

## ACP 2021 — Agenda of Sessions

### Sunday, 24 October

	Qingdao Room, 2F	Shenyang Room, 2F	Dalian Room, 2F	Changchun Room, 2F	Beijing Room, 2F	Shanghai Room, 2F	Wuxi/Guilin Room, 3F	Nanjing Room, 3F	Kaifeng Room, 3F
08:00–18:0	Registration, Lobby								
09:00–12:35			<b>Workshop: AI Meets Photonics</b> <i>(08:00–12:25)</i>	<b>Workshop: Biophotonic Imaging Roadmap 2021</b> <i>(09:00–11:15)</i>	<b>Workshop: Heterogeneous Photonic Integration on Silicon</b> <i>(09:00–11:45)</i>	<b>Workshop: Light: Science &amp; Application Workshop in Quantum Photonics</b> <i>(09:00–12:35)</i>		<b>Forum: All Optical Service Networks for F5G</b> <i>(8:30–12:35)</i>	<b>Forum: Silicon Photonics Integration for beyond 800G Pluggable and Co-Packaged Optics applications: Opportunities and Challenges</b> <i>(09:00–12:30)</i>
12:00–14:00	Lunch Break, Yi Café, 2F, Grand Tower								
14:00–18:30	<b>Workshop: Microcavity Frequency Combs: From Physics to Applications</b> <i>(begins at 13:00)</i>	<b>Workshop: Space-division Multiplexing (SDM)</b> <i>(ends 17:45)</i>	<b>Workshop: Co-Integration of Photonics and Electronics</b> <i>(14:00–17:55)</i>	<b>Workshop: Biophotonic Imaging Roadmap 2021+Panel Discussion</b> <i>(14:00–16:45)</i>	<b>Workshop: Heterogeneous Photonic Integration on Silicon</b> <i>(13:50–16:55)</i>	<b>Workshop: Nonlinearity Compensation or Advanced Coded Modulation Schemes to Achieve Fibre's Ultimate Transmission Limit?</b> <i>(13:00–18:00)</i>	<b>Workshop: Novel Routines from Fibres to Transceivers</b>	<b>Forum: Next-Generation Optical Switching and Transmission Technologies for F5g And Beyond</b> <i>(14:00–18:30)</i>	<b>Forum: Future Artificial Intelligence Optical Network Toward 2030: Technologies and Applications</b> <i>(13:00–18:15)</i>

# Workshop and Forums

## Workshops

### Workshop 1: Microcavity Frequency Combs: from Physics to Applications

Workshop Time: 13:00–17:45, Sunday, 24 October Venue:

Qingdao Room, 2F

#### Organizers

**Yunfeng Xiao**, Peking Univ., China

**Baicheng Yao**, Univ. of Electronic Science and Technology of China, China

**Heng Zhou**, Univ. of Electronic Science and Technology of China, China

**Description:** Microcavity frequency combs is a hot frontier of photonic physics and a significant direction of optical technology in recent years. Its R&D will lead the future developments of wide applications ranging from integrated optics, precision measurements, astronomical observation, ultrafast communication, to smart sensing. In this workshop, we share the cutting-edge advances, enhance and broaden the combination of science and techniques of microcombs.

#### Speakers:

**President: Baicheng Yao**, Univ. of Electronic Science and Technology of China, China

**13:00–13:25 Chee Wei Wong**, Univ. of California at Los Angeles, USA

Topic: Microcavity frequency combs: precision ultrafast measurements and stabilization

**13:25–13:50 Xu Yi**, Univ. of Virginia, USA

Topic: Microcavity frequency combs in deterministic quantum regime

**13:50–14:15 Shu-Wei Huang**, Univ. of Colorado at Boulder, USA

Topic: Photonic frequency comb based on dissipative quadratic soliton

**14:15–14:40 Qi-Fan Yang**, Peking Univ., China

Topic: Fundamental coherence of optical microcombs

**14:40–15:05 Wei-Qiang Xie**, Shanghai Jiao Tong Univ., China

Topic: Ultralow-loss AlGaAs nanophotonics for low-power and scalable nonlinear photonics integrated circuits

**15:05–15:20 Coffee Break**

**President: Heng Zhou**, Univ. of Electronic Science and Technology of China, China

**15:20–15:45 Lin Chang**, Peking Univ., China

Topic: Ultra-narrow linewidth lasers and microcombs based on self-injection locking in integrated photonics

**15:45–16:10 Benbo Xu**, Huawei Ltd. Co, China.

Topic: Recent progress in multi-wavelength laser source solutions

**16:10–16:35 Pacal Del’Haye**, Max Plank Inst., Germany Topic: TBD

**16:35–17:00 Victor Torres Company**, Univ. of Chalmers, Sweden

Topic: Microresonators frequency combs in optical communications: challenges and opportunities

**President: Yunfeng Xiao**, Peking Univ., China

**17:00–17:45 Plenary discussion**

### Workshop 2: Space-division Multiplexing (SDM)

Workshop Time: 14:00–17:45, Sunday, 24 October Venue:

Shenyang Room, 2F

#### Organizers

**Georg Rademacher**, National Inst. of Information and Communications Technology, Japan

**Rui Zhou**, Huawei, China

**Juan Carlos Alvarado-Zacarias**, Univ. of Central Florida, USA

**Description:** Space division multiplexing (SDM) in multi-mode and multi-core fibers has been a major topic in optical fiber communications research since the beginning of the last decade. SDM research aims at exploiting spatial diversity in optical transceivers, fibers, amplifiers, routers etc. to in-

crease the per-link transmission capacity while reducing cost, complexity, and eventually energy consumption.

