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10–15 February 2018
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Houston, Texas, USA

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PROGRAM CURRENT AS OF
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Plan to attend SPIE Medical Imaging—where the latest information is presented.

**Conferences:** Hear from 1,000 presentations on the latest advances in digital pathology; tomography; image processing; observer performance; image-registration, -informatics, and -segmentation; computer-aided diagnosis; and ultrasound.

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**Courses:** Get focused, efficient training on current approaches in biomedical imaging and physics, imaging and CT, observer studies, photon counting, and many more, that you can apply directly to your daily work. Register soon to ensure a spot.

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**SPIE Medical Imaging 2018 • www.spie.org/MI18program • Program current as of 10/15/2017**
Plenary and Keynote Sessions  
Don’t miss these world-class speakers discussing the latest directions and most promising breakthroughs.

Technical Events  
Join your peers and colleagues in group discussions around focused technical topics, various workshops, live demos, and at the interactive poster sessions.

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Participate in the following opportunities: RFW All-Conference Best Student Paper, Young Scientist Award, Student Paper Award, as well as information about Poster Awards.
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The SPIE Medical Imaging conference is where the science of medical imaging is explored and presented. The event focuses on the latest innovations related to underlying fundamental scientific principles, technology developments, scientific evaluation, and clinical applications. The symposium covers the full range of medical imaging modalities including medical image acquisition, display, processing, analysis, perception, and decision support.

Hear from leading physicists, researchers, and scientists presenting the latest advances in image processing, perception, registration informatics, and segmentation, as well as digital pathology, tomography, computer-aided diagnosis, and ultrasound. Join your peers where collaboration brings ideas to life and technology to market. Hear the latest results, network with leaders in the field, and see the applications of the future. We look forward to seeing you in Houston!

Symposium Chairs:

Leonard Berliner
Weill Cornell Medical College, and New York Presbyterian - Brooklyn Methodist Hospital (USA)

Ronald M. Summers
National Institutes of Health (USA)

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Awards and Plenary Session

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Monday 12 February 2017 • 4:00 to 5:30 pm • Location: Salon F

4:00 pm

WELCOME AND NEW SPIE FELLOWS
ACKNOWLEDGEMENTS

4:10 pm

BEST STUDENT PAPER AWARDS
ANNOUNCEMENT

The first place winner and runner up of the Robert F. Wagner All-Conference Student Paper Award will be announced and conference finalists will be recognized.

4:30 pm

PLENARY PRESENTATION

Multidisciplinary Computational Anatomy: Concept and Clinical Application

Makoto Hashizume
Graduate School of Medical Sciences
Kyushu University (Japan)

Abstract: A new project, Multidisciplinary Computational Anatomy (MCA) has started in Japan in 2014. It is funded by MEXT Grant-in-Aid for Scientific Research on Innovative Areas. The project aims at understanding the dynamic, living human anatomy by integration of multidisciplinary information with medical images from different kinds of modalities. Emphasis is set to a theory establishment and base construction of the mathematical study foundation, and to expand the range of the new clinical application system for making a correct decision in diagnosis and treatment. MCA-based medicine is one of the ideal solutions in the future medicine.

Biography: Dr. Makoto Hashizume graduated after Kyushu University School of Medicine in 1979. He is currently the director of Centre for Advanced Medical Innovation, and Chairman Professor, Department of Advanced Medical Initiatives, Graduate School of Medical Sciences, Kyushu University. He was given the title of distinguished professor, Kyushu University in 2014.
Image Perception, Observer Performance, and Technology Assessment

Sunday 11 February 2018 • 8:00 to 9:00 am
Location: Salon A

Richard B. Gunderman
Indiana Univ. (USA)

Abstract: Human beings are born with a remarkable visual apparatus, but even if all the parts – lens, retina, optic nerve, and so on – are present in working order, seeing remains at least in large part a learned skill. This is reflected in the fact that some people can see and understand things that others find meaningless or even fail to notice. One striking example is the radiology education of medical students and residents, who over the course of their training move from not knowing what they are looking at to quickly making complex diagnoses. In this session, we consider how seeing is learned and weigh the respective contributions of science, technology, and the arts in cultivating this remarkable human capacity.

Biography: Richard Gunderman is chancellor’s professor of radiology, pediatrics, medical education, philosophy, liberal arts, philanthropy, and medical humanities and health studies at Indiana University. The author of over 600 articles and 10 books, he has received the highest teaching awards of his medical school, Indiana University, and the Association of American Medical Colleges. His latest book is, We Come to Life with Those We Serve.

Imaging Biomarkers in Precision Medicine

Date: Sunday 11 February 2018 • 10:10 to 11:10 am
Location: Montrose

Martin Pomper
The Johns Hopkins Univ. School of Medicine (USA)

Abstract: Approximately 20 years ago in vivo molecular imaging as a unique discipline coalesced around a variety of modalities used to answer specific biological questions. Now in the era of precision medicine imaging ascends to a new level of relevance. Precision medicine leverages individual differences in genetics, environment and lifestyle to provide optimum care. While precision medicine is primarily thought of in genetic terms, providing information about whether an individual may harbor disease, precision imaging makes precision medicine actionable by uncovering the location of where disease may be present – or may soon be manifested. As molecularly targeted and precise therapies are increasingly adopted, imaging agents must follow suit by being equally precise to be useful in guiding management. In some cases existing imaging techniques and agents may not be up to the task of guiding emerging cancer therapies, as with anatomic imaging (CT or MR) for cytostatic therapeutics or standard molecular imaging (FDG-PET) for immunotherapy. Theranostic agents enable imaging and therapy concurrently, or in rapid succession, and are often precisely targeted. An array of precision imaging agents and theranostics is coming online to manage patients in new ways. In addition to providing a brief overview of imaging biomarkers for precision medicine, we will discuss specific examples – including theranostics – that are in the process of or will soon be clinically implemented for targeting prostate cancer and for reporting on immunotherapies. An important aspect of this work is that the agents provide sensitive, specific and quantitative information.

Biography: Martin Pomper is the Henry N. Wagner, Jr. Professor of Radiology and Director of the Division of Nuclear Medicine and Molecular Imaging at Johns Hopkins Medical School. He received undergraduate, graduate (organic chemistry) and medical degrees from the University of Illinois at Urbana-Champaign. Postgraduate medical training was at Johns Hopkins, including internship on the Osler Medical Service, residencies in diagnostic radiology and nuclear medicine and a fellowship in neuroradiology. He is board-certified in diagnostic radiology and nuclear medicine. He has been on the Radiology faculty at Johns Hopkins since 1995, with several other joint appointments. His interests are in the development of new radiopharmaceuticals, optical probes and techniques for molecular imaging and therapy of cancer, central nervous system disease and other disorders. He is a member of the National Academy of Inventors and the National Academy of Medicine. Digital Pathology

Conference 10581 • Paper Number 10581-12

Advancing Cancer Diagnostics with Deep Learning

Sunday 11 February 2018 • 1:20 to 2:20 pm
Location: River Oaks

Martin Stumpe
Google Research (United States)

Abstract: Rendering cancer diagnoses from biopsy slides involves challenging tasks for pathologists, such as detecting micro metastases in tissue biopsies, or distinguishing tumors from benign tissue that can look deceivingly similar. These tasks are typically very difficult for humans, and, consequently, over- and under-diagnoses are not uncommon, resulting in non-optimal treatment. Algorithmic approaches for pathology, on the other hand, face their own set of challenges in the form of gigapixel images, proprietary data formats, and low availability of digitized images let alone high quality labels. However, advances in deep learning, access to cloud based storage, and the recent FDA approval of the first whole slide image scanner for primary diagnosis now set the stage for a new era of digital pathology. This talk will discuss the potential of deep learning to improve the accuracy and availability of cancer diagnostics, and highlight some recent advances towards that goal.

Biography: Martin Stumpe leads the Pathology project at Google Research. Before that, he worked on Google Street View for automatically building maps using machine learning. Prior to joining Google, Martin worked on NASA’s Kepler Mission to detect extrasolar planets, and started a business with a computer vision tracking software, AnTracks. His background is in Physics, in which he graduated with a PhD at the Max-Planck-Institute in Goettingen, Germany, researching the molecular mechanisms of protein folding and stability, a topic that he continued during his postdoc research at Stanford University.
Special Events • Keynote Presentations

From Image Processing and 3D Computer Vision to Computational Brain Imaging: A Journey through Modelling and Geometry

Monday 12 February 2018 • 10:10 to 11:10 am
Location: Salon B

Rachid Deriche
INRIA Sophia Antipolis - Méditerranée (France)

Abstract: This talk is an invitation to a journey through Modelling and Geometry in the domains I contributed over the last few decades, in mathematical imaging, 3D computer vision and more recently in computational neuroimaging. The role and power of Modelling and Geometry are emphasized by presenting powerful Euclidean, Differential, Projective and Riemannian based algorithms for processing 2D and multi-valued images, building 3D models from 2D images and reconstructing brain structural connectivity from diffusion Magnetic Resonance Imaging.

Variational methods and geometric flows developed in image processing and computer vision for curves and surfaces will first be presented including methods of image regularization through Partial Differential Equations as well as methods of active image segmentation implemented via the level-set technique. Applied to brain images produced in vivo and non-invasively by diffusion MRI, the tools and algorithms presented open the possibility of recovering a detailed geometric description of the structural connectivity between brain areas. Various applications to computational brain imaging will be presented and discussed with a particular emphasis on the importance of the Riemannian geometry in the estimation, regularization and segmentation of diffusion images as well as the tracking, the reconstruction and the clustering of the bundles of white matter fibers. High Angular Resolution Diffusion Imaging (HARDI) models will also be presented to go beyond the classical Diffusion Tensor Model in diffusion MRI.

Overall, various geometry and model based algorithms will be shown to emphasize the role and power of modelling and geometry to process multi-valued and complex images and infer and recover more detailed analysis, reconstruction and geometric description. The talk will be supported by multiple videos related to the presented problems and applications.

Biography: Dr. Rachid Deriche is a Research Director and chair the Athena Lab. at Inria Sophia Antipolis-Méditerranée (France).

His research concentrated on Mathematical Image Processing before to shift to 3D Computer Vision and more recently to Computational Neuroimaging, with a particular emphasis on the processing of brain connectivities through diffusion MRI, MEG and EEG and the development of pioneering algorithms for their analysis and clinical application.

Dr Deriche has authored and co-authored more than 250 peer reviewed papers including over 60 journals, with more than 23,000 Google citations and an h-index of 69.

Dr. Deriche has been awarded the French Academy of Sciences Grand Prize of the EADS Foundation in Computer Science (2013), the Doctorate Honoris Causa by Sherbrooke University (2014) and the prestigious European Research Council (ERC) Advanced Grant (2016) for his research project on Computational Brain Connectivity Mapping.

Conference Sponsorship Opportunities

PLENARY SPONSORSHIP PACKAGE – $5,000 (Exclusive)
Excellent branding opportunity to reach 1200 leading professionals in the medical imaging industry.

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PROMOTIONAL TABLE DISPLAY – $1,900 (4 Available)
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CONFERENCE SPONSORSHIPS – $1,250 (EACH)

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Special Events • Keynote Presentations

**IMAGE-GUIDED PROCEDURES, ROBOTIC INTERVENTIONS, AND MODELING**
Conference 10576 • Paper Number 10576-7

**Review of Intervventional and Point-of-Caring Imaging**
Tuesday 13 February 2018 • 10:10 to 11:10 am
Location: Salon A

Cameron Piron
Synaptive Medical (Canada)

Abstract: As a serial entrepreneur and the president of Synaptive Medical, a company dedicated to developing technologies with an impact to change the standard of care in neurosurgery, Cameron has solid knowledge and expertise in understanding rules of the road for medtech-based entrepreneurship. In this lecture, Cameron shares insights on key strategic trends, changing dynamics in the medical devices industry and a discussion of the importance of new imaging technology in this expanding field. The lecture describes technology trends in this field, specifically the expanding use of optical imaging and magnetic resonance imaging to gather quantitative information at specific points-of-care in the patient care cycle.

Biography: Cameron Piron is an industry-recognized leader and innovator in image-guided surgery. Prior to co-founding Synaptive Medical, Cameron was president and co-founder of Sentinelle Medical, a medical device company that developed and manufactured advanced MRI-based breast imaging technologies. Sentinelle grew to over 200 employees and over $20 million in revenues before being acquired by Hologic, Inc. in 2010. Cameron studied systems design engineering at the University of Waterloo, followed by a graduate degree at the University of Toronto in medical biophysics. His awards include the Ontario Premier’s Catalyst Award for Best Young Innovator in 2008; the University of Waterloo’s Alumni Achievement medal in 2009 for leading-edge medical technology in this expanding field. The lecture describes technology trends in this field, specifically the expanding use of optical imaging and magnetic resonance imaging to gather quantitative information at specific points-of-care in the patient care cycle.

**PHYSICS OF MEDICAL IMAGING CONFERENCE**
Conference 10573 • Paper Number 10573-30

**Clinical Applications of Optical Imaging Techniques in the Breast**
Tuesday 13 February 2018 • 1:20 to 2:20 pm
Location: Salon C

Wei T. Yang
MD Anderson CancerCtr. (USA)

Abstract: CONFOCAL FLUORESCENCE MICROSCOPY (CFM): fresh human breast tumors, invasive tumor cellularity from core biopsy specimens, adipocytes in the tumor microenvironment associated with invasive and in-situ ductal cancer, comparison with histopathology for cancer diagnosis and staging, and in the automated assessment of breast tissue using nuclear and ductal parameters.

DIFFUSE OPTICAL SPECTROSCOPIC IMAGING (DOSI): This discussion will describe DOSI as a non-invasive functional imaging modality that employs infrared light to measure breast tissue concentrations of oxygenated hemoglobin, deoxygenated hemoglobin, water, and lipid. Correlation between baseline oxygen saturation and breast cancer response to neoadjuvant chemotherapy are explored. Preliminary results employing a hand-held probe for obtaining optical measurements of oxygen saturation in patients with varying tumor sizes, depths, and biologic subtypes undergoing neoadjuvant chemotherapy in a single center and multi-center setting are presented.

Biography: Dr. Wei Tse Yang, MBBS, FRCR is Professor and Chairman of the Department of Diagnostic Radiology and Robert D. Moreton Distinguished Chair in Diagnostic Radiology at the University of Texas MD Anderson Cancer Center. She is Director of the Quantitative Image Analysis Core (QIAC) and the Imaging Response Assessment Team (IRAT) and is on the executive steering committee for the Center for Advanced Biomedical Imaging (CABI) at MD Anderson. Dr. Yang championed the technique of Targeted Axillary Dissection (TAD), which ensures a false negative rate of less than 5 percent for SLND post NAC in breast cancer patients. She has authored more than 170 peer-reviewed articles along with co-authoring a textbook on breast imaging.

**COMPUTER-AIDED DIAGNOSIS**
Conference 10575 • Paper Number 10575-35

**Crowdsourcing Biomedical Research: Leveraging Communities as Innovation Engines**
Wednesday 14 February 2018 • 8:00 to 9:00 am
Location: Hunters Creek

Gustavo A. Stolovitzky
IBM Thomas J. Watson Research Ctr. (USA) and Icahn School of Medicine at Mount Sinai (USA)

Abstract: The generation of large-scale biomedical data is creating unprecedented opportunities for basic and translational science. Typically, the data producers perform initial analyses, but it is very likely that the most informative methods may reside with other groups. Crowdsourcing the analysis of complex and massive data has emerged as a framework to find robust methodologies. When the crowdsourcing is done in the form of scientific competitions, known as Challenges, the validation of the methods is automatically addressed. Challenges also encourage open innovation, create collaborative communities to solve diverse and important biomedical problems and foster the creation and dissemination of well-curated data repositories.

In this talk, I will discuss the scientific, methodological, and social lessons learnt in the close to 50 DREAM Challenges (www.dreamchallenges.org) run to date, and in particular, I will highlight the recent Digital Mammarography DREAM Challenge. In it, we challenged more than 1,200 registered participants to determine the cancer status of each breast of a subject, given a screening exam, a panel of clinical/demographic information, and if available, previous screening exam(s). The challenge gave access to more than 640,000 de-identified digital mammography images, corresponding to 146,000 mammography exams of 86,000 women, including demographic, clinical and longitudinal data. The community achieved excellent results (AUC of 0.87 in an independent validation set), reaching specificities and sensitivities that start to be competitive with the accuracy of radiologists in the clinic.

Biography: Dr. Gustavo Stolovitzky is the Director of the Translational Systems Biology and Nano-Biotechnology Program at IBM Research, and an adjunct Professor at the Icahn School of Medicine at Mount Sinai. Dr. Stolovitzky is a recognized leader in the field of systems biology, where he has pioneered the use of crowdsourcing as a tool for scientific research and of the Wisdom of Crowds as a robust methodology for predictive modeling. He is the founder and Chair of the DREAM Challenges, has organized more than 50 scientific Challenges, published over 150 papers and has more than 50 issued patents.
Abstract: Recent advances in machine learning have enabled computers to perform many image-based tasks at a level that exceeds human level performance. This has led several machine learning experts to conclude that computers will replace radiologists in the near future. In this debate, the various aspects of replacing humans with machine learning systems will be explored, including the technical advances and challenges, how these advances have been applied in radiology, regulatory issues, and human issues.

Biography: **Dr. Eliot Siegel** is Professor and Vice Chair at the University of Maryland School of Medicine, Department of Diagnostic Radiology, as well as Chief of Radiology and Nuclear Medicine for the Veterans Affairs Maryland Healthcare System. He is the director of the Maryland Imaging Research Technologies Laboratory and has adjunct appointments as Professor of Bioengineering at the University of Maryland College Park and as Professor of Computer Science at the University of Maryland Baltimore County. Dr. Siegel was responsible for the NCI's National Cancer Image Archive and served as Workspace Lead of the National Cancer Institute's caBIG In Vivo Imaging Workspace. He has been named as Radiology Researcher and Radiology Educator of the year by his peers as well as one of the Top Ten radiologists. Under his leadership, the VA Maryland Healthcare System became the first filmless healthcare enterprise in the world. He has written over 200 articles and book chapters about PACS (Picture Archiving and Communication Systems) and digital imaging, and has edited six books on the topic, including Filmless Radiology and Security Issues in the Digital Medical Enterprise. He has made more than 1,000 presentations throughout the world on a broad range of topics involving computer applications in imaging and medicine. Dr. Siegel served as symposium chairman for the Society of Photo-optical and Instrumentation Engineers (SPIE) Medical Imaging Meeting for three years, and is currently serving on the board of directors of the Society of Computer Applications in Radiology. He is a fellow of the American College of Radiology and of the Society of Imaging Informatics in Medicine.

Biography: **Dr. Erickson** received his MD and PhD degrees from Mayo Medical & Graduate Schools and then did his residency in diagnostic radiology and Neuroradiology fellowship at Mayo Clinic. He went on staff at Mayo Clinic, and was heavily involved in administrative responsibilities implementing a filmless department and then a paperless practice and EMR, including being the Vice Chair for IT at Mayo. More recently, he has refocused on imaging informatics research, receiving NIH grants for brain cancer, multiple sclerosis, and polycystic kidney disease. He is particularly focused on the application of deep learning to medical images, which is the emerging field of radiogenomics. He was the founding Chair of the Division of Imaging Informatics, and is currently the Associate Chair for Research in Radiology.

**Eliot L. Siegel**
University of Maryland Medical Center (USA)

**Bradley J. Erickson**
Mayo Clinic (USA)
Special Events • Technical Events

Join your peers and colleagues in group discussions around focused technical topics, various workshops, live demos, and at the interactive poster sessions.

Sunday/Monday Poster Session
Monday 12 February 2018 • 5:30 to 7:00 pm • Salon E

Poster authors are required to:
• Display the poster early on the first day of your session
• Attend the Poster Session to answer questions.

SUNDAY/MONDAY POSTER SESSION
Poster presentations from the Image Processing; Image Perception, Observer Performance, and Technology Assessment; Biomedical Applications in Molecular, Structural, and Functional Imaging; and Digital Pathology conferences will be included.

Author Set-Up Time: Sunday after 12:00 pm (noon)
Posters should remain on display until the end of the Poster Session on Monday.

Poster Session and Reception: Monday from 5:30 to 7:00 pm
NOTE: Extended poster viewing until 9:00 pm on Sunday.
Poster award winners will be recognized and certificates distributed in the conference meeting rooms. Check conference schedules for times and locations. Ribbons will identify winning posters during the Poster Sessions.

PROSTATEEx Lessons Learned and 2019 Challenge
Tuesday 13 February 2018 • 3:30 to 5:00 pm
Location: Hunters Creek
This panel presentations will discuss the design, results and challenges found in running the 2017 PROSTATEx (SPIE Medical Imaging 2017) and PROSTATEx-2 (2017 AAPM Annual meeting) Challenges. Panelists will provide an introduction and overview of previous SPIE-AAPM-NCI Challenges include a description of the PROSTATEx and PROSTAEx-2 Challenges. A panelist will then provide a discussion of infrastructure and logistical issues/obstacles found while conducting these latest PROSTATEx Challenges. Finally, a panelist will provide an overview of the proposed 2019 SPIE Medical Imaging Joint CAD/Pathology Challenge. This will be followed by a Q & A session with the audience where audience members can ask thought provoking question of the panel. New ideas for future challenges and available dataset could also be part of this discussion along with the role Challenges play in moving the CAD field forward.

TECHNICAL WORKSHOP/LIVE DEMONSTRATIONS

Live Demonstrations
Tuesday 13 February 2018 • 5:00 to 7:00 pm
Location: Salon D/E
WK 1 TECHNICAL WORKSHOP: COMPUTER-AIDED DIAGNOSIS (CONFERENCE 10575)

WORKSHOP CHAIRS:
Dr. Heang-Ping Chan, Univ. of Michigan Health System, (USA)
Dr. Horst Hahn, Fraunhofer MEVIS, (Germany)
The goal of this workshop is to provide a forum for systems and algorithms developers to show off their creations. The intent is for the audience to be inspired to conduct derivative research, for the demonstrators to receive feedback and find new collaborators, and for all to learn about the rapidly evolving field of medical imaging.

The Live Demonstration Workshop will be held as part of the 2017 SPIE Medical Imaging Conference on Tuesday, 13 February 2018 from 5:00 pm to 7:00 pm.

The Live Demonstration Workshop invites participation from all of the conferences that comprise the SPIE Medical Imaging Conference. We encourage the CAD, Digital Pathology, Image Processing, Imaging Informatics, Perception, Physics, and all other conferences to participate.

Advances in Image-Guided Procedures: A Multi-Disciplinary Joint Forum
Tuesday 13 February 2018 • 3:30 to 5:00 pm
Location: Salon A
Advances in image guidance and therapeutic approach have profoundly shaped the state of art in medical intervention - from image-guided radiation therapy (IGRT) and surgery (IGS) to the interventional radiology (IR) suite. Key to these advances have been multidisciplinary translational research of physicists, biomedical engineers, and computer scientists working with surgeons, radiologists, and oncologists to bring new technologies to bear in emerging therapeutic approaches.

This Special Session features invited speakers with presentations and panel discussion on recent advances and emerging methods in the decade ahead.

The Special Session offers a joint forum for SPIEconference attendees and clinicians from the UT MD Anderson Cancer Center.
This workshop features interactive demonstrations that are complementary to the topics of SPIE Medical Imaging. Workshop demonstrations include samples, systems, and software demonstrations that depict the implementation, operation, and utility of cutting-edge as well as mature research. Having an accepted SPIE Medical Imaging paper is not required for giving a Live Demonstration; however, authors of SPIE Medical Imaging papers are encouraged to submit demonstrations that are complimentary to their oral and poster presentations. The session will include a Certificate of Merit Award presented to one demonstration considered to be of exceptional interest. We invite all workshop visitors to vote for three of their favorite demonstrations, with the final winner chosen from the top scorers by a group of appointed judges.

**WORKSHOP:**

**Selected Papers from the Journal of Medical Imaging Special Issue**

Tuesday 13 February 2018 • 5:00 to 7:00 pm  
Location: Salon A

**WK 2 TECHNICAL WORKSHOP: IMAGE-GUIDED PROCEDURES, ROBOTIC INTERVENTIONS, AND MODELING (CONFERENCE 10576)**

As part of the exciting translational fields in image-guided procedures, robotic interventions and modeling, the scientific committee of the SPIE Medical Imaging conference proposed a special issue to be dedicated to this area in the *Journal of Medical Imaging*. Authors of accepted papers were invited to SPIE Medical Imaging 2018 to present at the meeting and contribute to a review of their accepted paper to the proceedings. Some selected papers were chosen to provide oral presentations in this cutting-edge workshop. Accepted papers that did not get presented at the workshop will be asked to present at the poster session.

**19TH SPIE/IFCARS JOINT WORKSHOP**

**Digital Operating Room: Clinical Applications of Multidisciplinary Computational Anatomy**

Tuesday 13 February 2018 • 5:00 to 7:00 pm  
Location: Hunters Creek

**WK 4 COMPUTER-AIDED DIAGNOSIS AND IMAGING INFOMATICS FOR HEALTHCARE, RESEARCH, AND APPLICATIONS**

**WORKSHOP CHAIR:**  
Leonard Berliner, New York Presbyterian - Brooklyn Methodist Hospital, (USA)

**PANELISTS/SPEAKERS:**

- Heinz Lemke, International Foundation for Computer Assisted Radiology and Surgery, (Germany)
- Makoto Hashizume, Kyushu University (Japan)
- Hiroyuki Yoshida, Massachusetts General Hospital (USA)
- Ron Schilling, EchoPixel, Inc. (USA)
- Brent Liu, University of Southern California (USA)

This workshop will present clinical scenarios demonstrating practical applications of Multidisciplinary Computational Anatomy. The role of Medical Imaging, Computer Aided Diagnosis, and Computational Anatomy in presurgical planning will be emphasized. Integration with the Operating Room through PACS and displays will be discussed. Ample time for open discussion with the audience will be provided.

**TUESDAY/ WEDNESDAY POSTER SESSION**

Poster presentations from the Physics of Medical Imaging; Computer-Aided Diagnosis; Image-guided Procedures, Robotic Interventions, and Modeling; Imaging Informatics for Healthcare, Research, and Applications; and Ultrasonic Imaging and Tomography conferences will be included.

**Author Set-Up Time:** Tuesday after 9:30 am  
**Posters should remain on display until the end of the Poster Session on Wednesday.**

**Poster Session and Reception:** Wednesday from 5:30 to 7:00 pm  
**NOTE:** Extended poster viewing until 9:00 pm on Tuesday.

**WORKSHOP/PANEL DISCUSSION**

**Ultrasound Computed Tomography Data Challenge**

Tuesday 14 February 2018 • 5:30 to 7:30 pm  
Location: Montrose

**WK 5 ULTRASONIC IMAGING AND TOMOGRAPHY (CONFERENCE 10580)**

Nicole V. Ruiter  
Karlsruhe Institute of Technology (Germany)

This challenge aims at closing this gap within the US(C)T community by combining available imaging algorithms with the data of various USCT devices. Our long term goal is to build up a reference database and to establish data format and software interfaces to enable simplified academic exchange to drive further development. This challenge aims on applying available image reconstruction algorithms on provided USCT data in order to establish a first interface specification.

Participants will be invited to be part of a panel discussion in order to discuss their experience and possible future steps towards objectively evaluate and compare USCT reconstruction algorithms and imaging protocols.
Special Events • Social and Networking Events

Join your colleagues at various events, including the Student Dessert with the Experts, Women’s Networking Lunch, and an offsite facilities tour—events not to be missed!

**Women’s Networking Lunch**
Monday 12 February 2018 • 12:10 to 1:20 pm
Location: Kingwood
Lunch ticket required
Join other women in the field for informal discussions and networking during the scheduled lunch on Monday.
Sign up at registration required before morning coffee break on Monday.

**Univ. of Texas MD Anderson Image-Guided Cancer Therapy Facilities Reception and Tour**
*(CONFERENCE 10576)*
Monday 12 February 2018 • 5:45 to 9:00 pm
Tour tickets are available at the SPIE registration desk. Tickets are complimentary and are first come, first served. Seating is limited.
Join your colleagues on a guided tour of the MD Anderson image-guided cancer therapy facilities, including an MR-LINAC and CT-guided interventional suites. Get a first-hand look at how advances have shaped the treatment and outcomes of various cancers.
Bus transportation provided by MD Anderson. Departing the Marriott Marquis at 5:45 pm, returning by 9:00 pm - must have ticket to board.

