom-bridged bisspirobifluorenes for the application of organic light-emitting diodes, Cheng-Lung Wu, Chin-Ti Chen, Academia Sinica (Taiwan); Chao-Tsen Chen, National Taiwan Univ. (Taiwan) . . . . . [9183-76]

High barrier properties of transparent thin-film encapsulations for top emission organic light-emitting diodes, Yu Duan, Huiying Li, Jilin Univ. (China) . . . . . [9183-77]

Extremely high efficiency phosphorescent organic light-emitting diodes with horizontal emitting dipoles, Kwon-Hyeon Kim, Chang-Ki Moon, Jeong-Hwan Lee, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of). . . . . [9183-78]

Highly efficient inverted top emitting organic light emitting diodes using a transparent top electrode with color stability on viewing angle, Jung-Bum Kim, Jeong-Hwan Lee, Chang-Ki Moon, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of) . . . . . [9183-79]

Fluorescent OLED overcoming phosphorescent OLED, Jin-Won Sun, Jeong-Hwan Lee, Kwon-Hyeon Kim, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of) . . . . . [9183-80]

Mechanism of peel-off of metal thin film for flexible OLED substrate: effect of surface treatment on delamination, Sungjoo Kim, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9183-81]

Color rendering index simulation for white organic light emitting diodes, Xiangyu Fu, Chaoyu Xiang, Franky So, Univ. of Florida (USA) . . . . . [9183-82]

Tuning emission colour of hybrid LEDs: the influence of MoO_3 thickness, Jorge Costa Dantas Faria, Alasdair J. Campbell, Martyn A. McLachlan, Imperial College London (United Kingdom) . . . . . [9183-83]

To enhance light extraction of OLED devices by multi-optic layers including a micro lens array, Jen-Chi Lee, Chao-Heng Chien, Tatung Univ. (Taiwan); Chuang-Hung Chiu, Chunghwa Picture Tubes, Ltd. (Taiwan); Yu-Xaong Kuo, Tatung Univ. (Taiwan) . . . . . [9183-84]

Correlating the transition dipole moment orientation of phosphorescent emitter molecules in organic light-emitting diodes (OLEDs) to basic material properties, Arko Graf, Philipp Liehm, Technische Univ. Dresden (Germany) and Univ. of St. Andrews (United Kingdom); Caroline Murawski, Simone Hofmann, Karl Leo, Technische Univ. Dresden (Germany); Malte C. Gather, Univ. of St. Andrews (United Kingdom) and Technische Univ. Dresden (Germany). . . . . [9183-85]

High efficiency ITO-free phosphorescent organic light emitting diodes with wide viewing angles, Soniya D. Yambem, Mujeeb Ullah, Ebinazar B. Namdas, Paul L. Burn, The Univ. of Queensland (Australia). . . . . [9183-86]

Ultra thin layer p-doping and band bending in C_{60} on MoO_x, Chenggong Wang, Univ. of Rochester (USA); Xiaoliang Liu, Central South Univ. (China); Yongli Gao, Univ. of Rochester (USA). . . . . [9183-87]

Virtual screening for OLED materials, Mathew D. Halls, David J. Giesen, Thomas F. Hughes, Alexander Goldberg, Yixiang Cao, H. Shaun Kwak, Schrödinger, Inc. (USA); Jacob Gavartin, Schrödinger, Inc. (United Kingdom) . . . . . [9183-88]

Energy transfer in organic light emitting diodes, Grayson Ingram, Zhenghong Lu, Univ. of Toronto (Canada) . . . . . [9183-89]

Sensitized fluorescence in organic light emitting diodes, Carmen Nguyen, Grayson Ingram, Zhenghong Lu, Univ. of Toronto (Canada) . . . . . [9183-90]

CONFERENCE 9184

LOCATION: CONV. CTR. ROOM 8

Tuesday–Thursday 19–21 August 2014 • Proceedings of SPIE Vol. 9184

Organic Photovoltaics XV

Conference Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

Conference Co-Chairs: **Paul A. Lane,** U.S. Naval Research Lab. (USA); **Ifor D. W. Samuel,** Univ. of St. Andrews (United Kingdom)

Program Committee: **Natalie Banerji,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Christoph J. Brabec,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Paul L. Burn,** The Univ. of Queensland (Australia); **Antonio F. Facchetti,** Polyera Corp. (USA); **René A. J. Janssen,** Technische Univ. Eindhoven (Netherlands); **Bernard Kippelen,** Georgia Institute of Technology (USA); **Ana F. Nogueira,** Univ. of Campinas (Brazil); **Dana C. Olson,** National Renewable Energy Lab. (USA); **Barry P. Rand,** Princeton Univ. (USA); **Sean E. Shaheen,** Univ. of Colorado at Boulder (USA); **Jiangeng Xue,** Univ. of Florida (USA); **He Yan,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Yang Yang,** Univ. of California, Los Angeles (USA); **Teketel Yohannes,** Addis Ababa Univ. (Ethiopia)

Cosponsors: ALDRICH Materials Science · Polyera

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 6A . MON 2:00 PM TO 4:35 PM

Solar Energy Plenary Session

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

2:00 pm: **CPV: Lessons from the First 100MW and the Explosion of Next Generation Technologies** *(Plenary)*, Adam P. Plesniak, Arzon Solar, LLC (USA) . . . . . [9175-301]

2:25 pm: **The Renaissance of CdTe-based Photovoltaics** *(Plenary)*, William Huber, GE Global Research (USA) . . . . . [9177-302]

2:50 pm: **Organic Solar Cells: From a Lab Curiosity to a Serious Photovoltaic Technology** *(Plenary)*, Karl Leo, Technische Univ. Dresden (Germany) and King Abdullah Univ. of Science and Technology (KAUST) (Saudi Arabia) . . . . . [9184-303]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

3:45 pm: **Hot Carrier Solar Cell Absorbers: Materials, Mechanisms and Nanostructures** *(Plenary)*, Gavin Conibeer, Australian Ctr. for Advanced Photovoltaics, The Univ. of New South Wales (Australia) . . . . . [9178-304]

4:10 pm: **International PV QA Task Force's Proposed Comparative Rating System for PV Modules** *(Plenary)*, John H. Wohlgemuth, Sarah Kurtz, National Renewable Energy Lab. (USA) . . . . . [9179-305]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 8 . . . . . TUE 8:15 AM TO 10:00 AM

Advances in Organic Photovoltaics

Session Chair: **Zakya H. Kafafi,** National Science Foundation (USA)

8:15 am: **Materials and device architectures for multi-junction polymer solar cells** *(Keynote Presentation)*, René A. J. Janssen, Technische Univ. Eindhoven (Netherlands) . . . . . [9184-1]

8:45 am: **Incorporating multiple absorbers to improve spectral absorption in high efficiency organic solar cells** *(Invited Paper)*, Barry P. Rand, Princeton Univ. (USA); David Cheyns, Kjell Cnops, IMEC (Belgium); Bregt Verreet, Princeton Univ. (USA) . . . . . [9184-2]

9:10 am: **The power of materials science tools for gaining insights in organic photovoltaic devices** *(Invited Paper)*, Natalie Stingelin, Imperial College London (United Kingdom). . . . . [9184-3]

9:35 am: **Organic solar cells with non-fullerene acceptors** *(Invited Paper)*, Michael L. Chabinyc, Univ. of California, Santa Barbara (USA) . . . . . [9184-4]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 8 . . . . .TUE 10:30 AM TO 12:05 PM

Novel Donors and Acceptors for Organic Photovoltaics

Session Chair: **Peter J. Skabara,** Univ. of Strathclyde (United Kingdom)

10:30 am: **Cyanine dyes in solid state organic heterojunction solar cells** *(Invited Paper)*, Jakob Heier, Chuyao Peng, Anna C. Véron, Thomas Geiger, Roland Hany, Frank A. Nüesch, EMPA (Switzerland); Marcus V. G. Vismara, Carlos F. O. Graeff, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil). . . . . [9184-5]

10:55 am: **Thiophene-thiazolothiazole copolymers: significant impact of side chain composition on backbone orientation and solar cell performances**, Itaru Osaka, RIKEN (Japan); Masahiko Saito, Hiroshima Univ. (Japan); Tomoyuki Koganezawa, Japan Synchrotron Radiation Research Institute (Japan); Kazuo Takimiya, RIKEN (Japan) . . . . . [9184-6]

11:10 am: **Organic OPV materials with enhanced charge separating properties** *(Invited Paper)*, Fatemeh Jahani Bahnamiri, Solmaz Torabi, Hilde D. de Gier, Evgenia Douvogianni, Univ. of Groningen (Netherlands); Remco W. A. Havenith, Univ. of Groningen (Netherlands) and Univ. Gent (Belgium); Ryan C. Chiechi, Lambert J. A. Koster, Jan C. Hummelen, Univ. of Groningen (Netherlands) [9184-7]

11:35 am: **Semi-crystalline low band gap polymers for highly efficient organic photovoltaic cells**, Han Young Woo, Thanh Luan Nguyen, Mohammad Afsar Uddin, Pusan National Univ. (Korea, Republic of). . . . . [9184-8]

11:50 am: **Solution-processable perylene diimide based small molecule acceptors: concept, synthesis, morphology tuning, and photovoltaic properties**, Chuanlang Zhan, Institute of Chemistry (China) . . . . . [9184-9]

Lunch/Exhibition Break . . . . . Tue 12:05 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 8 . . . . . .TUE 1:30 PM TO 3:00 PM

Charge Transfer at the Organic Heterojunction I

Joint Session with Conferences 9165 and 9184

Session Chair: **Barry P. Rand,** Princeton Univ. (USA)

1:30 pm: **Photoexcitations and charge photogeneration in donor-acceptor blends based on low bang-gap polymers for OPV applications** *(Invited Paper)*, Tek P. Basel, Uyen Huynh, Z. Valy Vardeny, The Univ. of Utah (USA) . . . . [9165-34]

1:55 pm: **Spatially resolving ultrafast exciton dynamics in organic semiconducting thin films** *(Invited Paper)*, Naomi S. Ginsberg, Cathy Y. Wong, Benjamin L. Cotts, Samuel B. Penwell, Hao Wu, Rodrigo J. Noriega-Manez, Univ. of California, Berkeley (USA) . . . . . [9184-10]

2:20 pm: **Exciton dynamics in disordered molecular environments** *(Invited Paper)*, Adam P. Willard, Massachusetts Institute of Technology (USA) . . [9165-70]

2:45 pm: **Using Monte Carlo modeling to reconcile conflicting experimental reports of the origin of efficient charge generation in organic solar cells**, Timothy M. Burke, Michael D. McGehee, Stanford Univ. (USA) . . . . . [9184-82]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

CONFERENCE 9184
LOCATION: CONV. CTR. ROOM 8

SESSION 4

LOCATION: CONV. CTR. ROOM 8 . . . . . .TUE 3:30 PM TO 5:30 PM

Charge Transfer at the Organic Heterojunction II

Joint Session with Conferences 9165 and 9184

Session Chair: **Z. Valy Vardeny,** The Univ. of Utah (USA)

3:30 pm: **Charge recombination in solution-processed small molecule bulk heterojunction solar cells** *(Invited Paper)*, Thuc-Quyen Nguyen, Univ. of California, Santa Barbara (USA) . . . . . [9184-11]

3:55 pm: **Photoinduced charge separationp processes: from natural photosynthesis to organic photovoltaic cells**, Oleg G. Poluektov, Argonne National Lab. (USA) . . . . . [9165-36]

4:10 pm: **Hot photocarrier dynamics in organic semiconductors studied by ultrafast terahertz photoconductivity and transient absorption** *(Invited Paper)*, Paul A. Lane, Paul D. Cunningham, Joseph S. Melinger, U.S. Naval Research Lab. (USA); Edwin J. Heilweil, National Institute of Standards and Technology (USA) . . . . . [9184-12]

4:35 pm: **Transport of hot carriers in polymer-based organic solar cells**, Almantas Pivrikas, The Univ. of Queensland (Australia) . . . . . [9184-13]

4:50 pm: **Understanding electronic and optical properties of organic semiconductors from first principles** *(Invited Paper)*, Leeor Kronik, Weizmann Institute of Science (Israel); Sahar Sharifzadeh, Lawrence Berkeley National Lab. (USA); Sivan Refaely-Abramson, Weizmann Institute of Science (Israel); Jeff B. Neaton, Lawrence Berkeley National Lab. (USA) and Univ. of California, Berkeley (USA) . . . . . [9165-37]

5:15 pm: **Using Forster resonance energy transfer to extend spectral harvesting in polymer solar cells**, Erik D. Klump, Tzung-han Lai, Franky So, Univ. of Florida (USA) . . . . . [9184-14]

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 8 . . . . WED 8:20 AM TO 10:00 AM

Charge Separation and Recombination

Session Chair: **Thuc-Quyen Nguyen,** Univ. of California, Santa Barbara (USA)

8:20 am: **Tuning photovoltaic performance in donor-acceptor polymers by chemical functionalization** *(Invited Paper)*, Martin J. Heeney, Imperial College London (United Kingdom) . . . . . [9184-15]

8:45 am: **Field dependent recombination at low temperatures in an organic photovoltaic blend**, Stavros Athanasopoulos, Univ. of Cambridge (United Kingdom); Alexei D. Chepelianskii, Univ. Paris-Sud 11 (France) and Univ. of Cambridge (United Kingdom); Richard H. Friend, Neil C. Greenham, Univ. of Cambridge (United Kingdom) . . . . . [9184-16]

9:00 am: **Impedance spectroscopy and large perturbation transient photovoltage: measurement methods for recombination dynamics in organic photovoltaic**, James I. Basham, National Institute of Standards and Technology (USA) and The Pennsylvania State Univ. (USA); Lindsay C. C. Elliot, National Institute of Standards and Technology (USA); Kurt P. Pernstich, ETH Zürich (Switzerland); Dean M. DeLongChamp, National Institute of Standards and Technology (USA); Thomas N. Jackson, The Pennsylvania State Univ. (USA); David J. Gundlach, National Institute of Standards and Technology (USA) . . . . . [9184-17]

9:15 am: **The relationship between charge carrier generation pathway and internal quantum efficiency**, Ardalan Armin, Ivan Kassal, Paul E. Shaw, Mike Hambsch, Martin Stolterfoht, The Univ. of Queensland (Australia); Jun M. Li, A*STAR Institute of Materials Research and Engineering (Singapore); Paul L. Burn, Paul Meredith, The Univ. of Queensland (Australia) . . . . . [9184-18]

9:30 am: **Carrier-selectivity limit on recombination dynamics of organic photovoltaics**, Kilwon Cho, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9184-19]

9:45 am: **Decreased recombination from light induced traps by increasing polymer crystallinity in bulk heterojunction solar cells**, Thomas Heumueller, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Stanford Univ. (USA); William R. Mateker, Isaac T. Sachs-Quintana, Koen Vandewal, Jonathan A. Bartelt, Stanford Univ. (USA); Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Michael D. McGehee, Stanford Univ. (USA) . . . . . [9184-20]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

LOCATION: CONV. CTR. ROOM 6A . .WED 10:30 AM TO 12:15 PM

Organic Photonics + Electronics Plenary Session

Session Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

10:30 am: **Materials and Devices for Bioresorbable Electronics** *(Plenary)*, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9185-401]

11:00 am: **Organic Electronic Bio-devices** *(Plenary)*, Luisa Torsi, Univ. of Bari "Aldo Moro" (Italy) . . . . . [9183-402]

11:30 am: **Announcement of the Organic Photonics + Electronics Best Student Paper Award Winner**

Sponsored by ALDRICH Materials Science Polyera

11:45 am: **Charge and Spin Transport Physics of Organic Semiconductors** *(Plenary)*, Henning Sirringhaus, Cavendish Lab., Univ. of Cambridge (United Kingdom) . . . . . [9184-403]

Lunch/Exhibition Break . . . . . .Wed 12:15 pm to 2:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 8 . . . . . .WED 2:00 PM TO 3:35 PM

Hybrid Solar Cells with Organic and Inorganic Components

Session Chair: **Ifor D. W. Samuel,** Univ. of St. Andrews (United Kingdom)

2:00 pm: **Highly efficient perovskite solar cells by a low temperature solution process and its working principle** *(Invited Paper)*, Jinsong Huang, Univ. of Nebraska-Lincoln (USA) . . . . . [9184-21]

2:25 pm: **Sub 150 °C processed meso-superstructured perovskite solar cells with enhanced efficiency**, Konrad Wojciechowski, Michael Saliba, Tomas Leijtens, Antonio Abate, Henry J. Snaith, Univ. of Oxford (United Kingdom) . . . . . [9184-22]

2:40 pm: **High efficiency dye solar cell** *(Invited Paper)*, Fabrizio Giordano, Chenyi Yi, Joël Teuscher, Shaik M. Zakeeruddin, Michael Grätzel, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9184-23]

3:05 pm: **Sn halide based perovskite sensitized solar cells covering up to 1060 nm**, Yuhei Ogomi, Atsushi Morita, Shota Tsukamoto, Takahiro Saito, Naotaka Fujikawa, Kyushu Institute of Technology (Japan); Shen Qing, Taro Toyoda, The Univ. of Electro-Communications (Japan); Kenji Yoshino, Univ. of Miyazaki (Japan); Shyam S. Pandey, Tingli Ma, Shuzi Shuzi Hayase, Kyushu Institute of Technology (Japan) . . . . . [9184-24]

3:20 pm: **P-contact metal oxide in efficient organometal halide perovskite/ fullerene hybrid solar cells**, Tzung-Fang Guo, Peter Chen, Kuo-Chin Wang, Jun-Yuan Jeng, Po-Shen Shen, Kuo-Cheng Chen, National Cheng Kung Univ. (Taiwan); Tsung-Yu Chiang, National Chung Cheng Univ. (Taiwan); Pei-Ying Lin, National Cheng Kung Univ. (Taiwan) . . . . . [9184-25]

Coffee Break . . . . . .Wed 3:35 pm to 4:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 8 . . . . . WED 4:00 PM TO 5:25 PM

Bulk Heterojunction Organic Solar Cells

Session Chair: **Harald Hoppe,** Technische Univ. Ilmenau (Germany)

4:00 pm: **Highly efficient inverted polymer solar cells based on a crosslinkable water/alcohol soluble conjugated polymer interlayer,** He Yan, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9184-26]

4:15 pm: **Influence of fluorination and molecular weight on the morphology and performance of PTB7:PC71BM solar cells**, Christopher R. McNeill, Monash Univ. (Australia); Xioaxi He, Univ. of Cambridge (United Kingdom); Subhrangsu Mukherjee, North Carolina State Univ. (USA); Scott E. Watkins, Tianshi Qin, Ming Chen, Commonwealth Scientific and Industrial Research Organisation (Australia); Lars Thomsen, Australian Synchrotron (Australia); Harald W. Ade, North Carolina State Univ. (USA) . . . . . [9184-27]

4:30 pm: **Improving spectral response in polymer-fullerene bulk heterojunction solar cells** *(Invited Paper)*, Barry C. Thompson, The Univ. of Southern California (USA) . . . . . [9184-28]

4:55 pm: **Elucidating double aggregation mechanisms in diketopyrrolopyrrole-based narrow bandgap polymer solar cells**, Gang Li, Jing Gao, Univ. of California, Los Angeles (USA); Wei Chen, Argonne National Lab. (USA); Yang Yang, Univ. of California, Los Angeles (USA) . . . . . [9184-29]

5:10 pm: **Characterizing energy level shifts between the pure and mixed regions in bulk heterojunction polymer:fullerene solar cells**, Sean Sweetnam, Stanford Univ. (USA); Guy O. Ngongang Ndjawa, Kenneth R. Graham, King Abdullah Univ. of Science and Technology (Saudi Arabia); Jonathan A. Bartelt, Timothy M. Burke, Stanford Univ. (USA); Aram Amassian, King Abdullah Univ. of Science and Technology (Saudi Arabia); Michael D. McGehee, Stanford Univ. (USA) . . . . . [9184-30]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Hybrid anode buffer layer MoO_3/CuI to improve the performances of the organic solar cells based on triphenylamine used as donor of electrons, Mohammed Makha, Univ. d'Angers (France) . . . . . [9184-50]

Organic photovoltaic devices: challenges and prospects, Divija Pandel, TERI Univ. (India); Nupur Rathore, Indian Institute of Technology Jodhpur (India)[9184-51]

Solution-processed parallel tandem polymer solar cells using silver nanowires as intermediate electrodes, Fei Guo, Karen Forberich, Christoph J. Brabec, Peter Kubis, Tayebeh Ameri, Ning Li, Thomas Przybilla, Erdmann Spiecker, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9184-52]

Critical issues in transport characterization on polymeric photovoltaic materials, Harrison Ka Hin Lee, Hong Kong Baptist Univ. (Hong Kong, China); Zhao Li, National Research Council Canada (Canada); Franky So, Univ. of Florida (USA); Sai Wing Tsang, City Univ. of Hong Kong (Hong Kong, China); Shu Kong So, Hong Kong Baptist Univ. (Hong Kong, China) . . . . . [9184-54]

The influence of thermal processing protocol upon the crystallization and photovoltaic performance of organometal trihalide perovskites, Michael Saliba, Univ. of Oxford (United Kingdom); Kwan Wee Tan, Ulrich B. Wiesner, Cornell Univ. (USA); Henry J. Snaith, Univ. of Oxford (United Kingdom) . . . . . [9184-56]

Inverted polymer solar cells based on thin ZnO films grown by mist chemical vapor deposition system, Chandan Biswas, Kang L. Wang, Univ. of California, Los Angeles (USA) . . . . . [9184-57]

Hybrid reduced graphene oxide-metal oxide solution processed election transport layers for high performance organic photovoltaics, Keyur K. Gandhi, Michail J. Beliatis, Imalka Jayawardena, Rhys Rhodes, Lynn Rozanski, Dinesha Dabers, Simon J. Henley, S. Ravi P. Silva, Univ. of Surrey (United Kingdom) . . . . . [9184-58]

All-plastic organic photovoltaic cells with a photovoltaic dynamic range of five orders of magnitude, Yinhua Zhou, Georgia Institute of Technology (USA) and Huazhong Univ. of Science and Technology (China); Talha M. Khan, Jaewon Shim, Amir Dindar, Canek Fuentes-Hernandez, Bernard Kippelen, Georgia Institute of Technology (USA) . . . . . [9184-59]

Organic photovoltaic cells with stable top metal electrodes modified with polyethylenimine, Talha M. Khan, Georgia Institute of Technology (USA); Yinuha Zhou, Georgia Institute of Technology (USA) and Huazhong Univ. of Science and Technology (China); Amir Dindar, Jaewon Shim, Canek Fuentes-Hernandez, Bernard Kippelen, Georgia Institute of Technology (USA) . . . . . [9184-61]

Understanding charge transport in vacuum deposited Schottky organic solar cells with microsecond transient photocurrent measurements, Sibi Sutty, Graeme M. Williams, Hany Aziz, Univ. of Waterloo (Canada) . . . . . [9184-62]

Reducing the variability in performance of organic solar cells containing vacuum deposited MoO_3 extraction layers, Graeme M. Williams, Hany Aziz, Univ. of Waterloo (Canada). . . . . [9184-63]

The pure and mixed halide organic-inorganic perovskite solar material, Swee Sien Lim, Guichuan Xing, Natalia Yantara, Nripan Mathews, Tze Chien Sum, Nanyang Technological Univ. (Singapore) . . . . . [9184-64]

Utilization of metallic coils for TCO-less cylindrical DSSC: investigation of photovoltaic performance under lower light intensities, Gaurav Kapil, Shyam S. Pandey, Yuhei Ogomi, Tingli Ma, Shuzi Shuzi Hayase, Kyushu Institute of Technology (Japan) . . . . . [9184-65]

Nanobump assembly for plasmonic organic solar cells, Hyung-Jun Song, Kinam Jung, Gunhee Lee, Youngjun Ko, Jong-Kwon Lee, Changhee Lee, ManSoo Choi, Seoul National Univ. (Korea, Republic of) . . . . . [9184-66]

All-inkjet-printed solar cells, Sungjune Jung, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9184-67]

Processing additives for polymeric bulk heterojunction solar cells: selection methods and mechanistic effects, Uyxing Vongsaysy, Univ. of Waterloo (Canada); Guillaume Wantz, Univ. Bordeaux 1 (France); Bertrand Pavageau, Solvay (France); Laurent Servant, Univ. Bordeaux 1 (France); Hany Aziz, Univ. of Waterloo (Canada) . . . . . [9184-68]

Effects of solvent additives on morphology and charge dynamics of bulk heterojunction solar cell, Ankur Solanki, Nanyang Technological Univ. (Singapore) . . . . . [9184-69]

Hydrogen bonding and noncovalent interaction can make crystalline high efficient polymer for polymer solar cell, Mohammad Afsar Uddin, Thanh Luan Nguyen, Han Young Woo, Pusan National Univ. (Korea, Republic of) . . . . [9184-70]

Highly planarized Ag nanowire and carbon nanotube composite electrodes for organic photovoltaics, Soniya D. Yambem, The Univ. of Queensland (Australia); Andrew Stapleton, David A. Lewis, Flinders Univ. (Australia); Paul L. Burn, Paul Meredith, The Univ. of Queensland (Australia) . . . . . [9184-71]

Spectroscopic characterization of crystalline non-fullerene organic blends for solar cells, Paul E. Shaw, Pascal Wolfer, Benjamin Langley, Paul L. Burn, Paul Meredith, The Univ. of Queensland (Australia) . . . . . [9184-72]

Towards efficient organic photovoltaic cells: enhancement of light trapping with breath figure patterns, Monika Josiek, Jagiellonian Univ. in Krakow (Poland); Jakub Haberko, Mateusz Marzec, AGH Univ. of Science and Technology (Poland); Rickard Hansson, Leif K. E. Ericsonn, Karlstad Univ. (Sweden); Andrzej Bernasik, AGH Univ. of Science and Technology (Poland); Ellen Moons, Karlstad Univ. (Sweden); Andrzej Budkowski, Jakub Rysz, Jagiellonian Univ. in Krakow (Poland) . . . . . [9184-73]

The influence of SAM modification of PEDOT:PSS anode on the performance of organic solar cells, Jakub Rysz, Monika Josiek, Jagiellonian Univ. in Krakow (Poland); Mateusz Marzec, AGH Univ. of Science and Technology (Poland); Rickard Hansson, Leif K. E. Ericsson, Karlstad Univ. (Sweden); Andrzej Bernasik, AGH Univ. of Science and Technology (Poland); Ellen Moons, Karlstad Univ. (Sweden); Andrzej Budkowski, Jagiellonian Univ. in Krakow (Poland) . . . . . [9184-74]

Multiscale study of the effect of solvent on the glass transition temperature, molecule diffusion, and reorientation of P3HT-PCBM, Min Huang, Manhua Liu, Tongji Univ. (China) . . . . . [9184-76]

Holographic spectral beamsplitting for increased organic photovoltaic conversion efficiency, Shelby D. Vorndran, College of Optical Sciences, The Univ. of Arizona (USA); Silvana Ayala, Yuechen Wu, Juan M. Russo, Raymond K. Kostuk, The Univ. of Arizona (USA); Jacob Friedlein, Sean E. Shaheen, Univ. of Colorado at Boulder (USA) . . . . . [9184-77]

Degradation effects on charge carrier transport in P3HT:PCBM solar cells studied by photo-CELIV, Meera Stephen, Vilnius Univ. (Lithuania); Safakath Karuthedath, IMDEA Materials Institute (Spain) . . . . . [9184-78]

Increasing optical density of single-layer multi-polymer bulk-heterojunction OPVs using CdSe(ZnS) core(shell) quantum dots, Buddy J. Bump, Grant T. Olson, Richard N. Savage, Robert Echols, California Polytechnic State Univ., San Luis Obispo (USA) . . . . . [9184-79]

Performance improvement of dye-sensitized solar cells by surface patterning of FTO electrodes, Chun-Pei Cho, National Chi Nan Univ. (Taiwan) . . . . [9184-80]

Influence of selenophene-thiophene phase separation on solar cell performance, Dong Gao, Dwight S. Seferos, Jon Hollinger, Univ. of Toronto (Canada) . . . . . [9184-83]

Efficient upscaling of organic solar cells and modules: influence of simulation model on precision in determining the optimal geometry, Marco Seeland, Burhan Muhsin, Kai-Rudi Eberhardt, Harald Hoppe, Technische Univ. Ilmenau (Germany) . . . . . [9184-84]

Plasmon-exciton interaction studied in the near-field, Yohannes Abate, California State Univ., Long Beach (USA) . . . . . [9184-86]

Importance of mixed phases and optimum domain purity on the photovoltaic performance of high-efficiency solution-processed small-molecule BHJ solar cells, Subhrangsu Mukherjee, North Carolina State Univ. (USA); Christopher Proctor, Ye Huang, Thuc-Quyen Nguyen, Guillermo C. Bazan, Edwards J. Kramer, Univ. of California, Santa Barbara (USA); Harald W. Ade, North Carolina State Univ. (USA) . . . . . [9184-87]

An efficient interconnection unit composed of electron-transporting layer/metal/p-doped hole transporting layer and its operation mechanism in tandem organic solar cells, Hyun-Sub Shim, Seoul National Univ. (Korea, Republic of); Jung-Hung Chang, National Taiwan Univ. (Taiwan); Seung-Jun Yoo, Seoul National Univ. (Korea, Republic of); Chih-I Wu, National Taiwan Univ. (Taiwan); Jang-Joo Kim, Seoul National Univ. (Korea, Republic of) . . . . . [9184-88]

CONFERENCE 9184

LOCATION: CONV. CTR. ROOM 8

Polaron photogeneration in P3HT-PCBM bulk heterojunctions revealed by infrared photoinduced absorption spectroscopy, Cesare Soci, Majid Panahandeh Fard, Zilong Wang, Manoj Kumar, Nanyang Technological Univ. (Singapore) . . . . . [9184-89]

Surface dependent nanostructures of ultra-thin copper(II) phthalocyanine films and their thermal evolution, Hyojung Kim, Pusan National Univ. (Korea, Republic of); Ji Whan Kim, Samsung Advanced Institute of Technology (Korea, Republic of); Junhyuk Jang, Jang-Joo Kim, Seoul National Univ. (Korea, Republic of); Hyun Hwi Lee, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9184-90]

Room-temperature solution-processed metal oxides for efficient hole transport layer of organic electronics, Wallace C. H. Choy, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9184-91]

Direct measurements of hot CT states in isoindigo polymer systems for polymer bulk heterojunction solar cells by CMEAS, Tzung-Han Lai, Sujin Baek, Univ. of Florida (USA); Caroline M. Grand, Georgia Institute of Technology (USA); Erik D. Klump, Univ. of Florida (USA); John R. Reynolds, Georgia Institute of Technology (USA); Franky So, Univ. of Florida (USA) . . . . . [9184-92]

Charge transport in peptide nanostructures doped with MEH-PPV and carbazole derivatives, Tatiana D. Martins, Antonio C. Chaves Ribeiro, Henrique S. Camargo, UFG (Brazil). . . . . [9184-94]

The origin of high open circuit voltage in organic-inorganic hybrid perovskite solar cells, Wenchao Yang, Yao Yao, Chang-Qin Wu, Fudan Univ. (China)[9184-95]

Benzothiadiazole or pyrimidine? Which is the promising acceptor moiety for D-A-A small molecule donor materials in organic solar cells? A theoretical evaluation, Yu-ai Duan, Yi Liao, Xia Zuo, Zhuo-yong Zhang, Capital Normal Univ. (China) . . . . . [9184-96]

Designing high efficiency organic photovoltaics by controlling the ordering at the donor-acceptor interface, Hsinhan Tsai, Cheng-Yu Kuo, Hsing-Lin Wang, Wanyi Nie, Gautam Gupta, Brian K. Crone, Aditya Mohite, Sergei Tretiak, Los Alamos National Lab. (USA) . . . . . [9184-97]

THURSDAY 21 AUGUST

SESSION 8

LOCATION: CONV. CTR. ROOM 8 . . . . .THU 8:00 AM TO 10:00 AM

Importance of Order and Morphology in Organic Solar Cells

Session Chair: **He Yan,** Hong Kong Univ. of Science and Technology (Hong Kong, China)

8:00 am: **Control of order and aggregation in polymer-fullerene bulk heterojunctions** *(Invited Paper)*, Harald Hoppe, Technische Univ. Ilmenau (Germany) . . . . . [9184-31]

8:25 am: **Multi-phase separation and internal structures in OPV blends as revealed by soft X-ray scattering**, Harald W. Ade, Subhrangsu Mukherjee, Wei Ma, North Carolina State Univ. (USA); Christopher Proctor, Ye Huang, Univ. of California, Santa Barbara (USA); Jonathan A. Bartelt, Stanford Univ. (USA); Thuc-Quyen Nguyen, Guillermo C. Bazan, Edwards J. Kramer, Univ. of California, Santa Barbara (USA); Michael D. McGehee, Stanford Univ. (USA); Jianhui Hou, Institute of Chemistry (China) . . . . . [9184-32]

8:40 am: **Interplay between ordering effects and solar cell performance in PBDTTPD polymers** *(Invited Paper)*, Pierre M. Beaujuge, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9184-33]

9:05 am: **Quantification of nano- and meso-scale phase separation and relation to donor and acceptor quantum efficiency, Jsc, and FF in polymer:fullerene solar cells**, Wei Ma, John R. Tumbleston, Subhrangsu Mukherjee, North Carolina State Univ. (USA); Cheng Wang, Lawrence Berkeley National Lab. (USA); Jianhui Hou, Institute of Chemistry (China); Harald W. Ade, North Carolina State Univ. (USA) . . . . . [9184-34]

9:20 am: **Large scale molecular dynamics simulations of chain conformation and morphology in high efficiency co-polymers for organic photovoltaics** *(Invited Paper)*, Ross Larsen, Travis Kemper, National Renewable Energy Lab. (USA) . . . . . [9184-35]

9:45 am: **Vertical stratification in organic bulk heterojunction solar cells and its impacts on device performance**, Tao Wang, Wuhan Univ. of Technology (China) and The Univ. of Sheffield (United Kingdom) . . . . . [9184-36]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 9

LOCATION: CONV. CTR. ROOM 8 . . . . .THU 10:30 AM TO 12:10 PM

Scaling Organic Photovoltaics from Cells to Modules

Session Chair: **Christoph J. Brabec,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany)

10:30 am: **Organic solar cells: from lab to Roll2Roll production** *(Invited Paper)*, Christian L. Uhrich, Heliatek GmbH (Germany). . . . . [9184-37]

10:55 am: **Organic nanoparticles to enable the environmentally friendly fabrication of organic solar cells fully from aqueous/alcoholic solutions**, Stefan Gärtner, Karlsruher Institut für Technologie (Germany); Marco Christmann, Bernd Baumstümmler, MJR PharmJet GmbH (Germany); Eva-Marie Prinz, MJR PharmJet GmbH (Germany) and Karlsruher Institut für Technologie (Germany); Bernd Penth, Synthesechemie Dr. Penth GmbH (Germany); Alexander Colsmann, Karlsruher Institut für Technologie (Germany) . . . . . [9184-38]

11:10 am: **Highly efficient multi junction organic solar cells with DCV2-5T-Me(3,3) as absorber material**, Rico Meerheim, Christian Körner, Karl Leo, Technische Univ. Dresden (Germany). . . . . [9184-39]

11:25 am: **Solution processed flexible planar hybrid perovskite solar cells**, Hardeep Singh Gill, Akshay Kokil, Univ. of Massachusetts Lowell (USA); Lian Li, Ravi Mosurkal, U.S. Army Natick Soldier Research, Development and Engineering Ctr. (USA); Jayant Kumar, Univ. of Massachusetts Lowell (USA) . . . . . [9184-40]

11:40 am: **In-situ transient absorption spectroscopy: a method for the characterization of roll-to-roll coated organic photovoltaic films**, Jonathan M. Downing, National Institute of Standards and Technology (USA); Bob C. Schroeder, Iain McCulloch, Imperial College London (United Kingdom); Lee J. Richter, Dean M. DeLongchamp, David J. Gundlach, National Institute of Standards and Technology (USA) . . . . . [9184-41]

11:55 am: **Flexible organic tandem solar cell modules: a story of up-scaling**, George D. Spyropoulos, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Peter Kubis, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Erlangen Graduate School in Advanced Optical Technologies (Germany); Ning Li, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Luca Lucera, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Florian Machui, Tayebeh Ameri, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Monika M. Voigt, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) . . . . . [9184-42]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:30 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 8 . . . . . THU 1:30 PM TO 2:55 PM

Novel Materials for Electrodes and Interfaces

Session Chair: **Bernard Kippelen,** Georgia Institute of Technology (USA)

1:30 pm: **Stability of organic solar cells applying solution processed NiO hole transport layer: comparison with water-based V_2O_5** *(Invited Paper)*, Gerardo Teran-Escobar, CIN2 (Spain) and Consejo Superior de Investigaciones Científicas (Spain); Raphael K. Arfaoui, Institut Català de Nanotecnologia (Spain) and Consejo Superior de Investigaciones Científicas (Spain); Kion Norrman, Risø National Lab. (Denmark); Monica Lira-Cantu, CIN2 (Spain) and Consejo Superior de Investigaciones Científicas (Spain) . . . . . [9184-43]

1:55 pm: **Solution processed interfacial materials for organic bulk heterojunction and planar heterojunction perovskite solar cells**, Wei Lin Leong, A*STAR Institute of Materials Research and Engineering (Singapore); Natalia Yantara, Nanyang Technological Univ. (Singapore); Yi Ren, A*STAR Institute of Materials Research and Engineering (Singapore); Nripan Mathews, Nanyang Technological Univ. (Singapore) . . . . . [9184-44]

2:10 pm: **Semitransparent organic photovoltaic modules with printed silver nanowire top electrodes**, Fei Guo, Peter Kubis, Karen Forberich, Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany). . . . . [9184-45]

2:25 pm: **Plasmonic electrodes for organic photovoltaics: polarization-independent absorption enhancement**, Beibei Zeng, Zakya H. Kafafi, Filbert J. Bartoli, Lehigh Univ. (USA) . . . . . [9184-47]

2:40 pm: **Plasmonic-electrical effects and carrier accumulation effects of metal nanomaterials for high performance organic solar cells**, Wallace C. H. Choy, The Univ. of Hong Kong (Hong Kong, China). . . . . [9184-48]

CONFERENCE 9185A

LOCATION: CONV. CTR. ROOM 7B

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9185A

Organic Field-Effect Transistors XIII

Conference Chairs: **Zhenan Bao,** Stanford Univ. (USA); **Iain McCulloch,** Imperial College London (United Kingdom)

Cosponsors: ALDRICH Materials Science CORNING

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 7B . . . MON 8:15 AM TO 10:00 AM

New Materials I

Session Chair: **Iain McCulloch,** Imperial College London (United Kingdom)

8:15 am: **The impact of isomeric purity on the performance of anthradithiophene-based transistors** *(Invited Paper)*, John E. Anthony, Univ. of Kentucky (USA) . . . . . [9185-101]

8:45 am: **Naphthodithiophenediimide (NDTI): a new building block for versatile organic semiconductors** *(Invited Paper)*, Kazuo Takimiya, Masahiro Nakano, Itaru Osaka, RIKEN (Japan) . . . . . [9185-102]

9:15 am: **Bistetracene: an air stable, high-mobility organic semiconductor with extended conjugation** *(Invited Paper)*, Alejandro L. Briseno, Lei Zhang, Univ. of Massachusetts Amherst (USA) . . . . . [9185-103]

9:45 am: **Intertwined lamello-columnar co-assemblies in liquid-crystalline side-chain pi-conjugated polymers: towards a new class of nanostructured supramolecular organic semiconductors**, Yiming Xiao, Danli Zeng, Univ. Pierre et Marie Curie (France); Martin Brinkmann, Institut Charles Sadron (France); Benoit Heinrich, Bertrand Donnio, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Jeong-Weon Wu, Jean-Charles Ribierre, Ewha Womans Univ. (Korea, Republic of); Emmanuelle Lacaze, David Kreher, André-Jean Attias, Fabrice Mathevet, Univ. Pierre et Marie Curie (France) . . . . . [9185-104]

Coffee Break . . . . . Mon 10:00 am to 10:25 am

SESSION 2

LOCATION: CONV. CTR. ROOM 7B . . MON 10:25 AM TO 12:10 PM

New Materials II

Session Chair: **John E. Anthony,** Univ. of Kentucky (USA)

10:25 am: **Polymers containing highly electroactive fused heterocycles for field effect transistors and single-material solar cell devices** *(Invited Paper)*, Peter J. Skabara, Univ. of Strathclyde (United Kingdom). . . . . [9185-105]

10:55 am: **Extended and fused benzothiadiazole and benzotriazole units in semiconducting polymers for organic electronic applications** *(Invited Paper)*, Miquel Planells, Iain McCulloch, Imperial College London (United Kingdom) . . . . . [9185-106]

11:25 am: **Solution processable organic materials for flexible electronics** *(Invited Paper)*, Rashmi Bhintade, Tomas G. Backlund, Stephen Bain, Aurelie Meneau, Piotr Wierzchowiec, Irina Afonina, Giles R. Lloyd, Mark James, Mark Verrall, Steven Tierney, David Sparrowe, Toby Cull, Merck Chemicals Ltd. (United Kingdom) . . . . . [9185-107]

11:55 am: **Critical factors to achieve low voltage- and capacitance-based organic field-effect transistors**, Hoichang Yang, Mi Jang, Inha Univ. (Korea, Republic of) . . . . . [9185-108]

Lunch Break . . . . . Mon 12:10 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 7B . . . . MON 1:30 PM TO 3:00 PM

Morphology I

Session Chair: **Michael L. Chabinyc,** Univ. of California, Santa Barbara (USA)

1:30 pm: **New measurements of order and structure in semiconducting polymers** *(Invited Paper)*, Dean M. DeLongchamp, Chad R. Snyder, Ryan C. Nieuwendaal, Brian A. Collins, National Institute of Standards and Technology (USA); Christine K. Luscombe, Prakash Sista, Shane D. Boyd, Univ. of Washington (USA) . . . . . [9185-109]

2:00 pm: **Semiconducting:insulating polymer blends: processing, structure and opportunities for the OFET field** *(Invited Paper)*, Natalie Stingelin, Imperial College London (United Kingdom) . . . . . [9185-110]

2:30 pm: **Mechanically induced heterogeneous nucleation for patterned organic semiconducting thin films**, Liyang Yu, Muhammad R. Niazi, Aram Amassian, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9185-111]

2:45 pm: **Nanoaggregates of poly(3-hexylthiophene): morphology-electrical properties relation**, Urszula Bielecka, Krzysztof Janus, Marcin Sojka, Juliusz Sworakowski, Wojciech Bartkowiak, Wroclaw Univ. of Technology (Poland) . . . . . [9185-112]

Coffee Break . . . . . Mon 3:00 pm to 3:25 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 7B . . . . MON 3:25 PM TO 5:40 PM

Morphology II

Session Chair: **Dean M. DeLongchamp,** National Institute of Standards and Technology (USA)

3:25 pm: **Microstructure and doping of organic semiconductors** *(Invited Paper)*, Michael L. Chabinyc, Univ. of California, Santa Barbara (USA) . . . . . [9185-113]

3:55 pm: **Observation of a distinct surface molecular orientation in films of a high mobility conjugated polymer**, Christopher R. McNeill, Monash Univ. (Australia); Torben Schuettfort, Univ. of Cambridge (United Kingdom); Lars Thomsen, Australian Synchrotron (Australia) . . . . . [9185-114]

4:10 pm: **Beyond conventional organic transistors: novel approaches with improved performance and stability** *(Invited Paper)*, Bjorn Lüssem, Kent State Univ. (USA); Max L. Tietze, Paul Pahner, Technische Univ. Dresden (Germany); Hans Kleemann, Technische Univ. Dresden (Germany) and Novaled GmbH (Germany); Alrun Günther, Daniel Kasemann, Karl Leo, Technische Univ. Dresden (Germany) . . . . . [9185-115]

4:40 pm: **High-performance organic transistors for printed circuits** *(Invited Paper)*, Jun Takeya, Osaka Univ. (Japan) . . . . . [9185-116]

5:10 pm: **Solution-processing of organic semiconductor thin films with controlled polymorphism** *(Invited Paper)*, Aram Amassian, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9185-118]

CONFERENCE 9185A

LOCATION: CONV. CTR. ROOM 7B

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 7B .... TUE 8:15 AM TO 10:15 AM

Transistor Devices I

Session Chair: **Aram Amassian,** King Abdullah Univ. of Science and Technology (Saudi Arabia)

8:15 am: **Ultraflexible organic thin-film transistors on 1-micron thick plastic substrates** *(Invited Paper)*, Tsuyoshi Sekitani, The Univ. of Tokyo (Japan)[9185-119]

8:45 am: **Towards low-voltage organic field-effect transistors (OFETs) with solution-processed high-k dielectric and interface engineering** *(Invited Paper)*, Jianbin Xu, Yaorong Su, The Chinese Univ. of Hong Kong (Hong Kong, China); Weiguang Xie, Jinan Univ. (China). . . . . [9185-120]

9:15 am: **Charge trapping study using optical spectroscopy of improvement of solution processed metal oxide thin film transistor by self-assembled monolayers**, Jin-Woo Park, Hyeong-Jung Kim, Dae-Hwan Kim, Mi-Jung Lee, Kookmin Univ. (Korea, Republic of) . . . . . [9185-121]

9:30 am: **Nonvolatile organic transistor memory devices based on nanostructured polymeric materials** *(Invited Paper)*, Wen-Chang Chen, National Taiwan Univ. (Taiwan) . . . . . [9185-122]

10:00 am: **Circularly-polarized light detecting phototransistors based on a helically-shaped chiral organic semiconductor**, Alasdair J. Campbell, Ying Yang, Rosenildo Correa da Costa, Matthew J. Fuchter, Imperial College London (United Kingdom) . . . . . [9185-123]

Coffee Break . . . . . Tue 10:15 am to 10:45 am

SESSION 6

LOCATION: CONV. CTR. ROOM 7B ...TUE 10:45 AM TO 12:30 PM

Transistor Devices II

Session Chair: **Alejandro L. Briseno,** Univ. of Massachusetts Amherst (USA)

10:45 am: **Solution-grown organic single-crystalline p-n junctions** *(Invited Paper)*, Hanying Li, Congcheng Fan, Zhejiang Univ. (China) . . . . . [9185-124]

11:15 am: **Exciton fission, fusion and long-range triplet exciton diffusion in molecular crystals: impact on photoconductivity and photoluminescence of organic semiconductors** *(Invited Paper)*, Vitaly Podzorov, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9185-125]

11:45 am: **Patterning of high-quality polycrystalline rubrene based on electron-irradiated polystyrene and its applications for organic thin-film transistors**, Jaejoon Kim, KAIST (Korea, Republic of); Hyeokmoo Lee, LG Chem, Ltd. (Korea, Republic of); Junmok Ha, Jiwon Park, Sungoh Cho, KAIST (Korea, Republic of) . . . . . [9185-126]

12:00 pm: **Terahertz study of hole transport in pentacene thin films**, Roland Kersting, Stefan G. Engelbrecht, Markus Prinz, Thomas R. Arend, Ludwig-Maximilians-Univ. München (Germany). . . . . [9185-127]

12:15 pm: **Tuning of energetic barrier at semiconductor/dielectric interface to enhance gate-bias stress stability of organic field-effect transistors**, Jiye Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Se Hyun Kim, Youngnam Univ. (Korea, Republic of); Chan Eon Park, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9185-128]

Lunch/Exhibition Break . . . . . Tue 12:30 pm to 2:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 7B .... TUE 2:00 PM TO 3:30 PM

Stretchable Electronics

Session Chair: **Zhenan Bao,** Stanford Univ. (USA)

2:00 pm: **Toward intrinsically stretchable organic semiconductors: mechanical properties of high-performance conjugated polymers** *(Invited Paper)*, Darren J. Lipomi, Suchol Savagatrup, Timothy F. O'Connor, Aditya S. Makaram, Daniel J. Burke, Aliaksandr V. Zaretski, Adam D. Printz, Univ. of California, San Diego (USA) . . . . . [9185-129]

2:30 pm: **Electrically engineered polymer-carbon hybrid heterojunction for high-performance printed transistors** *(Invited Paper)*, Do Hwan Kim, Gyu Won Kang, Soongsil Univ. (Korea, Republic of); Hyeon-Jin Shin, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Woo-Jae Kim, Kyungwon Univ. (Korea, Republic of) . . . . . [9185-130]

3:00 pm: **Highly stretchable polymer transistors consisting entirely of stretchable device components** *(Invited Paper)*, Unyong Jeong, Yonsei Univ. (Korea, Republic of). . . . . [9185-131]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 7B .... TUE 4:00 PM TO 5:45 PM

Processing Devices

Session Chair: **Natalie Stingelin,** Imperial College London (United Kingdom)

4:00 pm: **Printing processes for integrated sensor tags based on organic complementary transistors** *(Invited Paper)*, Tse Nga Ng, David E. Schwartz, Ping Mei, Janos Veres, Palo Alto Research Center, Inc. (USA). . . . . [9185-132]

4:30 pm: **Tuning molecular orientation and crystal structure via post-deposition processing to optimize charge transport in thin-film transistors** *(Invited Paper)*, Anna M. Hiszpanski, Princeton Univ. (USA); Arthur R. Woll, Cornell Univ. (USA); Nan Yao, Yueh-Lin Loo, Princeton Univ. (USA) . . . . . [9185-133]

5:00 pm: **High performance transparent organic thin film transistors grow by a novel off-centre spin-coating method**, Jinsong Huang, Yongbo Yuan, Univ. of Nebraska-Lincoln (USA); Gaurav Giri, Alexander L. Ayzner, Arjan P. Zoombelt, Stanford Univ. (USA); Stefan C. B. Mannsfeld, SLAC National Accelerator Lab. (USA); Jihua Chen, Oak Ridge National Lab. (USA); Dennis Nordlund, Michael F. Toney, SLAC National Accelerator Lab. (USA); Zhenan Bao, Stanford Univ. (USA) . . . . . [9185-134]

5:15 pm: **Printed organic field effect transistors with patterned polyethylenimine layers**, Amir Dindar, Georgia Institute of Technology (USA); Mathieu Fenoll, Solvay S.A. (Belgium); Canek Fuentes-Hernandez, Talha M. Khan, Anthony J. Giordano, Junxiang Zhang, Seth R. Marder, Bernard Kippelen, Georgia Institute of Technology (USA) . . . . . [9185-135]

5:30 pm: **Organic transistor circuit implementation using reverse stamping for interconnections between electrodes**, Sangmoo Choi, Canek Fuentes-Hernandez, Minseong Yun, Amir Dindar, Talha M. Khan, Cheng-Yin Wang, Bernard Kippelen, Georgia Institute of Technology (USA) . . . . . [9185-136]

WEDNESDAY 20 AUGUST

LOCATION: CONV. CTR. ROOM 6A ..WED 10:30 AM TO 12:15 PM

Organic Photonics + Electronics Plenary Session

Session Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

10:30 am: **Materials and Devices for Bioresorbable Electronics** *(Plenary)*, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9185-401]

11:00 am: **Organic Electronic Bio-devices** *(Plenary)*, Luisa Torsi, Univ. of Bari "Aldo Moro" (Italy) . . . . . [9183-402]

11:30 am: **Announcement of the Organic Photonics + Electronics Best Student Paper Award Winner**

Sponsored by ALDRICH Materials Science Polyera

11:45 am: **Charge and Spin Transport Physics of Organic Semiconductors** *(Plenary)*, Henning Sirringhaus, Cavendish Lab., Univ. of Cambridge (United Kingdom) . . . . . [9184-403]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Investigation of charge injection characteristics in diketopyrrolopyrrole ambipolar semiconducting polymers, Sunjung Lee, Mijung Lee, Kookmin Univ. (Korea, Republic of); Sukhyun Jung, Jin-Kyun Lee, Inha Univ. (Korea, Republic of); Cheawon Kim, Kookmin Univ. (Korea, Republic of) . . . . . [9185-117]

Stable operation of nonvolatile multistate memory using organic ferroelectric field-effect transistor circuits, Min-Hoi Kim, Jae-Hyun Lee, Hanbat National Univ. (Korea, Republic of). . . . . [9185-137]

Tunable crystalline structures of diketopyrrolopyrrole (DPP)-based semiconducting polymers for high-performance organic field-effect transistors, Mi Jang, Hoichang Yang, Inha Univ. (Korea, Republic of) . . [9185-138]

Polymer gated organic field effect transistor using magnesium phthalocyanine, Rajesh R. Kallarakkal, Oregon State Univ. (USA) . . . . . [9185-139]

Electrical characteristic of IGZO Oxide TFTs with organic/inorganic gate dielectric insulator, Sang Chul Lim, Electronics and Telecommunications Research Institute (Korea, Republic of). . . . . [9185-140]

Top-gate polymer thin-film transistors fabricated on elastomeric substrates, Soon-Won Jung, Jeong Seon Choi, Chan Woo Park, Bock Soon Na, Sang Chul Lim, Sang-Seok Lee, Hye Yong Chu, Jae Bon Koo, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9185-141]

Polyimide/silicon elastomer substrate for stretchable electronics, Bock Soon Na, Chan Woo Park, Soon-Won Jung, Sang Chul Lim, Sang-Seok Lee, Kyoung Ik Cho, Hye Yong Chu, Jae Bon Koo, Electronics and Telecommunications Research Institute (Korea, Republic of). . . . . [9185-142]

Characteristics of thermally evaporated PTCDI-C8 based n-channel organic thin film transistor, Shijeesh M. Raman, Vikas Lawrence Sylaja, Madambi Ku Jayaraj, Cochin Univ. of Science & Technology (India); Joaquim Puigdollers, Univ. Politècnica de Catalunya (Spain). . . . . [9185-143]

Development of inkjet-printed PMOS inverters on flexible substrate, Ta-Ya Chu, Afshin Dadvand, Christophe Py, Stephen Lang, Raluca Movileanu, Ye Tao, National Research Council Canada (Canada). . . . . [9185-144]

CONFERENCE 9185B

LOCATION: CONV. CTR. ROOM 7A

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9185B

Organic Semiconductors in Sensors and Bioelectronics VII

Conference Chair: **Ruth Shinar,** Iowa State Univ. (USA)

Conference Co-Chair: **Ioannis Kymissis,** Columbia Univ. (USA)

Program Committee: **Magnus Berggren,** Linköping Univ. (Sweden); **Fabio Cicoira,** Ecole Polytechnique de Montréal (Canada); **Emil J. W. List-Kratochvil,** Technische Univ. Graz (Austria); **Róisín M. Owens,** Ecole Nationale Supérieure des Mines de Saint-Étienne (France); **Ifor D. W. Samuel,** Univ. of St. Andrews (United Kingdom); **Franky So,** Univ. of Florida (USA); **Luisa Torsi,** Univ. degli Studi di Bari (Italy)

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 7A . . . TUE 8:30 AM TO 10:00 AM

Organic Semiconductors in Sensors and Bioelectronics I

Session Chair: **Malte C. Gather,** Univ. of St. Andrews (United Kingdom)

8:30 am: **Luminescent AIE materials for high-performance sensing applications** *(Invited Paper)*, Ben Zhong Tang, Wai Tung Leung, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9185-201]

8:55 am: **Selective detection of nitrated analytes** *(Invited Paper)*, Paul L. Burn, Shengqiang Fan, Andrew Clulow, Paul Meredith, Paul E. Shaw, The Univ. of Queensland (Australia). . . . . [9185-202]

9:20 am: **Correlating explosive analyte diffusion with fluorescence quenching in bifluorene-cored dendrimer thin films**, Mohammad A. Ali, Paul E. Shaw, Ian R. Gentle, Paul L. Burn, The Univ. of Queensland (Australia) . . . . . [9185-203]

9:35 am: **Explosive vapor sensing by star-shaped molecules** *(Invited Paper)*, Ifor D. W. Samuel, Yue Wang, Paulina Morawska, Univ. of St. Andrews (United Kingdom); Alexander Kanibolotsky, Univ. of Strathclyde (United Kingdom); Zarifi Masri, Arvydas Ruseckas, Univ. of St. Andrews (United Kingdom); Igor F. Perepichka, Bangor Univ. (United Kingdom); Peter J. Skabara, Univ. of Strathclyde (United Kingdom); Graham A. Turnbull, Univ. of St. Andrews (United Kingdom) . . . . . [9185-204]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 7A . . . TUE 10:30 AM TO 12:10 PM

Organic Semiconductors in Sensors and Bioelectronics II

Session Chair: **Ioannis Kymissis,** Columbia Univ. (USA)

10:30 am: **Integrated sensors for point of care detection** *(Invited Paper)*, John C. de Mello, Imperial College London (United Kingdom). . . . . [9185-205]

10:55 am: **OLED micro-displays as biophotonic platform** *(Invited Paper)*, Malte C. Gather, Univ. of St. Andrews (United Kingdom) . . . . . [9185-212]

11:20 am: **Plasmonic interferometer arrays for high-performance label-free biomolecular sensing** *(Invited Paper)*, Filbert J. Bartoli, Yongkang Gao, Beibei Zeng, Lehigh Univ. (USA); Qiaoqiang Gan, Univ. at Buffalo (USA); Xuanhong Chang, Lehigh Univ. (USA) . . . . . [9185-207]

11:45 am: **Selectivity and sensitivity enhancement of bulk heterojunction organic photodetectors** *(Invited Paper)*, Kai Cheong Tam, Hoi Lam Tam, Kok-Wai Cheah, Furong Zhu, Hong Kong Baptist Univ. (Hong Kong, China) . . . . . [9185-208]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 7A . . . . . TUE 1:40 PM TO 3:15 PM

Organic Semiconductors in Sensors and Bioelectronics III

Session Chair: **Paul L. Burn,** The Univ. of Queensland (Australia)

1:40 pm: **Improved charge injection in opto-electronic devices by incorporating DNA interlayer** *(Invited Paper)*, Thuc-Quyen Nguyen, Univ. of California, Santa Barbara (USA) . . . . . [9185-209]

2:05 pm: **Organic sensor systems fabricated by hybrid lithography comprising UV-exposure and two photon direct laser writing**, Uli Lemmer, Carsten Eschenbaum, Siegfried W. Kettlitz, Sebastian Valouch, Karlsruher Institut für Technologie (Germany) . . . . . [9185-210]

2:20 pm: **Conformable wearable systems comprising organic electronics on foil for well being and healthcare**, Margreet M. de Kok, Holst Ctr. (Netherlands) . . . . . [9185-211]

2:35 pm: **Conjugated polymer nano-probes for tumor imaging and theranostics**, Alexander J. C. Kuehne, DWI an der RWTH Aachen e.V. (Germany); Wiltrud Lederle, RWTH Aachen (Germany) . . . . . [9185-206]

2:50 pm: **Recent developments in the OLED-based platform for analytical applications** *(Invited Paper)*, Joseph Shinar, Weipan Cui, Eeshita Manna, Rui Liu, Ruth Shinar, Iowa State Univ. (USA) . . . . . [9185-213]

Coffee Break . . . . . Tue 3:15 pm to 3:45 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 7A . . . . . TUE 3:45 PM TO 5:15 PM

Organic Semiconductors in Sensors and Bioelectronics IV

Session Chair: **Emil J. W. List-Kratochvil,** Technische Univ. Graz (Austria)

3:45 pm: **Recent progress in up-conversion devices** *(Invited Paper)*, Do Young Kim, Tzung-Han Lai, Jaewoong Lee, Jesse R. Manders, Franky So, Univ. of Florida (USA) . . . . . [9185-214]

4:10 pm: **X-ray detector based on molecular plastic electronics**, Beynor A. Paez-Sierra, Pontificia Univ. Javeriana Bogotá (Colombia) and QUBITeXp International Trade S.A.S. (Colombia); Hernán Rodríguez, Juan M. Sánchez, Miguel A. Rodríguez, Leon D. Pérez, Pontificia Univ. Javeriana Bogotá (Colombia) . . . . . [9185-215]

4:25 pm: **Charge trap engineering for highly sensitive photodetectors** *(Invited Paper)*, Jinsong Huang, Univ. of Nebraska-Lincoln (USA) . . . . . [9185-216]

4:50 pm: **Green alternatives for sustainable organic electronics: H-bonded organic semiconductors** *(Invited Paper)*, Eric D. Glowacki, Johannes Kepler Univ. Linz (Austria); Mihai Irimia-Vladu, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria). . . . . [9185-217]

WEDNESDAY 20 AUGUST

LOCATION: CONV. CTR. ROOM 6A . .WED 10:30 AM TO 12:15 PM

Organic Photonics + Electronics Plenary Session

Session Chair: **Zakya H. Kafafi,** National Science Foundation, ret (USA)

10:30 am: **Materials and Devices for Bioresorbable Electronics** *(Plenary)*, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9185-401]

11:00 am: **Organic Electronic Bio-devices** *(Plenary)*, Luisa Torsi, Univ. of Bari "Aldo Moro" (Italy) . . . . . [9183-402]

11:30 am: **Announcement of the Organic Photonics + Electronics Best Student Paper Award Winner**

Sponsored by ALDRICH Materials Science Polyera

11:45 am: **Charge and Spin Transport Physics of Organic Semiconductors** *(Plenary)*, Henning Sirringhaus, Cavendish Lab., Univ. of Cambridge (United Kingdom) . . . . . [9184-403]

Lunch/Exhibition Break . . . . . .Wed 12:15 pm to 2:00 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 7A . . . WED 2:00 PM TO 3:30 PM

Organic Semiconductors in Sensors and Bioelectronics V

Session Chair: **Joseph Shinar,** Iowa State Univ. (USA)

2:00 pm: **Large area fabrication of self-aligned flexible organic thin film transistors using roll-to-roll compatible nanoimprint- lithography with natural and nature-inspired materials for biocompatible and biodegradable electronics** *(Invited Paper)*, Andreas Petritz, Alexander Fian, Mihai Irimia-Vladu, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Archim Wolfberger, Montan Univ. Leoben (Austria); Ursula Palfinger, Anja Haase, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Thomas Griesser, Montan Univ. Leoben (Austria); Barbara Stadlober, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) . . . . . [9185-218]

2:25 pm: **High performance biosensors based on solution-gated transistors with functionalized gate electrodes** *(Invited Paper)*, Feng Yan, The Hong Kong Polytechnic Univ. (Hong Kong, China) . . . . . [9185-219]

2:50 pm: **Electrolyte-gated organic field-effect transistors for ion and pH sensing applications** *(Invited Paper)*, Emil J. W. List-Kratochvil, Technische Univ. Graz (Austria) and NanoTecCenter Weiz Forschungsgesellschaft mbH (Austria) . . . . . [9185-220]

3:15 pm: **Stable organic-based label-free chemical and biological sensors for aqueous environments**, Minseong Yun, Canek Fuentes-Hernandez, Asha Sharma, Do Kyung Hwang, Amir Dindar, Sanjeev Singh, Sangmoo Choi, Bernard Kippelen, Georgia Institute of Technology (USA) . . . . . [9185-221]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 7A . . . WED 4:00 PM TO 5:30 PM

Organic Semiconductors in Sensors and Bioelectronics VI

Session Chair: **Ruth Shinar,** Iowa State Univ. (USA)

4:00 pm: **Artificial protonic synapses with memory** *(Invited Paper)*, Marco Rolandi, Univ. of Washington (USA) . . . . . [9185-222]

4:25 pm: **Effects of device geometry on the switching speeds of organic electrochemical transistors**, Jacob Friedlein, Robert R. McLeod, Sean E. Shaheen, Univ. of Colorado at Boulder (USA) . . . . . [9185-223]

4:40 pm: **Organic transistor-based wireless sensor system for biomedical applications** *(Invited Paper)*, Tsuyoshi Sekitani, The Univ. of Tokyo (Japan). . . . . [9185-224]

5:05 pm: **An implantable system for brain blood flow monitoring** *(Invited Paper)*, Youngwan Kim, Amrita V. Masurkar, Columbia Univ. (USA); Hongtao Ma, Weill Cornell Medical College (USA); Ioannis Kymissis, Columbia Univ. (USA). [9185-225]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Extending detection range of mercury sensor based on inhibitor effect, Van Sang Le, Boram Kim, Han Young Woo, Pusan National Univ. (Korea, Republic of) . . . . . [9185-226]

Interface formation between pentacene and silver contacts investigated by surface-enhanced Raman spectroscopy, Beynor A. Paez-Sierra, Pontificia Univ. Javeriana Bogotá (Colombia) and QUBITeXp International Trade S.A.S. (Colombia) . . . . . [9185-227]

Development of the PEDOT:PSS based pressure sensing devices, Ashok K. Batra, Alabama A&M Univ. (USA); Ashwith K. Chilvery, Talladega College (USA); Al-Muatasim Alomari, Manmohan D. Aggarwal, Alabama A&M Univ. (USA) . . . . . [9185-228]

PbS colloidal quantum dots IR photodetectors with trap-assisted photocurrent amplification, Jaewoong Lee, Do Young Kim, Franky So, Univ. of Florida (USA) . . . . . [9185-229]

Improved sensing probes for monitoring dissolved O_2, gas-phase O_2, and relative humidity, Weipan Cui, Rui Liu, Joseph Shinar, Ruth Shinar, Iowa State Univ. (USA) . . . . . [9185-230]

An in-ear microphone based on organic piezoelectric polymers, Andxy L. Zhang, Elizabeth Olsen, Ioannis Kymissis, Columbia Univ. (USA) . . . . . [9185-231]

Optical Engineering + Applications

- ILLUMINATION ENGINEERING
- OPTICAL DESIGN AND SYSTEMS ENGINEERING
- PHOTONIC DEVICES AND APPLICATIONS
- ADVANCED METROLOGY
- X-RAY, GAMMA-RAY, AND PARTICLE TECHNOLOGIES
- SIGNAL IMAGE AND DATA PROCESSING
- REMOTE SENSING
- ATMOSPHERIC AND SPACE OPTICAL SYSTEMS

Optical Engineering + Applications

SPECIAL PROGRAM

9186 **Fifty Years of Optical Sciences at The University of Arizona** *(Barrett, Greivenkamp, Dereniak)* . . . . . p. 144
9187 **The Nature of Light: Light in Nature V** *(Liang, Shaw)* . p. 146
9188 **Optics Education and Outreach III** *(Gregory)* . . . . . p. 147
9189 **Photonic Innovations and Solutions for Complex Environments and Systems (PISCES) II** *(Lakhtakia, Todd)* . . p. 149

ILLUMINATION ENGINEERING

Program Chair: **Ian T. Ferguson,** The Univ. of North Carolina at Charlotte (USA)

9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang)* . . . . . p. 150
9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

OPTICAL DESIGN AND SYSTEMS ENGINEERING

Program Chairs: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA) and **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA)

9192 **Current Developments in Lens Design and Optical Engineering XV** *(Johnson, Mahajan, Thibault)* . . . . . p. 154
9193 **Novel Optical Systems Design and Optimization XVII** *(Gregory, Davis)* . . . . . p. 157
9194 **Laser Beam Shaping XV** *(Forbes, Lizotte)* . . . . . p. 161
9195 **Optical System Alignment, Tolerancing, and Verification VIII** *(Sasián, Youngworth)* . . . . . p. 164
9196 **Systems Contamination: Prediction, Control, and Performance** *(Carosso, Egges)* . . . . . p. 166
9197 **An Optical Believe It or Not: Key Lessons Learned III** *(Kahan)* . . . . . p. 168
9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon)* . . . . . p. 152

PHOTONIC DEVICES AND APPLICATIONS

Program Chairs: **Shizhuo Yin,** The Pennsylvania State Univ. (USA) and **Ruyan Guo,** The Univ. of Texas at San Antonio (USA)

9198 **Ultrafast Nonlinear Imaging and Spectroscopy II** *(Liu, Khoo, Psaltis)* . . . . . p. 169

9199 **Terahertz Emitters, Receivers, and Applications V** *(Razeghi, Baranov, Zavada, Pavlidis)* . . . . . p. 171

9200 **Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications VIII** *(Yin, Guo)* . . . . . p. 173

9201 **Optical Data Storage 2014** *(Katayama, Milster)* . . . . . p. 176

9202 **Photonic Applications for Aviation, Aerospace, Commercial, and Harsh Environments V** *(Kazemi, Kress, Mendoza, Murshid, Javahiraly, Ishihara)* . . . . . p. 178

9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang)* . . . . . p. 150

9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza)* . . . . . p. 225

ADVANCED METROLOGY

Program Chair: **Katherine Creath,** Optineering (USA) and The Univ. of Arizona (USA)

9203 **Interferometry XVII: Techniques and Analysis** *(Creath, Burke, Schmit)* . . . . . p. 181

9204 **Interferometry XVII: Advanced Applications** *(Furlong, Gorecki, de Groot, Novak)* . . . . . p. 184

9205 **Reflection, Scattering, and Diffraction from Surfaces IV** *(Hanssen)* . . . . . p. 186

9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek, Orji)* . . . . . p. 100

9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi)* . . . . . p. 186

X-RAY, GAMMA-RAY, AND PARTICLE TECHNOLOGIES

Program Chairs: **Carolyn A. MacDonald,** Univ. at Albany (USA) and **Ralph B. James,** Brookhaven National Lab. (USA)

9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi)* . . . . . p. 186

9207 **Advances in X-Ray/EUV Optics and Components IX** *(Morawe, Khounsary, Goto)* . . . . . p. 190

9208 **Adaptive X-Ray Optics III** *(O'Dell, Khounsary)* . . . . . p. 193

9209 **Advances in Computational Methods for X-Ray Optics III** *(Sanchez del Rio, Chubar)* . . . . . p. 195

9210 **X-Ray Free-Electron Lasers: Beam Diagnostics, Beamline Instrumentation, and Applications II** *(Hau-Riege, Moeller, Yabashi)* . . . . . p. 198

9211 **Target Diagnostics Physics and Engineering for Inertial Confinement Fusion III** *(Bell, Grim)* . . . . . p. 200

9212 **Developments in X-Ray Tomography IX** *(Stock)* . . . . . p. 202

9213 **Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XVI** *(Burger, Franks, James, Fiederle)* . . . . . p. 205

9214 **Medical Applications of Radiation Detectors IV** *(Barber, Furenlid, Roehrig)* . . . . . p. 209

9215 **Radiation Detectors: Systems and Applications XV** *(Grim, Barber)* . . . . . p. 211

SIGNAL, IMAGE, AND DATA PROCESSING

Program Chair: **Khan M. Iftekharuddin,** Old Dominion Univ. (USA)

9216 **Optics and Photonics for Information Processing VIII** *(Awwal, Iftekharuddin, Matin, Márquez)* . . . . . p. 213

9217 **Applications of Digital Image Processing XXXVII** *(Tescher)* . . . . . p. 216

REMOTE SENSING

Program Chair: **Allen H.-L. Huang,** Univ. of Wisconsin-Madison (USA)

9218 **Earth Observing Systems XIX** *(Butler, Xiong, Gu)* . . . . . p. 219

9219 **Infrared Remote Sensing and Instrumentation XXII** *(Strojnik Scholl, Páez)* . . . . . p. 223

9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza)* . . . . . p. 225

9221 **Remote Sensing and Modeling of Ecosystems for Sustainability XI** *(Gao, Chang, Wang)* . . . . . p. 227

9222 **Imaging Spectrometry XIX** *(Mouroulis, Pagano)* . . . . . p. 229

9223 **Remote Sensing System Engineering V** *(Ardanuy, Puschell)* . . . . . p. 231

ATMOSPHERIC AND SPACE OPTICAL SYSTEMS

Program Chairs: **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA) and **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

9224 **Laser Communication and Propagation through the Atmosphere and Oceans III** *(van Eijk, Davis, Hammel)* . . . . . p. 232

9225 **Quantum Communications and Quantum Imaging XII** *(Meyers, Shih, Deacon)* . . . . . p. 235

9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor, Cardimona, Pirich, Prasad)* . . . . . p. 237

9227 **Unconventional Imaging and Wavefront Sensing X** *(Dolne, Karr, Gamiz, Dayton)* . . . . . p. 239

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Symposium-wide Plenary Session, 5:45 to 7:35 PM, p. 10	**Poster Session,** 5:30 to 7:30 PM, p. 15	**Signal, Image, and Data Processing Plenary Session,** 1:30 to 2:30 PM, p. 12		
		Optical Engineering Plenary Session, 4:00 to 6:05 PM, p. 13		

SPECIAL PROGRAM

9189 **Photonic Innovations and Solutions for Complex Environments and Systems (PISCES) II** *(Lakhtakia, Todd),* p. 149	9187 **The Nature of Light: Light in Nature V** *(Liang, Shaw),* p. 146	9186 **Fifty Years of Optical Sciences at The University of Arizona** *(Barrett, Greivenkamp, Dereniak),* p. 144		
			9188 **Optics Education and Outreach III** *(Gregory),* p. 147	

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY

ILLUMINATION ENGINEERING

Program Chair: **Ian T. Ferguson,** The Univ. of North Carolina at Charlotte (USA)

9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon),* p. 152

9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang),* p. 150

OPTICAL DESIGN AND SYSTEMS ENGINEERING

Program Chairs: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA) and **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA)

9191 **Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Winston, Gordon),* p. 152

9192 **Current Developments in Lens Design and Optical Engineering XV** *(Johnson, Mahajan, Thibault),* p. 154

9193 **Novel Optical Systems Design and Optimization XVII** *(Gregory, Davis),* p. 157

9194 **Laser Beam Shaping XV** *(Forbes, Lizotte),* p. 161

9195 **Optical System Alignment, Tolerancing, and Verification VIII** *(Sasián, Youngworth),* p. 164

9196 **Systems Contamination: Prediction, Control, and Performance** *(Carosso, Egges),* p. 166

9197 **An Optical Believe It or Not: Key Lessons Learned III** *(Kahan),* p. 168

PHOTONIC DEVICES AND APPLICATIONS

Program Chairs: **Shizhuo Yin,** The Pennsylvania State Univ. (USA) and **Ruyan Guo,** The Univ. of Texas at San Antonio (USA)

9198 **Ultrafast Nonlinear Imaging and Spectroscopy II** *(Liu, Khoo, Psaltis),* p. 169

9190 **Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems** *(Kane, Jiao, Dietz, Huang),* p. 150

9199 **Terahertz Emitters, Receivers, and Applications V** *(Razeghi, Baranov, Zavada, Pavlidis),* p. 171

9200 **Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications VIII** *(Yin, Guo),* p. 173

9201 **Optical Data Storage 2014** *(Katayama, Milster),* p. 176

9202 **Photonic Applications for Aviation, Aerospace, Commercial, and Harsh Environments V** *(Kazemi, Kress, Mendoza, Murshid, Javahiraly, Ishihara),* p. 178

9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza),* p. 225

ADVANCED METROLOGY

Program Chair: **Katherine Creath,** 4D Technology Corp. (United States), Optineering (USA), and The Univ. of Arizona (USA)

9203 **Interferometry XVII: Techniques and Analysis** *(Creath, Burke, Schmit),* p. 181

9204 **Interferometry XVII: Advanced Applications** *(Furlong, Gorecki, de Groot, Novak),* p. 184

9205 **Reflection, Scattering, and Diffraction from Surfaces IV** *(Hanssen),* p. 186

9173 **Instrumentation, Metrology, and Standards for Nanomanufacturing VIII** *(Postek, Orji),* p. 100

9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi),* p. 186

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY

X-RAY, GAMMA-RAY, AND PARTICLE TECHNOLOGIES

Program Chair: **Carolyn A. MacDonald,** Univ. at Albany (USA) and **Ralph B. James,** Brookhaven National Lab. (USA)

9208 **Adaptive X-Ray Optics III** *(O'Dell, Khounsary),* p. 193	9206 **Advances in Metrology for X-Ray and EUV Optics V** *(Assoufid, Ohashi, Asundi),* p. 186	9207 **Advances in X-Ray/EUV Optics and Components IX** *(Morawe, Khounsary, Goto),* p. 190		
	9210 **X-Ray Free-Electron Lasers: Beam Diagnostics, Beamline Instrumentation, and Applications II** *(Hau-Riege, Moeller, Yabashi),* p. 198		9209 **Advances in Computational Methods for X-Ray Optics III** *(Sanchez del Rio, Chubar, MacDonald, Sawhney),* p. 195	
	9211 **Target Diagnostics Physics and Engineering for Inertial Confinement Fusion III** *(Bell, Grim),* p. 200	9212 **Developments in X-Ray Tomography IX** *(Stock),* p. 202		
	9213 **Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XVI** *(Burger, Franks, James, Fiederle),* p. 205			
			9215 **Radiation Detectors: Systems and Applications XV** *(Grim, Barber),* p. 211	9214 **Medical Applications of Radiation Detectors IV** *(Barber, Furenlid, Roehrig),* p. 209

SIGNAL, IMAGE, AND DATA PROCESSING

Program Chair: **Khan M. Iftekharuddin,** Old Dominion Univ. (USA)

	9216 **Optics and Photonics for Information Processing VIII** *(Awwal, Iftekharuddin, Matin, Márquez),* p. 213			
	9217 **Applications of Digital Image Processing XXXVII** *(Tescher),* p. 216			

REMOTE SENSING

Program Chair: **Allen H.-L. Huang,** Univ. of Wisconsin-Madison (USA)

	9218 **Earth Observing Systems XIX** *(Butler, Xiong, Gu),* p. 219			
	9219 **Infrared Remote Sensing and Instrumentation XXII** *(Strojnik Scholl, Páez),* p. 223	9220 **Infrared Sensors, Devices, and Applications IV** *(LeVan, Sood, Wijewarnasuriya, D'Souza),* p. 225		
	9222 **Imaging Spectrometry XIX** *(Mouroulis, Pagano),* p. 229	9221 **Remote Sensing and Modeling of Ecosystems for Sustainability XI** *(Gao, Chang, Wang),* p. 227		
	9223 **Remote Sensing System Engineering V** *(Ardanuy, Puschell),* p. 231			

ATMOSPHERIC AND SPACE OPTICAL SYSTEMS

Program Chairs: **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA) and **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

9224 **Laser Communication and Propagation through the Atmosphere and Oceans III** *(van Eijk, Davis, Hammel),* p. xx232			9225 **Quantum Communications and Quantum Imaging XII** *(Meyers, Shih, Deacon),* p. 235	
	9226 **Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor, Cardimona, Pirich, Prasad),* p. 237			9227 **Unconventional Imaging and Wavefront Sensing X** *(Dolne, Karr, Gamiz, Dayton),* p. 239

CONFERENCE 9186

LOCATION: CONV. CTR. ROOM 16A

Tuesday–Wednesday 19–20 August 2014 • Proceedings of SPIE Vol. 9186

Fifty Years of Optical Sciences at The University of Arizona

Conference Chairs: **Harrison H. Barrett,** College of Optical Sciences, The Univ. of Arizona (USA); **John E. Greivenkamp,** College of Optical Sciences, The Univ. of Arizona (USA); **Eustace L. Dereniak,** College of Optical Sciences, The Univ. of Arizona (USA)

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 16A . . . . . .8:10 AM TO 8:20 AM

Welcome

Session Chair: **Thomas L. Koch,** College of Optical Sciences, The Univ. of Arizona (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 16A . . TUE 8:20 AM TO 10:25 AM

History of OSC

Session Chair: **Thomas L. Koch,** College of Optical Sciences, The Univ. of Arizona (USA)

8:20 am: **Optical Sciences Center/College of Optical Sciences: fifty years of excellence** *(Keynote Presentation)*, James C. Wyant, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-1]

9:20 am: **Evolution of the graduate and undergraduate curricula in the College of Optical Sciences** *(Invited Paper)*, Richard L. Shoemaker, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-2]

9:45 am: **Inexperienced as we were, it was ours to do!** *(Invited Paper)*, Robert P. Breault, Breault Research Organization, Inc. (USA) . . . . . [9186-3]

10:10 am: **OSC in the 1970s: a springboard for a career in optical engineering**, James E. Harvey, Photon Engineering LLC (USA) . . . . . [9186-4]

Coffee Break . . . . . Tue 10:25 am to 10:55 am

SESSION 2

LOCATION: CONV. CTR. ROOM 16A . . TUE 10:55 AM TO 12:10 PM

Astronomical and Space Optics at OSC

Session Chair: **Harrison H. Barrett,** College of Optical Sciences, The Univ. of Arizona (USA)

10:55 am: **Space optics contributions by the College of Optical Sciences** *(Invited Paper)*, James B. Breckinridge, College of Optical Sciences, The Univ. of Arizona (USA); Peter H. Smith, The Univ. of Arizona (USA) . . . . . [9186-5]

11:20 am: **Big optical systems for astronomy and solar energy** *(Invited Paper)*, J. Roger P. Angel, The Univ. of Arizona (USA) . . . . . [9186-6]

11:45 am: **Large optics fabrication and testing at the College of Optical Sciences** *(Invited Paper)*, James H. Burge, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-7]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 16A . . . . TUE 1:40 PM TO 3:10 PM

Optical Engineering at OSC

Session Chair: **Russell A. Chipman,** College of Optical Sciences, The Univ. of Arizona (USA)

1:40 pm: **Infrared optics at the College of Optical Sciences and in the world** *(Invited Paper)*, William L. Wolfe, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-8]

2:05 pm: **A page from the drawer: how Roland Shack opened the door to the aberration theory of freeform optics** *(Invited Paper)*, Kevin P. Thompson, Synopsys, Inc. (USA); Jannick P. Rolland, Univ. of Rochester (USA) . . . . . [9186-9]

2:30 pm: **Optical Sciences Center at the U of A in the late seventies: times of consolidation**, Marija Strojnik Scholl, Ctr. de Investigaciones en Óptica, A.C. (Mexico) . . . . . [9186-10]

2:45 pm: **Past, present, and future of optical design at the College of Optical Sciences** *(Invited Paper)*, José Sasián, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-11]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 16A . . . TUE 3:40 PM TO 5:20 PM

Quantum and Nonlinear Optics at OSC

Session Chair: **Thomas D. Milster,** College of Optical Sciences, The Univ. of Arizona (USA)

3:40 pm: **First 25 years of quantum optics at the University of Arizona** *(Invited Paper)*, Murray Sargent III, Microsoft Corp. (USA) . . . . . [9186-12]

4:05 pm: **Quantum control and a novel atom-light quantum interface** *(Invited Paper)*, Poul S. Jessen, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-13]

4:30 pm: **Progress of the quantum nano-optics of semiconductors group at Optical Sciences** *(Invited Paper)*, Galina Khitrova, Michael R. Gehl, Ricky Gibson Jr., Sander Zandbergen, Patrick Keiffer, Jasmine Sears, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-14]

4:55 pm: **Ultrafast light-matter coupling in condensed and gaseous nonlinear media** *(Invited Paper)*, Miroslav Kolesik, College of Optical Sciences, The Univ. of Arizona (USA); Pavel Polynkin, The Univ. of Arizona (USA); Ewan M. Wright, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-15]

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 16A . WED 8:20 AM TO 10:00 AM

Imaging at OSC

Session Chair: **Eustace L. Dereniak,** College of Optical Sciences, The Univ. of Arizona (USA)

8:20 am: **Image science and image-quality research in the Optical Sciences Center** *(Invited Paper)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA)[9186-16]

8:45 am: **History of digital radiology at the U of A** *(Invited Paper)*, Hans N. Roehrig, Michael P. Capp M.D., The Univ. of Arizona (USA) . . . . . [9186-17]

9:10 am: **Molecular imaging in the College of Optical Sciences: an overview of two decades of instrumentation development** *(Invited Paper)*, Lars R. Furenlid, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); H. Bradford Barber, Eric W. Clarkson, The Univ. of Arizona (USA); Matthew A. Kupinski, College of Optical Sciences, The Univ. of Arizona (USA); Zhonglin Liu, Gail D. Stevenson, James M. Woolfenden, The Univ. of Arizona (USA) . . . [9186-18]

9:35 am: **An information-theoretic approach to compressive imaging** *(Invited Paper)*, Amit Ashok, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-19]

Coffee Break . . . . . .Wed 10:00 am to 10:20 am

SESSION 6

LOCATION: CONV. CTR. ROOM 16A WED 10:20 AM TO 12:00 PM

Optical Instrumentation at OSC

Session Chair: **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA)

10:20 am: **From the outside looking in: developing snapshot imaging spectro-polarimeters** *(Invited Paper)*, Eustace L. Dereniak, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-20]

10:45 am: **Multilayer soft x-ray optics** *(Invited Paper)*, Charles M. Falco, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-21]

11:10 am: **Noise, error, and bandwidth in polarimeters** *(Invited Paper)*, J. Scott Tyo, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-22]

11:35 am: **Past and future of wearable augmented reality displays and their applications** *(Invited Paper)*, Hong Hua, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-23]

Lunch Break . . . . . .Wed 12:00 pm to 2:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 16A . . WED 2:00 PM TO 3:40 PM

Photonics at OSC

Session Chair: **John E. Greivenkamp,** College of Optical Sciences, The Univ. of Arizona (USA)

2:00 pm: **Developments in the photonics program at OSC** *(Invited Paper)*, Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-24]

2:25 pm: **A three-decade-long journey at the College of Optical Sciences** *(Invited Paper)*, Dror Sarid, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-25]

2:50 pm: **Nanophotonic materials and devices: driving the big data engine** *(Invited Paper)*, Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-26]

3:15 pm: **Mechanical effects of light on material media: radiation pressure and the linear and angular momenta of photons** *(Invited Paper)*, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-27]

Coffee Break . . . . . .Wed 3:40 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 16A . . WED 4:00 PM TO 5:40 PM

Optical Metrology at OSC

Session Chair: **Stanley Pau,** College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Optical metrology at the Optical Sciences Center: an historical review** *(Invited Paper)*, Katherine Creath, College of Optical Sciences, The Univ. of Arizona (USA) and Optineering (USA); Robert E. Parks, Optical Perspectives Group, LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-28]

4:25 pm: **History of the Shack Hartmann wavefront sensor and its impact in ophthalmic optics** *(Invited Paper)*, Jim Schwiegerling, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-29]

4:50 pm: **Half a century of light scatter metrology and counting** *(Invited Paper)*, John C. Stover, The Scatter Works Inc. (USA) . . . . . [9186-30]

5:15 pm: **Interferometry and ophthalmics at the College of Optical Sciences** *(Invited Paper)*, John E. Greivenkamp, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9186-31]

CONFERENCE 9187

LOCATION: CONV. CTR. ROOM 11A

Monday 18 August 2014 • Proceedings of SPIE Vol. 9187

The Nature of Light: Light in Nature V

Conference Chairs: **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA); **Joseph A. Shaw,** Montana State Univ. (USA)

Program Committee: **Katherine Creath,** Optineering (USA), The Univ. of Arizona {United States); **Mitsuo Takeda,** Univ. of Electro-Communications (Japan), Utsunomiya Univ. {Japan); **Priscilla Simonis,** Facultes Univ. Notre Dame de la Paix (Belgium); **Qiwen Zhan,** Univ. of Dayton (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 11A . . . MON 9:00 AM TO 9:30 AM

Optics of Art

9:00 am: **Atmospheric optics in art** *(Invited Paper)*, Stanley D. Gedzelman, The City College of New York (USA) . . . . . [9187-17]

SESSION 2

LOCATION: CONV. CTR. ROOM 11A . . .MON 9:30 AM TO 10:10 AM

Color in Nature

Session Chair: **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

9:30 am: **Natural case of multifunctional nanostructured surfaces: the wing of the grey cicada (Cicada orni)**, Louis Dellieu, Michaël Sarrazin, Priscilla Simonis, Olivier Deparis, Univ. of Namur (Belgium) . . . . . [9187-2]

9:50 am: **Polarimetry of light from iridescent shells**, Enrique J. Galvez, Rebecca Metzler, Carrie Burgess, Brian Regan, Colgate Univ. (USA) . . . . . [9187-3]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 3

LOCATION: CONV. CTR. ROOM 11A . .MON 10:40 AM TO 11:40 AM

Bio-inspired Optics I

Session Chair: **Priscilla Simonis,** Univ. of Namur (Belgium)

10:40 am: **Genetic algorithms used for the optimization of light-emitting diodes and solar thermal collectors**, Alexandre Mayer, Annick Bay, Lucie Gaouyat, Delphine Nicolay, Timoteo Carletti, Olivier Deparis, Univ. of Namur (Belgium) . . . . . [9187-5]

11:00 am: **Light extraction enhancement for light-emitting diodes: a firefly-inspired structure refined by the genetic algorithm**, Annick Bay, Univ. of Namur (Belgium) and Univ. of California, San Diego (USA); Alexandre Mayer, Univ. of Namur (Belgium) . . . . . [9187-4]

11:20 am: **Efficient spectral light focusing in microstructured marine diatom**, Arne Røyset, SINTEF (Norway); Julien Romann, Norwegian Univ. of Science and Technology (Norway); Jean Christophe Valmalette, Univ. du Sud Toulon-Var (France) . . . . . [9187-6]

Lunch Break . . . . . Mon 11:40 am to 1:10 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 11A . . . . . MON 1:10 PM TO 1:50 PM

Information from Light in Nature

Session Chair: **Joseph A. Shaw,** Montana State Univ. (USA)

1:10 pm: **Insights of finite difference models of the wave equation and Maxwell's equations into the geometry of space-time**, James B. Cole, Univ. of Tsukuba (Japan) . . . . . [9187-7]

1:30 pm: **Simulating the colors of thermal features at Yellowstone National Park**, Joseph A. Shaw, Paul W. Nugent, Montana State Univ. (USA); Michael Vollmer, Fachhochschule Brandenburg (Germany). . . . . [9187-16]

SESSION 5

LOCATION: CONV. CTR. ROOM 11A . . . . MON 1:50 PM TO 2:50 PM

Color and Vision in Nature

Session Chair: **Joseph A. Shaw,** Montana State Univ. (USA)

1:50 pm: **Counterintuitive color changes in Hoplia coerulea photonic nanostructure upon liquid impregnation**, Sébastien R. Mouchet, Univ. of Namur (Belgium); Bao-Lian Su, Univ. of Namur (Belgium) and Wuhan Univ. of Technology (China) and Univ. of Cambridge (United Kingdom); Olivier Deparis, Univ. of Namur (Belgium) . . . . . [9187-9]

2:10 pm: **Structural-based blue appearance in tarantulas**, Bor-Kai Hsiung, Chad M. Eliason, Todd A. Blackledge, Matthew D. Shawkey, The Univ. of Akron (USA) . . [9187-10]

2:30 pm: **Eye movement strategies in visual search: effect of peripheral information**, Tatjana Pladere, Ieva Timrote, Gunta Krumina, Univ. of Latvia (Latvia) [9187-11]

Coffee Break . . . . . Mon 2:50 pm to 3:20 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 11A . . . .MON 3:20 PM TO 4:20 PM

Bio-inspired Optics II

Session Chair: **Katherine Creath,** Optineering (USA), The Univ. of Arizona {United States)

3:20 pm: **A graphitic structure responsible for the blue coloration?**, Priscilla Simonis, Univ. of Namur (Belgium); Abigael Ingram, Natural History Museum (United Kingdom) . . . . . [9187-12]

3:40 pm: **Fabrication of hierarchical optical active nanostructures inspired by the blue Morpho butterfly utilizing laser interference lithography**, Radwanul Hasan Siddique, Abrar Faisal, Ruben Hünig, Karlsruher Institut für Technologie (Germany); Irene Wacker, Univ. Heidelberg (Germany); Uli Lemmer, Hendrik Hoelscher, Karlsruher Institut für Technologie (Germany) . . . . . [9187-13]

4:00 pm: **Radiative thermal insulation in animal furs and feathers**, Priscilla Simonis, Univ. of Namur (Belgium) . . . . . [9187-14]

SESSION 7

LOCATION: CONV. CTR. ROOM 11A . . . MON 4:20 PM TO 4:40 PM

Atmospheric Optics

Session Chair: **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

4:20 pm: **Observing auroras and noctilucent clouds from an airplane window**, Joseph A. Shaw, Montana State Univ. (USA) . . . . . [9187-15]

CONFERENCE 9188

LOCATION: CONV. CTR. ROOM 31C

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9188

Optics Education and Outreach III

Conference Chair: **G. Groot Gregory,** Synopsys, Inc. (USA)

Program Committee: **Anna Consortini,** Univ. degli Studi di Firenze (Italy); **Barbara A. Darnell,** ScinTech (USA); **Judith Donnelly,** Three Rivers Community College (USA); **Nancy J. Magnani,** Eastconn (USA); **Brian Monacelli,** the Optical Sciences Company (tOSC) (USA), Irvine Valley College (USA); **Joseph J. Niemela,** The Abdus Salam International Ctr. for Theoretical Physics (Italy); **Anne-Sophie Poulin-Girard,** Univ. Laval (Canada); **Kathleen B. Robinson,** SPIE (USA); **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA); **Donn M. Silberman,** PI (Physik Instrumente) L.P. (USA); **Alexander R. Small,** California State Polytechnic Univ., Pomona (USA); **Cristina Solano,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Richard N. Youngworth,** Riyo LLC (USA); **María J. Yzuel,** Univ. Autònoma de Barcelona (Spain)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

An overview of the European patent system with particular emphasis on IP issues for imaging devices, solar cells, and OLEDS, Ana Cabrita, Mauro Boero, Marylene Faou, European Patent Office (Netherlands) . . . . . [9188-23]

Optics outreach in elementary school kids from public education in Mexico, Perla M. Viera-González, Guillermo E. Sánchez-Guerrero, Juan C. Ruiz-Mendoza, Gustavo A. Cárdenas-Ortíz, Daniel E. Ceballos-Herrera, Romeo J. Selvas-Aguillar, Univ. Autónoma de Nuevo León (Mexico). . . . . [9188-24]

Summer school in Kabardina-Balkaria by BMSTU SPIE student chapter, Nikita V. Chernomyrdin, Arsenii A. Gavdush, Bauman Moscow State Technical Univ. (Russian Federation) . . . . . [9188-25]

Outcome-based learning optics in schools, M. Esakki Muthu Raju, Vidya Jyothi Institute of Technology (India) . . . . . [9188-26]

Solar-powered model vehicle competitions, Nazmi Yilmaz, Ali Serpenguzel, Koç Univ. (Turkey). . . . . [9188-27]

Easing wave optics understanding through technology, Amit Garg, Priyanka Kachru, Subhajit K. Dutta, Ananya Paul, Acharya Narendra Dev College (India). . . . . [9188-28]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E . . . . . .TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 31C . WED 8:00 AM TO 10:10 AM

Optics Programs

Session Chair: **Judith Donnelly,** Three Rivers Community College (USA)

8:00 am: **ETOP: the reference conference in education and training in optics and photonics. an overview of the 12th edition** *(Invited Paper)*, Manuel F. Costa, Univ. do Minho (Portugal); Mourad Zghal, Univ. of Carthage (Tunisia); Zohra Ben Lakhdar, Univ. El Manaur (Tunisia); Vasudevan Lakshminarayanan, Univ. of Waterloo (Canada). . . . . [9188-1]

8:30 am: **Developing a photonics education program at college level from the ground up**, Anca L. Sala, Baker College (USA) . . . . . [9188-2]

8:50 am: **Optical engineering capstone design projects with industry sponsors**, Robert M. Bunch, Paul O. Leisher, Sergio C. Granieri, Rose-Hulman Institute of Technology (USA) . . . . . [9188-3]

9:10 am: **NanoJapan--International research experience for undergraduates program: Fostering U.S.-Japan research collaborations in terahertz (THz) nanoscience**, Cheryl M. Matherly, The Univ. of Tulsa (USA); Sarah R. Phillips, Junichiro Kono, Rice Univ. (USA) . . . . . [9188-4]

9:30 am: **Learner-centered teaching in the college science classLOCATION: a practical guide for teaching assistants, instructors, and professors**, Margaret Z. Dominguez, Shelby D. Vorndran, The Univ. of Arizona (USA) . . . . . [9188-5]

9:50 am: **Hybrid education on optical design**, Irina L. Livshits, Ilya Mimorov M.D., National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); H. P. Urbach, Technische Univ. Delft (Netherlands). . [9188-6]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

CONFERENCE 9188

LOCATION: CONV. CTR. ROOM 31C

SESSION 2

LOCATION: CONV. CTR. ROOM 31C WED 10:40 AM TO 12:00 PM

Optics Curriculum

Session Chair: **Nancy J. Magnani,** Eastconn (USA)

10:40 am: **Illuminating math with optics**, Judith Donnelly, Three Rivers Community College (USA); Matthew Donnelly, Saint Bernard School (USA) [9188-7]

11:00 am: **Discussion design in the course of applied optics: problems, thoughts, and extending**, Zhaofeng Cen, Xiaotong Li, Zhenrong Zheng, Xiangdong Liu, Zhejiang Univ. (China). . . . . [9188-8]

11:20 am: **Optics and communication technology major of physics undergraduate degree at King Mongkut's Institute of Technology Ladkrabang**, Prathan Buranasiri, King Mongkut's Institute of Technology Ladkrabang (Thailand) . . . . . [9188-9]

11:40 am: **Digital devices: Big challenge in color management**, Oliver Vauderwange, Dan Curticapean, Paul Dressler, Peter Wozniak, Hochschule Offenburg (Germany). . . . . [9188-10]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 31C . . . WED 1:30 PM TO 3:10 PM

Technology to Enhance Education

Session Chair: **Richard N. Youngworth,** Riyo LLC (USA)

1:30 pm: **Color science demonstration kit from open source hardware and software**, Michael W. Zollers, Synopsys, Inc. (USA) . . . . . [9188-11]

1:50 pm: **The laser propagation demonstration: a STEM-based outreach project**, Mark F. Spencer, Michael J. Steinbock, Milo W. Hyde IV, Michael A. Marciniak, Air Force Institute of Technology (USA). . . . . [9188-12]

2:10 pm: **Optics outreach evolves in southern California: OptoBotics^{SM} begins to link informal to formal curriculum**, Donn M. Silberman, PI (Physik Instrumente) L.P. (USA) . . . . . [9188-13]

2:30 pm: **Microcontrollers and optical sensors for education in optics and photonics**, Paul Dressler, Heinz-Hermann Wielage, Oliver Vauderwange, Peter Wozniak, Dan Curticapean, Hochschule Offenburg (Germany) . . . . . [9188-14]

2:50 pm: **Increased knowledge transfer by using modern high-speed camera**, Dan Curticapean, Oliver Vauderwange, Kai Israel, Paul Dressler, Peter Wozniak, Hochschule Offenburg (Germany). . . . . [9188-15]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 31C . . WED 3:40 PM TO 6:00 PM

Promoting STEM

Session Chair: **Barbara A. Darnell,** ScinTech (USA)

3:40 pm: **Engaging the optics community in the development of informative, accessible resources focusing on careers**, Anne-Sophie Poulin-Girard, Fanie Gingras, Univ. Laval (Canada); Véronique Zambon, Gabrielle Thériault, Ctr. d'Optique, Photonique et Laser (Canada). . . . . [9188-16]

4:00 pm: **SPIE's school outreach activity program (SOAP) by IIT Madras SPIE student chapter: a review**, Lavanya Kalikivayi, Indian Institute of Technology Madras (India) and KVKL (India); Venkataramana Kalikivayi, Udaya Kumar K., Ganesan A. R., Indian Institute of Technology Madras (India) . . . . . [9188-17]

4:20 pm: **Fun with optics: Outreach activity by Vidya Jyothi Institute of Technology student chapter**, Badrinath Vadakkapattu Canthadai, Kumar Ravi, M. Esakki Muthu Raju, Vidya Jyothi Institute of Technology (India). . . . . [9188-18]

4:40 pm: **Color: what, how, and why we see: a workshop curriculum for K-12 students and parents**, Michael W. Zollers, G. Groot Gregory, Katherine W. Calabro, Synopsys, Inc. (USA) . . . . . [9188-19]

5:00 pm: **A colorful approach to teaching optics**, Nancy J. Magnani, Eastconn (USA); Judith Donnelly, Three Rivers Community College (USA) . . . . . [9188-20]

5:20 pm: **Photonics meet digital art**, Dan Curticapean, Kai Israel, Hochschule Offenburg (Germany). . . . . [9188-21]

5:40 pm: **Making a big difference in STEM education through the small world of nanoscience**, Robert Gordon, Hitachi High Technologies America, Inc. (USA) . . . . . [9188-22]

CONFERENCE 9189

LOCATION: CONV. CTR. ROOM 11A

Sunday 17 August 2014 • Proceedings of SPIE Vol. 9189

Photonic Innovations and Solutions for Complex Environments and Systems (PISCES) II

Conference Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Judith A. Todd,** The Pennsylvania State Univ. (USA)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 11A . . . . . 8:15 AM TO 8:25 AM

Meet and Greet

LOCATION: CONV. CTR. ROOM 11A . . . . . 8:25 AM TO 8:30 AM

Welcome and Opening Remarks

Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA); **Judith A. Todd**, The Pennsylvania State Univ. (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 11A . . . SUN 8:30 AM TO 10:10 AM

Session 1

Session Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Judith A. Todd,** The Pennsylvania State Univ. (USA)

8:30 am: **From vision to global market**, Mohan R. Krishnan, Encell Technology, Inc. (USA). . . . . [9189-1]

8:55 am: **Photonics research at GTRI**, Robert McGrath, Brent K. Wagner, Georgia Institute of Technology (USA); Grady Tuell, Georgia Tech Research Institute (USA) . . . . . [9189-2]

9:20 am: **The academic patent process: pitfalls and occasional home runs**, Susan D. Allen, Embry-Riddle Aeronautical Univ. (USA). . . . . [9189-3]

9:45 am: **From research to product: a complex pathway**, François R. Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France); Katia Mirochnitchenko, Pôle Optique et Photonique sud (France) . . . . . [9189-4]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 11A . . SUN 10:40 AM TO 12:20 PM

Session 2

Session Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Judith A. Todd,** The Pennsylvania State Univ. (USA)

10:40 am: **Knowhow-transfer between industry sectors through small engineering firms**, Bernhard Michel, Hembach Photonik GmbH (Germany)[9189-5]

11:05 am: **Medical imaging and computers in the diagnosis of breast cancer**, Maryellen L. Giger, The Univ. of Chicago (USA) . . . . . [9189-6]

11:30 am: **Silicon carbide novel optical sensor for combustion systems and nuclear reactors**, Geunsik Lim, Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9189-7]

11:55 am: **The future is for plastic optoelectronics**, Zakya H. Kafafi, National Science Foundation (USA) and Lehigh Univ. (USA) . . . . . [9189-8]

Lunch Break . . . . . Sun 12:20 pm to 1:20 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 11A . . . . SUN 1:20 PM TO 3:00 PM

Session 3

Session Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Judith A. Todd,** The Pennsylvania State Univ. (USA)

1:20 pm: **ChromaID: looking for nature's fingerprint**, Thomas A. Furness III, Ratlab LLC (USA) and Visualant, Inc. (USA) and Univ. of Washington (USA)[9189-9]

1:45 pm: **The Schmidt-Czerny-Turner spectrograph**, Jason McClure, Princeton Instruments (USA) . . . . . [9189-10]

2:10 pm: **Line-edge roughness and the impact of stochastic processes on lithography scaling for Moore's law**, Chris A. Mack, Lithoguru.com (USA) . . . . . [9189-11]

2:35 pm: **Technological innovations for a sustainable business model in the semiconductor industry**, Harry J. Levinson, GLOBALFOUNDRIES Inc. (USA) . . . . . [9189-12]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 11A . . . . SUN 3:30 PM TO 4:20 PM

Session 4

Session Chairs: **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Judith A. Todd,** The Pennsylvania State Univ. (USA)

3:30 pm: **Sun-, Earth- and Moon-integrated simulation ray tracing for observation from space using ASAP®**, Robert P. Breault, Breault Research Organization, Inc. (USA); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9189-13]

3:55 pm: **Tackling the challenges of water resources management from space: A long-term perspective on satellite sensor networks and data fusion**, Ni-Bin Chang, Univ. of Central Florida (USA). . . . . [9189-14]

PANEL DISCUSSION

LOCATION: CONV. CTR. ROOM 11A .SUN 4:30 PM TO 5:30 PM

Vision 2025: Where Are We Today?

Moderators: **Akhlesh Lakhtakia**, The Pennsylvania State Univ. (USA); **Judith A. Todd**, The Pennsylvania State Univ. (USA)

Panelists: **Mohan R. Krishnan**, Encell Technology, Inc. (USA); **Jason McClure**, Princeton Instruments, Inc. (USA); **Thomas A. Furness III**, Visualant, Inc. (USA); **Zakya Kafafi**, The Pennsylvania State Univ. (USA)**; Robert P. Breault**, Breault Research Organization, Inc. (USA)

The entire world continues to move on a trajectory for a knowledge-based global economy. Promotion of technoscientific innovation is widely recognized as necessary for solving the problems of today and forestalling those of tomorrow. Visions of the future are being articulated by individuals, organizations, and governments. Where are we researchers today on that yellow brick road? Are we propelling our research agendas in light of government policies and actions? Do universities and research institutes have the right frameworks for university-industry-government partnerships? Are the researchers of the future being nurtured adequately? Panel members will enunciate brief statements and then engage the audience in a discussion.

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

CONFERENCE 9190

LOCATION: CONV. CTR. ROOM 10

Wednesday–Thursday 20–21 August 2014 • Proceedings of SPIE Vol. 9190

Thirteenth International Conference on Solid State Lighting and LED-based Illumination Systems

Conference Chairs: **Matthew H. Kane,** Texas A&M Univ. at Galveston (USA); **Jianzhong Jiao,** OSRAM Opto Semiconductors Inc. (USA); **Nikolaus Dietz,** Georgia State Univ. (USA); **Jian-Jang Huang,** National Taiwan Univ. (Taiwan)

Program Committee: **Lianghui Chen,** Institute of Semiconductors (China); **Wood-Hi Cheng,** National Sun Yat-Sen Univ. (Taiwan); **John W. Curran,** LED Transformations, LLC (USA); **Christoph Hoelen,** Philips Lighting B.V. (Netherlands); **Jianzhong Jiao,** OSRAM Opto Semiconductors Inc. (USA); **Asif M. Khan,** Univ. of South Carolina (USA); **Michael R. Krames,** Soraa, Inc. (USA); **Yung Sheng Liu,** National Tsing Hua Univ. (Taiwan); **Eun-Hyun Park,** Kyung Hee Univ. (Korea, Republic of); **Seong-Ju Park,** Gwangju Institute of Science and Technology (Korea, Republic of); **Jeff Quinlan,** Acuity Brands Lighting, Inc. (USA); **Christian Wetzel,** Rensselaer Polytechnic Institute (USA); **Chih-Chung Yang,** National Taiwan Univ. (Taiwan); **Yiting Zhu,** Rensselaer Polytechnic Institute (USA)

Founding Chair: **Ian T. Ferguson,** The Univ. of North Carolina at Charlotte (United States)

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 10 . . . . . WED 8:15 AM TO 9:55 AM

SSL Control Systems and Methods

Session Chair: **Matthew H. Kane,** Texas A&M Univ. at Galveston (USA)

8:15 am: **Accurate chromatic control and color rendering optimization in LED lighting systems using junction temperature feedback**, Marco M. Sisto, Jonny Gauvin, INO (Canada) . . . . . [9190-1]

8:35 am: **Investigation of correlation of LF power modulation of light in natural and artificial illumination situations and acoustic emission**, Cornelius F. Hahlweg, Joachim Dörfler, bbw Hochschule (Germany) . . . . . [9190-2]

8:55 am: **LED illuminant on the ambient light**, Anqing Liu, Sandipan Mishra, Michael Shur, Rensselaer Polytechnic Institute (USA) . . . . . [9190-3]

9:15 am: **High efficiency LED driver based on optical feedback**, Edgar Marti-Arbona, Arizona State Univ. (USA); Tino Copani, STMicroelectronics (Italy); Bertan Bakkaloglu, Sayfe Kiaei, Arizona State Univ. (USA) . . . . . [9190-4]

9:35 am: **Real time compensation of in aging effects in solid-state lighting**, Mario Cappitelli, Airbus Deutschland (Germany) . . . . . [9190-5]

Coffee Break . . . . . Wed 9:55 am to 10:25 am

SESSION 2

LOCATION: CONV. CTR. ROOM 10 . . . WED 10:25 AM TO 11:45 AM

LED Lifetime/Chromaticity Issues

Session Chair: **Yiting Zhu,** Rensselaer Polytechnic Institute (USA)

10:25 am: **A new lifetime estimation model for a quicker LED reliability prediction**, Benoit H. Hamon, Philips France (France) and MINATEC (France); Laurent Mendizabal, MINATEC (France); Benoit Bataillou, Philips France (France); Adrien Gasse, MINATEC (France); Guy Feuillet, CEA-LETI (France). . . . . [9190-6]

10:45 am: **Uncertainty analysis for chromaticity coordinates and luminous flux measurements of LEDs**, Rui Qi, Soraa, Inc. (USA); David P. Bajorins, Orb Optronix, Inc. (USA). . . . . [9190-7]

11:05 am: **Optical simulations of light-emitting diodes through a combination of rigorous electromagnetic solvers and Monte Carlo ray-tracing methods**, Mayank Bahl, Guirong Zhou, Evan Heller, William Cassarly, Mingming Jiang, Robert Scarmozzino, G. Groot Gregory, Synopsys, Inc. (USA) . . . . . [9190-8]

11:25 am: **Foil based optical elements for beam shaping and color homogenization of phosphor converted white LED sources**, Franz-Peter Wenzl, Wolfgang Nemitz, Ladislav Kuna, Christian Sommer, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Paul Fulmek, Johann Nicolics, Technische Univ. Wien (Austria); Peter Pachler, Hans Hoschopf, Franz Schrank, TridonicAtco Optoelectronics GmbH (Austria); Gregor Langer, Austria Technologie & Systemtechnik Aktiengesellschaft (Austria); Paul Hartmann, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) . . . . . [9190-10]

Lunch/Exhibition Break . . . . . Wed 11:45 am to 1:45 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 10 . . . . . WED 1:45 PM TO 3:15 PM

Novel SSL Emitters

Session Chair: **Jianzhong Jiao,** OSRAM Opto Semiconductors Inc. (USA)

1:45 pm: **Laser diodes in solid-state lighting** *(Invited Paper)*, Jonathan J. Wierer Jr., Jeffrey Y. Tsao, Sandia National Labs. (USA) . . . . . [9190-11]

2:15 pm: **Laser-activated remote phosphor conversion with ceramic phosphors**, Alan Lenef, John F. Kelso, Maxim Tchoul, OSRAM SYLVANIA Inc. (USA); Olvier Mehl, Joerg Sorg, OSRAM AG (Germany) . . . . . [9190-12]

2:35 pm: **Fire-light LEDs for blue-balanced outdoor lighting**, Pranciskus Vitta, Rimantas Vaicekauskas, Paulius Eidikas, Akvile Zabiliute, Rytis Stanikunas, Algimantas Svegzda, Arunas Tuzikas, Andrius Tuzikas, Arturas Zukauskas, Vilnius Univ. (Lithuania) . . . . . [9190-13]

2:55 pm: **An imaging-based photometric and colorimetric measurement method for characterizing OLED panels for lighting applications**, Yiting Zhu, Nadarajah Narendran, Jianchuan Tan, Xi Mou, Rensselaer Polytechnic Institute (USA) . . . . . [9190-14]

Coffee Break . . . . . Wed 3:15 pm to 3:45 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 10 . . . . . WED 3:45 PM TO 4:55 PM

Light Extraction in SSL Services and Systems

Session Chair: **Jian-Jang Huang,** National Taiwan Univ. (Taiwan)

3:45 pm: **Understanding LED efficiency: reaching the limits via nano LEDs** *(Invited Paper)*, Matthias Sabathil, Alexander Linkov, Martin Strassburg, Martin Mandl, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9190-15]

4:15 pm: **Comparison of extraction efficiency for thin-film flip-chip InGaN light-emitting diodes with microsphere and microconcave array structures**, Peifen Zhu, Chee-Keong Tan, Nelson Tansu, Lehigh Univ. (USA) . . . . . [9190-16]

4:35 pm: **Analysis of light extraction enhancement for nitride flip-chip light-emitting diodes with hybrid full-wave and ray-tracing method**, Tsung-Xian Lee, National Taiwan Univ. of Science and Technology (Taiwan). . . . . [9190-17]

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Lightweight LED Fluorescent lamp using engineering poly carbonate, Hyun-Ju Cho, Daeduk College (Korea, Republic of); Jong-Phil Lee, Node Engineering (Korea, Republic of) . . . . . [9190-33]

Improved light extraction of nitride-based flip-chip light-emitting diodes by forming air voids on Ar-implanted sapphire substrate, Yu-hsiang Yeh, Jinn-Kong Sheu, National Cheng Kung Univ. (Taiwan); Ming-Lun Lee, Southern Taiwan Univ. of Technology (Taiwan); Po-Cheng Chen, Yu-Chen Yang, Cheng-Hsiung Yen, Wei-Chih Lai, National Cheng Kung Univ. (Taiwan) . . . . . [9190-34]

Investigation of structure in the modular light pipe component for LED automotive lamp, Hsi-Chao Chen, Yang Zhou, Chien-Sheng Huang, Bo-Wei Cheng, Jhe-Ming Jhang, National Yunlin Univ. of Science and Technology (Taiwan) . . . . . [9190-35]

Heat generation and thermo-mechanical effect modelling in longitudinally diode-pumped solid state lasers, Fouad Lakhdari, Ismahen Osmani, Saida Tabet, Ctr. de Développement des Téchnologies Avancées (Algeria) . . . . . [9190-36]

Realization of quantum dot-based polarized white LEDs using short-wavelength pass dichroic filters and reflective polarizer films, Su ji Yang, Ji Hye Oh, Young Rag Do, Kookmin Univ. (Korea, Republic of) . . . . . [9190-37]

High color rendering index of remote-type white LEDs with multi-layered quantum dot-phosphor films and short-wavelength pass dichroic filters, Hee Chang Yoon, Ji Hye Oh, Young Rag Do, Kookmin Univ. (Korea, Republic of) . . . . . [9190-38]

Tri-wavelength single output Infrared LED based on QW area selective intermixing, Abdullah J. Zakariya, Ministry of Interior-Kuwait (Kuwait); Bassam Alfeeli, Kuwait Foundation for Advancement of Science (Kuwait) . . . . . [9190-39]

Solution of multi-element LED light sources development automation problem, Vladimir Peretiagin, Aleksandr N. Chertov, Elena V. Gorbunova, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9190-40]

Properties of InN epilayers grown at superatmospheric reactor pressures, Sampath Gamage, Indika M. Senevirathna, Georgia State Univ. (USA); Bahadir Kucukgok, Babar Hussain, Ian T. Ferguson, The Univ. of North Carolina at Charlotte (USA); Nikolaus Dietz, Georgia State Univ. (USA) . . . . . [9190-41]

Investigation of optical intensity in indoor visible light communication with different LEDs array, Hsi-Chao Chen, Cheng-Jyun Liou, Yang Chou, I-Ju Liu, Wei-Cheng Lai, National Yunlin Univ. of Science and Technology (Taiwan) . . . [9190-42]

New understandings of failure modes in SSL luminaires, Sarah D. Shepherd, Karmann Mills, Robert Yaga, Cortina Johnson, J. Lynn Davis, RTI International (USA) . . . . . [9190-43]

Study of photometric performance for standardization of LED lighting in agriculture, Hong-Shik Lee, Jae Hyoung Ryu, Jin Hwan Lee, Ho June Bae, Mee-Ryoung Cho, Korea Institute of Lighting Technology (Korea, Republic of). [9190-45]

Characterize LED fluorescent replacement lamps using indirect light pathway, Jae Hyoung Ryu, Jin Hwan Lee, Ho June Bae, Hong-Shik Lee, Korea Institute of Lighting Technology (Korea, Republic of) . . . . . [9190-46]

THURSDAY 21 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 10 . . . . . THU 8:15 AM TO 9:55 AM

SSL System Design

Session Chair: **Wood-Hi Cheng,** National Sun Yat-Sen Univ. (Taiwan)

8:15 am: **Complete solid state lighting line at CEA LETI**, Ivan-Christophe Robin, Pierre Ferret, Amélie Dussaigne, Matthew Charles, Pierre Tchoulfian, Adrien Gasse, Alexandre Lagrange, Marianne Consonni, Hubert Bono, Yohan Desières, Abdenacer Aitmani, Samuel Makram-Matta, Emilie Bialic, Paula Gorrochategui, Laurent Mendizabal, Benjamin Leroy, CEA-LETI (France); Catherine Bougerol, Damien Salomon, Institut NÉEL (France) . . . . . [9190-19]

8:35 am: **Optimization of optical systems for LED spot lights with equal color uniformity**, Anne Teupner, CeDInt-UPM (Spain); Krister Bergenek, Ralph Wirth, OSRAM Opto Semiconductors GmbH (Germany); Juan C. Miñano, Pablo Benítez, Univ. Politécnica de Madrid (Spain) . . . . . [9190-20]

8:55 am: **A lighting metric for quantitative evaluation of accent lighting systems**, Cyril Acholo, Kenneth A. Connor, Richard J. Radke, Rensselaer Polytechnic Institute (USA) . . . . . [9190-21]

9:15 am: **Design a LED coupler to collocate with a light guide plate for illumination**, Tun-Chien Teng, National Taiwan Normal Univ. (Taiwan) . . . [9190-22]

9:35 am: **Smart restorative illumination of artwork and museum exhibits**, Arūnas Tuzikas, Andrius Petrulis, Rimantas Vaicekauskas, Vilnius Univ. (Lithuania); Michael Shur, Rensselaer Polytechnic Institute (USA); Artūras Žukauskas, Vilnius Univ. (Lithuania) . . . . . [9190-23]

Coffee Break . . . . . Thu 9:55 am to 10:25 am

SESSION 6

LOCATION: CONV. CTR. ROOM 10 . . . . THU 10:25 AM TO 12:35 PM

Phosphors in LED lighting

Session Chair: **Nikolaus Dietz,** Georgia State Univ. (USA)

10:25 am: **High-thermal-stability white light-emitting-diodes employing broadband glass phosphor** *(Invited Paper)*, Wood-Hi Cheng, Li-Yin Chen, Wei-Chih Cheng, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9190-24]

10:55 am: **Eu^{3+} doped TiO_2 nanospheres for GaN-based white light-emitting diodes**, Peifen Zhu, Lehigh Univ. (USA); Hongyang Zhu, Jilin Univ. (China); Weiping Qin, Jinan Univ. (China); Chee-Keong Tan, Nelson Tansu, Lehigh Univ. (USA) . . . . . [9190-25]

11:15 am: **Fabrication and performance of dual-wavelength white light-emitting diodes assisted with red-emitting nanocrystals**, Hong-Shuo Chen, National Central Univ. (Taiwan); Shu-Ru Chung, Sheng-Shiun Chen, National Formosa Univ. (Taiwan); Kuan-Wen Wang, National Central Univ. (Taiwan)[9190-26]

11:35 am: **Optical and thermal performance of a remote phosphor layer as a function of layer thickness**, Xi Mou, Nadarajah Narendran, Yiting Zhu, Indika U. Perera, Rensselaer Polytechnic Institute (USA). . . . . [9190-27]

11:55 pm: **The impact of individual materials parameters on color temperature reproducibility among phosphor converted LED sources**, Susanne Schweitzer, Wolfgang Nemitz, Christian Sommer, Paul Hartmann, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Paul Fulmek, Johann Nicolics, Technische Univ. Wien (Austria); Peter Pachler, Hans Hoschopf, Franz Schrank, TridonicAtco Optoelectronics GmbH (Austria); Gregor Langer, Austria Technologie & Systemtechnik Aktiengesellschaft (Austria); Franz-Peter Wenzl, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) . . . . . [9190-28]

12:15 pm: **Numerical model to analyze phosphor layer heat transfer of an LED system**, Indika U. Perera, Nadarajah Narendran, Rensselaer Polytechnic Institute (USA) . . . . . [9190-9]

Lunch/Exhibition Break . . . . . Thu 12:35 pm to 2:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 10 . . . . . THU 2:00 PM TO 3:40 PM

III-Nitride LEDs for SSL

Session Chair: **Matthew H. Kane,** Texas A&M Univ. at Galveston (USA)

2:00 pm: **Real-time InGaN growth monitoring during plasma-assisted MOCVD**, Daniel Seidlitz, Rasanga L. Samaraweera, Georgia State Univ. (USA); Babar Hussain, Ian T. Ferguson, The Univ. of North Carolina at Charlotte (USA); Nikolaus Dietz, Georgia State Univ. (USA) . . . . . [9190-29]

2:20 pm: **Controlling the interband Auger recombination mechanism in III-nitride based ternary active regions**, Chee-Keong Tan, Peifen Zhu, Nelson Tansu, Lehigh Univ. (USA) . . . . . [9190-30]

2:40 pm: **Property analysis of InGaN layers grown by remote-plasma assisted MOCVD**, Rasanga L. Samaraweera, Daniel Seidlitz, Indika M. Senevirathna, Georgia State Univ. (USA); Bahadir Kucukgok, Babar Hussain, Ian T. Ferguson, The Univ. of North Carolina at Charlotte (USA); Nikolaus Dietz, Georgia State Univ. (USA) . . . . . [9190-31]

3:00 pm: **Quantum efficiency improvement of InGaN/GaN LEDs using dual-metallic surface plasmon resonance**, Ahmed Fadil, Technical Univ. of Denmark (Denmark); Yiyu Ou, Light Extraction ApS (Denmark); Daisuke Iida, Meijo Univ. (Japan); Haiyan Ou, Technical Univ. of Denmark (Denmark) . . . . . [9190-32]

3:20 pm: **Time-dependent cathodoluminescence from GaN modelled through a 2D diode**, Eva M. Campo, Laurel J. Leigh, Bangor Univ. (United Kingdom); Milan Pophristic, Univ. of the Sciences (USA); Ian T. Ferguson, The Univ. of North Carolina at Charlotte (USA) . . . . . [9190-44]

CONFERENCE 9191

LOCATION: CONV. CTR. ROOM 10

Sunday, Monday and Wednesday 17, 18 and 20 August 2014 • Proceedings of SPIE Vol. 9191

Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI

Conference Chairs: **Roland Winston,** Univ. of California, Merced (USA); **Jeffrey M. Gordon,** Ben-Gurion Univ. of the Negev (Israel)

Program Committee: **Pablo Benítez,** Univ. Politécnica de Madrid (Spain), Light Prescriptions Innovators LLC (USA); **William J. Cassarly,** Synopsys, Inc. (USA); **Daniel Feuermann,** Ben-Gurion Univ. of the Negev (Israel); **Juan Carlos Miñano,** Univ. Politécnica de Madrid (Spain), Light Prescriptions Innovators LLC (USA); **Narkis E. Shatz,** SAIC (USA)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 10 . . . . .SUN 8:40 AM TO 8:50 AM

Opening Comments

Roland Winston, Univ. of California, Merced (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 10 . . . . SUN 8:50 AM TO 10:10 AM

Fundamental Optics and Radiative Transfer

Session Chair: **Roland Winston,** Univ. of California, Merced (USA)

8:50 am: **Conditions for perfect focusing multiple point sources with the SMS design method** *(Invited Paper)*, Pablo Benitez, Juan C. Miñano, Univ. Politécnica de Madrid (Spain) and Light Prescription Innovators, LLC (USA); Milena I. Nikolic, CeDInt-UPM (Spain); Jiayao Liu, Jose M. Infante, Univ. Politécnica de Madrid (Spain); Fabian Duerr, Vrije Univ. Brussel (Belgium) . . . . . [9191-1]

9:30 am: **The thermodynamic limit for coherence-limited solar power conversion**, Jeffrey M. Gordon, Heylal Mashaal, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9191-2]

9:50 am: **Excitation of multiple surface-plasmon-polariton waves guided by the interface of a photonic crystal and a two-dimensional gold grating**, Liu Liu, Muhammad Faryad, Anthony S. Hall, Greg D. Barber, Thomas E. Mallouk, Akhlesh Lakhtakia, Theresa S. Mayer, The Pennsylvania State Univ. (USA) . . . . . [9191-3]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 10 . . . SUN 10:40 AM TO 12:00 PM

Illumination Optics

Session Chair: **Marco Stefancich,** Masdar Institute of Science & Technology (United Arab Emirates)

10:40 am: **Recent progress in computational methods for optical design of freeform lenses with prescribed irradiance properties** *(Invited Paper)*, Vladimir I. Oliker, Emory Univ. (USA) . . . . . [9191-4]

11:20 am: **Tailoring free-form glass reflectors towards a homogeneous luminance distribution in roadway applications**, Thomas Heßling, Marc C. Hübner, Auer Lighting GmbH (Germany) . . . . . [9191-5]

11:40 am: **Influence of manufacturing tolerances on efficiency of different solutions for collimating LED light flux**, Mikhail A. Moiseev, Image Processing Systems Institute (Russian Federation) and Samara State Aerospace Univ. (Russian Federation) and LED Optics Design, LLC (Russian Federation); Egor V. Byzov, LED Optics Design, LLC (Russian Federation) and Image Processing Systems Institute (Russian Federation) and Samara State Aerospace Univ. (Russian Federation); Sergey V. Kravchenko, Image Processing Systems Institute (Russian Federation) and Samara State Aerospace Univ. (Russian Federation) and LED Optics Design, LLC (Russian Federation); Leonid L. Doskolovich, Image Processing Systems Institute (Russian Federation) and Samara State Aerospace Univ. (Russian Federation) . . . . . [9191-6]

Lunch Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 10 . . . . . .SUN 1:30 PM TO 3:30 PM

Novel Solar and LED Optics

Session Chair: **Jeffrey M. Gordon,** Ben-Gurion Univ. of the Negev (Israel)

1:30 pm: **Nonimaging optics in combined heat and power** *(Invited Paper)*, Eli Yablonovitch, Univ. of California, Berkeley (USA); Roland Winston, Lun Jiang, Univ. of California, Merced (USA). . . . . [9191-7]

2:10 pm: **Integrated design of solar thermal evacuated tubes using nonimaging optics**, Lun Jiang, Roland Winston, Univ. of California, Merced (USA) . . . . [9191-8]

2:30 pm: **New directions for nonimaging optics; pushing the boundaries**, Roland Winston, Lun Jiang, Univ. of California, Merced (USA) . . . . . [9191-9]

2:50 pm: **Light extraction efficiency in light emitting diodes (LEDs) for pyramidal geometry using light tools**, Melissa N. Ricketts, Roland Winston, Univ. of California, Merced (USA). . . . . [9191-10]

3:10 pm: **Nonimaging optics heats up Mongolian winter**, Roland Winston, Bennett K. Widyolar, Lun Jiang, Univ. of California, Merced (USA) . . . . . [9191-11]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 10 . . . . . SUN 4:00 PM TO 5:20 PM

Concentrator Photovoltaics

Session Chair: **Narkis E. Shatz,** SAIC (USA)

4:00 pm: **Christiansen's optical switches based on first order phase transitions for stationary solar tracking in concentrator photovoltaic: theory and experiment** *(Invited Paper)*, Marco Stefancich, Harry Apostoleris, Carlo Maragliano, Matteo Chiesa, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9191-12]

4:40 pm: **Micro-optical designs for angular confinement in solar cells**, Jeffrey M. Gordon, Daniel Feuermann, Ben-Gurion Univ. of the Negev (Israel) . . . [9191-13]

5:00 pm: **Decentralized nonimaging micro-optical concentrator**, Tian Gu, Univ. of Delaware (USA); William C. Sweatt, Sandia National Labs. (USA); Gautam Agrawal, Univ. of Delaware (USA); Bradley H. Jared, Ben J. Anderson, Ron S. Goeke, Brenton Elisberg, Scott M. Paap, Jose Luis Cruz-Campa, Vipin P. Gupta, Murat Okandan, Gregory N. Nielson, Sandia National Labs. (USA); Michael W. Haney, Univ. of Delaware (USA) . . . . . [9191-14]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 10 . . . .MON 9:10 AM TO 10:30 AM

Luminescent and Holographic Optics

Session Chair: **William Cassarly,** Synopsys, Inc. (USA)

9:10 am: **Luminescent manipulation of sunlight: leveraging low etendúe emission with nonimaging optics for photovoltaics and biofuels** *(Invited Paper)*, Noel C. Giebink, The Pennsylvania State Univ. (USA) . . . . . [9191-15]

9:50 am: **Optimization of a spectrum splitter using differential evolution algorithm for solar cell applications**, Li Fan, Univ. of Delaware (USA); Muhammad Faryad, Greg D. Barber, Thomas E. Mallouk, The Pennsylvania State Univ. (USA); Peter B. Monk, Univ. of Delaware (USA); Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA) . . . . . [9191-16]

10:10 am: **Design and analysis of holographic optical elements for daylighting interior of a building with solar radiation free from UV and IR**, Rajeev Ranjan, National Institute of Technology, Jamshedpur (India); Abhijit Ghosh, Anil K. Nirala, Indian School of Mines (India); Hiralal L. Yadav, National Institute of Technology, Jamshedpur (India) . . . . . [9191-18]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

SESSION 6

LOCATION: CONV. CTR. ROOM 10 . . . MON 11:00 AM TO 12:20 PM

Daylighting Optics

Session Chair: **Daniel Feuermann,** Ben-Gurion Univ. of the Negev (Israel)

11:00 am: **Light valve based on nonimaging optics with potential application in extreme climate greenhouses**, Angel A. Valerio, Michele A. Mossman, Lorne A. Whitehead, The Univ. of British Columbia (Canada) . . . . . [9191-19]

11:20 am: **Experimental study of direct transfer of concentrated solar radiation through optical fibres to high temperature thermal applications**, Maryam Rahou, John Andrews, Gary Rosengarten, RMIT Univ. (Australia) . . . . . [9191-20]

11:40 am: **Evaluation of solar optical modeling tools for modeling complex solar thermal receiver geometries**, Julius Yellowhair, Joshua M. Christian, Clifford K. Ho, Sandia National Labs. (USA) . . . . . [9191-21]

12:00 pm: **Light redirecting system using sine-wave based panels for dense urban areas**, Mohamed W. N. Mohamed, Ain Shams Univ. (Egypt); Islam A. Mashaly, The American Univ. in Cairo (Egypt); Osama N. Mohamed, Sally I. El-Henawy, Ola Galal, Iman Taha, Ain Shams Univ. (Egypt); Khaled Nassar, The American Univ. in Cairo (Egypt); Amr M. E. Safwat, Ain Shams Univ. (Egypt) . . . . . [9191-22]

Lunch Break . . . . . .Mon 12:20 pm to 2:00 pm

LOCATION: CONV. CTR. ROOM 6A . MON 2:00 PM TO 4:35 PM

Solar Energy Plenary Session

Session Chair: **Oleg V. Sulima,** GE Global Research (USA)

2:00 pm: **CPV: Lessons from the First 100MW and the Explosion of Next Generation Technologies** *(Plenary)*, Adam P. Plesniak, Arzon Solar, LLC (USA) . . . . . [9175-301]

2:25 pm: **The Renaissance of CdTe-based Photovoltaics** *(Plenary)*, William Huber, GE Global Research (USA) . . . . . [9177-302]

2:50 pm: **Organic Solar Cells: From a Lab Curiosity to a Serious Photovoltaic Technology** *(Plenary)*, Karl Leo, Technische Univ. Dresden (Germany) and King Abdullah Univ. of Science and Technology (KAUST) (Saudi Arabia) . . . . . [9184-303]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

3:45 pm: **Hot Carrier Solar Cell Absorbers: Materials, Mechanisms and Nanostructures** *(Plenary)*, Gavin Conibeer, Australian Ctr. for Advanced Photovoltaics, The Univ. of New South Wales (Australia) . . . . . [9178-304]

4:10 pm: **International PV QA Task Force's Proposed Comparative Rating System for PV Modules** *(Plenary)*, John H. Wohlgemuth, Sarah Kurtz, National Renewable Energy Lab. (USA) . . . . . [9179-305]

LOCATION: MARRIOTT MARQUIS, MARINA F . . . . . .MON 8:00 TO 10:00 PM

Illumination Technical Event

Chair: **Jake Jacobsen**, Synopsys, Inc. (USA)

Please join us for an evening of stimulating discussion.

Since we last discussed this topic five years ago, solar energy production in the US has seen substantial growth. What is the state of solar technology and what is coming down the road? Join us for evening of discussion of the current state of solar energy production and a look into the future. At the end of the planned event, time permitting, any member of the audience may present information within the broad field of illumination. Light refreshments will be served.

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS®

WEDNESDAY 20 AUGUST

POSTERS-WEDNESDAY

LOCATION: CONV. CTR. EXHIBIT HALL B1 WED 5:30 TO 7:30 PM

Conference attendees are invited to attend the poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

LED lighting freeform lens for achieving octagon spot, Shaoyun Yin, Chunlei Du, Xiuhui Sun, Peng Wu, Liangping Xia, Chongqing Institute of Green and Intelligent Technology (China) . . . . . [9191-23]

CONFERENCE 9192

LOCATION: CONV. CTR. ROOM 6E

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9192

Current Developments in Lens Design and Optical Engineering XV

Conference Chairs: **R. Barry Johnson,** Alabama A&M Univ. (USA); **Virendra N. Mahajan,** The Aerospace Corp. (USA); **Simon Thibault,** Univ. Laval (Canada)

Program Committee: **Robert M. Bates,** FiveFocal LLC (USA); **Julie L. Bentley,** Univ. of Rochester (USA); **Florian Bociort,** Technische Univ. Delft (Netherlands); **Robert M. Bunch,** Rose-Hulman Institute of Technology (USA); **Pierre H. Chavel,** Institut d'Optique (France); **Chung-Tse Chu,** The Aerospace Corp. (USA); **Apostolos Deslis,** JENOPTIK Optical Systems (USA); **José Antonio Díaz Navas,** Univ. de Granada (Spain); **James E. Harvey,** Photon Engineering LLC (USA); **Lakshminarayan Hazra,** Univ. of Calcutta (India); **Irina L. Livshits,** National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); **Steven A. Macenka,** Jet Propulsion Lab. (USA); **Michael Mandina,** Optimax Systems, Inc. (USA); **Pantazis Mouroulis,** Jet Propulsion Lab. (USA); **Alfonso Padilla-Vivanco,** Univ. Politécnica de Tulancingo (Mexico); **Ching-Cherng Sun,** National Central Univ. (Taiwan); **Yuzuru Takashima,** College of Optical Sciences, The Univ. of Arizona (USA); **Yongtian Wang,** Beijing Institute of Technology (China); **Cornelius Willers,** Council for Scientific and Industrial Research (South Africa); **Andrew P. Wood,** Qioptiq Ltd. (United Kingdom); **María J. Yzuel,** Univ. Autònoma de Barcelona (Spain)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

High-quality UV: NIR thin film interference polarizers, Vladimir V. Novopashin, Alexsandr V. Shestakov, POLYUS Research and Development Institute (Russian Federation) . . . . . [9192-37]

Investigation of diamond turning: of rapidly-solidified aluminum alloys, Cheng Yuan-Chieh, Wei-Yao Hsu, Instrument Technology Research Ctr. (Taiwan); Khaled Abou-El-Hossein, Oluwole Olufayo, Timothy Otieno, Nelson Mandela Metropolitan Univ. (South Africa) . . . . . [9192-38]

Pyramid wavefront sensor for image quality evaluation of optical system, Dan Zhou, Li-xin Zheng, Shanghai Astronomical Observatory (China) . . . . . [9192-39]

Comparison of refractive dual-prism beam scanner used in near and far field, Anhu Li, Tongji Univ. (China) . . . . . [9192-40]

Differential measurement method for atmospheric refraction, Jian-jun Cao, Li-xin Zheng, Shanghai Astronomical Observatory (China) . . . . . [9192-41]

Analysis of double conjugate zoom lens using tunable-focus lenses, Jiri Novak, Pavel Novak, Antonin Miks, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9192-42]

Research on properties of an infrared imaging diffractive element, Martyna Rachon, Karolina Wegrzynska, Marta Doch, Karol Kakarenko, Agnieszka Siemion, Jaroslaw Suszek, Maciej Sypek, Andrzej Kolodziejczyk, Warsaw Univ. of Technology (Poland) . . . . . [9192-43]

Near-infrared imaging equipment that detects small organic substances in thick foods, Souphaphone Phetchalern, Hiroto Tashima, Yuya Ishii, Takeshi Ishiyama, Shinichi Arai, Mitsuo Fukuda, Toyohashi Univ. of Technology (Japan). . . . . [9192-44]

Analyzing of light pattern uniformity in multi-chips LED lighting, Yu-Hsuan Chen, Chi-Hung Lee, Jou-Hui Lin, Shih-Hsin Ma, Feng Chia Univ. (Taiwan)[9192-45]

Study of CCT varying by volume scattering diffuser with moving and rotating white light LED, Shih-Hsin Ma, Wen-Chao Huang, Yu-Hsuan Chen, Jou-Hui Lin, Feng Chia Univ. (Taiwan). . . . . [9192-47]

LED collimation module for time sequential back-light system, Jou-Hui Lin, Chi-Hung Lee, An-Ching Tai, Yu-Hsuan Chen, Shih-Hsin Ma, Feng Chia Univ. (Taiwan) . . . . . [9192-48]

Manufacturing of freeform mirror by milling and altering its optical characteristics by Ns-laser polishing and ALD coatings, Jarkko Mutanen, Univ. of Eastern Finland (Finland); Jarno J. J. Kaakkunen, VTT Technical Research Ctr. of Finland (Finland); Hemmo Tuovinen, Univ. of Eastern Finland (Finland); Jouni Hiltunen, Univ. of Eastern Finland (Finland); Sini Kivi, Maunu Toiviainen, VTT Technical Research Ctr. of Finland (Finland); Juha Väyrynen, Karelia Univ. of Applied Sciences (Finland); Janne Laukkanen, Victor Prokofiev, Pertti Pääkkönen, Univ. of Eastern Finland (Finland); Mikko Juuti, VTT Technical Research Ctr. of Finland (Finland); Markku Kuittinen, Univ. of Eastern Finland (Finland); Kari Mönkkönen, Karelia Univ. of Applied Sciences (Finland) . . . . . [9192-49]

Portable system to luminaries characterization, Margarita Tecpoyotl-Torres, Jose G. Vera-Dimas, Svetlana V. Koshevaya, J. Jesús Escobedo-Alatorre, Luis Cisneros-Villalobos, Univ. Autónoma del Estado de Morelos (Mexico); Oscar G. Ibarra Manzano, Univ. de Guanajuato (Mexico); Jose J. Sanchez-Mondragon, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [9192-50]

Recovery phase holographic objects using the method of Gabor wavelet transform, Martin Hernández-Romo, Alfonso Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico) . . . . . [9192-51]

Controllable focal spot for direct-drive laser fusion based on electro-optic effect, Zheqiang Zhong, Bin Zhang, Sichuan Univ. (China) . . . . . [9192-52]

Research on chromatic properties of high-order kinoform, Karolina Wegrzynska, Martyna Rachon, Marta Doch, Agnieszka Siemion, Jaros?aw Suszek, Maciej Sypek, Andrzej Kolodziejczyk, Warsaw Univ. of Technology (Poland) . . . . . [9192-53]

Optimized restoration of wavefront coded images, Carina Toxqui-Quitl, Univ. Politécnica de Tulancingo (Mexico); Eva Acosta Plaza, Justo Arines-Piferrer, Univ. de Santiago de Compostela (Spain); Alfonso Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico) . . . . . [9192-54]

Controllable compliant manufacture technique for space off-axis aspheric optics, Ci Song, Yifan Dai, Xiaoqiang Peng, Yin Wang, Feng Shi, National Univ. of Defense Technology (China) . . . . . [9192-55]

Mold production for polymer optics, Marco Speich, Rainer Börret, Jonas Raab, Hochschule Aalen (Germany) . . . . . [9192-56]

Effect of injection molding processing conditions on optical properties of polyetherimide, Wei Zhao, Christopher Wall, Raghavendra Maddikeri, Andy May, SABIC Innovative Plastics (USA). . . . . [9192-59]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6E . . . TUE 8:30 AM TO 10:20 AM

Lens Design Methodology I

Session Chair: **R. Barry Johnson,** Alabama A&M Univ. (USA)

8:30 am: **The role of aberration analysis in modern optical design with a focus on zoom lenses** *(Invited Paper)*, Julie L. Bentley, Univ. of Rochester (USA) [9192-1]

9:00 am: **Saddle point methods to meet the challenges of the design of wide-angle optical systems**, Florian Bociort, Technische Univ. Delft (Netherlands); Irina L. Livshits, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Pascal van Grol, TNO (Netherlands); Maarten van Turnhout, TNO Science and Industry (Netherlands); H. Paul Urbach, Technische Univ. Delft (Netherlands) . . . . . [9192-2]

9:20 am: **Double surface imaging designs with unconstrained object to image mapping under rotational symmetry**, Jiayao Liu, Juan Carlos Miñano, Pablo Benítez, Univ. Politécnica de Madrid (Spain) . . . . . [9192-3]

9:40 am: **Exact space aberrations' distribution in centered optical systems**, Boian A. Hristov, Central Lab. of Optical Storage and Processing of Information (Bulgaria) . . . . . [9192-4]

10:00 am: **Design and analysis of an adaptive lens that mimics the performance of the crystalline lens in the human eye**, Agustín Santiago-Alvarado, Angel S. Cruz-Félix, Fernando Iturbide-Jiménez,María de Jesús Martínez-López, Magaly Ramírez-Como, Ingrid R. Vásquez-Báez, Victor D. Armengol-Cruz, Univ. Tecnológica de la Mixteca (Mexico). . . . . [9192-5]

Coffee Break . . . . . Tue 10:20 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6E . . . TUE 10:50 AM TO 12:10 PM

Lens Design Methodology II

Session Chair: **Pantazis Mouroulis,** Jet Propulsion Lab. (USA)

10:50 am: **Caustic surfaces of a plane wavefront refracted by a smooth arbitrary surface**, Maximino M. Avendaño-Alejo, Univ. Nacional Autónoma de México (Mexico) . . . . . [9192-6]

11:10 am: **Research on the controlling thermal defocus aberration for the infrared imaging system based on wavefront coding**, Di Chen, Liquan Dong, Yuejin Zhao, Mei Hui, Xiaohua Liu, Hong Wu, Ming Liu, Xiaohu Guo, Yijian Wu, Zhu Zhao, Manjin Liu, Cuiling Li, Beijing Institute of Technology (China) . . . . . [9192-7]

11:30 am: **Complex imaging with ray-rotating windows**, Aidan Strathearn, James Moncreiff, Stephen Oxburgh, Johannes Courtial, Univ. of Glasgow (United Kingdom) . . . . . [9192-8]

11:50 am: **Study of Camera Calibration Process with Ray Tracing**, Anne-Sophie Poulin-Girard, Xavier Dallaire, Univ. Laval (Canada); Audrey Veillette, Centre d'optique, photonique et laser, Université Laval (Canada); Simon Thibault, Denis Laurendeau, Univ. Laval (Canada) . . . . . [9192-9]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:20 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6E . . . . . TUE 1:20 PM TO 3:30 PM

Advanced Optical Techniques

Session Chair: **Simon Thibault,** Univ. Laval (Canada)

1:20 pm: **Diffraction limited integral field spectrographs for large telescopes** *(Invited Paper)*, James E. Larkin, Univ. of California, Los Angeles (USA) . . [9192-10]

1:50 pm: **Conception of a compact infrared camera using planar optics**, Tatiana Grulois, Guillaume Druart, Nicolas Guérineau, ONERA (France); Arnaud Crastes, ULIS (France). . . . . [9192-11]

2:10 pm: **Multi-aperture microoptical system for close-up imaging**, René Berlich, Andreas Brückner, Robert Leitel, Alexander Oberdörster, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Mathias Schulz, Rainer Fischer, Andreas Lindner, Sypro Optics GmbH (Germany); Frank C. Wippermann, Andreas Bräuer, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9192-12]

2:30 pm: **Optical performance analysis of plenoptic camera systems**, Christin Langguth, Alexander Oberdörster, Andreas Brückner, Frank C. Wippermann, Andreas Bräuer, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9192-13]

2:50 pm: **Proof-of-concept demonstration of a miniaturised multi-resolution refocusing imaging system using an electrically tunable lens**, Lien Smeesters, Gebirie Y. Belay, Heidi Ottevaere, Youri Meuret, Michael Vervaeke, Jürgen Van Erps, Hugo Thienpont, Vrije Univ. Brussel (Belgium) . . . . . [9192-14]

3:10 pm: **Consumer electronic optics: how small can a lens be?**, Simon Thibault, Univ. Laval (Canada); Hu Zhang, Jocelyn Parent, Patrice Roulet, ImmerVision (Canada) . . . . . [9192-15]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

LOCATION: MARRIOTT MARQUIS, MARINA D . . . . . TUE 8:00 TO 10:00 PM

Lens Design Technical Event

Session Chair: **Rich Pfisterer**, Photon Engineering, LLC (USA)

"Let's Give 'Em Something to Talk About!"

Lens designers! Join us for our annual gathering to meet and discuss... lens design! Let's talk about what we're designing, how we're going about doing it (what materials, software, techniques, etc.), and which problems we're encountering. We'll also explore current technical and commercial trends in the marketplace. This year's invited speaker will be Josh Cobb from Corning. The title of his presentation is "Étendue and what you can Étendue with it." Illumination engineers use the étendue for numerous radiometry calculations and optical designers use the optical invariant as an aid to system design. This talk is intended to review the concepts and present a wide variety of examples that show tips, tricks, and back-of-the-envelope calculations that can put a different perspective on system design.

Cosponsored by: Photon Engineering — Illuminating Ideas

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E . . . . . TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

WEDNESDAY 20 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 6E . . WED 8:30 AM TO 10:30 AM

Special Optical Surfaces

Session Chair: **Virendra N. Mahajan,** The Aerospace Corp. (USA)

8:30 am: **Overview of diffraction gratings technologies for space-flight satellites and in astronomy**, Arnaud Cotel, HORIBA Jobin Yvon S.A.S. (France) . . . . . [9192-16]

8:50 am: **Chromatic error correction of diffractive optical elements at minimum etch depths**, Jochen Barth, Tobias Gühne, Airbus Defence and Space (Germany) . . . . . [9192-17]

9:10 am: **Gradient index (GRIN) and homogeneous materials for multiband IR optics**, Daniel J. Gibson, Shyam S. Bayya, Jas S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9192-18]

9:30 am: **"Moth's-eye" anti-reflection gratings on Germanium freeform surfaces**, Meng Liu, Jason A. Shultz, Thomas J. Suleski, The Univ. of North Carolina at Charlotte (USA) . . . . . [9192-19]

9:50 am: **Anti-reflective coatings making blooming for tunneling particles**, Alexander Kaklyugin, Photron-Auto (France) . . . . . [9192-20]

10:10 am: **Stray light analysis and energy distribution description in high-power laser systems**, Xiaotong Li, Zhaofeng Cen, Zhejiang Univ. (China) [9192-21]

Coffee Break . . . . . Wed 10:30 am to 11:00 am

CONFERENCE 9192

LOCATION: CONV. CTR. ROOM 6E

SESSION 5

LOCATION: CONV. CTR. ROOM 6E . . WED 11:00 AM TO 12:20 PM

Applications and Analysis

Session Chair: **Alfonso Padilla-Vivanco,** Univ. Politécnica de Tulancingo (Mexico)

11:00 am: **3D head-mount display with single panel**, Yuchang Wang, Junejei Huang, Delta Electronics, Inc. (Taiwan). . . . . [9192-22]

11:20 am: **A focal view port optics for underwater photography**, Dan Slater, Consultant (USA). . . . . [9192-23]

11:40 am: **Vibration analysis and testing for the LLST optical module**, Michele S. Weatherwax, Keith B. Doyle, MIT Lincoln Lab. (USA) . . . . . [9192-24]

12:00 pm: **Improved design of Raman-based optical sensor for the identification of oral cancer**, Yashar Khodaei, Medhanie Tesfay, Erlangen Graduate School in Advanced Optical Technologies (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Christian Knipfer, Universitätsklinikum Erlangen (Germany); Werner Adler, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Kathrin Brunner, Florian Stelzle, Universitätsklinikum Erlangen (Germany); Stefan Will, Andreas Braeuer, Erlangen Graduate School in Advanced Optical Technologies (Germany) and Lehrstuhl für Technische Thermodynamik (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9192-25]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 6E . . . . WED 1:30 PM TO 3:40 PM

Solid State Lighting

Session Chair: **Ching-Cherng Sun,** National Central Univ. (Taiwan)

1:30 pm: **Packaging efficiency analysis of phosphor-converted white LEDs** *(Invited Paper)*, Ching-Cherng Sun, Yu-Yu Chang, Cheng-Chien Chen, Ching-Yi Chen, National Central Univ. (Taiwan). . . . . [9192-26]

2:00 pm: **Optical design of low glare luminaire applied for tunnel light**, Ming-Shiou Tsai, Ching-Cherng Sun, Yi-Chien Lo, National Central Univ. (Taiwan) . . . . . [9192-27]

2:20 pm: **Nonimaging achromatic lens design for LED direct-lit backlight applications**, Meng-Che Tsai, Bo-Song Chen, Tsung-Xian Lee, National Taiwan Univ. of Science and Technology (Taiwan) . . . . . [9192-28]

2:40 pm: **A novel method for designing dichroic color filter transmittance curves for lighting applications**, Rui Qi, Frank Shum, Soraa, Inc. (USA) . [9192-29]

3:00 pm: **Six-color solid state illuminator for cinema projector**, Junejei Huang, Yuchang Wang, Delta Electronics, Inc. (Taiwan). . . . . [9192-30]

3:20 pm: **The analysis of different blue light sources for YAG phosphor optical model**, Yu-Yu Chang, Ching-Yi Chen, Guan-Ting Kuo, Ruei-Lin Huang, Tsung-Hsun Yang, Ching-Cherng Sun, National Central Univ. (Taiwan) . . . . . [9192-31]

Coffee Break . . . . . .Wed 3:40 pm to 4:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 6E . . . WED 4:00 PM TO 5:40 PM

Polymer/Molded Glass Optics

Session Chairs: **Michael Schaub,** Raytheon Missile Systems (USA); **David H. Krevor,** Solazyme, Inc. (USA)

4:00 pm: **Fabrication of heterogeneous microlenses using self-surface tension**, Cheng-Han Chiang, Guo-Dung Su, National Taiwan Univ. (Taiwan) . . . . . [9192-32]

4:20 pm: **Miniaturized camera system for an endoscopic capsule for examination of the colonic mucosa**, Frank C. Wippermann, Martin Müller, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Martin Wäny, AWAIBA Lda. (Germany); Stephan Voltz, AWAIBA GmbH (Germany) . . . . . [9192-33]

4:40 pm: **Stability of glass versus plastics for transmissive high-power LED optics**, Christian Paßlick, Ansgar Hellwig, Marc C. Hübner, Auer Lighting GmbH (Germany) . . . . . [9192-34]

5:00 pm: **Surface microstructuring of glassy carbon for precision glass molding of diffractive optical element**, Karin Prater, Toralf Scharf, Hans P. Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andreas Hermerschmidt, HOLOEYE Photonics AG (Germany). . . . . [9192-35]

5:20 pm: **Manufacturing of the integrated microlenses via direct laser writing for the light flow control of UV LEDs**, Albertas Žukauskas, Arùnas Kadys, Roland Tomašiùnas, Mangirdas Malinauskas, Vilnius Univ. (Lithuania) . . . . . [9192-36]

CONFERENCE 9193

LOCATION: CONV. CTR. ROOM 1B

Sunday–Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9193

Novel Optical Systems Design and Optimization XVII

Conference Chairs: **G. Groot Gregory,** Synopsys, Inc. (USA); **Arthur J. Davis,** Reflexite Energy Solutions (USA)

Program Committee: **Jost Adam,** Christian-Albrechts-Univ. zu Kiel (Germany) and Univ. of California, Los Angeles (USA); **W. Andrew Cheng,** KLA-Tencor Corp. (USA); **Jyh-Long Chern,** Power Lens Technology, Inc. (Taiwan) and National Chiao Tung Univ. (Taiwan); **Peter I. Goldstein,** Philips Color Kinetics (USA); **Cornelius F. Hahlweg,** bbw Hochschule (Germany); **Richard C. Juergens,** Raytheon Missile Systems (USA); **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA); **Scott A. Lerner,** Carl Zeiss AG (USA); **Paul K. Manhart,** NASA Langley Research Ctr. (USA); **Joseph R. Mulley,** Melles Griot (USA); **Jorge Ojeda-Castaneda,** Univ. de Guanajuato (Mexico); **Craig Olson,** L-3 Communications (USA); **Kevin P. Rolland-Thompson,** Synopsys, Inc. (USA) and The Institute of Optics, Univ. of Rochester (USA); **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA); **David L. Shealy,** The Univ. of Alabama at Birmingham (USA); **Haiyin Sun,** ChemImage Corp. (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 1B . . . . . SUN 1:30 PM TO 3:10 PM

Phase Space and Telecentric Optics

Session Chair: **R. John Koshel,** College of Optical Sciences, The Univ. of Arizona (USA)

1:30 pm: **What does a wave-optically impossible light-ray field look like?**, Paul Stockman, Stephen Oxburgh, Univ. of Glasgow (United Kingdom); Tomas Tyc, Masaryk Univ. (Czech Republic); Johannes Courtial, Univ. of Glasgow (United Kingdom) . . . . . [9193-1]

1:50 pm: **Phase space imaging in optical design**, Denise Rausch, Alois Herkommer, Univ. Stuttgart (Germany) . . . . . [9193-2]

2:10 pm: **Monolithic all fiber optic Fourier transform aperture**, Jeffrey J. Perkins, Craig Richardson, Don Russell, Charles R. Schabacker, Fiberguide Industries, Inc. (USA) . . . . . [9193-3]

2:30 pm: **Windows into non-Euclidean spaces**, Stephen Oxburgh, Christopher D. White, Georgios Antoniou, Lena Mertens, Christopher Mullen, Jennifer Ramsay, Duncan McCall, Johannes Courtial, Univ. of Glasgow (United Kingdom) . . [9193-4]

2:50 pm: **Retrospectives and perspectives in telecentric imaging lens design**, Irina L. Livshits, Sergey Okishev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9193-5]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 1B . . . . . SUN 3:40 PM TO 5:30 PM

Computational Methods: Algorithms and Analysis

Session Chair: **G. Groot Gregory,** Synopsys, Inc. (USA)

3:40 pm: **Anamorphic stretch transform for analog and digital compression of big data** *(Invited Paper)*, Bahram Jalali, Mohamad Asghari, Univ. of California, Los Angeles (USA) . . . . . [9193-6]

4:10 pm: **Formal analysis of electromagnetic optics**, Sanaz Khan Afshar, Osman Hasan, Sofiène Tahar, Concordia Univ. (Canada) . . . . . [9193-7]

4:30 pm: **Digital image processing for wide-angle highly spatially-variant imagers**, Stephen J. Olivas, Nima Nikzad, Ashkan Arianpour, Igor Stamenov, Nojan Motamedi, Glenn Schuster, William M. Mellette, Joseph E. Ford, Univ. of California, San Diego (USA) . . . . . [9193-8]

4:50 pm: **Research on the feature extraction and pattern recognition of the distributed optical fiber sensing signal**, Bingjie Wang, Shaohua Pi, Fudan Univ. (China) . . . . . [9193-9]

5:10 pm: **The analysis and design of multiple phase plane for wavefront coding system**, Xiaohu Guo, Yuejin Zhao, Yijian Wu, Beijing Institute of Technology (China) . . . . . [9193-41]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 1B . . . MON 8:00 AM TO 10:10 AM

Computational Methods: Simulation

Session Chair: **Arthur J. Davis,** Reflexite Energy Solutions (USA)

8:00 am: **Stereo matching image processing by synthesized color and the characteristic area by the synthesized color**, Akira Akiyama, Kanazawa Technical College (Japan); Eiichiro Mutoh, The Society of Japanese Aerospace Companies (Japan); Hideo Kumagai, Tamagawa Seiki Co., Ltd. (Japan) . . . . . [9193-10]

8:20 am: **A combined simulation approach using ray-tracing and finite-difference time-domain for optical systems containing refractive and diffractive optical elements**, Christian Sommer, Claude Leiner, Susanne Schweitzer, Franz-Peter Wenzl, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Ulrich Hohennester, Karl-Franzens-Univ. Graz (Austria); Paul Hartmann, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) . . . . . [9193-11]

8:40 am: **Open-source fiber laser and amplifier design toolbox using custom FDTD simulation engine**, Luke K. Rumbaugh, Ming-Cheng Cheng, Clarkson Univ. (USA); Yifei Li, Univ. of Massachusetts Dartmouth (USA); William D. Jemison, Clarkson Univ. (USA) . . . . . [9193-12]

9:00 am: **LED source modeling and rayset generation from luminance maps** *(Invited Paper)*, Peter I. Goldstein, Philips Color Kinetics (USA) . . . . . [9193-13]

9:30 am: **Structural-thermal-optical-performance (STOP) model development and analysis of a field-widened Michelson interferometer**, Salvatore J. Scola, James Osmundsen, Luke Murchison, Warren Davis, Charles Boyer, Joshua Fody, Anthony Cook, NASA Langley Research Ctr. (USA); Shane Seaman, National Institute of Aerospace (USA); Chris Hostetler, NASA Langley Research Ctr. (USA); Ian Miller, LightMachinery Inc. (Canada); Wayne Welch, Adam Kosmer, Welch Mechanical Designs, LLC (USA) . . . . . [9193-14]

9:50 am: **The refractive lens light source heat absorption and thermal aberration analysis**, Ming-Ying Hsu, Instrument Technology Research Ctr. (Taiwan) . . . . . [9193-15]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

CONFERENCE 9193

LOCATION: CONV. CTR. ROOM 1B

SESSION 4

LOCATION: CONV. CTR. ROOM 1B . . .MON 10:40 AM TO 12:20 PM

Adaptive Optics

Session Chair: **Cornelius F. Hahlweg,** bbw Hochschule (Germany)

10:40 am: **Focus tunable mirrors made by ionic polymer-metal composite**, Chung-Min Li, Guo-Dung Su, National Taiwan Univ. (Taiwan) . . . . . [9193-16]

11:00 am: **Stability of the micromachined membrane deformable mirror as a freeform optical element**, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Oleg Soloviev, Vsevolod Patlan, Flexible Optical B.V. (Netherlands) . . . . . [9193-17]

11:20 am: **Compact fingerprint reader based on digital variable-focus liquid lens**, Gary C. Tsai, Lustrous Electro-Optics Co. Ltd. (Taiwan); Pei-Jen Wang, J. Andrew Yeh, National Tsing Hua Univ. (Taiwan) . . . . . [9193-18]

11:40 am: **Reliability of ionic polymer metallic composite for optomechanical applications**, Chungyi Yu, Guo-Dung Su, National Taiwan Univ. (Taiwan) [9193-19]

12:00 pm: **An adaptive achromatic doublet design by double variable focus lenses**, Lihui Wang, The Univ. of Tokyo (Japan); Hiromasa Oku, Gunma Univ. (Japan); Masatoshi Ishikawa, The Univ. of Tokyo (Japan) . . . . . [9193-20]

Lunch Break . . . . . .Mon 12:20 pm to 1:40 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 1B . . . . . MON 1:40 PM TO 2:10 PM

Optics and Sound

Session Chair: **Peter I. Goldstein,** Philips Color Kinetics (USA)

1:40 pm: **Chords and harmonies in mixed optical and acoustical stimuli** *(Invited Paper)*, Cornelius F. Hahlweg, bbw Hochschule (Germany); Cornelia Weyer, G&S Sicherheit für Betriebe GmbH (Germany); Joachim Dörfler, Ronny Fischer, bbw Hochschule (Germany) . . . . . [9193-21]

SESSION 6

LOCATION: CONV. CTR. ROOM 1B . . . . . MON 2:10 PM TO 3:30 PM

Instrumentation

Session Chair: **Peter I. Goldstein,** Philips Color Kinetics (USA)

2:10 pm: **Near-field imaging techniques for surface inspection**, Cornelius F. Hahlweg, bbw Hochschule (Germany); Lukas Pescoller, Peret GmbH (Italy) . . . . . [9193-22]

2:30 pm: **Improved methods for adjusting the UV content of measurement instrument illumination for the paper making industry**, Li Yang, Innventia AB (Sweden) . . . . . [9193-23]

2:50 pm: **Concurrent multi-view discrete spectral imaging device from the VIS to the NIR**, Farnoud Kazemzadeh, Shahid Haider, Alexander Wong, Christian Scharfenberger, David A. Clausi, Univ. of Waterloo (Canada) . . . . . [9193-24]

3:10 pm: **Zepto-mole detection in microfluidics by novel nonlinear multi-photon laser wave-mixing spectroscopy for biomedical and environmental applications**, Marcel M. Hetu, Manna F. Iwabuchi, Haoli Wu, Eric Maxwell, Sashary Ramos, William G. Tong, San Diego State Univ. (USA) . . . . . [9193-25]

Coffee Break . . . . . .Mon 3:30 pm to 4:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 1B . . . . MON 4:00 PM TO 6:00 PM

Cameras and Camera/Projector Systems

Session Chair: **G. Groot Gregory,** Synopsys, Inc. (USA)

4:00 pm: **Design and characterization of a copolymer radial gradient index zoom lens**, James A. Corsetti, Greg R. Schmidt, Duncan T. Moore, Univ. of Rochester (USA) . . . . . [9193-26]

4:20 pm: **Plenoptic camera image simulation for reconstruction algorithm verification**, Jim Schwiegerling, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9193-27]

4:40 pm: **Ultra-slim wafer-level camera with 720p resolution using micro-optics**, Andreas Brückner, Alexander Oberdörster, Jens Dunkel, Andreas Reimann, Frank C. Wippermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9193-28]

5:00 pm: **A hyperchromatic lens for recording time-resolved phenomena**, Daniel K. Frayer, Morris I. Kaufman, National Security Technologies, LLC (USA) . . . . . [9193-29]

5:20 pm: **Freeform mirror for illumination system of color-sequential LCOS pico projector**, Wei-Jei Peng, Chun-Chieh Chen, Chien-Yao Huang, Wei-Yao Hsu, Instrument Technology Research Ctr. (Taiwan) . . . . . [9193-30]

5:40 pm: **Image exposure suppressed optical system by spatial light modulator**, Jhe-Syuan Lin, Chao-Wen Liang, National Central Univ. (Taiwan) . . . . . [9193-31]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

WDM-PON network aimulation with different implementation of optical amplifier in the line, Jan Latal, Petr Koudelka, Petr Siska, Jan Vitasek, Vladimir Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . . . [9193-40]

A new method of grating fabrication by using auxiliary grating, Qingbo Wang, Zhengkun Liu, Huoyao Chen, Shaojun Fu, Univ. of Science and Technology of China (China) . . . . . [9193-42]

High-speed phosphor-LED wireless communication system utilizing no blue filter, Chien-Hung Yeh, Industrial Technology Research Institute (Taiwan); Chi-Wai Chow, Hsing-Yu Chen, Jyehong Chen, National Chiao Tung Univ. (Taiwan); Yen-Liang Liu, Industrial Technology Research Institute (Taiwan); Yu-Fu Wu, National Chiao Tung Univ. (Taiwan). . . . . [9193-44]

Coherent-light-based optomechanical door locking system, Saurabh S. Patil, Vanessa Rodrigues, Ajeetkumar Patil, Manipal Univ. (India). . . . . [9193-45]

Modeling large deflection of circular membranes for applications in active optical elements, Pavel Novak, Jiri Novak, Antonin Miks, Czech Technical Univ. in Prague (Czech Republic). . . . . [9193-46]

Radiation-tolerant camera system to provide inspections inside nuclear power plant reactors, Nadezhda K. Maltseva, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Natalya P. Kryazheva, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and ZAO "Diakont" (Russian Federation) . . . . . [9193-47]

Transformation optics with windows, Stephen Oxburgh, Christopher D. White, Georgios Antoniou, Ejovbokoghene Orife, Johannes Courtial, Univ. of Glasgow (United Kingdom). . . . . [9193-48]

Non-absorbing metamaterial film with dispersion of effective refractive index, Alexey S. Kadochkin, Ulyanovsk State Univ. (Russian Federation); Alexander S. Shalin, Institute of Radio Engineering and Electronics (Russian Federation) and Ulyanovsk State Univ. (Russian Federation) . . . . . [9193-49]

A pair of diopter-adjustable eyeglasses for presbyopia correction, Lihui Wang, Alvaro Cassinelli, The Univ. of Tokyo (Japan); Hiromasa Oku, Gunma Univ. (Japan); Masatoshi Ishikawa, The Univ. of Tokyo (Japan) . . . . . [9193-50]

Fabrication of wide-infrared spectral disperser of ZnS, Keigo Enya, Japan Aerospace Exploration Agency (Japan); Ikeda Yuji, Naofumi Fujishiro, Kyoto Sangyo Univ. (Japan) . . . . . [9193-51]

Quality improvement of transmission images for transparent displays with micro-lens array, Ting-Wei Huang, Wei-De Jeng, National Chiao Tung Univ. (Taiwan); Yuan Ouyang, Chang Gung Univ. (Taiwan); Yu-Hsiang Tsai, Kuo-Chang Lee, Mang Ou-Yang, National Chiao Tung Univ. (Taiwan) . . . . . [9193-52]

Simulation of integrated optical network (IPON) properties, Petr Siska, Petr Koudelka, Jan Latal, Stanislav Kepak, Vladimír Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . . . [9193-53]

Lorentz-transformation windows, Stephen Oxburgh, Norman Gray, Martin Hendry, Johannes Courtial, Univ. of Glasgow (United Kingdom) . . . . . [9193-54]

Accuracy of time interval measurements by digital photochronographic system, Vitaly Turkin, Vasiliy Andrianov, Viktor Kuzin, Oleg Dulin, All-Russia Research Institute of Automatics (Russian Federation) . . . . . [9193-55]

Speckle reduction in projection display by controlling the spatial coherence of laser source, Zhe Cui, Anting Wang, Zi Wang, Chun Gu, Shu-Lu Wang, Hai Ming, Univ. of Science and Technology of China (China) . . . . . [9193-56]

LOCATION: MARRIOTT MARQUIS, MARINA F . . . . . MON 8:00 TO 10:00 PM

Illumination Technical Event

Chair: **Jake Jacobsen**, Synopsys, Inc. (USA)

Please join us for an evening of stimulating discussion.

