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28 June – 1 July 2021**



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Monday, June 28

Monday, June 28 8:30 - 9:30 (Europe/Stockholm)

Opening and ONDM 25th Jubilee Celebration

Chairs: Marija Furdek (Chalmers University of Technology, Sweden), Paolo Monti (Chalmers University of Technology, Sweden)

This year we are celebrating the 25th edition of ONDM. To mark the anniversary, the conference will open with a Jubilee Panel featuring participants that chaired past ONDM editions and played key roles in developing and growing the conference.

The panel will serve as a platform to briefly look back at the past editions of ONDM and focus on what the future holds for optical communications.

Monday, June 28 9:30 - 10:30 (Europe/Stockholm)

K1: Demand for optical technologies enable better fully connected world

Gabriel Charlet - Huawei Paris Research Center, Paris, France

Chair: Jarosław P. Turkiewicz (Warsaw University of Technology & Institute of Telecommunications, Poland)

The keynote summarizes the state of art of optical network and outlook demands of future optical usage and demands, and calls for enabling technologies and solutions. Optical communication has penetrated into many areas. Fibres are deployed in data centers, long-haul backbones, metro networks and FTTH access networks. With the continuous development of service requirements, optical network capabilities and requirements are evolving accordingly.

- Continuous bandwidth increasing. For example, access network bandwidth increases from 2.5 Gb/s to 10 Gb/s, transport network increases from 100 Gb/s to 200 Gb/s and 400 Gb/s per wavelength, and data center network increases from 400 Gb/s to 800 Gb/s per wavelength.
- The application scope of optical fibre networks is expanded, such as fibre to the room, fibre to the desktop, and fibre to the machine.
- From segmented optical networks to end-to-end converged networks
- Thanks to AI technologies, optical networks provide low-latency, high-reliability, and guaranteed experience services in an autonomous way. Then a natural question to be asked is: What is the next-generation optical technology? The presentation will discuss what will look like the future optical network, including:
- Higher bandwidth: 50Gb/s or even higher in access, 800Gb/s to 1.6Tb/s in long-haul and 1.6Tb/s within data center.
- Guaranteed lower latency and jitter down to 1/10 of current generation and 10 times higher reliability, 10 times higher power efficiency
- Go from fibre-to-everything to wireless optical-to-everything, for example FSO and LiFi, which breaks the limitation of optical fibre, from connecting homes to connecting more things.
- Support autonomous driven network supported by artificial intelligence.
- Extend from optical communication to a plethora of new applications incl. optical sensing networks; So how to draw the blue print of next generation and how to make it happen? This is question for all stakeholders in the optical ecosystem. They must work together to explore the next-generation optical applications and key

Monday, June 28 10:30 - 10:45 (Europe/Stockholm)

Coffee break

Monday, June 28 10:45 - 12:55 (Europe/Stockholm)

UMBC: Ultra Multi Band Communications

Chair: Fatima C Garcia-Gunning (Tyndall National Institute & University College Cork, Ireland)

10:45 Challenges in Extending Optical Fiber Transmission Bandwidth Beyond C+L Band and How to Get There...1

Henrique Buglia and Eric Sillekens (University College London, United Kingdom (Great Britain)); Anastasiia Vasylychenkova (Aston University, United Kingdom (Great Britain)); Wenting Yi, Robert I Killey, Polina Bayvel and [Lidia Galdino](#) (University College London, United Kingdom (Great Britain))
Invited

11:15 Network Comparison of C+L-Band Transparent Versus C-Band Translucent Upgrade...5

[Rasoul Sadeghi](#), Bruno Correia and Emanuele Virgillito (Politecnico di Torino, Italy); Antonio Napoli (Infinera, Germany); Nelson Costa (Infinera, Portugal); Joao Pedro (Infinera Unipessoal Lda & Instituto de Telecomunicações, Portugal); Vittorio Curri (Politecnico di Torino, Italy)

