35TH IEEE INTERNATIONAL PERFORMANCE, COMPUTING AND COMMUNICATIONS CONFERENCE

Program Guide
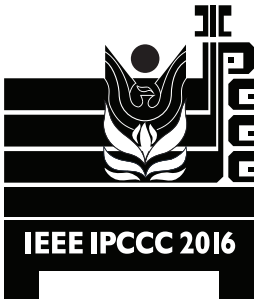
IEEE IPCCC 2016

Las Vegas, Nevada USA

December 9-11, 2016

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.

TCCC
Technical Committee on Computer Communications

IEEE

IEEE COMPUTER SOCIETY

Message from the IPCCC 2016 General Chairs

It is our great pleasure to warmly welcome you to the 35th IEEE International Performance, Computing, and Communications Conference (IPCCC 2016) at Las Vegas, Nevada, USA. IPCCC 2016 brings together researchers from academia, government, and industry all over the world to exchange information about the recent research outcomes in the performance of computer and communication systems. We are very happy to see a high quality conference program, including two keynote speeches, 48 papers in the main technical program, eight papers in the workshop program, and 17 posters.

First, we would like to sincerely thank Program Co-Chairs Prof. Benyuan Liu and Prof. Cedric Westphal, and all the TPC members for their hard work in reviewing the large number of submitted papers. Also, we thank Co-General Vice-Chairs Prof. Weichao Wang and Prof. Mea Wang, Workshop Chair Prof. Amjad Gawanmesh, Poster Chair Dr. Qiang Guan, Publication Chair Prof. Peixiang Liu, Publicity Co-Chairs Prof. Chunyu Ai, Prof. Nils Aschenbruck, Kathlene Hurt, Prof. Fan Li, and Prof. Xiaojun Ruan, Web Chair Neil Nelson, Financial Chair Nasr Ullah, and Registration Chair Jack Chen, for their enormous support. Last but not the least, we thank all the authors for their contributions to IPCCC 2016.

Dear friends, colleagues, ladies and gentlemen, we thank all of you for attending IPCCC 2016. We do hope that you will enjoy the technical programs and events and have a wonderful time in Las Vegas.

– Song Fu and Zhipeng Cai – IPCCC 2016 General Chairs

Message from the IPCCC 2016 Technical Program Chairs

We are extremely pleased to welcome you to Las Vegas, Nevada, for the 35th edition of the IEEE International Performance Computing and Communications Conference (IPCCC).

IPCCC is the premier conference on performance evaluation of computer and communication systems and we hope the participants will be able to productively share new results, trends and ideas. We would like researchers, developers and practitioners, industry, academia and government, from all over the world, to interact and mingle over three days between December 9th and 11th. We received 194 submissions and were able to accept only 48 papers, for an acceptance rate of 24.7 percent. Papers were submitted from 29 countries and authors of accepted papers come from 15 different countries. As last year, most submission came in descending order from China, USA, Germany, India, Australia, Tunisia and the UK.

We also invited some papers to be presented as poster presentations with an extended two-page abstract to be included in the proceedings. We hope this increases diversity at the conference and allows us to present more of the quality research work that was submitted to the conference.

The review process was conducted by an outstanding Technical Program Committee of 107 members and we are greatly indebted to their efforts. The TPC members provided extensive and thorough reviews for all the papers. All manuscripts submitted received three reviews and two-thirds of the papers received four reviews. The PC chairs then finalized the program based upon these quality reviews.

The final technical program contains 12 technical sessions and one poster session. Additionally, two keynote speakers will address the conference: Victor Bahl from Microsoft Research, and Ender Ayanoglu, from the University of California, Irvine.

We would also like to thank the external reviewers for their efforts as well. In addition, we would like to acknowledge our conference General Chairs Song Fu and Zhipeng Cai, our General Vice-Chairs Weichao Wang and Mea Wang, Publication Chair Peixiang Liu for putting out the proceedings under a tight deadline, Financial Chair Nasr Ullah, Registration Chair Jack Chen, Poster Chair Qiang Guan, graphic artist Denis McGinness, and many others for their hard work in making IPCCC 2016 successful.

Finally, we would like to thank all the authors for submitting their work. The conference would not exist without you and we hope you will find the program exciting, challenging and interesting.

– Benyuan Liu & Cedric Westphal – IPCCC 2016 Technical Program Chairs

Renaissance Las Vegas Hotel
3400 Paradise Rd,
Las Vegas, NV 89169-2770 USA
Ph: 800-750-0980
http://www.marriott.com/hotels/travel/lasbr-renaissance-las-vegas-hotel/

IPCCC 2016 Executive Committee

Co-General Chairs
Song Fu
University of North Texas, USA
Song.Fu@unt.edu

Zhipeng Cai
Georgia State University, USA
zhipeng.cai@gmail.com

Co-General Vice-Chairs
Weichao Wang
University of North Carolina at Charlotte, USA
weichaowang@uncc.edu