Since we last discussed this topic five years ago, solar energy production in the US has seen substantial growth. What is the state of solar technology and what is coming down the road? Join us for evening of discussion of the current state of solar energy production and a look into the future. At the end of the planned event, time permitting, any member of the audience may present information within the broad field of illumination. Light refreshments will be served.

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS

TUESDAY 19 AUGUST

SESSION 8

LOCATION: CONV. CTR. ROOM 1B . . . . TUE 8:20 AM TO 10:00 AM

Laser Systems

Session Chair: **Arthur J. Davis,** Reflexite Energy Solutions (USA)

8:20 am: **Unidirectional emission from whispering gallery modes via transformation optics**, Yushin Kim, KAIST (Korea, Republic of); Soo-Young Lee, Kyungpook National Univ. (Korea, Republic of); Jung-Wan Ryu, Pusan National Univ. (Korea, Republic of); Inbo Kim, Jae-Hyung Han, Heung-Sik Tae, Muhan Choi, Kyungpook National Univ. (Korea, Republic of); Bumki Min, KAIST (Korea, Republic of) . . . . . [9193-32]

8:40 am: **Reduced group delay dispersion in quantum dot passively mode-locked lasers operating at elevated temperature**, Jesse K. Mee, Air Force Research Lab. (USA); Ravi Raghunathan, David Murrell, Virginia Polytechnic Institute and State Univ. (USA); Alexandre Braga, The Univ. of Arizona (USA); Yan Li, APIC Corp. (USA); Luke F. Lester, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9193-33]

9:00 am: **Reaction bonded SiC material characteristics as related to its use in high-power laser systems**, Matthew Pitschman, Alan R. Hedges, Steve P. Rummel, Travis S. Miller, II-VI Infrared (USA) . . . . . [9193-34]

9:20 am: **The new design of final optics assembly on SG-III prototype facility**, Ping Li, China Academy of Engineering Physics (China) . . . . . [9193-35]

9:40 am: **The performance of the disk amplifier system in the integration test bed**, Lin Chen, LFRC (China) . . . . . [9193-36]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 9

LOCATION: CONV. CTR. ROOM 1B . . . . TUE 10:30 AM TO 11:30 AM

Optical Networks

Session Chair: **Joseph R. Mulley,** Melles Griot (USA)

10:30 am: **Impact of green technologies in optical networks case study: green wireless optical broadband access network**, William S. Puche, Univ. Pontificia Bolivariana (Colombia) and Politécnico Colombiano Jaime Isaza Cadavid (Colombia); Javier E. Sierra, Univ. Pontificia Bolivariana (Colombia) . . . . . [9193-37]

10:50 am: **Design of visible light communication system for maintaining uniform data rate**, Jiun-Yu Sung, Wan-Feng Lin, Yu-Fu Wu, Chi-Wai Chow, National Chiao Tung Univ. (Taiwan); Chien-Hung Yeh, Industrial Technology Research Institute (Taiwan) . . . . . [9193-38]

11:10 am: **Data transmission with OFDM technique using soliton carriers**, Kamaljit Singh Bhatia, Taranveer Kaur, Sri Guru Granth Sahib World Univ. (India) . . . . . [9193-39]

LOCATION: CONV. CTR. ROOM 6A . . TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

LOCATION: MARRIOTT MARQUIS, MARINA D . . . . . TUE 8:00 TO 10:00 PM

Lens Design Technical Event

Session Chair: **Rich Pfisterer**, Photon Engineering, LLC (USA)

"Let's Give 'Em Something to Talk About!"

Lens designers! Join us for our annual gathering to meet and discuss... lens design! Let's talk about what we're designing, how we're going about doing it (what materials, software, techniques, etc.), and which problems we're encountering. We'll also explore current technical and commercial trends in the marketplace. This year's invited speaker will be Josh Cobb from Corning. The title of his presentation is "Étendue and what you can Étendue with it." Illumination engineers use the étendue for numerous radiometry calculations and optical designers use the optical invariant as an aid to system design. This talk is intended to review the concepts and present a wide variety of examples that show tips, tricks, and back-of-the-envelope calculations that can put a different perspective on system design.

Cosponsored by: Photon ENGINEERING *Illuminating Ideas*

Light refreshments sponsored by:

The Optical Solutions Group at SYNOPSYS

CONFERENCE 9193

LOCATION: CONV. CTR. ROOM 1B

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E .....TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

LOCATION: MARRIOTT MARQUIS, MARINA F .....TUE 8:00 TO 10:00 PM

Optomechanical/Instrument Technical Group Event

Session Chair: **Alson E. Hatheway,** Alson E. Hatheway Inc. (USA)

This is the annual West Coast meeting of the premier group of optomechanical engineers who design and analyze the world's most advanced optical instruments and systems. The gathering is open to all attendees of SPIE Optics+Photonics.

This year's speaker will be Tony Hull, Adjunct Professor of Astronomy at the University of New Mexico. Before joining the University he was Director and Program Manager at L-3Com for the fabrication of the James Webb Space Telescope primary mirror suite. His subject will be: **Spaceborne Telescopes: Primary mirror material selection drives architecture decisions which define cost and complexity**.

Following Tony Hull's presentation, the floor will be open for other agenda items and our traditional 'Problems and Solutions Workshop' session. Be prepared to present some challenges to the Group. Anyone wishing to put an item on the agenda should contact the Chair, Al Hatheway, at aeh@aehinc.com.

CONFERENCE 9194

LOCATION: CONV. CTR. ROOM 1A

Sunday–Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9194

Laser Beam Shaping XV

Conference Chairs: **Andrew Forbes,** CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa); **Todd E. Lizotte,** Hitachi Via Mechanics (USA), Inc. (USA)

Program Committee: **Daniel M. Brown,** Optosensors Technology, Inc. (USA); **Fred M. Dickey,** FMD Consulting LLC (USA); **Angela Dudley,** CSIR National Laser Ctr. (South Africa); **Michael Duparré,** Friedrich-Schiller-Univ. Jena (Germany); **Julio Cesar Gutiérrez-Vega,** Tecnológico de Monterrey (Mexico); **Marc D. Himel,** JENOPTIK Optical Systems GmbH (Germany); **Alexander V. Laskin,** AdlOptica Optical Systems GmbH (Germany); **Alexis V. Kudryashov,** Active Optics Night N Ltd. (Russian Federation); **Carlos López-Mariscal,** U.S. Naval Research Lab. (USA); **David L. Shealy,** The Univ. of Alabama at Birmingham (USA); **Yakov G. Soskind,** DHPC Technologies (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 1A . . . . .SUN 1:30 PM TO 3:20 PM

Vector and Vortex Beams

Session Chair: **Andrew Forbes,** CSIR National Laser Ctr. (South Africa)

1:30 pm: **Vector beams** *(Invited Paper)*, Giovanni Milione, The City College of New York (USA) . . . . . [9194-1]

2:00 pm: **Cross-correlation measurements and the topological charge of a Laguerre-Gaussian beam**, Benjamin Perez-Garcia, Tecnológico de Monterrey (Mexico); Dorilian Lopez-Mago, ETH Zürich (Switzerland); Hipolito Garcia-Gracia, Jorge A. Garza, Raul I. Hernandez-Aranda, Julio C. Gutiérrez-Vega, Tecnológico de Monterrey (Mexico) . . . . . [9194-2]

2:20 pm: **Self-reconstruction of radial and azimuthal polarized Bessel beams**, Giovanni Milione, The City College of New York (USA) . . . . . [9194-3]

2:40 pm: **Generating non-diffracting electron Bessel beams by nanofabricated pure-phase holograms**, Ebrahim Karimi, Univ. of Ottawa (Canada); Vincenzo Grillo, Consiglio Nazionale delle Ricerche (Italy) . . . . . [9194-4]

3:00 pm: **Optical information transfer based on helico-conical laser beams**, Mona Mihailescu, Univ. Politehnica of Bucharest (Romania); Cristian Kusko, National Institute for Research and Development in Microtechnologies (Romania); Liliana Preda, Univ. Politehnica of Bucharest (Romania) . . . . . [9194-5]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 1A . . . . SUN 3:50 PM TO 5:20 PM

Single-Photon Beam Shaping

Session Chair: **Giovanni Milione,** The City College of New York (USA)

3:50 pm: **Generation and detection of Laguerre-Gauss modes using a phase-only spatial light modulator and an application to quantum computations** *(Invited Paper)*, Ebrahim Karimi, Univ. of Ottawa (Canada) . . . . . [9194-6]

4:20 pm: **Simulating spontaneous parametric down-conversion via the use of classical light**, Yingwen Zhang, Filippus S. Roux, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9194-7]

4:40 pm: **Entangled Bessel beams**, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9194-8]

5:00 pm: **Digital spiral imaging of single photons**, Thandeka I. Mhlanga, CSIR National Laser Ctr. (South Africa) . . . . . [9194-9]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 1A . . .MON 8:30 AM TO 10:10 AM

Methods

Session Chair: **Fred M. Dickey,** FMD Consulting LLC (USA)

8:30 am: **Detecting Bessel beams**, Abderrahmen Trichili, SUP'COM (Tunisia) and Univ of Carthage (Tunisia); Thandeka I. Mhlanga, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa); Mourad Zghal, Univ. of Carthage (Tunisia); Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa) . . . . . [9194-10]

8:50 am: **Wavefront sensing with all-digital Stokes measurements**, Angela Dudley, CSIR National Laser Ctr. (South Africa); Giovanni Milione, Robert R. Alfano, The City College of New York (USA); Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9194-11]

9:10 am: **Coherent radiation enhancement for laser beam shaping applications**, Michael Soskind, Rose Soskind, Rutgers, The State Univ. of New Jersey (USA); Yakov G. Soskind, DHPC Technologies (USA) . . . . . [9194-12]

9:30 am: **Optimal diffraction-limited focusing through static aberrations**, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vsevolod Patlan, Oleg Soloviev, Flexible Optical B.V. (Netherlands) . . . . . [9194-13]

9:50 am: **Fast hologram computation using GPU for optical tweezers**, Huarong Gu, Qiaofeng Tan, Tsinghua Univ. (China) . . . . . [9194-14]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 4

LOCATION: CONV. CTR. ROOM 1A . . MON 10:40 AM TO 12:10 PM

Applications

Session Chair: **Alexander V. Laskin,** AdlOptica Optical Systems GmbH (Germany)

10:40 am: **Laser beam shaping: adoption into industrial laser applications** *(Invited Paper)*, Todd E. Lizotte, Hitachi Via Mechanics (USA), Inc. (USA) . [9194-15]

11:10 am: **Characterization and application of bubbles during thermal blooming**, Ujitha A. Abeywickrema, Univ. of Dayton (USA); Neil T. Banerjee, Centerville High School (USA) . . . . . [9194-16]

11:30 am: **Obsidianus lapis cutting, ablating, melting parameter calculation using a pulsed re-doped fiber laser**, Alfredo I. Aguilar-Morales, Jose A. Alvarez-Chavez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Jesus S. Velazquez, Ctr. de Investigación en Ciencia Aplicada y Tecnología Avanzada (Mexico) . . . . . [9194-17]

11:50 am: **1 Tbps superchannel generated by optical flat comb source WDM-Nyquist and OFDM system simulative investigation**, Hraghi Abir, Mourad Menif, SUP'COM (Tunisia) . . . . . [9194-18]

Lunch Break . . . . . Mon 12:10 pm to 1:10 pm

CONFERENCE 9194
LOCATION: CONV. CTR. ROOM 1A

SESSION 5

LOCATION: CONV. CTR. ROOM 1A .... MON 1:10 PM TO 3:30 PM

Optical Design I

Session Chair: **Todd E. Lizotte,** Hitachi Via Mechanics (USA), Inc. (USA)

1:10 pm: **Dynamic beam shaping with freeform optics** *(Invited Paper)*, Thomas J. Suleski, Jason A. Shultz, Paul J. Smilie, The Univ. of North Carolina at Charlotte (USA) . . . . . [9194-19]

1:40 pm: **Laser beam transformations with anamorphic optics** *(Invited Paper)*, Yakov G. Soskind, DHPC Technologies (USA) . . . . . [9194-47]

2:10 pm: **The role of phase singularities in iterative beam shaping**, Carlos López-Mariscal, U.S. Naval Research Lab. (USA) . . . . . [9194-48]

2:30 pm: **Laser beam shaping with nanostructured lens**, Zhengtong Liu, Eng Huat Khoo, A*STAR Institute of High Performance Computing (Singapore); Andrew C. Y. Ngo, A*STAR Institute of Materials Research and Engineering (Singapore); Liying Hong, Rui Fen Wu, DSO National Labs. (Singapore); Jing Hua Teng, A*STAR Institute of Materials Research and Engineering (Singapore) . . . . . [9194-20]

2:50 pm: **Experimental characterization of variable output refractive beamshapers using freeform elements**, Jason A. Shultz, Paul J. Smilie, Brian S. Dutterer, Matthew A. Davies, Thomas J. Suleski, The Univ. of North Carolina at Charlotte (USA) . . . . . [9194-21]

3:10 pm: **Modelling of a circular polariser for high-power lasers**, Robert I. Heathcote, Rutherford Appleton Lab. (United Kingdom); Samuel Buck, James S. Green, Robert J. Clarke, Science and Technology Facilities Council (United Kingdom) . . . . . [9194-22]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 1A ... MON 4:00 PM TO 5:50 PM

Optical Design II

Session Chair: **Angela Dudley,** CSIR National Laser Ctr. (South Africa)

4:00 pm: **Multi-functional diffractive optical elements** *(Invited Paper)*, Anand Vijayakumar, Shanti Bhattacharya, Indian Institute of Technology Madras (India) . . . . . [9194-23]

4:30 pm: **Building achromatic refractive beam shapers**, Alexander V. Laskin, AdlOptica Optical Systems GmbH (Germany); David L. Shealy, The Univ. of Alabama at Birmingham (USA) . . . . . [9194-24]

4:50 pm: **Beam transformation: the universal tool for beam-quality manipulation**, Thomas Mitra, Udo Fornahl, Mikhail M. Ivanenko, Manfred Jarczynski, Anna Lisa Kleinschmidt, Jens Meinschien, Yuri V. Miklyaev, Alexei S. Mikhailov, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9194-25]

5:10 pm: **Designing refractive beam shapers via aberration theory**, Alexander V. Laskin, AdlOptica Optical Systems GmbH (Germany); David L. Shealy, The Univ. of Alabama at Birmingham (USA) . . . . . [9194-26]

5:30 pm: **Monolithical aspherical beam-expanding systems**, Ulrike Fuchs, asphericon GmbH (Germany) . . . . . [9194-27]

LOCATION: CONV. CTR. EXHIBIT HALL B1 .. MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Techniques to measure complex-plane fields, Angela Dudley, CSIR National Laser Ctr. (South Africa); Nombuso Majola, Naven Chetty, Univ. of KwaZulu-Natal (South Africa); Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . [9194-39]

Determination of the transverse size of an extended source using partially coherent vortices, Adad Yepiz Escalante, Benjamin Perez-Garcia, Raul I. Hernandez-Aranda, Tecnológico de Monterrey (Mexico); Grover A. Swartzlander Jr., Rochester Institute of Technology (USA) . . . . . [9194-40]

Focal shift of dual auto-focusing Airy beams, Jorge A. Garza, Photonics and Mathematical Optics Group (Mexico); Raul I Hernandez-Aranda, Tecnológico de Monterrey (Mexico) . . . . . [9194-41]

Non-uniformly correlated partially coherent beams and pulses, Toni Saastamoinen, Hanna Lajunen, Univ. of Eastern Finland (Finland). . . . . [9194-42]

Laguerre Gaussian beam multiplexing through turbulence, Abderrahmen Trichili, SUP'COM (Tunisia) and Univ. of Carthage (Tunisia); Thandeka I. Mhlanga, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa); Darryl Naidoo, Council for Scientific and Industrial Research (South Africa) and Stellenbosch Univ. (South Africa); Angela Dudley, CSIR National Laser Ctr. (South Africa); Mourad Zghal, Univ. of Carthage (Tunisia); Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa) and Stellenbosch Univ. (South Africa) . . . . . [9194-43]

Digital holograms for laser mode multiplexing, Thandeka I. Mhlanga, CSIR National Laser Ctr. (South Africa); Abderrahmen Trichilli, Univ. of Carthage (Tunisia) and Engineering School of Communication (Tunisia); Mourad Zghal, Univ. of Carthage (Tunisia); Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9194-44]

Symmetric and asymmetric bottle beam arrays, Maksym Ivanov, Natalia V. Shostka, Alexander V. Volyar, Taurida National V.I. Vernadsky Univ. (Ukraine) . . . . . [9194-45]

Optical vortex in microscopy imaging, Mateusz Michal Szatkowski, Jan Masajada, Agnieszka Popiolek-Masajada, Wroclaw Univ. of Technology (Poland) . . . . . [9194-46]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 1A .... TUE 8:10 AM TO 10:10 AM

Laser Beams and Resonators I

Session Chair: **Raul I. Hernandez-Aranda,** Tecnológico de Monterrey (Mexico)

8:10 am: **Propagation of optical vortices with fractional topological charges in free space**, Tamelia Ali, Liubov Kreminska, Andrii B. Golovin, David T. Crouse, The City College of New York (USA) . . . . . [9194-28]

8:30 am: **Compact optically-actuated high-power laser beam delivery system for industrial metal processing applications**, Ian A Baker, Nick Hay, HyeonSeok So, Young Key Kwon, Powerlase Photonics Ltd. (United Kingdom) . . . . . [9194-29]

8:50 am: **Modeling the effect of spatial filter plasma emission on high-intensity laser beam propagation**, Will Riedel, Eyal Feigenbaum, Charles D. Boley, Richard A. Sacks, Kathleen McCandless, Clay C. Widmayer, Steven T. Yang, Joseph T. Salmon, Kenneth S. Jancaitis, Kai N. LaFortune, Shamasundar N. Dixit, Charles D. Orth, Ronald K. House, Jean-Michel G. DiNicola, Michael J. Shaw, Brian J. MacGowan, Lawrence Livermore National Lab. (USA) . . . . . [9194-30]

9:10 am: **Direct synthesis of the laser beam with pre-determined intensity distribution by means of intracavity adaptive optics**, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vadim V. Kiyko, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and A. M. Prokhorov General Physics Institute (Russian Federation); Victor I. Kislov, Vladimir Kondratyev, Eugeniy Ofitserov, A. M. Prokhorov General Physics Institute (Russian Federation) . . . . . [9194-31]

9:30 am: **Three-dimensional self-similar fractal light in canonical resonators**, Steven W. Miller, Univ. of Glasgow (United Kingdom); John Nelson, Univ. Paris 7-Denis Diderot (France); Johannes Courtial, Univ. of Glasgow (United Kingdom) . . . . . [9194-32]

9:50 am: **Towards high-brightness lasers by intra-cavity mode control**, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9194-33]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 8

LOCATION: CONV. CTR. ROOM 1A . . TUE 10:40 AM TO 12:20 PM

Laser Beams and Resonators II

Session Chair: **Yakov G. Soskind,** DHPC Technologies (USA)

10:40 am: **High-power CW CO_2 laser-beam formation by means of adaptive optics**, Alexis V. Kudryashov, Alexander B. Alexandrov, Vadim Samarkin, Julia Sheldakova, Alexey Rukosuev, Moscow State Univ. of Mechanical Engineering (Russian Federation) and Active Optics Night N Ltd. (Russian Federation) [9194-34]

11:00 am: **Symmetrical output from corner-pumped TEM_{00} Nd:YAG laser operating in two stable regions**, Song Gao, China Academy of Engineering Physics (China) and Tsinghua Univ. (China); Mali Gong, Tsinghua Univ. (China); Xudong Xie, Ding Lei, Jun Tang, Qinghua Deng, China Academy of Engineering Physics (China) . . . . . [9194-35]

11:20 am: **Hysteresis loop and pattern from the dual-wavelength competition in an Nd:YVO_4 laser with an intracavity periodically-poled lithium niobate Bragg modulator**, Kun-Guei Hong, National Cheng Kung Univ. (Taiwan); Shou-Tai Lin, Feng Chia Univ. (Taiwan); Ming-Dar Wei, National Cheng Kung Univ. (Taiwan) . . . . . [9194-36]

11:40 am: **Coherent combining of four slab laser amplifiers with high beam quality**, Hong Yan, Yidong Ye, Fei Tian, Guohui Li, Xundong Pan, Wei Zhang, China Academy of Engineering Physics (China); Qingsong Gao, Institute of Applied Electronics (China); Tang Jian Zhou, Yuan Liao, Li Chen, Fei Lu, Jia Luo, China Academy of Engineering Physics (China) . . . . . [9194-37]

12:00 pm: **Generation and transformation of azimuthally and radially polarization in a typically three-element Nd:$GdVO_4$ laser**, Ken-Chia Chang, Ming-Dar Wei, National Cheng Kung Univ. (Taiwan). . . . . [9194-38]

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E . . . . . .TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

CONFERENCE 9195

LOCATION: CONV. CTR. ROOM 5B

Sunday–Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9195

Optical System Alignment, Tolerancing, and Verification VIII

Conference Chairs: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA); **Richard N. Youngworth,** Riyo LLC (USA)

Program Committee: **Matthew B. Dubin,** College of Optical Sciences, The Univ. of Arizona (USA); **Jonathan D. Ellis,** Univ. of Rochester (USA); **Sen Han,** Univ. of Shanghai for Science and Technology (China); **Marco Hanft,** Carl Zeiss AG (Germany); **Chao-Wen Liang,** National Central Univ. (Taiwan); **Norbert Lindlein,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Robert M. Malone,** National Security Technologies, LLC (USA); **Raymond G. Ohl IV,** NASA Goddard Space Flight Ctr. (USA); **Robert E. Parks,** Optical Perspectives Group, LLC (USA); **Martha Rosete-Aguilar,** Univ. Nacional Autónoma de México (Mexico); **Daniel G. Smith,** Nikon Research Corp. of America (USA); **Peng Su,** College of Optical Sciences, The Univ. of Arizona (USA); **Yana Z. Williams,** Atlas Material Testing Technology (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 5B . . .SUN 9:00 AM TO 10:20 AM

Optical Design and Tolerance Analysis I

Session Chair: **Peng Su,** College of Optical Sciences, The Univ. of Arizona (USA)

9:00 am: **Modeling tip-tilt types of errors in optical tolerance analysis**, Richard N. Youngworth, Riyo-LLC (USA); Eric Herman, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9195-1]

9:20 am: **Photonic Doppler velocimetry probe designed with stereo imaging**, Robert M. Malone, Brian M. Cata, Thomas H. Conwell, Edward P. Daykin, David L. Esquibel, Brent C. Frogget, National Security Technologies, LLC (USA); David B. Holtkamp, Los Alamos National Lab. (USA); Morris I. Kaufman, Kevin D. McGillivray, National Security Technologies, LLC (USA); Peter D. Pazuchanics, Los Alamos National Lab. (USA); Vincent T. Romero, National Security Technologies, LLC (USA); Danny S. Sorenson, Los Alamos National Lab. (USA) . . . . . [9195-2]

9:40 am: **Optical design and tolerancing of an ophthalmological system**, Ingo Sieber, Thomas Martin, Karlsruher Institut für Technologie (Germany); Allen Yi, Likai Li, The Ohio State Univ. (USA); Olaf Ruebenach, INGENERIC GmbH (Germany) . . . . . [9195-3]

10:00 am: **Study on decentration-induced optical aberrations in an optical system using Shack Hartmann wavefront sensor**, Venkataramana Kalikivayi, Indian Institute of Technology Madras (India) and Elite School of Optometry (India) and SASTRA Univ. (India); Krishna Kumar R., Elite School of Optometry (India); Kannan K., SASTRA Univ. (India); A. R. Ganesan, Indian Institute of Technology Madras (India) . . . . . [9195-4]

Coffee Break . . . . . Sun 10:20 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 5B . . SUN 10:50 AM TO 12:30 PM

Optical Design and Tolerance Analysis II

Session Chair: **Robert M. Malone,** National Security Technologies, LLC (USA)

10:50 am: **Tolerancing sub-aperture regions of optical surfaces using circular and elliptical Zernike polynomials**, Chih-Yu Huang, College of Optical Sciences, The Univ. of Arizona (USA); Richard N. Youngworth, Riyo-LLC (USA); Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA). . . . . [9195-5]

11:10 am: **Statistical distributions from lens manufacturing data** *(Invited Paper)*, Morris I. Kaufman, National Security Technologies, LLC (USA); Brandon B. Light, Optimax Systems, Inc. (USA); Robert M. Malone, National Security Technologies, LLC (USA); **Michael K. Gregory,** Optimax Systems, Inc. (USA) . . . . . [9195-6]

11:40 am: **Tolerances in panoramic lenses** *(Invited Paper)*, Simon Thibault, Xavier Dallaire, Univ. Laval (Canada) . . . . . [9195-7]

12:10 pm: **Designing null screens type sub-structured Ronchi to test a fast plano-convex aspheric lens**, Diana N. Castán Ricaño, Maximino M. Avendaño-Alejo, Univ. Nacional Autónoma de México (Mexico) . . . . . [9195-8]

Lunch Break . . . . . Sun 12:30 pm to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 5B . . . . .SUN 1:50 PM TO 3:20 PM

Verification for Optical Systems

Session Chair: **Robert E. Parks,** Optical Perspectives Group, LLC (USA)

1:50 pm: **Analysis methodology for a piezoelectric-driven optical tracker for ground-based interferometry**, James H. Clark III, U.S. Naval Research Lab. (USA); F. Ernesto Penado, Northern Arizona Univ. (USA) . . . . . [9195-9]

2:10 pm: **Imagery analysis and the need for standards** *(Invited Paper)*, Barbara G. Grant, Lines and Lights Technology (USA). . . . . [9195-10]

2:40 pm: **Verification of a large off-axis mirror and tip-tilt controllers**, Young-Soo Kim, Ju Heon Koh, Hwa Kyoung Jung, Ho June Jung, Jihun Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); Myung K. Cho, National Optical Astronomy Observatory (USA); Ho-Soon Yang, Joohyung Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Ho-Sang Kim, Kyoung-Don Lee, Institute for Advanced Engineering (Korea, Republic of); Hyo-Sung Ahn, Gwangju Institute of Science and Technology (Korea, Republic of); Won Hyun Park, Dae Wook Kim, Peng Su, The Univ. of Arizona (USA); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9195-11]

3:00 pm: **Modeling and simulation of fast-axis collimator lens alignment for high-power diode laser bar**, Jun Lei, Institute of Applied Electronics (China) . . . . . [9195-12]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 5B . . . . SUN 3:50 PM TO 5:30 PM

Metrology in Alignment, Tolerancing, and Verification

Session Chair: **José Sasián,** College of Optical Sciences, The Univ. of Arizona (USA)

3:50 pm: **Issues with measuring tilt and decenter of small molded aspheric lenses**, Robert E. Parks, Optical Perspectives Group, LLC (USA); William P. Kuhn, Opt-E (USA). . . . . [9195-13]

4:10 pm: **Evaluating non-null optical systems with deflectometry**, Weirui Zhao, Beijing Institute of Technology (China); Run Huang, Peng Su, James H. Burge, The Univ. of Arizona (USA) . . . . . [9195-14]

4:30 pm: **Ambient optomechanical alignment and pupil metrology for the flight instruments aboard the James Webb Space Telescope**, Phillip Coulter, Jeffery S. Gum, Theodore J. Hadjimichael, Jason E. Hylan, Timothy J. Madison, Raymond G. Ohl, Jerrod Young, NASA Goddard Space Flight Ctr. (United States); Joseph E. Hayden, Sigma Space Corp. (United States); Patrick K. Williams, SGT, Inc. (United States); Kyle F. McLean, Gregory W. Wenzel, Joseph C. McMann, Kevin W. Redman, QinetiQ North America (United States); Maurice Te Plate, European Space Agency (France); Susann Hummel, Markus Melf, Andreas Rödel, EADS Astrium (Germany); Michael Maszkiewicz, Canadian Space Agency (Canada); Alexander Beaton, COM DEV Canada (Canada); Paul F. Schweiger, Lockheed Martin Space Systems Co. (United States); Martyn Wells, David Lee, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [9195-15]

4:50 pm: **Integration, alignment, and verification of optical system assembly for FORMOSAT-5**, Ching-Wei Chen, Po-Hsuan Huang, Chia-Ray Chen, National Space Organization (Taiwan); Chia-Yen Chan, Chun-Chieh Lien, Po-Han Huang, Ming-Ying Hsu, Shenq-Tsong Chang, Ting-Ming Huang, Instrument Technology Research Ctr. (Taiwan) . . . . . [9195-16]

5:10 pm: **Aberration analysis and calculation in system of focused Gaussian beam illuminates lenslet array**, Zhu Zhao, Mei Hui, Beijing Institute of Technology (China); Ping Zhou, Tianquan Su, The Univ. of Arizona (USA); Yuejin Zhao, Di Chen, Yun Feng, Manjin Liu, Beijing Institute of Technology (China) . . . . . [9195-17]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Estimation of optical misalignment using artificial neural networks, Lucimara C. N. Scaduto, Opto Eletrônica S.A. (Brazil) and Univ. de São Paulo (Brazil); Mario A. Stefani, Opto Eletrônica S.A. (Brazil); Jarbas C. Castro Neto, Opto Eletrônica S.A. (Brazil) and Univ. de São Paulo (Brazil) . . . . . [9195-18]

Analysis of a spaceborne mirror on a main plate with isostatic mounts, Chia-Yen Chan, Chun-Chieh Lien, Po-Hsuan Huang, Shenq-Tsong Chang, Ting-Ming Huang, Instrument Technology Research Ctr. (Taiwan) . . . . . [9195-19]

Dynamic mesh-based analysis of irradiance characteristics of solar simulator, Qinglong Meng, Yanpeng Li, Yaxiu Gu, Chang'an Univ. (China) . . . . . [9195-20]

Analysis of target wavefront error for secondary mirror of a spaceborne telescope, Shenq-Tsong Chang, Wei-Cheng Lin, Ching-Hsiang Kuo, Chia-Yen Chan, Yu-Chuan Lin, Ting-Ming Huang, Instrument Technology Research Ctr. (Taiwan) . . . . . [9195-21]

Broadband tunability of femtosecond optical parametric oscillator based on periodically-poled lithium niobate, Tae Young Jeong, Ki-Ju Yee, Chungnam National Univ. (Korea, Republic of) . . . . . [9195-22]

Gravity effect for the primary mirror assembly of space-borne telescope, Wei-Cheng Lin, Shenq-Tsong Chang, Yu-Chuan Lin, Ming-Ying Hsu, Instrument Technology Research Ctr. (Taiwan) . . . . . [9195-23]

Dynamic compensation for the lithographic object lens, Hongwei Zhu, Tingwen Xing, Institute of Optics and Electronics (China); Zexiang Chen, Univ. of Electronic Science and Technology of China (China) . . . . . [9195-24]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E . . . . . .TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

LOCATION: MARRIOTT MARQUIS, MARINA F . . . . . TUE 8:00 TO 10:00 PM

Optomechanical/Instrument Technical Group Event

Session Chair: **Alson E. Hatheway,** Alson E. Hatheway Inc. (USA)

This is the annual West Coast meeting of the premier group of optomechanical engineers who design and analyze the world's most advanced optical instruments and systems. The gathering is open to all attendees of SPIE Optics+Photonics.

This year's speaker will be Tony Hull, Adjunct Professor of Astronomy at the University of New Mexico. Before joining the University he was Director and Program Manager at L-3Com for the fabrication of the James Webb Space Telescope primary mirror suite. His subject will be: **Spaceborne Telescopes: Primary mirror material selection drives architecture decisions which define cost and complexity**.

Following Tony Hull's presentation, the floor will be open for other agenda items and our traditional 'Problems and Solutions Workshop' session. Be prepared to present some challenges to the Group. Anyone wishing to put an item on the agenda should contact the Chair, Al Hatheway, at aeh@aehinc.com.

CONFERENCE 9196

LOCATION: CONV. CTR. ROOM 33B

Monday–Tuesday 18–19 August 2014 • Proceedings of SPIE Vol. 9196

Systems Contamination: Prediction, Control, and Performance

Conference Chairs: **Nancy Carosso,** NASA Goddard Space Flight Ctr. (USA); **Joanne Egges,** Ball Aerospace & Technologies Corp. (USA)

Program Committee: **Nithin S. Abraham,** NASA Goddard Space Flight Ctr. (USA); **David P. Taylor,** The Aerospace Corp. (USA); **Eve M. Wooldridge,** NASA Goddard Space Flight Ctr. (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33B . MON 9:00 AM TO 10:00 AM

Contamination Control Methods I

Session Chair: **Eve M. Wooldridge,** NASA Goddard Space Flight Ctr. (USA)

9:00 am: **Standards activity for contamination control at ASTM and IEST**, Jack T. Sanders, ATK Space Systems (USA) . . . . . [9196-1]

9:20 am: **Surfaces that shed dust: unraveling the mechanisms**, Genevieve Devaud, Christina Haley, Christina Rockwell, Alex Fischer, Ball Aerospace & Technologies Corp. (USA) . . . . . [9196-3]

9:40 am: **Analysis of particulates on tapelift samples**, De-Ling Liu, Robert M. Moision, John A. Chaney, Chris J. Panetta, The Aerospace Corp. (USA) . . [9196-4]

Coffee Break . . . . . Mon 10:00 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 33B . MON 10:50 AM TO 11:50 AM

Contamination Control Methods II

Session Chair: **Matthew Macias,** Northrop Grumman Aerospace Systems (USA)

10:50 am: **Experimental measurement of the reflection behavior of contaminant molecules**, Susumu Baba, Eiji Miyazaki, Yuka Miura, Junichiro Ishizawa, Yugo Kimoto, Takashi Tamura, Japan Aerospace Exploration Agency (Japan) . . . . . [9196-5]

11:10 am: **Diffusion of water into purged volumes**, Lubos Brieda, Particle In Cell Consulting, LLC (USA); Gregory Bennett, ASRC Federal Space and Defense (USA) . . . . . [9196-6]

11:30 am: **Identification of collected volatile condensable material from ASTM E595 of silicone damper fluid**, Myriam P. Easton, The Aerospace Corp. (USA); Aura C Labatete-Goeppinger, The Aerospace Corporation (USA) and The Aerospace Corp. (USA); Jesse D Fowler, De-Ling Liu, The Aerospace Corporation (USA) . . . . . [9196-7]

Lunch Break . . . . . Mon 11:50 am to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33B . . . MON 1:30 PM TO 2:50 PM

Contamination Analytical Methods I

Session Chair: **David P. Taylor,** The Aerospace Corp. (USA)

1:30 pm: **Molecular transport modeling for spaceborne instrument contamination prediction**, Chung M. Wong, Robert M. Moision, Jesse D. Fowler, De-Ling Liu, The Aerospace Corp. (USA) . . . . . [9196-8]

1:50 pm: **Analysis of molecular conductance through a labyrinth vent**, Lubos Brieda, Particle In Cell Consulting, LLC (USA); Tim Gordon, SGT, Inc. (USA)[9196-9]

2:10 pm: **Evaluating the bakeout effectiveness of RTV-S691 silicone adhesive by measuring outgassing rate**, Eiji Miyazaki, Susumu Baba, Yuka Miura, Junichiro Ishizawa, Yugo Kimoto, Takashi Tamura, Japan Aerospace Exploration Agency (Japan) . . . . . [9196-10]

2:30 pm: **Quantitative model of the effects of contamination and space environment on in-flight aging of thermal coatings**, Emilie Vanhove, Jean-François Roussel, ONERA (France); Stéphanie Remaury, Delphine Faye, Pascale Guigue, Ctr. National d'Études Spatiales (France) . . . . . [9196-11]

Coffee Break . . . . . Mon 2:50 pm to 3:20 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 33B . . MON 3:20 PM TO 4:00 PM

Contamination Analytical Methods II

Session Chair: **Jonathan P. Elders,** Raytheon Space & Airborne Systems (USA)

3:20 pm: **Towards high-fidelity simulations of multiple thruster plumes for contamination prediction**, Hiroumi Tani, Japan Aerospace Exploration Agency (Japan); Tetsufumi Ohmaru, Ryoyu Systems Co., Ltd. (Japan); Naoki Isobe, Takao Nakagawa, Japan Aerospace Exploration Agency (Japan) . . . . . [9196-12]

3:40 pm: **Ozone Mapper Profiler Suite: Using mission performance data to refine predictive contamination modeling**, Genevieve Devaud, Ball Aerospace & Technologies Corp. (USA); Glen Jaross, NASA Goddard Space Flight Ctr. (USA) . . . . . [9196-13]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 33B . . TUE 8:30 AM TO 10:30 AM

Coatings and Molecular Contamination

Session Chair: **Nithin S. Abraham,** NASA Goddard Space Flight Ctr. (USA)

8:30 am: **Spacecraft materials HCl susceptibility assessments**, Chung-Tse Chu, De-Ling Liu, Hyun I. Kim, Diana R. Alaan, The Aerospace Corp. (USA) . . . [9196-16]

8:50 am: **Black molecular adsorber coatings for spaceflight applications**, Nithin S. Abraham, Mark M. Hasegawa, Sharon A. Straka, NASA Goddard Space Flight Ctr. (USA) . . . . . [9196-17]

9:10 am: **Optical characterization of photofixed RTV effluent in an atomic oxygen atmosphere**, Natale J. Ianno, Jinya Pu, Univ. of Nebraska-Lincoln (USA) . . . . . [9196-18]

9:30 am: **Optical and re-emission behavior of silicone contaminants effected by UV irradiation with different wavelength ranges**, Yuka Miura, Susumu Baba, Riyo Yamanaka, Eiji Miyazaki, Junichiro Ishizawa, Yugo Kimoto, Takashi Tamura, Japan Aerospace Exploration Agency (Japan) . . . . . [9196-19]

9:50 am: **Effects of Ni diffusion on gold plated mirrors**, David P. Taylor, Chung-Tse Chu, The Aerospace Corp. (USA) . . . . . [9196-20]

10:10 am: **Investigation of laser induced damage performance of optical coatings in vacuum environment**, Meiping Zhu, Kui Yi, Shanghai Institute of Optics and Fine Mechanics (China); Xiulan Ling, North Univ. of China (China); Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China) . . [9196-21]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 6

LOCATION: CONV. CTR. ROOM 33B . . TUE 11:00 AM TO 11:40 AM

Project Contamination

Session Chair: **Joanne Egges,** Ball Aerospace & Technologies Corp. (USA)

11:00 am: **Contamination control requirements implementation for the James Webb Space Telescope (JWST), part 1: optics, instruments and thermal vacuum testing**, Eve M. Wooldridge, NASA Goddard Space Flight Ctr. (USA); Kelly Henderson-Nelson, Michael S. Woronowicz, Kevin Novo-Gradac, Radford L. Perry III, SGT, Inc. (USA); Matthew Macias, Northrop Grumman Aerospace Systems (USA); Joanne Egges, Ball Aerospace & Technologies Corp. (USA). . . . . [9196-22]

11:20 am: **Contamination control requirements implementation for the James Webb Space Telescope (JWST), part 2: spacecraft, sunshield, observatory, and launch**, Eve M. Wooldridge, Nithin S. Abraham, NASA Goddard Space Flight Ctr. (USA); Kelly Henderson-Nelson, Michael S. Woronowicz, SGT, Inc. (USA); Matthew Macias, Northrop Grumman Aerospace Systems (USA); Olivier Schmeitzky, Peter Rumler, European Space Research and Technology Ctr. (Netherlands); Jacques Breton, Beatriz Romero, Bruno Erin, Arianespace (France) . . . . . [9196-23]

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

PANEL DISCUSSION

LOCATION: MARRIOTT MARQUIS, MARINA E . . . . . TUE 8:00 TO 10:00 PM

Panel Discussion on the Care and Cleaning of Optics

Moderator: **Robert Schalck,** Consultant (USA)

Panelists: **James Hamilton**, Photonic Cleaning Technologies (USA); **Robert Sherman**, Applied Surface Technologies (USA); **Ray Williamson**, Consultant (USA)

There are many ways to clean optics; some are learned from experience and/or failure. How to clean optics has always been a challenging and controversial subject. Searching the Internet will yield hundreds of articles and videos that claim to know the best methods. The session will also cover the proper handling, storage and shipping of optics.

CONFERENCE 9197

LOCATION: CONV. CTR. ROOM 6E

Monday 18 August 2014 • Proceedings of SPIE Vol. 9197

An Optical Believe It or Not: Key Lessons Learned III

Conference Chair: **Mark A. Kahan,** Synopsys, Inc. (USA)

Program Committee: **George Z. Angeli,** LSST Corp. (USA); **Paul Atcheson,** Ball Aerospace & Technologies Corp. (USA); **Steven J. Battel,** Battel Engineering, Inc. (USA); **Robert P. Breault,** Breault Research Organization, Inc. (USA); **James T. Carnevale,** Raytheon Co. (USA); **William J. Cassarly,** Synopsys, Inc. (USA); **Daniel R. Coulter,** Jet Propulsion Lab. (USA); **Charles D. Cox,** UTC Aerospace Systems (USA); **Marc T. Daigle,** Optical Alchemy Inc. (USA); **Alan E. DeCew Jr.,** MIT Lincoln Lab. (USA); **Ronald G. Driggers,** U.S. Naval Research Lab. (USA); **Mark A. Ealey,** Univ. of Kansas (USA); **David F. Everett,** NASA Goddard Space Flight Ctr. (USA); **James L. Fanson,** Jet Propulsion Lab. (USA); **G. Groot Gregory,** Synopsys, Inc. (USA); **Alson E. Hatheway,** Alson E. Hatheway Inc. (USA); **Joseph B. Houston Jr.,** Houston Research Associates (USA); **Tony Hull,** The Univ. of New Mexico (USA); **Gary W. Matthews,** Exelis Inc. (USA); **Duncan T. Moore,** Univ. of Rochester (USA); **Harold Schall,** The Boeing Co. (USA); **Robert R. Shannon,** College of Optical Sciences, The Univ. of Arizona (USA); **Michael J.. Sholl,** Univ. of California, Berkeley (USA); **H. Philip Stahl,** NASA Marshall Space Flight Ctr. (USA); **David A. Thomas,** Univ. of Kansas (USA); **Linda C. Usher,** Executive Search Group (USA); **James C. Wyant,** College of Optical Sciences, The Univ. of Arizona (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6E . . MON 8:30 AM TO 10:20 AM

Lessons Learned over Decades

Session Chair: **Mark A. Kahan,** Synopsys, Inc. (USA)

8:30 am: **Two to the sixth and counting: a lifetime of optical experiences in five parts** *(Keynote Presentation)*, James W. Mayo III, Tau Technologies LLC (USA) . . . . . [9197-1]

9:50 am: **Timing is the elusive connector of dreams** *(Invited Paper)*, Joe J. Lones, Adroit Engineering, Inc. (USA); Lance Lones, eHoncho Ltd. (USA) . . . . . [9197-2]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 6E . .MON 10:50 AM TO 12:20 PM

Lessons Learned from New Adventures

Session Chair: **Mark A. Kahan,** Synopsys, Inc. (USA)

10:50 am: **Perspective on new technology product introduction** *(Invited Paper)*, Douglas A. Kirkpatrick, InnerProduct Partners (USA) . . . . . [9197-3]

11:20 am: **Bumps in the road** *(Invited Paper)*, James B. Breckinridge, Breckinridge Associates, LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA) and California Institute of Technology (USA) . . . . . [9197-4]

11:40 am: **Lessons learned from starting Rochester Precision Optics** *(Invited Paper)*, William P. Hurley, Rochester Precision Optics, LLC (USA) . . . . . [9197-5]

12:00 pm: **Use it or lose it: a survey of winning and losing in new optical product development**, Alson E. Hatheway, Alson E. Hatheway Inc. (USA) [9197-6]

Lunch Break . . . . . .Mon 12:20 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 6E . . . . MON 1:30 PM TO 2:30 PM

Lessons Learned from Close Calls, Human Fallibility, and Project Management

Session Chair: **Mark A. Kahan,** Synopsys, Inc. (USA)

1:30 pm: **Learning from near-misses to avoid future catastrophes** *(Invited Paper)*, Robin L. Dillon-Merrill, Georgetown Univ. (USA) . . . . . [9197-7]

1:50 pm: **Managing human fallibility in critical aerospace situations** *(Invited Paper)*, Larry Tew, Ctr. for Error Management (USA) . . . . . [9197-8]

2:10 pm: **Sound bites: A discussion on lessons learned from the integration of space sensors**, Catherine D. Merrill, The Univ. of Arizona (USA) . . . . . [9197-9]

SESSION 4

LOCATION: CONV. CTR. ROOM 6E . . . .MON 2:30 PM TO 5:20 PM

Lessons Learned from Optics, Opto-Mechanics, and Thermo-Optics

Session Chair: **Mark A. Kahan,** Synopsys, Inc. (USA)

2:30 pm: **That can't possibly be right!: Lessons learned in software modeling**, Richard N. Pfisterer, Photon Engineering LLC (USA) . . . . . [9197-10]

2:50 pm: **History of the formerly top secret KH-9 Hexagon spy satellite**, Phil Pressel, Quartus Engineering Inc. (USA) . . . . . [9197-11]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

3:40 pm: **A smart rock** *(Invited Paper)*, Phil Pressel, Quartus Engineering Inc. (USA) . . . . . [9197-12]

3:50 pm: **See evil, hear evil** *(Invited Paper)*, Phil Pressel, Quartus Engineering Inc. (USA) . . . . . [9197-13]

4:00 pm: **Stress failure vignettes: errors of 10,000, the help of Humpty-Dumpty, and others**, John W. Pepi, L-3 Communications IOS-SSG (USA) . . . . . [9197-14]

4:20 pm: **How to break a lens**, Alan E. DeCew Jr., MIT Lincoln Lab. (USA)[9197-15]

4:40 pm: **Lessons learned in athermal lens design: you can't always get what you want**, John Polizotti, BAE Systems (USA) . . . . . [9197-16]

5:00 pm: **Lessons learned: Design, start-up, and operation of cryogenic systems**, William M. Bell, Topsfield Engineering Service, Inc. (USA) . . . . . [9197-17]

CONFERENCE 9198

LOCATION: CONV. CTR. ROOM 18

Sunday–Monday 17–18 August 2014 • Proceedings of SPIE Vol. 9198

Ultrafast Nonlinear Imaging and Spectroscopy II

Conference Chair: **Zhiwen Liu,** The Pennsylvania State Univ. (USA)

Conference Co-Chairs: **Iam Choon Khoo,** The Pennsylvania State Univ. (USA); **Demetri Psaltis,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Program Committee: **George Barbastathis,** Massachusetts Institute of Technology (USA); **Randy A. Bartels,** Colorado State Univ. (USA); **Martin Centurion,** Univ. of Nebraska-Lincoln (USA); **Yujie J. Ding,** Lehigh Univ. (USA); **Jason M. Eichenholz,** Open Photonics, Inc. (USA); **Hans D. Hallen,** North Carolina State Univ. (USA); **Zhenyu Li,** The George Washington Univ. (USA); **Fiorenzo Gabriele Omenetto,** Tufts Univ. (USA); **Kebin Shi,** Peking Univ. (China); **Yong Xu,** Virginia Polytechnic Institute and State Univ. (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 18 . . . . SUN 8:00 AM TO 9:00 AM

Biological Imaging and Sensing Applications

Session Chair: **Kebin Shi,** Peking Univ. (China)

8:00 am: **Morpho-chemistry and functionality of diseased biological tissues**, Marta Lange, Riga Technical Univ. (Latvia); Riccardo Cicchi, Francesco Pavone, European Lab. for Non-linear Spectroscopy (Italy) . . . . . [9198-1]

8:15 am: **The use of one- and two-photon induced fluorescence spectroscopy for the optical characterisation of carcinogenic aflatoxins**, Lien Smeesters, Wendy Meulebroeck, Stefan Raeymaekers, Hugo Thienpont, Vrije Univ. Brussel (Belgium) . . . . . [9198-2]

8:30 am: **Combined Raman spectroscopy and autofluoresence imaging method for in vivo skin tumor diagnosis**, Valery P. Zakharov, Ivan A. Bratchenko, Dmitry N. Artemyev, Oleg O. Myakinin, Samara State Aerospace Univ. (Russian Federation); Sergey V. Kozlov, Alexander A. Moryatov, Samara State Medical Univ. (Russian Federation) . . . . . [9198-3]

8:45 am: **Polarization spectroellipsometric measurements for ecological monitoring aquatic environment**, Ferdenant A. Mkrtchyan, Institute of Radio Engineering and Electronics (Russian Federation) . . . . . [9198-4]

SESSION 2

LOCATION: CONV. CTR. ROOM 18 . . . . SUN 9:00 AM TO 10:15 AM

Ultrafast Sources

Session Chair: **Venkatraman Gopalan,** The Pennsylvania State Univ. (USA)

9:00 am: **3-GHz, ultrafast Yb-fiber laser sources: filling spectral gap** *(Invited Paper)*, Hung-Wen Chen, Jinkang Lim, Massachusetts Institute of Technology (USA); Shanhui Xu, Zhongmin Yang, South China Univ. of Technology (China); Franz Kaertner, Massachusetts Institute of Technology (USA) and Deutsches Elektronen-Synchrotron (Germany) and Univ. Hamburg (Germany); Guoqing Chang, Massachusetts Institute of Technology (USA) and Deutsches Elektronen-Synchrotron (Germany) . . . . . [9198-5]

9:25 am: **Application of four wave mixing in precise radio frequency dissemination** *(Invited Paper)*, Xing Lu, Peking Univ. (China); Kebin Shi, Peking Univ. (China) and Collaborative Innovation Ctr. of Quantum Matter (China). [9198-6]

9:50 am: **Mid-IR photothermal imaging with a compact ultrafast fiber probe laser** *(Invited Paper)*, Hui Liu, Alket Mertiri, Atcha Totachawattana, Mi K. Hong, Tim Gardner, Shyamsunder Erramilli, Michelle Y. Sander, Boston Univ. (USA) . [9198-7]

Coffee Break . . . . . Sun 10:15 am to 10:45 am

SESSION 3

LOCATION: CONV. CTR. ROOM 18 . . . .SUN 10:45 AM TO 12:25 PM

SFG/SHG Spectroscopy and Imaging

Session Chair: **Zhenyu Li,** The George Washington Univ. (USA)

10:45 am: **Reactions of methanol molecules on TiO_2 surfaces studied by in-situ surface sum frequency vibrational spectroscopy** *(Invited Paper)*, Zefeng Ren, Anan Liu, Ranran Feng, Shuo Liu, Peking Univ. (China) and Collaborative Innovation Ctr. of Quantum Matter (China) . . . . . [9198-8]

11:10 am: **Probing metastable ferroelectric states exhibiting large property enhancements** *(Invited Paper)*, Venkatraman Gopalan, The Pennsylvania State Univ. (USA) . . . . . [9198-9]

11:35 am: **Vibrational sum-frequency-generation (SFG) spectroscopy study of crystalline carbohydrate polymers: cellulose and starch** *(Invited Paper)*, Seong H. Kim, The Pennsylvania State Univ. (USA). . . . . [9198-10]

12:00 pm: **Structure of monolayer of organic molecules on water surface studied by phase sensitive sum frequency vibrational spectroscopy** *(Invited Paper)*, Chuanshan Tian, Shumei Sun, Fudan Univ. (China) . . . . . [9198-11]

Lunch Break . . . . . Sun 12:25 pm to 1:25 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 18 . . . . . SUN 1:25 PM TO 3:35 PM

Novel Nanoscale Techniques and Devices

Session Chair: **Seong H. Kim,** The Pennsylvania State Univ. (USA)

1:25 pm: **G-Fresnel spectrometer design and application**, Chenji Zhang, The Pennsylvania State Univ. (USA); Perry Edwards, Atoptix, LLC (USA); Zhiwen Liu, The Pennsylvania State Univ. (USA) . . . . . [9198-12]

1:40 pm: **Holographic collinear frequency resolved optical gating for spatio-temporal characterization of ultrafast optical pulse**, Nikhil Mehta, Chuan Yang, The Pennsylvania State Univ. (USA); Yong Xu, Virginia Polytechnic Institute and State Univ. (USA); Zhiwen Liu, The Pennsylvania State Univ. (USA) . . . . . [9198-13]

1:55 pm: **Time and neighbor interaction in resonance Raman spectroscopy** *(Invited Paper)*, Hans D. Hallen, Shupeng Niu, Ling Li, North Carolina State Univ. (USA) . . . . . [9198-14]

2:20 pm: **Miniature optofluidic darkfield microscope for biosensing** *(Invited Paper)*, Zhenyu Li, The George Washington Univ. (USA) . . . . . [9198-15]

2:45 pm: **Optical resonance spectroscopy with super-lattice nanostructure gratings** *(Invited Paper)*, Junpeng Guo, Haisheng Leong, Hong Guo, The Univ. of Alabama in Huntsville (USA) . . . . . [9198-16]

3:10 pm: **Single nanoparticle sensing using whispering-gallery microresonators and microlasers** *(Invited Paper)*, Lan Yang, Washington Univ. in St. Louis (USA) . . . . . [9198-17]

Coffee Break . . . . . Sun 3:35 pm to 4:05 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 18 . . . . . SUN 4:05 PM TO 5:35 PM

Ultrafast Dynamics of Two-dimensional Materials

Session Chair: **Hans D. Hallen,** North Carolina State Univ. (USA)

4:05 pm: **Excitonic dynamics in two-dimensional transition metal dichalcogenides** *(Invited Paper)*, Hui Zhao, The Univ. of Kansas (USA) . . [9198-18]

4:30 pm: **Ultrafast valley relaxation dynamics in single layer semiconductors** *(Invited Paper)*, Kenan Gundogdu, Linyou Cao, Cong Mai, Andrew Barrette, Yifei Yu, Ki Wook Kim, Yuriy G. Semenov, North Carolina State Univ. (USA) . . [9198-19]

4:55 pm: **Second harmonic generation in tungsten disulfide monolayers**, Corey Janisch, Yuanxi Wang, Ding Ma, Nikhil Mehta, Ana Laura-Elias, Nestor Perea-Lopez, Mauricio Terrones, Vincent Crespi, Zhiwen Liu, The Pennsylvania State Univ. (USA) . . . . . [9198-20]

5:10 pm: **Valley carrier dynamics in monolayer molybdenum disulphide from helicity resolved ultrafast pump-probe spectroscopy** *(Invited Paper)*, Qinsheng Wang, Dong Sun, Peking Univ. (China). . . . . [9198-21]

CONFERENCE 9198

LOCATION: CONV. CTR. ROOM 18

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 6

LOCATION: CONV. CTR. ROOM 18 . . . MON 8:00 AM TO 10:30 AM

Ultrafast Electron Diffraction and Imaging

Session Chair: **Yong Xu,** Virginia Polytechnic Institute and State Univ. (USA)

8:00 am: **Imaging of molecules in the gas phase with ultrafast electron diffraction** *(Invited Paper)*, Jie Yang, Martin Centurion, Univ. of Nebraska-Lincoln (USA) . . . . . [9198-22]

8:25 am: **Femtosecond photoelectron diffraction: a new approach to image molecular structure during photochemical reactions** *(Invited Paper)*, Daniel Rolles, Max-Planck-Arbeitsgruppen für strukturelle Molekularbiologie (Germany); Rebecca Boll, Denis Anielski, Deutsches Elektronen-Synchrotron (Germany) and Max-Planck-Institut für Kernphysik (Germany); Cédric Bomme, Deutsches Elektronen-Synchrotron (Germany); Evgeny Savelyev, Deutsches Elektronen-Synchrotron (Germany) and Georg-August-Univ. Göttingen (Germany); Artem Rudenko, Kansas State Univ. (USA) . . . . . [9198-23]

8:50 am: **Femtosecond low-energy electron diffraction and imaging** *(Invited Paper)*, Melanie Müller, Alexander Paarmann, Ralph Ernstorfer, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) . . . . . [9198-24]

9:15 am: **The perspectives of femtosecond imaging and spectroscopy of complex materials using electrons** *(Invited Paper)*, Chong-Yu Ruan, Michigan State Univ. (USA). . . . . [9198-25]

9:40 am: **Ultrabright low-repetition rate femtosecond electron sources: perspectives and challenges towards the study of structural dynamics in labile systems** *(Invited Paper)*, Germán Sciaini, Univ. of Waterloo (Canada); Meng Gao, Hubert Jean-Ruel, Cheng Lu, Lai C. Liu, Univ. of Toronto (Canada); Alexander Marx, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany); Ryan R. Cooney, Univ. of Toronto (Canada); Yifeng Jiang, Gunther Kassier, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany); Gustavo Moriena, Univ. of Toronto (Canada); R. J. Dwayne Miller, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany) . . . . . [9198-26]

10:05 am: **MeV ultrafast electron microscopy** *(Invited Paper)*, Pietro Musumeci, Renkai Li, Univ. of California, Los Angeles (USA) . . . . . [9198-27]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

SESSION 7

LOCATION: CONV. CTR. ROOM 18 . . . MON 11:00 AM TO 12:40 PM

Multi-Photon Microscopy

Session Chair: **Martin Centurion,** Univ. of Nebraska-Lincoln (USA)

11:00 am: **Fiber continuum and phase shaping for multicolor two-photon excited microscopy** *(Invited Paper)*, Ling Fu, Britton Chance Ctr. for Biomedical Photonics (China); Quan Cui, Wuhan National Lab. for Optoelectronics (China) . . . . . [9198-28]

11:25 am: **Time- and polarization-resolved cellular autofluorescence for quantitative biochemistry on living cells** *(Invited Paper)*, Ahmed A. Heikal, Univ. of Minnesota, Duluth (USA). . . . . [9198-29]

11:50 am: **Pushing the limits of nonlinear microscopy** *(Invited Paper)*, Chris Xu, Cornell Univ. (USA) . . . . . [9198-30]

12:15 pm: **Two-photon three-axis digital scanned light-sheet microscopy (2P3A-DSLM)** *(Invited Paper)*, Liangyi Chen, Peking Univ. (China) . . . . . [9198-31]

Lunch Break . . . . . Mon 12:40 pm to 2:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 18 . . . . MON 2:00 PM TO 3:05 PM

Ultrafast Spectroscopy

Session Chair: **Kenan Gundogdu,** North Carolina State Univ. (USA)

2:00 pm: **Photocyclization dynamics revealed by ultrafast spectroscopy**, Mohammadhassan Valadan, Univ. degli Studi di Napoli Federico II (Italy); Marco Micciarelli, Univ. degli Studi di Roma La Sapienza (Italy); Bartolomeo Della Ventura, Felice Gesuele, Carlo Altucci, Raffaele Velotta, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [9198-32]

2:15 pm: **Optical two-dimensional coherent spectroscopy of semiconductor nanostructures** *(Invited Paper)*, Steven Cundiff, Gael Nardin, Rohan Singh, Bo Sun, Takeshi Suzuki, Travis Autry, JILA (USA) . . . . . [9198-33]

2:40 pm: **Ultrafast spectroscopy toward generating coherence in a few quantum materials** *(Invited Paper)*, Jimin Zhao, Institute of Physics (China) . . . . . [9198-34]

Coffee Break . . . . . Mon 3:05 pm to 3:35 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 18 . . . . . MON 3:35 PM TO 5:40 PM

Novel Imaging Techniques

Session Chair: **Zhiwen Liu,** The Pennsylvania State Univ. (USA)

3:35 pm: **Restoration of blurred images based on phase conjugation by using single second-order nonlinear parametric processes** *(Invited Paper)*, Yujie J. Ding, Lehigh Univ. (USA) . . . . . [9198-35]

4:00 pm: **Adaptive control of waveguide modes in a mulitmode waveguide** *(Invited Paper)*, Yong Xu, Virginia Tech Ctr. for Photonics Technology (USA); Peng Lu, Matthew Shipton, Virginia Polytechnic Institute and State Univ. (USA) [9198-36]

4:25 pm: **Imaging with multi-mode fibers** *(Invited Paper)*, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9198-37]

4:50 pm: **Imaging of terahertz fields and responses** *(Invited Paper)*, Keith A. Nelson, Massachusetts Institute of Technology (USA) . . . . . [9198-38]

5:15 pm: **Metal-free flat lens using negative refraction by nonlinear four-wave mixing** *(Invited Paper)*, Jianjun Cao, Yuanlin Zheng, Yaming Feng, Xianfeng Chen, Shanghai Jiao Tong Univ. (China); Wenjie Wan, Shanghai Jiao Tong Univ. (China) and Univ. of Michigan-Shanghai Jiao Tong Univ. Joint Institute (China) . . [9198-39]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Label-free imaging of biological sample with multimodal multiphoton nonlinear microendoscopy, Jang Hyuk Lee, Myoung-Kyu Oh, Do-Kyeong Ko, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9198-40]

Generation of an octave-spanning supercontinuum in highly nonlinear fibers pumped by noise-like pulses, Shih-Shian Lin, National Chiao Tung Univ. (Taiwan); Sheng-Kwang Hwang, National Cheng Kung Univ. (Taiwan); Jia-Ming Liu, National Chiao Tung Univ. (Taiwan) and Univ. of California, Los Angeles (USA) . . . [9198-42]

Quality control of bone grafts using Raman spectroscopy, Elena V. Timchenko, Pavel E. Timchenko, Samara State Aerospace Univ. (Russian Federation); Larisa T. Volova, Julia V. Ponomareva, Samara State Medical Univ. (Russian Federation); Larisa A. Taskina, Svetlana V. Pershutkina, Samara State Aerospace Univ. (Russian Federation) . . . . . [9198-43]

Computational imaging based on the Hanbury Brown and Twiss effect, Yizhu Chen, Zhiwen Liu, The Pennsylvania State Univ. (USA) . . . . . [9198-44]

High-speed and two-photon in-vivo imaging of neutrophil in ear skin of mice, Bo Ram Kim, Eung Jang Lee, Seung-Han Park, Yonsei Univ. (Korea, Republic of) . . . . . [9198-45]

CONFERENCE 9199

LOCATION: CONV. CTR. ROOM 16A

Sunday–Monday 17–18 August 2014 • Proceedings of SPIE Vol. 9199

Terahertz Emitters, Receivers, and Applications V

Conference Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Alexei N. Baranov,** Univ. Montpellier 2 (France); **John M. Zavada,** National Science Foundation (USA); **Dimitris Pavlidis,** National Science Foundation (USA)

Program Committee: **Joshua Abell,** U.S. Naval Research Lab. (USA); **Stefano Barbieri,** Univ. Paris 7-Denis Diderot (France); **Henry O. Everitt,** U.S. Army Research, Development and Engineering Command (USA); **Jérôme Faist,** ETH Zürich (Switzerland); **Mauro F. Pereira,** Sheffield Hallam Univ. (United Kingdom); **Sven Höfling,** Julius-Maximilians-Univ. Würzburg (Germany); **Qing Hu,** Massachusetts Institute of Technology (USA); **Hiroshi Ito,** Kitasato Univ. (Japan); **Mona Jarrahi,** Univ. of Michigan (USA); **Wojciech Knap,** Univ. Montpellier 2 (France); **Stephen A. Lynch,** Cardiff Univ. (United Kingdom); **Juliette Mangeney,** Ecole Normale Supérieure (France); **Tariq Manzur,** Naval Undersea Warfare Ctr. (USA); **Gaël Mouret,** Univ. du Littoral Côte d'Opale (France); **Gregory S. Nusinovich,** Univ. of Maryland, College Park (USA); **Naoki Oda,** NEC Corp. (Japan); **Pascale Roy,** Synchrotron SOLEIL (France); **Carlo Sirtori,** Univ. Paris 7-Denis Diderot (France); **Zachary D. Taylor,** Univ. of California, Los Angeles (USA); **Roland Teissier,** Univ. Montpellier 2 (France); **Gintaras Valu?is,** Ctr. for Physical Sciences and Technology (Lithuania); **Miriam S. Vitiello,** Consiglio Nazionale delle Ricerche (Italy); **Benjamin S. Williams,** Univ. of California, Los Angeles (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 16A . . SUN 8:00 AM TO 10:00 AM

THz Emitters Based on Quantum Cascade Lasers

Session Chairs: **John M. Zavada,** National Science Foundation (USA); **Mauro F. Pereira,** Sheffield Hallam Univ. (United Kingdom)

8:00 am: **RT,CW operation of 3.5 THz laser diode based on DFG-QCL** *(Invited Paper)*, Manijeh Razeghi, Quan-Yong Lu, Neelanjan Bandyopadhyay, Steven Slivken, Yanbo Bai, David Heydari, Wei Zhou, Northwestern Univ. (USA) . . . . . [9199-1]

8:30 am: **Processing of AlGaAs/GaAs QC structures for terahertz laser** *(Invited Paper)*, Anna Szerling, Institute of Electron Technology (Poland); Kamil Kosiel, Michal O. Szymanski, Institute of Electron Technology (Poland); Zbigniew R. Wasilewski, Univ. of Waterloo (Canada); Artur Trajnerowicz, Krystyna Golaszewska, Maciej Sakowicz, Adam Laszcz, Mariusz Pluska, Institute of Electron Technology (Poland); Michal Walczakowski, Norbert Palka, Military Univ. of Technology (Poland); Anna B. Piotrowska, Institute of Electron Technology (Poland) . . . . . [9199-2]

9:00 am: **Broadly-tunable THz sources based on intra-cavity difference-frequency generation in mid-infrared quantum cascade lasers** *(Invited Paper)*, Yifan Jiang, Seungyong Jung, Karun Vijayraghavan, Aiting Jiang, Mikhail A. Belkin, The Univ. of Texas at Austin (USA) . . . . . [9199-3]

9:30 am: **Broadband THz quantum cascade lasers for comb applications** *(Invited Paper)*, Giacomo Scalari, ETH Zurich (Switzerland); Markus Rösch, Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9199-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 16A . . SUN 10:30 AM TO 11:40 AM

THz Emitters

Session Chairs: **Oleg Mitrofanov,** Univ. College London (United Kingdom); **Vyacheslav A. Trofimov,** Lomonosov Moscow State Univ. (Russian Federation)

10:30 am: **Terahertz generation and picosecond photo-thermoelectric currents in graphene** *(Invited Paper)*, Andreas Brenneis, Alexander Holleitner, Walter Schottky Institut (Germany) . . . . . [9199-5]

11:00 am: **Efficient nonequilibrium Green's functions simulations of THz quantum cascade lasers**, Mauro F. Fernandes Pereira Jr., Sheffield Hallam Univ. (United Kingdom); David Winge, Andreas Wacker, Lund Univ. (Sweden) . . [9199-6]

11:20 am: **Widely tunable THz-wave emitter with linear polarization characteristics based on antenna-integrated UTC-PD**, Hiroshi Ito, Kitasato Univ. (Japan); Toshihide Yoshimatsu, NTT Network Innovation Labs. (Japan); Hiroshi Yamamoto, Kitasato Univ. (Japan); Tadao Ishibashi, NTT Photonics Labs. (Japan). . . . . [9199-8]

Lunch Break . . . . . Sun 11:40 am to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 16A . . . .SUN 1:30 PM TO 3:20 PM

Fundamentals of THz Technology I

Session Chairs: **Mikhail A. Belkin,** The Univ. of Texas at Austin (USA); **Giacomo Scalari,** ETH Zürich (Switzerland)

1:30 pm: **TERA-MIR radiation: materials, generation, detection, and applications** *(Invited Paper)*, Mauro F. Fernandes Pereira Jr., Sheffield Hallam Univ. (United Kingdom). . . . . [9199-9]

2:00 pm: **Electromagnetic responses and ultrafast optical modulation of terahertz metamaterials**, Qingli Zhou, Yulei Shi, Jianfeng Liu, Cunlin Zhang, Capital Normal Univ. (China) . . . . . [9199-10]

2:20 pm: **Terahertz coded aperture mask using vanadium dioxide bowtie antenna array**, Souheil Nadri, Rebecca Percy, Robert M. Weikle II, Stuart A. Wolf, Jiwei Lu, Salinporn Kittiwatanakul, Univ. of Virginia (USA); Alex Arsenovic, Virginia Diodes, Inc. (USA) . . . . . [9199-11]

2:40 pm: **High-efficiency terahertz-wave generation in silicon membrane waveguides**, Hongjun Liu, Zhaolu Wang, Nan Huang, Qibing Sun, Xi'an Institute of Optics and Precision Mechanics (China) . . . . . [9199-12]

3:00 pm: **Transmission of THz pulse with a few circles through opaque samples placed at long distance (4-6 metres)**, Vyacheslav A. Trofimov, Vladislav V. Trofimov, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [9199-13]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 16A . . . SUN 3:50 PM TO 5:30 PM

Fundamentals of THz Technology II

Session Chairs: **Aleksandar D. Rakic,** The Univ. of Queensland (Australia); **Anna Mazhorova,** Institut National de la Recherche Scientifique (Canada)

3:50 pm: **Graphene plasmonic heterostructures for new types of THz lasers** *(Invited Paper)*, Taiichi Otsuji, Victor Ryzhii, Stephane A. Boubanga Tombet, Takayuki Watanabe, Akira Satou, Tohoku Univ. (Japan); Maxim Ryzhii, Univ. of Aizu (Japan); Alexander A. Dubinov, Vladimir Y. Aleshkin, Institute for Physics of Microstructures (Russian Federation); Michael Shur, Rensselaer Polytechnic Institute (USA) . . . . . [9199-14]

4:20 pm: **THz magnetospectroscopy of a CdTe/CdMgTe quantum point contact**, Ignas Grigelionis, Marcin Bialek, Univ. of Warsaw (Poland); Magdalena Czapkiewicz, Valery Kolkovski, Maciej Wiater, Michal Wojciechowski, Jerzy Wrobel, Tomasz Wojtowicz, Institute of Physics (Poland); Wojciech Knap, Univ. Montpellier 2 (France); Jerzy Lusakowski, Univ. of Warsaw (Poland) . . . . . [9199-15]

4:40 pm: **THz valence band antipolaritons**, Mauro F. Fernandes Pereira Jr., Inuwa A. Faragai, Sheffield Hallam Univ. (United Kingdom) . . . . . [9199-16]

5:00 pm: **Terahertz waveguides with low transmission losses: characterization and applications** *(Invited Paper)*, Oleg Mitrofanov, Univ. College London (United Kingdom); Miguel Navarro-Cia, Imperial College London (United Kingdom); Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Jeffrey E. Melzer, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9199-17]

CONFERENCE 9199

LOCATION: CONV. CTR. ROOM 16A

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 16A . MON 8:40 AM TO 10:00 AM

THz Detectors

Session Chairs: **Sukhdeep S. Dhillon,** Lab. Pierre Aigrain (France); **Anna Szerling,** Institute of Electron Technology (Poland)

8:40 am: **Magnetic-field tunable THz detectors based on GaAs/AlGaAs and CdTe/CdMgTe quantum wells** *(Invited Paper)*, Jerzy Lusakowski, Marcin Bialek, Ignas Grigelionis, Univ. of Warsaw (Poland); Valery Kolkovski, Zbigniew Adamus, Institute of Physics (Poland); Marian Grynberg, Univ. of Warsaw (Poland); Jerzy Wrobel, Tomasz Wojtowicz, Grzegorz Karczewski, Institute of Physics (Poland); Valdimir Umansky, Weizmann Institute of Science (Israel) . . . . . [9199-18]

9:10 am: **High performance room temperature THz sensor**, Janez Trontelj, Univ. of Ljubljana (Slovenia); Gintaras Valusis, Irmantas Kasalynas, Ctr. for Physical Sciences and Technology (Lithuania); Aleksander Sesek, Univ. of Ljubljana (Slovenia) . . . . . [9199-19]

9:30 am: **Emerging electronic devices for THz sensing and imaging** *(Invited Paper)*, Patrick Fay, Yi Xie, Yuning Zhao, Zhenguo Jiang, Syed M. Rahman, Lei Liu, Univ. of Notre Dame (USA) . . . . . [9199-20]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 16A . MON 10:30 AM TO 12:20 PM

THz Imaging

Session Chairs: **Elliott R. Brown,** Wright State Univ. (USA); **Zachary D. Taylor,** Univ. of California, Los Angeles (USA)

10:30 am: **THz QCL self-mixing interferometry for biomedical applications** *(Invited Paper)*, Aleksandar D. Rakic, Thomas Taimre, Karl Bertling, Yah Leng Lim, Stephen J. Wilson, The Univ. of Queensland (Australia); Paul Dean, Dragan Indjin, Edmund H. Linfield, A. Giles Davies, Univ. of Leeds (United Kingdom) . . . [9199-21]

11:00 am: **Use of terahertz radiation for non destructive testing of composite materials of aircrafts**, Nikolay S. Balbekin, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Evgeny Novoselov, Chalmers Univ. of Technology (Sweden); Pavel V. Pavlov, Irkutsk Military Aviation Engineering Institute (Russian Federation); Nikolay V. Petrov, Victor G. Bespalov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9199-22]

11:20 am: **Expectation maximisation algorithms for terahertz transmission tomography**, Benoit Recur, The Australian National Univ. (Australia); Hugo Balacey, Lab. Ondes et Matière d'Aquitaine (France) and Noctylio S.A.S (France); Patrick Mounaix, Univ. Bordeaux 1 (France) . . . . . [9199-23]

11:40 am: **Resolution enhancing of commercially available passive THz cameras due to computer processing**, Vyacheslav A. Trofimov, Vladislav V. Trofimov, Igor E. Kuchik, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [9199-24]

12:00 pm: **THz imaging studies of lead white-painted plaster samples to guide cultural heritage investigations at the cell of St. Neophytos in Paphos, Cyprus**, Roxanne Radpour, Bryan Nowroozi, Univ. of California, Los Angeles (USA); Neha Bajwa, Ctr. for Advanced Surgical and Interventional Technology (USA); James Garritano, Shijun Sung, Magdalena Balonis, Univ. of California, Los Angeles (USA); Priyamvada Tewari, Ctr. for Advanced Surgical and Interventional Technology (USA); Warren Grundfest, Ioanna Kakoulli, Zachary D. Taylor, Univ. of California, Los Angeles (USA). . . . . [9199-25]

Lunch Break . . . . . Mon 12:20 pm to 1:30 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 16A . . . MON 1:30 PM TO 3:20 PM

Spectroscopy and Biomedical Applications

Session Chairs: **Taiichi Otsuji,** Tohoku Univ. (Japan); **Dimitris Pavlidis,** Boston Univ. (USA)

1:30 pm: **First experimental investigation of selectivity in THz biospectroscopy** *(Invited Paper)*, Elliott R. Brown, Weidong Zhang, Leamon Viveros, Wright State Univ. (USA) . . . . . [9199-26]

2:00 pm: **THz optical design considerations and optimization for medical imaging applications**, Shijun Sung, James Garritano, Neha Bajwa, Univ. of California, Los Angeles (USA); Bryan Nowroozi, Ctr. for Advanced Surgical and Interventional Technology (USA); Priyamvada Tewari, Warren Grundfest, Zachary D. Taylor, Univ. of California, Los Angeles (USA) . . . . . [9199-27]

2:20 pm: **THz-TDS combined with a fuzzy rule-building expert system applied to identification of official rhubarb samples**, Zhuo-yong Zhang, Yi Liao, Xia Zuo, Jingrong Wang, Zhenwei Zhang, Capital Normal Univ. (China); Peter Harrington, Ohio Univ. (USA) . . . . . [9199-28]

2:40 pm: **In vivo confirmation of hydration based contrast mechanisms for THz medical Imaging using MRI**, Neha Bajwa, Ctr. for Advanced Surgical and Interventional Technology (USA); Bryan Nowroozi, James Garritano, Shijun Sung, Univ. of California, Los Angeles (USA); Priyamvada Tewari, Ctr. for Advanced Surgical and Interventional Technology (USA); Daniel B. Ennis, Jeffery Alger, Warren Grundfest, Zachary D. Taylor, Univ. of California, Los Angeles (USA) . . . . [9199-29]

3:00 pm: **THz dielectric substrate window optimization for hydration sensitivity**, James Garritano, Neha Bajwa, Shijun Sung, Bryan Nowroozi, Priyamvada Tewari, Roxanne Radpour, Warren Grundfest, Zachary D. Taylor, Univ. of California, Los Angeles (USA) . . . . . [9199-30]

Coffee Break . . . . . Mon 3:20 pm to 3:50 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 16A . . . MON 3:50 PM TO 5:20 PM

Novel Concepts and Materials for THz Technology

Session Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Alexei N. Baranov,** Univ. Montpellier 2 (France)

3:50 pm: **Graphene: a perfectly unexceptional nonlinear material** *(Invited Paper)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9199-31]

4:20 pm: **Resonant nonlinearities in quantum cascade lasers** *(Invited Paper)*, Sukhdeep S. Dhillon, Ecole Normale Superieure (France) . . . . . [9199-32]

4:50 pm: **Novel THz applications: from Bragg gratings waveguide sensors to nanoparticle-based imaging** *(Invited Paper)*, Anna Mazhorova, Matteo Clerici, Rafik Naccache, Manoj K. Mridha, Luca Razzari, Fiorenzo Vetrone, Roberto Morandotti, Institut National de la Recherche Scientifique (Canada) . . . . . [9199-33]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Visible-light controlled plasma excitations in high electron mobility GaAs/AlGaAs heterostructure, Marcin Bialek, Dmitriy Yavorskiy, Michal Marcinkiewicz, Tomasz Tarkowski, Univ. of Warsaw (Poland); Jerzy Wrobel, Institute of Physics (Poland); Vladimir Umansky, Weizmann Institute of Science (Israel); Barbara Pietka, Jerzy Lusakowski, Univ. of Warsaw (Poland) . . . . . [9199-34]

Mid infrared luminescence of dilute nitride semiconductors: microscopic approach vs experiments, Mauro F. Fernandes Pereira Jr., Chijioke I. Oriaku, Sheffield Hallam Univ. (United Kingdom); Anthony Krier, Qiandong Zhuang, Michael Thompson, Manoj Kesaria, Lancaster Univ. (United Kingdom) . . . . . [9199-35]

Experimental imaging research on continuous-wave terahertz in-line digital holography, Hao-Chong Huang, Dayong Wang, Lu Rong, Yunxin Wang, Beijing Univ. of Technology (China) . . . . . [9199-36]

CONFERENCE 9200

LOCATION: CONV. CTR. ROOM 17B

Sunday–Monday 17–18 August 2014 • Proceedings of SPIE Vol. 9200

Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications VIII

Conference Chairs: **Shizhuo Yin,** The Pennsylvania State Univ. (USA); **Ruyan Guo,** The Univ. of Texas at San Antonio (USA)

Program Committee: **Partha P. Banerjee,** Univ. of Dayton (USA); **Liliana Braescu,** Institut National de la Recherche Scientifique (Canada); **Ken-Yuh Hsu,** National Chiao Tung Univ. (Taiwan); **Rongqing Hui,** The Univ. of Kansas (USA); **Suganda Jutamulia,** Univ. of Northern California (USA); **Nickolai V. Kukhtarev,** Alabama A&M Univ. (USA); **Ravindra B. Lal,** Alabama A&M Univ. (USA); **Byoungho Lee,** Seoul National Univ. (Korea, Republic of); **Liangcai Cao,** Tsinghua Univ. (China); **Sergei F. Lyuksyutov,** The Univ. of Akron (USA); **Manmohan D. Aggarwal,** Alabama A&M Univ. (USA); **Paul B. Ruffin,** U.S. Army Research, Development and Engineering Command (USA); **Narsingh B. Singh,** Univ. of Maryland, Baltimore County (USA); **Ching-Cherng Sun,** National Central Univ. (Taiwan); **Xiang Zhang,** Univ. of California, Berkeley (USA)

Founding Chair: **Francis T.S. Yu,** The Pennsylvania State Univ. (United States)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 17B . . . .SUN 8:30 AM TO 12:10 PM

Advances in Photonic Crystals and Materials I

Session Chairs: **Abdalla M. Darwish,** Dillard Univ. (USA); **Ruyan Guo,** The Univ. of Texas at San Antonio (USA)

8:30 am: **Design and performance of optical materials by manipulating nano and micromorphology** *(Invited Paper)*, Narsingh B. Singh, Univ. of Maryland, Baltimore County (USA); Narasimha S. Prasad, NASA Langley Research Ctr. (USA); Bradley Arnold, Lisa Kelly, Brian M. Cullum, Univ. of Maryland, Baltimore County (USA) . . . . . [9200-1]

9:00 am: **Elaborations on surface structural effects, electrical surface resistivity, and optical waveguide properties of gadolinium oxide (Gd_2O_3) and gadolinium oxide europium doped (Gd_2O_3:Eu^{3+}) sol-gel films**, Quianna S. Johnson, Matthew E. Edwards Sr., Michael J. Curley, Alabama A&M Univ. (USA) . . . . . [9200-2]

9:20 am: **Helical auto-waves electron-hole plasma in semiconductor induced by femtosecond pulse at presence of external electric field**, Vyacheslav A. Trofimov, Vladimir A. Egorenkov, Mariya M. Loginovaa, Lomonosov Moscow State Univ. (Russian Federation). . . . . [9200-3]

9:40 am: **Mode dependent pump absorption in the double cladding fiber considering the mode diffusion**, Zhihua Huang, Xiaocheng Tian, Dangpeng Xu, Honghuan Lin, Jianjun Wang, China Academy of Engineering Physics (China) . . . . . [9200-4]

10:00 am: **Formation of sub pico-liter liquid periodic structure in a hollow optical fiber for photonic device applications**, Jihyun Hwang, Jongki Kim, Jiyoung Park, Kyunghwan K. Oh, Yonsei Univ. (Korea, Republic of) . . . . . [9200-5]

Coffee Break . . . . . Sun 10:20 am to 10:50 am

10:50 am: **Fabrication of transparent transistor by using nitrogen-doped SnO_2 P-type transparent conducting thin film**, Po-Ming Lee, Albert T. Wu, National Central Univ. (Taiwan) . . . . . [9200-6]

11:10 am: **Transparent p+-TiN:SnO_2/n+-ITO tunnel diode**, Chih-Yi Hsieh, Chin-Han Liao, Cheng-Yi Liu, National Central Univ. (Taiwan) . . . . . [9200-7]

11:30 am: **A compact in-situ ellipsometer using the liquid crystal phase retarder**, Wen-Tse Shih, Minghsin Univ. of Science and Technology (Taiwan); Mei-Li Hsieh, Yu Faye Chao, National Chiao Tung Univ. (Taiwan). . . . . [9200-8]

11:50 am: **Optical characterization of ferroelectric PZT thin films by variable angle spectroscopic ellipsometry**, Md. Shafiqur Rahman, Carlos D. Garcia, Amar S. Bhalla, Ruyan Guo, The Univ. of Texas at San Antonio (USA) . . . . . [9200-9]

Lunch Break . . . . . Sun 12:10 pm to 1:40 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 17B . . . .SUN 1:40 PM TO 5:20 PM

Advances in Photonic Crystals and Materials II

Session Chairs: **Narsingh B. Singh,** Univ. of Maryland, Baltimore County (USA); **Partha P. Banerjee,** Univ. of Dayton (USA)

1:40 pm: **Efficient upconversion polymer-inorganic nanocomposite thin film emitters prepared by the double beam matrix assisted pulsed laser evaporation (DB-MAPLE) method** *(Invited Paper)*, Abdalla M. Darwish, Siemon Wilson, Ashley Blackwell, Keylantra Taylor, Dillard Univ. (USA); Sergey S. Sarkisov, SSS Optical Technologies, LLC (USA); Brent Koplitz, Tulane Univ. (USA) . [9200-10]

2:10 pm: **Self-pulsing in a large mode area, end-pumped, double-clad Ytterbium-doped fiber laser**, Daniel Toral-Acosta, Univ. Autónoma de Nuevo León (Mexico); Alejandro Martínez-Rios, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Romeo Selvas-Aguilar, Univ. Autónoma de Nuevo León (Mexico) . . . . . [9200-11]

2:30 pm: **Beam shaping for holographic techniques**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany) . . . . . [9200-12]

2:50 pm: **Total absorption in a graphene monolayer in the optical regime by critical coupling with a photonic crystal guided resonance**, Jessica R. Piper, Shanhui Fan, Stanford Univ. (USA) . . . . . [9200-13]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

3:40 pm: **Widely tunable spectrum LED grown on nanostructured substrate**, Shizhuo Yin, Chao Wang, Jimmy Yao, The Pennsylvania State Univ. (USA); Claire Luo, The Pennsylvania State Univ. (USA) and General Opto Solutions, LLC (USA); Jun Zhou, Xiaoyan Lin, Shanghai Institute of Technology (China) . . . . . [9200-56]

4:00 pm: **Laser calorimetry of nonlinear-optical crystals based on piezoelectric resonance spectroscopy**, Aleksey V. Konyashkin, Oleg A. Ryabushkin, Ivan S. Ulyanov, Moscow Institute of Physics and Technology (Russian Federation) and NTO "IRE-Polus" (Russian Federation) . . . . . [9200-15]

4:40 pm: **Design and analysis of large mode area microstructured polymer optical fibre with single mode operation**, Than Singh Saini, Vinita Dahiya, Ajeet Kumar, Ravindra K. Sinha, Delhi Technological Univ. (India) . . . . . [9200-17]

5:00 pm: **Study of characteristics of MMI devices using matrix approach**, Rajib Chakraborty, Saikat Majumder, Univ. of Calcutta (India) . . . . . [9200-18]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

OPTICS

CONFERENCE 9200

LOCATION: CONV. CTR. ROOM 17B

MONDAY 18 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 17B . . MON 8:30 AM TO 12:00 PM

Innovations in Devices and Applications I

Session Chairs: **Wei-Hung Su,** National Sun Yat-Sen Univ. (Taiwan); **Ching-Cherng Sun,** National Central Univ. (Taiwan)

8:30 am: **Digital holographic microscope equipped with volume holographic optical element** *(Invited Paper)*, Yeh-Wei Yu, Ching-Cherng Sun, National Central Univ. (Taiwan) . . . . . [9200-19]

9:00 am: **Application of quantum dots in solid state lighting**, Shu-Ru Chung, National Formosa Univ. (Taiwan). . . . . [9200-20]

9:20 am: **Numerical analysis for a solid-core photonic crystal fiber with tunable zero dispersion wavelengths,** Alejandro Barrientos García, Igor A. Shukoivanov, José A. Andrade-Lucio, Igor V. Guryev, Oleksiy V. Shulika, Univ. de Guanajuato (Mexico); Juan C. Hernandez-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Gabriel Ramos-Ortiz, Ctr. de Investigaciones en Óptica, A.C. (Mexico). . . . . [9200-21]

9:40 am: **Optical model of reflection grating in collinear holographic storage system**, Shuai Xiao, Yeh-Wei Yu, Chih-Yuan Cheng, Ching-Cherng Sun, National Central Univ. (Taiwan) . . . . . [9200-22]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Three-dimensional display based on volume holographic kinoform in photopolymer** *(Invited Paper)*, Zheng Wang, Chengmingyue Li, Liangcai Cao, Hao Zhang, Qingsheng He, Guofan Jin, Tsinghua Univ. (China) . . . . . [9200-23]

11:00 am: **Effective design of fiber optic polarimetric sensors and its application for structural health monitoring**, Muneesh Maheshwari, Swee Chuan Tjin, Anand K. Asundi, Nanyang Technological Univ. (Singapore) . . . . . [9200-24]

11:20 am: **Photonic crystal based nano-displacement sensor**, Ravindra K. Sinha, Preeti Rani, Yogita Kalra, Venus Dillu, Delhi Technological Univ. (India). . . . . [9200-25]

11:40 am: **Fiber Bragg grating based humidity sensor with wide linear dynamic range**, Munendhar Pathi, Sunil K. Khijwania III, Indian Institute of Technology Guwahati (India). . . . . [9200-26]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 17B . . . . MON 1:30 PM TO 5:10 PM

Innovations in Devices and Applications II

Session Chairs: **Paul B. Ruffin,** U.S. Army Research, Development and Engineering Command (USA); **Shizhuo Yin,** The Pennsylvania State Univ. (USA)

1:30 pm: **2-10 m supercontinuum broadening using a highly nonlinear chalcogenide microfiber for mid-IR applications** *(Invited Paper)*, Amira Baili, Rim Cherif, SUP'COM (Tunisia); Than Singh Saini, Ajeet Kumar, Ravindra K. Sinha, Delhi Technological Univ. (India); Mourad Zghal, SUP'COM (Tunisia). . . . . [9200-27]

2:00 pm: **Mid-infrared supercontinuum generation in chalcogenide step-index fibers pumped at 2.9 and 4.5 m**, Irnis Kubat, Technical Univ. of Denmark (Denmark); Uffe Møller, DTU Fotonik (Denmark); Angela B. Seddon, Zhuoqi Tang, Slawomir Sujecki, Trevor M. Benson, The Univ. of Nottingham (United Kingdom); Samir Lamrini, Karsten Scholle, Peter Fuhrberg, LISA Laser Products (Germany); Bruce Napier, Vivid Components Ltd. (Germany); Mark Farries, Gooch & Housego (Torquay) Ltd. (United Kingdom); Jon D. Ward, Gooch & Housego plc (United Kingdom); Peter M. Moselund, NKT Photonics A/S (Denmark); Ole Bang, DTU Fotonik (Denmark). . . . . [9200-28]

2:20 pm: **Mid-IR supercontinuum generation and applications: a review**, Shizhuo Yin, The Pennsylvania State Univ. (USA); Paul B. Ruffin, Christina L. Brantley, Eugene Edwards, U.S. Army Research, Development and Engineering Command (USA); Claire Luo, General Opto Solutions, LLC (USA). . . . . [9200-29]

2:40 pm: **Enhanced gain in guest-host liquid crystal photorefractive hybrids**, Carl M. Liebig, Air Force Research Lab. (USA); Nelson V. Tabiryan, BEAM Engineering for Advanced Measurements Co. (USA); Sergey A. Basun, Air Force Research Lab. (USA) and Azimuth Corp. (USA); Ighodalo U. Idehenre, Air Force Research Lab. (USA) and Univ. of Dayton (USA); Victor Y. Reshetnyak, National Taras Shevchenko Univ. of Kyiv (Ukraine); Dean R. Evans, Air Force Research Lab. (USA) . . . . . [9200-30]

3:00 pm: **The calculation of the coherence time of spectral supercontinuum at the output of the fused silica with different parameters of the initial pulse**, Maxim Melnik, Anton Tsypkin, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9200-31]

Coffee Break . . . . . Mon 3:20 pm to 3:50 pm

3:50 pm: **Field induced dynamic optical waveguide switches**, Yun-Ching Chang, Shizhuo Yin, The Pennsylvania State Univ. (USA); Robert C. Hoffman, Andrew G. Mott, U.S. Army Research Lab. (USA) . . . . . [9200-32]

4:10 pm: **Crystalline deposition of bi-alkali photocathode through molecular beam epitaxy for fast-timing photodetectors**, Junqi Xie, Argonne National Lab. (USA) . . . . . [9200-33]

4:30 pm: **Phase-shifting holography using Bragg and non-Bragg orders in photorefractive lithium niobate**, Ujitha A. Abeywickrema, Partha P. Banerjee, Univ. of Dayton (USA) . . . . . [9200-34]

4:50 pm: **Single-platform Si photonic components for mid-infrared sensing and chemical imaging**, Ventsislav M. Lavchiev, Johannes Kepler Univ. Linz (Austria); Grant A. D. Ritchie, James Kirkbride, Univ. of Oxford (United Kingdom); Ursula Hedenig, Thomas Grille, Infineon Technologies Austria AG (Austria); Bernhard Jakoby, Johannes Kepler Univ. Linz (Austria) . . . . . [9200-57]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Recent advance in application of acousto-optic tunable filters, Ruslan A. Khansuvarov, Oleg V. Shakin, Arseny Y. Zhdanov, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) . . . . . [9200-14]

Design of equiangular spiral photonic crystal fiber for supercontinuum generation at 1550 nm, Than Singh Saini, Delhi Technological Univ. (India); Amira Baili, Univ. of Carthage (Tunisia); Vinita Dahiya, Ajeet Kumar, Delhi Technological Univ. (India); Rim Cherif, Mourad Zghal, Univ. of Carthage (Tunisia); Ravindra K. Sinha, Delhi Technological Univ. (India) . . . . . [9200-16]

Self-tuning acousto-optic deflectors with acoustic line made of $NaBi(MoO_4)_2$ crystal, Ruslan A. Khansuvarov, Oleg V. Shakin, Arseny Y. Zhdanov, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation); Arseniy Y Zhdanov, SUAI (Russian Federation). . . . . [9200-35]

Enhanced stability of Bi-doped $Ge_2Sb_2Te_5$ amorphous films, Natalia Korobova, National Research Univ. of Electronic Technology (Russian Federation); Sanjar Dusembayev, Oleg Y. Prikhodko, Al-Farabi Kazakh National Univ. (Kazakhstan); Sergey P. Timoshenkov, National Research Univ. of Electronic Technology (Russian Federation); Konstantin D. Tsendin, Ioffe Physico-Technical Institute (Russian Federation) . . . . . [9200-36]

Error angle determination of the star sensor with liquid cooling, Natalia Korobova, Pavel Razzhivalov, Viktor V. Kalugin, Sergey P. Timoshenkov, Eugeney Artemov, National Research Univ. of Electronic Technology (Russian Federation) . . . . . [9200-37]

Theoretical for astigmatism Fourier transform-based imaging processor, Peipei Hou, Jianfeng Sun, Ya'nan Zhi, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China). . . . . [9200-38]

Quasiperiodic Bragg reflection waveguides, Volodymyr I. Fesenko, Institute of Radio Astronomy (Ukraine) and Kharkov National Univ. of Radio Electronics (Ukraine); Vladimir R. Tuz, Institute of Radio Astronomy (Ukraine) and V.N. Karazin Kharkiv National Univ. (Ukraine); Pedro Pablo Rocha Garcia, Igor A. Sukhoivanov, Univ. de Guanajuato (Mexico) . . . . . [9200-39]

Absorption characteristic and two-center holographic recording in $LiNbO_3$:Ce:Ru crystals, Zhifang Chai, East China Normal Univ. (China); Ya'nan Zhi, Shanghai Institute of Optics and Fine Mechanics (China); Lu Cui, East China Normal Univ. (China) . . . . . [9200-40]

OPV, Ming Seng Hsu, Jen Wei Huang, Feng Lin Shyu, Chinese Military Academy (Taiwan) . . . . . [9200-41]

OPV II, Jen Wei Huang, Ming Seng Hsu, Chinese Military Academy (Taiwan); Tzu Chin Lin, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9200-42]

LED, Jen Wei Huang, Ming Seng Hsu, Yu Han Hung, Hsiao Fan Hsu, Chinese Military Academy (Taiwan). . . . . [9200-43]

Optimized design of Yb^{3+}/Er^{3+}-codoped cross-coupled integrated microring resonator array, Ramona M. Galatus, Technical Univ. of Cluj Napoca (Romania); Juan A. Valles, Univ. de Zaragoza (Spain). . . . . [9200-44]

Characterization of long period fiber grating as load sensing, Julián Móises M.

Estudillo-Ayala, Eduardo Huerta-Mascotte, Ruth I. Mata-Chávez, Ana D. Guzman-Chavez, Daniel Jauregui-Vázquez, Juan M. Sierra-Hernández, Everardo Vargas-Rodriguez, Roberto Rojas-Laguna, Univ. de Guanajuato (Mexico) . . . . . [9200-45]

Resonant tunneling in 2D-photonic superlattices, Fares Kanouni, Ctr. de Développement des Téchnologies Avancées (Algeria); Abderrehmane Brezini, LAMIN Lab. (Algeria) and Ecole Nationale Polytechnique d'Oran (Algeria); Abdnacer Assali, Ctr. de Développement des Téchnologies Avancées (Algeria) and UROP (Algeria); Graine Radaoune, Arab Fahima, Ctr. de Développement des Téchnologies Avancées (Algeria) . . . . . [9200-46]

Mechanically induced long period gratings in polarization maintaining photonic crystal fiber with a supercontinuum generation source, Eduardo Huerta-Mascotte, Ruth I. Mata-Chávez, Julian M. Estudillo-Ayala, Ana D. Guzman-Chavez, Martin Cano-Contreras, Mónica Trejo-Durán, Roberto Rojas-Laguna, Everardo Vargas-Rodriguez, Igor V. Guryev, Univ. de Guanajuato (Mexico)[9200-47]

Photoconductivity of ZnO based granular structures, Armen R. Poghosyan, Natella R. Aghamalyan, Elbak Y. Elbakyan, Institute for Physical Research (Armenia); Ruyan Guo, The Univ. of Texas at San Antonio (USA); Ruben K. Hovsepyan, Silva I. Petrosyan, Institute for Physical Research (Armenia) . [9200-48]

Design of the binary-encoded fringe pattern for projected fringe profilometry, Wei-Hung Su, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9200-49]

Projected fringe profilometry for non-diffusive objects, Wei-Hung Su, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9200-50]

3D shape measurements for plano-convex lenses using fringe projection techniques, Wei-Hung Su, National Sun Yat-Sen Univ. (Taiwan); Chau-Jern Cheng, National Taiwan Normal Univ. (Taiwan) . . . . . [9200-51]

A scanning approach using fringe projection techniques for 3D profile measurements, Wei-Hung Su, National Sun Yat-Sen Univ. (Taiwan); Nai-Jen Cheng, National Kaohsiung Univ. of Applied Sciences (Taiwan) . . . . . [9200-52]

Vibrometry analysis of electrooptical coupling near piezoelectric resonance, Robert McIntosh, Amar S. Bhalla, Ruyan Guo, The Univ. of Texas at San Antonio (USA) . . . . . [9200-53]

Homodyne and heterodyne optical interferometry for frequency dependent piezoelectric displacement measurement, Keith G. Delahoussaye, Amar S. Bhalla, Ruyan Guo, The Univ. of Texas at San Antonio (USA) . . . . . [9200-54]

Ponderomotive force induced nonlinear interaction between terahertz wave and air plasmas, Chengxun Yuan, Harbin Institute of Technology (China) and The Pennsylvania State Univ. (USA); Shizhuo Yin, The Pennsylvania State Univ. (USA) . . . . . [9200-55]

CONFERENCE 9201

LOCATION: CONV. CTR. ROOM 19

Monday–Tuesday 18–19 August 2014 • Proceedings of SPIE Vol. 9201

Optical Data Storage 2014

Conference Chairs: **Ryuichi Katayama,** Fukuoka Institute of Technology (Japan); **Thomas D. Milster,** College of Optical Sciences, The Univ. of Arizona (USA)

Program Committee: **Mark S. Akselrod,** Landauer Inc. (USA); **Mark R. Ayres,** Akonia Holographics, LLC (USA); **Min Gu,** Swinburne Univ. of Technology (Australia); **Tim Rausch,** Seagate Technology LLC (USA); **Luping Shi,** Tsinghua Univ. (China); **Kenichi Shimada,** Hitachi, Ltd. (Japan); **Yuzuru Takashima,** College of Optical Sciences, The Univ. of Arizona (USA); **Din Ping Tsai,** Academia Sinica (Taiwan)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 19 . . . MON 8:30 AM TO 10:00 AM

Holographic Data Storage I

Session Chair: **Mark R. Ayres,** Akonia Holographics, LLC (USA)

8:30 am: **Holographic data storage: science fiction or science fact?** *(Invited Paper)*, Ken E. Anderson, Akonia Holographics, LLC (USA) . . . . . [9201-1]

9:00 am: **Data pages recording and reconstruction by dual-channel polarization holography with coherent addition method** *(Invited Paper)*, Daisuke Barada, Utsunomiya Univ. (Japan) . . . . . [9201-2]

9:30 am: **Formalization and experimental evaluation of cavity-enhanced holographic readout**, Bo E. Miller, Yuzuru Takashima, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9201-3]

9:45 am: **Digital synthesis, multiplexed recording, and data reconstruction of 1D-Fourier holograms in projection-type optical storage system**, Evgeny Y. Zlokazov, National Research Nuclear Univ. MEPhI (Russian Federation); Sergey Odinokov, Bauman Moscow State Technical Univ. (Russian Federation); Nikolay N. Evtikhiev, Rostislav S. Starikov, Vladimir Bobrinev, National Research Nuclear Univ. MEPhI (Russian Federation); Aleksander Betin, Sergey Donchenko, Bauman Moscow State Technical Univ. (Russian Federation) . . . . . [9201-4]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 19 . . . MON 10:30 AM TO 12:15 PM

Heat-assisted Magnetic Recording I

Session Chair: **Tim Rausch,** Seagate Technology LLC (USA)

10:30 am: **FePt heat assisted magnetic recording media: status and roadmap** *(Invited Paper)*, Dieter Weller, HGST (USA) . . . . . [9201-5]

11:00 am: **Novel characterization methods for HAMR recording** *(Invited Paper)*, Michael Alex, Xiao Wu, Alex Chernyshov, Matt Gibbons, Antony Ajan, Western Digital Corp. (USA) . . . . . [9201-6]

11:30 am: **Spin stand characterization of HAMR recording using pulsed laser light** *(Invited Paper)*, Kevin R. Heim, Edward C. Gage, Tim Rausch, Seagate Technology LLC (USA) . . . . . [9201-7]

12:00 pm: **Lubricant depletion under various laser heating conditions for heat assisted magnetic recording**, Shaomin Xiong, Haoyu Wu, David B. Bogy, Univ. of California, Berkeley (USA) . . . . . [9201-8]

Lunch Break . . . . . Mon 12:15 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 19 . . . . . MON 1:30 PM TO 3:15 PM

Emerging Technologies I

Session Chair: **Min Gu,** Swinburne Univ. of Technology (Australia)

1:30 pm: **Advances in macromolecular data storage** *(Invited Paper)*, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9201-9]

2:00 pm: **Plasmonic coupling effects for readout of nano recording marks** *(Invited Paper)*, Din Ping Tsai, Academia Sinica (Taiwan) . . . . . [9201-10]

2:30 pm: **Sapphire optical discs for long term data storage**, Andriy Kryuchyn, Viacheslav V. Petrov, Anatoliy S. Lapchuk, Semen M. Shanoylo, Yevgeniy Morozov, Institute for Information Recording (Ukraine) . . . . . [9201-11]

2:45 pm: **Multilayer optical data storage medium by nonlinear photobleaching**, Cory W. Christenson, Anuj Saini, Case Western Reserve Univ. (USA); Christopher J. Ryan, Jeremiah A. Heilman, Heather M. Lemire, Folio Photonics LLC (USA); Christoph Weder, Univ. of Fribourg (Switzerland); Jie Shan, Kenneth D. Singer, Case Western Reserve Univ. (USA). . . . . [9201-12]

3:00 pm: **Co-extruded organic films and optical system for multilayer optical data storage**, Christopher J. Ryan, Kenneth D. Singer, Cory W. Christenson, Jeremiah A. Heilman, Heather M. Lemire, Folio Photonics LLC (USA) . . . . [9201-13]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 19 . . . . . MON 3:45 PM TO 5:15 PM

Holographic Data Storage II

Session Chair: **Kenichi Shimada,** Hitachi, Ltd. (Japan)

3:45 pm: **Optical compensation and enhancement techniques for holographic digital data storage system** *(Invited Paper)*, Yuzuru Takashima, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9201-14]

4:15 pm: **Playback of beyond high definition video signal in holographic data storage system with wavefront compensation and parallel signal processing** *(Invited Paper)*, Tetsuhiko Muroi, Nobuhiro Kinoshita, Norihiko Ishii, Koji Kamijo, Hiroshi Kikuchi, NHK Japan Broadcasting Corp. (Japan). . . . . [9201-15]

4:45 pm: **Three-dimensional shifting tolerance for multilayer collinear holographic data storage**, Jinqiu Liu, Liangcai Cao, Qingsheng He, Guofan Jin, Tsinghua Univ. (China). . . . . [9201-16]

5:00 pm: **Influence of aberrations on signal-to-noise ratio in microholographic recording**, Ryuichi Katayama, Fukuoka Institute of Technology (Japan). . [9201-17]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Data read-out from the crystalline x-ray optical memory medium protected by thin cover layer, Robert H. Bezirganyan Jr., Hakob P. Bezirganyan, X-ROM, Inc. (USA) . . . . . [9201-34]

Six-dimensional optical storage utilizing wavelength selective, polarization sensitive, and reflectivity graded Bragg reflectors, Shangqing Liu, Willow Optics Corp. (Canada) . . . . . [9201-35]

Analysis of near-field method for optical data storage using microstrip probe under illumination and illumination-collection mode, Andriy Kryuchyn, Viacheslav V. Petrov, Institute for Information Recording (Ukraine); Anatoliy S. Lapchuk, Institute for Information Recording (Ukraine); Yevhenii Morozov, Institute for Information Recording (Ukraine) . . . . . [9201-36]

Storage capacity of collinear holographic storage system improved by lens-array reference modulation, Yeh-Wei Yu, Chih-Yuan Cheng, Ching-Cherng Sun, National Central Univ. (Taiwan) . . . . . [9201-37]

Construction principles of optical data storage system on the base of computer generated Fourier holograms, Evgeny Y. Zlokazov, National Research Nuclear Univ. MEPhI (Russian Federation); Sergey Odinokov, Bauman Moscow State Technical Univ. (Russian Federation); Nikolay N. Evtikhiev, Rostislav S. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation); Vladimir Bobrinev, Bauman Moscow State Technical Univ. (Russian Federation); Sergey N. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation); Alexander Betin, Bauman Moscow State Technical Univ. (Russian Federation) . . . . . [9201-38]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 19 . . . . TUE 8:30 AM TO 10:00 AM

Heat-assisted Magnetic Recording II

Session Chair: **Ryuichi Katayama,** Fukuoka Institute of Technology (Japan)

8:30 am: **Near and far field experiments of power transfer by mode beating in plasmonic devices** *(Invited Paper)*, Tobias Maletzky, Dayu Zhou, Eric Jin, Moris Dovek, Headway Technologies, Inc. (USA). . . . . [9201-18]

9:00 am: **Heat assisted magnetic recording performance and integration challenges** *(Invited Paper)*, Chris J. Rea, Seagate Technology LLC (USA) [9201-19]

9:30 am: **Effects of optical properties on power delivery and self-heating in near field transducers for heat-assisted magnetic recording**, Nan Zhou, Luis M. Traverso, Xianfan Xu, Purdue Univ. (USA). . . . . [9201-20]

9:45 am: **Multi-objective inverse design of near-field transducers for heat-assisted magnetic recording**, Samarth Bhargava, Eli Yablonovitch, Univ. of California, Berkeley (USA) . . . . . [9201-21]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 19 . . . . TUE 10:30 AM TO 12:15 PM

Emerging Technologies II

Session Chair: **Din Ping Tsai,** Academia Sinica (Taiwan)

10:30 am: **3D direct laser writing of petabyte optical disc** *(Invited Paper)*, Eugen Pavel, Storex Technologies Inc. (Romania). . . . . [9201-22]

11:00 am: **Prospects and philosophy for high-density optical recording** *(Invited Paper)*, Thomas D. Milster, The Univ. of Arizona (USA) . . . . . [9201-23]

11:30 am: **Optical solutions for ultra-high density data storage** *(Invited Paper)*, Min Gu, Yaoyu Cao, Xiangping Li, Zongsong Gan, Swinburne Univ. of Technology (Australia). . . . . [9201-24]

12:00 pm: **A high-NA solid immersion objective for imaging a Blu-ray disc and investigating subsurface damage**, Victor E. Densmore III, Youngsik Kim, College of Optical Sciences, The Univ. of Arizona (USA); Thomas D. Milster, Matthew C. Wattson, Dolaphine Kwok, The Univ. of Arizona (USA) . . . . . [9201-25]

Lunch/Exhibition Break . . . . . Tue 12:15 pm to 1:45 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 19 . . . . . TUE 1:45 PM TO 3:30 PM

Elemental Technologies

Session Chair: **Thomas D. Milster,** The Univ. of Arizona (USA)

1:45 pm: **Decoupling direct tracking control system for super-multilayer optical disk** *(Invited Paper)*, Yukinobu Tanaka, Hitachi, Ltd. (Japan). . . . . [9201-26]

2:15 pm: **Micromachining technologies for application in optical storage system** *(Invited Paper)*, Pei Li, Luping Shi, Jing Pei, Longfa Pan, Tsinghua Univ. (China) . . . . . [9201-27]

2:45 pm: **Metallic resist for phase change lithography** *(Invited Paper)*, Bi Jian Zeng, Jun Zhu Huang, Ri Wen Ni, Nian Nian Yu, Wei Wei, Yang Zhi Hu, Zhen Li, Xiangshui Miao, Huazhong Univ. of Science and Technology (China) . . . . [9201-28]

3:15 pm: **High-density data recording on the thin nanocomposite films by laser thermo-lithography**, Andriy Kryuchyn, Ivan Gorbov, Institute for Information Recording (Ukraine); Konstantin P. Grytsenko, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Olexei Tolmachev, Institute of Organic Chemistry (Ukraine) . . . . . [9201-29]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 19 . . . . . TUE 4:00 PM TO 5:30 PM

Holographic Data Storage III

Session Chair: **Yuzuru Takashima,** College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Progress in second-generation holographic data storage** *(Invited Paper)*, Mark R. Ayres, Ken E. Anderson, Fred Askham, Brad Sissom, Akonia Holographics, LLC (USA) . . . . . [9201-30]

4:30 pm: **Shift-peristrophic multiplexing for holographic data storage** *(Invited Paper)*, Hiroyuki Kurata, Tokyo Univ. of Science (Japan) . . . . . [9201-31]

5:00 pm: **Quantitative modeling of the reaction/diffusion kinetics of holographic photopolymers**, Benjamin A. Kowalski, Adam C. Urness, Michael C. Cole, Univ. of Colorado at Boulder (USA); William L. Wilson, Univ. of Illinois at Urbana-Champaign (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA) . . . . . [9201-32]

5:15 pm: **Homodyne detection of holographic memory systems**, Adam C. Urness, Univ. of Colorado at Boulder (USA) and Univ. of Illinois Urbana-Champaign (USA); Mark R. Ayres, Akonia Holographics, LLC (USA); William L. Wilson, Univ. of Illinois at Urbana-Champaign (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA) . . . . . [9201-33]

CONFERENCE 9202

LOCATION: CONV. CTR. ROOM 33A

Monday–Thursday 18–21 August 2014 • Proceedings of SPIE Vol. 9202

Photonic Applications for Aviation, Aerospace, Commercial, and Harsh Environments V

Conference Chairs: **Alex A. Kazemi,** The Boeing Co. (USA); **Bernard C. Kress,** Google (USA); **Edgar A. Mendoza,** Redondo Optics, Inc. (USA)

Conference Co-Chairs: **Syed H. Murshid,** Florida Institute of Technology (USA); **Nicolas Javahiraly,** Univ. de Strasbourg (France); **Abraham K. Ishihara,** Carnegie Mellon Silicon Valley (USA)

Program Committee: **Muhammad Z. Alam,** Univ. of Toronto (Canada); **Mathieu Aubailly,** Univ. of Maryland, College Park (USA); **Dayan Ban,** Univ. of Waterloo (Canada); **Shyam S. Bayya,** U.S. Naval Research Lab. (USA); **Lynda E. Busse,** U.S. Naval Research Lab. (USA); **Francois Caloz,** Diamond SA (Switzerland); **Sandy Cherian,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **George Cummings III,** The Boeing Co. (USA); **Bernard Dam,** Technische Univ. Delft (Netherlands); **Raffaella Di Sante,** Univ. degli Studi di Bologna (Italy); **Niloy K. Dutta,** Univ. of Connecticut (USA); **Fumio Futami,** Tamagawa Univ. (Japan); **Shan Gao,** Harbin Institute of Technology (China); **Leo R. Gauthier Jr.,** Johns Hopkins Univ. Applied Physics Lab. (USA); **Sangyoun Gee,** Raydiance, Inc. (USA); **Jon A. Greene,** Lambda Instruments, Inc. (USA); **Søren Grinderslev,** TE Connectivity Ltd. (USA); **Jyh-Jier J. Ho,** National Taiwan Ocean Univ. (Taiwan); **Melissa E. Jansen,** Johns Hopkins Univ. Applied Physics Lab. (USA); **Tae-il Kim,** Sungkyunkwan Univ. (Korea, Republic of); **Philipp G. Kornreich,** Syracuse Univ. (USA); **Brian A. Lail,** Florida Institute of Technology (USA); **Jony Jiang Liu,** U.S. Army Research Lab. (USA); **Patrick P. Meyrueis,** Ecole Nationale Supérieure de Physique de Strasbourg (France); **Nezih Mrad,** Defence Research and Development Canada, Ottawa (Canada); **Juock S. Namkung,** Naval Air Warfare Ctr. Aircraft Div. (USA); **Kayo Ogawa,** Japan Women's Univ. (Japan); **Allen S. Panahi,** Pentair Inc. (USA); **Douglas A. Parker,** Esterline Souriau USA (USA); **Jean-Pierre Redouté,** Amphenol Air LB (France); **William Reid,** Amphenol Fiber Systems International (USA); **Ehsan Saeedi,** Google (USA); **Khaled Sarayeddine,** OPTINVENT S.A. (France); **Indu F. Saxena,** DynamedX (USA); **Dipankar Sengupta,** Univ. degli Studi di Padova (Italy); **Balaji Srinivasan,** Indian Institute of Technology Madras (India); **Guo-Dung Su,** National Taiwan Univ. (Taiwan); **Simon Thibault,** Univ. Laval (Canada); **Josef Vojtech,** CESNET z.s.p.o. (Czech Republic); **Tao Wu,** Nanchang Hangkong Univ. (China); **Chien-Hung Yeh,** Industrial Technology Research Institute (Taiwan)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Considerations for application of Laguerre-Gaussian beam wave in optical wireless communication, Kayo Ogawa, Aya Saito, Japan Women's Univ. (Japan) . . . . . [9202-51]

Materials and designs in multifunctional, injectable optoelectronic devices for optogenetics, Junsik Kim, Byeonghak Park, Hyejin Jang, Sungkyunkwan Univ. (Korea, Republic of); Tae-il Kim, Sungkyunkwan Univ. (Korea, Republic of) and Ctr. for Neuroscience Imaging Research (Korea, Republic of) . . . . . [9202-62]

Performance evaluation of SE solar cells with laser opening and single-step diffusion, Jyh-Jier J. Ho, National Taiwan Ocean Univ. (Taiwan). . . . . [9202-63]

Dimensional stability of materials based on Portland cement in the early stages of setting, Angelica M. Mesa Yandy, CONICET La Plata (Argentina) and Ctr. de Investigaciones Ópticas (Argentina) and Univ. Nacional de la Plata (Argentina); Raúl L. Zerbino, CONICET La Plata (Argentina) and Univ. Nacional de la Plata (Argentina); Graciela M. Giaccio, Comisión de Investigaciones Científicas (Argentina) and Univ. Nacional de la Plata (Argentina); Nelida A. Russo, Comisión de Investigaciones Científicas (Argentina) and Ctr. de Investigaciones Ópticas (Argentina); Ricardo Duchowicz, CONICET La Plata (Argentina) and Comisión de Investigaciones Científicas (Argentina) and Univ. Nacional de la Plata (Argentina) . . . . . [9202-64]

Method for separating video camera motion from scene motion for constrained 3D displacement measurements, Leo R. Gauthier Jr., Melissa E. Jansen, John R. Meyer, Johns Hopkins Univ. Applied Physics Lab., LLC (USA) . . . . . [9202-65]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33A . .TUE 8:00 AM TO 10:00 AM

Fiber Optic Sensor Systems

Session Chair: **Alex A. Kazemi,** The Boeing Co. (USA)

8:00 am: **Fiber optic liquid level sensor system for aviation applications** *(Invited Paper)*, Alex A. Kazemi, The Boeing Co. (USA) . . . . . [9202-1]

8:30 am: **Eye readable metal hydride based hydrogen tape sensor for health applications**, Bernard Dam, Peter Ngene, Herman Schreuders, Technische Univ. Delft (Netherlands) . . . . . [9202-2]

8:50 am: **A novel temperature-compensated FBG-based sensor with variable sensitivity**, Raffaella Di Sante, Univ. degli Studi di Bologna (Italy); Filippo Bastianini, Sestosensor srl (Italy); Lorenzo Donati, Paolo Proli, Univ. degli Studi di Bologna (Italy) . . . . . [9202-3]

9:10 am: **Hydrogen leak detection: a comparison between fiber optic sensors based on different sensitive materials** *(Invited Paper)*, Nicolas Javahiraly, Cedric Perrotton, Univ. of Strasbourg (France); Patrick Meyrueis, Univ. de Strasbourg (France) . . . . . [9202-4]

9:40 am: **Integrated optical hydrogen and temperature sensors on silicon-on-insulator platform**, Muhammad Z. Alam, Nicholas Carriere, Mo Mojahedi, J. S. Aitchison, Univ. of Toronto (Canada) . . . . . [9202-5]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

WEDNESDAY 20 AUGUST

SESSION 2

LOCATION: CONV. CTR. ROOM 33A . . TUE 10:30 AM TO 11:50 AM

Optical Sensors and Interconnects for Harsh Environments

Session Chair: **Edgar A. Mendoza,** Redondo Optics, Inc. (USA)

10:30 am: **Development of internal components for M38999 type connectors, for use in advanced photonic applications and with specialty optical fibers**, Alan Whitebook, Diamond USA Inc. (USA); Francois Caloz, Diamond SA (Switzerland) . . . . . [9202-7]

10:50 am: **Application suitability and reliability of harsh environment fiber optic interconnects**, William M. Reid, Amphenol Fiber Systems International (USA) . . . . . [9202-8]

11:10 am: **Use of the characteristic Raman lines of toluene (C7 H8) as a precise frequency reference on the spectral analysis of gasoline-ethanol blends**, Nicolas Javahiraly, Valentin Ortega Clavero, Univ. of Strasbourg (France); Andreas Weber, Werner W. Schröder, Hochschule Offenburg (Germany); Patrick Meyrueis, Univ. de Strasbourg (France). . . . . [9202-9]

11:30 am: **Novel optical encoder for harsh environments**, Bernard C. Kress, USI Photonics Inc. (USA); Vincent Brac de la Pierriere, Univ. de Strasbourg (France) . . . . . [9202-10]

Lunch/Exhibition Break . . . . . Tue 11:50 am to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33A . . . . TUE 1:50 PM TO 3:00 PM

Wearable Displays

Session Chair: **Bernard C. Kress,** Google (USA)

1:50 pm: **The segmentation of the HMD industry: smart glasses, gaming devices, professional AR, and defense** *(Invited Paper)*, Bernard C. Kress, Ehsan Saeedi, Google (USA) . . . . . [9202-11]

2:20 pm: **Monolithic light guide optics enabling new user experience for see-through AR glasses**, Khaled Sarayeddline, OPTINVENT S.A. (France). . . [9202-12]

2:40 pm: **Parity-time (PT) symmetry diffractives implementing see through optics**, Bernard C. Kress, USI Photonics Inc. (USA); Mykola Kulishov, HTA Enterprises (USA) . . . . . [9202-14]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 33A . . . . TUE 3:30 PM TO 5:20 PM

Optics and Photonics in Aviation and Commercial Industries

Session Chair: **Nicolas Javahiraly,** Télécom Physique Strasbourg (France)

3:30 pm: **Environmental tests of antireflective surface structures on windows for high energy laser applications** *(Invited Paper)*, Lynda E. Busse, Jesse A. Frantz, Shyam S. Bayya, L. Brandon Shaw, U.S. Naval Research Lab. (USA); Menelaos K. Poutous, Rajendra Joshi, The Univ. of North Carolina at Charlotte (USA); Ishwar D. Aggarwal, Sotera Defense Solutions, Inc. (USA); Jas S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9202-15]

4:00 pm: **Optical and piezoelectric properties of p-type ZnO nanowires on transparent flexible substrate for energy harvesting**, Guocheng Liu, Dayan Ban, Univ. of Waterloo (Canada) . . . . . [9202-16]

4:20 pm: **Investigation on harsh environmental effects on polymer fiber optic link for aircraft systems**, Sandy Cherian, Holger Spangenberg, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Reinhard Caspary, Technische Univ. Braunschweig (Germany). . . . . [9202-17]

4:40 pm: **Analysis and comparison of experimental and simulated results for an omnidirectional free space optical receiver architecture**, Syed H. Murshid, Grogory L. Lovell, Michael F. Finch, Florida Institute of Technology (USA) [9202-18]

5:00 pm: **The health risks associated with energy efficient fluorescent, LEDs, and artificial lighting**, Allen S. Panahi, Pentair Ltd. (USA). . . . . [9202-19]

SESSION 5

LOCATION: CONV. CTR. ROOM 33A . WED 8:00 AM TO 10:10 AM

Sensors and Monitoring Systems

Session Chair: **Syed H. Murshid,** Florida Institute of Technology (USA)

8:00 am: **Light weight, high-speed, and self-powered wireless fiber optic sensor (WiFOS) structural health monitor system for avionics and aerospace environments** *(Invited Paper)*, Edgar A. Mendoza, Yan Esterkin, Connie Kempen, Sunjian Sun, Redondo Optics, Inc. (USA). . . . . [9202-20]

8:30 am: **Results of sapphire optical fiber strain and temperature sensor testing up to 1600 C for next-gen nuclear reactors**, Jon A. Greene, Lambda Instruments, Inc. (USA); Robert S. Fielder, TechOpp Consulting Inc. (USA); Megan D. Enzinna, Kevin Flanagan, Lambda Instruments, Inc. (USA) . . . . . [9202-21]

8:50 am: **Distributed fiber optic sensor based on correlation coded Brillouin scattering for long range condition monitoring**, Prasanth P. P., Shahna M. Haneef, Bhargav Somepalli, Deepa Venkitesh, Balaji Srinivasan, Indian Institute of Technology Madras (India) . . . . . [9202-22]

9:10 am: **Pest damage estimation using thermal imaging**, Badrinath Vadakkapattu Canthadai, M. Esakki Muthu Raju, Vidya Jyothi Institute of Technology (India); Vengalrao Pachava, National Institute of Technology, Warangal (India); Dipankar Sengupta, Univ. degli Studi di Padova (Italy). . . . . [9202-23]

9:30 am: **High speed all-optical PRBS generation using binary phase shift keyed signal based on QD-SOA**, Wenbo Li, Hongyu Hu, Niloy K. Dutta, Univ. of Connecticut (USA). . . . . [9202-24]

9:50 am: **Remote fluorescence lifetime inspection of hermeticity of packaged food containers**, Edgar A. Mendoza, Yan Esterkin, Connie Kempen, Sunjian Sun, Redondo Optics, Inc. (USA) . . . . . [9202-25]

Coffee Break . . . . . Wed 10:10 am to 10:40 am

SESSION 6

LOCATION: CONV. CTR. ROOM 33A WED 10:40 AM TO 12:00 PM

Specialty Sensors/Communication Networking

Session Chair: **Abraham K. Ishihara,** Carnegie Mellon Silicon Valley (USA)

10:40 am: **Utilizing self-seeding RSOA with Faraday rotator mirror for colorless access network**, Yu-Fu Wu, Jiun-Yu Sung, National Chiao Tung Univ. (Taiwan); Chien-Hung Yeh, Industrial Technology Research Institute (Taiwan); Chi-Wai Chow, National Chiao Tung Univ. (Taiwan) . . . . . [9202-26]

11:00 am: **Demonstration of 2.5 Gbit/sec free space optical communication by Y-00 cipher for secure aviation system**, Fumio Futami, Osamu Hirota, Tamagawa Univ. (Japan) . . . . . [9202-27]

11:20 am: **All optical two way time transmission over strongly heterogeneous networks**, Josef Vojtech, Vladimir Smotlacha, CESNET z.s.p.o. (Czech Republic) . . . . . [9202-28]

11:40 am: **Fiber optic sensor for vibration detection**, Nicolas Javahiraly, Ayoub Chakari, Univ. of Strasbourg (France) . . . . . [9202-29]

Lunch/Exhibition Break . . . . . Wed 12:00 pm to 1:30 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 33A . . . WED 1:30 PM TO 3:20 PM

Multi-Components Measurements

Session Chair: **Soren Grinderslev,** TE Connectivity Ltd. (USA)

1:30 pm: **An order of magnitude improvement in optical fiber bandwidth using spatial domain multiplexing/space division multiplexing (SDM) in conjunction with orbital angular momentum (OAM)** *(Invited Paper)*, Syed H. Murshid, Saud Alanzi, Arnob Hridoy, Bilas Chowdhury, Florida Institute of Technology (USA); Abhijit Chakravarty, Gurinder S. Parhar, EMCORE Corp. (USA). . . . . [9202-30]

2:00 pm: **Development and deployment of a cavity enhanced UV-LED spectrometer for measurements of atmospheric HONO and NO_2 in Hong Kong**, Tao Wu, Nanchang Hangkong Univ. (China); Qiaozhi Zha, The Hong Kong Polytechnic Univ. (China); Weidong Chen, Univ. du Littoral Côte d'Opale (France); Zheng Xu, Tao Wang, The Hong Kong Polytechnic Univ. (China); Xingdao He, Nanchang Hangkong Univ. (China). . . . . [9202-31]

CONFERENCE 9202

LOCATION: CONV. CTR. ROOM 33A

2:20 pm: **Analysis of dispersion compensation all-pass filter using micro-ring resonators**, Ajay Kumar, Santosh Kumar, Indian School of Mines (India) . [9202-32]

2:40 pm: **Ranging light sensing guide with periodic structure**, Philipp G. Kornreich, Syracuse Univ. (USA). . . . . [9202-33]

3:00 pm: **Real-time atmospheric imaging and processing with hybrid adaptive optics and hardware accelerated lucky-region fusion (LRF) algorithm**, Jony Jiang Liu, Gary W. Carhart, Leonid A. Beresnev, U.S. Army Research Lab. (USA); Mathieu Aubailly, Univ. of Maryland, College Park (USA); Fouad E. Kiamilev, Christopher R. Jackson, Garrett A. Ejzak, Univ. of Delaware (USA) . . . . . [9202-34]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 33A . . WED 3:50 PM TO 6:00 PM

WDM, Hybrid, and Space Architectures

Session Chair: **Bernard Dam,** Technische Univ. Delft (Netherlands)

3:50 pm: **LPFG sensing network for distributed shape optimization** *(Invited Paper)*, Abraham K. Ishihara, Shahar Ben-Menahem, Carnegie Mellon Silicon Valley (USA); Alex A. Kazemi, The Boeing Co. (USA) . . . . . [9202-35]

4:20 pm: **Analysis of an all optical de-multiplexer architecture utilizing bevel design for spatially multiplexed optical fiber communication systems**, Syed H. Murshid, Michael F. Finch, Gregory L. Lovell, Florida Institute of Technology (USA) . . . . . [9202-36]

4:40 pm: **Analysis of spatial domain multiplexing/space division multiplexing (SDM) based hybrid architectures operating in tandem with wavelength division multiplexing**, Syed H. Murshid, Bilas Chowdhury, Arnob Hridoy, Saud Alanzi, Florida Institute of Technology (USA); Abhijit Chakravarty, Gurinder S. Parhar, EMCORE Corp. (USA). . . . . [9202-37]

5:00 pm: **Rollable nano-etched diffractive low-concentration PV sheets for space applications**, Abraham K. Ishihara, Vincent Brac de la Pierriere, Shahar Ben-Menahem, Bernard C. Kress, Carnegie Mellon Silicon Valley (USA); Gregory A. Dorais, Kalmanje Krishnakumar, NASA Ames Research Ctr. (USA) . . . . . [9202-38]

5:20 pm: **Harsh environment fiber optic connector testing methods**, Douglas A. Parker, Esterline Connection Technology (USA) and Souriau USA, Inc. (USA) . . . . . [9202-39]

5:40 pm: **Multi-spectral pyrometer for gas turbine blade temperature measurement**, Shan Gao, Lixin Wang, Harbin Institute of Technology (China); Chi Feng, Harbin Engineering Univ. (China) . . . . . [9202-40]

THURSDAY 21 AUGUST

SESSION 9

LOCATION: CONV. CTR. ROOM 33A . . THU 8:10 AM TO 10:00 AM

Photonics Systems and Components

Session Chair: **Jony Jiang Liu,** U.S. Army Research Lab. (USA)

8:10 am: **Concentric circles based simple optical landing aid for vertical takeoff and landing aircrafts**, Syed H. Murshid, Gregory L. Lovell, Rayan Enaya, Florida Institute of Technology (USA) . . . . . [9202-67]

8:30 am: **Micro packaging of hermetic seal mini dual in line laser diode module for aerospace applications** *(Invited Paper)*, Alex A. Kazemi, The Boeing Co. (USA); Eric Y. Chan, Dennis G. Koshinz, Boeing Research and Technology (USA)[9202-41]

9:00 am: **Making hexagonal electrodes on Nafion for deformable mirrors applications**, Po-Jung Huang, Guo-Dung Su, National Taiwan Univ. (Taiwan) . . . . . [9202-43]

9:20 am: **Mode splitting and resonant coupling between a slot metasurface and PMMA**, Michael F. Finch, Brian A. Lail, Florida Institute of Technology (USA) . . . . . [9202-44]

9:40 am: **Supercontinuum generation in tapered rib waveguide**, Hongyu Hu, Wenbo Li, Niloy K. Dutta, Univ. of Connecticut (USA) . . . . . [9202-45]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 10

LOCATION: CONV. CTR. ROOM 33A . THU 10:30 AM TO 12:00 PM

Optical Systems, Sources, and Components for Harsh Environment

Session Chair: **Raffaella Di Sante,** Univ. degli Studi di Bologna (Italy)

10:30 am: **Rugged sensor window materials for harsh environments** *(Invited Paper)*, Shyam S. Bayya, Guillermo Villalobos, Woohong R. Kim, Jas S. Sanghera, U.S. Naval Research Lab. (USA); Ishwar D. Aggarwal, Sotera Defense Solutions, Inc. (USA). . . . . [9202-47]

11:00 am: **Circular polarized leaky wave surface**, Franklin Manene, Brian A. Lail, Florida Institute of Technology (USA); Edward C. Kinzel, Missouri Univ. of Science and Technology (USA). . . . . [9202-48]

11:20 am: **Analysis of LPFG sensor systems for aircraft wing drag optimization**, Alex A. Kazemi, ARK International (USA); Abe Ishihara, Carnegie Mellon Univ. (USA) . . . . . [9202-49]

11:40 am: **Thermo-electro-opto modeling and optimization of a novel diffractive low concentration photovoltaic (LCPV) design**, Abraham K. Ishihara, Carnegie Mellon Silicon Valley (USA) . . . . . [9202-50]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:40 pm

SESSION 11

LOCATION: CONV. CTR. ROOM 33A . . . THU 1:40 PM TO 3:00 PM

Fiber Optic Sensors/Wireless Systems/ Spectral Analysis

Session Chair: **Lynda E. Busse,** U.S. Naval Research Lab. (USA)

1:40 pm: **A displacement and rotation sensor for spatial and rough conditions of use, based on micro polarimetric imaging**, Francis Georges, Univ. de Strasbourg (France); Mustapha Remouche, Volumion Company Strasbourg (France); Patrick Meyrueis, Univ. de Strasbourg (France). . . . . [9202-52]

2:00 pm: **Nanomaterial enabled evanescent wave absorption spectroscopy based sensors for high temperature, harsh environment sensing**, Paul R. Ohodnicki Jr., Michael P. Buric, Congjun Wang, National Energy Technology Lab. (USA) . . . . . [9202-53]

2:20 pm: **Pressure measurements using fiber Bragg gratings**, Nezih Mrad, Defence Research and Development Canada (Canada); Vasant Sridharan, Univ. of Waterloo (Canada). . . . . [9202-54]

2:40 pm: **Direct B-integral measurement, and SPM compensation in fiber optic CPA systems**, Sangyoun Gee, Michael M. Mielke, Raydiance, Inc. (USA) [9202-55]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 12

LOCATION: CONV. CTR. ROOM 33A . . . THU 3:30 PM TO 5:30 PM

Bragg Grating Sensors/3D Displacement

Session Chair: **Leo R. Gauthier Jr.,** Johns Hopkins Univ. Applied Physics Lab., LLC (USA)

3:30 pm: **Single video camera method for using scene metrics to measure constrained 3D displacements**, Leo R. Gauthier Jr., Melissa E. Jansen, John R. Meyer, Johns Hopkins Univ. Applied Physics Lab., LLC (USA) . . . . . [9202-56]

3:50 pm: **Highly distributed multi-point, temperature and pressure compensated, fiber optic oxygen sensors (FOxSense) for aircraft fuel tank environmental and safety monitoring**, Edgar A. Mendoza, Yan Esterkin, Connie Kempen, Sunjian Sun, Redondo Optics, Inc. (USA) . . . . . [9202-57]

4:10 pm: **Fiber optic sensitizer coatings: materials and applications** *(Invited Paper)*, Indu F. Saxena, Intelligent Optical Systems, Inc. (USA) . . . . . [9202-58]

4:30 pm: **Highly reproducible Bragg grating acousto-ultrasonic contact transducers**, Indu F. Saxena, Intelligent Optical Systems, Inc. (USA) . . . [9202-59]

4:50 pm: **Fiber optic connectors for harsh environment of aviation and aerospace applications**, Alex A. Kazemi, ARK International (USA) . . . . . [9202-66]

5:10 pm: **Generation of dynamic Brillouin grating in polarization maintaining fiber**, Dipankar Sengupta, Marco Santagiustina, Fabrizio Chiarello, Univ. degli Studi di Padova (Italy). . . . . [9202-61]

CONFERENCE 9203

LOCATION: CONV. CTR. ROOM 2

Sunday - Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9203

Interferometry XVII: Techniques and Analysis

Conference Chairs: **Katherine Creath,** Optineering (USA), The Univ. of Arizona (USA); **Jan Burke,** Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Joanna Schmit,** Bruker Nano Surfaces Division (USA)

Conference Co-Chair: **Catherine E. Towers,** Univ. of Leeds (United Kingdom)

Program Committee: **Astrid Aksnes,** Norwegian Univ. of Science and Technology (Norway); **Armando Albertazzi Gonçalves Jr.,** Univ. Federal de Santa Catarina (Brazil); **Brent C. Bergner,** KLA-Tencor Corp. (USA); **Nicholas Devaney,** National Univ. of Ireland, Galway (Ireland); **Arnaud Dubois,** Institut d'Optique (France); **David I. Farrant,** Commonwealth Scientific and Industrial Research Organisation (Australia); **Cosme Furlong,** Worcester Polytechnic Institute (USA); **Angarai R. Ganesan,** Indian Institute of Technology Madras (India); **Ulf Griesmann,** National Institute of Standards and Technology (USA); **Tobias Haist,** Univ. Stuttgart (Germany); **Guillermo H. Kaufmann,** Univ. Nacional de Rosario (Argentina); **Seung-Woo Kim,** KAIST (Korea, Republic of); **Klaus Mantel,** Max-Planck-Institut für die Physik des Lichts (Germany); **Michael B. North Morris,** 4D Technology Corp. (USA); **Yukitoshi Otani,** Utsunomiya Univ. (Japan); **Jannick P. Rolland,** Univ. of Rochester (USA); **Horst Schreiber,** Corning Incorporated (USA); **Manuel Servin,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Peng Su,** College of Optical Sciences, The Univ. of Arizona (USA); **Mitsuo Takeda,** Utsunomiya Univ. (Japan) and Univ. of Electro-Communications (Japan); **Benito Vazquez Dorrío,** Univ. de Vigo (Spain); **Song Zhang,** Iowa State Univ. (USA)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 2 . . . . . 1:20 PM TO 1:30 PM

Welcome and Opening Remarks

Katherine Creath, Optineering (USA) and The Univ. of Arizona (USA); **Jan Burke**, Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Joanna Schmit**, Bruker Nano Surfaces Division (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 2 . . . . . SUN 1:30 PM TO 3:30 PM

Digital Holography and Speckle

Session Chair: **Jan Burke,** Bremer Institut für angewandte Strahltechnik GmbH (Germany)

1:30 pm: **Complete shape measurement of micro parts by digital holography**, Silke Huferath-von Luepke, Reiner Klattenhoff, Colin Dankwart, Claas Falldorf, Ralf B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) . . . . . [9203-1]

1:50 pm: **Development of in-plane and out-of-plane deformation simultaneous measurement method for the analysis of buckling**, Yasuhiko Arai, Kansai Univ. (Japan). . . . . [9203-2]

2:10 pm: **Real-time processing of off-axis interferograms: from the camera to the user**, Pinhas Girshovitz, Tamir Gabai, Natan T. Shaked, Tel Aviv Univ. (Israel) . . . . . [9203-3]

2:30 pm: **Dual-wavelength digital holography: single shot calibration**, Davood Khodadad, Per Bergström, Luleå Univ. of Technology (Sweden); Emil Hällstig, Optronic (Sweden); Mikael Sjödahl, Luleå Univ. of Technology (Sweden) . . [9203-4]

2:50 pm: **Transparent stepped phase measurement using two illuminating beams**, Behnam Tayebi, Farnaz Sharif, Mohammad Reza Jafarfard?, Dug Young Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9203-5]

3:10 pm: **ITIA: Tripling the field-of-view in off-axis interferometric phase microscopy**, Irena Frenklach, Pinhas Girshovitz, Natan T. Shaked, Tel Aviv Univ. (Israel) . . . . . [9203-6]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 2 . . . . . SUN 4:00 PM TO 5:30 PM

Fabry-Perot and Fiber Sensors

Session Chair: **Peng Su,** College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Practical Fabry-Perot displacement interferometry in ambient air conditions with subnanometer accuracy** *(Invited Paper)*, Dirk Voigt, Arthur S. van de Nes, Steven A. van den Berg, VSL Dutch Metrology Institute (Netherlands) . . . . . [9203-7]

4:30 pm: **Simultaneous determination of thickness and refractive indices of birefringent wafer by simple transmission measurement**, Hee Joo Choi, Jun Yeol Ryu, Myoungsik Cha, Pusan National Univ. (Korea, Republic of). . . . . [9203-8]

4:50 pm: **Interferometric system for detecting radiation wavelength shift**, Pavel Brazhnikov, Vasiliy Andrianov, Oleg Koltovoy, Alexander Tikhov, All-Russia Research Institute of Automatics (Russian Federation) . . . . . [9203-9]

5:10 pm: **Mode-mode interference sensor with increasing number of modes along the multimode optical fiber**, Oleg Kotov, Ivan Chapalo, Andrey Medvedev, St. Petersburg State Polytechnical Univ. (Russian Federation) . . . . . [9203-10]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 2 . . . . MON 8:40 AM TO 10:30 AM

Deflectometry and Shearography

Session Chairs: **Song Zhang,** Iowa State Univ. (USA); **A. R. Ganesan,** Indian Institute of Technology Madras (India)

8:40 am: **A comparative study between deflectometry and shearography for detection of subsurface defects** *(Invited Paper)*, Philipp Huke, Jan Burke, Ralf B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) . . . . . [9203-11]

9:10 am: **A trial for a reliable shape measurement using interferometry and deflectometry**, Ryohei Hanayama, The Graduate School for the Creation of New Photonics Industries (Japan). . . . . [9203-41]

9:30 am: **Stability of absolute depth reconstruction from deflectometric measurement data**, Alexey V. Pak, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany). . . . . [9203-12]

9:50 am: **Measuring deformations with deflectometry**, Wansong Li, VEW Vereinigte Elektronik Werkstätten GmbH (Germany); Philipp Huke, Jan Burke, Bremer Institut für angewandte Strahltechnik GmbH (Germany); Christoph von Kopylow, VEW Vereinigte Elektronik Werkstätten GmbH (Germany); Ralf B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) . . . . . [9203-14]

10:10 am: **Spurious mid-spatial frequency structure on optical surfaces reconstructed from surface slope measurements**, Yue Dong, The Univ. of North Carolina at Charlotte (USA); Zahra Hosseinimakarem, Univ. of North Carolina at Charlotte (USA); Angela Davies, Christopher Evans, The Univ. of North Carolina at Charlotte (USA) . . . . . [9203-15]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

CONFERENCE 9203

LOCATION: CONV. CTR. ROOM 2

SESSION 4

LOCATION: CONV. CTR. ROOM 2 . . . . MON 11:00 AM TO 12:00 PM

Self-Calibration

Session Chair: **Klaus Mantel,** Max-Planck-Institut für die Physik des Lichts (Germany)

11:00 am: **Effect of alignment and tolerances on reverse raytrace calibration**, Kyle C. Heideman, John E. Greivenkamp, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9203-16]

11:20 am: **Characterization of field dependent aberrations in Fizeau interferometer using double Zernike polynomials**, Hung-Sheng Chang, Chao-Wen Liang, National Central Univ. (Taiwan); Po-Chih Lin, Ming-Sen Tsao,, National Central Univ (Taiwan) . . . . . [9203-17]

11:40 am: **A large field-of-view scene measurement based on control points with a single camera**, Yu Zhao, Di Zhang, Yan Li, Hui Liu, Univ. of Science and Technology of China (China); Lichao Xu, Univ. of Electronic Science and Technology of China (China); Lichun Zhu, National Astronomical Observatories (China); Weimin Li, Univ. of Science and Technology of China (China) . . . [9203-18]

Lunch Break . . . . . .Mon 12:00 pm to 1:30 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 2 . . . . . MON 1:30 PM TO 3:00 PM

Fringe Analysis I

Session Chair: **Michael B. North Morris,** 4D Technology Corp. (USA)

1:30 pm: **Hilbert-Huang processing and analysis of complex fringe patterns** *(Invited Paper)*, Maciej Trusiak, Krzysztof Patorski, Maciej Wielgus, Warsaw Univ. of Technology (Poland) . . . . . [9203-19]

2:00 pm: **Improvement of defect detection in shearography by using principal component analysis**, Jean-François Vandenrijt, Nicolas Lievre, Marc P. Georges, Univ. de Liège (Belgium) . . . . . [9203-20]

2:20 pm: **Links between fringe pattern analysis and digital image correlation: windowed, optimal, and tracking (WOT)**, Kemao Qian, Nanyang Technological Univ. (Singapore) . . . . . [9203-21]

2:40 pm: **Wavelet transform: capabilities expanded**, Krzysztof Pokorski, Krzysztof Patorski, Warsaw Univ. of Technology (Poland) . . . . . [9203-22]

Coffee Break . . . . . .Mon 3:00 pm to 3:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 2 . . . . . MON 3:30 PM TO 4:50 PM

Fringe Analysis II

Session Chair: **Armando Albertazzi Gonçalves Jr.,** Univ. Federal de Santa Catarina (Brazil)

3:30 pm: **Performance evaluation of a phase retrieval algorithm from sequences of interferograms with unknown phase shifts using generalized N-dimensional Lissajous figures**, Armando Albertazzi Gonçalves Jr., Analucia V. Fantin, Mauro E. Benedect, Daniel P. Willemann, Allison F. Maia, Univ. Federal de Santa Catarina (Brazil) . . . . . [9203-24]

3:50 pm: **Estimation of the temperature of a flame with asymmetric profile**, Efrén González-Ramírez, Univ. Autónoma de Zacatecas (Mexico); Luis Raúl Berriel Valdos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Jóse G. Arceo Olague, Enrique de la Rosa Miranda, Carlos Alberto Olvera-Olvera, Tonatiuh Saucedo Anaya, José Ismael de la Rosa Vargas, José de Jesús Villa Hernández, Univ. Autónoma de Zacatecas (Mexico) . . . . . [9203-23]

4:10 pm: **Design of new window function of phase extraction algorithm in wavelength tuning Fizeau interferometer**, Yangjin Kim, The Univ. of Tokyo (Japan); Kenichi Hibino, National Institute of Advanced Industrial Science and Technology (Japan); Naohiko Sugita, Mamoru Mitsuishi, The Univ. of Tokyo (Japan) . . . . . [9203-25]

4:30 pm: **Application of a swarm-based approach for phase unwrapping**, Lucas da Silva Maciel, Armando Albertazzi Gonçalves Júnior Jr., Univ. Federal de Santa Catarina (Brazil) . . . . . [9203-27]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Phase unwrapping using a surface mesh with constraints, José G. Arceo Olague, Univ. Autónoma de Zacatecas (Mexico); Luis Raúl Berriel Valdos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Enrique de la Rosa Miranda, Efrén González Ramírez, Carlos Alberto Olvera-Olvera, Tonatiuh Saucedo Anaya, José Ismael de la Rosa Vargas, José Ismael de la Rosa Vargas, Univ. Autónoma de Zacatecas (Mexico) . . . . . [9203-26]

Fiber-optic laser Doppler velocimeter with non-mechanical scanning of spatially encoded points for cross-sectional velocity distribution measurement, Koichi Maru, Kento Watanabe, Kagawa Univ. (Japan) . . . [9203-40]

Experiment analysis of freeform testing based on absolute testing method, Xin Jia, Fuchao Xu, Tingwen Xing, Institute of Optics and Electronics (China). [9203-44]

Digital holographic moiré patterns for optical numerical code generation, Gabriela N. de Oliveira, Marcos E. de Oliveira, Rosembergue B. Freire Jr., Paulo Acioly M. dos Santos, Univ. Federal Fluminense (Brazil) . . . . . [9203-48]

Measure of a zinc oxide (ZnO) film thickness using a point diffraction interferometer, Esteban Rueda-Soriano, Heberto Gómez-Pozos, José L. González-Vidal, Univ. Autónoma del Estado de Hidalgo (Mexico); A. Muñoz Potosi, Luis G. Valdivieso-González, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [9203-50]

An interferometric humidity sensor based on thin gelatin films, Sergio Calixto-Carrera, Areli Montes Pérez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) . . . . . [9203-51]

IDIA: doubling the recorded imaging area or the frame rate in off-axis interferometric microscopy, Pinhas Girshovitz, Natan T. Shaked, Tel Aviv Univ. (Israel) . . . . . [9203-52]

Periodic error characterization in commercial heterodyne interferometer using an external cavity diode laser based Fabry-Perot interferometer, Minhao Zhu, Haoyun Wei, Yan Li, Tsinghua Univ. (China) . . . . . [9203-53]

Shaping intensity behind amplitude masks for proximity correction lithography: design, measurement, and realization, Krishnaparvathy Puthankovilakam, Toralf Scharf, Qing Tan, Hans Peter Herzig, David Nguyen, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Uwe Vogler, Arianna Bramati, Reinhard Volkel, SUSS MicroOptics SA (Switzerland) . . . . . [9203-54]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 2 . . . . . TUE 8:40 AM TO 10:20 AM

Microscopy

Session Chair: **Joanna Schmit,** Bruker AXS, Inc. (USA)

8:40 am: **Interferometric microscope with true color imaging**, Jake L. Beverage, Xavier Colonna De Lega, Martin F. Fay, Zygo Corporation (USA) . . . . . [9203-29]

9:00 am: **Dual-wavelength diffraction phase microscopy for real-time dispersion measurement**, Mohammad Reza Jafarfard, Behnam Tayebi, Dug Young Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9203-30]

9:20 am: **Reduction of the stagnation effect by combined iterative and deterministic single beam phase retrieval techniques**, Konstantinos Falaggis, Warsaw Univ. of Technology (Poland) . . . . . [9203-31]

9:40 am: **Comparison of full-field interferometric measurement techniques applied to small vibration amplitudes determination**, Adam R. Styk, Warsaw Univ. of Technology (Poland) . . . . . [9203-32]

10:00 am: **Three dimensional photothermal microscopy of KDP crystals**, Jian Chen, Jingtao Dong, Qi Zhang, Zhouling Wu, ZC Optoelectronic Technologies, Ltd. (China) . . . . . [9203-33]

Coffee Break . . . . . Tue 10:20 am to 10:50 am

SESSION 8

LOCATION: CONV. CTR. ROOM 2 . . . . TUE 10:50 AM TO 12:00 PM

High-Precision Techniques

Session Chair: **Astrid Aksnes,** Norwegian Univ. of Science and Technology (Norway)

10:50 am: **Overview of the optic component manufacturing and measurements for Advanced Virgo optics** *(Invited Paper)*, Andrew D. Nelson, Aleksandr Estrin, Zygo Corporation (USA) . . . . . [9203-34]

11:20 am: **A novel linear sagnac interferometer in position determination of perturbations**, Shaohua Pi, Bingjie Wang, Jiang Zhao, Guangwei Hong, Dong Zhao, Bo Jia, Fudan Univ. (China). . . . . [9203-35]

11:40 am: **Effects of environmental instability on phase-sensitive optical frequency domain reflectometry**, Martha I. Bodine, Univ. of Colorado at Boulder (USA); Eric D. Moore, Chiaro Technologies, LLC (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA) . . . . . [9203-36]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 2 . . . . . TUE 1:30 PM TO 2:40 PM

Fringe Projection

Session Chair: **Katherine Creath,** Optineering (USA) and The Univ. of Arizona (USA)

1:30 pm: **High-speed 3D shape measurement with fiber interference** *(Invited Paper)*, Beiwen Li, Iowa State Univ. (USA); Pan Ou, BeiHang Univ. (China); Song Zhang, Iowa State Univ. (USA) . . . . . [9203-37]

2:00 pm: **Microscopic type of real-time uniaxial 3D profilometry by polarization camera**, Shuhei Shibata, Fumio Kobayashi, Daisuke Barada, Yukitoshi Otani, Utsunomiya Univ. (Japan) . . . . . [9203-38]

2:20 pm: **Analysis of optimization method for interferometric evaluation of small shape deviations**, Jiri Novak, Pavel Novak, Antonin Miks, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9203-46]

LOCATION: CONV. CTR. ROOM 2 . . . TUE 2:40 PM TO 3:10 PM

Discussion of Future Interferometry Conferences

Join us for a discussion of future interferometry conferences at SPIE Optics+Photonics San Diego.

