CHAPTER ANNUAL REPORT

2017/2018

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Chapter Officers

Chapter officers have been elected during the Chapter meeting of 6th November 2017. They officially established during the workshop “Photonics as a key enabling technology”, on 17th November 2017.

Advisor of the chapter: Lorenzo Pavesi

Co-advisor of the chapter: Massimo Borghi

President: Claudio Castellan

Secretary: Sara Piccione

Treasurer: Alessandro Trenti

Past-president: Tatevik Chalyan

Vice-president: Stefano Signorini
Since April 2018, Federico Caporaletti has been elected as the new treasurer of the chapter.

New elections have been held on 30th October 2018. The new officers have been formally designated during the meeting “Photonics as a key enabling technology”, on 15th November 2018.

President: Sara Piccione

Vice-president: Chiara Vecchi

Secretary: Davide Bazzanella

Treasurer: Nicolò Leone
The members of the chapter after the chapter meeting that elected the new officers.
Chapter Members

In November 2018, the chapter has 27 student members, listed here.

- Ivan Amelio
- Davide Bazzanella
- Maddalena Bertolla
- Stefano Biasi
- Alessio Bucciarelli
- Federico Caporaletti
- Andrea Capuano
- Claudio Castellan
- Francesco Dallari
- Andrea Ficorella
- Riccardo Franchi
- Nicolò Leone
- Damiano Lodi
- Manuel Alessandro Medina
- Sayed Hossein Mirdamadi Khouza
- Matteo Pasini
- Sara Piccione
- Gioele Piccoli
- Akshara Preethy Byju
- Pietro Ricci
- Consuelo Ripoll
- Mihai Rotariu
- Stefano Signorini
- Stefano Tondini
- Chiara Vecchi
- Clara Zaccaria
- Mirko Zanon

The chapter has also 2 alumni members.

- Tatevik Chalyan
- Milad Niroumand Jadidi
Nanoscience Laboratory KickOff Meeting 2017

SPIE Student Chapter of the University of Trento was a co-organizer for Kick Off Meeting 2017. The annual meeting of NanoScience Laboratory that was held on 24th of November, 2017 at the Department of Physics. The majority of the chapter members are from NanoScience Laboratory. The meeting aims at making the point of the research activities and paving the way for the future research programs. At the end of each year, we assemble for a day of seminars, when all group members show their activities and results achieved during the preceding year. Usually the meeting hosts two invited speakers from different institutions as well as from different departments of the University of Trento. Students from Bachelor and Master Courses attend the meeting to get to know the research projects of photonics group at the university. The day is full of nice presentations, active discussions, questions, and answers.

More than 30 attendees participated in the 2017 Kick Off Meeting. Two speakers from collaborating institutions and four research teams, formed by the scientists of Nanoscience Laboratory, presented the state of the art of the research in nanoscience and photonics.

Invited speakers were:

- Prof. Andrea Massa (University of Trento) with a talk “ELEDIA Research Center - Research Trends, Current Activities, and Future Applications”
- Prof. Marco Canossa (University of Trento) with a talk “Long-Term Memory Retrieval Requires Synaptic Glia for Protein Recycling”.

Four teams with four main research fields of NanoScience Laboratory are in the following (SPIE Chapter members are underlined in the list).

- The nano-materials team (Marina Scarpa, Paolo Bettotti, Cecilia Maestri, Chiara Piotto)
- The integrated quantum Photonics team (Stefano Biasi, Massimo Borghi, Alessandro Trenti)
- The nonlinear silicon Photonics team (Claudio Castellan, Pierre Guilleme, Stefano Signorini, Chiara Vecchi)
- The Applied silicon Photonics team (Davide Bazzanella, Tatevik Chalyan, Giorgio Fontana, Sara Piccione, Stefano Tondini)
OPTICS-2018

Introduction
SPIE Student Chapter of the University of Trento in collaboration with 14 other European SPIE and OSA Student Chapters hosted the 6th International Symposium on Optics and its Applications (OPTICS 2018) on February 17-20, 2018 in Trento, Italy.

The goal of this symposium was to bring together experienced and young scientists from various countries working in the field of optics, and to provide a perfect setting for their discussions of the most recent developments in that area. The Symposium provided a good opportunity for contacts and information exchange between experts and students.

73 participants from 14 European countries attended the symposium. 77% of participants (56 over 73) were SPIE members.

14 invited speakers from 12 European Research Institutions presented their talks on different research topics. 3 speakers attended the symposium thanks to the SPIE Visiting Lecturer Program. They are Professors Michael Berry invited by the Univ. of Trento Chapter, David Andrews invited by FEMTO-ST chapter and Mauro Pereira invited by Napoli chapter.