Mea Wang
University of Calgary, Canada
meawang@ucalgary.ca

Poster Session Chair
Qiang Guan
Los Alamos National Laboratory, USA
qguan@lanl.gov

Program Co-Chairs
Ben Liu
University of Massachusetts Lowell, USA
bliu@cs.uml.edu

Cedric Westphal
Huawei Technologies & University of California, Santa Cruz, USA
cedric.westphal@huawei.com

Workshop Chair
Amjad Gawanmeh
Concordia University, Montreal, QC, Canada & Khalifa University, UAE
amjad@ece.concordia.ca

Publications Chair
Peixiang Liu
Nova Southeastern University, USA
lpei@nova.edu

Publicity Co-Chairs
Chunyu Ai (North America)
University of South Carolina Upstate, USA
aic@uscupstate.edu

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

Nils Aschenbruck (Europe)
University of Osnabrueck, Germany
aschenbruck@uos.de

Fan Li (Asia)
Beijing Institute of Technology, PR China
fli@bit.edu.cn

Xiaojun Ruan (North America)
West Chester University of Pennsylvania, USA
xruan@wcupa.edu

Financial Chair
Nasr Ullah
Samsung, Inc., USA
Nasr.Ullah@ieee.org

Web Chair
Neil Nelson
Samsung, Inc., USA
webmaster@ipccc.org

Registration Chair
Jack Chen
Samsung, Inc., USA
email: registration@ipccc.org
fax: (512) 532-6471

IPCCC 2016 Technical Program Committee

Chunyu Ai
University of South Carolina Upstate

Habib M. Ammari
Norfolk State University

Abu Asaduzzaman
Wichita State University

Nils Aschenbruck
Universität Osnabrück

Yingyi Bu
University of California Irvine

Hao Che
University of Texas at Arlington

Yu Chen
Binghamton University

Siyao Cheng
Harbin Institute of Technology

Harsha Chenji
Ohio University

Haipeng Dai
Nanjing University

Jun Dai
California State University, Sacramento

Rui Dai
University of Cincinnati

Hongwei Du
Harbin Institute of Technology Shenzhen Graduate School

Anna Förster
University of Applied Sciences of Southern Switzerland

Xinwen Fu
University of Massachusetts Lowell

Yangchun Fu
Google Inc.

Wei Gao
University of Tennessee

Xiaofeng Gao
Shanghai Jiaotong University

Zhangyu Guan
State University of New York at Buffalo

Longjiang Guo
Heilongjiang University

Yang Guo
National Institute of Standards and Technology

Junzhe Han
Illinois Institute of Technology

Wei Hao
Northern Kentucky University

Xubin He
Virginia Commonwealth University

Yuan He
Tsinghua University

Jingyu Hua
Nanjing University

Murtuza Jadliwala
Wichita State University

Song Jiang
Wayne State University

Hai Jin
Huazhong University of Science and Technology

Taeho Jung
Illinois Institute of Technology

Bhanu Kaushik
Schlumberger Inc.

Mohammad Khan
University of Connecticut

Donghyun Kim
North Carolina Central University

Hovannes Kulhandjian
California State University at Fresno

Cheng Li
VMWare, Inc.

Huan Li
Beihang University

Pan Li
Case Western Reserve University

Qing Li
Graduate School at Shenzhen, Tsinghua University

Qinghua Li
University of Arkansas

Tan Li
VMWare, Inc.

Wenjia Li
New York Institute of Technology

Xiang-Yang Li
University of Science and Technology of China

Yingshu Li
Georgia State University

Zhen Ling
Southeastern University

Fangming Liu
Huazhong University of Science and Technology

Mohamed Mahmoud
Tennessee Tech University

Dwight Makaroff
University of Saskatchewan

Victoria Manfredi
Wesleyan University

Ying Mao
The College of New Jersey

Daniel Menasche
Federal University of Rio de Janeiro

Manki Min
South Dakota State University

Aarti Munjal
University of Colorado Denver

Jogesh K. Muppala
Hong Kong University of Science and Technology

Rodney Owens
Yadtel Group

Scott Pudlewski
MIT Lincoln Laboratory

Jia Rao
University of Colorado at Colorado Springs

Xiaojun Ruan
West Chester University of Pennsylvania

Kewei Sha
University of Houston

Bo Sheng
University of Massachusetts Boston

Dongwan Shin
New Mexico Tech

Arun Somani
Iowa State University

Junggab Son
North Carolina Central University

Ulrich Speidel
University of Auckland

Zhi Sun
State University of New York at Buffalo

Hengky Susanto
University of Science and Technology Hong Kong

Chiu Tan
Temple University

Rui Tan
Nanyang Technology University

Yun Tian
California State University, Fullerton

Duc Tran
University of Massachusetts Boston

Shambhu Upadhyaya
University at Buffalo

Bing Wang
University of Connecticut

Chengjun Wang
Vermont Technical College

Cong Wang
City University of Hong Kong, Hong Kong

Guiling Wang
New Jersey Institute of Technology

Haodong Wang
Cleveland State University

Honggang Wang
University of Massachusetts, Dartmouth

Jianping Wang
City University of Hong Kong, Hong Kong

Lizhe Wang
Chinese Academy of Sciences

Qian Wang
Wuhan University

Zhibo Wang
Wuhan University

Jinpeng Wei
Florida International University

Fan Wu
Shanghai Jiao Tong University

Kui Wu
University of Victoria

Tao Xiang
Chongqing University

Xiongwei Xie
University of North Carolina at Charlotte

Hong Xu
City University of Hong Kong, Hong Kong

Hongli Xu
University of Science and Technology of China

Guanhua Yan
Binghamton University

Jie Yang
Florida State University

Jingpei Yang
Samsung, Inc.