11:35 Investigating the Impact of Hybrid Raman-EDFAs in the Cost and Energy Efficiency of C+L Wideband Optical Networks...11

[Filippos Balasis](#) (KDDI-Research, Japan); Noboru Yoshikane and Takehiro Tsuritani (KDDI Research, Inc., Japan); Yuta Wakayama (KDDI Research, Japan)

11:55 Parameter Optimisation for Ultra-Wideband Optical Networks in the Presence of Stimulated Raman Scattering Effect...16

[Sam Nallaperuma](#), Nikita A. Shevchenko and Seb J Savory (University of Cambridge, United Kingdom (Great Britain))

12:15 Inter-Band GSNR Degradations and Leading Impairments in C+L Band 400G Transmission...22

[Andrea D'Amico](#), Elliot P. E. London and Emanuele Virgillito (Politecnico di Torino, Italy); Antonio Napoli (Infinera, Germany); Vittorio Curri (Politecnico di Torino, Italy)
Short Paper

12:35 Ultra-Wideband Information Throughput Attained via Launch Power Allocation...25

[Nikita A. Shevchenko](#), Sam Nallaperuma and Seb J Savory (University of Cambridge, United Kingdom (Great Britain))
Short Paper

Monday, June 28 12:55 - 14:00 (Europe/Stockholm)

Lunch break

Monday, June 28 14:00 - 16:00 (Europe/Stockholm)

WS1: Micro-service based autonomic traffic control in 5G and beyond

Chair: Ricard Vilalta (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain)

TeraFlow will be a new type of secure cloud-native SDN controller that will radically advance the state-of-the-art in beyond 5G networks. This new SDN controller shall be able to integrate with the current NFV and MEC frameworks as well as to provide revolutionary features for both flow management (service layer) and optical/microwave network equipment integration (infrastructure layer) while incorporating security using Machine Learning (ML) and forensic evidence for multi-tenancy based on Distributed Ledgers.

The target pool of stakeholders expands beyond the traditional telecom operators towards the edge and hyperscale cloud providers. These actors will be benefited from TeraFlow by a) exploiting a new type of secure SDN controller based on cloud-native solutions while, and b) achieving substantial business agility with novel and highly dynamic network services with zero-touch automation features.

This workshop intends to create awareness of multiple aspects of TeraFlow SDN controller. In this sense, discussion with related stakeholders will provide interesting feedback in order to update TeraFlow requirements.

WS2: Hexa-X workshop on 6G vision

Chairs: Patrik Rugeland (Ericsson Research, Sweden), Tommy Svensson (Chalmers University of Technology, Sweden), Mikko Uusitalo (Nokia Bell Labs, Finland)

The EU commission recently granted the 2.5 y Hexa-X project (H2020 ICT-52) to be the European Flagship project on explorative research towards 6G. With 25 partners from leading academic institutions and industry players, the project aims to lay the foundation for 6G, an area that will be of key importance in the technical evolution in the coming decade. The project will establish a vision for the future networks of 2030 addressing the envisioned use cases and services. The 6G networks will be designed based on the fundamental principles of trustworthiness, sustainability and digital inclusion. The project will explore a plethora of technical enablers related to e.g. enhanced radio performance and combined communication and localization/sensing; Connected intelligence with integrated AI/ML; Network evolution expansion, exploring new network architectures and novel verticals.

As the Hexa-X project will be the European 6G flagship project, interactions with other projects and initiatives will be crucial and the workshop presents an important venue for initiating collaboration and sharing of results. The project is not directly conducting research on optical networks but foresees that the technology will be an integral part in providing high performance and low latency backhaul and fronthaul to the core and access network and the workshop has invited leading experts in the field of optical networks to present the academic and industrial view point.

The workshop will also provide an overview of the Hexa-X vision for 6G for 2030, including use cases and key performance and value indicators. In addition, the workshop will host a panel discussing the aspects brought by the Hexa-X project and the invited speakers.

