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**Pages 1-527**



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# Technical Program

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## July 30 (Monday)

**8:30-9:30**

### **Keynote I: Networking the Many, Tiny and Far Away**

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Speaker: Kevin Fall (Nefeli Networks)

Chair: Tarek Abdelzaher (UIUC)

Email: [zaher@illinois.edu](mailto:zaher@illinois.edu)

Room: FuRong

**10:00-12:00**

### **Session 1: Cognitive Radio Network**

---

Chair: Yangcai Wang (Renmin University of China)

Email: [ycw@ruc.edu.cn](mailto:ycw@ruc.edu.cn)

Room: FuRong

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Chair: Weigang Wu (Sun Yat-sen University)

Email: [wuweig@mail.sysu.edu.cn](mailto:wuweig@mail.sysu.edu.cn)

Room: HaiTang

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Chair: Krishna Kant (Temple University)

Email: [kkant@temple.edu](mailto:kkant@temple.edu)

Room: JinGui

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### Invited Session 1: Security

Chair: Guoliang Xue (Arizona State University)

Email: [xue@asu.edu](mailto:xue@asu.edu)

Room: YinGui

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Room: FuRong

Panelists: Kui Ren (University at Buffalo, USA); Yuan He (Tsinghua University, China); Eduardo Tovar (ISEP, Portugal); Lothar Thiele (ETH, Switzerland);  
Moderator: Gian Pietro Picco (U. Trento, Italy)

Email: [gianpietro.picco@unitn.it](mailto:gianpietro.picco@unitn.it)

### 15:30-17:30

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#### Session 4: Security and Privacy

Chair: Narasimha Reddy (Texas A&M)

Email: [reddy@tamu.edu](mailto:reddy@tamu.edu)

Room: FuRong

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Chair: Lin Wang, (Technische Universität Darmstadt)  
Email: [wang@tk.tu-darmstadt.de](mailto:wang@tk.tu-darmstadt.de)  
Room: HaiTang

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### **Invited Session 2: Blockchain Solutions and Unclonable Functions**

---

Chair: John Daigle (University of Mississippi)  
Email: [wcdai@olemiss.edu](mailto:wcdai@olemiss.edu)  
Room: JinGui

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Chair: Sudharshan Vazhkudai (Oak Ridge National Laboratory)  
Email: [vazhkudaiss@ornl.gov](mailto:vazhkudaiss@ornl.gov)  
Room: YinGui

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## July 31 (Tuesday)

**8:30-9:30**

### **Keynote II: A Vision towards Pervasive Edge Computing**

---

Speaker: Yuanyuan Yang (Stony Brook University)

Chair: Sheng Zhong (Nanjing University)

Email: [zhongsheng@nju.edu.cn](mailto:zhongsheng@nju.edu.cn)

Room: FuRong

**10:00-12:00**

### **Session 6: Wireless Networks I**

---

Chair: Lei Deng (Dongguan University of Technology)

Email: [denglei@dgut.edu.cn](mailto:denglei@dgut.edu.cn)

Room: FuRong

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Chair: Rajkumar Kettimuthu (Argonne National Laboratory)

Email: [kettimut@anl.gov](mailto:kettimut@anl.gov)

Room: HaiTang

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- Chair: Gonca Gursun (Ozyegin University)
- Email: [goncagursun@gmail.com](mailto:goncagursun@gmail.com)
- Room: JinGui
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Email: [shambhu@buffalo.edu](mailto:shambhu@buffalo.edu)

Room: YinGui

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Room: FuRong

Panelists: Bolek Szymanski (RPI, USA);

Jiannong Cao (Hong Kong PolyU, Hong Kong);

Sajal Das (Missouri S&T, USA);

Moderator: Mani Srivastava (UCLA, USA)

Email: [mbs@ee.ucla.edu](mailto:mbs@ee.ucla.edu)

#### **15:30-16:30**

#### **Keynote III: Liberating Technology to Act on Our Behalf**

---

Speaker: Lama Nachman (Intel Corporation)

