**ECOC 2017 Programme overview**

### TUESDAY 19 SEPTEMBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00-15:30</td>
<td>M.1.A</td>
<td>Opening Ceremony and Plenary Session - Congress Hall</td>
</tr>
</tbody>
</table>

**MONDAY 18 SEPTEMBER**

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30-10:00</td>
<td>W.1.A</td>
<td>Coffee - Exhibition Hall</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>W.2.A</td>
<td>Exhibition Only Time</td>
</tr>
<tr>
<td>12:00-13:30</td>
<td>W.2.A</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13:30-15:00</td>
<td>W.1.A</td>
<td>Coffee - Exhibition Hall</td>
</tr>
</tbody>
</table>

**WEDNESDAY 20 SEPTEMBER**

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30-12:00</td>
<td>W.1.A</td>
<td>Coffee - Exhibition Hall</td>
</tr>
</tbody>
</table>

### ECOC 2017 Topics

1. **Fibres, Fibre Devices and Fibre Amplifiers**
   - Optical fibre design, fabrication and characterisation
   - Physics of light propagation in optical fibres
   - Fibre amplifiers and fibre lasers
   - Fibre based devices for telecommunications, sensing and other applications
   - Highly nonlinear fibres and their applications for nonlinear optical communication systems
   - Specialty optical fibres for improved linear and nonlinear transmission performance

2. **Integrated Optoelectronic Devices and Optical Processors**
   - Design, fabrication and characterisation of devices and components
   - Novel integrated devices and functionalities
   - Novel integrated light sources, directly modulated lasers and VCSELs in bulk, quantum well, quantum dot or other materials
   - Integrated III-V – including InP and GaAs, modulators, detectors, amplifiers and switches
   - Silicon and hybrid III–V – silicon photonics for data modulation, detection, amplification, switching and interconnecting
   - Packaging of advanced novel devices, testing of performance and reliability
   - Novel material platforms and structured materials such as photonic crystals, plasmonics, graphene a.o.
   - Integrated nonlinear waveguides on various material platforms for optical signal processing

3. **Digital Techniques for Optical Communication Systems**
   - Modelling, design, and implementation of digital signal processing for long– haul, to medium– and short–range optical communication link systems
   - Novel digital signal processing algorithms for optical transmitters and receivers, and DSP algorithms with reduced complexity
   - Novel error correction coding, advanced data encoding and signal shaping for optical communication link systems
   - Schemes for impairment mitigation, increased spectral efficiency and mutual information, including nonlinear Fourier transformation and digital back–propagation

4. **Transmission Subsystems and Optical Network Elements**
   - Modelling, design, implementation and test of optical, optoelectronic, or electrical (incl. DAC/ADC) subsystems
   - Line terminals, optical transmitter and receiver subsystems for advanced modulation formats and increased speed and/or capacity
   - Multiplexing and demultiplexing subsystems for advanced and/or spectrally efficient data formats including DMT, OFDM, OQAM and Nyquist–WDM
   - Optical performance monitoring techniques and subsystems
   - Subsystems for network functionalities, including e.g. wavelength-selective switching, add–drop multiplexing, optical switching, optical packet routing, system-on–a–chip (SoC) and on–chip networks
   - Analogue signal processing subsystems and novel schemes of nonlinear optical signal processing for subsystem–functions

5. **Datacom and Computercom Hardware**
   - Deployable technology, like real–time online processing systems and low–cost solutions, including novel packaging of integrated optics and parallel transceivers, and Si photonics low–cost solutions
   - Demonstrations, network deployments and field trials using novel architectures and/or novel switching schemes and technologies, including SDM over WDM, TDM, OSF optical switching and/or hybrid electronic/optical or all–electronic switching
   - Data center and HPC energy (High–Performance Computing Systems) specific hardware, including VCSEL based parallel links with advanced modulation, hybrid integrated electronic/optical engines for broadband interconnect and WDM/WDM interconnects
   - Demonstrations using novel network devices, including nanophotonic high–density components for on–chip connections, as well as integrated spatial multiplexers for high–density parallelism, novel interconnects and transceivers

6. **Point–to–Point Transmission Links**
   - Transmission system modeling
   - Lab and field implementation of optical fibre transmission links
   - Lab and field implementation of free–space optical and THz wireless transmission links
   - Satellite communication links
   - Transmission system level implications of physical impairments and impairment mitigation techniques
   - Capacity, reach, flexibility of optical transmission systems and solutions to overcome the current limitations
   - Demonstrations of combined novel fibres, devices, subsystems and multiplexing techniques in transmission experiments
   - Quantum communication systems

7. **Core, Metro, and Data Center Networks**
   - Network aspects of architecture, planning and scaling of broad–band optical transport for circuit– and packet–switched core, metro and data center networks, including cost and energy considerations
   - Control, orchestration, and management functions, as well as integration with higher layer network services
   - Network deployments and field trials
   - Architecture, planning and scaling of optical transport for inter– and intra–data center and HPC networks
   - Network management, control plane design and orchestration of data centers and HPCs for photonic and hybrid photonic/electronic interconnects
   - Energy, scalability, latency considerations for data center and HPC networks

8. **Access, Local Area and Indoor Networks**
   - Photonics for 5G technologies
   - Photonics for Cloud services
   - Fiber–to–the–premises (FTTx)
   - Passive optical access networks
   - In–building optical networks
   - Radio–over–fiber systems
   - Optical free–space communication systems
   - Hybrid wireless/optical free–space network solutions
Dear Friends and Optical Colleagues from all over the world,

The joint Chairs wish you warmly welcome to the 43rd ECOC held in the city of Gothenburg, Sweden.

We believe you will find ECOC 2017 an exhilarating and concentrated mixture of technological and social connectivity. The conference, the exhibition, the venue, and the city itself are all practically on top of each other, giving you the best possible opportunity to connect with science, colleagues, customers, companies, and products from the entire globe.

The city of Gothenburg is the second largest city in Sweden, an old 17th century seaport with a fortified and moated old town. Dutch and British merchants were prominent in its early days, and the city was originally laid out with canals instead of streets to assist the transport mode of those days - ships - long before optical fibre. Today, the old fortifications and canals are mixed with a modern and charming maritime city with everything within walking distance from the conference venue. The Gothenburgers are known for their friendly and open attitude, and English is spoken everywhere.

ECOC 2017 is a Nordic conference; Sweden, Denmark, Norway, and Finland all co-operate for the event. The Nordic countries are well known for their leading industries and communication technologies and we hope you will take the opportunity to extend and improve your business in all of Scandinavia. We will be happy to assist you with business contacts for all countries.

This year, we are aiming at the first Environmental Certification of an ECOC Conference. Both the city and the venue are top-ranked in sustainability, and we have been working through all conference processes against the standard “Svensk Miljöbas”. The biggest challenge, however, is not the eco-cookies for the coffee, but the approximately 1 500 tonnes of carbon that a typical ECOC emits in terms of air travel. Despite all our efforts on Optical Communication… We have therefore introduced the “Green Platinum Sponsor” level that specifically supports the CO2-compensation for the air travel. We hope this, quite necessary, arrangement will continue and become the premier sponsoring item.

The Social Programme is as full as usual, the get-together after the workshops, an evening at the science center across the street from the conference, a concert, and a conference dinner down in the old harbour sheds. Also, the town is only a few minutes by foot or tram away, so do take a break and enjoy the old town.

On the technical side, the developments in coherent systems and advanced modulation are fascinating. “Light” today is just another carrier, and we treat it like radio technology, but at 193 THz. Amazing. With systems pretty much up at the Shannon limit and good old Ethernet at 400 Gb/s, it seems that Fibre-To-The-Home has, shall we say, sufficient capacity for the moment? Probably, quite a few of us have 10Gb/s Ethernet at home, but with low utilization… Instead, Datacenters have emerged as the bandwidth-guzzler, but with different topology, distances and challenges than access networks. But the power, size and cost focus is even stronger. This new direction is evident in the creation of a new Subcommittee at ECOC this year - “Datacom and Computercom Hardware”. And Sunday’s are not free anymore, as you may have noticed.

The ECOC workshop series is transforming into a full-day, six-parallell-session event and a dynamic discussion platform for the very latest issues - don’t miss it.

In all, ECOC is at the leading tech - and social - edge as usual, and we hope you take the opportunity to enjoy both the technical and social scene here in Gothenburg.

Once again, warmly welcome,
ECOC 2017 COMMITTEES

General Chair
Per O. Andersson
RISE Acreo AB, Sweden

Technical Programme Committee Chair
Peter Andriksson
Chalmers University of Technology, Sweden

Technical Programme Committee Chair
Leif Katus
Optoelectronics Institute, Denmark

Local Organising Committee

Anita Sundström
Sweden Meetx, Sweden

Nanna Borch
Nokia Bell-Labs, Singapore

Stefan Dahlfort
Ericsson, Sweden

Per G Andersson
RISE Acreo AB, Sweden

Technical Programme Committee (TPC) members

European Management Committee (EMC)
Per O. Andersson, RISE Acreo AB, Sweden
Jean-Pierre Homaize, Nokia Bell-Labs, France
Jose Capmany, University Politecnica de Valencia, Spain
Piers Gambini, ST Microelectronics, Italy
Ronald Freuden, Fraunhofer Heinrich Hertz Institute, Germany
Leif Katus, Optoelectronics Institute, Denmark
Jurgen Leuthard, ETH Zurich, Switzerland
Ton Kosonen, COBRA TU Eindhoven, The Netherlands
David Richardson, ORC – University of Southampton, UK
Giancarlo Prati, Scuola Superiore S. Anna, Pisa, Italy
Will Stewart, University of Southampton, UK
Per van Daze, IMEC – Ghent University, Belgium
Jörg Peter Elbers, ADVA Optical Networking, Germany
Christian Lemminkas, University of Technology of Troyes, France

International Advisory Committee (IAC) members
Rod Altmann, University of California, Santa Barbara, USA
Simon Fleming, University of Sydney, Australia
Toshiro Morita, Technical University of Denmark
Jintong Lin, Beijing University of Posts and Telecommunications, China
Robert Tach, Nokia Bell Labs, USA

SC 1 – Fibres, Fibre Devices and Fibre Amplifiers
Chair: Hans Linberger, EPFL Switzerland, Switzerland
Patrice Wégré, University of Mons, Belgium
Lianhan Yan, Southwest Jiaotong University, China
Peter Ingø Bernt, OFF Hite Denmark, Denmark
Pierre Sillard, Prysmian Group, France
Bernhard Schmaul, Universität Erlangen – Nürnberg, Germany
Manos Tentjopoulos, University of Padova, Italy
Kenji Tanabe, Nippon Telegraph and Telephone, Japan
Ivanas Gaviliaus, University Politecnica de Valencia, Spain
Luis Thévenaz, EPFL Switzerland, Switzerland
Francesco Peletti, ORC, UK
Kaspys Baimuere, BFL, USA
Michael Sumbybaev, Asian Institute of Photonic Technologies (AIP), UK

SC 2 – Integrated Optoelectronic Devices and Optical Processors
Chair: Leo Spielmann, Aeon Corporation, USA
Dries Van Thourhout, imec – Ghent University, Belgium
Yilin Bi, Shanghai, China
Minhui Guo, Tampere University of Technology, Finland
Sylvia Menezes, CISA-LETI, France
Andreas Umbach, Freisair Corporation, Germany
John Denegar, Trinity College, Dublin Ireland
Antonio Fina, STMMicroelectronics, Italy
Takahiro Tanemura, University of Tokyo, Japan
Hiroshi Onoe, Tokyo Institute of Technology, Japan
Kiyojin Kudo, Keio University, Japan
Alex Liu, Nanyang Technological University, Singapore
Pascal Maheu, VLC Photonics, Spain
Marc Swart, Glasgow University, UK
Joe Campbell, Virginia University, USA
Fan Wei Jun, Nanyang Technological University, Singapore

SC 3 – Digital Techniques for Optical Communication Systems
Chair: Benn Thomsen, Microsoft, UK
Xiao Yi, University of Sydney, Australia
Darko Zibar, Technical University of Denmark, Denmark
Yves Joussel, ITM – Telekom Partnership, France
Helmut Stein, ADVA Optical Networking, Germany
Antonio Bogni, CINT, Italy
Giancarlo Prati, Nokia, Italy
Kiyoshi Fukui, NEC, Japan
Ezra Ip, NEC Labs, USA
Massimiliano Sabibi, Juniper, USA
Chao Oonkong, COBRA TU Eindhoven, Netherlands
Andreas Leon, Nokia Bell-Labs, Germany
Dan Sadot, Ben-Gurion University, Israel

SC 4 – Transmission Subsystems and Optical Network Elements
Chair: Michael Galili, Technical University of Denmark, Denmark
David Potel, MS-IVR, University, Canada
Laurent Bramerie, ENSMGT / Universite de Rennes 1, France
Hermis Akrampolou, National TU Athens, Greece
Moshe Tali, Tel-Aviv University, Israel
Pierangelo Buff, Politecnico di Milano, Italy
Takahito Inoue, National Institute of Advanced Industrial Science and Technology (AIST), Japan
Toshikiro Hirooka, Tokai University, Japan
Jochen Schneider, Chalmers University of Technology (CTH), Sweden
Niel Oudshoorn, EPFL Switzerland, Switzerland
Andrew Ellis, Aston University, UK
Adonis Borgia, Technical Educational Institute of Athens, Greece
Norbert Hank, TU München, Germany

SC 5 – Datacom and Computer Hardware
Chair: Romain Breust, Huawei in Munich, Germany
Fei Kong, IBM, Switzerland
Gordon Ng Ling Liu, Huawei Technologies Co. Ltd, China
Xin Yin, Ghent University, Belgium
Fabienne Salinas, Orange Labs, France
Roberto Sabella, Ericsson Telecommunications, Italy
Takahiro Nakamura, Photronics Electronics Technology Research Association (PETRA), Japan
Oded Raz, COBRA – TU Eindhoven, Netherlands
Laura Alcàntara, ETH Zurich, Switzerland
Richard Phynwyer Whyatt, UK
Cindel Schow, Univ. of California, Santa Barbara, USA
Mads Løstrup Nielsen, Aarhus, Denmark
Jose Capmany, University Politecnica de Valencia, Spain
Christoph Schallin, Renesse GmbH, Germany
Carlo Maristi, Cisco Photonics, Italy

SC 6 – Point-to-Point Transmission Links
Chair: Magnus Karlsson, Chalmers University of Technology (CTH), Sweden
Gabriel Chantel, Nokia Bell-Labs, France
Yane Frignan, Institut Mines-Télécom / Télécom SudParis, France
Peter Krummen, Technische Universität Dortmund, Germany
Chao Lu, Hong Kong Polytechnic University, Hong-Kong
Mark Stitt, Tel-Aviv University, Israel
Antonio Mezzetti, University of ‘Aquila, Italy
Takeshi Hoshida, Fujitsu, Japan
Yutaka Miyamoto, NTT, Japan
Beatriz Ortega, Universität Politecnica de Valencia, Spain
Sergey Popov, Royal University of Technology (KTH), Sweden
Alexi Pritytinski, Subcom, USA
Ren-Jean Essiambre, Nokia Bell-Labs, USA
Rob Smith, SURFnet, Netherlands
Robert Kilty, UCL, UK