This workshop intends to gather experts in the field to establish an overview of the current state of SDM research with a focus on:

- Integrated transceivers and components for SDM
- Advances in SDM fiber design, modeling and analysis of novel propagation effects
- An industry perspective on SDM

The workshop further aims at stipulating an open discussion between panelists and attendees on the challenges and opportunities envisaged in the deployment of massive parallel transmission systems.

#### Speakers:

**President: Rui Zhou**, Huawei, China

**14:00–14:15 Shikui Shen**, China Unicom, China Topic: China Unicom’s view on SDM technology

**14:15–14:30 Tobias Fehenberger**, ADVA Optical Networking, Germany

Topic: Integration in Space Division Multiplexed Systems: A Key Element to Commercial Success

**14:30–14:45 Lin Zhang**, Tianjin Univ., China Topic: SDM transmission systems and key devices

**14:45–15:00 Juhao Li**, Peking Univ., China Topic: Weak coupling FMF transmission systems

**15:00–15:15 Lei Shen**, YOFC, China

Topic: Challenges and solutions of SDM fiber in practical application

**15:15–15:30 Ning Wang**, China Mobile Research Institute, China

Topic: Potentials of SDM technology in fiber access networks

**15:30–15:45 Pandelis Diamantopoulos**, NTT, Japan Topic: Integrated Directly-Modulated Membrane Laser Transmitters for Short-Reach SDM Links

**15:45–16:00 Coffee Break**

**Presider: Georg Rademacher**, National Inst. of Information and Communications Technology, Japan & **Juan Carlos Alvarado-Zacarias**, Univ. of Central Florida, USA  
**16:00–16:15 Guilhem de Valicourt**, Nubis Communications, USA

Topic: Highly parallel integrated transceivers

**16:15–16:30 Nick Fontaine**, Nokia Bell Labs, USA Topic: Multi-mode EDFAs

**16:30–16:45 Rio Nagase**, Chiba Inst. of Technology, Japan Topic: Connector technologies for MCF

**16:45–17:00 Cristian Antonelli**, Univeristy de l'Aquila, Italy Topic: Modelling of crosstalk in MCF

**17:00–17:15 Peter Krummrich**, TU Dortmund, Germany Topic: Mode coupling in high mode count MMF

**17:15–17:30 Ruby SB Ospina**, Univ. of Campinas, Brazil Topic: MDL estimation in SDM transmission experiments

**17:30–17:45 Kazunori Mukasa**, Furukawa Electric, Japan Topic: Ultra-high core count MCF

### Workshop 3: Novel Routines from Fibres to Transceivers

Workshop Time: 13:45–18:00, Sunday, 24 October Venue:

Wuxi/Guilin Room, 3F

#### Organizers

**Liangming(Ansion) Xiong**, State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China **Weisheng Hu**, Shanghai Jiao Tong Univ., China

**Junjie Li**, China Telecom Research Inst., Beijing, China

**Description:** Telecom operators and Internet companies are particularly sensitive to the price and ease of use of high-speed connection solutions or routines of optical transmission. To design and develop novel routines or solutions for access or datacenter optical networks at a low cost is very important and necessary in industry. This workshop will give some representative routines, involving in optical fiber, interconnects, IC and optical chips or components, tunable DBR lasers, transceivers, and DCI or access network solutions.

#### Speakers:

**Presider: Weisheng Hu**, Shanghai Jiao Tong Univ., China  
**13:45–14:08 Junjie Li**, China Telecom Research Inst., Beijing, China

Topic: Chance and Challenge of 400Gb/s WDM in Backbone and Metro Networks

**14:08–14:31 Yi Yu**, Huawei Technologies Co., LTD.

Topic: Capacity and Flexibility Improvement for Next Generation Fixed Optical Networks

**14:31–14:54 Sai Chen**, Alibaba Group

Topic: High-speed Datacenter Optical Networks

**14:54–15:17 Lei Zhang**, State Key Laboratory of Optical Fiber and Cable Manufacture Technology, YOFC, China Topic: New Optical Fiber Connection Solutions for Datacenter

**15:17–15:40 Qunbi Zhuge**, Shanghai Jiao Tong Univ., China Topic: Capacity-approaching Design of Coherent Optical transceiver

**15:40–15:50 Coffee Break**

**Presider: Junjie Li**, China Telecom Research Inst., Beijing, China

**15:50–16:13 Honglin Ji**, The Univ. of Melbourne, Australia Topic: Advanced Optical Receivers for High-capacity Optical Interconnects

**16:13–16:36 Ivan Zheng**, Innolight Technology (Suzhou) LTD. Topic: TBD

**16:36–16:59 Song Liang**, Inst. of Semiconductors, Chinese Academy of Sciences 1.

Topic: High-speed Widely Tunable InP Based DBR Lasers 2.