Kan Yang
University of Waterloo

Panglong Yang
University of Science and Technology of China

Fan Ye
Stony Brook University

Wei Yu
Towson University

Xin Yuan
Florida State University

Bingsheng Zhang
State University of New York at Buffalo

Honggang Zhang
University of Massachusetts Boston

Hongwei Zhang
Wayne State University

Jianhui Zhang
Hangzhou Dianzi University

Lan Zhang
Tsinghua University

Wensheng Zhang
Iowa State University

Xiaoyan Zhang
Nanjing Normal University

Yanfeng Zhang
Northeastern University

Yuan Zhang
Nanjing University

Yupu Zhang
HP Labs

Gang Zhou
College of William and Mary

Ting Zhu
University of Maryland Baltimore

IPCCC 2016 Schedule Day One – Friday, December 9

> **Opening Remarks** (Chair: Song Fu) – 08:15

> Keynote I – 08:30-09:30
**Ender Ayanoglu, University of California, Irvine –
Fifth Generation (5G) Cellular Wireless: Vision, Goals, and Challenges**

> **Break** 09:30-09:45

> **Session 1.1** (Paramount Room) & **Session 1.2** (Five Spot Room) – 09:45-12:00

Session 1.1 Internet Service and Management (Chair: Feng Wang)

Mining Causality Graph For Automatic Web-based Service Diagnosis
Xiaohui Nie, Youjian Zhao, Kaixin Sui and Dan Pei (Tsinghua University, P.R. China);
Yu Chen and Xianping Qu (Baidu of China, P.R. China)

The Analysis of Service Extensibility in Extensible Network Service Model
Ji Zuqin, Shen Jun and Zhou Xiao (South East University, P.R. China)

A Hybrid Asymmetric Traffic Classifier for Deep Packet Inspection Systems with Route Asymmetry
Kasim Oztoprak (Middle East Technical University, Turkey);
Mehmet Akif Yazici (Istanbul Technical University, Turkey)

Towards Variable Length Addressing for Scalable Internet Routing
Feng Wang (Liberty University, USA); Xiaozhe Shao and Lixin Gao (University of Massachusetts at Amherst, USA); Hiroaki Harai and Kenji Fujikawa (National Institute of Information and Communications Technology, Japan)

Benchmarking ISPs in New Zealand
Se-young Yu and Aniket Mahanti (University of Auckland, New Zealand);
Mingwei Gong (Mount Royal University, Canada)

Session 1.2 Parallel and Distributed Systems (Chair: Song Fu)

Selecting Resources for Distributed Dataflow Systems According to Runtime Targets
Lauritz Thamsen and Ilya Verbitskiy (Technische Universität, Berlin, Germany); Florian Schmidt (Technische Universität, Berlin, Germany); Thomas Renner (Technische Universität, Berlin, Germany); Odej Kao (Technische Universität, Berlin, Germany)

On Query-Adaptive Online Partitioning: A Study of Evolutionary Algorithms
Ting Zhang (University of Massachusetts, Boston, USA);
Duc A. Tran (University of Massachusetts, Boston, USA)

Distributed dynamic MCU for Video Conferencing in Peer-to-Peer Network
Amjad Hossain and Javed Khan (Kent State University, USA)

A Pipelined Market Data Processing Architecture to Overcome Financial Data Dependency
Qiu Tang, Lei Jiang, Majing Su and Qiong Dai (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China)

Unified Power and Energy Measurement API for HPC Coprocessors
Mohak Chadha (BITS Pilani, Goa Campus, India); Abhishek Srivastava (BITS Pilani, Goa Campus, India); Santonu Sarkar (BITS Pilani, Goa Campus, India)

> **Lunch** (Envy Wine Cellar/EWR) 12:00-13:30

> **Session 1.3** (Paramount Room) & **Session 1.4** (Five Spot Room)– 13:30-15:00

Session 1.3 Internet of Things (Chair: Fan Li)

Mo-Sleep: Unobtrusive Sleep And Movement Monitoring Via WiFi Signal
Fan Li, Cheng Xu and Yang Liu (Beijing Institute of Technology, P.R. China); Yun Zhang (Beijing Institute of Technology, P.R. China); Zhuo Li and Kashif Sharif (Beijing Institute of Technology, P.R. China); Yu Wang (University of North Carolina at Charlotte, USA)