During the Symposium, a special section was dedicated to the professional development lectures from the academy and industry points of view. Students had a chance to present their research with oral presentations as well as posters. Co-organizer student chapters presented their activities parallel to the scientific poster session. 18 student oral talks and 11 posters were presented.

Symposium covered various topics in optics, as:

- Silicon photonics
- Strong field optics
- Optical properties of nanostructures
- Quantum optics
- Singular optics and its applications
- Laser spectroscopy
- Nonlinear & ultrafast optics
- Photonics & fiber optics
- Mathematical methods in optics
Organizers
Directors of the symposium:

- Lorenzo Pavesi - NanoScience Laboratory, Department of Physics, University of Trento, Italy
- Narine Gevorgyan – Department of General Physics and Quantum Nanostructures, Institute of Mathematics and High Technologies, Russian-Armenian (Slavonic) University, Armenia

Head of the project:

- Tatevik Chalyan - NanoScience Laboratory, Department of Physics, University of Trento, Italy

Coordinator:

- Tatsiana Egorova – NanoScience Laboratory, Department of Physics, University of Trento, Italy

Scientific Committee:

- Claudio Castellan – NanoScience Laboratory, Department of Physics, University of Trento, Italy
- Sara Piccione – NanoScience Laboratory, Department of Physics, University of Trento, Italy
- Stefano Signorini – NanoScience Laboratory, Department of Physics, University of Trento, Italy

Co-organizer student chapters, with their official representatives for the symposium are:

- Bordeaux Chapter, France – Nicolas Valero
- FEMTO-ST Chapter, France – Florent Behague
- Institute of Radiophysics and Electronics Chapter, Ukraine – Nataliia Mysko-Krutik
- Optics Students Karlsruhe (OSKar) Chapter, Germany – Badrinath Vadakkapattu
- Russian-Armenian Univ. and National Academy of Sciences Chapter, Armenia – Astghik Kuzanyan
- Saint Petersburg Electrotechnical Univ. Chapter, Russia – Ardi Rahman
- Univ. degli Studi di Napoli Federico II Chapter, Italy – Antonio Iuliano
- Univ. do Porto Chapter, Portugal – Vítor Amorim
- Univ. of Latvia Chapter, Latvia – Brigita Zutere
- Univ. of Rome La Sapienza Chapter, Italy – Andrea Geraldi
- Univ. of Southampton Chapter, UK – Angeles Camacho Rosales
- Vrije Univ. Brussel Chapter, Belgium – Agnieszka Gierej
- Wroclaw Univ. of Science and Technology OSA Student Chapter, Poland – Mateusz Szatkowski
- Yerevan State Univ. Chapter, Armenia – Vardazar Kotanjyan

Accommodation Grant
All co-organizer chapters received at least one accommodation grant for the chapter member who presented chapter activities during the poster session. The grant covered 4 nights (17.02-21.02) at the hotel in Trento/Povo or the equivalent amount of money, if the participants preferred to stay in other hotels. In addition to the grants for the chapter representatives, more accommodation grants were available. The applicants were notified by the end of January.

Student accommodation grants were covered by symposium co-sponsors Thorlabs and OptoSigma. 24 students have received accommodation grants. 14 over 24 were chapter official representatives.
**Location**

The symposium took place in Sala "Luigi Stringa" at Fondazione Bruno Kessler (FBK) located in Povo, via Sommarive, 18 - about three kilometers away from the city of Trento, in a mountainside of Marzola. Sala Stringa provided by symposium co-sponsor FBK, contains 135 seats.

The social dinner was organized in MUSE, Corso del Lavoro e della Scienza 3, very close to the Trento city center, just 10 minutes away from Piazza del Duomo.

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**OPTICS 2018 Sponsors:**

- SPIE
- UNIVERSITY OF TRENTO - Italy
  Department of Physics
- Fondazione Bruno Kessler
- BLM GROUP
- THORLABS
- OptoSigma
- LASERoptronic
- Crisel Instruments

Gadgets for the participants of the symposium were provided by sponsors. A special gadget with symposium logo has been ordered and was paid from the FOCUS grant.

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Gadgets for participants
Symposium was promoted at the University of Trento and Fondazione Bruno Kessler by conference info posters as well as by sharing the conference web page link (http://event.unitn.it/optics2018) with internal mailing lists. An article dedicated to international event in Trento was published in local newspaper on Monday, 19 February.

