Track 3: Network Architectures, Management and Applications
Grand Ballroom III, 3F

13:30-15:30 • November 05, 2023 • Sunday
Quantum Key Distribution Secured Optical Networks
Presider: Yanni Ou, Beijing University of Posts and Telecommunications, China

13:30-14:15 • ACPPOEM-1009-11 *Tutorial*
Evolution of Quntum Key Distribution Networks
Yongli Zhao
Beijing University of Posts and Telecommunications, China
In response to security threats posed by emerging technologies like quantum computing, Quantum Key Distribution (QKD) has gained prominence in the fields of photonics and network security research. This report offers a comprehensive review of optical fiber-based QKD networking research, applications, and the standardization efforts, alongside a forward-looking perspective on satellite-based QKD networks for securing laser communications. Within this context, the report involves the new challenges and solutions in network control management, interworking, and network resilience arising from the introduction of QKD to classical networks. These key perspectives address the evolving landscape of secure data transmission in our interconnected world.

14:15-14:30 • ACPPOEM-0731-116
Joint Multi-Layer Routing and Resource Allocation in QKD-Embedded IP over Optical Networks
Kaili Zhang, Xiaosong Yu, Yongli Zhao
State Key Laboratory of Information Photonics and Optical Communications, IPOC, Beijing University of Posts and Telecommunications, China
We proposed a joint multi-layer routing and resource allocation algorithm in QKD-Embedded IP over optical networks to satisfy the security requirements of IP over optical networks. The performance of the proposed algorithm is evaluated by simulation.

14:30-14:45 • ACPPOEM-0731-137
A Crosstalk-Minimized Wavelength Conflict Avoiding Algorithm for Optical Switching in Quantum-Key-Distribution Optical Networks
Yufei Guo, Xiaosong Yu, Yongli Zhao
State Key Laboratory of Information Photonics and Optical Communications, IPOC, Beijing University of Posts and Telecommunications, China
We proposed a wavelength conflict avoiding algorithm in quantum key distribution optical networks (QKD-ON) with multi-core fibers. The proposed algorithm minimizes the crosstalk in the switching process and improves the successful switching probability of requests by constructing the crosstalk auxiliary graph. Simulation results show that blocking probability is greatly reduced.

14:45-15:00 • ACPPOEM-0801-67
Security Provisioning in Quantum Key Distribution-Secured Optical Networks
Shifeng Ding, Chun-Kit Chan
The Chinese University of Hong Kong, Hong Kong, China
We consider the security of quantum keys and encrypted data in QKD-secured optical networks. A security framework integrating a multi-path multi-protocol (2MP) service provisioning scheme is proposed to enhance network security and reduce network costs.

15:00-15:15 • ACPPOEM-0812-1
Time-scheduled End-to-end Entanglement Establishment in Memory-cells-limited Quantum Networks
Yazi Wang[1], Xiaosong Yu[1], yongli zhao[1], Avishek Nag[2], jie zhang[1]
1.Beijing University of Posts and Telecomm, China; 2.School of Electrical and Electronic Engineering University College Dublin, Ireland
A routing and entangled pairs allocationalgorithm was proposed to support remote entangled pairs sharing with finite storage capacity and limited storage time, upon satisfying the timeconstraint, and the proposed algorithm is further verified via simulation.

15:15-15:30 • ACPPOEM-0801-143
Survivable Service Planning with Security-degraded Protection in Physical-layer Secured Optical Transport Networks
Tianhe Liu[1], Xiaoyu Yu[1], Wei Wang[1], Qiaojun Hu[1], Liyazhou Hu[2], Yajie Li[1], Yongli Zhao[1], Yongyuan Liu[3], Jie Zhang[1]
1.Beijing University of Posts and Telecommunications, China; 2.Macau University of Science and Technology, Macau, China; 3.Beitsing Communications Technology Co., Ltd, China
We propose a security-degradation-based protection provisioning scheme (SDPP) . Simulation results show that the proposed SDPP scheme performs better than the non-security-degradation-based protection provisioning(N-SDPP) scheme in terms of the blocking rate and the security deviation.

15:30-16:00 Coffee Break

16:00-17:30 • November 05, 2023 • Sunday
Optical Network Architectures
Presider: Xuwei Xue, Beijing University of Posts and Telecommunications, China

16:00-16:30 • ACPPOEM-0827-2 *Invited*
Advanced ROADM Architectures based on High Capacity WSSs
Haining Yang
Southeast University, China
This talk will review how CDC ROADMs can be enhanced and simplified by high-capacity wavlength selective switch(WSS) modules.

