# **2022 IEEE 23rd International Conference on High Performance Switching and Routing** (HPSR 2022)

Taicang, Jiangsu, China 6 – 8 June 2022



IEEE Catalog Number: CFP22HPS-POD **ISBN:** 

978-1-6654-0608-6

## Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

*Copyright and Reprint Permissions*: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

#### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	
ISBN (Print-On-Demand):	
ISBN (Online):	
ISSN:	

CFP22HPS-POD 978-1-6654-0608-6 978-1-6654-0607-9 2325-5595

#### Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



### Monday, June 6 13:00 - 14:40

### NewIP1: Invited Session on New IP I

### 13:00 Support Green Internet via New IP...1

Lijun Dong, Hesham ElBakoury and Richard Li (Futurewei Technologies, USA)

## Monday, June 6 14:45 - 16:25

### NewIP2: Invited Session on New IP II

- 14:45 Programmable Data Plane for New IP Using eXpress Data Path (XDP) in Linux...9 Bhaskar Kataria and Rohit Mp (National Institute of Technology Karnataka, India); Leslie Monis (University of California, Riverside, USA); Mohit P. Tahiliani (National Institute of Technology Karnataka, Surathkal, India); Kiran Makhijani (Futurewei Technologies, USA)
- **15:18** *The Effects of Packet Wash on SVC Video in Limited Bandwidth Environments...17* Stuart Clayman (University College London (UCL), United Kingdom (Great Britain)); Muge Sayit (Ege University, Turkey)
- **15:51** *CGM2: Carrier-Grade Minimalism Multicast with Stateless Explicit Path...23* Rui Meng (Huawei, China); Junjie Wan (Huawei Technologies Co., Ltd., China); Bing Xu (Huawei Technology Co., Ltd., China); Fengkai Li (Huawei Technologies Co., Ltd., China); Wanhong Wang and Zhongwei Li (Huawei Technology Co., Ltd., China); Chuang Wang (Huawei Corporation, China)

## Monday, June 6 16:30 - 18:00

TS1: High performance, programmable networks for the Internet of Things

16:30 LRP: Long-Lifetime and Reliable Percolation Routing for Underwater Sensor Networks...29

Yuan Liu (Northwestern Polytechnical University, China); Lin Cai and Junhao Hu (University of Victoria, Canada); Xiaohong Shen and Haiyan Wang (Northwestern Polytechnical University, China)

### 16:48 V2X Communication Aided Emergency Message Dissemination in Intelligent Transportation Systems...35

Xini Xiang (University of Macau, Macao); Bo Fan (Beijing University of Technology, China); Minghui Dai and Yuan Wu (University of Macau, Macao); Cheng-Zhong Xu (University of Macau, China)

### 17:06 Performance Analysis of Vehicle Platoon Communication in C-V2X Autonomous Mode...41

Ruirui Ning, Xiaokang Zhang and Weiyang Feng (Beijing Jiaotong University, China); Ning Zhang (University of Windsor, Canada); Siyu Lin (Beijing Jiaotong University, China)

- **17:24** *Wireless Charging Energy-Relay Scheme for Wireless Sensor Networks...47* Jianfan Zhu and Xilong Liu (Yunnan University, China)
- **17:42 RPQ: Resilient-Priority Queue Scheduling for Delay-Sensitive Applications...53** Xinqiao Li and Mingyuan Liu (Beijing Jiaotong University, China); Nan Cheng (Xidian University, China); Liu Kang and Wei Quan (Beijing Jiaotong University, China); Liang Guo (China Academy of Information and Communications Technology, China); Yajuan Qin (Beijing Jiaotong University, China)

### Tuesday, June 7

## Tuesday, June 7 13:00 - 14:00

### WKShop1: Intelligent data networks

#### 13:00 A Priority-Based Online Container Placement Strategy for 5G MEC Cloud Enabled Smart Grid...59

Jing Jiang (State Grid Corporation of China, State Power Economic Research Institute, China); Peizhe Xin (State Grid Economic and Technological Research Institute Co., Ltd., China); Yudong Wang (State Grid Economic and Technological Research Institute CO., LTD, China); Yi Zhang (State Grid Zhejiang Electric Power Company Information Telecommunication Branch, China)

#### 13:15 Test Case Filtering Based on Generative Adversarial Networks...65

Zhijuan Liu, Li Zhang and Xuangou Wu (Anhui University of Technology, China); Wei Zhao (Anhui University of Technology (Xiushan), China & Anhui Engineering Laboratory for Intelligent Applications and Security of Industrial Internet, China)

### 13:30 Multi-channel Fusion Graph Convolution Based Critical Node Identification in Temporal Networks...70

Lichun Cao (China); Chuanhua Zhou (Anhui University of Technology, China)

