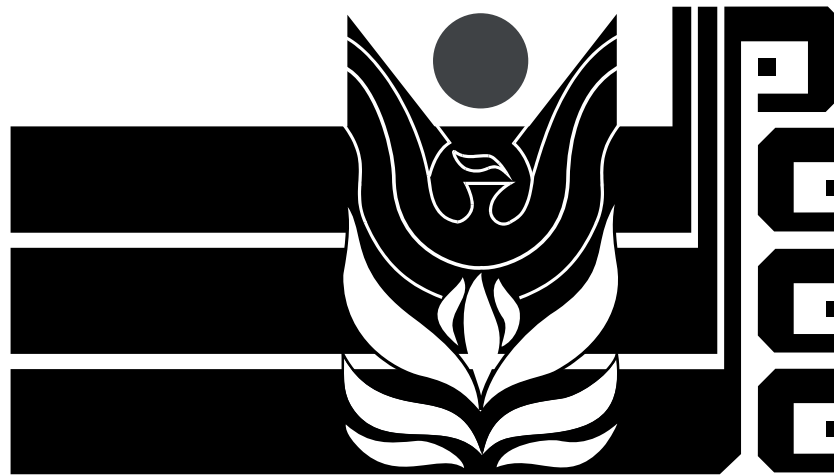


# 36<sup>TH</sup>

# IEEE INTERNATIONAL PERFORMANCE, COMPUTING AND COMMUNICATIONS CONFERENCE

## 2017 Program Guide



# IEEE IPCCC 2017

## San Diego, California USA

### December 10-12, 2017

The International Performance, Computing and Communications Conference is the premier IEEE conference presenting research in the performance of computer and communications systems. For more than three decades IPCCC has been a research forum for academic, industrial and government researchers.



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## Message from the IPCCC 2017 General Chairs

It is our great pleasure to warmly welcome you to the 36th IEEE International Performance, Computing, and Communications Conference (IPCCC 2017) at San Diego, California, USA. IPCCC 2017 brings together researchers from academia, government, and industry around the world, to exchange their latest research achievements in computer and communication systems, as well as to inspire each other through discussion and presentations. We are very proud to see a high-quality conference program, including two keynote speeches, 54 papers in the main technical program, 10 papers in the workshop program, and 13 posters.

Firstly, we would like to thank all authors of the submitted and accepted papers. They make the conference great, and their contributions make the field vivid. Secondly, we would like to express our appreciation to Program Co-Chairs Prof. Xubin He and Prof. Peixiang Liu, all members of the Technical Program Committee, as well as external reviewers for their tremendous effort and hard work in paper selection. Their timely feedback is very valuable to both the conference and the authors. Thirdly, we would like to sincerely thank our organizing committee members, including but not limited to General Vice-Chairs Prof. Benyuan Liu and Prof. Dejing Dou, TPC Chairs Prof. Xubin He and Prof. Peixiang Liu, Workshop Chair Prof. Amjad Gawanmeh, Poster Chair Prof. Tingting Chen, Publication Chair Prof. Fan Li, Publicity Chairs Prof. Qing Yang, Prof. Scott Scheidt, Prof. Qi Li, Prof. Aniket Mahanti, and Ms. Kathlene Hurt, Web Chair Neil Nelson, Financial Chair Nasr Ullah, and Registration Chair Jack Chen, for their enormous support and contribution in time. Their efforts make the conference possible. It has been a privilege for us to work with such a marvelous group of dedicated professionals. Last but not least, we would like to thank IEEE Computer Society, Technical Committee on Computer Communications (TCCC), and Samsung Austin R&D Center (SARC) for their continuing sponsorship and support of this conference.

On behalf of the conference executive committee, we welcome you to IPCCC 2017 at the beautiful city of San Diego. We do hope that you will enjoy the technical programs and events, and have a wonderful time!

– Mea Wang and Weichao Wang – IPCCC 2017 General Chairs

## Message from the IPCCC 2017 Technical Program Chairs

It is our great pleasure to welcome you to San Diego, California for the 36th edition of the IEEE International Performance Computing and Communications Conference, IPCCC 2017. We hope the academic, industrial, and government researchers from all over the world who participate in this conference can use it as a forum to exchange their ideas, share their research results, and discuss the new trends in performance evaluation of computer and communication systems.

We received in total 165 submissions from 25 countries and regions and were able to accept only 54 papers for oral presentation at the conference. Most submissions are from the following countries in descending order of the number of papers received: China, USA, Bangladesh, Australia, Germany, France, Canada, Japan, Korea, Lebanon, Brazil, New Zealand and the UK. Each manuscript submitted received at least 3 extensive and thorough reviews from our Technical Program Committee members and external reviewers. Based on these quality reviews, the TPC chairs made the final decisions to accept only the highest ranked papers. In addition, we accepted 13 papers to be presented as posters with an extended two-page abstract to be included in the proceedings. Ten papers were accepted to be presented in a workshop on Networking in Cyber Physical Systems.