Monday, June 28 16:00 - 16:15 (Europe/Stockholm)

Coffee break

Monday, June 28 16:15 - 18:25 (Europe/Stockholm)

G2E: Go2Edge

Chair: Ramon Casellas (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain)

16:15 Go2Edge Intro...N/A

Ramón J. Durán Barroso (University of Valladolid, Spain); Ignacio de Miguel (Universidad de Valladolid, Spain); David Larrabeiti (Universidad Carlos III de Madrid, Spain)

Short Paper

16:25 SD-WAN: How the Control of the Network Can Be Shifted from Core to Edge...28

Sebastian Troia, Ligia Maria Moreira Zorello and Guido Maier (Politecnico di Milano, Italy)

Invited

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Camilo Anzola-Rojas (Universidad de Valladolid, Spain); Ramón J. Durán Barroso (University of Valladolid, Spain); Ignacio de Miguel and Noemí Merayo (Universidad de Valladolid, Spain); Juan Carlos Aguado, Patricia Fernández, Rubén M. Lorenzo and Evaristo J. Abril (University of Valladolid, Spain)

Short Paper

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Sandip Das (Trinity College Dublin, Ireland); Marco Ruffini (CONNECT, Trinity College Dublin, Ireland)

18:05 Dimensioning Flex Ethernet Groups for the Transport of 5G NR Fronthaul Traffic in C-RAN Scenarios...39

José Alberto Hernández, Gabriel Otero Pérez and David Larrabeiti (Universidad Carlos III de Madrid, Spain); Oscar González de Dios (Telefonica I+D, Spain)

Short Paper

Tuesday, June 29

Tuesday, June 29 8:30 - 10:30 (Europe/Stockholm)

5G: Optical Networks in Support of 5G

Chair: Carla Raffaelli (University of Bologna, Italy)

8:30 Investigation on NOMA Based 60 GHz Radio-Over-Fiber Fronthaul Links...42

Christina Lim (University of Melbourne, Australia); Yijie Tao and Ampalavanapillai Nirmalathas (The University of Melbourne, Australia)

Invited

9:00 SDN-Based RAN Protection Solution for 5G, an Experimental Approach...45

Minqi Wang (Orange Labs, France); Gael Simon (Orange, France); Isabel Amigo (IMT Atlantique, France); Luiz Anet Neto (Imt-atlantique, France); Loutfi Nuaymi (IMT Atlantique, France); Philippe Chanclou (Orange Labs, France)

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Gabriel Otero Pérez, David Larrabeiti and José Alberto Hernández (Universidad Carlos III de Madrid, Spain); Juan Pedro Fernández-Palacios (Telefónica I+D, Spain); Ricardo Martinez (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain); Michela Svaluto Svaluto Moreolo (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain)

Short Paper

10:00 Specialty Fibers Exploiting Spatial Multiplexing for Signal Processing in Radio Access Networks...57

Mario Ureña and Rubén Guillem (Universitat Politècnica de València, Spain); Sabahat Shaheen (Universitat Politècnica de València & ITEAM Research Institute, Spain); Sergi Garcia Cortijo (Universitat Politècnica de Valencia, Spain); Elham Nazemosadat (ITEAM Research Institute, Universitat Politècnica de València, Spain); Itandehui Gris-Sanchez and Ivana Gasulla (Universitat Politècnica de València, Spain)

Invited

Tuesday, June 29 10:30 - 10:45 (Europe/Stockholm)

Coffee break

Tuesday, June 29 10:45 - 12:25 (Europe/Stockholm)

ANR: Advances in Network Routing

Chair: Georgios Ellinas (University of Cyprus, Cyprus)

10:45 Adaptive Snapshot Routing Based on Space Debris Risk Perception in Satellite Optical Networks...60

Zhuangzhuang Ma, Yongli Zhao, Wei Wang, Xiangjun Xin and Jie Zhang (Beijing University of Posts

and Telecommunications, China)

11:05 Wavelength Selective Photonic Integrated Switches for ROADM Node Functionality in Ultrahigh Capacity Metro Network...66