Chair: Shambhu Upadhyaya (University at Buffalo)

Email: [shambhu@buffalo.edu](mailto:shambhu@buffalo.edu)

Room: FuRong

#### **16:30-17:30**

#### **Poster Session I: Emerging Networks Topics: Cloud, SDN, NFV, ICN, and Blockchain**

---

Chair: Yong Guan (Iowa State University)

Email: [yguan@iastate.edu](mailto:yguan@iastate.edu)

Room: FuRong

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Chair: Weidong Yang (Henan University)

Email: [mengguyang@163.com](mailto:mengguyang@163.com)

Room: HaiTang

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## August 1 (Wednesday)

8:30-9:30

### Keynote IV: Automated Driving and Connected Vehicles

---

Speaker: Xuemin (Sherman) Shen  
(University of Waterloo)  
Chair: Kui Ren (University at Buffalo)  
Chair: [kui ren@buffalo.edu](mailto:kui ren@buffalo.edu)  
Room: FuRong

10:00-12:00

### Session 9: Modeling and Evaluation

---

Chair: Lothar Thiele (ETH, Switzerland)  
Email: [thiele@ethz.ch](mailto:thiele@ethz.ch)  
Room: FuRong

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Chair: Wei Liu (Georgia Gwinnett College)  
Email: [wliu@ggc.edu](mailto:wliu@ggc.edu)  
Room: HaiTang

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- ### Invited Session 5: Network Services and Protocols I
- 
- Chair: Wang Yang (Central South University, China)  
Email: [yangwang@csu.edu.cn](mailto:yangwang@csu.edu.cn)  
Room: JinGui
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Chair: Sheng Zhong (Nanjing University)

Email: [zhongsheng@nju.edu.cn](mailto:zhongsheng@nju.edu.cn)

Room: YinGui

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### **Distinguished Keynote Talk: The Way Towards Self-Learning Network**

Speaker: Nicholas Zhang (Huawei)

Chair: Wei Liu (Georgia Gwinnett College)

Email: [wliu@ggc.edu](mailto:wliu@ggc.edu)

Room: FuRong

**15:30-17:30**

### **Session 11: Hot Topics in Networking**

Chair: Siguang Chen (Nanjing University of Posts and Telecommunications)

Email: [sgchen@njupt.edu.cn](mailto:sgchen@njupt.edu.cn)

Room: FuRong

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### **Invited Session 7: Applications**

---

Chair: Jiazhen Zhou (University of Wisconsin - Whitewater)  
Email: [zhouj@uww.edu](mailto:zhouj@uww.edu)  
Room: HaiTang

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### **Invited Session 8: Network Services and Protocols II**

---

Chair: Kang Chen (Southern Illinois University, Carbondale)  
Email: [kchen@siu.edu](mailto:kchen@siu.edu)  
Room: JinGui

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### **Invited Session 9: Wireless Networks II**

---

Chair: Winston Seah (Victoria University of Wellington)  
Email: [Winston.Seah@ecs.vuw.ac.nz](mailto:Winston.Seah@ecs.vuw.ac.nz)  
Room: YinGui

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Abdulhamid Adebayo, Danda B. Rawat, Lina Ni and Min Song

Lixing Song and Aaron Striegel

- **A Lightweight Scheme for Rapid and Accurate WiFi Path Characterization...878**

## Integrated Workshop Schedule

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### Aug 2 (Thursday)

Email: [Zdy876@csu.edu.cn](mailto:Zdy876@csu.edu.cn)

#### 8:00-12:00

##### **SECIoT Workshop (RM: JinGui):**

Chair: Deyu Zhang, Wenjia Li and Feng Zeng  
Welcome 8:00 – 8:15

##### **Session 1: 8:15 – 9:45**

Session Chair: Deyu Zhang (Central South University)

Email: [Zdy876@csu.edu.cn](mailto:Zdy876@csu.edu.cn)

**Keynote:** Prof. Songtao Guo from Southwest University

**Title:** Mobile Edge Computing: Edge Cloud Selection and Computation Offloading

##### **Coffee Break (9:45 – 10:15 )**

##### **Session 2: 10:15 – 12: 00**

Session Chair: Deyu Zhang (Central South University)