![University of Trento](image1.png) ![“TRENTINO” newspaper](image2.png)

**Program**

**17.02.2018**

15.00-16.00 Registration
16.00-16.20 Opening
16.20-18.00 Professional Development Lectures: From Academy to Industry

16.20-17.00 Maurizio Sbetti: *Careers for physicists in photonics-enabled industrial companies: a personal experience*
ADIGE S.P.A., BLM GROUP, Levico Terme, Italy

17.00-17.30 Mattia Mancinelli: *The line between Academy and Industry*
Research Programs, SM Optics s.r.l., Vimercate, Italy

17.30-17.50 Maddalena Bertolla: *Industry meets academic research: the challenge of sensing an interlacing yarn*
Department of Physics, University of Trento & Aquafil Spa, Arco, Italy

17.50-18.00 Discussions: Round Table
18.00-19.00 Welcome Reception

**18.02.2018**

9.00-9.45 David Andrews: *Photons and Nanoscale Forces*
University of East Anglia, Norwich, United Kingdom

9.45-10.30 Mher Ghulinyan: *Integrated resonators optics*
Functional Materials and Photonics Structures, Fondazione Bruno Kessler, Povo, Italy

10.30-11.00 Coffee Break
11.00–11.45 Fernando Ramiro Manzano: *Forward and backward photonic routes through integrated devices*
Centro de Tecnologías Físicas, Instituto de Tecnología Química (CSIC-UPV), Valencia, Spain

**11.45–13.00 Student talks**

11.45–12.00 Andrea Ficorella: *Characterization of Optical Crosstalk in Vertically-integrated SPAD Arrays*

12.00–12.15 Astghik Kuzanyan: *Ultrafast detection of IR photons by thermoelectric single-photon detector at the telecommunication wavelength*

12.15–12.30 Angeles Camacho: *Additive manufacturing towards fabrication of next generation of optical fibres*

12.30–12.45 Vitor A. Amorim: *Optical and microfluidic monolithic devices fabricated by femtosecond laser micromachining*

12.45–13.00 Benoît Morel: *Nondiffracting femtosecond pulses and laser ablation*

13.00–14.30 Lunch Break

14.30–15.15 Michael Berry: *Superoscillations (faster than Fourier) (p) revisited: vorticulture, noise, fractals*
University of Bristol, Bristol, United Kingdom

15.15–16.00 Artur Aleksanyan: *Self-engineered approaches towards optical vortex coronagraphy*
Laboratoire Photonique Numérique et Nanosciences (LP2N), Institut d’Optique d’Aquitaine, Talence, France

16.00–16.30 Coffee Break

**16.30–17.30 Student talks**

16.30–16.45 Mateusz Szatkowski: *Correction of spatial light modulator – optical vortex dynamics criterion*

16.45–17.00 Arevik Amiryan: *Investigation of Faraday Rotation effect using pressure-controlled thickness nano-cell*

17.00–17.15 Vardazar Kotanjyan: *Generation of surface electromagnetic waves propagating along cylindrical interface between two homogeneous media*

17.15–17.30 Emmanuel Klinger: *Giant Magnetic Circular Dichroism exhibited using Derivative of Selective Reflection spectroscopy*

18.30–22.00 MUSE Guide Tour/Social Dinner

**19.02.2018**

9.00–9.45 David Blaschke: *Dynamical Schwinger effect in strong, time-dependent external fields*
University of Wroclaw, Poland; JINR Dubna, Russia; MEPhI, Russia

9.45–10.30 Iacopo Carusotto: *Quantum fluids of light*
INO-CNR BEC Center, Povo, Italy

10.30–11.00 Coffee Break
11.00-11.45 Giorgio Colangelo: *Simultaneous measurements of non-commuting observables in atomic interferometry*

ICFO - The Institute of Photonic Sciences The Barcelona Institute of Science and Technology, Barcelona, Spain

11.45-12.30 Student talks

11.45-12.00 Claudio Castellan: *Second Harmonic Generation in strained silicon*

12.00-12.15 Stefano Signorini: *Wavelength conversion and generation via intermodal four wave mixing in silicon waveguides*

12.15-12.30 Andrea Geraldi: *Stimulated Emission Tomography of Hyperentangled States*

12.30-12.40 Group Photo

12.40-14.00 Lunch Break

14.00-14.45 Michael Berry: *Magic mirrors and magic windows (department colloquium)*

University of Bristol, Bristol, United Kingdom

14.45-15.30 Massimo Borghi: *Integrated quantum photonics*

Centre for Quantum Photonics, University of Bristol, Bristol, United Kingdom

15.30-16.00 Coffee Break

16.00-18.00 Poster Session and Exhibition

**Poster Presentations**

Federico Caporaletti: *Nuclear $\gamma$-resonance time-domain interferometry as probe of slow dynamics in condensed matter*

Astghik Chalyan: *Automatic alignment of photonic components of massive optical switch to ITU channels*

Tatyana Gaydamak: *Easy-plane ferroborates. Magnetopiezoelectric effects*

Marta Lange: *Portable optical device for diagnostics of skin malformations*

Sheler Maktoobi: *Diffractive Coupling for Optical Neural Network*

Sara Piccione: *Mid-Infrared coincidence measurements on twin photons at room temperature*