On-demand Efficient Polling for Nanonetworks under Dynamic IoT Backhaul Network Conditions
Hang Yu, Bryan Ng and Winston K.G. Seah (Victoria University of Wellington, New Zealand)

An Energy-efficient Handover Algorithm for Wireless Sensor Networks
Fredrik Saveros (Linköping University, Sweden); Mingwei Gong (Mount Royal University, Canada); Niklas Carlsson (Linköping University, Sweden); Aniket Mahanti (University of Auckland, New Zealand)

Path Planning of Mobile Sinks in Charge of Data Gathering: a Coalitional Game Theory Approach
Ines Khoufi (INRIA, France); Pascale Minet (INRIA, France); Mohammed-Amine Koulali (ENSAO, Mohammed I University, Morocco); Abdellatif Kobbane (ENSIAS, Mohammed V University of Rabat, Morocco)

Session 1.4 Performance and Modeling (Chair: Honggang Zhang)

A Reuse Distance Based Performance Analysis on GPU L1 Data Cache
Dongwei Wang and Weijun Xiao (Virginia Commonwealth University, USA)

Sets, Lists and Trees: Distributed Data Structures on Distributed Hash Tables
Raed Al-Aaridhi (University of Duesseldorf, Germany);
Kalman Graffi (Heinrich Heine University Düsseldorf, Germany)

An Imbalanced Data Classification Method Based on Automatic Clustering Under-Sampling
Xiaoheng Deng, Weijian Zhong and Detian Zeng (Central South University, P.R. China); Ren Ju (National University of Defense Technology, P.R. China); Honggang Zhang (University of Massachusetts, Boston, USA)

CCNCPS1 Workshop I (Five Spot Room) – 14:40-15:00

Enhanced PHY-Layer Security Via Co-Channel Underlays
Alan J Michaels (Virginia Tech & Hume Center, USA); William C Headley (Virginia Tech & Hume Center, USA); Joseph M. Ernst (Virginia Tech, USA); Seth Hitefield (Virginia Polytechnic Institute and State University, USA)

> **Break** 15:00-15:15

> **Session 1.5** (Paramount Room) & **Session 1.6** (Five Spot Room) – 15:15-17:00

Session 1.5 Mobile and Wireless Networks
(Chair: Mahmoud Khasawneh)

Minimizing Intra-Flow Interference in Multi-Channel Mesh Networks: An Optimization Approach
Roman Seibel (University of Göttingen, Germany);
Somayeh Taheri (University of Calgary, Canada);
Keyu Wang and Dieter Hogrefe (University of Goettingen, Germany)

A Secure Routing Algorithm Based on Nodes Behavior During Spectrum Sensing in Cognitive Radio Networks
Mahmoud Khasawneh (Concordia University, Canada),
Anjali Agarwal (Concordia University, Canada)

Towards an Extensive Map-oriented Trace Basis for Human Mobility Modeling
Matthias Schwamborn and Nils Aschenbruck (University of Osnabrück, Germany)

Session 1.6 Many-core and Heterogeneous Computing
(Chair: Wei Zhang)

Cache Locking vs. Partitioning for Real-Time Computing on Integrated CPU-GPU Processors
Xin Wang and Wei Zhang (Virginia Commonwealth University, USA)

High Performance Computing on SpiNNaker Neuromorphic Platform: a Case Study for Energy Efficient Image Processing
Indar Sugiarto, Gengting Liu, Simon Davidson and Luis Plana (University of Manchester, United Kingdom); Steve Furber (University of Manchester, United Kingdom)

Optimized GPU Implementation for Dynamic Programming in Image Data Processing
Jing Ke (University of New South Wales & CSIRO, Australia); Tomasz Bednarz (DATA61, CSIRO, Australia);
Arcot Sowmya (University of New South Wales, Australia)

Energy-Efficient Task Scheduling for DVFS-enabled Heterogeneous Computing Systems Using a Linear Programming Approach
Yujian Zhang (Southeast University, P.R. China); Yun Wang (Southeast University, P.R. China); Hui Wang (Southeast University, P.R. China)

2016 IPCCC Schedule Day Two – Saturday, December 10

> Keynote II – 08:30-09:30
Victor Bahl, Microsoft Research – Distributed Video Analytics

> Break 09:30-09:45

> Session 2.1 (Paramount Room) & **Session 2.2** (Five Spot Room) – 09:45-12:00

Session 2.1 Data Center and Cloud Computing
(Chair: Bo Sheng)

ESplash: Efficient Speculation in Large Scale Heterogeneous Computing Systems
Jiayin Wang (University of Massachusetts, Boston, USA); Teng Wang (University of Massachusetts, Boston, USA); Zhengyu Yang and Ningfang Mi (Northeastern University, USA); Bo Sheng (University of Massachusetts, Boston, USA)

Montgolfier: Latency-Aware Power Management System for Heterogeneous Servers
Haoran Cai (Huazhong University of Science and Technology, P.R. China); Qiang Cao (Huazhong University of Science and Technology, P.R. China)