SC 7 – Core, Metro, and Data Centre Networks
Chair: Sebastien Boge, Nokia Bell-Labs, France
Dimitris Apostolopoulos, National Technical University of Athens, Greece
Ashim Autoreni, ADVA Optical Networking, Germany
Colin Didier, Minds – Ghent University, Belgium
Carlo Carra, Telecom Italia, Italy
Hiromu Harai, National Institute of Information and Communications Technology (NICT), Japan
Jose Capmany, University Politecnica de Valencia, Spain
Kwangjoon Kim, KDDI Research Inc., Japan
Naohiko Kikuchi, Hitachi, Japan
Steinar Bjørstad, Norwegian University of Science and Technology, Trondheim, Norway
Raul Muñoz, Centre technologie de telecommun – canons de catalunya, Spain
Lena Wosinska, KTH Royal Institute of Technology, Sweden
Dimitri Simosidis, University of Bristol, UK
Tom Isserthuth, Huawei Technologies Co. Ltd, USA
Pascalie Fernandez Juan Pedro, Telefónica, Spain

SC 8 – Access, Local Area and Indoor Networks
Chair: Stefan Dahlfort, Ericsson, Sweden
Edward Dadfarnia, Huawei Technologies Co., LTD, China
Elaine Wong, University of Melbourne, Australia
Wael Widi, Commerzbank, Belgium
Yaoqiang Li, Beijing Univ of Posts and Telecommunications, China
Philippe Cianchini, Orange Labs, France
Dirk Breuer, Deutsche Telekom, Germany
Roberto Gaudino, Politecnico di Torino, Italy
Katsiaki Akoula, NTT, Japan
Junichi Nakagawa, Mitsubishi Electric, Japan
Kwawon Kim, ETRI, Korea
Yan Shi, Genexis, Netherlands
Guillermo Carpena, Universidad Carlos III de Madrid, Spain
Chen-Ching Wei, National Sun Yat-Sen University, Taiwan
Dora Van Veen, Nokia Bell-Labs, USA
Derek Moon, Huawei, UK

Anders Borch
RISE Acreo AB, Sweden

Christina Anderson
Chalmers University of Technology, Sweden

Stefan Dahlfort
Ericsson, Sweden

Anna Sundström
Sweden Meetx, Sweden

Victoria Herrmann
Sweden Meetx, Sweden

Anders Borch
RISE Acreo AB, Sweden

Christina Anderson
Chalmers University of Technology, Sweden

Stefan Dahlfort
Ericsson, Sweden

Anna Sundström
Sweden Meetx, Sweden

Victoria Herrmann
Sweden Meetx, Sweden
Road to 5G and Photonics for 5G Mobile Networks

Organisers:
- Yan Shi, Former Geneva, The Netherlands
- Kota Asaka, NTT Japan
- Gemma Vall-Llosera, Ericsson, Sweden
- Patryk Urban, Ericsson, Sweden

Location:
- Room F1

Common abstract:
The 5G network evolution drives distinct technologies and applications forward, not only the mobile broadband services, but also vertical industries across boundaries. Massive capacity, massive connectivity and diverse deployment scenarios bring the big challenges to 5G. This workshop is set to give specific insight on the key requirements and applications of 5G in the telecom and datacom networks. Specifically, we will consider: a) Global 5G vision and road map, 5G key technologies and evolution routes; b) The technology integration from the radio access and optical access networks. In the last-contractor where we will discuss recent 5G field trial achievements; c) The transformation of the radio access networks (RAN) and, consequently, the underlying transport networks; d) Future technologies that can enable the post 5G era.

Workshop structure

Session 1 (09:00-10:45): The global 5G vision

Moderator: Gemma Vall-Llosera, Ericsson, Sweden

The 5G network evolution drives distinct technologies and applications forward, not only the mobile broadband services, but also vertical industries across boundaries. Massive capacity, massive connectivity, and diverse deployment scenarios bring the big challenges to 5G. The 5G infrastructure providers are required to identify and address these requirements by providing the short-term and long-term solutions. This session will focus on the “Global 5G vision” and give an overview on the key requirements and applications of 5G, the necessary breakthroughs, and the possible road map for 5G technology evolution.

Confirmed speakers:
- Sándor Albrecht, “5G as technology and business innovation platform for industries”, Ericsson, Sweden
- Martin Kristensen, “5G: Could the end be near?”, Nokia, Sweden
- Albert Rafel, “Service applications over 5G: requirements and their impact on the Metro-Haul Network; an operator’s perspective”, British Telecom, United Kingdom

Coffee break 10:45-11:15

Session 2 (11:15-13:00): 5G field trial and optical access

Moderator: Kota Asaka, NTT Japan

There are leading edge breakthroughs of technologies which have been demonstrated by 5G prototypes and field trials recently. From the technical perspective, recent work has been progressed on the 5G trials, although we are not yet able to candidacy the technologies which can be used for the standard and clearly convergence. One of the main focuses is the technology integrator from the radio access and optical access networks to the last-meter connection. In this session we present the recent 5G field trial achievements, and address a holistic approach on the 5G Rie from optical access point of view.

Confirmed speakers:
- Jason Feng, “High speed and short reach optical interconnects applications in the scenarios of 5G”, Huawei, China
- Satohiro Sugaya, “NITTO DCOMO Activities on 5G Trials”, NTT DCOMO, Japan
- Tatsuya Shintani, “Optical access technologies for 5G mobile system”, NTT, Japan

Lunch break (13:00-14:00)

Sponsored by IEEE Photonics Chapter Sweden

IEEE Photonics Chapter Sweden in pleased to invite all participants registered to the workshop for a networking lunch. Soft drinks, coffee and tea are included. Lunch vouchers will be distributed to the workshop participants on site.

3rd session (14:00-15:30): 5G transport systems

Moderator: Patryk Urban, Ericsson, Sweden

With the advent of 5G new capacity trends are imposed on both the telecommunication and data communication networks. Many of the services that the 5G network delivers to its users require strict latency requirements: non-limited access in data (time availability, N×10Gbit/s (N = 1 - 500) data rate, latency of < 1ms for fast internet and a factor of 10 increase in battery life time for small devices). These requirements impose a transformation of the radio access networks (RAN) and, consequently, a rethinking of the underlying transport network. Optical technologies with their conventional benefits of high-bandwidth, low latency, high capacity and network-independent, are today perceived as a key piece of the radio-access networks. In the last-mile and backhaul transport links, 5G preview and current generation of optical technologies (e.g. SDRS/NET, WDM, OFDM, etc. as well as analog Radio over Fiber (a-RoF), etc.) need to be reconsidered to match the needs of the emerging 5G transport segment. No longer bandwidth, but low-cost, flexible and reconfigurable optical technologies can further increase backhaul transport efficiency.

Confirmed speakers:
- Fabio Casabianca, “5G RAN architecture and use cases”, Ericsson, Sweden
- Michael Ewstt, “IEEE Project 802.15.WG: Optical technologies supporting 5G”, ADVA, Germany
- Jörg-Peter Elbers, “Challenges of a fully optical backhaul in 5G”, ADVA, Germany

Workshop structure

Session 1

Lionel C. Kermiriat, MIT, USA
- “Merging Photonics with nano-electronics”
- “Silicon Photonics for Exascale Data Networks”
- “Silicon Photonics for High-Volume Products”

Session 2

Michael Hochberg, Elxiron, USA
- “Complexity and volume scaling in silicon photonics: How do we make optics look more like electronics?”
- “Chip-scale packaging for high-voltage silicon photonics transceiver manufacturing”
- “Multi-channel Tera-scale PICs for High-Capacity Interconnects”

Session 3

Sebastian Rumley, Columbia University, USA
- “Can integrated optics meet the challenge of Multi-Tera-bit/s, 0-150 Gbps”
- “Accelerating the commercial viability of silicon photonics in exascale data centre environments”
Workshop Session 1 (09:00-10:00)

Vincent O’Byrne (Verizon, USA) : Making the case for NG-PON2: Verizon’s perspective
Fabiennne Salino (Orange, France): What are the realistic applications for PON capacities above 10G?
Ed Hindle (Nokia, UK): Higher line rate PONs: an alternative take enabled by advances in datacenter technologies
Hannichi Suzuki (NTT, Japan): What is the next step for PON deployment in Japan?
John Johnson (Broadcom, USA): Why 100G-EPON is the logical next step in PON evolution: An optical components perspective
Junichi Nakagawa (Mitsubishi Electric, Japan): Upcoming challenges for PON transceiver vendors
Peter Osmar (Tyma National Institute, Ireland): Innovations in burst-mode optical transceiver ICs at 25G and beyond
Weiping Huang (Hisense, China): Challenges in meeting diverse future PON transceiver requirements
Frank Effenberger (Huawei, USA): The future of PON is converged

Panel discussion (30 min approx.)

Organizers: David Plant, McGill University, Canada
Yikai Su, Shanghai Jiao Tong University, China
Sylvie Menegu, CEA-LETI, France
Dimitris Apostolopoulos, National Technical University of Athens, Greece

Location: Room F4

Abstract:
This workshop will present expert panels on different aspects of PON technology and evolution beyond 10G-EPON. It will focus on the following topics:
- The advantages of higher aggregate capacity
- Why do different PONs have different channel structures?
- Comparing the different requirements for the entire industry given current PON wavelengths
- The optimum technology of PONs

Coffee Break (10:00-10:30)

Workshop Session 2 (10:30-11:30)

Johns Hopkins (Broadcom, USA): Why 100G-EPON is the logical next step in PON evolution: An optical components perspective
Junichi Nakagawa (Mitsubishi Electric, Japan): Upcoming challenges for PON transceiver vendors
Peter Osmar (Tyma National Institute, Ireland): Innovations in burst-mode optical transceiver ICs at 25G and beyond
Weiping Huang (Hisense, China): Challenges in meeting diverse future PON transceiver requirements
Frank Effenberger (Huawei, USA): The future of PON is converged

Panel discussion (30 min approx.)

Organizers: Derek Nessett, Huawei, UK
Jun Shan Way, ZTE, USA

Location: Room F4

Abstract:
This workshop will present expert panels on different aspects of PON technology and evolution beyond 10G-EPON. It will focus on the following topics:
- The advantages of higher aggregate capacity
- Why do different PONs have different channel structures?
- Comparing the different requirements for the entire industry given current PON wavelengths

End (13:00)
**Constellation shaping – a simple add-on or a tool to combat the nonlinear fiber limit?**

**Organisers:**
- Metodij P. Yankov, Technical University of Denmark, Denmark
- Erik Agrell, Chalmers University of Technology, Sweden

**Location:** Room F5

**Abstract:**
Constellation shaping has in recent years gathered popularity as a tool for extending the reach of coherent optical communication systems. Particularly, probabilistic shaping has shown to be beneficial for systems, operating at high-order QAM beyond 16GQAM. Current practical constellation shaping methods allow for 10-20% data rate increase mostly due to their tolerance to the nonlinearity region. However, such constellations are generally intolerant to noise and are thus limited to operating in the weakly nonlinear regime. Constellation constructions which are tolerant to nonlinearities, and at the same time provide high spectral efficiency can be implemented with reasonable complexity in order to support very high speed optical communications at an affordable cost. This workshop aims at providing a forum for discussion between leading scientists in the field, with a focus on constellation shaping for the nonlinear regime of transmission. We will review currently popular constellation shaping methods and discuss different aspects of their implementation, scalability, integrability with existing systems, and potential gains that they provide. Important aspect of the discussion will be whether these schemes and their gains can be extended into the nonlinear regime, or completely new solutions are required in order to drastically improve the system performance.

The workshop will include, but is not limited to the following discussion topics:

**Workshop structure**

**Session 1: Theoretical aspects of shaping: Nonlinearity mitigation and power efficiency**

9:00 – 9:30: Session I opening
9:30 – 11:05: Marco Scamardella, School of Advanced Studies, Sant’Anna, Pisa, Italy, “Possible approaches to design a nonlinearity-tolerant constellation”, by Marco Scamardella.

**Session 2: Practical aspects and applications of constellation shaping**

11:10 – 12:00: Open mic & panel discussion (12:00-13:00)

**Session 3: SDM Fibers**

13:00 – 14:30: Open mic & panel discussion (12:00-13:00)

**What is the Best Fibre for the Deployment of Space-Division Multiplexing Systems?**

**Organisers:**
- Remy-Jean Etiemble, Bell Labs, Nokia, Holmdel, NJ, USA
- Takashi Saeki, Innovation Core SEI Inc., San Jose, CA, USA
- Chigo Obonkwe, Eindhoven University of Technology, Dept. of Electrical Engineering, Eindhoven, The Netherlands

**Location:** Room F5

**Abstract:**
The fate of the commercial deployment of space-division multiplexing (SDM) fibers depends primarily on the cored transport bit rate for the anticipated data traffic demand in future optical networks and the transmission performance of SDM fibers relative to single-mode fibers. The most important elements impacting the introduction of SDM fibers in optical networks are: i) the ratio of the average traffic demand to the nonlinearity Shannon limit of single-mode fibers, ii) the cost of SDM transponders, amplifiers and optical add/drop multiplexers and iii) the transmission performance of commercially-available SDM fibers. Many different flavors of SDM fibers are considered for future backbone optical networks. One can classify SDM fibers in three broad types: 1) multimode-based fibers, including few-mode fibers; 2) multimode fibers that support linear crosstalk between cores, and 3) coupled-core multifiber designed with strong linear coupling to reduce linear and nonlinear impairments. As important parameter for these types of fibers is that they require real-time multi-linear multiple-output (MIMO) processing of each individual core while type 2 requires processing of all cores simultaneously. Currently, type 1 SDM fibers require at a minimum processing of all cores belonging to the same mode groups, for each mode group.

A very important characteristic of SDM fibers that may determine which SDM fiber will emerge in commercial systems to replace single-mode fibers is the nonlinear interaction performance of these SDM fibers in high-capacity regime relative to arrays of single-mode fibers. The nonlinear performance of these fibers remains a very active area of research and the workshop is intended to share the latest results, predictions, intuitions and connections on “What is the best SDM fiber?”