16:30-17:00 • ACPPOEM-1009-8 *Invited*
A Stopgap Solution for EON Resource Assignment Postponing the Need for Disruptive Technologies
Yuxin Xu[1], Hang Xing[1], Bin Chen[2]
1. Zhejiang University of Technology, China; 2. Hefei University of Technology, China
This talk discusses optical reconfiguration strategies for datacom networks. The objective is to improve applications performance while avoiding traffic disruptions and reduce packet loss due to the reconfiguration of optical links.

17:00-17:15 • ACPPOEM-0717-3 *Industry Innovation Nomination*
Digital Twin-Enabled Service Optimization Sequence of Actions for Power Equalization
Chenyu Sun[1,2], Xin Yang[1,3], Gabriel Charlet[1], Photios Stavrou[2], Yvan Pointurier[1]
1.Huawei Technologies France, France; 2.EURECOM, France; 3.Politecnico di Milano, Italy
We experimentally demonstrate that service SNR can be degraded by several dB if links are not equalized in the correct sequence; this is prevented with our digital twin-enabled heuristic to optimize the sequence for equalization.

17:15-17:30 • ACPPOEM-0815-53
Non-Line-of-Sight Underwater Optical Wireless Communications with Wavy Surface
Chengwei Fang, Shuo Li, Yinong Wang, Ke Wang
Royal Melbourne Institute of Technology (RMIT) University, Australia
Underwater optical wireless communication (UOWC)can provide high-speed underwater data transmission. Here we establish and verified a non-line-of-sight (NLOS) UOWC system model incorporating the previously overlooked wavy water surfaces. The SNR performance is also investigated.

17:30-20:00 Welcome Reception

08:30-10:00 • November 06, 2023 • Monday
Elastic Optical Networks
Presider: Bin Chen, Hefei University of Technology, China

08:30-09:00 • ACPPOEM-0814-75 *Invited*
Non-disruptive optical reconfiguration strategies for datacom networks
Roberto Proietti
Politecnico di Torino, Italy
This talk discusses optical reconfiguration strategies for datacom networks. The objective is to improve applications performance while avoiding traffic disruptions and reduce packet loss due to the reconfiguration of optical links.

09:00-09:15 • ACPPOEM-0729-17
Cost-Efficient Computing Offloading in Computing First Networks Supported by EONs
Jingjie Xin, Xin Li, Lu Zhang, Chenyu Zhao, Yongjun Zhang, Shanguo Huang
Beijing University of Posts and Telecommunications, China
This paper proposes a cost-efficient computing offloading (CECO) scheme to determine offloading decisions for requests arriving at EON-supported computing first networks. Results show CECO can improve acceptance ratio and reduce completion delay and electricity charge.

09:15-09:30 • ACPPOEM-0814-38
A Deep-Reinforcement-Learning-based Dynamic Scheduling of Delay-Tolerant Requests in Elastic Optical Networks
Xiaoying Lin[1], Yue-Cai Huang[1], Han Zhang[1], Jie Zhang[2]
1.South China Normal University, China; 2.Shunde Polytechnic, China
We propose a deep reinforcement learning (DRL) framework for dynamic scheduling of delay-tolerant requests in the elastic optical networks, where the DRL agent automatically adjusts its scheduling strategy by interacting with the dynamic network environment. To the best of our knowledge, this is the first attempt to introduce DRL to schedule the delay-tolerant requests. The simulation results demonstrate that our proposed method outperforms the conventional heuristic methods.

09:30-09:45 • ACPPOEM-0814-50
Immediate and Advance Reservations with Dynamic Resources Provisioning in Edge-Cloud Elastic Optical Networks
Jinrui Wu[1], Bin He[1], Hong Chen[1], Weidong Shao[1], Min Jiang[1], Liulei Zhou[1], Bowen Chen[1], Weiguo Ju[2]
1.School of Electronic and Information Engineering Soochow University, China; 2.Institute of ICT Technology, China Information Consulting & Designing Institute CO., LTD,, China
This paper investigates resources provisioning for immediate and advance reservations in edge-cloud elastic optical networks (EC-EON). The simulation results demonstrate that the proposed dynamic resource provisioning method achieves higher spectrum efficiency and lower blocking probability.