LOCATION: CONV. CTR. ROOM 2 . . . TUE 3:10 PM TO 3:30 PM

Fringe Art Awards Voting and Presentation

Session Chair: **Joanna Schmit**, Bruker Nano Surfaces Division (USA)

Please join us for voting on your favorite Fringe Art followed by the presentation ceremony to award the best Fringe Art. The winner will receive an award certificate and a silly optical prize.

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

CONFERENCE 9204

LOCATION: CONV. CTR. ROOM 1B

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9204

Interferometry XVII: Advanced Applications

Conference Chairs: **Cosme Furlong,** Worcester Polytechnic Institute (USA); **Christophe Gorecki,** FEMTO-ST (France); **Peter J. de Groot,** Zygo Corporation (USA); **Erik L. Novak,** 4D Technology Corp. (USA)

Program Committee: **Armando Albertazzi Gonçalves Jr.,** Univ. Federal de Santa Catarina (Brazil); **Anand Krishna Asundi,** Nanyang Technological Univ. (Singapore); **Ralf B. Bergmann,** Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Katherine Creath,** Optineering (USA) and The Univ. of Arizona (USA); **Konstantinos Falaggis,** Warsaw Univ. of Technology (Poland); **Claas Falldorf,** Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Ángel M. Fernandez Doval,** Univ. de Vigo (Spain); **Pietro Ferraro,** Istituto Nazionale di Ottica (Italy); **Mauricio Flores Moreno,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Motoharu Fujigaki,** Wakayama Univ. (Japan); **James G. Fujimoto,** Massachusetts Institute of Technology (USA); **Daniel R. Guildenbecher,** Sandia National Labs. (USA); **Bradley T. Kimbrough,** 4D Technology Corp. (USA); **Małgorzata Kujawińska,** Warsaw Univ. of Technology (Poland); **Fernando Mendoza Santoyo,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Gunther Notni,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Wolfgang Osten,** Institut für Technische Optik (Germany); **Ryszard J. Pryputniewicz,** Worcester Polytechnic Institute (USA); **Christian Rembe,** Polytec GmbH (Germany); **Mikael Sjödahl,** Luleå Univ. of Technology (Sweden); **Pierre R. L. Slangen,** Mines Alès (France); **James D. Trolinger,** MetroLaser, Inc. (USA); **Rainer Tutsch,** Technische Univ. Braunschweig (Germany); **Wei-Chung Wang,** National Tsing Hua Univ. (Taiwan); **James C. Wyant,** College of Optical Sciences, The Univ. of Arizona (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Error reduction method using two fringe projectors on 3D shape measurement, Motoharu Fujigaki, Atsushi Shima, Yorinobu Murata, Wakayama Univ. (Japan) . . . . . [9204-17]

Study of the stability and uncertainty of an external cavity diode laser through a Michelson wavemeter,Ismael Outumuro González, Jose Luis Valencia, Lab. Oficial de Metroloxia de Galicia (Spain); Javier Diz-Bugarin, Jesus Blanco, Benito Vazquez-Dorrio, Univ. de Vigo (Spain) . . . . . [9204-20]

MG63 cells behavior on rough Polypyrrole scaffolds investigated by digital holographic microscopy, Mona Mihailescu, Univ. Politehnica of Bucharest (Romania); Andreea Matei, Adriana Acasandrei, National Institute for Lasers, Plasma and Radiation Physics (Romania); Roxana Cristina Popescu, Irina Alexandra Paun, Univ. Politehnica of Bucharest (Romania); Maria Dinescu, National Institute for Lasers, Plasma and Radiation Physics (Romania). . . . . [9204-21]

Non-destructive testing of pressurized vessels by laser shearography and computational modeling, Morteza Khaleghi, Timothy R. Kurisko, Ivo Dobrev, Xiaoran Chen, Cosme Furlong, Worcester Polytechnic Institute (USA) . . . [9204-22]

Advanced laser shearographic system for in-situ non-invasive analysis of oil-on-canvas paintings, Morteza Khaleghi, Ivo Dobrev, Worcester Polytechnic Institute (USA); Philip Klausmeyer, Worcester Art Museum (USA); Xiaoran Chen, Ellery Harrington, Cosme Furlong, Worcester Polytechnic Institute (USA). [9204-23]

Blade counting tool with a 3D borescope for turbine applications, Kevin G. Harding, GE Global Research (USA); Jiajun Gu, Li Tao, GE Global Research (China); Guiju Song, GE Global Research (USA); Jie Han, GE Global Research (China) . . . . . [9204-24]

A novel method for holographic femtosecond laser parallel processing using digital blazed grating and the divergent spherical wave, Chaowei Wang, Yahui Su, Jinli Wang, Anhui Univ. (China); Chenchu Zhang, Univ. of Science and Technology of China (China); Ziyu Zhang, Anhui Univ. (China); Jiawen Li, Univ. of Science and Technology of China (China) . . . . . [9204-26]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 6A . .TUE 4:00 PM TO 6:05 PM

Optical Engineering Plenary Session

Session Chairs: **José Sasián**, College of Optical Sciences, The Univ. of Arizona (USA); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Welcome and Opening Remarks**

4:05 pm: **Information content of a photon in optical imaging, quantum imaging, and radiology** *(Plenary)*, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); Kyle J. Myers, U.S. Food and Drug Administration (USA) . . . . . [9193-200]

4:45 pm: **Recent trends in optical components in the mobile industry** *(Plenary)*, Ung-Beom Lee, LG Innotek (Korea, Republic of) . . . . . [9192-201]

5:25 pm: **Optical design for consumer products** *(Plenary)*, Anurag Gupta, Google (USA) . . . . . [9197-201]

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 1B . . . . WED 8:00 AM TO 9:50 AM

Life Science Applications

Session Chair: **Cosme Furlong,** Worcester Polytechnic Institute (USA)

8:00 am: **Microscopic contouring with low coherence interferometry endoscopy** *(Invited Paper)*, Ben Buckner, Spectabit Optics, LLC (USA); Bauke Heeg, Lumium Optical Precision Instruments (Netherlands); Tom Jenkins, James D. Trolinger, MetroLaser, Inc. (USA) . . . . . [9204-1]

8:30 am: **Endoscopic metrology for cardiovascular flows studies**, Laura A. Arévalo-Díaz, Eva Roche, Virginia R. Palero, Nieves Andrés, Univ. de Zaragoza (Spain); Julia Lobera, Centro Universitario de la Defensa de Zaragoza (Spain); Miguel A. Martínez, M. Pilar Arroyo, Univ. de Zaragoza (Spain) . . . . . [9204-2]

8:50 am: **Shape and 3D acoustically-induced vibrations of the human eardrum characterized by digital holography**, Morteza Khaleghi, Cosme Furlong, Worcester Polytechnic Institute (USA); Jeffrey T. Cheng, Massachusetts Eye and Ear Infirmary (USA); John Rosowski, Harvard Medical School (USA). . . . . [9204-3]

9:10 am: **High-speed holographic system for full-field transient vibrometry of the human tympanic membrane**, Ivo Dobrev, E. J. Harrington, Worcester Polytechnic Institute (USA); Jeffrey T. Cheng, Massachusetts Eye and Ear Infirmary (USA); Cosme Furlong, Worcester Polytechnic Institute (USA); John Rosowski, Massachusetts Eye and Ear Infirmary (USA). . . . . [9204-4]

9:30 am: **Dynamic measurement of the corneal tear film with a Twyman-Green interferometer**, Jason Micali, John E. Greivenkamp, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9204-5]

Coffee Break . . . . . Wed 9:50 am to 10:20 am

SESSION 2

LOCATION: CONV. CTR. ROOM 1B . . WED 10:20 AM TO 12:00 PM

Surface Shape and Form

Session Chair: **Erik Novak,** 4D Technology Corp. (USA)

10:20 am: **Artifact-free calibration of spatial carrier interferometry**, Bradley T. Kimbrough, Korbinian Prause, Erik Novak, 4D Technology Corp. (USA) . . . [9204-6]

10:40 am: **Absolute height measurement of specular surfaces with modified active fringe reflection photogrammetry**, Hongyu Ren, Xiangqian Jiang, Feng Gao, Univ. of Huddersfield (United Kingdom); Zonghua Zhang, Hebei Univ. of Technology (China) . . . . . [9204-7]

11:00 am: **3D optical profilometry using a fiber optic Lloyd's mirror**, Turkay Kart, Gulsen Kosoglu, Heba Yuksel, M. Naci Inci, Bogaziçi Üniv. (Turkey) . . . . . [9204-8]

11:20 am: **An asymmetric polarization-based frequency scanning interferometer: design principle**, Seung Hyun Lee, Min Young Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9204-9]

11:40 am: **Dynamic shape measurements of rough surface with a two-wavelength method**, Nieves Andrés, Laura A. Arévalo-Díaz, José Alberto Lorda Abadías, Virginia R. Palero, Julia Lobera, M. Pilar Arroyo, Univ. de Zaragoza (Spain) . . . . . [9204-10]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 1B . . . . . WED 1:30 PM TO 3:20 PM

Novel Methods and Applications

Session Chair: **Christophe Gorecki,** FEMTO-ST (France)

1:30 pm: **Advanced wave field sensing using computational shear interferometry** *(Invited Paper)*, Claas Falldorf, Bremer Institut für angewandte Strahltechnik GmbH (Germany); Mostafa Agour, Bremer Institut für angewandte Strahltechnik GmbH (Germany) and Aswan Univ. (Egypt); Ralf B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) . . . . . [9204-11]

2:00 pm: **Simple setup for optical characterization of microlenses**, Stephane Perrin, Maciej Baranski, Nicolas Passilly, Luc Froehly, Jorge Albero, Sylwester Bargiel, Christophe Gorecki, FEMTO-ST (France) . . . . . [9204-12]

2:20 pm: **Dynamic temperature field measurements using a polarization phase shifting technique**, David Ignacio Serrano-García, Ctr. de Investigaciones en Óptica, A.C. (Mexico) and Utsunomiya Univ. (Japan); Amalia Martínez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Noel Ivan Toto Arellano, Univ. Tecnológica de Tulancingo (Mexico); Yukitoshi Otani, Utsunomiya Univ. (Japan) . . . . . [9204-13]

2:40 pm: **Speckle interferometry at 10 micrometers wavelength: a combined thermography and interferometry technique and its application in aeronautical nondestructive testing**, Marc P. Georges, Jean-François Vandenrijt, Cédric Thizy, Univ. de Liège (Belgium); Igor Alexeenko, Univ. Stuttgart (Germany); Giancarlo Pedrini, Institut für Technische Optik (Germany); Jonathan Rochet, OPTRION s.a. (Belgium); Birgit Vollheim, InfraTec GmbH (Germany); Iagoba Jorge, Ion Lopez, Fundación Centro de Tecnologias Aeronáuticas (Spain); Wolfgang Osten, Institut für Technische Optik (Germany) . . . . . [9204-14]

3:00 pm: **Comparison of phase retrieval techniques based on the transport of intensity equation using equally and unequally spaced plane separation criteria,**Juan Martinez-Carranza, Konstantinos Falaggis, Warsaw Univ. of Technology (Poland); Michal Jozwik, Warsaw University of Technology (Poland); Tomasz Kozacki, Warsaw Univ. of Technology (Poland) . . . . . [9204-15]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 1B . . . . . WED 3:50 PM TO 5:10 PM

Industrial and Large-scale Metrology

Session Chair: **Peter J. de Groot,** Zygo Corporation (USA)

3:50 pm: **Adding baselines at the Naval Precision Optical Interferometer**, Jonathan R. Andrews, James H. Clark, Sergio R. Restaino, J. Tom Armstrong, Henrique Schmidt, U.S. Naval Research Lab. (USA); Ellyn K Baines, US Naval Research Lab (USA); Don J. Hutter, James A. Benson, Bob T. Zavala, U.S. Naval Observatory (USA). . . . . [9204-16]

4:10 pm: **Small pitch fringe projection method with multiple linear fiber arrays for 3D shape measurement**, Takumi Hayashi, Motoharu Fujigaki, Yorinobu Murata, Wakayama Univ. (Japan) . . . . . [9204-25]

4:30 pm: **Minimization of errors in measurement of the internal geometrie of pipeline caused by the optical profilometer wheels.**, Milena W. D. Victorette, Armando Albertazzi Gonçalves Jr., Tiago L. F. da Costa Pinto, Univ. Federal de Santa Catarina (Brazil). . . . . [9204-18]

4:50 pm: **Glass bottle inspection by using digital in-line holography**, Prathan Buranasiri, Suwan Plaipichit, King Mongkut's Institute of Technology Ladkrabang (Thailand) . . . . . [9204-19]

CONFERENCE 9205

LOCATION: CONV. CTR. ROOM 7A

Sunday–Monday 17–18 August 2014 • Proceedings of SPIE Vol. 9205

Reflection, Scattering, and Diffraction from Surfaces IV

Conference Chair: **Leonard M. Hanssen,** National Institute of Standards and Technology (USA)

Program Committee: **Gérard Berginc,** Thales Optronique S.A.S. (France); **Andrea M. Brown,** Johns Hopkins Univ. Applied Physics Lab. (USA); **Aristide C. Dogariu,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **John C. Fleming,** Ball Aerospace & Technologies Corp. (USA); **Hsueh-Mei W. Graham,** Lockheed Martin Aeronautics Co. (USA); **Brian G. Hoover,** Advanced Optical Technologies (USA); **Danhong Huang,** Air Force Research Lab. (USA); **Alexei A. Maradudin,** Univ. of California, Irvine (USA); **Michael A. Marciniak,** Air Force Institute of Technology (USA); **Richard N. Pfisterer,** Photon Engineering LLC (USA); **Shouhong Tang,** KLA-Tencor Corp. (USA); **Benjamin K. Tsai,** National Institute of Standards and Technology (USA)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 7A . . . . SUN 2:00 PM TO 2:50 PM

Scatter Instrumentation and Measurement I

Session Chair: **Andrea M. Brown,** Johns Hopkins Univ. Applied Physics Lab. (USA)

1:50 pm: **Dynamic data driven bidirectional reflectance distribution function measurement system** *(Invited Paper)*, Stephen E. Nauyoks, Sam Freda, Michael A. Marciniak, Air Force Institute of Technology (USA). . . . . [9205-1]

2:20 pm: **Temperature-dependent BRDF facility**, Marc B. Airola, Andrea M. Brown, Michael E. Thomas, Douglas S. Mehoke, Johns Hopkins Univ. Applied Physics Lab., LLC (USA) . . . . . [9205-2]

Coffee Break . . . . . Sun 2:50 pm to 3:30 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 7A . . . . SUN 3:30 PM TO 4:30 PM

Scatter Theory and Modeling I

Session Chair: **Gerard Berginc,** Thales Optronique S.A.S. (France)

3:30 pm: **Controlling light absorption and emission by electrons in quantum dot with a surface-plasmon field**, Danhong Huang, Air Force Research Lab. (USA); Michelle Easter, Stevens Institute of Technology (USA); Godfrey Gumbs, Hunter College (USA); Shawn-Yu Lin, Rensselaer Polytechnic Institute (USA); Xiang Zhang, Univ. of California, Berkeley (USA); Alexei A. Maradudin, Univ. of California, Irvine (USA) . . . . . [9205-4]

3:50 pm: **Determination of the normalized surface height autocorrelation function of a two-dimensional randomly rough dielectric surface by the inversion of light scattering data**, Sangeeta Chakrabarti, Alexei A. Maradudin, Univ. of California, Irvine (USA); Ingve Simonsen, Norwegian Univ. of Science and Technology (Norway); Elena I. Chaikina, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9205-5]

4:10 pm: **Robust categorization of microfacet BRDF models to enable flexible application-specific BRDF adaptation**, Samuel D. Butler, Michael A. Marciniak, Air Force Institute of Technology (USA) . . . . . [9205-6]

SESSION 3

LOCATION: CONV. CTR. ROOM 7A . . . . SUN 4:30 PM TO 5:30 PM

Surface Profiling

Session Chair: **John C. Fleming,** Ball Aerospace & Technologies Corp. (USA)

4:30 pm: **A sensitive optical probe for surface topography based on an optimized astigmatic method**, Jingtao Dong, Gang Xiao, Jian Chen, Zhouling Wu, ZC Optoelectronic Technologies, Ltd. (China) . . . . . [9205-7]

4:50 pm: **Development of nano-LTP measurement at SSRF**, Yumei He, Jie Wang, Shanghai Institute of Applied Physics (China); Hongxin Luo, Shanghai Institute of Optics and Fine Mechanics (China); Yifei Zhang, Zhongliang Li, Shanghai Institute of Applied Physics (China). . . . . [9205-8]

5:10 pm: **Study of surface roughness of corroded metals using plastic optical fiber sensor**, M. Esakki Muthu Raju, Badrinath Vadakkapattu Canthadai, Vidya Jyothi Institute of Technology (India); Dipankar Sengupta, Univ. degli Studi di Padova (Italy); Vengalrao Pachava, National Institute of Technology, Warangal (India). . . . . [9205-9]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA). . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 4

LOCATION: CONV. CTR. ROOM 7A . . MON 8:50 AM TO 10:00 AM

Scatter Instrumentation and Measurement II

Session Chair: **Michael A. Marciniak,** Air Force Institute of Technology (USA)

8:50 am: **Diffusers, properties, and performance in BSDF** *(Invited Paper)*, Bilgehan Gür, Hedser van Brug, Man Xu, TNO Science and Industry (Netherlands) . . . . . [9205-10]

9:20 am: **Near specular scatter analysis method with a new goniophotometer**, Stephanie Meyen, Florian Sutter, Peter Heller, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Spain). . . . . [9205-11]

9:40 am: **Low-frequency Raman spectra and the nanostructure of chalcogenide semiconductors As-Se-S and As-Se-Te doped with samarium**, Gulnar I. Isayeva, Rahim Alekberov, Salima Mekhtiyeva, Abasat Isayev, Azerbaijan National Academy of Sciences (Azerbaijan) . . . . . [9205-12]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 5

LOCATION: CONV. CTR. ROOM 7A . . MON 10:30 AM TO 12:20 PM

Applications

Session Chair: **Hsueh-Mei W. Graham,** Lockheed Martin Aeronautics Co. (USA)

10:30 am: **Light propagation in phosphor-filled matrices for photovoltaic PL down-shifting** *(Invited Paper)*, Anastasiia Solodovnyk, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany) and Institute of Materials for Electronics and Energy Technology (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Benjamin Lipovšek, Univ. of Ljubljana (Slovenia); Karen Forberich, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Edda Stern, Bayerisches Zentrum für Angewandte Energieforschung e.V. (Germany); Miroslaw Batentschuk, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Marko Topič, Univ. of Ljubljana (Slovenia); Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9205-13]

11:00 am: **Effects of baffle in integrating sphere on total luminous flux measurement**, Kamol Wasapinyokul, Soontorn Chanyawadee, Rojana Leecharoen, Santhad Chuwongin, Ajchara Charoensook, National Institute of Metrology (Thailand) (Thailand). . . . . [9205-14]

11:20 am: **Obtaining the information of suspended rod-shaped particles by use of polarization measurements**, Ran Liao, Tsinghua Univ. (China) . . . . . [9205-15]

11:40 am: **Measurement of spatial coherence through the shadows of small obscurations**, Katelynn A. Sharma, James K. Wood, Miguel A. Alonso, Thomas G. Brown, Univ. of Rochester (USA) . . . . . [9205-33]

12:00 pm: **Uncertainties in strain measurements with birefringence**, José G. Suárez-Romero, Instituto Tecnológico de Querétaro (Mexico). . . . . [9205-17]

Lunch Break . . . . . .Mon 12:20 pm to 2:00 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 7A . . . . MON 2:00 PM TO 3:10 PM

Scatter Theory and Modeling II

Session Chair: **Danhong Huang,** Air Force Research Lab. (USA)

2:00 pm: **Modeling stray light from rough surfaces and subsurface scatter** *(Invited Paper)*, James E. Harvey, Photon Engineering LLC (USA) . . . . . [9205-18]

2:30 pm: **Wave-optics simulation of partially coherent beam illumination scattered from perfectly-reflecting rough surfaces**, Mark F. Spencer, Santasri Basu, Milo W. Hyde IV, Michael A. Marciniak, Air Force Institute of Technology (USA) . . . . . [9205-19]

2:50 pm: **Scattering models for range profiling: 2D-3D laser imagery**, Gérard Berginc, Thales Optronique S.A.S. (France) . . . . . [9205-20]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 7A . . . . MON 3:40 PM TO 5:10 PM

Imaging Methods and Applications

Session Chair: **Richard N. Pfisterer,** Photon Engineering LLC (USA)

3:40 pm: **3D laser imaging for concealed object identification** *(Invited Paper)*, Ion Berechet, SISPIA (France); Gérard Berginc, Thales Optronique S.A.S. (France); Stefan Berechet, SISPIA (France) . . . . . [9205-21]

4:10 pm: **IR-imaging-based system for detecting the defects of conductive materials**, Kimmo K. Leppänen, Juha M. Saarela, Tapio E. J. Fabritius, Univ. of Oulu (Finland) . . . . . [9205-22]

4:30 pm: **3D measurement of both front and back surfaces of transparent objects by polarization imaging**, Florence Drouet, Christophe Stolz, Olivier Laligant, Olivier Aubreton, Univ. de Bourgogne (France) . . . . . [9205-23]

4:50 pm: **Cone beam x-ray luminescence tomography reconstruction with prior anatomical information**, Pei-An Lo, Meng-Lung Lin, Shih-Chun Jin, Jyh-Cheng Chen, Syue-Liang Lin, C. Allen Chang, Huihua K. Chiang, National Yang-Ming Univ. (Taiwan) . . . . . [9205-24]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Preliminary design of multi-spectral BRDF measurement system for water surface, Eunsong Oh, Korea Institute of Ocean Science & Technology (Korea, Republic of) and Yonsei Univ. (Korea, Republic of); Hyukmo Kang, Korea Institute of Ocean Science & Technology (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Youngje Park, Korea Institute of Ocean Science & Technology (Korea, Republic of). . . . . [9205-3]

Light scattering by aerosol particles and air in the molecular condensation nuclei (MCN) detector, Vladimir Kuptsov, St. Petersburg State Polytechnical Univ. (Russian Federation); Vadim Katelevskii, ENPO Neorganika (Russian Federation); Vladimir Valyukhov, St. Petersburg State Polytechnical Univ. (Russian Federation); Evgenii Rybin, ENPO Neorganika (Russian Federation) . . . . . [9205-25]

Absolute testing for noncircular flats in synchrotron radiation, Hao Wei Lin, Li Song, Shanghai Institute of Applied Physics (China) . . . . . [9205-26]

Intermediate field measurement to characterize the wavefront of high-power laser large optics, Stéphane Bouillet, Frédéric Audo, Commissariat à l'Énergie Atomique (France) . . . . . [9205-27]

Investigation of interaction of structured illumination with randomly inhomogeneous surfaces, Nikolai V. Petrov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Artem E. Goryunov, Pavel V. Pavlov, Irkutsk Military Aviation Engineering Institute (Russian Federation) . . . . . [9205-28]

A Mach-Zehnder interferometer for the fine control of the polarization status of a beam, Enrico Tessarolo, Alain J. Corso, Consiglio Nazionale delle Ricerche (Italy); Paola Zuppella, Sara Zuccon, Maria G. Pelizzo, IFN-CNR LUXOR Lab. (Italy) . . . . . [9205-29]

A multifunctional automated system of 2D laser polarimetry of biological tissues, Natalia I. Zabolotna, Kostiantyn O. Radchenko, Vinnytsia National Technical Univ. (Ukraine). . . . . [9205-30]

Transmission of UV/visible light through model human epidermis at varying ambient humidity, Carlton W. Farley III, Sandra Sadate, Aschalew Kassu, Anup Sharma, Alabama A&M Univ. (USA) . . . . . [9205-31]

Scattering by three-dimensional slit-shape curves, Javier Muñoz-Lopez, Gabriel Martinez-Niconoff, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Patricia Martinez-Vara, Benemérita Univ. Autónoma de Puebla (Mexico) . [9205-32]

CONFERENCE 9206

LOCATION: CONV. CTR. ROOM 14A

Monday 18 August 2014 • Proceedings of SPIE Vol. 9206

Advances in Metrology for X-Ray and EUV Optics V

Conference Chairs: **Lahsen Assoufid,** Argonne National Lab. (USA); **Haruhiko Ohashi,** Japan Synchrotron Radiation Research Institute (Japan); **Anand Krishna Asundi,** Nanyang Technological Univ. (Singapore)

Program Committee: **Simon G. Alcock,** Diamond Light Source Ltd. (United Kingdom); **Raymond Barrett,** European Synchrotron Radiation Facility (France); **Daniele Cocco,** SLAC National Accelerator Lab. (USA); **Leslie L. Deck,** Zygo Corporation (USA); **Ralf D. Geckeler,** Physikalisch-Technische Bundesanstalt (Germany); **Kenneth A. Goldberg,** Lawrence Berkeley National Lab. (USA); **Mikhail V. Gubarev,** NASA Marshall Space Flight Ctr. (USA); **Mourad Idir,** Brookhaven National Lab. (USA); **Weiguo Liu,** Xi'an Univ. of Technology (China); **Hidekazu Mimura,** The Univ. of Tokyo (Japan); **Josep Nicolas,** CELLS - ALBA (Spain); **Rajdeep Singh Rawat,** National Institute of Education (Singapore); **Mark D. Roper,** Daresbury Lab. (United Kingdom); **Kawal J. Sawhney,** Diamond Light Source Ltd. (United Kingdom); **Frank Siewert,** Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Regina Soufli,** Lawrence Livermore National Lab. (USA); **Peter Z. Takacs,** Brookhaven National Lab. (USA); **Muriel Thomasset,** Synchrotron SOLEIL (France); **Amparo Vivo,** European Synchrotron Radiation Facility (France); **Zhanshan Wang,** Tongji Univ. (China); **Kazuto Yamauchi,** Osaka Univ. (Japan); **Tanfer Yandayan,** TUBITAK UME (Turkey); **Valeriy V. Yashchuk,** Lawrence Berkeley National Lab. (USA); **Brian W. Yates,** Canadian Light Source Inc. (Canada)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 14A . . MON 8:30 AM TO 10:10 AM

Slope Profilers

Session Chairs: **Haruhiko Ohashi,** Japan Synchrotron Radiation Research Institute (Japan); **Valeriy V. Yashchuk,** Lawrence Berkeley National Lab. (USA)

8:30 am: **A new optical head tracing reflected light for nanoprofiler**, Kohei Okuda, Kenya Okita, Yusuke Tokuta, Takao Kitayama, Motohiro Nakano, Kudo Ryota, Kazuya Yamamura, Katsuyoshi Endo, Osaka Univ. (Japan) . . . . . [9206-1]

8:50 am: **The developmental long trace profiler (DLTP) optimized for side-facing optics at the ALS**, Ian Lacey, Nikolay A. Artemiev, Edward E. Domning, Wayne R. McKinney, Gregory Y. Morrison, Simon A. Morton, Brian V. Smith, Valeriy V. Yashchuk, Lawrence Berkeley National Lab. (USA) . . . . . [9206-2]

9:10 am: **Upgrade of surface profiler for x-ray mirror at SPring-8**, Yasunori Senba, Hikaru Kishimoto, Takanori Miura, Haruhiko Ohashi, Japan Synchrotron Radiation Research Institute (Japan). . . . . [9206-4]

9:30 am: **Fabrication method of ellipsoidal mirrors for hard x-ray focusing-precision surface profiler and precision processing machine**, Hirokatsu Yumoto, Takahisa Koyama, Japan Synchrotron Radiation Research Institute (Japan) and RIKEN (Japan); Satoshi Matsuyama, Kazuto Yamauchi, Osaka Univ. (Japan); Haruhiko Ohashi, Japan Synchrotron Radiation Research Institute (Japan) and RIKEN (Japan) . . . . . [9206-5]

9:50 am: **Design of long trace profiler for high-energy photon source**, Fugui Yang, Ming Li, Institute of High Energy Physics (China) . . . . . [9206-6]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 14A MON 10:40 AM TO 12:00 PM

At-wavelength Metrology

Session Chairs: **Mourad Idir,** Brookhaven National Lab. (USA); **Kenneth A. Goldberg,** Lawrence Berkeley National Lab. (USA)

10:40 am: **A new reflectometer for at-wavelength characterization of XUV-reflection gratings**, Frank Eggenstein, Peter Bischoff, Andreas Gaupp, Fred Senf, Andrey Sokolov, Thomas Zeschke, Franz Schäfers, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9206-7]

11:00 am: **At-wavelength metrology of x-ray optics at Diamond Light Source**, Kawal Sawhney, Hongchang Wang, John P. Sutter, Simon G. Alcock, Sebastien Berujon, Diamond Light Source Ltd. (United Kingdom) . . . . . [9206-8]

11:20 am: **Material and shape properties of the compound refractive lenses**, Ivan Lyatun, Alexandr Goikhman, Petr Ershov, Svetlana Medvedeva, Immanuel Kant Baltic Federal Univ. (Russian Federation); Irina I. Snigireva, Anatoly Snigirev, ESRF - The European Synchrotron (France) and Immanuel Kant Baltic Federal Univ. (Russian Federation) . . . . . [9206-9]

11:40 am: **A ptychographic phase retrieval method for measuring figure error profile of soft x-ray focusing mirror**, Takahiro Saito, Takehiro Kume, Hiroto Motoyama, Hidekazu Mimura, The Univ. of Tokyo (Japan) . . . . . [9206-10]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 14A . . . MON 1:30 PM TO 2:50 PM

Microscopes/Figure Interferometers

Session Chairs: **Anand Krishna Asundi,** Nanyang Technological Univ. (Singapore); **Mikhail V. Gubarev,** NASA Marshall Space Flight Ctr. (USA)

1:30 pm: **Development of high-precision figure measurement system for x-ray optics using laser focus microscope**, Jangwoo Kim, Satoshi Matsuyama, Yasuhisa Sano, Kazuto Yamauchi, Osaka Univ. (Japan) . . . . . [9206-11]

1:50 pm: **Stitching measurement of curved x-ray mirror with the new APS slope profiler**, Jun Qian, Joseph Sullivan, Lahsen Assoufid, Argonne National Lab. (USA) . . . . . [9206-12]

2:10 pm: **An extreme ultraviolet interferometer suitable to generate dense interference pattern**, Karel Kolacek, Jiri Schmidt, Jaroslav Straus, Oleksandr Frolov, Vaclav Prukner, Radek Melich, Institute of Plasma Physics of the ASCR, v.v.i. (Czech Republic). . . . . [9206-13]

2:30 pm: **Experimental results for absolute cylindrical wavefront testing**, Patrick J. Reardon, Ayshah Alatawi, The Univ. of Alabama in Huntsville (USA) . . . [9206-14]

Coffee Break . . . . . Mon 2:50 pm to 3:20 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 14A . . .MON 3:20 PM TO 4:30 PM

Extreme Angle Measurements and Calibration

Session Chairs: **Frank Siewert,** Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Kawal Sawhney,** Diamond Light Source Ltd. (United Kingdom)

3:20 pm: **Pushing the limits: latest developments in angle metrology for the inspection of ultra-precise synchrotron optics** *(Invited Paper)*, Tanfer Yandayan, TÜBITAK UME (Turkey); Ralf D. Geckeler, Physikalisch-Technische Bundesanstalt (Germany); Frank Siewert, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany). . . . . [9206-15]

3:50 pm: **Angular calibration of surface slope measuring profilers with a bendable mirror**, Nikolay A. Artemiev, Brian V. Smith, Edward E. Domning, Ian Lacey, Valeriy V. Yashchuk, Lawrence Berkeley National Lab. (USA) . . . . [9206-16]

4:10 pm: **Design of a precision two-dimensional tip-tilting stage system for autocollimator-based long trace profiler angular calibration**, Deming Shu, Wenjun Liu, Argonne National Lab. (USA); Steven Kearney, Jayson Anton, Argonne National Lab. (USA) and Univ. of Illinois at Chicago (USA); Jun Qian, Joseph Sullivan, Lahsen Assoufid, Argonne National Lab. (USA) . . . . . [9206-17]

SESSION 5

LOCATION: CONV. CTR. ROOM 14A . . MON 4:30 PM TO 5:40 PM

Facilities

Session Chairs: **Lahsen Assoufid,** Argonne National Lab. (USA); **Daniele Cocco,** SLAC National Accelerator Lab. (USA)

4:30 pm: **A new x-ray optics laboratory (XROL) at the ALS: mission, arrangement, metrology capabilities, performance, and future plans** *(Invited Paper)*, Valeriy V. Yashchuk, Nikolay A. Artemiev, Ian Lacey, Wayne R. McKinney, Howard A. Padmore, Lawrence Berkeley National Lab. (USA). . . . . [9206-18]

5:00 pm: **A new XUV optics beamline at BESSY II**, Andrey Sokolov, Frank Eggenstein, Alexei Erko, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Rolf Follath, Paul Scherrer Institut (Switzerland); Silvio Künstner, Matthias Mast, Jan-Simon Schmidt, Fred Senf, Frank Siewert, Franz Schäfers, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . [9206-19]

5:20 pm: **Fabrication of OSAKA mirror for synchrotron applications**, Akihiko Ueda, Hiromi Okada, Shinya Aono, Shinsaku Shiroma, Takashi Tsumura, JTEC Corp. (Japan). . . . . [9206-20]

CONFERENCE 9207

LOCATION: CONV. CTR. ROOM 14A

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9207

Advances in X-Ray/EUV Optics and Components IX

Conference Chairs: **Christian Morawe,** European Synchrotron Radiation Facility (France); **Ali M. Khounsary,** X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA); **Shunji Goto,** Japan Synchrotron Radiation Research Institute (Japan)

Program Committee: **Lucia Alianelli,** Diamond Light Source Ltd. (United Kingdom); **Lahsen Assoufid,** Argonne National Lab. (USA); **Stefan Braun,** Fraunhofer IWS Dresden (Germany); **Shih-Lin Chang,** National Tsing Hua Univ. (Taiwan); **Raymond Conley Jr.,** Brookhaven National Lab. (USA); **Sultan B. Dabagov,** Istituto Nazionale di Fisica Nucleare (Italy); **Christian David,** Paul Scherrer Institut (Switzerland); **Hans M. Hertz,** KTH Royal Institute of Technology (Sweden); **Keiichi Hirano,** High Energy Accelerator Research Organization (Japan); **Werner H. Jark,** Elettra-Sincrotrone Trieste S.C.p.A. (Italy); **Yasushi Kagoshima,** Univ. of Hyogo (Japan); **George A. Kyrala,** Los Alamos National Lab. (USA); **Eric Louis,** FOM Institute DIFFER (Netherlands); **Carolyn A. MacDonald,** Univ. at Albany (USA); **Howard A. Padmore,** Lawrence Berkeley National Lab. (USA); **Ladislav Pina,** Czech Technical Univ. in Prague (Czech Republic); **Yuriy Ya Platonov,** Rigaku Innovative Technologies, Inc. (USA); **Seungyu Rah,** Pohang Univ. of Science and Technology (Korea, Republic of); **Peter Revesz,** Cornell Univ. (USA); **Horst Schulte-Schrepping,** Deutsches Elektronen-Synchrotron (Germany); **Regina Soufli,** Lawrence Livermore National Lab. (USA); **Stanislav Stoupin,** Argonne National Lab. (USA); **Joerg Wiesmann,** Incoatec GmbH (Germany); **Makina Yabashi,** RIKEN (Japan), Japan Synchrotron Radiation Research Institute (Japan); **Kazuto Yamauchi,** Osaka Univ. (Japan); **Brian W. Yates,** Canadian Light Source Inc. (Canada)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Saw-tooth refractive lens for high energy x-ray focusing, Mikhail A. Antimonov, Univ. of Illinois at Chicago (USA); Ali M. Khounsary, Argonne National Lab. (USA) and Univ. of Illinois at Chicago (USA); Sarvjit D. Shastrti, Argonne National Lab. (USA) . . . . . [9207-4]

High-efficiency short focal diamond lenses: fabrication and performance, Lucia Alianelli, Diamond Light Source Ltd. (United Kingdom) . . . . . [9207-36]

X-ray harmonics rejection on 3rd-generation synchrotron sources using compound refractive lenses, Maxim Polikarpov, National Research Nuclear Univ. MEPhI (Russian Federation); Irina Snigireva, Anatoly Snigirev, ESRF - The European Synchrotron (France) . . . . . [9207-37]

Diffractive focusing optics design at Helmholtz-Zentrum Berlin, Alexander Firsov, Maria Brzhezinskaya, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Anatoly Firsov, Alexander Svintsov, Institute of Microelectronics Technology and High Purity Materials (Russian Federation); Alexei Erko, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9207-38]

Polycapillary optics efficiency in focusing high-energy beams for micro-XRF, Claudia Polese, Istituto Nazionale di Fisica Nucleare (Italy) and Univ. degli Studi di Roma La Sapienza (Italy); Sultan B. Dabagov, Istituto Nazionale di Fisica Nucleare (Italy) and National Research Nuclear Univ. MEPhI (Russian Federation); Adolfo Esposito, Istituto Nazionale di Fisica Nucleare (Italy); Marco Ferretti, Consiglio Nazionale delle Ricerche (Italy); Astrik Gorghinian, Dariush Hampai, Istituto Nazionale di Fisica Nucleare (Italy); Andrea Liedl, Istituto Nazionale di Fisica Nucleare (Italy) and Univ. degli Studi di Roma Tre (Italy) . . . . . [9207-39]

Measurement of the refractive index of nematic liquid crystals 5CB by means of x-ray interferometry, Vahram P. Mkrtchyan, Tigran K. Dadalyan, Laura G. Gasparyan, Minas K. Balyan, Yerevan State Univ. (Armenia); Armen V. Kuyumchyan, American Nanoscience and Advanced Medical Equipment, Inc. (USA) . . . . . [9207-40]

Damage of EUV optical coatings induced by alpha-particles bombardment, Maria G. Pelizzo, Sara Zuccon, Alain J. Corso, Paola Zuppella, Marco Nardello, IFN-CNR LUXOR Lab. (Italy); Enrico Napolitani, Giampiero Naletto, Univ. degli Studi di Padova (Italy); Silvano Fineschi, Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [9207-41]

Novel space communication technology based on modulated x-ray source, Lizhi Sheng, Baosheng Zhao, Yongan Liu, Xi'an Institute of Optics and Precision Mechanics (China) . . . . . [9207-42]

Refractive optics x-ray microscopy as a multilayer structures investigation tool, Svetlana Medvedeva, Alexandr Goikhman, Ivan Lyatun, Petr Ershov, Immanuel Kant Baltic Federal Univ. (Russian Federation); Irina Snigireva, Anatoly Snigirev, ESRF - The European Synchrotron (France) and Immanuel Kant Baltic Federal Univ. (Russian Federation) . . . . . [9207-43]

Thin film protective coatings for beryllium windows and lenses for synchrotron radiation sources, Oksana Yurkevich, Ksenia Maksimova, Alexandr Goikhman, Ivan Lyatun, Immanuel Kant Baltic Federal Univ. (Russian Federation); Anatoly Snigirev, Irina Snigireva, Immanuel Kant Baltic Federal Univ. (Russian Federation) and ESRF - The European Synchrotron (France) . . . . . [9207-44]

Focusing hard x-rays with tilted and wedged multilayer Laue lenses, Adam Kubec, Technische Univ. Dresden (Germany); Stefan Braun, Fraunhofer IWS Dresden (Germany); Sven Niese, Kathleen Melzer, Technische Univ. Dresden (Germany); Andreas Leson, Fraunhofer IWS Dresden (Germany) . . . . . [9207-45]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 14A . . TUE 8:50 AM TO 10:10 AM

Refractive Optics

Session Chairs: **Werner H. Jark,** Elettra-Sincrotrone Trieste S.C.p.A. (Italy); **Stefan Braun,** Fraunhofer IWS Dresden (Germany)

8:50 am: **X-ray laminography and SAXS on beryllium grades and lenses and wavefront propagation through imperfect beryllium CRLs**, Thomas Roth, European XFEL GmbH (Germany); Lukas Helfen, ESRF - The European Synchrotron (France) and Karlsruher Institut für Technologie (Germany); Jörg Hallmann, Liubov Samoylova, European XFEL GmbH (Germany); Pawel Kwasniewski, ESRF - The European Synchrotron (France) and Deutsches Elektronen-Synchrotron (Germany); Bruno Lengeler, RXOPTICS (Germany); Anders Madsen, European XFEL GmbH (Germany) . . . . . [9207-1]

9:10 am: **X-ray multilens interferometry based on planar refractive optics**, Mikhail Lyubomirskiy, Anatoly Snigirev, Irina Snigireva, ESRF - The European Synchrotron (France); Viktor Kohn, Russian Research Ctr. Kurchatov Institute (Russian Federation); Sergey Kuznetsov, Vyacheslav Yunkin, Institute of Microelectronics Technology and High Purity Materials (Russian Federation) . . . . . [9207-2]

9:30 am: **Kinoform lenses for focusing high-energy x-rays (> 50 keV)**, Sarvjit D. Shastri, Argonne National Lab. (USA); Kenneth Evans-Lutterodt, Brookhaven National Lab. (USA); Richard L. Sheffield, Los Alamos National Lab. (USA); Aaron Stein, Brookhaven National Lab. (USA); Meredith Metzler, Cornell Univ. (USA); Peter Kenesei, Argonne National Lab. (USA) . . . . . [9207-3]

9:50 am: **The high-resolution reciprocal-space mapping of the Si-Ge nano-heterostructure by refractive x-ray optics**, Petr Ershov, Immanuel Kant Baltic Federal Univ. (Russian Federation); Sergey Kuznetsov, Institute of Microelectronics Technology and High Purity Materials (Russian Federation); Irina Snigireva, ESRF - The European Synchrotron (France) and Immanuel Kant Baltic Federal Univ. (Russian Federation); Peter Zaumseil, IHP-microelectronics (Germany); Yunkin Vyacheslav, Institute of Microelectronics Technology and High Purity Materials (Russian Federation); Alexandr Goikhman, Immanuel Kant Baltic Federal Univ. (Russian Federation); Anatoly Snigirev, ESRF - The European Synchrotron (France) and Immanuel Kant Baltic Federal Univ. (Russian Federation) . . . . . [9207-5]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 14A . TUE 10:40 AM TO 12:00 PM

Multilayers and Gratings

Session Chairs: **Christian Morawe,** ESRF - The European Synchrotron (France); **Raymond Conley Jr.,** Argonne National Lab. (USA)

10:40 am: **Diffraction gratings for a new RIXS facility at Advanced Light Source**, Dmitriy L. Voronov, Tony Warwick, Patrick P. Naulleau, Stefano Cabrini, Christophe Peroz, Howard A. Padmore, Lawrence Berkeley National Lab. (USA) . . . . . [9207-6]

11:00 am: **Specific aspects of roughness and interface diffusion in non-periodic Mo/Si multilayers**, Stefan Braun, Peter Gawlitza, Maik Menzel, Andreas Leson, Fraunhofer IWS Dresden (Germany) . . . . . [9207-7]

11:20 am: **In-situ stress study on WSi_2/Si multilayers**, Bing Shi, Albert Macrander, Jorg Maser, Raymond Conley, Lahsen Assoufid, Argonne National Lab. (USA) . . . . . [9207-8]

11:40 am: **Thermal expansion properties of thin multilayer films**, Xianchao Cheng, Christian Morawe, Jean-Christophe Peffen, Lin Zhang, ESRF - The European Synchrotron (France) . . . . . [9207-9]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 14A . . . .TUE 1:40 PM TO 3:00 PM

New Developments

Session Chairs: **Ali M. Khounsary,** X-ray Optics, Inc. (USA), Illinois Institute of Technology {United States); **Ladislav Pina,** Czech Technical Univ. in Prague (Czech Republic)

1:40 pm: **Can a simple edge focus x-rays in two dimensions?**, Werner H. Jark, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Gianluca Grenci, Consiglio Nazionale delle Ricerche (Italy) and National Univ. of Singapore (Singapore). . . . . [9207-10]

2:00 pm: **Incident beam monitoring monitoring by x-ray optical elements**, Stanislav Stoupin, Argonne National Lab. (USA). . . . . [9207-11]

2:20 pm: **Diffractive 3-dimensional XUV optics at HZB: recent developments**, Maria Brzhezinskaya, Alexander Firsov, Alexei Erko, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9207-12]

2:40 pm: **X-ray coherence studies applied to capillary optics**, Ivan A. Ergunov, P.N. Lebedev Physical Institute (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation); Sultan B. Dabagov, Istituto Nazionale di Fisica Nucleare (Italy) . . . . . [9207-13]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 14A . . . TUE 3:30 PM TO 4:30 PM

Synchrotron Beamlines

Session Chairs: **Shunji Goto,** Japan Synchrotron Radiation Research Institute (Japan); **Alexander Rack,** ESRF - The European Synchrotron (France)

3:30 pm: **MagneDyn: the future beamline for ultrafast magnetodynamical studies at FERMI**, Cristian Svetina, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Martina Dell'Angela, Nicola Mahne, Marco Malvestuto, Sincrotrone Trieste S.C.p.A. (Italy); Fulvio Parmigiani, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. Degli Studi di Trieste (Italy); Lorenzo Raimondi, Sincrotrone Trieste S.C.p.A. (Italy); Marco Zangrando, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Consiglio Nazionale delle Ricerche Istituto Officina dei Materiali (Italy) . . . . . [9207-14]

3:50 pm: **Ray tracing simulation of beamline 1-BM at the Advanced Photon Source for polarization analyses of synchrotron optics**, Naresh G. Kujala, Albert Macrander, Xianbo Shi, Ruben Reininger, Argonne National Lab. (USA); Xuan Gao, Clement Burns, Western Michigan Univ. (USA) . . . . . [9207-15]

4:10 pm: **Optimisation of the beam transport system for experiments with small spots at the x-ray fluorescence beamline at Elettra**, Werner H. Jark, Diane Eichert, Lars Luehl, Alessandro Gambitta, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) . . . . . [9207-16]

SESSION 5

LOCATION: CONV. CTR. ROOM 14A . . . TUE 4:30 PM TO 5:30 PM

Thin Films and Multilayers

Session Chairs: **Stefan Braun,** Fraunhofer IWS Dresden (Germany); **Bing Shi,** Argonne National Lab. (USA)

4:30 pm: **Preparation and characterization of x-ray mirrors with three single layers of a-C, B4C, and Ni onto one 800-mm long Si substrate**, Michael Störmer, Helmholtz-Zentrum Geesthacht (Germany); Frank Siewert, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Alexander Pilz, Pilz-Optics (Germany); Marion Kuhlmann, Elke Ploenjes, Kai Tiedtke, Deutsches Elektronen-Synchrotron (Germany) . . . . . [9207-17]

4:50 pm: **APS deposition facility upgrades and future plans**, Raymond Conley Jr., Argonne National Lab. (USA) and Brookhaven National Lab. (USA); Bing Shi, Stanley Wiedmeyer, Mark Erdmann, Scott Izzo, Lahsen Assoufid, Kurt Goetze, Tim Mooney, Argonne National Lab. (USA); Kenneth Lauer, Brookhaven National Lab. (USA) . . . . . [9207-18]

5:10 pm: **Graded multilayers for fully polarization resolved resonant inelastic x-ray scattering in the soft x-ray range**, Christian Morawe, Jean-Christophe Peffen, ESRF - The European Synchrotron (France); Ratchadaporn Supruangnet, Synchrotron Light Research Institute (Thailand); Lucio Braicovich, Politecnico di Milano (Italy); Nicholas B. Brookes, ESRF - The European Synchrotron (France); Giacomo Ghiringhelli, Politecnico di Milano (Italy); Flora Yakhou-Harris, ESRF - The European Synchrotron (France) . . . . . [9207-19]

LOCATION: MARRIOTT MARQUIS, CARDIFF . TUE 8:00 TO 10:00 PM

Workshop on X-Ray Mirrors

Session Chair: **Ali M. Khounsary,** X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA)

The X-ray Mirror Working Group provides an informal setting for the interested engineers and scientists to meet and discuss issues related to the design, analysis, cooling, fabrication, and metrology of x-ray mirrors. Topics for discussion can be e-mailed to the organizer, Dr. Ali Khounsary (amk@iit.edu), prior to the meeting.

CONFERENCE 9207

LOCATION: CONV. CTR. ROOM 14A

WEDNESDAY 20 AUGUST

SESSION 6

LOCATION: CONV. CTR. ROOM 14A . . WED 8:30 AM TO 9:30 AM

Short Pulses

Session Chairs: **Dmitriy L. Voronov,** Lawrence Berkeley National Lab. (USA); **Ladislav Pina,** Czech Technical Univ. in Prague (Czech Republic)

8:30 am: **Phase characterization of attosecond multilayer mirrors: from EUV to soft x-rays**, Franck Delmotte, Charles Bourassin-Bouchet, Sébastien de Rossi, Evgueni Meltchakov, Lab. Charles Fabry (France); Angelo Giglia, Stefano Nannarone, Consiglio Nazionale delle Ricerche (Italy) . . . . . [9207-20]

8:50 am: **Attosecond broadband multilayer mirrors for the water window spectral range**, Alexander Guggenmos, Stefan Radünz, Roman Rauhut, Sriram Venkatesan, Angela Wochnik, Christina Scheu, Ludwig-Maximilians-Univ. München (Germany); Eric Gullikson, Lawrence Berkeley National Lab. (USA); Stefan Fischer, Bert Nickel, Ferenc Krausz, Ulf Kleineberg, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9207-21]

9:10 am: **Phase delay characterization of multilayer coatings for EUV short pulses reflectance**, Alain J. Corso, Univ. degli Studi di Padova (Italy) and IFN-CNR LUXOR Lab. (Italy); Enrico Tessarolo, Consiglio Nazionale delle Ricerche (Italy); Paola Zuppella, Sara Zuccon, IFN-CNR LUXOR Lab. (Italy); Marco Nardello, Univ. degli Studi di Padova (Italy); Maria G. Pelizzo, IFN-CNR LUXOR Lab. (Italy)[9207-22]

SESSION 7

LOCATION: CONV. CTR. ROOM 14A . .WED 9:30 AM TO 10:10 AM

New Materials

Session Chairs: **Ali M. Khounsary,** X-ray Optics, Inc. (USA), Illinois Institute of Technology {United States); **Lucia Alianelli,** Diamond Light Source Ltd. (United Kingdom)

9:30 am: **Characterization of heated crystalline fluoride cut-off filters in the FUV**, Kenneth F. Dymond, Scott A. Budzien, Andrew C. Nicholas, U.S. Naval Research Lab. (USA); Peter W. Walker, Computational Physics, Inc. (USA); Richard Eastes, Andre Krywonos, Robert Eppig, Florida Space Institute (USA) . . . [9207-23]

9:50 am: **Characterization of thin HPHT IIa diamond by transmission and reflection measurements**, Shunji Goto, Hiroshi Yamazaki, Ayumi Miura, Yuichi Inubushi, Haruhiko Ohashi, Japan Synchrotron Radiation Research Institute (Japan); Makina Yabashi, RIKEN (Japan) . . . . . [9207-24]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 8

LOCATION: CONV. CTR. ROOM 14A WED 10:40 AM TO 12:00 PM

Microscopes and Telescopes

Session Chairs: **Christian Morawe,** ESRF - The European Synchrotron (France); **Michael Störmer,** Helmholtz-Zentrum Geesthacht (Germany)

10:40 am: **Development of achromatic full-field hard x-ray microscopy with ultraprecise total reflection mirrors**, Satoshi Matsuyama, Yoji Emi, Hidetoshi Kino, Yasuhisa Sano, Osaka Univ. (Japan); Yoshiki Kohmura, Tetsuya Ishikawa, RIKEN (Japan); Kazuto Yamauchi, Osaka Univ. (Japan). . . . . [9207-27]

11:00 am: **Toward achromatic soft x-ray imaging system with sub-10 nm spatial resolution**, Satoru Egawa, Takehiro Kume, Hidekazu Mimura, The Univ. of Tokyo (Japan) . . . . . [9207-28]

11:20 am: **Development of optical components for METIS instrument**, Marco Nardello, Univ. degli Studi di Padova (Italy); Sara Zuccon, Alain J. Corso, Paola Zuppella, IFN-CNR LUXOR Lab. (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy); Silvano Fineschi, Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy); Maria G. Pelizzo, IFN-CNR LUXOR Lab. (Italy) . . . . . [9207-29]

11:40 am: **Hard x-ray monitoring for astrophysical applications**, Ladislav Pina, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9207-30]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 14A . . . WED 1:30 PM TO 3:10 PM

Imaging

Session Chairs: **Shunji Goto,** Japan Synchrotron Radiation Research Institute (Japan); **Werner H. Jark,** Elettra-Sincrotrone Trieste S.C.p.A. (Italy)

1:30 pm: **Phase contrast imaging using a micro focus x-ray source**, Wei Zhou, Keivan Majidi, Jovan G. Brankov, Illinois Institute of Technology (USA). . . [9207-31]

1:50 pm: **Reflection on multilayer mirrors: beam profile and coherence properties**, Alexander Rack, Christian Morawe, ESRF - The European Synchrotron (France); Lahsen Assoufid, Argonne National Lab. (USA); Reiner Dietsch, AXO DRESDEN GmbH (Germany); Frank Siewert, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Amparo Vivo, Peter Cloetens, ESRF - The European Synchrotron (France); Timm Weitkamp, Synchrotron SOLEIL (France); Lucia Mancini, Diego Dreossi, Sincrotrone Trieste S.C.p.A. (Italy); Eric Ziegler, ESRF - The European Synchrotron (France) . . . . . [9207-32]

2:10 pm: **Characterization of low contrast samples and fast processes by portable x-ray tomography**, Luca Marchitto, Istituto Motori CNR (Italy); Sultan B. Dabagov, Istituto Nazionale di Fisica Nucleare (Italy) and P.N. Lebedev Physical Institute (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation); Luigi Allocca, Istituto Motori CNR (Italy); Dariush Hampai, Istituto Nazionale di Fisica Nucleare (Italy); Salvatore Alfuso, Istituto Motori CNR (Italy); Andrea Liedl, Istituto Nazionale di Fisica Nucleare (Italy); Claudia Polese, Istituto Nazionale di Fisica Nucleare (Italy) and Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [9207-33]

2:30 pm: **Phase imaging using polycapillary optics**, Sajid Bashir, Jonathan C. Petruccelli, Carolyn MacDonald, Univ. at Albany (USA) . . . . . [9207-34]

2:50 pm: **Simulations and testing of high asymmetry angle x-ray crystal monochromators for advanced x-ray imaging applications**, Zdenko Zápražný, Dušan Korytár, Peter Šiffalovič, Matej Jergel, Edmund Dobročka, Slovak Academy of Sciences (Slovakia); Claudio Ferrari, Consiglio Nazionale delle Ricerche (Italy); Patrik Vagovič, Ctr. for Free-Electron Laser Science (Germany); Petr Mikulík, Central European Institute of Technology (Czech Republic) and Masaryk Univ. (Czech Republic) . . . . . [9207-35]

CONFERENCE 9208

LOCATION: CONV. CTR. ROOM 14A

Sunday 17 August 2014 • Proceedings of SPIE Vol. 9208

Adaptive X-Ray Optics III

Conference Chairs: **Stephen L. O'Dell,** NASA Marshall Space Flight Ctr. (USA); **Ali M. Khounsary,** X-ray Optics, Inc. (USA), Illinois Institute of Technology (USA)

Conference Co-Chairs: **Raymond Barrett,** European Synchrotron Radiation Facility (France); **Stuart B. Shaklan,** Jet Propulsion Lab. (USA); **Kazuto Yamauchi,** Osaka Univ. (Japan)

Program Committee: **Kevin L. Baker,** Lawrence Livermore National Lab. (USA); **Daniele Cocco,** SLAC National Accelerator Lab. (USA); **Michael Hart,** Hart Scientific Consulting International LLC (USA), The Univ. of Arizona (USA); **René Hudec,** Astronomical Institute of the ASCR, v.v.i. (Czech Republic); **Mourad Idir,** Brookhaven National Lab. (USA); **Carolyn A. MacDonald,** Univ. at Albany (USA); **Derrick C. Mancini,** Argonne National Lab. (USA); **Pascal Mercère,** Synchrotron SOLEIL (France); **Michael J. Pivovaroff,** Lawrence Livermore National Lab. (USA); **Kawal J. Sawhney,** Diamond Light Source Ltd. (United Kingdom); **Daniel A. Schwartz,** Harvard-Smithsonian Ctr. for Astrophysics (USA); **Daniele Spiga,** INAF - Osservatorio Astronomico di Brera (Italy); **Melville P. Ulmer,** Northwestern Univ. (USA); **Maurizio Vannoni,** European XFEL GmbH (Germany); **Allan Wirth,** Northrop Grumman Xinetics (USA)

SUNDAY 17 AUGUST

LOCATION: CONV. CTR. ROOM 14A . . .SUN 8:50 AM TO 9:00 AM

Welcome and Opening Remarks

Stephen L. O'Dell, NASA Marshall Space Flight Ctr. (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 14A . SUN 9:00 AM TO 10:00 AM

Light-Source Applications

Session Chairs: **Daniele Cocco,** SLAC National Accelerator Lab. (USA); **Maurizio Vannoni,** European XFEL GmbH (Germany)

9:00 am: **Development of a two-stage x-ray focusing system with ultraprecise deformable mirrors**, Takumi Goto, Satoshi Matsuyama, Hiroki Nakamori, Osaka Univ. (Japan); Takashi Kimura, Hokkaido Univ. (Japan); Yasuhisa Sano, Osaka Univ. (Japan); Yoshiki Kohmura, Kenji Tamasaku, Makina Yabashi, Tetsuya Ishikawa, RIKEN (Japan); Kazuto Yamauchi, Osaka Univ. (Japan). . . . . [9208-1]

9:20 am: **Beam transport and focusing layout based on adaptive optics for the SQS scientific instrument at the European XFEL**, Tommaso Mazza, European XFEL GmbH (Germany); Riccardo Signorato, CINEL Strumenti Scientifici s.r.l. (Italy); Michael Meyer, Daniele La Civita, Maurizio Vannoni, Harald Sinn, European XFEL GmbH (Germany). . . . . [9208-2]

9:40 am: **K-B bendable optics improvements at FERMI@Elettra FEL: last upgrade**, Lorenzo Raimondi, Sincrotrone Trieste S.C.p.A. (Italy); Cristian Svetina, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. degli Studi di Trieste (Italy); Nicola Mahne, Sincrotrone Trieste S.C.p.A. (Italy); Daniele Cocco, SLAC National Accelerator Lab. (USA); Flavio Capotondi, Emanuele Pedersoli, Michele Manfredda, Maya Kiskinova, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Barbara Keitel, Guenter Brenner, Elke Ploenjes, Deutsches Elektronen-Synchrotron (Germany); Tobias Mey, Klaus Mann, Laser-Lab. Göttingen e.V. (Germany); Marco Zangrando, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Consiglio Nazionale delle Ricerche (Italy) . . . . . [9208-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 14A . SUN 10:30 AM TO 11:50 AM

Astronomical Applications

Session Chairs: **Daniele Spiga,** INAF - Osservatorio Astronomico di Brera (Italy); **Allan Wirth,** Northrop Grumman Xinetics (USA)

10:30 am: **Toward large-area sub-arcsecond x-ray telescopes**, Stephen L. O'Dell, NASA Marshall Space Flight Ctr. (USA); Thomas L. Aldcroft, Ryan Allured, Harvard-Smithsonian Ctr. for Astrophysics (USA); Carolyn Atkins, The Univ. of Alabama in Huntsville (USA); David N. Burrows, The Pennsylvania State Univ. (USA); Jain Cao, Northwestern Univ. (USA); Kai-Wing Chan, Univ. of Maryland, Baltimore County (USA); Brandon D. Chalifoux, Massachusetts Institute of Technology (USA); Vincenzo Cotroneo, Harvard-Smithsonian Ctr. for Astrophysics (USA); Ronald F. Elsner, NASA Marshall Space Flight Ctr. (USA); Michael E. Graham, Northwestern Univ. (USA); Mikhail V. Gubarev, NASA Marshall Space Flight Ctr. (USA); Ralf K. Heilmann, Massachusetts Institute of Technology (USA); Raegan L. Johnson-Wilke, The Pennsylvania State Univ. (USA); Kiranmayee Kilaru, Universities Space Research Association (USA); Jeffery J. Kolodziejczak, NASA Marshall Space Flight Ctr. (USA); Stuart McMuldroch, Harvard-Smithsonian Ctr. for Astrophysics (USA); Brian D. Ramsey, NASA Marshall Space Flight Ctr. (USA); Paul B. Reid, Harvard-Smithsonian Ctr. for Astrophysics (USA); Raul E. Riveros, Oak Ridge Associated Universities (USA); Jacqueline M. Roche, NASA Marshall Space Flight Ctr. (USA); Timo T. Saha, NASA Goddard Space Flight Ctr. (USA); Mark L. Schattenburg, Massachusetts Institute of Technology (USA); Daniel A. Schwartz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Susan E. Trolier-McKinstry, The Pennsylvania State Univ. (USA); Melville P. Ulmer, Semyon Vaynman, Northwestern Univ. (USA); Alexey A. Vikhlinin, Harvard-Smithsonian Ctr. for Astrophysics (USA); Xiaoli Wang, Northwestern Univ. (USA); Martin C. Weisskopf, NASA Marshall Space Flight Ctr. (USA); Rudeger H. T. Wilke, The Pennsylvania State Univ. (USA); William W. Zhang, NASA Goddard Space Flight Ctr. (USA) . . . . . [9208-5]

10:50 am: **Technology requirements for a square-meter arcsecond-resolution telescope for x-rays: the SMART-X mission**, Daniel A. Schwartz, Ryan Allured, Jay A. Bookbinder, Vincenzo Cotroneo, William R. Forman, Mark D. Freeman, Stuart McMuldroch, Paul B. Reid, Harvey D. Tananbaum, Alexey A. Vikhlinin, Harvard-Smithsonian Ctr. for Astrophysics (USA); Raegan L. Johnson-Wilke, Susan E. Trolier-McKinstry, Rudeger H. T. Wilke, The Pennsylvania State Univ. (USA); Mikhail V. Gubarev, Jeffery J. Kolodziejczak, Stephen L. O'Dell, Brian D. Ramsey, NASA Marshall Space Flight Ctr. (USA) . . . . . [9208-6]

11:10 am: **Development status of adjustable grazing incidence x-ray optics using thin film PZT actuators**, Vincenzo Cotroneo, Thomas L. Aldcroft, Ryan Allured, John Glenn, Edward Hertz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Raegan L. Johnson-Wilke, The Pennsylvania State Univ. (USA); Stuart McMuldroch, Paul B. Reid, Daniel A. Schwartz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Susan E. Trolier-McKinstry, The Pennsylvania State Univ. (USA); Alexey A. Vikhlinin, Harvard-Smithsonian Ctr. for Astrophysics (USA); Rudeger H. T. Wilke, The Pennsylvania State Univ. (USA) . . . . . [9208-7]

11:30 am: **Comparisons of the deflections of magnetically smart films on alloy of NiCo and glass substrates**, Melville P. Ulmer, Xiaoli Wang, Jain Cao, Michael E. Graham, Semyon Vaynman, Yifang Cao, Tyler Karian, Youwei Yao, Northwestern Univ. (USA) . . . . . [9208-8]

Lunch Break . . . . . Sun 11:50 am to 1:10 pm

CONFERENCE 9208

LOCATION: CONV. CTR. ROOM 14A

SESSION 3

LOCATION: CONV. CTR. ROOM 14A . . . . SUN 1:10 PM TO 3:30 PM

Device Development

Session Chairs: **Melville P. Ulmer,** Northwestern Univ. (USA); **Kazuto Yamauchi,** Osaka Univ. (Japan)

1:10 pm: **Adjustable optics systems based on PZT thin films with integrated ZnO electronics**, Raegan L. Johnson-Wilke, Rudeger H. T. Wilke, Margeaux L. Wallace, J. Israel Ramirez, Thomas N. Jackson, The Pennsylvania State Univ. (USA); Vincenzo Cotroneo, Stuart McMuldroch, Paul B. Reid, Daniel A. Schwartz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Susan E. Trolier-McKinstry, The Pennsylvania State Univ. (USA). . . . . [9208-9]

1:30 pm: **Active shape correction of a thin glass/plastic x-ray mirror**, Daniele Spiga, INAF - Osservatorio Astronomico di Brera (Italy); Marco Barbera, Univ. degli Studi di Palermo (Italy); Stefano Basso, Marta M. Civitani, INAF - Osservatorio Astronomico di Brera (Italy); Alfonso Collura, Ugo Lo Cicero, INAF - Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy); Giuseppe Lullo, Univ. degli Studi di Palermo (Italy); Marco Riva, Bianca Salmaso, INAF - Osservatorio Astronomico di Brera (Italy); Luisa Sciortino, Univ. degli Studi di Palermo (Italy) . . . . . [9208-10]

1:50 pm: **Using ion implant to change the figure of extremely thin and lightweight optics**, Larry A. Hess, Kai-Wing Chan, Ryan S. McClelland, William W. Zhang, NASA Goddard Space Flight Ctr. (USA) . . . . . [9208-19]

2:10 pm: **Test results for an AOA-Xinetics grazing incidence x-ray deformable mirror**, Charles F. Lillie, Lillie Consulting, LLC (USA); Richard G. Egan, Franklin M. Landers, Jeffrey Cavaco, Northrop Grumman Xinetics (USA); Kevin M. Ezzo, Q-Peak, Inc. (USA) . . . . . [9208-11]

2:30 pm: **Development of single grating x-ray Talbot interferometer as a feedback loop sensor element of an adaptive x-ray mirror system**, Shashidhara Marathe, Xianbo Shi, Naresh G. Kujala, Michael J. Wojcik, Ali M. Khounsary, Jun Qian, Albert Macrander, Lahsen Assoufid, Argonne National Lab. (USA) . [9208-12]

2:50 pm: **Design and fabrication of a high precision x-ray deformable mirror**, Allan Wirth, Audrey D. Plinta, Eric A. Lintz, Jeffrey Cavaco, AOA Xinetics (USA) . . . . . [9208-13]

3:10 pm: **Control of a 45-cm long x-ray deformable mirror with either external or internal metrology**, Lisa A. Poyneer, Thomas J. McCarville, Tommaso Pardini, David W. Palmer, Lawrence Livermore National Lab. (USA); Audrey D. Brooks, Northrop Grumman Xinetics (USA) . . . . . [9208-14]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 14A . . . SUN 4:00 PM TO 5:20 PM

Models and Algorithms

Session Chairs: **Kawal Sawhney,** Diamond Light Source Ltd. (United Kingdom); **Daniel A. Schwartz,** Harvard-Smithsonian Ctr. for Astrophysics (USA)

4:00 pm: **Structure in defocused beams of x-ray focusing mirrors: causes and possible solutions**, John P. Sutter, Simon G. Alcock, Diamond Light Source Ltd. (United Kingdom); Fiona Rust, Univ. of Bath (United Kingdom); Kawal Sawhney, Diamond Light Source Ltd. (United Kingdom) . . . . . [9208-15]

4:20 pm: **Analysis of active figure control effects on mounting strategy for x-ray optics**, Jeffery J. Kolodziejczak, Jacqueline M. Roche, Stephen L. O'Dell, Brian D. Ramsey, Ronald F. Elsner, Mikhail V. Gubarev, Martin C. Weisskopf, NASA Marshall Space Flight Ctr. (USA). . . . . [9208-16]

4:40 pm: **An error function minimization approach for the inverse problem of adaptive mirrors tuning**, Maurizio Vannoni, Fan Yang, European XFEL GmbH (Germany); Frank Siewert, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Harald Sinn, European XFEL GmbH (Germany) . . . . . [9208-17]

5:00 pm: **Microfocusing beamline for xuv-xuv pump-probe experiments using HH generation**, Fabio Frassetto, Istituto di Fotonica e Nanotecnologie (Italy); Sunilkumar Anumula, Francesca Calegari, Andrea Trabattoni, Mauro Nisoli, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Luca Poletto, Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9208-18]

LOCATION: CONV. CTR. ROOM 14A . . . . . 5:20 PM TO 5:30 PM

Closing Remarks

Ali M. Khounsary, X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA)

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

CONFERENCE 9209

LOCATION: CONV. CTR. ROOM 6C

Monday–Thursday 18–21 August 2014 • Proceedings of SPIE Vol. 9209

Advances in Computational Methods for X-Ray Optics III

Conference Chairs: **Manuel Sanchez del Rio,** European Synchrotron Radiation Facility (France); **Oleg Chubar,** Brookhaven National Lab. (USA)

Conference Co-Chairs: **Carolyn MacDonald,** Univ. at Albany (USA); **Kawal J. Sawhney,** Diamond Light Source Ltd. (United Kingdom)

Program Committee: **Lucia Alianelli,** Diamond Light Source Ltd. (United Kingdom); **Johannes Bahrdt,** Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Roger J. Dejus,** Argonne National Lab. (USA); **Gianluca Aldo Geloni,** European XFEL GmbH (Germany); **Graeme Hansford,** Univ. of Leicester (United Kingdom); **Kenneth W. Hill,** Princeton Plasma Physics Lab. (USA); **Mourad Idir,** Brookhaven National Lab. (USA); **Tetsuya Ishikawa,** RIKEN (Japan); **Ali M. Khounsary,** X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA); **Erik Bergbäck Knudsen,** Technical Univ. of Denmark (Denmark); **Jacek Krzywinski,** SLAC National Accelerator Lab. (USA); **Bernd C. Meyer,** Lab. Nacional de Luz Sincrotron (Brazil); **Giovanni Pareschi,** INAF - Osservatorio Astronomico di Brera (Italy); **Francois A. Polack,** Synchrotron SOLEIL (France); **Ruben Y. Reininger,** Brookhaven National Lab. (USA) and Scientific Answers & Solutions LLC (USA); **Liubov Samoylova,** European XFEL GmbH (Germany); **David A. Shapiro,** Brookhaven National Lab. (USA); **Yuri V. Shvyd'ko,** Argonne National Lab. (USA); **Anatoly A. Snigirev,** European Synchrotron Radiation Facility (France); **Peter C. Sondhauss,** MAX IV Lab., Lund Univ. (Sweden); **Alexey Y. Suvorov,** Brookhaven National Lab. (USA); **Laszlo Vincze,** Univ. Gent (Belgium); **Timm Weitkamp,** Synchrotron SOLEIL (France); **Garth J. Williams,** SLAC National Accelerator Lab. (USA); **Valeriy V. Yashchuk,** Lawrence Berkeley National Lab. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Separation of hard x-ray synchrotron radiation from electron beam slices, An He, Oleg Chubar, Lihua Yu, Brookhaven National Lab. (USA) . . . . . [9209-31]

WaveProperGator: interactive framework for x-ray FEL optics design and simulation, Alexey Buzmakov, A.V. Shubnikov Institute of Crystallography (Russian Federation); Oleg Chubar, Brookhaven National Lab. (USA); Liubov Samoylova, Harald Sinn, European XFEL GmbH (Germany) . . . . . [9209-32]

A proposal for an open source graphical environment for simulating x-ray optics, Luca Rebuffi, Sincrotrone Trieste S.C.p.A. (Italy); Janez Demsar, Univ. of Ljubljana (Slovenia); Niccolo Canestrari, Oleg Chubar, Brookhaven National Lab. (USA); Manuel Sanchez del Rio, ESRF - The European Synchrotron (France) . . . . . [9209-33]

Simulation of the ultrahigh energy resolution IXS analyzer system at NSLS-II, Alexey Y. Suvorov, David S. Coburn, Alessandro Cunsolo, Jeffrey W. Keister, Yong Q. Cai, Brookhaven National Lab. (USA). . . . . [9209-34]

An open software framework for advancement of x-ray optics simulation and modeling, David L. Bruhwiler, RadiaSoft LLC (USA); Oleg Tchoubar, Brookhaven National Lab. (USA); Jacek Krzywinski, Amber Boehnlein, SLAC National Accelerator Lab. (USA) . . . . . [9209-35]

Aberration free short focal x-ray lenses, Lucia Alianelli, Diamond Light Source Ltd. (United Kingdom); Manuel Sanchez del Rio, ESRF - The European Synchrotron (France) . . . . . [9209-36]

A new SHADOW update: integrating diffraction effects into ray tracing, Xianbo Shi, Argonne National Lab. (USA); Manuel Sanchez del Rio, ESRF - The European Synchrotron (France); Ruben Reininger, Argonne National Lab. (USA) . . . [9209-37]

An efficient wave-optics simulation method for beamlines containing extended focusing mirrors, Niccolo Canestrari, Oleg Chubar, Brookhaven National Lab. (USA) . . . . . [9209-38]

Fourier transform image processing techniques for grid-based phase imaging, Sajjad Tahir, Carolyn MacDonald, Jonathan C. Petruccelli, Univ. at Albany (USA) . . . . . [9209-39]

TUESDAY 19 AUGUST

LOCATION: MARRIOTT MARQUIS, CARDIFF . TUE 8:00 TO 10:00 PM

Workshop on X-Ray Mirrors

Chair: **Ali M. Khounsary,** X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA)

The X-ray Mirror Working Group provides an informal setting for the interested engineers and scientists to meet and discuss issues related to the design, analysis, cooling, fabrication, and metrology of x-ray mirrors. Topics for discussion can be e-mailed to the organizer, Dr. Ali Khounsary (amk@iit.edu), prior to the meeting.

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 6C . . WED 8:10 AM TO 10:00 AM

Fundamentals and Facility Reports I

Session Chair: **Kawal Sawhney,** Diamond Light Source Ltd. (United Kingdom)

8:10 am: **Generation and transport of high-coherence x-rays: current status and future prospects** *(Invited Paper)*, Kwang-Je Kim, Argonne National Lab. (USA) . . . . . [9209-1]

8:40 am: **Partial coherence and imperfect optics at a synchrotron radiation source modeled by wavefront propagation** *(Invited Paper)*, David Laundy, Simon G. Alcock, Lucia Alianelli, John P. Sutter, Kawal Sawhney, Diamond Light Source Ltd. (United Kingdom); Oleg Chubar, Brookhaven National Lab. (USA) . . . . [9209-2]

9:10 am: **Simulations applied to focusing optics at European XFEL** *(Invited Paper)*, Liubov Samoylova, Harald Sinn, European XFEL GmbH (Germany) [9209-3]

9:40 am: **Simulations of x-ray optics for ESRF-Upgrade programme**, Manuel Sanchez del Rio, ESRF - The European Synchrotron (France). . . . . [9209-4]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

OPTICS

CONFERENCE 9209

LOCATION: CONV. CTR. ROOM 6C

SESSION 2

LOCATION: CONV. CTR. ROOM 6C . . WED 10:30 AM TO 11:20 AM

Fundamentals and Facility Reports II

Session Chair: **Kawal Sawhney,** Diamond Light Source Ltd. (United Kingdom)

10:30 am: **Developments toward a framework for simulation at state-of-the-art x-ray facilities** *(Invited Paper)*, Garth J. Williams, SLAC National Accelerator Lab. (USA) . . . . . [9209-5]

11:00 am: **Recent updates in the Synchrotron Radiation Workshop code: on-going simulation activities for storage rings and x-ray FEL and plans for the future**, Oleg Chubar, Brookhaven National Lab. (USA) . . . . . [9209-6]

SESSION 3

LOCATION: CONV. CTR. ROOM 6C . . WED 11:20 AM TO 12:20 PM

Methods and Codes I

Session Chair: **Oleg Chubar,** Brookhaven National Lab. (USA)

11:20 am: **Propagation of coherent light pulses with PHASE** *(Invited Paper)*, Johannes Bahrdt, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Uwe Flechsig, Paul Scherrer Institut (Switzerland); Walan Grizzoli, Max IV Project (Sweden) . . . . . [9209-7]

11:50 am: **X-ray optics simulation and beamline design using a hybrid method** *(Invited Paper)*, Xianbo Shi, Ruben Reininger, Argonne National Lab. (USA); Manuel Sanchez del Rio, ESRF - The European Synchrotron (France); Jun Qian, Lahsen Assoufid, Argonne National Lab. (USA). . . . . [9209-8]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:30 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 6C . . . . WED 1:30 PM TO 3:10 PM

Methods and Codes II

Session Chair: **Oleg Chubar,** Brookhaven National Lab. (USA)

1:30 pm: **A powerful scriptable ray tracing package xrt** *(Invited Paper)*, Konstantin Klementiev, MAX IV Lab. (Sweden); Roman Chernikov, Deutsches Elektronen-Synchrotron (Germany). . . . . [9209-9]

2:00 pm: **Novel applications of the x-ray tracing software package McXtrace** *(Invited Paper)*, Erik B. Knudsen, Martin M. Nielsen, Kristoffer Haldrup, Søren Schmidt, Technical Univ. of Denmark (Denmark) . . . . . [9209-10]

2:30 pm: **MASH: a framework for the automation of x-ray optical simulations**, Peter Sondhauss, Lund Univ. (Sweden) . . . . . [9209-11]

2:50 pm: **Acceleration of the ray tracing in xrt with OpenCL**, Roman Chernikov, Deutsches Elektronen-Synchrotron (Germany); Konstantin Klementiev, MAX IV Lab. (Sweden) . . . . . [9209-12]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 6C . . . WED 3:40 PM TO 6:00 PM

Instruments and Beamlines

Session Chair: **Manuel Sanchez Del Rio,** ESRF - The European Synchrotron (France)

3:40 pm: **Wolter-I optical systems: from metrology to Point Spread Function** *(Invited Paper)*, Daniele Spiga, INAF - Osservatorio Astronomico di Brera (Italy); Lorenzo Raimondi, Sincrotrone Trieste S.C.p.A. (Italy). . . . . [9209-13]

4:10 pm: **Specification of x-ray mirrors in terms of system performance: a new twist to an old plot** *(Invited Paper)*, Valeriy V. Yashchuk, Lawrence Berkeley National Lab. (USA); Liubov Samoylova, European XFEL GmbH (Germany); Igor V. Kozhevnikov, A.V. Shubnikov Institute of Crystallography (Russian Federation) . . . . . [9209-14]

4:40 pm: **Soft Matter Interfaces beamline at NSLS-II: geometrical ray-tracing vs. wavefront propagation simulations**, Mikhail Zhernenkov, Oleg Chubar, Niccolo Canestrari, Elaine DiMasi, Brookhaven National Lab. (USA) . . . . . [9209-15]

5:00 pm: **Partially-coherent wavefront propagation simulations for inelastic x-ray scattering beamline including crystal optics**, Alexey Y. Suvorov, Yong Q. Cai, Brookhaven National Lab. (USA); John P. Sutter, Diamond Light Source Ltd. (United Kingdom); Oleg Chubar, Brookhaven National Lab. (USA) . . . . . [9209-16]

5:20 pm: **Wavefront propagation simulations for a UV/soft X-ray beamline at NSLS-II**, Niccolo Canestrari, Elio Vescovo, Andrew Walter, Oleg Chubar, Brookhaven National Lab. (USA). . . . . [9209-17]

5:40 pm: **Calculation of the instrumental profile function for a powder diffraction beamline used in nanocrystalline material research**, Luca Rebuffi, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Paolo Scardi, Univ. degli Studi di Trento (Italy) . . . . . [9209-18]

THURSDAY 21 AUGUST

SESSION 6

LOCATION: CONV. CTR. ROOM 6C . . .THU 8:20 AM TO 10:00 AM

Crystal Optics

Session Chair: **Carolyn MacDonald,** Univ. at Albany (USA)

8:20 am: **Theory of angular dispersive imaging x-ray spectrographs**, Yuri V. Shvyd'ko, Argonne National Lab. (USA) . . . . . [9209-19]

8:40 am: **Perfect crystal propagator for physical optics simulations with Synchrotron Radiation Workshop**, John P. Sutter, Diamond Light Source Ltd. (United Kingdom); Oleg Chubar, Alexey Y. Suvorov, Brookhaven National Lab. (USA) . . . . . [9209-20]

9:00 am: **Development of spatially-resolved high-resolution x-ray spectroscopy for fusion and light-source research**, Kenneth W. Hill, Manfred Bitter, Luis Delgado-Aparicio, Novimir Pablant, Philip Efthimion, Princeton Plasma Physics Lab. (USA); Jian Lu, Chongqing Univ. (China); Peter Beiersdorfer, Hui Chen, Marilyn Schneider, Klaus Widmann, Lawrence Livermore National Lab. (USA); Manuel Sanchez, ESRF - The European Synchrotron (France) . . . . . [9209-21]

9:20 am: **Imaging of the photonic crystals with coherent x-rays**, Irina I. Snigireva, Anatoly Snigirev, ESRF - The European Synchrotron (France); Victor Kohn, Russian Research Ctr. Kurchatov Institute (Russian Federation) . . . [9209-22]

9:40 am: **Modeling of a compound imaging system with a curved monochromator and polycapillary optics**, Bushra Kanwal, Alexandru F. Petrescu, Carolyn MacDonald, Univ. at Albany (USA) . . . . . [9209-23]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 7

LOCATION: CONV. CTR. ROOM 6C . . THU 10:30 AM TO 11:40 AM

High-Resolution Focusing Optics and Imaging I

Session Chair: **Irina Snigireva,** ESRF - The European Synchrotron (France)

10:30 am: **Computational x-ray phase imaging** *(Invited Paper)*, Jonathan C. Petruccelli, Carolyn MacDonald, Univ. at Albany (USA); George Barbastathis, Massachusetts Institute of Technology (USA) and SMART-Singapore MIT Alliance for Research & Technology (Singapore); Adam Pan, Massachusetts Institute of Technology (USA); Lei Tian, Univ. of California, Berkeley (USA); Kelli Zhu, Massachusetts Institute of Technology (USA); Sajid Bashir, Sajjad Tahir, Univ. at Albany (USA) . . . . . [9209-24]

11:00 am: **The finite-difference simulation of x-rays propagation through the system of lenses**, Sergey P. Kshevetskii, Immanuel Kant State Univ. of Russia (Russian Federation); Pawel R. Wojda, Gdansk Univ. of Technology (Poland) . . . . . [9209-26]

11:20 am: **Contrast enhancement of propagation based x-ray phase contrast imaging**, Adam Pan, Ling Xu, Massachusetts Institute of Technology (USA); Jonathan C. Petruccelli, Univ. at Albany (USA); Rajiv Gupta, Massachusetts General Hospital (USA); George Barbastathis, Massachusetts Institute of Technology (USA) . . . . . [9209-27]

Lunch/Exhibition Break . . . . . Thu 11:40 am to 1:10 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 6C ..... THU 1:10 PM TO 2:10 PM

High-Resolution Focusing Optics and Imaging II

Session Chair: **Irina Snigireva,** ESRF - The European Synchrotron (France)

1:10 pm: **Quantitative phase imaging using dual wavelength x-rays**, Ling Xu, Massachusetts Institute of Technology (USA); Yongjin Sung, Massachusetts General Hospital (USA); Adam Pan, Massachusetts Institute of Technology (USA); Rajiv Gupta, Massachusetts General Hospital (USA); George Barbastathis, Massachusetts Institute of Technology (USA) . . . . . [9209-28]

1:30 pm: **3D x-ray reconstruction using lightfield imaging**, Murat Tahtali, Sajib K. Saha, Andrew J. Lambert, Mark R. Pickering, UNSW@ADFA (Australia) . . [9209-29]

1:50 pm: **Developments of x-ray grating imaging and trying of multiple information fusion**, Yueping Han, Li Ruihong, North Univ. of China (China) . . . . . [9209-30]

LOCATION: CONV. CTR. ROOM 6C .. THU 2:10 PM TO 3:10 PM

Workshop on Software for Modeling X-ray Sources, Optics, and Scattering

Chairs: **Manuel Sanchez del Rio**, European Synchrotron Radiation Facility; **Oleg Chubar**, Brookhaven National Lab.

This workshop will have a three-fold aim: i) show live demonstrations of the codes and developments presented in the Advances in Computational Methods for X-Ray Optics III conference; ii) summarize and discuss collaborations targeting to standardize and exchange data, models, and codes among different packages; iii) organize the development of a new Python-based software infrastructure allowing to perform virtual experiments by running different interconnected codes and libraries that simulate emission by relativistic particles, propagate the radiation through optics, model scattering on samples, and perform experimental data processing. Speakers to be announced. Discussion and summary will follow.

CONFERENCE 9210

LOCATION: CONV. CTR. ROOM 13

Monday–Tuesday 18–19 August 2014 • Proceedings of SPIE Vol. 9210

X-Ray Free-Electron Lasers: Beam Diagnostics, Beamline Instrumentation, and Applications II

Conference Chairs: **Stefan P. Hau-Riege,** Lawrence Livermore National Lab. (USA); **Stefan P. Moeller,** SLAC National Accelerator Lab. (USA); **Makina Yabashi,** RIKEN (Japan)

Program Committee: **Henry N. Chapman,** Deutsches Elektronen-Synchrotron (Germany); **Christian David,** Paul Scherrer Institut (Switzerland); **Alan R. Fry,** SLAC National Accelerator Lab. (USA); **Gerhard Grübel,** Deutsches Elektronen-Synchrotron (Germany); **Gregory Y. Prigozhin,** MIT Kavli Institute for Astrophysics and Space Research (USA); **Nina Rohringer,** Max-Planck-Institut für Physik komplexer Systeme (Germany); **Harald Sinn,** European XFEL GmbH (Germany); **Kai Tiedtke,** Deutsches Elektronen-Synchrotron (Germany)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 13 . . . . . 8:50 AM TO 9:00 AM

Welcome and Opening Remarks

Stefan P. Hau-Riege, Lawrence Livermore National Lab. (USA); **Stefan P. Moeller**, SLAC National Accelerator Lab. (USA); **Makina Yabashi**, RIKEN (Japan)

SESSION 1

LOCATION: CONV. CTR. ROOM 13 . . . MON 9:00 AM TO 10:40 AM

Diagnostics and Instrumentation I

Session Chair: **Stefan P. Moeller,** SLAC National Accelerator Lab. (USA)

9:00 am: **SASE3: soft x-ray beamline at European XFEL** *(Invited Paper)*, Daniele La Civita, Natalia Gerasimova, Maurizio Vannoni, Harald Sinn, European XFEL GmbH (Germany). . . . . [9210-1]

9:30 am: **The experience of the FERMI@Elettra photon beam transport and diagnostics system (PADReS) during three years of continuous support of machine and user experiments: achievements, lessons learned, and future upgrades**, Marco Zangrando, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and IOM-CNR (Italy) . . . . . [9210-2]

9:50 am: **Status and perspectives of experimental platform at SACLA**, Yuichi Inubushi, Kensuke Tono, Tadashi Togashi, Tetsuo Katayama, Japan Synchrotron Radiation Research Institute (Japan); Kanade Ogawa, Shigeki Owada, Makina Yabashi, RIKEN (Japan) . . . . . [9210-3]

10:10 am: **First very positive soft x-ray self-seeding results at LCLS** *(Invited Paper)*, Daniele Cocco, SLAC National Accelerator Lab. (USA) . . . . . [9210-4]

Coffee Break . . . . . Mon 10:40 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 13 . . . MON 11:00 AM TO 12:10 PM

Optics I

Session Chair: **Christian David,** Paul Scherrer Institut (Switzerland)

11:00 am: **Control of a 45-cm long x-ray deformable mirror with either external or internal metrology** *(Invited Paper)*, Lisa A. Poyneer, Thomas J. McCarville, Tommaso Pardini, David W. Palmer, Lawrence Livermore National Lab. (USA); Audrey D. Brooks, Northrop Grumman Xinetics (USA) . . . . . [9210-5]

11:30 am: **Beam branching system for single-shot spectral and timing analysis of XFEL pulses**, Tetsuo Katayama, Japan Synchrotron Radiation Research Institute (Japan); Petri Karvinen, Ismo J. Vartiainen, Anni Partanen, Paul Scherrer Institut (Switzerland); Kanade Ogawa, RIKEN (Japan); Tadashi Togashi, Yuichi Inubushi, Kensuke Tono, Japan Synchrotron Radiation Research Institute (Japan); Christian David, Paul Scherrer Institut (Switzerland); Makina Yabashi, RIKEN (Japan) [9210-6]

11:50 am: **High-resolution single-shot spectral monitoring of hard XFEL radiation**, Mikako Makita, Petri Karvinen, Paul Scherrer Institut (Switzerland); Diling Zhu, SLAC National Accelerator Lab. (USA); Jan Grünert, European XFEL GmbH (Germany); Sebastian Cartier, Paul Scherrer Institut (Switzerland); Yiping Feng, SLAC National Accelerator Lab. (USA); Julia H. Jungmann, Pavle Juranic, Paul Scherrer Institut (Switzerland); Henrik T. Lemke, SLAC National Accelerator Lab. (USA); Aldo Mozzanica, Paul Scherrer Institut (Switzerland); Silke Nelson, SLAC National Accelerator Lab. (USA); Luc Patthey, Paul Scherrer Institut (Switzerland); Marcin Sikorski, Sanghoon Song, SLAC National Accelerator Lab. (USA); Christian David, Paul Scherrer Institut (Switzerland) . . . . . [9210-7]

Lunch Break . . . . . Mon 12:10 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 13 . . . . . MON 1:30 PM TO 3:30 PM

Optics II

Session Chair: **Stefan P. Hau-Riege,** Lawrence Livermore National Lab. (USA)

1:30 pm: **Development of split-delay x-ray optics using Si(220) crystals at SACLA** *(Invited Paper)*, Taito Osaka, Takashi Hirano, Osaka Univ. (Japan); Makina Yabashi, RIKEN (Japan); Yasuhisa Sano, Osaka Univ. (Japan); Kensuke Tono, Yuichi Inubushi, Japan Synchrotron Radiation Research Institute (Japan); Takahiro Sato, Tokyo Univ. (Japan); Kanade Ogawa, RIKEN (Japan); Satoshi Matsuyama, Osaka Univ. (Japan); Tetsuya Ishikawa, RIKEN (Japan); Kazuto Yamauchi, Osaka Univ. (Japan) . . . . . [9210-8]

2:00 pm: **Time-delayed beam splitting with energy separation of x-ray channels**, Yuri V. Shvyd'ko, Yuri P. Stetsko, Gregory B. Stephenson, Argonne National Lab. (USA) . . . . . [9210-9]

2:20 pm: **A hard x-ray split- and delay-unit for the High-Energy Density instrument at the European XFEL**, Sebastian Roling, Westfälische Wilhelms-Univ. Münster (Germany); Karen Appel, European XFEL GmbH (Germany); Stefan Braun, Fraunhofer IWS Dresden (Germany); Oleg Chubar, Brookhaven National Lab. (USA); Peter Gawlitza, Fraunhofer IWS Dresden (Germany); Liubov Samoylova, European XFEL GmbH (Germany); Evgeny Schneidmiller, Deutsches Elektronen-Synchrotron (Germany); Björn Siemer, Westfälische Wilhelms-Univ. Münster (Germany); Frank Siewert, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Thomas Tschentscher, European XFEL GmbH (Germany); Frank Wahlert, Michael Wöstmann, Westfälische Wilhelms-Univ. Münster (Germany); Mikhail V. Yurkov, Deutsches Elektronen-Synchrotron (Germany); Helmut Zacharias, Westfälische Wilhelms-Univ. Münster (Germany). . . . . [9210-10]

2:40 pm: **A multiple split-and-delay line for x-ray pump-probe experiments** *(Invited Paper)*, Christian David, Petri Karvinen, Paul Scherrer Institut (Switzerland); Marcin Sikorski, Sanghoon Song, SLAC National Accelerator Lab. (USA); Ismo J. Vartiainen, Christopher J. Milne, Aldo Mozzanica, Yves Kayser, Ana Diaz, Istvan Mohacsi, Paul Scherrer Institut (Switzerland); Gabriella A. Carini, Sven C. Herrmann, SLAC National Accelerator Lab. (USA); Elina Färm, Mikko Ritala, Univ. of Helsinki (Finland); David M. Fritz, Robert Aymeric, SLAC National Accelerator Lab. (USA) . . . . . [9210-11]

3:10 pm: **Silicon mirrors for high-intensity x-ray pump-and-probe experiments**, Tommaso Pardini, Lawrence Livermore National Lab. (USA); Sebastien Boutet, SLAC National Accelerator Lab. (USA); Tilo Doeppner, Luke B. Fletcher, Lawrence Livermore National Lab. (USA); Dennis F. Gardner Jr., JILA (USA); Randolph M. Hill, Mark S. Hunter, Lawrence Livermore National Lab. (USA); Jacek Krzywinski, Marc Messerschmidt, SLAC National Accelerator Lab. (USA); Arthur E. Pak, Lawrence Livermore National Lab. (USA); Florian Quirin, Klaus Sokolowski-Tinten, Univ. Duisburg-Essen (Germany); Garth J. Williams, SLAC National Accelerator Lab. (USA); Stefan P. Hau-Riege, Lawrence Livermore National Lab. (USA) . . . [9210-12]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 13 . . . . MON 4:00 PM TO 5:40 PM

Applications

Session Chair: **Marco Zangrando,** Elettra-Sincrotrone Trieste S.C.p.A. (Italy)

4:00 pm: **Spectrometer for single-shot x-ray emission-spectroscopy experiments at FEL sources**, Fabio Frassetto, Paolo Miotti, Istituto di Fotonica e Nanotecnologie (Italy); Marcello Coreno, Consiglio Nazionale delle Ricerche (Italy); Antti Kivimäki, Lab. Nazionale TASC (Italy); Cesare Grazioli, Sincrotrone Trieste S.C.p.A. (Italy); Monica de Simone, Lab. Nazionale TASC (Italy); Paola Finetti, Sincrotrone Trieste S.C.p.A. (Italy); Andrea Di Cicco, Fabio Iesari, Univ. degli Studi di Camerino (Italy); Salvatore Stagira, Politecnico di Milano (Italy); Luca Poletto, IFN-CNR LUXOR Lab. (Italy) . . . . . [9210-14]

4:20 pm: **The LCLS Matter in Extreme Conditions (MEC) instrument**, Philip A Heimann, Hae Ja Lee, Bob Nagler, Eric C. Galtier, Eduardo Granados, Brice Arnold, Jing Yin, SLAC National Accelerator Lab. (USA). . . . . [9210-15]

4:40 pm: **The challenges of mechanical design for the LCLS Matter in Extreme Conditions (MEC) instrument**, Brice Arnold, Eric C. Galtier, Philip A. Heimann, Hae Ja Lee, Bob Nagler, Jing Yin, Eduardo Granados, SLAC National Accelerator Lab. (USA) . . . . . [9210-16]

5:00 pm: **Diverse application platform for hard x-ray diffraction in SACLA (DAPHNIS)**, Kensuke Tono, Japan Synchrotron Radiation Research Institute (Japan); So Iwata, Rie Tanaka, Eriko Nango, RIKEN (Japan); Mamoru Suzuki, Osaka Univ. (Japan); Changyong Song, Jaehyun Park, RIKEN (Japan); Takashi Kameshima, Japan Synchrotron Radiation Research Institute (Japan); Shun Ono, RIKEN (Japan); Yasumasa Joti, Japan Synchrotron Radiation Research Institute (Japan); Takaki Hatsui, Makina Yabashi, RIKEN (Japan) . . . . . [9210-17]

5:20 pm: **Time-delay-compensated monochromator for FEL beamlines**, Luca Poletto, IFN-CNR LUXOR Lab. (Italy); Fabio Frassetto, Consiglio Nazionale delle Ricerche (Italy) and Istituto di Fotonia e Nanotecnologie (Italy); Elke Ploenjes, Marion Kuhlmann, Deutsches Elektronen-Synchrotron (Germany) . . . . . [9210-18]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 13 . . . . TUE 9:00 AM TO 10:30 AM

Diagnostics and Instrumentation II

Session Chair: **Kensuke Tono,** Japan Synchrotron Radiation Research Institute (Japan)

9:00 am: **Femtosecond-scale x-ray FEL diagnostics with the LCLS X-band Transverse Deflector** *(Invited Paper)*, Timothy J. Maxwell, Yuantao Ding, Zhirong Huang, SLAC National Accelerator Lab. (USA); Christopher Behrens, Deutsches Elektronen-Synchrotron (Germany); Patrick Krejcik, SLAC National Accelerator Lab. (USA) . . . . . [9210-19]

9:30 am: **Polarization measurement of free electron laser pulses in the VUV generated by the variable polarization source FERMI**, Paola Finetti, Enrico M. Allaria, Bruno Diviacco, Carlo Callegari, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Benoit Mahieu, Ecole Nationale Supérieure de Techniques Avancées (France); Jens Viefhaus, Deutsches Elektronen-Synchrotron (Germany); Marco Zangrando, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and CNR Istituto Officina dei Materiali (Italy); Giovanni De Ninno, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. of Nova Gorica (Slovenia); Guillaume Lambert, Ecole Nationale Supérieure de Techniques Avancées (France); Eugenio Ferrari, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. degli Studi di Trieste (Italy); Jens Buck, European XFEL GmbH (Germany); Markus Ilchen, European XFEL GmbH (Germany) and SLAC National Accelerator Lab. (USA); Boris Vodungbo, Deutsches Elektronen-Synchrotron (Germany) and Univ. of Nova Gorica (Slovenia); Nicola Mahne, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Cristian Svetina, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. degli Studi di Trieste (Italy); Carlo Spezzani, Simone Di Mitri, Giuseppe Penco, Mauro Trovo, William M. Fawley, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Primoz Rebernik, David Gauthier, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Univ. of Nova Gorica (Slovenia); Cesare Grazioli, Univ. of Nova Gorica (Slovenia) and Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Lab. Nazionale TASC (Italy); Marcello Coreno, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and Consiglio Nazionale delle Ricerche (Italy); Barbara Ressel, Univ. of Nova Gorica (Slovenia); Antti Kivimäki, Lab. Nazionale TASC (Italy); Tommaso Mazza, European XFEL GmbH (Germany); Leif Glaser, Frank Scholz, Joern Seltmann, Deutsches Elektronen-Synchrotron (Germany); Patrick Gessler, Jan Grünert, Alberto De Fanis, Michael Meyer, European XFEL GmbH (Germany); A. Knie, Univ. Kassel (Germany); Stefan P. Moeller, SLAC National Accelerator Lab. (USA); Lorenzo Raimondi, Flavio Capotondi, Emanuele Pedersoli, Oksana Plekan, Miltcho B. Danailov, Alexander A. Demidovich, Ivaylo Petrov Nikolov, Alessandro Abrami, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Julien Gautier, Ecole Nationale Supérieure de Techniques Avancées (France); Jan Lüning, UPMC Sorbonne Univ. (France); Philippe Zeitoun, Ecole Nationale Supérieure de Techniques Avancées (France); Luca Giannessi, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) and ENEA (Italy) . . . . . [9210-22]

9:50 am: **Proposal for a source size and source position monitor for high power x-ray sources based on a "negative" pin-hole camera**, Werner H. Jark, Elettra-Sincrotrone Trieste S.C.p.A. (Italy) . . . . . [9210-23]

10:10 am: **Intensity interferometry measurement at LCLS**, Sanghoon Song, SLAC National Accelerator Lab. (USA) . . . . . [9210-24]

LOCATION: CONV. CTR. ROOM 13 . . . TUE 10:30 AM TO 10:40 AM

Informal Discussion and Closing Remarks

Stefan P. Hau-Riege, Lawrence Livermore National Lab. (USA); **Stefan P. Moeller**, SLAC National Accelerator Lab. (USA); **Makina Yabashi**, RIKEN (Japan)

LOCATION: MARRIOTT MARQUIS, CARDIFF . TUE 8:00 TO 10:00 PM

Workshop on X-Ray Mirrors

Chair: **Ali M. Khounsary,** X-ray Optics, Inc. (USA) and Illinois Institute of Technology (USA)

The X-ray Mirror Working Group provides an informal setting for the interested engineers and scientists to meet and discuss issues related to the design, analysis, cooling, fabrication, and metrology of x-ray mirrors. Topics for discussion can be e-mailed to the organizer, Dr. Ali Khounsary (amk@iit.edu), prior to the meeting.

CONFERENCE 9211

LOCATION: CONV. CTR. ROOM 12

Monday 18 August 2014 • Proceedings of SPIE Vol. 9211

Target Diagnostics Physics and Engineering for Inertial Confinement Fusion III

Conference Chairs: **Perry M. Bell,** Lawrence Livermore National Lab. (USA); **Gary P. Grim,** Los Alamos National Lab. (USA)

Program Committee: **W. Jack Armstrong,** Univ. of Rochester (USA); **David K. Bradley,** Lawrence Livermore National Lab. (USA); **Frank E. Merrill,** Los Alamos National Lab. (USA); **John A. Oertel,** Los Alamos National Lab. (USA); **T. Craig Sangster,** Univ. of Rochester (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 12 . . . MON 8:30 AM TO 10:20 AM

Detectors and Imaging Systems

Session Chair: **Perry Bell,** Lawrence Livermore National Lab. (USA)

8:30 am: **Proof of principle test of a novel framing camera for high-energy x-ray imaging** *(Invited Paper)*, Nobuhiko Izumi, Gareth N. Hall, Arthur C. Carpenter, Fred V. Allen, Jason G. Cruz, Brian Felker, Joe P. Holder, Kenneth W. Piston, Otto L. Landen, Alexander A. Lumbard, Richard C. Montesanti, Nathan E. Palmer, Richard A. Zacharias, Riccardo Tommasini, David K. Bradley, Perry M. Bell, Joseph D. Kilkenny, Lawrence Livermore National Lab. (USA) . . . . . [9211-1]

9:00 am: **AXIS: an instrument for imaging Compton radiographs using ARC on the NIF**, Gareth N. Hall, Nobuhiko Izumi, Riccardo Tommasini, Arthur C. Carpenter, Nathan E. Palmer, Richard A. Zacharias, Brian Felker, Joe P. Holder, Fred V. Allen, Perry M. Bell, David K. Bradley, Richard C. Montesanti, Lawrence Livermore National Lab. (USA) . . . . . [9211-2]

9:20 am: **Electron imaging system for ultrafast diagnostics of HEDLP**, Jiaqi Qiu, Argonne National Lab. (USA) and Euclid Techlabs, LLC (USA); Wei Gai, Argonne National Lab. (USA); Chunguang Jing, Argonne National Lab. (USA) and Euclid Techlans, LLC (USA) . . . . . [9211-3]

9:40 am: **Results of hard x-ray imaging from OMEGA**, Daniel A. Lemieux, Los Alamos National Lab. (USA); H. Bradford Barber, The Univ. of Arizona (USA); Gary P. Grim, Los Alamos National Lab. (USA) . . . . . [9211-4]

10:00 am: **Mk x Nk gated CMOS imager**, James R. Janesick, SRI International Sarnoff (USA); Perry M. Bell, Alan Teruya, Joseph R. Kimbrough, Lawrence Livermore National Lab. (USA); James Andrews, John Tower, Tom Elliott, SRI International Sarnoff (USA); Jeanne Bishop, Chronicle Technology Inc. (USA) . . . . . [9211-5]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 12 . . . MON 10:50 AM TO 12:20 PM

Targeting and Neutron Measurements

Session Chair: **Perry Bell,** Lawrence Livermore National Lab. (USA)

10:50 am: **High-rep rate target development for ultra-intense interaction science at the Central Laser Facility** *(Invited Paper)*, Nicola Booth, Central Laser Facility (United Kingdom); Daniel Symes, Rutherford Appleton Lab. (United Kingdom); David Neely, Central Laser Facility (United Kingdom); Rajeev P. Pattathil, Martin Tolley, Christopher Spindloe, Rutherford Appleton Lab. (United Kingdom); Stephanie Tomlinson, Central Laser Facility (United Kingdom); Robert Heathcote, Rutherford Appleton Lab. (United Kingdom); David Rathbone, Central Laser Facility (United Kingdom). . . . . [9211-6]

11:20 am: **New results from thulium activation experiments at the National Ignition Facility**, Gary P. Grim, Robert S. Rundberg, Anna C. Hayes, Gerard Jungman, Melissa Boswell, Malcolm M. Fowler, Andi Klein, Jerry B. Wilhelmy, Los Alamos National Lab. (USA); A. Tonchev, C. Yeamans, Lawrence Livermore National Lab. (USA) . . . . . [9211-7]

11:40 am: **A fast scintillation telescope system to measure neutron induced beta decay**, Andi Klein, Robert S. Rundberg, Malcolm M. Fowler, Gary P. Grim, Melissa Boswell, Jerry B. Wilhelmy, Los Alamos National Lab. (USA) . . . . . [9211-8]

12:00 pm: **Engineering architecture of the neutron Time-of-Flight (nToF) diagnostic suite at the National Ignition Facility**, Todd J. Clancy, Joseph A. Caggiano, Mark J. Eckart, Mike Moran, James M. McNaney, Stephan Friedrich, Robert Hatarik, Edward Hartouni, James P. Knauer, Lawrence Livermore National Lab. (USA); Vladimir Glebov, Univ. of Rochester (USA) . . . . . [9211-9]

Lunch Break . . . . . Mon 12:20 pm to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 12 . . . . . MON 1:50 PM TO 3:00 PM

Framing Camera Systems

Session Chair: **Gary P. Grim,** Los Alamos National Lab. (USA)

1:50 pm: **Single line-of-sight imaging system for plasma interactions** *(Invited Paper)*, Terance J. Hilsabeck, Joseph D. Kilkenny, Tae Chung, Brian S. Sammuli, General Atomics (USA); Perry M. Bell, Joseph R. Kimbrough, Lawrence Livermore National Lab. (USA); Jonathan D. Hares, T. D. Bradshaw, Kentech Instruments Ltd. (United Kingdom). . . . . [9211-10]

2:20 pm: **Kirkpatrick Baez Optics fielding and alignment on the National Ignition Facility**, Marion J. Ayers, Louisa A. Pickworth, Jake M. Parker, Todd A. Decker, Perry M. Bell, David K. Bradley, Tommaso Pardini, Thomas J. McCarville, Paul B. Mirkarimi, Randolph M. Hill, Lawrence Livermore National Lab. (USA) . . . . . [9211-11]

2:40 pm: **Upgrades to the National Ignition Facility's gated imagers**, Dana R. Hargrove, Laura Robin Benedetti, Joe P. Holder, Perry M. Bell, David K. Bradley, Charles G. Brown, Joseph R. Kimbrough, Robert B. Petre, Kenneth W. Piston, Lawrence Livermore National Lab. (USA); Jonathan D. Hares, T. D. Bradshaw, Kentech Instruments Ltd. (United Kingdom) . . . . . [9211-12]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

CONFERENCE 9211

LOCATION: CONV. CTR. ROOM 12

SESSION 4

LOCATION: CONV. CTR. ROOM 12 . . . . .MON 3:30 PM TO 4:50 PM

Manipulator-based Diagnostic Systems

Session Chair: **Gary P. Grim,** Los Alamos National Lab. (USA)

3:30 pm: **Mach-Zehnder detector system issues and enhancements for use on the NIF DANTE x-ray diagnostic**, Bart Beeman, Lawrence Livermore National Lab. (USA); Kirk Miller, National Security Technologies, LLC (USA); William R. Donaldson, Univ. of Rochester (USA); Arthur C. Carpenter, Joseph R. Kimbrough, Todd J. Clancy, Bob Chow, Essex Bond, Zaylis Zayas-Rivera, Perry M. Bell, John Celeste, Andrew MacPhee, Klaus Widmann, Lawrence Livermore National Lab. (USA); R. Q. Abbott, K. K. Lee, J. C. Peterson, S. M. Gordoni, National Security Technologies, LLC (USA); John J. Buckley, National Security Technology (USA) . . . . . [9211-13]

3:50 pm: **Target material collection for High-Energy Imaging Diagnostic**, Maryum F. Ahmed, James M. Mcnaney, Ryan M. Vignes, Cal A. Smith, Christopher G. Bailey, Robert B. Petre, Lawrence Livermore National Lab. (USA) . . . . [9211-14]

4:10 pm: **Streaked x-ray spectrometer for the National Ignition Facility**, Sean P. Regan, Univ. of Rochester (USA); Kevin B. Fournier, Lawrence Livermore National Lab. (USA); Michael J. Bedzyk, A. Agliata, Univ. of Rochester (USA); Shannon L. Ayers, Lawrence Livermore National Lab. (USA); Raymond E. Bahr, Univ. of Rochester (USA); Maria A. Barrios, Perry M. Bell, David K. Bradley, Hui Chen, James A. Emig, Lawrence Livermore National Lab. (USA); Robert K. Jungquist, Univ. of Rochester (USA); Gregory E. Kemp, Lawrence Livermore National Lab. (USA); Joseph D. Kilkenny, General Atomics (USA); Frederic J. Marshall, David D. Meyerhofer, Univ. of Rochester (USA); F. Perez, J. Pino, Chuck Sorce, Lawrence Livermore National Lab. (USA); T. Craig Sangster, Milton J. Shoup III, Barukh Yaakobi, Univ. of Rochester (USA) . . . . . [9211-15]

4:30 pm: **Performance and operational upgrades of x-ray streak camera photocathode assemblies at NIF**, Ben W. Hatch, Nathan E. Palmer, Lawrence Livermore National Lab. (USA); Shahab Khan, Lawrence Livermore National Lab. (USA) and Lawrence Livermore National Lab. (USA); Andrew MacPhee, Robert B. Petre, Joe P. Holder, Nan J. Wong, Don Browning, Doug Homoelle, Shannon L. Ayers, Lawrence Livermore National Lab. (USA) . . . . . [9211-16]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Kirkpatrick-Baez microscope with spherical multilayer mirrors at 2.5keV photon energy, Ning An, Xuewei Du, Univ. of Science and Technology of China (China); Zhurong Cao, China Academy of Engineering Physics (China); Qiuping Wang, Univ. of Science and Technology of China (China) . . . . . [9211-17]

CONFERENCE 9212

LOCATION: CONV. CTR. ROOM 12

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9212

Developments in X-Ray Tomography IX

Conference Chair: **Stuart R. Stock,** Northwestern Univ. (USA)

Program Committee: **Felix Beckmann,** Helmholtz-Zentrum Geesthacht (Germany); **Graham R. Davis,** Queen Mary, Univ. of London (United Kingdom); **Atsushi Momose,** Tohoku Univ. (Japan); **Bert Müller,** Basel Univ. Hospital (Switzerland); **Andrew G. Peele,** Australian Synchrotron (Australia), La Trobe Univ. (Australia); **Erik Leo Ritman,** Mayo Clinic College of Medicine (USA); **Mark L. Rivers,** The Univ. of Chicago (USA); **Ge Wang,** Rensselaer Polytechnic Institute (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Powder diffraction-based microtomography for depicting phase distributions in bulk materials, Alexander Rack, Remi Tucoulou, European Synchrotron Radiation Facility (France); Catalina Jimenez, Francisco Garcia-Moreno, Helmholtz Centre Berlin (Germany); Carolina Mochales, Charité Universitätsmedizin Berlin (Germany); Anke Maerten, Technische Univ. Berlin (Germany); Tatjana Rack, Novitom (France); Claudia Fleck, Technische Univ. Berlin (Germany); Paul Zaslansky, Charité Universitätsmedizin Berlin (Germany); John Banhart, Technische Univ. Berlin (Germany); Peter Cloetens, European Synchrotron Radiation Facility (France) . . . . . [9212-40]

High-resolution x-ray computed tomography to understand ruminant phylogeny, Loïc Costeur, Naturhistorisches Museum (Switzerland); Georg Schulz, Bert Müller, Univ. Basel (Switzerland) . . . . . [9212-42]

Integrated high-throughput tomography experiment control environment, Igor Khokhriakov, Felix Beckmann, Lars Lottermoser, Helmholtz-Zentrum Geesthacht (Germany) . . . . . [9212-43]

Development and integration of an intelligent detector for grating-based phase-contrast tomography, Pavel Lytaev, Alexander C. Hipp, Lars Lottermoser, Julia Herzen, Imke Greving, Igor Khokhriakov, Stephan Meyer-Loges, Joern Plewka, Jörg Burmester, Helmholtz-Zentrum Geesthacht (Germany); Michele Caselle, Matthias Vogelgesang, Suren Chilingaryan, Andreas Kopmann, Matthias Balzer, Karlsruher Institut für Technologie (Germany); Felix Beckmann, Martin Müller, Andreas Schreyer, Helmholtz-Zentrum Geesthacht (Germany) . . . . . [9212-44]

Preliminary study of material decomposition via spectral filtration, Bo Meng, Wenxiang Cong, Ge Wang, Rensselaer Polytechnic Institute (USA) . . . . . [9212-45]

Portable μCT as a diagnostic tool for cultural heritage materials: a case study from the Huaca del Sol (Trujillo, Peru) adobe, Andrea Liedl, Univ. degli Studi di Roma Tre (Italy); Dariush Hampai, Istituto Nazionale di Fisica Nucleare (Italy); Claudia Polese, Istituto Nazionale di Fisica Nucleare (Italy) and Univ. degli Studi di Roma La Sapienza (Italy); Giorgio Cappuccio, Augusto Marcelli, Istituto Nazionale di Fisica Nucleare (Italy); Giancarlo Della Ventura, Univ. degli Studi di Roma Tre (Italy); Sultan B. Dabagov, Istituto Nazionale di Fisica Nucleare (Italy) and P.N. Lebedev Physical Institute (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9212-46]

Carotid plaque characterization using CT and MRI imaging acquisition and synergistic image analysis, Matthew Getzin, Rensselaer Polytechnic Institute (USA); Yiqin R. Xu, Albany Medical College (USA); Saaussan Madi, Ali Bahadur, Bruker BioSpin Corp. (USA); Michelle R. Lennartz, Albany Medical College (USA); Ge Wang, Rensselaer Polytechnic Institute (USA) . . . . . [9212-47]

CT image-based quantification of sub-pixel diameter micro-particle accumulations in tissues using a priori biological information, Andrew J. Vercnocke, Jill L. Anderson, Steven M. Jorgensen, Erik L. Ritman, Mayo Clinic College of Medicine (USA) . . . . . [9212-48]

TV minimization-based multimodal medical image reconstruction, Xuelin N. Cui, Virginia Tech (USA); Hengyong Yu, Wake Forest Univ. School of Medicine (USA); Ge Wang, Rensselaer Polytechnic Institute (USA) . . . . . [9212-49]

High-resolution in-situ modular lab-scale x-ray computed tomography (XCT) system for 4D materials science, James Mertens, Jason Williams, Nik Chawla, Arizona State Univ. (USA) . . . . . [9212-50]

ANKAphase: Software for single-distance phase-retrieval from inline x-ray phase contrast radiographs, Alexander Rack, ESRF - The European Synchrotron (France); David Haas, Karlsruher Institut für Technologie (Germany); Timm Weitkamp, Synchrotron SOLEIL (France) . . . . . [9212-51]

High-performance data management and analysis for tomography, Dilworth Y. Parkinson, Alastair A. MacDowell, Lawrence Berkeley National Lab. (USA)[9212-52]

In situ fatigue analysis of micro gaps in dental implants, Wolfram Wiest, Simon A. Zabler, Christian Fella, Andreas Balles, Julius-Maximilians-Univ. Würzburg (Germany); Alexander Rack, ESRF - The European Synchrotron (France); Katja Nelson, Univ. Medical Ctr. Freiburg (Germany); Randolf Hanke, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [9212-53]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 12 . . . . . TUE 8:30 AM TO 8:50 AM

Welcome and Opening Remarks

Stuart R. Stock, Northwestern Univ. (USA)

8:35 am: **Trends in the micro- and nano-CT: 2012-2014**, Stuart R. Stock, Northwestern Univ. (USA) . . . . . [9212-1]

SESSION 1

LOCATION: CONV. CTR. ROOM 12 . . . . .TUE 8:50 AM TO 10:15 AM

Phase Imaging I

Session Chair: **Stuart R. Stock,** Northwestern Univ. (USA)

8:50 am: **Grating interferometry-based phase microtomography of atherosclerotic human arteries** *(Invited Paper)*, Marzia Buscema, Margaret N. Holme, Georg Schulz, Peter Thalmann, Basel Univ. Hospital (Switzerland); Simone E. Hieber, Univ. Basel (Switzerland) and Basel Univ. Hospital (Switzerland); Vartan Kurtcuoglu, Univ. of Zürich (Switzerland); Magdalena Müller-Gerbl, Univ. Basel (Switzerland); Till Saxer, Hôpitaux Univ. de Genève (Switzerland); Felix Beckmann, Julia Herzen, Helmholtz-Zentrum Geesthacht (Germany); Bert Müller, Basel Univ. Hospital (Switzerland) . . . . . [9212-2]

9:15 am: **Single grating phase contrast imaging for x-ray microscopy and microtomography**, Peter Bruyndonckx, Alexander Sasov, Bart Pauwels, Bruker microCT (Belgium) . . . . . [9212-3]

9:35 am: **Quantitative edge illumination x-ray phase contrast tomography**, Charlotte K. Hagen, Paul C. Diemoz, Marco Endrizzi, Univ. College London (United Kingdom); Luigi Rigon, Fulvia Arfelli, Istituto Nazionale di Fisica Nucleare (Italy); Diego Dreoosi, Sincrotrone Trieste S.C.p.A. (Italy); Frances C. Lopez, Renata Longo, Istituto Nazionale di Fisica Nucleare (Italy); Alessandro Olivo, Univ. College London (United Kingdom) . . . . . [9212-4]

9:55 am: **X-ray phase-contrast imaging at PETRA III**, Alexander C. Hipp, Julia Herzen, Pavel Lytaev, Felix Beckmann, Imke Greving, Fabian Wilde, Malte Ogurreck, Thomas Dose, Lars Lottermoser, Rene Kirchhof, Igor Khokhriakov, Hilmar Burmester, Martin Müller, Andreas Schreyer, Helmholtz-Zentrum Geesthacht (Germany) . . . . . [9212-5]

Coffee Break . . . . . Tue 10:15 am to 10:45 am

SESSION 2

LOCATION: CONV. CTR. ROOM 12 . . . .TUE 10:45 AM TO 12:30 PM

Numerical Methods I

Session Chair: **Ge Wang,** Rensselaer Polytechnic Institute (USA)

10:45 am: **Dictionary learning-based low-dose x-ray CT reconstruction** *(Invited Paper)*, Xuanqin Mou, Junfeng Wu, Ti Bai, Qiong Xu, Xi'an Jiaotong Univ. (China); Hengyong Yu, Wake Forest Univ. School of Medicine (USA); Ge Wang, Rensselaer Polytechnic Institute (USA) . . . . . [9212-6]

11:10 am: **Practical pseudo-3D registration for large tomographic images**, Xuan Liu, Alexander Sasov, Bruker microCT (Belgium) . . . . . [9212-7]

11:30 am: **Strategies for efficient scanning and reconstruction methods on very large objects with high-energy x-ray computed tomography**, Nils Reims, Tobias Schön, Michael Böhnel, Michael Salamon, Frank Sukowski, Markus Firsching, Fraunhofer-Institut für Integrierte Schaltungen (IIS) (Germany) . . [9212-8]

11:50 am: **X-ray beam-hardening correction by varying the input spectrum**, Jeremy Holt, Mahsa Paziresh, Andrew M. Kingston, Adrian P. Sheppard, The Australian National Univ. (Australia) . . . . . [9212-9]

12:10 pm: **Improving spatial-resolution in high cone-angle micro-CT by source deblurring**, Heyang Li, Andrew M. Kingston, Glenn R. Myers, Benoit Recur, The Australian National Univ. (Australia); Michael Turner, Australian National University (Australia); Andrian P. Sheppard, The Australian National Univ. (Australia) [9212-10]

Lunch/Exhibition Break . . . . . Tue 12:30 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 12 . . . . . TUE 1:30 PM TO 3:15 PM

Applications I

Session Chair: **Bert Müller,** Basel Univ. Hospital (Switzerland)

1:30 pm: **Diffraction tomography reveals polymorph and microstructure distribution in complex biominerals** *(Invited Paper)*, Henrik Birkedal, Hanna Leemreize, Mie Birkbak, Aarhus Univ. (Denmark); Stuart R. Stock, Northwestern Univ. (USA) . . . . . [9212-11]

1:55 pm: **Synchrotron-based characterization of interconnections in microelectronics: recent 3D results**, Pierre Bleuet, Guillaume Audoit, CEA-LETI (France); Julien Bertheau, STMicroelectronics (France); Jean Charbonnier, CEA-LETI (France); Peter Cloetens, European Synchrotron Radiation Facility (France); Larissa Djomeni, Dario Ferreira Sanchez, CEA-LETI (France); Fiqiri Hodaj, Science et Ingénierie des Matériaux et Procédés (France); Patrice Gergaud, CEA-LETI (France); Frederic Lorut, STMicroelectronics (France); Jean-Sébastien Micha, Olivier Ulrich, CEA-INAC (France) . . . . . [9212-12]

2:15 pm: **Dynamic x-ray tomography imaging application for the study of granular materials**, Yujie Wang, Shanghai Jiao Tong Univ. (China); Xianghui Xiao, Kamel Fezzaa, Argonne National Lab. (USA) . . . . . [9212-13]

2:35 pm: **Investigating the plastic zone at the tip of a crack: A 3D diffraction and imaging study using synchrotron x-rays**, Jason Williams, Sudhanshu Singh, Arizona State Univ. (USA); Xianghui Xiao, Francesco De Carlo, Jonathan Almer, Peter Kenesei, Argonne National Lab. (USA); Nik Chawla, Arizona State Univ. (USA) . . . . . [9212-14]

2:55 pm: **Fast imaging and tomography applications at Advanced Photon Source (APS)**, Xianghui Xiao, Doga Gürsoy, Francesco De Carlo, Argonne National Lab. (USA) . . . . . [9212-15]

Coffee Break . . . . . Tue 3:15 pm to 3:45 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 12 . . . . . .TUE 3:45 PM TO 5:30 PM

Tube-based Tomography

Session Chair: **Erik Leo Ritman,** Mayo Clinic College of Medicine (USA)

3:45 pm: **Molecular imaging with a MARS spectral scanner** *(Invited Paper)*, Anthony P. H. Butler, Univ. of Otago, Christchurch (New Zealand) and CERN (New Zealand) and MARS Bioimaging Ltd. (New Zealand); Nigel Anderson, Univ. of Otago, Christchurch (New Zealand); Steven Gieseg, Univ. of Otago, Christchurch (New Zealand) and Univ. of Canterbury (New Zealand); Tim Woodfield, Univ. of Otago, Christchurch (New Zealand); Stephen T. Bell, MARS Bioimaging Ltd. (New Zealand); Philip H. Butler, CERN (New Zealand) and MARS Bioimaging Ltd. (New Zealand) and Univ. of Canterbury (New Zealand) . . . . . [9212-16]

4:10 pm: **Brute force absorption contrast microtomography** *(Invited Paper)*, Graham R. Davis, David Mills, Queen Mary, Univ. of London (United Kingdom) . . . . . [9212-17]

4:30 pm: **Liquid-metal-jet x-ray tube technology and tomography applications**, Emil Espes, Christina Gratorp, Oscar Hemberg, Göran Johansson, Johan Kronstedt, Mikael Otendal, Björn Sundman, Per A. Takman, Tomi T. Tuohimaa, Excillum AB (Sweden) . . . . . [9212-18]

4:50 pm: **An evaluation to design high-performance pinhole array detector module for four head SPECT: a simulation study**, Tasneem Rahman, Murat Tahtali, Mark R. Pickering, UNSW@ADFA (Australia) . . . . . [9212-19]

5:10 pm: **NanoXCT: development of a laboratory nano-CT system**, Frank Nachtrab, Markus Firsching, Norman Uhlmann, Fraunhofer-Institut für Integrierte Schaltungen (IIS) (Germany); Per A. Takman, Tomi T. Tuohimaa, Excillum AB (Sweden); Christoph Heinzl, Johann Kastner, Univ. of Applied Sciences Upper Austria (Austria); Daniel Larsson, Anders P. Holmberg, KTH Royal Institute of Technology (Sweden); Giovanni G. Berti, XRD-Tools s.r.l. (Italy); Michael Krumm, Christoph Sauerwein, RayScan Technologies GmbH (Germany) . . . . . [9212-20]

LOCATION: MARRIOTT MARQUIS, BALBOA . . . . . TUE 8:00 TO 10:00 PM

Penetrating Radiation Technical Event

Chair: **James E. Baciak**, Univ. of Florida (USA)

This event brings together technologists and scientists with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications. This year's speaker is Dr. Todd Hossbach from Pacific Northwest National Lab. His presentation will be: Radiation Detector Development to Enable Ultra-Sensitive Measurements: How Basic and Applied Research Can Work Together.

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 12 . . . WED 8:30 AM TO 10:00 AM

Synchrotron Tomography

Session Chair: **Graham R. Davis,** Queen Mary, Univ. of London (United Kingdom)

8:30 am: **High-energy attenuation-contrast and phase-contrast microtomography using synchrotron radiation at DESY** *(Invited Paper)*, Felix Beckmann, Helmholtz-Zentrum Geesthacht (Germany) . . . . . [9212-21]

8:55 am: **TomoPy: A framework for the analysis of synchrotron tomographic data**, Doga Gürsoy, Francesco De Carlo, Xianghui Xiao, Argonne National Lab. (USA) . . . . . [9212-22]

9:15 am: **P05: Imaging beamline at PETRA III**, Imke Greving, Malte Ogurreck, Julia Herzen, Fabian Wilde, Felix Beckmann, Thomas Dose, Helmholtz-Zentrum Geesthacht (Germany); Felix Marschall, Arndt Last, Harald Vogt, Karlsruher Institut für Technologie (Germany); Alexander C. Hipp, Pavel Lytaev, Martin Müller, Andreas Schreyer, Helmholtz-Zentrum Geesthacht (Germany) . . . . . [9212-23]

9:35 am: **X-ray imaging at ESRF including future upgrade** *(Invited Paper)*, Alexander Rack, Elodie Boller, Alberto Bravin, Peter Cloetens, Marine Cotte, Marco Di Michiel, Veijo Honkimaki, Tamzin Lafford, Wolfgang Ludwig, Gema Martinez-Criado, Mario Scheel, Paul Tafforeau, ESRF - The European Synchrotron (France) . . . . . [9212-24]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 12 . . .WED 10:30 AM TO 12:20 PM

Phase Imaging II

Session Chair: **Felix Beckmann,** Helmholtz-Zentrum Geesthacht (Germany)

10:30 am: **Tumors in murine brains studied by grating-based phase contrast microtomography** *(Invited Paper)*, Georg Schulz, Peter Thalmann, Simone E. Hieber, Univ. Basel (Switzerland); Marco D. Dominietto, ETH Zürich (Switzerland); Zsofia Kovacs, KinderSpital Zürich (Switzerland); Felix Beckmann, Helmholtz-Zentrum Geesthacht (Germany); Bert Müller, Univ. Basel (Switzerland). . . [9212-25]

10:55 am: **X-ray phase contrast tomography from whole organ down to single cells**, Martin Krenkel, Matthias Bartels, Tim Salditt, Georg-August-Univ. Göttingen (Germany) . . . . . [9212-26]

CONFERENCE 9212

LOCATION: CONV. CTR. ROOM 12

11:15 am: **Phase microtomography of human brain tissue visualizes the microanatomy of hippocampal sclerosis**, Simone E. Hieber, Univ. of Basel (Switzerland); Christopher Kelly, Univ. Hospital Basel (Switzerland); Peter Thalmann, Univ. Basel (Switzerland); Luigi Mariani, Univ. Hospital Basel (Switzerland); Georg Schulz, Univ. Basel (Switzerland); Imke Greving, Helmholtz-Zentrum Geesthacht (Germany); Bert Müller, Univ. Basel (Switzerland). . . . . [9212-27]

11:35 am: **Iterative method for x-ray in-line phase-contrast imaging**, Wenxiang Cong, Ge Wang, Rensselaer Polytechnic Institute (USA) . . . . . [9212-28]

11:55 am: **X-ray tomography of the guinea pig cochlea to assess damages after noise exposure** *(Invited Paper)*, Claus-Peter Richter, Hunter K. Young, Amanda Vo, Whitney Liddy, Stuart R. Stock, Northwestern Univ. (USA); Xianghui Xiao, Argonne National Lab. (USA); Donna Whitlon, Northwestern Univ. (USA) . . . . . [9212-29]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:20 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 12 . . . . . WED 1:20 PM TO 3:25 PM

Applications II

Session Chair: **Ge Wang,** Rensselaer Polytechnic Institute (USA)

1:20 pm: **Submicrometer structure of sea urchin tooth via remote synchrotron microCT imaging** *(Invited Paper)*, Stuart R. Stock, Northwestern Univ. (USA); Alexander Rack, ESRF - The European Synchrotron (France) . . . . . [9212-30]

1:45 pm: **Characterization of natural and artificial carious lesions and their remineralization using self-assembled peptides**, Iwona Dziadowiec, Basel Univ. Hospital (Switzerland); Felix Beckmann, Helmholtz-Zentrum Geesthacht (Germany); Peter Thalmann, Georg Schulz, Basel Univ. Hospital (Switzerland); Sabrina Stevanovic, Lucy Kind, Uwe Pieles, Zürcher Hochschule für Angewandte Wissenschaften (Switzerland); Bert Müller, Basel Univ. Hospital (Switzerland) . . . . . [9212-31]

2:05 pm: **Applied x-ray computed tomography with sub-micron resolution in paleontology using laboratory and synchrotron sources**, Pidassa M. Bidola, Marco K. Stockmar, Technische Univ. München (Germany); Mirian L. A. F. Pacheco, Univ. Federal de São Carlos (Brazil); Klaus Achterhold, Franz Pfeiffer, Technische Univ. München (Germany); Julia Herzen, Deutsches Elektronen-Synchrotron (Germany) . . . . . [9212-32]

2:25 pm: **3D visualization of casts from murine livers and kidneys**, Peter Thalmann, Univ. Basel (Switzerland); Simone E. Hieber, Basel Univ. Hospital (Switzerland); Georg Schulz, Stefanie Ehrbar, Univ. Basel (Switzerland); Vartan Kurtcuoglu, Ufuk Olgac, Anastasios Marmaras, Univ. of Zürich (Switzerland); Eric P. Meyer, Univ. of Zurich (Switzerland); Julia Herzen, Felix Beckmann, Helmholtz-Zentrum Geesthacht (Germany); Bert Müller, Univ. Basel (Switzerland). . . [9212-33]

2:45 pm: **SEM-based system for 100nm x-ray tomography for the analysis of porous silicon and 3D interconnects**, Pierre Bleuet, CEA-LETI (France); David Laloum, STMicroelectronics (France); Frederic-Xavier Gaillard, Guillaume Audoit, Celine Ribiere, CEA-LETI (France). . . . . [9212-34]

3:05 pm: **Recovering lost text with XMT**, David Mills, Graham R. Davis, Queen Mary, Univ. of London (United Kingdom); Paul L. Rosin, Yukun Lai, Cardiff Univ. (United Kingdom). . . . . [9212-35]

Coffee Break . . . . . .Wed 3:25 pm to 3:55 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 12 . . . . . WED 3:55 PM TO 5:15 PM

Numerical Methods II

Session Chair: **Erik Leo Ritman,** Mayo Clinic College of Medicine (USA)

3:55 pm: **Improving dynamic tomography quality through a maximum a posteriori model**, Glenn R. Myers, The Australian National Univ. (Australia); Matthew Geleta, The Univ. of Melbourne (Australia); Andrew M. Kingston, Benoit Recur, Adrian P. Sheppard, The Australian National Univ. (Australia) . . . . [9212-36]

4:15 pm: **Multiresolution tomography using an accurate forward model**, Doga Gürsoy, Francesco De Carlo, Xianghui Xiao, Argonne National Lab. (USA) [9212-37]

4:35 pm: **Dual-energy iterative reconstruction for material characterisation**, Benoit Recur, Mahsa Paziresh, Glenn R. Myers, Andrew M. Kingston, Shane J. Latham, Adrian P. Sheppard, The Australian National Univ. (Australia) . . . [9212-38]

4:55 pm: **Iterative reconstruction optimisations for high cone-angle helical micro-CT**, Benoit Recur, Andrew M. Kingston, Glenn R. Myers, Adrian P. Sheppard, The Australian National Univ. (Australia) . . . . . [9212-39]

CONFERENCE 9213

LOCATION: CONV. CTR. ROOM 14B

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9213

Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XVI

Conference Chairs: **Arnold Burger,** Fisk Univ. (USA); **Larry Franks,** Consultant (USA); **Ralph B. James,** Brookhaven National Lab. (USA); **Michael Fiederle,** Freiburger Materialforschungszentrum (Germany)

Program Committee: **Toru Aoki,** Shizuoka Univ. (Japan); **Fikri Aqariden,** EPIR Technologies, Inc. (USA); **Jim E. Baciak Jr.,** Univ. of Florida (USA); **David B. Beach,** National Nuclear Security Administration (USA); **Zane W. Bell,** Oak Ridge National Lab. (USA); **Lynn A. Boatner,** Oak Ridge National Lab. (USA); **Aleksey E. Bolotnikov,** Brookhaven National Lab. (USA); **Edith Bourret Courchesne,** Lawrence Berkeley National Lab. (USA); **Giuseppe S. Camarda,** Brookhaven National Lab. (USA); **Bill Cardoso,** Creative Electron (USA); **Henry Chen,** Redlen Technologies (Canada); **Nerine J. Cherepy,** Lawrence Livermore National Lab. (USA); **Jeffrey J. Derby,** Univ. of Minnesota (USA); **Kim F. Ferris,** Pacific Northwest National Lab. (USA); **Petro M. Fochuk,** Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); **Jan Franc,** Charles Univ. in Prague (Czech Republic); **Fei Gao,** Pacific Northwest National Lab. (USA); **Zhong He,** Univ. of Michigan (USA); **Keitaro Hitomi,** Tohoku Univ. (Japan); **Alan Janos,** U.S. Dept. of Homeland Security (USA); **Mercouri Kanatzidis,** Northwestern Univ. (USA); **Warnick J. Kernan,** Pacific Northwest National Lab. (USA); **Kelvin G. Lynn,** Washington State Univ. (USA); **Krishna C. Mandal,** Univ. of South Carolina (USA); **Robert D. McLaren,** Consultant (USA); **Shariar Motakef,** CapeSym, Inc. (USA); **Sanjoy Mukhopadhyay,** National Security Technologies, LLC (USA); **Ian Radley,** Kromek (United Kingdom); **Arie Ruzin,** Tel Aviv Univ. (Israel); **David J. Singh,** Oak Ridge National Lab. (USA); **Narsingh B. Singh,** Univ. of Maryland, Baltimore County (USA); **Michael R. Squillante,** Radiation Monitoring Devices, Inc. (USA); **Ashley C. Stowe,** Y-12 National Security Complex (USA); **Csaba Szeles,** EI Detection & Imaging Systems (USA); **Sergey E. Ulin,** National Research Nuclear Univ. MEPhI (Russian Federation); **Peter E. Vanier,** Brookhaven National Lab. (USA); **Aaron L. Washington II,** Savannah River National Lab. (USA); **Richard T. Williams,** Wake Forest Univ. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 14B . . MON 8:00 AM TO 8:05 AM

Welcome and Opening Remarks

Arnold Burger, Fisk Univ. (USA); **Larry Franks**, Consultant (USA); **Ralph B. James**, Brookhaven National Lab. (USA); **Michael Fiederle**, Freiburger Materialforschungszentrum (Germany)

SESSION 1

LOCATION: CONV. CTR. ROOM 14B . MON 8:05 AM TO 10:05 AM

Scintillators I

Session Chair: **Stephen A. Payne,** Lawrence Livermore National Lab. (USA)

8:05 am: **High Energy Resolution Transparent Ceramic Garnet Scintillators** *(Invited Paper)*, Nerine J. Cherepy, Stephen A. Payne, Zachary M. Seeley, Patrick R. Beck, Erik L. Swanberg, Steven Hunter, Larry Ahle, Scott E. Fisher, Lawrence Livermore National Lab. (USA); Charles Melcher, Hua Wei, The Univ. of Tennessee Knoxville (USA); Todd Stefanik, Young Soo Chung, Nanocerox, Inc. (USA); Joel Kindem, Cokiya, Inc. (USA) . . . . . [9213-1]

8:35 am: **High Energy Resolution Scintillators for Nuclear Nonproliferation Applications** *(Invited Paper)*, Charles Melcher, Mariya Zhuravleva, Merry Koschan, Hua Wei, Luis Stand, The Univ. of Tennessee Knoxville (USA). . . . . [9213-2]

9:05 am: **Electron thermalization and trapping in pure and doped scintillators studied by picosecond optical absorption**, Richard T. Williams, Kamil B. Ucer, Qi Li, Xinfu Lu, Wake Forest Univ. (USA); Arnold Burger, Fisk Univ. (USA); Gregory A. Bizarri, Lawrence Berkeley National Lab. (USA) . . . . . [9213-3]

9:25 am: **ZnSe:Te crystals grown by chemical vapor transport for scintillation application**, Pijush Bhattacharya, Fisk Univ. (USA) . . . . . [9213-4]

9:45 am: **Triplet harvesting plastic scintillators with neutron-gamma pulse shape discrimination**, Edgar van Loef, Radiation Monitoring Devices, Inc. (USA); Patrick Feng, Sandia National Labs. (USA); Gary Markosyan, Urmila Shirwadkar, Radiation Monitoring Devices, Inc. (USA); F. Patrick Doty, Sandia National Labs. (USA); Kanai S. Shah, Radiation Monitoring Devices, Inc. (USA) . . . . . [9213-5]

Coffee Break . . . . . Mon 10:05 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 14B . MON 10:30 AM TO 12:10 PM

CZT I

Session Chair: **Robert D. McLaren,** Consultant (USA)

10:30 am: **On polarization effect in high-resistivity CdTe-CdZnTe detectors** *(Invited Paper)*, Arie Ruzin, Tel Aviv Univ. (Israel) . . . . . [9213-6]

11:00 am: **Optimization of <= 200 µm pitch CZT detectors for future high-resolution x-ray instrumentation in astrophysics** *(Invited Paper)*, Anna Zajczyk, Matthias Beilicke, Henric Krawczynski, Fabian Kislat, Qingzhen Guo, Washington Univ. in St. Louis (USA) . . . . . [9213-7]

11:30 am: **Towards a deeper understanding of dislocations in detector-grade CdZnTe crystals**, Ge Yang, Aleksey E. Bolotnikov, Yonggang Cui, Giuseppe S. Camarda, Anwar Hossain, Utpal Roy, Ralph B. James, Brookhaven National Lab. (USA); Chad S. Korach, Stony Brook Univ. (USA). . . . . [9213-8]

11:50 am: **Effect of impurities near subgrain boundaries on CZT detector performance**, Giuseppe S. Camarda, Aleksey E. Bolotnikov, Yonggang Cui, Anwar Hossain, Brookhaven National Lab. (USA); KiHyun Kim, Wonho Lee, Brookhaven National Lab. (USA) and Korea Univ. (Korea, Republic of); Utpal Roy, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-9]

Lunch Break . . . . . Mon 12:10 pm to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 14B . . . MON 1:30 PM TO 3:10 PM

Neutron Detectors

Session Chair: **Arie Ruzin,** Tel Aviv Univ. (Israel)

1:30 pm: **Improvements to the neutron detection crystal ^{6}LiInSe$_2$** *(Invited Paper)*, Ashley Stowe, Y-12 National Security Complex (USA); Brenden Wiggins, Vanderbilt Univ. (USA); Pijush Bhattacharya, Eugene Tupitsyn, Fisk Univ. (USA); Eric D. Lukosi, The Univ. of Tennessee Knoxville (USA); Keivan Stassun, Vanderbilt Univ. (USA); Arnold Burger, Fisk Univ. (USA) . . . . . [9213-10]

2:00 pm: **Semiconductor neutron detectors using depleted uranium oxide** *(Invited Paper)*, Craig Kruschwitz, Sanjoy Mukhopadhyay, David Schwellenbach, National Security Technologies, LLC (USA); Thomas T. Meek, Brandon Shaver, Taylor Cunningham, Jerrad Auxier, The Univ. of Tennessee Knoxville (USA) . . . . . [9213-11]

2:30 pm: **Investigation of a LISe detector for neutron transmission imaging**, Eric D. Lukosi, Elan Herrera, Michael D. Richardson, Jeniffer Littell, Robert Milbrun, The Univ. of Tennessee Knoxville (USA); Ashley Stowe, Y-12 National Security Complex (USA); Arnold Burger, Fisk Univ. (USA) . . . . . [9213-12]

2:50 pm: **Solid-state thermal neutron detectors based on hexagonal boron nitride epilayers**, Hongxing Jiang, Tri C. Doan, Sashikanth Majety, Sam Grenadier, Jing Li, Jingyu Lin, Texas Tech Univ. (USA) . . . . . [9213-14]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

CONFERENCE 9213
LOCATION: CONV. CTR. ROOM 14B

SESSION 4

LOCATION: CONV. CTR. ROOM 14B . . .MON 3:40 PM TO 5:40 PM

Detector Materials I

Session Chair: **Krishna C. Mandal,** Univ. of South Carolina (USA)

3:40 pm: **$CdTe_xSe_{1-x}$: A potential candidate for room-temperature radiation detector applications** *(Invited Paper)*, Utpal Roy, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Yonggang Cui, Anwar Hossain, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA). . . . . [9213-15]

4:10 pm: **Investigation of current-voltage characteristics: the distribution of the electric field and charge collection efficiency in the x-ray sensors based on gallium arsenide compensated with chromium** *(Invited Paper)*, Anton Tyazhev, Vladimir Novikov, Andrei Zarubin, Oleg Tolbanov, Tomsk State Univ. (Russian Federation); Michael Fiederle, Freiburger Materialforschungszentrum (Germany) and Karlsruher Institut für Technologie (Germany); Elias Hamann, Karlsruher Institut für Technologie (Germany) and Albert-Ludwigs-Univ. Freiburg (Germany) . . . [9213-16]

4:40 pm: **Scintillator efficiency study with MeV x-rays** *(Invited Paper)*, Stuart A. Baker, Kristina K. Brown, Alden H. Curtis, Russell A. Howe, Stephen E. Mitchell, National Security Technologies, LLC (USA); Jeremy Danielson, Todd J. Haines, Los Alamos National Lab. (USA); Robert M. Malone, Steve S. Lutz, National Security Technologies, LLC (USA); Kris K. Kwiatkowski, Los Alamos National Lab. (USA); Aaron B. Luttman, National Security Technologies, LLC (USA) . . . . . [9213-17]

5:10 pm: **Performance comparison of detector grade CdZnTe grown under varying non-stoichiometric growth conditions** *(Invited Paper)*, Kelvin G. Lynn, Santosh Swain, Washington State Univ. (USA); Amlan Datta, CapeSym, Inc. (USA); Sachin Bhaladhare, Washington State Univ. (USA) . . . . . [9213-18]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

The neutron detectors based on oxide scintillators for control of fissionable radioactive substances, Oleksandr D. Opolonin, Volodymyr Ryzhikov, Borys Grinyov, Gennadiy Onyshchenko, Leonid Piven, Olena Lysetska, Institute for Scintillation Materials (Ukraine); Sergey A. Kostioukevitch, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Craig F. Smith, Naval Postgraduate School (USA) . . . . . [9213-47]

Simulation of spectroscopic response of Cd(Zn)Te radiation detectors with a Schottky diode, Alexandr A. Zakharchenko, Leonid N. Davydov, Anna I. Skrypnyk, Alexandr Rybka, Vladimir Kutny, Manap A. Khazhmuradov, National Science Ctr. Kharkov Institute of Physics and Technology (Ukraine); Petro M. Fochuk, Valery M. Sklyarchuk, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); Aleksey E. Bolotnikov, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-48]

Informatic downselection of candidate detection materials from II-VI and III-V semiconductor classes, Kim F. Ferris, Pacific Northwest National Lab. (USA); Dumont M. Jones, Proximate Technologies, LLC (USA) . . . . . [9213-49]

Development of an informatics model for the estimation of thermodynamic properties of radiation detection materials, Kim F. Ferris, Daniel Strano, Kunal J. Shah, Pacific Northwest National Lab. (USA); Dumont M. Jones, Proximate Technologies, LLC (USA) . . . . . [9213-50]

Recent progresses in scintillating doped silica fiber optics, Cristina De Mattia, Marie Claire Cantone, Univ. degli Studi di Milano (Italy); Norberto Chiodini, Mauro Fasoli, Univ. degli Studi di Milano-Bicocca (Italy); Eleonora Mones, Azienda Ospedaliera Maggiore della Carità (Italy); Anna Vedda, Univ. degli Studi di Milano-Bicocca (Italy); Ivan Veronese, Univ. degli Studi di Milano (Italy) . . . . . [9213-51]

Explanation of the dark current in n-type Cd(Zn)Te semi-insulating crystals with ohmic contacts, Valerii M. Sklyarchuk, Petro M. Fochuk, Ilarii Rarenko, Zinaida Zakharuk, Olena Sklyarchuk, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); Yevhen Nykoniuk, National Univ. of Water Management and Natural Resources Application (Ukraine); Alexandr Rybka, Vladimir Kutny, National Science Ctr. Kharkov Institute of Physics and Technology (Ukraine); Aleksey E. Bolotnikov, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-52]

Purification of p-type CdTe crystals by thermal treatment, Petro M. Fochuk, Ilarii Rarenko, Zinaida Zakharuk, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); Yevhen Nykoniuk, Vyacheslav Shlyakhovyj, National Univ. of Water Management and Natural Resources Application (Ukraine); Aleksey E. Bolotnikov, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-53]

The REWARD project: real time wide area radiation surveillance with semiconductor detectors, Christian Disch, Freiburger Materialforschungszentrum (Germany) . . . . . [9213-54]

THM growth of CZT in μ-gravity on FOTON-M4, Johannes Feyrer, Michael Fiederle, Freiburger Materialforschungszentrum (Germany); Ernesto Dieguez, Univ. Autónoma de Madrid (Spain); Andrea Zappettini, Istituto dei Materiali per l Elettronica ed il Magnetismo (Italy); Thierry Duffar, Carmen Stelian, Science et Ingénierie des Matériaux et Procédés (France). . . . . [9213-55]

Bulk resistivity changes in CZT with illumination from multiple energies, Aaron L. Washington II, Jonathan S. Wright, Martine C. Duff, Savannah River National Lab. (USA) . . . . . [9213-56]

Characterization of high-resistivity CdTe crystals grown under component overpressures of cadmium for radiation detector applications, Krishna C. Mandal, Sandeep K. Chaudhuri, Rahmi O. Pak, Khai Nguyen, Mohammad A. Mannan, Univ. of South Carolina (USA) . . . . . [9213-57]

Characterization of icosahedral boron arsenide (B12As2) for thermal neutron detection, Yonggang Cui, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Fernando Camino, Anwar Hossain, Utpal Roy, Dong Su, Yang Ge, Brookhaven National Lab. (USA); James H. Edgar, Clinton E. Whiteley, Ugochukwu Nwagwu, Kansas State Univ. (USA); Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-58]

Characterization of cadmium manganese telluride ($Cd_{1-x}Mn_xTe$) crystals grown by floating zone method, Anwar Hossain, Genda Gu, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Yonggang Cui, Utpal Roy, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-59]

Mechanism of laser-induced doping and formation of CdTe-based barrier structures for x-/gamma-ray detectors, Volodymyr A. Gnatyuk, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Toru Aoki, Shizuoka Univ. (Japan); Oleksandr I. Vlasenko, Sergiy N. Levytskyi, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Akifumi Koike, ANSeeN Ltd. (Japan) . . [9213-60]

Photon crosstalk in pixel array for x-ray imaging, MyungSoo Kim, Dong-uk Kang, Dae-Hee Lee, Jaewon Heo, Gyuseong Cho, Giyoon Kim, KAIST (Korea, Republic of) . . . . . [9213-61]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 14B . . TUE 8:00 AM TO 10:20 AM

Scintillators II

Session Chair: **Nerine J. Cherepy,** Lawrence Livermore National Lab. (USA)

8:00 am: **Advances in the growth of alkaline-Earth halide single crystals for scintillator detectors** *(Invited Paper)*, Lynn A. Boatner, Joanne O. Ramey, Oak Ridge National Lab. (USA); James A. Kolopus, Oak Ridge National Lab. (USA) and UT-Battelle LLC (USA); John S. Neal, Oak Ridge National Lab. (USA); Nerine J. Cherepy, Stephen A. Payne, Lawrence Livermore National Lab. (USA); Arnold Burger, Emmanuel Rowe, Pijush Bhattacharya, Fisk Univ. (USA). . . . . [9213-19]

8:30 am: **Toward a user's toolkit for modeling scintillator proportionality and light yield** *(Invited Paper)*, Qi Li, Xinfu Lu, Richard T. Williams, Wake Forest Univ. (USA) . . . . . [9213-20]

9:00 am: **Radiation response of inorganic scintillators: insights from Monte Carlo simulations** *(Invited Paper)*, Sebastien Kerisit, Dangxin Wu, Yulong Xie, Luke W. Campbell, Micah Prange, Fei Gao, Pacific Northwest National Lab. (USA) . . . . . [9213-21]

9:30 am: **Search for high-performance scintillator candidates among the electronic structures of mixed halides and other compounds** *(Invited Paper)*, Koushik Biswas, Arkansas State Univ. (USA) . . . . . [9213-22]

10:00 am: **Strontium iodide instrument development for gamma spectroscopy and radio-isotope identification**, Patrick R. Beck, Nerine J. Cherepy, Stephen A. Payne, Erik L. Swanberg, Peter A. Thelin, Scott E. Fisher, Lawrence Livermore National Lab. (USA); Kanai S. Shah, Rastago Hawrami, Radiation Monitoring Devices, Inc. (USA); Arnold Burger, Fisk Univ. (USA); Lynn A. Boatner, Oak Ridge National Lab. (USA); Michael Momayezi, Bridgeport Instruments, LLC (USA) . . . . . [9213-23]

Coffee Break . . . . . Tue 10:20 am to 10:50 am

SESSION 6

LOCATION: CONV. CTR. ROOM 14B . . TUE 10:50 AM TO 12:10 PM

CdTe and CZT

Session Chair: **Utpal Roy,** Brookhaven National Lab. (USA)

10:50 am: **Observations of extended defects in large-volume detector-grade CdZnTe crystals**, Anwar Hossain, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Yonggang Cui, Utpal Roy, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-24]

11:10 am: **Development and characterization of cadmium telluride pixel detectors with custom ASIC**, Hiromasa Miyasaka, Fiona A. Harrison, Walter R. Cook, Jill A. Burnham, Brian Grefenstette, Peter H. Mao, Vikram R. Rana, California Institute of Technology (USA); Tadayuki Takahashi, Institute of Space and Astronautical Science (Japan) . . . . . [9213-25]

11:30 am: **Modeling the migration of tellurium-rich second-phase particles in cadmium zinc telluride (CZT) via temperature gradient zone melting (TGZM)**, Kerry Wang, Andrew Yeckel, Jeffrey J. Derby, Univ. of Minnesota (USA) . [9213-26]

11:50 am: **Structural and electronic properties of contacts on chemically polished CdZnTe for radiation detector applications**, Suleyman Tari, Fikri Aqariden, Yong Chang, Sivananthan Labs., Inc. (USA); Christoph H. Grein, Univ. of Illinois at Chicago (USA); Maosheng Miao, Nicholas Kioussis, California State Univ., Northridge (USA) . . . . . [9213-27]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 14B . . . . TUE 1:40 PM TO 3:30 PM

Devices I

Session Chair: **Kelvin G. Lynn,** Washington State Univ. (USA)

1:40 pm: **Using position-sensing strips to enhance the performance of virtual Frisch-grid detectors** *(Invited Paper)*, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Yonggang Cui, Gianluigi De Geronimo, Jack Fried, George Mahler, Matthew Petryk, Utpal Roy, Emerson Vernon, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-28]

2:10 pm: **Review of current neutron detection systems for emergency response**, Sanjoy Mukhopadhyay, Richard J. Maurer, Paul P. Guss, Craig Kruschwitz, National Security Technologies, LLC (USA) . . . . . [9213-29]

2:30 pm: **A dual-energy transmission detector for vehicle scanning using wavelength-shifting fibers**, Seth Van Liew, American Science and Engineering, Inc. (USA) . . . . . [9213-30]

2:50 pm: **Characterization of the ePix100 prototype: a front-end ASIC for second-generation LCLS integrating hybrid pixel detectors**, Pietro Caragiulo, Angelo Dragone, Bojan Markovic, Ryan Herbst, Kurtis Nishimura, Benjamin A. Reese, Philip A. Hart, Sven C. Herrmann, Gabriel Blaj, Julie Segal, Astrid Tomada, Jasmine Hasi, Gabriella A. Carini, Christopher J. Kenney, Gunther Haller, SLAC National Accelerator Lab. (USA) . . . . . [9213-31]

3:10 pm: **Waveform discrimination counter for radiation detector**, Toru Aoki, Shizuoka Univ. (Japan); Akifumi Koike, Takaharu Okunoyama, Hisashi Morii, ANSeeN Ltd. (Japan); Hidenori Mimura, Shizuoka Univ. (Japan) . . . . . [9213-32]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 14B . . . TUE 4:00 PM TO 5:20 PM

CZT II

Session Chair: **Aleksey E. Bolotnikov,** Brookhaven National Lab. (USA)

4:00 pm: **Experimental identification of deep level defects in semi-insulating CdZnTe**, KiHyun Kim, Pilsu Kim, Chansun Park, Eunlim Kim, Yongsuk Lee, Korea Univ. College of Health Sciences (Korea, Republic of); Giuseppe S. Camarda, Aleksey E. Bolotnikov, Ralph B. James, Brookhaven National Lab. (USA). [9213-33]

4:20 pm: **Chemical treatment of CdZnTe radiation detectors using hydrogen bromide and ammonium-based solution**, Ifechukwude O. Okwechime, Stephen Egarievwe, Alabama A&M Univ. (USA); Anwar Hossain, Brookhaven National Lab. (USA); Zaveon M. Hales, Alabama A&M Univ. (USA); Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9213-34]

4:40 pm: **High-efficiency CdTe and GaAs sensors for x-ray imaging**, Simon Procz, Michael Fiederle, Alex Fauler, Frank Fischer, Albert-Ludwigs-Univ. Freiburg (Germany); Thomas Koenig, Elias Hamann, Karlsruher Institut für Technologie (Germany) . . . . . [9213-35]

5:00 pm: **Analysis of the growth of cadmium zinc telluride (CZT) by the traveling heater method (THM)**, Jeff H. Peterson, Andrew Yeckel, Jeffrey J. Derby, Univ. of Minnesota (USA) . . . . . [9213-36]

LOCATION: MARRIOTT MARQUIS, BALBOA . . . . . TUE 8:00 TO 10:00 PM

Penetrating Radiation Technical Event

Chair: **James E. Baciak**, Univ. of Florida (USA)

This event brings together technologists and scientists with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications. This year's speaker is Dr. Todd Hossbach from Pacific Northwest National Lab. His presentation will be: Radiation Detector Development to Enable Ultra-Sensitive Measurements: How Basic and Applied Research Can Work Together.