**Dessert with the Experts–A Student Networking Event**
Monday 12 February 2018 • 6:30 to 7:30 pm
Location: Kingwood
Open to student conference attendees.
First come, first served.
Enjoy a tasty dessert and casual atmosphere while networking with some of the best and brightest minds in medical imaging. Exchange ideas, share experiences, and make valuable contacts at this complimentary student event.
Journal of Medical Imaging

MEDICAL IMAGING FOR DETECTION, DIAGNOSTICS, AND THERAPY OF DISEASE

www.spie.org/jmi
Special Events • Award Events

2018 Poster Award Information
Monday 12 February 2018 • 8:00 to 8:30 am

POSTER AWARDS IN CONFERENCE ROOMS
Check the conference schedule for exact times.

RFW AWARD FINALISTS:
Robert F. Wagner (RFW) Award finalists will be recognized and certificates distributed in the conference meeting rooms. See conference schedules for times and locations.

POSTER AWARDS:
Each conference will recognize selected poster presentations of exceptional quality at either the Cum Laude or Honorable Mention level. Winners will be chosen by members of conference review committees. The winning posters will be identified during the receptions with award ribbons. Winners will be recognized and certificates distributed in the conference meeting rooms. See conference schedules for times and locations.

In addition, cum laude poster award recipients will be recognized in the Proceedings of SPIE volumes and the following year’s Call for Papers.

RECOGNITION LEVELS:
Each conference will recognize 1 selected poster at the Cum Laude level and 1 selected poster at the Honorable Mention level for the quality of work presented as well as the presentation.

BASIS FOR SELECTION:
Work should be of a standard of excellence as judged by the quality and quantity of results presented. It should include results that are both significant and new to the field of study. Conclusions should be well supported by the results, and relevant references should be cited. Presentation should be well organized, clear, and concise. It should be self-contained, giving adequate background, concise results, and relevant references. Graphic design will be considered only to the extent that it contributes to the clarity of presentation. A conference may give preference to first authors who are students or who are within five years of their terminal degrees.

Robert F. Wagner All-Conference Best Student Paper Award
Monday 12 February 2018 • 4:00 to 4:15 pm
Location: Salon F

The Robert F. Wagner All Conference Best Student Paper Award (established 2014) is acknowledgement of his many important contributions to the Medical Imaging meeting and his many important advances in the field of medical imaging.

CO-SPONSORED BY:

Contributions by the Medical Imaging Community
Deadline for full conference manuscript and academic advisor letter is 4-December 2017. A first place winner and runner up will be recognized with a cash prize ($1000 and $500 respectively) and a certificate during the Plenary Session at the meeting.

Robert F. Wagner Award Finalists will be recognized with certificates in their respective conference meeting rooms during the Awards Sessions. See conference schedules for times and locations.

ELIGIBILITY REQUIREMENTS
Applicant must:
• be a student without a doctoral degree
• be the principal author of the paper in the current program
• be selected by the Review Committee

TO APPLY
Submit the following by 4 December 2017. Late submissions will not be accepted:
• Full manuscript formatted according to manuscript guidelines via the SPIE Submission System
• Include “RFW Award” in Step 1 of the SPIE Submission System.
• Academic advisor letter stating that the principal contribution to the work described was made by the student. Email to the Conference Programs Coordinator (RobbineW@spie.org)
• Include “RFW Award” and the paper number in the subject line of your email.
Physics of Medical Imaging Student Paper and Poster Awards
(CONFERENCE 10573)
Thursday 15 February 2018 • 9:40 to 9:45 am
Location: Salon A

This award is specific to papers in the Physics of Medical Imaging conference 10573. The student paper award is a prize awarded to the first authors of high quality papers within the Physics of Medical Imaging conference.

SPONSORED BY

GE Healthcare

Deadline for full conference manuscript and academic advisor letter is 4 December 2017. The winner and runner up will be notified in late January and presented with their awards at the conference.

ELIGIBILITY REQUIREMENTS
Applicant must:
• be a student without a doctoral degree
• the first author of a paper in the current program
• submit no later than 4 December 2017.

A letter from the author’s academic advisor attesting to their status as a student is required. Submitted manuscripts will be peer reviewed and judged both on their scientific merit and clinical relevance.

TO APPLY
• Submit the following by 4 December 2017. Late submissions will not be accepted:
  • Full manuscript formatted according to manuscript guidelines via the SPIE Submission System
  • Include “10573 Student Paper Award” in Step 1 of the SPIE Submission System
  • Academic Advisor Letter. Email to the Conference Programs Coordinator RobbineW@spie.org
  • Include “10573 Student Paper Award” and paper number in the subject line of your email.

The award winners will be recognized in the conference room on Thursday morning before the coffee break.

Physics of Medical Imaging Poster Presentation Awards

The Physics of Medical Imaging conference will offer cash prizes as part of the poster presentation awards. Poster presentations must be displayed early on the first day of the Tuesday/Wednesday poster session to enter the competition. The space will be available to display posters beginning at noon on Tuesday. Award announcements will take place in the conference room before morning coffee break on Thursday.

The award winners will be recognized on Thursday afternoon before the coffee break.

Image-Guided Procedures, Robotic Interventions, and Modeling Awards
(CONFERENCE 10576)
Thursday 15 February 2018 • 3:00 to 3:05 pm
Location: Salon A

YOUNG SCIENTIST AWARD
This award is specific to papers in the Image-Guided Procedures, Robotic Interventions, and Modeling conference 10576. The Young Scientist Award is a prize awarded to the first authors of high quality papers within the Image-Guided Procedures, Robotic Interventions, and Modeling conference.

SPONSORED BY

SIEMENS Healthineers

Deadline for full conference manuscript and Letter of Support is 4 December 2017. The winner and runner up will be notified in late January and presented with their awards at the conference.

ELIGIBILITY REQUIREMENTS
Applicant must:
• be the first author of a paper in the current program
• and an early career scientist
• submit no later than 4 December 2017.

A Letter of Support from the author’s supervisor is required. Submitted manuscripts will be peer reviewed and judged both on their scientific merit and clinical relevance.

TO APPLY
• Submit the following by 4 December 2017. Late submissions will not be accepted:
  • Full manuscript formatted according to manuscript guidelines via the SPIE Submission System
  • Include “Young Scientist Award” in Step 1 of the SPIE Submission System
  • Letter of Support from author’s supervisor. Email to the Conference Programs Coordinator RobbineW@spie.org
  • Include “Young Scientist Award” and paper number in the subject line of your email.

The award winners will be recognized on Thursday afternoon before the coffee break.

Poster Presentation Awards

The Image-Guided Procedures, Robotic Interventions, and Modeling conference will offer cash prizes as part of the poster presentation awards. Poster presentations must be displayed early on the first day of the Tuesday/Wednesday poster session to enter the competition. The space will be available to display posters beginning at noon on Tuesday. Award announcements will take place in the conference room before afternoon coffee break on Thursday.

SPONSORED BY

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### Daily Events Schedule

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<td><strong>SC1235 New</strong> Deep Learning for Image Understanding (Wenzel, Mene) 8:30 am to 5:30 pm, p.70</td>
<td>KEYNOTE PRESENTATION: Image Perception, Observer Performance, and Technology Assessment • Conf. 10577, Richard B. Guderman, 8:00 to 9:00 am, p.6</td>
<td>CONFERENCE 10573: Physics of Medical Imaging Chairs: Joseph Y. Lo, Duke Univ. Medical Ctr. (USA), Taly Gilat Schmidt, Marquette Univ. (USA), and Guang-Hong Chen, Univ. of Wisconsin-Madison (USA)</td>
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<td><strong>SC1239 NEW</strong> Virtual Clinical Trials: An In-depth Tutorial (Maidment, Bakic, Barufaldi) 8:30 am to 5:30 pm, p.69</td>
<td>SC1184 Methodology for Measuring Dynamic Functional Connectivity in Neuroimaging Data Analysis (Lei) 8:30 am to 12:30 pm, p.70</td>
<td>CONFERENCE 10575: Computer-Aided Diagnosis Chairs: Nicholas Petrick, U.S. Food and Drug Administration (USA) and Kensaku Mori, Nagoya Univ. (Japan)</td>
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<td><strong>WS776</strong> Writing for Publication (Hanson) 1:30 pm to 5:30 pm, p.72</td>
<td>SC887 Spectral CT Imaging (Schmidt, Flohr, Grant) 8:30 am to 12:30 pm, p.72</td>
<td>CONFERENCE 10576: Image-Guided Procedures, Robotic Interventions, and Modeling Chairs: Baowei Fei, Emory Univ. (USA) and Robert J. Webster, Vanderbilt Univ. (USA)</td>
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<td><strong>Maximize your visibility to the medical imaging community; secure a sponsorship for SPIE Medical Imaging 2018.</strong> Contact SPIE Sales: <a href="mailto:spiesales@spie.org">spiesales@spie.org</a></td>
<td>CONFERENCE 10577: Image Perception, Observer Performance, and Technology Assessment Chairs: Robert M. Nishikawa, Univ. of Pittsburgh (USA) and Frank W. Samuelson, U.S. Food and Drug Administration (USA)</td>
<td>CONFERENCE 10578: Biomedical Applications in Molecular, Structural, and Functional Imaging Chairs: Andrzej Krol, SUNY Upstate Medical Univ. (USA) and Barjor Gimi, Geisel School of Medicine at Dartmouth (USA)</td>
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<td>**CONFERENCE 10581: Digital Pathology Chairs: Metin N. Gurcan, The Ohio State Univ. Wexner Medical Ctr. (USA) and John E. Tomaszewski, Univ. at Buffalo (USA)</td>
<td>Tuesday/Wednesday Poster Author Set-Up: Sunday after 9:30 am, p.11</td>
<td>**CONFERENCE 10580: Ultrasonic Imaging and Tomography Chairs: Neb Duric, Delphinus Medical Technologies (USA), Barbara Ann Karmanos Cancer Institute (USA) and Brett C. Byram, Vanderbilt Univ. (USA)</td>
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<td>KEYNOTE PRESENTATION: Imaging Biomarkers in Precision Medicine • Conf. 10578, Martin Pompe, 10:10 to 11:10 am, p.6</td>
<td>Best Student Paper Awards Announcement, 4:00 pm PLENARY PRESENTATION: Multidisciplinary Computational Anatomy: Concept and Clinical Application, Makoto Hashizume, 4:30 pm, p.6</td>
<td>Physics of Medical Imaging Student Paper and Poster Awards • Conf. 10573, 9:40 to 9:45 am, p.15</td>
<td>KEYNOTE PRESENTATION: Crowdsourcing Biomedical Research: Leveraging Communities as Innovation Engines • Conf. 10575, Gustavo A. Stolovitzky, 8:00 to 9:00 am, p.8</td>
<td>KEYNOTE PRESENTATION: Real-time Imaging Feedback for Histotripsy: Non-Invasive Ultrasound Cavitational Therapy • Conf. 10580, Zhen Xu, 10:10 to 11:10 am, p.9</td>
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<td>Sunday/Monday Poster Author Set-Up: Sunday after 12:00 pm (noon), p.11</td>
<td>KEYNOTE PRESENTATION: From Image Processing and 3D Computer Vision to Computational Brain Imaging: A Journey through Modelling and Geometry • Conf. 10574, Rachid Deriche, 10:10 to 11:10 am, p.7</td>
<td>Keynote Presentation: Review of Interventional and Point-of-Caring Imaging • Conf. 10578, Cameron Perin, 10:10 to 11:10 am, p.8</td>
<td>KEYNOTE PRESENTATION: Will Computers Replace Radiologists for Primary Reads in 20 Years: A Debate • Conf. 10579, Eliot L. Siegel and Bradley J. Erickson, 8:00 to 9:00 am, p.9</td>
<td>Tuesday/Wednesday Poster Session/Reception, 5:30 to 7:00 pm, p.11</td>
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<td><strong>SC1183 New</strong> Modern Diagnostic X-ray Sources (Behling) 1:30 pm to 5:30 pm, p.69</td>
<td>Women’s Networking Lunch, 12:10 to 1:20 pm, p.12</td>
<td>Keynote Presentation: Clinical Applications of Optical Imaging Techniques in the Breast • Conf. 10573, Wei T. Yang, 1:20 to 2:20 pm, p.8</td>
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<td>**CONFERENCE 10579: Imaging Informatics for Healthcare, Research, and Applications Chairs: Jianguo Zhang, Shanghai Institute of Technical Physics (China) and Po-Hao Chen, The Univ. of Pennsylvania Health System (USA)</td>
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<td>Student Paper Awards 2017 For submission requirements see Awards + Student Info online at <a href="http://www.spie.org/mi18program">www.spie.org/mi18program</a></td>
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<td>SC1086 Fundamentals of Medical Image Processing and Analysis (Deserno) 8:30 am to 12:30 pm, p.71</td>
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<td>SC1129 Photon Counting CT (Danielsson, Sjölin) 1:30 pm to 5:30 pm, p.69</td>
<td>Sunday/Monday Poster Session/Reception, 5:30 to 7:00 pm, p.10</td>
<td>Advances in Image-Guided Procedures: A Multi-Disciplinary Joint Forum, 3:30 to 5:00 pm, p.10</td>
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<td>SC1236 SimpleITK Jupyter Notebooks: Biomedical Image Analysis in Python (Johnson, Lovekamp, Yaniv) 1:30 pm to 5:30 pm, p.71</td>
<td>Univ. of Texas MD Anderson Image-Guided Cancer Therapy Facilities Reception and Tour, 5:45 to 9:00 pm, p.12</td>
<td>PANEL DISCUSSION: PROSTATEx Lessons Learned and 2019 Challenge, 3:30 to 5:00 pm, p.10</td>
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<td>SC119 NewSC1236 SimpleITK Jupyter Notebooks: Biomedical Image Analysis in Python (Johnson, Lovekamp, Yaniv) 1:30 pm to 5:30 pm, p.71</td>
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### Daily Conference Session Schedule

#### SUNDAY 11 FEBRUARY

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<tr>
<td>8:00 am to 9:40 am</td>
<td>SESSION 1 Brain: Shapes and Biomarkers</td>
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<td>SESSION 1 Keynote and Image Perception 1 Robert M. Nishikawa, Frank W. Samuelson</td>
<td>SESSION 1 MRI and IMRI Barjor Gimi, Alejandro F. Frangi</td>
<td>SESSION 1 Machine Learning Trends</td>
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<td>9:40 am to 10:10 am</td>
<td>COFFEE BREAK</td>
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<td>SESSION 2 Image Perception 2 Claudia R. Mello-Thoms, Elizabeth A. Krupinski</td>
<td>SESSION 2 Keynote and Emerging Trends Barjor Gimi, Andrzej Krol</td>
<td>SESSION 2 Diagnosis, Prognosis, and Predictive Analysis</td>
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<td>12:00 pm to 9:00 pm</td>
<td>Sunday/Monday Poster Viewing</td>
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<td>LUNCH BREAK</td>
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<td>SESSION 3 Machine Learning</td>
<td>SESSION 4 Technology Assessment Craig K. Abbey, David L. Wilson</td>
<td>SESSION 4 Cardiovascular Imaging Amir A. Amini, Juan R. Cebal</td>
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<td>1:20 pm to 3:00 pm</td>
<td>SESSION 3 Image Enhancement</td>
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<td>SESSION 4 Keynote and Emerging Trends</td>
<td>SESSION 4 Detection and Segmentation</td>
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<td>3:00 pm to 3:30 pm</td>
<td>COFFEE BREAK</td>
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<td>SESSION 4 Machine Learning</td>
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<td>SESSION 4 Technology Assessment</td>
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<td>SESSION 4 Cardiovascular Imaging Amir A. Amini, Juan R. Cebal</td>
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<td>8:00 am to 9:40 am</td>
<td>SESSION 1 Breast Imaging</td>
<td>SESSION 5 Registration</td>
<td>SESSION 1 Lung I and Liver</td>
<td>SESSION 5 Model Observers 1</td>
<td>SESSION 5 Novel Imaging Techniques and Applications</td>
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<td>SESSION 5 Precision Medicine and Grading</td>
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<td>Hilde Bosmans, Stephen J. Glick</td>
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<td>Catalin Fetita, Weijie Chen</td>
<td>Matthew A. Kupinski, Ljiljana Platiša</td>
<td>Ciprian N. Ionita, Andrzej Krol</td>
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<td>10:10 am to 12:10 pm</td>
<td>SESSION 2 Breast Phantoms</td>
<td>SESSION 6 Keynote and Highlights</td>
<td>SESSION 2 Radiomics</td>
<td>SESSION 6 Model Observers 2</td>
<td>SESSION 6 Innovations in Image Processing</td>
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<td>Anders Tingberg, Despina Kontos</td>
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<td>Maryellen L. Giger, Thomas Martin Deserno</td>
<td>Howard C. Gifford, Ingrid S. Reiser,</td>
<td>Ciprian N. Ionita, Armando Manduca</td>
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<td>1:20 pm to 3:40 pm</td>
<td>SESSION 3 Tomosynthesis</td>
<td>SESSION 7 fMRI and DTI</td>
<td>SESSION 3 Brain I</td>
<td>SESSION 7 Observer Performance Evaluation 2</td>
<td>SESSION 7 Optical</td>
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<td>Ioannis Sechopoulos, John M. Sabol</td>
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<td>Matthew S. Brown, Khan M. Iftikharuddin</td>
<td>Mark F. McEntee, Yan Chen</td>
<td>Xavier Intes, Baohong Yuan</td>
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<td>4:00 pm to 5:30 pm</td>
<td>Plenary and Awards Session</td>
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<td>Conf. 10573 Physics of Medical Imaging</td>
<td>Conf. 10574 Image Processing</td>
<td>Conf. 10575 Computer-Aided Diagnosis</td>
<td>Conf. 10576 Image-Guided Procedures, Robotic Interventions, and Modeling</td>
<td>Conf. 10577 Image Perception, Observer Performance, and Technology Assessment</td>
<td>Conf. 10578 Biomedical Applications in Molecular, Structural, and Functional Imaging</td>
<td>Conf. 10579 Imaging Informatics for Healthcare, Research, and Applications</td>
<td>Conf. 10580 Ultrasonic Imaging and Tomography</td>
<td>Conf. 10581 Digital Pathology</td>
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<td>8:00 am to 9:40 am</td>
<td>SESSION 4 Detectors Wei Zhao, Karim S. Karim</td>
<td>SESSION 8 Motion</td>
<td>SESSION 4 Musculoskeletal and Skin Karen Drukker, Carol L. Nova</td>
<td>SESSION 1 Deep Learning</td>
<td>SESSION 8 Neurological Imaging II Nicholas J. Tustison, Axel Wismüller</td>
<td>SESSION 9 Cancer Vikram D. Kodibagkar, Baohong Yuan</td>
<td>Tuesday/Wednesday Poster Viewing (Room: Salon D/E)</td>
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<td>SESSION 5 CT Systems and Algorithms Rebecca Fahrig, Kirsten Boedecker,</td>
<td>SESSION 9 Image Features</td>
<td>SESSION 5 Breast I Heang-Ping Chan, Susan M. Astley</td>
<td>SESSION 2 Keynote and Medical Robotics Baowei Fei, Robert J. Webster III</td>
<td>SESSION 9 Cancer Vikram D. Kodibagkar, Baohong Yuan</td>
<td>Tuesday/Wednesday Poster Viewing (Room: Salon D/E)</td>
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<td>SESSION 6 Keynote and Innovations in Imaging Systems, Joseph Y. Lo, Taly Gilat Schmidt</td>
<td>SESSION 10 Deep Learning: Lesions and Pathologies</td>
<td>SESSION 6 Cardiac, Vessels, and Novel Clarisa I. Sanchez, Horst K. Hahn</td>
<td>SESSION 3 Image Registration</td>
<td>SESSION 10 Imaging Agents Vikram D. Kodibagkar, Changjing Li,</td>
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<td>4:50 pm to 5:00 pm</td>
<td>WORKSHOP 3 Deep Learning for Imaging Physics</td>
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<td>WORKSHOP 1 Live Demonstrations Lubomir M. Hadjisiski, Horst K. Hahn</td>
<td>WORKSHOP 2 Selected Papers from the Journal of Medical Imaging Special Issue</td>
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<td>WORKSHOP 4 Selected Papers from the Journal of Medical Imaging Special Issue</td>
<td>WORKSHOP 4 19th SPIE/IFCARS Joint Workshop on the Digital Operating Room: Clinical Applications of Multidisciplinary Computational Anatomy</td>
<td>WORKSHOP ANOUNCEMENTS</td>
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<td>8:00 am to 9:40 am</td>
<td>SESSION 8 CT Image Quality and Dose</td>
<td>Thomas Flohr, Lifeng Yu</td>
<td>SESSION 8 Keynote and Eye Kensaku Mori, Lubomir M. Hadjiiski</td>
<td>SESSION 5 Neurological Procedures and Technologies</td>
<td>Session 6 Ultrasound Imaging and Detection Methods</td>
<td>Session 7 Enhanced Reality, Simulation, and Planning</td>
<td>Session 1 Imaging Informatics for Precision Medicine Wyatt Tellis</td>
<td>Session 1 Perfusion and CEUS</td>
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<td>9:40 am to 10:10 am</td>
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<td>10:10 am to 12:10 pm</td>
<td>SESSION 9 Photon Counting Imaging</td>
<td>Peter B. Noel, Hee-Joung Kim</td>
<td>SESSION 9 Colon and Prostate Janne J. Niippi, Hiroyuki Yoshida</td>
<td>SESSION 6 Ultrasound Imaging and Detection Methods</td>
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<td>1:20 pm to 3:00 pm</td>
<td>SESSION 10 Multi-Energy CT</td>
<td>Maria Drangova, Patrick J. La Riviere</td>
<td>SESSION 10 Head and Neck Hayit Greenspan, Xiaofeng Yang</td>
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<td>3:30 pm to 5:30 pm</td>
<td>SESSION 11 Deep Learning for CT</td>
<td>Guang-Hong Chen, Marc Kachelriess</td>
<td>SESSION 11 Lung II Georga D. Tourassi, Jong Hyo Kim</td>
<td>SESSION 8 Segmentation and Modeling</td>
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<td>5:30 pm to 7:00 pm</td>
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## Special Events • Award Events

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<th>TIME</th>
<th>SESSION 12 Neuroimaging</th>
<th>SESSION 12 Quantitative</th>
<th>SESSION 9 Cardiac and Lung Imaging and Tracking</th>
<th>SESSION 5 Keynote and Imaging Informatics</th>
<th>SESSION 5 Photoacoustics I</th>
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<td>8:00 am</td>
<td>Joseph W. Stayman,</td>
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<td>Jianguo Zhang, Steven C. Horii</td>
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<td>John Yorkston</td>
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<td>Po-Hao Chen</td>
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<td>Yuxiang Xing, Marc Kachelries</td>
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Wei Zhao, Stony Brook Medicine (USA)

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Conference Chairs: Elsa D. Angelini, Imperial College London (United Kingdom), Télécom ParisTech (France); Bennett A. Landman, Vanderbilt Univ. (USA)
Program Committee: Rafeeq Abuabharih, The Britsh of Columbia (Canada); Mohamed Anouali, Livingston Securities LLC (USA); Brian B. Avants, Univ. of Pennsylvania (USA); Meritxell Bach-Cuadrat, Univ. de Lausanne (Switzerland); Kyongtae Bye Baek, Univ. of Pittsburgh Medical Ctr. (USA); Ulis Bagci, Univ. of Central Florida (USA); Olivier Collot, IMB Brain & Spine Institute (France); Benoit M. Dawant, Vanderbilt Univ. (USA); Marleen de Bruijne, Erasmus MC (Netherlands); Alexandre X. Falcão, Univ. Estadual de Campinas (Brazil); Aaron Fenster, Robert Research Institute (Canada); James Fishbaugh, NYU Tandon School of Engineering (USA); Alejandro F. Frangi, The Univ. of Helsinki (Finland); Mona K. Garvin, The Univ. of Iowa (USA); Jianfeng Gee, Univ. of Pennsylvania (USA); Benjamin Globek, Imperial College London (United Kingdom); Miguel Angel González Ballestero, Univ. Pompeu Fabra (Spain); Hayit Greenspan, Tel Aviv Univ. (Israel); Ghassan Hamarneh, Simon Fraser Univ. (Canada); David R. Haynor, Univ. of Washington (USA); Tobias Heimann, Siemens AG (Germany); Christine P. Hendon, Columbia Univ. (USA); Ivana Ignjatovic, Univ. Medical Center Utrecht (Netherlands); Stefan Klein, Erasmus MC (Netherlands); Ender Konukoglu, ETH Zürich (Switzerland); Tianlu Hei, MD Imaging Research (USA); Karim Lekadir, Univ. of Granada, Spain (Spain); Arthur Mol, Univ. de P. F. Lelieveldt, Leiden Univ. Medical Ctr. (Netherlands);
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Dzung L. Pham, Henry Jackson Foundation/USU (USA); National Institutes of Health (USA), Johns Hopkins Univ. (USA); Jerry L. Prince, Johns Hopkins Univ. (USA)
Biomedical Applications in Molecular, Structural, and Functional Imaging
Conference Chairs: Barjor Gimi, Cooper Medical School, Rowan Univ. (USA); Andrzej Krol, SUNY Upstate Medical Univ. (USA)

Program Committee:
- Amir A. Amini, SUNY Upstate Medical School, Rowan Univ. (USA)
- Cooper

Molecular, Structural, Applications in Biomedical Imaging
Sunday–Tuesday 11–13 Feb. 2018
Proceedings of SPIE Vol. 10579

Conference Chairs: Amir A. Amini, SUNY Upstate Medical School, Rowan Univ. (USA); Cooper

Imaging Informatics for Healthcare, Research, and Applications
Conference Chairs: Jianguo Zhang, Shanghai Institute of Technical Physics (China); Po-Hao Chen, The Univ. of Pennsylvania Health System (USA)

Program Committee: Peter R. Bak, Humber River Hospital (Canada); Tessa S. Cook, The Univ. of Pennsylvania Health System (USA); Thomas M. Deserno, Technische Univ. Braunschweig (Germany); Steven C. Horii, The Univ. of Pennsylvania Health System (USA); Maria Y. Law, Hong Kong Sanatorium and Hospital (Hong Kong, China); Heinz U. Lemke, Computer Assisted Radiology and Surgery (Germany); Brent J. Liu, The Univ. of Southern California (USA); Brian Park, The Univ. of Pennsylvania Health System (USA); Eliot L. Siegel, Univ. of Maryland Medical Ctr. (USA); Wyatt Tellis, Univ. of California, San Francisco (USA)

Ultrasonic Imaging and Tomography
Conference Chairs: Neb Duric, Delphinus Medical Technologies (USA); Barbara Ann Karmanos Cancer Institute (USA); Johan G. Bosch, Erasmus Univ. Rotterdam (Netherlands); Jan D’hooge, Univ. of Leuven (Belgium); Marvin M. Doyley, Univ. of Rochester (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA); Mostafa Fatemi, Mayo Clinic College of Medicine (USA); Aaron Fenster, Roberts Research Institute (Canada); Jérémie Fromageau, The Institute of Cancer Research (UK); James F. Fowler, MetroHealth Clinic (USA); Emma J. Harris, The Institute of Cancer Research (UK); Michael Jaeger, Univ. Bern (Switzerland); Jørn Arendt Jensen, Technical Univ. of Denmark (Denmark); David H. Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Lasse Lavstaske, Norwegian Univ. of Science and Technology (Norway); Roman G. Maev, Univ. of Windsor (Canada); Stephen A. McAleevay, Univ. of Rochester (USA); Mohammad Mehrmohammadi, Wayne State Univ. (USA); Svetoslav I. Nikolov, BK Medical (Denmark); Olivier Roy, Barbara Ann Karmanos Cancer Institute (USA); Nicole V. Ruiter, Karlsruher Institut für Technologie (Germany); Kai E. Thomenius, Massachusetts Institute of Technology (USA); François Varray, CREATIS (France)

Digital Pathology
Conference Chairs: Selim Aksoy, Bilkent Univ. (Turkey); Ulysses J. Balis, Univ. of Michigan Health System (USA); Rohit Bhargava, Univ. of Illinois at Urbana-Champaign (USA); Ulf-Dietrich Braumann, Hochschule für Technik, Wirtschaft und Kultur Leipzig (Germany); Weijie Chen, U.S. Food and Drug Administration (USA); Wei-Chung Cheng, U.S. Food and Drug Administration (USA); Eric Cosatto, NCI Labs, America, Inc. (USA); Scott Doyle, Rutgers, The State Univ. of New Jersey (USA); Michael D. Feldman, The Univ. of Pennsylvania Health System (USA); David J. Foran, Research and Development, CEI Inc. (USA); Marios A. Gavrielides, U.S. Food and Drug Administration (USA); Tom R. L. Kimpe, Barco N.V. (Belgium); Elizabeth A. Krupinski, Emory Univ. School of Medicine (USA); Richard M. Levenson, Univ. of California, Davis (USA); Olivier Lezoray, Univ. de Caen Basse-Normandie (France); Geert Lijtens, Radboud Univ. Medical Ctr. (Netherlands); Anant Madabhushi, Case Western Reserve Univ. (USA); Derek R. Magee, Univ. of Leeds (UK); Anne L. Martel, Sunnybrook Research Institute (Canada); Erik Meijering, Erasmus MC (Netherlands); James P. Monaco, Inspirata, Inc. (USA); Mehdi Moradi, IBM Research (USA); Bahram Parvin, Lawrence Berkeley National Lab. (USA); Josien P. W. Pluim, Image Sciences Institute (Netherlands); Nasir M. Rajpoot, The Univ. of Warwick (UK); Gustavo Kunde Rohde, Carnegie Mellon Univ. (USA); Berkman Sahiner, U.S. Food and Drug Administration (USA); Chukka Srinivas, Ventana Medical Systems, Inc. (USA); Darren Treanor, Univ. of Leeds (UK); Jeroen van der Laak, Radboud Univ. Nijmegen Medical Ctr. (Netherlands); Aaron D. Ward, The Univ. of Western Ontario (Canada); Martin J. Yaffe, Sunnybrook Research Institute (Canada); Bülent Yener, Rensselaer Polytechnic Institute (USA)

Poster Sessions
Two poster sessions are scheduled. See Poster Presentation Guidelines for additional information.
Poster authors are required to:
- Display the poster early on the first day of your session
- Attend the Poster Session to answer questions.