**16:59–17:22 Hui Wang**, Citrus Technology, Shanghai, China Topic: IC Design Challenges for PAM4 Optical Interconnects 3.

**17:22–17:45 Liangbo Wang, Yuanjie Semiconductor Technology, Co., Ltd, China** 4.

Topic: InP Laser Status and Challenge for High Speed Optical Communication 5.

**Presider: Liangming(Ansion) Xiong**, State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China 6.

**17:45–18:00 Plenary discussion** 7.

### Workshop 4: AI Meets Photonics

Workshop Time: 08:00–12:25, Sunday, 24 October Venue:

Dalian Room, 2F

#### Organizers

**Weiwen Zou**, Shanghai Jiao Tong Univ., China

**Shuiying Xiang**, Xidian Univ., China

**Jianji Dong**, Huazhong Univ. of Science and Technology, China

**Hongwei Chen**, Tsinghua Univ., China

**Description:** The emerging brain-inspired AI technologies may outperform the traditional von Neumann computing scheme for some certain tasks, especially with the computation-burden tasks, e.g., image recognition, audio processing, deep learning, and much more.

The intersection of AI and photonics is now burgeoning for a new computing paradigm. It can combine both neuroscience information-processing capacity and unique properties of photonics, may offer a promising candidate to address the ever-growing computing-consuming scenarios with much lower power consumption.

This workshop shall shed light on how such merits can be combined, when such solutions may be affordable, and what advantages could be offered. Furthermore, current bottlenecks and technological limits shall be discussed. Especially, the workshop shall address such topics:

1. photonic feedforward neural network;
2. photonic convolutional neural network;
3. photonic neuromorphic computing;
4. photonic spiking neural network;
5. photonic reservoir computing;
6. Photonic ising machine;
7. Diffractive optical neural network.

#### Speakers:

**Presider: Shuiying Xiang**, Xidian Univ., China

**08:00–08:25 Shaofu Xu**, Shanghai Jiao Tong Univ., China Topic: Architecture design and chip fabrication of optical convolutional neural network

**08:25-08:50 Ye Tian**, Chongqing United Microelectronics Center (CUMEC), China

Topic: Artificial Intelligence empowered by Silicon photonic: engineering opportunities and challenges

**08:50-09:15 Chaoran Huang**, The Chinese Univ. of Hong Kong, China

Topic: Silicon photonic neural networks for high-speed signal processing

**09:15-09:40 Zengguang Cheng**, Fudan Univ., China Topic: Photonic memory and computing based on phase-change materials

**09:40-10:05 Yahui Zhang**, Xidian Univ., China

Topic: Photonic spiking neuron based on VCSELs: theory and experiment

**10:05-10:20 Coffee Break**

**Presider: Jianji Dong**, Huazhong Univ. of Science and Technology, China

**10:20-10:45 Chao Qian**, Zhejiang Univ., China

Topic: Deep learning for dynamic perception and self-adaptive invisibility cloak

**10:45-11:10 Xingyuan Xu**, Monash Univ., Australia

Topic: 11TOPS photonic convolution accelerator based on microcombs

**11:10-11:35 Bing Bai**, Photoncounts co.ltd/Beijing Jiaotong Univ., China

Topic: Photonic computing chip for nonlinear distortion compensation in optical communication system

**11:35-12:00 Jiamin Wu**, Tsinghua Univ., China

Topic: Opportunities and challenges for practical applications of optical neural network

**Presider: Weiwu Zou**, Shanghai Jiao Tong Univ., China &

**Hongwei Chen**, Tsinghua Univ., China

**12:00-12:25 Plenary discussion**

### **Workshop 5: Nonlinearity Compensation or Advanced Coded Modulation Schemes to Achieve Fibre's Ultimate Transmission Limit?**

Workshop Time: 14:00-17:20, Sunday, 24 October Venue:

Shanghai Room, 2F

#### **Organizers**

**Bin Chen**, Hefei Univ. of Technology, China

**Gabriele Liga**, Eindhoven Univ. of Technology, Netherlands

**Lin Sun**, The Hong Kong Polytechnic Univ., China

**Description:** Optical fibre transmission capacity is still unknown. However, what we know for sure is that fibre capacity is theoretically achievable using forward error correction in combination with one of these two alternative approaches: i) nonlinearity compensation (NLC); ii) coded modulation.

Digital nonlinearity compensation schemes have proven to be extremely effective when it comes of suppressing nonlinear distortions on the received signal, but is limited by high computational complexity. On the other hand, nonlinearity-tailored coded modulation schemes can be in general implemented with a lower complexity than NLC but they have not so far yielded dramatic information rates improvements. The question is then which of these two approaches is more effective in terms of performance-complexity tradeoff?

In this workshop, speakers will share their views on the future of approaching capacity and the prospects of performance-complexity tradeoff for optical fibre communication system.

