ICOP 2022

Italian Conference on Optics and Photonics

Trento, June 15-17, 2022

Organizers

Sponsored by

15TH JUNE

09.00 – 13.00 | **Registration**

10:00 - 10:30 WELCOME COFFEE

10.30 – 11.00 | **Opening** (room A101, Prof. Lorenzo Pavesi Chairman conferenza ICOP)

Prof. Flavio Deflorian

Magnifico Rettore Università di Trento

dott. Andrea Simoni

Segretario Generale della Fondazione Bruno Kessler

avv. Ivonne Forno

Presidente Hub Innovazione Trentino

Prof. Franco Dalfovo

Direttore Dipartimento di Fisica, Università di Trento

11.00 – 12.30 | Plenary session (room A101, session chair prof. Mario Martinelli)

Photonics in the PNRR

dott.ssa Camilla Sebastiani

Capo della Segreteria tecnica del

Ministro per l'Innovazione Tecnologica e la Transizione Digitale

Prof. Maria Chiara Carrozza

Presidente Consiglio Nazionale delle Ricerche

dott.ssa Laura Pedron

Dirigente generale Dipartimento Sviluppo economico, Ricerca e Lavoro, Provincia Autonoma di Trento

12:30 - 14:30 LUNCH BREAK

14.30 – 16.00	Parallel Sessions: **Quantum Photonics** (room A102) **Special Fibers Exploitation for TLC** (room A110) **Optical Imaging and Sensing: Novel Approaches** (room A108)

16:00 - 16:30 COFFEE BREAK

16.30 – 18.15	Parallel Sessions: **Emerging technologies** (room A102) **Laser and NL optics** (room A108) **Biophotonics** (room A110)

16TH JUNE

09.00 – 10.30	Plenary Session (room A101, session chair prof. M. Cucinotta) P.1 **Intra membrane molecular opto transducers for bio-hybrid systems and human-machine symbiosis** Guglielmo Lanzani P.2 **The future of optical fiber transmission: increasing the capacity to support 6G and IoT applications** Gabriella Bosco

10:30 - 11:00 COFFEE BREAK

11.00 – 12.30	Parallel Sessions: **Optical Networks and TLC Systems** (room A102) **Nanomaterials and Nanotechnology in Optical Sensing** (room A108) **Applications of Photonics Technology** (room A110)

12:30 - 14:30 LUNCH BREAK

14.30 – 16.00	Parallel Sessions: **Photonic Devices and Integrated Circuits** (room A102) **Deep learning and processing for TLC** (room A108) **Optical Fibre Sensors** (room A110)

16:00 - 16:30 COFFEE BREAK

16.30 – 17.00	room A110, session chair dr. Letizia De Maria **Pitch presentations from SIOF awardees**
16.30 – 18.00	**Poster Session**

18.30 - 22:30 SOCIAL EVENT (MUSE)

18.30 – 22.30	**MUSE Tour** **Social Dinner** **Show: Medicine of the Future** Andrea Brunello (Compagnia Arditodesìo | Jet Propulsion Theatre)

17TH JUNE

09.00 – 10.30	Plenary Session (Room A101, session chair dr. Luca Mion) **Photonics in Europe** P.3 **Photonics 21** Sebastien Bigo (Nokia Bell Labs) P.4 **Photonics within the European Horizon program** Stefano Selleri (DG connect) P.5 **PhotonHub Europe** Hugo Thienpont (UV Bruxel)

10:30 - 11:00 COFFEE BREAK

11.00 – 11.40	Plenary Session (Room A101, session chair dr. Marco Senigalliesi) **PhotonSTART –Photonic Innovation lead by Italian Sartup** **Pitches by photonics Italian startups** **PhotonPath,** Douglas Aguilar **ThinkQuantum,** Giuseppe Vallone **Officina Stellare,** Giovanni Dal Lago **Dynamic optics,** Stefano Bonora **SpectoPhotonics,** Giuseppe Antonacci **QTI,** Davide Bacco
11.40 – 12.40	Plenary Session (Room A101, session chair dr. Luca Mion) **Italian Photonics Initiatives** **Experience in Lombardia** Andrea Melloni (PoliMi) **Experience in Tuscany** Roberto Pini (distretto toscano GATE 4.0)
12.40 – 13.00	Plenary Session (Room A101, session chair prof. Lorenzo Pavesi) **Award Ceremony and closings**