**Workshop structure**

**Part 1: Historical Perspective and Space-Division Multiplexing (SDM) Fibers**

Andrew Chraplyvy and Bob Tkach, Bell Labs – Nokia, USA
- **Topic:** Historical perspective on introducing new optical fibers in optical networks
- **Topic:** Introducing new optical fibers in submarine networks

**Part 2: SDM Fibers**

Tetsuya Hayashi, Sumitomo Electric Industries, Ltd., Japan
- **Topic:** Coupled-core multicore transmission fibers
  - Pierre Sillard, Prysmian, France
  - Tetsuya Hayashi, Sumitomo Electric Industries, Ltd., Japan
  - Haoshuo Chen, Bell Labs – Nokia, USA

**Part 3: SDM Systems**

Yutaka Miyamoto, NTT, Japan
- **Topic:** Wish list for SDM systems

Roland Ryf, Bell Labs – Nokia, USA
- **Topic:** SDM transmission in coupled-core multicore and multimode fibers

Ben Putnam, NEC, Japan
- **Topic:** SDM transmission in multicore fibers

Koji Igarashi, Osaka University, Japan
- **Topic:** SDM transmission experiments

**Part 4: SDM Subsystems**

Nick Fontaine Bell Labs – Nokia, USA
- **Topic:** SDM switches and ROADMs

Ryo Nagase, Chiba Institute of Technology, Japan
- **Topic:** Multicore fibre connectors

Ezio Lo, NEC Labs, USA
- **Topic:** SDM amplifiers technologies and SDM transmission

Rodrigo Amecameca Correa, Univ. Central Florida, USA
- **Topic:** SDM fibers and amplifiers

Yongmin Jung, University of Southampton, UK
- **Topic:** SDM optical amplifiers

Harshott Cheln, Bell Labs – Southamp, USA
- **Topic:** SDM optical amplifiers

**Workshop topics**

**1. Historical Perspective and Space-Division Multiplexing (SDM) Fibers**

**2. SDM Fibers**

**3. SDM Systems**

**4. SDM Subsystems**
Opportunities for machine learning in optical communication: from components characterisation, systems design and network optimisation

Organisers:
Darko Zibar, DTU Fotonik, Denmark
Henk Wymeersch, Chalmers University of Technology, Sweden
Ilya Lyubomirsky, Inphi, USA

Location:
Room F4

Abstract:
In broad terms, machine learning is a multidisciplinary research area where some of the main tasks are to infer plausible models to describe the observed data and use the inferred models to make predictions. The core of the machine learning approaches is generalization: first the model is learned from the measured data acquired under one set of system configurations, and then the inferred model is applied to perform predictions for a new set of system configurations. Machine learning is especially useful for optimisation and performance prediction for systems that exhibit complex behaviors and where analytical models are hard to derive and numerical procedures time consuming. Recently, machine learning methods have started to enter the field of photonics, ranging from quantum mechanics, nanophotonics, optical communication and optical networks. Moreover, a few machine learning algorithms have also been proposed recently. The field of machine learning offers many powerful techniques, however, linking it to optical communication and photonics in general may not be trivial. In particular, choosing the right machine learning algorithm strongly depends on the problem that needs to be solved. In this workshop, we will address how techniques from machine learning can be applied in the field of optical communication and photonics, and which benefits machine learning methods can bring to optical communication. We will explore how machine learning can be used to design better lasers, predict the performance of optical communication systems, perform non-linear mitigations, optimise data centres and explore intelligent but measurement efficient next generations of optical networks. Moreover, we will look into how all-optical signal processing and integrated photonics can benefit the field of machine learning and which novel research opportunities could arise for all-optical solutions.

Workshop structure

Session 1
Moderator: Henk Wymeersch, Chalmers University of Technology, Sweden

14:05-14:40: Darko Zibar, DTU Fotonik, Denmark “Introduction to part II: ML for network layer”
14:45-15:05: Satyajeet Sing Ahula, Facebook, USA “Applications of machine learning in Facebook’s production network”
15:05-15:25: Luis Velasco, Universitat Politècnica de Catalunya, Spain “A distributed data analytics architecture for cognitive transport networks”
15:25-15:45: Haakon V. Iversen, Ericsson, Sweden “The need for machine learning and data analytics for future communication infrastructure”
15:45-16:05: Ilya Lyubomirsky, Inphi, USA “Introduction to part III: non-telecom applications of ML in optics”
16:05-16:20: Radhia Seghrouchni, ETH Zurich, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”
16:20-16:30: Luis Velasco, Universitat Politècnica de Catalunya, Spain “A distributed data analytics architecture for cognitive transport networks”
16:30-16:40: Nasser Mohammadiha, Zenuty, Sweden “Machine Learning for optical communication:培训班 and sensor fusion based on deep neural networks”
16:45-16:55: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
16:55-17:15: Jakob Tharme, MyRedco, Denmark “Machine learning methods for system performance prediction”
17:15-17:25: Takahito Tanimura, Fujitsu Labs, Japan “Application of machine learning for millimeter wave radar and data analytic for future communication infrastructure”
17:25-17:45: Ilya Lyubomirsky, Inphi, USA “Applications of machine learning in Facebook’s production network”

Panel discussion: what have we learned from part II-III and what are the future prospects

Coffee Break 16:45-17:00

Session 2
Moderator: Ilya Lyubomirsky, Inphi, USA

17:00-17:20: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”
17:20-17:40: Cristina Rottondi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”
17:40-17:50: Henk Wymeersch, Chalmers University of Technology, Sweden “Introduction to part II: ML for network layer”
17:50-18:10: Danit Ronen, Technion, Israel “Data Analytics based Network Operation and Management Infrastructure”
18:10-18:20: Christina Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”
18:20-18:30: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
18:30-18:40: Jakob Tharme, MyRedco, Denmark “Machine learning methods for system performance prediction”
18:40-18:50: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”
18:50-19:10: Ilya Lyubomirsky, Inphi, USA “Introduction to part III: non-telecom applications of ML in optics”
19:30-19:40: Ilya Lyubomirsky, Inphi, USA “Introduction to part III: non-telecom applications of ML in optics”
19:50-20:00: Ilya Lyubomirsky, Inphi, USA “Introduction to part III: non-telecom applications of ML in optics”

Panel discussion: what have we learned from part I and what are the future prospects 19:15-20.00

Coffee Break 19:45-20:00

Session 3
Moderator: Henk Wymeersch, Chalmers University of Technology, Sweden

20:05-20:25: Takahito Tanimura, Fujitsu Labs, Japan “Application of machine learning for millimeter wave radar and data analytic for future communication infrastructure”
20:25-20:45: Ilya Lyubomirsky, Inphi, USA “Applications of machine learning in Facebook’s production network”
20:45-20:55: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
21:15-21:25: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”

Panel discussion: what have we learned from part I-III and what are the future prospects 19:45-20.00

Coffee Break 20:45-21.00

Session 4
Moderator: Ilya Lyubomirsky, Inphi, USA

20:05-20:25: Takahito Tanimura, Fujitsu Labs, Japan “Application of machine learning for millimeter wave radar and data analytic for future communication infrastructure”
20:25-20:45: Ilya Lyubomirsky, Inphi, USA “Applications of machine learning in Facebook’s production network”
20:45-20:55: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
21:15-21:25: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”

Panel discussion: what have we learned from part I-III and what are the future prospects 19:45-20.00

Coffee Break 20:45-21.00

Session 5
Moderator: Henk Wymeersch, Chalmers University of Technology, Sweden

20:05-20:25: Takahito Tanimura, Fujitsu Labs, Japan “Application of machine learning for millimeter wave radar and data analytic for future communication infrastructure”
20:25-20:45: Ilya Lyubomirsky, Inphi, USA “Applications of machine learning in Facebook’s production network”
20:45-20:55: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
21:15-21:25: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”

Panel discussion: what have we learned from part I-III and what are the future prospects 19:45-20.00

Coffee Break 20:45-21.00

Session 6
Moderator: Henk Wymeersch, Chalmers University of Technology, Sweden

20:05-20:25: Takahito Tanimura, Fujitsu Labs, Japan “Application of machine learning for millimeter wave radar and data analytic for future communication infrastructure”
20:25-20:45: Ilya Lyubomirsky, Inphi, USA “Applications of machine learning in Facebook’s production network”
20:45-20:55: Alan P. T. Lau, Hong Kong Polytechnic University, China “Application of machine learning to optical performance monitoring”
21:15-21:25: Christian Rossbachi, Dalle Molle Institute for Artificial Intelligence, Switzerland “Machine learning-assisted routing and spectrum assignment in flexible optical networks”

Panel discussion: what have we learned from part I-III and what are the future prospects 19:45-20.00

Coffee Break 20:45-21.00
Plenary speakers

Dr. Vijay Vusirikala
10:30 – 11:00 Congress Hall

A Decade of Software Defined Networking at Google

Abstract: Google’s global cloud infrastructure is built on three pillars: ubiquity, disaggregation and high availability. To support these three pillars, we have been building a network unparalleled in reach, scale and capability over the last decade. Early on, we realized that the network we needed to support our services did not exist and could not be bought. Hence, over the past 10+ years, we set out to fill in the required pieces in–house. Our fundamental design philosophy is that the network should be treated as a large-scale distributed system and leverage the same control infrastructure we developed for Google’s compute and storage systems. In the process, we made every network layer intelligent, fault–tolerant, highly reliable and programmatically manageable to allow for rapid evolution and innovation. Software defined networking is the only way we build network infrastructure at Google today.

Vijay Vusirikala is Head of Optical Network Architecture and Engineering at Google, responsible for technology development, design, scaling and optimization of Google’s optical network covering client optics, campus, metro, long haul and submarine links. His team spurred a number of network innovations and catalyzed early adoption of new optical technologies such as open line systems, Data Center Interconnect (DCI), Subsea Open Cables, C+L band line systems, and programmable transport layer, in a large scale production environment.

Prior to Google, Vijay was Director of Marketing at Infinera where he worked with major global network operators to design and deploy PIC based digital optical networks. Prior to joining Infinera, he was at Motorola Access Networks as Director of Market Development for PON, DSL, and IPTV products. Earlier, he was with Sycamore Networks in senior system architecture and product management roles, where he defined architecture for reconfigurable optical networks, and integrated switching and transport systems.

Vijay has published extensively and holds 15+ patents in optical components, system design and network architecture. He is a frequent speaker at industry conferences and executive forums. He received an MS in Physics and a Ph.D in EE with a focus on optoelectronic integration from the University of Maryland, College Park and a BSEE from IIT, Madras in India.

Professor Anne L’Huillier
11:00 – 11:30 Congress Hall

50 years of Nobel Prizes in Photonics: From 1964 to 2014

Abstract: This presentation will describe some of the Nobel prizes in Physics in the area of Photonics. Starting from the 1964 Nobel prize to Townes, Basov and Prokhorov “for fundamental work in the field of quantum electronics, which has led to the construction of oscillators and amplifiers based on the maser–laser principle” to the 2014 Nobel prize to Akasaki, Amano and Nakamura “for the invention of efficient blue light–emitting diodes which has enabled bright and energy–saving white light sources”.

Anne L’Huillier is professor in Atomic Physics at Lund University since 1997. Her research is centered around high–order harmonic generation in strong laser fields and its applications, in particular, to attosecond science. She was elected to the Royal Swedish Academy of Sciences in 2004 and has been member of the Nobel committee for Physics from 2007 to 2015.

Professor Philip Diamond
11:30 – 12:00 Congress Hall

Square Kilometre Array and how it will be Heavily Reliant on Optical Fibre Systems

Abstract: The Square Kilometre Array, a next–generation radio telescope, will change the way humanity views the Universe. Building on 70 years of radio astronomy developments, astronomers and engineers are designing what will be the largest scientific instrument on the planet. The SKA, currently in the detailed design phase, will be built in Australia and South Africa by an international consortium, currently of 10 nations. The science to be done by SKA encompasses almost the entire history of the Universe, from exploring the so–called Cosmic Dawn, when the first stars and galaxies were formed, to understanding how planets are formed in the present day. Along the way SKA will enable precise studies of the secrets of gravity, dark energy, dark matter and the molecular building blocks of life.

I will discuss the current status of SKA, as the project prepares for the transition to construction. I will describe in detail the critical role that optical fibre systems play in enabling the SKA, with its requirement to transmit data at Tbit/sec rates over hundreds and thousands of kilometres, to become a reality.

Professor Philip Diamond is the Director–General of the SKA (Square Kilometre Array). He was appointed to this position in October 2012, and is responsible for the team designing and ultimately constructing the SKA, which, when completed, will be the largest scientific project on Earth.

From 2010 – 2012 he was the Chief of CSIRO Astronomy and Space Science (CASS), which operates the major radio astronomy facilities in Australia, namely Parkes, the Compact Array and Mopra. CASS also operates the NASA Deep Space Network tracking station at Tidbinbilla, near Canberra, and has built ASKAP, the Australian SKA Pathfinder, in the Murchison in Western Australia.

Prof Diamond moved to Australia in June 2010, leaving his previous role as Director of the Jodrell Bank Centre for Astrophysics, part of the School of Physics and Astronomy at the University of Manchester in the UK. The University owns and operates the giant Lovell Telescope and, on behalf of the UK’s Science and Technology Facilities Council, the e–MERLIN/VLBI National Facility. Prof. Diamond was responsible for the operation of both facilities.

Professor Diamond completed his PhD at the University of Manchester in 1982. He worked at the Onsala Space Observatory in Sweden and the Max–Planck Institute for Radiointeronomy in Bonn, Germany before moving to the National Radio Astronomy Observatory (NRAO) in the USA for 12 years. He held the position of Deputy Director of the NRAO’s VLA and VLBA before moving back to the UK in 1999 upon being appointed as the Director of MERLIN.

Professor Diamond’s research interests include studies of star birth and death; exploring both through the use of radio interferometers such as MERLIN. He is also interested in high resolution studies of supernovae, both in our own Galaxy and in others. Finally, he also dabbles in studies of discs of molecular gas rotating around super–massive black–holes at the centres of other galaxies. He has published ~300 research papers in astronomy.

Phil is married to Jill; they have a son who recently graduated with a degree in Biochemistry and Genetics from the University of Leeds and a daughter who works as a project manager for a company installing remote scanning devices in libraries, warehouses and factories. He enjoys reading, supporting Manchester United and the England Rugby and Cricket teams, watching his son play rugby and playing the (very) occasional game of squash.
Plenary speakers

Kazuo Hagimoto

12:00 – 12:30  Congress Hall

Optical Communications: Past, Present, and Future

Abstract: Looking back the milestones of Fiber–Optic Systems, the future of related technologies will be discussed referring to the evolution of wireless systems. Because optical communications are based on the laser frequencies of the 200 THz.

Mr. Hagimoto joined the NTT Electrical Communications Laboratories, Yokosuka, Japan in 1980, where he has led R&D projects on high-speed optical communications systems including 10G and higher EDFA repeatered systems. After a executive director of Science and Core Technology Laboratory Group, which is responsible for leading edge technologies of NTT R&D activities, he has been the President and CEO of NTT Electronics Corporation since 2013. His current research interests include very large capacity optical network systems and media networking technologies utilizing these systems.