Poster award winners will be recognized and certificates distributed in the conference meeting rooms. Check conference schedules for times and locations. Ribbons will identify winning posters during the Poster Sessions.

SUNDAY/MONDAY POSTER SESSION, see p. 34
Location: Salon E
Poster presentations from the Imaging Processing; Image Perception, Observer Performance, and Technology Assessment; Biomedical Applications in Molecular, Structural, and Functional Imaging; and Digital Pathology conferences will be included.

Author Set-Up Time:
Sunday after 12:00 pm (noon)
Posters should remain on display until the end of the Poster Session on Monday.

Poster Session and Reception: Monday from 5:30 to 7:00 pm
NOTE: Extended poster viewing until 9:00 pm on Sunday.

TUESDAY/WEDNESDAY POSTER SESSION, see p. 49
Location: Salon E
Poster presentations from the Physics of Medical Imaging; Computer-Aided Diagnosis; Image-guided Procedures, Robotic Interventions, and Modeling; Imaging Informatics for Healthcare, Research, and Applications; and Ultrasonic Imaging and Tomography conferences will be included.

Author Set-Up Time:
Tuesday after 9:30 am
Posters should remain on display until the end of the Poster Session on Wednesday.

Poster Session and Reception: Wednesday from 5:30 to 7:00 pm
NOTE: Extended poster viewing until 9:00 pm on Tuesday.
Weifu Li, Xi Chen, Institute of Automation (China); ATUM-SEM
networks for mitochondria segmentation based on
A novel fully deep convolutional neural
Univ. (Japan) ......................... [10574-10]

Cancer Ctr. Hospital (Japan); Kensaku Mori, Nagoya
School of Medicine (Japan); Kazunari Misawa, Aichi
networks
11:30 am:

(USA) ................................ [10574-9]

(USA); Chih-Liang Chin, Merck Sharp & Dohme Corp.
Joseph Forbes, Ansuman Bagchi, Merck & Co., Inc.
Merck & Co., Inc. (USA); Sarayu Parimal, Smita
Vanderbilt Univ. (USA); Ilknur Icke, Belma Dogdas,
average networks
in porcine cardiac cine MR images using a hybrid of
Bennett A. Landman, Vanderbilt Univ. (USA) . [10574-8]
Jiaqi Liu, Yuang Yao, Vanderbilt Univ. (USA); Albert
Shunxing Bao, Camilo Bermudez, Andrew J. Plassard,
convolutional kernels and conditional generative
Splenomegaly segmentation using global
Medical Ctr. Utrecht (Netherlands) ........... [10574-7]

10:30 am:

Analysis of visual search behaviour from
experience radiologists interpreting digital breast
tomosynthesis (DBT) images: a pilot study.
Jeng Wang, Berkman Sahiner, Nicholas A. Petrick,
Arie Pezeshk, U.S. Food and Drug Administration
(USA). ....................................... [10574-5]

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SUNDAY 11 FEBRUARY

CONFERENCE 10574
ROOM: SALON B
Sunday—Tuesday 11–13 Feb. 2018
Proceedings of SPIE Vol. 10574

CONFERENCE 10577
ROOM: SALON A
Sunday—Monday 11–12 Feb. 2018
Proceedings of SPIE Vol. 10577

CONFERENCE 10578
ROOM: MONTROSE
Sunday—Tuesday 11–13 Feb. 2018
Proceedings of SPIE Vol. 10578

CONFERENCE 10581
ROOM: RIVER OAKS
Sunday—Monday 11–12 Feb. 2018
Proceedings of SPIE Vol. 10581

ROOM: SALON D/E ............ 12:00 PM TO 9:00 PM

Sunday/Monday Poster Viewing
Posters will be on display Sunday and Monday with extended viewing until 9:00 pm on Sunday. The poster session with authors in attendance will be Monday evening from 5:30 to 7:00 pm. Award winners will be identified with ribbons during the reception. Award announcement times are listed in the conference schedule.

Lunch Break .................... Sun 12:10 pm to 1:20 pm

SESSION 3
ROOM: SALON B ............ 1:30 PM TO 3:40 PM

Image Enhancement
1:40 pm: Enhanced coronary artery calcium registration in dual energy chest radiography using automatic rib suppression, Bo Zhou, Di Wen, Case Western Reserve Univ. (USA); Robert Gilkeson, Case Western Reserve Univ. (USA) and Univ. of Iceland (Iceland) ....... [10578-13]

2:00 pm: Radiation dose reduction in digital breast tomosynthesis (DBT) by means of deep-learning-based supervised image processing, Junchi Liu, Amin Zarshenas, Zheng Wei, Illinois Institute of Technology (USA); Limin Yang, The Univ. of Iowa (USA); Laurie Fajardo, The Univ. of Utah (USA); Kenji Suzuki, Illinois Institute of Technology (USA) ........ [10578-14]

CONFERENCE 10578
ROOM: MONTROSE
Sunday—Tuesday 11–13 Feb. 2018
Proceedings of SPIE Vol. 10578

ROOM: SALON D/E ............ 12:00 PM TO 9:00 PM

Sunday/Monday Poster Viewing
Posters will be on display Sunday and Monday with extended viewing until 9:00 pm on Sunday. The poster session with authors in attendance will be Monday evening from 5:30 to 7:00 pm. Award winners will be identified with ribbons during the reception. Award announcement times are listed in the conference schedule.

Lunch Break .................... Sun 12:10 pm to 1:20 pm

SESSION 3
ROOM: MONTROSE ............ 1:20 PM TO 3:00 PM

Neurological Imaging I
1:20 pm: Resilient modular small-world directed brain networks in healthy subjects with multi-scale large-scale Granger causality analysis of resting-state functional MRI, Udayasankar Chockanathan, Univ. of Rochester Medical Ctr. (USA); Anas Z. Abidin, Adora M. DSouza, Univ. of Rochester (USA); Giovanni Schifitto, Univ. of Rochester Medical Ctr. (USA); Axel Wismüller, Univ. of Rochester (USA) ... [10578-10]

2:00 pm: Automatic outlier detection using hidden Markov model for cerebellar lobe segmentation, Aaron Carass, Jerry L. Prince, Lianrui Zuo, Johns Hopkins Univ. (USA) ... [10578-12]

2:20 pm: Advancing Cancer Diagnostics with Deep Learning (Keynote Presentation), Martin C. Stumpe, Google Research (USA) ... [10581-12]

SESSION 3
ROOM: RIVER OAKS ............ 1:30 PM TO 3:40 PM

Keynote and Emerging Trends
2:20 pm: Creating synthetic digital slides using conditional generative adversarial networks: application to Ki67 staining, Caglar Senaras, The Ohio State Univ. (USA); Berkman Sahiner, U.S. Food and Drug Administration (USA); Gary Tozbikian, Gerard Lozanski, Metin N. Gurcan, The Ohio State Univ. (USA) ... [10581-13]

2:40 pm: Single stain normalization for IHC whole slide images, Yoo Nie, Maria Sanz de Cea, Ventana Medical Systems, Inc. (USA) ... [10581-14]

Coffee Break ................. Sun 3:30 pm to 3:30 pm
Session Chairs: Craig K. Abbey, Univ. of California, Santa Barbara (USA); David L. Wilson, Case Western Reserve Univ. (USA)

3:30 pm: Interaction of anatomic and quantum noise in DBT and breast CT power spectrum. Amar Kavuri, Nathaniel R. Fredette, Mini Das, Univ. of Houston (USA) .

3:50 pm: Comparison of synthetic 2D images with planar and tomosynthesis imaging of the breast using a virtual clinical trial. Alistair Mackenzie, Sukmanjat Kaur, Premkumr Elangovan, David R. Dance, The Royal Surrey County Hospital NHS Trust (UK) .

4:10 pm: Assessment of DBT acquisition parameters for 2D and 3D search tasks. Howard C. Gifford, Uni. of Houston (USA); Mini Das, Uni. of Houston (USA) .

4:30 pm: Quantifying predictive capability of electronic health records for the most harmful breast cancer. Yirong Wu, Jun Fan, Univ. of Wisconsin-Madison (USA); Peggy Peisig, Richard Berg, Ahmad Taffi, Marshfield Clinic (USA); Jie Yin, Jiangbei People's Hospital (China); My Yuan, David Page, Univ. of Wisconsin-Madison (USA); Jennifer Cox, Univ. of Wisconsin School of Medicine and Public Health (USA); Elizabeth Burnside, Univ. of Wisconsin Hospitals and Clinics Authority (USA) .

4:50 pm: Test data reuse for evaluation of adaptive machine learning algorithms: overfitting to a fixed ‘test’ dataset and a potential solution. Alejsx Gossmann, Tulane Univ. (USA); Ari Peseth, Berkman Sahiner, U.S. Food and Drug Administration (USA) .

5:10 pm: Towards the use of computationally inserted lesions for mammographic CAD assessment. Zahra Ghariani, Ari Peseth, Nicholas A. Petrick, Berkman Sahiner, U.S. Food and Drug Administration (USA) .
Monday 12 February

**SESSION 1**
ROOM: SALON C  .... MON 8:00 AM TO 9:40 AM

Breast Imaging
Session Chairs: Hilde Bosmans, KU Leuven (Belgium); Stephen J. Glick, U.S. Food and Drug Administration (USA)
8:00 am: Comparison of direct-convolution a-Se and CdS/CdTe scintillator-based CMOS FPD/DBT flat-panel detectors, using an anthropomorphic breast phantom with embedded microcalcification signals. Andrey V. Makeev, Lynda C. Ikekuba, Stephen J. Glick, U.S. Food and Drug Administration (USA)  
8:20 am: Anatomic noise in digital mammography: a linear systems approach. Robert Lalonde, Jesse Tanguy, The Univ. of British Columbia Okanagan (Canada)  
8:40 am: Towards determination of individual glandular dose. Hanne Petersen, Magnus Dustrler, Daniel Fornvik, Pontus Timberg, Sophia Zackriesson, Lund Univ. (Sweden); Anders Tingberg, Lund Univ. (Sweden) and Skåne Univ. Hospital Malmö (Sweden)
9:00 am: Classification of breast microcalcifications using dual-energy mammography. Baha Ghammaraoui, U.S. Food and Drug Administration (USA)
9:20 am: Virtual clinical trial of lesion detection in digital mammography, and digital breast tomosynthesis. Predrag R. Bakic, Bruno Barufaldi, David Higginbotham, Susan P. Weinstein, The Univ. of Pennsylvania Health System (USA); Ali Avanaki, Kathryn Espig, Albert Xthona, Tom Kimpe, Barco, Inc. (USA); Bahaa Ghammaori, The Univ. of Pennsylvania Health System (USA)
9:40 am: Coffee Break Mon 9:40 to 10:10 am

**SESSION 2**
ROOM: SALON B  .... MON 8:00 AM TO 9:40 AM

Registration
8:00 am: A multilevel Markov Chain Monte Carlo approach for uncertainty quantification in deformable registration. Sandra Schultz, Heinz Handels, Jan Ehrhardt, Univ. zu Lübeck (Germany)
8:20 am: Quadratic: quality of dice in registration pipelines. Shikha Chaganti, Bennett A. Landman, Vanderbilt Univ. (USA)
8:40 am: Self-reference-based and during-registration-detection of motion artifacts in spatio-temporal medical image data. Etike Mücke, Universitätshospitalklinikum Hamburg-Eppendorf (Germany); Heinz Handels, Univ. zu Lübeck (Germany); René Werner, Universitätshospitalklinikum Hamburg-Eppendorf (Germany)
9:00 am: GPU-based stochastic-gradient optimization for non-rigid medical image registration in time-critical applications. Parag Bhalode, Technische Univ. Delft (Netherlands); Marius Sauerg, Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Zaid Al-Ars, Technische Univ. Delft (Netherlands); Floris Berendsen, Leiden Univ. Medical Ctr. (Netherlands)
9:40 am: Coffee Break Mon 9:40 to 10:10 am

**SESSION 3**
ROOM: HUNTERS CREEK  .... MON 8:00 AM TO 9:40 AM

Lung I and Liver
Session Chairs: Catalin Fetita, Télécom SudParis (France); Weijie Chen, U.S. Food and Drug Administration (USA)
8:00 am: Dense volumetric detection and segmentation of mediastinal lymph nodes in chest CT images. Hiroshi Oda, Holger R. Roth, Nagoya Univ. (Japan); Kanwal K. Bhatia, King’s College London (UK); Masahiro Oda, Nagoya Univ. (Japan); Takayuki Kitasaka, Aichi Institute of Technology (Japan); Shingo Iwano, Nagoya Univ (Japan); Hiroto Ishida, Sapporo Kosei Hospital (Japan); Hirotsugu Takabatake, Minami Sanjo Hospital (Japan); Masaki Mori, Sapporo Kosei Hospital (Japan); Hiroshi Natori, Keikai Kosei Hospital (Japan); Julia A. Schnabel, Univ. of Oxford (UK); Kensaku Oda, Nagoya Univ. (Japan)
8:20 am: Early detection of lung cancer recurrence after stereotactic ablative radiation therapy: radiomics system design, Salma Dammak, London Regional Cancer Program (Canada); David Palma, Western Univ. (Canada) and London Regional Cancer Program (Canada); Sarah Mattonen, Stanford Univ. School of Medicine (USA); Suresh Senan, Vizee Medical Ctr. (Canada); Aarón D. Ward, Western Univ. (Canada) and London Regional Cancer Program (Canada)
8:40 am: A practical method to evaluate personalized injected patient dose for cardiac perfusion SPECT imaging. The polar map as a numerical observer. P. Hendrik Pretorus, Karen L. Johnson, Michael A. King, Univ. of Waterloo (Canada);
9:00 am: Model Observers 1
Session Chairs: Matthew A. Kupinski, College of Optical Sciences, The Univ. of Arizona (USA); Lijijana Platiša, Univ. Gent (Belgium)
8:00 am: Correlation between model observers in uniform background and human observer in patient liver background in a low-contrast detection task in CT. Hao Gong, Lifeng Yu, Shuai Leng, Cynthia H. McCollough, Mayo Clinic (USA)
8:20 am: Lesion detection performance of cone beam CT images with anatomical noise background: single slice vs multi-slice human and model observer study. Minah Han, Hanjo Jang, Jonghaak Baek, Medixi Medixi (Korea); K. Bhatia, King’s College London (UK); Masahiro Oda, Nagoya Univ. (Japan); Hiroto Ishida, Sapporo Kosei Hospital (Japan); Hirotsugu Takabatake, Minami Sanjo Hospital (Japan); Masaki Mori, Sapporo Kosei Hospital (Japan); Hiroshi Natori, Keikai Kosei Hospital (Japan); Julia A. Schnabel, Univ. of Oxford (UK); Kensaku Oda, Nagoya Univ. (Japan)
8:40 am: Use of material decomposition in context of neurovascular intervention using standard flat panel and high-resolution CMOS detectors, Alexander R. Podgorsak, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA); Ashwin C. Venkataraman, Setlur S. V. Nagesh, Daniel R. Bednarek, Toshiba Stroke and Vascular Research Ctr. (USA); Stephen Rudin, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA); Adnan Siddiqui, Toshiba Stroke and Vascular Research Ctr. (USA); Ciprian I. Ionita, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA).  
9:00 am: Novel Imaging Techniques and Applications
Session Chairs: Ciprian I. Ionita, Toshiba Stroke and Vascular Research Ctr. (USA); Andrzej Krol, SUNY Upstate Medical Univ. (USA)
8:00 am: Use of material decomposition in context of neurovascular intervention using standard flat panel and high-resolution CMOS detectors, Alexander R. Podgorsak, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA); Ashwin C. Venkataraman, Setlur S. V. Nagesh, Daniel R. Bednarek, Toshiba Stroke and Vascular Research Ctr. (USA); Stephen Rudin, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA); Adnan Siddiqui, Toshiba Stroke and Vascular Research Ctr. (USA); Ciprian I. Ionita, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA).  
9:00 am: Standard-based interop-eration of coarse nuclei in post-neo-adjuvant breast cancer surgical specimens using fully convolutional networks. Rene Bilard, Univ. of Waterloo (Canada); Mehrdad J. Gangeh, Mohammad Peikari, Sherine Salama, Sharon Nofech-Mozes, Univ. of Toronto (Canada); Anne L. Martel, Sunnybrook Research Institute, Univ. of Toronto (Canada); Ali Ghodsi, Univ. of Waterloo (Canada)
9:20 am: Localization and classification of cell nuclei in post-neo-adjuvant breast cancer surgical specimens using fully convolutional networks. Rene Bilard, Univ. of Waterloo (Canada); Mehrdad J. Gangeh, Mohammad Peikari, Sherine Salama, Sharon Nofech-Mozes, Univ. of Toronto (Canada); Anne L. Martel, Sunnybrook Research Institute, Univ. of Toronto (Canada); Ali Ghodsi, Univ. of Waterloo (Canada)
10:10 am: Coffee Break Mon 9:40 to 10:10 am
### Monday, 12 February

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#### Session 1 Continued
- **Room:** HUNTERS CREEK  
  - **Time:** Mon 8:00 AM to 9:40 AM
  - **9:00 am:** Boosting CNN performance for lung texture classification using connected filtering, Sebastian Roberto Tarando, Catalin Fetita, Télécom SudParis (France); Hyoun Cho, Pitié-Salpêtrière Hospital (France); Pierre-Yves Brillet, Avicenne Hospital (France).
  - **9:20 am:** Automatic liver volume segmentation and fibrosis classification, Evgeny Bal, Tel Aviv Univ. (Israel); Eyal Klang, Michal Amitai, The Chaim Sheba Medical Ctr., Tel Hashomer (Israel); Hayit Greenspan, Tel Aviv Univ. (Israel).

#### Session 5 Continued
- **Room:** SALON A  
  - **Time:** Mon 8:00 AM to 9:40 AM
  - **9:00 am:** A balanced super-resolution optical fluctuation imaging method for super-resolution ultrasound, Minglei Lv, Yuexia Shu, Ying Liu, Zhuangzhi Yan, Xin Liu, Shanghai Univ. (China).
  - **9:20 am:** A deep learning model observer for use in alternative forced choice virtual clinical trials, Majdi Alnowami, Univ. of Surrey (UK) and King Abdulaziz Univ. (Saudi Arabia); G. Mills, Muhammad Awas, Univ. of Surrey (UK); Prem Elangovan, Mishal Patel, Mark D. Halling-Brown, The Royal Surrey County Hospital NHS Trust (UK); Kenneth Young, David R. Dance, The Royal Surrey County Hospital NHS Trust (UK) and Univ. of Surrey (UK); Kevin Wells, Univ. of Surrey (UK).

#### Session 5 Continued
- **Room:** MONTROSE  
  - **Time:** Mon 8:00 AM to 9:40 AM
  - **9:20 am:** Sparse-view CT reconstruction with improved GoogLeNet, Shipeng Xie, Nanjing Univ. of Posts and Telecommunications (China).

#### Session 5 Continued
- **Room:** RIVER OAKS  
  - **Time:** Mon 8:00 AM to 9:40 AM
  - **9:20 am:** Automatic cancer detection and localization on prostatectomy histopathology images, Wenchao Han, Univ. of Western Ontario (Canada); Carol Johnson, London Health Science Ctr. (Canada); Mena Gaed, José Gomez, Madeleine Moussa, Joseph Chin, Stephen Pautler, Glenn Baum, Aaron D. Ward, Western Univ. (Canada).

#### Awards Announcements
- **Room:** RIVER OAKS  
  - **Time:** Mon 9:40 AM to 9:45 AM
  - The Digital Pathology conference RFW runners up and poster award recipients will be recognized and certificates distributed.

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**Recognize the Extraordinary**

Honor someone who has made a difference. Nominate a teacher, colleague, or mentor for a SPIE Award.

**Deadline for nominations is 1 June 2018**
Sunnybrook Research Institute
prototype printing
using selective laser sintering rapid

R. Bakic, The Univ. of Pennsylvania Health Administration (USA) ........... [10573-7]
Stephen J. Glick, U.S. Food and Drug , Lynda
Anthropomorphic breast ...

Session Chairs: Despina Kontos, Univ. of Pennsylvania (USA) .......[10573-7]

10:10 am: From Image Processing and 3D Computer Vision to Computational Brain Imaging: A Journey through Modelling and Geometry (Keynote Presentation), Rachid Deriche, INRIA Sophia Antipolis - Mediterranee (France) . . . [10574-28]

10:30 am: Anthropomorphic breast phantoms for evaluation of FFDM/DBT and breast CT using inkjet printing, Lynda C. Ikejimba, Jesse Salad, Andrea Makeev, Christian Graff, Bahaa Ghammaouri, Stephen J. Glick, U.S. Food and Drug Administration (USA) . . . [10573-7]

5:10 pm: Improved simulation of Cooper’s ligaments in breast phantoms, David D. Pokrajac, Delaware State Univ. (USA); Marko D. Petkovic, Univ. of Nis (Serbia); Andrew D. A. Maidment, Predrag R. Bakic, The Univ. of Pennsylvania Health System (USA) . . . [10573-8]

11:10 am: Development of a physical 3D anthropomorphic breast texture model using selective laser sintering rapid prototype printing, James Mainprize, Sunnybrook Research Institute (Canada); Ann-Katherine Carton, Remy Klauss, Zhijin Li, Serge L. Muller, GE Healthcare France (France); David M. Hunter, Martin J. Yaffe, Sunnybrook Research Institute (Canada) . . . [10573-9]

10:30 am: Detection of bone loss via subchondral bone texture analysis, Jean-Baptiste Vinort, Kitware, Inc. (USA); Antonio Carlos Ruellas, Univ. of Michigan (USA); J.S. Marron, The Univ. of North Carolina at Chapel Hill (USA); Hina Shah, Kitware, Inc. (USA); Lucia Cevadines, Erika Beranvides, Univ. of Michigan (USA); Beatrix Paniagua, Kitware, Inc. (USA) . . . [10578-25]

10:50 am: Automated quality control and semantic segmentation for high-resolution microendoscopy of oral premalignant lesions using a CNN-based algorithm, Eric Yang, Rice Univ. (USA); David Brenes, Duke Univ. (USA); Nadarajah Vigneswaran, The Univ. of Texas Health Science Ctr. at Houston (USA) and The Univ. of Texas School of Dentistry (USA); Ann M. Gillenwater, The Univ. of Texas Health Science Ctr. of Dentistry (USA); John Wright, Y.S. Lisa Cheng, Texas A&M Univ. College of Dentistry (USA); Rebecca R. Richards-Kortum, Rice Univ. (USA) . . . [10578-26]

10:10 am: Towards a surround-aware numerical observer, Ali Avanaki, Barco, Inc. (USA). . . [10577-26]

10:30 am: Feasibility of using convolutional neural networks as model observer, Felix K. Kopp, Klinikum rechts der Isar der Technischen Univ. München (Germany); Marco Catalano, Univ. degli Studi di Napoli Federico II (Italy); Daniela Münzel, Klinikum rechts der Isar der Technischen Univ. München (Germany); Ernst J. Rummery, Klinikum rechts der Isar der Technischen Univ. München (Germany); Peter B. Noël, Klinikum rechts der Isar der Technischen Univ. München (Germany) and Technische Univ. München (Germany) . . . [10577-27]

11:00 am: Reducing the number of reconstructions needed for estimating channelized observer performance, Angel R. Pineda, Hope Miedema, Melissa Brenner, Sana Altaf, Manhattan College (USA) . . . [10577-29]

11:30 am: A resampling comparison of CHO’s detectability index bias and uncertainty, Francesc Massanes, Illinois Institute of Technology (USA); Alexandre Ba, François Bochud, Institut Univ. de Radiophysique Appliquée (Switzerland); Jovian G. Brankov, Illinois Institute of Technology (USA) . . . [10577-30]

11:40 am: Toward a model-based technique for the segmentation of the pulmonary emphysema, Srijita Chakravorti, Vanderbilt Univ. (USA); Victoria L. Morgan, Paula Trujillo Diaz, Vanderbilt Univ. Medical Ctr. (USA); Raul Wizir Gonzalez, Benoit M. Dawant, Vanderbilt Univ. (USA) . . . [10578-28]
### MONDAY 12 FEBRUARY

**SESSION 2 CONTINUED**
**ROOM: SALON C**  . MON 10:10 AM TO 12:10 PM

11:30 am: Design and validation of biologically-inspired spiculated lesion models utilising structural tissue distortion, P. Elangovan, The Royal Surrey County Hospital NHS Trust (UK); E. Mihalas, Univ. of Surrey (UK); Majdi R. Alnowami, Univ. of Surrey (UK) and Univ. of King Abdulaziz (Saudi Arabia); Kenneth C. Young, The Royal Surrey County Hospital NHS Trust (UK) and Univ. of Surrey (UK); David R. Dance, Univ. of Surrey (UK) and the Royal Surrey County Hospital NHS Trust (UK); V. Cooke, Jarvis Breast Screening and Diagnostic Ctr. (UK); Louise Wilkinson, St George's Healthcare NHS Trust (UK); Rosalind M. Given-Wilson, St George’s Healthcare NHS Trust (UK); Matthew G. Wallis, Cambridge Univ. Hospitals NHS Foundation Trust (UK); Kevin Wells, Univ. of Surrey (UK) . . . . . .[10573-10]

11:50 am: 3D printed anthropomorphic physical phantom for mammography and DBT with high contrast custom materials, lesions and uniform chest wall region, Andrea Rossman, Duke Univ. (USA) and Duke Univ. Medical Ctr. (USA) and Carl E. Ravin Advanced Imaging Labs. (USA); Matthew Cateraccio, Duke Univ. (USA); Anne M. Li, Duke Univ. (USA) and Duke Univ. Medical Ctr. (USA) and Carl E. Ravin Advanced Imaging Labs. (USA); Thomas J. Sauer, Justin B. Solomon, Duke Univ. Medical Ctr. (USA) and Carl E. Ravin Advanced Imaging Labs. (USA); Michael E. Gehm, Benjamin J. Wiley, Duke Univ. (USA); Ehsan Samei, Duke Univ. Medical Ctr. (USA) and Carl E. Ravin Advanced Imaging Labs. (USA) and Duke Univ. (USA); Joseph Y. Lo, Duke Univ. Medical Ctr. (USA) and Carl E. Ravin Advanced Imaging Labs. (USA) and Duke Univ. (USA). . . . . . .[10573-11]

Lunch Break . . . Mon 12:10 pm to 1:20 pm

### SESSION 2 CONTINUED
**ROOM: HUNTERS CREEK**  . MON 10:10 AM TO 12:10 PM

11:30 am: An empirical evaluation of cross-site variability in radiomic features for characterizing prostate MRI appearance, Prathyush Chirra, Case Western Reserve Univ. (USA); Nicolas B. Bloch, Boston Univ. (USA); Masoom Haider, Sunnybrook Health Sciences Ctr. (Canada); Ardeeshir Rastinehad, Icahn School of Medicine at Mount Sinai (USA); Andrei Purytsko, Cleveland Clinic (USA); Anant Madabhushi, Satish E. Viswanath, Case Western Reserve Univ. (USA) . . . . . [10575-10]

11:50 am: A deep learning classifier for prediction of pathological complete response to neoadjuvant chemotherapy from baseline breast DCE-MRI, Kavya Ravichandran, Massachusetts Institute of Technology (USA) and Case Western Reserve Univ. (USA); Nathaniel Braman, Andrew Janowczyk, Anant Madabhushi, Case Western Reserve Univ. (USA) . . . . . . . . . . [10575-11]

Lunch Break . . . Mon 12:10 pm to 1:20 pm

### SESSION 6 CONTINUED
**ROOM: MONTROSE**  . MON 10:10 AM TO 12:10 PM

11:30 am: Segmentation of myocardial scar on 3D LGE-MRI using a continuous max-flow based approach, Fatma Usta, Wail Guueaib, Univ. of Ottawa (Canada); James A. White, Univ. of Calgary (Canada); Eranga Ukwwata, Carleton Univ. (Canada) . . . . . . . . . . [10578-29]

11:50 am: Automatic segmentation of eyeball structures from micro-CT images based on sparse annotation, Takaaki Sugino, Holger R. Roth, Masahiro Oda, Nagoya Univ. (Japan); Seiji Omata, Shinya Sakuma, Fumihito Arai, Nagoya Univ. Graduate School of Engineering (Japan); Kensaku Mori, Nagoya Univ. (Japan) . . . . . . . . . . . . . . . . . . [10578-30]

Lunch Break . . . Mon 12:10 pm to 1:20 pm
### CONFERENCE 10573
**ROOM: SALON C**  
*Mon.–Thurs. 12–15 Feb. 2018*

#### SESSION 3 CONTINUED
**ROOM: SALON C** . . . . . . . MON 1:20 PM TO 3:40 PM

3:20 pm: Application of neural networks to model the signal-dependent noise of a digital breast tomosynthesis unit. Fabrizio A. Brito, Lucas R. Borges, Igor Guerrero, Univ. de São Paulo (Brazil); Andrew D. A. Maidment, Predrag R. Bakic, The Univ. of Pennsylvania Health System (USA); R. Bakic, The Univ. of Pennsylvania (USA); Marcelo A. C. Vieira, Univ. de São Paulo (Brazil) . . . . . . . . . [10573-18]

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

#### SESSION 7 CONTINUED
**ROOM: SALON C** . . . . . . . MON 1:20 PM TO 3:40 PM

2:40 pm: MRI textures as outcome predictor for Gamma Knife radiosurgery on vestibular schwannoma. Patrick Langenhuizen, Technische Univ. Eindhoven (Netherlands) and TweeSteden Ziekenhuis (Netherlands); Mark Legters, Svetlana Zinger, Technische Univ. Eindhoven (Netherlands); Jeroen Verheul, Sieger Leenstra, TweeSteden Ziekenhuis (Netherlands); Peter N. de Wit, Technische Univ. Eindhoven (Netherlands) . . . . . . . . . [10575-16]

3:00 pm: ADMULTlmg: a novel missing modality transfer learning based CAD system for diagnosis of MCI due to AD using incomplete multi-modality imaging data. Xiaonian Liu, Arizona State Univ. (USA); Kewei Chen, Banner Alzheimer’s Institute (USA); Teresa Wu, Arizona State Univ. (USA); David Weidman, Banner Alzheimer’s Institute (USA); Fleming Lure, MS Technologies Corp. (USA); Jing Li, Arizona State Univ. (USA) . . . . . . . . . [10575-17]

3:20 pm: Longitudinal connectome-based predictive modeling for REM sleep behavior disorder from structural brain connectivity. Luca Giancardo, The Univ. of Texas Health Science Ctr. at Houston (USA); Timothy Elimore, The City College of New York (USA); Jessika S. Ocampo, The Univ. of Texas Health Science Ctr. at Houston (USA); Laura Ocasio, Memorial Hermann Texas Medical Ctr. (USA); Arash Kamali, Roy Riascos-Castaneda, Mya C. Schiess, The Univ. of Texas Health Science Ctr. at Houston (USA) . . . . . . . . . [10575-18]

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

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**Univ. of Texas MD Anderson Image-Guided Cancer Therapy Facilities Reception and Tour**

Join your colleagues on a guided tour of the MD Anderson image-guided cancer therapy facilities, including an MR-LINAC and CT-guided interventional suites. Get a first-hand look at how advances have shaped the treatment and outcomes of various cancers.