Ardi Rahma: *Design of Spin Coater and Characterization of Spin Coating Process*

Consuelo Ripoll: *Nanosensor platform for metabolic profiling of breast cancer*

Lusine Tsarukyan: *Nondestructive readout of Bessel-like photonic structures in an external magnetic field*

Chiara Vecchi: *Second-Harmonic Generation in stressed Silicon microring resonators for octave spanning optical frequency comb generation*

Mirko Zanon: *Towards an all-optical optogenetic activation and readout system for insect brains*

20.02.2018
9.00–9.45 Lorenzo Pavesi: Classical and Quantum integrated Silicon Photonics NanoScience Laboratory, Department of Physics, University of Trento, Povo, Italy

9.45–10.30 Alessandro Tredicucci: How to control light with light: perfect absorption and transparency through interference
Dipartimento di Fisica, University of Pisa, Pisa, Italy

10.30–11.00 Coffee Break

11.00–11.45 Mauro F. Pereira: GHz–THz–Mid Infrared Devices: From Fundamental Theory and Simulations to Real World Applications
Department of Condensed Matter Theory, Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic

11.45–13.00 Student talks

11.45–12.00 Alessandro Ruocco: Self focusing of a laser beam into a plasma

12.00–12.15 Nicolas Valero: Novel cumulative photo-disruptive laser-skin interaction regime in dermatology: application to laser tattoo removal

12.15–12.30 Tatevik Chalyan: Integrated Microring Resonators for molecular interaction analyses

12.30–12.45 Nataliia Mysko-Krutik: The orientational order and morphology of N₂–CH₄ solid solutions. Cluster approach

12.45–13.00 Milad Niroumand: Multispectral Remote Sensing of Shallow Rivers

13.00–14.30 Lunch Break

14.30–15.30 Lab Tour

15.30–17.00 Closing Ceremony

Day 1 – 17.02.2018
Number of attendees – 52

The welcome and opening ceremony was done by the Head of Project Tatevik Chalyan. A short presentation regarding to OPTICS symposium series and the brief program for OPTICS 2018 was presented. A nice surprise was the video greetings from Andrea Armani and SPIE friends Meagan All, Tasha Chicovsky and Dirk Fabian. It was an excellent start for SPIE FOCUS conference.

After welcoming participants, we moved on to the session dedicated to professional development program merged with career development lectures. The chair of the session was Stefano Signorini,
the Vice-President of the University of Trento student chapter. First lecture was by Dr. Maurizio Sbetti presenting Adige, BLM Group, the company focused on high power laser manufacturing. He manages the R&D team of Adige, with a personal specific interest in the laser technology evolution. His lecture contained elements of personal experience of reaching the position in company as well as the one who hires employees.

The second lecture was done by Dr. Mattia Mancinelli, who previously worked as a researcher at the University of Trento about 8 years and recently moved to industry. He told a difference between two structures and advantages and disadvantages of both academy and industry. For students attending his lecture was very important to hear an opinion of excellent researcher about choice after graduation.

And the last presentation was done by Maddalena Bertolla, who is currently a PhD student at the University of Trento and does her PhD in collaboration between university and company. Questions related to the support from the company supervisors, the equilibrium between two different approaches have been risen.

All three presentations showed the link between academy and industry and tried to help students to decide whether they want to continue their study or to move to industry.

Day was concluded with the first group photo and welcome reception where the discussions were successfully continued.
Day 2 - 18.02.2018

Number of attendees - 61

Morning session chaired by University of Trento Student chapter Secretary Sara Piccione started at 9.00 a.m. The day opened Professor David Andrews, who was invited to OPTICS 2018 by FEMTO-ST chapter using their Visiting Lecturer grant. Dr. Mher Ghulinyan continued the session. After a short coffee break next speaker was Dr. Fernando Ramiro Manzano. Morning session was concluded with 5 student talks each 15 minutes duration, including questions. After each presentation to both invited speakers and students were addressed questions and discussions from the audience.

Sunday lunch was offered by the symposium and covered from the FOCUS grant. It included 3 meals, desert and coffee.
After lunch, the afternoon session started at 14.00 and was chaired by the President of the University of Trento chapter Claudio Castellan. Professor Michael Berry, who was the visiting lecturer invited by the Univ. of Trento chapter, started the session. Dr. Artur Aleksanyan presented next. After 30 minutes coffee break the stage was given to the students. 4 student talks were presented and discussed.
The second day of the symposium was concluded with a social event that included a guide visit to MUSE of Science of Trento and a social dinner organized for 70 people. Co-Director and Advisor of the University of Trento Student chapter Prof. Lorenzo Pavesi welcomed our guests.
Day 3 - 19.02.2018

Number of attendees - 110

Morning session started at 9.00 a.m. and chaired by Claudio Castellan, hosted Professors David Blaschke and Iacopo Carusoto. Both lectures were pure theoretical. After coffee break, the second
morning session was chaired by Tatevik Chalyan. Next speaker was Dr. Giorgio Colangelo. 3 students talks closed the session.