Mr. Hagimoto is a fellow of IEEE and the IEICE of Japan, and a member of OSA. He has served as a program co–chair of OAA’93 in Yokohama, Japan, a general co–chair of OAA’94 in Colorado, and the TPC chair of ICC2011 in Kyoto. He is currently a member of IEEE Photonics Society BoG (2015–17). He received the Sakurai Memorial Prize from the Optoelectronic Industry and Technology Development Association in 1989, the Oliver Lodge premium from the IEE in 1991, the Kenjiro Takayanagi memorial award in 1994, the achievement awards from the Institute of Electronics, Information and Communication of Engineers of Japan (IEICE) in 1984 and 2006, Maejima Award from TEISHIN association Japan in 2007, the 7th Industry–Academia–Government Collaboration Honor Program Prime Minister Award in 2009, and the Medal with Purple Ribbon from Japan in 2016.
Thursday 21 September 2017, 10:30-11:30  Room F4-F5
SC 1 – Fibers, Fiber Devices and Fiber Amplifiers

Th.2.D.1
David Richardson, Optoelectronics Research Centre – University of Southampton, UK
“Optical Amplifiers for Space-Division-Multiplexed Systems”

David Richardson obtained his B.Sc. and PhD in fundamental physics from Sussex University U.K. in 1985 and 1989 respectively. He joined the Optoelectronics Research Centre (ORC) at the University of Southampton in 1989 and was awarded a Royal Society University Fellowship in 1991 in recognition of his pioneering work on short pulse fibre lasers. Professor Richardson has been Deputy Director of the ORC with responsibility for optical fibre and laser related research since 2000. He has published more than 1000 research papers and produced more than 30 patents during his time at Southampton. He was one of the co-founders of SPI Lasers Ltd an ORC spin–off venture acquired by the Trumpf Group in 2008. Professor Richardson is a Fellow of the IEEE, OSA and ET and was elected a Fellow of the Royal Academy of Engineering in 2009. He has published more than 1000 research papers and produced more than 30 patents during his time at Southampton. He was one of the co-founders of SPI Lasers Ltd an ORC spin–off venture acquired by the Trumpf Group in 2008. Professor Richardson is a Fellow of the IEEE, OSA and ET and was elected a Fellow of the Royal Academy of Engineering in 2009. He received the 1990 John Ericsson Medal, the 2009 ITW Best Poster Award, the 2011 Globecom Best Paper Award, the 2013 CTO Best Poster Award, and the 2013 Chalmers Supervisor of the Year Award.

Wednesday 20 September 2017, 08:30-09:30  Room F3
SC 2 – Integrated Optoelectronic Devices and Optical Processors

W.1.C.1
Christopher R. Doerr, Acacia, USA
“Integrated Silicon Photonics”

Christopher R. Doerr earned a B.S. in aeronautical engineering and a B.S., M.S., and Ph.D. in electrical engineering from the Massachusetts Institute of Technology. He was a pilot in the U.S. Air Force. Since joining Bell Labs in 1995, Doerr’s research has focused on integrated devices for optical communication. He received the OSA Engineering Excellence Award in 2002. He is a Fellow of IEEE, OSA, and Bell Labs. He was Editor-in-Chief of IEEE Photonics Technology Letters from 2006–2008. He was awarded the IEEE William Streifer Scientific Achievement Award in 2009. He was a Technical and General Chair of OFC. He joined Acacia Communications in 2011, where he is AVP of Integrated Photonics.

Wednesday 20 September 2017, 13:30-14:30  Room F6
SC 4 – Transmission Subsystems and Optical Network Elements

W.3.F.1
Nicolas K. Fontaine, Nokia Bell Labs, USA
“Components For Space-Division Multiplexing”

Nicolas K. Fontaine is currently a Distinguished Member of the Technical Staff at Nokia Bell Labs working in the advanced photonics division at the Crawford Hill lab. He obtained his Ph. D. in 2010 from the University of California, Davis. At Bell Labs, he develops devices for space–division multiplexing in multi–core and few mode fibers, builds switching devices, and investigates spectral slice coherent receivers for THz bandwidth waveform measurement.
Monday 18 September 2017, 14:00-15:00  Room F1
SC 5 – Datacom and Computercom Hardware

M.1.A.1
Benjamin Lee, IBM, USA
“Silicon Photonic Switching: Technology and Architecture”

Benjamin G. Lee received the B.S. degree from Oklahoma State University, Stillwater, OK, USA, in 2004, and the M.S. and Ph.D. degrees from Columbia University, New York, NY, USA, in 2006 and 2009, respectively, all in electrical engineering. In 2009, he became a Postdoctoral Researcher at IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA, where he is currently a Research Staff Member. His research interests include silicon photonic devices, integrated optical switches and networks for high–performance computing systems and datacenters, and highly parallel multimode transceivers. He is a Member of the Optical Society and the IEEE Photonics Society. He currently serves on the Board of Governors for the Photonics Society.

Wednesday 20 September 2017, 10:30-11:30  Room F5
SC 6 – Point-to-Point Transmission Links

W.2.E.1
Sergei K. Turitsyn, Aston University, UK
“Nonlinear Fourier Transform Based Transmission”

Professor Sergei K. Turitsyn graduated from the Department of Physics of the Novosibirsk University, in 1982 and received his Ph.D. degree in Theoretical and Mathematical Physics from the Budker Institute of Nuclear Physics, Novosibirsk, Russia in 1986. In 1992 he moved to Germany, first, as a Humboldt Fellow and then working in the collaborative projects with Deutsche Telekom. Currently, he is a director of the Aston Institute of Photonic Technologies. He was a Principal Investigator in 55 national and international, research and industrial projects. Turitsyn was the recipient of a Royal Society Wolfson Research Merit Award in 2005. In 2011 he was awarded the European Research Council Advanced Grant. In 2014 he received Lebedev medal by the Rochnostensky Optical Society and in 2016 Aston 50th Anniversary Chair medal. He is a Fellow of the Optical Society of America and the Institute of Physics.

Tuesday 19 September 2017, 08:30-09:30  Room G4
SC 7 – Core, Metro, and Data Centre Networks

Tu.1.G.1
Ramon Casellas, CTTC, Spain
“Control, Management and Orchestration of Optical Networks: An Introduction, Challenges and Current Trends”

Ramon Casellas (IEEE Senior Member) is with CTTC, Spain, since 2006 where he holds a Senior Researcher position. Before, he worked as an associate professor at the networks and computer science department at the ENST France, having obtained his Ph.D. in 2002. Since joining CTTC, he has been involved in multiple European, national and industry grant research projects, on topics related to traffic engineering, network optimization and network control and management, with emphasis on optical and multi-layer transport networks. His research interests include the GMPLS/PCE architectures and protocols, Software Defined Networks (SDN) and Network Function Virtualization (NFV). He has coauthored over 150 papers, 4 book chapters and 4 IETF RFCs.

Tuesday 19 September 2017, 13:30-14:30  Room F2
SC 8 – Access, Local Area and Indoor Networks

Tu.2.B.1
Ton Koonen, Eindhoven University of Technology, The Netherlands

Ton Koonen is Full Professor in Eindhoven University of Technology since 2001. He is Chairman of the group Electro–Optical Communication Systems since 2004, Vice–Dean of the Dept. Electrical Engineering since 2012, and Scientific Director of the Institute for Photonic Integration at TU/e since Jan. 2016. Before 2001, he worked more than 20 years in applied research in industry, amongst others in Philips Telecommunication Industry and Bell Labs – Lucent Technologies. He is a Bell Labs Fellow (1998), IEEE Fellow (2007), USA Fellow (2013), and Distinguished Guest Professor of Hunan University, Changsha, China (2014). In 2011, he received an Advanced Investigator Grant of the European Research Council. He (co–)authored more than 650 papers on optical fiber communication. His current research interests include spatial division multiplexed systems, access and in–building fiber networks, including high–capacity POF networks, radio–over–fiber techniques, and optical wireless communication techniques.
**INVITED PAPERS**

**SC 1 – Fibers, Fiber Devices and Fiber Amplifiers**

**Wednesday 20 September 2017, 13:30-14:00** Room F2
Stojan Radic, University of California San Diego, USA
“Frequency Stabilisation and its Implication in Optical Networks”

**Tuesday 19 September 2017, 08:30-09:00** Room F1
Radan Slavik, University of Southampton, UK
“Ultra-low Thermal Sensitivity of Phase and Propagation Delay in Hollow-Core Fibres”

**Wednesday 20 September 2017, 08:30-09:00** Room F2
Cristian Antonelli, University of L’Aquila, Italy
“Propagation Effects in SDM Fibers”

**Wednesday 20 September 2017, 10:30-11:00** Room F6
Guifang Li, University of Central Florida, USA
“Weakly-coupled Few-Mode Fibers and their Applications”

**Monday 18 September 2017, 16:00-16:30** Room F2
Camille-Sophie Brès, École Polytechnique Fédérale de Lausanne, Switzerland
“Low Power Amplified MIR Parametric Conversion in Tapered Chalcogenide Photonic Crystal Fibers”

**SC 2 – Integrated Optoelectronic Devices and Optical Processors**

**Tuesday 19 September 2017, 14:00-14:30** Room F3
Daniel Blumenthal, UCSB Santa Barbara, USA
“Ultra-Low Loss Si3N4 Planar Waveguide Platform and Applications”

**Monday 18 September 2017, 15:00-15:30** Room F3
Takuro Fujii, NTT Corporation, Japan
“High Performance Epitaxially Grown III-V Membrane Lasers on Si”

**Monday 18 September 2017, 16:00-16:30** Room F3
Timo Aalto, VTT, Finland
“Transceivers for 400G Based on Hybrid Integrated Thick SOI and III-V Chips”

**Wednesday 20 September 2017, 11:30-12:00** Room F3
Frédéric Bouet, STMicroelectronics, France
“Challenges in Silicon Photonics Process Technology”

**Tuesday 19 September 2017, 08:30-09:00** Room F3
Wolfram Pernice, University of Münster, Germany
“Integrated Quantum Photonic Circuits with Electrically Driven Light Sources”

**SC 3 – Digital Techniques for Optical Communication Systems**

**Tuesday 19 September 2017, 14:00-14:30** Room F4
Georg Büchner, Technical University of Munich, Germany

**Wednesday 20 September 2017, 09:30-10:00** Room F4
Marco Scevola, TeCIP Institute, Scuola Superiore Sant’Anna, Italy
“Fiber Nonlinearity Mitigation in WDM Systems: Strategies and Achievable Rates”

**Tuesday 21 September 2017, 08:30-09:00** Room F4-F5
Vahid Aref, Nokia Bell Labs, Germany
“Does the Cross-Talk Between Nonlinear Modes Limit the Performance of NFDM Systems?”

**Wednesday 20 September 2017, 10:30-11:00** Room F4
Jens Rasmussen, Fujitsu, Japan
“DPSK for Short Reach Optical Links”

**Monday 18 September 2017, 14:30-15:00** Room F4
Toshiaki Koike-Akino, MERL, USA
“Irregular Polar Coding for Multi-Level Modulation in Complexity-Constrained Lightwave Systems”

**SC 4 – Transmission Subsystems and Optical Network Elements**

**Wednesday 20 September 2017, 14:30-15:00** Room F6
Joel Carpenter, The University of Queensland, Australia
“Principal Modes in Multimode Fiber”

**Thursday 21 September 2017, 08:30-09:00** Room G4
Hiroshi Yamazaki, NTT Corporation, Japan
“Ultra-Wideband Digital-to-Analog Conversion Technologies for Tbit/s Channel Transmission”

**Monday 18 September 2017, 16:30-17:00** Room F6
Michael Eiselt, ADVA Optical Networking SE, Germany
“Optical Transceivers for Mobile Front-Haul and PON Applications”

**Tuesday 19 September 2017, 08:30-09:00** Room F6
Masatoshi Suzuki, KDDI Research, Inc, Japan
“Ultra-High Spectral Efficiency Few-Mode Multicore Fiber Transmission”

**Tuesday 19 September 2017, 09:30-09:00** Room F5
Alexei Pilipetski, TE SubCom, USA
“The Role of SDM in Future Transoceanic Transmission Systems”

**Thursday 21 September 2017, 09:30-10:00** Room F5
Masanori Nakamura, NTT Network Innovation Laboratories, Japan
“Long Haul Transmission at High Baud Rates toward over 100-Gbaud with Coded Modulation”

**Wednesday 20 September 2017, 11:30-12:00** Room F5
Arthur Lowery, Monash University, Australia
“Control and Management of Sliceable Transponders”

**Monday 18 September 2017, 16:00-16:30** Room F5
Frank Chang, Inphi Corp, USA
“New Paradigm Shift to PAM4 Signaling at 100/400G for Cloud Data Centers: A Performance Review”

**SC 5 – Datacom and Computercom Hardware**

**Wednesday 20 September 2017, 09:30-10:00** Room F6
Yannick De Koninck, Luxtera Inc, USA
“Advanced Silicon Photonics Transceivers”

**SC 6 – Point-to-Point Transmission Links**

**Monday 18 September 2017, 14:00-14:30** Room F5
Yuta Wakayama, KDDI Research, Inc, Japan
“Application-driven Requirements for Next-Generation Data Center Interconnects”

**Thursday 19 September 2017, 13:30-14:00** Room F1
Dazeng Feng, Mellanox Technologies Inc, USA
“Silicon Photonics Integration Platform for High Performance Interconnects”

**Wednesday 20 September 2017, 14:00-14:30** Room F1
Jessie Rosenberg, IBM Watson Research Center, USA
“Monolithic Silicon Photonic WDM Transceivers”

**Wednesday 20 September 2017, 09:30-10:00** Room F1
Frank Chang, Inphi Corp, USA
“New Paradigm Shift to PAM4 Signaling at 100/400G for Cloud Data Centers: A Performance Review”

**SC 7 – Core, Metro, and Data Centre Networks**

**Thursday 21 September 2017, 09:30-10:00** Room F1
Naoki Suzuki, Mitsubishi Electric Corporation, Japan
“100G to 1T Based Coherent PON Technology”

**Thursday 21 September 2017, 10:30-11:00** Room F3
Marc De Leenheer, ON.Lab, USA
“SDN Control of Optical Networks”

**Wednesday 20 September 2017, 10:30-11:00** Room F1
Kevin Sparks, Nokia Bell Labs, USA
“Fiber Nonlinearity Mitigation in WDM Systems: Strategies and Achievable Rates”

**Tuesday 19 September 2017, 13:30-14:00** Room F6
Ken-ichi Sato, Nagoya University, Japan
“Realization and Application of Large-scale Fast Optical Circuit Switch for Data Center Networking”

**Monday 18 September 2017, 16:00-16:30** Room F1
Anna Tzanakaki, University of Athens, Greece, and University of Bristol, UK
“Optical Networking: An Important Enabler for 5G”

**SC 8 – Access, Local Area and Indoor Networks**

**Wednesday 20 September 2017, 13:30-14:00** Room F4
Jun-Ichi Kani, NTT Access Network Service Systems Laboratories, Japan
“Flexible Access System Architecture to Support Diverse Requirements and Agile Service Creation”

**Monday 18 September 2017, 14:00-14:30** Room F2
Xiang Liu, Huawei, China
“Recent Progresses on Efficient Mobile Front-haul for 5G Wireless Networks”

**Thursday 21 September 2017, 11:00-11:30** Room F2
Piet De Smet, Ghent University, Belgium
“ATTO: Wireless Networking at Fiber Speed”

**Thursday 21 September 2017, 08:30-09:00** Room F6
Junho Cho, Nokia Bell Labs, USA
“High Spectral Efficiency Transmission with Probabilistic Shaping”

**Thursday 21 September 2017, 09:30-10:00** Room F1
Nicola Sambo, Scuola Superiore Sant’Anna, Italy
“Control and Management of Sliceable Transponders”

**Thursday 21 September 2017, 10:30-11:00** Room F3
Nicola Sambo, Scuola Superiore Sant’Anna, Italy
“Control and Management of Sliceable Transponders”
Lab Automation Hackathon

Sunday, 17th September, 19:30 – 22:00
Place: Svenska Mässan, Gothenburg, Sweden
Room: G1

Organisers:
Jochen Schröder, Chalmers University of Technology
Nicolas Fontaine, Nokia Bell Labs
BinBin Guan, Acacia Communications

Lab work is most efficient when data can be acquired in an automated way. Especially when taking measurements over long durations automated acquisition avoids introducing human error and allows researchers to concentrate on the fun part of experimental work. Open source software in easy to learn languages such as Python provides just as much, or sometimes more features/interoperability for lab automation than alternative commercial software. In this hackathon several researchers with 10+ years experience of lab automation will show you the power of using Python to quickly get a lab experiment running and display the measurements in a browser. We will learn from companies that work in photonics how they take advantage of Python to create easy interfaces to their software and hardware.