09:45-10:00 • ACPPOEM-0731-105
Open Set Hardware Fingerprint Authentication of Optical Transmitters in Fiber Networks
Yilin Qiu[1], Jiawei Ren[2], Zhi Chai[1], Huang Xinran[1], Huang Renhui[1], Yang Xuelin[1]
1.Shanghai Jiao Tong University, China; 2.Henan Key Laboratory of Visible Light Communications, China
A physical-layer authentication is proposed for fingerprint recognition and classification of optical transmitters in fiber networks, based on the received optical spectra, where the recognition accuracy of 98% is achieved.

10:00-10:30 Coffee Break

10:30-12:00 • November 06, 2023 • Monday
QoS Guaranteed Optical Networks
Presider: Bitao Pan, Beijing University of Posts and Telecommunications, China

10:30-11:00 • ACPPOEM-1009-10 *Invited*
Building Digital Twin for Large-scale and Dynamic C+L-Band Optical Networks
Min Zhang
Beijing University of Posts and Telecommunications, China'
Optical networks are evolving towards wideband capabilities, highly dynamic states and ever-increasing scales. Digital twin models may perform efficient QoT estimation in large-scale C+L-band optical networks, and thus facilitate effective managements and failure positioning.

11:00-11:15 • ACPPOEM-0713-3
Innovation and Field Trial of Optical Service Unit (OSU) Based Metro-Optimized OTN Technologies
Ruiquan Jing[1], Chengliang Zhang[1], Junjie Li[1], Heng Zhou[1], Yadong Gong[1], Yuanbin Zhang[2], Xiaoli Huo[1], Chengxin Duan[2]
1.China Telecom Research Institute, China; 2.ZTE Corporation, China
The latency performance of the M-OTN/OSU technologies was verified in a network operator's lab. Moreover, the features of low latency and hitless bandwidth adjustment were verified in multi-vendor field trial based on commercial M-OTN equipment.

11:15-11:30 • ACPPOEM-0731-41
Demostration of Resource-Efficient and Load-Balanced Network Slicing in Computing Power Optical Networks
Yongjian Wu, Bojun Zhang, Shaoxiong Feng, Chaoqun Li, Yuqing Song, Zhiqun Gu, Jiawei Zhang, Yuefeng Ji
State Key Lab of Information Photonics and Optical Communications, Beijing Univ. of Posts and Telecommunications, China
We propose a resource-efficient and load-balanced routing algorithmin computing power optical networks. Additionally, we design and implement a software-defined Intelligent Computing Power Optical Network Convergence Platformto demonstrate the performance of the proposed routing algorithm.

11:30-11:45 • ACPPOEM-0731-75
A Protection Scheme Based on Multi-Granularity Connection Resource Sharing in Optical Networks
Wenhong Liu[1], Hongzhen Yang[2], Jiangsheng Li[3], Yufei Shi[3], Zhuotong Li[1], Yongli Zhao[1]
1.Beijing University of Posts and Telecommunications, China; 2.Information and communication branch State Grid Zhejiang Electric Power Co., Ltd, China; 3.State Grid Economic and Technological Research Institute Co., Ltd, China
This paper proposes a multi-granularity connection resource-sharing protection scheme in optical networks. Results demonstrate the improved performance in blocking rate, resource utilization rate, recovery failure rate, and bandwidth adjustment rate compared with the benchmark schemes.

11:45-12:00 • ACPPOEM-0815-93
Deterministic Overlay Networking for Edge Computing Distributed Cloud in Optical Networks
Mingyang Liu, Guochu Shou
Beijing University of Posts and Telecommunications, China
We propose a SD-TSN-based overlay network scheme to realize deterministic transmission for edge computing distributed cloud in optical network. A gateway is implemented to establish data transmission tunnels among clouds with low latency and jitter.

12:00-13:30 Lunch Break

13:30-15:30 • November 06, 2023 • Monday
Optical Switching Networks
Presider: Jiawei Zhang, Beijing University of Posts and Telecommunication, China

13:30-14:00 • ACPPOEM-0728-8 *Invited*
Service Provisioning in Wavelength-Switched Optical Networks based on P2MP Transceivers
Ruoxing Li, Sijia Li, **Zuqing Zhu**
University of Science and Technology of China, China
We address the challenge of provisioning dynamic requests in a wavelength-switched optical network (WSON) built with coherent point-to-multipoint transceivers (P2MP-TRXs) in this work. An efficient heuristic for transceiver, routing, and spectrum assignment (TRSA) is proposed, along with a subcarrier (SC) level proactive defragmentation method that can further enhance the provisioning performance through reconfiguring the spectrum allocations of leaf P2MP-TRXs. Extensive simulations confirm the effectiveness of our proposals.