#### **Speakers:**

**Presider: Bin Chen**, Hefei Univ. of Technology, China

**14:00-14:20 Christian Häger**, Chalmers Univ. of Technology, Sweden

Topic: Reducing the complexity of digital backpropagation with machine learning

**14:20-14:40 Stella Civelli**, Scuola Superiore Sant'Anna, Italy

Topic: Tailored Shaping, Improved Detection, Simpler Backpropagation: the Road to Nonlinearity Mitigation

**14:40-15:00 Yukui Yu**, HiSilicon, China

Topic: Implementation aspects of nonlinear equalizer for IM/DD systems

**15:00-15:20 Zhipei Li**, Beijing Inst. of Technology, China Topic: Machine learning based DSP techniques for probabilistically shaped signals maximizing GMI

**Presider: Lin Sun**, The Hong Kong Polytechnic Univ., China

**15:20-15:30 Plenary discussion**

**15:30-15:45 Coffee Break**

**Presider: Gabriele Liga**, Eindhoven Univ. of Technology, Netherlands

**15:45-16:05 Kaiquan Wu**, Eindhoven Univ. of Technology, Netherlands

Topic: Temporal shaping and high-dimensional modulation for fiber nonlinear mitigation

**16:05-16:25 Mengfan Fu**, Shanghai Jiao Tong Univ., China

Topic: Nonlinearity-tolerant probabilistic shaping in optical coherent transmissions

**16:25-16:45 Metodi Yankov**, Technical Univ. of Denmark, Denmark

Topic: Block error detection driven nonlinearity compensation for optical fiber communications

**16:45-17:05 Yi Lei**, Hefei Univ. of Technology, China Topic: Hybrid hard/soft decision staircase decoding for low-cost high-speed optical transmission

**Presider: Lin Sun**, The Hong Kong Polytechnic Univ., China

**17:05-17:20 Plenary discussion**

### **Workshop 6-7: Biophotonic Imaging Roadmap 2021**

Workshop Time: 9:00-16:45, Sunday, 24 October Venue:

Changchun Room, 2F

#### **Organizers**

**Peng Xi**, Peking Univ., China **Xunbin Wei**, Peking Univ., China

**Junle Qu**, Shenzhen Univ., China

**Description:** In the 21st century, biomedical imaging presents a series of new development trends: breaking the diffraction limit, high-speed, deep three-dimensional, label-free imaging. In association with other novel technologies such as multi-modality probes, new light sources, detectors, lightfield manipulation, computational imaging, and other



related technologies, biophotonic imaging provides new solutions and insights for many applications. Arising from asking questions to analyzing questions, this workshop will give examples of the cutting-edge biological imaging technologies and their applications, and discuss how we can expand the application of biological photonics imaging in interdisciplinary fields with these new tools. In the meantime, we will address how biophotonics field can better respond to our national calls, to solve the challenging international or regional life science and medicine problems.

#### **Speakers:**

**President: Xunbin Wei**, Peking Univ., China

**09:00–09:30 Peng Xi**, Peking Univ., China

Topic: Super-resolution: an adventure on a new dimension

**09:30–10:00 Ming Lei**, Xi'an Jiaotong Univ., China

Topic: Multi-color structured illumination microscopy for live cell imaging based on the enhanced image recombination transform algorithm

**10:00–10:15 Coffee Break**

**10:15–10:45 Liwei Liu**, Shenzhen Univ., China

Topic: Multimodal optical microscopic imaging technology and its biomedical applications

**10:45–11:15 Guohua Shi**, Suzhou Inst. of Biomedical Engineering and Technology Chinese Academy of Science, China

Topic: TBD

**11:15–14:00 Lunch Break**

**President: Junle Qu**, Shenzhen Univ., China

**14:00–14:30 Xunbin Wei**, Peking Univ., China Topic: TBD

**14:30–15:00 Sihua Yang**, South China Normal Univ., China

Topic: Photoacoustic imaging: medical transformation from small animals to humans

**15:00–15:15 Coffee Break**

**15:15–15:45 Chao Tian**, Univ. of Science and Technology of China, China

Topic: Biomedical photoacoustic computed tomography

**15:45–16:15 Ke Si**, Zhejiang Univ., China

Topic: Deep tissue optics imaging and its applications

**President: Peng Xi**, Peking Univ., China

**16:15–16:45 Plenary discussion**

### **Workshop 8-9: Heterogeneous Photonic Integration on Silicon**

Workshop Time: 9:00–16:55, Sunday, 24 October Venue:

Beijing Room, 2F

#### **Organizers**

**Liu Liu**, Zhejiang Univ., China

**Xinlun Cai**, Sun Yat-sen Univ., China

**Hon-Ki Tsang**, The Chinese Univ. of Hong Kong, China

**Description:** Silicon has become the platform of choice for large-scale photonic integration. Its compatibility with the mature CMOS processing technology offers the well-known advantages of scalability, low-cost at high-volume, and high yield. Despite its success during the last 20 years in both academia and industry, further improvement on functionalities and performances of silicon photonic circuits beyond the limitations posed by the intrinsic material capabilities of silicon is needed for photonics. Improvements in silicon photonics for efficient light generation, optical amplification, high-speed and efficient optical modulation, low-noise high quantum-efficiency high-speed photodetectors, nonlinear photonic devices and integrated quantum photonic applications may be brought about with the use of different materials integrated on silicon. Heterogeneous integration technology can bring together silicon and other materials with better optical properties. Combining the best of different material systems, it holds the potential to realize full functioning photonic circuits. This workshop will focus on recent advances and future developments of heterogeneous photonic integration on silicon in all related aspects including fabrication processes, discrete devices, integration technologies, novel two-dimensional materials on silicon etc.