Bring a laptop to participate in the exercise. There will also be plenty of time for mingling and discussion. Light food and drinks will be served.

Women’s Leadership in Science and Technology

Tuesday, 19th September, 12:00-13:30
Place: Svenska Mässan, Gothenburg, Sweden
Room: G4

A light lunch will be served at the session. Pre-registration mandatory.

Organisers:
Qin Wang, RISE Acreo
Lauren Mecum, IEEE Photonics Society
Patryk Urban, IEEE Photonics Sweden

To promote personal and professional growth for women in Science, Technology, Engineering and Mathematics (STEM) this special networking event will be arranged as part of the ECOC 2017 conference.

Two top female leaders are invited and will give talks to share their personal successful experience with the participants, which can hopefully inspire/encourage young female professionals and PhD students to be as future leaders in STEM areas.

The event chair is Dr. Lauren Mecum, IEEE IPS
12:00 Welcome and opening introduction, Dr. Qin Wang, RISE Acreo AB
12:05 Brief of IEEE WIP, Dr. Lauren Mecum
12:10 Announcement of European Women in Space Technology Initiative, Dr. Linda Mondin, European Space Agency (ESA)
12:15 Invited talk, Pia Sandvik, RISE
12:35 Invited talk, Anna Rathman, Swedish Space Corporation (SSC)
12:55 Panel discussions, Pia Sandvik, Anna Rathman and Linda Mondin will be in the panel to have interactions with audiences and answer questions.
13:30 End

Pia Sandvik
Pia Sandvik, CEO, RISE Research Institutes of Sweden. Pia has switched between research and the business sectors, and that’s something she enjoys. Her aim for RISE is to focus on both coordination synergies and develop new services that benefit customers and society.

Anna Rathman
Anna Rathman, Vice President & CTO, Technology & Innovation, Swedish Space Corporation (SSC). Her role as Chief Technical Officer is to provide the technical vision, support the business development, sets the tone and guides direction for the company’s development and deployment of core technologies.
method’s scalability, which we demonstrate experimentally with integration and packaging. The multi-input scheme ensures improved dynamic-range requirement on receivers by 7.8dB. An 8x8-port switch demonstrates improving the worst-case power-penalty by 8.8dB and reducing power at room temperature.

Built-in Power Monitors

Smart Routing Tables for Integrated Photonic Switch

Optical Video Transmission System of Terrestrial Systems

High Tolerance against Chirp Induced PMD Eye Window Monolithically Integrated on Ge Substrate

High Efficiency Epitaxially Grown InP MEMS Radial Electrode Tunable Laser

Low Latency Symbol Level Transmission Scheme for Mobile Femtocell with Intra PHY Split RAM Architecture

On Achievable Information Rates for Coherent Fiber-Optic Systems with Hard Decision Decoding

Improved Low-Power LDPC FEC for Coherent Optical Systems

High Power Monitors in 3D Chip assemblies

Signal-Quantizing and Bandwidth-Tolerant Encoding for Direct-Sequence Spread-Spectrum Communication with Reduced Complexity

High Tolerance against Chirp Induced PMD Eye Window Monolithically Integrated on Ge Substrate

High Efficiency Epitaxially Grown InP MEMS Radial Electrode Tunable Laser

Low Latency Symbol Level Transmission Scheme for Mobile Femtocell with Intra PHY Split RAM Architecture

On Achievable Information Rates for Coherent Fiber-Optic Systems with Hard Decision Decoding

Improved Low-Power LDPC FEC for Coherent Optical Systems

High Power Monitors in 3D Chip assemblies

Signal-Quantizing and Bandwidth-Tolerant Encoding for Direct-Sequence Spread-Spectrum Communication with Reduced Complexity

High Tolerance against Chirp Induced PMD Eye Window Monolithically Integrated on Ge Substrate

High Efficiency Epitaxially Grown InP MEMS Radial Electrode Tunable Laser
Optical networking: An important enabler for 5G

M.2.2A: Experimental Demonstration of 108 Gba/s Optical Packet Network for Mobile Fronthaul with Load-independent Ultra-low Latency

The paper presents a system-level demonstration of a 108 Gba/s optical packet network for mobile fronthaul with load-independent ultra-low latency. The system design, implementation, and measured performance are discussed. The authors demonstrate that the proposed architecture is capable of delivering high-speed data with low latency and high reliability, making it suitable for 5G mobile fronthaul applications.

M.2.2B: Optical Long-wave Laser Interconnects for Suited Optical Modulator

The paper presents an experimental demonstration of optical long-wave laser interconnects for optical modulator applications. The authors describe the design, fabrication, and characterization of high-speed, low-latency optical interconnects using long-wave lasers. The results highlight the potential of long-wave lasers for high-speed optical communication and data processing applications.

M.2.2C: Optical Transport Network for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents an overview of optical transport networks for 5G applications. The authors discuss the key requirements and challenges for transparent mobile front-/back-haul interconnects and beyond, as well as potential solutions and technologies. The paper also outlines future research directions and opportunities for advancing optical transport networks for 5G.

M.2.2D: Optical Transport Networks for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents an experimental demonstration of optical transport networks for 5G applications. The authors describe the design, implementation, and measured performance of a transparent mobile front-/back-haul interconnect, showcasing its potential for supporting high-speed data transmission and low-latency communication in 5G networks.

M.2.2E: Optical Transport Networks for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents a theoretical analysis of optical transport networks for 5G applications. The authors develop models and simulations to evaluate the performance and capabilities of transparent mobile front-/back-haul interconnects, highlighting key factors that influence their design and optimization.

M.2.2F: Optical Transport Networks for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents an industrial perspective on optical transport networks for 5G applications. The authors discuss the challenges and opportunities faced by industry players in developing and implementing transparent mobile front-/back-haul interconnects, as well as strategies for collaboration and innovation in this domain.

M.2.2G: Optical Transport Networks for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents a comparative study of optical transport networks for 5G applications. The authors analyze and contrast different approaches and technologies for realizing transparent mobile front-/back-haul interconnects, providing insights into their strengths and limitations.

M.2.2H: Optical Transport Networks for 5G: Towards the Realization of Transparent Mobile Front-/Back-Haul Interconnects and Beyond

The paper presents a policy analysis of optical transport networks for 5G applications. The authors examine the regulatory and policy frameworks that support the development and deployment of transparent mobile front-/back-haul interconnects, identifying key challenges and opportunities for further advancement.
We propose an optical interface for silicon photonics based on flip chip bonded structure realized the density of about 363 single-channel and WDM transmissions.

We successfully developed a high density broadband 16-channel 25-Gbaud optical photonic switch exhibiting an ultra-low on-chip loss, an ultra-wide -30-dB crosstalk bandwidth and low power consumption. A fully-integrated polarization-diversity 8x8 switch based on Dual-Frequency Driving of DP-MZM with 2.5-dB loss, 100-nm Operating Bandwidth, and Low Crosstalk Simultaneous 16-channel x 25 Gb/s Operation was demonstrated.

Our proposed 32QAM with quasi-Gray bits mapping is designed for capacity enhancement of 5G mobile networks and eventually realized the densities of about 105 bits/s/Hz using 4-level 32-QAM formats in 64-QAM format over 20 km of SSMF. The subset selection of DP-16QAM and DP-QPSK constellations, QAM formats is proposed. Optimized constellations at 6 bits/4D spectral efficiency using a 30-core fiber on 12.5 and 25-GHz carriers are demonstrated.

We propose and demonstrate spatial coherent matched filtering using DCM fiber to address all 45 modes of a 50-$\mu$m graded index multi-mode fiber at 1550~nm with 14 phase planes. We present a novel implementation of orbital angular momentum (OAM) fiber using WDM and OAM based multiplexing transmission over 10-km Graded-Index Step Index Fiber (GIGI FI).

We demonstrate transmission of 18.25Gb/s PM-16QAM and OTDM of 150Gbaud Signals over Long-haul and Transversal Distances at 100km Span Length with EDFA-only transmission by combining WDM with orbital angular momentum (OAM) based mode-multiplexing (MM) we experimentally demonstrate 4.8-Tb/s data transmission over an 18-femtometer chip without additionalosit energy consumption per bit and a 22% HD-FEC limit.

We propose a novel 2D rate-modulated multiplexing using multiple power level conversion which can address 40 channels of a 50-Gb/s grid without mode conversion at 1550 nm and 14 wavelength channels. This mode multiplexing is achieved using four 256-QAM MM that is able to simultaneously address all 14 wavelength channels within 2-6 GHz across.

We propose and demonstrate Spatial Coherent Matched Detection with High-Resolution Multimode Fiber Channel Demultiplexing and Demodulation of Mode-division-Multiplexing (MDM) Information. We use an MZM based differential detection using two-dimensional high-spatial orthogonal arrays. Capturing and demodulating all subchannels of 2640-WDM-OQPSK are simultaneously demultiplexed and coherently demultiplexed self-equalizing using optical multi-level signal detection.
Tu.1.G: Control and Orchestration
Room G4 (SC7)
Chair: Hiroaki Harai, National Institute of Information and Communications Technology (NICT), Japan

08:30 Tu.1.G.1 Tutorial
Control, Management and Orchestration of Optical Networks: An Introduction, Challenges and Current Trends

Ramon Casellas; Ricardo Martínez; Ricard Vilalta; Raul Muñoz
CTTC/CERCA, Optical Networks and Systems Dept., Castelldefels, Spain

This tutorial is an introduction to control and management, focusing on main drivers, key benefits and functional/protocol architectures. It covers multi-domain and multi-layer networks and includes complex use cases and current trends such as joint IT/network orchestration and slicing.

09:30 Tu.1.G.2 Software-Defined Networking Control Plane for Seamless Integration of Silicon Photonics in Datacom Networks

Yiwen Shen; Payman Samadi; Ziyi Zhu; Alexander Gazman; Erik Anderson; David Calhoun; Maarten Hattink; Keren Bergman, Columbia University, New York, USA

We present a scalable Software-Defined-Networking (SDN) control-plane to integrate Silicon Photonics (SiP) with conventional Ethernet/Wireless networks and simultaneously perform packet and circuit switching. Experimental evaluations demonstrate this unique solution with 224 microseconds control plane latency for data-center and high-performance computing platforms.

09:45 Tu.1.G.3 Priority-Aware Service Orchestration Using Big Data Analytics for Dynamic Slicing in 5G Transport Networks

Muhammad Rehan Raza1; Ahmad Rostami2; Allan Vidal3; Mateus Augusto Silva Santos3; Lena Wosinska1; Paolo Monti1
1KTH Royal Institute of Technology, Kista; 2Ericsson Research, Kista, Sweden; 3Ericsson Research, Indaiatuba, Brazil

We demonstrate how to efficiently scale-updown resource slices allocated to tenants with different service priorities. Experimental results show that our proposed strategy, based on big data analytics, reduces service degradation by more than 51%, compared to priority unaware approaches.
I. Introduction

II. System Architecture

III. Optical Modulation Format

IV. Receiver Design

V. Performance Evaluation

VI. Conclusion

References

Appendix A: Additional Technical Details

Appendix B: Experimental Setup

Appendix C: Data Tables

Acknowledgments
Microscopic deformation analysis of PC connector
terrestrial fibre can achieve 55% longer reach compared

P1.SC1.5 70-dB dynamic range. The results suggest that local group

Picosecond Resolution

energy of 155nJ and peak power of 650kW is achieved with a

We demonstrate ultrafast harmonically mode-locked fiber

1-km-long cavity.

We present a new approach in modeling real-time fiber

for 100km reach, we also present a new concept of fiber

We present a recent study on the ultrafast characterization of

P1.SC1.13 of 30 nanometers is demonstrated by properly designing a

highly tunable mode conversion and amplification exploiting

a fiber Bragg grating is measured.

P1.SC1.17 for OAM Transmission

Compact size and low cost hermetic sealed 100 Gb/s ROSA

Kisung Park; Gil Dong Lee; Sang No Lee; Hyung-Gi Park; Wol-Yon Hwang; Jinsoo

Sub-wavelength quantum dot microdisk lasers were directly

P1.SC2.29

We developed a PBS-integrated coherent mixer using a

we show that PBS-integrated peak power is lower than 10kW.

P1.SC2.24

A thin Silicon Photonics Platform for Telecommunication Wavelengths

P1.SC2.23

Deep UV Lithography on a Generic InP Photonic

P1.SC2.22

High-sensitivity Autocorrelation Measurement of

than 32 GHz. The method is compared to state-of-the-art methods and its

P1.SC2.21

Time Skew Estimator for Dual-Polarization QAM Transmitters

P1.SC2.20

Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC2.19

A Platform for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

P1.SC2.18

Few Mode Ring-Core Fiber Amplifier for Low Differential Group Delay

P1.SC1.11 First Multi-Channel DWDM Transmission and Inline Amplification using a Block-Cx-Photonic Integrated Optical Fiber Parametric Amplifier (PFP-IPA)

P1.SC1.10 Novel Fiber Design for Wideband Conversion and Amplification in Metallized Fiber

P1.SC1.12 Evaluation of RIN Mitigated Dual Order Differential Distributed Raman Amplification Using a Hybrid First-Order Forward Pump

P1.SC1.9 Multi-Axis Asymmetric Waveguide Structure for Gain-Chip and its Application to Polymer-Based Wavelength-Switching Grating for High Power Tunable Laser


P1.SC1.13 Evaluation of RIN Mitigated Dual Order Bidirectional Distributed Raman Amplification Using a Hybrid First Order Forward Pump

P1.SC1.20 Multi-Axis Asymmetric Waveguide Structure for Gain-Chip and its Application to Polymer-Based Wavelength-Switching Grating for High Power Tunable Laser

P1.SC1.15 Highly Selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.16 Gain Spectral Shaping Technique for DWP-Pump Tunable Optical Initializer Laser

P1.SC1.17 Ultrafast Temperature Extraction Using Support Vector Machine Based Data Clustering for BOSTA Sensors

P1.SC1.5 70-dB dynamic range. The results suggest that local group

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

P1.SC1.18 Few Mode Ring-Core Fiber Amplifier for Low Differential Group Delay

P1.SC1.17 for OAM Transmission

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC1.13 Evaluation of RIN Mitigated Dual Order Bidirectional Distributed Raman Amplification Using a Hybrid First Order Forward Pump

P1.SC1.12 Evaluation of RIN Mitigated Dual Order Differential Distributed Raman Amplification Using a Hybrid First-Order Forward Pump

P1.SC1.9 Multi-Axis Asymmetric Waveguide Structure for Gain-Chip and its Application to Polymer-Based Wavelength-Switching Grating for High Power Tunable Laser


P1.SC1.13 Evaluation of RIN Mitigated Dual Order Bidirectional Distributed Raman Amplification Using a Hybrid First Order Forward Pump

P1.SC1.20 Multi-Axis Asymmetric Waveguide Structure for Gain-Chip and its Application to Polymer-Based Wavelength-Switching Grating for High Power Tunable Laser

P1.SC1.15 Highly Selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

P1.SC1.18 Few Mode Ring-Core Fiber Amplifier for Low Differential Group Delay

P1.SC1.17 for OAM Transmission

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

P1.SC1.18 Few Mode Ring-Core Fiber Amplifier for Low Differential Group Delay

P1.SC1.17 for OAM Transmission

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

P1.SC1.18 Few Mode Ring-Core Fiber Amplifier for Low Differential Group Delay

P1.SC1.17 for OAM Transmission

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

P1.SC1.19 A Platforms for 2-Dimensional 48-Channel Optical Interconnects Based on Wet Etched Silicon MACHZEH Management.

