NUSOD 2023 PROGRAM

MONDAY SEPTEMBER 18

9:00–9:15 Welcome address

9:15–10:20 Integrated devices and systems I
- MA01: Thermal Control Scheme in Contra-Directional Couplers for Centered Tunable Bandwidths; *L. Tunesi (1), M. A. Mahdian (2), V. Curri (1), A. Carena (1), M. Nikdast (2), and P. Bardella (1);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO (USA)
- MA02: Finite-Difference Time-Domain Simulations of Surface Bragg Gratings; *I. A. Nechepurenko, Y. Rahimof, M. R. Mahani, S. Wenzel, and A. Wicht;* Ferdinand-Braun-Institut (FBH) (D)
- MA03: Coupling Efficiency Enhancement between SU-8 Waveguides and Plasmonic Nanostructures through Indium Tin Oxide Thin Films; *A. Mannetta, A. Buzzin, N. Hanine, B. Alam, V. Ferrara, and R. Asquini;* Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome (I)

10:20–11:00 Coffee break

11:00–12:20 Laser diodes I
- MB02: Simulation of the Mode Dynamics in Broad Ridge Laser Diodes; *E. Kuhn (1), A. Thränhardt (2);* (1) WIAS Berlin (D), (2) TU Chemnitz (D)
- MB03: Time-Domain Traveling-Wave Model of Distributed-feedback Quantum Cascade Laser; *S. Zaminga (1) , L. Columbo (2) , C. Silvestri (3) , M. Gioannini (2) , and F. Grillot (1);* (1) LTCI Telecom Paris, Institut Polytechnique de Paris, Palaiseau (F), (2) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (3) School of Information Technology and Electrical Engineering, The University of Queensland, Brisbane (AUS)
- MB04: Effect of Flat Region between Mesa and Gratings in Ridge-Type Semiconductor Lasers with Transversal Diffraction Gratings; *K. Taniguchi, T. Numai;* Ritsumeikan University (J)

12:20–13:50 Lunch break

13:50–15:00 Detectors and solar cells I

- MC01: <u>Multiscale Modelling of Curved Pixel Arrays</u>; *E. Bellotti(1,2), J. Glennon(1,2), M. Zhu(1), A. Kyrtsos(1), and A. Glasmann(1);* (1) Electrical and Computer Engineering Department, Boston University, 8 St Mary Street, Boston, MA (USA), (2) Division of Material Science and Engineering, Boston University, 8 St Mary Street, Boston, MA (USA) – **(INVITED)**
- MC02: <u>Inverse Doping Profile Extraction for Predictive SPAD Modeling</u>; *A. Bonzi (1), G. Laita (1), I. Rech (1), and A. Gulinatti(1);* (1) Politecnico di Milano, Italy
- MC03: <u>Modeling the Impact of Light Scattering on Photon Recycling in Solar Cells and LEDs</u>; *S. J. Zeder (1, 4), B. Ruhstaller (2, 4), and U. Aeberhard (3, 4);* (1) IMT PV-Lab, Ecole Polytechnique Federale de Lausanne, Neuchatel (CH), (2) ICP, ZHAW – Zürcher Hochschule für Angewandte Wissenschaften, Winterthur (CH), (3) IIS, Eidgenössische Technische Hochschule Zürich, Zürich (CH), (4) Fluxim AG, Winterthurc (CH)