Netsanet Tessema (University of Eindhoven & COBRA Research Institute, The Netherlands); Giovanni Delrosso (VTT Technical Research Centre of Finland, Finland); Srivathsa Bhat (VTT Research Centre of Finland, Finland); Kristif Prifti (Eindhoven University of Technology, The Netherlands); Aref Rasoulzadehzali and Yu Wang (Eindhoven University of Technology, The Netherlands); Timo Aalto (VTT Technical Research Centre of Finland, Finland); Ripalta Stabile (Technical University of Eindhoven, The Netherlands); Nicola Calabretta (COBRA Research Institute, The Netherlands)

Invited

11:35 Blockchain-Based Connectivity Provisioning in Multiple Transport SDN Domains...71

Pol Alemany, Ricard Vilalta, Raul Muñoz, Ramon Casellas and Ricardo Martinez (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain)

Short Paper

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Cristina Klippel Dominicini (Instituto Federal do Espírito Santo (IFES), Brazil); Rafael Silva Guimaraes (Federal Institute of Espirito Santo - Campus Cachoeiro de Itapemirim, Brazil); Diego Mafioletti (Federal University of Espirito Santo, Brazil); Magnos Martinello (Federal University of Espirito Santo, Brazil); Moises R. N. Ribeiro (Federal University of Espirito Santo, Brazil); Rodolfo S Villaca (Federal University of Espirito Santo (UFES), Brazil); Frédéric Loui (RENATER, France); Jordi Ortiz (University of Murcia, Spain); Frank Slyne (Connect Research Centre - Trinity College Dublin, Ireland); Marco Ruffini (CONNECT, Trinity College Dublin, Ireland); Eoin Kenny (HEAnet, Ireland)

Invited

Tuesday, June 29 12:25 - 13:30 (Europe/Stockholm)

Lunch Break

Tuesday, June 29 13:30 - 15:30 (Europe/Stockholm)

WS3: AI-NET-PROTECT Workshop

Chairs: Carmen Mas-Machuca (Technical University of Munich, Germany), Lena Wosinska (Chalmers University of Technology, Sweden)

Network evolution has lately been led by new mobile technologies (5G/6G), edge-centric computation, and artificial intelligence. The protection of critical data as well as guaranteeing various stringent service requirements such as very high throughput, ultra-low latency, high availability, and security, are some of the challenges faced by network operators, which are also addressed in this workshop.

The workshop is proposed by the CELTIC-Next flagship project AI-NET PROTECT (Providing Resilient & secure networks [Operating on Trusted Equipment] to CriTical infrastructures), which aims at providing automated resilience and security for networks operated on trusted equipment, critical infrastructures, and enterprises. During the workshop, different case studies on network automation and

machine learning performed in the frame of the project will be discussed.

The workshop will consist of 7 short presentations given by the representatives from Network operators, system providers, and academia, and will finish with a panel discussion.

WS4: New generation networks: How will 5G change networks, our life, and our bank account?

Chair: Andrea Di Giglio (Telecom Italia, Italy)

The workshop aims to show photographs of some aspects of the next generation (5G) networks under various aspects, not necessarily technical ones. In fact, presentations regarding new transmission, control or traffic technologies will also focus on economic aspects and 5G is also seen in the perspective of an exceptional investment opportunity.

Apart from the moderator, the participants in the Panel will all be women, giving the workshop not only a very high technical level, but also a sensitivity that male researchers often do not have. The successful researchers who will participate in the panel can serve as an example to girls who want to pursue this career.