Parallel Sessions

QUANTUM PHOTONICS

15TH JUNE 14.30 – 16.00 ROOM A102 SESSION CHAIR GEORG PUCKER

14.30 - 15.00	I.01	**POLIQI: Milano Quantum Infrastructure** Mario Martinelli
15.00 - 15.15	O.01	**QUANTEP: the QUANtum Technologies Experimental Platform** Andrea Salamon
15.15 - 15.30	O.02	**Generation of single-photon entangled states with a Silicon oxynitride integrated photonic chip** Nicolò Leone
15.30 - 15.45	O.03	**Coexistence of QKD and production channels in a deployed WDM network** Alberto Gatto
15.45 - 16.00	O.04	**An entangled photons source in the silicon platform for Mid-infrared Ghost spectroscopy** Matteo Sanna

SPECIAL FIBERS EXPLOITATION FOR TLC

15TH JUNE 14.30 – 16.00 ROOM A110 SESSION CHAIR GABRIELLA BOSCO

14.30 - 15.00	I.02	**MIMO-free transmission system exploiting mode group division multiplexing in FMF** Alberto Gatto
15.00 - 15.15	O.05	**MMF-based data center interconnect using commercial coherent transceiver** Roberto Gaudino
15.15 - 15.30	O.06	**Forward Raman amplification in few-mode fibers with modal coupling due to stress birefringence and core ellipticity** Marco Santagiustina
15.30 - 15.45	O.07	**On the interplay between cross-phase modulation and spatial mode dispersion** Chiara Lasagni
15.45 - 16.00	O.08	**Backscattering coefficient measurement in Hollow Core Inhibited Coupling Fibers**

		Federico Melli

OPTICAL IMAGING AND SENSING: NOVEL APPROACHES

15TH JUNE 14.30 – 16.00 ROOM A108, SESSION CHAIR SILVIA MARIA PIETRALUNGA

14.30 - 15.00	I.03	**Label-free biosensing by topological light confinement** Silvia Romano
15.00 - 15.15	O.09	**Gold nanorods and machine learning for paper-based genetic assays** Claudia Borri
15.15 - 15.30	O.10	**Towards the realisation of an integrated Exceptional Point Sensor** Riccardo Franchi
15.30 - 15.45	O.11	**Multiphoton Microscopy: a new tool for drug delivery applications and polymer science** Cristina Sissa
15.45 - 16.00	O.12	**A Machine Learning approach to the classification of chemo-structural determinants in label-free SERS detection of proteins** Andrea Barucci

EMERGING TECHNOLOGIES

15TH JUNE 16.30 – 18.15 ROOM A102 SESSION CHAIR ROBERTO GAUDINO

16.30 - 17.00	I.04	**Leveraging Lithium Niobate on Insulator Technology for Photonic Analog Computing** Lorenzo De Marinis
17.00 - 17.15	O.13	**On the interplay between strain and temperature in germanium microstructures** Costanza L. Manganelli
17.15 - 17.30	O.14	**Optical nanocavity enabling hyper resolution in 2D and 3D two photon direct writing lithography** Giuseppe E. Lio
17.30 - 17.45	O.15	**Low-phase noise frequency-stabilized laser against a fiber Fabry-Pérot cavity** Francesco Canella
17.45 - 18.00	O.16	**Plasmonic-based nanodevice to induce effective thrust on nanoparticle** Sergio Balestrieri

18.00 - 18.15	O.17	**Soliton Channels in Space-Division Multiplexed Systems** Mario Zitelli