15:00-15:30 Coffee break

15:30–16:30 Poster preview

16:30–18:30 Poster session and welcome reception

- MP01: <u>Design of Metasurface Radial Shear Interference Plate</u>; *C. Peng (1), J. Wei (1), Y. Zhou (2), Z. Wen (2), Z. Jiang (1), G. Chen(2);* (1) Institute of Applied Electronics, China Academy of Engineering Physics (CN), (2) School of Optoelectronic Engineering, Chongqing University (CN)
- MP02: <u>Metadata definition and database implementation for searchable Raman-spectroscopy data handling</u>; *I. Lavagno (1), A. Pecchia (2), A. Di Vito (3), M. Auf der Maur (3);* (1) Tiberlab srl, Rome (I), (2) CNR-ISMN, Consiglio Nazionale delle Ricerche, Rome (I), (3) Dept. of Electronic Engineering, University of Rome Tor Vergata, Rome (I)
- MP03: <u>Active Boosting of the Effective Optical Nonlinearity in Semiconductor Nanomaterials</u>; *Ö. E. Aşırım (1), T. M. İlgar (2);* (1) Technical University of Munich (D), (2) Hacettepe University (TR)
- MP04: <u>Different approximations for carriers lifetimes in HgCdTe quasi-neutral regions</u>; *M. Vallone (1), M. G. C. Alasio (1), A. Tibaldi (1,2), F. Bertazzi (1,2), S. Hanna (3), D. Eich (3), A. Wegmann (3), H. Figgemeier (3), G. Ghione (1), M. Goano (1,2);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) IEIIT-CNR (I), (3) AIM Infrarot-Module GmbH (D)
- MP05: <u>Range Performance Modelling and Estimation for Uncooled Monocular Thermal Imagers</u>; *A. Alsalmi (1,2), A.Almaiman (1), and M.Ramy (1);* (1) King Saud University (KSA), (2) Saudi Arabian Military Industry Company (KSA)
- MP06: <u>Simulation and experimental verification of enhanced Nd:YAG solar lasers using wavelength conversion dyes.</u>; *K. G. Wilcox;* University of Dundee (UK)
- MP07: <u>Convergence of Factorization Rulesfor Modal Methods in Fourier-Bessel Basis.Is the Inverse Rule Really the Best?</u>; *M. Dems;* Lodz University of Technology (PL)
- MP08: <u>Optimization of a High-Performance WGM Sensor Design for Glucose Detection in Urine</u>; *N.-A. Merabet (1), L. Cherbi (2);* Laboratory of instrumentation (LINS), Faculty of Electrical Engineering, University of Sciences and Technology Houari Boumediene, Algiers (DZ)
- MP09: <u>Numerical study of Self-Detection Near Field Optical Microscopy in the Terahertz range</u>; *C. Silvestri (1), L. L. Columbo (2), and M. Brambilla (3);* (1) The University of Queensland (AUS), (2) Politecnico di Torino (I), (3) Politecnico e Università degli Studi di Bari (I)
- MP10: <u>Numerical and semi-analytical analysis of modulation layer properties in ITO modulators</u>; *E. Avrutin;* School of Physics, Engineering, and Technology University of York (UK)
- MP11: <u>Ion implantation for semiconductor lasers</u>; *A. Szerling, M. Kozubal, M. Gębski, K. Pągowska, P. Michałowski, K. Kosiel, M. Ekielski, T. C. Łukasiewicz;* (1) Institute of Microelectronics and Photonics, Warsaw (PL), (2) Institute of Physics, Lodz University of Technology, Łódź (PL)

- MP12: <u>The Influence of Transport Layers on the Performance of Organic Solar Cells Studied by Drift-Diffusion Model</u>; *T. Pavličević (1), J. Gojanović (1), N. Ćirović (1), Sandra Živanović (2);* (1) School of Electrical Engineering,University of Belgrade, Bulevar kralja Aleksandra 73, 11120 Belgrade (SRB), (2) Institute for Micromanufacturing, Louisiana Tech University, Ruston, LA71272 (USA)
- MP13: <u>Thermal Crosstalk Effects in a Silicon Photonics Neuromorphic Network</u>; *Marco Orlandin (1), Ali Cem (2), Vittorio Curri (1), Andrea Carena (1), Francesco Da Ros (2), Paolo Bardella (1);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) Department of Electrical and Photonics Engineering, Technical University of Denmark (DK)
- MP14: <u>A compact 1 × 4 wavelength demultiplexer by Inverse Design</u>; *Preetam Kumar, Fekadu Mihret, E.S. Shivaleela, T. Srinivas;* Indian Institute of Science, Bengaluru (IND)
- MP15: <u>Well-in-Well Active Region Based III-Nitride Colour-Tunable LED</u>; *Ajeet Singh Rawat, Ashish Kumar Meena, Balkrishna Choubey, Kankat Ghosh;* Indian Institute of Technology Jammu, Jammu (IND)
- MP16: <u>An UWB Band-Pass Filter Using Plasmonic Series and Parallel SRRs with Coupling Gaps</u>; *K. Thirupathaiah (1,2), M. Qasymeh;* (1) Koneru Lakshmaiah Education Foundation, Hyderabad (IND), (2) Abu Dhabi University, Abu Dhabi (UAE)
- MP17PD: <u>Improving DBR operation at cryogenic temperatures through mirror grading</u>; *B. Namvar, T. Uusitalo, H. Virtanen, J. Viheriälä, Mircea Guina*; Engineering and Natural Sciences, University of Tampere (FIN)
- MP18PD: <u>Eigen-States and Wave functions in Asymmetric Double Multi-Quantum Wells Lattice-Matched to InP Substrate</u>; *K. Tanaka*; Graduate School of Information Science Hiroshima City Uniersity Ozuka-higashi, Asaminami-Ku, Hiroshima (J)