14:00-14:30 • ACPPOEM-1009-12 *Invited*
Optical Wireless Data Center Networks Using Nanosecond Optical Switching Technologies
Shaojuan Zhang
Eindhoven University of Technology, Netherlands
Optical wireless data center networks (DCNs), which incorporate optical wireless communication technology and optical switching technology, present a viable solution for the next generation of DCNs for providing massive network capacity and ultra-high bandwidth while meeting flexible and scalable architecture requirements.

14:30-15:00 • ACPPOEM-1009-14 *Invited*
Cloud computing data center optical switching disaggregation network
Fulong Yan
Beijing University of Posts and Telecommunications, China
We carry out investigations for data center disaggregation exploiting optical switching. The results show that PCIe over optical (PO) guarantees 3μs latency with 62m fiber. Moreover, the PO scheme saves 48.3% application completion time and 51.3% power consumption, respectively, compared with the ethernet solution.

15:00-15:15 • ACPPOEM-0731-28
DEER: Deadline-driven and Contention-free Central Arbitration in AWGR-based Optical Datacenter Networks
Shi Feng, Jiawei Zhang, Yuefeng Ji
Beijing University of Posts and Telecommunication, China
We propose an algorithm that enables flexible optical timeslot assignment for deadline-driven bursting traffic in an AWGR-based datacenter network. Assessments indicate that DEER decreases deadline missing rate by 41.48% versus RRB, 26.29% versus LQF.

15:15-15:30 • ACPPOEM-0731-32
When Electronic Spine-Leaf Meets Optical Torus: A Hybrid Optical-Electronic Data Center Network
Dawei Yu, Weidong Shao, Gangxiang Shen
Soochow University, China
We propose a hybrid DCN, merging electronic Spine-Leaf with optical Torus, supporting unicast, multicast, and Ring services. Our algorithm efficiently deploys Ring services considering node computing resources. Simulations confirm its effectiveness.

15:30-18:00 Coffee Break & Poster Session

18:30-21:00 Banquet and Awards Ceremony

08:30-10:00 • November 07, 2023 • Tuesday
Machine Learning Enhanced Optical Networks
Presider: Ruijie Zhu, Zhengzhou University, China

08:30-09:00 • ACPPOEM-0801-81 *Invited*
Error Analysis of Distributed Network Time Synchronization in Time-Varying Topology
Kangqi Zhu, Nan Hua, Xiaoping Zheng
Tsinghua University, China
In this paper, we analyze the physical and network layer error sources for distributed time synchronization of large-scale optical networks with time-varying topology, and compare the performance difference with that of fixed topology networks.

09:00-09:15 • ACPPOEM-0726-11
Long-Short-Term QoT Prediction for Already Established Light-Path While Considering Light-Path Correlation
Chenyu Zhao, Xin Li, Lu Zhang, Jingjie Xin, Daixuan Li, Shanguo Huang
Beijing University of Posts and Telecommunications, China
We proposed a deep LSTM-based neural network model training with field data and light-path correlation to accurately predict the QoT of already established light-path for 200 hours, enabling proactive measures to prevent service disruptions.

09:15-09:30 • ACPPOEM-0801-18
A Stacking Ensemble ML-Based Failure Prediction Model for Optical Networks with Imbalanced Data
Zhiming Sun[1], Chunyu Zhang[1], Min Zhang[1], Futao Yang[2], Danshi Wang[1]
1.State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China; 2.School of Public Security Information Technology and Intelligence, Criminal Investigation Police University of China, China
A stacking ensemble ML-based failure prediction model for optical networks with imbalanced data is proposed. Under the condition that the failure sample ratio is 5.3%, our model obtains 98.97% F1 score.

09:30-09:45 • ACPPOEM-0801-31
Neuron-level Transfer Learning for ANN-based QoT Estimation in Optical Networks
Yuhang Zhou, Zhiqun Gu, Jiawei Zhang, Yuefeng Ji
Beijing University of Posts and Telecommunications, China
We propose a neuron importance-based transfer model search algorithm to optimize the transfer model for QoT estimation. Simulation results show that the proposed scheme improves accuracy compared with conventional layer-level transfer learning-based QoT estimation schemes.