LASER AND NL OPTICS

15TH JUNE 16.30 – 18.15 ROOM A108 SESSION CHAIR GIORGIO PARLADORI

16.30 - 17.00	I.05	**Lanthanide-Doped Nanocrystals-Engineered Photonic Crystal Metasurface Allows Massive Radiance Enhancement of Upconversion Luminescence via Strongly-Coupled Bound States in the Continuum** Chiara Schiattarella
17.00 - 17.15	O.18	**A Compact Terahertz Time-Domain Spectrometer** Jacopo Manzolli
17.15 - 17.30	O.19	**Thermodynamics of Fiber Optics: Thermalization of Multimode Beams** Fabio Mangini
17.30 - 17.45	O.20	**Experimental study of coupling between multimode/singlemode Vertical Cavity Surface Emitting Lasers and Standard G.652 fiber for future green Radio-over-Fiber Infrastructures** Jacopo Nanni
17.45 - 18.00	O.21	**Fiber Optics in The Multiphoton Ionization Regime** Mario Ferraro
18.00 - 18.15	O.22	**Multimode soliton interactions in GRIN fibers** Yifan Sun

BIOPHOTONICS

15TH JUNE 16.30 – 18.15 ROOM A110 SESSION CHAIR ROBERTO PINI

16.30 - 17.00	I.06	**Development of two platforms for single cell optogenetics on in-vitro neuronal cultures** Clara Zaccaria
17.00 - 17.15	O.23	**Towards continuous near-patient therapeutic drug monitoring by an integrated optical device** Francesco Baldini
17.15 - 17.30	O.24	**Plasmonic sensor for the determination of SARS-CoV-2 exploiting molecularly imprinted polymers**

		Chiara Perri
17.30 - 17.45	O.25	**Functionalization of a Surface-Enhanced Raman Scattering substrate in a microfluidic chip for biochemical detection** Federica Granata
17.45 - 18.00	O.26	**Application of Surface-Enhanced Raman Spectroscopy for the detection of miRNA-based cancer biomarkers** Annamaria Cucinotta (Aizhan Issatayeva)
18.00 - 18.15	O.27	**Silicon-On-Insulator 1.3μm-Wavelength Optical Phased Array for Optical Coherence Tomography applications** Manuel Reza

OPTICAL NETWORKS AND TLC SYSTEMS

16TH JUNE 11.00 – 12.30 ROOM A102 SESSION CHAIR PIERPAOLO BOFFI

11.00 - 11.30	I.07	**Terabit direct-detection optical engines and switching circuits in multi-chip modules for Data-center networks and the 5G optical fronthaul** Annachiara Pagano
11.30 - 11.45	O.28	**Applicability of a new generation of photonic devices in backbone network scenarios** Marco Quagliotti
11.45 - 12.00	O.29	**Coexistence of VCSEL-based DMT transmission and standard OTN channels in the metropolitan area network scenario** Paola Parolari
12.00 - 12.15	O.30	**Optimization of 50G-PON APD-based receivers** Leonardo Minelli
12.15 - 12.30	O.31	**FTTH Optical Networks: Construction of infrastructures and evolution of optical cables** Massimo Tarsi

NANOMATERIALS AND NANOTECHNOLOGY IN OPTICAL SENSING

16TH JUNE 11.00 – 12.30 ROOM A108 SESSION CHAIR LUIGI ZENI

11.00 - 11.30	I.08	**Light at work at nanoscale: Tip-Enhanced Raman Spectroscopy** Giulia Rusciano

11.30 - 11.45	O.32	**Hydrogel-based Plasmonic Nanocomposites for Biochemical Sensing** Bruno Miranda
11.45 - 12.00	O.33	**Hydrogel doped by silver nanoparticles: employment in environmental remediation** Luca Burratti
12.00 - 12.15	O.34	**Polymer-based Nanoplasmonic Chemical Sensors and Biosensors** Francesco Arcadio
12.15 - 12.30	O.35	**Recent advances on rigid and flexible glass photonic structures activated by Rare-earth-doped SnO_2 nanocrystals** Lam T. N. Tran

APPLICATIONS OF PHOTONICS TECHNOLOGY

16TH JUNE 11.00 – 12.30 ROOM A110 SESSION CHAIR ALESSANDRO CHIASERA

11.00 - 11.30	I.09	**All-glass flexible 1D photonic crystals fabricated via RF-sputtering as dichroic mirrors** Alice Carlotto
11.30 - 11.45	O.36	**Integrated optofluidic Fabry-Perot resonator for sensing applications** Romeo Bernini
11.45 - 12.00	O.37	**Reservoir computing with a single microring: isolated response to nonlinear and memory tasks** Davide Bazzanella
12.00 - 12.15	O.38	**SERS detection of polyciclic aromatic hydrocarbons using coral-like nanostructured Ag-films** Angela Capaccio
12.15 - 12.30	O.39	**Organic light emitting devices (OLED): a playground for multidisciplinary research** Francesco Di Maiolo