TUESDAY SEPTEMBER 19

9:00-10:20 Laser diodes II
- TuA01: <u>Influence of Eigenstate Basis Sets on Self-Starting Harmonic Comb Simulations in THz QCLs</u>; *J. Popp, L. Seitner, F. Naunheimer, M. Haider, and C. Jirauschek;* TUM School of Computation, Information and Technology, Technical University of Munich (TUM) (D) – **(TOP10%)**
- TuA02: <u>Optical Frequency Combs in SiN Hybrid Lasers</u>; *C. Rimoldi, L. Columbo, M. Gioannini;* Department of Electronics and Telecommunications, Politecnico di Torino (I)
- TuA03: <u>Estimation of Frequency Noise Characteristics and Data-Driven Modeling of Narrow-Linewidth Semiconductor Lasers</u>; *M. Kantner, L. Mertenskötter;* WIAS Berlin (D) – **(TOP10%)**
- TuA05: <u>Calculation of Optical Modes in Large Emission Area Photonic Crystal Surface-Emitting Lasers</u>; *M. Radziunas (1), E. Kuhn (1), H. Wenzel (2), B. King (2), and P. Crump (2);* (1) Weierstrass Institute (WIAS), Mohrenstrasse 39, 10117 Berlin (D), (2) Ferdinand-Braun-Institut (FBH), Gustav-Kirchhoff-Str. 4, 12489 Berlin (D) – **(TOP10%)**

10:20–10:50 Coffee break

10:50–12:20 LEDs I
- TuB01: <u>Investigating the Competition of Radiative and Nonradiative Recombination in (In,Ga)N Quantum Wells</u>; *S. Schulz (1,2), J. McMahon (1,2), E. Kioupakis (3), R. M. Barrett (4), R. Ahumada-Lazo (4), J. A. Alanis (4), P. Parkinson (4), M. J. Kappers (5), R. A. Oliver (5), and D. Binks (4);* (1) Tyndall National Institute, University College Cork, Cork (IRL), (2) School of Physics, University College Cork, Cork (IRL), (3) Materials Science and Engineering Department, University of Michigan (USA), (4) Department of Physics & Astronomy, University of Manchester, Manchester (UK) (5) Department of Materials & Metallurgy, University of Cambridge, Cambridge (UK) – **(INVITED)**

- TuB02: <u>Electro-Thermal Drift-Diffusion Simulations for Organic Light-Emitting Diodes</u>; *V. Gerogakopoulos Paltidis , E. Stanzani, S. Jenatsch, B. Ruhstaller, and B. Blülle;* Fluxim AG, Winterthur (CH)
- TuB03: <u>Effect of the Hole Mobility on the Emission Spectrum of a Deep Ultraviolet Mixed Quantum Well Light Emitting Diode</u>; *F. Roemer (1), G. Hofmann (1), J. Hoepfner (2), M. Schilling (2), A. Muhin (2), T. Wernicke (2), M. Kneissl (2), and B. Witzigmann (1);* (1) Friedrich-Alexander-Universitat Erlangen-Nurnberg (D), (2) Technical University Berlin (D) – **(TOP10%)**
- TuB04: <u>Deep Learning-Driven Extraction of Superluminescent Diodes Parameters</u>; *A. Marchisio, V. Curri, A. Carena, and P. Bardella;* Politecnico di Torino (I)