Understanding Performance of I/O Intensive Containerized Applications for NVMe SSDs
Janki Bhimani (Samsung Semiconductor, Inc., USA); Jingpei Yang (Samsung Semiconductor, Inc., USA); Zhengyu Yang and Ningfang Mi (Northeastern University, USA); Qiumin Xu, Manu Awasthi, Rajinikanth Pandurangan and Vijay Balakrishnan (Samsung Semiconductor, Inc., USA)

Simple Data Entanglement Layouts with High Reliability
Veronica Estrada-Galinanes (University of Neuchatel, Switzerland); Jehan Francois Paris (University of Houston, USA); Pascal Felber (University of Neuchatel, Switzerland)

Time Synchronization Mechanisms for an Optically Groomed Data Center Network
Ganesh Chennimalai Sankaran (Indian Institute of Technology Madras & HCL Cisco Offshore Development Center, India); Krishna M. Sivalingam (Indian Institute of Technology Madras, India)

Session 2.2 Security and Privacy
(Chair: Wei Yu)

A Secure Data Allocation Solution for Heterogenous Hadoop Systems: SecHDFS
Bowen Tian (California State University, Fullerton, USA); Yun Tian (California State University, Fullerton, USA); Yijie Sun, Trevor Hurt, Brandon Huebert, Waymon Ho, Yuting Zhang and Danqi Chen (California State University, Fullerton, USA)

A Flexible and Scalable Implementation of Elliptic Curve Cryptography Over GF(p) Based on ASIP
Yao Qin, Hua Wang and Zhiping Jia (Shandong University, P.R. China); Hui Xia (Qingdao University, P.R. China)

A Support Vector Machine Based Naive Bayes Algorithm for Spam Filtering
Weimiao Feng (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); S. Guo and Liguo Zhang (Harbin Engineering University, P.R. China); Cuiling Cao (Harbin Engineering University, USA); Qing Yang (Montana State University, USA)

User Authentication and Identification on Smartphones by Incorporating Capacitive Touchscreen
Mohamed A. Rilvan (Southern Connecticut State University, USA); Kolby Lacy (Howard University, USA); Md Hossain (Southern Connecticut State University, USA); Bing Wang (University of Connecticut, USA)

Data Integrity Attacks Against the Distributed Real-time Pricing in the Smart Grid
Xinyu Yang, Xialei Zhang and Jie Lin (Xi'an Jiaotong University, P.R. China); Wei Yu (Towson University, USA); Xinwen Fu (University of Massachusetts Lowell, USA); Wei Zhao (University of Macau, P.R. China)

> Lunch (Envy Wine Cellar/EWR) – 12:00-13:30

> Session 2.3 (Paramount Room) & **Session 2.4** (Five Spot Room) – 13:30-15:00

Session 2.3 Cache, Memory, and Storage Systems
(Chair: Ningfang Mi)

GREM: Dynamic SSD Resource Allocation In Virtualized Storage Systems With Heterogeneous I/O Workloads
Zhengyu Yang and Jianzhe Tai (Northeastern University, USA); Janki Bhimani (Samsung Semiconductor, Inc, USA); Jiayin Wang (University of Massachusetts, Boston, USA); Ningfang Mi (Northeastern University, USA); Bo Sheng (University of Massachusetts, Boston, USA)

Small Cache Lookaside Table for Fast DRAM Cache Access
Jih-Kwon Peir, Xi Tao and Qi Zeng (University of Florida, USA); Shih-Lien Lu (TSMC, USA)

LAMS: A Latency-Aware Memory Scheduling Policy for Modern DRAM Systems
Wenjie Liu (Huazhong University of Science & Technology, P.R. China); Ping Huang and Kun Tang (Temple University, USA); Tao Lu (Virginia Commonwealth University, USA); Ke Zhou and Chunhua Li (Huazhong University of Science and Technology, P.R. China); Xubin He (Temple University, USA)

Local Memory Store (LMStr): The Case for Hardware Controlled Scratchpad Memory for General Purpose Processors
Nafiul Siddique (New Mexico State University, USA); Jeanine Cook (Sandia National Laboratories, USA); Abdel-Hameed A Badawy (New Mexico State University, USA); David Resnick (Sandia National Laboratories, USA)

Session 2.4 Mobile and Wireless Networks
(Chair: Wei Yu)

A Cognitive Radio Approach for Data Collection in Border Surveillance
Yueshi Wu and Mihaela Cardei (Florida Atlantic University, USA)

Event-based Clustering for Composite Event Detection in Wireless Sensors Network
Catalina Aranzazu Suescun and Mihaela Cardei (Florida Atlantic University, USA)

High Performance Mass Configuration Protocols for MANETs Using Efficient Broadcasting
Prateek Kumar Singh (Rensselaer Polytechnic Institute, USA); James Nguyen (US Army CERDEC, USA); Santosh Gupta and Koushik Kar (Rensselaer Polytechnic Institute, USA); Daniel Ku (CERDEC & Space and Terrestrial Communications Directorate, USA)