PHOTONIC DEVICES AND INTEGRATED CIRCUITS

16TH JUNE 14.30 – 16.00 ROOM A102 SESSION CHAIR STEFANO AZZINI

14.30 - 15.00	I.10	**Low Noise 2.6 to 26 GHz Tenfold Frequency Multiplication by an InP Optical Comb** Giampiero Contestabile

15.00 - 15.15	O.40	**Commuted Mode SiGe Phototransistors for Time Modulated Array Applications** Andrea Giovannini
15.15 - 15.30	O.41	**On-chip wireless interconnection through reconfigurable optical phased arrays** Gaetano Bellanca
15.30 - 15.45	O.42	**Monitoring Visible Light in Silicon Nitride Waveguides** Christian De Vita
15.45 - 16.00	O.43	**Mitigating Polarization Rotation Effects in Thin-Film Lithium Niobate Waveguides** Gabriele Cavicchioli

DEEP LEARNING AND PROCESSING FOR TLC

16TH JUNE 14.30 – 16.00 ROOM A108 SESSION CHAIR PAOLO BETTOTTI

14.30 - 15.00	I.11	**Deep learning-based Phase Retrieval Scheme for Minimum Phase Signal Recovery** Daniele Orsuti
15.00 - 15.15	O.44	**End-to-end Deep Learning for VCSEL's Nonlinear Digital Pre-Distortion** Leonardo Minelli
15.15 - 15.30	O.45	**Deep Learning Regression vs. Classification for QoT Estimation in SMF and FMF Links** Andrea Carena
15.30 - 15.45	O.46	**Solitonic neuromorphic hardware for pattern recognition and memorization** Alessandro Bile
15.45 - 16.00	O.47	**Chaotic lasers provide physical unclonable functions for network authentication** Lorenzo Lombardi

OPTICAL FIBRE SENSORS

16TH JUNE 14.30 – 16.00 ROOM A110 SESSION CHAIR LETIZIA DE MARIA

14.30 - 15.00	I.12	**Unconventional optical fibers for biosensing** Sara Tombelli

15.00 - 15.15	O.48	**A microstructured fiber for Streptavidin detection** Foroogh Khozeymeh
15.15 - 15.30	O.49	**Toward the Development of Optical fibre-based Dosimeters and Radiation Sensors** Aurora Bellone
15.30 - 15.45	O.50	**Higher-order mode optical fiber tapers for refractive index sensing based on Brillouin scattering** Ester Catalano
15.45 - 16.00	O.51	**Evaluation of strain sensing cables for Brillouin optical time domain analysis through Swept Wavelength Interferometry** Gabriele Bolognini

POSTER SESSION

16TH JUNE 16.30 – 18.00

16.30 - 18.00	PS.01	**Novel generation schemes for stable soliton states in optical microcavities** Francesco Rinaldo Talenti
	PS.02	**Design of a Ho:Nd-codoped fluoroindate fiber for Mid-IR laser emission** Antonella Maria Loconsole
	PS.03	**Design of an erbium-doped fluoroindate fiber laser pumped at 635 nm** Mario Christian Falconi
	PS.04	**Numerical analysis of a 16-core fiber for high power applications** Seyyedhossein Mckee
	PS.05	**Optical bench for multi-lane high-rate transceiver testing** Annachiara Pagano
	PS.06	**Plasmonic metastructures tailored to stimulate high local heating** Giuseppe E. Lio
	PS.07	**Surface-enhanced Raman spectroscopy (SERS) for sensitive determination of catechol moieties fraction in chamomile extract** Chiara Amicucci
	PS.08	**Innovative optical system for online monitoring sag, rotation and ice accretion for AT and AAT lines** Elena Golinelli
	PS.09	**Optical Voltage Sensor for Embedded operation in equipment of Medium Voltage network under different environmental condition**

Letizia De Maria

PS.10 **UV-C LED sources design and characterization**

Sarah Bollanti

PS.11 **Single silicon microring resonator for time delay reservoir computing: from theory to preliminary experimental results**