- **A Near-optimal Cloud Offloading Approach under Multi-user Multi-Radio Environment...N/A**

Guangsheng Feng, Haibin Lv, Bingyang Li, Huiqiang Wang, Hongwu Lv, Qiao Zhao (Harbin Engineering University)

- **Energy Management for Multi-User Mobile-Edge Computing Systems with Energy Harvesting Devices and QoS Constraints...905**

Guanglin Zhang, Yan Chen, Zhirong Shen (Donghua University) and Lin Wang (Shanghai Jiao Tong University)

##### **Session 3: 13:30 – 15: 00**

Session Chair: Lan Yao (Hunan University)

Email: [yao@hnu.edu.cn](mailto:yao@hnu.edu.cn)

- **Steering Machine Learning Mechanism Integrated Vessel Networks to Achieve Cooperative Collision Avoidance...N/A**

Tingting Yang, Chengzhuo Han, (Dalian

Maritime University) Jie Dong (Dalian University of Technology) and Minghua Xia (Sun Yat-Sen University)

- **Cluster-Aware Kronecker-Supported Data Collection for Sensory Data...887**

Siguang Chen, Zhihao Wang (Nanjing University of Posts and Telecommunications) and Kewei Sha (University of Houston - Clear Lake)

- **A Low-Cost Edge Server Placement Strategy in Wireless Metropolitan Area Networks...893**

Yongzheng, Ren, Feng Zeng, (Central South University), Wenjia Li (New York Institute of Technology)

- **Social-aware D2D Caching Content Deployment Strategy over Edge Computing Wireless Networks...899**

Tingting Xu, Jian Jiao, Xin Chen and Ying Chen (Beijing Information Science and Technology University)

Closing

**Coffee Break: 15:00 – 15:30**

**WiMAN Workshop (RM: JinGui):**

Chair: Cuong Pham and Ting Zhang  
Welcome

**Session 1: 15:30 – 17:00**

Session Chair: Ting Zhang (McDaniel College)  
Email: [tzhang@mcdaniel.edu](mailto:tzhang@mcdaniel.edu)

- **Diffusion Utility Increment Based Crowdsensing Data Transmission Model Over City Public Traffic System...911**

Zhenlong Peng, Jian An, Xiaolin Gui, Tianjie Wu, (Xi'an Jiaotong University,) Jiangxian Wu (Quanzhou Normal University)

- **Layered Compression Scheme for Efficient Data Collection of Sensory Data...917**

Siguang Chen, Shujun Zhang, Bin Xu, (Nanjing University of Posts and Telecommunications) Jing Hu, (Jiangsu China Tobacco Industry Co., Ltd.) Vijayakumar Varadarajan (VIT University)

- **New Reliable Self-Adaptive Routing Protocol for Vehicular Ad Hoc Network...922**

Degan Zhang, (Tianjin University of Technology) Yue Dong (Liaoning University), Jie Zhang, Ting Zhang (Tianjin University of Technology)

- **Analysis of Channel Access Priority Classes in LTE-LAA Spectrum Sharing System...928**

Yao Ma (National Institute of Standards and Technology)

Closing

**IoT PST Workshop (RM: HaiTang):**

Chair: Qian Chen, Sherif Abdelwahed and Qin Zhan  
Welcome

**Session 1: 8:15 – 9:45**

Session Chair: Qian Chen (University of Texas at San Antonio)  
Email: [guenevereqian.chen@utsa.edu](mailto:guenevereqian.chen@utsa.edu)

**Workshop Keynote:** Dr. Wei Yu, Towson University

**Coffee Break: 9:45 – 10:15**

**Session 2: 10:15 – 12:00**

Session Chair: Qian Chen (University of Texas at San Antonio)  
Email: [guenevereqian.chen@utsa.edu](mailto:guenevereqian.chen@utsa.edu)

- **Probabilistic Position Estimation and Model Checking for Resource-Constrained IoT Devices...935**