# 13:45 An QUIC Traffic Anomaly Detection Model Based on Empirical Mode Decomposition...76

Gang Lei, Junyi Wu, Keyang Gu, Lejun Ji and Yuanlong Cao (Jiangxi Normal University, China); Xun Shao (Kitami Institute of Technology, Japan)

## Tuesday, June 7 14:05 - 15:20

### TS2: Space-Air-Ground Integrated Networks (SAGIN)

# 14:05 Optimal Task Offloading for Deep Neural Network Driven Application in Space-Air-Ground Integrated Network...81

Rongfei Fan and Xiang Li (Beijing Institute of Technology, China); Zhi Liu (The University of Electro-Communications, Japan); Cheng Zhan (Southwest University, China); Han Hu (Beijing Institute of Technology, China)

# 14:20 Modeling and Analysis of Multi-UAV Networks Using Mat´ern Hard-Core Point Process...89

Yajie Zhu and Shangwei Zhang (Northwestern Polytechnical University, China)

### 14:35 A Traffic Scheduling Scheme for Load Balancing in SDN-Based Space-Air-Ground Integrated Networks...95

Jing Tao and Shidong Liu (State Grid Smart Grid Research Institute Co., Ltd, China); Chuan Liu (State Grid Smart Grid Research Institute Co., Ltd., China)

# 14:50 Joint Optimization in UAV-Ground Communications Empowered by Multiple Aerial RISs...101

Jingyi Li (Xidian University, China); Jiadai Wang (Northwestern Polytechnical University, China)

#### 15:05 Robust Placement and Power Control Algorithm for NOMA-UAV Networks...107

Zhengqiang Wang, Hao Zhang, Yang Liu, Xiaoyu Wan and Zifu Fan (Chongqing University of Posts and Telecommunications, China)

## Tuesday, June 7 15:25 - 16:55

### TS3: High-speed optical networks

# 15:25 Highspeed 50 Gb/s Passive Optical Network (50G-PON) Applications in Industrial Networks...113

Dezhi Zhang (China Telecom, China); Yuanqiu Luo (Futurewei Technologies, USA); Jialiang Jin (China Telecom, China)

### **15:40** *Regenerator-Aware Inter-Core and Inter-Mode Crosstalk-Avoided Resource Allocation for Spectrally-Spatially Elastic Optical Networks...119*

Joy Halder (South Asian University, India); Eiji Oki (Kyoto University, Japan); Bijoy Chand Chatterjee (South Asian University, India)

# 15:55 Inter-Core and Inter-Mode Crosstalk-Avoided Virtual Network Embedding in Spectrally-Spatially Elastic Optical Networks...125

Vinay Kumar and Joy Halder (South Asian University, India); Abhijit Mitra (IIIT-Delhi, India); Eiji Oki (Kyoto University, Japan); Bijoy Chand Chatterjee (South Asian University, India)

# **16:10** *A Non-Blocking Network Design for Terabit Capacity Optical Interconnects...131* Xiaoxue Yang and Bing Hu (Zhejiang University, China)

# 16:25 A Comparison Study on Different Data Sets for Span-Level QoT Regression in EONs...137

Farhad Arpanaei, José Alberto Hernández, Gonzalo Martínez and David Larrabeiti (Universidad Carlos III de Madrid, Spain)

### 16:40 Riley: An Inside-Out Network...143

Sean Choi (Santa Clara University, USA)

### Tuesday, June 7 17:00 - 18:15

### TS4: Network security and privacy protection

### 17:00 Anonymous Jamming Detection in 5G with Bayesian Network Model Based Inference Analysis...151

Ying Wang (Stevens Institute of Technology, USA); Shashank Jere (Virginia Tech, USA); Soumya Banerjee (Old Dominion University, USA); Lingjia Liu (Virginia Tech, USA); Sachin Shetty (Old Dominion University, USA); Shehadi Dayekh (2200 Ross Ave Ste 1600 & Deloitte, USA)

### 17:15 Enhancing the Security of a Private Network by Using A Multi-Level Hierarchical NAT Scheme...157

Shie-Yuan Wang and Yu-Hsun Yuan (National Yang Ming Chiao Tung University, Taiwan)

#### 17:30 *Resource Allocation for Secure Transmission in Wireless Powered Communication Networks...163*

Xun Tong, Shuaiying Kong, Guanqun Shen, Shubin Zhang and Kaikai Chi (Zhejiang University of Technology, China)

- **17:45** *LLDM: Low-Latency DoS Attack Detection and Mitigation in SDN...169* Zixu Huang, Xuanbo Huang, Jian Li, Kaiping Xue, Qibin Sun and Jun Lu (University of Science and Technology of China, China)
- **18:00** *Communication-Aware Fairness in Blockchain Transaction Ordering...175* Mohammad Nassar and Ori Rottenstreich (Technion - Israel Institute of Technology, Israel); Ariel Orda (Technion, Israel)