WEDNESDAY 20 AUGUST

SESSION 9

LOCATION: CONV. CTR. ROOM 14B . WED 8:10 AM TO 10:00 AM

Detector Materials II

Session Chair: **Larry Franks,** Consultant (USA)

8:10 am: **First-principles study of halide-based semiconductor radiation detection materials** *(Invited Paper)*, Mao-Hua Du, Oak Ridge National Lab. (USA); Koushik Biswas, Arkansas State Univ. (USA); David J. Singh, Oak Ridge National Lab. (USA) . . . . . [9213-37]

8:40 am: **Thin-film-based scintillators for hard x-ray microimaging detectors: the ScinTAX Project**, Alexander Rack, ESRF - The European Synchrotron (France); Angelica Cecilia, Karlsruher Institut für Technologie (Germany); Paul-Antoine Douissard, ESRF - The European Synchrotron (France); Klaus Dupre, Volker Wesemann, FEE GmbH (Germany); Tilo Baumbach, Karlsruher Institut für Technologie (Germany); Maurice Couchaud, CEA-LETI (France); Xavier Rochet, OPTIQUE PETER (France); Heinrich Riesemeier, Bundesanstalt für Materialforschung und -prüfung (Germany); Thierry Martin, ESRF - The European Synchrotron (France) . . . . . [9213-38]

9:00 am: **Oxidation/reduction reactions at the metal contact-TlBr interface: an x-ray photoelectron spectroscopy study**, Art J. Nelson, Erik L. Swanberg, Lars F. Voss, Robert T. Graff, Adam M. Conway, Rebecca J. Nikolic, Stephen A. Payne, Lawrence Livermore National Lab. (USA); Hadong Kim, Len Cirignano, Kanai S. Shah, Radiation Monitoring Devices, Inc. (USA) . . . . . [9213-39]

9:20 am: **Design and development of quaternary semiconductors for radiation detection**, Narsingh B. Singh, Univ. of Maryland, Baltimore County (USA); Michael House, Benjamin Schreib, URS Corp. (USA); Carlos Romero-Talamas, Ronghui Ma, Fow-Sen Choa, Bradley Arnold, Univ. of Maryland, Baltimore County (USA) . . . . . [9213-40]

9:40 am: **Investigation of low-leakage radiation detectors on n-type 4H-SiC epitaxial layers passivated with SiO_2 and Si_3N_4**, Khai Nguyen, Sandeep K. Chaudhuri, Krishna C. Mandal, Univ. of South Carolina (USA) . . . . . [9213-41]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 10

LOCATION: CONV. CTR. ROOM 14B . WED 10:30 AM TO 12:10 PM

Devices II

Session Chair: **Art J. Nelson,** Lawrence Livermore National Lab. (USA)

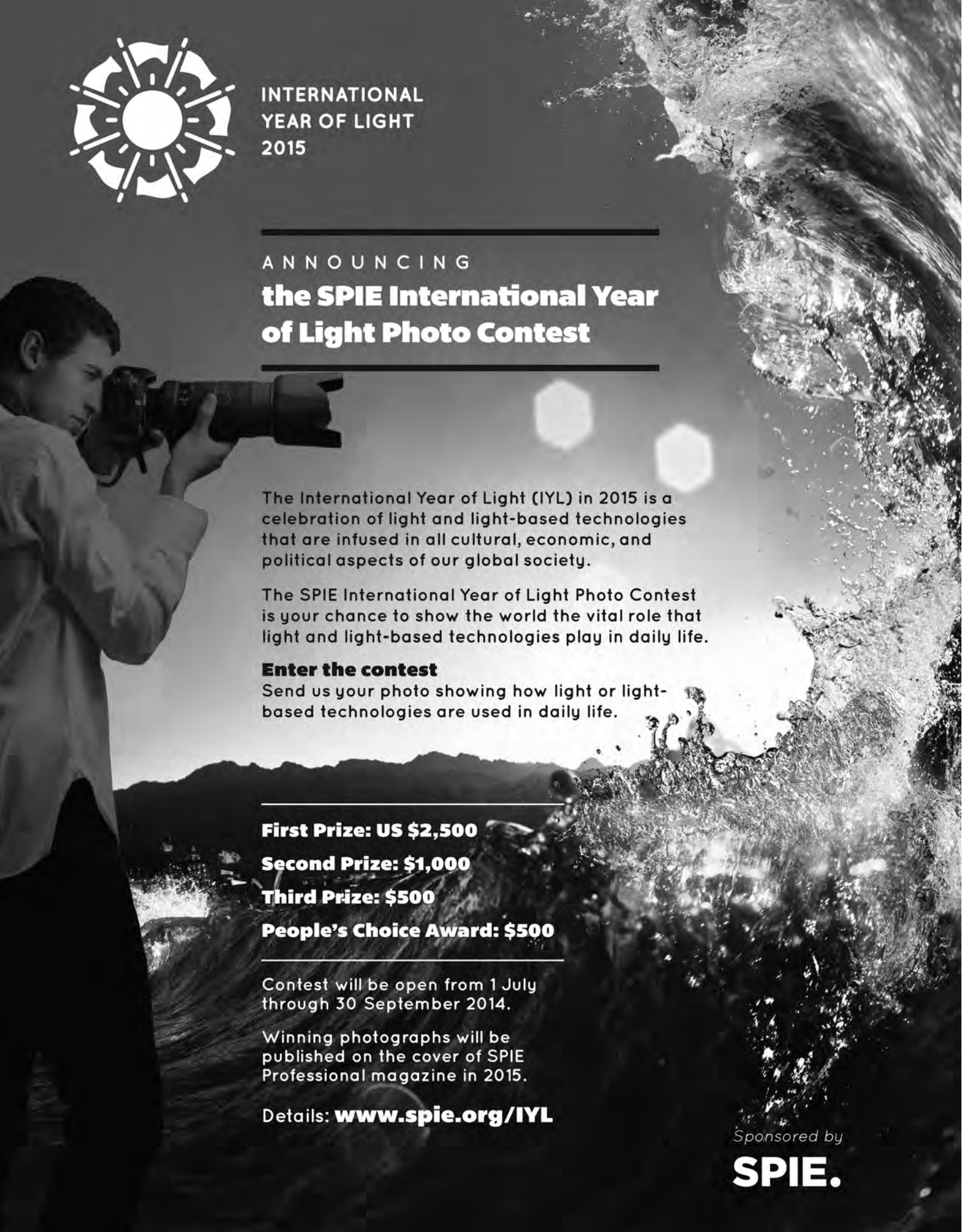
10:30 am: **Development of an x-ray generator using a pyroelectric crystal for x-ray fluorescence analysis on planetary landing missions**, Hiroki Kusano, Yuki Oyama, Masayuki Naito, Hiroshi Nagaoka, Haruyoshi Kuno, Eido Shibamura, Nobuyuki Hasebe, Yoshiharu Amano, Waseda Univ. (Japan); Kyeong J. Kim, Korea Institute of Geoscience & Mineral Resources (Korea, Republic of); José A. Matias Lopes, Univ. de Coimbra (Portugal) . . . . . [9213-42]

10:50 am: **Investigation of low-energy response of a plastic scintillator and its implication on the sensitivity of a hard x-ray focal plane Compton polarimeter**, Tanmoy Chattopadhyay, Santosh V. Vadawale, Physical Research Lab. (India) . . . . . [9213-43]

11:10 am: **Xenon detector with high-energy resolution for gamma-ray line emission registration**, Alexander S. Novikov, Sergey E. Ulin, Valery V. Dmitrenko, Ziyaetdin M. Uteshev, Konstantin F. Vlasik, Victor M. Grachev, Irina V. Chernysheva, Alexander E. Shustov, Denis V. Petrenko, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9213-44]

11:30 am: **Emergency OSL/TL dosimetry with integrated circuits from mobile phones**, Sergii Sholom, Stephen McKeever, Oklahoma State Univ. (USA) [9213-45]

11:50 am: **Use of a position-sensitive multi-anode photomultiplier tube for finding gamma-ray source direction**, Sanjoy Mukhopadhyay, Richard J. Maurer, Paul P. Guss, National Security Technologies, LLC (USA) . . . . . [9213-46]



INTERNATIONAL
YEAR OF LIGHT
2015

ANNOUNCING

the SPIE International Year of Light Photo Contest

The International Year of Light (IYL) in 2015 is a celebration of light and light-based technologies that are infused in all cultural, economic, and political aspects of our global society.

The SPIE International Year of Light Photo Contest is your chance to show the world the vital role that light and light-based technologies play in daily life.

Enter the contest
Send us your photo showing how light or light-based technologies are used in daily life.

First Prize: US $2,500

Second Prize: $1,000

Third Prize: $500

People's Choice Award: $500

Contest will be open from 1 July through 30 September 2014.

Winning photographs will be published on the cover of SPIE Professional magazine in 2015.

Details: **www.spie.org/IYL**

Sponsored by

SPIE.

CONFERENCE 9214

LOCATION: CONV. CTR. ROOM 14A

Monday, Tuesday and Thursday 18, 19 and 21 August 2014 • Proceedings of SPIE Vol. 9214

Medical Applications of Radiation Detectors IV

Conference Chairs: **H. Bradford Barber,** The Univ. of Arizona (USA); **Lars R. Furenlid,** The Univ. of Arizona (USA); **Hans N. Roehrig,** The Univ. of Arizona (USA)

Program Committee: **Yonggang Cui,** Brookhaven National Lab. (USA); **F. Patrick Doty,** Sandia National Labs., California (USA); **Geoffrey Harding,** Morpho Detection (Germany); **Ralph B. James,** Brookhaven National Lab. (USA); **Denny L. Lee,** Direct X Ray Digital Imaging Technology LLC (USA); **Rex A. Moats,** Children's Hospital Los Angeles (USA), The Univ. of Southern California (USA); **Vivek V. Nagarkar,** Radiation Monitoring Devices, Inc. (USA); **Eiichi Sato,** Iwate Medical Univ. (Japan); **Michael R. Squillante,** Radiation Monitoring Devices, Inc. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Dual-modality probe for imaging prostate cancer, Yonggang Cui, Brookhaven National Lab. (USA); Terry Lall, Hybridyne Imaging Technologies, Inc. (Canada); Flavien Daloz, Jean Marc Hebrard, GE Healthcare France (France); Ashish Dharnidharka, GE Healthcare (USA); James Ionson, Hybridyne Imaging Technologies, Inc. (Canada); Giuseppe S. Camarda, Anwar Hossain, Utpal Roy, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9214-19]

TUESDAY 19 AUGUST

LOCATION: MARRIOTT MARQUIS, BALBOA . . . . . TUE 8:00 TO 10:00 PM

Penetrating Radiation Technical Event

Chair: **James E. Baciak**, Univ. of Florida (USA)

This event brings together technologists and scientists with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications. This year's speaker is Dr. Todd Hossbach from Pacific Northwest National Lab. His presentation will be: Radiation Detector Development to Enable Ultra-Sensitive Measurements: How Basic and Applied Research Can Work Together.

THURSDAY 21 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 14A . . THU 8:30 AM TO 10:00 AM

X-Ray and Digital Radiography

Session Chair: **H. Bradford Barber,** The Univ. of Arizona (USA)

8:30 am: **Dual-energy computed tomography system using a high-speed photon counter**, Eiichi Sato, Yasuyuki Oda, Satoshi Yamaguchi, Iwate Medical Univ. (Japan); Osahiko Hagiwara, Hiroshi Matsukiyo, Akihiro Osawa, Toshiyuki Enomoto, Manabu Watanabe, Shinya Kusachi, Toho Univ. (Japan). . . . . [9214-1]

8:50 am: **Developments of metal artifact reduction methods of cone-beam computed tomography**, Kun-Long Shih, National Taipei Univ. of Technology (Taiwan); Jyh-Cheng Chen, National Yang-Ming Univ. (Taiwan). . . . . [9214-2]

9:10 am: **Si-strip detectors for breast imaging** *(Invited Paper)*, William C. Barber, DxRay, Inc. (USA); Jan C. Wessel, Nail Malakhov, Interon AS (Norway); Neal E. Hartsough, DxRay, Inc. (USA); Einar Nygard, Interon AS (Norway); Jan S. Iwanczyk, DxRay, Inc. (USA) . . . . . [9214-3]

9:40 am: **Low-dark-counting high-speed x-ray photon detection using an LSO Crystal and a small photomultiplier tube**, Satoshi Yamaguchi, Eiichi Sato, Yasuyuki Oda, Ryuji Nakamura, Hirobumi Oikawa, Tomonori Yabuushi, Hisanori Ariga, Shigeru Ehara, Iwate Medical Univ. (Japan) . . . . . [9214-4]

Coffee Break . . . . . Thu 10:00 am to 10:20 am

SESSION 2

LOCATION: CONV. CTR. ROOM 14A . . THU 10:20 AM TO 12:10 PM

Nuclear Medicine and SPECT

Session Chair: **Hans N. Roehrig,** The Univ. of Arizona (USA)

10:20 am: **Alpha-particle liver imaging and microdosimetry with the iQID camera** *(Invited Paper)*, Brian W. Miller, Pacific Northwest National Lab. (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Georg Otto, Stefanie Pektor, Christoph Brochhausen, Matthias Miederer, Johannes Gutenberg Univ. Mainz (Germany) . . . . . [9214-5]

10:50 am: **Detailed characterization of small pixel CZT detectors using hybrid pixel-waveform readout for gamma-ray imaging applications** *(Invited Paper)*, Ling-Jian Meng, Jon George, Univ. of Illinois at Urbana-Champaign (USA); Yonggang Cui, Aleksey E. Bolotnikov, Giuseppe S. Camarda, Anwar Hossain, Utpal Roy, Ge Yang, Ralph B. James, Brookhaven National Lab. (USA) . . . . . [9214-6]

11:20 am: **Fabrication of the pinhole aperture for AdaptiSPECT**, Cecile Chaix, The Univ. of Arizona (USA); Matthew A. Kupinski, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA); Lars R. Furenlid, The Univ. of Arizona (USA) . . . . . [9214-7]

11:40 am: **TlBr detectors for medical applications** *(Invited Paper)*, Hadong Kim, Len Cirignano, Alireza Kargar, Alexei V. Churilov, Guido Ciampi, Yaroslav Ogorodnik, Suyoung Kim, Kanai S. Shah, Radiation Monitoring Devices, Inc. (USA) . . . . . [9214-8]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:25 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 14A . . . . THU 1:25 PM TO 3:05 PM

Detectors for Medical Applications

Session Chair: **Lars R. Furenlid,** The Univ. of Arizona (USA)

1:25 pm: **Advances in scintillators for medical imaging applications** *(Invited Paper)*, Edgar van Loef, Kanai S. Shah, Radiation Monitoring Devices, Inc. (USA) . . . . . [9214-9]

1:55 pm: **High-efficiency microcolumnar LuI_3:Ce for high-frame-rate hard x-ray imaging** *(Invited Paper)*, Zsolt Marton, Stuart R. Miller, Elena Ovechkina, Charles Brecher, Harish B. Bhandari, Radiation Monitoring Devices, Inc. (USA); Peter Kenesei, Stephen K. Ross, Jonathan Almer, Argonne National Lab. (USA); Bipin K. Singh, Vivek V. Nagarkar, Radiation Monitoring Devices, Inc. (USA) . . . . . [9214-10]

2:25 pm: **Nuclear, optical, and magnetic resonance imaging in a mouse mammary window chamber model**, Hui Min Leung, College of Optical Sciences, The Univ. of Arizona (USA); Rachel Schafer, Arthur F. Gmitro, The Univ. of Arizona (USA) . . . . . [9214-11]

2:45 pm: **Thick CsI(Tl) column scintillator for iQID detector and FASTSPECT III system**, Ling Han, The Univ. of Arizona (USA); Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA); H. Bradford Barber, The Univ. of Arizona (USA); Brian W. Miller, Pacific Northwest National Lab. (USA); Lars R. Furenlid, The Univ. of Arizona (USA) . . . . . [9214-12]

Coffee Break . . . . . Thu 3:05 pm to 3:25 pm

CONFERENCE 9214

LOCATION: CONV. CTR. ROOM 14A

SESSION 4

LOCATION: CONV. CTR. ROOM 14A . . . . THU 3:25 PM TO 5:45 PM

Other Medical Applications

Session Chair: **H. Bradford Barber,** The Univ. of Arizona (USA)

3:25 pm: **Adaptive SPECT imaging with crossed-slit apertures** *(Invited Paper)*, Heather L. Durko, Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA); Lars R. Furenlid, The Univ. of Arizona (USA) . . . . . [9214-13]

3:55 pm: **Innovative visualization and segmentation approaches for telemedicine** *(Invited Paper)*, Dung C. Nguyen, Janet M. Roveda, Hans N. Roehrig, Marisa H. Borders M.D., Kimberly A. Fitzpatrick M.D., The Univ. of Arizona (USA) . . . . . [9214-14]

4:25 pm: **A SPECT system simulator built on the SolidWorks™ 3D design package**, Xin Li, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA); Lars R. Furenlid, The Univ. of Arizona (USA) . . . . . [9214-15]

4:45 pm: **Preclinical planar imager using a fine-pitch multi-bore collimator and an IQID detector**, David S. Fastje, H. Bradford Barber, The Univ. of Arizona (USA); Brian W. Miller, Pacific Northwest National Lab. (USA); Lars R. Furenlid, Ling Han, Zhonglin Liu, The Univ. of Arizona (USA); Harrison H. Barrett, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA) . . . . . [9214-16]

5:05 pm: **Medical imaging in the teaching world**, Hans N. Roehrig, The Univ. of Arizona (USA) . . . . . [9214-17]

5:25 pm: **Color calibration techniques**, Hans N. Roehrig, Fahad Hashmi, The Univ. of Arizona (USA) . . . . . [9214-18]

CONFERENCE 9215

ROOM: CONV. CTR. ROOM 13

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9215

Radiation Detectors: Systems and Applications XV

Conference Chairs: **Gary P. Grim,** Los Alamos National Lab. (USA); **H. Bradford Barber,** The Univ. of Arizona (USA)

Program Committee: **Patrick Feng,** Sandia National Labs., California (USA); **Paul P. Guss,** National Security Technologies, LLC (USA); **Khalid M. Hattar,** Sandia National Labs. (USA); **Ralph B. James,** Brookhaven National Lab. (USA); **Edward Steven Jimenez Jr.,** Sandia National Labs. (USA); **Will E. Johns,** Vanderbilt Univ. (USA); **Michael J. King,** Rapiscan Systems Labs. (USA); **Edward A. McKigney,** Los Alamos National Lab. (USA); **Wondwosen Mengesha,** Physical Optics Corp. (USA); **Frank E. Merrill,** Los Alamos National Lab. (USA); **Michael R. Squillante,** Radiation Monitoring Devices, Inc. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Real-time acquisition and preprocessing system of transient electromagnetic data based on LabVIEW, Huinan Zhao, Shuang Zhang, Lingjia Gu, Jian Sun, Jilin Univ. (China) . . . . . [9215-15]

Study of the radoptic effect in InP and GaN for ultrafast scintillator applications, Kristina K. Brown, National Security Technologies, LLC (USA); Paul T. Steele, Lawrence Livermore National Lab. (USA); Alden H. Curtis, National Security Technologies, LLC (USA) . . . . . [9215-16]

Characterization of large area silicon drift detectors, Shanmugam Munuswamy, Santosh V. Vadawale, Yashwant B. Acharya, Arpit Patel, Shiv Kumar Goyal, Tanmoy Chattopadhyay, Physical Research Lab. (India) . . . . . [9215-17]

TUESDAY 19 AUGUST

LOCATION: MARRIOTT MARQUIS, BALBOA . . . . . TUE 8:00 TO 10:00 PM

Penetrating Radiation Technical Event

Chair: **James E. Baciak**, Univ. of Florida (USA)

This event brings together technologists and scientists with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications. This year's speaker is Dr. Todd Hossbach from Pacific Northwest National Lab. His presentation will be: Radiation Detector Development to Enable Ultra-Sensitive Measurements: How Basic and Applied Research Can Work Together.

WEDNESDAY 20 AUGUST

SESSION 1

ROOM: CONV. CTR. ROOM 13 . . . . . WED 8:30 AM TO 10:20 AM

Threat Detection and Monitoring

Session Chair: **Gary P. Grim,** Los Alamos National Lab. (USA)

8:30 am: **A new pad-based neutron detector for stereo coded aperture thermal neutron imaging** *(Invited Paper)*, Istvan Dioszegi, Bo Yu, Graham Smith, Neil Schaknowski, Jack Fried, Peter E. Vanier, Cynthia Salwen, Brookhaven National Lab. (USA); Leon Forman, Ion Focus Technology, Inc. (USA) . . . . . [9215-1]

9:00 am: **Recent results with a combined gamma-ray and neutron imaging detector** *(Invited Paper)*, Lakshmi Soundara-Pandian, Chad M. Whitney, Erik B. Johnson, Robert Vinci, Jarek Glodo, James F. Christian, Michael R. Squillante, Radiation Monitoring Devices, Inc. (USA) . . . . . [9215-2]

9:30 am: **Rapid response radiation sensors for homeland security applications**, Sanjoy Mukhopadhyay, Richard J. Maurer, Paul P. Guss, National Security Technologies, LLC (USA) . . . . . [9215-3]

9:50 am: **Scintillation properties of a $Cs_2LiLa(Br_6)90\%(Cl_6)10\%$:Ce (CLLBC) crystal** *(Invited Paper)*, Paul P. Guss, Thomas G. Stampahar, Sanjoy Mukhopadhyay, National Security Technologies, LLC (USA); Alexander Barzilov, Amber Guckes, Univ. of Nevada, Las Vegas (USA) . . . . . [9215-4]

Coffee Break . . . . . Wed 10:20 am to 10:50 am

SESSION 2

ROOM: CONV. CTR. ROOM 13 . . . . . WED 10:50 AM TO 12:10 PM

Imaging Detectors and Systems I

Session Chair: **H. Bradford Barber,** The Univ. of Arizona (USA)

10:50 am: **Fast hybrid and monolithic CMOS imagers in multi-frame radiography** *(Invited Paper)*, Kris K. Kwiatkowski, Fesseha Mariam, Frank Merrill, Chris L. Morris, Paul Nedrow, Alexander Saunders, Los Alamos National Lab. (USA); Vincent Douence, Yibin Bai, Teledyne Imaging Sensors (USA) . . . . . [9215-5]

11:20 am: **Proton and neutron radiation hardness of GaN optoelectronic devices** *(Invited Paper)*, Ke-Xun Sun, Univ. of Nevada, Las Vegas (USA) . . [9215-6]

11:50 am: **Determining x-ray spectra of radiographic sources with a Compton spectrometer**, Amanda E. Gehring, Michelle A. Espy, Todd J. Haines, Los Alamos National Lab. (USA) . . . . . [9215-7]

Lunch/Exhibition Break . . . . . Wed 12:10 pm to 1:40 pm

CONFERENCE 9215

ROOM: CONV. CTR. ROOM 13

SESSION 3

ROOM: CONV. CTR. ROOM 13 . . . . . WED 1:40 PM TO 3:10 PM

Image Reconstruction and Analysis

Session Chair: **Daniel A. Lemieux,** The Univ. of Arizona (USA)

1:40 pm: **Irregular large-scale computed tomography on graphics processors improves energy-efficiency metrics for industrial applications** *(Invited Paper)*, Edward S. Jimenez Jr., Eric L. Goodman, Sandia National Labs. (USA); Ryeojin Park, College of Optical Sciences, The Univ. of Arizona (USA); Laurel J. Orr, Kyle R. Thompson, Sandia National Labs. (USA) . . . . . [9215-8]

2:10 pm: **A high-performance GPU-based forward-projection model for computed tomography applications**, Ismael Perez, Edward S. Jimenez Jr., Kyle R. Thompson, Sandia National Labs. (USA) . . . . . [9215-9]

2:30 pm: **Fisher information as a gamma-ray detector design tool**, Esen Salcin, Lars R. Furenlid, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA) . . . . . [9215-10]

2:50 pm: **Exploring mediated reality to approximate x-ray attenuation coefficients from radiographs**, Edward S. Jimenez Jr., Kyle R. Thompson, Laurel J. Orr, Sandia National Labs. (USA) . . . . . [9215-11]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 4

ROOM: CONV. CTR. ROOM 13 . . . . . WED 3:40 PM TO 5:00 PM

Imaging Detectors and Systems II

Session Chair: **Edward S. Jimenez Jr.,** Sandia National Labs. (USA)

3:40 pm: **X-ray detectors for the Dynamic Compression Sector at the Advanced Photon Source** *(Invited Paper)*, Yuxin Wang, Dynamic Compression Sector, Institute for Shock Physics, Washington State Univ. (USA); Stefan J. Turneaure, Institute for Shock Physics, Washington State Univ. (USA); Timothy J. Graber, Dynamic Compression Sector, Institute for Shock Physics, Washington State Univ. (USA); Kurt Zimmerman, Yogendra M. Gupta, Institute for Shock Physics, Washington State Univ. (USA) . . . . . [9215-12]

4:10 pm: **The effect of guard-ring on leakage current and spectroscopic performance of TlBr planar detectors** *(Invited Paper)*, Alireza Kargar, Hadong Kim, Len Cirignano, Kanai S. Shah, Radiation Monitoring Devices, Inc. (USA) . . . . . [9215-13]

4:40 pm: **Deep-pixel scintillator arrays for high-energy gamma-ray imaging**, H. Bradford Barber, David S. Fastje, Lars R. Furenlid, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA); Daniel A. Lemieux, Gary P. Grim, Los Alamos National Lab. (USA); Ling Han, College of Optical Sciences, The Univ. of Arizona (USA) and Ctr. for Gamma-Ray Imaging (USA); Brian W. Miller, Pacific Northwest National Lab. (USA); Philip Parkhurst, Proteus, Inc. (USA). . . . . [9215-14]

CONFERENCE 9216

LOCATION: CONV. CTR. ROOM 17A

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9216

Optics and Photonics for Information Processing VIII

Conference Chairs: **Abdul A. S. Awwal,** Lawrence Livermore National Lab. (USA); **Khan M. Iftekharuddin,** Old Dominion Univ. (USA); **Mohammad A. Matin,** Univ. of Denver (USA)

Conference Co-Chair: **Andrés Márquez,** Univ. de Alicante (Spain)

Program Committee: **Henri H. Arsenault,** Univ. Laval (Canada); **George Barbastathis,** Massachusetts Institute of Technology (USA); **Juan Campos,** Univ. Autònoma de Barcelona (Spain); **David Casasent,** Carnegie Mellon Univ. (USA); **Laurence G. Hassebrook,** Univ. of Kentucky (USA); **Kazuyoshi Itoh,** Osaka Univ. (Japan); **Mohammad Ataul Karim,** Old Dominion Univ. (USA); **Byoungho Lee,** Seoul National Univ. (Korea, Republic of); **Abhijit Mahalanobis,** Lockheed Martin Missiles and Fire Control (USA); **Mohammad A. Matin,** Univ. of Denver (USA); **Osamu Matoba,** Kobe Univ. (Japan); **Alastair D. McAulay,** Lehigh Univ. (USA); **Nasser M. Nasrabadi,** U.S. Army Research Lab. (USA); **Mark A. Neifeld,** The Univ. of Arizona (USA); **Takanori Nomura,** Wakayama Univ. (Japan); **Ting-Chung Poon,** Virginia Polytechnic Institute and State Univ. (USA); **Philippe Réfrégier,** Institut Fresnel (France); **Joseph Rosen,** Ben-Gurion Univ. of the Negev (Israel); **John T. Sheridan,** Univ. College Dublin (Ireland); **Jun Tanida,** Osaka Univ. (Japan); **Cardinal Warde,** Massachusetts Institute of Technology (USA); **Eriko Watanabe,** The Univ. of Electro-Communications (Japan); **Toyohiko Yatagai,** Utsunomiya Univ. (Japan); **Francis T. S. Yu,** The Pennsylvania State Univ. (USA); **María J. Yzuel,** Univ. Autònoma de Barcelona (Spain)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 17A . . MON 8:40 AM TO 10:30 AM

LEDs, Biophotonics, and Morphology

Session Chair: **Andrés Márquez,** Univ. de Alicante (Spain)

8:40 am: **Impact of LED irradiance on plant photosynthesis and action spectrum** *(Invited Paper)*, Most Tahera Naznin, Mark Lefsrud, Michael Schwalb, McGill Univ. (Canada) . . . . . [9216-1]

9:10 am: **Depth compensation in fluorescence molecular tomography using an adaptive support driven reweighted L1-minimization algorithm**, Junwei Shi, Fei Liu, Jianwen Luo, Jing Bai, Tsinghua Univ. (China) . . . . . [9216-2]

9:30 am: **Multispectral image restoration of historical documents based on mathematical morphology**, Juan Carlos Valdiviezo-Navarro, Edwin Lechuga-Salem, Univ. Politécnica de Tulancingo (Mexico); Gonzalo Urcid, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [9216-3]

9:50 am: **Oxygen saturation detection aided with the theory of lock-in amplifier**, Manjin Liu, Mei Hui, Ming Liu, Yuejin Zhao, Liquan Dong, Hong Wu, Xiaohua Liu, Lei Yang, Zhu Zhao, Yun Feng, Di Chen, Beijing Institute of Technology (China) . . . . . [9216-4]

10:10 am: **Multifunction medical endoscope system with optical fiber temperature sensor**, Zhengquan He, Xi'an Institute of Optics and Precision Mechanics (China); Libin Zhou, Northwest Univ. (China); Baoke Luo, Baowen Hu, Xinchao Du, Yulin Li, Xi'an Institute of Optics and Precision Mechanics (China) . . . . . [9216-65]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 17A . . MON 11:00 AM TO 12:20 PM

Optical Imaging

Session Chair: **Andrés Márquez,** Univ. de Alicante (Spain)

11:00 am: **A roadmap to global illumination in 3D scenes: models and solutions for GPU implementations**, Kenia Picos, Victor H. Díaz-Ramírez, Juan J. Tapia, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico). . . . . [9216-5]

11:20 am: **Illumination adaptation with rapid-response color sensors**, Xinchi Zhang, Quan Wang, Kim L. Boyer, Rensselaer Polytechnic Institute (USA) . [9216-6]

11:40 am: **Multiple-samples-method enabling high dynamic range imaging for high frame rate CMOS image sensor by FPGA and co-processor**, Blake C. Jacquot, Nathan G. Johnson-Williams, The Aerospace Corp. (USA) . . . . . [9216-7]

12:00 pm: **Optical design and characterization of an advanced computational imaging system (ACIS)**, R. Hamilton Shepard III, Christy Fernandez-Cull, MIT Lincoln Lab. (USA); Boxin Shi, Christopher Barsi, Ramesh Raskar, MIT Media Lab. (USA) . . . . . [9216-8]

Lunch/Exhibition Break . . . . . Mon 12:20 pm to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 17A . . . . MON 1:50 PM TO 3:10 PM

Real-time Systems Application

Session Chair: **Víctor H. Diaz-Ramirez,** Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico)

1:50 pm: **Image analysis algorithms for the advanced radiographic capability (ARC) grating tilt sensor at the National Ignition Facility**, Randy S. Roberts, Erlan S. Bliss, Michael C. Rushford, John M. Halpin, Abdul A. S. Awwal, Richard R. Leach Jr., Lawrence Livermore National Lab. (USA) . . . . . [9216-9]

2:10 pm: **Autonomous pedestrian localization techniques using CMOS camera sensors**, Chanwoo Chun, Monroe Community College (USA). . . . . [9216-10]

2:30 pm: **Digital vision sensor for collision avoidance and navigation**, Joseph H. Lin, MIT Lincoln Lab. (USA). . . . . [9216-11]

2:50 pm: **Detecting objects with partial obstruction at the ARC split beam injector images at the National Ignition Facility**, Abdul A. S. Awwal, Richard R. Leach Jr., Randy S. Roberts, Karl Wilhelmsen, David McGuigan, Jeffrey A. Jarboe, Lawrence Livermore National Lab. (USA) . . . . . [9216-12]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 17A . . . . MON 3:40 PM TO 5:20 PM

Holographic Systems and SLMs

Session Chair: **Abdul A. S. Awwal,** Lawrence Livermore National Lab. (USA)

3:40 pm: **GPU implementation of wave field translation method for fast hologram generation**, Seok Lee, Hocheon Wey, Dongkyung Nam, Dusik Park, Samsung Advanced Institute of Technology (Korea, Republic of) . . . . . [9216-13]

4:00 pm: **Optical adaptive reconstruction of Gabor transformed holograms**, Kartik Viswanathan, Patrick Gioia, Orange SA (France); Luce Morin, Institut National des Sciences Appliquées de Rennes (France) . . . . . [9216-14]

4:20 pm: **Averaged Stokes polarimetry applied to characterize parallel-aligned liquid crystal on silicon displays**, Andrés Márquez, Francisco J. Martínez, Sergi Gallego, Manuel Ortuño, Jorge Francés, Augusto Beléndez, Inmaculada Pascual, Univ. de Alicante (Spain) . . . . . [9216-15]

4:40 pm: **Adaptive SLM-based compensation of intermodal interference in few-mode optical fibers**, Vladimir S. Lyubopytov, Valeriy K. Bagmanov, Albert K. Sultanov, Ufa State Aviation Technical Univ. (Russian Federation) . . . . . [9216-16]

5:00 pm: **3D extended NPDD model of holographic grating formation in photopolymer materials**, Haoyu Li, Yue Qi, John T. Sheridan, Univ. College Dublin (Ireland) . . . . . [9216-17]

CONFERENCE 9216

LOCATION: CONV. CTR. ROOM 17A

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

A new light intensity controllable measurement matrix based on compressed sensing *(Invited Paper)*, Jiayan Zhuang, Nanjing Univ. of Science and Technology (China) . . . . . [9216-38]

Interference coloring effects of polymer dispersed liquid crystals, Andriy L. Nehrych, Peter P. Maksimyak, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9216-39]

Monocular pose estimation algorithm based on the bundle adjustment method, Weimin Li, Yan Li, Univ. of Science and Technology of China (China); Lichun Zhu, National Astronomical Observatories (China); Di Zhang, Hui Liu, Yu Zhao, Univ. of Science and Technology of China (China). . . . . [9216-40]

The spatial stochastization of optical radiation scattered by liquid crystal in the process of phase transition, Mykhailo S. Gavrylyak, Peter P. Maksimyak, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9216-41]

Influence of the photopolymer properties in the fabrication of diffractive optical elements, Sergi Gallego, Roberto Fernández, Andrés Márquez, Francisco J. Martínez, Manuel Ortuño, Univ. de Alicante (Spain); Stephan Marini, Univ de Alicante (Spain); Cristian Neipp, Inmaculada Pascual, Augusto Beléndez, Univ. de Alicante (Spain) . . . . . [9216-42]

Mexican sign language recognition using normalized moments and artificial neural networks, José Francisco S. Villarreal, Univ. Nacional Autónoma de México (Mexico); Margarita H. González, Amelia P. García, Univ. Autónoma del Estado de México (Mexico); Carina T. Quitl, Univ. Tecnológica de Tulancingo (Mexico). . . . . [9216-43]

Mueller-matrix processing of biological tissues polarization images and reconstruction of parameters phase and amplitude anisotropy, Olexander V. Dubolazov, Vladimir Ushenko, Artem Karachevtsev, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine). . . . . [9216-44]

Azimuthally stable laser polarimetry of polycrystalline films of human biological fluids, Vladimir Ushenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); Galina Koval, Bukovinian State Medical Univ. (Ukraine); Maxim Sidor, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [9216-45]

Numerical reconstruction of digital holograms on free software distribution ImageJ, Jorge Ivan Garcia Sucerquia, Raul Andres Castañeda Quintero, Univ. Nacional de Colombia Sede Medellín (Colombia). . . . . [9216-46]

Correlation-optical method for cement particle size definition, Mykhaylo P. Gorsky, Peter P. Maksimyak, Andrew P. Maksimyak, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine). . . . . [9216-47]

Frequency change rate effect on characteristics of optical spectral device based on acousto-optic tunable filter, Georgy Korol, Oleg Moskaletz, Arseny Y. Zhdanov, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) . . . . . [9216-48]

The stability of color discrimination threshold determined using pseudoisochromatic test plates, Brigita Zutere, Kaiva Jurasevska, Aija Livzane, Univ. of Latvia (Latvia) . . . . . [9216-49]

Combining two strategies to optimize biometric decisions against spoofing attacks, Weifeng Li, Graduate School at Shenzhen,Tsinghua Univ. (China); Norman Poh, Univ. of Surrey (United Kingdom); Yicong Zhou, Univ. of Macau (Macao, China) . . . . . [9216-50]

Comparison of methods of suppression of undesired diffraction orders at numerical reconstruction of digital Fresnel holograms, Pavel Cheremkhin, Nikolay N. Evtikhiev, Sergey N. Starikov, Vitaly V. Krasnov, Liudmila A. Porshneva, Vladislav G. Rodin, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9216-51]

Increasing quality of computer generated kinoforms using direct search with random trajectory method, Vitaly V. Krasnov, Alyona P. Bondareva, Pavel Cheremkhin, Nikolay N. Evtikhiev, Vladislav G. Rodin, Sergey N. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9216-52]

Analysis of correlation metrics performance for minimum energy invariant filters, Maxim V. Konstantinov, National Research Nuclear Univ MEPhI (Russian Federation); Elizaveta K. Petrova, Dmitry V. Shaulskiy, Rostislav S. Starikov, Evgeny Y. Zlokazov, National Research Nuclear Univ. MEPhI (Russian Federation)[9216-53]

Three-dimensional photon counting microscopy using Bayesian estimation, Myungjin Cho, Ki-Ok Cho, Hankyong National Univ. (Korea, Republic of) . [9216-55]

2D moiré fringe of square-aperture planar microlens array, Guikun Yin, Sumei Zhou, Baohao Zhang, Di Huang, Southwest Univ. (China) . . . . . [9216-56]

Simulation of time-dispersion spectral device with sample spectra accumulation, Arseny Y. Zhdanov, Oleg Moskaletz, Ruslan A. Khansuvarov, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation)[9216-57]

Application of improved genetic algorithm in camera calibration, Weimin Li, Hui Liu, Univ. of Science and Technology of China (China); Lichun Zhu, National Astronomical Observatories (China); Yu Zhao, Univ. of Electronic Science and Technology of China (China) . . . . . [9216-58]

Performance analysis of bi-directional broadband passive optical network using erbium-doped fiber amplifier, Yasser Almalaq, Mohammad A. Matin, Univ. of Denver (USA). . . . . [9216-59]

Analysis of the confluence of three patterns using centering and pointing system (CAPS) images for the advanced radiographic capability (ARC) at the National Ignition Facility, Richard R. Leach Jr., Abdul A. S. Awwal, Erlan S. Bliss, Randy S. Roberts, Michael C. Rushford, Karl Wilhelmsen, Tom Zobrist, Lawrence Livermore National Lab. (USA) . . . . . [9216-60]

Pipeline security threat event classification method based on optimized support vector machine, Yan Zhou, Lu Liu, Xiaozhong Tian, Petrochina Pipeline R&D Ctr. (China); Jun Zheng, Qingjun Yang, Yuanyang Zhang, PetroChina Pipeline Co. (China). . . . . [9216-61]

Modulation transfer function approximation application in imaging systems, Göktuğ G. Artan, TÜBITAK SAGE (Turkey); Alper Akmeše, Altuš Uçar, EKINOKS-AG (Turkey); Birkan Cetin, TÜBITAK SAGE (Turkey). . . . . [9216-62]

The separation of 1/f noise of semi-conductor laser based on GPU parallel computing, Haipeng Chen, Jilin Univ. (China) and Univ. of Wisconsin-Madison (USA); Shuxu Guo, Tian Zhang, Jian Sun, Jilin Univ. (China) . . . . . [9216-63]

The method of evaluation for 1/f low-frequency electronics noise based on compressed sensing, Haipeng Chen, Jilin Univ. (China) and Univ. of Wisconsin-Madison (USA); Shuxu Guo, Tian Zhang, Jian Sun, Jilin Univ. (China). . . . [9216-64]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 17A . . .TUE 9:00 AM TO 10:00 AM

Neural Networks and Algorithms

Session Chair: **Khan M. Iftekharuddin,** Old Dominion Univ. (USA)

9:00 am: **Improvements to vehicular traffic segmentation and classification for real-time emissions estimation using networked traffic surveillance cameras**, Jeffrey B. Flora, Mahbubul Alam, Khan M. Iftekharuddin, Old Dominion Univ. (USA) . . . . . [9216-18]

9:20 am: **Baseline estimation in flame's spectra by using neural networks and robust statistics**, Hugo O. Garces, Luis Arias, Alejandro Rojas, Univ. de Concepción (Chile) . . . . . [9216-19]

9:40 am: **Neural network-based person re-identification using color histograms**, Alex Kuefler, Occidental College (USA); James DePaola, California State Univ., Fullerton (USA); Thomas T. Lu, Jet Propulsion Lab. (USA) . . . [9216-20]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 17A . . .TUE 10:30 AM TO 11:40 AM

Quantum Computing and Silicon Devices

Session Chair: **Mohammad A. Matin,** Univ. of Denver (USA)

10:30 am: **Quantum nanophotonic circuits for ultralow-power classical information processing** *(Invited Paper)*, Jason S. Pelc, Charles Santori, Ranojoy Bose, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) . . . . . [9216-21]

11:00 am: **Mid-IR nonlinear optics on silicon**, Ting Wang, Singapore Univ. of Technology & Design (Singapore). . . . . [9216-22]

11:20 am: **Optical chaos synchronization and encrypted communications of VCSEL by direct optical injection**, Wakao Sasaki, Naohito Hosomi, Doshisha Univ. (Japan) . . . . . [9216-23]

Lunch/Exhibition Break . . . . . Tue 11:40 am to 1:30 pm

LOCATION: CONV. CTR. ROOM 16A . TUE 1:30 PM TO 2:30 PM

Signal, Image, and Data Processing Plenary Session

Session Chair: **Khan M. Iftekharuddin**, Old Dominion Univ. (USA)

Welcome and Introductions: 1:30 to 1:35 pm

1:35 pm: **Data-adaptive Filtering and the State of the Art in Image Processing** *(Plenary)*, Peyman Milanfar, Univ. of California, Santa Cruz (USA) . . . . . [9216-300]

SESSION 7

LOCATION: CONV. CTR. ROOM 17A . . . . TUE 2:40 PM TO 5:00 PM

Quantum Noise and Optical Interconnects

Session Chair: **Monish R. Chatterjee,** Univ. of Dayton (USA)

2:40 pm: **First principles investigation of magnetic noise sources for superconducting qubits on α-Al_2O_3** *(Invited Paper)*, Donghwa Lee, Jonathan DuBois, Vincenzo Lordi, Lawrence Livermore National Lab. (USA) . . . . . [9216-24]

3:10 pm: **Information encryption, transmission, and retrieval via chaotic modulation in a hybrid acousto-optic Bragg cell under profiled beam illumination**, Monish R. Chatterjee, Fares S. Almehmadi, Univ. of Dayton (USA) . . . . . [9216-25]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

4:00 pm: **Residue number system based distributed arithmetic approach for optical-OFDM system**, Kamaljit Singh Bhatia, Gurinder Singh, Tarandip Singh, Harpreet Singh, Sri Guru Granth Sahib World Univ. (India) . . . . . [9216-26]

4:20 pm: **A novel evolution to remodulated WDM-PON based on DPSK/ASK orthogonal modulation,** Qirui Zhou, Jun Ma, Zhejiang Univ. (China); Yang Lu, Hangzhou Dianzi Univ. (China); Lingchen Huang, Biao Chen, Zhejiang Univ. (China) . . . . . [9216-27]

4:40 pm: **Numerical investigation of the nonlinear dynamics of a hybrid acousto-optic Bragg cell with a variable feedback gain**, Monish R. Chatterjee, Hao Zhou, Univ. of Dayton (USA) . . . . . [9216-28]

WEDNESDAY 20 AUGUST

SESSION 8

LOCATION: CONV. CTR. ROOM 17A . . WED 9:00 AM TO 10:20 AM

Correlation Filters

Session Chair: **Alastair D. McAulay,** Lehigh Univ. (USA)

9:00 am: **Hybrid optoelectronic correlator (HOC) architecture for shift, scale, and rotation invariant target recognition incorporating polar mellin transform (PMT)**, Mehjabin S. Monjur, Northwestern Univ. (USA); Shih Tseng, Northwestern Univ. (USA) and Digital Optics Technologies, Inc. (USA); Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9216-29]

9:20 am: **Holographic MINACE filters for 4f correlator**, Nikolay N. Evtikhiev, Dmitry V. Shaulskiy, Rostislav S. Starikov, Sergey N. Starikov, Evgeny Y. Zlokazov, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9216-30]

9:40 am: **A distortion invariant method with optical computing for scene matching**, Tianxiang Zheng, Yan Zhao, Liangcai Cao, Qingsheng He, Guofan Jin, Tsinghua Univ. (China). . . . . [9216-31]

10:00 am: **Pattern recognition of electromagnetic field scattering from anthropogenic objects on underlying surface**, Denis A. Zherdev, Vladimir A. Fursov, Samara State Aerospace Univ. (Russian Federation) . . . . . [9216-32]

Coffee Break . . . . . Wed 10:20 am to 10:50 am

SESSION 9

LOCATION: CONV. CTR. ROOM 17A . . WED 10:50 AM TO 12:30 PM

Transforms and Image Enhancement

Session Chair: **Mohammad A. Matin,** Univ. of Denver (USA)

10:50 am: **Unitary implementation of the discrete two dimensional non-separable linear canonical transform**, Liang Zhao, Univ. College Dublin (Ireland); John J. Healy, National Univ. of Ireland, Maynooth (Ireland); John T. Sheridan, Univ. College Dublin (Ireland) . . . . . [9216-33]

11:10 am: **An approach for effective wavelet-domain de-noising of terahertz time-domain spectroscopy data**, Nikita V. Chernomyrdin, Kirill I. Zaytsev, Irina N. Fokina, Valeriy E. Karasik, Arsenii A. Gavdush, Bauman Moscow State Technical Univ. (Russian Federation). . . . . [9216-34]

11:30 am: **Statistical study of coherent images of particles in the volume of optical medium**, Tatiana Y. Nikolaeva, Nikolay V. Petrov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [9216-35]

11:50 am: **A fast and automatic fusion algorithm for unregistered multiexposure image sequence**, Yan Liu, Feihong Yu, Zhejiang Univ. (China) . . . . . [9216-36]

12:10 pm: **An ARMA model based motion artifact reduction algorithm in fNIRS data through a Kalman filtering approach**, Mehdi Amian, S. Kamaledin Setarehdan, Univ. of Tehran (Iran, Islamic Republic of) . . . . . [9216-37]

CONFERENCE 9217

LOCATION: CONV. CTR. ROOM 16B

Monday–Thursday 18–21 August 2014 • Proceedings of SPIE Vol. 9217

Applications of Digital Image Processing XXXVII

Conference Chair: **Andrew G. Tescher,** AGT Associates (USA)

Program Committee: **Vasudev Bhaskaran,** Qualcomm Inc. (USA); **Wo L. Chang,** National Institute of Standards and Technology (USA); **Frederic Dufaux,** Télécom ParisTech (France); **Touradj Ebrahimi,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Ali Habibi,** Consultant (USA); **Arianne T. Hinds,** CableLabs (USA); **T. Russell Hsing,** Telcordia Technologies, Inc. (USA); **Chun-Chieh J. Kuo,** The Univ. of Southern California (USA); **Dan Lelescu,** Pelican Imaging Corp. (USA); **Ofer Hadar,** Ben-Gurion Univ. of the Negev (Israel); **Marek R. Ogiela,** AGH Univ. of Science and Technology (Poland); **Andre J. Oosterlinck,** Kuleuven R & D (Belgium); **Sethuraman Panchanathan,** Arizona State Univ. (USA); **Fernando Pereira,** Instituto de Telecomunicações (Portugal); **Yuriy A. Reznik,** InterDigital, Inc. (USA); **Thomas Richter,** Univ. Stuttgart (Germany); **John A. Saghri,** California Polytechnic State Univ., San Luis Obispo (USA); **Peter Schelkens,** Vrije Univ. Brussel (Belgium); **Gary J. Sullivan,** Microsoft Corp. (USA); **Mihaela van der Schaar,** Univ. of California, Los Angeles (USA); **Anthony Vetro,** Mitsubishi Electric Research Labs. (USA); **Wenwu Zhu,** Tsinghua Univ. (China)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 16B . . MON 8:20 AM TO 11:50 AM

Restoration and Analysis

Session Chair: **Andrew G. Tescher,** AGT Associates (USA)

8:20 am: **A high accuracy image restoration method for turbulence degraded underwater images**, Kalyan K. Halder, UNSW Canberra (Australia); Murat Tahtali, Sreenatha G. Anavatti, UNSW@ADFA (Australia) . . . . . [9217-1]

8:40 am: **Reconstruction algorithms for compressive hyperspectral imaging systems with separable spatial and spectral operators**, Yaniv Oiknine, Yitzhak August, Adrian Stern, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9217-2]

9:00 am: **Full-body gestures and movements recognition: user descriptive and unsupervised learning approaches in GDL classifier,** Tomasz Hachaj, Cracow Pedagogical Univ. (Poland); Marek R. Ogiela, AGH Univ. of Science and Technology (Poland) . . . . . [9217-56]

9:20 am: **Distortion operator kernel and accuracy of iterative image restoration**, Artyom Makovetskii, Chelyabinsk State Univ. (Russian Federation); Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9217-3]

9:40 am: **Nonlinear filtering for character recognition in low quality document images**, Julia Diaz, Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9217-4]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Color image restoration based on camera microscanning**, Jose L. Lopez-Martinez, Univ. Autónoma de Yucatán (Mexico); Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Manuel Escalante-Torres, Univ. Autónoma de Yucatán (Mexico) . . . . . [9217-5]

10:50 am: **Scene-based nonuniformity correction with an anisotropic LMS algorithm for infrared images**, Lixiang Geng, Qian Chen, Weixian Qian, Guohua Gu, Nanjing Univ. of Science and Technology (China); Mengdi Yuan, Nanjing Univ. of Technology (China) . . . . . [9217-6]

11:10 am: **Study of adaptive correlation filter synthesis guided by the peak and shape of the correlation output**, Oliver G. Campos Trujillo, Gerardo Diaz Blancas, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico) . . . . . [9217-7]

11:30 am: **Digital deblurring based on linear-scale differential analysis**, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vitali Bezzubik, Nikolai Belashenkov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9217-8]

Lunch Break . . . . . Mon 11:50 am to 1:20 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 16B . . . MON 1:20 PM TO 5:10 PM

Classification and Evaluation

Session Chair: **Frederic Dufaux,** Télécom ParisTech (France)

1:20 pm: **Prediction-guided quantization for video tone mapping**, Agnes Le Dauphin, Ronan Boitard, Dominique Thoreau, Yannick Olivier, Edouard Francois, Fabrice Leléannec, Technicolor S.A. (France) . . . . . [9217-9]

1:40 pm: **A dynamic range complexity measure for high dynamic range content**, Giuseppe Valenzise, Francesca De Simone, Frederic Dufaux, Télécom ParisTech (France) . . . . . [9217-10]

2:00 pm: **Crowdsourcing evaluation of high dynamic range image compression**, Philippe Hanhart, Pavel Korshunov, Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9217-11]

2:20 pm: **Influence of internal and external environmental parameters on content understanding in HDR**, Lin Yuan, Pavel Korshunov, Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9217-12]

2:40 pm: **I-Vectors for image classification**, David C. Smith, National Security Agency (USA) . . . . . [9217-13]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

3:30 pm: **Classification and quantification of suspended dust from steel plants by using color and transmission image analysis**, Yoshiyuki Umegaki, Akira Kazama, JFE Steel Corp. (Japan); Yoshinori Fukuda, JFE Techno-Research Corp. (Japan) . . . . . [9217-14]

3:50 pm: **Recognition of similar objects by linear correlation filters**, Jose R. Jaquez, Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9217-15]

4:10 pm: **System for objective assessment of image differences in digital cinema**, Karel Fliegel, Petr Pata, Czech Technical Univ. in Prague (Czech Republic); Jiri Myslik, Josef Pecak, Marek Jicha, Film and TV School of Academy of Performing Arts in Prague (Czech Republic) . . . . . [9217-16]

4:30 pm: **Open source database of images DEIMOS: extension for large-scale subjective image quality assessment**, Stanislav Vítek, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9217-17]

4:50 pm: **MTF analysis for coded aperture imaging in a flat panel display**, Sungjoo Suh, Jae-Joon Han, Dusik Park, Samsung Advanced Institute of Technology (Korea, Republic of) . . . . . [9217-18]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Heterogeneous iris image hallucination using sparse representation on a learned heterogeneous patch dictionary, Yung-Hui Li, National Central Univ. (Taiwan); Dai-Yan Ji, Advanced Analog Technology, Inc. (Taiwan); Bo-Ren Zheng, Feng Chia Univ. (Taiwan); Chung-Hao Tien, National Chiao Tung Univ. (Taiwan) . . . . . [9217-55]

Biometric analysis of palm-dorsal vein distribution using different techniques of feature extraction, Raúl Castro-Ortega, Carina Toxqui-Quitl, Univ. Politécnica de Tulancingo (Mexico); José F. Solís-Villarreal, Univ. Autónoma del Estado de México (Mexico); Alfonso Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico) . . . . . [9217-67]

Camera self-calibration's application in light pen visual measurement system, Weimin Li, Yan Li, Yu Zhao, Univ. of Science and Technology of China (China) . . . . . [9217-68]

A SVM training samples reduction strategy, Weimin Li, Yu-Wei Wang, Univ. of Science and Technology of China (China); Lichun Zhu, National Astronomical Observatories (China); Yu Zhao, Univ. of Science and Technology of China (China) . . . . . [9217-69]

Early decision of TU split in HEVC using DC energy proportions, Jonghyun Ma, Yongjo Ahn, Donggyu Sim, Kwangwoon Univ. (Korea, Republic of) . . . . . [9217-70]

Principles of image processing in machine vision systems for the color analysis of minerals, Daria B. Petukhova, Elena V. Gorbunova, Aleksandr N. Chertov, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9217-71]

The empirical mode decomposition algorithm via fast fourier transform, Oleg O. Myakinin, Valery P. Zakharov, Ivan A. Bratchenko, Dmitry V. Kornilin, Dmitry N. Artemyev, Samara State Aerospace Univ. (Russian Federation); Alexander G. Khramov, Samara State Aerospace Univ. (Russian Federation) and Image Processing Systems Institute (Russian Federation) . . . . . [9217-72]

Segmentation of astronomical images, Jan Švihlík, Institute of Chemical Technology (Czech Republic); Karel Fliegel, Stanislav Vitek, Petr Pata, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9217-73]

Real time soft-partition-based weighted sum filtering with GPU acceleration, Shuqun Zhang, Bryan Furia, College of Staten Island (USA) . . . . . [9217-74]

An object boundary detection system based on a 3D stereo monitor, Shuqun Zhang, Bryan Furia, College of Staten Island (USA) . . . . . [9217-75]

A super-resolution algorithm based on adaptive weighted total variation, Xun-Jie Zhao, Chengjin Li, Soochow Univ. (China); Xuesong Zhang, Science and Technology on Electro-optical Security Lab. (China) . . . . . [9217-76]

Machine vision based on the concept of contrast sensitivity of the human eye, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vitali Bezzubik, Nikolai Belashenkov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9217-77]

Image reconstruction in speckle interferometry, Yuanyuan Ding, Shanghai Astronomical Observatory (China). . . . . [9217-78]

Segmentation accuracy evaluation for high resolution imagery and 3D laser point cloud data, Nina Ni, Ninghua Chen, Zhejiang Univ. (China); Jianyu Chen, Haiqing Huang, The Second Institute of Oceanography, SOA (China) . . . . [9217-79]

MODIS images super-resolution algorithm via sparse representation, Yue Pang, Lingjia Gu, Ruizhi Ren, Jian Sun, Jilin Univ. (China) . . . . . [9217-80]

A study on an automatic Ronchi test system, Chun-Li Chang, Instrument Technology Research Ctr. (Taiwan) . . . . . [9217-81]

Relay-and-antenna selection and digital transceiver design for two-way AF-MIMO multiple-relay systems, Chia-Chang Hu, Leo Su, National Chung Cheng Univ. (Taiwan) . . . . . [9217-82]

Application of subsidence monitoring over Yangtze river marshland with ground-based SAR system IBIS, Zhiwei Qiu, Hohai Univ. (China). . . . . [9217-83]

Objective evaluation of naturalness, contrast, and colorfulness of tone-mapped images, Lukáš Krasula, Karel Fliegel, Czech Technical Univ. in Prague (Czech Republic); Patrick Le Callet, Univ. de Nantes (France); Miloš Klima, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9217-85]

TUESDAY 19 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 16B . . .TUE 8:40 AM TO 11:50 AM

System Issues

Session Chairs: **Gary J. Sullivan,** Microsoft Corp. (USA); **Ofer Hadar,** Ben-Gurion Univ. of the Negev (Israel)

8:40 am: **Analysis of prediction algorithms for residual compression in a lossy to lossless scalable video coding system based on HEVC**, Andreas Heindel, Eugen Wige, André Kaup, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9217-19]

9:00 am: **A linearly constrained signal subspace projection for target detection in hyperspectral images**, Lena Chang, Ching-Min Cheng, Zay-Shing Tang, National Taiwan Ocean Univ. (Taiwan) . . . . . [9217-20]

9:20 am: **Method of automatic color rendering settings for machine vision systems**, Denis D. Shitov, Aleksandr N. Chertov, Elena V. Gorbunova, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9217-21]

9:40 am: **Energy minimization of mobile video devices with a hardware H.264/AVC encoder based on energy-rate-distortion opmization**, Donghun Kang, Jungeon Lee, Chul-Hee Lee, Chong-Min Kyung, KAIST (Korea, Republic of) . . . . . [9217-22]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

10:30 am: **Comparative assessment of H.265/MPEG-HEVC, VP9, and H.264/MPEG-AVC encoders for low-delay video applications**, Dan Grois, Detlev Marpe, Tung Nguyen, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); Ofer Hadar, Ben-Gurion Univ. of the Negev (Israel) . . . [9217-84]

10:50 am: **Joint-layer encoder optimization for HEVC scalable extensions**, Chia-Ming Tsai, Yuwen He, Yan Ye, Jie Dong, Xiaoyu Xiu, Yong He, InterDigital, Inc. (USA) . . . . . [9217-24]

11:10 am: **Source coding for transmission of reconstructed dynamic geometry: a rate-distortion-complexity analysis of different approaches**, Rufael N. Mekuria, Pablo Cesar, Ctr. voor Wiskunde en Informatica (Netherlands); Dick Bulterman, FX Palo Alto Lab. (USA) and Vrije Univ. Amsterdam (Netherlands) . . . . . [9217-25]

11:30 am: **Research on test of product based on spatial sampling criteria and variable step sampling mechanism**, Han Yueping, Li Ruihong, North Univ. of China (China) . . . . . [9217-26]

Lunch/Exhibition Break . . . . . Tue 11:50 am to 1:30 pm

LOCATION: CONV. CTR. ROOM 16A . TUE 1:30 PM TO 2:30 PM

Signal, Image, and Data Processing Plenary Session

Session Chair: **Khan M. Iftekharuddin**, Old Dominion Univ. (USA)

Welcome and Introductions: 1:30 to 1:35 pm

1:35 pm: **Data-adaptive Filtering and the State of the Art in Image Processing** *(Plenary)*, Peyman Milanfar, Univ. of California, Santa Cruz (USA) . . . . . [9216-300]

SESSION 4

LOCATION: CONV. CTR. ROOM 16B . . . TUE 2:40 PM TO 5:50 PM

Quality and Assessment

Session Chair: **Peter Schelkens,** Vrije Univ. Brussel (Belgium)

2:40 pm: **Comparison of compression efficiency between HEVC/H.265 and VP9 based on subjective assessments**, Martin Rerabek, Hiromi Nemoto, Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9217-27]

3:00 pm: **Statistical feature selection for enhanced detection of brain tumor**, Ahmad Chaddad, Rivka R. Colen M.D., The Univ. of Texas M.D. Anderson Cancer Ctr. (USA). . . . . [9217-28]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

3:50 pm: **Robust features encoded limited physiological information for face recognition**, Dakshina R. Kisku, Asansol Engineering College (India); Phalguni Gupta, Indian Institute of Technology Kanpur (India); Jamuna Kanta Sing, Jadavpur Univ. (India) . . . . . [9217-29]

4:10 pm: **3D live meshes of natural objects and scenes**, Lazar M. Bivolarski, ALBENA Technologies (USA) . . . . . [9217-30]

4:30 pm: **The distribution for foggy drop size based on image analyzing**, Xianqiao Chen, Wei Liu, XiuMin Chu, Chengmin Zou, Wuhan Univ. of Technology (China) . . . . . [9217-31]

4:50 pm: **Efficient object recognition algorithms for telescopes**, Zhendong Chen, Congcong Zhang, Shanghai Astronomical Observatory (China) . . . [9217-32]

5:10 pm: **Facial recognition using composite correlation filters designed by multiobjective combinatorial optimization**, Andres J. Cuevas-Romano, Victor H. Diaz-Ramirez, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico); Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Leonardo Trujillo Reyes, Instituto Tecnologico de Tijuana (Mexico). . . . . [9217-33]

5:30 pm: **Multispectral palmprint recognition by Kernel associative memory-based computational model and finite ridgelet transform**, Dakshina R. Kisku, Asansol Engineering College (India); Phalguni Gupta, Indian Institute of Technology Kanpur (India); Jamuna Kanta Sing, Jadavpur Univ. (India) . . . . . [9217-34]

CONFERENCE 9217

LOCATION: CONV. CTR. ROOM 16B

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 16B . WED 8:00 AM TO 10:20 AM

Reconstruction and Tracking

Session Chair: **Touradj Ebrahimi,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

8:00 am: **Reconstruction of compressive multispectral sensing data using a multi-layered conditional random field approach**, Farnoud Kazemzadeh, Mohammad J. Shafiee, Alexander Wong, David A. Clausi, Univ. of Waterloo (Canada) . . . . . [9217-35]

8:20 am: **Correction of defective pixels for medical and space imagers based on Ising theory**, Eliahu Cohen, Tel Aviv Univ. (Israel); Moriel Shnitser, Tsvika Avraham, Ofer Hadar, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9217-36]

8:40 am: **Estimation of grain size in asphalt samples using digital image analysis**, Hanna Källén, Anders Heyden, Lund Univ. (Sweden); Per Lindh, PEAB AB (Sweden) . . . . . [9217-37]

9:00 am: **Interactive alignment and image reconstruction for wafer-level multi-aperture camera systems**, Alexander Oberdörster, Andreas Brückner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Hendrik P. A. Lensch, Eberhard Karls Univ. Tübingen (Germany) . . . . . [9217-38]

9:20 am: **Automatic inspection of solar wafer by NIR imaging with backlight illumination strategy**, Mohd Z. Abdullah, Zeinab Mahdavipour, Univ. Sains Malaysia (Malaysia) . . . . . [9217-39]

9:40 am: **Target tracking using interest point detection and correlation filtering**, Leopoldo Gaxiola, Víctor H. Diaz-Ramirez, Juan J. Tapia, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico). . . . . [9217-40]

10:00 am: **An algorithm for the characterization of digital images of pigmented lesions of human skin**, Laura Y. Mera-González, José A. Delgado Atencio, Juan Carlos Valdiviezo-Navarro, Margarita Cunill-Rodriguez, Univ. Politécnica de Tulancingo (Mexico) . . . . . [9217-41]

Coffee Break . . . . . .Wed 10:20 am to 10:50 am

SESSION 6

LOCATION: CONV. CTR. ROOM 16B . WED 10:50 AM TO 11:50 AM

Architecture Issues I

Session Chair: **Thomas Richter,** Univ. Stuttgart (Germany)

10:50 am: **On the integer coding profile of JPEG XT**, Thomas Richter, Univ. Stuttgart (Germany). . . . . [9217-42]

11:10 am: **Nonlinear multi-scale complex wavelet diffusion based speckle reduction approach for 3D ultrasound images**, Muhammad S. Uddin, Murat Tahtali, Andrew J. Lambert, Mark R. Pickering, UNSW@ADFA (Australia); Margaret Marchese, Iain Stuart M.D., National Capital Diagnostic Imaging (Australia)[9217-43]

11:30 am: **To develop a geometric matching method for precision mold alignment machine**, Chun-Jen Chen, National Formosa Univ. (Taiwan); Chun-Li Chang, Instrument Technology Research Ctr. (Taiwan); Wen-Yuh Jywe, National Formosa Univ. (Taiwan). . . . . [9217-44]

Lunch/Exhibition Break . . . . . .Wed 11:50 am to 1:00 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 16B . . . WED 1:00 PM TO 3:20 PM

Architecture Issues II

Session Chair: **Thomas Richter,** Univ. Stuttgart (Germany)

1:00 pm: **3D meshes compression performance benchmarking**, Lazar M. Bivolarski, ALBENA Technologies (USA); Christian Tulvan, France Telecom (France) . . . . . [9217-45]

1:20 pm: **Thermographic image analysis as a pre-screening tool for the detection of canine bone cancer**, Samrat Subedi, Scott E. Umbaugh, Jiyuan Fu, Southern Illinois Univ. Edwardsville (USA); Dominic J. Marino, Catherine A. Loughin, Long Island Veterinary Specialists (USA) . . . . . [9217-46]

1:40 pm: **Estimation and measurement of space variant features of imaging systems and analysis of their influence on accuracy in astronomical imaging**, Elena Anisimova, Jan Bednar, Martin Blazek, Petr Janout, Karel Fliegel, Petr Pata, Stanislav Vitek, Czech Technical Univ. in Prague (Czech Republic); Jan Švihlík, Institute of Chemical Technology (Czech Republic) . . . . . [9217-47]

2:00 pm: **Polar format statistical image processing based fiber optic pressure sensors**, Muhammed Burak Alver, Kemal Fidanboylu, Onur Toker, Fatih Univ. (Turkey) . . . . . [9217-48]

2:20 pm: **Vehicle detection and tracking in roadway traffic analysis using Kalman filter and features**, Ahad Karimi Moridani, Seyyede Hoora Fakhrmoosavy, Pante'a Alipour, Islamic Azad Univ. (Iran, Islamic Republic of). . . . . [9217-49]

2:40 pm: **Quick-shift framework for color image segmentation based on invariant representation**, Abdelhameed F. Ibrahim, Mansoura Univ. (Egypt) . . . . . [9217-50]

3:00 pm: **A visible light imaging device for cardiac rate detection with reduced effect of body movement**, Xiaotian Jiang, Ming Liu, Yuejin Zhao, Liquan Dong, Hong Wu, Mei Hui, Xiaohua Liu, Lingqin Kong, Huishi Zhu, Xiaoli Jin, Beijing Institute of Technology (China) . . . . . [9217-64]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 16B . . . WED 3:50 PM TO 5:10 PM

Recognition and Visualization I

Session Chairs: **Vasudev Bhaskaran,** Qualcomm Inc. (USA); **Yuriy A. Reznik,** InterDigital, Inc. (USA)

3:50 pm: **Iris detection on mobile devices**, Magdi Mohammed, Qualcomm Inc. (USA) . . . . . [9217-51]

4:10 pm: **Learning to predict where human gaze is using quaternion transform**, Ting Li, Shanghai Jiao Tong Univ. (China). . . . . [9217-52]

4:30 pm: **Visualization of photo album on mobile devices**, Changhwan Chun, Hyundai Motor Co. (Korea, Republic of) . . . . . [9217-53]

4:50 pm: **Face recognition using the most representative sift images**, Issam J. Dagher, Nour ElSallak, Hani Hazim, Univ. of Balamand (Lebanon) . . . . . [9217-54]

THURSDAY 21 AUGUST

SESSION 9

LOCATION: CONV. CTR. ROOM 16B . THU 9:00 AM TO 10:00 AM

Recognition and Visualization II

Session Chairs: **Vasudev Bhaskaran,** Qualcomm Inc. (USA); **Yuriy A. Reznik,** InterDigital, Inc. (USA)

9:00 am: **Multiple objects tracking with HOGs matching in circular windows**, Daniel Miramontes-Jaramillo, Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Víctor H. Diaz-Ramirez, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico) . . . . . [9217-57]

9:20 am: **Markov random fields for static foreground classification in surveillance systems**, Jack Fitzsimons, Trinity College (Ireland); Thomas T. Lu, Jet Propulsion Lab. (USA) . . . . . [9217-59]

9:40 am: **Single image dehazing using local adaptive signal processing**, Jesus A. Valderrama, Victor H. Diaz-Ramirez, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico); Vitaly Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) . . . . . [9217-60]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 10

LOCATION: CONV. CTR. ROOM 16B . .THU 10:30 AM TO 12:10 PM

Processing Issues

Session Chairs: **Andrew G. Tescher,** AGT Associates (USA); **Andre J. Oosterlinck,** Kuleuven R & D (Belgium)

10:30 am: **Adaptive live IP multicast of SVC with unequal FEC**, Amir Lasri, Avi Lev, Ben Guirion Univeristy (Israel); Maoz Loants, Ofer Hadar, Ben-Gurion Univ. of the Negev (Israel). . . . . [9217-61]

10:50 am: **Real-time SHVC software decoding with multi-threaded parallel processing**, Yuwen He, InterDigital, Inc. (USA); Srinivas Gudumasu, Aricent, Inc. (India); Yan Ye, Yong He, Eun-Seok Ryu, Jie Dong, Xiaoyu Xiu, InterDigital, Inc. (USA) . . . . . [9217-62]

11:10 am: **Entropy-based optimal ROI determination for multichannel blind deconvolution**, Mohd Z. Abdullah, Ahmad H. Shapri, Univ. Sains Malaysia (Malaysia). . . . . [9217-63]

11:30 am: **Information embedding to a real object by projecting a checkered-pattern carrier-screen image**, Rui Shogenji, Shizuoka Univ. (Japan) . . . [9217-65]

11:50 am: **Adaptive image coding based on cubic-spline interpolation**, JianXing Jiang, Shaohua Hong, Xiamen Univ. (China); Tsung-Ching Lin, I-Shou Univ. (Taiwan); Lin Wang, Xiamen Univ. (China); Trieu-Kien Truong, I-Shou Univ. (Taiwan) . . . . . [9217-66]

CONFERENCE 9218

LOCATION: CONV. CTR. ROOM 32B

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9218

Earth Observing Systems XIX

Conference Chairs: **James J. Butler,** NASA Goddard Space Flight Ctr. (USA); **Xiaoxiong (Jack) Xiong,** NASA Goddard Space Flight Ctr. (USA); **Xingfa Gu,** Institute of Remote Sensing Applications (China)

Program Committee: **Philip E. Ardanuy,** Raytheon Intelligence & Information Systems (USA); **Robert A. Barnes,** NASA Goddard Space Flight Ctr. (USA); **Hal J. Bloom,** Science & Technology Corp. (USA); **Jeffrey S. Czapla-Myers,** College of Optical Sciences, The Univ. of Arizona (USA); **Armin Doerry,** Sandia National Labs. (USA); **Christopher N. Durell,** Labsphere, Inc. (USA); **Mitchell D. Goldberg,** National Environmental Satellite, Data, and Information Service (USA); **Joel McCorkel,** NASA Goddard Space Flight Ctr. (USA); **Thomas S. Pagano,** Jet Propulsion Lab. (USA); **Jeffery J. Puschell,** Raytheon Space & Airborne Systems (USA); **Carl F. Schueler,** Schueler Consulting, Santa Barbara (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 32B . . MON 8:10 AM TO 10:10 AM

Soumi NPP I

Session Chair: **Jeffery J. Puschell,** Raytheon Space & Airborne Systems (USA)

8:10 am: **Assessment of the clouds and the Earth's radiant energy system (CERES) flight model 5 (FM5) instrument's performance and stability**, Nathaniel P. Smith, Susan Thomas, Phillip C. Hess, Mohan Shankar, Robert S. Wilson, Dale R. Walikainen, Science Systems and Applications, Inc. (USA); Kory J. Priestley, NASA Langley Research Ctr. (USA) . . . . . [9218-1]

8:30 am: **Determine SNPP VIIRS SDSM screen transmittance from both yaw and non-yaw maneuver data**, Ning Lei, Xuexia Chen, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-2]

8:50 am: **S-NPP VIIRS lunar observations**, Jon Fulbright, Zhipeng Wang, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-3]

9:10 am: **Progress in the on-orbit calibration of SNPP VIIRS for ocean data processing**, Robert E. Eplee Jr., Kevin R. Turpie, Garhard Meister, Frederick S. Patt, Bryan A. Franz, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-4]

9:30 am: **Operational in-flight calibration of NPP VIIRS in the visible using Rayleigh scattering**, Robert J. Frouin, Univ. of California, San Diego (USA); Alain Sei, Bruce Hauss, Patty D. Pratt, Justin Ip, Northrop Grumman Aerospace Systems (USA) . . . . . [9218-76]

9:50 am: **On-orbit calibration methodologies for S-NPP VIIRS day night bands**, Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); ShihYan Lee, Zhipeng Wang, Aisheng Wu, Xuexia Chen, Ning Lei, Jon Fulbright, Sigma Space Corp. (USA) . . . . . [9218-5]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 32B .MON 10:40 AM TO 12:20 PM

Soumi NPP II

Session Chair: **Hal J. Bloom,** Science & Technology Corp. (USA)

10:40 am: **SNPP VIIRS day-night band on-orbit radiometric calibration**, ShihYan Lee, Chengbo Sun, Kwofu V. Chiang, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-6]

11:00 am: **VIIRS Day-Night Band (DNB) calibration methods for improved uniformity**, Stephen Mills, Renaissance Man Engineering (USA); Steven D. Miller, Colorado State Univ. (USA) . . . . . [9218-7]

11:20 am: **Assessment of on-orbit crosstalk impact for SNPP VIIRS VisNIR bands**, ShihYan Lee, Hassan Oudrari, Jeffrey McIntire, Sigma Space Corp. (USA); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-8]

11:40 am: **Trending of SNPP ephemeris and its implications on VIIRS geometric performance**, Guoqing Lin, NASA Goddard Space Flight Ctr. (USA); Masahiro Nishihama, Sigma Space Corp. (USA); Robert E. Wolfe, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-9]

12:00 pm: **The ground track oblique Cassini projection used for producing VIIRS mapped imagery**, Stephen Mills, Renaissance Man Engineering (USA) and Stellar Solutions Inc. (USA) . . . . . [9218-10]

Lunch Break . . . . . Mon 12:20 pm to 1:50 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 32B . . . MON 1:50 PM TO 3:30 PM

Instrument Cross-Comparisons and Vicarious Calibration I

Session Chair: **Mitchell D. Goldberg,** National Environmental Satellite, Data, and Information Service (USA)

1:50 pm: **Comparison of AIRS, IASI, and CrIS radiances and trends at Dome C**, Denis A. Elliott, Hartmut H. Aumann, Jet Propulsion Lab. (USA) . . . . . [9218-11]

2:10 pm: **AIRS Level-1C and applications to cross-calibration with MODIS and CrIS**, Evan M. Manning, Hartmut H. Aumann, Steven E. Broberg, Jet Propulsion Lab. (USA) . . . . . [9218-12]

2:30 pm: **Evaluation of the AIRS and CrIS relative radiometric calibration under cloudy conditions**, Hartmut H. Aumann, Evan M. Manning, Jet Propulsion Lab. (USA) . . . . . [9218-13]

2:50 pm: **Relative spectral response corrected calibration inter-comparison of S-NPP VIIRS and Aqua MODIS thermal emissive bands**, Boryana V. Efremova, Aisheng Wu, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA). . . . . [9218-14]

3:10 pm: **Calibrating historical IR sensors using MODIS, GEO, and AVHRR infrared tropical mean calibration models**, Benjamin R. Scarino, Science Systems and Applications, Inc. (USA); David R. Doelling, Patrick Minnis, NASA Langley Research Ctr. (USA). . . . . [9218-15]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 32B . . MON 4:00 PM TO 5:20 PM

Instrument Cross-Comparisons and Vicarious Calibration II

Session Chair: **Jeffrey S. Czapla-Myers,** College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **Assessment of several Pseudo Invariant Calibration Sites (PICS) for the post launch calibration of optical sensors**, Nischal Mishra, South Dakota State Univ. (USA); Amit Angal, Science Systems and Applications, Inc. (USA); Dennis L. Helder, David Aaron, South Dakota State Univ. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-16]

4:20 pm: **Assessment of VIIRS radiometric performance using vicarious calibration sites**, Sirish Uprety, Colorado State Univ. (USA); Changyong Cao, NOAA National Environmental Satellite, Data, and Information Service (USA); Wenhui Wang, Univ. of Maryland, College Park (USA); Frank Padula, ERT, Inc. (USA); Slawomir Blonski, Xi Shao, Univ. of Maryland, College Park (USA) [9218-17]

4:40 pm: **On-orbit validation methods using the Clouds and Earth's Radiant Energy System (CERES) solar calibration versus deep convective cloud ratios**, Robert S. Wilson, Science Systems and Applications, Inc. (USA); Kory J. Priestley, NASA Langley Research Ctr. (USA); Susan Thomas, Phillip C. Hess, Mohan Shankar, Nathan Smith, Zbigniew P. Szewczyk, Science Systems and Applications, Inc. (USA). . . . . [9218-18]

5:00 pm: **Cross-calibration of Landsat 5 TM, and Landsat 8 OLI with Aqua MODIS using PICS**, Amit Angal, Science Systems and Applications, Inc. (USA); Nischal Mishra, South Dakota State Univ. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Dennis L. Helder, South Dakota State Univ. (USA) . . . . . [9218-19]

CONFERENCE 9218

LOCATION: CONV. CTR. ROOM 32B

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Examining the angular dependency of the SNPP VIIRS Solar Diffuser bidirectional reflectance distribution function degradation factor, Ning Lei, Kwofu V. Chiang, Sigma Space Corp. (USA); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-58]

Lidar monitoring of organic matter in the Pearl River estuary, Peng Chen, Wuhan Univ. (China) and The Second Institute of Oceanography, SOA (China); Haiqing Huang, Jianyu Chen, Zhihua Mao, The Second Institute of Oceanography, SOA (China) . . . . . [9218-59]

Status of time-dependent response versus scan-angle (RVS) for Terra and Aqua MODIS reflective solar bands, Xu Geng, Sigma Space Corp. (USA); Amit Angal, Science Systems and Applications, Inc. (USA); Junqiang Sun, Hongda Chen, Aisheng Wu, Yonghong Li, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-60]

Development of 2D deconvolution method to repair blurred MTSAT-1R visible imagery, Konstantin V. Khlopenkov, Science Systems and Applications, Inc. (USA); David R. Doelling, NASA Langley Research Ctr. (USA); Arata Okuyama, Japan Aerospace Exploration Agency (Japan) . . . . . [9218-61]

Correction method of physical temperature variation for airborne double-antenna microwave radiometer, Jian Sun, Jilin Univ. (China) and Northeast Institute of Geography and Agroecology (China); Kai Zhao, Tao Jiang, Northeast Institute of Geography and Agroecology (China); Lingjia Gu, Jilin Univ. (China) . . . . . [9218-62]

An adaptive GIMS-technology for the remote monitoring of aquatic ecosystems, Ferdenant A. Mkrtchyan, Institute of Radio Engineering and Electronics (Russian Federation) . . . . . [9218-63]

Design of the precise uniform light source based on optically connected integrating spheres for VIIR calibration, Leonid A. Mikheenko, Volodymyr N. Borovytsky, Oleksandr Malenko, National Technical Univ. of Ukraine (Ukraine) . . . . . [9218-64]

CLARREO calibration uncertainty assessment tool: status and path forward, Boryana V. Efremova, Aishteng Wu, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, James J. Butler, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-65]

Post-launch performance evaluation of the OMPS Nadir Mapper and Nadir Profiler, Michael G. Grotenhuis, Xiangqian Wu, National Oceanic and Atmospheric Administration (USA) . . . . . [9218-66]

Using the moon to evaluate the radiometric calibration performance of S-NPP VIIRS thermal emissive bands, Zhipeng Wang, Boryana V. Efremova, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-67]

Comparing Hyperion lunar observation with model in support of GOES-R Advanced Baseline Imager (ABI) calibration, Xi Shao, Univ. of Maryland, College Park (USA); Changyong Cao, NOAA National Environmental Satellite, Data, and Information Service (USA); Sirish Uprety, Colorado State Univ. (USA); Frank Padula, ERT, Inc. (USA) . . . . . [9218-68]

UV-elastic lidar for observations of tropospheric aerosol in the tropical and Andean region of Colombia, Andres Esteban Bedoya Velasquez, Univ. Nacional de Colombia Sede Medellín (Colombia) . . . . . [9218-69]

Estimation of a coaxial tropospheric lidar overlap function from analytical calculations and real measurements, Mauricio Munera Perez, Univ. Nacional de Colombia Sede Medellín (Colombia) . . . . . [9218-70]

Technology demonstrator of radiation resistant photon counting detector, Ivan Prochazka, Josef Blazej, Czech Technical Univ. in Prague (Czech Republic); Jan Kodet, Czech Technical Univ. in Prague (Czech Republic) and Technische Univ. München (Germany) . . . . . [9218-71]

On-orbit MTF estimation of high resolution satellite optical sensor using reflected point sources, Weiwei Xu, Anhui Institute of Optics and Fine Mechanics (China) . . . . . [9218-72]

A temperature calibration method for CDOM fluorescence LIF lidar, Peng Chen, Wuhan Univ. (China) and The Second Institute of Oceanography, SOA (China); Haiqing Huang, Jianyu Chen, Zhihua Mao, The Second Institute of Oceanography, SOA (China) . . . . . [9218-73]

Developing an automated global validation site time series system for VIIRS, Wenhui Wang, ERT, Inc. (USA); Changyong Cao, NOAA National Environmental Satellite, Data, and Information Service (USA); Sirish Uprety, Colorado State Univ. (USA); Yan Bai, Frank Padula, ERT, Inc. (USA); Xi Shao, Univ. of Maryland, College Park (USA) . . . . . [9218-74]

Statistical analysis of the electronic crosstalk correction in Terra MODIS Band 27, Sriharsha Madhavan, Science Systems and Applications, Inc. (USA); Junqiang Sun, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Brian N. Wenny, Aisheng Wu, Sigma Space Corp. (USA). . . . . [9218-75]

TUESDAY 19 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 32B . . TUE 8:30 AM TO 10:10 AM

EOS Terra I

Session Chair: **Thomas S. Pagano,** Jet Propulsion Lab. (USA)

8:30 am: **Terra's role in improving on-orbit calibration approaches**, Kurtis J. Thome, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-20]

8:50 am: **Terra mission operations: launch to the present (and beyond)**, Angelita C. Kelly, Eric M. Moyer, NASA Goddard Space Flight Ctr. (USA). . . . . [9218-21]

9:10 am: **Evaluation of TERRA/ MISR's detector-based calibration from nearly 15 years of flight data**, Carol J. Bruegge, Veljko M. Jovanovic, David J. Diner, Jet Propulsion Lab. (USA); Roger Davis, The Univ. of Auckland (New Zealand); Larry DiGirolamo, Univ. of Illinois at Urbana-Champaign (USA); Ralph Kahn, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-22]

9:30 am: **Status of Terra MODIS operation, calibration, and performance**, Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Brian N. Wenny, Aisheng Wu, Sigma Space Corp. (USA); Amit Angal, Science Systems and Applications, Inc. (USA); Xu Geng, Jennifer L. Dodd, Daniel O. Link, Sigma Space Corp. (USA); William L. Barnes, Univ. of Maryland, Baltimore County (USA); Vince Salomonsan, The Univ. of Utah (USA) . . . . . [9218-23]

9:50 am: **Retrieval algorithm development and product validation for TERRA/ MOPITT**, Merritt Deeter, Sara Martinez-Alonso, Helen M. Worden, Louisa K. Emmons, Vince Dean, Debbie Mao, Gene L. Francis, David P. Edwards, John C. Gille, National Ctr. for Atmospheric Research (USA) . . . . . [9218-24]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 6

LOCATION: CONV. CTR. ROOM 32B . TUE 10:40 AM TO 12:20 PM

EOS Terra II

Session Chair: **Carl F. Schueler,** Schueler Consulting-Santa Barbara (USA)

10:40 am: **On-orbit stability and performance of the Clouds and Earth's Radiant Energy System (CERES) Instruments onboard the Aqua and Terra Spacecraft**, Mohan Shankar, Susan Thomas, Dale R. Walikainen, Science Systems and Applications, Inc. (USA); Kory J. Priestley, NASA Langley Research Ctr. (USA) . . . . . [9218-25]

11:00 am: **Vicarious calibration of Terra/ASTER/VNIR with desert scenes together with cross calibration**, Kohei Arai, Saga Univ. (Japan) . . . . . [9218-26]

11:20 am: **ASTER/TIR vicarious calibration activities in US and Japan validation sites for 14 years**, Hideyuki Tonooka, Ibaraki Univ. (Japan); Simon J. Hook, Jet Propulsion Lab. (USA); Tsuneo Matsunaga, National Institute for Environmental Studies (Japan); Soushi Kato, National Institute of Advanced Industrial Science and Technology (Japan); Elsa Abbott, Howard Tan, Jet Propulsion Lab. (USA) [9218-27]

11:40 am: **Review of Terra MODIS thermal emissive band radiometric performance evaluation**, Chris Moeller, W. Paul Menzel, Univ. of Wisconsin-Madison (USA). . . . . [9218-28]

12:00 pm: **In-flight validation of the mid and thermal infrared products from ASTER and MODIS on the Terra and Aqua platforms using the Lake Tahoe and Salton Sea automated validation sites**, Simon J. Hook, William R. Johnson, Robert G. Radocinski, Gerardo Rivera, Jet Propulsion Lab. (USA) . . . . . [9218-29]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 1:50 pm

SESSION 7

LOCATION: CONV. CTR. ROOM 32B . . . . TUE 1:50 PM TO 3:10 PM

EOS Terra III

Session Chair: **Armin W. Doerry,** Sandia National Labs. (USA)

1:50 pm: **Corrections to MODIS Terra calibration and polarization trending derived from ocean color products**, Gerhard Meister, NASA Goddard Space Flight Ctr. (USA); Robert E. Eplee Jr., SAIC (USA); Bryan A. Franz, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-30]

2:10 pm: **Comparison of coincident MODIS and MISR reflectances over the 15-year period of EOS Terra**, Aisheng Wu, Sigma Space Corp. (USA); Amit Angal, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-31]

2:30 pm: **Cross-calibration of Earth Observing System Terra satellite sensors MODIS and ASTER**, Joel McCorkel, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-32]

2:50 pm: **The absolute radiometric calibration of Terra imaging sensors: MODIS, MISR, and ASTER**, Jeffrey S. Czapla-Myers, The Univ. of Arizona (USA); Kurtis J. Thome, NASA Goddard Space Flight Ctr. (USA); Stuart F. Biggar, Nikolaus J. Anderson, The Univ. of Arizona (USA). . . . . [9218-33]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 32B . . . TUE 3:40 PM TO 5:40 PM

Pre-Launch Calibration

Session Chair: **Christopher N. Durell,** Labsphere, Inc. (USA)

3:40 pm: **Validation of spectral radiance assignments to integrating sphere radiance standards for the Advanced Baseline Imager**, Carol Johnson, Stephen Maxwell, Eric L. Shirley, National Institute of Standards and Technology (USA); Kim Slack, Gary D. Graham, Exelis Inc. (USA) . . . . . [9218-34]

4:00 pm: **Improved thermal-vacuum compatible flat plate radiometric source for system-level testing of optical sensors**, Mark A. Schwarz, Craig J. Kent, Stellar Solutions Inc. (USA); Steven W. Brown, National Institute of Standards and Technology (USA) . . . . . [9218-35]

4:20 pm: **Diffuser properties and according performance in BSDF and spectral features in space application**, Bilgehan Gür, Hedser van Brug, Man Xu, Elizabeth Vela, TNO Science and Industry (Netherlands) . . . . . [9218-36]

4:40 pm: **BRDF characterization of solar diffuser for JPSS J1 using PASCAL**, Vijay Murgai, Lindsay H. Johnson, John M. Nixt, Eric M. Moskun, Raytheon Space & Airborne Systems (USA). . . . . [9218-37]

5:00 pm: **JPSS solar diffuser stability monitor response to sun angle of incidence**, Vijay Murgai, Kristie Yu, Eugene D. Kim, Neil R. Nelson, Raytheon Space & Airborne Systems (USA); James K. McCarthy, Stellar Solutions Inc. (USA) . . . . . [9218-38]

5:20 pm: **Development of low optical cross talk filters for VIIRS for JPSS**, Vijay Murgai, Derek Hendry, Raytheon Space & Airborne Systems (USA); Kevin R. Downing, Materion Barr Precision Optics & Thin Film Coatings (USA); Dave Carbone, Materion Corp. (USA); John R. Potter, Materion Barr Precision Optics & Thin Film Coatings (USA) . . . . . [9218-39]

WEDNESDAY 20 AUGUST

SESSION 9

LOCATION: CONV. CTR. ROOM 32B . .WED 8:30 AM TO 10:10 AM

Landsat 8 I

Session Chair: **Joel McCorkel,** NASA Goddard Space Flight Ctr. (USA)

8:30 am: **Landsat-8 Operational Land Imager on-orbit radiometric calibration and stability**, Brian L. Markham, Julia A. Barsi, Edward Kaita, Lawrence Ong, NASA Goddard Space Flight Ctr. (USA); Md. Obaidul Haque, SAIC (USA) and SGT, Inc. (USA); Nischal Mishra, South Dakota State Univ. (USA) . . . . . [9218-40]

8:50 am: **On-orbit performance of the Landsat 8 Operational Land Imager**, Esad Micijevic, U.S. Geological Survey (USA) and SGT, Inc. (USA); Kelly J. Vanderwerff, SGT, Inc. (USA); Pat L. Scaramuzza, U.S. Geological Survey (USA) and SGT, Inc. (USA); Julia A. Barsi, Raviv Levy, NASA Goddard Space Flight Ctr. (USA) and Science Systems and Applications, Inc. (USA) . . . . . [9218-41]

9:10 am: **Performance of the thermal infrared sensor onboard Landsat 8 over the first year on-orbit**, Matthew Montanaro, Sigma Space Corp. (USA); Brian L. Markham, NASA Goddard Space Flight Ctr. (USA); Allen W. Lunsford, The Catholic Univ. of America (USA); Kelly J. Vanderwerff, SGT, Inc. (USA); Julia A. Barsi, Science Systems and Applications, Inc. (USA). . . . . [9218-42]

9:30 am: **Landsat 8 Operational Land Imager (OLI) detector to detector uniformity challenge and performance**, Raviv Levy, NASA Goddard Space Flight Ctr. (USA); Frank J. Pesta, South Dakota State Univ. (USA); Julia A. Barsi, NASA Goddard Space Flight Ctr. (USA) and Science Systems and Applications, Inc. (USA); Brian L. Markham, Philip W. Dabney, NASA Goddard Space Flight Ctr. (USA); Pat L. Scaramuzza, U.S. Geological Survey (USA) and SGT, Inc. (USA) . . . . . [9218-43]

9:50 am: **The absolute radiometric calibration of the Landsat 8 Operational Land Imager using the reflectance-based approach and the Radiometric Calibration Test Site (RadCaTS)**, Jeffrey S. Czapla-Myers, Nikolaus J. Anderson, College of Optical Sciences, The Univ. of Arizona (USA); Kurtis J. Thome, NASA Goddard Space Flight Ctr. (USA); Stuart F. Biggar, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9218-44]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 10

LOCATION: CONV. CTR. ROOM 32B .WED 10:40 AM TO 11:40 AM

Landsat 8 II

Session Chair: **Xiaoxiong Xiong,** NASA Goddard Space Flight Ctr. (USA)

10:40 am: **Chasing the TIRS ghosts: calibrating the Landsat 8 thermal bands**, John R. Schott, Nina G. Raqueno, Rochester Institute of Technology (USA); Matthew Montanaro, Sigma Space Corp. (USA); Emmett J. Ientilucci, Aaron D. Gerace, Rochester Institute of Technology (USA); Allen W. Lunsford, NASA Goddard Space Flight Ctr. (USA) and The Catholic Univ. of America (USA)[9218-45]

11:00 am: **Landsat-8 data processing evolution**, Ron A. Morfitt, U.S. Geological Survey (USA); Michael J. Choate, U.S. Geological Survey (USA) and SGT, Inc. (USA) . . . . . [9218-46]

11:20 am: **European Space Agency (ESA) Landstat MSS/TM/ETM+ archive bulk-processing: processor improvements and data quality**, Ferran Gascon, Roberto Biasutti, European Space Agency (Italy); Riccardo Ferrara, Advanced Computer Systems S.p.A. (Italy); Peggy Fischer, European Space Agency (Italy); Luca Galli, Advanced Computer Systems S.p.A. (Italy); Bianca Hoersch, European Space Agency (Italy); Stacey Hopkins, Jan Jackson, ARGANS Ltd. (United Kingdom); Samantha Lavender, Telespazio VEGA UK Ltd. (United Kingdom); Stefano Mica, Advanced Computer Systems S.p.A. (Italy); Amy Northrop, Telespazio VEGA UK Ltd. (United Kingdom); Alessandra Paciucci, Serco (Italy); Frédéric Paul, Ifremer (France); Sabrina Pinori, Serco (Italy); Sébastien Saunier, Magellium (France) . . . . . [9218-47]

Lunch/Exhibtion Break . . . . . .Wed 11:40 am to 1:10 pm

CONFERENCE 9218

LOCATION: CONV. CTR. ROOM 32B

SESSION 11

LOCATION: CONV. CTR. ROOM 32B . . . . WED 1:10 PM TO 3:10 PM

New Missions and Instruments

Session Chair: **Philip E. Ardanuy,** Raytheon Intelligence & Information Systems (USA)

1:10 pm: **EUMETSAT programmes and plans**, K. Dieter Klaes, EUMETSAT (Germany) . . . . . [9218-48]

1:30 pm: **Copernicus Sentinel-2 Mission: products, algorithms, and CAL/VAL**, Ferran Gascon, European Space Agency (Italy) . . . . . [9218-49]

1:50 pm: **The CarbonSat candidate mission: imaging greenhouse gas concentrations from space**, Bernd Sierk, Armin Loescher, Yasjka Meijer, Jerôme C. Caron, Jean-Loup Bézy, European Space Agency (Netherlands) . . . . . [9218-50]

2:10 pm: **Design validation for Icesat2 space-based laser transmitter**, Patrick M. Burns, Nicholas W. Sawruk, Ryan E. Edwards, William J. Rudd, Elias Fakhoury, Theodore Wysocki Sr., Floyd E. Hovis, Fibertek, Inc. (USA) . . . . . [9218-51]

2:30 pm: **The GeoTASO airborne spectrometer project**, James W. Leitch, Thomas Delker, William S. Good, Lyle Ruppert, Ball Aerospace & Technologies Corp. (USA); Kelly Chance, Xiong Liu, Caroline R. Nowlan, Harvard-Smithsonian Ctr. for Astrophysics (USA); Scott J. Janz, Nickolay A. Krotkov, Kenneth Pickering, NASA Goddard Space Flight Ctr. (USA); Matthew G. Kowalewski, Goddard Earth Sciences and Technology Ctr. (USA); Jun Wang, Univ. of Nebraska-Lincoln (USA) . . . . . [9218-52]

2:50 pm: **Remote sensing capabilities of the GeoCAPE Airborne Simulator**, Matthew G. Kowalewski, Goddard Earth Sciences and Technology Ctr. (USA); Scott J. Janz, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-53]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 12

LOCATION: CONV. CTR. ROOM 32B . . WED 3:40 PM TO 5:00 PM

MODIS On-Orbit Performance

Session Chair: **James J. Butler,** NASA Goddard Space Flight Ctr. (USA)

3:40 pm: **Monitoring the Terra and Aqua MODIS RSB calibration using the scattered light from the nadir-port**, Amit Angal, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Xu Geng, Junqiang Sun, Sigma Space Corp. (USA) . . . . . [9218-54]

4:00 pm: **Progress on alternative method of on-orbit Response versus Scan Angle (RVS) characterization for MODIS reflective solar bands**, Hongda Chen, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA); Amit Angal, Science Systems and Applications, Inc. (USA); Xu Geng, Aisheng Wu, Sigma Space Corp. (USA) . . . . . [9218-55]

4:20 pm: **Evaluation of Terra and Aqua MODIS thermal emissive band response versus scan angle**, Brian N. Wenny, Aisheng Wu, Sigma Space Corp. (USA); Sriharsha Madhavan, Science Systems and Applications, Inc. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-56]

4:40 pm: **MODIS band-to-band image misalignment for on-board objects and its impact to calibration**, Zhipeng Wang, Sigma Space Corp. (USA); Xiaoxiong J. Xiong, NASA Goddard Space Flight Ctr. (USA) . . . . . [9218-57]

CONFERENCE 9219

LOCATION: CONV. CTR. ROOM 31C

Monday 18 August 2014 • Proceedings of SPIE Vol. 9219

Infrared Remote Sensing and Instrumentation XXII

Conference Chairs: **Marija Strojnik Scholl Scholl,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Gonzalo Páez,** Ctr. de Investigaciones en Óptica, A.C. (Mexico)

Program Committee: **Gabriele E. Arnold,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Gail J. Brown,** Air Force Research Lab. (USA); **Jam Farhoomand,** TechnoScience Corp. (USA); **Gerald T. Fraser,** National Institute of Standards and Technology (USA); **John C. Gille,** Univ. of Colorado at Boulder (USA); **Sarath D. Gunapala,** Jet Propulsion Lab. (USA); **Neil R. Malone,** Raytheon Co. (USA); **Stanley J. Wellard,** Space Dynamics Lab. (USA); **Jürgen Wolf,** NASA Ames Research Ctr. (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 31C . MON 8:10 AM TO 10:00 AM

Infrared Instruments I

Session Chairs: **Marija Strojnik Scholl,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Gonzalo Páez,** Ctr. de Investigaciones en Óptica, A.C. (Mexico)

8:10 am: **The GOSAT / TANSO interferometer after five years on orbit** *(Invited Paper)*, Louis M. Moreau, James Veilleux, ABB Analytical Measurement (Canada) . . . . . [9219-1]

8:40 am: **Space-based carbon monitoring by GOSAT and GOSAT-2: instrumentation and level-1 processing**, Hiroshi Suto, Akihiko Kuze, Kei Shiomi, Masakatsu Nakajima, Japan Aerospace Exploration Agency (Japan) . . . . . [9219-2]

9:00 am: **Onboard infrared signal processing system for asteroid sample return mission HAYABUSA2**, Hiroki Hihara, NEC TOSHIBA Space Systems, Ltd. (Japan); Hisashi Otake, Tatsuaki Okada, Japan Aerospace Exploration Agency (Japan); Ryu Funase, The Univ. of Tokyo (Japan); Junpei Sano, Kaori Iwase, Satoko Kawakami, NEC TOSHIBA Space Systems, Ltd. (Japan); Jun Takada, Tetsuya Masuda, NEC Corp. (Japan). . . . . [9219-3]

9:20 am: **MERTIS: optical performance of the thermal infrared push-broom imaging spectrometer**, Martin Bauer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany). . . . . [9219-4]

9:40 am: **Advancements in SiPIN hybrid focal plane technology**, Sean P. Kilcoyne, Neil R. Malone, Raytheon Co. (USA) . . . . . [9219-26]

Coffee Break . . . . . Mon 10:00 am to 10:50 am

SESSION 2

LOCATION: CONV. CTR. ROOM 31C . MON 10:50 AM TO 11:50 AM

Infrared Instruments II

Session Chairs: **Gonzalo Páez,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Douglas R. Battles,** HE Space Operations GmbH (Germany)

10:50 am: **2 km integrated path measurements of CO_2, CH_4, H_2O, and HDO with a dual-comb spectrometer**, Ian Coddington, National Institute of Standards and Technology (USA); Greg B. Rieker, Univ. of Colorado at Boulder (USA); Fabrizio R. Giorgetta, Willaim C. Swann, National Institute of Standards and Technology (USA); Laura C. Sinclair, Chris Comer, National Institute of Science and Technology (USA); Esther Baumann, Nathan R. Newbury, National Institute of Standards and Technology (USA) . . . . . [9219-5]

11:10 am: **AeroADL: applying the integration of the Suomi-NPP science algorithms with the Algorithm Development Library to the calibration and validation task**, Scott Houchin, The Aerospace Corp. (USA) . . . . . [9219-7]

11:30 am: **Excellent approach to modeling urban expansion by fuzzy cellular automata: agent-base model**, Abdulrazak A. Mohammed, Yousef Khajavigodellou, Salahaddin Univ.-Hawler (Iraq) . . . . . [9219-8]

Lunch Break . . . . . Mon 11:50 am to 2:00 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 31C . . . MON 2:00 PM TO 3:10 PM

Technology for Infrared Instruments

Session Chairs: **Marija Strojnik Scholl,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Martin Bauer,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

2:00 pm: **Advanced simulation methods to detect resonant frequency stack up in focal plane design** *(Invited Paper)*, Craig Adams, Neil R. Malone, Raymond Torres, Armando Fajardo, John L. Vampola, William Drechsler, Russell Parlato, Christopher Cobb, Max Randolph, Surath Chiourn, Robert Swinehart, Raytheon Co. (USA) . . . . . [9219-9]

2:30 pm: **Cryogenic filter wheel design for an infrared instrument**, Joaquin Azcue, Carlos Villanueva, Antonio Sanchez, Cristina Polo, Manuel Reina, Angel Carretero, Josefina Torres, Gonzalo Ramos, Luis Miguel Gonzalez, Maria Dolores Sabau, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Francisco Najarro, Ctr. de Astrobiología (Spain); Jesus Martin-Pintado, INTA Instituto Nacional de Técnica Aeroespacial (Spain) . . . . . [9219-11]

2:50 pm: **Preliminary study of the Suomi NPP VIIRS detector level spectral response function effects for the long-wave infrared bands M15 and M16**, Francis P. Padula, GeoThinkTank LLC (USA); Changyong Cao, NOAA National Environmental Satellite, Data, and Information Service (USA) . . . . . [9219-12]

Coffee Break . . . . . Mon 3:10 pm to 4:00 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 31C . . MON 4:00 PM TO 5:30 PM

Remote Sensing of Acoustic or Vibration Signals Using Non-traditional Domains

Session Chairs: **Wellesley Pereira,** Air Force Research Lab. (USA); **Frank O. Clark,** Spectral Sciences, Inc. (USA)

4:00 pm: **Investigating potential correlations between jet engine noise and plume dynamics in the hypertemporal infrared domain**, Phillip M. Cunio, Reed Weber, Kimberly Knobel, Jason Wager, Gerardo Lopez, Air Force Research Lab. (USA) . . . . . [9219-13

4:20 pm: **Detecting small surface vibrations by passive electro-optical illumination**, Matthew Buoni, Toyon Research Corp. (USA); Wellesley E. Pereira, Air Force Research Lab. (USA); Carlos Garcia-Cervera, Univ. of California, Santa Barbara (USA); Reed Weber, Air Force Research Lab. (USA). . . . . [9219-14]

4:40 pm: **Feasibility considerations for a long-range passive vibrometer**, Alan Marchant, Utah State Univ. (USA); Chad Fish, Utah State Univ. Research Foundation (USA); Jie Yao, Wavefront, LLC (USA); Phillip M. Cunio, Wellesley E. Pereira, Air Force Research Lab. (USA) . . . . . [9219-15]

5:00 pm: **A passive optical technique to remotely measure physical properties of a vibrating surface** *(Invited Paper)*, Frank O. Clark, Spectral Sciences, Inc. (USA); John Kielkopf, Univ. of Louisville (USA); Wellesley E. Pereira, Air Force Research Lab. (USA); Jason Cline, Ryan Penney, Spectral Sciences, Inc. (USA) . . . . . [9219-16]

CONFERENCE 9219

LOCATION: CONV. CTR. ROOM 31C

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Spectroscopic measurement of ignition parameters in forest fuel, Roberto C. Barragan-Campos, Guillermo Garcia-Torales, Antonio Rodriguez-Rivas, Jorge L. Flores-Nuñez, Univ. de Guadalajara (Mexico). . . . . [9219-17]

Supercontinuum spectrum in IR Bessel-Gauss and Gauss pulsed beam filament under anomalous group velocity dispersion in fused silica, Alexandra E. Dokukina, Evgeniya O. Smetanina, Lomonosov Moscow State Univ. (Russian Federation); Victor O. Kompanets, Sergey V. Chekalin, Institute of Spectroscopy (Russian Federation); Valeriy P. Kandidov, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [9219-18]

Stand-off and up-close Raman detection of nitrates in buried in sand, Carlton W. Farley III, Sandra Sadate, Aschalew Kassu, Anup Sharma, Alabama A&M Univ. (USA) . . . . . [9219-19]

Stand-off Raman detection of hidden explosives, Sandra Sadate, Carlton W. Farley III, Aschalew Kassu, Anup Sharma, Alabama A&M Univ. (USA). . . . [9219-20]

3D shape measurement with binary phase-shifting technique and regularization methods, Jorge L. Flores-Nuñez, Adriana Silva, Univ. de Guadalajara (Mexico); Ricardo Legarda-Sáenz, Univ. Autónoma de Yucatán (Mexico); Guillermo García-Torales, Sandra E. Balderas-Mata, Univ. de Guadalajara (Mexico). . . . . [9219-21]

Gray coded trapezoidal fringes for 3D surface-shape measurement, Jorge L. Flores-Nuñez, Oscar G. Pérez, Guillermo García-Torales, Univ. de Guadalajara (Mexico); Horacio Soto, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Sandra E. Balderas-Mata, Univ. de Guadalajara (Mexico). . . . . [9219-22]

Evaluate the effective of annular aperture on the OTF for fractal optical modulator, Abdulrazak A. Mohammed, Salahaddin Univ.-Hawler (Iraq) . . [9219-23]

A near infrared-based downhole water-cut meter using neural network technique, Mahmoud Meribout, The Petroleum Institute (United Arab Emirates); Esra Al Hosani, ADCO Oil Co. (United Arab Emirates) . . . . . [9219-25]

Latchable mechanical deformable mirror for improvement of performance of space-borne telescopes, Keigo Enya, Hirokazu Kataza, Japan Aerospace Exploration Agency (Japan). . . . . [9219-32]

CONFERENCE 9220

LOCATION: CONV. CTR. ROOM 32A

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9220

Infrared Sensors, Devices, and Applications IV

Conference Chairs: **Paul D. LeVan,** Air Force Research Lab. (USA); **Ashok K. Sood,** Magnolia Optical Technologies, Inc. (USA); **Priyalal Wijewarnasuriya,** U.S. Army Research Lab. (USA); **Arvind I. D'Souza,** DRS Sensors & Targeting Systems, Inc. (USA)

Program Committee: **Sumith Bandara,** U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Eric A. DeCuir Jr.,** U.S. Army Research Lab. (USA); **Eustace L. Dereniak,** College of Optical Sciences, The Univ. of Arizona (USA); **Nibir K. Dhar,** Defense Advanced Research Projects Agency (USA); **Patti S. Gillespie,** U.S. Army Research Lab. (USA); **Barbara G. Grant,** Lines and Lights Technology (USA); **Sarath D. Gunapala,** Jet Propulsion Lab. (USA); **John P. Hartke,** U.S. Military Academy (USA); **John E. Hubbs,** Ball Aerospace & Technologies Corp. (USA); **Sanjay Krishna,** Ctr. for High Technology Materials (USA); **Michael W. Kudenov,** North Carolina State Univ. (USA); **Hiroshi Murakami,** Japan Aerospace Exploration Agency (Japan); **Manijeh Razeghi,** Northwestern Univ. (USA); **Jimmy Xu,** Brown Univ. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Land salinization classification method using Landsat TM images in Western Jilin Province of China, Haoyang Fu, Lingjia Gu, Ruizhi Ren, Jian Sun, Jilin Univ. (China) . . . . . [9220-27]

Inkjet-printed cytochrome c protein for long wavelength infrared sensing, Suo Feng Liang, National Taiwan Univ. (Taiwan) . . . . . [9220-28]

Analysis of local charge-carrier diffusion length values in the photosensing film of photovoltaic HgCdTe FPA photodetectors, Victor A. Stuchinsky, Alexei V. Vishnyakov, Dmitry V. Brunev, Alexei V. Zverev, Sergey A. Dvoretsky, A.V. Rzhanov Institute of Semiconductor Physics (Russian Federation). . . . . [9220-29]

Detection of adulteration in onion powder by using FT-NIR and FT-IR spectroscopy, Byoungkwan Cho, Sangdae Lee, Lohumi Santosh, Hoonsoo Lee, Chungnam National Univ. (Korea, Republic of). . . . . [9220-30]

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 32A . . TUE 8:50 AM TO 10:10 AM

Advanced Detector Material and FPA Component Studies

Session Chairs: **Paul D. LeVan,** Air Force Research Lab. (USA); **Arvind I. D'Souza,** DRS Sensors & Targeting Systems, Inc. (USA)

8:50 am: **Hall Effect and negative energy gap in HgTe/CdTe superlattice with thick quantum wells**, Abdelhakim Nafidi, Hassan Chaib, Aomar Idbaha, Driss Barkissy, Abderrazak Boutramine, Univ. Ibn Zohr (Morocco). . . . . [9220-1]

9:10 am: **Interface and facet control during Czochralski growth of (111) InSb crystals for cost reduction and yield improvement of IR focal plane array substrates**, Nathan W. Gray, Victor Perez-Rubio, Joseph Bolke, William B. Alexander, Sylarus Technologies (USA) . . . . . [9220-2]

9:30 am: **Fabrication of resonator-quantum well infrared photodetector test devices**, Jason Sun, Kwong-Kit Choi, Kimberley A. Olver, U.S. Army Research Lab. (USA) . . . . . [9220-3]

9:50 am: **Embedded plasmonic-enhanced quantum well infrared photodetector**, Robert L. Brown, Alireza Bonakdar, Sung Jun Jang, Northwestern Univ. (USA); Omer G. Memis, Intel Corp. (USA); Hooman Mohseni, Northwestern Univ. (USA) . . . . . [9220-4]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 32A . TUE 10:40 AM TO 11:40 AM

Performance Modeling and Simulation: Noise

Session Chairs: **Ashok K. Sood,** Magnolia Optical Technologies, Inc. (USA); **Paul D. LeVan,** Air Force Research Lab. (USA)

10:40 am: **Study of real-time image denoising and hole-filling for micro-cantilever IR FPA imaging system**, Yun Feng, Yuejin Zhao, Liquan Dong, Ming Liu, Xiaohua Liu, Mei Hui, Hong Wu, Xiaomeng Li, Zhu Zhao, Manjin Liu, Beijing Institute of Technology (China) . . . . . [9220-5]

11:00 am: **Hyperspectral modeling of an infrared focal plane array**, Salima Mouzali, Sidonie Lefebvre, Sylvain Rommeluère, Yann Ferrec, Jérôme Primot, ONERA (France) . . . . . [9220-6]

11:20 am: **Surface resistivity and dielectric constant temperature dependence measures of pure and multiwall carbon nanotubes (MWCNT) and silver nano-particle doped polyvinylidene difluoride (PVDF)- and polyvinyl alcohol (PVA) films**, Matthew E. Edwards Sr., Stephen Egarievwe, Tatiana Kukhtareva, Jemilia Polius, Afef Janen, John Corda, Alabama A&M Univ. (USA). . . . . [9220-7]

Lunch/Exhibition Break . . . . . Tue 11:40 am to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 32A . . . . TUE 1:30 PM TO 2:50 PM

Detector and FPA Characterization

Session Chairs: **Priyalal S. Wijewarnasuriya,** U.S. Army Research Lab. (USA); **Arvind I. D'Souza,** DRS Sensors & Targeting Systems, Inc. (USA)

1:30 pm: **The influence of sunlight irradiation on the characteristics of InGaAs detectors**, Xiumei Shao, Xue Li, Hengjing Tang, Tao Li, Haimei Gong, Shanghai Institute of Technical Physics (China) . . . . . [9220-8]

1:50 pm: **Study on 512×128 pixel InGaAs near infrared focal plane arrays**, Xue Li, Hengjing Tang, Songlei Huang, Zhangcheng Huang, Haimei Gong, Shanghai Institute of Technical Physics (China) . . . . . [9220-9]

2:10 pm: **Resonant scanning mechanism**, John W. Wallace, Mike Newman, Homero Gutierrez, Charlie Hoffman, Tim Quakenbush, Dan Waldeck, Chris Leone, Miro Ostaszewski, Ball Aerospace & Technologies Corp. (USA) . . . . . [9220-10]

2:30 pm: **MWIR InAsSb FPA data and analysis**, Ernest W. Robinson, Arvind I. D'Souza, DRS Sensors & Targeting Systems, Inc. (USA) . . . . . [9220-11]

Coffee Break . . . . . Tue 2:50 pm to 3:20 pm

CONFERENCE 9220

LOCATION: CONV. CTR. ROOM 32A

SESSION 4

LOCATION: CONV. CTR. ROOM 32A . . . TUE 3:20 PM TO 5:00 PM

Applications of EO Sensing Technology

Session Chairs: **Ashok K. Sood,** Magnolia Optical Technologies, Inc. (USA); **Priyalal S. Wijewarnasuriya,** U.S. Army Research Lab. (USA)

3:20 pm: **Human suspicious activity recognition in thermal infrared video**, Jakir Hossen, The Univ. of Memphis (USA) . . . . . [9220-12]

3:40 pm: **Analysis of total oil content and fatty acid composition by NIR reflectance spectroscopy in edible nuts**, Chari V. Kandala, Jaya Sundaram, Agricultural Research Service (USA) . . . . . [9220-13]

4:00 pm: **Temperature-tuned erbium-doped fiber ring laser with Mach-Zehnder interferometer based on two quasi-abrupt tapered fiber sections**, Romeo Selvas-Aguilar, Univ. Autónoma de Nuevo León (Mexico); Alejandro Martínez-Rios, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Gilberto Anzueto-Sanchez, Univ. Autónoma del Estado de Morelos (Mexico); Arturo Castillo-Guzmán, Monica Hernández-Luna, Roberto Robledo, Univ. Autónoma de Nuevo León (Mexico) . . . . . [9220-14]

4:20 pm: **Development of blood vessel search system by using NIR light for blood sampling**, Kai Cheng, Eiji Nakamachi, Yusuke Morita, Kazuyuki Narita, Doshisha Univ. (Japan) . . . . . [9220-15]

4:40 pm: **High reflected cubic cavity as long path absorption cell for infrared gas sensing**, Jia Yu, Qiang Gao, Zhiguo Zhang, Harbin Institute of Technology (China) . . . . . [9220-32]

WEDNESDAY 20 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 32A . . WED 8:00 AM TO 9:40 AM

Novel Sensing Concepts

Session Chairs: **Ashok K. Sood,** Magnolia Optical Technologies, Inc. (USA); **Priyalal S. Wijewarnasuriya,** U.S. Army Research Lab. (USA)

8:00 am: **Approaching high temperature photon counting with electron-injection detectors**, Vala Fathipour, Northwestern Univ. (USA); Omer G. Memis, Intel Corp. (USA); Sung Jun Jang, Robert L. Brown, Hooman Mohseni, Northwestern Univ. (USA) . . . . . [9220-16]

8:20 am: **Dual behavior of optical antenna integrated with sub-wavelength photodetector to achieve ultra-high specific detectivity**, Alireza Bonakdar, Robert L. Brown, Hooman Mohseni, Northwestern Univ. (USA). . . . . [9220-17]

8:40 am: **Large area photodetectors based on InP NWs with InAs/InAsP QWs**, Vishal Jain, Lund Univ. (Sweden) and Halmstad Univ. (Sweden); Magnus Heurlin, David Lindgren, Ali Nowzari, Laiq Hussain, Jesper Wallentin, Lund Univ. (Sweden); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA); Magnus T. Borgström, Anders Gustafsson, Lars Samuelson, Lund Univ. (Sweden); Håkan Pettersson, Lund Univ. (Sweden) and Halmstad Univ. (Sweden) . . [9220-18]

9:00 am: **Low-stress silicon nitride platform for broadband mid-infrared microphotonics**, Pao T. Lin, Vivek Singh, Massachusetts Institute of Technology (USA); Hao-Yu Lin, Harvard Univ. (USA); Tom Tiwald, J.A. Woollam Co., Inc. (USA); Lionel C. Kimerling, Anuradha Agarwal, Massachusetts Institute of Technology (USA) . . . . . [9220-19]

9:20 am: **Frequency tunable photo-impedance sensor**, Tanuj Saxena, Sergey Rumyantsev, Partha Dutta, Michael Shur, Rensselaer Polytechnic Institute (USA) . . . . . [9220-20]

Coffee Break . . . . . Wed 9:40 am to 10:10 am

SESSION 6

LOCATION: CONV. CTR. ROOM 32A . WED 10:10 AM TO 11:50 AM

Applications of Detectors and FPAs

Session Chairs: **Paul D. LeVan,** Air Force Research Lab. (USA); **Arvind I. D'Souza,** DRS Sensors & Targeting Systems, Inc. (USA)

10:10 am: **Er^{3+}/Yb^{3+} co-doped all-fiber Mach-Zehnder interferometer for 1550nm applications**, Grethell G. Perez-Sanchez, Tecnológico de Estudios Superiores de Coacalco (Mexico) and Ctr. de Investigación e Innovación Tecnológica (Mexico); Jose A. Alvarez-Chavez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Enrique F. Pinzón-Escobar, G. Eduardo Sandoval-Romero, Univ. Nacional Autónoma de México (Mexico); David Jaramillo-Vigueras, Alfredo I. Aguilar-Morales, Ctr. de Investigación e Innovación Tecnológica (Mexico) [9220-21]

10:30 am: **All-fibre temperature sensing interferometer based on resonant frequency-shifting**, José A. Álvarez-Chávez, Grethell G. Perez-Sanchez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Joaquin H. Rodriguez-Rodriguez, Instituto de Investigaciones Electricas (Mexico); David Jaramillo-Vigueras, Ctr. de Investigación e Innovación Tecnológica (Mexico). . . . . [9220-22]

10:50 am: **Fabrication of long period fiber gratings by electric arc for strain sensing applications**, Maria G. Pulido-Navarro, Jose A. Alvarez-Chavez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Daniel E. Ceballos-Herrera, Univ. Autónoma de Nuevo León (Mexico); Ponciano J. Escamilla-Ambrosio, Ctr. de Investigación en Computación (Mexico) . . . . . [9220-23]

11:10 am: **Pupil imager**, Paul D. LeVan, Air Force Research Lab. (USA). . [9220-24]

11:30 am: **An improved apparatus of infrared videopupillography for monitoring pupil size**, Ting-Wei Huang, National Chiao Tung Univ. (Taiwan); Mei-Lan Ko, National Taiwan Univ. Hospital, Hsin-Chu Branch (Taiwan); Yuan Ouyang, Chang Gung Univ. (Taiwan); Yin-Yuan Chen, Bi-Shiou Tsuen, Jin-Chern Chiou, Mang Ou-Yang, National Chiao Tung Univ. (Taiwan) . . . . . [9220-25]

CONFERENCE 9221

LOCATION: CONV. CTR. ROOM 33B

Monday–Wednesday 18–20 August 2014 • Proceedings of SPIE Vol. 9221

Remote Sensing and Modeling of Ecosystems for Sustainability XI

Conference Chairs: **Wei Gao,** Colorado State Univ. (USA); **Ni-Bin Chang,** Univ. of Central Florida (USA)

Conference Co-Chair: **Jinnian Wang,** Institute of Remote Sensing Applications (China)

Program Committee: **E. Raymond Hunt Jr.,** Agricultural Research Service (USA); **Thomas J. Jackson,** U.S. Dept. of Agriculture (USA); **Brian Robert Johnson,** NEON, Inc. (USA); **Thomas U. Kampe,** NEON, Inc. (USA); **Xin-Zhong Liang,** Univ. of Illinois at Urbana-Champaign (USA); **Dennis Ojima,** Colorado State Univ. (USA); **John J. Qu,** George Mason Univ. (USA); **David Riaño,** Univ. of California, Davis (USA); **Jiong Shu,** East China Normal Univ. (China); **Zhibin Sun,** Colorado State Univ. (USA); **Qiao Wang,** Ministry of Environmental Protection (China); **Hongjie Xie,** The Univ. of Texas at San Antonio (USA); **Xiaobing Zhou,** Montana Tech (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Research on three-dimensional WebGIS construction based on Skyline, Tingting Wang, Institute of Geographical Sciences and Natural Resources Research (China) . . . . . [9221-6]

Multi-angle polarized remote sensing of soot aerosol over China, Tianhai Cheng, Institute of Remote Sensing and Digital Earth (China) . . . . . [9221-7]

Changes of building zones at the beginning of 21st century in Zhejiang Province, China, Dong Liu, Zhejiang Univ. (China); Jianyu Chen, The Second Institute of Oceanography, SOA (China) . . . . . [9221-8]

A new ocean color algorithm for suspended sediment concentration monitoring for East China Sea, Haiqing Huang, Jianyu Chen, Qiankun Zhu, Fang Gong, Tianyu Wang, The Second Institute of Oceanography, SOA (China) . [9221-9]

Characterisation of aerosol types over China and its application in remote sensing *(Invited Paper)*, Xingfa Gu, Hao Chen, Institute of Remote Sensing and Digital Earth (China) . . . . . [9221-11]

The application of satellite remote sensing data in the simulation of suspended sediment transport, Xuefei Yang, Shanghai Institute of Technical Physics (China) and The Second Institute of Oceanography, SOA (China); Zhihua Mao, Haiqing Huang, Tianyu Wang, Fang Gong, Jianyu Chen, The Second Institute of Oceanography, SOA (China) . . . . . [9221-16]

Geographical information integration and visualization research of Shandong province, China based on ArcGIS engine, Mingzhu Xu, Institute of Geographical Sciences and Natural Resources Research (China); Jicai Ning, Qingshui Lu, Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-18]

Harmhul algal bloom detection with MODIS inherent optical properties products: a decision tree application, Hui Lei, Hangzhou Normal Univ. (China) and The Second Institute of Oceanography, SOA (China); Bin Zhou, Hangzhou Normal Univ. (China); Bangyi Tao, Haiqing Huang, The Second Institute of Oceanography, SOA (China); Junbo Shao, Bei Huang, Zhoushan Marine Ecological Environment Monitoring Station (China) . . . . . [9221-27]

The polarizing spectral characteristic and distribution of East China Sea and Hangzhou Bay, Liu Jia, Jianyu Chen, Haiqing Huang, Xianqiang He, Bai Yan, The Second Institute of Oceanography, SOA (China) . . . . . [9221-28]

Assessing coastline exploitation degree from multi-temporal Landsat images: Jintang Island, China, Xiao Ping Zhang, Delu Pan, Jianyu Chen, Haiqing Huang, Zhu Li, The Second Institute of Oceanography, SOA (China). . . . . [9221-29]

Dynamic analysis on coastline and sea reclamation in the region around Bohai based on remote sensing images, Xiangyang Liu, Zhiqiang Gao, Jicai Ning, Qingshui Lu, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-30]

Nuclear power plants in China's coastal zone: risk and safety, Qingshui Lu, Zhiqiang Gao, Jicai Ning, Yantai Institute of Coastal Zone Research (China); Wei Gao, Colorado State Univ. (USA) . . . . . [9221-31]

Dynamic analysis on harbors in the region around Bohai based on remote sensing, Chong You, East China Normal Univ. (China) . . . . . [9221-32]

The study of the spatio-temporal changes of drought in the Mongolian Plateau in 30 years based on TVDI, Xiaoming Cao, Yiming Feng, Chinese Academy of Forestry (China) . . . . . [9221-33]

Retrieval of aerosol optical depth over the Yangtze River region with HJ-1/CCD and Landsat/TM data, Lu Zhang, Runhe Shi, Long Li, Wei Gao, East China Normal Univ. (China) . . . . . [9221-34]

A research of high spectrum inversion of Phycocyanin in Taihu Lake, Jing Wang, Runhe Shi, Wei Gao, East China Normal Univ. (China) . . . . . [9221-35]

Analysis of optimal narrow band PVI for estimating foliar photosynthetic pigments based on PROSPECT model, Hong Wang, Runhe Shi, Pudong Liu, Ming-Liang Ma, East China Normal Univ. (China); Wei Gao, East China Normal Univ. (China) and Colorado State Univ. (USA) . . . . . [9221-36]

Influence of bandwidth for the estimation of leaf chlorophyll concentration using normalized difference vegetation indices, Mingliang Ma, Runhe Shi, Pudong Liu, Hong Wang, Wei Gao, East China Normal Univ. (China) . . . . [9221-37]

The data fusion of aerosol optical thickness using universal kriging in East China, Long Li, Runhe Shi, Lu Zhang, Wei Gao, East China Normal Univ. (China) . . . . . [9221-38]

The temporal and spatial relationship between the urban heat island intensity and the LUCC, Ke Liu, Xingfa Gu, Institute of Remote Sensing and Digital Earth (China); Wei Gao, East China Normal Univ. (China) . . . . . [9221-39]

Analysis on the balance between supply and demand of cropland in Yantai City of China in 2020, Qiuxian Wang, Yantai Institute of Coastal Zone Research (China) and Univ. of Chinese Academy of Sciences (China) and Ludong Univ. (China); Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China). [9221-40]

Examining the effects of increasing land price on urban sprawl in China coastal provinces during 1990-2010, Qingshui Lu, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-41]

The grain production potential assessment with multiple cropping index (MCI) in China, Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China)[9221-42]

Analysis of ecological risk based on landscape structure in Taihang Mountain, Hebei province, Ning Xu, Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-43]

Temporal and spatial changes of evapotranspiration in Shandong province for recent 54 years, Jialin Yang, East China Normal Univ. (China) . . . . . [9221-44]

Meteorological information management and service system based on WebGIS for Shanghai Municipality, Manyi Wang, East China Normal Univ. (China) . . . . . [9221-45]

Estimating leaf photosynthetic pigments information by stepwise multiple linear regression analysis and a leaf optical model, Pudong Liu, Runhe Shi, Hong Wang, Kaixu Bai, Wei Gao, East China Normal Univ. (China) . . . . . [9221-46]

CONFERENCE 9221

LOCATION: CONV. CTR. ROOM 33B

TUESDAY 19 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33B . . . . TUE 1:30 PM TO 4:20 PM

Remote Sensing for Agriculture, Ecosystems, and Hydrology

Session Chairs: **Ni-Bin Chang,** Univ. of Central Florida (USA); **Alem Kindya K. Gebru,** Stellenbosch Univ. (South Africa)

1:30 pm: **Impact of teleconnection phenomena and local environmental factors on forest greenness in North and Central America** *(Invited Paper)*, Ni-Bin Chang, Univ. of Central Florida (USA) . . . . . [9221-1]

2:00 pm: **Hurst exponent for fractal characterization of satellite images**, Juan Carlos Valdiviezo-Navarro, Univ. Politécnica de Tulancingo (Mexico); Anna Carbone, Politecnico di Torino (Italy); Gabriel Cristóbal Perez, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [9221-2]

2:20 pm: **Assimilation of remote sensing data into crop growth model to improve the estimation of regional wheat yield**, Chaoshun Liu, East China Normal Univ. (China) . . . . . [9221-3]

2:40 pm: **Spatial discretization of distributed hydrological response units for SWAT**, Jicai Ning, Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-4]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

3:30 pm: **Investigation of atmospheric insect wing-beat frequencies and iridescent features using a multi-spectral kHz remote detection system** *(Invited Paper)*, Alem K. Gebru, Stellenbosch Univ. (South Africa); Mikkel S. Brydegaard, Stellenbosch Univ. (South Africa) and Lund Univ. (Sweden); Erich G. Rohwer, Pieter Neethling, Stellenbosch Univ. (South Africa). . . . . [9221-5]

4:00 pm: **Monitoring of land- and sea-use in Zhoushan Islands, China by an spectral rule-based pre-classification approach**, Zhu Li, Jianyu Chen, Zhihua Mao, Haiqing Huang, Xiao Ping Zhang, The Second Institute of Oceanography, SOA (China). . . . . [9221-10]

WEDNESDAY 20 AUGUST

SESSION 2

LOCATION: CONV. CTR. ROOM 33B . . WED 9:10 AM TO 11:30 AM

Environmental Remote Sensing and GIS

Session Chairs: **Xingfa Gu,** Institute of Remote Sensing and Digital Earth (China); **Bernd Fichtelmann,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

9:10 am: **Improving the estimation of surface heat and water fluxes using ensemble Kalman filter**, Juan Du, East China Normal Univ. (China) . . . . [9221-13]

9:30 am: **Optical control methods of hydrogen influence on plants**, Elena V. Timchenko, Ekaterina A. Selezneva, Nikolay V. Tregub, Larisa A. Taskina, Pavel E. Timchenko, Samara State Aerospace Univ. (Russian Federation) . . . . . [9221-14]

9:50 am: **Using NOAA/AVHRR based remote sensing data and PCR method for estimation of Aus rice yield in Bangladesh** *(Invited Paper)*, Mohammad Nizamuddin, The City College of New York (USA); Kawsar A. Akhand, The City Univ. of New York (USA); Leonid Roytman, The City College of New York (USA); Felix Kogan, Mitch Goldberg, National Environmental Satellite, Data, and Information Service (USA). . . . . [9221-15]

Coffee Break . . . . . .Wed 10:20 am to 10:50 am

10:50 am: **Optical identification of diatom bloom based on MERIS measurement in the East China Sea**, Bangyi Tao, Zhihua Mao, The Second Institute of Oceanography, SOA (China); Hui Lei, Hangzhou Normal Univ. (China); Qiankun Zhu, Haiqing Huang, The Second Institute of Oceanography, SOA (China) . . . . . [9221-17]

11:10 am: **Calibration of sea surface wind speed from multi-satellite altimeters**, Jingsong Yang, The Second Institute of Oceanography, SOA (China). . . . [9221-19]

Lunch/Exhibition Break . . . . . .Wed 11:30 am to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33B . . . WED 1:30 PM TO 4:40 PM

Remote Sensing and Modeling Applications

Session Chairs: **Nickolai V. Kukhtarev,** Alabama A&M Univ. (USA); **Chaoshun Liu,** East China Normal Univ. (China)

1:30 pm: **Crude oil remote sensing, characterization, and cleaning with CW and pulsed lasers** *(Invited Paper)*, Nickolai V. Kukhtarev, Alabama A&M Univ. (USA) . . . . . [9221-20]

2:00 pm: **Linkages between turbidity levels in Lake Mead associated forest fire events in the lower Virgin watershed** *(Invited Paper)*, Ni-Bin Chang, Univ. of Central Florida (USA). . . . . [9221-21]

2:30 pm: **Study of emissivity behavior in soil through medium infrared range images**, Carlos Villaseñor-Mora, Arturo González-Vega, Haydee Hernández-Arellano, A. Jacqueline Chávez-Martínez, L. Fernando Avilez-Pérez, Univ. de Guanajuato (Mexico) . . . . . [9221-22]

2:50 pm: **Climatic suitability of potential rice planting distribution and its response to climate change in China**, Chaoshun Liu, East China Normal Univ. (China) . . . . . [9221-23]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

3:40 pm: **The dynamic response of vegetation to climatic factors in East China during 1998 to 2008**, Cong Zhou, Runhe Shi, Chaoshun Liu, East China Normal Univ. (China); Wei Gao, East China Normal Univ. (China) and Colorado State Univ. (USA) . . . . . [9221-24]

4:00 pm: **The responses of vegetation water content (EWT) along a coastal region using remote sensing**, Zhiqiang Gao, Yantai Institute of Coastal Zone Research (China) . . . . . [9221-25]

4:20 pm: **Research on dynamic changes of suspended sediment in Hangzhou Bay based on tower spectrum**, Dai Qian, Xianqiang He, Jianyu Chen, Haiqing Huang, The Second Institute of Oceanography, SOA (China) . . . . . [9221-26]

CONFERENCE 9222

LOCATION: CONV. CTR. ROOM 33A

Monday 18 August 2014 • Proceedings of SPIE Vol. 9222

Imaging Spectrometry XIX

Conference Chairs: **Pantazis Mouroulis,** Jet Propulsion Lab. (USA); **Thomas S. Pagano,** Jet Propulsion Lab. (USA)

Program Committee: **Christoph C. Borel,** Air Force Institute of Technology (USA); **Chein-I Chang,** Univ. of Maryland, Baltimore County (USA); **François Châteauneuf,** INO (Canada); **Thomas Cooley,** Air Force Research Lab. (USA); **Eustace L. Dereniak,** College of Optical Sciences, The Univ. of Arizona (USA); **Bo-Cai Gao,** U.S. Naval Research Lab. (USA); **Robert O. Green,** Jet Propulsion Lab. (USA); **Kevin C. Gross,** Air Force Institute of Technology (USA); **Emmett J. Ientilucci,** Rochester Institute of Technology (USA); **Robert T. Kroutil,** Dynamac Corp. (USA); **Mehrube Mehrubeoglu,** Texas A&M Univ. Corpus Christi (USA); **Joseph Meola,** Air Force Research Lab. (USA); **Jose F. Moreno,** Univ. de València (Spain); **Luc Rochette,** LR Tech (Canada); **Michael E. Schaepman-Strub,** Zurich Univ. of Applied Sciences (Switzerland); **John F. Silny,** Raytheon Space & Airborne Systems (USA)

This year's meeting will commemorate the leadership and accomplishments of SPIE Fellow **Sylvia S. Shen,** Distinguished Scientist at the Aerospace Corporation, and Chair of the Imaging Spectrometry conference for 15 years.

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33A . MON 8:00 AM TO 10:00 AM

Sensor Systems and Applications

Session Chair: **Pantazis Mouroulis,** Jet Propulsion Lab. (USA)

8:00 am: **Observing system simulation experiments to assess the potential impact of proposed satellite instruments on hurricane prediction**, Robert M. Atlas, National Oceanic and Atmospheric Administration (USA); Thomas S. Pagano, Jet Propulsion Lab. (USA) . . . . . [9222-1]

8:20 am: **Simulating satellite infrared sounding retrievals in support of Observing System Simulation Experiments (OSSEs)**, Thomas S. Pagano, William S. Mathews, Frederick W. Irion, Jet Propulsion Lab. (USA) . . . . . [9222-2]

8:40 am: **Tracking the evolution of spectral point spread functions on orbit**, Kenneth F. Dymond, Scott A. Budzien, Andrew C. Nicholas, U.S. Naval Research Lab. (USA); Peter W. Walker II, Computational Physics, Inc. (USA) . . . . . [9222-3]

9:00 am: **Advances in on-orbit EUV and FUV stellar calibrations by the Special Sensor Ultraviolet Limb Imager**, Scott A. Budzien, U.S. Naval Research Lab. (USA); Peter W. Walker II, Computational Physics, Inc. (USA); Andrew C. Nicholas, U.S. Naval Research Lab. (USA) . . . . . [9222-4]

9:20 am: **Differentiation of bacterial colonies and temporal growth patterns using hyperspectral imaging**, Mehrube Mehrübeoglu, Gregory W. Buck, Daniel W. Livingston, Texas A&M Univ. Corpus Christi (USA) . . . . . [9222-5]

9:40 am: **Modeling the expected performance of the REgoligth X-ray Imaging Spectrometer (REXIS)**, Niraj K. Inamdar, Rebecca A. Masterson, Massachusetts Institute of Technology (USA); Branden T. Allen, Harvard-Smithsonian Ctr. for Astrophysics (USA); Richard P. Binzel, Massachusetts Institute of Technology (USA); Jae Sub Hong, Jonathan E. Grindlay, Harvard-Smithsonian Ctr. for Astrophysics (USA); Matthew W. Smith, Massachusetts Institute of Technology (USA) . . . . . [9222-6]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

LOCATION: CONV. CTR. ROOM 33A . . . 10:30 AM TO 10:50 AM

Special Presentation: A Tribute to Sylvia Shen

Session Chair: **Thomas S. Pagano,** Jet Propulsion Lab. (USA)

SESSION 2

LOCATION: CONV. CTR. ROOM 33A . MON 10:50 AM TO 11:50 AM

New Sensors and Missions

Session Chair: **Thomas S. Pagano,** Jet Propulsion Lab. (USA)

10:50 am: **Stray light analysis of the focal plane filter stack on the Prototype HyspIRI-TIR (PHyTIR) instrument**, William R. Johnson, Simon J. Hook, Marc C. Foote, Bruno M. Jau, Bjorn T. Eng, Jet Propulsion Lab. (USA) . . . . . [9222-7]

11:10 am: **Multislit optimized spectrometer: flight-like environment test results**, William S. Good, Tim Valle, Peter Spuhler, Chuck Hardesty, Conor Staples, Ball Aerospace & Technologies Corp. (USA); Curtiss O. Davis, Nicholas B. Tufillaro, Oregon State Univ. (USA) . . . . . [9222-8]

11:30 am: **Field and laboratory test results demonstrating the error budget for the Climate Absolute Radiance and Refractivity Observatory**, Kurtis J. Thome, Joel McCorkel, Brendan McAndrew, NASA Goddard Space Flight Ctr. (USA) . . . . . [9222-9]

Lunch Break . . . . . Mon 11:50 am to 1:20 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33A . . . MON 1:20 PM TO 3:10 PM

Imaging Spectrometer Development at JPL

Session Chair: **Steven A. Macenka,** Jet Propulsion Lab. (USA)

1:20 pm: **Lessons and results from 30 years of imaging spectroscopy** *(Invited Paper)*, Robert O. Green, Jet Propulsion Lab. (USA) . . . . . [9222-10]

1:50 pm: **Design of the Compact Wide Swath Imaging Spectrometer (CWIS)**, Byron Van Gorp, Pantazis Mouroulis, Robert O. Green, Daniel W. Wilson, Jet Propulsion Lab. (USA) . . . . . [9222-11]

2:10 pm: **Design of a CubeSat-compatible imaging spectrometer**, Pantazis Mouroulis, Byron Van Gorp, Robert O. Green, Daniel W. Wilson, Jet Propulsion Lab. (USA) . . . . . [9222-12]

2:30 pm: **Wide-field imaging spectrometer for the Hyperspectral Infrared Imager (HyspIRI) mission**, Holly A. Bender, Pantazis Mouroulis, Robert O. Green, Daniel W. Wilson, Ronald J. Korniski, Jet Propulsion Lab. (USA) . . . . . [9222-13]

2:50 pm: **Remote plume detection with the Hyperspectral Thermal Emission Spectrometer (HyTES)**, William R. Johnson, Simon J. Hook, Glynn Hulley, Jonathan Mihaly, Jet Propulsion Lab. (USA) . . . . . [9222-14]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

CONFERENCE 9222

LOCATION: CONV. CTR. ROOM 33A

SESSION 4

LOCATION: CONV. CTR. ROOM 33A . . .MON 3:40 PM TO 5:40 PM

Modeling, Phenomenology, and Algorithms

Session Chair: **Thomas S. Pagano,** Jet Propulsion Lab. (USA)

3:40 pm: **Radiometric sensitivity contrast metrics for hyperspectral remote sensors**, John F. Silny, Louis Zellinger, Raytheon Co. (USA). . . . . [9222-15]

4:00 pm: **Modeling effects of bidirectional reflectance distribution function on remote sensing in the long wave infrared spectrum**, Samuel D. Butler, Michael A. Marciniak, Air Force Institute of Technology (USA); Joseph Meola, Air Force Research Lab. (USA) . . . . . [9222-16]

4:20 pm: **Geophysical applications of spectral deconvolution using the Richardson-Lucy algorithm**, Kenneth F. Dymond, Scott A. Budzien, Andrew C. Nicholas, U.S. Naval Research Lab. (USA) . . . . . [9222-17]

4:40 pm: **Using kernel-based and single-scattering albedo approaches for generalized spectral mixture analysis of hyperspectral imagery**, Robert S. Rand, National Geospatial-Intelligence Agency (USA); Ronald G. Resmini, The MITRE Corp. (USA) . . . . . [9222-18]

5:00 pm: **Spatial-spectral metric learning for hyperspectral remote sensing image classification**, Jiangtao Peng, Hubei Univ. (China); Yicong Zhou, C. L. Philip Chen, Univ. of Macau (China) . . . . . [9222-19]

5:20 pm: **Monte-Carlo radiative transfer simulation of bottom reflectance in optically shallow water columns**, Abdoul Nasser Ibrahim, Jianhua Gong, Institute of Remote Sensing and Digital Earth (China); Masahiro Murakami, Kochi Univ. of Technology (Japan) . . . . . [9222-20]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

LITES and GROUP-C: multi-sensor ionospheric imaging from the ISS, Andrew W. Stephan, Scott A. Budzien, U.S. Naval Research Lab. (USA); Supriya Chakrabarti, Timothy A. Cook, Univ. of Massachusetts Lowell (USA); Steven P. Powell, Mark L. Psiaki, Cornell Univ. (USA). . . . . [9222-21]

Preflight calibration of the Special Sensor Ultraviolet Limb Imager, Peter W. Walker II, Computational Physics, Inc. (USA); Andrew C. Nicholas, Andrew W. Stephan, Scott A. Budzien, U.S. Naval Research Lab. (USA). . . . . [9222-22]

Random projection-based dimensionality reduction method for hyperspectral target detection, Weiyi Feng, Nanjing Univ. of Science and Technology (China) . . . . . [9222-23]

CONFERENCE 9223

LOCATION: CONV. CTR. ROOM 32A

Monday 18 August 2014 • Proceedings of SPIE Vol. 9223

Remote Sensing System Engineering V

Conference Chairs: **Philip E. Ardanuy,** Raytheon Intelligence & Information Systems (USA); **Jeffery J. Puschell,** Raytheon Space & Airborne Systems (USA)

Program Committee: **Robert M. Atlas,** National Oceanic and Atmospheric Administration (USA); **Ni-Bin Chang,** Univ. of Central Florida (USA); **Stephen A. Cota,** The Aerospace Corp. (USA); **Gerald J. Dittberner,** Harris Corp. (USA); **William B. Gail,** Microsoft Corp. (USA); **Xingfa Gu,** Institute of Remote Sensing and Digital Earth (China); **M. Gregory Hammann,** GeoEye, Inc. (USA); **Allen H.-L. Huang,** Univ. of Wisconsin-Madison (USA); **K. Dieter Klaes,** European Organisation for the Exploitation of Meteorological Satellites (Germany); **Stephen A. Mango,** NOAA / NESDIS Office of Satellite Operations (USA); **Jens Nieke,** European Space Research and Technology Ctr. (Netherlands); **Monesh Patel,** Medtronic, Inc. (USA); **Carl F. Schueler,** Schueler Consulting-Santa Barbara (USA); **Osman G. Sezer,** Texas Instruments Inc. (USA)

MONDAY 18 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 32A . MON 8:00 AM TO 10:10 AM

Remote Sensing System Applications I

Session Chair: **Jeffery J. Puschell,** Raytheon Space & Airborne Systems (USA)

8:00 am: **Improvements in weather forecasting and disaster monitoring resulting from the STORM geosynchronous infrared sounder** *(Invited Paper)*, Allen H-L. Huang, Univ. of Wisconsin-Madison (USA) . . . . . [9223-1]

8:30 am: **Satellite data fusion and information retrieval with ground-based sensor networks for monitoring ecosystem evolution** *(Invited Paper)*, Ni-Bin Chang, Univ. of Central Florida (USA) . . . . . [9223-2]

9:00 am: **Persistent observations of the Arctic from a highly elliptical orbit using multispectral, wide field of view day-night imagers** *(Invited Paper)*, Jeffery J. Puschell, Raytheon Space & Airborne Systems (USA); David B. Johnson, National Ctr. for Atmospheric Research (USA); Steven D. Miller, Colorado State Univ. (USA) . . . . . [9223-3]

9:30 am: **VIIRS reflective solar bands on-orbit calibration coefficient performance using imagery and moderate band intercomparisons**, David I. Moyer, Nicholas R. Vandermierden, Kameron Rausch, Frank De Luccia, The Aerospace Corp. (USA) . . . . . [9223-4]

9:50 am: **Impact of changes in VIIRS solar reflective band sensitivity due to aging on environmental data record performance**, Jeffery J. Puschell, Vijay Murgai, Raytheon Space & Airborne Systems (USA) . . . . . [9223-5]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 32A . MON 10:40 AM TO 11:30 AM

Remote Sensing System Applications II

Session Chair: **Ni-Bin Chang,** Univ. of Central Florida (USA)

10:40 am: **Uncooled emissive infrared imager for a CubeSat** *(Invited Paper)*, Jeffery J. Puschell, Raytheon Space & Airborne Systems (USA); Paolo Masini, Raytheon Co. (USA) . . . . . [9223-6]

11:10 am: **Calibration of a system to collect visible-light polarization data for classification of geosynchronous satellites**, Andy Speicher, Mohammad A. Matin, Univ. of Denver (USA); Roger Tippets, Francis K. Chun, U.S. Air Force Academy (USA) . . . . . [9223-7]

Lunch Break . . . . . Mon 11:50 am to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 32A . . . MON 1:40 PM TO 3:10 PM

Active Remote Sensing Systems

Session Chair: **Philip E. Ardanuy,** Raytheon Intelligence & Information Systems (USA)

1:40 pm: **2 micron pulsed remote sensing of atmospheric carbon dioxide** *(Invited Paper)*, Jirong Yu, Mulugeta Petros, Upendra N. Singh, NASA Langley Research Ctr. (USA) . . . . . [9223-9]

2:10 pm: **Control architecture for an adaptive electronically steerable flash lidar and associated instruments**, Lyle Ruppert, Jeremy Craner, Timothy R. Harris, Ball Aerospace & Technologies Corp. (USA) . . . . . [9223-10]

2:30 pm: **Improving range accuracy of pulsed-laser range finding based on differential optical path**, Jie Cao, Hao Qun, Jiaxing Mu, Beijing Institute of Technology (China) . . . . . [9223-11]

2:50 pm: **An instrument for measurement of spontaneous Rayleigh-Brillouin scattering profiles in atomic and molecular gases**, Xingdao He, Jing Feng, Tao Wu, Ruxiao Xia, Nanchang Hangkong Univ. (China) . . . . . [9223-12]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 4

LOCATION: CONV. CTR. ROOM 32A . . . MON 3:40 PM TO 5:30 PM

Innovations in Remote Sensing

Session Chair: **Carl F. Schueler,** Schueler Consulting-Santa Barbara (USA)

3:40 pm: **Integrated ocean observing system** *(Invited Paper)*, Philip E. Ardanuy, Raytheon Intelligence & Information Systems (USA) . . . . . [9223-13]

4:10 pm: **Pattern recognition applied to infrared images for early alerts in fog**, Mario Marchetti, Vincent Boucher, Portal Cerema (France); Jean Dumoulin, Aurélien Cord, Institut Francais des Sciences et Technologies des Transports de l'amenagement et des Reseaux (France) . . . . . [9223-14]

4:30 pm: **Appreciation of the traffic effects on the road surface temperature by infrared thermography**, Abderrahmen Khalifa, Mario Marchetti, Portal Cerema (France); Michel Buès, Univ. de Lorraine (France) . . . . . [9223-15]

4:50 pm: **Monitoring system for 3D and 4D applications using smart cameras**, Jinwoo Park, Hohyun Jung, Minseok Kim, ChulUong Choi, Yeon Yeu, Pukyong National Univ. (Korea, Republic of) . . . . . [9223-16]

5:10 pm: **A hybrid algorithm for robust acoustic source localization in noisy and reverberant environments**, Ramesh Rajagopalan, Timothy Dessonville, Univ. of St. Thomas (USA) . . . . . [9223-17]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Monitoring LUCC from outer space in high spatial resolution based on objected-oriented method, Dong Liu, Zhejiang Univ. (China); Jianyu Chen, The Second Institute of Oceanography, SOA (China) . . . . . [9223-8]

An optical positioning sensor by combining optical projection and a virtual camera model, Benrui Zheng, Yue Dong, Brigid A. Mullany, Edward P. Morse, Angela Davies, The Univ. of North Carolina at Charlotte (USA) . . . . . [9223-18]

Interferometric verification on focal plate flatness of Earth-observing Cassegrain Telescope, Ho-Lin Tsay, Ting-Ming Huang, Chia-Yen Chan, Instrument Technology Research Ctr. (Taiwan) . . . . . [9223-19]

Development of a fiber-optic temperature sensor based on aqueous solution of sodium chloride, Hyeok In Sim, Konkuk Univ. (Korea, Republic of) and Dongguk Univ. (Korea, Republic of); Sang Hun Shin, Seon Guen Kim, Seunghan Hong, Hyesu Jeon, Jae Seok Jang, Jae Seok Kim, Gu Won Kwon, Kyung Won Jang, Wook Jae Yoo, Konkuk Univ. (Korea, Republic of); Joo Hyun Moon, Dongguk Univ. (Korea, Republic of); Bongsoo Lee, Konkuk Univ. (Korea, Republic of) . . . . . [9223-20]

Radio occultation based on BD satellite navigation, Jiang Hu, Shanghai Institute of Microsystem and Information Technology (China); Haiying Hu, Shanghai Institute of Microsystem and Information Technology (China), Shanghai Engineering Ctr. for Microsatellites (China), and Shanghai Institute for Advanced Studies (China); Xuemin Shen, Wenbin Gong, Yonghe Zhang, Shanghai Engineering Ctr. for Microsatellites (China) . . . . . [9223-21]

CONFERENCE 9224

LOCATION: CONV. CTR. ROOM 33C

Sunday–Tuesday 17–19 August 2014 • Proceedings of SPIE Vol. 9224

Laser Communication and Propagation through the Atmosphere and Oceans III

Conference Chairs: **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands); **Christopher C. Davis,** Univ. of Maryland, College Park (USA); **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA)

Program Committee: **Larry C. Andrews,** Univ. of Central Florida (USA); **Jaime Anguita,** Univ. de Los Andes (Chile); **Shlomi Arnon,** Ben-Gurion Univ. of the Negev (Israel); **Mikhail S. Belen'kii,** Trex Enterprises Corp. (USA); **Matthew M. Bold,** Lockheed Martin Space Systems Co. (USA); **Jeremy P. Bos,** Air Force Research Lab. (USA); **Mikhail I. Charnotskii,** National Oceanic and Atmospheric Administration (USA); **Gang Chen,** Univ. of California, Riverside (USA); **Jony Jiang Liu,** U.S. Army Research Lab. (USA); **Arun K. Majumdar,** Naval Air Warfare Ctr. Weapons Div. (USA); **Vladimir B. Markov,** Advanced Systems & Technologies, Inc. (USA); **Stuart D. Milner,** Univ. of Maryland, College Park (USA); **Dominic C. O'Brien,** Univ. of Oxford (United Kingdom); **Ronald L. Phillips,** Florida Space Institute (USA); **William S. Rabinovich,** U.S. Naval Research Lab. (USA); **Michael C. Roggemann,** Michigan Technological Univ. (USA); **Karin Stein,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Thomas Weyrauch,** Univ. of Dayton (USA); **Otakar Wilfert,** Brno Univ. of Technology (Czech Republic); **Heba Yuksel,** Bogaziçi Üniv. (Turkey)

SUNDAY 17 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33C . . . .SUN 1:30 PM TO 3:20 PM

Fundamentals of Turbulence

Session Chairs: **Christopher C. Davis,** Univ. of Maryland, College Park (USA); **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

1:30 pm: **Propagation of a Gaussian-beam wave in general anisotropic turbulence** *(Invited Paper)*, Larry Andrews, Univ. of Central Florida (USA) and Townes Laser Institute (USA); Ronald L. Phillips, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Townes Laser Institute (USA)[9224-1]

2:00 pm: **Comparison of the split-step method for various power spectral models**, Heba Yuksel, Bogaziçi Üniv. (Turkey). . . . . [9224-2]

2:20 pm: **Spatio-temporal modeling of atmospheric phase turbulence for narrow and extended media and examination of propagation characteristics of chaotic waves through such turbulence**, Monish R. Chatterjee, Fathi H. A. Mohamed, Univ. of Dayton (USA) . . . . . [9224-3]

2:40 pm: **Statistics of the turbulent phase in strong scintillation conditions**, Mikhail I. Charnotskii, National Oceanic and Atmospheric Administration (USA) . . . . . [9224-4]

3:00 pm: **Modeling of the turbulent phase in strong scintillation conditions**, Mikhail I. Charnotskii, National Oceanic and Atmospheric Administration (USA) . . . . . [9224-5]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 33C . . . SUN 3:50 PM TO 5:20 PM

Systems

Session Chairs: **Mikhail I. Charnotskii,** National Oceanic and Atmospheric Administration (USA); **Christopher C. Davis,** Univ. of Maryland, College Park (USA)

3:50 pm: **A flexible cross-talk simulator for multiple spatial-mode free-space optical communication** *(Invited Paper)*, Jeffrey H. Shapiro, Massachusetts Institute of Technology (USA) . . . . . [9224-6]

4:20 pm: **Performance analysis of MIMO FSO systems with radial array beams and finite sized detectors**, Muhsin C. Gokce, Cankaya Univ. (Turkey); Canan Kamacıoglu, Çankaya Univ. (Turkey); Murat Uysal, Yahya K. Baykal, Ozyegin Univ. (Turkey) . . . . . [9224-7]

4:40 pm: **Precoding design for multiple user massive MIMO indoor visible light communication system**, Gang Chen, Tian Lang, Qian Gao, Univ. of California, Riverside (USA) . . . . . [9224-8]

5:00 pm: **Performance analysis of interference alignment with imperfect CSI in MIMO free space optical communications through turbulence**, Yaqin Zhao, Guowei Li, Xin Zhong, Guanghui Ren, Harbin Institute of Technology (China) . . . . . [9224-9]

LOCATION: CONV. CTR. ROOM 6A . . . . . SUN 5:45 TO 7:35 PM

Symposium-wide Plenary Session

5:45 pm: **Welcome and Opening Remarks,** H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA)

5:50 pm: **Bringing star power to Earth** *(Plenary)*, Mike Dunne, Lawrence Livermore National Lab. (USA) . . . . . [9178-201]

6:25 pm: **The Europa Clipper Mission concept: Exploring a potentially habitable world** *(Plenary)*, Robert T. Pappalardo, Jet Propulsion Lab. (USA) . . . . . [9218-202]

7:00 pm: **The road ahead for wearables** *(Plenary)*, Babak Parviz, Amazon Inc. (USA) . . . . . [9193-203]

MONDAY 18 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 33C . .MON 8:40 AM TO 10:10 AM

Adaptive Optics and Simulation

Session Chairs: **Karin Stein,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA)

8:40 am: **Atmospheric effects and ultimate ranging accuracy for lunar laser ranging** *(Invited Paper)*, Douglas G. Currie, Univ. of Maryland, College Park (USA); Ivan Prochazka, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9224-10]

9:10 am: **Analysis for the feasibility of a mobile sodium guide star system**, Steven M. Zuraski, Univ. of Dayton (USA) and U.S. Air Force (USA); Steven T. Fiorino, Air Force Institute of Technology (USA) . . . . . [9224-11]

9:30 am: **Intelligent correction of laser propagation through turbulent media by using adaptive optics**, Jonathan Ko, Chensheng Wu, Christopher C. Davis, Univ. of Maryland, College Park (USA). . . . . [9224-12]

9:50 am: **Current status and challenges in optical turbulence simulations in various layers of the Earth's atmosphere**, Ping He, Christopher G. Nunalee, Sukanta Basu, North Carolina State Univ. (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA); Steven T. Fiorino, Air Force Institute of Technology (USA) . [9224-13]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 4

LOCATION: CONV. CTR. ROOM 33C MON 10:40 AM TO 12:00 PM

Beam Reconstruction and Focusing

Session Chairs: **Heba Yuksel,** Bogaziçi Üniv. (Turkey); **Colin Reinhardt,** Space and Naval Warfare Systems Ctr. Pacific (USA)

10:40 am: **Phase and amplitude wave front sensing and reconstruction with a modified plenoptic camera**, Chensheng Wu, Jonathan Ko, William Nelson, Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . . . [9224-14]

11:00 am: **Advanced TIL regime for laser beam focusing in turbulent regime**, Phillip A. Sprangle, U.S. Naval Research Lab. (USA) and Univ. of Maryland, College Park (USA); Antonio C. Ting, U.S. Naval Research Lab. (USA); Anatoliy Khizhnyak, Ivan V. Tomov, Vladimir B. Markov, Dmitriy V. Korobkin, Advanced Systems & Technologies, Inc. (USA) . . . . . [9224-15]

11:20 am: **Evolution of laser-induced plasma in solvent aerosols**, Ronald J. Wroblewski, Alexandru Hening, Robert George, Scott C. McGirr, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-16]

11:40 am: **Applications of laser induced filaments for optical communication links**, Alexandru Hening, David T. Wayne, Mike Lovern, Mark E. Lasher, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-17]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 5

LOCATION: CONV. CTR. ROOM 33C . . . MON 1:30 PM TO 3:10 PM

Imaging and Non-Gaussian Beams

Session Chairs: **Arun K. Majumdar,** Naval Air Warfare Ctr. Weapons Div. (USA); **Christopher C. Davis,** Univ. of Maryland, College Park (USA)

1:30 pm: **Visualizing the effects of distributed volume Non-Kolmogorov and anisotropic turbulence on incoherent imaging**, Jeremy P. Bos, V.S. Rao Gudimetla, Air Force Research Lab. (USA) . . . . . [9224-18]

1:50 pm: **Examining the validity of using a Gaussian Schell model for modeling an extended beacon on a rough perfectly reflecting surface**, Santasri Basu, Air Force Institute of Technology (USA) and Oak Ridge Institute for Science and Education (USA); Milo W. Hyde IV, Air Force Institute of Technology (USA); Jack E. McCrae Jr., Air Force Institute of Technology (USA) and Oak Ridge Institute for Science and Education (USA); Mark F. Spencer, Steven T. Fiorino, Air Force Institute of Technology (USA) . . . . . [9224-19]