Towards Energy Efficiency in Ultra Dense Networks
Wei Yu, Hansong Xu and Amirshahram Hematian (Towson University, USA); David Griffith and Nada Golmie (NIST, USA)

> Break 15:00-15:15

> Workshop Programs – Five Spot Room – 15:15-18:30

CCNCPS2 Workshops 2-5 – 15:15-17:00

Can Maturity Models Support Cyber Security?
Ngoc LE (University of Technology, Sydney, Australia); Doan B Hoang (University of Technology, Sydney, Australia)

AutoReplica: Automatic Data Replica Manager in Distributed Caching and Data Processing Systems
Zhengyu Yang (Northeastern University, USA); Jiayin Wang (University of Massachusetts, Boston, USA); David Evans (Samsung Semiconductor Inc., USA); Ningfang Mi (Northeastern University, USA)

Jamming Mobility in 802.11p Networks: Modeling, Evaluation, and Detection
Sharaf Malebary (University of South Carolina, USA); Wenyuan Xu (University of South Carolina, USA); Chin-Tser Huang (University of South Carolina, USA)

Reliability of Cyber Physical Systems with Focus on Building Management Systems
Sanja Lazarova-Molnar (University of Southern Denmark, Denmark); Hamid Reza Shaker (University of Southern Denmark, Denmark); Nader Mohamed (Middleware Technologies Lab., Bahrain)

CCNCPS3 Workshops 6-8 – 17:15-18:30

Dynamically Reconfigurable AES Cryptographic Core for Small, Power Limited Mobile Sensors
Amar A Rasheed (Armstrong State University, USA)

Delay Analysis of IEEE 802.11e EDCA with Enhanced QoS for Delay Sensitive Applications
Ikram Syed (Ajou University, Korea); Byeong-hee Roh (Ajou University, Korea)

Optimal Multicriteria RAT-Selection Decisions for Multiple Handoff Calls in Heterogeneous Wireless Networks
Olabisi Emmanuel Falowo (University of Cape Town, South Africa)

> Reception & Poster Session
Sponsored by the TCCC
Summit Room – 17:30-19:30
(See Page 6 for Poster Information)

2016 IPCCC Schedule Day Three – Sunday, December 11

> Session 3.1 (Five Spot Room) – 08:30-09:45

Session 3.1 Security and Privacy (Chair: Benyuan Liu)

A Dynamic Bandwidth Pricing Mechanism Based on Trust Management in P2P Streaming Systems
Mingchu Li (Dalian University of Technology, P.R. China); Shiyu Wang (Dalian University of Technology, P.R. China);
Kun Lu (Dalian University of Technology, P.R. China)

Detecting and Defending against Inter-App Permission Leaks in Android Apps
Yi He (Tsinghua University, P.R. China); Qi Li (Tsinghua University, P.R. China)

CrashFuzzer: Detecting Input Processing Related Crash Bugs in Android Applications
Aimin Zhang and Yi He (Tsinghua University, P.R. China); Yong Jiang (Tsinghua University, P.R. China)

> Break 09:45-10:00

> Session 3.2 (Five Spot Room) – 10:00-11:15

Session 3.2 Internet Service and Management (Chair: Weichao Wang)

Optimizing Content Delivery in ICN Networks by the Supply Chain Model
Zhen Feng, Mingwei Xu, Yuan Yang and Yu Wang (Tsinghua University, P.R. China); Qing Li (Tsinghua University, P.R. China);
Weichao Wang (University of North Carolina at Charlotte, USA)

Failure Recovery Using Vlan-tag in SDN: High Speed with Low Memory Requirement
Jue Chen, Jinbang Chen, Junchen Ling and Zhang Wei (East China Normal University, P.R. China)

Quantifying Entity Criticality for Fault Impact Analysis and Dependability Enhancement in Software-Defined Networks
Song Huang (University of North Texas, USA); Zhiang Deng (Cisco Systems, Inc, USA); Song Fu (University of North Texas, USA)

> Conference Adjourn – 11:15

> IPCCC 2016 Poster Program

> Saturday Dec. 10 (Summit Room) – 17:30-19:30

Building an IEEE 802.15.4e TSCH network
Ines Khoufi (INRIA, France);
Pascale Minet (INRIA, France);
Erwan Livolant (INRIA, France);
Badr Rmili (CNES, France)

Estimating Clustering Coefficients via Metropolis-Hastings Random Walk and Wedge Sampling on Large OSN Graph
Emrah Cem (University of Texas at Dallas, USA);
Kamil Sarac (University of Texas at Dallas, USA)

Improving Disk Array Reliability Through Faster Repairs
Jehan-François Paris (University of Houston, USA);
Thomas Schwarz (Marquette University, USA);
Darrell Long (University of California, Santa Cruz, USA)

Performance Prediction Techniques for Scalable Large Data Processing in Distributed MPI Systems - Large Data Processing in Distributed MPI Systems
Janki Bhimani (Samsung Semiconductor, Inc, USA);
Ningfang Mi (Northeastern University, USA);
Miriam Leeser (Northeastern University, USA)