#### **Speakers:**

**President: Xinlun Cai**, Sun Yat-sen Univ., China

**9:00–9:20 Bowen Song**, UC Santa Barbara, USA

Topic: Heterogeneous Integration by Direct Epitaxy on Silicon: Lasers and Photodetectors

**9:20–9:40 Yuan Yuan**, Hewlett Packard Labs, USA

Topic: Energy-Efficient Silicon Photonics with Heterogeneous Integration

**9:40–10:00 Siming Chen**, University College London, UK Topic: Roadmap of Monolithic III-V Quantum Dot Laser in Silicon Photonics

**10:00–10:15 Coffee Break**

**10:15–10:35 Kei-May Lau**, Hong Kong Univ. of Science and Technology, China

Topic: Heterogeneous epitaxy on silicon for lasers and photodetectors

**10:35–10:55 Weihua Guo**, Huazhong Univ. of Science and Technology, China

Topic: A potential new way for the hybrid integration of the laser and silicon waveguide

**10:55–11:15 Gunther Roelkens**, Ghent Univ., Belgium Topic: micro-transfer printing for heterogeneous silicon photonic integrated circuits

**11:15–11:45 Plenary discussion President: Liu Liu**, Zhejiang Univ., China

**13:50–14:10 Huan Li**, Zhejiang Univ., China

Topic: Integrated Acousto-Optics on Thin-Film Lithium Niobate  
**14:10–14:30 Xinjun Wang**, Peking Univ., China Topic: Si-III-V comb and system application

**14:30–14:50 Xiaoxiao Xue**, Tsinghua Univ., China

Topic: High-efficiency microcomb generation and applications  
**14:50–15:10 Linjie Zhou**, Shanghai Jiao Tong Univ., China

Topic: Nonvolatile optical control using phase change materials on silicon

**15:10–15:25 Coffee Break**

**15:25-15:45 Yi Wang**, The Chinese Univ. of Hong Kong, China

Topic: Hybrid 2D materials for photonic integration

**15:45–16:05 Zhichao Ye**, Chalmers Univ. of Technology, Sweden

Topic: Ultralow-loss Si<sub>3</sub>N<sub>4</sub> waveguides for nonlinear optics

**16:05-16:25 Buwen Cheng**, Institute of Semiconductor, CAS, China

Topic: Ge active photonic devices on Si substrate

**16:25-16:55 Plenary discussion**

## **Workshop 10: Co-integration of Photonics and Electronics**

Workshop Time: 14:00–17:45, Sunday, 24 October Venue:

Dalian Room, 2F

### **Organizers**

**Yikai Su**, Shanghai Jiao Tong Univ., China

**Beiju Huang**, Inst. of Semiconductors, CAS, China

**Description:** Co-integration of photonics and electronics has received considerable attention in recent years for the advantages of shrunk footprint, lower cost, and reduced power consumption. Silicon photonics is a platform on which photonics and electronics can be integrated, by leveraging standard fabrication processes in the microelectronics industry. This workshop will provide an open forum for speakers and audience to discuss the possible technologies to merge photonics and electronics on chip and forecast potential applications. We will first review the current status of co-integration with an emphasis on monolithic integration on silicon. Then we will talk about the desired performance metrics of building blocks, required fabrication processes, and mass production issues. Finally we will brain storm the possible roadmap for future technology development and the emerging applications.

### **Speakers:**

**President: Yikai Su**, Shanghai Jiao Tong Univ., China

**14:00–14:25 Xu Wang**, Lumerical, Canada Topic: Co-design of photonics and electronics

**14:25-14:50 Ke Li**, Univ. of Southampton, UK

Topic: Electronic-photonic convergence for 100+Gb/s silicon photonics transmitters

**14:50-15:15 Shuren Hu**, Aurora Innovations Inc., Sweden

Topic: Integration choices in silicon photonics coherent LiDAR

**15:15–15:30 Coffee Break**

**President: Beiju Huang**, Inst. of Semiconductors, CAS, China

**15:30–15:55 Xi Xiao**, Wuhan research Inst. of post and telecommunications, China

Topic: What is the better choice for photonics-electronics integration? Chiplet or monolithic OEIC?

**15:55–16:20 Min Tan**, Huazhong Univ. of Science and Technology, China

Topic: Integration methods for scalable feedback control of multiple photonic parameters: key challenges and recent advances

**16:20–16:45 Nan Qi**, Inst. of Semiconductors, CAS, China

Topic: Monolithic integration – a bumpy way to make silicon photonics more electrical

**16:45–17:15 Zan Zhang**, Chang An Univ., China

Topic: 3D integration of photonics and electronics through CMOS backend process

**President: Yikai Su**, Shanghai Jiao Tong Univ., China & **Beiju Huang**, Inst. of Semiconductors, CAS, China

**17:15–17:45 Plenary discussion**

## **Workshop 11: Light: Science & Application workshop in Quantum Photonics**

Workshop Time: 09:00–12:35, Sunday, 24 October Venue:

Shanghai Room, 2F

### **Organizers**

**Guilu Long**, Tsinghua Univ., China

**Lajos Hanzo**, University of Southampton, UK

**Yuhong Bai**, Changchun Inst. of Optics, Fine Mechanics and Physics, CAS, China

**Description:** Photonics is vital in quantum information processing. While quantum key distribution (QKD), where secret

key is negotiated through quantum channel, continues its strong momentum and fast development, quantum secure direct communication (QSDC), where secret information is transmitted directly through quantum channel, is witnessing a transformation from a mere theoretical scheme to a fully developed practical protocol. Sponsored by the world-leading optical journal, Light, Science & Applications, the quantum photonics workshop features seven invited talks on the recent progress in QKD, QSDC and photonic chip for scalable quantum information processing. A 15-user quantum networks with QSDC, and the world first experimental endeavor to study the feasibility of QKD and QSDC from the 36000 km SJ-20 geosynchronous orbit satellite will be reported in the workshop. Important issues of quantum communication within the larger arena of the communication world will be touched in the workshop.

### **Speakers:**

**President: Guilu Long**, Tsinghua Univ., China

**09:00–09:25 Xianfeng Chen**, Shanghai Jiao Tong Univ., China

Topic: A 15-user quantum secure direct communication network  
**09:25–09:50 Yuan-Xing Liu**, Beijing Inst. of Aerospace Control Devices, China

Topic: Transmission of photonic polarization states from geosynchronous Earth orbit satellite to the ground

**09:50–10:15 Hong-xin Li**, Strategic Support Force Information Engineering Univ., China

Topic: A Scheme of Quantum Secure Direct Communication Based on 4-Dimension Hilbert Space by Mixing Bell State Particles and Single Photons

**10:15–10:40 Gui-Lu Long**, Tsinghua Univ./BAQIS, China

Topic: Long-distance high-throughput quantum secure direct communication

**10:40-10:55 Coffee Break**

**President: Yuhong Bai**, Changchun Inst. of Optics, Fine Mechanics and Physics, CAS, China

**10:55–11:20 Xian-Min Jin**, Shanghai Jiao Tong Univ., China

Topic: 3D photonic chip for scalable quantum information processing

**11:20–11:45 Adrian Wonfor**, Univ. of Cambridge, UK

Topic: Quantum networks in the UK

**11:45–12:15 Lajos Hanzo**, Univ. of Southampton, UK Topic:

TBA

**Presider: Lajos Hanzo**, University of Southampton, UK

**12:15–12:35 Plenary discussion**

## Industry Fourms

### Forum1: All optical service networks for F5G

Time: 8:30–12:35, Sunday, 24 October Venue: Nanjing Room,

3F

#### Organizers

**Xiang Liu**, Huawei Hong Kong Research Center, China

**Yongli Zhao**, Beijing Univ. of Posts and

Telecommunications, China

**Yi Lin**, Huawei, China

**Description:** F5G is the 5th generation fixed networks, which can support the 5th generation wireless networks. Low latency, massive connections, full fiber connection are the main features of F5G. There are mainly two parts in F5G, which are access networks and core networks. All optical service network is a new network prototype for F5G core networks. There are many challenges and opportunities for all optical service network in the near future. In this workshop, some famous experts from academic and industry will be invited to give some interesting topics, which includes the service requirement, network architecture, enabled protocols, routing algorithms, and so on.

#### Speakers:

**Presider: Yongli Zhao**, Beijing Univ. of Posts and Telecommunications, China

**08:30–08:50 Haiyi Zhang**, CAICT, China

**Topic:** TBD

**08:50–09:10 Ming Jiang**, ISG F5G & China Telecom, China

Topic: Introduction of ETSI ISG-F5G Standards

**09:10–09:30 Han Li**, China Mobile, China Topic: Fronthaul Technologies in 5G

**09:30–09:50 Guangquan Wang (or others)**, China Unicom, China Topic: TBD

**09:50–10:10 Ruiquan Jing**, China Telecom, China Topic: Advances in OSU-OTN

**10:10–10:25 Coffee Break**

**Presider: Yi Lin**, Huawei, China

**10:25–10:45 Raouf Boutaba**, Univ. of Waterloo, Canada

Topic: Elastic Optical Network (EON) slicing technologies

**10:45–11:05 Lei Wang**, Alibaba, China

Topic: AONA: a data analytics platform for operation of datacenter optical networks

**11:05–11:25 Nan Hua**, Tsinghua Univ., China

Topic: Low-latency metro-access converged networks based on all-optical time slicing technology

**11:25–11:45 Zuqing Zhu**, China Univ. of Science and Technology, China

Topic: DRL-assisted Light-tree Reconfiguration for Dynamic Multicast in Elastic Optical Networks

**11:45–12:05 Yongli Zhao**, Beijing Univ. of Posts and Telecommunications, China

Topic: Framework and Key Technologies of Deterministic Full-Fibre Service Network (DFSN) for F5G