09:45-10:00 • ACPPOEM-0814-3
Tidal Traffic Prediction for Reliable Optical Network Orchestration in Industry 5.0
Igor Kardush, Sejeong Kim, Elaine Wong
The University of Melbourne, Australia
We propose a tidal traffic prediction and network orchestration scheme that proactively enable protection paths for optical networks in Industry 5.0. Results show a fast machine learning convergence and improved network connection availability.

10:00-10:30 Coffee Break

10:30-12:00 • November 07, 2023 • Tuesday
Optical Network-on-Chip
Presider: Yi Lei, Hefei University of Technology, China

10:30-11:00 • ACPPOEM-0801-89 *Invited*
Technology and Management Evolution of Optical Networks Oriented at Computing Force Network
Liuyan Han, Yang Zhao, Minxue Wang, Dechao Zhang, Han Li
China Mobile Research Institute, China
We analyze how to better integrate computing services and transport networks and propose the new technologies on it. Experimental and field trial results validate the computing service transport and flexible scheduling system.

11:00-11:15 • ACPPOEM-0717-1
MSONoC: A Metasurfaces-assisted Optical Networks-on-Chip Architecture
Zimo Wang, **Pengxing Guo,** Jiahao Zhou, Kun Liu, Zhengrong You, Weigang Hou, Lei Guo
Chongqing University of Posts and Telecommunications, China
This paper proposes a metasurface-assisted wired-wireless hybrid optical networks-on-chip (ONoC) structure. It can achieve 6.5%-28.6%, 7.5%-14.7% and 16.4%-103.4% performance improvements in insertion loss, crosstalk noise and SNR, respectively, compared with the traditional wired-based ONoCs.

11:15-11:30 • ACPPOEM-0723-4
A user-centric cell-free network architecture for bidirectional VLC based on tri-color LEDs
Xiuqi Huang[1], Chih-Yung Yang[2], QiGuan Chen[1], Min Zhang[1]
1.Beijing Univ of Posts & Telecom, China; 2.ITON technology Corp., China
Visible light communication (VLC) technology is a potential candidate for access networking in 6G, which offers a higher spectral efficiency than radio-frequency (RF)-based femtocell networks by three orders of magnitude. This paper proposes an all-wireless optical bidirectional VLC access network architecture to solve the problem that users need to switch access frequently when VLC is deployed to the application. The networking architecture is based on tri-color LEDs, which improve the quality of user communication by partitioning the AP coverage area and determining the number of service wavelengths based on the user's location. The feasibility of the proposed access network architecture scheme was verified by theoretical analysis, simulation and experimentation. We showed that the proposed access network architecture is suitable for large-scale bidirectional VLC access networks and can be used as a potential technology for 6G.

11:30-11:45 • ACPPOEM-0728-14
Energy-Efficient and Low-Latency Optical Network-on-Chip Architecture and Mapping Solution for Artificial Neural Networks
Kun Liu, **Pengxing Guo,** Jiahao Zhou, Zimo Wang, Zhengrong You, Weigang Hou, Lei Guo
Chongqing University of Posts and Telecommunications, China
This paper proposes a ANN accelerator interconnection architecture and mapping mechanism based on ONoC. Compared with traditional ANN accelerators, energy consumption and latency are reduced by 46.8% and 79.7%, throughput is increased by 4.8 times.

11:45-12:00 • ACPPOEM-0729-12
Probabilistic Path Selection Based on Arbiter-enabled Router in WDM Optical Network-on-chip
Daqing Meng[1], Qiuyan Yao[1], Hui Yang[1], Jie Zhang[1], Nan Feng[2], Mingqing Zuo[3], Yucong Liu[3]
1.Beijing University of Posts and Telecommunications, China; 2.The 54th research Institute of CETC, China; 3.China Mobile Communication Corporation Research Institute, China
This paper proposes a multipath arbitration routing algorithm for optical network-on-chip based on grid topology. The simulation results demonstrate the reliability of the algorithm by analyzing latency, power consumption, memory United Statesge and loss.