2:10 pm: **Scintillation reduction in multi-Gaussian Schell-model beams propagating in atmospheric turbulence**, Svetlana Avramov-Zamurovic, Charles Nelson, Reza Malek-Madani, U.S. Naval Academy (USA); Yalong Gu, The City College of New York (USA); Greg Gbur, The Univ. of North Carolina at Charlotte (USA); Olga Korotkova, Univ. of Miami (USA) . . . . . [9224-20]

2:30 pm: **Laboratory implementation of partially coherent beams with super-Gaussian distribution**, Xifeng Xiao, New Mexico State Univ. (USA); Olga Korotkova, Univ. of Miami (USA); David G. Voelz, New Mexico State Univ. (USA) . . . . . [9224-21]

2:50 pm: **3D geometric modeling and simulation of laser propagation through turbulence with plenoptic functions**, Chensheng Wu, William Nelson, Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . . . [9224-22]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 33C . . . MON 3:40 PM TO 5:30 PM

Atmospheric Effects I

Session Chairs: **Jeremy P. Bos,** Air Force Research Lab. (USA); **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

3:40 pm: **A hierarchy of atmospheric effects and laser beam detection** *(Invited Paper)*, John S. deGrassie, Ike Bendall, Stephen M. Hammel, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-23]

4:10 pm: **A reconsideration of the best wavelengths for free-space optics**, Colin Reinhardt, John S. deGrassie, Stephen M. Hammel, Space and Naval Warfare Systems Ctr. Pacific, San Diego (USA) . . . . . [9224-24]

4:30 pm: **Simultaneous atmospheric extinction and scintillation estimation using a modulated beacon**, Colin Reinhardt, David T. Wayne, Stephen M. Hammel, Kevin M. McBryde, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-25]

4:50 pm: **Investigation of scintillometer designs for dynamic path measurement**, Stephen M. Hammel, David T. Wayne, Colin Reinhardt, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-26]

5:10 pm: **Propagation of light through ship exhaust plumes**, Miranda van Iersel, Ric H. Schleijpen, Alexander M. J. van Eijk, Andreas Mack, TNO Defence, Security and Safety (Netherlands) . . . . . [9224-27]

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Double wedge scanning system with large range and high accuracy for satellite trajectory optical simulation, Lijuan Wang, Jianfeng Sun, Yu Zhou, Zhu Luan, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China). [9224-47]

Effects of target reflective characteristics on laser ranging by comparing the BRDF model with the Lambertian model, Wen-Ting Wang, Ying-Ying Yang, Institute of Semiconductors (China); Bao-Hua Wang, Institute of Semiconductor (China); Xue-Chun Lin, Institute of Semiconductors (China) . . . . . [9224-48]

Indoor demonstration of free-space picosecond two-way time transfer on single photon level, Josef Blazej, Ivan Prochazka, Czech Technical Univ. in Prague (Czech Republic); Jan Kodet, Czech Technical Univ. in Prague (Czech Republic) and Technische Univ. München (Germany) . . . . . [9224-49]

Effects of de-blurring on background modeling used for surveillance in long-distance horizontal imaging, Yitzhak Yitzhaky, Adiel Elkabetz, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9224-50]

Adaptive optics for ocean surface wavefront sensing: polarized modulated directed beams, Katharine J. Jones, WBAO Consultant Group (USA) . . . [9224-51]

Adaptive optical wavefront compensation system with space filter for satellite-to-ground laser communication link, Jianfeng Sun, Wei Lu, Yu Zhou, Ya'nan Zhi, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China). . . . . [9224-52]

Indoor visible light communication: modeling and analysis of multi-state modulation, Petr Koudelka, Jan Latal, Petr Siska, Jan Vitasek, Andrej Liner, Radek Martinek, Vladimir Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . . . [9224-53]

TUESDAY 19 AUGUST

SESSION 7

LOCATION: CONV. CTR. ROOM 33C . . TUE 8:20 AM TO 10:10 AM

Atmospheric Effects II

Session Chairs: **Douglas G. Currie,** Univ. of Maryland, College Park (USA); **David T. Wayne,** Space and Naval Warfare Systems Ctr. Pacific (USA)

8:20 am: **Atmospheric limitations on the performance of electro-optical systems** *(Invited Paper)*, Karin U. Stein, Szymon Gladysz, Dirk P. Seiffer, Detlev Sprung, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) . . . . . [9224-28]

8:50 am: **Turbulence estimation and mitigation in horizontal path imaging**, Kristofor Gibson, Space and Naval Warfare Systems Ctr. Pacific (USA) . . [9224-29]

9:10 am: **Impact of large-scale atmospheric refractive structures on optical wave propagation**, Christopher G. Nunalee, Ping He, Sukanta Basu, North Carolina State Univ. (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA); Steven T. Fiorino, Air Force Institute of Technology (USA) . . . . . [9224-30]

9:30 am: **Estimation and prediction of optical turbulence in the atmospheric surface layer**, Yao Wang, Sukanta Basu, North Carolina State Univ. (USA)[9224-31]

9:50 am: **Reconstructing the prevailing meteorological and optical environment during the time of the Titanic disaster**, Sukanta Basu, Chris G. Nunalee, Ping He, North Carolina State Univ. (USA); Steven T. Fiorino, Air Force Institute of Technology (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA)[9224-32]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

CONFERENCE 9224

LOCATION: CONV. CTR. ROOM 33C

SESSION 8

LOCATION: CONV. CTR. ROOM 33C . TUE 10:40 AM TO 12:00 PM

Propagation

Session Chairs: **John S. deGrassie,** Space and Naval Warfare Systems Ctr. Pacific (USA); **Stephen M. Hammel,** Space and Naval Warfare Systems Command (USA)

10:40 am: **On the atmospheric propagation of Gaussian, Bessel, and airy beams**, John P. Palastro, William Nelson, Chris C. Davis, Phil A. Sprangle, Univ. of Maryland, College Park (USA) . . . . . [9224-33]

11:00 am: **Real-time hardware background subtraction**, Galen Cauble, David T. Wayne, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-34]

11:20 am: **Enhanced backscatter of optical beams reflected in atmospheric turbulence**, William Nelson, John P. Palastro, Chensheng Wu, Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . . . [9224-35]

11:40 am: **Experimental results on the enhanced backscatter phenomenon and its dynamics**, Chensheng Wu, William Nelson, Jonathan Ko, Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . . . [9224-36]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 9

LOCATION: CONV. CTR. ROOM 33C .... TUE 1:30 PM TO 3:10 PM

Underwater Communication

Session Chairs: **Gang Chen,** Univ. of California, Riverside (USA); **David T. Wayne,** Space and Naval Warfare Systems Ctr. Pacific (USA)

1:30 pm: **LED based underwater optical wireless communication**, Shlomi Arnon, Etai Rosenkrantz, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9224-37]

1:50 pm: **Modulated retro reflector for VLC applications**, Etai Rosenkrantz, Shlomi Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . . . [9224-38]

2:10 pm: **Statistical characterization of fluctuations of a laser beam transmitted through a random air-water interface: new results from a laboratory experiment**, Arun K. Majumdar, Phillip Land, John Siegenthaler, Naval Air Warfare Ctr. Weapons Div. (USA) . . . . . [9224-39]

2:30 pm: **Multiple phase-screen simulation of oceanic beam propagation**, Nathan H. Farwell, Olga Korotkova, Univ. of Miami (USA) . . . . . [9224-40]

2:50 pm: **A novel method to optimize the wavelength for underwater free-space optical communications**, Burton Neuner III, B. Melvin L. Pascoguin, Space and Naval Warfare Systems Ctr. Pacific (USA) . . . . . [9224-41]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 10

LOCATION: CONV. CTR. ROOM 33C ... TUE 3:40 PM TO 5:00 PM

Novel Applications and Designs

Session Chairs: **Christopher C. Davis,** Univ. of Maryland, College Park (USA); **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands)

3:40 pm: **Statistical characteristics of free space optical systems employing reception spatial diversity**, Jose Paulo G. de Oliveira, Univ. de Pernambuco/FITec (Brazil) . . . . . [9224-42]

4:00 pm: **Vehicular ranging and communication system design based on PD array**, Gang Chen, Zening Li, Linchao Liao, Univ. of California, Riverside (USA) . . . . . [9224-43]

4:20 pm: **NLOS UV communication performance analysis for turbulence channel**, Gang Chen, Linchao Liao, Zening Li, Univ. of California, Riverside (USA) . . . . . [9224-44]

4:40 pm: **Inter-satellite coherent optical communication homodyne receiver locked frequency analysis and method**, Guo Haichao, China Academy of Space Technology (China) . . . . . [9224-45]

CONFERENCE 9225

LOCATION: CONV. CTR. ROOM 33C

Monday, Wednesday and Thursday 18, 20 and 21 August 2014 • Proceedings of SPIE Vol. 9225

Quantum Communications and Quantum Imaging XII

Conference Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Yanhua Shih,** Univ. of Maryland, Baltimore County (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

Program Committee: **Stefania A. Castelletto,** RMIT Univ. (Australia); **Milena D'Angelo,** Univ. degli Studi di Bari (Italy); **Mark T. Gruneisen,** Air Force Research Lab. (USA); **Richard J. Hughes,** Los Alamos National Lab. (USA); **Yoon-Ho Kim,** Pohang Univ. of Science and Technology (Korea, Republic of); **Todd B. Pittman,** Univ. of Maryland, Baltimore County (USA); **Barry C. Sanders,** Univ. of Calgary (Canada); **Alexander V. Sergienko,** Boston Univ. (USA); **Dmitry V. Strekalov,** Jet Propulsion Lab. (USA); **Shigeki Takeuchi,** Hokkaido Univ. (Japan); **Xiao Tang,** National Institute of Standards and Technology (USA); **Arnold Tunick,** U.S. Army Research Lab. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Digital spiral-phase bi-photon imaging, Thandeka I. Mhlanga, Melanie McLaren, Alpha Ibrahim, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . [9225-24]

Review of representative free-space quantum communications experiments, Ronald E. Meyers, Keith Deacon, Arnold Tunick, U.S. Army Research Lab. (USA); Sanjit Karmakar, Univ. of Maryland, Baltimore County (USA). . . . . [9225-25]

Thermal light imaging with non-classical resolution, Jane N. Sprigg, Tao Peng, Yanhua Shih, Univ. of Maryland, Baltimore County (USA) . . . . . [9225-34]

WEDNESDAY 20 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33C . WED 8:00 AM TO 10:10 AM

Quantum Imaging

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

8:00 am: **Overcoming classical measurement limits through photon number correlations** *(Invited Paper)*, Marco Genovese, Istituto Nazionale di Ricerca Metrologica (Italy) . . . . . [9225-1]

8:30 am: **Quantum ghost imaging research at ARL** *(Invited Paper)*, Ronald E. Meyers, Keith Deacon, U.S. Army Research Lab. (USA) . . . . . [9225-2]

9:00 am: **Sub-Poissonian spatial correlations detected by novel photon number resolving camera** *(Invited Paper)*, Radoslaw Chrapkiewicz, Michal Dabrowski, Michal Parniak, Wojciech Wasilewski, Univ. of Warsaw (Poland). . . . . [9225-3]

9:30 am: **Reduction effect of the accumulated number of ghost imaging by circulatory pattern**, Kyuki Shibuya, Katsuhiro Nakae, Yasuhiro Mizutani, Tetsuo Iwata, Univ. of Tokushima (Japan) . . . . . [9225-4]

9:50 am: **Imaging single photons in non-separable polarization-spatial states**, Enrique J. Galvez, Xinru Cheng, Colgate Univ. (USA). . . . . [9225-5]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 2

LOCATION: CONV. CTR. ROOM 33C .WED 10:40 AM TO 11:40 AM

Quantum Communications I

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

10:40 am: **Quantum repeater architecture and NV-based node technology** *(Invited Paper)*, Kae Nemoto, National Institute of Informatics (Japan). . . . [9225-16]

11:10 am: **Enhancement of quantum noise effect by classical error control codes in the intensity modulation based Y-00 quantum stream cipher** *(Invited Paper)*, Kentaro Kato, Tamagawa Univ. (Japan) . . . . . [9225-19]

Lunch/Exhibition Break . . . . . .Wed 11:40 am to 1:30 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33C . . . WED 1:30 PM TO 3:00 PM

Quantum Information

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

1:30 pm: **Verification and validation of a quantum random number generator** *(Invited Paper)*, Travis S. Humble, Oak Ridge National Lab. (USA). . . . . [9225-9]

2:00 pm: **Conditionally random phase imprint of a beam profile: a spatial analogue to a non-Markovian process** *(Invited Paper)*, Jandir M. Hickmann, Ana C. Ribeiro-Teixeira, Univ. Federal do Rio Grande do Sul (Brazil); Itamar V. S. de Lima, Univ. Federal da Paraíba (Brazil); Ricardo R. Bordalo Correia, Sandra D. Prado, Robert Fischer, Univ. Federal do Rio Grande do Sul (Brazil). . . . . [9225-10]

2:30 pm: **Z_2 quantum memory implemented on circuit quantum electrodynamics** (Invited Paper), Thi Ha Kyaw, Ctr. for Quantum Technologies (Singapore); Simone Felicetti, Guillermo Romero, Enrique Solano, Univ. del País Vasco (Spain); Leong-Chuan Kwek, Ctr. for Quantum Technologies (Singapore) . . . . . [9225-11]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

CONFERENCE 9225
LOCATION: CONV. CTR. ROOM 33C

SESSION 4

LOCATION: CONV. CTR. ROOM 33C . . . WED 3:30 PM TO 5:20 PM

Entanglement / Metrology

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

3:30 pm: **Complete temporal characterization of single photons** *(Invited Paper)*, Adarsh S. Prasad, Univ. of Calgary (Canada); Zhongzhong Qin, Univ. of Calgary (Canada) and East China Normal Univ. (China); Travis Brannan, Univ. of Calgary (Canada); Alexander I. Lvovsky, Univ. of Calgary (Canada) and Russian Quantum Ctr. (Russian Federation); Andrew MacRae, Univ. of Calgary (Canada) and Univ. of California, Berkeley (USA); Arina Tashchilina, Univ. of Calgary (Canada) . . [9225-12]

4:00 pm: **Radial modal dependence of azimuthal spectrum after parametric down-convertion**, Yingwen Zhang, Filippus S. Roux, Melanie McLaren, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9225-13]

4:20 pm: **Quantum process tomography with unknown measurements** *(Invited Paper)*, Michał Karpiński, Merlin Cooper, Brian J. Smith, Univ. of Oxford (United Kingdom) . . . . . [9225-14]

4:50 pm: **Experimental test of error-disturbance uncertainty relations by weak measurement** *(Invited Paper)*, Keiichi Edamatsu, Fumihiro Kaneda, So-Young Baek, Tohoku Univ. (Japan); Masanao Ozawa, Nagoya Univ. (Japan) . . . . [9225-15]

THURSDAY 21 AUGUST

SESSION 5

LOCATION: CONV. CTR. ROOM 33C . . THU 8:00 AM TO 10:30 AM

Quantum Communications II

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

8:00 am: **High performance quantum communication without the needs of quantum memories** *(Invited Paper)*, William J. Munro, NTT Basic Research Labs. (Japan) . . . . . [9225-6]

8:30 am: **Quantum teleportation via a 143 km free-space link** *(Invited Paper)*, Thomas Herbst, Univ. Wien (Austria); Xiao-Song Ma, Yale Univ. (USA); Thomas Scheidl, Institut für Quantenoptik und Quanteninformation (Austria); Bernhard Wittmann, Institut für Quantenoptik und Quanteninformation (Austria) and Univ. Wien (Austria); Rupert Ursin, Institut für Quantenoptik und Quanteninformation (Austria); Anton Zeilinger, Institut für Quantenoptik und Quanteninformation (Austria) and Univ. Wien (Austria) . . . . . [9225-17]

9:00 am: **FEC coding for QKD at higher photon flux levels based on spatial entanglement of twin beams in PDC** *(Invited Paper)*, Marina Mondin, Politecnico di Torino (Italy); Fred Daneshgaran, California State Univ., Los Angeles (USA); Inam Bari, Politecnico di Torino (Italy) . . . . . [9225-18]

9:30 am: **Progress in Y-00 physical cipher for Giga bit /sec optical data communications** *(Invited Paper)*, Osamu Hirota, Fumio Futami, Tamagawa Univ. (Japan) . . . . . [9225-8]

10:00 am: **Information teleportation networks** *(Invited Paper)*, Ronald E. Meyers, Keith Deacon, Arnold Tunick, U.S. Army Research Lab. (USA) . . . . . [9225-20]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 6

LOCATION: CONV. CTR. ROOM 33C . . THU 11:00 AM TO 12:20 PM

Quantum Information and Technology

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon,** U.S. Army Research Lab. (USA)

11:00 am: **Towards large scale quantum information processing with trapped ions** *(Invited Paper)*, Winfried K. Hensinger, Univ. of Sussex (United Kingdom) . . . . . [9225-21]

11:30 am: **A waveguide frequency converter connecting rubidium-based quantum memories to the telecom C-band** *(Invited Paper)*, Boris Albrecht, Pau Farrera, ICFO - Institut de Ciències Fotòniques (Spain); Xavier Fernandez-Gonzalvo, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. of Otago (New Zealand); Matteo Cristiani, Hugues de Riedmatten, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9225-22]

12:00 pm: **Principle for possible memory structures with extra high density by using the electron sharing mechanisms of atoms in an inflective orbit**, Taner Sengor, Yýldýz Teknik Üniv. (Turkey) . . . . . [9225-23]

Lunch/Exhibition Break . . . . . 12:20 pm to 1:50 pm

SESSION 7:

Quantum Information II

LOCATION: CONV. CTR. ROOM 33C . . . . . THU 1:50 PM - 2:50 PM

Session Chairs: **Ronald E. Meyers,** U.S. Army Research Lab. (USA); **Keith S. Deacon**, U.S. Army Research Lab. (USA)

1:50 pm: **Rydberg excitation assisted light shift blockade in Rb atoms for realizing a collective state quantum bit and quantum memory** *(Invited Paper)***,** 9225-35 Selim M. Shahriar, May Kim, Yanfei Tu, Northwestern Univ. (USA) . . . . . [9225-35]

2:10 pm: **Statistics, quantum coherence of thermal and pseudo-thermal light,** Yanhua Shih, Univ. of Maryland, Baltimore County (USA) . . . . . [9225-36]

2:30 pm: **On the delayed-choice quantum eraser with thermal light,** Tao Peng, Hui Chen, Yanhua Shih, Univ. of Maryland, Baltimore County (USA); Marlan O. Scully, Texas A&M Univ. (USA) . . . . . [9225-37]

CONFERENCE 9226

LOCATION: CONV. CTR. ROOM 5B

Monday–Tuesday 18–19 August 2014 • Proceedings of SPIE Vol. 9226

Nanophotonics and Macrophotonics for Space Environments VIII

Conference Chairs: **Edward W. Taylor,** International Photonics Consultants, Inc. (USA); **David A. Cardimona,** Air Force Research Lab. (USA)

Conference Co-Chairs: **Ronald G. Pirich,** Northrop Grumman Aerospace Systems (Retired) (USA); **Narasimha S. Prasad,** NASA Langley Research Ctr. (USA)

Program Committee: **Joseph C. Boisvert,** Spectrolab, Inc. (USA); **Yiqiao Chen,** SVT Associates, Inc. (USA); **Koen Clays,** Katholieke Univ. Leuven (Belgium); **Jason Cline,** Spectral Sciences, Inc. (USA); **Vincent M. Cowan,** Air Force Research Lab. (USA); **Nathan J. Dawson,** Youngstown State Univ. (USA); **Jihong Geng,** AdValue Photonics, Inc. (USA); **Michael J. Hayduk,** Air Force Research Lab. (USA); **F. Kenneth Hopkins,** Air Force Research Lab. (USA); **Huan Huang,** PolarOnyx, Inc. (USA); **Gary B. Hughes,** California Polytechnic State Univ., San Luis Obispo (USA); **Kenneth J. Jerkatis,** Boeing Directed Energy Systems (USA); **Mark G. Kuzyk,** Washington State Univ. (USA); **Serge Oktyabrsky,** Univ. at Albany (USA); **Javier Pérez-Moreno,** Skidmore College (USA); **Sam-Shajing Sun,** Norfolk State Univ. (USA); **Michael D. Watson,** NASA Marshall Space Flight Ctr. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. ROOM 5B . . . . . 8:00 AM TO 8:10 AM

Welcome and Introduction

Conference Chair: **Edward W. Taylor**, International Photonics Consultants, Inc. (USA)

SESSION 1

LOCATION: CONV. CTR. ROOM 5B . . . MON 8:10 AM TO 10:30 AM

Technology for Planetary Defense

Session Chair: **Gary B. Hughes,** California Polytechnic State Univ., San Luis Obispo (USA)

8:10 am: **Optical modeling for a laser phased-array directed energy system** *(Invited Paper)*, Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (USA); Philip Lubin, Univ. of California, Santa Barbara (USA); Hugh O'Neill, California Polytechnic State Univ., San Luis Obispo (USA); Peter Meinhold, Jon Suen, Johanna Bible, Jordan Riley, Isabella J. Hummelgård, Univ. of California, Santa Barbara (USA); Mark Pryor, Vorticity, Inc. (USA); Miikka Kangas, Univ. of California, Santa Barbara (USA) . . . . . [9226-1]

8:40 am: **Mechanical design for a laser phased-array directed energy system**, Hugh O'Neill, California Polytechnic State Univ., San Luis Obispo (USA); Philip Lubin, Univ. of California, Santa Barbara (USA); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (USA); Mark Pryor, Vorticity, Inc. (USA); Peter Meinhold, Jon Suen, Miikka Kangas, Johanna Bible, Caio Motta, Jordan Riley, Isabella J. Hummelgård, Univ. of California, Santa Barbara (USA) . . . [9226-2]

9:00 am: **Frequency stabilized lasers for space applications**, Michael Lieber, Michael Adkins, Robert Pierce, Robert Warden, Cynthia Wallace, Carl Weimer, Ball Aerospace & Technologies Corp. (USA) . . . . . [9226-3]

9:20 am: **Directed energy active illumination for near-Earth object detection**, Jordan Riley, Philip Lubin, Univ. of California, Santa Barbara (USA); Gary B. Hughes, Hugh O'Neill, California Polytechnic State Univ., San Luis Obispo (USA); Peter Meinhold, Jon Suen, Johanna Bible, Isabella J. Hummelgård, Janelle Griswold, Brianna Cook, Univ. of California, Santa Barbara (USA). . . . . [9226-4]

9:40 am: **Effects of asteroid rotation on directed energy deflection**, Isabella J. Hummelgård, Philip Lubin, Univ. of California, Santa Barbara (USA); Gary B. Hughes, Hugh O'Neill, California Polytechnic State Univ., San Luis Obispo (USA); Peter Meinhold, Jon Suen, Johanna Bible, Jordan Riley, Jane Wu, Univ. of California, Santa Barbara (USA) . . . . . [9226-5]

10:00 am: **Recent advances in theoretical modeling of laser ablation for asteroid deflection** *(Invited Paper)*, Nicolas Thiry, Massimiliano Vasile, Univ. of Strathclyde (United Kingdom) . . . . . [9226-6]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

SESSION 2

LOCATION: CONV. CTR. ROOM 5B . . MON 11:00 AM TO 12:00 PM

Space Experiments, Systems, and Components

Session Chairs: **Michael D. Watson,** NASA Marshall Space Flight Ctr. (USA); **Narasimha S. Prasad,** NASA Langley Research Ctr. (USA)

11:00 am: **Post-flight test results of acousto-optic modulator and acousto-optic tunable filter devices subjected to space exposure** *(Invited Paper)*, Narasimha S. Prasad, NASA Langley Research Ctr. (USA); Sudhir B. Trivedi, Jolanta I. Soos Rosemeier, Brimrose Corp. of America (USA) . . . . . [9226-7]

11:30 am: **System engineering of photonic systems for space application** *(Invited Paper)*, Michael D. Watson, NASA Marshall Space Flight Ctr. (USA)[9226-8]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

LOCATION: CONV. CTR. ROOM 5B . MON 1:30 PM TO 2:30 PM

Keynote Session

Session Chair: **Edward W. Taylor,** International Photonics Consultants, Inc. (USA)

1:30 pm: **Microfossils and biomolecules in carbonaceous meteorites: implications to the possibility of life in water-bearing asteroids and comets** *(Keynote Presentation)*, Richard B. Hoover, Univ. of Buckingham (United Kingdom) and Athens State Univ. (USA) . . . . . [9226-9]

SESSION 3

LOCATION: CONV. CTR. ROOM 5B . . . . MON 2:30 PM TO 3:30 PM

Theoretical and Simulated Testing of Advanced Photonic Materials

Session Chairs: **Javier Pérez-Moreno,** Skidmore College (USA); **Jason Cline,** Spectral Sciences, Inc. (USA)

2:30 pm: **Sensitivity of rarefied gas simulations of satellite ground tests to gas-surface interaction models** *(Invited Paper)*, Jason Cline, Timothy Deschenes, Jason Quenneville, Ramona S. Taylor, Spectral Sciences, Inc. (USA) . . . . [9226-10]

3:00 pm: **Determining the molecular origin of radiation damage/enhancement in electro-optic polymeric materials through polarized light microscopy** *(Invited Paper)*, Javier Pérez-Moreno, Skidmore College (USA) . . . . . [9226-11]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

CONFERENCE 9226

LOCATION: CONV. CTR. ROOM 5B

SESSION 4

LOCATION: CONV. CTR. ROOM 5B . . . MON 4:00 PM TO 5:30 PM

Fiber Optic Technology

Session Chair: **Ronald G. Pirich,** Northrop Grumman Aerospace Systems (USA)

4:00 pm: **Internal strain monitoring in composite materials with embedded photonic crystal fiber Bragg gratings** *(Invited Paper)*, Thomas Geernaert, Camille Sonnenfeld, Sanne Sulejmani, Vrije Univ. Brussel (Belgium); Karima Chah, Univ. de Mons (Belgium); Geert Luyckx, Nicolas Lammens, Eli J. Voet, Univ. Gent (Belgium); Martin Becker, Institut für Photonische Technologien e.V. (Germany); Francis Berghmans, Hugo Thienpont, Vrije Univ. Brussel (Belgium) . . . . . [9226-12]

4:30 pm: **Fiber optical sensors for aircraft applications** *(Invited Paper)*, Ralf D. Pechstedt, Oxsensis Ltd. (United Kingdom) . . . . . [9226-13]

5:00 pm: **Synopsis of fiber optics in harsh environments** *(Invited Paper)*, Ronald G. Pirich, Long Island Forum for Technology (USA) . . . . . [9226-14]

TUESDAY 19 AUGUST

LOCATION: CONV. CTR. ROOM 5B . . . . . 8:00 AM TO 8:10 AM

Welcome and Introduction

Conference Chair: **Edward W. Taylor**, International Photonics Consultants, Inc. (USA)

SESSION 5

LOCATION: CONV. CTR. ROOM 5B . . . TUE 8:10 AM TO 10:00 AM

Advances in Lasers, Nanomaterials, and Integrated Systems

Session Chairs: **Kenneth J. Jerkatis,** Boeing Directed Energy Systems (USA); **F. Kenneth Hopkins,** Air Force Research Lab. (USA)

8:10 am: **On life assessment of high reliability high power optical switch**, Yuanjian Xu, Peter Chu, Boeing Satellite Systems International, Inc. (USA)[9226-15]

8:30 am: **Compact VCSEL-based laser array communications systems for improved data performance in satellites** *(Invited Paper)*, Richard F. Carson, Mial E. Warren, John R. Joseph, Thomas Wilcox, David J. Abell, Kirk J. Otis, TriLumina, Inc. (USA); Charles P. Collier, Air Force Research Lab. (USA) . . . . . [9226-16]

9:00 am: **Germanium devices for integrated photonic circuits** *(Invited Paper)*, F. Kenneth Hopkins, Air Force Research Lab. (USA); Alexander C. Benken, Kevin M. Walsh, Univ. of Louisville (USA); John G. Jones, Kent Averett, Darnell E. Diggs, Air Force Research Lab. (USA). . . . . [9226-17]

9:30 am: **Shockwave consolidation of nanostructured thermoelectric materials** *(Invited Paper)*, Narasimha S. Prasad, NASA Langley Research Ctr. (USA); Patrick J. Taylor, U.S. Army Research Lab. (USA); David C. Nemir, TXL Group, Inc. (USA) . . . . . [9226-18]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: CONV. CTR. ROOM 5B . . TUE 10:30 AM TO 12:00 PM

Advances in Space Power Technology

Session Chairs: **Sam-Shajing Sun,** Norfolk State Univ. (USA); **Yiqiao Chen,** SVT Associates, Inc. (USA)

10:30 am: **Next-generation space solar cells** *(Invited Paper)*, Joseph C. Boisvert, Daniel C. Law, Richard R. King, Eric M. Rehder, Philip T. Chiu, Xing-Quan Liu, William D. Hong, Shoghig Mesropian, Kenneth M. Edmondson, Scott B. Singer, Nasser H. Karam, Spectrolab, Inc. (USA) . . . . . [9226-19]

11:00 am: **AlGaAsSb as a top cell material for InP-based triple-junction solar cells** *(Invited Paper)*, Yiqiao Chen, SVT Associates, Inc. (USA) . . . . . [9226-20]

11:30 am: **Engineering polymer frontier orbitals for efficient photon harvesting** *(Invited Paper)*, Sam-Shajing Sun, Tanya S. David, Norfolk State Univ. (USA) . . . . . [9226-21]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

LOCATION: CONV. CTR. ROOM 5B . . . . . 1:30 PM TO 1:40 PM

Welcome and Introduction

Conference Chair: **David A. Cardimona**, Air Force Research Lab. (USA)

SESSION 7

LOCATION: CONV. CTR. ROOM 5B . . . . .TUE 1:40 PM TO 3:00 PM

Advances in Detector Technologies I

Session Chair: **Vincent M. Cowan,** Air Force Research Lab. (USA)

1:40 pm: **Heterostructure engineering of type II superlattice detectors** *(Invited Paper)*, Sanjay Krishna, The Univ. of New Mexico (USA) . . . . . [9226-22]

2:10 pm: **Long wavelength infrared HgCdTe photodetectors exposed to proton radiation** *(Invited Paper)*, Jeremy D. Bergeson, Silviu Velicu, Ramana Bommena, Stephen Fahey, EPIR Technologies, Inc. (USA); Vincent M. Cowan, Christian P. Morath, Air Force Research Lab. (USA) . . . . . [9226-23]

2:40 pm: **High operating temperature midwave infrared photodetectors based on InAs/GaSb type II strained layer superlattices**, David A. Ramirez, SKINfrared LLC (USA); Elena Plis, SKINfrared LLC (USA) and The Univ. of New Mexico (USA); Stephen A. Myers, SKINfrared LLC (USA); Sanjay Krishna, The Univ. of New Mexico (USA) and SKINfrared LLC (USA) . . . . . [9226-24]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 8

LOCATION: CONV. CTR. ROOM 5B . . . . TUE 3:30 PM TO 4:40 PM

Advances in Detector Technologies II

Session Chair: **Vincent M. Cowan,** Air Force Research Lab. (USA)

3:30 pm: **Effect of defects on III-V MWIR nBn detector performance**, Gregory R. Savich, Daniel E. Sidor, Univ. of Rochester (USA); Vincent M. Cowan, Christian P. Morath, Air Force Research Lab. (USA); Gary W. Wicks, Univ. of Rochester (USA) . . . . . [9226-25]

3:50 pm: **In-situ minority carrier lifetime measurements at radiation sources for rad-hard IR detector materials**, Geoffrey D. Jenkins, Air Force Research Lab. (USA) . . . . . [9226-26]

4:10 pm: **Biopolymers suitable for space environments** *(Invited Paper)*, James G. Grote, Fahima Ouchen, Air Force Research Lab. (USA); Perry P. Yaney, Univ. of Dayton (USA). . . . . [9226-27]

CONFERENCE 9227

LOCATION: CONV. CTR. ROOM 33B

Thursday 21 August 2014 • Proceedings of SPIE Vol. 9227

Unconventional Imaging and Wavefront Sensing X

Conference Chairs: **Jean J. Dolne,** The Boeing Co. (USA); **Thomas J. Karr,** Defense Advanced Research Projects Agency (USA); **Victor L. Gamiz,** Air Force Research Lab. (USA)

Conference Co-Chair: **David C. Dayton,** Applied Technology Associates (USA)

Program Committee: **Stephen C. Cain,** Air Force Institute of Technology (USA); **James Fienup,** Univ. of Rochester (USA); **Wes D. Freiwald,** Pacific Defense Solutions, LLC (USA); **Richard B. Holmes,** Boeing LTS Inc. (USA); **Liren Liu,** Shanghai Institute of Optics and Fine Mechanics (China); **Zhaowei Liu,** Univ. of California, San Diego (USA); **Sergio R. Restaino,** U.S. Naval Research Lab. (USA); **Michael C. Roggemann,** Michigan Technological Univ. (USA); **Robert K. Tyson,** The Univ. of North Carolina at Charlotte (USA); **David G. Voelz,** New Mexico State Univ. (USA)

MONDAY 18 AUGUST

LOCATION: CONV. CTR. EXHIBIT HALL B1 . . MON 5:30 TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. See page 281 for setup instructions.

Phase detection experiment for the down-looking synthetic aperture imaging ladar with electro-optic modulation, Zhiyong Lu, Jianfeng Sun, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9227-12]

Speckle effect in a down-looking synthetic aperture imaging ladar, Qian Xu, Yu Zhou, Jianfeng Sun, Zhiyong Lu, Zhiwei Sun, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9227-14]

Phase error suppression by low-pass filtering for synthetic aperture imaging ladar, Zhiwei Sun, Peipei Hou, Ya'nan Zhi, Jianfeng Sun, Qian Xu, Zhiyong Lu, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China). . . . . [9227-15]

THURSDAY 21 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 33B . . THU 8:20 AM TO 10:00 AM

Wavefront Sensing and Imaging

Session Chair: **David C. Dayton,** Applied Technology Associates (USA)

8:20 am: **Hybrid curvature and modal wavefront sensor**, Shihao Dong, Univ. Stuttgart (Germany); Tobias Haist, Tom Dietrich, Wolfgang Osten, Institut für Technische Optik (Germany) . . . . . [9227-1]

8:40 am: **Nanosatellite wavefront sensing for in-space demonstration of deformable mirrors**, Anne D. Marinan, Kerri L. Cahoy, Caitlin Kerr, Massachusetts Institute of Technology (USA); Matthew Webber, Harvard-Smithsonian Ctr. for Astrophysics (USA); Ruslan Belikov, Eduardo A. Bendek, NASA Ames Research Ctr. (USA). . . . . [9227-3]

9:00 am: **Spectral method for calculating pixel overlap areas applied to multiframe image de-aliasing**, Edward Cohen, Richard H. Picard, ARCON Corp. (USA); Peter N. Crabtree, Air Force Research Lab. (USA) . . . . . [9227-4]

9:20 am: **Comparison of sensor noise effects on FITTS and projection based phase only correlation algorithms for high speed video trackers**, David C. Dayton, Applied Technology Associates (USA) . . . . . [9227-5]

9:40 am: **Analysis of detection position in wavefront sensor-less adaptive optics systems**, Lizhi Dong, Ping Yang, Wenjin Liu, Shuai Wang, Xing He, Bing Xu, Institute of Optics and Electronics (China) . . . . . [9227-6]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 2

LOCATION: CONV. CTR. ROOM 33B . .THU 10:30 AM TO 11:30 AM

Optical Systems Performance Analysis

Session Chair: **Jean J. Dolne,** The Boeing Co. (USA)

10:30 am: **Statistical bounds and maximum likelihood performance for shot noise limited knife-edge modeled stellar occultation**, Peter N. Crabtree, Patrick J. McNicholl, Air Force Research Lab. (USA) . . . . . [9227-7]

10:50 am: **Effect of different wall thicknesses on the accuracy of through-the-wall radar imaging using biconical antenna array**, Mohd Z. Abdullah, Nik Syahrim Nik Anwar, Univ. Sains Malaysia (Malaysia) . . . . . [9227-8]

11:10 am: **An iterative procedure for ultra-wideband imagery of space objects from distributed multi-band radar data**, Xiaojian Xu, Xin Li, BeiHang Univ. (China); Feiyang He, BeiHang Univ (China) . . . . . [9227-9]

Lunch/Exhibition Break . . . . . Thu 11:30 am to 1:40 pm

SESSION 3

LOCATION: CONV. CTR. ROOM 33B . . . THU 1:40 PM TO 2:40 PM

Imaging Systems and Analysis I

Session Chair: **Victor L. Gamiz,** Air Force Research Lab. (USA)

1:40 pm: **A telescopic cinema sound camera for observing high altitude aerospace vehicles**, Dan Slater, Consultant (USA) . . . . . [9227-10]

2:00 pm: **Three-dimensional imaging using differential synthetic aperture interferometry**, Ning Zhang, Yu Zhou, Jianfeng Sun, Ya'nan Zhi, Zhiyong Lu, Qian Xu, Zhiwei Sun, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9227-13]

2:20 pm: **Experimental comparison of angular resolutions between the TOMBO and single lens systems**, Ping Yang, Yuan Gao, Guomao Tang, Bing Xu, Institute of Optics and Electronics (China) . . . . . [9227-16]

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

A
A., Sivanantharaja [9190-18] S4
Aaron, David [9218-16] S4
Abate, Antonio [9184-22] S6
Abate, Yohannes [9184-86] SPWed
Abb, Martina [9161-7] S2
Abbott, Elsa [9218-27] S6
Abbott, R. Q. [9211-13] S4
Abdelsamie, Maged [9165-42] S12
Abdulhalim, Ibrahim [9172-43] S2, [9182-26] S5
Abdullah, Mohd Zaid [9217-39] S5, [9217-63] S10, [9227-8] S2
Abell, David J. [9226-16] S5
Abell, Joshua 9199 Program Committee
Abeywickrema, Ujitha A. [9194-16] S4, [9200-34] S4
Abir, Hraghi [9194-18] S4
Abou-El-Hossein, Khaled [9192-38] SPMon
Abouzeid, Abraham H. [9166-5] S1
Abraham, Nithin S. 9196 Program Committee, 9196 S5 Session Chair, [9196-17] S5, [9196-23] S6
Abrami, Alessandro [9210-22] S5
Abramson, Alexis [9179-16] S3
Abuleil, Marwan [9182-26] S5
Acasandrei, Adriana [9204-21] SPMon
Acharya, Krishna [9162-14] S4
Acharya, Yashwant B. [9215-17] SPMon
Acholo, Cyril [9190-21] S5
Achterhold, Klaus [9212-32] S7
Acosta Plaza, Eva [9192-54] SPMon
Acuna, Guillermo P. [9163-83] S18
Adachi, Chihaya 9183 Conference CoChair, [9183-68] SPWed, [9183-91] S8
Adam, Jean-Paul [9167-52] S10
Adam, Jost 9193 Program Committee
Adamo, Giorgio [9163-3] S2, [9163-42] S11
Adams, Craig [9219-9] S3
Adams, Jens [9177-1] S1
Adamus, Zbigniew [9199-18] S5
Ade, Harald W. [9184-26] S7, [9184-27] S7, [9184-32] S8, [9184-34] S8, [9184-87] SPWed
Adkins, Michael [9226-3] S1
Adler, Werner [9192-25] S5
Adroguer, Pierre [9167-87] S16b
Aeschlimann, Martin 9163 Program Committee
Afanasiev, Konstantin N. [9161-22] S5
Affronte, Marco [9167-40] S6
Afonina, Irina [9185-107] S2
Afzal, Francis O. [9162-50] S14
Agahi, Massoud H. 9166 Conference Chair, 9166 S2 Session Chair, [9166-1] S1
Agarwal, Anuradha [9170-12] S2, [9220-19] S5
Aggarwal, Ishwar D. [9202-15] S4, [9202-47] S10
Aggarwal, Manmohan D. [9176-5] S1, [9185-228] SPWed, 9200 Program Committee
Aghamalyan, Natella R. [9200-48] SPMon
Agliata, A. [9211-15] S4
Agour, Mostafa [9204-11] S3
Agrawal, Gautam [9191-14] S4
Aguilar-Morales, Alfredo I. [9194-17] S4, [9220-21] S6
Ahle, Larry [9213-1] S1
Ahluwalia, Balpreet Singh [9164-77] S15, [9169-30] S7
Ahmadi, Shideh [9165-27] S7
Ahmed, Maryum F. [9211-14] S4
Ahmed, Tahsin [9166-17] S2
Ahmed, Wafaa [9165-71] S14
Ahn, Hyo-Sung [9195-11] S3
Ahn, Kwang-Jun [9163-100] SPWed, [9168-16] S3
Ahn, Sungmo [9163-65] S15
Ahn, Yongjo [9217-70] SPMon
Ahuja, Rajeev [9168-26] SPWed
Aida, Takuzo [9181-10] S3
Airola, Marc B. [9205-2] S1
Aitchison, James Stewart [9166-11] S2, [9202-5] S1
Aitmani, Abdenacer [9190-19] S5
Aizin, Gregory R. [9162-21] S6
Aizpurua, Javier [9163-10] S3, [9163-29] S7
Ajan, Antony [9201-6] S2
Ajayan, Pulickel M. [9168-12] S3
Ajward, Milhan [9181-24] S6
Akhand, Kawsar A. [9221-15] S2
Akhlaghi Bouzan, Milad [9170-24] S5
Akimov, A. V. [9160-11] S3
Akiyama, Akira [9193-10] S3
Akmese, Alper [9216-62] SPMon
Akselrod, Mark S. 9201 Program Committee
Aksnes, Astrid 9203 Program Committee, 9203 S8 Session Chair
Aksun, M. I. [9163-79] S18
Akyurtlu, Alkim [9160-56] S11
Al Hosani, Esra [9219-25] SPMon
Alaan, Diana R. [9196-16] S5
Alabastri, Alessandro [9161-30] S6
Alam, Mahammad Zahirul [9164-1] S1
Alam, Mahbubul [9216-18] S5
Alam, Muhammad Z. [9202-5] S1
Alam, Muhammad Z. 9202 Program Committee
Alanzi, Saud F. [9202-30] S7, [9202-37] S8
Alasward, Abdulaziz [9178-25] SPWed
Alatawi, Ayshah [9206-14] S3
Al-Attar, Nebras E. [9172-24] S6
Al-Balushi, Ahmed [9164-43] S8, [9166-26] S3
Albero, Jorge [9204-12] S3
Albertazzi Gonçalves, Armando 9203 Program Committee, 9203 S6 Session Chair, [9203-24] S6, [9203-27] S6, 9204 Program Committee, [9204-18] S4
Albin, David S. 9179 Program Committee
Albrecht, Boris [9225-22] S6
Alcock, Simon G. 9206 Program Committee, [9206-8] S2, [9208-15] S4, [9209-2] S1
Aldcroft, Thomas L. [9208-5] S2, [9208-7] S2
Alekberov, Rahim [9205-12] S4
Aleman, Gabriela [9170-25] S5
Alers, Glenn 9179 Program Committee
Aleshkin, Vladimir Ya. [9199-14] S4
Alex, Michael [9201-6] S2
Alexander, William B. [9220-2] S1
Alexandrou, Antigoni [9164-40] S7
Alexandrov, Alexander B. [9194-34] S8
Alexeenko, Igor V. [9204-14] S3
Alfano, Robert R. [9194-11] S3
Alfeeli, Bassam [9190-39] SPWed
Alford, Neil M. [9177-12] S3
Alfuso, Salvatore [9207-33] S9
Algadey, Tarig A. [9160-88] SPWed
Alger, Jeffery [9199-29] S7
Alhazzani, Amal A. [9166-60] SPWed
Ali, Mohammad A. [9185-203] S1
Ali, Tamelia [9160-4] S1, [9194-28] S7
Alianelli, Lucia 9207 Program Committee, 9207 S7 Session Chair, [9207-36] SPMon, 9209 Program Committee, [9209-2] S1, [9209-36] SPMon
Alipour, Pante'a [9217-49] S7
Alisafaee, Hossein [9160-19] S4
Alizadeh, Hossein [9163-99] SPWed
Al-Kaysi, Rabih [9164-46] S9
Allaria, Enrico M. [9210-22] S5
Allen, Branden T. [9222-6] S1
Allen, Fred V. [9211-1] S1, [9211-2] S1
Allen, S. James [9162-21] S6
Allen, Susan D. [9189-3] S1
Allendorf, Mark D. [9174-20] S5
Allgeyer, Edward [9169-10] S3
Allocca, Luigi [9207-33] S9
Allured, Ryan [9208-5] S2, [9208-6] S2, [9208-7] S2
Almalaq, Yasser [9216-59] SPMon
Almehmadi, Fares S. [9216-25] S7
Almer, Jonathan [9212-14] S3, [9214-10] S3
Almutairi, Adah [9163-112] SPWed
Alomari, Al-Muatasim [9185-228] SPWed
Alonova, Irina V. [9166-15] S2
Alonso, Miguel A. [9205-33] S5
Alotaibi, Bandar M. [9176-15] S5
Alouani, Mebarek [9167-39] S6
Alouini, Mehdi [9167-3] S1a
Al-Shammari, Rusul M. [9172-24] S6
Alsmeier, Jan-Hendrick [9177-14] S3
Altman, David [9164-117] SPWed
Altucci, Carlo [9198-32] S8
Altun, Ali Ozhan [9168-7] S2
Alù, Andrea 9160 Program Committee, [9163-8] S3
Aluicio-Sardui, Eduardo [9165-11] S3
Alvarez, Daneilla [9168-27] SPWed
Álvarez-Chávez, Jose A. [9194-17] S4, [9220-21] S6, [9220-22] S6, [9220-23] S6
Alvarez-Elizondo, Martha B. [9164-24] S5
Alver, Muhammed Burak [9217-48] S7
Alverson, Andrew J. [9171-23] S6
Alves-Santos, Obed [9167-98] S18a
Amand, Thierry [9167-102] S18b, [9167-15] S3a, [9167-9] S2a
Amann, Markus-Christian [9163-8] S3
Amano, Yoshiharu [9213-42] S10
Amarasinghe, Dimali [9183-45] S10
Amassian, Aram [9165-42] S12, [9165-5] S2, [9184-30] S7, 9185 S5 Session Chair, [9185-111] S3, [9185-118] S4
Ambaye, Haile [9167-71] S14
Ambwani, Palak [9167-31] S4b
Ameri, Tayebeh [9184-42] S9, [9184-52] SPWed, [9184-93] SPWed
Amian, Mehdi [9216-37] S9
Amin, Hayder [9166-21] S3
Amoah, Timothy [9162-15] S5
Amra, Claude [9162-43] S12
Amster, Oskar [9173-7] S2
Amy, Alexander [9169-18] S4
An, Ning [9211-17] SPMon
An, Sung Jin [9161-34] SPWed, [9170-49] SPWed, [9174-10] S3
An, Zhenghua [9160-91] SPWed
Anavatti, Sreenatha G. [9217-1] S1
Anders, Jason C. [9172-34] S8
Andersen, Mikkel F. [9164-94] SPWed
Andersen, Thomas [9164-34] S6
Anderson, Ben J. [9191-14] S4
Anderson, Dana Z. [9164-6] S1
Anderson, Jill L. [9212-48] SPMon
Anderson, Ken E. [9201-1] S1, [9201-30] S8
Anderson, Lindsey L. [9164-62] S12, [9166-14] S2
Anderson, Nigel [9212-16] S4
Anderson, Nikolaus J. [9218-33] S7, [9218-44] S9
Anderson, P. Duke [9168-32] S2
Anderson, Roger W. [9175-10] S3
Ando, Jun [9169-6] S2
Ando, Kazuya [9167-89] S17a
Ando, Yuichiro [9167-88] S17a
Andrade-Lucio, José Amparo [9200-21] S3
Andraud, Chantal [9171-24] S6
Andrés, Nieves [9204-10] S2, [9204-2] S1
Andres-Arroyo, Ana [9164-53] S11
Andrew, Piers [9160-33] S7
Andrews, David L. Symposium Chair, 9160 Program Committee, [9160-54] S11, 9161 Program Committee, [9162-25] S7
Andrews, James [9211-5] S1
Andrews, John [9191-20] S6
Andrews, Jonathan R. [9204-16] S4
Andrews, Larry C. 9224 Program Committee, [9224-1] S1
Andrews, Mark P. 9172 S8 Session Chair, [9172-26] S7
Andreyev, Igor [9164-23] S5
Andrianov, Vasiliy P. [9193-55] SPMon, [9203-9] S2
Angal, Amit [9218-16] S4, [9218-19] S4, [9218-23] S5, [9218-31] S7, [9218-54] S12, [9218-55] S12, [9218-60] SPMon
Angel, J. Roger P. [9175-11] S3, [9175-26] S7, [9175-4] S1, [9186-6] S2
Angeli, George Z. 9197 Program Committee
Angelsky, Oleg Vyacheslavovich [9164-98] SPWed
Angstmann, Christopher [9164-56] S11
Anguita, Jaime A. 9224 Program Committee
Anh, Le Duc [9167-80] S15b
Anielski, Denis [9198-23] S6
Anisimova, Elena [9217-47] S7
Anlage, Steven M. [9160-59] S12, [9169-36] S8
Anoma, Marc [9160-34] S7
Antalik, Marian [9164-100] SPWed
Anthony, John E. 9185 S2 Session Chair, [9185-101] S1
Antimonov, Mikhail A. [9207-4] SPMon
Antohe, Stefan [9172-33] S8
Anton, Jayson [9206-17] S4
Antoniou, Georgios [9193-4] S1, [9193-48] SPMon
Antonucci, Ester [9207-29] S8, [9207-41] SPMon
Anumula, Sunilkumar [9208-18] S4
Anwar, Mehdi F. [9174-7] S2
Anzueto-Sanchez, Gilberto [9220-14] S4
Aoki, Toru 9213 Program Committee, [9213-32] S7, [9213-60] SPMon
Aono, Shinya [9206-20] S5
Aoud, Yassine Ait El [9160-56] S11
Apalkov, Dmytro [9167-46] S8
Apostoleris, Harry [9175-18] S5, [9178-9] S3, [9191-12] S4
Appel, Karen [9210-10] S3
Aqariden, Fikri 9213 Program Committee, [9213-27] S6
Arab, Shermin [9168-32] S2
Arabi, Hesam Edin [9175-3] S1
Arabski, Jacek [9167-39] S6
Arai, Kohei [9218-26] S6
Arai, Shinichi [9192-44] SPMon
Arai, Yasuhiko [9203-2] S1
Arakawa, Hironori 9176 Program Committee
Araoka, Fumito [9181-10] S3
Arceo Olague, José Guadalupe [9203-23] S5, [9203-26] S6
Ardanuy, Philip E. 9218 Program Committee, 9218 S11 Session Chair, 9223 Conference Chair, 9223 S3 Session Chair, [9223-13] S4
Arend, Thomas R. [9185-127] S6
Arévalo-Díaz, Laura A. [9204-10] S2, [9204-2] S1
Arezoomandan, Sara [9160-81] S16
Arfaoui, Raphael K. [9179-26] S5, [9184-43] S10
Arfelli, Fulvia [9212-4] S1
Argyropoulos, Christos [9163-8] S3
Arianpour, Ashkan [9193-8] S2
Arias, Luis [9216-19] S5
Arie, Ady [9162-68] S19
Ariga, Hisanori [9214-4] S1
Arines-Piferrer, Justo [9192-54] SPMon
Arita, Yoshihiko [9164-17] S4, [9164-23] S5, [9164-5] S1
Armakavicius, Nerijus [9170-57] SPWed
Armengol-Cruz, Victor D. [9192-5] S1
Armin, Ardalan [9184-18] S5
Armstrong, J. Tom [9204-16] S4
Armstrong, W. Jack 9211 Program Committee
Arnold, Bradley [9200-1] S1, [9213-40] S9
Arnold, Brice [9210-15] S4, [9210-16] S4
Arnold, Gabriele E. 9219 Program Committee
Arnold, Michael S. [9165-23] S6
Arnold, Nikita [9163-5] S2
Arnold, S. [9166-22] S3
Arnon, Shlomi 9224 Program Committee, [9224-37] S9, [9224-38] S9
Aronow, Andrew [9163-126] SPWed
Arroyo, M. Pilar [9204-10] S2, [9204-2] S1
Arroyo-Carrasco, Maximino Luis [9164-106] SPWed
Arsenault, Henri H. 9216 Program Committee
Arsenin, Aleksey V. [9163-19] S5
Arsenovic, Alex [9199-11] S3
Artan, Göktug G. [9216-62] SPMon
Arteaga, Oriol [9163-69] S16
Artemiev, Nikolay A. [9206-16] S4, [9206-18] S5, [9206-2] S1
Artemov, Eugeney [9200-37] SPMon
Artemyev, Dmitry N. [9198-3] S1, [9217-72] SPMon

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Artusio-Glimpse, Alexandra B. [9164-86] S18
Arzola, Alejandro V. [9164-18] S4
Asaoka, Keizou [9179-3] S1
Asbury, John B. 9165 Program Committee, [9165-30] S7, [9165-9] S3, [9181-7] S2
Asgari, Sirous [9170-58] SPWed
Asghari, Mohammad Hossein [9193-6] S2
Ashcroft, Ian A. [9179-21] S4
Ashok, Amit [9186-19] S5
Askari, Davood [9168-31] SPWed
Askham, Fred [9201-30] S8
Aspuru-Guzik, Alán [9161-27] S6
Assali, Abdnacer [9200-46] SPMon
Assali, Simone [9174-4] S1
Assoufid, Lahsen 9206 Conference Chair, 9206 S5 Session Chair, [9206-12] S3, [9206-17] S4, 9207 Program Committee, [9207-18] S5, [9207-32] S9, [9207-8] S2, [9208-12] S3, [9209-8] S3
Asundi, Anand Krishna [9200-24] S3, 9204 Program Committee, 9206 Conference Chair, 9206 S3 Session Chair
Atar, Nurit [9168-13] S1
Atcheson, Paul 9197 Program Committee
Athanasopoulos, Stavros [9184-16] S5
Atkin, Joanna [9169-28] S6
Atkins, Carolyn [9208-5] S2
Atlas, Robert M. [9222-1] S1, 9223 Program Committee
Attané, Jean-Philippe [9167-81] S16a, [9167-90] S17a
Attias, André-Jean 9170 Program Committee, [9170-35] S7, [9185-104] S1
Atwater, Harry A. [9160-57] S12, [9162-4] S1, [9162-46] S13, [9162-47] S13, [9162-73] SPWed, 9163 Program Committee, 9163 S4 Session Chair, [9163-118] SPWed, [9163-2] S1, [9163-44] S11, [9163-50] S12, [9163-66] S15, 9175 Program Committee, 9175 S5 Session Chair, [9175-13] S4, [9175-14] S4, [9175-15] S4
Aubailly, Mathieu 9202 Program Committee, [9202-34] S7
Aubert, Tangi [9170-41] S8
Aubreton, Olivier [9205-23] S7
Audo, Frederic [9205-27] SPMon
Audoit, Guillaume [9212-12] S3, [9212-34] S7
Auffret, Stéphane [9167-49] S9
August, Yitzhak [9217-2] S1
Augustynski, Jan 9176 Program Committee, [9176-6] S2
Aumann, Andreas [9164-115] SPWed
Aumann, Hartmut H. [9218-11] S3, [9218-12] S3, [9218-13] S3
Autry, Travis [9198-33] S8
Auxier, Jerrad [9213-11] S3
Avendaño-Alejo, Maximino M. [9192-6] S2, [9195-8] S2
Averett, Kent [9226-17] S5
Avilés, Ivan [9163-120] SPWed
Avilez-Pérez, L. Fernando [9221-22] S3
Avouris, Phaedon 9162 S10 Session Chair, [9162-30] S9
Avraham, Tsvika [9217-36] S5
Avramov-Zamurovic, Svetlana [9224-20] S5
Awwal, Abdul A. S. 9216 Conference Chair, 9216 S4 Session Chair, [9216-12] S3, [9216-60] SPMon, [9216-9] S3
Ayala, Silvana A. [9184-77] SPWed
Aydemir, Murat [9183-74] SPWed
Aydin, Koray 9162 Program Committee
Aydogdu, Gülgün H. [9170-29] S5, [9172-29] S7
Ayers, Marion J. [9211-11] S3
Ayers, Shannon [9211-15] S4, [9211-16] S4
Aymeric, Robert [9210-11] S3
Ayres, Mark R. 9201 Program Committee, 9201 S1 Session Chair, [9201-30] S8, [9201-33] S8
Aytug, Tolga [9172-8] S2
Ayzner, Alexander L. [9185-134] S8
Azbite, Solveyga E. [9160-101] SPWed
Azcue, Joaquin [9219-11] S3
Azevedo, Antonio 9167 S17a Session Chair, [9167-98] S18a
Aziz, Hany 9183 S7 Session Chair, 9183 S8 Session Chair, [9183-16] S4, [9183-63] SPWed, [9183-65] SPWed, [9183-66] SPWed, [9184-62] SPWed, [9184-63] SPWed, [9184-68] SPWed
Azulay, Doron [9168-13] S1
Azzeer, Abdallah Mohammed Ali [9163-61] S15

B

Baba, Susumu [9196-10] S3, [9196-19] S5, [9196-5] S2
Babicheva, Viktoriia E. [9160-66] S13, [9162-18] S6
Babin, Sergey [9161-24] S5
Baciak, James E. 9213 Program Committee
Back, Christian H. [9167-10] S2a, [9167-96] S18a
Backlund, Tomas G. [9185-107] S2
Bader, Samuel D. [9167-97] S18a
Badiee, Amir [9179-21] S4
Bae, Seo Ryung [9166-12] S2
Baek, So-Young [9225-15] S4
Baek, Sujin [9184-92] SPWed
Baek, Youn-Kyung [9161-20] S4, [9161-32] SPWed
Baena Doello, Juan Domingo [9160-102] SPWed
Baer, Marcus [9177-14] S3
Bagienski, William [9175-24] S7
Baglin, John [9167-67] S14
Bagmanov, Valeriy K. [9216-16] S4
Bahadur, Ali [9212-47] SPMon
Bahl, Mayank [9190-8] S2
Bahl, Monika [9173-13] S4
Bahr, Raymond E. [9211-15] S4
Bahrami, Farshid [9166-11] S2
Bahrdt, Johannes 9209 Program Committee, [9209-7] S3
Bai, Jie [9176-20] S6
Bai, Jing [9216-2] S1
Bai, Kaixu [9221-46] SPMon
Bai, Lihui [9167-97] S18a
Bai, Ping [9163-37] S9
Bai, Ti [9212-6] S2
Bai, Yan [9218-74] SPMon
Bai, Yan [9221-28] S3
Bai, Yanbo [9199-1] S1
Bai, Yibin [9215-5] S2
Baik, Jeong Min [9161-42] SPWed, [9163-104] SPWed, [9170-40] S8
Baik, Seunghyun 9168 Program Committee
Bailey, Christopher G. [9211-14] S4
Baili, Amira [9170-42] S8, [9200-16] SPMon, [9200-27] S4
Baili, Ghaya [9167-3] S1a
Bain, Angus J. 9161 Program Committee
Bain, Stephen [9185-107] S2
Baines, Ellyn K. [9204-16] S4
Bajorins, David P. [9190-7] S2
Bajwa, Neha [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Bak, Je Hoon [9177-26] SPWed
Baker, Colin [9161-13] S3
Baker, Ian A. [9194-29] S7
Baker, Kevin L. 9208 Program Committee
Baker, Stuart A. [9213-17] S4
Bakkaloglu, Bertan [9190-4] S1
Bakkers, Erik P. A. M. [9167-13] S2b, [9174-4] S1
Bakulin, Artem A. 9165 S12 Session Chair, [9165-29] S7
Balacey, Hugo [9199-23] S6
Balakrishnan, Kaushik [9177-18] S4, [9177-19] S4
Balandeh, Mehrdad [9176-17] S5
Balandin, Alexander A. [9168-29] S5
Balbekin, Nikolay S. [9199-22] S6
Balberg, Isaac [9168-13] S1
Balderas-Mata, Sandra Eloisa [9219-21] SPMon, [9219-22] SPMon
Balles, Andreas [9212-53] SPMon
Balocchi, Andrea [9167-9] S2a
Balonis, Magdalena [9199-25] S6
Balyan, Minas K. [9207-40] SPMon
Balzer, Matthias [9212-44] SPMon
Ban, Dayan 9202 Program Committee, [9202-16] S4
Banaei, Esmaeil Hooman [9175-3] S1
Bandara, Sumith 9220 Program Committee
Bandaru, Prabhakar [9160-32] S7
Bando, Kazuki [9169-6] S2
Bandyopadhyay, Neelanjan [9199-1] S1
Banerjee, Anamika [9176-21] S6
Banerjee, Ayan [9164-19] S4, [9164-39] S7, [9164-92] S20
Banerjee, Neil T. [9194-16] S4
Banerjee, Partha P. [9163-49] S12, 9200 Program Committee, 9200 S2 Session Chair, [9200-34] S4
Banerjee, Saswatee [9170-22] S4, [9181-37] SPWed
Banerji, Natalie 9165 Conference Chair, 9165 S2 Session Chair, [9165-10] S3, 9184 Program Committee
Bang, Ole [9200-28] S4
Banhart, John [9212-40] SPMon
Bansal, Ashu K. [9171-4] S1
Bansal, Shubhra 9179 S6 Session Chair, 9179 SPanel Panel Member, [9179-1] S1
Bao, Wenzhong [9160-24] S5
Bao, Yiliang [9180-6] S2
Bao, Ying [9162-74] SPWed
Bao, Zhenan 9185 Conference Chair, 9185 S7 Session Chair, [9185-134] S8
Bar, Galit [9181-18] S4
Barada, Daisuke [9201-2] S1, [9203-38] S9
Baranov, Alexei N. 9199 Conference Chair, 9199 S8 Session Chair
Baranski, Maciej [9204-12] S3
Barate, Phillipe [9167-3] S1a, [9167-9] S2a
Barbastathis, George 9198 Program Committee, [9209-24] S7, [9209-27] S7, [9209-28] S8, 9216 Program Committee
Barber, Greg D. [9191-16] S5, [9191-3] S1
Barber, H. Bradford [9186-18] S5, [9211-4] S1, 9214 Conference Chair, 9214 S1 Session Chair, 9214 S4 Session Chair, [9214-12] S3, [9214-16] S4, 9215 Conference Chair, 9215 S2 Session Chair, [9215-14] S4
Barber, William C. [9214-3] S1
Barbera, Marco [9208-10] S3
Barbero, Giovanni [9182-49] SPWed
Barbieri, Stefano 9199 Program Committee
Barboza, Raouf [9182-15] S3
Bardeen, Christopher J. [9164-46] S9, [9165-2] S1
Bargiel, Sylwester [9204-12] S3
Bari, Inam [9225-18] S5
Barker, Peter F. [9164-2] S1, [9164-3] S1
Barkissy, Driss [9220-1] S1
Barman, Biplob [9167-21] S3b
Barnakov, Yuri A. [9160-18] S4
Barnard, Jonathan S. [9163-10] S3
Barnes, Bryan M. 9173 Program Committee, 9173 S2 Session Chair
Barnes, Eugenia [9166-4] S1
Barnes, Robert A. 9218 Program Committee
Barnes, William L. [9163-90] SPWed
Barnes, William L. [9218-23] S5
Barnett, Stephen M. [9164-16] S4
Barragan Campos, Roberto C. [9219-17] SPMon
Barreau, Nicolas [9179-15] S3, [9179-17] S3
Barreca, Davide [9176-6] S2
Barrett, Harrison H. 9186 Conference Chair, 9186 S2 Session Chair, [9186-16] S5, [9186-18] S5, [9193-200] SPLEN, [9214-12] S3, [9214-13] S4, [9214-16] S4
Barrett, Raymond 9206 Program Committee, 9208 Conference CoChair
Barrette, Andrew [9198-19] S5
Barrientos García, Alejandro [9200-21] S3
Barrientos, Lorena [9165-62] SPWed
Barrios, Maria A. [9211-15] S4
Barsi, Christopher [9216-8] S2
Barsi, Julia A. [9218-40] S9, [9218-41] S9, [9218-42] S9, [9218-43] S9
Bartels, Matthias [9212-26] S6
Bartels, Randy A. 9198 Program Committee
Bartelt, Jonathan A. [9184-20] S5, [9184-30] S7, [9184-32] S8
Bartelt, Norman C. [9174-6] S2
Barth, Jochen [9192-17] S4
Barth, Tim [9172-4] S1
Bartkowiak, Wojciech [9185-112] S3
Bartoli, Filbert J. [9172-22] S6, [9184-47] S10, [9185-207] S2
Bartsch, Carrie M. 9171 Program Committee
Barzilov, Alexander [9215-4] S1
Basappa, Prathap [9172-19] S5, [9172-39] SPWed
Basel, Tek P. [9165-34] S3, [9165-34] S9
Basham, James I. [9184-17] S5
Bashir, Sajid [9207-34] S9, [9209-24] S7
Basol, Bülent M. 9177 Program Committee
Basov, Dmitri N. [9160-24] S5, [9168-2] S1, [9169-33] S8
Basso, Stefano [9208-10] S3
Bastiaansen, Cees W. M. [9182-27] S5
Bastianini, Filippo [9202-3] S1
Basu, Santasri [9205-19] S6, [9224-19] S5
Basu, Sukanta [9224-13] S3, [9224-30] S7, [9224-31] S7, [9224-32] S7
Basun, Sergey A. [9200-30] S4
Bataillou, Benoit [9190-6] S2
Batentschuk, Miroslaw [9178-26] SPWed, [9178-3] S1, [9181-44] SPWed, [9205-13] S5
Bates, Brittany [9160-99] SPWed
Bates, Robert M. 9192 Program Committee
Bathe, Mark [9161-27] S6
Bathe, Ravi Nathuram [9180-4] S1
Batista, Victor S. [9165-21] S5
Batman, Haci [9170-29] S5
Batra, Ashok Kumar [9176-5] S1, [9185-228] SPWed
Battel, Steven J. 9197 Program Committee
Battles, Douglas R. 9219 S2 Session Chair
Bauer, Martin 9219 S3 Session Chair, [9219-4] S1
Bauer, Michael K. [9163-7] S2
Bauman, Stephen J. [9163-46] S11
Baumann, Esther [9219-5] S2
Baumann, Thomas [9183-7] S2
Baumbach, Tilo [9213-38] S9
Baumberg, Jeremy J. [9162-75] S11, [9163-10] S3, [9163-29] S7, [9164-42] S8
Baumstümmler, Bernd [9184-38] S9
Bay, Annick [9187-4] S2, [9187-5] S2
Bay, Hamed Hosseini 9168 S5 Session Chair, [9168-22] S5
Baykal, Yahya Kemal [9224-7] S2
Bayreuther, Günther [9167-10] S2a
Bayya, Shyam S. [9192-18] S4, 9202 Program Committee, [9202-15] S4, [9202-47] S10
Bazan, Guillermo C. [9184-32] S8, [9184-87] SPWed
Bazaru Rujoiu, Tatiana [9171-12] S3
Beach, David B. 9213 Program Committee
Beach, Geoffrey S. [9167-37] S6
Beach, Joseph D. [9178-25] SPWed
Beach, Robert [9167-46] S8
Beaton, Alexander [9195-15] S4
Beaujuge, Pierre M. [9184-33] S8
Beaupré, Serge [9165-11] S3
Beaurepaire, Eric [9167-39] S6
Beausoleil, Raymond G. [9216-21] S6
Beck, Mattias [9199-4] S1
Beck, Patrick R. [9213-1] S1, [9213-23] S5
Becker, Martin [9226-12] S4
Beckmann, Felix 9212 Program Committee, 9212 S6 Session Chair, [9212-2] S1, [9212-21] S5, [9212-23] S5, [9212-25] S6, [9212-31] S7, [9212-33] S7, [9212-43] SPMon, [9212-44] SPMon, [9212-5] S1
Bednar, Jan [9217-47] S7
Bedoya Velasquez, Andres Esteban [9218-69] SPMon
Bedzyk, Michael J. [9211-15] S4
Beechem, Thomas E. [9174-30] S7
Beeckman, Jeroen [9182-2] S1, [9182-46] SPWed
Beeman, Bart [9211-13] S4
Beenken, Wichard JD [9165-47] S13
Beermann, Jonas [9163-7] S2
Behill, Ashli [9170-52] SPWed

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Behrens, Christopher [9210-19] S5
Behymer, Elaine M. [9163-77] S17
Beiersdorfer, Peter [9209-21] S6
Beigné, Cyrille [9167-90] S17a
Beilicke, Matthias [9213-7] S2
Bekele, Robel Y. [9177-6] S2
Beker, Laura [9181-18] S4
Belardini, Alessandro [9160-53] S11
Belashchenko, Kirill D. [9167-68] S14
Belashenkov, Nikolai [9217-77] SPMon, [9217-8] S1
Belay, Gebirie Y. [9192-14] S3
Belc, Marius [9172-33] S8
Beléndez, Augusto [9216-15] S4, [9216-42] SPMon
Belen'kii, Mikhail S. 9224 Program Committee
Beliak, Ievgen V. [9178-27] SPWed
Beliatis, Michail J. [9177-21] S5, [9184-58] SPWed
Belikov, Ruslan [9227-3] S1
Belkin, Mikhail A. [9163-8] S3, 9199 S3 Session Chair, [9199-3] S1
Bell, L. Douglas [9170-28] S5
Bell, Perry 9211 Conference Chair, 9211 S1 Session Chair, 9211 S2 Session Chair, [9211-1] S1, [9211-10] S3, [9211-11] S3, [9211-12] S3, [9211-13] S4, [9211-15] S4, [9211-2] S1, [9211-5] S1
Bell, Stephen T. [9212-16] S4
Bell, William M. [9197-17] S4
Bell, Zane W. 9213 Program Committee
Bellessa, Joel 9163 S5 Session Chair, [9163-26] S7
Bellido, Edson P. [9163-110] SPWed
Bellotti, Roberto [9173-3] S1
Belov, Pavel A. [9160-20] S4, [9160-27] S6, [9160-44] S9, [9160-45] S9, [9160-51] S10, [9160-66] S13, [9160-72] S15, [9163-102] SPWed, [9163-93] SPWed
Ben Lakhdar, Zohra [9188-1] S1
Ben Salem, Amine [9170-42] S8
Benammar, Mohieddine [9177-18] S4, [9177-19] S4
Bendall, Ike [9224-23] S6
Bendek, Eduardo A. [9227-3] S1
Bender, Holly A. [9222-13] S3
Bendix, Poul M. [9164-34] S6
Bendoym, Igor [9160-4] S1
Benedect, Mauro E. [9203-24] S6
Benedetti, Laura Robin [9211-12] S3
Benichou, Emmanuel [9163-140] SPWed, [9171-13] S3, [9171-25] SPWed, [9181-22] S5
Benítez, Pablo [9190-20] S5, 9191 Program Committee, [9191-1] S1, [9192-3] S1
Benken, Alexander C. [9226-17] S5
Ben-Menahem, Shahar [9202-35] S8, [9202-38] S8
Bennett, Gregory [9196-6] S2
Benosman, Ryad [9164-89] S18
Benson, James A. [9204-16] S4
Benson, Trevor Mark [9200-28] S4
Bentley, Julie L. 9192 Program Committee, [9192-1] S1, SC912
Benton, Jonathan D. [9176-20] S6
Benz, Alexander [9160-39] S8, [9162-54] S15, 9163 S10 Session Chair, [9163-31] S8
Bera, Antoine [9175-7] S2
Bera, Sudipta K. [9164-39] S7
Berdondini, Luca [9166-21] S3
Berechet, Ion [9205-21] S7
Berechet, Stefan [9205-21] S7
Beresnev, Leonid A. [9202-34] S7
Berezovsky, Jesse [9167-6] S1b
Bergenek, Krister [9190-20] S5
Bergeron, Eric [9163-81] S18
Bergeson, Jeremy D. [9226-23] S7
Berggren, Magnus 9185 Program Committee
Berghmans, Francis [9226-12] S4
Berginc, Gerard [9172-1] SKey, 9205 Program Committee, 9205 S2 Session Chair, [9205-20] S6, [9205-21] S7
Bergman, David J. 9163 Program Committee
Bergmann, Emeric [9163-140] SPWed
Bergmann, Ralf B. [9203-1] S1, [9203-11] S3, [9203-14] S3, 9204 Program Committee, [9204-11] S3
Bergner, Brent C. 9203 Program Committee
Bergström, Per [9203-4] S1
Berini, Pierre 9160 Program Committee, [9163-41] S10
Berkelbach, Timothy [9181-9] S2
Berlich, René [9192-12] S3
Bernasik, Andrzej [9184-73] SPWed, [9184-74] SPWed
Bernatova, Silvie [9164-100] SPWed
Berndsen, Zachary [9164-93] S20
Bernhard, Christoph [9183-37] S8
Berns, Michael W. 9164 S6 Session Chair, [9164-123] S20, [9164-38] S7
Berriel Valdos, Luis Raúl [9203-23] S5, [9203-26] S6
Berry, Keith [9163-111] SPWed
Berski, Fabian [9167-99] S18a
Bertacco, Riccardo [9167-39] S6, [9167-8] S2a
Bertheau, Julien [9212-12] S3
Berti, Giovanni G. [9212-20] S4
Berti, Giulia [9165-11] S3, [9167-28] S4b
Bertling, Karl [9199-21] S6
Bertness, Kristine A. 9174 Program Committee
Bertoli, Stefano [9167-8] S2a
Bertomeu, Joan [9180-8] S2
Bertram, Frank [9174-11] S3, [9174-14] S3
Bertran, Francois [9167-39] S6
Berujon, Sebastien [9206-8] S2
Besaga, Vira R. [9164-98] SPWed
Bespalov, Victor G. [9199-22] S6
Betancourt, Tania [9166-4] S1
Bethke, Don [9162-21] S6
Betin, Aleksander [9201-38] SPMon, [9201-4] S1
Beverage, Jake L. [9203-29] S7
Bewersdorf, Joerg 9169 Program Committee, [9169-10] S3, [9169-23] S5, [9169-9] S3
Bezares, Francisco J. [9160-42] S9
Bezirganyan, Hakob P. [9201-34] SPMon
Bezirganyan, Robert H. [9201-34] SPMon
Bezryadina, Anna S. [9164-32] S6
Bézy, Jean-Loup [9218-50] S11
Bezzubik, Vitali [9217-77] SPMon, [9217-8] S1
Bhaladhare, Sachin [9213-18] S4
Bhalla, Amar S. [9200-53] SPMon, [9200-54] SPMon, [9200-9] S1
Bhandari, Harish B. [9214-10] S3
Bhargava, Samarth [9201-21] S5
Bhaskaran, Vasudev 9217 Program Committee, 9217 S8 Session Chair, 9217 S9 Session Chair
Bhatia, Kamaljit Singh [9193-39] S9, [9216-26] S7
Bhattacharya, Pijush [9213-10] S3, [9213-19] S5, [9213-4] S1
Bhattacharya, Shanti [9194-23] S6
Bhintade, Rashmi [9185-107] S2
Bhuiya, Abdul M. [9164-57] S11
Bhushan, Bharat 9172 Program Committee
Bi, Xintao [9167-87] S16b
Bi, Yan-Gang [9183-58] SPWed
Bialek, Marcin [9199-15] S4, [9199-18] S5, [9199-34] SPMon
Bianchi, Francesco [9165-14] S4
Bianchi, Massimiliano [9167-8] S2a
Bianchi, Silvio [9164-13] S3, [9164-63] S12
Biasic, Emilie [9190-19] S5
Biasutti, Roberto [9218-47] S10
Bible, Johanna [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Bickel, Jessica E. [9167-34] S5
Bidola, Pidassa M. [9212-32] S7
Bielecka, Urszula [9185-112] S3
Biermann, Klaus [9167-73] S15a
Biggar, Stuart F. [9218-33] S7, [9218-44] S9
Biggie, Ryan P. [9179-6] S1
Billon, Cyrielle [9171-24] S6
Bilyi, Oleksandr I. [9166-51] SPWed
Bindl, Dominick J. [9165-23] S6
Binzel, Richard P. [9222-6] S1
Birkbak, Mie [9212-11] S3
Birkedal, Henrik [9212-11] S3
Birowosuto, M. D. [9162-27] S8
Bischoff, Peter [9206-7] S2
Bishop, Jeanne [9211-5] S1
Bisig, Andre [9167-32] S5, [9167-69] S14, [9167-70] S14
Bissell, Luke J. [9163-126] SPWed
Biswas, Chandan [9184-57] SPWed
Biswas, Koushik [9213-22] S5
Biswas, Koushik [9213-37] S9
Biswas, Sushmita [9160-75] S15
Biteen, Julie S. [9165-39] S11
Bitter, Manfred [9209-21] S6
Bittner, Eric R. 9165 S1 Session Chair, [9165-7] S2
Bivolarski, Lazar M. [9217-30] S4, [9217-45] S7
Biyikli, Necmi 9174 Program Committee
Bizarri, Gregory A. [9213-3] S1
Blach, Jean-Francois [9182-4] S1
Blackburn, Jeffrey L. [9165-23] S6
Blackledge, Todd A. [9187-10] S4
Blackwell, Ashley [9200-10] S2
Blaj, Gabriel [9213-31] S7
Blake, Phillip [9163-136] SPWed, [9171-23] S6
Blanchard-Desce, Mireille H. 9161 Program Committee
Blanco Canosa, Juan B. [9166-10] S1
Blanco, Jesus [9204-20] SPMon
Blascakova, Ludmila [9166-3] S1
Blazej, Josef [9218-71] SPMon, [9224-49] SPMon
Blazek, Martin [9217-47] S7
Blecher, Jared Jacob [9180-9] S3
Bleuet, Pierre [9212-12] S3, [9212-34] S7
Bliss, Erlan S. [9216-60] SPMon, [9216-9] S3
Blonski, Slawomir [9218-17] S4
Bloom, Hal J. 9218 Program Committee, 9218 S2 Session Chair
Blügel, Stefan [9167-64] S13
Blum, Monika [9177-14] S3
Blumstengel, Sylke [9165-14] S4
Boardman, Allan D. 9160 S4 Session Chair, [9160-12] S3, 9163 Conference Chair, 9163 S1 Session Chair, 9163 S6 Session Chair
Boatner, Lynn A. 9213 Program Committee, [9213-19] S5, [9213-23] S5
Bobrinev, Vladimir [9201-38] SPMon, [9201-4] S1
Bociort, Florian 9192 Program Committee, [9192-2] S1
Bockowski, Michal [9174-15] S3
Bocksrocker, Tobias [9183-75] SPWed
Bockstaller, Michael R. [9181-29] S7
Bodermann, Bernd 9173 Program Committee
Bodine, Martha I. [9203-36] S8
Boehnlein, Amber [9209-35] SPMon
Boero, Mauro [9188-23] SPMon
Bogdanov, Alexei B. [9167-35] S5
Bogdanov, Alexei L. [9160-36] S7
Boginskaya, Irina A. [9161-22] S5
Bogy, David B. [9201-8] S2
Böhm, Gerhard [9163-8] S3
Bohn, Paul W. [9166-17] S2
Böhnel, Michael [9212-8] S2
Böhnert, Tim [9167-59] S11
Boisvert, Joseph C. 9226 Program Committee, [9226-19] S6
Boitard, Ronan [9217-9] S2
Bold, Matthew 9224 Program Committee
Boley, Charles D. [9194-30] S7
Bolke, Joseph [9220-2] S1
Boll, Rebecca [9198-23] S6
Boller, Elodie [9212-24] S5
Bolotnikov, Aleksey E. 9213 Program Committee, 9213 S8 Session Chair, [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-33] S8, [9213-48] SPMon, [9213-52] SPMon, [9213-53] SPMon, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, [9214-6] S2
Boltalina, Olga V. [9165-23] S6
Boltasseva, Alexandra 9160 Program Committee, 9160 S12 Session Chair, [9160-103] SPWed, [9160-11] S3, [9160-52] S11, [9162-18] S6, [9163-1] S1, [9163-11] S4
Bombeck, M. [9167-31] S4b
Bomme, Cédric [9198-23] S6
Bommena, Ramana [9226-23] S7
Bonacina, Luigi 9165 S11 Session Chair, [9165-41] S12
Bonakdar, Alireza [9170-44] S8, [9172-28] S7, [9220-17] S5, [9220-4] S1
Bond, Essex [9211-13] S4
Bond, Tiziana Conese [9163-77] S17, [9168-7] S2
Bondareva, Alyona P. [9216-52] SPMon
Bondavalli, Paolo 9168 Program Committee
Bonner, Carl E. [9160-103] SPWed
Bono, Hubert [9190-19] S5
Bookbinder, Jay A. [9208-6] S2
Booth, Martin J. [9169-10] S3, [9169-9] S3
Booth, Nicola [9211-6] S2
Boppana, Sravanthi [9179-12] S2
Bora, Mihail [9163-77] S17
Bordalo Correia, Ricardo R. [9225-10] S3
Borders, Marisa H. [9214-14] S4
Bordeu, Ignacio A. [9164-66] S13
Bordun, Ivan O. [9166-51] SPWed
Borel, Thomas [9183-63] SPWed
Borel-Donohue, Christoph C. 9222 Program Committee
Boreman, Glenn D. SC156
Borghs, Gustaaf R. [9167-12] S2b
Borgström, Magnus T. [9170-59] SPWed, [9220-18] S5
Borovytsky, Volodymyr N. [9218-64] SPMon
Börret, Rainer [9192-56] SPMon
Borri, Paola [9181-31] S7
Borshch, Volodymyr [9182-24] S5
Bortolozzo, Umberto [9182-15] S3
Bos, Jeremy P. 9224 Program Committee, 9224 S6 Session Chair, [9224-18] S5
Bos, Sandra [9173-2] S1
Boschini, Fabio [9167-85] S16b
Bose, Ranojoy [9162-9] S3, [9216-21] S6
Bosman, Michel [9163-37] S9
Boswell, Melissa [9211-7] S2, [9211-8] S2
Botton, Gianluigi A. [9163-110] SPWed
Botvinick, Elliot L. [9164-24] S5, [9164-28] S6
Boubanga Tombet, Stephane Albon [9199-14] S4
Boucher, Vincent [9223-14] S4
Bouet, L. [9167-102] S18b
Bougeard, Dominique [9167-10] S2a
Bougerol, Catherine [9190-19] S5
Bouillet, Stephane [9205-27] SPMon
Boukari, Samy [9167-39] S6
Boulais, Étienne [9161-27] S6
Boulle, Olivier [9167-64] S13
Bourassin-Bouchet, Charles [9207-20] S6
Bourret Courchesne, Edith 9213 Program Committee
Boutet, Sébastien [9210-12] S3
Boutramine, Abderrazak [9220-1] S1
Bowen, Martin [9167-39] S6
Bower, Ward I. 9179 Program Committee
Bowers, Clifford R. [9167-23] S4a, [9167-24] S4a
Bowman, Eric [9171-4] S1
Bowman, Robert M. [9169-18] S4
Bowyer, Ellis [9167-14] S2b
Box, Stuart J. [9164-61] S12
Boychuk, Taras M. [9166-42] SPWed, [9166-43] SPWed, [9169-32] S8
Boyd, Robert W. 9161 Program Committee, [9164-1] S1
Boyd, Shane D. [9185-109] S3
Boyer, Charles [9193-14] S3
Boyer, Kim L. [9216-6] S2
Bozhevolnyi, Sergey I. [9160-5] S2, [9163-7] S2
Bozhko, Alexei [9172-21] S5
Bozio, Renato [9161-3] S1, [9181-43] SPWed
Brabec, Christoph J. [9177-1] S1, [9178-26] SPWed, [9178-3] S1, [9179-10] S2, 9180 Program Committee, [9180-20] S4, [9181-44] SPWed, 9184 Program Committee, 9184 S9 Session Chair, [9184-20] S5, [9184-42] S9, [9184-45] S10, [9184-52] SPWed, [9184-93] SPWed, [9205-13] S5

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Brac de la Pierriere, Vincent [9202-10] S2, [9202-38] S8
Bradforth, Stephen E. [9165-24] S6
Bradley, Alexander Z. [9179-22] S4, [9179-5] S1
Bradley, David K. 9211 Program Committee, [9211-1] S1, [9211-11] S3, [9211-12] S3, [9211-15] S4, [9211-2] S1
Bradshaw, T. D. [9211-10] S3, [9211-12] S3
Braescu, Liliana 9200 Program Committee
Braeuer, Andreas [9192-25] S5
Braga, Alexandre [9193-33] S8
Braicovich, Lucio [9207-19] S5
Braitbart, Philippe Ori [9169-4] S1
Bramati, Arianna [9203-54] SPMon
Brambila-Tamayo, Emma C. [9164-122] SPWed
Brambilla, Alberto [9165-11] S3, [9167-28] S4b
Brandani, Giovanni [9165-51] S14
Brankov, Jovan G. [9207-31] S9
Brannan, Travis [9225-12] S4
Brantley, Christina L. [9200-29] S4
Branz, Howard M. 9177 Program Committee
Brar, Victor W. [9160-57] S12, [9162-46] S13
Brasselet, Etienne 9164 S17 Session Chair, [9164-20] S4, [9182-43] S8
Bratchenko, Ivan A. [9198-3] S1, [9217-72] SPMon
Bräuer, Andreas [9192-12] S3, [9192-13] S3
Braun, Kai [9169-20] S4
Braun, Paul V. 9162 Program Committee, [9162-19] S6
Braun, Stefan 9207 Program Committee, 9207 S1 Session Chair, 9207 S5 Session Chair, [9207-45] SPMon, [9207-7] S2, [9210-10] S3
Braunecker, Wade A. [9165-15] S4, [9165-16] S4
Bravin, Alberto [9212-24] S5
Braymen, Steven [9178-17] S5
Brazhnikov, Pavel P. [9203-9] S2
Breault, Robert P. [9186-3] S1, [9189-13] S4, 9197 Program Committee
Brecher, Charles [9214-10] S3
Breckinridge, James B. [9186-5] S2, [9197-4] S2
Brédas, Jean-Luc [9183-17] S4
Brekke, Nick [9175-9] S3
Brener, Igal 9160 Program Committee, [9160-39] S8, [9160-41] S11, [9160-9] S2, [9162-54] S15, [9163-31] S8, [9174-13] S3
Brenneis, Andreas [9199-5] S2
Brenner, Guenter [9208-4] S1
Breton, Jacques [9196-23] S6
Brevet, Pierre-François [9163-140] SPWed, 9171 S4 Session Chair, [9171-13] S3, [9171-25] SPWed, 9181 S7 Session Chair, [9181-22] S5
Brezini, Abderrehmane [9200-46] SPMon
Brieda, Lubos [9196-6] S2, [9196-9] S3
Briggs, Ryan M. [9163-66] S15
Bringer, Andreas [9167-75] S15a
Brinkmann, Martin [9165-10] S3, [9185-104] S1
Briseno, Alejandro L. 9185 S6 Session Chair, [9185-103] S1
Britten, Jerald A. [9163-77] S17
Broberg, Steven E. [9218-12] S3
Broch, Katharina [9165-2] S1
Brochhausen, Christoph [9214-5] S2
Brodie, Graham W. [9164-74] S15
Broekmans, Onno D. [9164-41] S8
Broer, Dick J. [9182-27] S5
Brom, Joseph E. [9174-16] S4
Bromley, Keith [9165-51] S14
Brongersma, Mark L. 9160 Program Committee, [9160-2] S1
Brooker, R. Paul [9179-32] S6
Brookes, Nicholas B. [9167-39] S6, [9207-19] S5
Brooks, Audrey D. [9208-14] S3, [9210-5] S2
Brown, Ana M. [9162-47] S13
Brown, Andrea M. 9205 Program Committee, 9205 S1 Session Chair, [9205-2] S1
Brown, Charles G. [9211-12] S3
Brown, Daniel M. 9194 Program Committee
Brown, Dean [9160-74] S15
Brown, Dean P. [9163-16] S5
Brown, Elliott R. 9199 S6 Session Chair, [9199-26] S7
Brown, Gail J. 9219 Program Committee
Brown, Kristina K. [9213-17] S4, [9215-16] SPMon
Brown, Robert L. [9220-16] S5, [9220-17] S5, [9220-4] S1
Brown, Steven J. [9181-17] S4
Brown, Steven W. [9218-35] S8
Brown, Thomas G. [9205-33] S5
Browning, Don [9211-16] S4
Bruck, Roman [9162-23] S7
Brückner, Andreas [9192-12] S3, [9192-13] S3, [9193-28] S7, [9217-38] S5
Brudvig, Gary W. [9165-21] S5
Brueck, Steven R. J. [9168-9] S2, [9174-13] S3
Bruegge, Carol J. [9218-22] S5
Bruhwiler, David L. [9209-35] SPMon
Brullot, Ward [9163-128] SPWed
Brun, Loic [9163-65] S15
Brunev, Dmitry V. [9220-29] SPMon
Brunner, Kathrin [9192-25] S5
Brusatin, Giovanna [9161-11] S3
Brutchey, Richard L. [9165-24] S6
Bruyère, Aurélie [9181-22] S5
Bruyndonckx, Peter [9212-3] S1
Brydegaard, Mikkel S. [9221-5] S1
Brzhezinskaya, Maria [9207-12] S3, [9207-38] SPMon
Brzobohatý, Oto [9164-118] SPWed, [9164-96] SPWed
Buck, Gregory W. [9222-5] S1
Buck, Jens [9210-22] S5
Buck, Mathew R. [9162-14] S4
Buck, Samuel [9194-22] S5
Buckley, John J. [9211-13] S4
Buckner, Ben [9204-1] S1
Budashov, Igor A. [9161-22] S5
Budkowski, Andrzej [9184-73] SPWed, [9184-74] SPWed
Budzien, Scott A. [9207-23] S7, [9222-17] S4, [9222-21] SPMon, [9222-22] SPMon, [9222-3] S1, [9222-4] S1
Buerhop-Lutz, Claudia [9177-1] S1, [9179-10] S2
Buès, Michel [9223-15] S4
Bugrov, Alexey [9161-24] S5
Bui, Ann A. M. [9164-123] S20, [9164-38] S7
Bukauskas, Virginijus [9172-20] S5
Bullion, Katherine M. [9178-17] S5
Bulmer, Jack [9170-28] S5
Bulterman, Dick [9217-25] S3
Bump, Buddy J. [9184-79] SPWed
Bunch, Robert M. [9188-3] S1, 9192 Program Committee
Bunning, Timothy J. 9182 Program Committee, [9182-1] S1, [9182-22] S5
Buoni, Matthew [9219-14] S4
Buranasiri, Prathan [9162-72] SPWed, [9188-9] S2, [9204-19] S4
Burbelo, Roman [9170-50] SPWed
Burek, Michael J. [9162-29] S8
Burge, James H. [9186-7] S2, [9195-14] S4
Burger, Arnold 9213 Conference Chair, [9213-10] S3, [9213-12] S3, [9213-19] S5, [9213-23] S5, [9213-3] S1
Burgess, Carrie [9187-3] S1
Burgin, Julien [9164-52] S11
Burgos, Stanley P. [9163-66] S15
Buric, Michael P. [9202-53] S11
Burke, Daniel [9169-10] S3, [9169-9] S3
Burke, Daniel J. [9185-129] S7
Burke, Jan 9203 Conference Chair, 9203 S1 Session Chair, [9203-11] S3, [9203-14] S3
Burke, Timothy M. [9184-30] S7, [9184-82] S3, [9184-82] S9
Burkhard, George [9165-5] S2
Burmester, Hilmar [9212-5] S1
Burmester, Jörg [9212-44] SPMon
Burn, Paul L. [9183-4] S1, [9183-86] SPWed, 9184 Program Committee, 9184 SPWed Session Chair, [9184-18] S5, [9184-71] SPWed, [9184-72] SPWed, 9185 S3 Session Chair, [9185-202] S1, [9185-203] S1
Burnham, Jill A. [9213-25] S6
Burns, Clement [9207-15] S4
Burns, David M. [9179-18] S4
Burns, Devin E. [9170-8] S2
Burns, Patrick M. [9218-51] S11
Burrowes, Capucine [9167-52] S10
Burrows, David N. [9208-5] S2
Burshtein, Zeev [9168-13] S1
Busby, Erik [9181-9] S2
Buscema, Marzia [9212-2] S1
Busch, Kurt 9162 Program Committee
Buschlinger, Robert [9161-4] S1
Busse, Lynda E. 9202 Program Committee, 9202 S11 Session Chair, [9202-15] S4
Bussetti, Gianlorenzo [9167-28] S4b
Bussolotti, Fabio [9165-58] SPWed
Butenko, Anna B. [9167-35] S5
Butler, Anthony P. H. [9212-16] S4
Butler, Jim 9218 Conference Chair, 9218 S12 Session Chair, [9218-65] SPMon
Butler, Philip H. [9212-16] S4
Butler, Samuel D. [9205-6] S2, [9222-16] S4
Butt, Hans-Jürgen [9165-11] S3
Büttner, Felix [9167-32] S5, [9167-69] S14, [9167-70] S14
Butykai, Adam [9164-65] S13
Buzmakov, Alexey V. [9209-32] SPMon
Bykov, Alexander V. [9183-62] SPWed
Bykov, Dmitry S. [9164-71] S14
Bykov, Igor V. [9161-22] S5
Byles, Bryan [9174-34] S8
Byzov, Egor V. [9191-6] S2

C

Cabrini, Stefano 9161 Conference Chair, 9161 S2 Session Chair, 9161 S5 Session Chair, [9161-24] S5, [9207-6] S2
Cabrita, Ana [9188-23] SPMon
Cadiz, Fabian [9167-11] S2a
Cadusch, Jasper J. [9163-74] S17
Caggiano, Joseph A. [9211-9] S2
Cahoy, Kerri L. [9227-3] S1
Cai, Chen [9164-68] S14
Cai, Tao [9162-9] S3
Cai, Wenshan 9160 S16 Session Chair, [9160-73] S15, [9160-76] S15
Cai, Yong Q. [9209-16] S5, [9209-34] SPMon
Cain, Stephen C. 9227 Program Committee
Calabro, Katherine W. [9188-19] S4
Calafiore, Giuseppe [9161-24] S5
Caldwell, Joshua D. [9160-42] S9
Calegari, Francesca [9208-18] S4
Calixto-Carrera, Sergio [9203-51] SPMon
Callahan, Rebecca A. [9182-23] S5, [9182-38] S8
Callegari, Agnese [9164-95] SPWed
Callegari, Carlo [9210-22] S5
Calloni, Alberto [9165-11] S3, [9167-28] S4b
Caloz, Francois 9202 Program Committee, [9202-7] S2
Camarda, Giuseppe S. 9213 Program Committee, [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-33] S8, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, [9214-19] SPMon, [9214-6] S2
Camargo, Henrique S. [9184-94] SPWed
Camino, Fernando [9213-58] SPMon
Campbell, Alasdair J. [9183-28] S6, [9183-83] SPWed, [9185-123] S5
Campbell, Luke W. [9213-21] S5
Campo, Eva M. [9160-500] SPIen, 9170 Conference Chair, 9170 S2 Session Chair, 9170 S8 Session Chair, [9170-16] S3, [9170-2] S1, [9190-44] S7
Campos Trujillo, Oliver G. [9217-7] S1
Campos, Juan 9216 Program Committee
Campos, Luis [9181-9] S2
Camposeo, Andrea [9183-41] S9
Čančula, Miha [9182-11] S3
Canestrari, Niccolo [9209-15] S5, [9209-17] S5, [9209-33] SPMon, [9209-38] SPMon
Cang, Hu [9166-34] S4
Cano-Contreras, Martin [9200-47] SPMon
Canteenwala, Taizoon [9181-4] S1
Cantone, Marie Claire [9213-51] SPMon
Cantoni, Matteo [9167-39] S6, [9167-8] S2a
Cao, Changyong [9218-17] S4, [9218-68] SPMon, [9218-74] SPMon, [9219-12] S3
Cao, Jain [9208-5] S2, [9208-8] S2
Cao, Jianjun [9198-39] S9
Cao, Jian-jun [9192-41] SPMon
Cao, Jie [9223-11] S3
Cao, Liangcai 9200 Program Committee, [9200-23] S3, [9201-16] S4, [9216-31] S8
Cao, Linyou [9198-19] S5
Cao, Xiaoming [9221-33] SPMon
Cao, Yaoyu [9201-24] S6
Cao, Yifang [9208-8] S2
Cao, Yixiang [9183-88] SPWed
Cao, Zhurong [9211-17] SPMon
Capasso, Federico 9160 S9 Session Chair, [9160-35] S7, 9163 S2 Session Chair, [9163-12] S4, [9164-50] S11, [9172-4] S1, [9220-18] S5
Capolino, Filippo [9160-97] SPWed
Capotondi, Flavio [9208-4] S1, [9210-22] S5
Capp, Michael Paul [9186-17] S5
Cappitelli, Mario [9190-5] S1
Capps, Jeremy [9167-58] S11
Cappuccio, Giorgio [9212-46] SPMon
Capretti, Antonio [9160-55] S11
Caragiulo, Pietro [9213-31] S7
Carberry, David M. [9164-87] S18
Carbone, Anna [9221-2] S1
Carbone, Dave [9218-39] S8
Cardema, Jason [9219-6] S2
Cárdenas-Ortíz, Gustavo A. [9188-24] SPMon
Cardimona, David A. 9226 Conference Chair
Cardoso, Bill 9213 Program Committee
Carey, Graham H. [9165-42] S12
Carhart, Gary W. [9202-34] S7
Carini, Gabriella A. [9210-11] S3, [9213-31] S7
Carlen, Edwin [9163-103] SPWed
Carletti, Timoteo [9187-5] S2
Carlin, Jean-François [9162-28] S8
Carlson, Joel B. [9178-17] S5
Carnevale, James T. 9197 Program Committee
Caron, Jerôme C. [9218-50] S11
Caron, Julien [9169-4] S1
Carosso, Nancy 9196 Conference Chair
Carpene, Ettore [9167-85] S16b
Carpenter, Arthur C. [9211-1] S1, [9211-13] S4, [9211-2] S1
Carpentier, Alicia V. [9164-94] SPWed
Carrère, Hélène [9167-9] S2a
Carretero, Angel [9219-11] S3
Carretero-Palacios, Sol [9164-62] S12, [9166-14] S2
Carriere, Nicholas [9202-5] S1
Carson, Richard F. [9226-16] S5
Cartier, Sebastian [9210-7] S2
Cartwright, Alexander N. [9167-21] S3b
Carvalho, Guilherme Morais [9165-68] SPWed
Casado, Leonardo [9180-15] S3
Casasent, David 9216 Program Committee
Caselle, Michele [9212-44] SPMon
Caspary, Reinhard [9202-17] S4
Cassarly, William [9190-8] S2, 9191 Program Committee, 9191 S5 Session Chair, 9197 Program Committee
Cassinelli, Alvaro [9193-50] SPMon
Castán Ricaño, Diana Nallely [9195-8] S2
Castañeda Quintero, Raul Andres [9216-46] SPMon
Castellanos Munoz, Michel [9162-66] S18
Castelletto, Stefania 9225 Program Committee
Castillo-Guzmán, Arturo [9220-14] S4
Castracane, James [9173-14] S4
Castro Neto, Antonio H. [9160-24] S5, [9168-2] S1, [9169-33] S8
Castro Neto, Jarbas C. [9195-18] SPMon
Castro-Ortega, Raúl [9217-67] SPMon
Cata, Brian M. [9195-2] S1

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Català, Frederic [9164-9] S2
Cauble, Galen [9224-34] S8
Cauwenberghs, Gert 9166 Program Committee
Cavaco, Jeffrey [9208-11] S3, [9208-13] S3
Cazayous, Maximilien [9167-27] S4b
Ceballos-Herrera, Daniel E. [9188-24] SPMon, [9220-23] S6
Cecilia, Angelica [9213-38] S9
Celanovic, Ivan [9170-34] S6, [9178-10] S3
Celeste, John [9211-13] S4
Cen, Zhaofeng [9188-8] S2, [9192-21] S4
Centurion, Martin 9198 Program Committee, 9198 S7 Session Chair, [9198-22] S6
Cerecedo-Nuñez, Héctor H. [9164-105] SPWed
Cerullo, Giulio [9167-8] S2a
Cesar, Pablo [9217-25] S3
Cetin, Birkan [9216-62] SPMon
Cetto, Ana Maria Meeting VIP
Cha, Dongkyu [9165-42] S12
Cha, Myoungsik [9203-8] S2
Chabinyc, Michael L. [9181-17] S4, [9184-4] S1, 9185 S3 Session Chair, [9185-113] S4
Chaddad, Ahmad [9217-28] S4
Chae, Miyoung [9183-70] SPWed
Chah, Karima [9226-12] S4
Chai, Zhifang [9200-40] SPMon
Chaib, Hassan [9220-1] S1
Chaikin, Paul M. [9162-15] S5
Chaikina, Elena I. [9163-120] SPWed, [9205-5] S2
Chaix, Cecile [9214-7] S2
Chakari, Ayoub [9202-29] S6
Chakhmane, Asmaa [9165-55] SPWed
Chakrabarti, Sangeeta [9205-5] S2
Chakrabarti, Supriya [9222-21] SPMon
Chakraborty, Rajib [9200-18] S2
Chakravarty, Abhijit [9202-30] S7, [9202-37] S8
Chalifoux, Brandon D. [9208-5] S2
Chan, Che Ting 9160 Program Committee, [9163-68] S16, [9164-8] S2
Chan, Chia-Yen [9195-16] S4, [9195-19] SPMon, [9195-21] SPMon, [9223-19] SPMon
Chan, Cyrus Yiu Him [9183-11] S3
Chan, Emory [9161-5] S1
Chan, Eric Y. [9202-41] S9
Chan, Kai-Wing [9208-19] S3, [9208-5] S2
Chan, Sheng-Wen [9177-27] SPWed
Chance, Kelly [9218-52] S11
Chaney, John A. [9196-4] S1
Chang, Allan 9162 Program Committee, [9163-77] S17
Chang, C. Allen [9205-24] S7
Chang, Chein-I 9222 Program Committee
Chang, Chia-Ming [9182-36] S2
Chang, Chieh [9170-31] S6
Chang, Chun-Li [9217-44] S6, [9217-81] SPMon
Chang, Guoqing [9198-5] S2
Chang, Hung-Sheng [9203-17] S4
Chang, Jan Kai [9177-13] S3
Chang, Jen-Chuan [9177-27] SPWed
Chang, Jung-Hung [9183-64] SPWed, [9184-88] SPWed
Chang, Ken-Chai [9194-38] S8
Chang, Lena [9217-20] S3
Chang, Meng-Hao [9183-60] SPWed
Chang, Ni-Bin [9189-14] S4, 9221 Conference Chair, 9221 S1 Session Chair, [9221-1] S1, [9221-21] S3, 9223 Program Committee, 9223 S2 Session Chair, [9223-2] S1
Chang, Robert P. H. [9163-28] S7
Chang, Shenq-Tsong [9195-16] S4, [9195-19] SPMon, [9195-21] SPMon, [9195-23] SPMon
Chang, Shih-Cheng [9177-27] SPWed
Chang, Shih-Lin 9207 Program Committee
Chang, Wo L. 9217 Program Committee
Chang, Xuanhong [9185-207] S2
Chang, Yia-Chung [9161-14] S3, [9163-135] SPWed
Chang, Yong [9213-27] S6
Chang, Yuhsin [9163-131] SPWed
Chang, Yun-Ching [9200-32] S4
Chang, Yun-Chorng [9160-69] S14
Chang, Yu-Yu [9192-26] S6, [9192-31] S6
Chanyawadee, Soontorn [9205-14] S5
Chao, Yu Faye [9200-8] S1
Chapalo, Ivan [9203-10] S2
Chapman, Henry N. 9210 Program Committee
Charbonnier, Jean [9212-12] S3
Charles, Matthew [9190-19] S5
Charnotskii, Mikhail I. 9224 Program Committee, 9224 S2 Session Chair, [9224-4] S1, [9224-5] S1
Charoensook, Ajchara [9205-14] S5
Charra, Fabrice [9170-35] S7
Châteauneuf, François 9222 Program Committee
Chatten, Amanda J. 9178 Program Committee
Chatterjee, Monish R. [9160-88] SPWed, 9216 S7 Session Chair, [9216-25] S7, [9216-28] S7, [9224-3] S1
Chattopadhyay, Tanmoy [9213-43] S10, [9215-17] SPMon
Chatzakis, Ioannis [9160-80] S16
Chaudhary, Ashok [9172-43] S2
Chaudhuri, Sandeep K. [9213-41] S9, [9213-57] SPMon
Chavel, Pierre H. 9192 Program Committee
Chaves Ribeiro, Antonio Carlos [9184-94] SPWed
Chaves, Leandro Fonseca [9179-8] S2
Chaves-O'Flynn, Gabriel D. [9167-53] S10
Chavez, James [9168-27] SPWed
Chávez-Martínez, A. Jacqueline [9221-22] S3
Chawla, Nik [9212-14] S3, [9212-50] SPMon
Cheah, Kok-Wai [9185-208] S2
Chegal, Won [9166-56] SPWed, [9173-17] SPWed, [9173-19] SPWed
Chekalin, Sergei V. [9219-18] SPMon
Chen, Anderson [9175-2] S1, [9179-29] S6
Chen, Beishi [9172-25] S6
Chen, Biao [9216-27] S7
Chen, Bo-Song [9192-28] S6
Chen, C. L. Philip [9222-19] S4
Chen, Chao-Tsen [9183-76] SPWed
Chen, Che-Chin [9163-20] S6
Chen, Cheng-Chien [9192-26] S6
Chen, Chia-Ray [9195-16] S4
Chen, Chih-Jung [9176-19] S6
Chen, Ching-Wei [9195-16] S4
Chen, Ching-Yi [9192-26] S6, [9192-31] S6
Chen, Chin-Ti [9183-50] S11, [9183-76] SPWed
Chen, Chun-Chieh [9193-30] S7
Chen, Chun-Jen [9217-44] S6
Chen, Chun-Ko [9177-17] S4
Chen, Chyong-Hua [9163-131] SPWed
Chen, Di [9192-7] S2, [9195-17] S4, [9216-4] S1
Chen, Gang 9224 Program Committee, 9224 S9 Session Chair, [9224-43] S10, [9224-44] S10, [9224-8] S2
Chen, Guan-Jhen [9168-10] SPWed
Chen, Haipeng [9216-63] SPMon, [9216-64] SPMon
Chen, Hao [9164-57] S11
Chen, Hao [9221-11] SPMon
Chen, Henry 9213 Program Committee
Chen, Hongda [9163-85] SPWed
Chen, Hongda [9218-55] S12, [9218-60] SPMon
Chen, Hongsheng 9160 Program Committee
Chen, Hong-Shuo [9190-26] S6
Chen, How-Foo [9166-24] S3
Chen, Hsi-Chao [9168-10] SPWed, [9190-35] SPWed, [9190-42] SPWed
Chen, Hsieh-Chih [9177-13] S3
Chen, Hsing-Yu [9193-44] SPMon
Chen, Hsin-Yu [9202-13] S3
Chen, Hui [9209-21] S6, [9211-15] S4
Chen, Hui [9225-37]S7
Chen, Hung-Shan [9182-36] S2
Chen, Hung-Wen [9198-5] S2
Chen, Hung-Ying [9160-70] S14
Chen, Hung-Ying [9163-60] S14
Chen, Huoyao [9193-42] SPMon
Chen, Jian [9203-33] S7, [9205-7] S3
Chen, Jianyu [9217-79] SPMon, [9218-59] SPMon, [9218-73] SPMon, [9221-10] S1, [9221-16] S2, [9221-26] S3, [9221-28] S3, [9221-29] S3, [9221-8] S1, [9221-9] S1, [9223-8] S2
Chen, Jihua [9185-134] S8
Chen, Joseph C. [9164-32] S6
Chen, Jyehong [9193-44] SPMon
Chen, Jyh-Cheng [9205-24] S7, [9214-2] S1
Chen, Kevin Peng [9161-25] S5
Chen, Kuo-Cheng [9165-46] S13, [9184-25] S6
Chen, Kuo-Ping [9163-72] S16
Chen, Li [9194-37] S8
Chen, Lianghui 9190 Program Committee
Chen, Liangyi [9198-31] S7
Chen, Lih-Jeih [9183-61] SPWed
Chen, Lin [9193-36] S8
Chen, Li-Yin [9190-24] S6
Chen, Mei-Hsin [9184-55] SPWed
Chen, Minfeng [9161-14] S3
Chen, Ming [9184-27] S7
Chen, Mingzhou [9164-17] S4
Chen, Ninghua [9217-79] SPMon
Chen, Peng [9218-59] SPMon, [9218-73] SPMon
Chen, Pengyuan [9163-8] S3
Chen, Peter [9165-46] S13, [9184-25] S6
Chen, Po-Cheng [9190-34] SPWed
Chen, Qian [9217-6] S1
Chen, Qi-Dai [9183-54] S12, [9183-57] SPWed, [9183-58] SPWed
Chen, Quanhang [9181-36] SPWed
Chen, Ray T. [9181-40] SPWed
Chen, Renjie [9174-39] S9
Chen, Rongzhang [9161-25] S5
Chen, Shaw-Horng 9182 Program Committee
Chen, Sheng-Chieh [9182-49] SPWed
Chen, Sheng-Hui [9177-17] S4
Chen, Sheng-Shiun [9190-26] S6
Chen, Shizhen [9167-17] S3a
Chen, Tien-Jung [9182-50] SPWed
Chen, Wei [9178-26] SPWed, [9181-44] SPWed
Chen, Wei [9184-29] S7
Chen, Wei Ting [9160-83] S17, [9160-92] SPWed, [9163-22] S6, [9163-88] SPWed
Chen, Weidong [9202-31] S7
Chen, Wen-Chang [9185-122] S5
Chen, Xianfeng [9198-39] S9
Chen, Xiangfan [9160-40] S8
Chen, Xianqiao [9217-31] S4
Chen, Xiaoran [9204-22] SPMon, [9204-23] SPMon
Chen, Xuesheng [9179-21] S4
Chen, Xuexia [9218-2] S1, [9218-5] S1
Chen, Yanfeng [9162-69] S19
Chen, Yaohui [9162-67] S18
Chen, Yi-Chun [9203-17] S4
Chen, Yi-Hsun [9163-72] S16
Chen, Ying [9183-14] S4, [9183-18] S4
Chen, Yin-Yuan [9220-25] S6
Chen, Yiqiao 9226 Program Committee, 9226 S6 Session Chair, [9226-20] S6
Chen, Yizhu [9198-44] SPMon
Chen, Yong [9170-47] SPWed
Chen, Yong P. [9163-11] S4
Chen, Yue [9164-79] S15
Chen, Yu-Hsuan [9192-45] SPMon, [9192-47] SPMon, [9192-48] SPMon
Chen, Zexiang [9195-24] SPMon
Chen, Zhendong [9217-32] S4
Chen, Zhigang [9162-22] S7, [9164-32] S6
Chen, Zhuoying [9165-29] S7
Cheng, Bo-Wei [9190-35] SPWed
Cheng, Chau-Jern [9200-51] SPMon
Cheng, Chih-Yuan [9200-22] S3, [9201-37] SPMon
Cheng, Ching-Min [9217-20] S3
Cheng, Jeffrey T. [9204-3] S1, [9204-4] S1
Cheng, Kai [9220-15] S4
Cheng, Ming-Cheng [9193-12] S3
Cheng, Nai-Jen [9200-52] SPMon
Cheng, Tianhai [9221-7] SPMon
Cheng, W. Andrew 9193 Program Committee
Cheng, Wei-Chih [9190-24] S6
Cheng, Wood-Hi 9190 Program Committee, 9190 S5 Session Chair, [9190-24] S6
Cheng, Xianchao [9207-9] S2
Cheng, Xinru [9225-5] S1
Cheng, Yuan-Chieh [9192-38] SPMon
Chepelianskii, Alexei D. [9184-16] S5
Cheremkhin, Pavel A. [9216-51] SPMon, [9216-52] SPMon
Cherepy, Nerine J. 9213 Program Committee, 9213 S5 Session Chair, [9213-1] S1, [9213-19] S5, [9213-23] S5
Cherian, Sandy 9202 Program Committee, [9202-17] S4
Cherif, Rim [9170-42] S8, [9200-16] SPMon, [9200-27] S4
Chern, Jyh-Long 9193 Program Committee
Chernikov, Roman [9209-12] S4, [9209-9] S4
Chernomyrdin, Nikita V. [9188-25] SPMon, [9216-34] S9
Chernysheva, Irina V. [9213-44] S10
Chernyshov, Alex [9201-6] S2
Cherqui, Charles [9169-19] S4
Chertov, Aleksandr N. [9190-40] SPWed, [9217-21] S3, [9217-71] SPMon
Chetty, Naven [9194-39] SPMon
Cheyns, David [9184-2] S1
Chi, Chun-Yung [9168-32] S2
Chiang, Cheng-Han [9192-32] S7
Chiang, Chien-Chih [9177-27] SPWed
Chiang, Hai-Pang [9161-28] S6
Chiang, Huihua K. [9205-24] S7
Chiang, Kwofu V. [9218-58] SPMon, [9218-6] S2
Chiang, Long [9181-4] S1
Chiang, Tsung-Yu [9165-46] S13, [9184-25] S6
Chiarello, Fabrizio [9202-61] S12
Chico, Juliet [9170-25] S5
Chiechi, Ryan C. [9184-7] S2
Chien, Chao-Heng [9183-84] SPWed
Chien, P. Ching-Hang [9163-135] SPWed
Chiesa, Matteo [9175-18] S5, [9178-9] S3, [9191-12] S4
Chigrinov, Vladimir G. [9182-42] S8
Chilingaryan, Suren [9212-44] SPMon
Chilvery, Ashwith Kumar [9185-228] SPWed
Chiodini, Norberto [9213-51] SPMon
Chiou, Jin-Chern [9220-25] S6
Chiou, Pei-Yu Eric [9164-79] S15
Chiourn, Surath [9219-9] S3
Chipman, Russell A. 9186 S3 Session Chair
Chipouline, Arkadi [9162-16] S5, [9163-16] S5
Chistyakov, Alexander A. [9163-125] SPWed
Chiu, Chuang-Hung [9183-84] SPWed
Chiu, Philip T. [9226-19] S6
Cho, Byoungkwan [9220-30] SPMon
Cho, Chun-Pei [9184-80] SPWed
Cho, Doo-Hee [9183-51] S11
Cho, Gyuseong [9213-61] SPMon
Cho, Hui-Sup [9160-98] SPWed
Cho, Hyun Mo [9166-56] SPWed, [9173-17] SPWed, [9173-19] SPWed
Cho, HyungWon [9170-40] S8
Cho, Hyun-Ju [9190-33] SPWed
Cho, Hyunsu [9183-31] S7, [9183-55] S12, [9183-69] SPWed
Cho, Kilwon [9184-19] S5
Cho, Ki-Ok [9216-55] SPMon
Cho, Kyoung Ik [9185-142] SPWed
Cho, Myung Kyu [9195-11] S3
Cho, Myungjin [9216-55] SPMon
Cho, Nam Sung [9183-51] S11
Cho, Suehyun K. [9163-65] S15, [9166-8] S1
Cho, Sung-Hak [9180-17] S4
Cho, Sungoh [9185-126] S6
Cho, Won-Ju [9174-41] S9
Cho, Yong Jai [9166-56] SPWed, [9173-17] SPWed, [9173-19] SPWed
Cho, Yunae [9177-25] S5
Choa, Fow-Sen [9213-40] S9
Choate, Michael J. [9218-46] S10
Chodavarapu, Vamsy P. [9172-26] S7

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Choi, Chulmin [9176-25] S7
Choi, ChulUong [9223-16] S4
Choi, Duyoung [9168-24] S5, [9168-25] SPWed
Choi, Hee Joo [9203-8] S2
Choi, Hyejin [9166-53] SPWed
Choi, Hyekyoung [9165-66] SPWed
Choi, Hyung Seok [9161-39] SPWed
Choi, Jeong Seon [9185-141] SPWed
Choi, Jia 9168 Program Committee
Choi, Jihye [9166-12] S2, [9166-45] SPWed
Choi, Jiyeon [9180-17] S4
Choi, Kwong-Kit [9220-3] S1
Choi, Kyu-Chae [9161-20] S4, [9161-32] SPWed
Choi, ManSoo [9162-46] S13, [9184-66] SPWed
Choi, Muhan [9193-32] S8
Choi, Sangmoo [9185-136] S8, [9185-221] S5
Choi, Shinyoung [9166-57] SPWed
Choi, Wing-Kit [9182-52] SPWed
Choi, Won Kook [9170-4] S1
Choi, Yu-Jin [9161-35] SPWed, [9161-36] SPWed, [9161-37] SPWed, [9161-38] SPWed, [9161-45] SPWed
Chon, James W. M. [9163-108] SPWed
Choowongin, Santhad [9205-14] S5
Chou, Charlotte [9183-30] S7
Chou, Jeffrey [9170-34] S6
Chou, Kang Wei [9165-5] S2
Chou, Kun-Yi [9183-47] S10
Chou, Wu-Ching [9167-21] S3b
Choudhury, Pankaj K. 9172 Program Committee, [9172-15] S4
Chow, Bob [9211-13] S4
Chow, Chi-Wai [9193-38] S9, [9193-44] SPMon, [9202-26] S6
Chowdhury, Bilas [9202-30] S7, [9202-37] S8
Choy, Wallace C. H. [9184-48] S10, [9184-91] SPWed
Chrapkiewicz, Radoslaw [9225-3] S1
Chrisey, Douglas B. 9180 Program Committee
Christen, David K. [9172-8] S2
Christensen, Johan [9160-29] S6
Christenson, Cory W. [9201-12] S3, [9201-13] S3
Christian, James F. [9215-2] S1
Christian, Joshua M. [9175-8] S2, [9191-21] S6
Christmann, Marco [9184-38] S9
Christodoulides, Demetrios N. 9162 S7 Session Chair, [9162-22] S7, [9162-59] S16, [9162-60] S16
Chrostowski, Lukas [9166-31] S4
Chu, Chung-Tse 9192 Program Committee, [9196-16] S5, [9196-20] S5
Chu, Daping [9182-41] S8
Chu, Hye Yong [9183-51] S11, [9185-141] SPWed, [9185-142] SPWed
Chu, Peter [9226-15] S5
Chu, Shi-Wei [9169-29] S7
Chu, Ta-Ya [9185-144] SPWed
Chu, XiuMin [9217-31] S4
Chua, Song-Liang [9181-26] S6
Chuang, Frank Y. S. [9169-30] S7
Chuang, Hsin-Yuan [9166-24] S3
Chubar, Oleg 9209 Conference Chair, 9209 S3 Session Chair, 9209 S4 Session Chair, [9209-15] S5, [9209-16] S5, [9209-17] S5, [9209-2] S1, [9209-20] S6, [9209-31] SPMon, [9209-32] SPMon, [9209-33] SPMon, [9209-35] SPMon, [9209-38] SPMon, [9209-6] S2, [9210-10] S3
Chui, Chi On [9174-38] S9
Chun, Changhwan [9217-53] S8
Chun, Chanwoo [9216-10] S3
Chun, Francis K. [9223-7] S2
Chun, Hyunchae [9183-45] S10
Chung, Aram [9164-79] S15
Chung, Gwiy-Sang [9172-41] SPWed
Chung, Jin [9183-55] S12, [9183-69] SPWed
Chung, Shu-Ru [9190-26] S6, [9200-20] S3
Chung, Tae [9211-10] S3
Chung, Ting-Fung [9163-11] S4
Chung, Young Soo [9213-1] S1
Churilov, Alexei V. [9214-8] S2
Chvátal, Lukas [9164-18] S4, [9164-96] SPWed
Ci, Song [9192-55] SPMon
Ciampi, Guido [9214-8] S2
Cibula, Matthew A. [9164-104] SPWed
Ciccacci, Franco 9167 Program Committee, [9167-28] S4b
Cicchi, Riccardo [9198-1] S1
Cicoira, Fabio 9185 Program Committee
Ciegis, Arvydas [9163-94] SPWed, [9178-28] SPWed
Ciobanu, Cristian V. [9174-31] S7
Ciorga, Mariusz [9167-10] S2a
Cirignano, Len [9213-39] S9, [9214-8] S2, [9215-13] S4
Cisneros-Villalobos, Luis [9192-50] SPMon
Ciszak, Kamil [9163-97] SPWed
Ciupina, Victor [9172-33] S8
Civitani, Marta M. [9208-10] S3
Cizmar, Petr [9173-5] S2
Cizmár, Tomás [9164-14] S3
Clancy, Todd J. [9211-13] S4, [9211-9] S2
Clark, Alasdair W. [9164-78] S15
Clark, Frank O. 9219 S4 Session Chair, [9219-16] S4
Clark, James H. [9204-16] S4
Clark, James H. [9195-9] S3
Clark, Jenny 9165 Program Committee
Clark, Katie [9165-19] S5
Clark, Noel A. [9182-23] S5, [9182-38] S8, [9182-40] S7
Clarke, Robert J. [9194-22] S5
Clarkson, Eric W. [9186-18] S5
Clausi, David A. [9193-24] S6, [9217-35] S5
Clays, Koen 9226 Program Committee
Clerc, Marcel Gabriel [9182-15] S3
Clerici, Matteo [9199-33] S8
Clikeman, Tyler T. [9165-23] S6
Cline, Jason [9219-16] S4, 9226 Program Committee, 9226 S3 Session Chair, [9226-10] S3
Cloetens, Peter [9207-32] S9, [9212-12] S3, [9212-24] S5, [9212-40] SPMon
Clulow, Andrew [9185-202] S1
Cluzel, Benoit [9164-47] S10
Cnops, Kjell [9184-2] S1
Cobas, Enrique [9167-104] S18b
Cobb, Christopher [9219-9] S3
Coburn, David S. [9209-34] SPMon
Cocco, Daniele 9206 Program Committee, 9206 S5 Session Chair, 9208 Program Committee, 9208 S1 Session Chair, [9208-4] S1, [9210-4] S1
Cochran, Sandy [9164-74] S15
Coddington, Ian [9219-5] S2
Coffey, David [9182-38] S8
Cohen, Edward [9227-4] S1
Cohen, Eliahu [9217-36] S5
Cojoc, Danut-Adrian 9164 S19 Session Chair, [9164-27] S6
Cojocaru, Costel-Sorin 9168 Program Committee
Colas des Francs, Gérard [9164-112] SPWed
Cole, James B. [9163-9] S3, [9187-7] S3
Cole, Michael C. [9201-32] S8
Coleman, Elane [9174-22] S6
Colen, Rivka R. [9217-28] S4
Colli, Alan [9163-29] S7
Collier, Charles P. [9226-16] S5
Collings, Neil 9182 Program Committee
Collins, Brian Akira [9185-109] S3
Collura, Alfonso [9208-10] S3
Colomer, Jean-François [9172-11] S3
Colonna De Lega, Xavier [9203-29] S7
Colsmann, Alexander [9177-5] S2, [9183-37] S8, [9184-38] S9
Compton, Jonathan [9164-28] S6
Concina, Isabella [9161-17] S4
Cong, Wenxiang [9212-28] S6, [9212-45] SPMon
Conibeer, Gavin 9178 Conference Chair, 9178 S1 Session Chair, [9178-304] SPIen
Conley, Raymond 9207 S2 Session Chair, [9207-18] S5, [9207-8] S2
Conley, Raymond 9207 Program Committee
Connor, Kenneth A. [9190-21] S5
Conron, Sarah [9165-5] S2
Consonni, Marianne [9190-19] S5
Consortini, Anna 9188 Program Committee
Contreras-Tello, Humberto [9173-12] S4
Conway, Adam M. [9213-39] S9
Conwell, Thomas H. [9195-2] S1
Cook, Anthony [9193-14] S3
Cook, Brianna [9226-4] S1
Cook, Timothy A. [9222-21] SPMon
Cook, Walter R. [9213-25] S6
Cooley, Thomas W. 9222 Program Committee
Cooney, Ryan R. [9198-26] S6
Cooper, Jonathan M. [9164-78] S15
Cooper, Khershed P. 9173 Program Committee
Cooper, Merlin [9225-14] S4
Cooper, Thomas M. [9181-38] SPWed
Cooper, Thomas M. [9181-4] S1
Copani, Tino [9190-4] S1
Čopar, Simon [9182-11] S3
Cord, Aurélien [9223-14] S4
Corda, John C. [9220-7] S2
Cordes, Aaron 9173 Program Committee
Coreno, Marcello [9210-14] S4, [9210-22] S5
Correa da Costa, Rosenildo [9183-28] S6, [9185-123] S5
Corsetti, James A. [9193-26] S7
Corsetti, Stella [9164-107] SPWed
Corso, Alain J. [9163-107] SPWed, [9163-109] SPWed, [9177-24] S5, [9205-29] SPMon, [9207-22] S6, [9207-29] S8, [9207-41] SPMon
Cortes, Cristian L. [9160-48] S10, [9160-63] S13
Cosar, Mustafa B. [9172-29] S7
Costa Dantas Faria, Jorge [9183-83] SPWed
Costa, Manuel F. [9188-1] S1
Costeur, Loïc [9212-42] SPMon
Cota, Stephen A. 9223 Program Committee
Cotel, Arnaud [9192-16] S4
Cotroneo, Vincenzo [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Cotte, Marine [9212-24] S5
Cotterell, Michael I. [9164-70] S14
Cotts, Benjamin L. [9184-10] S3, [9184-10] S9
Couchaud, Maurice [9213-38] S9
Couderc, Elsa [9165-24] S6
Coughenour, Blake M. [9175-26] S7, [9175-4] S1
Coulembier, Olivier [9181-21] S5
Coulter, Daniel R. 9197 Program Committee
Coulter, Phillip [9195-15] S4
Courtial, Johannes [9192-8] S2, [9193-1] S1, [9193-4] S1, [9193-48] SPMon, [9193-54] SPMon, [9194-32] S7
Courtwright, Devon [9160-103] SPWed, [9160-28] S6
Coutts, David W. [9163-133] SPWed
Cowan, Vincent M. 9226 Program Committee, 9226 S7 Session Chair, 9226 S8 Session Chair, [9226-23] S7, [9226-25] S8
Cowburn, Russell P. 9167 Program Committee
Cox, Charles D. 9197 Program Committee
Crabtree, Peter N. [9227-4] S1, [9227-7] S2
Crabtree, Robert H. [9165-21] S5
Craig, Derek [9164-23] S5
Craner, Jeremy [9223-10] S3
Crastes, Arnaud [9192-11] S3
Creath, Katherine 9173 Track Chair, [9186-28] S8, 9187 Program Committee, 9187 S5 Session Chair, 9203 Conference Chair, 9203 S9 Session Chair, 9203 Track Chair, 9204 Program Committee, 9204 Track Chair, 9205 Track Chair, 9206 Track Chair, SC211
Crespi, Vincent [9198-20] S5
Criante, Luigino [9170-15] S3
Cristiani, Matteo [9225-22] S6
Cristóbal Perez, Gabriel [9221-2] S1
Cromer, Christopher L. [9219-5] S2
Crone, Brian K. [9184-97] SPWed
Cronin, Stephen B. [9168-32] S2
Crooker, Scott A. 9167 Program Committee, [9167-31] S4b
Cros, Vincent 9167 Program Committee
Crouse, David Thomas [9160-4] S1, [9194-28] S7
Crowell, Paul A [9167-71] S14
Cruz, Elmer M. [9163-115] SPWed
Cruz, Gladys [9164-123] S20
Cruz, Jason Gruspe [9211-1] S1
Cruz, Leila R. O. 9179 Program Committee
Cruz-Campa, Jose Luis [9191-14] S4
Cruz-Félix, Angel S. [9192-5] S1
Cubukcu, Ertugrul [9160-22] S5
Cuchet, Lea [9167-49] S9
Cuevas, Andres [9217-33] S4
Cui, Lu [9200-40] SPMon
Cui, Quan [9198-28] S7
Cui, Weipan [9185-213] S3, [9185-230] SPWed
Cui, Xiaoyu [9165-42] S12
Cui, Xuelin Nick [9212-49] SPMon
Cui, Ying [9183-35] S8
Cui, Yonggang [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, 9214 Program Committee, [9214-19] SPMon, [9214-6] S2
Cui, Zhe [9193-56] SPMon
Cuk, Tanja [9176-2] S1
Culcer, Dimitrie [9167-87] S16b
Cull, Toby [9185-107] S2
Cullum, Brian M. [9200-1] S1
Cummings, George 9202 Program Committee
Cundiff, Steven [9198-33] S8
Cunha, Rafael O. [9167-98] S18a
Cunha, Wiliam Ferreira [9165-61] SPWed, [9165-67] SPWed, [9165-68] SPWed
Cunill-Rodriguez, Margarita [9217-41] S5
Cunio, Phillip M. [9219-13] S4, [9219-15] S4
Cunningham, Paul D. [9184-12] S10, [9184-12] S4
Cunningham, Taylor [9213-11] S3
Cunsolo, Alessandro [9209-34] SPMon
Curley, Michael J. [9200-2] S1
Curran, John W. 9190 Program Committee
Currie, Douglas G. 9224 S7 Session Chair, [9224-10] S3
Curry, John J. [9164-72] S14
Curticapean, Dan [9188-10] S2, [9188-14] S3, [9188-15] S3, [9188-21] S4
Curtis, Alden H. [9213-17] S4, [9215-16] SPMon
Cyprych, Konrad [9171-15] S4
Czapkiewicz, Magdalena [9199-15] S4
Czapla-Myers, Jeffrey S. 9218 Program Committee, 9218 S4 Session Chair, [9218-33] S7, [9218-44] S9
Czerner, Michael [9167-59] S11
Czerwieniec, Rafal [9183-22] S5

D

da Costa Pinto, Tiago L. F. [9204-18] S4
da Rocha Freire, Rosembergue Brasileiro [9203-48] SPMon
da Silva Maciel, Lucas [9203-27] S6
Dabagov, Sultan B. 9207 Program Committee, [9207-13] S3, [9207-33] S9, [9207-39] SPMon, [9212-46] SPMon
Dabers, Dinesha [9184-58] SPWed
Dabney, Philip W. [9218-43] S9
Dabrowski, Michal [9225-3] S1
Dadalyan, Tigran K. [9207-40] SPMon
Dadvand, Afshin [9185-144] SPWed
Dagher, Issam J. [9217-54] S8
Dahbashi, Ramin [9167-99] S18a
Dahiya, Vinita [9200-16] SPMon, [9200-17] S2
Dai, Liming 9171 Program Committee
Dai, Qing [9183-35] S8
Dai, Siyuan [9169-33] S8
Dai, Siyuan [9160-24] S5
Dai, Yifan [9192-55] SPMon
Daigle, Marc T. 9197 Program Committee
Dal Negro, Luca [9160-55] S11, [9160-58] S12, [9160-86] S17, 9161 S6 Session Chair, [9161-6] S2
D'Alessandro, Giampaolo [9182-7] S2
Dallaire, Xavier [9192-9] S2, [9195-7] S2

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Dallera, Claudia [9167-85] S16b
Daloz, Flavien [9214-19] SPMon
Daly, John G. SC015
Dam, Bernard 9202 Program Committee, 9202 S8 Session Chair, [9202-2] S1
Damm, Signe [9169-27] S6
Dan, Yaping [9170-1] S1
Danailov, Miltcho B. [9210-22] S5
Daneshgaran, Fred [9225-18] S5
D'Angelo, Milena 9225 Program Committee
Daniel, Rebekah [9164-117] SPWed
Daniels, Arnold SC835
Danielson, Jeremy [9213-17] S4
Dankwart, Colin [9203-1] S1
Dantelle, Géraldine [9164-112] SPWed
Dantham, Venkata R. [9166-22] S3
Daoudi, Abdetylah [9182-48] SPWed, [9182-51] SPWed
Dapkus, P. Daniel [9168-32] S2
Darbe, Sunita [9175-14] S4, [9175-15] S4
Darnell, Barbara A. 9188 Program Committee, 9188 S4 Session Chair
Darwish, Abdalla M. 9200 S1 Session Chair, [9200-10] S2
Das, Saptarshi [9174-29] S7
Dass Kaura, Sahab [9176-21] S6
Datskos, Panos G. [9175-19] S6
Datta, Amlan [9213-18] S4
Davenport, Tattiana K. C. [9170-52] SPWed
David, Christian 9207 Program Committee, 9210 Program Committee, 9210 S2 Session Chair, [9210-11] S3, [9210-6] S2, [9210-7] S2
David, Christin [9160-29] S6
David, Tanya S. [9226-21] S6
Davies, A. Giles [9199-21] S6
Davies, Angela [9203-15] S3, [9223-18] SPMon
Davies, Matthew A. [9194-21] S5
Davies, Roger [9218-22] S5
Davis, Arthur J. 9193 Conference Chair, 9193 S3 Session Chair, 9193 S8 Session Chair
Davis, Christopher C. 9224 Conference Chair, 9224 S1 Session Chair, 9224 S10 Session Chair, 9224 S2 Session Chair, 9224 S5 Session Chair, [9224-12] S3, [9224-14] S4, [9224-22] S5, [9224-33] S8, [9224-35] S8, [9224-36] S8
Davis, Curtiss O. [9222-8] S2
Davis, E. James [9164-55] S11
Davis, Graham R. 9212 Program Committee, 9212 S5 Session Chair, [9212-17] S4, [9212-35] S7
Davis, J. Lynn [9190-43] SPWed
Davis, Kristopher O. [9179-32] S6
Davis, Richey M. [9163-117] SPWed
Davis, Timothy J. [9163-74] S17
Davis, Warren [9193-14] S3
Davydov, Albert V. 9174 Conference Chair, 9174 S8 Session Chair, [9174-9] S3
Davydov, Leonid N. [9213-48] SPMon
Dawes, Judith M. [9163-133] SPWed
Dawood, Farah [9162-14] S4
Dawson, Martin David [9183-45] S10
Dawson, Nathan J. 9226 Program Committee
Dawson, Noel M. [9168-9] S2
Dawson, Paul [9168-23] S5, [9169-18] S4
Dawson, Philip E. [9166-10] S1
Dayeh, Shadi A. [9174-39] S9, [9174-6] S2
Dayeh, Shadi A. 9174 Program Committee
Daykin, Edward P. [9195-2] S1
Dayton, David C. 9227 Conference CoChair, 9227 S1 Session Chair, [9227-5] S1
De Angelis, Francesco [9161-30] S6, [9163-134] SPWed, [9166-21] S3
De Carlo, Francesco [9212-14] S3, [9212-15] S3, [9212-22] S5, [9212-37] S8
De Fanis, Alberto [9210-22] S5
De Filippo, Christian Corrado [9181-43] SPWed
de Fornel, Frédérique [9164-47] S10
De Geronimo, Gianluigi [9213-28] S7
de Gier, Hilde D. [9184-7] S2
de Groot, Cornelis Hendrik [9161-7] S2
de Groot, Peter J. 9204 Conference Chair, 9204 S4 Session Chair
de Kok, Margreet M. [9185-211] S3
de la Rosa Miranda, Enrique [9203-23] S5, [9203-26] S6
de la Rosa Vargas, José Ismael [9203-23] S5, [9203-26] S6
De La Rue, Richard M. 9162 S6 Session Chair, [9162-37] S11
De Leon, Israel [9164-1] S1
de Lima, Itamar V. S. [9225-10] S3
De Luccia, Frank [9219-6] S2, [9223-4] S1
De Mattia, Cristina [9213-51] SPMon
de Mello, John C. [9183-2] S1, [9185-205] S2
De Ninno, Giovanni [9210-22] S5
de Oliveira, Gabriela Nieva [9203-48] SPMon
de Oliveira, Jose Paulo G. [9224-42] S10
de Oliveira, Marcos Eduardo [9203-48] SPMon, [9203-49] SPMon
de Riedmatten, Hugues [9225-22] S6
de Rossi, Sébastien [9207-20] S6
De Simone, Francesca [9217-10] S2
De Simone, Monica [9210-14] S4
De Sio, Luciano [9182-22] S5
de Sousa, Rogério 9167 Program Committee
de Souza Lima, Anderson [9179-26] S5
De Vries, Timothy [9183-13] S3
Deacon, Keith 9225 Conference Chair, [9225-2] S1, [9225-20] S5, [9225-25] SPMon
Dean, Paul [9199-21] S6
Dean, Vince [9218-24] S5
Debije, Michael George [9182-27] S5
Debnath, Ratan [9174-9] S3
Debono, Luke J. [9164-61] S12
DebRoy, Tarasankar [9180-9] S3
Debu, Desalegn Tadesse [9163-46] S11
DeCew, Alan E. 9197 Program Committee, [9197-15] S4
Deck, Leslie L. 9206 Program Committee
Decker, Manuel [9160-10] S2, [9160-41] S11, [9160-9] S2, [9162-13] S4, [9162-5] S1
Decker, Todd A. [9211-11] S3
Decombe, Jean-Baptiste [9164-112] SPWed
DeCuir, Eric A. 9220 Program Committee
Deeb, Claire [9163-137] SPWed
Deeter, Merritt [9218-24] S5
Deferme, Wim [9183-36] S8
deGrassie, John S. 9224 S8 Session Chair, [9224-23] S6, [9224-24] S6
Degroff, John [9175-2] S1
DeGroote Nelson, Jessica E. SC1086
DeHarpporte, Colette R. WS1142
DeJarnette, Drew [9163-136] SPWed, [9175-9] S3
Dejus, Roger J. 9209 Program Committee
del Caño, Teodosio [9180-15] S3
Delahoussaye, Keith G. [9200-54] SPMon
Delbosc, Nicolas [9181-21] S5
Delehanty, James B. [9166-10] S1
Delfyett, Peter J. [9170-24] S5
Delgado Atencio, José A. [9217-41] S5
Delgado-Aparicio, Luis [9209-21] S6
Delker, Thomas [9218-52] S11
Della Ventura, Bartolomeo [9198-32] S8
Della Ventura, Giancarlo [9212-46] SPMon
Dell'Angela, Martina [9207-14] S4
Dellea, Olivier [9172-10] S3
Delli Veneri, Paola 9177 Program Committee
Dellieu, Louis [9187-2] S1
Delmotte, Franck [9207-20] S6
DeLongchamp, Dean M. [9184-17] S5, [9184-41] S9, 9185 S4 Session Chair, [9185-109] S3
delToro, Damian J. [9164-93] S20
Delville, Jean-Pierre [9164-52] S11, [9164-85] S17
Delville, Marie Helene [9164-52] S11
Demaray, Ernest [9174-18] S4, [9175-10] S3
Demarina, Natalia [9167-75] S15a
Demidovich, Alexander A. [9210-22] S5
Demmerle, Frederic [9163-8] S3
Demore, Christine E. M. [9164-74] S15
Demsar, Janez [9209-33] SPMon
Deng, Hong [9174-28] S7
Deng, Qinghua [9194-35] S8
Denisultanov, Alaudi K. [9160-101] SPWed
Denisyuk, Andrey I. [9163-102] SPWed
Denkova, Denitza [9163-86] SPWed, [9169-17] S4
Densmore, Victor E. [9201-25] S6
DePaola, James [9216-20] S5
Deparis, Olivier [9172-11] S3, [9187-2] S1, [9187-5] S2, [9187-9] S4
Deppe, Dennis [9167-4] S1b
Deranlot, Cyrile [9167-81] S16a
Derby, Jeffrey J. 9213 Program Committee, [9213-26] S6, [9213-36] S8
Dereniak, Eustace L. 9186 Conference Chair, 9186 S5 Session Chair, [9186-20] S6, 9220 Program Committee, 9222 Program Committee
Derenko, Susan [9166-23] S3
Dery, Hanan 9167 Program Committee, [9167-16] S3a
Desboeufs, Nicolas [9164-45] S9, [9172-27] S7
Deschamps, Thierry [9162-41] S12
Descharmes, Nicolas [9164-48] S10
Deschenes, Timothy [9226-10] S3
Desfonds, Gérard [9167-90] S17a
Desiatov, Boris [9160-68] S14, [9163-6] S2
Desières, Yohan [9190-19] S5
Deslis, Apostolos 9192 Program Committee
Dessonville, Timothy [9223-17] S4
Devaney, Nicholas 9203 Program Committee
Devarapu, G. Chinna R. [9162-42] S12
Devaud, Genevieve [9196-13] S4, [9196-3] S1
Devi, Diane [9165-20] S5
Devolder, Thibaut [9167-52] S10
Devore, David [9183-13] S3
Dhanapalan, Shanmuga Sundar [9190-18] S4
Dhar, Nibir K. [9180-6] S2, 9220 Program Committee
Dhara, Rohitha [9172-19] S5, [9172-23] S6, [9172-39] SPWed
Dharanipathy, Ulagalandha [9162-28] S8, [9164-48] S10
Dharnidharka, Ashish [9214-19] SPMon
Dhere, Neelkanth G. 9179 Conference Chair, 9179 SPanel Panel Member, [9179-11] S2, [9179-23] S4, [9179-32] S6, [9179-4] S1, [9179-8] S2, [9180-1] S1, [9180-18] S4
Dhillon, Sukhdeep S. 9199 S5 Session Chair, [9199-32] S8
Dholakia, Kishan 9164 Conference Chair, 9164 S14 Session Chair, 9164 S4 Session Chair, 9164 S8 Session Chair, [9164-17] S4, [9164-23] S5, [9164-5] S1
Di Camillo, Daniela [9183-41] S9
Di Carlo, Dino [9164-79] S15
Di Cicco, Andrea [9210-14] S4
Di Fabrizio, Enzo [9163-134] SPWed, [9164-13] S3
Di Fonzo, Fabio [9170-15] S3, [9176-17] S5
Di Leonardo, Roberto 9164 S13 Session Chair, [9164-13] S3, [9164-59] S12, [9164-63] S12
Di Martino, Giuliana [9163-75] S17
Di Michiel, Marco [9212-24] S5
Di Mitri, Simone [9210-22] S5
Di Nicola, Jean-Michel G. [9194-30] S7
Di Sante, Raffaella 9202 Program Committee, 9202 S10 Session Chair, [9202-3] S1
Dias, Julio [9203-49] SPMon
Diaspro, Alberto 9169 Program Committee
Diaz Blancas, Gerardo [9217-7] S1
Diaz Leon, Juan Jose [9174-18] S4, [9174-22] S6, [9175-10] S3
Diaz Navas, Jose Antonio 9192 Program Committee
Diaz, Ana [9210-11] S3
Diaz, Fernando J. [9163-138] S8
Diaz, Julia [9217-4] S1
Diaz-Ramirez, Víctor H. 9216 S3 Session Chair, [9216-5] S2, [9217-33] S4, [9217-40] S5, [9217-57] S9, [9217-60] S9
Dickey, Fred M. 9194 Program Committee, 9194 S3 Session Chair
Dickinson, Mark Russell [9164-101] SPWed
Dickson, Wayne [9160-38] S8
Didovets, Oleg [9182-17] S4
Dieguez, Ernesto [9213-55] SPMon
Dieleman, Frederik [9163-75] S17
Diemoz, Paul C. [9212-4] S1
Dieny, Bernard [9167-49] S9
Dietrich, Tom [9227-1] S1
Dietsch, Reiner [9207-32] S9
Dietz, Nikolaus 9190 Conference Chair, 9190 S6 Session Chair, [9190-29] S7, [9190-31] S7, [9190-41] SPWed
Diggs, Darnell E. [9226-17] S5
Digianantonio, Lucas [9161-24] S5
DiGirolamo, Larry [9218-22] S5
Dilcher, Eric [9167-4] S1b
Dillon-Merrill, Robin L. [9197-7] S3
Dillu, Venus [9163-33] S8, [9200-25] S3
DiMasi, Elaine [9209-15] S5
Dimitrov, Stoichko D. [9165-4] S2
Dinca, Virginia [9172-33] S8
Dindar, Amir [9184-59] SPWed, [9184-61] SPWed, [9185-135] S8, [9185-136] S8, [9185-221] S5
Diner, David J. [9218-22] S5
Dinescu, Maria [9204-21] SPMon
Ding, He [9162-41] S12
Ding, Lei [9194-35] S8
Ding, Qing [9164-57] S11
Ding, Ran [9183-57] SPWed
Ding, Wen [9172-38] SPWed
Ding, Yuantao [9210-19] S5
Ding, Yuanyuan [9217-78] SPMon
Ding, Yujie J. 9198 Program Committee, [9198-35] S9
Dionne, Jennifer A. 9160 Program Committee, 9160 S7 Session Chair, [9160-47] S10
Diorio, Nicholas J. [9182-25] S5
Dioszegi, Istvan [9215-1] S1
Dipalo, Michele [9166-21] S3
Disch, Christian [9213-54] SPMon
Disney, Claire E. R. [9178-18] S5
Dittberner, Gerald J. 9223 Program Committee
Divan, Ralu [9167-97] S18a
Diviacco, Bruno [9210-22] S5
Dixit, Shamasundar N. [9194-30] S7
Dixson, Ronald G. [9173-4] S1
Diz-Bugarin, Javier [9204-20] SPMon
Djalalian-Assl, Amir H. [9163-74] S17
Djeghloul, Fatima [9167-39] S6
Djomeni, Larissa [9212-12] S3
Dmitrenko, Valery V. [9213-44] S10
Do, Young Rag [9190-37] SPWed, [9190-38] SPWed
Doan, Tri C. [9213-14] S3
Dobisz, Elizabeth A. 9170 Conference Chair, 9170 S4 Session Chair, 9170 S5 Session Chair
Dobrev, Ivo [9204-22] SPMon, [9204-23] SPMon, [9204-4] S1
Dobrocka, Edmund [9207-35] S9
Doch, Marta [9192-43] SPMon, [9192-53] SPMon
Dodabalapur, Ananth 9171 Program Committee
Dodd, Jennifer L. [9218-23] S5
Doelling, David [9218-15] S3, [9218-61] SPMon
Doeppner, Tilo [9210-12] S3
Doerry, Armin W. 9218 Program Committee, 9218 S7 Session Chair
Dogariu, Aristide C. 9205 Program Committee
Doi, Takuya 9179 Program Committee
Dokukina, Alexandra E. [9219-18] SPMon
Dolne, Jean J. 9227 Conference Chair, 9227 S2 Session Chair
Dominguez, Gerardo [9160-24] S5, [9169-33] S8
Dominguez, Jason [9160-9] S2

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Dominguez, Margaret Z. [9188-5] S1
Dominietto, Marco Diego [9212-25] S6
Domning, Edward E. [9206-16] S4, [9206-2] S1
Donaldson, William R. [9211-13] S4
Donati, Lorenzo [9202-3] S1
Donchenko, Sergey [9201-4] S1
Donchev, Evgeniy [9177-12] S3
Dong, Biqin [9160-40] S8
Dong, Chung-Li 9176 S6 Session Chair, [9176-16] S5
Dong, Jianjie [9163-27] S7
Dong, Jie [9217-24] S3, [9217-62] S10
Dong, Jingtao [9203-33] S7, [9205-7] S3
Dong, Liquan [9192-7] S2, [9216-4] S1, [9217-64] S7, [9220-5] S2
Dong, Lizhi [9227-6] S1
Dong, Shihao [9227-1] S1
Dong, Yue [9203-15] S3, [9223-18] SPMon
Donnelly, Judith 9188 Program Committee, 9188 S1 Session Chair, [9188-20] S4, [9188-7] S2, WS1141
Donnelly, Matthew [9188-7] S2
Donnio, Bertrand [9185-104] S1
Donzella, Valentina [9166-31] S4
Dorais, Gregory A. [9202-38] S8
Dörfler, Joachim [9190-2] S1, [9193-21] S5
dos Santos, Paulo Acioly Marques [9203-48] SPMon, [9203-49] SPMon
Dose, Thomas [9212-23] S5, [9212-5] S1
Doskolovich, Leonid L. [9191-6] S2
Doti, Rafael [9164-49] S10
Doty, F. Patrick [9213-5] S1, 9214 Program Committee
Douali, Redouane [9182-48] SPWed
Douence, Vincent [9215-5] S2
Douissard, Paul-Antoine [9213-38] S9
Doumont, Jean-luc WS897, WS908
Douvogianni, Evgenia [9184-7] S2
Dovek, Moris [9201-18] S5
Dowgiallo, Anne-Marie [9165-23] S6
Dowling, Jonathan P. [9162-50] S14
Downes, James E. [9163-133] SPWed
Downing, Jonathan M. [9184-41] S9
Downing, Kevin R. [9218-39] S8
Doyle, Keith B. [9192-24] S5
Dragone, Angelo [9213-31] S7
Drazdys, Ramutis [9172-32] S8
Drechsler, William [9219-9] S3
Dreossi, Diego [9207-32] S9, [9212-4] S1
Dressler, Paul [9188-10] S2, [9188-14] S3, [9188-15] S3
Drew, Kristine M. C. [9175-25] S7
Driggers, Ronald G. 9197 Program Committee
Driscoll, Jeffrey B. [9181-17] S4
Dror, Raphi [9168-13] S1
Drouard, Emmanuel [9162-41] S12
Drouet, Florence [9205-23] S7
Drouhin, Henri-Jean 9167 Conference Chair, [9167-60] S12
Druart, Guillaume [9192-11] S3
D'Souza, Arvind I. 9220 Conference Chair, 9220 S1 Session Chair, 9220 S3 Session Chair, 9220 S6 Session Chair, [9220-11] S3
Du, Chunlei [9191-23] SPWed
Du, Juan [9221-13] S2
Du, Junjie [9164-8] S2
Du, Mao-Hua [9213-37] S9
Du, Ping [9170-35] S7
Du, Xinchao [9216-65] S1
Du, Xuewei [9211-17] SPMon
Duan, Yu [9183-77] SPWed
Duan, Yu-ai [9184-96] SPWed
Dubiel, Manfred [9163-58] S14
Dubin, Matthew B. 9195 Program Committee
Dubinov, Alexander A. [9199-14] S4
Dubois, Arnaud 9203 Program Committee
Dubois, Jonathan [9216-24] S7
Dubois, Philippe [9181-21] S5
Dubolazov, Olexander V. [9166-39] SPWed, [9166-40] SPWed, [9166-41] SPWed, [9166-42] SPWed, [9166-43] SPWed, [9166-44] SPWed, [9166-46] SPWed, [9166-47] SPWed, [9166-48] SPWed, [9166-49] SPWed, [9169-32] S8, [9169-35] S8, [9216-44] SPMon, [9216-45] SPMon
Duchesne, Ismaël [9182-21] S4
Duchowicz, Ricardo [9202-64] SPMon
Ducruet, Clarisse [9167-90] S17a
Dudley, Angela 9194 Program Committee, 9194 S6 Session Chair, [9194-11] S3, [9194-39] SPMon, [9194-43] SPMon
Duenas, Jose A. [9168-23] S5
Duerr, Fabian [9191-1] S1
Dufaux, Frederic 9217 Program Committee, 9217 S2 Session Chair, [9217-10] S2
Duff, Martine C. [9213-56] SPMon
Duffar, Thierry [9213-55] SPMon
Dufour, Pascal [9175-25] S7
Duggan, Janet [9164-6] S1
Duim, Whitney [9169-23] S5
Dulin, Oleg [9193-55] SPMon
Dumoulin, Jean [9223-14] S4
Dunkel, Jens [9193-28] S7
Dunklin, Jeremy [9163-111] SPWed, [9163-113] SPWed
Dunlap, David H. [9169-19] S4
Dunne, Mike [9178-201] SPIen
Dunoyer, Nicolas [9172-10] S3
Dunsby, Christopher W. [9169-2] S1
Dunsky, Corey M. 9180 Program Committee, 9180 S4 Session Chair
Duò, Lamberto [9165-11] S3, [9167-28] S4b
Duong, Hong Dinh [9166-36] SPWed, [9166-37] SPWed
Duparré, Michael 9194 Program Committee
Dupre, Klaus [9213-38] S9
Durell, Christopher N. 9218 Program Committee, 9218 S8 Session Chair
Durko, Heather L. [9214-13] S4
Dusembayev, Sanjar [9200-36] SPMon
Dussaigne, Amélie [9190-19] S5
Dutta Gupta, S. [9164-19] S4
Dutta, Niloy K. 9202 Program Committee, [9202-24] S5, [9202-45] S9
Dutta, Partha [9220-20] S5
Dutta, Subhajit Kumar [9188-28] SPMon
Dutterer, Brian S. [9194-21] S5
Dvoretsky, Sergey [9220-29] SPMon
Dyakonov, Michel I. 9167 Program Committee
Dyer, Gregory C. [9162-21] S6
Dymond, Kenneth F. [9207-23] S7, [9222-17] S4, [9222-3] S1
Dyshel, Maria [9165-44] S12
Dziadowiec, Iwona [9212-31] S7

E

Ealey, Mark A. 9197 Program Committee
Easter, Michelle [9205-4] S2
Eastes, Richard [9207-23] S7
Easton, Myriam P. [9196-7] S2
Eberhardt, Kai-Rudi [9165-6] S2, [9184-84] SPWed
Ebke, Daniel [9167-66] S14
Ebnonnasir, Abbas [9174-31] S7
Ebrahim, Tabrez 9217 S5 Session Chair
Ebrahimi, Touradj 9217 Program Committee, [9217-11] S2, [9217-12] S2, [9217-27] S4
Echols, Robert [9184-79] SPWed
Eckart, Mark J. [9211-9] S2
Ecke, Gernot [9165-6] S2
Ecker, Bernhard [9165-6] S2
Eckstein, Ralph [9183-34] S8
Ecoffet, Carole [9164-97] SPWed
Economou, Eleftherios N. [9160-78] S16
Edamatsu, Keiichi [9225-15] S4
Edgar, James H. [9213-58] SPMon
Edmondson, Kenneth M. [9226-19] S6
Edwards, David P. [9218-24] S5
Edwards, Eugene [9200-29] S4
Edwards, Matthew E. [9200-2] S1, [9220-7] S2
Edwards, Perry [9198-12] S4
Edwards, Ryan E. [9218-51] S11
Edwards, Vernessa M. [9170-36] S7
Efremova, Boryana V. [9218-14] S3, [9218-65] SPMon, [9218-67] SPMon
Efthimion, Philip [9209-21] S6
Egan, Peter [9160-12] S3
Egan, Richard G. [9208-11] S3
Egarievwe, Stephen [9213-34] S8, [9220-7] S2
Egawa, Satoru [9207-28] S8
Egel, Amos [9183-75] SPWed
Eggeling, Christian 9169 Program Committee
Eggenstein, Frank [9206-19] S5, [9206-7] S2
Egges, Joanne 9196 Conference Chair, 9196 S6 Session Chair, [9196-22] S6
Eggleton, Benjamin J. 9162 S18 Session Chair, [9162-58] S16
Egner, Alexander 9169 Conference Chair, 9169 S1 Session Chair, 9169 S6 Session Chair, [9169-12] S3
Egorenkov, Vladimir A. [9200-3] S1
Egues, José Carlos [9167-94] S17b
Ehara, Shigeru [9214-4] S1
Ehrbar, Stefanie [9212-33] S7
Ehrig, Jens [9165-38] S11, [9169-21] S5
Eich, Manfred [9161-23] S5, 9162 S17 Session Chair, [9162-66] S18, 9181 Conference CoChair
Eichenholz, Jason M. 9198 Program Committee
Eichert, Diane [9207-16] S4
Eiden, Anna L. [9163-29] S7
Eidikas, Paulius [9190-13] S3
Einsle, Joshua F. [9169-18] S4
Eisebitt, Stefan [9167-32] S5, [9167-69] S14, [9167-70] S14
Eisler, Carissa N. [9175-15] S4
Ejzak, Garrett A. [9202-34] S7
Ek, Sara [9162-67] S18
El Idrissi, Hassan [9165-53] SPWed, [9165-54] SPWed, [9165-55] SPWed
El Kaaouachi, Abdelhamid [9165-53] SPWed, [9165-54] SPWed, [9165-55] SPWed, [9182-48] SPWed, [9182-51] SPWed
Elbakyan, Elbak Y. [9200-48] SPMon
Eldada, Louay A. 9170 Conference Chair, 9170 S1 Session Chair, 9170 S3 Session Chair, 9170 S6 Session Chair, [9170-30] S5, 9177 Conference Chair, 9177 S1 Session Chair, 9177 S2 Session Chair, 9177 S3 Session Chair
Elders, Jonathan P. 9196 S4 Session Chair
Elezzabi, Abdulhakem Y. [9163-34] S8, [9163-39] S10
El-Gaaly, Gehan A. [9166-60] SPWed
Elhamri, Said [9171-11] S3
El-Henawy, Sally I. [9191-22] S6
Eliason, Chad M. [9187-10] S4
Elisberg, Brenton [9191-14] S4
Elkabetz, Adiel [9224-50] SPMon
Elliott, Denis A. [9218-11] S3
Elliott, Lindsay C.C. [9184-17] S5
Elliott, Tom [9211-5] S1
Ellis, Chase T. [9160-42] S9
Ellis, Jonathan D. 9195 Program Committee
ElSallak, Nour [9217-54] S8
Elsner, Ronald F. [9208-16] S4, [9208-5] S2
El-Zohary, Salah E. [9170-5] S1
Emani, Naresh K. [9163-11] S4
Emboras, Alexandros [9163-6] S2
Emelyanov, Andrey [9177-4] S1
Emi, Yoji [9207-27] S8
Emig, James A. [9211-15] S4
Emmons, Louisa K. [9218-24] S5
Enaya, Rayan [9202-67] S9
Enderlein, Jörg 9169 Program Committee
Endo, Katsuyoshi [9206-1] S1
Endres, Bernhard [9167-10] S2a
Endrizzi, Marco [9212-4] S1
Eng, Bjorn T. [9222-7] S2
Engelbrecht, Stefan G. [9185-127] S6
Engheta, Nader 9160 Conference Chair, [9160-55] S11
Englund, Dirk R. [9162-10] S3, [9162-34] S10
Ennis, Daniel B. [9199-29] S7
Enomoto, Toshiyuki [9214-1] S1
Ensley, Trenton [9181-1] S1
Enya, Keigo [9193-51] SPMon
Enzinna, Megan D. [9202-21] S5
Eplee, Robert E. [9218-30] S7, [9218-4] S1
Eppig, Robert [9207-23] S7
Erdmann, Mark [9207-18] S5
Ergunov, Ivan A. [9207-13] S3
Erickson, Kristopher J. [9168-18] S4, [9174-35] S8
Erickson, M. J. [9167-71] S14
Ericsonn, Leif K.E. [9184-73] SPWed, [9184-74] SPWed
Eriksen, René L. [9163-7] S2
Erin, Bruno [9196-23] S6
Erko, Alexei [9206-19] S5, [9207-12] S3, [9207-38] SPMon
Ernstorfer, Ralph [9198-24] S6
Errai, Mohamed [9165-53] SPWed, [9165-54] SPWed
Erramilli, Shyamsunder [9198-7] S2
Ershov, Petr [9206-9] S2, [9207-43] SPMon, [9207-5] S1
Erwin, Patrick [9165-5] S2
Esashi, Junki [9176-18] S6
Escalante-Torres, Manuel [9217-5] S1
Escamilla-Ambrosio, Ponciano J. [9220-23] S6
Eschenbaum, Carsten [9185-210] S3
Escobedo-Alatorre, J. Jesús [9192-50] SPMon
Escoubas, Ludovic [9172-1] SKey
Espes, Emil [9212-18] S4
Esposito, Adolfo [9207-39] SPMon
Esposito, Daniel [9163-126] SPWed
Espy, Michelle A. [9215-7] S2
Esquibel, David L. [9195-2] S1
Esterkin, Yan [9202-20] S5, [9202-25] S5, [9202-57] S12
Estudillo-Ayala, Julian M [9200-45] SPMon, [9200-47] SPMon
Etrich, Christoph [9160-10] S2
Euser, Tijmen G. [9164-71] S14
Evans, Christopher J. [9203-15] S3
Evans, Dean R. 9181 Program Committee, [9200-30] S4
Evans-Lutterodt, Kenneth [9207-3] S1
Everett, David F. 9197 Program Committee
Everitt, Henry O. 9199 Program Committee
Evtikhiev, Nikolay N. [9201-38] SPMon, [9201-4] S1, [9216-30] S8, [9216-51] SPMon, [9216-52] SPMon
Eyink, Kurt G. [9163-126] SPWed
Ezzo, Kevin M. [9208-11] S3