*Bus transportation provided by MD Anderson.*

Departing the Marriott Marquis at 5:45 pm, returning by 9:00 pm - must have ticket to board.

Tour tickets are available at the SPIE registration desk. Tickets are complimentary and are first come, first served. Seating is limited.

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**Awards and Plenary Session**

**MONDAY 12 FEBRUARY 2018 • 4:00 TO 5:30 PM • LOCATION: SALON F**

- **Welcome and new SPIE Fellows Acknowledgements**
- **4:10 pm Best Student Paper Awards Announcements**
  - The first place winner and runner up of the Robert F. Wagner All-Conference Student Paper Award will be announced.
- **4:30 pm**  
  
  **PLENARY PRESENTATION**  
  Multidisciplinary Computational Anatomy: Concept and Clinical Application  
  Makoto Hashizume, Graduate School of Medical Sciences, Kyushu University (Japan)
CT artifact reduction via U-net CNN
Republic of Korea, Jongduk Baek, Yonsei Univ. (Korea, Republic of) .......................... [10574-61]

Machine Learning
Automatic localization and segmentation of optical disk based on faster R-CNN and level set in fundus image. Donghun Park, Cheolsoo Lee, AnYoung Lee, Yoon-Soo Kim, SungIo Lee, Kangpil Choi, (South Korea) (Korea, Republic of) .......................... [10574-60]

Circle-like foreign element detection in chest x-rays using normalized cross-correlation and unsupervised clustering. Fatema T. Zohora, The Univ. of South Dakota (USA); Sameer Antani, National Library of Medicine (USA); KC Santosh, The Univ. of South Dakota (USA) .......................... [10574-66]

Orientation recognition in hand radiographs: a transfer learning approach. Ivo Matteo Baltruschat, Universitätsklinikum Hamburg-Eppendorf (Germany); Axel Saabach, Philips Research (Germany); Christian Heinrich, University of Lübeck (Germany); Hannes Niccks, Philips Research (Germany) .......................... [10574-67]

Organ labelling and localization in thoracic CT volumes using 3D CNNs and leveraging spatial distributions. Rajat Elias Soans, James A. Shackleford, Drexel Univ. (USA) .......................... [10574-68]

Automatic decomposition and mirtal valve segmentation of cardiac ultrasound time series data. Yoni Dukler, Brigham and Women’s Hospital (USA); Yurun Ge, Shanghai Jiao Tong Univ. (China); Yizhao Qian, Univ. of California, Los Angeles (USA); Shinyo Yamamoto, Waseda Univ. (Japan); Baichuan Yuan, Univ. of California, Los Angeles (USA); Long Zhao, Univ. of California, Berkeley (USA); Andrea L. Bertozzi, Univ. of California, Los Angeles (USA); Blake Hunter, Claremont McKenna College (USA); Rafael Llerena, Jesse T. Yen, Univ. of Southern California (USA) .......................... [10574-69]

Transfer learning for diabetic retinopathy. Jeremy Benson, Hector Carrillo, VisionQuest Biomedical LLC (USA); The Univ. of New Mexico (USA); Jeff Woodcock, Sheila Nemeth, Simon Banigs, VisionQuest Biomedical LLC (USA); Trilce Estrada, The Univ. of New Mexico (USA); Peter Soliz, VisionQuest Biomedical LLC (USA) .......................... [10574-70]

CT artifact reduction via U-net CNN. Chengzhu Zhang, Yuxiang Xing, Taishuang Hu (China) .......................... [10574-62]

Automatic segmentation of thoracic aorta segments in low-dose chest CT. Julia Nootboot, Bob de Vos, Jelmer Wolterink, Ivana Ijsgun, Univ. Medical Ctr. Utrecht (Netherlands) .......................... [10574-63]

Fast super resolution with iterative guided patchy refinement for CT angiography images. Yutaro Iwamoto, Ritsumeikan Univ. (Japan); Xian-Hua Han, Yamaguchi University (Japan); Akiko Shino, University of Medical Science (Japan); Yen-Wei Chen, Ritsumeikan Univ. (Japan) .......................... [10574-64]

CT-MR aortic aneurysm image segmentation by neural network fusion. Dung Wang, Rui Zhang, Zhongteng Teng, Yuan Huang, Filippo Spiga, Univ. of Cambridge (UK); Michael Hong-Fei Du, Imperial College London (UK); Jonathan H. Gillard, Univ. of Cambridge (UK); Qingsheng Lu, Changhui Hospital (China); Pietro Lio, Univ. of Cambridge (UK) .......................... [10574-75]

Spine centreline extraction and efficient spine radius of MRI and CT data. Qinghua Liu, Jesus M. Arias, Philips Research (Germany); Nora Vogt, Univ. zu Lübeck (Germany); Peter Börnert, Philips Research (Germany) .......................... [10574-76]

Quantification and Modeling
Segmentation of subcutaneous fat within mouse skin in 3D OCT image data using random forest machine learning. Chih-Cheng Lin, defeng Zhang, Soochow Univ. and level set in fundus image. Donghun Park, Cheolsoo Lee, AnYoung Lee, Yoon-Soo Kim, SungIo Lee, Kangpil Choi, (South Korea) (Korea, Republic of) .......................... [10574-61]

Automatic detection of the inner ears in head CT images using deep convolutional neural networks. Dongqing Zhang, Jack H. Noble, Benoit M. Dawant, University of California, San Francisco (USA); Christian von Ehrenstein, University of Lübeck (Germany) .......................... [10574-77]

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Multisegmentation structures detection using deep convolutional neural networks. Jorge Onieva Onieva, German Gonzalez Serrano, Thomas P. Young, George R. Washko, Brigham and Women’s Hospital (USA); Maria Jesus Ledesma Carbaya, Univ. Politécnica de Madrid (Spain); Raúl San José Estépar, Brigham and Women’s Hospital (USA) .......................... [10574-79]

Coupling reconstruction and motion estimation for dynamic MRI through optical flow constraint, Ningning Zhao, Daniel O’Connor, Dan Ruan, Univ. of California, Los Angeles (USA); Adrian Basarab, Institut de Recherche en Informatique de Toulouse (France); Ke Sheng, Univ. of California, Los Angeles (USA) .......................... [10574-80]


High resolution robust and smooth precision matrices to capture functional connectivity, Nicolas Honnorat, Univ. of Pennsylvania (USA) .......................... [10574-82]

Huber loss with particulate coefficient metric altered following acute mTBI. Xiaoci Wang, Chuanzhu Sun, Shan Wang, Jieli Cao, Hui Xu, Shuoqiu Gan, Zhen Chen, Xin Jian Jiaotong Univ. (China); Bo Yin, Guanghui Bai, Meihua Shao, Chenguai Gu, Liuxun Hu, Limei Ye, Dandong Li, Zhihan Yan, The 2nd Affiliated Hospital & Yongchuan Branch of WMU (China); Hui Bai, Xin Jian Jiaotong Univ. (China) .......................... [10574-83]

Aorta and pulmonary artery segmentation using optimal surface graph cut in non-contrast CT. Zahra Sander, Philippe Lamblin, Carolin Köchler, Max Zorza, Erasmus MC (Netherlands); Jesper Holst Pedersen, Rigshospitalet (Denmark); Marleen Bruin, Erasmus MC (Netherlands) and University of Copenhagen (Denmark) .......................... [10574-84]

Model based rib-cage unfolding for trauma CT. Jens von Berg, Tobias Kliner, Christian Lohse, Philips Research (Germany) .......................... [10574-85]

Thoracic lymph node station recognition on CT images based on automatic anatomy recognition with an optimal parameter strategy. Atiur Kamrul Udupa, Guoping Xu, Univ. of Pennsylvania (USA) .......................... [10574-86]

Tapering analysis of airways with anatomy recognition with an optimal parameter strategy. Atiur Kamrul Udupa, Guoping Xu, Univ. of Pennsylvania (USA) .......................... [10574-86]

Volumetric versus area-based density assessment: comparisons using automatic quantitative measurements from a large screening cohort. Aimilia Gjasouini, Meng-Kang Hsieh, Lauren Pantalone, Emily F. Conant, Despina Katsikis, Univ. of Pennsylvania (USA) .......................... [10574-88]

Subject-specific brain tumor growth modeling via an efficient Bayesian inference framework, Yongjin Chang, KAIST (Korea, Republic of); Gregory C. Sharp, Zhongliang Shen, Helen A. Shi, Georges El Fakhri, Jong Beom Ra, Jonghye Woo, Massachusetts General Hospital (USA) .......................... [10574-89]

Image-based assessment of uncertainty in quantification of carotid lumen, Lily Kaulfhold, Fraunhofer MEVIS (Germany); Andreas Harloff, Universitatsklinikum Freiburg (Germany); Christian Schumann, Fraunhofer MEVIS (Germany); Lübecker Hochschule, Jürgen Hennig, Axel J. Kräfft, Universitatsklinikum Freiburg (Germany); Anna Hennemuth, Fraunhofer MEVIS (Germany) and Charité Universitätsmedizin Berlin (Germany) .......................... [10574-90]

Automated Agatston score computation in non-ECG gated CT scans using deep learning. Carlos Cano Espinosa, Univ. de Alicante (Spain); Germán González, Sierra Research S.L. (Spain); George R. Washko, Brigham and Women’s Hospital (USA); Miguel Cazorla, Univ. de Alicante (Spain); Raul San José Estépar, Brigham and Women’s Hospital (Spain) .......................... [10574-91]

Generative statistical modeling of left atrial appendage appearance to substantiate clinical paradigms for catheter ablation. Sorosh Sanatkhani, Univ. of Pittsburgh (USA); Prahld G. Menon, Duquesne Univ. (USA) .......................... [10574-92]

Feature analysis of high SUV regions base on FDG-PET. Yohel Velez, Shoken Oshiro, Tetsuya Totsuza, Kobe City College of Technology (Japan); Michio Sionte, Institute of Biomedical Research and Innovation (Japan) .......................... [10574-93]

Relating regional characteristics of left atrial shape to presence of scar in patients with atrial fibrillation. Sorooosh Sanatkhani, Univ. of Pittsburgh (USA); Michael Orladosu, Duquesne Univ. (USA); Sotrios Ntidios, Massachusetts General Hospital (USA); Prahld G. Menon, Duquesne Univ. (USA) .......................... [10574-94]

Registration
Generalized mass transport modeling in the gymsomatic system. Rena Elkin, Story Brook Univ. (USA); Klara Steklova, Eldad Haber, The Univ. of British Columbia (Canada); Hedok Lee, Helene Benveniste, Yale School of Medicine (USA) .......................... [10574-95]
Enhancement of breast perimeter region in digital mammography, Ana Luiza Menegatti Pavani, Univ. Estadual Paulista “Julio de Mesquita Filho” (Brazil); Antoine Vacquant, Univ. Clermont Auvergne (France); Allan Felipe Fattori Alves, Andre Petean Trindade, Caio Cesar Quini, Diana Rodrigues de Pina, Univ. Estadual Paulista “Julio de Mesquita Filho” (Brazil) . [10574-98]

Fast diffeomorphic image registration via GPU-based parallel computing: an investigation of the matching cost function, Jiong Wu, Xiaoying Tang, Sun Yat-Sen Univ. (China) . [10574-97]

Group-wise shape correspondence of variable and complex objects, Ilwoo Lyu, Vanderbilt Univ. (USA); Jonathan Perdomo, The Univ. of North Carolina at Chapel Hill (USA); Gabriel S. Yapuncich, Duke Univ. (USA); Beatriz Paniagua, Kitware, Inc. (USA); Doug M. Boyer, Duke Univ. (USA); Martin A. Styner, The Univ. of North Carolina at Chapel Hill (USA) . [10574-98]

Segmentation
Student beats the teacher: deep neural networks for lateral incisions segmentation in brain MR, Jonas Teuwen, Mohsen Ghafoorian, Rashandra Nanniesing, Frank-Erik de Leeuw, Bram van Ginneken, Mohsen Ghafoorian, Rashindra Manniesing, Mohammad Reza Shajari, Univ. Twente (Netherlands); Lucas J. van Vliet, Jurgen H. Runge, Cristina Lavini, Jaap Koes, Technische Univ. Delft (Netherlands); Boudewijn P. Platel, Radboud Ctr. at Nijmegen (Netherlands); Allan Felipe Fattori Alves, Andre Petean Trindade, Caio Cesar Quini, Diana Rodrigues de Pina, Univ. Estadual Paulista “Julio de Mesquita Filho” (Brazil) . [10574-98]

Fully convolutional neural networks improve abdominal organ segmentation, Meg F. Bobo, Shunxing Bao, Yuankai Hsiao, Yuanqiao Tan, Xiao Guo, Andrew J. Plassard, Ilwoo Lyu, Vanderbilt Univ. (USA); Albert Assad, Incyte Corp. (USA); Richard G. Abrahamson, Bennett A. Landman, Vanderbilt Univ. (USA) . [10574-100]

Multi-class segmentation of neuronal electron microscopy images using deep learning, Nivedita Kheragrab, Chirag Agarwal, Univ. of Illinois at Chicago (USA) . [10574-101]

Exudate segmentation using fully convolutional neural networks and Inception modules, Piotr Chudzik, Univ. of Lincoln (UK); Somshuba Majumdar, Univ. of Illinois (USA); Francisco Caliva, Bashar Al-Diri, Andrew Hunter, Univ. of Lincoln (UK) . [10574-105]

Deformable model reconstruction of the subarachnoid space, Jeffrey Glaister, Muhan Shao, Shaoqiang Li, Aaron Hsiau, Johns Hopkins Univ. (USA); Shenhaisi Roy, Henry M. Jackson Foundation (USA); Ari M. Blitz, Jeffrey J. Landis, Lotta Ellingsen, Johns Hopkins Univ. (USA) . [10574-106]

CNN-based automatic plaque characterization for intracoronary optical coherence tomography images, Shenghua He, Washington Univ. in St. Louis (USA); Jie Zheng, Washington Univ. School of Medicine in St. Louis (USA); Akiko Maehara, Gary Mintz, Cardiovascular Research Foundation (USA); Dalin Tang, Worcester Polytechnic Institute (USA); Mark Anastasio, Washington Univ. in St. Louis (USA); Hua Li, Washington Univ. School of Medicine in St. Louis (USA) . [10574-107]

Sequential neural networks for binary/multiclass informed glioma segmentation, Andrew Beers, Massachusetts General Hospital (USA); Ken Chang, James Brown, Elizabeth Gerstner, Bruce Rosen, Jayashree Kalpathy-Cramer, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA) . [10574-108]

A hybrid segmentation method for functional liver partition based on 4D DCE-MR images, Tian Zhang, Zhiyu Wu, Technische Univ. Delft (Netherlands); Jurgen H. Runge, Cristina Lavini, Jaap Koes, Technische Univ. Delft (Netherlands); Lucas J. van Vliet, Frans M. Vos, Technische Univ. Delft (Netherlands) . [10574-109]

A new medical image segmentation model based on fractional order differential derivative and level set, Bo Chen, The State Univ. of New York (USA) and Zhenshen Univ. (China); Shun Huang, Feifei Xie, Shenzhen Univ. (China); Lihong Li, College of Staten Island (USA); Wensheng Chen, Shenzhen Univ. (China); Zhenning Wang, Shenzhen Univ. (China); Zhongping Li, College of Staten Island (USA) . [10574-110]

Automatic PET cervical tumor segmentation by deep learning with prior information, Liyuan Chen, Chenyang Shen, Shiyun Liu, Li. Genevieve Mac-Kiernan, Kevin Albuqueruque, Michael Folkert, Jing Wang, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) . [10574-111]

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Automated segmentation and feature extraction in cardiac electrical impedance tomography images, Saaed H. Arshad, Ethan K. Murphy, Ryan J. Halter, Thayer School of Engineering at Dartmouth (USA) ..................................................[10578-61]

3D segmentation of the ascending and descending aorta from CT data via graph-cuts, Jung won Cha, Alexander Nosrati Stoddard, Alkob Amini, Univ. of Louisville (USA) ..................................................[10578-62]

Multi-pathways CNN for robust vascular segmentation, Titinum Griningsrotak, Ritsumeikan Univ. (Japan); Xian-Hua Han, National Institute of Advanced Industrial Science and Technology (Japan); Xiong Wei, Institute for Infocomm Research (Singapore); Yen-Wei Chen, Ritsumeikan Univ. (Japan) ..................................................[10578-63]

Sensitivity of FFR-CT to manual segmentation, Prem Venugopal, Xia Li, Lushu Cheng, Rosshi Bhagalia, Peter M. Edic, GE Global Research (USA) ..................................................[10578-64]

SLIC robust (SLICR) for fast, robust CT myocardial blood flow quantification, Hao Wu, Brendan L. Eck, Jacob Levin, Case Western Reserve Univ. (USA); Anas Fares, Univ. Hospitals Case Medical Ctr. (USA); Yuemeng Li, Di Wen, Case Western Reserve Univ. (USA) ..................................................[10578-65]

Pulmonary function diagnosis based on diaphragm movement using dynamic flat-panel detector imaging: an animal-based study, Rie Tanaka, Kanazawa Univ. (Japan); Tohru Nani, Norishika Nitta, Takahisa Tabata, Shiga Univ. of Medical Science (Japan); Norisato Matsutani, Shintaro Muraoka, Shikou Kaneko, Sho Noy, Taeyoung Yoon L. Eck, Jacob Levin, Case Western Reserve Univ. (USA); Hiram G. Bezerra, Univ. Hospitals Case Medical Ctr. (USA); David L. Wilson, Case Western Reserve Univ. (USA) ..................................................[10578-66]

Hierarchical model-based object localization for auto-contouring in head and neck radiation therapy planning, Kurumi Saito, Yuya Kobayashi, Satoru Ohnishi, Yoshihi Kawata, Norobu Niki, Tokuhashi Univ. (Japan); Keji Umetani, Japan Atomic Energy Agency Radiation Research Institute (JASRI) (Japan); Yoshihiro Okamoto, Cleveland Clinic Heart and Vascular Institute (USA); Hiroshi Sakai, Hyogo Prefectural Amagasaki General Medical Ctr. (Japan); Yasutaka Nakano, Shiga Univ. of Medical Science (Japan); Harumi Ito, Univ. of Fukui (Japan) ..................................................[10578-67]

Optimization of SPECT stem cell tracking in rat brain, Igor Patrakeev, Maria-Adelaida Micci, Margaret Parsley, Massoud Motamedi, The Univ. of Texas Medical Branch (USA) ..................................................[10578-83]

Analysis of functional MRI data in isolated, physically restricted mice using light stimulation system, Wook Kim, Korea Institute of Radiological & Medical Sciences (Korea); Sang-Kyung Roh, Sung-Kuk Konkuk Univ. (Korea, Republic of); Yong Sung Park, Yong Jin Lee, Joo Hyun Kang, Sang Moo Lim, Sang-Keun Woo, Korea Institute of Radiological & Medical Sciences (Korea, Republic of) ..................................................[10578-84]

Novel Imaging Techniques and Applications

An EIT system for mobile medical diagnostics, Christian Gis, Univ. Siegen (Germany) ..................................................[10578-85]

Uptake of L-mauro-calcine in DAOY cells and bio-distribution in mice by SPECT/CT, Prem Sadanand Samant, Mikasa S. G. Gather, Baylor College of Medicine (USA) ..................................................[10578-77]

Bayesian inference and model selection for physiologically-based pharmacokinetic modeling of superparamagnetic iron oxide nanoparticles, Lynn Bi, Columbia Univ. (USA) and M.D. Anderson Cancer Ctr. (USA); David K. Kaipust, Keun Yong Park, Wolfgang Stefan, Sara Thower, David Fuente, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) ..................................................[10578-87]

Optical Evaluating LED photoacoustic imaging for human inflammatory arthritis, Janggun Jo, Guan Xu, Univ. of Michigan (USA); Jiaehoon Lee, Texas Tech Univ. (USA); Xueding Wang, Univ. of Michigan (USA) ..................................................[10578-91]

3D modeling of chromosomes territories in normal and aneuploid nuclei, Fan-yun Yen, Fatima Merchant, Univ. of Houston (USA) ..................................................[10578-92]

Segmentation of brain lesions from multi-modal MRI data using machine-learning techniques, Xiaohong Gao, Gao, Middexsec Univ. (UK); Yu Qian, Cortixxa Vision Systems Ltd. (UK) ..................................................[10578-93]

A competing round-robin prediction model for histologic subtype prediction of lung adenocarcinomas based on thoracic computed tomography, Li Wei Chen, Shun-Mao Yang, Hao-Jen Wang, National Taiwan Univ. (Taiwan); Mong-Wei Lin, National Taiwan Univ. Hospital (Taiwan); Lung-Cheng Ron, Fu-Sheng Hsu, Chi-Chen Li, Chung-Ming Chen, National Taiwan Univ. (Taiwan) ..................................................[10578-66]

Comparison of Gaussian filter versus wavelet-based denoising on graph-based segmentation of retinal OCT images, Priyanka Roya, Mohana Kuppusamy Parthasarathy, John Zeik, Vasudha Lakshminarayan, Univ. of Waterloo (Canada) ..................................................[10578-95]

Low jawbone data generation for deep learning tools using MeVisLab, Lili Jiang, Sjengius Univ. of Technology (China); Lydia Lindner, Technische Univ. Graz (Austria); Norbert Jakse, Jürgen Wallner, Medizinischen Univ. Graz (Austria); Dieter Stefan, Fraunhofer IOF (Germany) ..................................................[10578-96]

Detection and registration of vessels for longitudinal 3D retinal OCT images using SURF, Lingqiao Pan, Soochow Univ. (China) and Jiangsu Univ. of Technology (China); Liling Guan, Fei Shi, Xinjian Chen, Soochow Univ. (China) ..................................................[10578-97]

Lung tumor segmentation based on multi-scale template matching and U-net propagation, Jiahui Li, Soochow Univ. (China); Feihong Yu, The First Affiliated Hospital, Nanjing Medical Univ. (China); Dehui Xiang, Soochow Univ. (China) ..................................................[10578-98]
3D human lung histology reconstruction and registration to in vivo imaging, Sean Pentinga, Western Univ. (Canada) and London Regional Cancer Program (Canada); Keith Kwan, Chinese PLA Geshch, Beijing Headquarter, China; Jing Li, Chinese PLA Geshch (China) . . . . . . [10581-99]

Heart chamber segmentation from CT using convolutional neural networks (CNN), James D. Dormer, Ling Ma, Martin Halicek, Carolyn M. Reilly, Baowei Fei, Emory Univ. (USA) . . . . [10578-100]

Automated connectivity-based cortical mapping using registration-constrained classification, Kristian Esenburg, David Haynor, Thomas Grabowski, Univ. of Washington (USA) . . . . [10578-101]

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A watershed and feature based approach for automated detection of lymphocytes on lung cancer images, Germán Corredor, Univ. Nacional de Colombia Sede Bogotá (Colombia); Xiangxue Wang, Cheng Lu, Case Western Reserve Univ. (USA); Eduardo Romero Castro, Univ. Nacional de Colombia Sede Bogotá (Colombia); Anant Madabhushi, Case Western Reserve Univ. (USA) . . . . [10581-26]

Automated segmentation of epithelial tissue in prostatesctomy slides using deep learning, Wouter Bulten, Christina A. Hulsbergen-van de Kaa, Jeroen van der Laak, Geert J. S. Litjens, Radboud Univ. Medical Ctr. (Netherlands) . . . . [10581-27]

Registration parameter optimization for 3D tissue modeling from resected tumors cut into serial H&E slides, Starr Johnson, Univ. at Buffalo (USA) . . . . [10581-28]

Determining tumor cellularity in digital pathology imaging using registration-constrained classification, Kristian Esenburg, David Haynor, Thomas Grabowski, Univ. of Washington (USA) . . . . [10581-29]

A comparison of discriminatory power of low- and high-level features learned by deep convolutional neural networks for epithelium and stroma classification, Yucheng Qiu, Yue Du, The Univ. of Oklahoma (USA); Roy Zhang, Moore, The Univ. of Oklahoma Health Sciences Ctr. (USA); Abolfazl Zargari, The Univ. of Oklahoma (USA); Theresa Thai, Camille Gunderson, Katherine Moixley, Robert Mannel, The Univ. of Oklahoma Health Sciences Ctr. (USA); Hong Liu, Bin Zhang, The Univ. of Oklahoma (USA) . . . . [10581-40]

Image processing to extend effective OCT penetration depth in tissue, Shaneti Maharaj, Drexel Univ. College of Medicine (USA); David E. Breen, Drexel Univ. (USA); Fernando U. Garcia, Cancer Treatment Ctrs. of America (USA); Mark Zarella, Drexel Univ. College of Medicine (USA) . . . . [10581-42]

Registration accuracy between whole slide images and glass slides in deEAP workflow, Qi Gong, Benjamin P. Berman, Marinos A. Gavrielides, Brandon D. Gallas, U.S. Food and Drug Administration (USA) . . . . [10581-43]