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?

P1.SC2.21 Highly-selective 7 Orbital Angular Momentum Mode Multiplier Based on Multi-Plane Light Compressor

P1.SC1.9 2D-Silicon Power Platform for Telecommunication Wavelengths

we show in this paper that PBS-integrated peak power is lower than 10kW.

P1.SC2.24 Compact Size and Low Cost Hermetic Seal 100Gbs (25Gb/s x 4) PAM-4 Serial Optical Linear Receiver (LRDFA) Design Using AlInAs Substrate and Si Optical Grating?
P1.SC3.43 Experiment Demonstration of Erbium Doping and Steganography in Optical Fiber Communication

We demonstrate the transmission performance of 100 Gb/s PAM-4 signals over 80 km of standard single-mode fiber (SSMF) with a receiver sensitivity of 6.5 dB. The results show that the proposed system can achieve a transmission distance of more than 80 km with a high signal-to-noise ratio (SNR). This work has potential applications in long-distance optical communication systems.

P1.SC4.69 260-Gb/s Polarization-Multiplexed Dual-Component DPSK Signal Transmission over 60-km SSMF Using Transparent SSB

We investigate the performance of 260-Gb/s polarization-multiplexed dual-component DPSK signals transmitted over 60-km standard single-mode fiber (SSMF) using transparent single-sideband (SSB) modulation. The results show that the proposed system can achieve a transmission distance of more than 60 km with a high data rate of 260 Gb/s per component. This work has potential applications in high-speed optical communication systems.

P1.SC5.67 Broadband Inter-Core Optical Multi-Carrier

We present the design and implementation of a new broadband inter-core optical multi-carrier system for high-speed optical communication. The system is capable of simultaneously transmitting multiple optical carriers across different fiber cores, enabling a significant increase in bandwidth. The results show that the proposed system can achieve a transmission rate of 100 Gb/s per carrier, demonstrating its potential for future high-speed optical communication systems.
USA Blvd., 13139 Jess Pirtle Blvd., Sugarland, USA

VCSELs with different apertures and only transmitter

Justin Lavrencik1; Siddharth Varughese1; Johan Gustavsson2; Erik Haglund2; 2Chalmers University of Technology, Goteborg, Sweden

and compared against conventional PAM4
detection employing duobinary signals as least and most

Duobinary IQ Modulation Schemes for C- and O-band

Chair: Christoph Schulien, Ranovus GmbH, Germany

New Paradigm Shift to PAM4 Signaling at

FPGA-based evaluation platform of AMCC

We developed the FPGA-based evaluation platform of AMCC

Mobile Fronthaul Network

Development of Evaluation Platform of AMCC

Kapodistrian University of Athens, GR, Bristol, UK

5University of Bristol, National & Kapodistrian University of Athens, GR, National &

K Kondepu1; J Zou2; Arash Farhadi Beldachi1; Hung Kai Chen3; Christopher

dB optical budget and up to 70 km reach.

Experimental Investigation into Burst-Mode

08:45 W.1.E.2

Performance Evaluation of Next-Generation

Elastic Bandwidth with Flexible VCSEL-based WDM

Frontend

Raymond S Cao1; Rakesh Misra1; Vahid Khaleghi1; K P Khanna1; Thuan Trinh1; Anjan Moodi1; Abhishek Jotarekar1

We demonstrate field trial CPRI3 error-free transmission over

08:15 W.1.E.5

180-km Linear MZM Driver in CMOS for Single-Rate

400Gb/s Coherent Optical Transmitter

Nobuyuki Noda, G. Kohata, A. Masuda, H. Kojima, T. Kurimoto, K. Koizumi, NTT Network Innovation,

We consider the effects of limited-resolution arithmetic on the

Performance of Time-Domain Digital Back Propagation in

We consider the effectiveness of limited-resolution arithmetic on the

09:30 W.1.D.3

Back Propagation by Inter-Symbol Interference

We investigate for the first time the performance of virtual

Propagation in Few-Mode Fibre Spans with

09:00 W.1.D.5

we can achieve floating-point performance using 9-bit pairwise

Performance of Time-Domain Digital Back Propagation

We consider the effects of limited-resolution arithmetic on the

09:30 W.1.D.1

we can achieve floating-point performance using 9-bit pairwise

09:00 W.1.D.1

09:00 W.1.D.4

Evaluation of Inter-Core Skew in an Uncoupled

multi-core fibre with Air-hole structure for Low Crosstalk in C+L

W.1.E: Advances in Multi-Wavelength PON

W.1.F: High-Performance ICs for Photonics

Room 1 (SOS)

Chair: Chrysostomos Schuler, Renesse GmbH, Germany

USA Blvd., 13139 Jess Pirtle Blvd., Sugarland, USA

VCSELs with different apertures and only transmitter

Justin Lavrencik1; Siddharth Varughese1; Johan Gustavsson2; Erik Haglund2; 2Chalmers University of Technology, Goteborg, Sweden

and compared against conventional PAM4
detection employing duobinary signals as least and most

Duobinary IQ Modulation Schemes for C- and O-band

Chair: Christoph Schulien, Ranovus GmbH, Germany

New Paradigm Shift to PAM4 Signaling at

FPGA-based evaluation platform of AMCC

We developed the FPGA-based evaluation platform of AMCC

Mobile Fronthaul Network

Development of Evaluation Platform of AMCC

Kapodistrian University of Athens, GR, Bristol, UK

5University of Bristol, National & Kapodistrian University of Athens, GR, National &

K Kondepu1; J Zou2; Arash Farhadi Beldachi1; Hung Kai Chen3; Christopher

dB optical budget and up to 70 km reach.

Experimental Investigation into Burst-Mode

08:45 W.1.E.2

Performance Evaluation of Next-Generation

Elastic Bandwidth with Flexible VCSEL-based WDM

Frontend

Raymond S Cao1; Rakesh Misra1; Vahid Khaleghi1; K P Khanna1; Thuan Trinh1; Anjan Moodi1; Abhishek Jotarekar1

We demonstrate field trial CPRI3 error-free transmission over

08:15 W.1.E.5

180-km Linear MZM Driver in CMOS for Single-Rate

400Gb/s Coherent Optical Transmitter

Nobuyuki Noda, G. Kohata, A. Masuda, H. Kojima, T. Kurimoto, K. Koizumi, NTT Network Innovation,

We consider the effects of limited-resolution arithmetic on the

Performance of Time-Domain Digital Back Propagation

We consider the effects of limited-resolution arithmetic on the

09:30 W.1.D.3

Back Propagation by Inter-Symbol Interference

We investigate for the first time the performance of virtual

Propagation in Few-Mode Fibre Spans with

09:00 W.1.D.5

we can achieve floating-point performance using 9-bit pairwise

Performance of Time-Domain Digital Back Propagation

We consider the effects of limited-resolution arithmetic on the
We present a Data Centre Virtualisation architecture with an architecture for Data Centre Virtualisation with Time Demand QoS guarantees. We demonstrate a 3-ToR real-time leveraging original optical components and custom SDN Cloud-BOSS Intra-Data Center Network: on-Demand optical networking foundation.

Clouds, network programmability and multi-operator federation.

Kevin Sparks, Nokia Bell Labs, Westford, Massachusetts, USA

10:30 W.2.A.1

Highly ranked paper

Optical Communica, Shanghai, China

By employing enhanced DPCM, 15-Gbaud PAM4 digital mobile

We implement a deep neural network (DNN) to attain a 64-Gbps

WDM/MDM Optical Transmission

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

11:00 W.2.C.3

We investigate the effect of varying the DSP resampling rate

We propose a spectrally efficient and cost-effective twin-SSB

4.41x10^-5. The data-rate-distance product achieves recorded

Nokia Shanghai Bell, Shanghai, China

We propose and experimentally demonstrate a silicon three-

We propose and experimentally demonstrate a 42dB loss budget, enabling 40km

Mario Verbeke1; Pieter Rombouts2; Hannes Ramon1; Guy Torfs1; Johan

Jens Rasmussen1; Tomislav Drenski2

DSP for Short Reach Optical Links

Jens Rasmussen1; Tomislav Drenski2

We experimentally demonstrate a sharply bent (5 µm radius)

The circuit occupies a compact active

We present design strategies for weakly-coupled few-mode

We propose Cloud-BSOS, an intra-data center network

We propose and experimentally demonstrate a silicon three-

We propose and experimentally demonstrate a silicon three-

Hybrid Photonic Band Gap and Mode Scrambling

We present design strategies for weakly-coupled few-mode

Materials integration.

Frederic Boeuf1; Nathalie Vulliet1; Charles Baudot1; Sonia Messaoudene2; Elise

We experimentally demonstrate a sharply bent (5 µm radius)

We experimentally demonstrate a sharply bent (5 µm radius)

11:45 W.2.B.6

20km fibre using 10GHz optics within an overall end-to-end

We investigate the effect of varying the DSP resampling rate

11:45 W.2.B.5

4-PAM Optical Interconnect

We implement a deep neural network (DNN) to attain a 64-Gbps

Polina Bayvel; Robert Killey, University College London, London, UK

Polina Bayvel; Robert Killey, University College London, London, UK

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

We investigate the effect of varying the DSP resampling rate

We investigate the effect of varying the DSP resampling rate

4-PAM Optical Interconnect

We experimentally demonstrate a sharply bent (5 µm radius)

Optical Networking Foundation, University of Southampton, University of

We propose Cloud-BSOS, an intra-data center network leveraging original optical components and custom SDN control to enable sub-wavelength networking silicon and

Cloud-BOSS Intra-Data Center Network: on-Demand optical networking foundation.

We propose Cloud-BSOS, an intra-data center network leveraging original optical components and custom SDN control to enable sub-wavelength networking silicon and

We propose Cloud-BSOS, an intra-data center network leveraging original optical components and custom SDN control to enable sub-wavelength networking silicon and

We propose and experimentally demonstrate a 3-ToR real-time leveraging original optical components and custom SDN Cloud-BOSS Intra-Data Center Network: on-Demand optical networking foundation.

Clouds, network programmability and multi-operator federation.

Kevin Sparks, Nokia Bell Labs, Westford, Massachusetts, USA

10:30 W.2.A.1

Highly ranked paper

Optical Communica, Shanghai, China

By employing enhanced DPCM, 15-Gbaud PAM4 digital mobile

We implement a deep neural network (DNN) to attain a 64-Gbps

WDM/MDM Optical Transmission

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

11:00 W.2.C.3

We investigate the effect of varying the DSP resampling rate

We propose a spectrally efficient and cost-effective twin-SSB

4-PAM Optical Interconnect

We implement a deep neural network (DNN) to attain a 64-Gbps

Polina Bayvel; Robert Killey, University College London, London, UK

Polina Bayvel; Robert Killey, University College London, London, UK

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

We investigate the effect of varying the DSP resampling rate

11:45 W.2.B.6

20km fibre using 10GHz optics within an overall end-to-end

We investigate the effect of varying the DSP resampling rate

4-PAM Optical Interconnect

We implement a deep neural network (DNN) to attain a 64-Gbps

Polina Bayvel; Robert Killey, University College London, London, UK

Polina Bayvel; Robert Killey, University College London, London, UK

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

We investigate the effect of varying the DSP resampling rate

11:45 W.2.B.5

4-PAM Optical Interconnect

We implement a deep neural network (DNN) to attain a 64-Gbps

Polina Bayvel; Robert Killey, University College London, London, UK

Polina Bayvel; Robert Killey, University College London, London, UK

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

We investigate the effect of varying the DSP resampling rate

11:45 W.2.B.6

20km fibre using 10GHz optics within an overall end-to-end

We investigate the effect of varying the DSP resampling rate

4-PAM Optical Interconnect

We implement a deep neural network (DNN) to attain a 64-Gbps

Polina Bayvel; Robert Killey, University College London, London, UK

Polina Bayvel; Robert Killey, University College London, London, UK

Yu He; Yong Zhang; Xinhong Jiang; Ciyuan Qiu; Yikai Su

We investigate the effect of varying the DSP resampling rate
A Flow Controller is proposed and experimentally assessed for Dynamic Metro-Core Predictive Traffic Models. Our framework simultaneously detects and identifies significant faults, and outperforms current approaches. Our proposal is an open-source software defined network architecture for intelligence network assurance. We propose and demonstrate a cognitive fault detection and recovery scheme for 125 Gbps coherent optical networking. We implement joint DSP to compensate the interference cross-talk and we observe an additional 2.8 dB OSNR improvement for 125 Gbps coherent optical networking. The first demonstration of the service restoration technique is possible not only to mimic established wireless techniques but also to extend new wireless functionalities to the optical core.
POSTER SESSION 2

WEDNESDAY 20 SEPTEMBER | 15:30-17:00

SCS - DATACOM AND COMPUTER HARDWARE

P2.SC.5.1
Bifidirectional PAM-4 & Experimental Proof-of-Concept to Double Capacity per Fiber in 2-nm Data Centers

António Eira; Nelson Costa; João Pedro, Coriant Portugal, Amadora, Portugal

We designed and demonstrated fast and hitless data center interconnects using an embedded optical switch fabric to bridge the gap between closed and open line networks, allowing applications to route traffic to different network domains.

P2.SC.5.2
First Algorithm for Guardband-less Elastic Optical Network

S. J. B. Yoon, 2

We present a novel and simple algorithm that achieves guardband-less operation of the elastic optical network.

P2.SC.5.3
Networks to Bridge the Gap Between Closed and Open Line Networks

We designed and demonstrated fast and hitless data center interconnects using an embedded optical switch fabric to bridge the gap between closed and open line networks, allowing applications to route traffic to different network domains.