Tuesday, June 29 15:30 - 15:45 (Europe/Stockholm)

Coffee break

Tuesday, June 29 15:45 - 16:45 (Europe/Stockholm)

K2: 6G Wanderlust: Toward the Internet of No Things to "See the Invisible"

Martin Maier - Institut National de la Recherche Scientifique (INRS), Montréal, Canada

Chair: Carmen Mas-Machuca (Technical University of Munich, Germany)

The title of this keynote is inspired by Jeff Bezos' latest book *Invent & Wander*. In it, among others, readers learn why it's all about the long term, how a willingness to fail is closely connected to innovation, and what the Covid-19 pandemic has taught us. Each insight offers new ways of thinking through today's challenges - and more importantly, tomorrow's - and the never-ending urgency of striving ahead, never resting on one's laurels. The essence of this day 1 mindset may be best captured by the wonderful word "wanderlust," the irresistible urge or desire to wander far away and discover the world at the end of your comfort zone. The keynote presents recent work paving the way for the future Internet of No Things. While 5G was supposed to be about the Internet of Everything, to be transformative 6G might be just about the opposite of Everything, that is, Nothing or, more technically, No Things. In addition to the recently emerging invisible-to-visible (I2V) technology concept, the keynote explores the convergence of AI-enhanced multi-access edge computing (MEC), intelligent mobile robots, and blockchain technologies to help realize the Internet of No Things as a useful stepping-stone toward realizing the far-reaching vision of future 6G networks, ushering in the 6G post-smartphone era and the delivery of advanced extended reality (XR) experiences, e.g., sixth-sense perceptions.

Tuesday, June 29 16:45 - 18:35 (Europe/Stockholm)

NOV: Network Orchestration and Virtualization

Chair: Ricardo Martinez (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain)

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Anna Tzanakaki (National and Kapodistrian University of Athens, Greece); Markos Anastasopoulos (University of Bristol, United Kingdom (Great Britain)); Alexandros Manolopoulos (National Kapodistrian University of Athens, Greece); Dimitra Simeonidou (University of Bristol, United Kingdom (Great Britain))

Invited

17:15 Orchestrating Virtualized Core Network Migration in OpenROADM SDN-Enabled Network...80

Shunmugapriya Ramanathan (University of Texas at Dallas, USA); Koteswararao Kondepu (Indian Institute of Technology Dharwad, India); Tianliang Zhang, Behzad Mirkhazadeh and Miguel Razo (University of Texas at Dallas, USA); Marco Tacca (The University of Texas at Dallas, USA); Luca Valcarengi (Scuola Superiore Sant'Anna, Italy); Andrea Fumagalli (UTD, USA)

17:35 Break

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Invited

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Wednesday, June 30

Wednesday, June 30 8:30 - 10:20 (Europe/Stockholm)

FON: Flexgrid Optical Networks

Chair: Nihel Djoher-Benzaoui (Bell Labs, France)

8:30 Evaluation of Lightpath Deployment Strategies in Flexible-Grid Optical Networks...97

Amir Varasteh (Technische Universität München, Germany); Sai Kireet Patri (ADVA, Germany); Achim Autenrieth (ADVA Optical Networking, Germany); Carmen Mas-Machuca (Technical University of Munich, Germany)

8:50 Spectrum Defragmentation with Improved Lightpath Migration Scheme in Flex-Grid Networks...103

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Short Paper

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Patricia Morales, Patricia Franco and Astrid Lozada (Universidad Técnica Federico Santa María, Chile); Nicolás Jara (Universidad Técnica Federico Santa María, Chile); Felipe Calderón, Juan Ignacio Pinto-Ríos and Ariel Leiva (Pontificia Universidad Católica de Valparaíso, Chile)

9:50 Enabling High Capacity Flexible Optical Networks...118

Fatima C Garcia-Gunning (Tyndall National Institute & University College Cork, Ireland); Amandeep Kaur (Tyndall National Institute, Ireland); Natalia Cañas-Estrada (Tyndall National Institute & University College Cork, Ireland); Julie Raulin and Yuliya Verbishchuk (University College Cork & Tyndall National Institute, Ireland); Cormac J. Sreenan (University College Cork, Ireland)
Invited

Wednesday, June 30 10:20 - 10:35 (Europe/Stockholm)

Coffee break

Wednesday, June 30 10:35 - 11:35 (Europe/Stockholm)