Classification of lung cancer histology images using patch-level summary statistics, Simon Graham, Muhammad Salemi, Qi Gong, Benjamin P. Berman, Hootan Salems, Cedars-Sinai Medical Ctr. (USA); Corey Arnold, Univ. of California, Los Angeles (USA); Beatrice S. Knuudsen, Arkadiusz Gerych, Cedars-Sinai Medical Ctr. (USA) . . . . [10581-46]

SlideSeg: a Python module for the creation of annotated image repositories from whole slide images, Brendan Crabb, SPAWAR Systems Ctr. Pacific (USA); Niels Ho, Olson, Naval Hospital Camp Pendleton (USA) and Naval Medical Ctr. San Diego (USA) . . . . [10581-47]

An unsupervised network for fast microscopic image registration, Chang Lu, Gunnar Läthén, Institute of Biomedical Communications, National Library of Medicine (USA) and Univ. of Chinese Academy of Sciences (China) and Univ. of Chinese Academy of Sciences (China); Xi Chen, Qiwei Xie, Institute of Automation, Chinese Academy of Sciences (China); Hua Han, Institute of Automation, Chinese Academy of Sciences (China) and The Ctr. for Excellence in Brain Science and Intelligence Technology, Chinese Academy of Sciences (China) and Univ. of Chinese Academy of Sciences (China) . . . . [10581-48]

Landmark-based reconstruction of 3D smooth structures from serial histological sections, Naoki Kawamura, Hirokazu Kobayashi, Tatsuya Yokota, Hidekata Hontani, Nagoya Institute of Technology (Japan); Chika Iwamoto, Kenoki Takeda, Makoto Hashizume, Kyushu Univ. (Japan) . . . . [10581-49]

Detecting and segmenting overlapping red blood cells in microscopic images of thin blood smears, Golan Moallem, Hamed San-Samarr, Texas Tech Univ. (USA); Mahdieh Pooostchi, Lister Hill National Ctr. for Biomedical Communications, National Library of Medicine (USA); Richard J. Maude, Kamolrat Silamut, Mahidol-Oxford Tropical Medicine Research Unit (Thailand); Sameer Antani, Stefan Jaeger, George Thoma, Lister Hill National Ctr. for Biomedical Communications, National Library of Medicine (USA) . . . . [10581-50]
CONFERENCE 10573
ROOM: SALON C
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10574
ROOM: SALON B
Sun.–11 Feb. 2018

CONFERENCE 10575
ROOM: HUNTERS CREEK
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10576
ROOM: SALON A
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10578
ROOM: MONTROSE
Sun.–11 Feb. 2018

SESSION 4
ROOM: SALON C . TUE 8:00 AM TO 9:40 AM

Detectors
Session Chairs: Wei Zhao, Stony Brook University (USA); Karim S. Karim, Univ. of Waterloo (Canada)
8:00 am: Evaluation of novel multilayer x-ray detector designs using rapid Monte Carlo simulation, Scott Dow, Adrian F. Howansky, Wei Zhao, Stony Brook Univ. (USA)
8:20 am: Empirical and theoretical examination of the noise performance of prototype polycrystalline silicon active pixel arrays, Martin Konieczek, Larry E. Antonuk, Yousaf El-Mohri, Albert K. Liang, Qihua Zhao, Univ. of Michigan (USA)
8:40 am: Imaging performance of CMOS and a-Si:H flat panel detectors for C-Arm fluoroscopy and cone-beam CT, Niral Sheth, Matthew Jacobson, Wojciech Bziewski, Johns Hopkins Univ. (USA); Gerard Kleinszig, Sebastian Vogt, Siemens Healthcare (Germany); William S. Anderson, Johns Hopkins Univ. School of Medicine (USA); Clifford Weiss, Johns Hopkins Univ. (USA); Greg Osgood, The Johns Hopkins Hospital (USA); Jeffrey H. Siewersdien, Johns Hopkins Univ. (USA)
9:00 am: X-ray performance of new high dynamic range CMOS detector, Arundhuti Ganguly, Pieter G. Roos, Jiann M. Yu, Steven Freestone, Varex Imaging Corp. (USA); Donald B. Hondoqwaga, Dartmouth College (USA) and Varex Imaging (USA); Richard E. Colbeth, Ivan P. Mollov, Varex Imaging Corp. (USA)
9:20 am: Investigation of random gain variations in columnar CsI:Tl using single x-ray photon imaging, Adrian F. Howansky, A.R. Lubinsky, Stony Brook Univ. (USA); S.K. Ghose, Brookhaven National Laboratory, Photon Sciences Division (USA); Katsushiko Suzuki, Hamamatsu Photonics, K.K. (Japan); Wei Zhao, Stony Brook Univ. (USA). [10573-23]
Coffee Break . . . Tue 9:40 am to 10:10 am

SESSION 5
ROOM: B . TUE 8:00 AM TO 9:40 AM

Motion
8:00 am: A novel filtering approach for 3D harmonic phase analysis of tagged MRI, Xiaowei Wang, Jerry L. Prince, Arnold D. Gomez, Johns Hopkins Univ. (USA)
8:20 am: Feasibility of intra-sweep motion correction for 4D DSA reconstruction for applications in the thorax and abdomen, Martin G. Wagner, Paul Laesecke, Colin Harari, Univ. of Wisconsin-Madison (USA); Sebastian Schafer, Siemens Healthcare (Germany); Michael Speidel, Charles Mistretta, Univ. of Wisconsin-Madison (USA)
8:40 am: Deep learning-based CT motion artifact recognition in coronary arteries, Tanja Elts, Hannes Nickisch, Tobias Wissel, Holger Schmitt, Philips Research (Germany); Mari Vembav, Philips Healthcare (USA); Michael M. Morlock, Technische Univ. Hamburg-Harburg (Germany); Michael Grass, Philips Research (Germany)
9:00 am: Population-based respiratory 4D motion atlas construction and its application for VR simulations of liver punctures, Andre Mastmeyer, Matthias Wilms, Heinz Handels, Univ. zu Lüneburg (Germany)
9:20 am: Sensitivity analysis of Jacobian determinant used in treatment planning for lung cancer, Wei Shao, Sarah E. Gerard, Yue Pan, The Univ. of Iowa (USA); Taylor J. Patton, Univ. of Wisconsin-Madison (USA); Joseph M. Reinhardt, Onguz C. Durumeric, The Univ. of Iowa (USA); John E. Bayouth, Univ. of Wisconsin-Madison (USA); Gary E. Christensen, The Univ. of Iowa (USA)
Coffee Break . . . Tue 9:40 am to 10:10 am

Musculoskeletal and Skin
Session Chairs: Karen Drukker, The Univ. of Chicago (USA); Carol L. Novak, Siemens Healthineers (USA)
8:00 am: Automated synovium segmentation in Doppler ultrasound images for rheumatoid arthritis assessment, Pak Hei Yeung, The Univ. of Hong Kong (Hong Kong, China); York Kiat Tan, Singapore General Hospital (Singapore); Shuoyu Xu, Sun Yat-Sen Univ. Cancer Ctr. (China) . . . . . . . . . . . . [10576-19]
8:20 am: Automatic pedicles detection using convolutional neural network in a 3D spine reconstruction from biplanar radiographs, Christine Bakhous, Benjamin Aubert, Carlos Vazquez, Thierry Cresson, École de Technologie Supérieure (Canada); Stefan Parent, CHU Sainte-Justine (Canada); Jacques De Guise, École de Technologie Supérieure (Canada) [10576-20]
8:40 am: Fully automated bone mineral density assessment from low-dose chest CT, Shuang Liu, Cornell Univ. (USA); Jessica Gonzalez, Javier Zulueta, Juan P. de Torres, Clinic X, Univ. de Navarra (Spain); David F. Yankelevitz, Claudia I. Henschke, Icahn School of Medicine at Mount Sinai (USA); Anthony P. Reeves, Cornell Univ. (USA)
9:00 am: Vessel layer separation in x-ray angiograms with fully convolutional networks, Haiyang Hao, Technische Univ. Delft (Netherlands); Hua Ma, Theo van Walsum, Erasmus MC (Netherlands)
9:20 am: Cine cardiac MRI slice misalignment correction towards full 3D left ventricle segmentation, Shusl Dang, Cristian Linte, Rochester Ctr. at Houston (USA) . . . [10576-41]
9:40 am: Coffee Break . . . Tue 9:40 am to 10:10 am

SESSION 7
ROOM: HUNTERS CREEK . TUE 8:00 AM TO 9:40 AM

Deep Learning
8:00 am: Automatic slice segmentation of intraoperative transrectal ultrasound images using convolutional neural networks, Nooshin Ghavami, Yipeng Hu, Ester Bornmatt, Rachel Rodeil, Eli D. Gibson, Caroline M. Moore, Dean C. Barratt, Univ. College London (UK)
8:20 am: Generative adversarial networks for endoscopic image preprocessing, Isabel Funke, Sebastian Bodenstedt, National Ctr. for Tumor Diseases Dresden (Germany); Carina Riediger, Jürgen Weitzl, Universitätsklinikum Carl Gustav Carus Dresden (Germany); Stefanie Speidel, National Ctr. for Tumor Diseases Dresden (Germany)
8:40 am: Tumor margin classification of head and neck cancer using hyperspectral imaging and convolutional neural networks, Martin Halicka, Georgia Institute of Technology (USA); James V. Little, Xu Wang, Mihir R. Patel, Christopher C. Griffith, Amy Y. Chen, Emory Univ. School of Medicine (USA); Baowei Fei, Emory Univ. (USA)
9:00 am: Vessel layer separation in x-ray angiograms with fully convolutional networks, Haiyang Hao, Technische Univ. Delft (Netherlands); Hua Ma, Theo van Walsum, Erasmus MC (Netherlands)
9:20 am: Cine cardiac MRI slice misalignment correction towards full 3D left ventricle segmentation, Shusl Dang, Cristian Linte, Rochester Ctr. at Houston (USA)
9:40 am: Coffee Break . . . Tue 9:40 am to 10:10 am

SESSION 1
ROOM: SALON A . TUE 8:00 AM TO 9:40 AM

Neurological Imaging II
Session Chairs: Nicholas J. Tutson, Univ. of Virginia (USA); Axel Wismüller, Univ. of Rochester Medical Ctr. (USA)
8:00 am: An improved approach of high graded glioma segmentation using sparse autoencoder and fuzzy c-means clustering from multi-modal MR images, Debanjali Bhattacharya, Neelam Sinha, International Institute of Information Technology, Bangalore (India)
8:20 am: Improved self super resolution in magnetic resonance images, Aaron Carass, Johns Hopkins Univ. (USA); Sachin Goyal, Indian Institute of Technology (India); Can Zhao, Johns Hopkins Univ. (USA); Arnoj Jog, Athinoula A. Martins Ctr. for Biomedical Imaging (USA)
8:40 am: Automatic callosal fiber convergence plane computation through DTI-based divergence map, Gustavo R. Pinheiro, Giovana S. Cover, Univ. Estadual de Campinas (Brazil); Mariana R. Pinheiro, Univ. Estadual de Campinas (Brazil) and Univ. Estadual de Campinas (Brazil); Leticia Rittner, Univ. Estadual de Campinas (Brazil)
9:00 am: Fluorescence imaging of lymphatic outflow of cerebrospinal fluid in mice, Sunkuk Kwon, Christopher F. Janssen, Fred Velasquez, Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA)
9:20 am: Corpus callosum parcellation methods: a quantitative comparative study, Mariana Eugénia de Carvalho Pereira, Giovana S. Cover, Faculdade de Engenharia de Campinas, Univ. Estadual de Campinas (Brazil); Simone Appenizzer, Faculdade de Ciências Médicas, Univ. Estadual de Campinas (Brazil); Leticia Rittner, Faculdade de Engenharia de Campinas, Univ. Estadual de Campinas (Brazil); Amod Jog, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA)
9:40 am: Coffee Break . . . Tue 9:40 am to 10:10 am
CT Systems and Algorithms

Session Chairs: Rebecca Fahrig, Siemens Healthineers (Germany); Kirsten Boedecker, Toshiba Medical Research Institute USA, Inc. (USA)

10:10 am: CT metal artifact reduction using MR image patches, Jonathan Scharff Nielsen, Technical Univ. of Denmark (Denmark); Jens M. Edmund, Gentofte and Herlev Hospital (Denmark) and Niels Bohr Institute (Denmark) and Univ. of Copenhagen (Denmark); Koen Van Leemput, Massachusetts General Hospital (USA) and Technical Univ. of Denmark (Denmark) .[10573-24]

10:30 am: Metal artifact reduction for radiation therapy: a simulation study, Yannan Jin, GE Global Research (USA); Joost Verburg, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Lars Gasteby, Gu Wang, Rensselaer Polytechnic Institute (USA); Harald Paganetti, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Lin Fu, GE Global Research (USA) .[10573-25]

10:50 am: Inter-scanner variation independent descriptors for constrained diffeomorphic demons registration of retina OCTs, Sueretar Reangumnarat, Mahidol Univ. (Thailand); Aaron Carass, Johns Hopkins Univ. (USA); Yufan He, Johns Hopkins Univ. (USA); Peter Calabresi, The Johns Hopkins Hospital (USA); Jerry L. Prince, Johns Hopkins Univ. (USA) .[10573-26]

11:10 am: A temporal-frequency variant on robust-principle component analysis for segmentation of motile cilia in optical coherence tomography images, James P. McLean, Yuye Ling, Christine Hendon, Columbia Univ. (USA) .[10573-27]

11:30 am: Classification of malignant and benign liver tumors using a radionics approach, Martijn Starmans, Razvan L. Miclea, Sebastian R. van der Voort, Erasmus MC (Netherlands); Wiro J. Niessen, Erasmus MC (Netherlands) and Technische Univ. Delft (Netherlands); Maarten G. Thorneer, Stefan Klein, Erasmus MC (Netherlands).[10573-28]

11:50 am: Quantitative phase and texture angularity analysis for brain white matter lesions, Shalease Bexandall, Shrshitha Sharma, Peng Theth, Glen Prinham, Yunyan Zhang, Univ. of Calgary (Canada) .[10573-29]
### TUESDAY 13 FEBRUARY

<table>
<thead>
<tr>
<th>Conference</th>
<th>Room</th>
<th>Dates</th>
<th>Time</th>
<th>Sessions</th>
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<tr>
<td>10573</td>
<td>Salon C</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>10:10 AM to 12:10 PM</td>
<td>Award Announcements&lt;br&gt;Room: Salon C&lt;br&gt;Tue 10:10 AM to 12:10 PM&lt;br&gt;The Image Processing conference RFW runners up and poster award recipients will be recognized and certificates distributed.</td>
</tr>
<tr>
<td>10575</td>
<td>Hunters Creek</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>10:10 AM to 12:10 PM</td>
<td>TUESDAY/WEDNESDAY POSTER VIEWING&lt;br&gt;Room: Salon D/E&lt;br&gt;12:00 PM to 9:00 PM&lt;br&gt;Posters will be on display Tuesday and Wednesday with extended viewing until 9:00 pm on Tuesday. The poster session with authors in attendance will be Wednesday evening from 5:30 to 7:00 pm. Award winners will be identified with ribbons during the reception. Award announcement times are listed in the conference schedule. Lunch Break . . . . Tue 12:10 pm to 1:20 pm</td>
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<tr>
<td>10576</td>
<td>Salon A</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>10:10 AM to 12:10 PM</td>
<td>TUESDAY/WEDNESDAY POSTER VIEWING&lt;br&gt;Room: Salon D/E&lt;br&gt;12:00 PM to 9:00 PM&lt;br&gt;Posters will be on display Tuesday and Wednesday with extended viewing until 9:00 pm on Tuesday. The poster session with authors in attendance will be Wednesday evening from 5:30 to 7:00 pm. Award winners will be identified with ribbons during the reception. Award announcement times are listed in the conference schedule. Lunch Break . . . . Tue 12:10 pm to 1:20 pm</td>
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<tr>
<td>10578</td>
<td>Montrose</td>
<td>Sun.–Tues. 11–13 Feb. 2018</td>
<td>10:10 AM to 12:10 PM</td>
<td>TUESDAY/WEDNESDAY POSTER VIEWING&lt;br&gt;Room: Salon D/E&lt;br&gt;12:00 PM to 9:00 PM&lt;br&gt;Posters will be on display Tuesday and Wednesday with extended viewing until 9:00 pm on Tuesday. The poster session with authors in attendance will be Wednesday evening from 5:30 to 7:00 pm. Award winners will be identified with ribbons during the reception. Award announcement times are listed in the conference schedule. Lunch Break . . . . Tue 12:10 pm to 1:20 pm</td>
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**Award Announcements**

11:10 am: X-ray cone-beam imaging of the entire spine in the weight-bearing position, Frédéric Noo, The Univ. of Utah (USA); Andreas Fieselmann, Siemens Healthineers (Germany); Mehmet B. Oktay, The Univ. of Utah (USA); Magdalena Herbst, Ludwig Ritschl, Sebastian Vogt, Thomas Mertelmeier, Siemens Healthineers (Germany).

11:30 am: Implementation of a piecewise-linear dynamic attenuator, Picha Shunhavanich, N. R. Bennett, Stanford Univ. (USA); Scott S. Hsieh, Univ. of California, Los Angeles (USA); Norbert J. Pelc, Stanford Univ. (USA).

11:50 am: Dynamic beam filtering for miscentered patients, Andrew Mao, William Shyr, Grace J. Gang, Joseph W. Stayman, Johns Hopkins Univ. (USA).

11:50 am: Automatic segmentation of corneal ulcer area based on ocular staining images, Lijie Deng, Xiaoying Tang, Sun Yat-Sen Univ. (China).
CONFERENCE 10573
ROOM: SALON C
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10574
ROOM: SALON B
Sun.–Tues. 11–13 Feb. 2018

CONFERENCE 10575
ROOM: HUNTERS CREEK
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10576
ROOM: SALON A
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10578
ROOM: MONTROSE
Sun.–Tues. 11–13 Feb. 2018

SESSION 6
ROOM: SALON C ....... TUE 1:20 TO 3:00 PM
Keynote and innovations in Imaging Systems
Session Chairs: Joseph Y. Lo, Carl E. Ravin Advanced Imaging Labs. (USA); Taly Gilat Schmidt, Marquette Univ. (USA)

1:20 pm: Clinical Applications of Optical Imaging Techniques in the Breast (Keynote Presentation), Wei T. Yang, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [10573-30]

2:00 pm: Design, construction, and initial results of a prototype multi-contrast x-ray breast imaging system, Ke Li, Ran Zhang, John Garrett, Yongshuai Ge, Xu Ji, Guang-Hong Chen, Univ. of Wisconsin-Madison (USA) ........... [10573-31]

2:20 pm: Lung cancer, respiratory 3D motion imaging, with a 19 focal spot kV x-ray tube and a 60 fps flat panel imager, Douglas Boyd, Samuel Song, Vitaliy Ziskin, Edward Seppi, Edward Shapiro, Varex Imaging Rochester (USA) ....... [10573-32]

2:40 pm: Human-Computer interaction using deep learning and interleaved freezing, Piotr Chudzik, Univ. of Lincoln (UK); Somshubra Majumdar, Univ. of Illinois (USA); Francesco Caliva, Bashar Al-Diri, Andrew Hunter, Univ. of Lincoln (UK) ........... [10573-33]

3:00 pm: Dataset variability leverages white-matter lesion segmentation performance with convolutional neural network, Ziga Spilč, Franjo Pernik, Boštjan Likar, Tim Jerman, Domen Ravnik, Univ. of Ljubljana (Slovenia) ....... [10573-34]

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

SESSION 10
ROOM: SALON B ....... TUE 1:20 TO 3:00 PM
Deep Learning: Lesions and Pathologies
1:20 pm: MRI tumor segmentation with densely connected 3D CNN, Lele Chen, Yue Wu, Adora M. DSouza, Anas Z. Abidin, Chenliang Xu, Axel Wismüller, Univ. of Rochester (USA) ........... [10574-50]

1:40 pm: Quantification of lung abnormalities in cystic fibrosis using deep networks, Filipe Marques, Erasmus MC (Netherlands); Marileen de Bruijne, Erasmus MC (Netherlands) and Univ. of Copenhagen (Denmark); Florian Dubost, Erasmus MC (Netherlands) ........... [10574-51]

2:00 pm: Deep learning for biomarker regression: application to osteoporosis and emphysema on chest CT scans, German Gonzalez Serrano, Sierra Research S.L. (Spain); George R. Washko M.D., Raúl San Jose Estépar, Brigham and Women’s Hospital (USA) ........... [10574-52]

2:20 pm: Microaneurysm detection using deep learning and interleaved freezing, Piotr Chudzik, Univ. of Lincoln (UK); Somshubra Majumdar, Univ. of Illinois (USA); Francesco Caliva, Bashar Al-Diri, Andrew Hunter, Univ. of Lincoln (UK) ........... [10574-53]

2:40 pm: Dataset variability leverages white-matter lesion segmentation performance with convolutional neural network, Ziga Spilč, Franjo Pernik, Boštjan Likar, Tim Jerman, Domen Ravnik, Univ. of Ljubljana (Slovenia) ....... [10574-54]

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

SESSION 6
ROOM: HUNTERS CREEK ....... TUE 1:20 TO 3:00 PM
Cardiac, Vessels, and Novel Devices
Session Chairs: Clarisa I. Sánchez, Radboud Univ. Medical Ctr. (Netherlands); Horst K. Hahn, Fraunhofer MEVIS (Germany)

1:20 pm: A quality score for coronary artery tree extraction results, Qing Cao, Alexander Broersen, Leiden Univ. Medical Ctr. (Netherlands); Pieter H Katsiara, Leiden Univ. Medical Ctr. (Netherlands) and Medis medical imaging systems bv (Netherlands); Boudewijn P. F. Liesveldt, Joke Dijkstra, Leiden Univ. Medical Ctr. (Netherlands) ........... [10575-30]

1:40 pm: Aortic root segmentation in 4D ultrasound echocardiography, Shubham Chechani, Rahul Suresh, Kedar A. Patwardhan, Samsung R&D Institute India - Bangalore (India) ....... [10575-31]

2:00 pm: Automated assessment of aortic and main pulmonary arterial diameters using model-based blood vessel segmentation for predicting chronic thromboembolic pulmonary hypertension in low-dose CT lung screening, Hidenobu Suzuki, Yoshiki Kawa, Noboru Niki, Tokushima Univ. (Japan); Toshihiko Sugura, Nobuhiro Tadano, Chiba Univ. (Japan); Masahiro Kusumoto, National Cancer Ctr. Hospital East (Japan); Kenji Eguchi, Teikyo Univ. (Japan); Masahiro Kaneko, Tokyo Health Service Association (Japan) ....... [10575-32]

2:20 pm: Computer aided diagnosis system for automated label-free early detection of oral epithelial cancer and dysplasia based on autofluorescence imaging and lifetime imaging endoscopy, Javier A. Jo, Shuna Cheng, Rodrigo Cuenca, Elvis Duran, Luis Luna, Udaysankar Chockanathan, Univ. of Rochester Medical Ctr. (USA); Adora M. DSouza, Anas Z. Abidin, Univ. of Rochester (USA); Giovanni Schiffini, Axel Wismüller, Univ. of Rochester Medical Ctr. (USA) ....... [10575-34]

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

SESSION 3
ROOM: SALON A ....... TUE 1:20 TO 3:00 PM
Image Registration
1:20 pm: Clustered iterative sub-atlas registration for improved deformable registration using statistical shape models, Benjamin Ramsay, Thairisu D. de Silva, Ronze Han, Michael D. Ketcha, Ali Uneri, Joseph Geeveres, Niral Sheth, Matt Jacobson, Johns Hopkins Univ. (USA); Sebastian Vogt, Gerhard Kleinzieng, Siemens Healthineers, Germany; Greg M. Osgood, Jeffrey H. Siewerdsen, Johns Hopkins Univ. (USA) ....... [10576-11]

1:40 pm: Nonrigid registration for laparoscopic liver surgery using sparse intraoperative data, Jon S. Heiselema, Jarrod A. Collier, Logan W. Clements, Jared A. Weis, Vanderbilt Univ. (USA); Amber L. Simpson, Memorial Sloan-Kettering Cancer Ctr. (USA); Suniti K. Geethaghe, Vanderbilt Univ. Medical Ctr. (USA); T. Peter Kingsham, William R. Jamagin, Memorial Sloan-Kettering Cancer Ctr. (USA); Michael I. Miga, Vanderbilt Univ. (USA) ....... [10576-12]

2:00 pm: Real-time, image-based 3D-2D registration for ultrasound-guided spinal interventions, Thairisu D. de Silva, Ali Uneri, Xiaoxuan Zhang, Michael D. Ketcha, Runze Han, Matti Jacobson, Niral Sheth, Johns Hopkins Univ. (USA); Sebastian Vogt, Gerhard Kleinzieng, Siemens Healthineers (Germany); Alan Belzberg, Dani Scibbula, Jeffrey H. Siewerdsen, Johns Hopkins Univ. (USA) ....... [10576-13]

2:20 pm: Influence of 4D CT motion artifacts on correspondence model-based 4D dose accumulation, Thilo Graeser, Martin Möddel, Florian Griese, Tobias Knopp, Universitätshospital Hamburg-Eppendorf (Germany) ....... [10576-14]

2:40 pm: Deformable registration of radiation dose lines to delayed contrast-enhanced magnetic resonance images for assessment of myocardial lesion formation following proton beam therapy, Maryam E. Rettmann, Atsushi Suzuki, Amanda Deitier, Songyin Wang, Helge Leumann, Stephan Hofmann, Hiroki Konishi, Jon Kruse, Jack Cusma, Laura Newman, Kay Parker, Michael Herman, Douglas Packer, Mayo Clinic (USA) ....... [10576-15]

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

SESSION 10
ROOM: MONTROSE ....... TUE 1:20 TO 3:00 PM
Imaging Agents
Session Chairs: Vikram D. Kodibagkar, Arizona State Univ. (USA); Changqing Li, Univ. of California, Merced (USA)

1:20 pm: Optimization of an iodine-based nanoparticle contrast agent for molecular CT imaging, Ketan Kumar Ghaghada, Chandresh Kumar Patel, Ananth Annapragasam, Texas Children’s Hospital (USA) ....... [10578-49]

1:40 pm: Molecular contrast enhancement of pump-probe optical coherence tomography (PP-OCT) by methylene blue loaded PLGA particles, Jorge Palma-Chavez, Wihan Kim, Brian E. Applegate, Phaparin P. Chareonphop, Javier A. Jo, Texas A&M Univ. (USA) ....... [10578-50]

2:00 pm: Enlarging the field of view in magnetic particle imaging using a moving table approach, Patrik Szargwalski, Nadine Gdaniec, Matthias Graeser, Martin Möddel, Florian Griese, Tobias Knopp, Universitätshospital Hamburg-Eppendorf (Germany) ....... [10578-51]

2:20 pm: Validation of ultrasound switchable fluorescence imaging via micro-CT, Baohong Yang, Tingfeng Yao, Shuai Yu, The Univ. of Texas at Arlington (USA) ....... [10578-52]

2:40 pm: Direct prior regularization on anatomical images for cone beam x-ray luminescence computed tomography reconstruction, Peng Gao, Hongbing Lu, Fourth Military Medical Univ. (China) ....... [10578-53]

Coffee Break ....... Tue 3:00 pm to 3:30 pm
SESSION 7
ROOM: SALON C . TUE 3:30 PM TO 4:50 PM
Photen Counting Detectors

Session Chairs: Shiva Abbaszadeh, Univ. of Illinois (USA); Mats Danielsson, KTH Royal Institute of Technology (Sweden) 

3:30 pm: Count statistics and pleue correction for nonalayzable photon counting detectors with finite pulse length, Fredrik Grönberg, Martin Sjölin, Mats Danielsson, KTH Royal Institute of Technology (Sweden) . . . . . . . . . [10573-34]

3:50 pm: Spatio-energetic cross-talk in photon counting detectors: numerical detector model (PXtalk32) and workflow for CT image quality assessment, Katsuuyki Taguchi, The Johns Hopkins Univ. School of Medicine (USA); Steffen Kappler, Siemens Healthineers (Germany) and Klinikum der München (Germany); Okkyun Lee, The Johns Hopkins Univ. School of Medicine (USA); Steffen Kappler, Siemens Healthineers (Germany). . . . . . . . . [10573-35]

4:10 pm: A rate count-dependent method for spectral distortion correction in photon counting CT, Jannis Dickmann, Deutsches Krebsforschungszentrum (Germany) and KTH Royal Institute of Technology (Sweden) and Technische Univ. Darmstadt (Germany); Joscza Maier, Stefan Sawall, Deutsches Krebsforschungszentrum (Germany); Christian Broennimann, DECTRIS Ltd. (Switzerland); Marc Kachelriess, Technische Universität Darmstadt (Germany). . . . . . . . . [10573-36]

4:30 pm: Frequency dependent DQE of photon counting detector with spectral degradation and cross-talk, Paurakh L. Rajbhandary, Mats Persson, Norbert J. Pelc, Stanford Univ. (USA) . . . . . . . . [10573-37]

WORKSHOP
ROOM: SALON C . TUE 5:00 PM TO 7:00 PM
Deep Learning: Generative Adversarial Networks

3:30 pm: Modeling the progression of Alzheimer’s disease in MRI using generative adversarial networks, Christopher Bowles, Imperial College London (UK); Roger Gunn, Imanova, Imperial College London (UK); Alexander Hammers, King’s College London (UK); Daniel Rueckert, Imperial College London (UK) . . . . . . . . . [10573-55]

3:50 pm: Learning implicit brain MRI manifolds with deep learning, Camilo Bermudez, Vanderbilt Univ. (USA); Andrew J. Plissard, L. Taylor Davis, Allen T. Newton, Vanderbilt Univ. (USA); Susan M. Creswick, National Institutes of Health (USA); Bennett A. Landman, Vanderbilt Univ. (USA) . . . . . . . . . [10573-56]

4:10 pm: Chest x-ray generation and data augmentation for cardiovascular abnormality classification, Ali Madani, Mehdi Moradi, Alexandros Karargyris, Tanveer F. Syeda-Mahmood, IBM Research - Almaden (USA) . . . . . . . . [10573-57]

4:30 pm: Contextual loss functions for optimization of convolutional neural networks predicting pseudo CTs from MRI, Marijn van Stralen, Univ. Medical Ctr. Utrecht (Netherlands) and MRRiguidance B.V. (Netherlands); Yuan Zhou, Technische Univ. Delft (Netherlands); Phillip J. Wozny, Technische Univ. (Netherlands); Peter R. Seevinck, Univ. Medical Ctr. Utrecht (Netherlands) and MRRiguidance B.V. (Netherlands); Marco Loog, Technische Univ. Delft (Netherlands) . . . . . . . . [10573-58]

WORKSHOP
ROOM: SALON C/D/E . TUE 5:00 TO 7:00 PM
Live Demonstrations

Session Chairs: Lubomir M. Hadjiiski, Univ. of Michigan Health System (USA); Horst K. Hahn, Fraunhofer MEVIS (Germany)

See Special Events for more information.