Next, the symposium official group photo was taken.

Credits: Giuseppe Froner, University of Trento

Lunch was partially covered by the activity grant of the UniTN student chapter.

At 14.00 a.m. all participants of OPTICS 2018 and members of the Department of Physics gather together for the beautiful talk from Professor Michael Berry, who presented an amazing world of magic mirrors and magic windows. Symposium talk merged with department colloquium hosted almost 110 attendees. Numerous questions and nice discussions in a highest-level scientific atmosphere gave the chance also to young scientists to hear advises of the celebrity as Sir. Michael Berry. He thanked SPIE for supporting his travel to Trento. The chair of the colloquium was Professor Bruno Giacomazzo from the Department of Physics.
After such an amazing talk, we moved on to the next speaker. Dr. Massimo Borghi, the UniTN chapter Co-Adviser, concluded the session with another very nice presentation. Coffee break followed then.

After coffee break, we shifted to the Open Space of FBK, where the poster session took place. 15 chapters presented their activities and shared with new ideas and collaborations. While the 11 scientific posters were discussed and judged by our invited speakers.
The last day of the symposium chaired by Stefano Signorini opened Professor Lorenzo Pavesi. He briefly presented the University of Trento and the research projects at the NanoScience Laboratory. Professor Alessandro Tredicucci continued the morning session. As every day, at 10.30 a.m. a coffee break gave an opportunity to refresh and come back to the last session of the symposium. Professor Mauro Pereira, invited to OPTICS 2018 by the Napoli student chapter, presented his recent research activities. After him, the stage was left to the students. 5 student talks related to the applications of optics and photonics were presented. Questions and friendly discussions accompanied the last session as well.
After lunch, break participants were divided into two groups for the lab tour. Both groups visited a clean room of FBK and laboratories of NanoScience Laboratory.
After lab tour, we reached the logical end of the symposium and gather once more for the closing ceremony. All participants got their certificates. Directors of OPTICS 2018 Lorenzo Pavesi and Narine Gevorgyan said their greetings to all participants and organizers. Tatevik Chalyan, Claudio Castellan and Stefano Signorini in behalf of all organizers awarded winners of the Best Oral Presentation and Best Poster Presentation. Best Oral Presentation was awarded Nicolas Velero from Centre Lasers Intenses et Applications, Université de Bordeaux-CNRS-CEA with a presentation titled “Novel cumulative photo-disruptive laser-skin interaction regime in dermatology: application to laser tattoo removal”, and Best Poster Presentation was awarded Sheler Maktoobi from FEMTO-ST, with a poster titled “Diffractive Coupling for Optical Neural Network”. Both winners were selected by the votes of our invited speakers, who were present during the entire symposium and were giving their votes for each presentation. The prize for both winners was the same and it consisted of certificates and typical Trentino food and wine.
After the official closing of the 6th International Symposium on Optics and its Applications (OPTICS 2018) traditional cakes with SPIE and OPTICS logos were waiting for us. Awesome cakes and good wine made a beautiful atmosphere for congratulations to winners, to all participants and in particular, to the organizers for the most international SPIE FOCUS conference that reached such a great success and gave a birth to new friendships and collaborations.
TIQIT

The Trento-Innsbruck Quantum Information Tour (http://ai-sf.it/tiqit18/index.html) is an event organised by AISF Trento (Local Committee of the Italian Association of Physics Students AISF) for all the members of the association. It brings 40 students to visit some of the most advanced research facilities in Trento and Innsbruck and is conceived to showcase research mainly in the field of Quantum Information.

The second edition of TIQIT took place from the 10th to the 13th April 2018. During the second day of the event, the chapter members Claudio Castellan, Stefano Signorini and Stefano Biasi gave presentations on the activities carried out by the Nanoscience Laboratory of the University of Trento on topics related to quantum optics technologies. During the afternoon, visits to the laboratories of the University of Trento were organized.
Students talks to students
During the workshop "Student talk to students" the students of the Nanoscience Laboratory present talks on their activities. The workshop is organized for master students, and aims to help them in the choice of the activities available for their master thesis.

During this year’s edition of the workshop, the chapter members Matteo Pasini, Gioele Piccoli, Nicolò Leone, Chiara Vecchi, Manuel Alessandro Medina, Davide Bazzanella and Pietro Ricci presented their work. The workshop was organized on 30th May 2018, and the program was the following.