PETS: Performance, Energy and Thermal Aware Scheduler for Job Mapping with Resource Allocation in Heterogeneous Systems
Shouq Alsubaihi (University of California, USA);
Jean-Luc Gaudiot (University of California, USA)

Thwart Eavesdropping Attacks on Network Communication Based on Moving Target Defense
Duohe Ma (Chinese Academy of Sciences & State Key Laboratory Of Information Security, P.R. China)

Towards a First-Reflection Ultrasonic Sensor Array for Compensatory Movement Identification in Stroke Sufferers
Henry Griffith (Michigan State University, USA);
Rajiv Ranganathan (Michigan State University, USA);
Subir Biswas (Michigan State University, USA)

Polarized Beamforming for Enhanced Countermeasure of Wireless Jamming Attack
Ali Aldarraji (Tennessee State University, USA);
Liang Hong (Tennessee State University, USA);
Sachin Shetty (Old Dominion University, USA)

Reducing Leakage Energy for GPU Data Caches
Hao Wen (Virginia Commonwealth University, USA);
Wei Zhang (Virginia Commonwealth University, USA)

User Behavior Aware Channel Allocation Scheme for Mobile Ad hoc Networks
Roni Shigueta (Pontifical Catholic University of Parana, Brazil);
Mauro Fonseca (Federal Technological University of Parana, Brazil);
Aline Carneiro Viana (INRIA, France)

Using Context Switches for VM Scaling
James Hadley (Lancaster University, United Kingdom);
Utz Roedig (Lancaster University, United Kingdom);
Yehia Elkhatib (Lancaster University, United Kingdom)

Bandwidth Scheduling with Multiple Variable Node-Disjoint Paths in High-performance Networks
Aiqin Hou (Northwest University, P.R. China);
Chase Wu (New Jersey Institute of Technology & Oak Ridge National Laboratory, USA);
Dingyi Fang (Northwest University, P.R. China);
Yongqiang Wang (Northwest University, P.R. China);
Meng Wang (Northwest University, P.R. China);
Tao Wang (Northwest University, P.R. China)

KOVA : A Tool for Kernel Visualization and Analysis
Manu Awasthi (Samsung Semiconductor, Inc, USA);
Krishna T. Malladi (Samsung Semiconductor, Inc, USA)

A Secure Framework for mHealth Data Analytics with Visualization
Denise Ferebee (LeMoyne-Owen College, USA);
Chase Wu (New Jersey Institute of Technology & Oak Ridge National Laboratory, USA);
Janet Ricks (University of Mississippi, USA);
Vivek Shandilya (Jacksonville University, USA);
David Aguilar (LeMoyne-Owen College, USA);
Karyn Cole (LeMoyne-Owen College, USA)

Holistic Data Centres: Next Generation Data and Thermal Energy Infrastructures
Paul Townend (University of Leeds, UK);
Jie Xu (University of Leeds, UK)

Towards Designing and Implementing a Secure One Time Password Authentication System
Swaponeel Roy (University of North Florida, USA);
Matt Rutherford (University of North Florida, USA);
Charlene Crawshaw (University of North Florida, USA)

Middleware to Support Cyber-Physical Systems
Nader Mohamed (Middleware Technologies Lab, Bahrain);
Jameela Al-Jaroodi (Robert Morris University, USA);
Sanja Lazarova-Molnar (University of Southern Denmark, Denmark);
Imad Jawhar (UAE University, UAE)

Keynote Speakers

Fifth Generation (5G) Cellular Wireless: Vision, Goals, and Challenges
Ender Ayanoglu, Professor at the University of California, Irvine

Friday December 9, 08:30

Abstract:

Cellular wireless or mobile communications have seen four generations of technological developments. Beginning with analog voice and then moving on to digital voice with the second generation, these generations were each marked with a clear technological advancement. For the third generation the advancement was in incorporating data on top of a voice-based infrastructure. With the fourth generation every service was converted into data format or packetized transmissions, including voice and video. Today, technologists are proposing a fifth generation for around the time frame of 2020. Most consider this era to be when the infrastructure will need to be renewed.

Together with this observation it is usually argued that the new generation technology should possess a number of features. Yet, there is really no consensus on what these new features should be. Some argue that we are facing a new generation of devices that will have continuous Internet connectivity, and with that there will be more machine to-machine or machine-type communications. It is further argued that, as a result, new communication protocols should be able to support the new formats of communication that this change will require. For example, it is argued that machine-type communication will require very low latency. Others argue that the demand for services will increase by about three orders of magnitude and the new technology should be designed to support this tremendous increase, perhaps handling each order of magnitude by means of a different approach. Yet, there are others who argue that the current communications infrastructure is highly energy-inefficient and the fifth generation should be designed to solve this problem by increasing energy efficiency by several orders of magnitude.

In this talk, we will discuss the pros and cons of the approaches for defining and realizing the fifth generation cellular wireless technologies as seen today. We will discuss what fifth generation can be expected to be and, more importantly, what it cannot be. The goal in this presentation is to address both the very high expectations and the realities.