12:00-13:30 Lunch Break

13:30-15:45 • November 07, 2023 • Tuesday
Optical Satellite Networks
Presider: Fu Wang, Beijing University of Posts and Telecommunications, China

13:30-14:00 • ACPPOEM-1009-13 *Invited*
Space-terrestrial Integrated Optical Networking for 6G Core Networks
Ruijie Zhu
Zhengzhou University, China
6G core networks will be space-terrestrial integrated optical networks. This talk will discuss the key challenges and future research directions for 6G core networks.

14:00-14:15 • ACPPOEM-0714-2 *Industry Innovation Nomination*
Applications of free space optics in terrestrial backhaul
Buzheng Wei, Shikui Shen, Guangquan Wang, He Zhang, Xiongyan Tang, Liang Zhao
China Unicom, China
This paper gives an overview of free space optics applications in terrestrial backhaul. Free space optics has flexible and fast deployment advantages which serve 5G-A or 6G in space-sky-ground-ocean communication scenarios well. In this paper, some demonstrations of FSO backhaul implementations are presented while different realization schemes are provide as well.

14:15-14:30 • ACPPOEM-0716-1
Chaotic Constellation Shaping Synchronization Header Assistance Cognate Coherence OFDM-FSO Communication
Wenhui Zhu, **Tingwei Wu**, Yejun Liu, Song Song, Lun Zhao, Lei Guo
Institute of Intelligent Communication and Network Security, School of Communication and Information Engineering, Chongqing University of Posts and Telecommunications, China
We propose an orthogonal frequency division multiplexing - free space optical - chaotic constellation shaping (OFDM-FSO-CCS) scheme based on synchronization header assistance.

14:30-14:45 • ACPPOEM-0730-13
Parallel Subnetwork Routing Algorithm for Inter-Satellite Optical Communication
Yiming Hong, Junjie Zhang, Jingjing Zang, Xiwen Fan, Qianqian Zhao
Shanghai University, China
We propose an algorithm to reduce latency by dividing subnetworks and establishing long-distance links between subnets. It reduces the delay by 10.23ms on average compared to classic Dijkstra algorithm by simulating the Starlink constellation.

14:45-15:00 • ACPPOEM-0731-100
Adaptive Dynamic Virtual Network Function Placement in Mega LEO Satellite Optical Networks
Wenchao Zhang[1], **Ruijie Zhu**[1], Yudong Zhang[1], Zhichao Yang[1], Huiying Sang[1], Chao Xi[2], Bo Yang[2]
1.Zhengzhou University, China; 2.Space Star Technology CO., LTD, China
We propose an adaptive-based VNF placement (A-VNFP) algorithm. Simulation results demonstrate that the A-VNFP algorithm can efficiently allocate resources and place the VNFs for user requests in mega LEO satellite optical networks.

15:00-15:15 • ACPPOEM-0731-180
Spatio-temporal Routing Based on Sun Outage Prediction in Deterministic Satellite Optical Networks
Yating Wei[1], **Ruijie Zhu**[1], Yudong Zhang[1], Wenchao Zhang[1], Qiancheng Zhao[1], Zhichun Sun[1], Xiaojie Hou[1], Zhichao Yang[1], Huiying Sang[1], Mengzhen Liu[1], Kai Li[1], Aman Wang[1], Chao Xi[2], Bo Yang[2]
1.Zhengzhou University, China; 2.Space Star Technology CO., LTD, China
A spatio-temporal routing algorithm based on sun outage prediction is proposed to reduce the impact of optical inter-satellite link interruption in deterministic satellite optical networks. Simulations prove that our approach can significantly improve transmission quality.

15:15-15:30 • ACPPOEM-0814-37
Optimizing Multi-Source Multi-Sink Maximum Flow with Coverage Constraints in Large-Scale Optical Satellite Networks
Yunxiao Ning, Yongli Zhao, Jie Zhang
Beijing University of Posts and Telecommunications, China
A novel algorithm is proposed to optimize throughput with global internet coverage in large-scale optical satellite networks. Simulations prove that our proposed algorithm can achieve 99.66% of the optimal throughput while ensuring global internet coverage.

15:30-15:45 • ACPPOEM-0814-70
Assessment of the Doppler effect on transmission characteristics in LEO satellite networks
Lipeng Guo[1], Fu Wang[1], Weiying Feng[2], Haipeng Yao[3], Dandan Sun[1], Qi Zhang[1]
1.School of Electronic Engineering Beijing University of Posts and Telecommunications, China; 2.School of Space and Environment Beihang University, China; 3.School of Information and Communication Engineering Beijing University of Posts and Telecommunications, China
In this paper, we derive and simulate in detail the Doppler shifts at different locations under the LEO satellite network, and analyze their effects on the network characteristics.