The final technical program contains 11 technical sessions, one poster session and one special session on Networking in Cyber Physical Systems. Dr. K. K. Ramakrishnan from the University of California Riverside, and Dr. Wenjing Lou from Virginia Tech will give the keynote speeches for the conference. Special thanks to the Technical Committee on Computer Communications (TCCC) for sponsoring the poster session and reception!

We would like to thank all of the TPC members and the external reviewers for their efforts to review all of the manuscripts. In addition, we would like to acknowledge our conference General Chairs Mea Wang and Weichao Wang, our General Vice-Chairs Dejing Dou and Benyuan Liu, Workshop Chair Amjad Gawanmeh, Poster Chair Tingting Chen, Publication Chair Fan Li, Financial Chair Nasr Ullah, Web Chair Neil Nelson, Registration Chair Jack Chen, and many others for their hard work in making IPCCC 2017 a success.

Finally, we also would like to thank the authors who submitted their work to IPCCC 2017 and those who will present their research at this conference. We hope those authors will continue to support IPCCC and make it an even better event in the future.

– Xubin He and Peixiang Liu – IPCCC 2017 Technical Program Chairs

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Opening Remarks at 8:15 AM, Session 3.1 8:30 AM

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meawang@ucalgary.ca

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weichao.wang@unc.edu

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bliu@cs.uml.edu

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**Dr. Xubin He**  
Temple University, USA  
xubin.he@temple.edu

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Nova Southeastern University,  
USA  
lpei@nova.edu

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amjad@ece.concordia.ca

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scott.scheidt@armstrong.edu

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qi.li@sz.tsinghua.edu.cn

**Dr. Aniket Mahanti**  
University of Auckland, New  
Zealand  
a.mahanti@auckland.ac.nz

**Kathlene Hurt (Special Projects)**  
Samsung, Inc., USA  
k.r.hurt@ieee.org

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Nasr.Ullah@ieee.org

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# IPCCC 2017 Day One – Sunday, December 10

> Registration (Room:William D Evans I) 7:30-8:15 AM

> Opening Remarks (Room:William D Evans I) 8:15 AM

> Keynote I – 08:30-09:45: Dr. K. K. Ramakrishnan, Professor of Computer Science at UCR – Software-Based Networks: Leveraging High-performance NFV Platforms to Meet Future Communication Challenges

> Break 9:45-10:00

> Session I.I (Room:William D Evans I) – 10:00 AM-12:00 PM

Session I.I Best Paper Candidates (Chair: Xubin He)

## Robust and Lightweight Fault Localization

Bo Wu, Ke Xu, Qi Li, Fan Yang (Tsinghua University, P.R. China)

## When QUIC Meets TCP: An Experimental Study

Yajun Yu, Mingwei Xu, Yuan Yang (Tsinghua University, P.R. China)

## Scheduling Loop-Free Updates for Multiple Policies with Overlaps in Software-Defined Networks

Jinping Yu, Xinxin Fan (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China); Guoqiang Zhang (Nanjing Normal University, P.R. China); Jingping Bi (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

## H-NVMe: A Hybrid Framework of NVMe-based Storage System in Cloud Computing Environment

Zhengyu Yang (Northeastern University, USA); Morteza Hoseinzadeh (University of California, USA); Ping Wong, John Artoux, Clay Mayers, David Evans, Rory Bolt (Samsung Semiconductor Inc, USA); Janki Bhimani (Northeastern University & Samsung Semiconductors, USA); Ningfang Mi (Northeastern University, USA); Steven Swanson (University of California, USA)

## Link-Based Fine Granularity Flow Migration in SDNs to Reduce Packet Loss

Yang Chen, Jie Wu (Temple University, USA)

> Lunch (Room:West Bay Beach) 12:00 -1:15 PM

> Session I.2 (Room:William D Evans I) & Session I.3 (Room:William D Evans II) – 1:15-3:15 PM

Session I.2 Data Center and Cloud Computing (Chair: Ningfang Mi)

## AutoTiering: Automatic Data Placement Manager in Multi-Tier All-Flash Datacenter

Zhengyu Yang (Northeastern University, USA); Morteza Hoseinzadeh (University of California, USA); Allen Andrews, Clay Mayers, David Evans, Rory Bolt (Samsung Semiconductor Inc, USA); Janki Bhimani (Northeastern University & Samsung Semiconductors, USA); Ningfang Mi (Northeastern University, USA); Steven Swanson (University of California, USA)