SESSION 7
ROOM: HUNTERS CREEK . TUE 3:30 TO 5:00 PM
PROSTATEx Lessons Learned and 2019 Challenge

Session Chairs: Samuel G. Armato III, The Univ. of Chicago (USA); Hiroshi Fujita, Gifu Univ. School of Medicine (Japan)

See Special Events for more information.

SESSION 4
ROOM: SALON A . TUE 3:30 TO 5:00 PM
Advances in Image-Guided Procedures: A Multi-Disciplinary Joint Forum

Advances in image guidance and therapeutic approach have profoundly shaped the state of the art in medical intervention - from image-guided radiation therapy (IGRT) and surgery (IGS) to the interventional radiology (IR) suite. Key to these advances have been multidisciplinary translational research of physicists, biomedial engineers, and computer scientists working with surgeons, radiologists, and oncologists to bring new technologies to bear in emerging therapeutic approaches.

This Special Session features invited speakers with presentations and panel discussion on recent advances and emerging methods in the decade ahead.

The Special Session offers a joint forum for SPIE conference attendees and clinicians from the UT MD Anderson Cancer Center.

WORKSHOP
ROOM: SALON A . TUE 5:00 TO 7:00 PM
Selected Papers from the Journal of Medical Imaging Special Issue

See Special Events for more information.

SPIE Medical Imaging 2018 • www.spie.org/MI18program • Program current as of 10/15/2017
CT Image Quality and Dose

Session Chairs: Thomas Flohr, Siemens Healthineers (Germany); Lifeng Yu, Mayo Clinic (USA)

8:00 am: Joint optimization of fluence field modulation and regularization for multi-task objectives, Grace J. Gang, Joseph W. Stayman, Johns Hopkins Univ. (USA); Scott S. Hiieh, Univ. of California, Los Angeles (USA); Jia Wang, Norbert J. Pelc, Stanford Univ. (USA) ...........................................[10573-38]

8:20 am: Can image-domain filtering of FBP CT reconstructions match low-contrast performance of iterative reconstructions?, Sarah E. Dwei, Stanford Univ. (USA); Scott S Hiieh, Univ. of California, Los Angeles (USA); Jia Wang, Norbert J. Pelc, Stanford Univ. (USA) ...........................................[10573-39]

8:40 am: From patient-informed to patient-specific organ dose estimation in clinical computed tomography, Wanji Fu, William P. Segars, Ehsan Abadi, Shobhit Sharma, Ehsan Samet, Duke Univ. (USA) ........................................................................[10573-40]

9:00 am: Automated exposure control for CT using a task-based image quality metric, Parag Khobragade, Marquette Univ. (USA); Jiahua Fan, Franco Rupchoicz, Domenic Crostty, GE Healthcare (USA); Taly Gilat Schmidt, Marquette Univ. (USA) .................................................................[10573-41]

9:20 am: Affordable and easy-to-use diagnostic tool for detection of keratoconus using smartphone, Behnam Askarian, Jo Woon Chong, Fatemeh Sadat Tabei, Texas Tech Univ. (USA) .............................................[10573-36]

Coffee Break. . . Wed 9:40 am to 10:10 am

SESSION 8 ROOM: HUNTERS CREEK . . . . . . . . Wed 8:00 to 9:40 AM

Keynote and Eye

Session Chairs: Kensaku Mori, Nagoya Univ. (Japan); Lubomir M. Hadijski, Univ. of Michigan Health System (USA)

8:00 am: Automated segmentation of geographic atrophy using deep convolutional neural networks, Zhihong Hu, Ziyuan Wang, Doheny Eye Institute (USA); Srinivas Sadda, Doheny Eye Institute (USA) and David Geffen School of Medicine, Univ. of California Los Angeles (USA) .............................................[10573-36]

9:00 am: Crowdsourcing Biomedical Research: Leveraging Communities as Innovation Engines (Keynote Presentation), Gustavo A. Stolovitzky, IBM Thomas J. Watson Research Ctr. (USA) and Icahn School of Medicine at Mount Sinai (USA) .................................[10573-35]

9:30 am: Crowdsourcing Biomedical Research: Leveraging Communities as Innovation Engines (Keynote Presentation), Gustavo A. Stolovitzky, IBM Thomas J. Watson Research Ctr. (USA) and Icahn School of Medicine at Mount Sinai (USA) .................................[10573-35]

Coffee Break . . . Wed 9:40 am to 10:10 am
Photon Counting Imaging
Session Chairs: Peter B. Noel, Klinikum rechts der Isar der Technischen Univ. München (Germany); Hee-Joung Kim, Yonsei Univ. (Korea, Republic of)
10:10 am: Ultra-high resolution photon-counting CT reconstruction using spectral prior image constrained compressed sensing (UHR-SPPCS), Kishore Rajendran, Shenzhen Tao, Dilbar Abdurakhimova, Shuai Leng, Cynthia H. McCollough, Mayo Clinic (USA) [10573-43]
10:30 am: Photon counting, dual energy x-ray imaging at CT count rates: measurements and implications of in-pixel charge sharing correction, Christer Ulberg, Direct Conversion AB (Sweden) and XCounter AB (Sweden); Charlotte Eriksson, XCounter AB (Sweden); Alexander Stewart, Direct Conversion AB (Sweden); Mattias Urech, XCounter AB (Sweden); Nicolas Weber, Direct Conversion AB (Sweden) [10573-44]
10:50 am: Generalized linear-systems framework for performance assessment of energy-resolving photon-counting detectors, Mats Persson, Paurak L. Raghabrandt, Norbert J. Pelc, Stanford Univ. (USA) [10573-45]
11:10 am: Experimental evaluation of the influence of scattered radiation on quantitative spectral CT imaging, Artur Sossin, Philips Research (Germany); Michal Rokni, Philips Healthcare (Israel); Bernhard Brendel, Heiner Daer, Axel Thran, Klaus Erhard, Philips Research (Germany) [10573-46]
11:30 am: Impact of photon counting detector CT performance on volumetric diagnostic workflow, Wei Zhou, Michael Bruesewitz, Mayo Clinic (USA); Ahmed Halaweish, Siemens Healthineers (USA); Cynthia H. McCollough, Shuai Leng, Mayo Clinic (USA) [10573-47]

Colon and Prostate
Session Chairs: Janne J. Näppi, Massachusetts General Hospital (USA); Hiroyuki Yoshida, Massachusetts General Hospital (USA) [10573-38]
10:10 am: Detection of protruding lesion in wireless capsule endoscopy videos of small intestine, Chengliang Wang, Zhuo Luo, Chengqing Univ. (China); Jiaying Bai, Guobin Liao, Third Military Medical Univ. (China) [10573-38]
10:30 am: Radiomics analysis of DWI data to identify the rectal cancer patients qualified for local excision after neoadjuvant chemoradiotherapy, Jie Tian, Institute of Automation (China); Zhenhao Tang, Shandong Univ. (China); Zhenyu Lu, Institute of Automation (China); Xiaoyang Zhang, Yanjie Shi, Beijing Univ. Cancer Hospital & Institute (China); Shou Wang, Mengjie Fang, Institute of Automation (China); Yinghui Sun, Beijing Univ. Cancer Hospital & Institute (China); Enqing Dong, Shandong Univ. (China) [10573-38]
10:50 am: Development of a computer aided diagnosis model for prostate cancer classification on multi-parametric MRI, Ryan Alfaro, Derek Soetemans, Western Univ. (Canada) and Lawson Health Research Institute (Canada); Glenn Bauman, Western Univ. (Canada) and Schulich School of Medicine and Dentistry (Canada); Matthew Gibson, Univ. College London (UK); Men Gaed, Robarts Research Institute (Canada); Madeleine Moussa, José Gomez-Lemus, Robarts Research Institute (Canada); Joseph Chin, London Health Sciences Ctr. (Canada); Stephen Paultier, London Health Sciences Ctr. (Canada); Aaron D. Ward, Western Univ. (Canada) and Schulich School of Medicine and Dentistry (Canada) [10573-39]
11:10 am: Cascade classification of endoscopically imageable colorectal lesions for automated pathological classification, Georgera Takiguchi, Yasuhiro Ohnishi, Shohai Oda, Yuki Moriyama, Masanori Murakami, Joji Kitajima, Noboru Hara, Akio Matsuyama, Department of Gastroenterological Surgery, Osaka Medical College (Japan); Yuichi Mori, Masashi Misawa, Showa Univ. Northern Yokohama Hospital (Japan); Takanori Tanabe, Showa Univ. Northern Yokohama Hospital (Japan); Masahiro Oda, Nagoya Univ. (Japan); Shin-ei Kudo, Showa Univ. Northern Yokohama Hospital (Japan); Kensaku Mori, Nagoya Univ. (Japan) [10573-40]
11:30 am: Real-time transverse process detection in ultrasound, Bryan Tran, Csaba Pinter, Andras Lasso, Tamas Ungi, Ben Church, Zachary M. C. Baum, Gabor Fichtinger, Lab. for Percutaneous Surgery, Queen’s Univ. (Canada) [10573-41]

Ultrasound Imaging and Detection Methods
10:10 am: 3D ultrasound guidance system for permanent breast seed implantation: integrated system performance evaluation and clinical procedure, Justin A. Michael, Robarts Research Institute (Canada) and Western Univ. (Canada); Jessica R. Rodgers, Robarts Research Institute (Canada) and Biomedical Engineering Graduate Program, Western Univ. (Canada); Daniel Morton, BC Cancer Research Ctr. (Canada) and Univ. of Victoria (Canada); Deirdre L. Batchelor, BC Cancer Research Ctr. (Canada); Michelle Hillis, BC Cancer Research Ctr. (Canada); Van Hung, Univ. of Victoria (Canada); Aaron Fenster, Robarts Research Institute (Canada) and Western Univ. (Canada) [10573-39]
10:30 am: Feature study on catheter detection in three-dimensional ultrasound, Hongxu Yang, Arash Pourاحتمان, Tehran Univ. Eindhoven (Netherlands); Caffeng Shan, Alexander F. Kolen, Philips Research (Netherlands); Peter H. N. de Wit, Technische Univ. Eindhoven (Netherlands) [10573-39]
10:50 am: Coherent needle detection in ultrasound volumes using 3D conditional random fields, Farhad Ghazvinian Zanjani, Arash Pourاحتمان, Xiakai Tang, Svtlana Zinger, Technische Univ. Eindhoven (Netherlands); Nenad Mihajlovic, Philips Research (Netherlands); Gary C. Ng, Philips Healthcare (USA); Hendrikus H. M. Korsten, Catharina Hospital (Netherlands); Peter H. N. de Wit, Technische Univ. Eindhoven (Netherlands) [10573-29]
11:10 am: Compliant joint echogenicity in ultrasound, Jie Tian, Department of Radiology, Department of Medical Imaging and Radiation Oncology, The Chinese University of Hong Kong (Hong Kong); Shun Zhang, Dept. of Radiology, The Chinese University of Hong Kong (Hong Kong); Feng Chen, Dept. of Radiology, The Chinese University of Hong Kong (Hong Kong); Kun Zhao, Dept. of Radiology, The Chinese University of Hong Kong (Hong Kong) [10573-29]
11:30 am: Frequent subgraph mining for Alzheimer disease, Fei Gao, Arizona State Univ. (USA); Leslie Baxter, Barrow Neurological Institute (USA); Kewei Chen, Banner Alzheimer’s Institute (USA); Richard J. Caselli, Mayo Clinic Arizona (USA); Lei Wu, Vanderbilt Univ. (USA); Jing Li, Arizona State Univ. (USA) [10573-29]
11:50 am: Using deep learning for detecting gender in adult chest radiographs, Zhenchao Wang, Sameer Antani, Rodney Londe, Hanyuan Manella, Academy of Sciences (China); Yanping Gao, Jiaxing Med. Coll. (China); Jianyong Sun, Shanghai Jiaotong Univ. (China); Ming Li, Huadong Hosp. (China); Weiqiang Zhang, The First Affiliated Hosp. of Jiangxi Univ. (China); Jiayong Sun, Shanghai Inst. of Medical Physics (China) [10573-29]
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<th>SESSION 9 CONTINUED</th>
<th>ROOM: HUNTERS CREEK</th>
<th>WED 10:10 AM TO 12:10 PM</th>
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<tr>
<td>11:50 am: Development of a spectral, photon-counting micro-CT system with a translate-rotate geometry, Matthew Holbrook, Darin P. Clark, Duke Univ. (USA); William C. Barber, DxRay, Inc. (USA); Cristian T. Badea, Duke Univ. (USA). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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<td>11:30 am: A new fractional order derivative based active contour model for colon wall segmentation, Bo Chen, Stony Brook Univ. (USA); Lihong C. Li, College of Staten Island (USA); Hua-feng Wang, North China Univ. of Technology (China); Wensheng Chen, Shenzhen Univ. (China); Zhengrong Liang, Stony Brook Univ. (USA). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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<td>11:50 am: Detection of colorectal masses in CT colonography: application of deep residual networks for differentiating masses from normal colon anatomy, Janne J. Näppi, Toru Hironaka, Hiroyuki Yoshida, Massachusetts General Hospital (USA). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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<th>WED 10:10 AM TO 12:10 PM</th>
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<tr>
<td>11:50 am: Development of a national electronic interval cancer review for breast screening, Mark D. Halling-Brown, Mishal N. Patel, The Royal Surrey County Hospital NHS Trust (UK); Matthew G. Wallis, NIHR Cambridge Biomedical Research Ctr. (UK); Kenneth C. Young, The Royal Surrey County Hospital NHS Trust (UK). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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<th>SESSION 6 CONTINUED</th>
<th>ROOM: SALON A</th>
<th>WED 10:10 AM TO 12:10 PM</th>
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<td>11:50 am: Visual aid for identifying vertebral landmarks in ultrasound, Zachary M. C. Baum, Tamas Ungi, Andras Lasso, Ben Church, Lab. for Percutaneous Surgery, Queen’s Univ. (Canada); Christopher Schlinger, Premier Chiropractic (USA); Gabor Fichtinger, Lab. for Percutaneous Surgery, Queen’s Univ. (Canada). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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<th>SESSION 2 CONTINUED</th>
<th>ROOM: SALON B</th>
<th>WED 10:10 AM TO 12:10 PM</th>
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<tr>
<td>11:50 am: Development of a national electronic interval cancer review for breast screening, Mark D. Halling-Brown, Mishal N. Patel, The Royal Surrey County Hospital NHS Trust (UK); Matthew G. Wallis, NIHR Cambridge Biomedical Research Ctr. (UK); Kenneth C. Young, The Royal Surrey County Hospital NHS Trust (UK). Lunch Break . . Wed 12:10 pm to 1:20 pm</td>
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10579 continues on page 48
10580 continues on page 48
Session Chairs: Maria Drangova, Robarts Research Institute (Canada); Patrick A. D’Andrade, Tufts Univ. (USA).

1:20 pm: Spectral imaging of iodine and adipodilin nanoparticles using dual-energy CT, Cristian T. Badea, Matthew Holbrook, Darin P. Clark, Duke Univ. (USA); Keita Maghagha, Texas Children’s Hospital (USA).

1:40 pm: Enhanced Reality, Simulation, and Planning: Coffee Break. (Wed 3:00 pm to 3:30 pm)

1:20 pm: Quantitative assessment of mechanical properties of bone in children’s long bones using total least squares and conjugate gradient methods, Ivan Slapaticar, Univ. of Split (Croatia); Jesse Barlow, The Pennsylvania State Univ. (USA).

2:00 pm: Computed tomography for cancer detection using optimized transducer scaffolding, Kathleen Ryan, Katholieke Universiteit Leuven (Belgium); Daniel Z. Lee, Rohit Kulkarni, Univ. of Pennsylvania (USA); Matthew S. Holden, Gabor Fichtinger, Lab. for Enhanced Reality, Simulation, and Interaction Paradigms for Medical Imaging Visualization, Simulation, and Training, Queen’s Univ. of Health (USA); Andras Lasso, Regina Leung, Andras Lasso, Matthew S. Holden, Gabor Fichtinger, Lab. for Enhanced Reality, Simulation, and Interaction Paradigms for Medical Imaging Visualization, Simulation, and Training, Queen’s Univ. of Health (USA); Andras Lasso, Regina Leung, Andras Lasso, Matthew S. Holden, Gabor Fichtinger, Lab. for Enhanced Reality, Simulation, and Interaction Paradigms for Medical Imaging Visualization, Simulation, and Training, Queen’s Univ. of Health (USA); Andras Lasso, Regina Leung, Andras Lasso, Matthew S. Holden, Gabor Fichtinger, Lab. for Enhanced Reality, Simulation, and Interaction Paradigms for Medical Imaging Visualization, Simulation, and Training, Queen’s Univ. of Health (USA); Andras Lasso, Regina Leung, Andras Lasso, Matthew S. Holden, Gabor Fichtinger, Lab. for Enhanced Reality, Simulation, and Interaction Paradigms for Medical Imaging Visualization, Simulation, and Training, Queen’s Univ. of Health (USA).

2:40 pm: Multi-energy CT reconstructions with a non-linear full-spectral forward model, Steven W. Tilley II, The Univ. of Pennsylvania (USA); Jiaming Zhao, The Pennsylvania State Univ. (USA); Jennifer M. Knapp, Massachusetts General Hospital (USA); Saelan Leuty, The University of British Columbia (Canada); Adam M. Blank, Northwestern Univ. (USA).

3:00 pm: Three-material decomposition in multi-energy CT: impact of prior information on noise and bias, Liqiang Guan, Norbert J. Pelc, Stanford Univ. (USA); Rajbhandary, Norbert J. Pelc, Stanford Univ. (USA); Rajbhandary, Norbert J. Pelc, Stanford Univ. (USA).

3:40 pm: Feasibility of 3D ultrasound tomography in breast cancer detection, Marcin Pater, Jerzy Wogodzinski, The Penn State College of Medicine (USA); Andreas Fichtner, ETH Zurich (Switzerland).

4:20 pm: Real-time 3D ultrasound-guided orthopedic surgery: from pre-op CT to intra-op x-ray via RGBD sensing and 3D printing, Emerson W. Tucker, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Javad Fotouhi, Sing Chun Lee, Mathias Unberath, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Mehraad Armand, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Greg M. Osgood, The Johns Hopkins Hospital (USA); Alexander Fichtner, ETH Zurich (Switzerland).

5:00 pm: 3D ultrasound tomography in breast cancer detection, Marcin Pater, Jerzy Wogodzinski, The Penn State College of Medicine (USA); Andreas Fichtner, ETH Zurich (Switzerland).

5:40 pm: Real-time 3D ultrasound-guided orthopedic surgery: from pre-op CT to intra-op x-ray via RGBD sensing and 3D printing, Emerson W. Tucker, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Javad Fotouhi, Sing Chun Lee, Mathias Unberath, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Mehraad Armand, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Greg M. Osgood, The Johns Hopkins Hospital (USA); Alexander Fichtner, ETH Zurich (Switzerland).

6:00 pm: 3D ultrasound tomography in breast cancer detection, Marcin Pater, Jerzy Wogodzinski, The Penn State College of Medicine (USA); Andreas Fichtner, ETH Zurich (Switzerland).

6:20 pm: Real-time 3D ultrasound-guided orthopedic surgery: from pre-op CT to intra-op x-ray via RGBD sensing and 3D printing, Emerson W. Tucker, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Javad Fotouhi, Sing Chun Lee, Mathias Unberath, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Mehraad Armand, Johns Hopkins Univ. (USA) and Technische Univ. München (Germany); Greg M. Osgood, The Johns Hopkins Hospital (USA); Alexander Fichtner, ETH Zurich (Switzerland).
WEDNESDAY 14 FEBRUARY

CONFERENCE 10573
ROOM: SALON C
Mon.-Thurs. 12-15 Feb. 2018

CONFERENCE 10574
ROOM: HUNTERS CREEK
Mon.-Thurs. 12-15 Feb. 2018

CONFERENCE 10576
ROOM: SALON A
Mon.-Thurs. 12-15 Feb. 2018

CONFERENCE 10579
ROOM: SALON B
Mon.-Thurs. 12-15 Feb. 2018

CONFERENCE 10580
ROOM: MONTROSE
Mon.-Thurs. 12-15 Feb. 2018

Deep Learning for CT
Session Chairs: Guang-Hong Chen, Univ. of Wisconsin School of Medicine and Public Health (USA); Marc Kachelriess, Deutsches Krebsforschungszentrum (Germany)

10:30 am: Deep learning based cone beam CT reconstruction framework using a cascaded neural network architecture, Yinhong Li, Guang-Hong Chen, Univ. of Wisconsin-Madison (USA) . . . . . [10573-54]

10:50 am: Improve angular resolution for sparse-view CT with residual convolutional neural network, Kaichao Liang, Xingyu Wu, Tsinghua University (China) . . . . . [10573-55]

11:10 am: Deep scatter estimation (DSE): feasibility of using a deep convolutional neural network for real-time x-ray scatter prediction in cone-beam CT, Joscha Hopp, Hartmut Gemmeke, Karlsruher Institut für Technologie (Germany) . . . . . [10573-56]

11:30 am: Automated segmentation and radiomic characterization of visceral fat on bowel MRIs for Crohn’s disease, Jiali Barbur, Kastav Bera, Rajat Thawani, Case Western Reserve Univ. (USA); Jean-Paul Achkar, Claudio Fiocchi, Marsha Kary, Rishi Gupta, Jacob Kurowski, The Cleveland Clinic (USA); Satish Viswanath, Case Western Reserve Univ. (USA) . . . . . [10573-57]

11:40 am: A semiautomatic algorithm for three-dimensional segmentation of the prostate in CT images using shape and local texture characteristics, Mayyas Shahedi, Emory Univ. School of Medicine (USA); Ling Ma, Roman The Guo, Emory Univ. (USA); Guoyi Zhang, Emory Univ. School of Medicine (USA); David M. Schuster, Peter T. Nieh, Viraj V. Master, BoaWei Fei, Emory Univ. (USA) . . . . . [10573-58]

12:00 pm: Auto-contouring via automatic anatomical region of organs at risk in head and neck cancer on CT images, Xingyu Wu, Jayaram K. Udupa, Yubing Xing, University of Wisconsin School of Medicine and Public Health (USA); Paul Lampe, A. McGarry Houghton, Fred Hutchinson Cancer Research Ctr. (USA); David R. Haynor, Univ. of Washington (USA); W. Art Chaovilavongsve, Univ. of Arkansas (USA); Paul E. Kinahan, Univ. of Washington (USA) . . . . . [10573-59]

12:20 pm: Prognostic importance of pleural attachment status measured by pretreatment CT images in patients with stage I/A lung adenocarcinoma: measurement of the ratio of the interface between nodular and neighboring pleura to nodular surface area, Yoshiaki Kawata, Noboru Niki, Toa Univ. (Japan); Masahiko Kusumoto, National Cancer Ctr. Hospital East (Japan); Hirobono Ohtsuki, Abashiri Prison (Japan); Kenji Uezono, Ganncho Ishii, Yusuke Matsumoto, Takamasa Tsuchida, National Cancer Ctr. Hospital East (Japan); Kenji Eguchi, Teikyo Univ. School of Medicine (Japan); Masahiro Kaneko, Tokyo Health Service Association for Mental and Physical Health (Japan) . . . . . . . . . [10573-60]

12:40 pm: Segmentation and Modeling
3:30 pm: Automated segmentation and radiomic characterization of visceral fat on bowel MRIs for Crohn’s disease, Jiali Barbur, Kastav Bera, Rajat Thawani, Case Western Reserve Univ. (USA); Jean-Paul Achkar, Claudio Fiocchi, Marsha Kary, Rishi Gupta, Jacob Kurowski, The Cleveland Clinic (USA); Satish Viswanath, Case Western Reserve Univ. (USA) . . . . . [10573-57]

12:50 pm: A semiautomatic algorithm for three-dimensional segmentation of the prostate in CT images using shape and local texture characteristics, Mayyas Shahedi, Emory Univ. School of Medicine (USA); Ling Ma, Roman The Guo, Emory Univ. (USA); Guoyi Zhang, Emory Univ. School of Medicine (USA); David M. Schuster, Peter T. Nieh, Viraj V. Master, BoaWei Fei, Emory Univ. (USA) . . . . . [10573-58]

1:10 pm: Auto-contouring via automatic anatomical region of organs at risk in head and neck cancer on CT images, Xingyu Wu, Jayaram K. Udupa, Yubing Xing, University of Wisconsin School of Medicine and Public Health (USA); Paul Lampe, A. McGarry Houghton, Fred Hutchinson Cancer Research Ctr. (USA); David R. Haynor, Univ. of Washington (USA); W. Art Chaovilavongsve, Univ. of Arkansas (USA); Paul E. Kinahan, Univ. of Washington (USA) . . . . . [10573-59]

1:30 pm: Prognostic importance of pleural attachment status measured by pretreatment CT images in patients with stage I/A lung adenocarcinoma: measurement of the ratio of the interface between nodular and neighboring pleura to nodular surface area, Yoshiaki Kawata, Noboru Niki, Toa Univ. (Japan); Masahiko Kusumoto, National Cancer Ctr. Hospital East (Japan); Hirobono Ohtsuki, Abashiri Prison (Japan); Kenji Uezono, Ganncho Ishii, Yusuke Matsumoto, Takamasa Tsuchida, National Cancer Ctr. Hospital East (Japan); Kenji Eguchi, Teikyo Univ. School of Medicine (Japan); Masahiro Kaneko, Tokyo Health Service Association for Mental and Physical Health (Japan) . . . . . . . . . [10573-60]
### SESSION 11 CONTINUED
**Room:** HUNTERS CREEK  
**Wed 3:30 to 5:30 PM**

- 4:50 pm: Using YOLO based deep learning network for real time detection and localization of lung nodules from low dose CT scans, Sindhu Ramachandran, Jose George, Shibon Skaria, Varun V.V., QuEST Global Services Pte. Ltd. (India).  
- 5:10 pm: Automated volumetric lung segmentation of thoracic CT images using fully convolutional neural network, Mohammadreza Negahdar, IBM Research - Almaden (USA); David Beymer, Tanveer F. Syeda-Mahmood, IBM Research - Almaden (USA).

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### SESSION 8 CONTINUED
**Room:** SALON A  
**Wed 3:30 to 5:10 PM**

- 4:50 pm: Machine learning-based colon deformation estimation method for colonoscope tracking, Masahiro Oda, Nagoya Univ. (Japan); Takayuki Kitasaka, Aichi Institute of Technology (Japan); Kazuhiro Furukawa, Nagoya Univ. Hospital (Japan); Ryoji Miyahara, Nagoya Univ. Graduate School of Medicine (Japan); Yoshihi Hirooka, Nagoya Univ. Hospital (Japan); Hideki Goto, Nagoya Univ. Graduate School of Medicine (Japan); Nassim Navab, Technische Univ. München (Germany); Kensaku Mori, Nagoya Univ. Hospital (Japan).