12:20–13:50 Lunch break

13:50–15:20 Integrated Devices and Systems II
- TuC02: <u>Design of Si/polySi Microrings with Complex Waveguide Cross-Sections and Minimal non-Linearity</u>; *S. Cucco, M. Novarese, M. Gioannini;* Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I)
- TuC03: <u>GaAs-Based Integration Photonics: Efficient Tapers</u>; *T. R. AlBiladi;* (1) The Future Compound Semiconductor Hub, School of Physics and Astronomy, Cardiff University, Queen's Building, The Parade, Cardiff, Wales (UK) CF24 3AA; (2) Physics and Astronomy Department, Faculty of Science, King Saud University, Riyadh 11451 (KSA) (3) Physics Department, Faculty of Science, University of Jeddah, Jeddah 21589 (KSA)
- TuC04: <u>Designing Rectangular Surface Bragg Gratings using Machine Learning Models</u>; *M. R. Mahani, Igor Nechepurenko, Yasmin Rahimof, and Andreas Wicht;* Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik, Gustav-Kirchhoff-Straße 4, 12489, Berlin (D)
- TuC01: <u>Phonon transport and thermoelectric properties of two-dimensional materials</u>; *A. Pecchia;* Roma 2 (IT) – **(INVITED)**

15:20–15:50 Coffee break

15:50–17:30 Novel materials
- TuD01: <u>Identifying Defects in Charge Trapping Related Phenomena</u>; *D. Waldhoer, C. Schleich, J. Michl, T. Grasser;* Institute for Microelectronics, TU Wien (A) – **(INVITED)**
- TuD02: <u>Empirical Tight-Binding Simulations for Nonuniform Disordered GaAsSb Alloy</u>; *A.-L. Phan (1), A. Di Vito (1), A. Pecchia (2), and M. Auf der Maur (1);* (1) University of Rome "Tor Vergata", Rome (I), (2) CNR-ISMN, Monterotondo, Rome (I)
- TuD03: <u>Modeling the Anisotropic Detection Material in a Quantum well Infrared Detector for Critical Coupling and High-Discrimination Polarization Detection</u>; *J. Zhou (1), Z. Chu (1), T. Zhen (1), T. Zhu (1), J. Shen (1), B. Wang (2), X. Chen (1), and W. Lu (1);* (1) Shanghai Institute of Technical Physics, Chinese Academy of Sciences, Shanghai (CN), (2) Beijing University of Posts and Telecommunications, Beijing (CN) – **(INVITED)**
- TuD04: <u>Simulation of Optical Gain in AlGaN Quantum Wells</u>; *S. Kölle (1), F. Römer (1), G. Cardinali (2), A. Schultz (2), N. Susilo (2), D. Hauer Vidal (2), T. Wernicke (2), M. Kneissl (2,3) and B. Witzigmann (1);* (1) Friedrich-Alexander-Universität Erlangen-Nürnberg (D), (2) Technische Universität Berlin, Germany; (3) Ferdinand-Braun Institute (D)

WEDNESDAY SEPTEMBER 20

9:00–10:00 LEDs II
- WA01: <u>Modeling the Electrical Characteristic and Degradation Mechanisms of UV-C LEDs</u>; *N. Roccato (1), F. Piva (1), C. De Santi (1), M. Buffolo (1), N. Susilo (3), D. Hauer Vidal (3), A. Muhin (3), L. Sulmoni (3), T. Wernicke (3), M. Kneissl (3),(4), G. Meneghesso (1), E. Zanoni (1), and M. Meneghini (1,2);* (1) Department of Information Engineering, University of Padova (I), (2) Department of Physics and Astronomy, University of Padova (I), (3)