## Towards Location-Aware Joint Job and Data Assignment in Cloud Data Centers with NVM

Xin Li (Nanjing University of Aeronautics and Astronautics, P.R. China); Jie Wu (Temple University, USA); Zhuzhong Qian, Zhuzhong Qian (Nanjing University, P.R. China); Shaojie Tang (University of Texas at Dallas, USA); Sanglu Lu (Nanjing University, P.R. China)

## START: Sensible Traffic Scheduling in Dynamic Data Center Networks

Ziyan Song, Ting Zhang (Tsinghua University, P.R. China); Qing Li, Guang Yang, Yong Jiang (Graduate School at Shenzhen, Tsinghua University, P.R. China)

## Resource Optimization for Survivable Embedding of Virtual Clusters in Cloud Data Centers

Biyu Zhou (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China); Jie Wu (Temple University, USA); Fa Zhang, Zhiyong Liu (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China)

## Elastic Scaling of Virtual Elastic Scaling of Virtual Clusters in Cloud Data Center Networks

Shuaibing Lu, Zhiyi Fang (Jilin University, P.R. China); Jie Wu (Temple University, USA); Guannan Qu (Jilin University, P.R. China)

> Break 3:15-3:30 PM

> Session I.4 (Room :William D Evans I) & Session I.5 (Room :William D Evans II) – 3:30-5:30 PM

Session I.4 Recovery, Optimization and Beyond (Chair: Weichao Wang)

## Integrated Recovery and Task Allocation for Stream Processing

Hongliang Li (Jilin University, P.R. China); Jie Wu (Temple University, USA); Zhen Jiang (West Chester University of Pennsylvania; Information Security Center, USA); Xiang Li, Xiaohui Wei, Yuan Zhuang (Jilin University, P.R. China)

## Optimizing Locality in Graph Computations Using Reuse Distance Profiles

Abdel-Hameed A. Badawy (New Mexico State University, USA); Donald Yeung (University of Maryland, USA)

## Does the Content Defined Chunking Really Solve the Local Boundary Shift Problem?

Wenlong Tian (Huazhong University of Science and Technology; Virginia Commonwealth University, P.R. China); Ruixuan Li (Huazhong University of Science and Technology, P.R. China); Zhiyong Xu (Suffolk University, USA); Weijun Xiao (Virginia Commonwealth University, USA)

## On Minimizing the Maximum Sensor Movement to Construct a Horizontal Barrier: Xiaoyun Zhang, Daji Qiao (Iowa State University, USA)

**Robust Passive Static Human Detection with Commodity WiFi Devices**  
Hai Zhu, Fu Xiao, Lijuan Sun, Xiaohui Xie, Ruchuan Wang (Nanjing University of Posts and Telecommunications, P.R. China)

Session I.5 Security and Privacy (Chair: Tingting Chen)

## Mitigating Cloud Co-Resident Attacks via Grouping-Based Virtual Machine Placement Strategy

Xin Liang, Gui Lin, Jian An (Xi'an Jiaotong University, P.R. China); Dewang Ren (Xi'an Jiaotong University; School of Electronics; Information Engineering and Shaanxi Province Key Laboratory of Computer Network, P.R. China)

## A Privacy-Preserving Combinatorial Auction Mechanism for Spectrum Redistribution

Fudong Qiu, Fan Wu, Xiaofeng Gao, Guihai Chen (Shanghai Jiao Tong University, P.R. China)

## Identifying Malware with HTTP Content Type Inconsistency via Header-Payload Comparison

Fei Xu, Haiqing Pan, Zigang Cao, Zhen Li, Gang Xiong, Yangyang Guan (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); Siu Ming Yiu (The University of Hong Kong, Hong Kong)

## Revisiting inter-AS IP Spoofing Let the Protection Drive Source Address Validation

Yihao Jia, Ying Liu, Gang Ren, Lin He (Tsinghua University, P.R. China)

## Cookie-Based Amplification Repression Protocol

Jing Zheng (Tsinghua University, P.R. China); Jianhua Sun (College of William and Mary, USA); Kun Sun (George Mason University, USA); Bo Wu, Qi Li (Tsinghua University, P.R. China)

> Reception & Poster Session (Room: Del Mar) - 6:00-8:00 PM

# IPCCC 2017 Day Two – Monday, December 11

➤ Registration 7:30-8:15 AM / Opening Remarks (Room:William D Evans I) 8:15 AM

➤ Keynote II – 08:30-09:45: Dr.Wenjing Lou, Professor of Computer Science at Virginia Tech – The Internet of Things and its Security Challenges

➤ Break 9:45-10:00 AM

➤ Session 2.1 (Room:William D Evans I) & Session 2.2 (Room:William D Evans II) – 10:00 AM -12:00 PM