F

Fabero, Fernando 9179 Program Committee
Fabritius, Tapio E. J. [9177-3] S1, [9183-62] SPWed, [9205-22] S7
Facchetti, Antonio F. 9184 Program Committee, [9184-26] S7
Fadil, Ahmed [9190-32] S7
Fahey, Stephen [9226-23] S7
Fahima, Arab [9200-46] SPMon
Fainberg, Boris D. [9160-43] S9
Fainman, Shaya [9160-502] SPIen
Fainman, Yeshaiahu [9162-55] S15, [9182-31] S6
Faisal, Abrar [9187-13] S5
Faist, Jérôme 9199 Program Committee, [9199-4] S1
Fajardo, Armando [9219-9] S3
Fakhoury, Elias [9218-51] S11
Fakhrmoosavy, Seyyede Hoora [9217-49] S7
Falaggis, Konstantinos [9203-31] S7, 9204 Program Committee, [9204-15] S3
Falco, Charles M. [9177-18] S4, [9177-19] S4, [9186-21] S6
Falkner, Matthias [9160-9] S2
Falldorf, Claas [9203-1] S1, 9204 Program Committee, [9204-11] S3
Fallet, Clément [9169-4] S1
Fan, Congcheng [9185-124] S6
Fan, Li [9191-16] S5
Fan, Shanhui [9160-34] S7, [9161-29] S6, 9162 Program Committee, [9162-57] S16, [9168-3] S1, [9177-23] S5, [9200-13] S2
Fan, Shengqiang [9185-202] S1
Fan, W. C. [9167-21] S3b
Fan, Xiaoming [9170-9] S2
Fang, Kejie [9162-57] S16
Fang, Xu [9160-1] S1
Fang, Xu [9172-25] S6
Fanson, James L. 9197 Program Committee
Fantin, Analucia V. [9203-24] S6
Faou, Marylene [9188-23] SPMon
Faragai, Inuwa A. [9199-16] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Farge, Géraldine [9164-41] S8
Farhoomand, Jam 9219 Program Committee
Faria, Paulo Eduardo [9167-1] S1a
Farkas, Dan [9164-6] S1
Farley, Carlton W. [9205-31] SPMon, [9219-19] SPMon, [9219-20] SPMon
Färm, Elina [9210-11] S3
Farrant, David I. 9203 Program Committee
Farré Flaquer, Arnau [9164-29] S6, [9164-37] S7, [9164-9] S2
Farrera, Pau [9225-22] S6
Farries, Mark [9200-28] S4
Farsari, Maria [9160-67] S14
Farwell, Nathan H. [9224-40] S9
Faryad, Muhammad [9191-16] S5, [9191-3] S1, SC1140
Fasano, Vito [9183-41] S9
Fasoli, Mauro [9213-51] SPMon
Fastje, David S. [9214-16] S4, [9215-14] S4
Fatemian, Tahereh [9166-2] S1
Fathipour, Vala [9220-16] S5
Faubert, Jocelyn [9164-49] S10
Fauchet, Philippe M. [9160-501] SPlen, 9166 Program Committee
Fauler, Alex [9213-35] S8
Faulkner, Grahame E. [9183-45] S10
Fave, Alain [9162-41] S12
Fawley, William M. [9210-22] S5
Fay, Martin F. [9203-29] S7
Fay, Patrick [9199-20] S5
Faye, Delphine [9196-11] S3
Fecher, Frank W. [9177-1] S1, [9179-10] S2
Fecher, Gerhard H. [9167-66] S14
Fedorov, Ilya A. [9160-36] S7
Fedotov, Vassili A. [9163-22] S6
Fedyanin, Andrey A. [9160-41] S11, [9160-77] S15
Fedyanin, Dmitry Yu [9163-19] S5
Fei, Zhe [9160-24] S5, [9168-2] S1, [9169-33] S8
Feigenbaum, Eyal [9163-66] S15, [9194-30] S7
Felbacq, Didier 9162 Program Committee, 9162 S19 Session Chair, [9162-3] S1, 9172 Program Committee, [9172-2] S1
Felder, Thomas C. [9179-22] S4
Feldmann, Jochen [9164-62] S12, [9166-14] S2, [9166-59] SPWed
Felicetti, Simone [9225-11] S3
Felker, Brian [9211-1] S1, [9211-2] S1
Fella, Christian [9212-53] SPMon
Felser, Claudia [9167-66] S14
Feng, Chi [9202-40] S8
Feng, Jing [9223-12] S3
Feng, Jing [9183-54] S12, [9183-57] SPWed, [9183-58] SPWed
Feng, Patrick [9213-5] S1, 9215 Program Committee
Feng, Ranran [9198-8] S3
Feng, Weiyi [9222-23] SPMon
Feng, Yaming [9198-39] S9
Feng, Yiming [9221-33] SPMon
Feng, Yiping [9210-7] S2
Feng, Yun [9195-17] S4, [9216-4] S1, [9220-5] S2
Fenoll, Mathieu [9185-135] S8
Feofanov, Ivan N. [9163-125] SPWed
Ferdinandus, Manuel R. [9181-1] S1
Ferekides, Christos S. [9180-13] S3
Ferguson, Andrew J. [9165-16] S4, [9165-23] S6, 9178 Program Committee, 9178 S3 Session Chair
Ferguson, Ian T. 9190 Track Chair, [9190-29] S7, [9190-31] S7, [9190-41] SPWed, [9190-44] S7, 9191 Track Chair
Ferguson, James [9171-4] S1
Fernandes, Susana [9180-16] S4
Fernández Doval, Ángel M. 9204 Program Committee
Fernández, Roberto [9216-42] SPMon
Fernandez-Cuesta, Irene 9170 Program Committee
Fernandez-Cull, Christy [9216-8] S2
Fernandez-Gonzalvo, Xavier [9225-22] S6
Ferrara, Lorenzo [9164-13] S3
Ferrara, Riccardo [9218-47] S10
Ferrari, Andrea C. [9163-29] S7
Ferrari, Claudio [9207-35] S9
Ferrari, Eugenio [9210-22] S5
Ferrari, Lorenzo [9160-16] S4
Ferraro, Pietro 9204 Program Committee
Ferrec, Yann [9220-6] S2
Ferreira Sanchez, Dario [9212-12] S3
Ferreira, Sukarno O. [9167-7] S1b
Ferrera, Marcello [9162-18] S6
Ferret, Pierre [9190-19] S5
Ferretti, Marco [9207-39] SPMon
Ferris, Kim F. 9213 Program Committee, [9213-49] SPMon, [9213-50] SPMon
Ferry, Michael J. [9181-3] S1
Fesenko, Volodymyr I. [9200-39] SPMon
Feuermann, Daniel 9191 Program Committee, 9191 S6 Session Chair, [9191-13] S4
Feuillet, Guy [9190-6] S2
Feyrer, Johannes [9213-55] SPMon
Fezzaa, Kamel [9212-13] S3
Fian, Alexander [9185-218] S5
Fichtelmann, Bernd 9221 S2 Session Chair
Fick, Jochen [9164-112] SPWed
Fidanboylu, Kemal [9217-48] S7
Fiddy, Michael A. [9160-19] S4, [9160-96] SPWed
Fiederle, Michael 9213 Conference Chair, [9213-16] S4, [9213-35] S8, [9213-55] SPMon
Fiedler, Callie I. [9181-33] SPWed
Fielder, Robert S. [9202-21] S5
Fienup, James R. 9227 Program Committee
Figiel, Jeffrey J. [9174-13] S3
Filonov, Dmitry S. [9160-45] S9, [9160-72] S15, [9163-93] SPWed
Finazzi, Marco [9167-28] S4b
Finch, Michael F. [9202-18] S4, [9202-36] S8, [9202-44] S9
Findikoglu, Alp T. [9174-6] S2
Fineschi, Silvano [9207-29] S8, [9207-41] SPMon
Finetti, Paola [9210-14] S4, [9210-22] S5
Finlayson, Chris E. [9162-75] S11
Fiorino, Steven T. [9224-11] S3, [9224-13] S3, [9224-19] S5, [9224-30] S7, [9224-32] S7
Firby, Curtis J. [9163-39] S10
Firsching, Markus [9212-20] S4, [9212-8] S2
Firsov, Alexander [9207-12] S3, [9207-38] SPMon
Firsov, Anatoly [9207-38] SPMon
Fischer, Alex [9196-3] S1
Fischer, Arthur J. 9162 S4 Session Chair, [9162-6] S2
Fischer, Frank [9213-35] S8
Fischer, Peer [9166-14] S2
Fischer, Peggy [9218-47] S10
Fischer, Rainer [9192-12] S3
Fischer, Robert [9225-10] S3
Fischer, Ronny [9193-21] S5
Fischer, Stefan [9207-21] S6
Fischer, Thomas [9176-22] S6
Fish, Chad [9219-15] S4
Fisher, Scott E. [9213-1] S1, [9213-23] S5
Fiszman, Nicolas [9164-40] S7
Fitzpatrick, Kimberly A. [9214-14] S4
Fitzsimons, Jack [9217-59] S9
Flaig, Thomas W. [9166-8] S1
Flanagan, Kevin [9202-21] S5
Flatté, Michael E. 9167 Program Committee, [9167-74] S15a, [9167-79] S15b
Fléchon, Charlotte [9183-7] S2
Flechsig, Uwe [9209-7] S3
Fleck, Claudia [9212-40] SPMon
Fleming, John C. 9205 Program Committee, 9205 S3 Session Chair
Fletcher, Luke B. [9210-12] S3
Fliegel, Karel [9217-16] S2, [9217-47] S7, [9217-73] SPMon
Flora, Jeffrey B. [9216-18] S5
Flores Moreno, J. Mauricio 9204 Program Committee
Florescu, Marian 9162 S1 Session Chair, [9162-15] S5
Flores-Flores, Edy [9164-126] SPWed
Flores-Nuñez, Jorge L. [9219-17] SPMon, [9219-21] SPMon, [9219-22] SPMon
Flory, François R. [9161-2] S1, 9172 S2 Session Chair, [9172-1] SKey, [9189-4] S1
Floudas, George [9165-11] S3
Flowers, Cristofer A. [9175-15] S4
Flueckiger, Jonas [9166-31] S4
Fochuk, Petro M. 9213 Program Committee, [9213-48] SPMon, [9213-52] SPMon, [9213-53] SPMon
Fody, Joshua [9193-14] S3
Foerster, Michael [9167-32] S5
Fogler, Michael M. [9160-24] S5, [9168-2] S1, [9169-33] S8
Fokina, Irina N. [9216-34] S9
Follath, Rolf [9206-19] S5
Fonseca, Piergiacomo Z. G. [9164-2] S1
Fonseca-Guerra, Gabriel A. [9167-98] S18a
Foote, Marc C. [9222-7] S2
Foraida, Z. [9173-14] S4
Forberich, Karen [9178-26] SPWed, [9178-3] S1, [9181-44] SPWed, [9184-45] S10, [9184-52] SPWed, [9205-13] S5
Forbes, Andrew [9175-22] S6, 9194 Conference Chair, 9194 S1 Session Chair, [9194-10] S3, [9194-11] S3, [9194-33] S7, [9194-39] SPMon, [9194-43] SPMon, [9194-44] SPMon, [9194-7] S2, [9194-8] S2, [9225-13] S4, [9225-24] SPMon
Forbes, Patricia B. [9175-22] S6
Forcherio, Gregory T. [9161-43] SPWed, [9163-111] SPWed, [9163-113] SPWed, [9163-136] SPWed
Ford, Joseph E. [9193-8] S2
Forestiere, Carlo [9160-86] S17
Forman, Darren L. [9170-38] S7
Forman, Leon [9215-1] S1
Forman, William R. [9208-6] S2
Fornahl, Udo [9194-25] S6
Forró, László [9164-48] S10, [9164-65] S13
Forsh, Pavel [9177-4] S1
Foster, Erick [9166-17] S2
Foster, Michael E. [9174-20] S5
Foteinopoulou, Stavroula 9162 Conference Chair, 9162 S5 Session Chair, [9162-42] S12, [9162-65] S18
Foucher, Johann [9173-2] S1
Fournier, Kevin B. [9211-15] S4
Fowler, Jesse D. [9196-7] S2, [9196-8] S3
Fowler, Malcolm M. [9211-7] S2, [9211-8] S2
Franc, Jan 9213 Program Committee
Francés, Jorge [9216-15] S4
Francis, Gene L. [9218-24] S5
Franckevicius, Marius [9163-82] SPWed
Franco, Afredo [9161-40] SPWed
Francois, Edouard [9217-9] S2
Frank, Bettina [9163-42] S11
Franks, Larry 9213 Conference Chair, 9213 S9 Session Chair
Frantz, Jesse A. [9161-13] S3, [9177-6] S2, [9202-15] S4
Franz, Bryan A. [9218-30] S7, [9218-4] S1
Frare, Maria Chiara [9181-43] SPWed
Fraser, Gerald T. 9219 Program Committee
Frasier, James [9163-122] SPWed
Frassetto, Fabio [9208-18] S4, [9210-14] S4, [9210-18] S4
Frauenrath, Holger [9165-10] S3
Frawley, Mary [9164-109] SPWed
Frayer, Daniel K. [9193-29] S7
Freda, Sam [9205-1] S1
Freeman, Mark D. [9208-6] S2
Freimuth, Frank [9167-64] S13
Freisem, Sabine [9167-4] S1b
Freitag, Marcus [9162-30] S9
Freiwald, Wes D. 9227 Program Committee
French, Paul M. W. [9169-2] S1
French, Roger H. [9179-16] S3
Frenklach, Irena [9203-6] S1
Frey, Gitti 9165 Program Committee
Friebele, E. Joseph [9161-13] S3
Fried, Jack [9213-28] S7, [9215-1] S1
Friedlein, Jacob [9184-77] SPWed, [9185-223] S6
Friedman, Adam L. [9167-104] S18b
Friedman, Daniel J. 9175 Program Committee
Friedman, Joseph S. [9167-55] S10
Friedman, Stuart [9173-7] S2
Friedrich, Stephan [9211-9] S2
Friend, Richard H. [9184-16] S5
Fritz, David Mark [9210-11] S3
Fritzsche, Helmut [9167-35] S5
Froehly, Luc [9204-12] S3
Frogget, Brent C. [9195-2] S1
Frolov, Oleksandr [9206-13] S3
Frolov, S. M. [9167-13] S2b
Frougier, Julien [9167-3] S1a
Frouin, Robert J. [9218-76] S1
Fry, Alan R. 9210 Program Committee
Fryauf, David M. [9174-18] S4, [9174-22] S6
Fu, Haoyang [9220-27] SPMon
Fu, Jinxin [9164-67] S13
Fu, Jiyuan [9217-46] S7
Fu, Lan [9174-5] S1
Fu, Ling [9198-28] S7
Fu, Shaojun [9170-47] SPWed, [9193-42] SPMon
Fu, Shih-Yu [9161-8] S2
Fu, Xiangyu [9183-82] SPWed
Fuchs, Cornelius [9183-71] SPWed
Fuchs, Ulrike [9194-27] S6
Fuchter, Matthew J. [9183-28] S6, [9185-123] S5
Fuentes-Hernandez, Canek [9183-46] S10, [9184-59] SPWed, [9184-61] SPWed, [9185-135] S8, [9185-136] S8, [9185-221] S5
Fuh, Andy Ying-Guey [9182-13] S3
Fuhrberg, Peter [9200-28] S4
Fujigaki, Motoharu 9204 Program Committee, [9204-17] SPMon, [9204-25] S4
Fujihara, Takashi [9181-11] S3
Fujikawa, Naotaka [9184-24] S6
Fujimagari, Hiromu [9174-1] S1
Fujimoto, James G. 9204 Program Committee
Fujisawa, Kaori [9182-5] S1
Fujishiro, Naofumi [9193-51] SPMon
Fujita, Katsumasa 9169 Program Committee, 9169 S8 Session Chair, [9169-29] S7, [9169-6] S2
Fukae, Ryohei [9182-9] S2
Fukuda, Mitsuo [9181-41] SPWed, [9192-44] SPMon
Fukuda, Yoshinori [9217-14] S2
Fukui, Takashi [9174-3] S1
Fukushima, Koichi [9160-94] SPWed
Fukushima, Tatsuya [9183-15] S4
Fulbright, Jon [9218-3] S1, [9218-5] S1
Fullager, Daniel B. [9160-19] S4
Fullerton, Eric E. 9167 S18b Session Chair, [9167-77] S15b
Fulmek, Paul [9190-10] S2, [9190-28] S6
Fumagalli, Francesco [9170-15] S3
Fumani, Ahmad K. [9167-6] S1b
Funase, Ryu [9219-3] S1
Fung, Yin Hsien [9164-94] SPWed
Furchi, Marco M. [9162-31] S9
Furenlid, Lars R. [9186-18] S5, 9214 Conference Chair, 9214 S3 Session Chair, [9214-12] S3, [9214-13] S4, [9214-15] S4, [9214-16] S4, [9214-7] S2, [9215-10] S3, [9215-14] S4
Furia, Bryan [9217-74] SPMon, [9217-75] SPMon
Furlong, Cosme 9203 Program Committee, 9204 Conference Chair, 9204 S1 Session Chair, [9204-22] SPMon, [9204-23] SPMon, [9204-3] S1, [9204-4] S1
Furness, Thomas A. [9189-9] S3
Fursov, Vladimir A. [9216-32] S8
Fürstenberg, Alexandre 9165 Program Committee
Fury, Chris [9164-111] SPWed
Futami, Fumio 9202 Program Committee, [9202-27] S6, [9225-8] S5

G

G. Rodrigo, Sergio [9162-48] S13
Gaal, Richard [9164-65] S13
Gabay, Tamir [9203-3] S1
Gabor, Nathaniel M. [9168-8] S2
Gaburro, Zeno 9161 Program Committee, [9172-13] S4
Gacoin, Thierry [9164-112] SPWed, [9164-45] S9, [9172-27] S7
Gadalla, Mohammad [9177-2] S1
Gadallah, Abde-Sattar [9161-12] S3
Gade, Vivek S. 9179 Program Committee, [9179-11] S2, [9179-14] S3
Gage, Edward C. [9201-7] S2
Gai, Wei [9211-3] S1
Gail, William B. 9223 Program Committee
Gaillard, Frederic-Xavier [9212-34] S7
Gajc, Marcin [9160-53] S11

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Galal, Ola [9191-22] S6
Galatus, Ramona M. [9200-44] SPMon
Gallego, Sergi [9216-15] S4, [9216-42] SPMon
Galli, Luca [9218-47] S10
Gallot, Guilhem 9166 Program Committee
Galperin, Michael [9160-43] S9
Galstian, Tigran V. [9182-21] S4
Galtier, Eric C. [9210-15] S4, [9210-16] S4
Galvez, Enrique J. [9187-3] S1, [9225-5] S1
Gamage, Sampath [9190-41] SPWed
Gambardella, Pietro [9167-64] S13
Gambarelli, Serge [9167-90] S17a
Gambitta, Alessandro [9207-16] S4
Gambogi, William J. 9179 Program Committee, [9179-22] S4, [9179-5] S1
Gamiz, Victor L. 9227 Conference Chair, 9227 S3 Session Chair
Gammon, Peter M. [9177-12] S3
Gamouras, Angela [9167-4] S1b
Gan, Qiaoqiang [9160-17] S4, [9161-18] S4, [9166-16] S2, [9169-8] S2, [9170-19] S4, 9172 S5 Session Chair, [9172-22] S6, [9185-207] S2
Gan, Zongsong [9201-24] S6
Gan'shina, Elena [9172-21] S5
Ganchevskaya, Sofia V. [9164-127] SPWed
Gandhi, Keyur K. [9177-21] S5, [9184-58] SPWed
Ganesan, A. R. [9188-17] S4, [9195-4] S1, 9203 Program Committee, 9203 S3 Session Chair
Gangopadhyay, Palash [9163-76] S17
Gannett, Will [9169-33] S8
Gannott, Florentina [9168-5] S1
Gao, Bo-Cai 9222 Program Committee
Gao, Dong [9165-1] S1, [9184-83] SPWed
Gao, Dongliang [9164-121] SPWed
Gao, Fei 9213 Program Committee, [9213-21] S5
Gao, Feng [9204-7] S2
Gao, Jing [9184-29] S7
Gao, Meng [9198-26] S6
Gao, Q. [9174-5] S1
Gao, Qian [9224-8] S2
Gao, Qiang [9220-32] S4
Gao, Qiang [9181-24] S6
Gao, Qingsong [9194-37] S8
Gao, Shan 9202 Program Committee, [9202-40] S8
Gao, Song [9194-35] S8
Gao, Wei [9221-24] S3, [9221-39] SPMon, [9221-46] SPMon
Gao, Wei 9221 Conference Chair, [9221-31] SPMon, [9221-34] SPMon, [9221-35] SPMon, [9221-36] SPMon, [9221-37] SPMon, [9221-38] SPMon
Gao, Xuan [9207-15] S4
Gao, Yongkang [9185-207] S2
Gao, Yongli [9183-10] S3, [9183-87] SPWed
Gao, Yuan [9227-16] S3
Gao, Zhiqiang [9221-18] SPMon, [9221-25] S3, [9221-30] SPMon, [9221-31] SPMon, [9221-4] S1, [9221-40] SPMon, [9221-42] SPMon, [9221-43] SPMon
Gaouyat, Lucie [9172-11] S3, [9187-5] S2
Garboushian, Vahan [9175-24] S7
Garces, Hugo O. [9216-19] S5
García de Abajo, Francisco Javier [9160-21] S9, [9163-15] S4, [9163-45] S11, [9163-55] S14, [9163-59] S14
García, Amelia P. [9216-43] SPMon
Garcia, Carlos D. [9200-9] S1
Garcia, Karin [9167-52] S10
García-Ballesteros, Juan José [9180-15] S3
Garcia-Cervera, Carlos [9219-14] S4
Garcia-Gracia, Hipolito [9194-2] S1
Garcia-Macedo, Jorge A. [9161-40] SPWed
Garcia-Moreno, Francisco [9212-40] SPMon
Garcia-Sucerquia, Jorge Ivan [9216-46] SPMon
Garcia-Torales, Guillermo [9219-17] SPMon, [9219-21] SPMon, [9219-22] SPMon
García-Valenzuela, Augusto [9173-12] S4
Gardner, Dennis Floyd [9210-12] S3
Gardner, Eric W. [9163-122] SPWed
Gardner, Tim [9198-7] S2
Garello, Kevin [9167-64] S13
Garg, Amit [9188-28] SPMon
Gargano, Ricardo G. [9165-61] SPWed, [9165-69] SPWed
Garnache, Arnaud [9167-3] S1a
Garreau-Illes, Lucie A. G. [9179-22] S4
Garritano, James [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Gärtner, Stefan [9184-38] S9
Garza, Jorge A. [9194-2] S1, [9194-41] SPMon
Gascon, Ferran [9218-47] S10, [9218-49] S11
Gaskill, Jack D. SC017
Gasparyan, Laura G. [9207-40] SPMon
Gasse, Adrien [9190-19] S5, [9190-6] S2
Gather, Malte C. 9183 Program Committee, 9183 S5 Session Chair, 9183 S6 Session Chair, [9183-48] S11, [9183-71] SPWed, [9183-85] SPWed, 9185 S1 Session Chair, [9185-212] S2
Gattu, Suhasini [9173-14] S4
Gaudin, Gilles [9167-64] S13
Gaupp, Andreas [9206-7] S2
Gauthier, David [9210-22] S5
Gauthier, Leo R. 9202 Program Committee, 9202 S12 Session Chair, [9202-56] S12, [9202-65] SPMon
Gautier, Julien [9210-22] S5
Gauvin, Jonny [9190-1] S1
Gavartin, Jacob [9183-88] SPWed
Gavdush, Arsenii A. [9188-25] SPMon, [9216-34] S9
Gavrilenko, Vladimir I. [9160-103] SPWed
Gavrylyak, Mykhailo S. [9216-41] SPMon
Gawlitza, Peter [9207-7] S2, [9210-10] S3
Gaxiola, Leopoldo [9217-40] S5
Gbur, Greg [9224-20] S5
Ge, Yang [9223-12] S3
Geary, Andrew [9175-26] S7
Gebru, Alem Kindya 9221 S1 Session Chair, [9221-5] S1
Geckeler, Ralf D. 9206 Program Committee, [9206-15] S4
Gee, Sangyoun 9202 Program Committee, [9202-55] S11
Geernaert, Thomas [9226-12] S4
Gehl, Michael R. [9186-14] S4
Gehring, Amanda E. [9215-7] S2
Geiger, Thomas [9184-5] S2
Geilhufe, Jan [9167-32] S5
Geiser, Brian P. [9173-6] S2
Gelbaor Kirzhner, Miri [9182-26] S5
Geleta, Matthew [9212-36] S8
Gelfand, Ryan M. 9166 Program Committee, [9166-26] S3
Geloni, Gianluca Aldo 9209 Program Committee
Genevet, Patrice [9170-33] S6
Geng, Jihong 9226 Program Committee
Geng, Lixiang [9217-6] S1
Geng, Xu [9218-23] S5, [9218-54] S12, [9218-55] S12, [9218-60] SPMon
Geng, Zhaoxin [9163-85] SPWed
Gennett, Thomas [9165-15] S4, [9165-16] S4
Genovese, Marco [9225-1] S1
Gentile, Martin J. [9163-90] SPWed
Gentle, Ian R. [9185-203] S1
George, Jean-Marie 9167 Program Committee, [9167-3] S1a, [9167-81] S16a, [9167-90] S17a
George, Jon [9214-6] S2
George, Matthew C. [9163-122] SPWed
George, Robert [9224-16] S4
Georges, Francis [9202-52] S11
Georges, Marc P. [9203-20] S5, [9204-14] S3
Gerace, Aaron D. [9218-45] S10
Gerasimova, Natalia [9210-1] S1
Gergaud, Patrice [9212-12] S3
Gerhardt, Nils C. [9167-2] S1a
Gerich, Carola Eleonora [9166-23] S3
Gerlin, Francesca [9163-107] SPWed, [9163-109] SPWed
Germer, Thomas A. SC492
Gerster, Thomas [9167-75] S15a
Gertnere, Zanda [9172-35] SPWed
Gertners, Ugis [9172-35] SPWed
Gervits, N.E. [9165-56] SPWed
Gessler, Patrick [9210-22] S5
Gesuele, Felice [9198-32] S8
Getzin, Matthew [9212-47] SPMon
Gevkan, Ivan I. [9161-44] SPWed
Gevorgyan, Ashot H. [9182-44] SPWed, [9182-47] SPWed
Ghadiri, Reza [9164-115] SPWed, [9164-88] S18
Ghasemi, Javad [9168-9] S2
Ghasemi, Masih [9172-15] S4
Ghazinejad, Maziar 9168 Conference Chair, 9168 S1 Session Chair, 9168 S3 Session Chair, 9168 S4 Session Chair, [9168-11] S3, [9168-31] SPWed
Ghebrebrhan, Michael [9178-17] S5
Ghiringhelli, Giacomo [9207-19] S5
Ghosh, Abhijit [9191-18] S5
Ghosh, Ambarish [9163-62] S15
Ghosh, Nirmalya [9164-19] S4
Giaccio, Graciela M. [9202-64] SPMon
Giannessi, Luca [9210-22] S5
Giardini, Stephen [9178-17] S5
Gibbons, Matt [9201-6] S2
Gibson, Daniel J. [9192-18] S4
Gibson, Graham M. 9164 S18 Session Chair, [9164-16] S4, [9164-35] S7
Gibson, Hannah [9175-20] S6
Gibson, Kristofor [9224-29] S7
Gibson, Lachlan [9164-22] S5, [9164-99] SPWed
Gibson, Ricky [9186-14] S4
Giebink, Noel C. 9175 Program Committee, 9175 S3 Session Chair, 9183 S11 Session Chair, 9183 S12 Session Chair, [9183-38] S9, [9191-15] S5
Gieseg, Steven [9212-16] S4
Giesen, David J. [9183-88] SPWed
Giessen, Harald 9160 Program Committee, [9160-31] S7, 9163 Program Committee, [9163-4] S2, [9163-42] S11
Gigan, Sylvain [9164-102] SPWed, [9164-103] SPWed, [9164-15] S3
Giger, Maryellen L. [9189-6] S2
Giglia, Angelo [9207-20] S6
Gilissen, Koen [9183-36] S8
Gill, Hardeep Singh [9178-17] S5, [9184-40] S9
Gille, John C. [9218-24] S5, 9219 Program Committee
Gillespie, Patti S. 9220 Program Committee
Ginger, David S. 9165 S3 Session Chair, [9165-13] S4
Gingras, Fanie [9188-16] S4
Ginis, Vincent [9160-62] S13, [9160-7] S2
Ginley, David S. 9177 Program Committee
Ginsberg, Naomi S. [9184-10] S3, [9184-10] S9
Ginzburg, Pavel [9160-20] S4, [9160-27] S6, [9160-38] S8, [9163-116] SPWed, [9163-93] SPWed
Gioia, Patrick [9216-14] S4
Giordano, Anthony J. [9185-135] S8
Giordano, Fabrizio [9184-23] S6
Giorgetta, Fabrizio R. [9219-5] S2
Giorgioni, Anna [9167-16] S3a
Girardo, Salvatore [9164-76] S15
Giri, Gaurav [9185-134] S8
Girka, Yura [9170-51] SPWed
Girshovitz, Pinhas [9203-3] S1, [9203-52] SPMon, [9203-6] S1
Gladysz, Szymon [9224-28] S7
Glasbrenner, James K. [9167-68] S14
Glaser, Leif [9210-22] S5
Glaser, Matthew A. [9182-40] S7
Glebov, Vladimir [9211-9] S2
Gleckman, Philip [9175-7] S2
Gleeson, Helen F. [9164-101] SPWed, [9182-14] S3
Glembocki, Orest J. [9160-42] S9
Glenn, John [9208-7] S2
Glodo, Jarek [9215-2] S1
Glowacki, Eric D. [9171-1] S1, [9185-217] S4
Glugla, David J. [9181-34] SPWed
Gmitro, Arthur F. [9214-11] S3
Gnatyuk, Volodymyr A. [9213-60] SPMon
Gobsch, Gerhard [9165-6] S2
Goddard, William A. [9163-44] S11
Goeke, Ronald S. [9191-14] S4
Goetze, Kurt [9207-18] S5
Goforth, Ian A. [9160-19] S4
Goikhman, Alexandr [9206-9] S2, [9207-43] SPMon, [9207-44] SPMon, [9207-5] S1
Gok, Gurkan [9160-37] S8
Gokarna, Anisha [9161-17] S4
Gokce, Muhsin C. [9224-7] S2
Gököz, A. Burak [9164-95] SPWed
Golaszewska, Krystyna [9199-2] S1
Goldberg, Alexander [9183-88] SPWed
Goldberg, Kenneth A. 9206 Program Committee, 9206 S2 Session Chair
Goldberg, Mitch 9218 Program Committee, 9218 S3 Session Chair, [9221-15] S2
Goldflam, Michael D. [9168-2] S1
Goldstein, Jonathan T. [9172-34] S8
Goldstein, Peter I. 9193 Program Committee, 9193 S5 Session Chair, 9193 S6 Session Chair, [9193-13] S3
Golfier, Stefan [9164-76] S15
Goli, P. [9168-29] S5
Golovin, Andrii B. [9194-28] S7
Goltsov, Alexander [9161-24] S5
Gomard, Guillaume [9162-41] S12, [9183-75] SPWed
Gomes, Mario W. [9164-86] S18
Gomes, Raquel [9170-41] S8
Gómez-Pozos, Heberto [9203-50] SPMon
Gong, Fang [9221-16] S2, [9221-9] S1
Gong, Haimei [9220-8] S3, [9220-9] S3
Gong, Jianhua [9222-20] S4
Gong, Mali [9194-35] S8
Gong, Qihuang [9170-23] S4
Gong, Wenbin [9223-21] SPMon
Gong, Yinyan [9165-27] S7
Gönüllü, Yakup [9176-22] S6
González Fernández, Luis Miguel [9219-11] S3
González Oliva, Abel [9164-97] SPWed
González Ramírez, Efrén [9203-23] S5, [9203-26] S6
Gonzalez- Romero, Elisa [9166-54] SPWed
González, Margarita H. [9216-43] SPMon
González-Vega, Arturo [9221-22] S3
González-Vidal, José Luis [9203-50] SPMon
Good, William S. [9218-52] S11, [9222-8] S2
Goodby, John W. [9182-14] S3
Goodman, Eric L. [9215-8] S3
Goodman, Sarah [9181-25] S6
Goodson, Theodore G. 9181 Program Committee, [9181-5] S1
Gopalan, Venkatraman 9198 S2 Session Chair, [9198-9] S3
Gorbov, Ivan [9201-29] S7
Gorbunova, Elena V. [9190-40] SPWed, [9217-21] S3, [9217-71] SPMon
Gordel, Marta [9163-32] S8
Gordon, Ivan 9177 Program Committee
Gordon, Jeffrey M. [9178-5] S2, 9191 Conference Chair, 9191 S3 Session Chair, [9191-13] S4, [9191-2] S1
Gordon, Reuven [9164-43] S8, [9166-26] S3, 9172 S4 Session Chair, [9172-9] S3
Gordon, Robert [9188-22] S4
Gordon, Robert B. [9175-24] S7
Gordon, Tim [9196-9] S3
Gordon, Vernita 9164 S12 Session Chair, [9164-31] S6
Gordoni, S. M. [9211-13] S4
Gorecka, Ewa [9182-18] S4
Gorecki, Christophe 9204 Conference Chair, 9204 S3 Session Chair, [9204-12] S3
Gorghinian, Astrik [9207-39] SPMon
Gorgoi, Mihaela [9177-14] S3
Gorodetsky, Alon [9166-29] S4
Gorrochategui, Paula [9190-19] S5
Gorsky, Mykhaylo P. [9216-47] SPMon
Görtz, Verena [9182-14] S3

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Goryunov, Artem E. [9205-28] SPMon
Goto, Shunji 9207 Conference Chair, 9207 S4 Session Chair, 9207 S9 Session Chair, [9207-24] S7
Goto, Takumi [9208-1] S1
Gottwald, Matthias [9167-50] S9
Gould, Travis J. [9169-10] S3, [9169-9] S3
Goushi, Kenichi [9183-68] SPWed
Goyal, Shiv Kumar [9215-17] SPMon
Goyette, Rick [9167-71] S14
Graber, Timothy J. [9215-12] S4
Grachev, Victor M. [9213-44] S10
Gracias, David H. 9166 Program Committee
Graeff, Carlos Frederico de Oliveira [9184-5] S2
Graf, Arko [9183-85] SPWed
Graff, Robert T. [9213-39] S9
Graham, Gary D. [9218-34] S8
Graham, Hsueh-Mei W. 9205 Program Committee, 9205 S5 Session Chair
Graham, Kenneth R. [9165-5] S2, [9184-30] S7
Graham, Michael E. [9208-5] S2, [9208-8] S2
Grahn, Patrick [9160-25] S6
Grajower, Meir [9160-68] S14, [9163-6] S2
Granados, Eduardo [9210-15] S4, [9210-16] S4
Grand, Caroline M. [9184-92] SPWed
Grandidier, Jonathan [9175-29] SPWed
Grandjean, Nicolas [9162-28] S8
Granier, Christopher H, [9162-50] S14
Granieri, Sergio C. [9188-3] S1
Grant, Barbara G. [9195-10] S3, 9220 Program Committee, SC1143
Gratorp, Christina [9212-18] S4
Grätzel, Michael 9176 Program Committee, [9184-23] S6
Gray, Nathan W. [9220-2] S1
Gray, Norman [9193-54] SPMon
Gray, Stephen Kevin [9164-80] S16
Grazioli, Cesare [9210-14] S4, [9210-22] S5
Grazulis, Lawrence [9163-126] SPWed
Grbic, Anthony 9160 S10 Session Chair, [9160-37] S8
Greaney, Matthew J. [9165-24] S6
Grechukh, Taras Z. [9166-51] SPWed
Green, James S. [9194-22] S5
Green, Martin A. [9178-18] S5
Green, Robert O. 9222 Program Committee, [9222-10] S3, [9222-11] S3, [9222-12] S3, [9222-13] S3
Greene, Jon A. 9202 Program Committee, [9202-21] S5
Greene, Nicole [9160-99] SPWed
Greenham, Neil C. [9184-16] S5
Grefenstette, Brian W. [9213-25] S6
Greffet, Jean-Jacques 9163 Program Committee, [9163-26] S7
Gregory, G. Groot 9188 Conference Chair, [9188-19] S4, [9190-8] S2, 9193 Conference Chair, 9193 S2 Session Chair, 9193 S7 Session Chair, 9197 Program Committee
Greig, Shawn R. [9163-34] S8
Grein, Christoph H. [9213-27] S6
Greivenkamp, John E. 9186 Conference Chair, 9186 S7 Session Chair, [9186-31] S8, [9203-16] S4, [9204-5] S1, SC690
Grenadier, Sam [9213-14] S3
Grenci, Gianluca [9207-10] S3
Greving, Imke [9212-23] S5, [9212-27] S6, [9212-44] SPMon, [9212-5] S1
Griesmann, Ulf 9203 Program Committee
Griessen, Ronald [9163-4] S2
Griesser, Thomas [9185-218] S5
Grigelionis, Ignas [9199-15] S4, [9199-18] S5
Grigoropoulos, Costas P. [9180-11] S3
Grille, Thomas [9200-57] S4
Grilli, Emanuele [9167-16] S3a
Grillo, Vincenzo [9194-4] S1
Grim, Gary P. 9211 Conference Chair, 9211 S3 Session Chair, 9211 S4 Session Chair, [9211-4] S1, [9211-7] S2, [9211-8] S2, 9215 Conference Chair, 9215 S1 Session Chair, [9215-14] S4
Grimm, Stefan B. [9168-5] S1
Grinderslev, Soren 9202 Program Committee, 9202 S7 Session Chair, [9202-6] S2
Grindlay, Jonathan E. [9222-6] S1
Grine, Albert D. [9162-21] S6
Grinvald, Shmuel [9181-18] S4
Grinyov, Borys [9213-47] SPMon
Grist, Samantha M. [9166-31] S4
Griswold, Janelle [9226-4] S1
Grizzoli, Walan [9209-7] S3
Grois, Dan [9217-84] S3
Gross, Kevin C. 9222 Program Committee
Grote, James G. Symposium Chair, 9171 Program Committee, [9171-11] S3, [9171-16] S4, [9171-20] S5, [9171-32] S3, [9171-6] S2, [9226-27] S8
Grote, Richard R. [9181-17] S4
Grotenhuis, Michael G. [9218-66] SPMon
Grübel, Gerhard 9210 Program Committee
Grulois, Tatiana [9192-11] S3
Grundfest, Warren S. [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Gruneisen, Mark T. 9225 Program Committee
Grünert, Jan [9210-22] S5, [9210-7] S2
Grützmacher, Detlev [9167-75] S15a
Grynberg, Marian [9199-18] S5
Grytsenko, Konstantin P. [9201-29] S7
Grzelak, Justyna K. [9163-97] SPWed
Gu, Chun [9193-56] SPMon
Gu, Genda [9213-59] SPMon
Gu, Guiru [9163-67] S15
Gu, Guohua [9217-6] S1
Gu, Hua Rong [9194-14] S3
Gu, Jiajun [9204-24] SPMon
Gu, Lei [9181-23] S6
Gu, Lingjia [9215-15] SPMon, [9217-80] SPMon, [9218-62] SPMon, [9220-27] SPMon
Gu, Min 9201 Program Committee, 9201 S3 Session Chair, [9201-24] S6
Gu, Tian [9191-14] S4
Gu, Xiaohong [9179-24] S4
Gu, Xingfa 9218 Conference Chair, 9221 S2 Session Chair, [9221-11] SPMon, [9221-39] SPMon, 9223 Program Committee
Gu, Yalong [9224-20] S5
Gu, Yaxiu [9195-20] SPMon
Gu, Yaxiu [9195-20] SPMon
Gubarev, Mikhail V. 9206 Program Committee, 9206 S3 Session Chair, [9208-16] S4, [9208-5] S2, [9208-6] S2
Guck, Jochen R. [9164-76] S15
Guckes, Amber [9215-4] S1
Guclu, Caner [9160-97] SPWed
Gudimetla, V.S. Rao [9224-18] S5
Gudumasu, Srinivas [9217-62] S10
Guennou, Mael [9167-27] S4b
Guérineau, Nicolas [9192-11] S3
Guerreiro, Ariel R. [9164-97] SPWed
Guggenmos, Alexander [9207-21] S6
Guha, Supratik 9174 Program Committee
Gühne, Tobias [9192-17] S4
Gui, Yongsheng [9167-97] S18a
Guigue, Pascale [9196-11] S3
Guildenbecher, Daniel R. 9204 Program Committee
Guilet, Stéphane [9167-52] S10
Guillaume, Stéphane-Olivier [9163-55] S14
Gulbinas, Vidmantas [9163-82] SPWed
Guler, Urcan [9160-52] S11
Gullikson, Eric [9207-21] S6
Gum, Jeffery S. [9195-15] S4
Gumbs, Godfrey [9205-4] S2
Gunapala, Sarath D. 9219 Program Committee, 9220 Program Committee
Gundlach, David J. [9184-17] S5, [9184-41] S9
Gundogdu, Kenan 9198 S8 Session Chair, [9198-19] S5
Gunewardene, Mudalige S. [9169-24] S5
Günther, Alrun [9185-115] S4
Gunther, Christian [9167-32] S5
Guo, Fei [9178-26] SPWed, [9180-20] S4, [9181-44] SPWed, [9184-45] S10, [9184-52] SPWed
Guo, Hong [9198-16] S4
Guo, Jinghua 9176 Program Committee, [9176-16] S5
Guo, Junpeng [9163-119] SPWed, [9198-16] S4
Guo, Liejin [9176-11] S3
Guo, Luqing [9161-18] S4
Guo, Qingzhen [9213-7] S2
Guo, Ruyan 9190 Track Chair, 9198 Track Chair, 9199 Track Chair, 9200 Conference Chair, 9200 S1 Session Chair, 9200 Track Chair, [9200-48] SPMon, [9200-53] SPMon, [9200-54] SPMon, [9200-9] S1, 9201 Track Chair, 9202 Track Chair, 9220 Track Chair
Guo, Shuxu [9216-63] SPMon, [9216-64] SPMon
Guo, Tzung-Fang [9165-46] S13, [9184-25] S6
Guo, Xi [9163-117] SPWed
Guo, Xiaohu [9192-7] S2, [9193-41] S2
Guo, Yu [9160-64] S13
Gupta, Anurag [9197-201] SPLEN
Gupta, Gautam [9184-97] SPWed
Gupta, Mool Chandra 9180 Program Committee, [9180-14] S3, [9180-6] S2
Gupta, Phalguni [9217-29] S4, [9217-34] S4
Gupta, Rajiv [9209-27] S7, [9209-28] S8
Gupta, Vipin P. [9191-14] S4
Gupta, Yogendra M. [9215-12] S4
Gür, Bilgehan [9205-10] S4, [9218-36] S8
Gurevich, Evgeny L. [9164-88] S18
Gürsoy, Doga [9212-15] S3, [9212-22] S5, [9212-37] S8
Gurvitz, Egor A. [9160-82] S16
Guryev, Igor V. [9200-21] S3, [9200-47] SPMon
Gusachenko, Ivan [9164-109] SPWed, [9164-110] SPWed
Guss, Paul P. [9213-29] S7, [9213-46] S10, 9215 Program Committee, [9215-3] S1, [9215-4] S1
Gustafsson, Anders [9220-18] S5
Gustainyte, Ausra [9163-82] SPWed, [9166-54] SPWed
Gustavsson, Thomas L. [9165-49] S14
Gutierrez, Homero [9220-10] S3
Gutiérrez-Vega, Julio Cesar 9194 Program Committee, [9194-2] S1
Guzhva, Michael E. [9163-102] SPWed
Guzman-Chavez, Ana D. [9200-45] SPMon, [9200-47] SPMon
Guzzi, Mario [9167-16] S3a
Gvishi, Raz [9168-13] S1, [9181-18] S4
Gwo, Shangjr [9160-70] S14, [9163-60] S14, [9163-95] SPWed
Gwon, Minji [9177-25] S5

H

Ha, Jong-Yoon [9174-9] S3
Ha, Junmok [9185-126] S6
Haam, Seungjoo [9166-12] S2, [9166-45] SPWed
Haas, David [9212-51] SPMon
Haas, Evan [9219-6] S2
Haas, Harald [9183-45] S10
Haase, Anja [9185-218] S5
Haberer, Elaine D. [9171-27] SPWed, [9171-29] SPWed, [9171-30] SPWed
Haberko, Jakub [9184-73] SPWed
Habibi, Ali 9217 Program Committee
Hablani, Surbhi [9181-36] SPWed
Hachaj, Tomasz [9217-56] S1
Hacke, Peter [9179-2] S1
Hadar, Ofer 9217 Program Committee, 9217 S3 Session Chair, [9217-36] S5, [9217-61] S10, [9217-84] S3
Hadji, Emmanuel [9164-47] S10
Hadjimichael, Theodore J. [9195-15] S4
Hafezi, Mohammad [9162-70] S19
Hagan, David J. [9181-1] S1, [9181-18] S4
Hagen, Charlotte K. [9212-4] S1
Haghi, Mehrdad [9168-30] S3
Hagiwara, Osahiko [9214-1] S1
Hahlweg, Cornelius F. [9190-2] S1, 9193 Program Committee, 9193 S4 Session Chair, [9193-21] S5, [9193-22] S6
Hai, Pham Nam [9167-80] S15b
Haichao, Guo [9224-45] S10
Haider, Shahid [9193-24] S6
Haigh, Sarah 9170 Program Committee
Haines, Andrew I. [9162-75] S11
Haines, Todd J. [9213-17] S4, [9215-7] S2
Haist, Tobias 9203 Program Committee, [9227-1] S1
Haji, Farnaz [9166-1] S1
Halas, Naomi J. 9163 Program Committee
Halder, Kalyan K. [9217-1] S1
Haldrup, Kristoffer [9209-10] S4
Hales, Zaveon M. [9213-34] S8
Haley, Christina [9196-3] S1
Hall, Anthony Shoji [9191-3] S1
Hall, Gareth N. [9211-1] S1, [9211-2] S1
Hall, Kimberley C. 9167 S2b Session Chair, [9167-4] S1b
Hallam, Benny T. [9160-33] S7
Hallen, Hans D. 9198 Program Committee, 9198 S5 Session Chair, [9198-14] S4
Haller, Gunther [9213-31] S7
Hallmann, Jörg [9207-1] S1
Halls, Mathew D. [9183-88] SPWed
Hällstig, Emil [9203-4] S1
Halpin, John M. [9216-9] S3
Ham, Juyoung [9183-29] S7
Hamadou Ibrahim, Alpha [9225-24] SPMon
Hamad-Schifferli, Kimberly S. 9166 Program Committee
Hamann, Elias [9213-16] S4, [9213-35] S8
Hambsch, Mike [9184-18] S5
Hamburger, Manuel [9183-34] S8
Hamilton, Allister B. [9174-30] S7
Hamilton, David Cole [9164-23] S5
Hamm, Joachim M. [9160-79] S16
Hammann, M. Gregory 9223 Program Committee
Hammel, P. Chris [9167-91] S17a
Hammel, Stephen M. 9224 Conference Chair, 9224 S3 Session Chair, 9224 S8 Session Chair, 9224 Track Chair, [9224-23] S6, [9224-24] S6, [9224-25] S6, [9224-26] S6, 9225 Track Chair, 9226 Track Chair, 9227 Track Chair
Hammer, Kimberly N. [9175-11] S3, [9175-26] S7, [9175-4] S1
Hamon, Benoit H. [9190-6] S2
Hampai, Dariush [9207-33] S9, [9207-39] SPMon, [9212-46] SPMon
Hamzavytehrany, Babak [9179-22] S4, [9179-5] S1
Han, Gyoowan [9180-2] S1
Han, Jae-Hyung [9193-32] S8
Han, Jae-Joon [9217-18] S2
Han, Jinkyu [9176-26] S7
Han, Jung 9174 Program Committee
Han, Ling [9214-12] S3, [9214-16] S4, [9215-14] S4
Han, Pyung-Cho [9180-19] S4
Han, Sen 9195 Program Committee
Han, Tae-Hee [9183-32] S7
Han, Yueping [9209-30] S8, [9217-26] S3
Hanayama, Ryohei [9203-41] SPMon
Hanczyc, Piotr [9166-13] S2
Haneef, Shahna Muhammad [9202-22] S5
Haney, Michael W. [9191-14] S4
Haney, Paul M. [9174-40] S9
Hanft, Marco 9195 Program Committee
Hanhart, Philippe [9217-11] S2
Hanke, Randolf [9212-53] SPMon
Hankiewicz, Ewelina 9167 S15b Session Chair, [9167-87] S16b, [9167-93] S17b
Hanna, Simon 9164 S15 Session Chair, [9164-61] S12, [9164-81] S16
Hanneken, Christian [9167-34] S5
Hansford, Graeme 9209 Program Committee
Hanssen, Leonard M. 9205 Conference Chair
Hansson, Rickard [9184-73] SPWed, [9184-74] SPWed
Hanulia, Taras [9172-36] SPWed

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Hany, Roland [9184-5] S2
Hao, Qun [9223-11] S3
Haque, Md. Obaidul [9218-40] S9
Hara, Shinjiro [9174-1] S1
Haraguchi, Masanobu [9170-5] S1
Hardesty, Chuck [9222-8] S2
Hardikar, Kedar Y. [9179-20] S4
Harding, Geoffrey 9214 Program Committee
Harding, Kevin G. [9204-24] SPMon
Hardtdegen, Hilde [9167-75] S15a
Hares, Jonathan D. [9211-10] S3, [9211-12] S3
Hargrove, Dana R. [9211-12] S3
Hari, Parameswar [9175-9] S3
Harju, Aapo [9175-28] SPWed
Harkema, Stephan [9183-52] S12
Harper, Aaron W. 9161 Program Committee
Harrington, Ellery J. [9204-23] SPMon, [9204-4] S1
Harrington, James A. [9199-17] S4
Harrington, Peter [9199-28] S7
Harris, Timothy R. [9223-10] S3
Harrison, Fiona A. [9213-25] S6
Hart, Michael 9208 Program Committee
Hart, Philip A. [9213-31] S7
Hartke, John P. 9220 Program Committee
Härtling, Thomas [9166-23] S3
Hartmann, Lucia [9165-10] S3
Hartmann, Nicolai [9163-56] S14
Hartmann, Paul [9190-10] S2, [9190-28] S6, [9193-11] S3
Hartouni, Edward [9211-9] S2
Hartschuh, Achim [9163-56] S14
Hartsough, Neal E. [9214-3] S1
Harvey, James E. [9186-4] S1, 9192 Program Committee, [9205-18] S6
Hasebe, Nobuyuki [9213-42] S10
Hasegawa, Mark M. [9196-17] S5
Hashemi, Hosein [9170-45] S8
Hashimoto, Mayuko [9182-9] S2
Hashmi, Fahad [9214-18] S4
Hasi, Jasmine [9213-31] S7
Hasman, Erez 9167 Program Committee
Hassani Nia, Iman [9163-73] S17
Hassebrook, Laurence G. 9216 Program Committee
Hata, Kenji 9168 Program Committee
Hatakeyama, T. [9163-138] S8
Hatarik, Robert [9211-9] S2
Hatch, Ben W. [9211-16] S4
Hatheway, Alson E. 9197 Program Committee, [9197-6] S2, SC781
Hatsui, Takaki [9210-17] S4
Hattar, Khalid M. [9174-30] S7, 9215 Program Committee
Hauge, Robert H. [9168-18] S4
Haugstad, Greg [9167-31] S4b
Hau-Riege, Stefan P. 9210 Conference Chair, 9210 S3 Session Chair, [9210-12] S3
Hausmann, Birgit M. [9162-29] S8
Hauss, Bruce [9218-76] S1
Havenith, Remco W. A. [9184-7] S2
Hawkins, Aaron R. [9164-75] S15
Hawrami, Rastgo [9213-23] S5
Hay, Nick [9194-29] S7
Hay, Rebecca F. [9164-35] S7
Hayashi, Masamitsu [9167-65] S13
Hayashi, Takumi [9204-25] S4
Hayden, Joseph E. [9195-15] S4
Hayduk, Michael J. 9226 Program Committee
Hayenga, William [9163-112] SPWed, [9170-24] S5
Hayes, Anna C. [9211-7] S2
Hayes, Sophia C. 9165 Conference Chair, 9165 S14 Session Chair
Hayes, Sophia E. 9167 S3a Session Chair, [9167-23] S4a, [9167-24] S4a
Hazart, Jérome [9173-2] S1
Hazim, Hani [9217-54] S8
Hazra, Lakshminarayan 9192 Program Committee
He, An [9209-31] SPMon
He, Cheng [9162-69] S19
He, Feiyang [9227-9] S2
He, Junwen [9175-15] S4
He, Ping [9224-13] S3, [9224-30] S7, [9224-32] S7
He, Qingsheng [9200-23] S3, [9201-16] S4, [9216-31] S8
He, Xiang [9168-9] S2
He, Xianqiang [9221-26] S3, [9221-28] S3
He, Xiaowei [9168-18] S4
He, Xing [9227-6] S1
He, Xingdao [9202-31] S7, [9223-12] S3
He, Xioaxi [9184-27] S7
He, Yong [9217-24] S3, [9217-62] S10
He, Yumei [9205-8] S3
He, Yuwen [9217-24] S3, [9217-62] S10
He, Zambing [9172-11] S3
He, Zhengquan [9216-65] S1
He, Zhong 9213 Program Committee
Healy, John J. [9216-33] S9
Heathcote, Robert [9194-22] S5, [9211-6] S2
Heben, Michael J. 9177 Conference Chair, 9177 S4 Session Chair, 9177 S5 Session Chair
Hebrard, Jean Marc [9214-19] SPMon
Hecht, Stefan [9165-14] S4
Heckman, Emily M. 9171 Program Committee
Hedayat, Hamoon [9167-85] S16b
Hedenig, Ursula [9200-57] S4
Hedges, Alan R. [9193-34] S8
Heedt, Sebastian [9167-75] S15a
Heeg, Bauke [9204-1] S1
Heeney, Martin J. [9184-15] S5
Hehn, Michel [9167-60] S12
Heideman, Kyle C. [9203-16] S4
Heidler, Jakoba [9167-70] S14
Heier, Jakob [9184-5] S2
Heikal, Ahmed A. [9198-29] S7
Heiliger, Christian [9167-59] S11
Heiling, Calvin [9175-20] S6
Heilman, Jeremy A. [9201-12] S3, [9201-13] S3
Heilmann, Ralf K. [9208-5] S2
Heilweil, Edwin J. [9184-12] S10, [9184-12] S4
Heim, Kevin R. [9201-7] S2
Heimann, Philip A. [9210-15] S4, [9210-16] S4
Heindel, Andreas [9217-19] S3
Heinrich, Benoit [9185-104] S1
Heinrich, Matthias [9162-60] S16
Heinz, Maximilian [9163-58] S14
Heinzl, Christoph [9212-20] S4
Helder, Dennis L. [9218-16] S4, [9218-19] S4
Helfen, Lukas [9207-1] S1
Helgert, Christian [9160-10] S2
Hell, Stefan W. [9164-41] S8, 9169 Program Committee
Heller, Evan [9190-8] S2
Heller, Iddo [9164-41] S8
Heller, Peter [9205-11] S4
Hellesø, Olav Gaute [9164-77] S15
Hellstrom, Sondra L. [9163-50] S12, 9170 Program Committee
Hellwig, Ansgar [9192-34] S7
Hemberg, Oscar [9212-18] S4
Hemine, Jamal [9165-53] SPWed, [9165-54] SPWed, [9182-48] SPWed, [9182-51] SPWed
Henderson-Nelson, Kelly [9196-22] S6, [9196-23] S6
Hendrickson, Joshua R. [9163-126] SPWed
Hendry, Derek [9218-39] S8
Hendry, Euan [9169-18] S4
Hendry, Martin [9193-54] SPMon
Hening, Alexandru [9224-16] S4, [9224-17] S4
Henk, Juergen [9167-56] S11
Henley, Simon J. [9177-21] S5, [9184-58] SPWed
Henneberger, Fritz [9163-70] S16, [9165-14] S4
Hennessy, John [9170-28] S5
Henninot, Jean-François [9182-4] S1
Henrard, Luc [9163-55] S14
Henry, Bruce Ian [9164-56] S11
Hens, Zeger [9170-41] S8
Hensen, Jan L. M. [9182-27] S5
Hensinger, Winfried K. [9225-21] S6
Heo, Dae-Jun [9170-55] SPWed
Heo, Jaewon [9213-61] SPMon
Herbst, Ryan [9213-31] S7
Herbst, Thomas [9225-17] S5
Heremans, Jean J. 9167 S1b Session Chair, [9167-12] S2b
Herkommer, Alois [9193-2] S1
Herman, Eric [9195-1] S1
Hermerschmidt, Andreas [9192-35] S7
Hernández, Sergi [9180-8] S2
Hernandez-Aranda, Raul I. 9194 S7 Session Chair, [9194-2] S1, [9194-40] SPMon, [9194-41] SPMon
Hernández-Arellano, Haydee [9221-22] S3
Hernández-Cordero, Juan [9164-82] S16
Hernandez-García, Juan C. [9200-21] S3
Hernández-Luna, Monica [9220-14] S4
Hernández-Mínguez, Alberto [9167-73] S15a
Hernández-Romo, Martin [9192-51] SPMon
Hernandez-Sosa, Gerardo [9183-34] S8
Hernández-Zavala, Jenny E. [9164-105] SPWed
Herrera, Elan [9213-12] S3
Herrmann, Lars O. [9162-75] S11, [9163-10] S3, [9164-42] S8
Herrmann, Sven C. [9210-11] S3, [9213-31] S7
Herrmann, Werner 9179 Program Committee
Hersam, Mark C. 9168 Program Committee, 9168 S2 Session Chair, [9168-6] S2
Hertz, Edward [9208-7] S2
Hertz, Hans M. 9207 Program Committee
Herzen, Julia [9212-2] S1, [9212-23] S5, [9212-32] S7, [9212-33] S7, [9212-44] SPMon, [9212-5] S1
Herzig, Hans Peter [9192-35] S7, [9203-54] SPMon
Herzog, Joseph B. [9163-139] SPWed, [9163-46] S11, [9171-23] S6
Heske, Clemens [9177-14] S3
Hess, Larry A. [9208-19] S3
Hess, Ortwin [9160-79] S16, [9162-76] S18
Hess, Phillip C. [9218-1] S1, [9218-18] S4
Hess, Samuel T. 9169 Program Committee, [9169-24] S5
Heßling, Thomas [9191-5] S2
Heta, Yushi [9179-22] S4
Hetu, Marcel M. [9193-25] S6
Heumueller, Thomas [9184-20] S5
Heurlin, Magnus [9170-59] SPWed, [9220-18] S5
Hey, Rudolf [9167-73] S15a
Heydari, David [9199-1] S1
Heyden, Anders [9217-37] S5
Hibino, Kenichi [9203-25] S6
Hicken, Robert J. [9169-18] S4
Hickmann, Jandir M. [9225-10] S3
Hieber, Simone Elke [9212-2] S1, [9212-25] S6, [9212-27] S6, [9212-33] S7
Higa, Takaya [9178-24] S6
Higuchi, Mai [9163-106] SPWed
Hihara, Hiroki [9219-3] S1
Hill, Avery M. [9163-139] SPWed, [9163-46] S11
Hill, Kenneth W. 9209 Program Committee, [9209-21] S6
Hill, Madelyn [9163-126] SPWed
Hill, Randolph M. [9210-12] S3, [9211-11] S3
Hilsabeck, Terance J. [9211-10] S3
Hiltunen, Jouni [9192-49] SPMon
Himel, Marc D. 9194 Program Committee
Hinderhofer, Alexander [9165-58] SPWed
Hinds, Arianne T. 9217 Program Committee
Hipp, Alexander C. [9212-23] S5, [9212-44] SPMon, [9212-5] S1
Hirano, Keiichi 9207 Program Committee
Hirano, Takashi [9210-8] S3
Hirose, Fumihiko [9177-20] S5
Hirota, Osamu [9202-27] S6, [9225-8] S5
Hiszpanski, Anna M. [9185-133] S8
Hitomi, Keitaro 9213 Program Committee
Hiyama, Kunimasa [9183-15] S4
Hnatovsky, Cyril [9164-11] S3
Hnatush, Svitlana O. [9166-51] SPWed
Ho, Clifford K. [9175-8] S2, [9191-21] S6
Ho, Jyh-Jier J. 9202 Program Committee, [9202-63] SPMon
Ho, Kai-Ming 9162 S15 Session Chair, [9162-45] S13
Hobley, Laura [9165-51] S14
Hobson, Peter A. [9160-33] S7
Hodaei, Hossein [9162-60] S16
Hodaj, Fiqiri [9212-12] S3
Hoelen, Christoph 9190 Program Committee
Hoelscher, Hendrik [9187-13] S5
Hoersch, Bianca [9218-47] S10
Hoffman, Charles [9220-10] S3
Hoffman, David [9161-16] S4
Hoffman, Robert C. [9200-32] S4
Hoffmann, Axel [9167-97] S18a
Hoffmann, Stephan [9179-13] S2
Höfle, Stefan [9183-37] S8
Höfling, Felix [9164-65] S13
Höfling, Sven 9199 Program Committee
Hofmann, Martin R. [9167-2] S1a
Hofmann, Simone [9183-71] SPWed, [9183-85] SPWed
Hoga, Felix [9177-1] S1
Hogan, Stephen J. 9179 Program Committee
Hohenester, Ulrich [9193-11] S3
Hoke, Eric T. [9165-5] S2
Holbrook, Chad M. [9172-34] S8
Holder, Joe [9211-1] S1, [9211-12] S3, [9211-16] S4, [9211-2] S1
Holländer, Bernhard [9177-14] S3
Holleitner, Alexander [9199-5] S2
Holler, Stephen [9166-22] S3
Hollinger, Jon [9184-83] SPWed
Hollingsworth, Jennifer A. [9162-14] S4
Hollmann, Andre [9178-3] S1
Holmberg, Anders P. [9212-20] S4
Holme, Margaret N. [9212-2] S1
Holmes, Richard B. 9227 Program Committee
Holmes, Russell J. 9183 S3 Session Chair, 9183 S4 Session Chair, [9183-27] S6
Holmgaard, Tobias [9163-7] S2
Holt, Jeremy [9212-9] S2
Holtkamp, David B. [9195-2] S1
Holzmeister, Phil [9163-83] S18
Homoelle, Doug [9211-16] S4
Honda, Mitsuhiro [9169-26] S6
Hone, James [9168-19] S4
Hong, Guangwei [9203-35] S8
Hong, Jae Sub [9222-6] S1
Hong, Jiyun [9165-20] S5
Hong, Kun-Guei [9194-36] S8
Hong, Liang [9183-13] S3
Hong, Liying [9172-7] S2, [9194-20] S5
Hong, Mi K. [9198-7] S2
Hong, Minki [9183-17] S4
Hong, Seunghan [9223-20] SPMon
Hong, Shaohua [9217-66] S10
Hong, William D. [9226-19] S6
Hong, Wooyoung [9166-27] S4
Hong, Young Hwan [9170-55] SPWed
Hong, Young Joon [9174-10] S3, [9174-3] S1
Honkimaki, Veijo [9212-24] S5
Hönninger, Clemens [9180-17] S4
Hook, Simon J. [9218-27] S6, [9218-29] S6, [9222-14] S3, [9222-7] S2
Hoover, Brian G. 9205 Program Committee
Hoover, Richard B. [9226-9] SKey
Hopfe, Marcel [9172-4] S1
Höpfner, Henning [9167-2] S1a
Hopkins, F. Kenneth 9226 Program Committee, 9226 S5 Session Chair, [9226-17] S5
Hopkins, Stacey [9218-47] S10
Hoppe, Harald [9165-47] S13, [9165-6] S2, 9184 S7 Session Chair, [9184-31] S8, [9184-84] SPWed
Hor, Yew Li [9160-60] S12
Horenstein, Mark N. [9175-20] S6
Horie, Kenta [9171-7] S2
Horneber, Anke [9169-20] S4
Horowitz, Flavio 9172 Program Committee
Hoschopf, Hans [9190-10] S2, [9190-28] S6
Hosomi, Naohito [9216-23] S6
Hospodková, Alice [9161-41] SPWed
Hossain, Anwar [9213-15] S4, [9213-24] S6, [9213-34] S8, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, [9214-19] SPMon, [9214-6] S2
Hossain, Mohammad A. [9179-16] S3
Hosseini, Amir [9181-40] SPWed
Hosseinimakarem, Zahra [9203-15] S3
Hosseinzadeh Kassani, Sahar [9171-19] S5
Hossen, Jakir [9220-12] S4
Hostetler, Chris [9193-14] S3
Hou, Jianhui [9184-32] S8, [9184-34] S8
Hou, Peipei [9200-38] SPMon, [9227-15] SPMon

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Hou, Shuoben [9171-4] S1
Hou, Yihe [9164-128] SPWed
Houchin, Scott [9219-7] S2
Houdré, Romuald [9162-28] S8, 9164 S11 Session Chair, [9164-48] S10
Hoult, Anthony P. 9180 Program Committee
House, Michael [9213-40] S9
House, Ronald K. [9194-30] S7
Houston, Joseph B. 9197 Program Committee
Hovis, Floyd E. [9218-51] S11
Hovsepyan, Ruben K. [9200-48] SPMon
Howard, Scott S. [9166-17] S2
Howe, Russell A. [9213-17] S4
Howell, Stephen W. [9174-30] S7
Hrelescu, Calin [9163-5] S2
Hridoy, Arnob [9202-30] S7, [9202-37] S8
Hristov, Boian A. [9192-4] S1
Hrozhyk, Uladzimir [9182-22] S5
Hsiao, Tzu-Ti [9168-10] SPWed
Hsieh, Chih-Yi [9200-7] S1
Hsieh, Ching-Heng [9183-47] S10
Hsieh, Mei-Li [9162-51] S14, [9200-8] S1
Hsieh, Wen-Feng [9161-14] S3
Hsing, T. Russell 9217 Program Committee
Hsiung, Bor-Kai [9187-10] S4
Hsu, Chia-Hung [9161-14] S3
Hsu, Hsiao Fan [9200-43] SPMon
Hsu, Hua-Shu [9165-63] SPWed
Hsu, Ken-Yuh 9200 Program Committee
Hsu, Ming Seng [9200-41] SPMon, [9200-42] SPMon, [9200-43] SPMon
Hsu, Ming-Ying [9193-15] S3, [9195-16] S4, [9195-23] SPMon
Hsu, Tzu-Fang [9165-63] SPWed
Hsu, Wei-Lun [9163-88] SPWed
Hsu, Weitse [9177-27] SPWed
Hsu, Wei-Yao [9192-38] SPMon, [9193-30] S7, [9203-17] S4
Hsu, Yu-Kuei [9161-8] S2
Htoon, Han [9162-14] S4
Hu, Baowen [9216-65] S1
Hu, Can-Ming [9167-97] S18a
Hu, Chia-Chang [9217-82] SPMon
Hu, Hai-feng [9160-17] S4, [9161-18] S4
Hu,Haiying [9223-21] SPMon
Hu, Honghua [9181-1] S1, [9181-18] S4
Hu, Hongyu [9202-24] S5, [9202-45] S9
Hu, Jiang [9223-21] SPMon
Hu, Qing 9199 Program Committee
Hu, Wei [9182-30] S6
Hu, Xiao [9167-92] S17b
Hu, Xiaoping [9177-9] S2
Hu, Xiukun [9167-59] S11
Hu, Yang Zhi [9201-28] S7
Hua, Hong [9186-23] S6
Hua, Yi [9163-137] SPWed
Huang, Allen 9218 Track Chair, 9219 Track Chair, 9220 Track Chair, 9221 Track Chair, 9222 Track Chair, 9223 Program Committee, 9223 Track Chair, [9223-1] S1
Huang, Bei [9221-27] SPMon
Huang, Bo 9169 Program Committee
Huang, Chen-Bin [9164-125] SPWed
Huang, Chien-Sheng [9190-35] SPWed
Huang, Chien-Yao [9193-30] S7
Huang, Chih-Yu [9195-5] S2
Huang, Danhong 9205 Program Committee, 9205 S6 Session Chair, [9205-4] S2
Huang, Di [9216-56] SPMon
Huang, Fang [9169-23] S5
Huang, Fei [9184-26] S7
Huang, Fumin [9163-29] S7
Huang, Haiqing [9217-79] SPMon, [9218-59] SPMon, [9218-73] SPMon, [9221-10] S1, [9221-16] S2, [9221-17] S2, [9221-26] S3, [9221-27] SPMon, [9221-28] S3, [9221-29] S3, [9221-9] S1
Huang, Hao-Chong [9199-36] SPMon
Huang, Huan 9226 Program Committee
Huang, Jen Wei [9200-41] SPMon, [9200-42] SPMon, [9200-43] SPMon
Huang, Jer-Shing [9164-125] SPWed, [9164-51] S11
Huang, Jian-Jang [9161-28] S6, 9190 Conference Chair, 9190 S4 Session Chair
Huang, Jinsong [9184-21] S6, [9185-134] S8, [9185-216] S4
Huang, Jun Zhu [9201-28] S7
Huang, Junejei [9192-22] S5, [9192-30] S6
Huang, Kai-Chih [9169-6] S2
Huang, Kun [9170-33] S6
Huang, Kuo-Ting [9168-10] SPWed
Huang, Lingchen [9216-27] S7
Huang, Min [9184-76] SPWed
Huang, Nan [9199-12] S3
Huang, Po-Han [9195-16] S4
Huang, Po-Hsuan [9195-16] S4, [9195-19] SPMon
Huang, Po-Jung [9202-43] S9
Huang, Ran [9175-23] S7, [9175-6] S2
Huang, Ruei-Lin [9192-31] S6
Huang, Run [9195-14] S4
Huang, Songlei [9220-9] S3
Huang, Ting-Ming [9195-16] S4, [9195-19] SPMon, [9195-21] SPMon, [9223-19] SPMon
Huang, Ting-Wei [9193-52] SPMon, [9220-25] S6
Huang, Wei-Jie [9179-27] S5, [9179-6] S1
Huang, Wen-Chao [9192-47] SPMon
Huang, Yao-Han [9182-13] S3
Huang, Yao-Wei [9160-83] S17, [9160-92] SPWed, [9163-22] S6, [9163-88] SPWed
Huang, Ye [9184-32] S8, [9184-87] SPWed
Huang, Yu-Min [9160-69] S14
Huang, Zhangcheng [9220-9] S3
Huang, Zhihua [9200-4] S1
Huang, Zhirong [9210-19] S5
Huant, Serge [9164-112] SPWed
Hubbs, John E. 9220 Program Committee
Huber, William [9177-302] SPIen
Hübner, Jens [9167-99] S18a
Hübner, Marc C. [9191-5] S2, [9192-34] S7
Hudec, René 9208 Program Committee
Hudelson, John N. [9175-20] S6
Huerta-Mascotte, Eduardo [9200-45] SPMon, [9200-47] SPMon
Huferath-von Luepke, Silke [9203-1] S1
Huffaker, Diana L. [9162-56] S15
Hughes, Barbara K. [9165-15] S4, [9165-16] S4
Hughes, Brian [9167-67] S14
Hughes, Gary B. 9226 Program Committee, 9226 S1 Session Chair, [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Hughes, Richard J. 9225 Program Committee
Hughes, Stephen [9162-1] S1
Hughes, Thomas F. [9183-88] SPWed
Hugonin, Jean-Paul [9162-2] S1, [9163-26] S7
Huh, Dal Ho [9183-70] SPWed
Huh, Yong-Min [9166-12] S2, [9166-45] SPWed
Hui, Mei [9192-7] S2, [9195-17] S4, [9216-4] S1, [9217-64] S7, [9220-5] S2
Hui, Rongqing 9200 Program Committee
Huignard, Jean-Pierre 9182 Program Committee
Huke, Philipp [9203-11] S3, [9203-14] S3
Hull, Tony B. 9197 Program Committee
Hulley, Glynn [9222-14] S3
Humble, Travis S. [9225-9] S3
Hummel, Susann [9195-15] S4
Hummelen, Jan C. [9184-7] S2
Hummelgård, Isabella Johansson [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Hung, Chia Chun [9164-51] S11
Hung, Yu Han [9200-43] SPMon
Hünig, Ruben [9187-13] S5
Hunt, E. Raymond 9221 Program Committee
Hunter, Mark S. [9210-12] S3
Hunter, Scott Robert [9175-19] S6
Hunter, Steven [9213-1] S1
Huo, Yan [9167-29] S4b
Hurley, William P. [9197-5] S2
Hurtado, Antonio [9174-13] S3
Hurwitz, Daniel [9164-31] S6
Huser, Thomas R. [9164-77] S15, [9169-30] S7
Hussain, Babar [9190-29] S7, [9190-31] S7, [9190-41] SPWed
Hussain, Laiq [9220-18] S5
Hussain, Muhammad M. 9174 Program Committee
Huston, Alan [9166-10] S1
Husu, Hannu [9173-18] SPWed
Hutchison, Jaime [9164-31] S6
Hutter, Don J. [9204-16] S4
Huynh, Uyen [9165-34] S3, [9165-34] S9
Hwang, David Jae-Seok 9180 Conference CoChair, [9180-19] S4
Hwang, Do Kyung [9170-4] S1
Hwang, Do Kyung [9185-221] S5
Hwang, Hongsup [9171-8] S2
Hwang, Jeeseong [9166-30] S4
Hwang, Jihyun [9200-5] S1
Hwang, Ji-Hyung [9171-18] S5
Hwang, Joohyun [9183-51] S11
Hwang, Jun Young [9180-12] S3
Hwang, Sheng-Kwang [9198-42] SPMon
Hyde, Milo W. [9188-12] S3, [9205-19] S6, [9224-19] S5
Hyde, Paul [9167-97] S18a
Hylan, Jason E. [9195-15] S4

I

Ianno, Natale J. [9196-18] S5
Ibarra Manzano, Oscar Gerardo [9192-50] SPMon
Ibrahim, Abdelhameed [9217-50] S7
Ibrahim, Abdoul Nasser [9222-20] S4
Ibrahim, Fatima [9167-39] S6
Ibrahim, Mohamed M. [9166-60] SPWed
Ibrahim, Salwa Ali [9165-71] S14
Ichikawa, Yukimi [9178-23] S6
Idbaha, Aomar [9220-1] S1
Idehenre, Ighodalo U. [9200-30] S4
Idir, Mourad 9206 Program Committee, 9206 S2 Session Chair, 9208 Program Committee, 9209 Program Committee
Idriss, Hicham 9176 Program Committee
Ientilucci, Emmett J. [9218-45] S10, 9222 Program Committee
Iesari, Fabio [9210-14] S4
Iftekharuddin, Khan M. 9216 Conference Chair, 9216 S5 Session Chair, 9216 Track Chair, [9216-18] S5, 9217 Track Chair
Iftimie, Sorina [9172-33] S8
Ihlemann, Jürgen [9163-58] S14
Iida, Daisuke [9190-32] S7
Iijima, Motoyuki [9176-18] S6
Iisaka, You [9171-14] S4
Ijiro, Kuniharu 9171 Program Committee, [9171-5] S2, [9171-7] S2
Ikeda, Tomiki 9182 Program Committee, [9182-8] S2
Ilchen, Markus [9210-22] S5
Im, Pureun [9161-35] SPWed, [9161-36] SPWed, [9161-45] SPWed, [9161-46] SPWed, [9161-47] SPWed
Im, Seongil [9170-4] S1, [9171-18] S5
Im, Seyoung [9170-17] S3
Im, Yirang [9183-21] S5
in het Panhuis, Marc [9171-2] S1
Inamdar, Niraj K. [9222-6] S1
Inampudi, Sandeep [9160-6] S2, [9160-8] S2, [9160-84] S17
Inci, M. Naci [9204-8] S2
Indjin, Dragan [9199-21] S6
Indrisiunas, Simonas [9180-5] S2, [9180-7] S2
Infante Herrero, Jose M. [9191-1] S1
Ingram, Abigael [9187-12] S5
Ingram, Grayson [9183-89] SPWed, [9183-90] SPWed
Inoue, Yo [9182-28] S6
Inubushi, Yuichi [9207-24] S7, [9210-3] S1, [9210-6] S2, [9210-8] S3
Ionescu, Robert [9168-33] S4
Ionson, James [9214-19] SPMon
Iorsh, Ivan V. [9160-20] S4
Ip, Alexander H. [9178-13] S4
Ip, Justin [9218-76] S1
Ipuy, Martin [9171-24] S6
Irie, Yasuhiko [9164-31] S6
Irimia-Vladu, Mihai [9185-217] S4, [9185-218] S5
Irion, Fredrick William [9222-2] S1
Irmer, Bernd [9173-2] S1
Isaacs, Sivan [9182-26] S5
Isaiev, Mykola [9170-50] SPWed
Isayev, Abasat [9205-12] S4
Isayeva, Gulnar I. [9205-12] S4
Isella, Giovanni [9167-16] S3a
Ishibashi, Koji [9181-11] S3
Ishibashi, Tadao [9199-8] S2
Ishihara, Abe 9202 Conference CoChair, 9202 S6 Session Chair, [9202-35] S8, [9202-38] S8, [9202-49] S10, [9202-50] S10
Ishihara, Hajime [9160-94] SPWed
Ishii, Hisao 9183 Program Committee, [9183-23] S5
Ishii, Norihiko [9201-15] S4
Ishii, Yuya [9181-41] SPWed, [9192-44] SPMon
Ishikawa, Atsushi [9163-101] SPWed, [9163-20] S6
Ishikawa, Masatoshi [9193-20] S4, [9193-50] SPMon
Ishikawa, Ryousuke [9178-24] S6
Ishikawa, Tetsuya [9207-27] S8, [9208-1] S1, 9209 Program Committee, [9210-8] S3
Ishiyama, Takeshi [9192-44] SPMon
Ishizawa, Junichiro [9196-10] S3, [9196-19] S5, [9196-5] S2
Islam, M. Saif 9174 Conference Chair, 9174 S3 Session Chair, [9174-32] S8, [9174-41] S9
Ismaili, Mimoun [9182-48] SPWed
Isobe, Naoki [9196-12] S4
Israel, Kai [9188-15] S3, [9188-21] S4
Ito, Hiroshi 9199 Program Committee, [9199-8] S2
Ito, Hiroto [9183-15] S4
Itoh, Hiroshi [9173-4] S1
Itoh, Kazuyoshi 9216 Program Committee
Iturbide-Jiménez, Fernando [9192-5] S1
Ivanenko, Mikhail M. [9194-25] S6
Ivanov, Andrey [9163-123] SPWed
Ivanov, Ilia N. [9172-8] S2
Ivanov, Maksym [9194-45] SPMon
Ivashko, Pavlo V. [9166-48] SPWed
Iwabuchi, Manna F. [9193-25] S6
Iwanczyk, Jan S. [9214-3] S1
Iwase, Kaori [9219-3] S1
Iwata, So [9210-17] S4
Iwata, Tetsuo [9225-4] S1
Izumi, Nobuhiko [9211-1] S1, [9211-2] S1
Izzo, Scott [9207-18] S5

J

Jaafar, Ali [9167-39] S6
Jabbour, Ghassan E. 9161 Program Committee, 9170 Program Committee
Jackson, Christopher R. [9202-34] S7
Jackson, Jan [9218-47] S10
Jackson, Thomas J. 9221 Program Committee
Jackson, Thomas N. [9184-17] S5, [9208-9] S3
Jacob, Zubin 9160 S14 Session Chair, [9160-48] S10, [9160-63] S13, [9160-64] S13
Jacquot, Blake C. [9216-7] S2
Jafarfard, Mohammadreza [9203-30] S7, [9203-5] S1
Jafarov, Maarif A. [9170-43] S8
Jaffrès, Henri 9167 Program Committee, 9167 S1a Session Chair, [9167-3] S1a, [9167-81] S16a, [9167-90] S17a
Jagadish, Chennupati [9164-56] S11, 9174 Program Committee, [9174-5] S1, [9181-24] S6
Jahani Bahnamiri, Fatemeh [9184-7] S2
Jain, Apurva [9175-3] S1
Jain, Vishal [9170-59] SPWed, [9220-18] S5
Jákl, Petr [9164-100] SPWed, [9164-118] SPWed, [9164-18] S4
Jakli, Antal I. [9182-25] S5
Jakoby, Bernhard [9200-57] S4
Jakubiak, Rachel [9172-34] S8, 9181 Conference CoChair
Jakubka, Florian [9168-5] S1
Jalali, Bahram [9193-6] S2
Jamali, Afsoon [9182-24] S5
James, Mark [9185-107] S2
James, Ralph B. 9206 Track Chair, 9207 Track Chair, 9208 Track Chair, 9209 Track Chair, 9210 Track Chair, 9211 Track Chair, 9212 Track Chair, 9213 Conference Chair, 9213 Track Chair, [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-33] S8, [9213-34] S8, [9213-48] SPMon, [9213-52] SPMon,

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

[9213-53] SPMon, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, 9214 Program Committee, 9214 Track Chair, [9214-19] SPMon, [9214-6] S2, 9215 Program Committee, 9215 Track Chair
James, Timothy [9163-74] S17
Jamet, Matthieu [9167-81] S16a, [9167-90] S17a
Jan, Guenole [9167-54] S10
Jancaitis, Kenneth S. [9194-30] S7
Jancura, Daniel [9166-3] S1
Janen, Afef [9220-7] S2
Janesick, James R. [9211-5] S1, SC504, SC916
Jang, Hyejin [9202-62] SPMon
Jang, Hyun-June [9174-41] S9
Jang, Jae Seok [9223-20] SPMon
Jang, Jae-Hyung [9170-56] SPWed
Jang, Junhyuk [9184-90] SPWed
Jang, Kyung Won [9223-20] SPMon
Jang, Mi [9185-108] S2, [9185-138] SPWed
Jang, Min S. [9162-46] S13
Jang, Sung Jun [9172-28] S7, [9220-16] S5, [9220-4] S1
Janietz, Silvia [9183-1] S1
Janisch, Corey [9198-20] S5
Janora, Kevin H. [9183-56] S12
Janos, Alan 9213 Program Committee
Janout, Petr [9217-47] S7
Jansen, Melissa E. 9202 Program Committee, [9202-56] S12, [9202-65] SPMon
Jansen-van Vuuren, Ross D. [9183-4] S1
Janssen, René A. J. 9184 Program Committee, [9184-1] S1
Janus, Krzysztof [9185-112] S3
Janz, Scott J. [9218-52] S11, [9218-53] S11
Jaquez, Jose R. [9217-15] S2
Jaradat, Hamzeh M. [9160-56] S11
Jaramillo, Thomas F. [9176-24] S7
Jaramillo-Vigueras, David [9220-21] S6, [9220-22] S6
Jarboe, Jeffrey A. [9216-12] S3
Jarczynski, Manfred [9194-25] S6
Jared, Bradley H. [9191-14] S4
Jarillo-Herrero, Pablo [9169-33] S8
Jark, Werner H. 9207 Program Committee, 9207 S1 Session Chair, 9207 S9 Session Chair, [9207-10] S3, [9207-16] S4, [9210-23] S5
Jaross, Glen R. [9196-13] S4
Jarrahi, Mona [9166-61] S2, 9199 Program Committee
Jarzebiak, Richard [9175-2] S1
Jasieniak, Jacek J. [9161-3] S1
Jau, Bruno M. [9222-7] S2
Jauregui-Vázquez, Daniel [9200-45] SPMon
Javahiraly, Nicolas 9202 Conference CoChair, 9202 S4 Session Chair, [9202-29] S6, [9202-4] S1, [9202-9] S2
Javaid, Saquib [9167-39] S6
Jayaraj, Madambi Ku [9161-49] SPWed, [9185-143] SPWed
Jayawardena, Imalka [9184-58] SPWed
Jean-Ruel, Hubert [9198-26] S6
Jeffrey, Frank [9178-17] S5
Jemison, William D. [9193-12] S3
Jen, Alex K. Y. 9181 S6 Session Chair, [9181-28] S7, [9181-40] SPWed
Jen, Yi-Jun 9172 Program Committee, 9172 S6 Session Chair, [9172-18] S5, [9172-3] S1
Jeney, Sylvia [9164-48] S10, [9164-65] S13
Jeng, Jun-Yuan [9165-46] S13, [9184-25] S6
Jeng, Wei-De [9193-52] SPMon
Jenkins, Geoffrey D. [9226-26] S8
Jenkins, Thomas P. [9204-1] S1
Jeon, Duk Young [9161-39] SPWed
Jeon, Hyesu [9223-20] SPMon
Jeon, Seaho [9181-4] S1
Jeon, SuKyung [9165-20] S5
Jeong, Kwang-Un [9161-35] SPWed, [9161-36] SPWed, [9161-37] SPWed, [9161-38] SPWed, [9161-45] SPWed, [9161-46] SPWed, [9161-47] SPWed, [9170-48] SPWed
Jeong, Mun Seok [9168-12] S3
Jeong, Sohee [9165-66] SPWed
Jeong, Soon-Jong [9170-53] SPWed
Jeong, Su Yong [9168-16] S3
Jeong, Su-Hun [9183-32] S7
Jeong, Tae Young [9163-100] SPWed, [9195-22] SPMon
Jeong, Unyong [9185-131] S7
Jeong, Woong [9166-56] SPWed
Jepu, Ionut [9172-33] S8
Jerca, Florica Adriana [9171-34] SPWed
Jerca, Valentin Victor [9171-34] SPWed
Jergel, Matej [9207-35] S9
Jerkatis, Kenneth J. 9226 Program Committee, 9226 S5 Session Chair
Jermyn, Adam S. [9163-44] S11
Jessen, Poul S. [9186-13] S4
Ježek, Jan [9164-116] SPWed
Jha, Rashmi [9174-27] S7
Jhang, Hao-Syuan [9161-8] S2
Jhang, Jhe-Ming [9190-35] SPWed
Jheng, Ci-Yao [9172-18] S5, [9172-3] S1
Ji, Dai-Yan [9217-55] SPMon
Ji, Dengxin [9160-17] S4, [9161-18] S4, [9166-16] S2, [9169-8] S2, [9170-19] S4
Ji, Liang [9179-16] S3
Jia, Bo [9203-35] S8
Jia, Liu [9221-28] S3
Jia, Xin [9203-44] SPMon
Jiang, Aiting [9199-3] S1
Jiang, Hongxing [9213-14] S3
Jiang, Hu [9223-21] SPMon
Jiang, JianXing [9217-66] S10
Jiang, Ke [9163-40] S10
Jiang, Lun [9191-11] S3, [9191-7] S3, [9191-8] S3, [9191-9] S3
Jiang, Mingming [9190-8] S2
Jiang, Suhua [9161-18] S4, [9170-19] S4
Jiang, Tao [9218-62] SPMon
Jiang, Xiangqian [9204-7] S2
Jiang, Xiaotian [9217-64] S7
Jiang, Yifan [9199-3] S1
Jiang, Yifeng [9198-26] S6
Jiang, Zhenguo [9199-20] S5
Jiao, Jianzhong 9190 Conference Chair, 9190 Program Committee, 9190 S3 Session Chair
Jicha, Marek [9217-16] S2
Jimenez, Catalina [9212-40] SPMon
Jimenez, Edward S. 9215 Program Committee, 9215 S4 Session Chair, [9215-11] S3, [9215-8] S3, [9215-9] S3
Jiménez, Maria-Consuelo [9165-49] S14
Jin, Eric [9201-18] S5
Jin, Guo Fan [9200-23] S3, [9201-16] S4, [9216-31] S8
Jin, Jung-Il 9171 Program Committee
Jin, Shih-Chun [9205-24] S7
Jin, Sungho [9168-24] S5, [9168-25] SPWed, [9176-25] S7
Jin, Xiaoli [9217-64] S7
Jin, Xiaomin [9170-25] S5, [9170-52] SPWed
Jing, Chunguang [9211-3] S1
Jo, Jae Heung [9166-56] SPWed
Jo, Masafumi [9162-8] S2
Jo, Sung-Hyun [9160-98] SPWed
Joannopoulos, John D. [9170-34] S6, [9178-10] S3, [9178-17] S5, [9181-26] S6
Johansson, Göran [9212-18] S4
Johansson, Jonas [9164-64] S13
John, Sajeev 9162 S8 Session Chair, [9162-40] S12
Johns, Will E. 9215 Program Committee
Johnson, Brian Robert 9221 Program Committee
Johnson, Carol [9218-34] S8
Johnson, Cortina [9190-43] SPWed
Johnson, Craig M. [9178-18] S5
Johnson, David B. [9223-3] S1
Johnson, Erik B. [9215-2] S1
Johnson, Justin C. [9165-3] S1, [9178-2] S1
Johnson, Lee [9170-14] S3
Johnson, Lindsay H. [9218-37] S8
Johnson, Mark [9174-18] S4
Johnson, Nigel P. [9162-37] S11
Johnson, Quianna S. [9200-2] S1
Johnson, R. Barry 9192 Conference Chair, 9192 S1 Session Chair
Johnson, Steven G. [9181-26] S6
Johnson, William R. [9218-29] S6, [9222-14] S3, [9222-7] S2
Johnson-Helperin, Ezekiel [9167-100] S18a
Johnson-Wilke, Raegan L. [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Johnson-Williams, Nathan G. [9216-7] S2
Jokinen, Karoliina [9183-62] SPWed
Joly, Loic [9167-39] S6
Jones, Dumont M. [9213-49] SPMon, [9213-50] SPMon
Jones, John G. [9172-34] S8, [9226-17] S5
Jones, Justin S. [9170-8] S2
Jones, Katharine J. [9224-51] SPMon
Jones, Philip H. [9164-111] SPWed
Jones, Stephanie H. [9164-69] S14
Jones-Albertus, Rebecca 9179 Conference CoChair, [9179-1] S1
Jonin, Christian [9163-140] SPWed
Joniova, Jaroslava [9166-3] S1
Jonker, Berend T. [9167-104] S18b, [9167-95] S17b
Joo, Chul Woong [9183-51] S11
Jorge, Iagoba [9204-14] S3
Jorge, Pedro A. S. [9164-97] SPWed
Jorgensen, Steven M. [9212-48] SPMon
Joseph John, Jim [9179-12] S2
Joseph, John R. [9226-16] S5
Joshi, Rajendra [9202-15] S4
Josiek, Monika [9184-73] SPWed, [9184-74] SPWed
Joti, Yasumasa [9210-17] S4
Jou, Jwo-Huei [9183-47] S10
Jovanovic, Veljko Milorad [9218-22] S5
Joyce, Donna M. 9171 S3 Session Chair, [9171-20] S5
Jozwik, Michal [9204-15] S3
Juergens, Richard C. 9193 Program Committee
Jun, Seong Chan 9168 Program Committee
Jung, Ho June [9195-11] S3
Jung, Hohyun [9223-16] S4
Jung, Hwa Kyoung [9195-11] S3
Jung, Hyunseung [9160-100] SPWed
Jung, Kinam [9184-66] SPWed
Jung, Seungyong [9199-3] S1
Jung, Soon-Won [9185-141] SPWed, [9185-142] SPWed
Jung, Sukhyun [9185-117] S4
Jung, Sungjune [9184-67] SPWed
Jung, Woohyun [9171-18] S5, [9171-19] S5, [9181-39] SPWed
Jünger, Felix [9164-30] S6
Jungman, Gerard [9211-7] S2
Jungmann, Julia H. [9210-7] S2
Jungquist, Robert K. [9211-15] S4
Jungwirth, Tomás 9167 Program Committee
Juranic, Pavle [9210-7] S2
Jurasevska, Kaiva [9216-49] SPMon
Jurkeviciute, Ausrine [9170-57] SPWed
Jutamulia, Suganda 9200 Program Committee
Juuti, Mikko [9192-49] SPMon
Jywe, Wen-Yuh [9217-44] S6

K

K., Kannan [9195-4] S1
K., Udaya Kumar [9188-17] S4
Kaakkunen, Jarno J.J. [9192-49] SPMon
Kacenjar, Steve T. [9160-4] S1
Kachru, Priyanka [9188-28] SPMon
Kadic, Muamer [9160-85] S17
Kadiri, Hind [9161-17] S4
Kadochkin, Alexey S. [9193-49] SPMon
Kadys, Arùnas [9192-36] S7
Kaertner, Franz [9198-5] S2
Kafafi, Zakya H. Symposium Chair, [9172-22] S6, 9184 Conference Chair, 9184 S1 Session Chair, [9184-47] S10, [9189-8] S2
Kafesaki, Maria 9160 S17 Session Chair, [9160-23] S5, [9160-67] S14, [9160-78] S16, [9162-17] S5
Kagoshima, Yasushi 9207 Program Committee
Kahan, Mark A. 9197 Conference Chair, 9197 S1 Session Chair, 9197 S2 Session Chair, 9197 S3 Session Chair, 9197 S4 Session Chair
Kahn, Ralph [9218-22] S5
Kahr, Bart [9163-69] S16
Kainuma, Ryosuke [9172-21] S5
Kaita, Edward [9218-40] S9
Kaivola, Matti [9160-25] S6
Kaji, Hironori 9183 Program Committee, [9183-15] S4
Kajiyama, Yoshitaka [9183-63] SPWed
Kajzar, François 9161 Program Committee, 9171 Program Committee, 9171 S2 Session Chair, [9171-12] S3, [9171-15] S4, [9171-34] SPWed, [9171-9] S2
Kakarenko, Karol [9192-43] SPMon
Kaklyugin, Alexander [9192-20] S4
Kakoulli, Ioanna [9199-25] S6
Kalaiselvi, Shenbaga M. P. [9207-26] S7
Kalejs, Juris P. [9179-25] S5
Kalikivayi, Lavanya [9188-17] S4
Kalikivayi, Venkataramana [9188-17] S4, [9195-4] S1
Kallarakkal, Rajesh Ramakrishnan [9185-139] SPWed
Källén, Hanna [9217-37] S5
Kalra, Yogita [9200-25] S3
Kalugin, Viktor V. [9200-37] SPMon
Kalusniak, Sascha [9163-70] S16
Kamacioglu, Canan [9224-7] S2
Kamata, Toshihide [9171-17] S4
Kambe, Mika [9179-3] S1
Kameshima, Takashi [9210-17] S4
Kamijo, Koji [9201-15] S4
Kaminose, Ryohei [9181-41] SPWed
Kaminski, Clemens 9169 S7 Session Chair, [9169-22] S5
Kamiya, Hidehiro [9176-18] S6
Kampe, Thomas U. 9221 Program Committee
Kan, Jimmy [9167-50] S9
Kan, Qiang [9163-85] SPWed
Kan, Zhipeng [9165-11] S3
Kanai, Yosuke 9176 Program Committee
Kanatzidis, Mercouri 9213 Program Committee
Kandala, Chari V. [9220-13] S4
Kandidov, Valeriy P. [9219-18] SPMon
Kane, Bruce E. [9164-4] S1
Kane, Matthew H. 9190 Conference Chair, 9190 S1 Session Chair, 9190 S7 Session Chair
Kaneda, Fumihiro [9225-15] S4
Kaneko, Yasuyuki [9172-31] S8
Kang, Byounghoon [9166-12] S2
Kang, Dong-Gue [9161-36] SPWed, [9161-45] SPWed, [9161-46] SPWed, [9170-48] SPWed
Kang, Donghun [9217-22] S3
Kang, Dong-uk [9213-61] SPMon
Kang, Guoguo [9163-27] S7
Kang, Gyu Won [9185-130] S7
Kang, Heuiseok [9180-12] S3
Kang, Hyukmo [9205-3] S1
Kang, Jin-Kyu [9170-53] SPWed, [9170-55] SPWed
Kang, Kwang-Sun [9160-71] S14, [9181-45] SPWed, [9183-44] S10
Kang, Kyung-Tae [9180-12] S3
Kang, Seung [9167-50] S9
Kangas, Miikka [9226-1] S1, [9226-2] S1
Kanibolotsky, Alexander [9183-40] S9, [9185-204] S1
Kaňka, Jan [9164-100] SPWed, [9164-116] SPWed, [9164-96] SPWed
Kanomata, Kensaku [9177-20] S5
Kanouni, Fares [9200-46] SPMon
Kante, Boubacar [9161-10] S2
Kanwal, Bushra [9209-23] S6
Kapil, Gaurav [9184-65] SPWed
Kapitanova, Polina V. [9160-72] S15, [9163-93] SPWed
Kapoor, Avinashi [9161-15] S3
Kappler, Jean-Paul [9167-39] S6
Kar, Aravinda 9180 Conference CoChair, 9180 S3 Session Chair, [9180-1] S1, [9180-18] S4, [9189-7] S2
Karabacak, Tansel [9174-36] S8
Karachevtsev, Artem O. [9166-44] SPWed, [9169-35] S8, [9216-44] SPMon

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Karam, Nasser H. [9226-19] S6
Karami, Morteza [9160-96] SPWed
Karan, Niladri S. [9162-14] S4
Karapetyan, Ruben V. [9182-44] SPWed, [9182-47] SPWed
Karasek, Vitezslav [9164-118] SPWed
Karassik, Valeriy E. [9216-34] S9
Karczewski, Grzegorz [9199-18] S5
Kardasz, Bartek [9167-53] S10
Kargar, Alireza [9214-8] S2, [9215-13] S4
Kargar, Alireza [9176-25] S7
Kargar, Fariborz [9168-29] S5
Karhu, Eric A. [9167-35] S5
Karian, Tyler [9208-8] S2
Karim, Mohammad Ataul 9216 Program Committee
Karim, Mohammad Rezaul [9177-8] S2
Karimi Moridani, Ahad Ahad [9217-49] S7
Karimi, Ebrahim [9164-1] S1, [9194-4] S1, [9194-6] S2
Karmakar, Sanjit [9225-25] SPMon
Karpierz, Krzysztof [9199-7] S2
Karpiński, Michał [9225-14] S4
Karpo, Alexey B. [9163-125] SPWed
Karr, Thomas J. 9227 Conference Chair
Kart, Turkay [9204-8] S2
Karunatilaka, Krishanthi [9165-39] S11
Karuthedath, Safakath [9184-78] SPWed
Karvinen, Petri [9210-11] S3, [9210-6] S2, [9210-7] S2
Kašalynas, Irmantas [9199-19] S5
Kasemann, Daniel [9185-115] S4
Kasera, Setu [9163-10] S3
Kashkarov, Pavel [9177-4] S1
Kasica, Richard [9160-42] S9
Kassal, Ivan [9184-18] S5
Kassama, Lamin [9171-28] SPWed
Kasser, Thaer [9184-93] SPWed
Kassier, Gunther [9198-26] S6
Kassu, Aschalew [9205-31] SPMon, [9219-19] SPMon, [9219-20] SPMon
Kastner, Johann [9212-20] S4
Kasunic, Keith J. SC1019, SC1085
Katayama, Kenji [9182-8] S2
Katayama, Ryuichi 9201 Conference Chair, 9201 S5 Session Chair, [9201-17] S4
Katayama, Tetsuo [9210-3] S1, [9210-6] S2
Katelevskii, Vadim [9205-25] SPMon
Kato, Kentaro [9225-19] S2
Kato, Shinya [9178-20] S6, [9178-21] S6, [9178-22] S6
Kato, Soushi [9218-27] S6
Kats, Mikhail A. [9160-35] S7, [9172-4] S1
Katz, Michael [9174-17] S4
Kaufman, Morris I. [9193-29] S7, [9195-2] S1, [9195-6] S2
Kaufmann, Guillermo H. 9203 Program Committee
Kaup, André [9217-19] S3
Kaur, Kamalpreet [9168-26] SPWed
Kaur, Taranveer [9193-39] S9
Kauranen, Martti 9163 Program Committee
Kaushik, Karishma [9164-31] S6
Kaveh, Masoud [9181-24] S6
Kavu, Vishnu [9161-49] SPWed
Kawabe, Yutaka [9171-14] S4
Kawakami, Roland K. [9167-101] S18b
Kawakami, Satoko [9219-3] S1
Kawata, Satoshi Symposium Chair, 9163 Program Committee, 9169 Program Committee, [9169-15] S4, [9169-26] S6, [9169-29] S7, [9169-6] S2
Kawatsuki, Nobuhiro [9182-9] S2
Kayser, Yves [9210-11] S3
Kazama, Akira [9217-14] S2
Kazanskii, Andrei G. [9177-4] S1
Kazemi, Alex A. 9202 Conference Chair, 9202 S1 Session Chair, [9202-1] S1, [9202-12] S3, [9202-19] S4, [9202-34] S7, [9202-35] S8, [9202-41] S9, [9202-49] S10, [9202-58] S12, [9202-66] S12
Kazemi, Alireza [9168-9] S2
Kazemzadeh, Farnoud [9193-24] S6, [9217-35] S5
Ke, Karen Lin [9170-33] S6
Kearney, Steven [9206-17] S4
Kearns, Kenneth L. [9183-13] S3
Keating, Mark [9164-24] S5
Kei, Shiomi [9219-2] S1
Keiffer, Patrick [9186-14] S4
Keilmann, Fritz [9160-24] S5, 9163 Program Committee, [9169-33] S8
Keister, Jeffrey W. [9209-34] SPMon
Keitel, Barbara [9208-4] S1
Keivanidis, Panagiotis E. [9165-11] S3
Kellay, Hamid [9164-85] S17
Keller, Aaron M. [9162-14] S4
Keller, Nicholas A. [9164-93] S20
Kelly, Angelita C. [9218-21] S5
Kelly, Christopher [9212-27] S6
Kelly, Lisa [9200-1] S1
Kelso, John F. [9190-12] S3
Kemp, Gregory E. [9211-15] S4
Kemp, Scott [9164-53] S11
Kempe, Michael D. 9179 S2 Session Chair, [9179-2] S1
Kempen, Connie [9202-20] S5, [9202-25] S5, [9202-57] S12
Kemper, Travis [9184-35] S8
Kéna-Cohen, Stéphane [9163-75] S17
Kenanakis, George [9160-67] S14, [9160-78] S16
Kenens, Bart M. [9163-98] SPWed
Kenesei, Peter [9207-3] S1, [9212-14] S3, [9214-10] S3
Keng, David [9166-22] S3
Kenney, Christopher J. [9213-31] S7
Kent, Andrew D. [9167-53] S10
Kent, Craig James [9218-35] S8
Kepak, Stanislav [9193-53] SPMon
Kera, Satoshi [9165-58] SPWed
Kerisit, Sebastien [9213-21] S5
Kernan, Warnick J. 9213 Program Committee
Kerr, Caitlin [9227-3] S1
Kersting, Roland [9185-127] S6
Kesa, Peter [9164-100] SPWed
Kesaria, Manoj [9199-35] SPMon
Kessler, Bill [9179-7] S1
Kettemann, Stefan [9167-75] S15a
Kettlitz, Siegfried W. [9185-210] S3
Keyes, Tia E. [9172-24] S6
Keyser, Ulrich F. [9164-42] S8, [9164-76] S15
Kezsmarki, Istvan [9164-65] S13
Khajavigodellou, Yousef [9219-8] S2
Khajavikhan, Mercedeh [9162-60] S16, [9163-112] SPWed, [9163-114] SPWed, [9170-24] S5
Khaleghi, Morteza [9204-22] SPMon, [9204-23] SPMon, [9204-3] S1
Khalifa, Abderrahmen [9223-15] S4
Khan Afshar, Sanaz [9193-7] S2
Khan Niazi, Muhammad Rizwan [9185-111] S3
Khan, Aamir A. [9166-17] S2
Khan, Asif M. 9190 Program Committee
Khan, Jafar I. [9165-64] SPWed
Khan, Saima I. [9162-37] S11
Khan, Shahab [9211-16] S4
Khan, Talha M. [9184-59] SPWed, [9184-61] SPWed, [9185-135] S8, [9185-136] S8
Khandelwal, Hitesh [9182-27] S5
Khanikaev, Alexander B. [9160-61] S13
Khansuvarov, Ruslan A. [9200-14] SPMon, [9200-35] SPMon, [9216-57] SPMon
Khashimova, Diana [9172-14] S4
Khater, Yashika [9166-6] S1
Khatibzadeh, Nima [9164-123] S20, [9164-38] S7
Khayyat Jafari, Ahmad [9160-93] SPWed
Khazaeinezhad, Reza [9171-19] S5
Khazhmuradov, Manap A. [9213-48] SPMon
Khenkin, Mark [9177-4] S1
Kherani, Nazir P. [9166-11] S2
Khijwania, Sunil K. [9200-26] S3
Khitrova, Galina [9186-14] S4
Khizhnyak, Anatoliy [9224-15] S4
Khlopenkov, Konstantin V. [9218-61] SPMon
Khodadad, Davood [9203-4] S1
Khodaei, Yashar [9192-25] S5
Khodaparast, Giti A. 9167 Program Committee, 9167 S15a Session Chair, [9167-42] S7, [9167-44] S7
Khodorkovsky, Vladimir [9181-18] S4
Khodr, Majed [9170-7] S1
Khodzitsky, Mikhail K. [9160-101] SPWed, [9160-82] S16
Khokhriakov, Igor [9212-43] SPMon, [9212-44] SPMon, [9212-5] S1
Khoo, Eng Huat [9160-49] S10, [9160-60] S12, [9172-7] S2, [9194-20] S5
Khoo, Iam Choon 9182 Conference Chair, 9182 S1 Session Chair, 9182 S8 Session Chair, [9182-12] S3, [9182-29] S6, [9182-31] S6, 9198 Conference CoChair
Khoram, Parisa [9184-93] SPWed
Khosroabadi, Akram A. [9163-76] S17
Khounsary, Ali M. 9207 Conference Chair, 9207 S3 Session Chair, 9207 S7 Session Chair, [9207-4] SPMon, 9208 Conference Chair, [9208-12] S3, 9209 Program Committee
Khovaylo, Vladimir [9172-21] S5
Khramov, Alexander G. [9217-72] SPMon
Khurgin, Jacob B. 9160 Program Committee, [9160-15] S4, [9199-31] S8
Khvalkovskiy, Alexey [9167-46] S8
Kiaei, Sayfe [9190-4] S1
Kiamilev, Fouad E. [9202-34] S7
Kibria, Md Golam [9176-15] S5
Kiefer, Johannes [9164-107] SPWed
Kielkopf, John [9219-16] S4
Kik, Pieter G. [9163-47] S11, [9163-54] S13
Kikuchi, Hiroshi [9201-15] S4
Kilaru, Kiranmayee [9208-5] S2
Kilcoyne, Sean P. [9219-26] S1
Kildishev, Alexander V. [9160-11] S3, 9162 Program Committee, [9162-18] S6, [9163-1] S1, [9163-11] S4
Kilkenny, Joseph D. [9211-1] S1, [9211-10] S3, [9211-15] S4
Kim, Beomjin [9183-8] S2
Kim, Bo Ram [9173-15] SPWed, [9198-45] SPMon
Kim, Bo Seong [9183-21] S5
Kim, Boram [9185-226] SPWed
Kim, Cheawon [9185-117] S4
Kim, Dae Suk [9166-56] SPWed
Kim, Dae Wook [9195-11] S3
Kim, Dae-Hwan [9185-121] S5
Kim, Dae-Yoon [9161-35] SPWed, [9161-37] SPWed, [9161-38] SPWed, [9161-45] SPWed, [9161-47] SPWed, [9170-48] SPWed
Kim, Dai-Sik 9163 Program Committee
Kim, Do Hwan [9185-130] S7
Kim, Do Young [9185-214] S4, [9185-229] SPWed
Kim, Dongwook [9177-25] S5
Kim, Dug Young [9203-30] S7, [9203-5] S1
Kim, Eugene D. [9218-38] S8
Kim, Eung-Gun [9183-73] SPWed
Kim, Eungjun [9183-55] S12
Kim, Eunhye [9183-31] S7, [9183-55] S12, [9183-69] SPWed
Kim, Eunkyoung [9171-21] S6
Kim, Eunlim [9213-33] S8
Kim, Giyoon [9213-61] SPMon
Kim, Hadong [9213-39] S9, [9214-8] S2, [9215-13] S4
Kim, Ho Jong [9168-16] S3
Kim, Hoe-Kyeong [9182-28] S6
Kim, Ho-Sang [9195-11] S3
Kim, Hui-Su [9161-35] SPWed, [9161-36] SPWed
Kim, Hyeong-Jung [9185-121] S5
Kim, Hyochul [9162-9] S3
Kim, Hyojung [9168-12] S3
Kim, Hyojung [9184-90] SPWed
Kim, Hyun [9172-12] S3
Kim, Hyun [9171-8] S2
Kim, Hyun I. [9196-16] S5
Kim, Hyun Jung [9183-70] SPWed
Kim, Hyun-Ouk [9166-12] S2, [9166-45] SPWed
Kim, Hyunwoong [9170-56] SPWed
Kim, Inbo [9193-32] S8
Kim, Insu [9166-57] SPWed
Kim, Jae Hoon [9171-18] S5
Kim, Jae Seok [9223-20] SPMon
Kim, Jae-Hyun [9170-17] S3
Kim, Jaejoon [9185-126] S6
Kim, Jang-Joo 9183 Program Committee, 9183 S1 Session Chair, 9183 S2 Session Chair, [9183-24] S6, [9183-26] S6, [9183-78] SPWed, [9183-79] SPWed, [9183-80] SPWed, [9184-88] SPWed, [9184-90] SPWed
Kim, Jangwoo [9206-11] S3
Kim, Janice [9165-20] S5
Kim, Jeong Won [9165-66] SPWed
Kim, Jeongyong [9161-9] S2
Kim, Ji Tae [9165-38] S11
Kim, Ji Whan [9184-90] SPWed
Kim, Jihee [9168-12] S3
Kim, Jihun [9195-11] S3
Kim, Jisu [9164-119] SPWed
Kim, Ji-Tae [9161-35] SPWed, [9161-36] SPWed, [9161-45] SPWed, [9161-46] SPWed
Kim, Jiye [9185-128] S6
Kim, Jiyoung [9174-21] S5
Kim, Jongbum [9160-52] S11
Kim, Jongki [9200-5] S1
Kim, Jong-Young [9161-34] SPWed
Kim, Joonghan [9183-8] S2
Kim, Joo-Von [9167-52] S10
Kim, June-Seo [9167-69] S14
Kim, Jung-Bum [9183-79] SPWed
Kim, Junsik [9202-62] SPMon
Kim, Ki Wook [9198-19] S5
Kim, KiHyun [9213-33] S8, [9213-9] S2
Kim, Kwang-Je [9209-1] S1
Kim, Kwon-Hyeon [9183-24] S6, [9183-78] SPWed, [9183-80] SPWed
Kim, Kyeong J. [9213-42] S10
Kim, Kyongseok [9173-15] SPWed
Kim, Laura [9162-46] S13
Kim, May [9225-35] S7
Kim, Min Young [9204-9] S2
Kim, Min-Hoi [9183-67] SPWed, [9185-137] SPWed
Kim, Minseok [9223-16] S4
Kim, Myeong-Hoon [9166-12] S2
Kim, Myungshik [9163-75] S17
Kim, MyungSoo [9213-61] SPMon
Kim, Oh Young [9183-21] S5
Kim, Pilsu [9213-33] S8
Kim, Sang-Gook [9170-34] S6
Kim, Se Hyun [9185-128] S6
Kim, Seon Geun [9223-20] SPMon
Kim, Seong H. 9198 S4 Session Chair, [9198-10] S3
Kim, Seungchul [9170-54] SPWed
Kim, Seungho [9183-8] S2
Kim, Seunghyun [9163-100] SPWed
Kim, Seung-Woo 9203 Program Committee
Kim, Seyoon [9162-46] S13
Kim, Steve Sang Nyon 9171 Program Committee, [9171-11] S3
Kim, Sug-Whan [9189-13] S4, [9195-11] S3, [9205-3] S1
Kim, Sung Joo [9176-25] S7
Kim, Sungjoo [9183-81] SPWed
Kim, Sungjun [9183-29] S7
Kim, Suyoung [9214-8] S2
Kim, Tae Gun [9165-66] SPWed
Kim, Taehyung [9164-46] S9
Kim, Tae-il 9202 Program Committee, [9202-62] SPMon
Kim, Wonkyu [9163-119] SPWed
Kim, Woohong R. [9161-13] S3, [9202-47] S10
Kim, Woojae [9185-130] S7
Kim, Wook [9183-70] SPWed
Kim, Yangjin [9203-25] S6
Kim, Yoon-Ho 9225 Program Committee
Kim, Young-Ki [9182-24] S5
Kim, Young-Kuk [9161-20] S4, [9161-32] SPWed
Kim, Youngsik [9201-25] S6
Kim, Young-Soo [9195-11] S3
Kim, Youngsun [9161-39] SPWed
Kim, Youngwan [9185-225] S6
Kim, Yujin [9166-11] S2
Kim, Yun-Hi [9183-5] S2
Kim, Yushin [9193-32] S8
Kimbrough, Bradley T. 9204 Program Committee, [9204-6] S2
Kimbrough, Joe [9211-10] S3, [9211-12] S3, [9211-13] S4, [9211-5] S1
Kimerling, Lionel C. [9170-12] S2, [9220-19] S5
Kimling, Judith [9167-59] S11
Kimoto, Yugo [9196-10] S3, [9196-19] S5, [9196-5] S2
Kimura, Takashi [9208-1] S1
Kimura, Yasuyuki [9164-21] S5, [9164-60] S12
Kinashi, Kenji [9181-11] S3

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Kind, Lucy [9212-31] S7
Kindem, Joel [9213-1] S1
King, Martin D. [9164-69] S14
King, Michael J. 9215 Program Committee
King, Richard R. [9226-19] S6
Kingsborough, Richard P. [9178-17] S5
Kingston, Andrew M. [9212-10] S2, [9212-36] S8, [9212-38] S8, [9212-39] S8, [9212-9] S2
Kinjo, Hiroumi [9183-23] S5
Kino, Hidetoshi [9207-27] S8
Kinoshita, Nobuhiro [9201-15] S4
Kinsey, Nathaniel [9160-103] SPWed, [9160-52] S11, [9162-18] S6
Kinzel, Edward C. [9169-16] S4, [9202-48] S10
Kioussis, Nicholas [9213-27] S6
Kippelen, Bernard 9183 S3 Session Chair, 9183 S4 Session Chair, [9183-46] S10, 9184 Program Committee, 9184 S10 Session Chair, [9184-59] SPWed, [9184-61] SPWed, [9185-135] S8, [9185-136] S8, [9185-221] S5
Kirby, Brian J. [9167-35] S5
Kirchhof, Rene [9212-5] S1
Kirchner, Silke R. [9166-14] S2
Kirk, James [9166-31] S4
Kirkbride, James [9200-57] S4
Kirkpatrick, Douglas A. [9197-3] S2
Kirmani, Ahmad R. [9165-42] S12
Kiselev, Mikhail [9167-5] S1b
Kishimoto, Hikaru [9206-4] S1
Kiskinova, Maya [9208-4] S1
Kisku, Dakshina R. [9217-29] S4, [9217-34] S4
Kislat, Fabian [9213-7] S2
Kislov, Victor I. [9194-31] S7
Kissel, Glen J. [9160-90] SPWed
Kita, Hiroshi [9183-15] S4
Kitayama, Takao [9206-1] S1
Kitchin, Steven [9160-96] SPWed
Kittiwatanakul, Salinporn [9199-11] S3
Kitur, John K. [9181-23] S6
Kivi, Sini [9192-49] SPMon
Kivimäki, Antti [9210-14] S4, [9210-22] S5
Kivshar, Yuri S. 9160 Program Committee, [9160-10] S2, [9160-20] S4, [9160-27] S6, [9160-41] S11, [9160-44] S9, [9160-45] S9, [9160-72] S15, [9160-9] S2, 9162 Program Committee, [9162-13] S4, [9162-5] S1, [9163-93] SPWed
Kiyko, Vadim V. [9194-31] S7
Kiyomoto, Megumi [9206-20] S5
Klaes, K. Dieter [9218-48] S11, 9223 Program Committee
Klapp, Iftach [9182-26] S5
Klar, Thomas A. [9163-5] S2, 9169 S3 Session Chair, [9169-1] S1
Klattenhoff, Reiner [9203-1] S1
Kläui, Mathias 9167 Program Committee, [9167-32] S5, [9167-69] S14, [9167-70] S14
Klausmeyer, Philip [9204-23] SPMon
Klebanov, Matvei [9172-43] S2
Kleemann, Hans [9185-115] S4
Klein, Andi [9211-7] S2, [9211-8] S2
Klein, Brianna [9168-9] S2
Klein, Olivier 9167 S18a Session Chair, [9167-82] S16a
Kleineberg, Ulf [9163-61] S15, [9207-21] S6
Kleinschmidt, Anna Lisa [9194-25] S6
Klem, John F. [9160-39] S8
Klementiev, Konstantin [9209-12] S4, [9209-9] S4
Klimov, Vasily V. [9160-11] S3
Klimov, Victor I. [9162-12] S4, [9178-11] S4, [9178-14] S4
Kling, Emmanuel [9162-3] S1, [9172-2] S1
Klos, Andrzej [9160-53] S11
Klump, Erik D. [9184-14] S10, [9184-14] S4, [9184-92] SPWed
Klupp Taylor, Robin [9178-3] S1
Knap, Wojciech 9199 Program Committee, [9199-15] S4
Knauer, James P. [9211-9] S2
Knauer, Keith A. [9183-46] S10
Knie, A. [9210-22] S5
Knipfer, Christian [9192-25] S5
Knobel, Kimberly [9219-13] S4
Knopf, George K. [9180-4] S1
Knorr, Fritz J. [9165-22] S6, [9165-28] S7
Knudsen, Erik B. 9209 Program Committee, [9209-10] S4
Ko, Do-Kyeong [9198-40] SPMon
Ko, Jonathan [9224-12] S3, [9224-14] S4, [9224-36] S8
Ko, Mei-Lan [9220-25] S6
Ko, Youngjun [9184-66] SPWed
Kobayashi, Fumio [9203-38] S9
Kobayashi, Nobuhiko P. 9174 Conference Chair, 9174 S1 Session Chair, 9174 S9 Session Chair, [9174-18] S4, [9174-22] S6, [9175-10] S3
Kobayashi, Norihisa 9171 Conference Chair, 9171 S1 Session Chair, [9171-17] S4
Kober, Vitaly [9217-15] S2, [9217-3] S1, [9217-33] S4, [9217-4] S1, [9217-5] S1, [9217-57] S9, [9217-60] S9
Kobin, Björn [9165-14] S4
Koch, Matthias [9164-113] SPWed, [9164-114] SPWed
Koch, Norbert [9165-14] S4
Koch, Stephan W. [9186-15] S4
Koch, Thomas L. 9186 S1 Session Chair
Kochman, Tadeusz [9199-7] S2
Kodambaka, Suneel [9174-31] S7
Kodet, Jan [9218-71] SPMon, [9224-49] SPMon
Koeckelberghs, Guy [9181-12] S3
Koel, Bruce E. 9176 S4 Session Chair, [9176-1] S1, [9176-4] S1
Koen, Katherine [9165-19] S5
Koenig, Thomas [9213-35] S8
Koenraad, Paul M. [9167-74] S15a
Kogan, Felix [9221-15] S2
Koganezawa, Tomoyuki [9184-6] S2
Koh, Ju Heon [9195-11] S3
Kohda, Makoto [9167-76] S15a
Kohl, Jesse [9181-25] S6
Köhl, Michael 9179 Program Committee, 9179 S4 Session Chair, 9179 SPanel Panel Member, [9179-13] S2
Köhler, Jannis [9164-115] SPWed, [9164-88] S18
Kohmura, Yoshiki [9207-27] S8, [9208-1] S1
Kohn, Victor [9207-2] S1, [9209-22] S6
Kohoutek, John M. [9169-34] S8
Koike, Akifumi [9213-32] S7, [9213-60] SPMon
Koizumi, Yuna [9179-3] S1
Kokil, Akshay [9184-40] S9
Kolacek, Karel [9206-13] S3
Kolber, Maria [9182-40] S7
Kolchenko, Vasily [9166-22] S3
Kolesik, Miroslav [9186-15] S4
Koleske, Daniel D. [9162-54] S15, [9162-6] S2, [9174-13] S3
Kolkovski, Valery [9199-15] S4, [9199-18] S5
Kolkowski, Radoslaw [9163-32] S8
Kolmakov, Andrei A. [9174-40] S9
Kolodziejczak, Jeffery J. [9208-16] S4, [9208-5] S2, [9208-6] S2
Kolodziejczyk, Andrzej [9192-43] SPMon, [9192-53] SPMon
Kolopus, James A. [9213-19] S5
Koltovoy, Oleg [9203-9] S2
Kompanets, Victor O. [9219-18] SPMon
Konagai, Makoto [9177-16] S4, [9178-20] S6, [9178-21] S6, [9178-22] S6, [9178-23] S6, [9178-24] S6
Kondo, Michio [9179-3] S1
Kondo, Mizuho [9182-9] S2
Kondratenko, Sergey Victorovich [9170-51] SPWed, [9174-25] S6
Kondratyev, Vladimir [9194-31] S7
Konesky, Gregory A. [9168-21] S5
Kong, Byung-Joo [9181-39] SPWed
Kong, Lingqin [9217-64] S7
Kono, Junichiro [9168-12] S3, [9168-18] S4, [9188-4] S1
Konstantinidis, George [9199-7] S2
Konstantinov, Maxim V. [9216-53] SPMon
Konyashkin, Aleksey V. [9200-15] S2
Koo, Jae Bon [9185-141] SPWed, [9185-142] SPWed
Kooi, Steven E. [9178-17] S5
Koopmans, Bert [9167-69] S14
Koosha, Rasool [9170-45] S8
Kopchick, James G. [9179-22] S4
Koplitz, Brent [9200-10] S2
Kopmann, Andreas [9212-44] SPMon
Koppens, Frank H. 9162 S9 Session Chair, [9162-36] S10
Korach, Chad S. [9213-8] S2
Korblova, Eva D. [9182-38] S8, [9182-40] S7
Körner, Christian [9184-39] S9
Kornilin, Dmitry V. [9217-72] SPMon
Korniski, Ronald J. [9222-13] S3
Kornreich, Philipp G. 9202 Program Committee, [9202-33] S7
Korobkin, Dmitriy V. [9224-15] S4
Korobova, Natalia [9200-36] SPMon, [9200-37] SPMon
Korol, Georgy [9216-48] SPMon
Korotaev, Valery V. [9190-40] SPWed, [9217-21] S3, [9217-71] SPMon
Korotkova, Olga [9224-20] S5, [9224-21] S5, [9224-40] S9
Korshunov, Pavel [9217-11] S2, [9217-12] S2
Korytár, Dušan [9207-35] S9
Korzeb, Karolina [9160-53] S11
Koschan, Merry [9213-2] S1
Koschny, Thomas [9160-23] S5, [9160-62] S13, [9160-7] S2, [9160-80] S16, [9162-17] S5
Koshel, R. John 9186 S6 Session Chair, 9191 Track Chair, 9192 Track Chair, 9193 Program Committee, 9193 S1 Session Chair, 9193 Track Chair, 9194 Track Chair, 9195 Track Chair, 9196 Track Chair, 9197 Track Chair
Koshelev, Alexander [9161-24] S5
Koshevaya, Svetlana V. [9192-50] SPMon
Koshinz, Dennis G. [9202-41] S9
Koshka, Yaroslav [9174-37] S8
Kosiel, Kamil [9199-2] S1
Kosmer, Adam [9193-14] S3
Kosoglu, Gulsen [9204-8] S2
Kostcheev, Sergei [9161-12] S3
Kosten, Emily D. [9175-13] S4
Koster, Lambert Jan Anton [9184-7] S2
Kostioukevitch, Sergey A. [9213-47] SPMon
Kostopoulos, Thanasis [9199-7] S2
Kostuk, Raymond K. 9175 Program Committee, 9175 S7 Session Chair, [9175-16] S5, [9175-17] S5, [9184-77] SPWed
Kotnala, Abhay [9164-43] S8, [9166-26] S3, [9172-9] S3
Kotov, Oleg [9203-10] S2
Kottos, Tsampikos [9162-61] S16
Koudelka, Petr [9193-40] SPMon, [9193-53] SPMon, [9224-53] SPMon
Koumakis, Nikolaos [9164-59] S12
Kouwenhoven, Leo P. [9167-13] S2b
Kovacs, Zsofia [9212-25] S6
Koval, Galina [9216-45] SPMon
Kovalev, Dmitri I. 9161 Program Committee
Kowalewski, Matthew G. [9218-52] S11, [9218-53] S11
Kowalski, Benjamin A. [9201-32] S8
Koyama, Takahisa [9206-5] S1
Kozacki, Tomasz [9204-15] S3
Kozak, Dmitry A. [9170-11] S2
Kozák, Martin [9161-41] SPWed
Kozhevnikov, Igor V. [9209-14] S5
Kozhiparambil, Sanal K. [9161-49] SPWed
Koziej, Dorota [9170-13] S3
Kozlov, Sergey V. [9198-3] S1
Kozlowski, Gregory [9172-34] S8
Kozyrev, Yuriy N. [9174-25] S6
Krajewski, Todd A. [9179-20] S4
Kramer, Edward J. [9184-32] S8, [9184-87] SPWed
Krames, Michael R. 9190 Program Committee
Krasavin, Alexey V. [9160-27] S6, [9160-38] S8, [9163-116] SPWed, [9163-19] S5
Krasnok, Alexandr E. [9160-45] S9, [9160-51] S10
Krasnov, Vitaly V. [9216-51] SPMon, [9216-52] SPMon
Krasovskii, Vitaly I. [9163-125] SPWed
Krauss, Thomas F. [9162-66] S18
Krausz, Ferenc [9207-21] S6
Kravchenko, Sergey V. [9191-6] S2
Krawczynski, Henric [9213-7] S2
Kreher, David [9170-35] S7, [9185-104] S1
Kreibig, Uwe [9163-4] S2
Kreisel, Jens [9167-27] S4b
Krejcik, Patrick [9210-19] S5
Kreminska, Liubov [9194-28] S7
Krenkel, Martin [9212-26] S6
Kress, Bernard C. 9202 Conference Chair, 9202 S3 Session Chair, [9202-10] S2, [9202-11] S3, [9202-14] S3, [9202-38] S8
Krevor, David H. 9192 S7 Session Chair
Krier, Anthony [9199-35] SPMon
Kriesch, Arian [9161-4] S1, [9163-66] S15
Krinsky, Suzanne WS1059
Krishna, Sanjay 9162 S13 Session Chair, [9162-49] S14, [9168-9] S2, 9220 Program Committee, [9226-22] S7, [9226-24] S7
Krishnakumar, Kalmanje [9202-38] S8
Krishnan Jagadamma, Lethy [9165-5] S2
Krishnan, Madhavi [9164-44] S9
Krishnan, Mohan R. [9189-1] S1
Kristensen, Anders 9172 Program Committee
Krolikowski, Wieslaw Z. [9164-11] S3, [9164-12] S3
Kromann, Emil [9169-10] S3
Krommenhoek, Peter J. [9179-24] S4
Kronawitter, Coleman X. [9176-1] S1, [9176-4] S1
Kronek, Juraj [9166-3] S1
Kronik, Leeor [9165-37] S10, [9165-37] S4
Kronstedt, Johan [9212-18] S4
Krotkov, Nickolay A. [9218-52] S11
Kroutil, Robert T. 9222 Program Committee
Krueger, Emma Leigh [9165-19] S5
Krueger, Hartmut [9183-1] S1
Krueger, Neil A. [9162-19] S6
Krüger, Benjamin [9167-32] S5, [9167-69] S14
Kruk, Sergey S. [9160-10] S2, [9162-5] S1
Krumina, Gunta [9187-11] S4
Krumm, Michael [9212-20] S4
Krupka, Oksana 9171 Program Committee
Kruschwitz, Craig [9213-11] S3, [9213-29] S7
Kryazheva, Natalya P [9193-47] SPMon
Krycka, Kathryn [9167-35] S5
Krylova, Anastasia K. [9160-66] S13
Krylyuk, Sergiy [9174-9] S3
Krysteczko, Patryk [9167-59] S11
Kryuchyn, Andriy A. [9178-27] SPWed, [9201-11] S3, [9201-29] S7, [9201-36] SPMon
Krywonos, Andre [9207-23] S7
Krzywinski, Jacek 9209 Program Committee, [9209-35] SPMon, [9210-12] S3
Kshevetskii, Sergey P. [9209-26] S7
Ksouri, Sarah Isabelle [9164-115] SPWed, [9164-88] S18
Ku, Chun-Neng [9183-60] SPWed
Kuahara, Shota [9182-8] S2
Kubat, Irnis [9200-28] S4
Kubec, Adam [9207-45] SPMon
Kubetzka, André [9167-34] S5
Kubis, Peter [9180-20] S4, [9184-42] S9, [9184-45] S10, [9184-52] SPWed
Kubo, Wakana [9163-71] S16
Kubota, Shigeru [9177-20] S5
Kuchik, Igor E. [9199-24] S6
Kucukgok, Bahadir [9190-31] S7, [9190-41] SPWed
Kudenov, Michael W. 9220 Program Committee
Kudryashov, Alexis V. 9194 Program Committee, [9194-34] S8
Kudyshev, Zhaxylyk A. [9160-26] S6
Kuefler, Alex [9216-20] S5
Kuehne, Alexander J. C. [9183-3] S1, [9185-206] S3
Kühler, Paul [9164-62] S12
Kuhlmann, Marion [9207-17] S5, [9210-18] S4
Kuhn, Hendrik [9167-99] S18a
Kuhn, William P. [9195-13] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Kuhta, Nicholas A. [9160-84] S17
Kuipers, Laurens K. [9162-64] S18, 9163 Program Committee, 9163 S12 Session Chair, [9163-38] S10
Kuittinen, Markku [9175-28] SPWed, [9192-49] SPMon
Kujala, Naresh G. [9207-15] S4, [9208-12] S3
Kujawińska, Małgorzata 9204 Program Committee
Kukhtarev, Nickolai V. [9170-36] S7, 9200 Program Committee, 9221 S3 Session Chair, [9221-20] S3
Kukhtareva, Tatiana V. [9170-36] S7, [9171-28] SPWed, [9220-7] S2
Kulik, Pavel [9166-31] S4
Kulishov, Mykola [9202-14] S3
Kulkarni, Ashish [9166-6] S1
Kulkarni, Vikram V. [9163-80] S18
Kulyk, Olena [9171-4] S1
Kumagai, Hideo [9193-10] S3
Kumamoto, Yasuaki [9169-26] S6
Kumano, Hidekazu [9167-15] S3a
Kumar, Ajay [9202-32] S7
Kumar, Ajeet [9170-42] S8, [9200-16] SPMon, [9200-17] S2, [9200-27] S4
Kumar, Anil [9161-15] S3
Kumar, Bharat [9181-9] S2
Kumar, Jayant [9178-17] S5, [9184-40] S9
Kumar, Manoj [9184-89] SPWed
Kumar, Sanjeev [9161-15] S3
Kumar, Santosh [9163-21] S6, [9202-32] S7
Kume, Takehiro [9206-10] S2, [9207-28] S8
Kuna, Ladislav [9190-10] S2
Kunene, Musa [9175-22] S6
Kuno, Haruyoshi [9213-42] S10
Künstner, Silvio [9206-19] S5
Kuo, Cheng-Yu [9184-97] SPWed
Kuo, Chin-Chia [9161-14] S3
Kuo, Ching-Hsiang [9195-21] SPMon
Kuo, Chun-Chieh J. 9217 Program Committee
Kuo, Chun-Lin [9176-23] S6
Kuo, Guan-Ting [9192-31] S6
Kuo, Hui-Jean [9203-47] SPMon
Kuo, Wen-Kai [9163-127] SPWed
Kuo, Ya-Ching [9184-55] SPWed
Kuo, Yu-Xaong [9183-84] SPWed
Kupinski, Matthew A. [9186-18] S5, [9214-7] S2
Kuponiyi, Abiola John [9171-28] SPWed
Kuptsov, Vladimir [9205-25] SPMon
Kurabayashi, Katsuo [9166-25] S3
Kurata, Hiroyuki [9201-31] S8
Kurisko, Timothy R. [9204-22] SPMon
Kurochkin, Ilya S. [9161-22] S5
Kuroda, Takashi [9162-8] S2, 9167 S2a Session Chair, [9167-15] S3a
Kurokawa, Yasuyoshi [9178-22] S6
Kurtcuoglu, Vartan [9212-2] S1, [9212-33] S7
Kurtz, Sarah [9179-305] SPlen
Kurua, Cihan [9168-24] S5, [9168-25] SPWed
Kurumiya, Aki [9176-18] S6
Kurup, Abhishek [9164-24] S5
Kurz, Lisa [9164-15] S3
Kusachi, Shinya [9214-1] S1
Kusano, Hiroki [9213-42] S10
Kusko, Cristian [9194-5] S1
Kussow, Adil-Gerai [9160-56] S11
Kutny, Vladimir [9213-48] SPMon, [9213-52] SPMon
Kuyumchyan, Armen V. [9170-32] S6, [9207-40] SPMon
Kuze, Akihiko [9219-2] S1
Kuzin, Viktor [9193-55] SPMon
Kuzmich, Andrey [9170-50] SPWed
Kuznetsov, Sergey [9207-2] S1, [9207-5] S1
Kuzyk, Mark G. 9181 Program Committee, 9226 Program Committee
Kwak, H. Shaun [9183-88] SPWed
Kwasniewski, Pawel [9207-1] S1
Kwek, Leong-Chuan [9225-11] S3
Kwiatkowski, Kris K. [9213-17] S4, [9215-5] S2
Kwok, Dolaphine [9201-25] S6
Kwok, Hoi Sing [9182-42] S8
Kwok, Sen W. [9170-12] S2
Kwon, Gu Won [9223-20] SPMon
Kwon, Ojoon [9170-54] SPWed
Kwon, Young Key [9194-29] S7
Kyaw, Thi Ha [9225-11] S3
Kymissis, Ioannis 9185 Conference CoChair, 9185 S2 Session Chair, [9185-225] S6, [9185-231] SPWed
Kyrala, George A. 9207 Program Committee
Kyrsting, Anders [9164-34] S6
Kyung, Chong-Min [9217-22] S3

L

La Civita, Daniele [9208-2] S1, [9210-1] S1
Labrosse, Aurelien [9173-2] S1
Lacaze, Emmanuelle [9185-104] S1
Lacey, Ian [9206-16] S4, [9206-18] S5, [9206-2] S1
Lacour, Daniel [9167-60] S12
Laczkowski, Piotr [9167-81] S16a, [9167-90] S17a
Lafford, Tamzin [9212-24] S5
LaFortune, Kai N. [9194-30] S7
Lagae, Liesbet [9163-86] SPWed
Lagally, Max G. [9162-52] S14
Lagarkov, Andrey N. [9161-22] S5, [9163-123] SPWed
Lage, Marielle H. [9167-7] S1b
Lagrange, Alexandre [9190-19] S5
Lagutchev, Alexei [9160-11] S3
Lahiri, Basudev [9162-37] S11
Lahlil, Khalid [9164-45] S9
Lahneman, David [9160-14] S3
Lai, Ngoc Diep [9171-22] S6
Lai, Teh [9179-6] S1
Lai, Tzung-Han [9184-14] S10, [9184-14] S4, [9184-92] SPWed, [9185-214] S4
Lai, Wei-Cheng [9190-42] SPWed
Lai, Wei-Chih [9190-34] SPWed
Lai, Yukun [9212-35] S7
Lail, Brian A. 9202 Program Committee, [9202-44] S9, [9202-48] S10
Laissaoui, Mohammed [9175-27] SPWed
Lajunen, Hanna [9163-105] SPWed, [9194-42] SPMon
Lajunen, Hanna [9175-28] SPWed
Lake, David [9167-35] S5
Lakhdari, Fouad [9190-36] SPWed
Lakhtakia, Akhlesh 9172 Conference Chair, 9172 SKey Session Chair, [9172-16] S4, [9172-30] S7, 9189 Conference Chair, 9189 S1 Session Chair, 9189 S2 Session Chair, 9189 S3 Session Chair, 9189 S4 Session Chair, [9191-16] S5, [9191-3] S1, SC1140
Lakshminarayanan, Vasudevan [9188-1] S1
Lal, Ravindra B. 9200 Program Committee
Lalanne, Philippe [9162-2] S1
Laligant, Olivier [9205-23] S7
Lalkens, Birka [9163-83] S18
Lall, Terry [9214-19] SPMon
Lalouat, Loic [9162-41] S12
Laloum, David [9212-34] S7
Lambert, Andrew J. [9209-29] S8, [9217-43] S6
Lambert, Christoph [9184-93] SPWed
Lambert, Guillaume [9210-22] S5
Lambertz, Andreas [9177-14] S3
Lambin, Philippe [9172-11] S3
Lamela Rivera, Horacio 9168 Program Committee
Lammens, Nicolas [9226-12] S4
Lamrini, Samir [9200-28] S4
Land, Phillip [9224-39] S9
Landen, Otto L. [9211-1] S1
Landers, Franklin M. [9208-11] S3
Landis, Gerald R. [9172-34] S8
Lane, Paul A. 9184 Conference CoChair, [9184-12] S10, [9184-12] S4
Lang, Stephen [9185-144] SPWed
Lang, Tian [9224-8] S2
Langbein, Wolfgang [9181-31] S7
Lange, Marta [9198-1] S1
Langer, Gregor [9190-10] S2, [9190-28] S6
Langguth, Christin [9192-13] S3
Langhammer, Christoph [9163-36] S9
Langley, Benjamin [9184-72] SPWed
Lantigua, Christopher [9163-112] SPWed
Lanzani, Guglielmo [9170-15] S3
Lapchuk, Anatoly Stepanovych [9201-11] S3, [9201-36] SPMon
Lapine, Mikhail [9160-72] S15
Largent, Axel [9173-2] S1
Larkin, James E. [9192-10] S3
Larsen, Ross [9165-15] S4, [9184-35] S8
Larson, Bryon W. [9165-23] S6
Larson, Cindy C. [9163-77] S17
Larson, David J. [9173-6] S2
Larsson, Daniel [9212-20] S4
Lasher, Mark E. [9224-17] S4
Laskin, Alexander V. 9194 Program Committee, 9194 S4 Session Chair, [9194-24] S6, [9194-26] S6, [9200-12] S2
Laskin, Vadim V. [9200-12] S2
Lassailly, Yves [9164-45] S9, [9172-27] S7
Lassila, Antti [9173-18] SPWed
Last, Arndt [9212-23] S5
Laszcz, Adam [9199-2] S1
Latal, Jan [9193-40] SPMon, [9193-53] SPMon, [9224-53] SPMon
Latham, Shane J. [9212-38] S8
Lau, Chun Ning [9160-24] S5
Lauer, Kenneth [9207-18] S5
Laukkanen, Janne [9173-18] SPWed, [9192-49] SPMon
Laundy, David [9209-2] S1
Laura-Elias, Ana [9198-20] S5
Laurendeau, Denis [9192-9] S2
Lauter, Valeria [9167-71] S14
Lauzurica, Sara [9180-15] S3, [9180-8] S2
Lavchiev, Ventsislav M. [9200-57] S4
Lavender, Samantha [9218-47] S10
Lavery, Martin P. [9164-16] S4
Lavrentovich, Oleg D. 9182 Program Committee, 9182 S3 Session Chair, [9182-24] S5, [9182-25] S5
Law, Daniel C. [9226-19] S6
Lawrence Sylaja, Vikas [9185-143] SPWed
Lawrence, Chris R. [9160-33] S7
Lawrence, Dan [9173-6] S2
Lawson, Paige WS1059
Lazic, Predrag [9167-101] S18b
Le Dauphin, Agnes [9217-9] S2
Le Goff, Adrien [9167-52] S10
Le Rouzo, Judikaël [9161-2] S1
Le Thi Ngoc, Loan [9163-103] SPWed
Le, Henry [9164-31] S6
Le, Son [9167-54] S10
Le, Van Sang [9166-53] SPWed, [9185-226] SPWed
Leach, Richard R. [9216-12] S3, [9216-60] SPMon, [9216-9] S3
Leahu, Grigore [9160-53] S11
Leake, Kaelyn D. [9164-75] S15
Leal, Luciano [9165-60] SPWed
Leathersich, Jeffrey M. [9170-28] S5
Lechuga-Salem, Edwin [9216-3] S1
Leclerc, Mario [9165-11] S3
Lederle, Wiltrud [9185-206] S3
Ledoux-Rak, Isabelle [9171-31] SPWed
Lee, Bola [9183-29] S7
Lee, Bongsoo [9223-20] SPMon
Lee, Byoungho 9200 Program Committee, 9216 Program Committee
Lee, Catherine [9162-10] S3
Lee, Changhee [9184-66] SPWed
Lee, Charles Y. C. 9171 Program Committee, 9181 Program Committee
Lee, Cheng-Chung 9172 S3 Session Chair, [9172-1] SKey, [9172-5] S2
Lee, Chi-Hung [9192-45] SPMon, [9192-48] SPMon
Lee, Chul-Hee [9217-22] S3
Lee, Dae-Hee [9213-61] SPMon
Lee, Denny L. 9214 Program Committee
Lee, Dominic F. [9175-19] S6
Lee, Donghwa [9216-24] S7
Lee, Dong-Wook [9170-55] SPWed
Lee, Eung Jang [9198-45] SPMon
Lee, Eun-Jin [9161-20] S4, [9161-32] SPWed
Lee, Gunhee [9184-66] SPWed
Lee, Hae Ja [9210-15] S4, [9210-16] S4
Lee, Haemi 9169 S4 Session Chair, [9169-5] S2
Lee, Hak-Joo [9170-17] S3
Lee, Harrison Ka Hin [9183-11] S3, [9184-54] SPWed
Lee, Hayoon [9183-8] S2
Lee, Hee Sung [9170-4] S1
Lee, Hee-Ho [9160-98] SPWed
Lee, Ho Wai [9160-57] S12, [9162-4] S1, [9163-118] SPWed, [9163-66] S15
Lee, Hojin [9160-100] SPWed
Lee, Hoonsoo [9220-30] SPMon
Lee, Hwan [9180-19] S4
Lee, Hyeokmoo [9185-126] S6
Lee, Hyojin [9182-45] SPWed
Lee, Hyun Hwi [9184-90] SPWed
Lee, Hyun-Young [9170-53] SPWed
Lee, Illhwan [9183-29] S7
Lee, J. [9163-8] S3
Lee, Jaeho [9183-55] S12, [9183-69] SPWed
Lee, Jaehyun [9183-8] S2
Lee, Jae-Hyun [9183-67] SPWed, [9185-137] SPWed
Lee, Jae-Ryung [9177-26] SPWed
Lee, Jae-Shin [9170-53] SPWed, [9170-55] SPWed
Lee, Jaewon 9183 Program Committee
Lee, Jaewoong [9185-214] S4, [9185-229] SPWed
Lee, Jang Hyuk [9198-40] SPMon
Lee, Jee Won [9166-36] SPWed, [9166-37] SPWed
Lee, Jen-Chi [9183-84] SPWed
Lee, Jeong-Hwan [9183-24] S6, [9183-78] SPWed, [9183-79] SPWed, [9183-80] SPWed
Lee, Jeong-Ik [9183-51] S11
Lee, Jeongsu [9167-1] S1a
Lee, Jeongwon [9181-26] S6
Lee, Ji-Hoon [9182-45] SPWed
Lee, Jinhyung [9183-53] S12
Lee, Jin-Kyun [9185-117] S4
Lee, Jonghee [9183-51] S11
Lee, Jong-Kwon [9184-66] SPWed
Lee, Jong-Lam [9170-40] S8, [9183-29] S7, [9183-81] SPWed
Lee, Jong-Phil [9190-33] SPWed
Lee, Joohyung [9195-11] S3
Lee, Jun Yeob [9183-21] S5
Lee, Jungeon [9217-22] S3
Lee, K. K. [9211-13] S4
Lee, Kang Mun [9183-70] SPWed
Lee, Kangho [9167-50] S9
Lee, Keon Jae 9166 Program Committee
Lee, Kuo-Chang [9193-52] SPMon
Lee, Kwang-Sup [9171-3] S1, 9181 Program Committee, 9181 S1 Session Chair
Lee, Kyoung-Don [9195-11] S3
Lee, Kyung Min [9182-1] S1
Lee, Michael P. [9164-16] S4, [9164-35] S7
Lee, Mi-Jung [9185-117] S4, [9185-121] S5
Lee, Ming-Lun [9190-34] SPWed
Lee, Mon-Juan [9182-16] S4
Lee, Nam-Heon [9183-70] SPWed
Lee, Paul [9207-26] S7
Lee, Po-Ming [9200-6] S1
Lee, Sang-A [9161-37] SPWed, [9161-38] SPWed, [9161-47] SPWed
Lee, Sangdae [9220-30] SPMon
Lee, Sang-Seok [9185-141] SPWed, [9185-142] SPWed
Lee, Seok [9216-13] S4
Lee, Seung Hee 9168 Program Committee
Lee, Seung Hyun [9204-9] S2
Lee, ShihYan [9218-5] S1, [9218-6] S2, [9218-8] S2
Lee, Soo-Young [9193-32] S8
Lee, Steve [9164-12] S3
Lee, Sungbae J. [9170-56] SPWed
Lee, Sung-Ho [9173-15] SPWed
Lee, Sunghun [9183-24] S6
Lee, Sunjung [9185-117] S4
Lee, Tae-Woo 9183 S11 Session Chair, 9183 S12 Session Chair, [9183-32] S7
Lee, Tia S. [9165-1] S1
Lee, Tsung-Xian [9190-17] S4, [9192-28] S6
Lee, Wei [9182-16] S4, [9182-49] SPWed
Lee, Wonho [9213-9] S2
Lee, Xuan Hao [9192-26] S6
Lee, Yeon Ui [9160-65] S13
Lee, Yongsuk [9213-33] S8
Lee, Young Hee 9168 Conference Chair, 9168 Program Committee
Lee, Yuan-Jen [9167-54] S10
Lee, Yu-Heng [9174-5] S1
Lee, Yun Jae [9170-4] S1