Toshifusa Sekizawa, Taiju Mikoshi, Masataka Nagura, Ryo Watanabe (Nihon University) and Qian Chen (University of Texas at San Antonio)

- **Can Machine Learning Techniques be effectively used in real networks against DDoS attacks?...942**

Jarrod Bakker, Bryan Ng and Winston Seah (Victoria University of Wellington)

- **Survivability Model for Security and Dependability Analysis of a Vulnerable Critical System...948**

Xiaolin Chang, Shaohua Lv, (Beijing Jiaotong University) Ricardo Rodríguez (Centro Universitario de la Defensa) and Yang Yang (Beijing Jiaotong University)

**Session 3: 13:30 – 15:00**

Session Chair: Qian Chen (University of Texas at San Antonio)  
Email: [guenevereqian.chen@utsa.edu](mailto:guenevereqian.chen@utsa.edu)

- **Blockchain-based Security Layer for Identification and Isolation of Malicious Things in IoT: A Conceptual Design...954**

Mandrita Banerjee, Junghee Lee, Qian Chen and Kim-Kwang Raymond Choo (University of Texas at San Antonio)

- **On the RSA Problem in SLICE Networks: A Novel Relaxation and Decomposition Approach...960**

Yang Wang, Hung Nguyen (La Salle University) and Chaoyang Li (Oakland University).

- **A Blockchain-based Authentication and Security Mechanism of IoT...965**

Dongxing Li, Wei Peng, Wenping Deng and Fangyu Gai (National University of Defense Technology)

Closing

**ECN Workshop (RM: YinGui):**

Chair: Lin Wang, Xu Chen and Antonio Fernández Anta  
Welcome

**Session 1: 8:15 – 9:45**

**Session Chair:** Lin Wang (Technische Universität Darmstadt)

Email: [wang@tk.tu-darmstadt.de](mailto:wang@tk.tu-darmstadt.de)

**Workshop Keynote:** Prof. Jussi Kangasharju, University of Helsinki

**Coffee Break: 9:45 – 10:15**

**Session 2: 10:15 – 12:00**

Session Chair: Xu Chen (Sun Yat-sen University)

Email: [chenxu35@mail.sysu.edu.cn](mailto:chenxu35@mail.sysu.edu.cn)

- **Application, Workload, and Infrastructure Models for Virtualized Content Delivery Networks Deployed in Edge Computing Environments...971**

Thang Le Duc and Per-Olov Ostberg (Umea University)

- **GPU-Accelerated Task Execution in Heterogeneous Edge Environments...978**

Dominik Schäfer, Janick Edinger and Christian Becker (Universität Mannheim)

- **A Pricing-based Cost-aware Dynamic Resource Management for Cooperative Cloudlets in Edge Computing...985**

Xili Wan, Jia Yin, Xinjie Guan, Guangwei Bai (Nanjing Tech University) and Baek-Young Choi (University of Missouri)

- **Novel Method of Game-Based Energy Efficient Subcarrier Allocation for IOT...991**

Degan Zhang, Xiaohuan Liu, Ting Zhang and Guoqiang Mao (Tianjin University of Technology)

**Session 3: 13:30 – 15:00**

Session Chair: Lin Wang (Technische Universität Darmstadt)

Email: [wang@tk.tu-darmstadt.de](mailto:wang@tk.tu-darmstadt.de)

- **INCEPT: INcremental ControllEr PlacemenT in Software Defined Networks...997**

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- **IoT Applications in Fog and Edge Computing: Where Are We and Where Are We Going?...1003**

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- **Opportunistic prefetching of cellular Internet of Things (cIoT) device context...1009**

Srinivasan Iyengar (University of Massachusetts Amherst), Vijay Gurbani, Yu Zhou and Sameerkumar Sharma (Nokia Bell Labs)

**Coffee Break: 15:00 – 15:30**

**Session 4: 15:30 – 17:00**

Session Chair: Lin Wang (Technische Universität Darmstadt)  
Email: [wang@tk.tu-darmstadt.de](mailto:wang@tk.tu-darmstadt.de)