Session 2.1 Cache, Memory, & Storage Systems - (Chair: Jehan Francois Paris) Session 2.2 Crowdsourcing and Mobile Crowdsensing - (Chair: Wei Yu)

## Popularity-Based Neighborhood Collaborative Caching for Information-Centric Networks

Xiaodong Zhu, Jinlin Wang, Lingfang Wang, Weining Qi (Institute of Acoustics, Chinese Academy of Sciences, P.R. China)

## Using Entanglements to Increase the Reliability of Two-Dimensional Square RAID Arrays

Jehan-Francois Paris (University of Houston, USA); Veronica Estrada-Galinanes (University of Neuchatel, Switzerland); Ahmed Amer (Santa Clara University, USA); Carlos Rincon (University of Houston, USA)

## Joint Source Selection and Transfer Optimization for Erasure Coding Storage System

Han Zhang, Xingang Shi, Yingya Guo (Tsinghua University, P.R. China); Haijun Geng (Shanxi University, P.R. China); Zhiliang Wang, Xia Yin (Tsinghua University, P.R. China)

## A DAX-Enabled mmap Mechanism for Log-Structured In-Memory File Systems

Zhixiang Mao, Shengan Zheng, Linpeng Huang, Yanyan Shen (Shanghai Jiao Tong University, P.R. China)

## Secure Processing-Aware Media Storage (SPMS)

Jannatun Noor (Bangladesh University of Engineering and Technology, Bangladesh); Hasan Ibna Akbar, Ruhul Amin Sujon (IPvision Canada Inc, Bangladesh); A. B. M. Alim Al Islam (Bangladesh University of Engineering and Technology, Bangladesh)

## A Truthful Auction Mechanism for Resource Provisioning in Mobile Crowdsensing

Zhenyu Ju, Chuanhe Huang (Wuhan University, P.R. China); Yanjiao Chen (State Key Lab of Software Engineering, Wuhan University, P.R. China); Lin Ma (Wuhan University, P.R. China)

## iSense: Energy-Aware Crowd-Sensing Framework

Mohamed Abdelaal, Mohammad Qaid, Frank Dürr, Kurt Rothermel (University of Stuttgart, Germany)

## Fault Tolerant Mechanism Design for Time Coverage in Crowdsensing System

Yangsu Liu, Zhenzhe Zheng, Fan Wu, Xiaofeng Gao, Guihai Chen (Shanghai Jiao Tong University, P.R. China)

## Towards Cost-Effective and Budget-Balanced Task Allocation in Crowdsourcing Systems

Luoyao Hao, Chengming Jin, Xiaofeng Gao, Fan Wu, Guihai Chen (Shanghai Jiao Tong University, P.R. China)

## Approach to Detect Non-Adversarial Overlapping Collusion in Crowdsourcing

Georges A. Kamhoua, Niki Pissinou; S.S. Iyengar, Jonathan Beltran (Florida International University, USA); Jerry Miller (Florida International University; Applied Research Center (ARC), USA); Charles A. Kamhoua (US Army Research Laboratory; Network Science Division, USA); Laurent L. Njilla (Air Force Research Laboratory, USA)

➤ Lunch (Room:West Bay Beach) 12:00 -1:15 PM

➤ Session 2.3 (Room:William D Evans I) & Session 2.4 (Room:William D Evans II) – 1:15-3:15 PM

Session 2.3 Internet Service and Management (Chair: Qing Yang)

## Analyzing and Optimizing BGP Stability in Future Space-Based Internet

Zengyin Yang, Hewu Li, Qian Wu, Jianping Wu (Tsinghua University, P.R. China)

## TCP WISE: One Initial Congestion Window Is Not Enough

Xiaohui Nie, Youjian Zhao (Tsinghua University, P.R. China); Guo Chen (Microsoft Research Asia, P.R. China); Kaixin Sui, Yazheng Chen, Dan Pei (Tsinghua University, P.R. China); Miao Zhang (Baidu, P.R. China); Jiyang Zhang (Baidu, P.R. China)

## Scalability Comparison of SDN Control Plane Architectures Based on Simulations

Hemin Yang, Jared Ivey, George F. Riley (Georgia Institute of Technology, USA)

## Anonymous and Analysable Web Browsing

Tran Phuong Thao, Adetokunbo Makanju, Ayumu Kubota (KDDI Research, Inc., Japan)

## Metric Learning With Statistical Features For Network Traffic Classification

Ziqing Zhang, Cuicui Kang, Peipei Fu, Zigang Cao, Zhen Li, Gang Xiong (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China)

Session 2.4 Performance and Modeling (Chair: Fatih Berber)

## Performance Enhancement of a Computational Persistent Homology Package

Alan Hylton (NASA, USA); Greg Henselman-Petrusek (University of Pennsylvania, USA); Janche Sang (Cleveland State University, USA); Robert Short (Lehigh University, USA)