P2.SC.5.4
First Algorithm for Guardband-less Elastic Optical Network

S. J. B. Yoon, 2

We present a novel and simple algorithm that achieves guardband-less operation of the elastic optical network.

P2.SC.5.5
Networks to Bridge the Gap Between Closed and Open Line Networks

We designed and demonstrated fast and hitless data center interconnects using an embedded optical switch fabric to bridge the gap between closed and open line networks, allowing applications to route traffic to different network domains.
This study quantifies how software defined contention in elastic optical networks can be exploited to improve network performance. The results show that by using software defined contention, the network capacity can be increased by up to 50% with a reduction in number of transceivers.

**P2.SC8.57**

**Optimization of Modulation Formats for High Performance Millimetre Wave RoF Transmission**


We experimentally confirm the Coexistence of Coherent UDWDM-PON with GPON downstream and upstream direction is presented on 20-km SMF link with CNDR of 48-IF carrier LTE-A signal. We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal. We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal.

**P2.SC8.58**

**High-Capacity Tier II Fronthaul Network with SSb-DO Multiband OFDM/GAN-CAM**

Eugene Gim, Aeryon Labs, Canada; Daniela S. Iyengar, Aeryon Labs, Canada; Jean-Christophe Sack, Thales, Canada; Arlindo Costa, Aeryon Labs, Canada.

We experimentally demonstrate real-time C-band transmission with electrical duo-binary transmitters using high-speed 25 Gbit/s 16QAM/32QAM and 51Gbit/s 64QAM WDM-PON downstream transmission. Link budgets of 31 and 26-28 dB are achieved at 30 and 36 Gbit/s respectively.

**P2.SC8.59**

**Performance Millimetre Wave RoF Transmission**

Xinying Li, ZTE, China; Miao Kong, ZTE, China; Jianjun Yu, ZTE, China; Gee-Kung Chang, National Chiao Tung University, Taiwan.

We study the ability to separate quality multiplexed data streams in SE PHY MIMO system. A typical single stream has been assessed and real measurements for verification with a 3D-printed optical transceiver have been done.

**P2.SC8.60**

**60-GHz RoF system with 25-km SMF-28 link and up to 70-m wireless link, and demonstrate 12QAM brings a better trade-off than 8QAM, which if served would negatively affect network interference/noise.**

Roberto Proietti, Hongbo Lu, Gengchen Liu, Alberto Castro, Mohammadsadegh Mousavi, Shamsabardeh, S.J.Ben Yoo, University of California, Davis, USA.

Using a Long-Term Evolution software base station with a MAC/PHY functional split, we demonstrate real-time C-band transmission with electrical duo-binary transmitters using high-speed 25 Gbit/s 16QAM/32QAM and 51Gbit/s 64QAM WDM-PON downstream transmission. Link budgets of 31 and 26-28 dB are achieved at 30 and 36 Gbit/s respectively.

**P2.SC8.61**

**Multiband OQAM/QAM-CAP High-Capacity Tier-II Fronthaul Network with SSB-DD PON**

Kang Wang, Xiamen University, China; Tong Wang, NKBAN Labs, China; Hongbo Lu, ZTE, China; Gengchen Liu, ZTE, China; Alberto Castro, ZTE, China; Mohammadsadegh Mousavi, ZTE, China; Shamsabardeh, S.J.Ben Yoo, University of California, Davis, USA.

We experimentally demonstrate real-time C-band transmission with electrical duo-binary transmitters using high-speed 25 Gbit/s 16QAM/32QAM and 51Gbit/s 64QAM WDM-PON downstream transmission. Link budgets of 31 and 26-28 dB are achieved at 30 and 36 Gbit/s respectively.

**P2.SC8.62**

**Effect of Blue Filter on the SNR and Data-Rate for Bi-directional Visible Light Communication**

Shokoufeh Mardani, Amir Masood Khalid, Frans Mj Willems, Jean Paul Linnartz, University of Erlangen-Nuremberg, Germany; Philips Lighting, Netherlands.

We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal. We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal.

**P2.SC8.63**

**Effect of Blue Filter on the SNR and Data-Rate for Bi-directional Visible Light Communication**

Shokoufeh Mardani, Amir Masood Khalid, Frans Mj Willems, Jean Paul Linnartz, University of Erlangen-Nuremberg, Germany; Philips Lighting, Netherlands.

We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal. We analyse carrier-to-noise and distortion ratio (CNDR) over-fibre based Mobile Fronthaul. Simulated CNDR for 48-IF carrier LTE-A signal performed in simulated CNDR for 48-IF carrier LTE-A signal.
Demonstration of Real-time Modulation-Adaptable Transmitter
Chair: Andreas Umbach, Finisar Corporation, USA
08:30     Th.1.D.1
Invited
Chair: Antonella Bogoni, CNIT, Italy
Room F6    (SC6)
08:30     Th.1.E.1
Invited
Chair: Chie Nakagawa, NTT Photonics Labs, Japan
Room F4-F5   (SC3)
08:30     Th.1.F.1
Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation for Flexible Networking
Using 1.6-Tb/s Superchannel
Thorsten Koch; Robert Cassettari; Xia Guo; Benjamin Schmidt; Ansgar Schröder; Davide Spiazzi; Achim Hentschel; Andreas Streibl; Andreas Umbach; Michael Andrae; Tilman Würfl; Thomas Blumel; Peter König; Filip Misic

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.

Optical Phase Conjugation for Simultaneous Dispersion and Nonlinearity Compensation using 1.6-Tb/s Superchannel
Thorsten Koch, Robert Cassettari, Xia Guo, Ansgar Schröder, Davide Spiazzi, Achim Hentschel, Andreas Streibl, Andreas Umbach, Michael Andrae, Tilman Würfl, Thomas Blumel, Peter König, Filip Misic

We report, and experimentally validate, an analytical expression of a 1.6-Tb/s Superchannel using Waveband-Shift-Free Optical Phase Conjugation. Our experimental results demonstrate a 1.6-Tb/s Superchannel using waveband-shift-free optical phase conjugation to prevent the cascaded nonlinearities.
**Technological Programme**

**Thursday, 21st September | 10:30-12:00**

**Th.2.B: Fibre Connectivity for Data Centres**
Chair: Carlo Montesi, Cisco Photonics, Italy

**10:30**
**Th.2.A.1** Application-driven Requirements for Next-Generation Data Center Interconnects

**10:45**
**Th.2.A.2** 56-Gb/s PAM4 Transmission over 2-km-25-mm Cladding 4-Core Multifibre Data Centre Connectivity Fibre

**11:00**
**Th.2.A.3** 14.5-Tb/s Mode-Group and Wavelength Multiplexed Direct Detection Transmission over 2.8-km G-OSNR Fiber

**11:15**
**Th.2.A.4** Highly ranked paper

**11:30**
**Th.2.A.5** 200-Gb/s DMT Transmission over 1.6-km SOMF with A Single EML/SMF Span for Optical Interconnections C-Single-Mode Fibres of Next-Generation Optical Interconnections

**12:00**
**LUNCH BREAK**

**12:30**
**Th.2.B.1** Local Area Networks (LAN) and Next Generation Data Centre Interconnects
Chair: Katsuki AKITA, NTN, Japan

**10:30**
**Th.2.C.1** 112-Gb/s Transmission in a 20-mm Steaming AWG-Based Optical Wireless Communication System

**10:45**
**Th.2.C.2** 50-Gb/s Indoor Optical Wireless Communication Equipped with Millimeter Wave Backup System and Localization and Tracking

**11:00**
**Th.2.C.3** Wireless Access Networks for Smart Home and Automotive Applications

**11:15**
**Th.2.C.4** Network Slicing Using Dynamic Flex Ethernet over Transport Networks

**11:30**
**Th.2.C.5** Highly ranked paper

**12:00**
**LUNCH BREAK**

**12:30**
**Th.2.D.1** Optical Amplifiers for Single-Multimode Multiples Systems

**10:30**
**Th.2.D.2** Network Capacity Improvement by Quality of Transmission Estimator with Learning Process

**10:45**
**Th.2.D.3** Experimental Demonstration of 4K-HD Video Transmission Using T-band Wavelength Division Multiplexing System for Passive Optical Local Area Networks

**11:00**
**Th.2.D.4** Multiband Clipped LTE-A and 6-GHz 4-RF-Simultaneous Transmission over 5G-Thick-Strategy and Wireless and Wireline Link for Home Area Networks

**11:15**
**Th.2.D.5** Experimental Demonstration of Network Automation Based on SDN Estimation and Control System

**11:30**
**Th.2.D.6** Improved Cladding-pumped 32-core multimode fibre amplifier

**12:00**
**LUNCH BREAK**

**12:30**
**Th.2.E.1** Performance of Nonlinear Compensation Techniques in a 71.6-GHz Capacity Demonstration Over 8070 km

**10:30**
**Th.2.E.2** Improved Cladding-pumped 32-core multimode fibre amplifier

**10:45**
**Th.2.E.3** Geometrically Shaped 16QAM Outperforming 8QAM

**11:00**
**Th.2.E.4** Faster Open Submarine Cable

**11:15**
**Th.2.E.5** On the Use of High-Dimensional MIMO for Long-Distance Homogeneous Single-Mode Multimode Fiber Transmission

**11:30**
**Th.2.E.6** Geometrically Shaped 16QAM Outperforming 8QAM

**12:00**
**LUNCH BREAK**

**12:30**
**Th.2.F.1** On the Bit Error Rate of Optical Transmission Systems Corrupted by Biraditive Additive Gaussian Noise

**10:30**
**Th.2.F.2** Optical Amplifiers for Single-Multimode Multiples Systems

**10:45**
**Th.2.F.3** Novel Characterization and Compensation of Room F4.1 (SC1)
Chair: Alexis Filipidis, Sorbonne, USA

**11:00**
**Th.2.F.4** SDN Control of Optical Networks

**11:15**
**Th.2.F.5** Digital Back-Propagation Performance in Wideband Transmission Systems

**11:30**
**Th.2.F.6** Proactive Fiber Damage Detection in Real-time Coherent Transmitter
Chair: Yongmin Jung, Riken, Japan

**12:00**
**LUNCH BREAK**
GENERAL INFORMATION

Conference Venue
Svenska Mässan, The Swedish Exhibition & Congress Center
ECOC – Entrance number 2
Mässans gata 24, Gothenburg
www.svenskamassan.se

Closest tram/bus stop: Korsvägen
Conference Secretariat
Swedish Meets – Entrance number 2
ecoc2017@meetx.se
www.ecoc2017.org

Conference App
The conference app “ECOC 2017” is available to download for Apple devices and Android devices. The app contains a lot of useful general information, technical programme, my schedule and much more. Once downloaded, a lot of the information is available in the app offline.

Travel information
Airport buses
Costs SEK 95 simple way and SEK 185 return, no cash accepted on the bus only credit cards. It takes 20 minutes to travel between the airport called Landvetter and the venue Svenska Mässan, the bus stop is called “Korsvägen/Svenska Mässan” and is located right outside the entrance of the venue. For information and timetable please visit www.vagtrafik.se

Airport Taxi
Costs approximately SEK 420 to/from Landvetter Airport. Ask for a fixed price. The driver should have a taxi ID card clearly displayed in the vehicle. Service is included in the taxi meter price. Avoid unlicensed taxis.
We recommend:
Taxi Göteborg: +46 (0) 31 650 00
Taxi Kurir: +46 (0) 31 27 27 27

When in Gothenburg
In Gothenburg we walk! The venue is located right in the city center, all hotels and social venues are located by walking distance from the Swedish Exhibition Center or “Svenska Mässan” is located on Mässans gata. The closest tram stop is called “Korsvägen”. From the train station you will find a tram stop just outside at Drottningtorget. Take tram No. 2 or 13 to tram stop “Korsvägen”.

For travel information and travel planner visit the website www.vagtrafik.se or download the app “To Go”.
You can buy tickets in most convenience stores such as Pressbyrán, 7-eleven etc. or pay with credit card on the tram (not on the bus). No cash is accepted.

Göteborg City Card
Göteborg City Card gives you free admission to lots of entertainment, sights, excursion, Lisberg amusement park (located opposite the conference venue) and many museums. Travel with trams, buses and boats are included in the city card. You’ll also get shopping booklets with discounts in selected stores. Maximise your stay in Gothenburg. The card is valid for 24, 48 or 72 h.

Bike rental: Styr & Ställ
Gothenburg is a bike friendly city. Throughout the city you will find bike stands with rental bikes. For a small cost you can rent a bicycle as often as you wish. The first half hour of each journey is always free, regardless of the number of journeys per day. Short time visitors can choose the 3-Day Pass, which can be purchased from any of the credit card terminals. It is also included in the Göteborg City Card.
More information: en.goteborgbikes.se

Wifi
There is a free wifi in the conference venue called “ECOC2017”, no password needed.

Gothenburg
To make the most out of your visit to Gothenburg, the website www.goteborg.com or the app “Gothenburg” is very informative and useful.

Conference Registration
The Conference Registration desk is located in entrance number 2 at Svenska Mässan. You do not need to register for the exhibition as the Conference badge gives you full access to it.

Registration opening hours:
Sunday 17 September
08:00–19:30
Monday 18 September
08:00–18:00
Tuesday 19 September
07:30–17:30
Wednesday 20 September
07:30–17:30
Thursday 21 September
07:30–16:00

Location: Svenska Mässan, Entrance number 2, Mässans gata 24

Badges
To collect your badge onsite you need to bring the email confirmation (electronically in the phone works fine) or the text message that has been sent to you in advance, containing the bar code that you will be scanning in the self-service desks in the registration area. Delegate badges must be worn at all times to gain access to the conference sessions, exhibition and social events. Please note that we cannot replace lost badges.

Catering
Delegate coffee breaks
Coffee is included in the conference registration and will be held in the following places and times:
Sunday 17 Sept., Hall F
10:00-11:30 and 15:00-16:00
Monday 18 Sept., Congress Foyer
09:00-10:00
Monday 18 Sept., Exhib. area
15:30-16:00
Tuesday 19 Sept., Exhib. area
10:00-10:30 and 15:00-15:30
Wednesday 20 Sept., Exhib. area
10:00-10:30 and 15:00-15:30
Thursday 21 Sept., Hall F
10:00-10:30 and 15:00-15:30

Lunch
Lunch is NOT included in conference registration fees. However there are a variety of “Food Beverage selling points” and Restaurants in the venue as well as inside the Exhibition Hall.

Information about catering
For information about catering during ECOC 2017, Gothia Towers restaurants and table reservations please visit www.gothiatowers.com/ecoc2017/

Coffee & Tea

Wraps, sandwiches & Pastries

Beverage & Water

Food & Drinks – Corner Café
Where: Located in the exhibition hall
Opening hours: Monday-Tuesday 09:30-17:00,
Wednesday 09:30-16:00

Food & Drinks – Centre Café
Where: Located in the exhibition hall
Opening hours: Monday-Wednesday 11:30-15:00

Food & Drinks – Asia
Where: Located in the exhibition hall
Opening hours: Monday-Wednesday 11:30-15:00

Gothia Tower’s Restaurants

Twentyfourseven

A café & bar with a “grab ‘n’ go” concept, located in the middle of the hotel lobby of Gothia Towers.
Open every day of the week from 06:30 to 03:00. No reservations at this café.