15:45-16:00 Coffee Break

16:00-18:00 • November 07, 2023 • Tuesday
Optical Access Networks
Presider: Yuxin Xu, Hefei University of Technology, China

16:00-16:30 • ACPPOEM-0902-1 *Invited*
Cluster-based Method for Eavesdropping Identification and Localization in Optical Links
Haokun Song[1,2], Rui Lin[1], Andrea Sgambelluri[3], Filippo Cugini[4], Yajie Li[2], Jie Zhang[2], Paolo Monti[1]
1.Chalmers University of Technology, Sweden; 2.Beijing University of Posts and Telecommunications, China; 3.Scuola Superiore Sant'Anna, Italy; 4.National, Inter-University Consortium for Telecommunications (CNIT), Italy
We propose a cluster-based method to detect and locate eavesdropping events in optical line systems characterized by small power losses. Our findings indicate that detecting such subtle losses from eavesdropping can be accomplished solely through optical performance monitoring (OPM) data collected at the receiver. On the other hand, the localization of such events can be effectively achieved by leveraging in-line OPM data.

16:30-17:00 • ACPPOEM-1009-9 *Invited*
Optics-informed Neural Networks for photonic AI accelerators
Nikos Pleros
Aristotle University of Thessaloniki, Greece
In this talk we address the main challenges faced today in the field of neuromorphic photonics. We present our recent work on linear silicon photonic architectures and optics-informed Deep Learning training models, demonstrating experimental results that confirm the potential of photonic AI accelerators to reach the high-scalability and high-performance metrics required by the AI industry within an impressive energy efficiency envelope.

17:00-17:15 • ACPPOEM-0713-4
Fault Prediction for Optical Access Network Equipment using Decision Tree Methods
Killian Murphy, Antoine Lavignotte, Catherine Lepers
Télécom SudParis, France
We introduce a new QoS metric, measuring the reduction of Quality of Service loss due to failures. This metric is used to provide network context to the Machine Learning task of Network Fault Prediction. A set of 20 optical equipment monitored over the course of three weeks in real networks is studied. Decision Tree based methods are used to create a benchmark of DT methods for alarm prediction.

17:15-17:30 • ACPPOEM-0730-4
A Point-to-Multipoint Architecture Using Fiber Unidirectional Ring Protected by Optical Switches Array for Business Access Network
Jianhua Liu
Huawei Technologies, China
A novelty point-to-multipoint architecture using fiber unidirectional ring protected by optical switches array for business access network is proposed. This fiber unidirectional ring can protect multiple faults, provide good resiliency, and use half number of optical modules and fibers compared with Ethernet ring. This fiber unidirectional ring also can support point to multi-points with star or tree topology. At the same time this fiber unidirectional ring has low cost, robust, resiliency features so that it is suitable for access network in business scenario, as an alternative solution to passive optical network. Compared with PON, this fiber unidirectional ring has following extra advantages: low insertion loss (0.5dB), reusing existent Ethernet optical modules, about 100% physical layer bandwidth utilization, very significantly reduce the impact of rogue ONT.

17:30-17:45 • ACPPOEM-0801-110
Cooperative Scheduling of PON domain and TSN domain for Global Optimization of E2E Time-Sensitive Industrial Flows
Chen Su, JiaWei Zhang, YueFeng Ji
Beijing University of Posts and Telecommunications, China
We propose a TSN equivalent model for TDM-PON to co-schedule time-sensitive flows across TSN and TDM-PON domains. Simulation results show that the schedulability of this strategy is 25% higher than that of non-cooperative one.

17:45-18:00 • ACPPOEM-0801-150
Comparative Study of Multiplication-Based and Addition-Based Auxiliary Management and Control Channel for FDM PON
Wangwei Shen, Jiaye Wang, Guoqiang Li, Sizhe Xing, An Yan, Zhongya Li, Jianyang Shi, Nan Chi, Junwen Zhang
Key Laboratory of EMW Information of Fudan University, China
We presented a comparison study of multiplication-based and addition-based auxiliary management and control channels (AMCC) on the performance of both the AMCC and the main signal in frequency division multiplexing coherent passive optical networks (FDM-CPON).