## Response Time Speedup of Multi-Tier Internet Systems

Fatih Berber, Ramin Yahyapour (GWDG University of Göttingen, Germany)

## QoE-Aware Optimization for SVC-Based Adaptive Streaming in D2D Communications

Luoyao Hao, Chengming Jin, Xiaofeng Gao, Linghe Kong, Fan Wu, Guihai Chen (Shanghai Jiao Tong University, P.R. China)

## A Hierarchical-Learning-Based Crowdedness Estimation Mechanism for Crowdsensing Buses

Xiaoguang Niu, Zhen Wang, Qiongzan Ye, Yihao Zhang, Jiawei Wang (Wuhan University, P.R. China)

➤ Break 3:15-3:30 PM

➤ Session 2.5 (Room:William D Evans I) & Session 2.6 (Room:William D Evans II) – 3:30-5:30 PM

Session 2.5 Many-Core and Heterogenous Computing - (Chair: Ying Mao) Session 2.6 IoT and Smart Grids - (Chair: Alan Hylton)

## Improving 3D Lattice Boltzmann Method Stencil with Asynchronous Transfers on Many-Core Processors

Minh Quan Ho (University of Grenoble Alpes, Kalray SA, France); Christian Obrecht (National Institute for Applied Sciences of Lyon, France); Bernard Tourancheau (University of Grenoble Alpes, Kalray SA, France); Benoit Dupont de Dinechin, Julien Hascoet (Kalray, France)

## Laro: Lazy Repartitioning for Graph Workloads on Heterogeneous Clusters

Feng Sheng, Qiang Cao, Haoran Cai, Jie Yao, Changsheng Xie (Huazhong University of Science and Technology, P.R. China)

## DRAPS: Dynamic and Resource-Aware Placement Scheme for Docker Containers in a Heterogeneous Cluster

Ying Mao, Jenna Oak, Anthony Pompili, Daniel Beer (The College of New Jersey, USA); Tao Han (University of North Carolina at Charlotte, USA); Peizhao Hu (Rochester Institute of Technology, USA)

## Mitigate Data Skew Caused Stragglers Through ImKP Partition in MapReduce

Xue Ouyang (University of Leeds, United Kingdom); Huan Zhou (National University of Defense Technology, P.R. China); Stephen Clement, Paul Townend, Jie Xu (University of Leeds, United Kingdom)

## Efficient Tamper-Evident Logging of Distributed Systems via Concurrent Authenticated Tree

Fangxiao Ning, Yu Wen, Gang Shi, Dan Meng (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China)

## Towards a Holistic and Optimized Framework for Smart Grid Regulation

Junjie Wang, Jinyang Li, Tianshu Pang, Xiaoshan Sun, Qi Liu, Hengchang Liu (University of Science and Technology of China, P.R. China)

## IHB: A Scalable and Efficient Scheme to Identify Homologous Binaries in IoT Firmwares

Yu Chen, Hong Li (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); Weiwei Zhao (School of Information Science & Engineering, Lanzhou University, P.R. China); Lin Zhang (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); Zhongjin Liu (National Computer Network Emergency Response Technical Team/Coordination Center of China, P.R. China); Zhiqiang Shi (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China)

## Auto-Identification of Background Traffic Based on Autonomous Periodic Interaction

Chang Liu, Lingwu Zeng, Junzheng Shi, Fei Xu, Gang Xiong (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); Siu Ming Yiu (The University of Hong Kong, Hong Kong)

## An Energy-Aware Collaborative Multi-Agent System for Autonomous Underwater Vehicles

Luis Felipe Zapata-Rivera, Catalina Aranzazu-Suescun, Imadeldin Mahgoub (Florida Atlantic University, USA)

## A Strategy-Proof Privacy-Preserving Double Auction Mechanism for Electrical Vehicles Demand Response in Microgrids

Donghe Li, Qingyu Yang (Xi'an Jiaotong University, P.R. China); Wei Yu (Towson University, USA); Dou An (Xi'an Jiaotong University, P.R. China); Xinyu Yang (Xi'an Jiaotong University, P.R. China); Wei Zhao (University of Macau, P.R. China)

# IPCCC 2017 Day Three: Workshop Session – Tuesday, December 12

➤ Registration (Room:William D Evans I) 7:30-8:00 AM

➤ Opening Remarks (Room:William D Evans I) – 08:15 AM

➤ Session 3.1 (Room:William D Evans I) – 8:30-10:30 AM

Session 3.1 Workshop - Cyber Physical Systems (Chair: Zhengyu Yang)

## **An Efficient and Secure Scheme for Smart Home Communication Using Identity-Based Signcryption**

Yosef Ashibani, Qusay Mahmoud  
(University of Ontario Institute of Technology, Canada)