K3: Adversaries in the network

Sandra Scott-Hayward - Queen's University Belfast, Belfast, United Kingdom
Chair: David Larrabeiti (Universidad Carlos III de Madrid, Spain)

The communication networks on which we rely for so many aspects of our daily lives are constantly under attack. This is increasingly the case as we have adapted to remote working, schooling, health service provision, etc. The emergence of technologies such as Software-Defined Networking (SDN), Network Functions Virtualization (NFV), and Multi-Access Edge Computing (MEC) enable innovation in network security, but these technologies create additional attack surfaces. Dramatic advances in Machine Learning (ML) and Artificial Intelligence (AI) techniques are influencing security services and design for security, but they can also be exploited to produce sophisticated attacks. In this keynote, we will discuss the latest research on security in the networks of the future. We specifically consider adversaries in the network; how do we deal with adversarial attacks targeting ML-based network systems or programmable data planes? What do protections against adversarial attacks look like? Assuming that we can never guarantee security, can we optimize the security profile of the network?

Wednesday, June 30 11:35 - 12:55 (Europe/Stockholm)

QN1: Quantum networks

Chair: Rui Lin (Chalmers University of Technology & Huazhong University of Science and Technology, Sweden)

11:35 *Building a Dynamic Quantum Network: From Quantum Security to Quantum Internet...N/A*

Reza Nejabati (University of Bristol, United Kingdom (Great Britain))

Invited

12:35 *On the Availability of the Decoy State BB84 QKD over a Terrestrial FSO Link...121*

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(National Technical University of Athens, Greece)

Wednesday, June 30 12:55 - 14:00 (Europe/Stockholm)

Lunch break

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NGOAN: Next Generation Optical Access Networks

Chair: Marco Ruffini (CONNECT, Trinity College Dublin, Ireland)

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Rene Bonk (Nokia Bell Labs, Germany)

Invited

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Leslie Rusch (Université Laval, Canada); Xun Guan (Laval University, Canada); Wei Shi (University of British Columbia, Canada)

Invited

Wednesday, June 30 15:50 - 16:05 (Europe/Stockholm)

Coffee break

Wednesday, June 30 16:05 - 18:35 (Europe/Stockholm)

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Chair: Federico Tonini (Chalmers University of Technology, Sweden)

Adapting the Classical Optical Communication Simulation Framework for Continuous-Variable Quantum Key Distribution Simulations...N/A

Essam Berikaa (McGill University, Canada); Fabio Cavaliere (Ericsson Telecomunicazioni, Italy); Jinsong Zhang (McGill University, Canada); Ramon Gutierrez-Castrejon (Universidad Nacional Autonoma de Mexico - UNAM, Mexico); Luca Giorgi and Antonio D'Errico (Ericsson, Italy); Stephane Lessard (Ericsson, Canada); David Plant (McGill University, Canada)
Short Paper

Softwarized and Autonomous Management of Photonic Switching Systems Using Machine Learning...N/A

Ihtesham Khan, Muhammad Umar Masood and Lorenzo Tunesi (Politecnico di Torino, Italy); Enrico Ghillino (Synopsys, Inc, Italy); Paolo Bardella, Andrea Carena and Vittorio Curri (Politecnico di Torino, Italy)
Short Paper

Statistical Analysis of GSNR Fluctuations Due to Physical Layer Uncertainties...N/A

Giacomo Borraccini, Andrea D'Amico, Andrea Carena and Vittorio Curri (Politecnico di Torino, Italy)
Short Paper

Network Topology Optimization for Optical Networks in Aircraft Using MILP...N/A

Bjoern Annighoefer, Adrian Zeyher and Johannes Reinhart (University of Stuttgart, Germany)

Optimization of Shared-Laser Coherent Transceiver for Short-Reach Links...N/A

Giuseppe Rizzelli and Roberto Gaudino (Politecnico di Torino, Italy)
Short Paper

Exploration of Optical Signal QoT Margin with Intelligent WSS Filtering Penalty Estimator Using Neural Network...N/A