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### SESSION 4 CONTINUED
**Room:** SALON B  
**Wed 3:30 to 5:30 PM**

- 5:10 pm: Fully automated disease severity assessment and treatment monitoring in retinopathy of prematurity using deep learning, James M. Brown, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); J. Peter Campbell, Oregon Health & Science Univ. (USA); Andrew Beers, Ken Chang, Kyra Donohue, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Susan Ostmo, Oregon Health & Science Univ. (USA); R.V. Paul Chan, Univ. of Illinois at Chicago (USA); Jennifer Dy, Deniz Erdogmus, Stratis Ioannidis, Northeastern Univ. (USA); Michael F. Chiang, Oregon Health & Science Univ. (USA); Jayashree Kalpathy-Cramer, Athinoula A. Martinos Ctr. For Biomedical Imaging (USA).
Compton scatter detector with photon-counting detector; a preliminary study, Kai Wang, Haltao Cheng, Xi Chen, Xuanqin Mou, Xi’an Jiaotong Univ. (China) .................................................. [10573-83]

Contrast-enhanced x-ray microscopy of bovine articular cartilage, Ying Zhu, Dragana Ponjievic, John R. Matyas, Steven K. Boyd, Univ. of Calgary (Canada) ................................................... [10573-84]

Towards bimodal intravascular OCT MPI and 3D percutaneous catheter, Sang Lu, Technische Univ. Hamburg-Harburg (Germany) .................................................... [10573-85]

A fully vacuum-sealed, miniature x-ray tube with carbon nanotube field emitters for compact portable dental x-ray systems, Sora Park, Jin-Woo Jeong, Jae-woo Kim, Jiu-Tae Kang, Ji-Hwan Yeon, Sunghie Kim, Electronics and Telecommunications Research Institute (Korea, Republic of); Hyejin Jeon, Eunsol Go, Jeong-Woong Lee, Yoon-Ho Song, Electronics and Telecommunications Research Institute (Korea, Republic of); and Univ. of Science and Technology (Korea, Republic of) .................................................. [10573-86]

Proton radiography for relativistic proton beam therapy, Matthew J. Fisch, Michelle Espay, Frank E. Merrill, Los Alamos National Lab. (USA) ................................................... [10573-88]

Transrectal ultrasound-waveform tomography using plane-wave reflection data for prostate imaging, Lianjie Huang, Kai Gao, Yunsong Huang, Los Alamos National Lab. (USA) .................................................. [10573-83]

Sensitivity of diffuse correllation spectroscopy to flow rate changes, a study with tissue simulating optical phantoms, Sara Zanfardino, Karthik Chandrasekaran, Univ. of California, Santa Barbara (USA); Vincent Radzicki, Hua Lee, Shvikumar Chandrasekaran, Univ. of California, Santa Barbara (USA) .................................................. [10573-98]

Estimation and validation of patient-specific liver elasticity derived within radiotherapy setup, Katelyn Hasse, Fei Han, John Neylon, Peng Hu, Yingli Yang, Anand Santhanam, Univ. of California, Los Angeles (USA) .................................................. [10573-93]

Quantitative image-based phosphorous-31 MR spectroscopy for evaluating age-based differences in skeletal muscle metabolites, Shenweng Deng, Heijing Tian, Juan Vassilev, Ralph Demoff, Geoffrey D. Clarke, The Univ. of Texas Health Science Ctr. at San Antonio (USA) .................................................. [10573-100]

High-concentration gadolinium nanoparticles for pre-clinical vascular imaging, Charmaine Cruje, David W. Holdsworth, Roberts Research Institute (Canada); Maria Drangova, Roberts Research Institute (Canada) .................................................. [10573-94]

Non-invasive electronic imaging of cardiovascular tissues using neural networks, Abhejit Rajagopal, Univ. of California, Santa Barbara (USA); Vincent Radzicki, Hua Lee, Shvikumar Chandrasekaran, Univ. of California, Santa Barbara (USA) .................................................. [10573-95]

Hyperspectral imaging: comparison of acousto-optic and liquid crystal tunable filters, Ramy M. Y. M. Abdalti, Egyptian Armed Forces (Egypt) .................................................. [10573-96]

Low-cost optical technologies based on a single-board computer to increase the early detection of cervical cancer in low-resource areas, Sonia Parra, Rice Univ. (USA); Eduardo Carranza, Univ. of Houston (USA); Jonathon Carruthers, Rice Univ. (USA); Kathleen Schmier, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Mauricio Maza, Basic Health International (USA); and Albert Einstein College of Medicine (USA) .................................................. [10573-97]

Quantitative Imaging

An investigation into how the radiotherapy dose response of normal appearing brain tissue in glioma patients influences ADC measurements, Haris Shuaib, Lucy Brazil, Guy’s and St Thomas’ NHS Foundation Trust (UK); Thomas C. Booth, King’s College Hospital (UK) .................................................. [10573-98]

Estimation and validation of patient-specific liver elasticity derived within radiotherapy setup, Katelyn Hasse, Fei Han, John Neylon, Peng Hu, Yingli Yang, Anand Santhanam, Univ. of California, Los Angeles (USA) .................................................. [10573-99]

Quantitative image-based phosphorous-31 MR spectroscopy for evaluating age-based differences in skeletal muscle metabolites, Shenweng Deng, Heijing Tian, Juan Vassilev, Ralph Demoff, Geoffrey D. Clarke, The Univ. of Texas Health Science Ctr. at San Antonio (USA) .................................................. [10573-100]

A rapid, robust multi-echo phase unwrapping method for quantitative susceptibility mapping (QSM) using strategically acquired gradient echo (SAGE) data acquisition, Yongsheng Chen, Northeastern Univ. (China) and MIRI Biomedical Institute for Biomedical Research (USA) and Wayne State Univ. (USA); Saifeng Liu, MIRI Biomedical Institute for Biomedical Research (USA); Yan Kang, Northeastern Univ. (China); E. Mark Haacke, Wayne State Univ. (USA) and MIRI Biomedical Institute for Biomedical Research (USA) and Northeastern Univ. (China) .................................................. [10573-101]

Phantoms

Anatomical DCE-MRI phantoms generated from glioma patient data, Andrew Beers, Massachusetts General Hospital (USA); Keri Chang, James Brown, Albert Einstein Ctr. for Biomedical Imaging (USA); Xia Zhu, Dianpan Sengupta, Theodore L. Willie, Intel Corp. (USA); Elizabeth Gersten, Bruce Rosen, Atinolua A. Martins Ctr. for Biomedical Imaging (USA); Jayashree Kalpathy-Cramer, Atinolua A. Martins Ctr. for Biomedical Imaging (USA) and The Ctr for Clinical Data Science, Massachusetts General Hospital (USA) and Brigham and Women’s Hospital (USA) .................................................. [10573-102]

Development of solid water phantom using wax, Tomoe Hagi, Qin Li, Bahaa Fattah, Robert J. Jennings, Benjamin P. Berman, Nicholas A. Petrick, U.S. Food and Drug Administration (USA) .................................................. [10573-103]

Development of a novel respiratory phantom for motion correction studies in PET imaging, Daniel Scott-Jackson, Utah Ctr. for PET imaging, Univ. of Utah (UK); Sarah McCuaid, The Royal Surrey County Hospital NHS Trust (UK); Kevin Wells, Emma Lewis, Univ. of Surrey (UK); James Scuffham, Royal Surrey County Hospital NHS Trust (UK) .................................................. [10573-104]

Scatter profiles of the MIRD phantom with Geant4, Mehmet Oktay, Utah Ctr. for Biomedical Imaging, The Univ. of Utah (UK); Sarah McQuaid, The Royal Hampshire Hospital NHS Trust (UK) .................................................. [10573-105]

Investigating the depth-sensitivity of laser speckle contrast imaging in flow phantoms, Anthony Young, Karthik Chandrasekaran, Univ. of Wisconsin-Madison (USA) .................................................. [10573-106]

Image Reconstruction

The advantages of unregularized sparse reconstruction: an experimental phantom study, John Hayes, Univ. of Wisconsin (USA); Daniel Gomez-Cordona, John W. Garrett, Univ. of Wisconsin-Madison (USA); Par Zhang, Univ. of Wisconsin School of Medicine and Public Health (USA); Guang-Hong Chen, Univ. of Wisconsin-Madison (USA) .................................................. [10573-107]

Motion compensated reconstruction of the sortic valve for computed tomography, Tanja Elss, Rolf Bippus, Holger Schmitt, Philips Research (Germany); Thomas Ivanc, Philips Healthcare (USA); Michael M. Morlock, Technische Univ. Hamburg-Harburg (USA); Michael Grass, Philips Research (Germany) .................................................. [10573-108]

Real-time image reconstruction for low-dose CT using deep convolutional generative adversarial networks (GANs), Kiwhan Choi, Korea Institute of Science and Technology (Korea, Republic of); Phong Wong Kim, Joon Seok Lim, Yonsei Univ. College of Medicine (Korea, Republic of) .................................................. [10573-109]

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Session Chairs: Adam M. Alessio, Univ. of Washington (USA); Michael Grass, Philips Research (Germany)
10:10 am: Realistic lesion simulation: application of elastostatic deformation to lesion-local environment in lung CT. Thomas J. Sauer, Jocelyne Hoye, Justin B. Solomon, Ehsan Samet, Duke Univ. (USA) ........................................ [10573-65]
10:30 am: CT investigation of patient-specific phantoms with coronary artery disease. Lauren M. Shepard, Kelsey N. Sommer, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA); Erin Angel, Toshiba America Medical Systems, Inc. (USA); Vijay Iyer, Michael F. Wilson, Univ. at Buffalo (USA); Frank J. Rybicki, Ottawa Hospital Research Institute (Canada) and Univ. of Ottawa (Canada); Dimitrios Mitsouras, Ottawa Research Institute (Canada) and Brigham and Women’s Hospital (USA); Sabee Molloy, Univ. of California, Irvine (USA); Ciprian N. Ionita, Univ. at Buffalo (USA) and Toshiba Stroke and Vascular Research Ctr. (USA) ........................................ [10573-66]
10:50 am: Evaluation of radiation dose reduction via myocardial frame reduction in dynamic cardiac CT for perfusion quantitation, Michael D. Blindschadel, Kelley R. Branch, Adam M. Alessio, Univ. of Washington (USA) ........................................ [10573-67]
11:10 am: Stack transition artifact removal (STAR) for cardiac CT. Serge Lebedev, Deutsches Krebsforschungszentrum (Germany); Karl Stierstorfer, Siemens Healthineers (Germany); Marc Kachelriess, Deutsches Krebsforschungszentrum (Germany) ........................................ [10573-68]
11:30 am: Serial assessment of CT coronary calcifications for regression/progression analysis, David L. Wilson, Di Wen, Brendan Eck, Jerry Lipinski, Jacob Levi, Robert C. Gilkeson, Christopher Longenecker, Case Western Reserve Univ. (USA) ........................................ [10573-69]
### SESSION 13 CONTINUED
**ROOM: SALON C**  
**THU 10:10 AM TO 12:10 PM**

11:50 am: Bias and variability in morphology features of lung lesions across CT imaging conditions, Jocelyn Hoye, Justin B. Solomon, Thomas J. Sauer, Marthony Robins, Ehsan Samei, Duke Univ. Medical Ctr. (USA)  

Lunch Break . . . . Thu 12:10 pm to 1:20 pm

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**SESSION 13 CONTINUED**
**ROOM: HUNTER CREEK**  
**THU 10:10 AM TO 12:10 PM**

11:50 am: Radiation-free quantification of head malformations in craniosynostosis patients from 3D photography, Liyun Tu, Antonio R. Porras, Albert Oh, Children’s National Health System (USA); Natasha Lepore, Children’s Hospital Los Angeles (USA) and The Univ. of Southern California (UK); Manuel Mastromanolis, Deki Tsering, Children’s National Health System (USA); Beatrix Paniagua, Andinet Enquobahrie, Kitware, Inc. (USA); Robert Keating, Children’s National Health System (USA); Gary F. Rogers, Children’s National Medical Ctr. (USA); Marius George Lingurar, Children’s National Helath System (USA) and The George Washington Univ. (USA)  

Lunch Break . . . . Thu 12:10 pm to 1:20 pm

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**SESSION 10 CONTINUED**
**ROOM: SALON A**  
**THU 10:10 AM TO 12:10 PM**

11:50 am: A novel small field of view hybrid gamma camera for scintigraphic imaging, Mohammed S. Alqahtani, John E. Lees, Sarah L. Bugby, Layal K. Jambi, Univ. of Leicester (UK); Ak H. Ng, The Univ. of Nottingham (UK); Bahadar S. Bhattia, Numaan S. Dawood, Awad M. Almarhaby, William R. McKnight, Univ. of Leicester (UK); Alan C. Perkins, The Univ. of Nottingham (UK)  

Lunch Break . . . . Thu 12:10 pm to 1:20 pm

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**Award Announcements**
**ROOM: SALON C**  
**THU 12:10 TO 12:15 PM**

The Computer-Aided Diagnosis conference RFW runner ups and poster award recipients will be recognized and certificates distributed.

Lunch Break . . . . Thu 12:15 pm to 1:20 pm

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**Fight Bias, Embrace Diversity**

SPIE seeks to cultivate a culture of openness and inclusivity. Help us eradicate bias and make the world of optics and photonics a shining example of all minds coming together to innovate regardless of gender, race, nationality, culture, educational background, politics, sexuality, body-type and age, for the betterment of life.

Educate yourself on the issues faced by a diverse workforce, challenge your own assumptions, and tap into the rich pool of talent, perspectives, and ideas offered by people different from you.
CONFERENCE 10573
ROOM: SALON C
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10575
ROOM: HUNTERS CREEK
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10576
ROOM: SALON A
Mon.–Thurs. 12–15 Feb. 2018

CONFERENCE 10579
ROOM: SALON B
Tues.–Thurs. 13–15 Feb. 2018

CONFERENCE 10580
ROOM: MONTROSE
Tues.–Fri. 13–16 Feb. 2018

THURSDAY 15 FEBRUARY

SESSION 14
ROOM: SALON C .... THU 1:20 TO 3:00 PM
Phase Contrast Imaging
Session Chairs: Mini Das, Univ. of Houston (USA); Jinyi Qi, Univ. of California, Davis (USA)
1:20 pm: Monochromatic breast-CT: absorption and phase-retrieved images, Luca Brombal, Univ. degli Studi di Trieste (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Bruno Golosio, Univ. degli Studi di Cagliari (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Deborah Bonazza, Cattinaria Hospital (Italy) and Univ. degli Studi di Trieste (Italy); Adriano Contillo, Univ. degli Studi di Sassari (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Luigi Rigon, Univ. Studi di Napoli Federico II (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Sandro Donato, Univ. degli Studi di Trieste (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Giovanni Maset, Cattinaria Hospital (Italy) and Univ. degli Studi di Cagliari (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Deborah Bonazza, Cattinaria Hospital (Italy) and Univ. degli Studi di Trieste (Italy); Adriano Contillo, Univ. Studi di Sassari (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Luigi Rigon, Univ. and Istituto Nazionale di Fisica Nucleare (Italy); Angel A. Patwardhan, Samsung R&D Institute (USA); Maximilian Spies, Technische Univ. Berlin (Germany)
1:40 pm: Comparison of machine learning approaches for thyroid nodule characterization from shear wave elastography images, Carina Periera, Manjiri K. Dighe, Adam M. Alessio, Univ. of Washington (USA) .
2:40 pm: Automatic detection of kidney in 3D pediatric ultrasound images using deep neural networks, Poonreh Roshanaiat, Atzeli Sahoo, Elijah Biggs, Children’s National Medical Ctr. (USA); James Jago, Phillips Healthcare (USA); Marius George Lingurar, Children’s National Medical Ctr. (USA) .

CONFERENCE 10576
ROOM: SALON A .... THU 1:20 TO 3:00 PM
Abdominal Imaging and Guidance Technologies
1:20 pm: Needle deflection in thermal ablation procedures of liver tumors: a CT image analysis, Tonke L. de Jong, Technische Univ. Delft (Netherlands); S.J.C. Klink, Adriaan Moelker, Erasmus MC (Netherlands); Benjamin Ramsay, Tharindu S. De Silva, Joseph Goerres, Uli Aneri, Michael D. Ketcha, Matthew W. Jacobsen, Niral Sheth, Johns Hopkins Univ. (USA); Sebastian Vogt, Gerhard Kleinszig, Siemens Healthineers (Germany); Greg M. Osgood, The Johns Hopkins Hospital (USA); Albert Mears M.D., Joseph Brey M.D., Tao Sun, The Johns Hopkins Hospital (USA); Nasir Navab, Johns Hopkins Univ. (USA) .
2:00 pm: Automatic definition of surgical trajectories and acceptance windows in pelvis trauma surgery using deformable registration, Runze Han, The Johns Hopkins Univ. (USA); Benjamin Ramsay, Tharindu S. De Silva, Joseph Goerres, Uli Aneri, Michael D. Ketcha, Matthew W. Jacobsen, Niral Sheth, Johns Hopkins Univ. (USA); Sebastian Vogt, Gerhard Kleinszig, Siemens Healthineers (Germany); Greg M. Osgood, The Johns Hopkins Hospital (USA); Albert Mears M.D., Joseph Brey M.D., Tao Sun, The Johns Hopkins Hospital (USA); Nasir Navab, Johns Hopkins Univ. (USA) .
2:20 pm: Intra-operative 360° 3D transvaginal ultrasound guidance during high-dose-rate interstitial gynecologic brachytherapy needle placement, Jessica R. Rodgers, Western Univ. (Canada); Jeffrey S. Bax, Roberts Research Institute (Canada); Vikram Veiker, Kathleen Sury, David D’Souza, London Regional Cancer Program (Canada); Eric Leung, Odette Cancer Ctr. (Canada); Aaron Fenster, Roberts Research Institute (Canada) .

CONFERENCE 10579
ROOM: SALON B .... THU 1:20 TO 3:00 PM
Innovations in Imaging Informatics
1:20 pm: On the accuracy of low-cost motion capture systems for range of motion measurements, Kevin Yu, Rohgayeh Barmaki, Mathias Unberath, Johns Hopkins Univ. (USA); Albert Mears M.D., Joseph Brey M.D., Tao Sun, The Johns Hopkins Hospital (USA); Nasir Navab, Johns Hopkins Univ. (USA) .
2:00 pm: Molecular imaging and validation of non-melanoma skin cancer margins, Yiqiao Liu, Elijah Walker, Case Western Reserve Univ. (USA); InYoung Kim, Louis Stokes Cleveland Veterans Affairs Medical Ctr. (USA); Daniel Popkin, Louis Stokes Cleveland Veterans Affairs Medical Ctr. (USA) and Case Western Reserve Univ. (USA); Bo Zhou, Case Western Reserve Univ. (USA); Matthew Bogro, Stanford Univ. Medical Ctr. (USA) and Stanford Univ. (USA); James Basilion, Case Western Reserve Univ. (USA) and National Foundation for Cancer Research (USA); Matthew Bogro, Stanford Univ. Medical Ctr. (USA) and Stanford Univ. (USA); Roshanitabrizi, Awais Mansoor, Elijah Walker, Case Western Reserve Univ. (USA) .
2:20 pm: Does transitioning from computed radiography (DR) to direct radiography (DR) with post-processing imaging systems affect workflow efficiency?, Raja Gai, Thomas Jefferson Univ. (USA); Christopher Roth, Elizabeth Smith, Jaydev K. Dave, Thomas Jefferson Univ. (USA) .
### Thursday 15 February

<table>
<thead>
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<th>Conference</th>
<th>Room</th>
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<tr>
<td>10573</td>
<td>Salon C</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>2:00 pm</td>
<td>Joint-reconstruction-enabled data acquisition designs for single-shot edge-illumination x-ray phase-contrast tomosynthesis, Yujia Chen, Weimin Zhou, Washington Univ. in St. Louis (USA); Charlotte K. Hagen, Alessandro Olivo, Univ. College London (UK); Mark A. Anastasio, Washington Univ. in St. Louis (USA). [10573-73]</td>
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<tr>
<td>10575</td>
<td>Hunters Creek</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>2:00 pm</td>
<td>Two-dimensional quadratic grating for far-field phase contrast x-ray interferometry, Joyoni Dey, Narayan Bhusal, Leslie Butler, Kyungmin Ham, Louisiana State Univ. (USA). [10573-74]</td>
</tr>
<tr>
<td>10576</td>
<td>Salon A</td>
<td>Mon.–Thurs. 12–15 Feb. 2018</td>
<td>2:00 pm</td>
<td>Two-dimensional quadratic grating for far-field phase contrast x-ray interferometry, Joyoni Dey, Narayan Bhusal, Leslie Butler, Kyungmin Ham, Louisiana State Univ. (USA). [10573-74]</td>
</tr>
<tr>
<td>10579</td>
<td>Salon B</td>
<td>Tues.–Thurs. 13–15 Feb. 2018</td>
<td>2:00 pm</td>
<td>The development of an ophthalmologic imaging CADe structured report for retinal image radiomics research, Huiqun Wu, Nantong Univ. (China); Joseph Liu, Siliang Zhang, Alyssa Zhu, Christopher Sullisto, The Univ. of Southern California (USA); Jingjing Li, Aiming Sang, Jianshuang Dong, Nantong Univ., (China); Brent J. Liu, The Univ. of Southern California (USA). [10579-35]</td>
</tr>
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</table>

**Session 11 Continued**

**Room: Salon A . . . Thu 1:20 to 3:00 PM**

- **2:40 pm:** Ring navigation: an ultrasound-guided technique using real-time motion compensation for prostate biopsies, Derek J. Gillies, Lori Gardi, David Tessier, Robarts Research Institute (Canada) and Western Univ. (Canada); Ashley Mercado, St. Joseph’s Health Care London (Canada); Shuang-ren Zhao, Ctr. for Imaging Technology Commercialization (Canada); Aaron Fenster, Robarts Research Institute (Canada) and Ctr. for Imaging Technology Commercialization (Canada) and Western Univ. (Canada). [10576-52]

**Coffee Break . . . Thu 3:00 pm to 3:30 pm**

**Award Announcements**

**Room: River Oaks . . . 3:00 to 3:05 PM**

The Image-Guided Procedures, Robotic Interventions, and Modeling RFW runners up, Young Scientist, and poster presentation award recipients will be recognized and certificates distributed.

**Coffee Break . . . Thu 3:05 pm to 3:30 pm**
Image Reconstruction
Session Chairs: Yuxiang Xing, Tsinghua Univ. (China); Marko Visain, Deutsches Krebsforschungszentrum (Germany)

3:30 pm: Fast low-dose compressed-sensing (CS) image reconstruction in four-dimensional digital tomosynthesis using on-board image (OBI), Sunghoon Choi, Yonsei Univ. (Korea, Republic of); Scott S. Hsieh, Univ. of California, Los Angeles (USA); Chong-Woo Seo, Hee-Joung Kim, Yonsei Univ. (Korea, Republic of).

3:50 pm: Organ-specific context-sensitive CT image reconstruction and display of aortic stenosis, Deutsches Krebsforschungszentrum (Germany); Shuqing Chen, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Stefan Sawal, David Simons, Deutsches Krebsforschungszentrum (Germany); Matthias May, Universitätsklinikum Erlangen (Germany); Heinz-Peter Schlemmer, Deutsches Krebsforschungszentrum (Germany); Andreas Maier, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Michael Leit, Klinikum Nürnberg (Germany) and Paracelsus Medizinische Privatuniversität (Germany); Marc Kachelriess, Deutsches Krebsforschungszentrum (Germany).

4:10 pm: Sensitivity and specificity of a sparse reconstruction algorithm for electrode localization techniques, National Ctr. for Tumor Diseases (Germany); Rüdiger Dillmann, Karlsruher Institut für Technologie (Germany); Veda Murthy, Ximing Wang, Lin Cao, John Speidel, National Ctr. for Tumor Diseases (Germany); Andrew Harris, Robarts Research Institute (Canada).

4:30 pm: Content-oriented sparse dimensional digital tomosynthesis using compressive sensing (CS) image reconstruction in four-dimensional digital tomosynthesis, Ravi K. Samala, Heang-Ping Chan, Lubomir M. Hadjikis, Mark A. Helvie, Caleb Richter, Kenny H. Cha, Univ. of Michigan (USA).

4:50 pm: ICADs: interpretable computer aided diagnosis of breast masses, Seong Tae Kim, Hakmin Lee, Hak Gu Kim, Yong Man Ro, KAIST (Korea).

5:10 pm: Do pre-trained deep learning models improve computer-aided classification of digital mammograms?, Emily B. Sonnenblick, Lea Azour, Shokoofeh Azizi, Sharareh Bayat, Emran Speidel, National Ctr. for Tumor Diseases (Germany); Andrew Harris, Robarts Research Institute (Canada).

8:00 pm: Poster Session, Room B, Salons A & B
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Handbook of Optical Biomedical Diagnostics, 2nd Edition: 2-Volume Set
Editor: Valery V. Tuchin
Print: $181.05 / $213.00
eBook: $154.70 / $182.00
PM264

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Valery V. Tuchin
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Sabine Koelle and Matthias Trottmann
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Editors: Sos S. Agaian, Jinshan Tang, and Jindong Tan
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<td>SC1235 Deep Learning for Image Understanding (Wenzel, Meine) 8:30 am to 5:30 pm, $520 / $610, p. 70</td>
<td>SC1184 Methodology for Measuring Dynamic Functional Connectivity in Neuroimaging Data Analysis (Lei) 8:30 am to 12:30 pm, $300 / $350, p. 70</td>
<td>SC086 Fundamentals of Medical Image Processing and Analysis (Deserno) 8:30 am to 5:30 pm, $520 / $610, p. 69</td>
<td>SC987 Spectral CT Imaging (Schmidt, Flohr, Grant) 8:30 am to 12:30 pm, $300 / $350, p. 72</td>
<td>SC1239 Virtual Clinical Trials: An In-depth Tutorial (Maidment, Bakic, Barufaldal) 8:30 am to 12:30 pm, $300 / $350, p. 69</td>
<td>SC1129 Photon Counting CT (Danielsson, Sjölin) 1:30 pm to 5:30 pm, $300 / $350, p. 69</td>
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<td>SC1239 Virtual Clinical Trials: An In-depth Tutorial (Maidment, Bakic, Barufaldal) 8:30 am to 12:30 pm, $300 / $350, p. 69</td>
<td>SC1126 SimpleITK Jupyter Notebooks: Biomedical Image Analysis in Python (Johnson, Lowekamp, Yaniv) 1:30 pm to 5:30 pm, $300 / $350, p. 71</td>
<td>WS776 Writing for Publication (Hanson) 1:30 pm to 5:30 pm, $60 / $110, p. 72</td>
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SATISFACTION GUARANTEED OR YOUR MONEY BACK.
Fundamentals of Medical Image Processing and Analysis

SC086 • Course Level: Intermediate • CEU: 0.7
$520 SPIE Members • $274 SPIE Student Members
$610 Non-Members USD
Saturday 8:30 am to 5:30 pm

This course is also available in online format.

This course gives an overview of medical image formation, enhancement, analysis, visualization, and communication with many examples from medical applications. It starts with a brief introduction to medical imaging modalities and acquisition systems. Basic approaches to display one-, two-, and three-dimensional (3D) biomedical data are introduced. As a focus, image enhancement techniques, segmentation, texture analysis and their application in diagnostic imaging will be discussed. To complete this overview, storage, retrieval, and communication of medical images are also introduced.

In addition to this theoretical background, a 45 min practical demonstration with ImageJ is given. ImageJ is a Java-based platform for medical image enhancement and visualization. It is developed by the National Institutes of Health, USA, open source and freely available in the public domain. For this course, ImageJ is appropriately configured with useful plug-ins (e.g. DICOM import, 3D rendering) and distributed on CD-ROM. Attendees are welcome to perform on their own laptop computers.

LEARNING OUTCOMES
This course will enable you to:
• identify major processes involved in formation of medical images
• recognize the imaging modality from their visualization
• classify the various medical image processing algorithms
• describe fundamental methods of image enhancement
• enhance medical images using appropriate software
• visualize all types of medical image data
• appraise efficacy and drawbacks of several techniques of image segmentation
• get familiar with the fundamental concepts of texture analysis
• explain the basic principles of medical image communication
• get started with ImageJ and self-perform fundamental processes of medical image processing

INTENDED AUDIENCE
Engineers, scientists, biomedical researchers and managers who need a basic understanding of medical image processing technologies and methods. Some prior background with image processing and computer technology will be helpful.