## **Cyber-Physical System Enabled Nearby Traffic Flow Modelling for Autonomous Vehicles**

Baiyu Chen (University of California Berkeley, USA);  
Zhengyu Yang (Northeastern University, USA);  
Siyu Huang (Ocean University of China, P.R. China);  
Xianzhi Du (University of Maryland, USA);  
Zhiwei Cui, Janki Bhimani, Ningfang Mi, Xin Xie (Northwestern University, USA)

## **The VLSI Architecture of a Highly Efficient Configurable Preprocessor for MIMO Detections**

Tzu-Ting Tseng, Chung-An Shen  
(National Taiwan University of Science and Technology, Taiwan)

## **Resource Consumption Analysis of Online Activity Recognition on Mobile Phones and Smartwatches**

Muhammad Shoab (University of Twente, the Netherlands);  
Ozlem Durmaz Incel (Galatasaray University, Istanbul, Turkey);  
Hans Scholten, Paul Havinga (University of Twente, the Netherlands)

## **Towards Truthful Auction for Big Data Trading**

Dou An, Qingyu Yang (Xi'an Jiaotong University, P.R. China);  
Wei Yu (Towson University, USA);  
Donghe Li, Yang Zhang (Xi'an Jiaotong University, P.R. China);  
Wei Zhao (University of Macau, Macau, China)

➤ Break 10:30-10:45 AM

➤ Session 3.2 (Room:William D Evans I) – 10:45 AM -12:45 PM

Session 3.2 Workshop - Cyber Physical Systems (Chair: Chung-An Shen)

## **Towards Scalable and Adaptable Security Monitoring**

Peter Dorfinger, Christof Brandauer (Salzburg Research Forschungsgesellschaft, Austria); Pedro Paiva (Instituto Tecnológico de Aeronáutica, Brazil)

## **Message Content Control for Distributed Map Sharing in Vehicular Safety Communications**

S. M. Osman Gani, Yaser P. Fallah (University of Central Florida, USA);  
Gaurav Bansal, Takayuki Shimizu (TOYOTA InfoTechnology Center, USA)

## **Biomedical Signal Transmission Using Human Body Communication**

Fukuro Koshiji, Ryogo Urushidate (Tokyo Polytechnic University, Japan);  
Kohji Koshiji (Tokyo University of Science, Japan)

## **Preserving Privacy in Distributed System (PPDS) Protocol: Security Analysis**

Achref Aloui (University of Paris VIII, France);  
Mounira Msahli (University of Paris-Saclay, France);  
Sihem Mesnager (University of Paris VIII, France);  
Stephane Bressan (National University of Singapore, Republic of Singapore);  
Talel Abdesslem (University of Paris-Saclay, France)

## **Modeling for Performance and Security Balanced Trading Communication Systems in the Cloud**

Akilu D Tesfamicael, Vicky Liu, Ernest Foo, William Caelli  
(Queensland University of Technology, Australia)

➤ Conference Adjourn – 12:45

## ➤ Poster Program

➤ Reception & Poster Session – Sunday Dec. 10 (Room: Del Mar) - 6:00-8:00 PM

Special thanks to the Technical Committee on Computer Communications (TCCC) for sponsoring this session!

## **Profit Maximization Resource Allocation in Cloud Computing with Performance Guarantee**

Meixuan Li, Yu-e Sun, He Huang (Soochow University, P.R. China);  
Jing Yuan (University of Texas at Dallas, USA);  
Yang Du, Yu Bao (University of Science and Technology of China, P.R. China);  
Yonglong Luo (Anhui Normal University, P.R. China)

## **Reducing Idle Listening Time in 802.11 via NDN**

Fan Wu, Wang Yang, Qingshan Guo, Xinfang Xie  
(Central South University, P.R. China)

## **Fault-Tolerant 3D Mesh for Network-on-Chip**

Khaleida Papry, A. B. M. Alim Al Islam  
(Bangladesh University of Engineering and Technology, Bangladesh)

## **Motif: A Social Reading Platform that Helps People Filter, Memorize, and Organize Online Contents**

Yu Tian, Xin Ye (California State University San Marcos, USA)

## **An Update-Overhead-Aware Caching Policy for Write-Optimized File Systems on SMR Disks**

Shuo-Han Chen, Wei-Shin Li, Min-Hong Shen, Yi-Han Lien (National Tsing Hua University, Taiwan);  
Tseng-Yi Chen, Tsan-sheng Hsu (Academia Sinica, Taipei, Taiwan);  
Hsin-Wen Wei (Tamkang University, Taiwan);  
Wei-Kuan Shih (National Tsing Hua University, Taiwan)