- 14.30 – 14.50 Matteo Pasini - One-Photon Entanglement for Quantum Information and Cryptography
- 14.50 – 15.10 Gioele Piccoli - Engineering high quality integrated micro-resonators
- 15.10 – 15.30 Nicolò Leone - Fluid of light: are photons like cold atoms?
- 15.30 – 15.50 Chiara Vecchi - The mystery of Second Harmonic Generation in Strain Silicon Waveguides
- 15.50 – 16.10 Manuel Alessandro Medina - Integrated silicon photonics for optical communication
- 16.10 – 16.30 Davide Bazzanella - Neuromorphic photonics: exploiting light for machine learning
Chiara Vecchi

Manuel Alessandro Medina

Davide Bazzanella

Pietro Ricci
**Photonics as a key enabling technology**

On 15th November 2018 we organized the second edition of the workshop “Photonics As a Key Enabling Technology” ([https://webmagazine.unitn.it/en/evento/dphys/48324/photonics-as-a-key-enabling-technology](https://webmagazine.unitn.it/en/evento/dphys/48324/photonics-as-a-key-enabling-technology)). Following the spirit of the first year’s edition, this event aimed at bringing together experts, belonging to local research realities, who exploit optics and photonics in their scientific work. This event is thought as an opportunity to share knowledge in order to further develop research and collaborations, as well as to improve our understanding of photonics and its applications. The event has been also an opportunity to celebrate the second anniversary of the chapter, and an occasion to present the new officers elected in the chapter meeting of some weeks before.

The event had more than 70 participants, including 9 invited speakers from different departments of the University of Trento, the Bruno Kessler Foundation and the Italian Institute of Technology. During the poster session, 8 members of the chapter presented their research activities. To celebrate the second anniversary of the chapter, the members prepared fantastic cakes and took part to a cake contest, which celebrated the “Cake Boss” of the chapter.

In the following, we list the program of the event, as well as a selection of pictures taken during the day.

**Program**

9:00–10:45 First morning session

9:00–9:15 Welcome remarks

Giulio Monaco, Department of Physics, University of Trento – “X-rays inelastic scattering experiments: recent results”

Antonio Perreca, Department of Physics, University of Trento – “The shape of light in gravitational wave detectors”


10:45–11:15 Coffee break

11:15–12:45 Second morning session

Alessandro Gozzi, CNCS@UniTn, Italian Institute of Technology – “Brain-wide mapping of neural activity with optogenetic–fMRI”

Marco Canossa, CIBIO, University of Trento – “The breaking of symmetry: axon/dendrites specification in neuronal circuits assembly”

Giacomo Oliveri, DISI, University of Trento – “Dealing with complexity in wireless and optical technologies for radar, meteorology, telecommunications, and biomedicine: advances, perspectives, and challenges”

12:45–14:15 Lunch break

14:15–16:00 Second morning session
Mher Ghulinyan, Fondazione Bruno Kessler, Trento – “Ultra-thin and ultra-low-loss silicon photonics”

Lorenzo Pavesi, Department of Physics, University of Trento – “Nonlinear optics as an enabling technology”

Matteo Perenzoni, Fondazione Bruno Kessler, Trento – “Exploiting single photons for novel imaging techniques”

Claudio Castella, president of the SPIE Trento Chapter – “Two years of SPIE chapter in Trento”

16:00-16:30 Coffee break and cake contest
16:30-18:00 Poster session
18:00-19:00 Closing ceremony

Selected moments of the day

The credits of all the pictures shown here are by Luca Pichenstein.

The president of the Chapter, Claudio Castellan, and the advisor of the chapter, Prof. Lorenzo Pavesi, welcome the participants of the workshop.
The first speaker of the day is Prof. Giulio Monaco, Director of the Physics department of the University of Trento, who gave a presentation on “X-rays inelastic scattering experiments: recent results”

Antonio Perreca talks about gravitational waves detectors

Claudia Paris talks about “Optical Remote Sensing for Environmental Monitoring”
The coffee break is a good moment to meet people and to share experiences.

The second morning session is opened by Alessandro Gozzi, from the Italian Institute of Technology.
Prof. Marco Canossa, from the biology department of the University of Trento, talks about “The breaking of symmetry: axon/dendrites specification in neuronal circuits assembly”.

Giacomo Oliveri talks about complexity in wireless and optical technologies.

The afternoon session is opened by Mher Ghulinyan, from the Bruno Kesslef Foundation, talking about “Ultra-thin and ultra-low-loss silicon photonics”
Lorenzo Pavesi, professor of Department of Physics of the University of Trento and advisor of our chapter, talks about “Nonlinear optics as an enabling technology”

Matteo Perenzoni, from the Bruno Kessler Foundation, talks about single photons for imaging.

Claudio Castellan, president of the chapter, closes the session recovering the main activities organized by the University of Trento SPIE Student chapter in its two first years.
During this moment, we show a video sent by former members of the chapter and by other chapters from all around the world, which sent us a message to wish us a good anniversary.