### Wednesday, June 8

### Wednesday, June 8 13:00 - 14:30

### TS5: Architecture and management of 5G and beyond

### 13:00 How Does 5G NR V2X Mode 2 Handle Aperiodic Packets and Variable Packet Sizes?...183

Alejandro Molina-Galan (Universidad Miguel Hernández de Elche, Spain); Baldomero Coll-Perales (Universidad Miguel Hernandez de Elche (UMH), Spain); Luca Lusvarghi (University of Modena and Reggio Emilia, Italy); Javier Gozalvez (Universidad Miguel Hernandez de Elche, Spain); Maria Luisa Merani (University of Modena and Reggio Emilia, Italy)

#### 13:15 Joint Routing and Scheduling for Deterministic Networking: A Segment Routing Approach...189

Tianchi Li and Yueping Cai (Chongqing University, China)

# 13:30 A Deep Reinforcement Learning Approach for Deploying SDN Switches in ISP Networks from the Perspective of Traffic Engineering...195

Yingya Guo, Jianshan Chen and Kai Huang (Fuzhou University, China); Jianping Wu

(Tsinghua University, China)

# 13:45 Age of Information Minimization in Wireless Powered NOMA Communication Networks...201

Weiwei Jin, Liang Huang and Kaikai Chi (Zhejiang University of Technology, China)

#### 14:00 A Novel Personnel Counting Method Based on WiFi Perception...206

Shen Wang and Yijie Xun (Northwestern Polytechnical University, China); Jie Zhao and Yuanyuan Sun (Xidian University, China)

# 14:15 A Dynamic Flow Table Management Method Based on Real-Time Traffic Monitoring...212

Jinyuan Zhang, Xuanbo Huang, Jian Li, Kaiping Xue, Qibin Sun and Jun Lu (University of Science and Technology of China, China)

### Wednesday, June 8 14:35 - 16:05

### TS6: Intelligent traffic scheduling and computation offloading

14:35 Photonic-Aware Neural Networks for Packet Classification in URLLC Scenarios...218 Emilio Paolini (Scuola Superiore Sant'Anna, Italy); Federico Civerchia (SmaRTy Italia SRL, Italy); Lorenzo De Marinis and Luca Valcarenghi (Scuola Superiore Sant'Anna, Italy); Luca Maggiani (SmaRTy Italia SRL, Italy); Nicola Andriolli (National Research Council of Italy, Italy)

### 14:50 A Data Analytics Based Approach to Cloud Resource Auto-Scaling...224

Murali Kodialam (Nokia Bell Labs, USA); Fang Hao (Bell Labs, Nokia, USA); Sarit Mukherjee (Nokia Bell Labs, USA); T. V Lakshman (Bell Labs, Nokia, USA)

### 15:05 Trajectory Planning for UAV Assisted Mobile Edge Computing via Reinforcement Learning...232

Simeng He and Shangwei Zhang (Northwestern Polytechnical University, China)

# 15:20 Storage-Enabled Adaptive Multi-Path Scheduling Method for Data Transfers in Task Offloading...238

Xiao Lin and Shuo Ji (Fuzhou University, China); Shengnan Yue (Shanghai Jiao Tong University, China); Jun Li (Soochow University, China); Feng Chen (FuZhou University, China)

### 15:35 C-LSTM: CNN and LSTM Based Offloading Prediction Model in Mobile Edge Computing (MEC)...245

Yixiang Li (Central South University, China)

### 15:50 Dynamic Task Division and Allocation in Mobile Edge Computing Systems: A Latency Oriented Approach via Deep Q-Learning Network...252

Pengcheng Tan and Yang Li (University of Macau, China); Minghui Dai and Yuan Wu (University of Macau, Macao)

### Wednesday, June 8 16:10 - 17:00

WKShop2: Leveraging Machine Learning and Artificial Intelligence in Mobile Edge Computing

#### 16:10 A Non-Intrusive Security Estimation Method Based on Common Attribute of *IIoT Systems...260*

Kai Fang, Yuanyuan Pan, Penglai Guo, Xiaoling Peng and Tingting Wang (Macau University of Science and Technology, Macao); Xun Yuan (Macau University of Science and Technology, China); Jianqing Li (Macau University of Science and Technology, Macao)

# 16:26 Incremental Learning Assisted Dynamic Driver identification : A New Perspective...265

Wei Guo and Junman Qin (Xidian University, China); Yijie Xun (Northwestern Polytechnical University, China)

#### 16:43 Deep Reinforcement Learning for VRC Deployment in Mobile Edge Computing...271

Yuanzhuo Wu, Guanqun Shen and Shubin Zhang (Zhejiang University of Technology, China); Gang Chen (Zhejiang Textile & Fashion College, China)