Tianliang Zhang (The University of Texas at Dallas); Mustafa Al-Qadi (The University of Kansas, USA); Rongqing Hui (The University of Kansas); Andrea Fumagalli (The University of Texas at Dallas)

A Resource Sharing Method for Reliable Slice as a Service Provisioning in 5G Metro Networks...N/A

Elisabetta Amato (University of Bologna, Italy); Federico Tonini (Chalmers University of Technology, Sweden); Carla Raffaelli (University of Bologna, Italy); Paolo Monti (Chalmers University of Technology, Sweden)
Short Paper

Dynamic Selection of User Plane Function in 5G Environments...N/A

Viktoria-Maria Alevizaki (National and Kapodistrian University of Athens, Greece); Markos Anastasopoulos (University of Bristol, United Kingdom (Great Britain)); Anna Tzanakaki (National and Kapodistrian University of Athens, Greece); Dimitra Simeonidou (University of Bristol, United Kingdom (Great Britain))
Short Paper

Software-Defined Optical Intra-Rack Network Architecture and MAC Protocol for Data Centers...N/A

Peristera A. Baziana (University of Thessaly, Greece)

Wednesday, June 30 16:05 - 17:55 (Europe/Stockholm)

RSA: Routing and Spectrum Assignment

Chair: Salvatore Spadaro (Universitat Politecnica de Catalunya (UPC), Spain)

16:05 Adaptive Link-By-Link Band Allocation: A Novel Adaptation Scheme in Multi-Band Optical Networks...142

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George N. Rouskas and Chaitanya Bandikatla (North Carolina State University, USA)
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Brigitte Jaumard and Quang Anh Nguyen (Concordia University, Canada)

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Short Paper

Thursday, July 1

Thursday, July 1 8:30 - 10:20 (Europe/Stockholm)

NPR: Network Performance and Resilience

Chair: Isabella Cerutti (Joint Research Centre, Italy)

8:30 Design and Performance Evaluation of Resilient Optical Path Networks That Adopt Spatially-Jointed Flexible Waveband Routing...166

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(Nagoya University, Japan)

8:50 Usage of Graph Neural Network for Large-Scale Network Performance Evaluation...172

Cen Wang, Noboru Yoshikane and Takehiro Tsuritani (KDDI Research, Inc., Japan)

9:10 A Scalable Telemetry Framework for Zero Touch Optical Network Management...177

Luca Valcarenghi and Alessandro Pacini (Scuola Superiore Sant'Anna, Italy); Andrea Sgambelluri (Scuola Superiore Sant'Anna Pisa, Italy); Francesco Paolucci (CNIT, Italy)

Invited

9:40 Traffic Protection in Multilayer Core Networks by Optimum Thinning of MPLS Tunnel Capacities...183

Ronald Romero Reyes and Shkurte Esati (Technische Universität Chemnitz, Germany); Thomas Bauschert (Chemnitz University of Technology, Germany)

10:00 Minimum Disturbance Rerouting to Optimize Bandwidth Usage...189

Huy Quang Duong (Centre de Recherche Informatique de Montréal, Canada); Brigitte Jaumard (Concordia University, Canada); David Coudert (Université Côte d'Azur, Inria, CNRS, I3S, France)

Thursday, July 1 10:20 - 10:35 (Europe/Stockholm)

Coffee break

Thursday, July 1 10:35 - 12:35 (Europe/Stockholm)

OND: Optical Network Design

Chair: Chathurika Ranaweera (Deakin University, Australia)

10:35 On Short- and Long-Term Traffic Prediction in Optical Networks Using Machine Learning...195

Michal Aibin (British Columbia Institute of Technology, Canada & Northeastern University, USA); Nathan Chung, Tyler Gordon, Liam Lyford and Connor Vinchoff (British Columbia Institute of Technology, Canada)