During the poster session, the students of the chapter presented their research activities.

During the poster session, the participants tried the cakes prepared by the members of the chapter.
This was also the moment to officially introduce the new officers of the chapter.
The of Matteo Pasini titled “Testing Single-Photon Entanglement For Quantum Information Applications” was voted as the best one by the participants. The new chapter president Sara Piccione and the past vice-president Stefano Signorini awarded him. The award consisted in a fantastic optical fiber lamp.

The participants voted also the best cake of the event. The winner was the new vice president of the chapter, Chiara Vecchi. She prepared a modified version of the “Black Forest cake”, which from now on will be named “SPIE Trento Forest cake”.
The “SPIE Trento Forest Cake”, which won the cake contest.

What remains of the cakes at the end of the afternoon.
The group photo at the end of the day
Outreach activities

“Pillole di luce” – International Day of Light 2018

To celebrate the International Day of Light, we organized the event “Pillole di luce” (pills of light). The event aimed at bringing together science and medicine, by talking about light applications in different fields of medicine. The event was open to all the citizenship. It has been organized at the Sociology Department of the University of Trento, with the aim to involve people coming from non-scientific education.

Four speakers have been invited, each giving a 30 minutes presentation.

- Matteo Caffini, from the “Center for Mind – Brain Sciences” of the University of Trento, gave a talk titled “Cervelli illuminati” (lightened brains). He gave a presentation on his research activities, where he uses optical methods to monitor the neural activity in children.
- Renzo Antolini, from the Physics Department of the University of Trento, told about optical molecular imaging. He provided an historical perspective on the advances that optical technologies had in the field of molecular imaging. He introduced the main technologies that are already available in the hospital, as well as the ones that in his opinion will have an important impact in next years.
- Daniele Arosio, from the Biophysics Institute in Trento, told about the use of fluorescence in the molecular imaging.
- Mauro De Concini, former director of the Ophthalmology Department of Trento hospital, gave a presentation on the role of laser light to treat eye diseases. He described the improvements that occurred from the 1970s, when laser light was first used in medicine, up to present years.

After the presentations, a reception was organized for all the participants. During the reception, outreach experiments were performed.

About 60 people attended the event, most of which coming from non-scientific education.

Welcome remarks by Claudio Castellan
The speakers: Daniele Arosio, Renzo Antolini, Matteo Caffini, Mauro De Concini
The reception and the outreach experiments

The organizing team: Federico Caporaletti, Claudio Castellan, Maddalena Bertolla, Tatsiana Egorova, Stefano Signorini, Sara Piccione and Tatev Chalyan.
Outreach activities at the primary school

On 23–24 May 2018, the former treasurer of the chapter Alessandro Trenti went to a primary school close to Trento. He gave four lectures, each of about 2 hours. He performed optics-related outreach experiments with children.
Outreach activities with the Scout Movement
Nicolò Leone performed optics-related outreach experiments with children of the Scout Movement.
Out of the lab

“Out of the lab” (https://noi.bz.it/it/vivere/out-of-the-lab/eventi/la-scienza-nelle-cose-di-ogni-giorno-out-of-the-lab) is a scientific divulgation project organized in Bolzano. It aims to create an innovative collaboration between science and culture. It wants to celebrate the world of scientific research, and the people who animates it. Under-35 researchers call tell their stories and present the contents of their research work to children and people interested to science world.

During this year’s edition, on November 22nd, the chapter member Stefano Biasi presented optics-related outreach experiments.
European Researchers' Night

University of Trento SPIE Student chapter participated to 2018 edition of the European Resercher's night. This event was held in Trento on September 28th, from 17:00 to 24:00 (https://event.unitn.it/nottedeiricercatori2018/). The event was organized at the science museum of Trento (MUSE). Five chapter members took part to this event: Claudio Castellan, Maddalena Bertolla, Riccardo Franchi, Chiara Vecchi and Matteo Pasini. We performed experiments aimed at showing how optical technologies affect our daily life. In particular, we performed experiments on total internal reflection, refraction and optical cloaking. Hundreds of people visited our experiments, from children to senior citizens.
Travels of the chapter members

SPIE Photonic West

The chapter secretary Sara Piccione attended the Leadership Workshop during the Photonics West conference in San Francisco.
SPIE Photonics Europe

The chapter Vice-President Stefano Signorini attended the Leadership Workshop during the Photonics Europe conference in Strasbourg. Together with him, the chapter activities were presented during the Poster session by the chapter president Claudio Castellan, the past president Tatevik Chalyan and the chapter co-advisor Massimo Borghi.
Symposium of Mexican Students and Studies in the UK

The chapter member Stefano Biasi attended the "Symposium of Mexican Students and Studies in the UK" on July 11th - 13th 2018 in Southampton, UK.
The Chapter vice-president Stefano Signorini attended the SPIE Optics+Photonics conference in San Diego in August 2018.