**Presider: Xiang Liu**, Huawei Hong Kong Research Center, China

**12:05–12:35 Plenary discussion**

### Forum2: Next-generation optical switching and transmission technologies for F5G and beyond

Time: 14:00–18:30, Sunday, 24 October Venue: Nanjing

Room, 3F

#### Organizers

**Gangxiang Shen**, Soochow Univ., China

**Ning Deng**, Huawei, China

**Vittorio Curri**, Politecnico di Torino, Italy

**Description:** There are many issues and challenges in the F6G-oriented next-generation optical switching and transmission technology to be explored. This workshop attempts to provide an overview of the state of the art of current re-

search regarding OXC/ROADM, multiband optical transmission, 400G and beyond transmission, issues on ultra-low loss fibers, and so on. We will specifically pay attention to many important research topics, including C+L-band optical channel signal quality estimation, optical amplifier placement in multi-band transmission system, novel fiber and optical amplifier, large-scale OXC/ROADM, and low-cost ROADM. We aim to encourage an open discussion on the challenges and opportunities of next-generation optical switching and transmission technologies and help construct low-cost high-performance F6G.

#### Speakers

**Presider: Ning Deng**, Huawei, China

**14:00–14:25 Tianhai Chang**, Huawei Technologies, China Topic: New opportunities for PON technology evolution in the F5G era

**14:25–14:50 Yi Cai**, Soochow Univ., China

Topic: The key to unlock all information carriers for F5G and beyond: optical coherent DSP

**14:50–15:15 Fan Zhang**, Peking Univ., China

Topic: Fiber nonlinearity mitigation in high-speed coherent optical transmission systems

**15:15–15:40 Haining Yang**, Southeast Univ., China

Topic: Technology challenges and evolution of state-of-the-art LCoS and WSS

**15:40–15:55 Coffee Break**

**Presider: Vittorio Curri**, Politecnico di Torino, Italy

**15:55–16:20 Yiran Ma**, Finisar, Australia

Topic: Novel architecture and technologies for OXC/ROADM towards large-scale and low-cost optical networking

**16:20–16:45 Maxim Kuschnerov**, Huawei Technologies, Germany

Topic: Issues and opportunities for 800G and beyond optical transmission in F6G

**15:45–17:10 Alex Donodin**, Aston Univ., UK

Topic: Doped-fiber amplifiers beyond the C+L band

**17:10–17:35 Nicola Calabretta**, Eindhoven Univ. of Technology, Netherlands

Topic: Optical switching technologies in multi-band networking

**17:35-18:00 Giacomo Borraccini**, Politecnico di Torino, Italy  
Topic: Autonomous optical line control in disaggregated networks

**Presider: Gangxiang Shen**, Soochow Univ., China

**18:00-18:30 Plenary discussion**

### **Forum3: Future artificial intelligence optical network toward 2030: technologies and applications**

Time: 13:30-17:55, Sunday, 24 October Venue: Kaifeng Room, 3F

#### **Organizers**

**Bin Zhang**, Fiberhome Telecommunication Technologies Co., LTD, China

**Jianxin Lv**, Fiberhome Telecommunication Technologies Co., LTD, China

**Liwei Kuang**, FiberHome Telecommunication Technologies Co., LTD, China

**Description:** Optical network has been evolving into intelligent communication infrastructure with four distinguished characteristics, namely massive connection, broad band, on-demand service, as well as opening capability. Nowadays, advanced technologies such as optical cross connection (OXC), optical service unit (OSU), artificial intelligent (AI), digital twin (DT) are utilized in optical network, and hence efficiently enhance the functionalities and performances. This forum presents frontier studies, novel approaches, application scenarios, future prospect of intelligent optical network. Experts from telecommunication service providers, research Inst.s, manufactures, universities will provide excellent speeches. You are welcome to join us and discuss relevant research progress. In this forum, for each invited presentation, the time is 20 minutes including 5 minutes for questions and answers.

#### **Speakers**

**Presider: Liwei Kuang**, FiberHome Telecommunication Technologies Co., LTD, China

**13:30-13:45 Welcome Speech (Zhiwen Fan**, Vice Executive, Fiberhome Telecommunication Technologies Co.,LTD, China)

**13:45-14:10 Yunbo Li**, China Mobile, China

Topic: Building a Three-Dimensional Heterogeneous Optical Communication Network with the help of Artificial Intelligence

**14:10-14:35 He Zhang**, China Unicom, China

Topic: Application of Artificial Intelligence in Optical Network  
**14:35-15:00 Quan Cao**, Wuhan Feisiling Microelectronics Technology Co., Ltd, China

Topic: Opportunities and Challenges of Optical Modules and Devices in Coherent Optical Transmission Systems"

**15:00-15:25 Anran Xu**, FiberHome Telecommunication Technologies Co., LTD, China

Topic: Recent Studies of Intelligent Optical Network: Theoretical Breakthrough, Technology Innovation, and Application Scenarios.