Technische Universität Berlin, Institute of Solid State Physics, Berlin (D), (4) Ferdidnand-Braun-Institut (FBH), Berlin (D)
- WA02: <u>Theoretical Investigation of Carrier Transport and Recombination Processes for Deep UV (Al,Ga)N Light Emitters</u>; *R. Finn (1), M. O'Donovan (2), P. Farrell (2), T. Streckenbach (2), J. Moatti (3), T. Koprucki (2), S. Schulz (1,4);* (1) Tyndall National Institute, University College Cork (IRL), (2) Weierstrass Institute (WIAS), Berlin (D), (3) Inria, Universite de Lille, CNRS, Lille (F), (4) School of Physics, University College Cork, Cork (IRL)
- WA03: <u>Subthreshold Characteristics of GaN-based LEDs: Trap-Assisted Tunneling and Coupled Defects</u>; *Francesco Mercinelli(1), Alberto Tibaldi(1,2), Michele Goano(1,2), and Francesco Bertazzi(1,2);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CNR-IEIIT, Torino (I)

10:00–10:30 THE NEXT NUSOD
Ramp session of the future editions of the Conference: location, topics, …

10:30–11:00 Coffee break

11:00–12:00 VCSELs I
- WB01: Physics-based Modeling of AlGaAs Tunnel Junction VCSELs: a Comparative Appraisal; *A. Gullino (1,2), V. Torrelli (1,2), M. D'Alessandro (1,2), A. Tibaldi (1,2), F. Bertazzi (1,2), M. Goano (1,2), and P. Debernardi (2);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CNR-IEIIT, Torino (I) – **(TOP10%)**
- WB03: <u>Addressing the Electrical Degradation of 845 nm Micro-Transfer Printed VCSILs through TCAD Simulations</u>; *M. Zenari(1), M. Buffolo(1), C. De Santi(1), J. Goyvaerts(5), A. Grabowski(4), J. Gustavsson(4), R. Baets(3), A. Larsson(4), G. Roelkens(3), G. Meneghesso(1), E. Zanoni(1), and M. Meneghini(1,2);* (1) Department of Information Engineering, University of Padova (I), (2) Department of Physics and Astronomy, University of Padova (I), (3) Photonics Research Group, Ghent University-imec (B), (4) Department of Microtechnology and Nanoscience, Chalmers University of Technology, Göteborg (S), (5) LIGENTEC SA, EPFL Innovation Park Bâtiment L, Ecublens (CH)
- WB04: <u>Modeling of Single-Mode High-Power VCSEL Arrays</u>; *V. Torrelli (1,2), A. Tibaldi (1,2), F. Bertazzi (1,2), M. Goano (1,2), and P. Debernardi (2);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CNR-IEIIT, Torino (I)

15:00–22:00 Excursion & dinner
The guided tour of the city center of Turin is scheduled at 15:00. For those who are interested in, the meeting point is in front of the Regio Theatre, located in piazza Castello 205.
In the evening, you are kindly invited to join in the social dinner by Arcadia Restaurant, Galleria Subalpina 16. Appointment at 19:30; dinner will start at 20:00.

THURSDAY SEPTEMBER 21

9:00–10:20 VCSELs II
- ThA01: Numerical Analysis of Multi-Mode VCSELs for Applications in High Bitrate Optical Communication; *C. Rimoldi (1), L. Columbo (1), A. Tibaldi (1,2), P. Debernardi (2), and M. Gioannini (1);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CNR-IEIIT, Torino (I) – **(TOP10%)**
- ThA02: Single-Mode Emission in VCSELs with Antiresonant Oxide Islands; *M. Więckowska, M. Dems;* Lodz University of Technology
- ThA03: <u>Analytical Model of the Ultrabroadband Operation of Transverse-Coupled-Cavity VCSELs</u>; *V. Torrelli (1,2), M. D'Alessandro (1,2), L. Miri (1), P. Debernardi (2), F. Bertazzi (1,2), M. Goano (1,2), M. Gioannini (1), and A. Tibaldi (1,2);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CNR-IEIIT, Torino (I)