Stefano Signorini with the friends of the Roma and Napoli chapters.
IONS Yerevan 2018

The chapter president Claudio Castellan and the past president Tatevik Chalyan attended the IONS Yerevan conference, from 30th August to 2nd September 2018.

Tatevik Chalyan gave an invited presentation titled “Successful management of student chapters”. She reported her experience as the founder of the University of Trento SPIE Student Chapter, and she gave here advices on how to manage a chapter and keeping it active.
Claudio Castellan presented the activities organized by our chapter in the first two years. The participation to the conference has been also a way to promote the future activities of the chapter, such as the “Nonlinear Photonics Winter School”. The idea was also to create a network of European chapters, aimed at create new collaborations and new projects for the future.
Group photos
Aravind Harikumar attended the SPIE RemoteSensing conference, from 10th to 13th September 2018 in Berlin, Germany.
Upcoming events

**Nanoscience Laboratory KickOff Meeting 2018**

Nanoscience Laboratory KickOff meeting is planned for December 10th, 2018 (https://webmagazine.unitn.it/evento/dphys/50896/nanoscience-laboratory-kick-off-meeting). Members of the chapter will present their research activities.

The schedule of the event is the following. The members of the chapter are underlined.

- 14.00 Stefano Azzini
- 14.30 Beatrice Vignoli
- 15.00 Enver Sangineto
- 15.30 Mattia Mancinelli
- 16 coffee-break
- 16.30 Micro and application team (Stefano Biasi, Sara Piccione, Andrea Volpini, Damiano Lodi, Davide Bazzanella, Clara Zaccaria)
- 17.00 Nano and Materials team (Cecilia Maestri, Chiara Piotto, Francesca Marchetti, Nicola Ferrari)
- 17.30 Nonlinear team (Pierre Guilleme, Claudio Castellan, Chiara Vecchi, Riccardo Franchi)
- 18.00 Quantum team (Stefano Signorini, Matteo Pasini, Nicolò Leone)

**Christmas Party**

The event is planned for the 21st December 2018. With this event, we aim to create a friendship atmosphere between the members of the chapter, aimed to share the events occurred during the year and to create a group getting on well. Moreover, we aim to invite students from the university that could be interested in joining the chapter: with this event, we aim to increase the number of the chapter members.

**Optoelectronics and Photonics Winter school – Nonlinear Photonics**

The chapter will be involved in the organization of the 10th edition of the Optoelectronics and Photonics Winter school (https://event.unitn.it/nlp2019/). The school will be held from 20th to 26th January 2019 in Andalo, Trentino.

The main organizers of the school are the University of Trento, the Nanoscience Laboratory, and The University of Rome La Sapienza. The school aims to bring together a large number of PhD students and young researchers from all parts of the world who, during a one-week intense schedule, follow a series of lectures on selected topics. The lectures are held by internationally recognized experts in the field. At the same time, the students are encouraged to enjoy the beautiful location where the school is organized. To this end a large lunch break is considered to allow skiing and relaxing on the mountains or at the hotel facilities.

This year the school introduces students and post-docs to the concepts of nonlinear photonics, focusing on the hot topics that are driving the technological and scientific research. The target audience is PhD students and young researchers, who will have the opportunity to attend the lectures given by scientists leading of the nonlinear optics community.
The Chapter will be mainly involved in the organization of informal events, which aim to help the networking between researchers and students.

**Workshop on “Integrated optics for biosensing”**

Some of the participants of the “Nonlinear Photonics” winter school coming from abroad asked to visit the University of Trento after the school. They are particularly interested in the field of integrated optics for biosensing. Therefore, we plan to organize a workshop where our hosts will present their research activities. After that, members of the University of Trento and of the Bruno Kessler Foundation will give presentations on this topic. This workshop aims at creating new collaborations. Moreover, it also aims at offering opportunities to students to understand the activities done in Trento in the field of integrated biosensing.

**Photonics West 2019**

The chapter members Chiara Vecchi and Maddalena Bertolla will attend the next edition of the Photonics West Conference, and will attend the Leadership Workshop. Chiara asked for using the SPIE Officer Travel Grant to cover her travel expenses.

**EDUCA 2019**

EDUCA is a cultural project held annually in Rovereto (Trento) since 2008 ([http://www.educaonline.it](http://www.educaonline.it)). This event aims at introducing new innovative methods in the children education, overcoming the problems that typically affect standard education. We aim to participate to this event proposing laboratories for children, where they can realize with their hands optics-based experiment. The goal of our initiative is making aware children, since their youth, of what is optics and what are the fantastic scenarios that it can enable.
### Financial report

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<td>SPIE Activity Grant</td>
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