## **Two-Level Decomposition for Multi-Commodity Multicast Traffic Engineering**

Jianwei Zhang, Xinchang Zhang, Meng Sun (Shandong Computer Science Center (National Supercomputer Center in Jinan), P.R. China)

## **Bandwidth Preemption for Data Transfer Request with Higher Priority**

Liudong Zuo (California State University, Dominguez Hills, USA)

## **Secure the Internet of Things with Challenge Response Authentication in Fog Computing**

Salem Alharbi, Peter Rodriguez, Rajaputhri Maharaja, Prashant Iyer, Nivethitha Bose, Zilong Ye (California State University, USA)

## **Balancing Interdependent Networks: Theory and Algorithm**

Zheng Liu (Tsinghua University, P.R. China);  
Qing Li (Graduate School at Shenzhen, Tsinghua University, P.R. China);  
Dan Wang (The Hong Kong Polytechnic University, Hong Kong);  
Mingwei Xu (Tsinghua University, P.R. China)

## **Many-Objective Performance Enhancement in Computing Clusters**

A.S.M Rizvi (University of Southern California, USA);  
Tarik Reza Toha, Siddhartha Shankar Das (Bangladesh University of Engineering and Technology, Bangladesh);  
Sriram Chellappan (University of South Florida, USA);  
A. B. M. Alim Al Islam (Bangladesh University of Engineering and Technology, Bangladesh)

## **Unsupervised Machine Learning in 5G Networks for Low Latency Communications**

Eren Balevi, Richard D. Gitlin (University of South Florida, USA)

## **Enhancing SSDs with Multi-Stream: What? Why? How?**

Janki Bhimani (Northeastern University; Samsung Semiconductors Inc., USA);  
Jingpei Yang (Samsung Semiconductor, USA);  
Zhengyu Yang, Ningfang Mi (Northeastern University, USA);  
N. H.V. Krishna Giri, Rajinikanth Pandurangan, Changho Choi, Vijay Balakrishnan (Samsung Semiconductors Inc., USA)

## **Probabilistic Monte Carlo Simulations for Static Branch Prediction**

Bhargava Kalla (Arizona State University, USA);  
Nandakishore Santhi (Los Alamos National Laboratory, USA);  
Abdel-Hameed A. Badawy (New Mexico State University, USA);  
Gopinath Chennupati, Stephan Eidenbenz (Los Alamos National Laboratory, USA)

## Software-Based Networks: Leveraging High-performance NFV Platforms to Meet Future Communication Challenges

**Dr. K. K. Ramakrishnan, Professor of Computer Science at the University of California, Riverside**

**Sunday December 10, Room: William D Evans I - 8:30 AM**

### **Abstract:**

Communication networks are changing. They are becoming more and more “software-based.” The use of Network Function Virtualization (NFV) to run network services in software, along with the concept of Software Defined Networks (SDN), will lead to a largely software-based network environment. To truly achieve the vision of a high-performance software-based network that is flexible, lower-cost, and agile, a fast and carefully designed NFV platform along with a comprehensive SDN control plane is needed. Our high-performance NFV platform, OpenNetVM, enables high bandwidth network functions to operate at near line speed, while taking advantage of the flexibility and customization of low cost commodity servers. We envision a dynamic and flexible network that can support a smarter data plane than just simple switches that forward packets. We will describe scheduling frameworks for OpenNetVM that enables per-flow customization and rate-and-cost proportional fair scheduling of flows.

Use of OpenNetVM opens up opportunities to re-architect the way networks are put together. As an example, we demonstrate the utility of OpenNetVM for supporting future cellular networks (e.g., 5G and beyond). NFV enables dynamic management of capacity to support the Mobile Core Network of future cellular networks. Truly exploiting the opportunities of a software-based environment requires careful thinking about the protocols utilized as well. We describe CleanG, a simplified software-based architecture for the cellular core network with a simplified control plane protocol.

### **Biography**

Dr. K. K. Ramakrishnan is a Professor in the Computer Science and Engineering Department of the University of California, Riverside. From 1994 until 2013, he was with AT&T, most recently as a Distinguished Member of Technical Staff at AT&T Labs-Research, Florham Park, NJ. Prior to 1994, he was a Technical Director and Consulting Engineer in Networking at Digital Equipment Corporation. Between 2000 and 2002, he was at TeraOptic Networks, Inc., as Founder and Vice President.