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Leecharoen, Rojana [9205-14] S5
Leeder, Jamie M. [9162-25] S7
Leemreize, Hanna [9212-11] S3
Lefebvre, Sidonie [9220-6] S2
Lefevre, Patrick [9167-39] S6
Lefsrud, Mark [9216-1] S1
LeGall, Antoine [9164-40] S7
Legarda-Sáenz, Ricardo [9219-21] SPMon
Legedza, S. [9168-29] S5
Legrand, Christiane [9182-48] SPWed, [9182-51] SPWed
Lei, Hui [9221-17] S2, [9221-27] SPMon
Lei, Jun [9195-12] S3
Lei, Ning [9218-2] S1, [9218-5] S1, [9218-58] SPMon
Leigh, Laurel J. [9190-44] S7
Leighton, Chris [9167-31] S4b, [9167-71] S14
Leijtens, Tomas [9184-22] S6
Leiner, Claude [9193-11] S3
Leisher, Paul O. [9188-3] S1
Leißner, Till [9163-7] S2
Leitch, James W. [9218-52] S11
Leitel, Robert [9192-12] S3
Leitl, Markus J. [9183-22] S5
Leléannec, Fabrice [9217-9] S2
Lelescu, Dan 9217 Program Committee
Lemaire, Paul C. [9174-19] S5
Lemaître, Aristide [9163-26] S7
Lemieux, Daniel A. [9211-4] S1, 9215 S3 Session Chair, [9215-14] S4
Lemire, Heather M. [9201-12] S3, [9201-13] S3
Lemke, Christoph [9163-7] S2
Lemke, Henrik T. [9210-7] S2
Lemmer, Uli [9177-5] S2, [9183-34] S8, [9183-37] S8, [9183-39] S9, [9183-75] SPWed, [9185-210] S3, [9187-13] S5
Lemmetyinen, Helge J. [9176-6] S2
Lendel, Vasyl [9172-36] SPWed
Lenef, Alan [9190-12] S3
Lengeler, Bruno [9207-1] S1
Lennartz, Michelle R. [9212-47] SPMon
Lensch, Hendrik P. A. [9217-38] S5
Leo, Karl [9183-71] SPWed, [9183-85] SPWed, [9184-303] SPIen, [9184-39] S9, [9185-115] S4
Léonard, François [9168-18] S4, 9174 Program Committee, [9174-20] S5, [9174-32] S8, [9174-33] S8
Leone, Chris [9220-10] S3
Leong, Haisheng [9198-16] S4
Leong, Wei Lin [9184-44] S10
Lepage, Dominic [9160-16] S4
Lepcha, Ashish [9176-22] S6
Lepore, Alessia [9164-59] S12
Leppänen, Kimmo K. [9177-3] S1, [9205-22] S7
Lereu, Aude L. [9162-43] S12
Lerner, Scott A. 9193 Program Committee
Lerondel, Gilles 9161 Conference Chair, 9161 S1 Session Chair, [9161-12] S3, [9161-17] S4
Leroy, Benjamin [9190-19] S5
Leson, Andreas [9207-45] SPMon, [9207-7] S2
Lessard-Viger, Mathieu [9163-112] SPWed
Lester, Luke F. [9162-54] S15, [9174-13] S3, [9193-33] S8
Leung, Hui Min [9214-11] S3
Leung, Raymond [9170-31] S6
Leung, Wai Tung [9185-201] S1
Leutz, Ralf 9179 Program Committee
LeVan, Paul D. 9220 Conference Chair, 9220 S1 Session Chair, 9220 S2 Session Chair, 9220 S6 Session Chair, [9220-24] S6
Levi, Ofer [9166-28] S4
Levine, Zachary H. [9164-72] S14
Levinson, Harry J. [9189-12] S3
Levy, Raviv [9218-41] S9, [9218-43] S9
Levy, Uriel 9160 Program Committee, 9160 S11 Session Chair, [9160-68] S14, 9163 S7 Session Chair, [9163-6] S2
Levy-Clement, Claude 9176 Program Committee
Levytskyi, Sergiy N. [9213-60] SPMon
Lewandowski, Allan [9175-10] S3
Lewis, David A. [9184-71] SPWed
Lezec, Henri [9169-34] S8
L'Heureux, Guillaume [9163-26] S7
Li, Anhu [9192-40] SPMon
Li, Beiwen [9203-37] S9
Li, Changyi [9174-13] S3
Li, Chengjin [9217-76] SPMon
Li, Chengmingyue [9200-23] S3
Li, Chou-Cheng [9177-27] SPWed
Li, Chunfu [9174-28] S7
Li, Chung-Min [9193-16] S4
Li, Connie H. [9167-95] S17b
Li, Cuiling [9192-7] S2
Li, E. P. [9172-7] S2
Li, Gang [9184-29] S7
Li, Guohui [9194-37] S8
Li, Guowei [9224-9] S2
Li, Han [9163-49] S12
Li, Hanying [9185-124] S6
Li, Haoyu [9216-17] S4
Li, Heyang [9212-10] S2
Li, Huiying [9183-77] SPWed
Li, Jian 9183 S10 Session Chair, 9183 S9 Session Chair, [9183-6] S2
Li, Jiaojiao [9178-25] SPWed
Li, Jiawen [9204-26] SPMon
Li, Jie [9181-36] SPWed
Li, Jing [9213-14] S3
Li, Jun M. [9184-18] S5
Li, Juntao [9162-66] S18
Li, Li [9164-12] S3
Li, Lia Ying [9164-3] S1
Li, Lian [9184-40] S9
Li, Lian [9167-105] S18b, [9167-95] S17b
Li, Likai [9195-3] S1
Li, Ling [9198-14] S4
Li, Long [9221-34] SPMon, [9221-38] SPMon
Li, Lu [9183-30] S7
Li, Mary J. [9170-8] S2
Li, Miao [9166-59] SPWed
Li, Ming [9206-6] S1
Li, Ming-Shian [9182-13] S3
Li, Ning [9184-42] S9, [9184-52] SPWed
Li, Pei [9201-27] S7
Li, Pengke [9167-43] S7
Li, Ping [9193-35] S8
Li, Qi [9213-20] S5, [9213-3] S1
Li, Qian-Guang [9163-91] SPWed
Li, Qiming [9162-54] S15, [9174-13] S3
Li, Renkai [9198-27] S6
Li, Ruipeng [9165-5] S2
Li, Shiqiang [9163-28] S7
Li, Tao [9220-8] S3
Li, Ting [9217-52] S8
Li, Wansong [9203-14] S3
Li, Weifeng [9216-50] SPMon
Li, Weimin [9203-18] S4, [9216-40] SPMon, [9216-58] SPMon, [9217-68] SPMon, [9217-69] SPMon
Li, Wenbo [9202-24] S5, [9202-45] S9
Li, Wen-Ren [9165-59] SPWed, [9165-65] SPWed
Li, Xiangping [9201-24] S6
Li, Xiaomeng [9220-5] S2
Li, Xiaoqin [9163-60] S14
Li, Xiaotong [9188-8] S2, [9192-21] S4
Li, Xin [9214-15] S4
Li, Xin [9227-9] S2
Li, Xue [9220-8] S3, [9220-9] S3
Li, Yan [9203-18] S4, [9216-40] SPMon, [9217-68] SPMon
Li, Yan [9169-16] S4
Li, Yan [9203-53] SPMon
Li, Yan [9170-23] S4
Li, Yan [9193-33] S8
Li, Yan-Min [9182-52] SPWed
Li, Yanpeng [9195-20] SPMon
Li, Yao [9170-27] S5, [9172-37] SPWed
Li, Yifei [9193-12] S3
Li, Yonghong [9218-60] SPMon
Li, Yuanjie [9170-6] S1
Li, Yulin [9216-65] S1
Li, Yung-Hui [9217-55] SPMon
Li, Z. [9174-5] S1
Li, Zening [9224-43] S10, [9224-44] S10
Li, Zhao [9184-54] SPWed
Li, Zhen [9201-28] S7
Li, Zhenyu 9198 Program Committee, 9198 S3 Session Chair, [9198-15] S4
Li, Zhongliang [9205-8] S3
Li, Zhu [9221-10] S1, [9221-29] S3
Liang, Chao-Wen [9193-31] S7, 9195 Program Committee, [9203-17] S4
Liang, Feng [9166-27] S4
Liang, Jiajie [9183-30] S7
Liang, Rongguang 9187 Conference Chair, 9187 S1 Session Chair, 9187 S6 Session Chair, [9195-5] S2
Liang, Shiheng [9167-3] S1a
Liang, Suo Feng [9220-28] SPMon
Liang, Xiangdong [9181-26] S6
Liang, Xin-Zhong 9221 Program Committee
Liao, Chin-Han [9170-3] S1, [9200-7] S1
Liao, Chun Yen [9163-22] S6, [9163-88] SPWed
Liao, Haitao [9179-27] S5
Liao, Linchao [9224-43] S10, [9224-44] S10
Liao, Ran [9205-15] S5
Liao, Yi [9165-39] S11
Liao, Yi [9184-96] SPWed, [9199-28] S7
Liao, Yuan [9194-37] S8
Liberale, Carlo [9163-134] SPWed, [9164-13] S3
Liberman, Vladimir [9160-18] S4, [9178-17] S5
Liblibici, Sibel [9161-16] S4
LiChuan, Huang [9169-7] S2
Liddy, Whitney [9212-29] S6
Lieber, Michael [9226-3] S1
Liebig, Carl M. [9200-30] S4
Liebing, Niklas [9167-59] S11
Liedl, Andrea [9207-33] S9, [9207-39] SPMon, [9212-46] SPMon
Liedl, Tim [9164-42] S8
Liehm, Philipp [9183-85] SPWed
Lien, Chun-Chieh [9195-16] S4, [9195-19] SPMon
Lien, Yu-Chen [9183-61] SPWed
Lienau, Christoph 9163 S16 Session Chair, [9163-64] S15
Lievre, Nicolas [9203-20] S5
Light, Brandon B. [9195-6] S2
Lillie, Charles F. [9208-11] S3
Lim, Geunsik [9189-7] S2
Lim, Hyunsoo [9183-23] S5
Lim, Jinkang [9198-5] S2
Lim, Jong-Woo [9166-12] S2
Lim, Sang Chul [9185-140] SPWed, [9185-141] SPWed, [9185-142] SPWed
Lim, Swee Sien [9184-64] SPWed
Lim, Yah Leng [9199-21] S6
Limmer, Steven J. [9174-35] S8
Lin, Bo-Rung [9182-50] SPWed
Lin, Chiao-Chi [9179-24] S4
Lin, Chungsan [9218-35] S8
Lin, Chun-Rong [9165-56] SPWed, [9165-63] SPWed
Lin, Guan-Jhong [9182-50] SPWed
Lin, Guoqing [9218-9] S2
Lin, Hao-Yu [9170-12] S2, [9220-19] S5
Lin, Honghuan [9200-4] S1
Lin, Hsuan-Ching [9161-14] S3
Lin, Hung-Hsuan [9184-55] SPWed
Lin, Ja-Hon [9161-14] S3
Lin, Jhe-Syuan [9193-31] S7
Lin, Jingyu [9213-14] S3
Lin, Jin-Sheng [9183-60] SPWed
Lin, Joseph H. [9216-11] S3
Lin, Jou-Hui [9192-45] SPMon, [9192-47] SPMon, [9192-48] SPMon
Lin, Meng-Hsien [9160-70] S14, [9163-96] SPWed
Lin, Meng-Jie [9172-18] S5
Lin, Meng-Lung [9205-24] S7
Lin, Pao T. [9170-12] S2, [9220-19] S5
Lin, Pei-Ying [9165-46] S13, [9184-25] S6
Lin, Pin Ann [9169-34] S8
Lin, Po-Chih [9203-17] S4
Lin, Shawn-Yu [9162-51] S14, [9205-4] S2
Lin, Shih-Shian [9198-42] SPMon
Lin, Shou-Tai [9194-36] S8
Lin, Syue-Liang [9205-24] S7
Lin, Tsung-Ching [9217-66] S10
Lin, Tzu Chin [9200-42] SPMon
Lin, Wan-Feng [9193-38] S9
Lin, Wei Hsiang [9183-64] SPWed
Lin, Wei-Cheng [9195-21] SPMon, [9195-23] SPMon
Lin, Weihao [9205-26] SPMon
Lin, Wun Wei [9161-48] SPWed
Lin, Xiaoyan [9200-56] S2
Lin, Xue-Chun [9163-91] SPWed, [9224-48] SPMon
Lin, Yan-Gu [9161-8] S2
Lin, Yen-Chen [9161-28] S6
Lin, Yida [9170-23] S4
Lin, Yi-Hsin [9182-36] S2
Lin, Yu [9169-23] S5
Lin, Yuanhai [9163-52] S12
Lin, Yuankun [9161-25] S5
Lin, Yu-Chuan [9195-21] SPMon, [9195-23] SPMon
Lin, Zhifang [9164-8] S2
Lindemann, Markus [9167-2] S1a
Lindgren, David [9220-18] S5
Lindh, Per [9217-37] S5
Lindlein, Norbert 9195 Program Committee
Lindner, Andreas [9192-12] S3
Liner, Andrej [9224-53] SPMon
Linfield, Edmund H. [9199-21] S6
Ling, Xiulan [9196-21] S5
Link, Daniel O. [9218-23] S5
Linke, Heiner [9164-64] S13
Linkov, Alexander [9190-15] S4
Linnenberger, Anna [9164-33] S6
Lintz, Eric A. [9208-13] S3
Liou, Cheng-Jyun [9190-42] SPWed
Liou, Jian-Chiun [9183-60] SPWed
Lipomi, Darren J. [9185-129] S7
Lipovšek, Benjamin [9205-13] S5
Lipson, Michal 9162 Program Committee
Lira-Cantu, Monica [9179-26] S5, [9184-43] S10
List-Kratochvil, Emil J. W. 9185 Program Committee, 9185 S4 Session Chair, [9185-220] S5
Litchinitser, Natalia M. 9160 Program Committee, 9160 S5 Session Chair, [9160-26] S6
Littell, Jennifer [9213-12] S3
Liu, Ai Qun [9160-83] S17, [9160-92] SPWed, [9163-23] S6, [9163-88] SPWed
Liu, Anan [9198-8] S3
Liu, Anping [9180-3] S1
Liu, Anqing [9190-3] S1
Liu, Baoli [9167-102] S18b
Liu, Chaoshun 9221 S3 Session Chair, [9221-23] S3, [9221-24] S3, [9221-3] S1
Liu, Cheng-Yi [9165-17] S4, [9170-3] S1, [9200-7] S1
Liu, Chien-Liang [9177-13] S3
Liu, De-Ling [9196-16] S5, [9196-4] S1, [9196-7] S2, [9196-8] S3
Liu, Dong [9221-8] S1, [9223-8] S2
Liu, Fei [9216-2] S1
Liu, Guocheng [9202-16] S4
Liu, Hong [9170-33] S6
Liu, Hongjun [9199-12] S3
Liu, Hongxiang [9172-40] SPWed
Liu, Huanlong [9167-54] S10
Liu, Hui [9198-7] S2
Liu, Hui [9203-18] S4, [9216-40] SPMon, [9216-58] SPMon
Liu, I-Ju [9190-42] SPWed
Liu, Jia-Ming [9198-42] SPMon
Liu, Jian [9179-27] S5
Liu, Jianfeng [9199-10] S3
Liu, Jiayao [9191-1] S1, [9192-3] S1
Liu, Jie [9183-56] S12
Liu, Jifeng [9175-21] S6
Liu, Jinqiu [9201-16] S4
Liu, Jony Jiang 9202 Program Committee, 9202 S9 Session Chair, [9202-34] S7, 9224 Program Committee
Liu, Jun [9163-80] S18
Liu, Kai [9160-17] S4, [9161-18] S4, [9169-8] S2, [9170-19] S4
Liu, Ke [9221-39] SPMon
Liu, Lai C. [9198-26] S6
Liu, Lei [9199-20] S5
Liu, Liren [9200-38] SPMon, [9224-47] SPMon, [9224-52] SPMon, 9227 Program Committee, [9227-13] S3, [9227-14] SPMon, [9227-15] SPMon
Liu, Liu [9191-3] S1
Liu, Lu [9216-61] SPMon
Liu, Lulu [9164-50] S11
Liu, Manhua [9184-76] SPWed
Liu, Manjin [9192-7] S2, [9195-17] S4, [9216-4] S1, [9220-5] S2
Liu, Meng [9192-19] S4
Liu, Mengkun [9160-24] S5, [9169-33] S8
Liu, Ming [9192-7] S2, [9216-4] S1, [9217-64] S7, [9220-5] S2
Liu, Mingguo [9175-24] S7
Liu, Peng [9184-26] S7
Liu, Pudong [9221-36] SPMon, [9221-37] SPMon, [9221-46] SPMon
Liu, Rui [9185-213] S3, [9185-230] SPWed
Liu, Ruzhen [9172-40] SPWed
Liu, Shangqing [9201-35] SPMon
Liu, Sheng [9162-54] S15, [9162-6] S2
Liu, Shuo [9198-8] S3
Liu, Shuyi [9183-18] S4
Liu, Tianyu [9167-79] S15b
Liu, Wei [9217-31] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Liu, Wei-Chih [9172-18] S5, [9172-3] S1
Liu, Weiguo 9206 Program Committee
Liu, Wei-Ren [9161-14] S3
Liu, Weizhe [9167-87] S16b
Liu, Wenjin [9227-6] S1
Liu, Wenjun [9206-17] S4
Liu, Xiangdong [9188-8] S2
Liu, Xiangyang [9221-30] SPMon
Liu, Xiaohua [9192-7] S2, [9216-4] S1, [9217-64] S7, [9220-5] S2
Liu, Xiaoliang [9183-87] SPWed
Liu, Xin [9183-39] S9
Liu, Xing-Quan [9226-19] S6
Liu, Xiong [9218-52] S11
Liu, Xu [9172-25] S6
Liu, Xuan [9212-7] S2
Liu, Xusong [9170-27] S5
Liu, Yachao [9167-17] S3a
Liu, Yan [9216-36] S9
Liu, Yanghui [9170-6] S1
Liu, Yen-Liang [9193-44] SPMon
Liu, Yen-Shuo [9165-17] S4
Liu, Yi-Chen [9161-28] S6
Liu, Ying [9167-95] S17b
Liu, Yongan [9207-42] SPMon
Liu, Yung Sheng 9190 Program Committee
Liu, Yuxiao [9175-23] S7, [9175-6] S2
Liu, Yuyun [9182-39] S8
Liu, Ze [9183-35] S8
Liu, Zhaowei [9160-16] S4, [9169-31] S7, 9227 Program Committee
Liu, Zhejun [9161-18] S4
Liu, Zhengkun [9193-42] SPMon
Liu, Zhengtong [9172-7] S2
Liu, Zhengtong [9194-20] S5
Liu, Zhiwen 9198 Conference Chair, 9198 S9 Session Chair, [9198-12] S4, [9198-13] S4, [9198-20] S5, [9198-44] SPMon
Liu, Zhonglin [9186-18] S5, [9214-16] S4
Livingston, Daniel W. [9222-5] S1
Livshits, Irina L. [9188-6] S1, 9192 Program Committee, [9192-2] S1, [9193-5] S1
Livzane, Aija [9216-49] SPMon
Lizotte, Todd E. 9194 Conference Chair, 9194 S5 Session Chair, [9194-15] S4
Lloyd, Giles R. [9185-107] S2
Lloyd, John [9175-13] S4
LLuscà, Marta [9180-8] S2
Lo Cicero, Ugo [9208-10] S3
Lo, Mei-Ling [9172-5] S2
Lo, Pei-An [9205-24] S7
Lo, Shih-Chun [9183-4] S1
Lo, Yi-Chien [9192-27] S6
Lo, Yu-Hwa 9166 Program Committee
Loants, Maoz [9217-61] S10
Lobera, Julia [9204-10] S2, [9204-2] S1
Loescher, Armin [9218-50] S11
Loginova, Mariya M. [9200-3] S1
Lohmüller, Theobald [9164-62] S12, [9166-14] S2, [9166-59] SPWed
Loiko, Yurii V. [9164-11] S3
Loiseau, Annick 9168 Program Committee
Lokar, Ziga [9164-84] S17
Loke, Vincent L. Y. [9164-87] S18
Lokshin, Vladimir [9181-18] S4
Lombardo, Antonio [9163-29] S7
Lomheim, Terrence S. SC194
Lomibao, Art [9168-27] SPWed
Loncar, Marko [9162-29] S8, [9166-27] S4
Lones, Joe J. [9197-2] S1
Lones, Lance [9197-2] S1
Long, James P. [9163-119] SPWed
Long, Jane [9169-23] S5
Longo, Renata [9212-4] S1
Loo, Yueh-Lin [9178-8] S3, [9185-133] S8
Loonen, Roel C. G. M. [9182-27] S5
Lopatynska, Olga [9172-36] SPWed
Lopez, Catalina B. [9163-115] SPWed, [9163-92] SPWed
López, Cefe 9162 Program Committee
Lopez, Frances C. [9212-4] S1
Lopez, Gerardo [9219-13] S4
López, Ion [9204-14] S3
Lopez, Sergio [9172-24] S6
Lopez-Mago, Dorilian [9194-2] S1
López-Mariscal, Carlos 9194 Program Committee, [9194-48] S5
Lopez-Martinez, Jose L. [9217-5] S1
López-Peña, Luis A. [9164-122] SPWed, [9164-82] S16
López-Tejeira, Fernando [9163-86] SPWed
López-Vidrier, Julian [9180-8] S2
Lorda Abadías, José Alberto [9204-10] S2
Lordan, Frances [9169-27] S6
Lordi, Vincenzo [9216-24] S7
Lorenz, Hagen [9173-10] S3
Lorut, Frederic [9212-12] S3
Losego, Mark D. [9174-19] S5
Lottermoser, Lars [9212-43] SPMon, [9212-44] SPMon, [9212-5] S1
Loudon, James C. [9167-35] S5
Loughin, Catherine A. [9217-46] S7
Loughran, Thomas H. J. [9169-18] S4
Louis, Eric 9207 Program Committee
Lounis, Brahim [9169-13] S3
Loussert, Charles [9182-43] S8
Lovell, Gregory L. [9202-18] S4, [9202-36] S8, [9202-67] S9
Lovergine, Nico [9174-24] S6
Lovern, Michael [9224-17] S4
Low, Tony [9162-30] S9
Lozzi, Luca [9183-41] S9
Lu, Cheng [9198-26] S6
Lu, Dawei [9163-65] S15
Lu, Dylan [9160-16] S4
Lu, Fei [9194-37] S8
Lu, Feng [9163-8] S3
Lu, Jian [9209-21] S6
Lu, Jiwei [9199-11] S3
Lu, Minghui [9162-69] S19
Lu, Peng [9198-36] S9
Lu, Ping [9162-54] S15, [9162-6] S2
Lu, Qingshui [9221-18] SPMon, [9221-30] SPMon, [9221-31] SPMon, [9221-41] SPMon
Lu, Quan-Yong [9199-1] S1
Lu, Thomas T. [9216-20] S5, [9217-59] S9
Lu, Tianming [9164-89] S18
Lu, Wei [9224-52] SPMon
Lu, Xinfu [9213-20] S5, [9213-3] S1
Lu, Xing [9198-6] S2
Lu, Xuejun [9163-67] S15
Lu, Yang [9216-27] S7
Lu, Yan-Qing [9182-30] S6
Lu, Yuan [9167-3] S1a
Lu, Yu-Jung [9163-60] S14, [9163-95] SPWed
Lu, Zhenghong [9183-25] S6, [9183-89] SPWed, [9183-90] SPWed
Lu, Zhiyong [9227-12] SPMon, [9227-13] S3, [9227-14] SPMon, [9227-15] SPMon
Luan, Zhu [9224-47] SPMon
Lubin, Philip [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Lucchetti, Liana [9182-3] S1
Lucera, Luca [9180-20] S4, [9184-42] S9
Ludwig, Wolfgang [9212-24] S5
Luehl, Lars [9207-16] S4
Luethen, Volkmar [9176-6] S2
Lugo, J. Eduardo [9164-49] S10
Luk, Ting-Shan [9160-97] SPWed, [9162-54] S15, [9174-13] S3
Lukosi, Eric D. [9213-10] S3, [9213-12] S3
Lullo, Giuseppe [9208-10] S3
Lumbard, Alexander Andrew [9211-1] S1
Lumdee, Chatdanai [9163-54] S13
Lungu, Christian P. [9172-33] S8
Lüning, Jan [9210-22] S5
Lunnemann Hansen, Per [9162-67] S18
Lunsford, Allen W. [9218-42] S9, [9218-45] S10
Luo, Baoke [9216-65] S1
Luo, Claire [9200-29] S4, [9200-56] S2
Luo, Hailu [9167-17] S3a
Luo, Hongxin [9205-8] S3
Luo, Jia [9194-37] S8
Luo, Jianwen [9216-2] S1
Luo, Jingdong [9181-40] SPWed
Luo, Justin [9164-28] S6
Luo, Liang [9160-80] S16
Luo, Xiangang [9163-130] SPWed, [9163-132] SPWed
Lupini, Andrew R. [9172-8] S2
Lusakowski, Jerzy [9199-15] S4, [9199-18] S5, [9199-34] SPMon, [9199-7] S2
Luscombe, Christine K. [9185-109] S3
Lüssem, Bjorn [9185-115] S4
Lutti, Julie [9181-31] S7
Luttman, Aaron B. [9213-17] S4
Lutz, Stephen S. [9213-17] S4
Luyckx, Geert [9226-12] S4
Lv, Jiu-an [9182-39] S8
Lvovsky, Alexander I. [9225-12] S4
Lyashenko, Oleg V. [9170-50] SPWed
Lyatun, Ivan [9206-9] S2, [9207-43] SPMon, [9207-44] SPMon
Lydecker, Leigh K. [9173-14] S4
Lynch, Stephen A. 9199 Program Committee
Lynn, Kelvin G. 9213 Program Committee, 9213 S7 Session Chair, [9213-18] S4
Lysetska, Olena [9213-47] SPMon
Lytaev, Pavel [9212-23] S5, [9212-44] SPMon, [9212-5] S1
Lyu, Hong-Kun [9160-98] SPWed
Lyubomirskiy, Mikhail [9207-2] S1
Lyubopytov, Vladimir S. [9216-16] S4
Lyubutin, I. S. [9165-56] SPWed
Lyuksyutov, Sergei F. 9200 Program Committee

M

M. R., Shijeesh [9161-49] SPWed
Ma, Ding [9198-20] S5
Ma, Dongge 9183 S5 Session Chair, 9183 S6 Session Chair, [9183-49] S11
Ma, Hongtao [9185-225] S6
Ma, Huan [9164-28] S6
Ma, Jonghyun [9217-70] SPMon
Ma, Jun [9216-27] S7
Ma, Ming-Liang [9221-36] SPMon, [9221-37] SPMon
Ma, Qiong [9169-33] S8
Ma, Ronghui [9213-40] S9
Ma, Shih-Hsin [9192-45] SPMon, [9192-47] SPMon, [9192-48] SPMon
Ma, Tingli [9184-24] S6, [9184-65] SPWed
Ma, Tzuhsuan [9160-61] S13
Ma, Wei [9184-26] S7, [9184-32] S8, [9184-34] S8
Ma, Xiaoliang [9163-132] SPWed
Ma, Xiao-Song [9225-17] S5
Macchioni, Alceo [9176-7] S2
MacDonald, Carolyn 9206 Track Chair, 9207 Program Committee, 9207 Track Chair, [9207-34] S9, 9208 Program Committee, 9208 Track Chair, 9209 Conference CoChair, 9209 S6 Session Chair, 9209 Track Chair, [9209-23] S6, [9209-24] S7, [9209-39] SPMon, 9210 Track Chair, 9211 Track Chair, 9212 Track Chair, 9213 Track Chair, 9214 Track Chair, 9215 Track Chair
MacDonald, Kevin F. [9160-1] S1
MacDonald, Michael P. [9164-74] S15
MacDowell, Alastair A. [9212-52] SPMon
Macenka, Steven A. 9192 Program Committee, 9222 S3 Session Chair
MacGowan, Brian J. [9194-30] S7
Machorro, Roberto [9163-92] SPWed
Machui, Florian [9184-42] S9
Macias, Matthew 9196 S2 Session Chair, [9196-22] S6, [9196-23] S6
Mack, Andreas [9224-27] S6
Mack, Chris A. [9189-11] S3
Mackay, Tom G. 9172 Conference Chair, 9172 S7 Session Chair, [9172-17] S4
Maćkowski, Sebastian [9163-56] S14, [9163-97] SPWed
MacLaren, Scott [9168-4] S1
Maclennan, Joseph E. [9182-40] S7
Macleod, H. Angus 9172 Program Committee
MacMaster, Steven W. [9179-22] S4
MacPhee, Andrew [9211-13] S4, [9211-16] S4
MacPhee, Cait [9165-51] S14
MacRae, Andrew [9225-12] S4
Macrander, Albert [9207-15] S4, [9207-8] S2, [9208-12] S3
Maddikeri, Raghavendra [9192-59] SPMon
Mader, Andreas [9166-14] S2
Madhavan, Sriharsha [9218-56] S12, [9218-75] SPMon
Madi, Saaussan [9212-47] SPMon
Madison, Timothy J. [9195-15] S4
Madou, Marc J. [9168-1] S1
Madsen, Anders [9207-1] S1
Madsen, Christi K. [9175-23] S7, [9175-6] S2
Maekawa, Sadamichi 9167 S12 Session Chair, [9167-57] S11
Maerten, Anke [9212-40] SPMon
Magela, Geraldo [9165-61] SPWed
Maggi, Claudio [9164-59] S12
Maggini, Michele [9163-107] SPWed, [9163-109] SPWed, [9181-43] SPWed
Maghsoudi, Hadi [9170-58] SPWed
Magill, Brenden A. [9163-117] SPWed, [9167-44] S7
Magnani, Nancy J. 9188 Program Committee, 9188 S2 Session Chair, [9188-20] S4, WS1115
Magnusson, Robert 9170 Program Committee
Mah, Misoon Y. 9171 Program Committee
Mahajan, Virendra N. 9192 Conference Chair, 9192 S4 Session Chair
Mahalanobis, Abhijit 9216 Program Committee
Mahalingam, Krishnamurthy [9163-126] SPWed
Mahboub, Melika [9170-58] SPWed
Mahdavipour, Zeinab [9217-39] S5
Maheshwari, Muneesh [9200-24] S3
Mahieu, Benoit [9210-22] S5
Mahler, George [9213-28] S7
Mahmood, Zahid Hasan [9172-19] S5, [9172-39] SPWed
Mahne, Nicola [9207-14] S4, [9208-4] S1, [9210-22] S5
Mai, Cong [9198-19] S5
Maia, Allison F. [9203-24] S6
Maier, Stefan A. [9163-75] S17, [9169-2] S1
Maisonneuve, Mathieu [9166-11] S2
Majety, Sashikanth [9213-14] S3
Majidi, Keivan [9207-31] S9
Majkrzak, Charles F. [9167-35] S5
Majola, Nombuso [9194-39] SPMon
Majumdar, Arun K. 9224 Program Committee, 9224 S5 Session Chair, [9224-39] S9
Majumder, Saikat [9200-18] S2
Makaram, Aditya S. [9185-129] S7
Makarov, Nikolay S. [9178-14] S4
Makha, Mohammed [9184-50] SPWed
Makita, Mikako [9210-7] S2
Makovetskii, Artyom [9217-3] S1
Makram-Matta, Samuel [9190-19] S5
Maksimova, Ksenia [9207-44] SPMon
Maksimyak, Andrew P. [9164-98] SPWed, [9216-47] SPMon
Maksimyak, Peter P. [9164-98] SPWed, [9216-39] SPMon, [9216-41] SPMon, [9216-47] SPMon
Malachias, Angelo S. [9167-7] S1b
Malakhov, Nail [9214-3] S1
Maleki, Alireza [9163-133] SPWed
Malek-Madani, Reza [9224-20] S5
Malenko, Oleksandr [9218-64] SPMon
Malerba, Mario [9166-21] S3
Maletzky, Tobias [9201-18] S5
Malinauskas, Mangirdas [9192-36] S7
Mallouk, Thomas E. [9191-16] S5, [9191-3] S1
Malone, Neil R. 9219 Program Committee, [9219-26] S1, [9219-9] S3
Malone, Robert M. 9195 Program Committee, 9195 S2 Session Chair, [9195-2] S1, [9195-6] S2, [9213-17] S4
Maltseva, Nadezhda K. [9193-47] SPMon
Malvestuto, Marco [9207-14] S4
Man, Weining [9162-15] S5
Manasreh, Omar [9163-139] SPWed
Manca, Jean V. [9183-36] S8

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Mancini, Derrick C. 9208 Program Committee
Mancini, Lucia [9207-32] S9
Mandal, Krishna C. 9213 Program Committee, 9213 S4 Session Chair, [9213-41] S9, [9213-57] SPMon
Manders, Jesse R. [9185-214] S4
Mandes, Aurelia [9172-33] S8
Mandina, Michael 9192 Program Committee
Mandl, Martin [9190-15] S4
Manea, Ana-Maria [9171-12] S3
Manene, Franklin [9202-48] S10
Manfredda, Michele [9173-11] S3, [9208-4] S1, [9210-21] S5
Mangeney, Juliette 9199 Program Committee
Mango, Stephen A. 9223 Program Committee
Manhart, Paul K. 9193 Program Committee
Manjavacas, Alejandro [9160-21] S9, [9163-45] S11, [9163-80] S18
Mankowski, Trent [9177-18] S4, [9177-19] S4
Manley, Phillip [9178-19] S5
Mann, Andrew [9180-19] S4
Mann, Klaus [9208-4] S1
Manna, Eeshita [9185-213] S3
Manna, Uttam [9162-74] SPWed
Mannan, Mohammad A. [9213-57] SPMon
Manning, Evan M. [9218-12] S3, [9218-13] S3
Mannsfeld, Stefan C.B. [9185-134] S8
Mano, Takaaki [9162-8] S2, [9167-15] S3a
Manolescu, Andrei [9167-58] S11
Manousiadis, Pavlos [9183-45] S10
Mansuripur, Masud [9160-30] S6, 9164 S10 Session Chair, [9164-10] S2, [9167-18] S3a, [9177-18] S4, [9177-19] S4, [9186-27] S7, [9201-9] S3
Mantel, Klaus 9203 Program Committee, 9203 S4 Session Chair
Manzoni, Cristian [9167-8] S2a
Manzur, Tariq 9174 Program Committee, 9199 Program Committee
Mao, Debbie [9218-24] S5
Mao, Peter H. [9213-25] S6
Mao, Samuel S. 9174 Program Committee, 9180 Program Committee
Mao, Zhihua [9218-59] SPMon, [9218-73] SPMon, [9221-10] S1, [9221-16] S2, [9221-17] S2
Maoz, Ben [9163-69] S16
Maradudin, Alexei A. 9205 Program Committee, [9205-4] S2, [9205-5] S2
Maragkaki, Stella [9180-16] S4
Maragliano, Carlo [9175-18] S5, [9178-9] S3, [9191-12] S4
Maraka, Harsha Vardhan Reddy [9172-24] S6
Marangoni, Marco [9167-8] S2a
Marathe, Shashidhara [9208-12] S3
Marcano, Aristides 9181 Program Committee, [9181-2] S1
Marcelli, Augusto [9212-46] SPMon
Marchant, Alan [9219-15] S4
Marchetti, Mario [9223-14] S4, [9223-15] S4
Marchioro, Arianna [9165-22] S6, [9165-31] S8
Marchitto, Luca [9207-33] S9
Marciniak, Michael A. [9188-12] S3, 9205 Program Committee, 9205 S4 Session Chair, [9205-1] S1, [9205-19] S6, [9205-6] S2, [9222-16] S4
Marcinkiewicz, Michal [9199-34] SPMon, [9199-7] S2
Marcus, Andrew H. [9165-40] S11
Marder, Seth R. [9185-135] S8
Mariam, Fesseha [9215-5] S2
Mariani, Luigi [9212-27] S6
Marie, Xavier 9167 Program Committee, [9167-102] S18b, [9167-15] S3a, [9167-3] S1a, [9167-9] S2a
Marinan, Anne D. [9227-3] S1
Marinescu, Catalina [9167-58] S11
Marini, Jonathan [9170-28] S5
Marini, Stephan [9216-42] SPMon
Marino, Dominic J. [9217-46] S7
Marino, Giuseppe [9163-93] SPWed
Markham, Brian L. [9218-40] S9, [9218-42] S9, [9218-43] S9
Markosyan, Gary [9213-5] S1
Markov, Vladimir B. 9224 Program Committee, [9224-15] S4
Markovic, Bojan [9213-31] S7
Markovich, Dmitriy L. [9160-44] S9
Markovich, Gil [9163-69] S16
Markovitsi, Dimitra [9165-49] S14
Markushin, Yury Y. [9181-2] S1
Marmaras, Anastasios [9212-33] S7
Marpe, Detlev [9217-84] S3
Márquez, Andrés 9216 Conference CoChair, 9216 S1 Session Chair, 9216 S2 Session Chair, [9216-15] S4, [9216-42] SPMon
Marsà Samper, Ferran [9164-37] S7, [9164-9] S2
Marschall, Felix [9212-23] S5
Marshall, Frederic J. [9211-15] S4
Marshall, Kenneth L. 9182 S5 Session Chair, [9182-17] S4
Martí Panameño, Erwin A. [9162-71] SPWed
Marti-Arbona, Edgar [9190-4] S1
Martin, Olivier J. F. 9163 Program Committee, [9168-23] S5
Martin, Thierry [9213-38] S9
Martin, Thomas [9195-3] S1
Martin-Badosa, Estela [9164-29] S6, [9164-9] S2
Martinek, Radek [9224-53] SPMon
Martinelli, Lucio [9172-27] S7
Martínez Vara, Patricia [9205-32] SPMon
Martínez, Amalia [9204-13] S3
Martínez, Francisco J. [9216-15] S4, [9216-42] SPMon
Martinez, Madison [9165-15] S4
Martínez, Miguel [9204-2] S1
Martinez-Alonso, Sara [9218-24] S5
Martínez-Carranza, Juan [9204-15] S3
Martinez-Criado, Gema [9212-24] S5
Martínez-López, María de Jesús [9192-5] S1
Martínez-Niconoff, Gabriel [9205-32] SPMon
Martínez-Rios, Alejandro [9200-11] S2, [9220-14] S4
Martín-Palma, Raúl J. 9172 Program Committee
Martin-Pintado, Jesus [9219-11] S3
Martins, Tatiana D. [9184-94] SPWed
Marton, Zsolt [9214-10] S3
Marty, Alain [9167-90] S17a
Maru, Koichi [9203-40] SPMon
Marx, Alexander [9198-26] S6
Marzec, Mateusz [9184-73] SPWed, [9184-74] SPWed
Mas, Josep [9164-29] S6
Masajada, Jan [9194-46] SPMon
Maser, Jorg [9207-8] S2
Mashaal, Heylal [9178-5] S2, [9191-2] S1
Mashaly, Islam A. [9191-22] S6
Masini, Paolo [9223-6] S2
Maslovska, Olga D. [9166-51] SPWed
Mason, Bernard J. [9164-70] S14
Masri, Zarifi [9185-204] S1
Massengale, Jeremy A. [9163-126] SPWed
Masson, Jean-Baptiste [9164-40] S7
Mast, Matthias [9206-19] S5
Masterson, Rebecca A. [9222-6] S1
Mastuda, Takashi [9167-22] S4a
Masuda, Tetsuya [9219-3] S1
Masuhara, Hiroshi 9164 S9 Session Chair, [9164-83] S17
Masui, Kyoko [9169-7] S2
Masurkar, Amrita V. [9185-225] S6
Maszkiewicz, Michael [9195-15] S4
Mata-Chávez, Ruth I. [9200-45] SPMon, [9200-47] SPMon
Matczyszyn, Katarzyna [9163-32] S8
Matei, Andreea [9204-21] SPMon
Mateker, William R. [9184-20] S5
Mathai, Mathew K. 9183 Program Committee
Matherly, Cheryl M. [9188-4] S1
Mathevet, Fabrice [9170-35] S7, [9185-104] S1
Mathew, Reuble [9167-4] S1b
Mathew, Xavier 9179 Program Committee
Mathews, Nripan 9165 S8 Session Chair, [9165-48] S13, [9184-44] S10, [9184-64] SPWed
Mathews, William S. [9222-2] S1
Mathies, Richard A. [9161-16] S4
Mathur, Sanjay 9176 Conference Chair, 9176 S1 Session Chair, [9176-22] S6, [9176-6] S2
Matias Lopes, José A. [9213-42] S10
Matin, Mohammad A. 9216 Conference Chair, 9216 Program Committee, 9216 S6 Session Chair, 9216 S9 Session Chair, [9216-59] SPMon, [9223-7] S2
Matoba, Osamu 9216 Program Committee
Matsuda, Kazunari [9162-7] S2
Matsuda, Yasuhiro H. [9167-41] S7, [9167-42] S7
Matsukiyo, Hiroshi [9214-1] S1
Matsunaga, Tsuneo [9218-27] S6
Matsuo, Yasutaka [9171-7] S2
Matsuyama, Satoshi [9206-11] S3, [9206-5] S1, [9207-27] S8, [9208-1] S1, [9210-8] S3
Mattana, Richard [9167-39] S6
Matthews, Gary W. 9197 Program Committee
Matthews, Sean [9168-27] SPWed
Matyukha, Iryna O. [9161-44] SPWed
Maurer, Richard J. [9213-29] S7, [9213-46] S10, [9215-3] S1
Maurice, Anthony [9163-140] SPWed, [9171-13] S3, [9171-25] SPWed
Mawass, Mohamad-Assaad [9167-32] S5, [9167-69] S14, [9167-70] S14
Maxwell, Eric [9193-25] S6
Maxwell, Stephen [9218-34] S8
Maxwell, Timothy J. [9210-19] S5
May, Andy [9192-59] SPMon
Mayer, Alexandre [9187-4] S2, [9187-5] S2
Mayer, Theresa S. [9191-3] S1
Mayo, James W. [9197-1] S1
Mayrhofer, Leonhard [9176-6] S2
Maytorena, Jesus A. [9163-115] SPWed
Mazeikiene, Regina [9180-5] S2
Mazhorova, Anna 9199 S4 Session Chair, [9199-33] S8
Mazilu, Michael 9164 S1 Session Chair, [9164-17] S4, [9164-23] S5, [9164-5] S1, [9164-7] S2
Mazumder, Malay [9175-20] S6
Mazza, Tommaso [9208-2] S1, [9210-22] S5
Mbomson, Ifeoma G. [9162-37] S11
McAndrew, Brendan [9222-9] S2
McAulay, Alastair D. 9216 Program Committee, 9216 S8 Session Chair
McBryde, Kevin M. [9224-25] S6
McCall, Duncan [9193-4] S1
McCall, Martin W. 9160 Program Committee
McCandless, Kathleen [9194-30] S7
McCarthy, James K. [9218-38] S8
McCarville, Thomas J. [9208-14] S3, [9210-5] S2, [9211-11] S3
McClelland, Ryan S. [9208-19] S3
McClintock, Ryan 9166 Program Committee, 9168 Program Committee
McClure, Jason [9189-10] S3
McCombe, Bruce D. [9167-21] S3b
McConnell, Robert 9179 Program Committee
McCorkel, Joel 9218 Program Committee, 9218 S9 Session Chair, [9218-32] S7, [9222-9] S2
McCourt, Peter [9164-77] S15
McCrae, Jack E. [9224-19] S5
McCulloch, Iain [9184-41] S9, 9185 Conference Chair, 9185 S1 Session Chair, [9185-106] S2
McDaniel, Hunter [9178-14] S4
McDermott, D. [9164-73] S15
McGehee, Michael D. [9165-5] S2, [9184-20] S5, [9184-30] S7, [9184-32] S8, [9184-82] S3, [9184-82] S9
McGill, Stephen A. [9167-44] S7
McGillivray, Kevin D. [9195-2] S1
McGirr, Scott C. [9224-16] S4
McGloin, David [9164-107] SPWed
McGrath, Robert [9189-2] S1
McGuigan, David [9216-12] S3
McHale, Jeanne L. 9165 S5 Session Chair, [9165-22] S6, [9165-28] S7
McIntire, Jeffrey [9218-8] S2
McIntosh, Robert [9200-53] SPMon
McIntyre, David H. [9164-104] SPWed
McKeever, Stephen [9213-45] S10
McKendry, Jonathan James Donald [9183-45] S10
McKigney, Edward A. 9215 Program Committee
McKinney, Wayne R. [9206-18] S5, [9206-2] S1
McLachlan, Martyn A. [9183-83] SPWed
McLaren, Melanie [9225-13] S4, [9225-24] SPMon
McLaren, Robert D. 9213 Program Committee, 9213 S2 Session Chair
McLean, Kyle F. [9195-15] S4
McLeod, Alexander S. [9160-24] S5, [9168-2] S1, [9169-33] S8
McLeod, Robert R. [9170-38] S7, [9181-15] S4, [9181-34] SPWed, [9185-223] S6, [9201-32] S8, [9201-33] S8, [9203-36] S8
McMeekin, Scott G. [9162-37] S11
McMillen, Mark [9162-24] S7
McMuldroch, Stuart [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Mcnaney, James M. [9211-14] S4, [9211-9] S2
McNeill, Andrew [9171-4] S1
McNeill, Christopher R. [9184-27] S7, [9185-114] S4
McNicholl, Patrick J. [9227-7] S2
McPhedran, Ross C. [9160-72] S15
Mechau, Norman [9183-34] S8
Medintz, Igor L. [9166-10] S1
Medlin, Douglas L. [9174-35] S8
Medvedev, Andrey [9203-10] S2
Medvedeva, Svetlana [9206-9] S2, [9207-43] SPMon
Mee, Jesse K. [9193-33] S8
Meek, Thomas T. [9213-11] S3
Meeker, Michael A. [9167-44] S7
Meerheim, Rico [9184-39] S9
Mehl, Georg H. [9182-24] S5
Mehl, Oliver [9190-12] S3
Mehmood, Muhammad Qasim [9170-33] S6
Mehoke, Douglas S. [9205-2] S1
Mehrübeoglu, Mehrube 9222 Program Committee, [9222-5] S1
Mehta, Nikhil [9198-13] S4, [9198-20] S5
Mei, Ping [9185-132] S8
Meijer, Yasjka [9218-50] S11
Meinertz, Jörg [9163-58] S14
Meinhold, Peter [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Meinschien, Jens [9194-25] S6
Meister, Gerhard [9218-30] S7, [9218-4] S1
Meixner, Alfred J. 9169 Program Committee, [9169-20] S4
Mekhtiyeva, Salima [9205-12] S4
Mekuria, Rufael N. [9217-25] S3
Melcher, Charles [9213-1] S1, [9213-2] S1
Melf, Markus [9195-15] S4
Melich, Radek [9206-13] S3
Melinger, Joseph S. [9184-12] S10, [9184-12] S4
Mellette, William M. [9193-8] S2
Melnichenko, Mykola [9170-50] SPWed
Melnik, Maxim [9200-31] S4
Melnikov, Andrey Gennady [9166-15] S2
Melnikov, Gennady Vasilievich [9166-15] S2
Meltchakov, Evgueni [9207-20] S6
Melzer, Christian [9183-42] S9
Melzer, Jeffrey E. [9199-17] S4
Melzer, Kathleen [9207-45] SPMon
Memis, Omer G. 9166 Program Committee, [9220-16] S5, [9220-4] S1
Memoli, Gianluca [9164-111] SPWed
Mendes, Joaquim B. [9167-98] S18a
Méndez, Eugenio R. [9163-120] SPWed, [9163-121] SPWed
Méndez-Vazquez, Maria Guadalupe [9164-106] SPWed
Mendizabal, Fernando [9165-57] SPWed
Mendizabal, Laurent [9190-19] S5, [9190-6] S2

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Mendoza González, Gregorio [9162-71] SPWed
Mendoza Santoyo, Fernando 9204 Program Committee
Mendoza, Edgar A. 9202 Conference Chair, 9202 S2 Session Chair, [9202-20] S5, [9202-25] S5, [9202-57] S12
Meneau, Aurelie [9185-107] S2
Menéndez-Velázquez, Amador [9175-3] S1
Meng, Bo [9212-45] SPMon
Meng, Junwei [9181-2] S1
Meng, Lei [9177-16] S4
Meng, Ling-Jian [9214-6] S2
Menges, Carolin [9164-41] S8
Mengesha, Wondwosen 9215 Program Committee
Menif, Mourad [9194-18] S4
Menzel, Christoph [9160-10] S2
Menzel, Maik [9207-7] S2
Menzel, Matthias [9167-34] S5
Menzel, W. Paul [9218-28] S6
Meola, Joseph 9222 Program Committee, [9222-16] S4
Mera-González, Laura Y. [9217-41] S5
Mercère, Pascal 9208 Program Committee
Meredith, Paul [9183-4] S1, [9184-18] S5, [9184-71] SPWed, [9184-72] SPWed, [9185-202] S1
Meribout, Mahmoud [9219-25] SPMon
Merrill, Catherine D. [9197-9] S3
Merrill, Frank 9211 Program Committee, 9215 Program Committee, [9215-5] S2
Merrit, Travis R. [9167-44] S7
Mertens, James [9212-50] SPMon
Mertens, Jan [9163-29] S7
Mertens, Lena [9193-4] S1
Mertig, Ingrid 9167 S14 Session Chair, [9167-56] S11
Mertiri, Alket [9198-7] S2
Mesa Yandy, Angelica M. [9202-64] SPMon
Meskinis, Sarunas [9163-94] SPWed, [9178-28] SPWed
Mesropian, Shoghig [9226-19] S6
Messerschmidt, Marc [9210-12] S3
Mettenbörger, Andreas [9176-22] S6, [9176-6] S2
Metzler, Meredith [9207-3] S1
Metzler, Rebecca [9187-3] S1
Meulebroeck, Wendy [9198-2] S1
Meunier, Michel [9163-81] S18, [9166-11] S2, [9166-9] S1
Meuret, Youri [9192-14] S3
Mey, Tobias [9208-4] S1
Meyen, Stephanie [9205-11] S4
Meyer, Bernd C. 9209 Program Committee
Meyer, Eric P. [9212-33] S7
Meyer, John R. [9202-56] S12, [9202-65] SPMon
Meyer, Michael [9208-2] S1, [9210-22] S5
Meyerhofer, David D. [9211-15] S4
Meyer-Loges, Stephan [9212-44] SPMon
Meyers, Ronald E. 9225 Conference Chair, [9225-2] S1, [9225-20] S5, [9225-25] SPMon
Meynell, Simon [9167-35] S5
Meyrueis, Patrick 9202 Program Committee, [9202-4] S1, [9202-52] S11, [9202-9] S2
Mezzetti, Alessandro [9176-17] S5
Mhlanga, Thandeka I. [9194-10] S3, [9194-43] SPMon, [9194-44] SPMon, [9194-9] S2, [9225-24] SPMon
Mi, Zetian [9174-12] S3, 9176 S3 Session Chair, [9176-15] S5
Miano, Giovanni [9160-86] S17
Miao, Maosheng [9213-27] S6
Miao, Xiangshui [9201-28] S7
Mica, Stefano [9218-47] S10
Micali, Jason [9204-5] S1
Micciarelli, Marco [9198-32] S8
Micha, Jean-Sébastien [9212-12] S3
Michel, Bernhard [9189-5] S2
Michl, Josef [9165-3] S1, [9178-2] S1
Micijevic, Esad [9218-41] S9
Micouin, Guillaume [9171-24] S6
Miederer, Matthias [9214-5] S2
Mielke, Michael M. [9202-55] S11
Mietke, Alexander [9164-76] S15
Mihailescu, Mona [9194-5] S1, [9204-21] SPMon
Mihaly, Jonathan [9222-14] S3
Mijalkov, Mite [9164-95] SPWed
Mikhailov, Alexei S. [9194-25] S6
Mikheenko, Leonid A. [9218-64] SPMon
Miklyaev, Yuri V. [9194-25] S6
Mikš, Antonin [9192-42] SPMon, [9193-46] SPMon, [9203-46] S9
Mikulik, Petr [9207-35] S9
Milan, Riccardo [9161-17] S4
Milana, Silvia [9163-29] S7
Milanfar, Peyman [9216-300] SPIen
Milburn, Robert [9213-12] S3
Miles, Rachael [9164-107] SPWed
Milione, Giovanni 9194 S2 Session Chair, [9194-1] S1, [9194-11] S3, [9194-3] S1
Millen, James [9164-2] S1
Miller, Bo Elliot [9201-3] S1
Miller, Brian W. [9214-12] S3, [9214-16] S4, [9214-5] S2, [9215-14] S4
Miller, Eric L. [9176-24] S7
Miller, Ian [9193-14] S3
Miller, John [9181-9] S2
Miller, Kirk [9211-13] S4
Miller, Owen D. [9162-44] S13, [9178-17] S5
Miller, R. J. Dwayne [9198-26] S6
Miller, Sarah [9166-4] S1
Miller, Steven D. [9218-7] S2, [9223-3] S1
Miller, Steven W. [9194-32] S7
Miller, Stuart R. [9214-10] S3
Miller, Travis S. [9193-34] S8
Mills, Bernice [9168-18] S4
Mills, David [9212-17] S4, [9212-35] S7
Mills, Karmann [9190-43] SPWed
Mills, Stephen [9218-10] S2, [9218-7] S2
Milne, Christopher J. [9210-11] S3
Milne, William I. 9168 Program Committee, [9168-23] S5
Milner, Stuart D. 9224 Program Committee
Milosevic, Milan M. [9162-15] S5
Milot, Rebecca L. [9165-21] S5
Milster, Thomas D. [9170-14] S3, 9186 S4 Session Chair, 9201 Conference Chair, 9201 S7 Session Chair, [9201-23] S6, [9201-25] S6
Mimorov, Ilya [9188-6] S1
Mimura, Hidekazu 9206 Program Committee, [9206-10] S2, [9207-28] S8
Mimura, Hidenori [9213-32] S7
Min, Bumki [9193-32] S8
Min, Changjun [9162-50] S14, [9164-54] S11
Min, Tai [9167-47] S8
Miñano, Juan Carlos [9190-20] S5, 9191 Program Committee, [9191-1] S1, [9192-3] S1
Mîndroiu, Mihaela [9171-9] S2
Ming, Hai [9193-56] SPMon
Miniewicz, Andrzej [9171-15] S4
Minnaert, Ben [9184-53] SPWed
Minnis, Patrick [9218-15] S3
Minotto, Alessandro [9161-3] S1
Miotti, Paolo [9210-14] S4
Mirabella, Frederic [9172-11] S3
Miramontes-Jaramillo, Daniel [9217-57] S9
Miranda, Miguel A. [9165-49] S14
Miri, Mohammad-Ali [9162-59] S16, [9162-60] S16
Mirkarimi, Paul B. [9211-11] S3
Mirochnitchenko, Katia [9189-4] S1
Miron, Mihai [9167-64] S13
Mironas, Audruzis [9172-20] S5
Miroshnichenko, Andrey E. [9160-41] S11, [9160-44] S9
Mirzaee, Somayeh Mohammad Ali [9181-32] S6
Mishler, Jonathan [9171-23] S6
Mishra, Nischal [9218-16] S4, [9218-19] S4, [9218-40] S9
Mishra, Sandipan [9190-3] S1
Miska, Patrice [9161-17] S4
Miškovský, Pavol [9166-3] S1
Misra, Sudhajit [9180-13] S3
Mistry, Kevin S. [9165-23] S6
Mitchell, Stephen E. [9213-17] S4
Mitomo, Hideyuki [9171-7] S2
Mitra, Thomas [9194-25] S6
Mitrofanov, Oleg 9199 S2 Session Chair, [9199-17] S4
Mitsuishi, Mamoru [9203-25] S6
Mitus, Antoni C. [9171-15] S4, [9182-12] S3
Miura, Ayumi [9207-24] S7
Miura, Seiya [9182-9] S2
Miura, Takanori [9206-4] S1
Miura, Yuka [9196-10] S3, [9196-19] S5, [9196-5] S2
Miyajima, Daigo [9181-10] S3
Miyajima, Shinsuke [9177-16] S4, [9178-20] S6, [9178-21] S6, [9178-24] S6
Miyamachi, Toshio [9167-39] S6
Miyasaka, Hiromasa [9213-25] S6
Miyauchi, Yuhei [9162-7] S2
Miyazaki, Eiji [9196-10] S3, [9196-19] S5, [9196-5] S2
Miyazaki, Hayato [9176-18] S6
Mizutani, Yasuhiro [9225-4] S1
Mkrtchyan, Ferdenant A. [9198-4] S1, [9218-63] SPMon
Mkrtchyan, Vahram P. [9207-40] SPMon
Moats, Rex A. 9214 Program Committee
Mochales, Carolina [9212-40] SPMon
Moeller, Chris [9218-28] S6
Moeller, Stefan P. 9210 Conference Chair, 9210 S1 Session Chair, [9210-22] S5
Moeller, Uffe [9200-28] S4
Moffa, Maria [9183-41] S9
Mohacsi, Istvan [9210-11] S3
Mohajeri, Nahid [9179-32] S6
Mohamed, Fathi H.A. [9224-3] S1
Mohamed, Mohamed W.N. [9191-22] S6
Mohamed, Osama N. [9191-22] S6
Mohammadimasoudi, Mohammad [9170-41] S8, [9182-46] SPWed
Mohammed, Abdulrazak Abdulsalam [9219-23] SPMon, [9219-8] S2
Mohammed, Magdi [9217-51] S8
Mohammed, Omar F. [9165-25] S6
Mohanty, J. [9167-32] S5
Mohd Said, Suhana B. [9182-19] S4
Mohd Shapri, Ahmad Husni [9217-63] S10
Mohite, Aditya [9184-97] SPWed
Mohseni, Hooman [9163-73] S17, 9166 Conference Chair, 9166 S1 Session Chair, 9166 S4 Session Chair, [9170-44] S8, [9172-28] S7, [9220-16] S5, [9220-17] S5, [9220-4] S1
Moisan, Lionel [9169-4] S1
Moiseev, Mikhail A. [9191-6] S2
Moision, Robert M. [9196-4] S1, [9196-8] S3
Mojahedi, Mohammad [9166-11] S2, [9202-5] S1
Mokari, Taleb 9161 Conference Chair, 9161 S4 Session Chair, [9161-21] S5, [9165-44] S12
Mokkapati, Sudha [9174-5] S1
Mokrousov, Yuriy [9167-64] S13
Molenkamp, Laurens W. 9167 Program Committee
Möller, Friederike M. [9163-83] S18
Moloney, Jerome V. [9186-15] S4
Molpeceres, Carlos 9180 Conference CoChair, 9180 S2 Session Chair, [9180-15] S3, [9180-8] S2
Momayezi, Michael [9213-23] S5
Momose, Atsushi 9212 Program Committee
Mompart, Jordi [9164-11] S3
Monacelli, Brian 9188 Program Committee
Monastyrsky, Liubomyr S. [9166-38] SPWed
Monchesky, Theodore L. [9167-35] S5
Moncreiff, James [9192-8] S2
Mondal, Argha [9164-39] S7, [9164-92] S20
Mondin, Marina [9225-18] S5
Mones, Eleonora [9213-51] SPMon
Monjur, Mehjabin S. [9216-29] S8
Monk, Peter B. [9191-16] S5
Mönkkönen, Kari [9192-49] SPMon
Monkman, Andrew P. [9183-20] S5, [9183-74] SPWed
Montanaro, Matthew [9218-42] S9, [9218-45] S10
Montano, Ines [9160-39] S8
Montazeri, Arthur O. [9166-11] S2
Monteiro, Tania S. [9164-2] S1
Montes Pérez, Areli [9203-51] SPMon
Montes Usategui, Mario [9164-37] S7
Montesanti, Richard C. [9211-1] S1, [9211-2] S1
Montes-Usategui, Mario [9164-29] S6, [9164-9] S2
Monton, Carlos M. [9181-17] S4
Mook, Alexander [9167-56] S11
Moon, Chang-Ki [9183-78] SPWed, [9183-79] SPWed
Moon, Chung Hee [9171-27] SPWed, [9171-29] SPWed
Moon, Jaehyun [9183-51] S11
Moon, Joo Hyun [9223-20] SPMon
Mooney, Tim [9207-18] S5
Moons, Ellen [9184-73] SPWed, [9184-74] SPWed
Moore, Duncan T. [9193-26] S7, 9197 Program Committee
Moore, Eric D. [9203-36] S8
Moore, Gary F. [9165-21] S5
Mor, Flavio M. [9164-48] S10, [9164-65] S13
Morad, Ratson [9175-9] S3
Morales, Miguel [9180-15] S3, [9180-8] S2
Moran, Mike [9211-9] S2
Morandotti, Roberto [9199-33] S8
Moranted, Joan Ramon [9176-6] S2
Morath, Christian P. [9226-23] S7, [9226-25] S8
Morawe, Christian 9207 Conference Chair, 9207 S2 Session Chair, 9207 S8 Session Chair, [9207-19] S5, [9207-32] S9, [9207-9] S2
Morawska, Paulina [9185-204] S1
Moreau, Louis M. [9219-1] S1
Moreno, Jose 9222 Program Committee
Morfitt, Ron A. [9218-46] S10
Morgan, John Paul [9175-25] S7
Morgan, Steven H. [9178-25] SPWed
Moriena, Gustavo [9198-26] S6
Morii, Hisashi [9213-32] S7
Morin, Luce [9216-14] S4
Morita, Atsushi [9184-24] S6
Morita, Yusuke [9220-15] S4
Mørk, Jesper [9162-67] S18
Morozov, Andrey A. [9164-127] SPWed
Morozov, Yevgeniy [9201-11] S3, [9201-36] SPMon
Morris, Chris L. [9215-5] S2
Morris, R. J. [9165-51] S14
Morrison, Gregory Y. [9206-2] S1
Morse, Edward P. [9223-18] SPMon
Mortensen, N. Asger [9160-29] S6, [9162-35] S10
Morton, Simon A. [9206-2] S1
Moryatov, Alexander A. [9198-3] S1
Mosaddegh, Peiman [9170-45] S8
Moselund, Peter M. [9200-28] S4
Moser, Christophe [9175-12] S3
Moser, Jacques E. 9165 S13 Session Chair, [9165-22] S6, [9165-31] S8
Moses, Sherita [9170-36] S7
Moshchalkov, Victor V. [9163-86] SPWed, [9169-17] S4
Moskaletz, Oleg [9216-48] SPMon, [9216-57] SPMon
Moskun, Eric M. [9218-37] S8
Mossman, Michele A. [9191-19] S6
Mosurkal, Ravi [9184-40] S9
Motakef, Shariar 9213 Program Committee
Motamedi, Nojan [9193-8] S2
Motayed, Abhishek [9174-9] S3
Motoyama, Hiroto [9206-10] S2
Mott, Andrew G. [9181-3] S1, [9200-32] S4
Motta, Caio [9226-2] S1
Mottay, Eric P. [9180-17] S4
Mou, Shin [9171-11] S3
Mou, Xi [9190-14] S3, [9190-27] S6
Mou, Xuanqin [9212-6] S2
Mouchet, Sébastien R. [9187-9] S4
Mounaix, Patrick [9199-23] S6
Moura, Fabio Vieira [9165-69] SPWed
Mouret, Gaël 9199 Program Committee
Mouroulis, Pantazis 9192 Program Committee, 9192 S2 Session Chair, 9222 Conference Chair, 9222 S1 Session Chair, [9222-11] S3, [9222-12] S3, [9222-13] S3
Mousavi, S. Hossein [9160-61] S13
Moutafis, Christoforos [9167-32] S5

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Moutafis, Christoforos [9167-70] S14
Mouzali, Salima [9220-6] S2
Movileanu, Raluca [9185-144] SPWed
Mower, Jacob [9162-10] S3
Moyer, David I. [9223-4] S1
Moyer, Eric M. [9218-21] S5
Mozzanica, Aldo [9210-11] S3, [9210-7] S2
Mrad, Nezih 9202 Program Committee, [9202-54] S11
Mridha, Manoj K. [9199-33] S8
Mu, Cheng [9184-26] S7
Mu, Jiaxing [9223-11] S3
Mueller, Thomas [9162-31] S9
Muhsin, Burhan [9184-84] SPWed
Mukhanov, Oleg [9160-59] S12
Mukherjee, Subhrangsu [9184-32] S8, [9184-34] S8, [9184-87] SPWed
Mukherjee, Subhrangsu [9184-27] S7
Mukhin, Ivan S. [9163-102] SPWed
Mukhopadhyay, Sanjoy 9213 Program Committee, [9213-11] S3, [9213-29] S7, [9213-46] S10, [9215-3] S1, [9215-4] S1
Mullany, Brigid A. [9223-18] SPMon
Mullen, Christopher [9193-4] S1
Mullen, Ruth Ann [9162-15] S5
Müller, Bert 9212 Program Committee, 9212 S3 Session Chair, [9212-2] S1, [9212-25] S6, [9212-27] S6, [9212-31] S7, [9212-33] S7, [9212-42] SPMon
Müller, Martin [9192-33] S7
Müller, Martin [9212-23] S5, [9212-44] SPMon, [9212-5] S1
Müller, Melanie [9198-24] S6
Müller-Gerbl, Magdalena [9212-2] S1
Mulley, Joseph R. 9193 Program Committee, 9193 S9 Session Chair
Mulroe, Brigid [9166-22] S3
Munekata, Hiro 9167 Program Committee, [9167-22] S4a
Munera Perez, Mauricio [9218-70] SPMon
Muniyandi, Muneeswaran [9165-26] S7
Muñoz Potosi, A. [9203-50] SPMon
Muñoz-Lopez, Javier [9205-32] SPMon
Munro, William J. [9225-6] S2
Munuswamy, Shanmugam [9215-17] SPMon
Murai, Kensuke [9163-43] S11
Murakami, Hiroshi 9220 Program Committee
Murakami, Masahiro [9222-20] S4
Murakami, Yoichi 9179 Program Committee
Murata, Yorinobu [9204-17] SPMon, [9204-25] S4
Murawski, Caroline [9183-85] SPWed
Murchison, Luke [9193-14] S3
Murdin, Benedict 9167 S3b Session Chair, [9167-14] S2b
Murgai, Vijay [9218-37] S8, [9218-38] S8, [9218-39] S8, [9223-5] S1
Muroi, Tetsuhiko [9201-15] S4
Murphy, Antony Paul [9169-27] S6
Murphy, Joseph R. [9167-21] S3b
Murphy, Neil R. [9172-34] S8
Murrell, David [9193-33] S8
Murshid, Syed H. 9202 Conference CoChair, 9202 S5 Session Chair, [9202-18] S4, [9202-30] S7, [9202-36] S8, [9202-37] S8, [9202-67] S9
Murugesan, Yogesh [9182-7] S2
Murukeshan, Vadakke Matham [9180-22] S2
Musevic, Igor [9164-84] S17, [9182-33] S7
Muskens, Otto L. [9161-7] S2, 9162 S11 Session Chair, [9162-20] S6, [9162-23] S7, 9163 S14 Session Chair, [9163-30] S7
Musumeci, Pietro [9198-27] S6
Mutanen, Jarkko [9175-28] SPWed, [9192-49] SPMon
Mutlu, Zafer [9168-14] S3, [9168-22] S5, [9168-33] S4
Mutoh, Eiichiro [9193-10] S3
Myakinin, Oleg O. [9198-3] S1, [9217-72] SPMon
Myers, Glenn R. [9212-10] S2, [9212-36] S8, [9212-38] S8, [9212-39] S8
Myers, Jason D. [9177-6] S2
Myers, Kyle J. [9186-16] S5, [9193-200] SPLEN
Myers, Stephen A. [9226-24] S7
Myllylä, Risto [9183-62] SPWed
Myslik, Jiri [9217-16] S2
Mysliwiec, Jaroslaw [9171-15] S4
Myung, Nosang V. [9171-27] SPWed, [9171-29] SPWed

N

Na, Bock Soon [9185-141] SPWed, [9185-142] SPWed
Na, Hong-Yeop [9183-13] S3
Naccache, Rafik [9199-33] S8
Nachtrab, Frank [9212-20] S4
Naciri, Jawad [9166-10] S1
Nadj-Perge, S. [9167-13] S2b
Nadova, Zuzana [9166-3] S1
Nadri, Souheil [9199-11] S3
Nafidi, Abdelhakim [9220-1] S1
Nagaoka, Hiroshi [9213-42] S10
Nagaraj, Mamatha [9182-14] S3
Nagarkar, Vivek V. 9214 Program Committee, [9214-10] S3
Nägerl, Valentin [9169-11] S3
Nagler, Bob [9210-15] S4, [9210-16] S4
Nagornykh, Pavel [9164-4] S1
Naidoo, Darryl [9194-43] SPMon
Naik, Gururaj V. [9160-52] S11, [9162-18] S6
Naik, Rajesh R. [9171-11] S3
Naito, Masayuki [9213-42] S10
Najafabadi, Ehsan M. [9183-46] S10
Najarro de la Parra, Francisco [9219-11] S3
Naka, Yumiko [9181-13] S3
Nakae, Katsuhiro [9225-4] S1
Nakagawa, Takao [9196-12] S4
Nakajima, Hideaki [9167-15] S3a
Nakajima, Masakatsu [9219-2] S1
Nakajima, Tatsuya [9160-94] SPWed
Nakamachi, Eiji [9220-15] S4
Nakamori, Hiroki [9208-1] S1
Nakamura, Kazuki [9171-17] S4
Nakamura, Ryuji [9214-4] S1
Nakano, Masahiro [9185-102] S1
Nakano, Motohiro [9163-43] S11, [9206-1] S1
Nakanotani, Hajime [9183-91] S8
Nakayama, Yasuo [9183-23] S5
Naletto, Giampiero [9207-29] S8, [9207-41] SPMon
Nalla, Venkatram [9163-3] S2
Nam, Dongkyung [9216-13] S4
Nam, Yoon Sung [9161-39] SPWed, [9166-57] SPWed, [9171-18] S5
Namdas, Ebinazar B. [9183-4] S1, [9183-86] SPWed
Namkung, Juock S. 9202 Program Committee
Nango, Eriko [9210-17] S4
Nannarone, Stefano [9207-20] S6
Napier, Bruce [9200-28] S4
Napolitani, Enrico [9207-41] SPMon
Narang, Prineha [9163-44] S11
Nardello, Marco [9163-107] SPWed, [9207-22] S6, [9207-29] S8, [9207-41] SPMon
Nardin, Gael [9198-33] S8
Narendran, Nadarajah [9190-14] S3, [9190-27] S6, [9190-9] S2
Narimanov, Evgenii [9160-13] S3, [9160-14] S3
Narimanov, Evgenii E. [9181-23] S6
Narita, Kazuyuki [9220-15] S4
Nasrabadi, Nasser M. 9216 Program Committee
Nassar, Khaled [9191-22] S6
Natelson, Douglas [9163-46] S11
Nathan, Menachem [9168-13] S1
Naulleau, Patrick P. [9207-6] S2
Nauyoks, Stephen E. [9205-1] S1
Navarro-Cia, Miguel [9199-17] S4
Nawrodt, Ronny [9172-4] S1
Nayak, Ajaya K. [9167-66] S14
Nazir, Adnan [9163-134] SPWed
Naznin, Most Tahera [9216-1] S1
Ndi, Francis [9179-30] S6
Neal, John S. [9213-19] S5
Neale, Steven L. [9164-126] SPWed, [9164-78] S15
Neaton, Jeff B. [9165-37] S10, [9165-37] S4
Nedev, Spas N. [9164-62] S12, [9166-14] S2
Nedrow, Paul [9215-5] S2
Neely, David [9211-6] S2
Neethling, Pieter [9221-5] S1
Negre, Christian F. A. [9165-21] S5
Nehrych, Andriy L. [9216-39] SPMon
Neifeld, Mark A. 9216 Program Committee
Neil, Mark A. [9169-2] S1
Neipp, Cristian [9216-42] SPMon
Nekarda, Jan 9180 Program Committee
Nelson Weker, Johanna L. [9170-31] S6
Nelson, Andrew D. [9203-34] S8
Nelson, Andrew J. [9169-24] S5
Nelson, Art J. 9213 S10 Session Chair, [9213-39] S9
Nelson, Charles [9224-20] S5
Nelson, John [9194-32] S7
Nelson, Katja [9212-53] SPMon
Nelson, Keith A. [9198-38] S9
Nelson, Neil R. [9218-38] S8
Nelson, Silke [9210-7] S2
Nelson, William [9224-14] S4, [9224-22] S5, [9224-33] S8, [9224-35] S8, [9224-36] S8
Nemir, David C. [9226-18] S5
Nemitz, Wolfgang [9190-10] S2, [9190-28] S6
Nemoto, Hiromi [9217-27] S4
Nemoto, Kae [9225-16] S5
Nepal, Dhriti [9160-75] S15
Neshev, Dragomir N. [9160-10] S2, [9160-41] S11, [9160-44] S9, [9160-9] S2, [9162-11] S3, [9162-13] S4, [9162-5] S1
Nesmith, Bill J. [9175-29] SPWed
Neto, Pedro H. [9165-68] SPWed
Neubrech, Frank F. [9160-31] S7, [9163-4] S2
Neuner, Burton [9224-41] S9
Newbury, Nathan R. [9219-5] S2
Newman, Mike [9220-10] S3
Neyts, Kristiaan [9170-41] S8, [9182-2] S1, [9182-46] SPWed
Ng, Jack [9164-8] S2
Ng, Tse Nga [9185-132] S8
Ngene, Peter [9202-2] S1
Ngo, Andrew C. Y. [9172-7] S2, [9194-20] S5
Ngo, Hoang Minh [9171-31] SPWed
Ngo, Yen H. [9171-11] S3
Ngo-Duc, Tam-Triet [9171-30] SPWed
Ngongang Ndjawa, Guy Oliver [9165-5] S2, [9184-30] S7
Nguyen, Bao-Lam [9166-53] SPWed
Nguyen, Binh-Minh [9174-39] S9
Nguyen, Carmen [9183-90] SPWed
Nguyen, David [9203-54] SPMon
Nguyen, Dung C. [9214-14] S4
Nguyen, Hoang T. [9163-77] S17
Nguyen, Hue M. [9162-14] S4
Nguyen, Khai [9213-41] S9, [9213-57] SPMon
Nguyen, Paul [9163-139] SPWed
Nguyen, Thanh Luan [9184-70] SPWed, [9184-8] S2
Nguyen, Thuc-Quyen 9184 S5 Session Chair, [9184-11] S10, [9184-11] S4, [9184-32] S8, [9184-87] SPWed, [9185-209] S3
Nguyen, Tung [9217-84] S3
Nguyen, Vinh Q. [9177-6] S2
Ni, Chuan [9170-20] S4
Ni, Guangxin [9168-2] S1
Ni, Nina [9217-79] SPMon
Ni, Ri Wen [9201-28] S7
Ni, Zhenjiang [9164-89] S18
Nic Chormaic, Síle G. [9164-109] SPWed, [9164-110] SPWed
Nicholas, Andrew C. [9207-23] S7, [9222-17] S4, [9222-22] SPMon, [9222-3] S1, [9222-4] S1
Nichols, Shane [9163-69] S16
Nichols, Valerie [9165-2] S1
Nickel, Bert [9207-21] S6
Nicolas, Josep 9206 Program Committee
Nicolay, Delphine [9187-5] S2
Nicolescu, Virginia [9172-33] S8
Nicolics, Johann [9190-10] S2, [9190-28] S6
Nie, Shuaihua [9167-29] S4b
Nie, Wanyi [9184-97] SPWed
Niederberger, Markus [9176-6] S2
Nieke, Jens 9223 Program Committee
Nielsch, Kornelius [9167-59] S11, [9167-61] S12
Nielsen, Martin M. [9209-10] S4
Nielsen, Michael G. [9160-5] S2
Nielson, Gregory N. [9191-14] S4
Niemela, Joseph J. 9188 Program Committee
Nieminen, Timo A. [9164-123] S20, [9164-22] S5, [9164-38] S7, [9164-87] S18, [9164-99] SPWed
Niese, Sven [9207-45] SPMon
Nieuwendaal, Ryan C. [9185-109] S3
Niikura, Kenichi [9171-7] S2
Nijhuis, Christian A. [9163-37] S9
Nik Anwar, Nik Syahrim [9227-8] S2
Nikitin, Vladimir [9167-46] S8
Nikolaeva, Tatiana Yu [9216-35] S9
Nikolic, Milena I. [9191-1] S1
Nikolic, Rebecca J. [9213-39] S9
Nikolov, Ivaylo Petrov [9210-22] S5
Nikoobakht, Babak [9174-8] S2
Nikumb, Suwas [9180-4] S1
Nikzad, Nima [9193-8] S2
Nikzad, Shouleh [9170-28] S5
Ning, Hailing [9162-19] S6
Ning, Jicai [9221-18] SPMon, [9221-30] SPMon, [9221-31] SPMon, [9221-4] S1
Nirala, Anil Kumar [9191-18] S5
Nishibayashi, Kazuhiro [9167-22] S4a
Nishihama, Masahiro [9218-9] S2
Nishimura, Kurtis [9213-31] S7
Nisoli, Mauro [9208-18] S4
Niu, Shupeng [9198-14] S4
Niu, Xiaofan [9183-30] S7
Nixt, John M. [9218-37] S8
Nizamuddin, Mohammad [9221-15] S2
Nobrega de Assis, Lucas Marinho [9171-9] S2
Noda, Susumu 9162 S14 Session Chair, [9162-53] S15
Noginov, Mikhail A. 9160 Conference Chair, 9160 S1 Session Chair, [9160-103] SPWed, [9160-18] S4, [9160-28] S6, [9181-23] S6
Noginova, Natalia [9160-99] SPWed
Nogueira, Ana F. 9184 Program Committee
Noh, Changho [9183-70] SPWed
Noh, Ilkoo [9166-45] SPWed
Nolte, Peter W. [9162-24] S7
Nomenyo, Komla [9161-12] S3, [9161-17] S4
Nomura, Takanori 9216 Program Committee
Nordlander, Peter [9162-33] S10, 9163 Program Committee, [9163-80] S18, 9169 Program Committee, 9169 S5 Session Chair, [9169-25] S6
Nordlund, Dennis [9185-134] S8
Noriega-Manez, Rodrigo J. [9184-10] S3, [9184-10] S9
Norris, David J. [9162-39] S11
Norris, Kate J. [9174-18] S4, [9174-22] S6
Norrman, Kion [9184-43] S10
North Morris, Michael B. 9203 Program Committee, 9203 S5 Session Chair
Northrop, Amy [9218-47] S10
Norwood, Robert A. [9163-76] S17, [9186-26] S7
Noske, Matthias [9167-70] S14
Notni, Gunther 9204 Program Committee
Notomi, Masaya [9162-27] S8
Noureldine, Dalal A. [9176-14] S4
Novak, Eric [9163-46] S11
Novak, Erik 9204 Conference Chair, 9204 S2 Session Chair, [9204-6] S2
Novák, Jiří [9192-42] SPMon, [9193-46] SPMon, [9203-46] S9
Novák, Pavel [9192-42] SPMon, [9193-46] SPMon, [9203-46] S9
Novikov, Alexander S. [9213-44] S10
Novikov, Vladimir [9213-16] S4
Novo-Gradac, Kevin [9196-22] S6
Novopashin, Vladimir V. [9192-37] SPMon
Novoselov, Evgeny [9199-22] S6
Novotny, Lukas 9163 Program Committee
Nowlan, Caroline R. [9218-52] S11
Nowroozi, Bryan [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Nowzari, Ali [9170-59] SPWed, [9220-18] S5
Nozik, Arthur J. [9165-3] S1, [9178-2] S1
Nuckolls, Colin P. [9181-9] S2
Nüesch, Frank A. [9184-5] S2

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Nunalee, Christopher G. [9224-13] S3, [9224-30] S7, [9224-32] S7
Nunzi, Jean-Michel 9181 Conference Chair, [9181-32] S6
Nusinovich, Gregory S. 9199 Program Committee
Nusir, Ahmad I. [9163-139] SPWed
Nwagwu, Ugochukwu [9213-58] SPMon
Nye, Nicholas [9163-114] SPWed
Nygard, Einar [9214-3] S1
Nyk, Marcin [9163-56] S14, [9163-97] SPWed
Nykoniuk, Yevhen [9213-52] SPMon, [9213-53] SPMon

O

O, Sang Won [9166-56] SPWed
Obayashi, Tadashi [9179-3] S1
Oberdörster, Alexander [9192-12] S3, [9192-13] S3, [9193-28] S7, [9217-38] S5
O'Brien, Dominic C. [9183-45] S10, 9224 Program Committee
O'Brien, Kevin [9163-138] S8
O'Brien, L. [9167-71] S14
Obstbaum, Martin [9167-96] S18a
O'Carroll, Deirdre M. [9181-25] S6
Ochiai, Tetsuyuki [9162-63] S17
Ocker, Berthold [9167-52] S10
O'Connor, Daniel P. [9163-93] SPWed
O'Connor, Timothy F. [9185-129] S7
Oda, Naoki 9199 Program Committee
Oda, Yasuyuki [9214-1] S1, [9214-4] S1
Oddershede, Lene Broeng [9164-36] S7
O'Dell, Stephen L. 9208 Conference Chair, [9208-16] S4, [9208-5] S2, [9208-6] S2
Odinokov, Sergey [9201-38] SPMon, [9201-4] S1
Odom, Teri W. [9163-137] SPWed
Oertel, John A. 9211 Program Committee
Oestreich, Michael [9167-99] S18a
O'Faolain, Liam 9162 Program Committee, [9162-66] S18
Ofitserov, Eugeniy [9194-31] S7
Oganesyan, Koryun B. [9182-44] SPWed, [9182-47] SPWed
Ogata, Naoya 9171 Program Committee
Ogawa, Kanade [9210-3] S1, [9210-6] S2, [9210-8] S3
Ogawa, Kayo 9202 Program Committee, [9202-51] SPMon
Ogiela, Marek R. 9217 Program Committee, [9217-56] S1
Ogomi, Yuhei [9184-24] S6, [9184-65] SPWed
Ogorodnik, Yaroslav [9214-8] S2
Ogurreck, Malte [9212-23] S5, [9212-5] S1
Oh, Eunsong [9205-3] S1
Oh, Ji Hye [9190-37] SPWed, [9190-38] SPWed
Oh, Jin Yong [9174-41] S9
Oh, Kyunghwan Ken [9171-18] S5, [9171-19] S5, [9181-39] SPWed, [9200-5] S1
Oh, Mi Hwa [9161-39] SPWed, [9166-57] SPWed
Oh, Myoung-kyu [9198-40] SPMon
Oh, Sang Soon [9160-79] S16
Ohashi, Haruhiko 9206 Conference Chair, 9206 S1 Session Chair, [9206-4] S1, [9206-5] S1, [9207-24] S7
Ohl, Raymond G. 9195 Program Committee, [9195-15] S4
Ohmaru, Tetsufumi [9196-12] S4
Ohno, Hideo 9167 S9 Session Chair, [9167-45] S8
Ohodnicki, Paul R. [9161-25] S5, [9202-53] S11
Ohresser, Philippe [9167-39] S6
Ohta, Taisuke [9174-30] S7
Oikawa, Hirobumi [9214-4] S1
Oiknine, Yaniv [9217-2] S1
Ojeda-Castaneda, Jorge 9193 Program Committee
Ojima, Dennis 9221 Program Committee
Okada, Hiromi [9206-20] S5
Okada, Tatsuaki [9219-3] S1
Okamoto, Toshihiro [9170-5] S1
Okandan, Murat [9191-14] S4
Okishev, Sergey [9193-5] S1
Okita, Kenya [9206-1] S1
Oktyabrsky, Serge 9226 Program Committee
Oku, Hiromasa [9193-20] S4, [9193-50] SPMon
Okubo, Shogo [9164-60] S12
Okuda, Kohei [9206-1] S1
Okumoto, Kentaro [9182-9] S2
Okun, Paul [9160-4] S1
Okuno, Yoshito [9169-15] S4
Okunoyama, Takaharu [9213-32] S7
Okuyama, Arata [9218-61] SPMon
Okwechime, Ifechukwude O. [9213-34] S8
Oldham, Christopher J. [9174-19] S5
Olejnik, Maria [9163-56] S14
Olesiak-Banska, Joanna [9163-32] S8
Olgac, Ufuk [9212-33] S7
Oliker, Vladimir I. [9191-4] S2
Olivas, Stephen J. [9193-8] S2
Olive, Enrick [9167-25] S4a
Oliveira Neto, Pedro [9165-61] SPWed
Olivier, Yannick [9217-9] S2
Olivieri, Anthony [9163-41] S10
Olivo, Alessandro [9212-4] S1
Ollier, Emmanuel [9172-10] S3
Olsen, Elizabeth [9185-231] SPWed
Olson Reichhardt, Cynthia J. [9164-58] S12, [9164-73] S15
Olson, Craig 9193 Program Committee
Olson, Dana C. 9184 Program Committee, 9184 SPWed Session Chair
Olson, David [9173-6] S2
Olson, Grant T. [9184-79] SPWed
Olufayo, Oluwole [9192-38] SPMon
Olver, Kimberley A. [9220-3] S1
Olvera-Olvera, Carlos A. [9203-23] S5, [9203-26] S6
O'Mahoney, Paul [9164-74] S15
Omenetto, Fiorenzo Gabriele 9198 Program Committee
Omrie, Corrie [9182-24] S5
O'Neill, Hugh [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Ong, Khuong P. [9177-15] S4
Ong, Lawrence [9218-40] S9
Onishchenko, Gennadiy [9213-47] SPMon
Ono, Shun [9210-17] S4
Onur Avci, Can [9167-64] S13
Oosterlinck, Andre J. 9217 Program Committee, 9217 S10 Session Chair
Ootsu, Shinya [9183-15] S4
Opitz, Joerg [9166-23] S3
Opitz, Madeleine [9166-14] S2
Opolonin, Oleksandr D. [9213-47] SPMon
Oriaku, Chijioke I. [9199-35] SPMon
Orife, Ejovbokoghene [9193-48] SPMon
Orji, Ndubuisi George 9173 Conference CoChair, 9173 S1 Session Chair, 9173 S3 Session Chair, 9173 S4 Session Chair, [9173-4] S1
Orlov, Alexey A. [9160-66] S13
Oron, Dan [9165-44] S12
Orr, Laurel J. [9215-11] S3, [9215-8] S3
Orr-Ewing, Andrew J. [9164-70] S14
Ortega Clavero, Valentin [9202-9] S2
Ortega Piwonka, Ignacio [9164-56] S11
Ortega, Jesus [9175-8] S2
Orth, Charles D. [9194-30] S7
Ortuño, Manuel [9216-15] S4, [9216-42] SPMon
Osaka, Itaru [9184-6] S2, [9185-102] S1
Osaka, Taito [9210-8] S3
Osawa, Akihiro [9214-1] S1
Osewski, Pawel [9160-53] S11
Osgood, Richard M. [9181-17] S4
Osgood, Richard M. [9178-17] S5
Oshikane, Yasushi [9163-43] S11
Oskouei, Ahmad A. [9165-31] S8
Osmani, Ismahen [9190-36] SPWed
Osmundsen, James [9193-14] S3
Ostaszewski, Miro [9220-10] S3
Osten, Wolfgang [9181-16] S4, 9204 Program Committee, [9204-14] S3, [9227-1] S1
Ostendorf, Andreas [9164-115] SPWed, [9164-88] S18, [9180-16] S4
Osterloh, Frank E. 9176 Program Committee
Osterman, Natan [9164-84] S17
Osvet, Andres [9178-26] SPWed, [9178-3] S1, [9181-44] SPWed
Oszwaldowski, Rafal [9167-21] S3b
Otake, Hisashi [9219-3] S1
Otani, Yoshichika 9167 Program Committee
Otani, Yukitoshi 9203 Program Committee, [9203-38] S9, [9204-13] S3
Otanicar, Todd [9175-9] S3
Otendal, Mikael [9212-18] S4
Otey, Clayton R. [9161-29] S6
Otieno, Timothy [9192-38] SPMon
Otis, Kirk J. [9226-16] S5
Otsuji, Taiichi 9199 S7 Session Chair, [9199-14] S4
Ott, Dino [9164-36] S7
Ottevaere, Heidi [9192-14] S3
Otto, Georg [9214-5] S2
Otto, Oliver [9164-76] S15
Ou, Haiyan [9190-32] S7
Ou, Jun-Yu [9163-3] S2
Ou, Pan [9203-37] S9
Ou, Yiyu [9190-32] S7
Ouacha, Hassan M. [9163-61] S15
Ouali, Mardia [9182-4] S1
Ouardi, Siham [9167-66] S14
Ouchen, Fahima 9171 Conference Chair, 9171 S5 Session Chair, [9171-11] S3, [9171-20] S5, [9171-32] S3, [9171-6] S2, [9226-27] S8
Oudrari, Hassan [9218-8] S2
Oussadou, Mezhoura [9165-47] S13
Outumuro González, Ismael [9204-20] SPMon
Ou-Yang, Daniel H. [9164-67] S13, [9164-96] SPWed
Ou-Yang, Mang [9193-52] SPMon, [9220-25] S6
Ouyang, Yuan [9193-52] SPMon, [9220-25] S6
Ovechkina, Elena [9214-10] S3
Owada, Shigeki [9210-3] S1
Owens, Róisín M. 9185 Program Committee
Oxburgh, Stephen [9192-8] S2, [9193-1] S1, [9193-4] S1, [9193-48] SPMon, [9193-54] SPMon
Oyama, Yuki [9213-42] S10
Oyarzun Medina, Simon [9167-90] S17a
Ozaki, Masanori [9182-28] S6
Ozawa, Masanao [9225-15] S4
Ozawa, Yusuke [9183-23] S5
Ozcan, Aydogan [9166-18] S3
Ozcelik, Damla [9164-75] S15
Ozdemir, Sahin Kaya [9163-75] S17
Özhan, Alp Eren Sinan [9170-29] S5
Ozkan, Cengiz Sinan [9168-14] S3, [9168-17] S4
Ozkan, Cengiz Sinan [9168-20] S4, [9168-22] S5, [9168-33] S4
Ozkan, Mihrimah [9168-14] S3, [9168-20] S4, [9168-22] S5, [9168-33] S4
Özyilmaz, Barbaros [9168-2] S1

P

P.P., Prasanth [9202-22] S5
Pääkkönen, Pertti [9192-49] SPMon
Paap, Scott M. [9191-14] S4
Paarmann, Alexander [9198-24] S6
Pablant, Novimir [9209-21] S6
Pachava, Vengalrao [9202-23] S5, [9205-9] S3
Pacheco, Mirian L. A. F. [9212-32] S7
Pachler, Peter [9190-10] S2, [9190-28] S6
Paciucci, Alessandra [9218-47] S10
Pacoret, Cecile [9164-89] S18
Pacuski, Wojciech [9167-19] S3b
Padgett, Miles J. [9164-16] S4, [9164-35] S7
Padilla-Sosa, Patricia [9164-105] SPWed
Padilla-Vivanco, Alfonso 9192 Program Committee, 9192 S5 Session Chair, [9192-51] SPMon, [9192-54] SPMon, [9217-67] SPMon
Padmore, Howard A. [9206-18] S5, 9207 Program Committee, [9207-6] S2
Padula, Frank [9218-17] S4, [9218-68] SPMon, [9218-74] SPMon, [9219-12] S3
Paek, Se-Hwan [9166-56] SPWed
Paez, Gonzalo 9219 S1 Session Chair, 9219 S2 Session Chair
Páez, Gonzalo 9219 Conference Chair
Páez, Rafael [9164-106] SPWed
Paez-Sierra, Beynor A. [9185-215] S4, [9185-227] SPWed
Pagano, Thomas S. 9218 Program Committee, 9218 S5 Session Chair, 9222 Conference Chair, 9222 S2 Session Chair, 9222 S4 Session Chair, [9222-1] S1, [9222-2] S1
Paget, Daniel [9167-11] S2a
Pagliara, Stefano [9164-76] S15
Pahner, Paul [9185-115] S4
Paiella, Roberto [9162-52] S14
Pak, Alexey V. [9203-12] S3
Pak, Arthur E. [9210-12] S3
Pak, Rahmi O. [9213-57] SPMon
Pakkanen, Tuula [9175-28] SPWed
Pala, Nezih 9174 Program Committee
Palastro, John P. [9224-33] S8, [9224-35] S8
Palero, Virginia R. [9204-10] S2, [9204-2] S1
Palfinger, Ursula [9185-218] S5
Palka, Norbert [9199-2] S1
Palmer, David W. [9208-14] S3, [9210-5] S2
Palmer, Nathan [9211-1] S1, [9211-16] S4, [9211-2] S1
Palmer, Todd A. [9180-9] S3
Palmstrom, Chris J. [9167-44] S7
Palomba, Stefano [9163-138] S8
Pan, Adam [9209-24] S7, [9209-27] S7, [9209-28] S8
Pan, Delu [9221-29] S3
Pan, Huaihai [9163-61] S15
Pan, Keyao [9161-27] S6
Pan, Long-fa [9201-27] S7
Pan, Xiaoqing [9176-25] S7
Pan, Xudong [9194-37] S8
Pan, Zhengda [9178-25] SPWed
Panahandeh Fard, Majid [9184-89] SPWed
Panahi, Allen S. 9202 Program Committee, [9202-19] S4
Panajotov, Krassimir [9182-2] S1
Panaro, Simone [9163-134] SPWed
Panchanathan, Sethuraman 9217 Program Committee
Panchapakesan, Balaji Uni 9170 Program Committee, [9170-10] S2, [9170-9] S2
Pandel, Divija [9184-51] SPWed
Pandey, Shyam S. [9184-24] S6, [9184-65] SPWed
Panetta, Chris J. [9196-4] S1
Pang, Jing S. [9177-12] S3
Pang, Yue [9217-80] SPMon
Pangrác, Jirí [9161-41] SPWed
Paniagua-Domínguez, Ramón [9163-86] SPWed
Panjehpour, Masoud 9166 Program Committee
Papadakis, Georgia T. [9160-57] S12, [9162-4] S1, [9163-118] SPWed
Pappalardo, Robert T. [9218-202] SPIen
Paraecattil, Arun A. [9165-31] S8
Paranthaman, Parans M. [9172-8] S2
Pardini, Tommaso [9208-14] S3, [9210-12] S3, [9210-5] S2, [9211-11] S3
Parent, Jocelyn [9192-15] S3
Pareschi, Giovanni 9209 Program Committee
Parfenyev, Vladimir [9160-36] S7
Parhar, Gurinder S. [9202-30] S7, [9202-37] S8
Parize, Romain [9161-17] S4
Park, Byeonghak [9202-62] SPMon
Park, Chan Eon [9185-128] S6
Park, Chan Woo [9185-141] SPWed, [9185-142] SPWed
Park, Chando [9167-50] S9
Park, Chansun [9213-33] S8
Park, Cheolmin [9171-33] S6
Park, Dusik [9216-13] S4, [9217-18] S2
Park, Eun-Hyun 9190 Program Committee
Park, Hyung Gyu [9168-7] S2
Park, Jae Chul [9161-39] SPWed
Park, Jae Yong [9170-40] S8
Park, Jaehyun [9210-17] S4
Park, Jaeshin [9170-17] S3
Park, Jinwoo [9223-16] S4
Park, Jin-Woo [9185-121] S5
Park, Jiwon [9185-126] S6
Park, Jiyoung [9200-5] S1
Park, Jong-Tae [9174-41] S9

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Park, Jongwook 9183 Program Committee, [9183-8] S2
Park, Joonmo [9161-42] SPWed, [9163-104] SPWed
Park, Kyoungweon [9160-75] S15
Park, Min-Ho [9183-32] S7
Park, Min-Wook [9161-46] SPWed, [9170-48] SPWed
Park, Nam-Gyu [9165-45] S13
Park, Ryeojin [9215-8] S3
Park, Seong-Ju 9190 Program Committee
Park, Seung Koo [9183-51] S11
Park, Seung-Han [9173-15] SPWed, [9198-45] SPMon
Park, Soo Young [9181-8] S2
Park, Soon-Chun [9161-47] SPWed, [9170-48] SPWed
Park, Sung Ha [9171-18] S5, [9181-39] SPWed
Park, Sungmin [9166-52] SPWed
Park, Won Hyun [9195-11] S3
Park, Wounjhang [9163-65] S15, [9166-8] S1, 9170 Program Committee, 9170 S7 Session Chair, [9178-16] S5
Park, Young Je [9205-3] S1
Park, Young Jun [9177-26] SPWed
Park, Young-Jin [9160-98] SPWed
Parker, Douglas A. 9202 Program Committee, [9202-39] S8
Parker, Jake M. [9211-11] S3
Parkhurst, Philip [9215-14] S4
Parkin, Stuart S. P. [9167-63] S13, [9167-67] S14
Parkinson, Dilworth Y. [9212-52] SPMon
Parks, Robert E. [9186-28] S8, 9195 Program Committee, 9195 S3 Session Chair, [9195-13] S4
Parlato, Russell [9219-9] S3
Parmigiani, Fulvio [9207-14] S4
Parniak, Michal [9225-3] S1
Parsons, Gregory N. [9174-19] S5
Partanen, Anni [9175-28] SPWed, [9210-6] S2
Paruch, Patrycja 9165 S7 Session Chair, [9165-32] S8
Parviz, Babak [9193-203] SPlen
Pascoguin, B. Melvin L. [9224-41] S9
Pascual, Inmaculada [9216-15] S4, [9216-42] SPMon
Paspaley-Grbavac, Milan [9166-22] S3
Passilly, Nicolas [9204-12] S3
Paßlick, Christian [9192-34] S7
Passoni, Luca [9170-15] S3
Pastoriza-Santos, Isabel [9166-54] SPWed
Páta, Petr [9217-16] S2, [9217-47] S7, [9217-73] SPMon
Patel, Arpit [9215-17] SPMon
Patel, Monesh 9223 Program Committee
Patel, Niravkumar R. [9166-5] S1
Pathi, Munendhar [9200-26] S3
Pati, Gour S. [9181-2] S1
Patil, Ajeetkumar [9193-45] SPMon
Patil, Saurabh S. [9193-45] SPMon
Patino, Daisy [9168-22] S5
Patlan, Vsevolod V [9193-17] S4, [9194-13] S3
Patorski, Krzysztof [9203-19] S5, [9203-22] S5
Patriarche, Gilles [9161-17] S4
Patskovsky, Sergiy V. [9163-81] S18
Patt, Frederick S. [9218-4] S1
Pattathil, Rajeev Paramel [9211-6] S2
Patthey, Luc [9210-7] S2
Patton, Brian R. [9169-9] S3
Pau, Stanley 9186 S8 Session Chair
Paudel, Naba [9180-13] S3
Paul, Ananya [9188-28] SPMon
Paul, Frédéric [9218-47] S10
Paulson, Bjorn [9171-18] S5, [9171-19] S5, [9181-39] SPWed
Paun, Irina Alexandra [9204-21] SPMon
Pauwels, Bart [9212-3] S1
Pauzauskie, Peter J. [9164-55] S11
Pavageau, Bertrand [9184-68] SPWed
Pavel, Eugen [9201-22] S6
Pavlidis, Dimitris 9199 Conference Chair, 9199 S7 Session Chair
Pavlov, Pavel V. [9199-22] S6, [9205-28] SPMon
Pavone, Francesco [9198-1] S1
Pawlak, Dorota A. [9160-53] S11, 9170 Program Committee
Pawlicka, Agnieszka [9171-9] S2
Pawlik, Grzegorz [9171-15] S4, [9182-12] S3
Payne, Christine K. [9165-50] S14
Payne, Stephen A. 9213 S1 Session Chair, [9213-1] S1, [9213-19] S5, [9213-23] S5, [9213-39] S9
Paziresh, Mahsa [9212-38] S8, [9212-9] S2
Pazuchanics, Peter D. [9195-2] S1
Pearce, Kellie [9163-61] S15
Pearson, John E. [9167-97] S18a
Pecak, Josef [9217-16] S2
Pechstedt, Ralf D. [9226-13] S4
Peckus, Domantas [9163-82] SPWed, [9163-94] SPWed
Pedersen, Kjeld [9163-7] S2, [9177-22] S5
Pedersen, Thomas Garm [9177-22] S5
Pedersoli, Emanuele [9208-4] S1, [9210-22] S5
Pedrini, Giancarlo [9204-14] S3
Peele, Andrew G. 9212 Program Committee
Peffen, Jean-Christophe [9207-19] S5, [9207-9] S2
Pei, Chengkui [9181-3] S1
Pei, Jing [9201-27] S7
Pei, Qibing [9183-30] S7
Pektor, Stefanie [9214-5] S2
Pelc, Jason S. [9216-21] S6
Pelizzo, Maria G. [9163-107] SPWed, [9163-109] SPWed, [9177-24] S5, [9205-29] SPMon, [9207-22] S6, [9207-29] S8, [9207-41] SPMon
Pellegrotti, Jesica [9163-83] S18
Penado, F. Ernesto [9195-9] S3
Penco, Giuseppe [9210-22] S5
Peng, Cheng [9162-34] S10
Peng, Chuyao [9184-5] S2
Peng, Jiangtao [9222-19] S4
Peng, Siying 9163 S17 Session Chair, [9163-50] S12
Peng, Tao [9225-34] SPMon, [9225-37] S7
Peng, Wei-Jei [9193-30] S7
Peng, Xiaoqiang [9192-55] SPMon
Penney, Ryan [9219-16] S4
Penninck, Lieven [9170-41] S8
Pensack, Ryan D. [9165-1] S1
Penteado, Poliana H. [9167-94] S17b
Penth, Bernd [9184-38] S9
Penwell, Samuel B. [9184-10] S3, [9184-10] S9
Pepi, John W. [9197-14] S4, SC796
Percy, Rebecca [9199-11] S3
Perea-Lopez, Nestor [9198-20] S5
Pereira, Camila L. [9179-4] S1
Pereira, Fernando 9217 Program Committee
Pereira, Mauro F. 9199 Program Committee, 9199 S1 Session Chair, [9199-16] S4, [9199-35] SPMon, [9199-6] S2, [9199-9] S3
Pereira, Wellesley 9219 S4 Session Chair, [9219-14] S4, [9219-15] S4, [9219-16] S4
Perepichka, Igor F. [9185-204] S1
Perera, Chamanei S. [9163-89] SPWed
Perera, Indika U. [9190-27] S6, [9190-9] S2
Peretiagin, Vladimir [9190-40] SPWed
Peretti, Jacques [9164-45] S9, [9172-27] S7
Peretti, Romain [9162-41] S12
Perez, F. [9211-15] S4
Perez, Ismael [9215-9] S3
Pérez, Leon D. [9185-215] S4
Perez, Maximillian A. [9164-6] S1
Perez-Chavez, Veronica [9163-121] SPWed
Perez-Garcia, Benjamin [9194-2] S1, [9194-40] SPMon
Perez-Macias, Oscar G. [9219-22] SPMon
Perez-Moreno, Javier [9181-36] SPWed, 9226 Program Committee, 9226 S3 Session Chair, [9226-11] S3
Perez-Rubio, Victor M. [9220-2] S1
Perez-Sanchez, Grethell G. [9220-21] S6, [9220-22] S6
Perkins, Jeffrey J. [9193-3] S1
Permyakov, Dmitry [9160-44] S9
Pern, F. J. John 9179 Program Committee
Pernstich, Kurt P. [9184-17] S5
Peroz, Christophe [9161-24] S5, [9207-6] S2
Perret-Aebi, Laure-Emmanuelle 9179 Program Committee
Perrin, Stephane [9204-12] S3
Perronet, Karen [9164-40] S7
Perrotton, Cedric [9202-4] S1
Perry, Radford L. [9196-22] S6
Persano, Luana [9183-41] S9
Pershutkina, Svetlana V. [9198-43] SPMon
Persoons, André P. 9181 Program Committee, 9181 S3 Session Chair, [9181-20] S5, [9181-21] S5
Pertsch, Thomas [9160-10] S2, [9160-77] S15, [9160-9] S2
Peschel, Ulf [9161-4] S1, [9163-66] S15
Pescoller, Lukas [9193-22] S6
Peshek, Timothy J. [9179-16] S3
Pesta, Frank [9218-43] S9
Peteanu, Linda A. [9165-20] S5
Peterka, Darcy [9164-33] S6
Peterman, Erwin J. G. [9164-41] S8
Peterson, Gregory W. [9174-19] S5
Peterson, J. C. [9211-13] S4
Peterson, Jeff H. [9213-36] S8
Pethe, Shirish 9179 Program Committee
Petit, Julien [9164-85] S17
Petranovskii, Vitalii P. [9163-92] SPWed
Petre, Robert B. [9211-12] S3, [9211-14] S4, [9211-16] S4
Petrenko, Denis V. [9213-44] S10
Petrescu, Alexandru F. [9209-23] S6
Petris, Adrian [9171-12] S3
Petritz, Andreas [9185-218] S5
Petros, Mulugeta [9223-9] S3
Petrosyan, Silva I. [9200-48] SPMon
Petrou, Athos [9167-21] S3b
Petrov, Alexander Yu. [9162-66] S18
Petrov, Nikolai V. [9199-22] S6, [9205-28] SPMon, [9216-35] S9
Petrov, Peter K. [9177-12] S3
Petrov, Viacheslav V. [9201-11] S3, [9201-36] SPMon
Petrova, Elizaveta K. [9216-53] SPMon
Petrova, Rumyana [9163-122] SPWed
Petruccelli, Jonathan C. [9207-34] S9, [9209-24] S7, [9209-27] S7, [9209-39] SPMon
Petrulis, Andrius [9190-23] S5; [9190-13] S3
Petryk, Matthew [9213-28] S7
Pettersson, Håkan [9170-59] SPWed, [9220-18] S5
Pettinger, Bruno 9169 Program Committee
Petukhov, Andre [9167-21] S3b
Petukhova, Daria B. [9217-71] SPMon
Peyghambarian, Nasser N. [9186-24] S7
Peyrade, David [9164-47] S10
Pezzoli, Fabio 9167 S17b Session Chair, [9167-16] S3a
Pfau, B. [9167-32] S5
Pfefferkorn, Candace 9175 Conference Chair, 9175 S2 Session Chair
Pfeiffer, Franz [9212-32] S7
Pfisterer, Richard N. [9197-10] S4, 9205 Program Committee, 9205 S7 Session Chair
Pham, Do Chung [9167-60] S12
Phetchalern, Souphaphone [9192-44] SPMon
Phillips, Brian S. [9164-75] S15
Phillips, David B. [9164-16] S4, [9164-35] S7, [9164-61] S12
Phillips, Nancy 9179 S1 Session Chair, 9179 SPanel Panel Member, [9179-18] S4
Phillips, Ronald L. 9224 Program Committee, [9224-1] S1
Phillips, Sarah R. [9188-4] S1
Phung, Timothy [9167-67] S14
Pi, Keyu [9167-54] S10
Pi, Shaohua [9193-9] S2, [9203-35] S8
Piatkowski, Dawid [9163-56] S14, [9163-97] SPWed
Picard, Emmanuel [9164-47] S10
Picard, Richard H. [9227-4] S1
Pickering, Kenneth [9218-52] S11
Pickering, Mark R. [9209-29] S8, [9212-19] S4, [9217-43] S6
Pickworth, Louisa A. [9211-11] S3
Picone, Andrea [9167-28] S4b
Picos, Kenia [9216-5] S2
Picotto, Gian Bartolo [9173-3] S1
Picraux, Samuel T. 9174 Program Committee, [9174-6] S2
Pieles, Uwe [9212-31] S7
Pientka, James M. [9167-21] S3b
Pierce, Robert [9226-3] S1
Pietka, Barbara [9199-34] SPMon
Piland, Geoffrey [9165-2] S1
Pilat, Zdeněk [9164-116] SPWed
Piliarik, Marek [9165-38] S11, [9169-21] S5
Pillai, Supriya [9178-18] S5
Pilz, Alexander [9207-17] S5
Pin, Christophe [9164-47] S10
Pina, Ladislav 9207 Program Committee, 9207 S3 Session Chair, 9207 S6 Session Chair, [9207-30] S8
Pina-Hernandez, Carlos A. [9161-24] S5
Pinarbasi, Mustafa [9167-51] S9, [9167-53] S10
Pince, Ercag [9164-102] SPWed
Pinchuk, Anatoliy O. [9163-40] S10
Pino, J. [9211-15] S4
Pinori, Sabrina [9218-47] S10
Pinzón-Escobar, Enrique F. [9220-21] S6
Piotrowska, Anna B. [9199-2] S1
Piper, Jessica R. [9200-13] S2
Pirich, Ronald G. 9226 Conference CoChair, 9226 S4 Session Chair, [9226-14] S4
Piryatinski, Andrei [9169-19] S4
Pisano, Eduardo [9163-120] SPWed
Pisignano, Dario [9183-41] S9
Piston, Kenneth W. [9211-1] S1, [9211-12] S3
Pitschman, Matthew [9193-34] S8
Pittman, Todd B. 9225 Program Committee
Piven, Leonid [9213-47] SPMon
Pivnenko, Mike N. [9182-41] S8
Pivovaroff, Michael J. 9208 Program Committee
Pivrikas, Almantas [9184-13] S10, [9184-13] S4
Pladere, Tatjana [9187-11] S4
Plaipichit, Suwan [9204-19] S4
Planells, Miquel [9185-106] S2
Platonov, Yuriy Ya 9207 Program Committee
Platt, Heather [9165-15] S4
Plaza Ortega, Juan Manuel [9163-59] S14
Plekan, Oksana [9210-22] S5
Plesniak, Adam P. 9175 Conference Chair, 9175 S1 Session Chair, 9175 S4 Session Chair, [9175-24] S7, [9175-301] SPlen
Plewka, Joern [9212-44] SPMon
Plinta, Audrey D. [9208-13] S3
Plis, Elena [9226-24] S7
Plissard, S. R. [9167-13] S2b
Ploenjes, Elke [9207-17] S5, [9208-4] S1, [9210-18] S4
Ploschner, Martin [9164-14] S3
Ploss, Daniel [9161-4] S1
Plum, Eric [9160-1] S1
Pluska, Mariusz [9199-2] S1
Pochas, Chris M. [9165-8] S3
Poddubny, Alexander [9160-10] S2, [9160-20] S4, [9160-51] S10, [9163-93] SPWed
Podolskiy, Viktor A. 9160 S3 Session Chair, [9160-6] S2, [9160-8] S2, [9160-84] S17, [9181-23] S6
Podzorov, Vitaly [9185-125] S6
Poghosyan, Armen R. [9200-48] SPMon
Pogorzelec, Peter [9164-23] S5
Poh, Norman [9216-50] SPMon
Pokorný, Martin [9161-41] SPWed
Pokorski, Krzysztof [9203-22] S5
Pokrass, Mariana [9168-13] S1
Polack, Francois A. 9209 Program Committee
Polese, Claudia [9207-33] S9, [9207-39] SPMon, [9212-46] SPMon
Poletto, Luca [9208-18] S4, [9210-14] S4, [9210-18] S4
Polikarpov, Maxim [9207-37] SPMon
Polini, Alessandro [9183-41] S9
Polius, Jemilia [9220-7] S2
Polizos, Georgios [9175-19] S6
Polizotti, John J. [9197-16] S4
Pollard, Robert J. [9169-27] S6
Polman, Albert 9160 Program Committee, [9162-47] S13
Polo, Cristina [9219-11] S3
Poluektov, Oleg G. [9165-36] S10, [9165-36] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Polyakov, Aleksandr [9161-24] S5
Polynkin, Pavel [9186-15] S4
Pomerantseva, Ekaterina 9174 S7 Session Chair, [9174-34] S8
Pong, Philip W. T. 9168 Program Committee
Ponomareva, Julia V. [9198-43] SPMon
Ponsetto, Joseph L. [9169-31] S7
Poole, Zsolt L. [9161-25] S5
Poon, Ting-Chung 9216 Program Committee
Poperenko, Leonid V. [9172-36] SPWed
Popescu, Roxana Cristina [9204-21] SPMon
Pophristic, Milan [9190-44] S7
Popiolek-Masajada, Agnieszka [9194-46] SPMon
Porfirev, Alexey P. [9164-124] SPWed, [9164-127] SPWed
Porosnicu, Corneliu [9172-33] S8
Porrazzo, Ryan [9173-14] S4
Porshneva, Liudmila A. [9216-51] SPMon
Pospischil, Andreas [9162-31] S9
Postek, Michael T. 9173 Conference Chair, 9173 S1 Session Chair, 9173 S2 Session Chair, [9173-1] S1, [9173-5] S2
Potter, Barrett G. [9179-27] S5, [9179-6] S1
Potter, Graham [9173-14] S4
Potter, John R. [9218-39] S8
Poulin-Girard, Anne-Sophie 9188 Program Committee, [9188-16] S4, [9192-9] S2
Poutous, Menelaos K. [9202-15] S4
Poutrina, Ekaterina [9160-74] S15
Povinelli, Michelle L. 9162 Program Committee, [9168-32] S2
Powell, David A. [9160-10] S2, [9160-72] S15
Powell, Steven P. [9222-21] SPMon
Power, Rory M. [9164-68] S14
Poyneer, Lisa A. [9208-14] S3, [9210-5] S2
Prado, Sandra D. [9225-10] S3
Prakash, Pranam [9163-124] SPWed
Prange, Micah [9213-21] S5
Prasad, Adarsh S. [9225-12] S4
Prasad, Narasimha S. [9200-1] S1, 9226 Conference CoChair, 9226 S2 Session Chair, [9226-18] S5, [9226-7] S2
Prasad, Paras N. 9161 Program Committee, SC1082
Prater, Karin [9192-35] S7
Pratt, Patty D. [9218-76] S1
Prause, Korbinian [9204-6] S2
Prayakarao, Srujana [9160-103] SPWed
Preda, Liliana [9194-5] S1
Preece, Daryl C. [9164-22] S5, [9164-32] S6, [9164-87] S18, [9164-99] SPWed
Prendergast, David 9176 Program Committee
Prescod, Andru J. 9175 Program Committee, 9175 S6 Session Chair
Pressel, Phil [9197-11] S4, [9197-12] S4, [9197-13] S4
Preston, Thomas C. [9164-70] S14
Prete, Paola [9174-24] S6
Prezhdo, Oleg V. 9165 Program Committee
Pribiag, Vlad S. 9167 S4b Session Chair, [9167-13] S2b
Priestley, Kory J. [9218-1] S1, [9218-18] S4, [9218-25] S6
Prigozhin, Gregory Y. 9210 Program Committee
Prikhodko, Oleg Y. [9200-36] SPMon
Primot, Jérôme [9220-6] S2
Printz, Adam D. [9185-129] S7
Prinz, Eva-Marie [9184-38] S9
Prinz, Markus [9185-127] S6
Pritchett, Timothy M. [9181-3] S1
Prochazka, Ivan [9218-71] SPMon, [9224-10] S3, [9224-49] SPMon
Proctor, Christopher [9184-32] S8, [9184-87] SPWed
Procz, Simon [9213-35] S8
Prodan, Gabriel [9172-33] S8
Prodan, Madalina D. [9172-33] S8
Proft, Bernd [9176-6] S2
Proietti Zaccaria, Remo [9161-30] S6, [9163-134] SPWed
Prokashev, Vadim N. [9200-14] SPMon
Prokes, Sharka M. 9174 Program Committee, 9174 S2 Session Chair, [9174-17] S4
Prokofiev, Victor [9192-49] SPMon
Proli, Paolo [9202-3] S1
Prosa, Ty J. [9173-6] S2
Pruessner, Marcel W. [9170-11] S2
Prukner, Vaclav [9206-13] S3
Prydiy, Alexander G. [9166-47] SPWed
Pryor, Mark [9226-1] S1, [9226-2] S1
Pryputniewicz, Ryszard J. 9204 Program Committee
Przybilla, Thomas [9184-52] SPWed
Psaltis, Demetri 9198 Conference CoChair, [9198-37] S9
Psiaki, Mark L. [9222-21] SPMon
Ptasinski, Joanna N. [9182-31] S6
Pu, Jinya [9196-18] S5
Pu, Mingbo [9163-130] SPWed, [9163-132] SPWed
Pu, Yong-Jin 9183 Program Committee, [9183-9] S2
Puche, William S. [9193-37] S9
Puchkova, Anastasiya [9163-83] S18
Puigdollers, Joaquim [9185-143] SPWed
Pulgarin, Adrian [9165-31] S8
Pulido, Laura M. [9160-102] SPWed
Pulido-Navarro, Maria G. [9220-23] S6
Puppin, Ezio [9167-85] S16b
Pusch, Andreas [9160-79] S16
Puschell, Jeffery J. 9218 Program Committee, 9218 S1 Session Chair, 9223 Conference Chair, 9223 S1 Session Chair, [9223-1] S1, [9223-13] S4, [9223-3] S1, [9223-5] S1, [9223-6] S2
Pushp, Aakash [9167-67] S14
Pustovit, Vitaliy N. [9160-75] S15, 9163 S15 Session Chair, [9163-16] S5
Puthankovilakam, Krishnaparvathy [9203-54] SPMon
Py, Christophe [9185-144] SPWed

Q

Qi, Rui [9190-7] S2, [9192-29] S6
Qi, Yue [9216-17] S4
Qian, Dai [9221-26] S3
Qian, Jun [9206-12] S3, [9206-17] S4, [9208-12] S3, [9209-8] S3
Qian, Kemao [9203-21] S5
Qian, Weixian [9217-6] S1
Qiao, Shuag [9167-29] S4b
Qin, Anjun [9182-6] S2
Qin, Tianshi [9184-27] S7
Qin, Weiping [9190-25] S6
Qin, Yi [9170-23] S4
Qin, Zhongzhong [9225-12] S4
Qing, Lan [9167-16] S3a
Qing, Shen [9184-24] S6
Qiu, Cheng-Wei [9164-121] SPWed, [9170-33] S6
Qiu, Jiaqi [9211-3] S1
Qiu, Keqiang [9170-47] SPWed
Qiu, Zhiwei [9217-83] SPMon
Qu, Fanyao Q. [9165-69] SPWed
Qu, John J. 9221 Program Committee
Quakenbush, Tim [9220-10] S3
Quan, Qimin [9166-27] S4
Queirós, Raquel B. [9164-97] SPWed
Quenneville, Jason [9226-10] S3
Querlioz, Damien [9167-55] S10
Quigley, Andrew S. [9167-35] S5
Quinlan, Jeff 9190 Program Committee
Quirin, Florian [9210-12] S3
Quitl, Carina T. [9216-43] SPMon

R

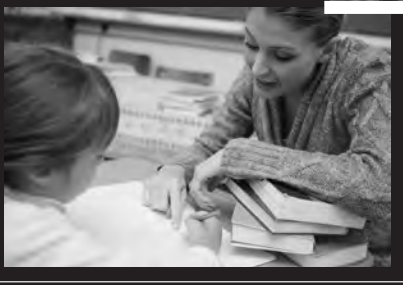
R., Krishna Kumar [9195-4] S1
Raab, Jonas [9192-56] SPMon
Raabe, Jörg [9167-32] S5
Rab, Md Afzalur [9172-19] S5, [9172-23] S6, [9172-39] SPWed
Rabinovich, William S. [9170-11] S2, 9224 Program Committee
Rachman, Ilya M. [9166-5] S1
Rachon, Martyna [9192-43] SPMon, [9192-53] SPMon
Raciukaitis, Gediminas [9180-5] S2, [9180-7] S2
Rack, Alexander 9207 S4 Session Chair, [9207-32] S9, [9212-24] S5, [9212-30] S7, [9212-40] SPMon, [9212-51] SPMon, [9212-53] SPMon, [9213-38] S9
Rack, Tatjana [9212-40] SPMon
Radaoune, Graine [9200-46] SPMon
Radchenko, Kostiantyn O. [9205-30] SPMon
Radke, Richard J. [9190-21] S5
Radley, Ian 9213 Program Committee
Radocinski, Robert G. [9218-29] S6
Radpour, Roxanne [9199-25] S6, [9199-30] S7
Radünz, Stefan [9207-21] S6
Raeymaekers, Stefan [9198-2] S1
Raghavan, Ashwin S. [9180-9] S3
Raghunathan, Ravi [9193-33] S8
Rah, Seungyu 9207 Program Committee
Rahman, Md.Shafiqur [9200-9] S1
Rahman, Syed M. [9199-20] S5
Rahman, Tasneem [9212-19] S4
Rahou, Maryam [9191-20] S6
Raimondi, Lorenzo [9207-14] S4, [9208-4] S1, [9209-13] S5, [9210-22] S5
Rainer, Thomas [9163-58] S14
Rainville, Simon [9182-21] S4
Rajagopalan, Ramesh [9223-17] S4
Rajamanickam, Vijayakumar [9164-13] S3
Rajasekar, Vidyashree [9179-12] S2
Rajbhandari, Sujan [9183-45] S10
Raju, M. Esakki Muthu [9188-18] S4, [9188-26] SPMon, [9202-23] S5, [9205-9] S3
Rakic, Aleksandar D. 9199 S4 Session Chair, [9199-21] S6
Ralaiarisoa, Rojonirina Maryline [9179-19] S4
Ramachandran, Ajan [9167-4] S1b
Ramadurgam, Sarath [9161-19] S4
Raman, Aaswath P. [9160-34] S7
Raman, Shijeesh Methattel [9185-143] SPWed
Ramanathan, Shriram [9160-35] S7, [9172-4] S1
Ramey, Joanne O. [9213-19] S5
Ramezani, Hamidreza [9162-61] S16
Ramirez, David Alejandro [9226-24] S7
Ramirez, J. Israel [9208-9] S3
Ramírez-Como, Magaly [9192-5] S1
Ramirez-San-Juan, Julio [9164-126] SPWed
Ramos, Gonzalo [9219-11] S3
Ramos, Sashary [9193-25] S6
Ramos-Garcia, Ruben [9164-106] SPWed, [9164-126] SPWed
Ramos-Ortiz, Gabriel [9200-21] S3
Ramsay, Jennifer [9193-4] S1
Ramsey, Brian D. [9208-16] S4, [9208-5] S2, [9208-6] S2
Ramu, Govind 9179 SPanel Panel Moderator, [9179-28] S6
Rana, Vikram R. [9213-25] S6
Rand, Barry P. 9165 S9 Session Chair, 9184 Program Committee, 9184 S3 Session Chair, [9184-2] S1
Rand, Robert S. [9222-18] S4
Randolph, Max [9219-9] S3
Rani, Preeti [9163-33] S8, [9200-25] S3
Ranjan, Bikas [9169-7] S2
Ranjan, Rajeev [9191-18] S5
Rao, Vepa Kameswara [9168-26] SPWed
Raqueno, Nina G. [9218-45] S10
Rarenko, Ilarii [9213-52] SPMon, [9213-53] SPMon
Raschke, Markus B. 9169 Program Committee
Raskar, Ramesh [9216-8] S2
Rathbone, David [9211-6] S2
Rathore, Nupur [9184-51] SPWed
Ratner, Daniel [9166-31] S4
Rau, Ileana 9171 Conference Chair, 9171 S6 Session Chair, [9171-12] S3, [9171-15] S4, [9171-34] SPWed, [9171-9] S2
Rauhut, Roman [9207-21] S6
Rausch, Denise [9193-2] S1
Rausch, Kameron [9223-4] S1
Rausch, Tim 9201 Program Committee, 9201 S2 Session Chair, [9201-7] S2
Ravelosona, Dafiné 9167 Program Committee, [9167-52] S10
Ravi, Kumar [9188-18] S4
Ravi, Vilupanur A. [9168-30] S3
Ravnik, Miha [9182-11] S3
Rawat, Rajdeep Singh 9206 Program Committee, [9207-26] S7
Ray, Dipanjan [9164-58] S12
Razafindrakoto, Richard [9172-2] S1
Razeghi, Manijeh Symposium Chair, 9166 Conference Chair, 9166 S3 Session Chair, 9167 Conference Chair, 9168 Conference Chair, 9199 Conference Chair, 9199 S8 Session Chair, [9199-1] S1, 9220 Program Committee
Razzari, Luca [9199-33] S8
Razzhivalov, Pavel [9200-37] SPMon
Rea, Chris J. [9201-19] S5
Reardon, Patrick J. [9206-14] S3
Rebernik, Primoz [9210-22] S5
Reboud, Julien [9164-78] S15
Rebuffi, Luca [9209-18] S5, [9209-33] SPMon
Recur, Benoit [9199-23] S6, [9212-10] S2, [9212-36] S8, [9212-38] S8, [9212-39] S8
Redouté, Jean-Pierre 9202 Program Committee
Redwing, Joan M. 9174 S6 Session Chair, [9174-16] S4
Reece, Peter J. [9164-53] S11, [9164-56] S11
Reese, Benjamin A. [9213-31] S7
Reeve, Robert M. [9167-69] S14
Refaely-Abramson, Sivan [9165-37] S10, [9165-37] S4
Réfrégier, Philippe 9216 Program Committee
Regan, Brian [9187-3] S1
Regan, Sean P. [9211-15] S4
Regan, Will [9169-33] S8
Regnier, Stephane [9164-89] S18
Rehder, Eric M. [9226-19] S6
Reichert, Matthew C. [9181-1] S1
Reichhardt, Charles M. [9164-58] S12, [9164-73] S15
Reichman, David R. [9181-9] S2
Reid, Jonathan P. [9164-107] SPWed, [9164-68] S14, [9164-70] S14
Reid, Paul B. [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Reid, William M. 9202 Program Committee, [9202-8] S2
Reihani, S. Nader S. [9164-36] S7
Reimann, Andreas [9193-28] S7
Reims, Nils [9212-8] S2
Reina, Manuel [9219-11] S3
Reinhard, Björn M. [9163-99] SPWed, [9166-33] S4
Reinhard, Manuel [9177-5] S2
Reinhardt, Colin 9224 S4 Session Chair, [9224-24] S6, [9224-25] S6, [9224-26] S6
Reinhold, Jörg [9160-77] S15
Reininger, Ruben [9207-15] S4, 9209 Program Committee, [9209-37] SPMon, [9209-8] S3
Reinke, Petra [9174-23] S6
Reiss, Gunter [9167-59] S11
Reitzig, Manuela [9166-23] S3
Remaury, Stéphanie [9196-11] S3
Rembe, Christian 9204 Program Committee
Remouche, Mustapha [9202-52] S11
Ren, Bin 9169 Program Committee
Ren, Guanghui [9224-9] S2
Ren, Hongyu [9204-7] S2
Ren, Jinli [9170-23] S4
Ren, Ruizhi [9217-80] SPMon, [9220-27] SPMon
Ren, Xifeng [9169-16] S4
Ren, Yi [9184-44] S10
Ren, Zefeng [9198-8] S3
Ren, Zhifeng 9174 Program Committee
Renaut, Claude [9164-47] S10
Reno, John L. [9162-21] S6
Rensberg, Jura [9172-4] S1
Renteria, J. [9168-29] S5
Renucci, Pierre [9167-3] S1a, [9167-9] S2a
Repenko, Tatjana [9183-3] S1
Rerabek, Martin [9217-27] S4
Reshetnyak, Viktor Yu. [9200-30] S4
Residori, Stefania [9182-15] S3
Resmini, Ronald G. [9222-18] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Ressel, Barbara [9210-22] S5
Restaino, Sergio R. [9204-16] S4, 9227 Program Committee
Rettner, Charles T. [9167-67] S14
Reutzel, Edward W. 9180 Conference Chair, 9180 S1 Session Chair, [9180-9] S3
Revesz, Peter 9207 Program Committee
Rex, Riley E. [9165-28] S7
Reyes, Roberto L. [9163-117] SPWed
Reynolds, John R. [9184-92] SPWed
Reyren, Nicolas [9167-81] S16a, [9167-90] S17a
Réza, Alfonsas [9180-5] S2
Rezende, Andre Luiz Tenorio [9179-8] S2
Rezende, Sergio M. [9167-98] S18a
Reznik, Yuriy A. 9217 Program Committee, 9217 S8 Session Chair, 9217 S9 Session Chair
Rhee, Jong Il [9166-36] SPWed, [9166-37] SPWed
Rhensius, Jan [9167-70] S14
Rho, Junsuk [9163-138] S8
Rhodes, Rhys [9184-58] SPWed
Riaño, David 9221 Program Committee
Ribeiro Teixeira, Ana C. [9225-10] S3
Ribeiro, Damaso Dos Santos [9165-69] SPWed
Ribeiro, Sidney J. 9172 Program Committee
Ribiere, Celine [9212-34] S7
Ribierre, Jean-Charles [9185-104] S1
Rice, James H. [9169-27] S6, [9172-24] S6
Rice, William D. [9167-31] S4b
Richardson, Craig [9193-3] S1
Richardson, Martin C. [9160-26] S6
Richardson, Michael D. [9213-12] S3
Richly, Maximilian U. [9164-40] S7
Richter, Claus-Peter [9212-29] S6
Richter, Lee J. [9184-41] S9
Richter, Thomas 9217 Program Committee, 9217 S6 Session Chair, 9217 S7 Session Chair, [9217-42] S6
Ricketts, Melissa N. [9191-10] S3
Riedel, Will [9194-30] S7
Riediger, Max [9161-4] S1
Rieker, Greg B. [9219-5] S2
Riesemeier, Heinrich [9213-38] S9
Rigon, Luigi [9212-4] S1
Riley, Jordan [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Rimshaw, Adam D. [9181-7] S2
Rinaldi, Christian 9167 S4a Session Chair, [9167-39] S6, [9167-8] S2a
Rinnerbauer, Veronika [9170-34] S6, [9178-10] S3
Rioux, David [9163-81] S18
Ritala, Mikko [9210-11] S3
Ritchie, Grant A. D. [9200-57] S4
Ritman, Erik Leo 9212 Program Committee, 9212 S4 Session Chair, 9212 S8 Session Chair, [9212-48] SPMon
Riva, Marco [9208-10] S3
Riva, Michele [9167-28] S4b
Rivera, Gerardo [9218-29] S6
Riveros, Raul E. [9208-5] S2
Rivers, Mark L. 9212 Program Committee
Rivière, David [9164-85] S17
Riyadh, Shaymaa [9161-25] S5
Robbins, Spencer [9160-103] SPWed
Robel, Istvan [9178-14] S4
Roberston, Michael D. [9167-35] S5
Robert de Saint Vincent, Matthieu [9164-85] S17
Roberts, Ann [9163-74] S17
Roberts, Christopher M. [9160-6] S2, [9160-8] S2
Roberts, Kenneth [9175-9] S3
Roberts, Randy S. [9216-12] S3, [9216-60] SPMon, [9216-9] S3
Roberz, Franziska [9182-27] S5
Robin, Ivan-Christophe [9190-19] S5
Robinson, Bruce H. 9171 Program Committee
Robinson, Ernest W. [9220-11] S3
Robinson, Hans D. [9163-117] SPWed
Robinson, Jeremy T. [9167-104] S18b, [9167-95] S17b
Robinson, Kathleen B. 9188 Program Committee
Robledo, Roberto [9220-14] S4
Robusto, Paul F. [9179-7] S1
Rocha Garcia, Pedro Pablo [9200-39] SPMon
Rocha, Yesenia [9164-123] S20
Roche Seruendo, Eva M. [9204-2] S1
Roche, Jacqueline M. [9208-16] S4, [9208-5] S2
Rochet, Jonathan [9204-14] S3
Rochet, Xavier [9213-38] S9
Rochette, Luc 9222 Program Committee
Rochford, Caitlin [9174-35] S8
Rockstuhl, Carsten [9160-10] S2
Rockwell, Christina [9196-3] S1
Rode, Andrei V. [9164-12] S3
Rödel, Andreas [9195-15] S4
Röder, Beate [9179-19] S4
Röder, Olaf [9166-23] S3
Roder, Paden B. [9164-55] S11
Röder, Robert [9161-4] S1
Rodesney, Christopher [9164-31] S6
Rodgers, Marianne P. 9179 Program Committee, [9179-32] S6
Rodin, Aleksandr S. [9160-24] S5, [9169-33] S8

SPIE provided over $3.2 million in support of education and outreach programs in 2013.



GIVING.

SPIE supports tomorrow's leaders through a wide array of scholarships, grants, educational materials, and networking opportunities.

SPIE Scholarships
Education Outreach Grants
Student Chapters
Student Activities
Best Student Paper Prizes
Free Posters

Free Educational CDs, DVDs, and Videos
Women in Optics
Education and Training in Optics and Photonics Conference (ETOP)
Hands on Optics (HOO): K-12 outreach
Science Fairs
Optics Education Directory

Free SPIE Journal Access in developing nations
Active Learning in Optics and Photonics (ALOP): Teacher Training
International Centre for Theoretical Physics (ICTP) Winter College
Visiting Lecturer Program

SPIE is the international society for optics & photonics.

www.spie.org/giving **SPIE.**

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Rodin, Vladislav G. [9216-51] SPMon, [9216-52] SPMon
Rodionova, Valeria [9172-21] S5
Rodmacq, Bernard [9167-49] S9
Rodrigues Ribeiro, Ana Rita S. [9164-97] SPWed
Rodrigues, Rafael [9180-18] S4
Rodrigues, Vanessa [9193-45] SPMon
Rodriguez, Alejandro W. [9181-26] S6
Rodríguez, Hernán [9185-215] S4
Rodríguez, Miguel A. [9185-215] S4
Rodríguez-Fortuño, Francisco J. [9163-93] SPWed
Rodriguez-Rivas, Antonio [9219-17] SPMon
Rodriguez-Rodriguez, Joaquin H. [9220-22] S6
Rodriguez-Suarez, Roberto L. [9167-98] S18a
Roehrig, Hans N. [9186-17] S5, 9214 Conference Chair, 9214 S2 Session Chair, [9214-14] S4, [9214-17] S4, [9214-18] S4
Rogalski, Jan [9169-20] S4
Rogers, David J. [9161-12] S3
Rogers, John A. [9185-401] SPIen
Roggemann, Michael C. 9224 Program Committee, 9227 Program Committee
Rohart, Stanislas [9167-33] S5
Rohrbach, Alexander [9164-113] SPWed, [9164-114] SPWed, [9164-30] S6
Rohringer, Nina 9210 Program Committee
Rohwer, Erich G. [9221-5] S1
Rojas, Alejandro [9216-19] S5
Rojas-Laguna, Roberto [9200-45] SPMon, [9200-47] SPMon
Rojas-Sánchez, Juan-Carlos [9167-81] S16a, [9167-90] S17a
Rolandi, Marco [9185-222] S6
Roling, Sebastian [9210-10] S3
Rolland, Damien [9165-10] S3
Rolland, Jannick P. [9186-9] S3, 9203 Program Committee
Rolles, Daniel [9198-23] S6
Rollny, Lisa R. [9165-42] S12
Romann, Julien [9187-6] S2
Romero, Beatriz [9196-23] S6
Romero, Guillermo [9225-11] S3
Romero, Paige [9168-22] S5
Romero, Vincent T. [9195-2] S1
Romero-Talamas, Carlos [9213-40] S9
Rommeluère, Sylvain [9220-6] S2
Romming, Niklas [9167-34] S5
Rong, Lu [9199-36] SPMon
Ronning, Carsten [9161-4] S1, [9172-4] S1
Rooks, Michael Joseph [9170-31] S6
Roper, Donald Keith [9161-43] SPWed, [9163-111] SPWed, [9163-113] SPWed, [9163-136] SPWed, [9166-19] S3, [9171-23] S6
Roper, Mark D. 9206 Program Committee
Roro, Kittessa T. [9175-22] S6
Rortais, Fabien [9167-90] S17a
Rösch, Markus [9199-4] S1
Rose, Alec [9160-74] S15
Rose, Kyle D. [9176-5] S1
Roseguo, Daniel [9168-27] SPWed
Rosen, Joseph 9216 Program Committee
Rosenbury, Christopher [9160-19] S4
Rosendahl, Philipp [9164-76] S15
Rosengarten, Gary [9191-20] S6
Rosenkrantz, Etai [9224-37] S9, [9224-38] S9
Rosete-Aguilar, Martha 9195 Program Committee
Rosin, Paul L. [9212-35] S7
Roslyak, Oleksiy [9169-19] S4
Rosowski, John [9204-3] S1, [9204-4] S1
Ross, Stephen K. [9214-10] S3
Rossler, Ulrich K. [9167-35] S5
Rossoud, David [9163-110] SPWed
Roth, Julian [9164-113] SPWed
Roth, Thomas [9207-1] S1
Rothschild, Mordechai [9178-17] S5
Rotkin, Slava V. [9168-4] S1
Rott, Karsten [9167-59] S11
Roulet, Patrice [9192-15] S3
Rousseau, Emmanuel [9162-3] S1, [9172-2] S1
Roussel, Jean-François [9196-11] S3
Roux, Filippus S. [9194-7] S2, [9225-13] S4
Roveda, Janet M. [9214-14] S4
Rowe, Alistair [9167-11] S2a
Rowe, Emmanuel [9213-19] S5
Roxworthy, Brian J. [9164-57] S11
Roy, Basudev [9164-39] S7, [9164-92] S20
Roy, Basudev [9164-19] S4
Roy, Kuntal [9167-30] S4b
Roy, Pascale 9199 Program Committee
Roy, Soumyajit [9164-92] S20
Roy, Utpal 9213 S6 Session Chair, [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, [9214-19] SPMon, [9214-6] S2
Røyset, Arne [9187-6] S2
Roytman, Leonid [9221-15] S2
Rozanski, Lynn [9184-58] SPWed
Rozgoni, Ivan I. [9161-44] SPWed
Ruan, Chong-Yu [9198-25] S6
Ruan, Qiandong [9163-42] S11
Rubinsztein-Dunlop, Halina H. [9164-123] S20, [9164-22] S5, [9164-38] S7, [9164-87] S18, [9164-99] SPWed
Rudack, Andrew C. [9179-32] S6
Rudd, William J. [9218-51] S11
Rudenko, Artem [9198-23] S6
Ruebenach, Olaf [9195-3] S1
Rueda-Soriano, Esteban [9203-50] SPMon
Ruffin, Paul B. 9200 Program Committee, 9200 S4 Session Chair, [9200-29] S4
Ruggieri, Fabrizio [9183-41] S9
Ruh, Dominic [9164-114] SPWed
Ruihong, Li [9209-30] S8, [9217-26] S3
Ruiz, Isaac [9168-33] S4
Ruiz-Mendoza, Juan C. [9188-24] SPMon
Rukenstien, Pazit [9165-44] S12
Rukosuev, Alexey [9194-34] S8
Rumbaugh, Luke K. [9193-12] S3
Rumbles, Garry [9182-23] S5, [9182-38] S8
Rumler, Peter [9196-23] S6
Rummel, Steve P. [9193-34] S8
Rumyantsev, Sergey [9220-20] S5
Rundberg, Robert S. [9211-7] S2, [9211-8] S2
Runge, Erich [9165-47] S13
Ruppert, Lyle [9218-52] S11, [9223-10] S3
Rusch, Peter [9179-31] S6
Ruseckas, Arvydas [9185-204] S1
Rushford, Michael C. [9216-60] SPMon, [9216-9] S3
Russell, Don [9193-3] S1
Russell, Philip St. John [9164-71] S14
Russo, Juan M. [9175-16] S5, [9175-17] S5, [9184-77] SPWed
Russo, Nelida A. [9202-64] SPMon
Rust, Fiona [9208-15] S4
Rutloh, Michael [9181-16] S4
Ruzin, Arie 9213 Program Committee, 9213 S3 Session Chair, [9213-6] S2
Ruzmetov, Dmitry [9174-40] S9
Ryabushkin, Oleg A. [9200-15] S2
Ryan, Christopher J. [9201-12] S3, [9201-13] S3
Rybabov, Filipp N. [9167-35] S5
Rybin, Evgenii [9205-25] SPMon
Rybka, Alexandr [9213-48] SPMon, [9213-52] SPMon
Ryerson, Joseph [9165-3] S1, [9178-2] S1
Rykov, Mikhail A. [9164-127] SPWed
Ryota, Kudo [9206-1] S1
Rysz, Jakub [9184-73] SPWed, [9184-74] SPWed
Ryu, Eun-Seok [9217-62] S10
Ryu, Jung-Wan [9193-32] S8, [9203-8] S2
Ryu, Kwang-Su [9167-67] S14
Ryzhii, Maxim [9199-14] S4
Ryzhii, Victor [9199-14] S4
Ryzhikov, Ilya A. [9161-22] S5
Ryzhikov, Volodymyr [9213-47] SPMon

S

Saarela, Juha M. [9177-3] S1, [9205-22] S7
Saastamoinen, Toni [9163-105] SPWed, [9173-18] SPWed, [9194-42] SPMon
Sabathil, Matthias [9190-15] S4
Sabau-Graziati, Maria Dolores [9219-11] S3
Sachs-Quintana, Isaac T. [9184-20] S5
Sacks, Richard A. [9194-30] S7
Sadate, Sandra [9205-31] SPMon, [9219-19] SPMon, [9219-20] SPMon
Sadecka, Katarzyna [9160-53] S11
Sadofev, Sergey [9163-70] S16
Sadowski, Bryan [9161-13] S3
Saeedi, Ehsan 9202 Program Committee, [9202-11] S3
Safrani, Avner [9182-26] S5
Safwat, Amr M.E. [9191-22] S6
Sagara, Yuta [9183-68] SPWed
Saghri, John A. 9217 Program Committee
Saglimbeni, Filippo [9164-63] S12
Sagnes, Isabelle [9167-3] S1a
Saha, Dipta [9167-23] S4a, [9167-24] S4a, [9167-42] S7
Saha, Sajib Kumar [9209-29] S8
Saha, Timo T. [9208-5] S2
Sahakian, Alan V. [9167-55] S10
Saini, Anuj [9201-12] S3
Saini, Than Singh [9170-42] S8, [9200-16] SPMon, [9200-17] S2, [9200-27] S4
Saito, Aya [9202-51] SPMon
Saito, Hiroko [9179-3] S1
Saito, Masahiko [9184-6] S2
Saito, Takahiro [9206-10] S2
Saito, Takahiro [9184-24] S6
Saito, Yuika [9169-15] S4, [9169-26] S6, [9169-7] S2
Sakai, Wataru [9181-11] S3
Sakdinawat, Anne [9170-31] S6
Sakita, Shinya [9174-1] S1
Sakoda, Kazuaki 9162 S16 Session Chair, [9162-62] S17, [9162-8] S2, [9167-15] S3a, [9181-30] S7
Sakowicz, Maciej [9199-2] S1
Sakuma, Yoshiki [9162-8] S2
Sakurai, Keiichiro [9179-3] S1
Sala, Anca L. [9188-2] S1
Salamon, Michael [9212-8] S2
Salandrino, Alessandro [9163-138] S8
Salazar-Romero, Yadira [9164-82] S16
Salcin, Esen [9215-10] S3
Salditt, Tim [9212-26] S6
Salgado, R. [9168-29] S5
Saliba, Michael [9177-10] S3, [9184-22] S6, [9184-56] SPWed
Salim, Evan [9164-6] S1
Salleo, Alberto 9178 Program Committee, [9180-13] S3
Salmaso, Bianca [9208-10] S3
Salmon, Joseph Thaddeus [9194-30] S7
Salomon, Damien [9190-19] S5
Salomonson, Vincent V. [9218-23] S5
Salwen, Cynthia [9215-1] S1
Samaraweera, Rasanga L. [9190-29] S7, [9190-31] S7
Samarkin, Vadim [9194-34] S8
Samarut, Jacques [9171-24] S6
Sammuli, Brian S. [9211-10] S3
Samoc, Anna 9171 Program Committee
Samoc, Marek J. [9163-32] S8, 9171 Program Committee
Samoylova, Liubov [9207-1] S1, 9209 Program Committee, [9209-14] S5, [9209-3] S1, [9209-32] SPMon, [9210-10] S3
Sampaio Lima, Luiz 9167 S6 Session Chair, [9167-36] S5
Samuel, Ifor D. W. [9171-4] S1, 9183 Program Committee, [9183-40] S9, [9183-45] S10, 9184 Conference CoChair, 9184 S6 Session Chair, 9185 Program Committee, [9185-204] S1
Samuelson, Lars [9170-59] SPWed, [9220-18] S5
Samusev, Anton K. [9160-44] S9, [9163-102] SPWed
Samusev, Kirill B. [9162-13] S4
Sanchez Del Rio, Manuel 9209 Conference Chair, 9209 S5 Session Chair, [9209-21] S6, [9209-33] SPMon, [9209-36] SPMon, [9209-37] SPMon, [9209-4] S1, [9209-8] S3
Sánchez, Antonio [9219-11] S3
Sánchez, Juan M. [9185-215] S4
Sanchez, Saul [9166-35] SPWed
Sánchez-Aniorte, María Isabel [9180-8] S2
Sánchez-Gil, José A. [9163-86] SPWed
Sánchez-Guerrero, Guillermo E. [9188-24] SPMon
Sánchez-Mondragón, Jose Javier [9192-50] SPMon
Sancho-Parramon, Jordi [9164-29] S6
Sander, Michelle Y. [9198-7] S2
Sanders, Barry C. 9225 Program Committee
Sanders, Gary D. [9167-42] S7
Sanders, Jack T. [9196-1] S1
Sandhu, Sunil [9160-34] S7
Sandoghdar, Vahid 9163 Program Committee, [9165-38] S11, 9169 Program Committee, [9169-21] S5
Sandoval-Romero, G. Eduardo [9220-21] S6
Sanghera, Jas S. [9161-13] S3, [9177-6] S2, [9192-18] S4, [9202-15] S4, [9202-47] S10
Sangster, T. Craig 9211 Program Committee, [9211-15] S4
Sanna, M. Cristina [9173-9] S3
Sano, Junpei [9219-3] S1
Sano, Yasuhisa [9206-11] S3, [9207-27] S8, [9208-1] S1, [9210-8] S3
Santagiustina, Marco [9202-61] S12
Santiago-Alvarado, Agustín [9192-5] S1
Santori, Charles [9216-21] S6
Santos, Michael B. [9167-12] S2b
Santos, Paulo V. [9167-73] S15a
Santos, Webster L. [9163-117] SPWed
Santosh, Lohumi [9220-30] SPMon
Santucci, Sandro [9183-41] S9
Saproo, Ajay [9179-20] S4, [9179-7] S1
Sarangan, Andrew M. [9163-49] S12, [9170-20] S4, [9170-37] S7
Sarayeddine, Khaled 9202 Program Committee, [9202-12] S3
Sargent, Edward H. [9165-42] S12, [9178-13] S4
Sargent, Murray [9186-12] S4
Sariciftci, Niyazi Serdar 9171 Program Committee, [9171-1] S1
Sarid, Dror [9186-25] S7
Sarikaya, Mehmet [9171-10] S3
Sarkar, Suproteem K. [9166-6] S1
Sarkisov, Sergey S. [9200-10] S2
Sarpkaya, Ibrahim [9168-19] S4
Sarrazin, Michaël [9187-2] S1
Sarychev, Andrey Karlovich [9160-36] S7, [9161-22] S5, [9163-123] SPWed
Sasaki, Takeo [9181-13] S3
Sasaki, Wakao [9216-23] S6
Sasián, José [9186-11] S3, 9188 Program Committee, 9191 Track Chair, 9192 Track Chair, 9193 Program Committee, 9193 Track Chair, 9194 Track Chair, 9195 Conference Chair, 9195 S4 Session Chair, 9195 Track Chair, 9196 Track Chair, 9197 Track Chair
Sasov, Alexander [9212-3] S1, [9212-7] S2
Sassa, Takafumi [9181-11] S3
Sato, Eiichi 9214 Program Committee, [9214-1] S1, [9214-4] S1
Sato, Takashiro [9210-8] S3
Sato, Tomoya [9183-23] S5
Satou, Akira [9199-14] S4
Satozono, Shota [9181-41] SPWed
Satsangi, Vibha R. [9176-21] S6
Saucedo Anaya, Tonatiuh [9203-23] S5, [9203-26] S6
Sauer, Markus 9169 Program Committee
Sauerwein, Christoph [9212-20] S4
Saulnier, Debra J. [9182-17] S4
Saunders, Aaron E. [9175-9] S3
Saunders, Alexander [9215-5] S2
Saunier, Sébastien [9218-47] S10
Sauvan, Christophe [9162-2] S1
Savagatrup, Suchol [9185-129] S7
Savage, Richard N. [9184-79] SPWed
Savelyev, Evgeny [9198-23] S6
Savero, Williams [9167-81] S16a
Savich, Gregory R. [9226-25] S8
Savinov, Vassili [9163-22] S6
Savoini, Matteo [9167-84] S16b
Savranskaya, Yelena [9219-6] S2
Sawabe, Atsuhito 9174 Program Committee

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Sawaya, Nicolas [9161-27] S6
Sawhney, Kawal 9206 Program Committee, 9206 S4 Session Chair, [9206-8] S2, 9208 Program Committee, 9208 S4 Session Chair, [9208-15] S4, 9209 Conference CoChair, 9209 S1 Session Chair, 9209 S2 Session Chair, [9209-2] S1
Sawruk, Nicholas W. [9218-51] S11
Saxena, Indu Fiesler 9202 Program Committee, [9202-58] S12, [9202-59] S12
Saxena, Tanuj [9220-20] S5
Saxer, Till [9212-2] S1
Scaduto, Lucimara C. N. [9195-18] SPMon
Scalari, Giacomo 9199 S3 Session Chair, [9199-4] S1
Scaramuzza, Pat L. [9218-41] S9, [9218-43] S9
Scardi, Paolo [9209-18] S5
Scarino, Benjamin R. [9218-15] S3
Scarmozzino, Robert [9190-8] S2
Scarola, Vito [9167-72] S15a
Scarpulla, Michael A. 9180 Program Committee, [9180-13] S3
Schaak, Diane [9166-27] S4
Schaal, Frederik [9181-16] S4
Schabacker, Charles R. [9193-3] S1
Schade, Sebastian [9173-2] S1
Schaefer, Christian [9162-75] S11
Schaeffer, Daniel A. [9175-19] S6
Schaepman-Strub, Michael E. 9222 Program Committee
Schafer, Rachel [9214-11] S3
Schafer, Sebastian [9167-46] S8
Schäferling, Martin [9163-4] S2
Schäfers, Franz [9206-19] S5, [9206-7] S2
Schaffert, Stefan [9167-32] S5
Schaknowski, Neil [9215-1] S1
Schalck, Robert SC1114
Schall, Harold 9197 Program Committee
Schamel, Debora [9166-14] S2
Schäpers, Thomas [9167-75] S15a
Scharf, Toralf [9192-35] S7, [9203-54] SPMon
Scharfenberger, Christian [9193-24] S6
Schattenburg, Mark L. [9208-5] S2
Schatz, George C. 9163 Program Committee
Schaub, Michael 9192 S7 Session Chair
Scheel, Mario [9212-24] S5
Scheidl, Thomas [9225-17] S5
Schelkens, Peter 9217 Program Committee, 9217 S4 Session Chair
Schenning, Albert P. H. J. [9182-27] S5
Scherer, Norbert F. [9162-74] SPWed, [9164-80] S16
Scherman, Oren A. [9163-10] S3
Scheu, Christina [9207-21] S6
Scheurer, Fabrice [9167-39] S6
Schienle, Alexander [9183-37] S8
Schiessl, Stefan P. [9168-5] S1
Schilling, Jörg 9162 Program Committee, [9162-24] S7
Schittny, Robert 9160 S15 Session Chair, [9160-85] S17
Schleijpen, Ric H. M. A. [9224-27] S6
Schlesinger, Raphael [9165-14] S4
Schlitz, Ruth A. [9181-17] S4
Schlothauer, Jan Caspar [9179-19] S4
Schmeitzky, Olivier [9196-23] S6
Schmid, Martina [9178-19] S5
Schmid, Maximilian [9167-10] S2a
Schmidt, Georg 9167 Program Committee, [9167-78] S15b
Schmidt, Greg R. [9193-26] S7
Schmidt, Holger [9164-75] S15
Schmidt, Jan-Simon [9206-19] S5
Schmidt, Jiri [9206-13] S3
Schmidt, Jürgen [9163-61] S15
Schmidt, Oliver A. [9164-71] S14
Schmidt, Sebastian W. [9173-2] S1
Schmidt, Shon A. [9166-20] S3, [9166-31] S4
Schmidt, Søren [9209-10] S4
Schmit, Joanna 9203 Conference Chair, 9203 S7 Session Chair
Schmitt, Henrique R. [9204-16] S4
Schmitt, Regina Katharina [9164-64] S13
Schmitzer, Heidrun [9181-24] S6, [9181-31] S7
Schmuttenmaer, Charles A. [9165-21] S5
Schneider, Marilyn [9209-21] S6
Schneider, Michael [9167-32] S5
Schneidmiller, Evgeny [9210-10] S3
Schneller, Eric [9179-11] S2, [9179-23] S4, [9179-32] S6, [9179-4] S1, [9180-1] S1, [9180-18] S4
Schödel, René [9173-10] S3
Schoenfeld, Winston V. [9179-32] S6
Scholes, Gregory D. [9165-1] S1
Scholle, Karsten [9200-28] S4
Scholz, Frank [9210-22] S5
Scholz, Reinhard [9183-71] SPWed
Schön, Tobias [9212-8] S2
Schott, John R. [9218-45] S10
Schrank, Franz [9190-10] S2, [9190-28] S6
Schrauben, Joel N. [9165-3] S1, [9178-2] S1
Schreib, Benjamin [9213-40] S9
Schreiber, Frank [9165-2] S1
Schreiber, Horst 9203 Program Committee
Schreuders, Herman [9202-2] S1
Schreyer, Andreas [9212-23] S5, [9212-44] SPMon, [9212-5] S1
Schröder, Werner W. [9202-9] S2
Schroeder, Bob C. [9184-41] S9
Schryvers, Dominique [9172-11] S3
Schubert, Jürgen [9167-75] S15a
Schueler, Carl F. 9218 Program Committee, 9218 S6 Session Chair, 9223 Program Committee, 9223 S4 Session Chair
Schuettfort, Torben [9185-114] S4
Schuller, Ivan K. [9181-17] S4
Schuller, Jon A. 9181 Conference CoChair, 9181 S4 Session Chair, [9181-17] S4
Schulte-Schrepping, Horst 9207 Program Committee
Schulz, Georg [9212-2] S1, [9212-25] S6, [9212-27] S6, [9212-31] S7, [9212-33] S7, [9212-42] SPMon
Schulz, Mathias [9192-12] S3
Schulz, Tomek [9167-32] S5, [9167-69] S14
Schumacher, Hans-Werner [9167-59] S11
Schuster, Daniel G. [9164-86] S18
Schuster, Glenn [9193-8] S2
Schütz, Gisela [9167-69] S14, [9167-70] S14
Schwab, Tobias [9183-71] SPWed
Schwalb, Michael [9216-1] S1
Schwartz, Christian [9172-4] S1
Schwartz, Daniel A. 9208 Program Committee, 9208 S4 Session Chair, [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Schwartz, David E. [9185-132] S8
Schwartz, Osip [9165-44] S12
Schwartzberg, Adam M. 9161 Conference Chair, 9161 S3 Session Chair, [9161-16] S4
Schwarz, Mark A. [9218-35] S8
Schweiger, Paul F. [9195-15] S4
Schweitzer, Susanne [9190-28] S6, [9193-11] S3
Schwellenbach, David [9213-11] S3
Schwiegerling, Jim [9186-29] S8, [9193-27] S7
Sciaini, Germán [9198-26] S6
Sciortino, Luisa [9208-10] S3
Scola, Salvatore J. [9193-14] S3
Scotognella, Francesco [9170-15] S3
Scott, Kurt P. [9179-18] S4
Scrace, Thomas A. [9167-21] S3b
Scully, Marlan O. [9225-37] S7
Seabron, Eric [9168-4] S1
Seaman, Shane [9193-14] S3
Sears, Jasmine [9186-14] S4
Seassal, Christian [9162-41] S12
Seddon, Angela B. [9200-28] S4
See, Erich M. [9163-117] SPWed
Seeland, Marco [9184-84] SPWed
Seeley, Zachary M. [9213-1] S1
Seferos, Dwight S. [9165-1] S1, [9184-83] SPWed
Segal, Julie [9213-31] S7
Segovia Olvera, Paulina [9163-116] SPWed
Sei, Alain [9218-76] S1
Seidel, Jan [9167-26] S4b
Seidlitz, Daniel [9190-29] S7, [9190-31] S7
Seiffer, Dirk Peter [9224-28] S7
Sekitani, Tsuyoshi [9185-119] S5, [9185-224] S6
Sekkat, Zouheir 9181 S5 Session Chair, [9181-14] S4
Selezneva, Ekaterina A. [9221-14] S2
Selimis, Alexandros 9160 S13 Session Chair, [9160-67] S14
Sellers, Ian R. [9167-21] S3b
Sellers, Steve E. [9175-7] S2
Selopal, Gurpreet Singh [9161-17] S4
Selskis, Algirdas [9180-5] S2
Seltmann, Joern [9210-22] S5
Selvas-Aguilar, Romeo [9200-11] S2, [9220-14] S4
Selvas-Aguillar, Romeo J. [9188-24] SPMon
Semenov, Yuriy G. [9198-19] S5
Semenova, Elizaveta S. [9162-67] S18
Senba, Yasunori [9206-4] S1
Senellart, Pascale [9163-26] S7
Seneor, Pierre [9167-39] S6
Senevirathna, Matara Kankanamge Indika [9190-31] S7, [9190-41] SPWed
Senf, Fred [9206-19] S5, [9206-7] S2
Sengor, Taner [9225-23] S6
Sengupta, Dipankar 9202 Program Committee, [9202-23] S5, [9202-61] S12, [9205-9] S3
Sengupta, Shiladitya [9166-6] S1
Senkevich, Jay J. [9178-10] S3
Senn, Sean [9166-5] S1
Sensale-Rodriguez, Berardi [9160-81] S16
Sentanin, F. [9171-9] S2
Senthilkumaran, P. [9173-13] S4
Seo, Jiwon [9181-35] SPWed
Seo, Seungwon [9163-100] SPWed, [9168-16] S3
Seo, Yoon Ho [9166-56] SPWed
Sergienko, Alexander V. 9225 Program Committee
Seridonio, Antonio C. [9167-94] S17b
Serpengüzel, Ali [9188-27] SPMon
Serrano-García, David Ignacio [9204-13] S3
Serrano-Guisan, Santiago [9167-59] S11
Servant, Laurent [9184-68] SPWed
Servin, Manuel 9203 Program Committee
Sery, Mojmír [9164-100] SPWed, [9164-116] SPWed
Sešek, Aleksander [9199-19] S5
Sesti, Erika L. [9167-23] S4a, [9167-24] S4a
Setarehdan, S. Kamaledin [9216-37] S9
Šetkus, Arunas [9172-20] S5
Sezer, Osman G. 9223 Program Committee
Sfeir, Matthew Y. [9165-20] S5, [9181-9] S2
Shadrivov, Ilya V. [9160-72] S15
Shafarman, William N. 9177 Program Committee
Shafiee, Mohammad J. [9217-35] S5
Shah, Kanai S. [9213-23] S5, [9213-39] S9, [9213-5] S1, [9214-8] S2, [9214-9] S3, [9215-13] S4
Shah, Kunal J. [9213-50] SPMon
Shah, Piyush J. [9170-20] S4
Shah, Raman [9162-74] SPWed
Shahbazyan, Tigran V. 9163 Program Committee, 9163 S11 Session Chair, [9163-14] S4, [9163-16] S5
Shahedipour-Sandvik, Fatemah Shadi [9170-28] S5
Shaheen, Sean E. 9178 Program Committee, 9178 S2 Session Chair, 9184 Program Committee, [9184-77] SPWed, [9185-223] S6
Shahriar, Selim M. [9216-29] S8, [9225-35]S7
Shaked, Natan T. [9203-3] S1, [9203-52] SPMon, [9203-6] S1
Shakin, Oleg V. [9200-14] SPMon, [9200-35] SPMon
Shaklan, Stuart B. 9208 Conference CoChair
Shalaev, Vladimir M. 9160 S2 Session Chair, [9160-103] SPWed, [9160-11] S3, [9160-52] S11, [9162-18] S6, 9163 Program Committee, [9163-1] S1, [9163-11] S4
Shalaginov, Mikhail Y. [9160-11] S3
Shalin, Alexander S. [9160-27] S6, [9193-49] SPMon
Shalygin, Alexander N. [9163-123] SPWed
Shan, Jie [9201-12] S3
Shaner, Eric A. [9162-21] S6
Shankar, Mohan [9218-1] S1, [9218-18] S4, [9218-25] S6
Shannon, Robert R. 9197 Program Committee
Shanoylo, Semen M. [9201-11] S3
Shao, Jianda [9196-21] S5
Shao, Junbo [9221-27] SPMon
Shao, Renfan [9182-23] S5, [9182-38] S8, [9182-40] S7
Shao, Xi [9218-17] S4, [9218-68] SPMon, [9218-74] SPMon
Shao, Xiumei [9220-8] S3
Shapiro, David A. 9209 Program Committee
Shapiro, Jeffrey H. [9162-10] S3, [9224-6] S2
Shapiro, Ofer [9181-26] S6
Sharif, Farnaz [9203-5] S1
Sharifzadeh Baei, Maedeh [9166-55] SPWed
Sharifzadeh, Sahar [9165-37] S10, [9165-37] S4
Sharma, Anup [9205-31] SPMon, [9219-19] SPMon, [9219-20] SPMon
Sharma, Asha [9185-221] S5
Sharma, Dipika [9176-21] S6
Sharma, K. Mayank S. [9163-124] SPWed
Sharma, Katelynn A. [9205-33] S5
Sharma, Renu [9169-34] S8
Sharma, Vikash [9168-26] SPWed
Sharp, Graham J. [9162-37] S11
Shastri, Sarvjit D. [9207-3] S1, [9207-4] SPMon
Shatz, Narkis E. 9191 Program Committee, 9191 S4 Session Chair
Shaulskiy, Dmitry V. [9216-30] S8, [9216-53] SPMon
Shaver, Christopher B. [9213-11] S3
Shaw, Joseph A. 9187 Conference Chair, 9187 S3 Session Chair, 9187 S4 Session Chair, [9187-15] S6, [9187-16] S3, SC567, SC915
Shaw, L. Brandon [9161-13] S3, [9202-15] S4
Shaw, Michael J. [9194-30] S7
Shaw, Paul E. [9184-18] S5, [9184-72] SPWed, [9185-202] S1, [9185-203] S1
Shawkey, Matthew D. [9187-10] S4
Shcherbakov, Maxim [9160-41] S11, [9160-77] S15
Shealy, David L. 9193 Program Committee, 9194 Program Committee, [9194-24] S6, [9194-26] S6
Sheffield, Richard [9207-3] S1
Shehata, Afaf I. [9166-60] SPWed
Sheldakova, Julia [9194-34] S8
Sheldon, Matthew T. [9162-47] S13
Shen, Junfeng [9164-54] S11
Shen, Nian-Hai [9160-23] S5, [9160-80] S16
Shen, Po-Shen [9184-25] S6
Shen, Shaohua [9176-8] S2
Shen, Shun-Qing [9167-86] S16b
Shen, Weidong [9172-25] S6
Shen, Xuemin [9223-21] SPMon
Shen, Yichen [9170-34] S6, [9178-10] S3
Shen, Yi-Kai [9161-14] S3
Shen, Yongqiang [9182-23] S5, [9182-40] S7
Shenashen, Mohamed [9170-5] S1
Sheng, Lizhi [9207-42] SPMon
Sheng, Yunlong [9164-26] S5
Shenoi, Rajeev V. [9162-51] S14
Shensky, William M. [9181-3] S1
Shepard, R. Hamilton [9216-8] S2
Shepherd, Sarah D. [9174-19] S5, [9190-43] SPWed
Sheppard, Adrian P. [9212-10] S2, [9212-36] S8, [9212-38] S8, [9212-39] S8, [9212-9] S2
Sheridan, John T. 9216 Program Committee, [9216-17] S4, [9216-33] S9
Sherrott, Michelle [9160-57] S12, [9162-46] S13
Shestakov, Alexsandr V. [9192-37] SPMon