10:55 Optical Metro Network Design with Low Cost of Equipment...201

Oleg Karandin, Omran Ayoub, Memedhe Ibrahim and Francesco Musumeci (Politecnico di Milano, Italy); Andrea Castoldi and Rosanna Pastorelli (SM-Optics, Italy); Massimo Tornatore (Politecnico di Milano & University of California, Davis, Italy)

Invited

11:25 Transmission-Aware Bandwidth Variable Transceiver Allocation in DWDM Optical Networks...205

Dmitry Khomchenko (VPI Development Center, Belarus); Sai Kireet Patri and Achim Autenrieth (ADVA, Germany); Carmen Mas-Machuca (Technical University of Munich, Germany); Andre Richter (VPIphotonics, Germany)

11:45 Point-To-Multipoint Coherent Optics for Re-Thinking the Optical Transport: Case Study in 5G Optical Metro Networks...211

Nina Skorin-Kapov (Centro Universitario de Defensa, CUD San Javier, Spain); Francisco-Javier Moreno-Muro (ATOS Research and Innovation, Spain); Maria Victoria Bueno (UPCT, Spain); [Pablo Pavon-Marino](#) (Technical University of Cartagena, Spain)

Invited

12:15 On the Impact of Billing Cycles on Compensations in Network SLAs...215

[Tobias Enderle](#) (University of Stuttgart, Germany)

Thursday, July 1 12:35 - 13:35 (Europe/Stockholm)

Lunch break

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QN2: Quantum networks

Chair: Rui Lin (Chalmers University of Technology & Huazhong University of Science and Technology, Sweden)

13:35 Quantum Technologies for Future Quantum Optical Networks...221

[Alberto Gatto](#) (Politecnico di Milano, Italy); Juan Brito (Center Computational Simulation - Universidad Politecnica de Madrid, Spain); Marco Brunero (Cohaerentia, Italy); Dileepsai Bodanapu (Consiglio Nazionale delle Ricerche, Italy); Rubén Méndez and Rafa Vicente (Universidad Politécnica de Madrid, Spain); Paolo Comi (Italtel, Italy); Vicente Martin (Universidad Politecnica de Madrid, Spain); Paolo Martelli (Politecnico di Milano, Italy)

Invited

14:05 Integration of QKD in WDM Networks...226

[Paolo Martelli](#) and Alberto Gatto (Politecnico di Milano, Italy); Marco Brunero (Cohaerentia, Italy); Dileepsai Bodanapu (Consiglio Nazionale delle Ricerche, Italy); Mariangela Rapisarda (Politecnico di Milano, Italy); Paolo Comi (Italtel, Italy); Mario Martinelli (Politecnico di Milano, Italy)

Invited

Thursday, July 1 14:35 - 14:45 (Europe/Stockholm)

Coffee break

Thursday, July 1 14:45 - 16:15 (Europe/Stockholm)

WS5: Female talent in engineering and photonics: the way up

Chairs: Marija Furdek (Chalmers University of Technology, Sweden), David Larrabeiti (Universidad Carlos III de Madrid, Spain), Michela Svaluto Svaluto Moreolo (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain)

This workshop aims at identifying issues pertinent to the representation of women in scientific and engineering careers, dissecting challenges in nurturing female talent, and identifying strategies for retaining it. The event will take place in the form of a panel, bringing together leaders from academia and industry, and engaging them in a dynamic discussion with the audience. The status of women in the field of optical networking and photonics will be discussed as a sample of the situation in a concrete engineering area.

Some of the questions we will try to answer include:

- What are the main causes of female talent drain from industry and research centers?
- Are existing equality-oriented policies enough?
- How to transform the widely adopted image of a scientist as a male?
- How to strengthen female mentorship?
- What is the current status of women in research on optical networking and photonics?

Thursday, July 1 16:15 - 17:00 (Europe/Stockholm)

Best paper awards and closing ceremony

Chairs: Marija Furdek (Chalmers University of Technology, Sweden), Paolo Monti (Chalmers University of Technology, Sweden)