INSTRUCTOR
Thomas Deserno (né Lehmann), PhD, is full professor of Medical Informatics at RWTH Aachen University, Germany, where he heads the Division of Image and Data Management. He lectures graduate courses on biomedical imaging and image processing, co-authored the text Image Processing for the Medical Sciences (1997), and edited the Handbook of Medical Informatics (2005) and Biomedical Image Processing (2011). His research interests include discrete realizations of continuous image transforms, medical image processing applied to quantitative measurements for computer-assisted diagnoses, and content-based image retrieval from large medical databases. He has authored over 100 scientific publications, is Senior Member of IEEE and SPIE and a member of IADMR, serves on the International Editorial Boards of Dentomaxillofacial Radiology, Methods of Information in Medicine, World Journal of Radiology, and The Scientific World Journal, and he is Co-editor Europe of the International Journal of Healthcare Information Systems and Informatics.

Attendee testimonial:
Very good overview of the subject with good references for follow-up study of the topic.

Photon Counting CT

SC1129 • Course Level: Introductory • CEU: 0.4
$300 SPIE Members • $170 SPIE Student Members
$350 Non-Members USD
Sunday 1:30 pm to 5:30 pm

This course explains the principles of photon counting detectors for spectral x-ray imaging. Typical technical implementations are described and fundamental differences to energy integrating systems are pointed out. In particular, the issues of high-rate handling and the effect of detector cross talk on energy resolution are described. Requirements on electronics for spectral imaging in computed tomography are also discussed.

A second objective of the course is to describe how energy sensitive counting detectors make use of the energy sampling of the linear attenuation coefficients of the background and target materials for any given imaging task; methods like material basis decomposition and optimal energy weighting will be explained.

The second objective highlights the interesting fact that while the spatial-frequency descriptor of signal-to-noise-ratio transfer (DQE) of a system gives a complete characterization of performance for energy integrating (and pure photon counting) systems, it fails to characterize multibin systems since a complete description of the transfer characteristics requires specification of how the information of each energy bin is handled. The latter is in turn dependent on the imaging case at hand which shows that there is no such thing as an imaging case independent system DQE for photon counting multibin systems. We also suggest how this issue could be resolved.

LEARNING OUTCOMES
This course will enable you to:
• describe the fundamental operating principles of photon counting detectors for spectral x-ray imaging
• distinguish between the proposed detector materials in terms of their main physical limitations/challenges to high-rate energy resolved photon counting
• list essential requirements on read-out electronics and predict effect on image quality if not fulfilled
• explain the physical origin of pile-up and separate between the effects of decreased energy resolution and loss of counts
• explain the physical origins of cross-talk and how it degrades performance, both in terms of resolution and noise
• compute optimal weights for the energy bins
• illustrate how poor choice of weights results in inferior image quality
• perform material basis decomposition and explain why noise in decomposed images is a poor figure-of-merit
• distinguish between system DQE and task dependent DQE and suggest solutions to allow comparison at system level between multibin energy resolved systems and other solutions

INTENDED AUDIENCE
Scientists, engineers, or managers who wish to learn more about basic strengths and challenges of photon counting detectors for spectral x-ray imaging, how the data is treated and how performance can be quantified.

INSTRUCTOR
Mats Danielsson has been developing photon counting x-ray detectors for medical imaging for 15 years and his research has resulted in detector systems in worldwide clinical use. He received his Ph.D. in experimental physics in 1996 based on work at CERN, Geneva and later did his postdoc at Lawrence Berkeley National Laboratory. In 2006 he was appointed Professor at KTH Royal Institute of Technology in Stockholm, Sweden, where he heads the physics of medical imaging research group. Dr. Danielsson is a lifetime member of SPIE.

Martin Sjölin has worked with the development of photon-counting spectral x-ray detectors since 2011. He has worked on several topics related to photon-counting spectral detectors, including: energy calibration, geometric calibration, count-rate performance, sampling and digital data compression. Martin received his PhD from KTH Royal Institute of Technology, Sweden, in 2016 with the thesis “Methods of image acquisition and calibration for x-ray computed tomography”. His current research is focused on the design and development of spectral photon-counting detectors suitable for clinical CT.

Modern Diagnostic X-ray Sources

SC1183 • Course Level: Introductory • CEU: 0.4
$430 SPIE Members • $222 SPIE Student Members
$480 Non-Members USD
Sunday 1:30 pm to 5:30 pm

During recent decades, in particular since the advent of computed tomography and the increasing use of interventional X-ray systems, progress in the development of modern diagnostic X-ray sources has been tremendous. X-ray scientists and clinicians may want to improve their background knowledge about technology, application, features, potential hazards and diagnostic opportunities in practice.

Medical physicists are often struggling with unexpected side effects. This lecture will provide a sound basis for understanding the physics of production of “clinical” X-rays for diagnostics and briefly touch...
therapeutic use. It will treat functional principles of X-ray sources including high voltage supply. Design aspects, special features, radiation protection, and modern performance metric, manufacturing technology, and cost aspects will be discussed. Why is vacuum technology not at all outdated? Will we find the X-ray LED, compact X-ray Lasers or flat panel sources in medical imaging soon? Why do hundreds of tube types populate the market? The lecture will cover system performance aspects related to the source, material boundary conditions, and manufacturing technology. The quest for affordable healthcare demands for trade-offs between value and cost, and objective comparison of tube types. Initial costs and costs of tube replacement will be discussed as well as means to extend tube life and to save natural resources. Last but not least, the lecture may spark fascination for this species of off-the-mainstream vacuum electronics light sources.

LEARNING OUTCOMES
This course will enable you to:
- summarize the development of X-ray tubes and the use of different X-ray tubes types by their basic technology and explain pro's and con's
- describe key components of X-ray tubes like bearings, cathodes, vacuum frame, and housing
- explain methods for heat management
- recognize side-effects like vacuum discharges and off-focal radiation and identify remedies
- summarize the peculiarities of bremsstrahlung from various types of X-ray tubes
- explain the benefits of reflection targets for imaging
- predict the X-ray tube performance in an X-ray system using documented metrics
- analyze X-ray tubes by their initial and service costs in an imaging system
- predict the impact of the X-ray tube design on the clinical work-flow
- name the implemented measures for protection against hazards of ionizing radiation
- apply modern metric in the comparison and decision making process

INTENDED AUDIENCE
Medical X-ray researchers, X-ray physicists, medical physicists, radiologists, cardiologists and other surgeons with interest in X-ray diagnostics and interventional X-ray application, students of engineering, radiology and physics, X-ray system and tube developers, X-ray manufacturing staff, bodies, suppliers and personnel responsible for quality insurance, members of standardization committees, managers responsible for costs of service. Undergraduate training in engineering or science is assumed.

INSTRUCTOR
Rolf Behling has a physicist, Fellow Scientist of the Philips group and a veteran in the field of medical imaging. During his 35-year tenure in this industry, he headed departments for vacuum technology development, was responsible for international project coordination, summarization innovation, head of marketing and field support for X-ray tubes, department head for X-ray tube development, project manager, and manufacturing process physicist. The first ever game changing X-ray tube with liquid bearing was developed under his project leadership. Rolf Behling currently heads the Philips group for advanced development of X-ray tubes and X-ray generators at Philips Healthtech in Hamburg, Germany. He is a part-time lecturer at the University of Hamburg, and has contributed numerous patents and publications in the field of vacuum technology and medical imaging.

COURSE PRICE INCLUDES the text Modern Diagnostic X-Ray Sources, Technology, Manufacturing, Reliability (CRC Press, 2015) by Rolf Behling.

Methodology for Measuring Dynamic Functional Connectivity in Neuroimaging Data Analysis

This course will enable you to:
- describe and summarize statistical properties of neuroimaging data (fMRI, MEG, EEG)
- explain why methods originated from distinctive fields of science can be used to measure FC
- list and distinguish statistical reasoning and mathematical derivation of each classical measure of FC
- classify the limitations and conditions in developing each classical measure of FC
- identify the hidden assumptions in applying classical measures to Time Series of neuroimaging data
- formulate a protocol for applying dynamic measures of FC to Time Series of neuroimaging data
- explain why the proposed Phase-Locking value can achieve a real time measure of FC for MEG data
- formulate a procedure for applying Phase-Locking value to Time Series of neuroimaging data
- design experiments for measuring FC in resting status and with repeated stimulus

INTENDED AUDIENCE
This course is intended for engineers, physicists, scientists, researchers, radiologists, as well as students, who are in the field of medical imaging, neuroimaging data analysis, and brain study.

INSTRUCTOR
Tianhu Lei received his Ph.D. in System Engineering from the University of Pennsylvania. Since then, he has been with University of Maryland, the University of Pennsylvania, and University of Pittsburgh. He has more than 25 years of experience in medical imaging and image analysis research. He is the author of the book Statistics of Medical Imaging, CRC Press, 2012 which was awarded 2013 Ziegel Prize from Technometrics.

Deep Learning for Image Understanding

This course is intended for engineers, physicists, scientists, researchers, radiologists, as well as students, who are in the field of medical imaging, neuroimaging data analysis, and brain study.

INSTRUCTOR
Tianhu Lei received his Ph.D. in System Engineering from the University of Pennsylvania. Since then, he has been with University of Maryland, the University of Pennsylvania, and University of Pittsburgh. He has more than 25 years of experience in medical imaging and image analysis research. He is the author of the book Statistics of Medical Imaging, CRC Press, 2012 which was awarded 2013 Ziegel Prize from Technometrics.
Jupyter notebooks. The Docker containers provided are also the course documentation and are meant to be taken home for further use and research.

**LEARNING OUTCOMES**

This course will enable you to:

- identify the commonly used Deep Learning frameworks (Theano, TensorFlow, CNTK, Caffe, Torch, Lasagne, Keras) and their respective strengths
- describe the state of the art of deep learning methods in medical applications
- construct a computing pipeline using Python based infrastructure, using the above frameworks
- select suitable deep learning network architecture for a given problem and implement it
- explain and interpret learning progress using appropriate metrics
- interpret the model performance using visual analytics

**INTENDED AUDIENCE**

Students, researchers, and engineers from academia and industry, who seek to obtain practical working knowledge in deep learning.

**INSTRUCTOR**

Markus Wenzel works on machine learning methods for medical applications since 2005 and has published more than 30 conference and journal papers on the subject. He received his PhD for his work on decision support systems for breast care. At Fraunhofer MEVIS, he is a senior scientist for cognitive medical computing. He is a funded member of the Fraunhofer Society research class “Cognitive Machines” and is experienced in teaching and lecturing for academia and industry. He has acquired and led several international research projects.

Hans Meine is a senior scientist who has been using machine learning for image analysis since 2002, and focused on various medical applications at Fraunhofer MEVIS since 2011. Since early 2016, he is organizing the internal training and coaching of Fraunhofer MEVIS staff for the new methodologies in Deep Learning, and now leads the “Image and Data Analysis” competence area that incorporates both image and non-image data. Recently, his team scored top positions in the „Liver and Tumor Segmentation“ challenges at ISBI and MICCAI 2017 using Deep Learning.

**SimpleITK Jupyter Notebooks:**

**NEW Biomedical Image Analysis in Python**

**SC1236 • Course Level: Intermediate • CEU: 0.4**

$300 SPIE Members • $170 SPIE Student Members

$350 Non-Members USD

**NEW**

Sunday 1:30 pm to 5:30 pm

SimpleITK is a simplified programming interface to the algorithms and data structures of the Insight Segmentation and Registration Toolkit (ITK). It supports bindings for multiple programming languages including C++, Python, R, Java, C#, Lua, Ruby and TCL. Combining SimpleITK’s Python binding with the Jupyter notebook web application creates an environment which facilitates collaborative development of biomedical image analysis workflows.

In this course, we will use a hands-on approach utilizing Python based SimpleITK Jupyter notebooks to explore and experiment with various toolkit features. Participants will follow along using their personal laptops, enabling them to explore the effects of changes and settings not covered by the instructor. We will start by introducing the toolkit’s two basic data elements, Images and Transformations. We will then explore the various features available in the toolkit’s registration framework including: optimizer selection, the use of linear and deformable transformations, the embedded multi-resolution framework, self-calibrating optimizers and the use of callbacks for registration progress monitoring. Finally, we will show how to use SimpleITK as a tool for image preparation and data augmentation for deep learning via spatial and intensity transformations.

**LEARNING OUTCOMES**

This course will enable you to:

- describe the components that comprise the SimpleITK registration framework.
- use the SimpleITK registration framework to register their own data by selecting the appropriate components and settings.
- list all of the SimpleITK transformation types and image intensity manipulation filters.
- use SimpleITK to prepare images as input for deep learning networks, including generation of synthetic images for data augmentation.

**INTENDED AUDIENCE**

Students, researchers and engineers involved in biomedical image analysis with the need for convenient image IO, image registration and image manipulation via spatial and intensity transformations. Knowledge of the Python programming language is assumed.

**INSTRUCTOR**

Hans Johnson is an Associate Professor in the Department of Electrical and Computer Engineering, University of Iowa. He has taught university courses using SimpleITK to graduate students from various programs. He is actively involved in the development of open source software, contributing to multiple projects including BRAINSFit, 3D Slicer, ITK, and SimpleITK. He is the current president of the Insight Software Consortium. Dr. Johnson has authored over 100 peer-reviewed journal and conference papers, with his research supported by multiple NIH grants and contracts.

Bradley Lowekamp is a Computer Scientist at MSC LLC, and the Office of High Performance Computing and Communications, US National Library of Medicine. He is the lead architect and developer SimpleITK. He is actively involved in the development of open source software, contributing to multiple projects including 3D Slicer, ITK, and SimpleITK. Mr. Lowekamp’s interests include biomedical image analysis and software engineering.


As this is a hands-on course, participants will need to bring their own laptops.

Participants will be provided with the source code for all of the SimpleITK Jupyter notebooks (Python code) and the image data used in the course. These will be provided under an Apache 2.0 license.

Instructors will email people registered for this course in advance so that we can provide them with instructions on how to install the SimpleITK Jupyter notebook environment before arriving at the conference venue. For those who do not install the environment in advance, one of the instructors will help them with the installation at the beginning of the first session.

**Virtual Clinical Trials: An In-depth Tutorial**

**NEW**

**SC1239 • Course Level: Intermediate • CEU: 0.4**

$300 SPIE Members • $170 SPIE Student Members

$350 Non-Members USD

Saturday 8:30 am to 12:30 pm

In 2014, it was estimated that there were just 450 anatomic phantoms in the world. Today, based on advanced models of breast anatomy, an infinite number of models exist. As such, it is possible to simulate individuals and specific pathologies from the population of all humans with increasingly higher accuracy. This, together with advanced models of image simulation, image processing and image reconstruction, means that we can create arbitrarily large databases of simulated images. At the same time, advances in machine observer methods mean that it is possible to conduct virtual clinical trials (VCT) using the simulated images, together with simulations of medical displays, human optical perception and cognition.

The logistics of conducting VCT with thousands of patients is similar to the logistics of organizing the data from clinical trials of similar size. As such, we have developed a standards document outlining methods for conducting VCT, storing VCT results (intermediate and final), and communicating these image data and associate metadata between VCT components. In this course, we will use our experience in conducting large-scale VCT to encourage those new to the field to adopt VCT methods and to aid those already conducting VCT. The course will have applicability to VCT for designing new medical imaging equipment and methods, to use VCT data for prototyping and/or complementing the conduct of real clinical trials, and for preparing VCT data for regulatory approvals of new systems and methods.

**LEARNING OUTCOMES**

This course will enable you to:

- describe the roles and methods for conducting VCT
- identify the necessary constituent software components for conducting VCT
Courses

- name the standards relevant for conducting VCT, including DICOM, ASME, IEEE, AAPM, etc.
- construct and Design examples of VCTs to illustrate there usage
- demonstrate existing use cases
- explain the underlying statistical considerations for conducting VCT

INTENDED AUDIENCE
Clinicians, scientists, and administrators from academia, industry and government.

INSTRUCTOR
Andrew D. Maidment has 30 years of experience in breast cancer research, with specific training and expertise in development of digital x-ray detectors and 3D breast x-ray imaging. Dr. Maidment has been conducting research into VCT for nearly 20 years, has extensive grant funding in VCTs, and has published extensively in this field. As an Associate Professor in Radiology at the University of Pennsylvania, he has extensive teaching experience.

Predrag Bakic has more than 20 years experience in breast cancer research, with specific training and expertise in developing and conducting VCT. Dr. Bakic’s PhD thesis was on the topic of breast anatomy models for imaging simulation.

Bruno Barufaldi received his Ph.D. from the University of Sao Paolo in 2016. For the last 2 years, he has been active in the field of VCT, designing much of the pipeline software used in the OpenVCT suite of software.

The latest draft of the OpenVCT standard will be provided to participants. This document is open-source and does not have copyright restrictions. Instructors will quickly introduce the material to those unfamiliar with VCT. However, the majority of the material will be at the intermediate to advanced level to benefit those with VCT experience.

Writing for Publication

WS776 • Course Level: Introductory • CEU: 0.4
$60 SPIE Members • $50 Student Members
$110 Non-Members USD
Saturday 1:30 pm to 5:30 pm

This course teaches attendees the skills needed to create well-written scientific articles for publication in journals or proceedings. We discuss the structure of a paper and the roles of its various parts. You will learn the principles of good technical writing and how to avoid common pitfalls. We will discuss how to use writer’s aids, many of which are available online.

LEARNING OUTCOMES
- plan and craft well-written articles for publication
- improve the quality of your scientific writing
- edit and revise your writing for consistent style
- overcome writer’s block

INTENDED AUDIENCE
This course is intended for researchers, especially students and those in their early career, who want to improve their skills in writing scientific articles. The course will be taught at a basic level, but should also benefit those with some experience in technical writing. Participants should be proficient in English.

INSTRUCTOR
Kenneth Hanson has published over 160 papers and edited numerous proceedings. He was chair of the Image Processing Conference for six years and chair of the Medical Imaging Symposium for three.

Attendee testimonial:
Great course, everything is clearly explained, the instructor was (very) open for questions/suggestions. The course notes are very clear and I will definitely use them as guideline while writing my next paper!
General Information

Registration

ONSITE REGISTRATION AND BADGE PICK-UP HOURS
Texan Foyer, 4th Floor
Saturday February 10 .......................... 7:15 am to 4:00 pm
Sunday February 11 .......................... 7:15 am to 4:00 pm
Monday February 12 .......................... 7:30 am to 4:00 pm
Tuesday February 13 .......................... 7:30 am to 4:00 pm
Wednesday February 14 ........................ 7:30 am to 4:00 pm
Thursday February 15 ........................ 7:30 am to 1:30 pm

CONFERENCE REGISTRATION
Includes admission to all conference sessions, plenaries, panels, poster sessions, coffee breaks, and a choice of online proceedings.

COURSE AND WORKSHOP REGISTRATION
Courses and workshops are priced separately. Course-only registration includes your selected course(s), course notes, and coffee breaks. Course prices include applicable taxes. Onsite, please go to Course Desk after you pick up your badge.

EARLY REGISTRATION PRICING AND DATES
Conference registration prices increase by US$150 (Students, $75) and course prices increase $75 after 26 January 2018. The online form will automatically display the increased prices.

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 60% 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.

PRESS REGISTRATION
For credentialed press and media representatives only. Please email contact information, title, and organization to media@spie.org.

SPIE CASHIER
Registration Area
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.

RECEIPT 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. 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 2 February 2018; 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.

Author / Presenter Information

SPEAKER CHECK-IN AND PRESENTATION UPLOAD
David Mitzner Room, 4th Floor
Sunday through Thursday .......................... 7:30 am to 5:00 pm

All presenters must stop by Speaker Check-in to upload their file(s) at least two hours before their scheduled talk. Authors are not able to present using their own devices. All conference rooms have a laptop, projector, screen, lapel microphone, and laser pointer.

POSTER SETUP INSTRUCTIONS
Texan Ballroom Salon D, 4th Floor

Sunday/Monday Poster Session
Author Setup Time .......................... Sunday Noon to 1:30 pm
Authors Remove Posters .......................... Monday 7 pm

Tuesday/Wednesday Poster Session
Author Setup Time .......................... Tuesday 9:30 to 11 am
Authors Remove Posters .......................... Wednesday 7 pm

Paper numbers will be placed on the poster boards in numerical order; please find your paper number and put up your poster in the designated space.

A poster author or coauthor is required to stand by the poster during the scheduled interactive poster session to answer questions from attendees.

Presenters who have not placed their poster(s) on their assigned board by 30 minutes prior to the session on the day of their presentation will be considered a “no show” and their manuscript will not be published.

Presenters must remove their posters at the end of 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.

SAVE MONEY—Register before 26 January

Tel: +1 360 676 3290  •  help@spie.org  •  #SPIEMedicalImaging
**General Information**

**Onsite Services**

**INTERNET ACCESS**
Complimentary wireless access available; instructions will be posted onsite.

**SPIE CONFERENCE AND EXHIBITION APP**
Search and browse the program, special events, participants, exhibitors, courses, and more. Free Conference App available for iPhone and Android phones.

**SPIE BOOKSTORE**
Texan Foyer, 4th Floor
Stop by the SPIE Bookstore to browse the latest SPIE Press Books, proceedings, and educational materials. While there, get a t-shirt or educational toy to bring home to the family.

**SPIE EDUCATION SERVICES**
Location
Browse course offerings or learn more about SPIE courses available in portable formats such as Online and customized, In-company courses.

**SPIE LUGGAGE & COAT CHECK**
Complimentary luggage, package, and coat storage are available at the hotel front desk. Please note hours; no late pickup available.

**CHILD CARE SERVICES**
Mom's Best Friend – Hotel Child Care
https://momsbestfriend.com/houston/hotel-babysitter
281.578.2584 or 713.776.2669
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: +1 346 888 2941.

**LOST AND FOUND**
Registration Desk, Texan Foyer 4th Floor
Hours
Found items will be kept at the Registration Desk until 1 pm on Thursday and then turned over to Marriott Marquis security. At the end of the meeting, all found items will be turned over to Marriott Marquis Houston Security.

**Food and Beverage Services**

**COFFEE BREAKS**
Texan Foyer, 4th Floor
Complimentary coffee will be served twice daily, at 10:00 am and 3:00 pm. Check individual conference listings for exact times and locations.

**FOOD & REFRESHMENTS FOR PURCHASE**
Location and hours TBD
Hot and cold snacks, hot entrees, salads, and pastries are available for purchase. Cash and credit cards accepted.

**SPIE-HOSTED LUNCHES**
Texan Ballroom Salon F, 4th Floor
Sunday through Thursday .......................... 12:10 to 12:50 pm
SPIE-hosted lunches will be included in registration packets for full-conference registrants including Students Sunday through Thursday.
All attendees need to make their own lunch arrangements on Saturday.

**Hotel**
Reserve your hotel room in SPIE contracted hotels for discounted rates. Attendees receive discounted convention rates by reserving their hotel room through the official housing reservation system for SPIE Medical Imaging. Housing opens on Oct 18th, visit the Medical Imaging Hotel webpage to make your online reservations.

**WARNING: UNOFFICIAL HOUSING SOLICITATIONS**
SPIE has arranged special discounted hotel rates for SPIE conference attendees.
Use the SPIE Official Housing Vendor to book your room
To receive special hotel rates for this meeting, you must use the SPIE Official Housing Vendor. SPIE strongly recommends you DO NOT book housing from any company that contacts you via phone or email.
• The reservation system that SPIE uses for this event is available only via the Hotel page on the event website.
• SPIE Official Housing Vendors use an Official SPIE Contractor logo to verify they are authorized by SPIE
• Our housing vendors DO NOT reach out to you with solicitations.
• Our housing vendors may follow up with you about housing once you have begun booking via our website, but NOT as an initial solicitation.
• SPIE cannot be liable for any claims made by unofficial entities or for any damages suffered by you if you use any vendor or service that is not an SPIE Official Housing Vendor.
SPIE Medical Imaging 2018 is being held at:

**Marriott Marquis Houston**

1777 Walker Street
Houston, TX 77010

As the newest addition to the scenic Houston skyline, Marriott Marquis Houston captures the bold spirit of Texas while embracing the best of Southern hospitality, all with stunning views of Downtown Houston. Enjoy quick access to George R. Brown Convention Center via our sky bridge as well access to nearby attractions including Minute Maid Park, Toyota Center and BBVA Compass Stadium.

The hotel also features a Texas-shaped lazy river, a heated infinity pool, and the signature High Dive bar - all on the rooftop overlooking Discovery Green Park. Xochi by Chef Hugo Ortega, Cueva wine bar and Texas T cafe.

### Visiting Texas

Texas is a large state located in the southern U.S. with deserts, pine forest and the Rio Grande, a river that forms its border with Mexico. The population is 26.9 million (2014) and is home to over 45 colleges and universities. Austin, the capital of the state, is known for its eclectic music scene and LBJ Presidential Library.

Houston is Texas' largest city, extending to Galveston Bay. It’s closely linked with the Space Center Houston, the coastal visitor center at NASA’s astronaut training and flight control complex. The city’s relatively compact Downtown includes the Theater District, home to the renowned Houston Grand Opera, and the Historic District, with 19th-century architecture and upscale restaurants.

Houston is also known for its medical research opportunities. This area offers one of the highest densities of clinical facilities for patient care, basic science, and translational research and continues to be a hub for medical advancement and care thanks to the proximity of the Texas Medical Center, MD Anderson Cancer Center, Rice University and the University of Houston; top level research in one location and an opportunity to network with like-minded leaders gathering in one city.

- Visiting Houston – Restaurants, Shopping, Maps and more!
- Food and Dining
- Things to See and Do
Visit the Medical Imaging Travel page for links.

### Airport Information

- **George Bush Intercontinental Airport** - (IAH) is located approximately 20 miles SW of the hotel.
- **William P Hobby Airport** - (HOU) is located approximately 9 miles NW of the hotel.
- **Ellington Field** - (EFD) is located approximately 17.5 miles NW of the hotel.

### Car Rental

Hertz Car Rental is the selected official car rental agency for this Event. To reserve a car, identify yourself as a Medical Imaging conference attendee using the Hertz Meeting Code CV# 029B0023. Discount rates apply for rentals up to one week prior through one week after the conference dates. Note: When booking from International Hertz locations, the CV # must be quoted with the letters CV before the number, i.e. CV029B0023. To rent online: www.hertz.com/rentacar/reservation

- 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 the nearest Hertz Reservation Center or travel agent.
- Outside of these areas call 1-405-749-4434.

### Visa Information

If you need a travel visa, begin the visa application process now. Strict security requirements may cause delays in visa processing. It is strongly encouraged travelers to apply for their visas as early as possible (at least 3 to 4 months before the visa is needed).

Individuals requiring letters of invitation to obtain travel visas to present their papers may access information and the form on the Visa Information and Invitation Requests page online.
SPIE Event Policies

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.

Attendee Registration and Admission Policy
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 to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, 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 prohibit entry or to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, whose conduct is not in keeping with the character and purpose of the event. With the 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 to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, whose conduct is not in keeping with the character and purpose of the event.

Payment Policy
Registrations must be fully paid before access to the conference is allowed. SPIE accepts VISA, MasterCard, American Express, Discover, Diner’s Club, checks and wire transfers. Onsite registrations can also be paid with cash.

SPIE Safe Meeting and Misconduct Policy
SPIE is a professional, not-for-profit society committed to providing valuable and safe conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members, meeting attendees, staff, and contractors. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violations will be addressed promptly and seriously. Consequences up to and including expulsion from the event as appropriate may be implemented immediately.

The SPIE anti-harassment policy can be found at http://spie.org/policy

Reporting of Unethical or Inappropriate Behavior
Onsite at an SPIE meeting, contact any SPIE Staff with concerns or questions for thorough follow-up. If you feel in immediate danger, please dial the local emergency number for police intervention.

SPIE has established a confidential reporting system for staff and all meetings participants to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phoning toll-free to +1-888-818-6898 from within the United States and Canada, or online at www.SPIE.ethicspoint.com and may be made anonymously.

Identification Requirement Policy
To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials.

Individuals are not allowed to pick up badges for other attendees. 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.

Access to Conference Events / Access for Children Younger than 18
All conference technical and networking events require a badge for admission. Registered attendees may bring children with them as long as they have been issued a badge. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

Exhibition Hall Access / Access for Children Younger than 18
Everyone who attends the exhibition must be registered and have a badge. Badges for children are free and available onsite at the registration desk. Children under 14 years of age must be accompanied by an adult at all times. Guardians are asked to help maintain a professional, disturbance-free exhibition environment. Children under 18 are not allowed in the exhibition area during exhibition move-in and move-out.

Unauthorized Solicitation Policy
Unauthorized solicitation in the Exhibition Hall is prohibited. Any nonexhibiting 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.

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 materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In or SPIE Registration. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media. Refusal to comply with such requests is grounds for expulsion from the event.

Exhibition Hall: Recordings of any kind are prohibited without 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. Refusal to comply with such requests is grounds for expulsion from the event.
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