He is an IEEE Fellow (2005) recognized for his work on congestion control and traffic management. Dr. Ramakrishnan is also an AT&T Fellow, recognized in 2006 for his work on congestion control, traffic management and VPN services, and for fundamental contributions on communication networks with a lasting impact on AT&T and the industry. He received an AT&T Technology Medal in 2013 for his work on Mobile Video Delivery Strategy and Optimization. His work on the “DECbit” congestion avoidance protocol received the ACM Sigcomm Test of Time Paper Award in 2006. He has published over 250 papers and has 165 patents issued in his name, and has received several best-paper awards. He has been on the editorial board of a number of technical journals and has served as the TPC Chair and General Chair for several networking conferences and is currently co-Editor-in-Chief for the CCF Transactions on Networking journal.

Dr. K. K. Ramakrishnan received his MS from the Indian Institute of Science (1978), MS (1981) and Ph.D. (1983) in Computer Science from the University of Maryland, College Park, USA.

## The Internet of Things and its Security Challenges

**Dr. Wenjing Lou, Professor of Computer Science at Virginia Tech**

**Monday December 11, Room: William D Evans I - 8:30 AM**

### **Abstract:**

Internet of Things (IoT) is an emerging technology that has drawn a lot of attention in recent years. Things in IoT can take a wide variety of forms, from simple RFIDs attached to merchandises, smart thermostats installed in the classrooms, implantable medical devices on the patients, to video cameras on top of light poles, and automobiles with built-in sensors. The explosive deployment of IoTs has pushed the boundary of the cyber-world to be tightly intertwined with our physical world. The IoT enables the exchange of information in a variety of application scenarios, each having unique characteristics and requiring unique performance guarantees, and together they bring potentially tremendous benefits to us – home automation, environmental monitoring, health and lifestyle, smart cities, just to name a few.

Some significant risks go along with the potential benefits of the IoT. As we add devices to our cloths, bodies, homes, and environments, more personal information will be collected. Some information is deeply sensitive. As devices are more closely connected with our physical world and some are capable of taking actions, data security and device security become critically important. Last year, IoT devices have also been exploited to launch the largest DDoS attack in history to disrupt the Internet services.

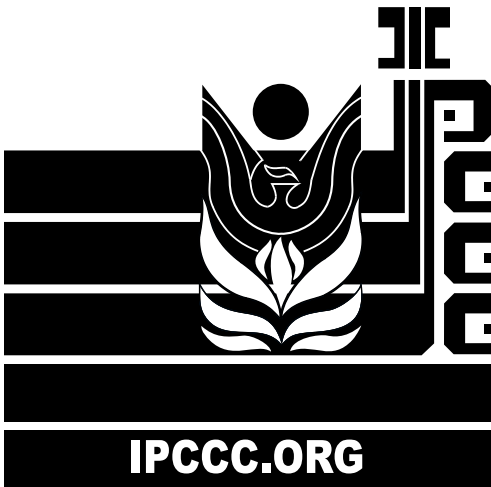
A secure and trustworthy IoT is not an easy task. It demands multiple lines of defense from different layers to thwart attacks from both the physical world and cyberspace. It also requires the integration of security and privacy mechanisms into computing and networking functions. In this talk, I will introduce the network architecture and unique characteristics of IoT systems. I will then focus on unique security and privacy challenges in the IoT. Many of the security and privacy problems are very challenging and call for interdisciplinary expertise from a number of technical domains.

### **Biography**

Prof. Wenjing Lou is a Professor of Computer Science at Virginia Tech and a Fellow of the IEEE. She holds a Ph.D. in Electrical and Computer Engineering from the University of Florida. Her research interests cover many topics in the cybersecurity field, with her current research interest focusing on privacy protection techniques in networked information systems and cross-layer security enhancement in wireless networks.

Prof. Lou is currently on the editorial boards of ACM/IEEE Transactions on Networking, IEEE Transactions on Mobile Computing, and Journal of Computer Security. She is the Steering Committee Chair of IEEE Conference on Communications and Network Security (IEEE CNS), which is a conference series in IEEE Communications Society (ComSoc) core conference portfolio and the only ComSoc conference focusing solely on cybersecurity.

Prof. Lou served as a program director at the US National Science Foundation (NSF) from August 2014 to August 2017. At NSF, her responsibilities included the Networking Technology and Systems (NeTS) program, a core program of the Computer and Network Systems (CNS) division within the Directorate for Computer & Information Science & Engineering (CISE), and the Secure and Trustworthy Cyberspace (SaTC) program, a cross-cutting security program led by CISE/CNS.



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- Smart Health Systems, Wearable, and Implantable Systems
- Smartphone and Mobile Applications
- Software Defined Networking
- Ubiquitous Computing
- Wireless Communication and Networks
- Workload Characterization and its Impacts on Architecture Design

#### Important Dates:

Paper Abstract Due: Friday July 20, 2018 / Full Paper Due: Friday August 3, 2018 / Poster and Workshop Paper Due: Friday August 24, 2018  
Acceptance Notification: Friday September 21, 2018 / Camera Ready Due: Friday October 5, 2018

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