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Sheu, Jinn-Kong [9190-34] SPWed
Shevchenko, Andriy [9160-25] S6
Shi, Bing 9207 S5 Session Chair, [9207-18] S5, [9207-8] S2
Shi, Boxin [9216-8] S2
Shi, Feng [9192-55] SPMon
Shi, Jing 9167 Program Committee
Shi, Junwei [9216-2] S1
Shi, Kebin 9198 Program Committee, 9198 S1 Session Chair, [9198-6] S2
Shi, Luping 9201 Program Committee, [9201-27] S7
Shi, Runhe [9221-24] S3, [9221-34] SPMon, [9221-35] SPMon, [9221-36] SPMon, [9221-37] SPMon, [9221-38] SPMon, [9221-46] SPMon
Shi, Shou-Lei [9183-35] S8
Shi, Wei [9164-54] S11
Shi, Xianbo [9207-15] S4, [9208-12] S3, [9209-37] SPMon, [9209-8] S3
Shi, Xiaolei [9183-56] S12
Shi, Yulei [9199-10] S3
Shibamura, Eido [9213-42] S10
Shibata, Maki [9183-12] S3
Shibata, Shuhei [9203-38] S9
Shibuya, Kyuki [9225-4] S1
Shieh, Han-Ping D. [9182-37] S7
Shih, Hui-Ting [9183-35] S8
Shih, Kun-Long [9214-2] S1
Shih, Min-Hsiung [9168-28] SPWed
Shih, Wen-Tse [9200-8] S1
Shih, Yanhua 9225 Conference Chair [9225-34] SPMon, [9225-36] S7, [9225-37] S7
Shim, Bong Sup [9171-8] S2, [9172-12] S3
Shim, Hyun-Sub [9184-88] SPWed
Shim, Jaewon [9184-59] SPWed, [9184-61] SPWed
Shima, Atsushi [9204-17] SPMon
Shimada, Ken-ichi 9201 Program Committee, 9201 S4 Session Chair
Shimamoto, Naonobu [9171-7] S2
Shin, Dongmyung [9183-72] SPWed
Shin, Hwangyu [9183-8] S2
Shin, Hyeon-Jin [9185-130] S7
Shin, Inchul [9171-18] S5, [9171-19] S5
Shin, Jang-Kyoo [9160-98] SPWed
Shin, Jin-Wook [9183-51] S11
Shin, Jung Hun [9164-119] SPWed
Shin, Sang Hun [9223-20] SPMon
Shinar, Joseph 9183 Program Committee, [9183-14] S4, 9185 S5 Session Chair, [9185-213] S3, [9185-230] SPWed
Shinar, Ruth 9185 Conference Chair, 9185 S6 Session Chair, [9185-213] S3, [9185-230] SPWed
Shipton, Matthew [9198-36] S9
Shiradkar, Narendra S. [9179-11] S2, [9179-23] S4, [9179-32] S6, [9179-4] S1
Shiraishi, Masashi 9167 S16a Session Chair, [9167-88] S17a
Shirey, Loretta [9160-42] S9
Shirley, Eric L. [9218-34] S8
Shiroma, Shinsaku [9206-20] S5
Shirwadkar, Urmila [9213-5] S1
Shishkin, Ivan [9162-13] S4
Shitov, Denis D. [9217-21] S3
Shiue, Ren-Jye [9162-34] S10
Shiyanovskii, Sergij V. [9182-24] S5
Shlyakhovyj, Vyacheslav [9213-53] SPMon
Shnitser, Moriel [9217-36] S5
SHoemaker, Richard L. [9186-2] S1
Shogenji, Rui [9217-65] S10
Sholl, Michael J. 9197 Program Committee
Sholom, Sergii [9213-45] S10
Shon, Yuran [9171-8] S2
Shoorideh, Kaveh [9174-38] S9
Shorokhov, Alexander [9160-77] S15
Shorte, Spencer L. [9169-4] S1
Shostka, Nataliya V. [9194-45] SPMon
Shoup, Milton J. [9211-15] S4
Shreve, Andrew P. [9165-20] S5
Shrivastav, Rohit [9176-21] S6
Shtapenko, Oksana V. [9161-44] SPWed
Shu, Deming [9206-17] S4
Shu, Jiong 9221 Program Committee
Shukoivanov, Igor A. [9200-21] S3
Shulika, Oleksiy V. [9200-21] S3
Shultz, Jason A. [9192-19] S4, [9194-19] S5, [9194-21] S5
Shum, Frank [9192-29] S6
Shur, Michael [9190-23] S5, [9190-3] S1, [9199-14] S4, [9220-20] S5
Shustov, Alexander E. [9213-44] S10
Shuzi Hayase, Shuzi [9184-24] S6, [9184-65] SPWed
Shvedov, Vladlen G. [9164-11] S3
Shvets, Gennady B. 9160 Program Committee, [9160-61] S13, [9162-38] S11, 9163 Program Committee, 9163 S3 Session Chair, [9163-13] S4
Shvyd'ko, Yuri V. 9209 Program Committee, [9209-19] S6, [9210-9] S3
Shyu, Feng Lin [9200-41] SPMon
Si, Jinhai [9172-38] SPWed
Si, Satyabrata [9164-52] S11
Sibilia, Concita [9160-53] S11
Siddique, Radwanul Hasan [9187-13] S5
Siddiquee, Arif M. [9163-108] SPWed
Sidor, Daniel E. [9226-25] S8
Sidor, Maxim [9166-41] SPWed, [9216-45] SPMon
Sieber, Ingo [9195-3] S1
Siegal, Michael P. [9174-35] S8
Siegenthaler, John [9224-39] S9
Siegneur, Hubert P. [9179-32] S6
Siemer, Björn [9210-10] S3
Siemion, Agnieszka [9192-43] SPMon, [9192-53] SPMon
Sierk, Bernd [9218-50] S11
Sierra, Javier E. [9193-37] S9
Sierra-Hernández, Juan Manuel [9200-45] SPMon
Siewert, Frank 9206 Program Committee, 9206 S4 Session Chair, [9206-15] S4, [9206-19] S5, [9207-17] S5, [9207-32] S9, [9208-17] S4, [9210-10] S3
Šiffalovič, Peter [9207-35] S9
Sigalov, Mark [9181-18] S4
Sigle, Daniel O. [9163-29] S7, [9164-42] S8
Signorato, Riccardo [9208-2] S1
Signorini, Raffaella [9161-3] S1, [9181-43] SPWed
Siitonen, Samuli [9173-18] SPWed
Sikorski, Marcin [9210-11] S3, [9210-7] S2
Silberman, Donn M. 9188 Program Committee, [9188-13] S3
Siler, Martin [9164-118] SPWed, [9164-18] S4
Silhanek, Alejandro V. [9169-17] S4
Silny, John F. 9222 Program Committee, [9222-15] S4
Silov, Andrei [9167-74] S15a
Silva, Carlos 9165 Conference CoChair
Silva, S. Ravi P. [9177-21] S5, [9184-58] SPWed
Silva-Mejia, Adriana [9219-21] SPMon
Silveiro, Iván [9163-15] S4, [9163-59] S14
Silvestrini, Simone [9163-107] SPWed, [9163-109] SPWed
Sim, Donggyu [9217-70] SPMon
Sim, Hyeok In [9223-20] SPMon
Simard, Mikaël [9163-81] S18
Simatonis, Linas [9170-57] SPWed
Simi, Alessandro [9166-21] S3
Simkiene, Irena [9180-5] S2, [9180-7] S2
Simmons-Potter, Kelly [9179-27] S5, [9179-6] S1
Simonds, Brian J. [9180-13] S3
Simoni, Francesco 9182 Program Committee, 9182 S6 Session Chair, [9182-3] S1
Simonis, Priscilla 9187 Program Committee, 9187 S2 Session Chair, [9187-12] S5, [9187-14] S5, [9187-2] S1
Simonsen, Ingve [9205-5] S2
Simonutti, Roberto [9161-26] S6
Simovski, Constantin R. [9160-45] S9, [9163-102] SPWed
Simpkins, Blake S. [9163-119] SPWed
Simpson, Stephen H. [9164-16] S4, [9164-61] S12, [9164-68] S14, [9164-81] S16
Sinclair, Hugo G. [9169-2] S1
Sinclair, Laura C. [9219-5] S2
Sinclair, Michael [9175-25] S7
Sinclair, Michael B. [9160-97] SPWed
Sinev, Ivan S. [9163-102] SPWed
Sing, Jamuna Kanta [9217-29] S4, [9217-34] S4
Singer, Kenneth D. [9201-12] S3, [9201-13] S3
Singer, Scott B. [9226-19] S6
Singh, Bipin K. [9214-10] S3
Singh, Chetan Raj [9165-6] S2
Singh, David J. [9177-15] S4, 9213 Program Committee, [9213-37] S9
Singh, Fouran [9161-15] S3
Singh, Gurinder [9216-26] S7
Singh, Haobijam Johnson [9163-62] S15
Singh, Harpreet [9216-26] S7
Singh, Kristi M. 9171 Program Committee
Singh, Narsingh B. 9200 Program Committee, 9200 S2 Session Chair, [9200-1] S1, 9213 Program Committee, [9213-40] S9
Singh, Rajiv K. [9183-53] S12
Singh, Rohan [9198-33] S8
Singh, Sanjeev [9185-221] S5
Singh, Sudhanshu [9212-14] S3
Singh, Tarandip [9216-26] S7
Singh, Udaibir [9161-15] S3
Singh, Upendra N. [9223-9] S3
Singh, Vivek [9170-12] S2, [9220-19] S5
Singha Roy, Subhamoy [9172-42] SPWed
Sinha, Ravindra Kumar [9163-33] S8, [9170-42] S8, [9200-16] SPMon, [9200-17] S2, [9200-25] S3, [9200-27] S4
Sinicco, Ivan 9179 Program Committee
Sinn, Harald [9208-17] S4, [9208-2] S1, [9209-3] S1, [9209-32] SPMon, 9210 Program Committee, [9210-1] S1
Sipahi, Guilherme M. [9167-1] S1a, [9167-101] S18b
Sirat, Gabriel Y. [9169-4] S1
Sirringhaus, Henning [9184-403] SPIen
Sirtori, Carlo 9199 Program Committee
Siska, Petr [9193-40] SPMon, [9193-53] SPMon, [9224-53] SPMon
Sissom, Brad [9201-30] S8
Sista, Prakash [9185-109] S3
Sista, Srinivas P. [9183-56] S12
Sisto, Marco Michele [9190-1] S1
Sitters, Gerrit [9164-41] S8
Sivan, Yonatan [9169-2] S1
Sjödahl, Mikael [9203-4] S1, 9204 Program Committee
Skabara, Peter J. [9183-40] S9, 9184 S2 Session Chair, [9185-105] S2, [9185-204] S1
Skarabot, Miha [9164-84] S17
Skidanov, Roman Vasilevich [9164-124] SPWed, [9164-127] SPWed
Sklyarchuk, Olena [9213-52] SPMon
Sklyarchuk, Valerii M. [9213-48] SPMon, [9213-52] SPMon
Skovsen, Esben [9163-7] S2
Skrypnyk, Anna I. [9213-48] SPMon
Slack, Kim [9218-34] S8
Sladek, Kamil [9167-75] S15a
Slangen, Pierre R. L. 9204 Program Committee
Slapikas, Kestutis [9178-28] SPWed
Slater, Dan [9192-23] S5, [9227-10] S3
Slivken, Steven [9199-1] S1
Slobozhanuk, Alexey P. [9160-51] S10, [9160-72] S15
Slyvchuk, Yurij I. [9161-44] SPWed
Small, Alexander R. 9188 Program Committee
Smeesters, Lien [9192-14] S3, [9198-2] S1
Smetanina, Evgeniya O. [9219-18] SPMon
Smilgies, Detlef M. [9183-28] S6
Smilie, Paul J. [9194-19] S5, [9194-21] S5
Smith, Barton [9175-19] S6
Smith, Bennett E. [9164-55] S11
Smith, Brian J. [9225-14] S4
Smith, Brian V. [9206-16] S4, [9206-2] S1
Smith, Cal A. [9211-14] S4
Smith, Craig F. [9213-47] SPMon
Smith, Daniel G. 9195 Program Committee
Smith, David C. [9217-13] S2
Smith, David R. 9160 Program Committee, [9160-74] S15
Smith, Douglas E. [9164-93] S20
Smith, Geoffrey B. 9172 Program Committee
Smith, Graham [9215-1] S1
Smith, Matthew W. [9222-6] S1
Smith, Nathan [9218-18] S4
Smith, Nathaniel P. [9218-1] S1
Smith, Nicholas Isaac [9169-29] S7, [9169-6] S2
Smith, Peter H. [9186-5] S2
Smith, Steven R. [9172-34] S8
Smolentseva, Elena [9163-92] SPWed
Smolyaninov, Igor I. [9160-14] S3, [9160-46] S10
Smolyaninova, Vera N. [9160-14] S3, [9160-46] S10
Smotlacha, Vladimir [9202-28] S6
Snaith, Henry J. [9177-10] S3, [9184-22] S6, [9184-56] SPWed
Snigirev, Anatoly [9206-9] S2, [9207-2] S1, [9207-37] SPMon, [9207-43] SPMon, [9207-44] SPMon, [9207-5] S1, 9209 Program Committee, [9209-22] S6
Snigireva, Irina [9206-9] S2, [9207-2] S1, [9207-37] SPMon, [9207-43] SPMon, [9207-44] SPMon, [9207-5] S1, 9209 S7 Session Chair, 9209 S8 Session Chair, [9209-22] S6
Snoswell, David R. E. [9162-75] S11
Snyder, Chad R. [9185-109] S3
So, Franky 9183 Conference Chair, 9183 S1 Session Chair, 9183 S2 Session Chair, [9183-18] S4, [9183-53] S12, [9183-82] SPWed, [9184-14] S10, [9184-14] S4, [9184-54] SPWed, [9184-92] SPWed, 9185 Program Committee, [9185-214] S4, [9185-229] SPWed
So, HyeonSeok [9194-29] S7
So, Jin-Kyu [9163-3] S2
So, Shu Kong [9183-11] S3, [9184-54] SPWed
Soci, Cesare [9160-3] S1, [9163-3] S2, [9163-42] S11, [9184-89] SPWed
Sojka, Marcin [9185-112] S3
Sokhoyan, Ruzan [9162-4] S1, [9162-73] SPWed
Sokolov, Andrey [9206-19] S5, [9206-7] S2
Sokolov, Konstantin V. [9166-32] S4
Sokolowski-Tinten, Klaus [9210-12] S3
Solanki, Ankur [9184-69] SPWed
Solano, Cristina 9188 Program Committee
Solano, Enrique [9225-11] S3
Solís Villareal, José Francisco [9216-43] SPMon, [9217-67] SPMon
Soljačić, Marin [9162-26] S8, [9170-34] S6, [9178-10] S3, [9181-26] S6
Solntsev, Alexander S. [9162-11] S3
Solodar, Asi [9182-26] S5
Solodovnyk, Anastasiia [9178-26] SPWed, [9178-3] S1, [9205-13] S5
Solomon, Glenn S. [9162-9] S3
Soloviev, Oleg [9193-17] S4, [9194-13] S3
Somepalli, Bhargav [9202-22] S5
Sommer, Christian [9190-10] S2, [9190-28] S6, [9193-11] S3
Sompet, Pimonpan [9164-94] SPWed
Son, Ho Yeon [9171-26] SPWed
Son, Juhiuk [9171-18] S5
Son, Jun Young [9181-39] SPWed
Sondergaard, Thomas M. [9163-7] S2, [9177-22] S5
Sondhauss, Peter 9209 Program Committee, [9209-11] S4
Song, Changyong [9210-17] S4
Song, Guiju [9204-24] SPMon
Song, Haomin [9160-17] S4, [9161-18] S4, [9166-16] S2, [9169-8] S2, [9170-19] S4
Song, Hyung-Jun [9184-66] SPWed
Song, Li [9205-26] SPMon
Song, Sanghoon [9210-11] S3, [9210-24] S5, [9210-7] S2
Song, Zhongxiao [9172-38] SPWed
Sonnefraud, Yannick [9163-75] S17, [9169-2] S1
Sonnenfeld, Camille [9226-12] S4

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Sood, Ashok K. 9220 Conference Chair, 9220 S2 Session Chair, 9220 S4 Session Chair, 9220 S5 Session Chair
Soos Rosemeier, Jolanta I. [9226-7] S2
Soppera, Olivier [9164-97] SPWed
Sorce, Chuck [9211-15] S4
Sordan, Roman [9167-8] S2a
Sorenson, Danny S. [9195-2] S1
Sorg, Joerg [9190-12] S3
Soskind, Michael [9194-12] S3
Soskind, Rose [9194-12] S3
Soskind, Yakov G. 9194 Program Committee, 9194 S8 Session Chair, [9194-12] S3, [9194-47] S5
Soto, Horacio [9219-22] SPMon
Soucaille, Rémy [9167-52] S10
Soufli, Regina 9206 Program Committee, 9207 Program Committee
Soukoulis, Costas M. 9160 Program Committee, [9160-23] S5, [9160-62] S13, [9160-7] S2, [9160-78] S16, [9160-80] S16, [9162-17] S5
Soundara-Pandian, Lakshmi [9215-2] S1
Sousa, Ricardo C. [9167-49] S9
Spahn, Peter [9162-75] S11
Spalding, Gabriel C. 9164 Conference Chair, 9164 S16 Session Chair, 9164 S2 Session Chair, 9164 S3 Session Chair, 9164 S5 Session Chair, [9164-74] S15
Spangenberg, Holger [9202-17] S4
Spano, Frank C. [9165-8] S3
Sparenberg, Mino [9165-14] S4
Sparrowe, David [9185-107] S2
Späth, Christian [9163-61] S15
Speich, Marco [9192-56] SPMon
Speicher, Andy [9223-7] S2
Speirits, Fiona C. [9164-16] S4
Spencer, Mark F. [9188-12] S3, [9205-19] S6, [9224-19] S5
Spendier, Kathrin [9163-40] S10
Spezzani, Carlo [9210-22] S5
Spiecker, Erdmann [9181-44] SPWed, [9184-52] SPWed
Spiga, Daniele 9208 Program Committee, 9208 S2 Session Chair, [9208-10] S3, [9209-13] S5
Spillmann, Christopher M. [9166-10] S1
Spindler, Susann [9165-38] S11, [9169-21] S5
Spindloe, Christopher [9211-6] S2
Spivak, D. [9167-71] S14
Sprangle, Phillip A. [9224-15] S4, [9224-33] S8
Sprigg, Jane N. [9225-34] SPMon
Springer, Michael T. [9182-23] S5, [9182-38] S8
Sprung, Detlev [9224-28] S7
Spuhler, Peter [9222-8] S2
Spyropoulos, George D. [9180-20] S4, [9184-42] S9
Squillante, Michael R. 9213 Program Committee, 9214 Program Committee, 9215 Program Committee, [9215-2] S1
Sreenivasan, Varun K. A. [9162-13] S4
Sridharan, Vasant [9202-54] S11
Srinivasan, Balaji 9202 Program Committee, [9202-22] S5
Srivastava, Abhishek K. [9182-42] S8
Srivastava, Anurag [9168-26] SPWed
Stadlober, Barbara [9185-218] S5
Staforelli Vivanco, Juan Pablo [9164-66] S13
Stagira, Salvatore [9210-14] S4
Stahl, H. Philip 9197 Program Committee
Stalcup, Thomas E. [9175-11] S3, [9175-26] S7
Stamenov, Igor [9193-8] S2
Stampahar, Thomas G. [9215-4] S1
Stand, Luis [9213-2] S1
Stanescu, Iuliana Mihaela [9172-33] S8
Stanikunas, Rytis [9190-13] S3
Stanley-Wall, Nicola [9165-51] S14
Stano, Peter 9167 S16b Session Chair, [9167-38] S6
Stanton, Christopher J. 9167 S7 Session Chair, [9167-23] S4a, [9167-24] S4a, [9167-42] S7
Staples, Conor [9222-8] S2
Stapleton, Andrew [9184-71] SPWed
Starikov, Rostislav S. [9201-38] SPMon, [9201-4] S1, [9216-30] S8, [9216-53] SPMon
Starikov, Sergey N. [9201-38] SPMon, [9216-30] S8, [9216-51] SPMon, [9216-52] SPMon
Stark, Jeremy [9175-20] S6
Stärk, Martin [9167-70] S14
Starr, David E. [9177-14] S3
Stassun, Keivan [9213-10] S3
Staude, Isabelle 9160 S8 Session Chair, [9160-10] S2, [9160-41] S11, [9160-9] S2, [9162-13] S4, [9162-5] S1
Stavila, Vitalie [9174-20] S5
Stavrinidis, Antonis [9199-7] S2
Stavrinidis, George [9199-7] S2
Steckl, Andrew J. 9171 Program Committee
Steele, Paul T. [9215-16] SPMon
Steenbergen, Elizabeth H. [9163-126] SPWed
Stefancich, Marco [9175-18] S5, [9178-9] S3, 9191 S2 Session Chair, [9191-12] S4
Stefani, Fernando D. [9163-83] S18
Stefani, Mario A. [9195-18] SPMon
Stefanik, Todd [9213-1] S1
Steijvers, Henk [9179-15] S3
Stein, Aaron [9207-3] S1
Stein, Karin U. 9224 Program Committee, 9224 S3 Session Chair, [9224-28] S7
Steinbock, Michael J. [9188-12] S3
Steinhardt, Paul [9162-15] S5
Stelian, Carmen [9213-55] SPMon
Stelmakh, Veronika [9170-34] S6, [9178-10] S3
Stelzle, Florian [9192-25] S5
Stenhouse, Peter J. [9178-17] S5
Stephan, Andrew W. [9222-21] SPMon, [9222-22] SPMon
Stephen, Meera [9184-78] SPWed
Stephenson, Gregory Brian [9210-9] S3
Stern, Adrian [9217-2] S1
Stern, Edda [9178-26] SPWed, [9178-3] S1, [9205-13] S5
Stern, Liron [9160-68] S14, [9163-6] S2
Stetsko, Yuri P. [9210-9] S3
Stevanovic, Sabrina [9212-31] S7
Stevenson, Gail D. [9186-18] S5
Stewart, Michael H. [9166-10] S1
Stewart, Robert J. [9165-30] S7
Stiebing, Martin [9163-58] S14
Stievater, Todd H. [9170-11] S2
Stilgoe, Alex B. [9164-123] S20, [9164-38] S7
Stingelin, Natalie 9165 S4 Session Chair, [9165-12] S3, [9184-3] S1, 9185 S8 Session Chair, [9185-110] S3
Stock, Stuart R. 9212 Conference Chair, 9212 S1 Session Chair, [9212-11] S3, [9212-29] S6, [9212-30] S7
Stockman, Mark I. 9160 Program Committee
Stockman, Paul [9193-1] S1
Stockmar, Marco K. [9212-32] S7
Stoll, Hermann [9167-69] S14, [9167-70] S14
Stolterfoht, Martin [9184-18] S5
Stolz, Christophe [9205-23] S7
Stolz, Sebastian [9183-34] S8
Stone, Morley O. 9171 Program Committee
Storm, Kristian [9170-59] SPWed
Störmer, Michael 9207 S8 Session Chair, [9207-17] S5
Storozhuk, Darina Petrivna [9174-25] S6
Stotts, Larry B. SC1112
Stoupin, Stanislav 9207 Program Committee, [9207-11] S3
Stover, John [9186-30] S8, SC1003
Stowe, Ashley 9213 Program Committee, [9213-10] S3, [9213-12] S3
Straka, Sharon A. [9196-17] S5
Strano, Daniel [9213-50] SPMon
Strassburg, Martin [9190-15] S4
Strathearn, Aidan [9192-8] S2
Strauf, Stefan [9168-19] S4
Straus, Jaroslav [9206-13] S3
Strauss, Steven H. [9165-23] S6
Strekalov, Dmitry V. 9225 Program Committee
Strohfeldt, Nikolai [9163-4] S2
Strojnik, Marija [9186-10] S3, 9219 Conference Chair, 9219 S1 Session Chair, 9219 S3 Session Chair
Strubbe, Filip [9170-41] S8
Strudley, Thomas [9162-23] S7
Strum, Galit [9181-18] S4
Stryckers, Jeroen [9183-36] S8
Stuchinsky, Victor A. [9220-29] SPMon
Stumpe, Joachim [9181-16] S4
Stutz, Charles Ed [9172-34] S8
Styk, Adam R. [9203-32] S7
Su, Bao-Lian [9187-9] S4
Su, Chaochin [9165-59] SPWed, [9165-65] SPWed
Su, Dong [9213-58] SPMon
Su, Guo-Dung [9192-32] S7, [9193-16] S4, [9193-19] S4, 9202 Program Committee, [9202-13] S3, [9202-43] S9
Su, Heng Chia [9171-29] SPWed
Su, Hui-Wen [9182-16] S4
Su, Jinzhan [9176-11] S3
Su, Leo [9217-82] SPMon
Su, Lih-Jen [9166-8] S1
Su, Peng 9195 Program Committee, 9195 S1 Session Chair, [9195-11] S3, [9195-14] S4, 9203 Program Committee, 9203 S2 Session Chair
Su, Tianquan [9195-17] S4
Su, Wei-Hung 9200 S3 Session Chair, [9200-49] SPMon, [9200-50] SPMon, [9200-51] SPMon, [9200-52] SPMon
Su, Yahui [9204-26] SPMon
Su, Yaorong [9185-120] S5
Su, Yikai [9182-34] S7
Suárez-Romero, José G. [9205-17] S5
Subedi, Samrat [9217-46] S7
Subramania, Ganapathi S. 9162 Conference Chair, 9162 S3 Session Chair, [9162-54] S15, [9162-6] S2
Subramanian, Arunkumar [9174-34] S8
Suemune, Ikuo [9167-15] S3a
Suen, Jonathan Y. [9226-1] S1, [9226-2] S1, [9226-4] S1, [9226-5] S1
Suganuma, Shinta [9172-31] S8
Sugimoto, Nana [9182-5] S1
Sugita, Naohiko [9203-25] S6
Sugiyama, Teruki [9164-83] S17
Suh, Jin-Suck [9166-12] S2, [9166-45] SPWed
Suh, Sungjoo [9217-18] S2
Suh, Yung Doug 9169 Program Committee, [9169-5] S2
Sujecki, Slawomir [9200-28] S4
Sukhoivanov, Igor A. [9200-39] SPMon
Sukhorukov, Andrey A. 9162 Program Committee, [9162-11] S3
Sukowski, Frank [9212-8] S2
Sulaev, Azat [9163-3] S2
Sulejmani, Sanne [9226-12] S4
Suleski, Thomas J. [9192-19] S4, [9194-19] S5, [9194-21] S5, SC454
Sulima, Oleg V. Symposium Chair, 9178 Conference Chair, 9178 S6 Session Chair, 9179 Program Committee
Sullivan, Gary J. 9217 Program Committee, 9217 S3 Session Chair
Sullivan, Joseph [9206-12] S3, [9206-17] S4
Sultanov, Albert K. [9216-16] S4
Sum, Tze Chien [9165-33] S8, [9184-64] SPWed
Summers, Christopher J. [9163-65] S15
Summitt, Chris [9170-14] S3
Sun, Bo [9198-33] S8
Sun, Changqing [9165-27] S7
Sun, Cheng [9160-40] S8
Sun, Chengbo [9218-6] S2
Sun, Ching-Cherng 9192 Program Committee, 9192 S6 Session Chair, [9192-26] S6, [9192-27] S6, [9192-31] S6, 9200 Program Committee, 9200 S3 Session Chair, [9200-19] S3, [9200-22] S3, [9201-37] SPMon
Sun, Dong [9198-21] S5
Sun, Greg [9160-83] S17, [9160-92] SPWed, 9163 S9 Session Chair, [9163-53] S13, [9163-88] SPWed
Sun, Haiyin 9193 Program Committee
Sun, Handong [9163-3] S2
Sun, Hong-Bo [9183-54] S12, [9183-57] SPWed, [9183-58] SPWed
Sun, Hongwei [9160-89] SPWed
Sun, Jason [9220-3] S1
Sun, Jian [9215-15] SPMon, [9216-63] SPMon, [9216-64] SPMon, [9217-80] SPMon, [9218-62] SPMon, [9220-27] SPMon
Sun, Jianfeng [9200-38] SPMon, [9224-47] SPMon, [9224-52] SPMon, [9227-12] SPMon, [9227-13] S3, [9227-14] SPMon, [9227-15] SPMon
Sun, Jin-Won [9183-80] SPWed
Sun, Junqiang [9218-54] S12, [9218-60] SPMon, [9218-75] SPMon
Sun, Ke-Xun [9215-6] S2
Sun, Keye [9180-6] S2
Sun, Lin [9163-18] S5
Sun, Lirong [9172-34] S8
Sun, Liuyang [9163-60] S14
Sun, Qibing [9199-12] S3
Sun, Sam-Shajing 9226 Program Committee, 9226 S6 Session Chair, [9226-21] S6
Sun, Shih-Hung [9182-16] S4
Sun, Shulin [9160-83] S17, [9160-92] SPWed
Sun, Shumei [9198-11] S3
Sun, Shuo [9162-9] S3
Sun, Sunjian [9202-20] S5, [9202-25] S5, [9202-57] S12
Sun, Wenci [9170-6] S1
Sun, Wenfang [9181-3] S1
Sun, Xiuhui [9191-23] SPWed
Sun, Zhibin 9221 Program Committee
Sun, Zhipei [9163-29] S7
Sun, Zhiwei [9227-13] S3, [9227-14] SPMon, [9227-15] SPMon
Sundaram, Jaya [9220-13] S4
Sundaram, Ravi S. [9163-29] S7
Sundararaman, Ravishankar [9163-44] S11
Sundman, Björn [9212-18] S4
Sung, Jiun-Yu [9193-38] S9, [9202-26] S6
Sung, Shijun [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Sung, Yongjin [9209-28] S8
Supruangnet, Ratchadaporn [9207-19] S5
Surampudi, Subbarao [9175-29] SPWed
Sureau, Franck [9166-3] S1
Surma, Barbara [9160-53] S11
Susumu, Kimihiro [9166-10] S1
Suszek, Jarosław [9192-43] SPMon, [9192-53] SPMon
Suto, Hiroshi [9219-2] S1
Sutter, Florian [9205-11] S4
Sutter, John P. [9206-8] S2, [9208-15] S4, [9209-16] S5, [9209-2] S1, [9209-20] S6
Sutton, Melissa [9166-4] S1
Sutty, Sibi [9184-62] SPWed
Suvarna, Puneet [9170-28] S5
Suvorov, Alexey Y. [9170-32] S6, 9209 Program Committee, [9209-16] S5, [9209-20] S6, [9209-34] SPMon
Suzanoviciene, Rasa [9180-7] S2
Suzuki, Hajime [9183-15] S4
Suzuki, Mamoru [9210-17] S4
Suzuki, Motofumi 9172 Conference Chair, 9172 S1 Session Chair, [9172-31] S8
Suzuki, Takahiko [9177-20] S5
Suzuki, Takemasa [9171-14] S4
Suzuki, Takeshi [9198-33] S8
Svegzda, Algimantas [9190-13] S3
Svetina, Cristian [9207-14] S4, [9208-4] S1, [9210-22] S5
Švihlík, Jan [9217-47] S7, [9217-73] SPMon
Svintsov, Alexander [9207-38] SPMon
Swagten, Henk J. M. [9167-32] S5, [9167-69] S14
Swain, Santosh [9213-18] S4
Swanberg, Erik L. [9213-1] S1, [9213-23] S5, [9213-39] S9
Swann, William C. [9219-5] S2
Swartzlander, Grover A. [9164-86] S18, [9194-40] SPMon
Sweatt, William C. [9191-14] S4
Sweetnam, Sean [9184-30] S7
Swinehart, Robert [9219-9] S3
Sworakowski, Juliusz [9185-112] S3
Symes, Daniel [9211-6] S2
Symonds, Clementine [9163-26] S7
Synooka, Olesia [9165-6] S2
Syouji, Atsushi [9160-94] SPWed
Sypek, Maciej [9192-43] SPMon, [9192-53] SPMon
Syrenova, Svetlana [9163-36] S9
Syrvatka, Vasyl Ja [9161-44] SPWed
Szambolics, Helga [9172-10] S3
Szatkowski, Mateusz Michal [9194-46] SPMon

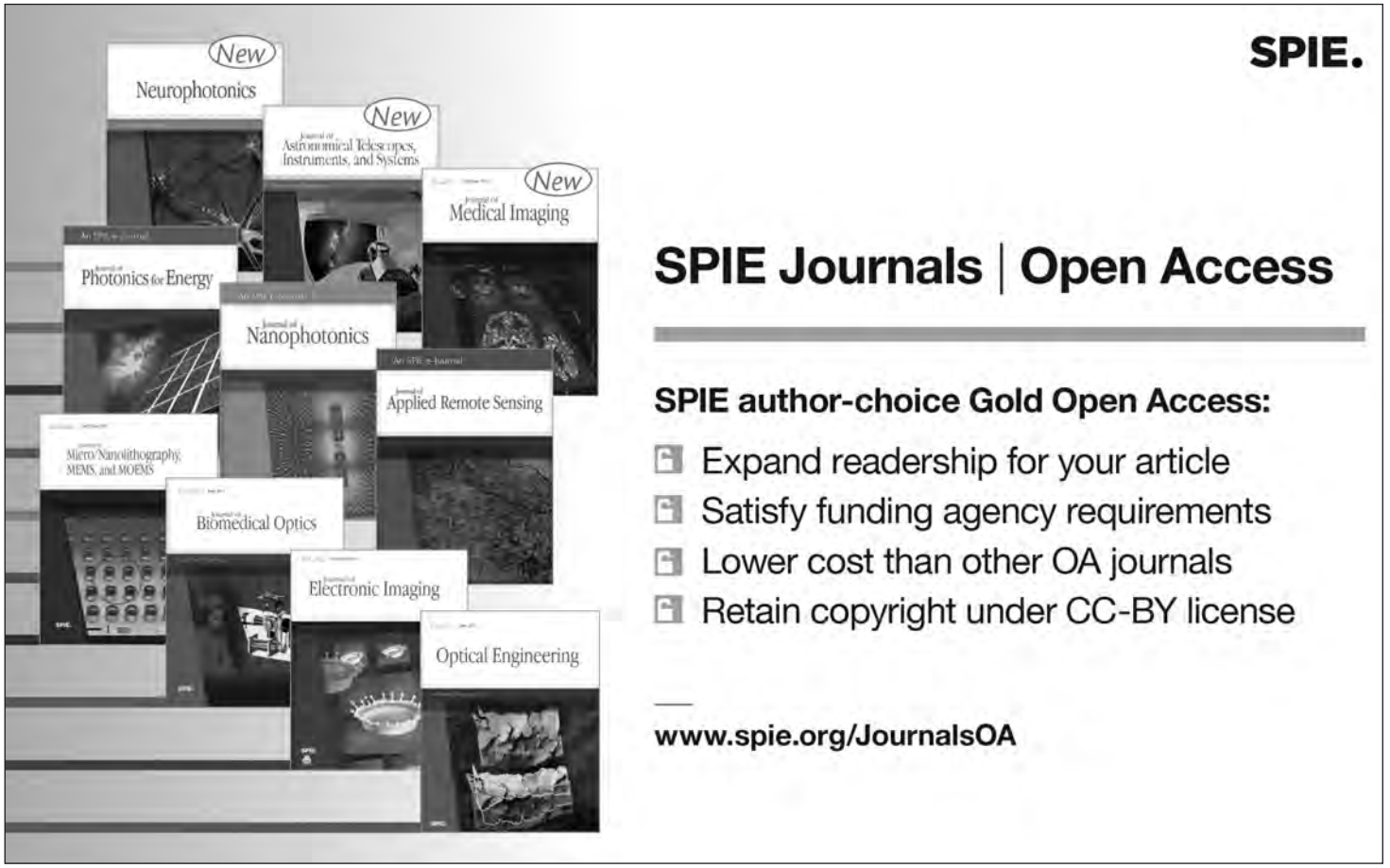
INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Szeles, Csaba 9213 Program Committee
Szerling, Anna 9199 S5 Session Chair, [9199-2] S1
Szewczyk, Zbigniew P. [9218-18] S4
Szmulowicz, Frank [9163-126] SPWed
Sznitko, Lech [9171-15] S4
Szukalski, Adam [9171-15] S4
Szymanski, Michal O. [9199-2] S1

T

Tabet, Saida [9190-36] SPWed
Tabiryan, Nelson V. [9181-19] S4, 9182 S7 Session Chair, [9182-22] S5, [9200-30] S4
Tachibana, Yasuhiro 9176 Program Committee, [9176-10] S3
Tae, Heung-Sik [9193-32] S8
Tafforeau, Paul [9212-24] S5
Taguchi, Atsushi [9169-26] S6
Taha, Iman [9191-22] S6
Tahar, Sofiène [9193-7] S2
Tahir, Sajjad [9209-24] S7, [9209-39] SPMon
Tahtali, Murat [9209-29] S8, [9212-19] S4, [9217-1] S1, [9217-43] S6
Tai, An-Ching [9192-48] SPMon
Tai, Tamin [9169-36] S8
Taimre, Thomas [9199-21] S6
Takacs, Peter Z. [9173-8] S3, 9206 Program Committee
Takada, Jun [9219-3] S1
Takahashi, Tadayuki [9213-25] S6
Takanabe, Kazuhiro [9176-14] S4
Takani, Masayoshi [9179-3] S1
Takano, Akihiro [9179-3] S1
Takashima, Yuzuru [9170-14] S3, 9192 Program Committee, 9201 Program Committee, 9201 S8 Session Chair, [9201-14] S4, [9201-3] S1
Takayama, Michihiro [9179-3] S1
Takeda, Hiroyuki [9162-62] S17, [9181-30] S7
Takeda, Mitsuo 9187 Program Committee, 9203 Program Committee
Takeuchi, Shigeki 9225 Program Committee
Takeya, Jun [9185-116] S4
Takezoe, Hideo [9181-10] S3
Taki, Majid [9182-4] S1
Takimiya, Kazuo [9184-6] S2, [9185-102] S1
Takman, Per [9212-18] S4, [9212-20] S4
Tal, Amir [9181-18] S4
Talapin, Dmitri 9161 Program Committee
Taleb, Amina [9167-39] S6
Talebi Fard, Sahba [9166-31] S4
Talebitaher, Alireza [9207-26] S7
Talin, A. Alec [9168-18] S4, 9174 Conference Chair, 9174 S4 Session Chair, 9174 S5 Session Chair, [9174-20] S5, [9174-40] S9
Tam, Hoi Lam [9185-208] S2
Tam, Kai Cheong [9185-208] S2
Tamai, Sho [9182-5] S1
Tamaru, Masakazu [9182-5] S1
Tamasaku, Kenji [9208-1] S1
Tamba, Maria-Gabriela [9182-24] S5
Tame, Mark S. [9163-75] S17
Tamizhmani, Govindasamy [9179-12] S2
Tamuleviciene, Asta [9163-94] SPWed, [9170-57] SPWed
Tamulevicius, Sigitas [9163-82] SPWed, [9163-94] SPWed, [9170-57] SPWed, [9178-28] SPWed
Tamulevicius, Tomas [9163-94] SPWed, [9170-57] SPWed, [9178-28] SPWed
Tamura, Takashi [9196-10] S3, [9196-19] S5, [9196-5] S2
Tan, Augustine T. L. [9207-26] S7
Tan, Chee-Keong [9176-9] S2, [9190-16] S4, [9190-25] S6, [9190-30] S7
Tan, Hark Hoe [9164-56] S11, [9174-5] S1
Tan, Howard [9218-27] S6
Tan, Jianchuan [9190-14] S3
Tan, Kwan Wee [9184-56] SPWed
Tan, Loon-Seng [9181-19] S4, [9181-4] S1
Tan, Qiao Feng [9194-14] S3
Tan, Qing [9203-54] SPMon
Tan, Shu Fen [9163-37] S9
Tan, Siew Li [9170-1] S1
Tanaka, Masaaki [9167-80] S15b
Tanaka, Rie [9210-17] S4
Tanaka, Takuo [9163-101] SPWed, [9163-20] S6, [9163-71] S16
Tanaka, Yukinobu [9201-26] S7
Tananbaum, Harvey D. [9208-6] S2
Tane, Alexandrina [9171-12] S3
Tang, Ben Zhong [9182-6] S2, [9185-201] S1
Tang, Guomao [9227-16] S3
Tang, Hengjing [9220-8] S3, [9220-9] S3
Tang, Hong X. [9167-79] S15b
Tang, Jun [9194-35] S8
Tang, Shouhong 9173 Program Committee, 9173 S4 Session Chair, 9205 Program Committee
Tang, Wei [9174-39] S9, [9174-6] S2
Tang, Xiao 9225 Program Committee
Tang, Zay-Shing [9217-20] S3
Tang, Zhuoqi [9200-28] S4
Tani, Hiroumi [9196-12] S4
Tanida, Jun 9170 Program Committee, 9216 Program Committee
Taniguchi, Takashi [9169-33] S8
Tansu, Nelson [9176-9] S2, [9190-16] S4, [9190-25] S6, [9190-30] S7
Tao, Bangyi [9221-17] S2, [9221-27] SPMon
Tao, Li [9204-24] SPMon
Tao, Liu [9172-8] S2
Tao, Ye [9185-144] SPWed
Tapia, Juan J. [9216-5] S2, [9217-40] S5
Tari, Suleyman [9213-27] S6
Tarkowski, Tomasz [9199-34] SPMon, [9199-7] S2
Tarnowski, Karol [9182-12] S3
Tartakovsky, Gennady [9160-36] S7
Tashchilina, Arina [9225-12] S4
Tashima, Hiroto [9192-44] SPMon
Taskina, Larisa A. [9198-43] SPMon, [9221-14] S2
Tasolamprou, Anna C. [9162-17] S5
Tassin, Philippe 9160 S6 Session Chair, [9160-23] S5, [9160-62] S13, [9160-7] S2, [9160-80] S16
Tatapudi, Sai [9179-12] S2
Tayebi, Behnam [9203-30] S7, [9203-5] S1
Taylor, Adam B. [9163-108] SPWed
Taylor, David P. 9196 Program Committee, 9196 S3 Session Chair, [9196-20] S5
Taylor, Edward W. 9226 Conference Chair, 9226 SKey Session Chair
Taylor, Keylantra [9200-10] S2
Taylor, Patrick J. [9226-18] S5
Taylor, Ramona S. [9226-10] S3
Taylor, Zachary D. 9199 Program Committee, 9199 S6 Session Chair, [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7



INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Tchoul, Maxim [9190-12] S3
Tchoulfian, Pierre [9190-19] S5
Te Plate, Maurice [9195-15] S4
Teboul, Eric [9179-30] S6
Tecpoyotl-Torres, Margarita [9192-50] SPMon
Teissier, Roland 9199 Program Committee
Teitelboim, Ayelet [9165-44] S12
Teitell, Michael A. [9164-79] S15
Teixeira, Jonathan [9165-61] SPWed
Tekoglu, Serpil [9183-34] S8
Teng, Jinghua [9170-33] S6, [9172-7] S2, [9194-20] S5
Teng, Tun-Chien [9190-22] S5
Tenne, Ron [9165-44] S12
Terakawa, Akira [9179-3] S1
Teran-Escobar, Gerardo [9179-26] S5, [9184-43] S10
Terán-Hinojosa, Estrella [9161-40] SPWed
Terborg, Roland Alfonso [9164-122] SPWed, [9164-82] S16
Terrones, Mauricio [9198-20] S5
Teruya, Alan [9211-5] S1
Tescher, Andrew G. 9217 Conference Chair, 9217 S1 Session Chair, 9217 S10 Session Chair
Tesfay, Medhanie [9192-25] S5
Tessarolo, Enrico [9163-107] SPWed, [9205-29] SPMon, [9207-22] S6
Teupner, Anne [9190-20] S5
Teuscher, Joël [9184-23] S6
Tew, Larry [9197-8] S3
Tewari, Priyamvada [9199-25] S6, [9199-27] S7, [9199-29] S7, [9199-30] S7
Thacker, Vivek [9164-42] S8
Thakur, Pardeep [9167-39] S6
Thalmann, Peter [9212-2] S1, [9212-25] S6, [9212-27] S6, [9212-31] S7, [9212-33] S7
Theelen, Mirjam [9179-15] S3, [9179-17] S3
Thelin, Peter A. [9213-23] S5
Thériault, Gabrielle [9188-16] S4
Thibault, Simon 9192 Conference Chair, 9192 S3 Session Chair, [9192-15] S3, [9192-9] S2, [9195-7] S2, 9202 Program Committee
Thiemens, Mark [9160-24] S5, [9169-33] S8
Thienpont, Hugo [9192-14] S3, [9198-2] S1, [9226-12] S4
Thierry, François [9161-2] S1
Thiry, Nicolas [9226-6] S1
Thizy, Cédric [9204-14] S3
Thomas, David A. 9197 Program Committee
Thomas, Jayan 9181 Program Committee
Thomas, Luc 9167 Program Committee, 9167 S8 Session Chair, [9167-54] S10, [9167-67] S14
Thomas, Michael E. [9205-2] S1
Thomas, Susan [9218-1] S1, [9218-18] S4, [9218-25] S6
Thomasset, Muriel 9206 Program Committee
Thome, Kurtis J. [9218-20] S5, [9218-33] S7, [9218-44] S9, [9222-9] S2
Thompson, Barry C. [9184-28] S7
Thompson, Joe D. [9167-31] S4b
Thompson, Kevin P. [9186-9] S3, 9193 Program Committee
Thompson, Kyle R. [9215-11] S3, [9215-8] S3, [9215-9] S3
Thompson, Mark E. [9165-5] S2
Thompson, Michael [9199-35] SPMon
Thomsen, Lars [9184-27] S7, [9185-114] S4
Thoreau, Dominique [9217-9] S2
Tian, Chuanshan [9198-11] S3
Tian, Fei [9194-37] S8
Tian, Jianjun [9178-15] S4
Tian, Lei [9209-24] S7
Tian, Xiaocheng [9200-4] S1
Tian, Xiaozhong [9216-61] SPMon
Tiberio, Richard C. 9170 Program Committee, [9170-31] S6
Tiedtke, Kai [9207-17] S5, 9210 Program Committee
Tien, Chung-Hao [9217-55] SPMon
Tierney, Steven [9185-107] S2
Tietze, Max L. [9185-115] S4
Tihan, Gratiela [9171-9] S2
Tikhov, Alexander A. [9203-9] S2
Tilley, Andrew J. [9165-1] S1
Timchenko, Elena V. [9198-43] SPMon, [9221-14] S2
Timchenko, Pavel E. [9198-43] SPMon, [9221-14] S2
Timoshenkov, Sergey P. [9200-36] SPMon, [9200-37] SPMon
Timrote, Ieva [9187-11] S4
Tinevez, Jean-Yves [9169-4] S1
Ting, Antonio C. [9224-15] S4
Tinnefeld, Philip [9163-83] S18
Tippets, Roger [9223-7] S2
Tischler, Joseph G. [9160-42] S9
Tisdale, William A. [9178-12] S4
Titchener, James G. [9162-11] S3
Tittl, Andreas [9163-4] S2
Tiwald, Tom [9220-19] S5
Tiwari, Ayodhya N. 9177 Program Committee
Tjin, Swee Chuan [9200-24] S3
Tkachenko, Georgiy V. [9164-20] S4
Todd, Judith A. 9189 Conference Chair, 9189 S1 Session Chair, 9189 S2 Session Chair, 9189 S3 Session Chair, 9189 S4 Session Chair
Todescato, Francesco [9161-3] S1
Toe, Wen Jun [9164-53] S11, [9164-56] S11
Togashi, Tadashi [9210-3] S1, [9210-6] S2
Toiviainen, Maunu [9192-49] SPMon
Toivola, Kristopher [9179-7] S1
Toker, Onur [9217-48] S7
Tokranova, Natalya [9173-14] S4
Tokuda, Shuuji [9179-3] S1
Tokuta, Yusuke [9206-1] S1
Tolbanov, Oleg [9213-16] S4
Tolenis, Tomas [9172-32] S8
Tolley, Martin [9211-6] S2
Tolmachev, Olexei [9201-29] S7
Toma, Andrea [9163-134] SPWed
Toma, Takahiro [9176-9] S2
Tomada, Astrid [9213-31] S7
Tomasiunas, Roland [9192-36] S7
Tomita, Masahiko [9179-3] S1
Tomizawa, Hiroshi [9178-23] S6
Tomlinson, Stephanie [9211-6] S2
Tommasini, Riccardo [9211-1] S1, [9211-2] S1
Tomori, Zoltan [9164-100] SPWed
Tomov, Ivan Vassilev [9224-15] S4
Tompa, Gary S. [9174-22] S6
Tonchev, A. [9211-7] S2
Tondiglia, Vincent P. [9181-19] S4, [9182-1] S1
Toney, Michael F. [9185-134] S8
Tong, Limin [9163-17] S5
Tong, Ru-Ying [9167-54] S10
Tong, William G. [9193-25] S6
Tonin, Mario [9164-48] S10
Tono, Kensuke 9210 S5 Session Chair, [9210-17] S4, [9210-3] S1, [9210-6] S2, [9210-8] S3
Tonooka, Hideyuki [9218-27] S6
Topic, Marko [9205-13] S5
Torabi, Solmaz [9184-7] S2
Toral-Acosta, Daniel [9200-11] S2
Torchilin, Vladimir [9166-5] S1
Torng, Terry [9167-54] S10
Toroghi, Seyfollah [9163-47] S11
Torquato, Salvatore [9162-15] S5
Torres Redondo, Josefina [9219-11] S3
Torres, Juan P. [9164-82] S16
Torres, Raymond [9219-9] S3
Torres-Hurtado, Susana Alejandra [9164-126] SPWed
Torsi, Luisa [9183-402] SPIen, 9185 Program Committee
Totachawattana, Atcha [9198-7] S2
Toto Arellano, Noel Ivan [9204-13] S3
Touati, Farid [9177-18] S4, [9177-19] S4
Toulouse, Constance [9167-27] S4b
Toussaint, Kimani C. [9164-57] S11
Tower, John [9211-5] S1
Towers, Catherine E. 9203 Conference CoChair
Toxqui-Quitl, Carina [9192-54] SPMon, [9217-67] SPMon
Toyoda, Taro [9184-24] S6
Trabattoni, Andrea [9208-18] S4
Trajnerowicz, Artur [9199-2] S1
Traverso, Luis M. [9170-18] S4, [9201-20] S5
Trebbia, Jean-Baptiste [9169-13] S3
Trefonas, Peter [9183-13] S3
Tregub, Nikolay V. [9221-14] S2
Trejo-Durán, Mónica [9200-47] SPMon
Tremblay, Eric J. [9175-12] S3
Trepanier, Melissa [9160-59] S12
Tretiak, Sergei 9165 Program Committee, [9184-97] SPWed
Tretyakov, Sergei 9160 Program Committee
Trichili, Abderrahmen [9194-10] S3, [9194-43] SPMon, [9194-44] SPMon
Tripathi, Renu [9181-2] S1
Triplett, Mark [9174-32] S8
Trivedi, Sudhir B. [9226-7] S2
Trofimov, Vladislav V. [9199-13] S3, [9199-24] S6
Trofimov, Vyacheslav A. 9199 S2 Session Chair, [9199-13] S3, [9199-24] S6, [9200-3] S1
Trojánek, Frantisek [9161-41] SPWed
Trolier-McKinstry, Susan E. [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Trolinger, James D. 9204 Program Committee, [9204-1] S1
Trontelj, Janez [9199-19] S5
Trout, T. John [9179-22] S4
Trovo, Mauro [9210-22] S5
Trujillo Reyes, Leonardo [9217-33] S4
Truong, Trieu-Kien [9217-66] S10
Truong, Viet Giang [9164-109] SPWed, [9164-110] SPWed
Trusiak, Maciej [9203-19] S5
Tsai, Benjamin K. 9205 Program Committee
Tsai, Chia-Ming [9217-24] S3
Tsai, Din Ping 9160 Program Committee, [9160-83] S17, [9160-92] SPWed, 9163 Program Committee, [9163-20] S6, [9163-22] S6, [9163-23] S6, [9163-88] SPWed, 9169 Program Committee, [9169-3] S1, 9201 Program Committee, 9201 S6 Session Chair, [9201-10] S3
Tsai, Gary C. [9193-18] S4
Tsai, Hsinhan [9184-97] SPWed
Tsai, Meng-Che [9192-28] S6
Tsai, Ming-Shiou [9192-27] S6
Tsai, Song-Yeu [9177-27] SPWed
Tsai, Wei-Yi [9164-125] SPWed
Tsai, Yu-Hsiang [9193-52] SPMon
Tsai, Yutsung [9167-21] S3b
Tsakalakos, Loucas 9174 Program Committee
Tsakmakidis, Kosmas [9162-76] S18
Tsang, Sai Wing [9184-54] SPWed
Tsao, Jeffrey Y. [9162-6] S2, [9190-11] S3
Tsao, Yao-Chung [9177-22] S5
Tsay, Ho-Lin [9223-19] SPMon
Tschentscher, Thomas [9210-10] S3
Tsendin, Konstantin D. [9200-36] SPMon
Tseng, Fu-Tian [9160-69] S14
Tseng, Mei-Rurng [9183-60] SPWed
Tseng, Shih [9216-29] S8
Tseng, Wei-Hsuan [9177-13] S3
Tseng, Yaw-Teng [9165-56] SPWed, [9165-63] SPWed
Tserkezis, Christos 9163 S13 Session Chair, [9163-10] S3, [9163-29] S7
Tsonev, Dobroslav [9183-45] S10
Tsuen, Bi-Shiou [9220-25] S6
Tsuji, Akinori [9170-5] S1
Tsujimura, Sho [9181-11] S3
Tsukamoto, Shota [9184-24] S6
Tsumura, Takashi [9206-20] S5
Tsutsumi, Naoto 9181 Program Committee, [9181-11] S3
Tsutsumi, Osamu [9182-5] S1
Tsymbal, Evgeny 9167 Program Committee
Tsypkin, Anton [9200-31] S4
Tu, Yanfei [9225-35] S7
Tu, Yong-Wei [9183-35] S8
Tucoulou, Remi [9212-40] SPMon
Tuell, Grady [9189-2] S1
Tufillaro, Nicholas B. [9222-8] S2
Tulvan, Christian [9217-45] S7
Tumbleston, John R. [9184-34] S8
Tumkur, Thejaswi U. [9160-18] S4, [9160-28] S6
Tunick, Arnold 9225 Program Committee, [9225-20] S5, [9225-25] SPMon
Tuohimaa, Tomi T. [9212-18] S4, [9212-20] S4
Tuovinen, Hemmo [9192-49] SPMon
Tupitsyn, Eugene [9213-10] S3
Türkcan, Silvan C. [9164-40] S7
Turkin, Vitaly [9193-55] SPMon
Turnbull, Graham A. [9183-40] S9, [9183-45] S10, [9185-204] S1
Turneaure, Stefan J. [9215-12] S4
Turner, John A. 9176 Program Committee
Turner, Michael L. [9212-10] S2
Turpie, Kevin R. [9218-4] S1
Turpin, Alejandro [9164-11] S3
Turunen, Jari [9173-18] SPWed
Tutsch, Rainer 9204 Program Committee
Tutuc, Emanuel 9174 Program Committee
Tuz, Vladimir R. [9200-39] SPMon
Tuzikas, Arunas [9190-13] S3, [9190-23] S5
Twigg, Mark E. [9174-17] S4
Tyazhev, Anton [9213-16] S4
Tyc, Tomás [9164-14] S3, [9193-1] S1
Tyliszczak, Tolek [9167-70] S14
Tymchenko, M. [9163-8] S3
Tyo, J. Scott [9186-22] S6
Tyson, Robert K. 9227 Program Committee

U

Uçar, Altuğ [9216-62] SPMon
Ucer, Kamil B. [9213-3] S1
Uddin, Mohammad Afsar [9184-70] SPWed, [9184-8] S2
Uddin, Muhammad Shahin [9217-43] S6
Ueda, Akihiko [9206-20] S5
Uemura, Sei [9171-17] S4
Ueno, Nobuo [9165-58] SPWed
Uhlmann, Norman [9212-20] S4
Uhrich, Christian L. [9184-37] S9
Uji-i, Hiroshi [9163-98] SPWed
Ukraintsev, Vladimir A. 9173 Program Committee
Ulin, Sergey E. 9213 Program Committee, [9213-44] S10
Ullah, Mujeeb [9183-86] SPWed
Ulmer, Melville P. 9208 Program Committee, 9208 S3 Session Chair, [9208-5] S2, [9208-8] S2
Ulrich, Olivier [9212-12] S3
Ulyanov, Ivan S. [9200-15] S2
Umansky, Vladimir [9199-18] S5, [9199-34] SPMon
Umbaugh, Scott [9217-46] S7
Umegaki, Yoshiyuki [9217-14] S2
Unal, G. Seda [9163-79] S18
Unruh, Tobias [9184-93] SPWed
Uprety, Sirish [9218-17] S4, [9218-68] SPMon, [9218-74] SPMon
Upton, Leslie [9181-5] S1
Urbach, H. Paul [9188-6] S1, [9192-2] S1
Urbas, Augustine M. 9160 Program Committee, [9160-74] S15, [9160-75] S15, [9163-16] S5, [9181-23] S6
Urbaszek, Bernhard [9167-102] S18b, [9167-15] S3a, [9167-9] S2a
Urcid, Gonzalo [9216-3] S1
Urness, Adam C. [9181-15] S4, [9201-32] S8, [9201-33] S8
Ursin, Rupert [9225-17] S5
Ushenko, Alexander G. [9166-39] SPWed, [9166-40] SPWed
Ushenko, Vladimir [9216-44] SPMon, [9216-45] SPMon
Ushenko, Yuriy A. [9166-41] SPWed, [9166-42] SPWed, [9166-44] SPWed
Usher, Linda C. 9197 Program Committee
Uskova, Olena [9182-22] S5
Uteshev, Ziyaetdin M. [9213-44] S10
Utz, Martin [9167-10] S2a
Uysal, Murat [9224-7] S2

V

Vadakkapattu Canthadai, Badrinath [9188-18] S4, [9202-23] S5, [9205-9] S3
Vadawale, Santosh V. [9213-43] S10, [9215-17] SPMon
Vagovic, Patrik [9207-35] S9
Vaia, Richard [9160-75] S15
Vaicekauskas, Rimantas [9190-13] S3, [9190-23] S5
Valadan, Mohammadhassan [9198-32] S8
Valderrama, Jesus A. [9217-60] S9
Valdivia-Valero, Francisco J. [9164-112] SPWed
Valdivieso-González, Luis G. [9203-50] SPMon
Valdiviezo-Navarro, Juan Carlos [9216-3] S1, [9217-41] S5, [9221-2] S1
Valencia, Daniel [9180-15] S3

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Valencia, Jose Luis [9204-20] SPMon
Valenzise, Giuseppe [9217-10] S2
Valerio, Angel A. [9191-19] S6
Valev, Ventsislav K. [9163-10] S3, [9169-17] S4
Valle, Tim [9222-8] S2
Valles, Juan A. [9200-44] SPMon
Valley, John F. 9173 S3 Session Chair, [9173-9] S3
Valmalette, Jean Christophe [9187-6] S2
Valouch, Sebastian [9185-210] S3
Valušis, Gintaras 9199 Program Committee, [9199-19] S5
Valyukhov, Vladimir [9205-25] SPMon
Vampola, John L. [9219-9] S3
van Bree, Joost [9167-74] S15a
van Brug, Hedser [9205-10] S4, [9218-36] S8
van de Groep, Jorik [9162-47] S13
van de Nes, Arthur S. [9203-7] S2
van den Berg, Albert [9163-103] SPWed
van den Berg, J. W. G. [9167-13] S2b
van den Berg, Marius F. [9169-20] S4
van den Berg, Steven A. [9203-7] S2
van der Schaar, Mihaela 9217 Program Committee
Van Dorpe, Pol [9163-86] SPWed, [9169-17] S4
van Eijk, Alexander M. J. 9224 Conference Chair, 9224 S1 Session Chair, 9224 S10 Session Chair, 9224 S6 Session Chair, 9224 Track Chair, [9224-27] S6, [9224-28] S7, 9225 Track Chair, 9226 Track Chair, 9227 Track Chair
Van Erps, Jürgen [9192-14] S3
Van Gorp, Byron [9222-11] S3, [9222-12] S3
van Grol, Pascal [9192-2] S1
van Hulst, Niek F. 9163 Program Committee
van Iersel, Miranda [9224-27] S6
Van Liew, Seth [9213-30] S7
van Loef, Edgar [9213-5] S1, [9214-9] S3
Van Roy, Willem [9167-12] S2b
van Sark, Wilfried G. J. H. M. 9178 Program Committee, 9178 S5 Session Chair, [9178-1] S1
Van Stryland, Eric W. 9181 S2 Session Chair, [9181-1] S1, [9181-18] S4
van 't Erve, Olaf M. J. 9167 Program Committee, [9167-104] S18b, [9167-95] S17b
van Turnhout, Maarten [9192-2] S1
van Waeyenberge, Bartel [9167-70] S14
van Weperen, I. [9167-13] S2b
Vanden Bout, David A. 9165 S6 Session Chair, [9165-19] S5
Vandendriessche, Stefaan [9181-12] S3
Vandenrijt, Jean-François [9203-20] S5, [9204-14] S3
Vandermierden, Nicholas R. [9223-4] S1
Vanderwerff, Kelly J. [9218-41] S9, [9218-42] S9
Vandewal, Koen [9180-13] S3, [9184-20] S5
Vanhove, Emilie [9196-11] S3
Vanier, Peter E. 9213 Program Committee, [9215-1] S1
Vanmaekelbergh, Daniel [9178-4] S2
Vannbel, Maarten K. [9181-42] SPWed
Vannoni, Maurizio 9208 Program Committee, 9208 S1 Session Chair, [9208-17] S4, [9208-2] S1, [9210-1] S1
Vardanyan, Gagik A. [9182-44] SPWed, [9182-47] SPWed
Vardeny, Z. Valy 9165 S10 Session Chair, [9165-34] S3, [9165-34] S9, 9184 S4 Session Chair
Vargas-Rodriguez, Everardo [9200-45] SPMon, [9200-47] SPMon
Vartiainen, Ismo J. [9210-11] S3, [9210-6] S2
Vasile, Eugeniu [9172-33] S8
Vasile, Massimiliano [9226-6] S1
Vasilescu, Dan Sorin [9171-34] SPWed
Vasiliauskas, Andrius [9163-94] SPWed, [9178-28] SPWed
Vašinek, Vladimír [9193-40] SPMon, [9193-53] SPMon, [9224-53] SPMon
Vaškelis, Šarunas [9172-20] S5
Vaskin, Alexander [9163-123] SPWed
Vaskin, Alexander V. [9161-22] S5
Vásquez-Báez, Ingrid R. [9192-5] S1
Vatterodt, Sebastian [9172-4] S1
Vauderwange, Oliver [9188-10] S2, [9188-14] S3, [9188-15] S3
Vayá, Ignacio [9165-49] S14
Vaynman, Semyon [9208-5] S2, [9208-8] S2
Väyrynen, Juha [9192-49] SPMon
Vayssieres, Lionel 9174 Program Committee, 9176 Program Committee, 9176 S2 Session Chair, [9176-3] S1
Vaz, C. A. F. [9167-32] S5
Vazquez- Dorrío, Benito 9203 Program Committee, [9204-20] SPMon
Vdovin, Gleb V. [9193-17] S4, [9194-13] S3, [9194-31] S7, [9217-77] SPMon, [9217-8] S1
Vedda, Anna [9213-51] SPMon
Veelaert, Peter [9184-53] SPWed
Veillette, Audrey [9192-9] S2
Veilleux, James [9219-1] S1
Vela, Elizabeth [9218-36] S8
Velasco, Mary Grace M. [9169-10] S3
Velasco-Gutiérrez, Cristian R. [9164-122] SPWed
Velazquez-Gonzalez, Jesus S. [9194-17] S4
Veleshchuk, Vitaliy P. [9170-50] SPWed
Velicu, Silviu [9226-23] S7
Velizhanin, Kirill A. [9163-14] S4
Vella, Jarrett [9181-23] S6
Velotta, Raffaele [9198-32] S8
Velu, Sabareesh K. P. [9164-102] SPWed
Vemuri, Krishna Krishna [9160-32] S7
Vencill, Lindsey M. [9188-22] S4
Venkataraman, Vivek [9162-29] S8
Venkatesan, Sriram [9207-21] S6
Venkitesh, Deepa [9202-22] S5
Venugopalan, Vasan [9164-28] S6
Vera-Dimas, Jose Gerardo [9192-50] SPMon
Verbiest, Thierry [9163-128] SPWed, [9181-12] S3, [9181-42] SPWed
Vercnocke, Andrew J. [9212-48] SPMon
Vercruysse, Dries [9163-86] SPWed
Verellen, Niels [9163-86] SPWed, [9169-17] S4
Veres, Janos [9185-132] S8
Vergara-Toloza, Rafael O. [9181-19] S4, [9182-22] S5
Vergeles, Sergey [9160-36] S7
Vergnaud, Céline [9167-90] S17a
Verhagen, Ewold 9163 S8 Session Chair, [9163-48] S12
Verma, Anuradha [9176-21] S6
Verma, Prabhat 9169 Conference Chair, 9169 S2 Session Chair, 9169 S6 Session Chair, [9169-15] S4, [9169-26] S6, [9169-7] S2
Vernek, Edson [9167-94] S17b
Vernier, Nicolas [9167-52] S10
Vernon, Emerson [9213-28] S7
Vernon, Kristy C. [9163-89] SPWed
Véron, Anna C. [9184-5] S2
Veronese, Ivan [9213-51] SPMon
Veronis, Georgios [9162-50] S14
Verrall, Mark [9185-107] S2
Verreet, Bregt [9184-2] S1
Vervaeke, Michael [9192-14] S3
Vescovo, Elio [9209-17] S5
Vetro, Anthony 9217 Program Committee
Vetrone, Fiorenzo [9199-33] S8
Vezzoli, Stefano [9163-3] S2
Vico Triviño, Noelia [9162-28] S8
Victorette, Milena Won Dias [9204-18] S4
Vidal, Estefania [9182-15] S3
Viefhaus, Jens [9210-22] S5
Viera-González, Perla M. [9188-24] SPMon
Vigil, Genevieve [9166-17] S2
Vignes, Ryan M. [9211-14] S4
Vigueras Zuñiga, Marco O. [9164-105] SPWed
Vijayakumar, Anand [9194-23] S6
Vijayraghavan, Karun [9199-3] S1
Vikhlinin, Alexey A. [9208-5] S2, [9208-6] S2, [9208-7] S2
Vila, Laurent [9167-81] S16a, [9167-90] S17a
Vilhena, Henrique [9162-37] S11
Villa Hernández, José de Jesús [9203-23] S5, [9203-26] S6
Villalobos, Guillermo [9161-13] S3, [9202-47] S10
Villanueva, Carlos [9219-11] S3
Villaseñor-Mora, Carlos [9221-22] S3
Vinci, Robert [9215-2] S1
Vincze, Laszlo 9209 Program Committee
Virganavicius, Dainius [9170-57] SPWed
Vishnyakov, Alexei V. [9220-29] SPMon
Vismara, Marcus V. G. [9184-5] S2
Viswanathan, Kartik [9216-14] S4
Vitasek, Jan [9193-40] SPMon, [9224-53] SPMon
Vitebskiy, Ilya [9162-61] S16
Vítek, Stanislav [9217-17] S2, [9217-47] S7, [9217-73] SPMon
Vitiello, Miriam S. 9199 Program Committee, [9199-17] S4
Vitkavage, Daniel J. [9179-20] S4
Vitta, Pranciskus [9190-13] S3
Viveros, Leamon [9199-26] S7
Vivo, Amparo [9207-32] S9
Vivo, Amparo 9206 Program Committee
Vlad, Valentin I. [9171-12] S3
Vladár, Andras E. [9173-5] S2
Vladoiu, Rodica [9172-33] S8
Vlaminck, Vincent [9167-97] S18a
Vlasenko, Oleksandr I. [9170-50] SPWed, [9213-60] SPMon
Vlasik, Konstantin F. [9213-44] S10
Vo, Amanda [9212-29] S6
Vo, Thanh Phong [9163-133] SPWed
Vodungbo, Boris [9210-22] S5
Voelz, David G. [9224-21] S5, 9227 Program Committee
Voet, Eli J. [9226-12] S4
Vogelgesang, Matthias [9212-44] SPMon
Vogler, Uwe [9203-54] SPMon
Vogt, Harald [9212-23] S5
Voigt, Dirk [9203-7] S2
Voigt, Monika M. [9180-20] S4, [9184-42] S9
Voisiat, Bogdan [9180-5] S2, [9180-7] S2
Vojtech, Josef 9202 Program Committee, [9202-28] S6
Völkel, Reinhard [9203-54] SPMon
Völker, Sebastian F. [9184-93] SPWed
Volke-Sepúlveda, Karen P. 9164 S20 Session Chair, [9164-122] SPWed, [9164-82] S16
Vollheim, Birgit [9204-14] S3
Volova, Larisa T. [9198-43] SPMon
Volpe, Giorgio [9164-102] SPWed, [9164-103] SPWed, [9164-15] S3
Volpe, Giovanni S. 9164 S7 Session Chair, [9164-102] SPWed, [9164-103] SPWed, [9164-15] S3, [9164-66] S13, [9164-91] S19, [9164-95] SPWed
Voltz, Stephan [9192-33] S7
Volyar, Alexander Vladimirovich [9194-45] SPMon
Volz, Daniel [9183-7] S2
Vomiero, Alberto [9161-17] S4
von Bergmann, Kirsten [9167-34] S5
von Freymann, Georg [9162-24] S7
von Hauff, Elizabeth [9165-6] S2
von Kopylow, Christoph [9203-14] S3
von Korff Schmising, C. [9167-32] S5
von Roedern, Bolko 9179 Program Committee
von Seggern, Heinz [9183-42] S9
Vongsaysy, Uyxing [9184-68] SPWed
Vorndran, Shelby D. [9175-16] S5, [9175-17] S5, [9184-77] SPWed, [9188-5] S1
Vorobyov, V. V. [9160-11] S3
Voronine, Dmitri V. [9163-78] S18
Voronov, Alexander [9180-2] S1
Voronov, Dmitriy L. 9207 S6 Session Chair, [9207-6] S2
Vorontsov, Mikhail A. [9224-13] S3, [9224-30] S7, [9224-32] S7
Voroshilov, Pavel M. [9163-102] SPWed, [9163-93] SPWed
Voss, Lars F. [9213-39] S9
Vozianova, Anna V. [9160-82] S16
Voznyuk, Volodymyr [9167-46] S8
Vrees, Robert [9169-9] S3
Vroon, Zeger [9179-15] S3, [9179-17] S3
Vu, Anh-Duc [9164-45] S9, [9172-27] S7
Vuluga, Dumitru Mircea [9171-34] SPWed
Vyacheslav, Yunkin [9207-5] S1

W

Wacker, Andreas [9199-6] S2
Wacker, Irene [9187-13] S5
Wadell, Carl 9163 S18 Session Chair, [9163-36] S9
Wager, Jason [9219-13] S4
Waghmare, Umesh V. [9176-21] S6
Wagner, Brent K. [9189-2] S1
Wagner, Hans-Peter A. [9181-24] S6, [9181-31] S7
Wagner, Martin [9160-24] S5, [9169-33] S8
Wahlert, Frank [9210-10] S3
Waks, Edo 9162 S2 Session Chair, [9162-9] S3
Walasik, Wiktor [9182-12] S3
Walba, David M. 9182 Program Committee, 9182 S4 Session Chair, [9182-23] S5, [9182-38] S8, [9182-40] S7
Walczakowski, Michał [9199-2] S1
Waldeck, Dan [9220-10] S3
Walden-Newman, William [9168-19] S4
Walikainen, Dale R. [9218-1] S1, [9218-25] S6
Walker, Peter W. [9207-23] S7, [9222-22] SPMon, [9222-3] S1, [9222-4] S1
Wall, Christopher [9192-59] SPMon
Wallace, Cynthia [9226-3] S1
Wallace, John W. [9220-10] S3
Wallace, Margeaux L. [9208-9] S3
Wallentin, Jesper [9220-18] S5
Walls, Howard J. [9174-19] S5
Walsh, Kevin M. [9226-17] S5
Walter, Andrew [9209-17] S5
Walters, Joseph [9179-32] S6
Wan, Wenjie [9198-39] S9
Wang, An-Ting [9193-56] SPMon
Wang, Bao-Hua [9224-48] SPMon
Wang, Bingjie [9193-9] S2, [9203-35] S8
Wang, Chang-Han [9160-69] S14
Wang, Chao [9200-56] S2
Wang, Chaowei [9204-26] SPMon
Wang, Chen [9160-40] S8
Wang, Cheng [9184-34] S8
Wang, Chenggong [9183-87] SPWed
Wang, Cheng-Yin [9185-136] S8
Wang, Chih-Ming [9160-83] S17, [9160-92] SPWed
Wang, Chunmei [9173-4] S1
Wang, ChunXia [9163-85] SPWed
Wang, Chun-Yuan [9163-60] S14
Wang, Congjun [9202-53] S11
Wang, David H. [9181-19] S4
Wang, Dayong [9199-36] SPMon
Wang, Deli [9176-25] S7
Wang, Fan [9174-5] S1
Wang, Fan [9164-53] S11
Wang, Gang [9183-35] S8
Wang, Gang [9167-102] S18b
Wang, Ge 9212 Program Committee, 9212 S2 Session Chair, 9212 S7 Session Chair, [9212-28] S6, [9212-45] SPMon, [9212-47] SPMon, [9212-49] SPMon, [9212-6] S2
Wang, George T. [9160-97] SPWed, [9162-54] S15, [9162-6] S2, 9174 Program Committee, [9174-13] S3
Wang, Hai [9163-134] SPWed
Wang, Han [9164-74] S15
Wang, Han Chung [9162-30] S9
Wang, Heli 9176 Program Committee, 9176 S7 Session Chair, [9176-24] S7
Wang, Hong [9221-36] SPMon, [9221-37] SPMon, [9221-46] SPMon
Wang, Hong-Bo [9183-54] S12, [9183-57] SPWed, [9183-58] SPWed
Wang, Hongchang [9206-8] S2
Wang, Hsing-Lin [9184-97] SPWed

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Wang, Hsiu-Hsuan [9165-59] SPWed, [9165-65] SPWed
Wang, Hui-Feng [9183-35] S8
Wang, Jianjun [9200-4] S1
Wang, Jicheng [9163-18] S5
Wang, Jie [9205-8] S3
Wang, Jigang [9160-80] S16
Wang, Jin [9172-38] SPWed
Wang, Jing [9221-35] SPMon
Wang, Jingrong [9199-28] S7
Wang, Jinli [9204-26] SPMon
Wang, Jinnian 9221 Conference CoChair
Wang, Jun [9218-52] S11
Wang, Junxin [9170-37] S7
Wang, Kang L. [9184-57] SPWed
Wang, Ken X. [9168-3] S1, [9177-23] S5
Wang, Kerry [9213-26] S6
Wang, Kuan-Wen [9190-26] S6
Wang, Kuo-Chin [9184-25] S6
Wang, Lan [9163-3] S2
Wang, Lei [9176-26] S7
Wang, Lih-Ping [9177-27] SPWed
Wang, Lihui [9193-20] S4, [9193-50] SPMon
Wang, Lijuan [9224-47] SPMon
Wang, Lin [9217-66] S10
Wang, Lixin [9202-40] S8
Wang, Manyi [9221-45] SPMon
Wang, Min [9181-4] S1
Wang, Pei-Jen [9193-18] S4
Wang, Po Chuan [9183-64] SPWed
Wang, Po-Kang [9167-54] S10
Wang, Qi [9183-16] S4, [9183-65] SPWed, [9183-66] SPWed
Wang, Qian [9166-31] S4
Wang, Qiao 9221 Program Committee
Wang, Qingbo [9193-42] SPMon
Wang, Qinsheng [9198-21] S5
Wang, Qiuping [9211-17] SPMon
Wang, Qiuxian [9221-40] SPMon
Wang, Quan [9216-6] S2
Wang, Renjie [9183-4] S1
Wang, Shuai [9227-6] S1
Wang, Shubo [9163-68] S16
Wang, Shu-Lu [9193-56] SPMon
Wang, Sunglin [9170-14] S3
Wang, Tao [9202-31] S7
Wang, Tao [9176-20] S6, [9184-36] S8
Wang, Tianyu [9221-16] S2, [9221-9] S1
Wang, Ting [9216-22] S6
Wang, Tingting [9221-6] SPMon
Wang, Wei [9168-20] S4
Wang, Wei-Chung 9204 Program Committee
Wang, Wenhui [9218-17] S4, [9218-74] SPMon
Wang, Wen-Ting [9224-48] SPMon
Wang, Xiaoli [9208-5] S2, [9208-8] S2
Wang, Xiaosheng [9181-24] S6
Wang, Xiaoxin [9175-21] S6
Wang, Xudong [9174-26] S7
Wang, Yao [9224-31] S7
Wang, Yin [9192-55] SPMon
Wang, Yipei [9163-17] S5
Wang, Yongtian 9192 Program Committee
Wang, Yu [9160-55] S11
Wang, Yuan [9161-10] S2
Wang, Yuanxi [9198-20] S5
Wang, Yuchang [9192-22] S5, [9192-30] S6
Wang, Yudong [9161-7] S2
Wang, Yue [9183-40] S9, [9185-204] S1
Wang, Yueke [9163-18] S5
Wang, Yu-Jen [9167-54] S10
Wang, Yu-Jen [9182-36] S2
Wang, Yujie [9212-13] S3
Wang, Yunxin [9199-36] SPMon
Wang, Yu-Wei [9217-69] SPMon
Wang, Yuxin [9215-12] S4
Wang, Zhanshan 9206 Program Committee
Wang, Zhaolu [9199-12] S3
Wang, Zheng [9200-23] S3
Wang, Zhipeng [9218-3] S1, [9218-5] S1, [9218-57] S12, [9218-67] SPMon
Wang, Zi [9193-56] SPMon
Wang, Zilong [9163-3] S2, [9163-42] S11, [9184-89] SPWed
Wantz, Guillaume [9184-68] SPWed
Wäny, Martin [9192-33] S7
Ward, Andrew D. [9164-69] S14
Ward, Jon D. [9200-28] S4
Warde, Cardinal 9216 Program Committee
Warden, Robert [9226-3] S1
Warmann, Emily C. [9175-13] S4, [9175-14] S4
Warner, Stephen H. [9175-11] S3
Warren, Mial E. [9226-16] S5
Warwick, Tony [9207-6] S2
Wasapinyokul, Kamol [9205-14] S5
Washington, Aaron L. 9213 Program Committee, [9213-56] SPMon
Wasilewski, Wojciech [9225-3] S1
Wasilewski, Zbigniew R. [9199-2] S1
Wasserman, Daniel M. 9162 Program Committee
Watanabe, Eriko 9216 Program Committee
Watanabe, Kenji [9169-33] S8
Watanabe, Kento [9203-40] SPMon
Watanabe, Manabu [9214-1] S1
Watanabe, Takayuki [9199-14] S4
Watkins, Scott E. [9184-27] S7
Watkins, Simon [9174-2] S1
Watson, Michael D. 9226 Program Committee, 9226 S2 Session Chair, [9226-8] S2
Watson, Stephanie S. [9179-24] S4
Watts, Steve [9167-53] S10
Wattson, Matthew C. [9201-25] S6
Wayne, David T. 9224 S7 Session Chair, 9224 S9 Session Chair, [9224-17] S4, [9224-25] S6, [9224-26] S6, [9224-34] S8
Weatherwax, Michele S. [9192-24] S5
Webb, Lauren 9165 Program Committee
Webber, Matthew [9227-3] S1
Weber, Andreas [9202-9] S2
Weber, Mads [9167-27] S4b
Weber, Reed [9219-13] S4, [9219-14] S4
Weber, Verena [9181-43] SPWed
Weber, Wolfgang 9167 S5 Session Chair, [9167-39] S6
Wedel, Armin [9183-1] S1
Weder, Christoph [9201-12] S3
Wegener, Martin 9160 Program Committee, [9160-85] S17
Wegrowe, Jean-Eric 9167 Conference Chair, 9167 S11 Session Chair, [9167-60] S12
Wegrzynska, Karolina [9192-43] SPMon, [9192-53] SPMon
Wehrmann, Isabel [9167-75] S15a
Wehrspohn, Ralf B. 9162 Program Committee
Wei, Dahai H. [9167-96] S18a
Wei, David [9164-101] SPWed
Wei, Feifei [9169-31] S7
Wei, Haoyun [9203-53] SPMon
Wei, Hong [9163-35] S9
Wei, Hua [9213-1] S1, [9213-2] S1
Wei, Min [9174-28] S7
Wei, Ming-Dar [9194-36] S8, [9194-38] S8
Wei, Wei [9201-28] S7
Wei, Yankuan [9176-11] S3
Wei, Yu Shan [9165-17] S4
Weidenfeld, Susanne [9181-16] S4
Weigand, Markus [9167-32] S5, [9167-69] S14, [9167-70] S14
Weigum, Shannon E. [9166-4] S1
Weikle, Robert M. [9199-11] S3
Weiler, Mathias [9167-83] S16a
Weimer, Carl [9226-3] S1
Weinhardt, Lothar [9177-14] S3
Weisenburger, Siegfried [9169-21] S5
Weiss, Dieter [9167-10] S2a
Weisskopf, Martin C. [9208-16] S4, [9208-5] S2
Weitkamp, Timm [9207-32] S9, 9209 Program Committee, [9212-51] SPMon
Welch, Charles [9168-27] SPWed
Welch, Wayne [9193-14] S3
Wellard, Stanley J. 9219 Program Committee
Weller, Dieter [9201-5] S2
Wells, Martyn [9195-15] S4
Welsh, Dean M. [9183-13] S3
Wen, Baomei [9174-9] S3
Wen, Shuangchun [9167-17] S3a
Wenas, Yesaya C. [9174-5] S1
Wende, Wolfgang [9164-41] S8
Wenk, Paul [9167-75] S15a
Wenny, Brian [9218-23] S5, [9218-56] S12, [9218-75] SPMon
Wenzel, Gregory W. [9195-15] S4
Wenzl, Franz-Peter [9190-10] S2, [9190-28] S6, [9193-11] S3
Werner, James H. [9165-20] S5
Wesemann, Volker [9213-38] S9
Wessel, Jan C. [9214-3] S1
Wessels, Bruce W. [9167-42] S7, [9167-55] S10
Westbrook, Nathalie [9164-40] S7
Westin, Gunnar 9176 Program Committee, 9176 S5 Session Chair, [9176-13] S4
Wetzel, Christian 9190 Program Committee
Wey, Hocheon [9216-13] S4
Weyer, Cornelia [9193-21] S5
Weyrauch, Thomas 9224 Program Committee
Wheaton, Skyler [9166-26] S3, [9172-9] S3
Wheelwright, Brian M. [9175-11] S3, [9175-26] S7, [9175-4] S1
White, Alexander J. [9160-43] S9
White, Christopher D. [9193-4] S1, [9193-48] SPMon
White, Timothy J. [9181-19] S4, 9182 S2 Session Chair, [9182-1] S1, [9182-22] S5
Whitebook, Alan [9202-7] S2
Whitehead, Lorne A. [9191-19] S6
Whiteley, Clinton E. [9213-58] SPMon
Whitesides, George M. [9170-12] S2
Whitlon, Donna [9212-29] S6
Whitney, Chad M. [9215-2] S1
Whitworth, Guy L. [9183-40] S9
Whyte, Don [9178-25] SPWed
Wiater, Maciej [9199-15] S4
Wicharn, Surawut [9162-72] SPWed
Wicker, Josef [9219-6] S2
Wickremasinghe, Niranjala D. [9181-24] S6
Wicks, Gary W. [9226-25] S8
Widmann, Klaus [9209-21] S6, [9211-13] S4
Widmayer, Clay C. [9194-30] S7
Widyolar, Bennett K. [9191-11] S3
Wie, Jeong Jae [9181-19] S4
Wieczorek, Martin [9183-71] SPWed
Wiedemair, Justyna [9163-103] SPWed
Wiederrecht, Gary P. [9163-137] SPWed
Wiedmeyer, Stanley [9207-18] S5
Wiegand, J. [9167-99] S18a
Wielage, Heinz-Hermann [9188-14] S3
Wielgus, Maciej [9203-19] S5
Wierer, Jonathan J. [9174-13] S3, [9190-11] S3
Wierzchowiec, Piotr [9185-107] S2
Wiesendanger, Roland [9167-34] S5
Wiesmann, Joerg 9207 Program Committee
Wiesner, Ulrich B. [9160-103] SPWed, [9184-56] SPWed
Wiest, Wolfram [9212-53] SPMon
Wige, Eugen [9217-19] S3
Wiggin, Saul [9160-87] S17
Wiggins, Brenden [9213-10] S3
Wijayantha, Upul 9176 Program Committee
Wijewarnasuriya, Priyalal S. 9220 Conference Chair, 9220 S3 Session Chair, 9220 S4 Session Chair, 9220 S5 Session Chair
Wilcox, Thomas [9226-16] S5
Wilde, Fabian [9212-23] S5, [9212-5] S1
Wildeman, Jurjen [9165-20] S5
Wildman, Ricky D. [9179-21] S4
Wilfert, Otakar 9224 Program Committee
Wilhelmsen, Karl [9216-12] S3, [9216-60] SPMon
Wilhelmy, Jerry B. [9211-7] S2, [9211-8] S2
Wilke, Rudeger H. T. [9208-5] S2, [9208-6] S2, [9208-7] S2, [9208-9] S3
Wilkinson, James S. [9164-77] S15
Wilks, Regan G. [9177-14] S3
Will, Scott [9160-26] S6
Will, Stefan [9192-25] S5
Willard, Adam P. [9165-70] S3, [9165-70] S9
Willemann, Daniel P. [9203-24] S6
Willers, Cornelius 9192 Program Committee
Williams, Adrienne [9171-11] S3
Williams, Benjamin S. 9199 Program Committee
Williams, Garth J. 9209 Program Committee, [9209-5] S2, [9210-12] S3
Williams, Graeme M. [9183-16] S4, [9184-62] SPWed, [9184-63] SPWed
Williams, Jason [9212-14] S3, [9212-50] SPMon
Williams, Michael J. [9181-2] S1
Williams, Patrick K. [9195-15] S4
Williams, Philip S. [9174-19] S5
Williams, Richard T. 9213 Program Committee, [9213-20] S5, [9213-3] S1
Williams, Yana Z. 9195 Program Committee
Willot, Pieter [9181-12] S3
Wilpliez, Laurie [9180-17] S4
Wilson, Daniel W. [9222-11] S3, [9222-12] S3, [9222-13] S3
Wilson, Murray N. [9167-35] S5
Wilson, Robert S. [9218-1] S1, [9218-18] S4
Wilson, Simeon [9200-10] S2
Wilson, Stephen J. [9199-21] S6
Wilson, William L. [9168-4] S1, [9181-15] S4, [9201-32] S8, [9201-33] S8
Winge, David [9199-6] S2
Winget, Paul [9183-17] S4
Wingo, Dennis [9176-5] S1
Winston, Roland 9191 Conference Chair, 9191 S1 Session Chair, [9191-10] S3, [9191-11] S3, [9191-7] S3, [9191-8] S3, [9191-9] S3
Winter, Benjamin [9181-44] SPWed
Winterstein, Jonathan [9169-34] S8
Wippermann, Frank C. [9192-12] S3, [9192-13] S3, [9192-33] S7, [9193-28] S7
Wirth, Allan 9208 Program Committee, 9208 S2 Session Chair, [9208-13] S3
Wirth, Ralph [9190-20] S5
Witte, Christian [9164-78] S15
Wittmann, Bernhard [9225-17] S5
Wochnik, Angela [9207-21] S6
Wohlgemuth, John H. 9179 Conference CoChair, 9179 S3 Session Chair, 9179 S5 Session Chair, 9179 SPanel Panel Member, [9179-2] S1, [9179-305] SPlen, [9179-32] S6
Wojciechowski, Konrad [9184-22] S6
Wojciechowski, Michal [9199-15] S4
Wojcik, Michael J. [9208-12] S3
Wojda, Pawel R. [9209-26] S7
Wojtowicz, Tomasz [9199-15] S4, [9199-18] S5
Wolden, Colin A. [9178-25] SPWed
Wolf, Georg [9167-53] S10
Wolf, Jürgen 9219 Program Committee
Wolf, Michael [9167-6] S1b
Wolf, Stuart A. [9199-11] S3
Wolfberger, Archim [9185-218] S5
Wolfe, Robert E. [9218-9] S2
Wolfe, William L. [9186-8] S3
Wolfer, Pascal [9184-72] SPWed
Wolfson, Deanna L. [9169-30] S7
Woll, Arthur R. [9185-133] S8
Wolter, Boris [9167-34] S5
Woltersdorf, Georg [9167-96] S18a
Wong, Alexander [9193-24] S6, [9217-35] S5
Wong, Cathy Y. [9184-10] S3, [9184-10] S9
Wong, Chee Wei [9168-19] S4, 9170 Program Committee
Wong, Chung M. [9196-8] S3
Wong, Franco N. C. [9162-10] S3
Wong, Nan J. [9211-16] S4
Wong, Stanislaus S. [9176-26] S7
Woo, Han Young [9166-52] SPWed, [9166-53] SPWed, [9184-70] SPWed, [9184-8] S2, [9185-226] SPWed
Woo, Jeong Min [9170-56] SPWed
Woo, Seong-Hoon [9183-32] S7
Woo, ShinJae [9166-52] SPWed
Wood, Andrew P. 9192 Program Committee
Wood, James K. [9205-33] S5
Wood, Ryan [9167-23] S4a, [9167-24] S4a
Woodfield, Tim [9212-16] S4
Woodward, Hunter [9183-13] S3
Wooldridge, Eve M. 9196 Program Committee, 9196 S1 Session Chair, [9196-22] S6, [9196-23] S6
Woolf, Alexander J. [9164-50] S11

SPIE. CAREER CENTER

ADVANCE YOUR TECHNICAL CAREER

www.SPIECareerCenter.org

Stay informed

- See what engineering and technical jobs are available by using our exclusive job search tools

Gain exposure

- Post your CV/resume online for employers to see—it's free!

Build your network

- Attend our Job Fairs and enroll in SPIE educational courses

Go above and beyond

- Set up job alerts, access career-related articles and more

Contact Sara Liebert: +1 360 685 5600, info@spiecareercenter.org

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Woolfenden, James M. [9186-18] S5
Woolley, Adam T. 9166 Program Committee
Worden, Helen M. [9218-24] S5
Woronowicz, Michael S. [9196-22] S6, [9196-23] S6
Wöstmann, Michael [9210-10] S3
Wozniak, Peter [9188-10] S2, [9188-14] S3, [9188-15] S3
Wright, Ewan M. [9164-17] S4, [9186-15] S4
Wright, Jeremy B. [9162-54] S15, [9162-6] S2, [9174-13] S3
Wright, Jonathan S. [9213-56] SPMon
Wrobel, Jerzy [9199-15] S4, [9199-18] S5, [9199-34] SPMon
Wroblewski, Ronald J. [9224-16] S4
Wu, Aisheng [9218-14] S3, [9218-23] S5, [9218-31] S7, [9218-5] S1, [9218-55] S12, [9218-56] S12, [9218-60] SPMon, [9218-65] SPMon, [9218-75] SPMon
Wu, Albert T. [9200-6] S1
Wu, Chang-Qin [9184-95] SPWed
Wu, Che Wen [9162-11] S3
Wu, Cheng-Lung [9183-76] SPWed
Wu, Chensheng [9224-12] S3, [9224-14] S4, [9224-22] S5, [9224-35] S8, [9224-36] S8
Wu, Chih-I [9177-13] S3, [9183-64] SPWed, [9184-88] SPWed
Wu, Dangxin [9213-21] S5
Wu, Hao [9184-10] S3, [9184-10] S9
Wu, Haoli [9193-25] S6
Wu, Haoyu [9201-8] S2
Wu, Hong [9192-7] S2, [9216-4] S1, [9217-64] S7, [9220-5] S2
Wu, Jane [9226-5] S1
Wu, Jeong-Weon [9160-65] S13, [9185-104] S1
Wu, Jin-Jei [9182-50] SPWed
Wu, Junfeng [9212-6] S2
Wu, Lin [9163-37] S9
Wu, Meng-Yin [9165-23] S6
Wu, Ming-Wei [9167-103] S18b
Wu, Peng [9191-23] SPWed
Wu, Pin Chieh [9163-88] SPWed
Wu, Pin Chieh [9160-83] S17, [9160-92] SPWed, [9163-22] S6
Wu, Qin [9181-9] S2
Wu, Rui [9170-23] S4
Wu, Rui Fen [9194-20] S5
Wu, Tao [9202-31] S7, [9223-12] S3
Wu, Tao 9202 Program Committee
Wu, Ting-Hsiang [9164-79] S15
Wu, WenXuan [9166-31] S4
Wu, Xiangqian [9218-66] SPMon
Wu, Xiao [9201-6] S2
Wu, Xiaoqin [9163-17] S5
Wu, Yen-Ju [9170-3] S1
Wu, Yijian [9192-7] S2, [9193-41] S2
Wu, Yizheng [9167-29] S4b
Wu, Yuechen [9175-16] S5, [9175-17] S5, [9184-77] SPWed
Wu, Yu-Fu [9193-38] S9, [9193-44] SPMon, [9202-26] S6
Wu, Yu-Kun [9183-57] SPWed, [9183-58] SPWed
Wu, Zhouling [9203-33] S7, [9205-7] S3
Wuite, Gijs J. [9164-41] S8
Wulfhekel, Wulf [9167-39] S6
Wunderlich, J. 9167 Program Committee
Wurtz, Gregory A. [9160-38] S8, [9163-93] SPWed
Wyant, James C. [9186-1] S1, 9197 Program Committee, 9204 Program Committee, SC213
Wysocki, Aleksander L. [9167-68] S14
Wysocki, Theodore [9218-51] S11

X

Xia, Deyang [9172-38] SPWed
Xia, Guo [9163-17] S5
Xia, Jianlong [9181-9] S2
Xia, Liangping [9191-23] SPWed
Xia, Ruxiao [9223-12] S3
Xia, Younan 9161 Program Committee
Xiang, Chaoyu [9183-53] S12, [9183-82] SPWed
Xiang, Jie [9182-24] S5
Xiao, Gang [9205-7] S3
Xiao, Shuai [9200-22] S3
Xiao, Xianghui [9212-13] S3, [9212-14] S3, [9212-15] S3, [9212-22] S5, [9212-29] S6, [9212-37] S8
Xiao, Xiaoyin [9162-6] S2
Xiao, Xifeng [9224-21] S5
Xiao, Yiming [9185-104] S1
Xiao, Yun-Feng [9170-23] S4
Xie, Hongjie 9221 Program Committee
Xie, Huai-Yi [9163-135] SPWed
Xie, Junqi [9200-33] S4
Xie, Weiguang [9185-120] S5
Xie, Xiangsheng [9164-12] S3
Xie, Xudong [9194-35] S8
Xie, Yi [9182-2] S1
Xie, Yi [9199-20] S5
Xie, Yiyang [9163-85] SPWed
Xie, Yulong [9213-21] S5
Xing, Guichuan [9184-64] SPWed
Xing, Tingwen [9195-24] SPMon, [9203-44] SPMon
Xiong, Shaomin [9201-8] S2
Xiong, Xiaoxiong 9218 Conference Chair, 9218 S10 Session Chair, [9218-14] S3, [9218-16] S4, [9218-19] S4, [9218-2] S1, [9218-23] S5, [9218-3] S1, [9218-31] S7, [9218-5] S1, [9218-54] S12, [9218-55] S12, [9218-56] S12, [9218-57] S12, [9218-58] SPMon, [9218-6] S2, [9218-60] SPMon, [9218-65] SPMon, [9218-67] SPMon, [9218-75] SPMon, [9218-8] S2
Xiu, Xiaoyu [9217-24] S3, [9217-62] S10
Xomalis, Angelos [9160-67] S14
Xu, Bing [9227-16] S3, [9227-6] S1
Xu, Chris [9198-30] S7
Xu, Dangpeng [9200-4] S1
Xu, Hongxing 9163 Program Committee, [9163-25] S7, [9169-14] S4
Xu, Huiwen [9162-54] S15
Xu, Huiwen [9174-13] S3
Xu, Jianbin [9185-120] S5
Xu, Jimmy 9220 Program Committee
Xu, Lichao [9203-18] S4
Xu, Ling [9209-27] S7, [9209-28] S8
Xu, Man [9205-10] S4, [9218-36] S8
Xu, Minfei [9183-53] S12
Xu, Mingzhu [9221-18] SPMon
Xu, Ning [9221-43] SPMon
Xu, Qi [9178-18] S5
Xu, Qian [9227-13] S3, [9227-14] SPMon, [9227-15] SPMon
Xu, Qiang [9177-15] S4
Xu, Qiong [9212-6] S2
Xu, Rui [9183-35] S8
Xu, Shanhui [9198-5] S2
Xu, Weiwei [9218-72] SPMon
Xu, Xianfan [9169-16] S4, [9170-18] S4, 9173 Program Committee, 9178 Program Committee, 9178 S4 Session Chair, [9201-20] S5
Xu, Xiangdong [9170-47] SPWed
Xu, Xiaojian [9227-9] S2
Xu, Yifan [9179-16] S3
Xu, Yiqin Roger [9212-47] SPMon
Xu, Yong 9198 Program Committee, 9198 S6 Session Chair, [9198-13] S4, [9198-36] S9
Xu, Yuanjian [9226-15] S5
Xu, Zheng [9202-31] S7
Xu, Zhonkai [9175-20] S6
Xue, Jiangeng 9184 Program Committee

Y

Yaakobi, Barukh [9211-15] S4
Yabashi, Makina 9207 Program Committee, [9207-24] S7, [9208-1] S1, 9210 Conference Chair, [9210-17] S4, [9210-3] S1, [9210-6] S2, [9210-8] S3
Yablonovitch, Eli 9162 S12 Session Chair, [9162-44] S13, [9191-7] S3, [9201-21] S5
Yabuushi, Tomonori [9214-4] S1
Yadav, Hiralal L. [9191-18] S5
Yaffe, Omer [9181-9] S2
Yaga, Robert [9190-43] SPWed
Yakhou-Harris, Flora [9207-19] S5
Yamaguchi, Satoshi [9214-1] S1, [9214-4] S1
Yamamichi, Masaaki [9179-3] S1
Yamamoto, Hiroshi [9199-8] S2
Yamamura, Kazuya [9206-1] S1
Yamanaka, Riyo [9196-19] S5
Yamashita, Shinji [9162-32] S9
Yamauchi, Kazuto 9206 Program Committee, [9206-11] S3, [9206-5] S1, 9207 Program Committee, [9207-27] S8, 9208 Conference CoChair, 9208 S3 Session Chair, [9208-1] S1, [9210-8] S3
Yamazaki, Hiroshi [9207-24] S7
Yamazaki, Tatsuya [9178-20] S6, [9178-21] S6
Yambem, Soniya D. [9183-4] S1, [9183-86] SPWed, [9184-71] SPWed
Yan, Buyi [9165-42] S12
Yan, Fei [9160-89] SPWed
Yan, Feng [9185-219] S5
Yan, He 9184 Program Committee, 9184 S8 Session Chair, [9184-26] S7
Yan, Hong [9194-37] S8
Yan, Ping-Rui [9183-57] SPWed, [9183-58] SPWed
Yan, Yiran [9171-27] SPWed, [9171-29] SPWed
Yan, Zijie [9162-74] SPWed, [9164-80] S16
Yanai, Avner [9160-68] S14
Yandayan, Tanfer 9206 Program Committee, [9206-15] S4
Yaney, Perry P. 9171 Program Committee, [9171-32] S3, [9171-6] S2, [9226-27] S8
Yang, Bin [9169-13] S3
Yang, Bona [9183-72] SPWed
Yang, C. S. [9167-21] S3b
Yang, Chen [9161-19] S4
Yang, Chenying [9172-25] S6
Yang, Chih-Chung 9190 Program Committee
Yang, Chuan [9198-13] S4
Yang, Fan [9174-28] S7
Yang, Fan [9208-17] S4
Yang, Fu-Chin [9183-47] S10
Yang, Fugui [9206-6] S1
Yang, Ge [9213-15] S4, [9213-24] S6, [9213-28] S7, [9213-58] SPMon, [9213-59] SPMon, [9213-8] S2, [9213-9] S2, [9214-19] SPMon, [9214-6] S2
Yang, Henglong [9183-61] SPWed
Yang, Hoichang [9185-108] S2, [9185-138] SPWed
Yang, Hong [9170-23] S4
Yang, Ho-Soon [9195-11] S3
Yang, Huai [9182-35] S7
Yang, Jialin [9221-44] SPMon
Yang, Jianbo [9170-23] S4
Yang, Jie [9198-22] S6
Yang, Jingsong [9221-19] S2
Yang, Jinpeng [9165-58] SPWed
Yang, Kai [9160-81] S16
Yang, Kuang-Yu [9160-83] S17, [9160-92] SPWed
Yang, Lan [9198-17] S4
Yang, Lei [9216-4] S1
Yang, Li [9193-23] S6
Yang, Ping [9227-16] S3, [9227-6] S1
Yang, Qingjun [9216-61] SPMon
Yang, See-Hun [9167-67] S14
Yang, Steven T. [9194-30] S7
Yang, Su ji [9190-37] SPWed
Yang, Sui [9161-10] S2
Yang, Tsung-Hsun [9192-31] S6
Yang, Wanli [9177-14] S3
Yang, Wan-Ting [9168-10] SPWed
Yang, Wenchao [9184-95] SPWed
Yang, Xiaoping [9166-8] S1
Yang, Xuefei [9221-16] S2
Yang, Ya Tang [9164-51] S11
Yang, Yang 9184 Program Committee, [9184-29] S7
Yang, Ying [9183-28] S6, [9185-123] S5
Yang, Ying-Jay [9182-50] SPWed
Yang, Ying-Ying [9163-91] SPWed, [9224-48] SPMon
Yang, Yu-Chen [9190-34] SPWed
Yang, Zhongmin [9198-5] S2
Yann, Bretonniere [9171-24] S6
Yantara, Natalia [9184-44] S10, [9184-64] SPWed
Yao, Jie [9219-15] S4
Yao, Jimmy [9200-56] S2
Yao, Maoqing [9168-32] S2
Yao, Nan [9185-133] S8
Yao, Yao [9184-95] SPWed
Yao, Youwei [9208-8] S2
Yashchuk, Valeriy V. 9206 Program Committee, 9206 S1 Session Chair, [9206-16] S4, [9206-18] S5, [9206-2] S1, 9209 Program Committee, [9209-14] S5
Yatagai, Toyohiko 9216 Program Committee
Yates, Brian W. 9206 Program Committee, 9207 Program Committee
Yavorskiy, Dmitriy [9199-34] SPMon
Yavuz, Serdar [9168-25] SPWed
Yazgan, Başak [9172-29] S7
Ye, Byeong-Uk [9161-42] SPWed, [9170-40] S8
Ye, Huapeng [9170-33] S6
Ye, Yan [9217-24] S3, [9217-62] S10
Ye, Yidong [9194-37] S8
Yeamans, C. [9211-7] S2
Yeckel, Andrew [9213-26] S6, [9213-36] S8
Yee, Ki-Ju [9163-100] SPWed, [9168-16] S3, [9195-22] SPMon
Yeh, Chien-Hung [9193-38] S9, [9193-44] SPMon, 9202 Program Committee, [9202-26] S6
Yeh, Chih Ting [9177-13] S3
Yeh, J. Andrew [9193-18] S4
Yeh, Yu-hsiang [9190-34] SPWed
Yellowhair, Julius [9175-20] S6, [9175-8] S2, [9191-21] S6
Yelton, William Graham [9174-35] S8
Yen, Cheng-Hsiung [9190-34] SPWed
Yen, Chih-Feng [9168-10] SPWed
Yeng, Yi Xiang [9170-34] S6, [9178-10] S3
Yepiz Escalante, Adad [9194-40] SPMon
Yermolenko, Sergey B. [9166-46] SPWed, [9166-49] SPWed
Yersin, Hartmut 9183 S10 Session Chair, 9183 S9 Session Chair, [9183-22] S5
Yeu, Yeon [9223-16] S4
Yi, Allen [9195-3] S1
Yi, Chenyi [9184-23] S6
Yi, Kui [9196-21] S5
Yi, Yeonjin [9171-18] S5
Yilmaz, Nazmi [9188-27] SPMon
Yin, Guikun [9216-56] SPMon
Yin, Jing [9210-15] S4, [9210-16] S4
Yin, Jing-Wen [9183-35] S8
Yin, Jun [9163-3] S2
Yin, Shaoyun [9191-23] SPWed
Yin, Shizhuo 9190 Track Chair, 9198 Track Chair, 9199 Track Chair, 9200 Conference Chair, 9200 S4 Session Chair, 9200 Track Chair, [9200-29] S4, [9200-32] S4, [9200-55] SPMon, [9200-56] S2, 9201 Track Chair, 9202 Track Chair, 9220 Track Chair
Yin, Xiaobo [9161-10] S2
Yin, Yu-Feng [9161-28] S6
Yitzhaky, Yitzhak [9224-50] SPMon
Yoda, Hiroaki 9167 S10 Session Chair, [9167-48] S9
Yohannes, Teketel 9184 Program Committee
Yokoo, Atsushi [9162-27] S8
Yokoyama, Daisuke 9183 S7 Session Chair, 9183 S8 Session Chair, [9183-12] S3
Yokoyama, Hisanobu [9179-3] S1
Yonezawa, Keiichiro [9165-58] SPWed
Yoo, Jinkyoung [9174-6] S2
Yoo, Seunghyup [9183-31] S7, [9183-55] S12, [9183-69] SPWed
Yoo, Seung-Jun [9183-24] S6, [9184-88] SPWed
Yoo, Wook Jae [9223-20] SPMon
Yoon, Dong Ki [9171-18] S5
Yoon, Hee Chang [9190-38] SPWed
Yoon, Jungbum [9167-69] S14
Yoon, Tae-Hoon [9182-45] SPWed
Yoon, Won-Jin [9161-35] SPWed, [9161-36] SPWed, [9161-37] SPWed, [9161-38] SPWed, [9161-45] SPWed, [9170-48] SPWed
Yoon, Yong Hee [9166-56] SPWed
Yoshida, Hiroyuki [9182-28] S6
Yoshida, Kou [9183-91] S8
Yoshikawa, Hideki [9179-3] S1
Yoshimatsu, Toshihide [9199-8] S2
Yoshino, Kenji [9184-24] S6
Yost, Bradley [9160-14] S3
You, Chong [9221-32] SPMon
You, Chun-Yeol [9167-69] S14
Youn, Wooram [9183-53] S12
Young, Henry D. [9171-11] S3
Young, Hunter K. [9212-29] S6
Youngworth, Richard N. 9188 Program Committee, 9188 S3 Session Chair, 9195 Conference Chair, [9195-1] S1, [9195-5] S2, SC003
Younis, Osama M. [9182-5] S1
Youssef, Tareq [9165-71] S14
Yu, Bo [9215-1] S1
Yu, Chungyi [9193-19] S4
Yu, Feihong [9216-36] S9
Yu, Francis T. S. 9216 Program Committee
Yu, Hengyong [9212-49] SPMon, [9212-6] S2
Yu, Jeong Heon [9166-57] SPWed

INDEX OF AUTHORS, CHAIRS, AND COMMITTEE MEMBERS

Bold = SPIE Member

Yu, Jia [9220-32] S4
Yu, Jirong [9223-9] S3
Yu, Jun Ho [9180-12] S3
Yu, Kristie [9218-38] S8
Yu, Lihua [9209-31] SPMon
Yu, Lingyao [9164-26] S5
Yu, Liyang [9185-111] S3
Yu, Nian Nian [9201-28] S7
Yu, Xiaobai [9175-21] S6
Yu, Yanlei [9182-39] S8
Yu, Yeh-Wei [9200-19] S3, [9200-22] S3, [9201-37] SPMon
Yu, Yifei [9198-19] S5
Yu, Zhibin [9183-30] S7
Yu, Zongfu [9160-34] S7, [9163-57] S14
Yu, Zong-Ru [9203-17] S4
Yuan, Chengxun [9200-55] SPMon
Yuan, Jun [9163-85] SPWed
Yuan, Lin [9217-12] S2
Yuan, Mengdi [9217-6] S1
Yuan, Xiaocong [9164-54] S11
Yuan, Yongbo [9185-134] S8
Yuen, Isaac [9164-8] S2
Yuji, Ikeda [9193-51] SPMon
Yuksel, Heba [9204-8] S2, 9224 Program Committee, 9224 S4 Session Chair, [9224-2] S1
Yumoto, Hirokatsu [9206-5] S1
Yun, Binfeng [9163-54] S13
Yun, Feng [9172-38] SPWed
Yun, Minseong [9185-136] S8, [9185-221] S5
Yunkin, Vyacheslav [9207-2] S1
Yurkevich, Oksana [9207-44] SPMon
Yurkov, Mikhail V. [9210-10] S3
Yuste, Rafael [9164-33] S6
Yuyama, Ken-ichi [9164-83] S17
Yvind, Kresten [9162-67] S18
Yzuel, María J. 9188 Program Committee, 9192 Program Committee, 9216 Program Committee

Z

Zabiliute, Akvile [9190-13] S3
Zabler, Simon A. [9212-53] SPMon
Zabolotna, Nataliya I. [9166-39] SPWed, [9166-40] SPWed, [9205-30] SPMon
Zacharias, Helmut [9210-10] S3
Zacharias, Richard A. [9211-1] S1, [9211-2] S1
Zadrovicz, Katy [9175-2] S1
Zafar, Sayem [9177-2] S1
Zagolla, Volker [9175-12] S3
Zajczyk, Anna [9213-7] S2
Zakariya, Abdullah J. [9190-39] SPWed
Zakeeruddin, Shaik M. [9184-23] S6
Zakharchenko, Alexandr A. [9213-48] SPMon
Zakharov, Valery P. [9198-3] S1, [9217-72] SPMon
Zakharuk, Zinajida [9213-52] SPMon, [9213-53] SPMon
Zaman, Mohammed Shahriar [9171-30] SPWed
Zambon, Véronique [9188-16] S4
Zandbergen, Sander [9186-14] S4
Zangrando, Marco [9207-14] S4, [9208-4] S1, 9210 S4 Session Chair, [9210-2] S1, [9210-22] S5
Zanni, Martin T. [9165-18] S5
Zappettini, Andrea [9213-55] SPMon
Zápražný, Zdenko [9207-35] S9
Zaretski, Aliaksandr V. [9185-129] S7
Zarovski, Valer N. [9172-33] S8
Zarubin, Andrei [9213-16] S4
Zasedatelev, Anton Vladimirovich [9163-125] SPWed
Zaslansky, Paul [9212-40] SPMon
Zaumseil, Jana [9168-5] S1, [9183-43] S9
Zaumseil, Peter [9207-5] S1
Zavada, John M. 9166 Program Committee, 9199 Conference Chair, 9199 S1 Session Chair
Zavala, Bob T. [9204-16] S4
Zavala, Lauro [9168-33] S4
Zaverton, Melissa A. [9170-14] S3
Zayas-Rivera, Zaylis [9211-13] S4
Zayats, Anatoly V. [9160-20] S4, [9160-27] S6, [9160-38] S8, [9163-116] SPWed, [9163-19] S5, [9163-93] SPWed
Zaytsev, Kirill I. [9216-34] S9
Zeilinger, Anton [9225-17] S5
Zeitoun, Philippe [9210-22] S5
Zellinger, Louis [9222-15] S4
Zeman, Miro [9179-15] S3, [9179-17] S3
Zemánek, Pavel [9164-100] SPWed, [9164-116] SPWed, [9164-118] SPWed, [9164-18] S4, [9164-96] SPWed
Zeng, Beibei [9184-47] S10, [9185-207] S2
Zeng, Bi Jian [9201-28] S7
Zeng, Danli [9185-104] S1
Zeng, Xie [9160-17] S4, [9161-18] S4, [9166-16] S2, [9169-8] S2, [9170-19] S4
Zenobi, Renato 9169 Program Committee
Zerbino, Raúl L. [9202-64] SPMon
Zerrad, Myriam [9162-43] S12
Zeschke, Thomas [9206-7] S2
Zettl, Alex [9160-24] S5, [9169-33] S8
Zgarian, Roxana [9171-9] S2
Zghal, Mourad [9170-42] S8, [9188-1] S1, [9194-10] S3, [9194-43] SPMon, [9194-44] SPMon, [9200-16] SPMon, [9200-27] S4
Zha, Qiaozhi [9202-31] S7
Zhai, Tianrui [9163-52] S12
Zhan, Chuanlang [9184-9] S2
Zhan, Qiwen 9187 Program Committee
Zhang, Andxy Lei [9185-231] SPWed
Zhang, Baohao [9216-56] SPMon
Zhang, Bin [9192-52] SPMon
Zhang, Boyang [9163-119] SPWed
Zhang, Chen [9183-35] S8
Zhang, Chenchu [9204-26] SPMon
Zhang, Chenji [9198-12] S4
Zhang, Congcong [9217-32] S4
Zhang, Cuiyu [9182-25] S5
Zhang, Cunlin [9199-10] S3
Zhang, Dai [9169-20] S4
Zhang, Daimeng [9160-59] S12
Zhang, Di [9203-18] S4, [9216-40] SPMon
Zhang, Dongdong [9164-128] SPWed
Zhang, Hao [9200-23] S3
Zhang, Hu [9192-15] S3
Zhang, Jin Zhong 9176 Program Committee
Zhang, Jinping [9173-16] S4
Zhang, Junce [9174-18] S4, [9174-22] S6
Zhang, Junxiang [9185-135] S8
Zhang, Lanying [9182-35] S7
Zhang, Le [9183-91] S8
Zhang, Lei [9185-103] S1
Zhang, Lei [9160-80] S16, [9162-17] S5
Zhang, Lin [9207-9] S2
Zhang, Ling [9163-91] SPWed
Zhang, Lu [9221-34] SPMon, [9221-38] SPMon
Zhang, Miluo [9171-27] SPWed
Zhang, Mingsheng [9170-33] S6
Zhang, Nan [9160-17] S4, [9161-18] S4, [9166-16] S2, [9169-8] S2, [9170-19] S4
Zhang, Ning [9227-13] S3
Zhang, Peng [9161-10] S2
Zhang, Qi [9203-33] S7
Zhang, Qing [9175-21] S6
Zhang, Shengen [9178-15] S4
Zhang, Shu [9164-99] SPWed
Zhang, Shuang [9215-15] SPMon
Zhang, Shuqun [9217-74] SPMon, [9217-75] SPMon
Zhang, Shuyan [9172-4] S1
Zhang, Song 9203 Program Committee, 9203 S3 Session Chair, [9203-37] S9
Zhang, Tao [9180-19] S4
Zhang, Tao [9164-42] S8
Zhang, Tian [9216-63] SPMon, [9216-64] SPMon
Zhang, Tianhang [9164-121] SPWed
Zhang, Tiantian [9167-3] S1a, [9167-9] S2a
Zhang, Wei [9167-97] S18a
Zhang, Wei [9194-37] S8
Zhang, Weidong [9199-26] S7
Zhang, Weihua [9163-51] S12
Zhang, William W. [9208-19] S3, [9208-5] S2
Zhang, Xi [9165-27] S7
Zhang, Xiang 9160 Program Committee, [9161-10] S2, [9162-76] S18, [9163-138] S8, 9200 Program Committee, [9205-4] S2
Zhang, Xiao Ping [9221-10] S1, [9221-29] S3
Zhang, Xinchi [9216-6] S2
Zhang, Xingyu [9181-40] SPWed
Zhang, Xinhui [9167-29] S4b
Zhang, Xinping [9163-52] S12
Zhang, Xuecang [9168-15] S3
Zhang, Xue-jun [9173-16] S4
Zhang, Xuesong [9217-76] SPMon
Zhang, Xufeng [9167-79] S15b
Zhang, Yifei [9205-8] S3
Zhang, Yingjie [9183-16] S4, [9183-66] SPWed
Zhang, Yingwen [9194-7] S2, [9225-13] S4
Zhang, Yonghe [9223-21] SPMon
Zhang, Yu Ping [9172-26] S7
Zhang, Yuanyang [9216-61] SPMon
Zhang, Yueguang [9172-25] S6
Zhang, Yuquan [9164-54] S11
Zhang, Zhengyi [9168-19] S4
Zhang, Zhenwei [9199-28] S7
Zhang, Zhiguo [9220-32] S4
Zhang, Zhongyu [9173-16] S4
Zhang, Zhuo-yong [9184-96] SPWed, [9199-28] S7
Zhang, Ziyu [9204-26] SPMon
Zhang, Zonghua [9204-7] S2
Zhao, Baosheng [9207-42] SPMon
Zhao, Dong [9203-35] S8
Zhao, Dongyu [9182-6] S2
Zhao, Hui [9198-18] S5
Zhao, Huinan [9215-15] SPMon
Zhao, Jiang [9203-35] S8
Zhao, Jianhua [9167-29] S4b
Zhao, Jimin [9198-34] S8
Zhao, Jiupeng [9170-27] S5, [9172-37] SPWed
Zhao, Jun [9163-42] S11
Zhao, Junjie [9174-19] S5
Zhao, Kai [9218-62] SPMon
Zhao, Liang [9176-8] S2
Zhao, Liang [9216-33] S9
Zhao, Peng [9176-1] S1
Zhao, Peng [9181-18] S4
Zhao, Qibin [9162-75] S11
Zhao, Shuo [9182-29] S6
Zhao, Wei [9192-59] SPMon
Zhao, Weirui [9195-14] S4
Zhao, Xingyan [9170-1] S1
Zhao, Xun-Jie [9217-76] SPMon
Zhao, Yan [9216-31] S8
Zhao, Yaqin [9224-9] S2
Zhao, Yi [9183-54] S12, [9183-57] SPWed, [9183-58] SPWed
Zhao, Yu [9203-18] S4, [9216-40] SPMon, [9216-58] SPMon, [9217-68] SPMon, [9217-69] SPMon
Zhao, Yuejin [9192-7] S2, [9193-41] S2, [9195-17] S4, [9216-4] S1, [9217-64] S7, [9220-5] S2
Zhao, Yuning [9199-20] S5
Zhao, Zeng [9160-24] S5
Zhao, Zhu [9192-7] S2, [9195-17] S4, [9216-4] S1, [9220-5] S2
Zhdanov, Arseny Yu [9200-14] SPMon, [9200-35] SPMon, [9216-48] SPMon, [9216-57] SPMon
Zheludev, Nikolay I. 9160 Conference Chair, [9160-1] S1, 9163 Program Committee, [9163-22] S6, [9163-23] S6, [9163-3] S2
Zhen, Bo [9181-26] S6
Zheng, Benrui [9223-18] SPMon
Zheng, Bo-Ren [9217-55] SPMon
Zheng, Jun [9216-61] SPMon
Zheng, Lixin [9192-39] SPMon, [9192-41] SPMon
Zheng, Tianxiang [9216-31] S8
Zheng, Yanchang [9170-47] SPWed
Zheng, Yuanlin [9198-39] S9
Zheng, Zhenrong [9188-8] S2
Zheng, Zheshen [9162-10] S3
Zherdev, Denis A. [9216-32] S8
Zhernenkov, Mikhail [9209-15] S5
Zhi, Ya'nan [9200-38] SPMon, [9200-40] SPMon, [9224-52] SPMon, [9227-13] S3, [9227-15] SPMon
Zhigilei, Leonid V. [9180-10] S3
Zhong, Tom Xu [9167-54] S10
Zhong, Xin [9224-9] S2
Zhong, Zheqiang [9192-52] SPMon
Zhou, Bin [9221-27] SPMon
Zhou, Cong [9221-24] S3
Zhou, Dan [9192-39] SPMon
Zhou, Dayu [9201-18] S5
Zhou, Fan [9160-40] S8
Zhou, Guirong [9190-8] S2
Zhou, Hao [9216-28] S7
Zhou, Jiangfeng [9160-93] SPWed
Zhou, Jianying [9164-12] S3, [9182-32] S6
Zhou, Jun [9200-56] S2
Zhou, Lei [9160-83] S17, [9160-92] SPWed
Zhou, Libin [9216-65] S1
Zhou, Nan [9169-16] S4, [9170-18] S4, [9201-20] S5
Zhou, Ping [9195-17] S4
Zhou, Qingli [9199-10] S3
Zhou, Qirui [9216-27] S7
Zhou, Sumei [9216-56] SPMon
Zhou, Tang Jian [9194-37] S8
Zhou, Wei [9199-1] S1
Zhou, Wei 9173 Program Committee
Zhou, Wei [9207-31] S9
Zhou, Xiaobing 9221 Program Committee
Zhou, Xinxing [9167-17] S3a
Zhou, Yan [9216-61] SPMon
Zhou, Yang [9190-35] SPWed, [9190-42] SPWed
Zhou, Yicong [9216-50] SPMon, [9222-19] S4
Zhou, Yinhua [9183-46] S10, [9184-59] SPWed, [9184-61] SPWed
Zhou, You [9172-4] S1
Zhou, Yu [9224-47] SPMon, [9224-52] SPMon, [9227-13] S3, [9227-14] SPMon
Zhu, Chuanrui [9167-102] S18b
Zhu, Diling [9210-7] S2
Zhu, Furong [9185-208] S2
Zhu, Guohua [9160-28] S6, [9181-23] S6
Zhu, Hongwei [9195-24] SPMon
Zhu, Hongyang [9190-25] S6
Zhu, Huishi [9217-64] S7
Zhu, Jia [9161-10] S2
Zhu, Jian [9167-54] S10
Zhu, Kelli [9209-24] S7
Zhu, Lichun [9203-18] S4, [9216-40] SPMon, [9216-58] SPMon, [9217-69] SPMon
Zhu, Lingyan [9164-46] S9
Zhu, Linxiao [9160-34] S7, [9161-29] S6
Zhu, Meiping [9196-21] S5
Zhu, Minhao [9203-53] SPMon
Zhu, Peifen [9176-9] S2, [9190-16] S4, [9190-25] S6, [9190-30] S7
Zhu, Qiankun [9221-17] S2, [9221-9] S1
Zhu, Wenwu 9217 Program Committee
Zhu, Xiaodan [9183-30] S7
Zhu, Xiaoyang [9165-43] S12, [9181-6] S2, [9181-9] S2
Zhu, Yiting 9190 Program Committee, 9190 S2 Session Chair, [9190-14] S3, [9190-27] S6
Zhu, Zhaozhao [9177-18] S4, [9177-19] S4
Zhuang, Jiayan [9216-38] SPMon
Zhuang, Qiandong [9199-35] SPMon
Zhuang, Xiaowei 9169 Program Committee
Zhukovsky, Sergei V. [9160-66] S13
Zhuravleva, Mariya [9213-2] S1
Ziegler, Eric [9207-32] S9
Zimmerman, Kurt [9215-12] S4
Zink, Barry L. [9167-62] S12
Zlokazov, Evgeny Y. [9201-38] SPMon, [9201-4] S1, [9216-30] S8, [9216-53] SPMon
Zobrist, Tom [9216-60] SPMon
Zoghi, Shervin [9168-31] SPWed
Zollers, Michael W. [9188-11] S3, [9188-19] S4
Zong, Yutao [9179-9] S2
Zoombelt, Arjan P. [9185-134] S8
Zou, Chengmin [9217-31] S4
Zuccon, Sara [9163-107] SPWed, [9163-109] SPWed, [9177-24] S5, [9205-29] SPMon, [9207-22] S6, [9207-29] S8, [9207-41] SPMon
Žukauskas, Albertas [9192-36] S7
Žukauskas, Arturas [9190-13] S3, [9190-23] S5
Žumer, Slobodan [9182-11] S3
Zuo, Xia [9184-96] SPWed, [9199-28] S7
Zuppella, Paola [9163-107] SPWed, [9163-109] SPWed, [9177-24] S5, [9205-29] SPMon, [9207-22] S6, [9207-29] S8, [9207-41] SPMon
Zuraski, Steven M. [9224-11] S3
Zutere, Brigita [9216-49] SPMon
Zutic, Igor 9167 Program Committee, 9167 S13 Session Chair, [9167-1] S1a, [9167-101] S18b, [9167-21] S3b
Zverev, Alexei V. [9220-29] SPMon
Zvyagin, Andrei V. [9162-13] S4
Zweben, Carl H. SC218
Zyss, Joseph 9163 Program Committee

NOMINATE A COLLEAGUE

Honor your coworkers with an SPIE Award

The SPIE Awards Program is not only one of the most prestigious ways the Society recognizes excellence, but also one of the longest running SPIE Programs. Since 1959, SPIE has honored the best in optics and photonics for their significant achievements and contributions in advancing the science of light.

Gold Medal of the Society
Britton Chance Biomedical Optics Award
Biophotonics Technology Innovator Award
A.E. Conrady Award
Harold E. Edgerton Award
Dennis Gabor Award
George W. Goddard Award
Rudolf Kingslake Medal and Prize
G. G. Stokes Award
Chandra S. Vikram Award in Optical Metrology
Frits Zernike Award for Microlithography
Early Career Achievement Award
SPIE Educator Award
SPIE Technology Achievement Award
President's Award
Directors' Award
Joseph W. Goodman Book Writing Award

See **www. spie.org/awards** for details.

SPIE.

Submit your paper to an SPIE Journal

www.spie.org/journals

SPIE.

REGISTRATION

ONSITE REGISTRATION AND BADGE PICK-UP HOURS

Convention Center, Sails Pavilion (Upper Level)

Sunday 17 August · 7:00 am to 5:00 pm

Monday 18 August · 7:15 am to 5:00 pm

Tuesday 19 August · 7:30 am to 5:00 pm

Wednesday 20 August · 7:30 am to 5:00 pm

Thursday 21 August · 7:45 am to 4:00 pm

CONFERENCE REGISTRATION

Includes admission to all conference sessions, plenaries, panels, and poster sessions, admission to the Exhibition, Welcome Reception, Job Fair, coffee breaks, and a choice of proceedings. Student pricing does not include proceedings.

COURSE AND WORKSHOP REGISTRATION

Courses and workshops are priced separately. Course-only registration includes your selected course(s), course notes, coffee breaks, and admittance to the exhibition. Course prices include applicable taxes. Onsite, please go to Course Materials at the Marriott after you pick up your badge.

Multiple facilities may be used for courses; allow yourself enough time to register, pick up your materials and possibly walk to a nearby facility before your course begins.

EXHIBITION REGISTRATION

Exhibition-Only visitor registration is complimentary.

SPIE MEMBER, SPIE STUDENT MEMBER, AND STUDENT PRICING

• SPIE Members receive conference and course registration discounts. Discounts are applied at the time of registration.

• SPIE Student Members receive a 50% discount on all courses.

• Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

SPIE PRESS ROOM

SPIE registration area
Open daily 8:00 AM to close of registration

For registered press only. The press room provides meeting space, refreshments, access to exhibitor press releases, and Internet connections.

Press are urged to register before the meeting by emailing name, contact information, and name of publication to media@spie.org.

SPIE CASHIER

Convention Center, Sails Pavilion (Upper Level)
Open during registration hours.

REGISTRATION PAYMENTS

If you are paying by cash or check as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the SPIE Cashier.

RECEIPTS AND CERTIFICATE OF ATTENDANCE

Preregistered attendees who did not receive a receipt or attendees who need a Certificate of Attendance may obtain those from the SPIE Cashier at Badge Corrections and Receipts.

BADGE CORRECTIONS

Badge corrections can be made by the SPIE Cashier at the Badge Corrections station. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

REFUND INFORMATION

There is a US$50 service charge for processing refunds. Requests for refunds must be received by 7 August 2014; all registration fees will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions or Special Events purchased are not refundable.

U.S. GOVERNMENT CREDIT CARDS

U.S. Government credit card users: have your purchasing officer contact the credit card company and get prior authorization before attempting to register. Advise your purchasing agent that SPIE is considered a 5968 company for authorization purposes.

SPIE is the international society for optics and photonics, a not-for-profit organization founded in 1955 to advanced light-based technologies. The Society serves nearly 225,000 constituents from approximately 150 countries, offering conferences, continuing education, books, journals, and a digital library in support of interdisciplinary information exchange, professional growth, and patent precedent. SPIE provided $3.2 million in support of education and outreach programs in 2013.

ADVERTISERS INDEX

American Elements . . . . . .back cover
Photon Engineering. . . . . p. 283
Trioptics . . . . . inside front cover

SPIE.

stay connected
optics.org
daily coverage of the optics and photonics
industry and the markets that it serves
the business of photonics
optics.org

AUTHOR / PRESENTER INFORMATION

Speaker Check-In and Preview Station

Convention Center, Ballroom 6 Lobby (Upper Level)

Sunday through Thursday · 7:30 am to 5:00 pm

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. All oral presenters are requested to come to Speaker Check-In with their memory devices or laptops to confirm their presentation display settings.

Poster Setup Instructions

Convention Center, Hall B1 (Ground Level)

Monday 18 August · Setup 10:00 am to 4:30 pm, Session 5:30 pm to 7:30 pm

Wednesday 20 August · Setup 10:00 am to 4:30 pm, Session 5:30 pm to 7:30 pm

Poster presenters must set up their posters between 10:00 am and 4:30 pm on the day of their assigned presentation.

- Paper numbers will be posted on the poster boards in numerical order; please find your paper number and post your poster in the designated space.
- A poster author or coauthor is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their papers on their assigned board by 4:30 pm on the day of their presentation will be considered a "no show" and their manuscript will not be published.
- Presenters must remove their posters immediately after the poster session. Posters not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.

ONSITE SERVICES

Internet Access

Wired Internet Access

Convention Center, Ballroom 6 Lobby (Upper Level)

Complimentary wired Internet access is available; attendees can hook up their laptops or use provided workstations.

WiFi

B1 Lobby and Upper Level Lobbies

Complimentary wireless access is also available; instructions will be posted onsite.

SPIE Conference App

On your Smart Phone (iPhone, Adroid)

Search and browse the program, special events, participants, exhibitors, courses, and more. Free Conference Apps available for iPhone and Android phones.

SPIE Bookstore

Convention Center, Sails Pavilion (Upper Level)

The SPIE Bookstore is your source for the latest SPIE Press Books, Proceedings, and Education and Professional Development materials. Become an SPIE member, explore the Digital Library, take home a free SPIE poster, or buy a souvenir (tie, t-shirt, educational toys, and more).

SPIE Education Services

Convention Center, Sails Pavilion (Upper Level)

Browse course offerings and the other education services available: SPIE courses, videos, and CDs, as well as customized in-company courses.

SPIE Press Room

SPIE registration area
Open daily 8:00 AM to close of registration

For registered press only. The press room provides meeting space, refreshments, access to exhibitor press releases, and Internet connections.

Press are urged to register before the meeting by emailing name, contact information, and name of publication to media@spie.org.

SPIE Luggage and Coat Check

Convention Center, Hall A Lobby (Ground Level)

Sunday/Monday · 7:15 am to 6:00 pm

Tuesday/Wednesday · 7:30 am to 6:00 pm

Thursday · 7:45 am to 6:00 pm

Complimentary luggage, package, and coat storage are available. Please note hours; no late pickup available.

GENERAL INFORMATION

FedEx Kinko's

Convention Center, Hall B Lobby (Ground Level)
Monday through Thursday

Services include photocopying, faxing, printing services, and shipping. Office supplies are also available. Phone 619-525-5477

Restaurant and City Information

Convention Center, Hall B2 (Ground Level)
10:00 am to 6:00 pm

Services include sightseeing, shopping, and restaurant information.

Child Care Services

Marion's Childcare, Inc. Email: amy@hotelchildcare.com; Telephone: 619-303-4379, or 888-891-5029

NOTE: SPIE does not imply an endorsement nor recommendation of these services. They are provided on an "information only" basis for your further analysis and decision. Other services may be available.

Urgent Message Line

An urgent message line is available during registration hours: 619-525-6200

Lost and Found

Cashier, Convention Center, Sails Pavilion (Upper Level)

Open during Registration Hours

Found items will be kept at Cashier the duration of the meeting. At the end of the meeting, all found items will be turned over to the San Diego Convention Center Security, lost and found hotline: 619-525-5407.

FOOD AND BEVERAGE SERVICES

Coffee Breaks

Complimentary coffee will be served twice daily, at 10:00 am and 3:00 pm. Check individual conference listings for exact times and locations.

Sunday and Monday AM and PM: Upper Level Lobby

Tuesday and Wednesday AM and PM: Sails Pavilion (Upper Level)

Thursday AM: Sails Pavilion (Upper Level)

Thursday PM: Upper Level Lobby

Food and Refreshments for Purchase

Upper Level Lobby Service Carts

Sunday through Thursday · 9:00 am to 3:00 pm

Food Outlet – Exhibition Hall, Sails Pavilion (Upper Level)

Tuesday through Thursday · 11:00 am to 2:00 pm

Hot and cold snacks, hot entrees, deli sandwiches, salads, and pastries are available for purchase. Cash and credit cards accepted.

Desserts

Complimentary tickets for dessert snacks are included in course and conference attendee registration packets.

SPIE COURSES

CONTINUING EDUCATION.
RELEVANT TRAINING.
PROVEN INSTRUCTORS.

Bring top instructors to your desktop or facility for convenient, consistent and measurable learning—tailored to fit your schedule and meet your needs

www.spie.org/education

SPIE.

2. WAYS TO TRAIN

ONLINE COURSES.
- Ensure training consistency across multiple locations
- Managers can track student progress and completion
- Content is modular - students can train as time allows
- Course remains active for a full year to allow review

IN-COMPANY.
- Catalog of 1000+ courses to choose from
- Customizable content
- Instructor teaches at your facility
- Ideal for training large groups at one time

TRAVEL

With the countless number of things to see, do, taste and experience in San Diego, determining how to get around is as important as planning your itinerary. San Diego offers plenty of options for public transportation, be it by trolley, train, bus, taxi, ferry, or even a limousine. The easiest option is to rent a car, so you can roam freely through the vast and various San Diego regions. But if you're looking to save a buck or be eco-friendly, plan to make the most of San Diego's convenient and easy public transport options.

Learn more at www.sandiego.org

Taxi

Taxi service from the San Diego Airport to the downtown hotels is approximately $12 - $16 depending on traffic.

Shuttles

SuperShuttle

SPIE Optics + Photonics attendees will receive a $2 discount one way with an advance reservation. Make a reservation online or by phone by calling 1-800-258-3826.

Bayfront Shuttle

Bayfront Shuttle - $1 - Hop on the Big Bay Shuttle along the bay with stops at various hotels, Seaport Village, Navy Pier, Maritime Museum.

San Diego Trolley

Trolley cars travel above ground on light rail lines every 15 minutes. Learn more at www.sdcommute.com

Car Rental

Hertz Car Rental is the official car rental agency for SPIE Optics + Photonics. To reserve a car, identify yourself as a conference attendee using the Hertz Meeting Code CV# 029B0019. When booking from International Hertz locations, the CV # must be entered with the letters CV before the number, i.e. CV029B0019.

- Reserve online at www.Hertz.com
- In the United States call 1-800-654-2240
- In Canada call 1-800-263-0600, or 1-416-620-9620 in Toronto
- In Europe and Asia call a Hertz Reservation Center or travel agent
- Outside of these areas call 1-405-749-4434

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

Granting Attendee Registration and Admission

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, who in their sole opinion are not, or whose conduct is not, in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to any attendee, exhibitor, representative, or vendor who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

Misconduct Policy

SPIE is a professional, not-for-profit society committed to providing valuable conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members and meeting attendees. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violators will be asked to leave the event.

Identification

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued Photo ID at registration to collect registration materials.

Individuals are not allowed to pick up badges for attendees other than themselves. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

Capture and Use of a Person's Image

By registering for this event, I grant full permission to SPIE to capture, store, use, and/or reproduce my image or likeness by any audio and/or visual recording technique (including electronic/digital photographs or videos), and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

By registering for this event, I waive any right to inspect or approve the use of the images or recordings or of any written copy. I also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, I release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

Payment Method

Registrants for paid elements of the event, who do not provide a method of payment, will not be able to complete their registration. Individuals with incomplete registrations will not be able to attend the conference until payment has been made. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also pay with Cash.

Authors/Coauthors

By submitting an abstract, you agree to the following conditions:

- An author or coauthor (including keynote, invited, and solicited speakers) will register at the author registration rate, attend the meeting, and make the presentation as scheduled.
- A full-length manuscript (6-page minimum) for any accepted oral or poster presentation will be submitted for publication in the SPIE Digital Library, and printed conference Proceedings. (Some SPIE events have other requirements that the author is made aware of at the time of submission.)
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings and SPIE Digital Library (or via the requirements of that event).

Audio, Video, Digital Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use the materials presented in any meeting/course room, or in course notes on display without written permission. Consent forms for material presented in meeting rooms are available at Speaker Check-In. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media.

Exhibition Hall: For security and courtesy reasons, recordings of any kind are prohibited unless one has explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall.

Your registration signifies your agreement to be photographed or videotaped by SPIE in the course of normal business. Such photos and video may be used in SPIE marketing materials or other SPIE promotional items.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. Come to Speaker Check-In and test your laser pointer on our power meter. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Misuse of any laser pointer can lead to eye damage.

Access to Technical and Networking Events

Persons under the age of 18 including babies, carried or in strollers, and toddlers are not allowed in technical or networking events. Anyone 18 or older must register as an attendee. All technical and networking events require a valid conference badge for admission.

Underage Persons on Exhibition Floor Policy

For safety and insurance reasons:

- No persons under the age of 18 will be allowed in the exhibition area during move-in and move-out.
- Children 14 and older, accompanied by an adult, will be allowed in the exhibition area during open exhibition hours only
- All children younger than 14, including babies in strollers and toddlers, are not allowed in the exhibition area at any time.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

At SPIE events where wireless is included with your registration, SPIE provides wireless access for attendees during the conference and exhibition but cannot guarantee full coverage in all locations, all of the time. Please be respectful of your time and usage so that all attendees are able to access the internet.

Excessive usage (e.g., streaming video, gaming, multiple devices) reduces bandwidth and increases cost for all attendees. No routers may be attached to the network. Properly secure your computer before accessing the public wireless network. Failure to do so may allow unauthorized access to your laptop as well as potentially introduce viruses to your computer and/or presentation. SPIE is not responsible for computer viruses or other computer damage.

Mobile Phones and Related Devices Policy

Mobile phones, tablets, laptops, pagers, and any similar electronic devices should be silenced during conference sessions. Please exit the conference room before answering or beginning a phone conversation.

Smoking

For the health and consideration of all attendees, smoking is not permitted at any event elements, such as but not limited to: plenaries, conferences, workshops, courses, poster sessions, hosted meal functions, receptions, and in the exhibit hall. Most facilities also prohibit smoking in all or specific areas. Attendees should obey any signs preventing or authorizing smoking in specified locations.

Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

Event Cancellation

If for some unforeseen reason SPIE should have to cancel the event, registration fees processed will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

Confidential Reporting of Unethical or Inappropriate Behavior

SPIE is an organization with strong values of responsibility and integrity. Our Ethics Statement and Code of Professional Conduct contain general guidelines for conducting business with the highest standards of ethics. SPIE has established a confidential reporting system for staff & other stakeholders to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phone or through the website, and, if preferred, may be made anonymously. The web address is www.SPIE.ethicspoint.com and the toll free hotline number is 1-888-818-6898.

SPIE INTERNATIONAL HEADQUARTERS

PO Box 10
Bellingham, WA 98227-0010 USA
Tel: +1 360 676 3290
Fax: +1 360 647 1445
help@spie.org • www.SPIE.org

SPIE EUROPE OFFICES

2 Alexandra Gate
Ffordd Pengam, Cardiff, CF24 2SA UK
Tel: +44 29 2089 4747
Fax: +44 29 2089 4750
info@spieeurope.org • www.SPIE.org

SPIE. OPTICS + PHOTONICS

Printed Proceedings

If you are only interested in editor-reviewed papers from a single conference or want an archive of the conference that includes your paper, choose the printed book, available 6 weeks after the conference.

SPIE Optical Engineering + Applications

Vol#	Title/Editor	Price
9186	**Fifty Years of Optical Sciences at The University of Arizona** *(Greivenkamp, Dereniak, Barrett)*	$ 60
9187	**The Nature of Light: Light in Nature V** *(Shaw, Liang)*	$ 45
9188	**Optics Education and Outreach III** *(Gregory)*	$ 53
9189	**Photonic Innovations and Solutions for Complex Environments and Systems (PISCES) II** *(Todd, Lakhtakia)*	$ 45
9190	**Thirteenth International Conference on Solid State Lighting** *(Jiao, Huang, Kane, Dietz)*	$ 70
9191	**Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XI** *(Gordon, Winston)*	$ 53
9192	**Current Developments in Lens Design and Optical Engineering XV** *(Johnson, Mahajan, Thibault)*	$ 80
9193	**Novel Optical Systems Design and Optimization XVII** *(Gregory, Davis)*	$ 80
9194	**Laser Beam Shaping XV** *(Lizotte, Forbes)*	$ 70
9195	**Optical System Alignment, Tolerancing, and Verification VIII** *(Sasián, Youngworth)*	$ 53
9196	**Systems Contamination: Prediction, Measurement, and Control 2014** *(Carosso, Egges)*	$ 53
9197	**An Optical Believe It or Not: Key Lessons Learned III** *(Kahan)*	$ 53
9198	**Ultrafast Nonlinear Imaging and Spectroscopy II** *(Liu, Eichenholz)*	$ 70
9199	**Terahertz Emitters, Receivers, and Applications V** *(Razeghi, Zavada, Baranov, Pavlidis, Everitt)*	$ 60
9200	**Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications VIII** *(Yin, Guo)*	$ 80
9201	**Optical Data Storage 2014** *(Milster, Katayama)*	$ 60
9202	**Photonics Applications for Aviation, Aerospace, Commercial, and Harsh Environments V** *(Mendoza, Kress, Kazemi)*	$ 90
9203**	**Interferometry XVII: Techniques and Analysis** *(Creath, Schmit, Burke)*	$ 80
9204**	**Interferometry XVII: Advanced Applications** *(Gorecki, de Groot, Furlong, Novak)*	$ 53
9205	**Reflection, Scattering, and Diffraction from Surfaces IV** *(Hanssen)*	$ 60
9206	**Advances in Metrology for X-Ray and EUV Optics V** *(Asundi, Assoufid, Ohashi)*	$ 53
9207	**Advances in X-Ray/EUV Optics and Components IX** *(Khounsary, Morawe, Goto)*	$ 70
9208	**Adaptive X-Ray Optics III** *(Khounsary, O'Dell)*	$ 45
9209	**Advances in Computational Methods for X-Ray Optics III** *(Sanchez del Rio, Chubar)*	$ 70
9210	**X-Ray Free-Electron Lasers: Beam Diagnostics, Beamline Instrumentation, and Applications II** *(Yabashi, Hau-Riege, Moeller)*	$ 53
9211	**Target Diagnostics Physics and Engineering for Inertial Confinement Fusion III** *(Bell, Grim)*	$ 45
9212	**Developments in X-Ray Tomography IX** *(Stock)*	$ 80
9213	**Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XVI** *(James, Burger, Fiederle, Franks)*	$ 90
9214	**Medical Applications of Radiation Detectors IV** *(Roehrig, Barber, Furenlid)*	$ 45
9215	**Radiation Detectors: Systems and Applications XV** *(Barber, Grim)*	$ 45
9216	**Optics and Photonics for Information Processing VIII** *(Awwal, Iftekharuddin, Matin)*	$ 90
9217	**Applications of Digital Image Processing XXXVII** *(Tescher)*	$105
9218	**Earth Observing Systems XIX** *(Butler, Xiong, Gu)*	$100
9219	**Infrared Remote Sensing and Instrumentation XXII** *(Strojnik Scholl, Páez)*	$ 53
9220	**Infrared Sensors, Devices, and Applications IV** *(Sood, Wijewarnasuriya, LeVan, D'Souza)*	$ 60
9221	**Remote Sensing and Modeling of Ecosystems for Sustainability XI** *(Gao, Chang, Wang)*	$ 70
9222	**Imaging Spectrometry XIX** *(Mouroulis, Pagano)*	$ 53
9223	**Remote Sensin g System Engineering V** *(Puschell, Ardanuy)*	$ 53
9224	**Laser Communication and Propagation through the Atmosphere and Oceans III** *(Davis, van Eijk, Hammel)*	$ 80
9225	**Quantum Communications and Quantum Imaging XII** *(Meyers, Shih, Deacon)*	$ 53
9226	**Nanophotonics and Macrophotonics for Space Environments VIII** *(Taylor, Cardimona)*	$ 53
9227	**Unconventional Imaging and Wavefront Sensing 2014** *(Karr, Gamiz, Dolne)*	$ 45

**** Indicates volumes that will be available at the meeting. Other Proceedings will be available an average of 6 weeks after the meeting.**

SPIE NanoScience + Engineering

Vol#	Title/Editor	Price
9160	**Metamaterials: Fundamentals and Applications 2014** *(Zheludev, Engheta, Noginov)*	$125
9161	**Nanophotonic Materials XI** *(Cabrini, Schwartzberg, Lérondel, Mokari)*	$ 70
9162	**Active Photonic Materials VI** *(Subramania, Foteinopoulou)*	$100
9163	**Plasmonics: Metallic Nanostructures and Their Optical Properties XII** *(Boardman)*	$145
9164	**Optical Trapping and Optical Micromanipulation XI** *(Dholakia, Spalding)*	$135
9165	**Physical Chemistry of Interfaces and Nanomaterials XIII** *(Hayes, Banerji)*	$ 90
9166	**Biosensing and Nanomedicine VII** *(Razeghi, Mohseni, Agahi)*	$ 90
9167	**Spintronics VII** *(Razeghi, Drouhin, Wegrowe)*	$125
9168	**Carbon Nanotubes, Graphene, and Associated Devices VII** *(Razeghi, Lee, Ghazinejad)*	$ 53
9169	**Nanoimaging and Nanospectroscopy II** *(Verma, Egner)*	$ 60
9170	**Nanoengineering: Fabrication, Properties, Optics, and Devices XI** *(Dobisz, Eldada, Campo)*	$ 80
9171	**Nanobiosystems: Processing, Characterization, and Applications VII** *(Rau, Kobayashi, Ouchen)*	$ 60
9172	**Nanostructured Thin Films VII** *(Lakhtakia, Suzuki, Mackay)*	$ 70
9173	**Instrumentation, Metrology, and Standards for Nanomanufacturing, Optics, and Semiconductors VIII** *(Postek)*	$ 45
9174	**Nanoepitaxy: Materials and Devices VI** *(Islam, Kobayashi, Talin, Davydov)*	$ 70

SPIE Solar Energy + Technology

Vol#	Title/Editor	Price
9175	**High and Low Concentrator Systems for Solar Energy Applications IX** *(Pfefferkorn, Plesniak)*	$ 60
9176	**Solar Hydrogen and Nanotechnology IX** *(Mathur)*	$ 53
9177	**Thin Films for Solar and Energy Technology VI** *(Eldada, Heben)*	$ 53
9178	**Next Generation Technologies for Solar Energy Conversion V** *(Sulima, Conibeer)*	$ 53
9179	**Reliability of Photovoltaic Cells, Modules, Components, and Systems VII** *(Dhere, Jones-Albertus, Wohlemuth)*	$ 60
9180	**Laser Processing and Fabrication for Solar and Optoelectronic Devices III** *(Reutzel)*	$ 53

SPIE Organic Photonics + Electronics

Vol#	Title/Editor	Price
9181	**Light Manipulating Organic Materials and Devices.** *(Nunzi)*	$ 70
9182	**Liquid Crystals XVIII** *(Khoo)*	$ 80
9183	**Organic Light Emitting Materials and Devices XVIII** *(So, Adachi)*	$105
9184	**Organic Photovoltaics XV** *(Kafafi, Samuel, Lane)*	$120
9185	**Organic Field-Effect Transistors XIII; and Organic Semiconductors in Sensors and Bioelectronics VII** *(McCulloch, Bao, Shinar, Kymissis)*	$100

Online Proceedings via SPIE Digital Library

SPIE. DIGITAL LIBRARY

Choose this option if you would like to receive online access to multiple related proceedings via the SPIE Digital Library. Access will be available using your SPIE login credentials as soon as the papers are published online, typically beginning one to two weeks following the symposium. Available for registered attendees only. $155 per collection.

Optics + Photonics 2014 Online Proceedings

Additional online collections may be purchased only by registered attendees for $155 per collection.

Optics and Photonics 2014: NanoScience
Product Code: **DLOP14-1**
Included Volumes: 9160, 9161, 9162, 9163, 9164, 9165, 9166, 9167, 9168, 9169

Optics and Photonics 2014: NanoEngineering
Product Code: **DLOP14-2**
Included Volumes: 9170, 9171, 9172, 9173, 9174, 9176, 9178, 9226

Optics and Photonics 2014: Solar Energy and Technology
Product Code: **DLOP14-3**
Included Volumes: 9175, 9176, 9177, 9178, 9179, 9180, 9184, 9191

Optics and Photonics 2014: Organic Photonics and Electronics
Product Code: **DLOP14-4**
Included Volumes: 9181, 9182, 9183, 9184, 9185, 9190

Optics and Photonics 2014: Optical Design and Systems Engineering and Illumination
Product Code: **DLOP14-5**
Included Volumes: 9186, 9187, 9188, 9189, 9190, 9191, 9192, 9193, 9194, 9195, 9196, 9197

Optics and Photonics 2014: Photonic Devices and Applications
Product Code: **DLOP14-6**
Included Volumes: 9190, 9198, 9199, 9200, 9201, 9202, 9220

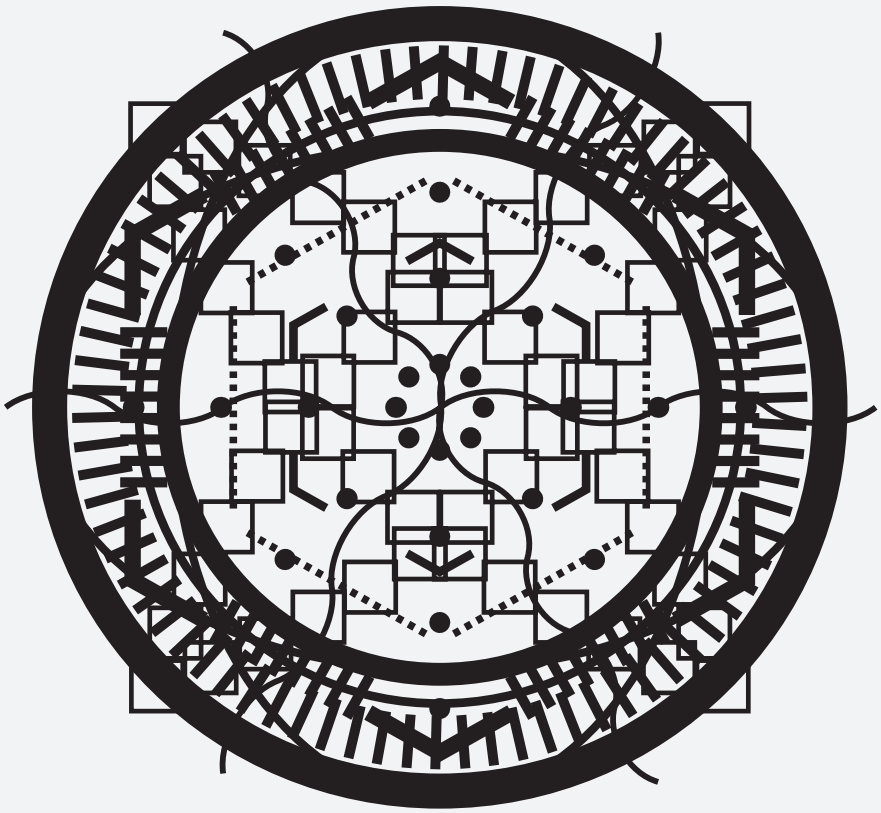
Optics and Photonics 2014: Advanced Metrology
Product Code: **DLOP14-7**
Included Volumes: 9203, 9204, 9205, 9206

Optics and Photonics 2014: X-Ray, Gamma-Ray, and Particle Technologies
Product Code: **DLOP14-8**
Included Volumes: 9206, 9207, 9208, 9209, 9210, 9211, 9212, 9213, 9214, 9215

Optics and Photonics 2014: Image and Signal Processing
Product Code: **DLOP14-9**
Included Volumes: 9216, 9217

Optics and Photonics 2014: Remote Sensing
Product Code: **DLOP14-10**
Included Volumes: 9218, 9219, 9220, 9221, 9222, 9223

Optics and Photonics 2014: Atmospheric and Space Optical Systems
Product Code: **DLOP14-11**
Included Volumes: 9224, 9225, 9226, 9227



Helping engineers and scientists stay current and competitive

Optics & Astronomy | Biomedical Optics | Optoelectronics & Communications | Defense & Security Energy | Lasers Nano/ | Micro | Technologies Sensors

SPIE. DIGITAL LIBRARY

Find the answer
SPIEDigitalLibrary.org

2015 OPTICS + PHOTONICS

The latest research in optical engineering and applications, nanotechnology, solar energy, and organic photonics

Plan to Attend in 2015

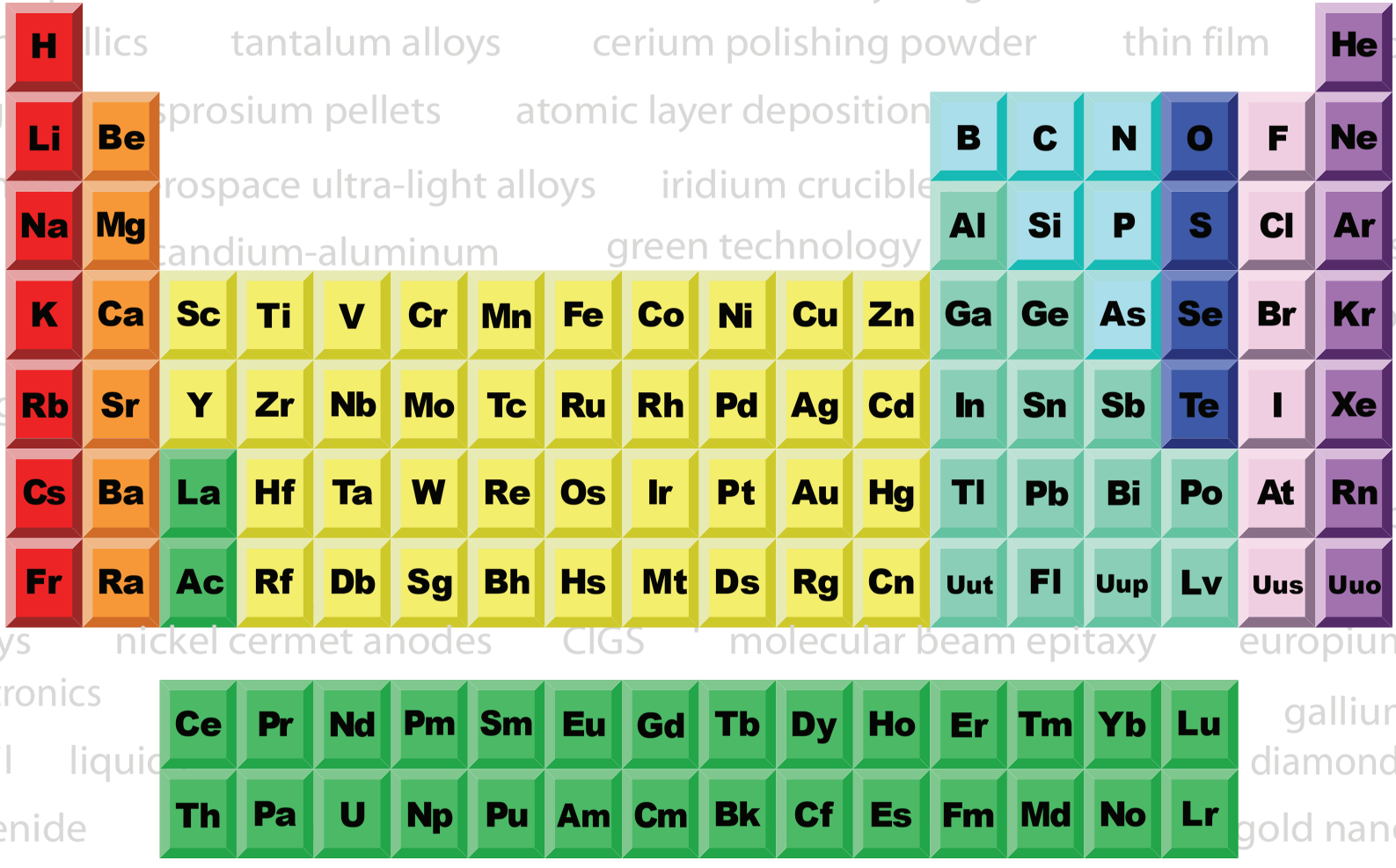
WWW.SPIE.ORG/OP15

San Diego Convention Center
San Diego, California, USA

Conferences & Courses: 9–13 August 2015

Exhibition: 11–13 August 2015

SPIE. OPTICS+ PHOTONICS



Now Invent.™

AMERICAN ELEMENTS

The Materials Science Company ®

catalog: americanelements.com

© 2001-2014. American Elements is a U.S. Registered Trademark.