**15:25-15:40 Coffee Break**

**Presider: Jianxin Lv**, Fiberhome Telecommunication Technologies Co., LTD, China

**15:40-16:05 Jian Wu**, Beijing Univ. of Posts and Telecommunications, China

Topic: DSP Enhanced PAM Systems for Short-reach Optical Communications

**16:05-16:30 Xiaoping Zheng**, Tsinghua Univ., China Topic: The Precise Perception for Future Intelligent Optical Network

**16:30-16:55 Yajie Li**, Beijing Univ. of Posts and Telecommunications, China

Topic: Resource Orchestration and Service Provisioning in Cloud-Network Integration

**16:55-17:25 Hongtao Guan**, Inst. of Computing Technology, Chinese Academy of Science, China

Topic: Challenges and Methods of Realizing Traditional Internet Middlebox by NFV

**Presider: Bin Zhang**, Fiberhome Telecommunication Technologies Co., LTD, China

**17:25-17:55 Plenary discussion**

### **Forum4: Silicon Photonics Integration for beyond 800G Pluggable and Co-Packaged Optics applications: Opportunities and Challenges**

#### **Organizers**

Zhiping Zhou, Peking Univ., Shanghai Institute of Optics Fine Mechanics, China

Hua Zhang, LUSTER LightTech Co. Ltd., China

**Description:** This is the seventh time for Luster LightTech Co., Ltd. to organize the ACP Industry forum. This year's industry forum will focus on Silicon Photonics(SiP) Integration. Distinguished speakers from the industry will discuss the latest advances and marketing trends of the SiP integration. Some key aspects to be addressed in this forum will be included but not limited to the following:

What are the key challenges on 800G and beyond low power/cost solutions for intra-DC applications?

What will be optimal schemes for Silicon Photonics Integration? Hybrid Integration, Heterogeneous III-V-on-Silicon Photonic Integration, ...?

Will Co-Packaged Optics (CPO) be a nice-to-have or must-have solution within 3-5 years?

...

#### **Speakers**

**Presider: Zhiping Zhou**, Peking Univ., Shanghai Institute of Optics Fine Mechanics, China

09:00-09:10 Welcome Speech

09:10-09:30 Chongjin Xie, Alibaba, China

Topic: When Do We Need Co-Packaged Optics in Data Center Networks?

09:30-09:50 Yibo Liang, HiSilicon Optoelectronics Co., Ltd., China

Topic: on Next Generation Data Center Optical Modules & Optical Devices

09:50-10:10 Glenn Li, Skorpis Technologies, Inc., US

Topic: A Large-Scale Heterogeneous Photonics Integration Platform for Next-Generation

Communication Products

10:10-10:30 Siyang Liu, CUMEC, China



Topic: Challenges in CPO and Integrated Silicon Photonics Technology

10:30–10:40 Coffee Break

**Presider: Hua Zhang, LUSTER LightTech Co. Ltd., China**

10:40-11:00 Jiansheng Feng, Tencent, China

Topic: Optical Interconnection for the 5-th Paradigm

11:00–11:20 Hua Zhang, Hisense Broadband Multimedia Technologies Co., Ltd., China

Topic: Enabling technologies for 800G and beyond transceivers

11:20-11:40 Ben Chen, Hengtong Rockley Technology, China

Topic: The opportunities and Challenges of Silicon Photonics for Intra-DC application

11:40-12:00 Xuerui Sun, Great China Region and Korea, EXFO

Topic: The challenges of PIC component from R&D to mass production and cutting edge testing solution

Presider: Zhiping Zhou, Peking Univ., Shanghai Institute of Optics Fine Mechanics, China

12:00–12:30 Plenary discussion

## Student Events

### Organizer

**Haoshuo Chen**, Nokia Bell Labs, USA

### Wechat Study Group

This event is designed to help students expand their professional networks while at the conference. Attendees are encouraged to join the study group by technical interests before the conference.

Research topics include :

- 1) Digital signal processing,
- 2) Software-defined network and network monitoring,
- 3) Space division multiplexing,
- 4) Microwave photonics,
- 5) Photonic integration.

2D barcodes for the wechat study groups can be found at ACP website .

(Link: <http://www.acpconf.com/art.html?id=34>)

During ACP2021, seminars will be arranged by each study group .

The study group will be maintained by the student volunteers after ACP2021 as a long-term study and information exchange platform .

## Talking with industry leaders and distinguished researchers

### Speakers

**Student event 2: Talking with industry leaders and distinguished researchers**

**Session 1: Monday (Oct. 25), 10:00-11:30**

**Presider: Prof. Nan Ye, Shanghai University**

Yunbo Li, Senior Engineer, Research Institution of China Mobile

Sai Chen, Senior Network Engineer, Alibaba Group

Jianqiang Li, Principal Network Engineer, Kuaishou Technology

Cang Jin, Development Engineer, OFS Laboratories

Binbin Guan, Senior Service Engineer, Microsoft

Changyu Lin, Senior software developer, Bytedance

**Session 2: Monday (Oct. 25), 19:30-21:00**

**Presider: Prof. Bing Chen, Hefei University of Technology**

Xiang Liu, Huawei Hong Kong Research Center,

Xi Chen, Senior Technical staff, Nokia Bell Labs

Shihuan Zou, Senior Global Business Development Manager, ADVA Optical Networking SE

Guangwei Cong, Senior Researcher, National Institute of

Advanced Industrial Science and Technology (AIST), Japan

Paikun Zhu, Researcher, National Institute of Information and Communications Technology (NICT), Japan

Leimeng Zhuang, R&D Team Leader, IMEC USA

Qixiang Cheng, Assistant Professor, University of Cambridge