Heaven 23

Seasonal contemporary cuisine with mile-high views in all directions from the top floor of Tower 1. Open every day of the week from 12:00 to late. Reservations can be made.

Ristoria

A critically acclaimed gourmet restaurant that takes you on a culinary journey that lasts a whole evening, located at the top floor of Tower 2 in our 5-star sister hotel Upper House. It’s also possible to book a table at Upper House Lounge. The restaurant has a star in the Michelin Guide.

For reservations at the Gothia Towers Restaurants
Visit: www.gothiatowers.com/ecoc2017/
Phone: +46 031 750 88 65
Email: restaurants@gothiatowers.com
**Social Events**

**Get Together**
- **Date:** Sunday, 17 September
- **Time:** 18:00-19:30
- **Place:** Svenska Mässan, Hall F
- **Price:** Included in the registration fee

Pre-registration is mandatory.

ECOC Conference 2017 has the pleasure to invite you to attend the Get Together where you will get the opportunity to meet and socialize with colleagues that are attending the conference. The Get Together includes snacks and drinks.

---

**Concert**
- **Date:** Tuesday, 19 September
- **Time:** 17:45-19:00
- **Place:** Gothenburg Concert Hall, Götaplatsen
- **Price:** SEK 100 excl. vat

Pre-registration is mandatory.

Classical concert with musicians from the Gothenburg Symphony Orchestra. Music by Philip Glass (String Quartet No 2) and Edward Grieg (String Quartet no 1 G minor op 27).

---

**Conference Dinner**
- **Date:** Wednesday, 20 September
- **Time:** 19:00-24:00
- **Place:** Kajskjul 8, Packhuskajen 11
- **Website:** www.kajskjul8.se
- **Price:** SEK 500 excl. vat

Pre-registration is mandatory.

The ECOC 2017 Conference Dinner will take place at Kajskjul 8, a venue located in the harbor area in the city center. Kajskjul 8 was built on the quays along the railroad tracks around 1870. Originally used as a warehouse, the shed was then filled with all kinds of products, such as spices imported from the Orient as well as timber from the forests of Värmland (region north of Gothenburg), which would then be transported down to southern Europe and other places. It is a building with a lot of interesting history, nowadays used for events and dinners.

Dinner includes a 3 course dinner, beverages, and entertainment. Closed tram/bus stop: Stenpiren or Lilla Bommen

---

**Post Deadline Papers Proceedings**
- **Date:** Tuesday, 19 September
- **Time:** 10:00 – 12:30
- **Place:** Congress Hall

The plenary session is open to delegates, exhibitors, visitors and the general public.

---

**Presentations & Speaker Preview Room**
- **Date:** Tuesday, 19 September
- **Time:** 13:00-19:30
- **Place:** Hall F, Room F4-F5

The closing ceremony, including the Best Student Paper Award sponsored by ADVA is open to delegates, exhibitors, visitors and the general public.

---

**Exhibition**
- **Date:** Tuesday, 19 September
- **Time:** 13:00-17:00
- **Place:** Congress Hall
- **Website:** www.ecoc2017.org/Exhibition

The exhibition will take place in Hall A and B. The conference participants have automatically access to the exhibition. The Exhibition opens on Tuesday, 19 September, and the conference will have exhibition only time between 10:00-12:00 to allow the Conference participants to visit the Exhibition. For information about the exhibition, please visit the website.

---

**Posters**
- **Date:** Tuesday, 19 September
- **Time:** 15:30 – 17:00
- **Place:** Hall F, Room F4-F5

We would like to call the attention of poster presenters to the following items:
- Each poster board is marked with a poster ID-number. Please find your poster ID-number in the Programme.
- Authors are requested to use only the boards provided for their poster.
- Posters should be fixed to the poster board using pins which will be provided on site.
- Authors are required to stand by their posters during their whole scheduled poster session time on Wednesday and Thursday.
- The maximum size of your poster should be 90cm (width) by 120cm (height), portrait style.

---

**Currency & ATM Machine**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

The ECOC Plenary Session is open to delegates, exhibitors, visitors and the general public.

---

**Press Room**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

Press Room is located in the Exhibition Hall. Only press representatives correctly identified will be allowed to use this room.

---

**First Aid**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

First Aid is a paramedic in the venue. In case of medical need, please come to the onsite registration desk or go to the Exhibit Service Desk and we will help you. In medical emergency please call 112.

---

**No Smoking Policy**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

According to Swedish law smoking is prohibited inside any building, venue, hotels, buses, etc. Smoking is only allowed at open air zones.

---

**Lost-and-Found**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

Lost-and-Found will be collected in the registration.

---

**Insurance**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

The Organisers cannot be held responsible for accidents to participants or for damage to or loss of their personal property however caused.

---

**Venue and Conference Floorplan**
- **Date:** Tuesday, 19 September
- **Time:** 08:00-18:30

Please see the floor plan at the last page of this book.
ECOC 2017 cares about sustainability!

As an organiser, ECOC 2017 has been working hard when planning the conference to reduce the impact on the environment and climate. However, a conference of this size always affects the environment due to the amount of people participating in the conference e.g. the increased travel, food and waste etc.

ECOC conference 2017 is environmentally certified according to the Swedish Environmental Base standard. This means that we have implemented around 50 actions to reduce the negative impact on the environment and be socially responsible. This also means that we encourage our partners to act in a sustainable way.

Some of the things we do:
- The organiser has environmentally certified the conference according to the Swedish Environmental Base standard.
- The organiser will climate compensate parts of the delegates journeys for the Conference.
- The venue Svenska Mässan, the hotels and social events are all located in the city center and you can walk between them all.
- The hotels are chosen that have effective and comprehensive environmentally-friendly policies and operations.
- For sponsorship we offer a green sponsorship package and have active communication with all sponsors regarding the ECOC 2017 sustainability policy.
- For most conference meals that are provided by the conference we choose not to serve red meat.
- At all catering points in the venue we offer vegetarian alternatives for all lunches.
- All coffee/tea served at the “fika” breaks (coffee breaks) are organic and Fairtrade. All sandwiches and sweets served together with the coffee during the fikas have two main ingredients that are organic.
- All social events venues has been chosen that are considering the environment, serving MSC certified fish and using locally produced products if possible.
- Swedish tap water is of such a high quality and tap water stations will be available throughout the venue.
- The venue are providing waste separation bins in the conference area and the waste from other bins will be sorted later at the waste station.
- Printed materials are kept to a minimum and all printed paper provided by the conference such as the programme is made of certified paper (Svanen). Conference materials such as abstracts and proceedings are provided online.
- Gifts and give aways are minimised. ECOC 2017 will instead of delegate gifts donate money to a solar lamp project in the third world via the Swedish organisation “Barnfonden”.
- Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
- Conference delegate badges made of paper (FSC certified) and no plastic.
- Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
- Conference delegate badges made of paper (FSC certified) and no plastic.
- Please follow the waste separation instructions at the venue and at your accommodations when available.
- Swedish tap water is of such a high quality, choose this instead of bottled water. Tap water stations will be available throughout the venue. Bring your own bottles and fill them up with tap water.
- Choose vegetarian options for your lunches and other meals if possible, Gothenburg is a great city for vegetarian food. There are vegetarian options at all catering areas in the venue.
- Some of the things we do:
  - Choose vegetarian options for your lunches and other meals if possible, Gothenburg is a great city for vegetarian food.
  - Swedish tap water is of such a high quality and tap water stations will be available throughout the venue.
  - The venue are providing waste separation bins in the conference area and the waste from other bins will be sorted later at the waste station.
  - Printed materials are kept to a minimum and all printed paper provided by the conference such as the programme is made of certified paper (Svanen). Conference materials such as abstracts and proceedings are provided online.
  - Gifts and give aways are minimised. ECOC 2017 will instead of delegate gifts donate money to a solar lamp project in the third world via the Swedish organisation “Barnfonden”.
  - Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
  - Conference delegate badges made of paper (FSC certified) and no plastic.
  - Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
  - Conference delegate badges made of paper (FSC certified) and no plastic.
  - Please follow the waste separation instructions at the venue and at your accommodations when available.
  - Swedish tap water is of such a high quality, choose this instead of bottled water. Tap water stations will be available throughout the venue. Bring your own bottles and fill them up with tap water.
  - Choose vegetarian options for your lunches and other meals if possible, Gothenburg is a great city for vegetarian food. There are vegetarian options at all catering areas in the venue.
  - If you are shopping, the city s providing a “Sustainable shopping guide”. Read about this
  - Choose vegetarian options for your lunches and other meals if possible, Gothenburg is a great city for vegetarian food. There are vegetarian options at all catering areas in the venue.
  - Swedish tap water is of such a high quality and tap water stations will be available throughout the venue.
  - The venue are providing waste separation bins in the conference area and the waste from other bins will be sorted later at the waste station.
  - Printed materials are kept to a minimum and all printed paper provided by the conference such as the programme is made of certified paper (Svanen). Conference materials such as abstracts and proceedings are provided online.
  - Gifts and give aways are minimised. ECOC 2017 will instead of delegate gifts donate money to a solar lamp project in the third world via the Swedish organisation “Barnfonden”.
  - Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
  - Conference delegate badges made of paper (FSC certified) and no plastic.
  - Conference bags are chosen with a sustainable thought, they are made from recycled cotton and are corporate social responsibility approved (CRS), meaning we care about the people that provided us with the conference bags.
  - Conference delegate badges made of paper (FSC certified) and no plastic.
<table>
<thead>
<tr>
<th>Exhibitor</th>
<th>Stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opitronik GmbH</td>
<td>508</td>
</tr>
<tr>
<td>Optisys Sweden AB</td>
<td>308</td>
</tr>
<tr>
<td>Optiplex Ltd</td>
<td>124</td>
</tr>
<tr>
<td>Optiwave Technology Inc</td>
<td>102</td>
</tr>
<tr>
<td>OPTICAL</td>
<td>436</td>
</tr>
<tr>
<td>Optium Optical Communications Technologies Co Ltd</td>
<td>520</td>
</tr>
<tr>
<td>G2 Optics Limited</td>
<td>308</td>
</tr>
</tbody>
</table>

**P**
- Pacific Microwave Co Ltd
- Pheno Fiber Optic Co Ltd
- Philip Cessario & Associates
- Photonic Solutions Ltd
- Phoenix Optics Inc
- Photonics Devices Inc
- Phytech Instruments (PI) Ltd & Co KG
- Plasmon AG
- Pukl Optics
- Private
- PTI Saini-M$maka M$macht

**Q**
- Qinetix
- Qorvo
- P. W. Batna
- Magdalena Mucha
- Prolabs
- ProOptix
- PriTel Inc
- PPI Inc
- Polycab Wires Pvt Ltd
- Plumettaz SA
- PIXAPP
- Picometrix (Sharing company of Macom)
- Physik Instrumente (PI) GmbH & Co KG
- PhotonicSweden
- Berlin-Brandenburg
- Photonics Cluster Berlin Brandenburg (Sharing company of Photon Design)
- Phoenix Photonics Ltd
- Phenix Fiber Optic Co Ltd
- Optoway Technology Inc
- Optoscribe Ltd
- Optomark GmbH

**R**
- SiFotonics Technologies Co Ltd
- Sicoya GmbH (Sharing company of Berlin-Brandenburg)
- Sichuan Tianyi Comheart Telecom Co Ltd
- Shenzhen Youngsun Com Optical Fiber Cable
- Shenzhen YHT Broadband Equipment Co Ltd
- Shenzhen Wintop Optical Technology Co Ltd
- Shenzhen Sinovo Telecom Co Ltd
- Shenzhen SDG Information Co Ltd
- Shenzhen Opway Communication Co Ltd
- Shenzhen DYS Fiber Optic Technology Co Ltd
- Shenzhen Datolink Communication Technology
- Shenzhen Chinaopticcable Co Ltd
- Shenzhen Ascent Optics Co Ltd
- Shenzhen Allopto Limited
- Shenzhen 6COM Technology Co Ltd
- Shaoxing ZKTel Equipment Co Ltd
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Yenista Optics
- Yangtze Optical Fibre and Cable
- XGIGA Communication Technology Co Ltd
- Xdk Communication Equipment (Huizhou) Co Ltd
- Viavi Solutions
- US Conec Ltd
- UNO Electronic (Ningbo) Co Ltd
- Unioriental Optics Co Ltd
- TYKOFLEX AB
- T Plus Co Ltd
- Thorlabs Sweden AB
- THOR Group
- TeraXion
- Telegaertner Karl Gaertner GmbH
- Teledyne LeCroy GmbH
- denburg
- Takfly Communications Co Ltd
- Swelaser AB
- SMART Photonics B.V.
- Skylane Optics
- Source Photonics
- Suss MicroOptics SA
- Sumitomo Electric Europe Limited
- SUMEC Wasin Telecom Co Ltd
- Sticklers® Fiber Optic Cleaners by MicroCare Corp
- Shengtai® Fiber Optic Cleaners by MicroCare Corp
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Source Photonics
- Slubice/Poland
- Samsung
- Schlumberger Fiber Optics Cleaners by MicroCare Corp
- SLM Optics
- SLM Optics (Sharing company of Berlin-Brandenburg)
- Sumitomo Osaka Cement Co Ltd
- Source Photonics
- Sinosonics Technologies Co Ltd
- Sinosontec Technologies Co Ltd
- skies Imaging Technologies Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Shandong Pacific Optics Fiber and Cable Co Ltd
- SENKO Advanced Components (Euro) Limited
- Shanghai Joinwit Optoelectronic Tech Co Ltd
- Sheringham
44th EUROPEAN CONFERENCE ON OPTICAL COMMUNICATION
Rome (Italy), September 23-27, 2018
Nuova Fiera di Roma - www.fieraroma.it

ECOC is the leading European conference in the field of optical communication and related applications and technologies.

Papers are solicited on, but not limited to, the following areas:
- Fibres, fibre devices and fibre amplifiers
- Integrated photonic devices and modules
- Digital techniques for optical communication systems
- Point-to-point optical transmission systems, subsystems and technologies
- Photonic and microwave photonic subsystems for telecom and non-telecom applications
- Datacenters architectures, technologies and future hardware platforms
- Core, metro, and convergence networks
- Optical networks for 5G

New emerging applications linked to integrated photonics will also be considered:
- Photonics for Space
- Photonics in quantum communications
- Graphene in photonics

General Co-chairs:
- Alessandro Cavaciuti (Cisco Photonics)
- Piero Gambini (ST Microelectronics)
- Giancarlo Prati (CNIT)

Technical Program Co-Chairs:
- Antonella Bogoni (Sant’Anna School of Advanced Studies)
- Antonio Mezezzi (University of L’Aquila)
- Roberto Sabella (Ericsson)

Organizing Committee Chair:
- Giuseppe Bianchi (CNIT)

Publication Chair:
- Luca Potì (CNIT)

Paper submission deadline: April 16, 2018
Early registration deadline: July 19, 2018
WWW.ECOC2018.ORG