- **Synchronization of Video-embedded 3D Contents for Tiled Display System...1015**

Longjiang Li (University of Science and Technology of China), Shawn Xiaoli Xiong (iLumintel Co., Ltd), Jianjun Yang and Yuming Mao (University of Science and Technology of China)

- **An Edge Device Centric e-Health Interconnection Architecture...1021**

Wei Liu (Georgia Gwinnett College), S.S. Zhu (S. T. U.) and U. Krieger (University of Bamberg)

Closing

**BDMLS Workshop (RN: FuRong):**

Chair: Xiaofeng Lu and Baojiang Cui  
Welcome

**Session 1: 8:15 – 9:45**

Session Chair: Xiaofeng Lu (Beijing University of Posts and Communications)  
Email: [luxf@bupt.edu.cn](mailto:luxf@bupt.edu.cn)

**Workshop Keynote:** Application of Biometric Authentication in Internet Finance by Dr. Hongwei Luo

**Coffee Break: 9:45 – 10:15**

**Session 2: 10:15 – 12:00**

Session Chair: Tao Chang (Hangzhou Hikvision Digital Technology Co., Ltd)  
Email: [changtao@hikvision.com](mailto:changtao@hikvision.com)

- **Malware Detection Using Machine Learning Based on the Combination of Dynamic and Static Features...1026**

Jingling Zhao, Suoxing Zhang, Bohan Liu, Baojiang Cui (Beijing University of Posts and Telecommunications)

- **A double-layer detection and classification approach for network attacks...1032**

Chong Sun, Kun Lv, Changzhen Hu (Beijing Institute of Technology)

- **Vulnerability mining method based on genetic algorithm and model constraint...1040**

Jun Yang, Guojun Mei, Chen Chen, (Beijing University of Posts and Telecommunications)

- **A Monte Carlo Graph Search Algorithm With Ant Colony Optimization for Optimal Attack Path Analysis...1046**

Hui Xie, Kun Lv, Changzhen Hu (Beijing Institute of Technology)

**Session 3: 13:30 – 15:00**

Session Chair: Yatao Yang (Beijing Electronic Science & Technology Institute)  
Email: [yy2008@163.com](mailto:yy2008@163.com)

- **A Format Preserving Encryption Algorithm to Support the Maintenance of the Relation between Plaintext and Ciphertext in Data Mining...N/A**

Baojiang Cui, KaiYue Wang, RuiQing Liu (Beijing University of Posts and Telecommunications)



- **A safety-security assessment approach for Communication-based train control (CBTC) systems based on the extended fault tree...1054**

Shengwei Yi, Hongwei Wang, Yangyang Ma, Feng Xie, Puhua Zhang (China Information Technology Security Evaluation Center)

- **Terminal Sensitive Data Protection by Adjusting Access Time Bidirectionally and Automatically...1059**

Xiaofeng LU, Chen LIANG, Pietro LIO, Pan HUI, Sha Jing (Beijing University of Posts and Telecommunications)

- **The Runtime System Problem Identification Method Based on Log Analysis...1065**

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**Coffee Break 15:00 – 15:30**

**Session 4: 15:30 – 17:00**

Session Chair: Shengwei Yi  
(China Information Technology Security Evaluation Center)

Email: [yishengwei@foxmail.com](mailto:yishengwei@foxmail.com)

- **Hsata: Improved SATA Protocol with HMAC...1072**

YANG Yatao, CAO Guangcan, QU Ming, HUANG Jierun (Beijing Electronic Science & Technology Institute)

- **Pedestrian Detection Algorithm Based on Multi-Feature Cascade...1078**

Jia Wen, Peng-Fei Liu, Chu Jia, Hong-Jun Wang (Yanshan University)

- **Hierarchical Filtering Method of Alerts Based on multi-source information Correlation analysis...1084**

Xudong He, Jian Wang, Jiqiang Liu, Yang Yu, Lei Han, Shaohua Lv (Beijing Jiaotong University)

Closing