Giovanni Donati

PS.12 **The influence of photoinitiator concentration on the two-photon polymerization threshold of pentaerythritol triacrylate (PETIA) monomer**

Seyyedhossein Mckee

PS.13 **Fiber-based Microwave Interferometer for monitoring the fiber-induced delay of antenna downlink in radioastronomic scenarios**

Jacopo Nanni

PS.14 **The analysis and design of a Variational Quantum Eigensolver on a silicon photonics chip**

Alessio Baldazzi

PS.15 **QUANTEP: the QUANtum Technologies Experimental Platform**

Andrea Salamon

PS.16 **Raman Efficiency estimation for integrated quantum-classical communication systems**

Alessandro Gagliano

PS.17 **Transverse roughness effects on loss and modal content in hollow-core tube lattice fibers**

Federico Melli

~~PS.18~~ ~~**Conventional and un-conventional lithographic techniques for high precision nano-device manufacturing**~~

~~Adriano Colombelli~~

PS.19 **Direct writing femtosecond-pulse fiber Bragg gratings for sensing and laser applications**

Martha Segura

PS.20 **2-FAL sensor system for industrial application**

Letizia De Maria

PS.21 **Experimental Evaluation of the Birefringence Effect on Fiber Optic Current Sensors**

Andrea Madaschi

PS.22 **A Raman spectroscopy ex vivo study of the potential role of Er:YAG laser and fluoride in the dental enamel remineralization**

Annamaria Cucinotta (Aizhan Issatayeva)

PS.23 **Hybrid Strain Sensors based on Hydrogel Plasmonic Nanocomposites**

Bruno Miranda

PS.24 **Linewidth narrowing and stabilization from a short cavity Brillouin ring laser source design for fiber sensing applications**

Leonardo Rossi

PS.25 **Analysis of a silicon subwavelength grating ring resonator as a refractometric sensor**

Foroogh Khozeymeh

PS.26 **Optoelectronics on fiber: towards all-in-fiber autonomous optrodes**

A. Ricciardi

PS.27 **Multifunctional lab-on-fiber smart cavity for biochemical sensing**

M. Giaquinto

PS.28 **Hierarchical binary structures as SERS-active substrates**

M. A. Cutolo, G. Quero, V. Calcagno, S. Spaziani, F. Galeotti, M. Pisco, A. Irace, G. Breglio, A. Cusano

PS.29 **Towards Advanced Lab-on-Fiber Optrodes based on All-Dielectric Fluorescence Enhancing Metasurfaces**

Hiba Alhalaby

PS.30 **Machine-learning assisted OFDR-based acoustic distributed sensing for restoration of information lost at fading point**

Arman Aitkulov

PS.31 **Photon harvesting in large-area flat-optics nanoarrays**

G. Ferrando, M. Barelli, M.C. Giordano, M.Gardella, D. Chowdhury, F. Buatier de Mongeot

PS.32 **Near-field spectroscopy investigation of the strong coupling between an infrared nanoantenna and a semiconductor quantum well**

S.Sotgiu, M. Malerba, A. Schirato, L. Baldassarre, R. Gilibert, V.Giliberti, M.Jeannin, J-M. Manceau, L. Li, A.G. Davies, E.H. Linfield, A. Alabastri, M. Ortolani, R. Colombelli

PS.33 **Tailored Epsilon Near Zero Metamaterials for Hyper Resolute Direct Laser Writing**

G.E.Lio, A. De Luca, M. Giocondo , R. Caputo

PS 34 **Monolithic integration of photonic integrated circuits with silicon photodiodes**

Martino Bernard, Fabio Acerbi, Mher Ghulinyan

PS 35 **Silicon oxynitride platform for integrated quantum photonics**

Gioele Piccoli, Matteo Sanna, Massimo Borghi, Lorenzo Pavesi, Mher Ghulinyan

PS 36 **A complex-valued perceptron as a photonic neural network for all-optical signal recovery**

Emiliano Staffoli, Mattia Mancinelli, Davide Bazzanella e Lorenzo Pavesi

LOCATION MAP

Polo Scientifico e Tecnologico “Fabio Ferrari”, Povo1

Via Sommarive 5, 38123 Povo, Trento