- ThA04: Experimental VCSEL Digital Twin modeling for net 100 Gb/s/λ nonlinear Digital Pre-Distortion; *L. Minelli (1), F. Forghieri (2), and R. Gaudino (1);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) CISCO Photonics (I)

10:20–10:50 Coffee break

10:50–12:10 Detectors and solar cells II
- ThB01: <u>Dipole Emission Modelling using TMM for Solar Cell and LED Application</u>; *P. Amiri(1), M. Auf der Maur(1);* (1) Department of Electronic Engineering, University of Rome "Tor Vergata",Rome (I)
- ThB02: <u>Machine-Learning-Assisted Optimization of Type-II Superlattices for Enhanced Vertical Hole Mobility</u>; *J. Glennon (1), E. Bellotti (2);* (1) Boston University (USA), (2) Boston University (USA)
- ThB03: <u>Modeling the Electronic Transport in FinFET-like Lateral Ge-on-Si pin Waveguide Photodetectors for Ultra-Wide Bandwidth Applications</u>; *M. G. C. Alasio (1,2), M. Zhu (2), A. Fronteddu (1), A. Cardinale (1), A. Ballarati (1), E. Bellotti (2), G. Ghione (1), A. Tibaldi (1,3), F. Bertazzi (1,3), M. Vallone (1), and M. Goano (1,3);* (1) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I), (2) Boston University, 8 St Mary Street, Boston, MA (USA), (3) IEIIT-CNR, Torino (I)
- ThB04: <u>Impact of Fabrication Variabilities on Performance of Avalanche Photodetectors</u>; *Mike Zhu (1), Matteo G. C. Alasio (1,2), and E. Bellotti (1);* (1) Boston University, 8 St Mary Street, Boston, MA (USA), (2) Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino (I)

12:10–13:40 Lunch break

13:40–15:00 Mathematical models
- ThC01: <u>Building Research Data Infrastructures for Mathematical Modeling and Numerical Simulation.</u>; *T. Koprucki;* WIAS Berlin (D) – **(INVITED)**
- ThC03: <u>Symmetries in Transmission Electron Microscopy Images of Semiconductor Nanostructures with Strain</u>; *A. Maltsi (1), A. Mielke (1,2) and T. Koprucki (1);* (1) Weierstraß-Institut für Angewandte Analysis und Stochastic, Berlin (D), (2) Humboldt-Universität zu Berlin, Institut für Mathematik, Berlin (D)
- ThC04: <u>Atomistic Study of Urbach Tail Energies in (Al,Ga)N Quantum Well Systems</u>; *M. O'Donovan (1), R. Finn (2), S. Schulz (2,3), and T. Koprucki (1);* (1) WIAS Berlin (D), (2) Tyndall National Institute Cork (IRL), (3) School of Physics, University College Cork (IRL)

15:00–15:30 Coffee break

15:30–17:00 Integrated Devices and Systems III
- ThD01: <u>Design of Modular Multimode Cavities</u>; *M. Heuck;* Technical University of Denmark Department of Electrical and Photonics Engineering, Lyngby (DK) – **(INVITED)**
- ThD02: <u>Flat and broadband Continuum Source based on Similariton Spectrum Generated in Germanium-doped Photonic Crystal Fiber for DWDM</u>; *H. Azza, L. Cherbi;* University of Science and Technology Houari Boumediene, USTHB (DZ)
- ThD03: <u>Design and Optimizing Backside Grating Couplers in Si-Photonics Circuits</u>; *M. Ghomashi (1), R. Baets (1,2), and Y. Li(1,2);* (1) Photonics Research Group, Ghent University-imec (B), (2) Center for Nano- and Biophotonics, Ghent University (B)
- ThD04: <u>Multiphysics Simulation Approach for Photonic Devices Integrating Phase Change Materials</u>; *A. Shafiee, B. Charbonnier, S. Pasricha, and M. Nikdast;* Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO (USA), Université Grenoble Alpes (F)