Biography

Ender Ayanoglu received his Ph.D. degree from Stanford University, Stanford, CA in 1986 in electrical engineering. He was with the Communications Systems Research Laboratory, Holmdel, NJ, part of AT&T Bell Laboratories until 1996, and Bell Labs, Lucent Technologies from 1996 until 1999. During 1999-2002, he was a Systems Architect at Cisco Systems, Inc., San Jose, CA. Since 2002, he has been a Professor in the Department of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA, where he served as the Director of the Center for Pervasive Communications and Computing and held the Conexant-Broadcom Endowed Chair during 2002-2010.

His past accomplishments include the invention of the 56K modem, characterization of wavelength conversion gain in Wavelength Division Multiplexed (WDM) systems and diversity coding. 56K modems broke what was believed to be the "Shannon limit" of about 36 kb/s for voiceband modems. Since every laptop computer includes one, the number of implementations of 56K modems is estimated to be in the hundreds of millions or even billions. Prof. Ayanoglu's work on wavelength conversion gain in WDM networks showed large gains can be achieved via better wavelength selection and routing algorithms without the need for optical wavelength converters. Diversity coding, a technique for link failure recovery in communications networks employing erasure coding, was introduced by Prof. Ayanoglu in 1990, prior to the publication of the first papers on network coding. During 2000-2001, Dr. Ayanoglu served as the founding chair of the IEEE-ISTO Broadband Wireless Internet Forum (BWIF), an industry standards organization which developed and built a broadband wireless system employing Orthogonal Frequency Division Multiplexing (OFDM) and a Medium Access Control (MAC) algorithm that provides Quality-of-Service (QoS) guarantees. This system is the precursor of today's Fourth Generation (4G) cellular wireless systems such as WiMAX, LTE, and LTE-Advanced.

From 1990 to 2002, Dr. Ayanoglu served on the Executive Committee of the IEEE Communications Society Communication Theory Committee, and from 1999 to 2001, was its Chair. From 1993 until 2014 Dr. Ayanoglu was an Editor, and since January 2014 is a Senior Editor of the IEEE Transactions on Communications. He served as the Editor-in-Chief of the IEEE Transactions on Communications from 2004 to 2008. Since December 2014, he has served as the Editor-in-Chief of IEEE Journal on Selected Areas in Communications - Series on Green Communications and Networking. He led the efforts to convert this series into an IEEE journal, and since June 2016, he has served as the founding Editor-in-Chief of the new journal IEEE Transactions on Green Communications and Networking.

Dr. Ayanoglu is the recipient of the IEEE Communications Society Stephen O. Rice Prize Paper Award in 1995 and the IEEE Communications Society Best Tutorial Paper Award in 1997. He received the IEEE Communications Society Communication Theory Technical Committee Outstanding Service Award in 2014. He has been an IEEE Fellow since 1998.

Distributed Video Analytics
Victor Bahl, Director, Mobility & Networking Research, Microsoft Research

Saturday December 10, 08:30

Abstract:

The virtues of edge computing have been expounded in the research community but deployment across our industry has been slow. Reflecting on this, we have been working on a compelling video analytics application for edge computing Our motivation for doing this is based on the observation that cities worldwide have deployed millions of cameras for management and security purposes. These cameras record images 24x7x365, mostly storing them for possible analysis at a later time. The time lag between capturing and analyzing is a limitation of current technology and cost. We believe that real-time analytics of live video streams is compelling for many important reasons and a perfect application of edge computing. Unfortunately existing state-of-the-art video analytics systems are costly, insufficient, and often require manual intervention. Large-scale automated video analytics is a grand challenge for the research community and for those of us who work on big data systems. Privacy regulations, bandwidth constraints, and latency naturally lead us to design and develop systems where video is analyzed across both edge and cloud clusters. In this talk I will describe our hybrid edge-cloud video analytics infrastructure and a pilot system that we have built and deployed in the second largest city in Washington state, USA. I will draw some lessons from there to help us all navigate the future as more such systems come on line.

Biography

Victor Bahl is a Distinguished Scientist and the Director of Mobility & Networking in Microsoft Research. In this role he advises Microsoft's CEO and senior leadership team on long-term vision/strategy around networked systems, cloud computing, mobile computing, wireless systems, and datacenter networking. He heads a high-powered group that executes on this vision through research, technology transfers to product groups, industry partnerships, and associated policy engagement with governments and research institutes around the world. Dr. Bahl has published over 125 scientific papers in top conferences and journals, authored over 130 patents, and won numerous technical and leadership awards including a test-of-time award, three best paper awards, two awards from the United States FCC, a distinguished service award, a lifetime technical achievement awards from ACM, distinguished alumni award, and a IEEE outstanding leadership award. Over the years he has developed seminal technologies including white space networking (2010), edge-based cloud computing (2009), mesh networking (2005), multi-radio wireless systems (2001), public WiFi hot-spots (2000), and indoor localization systems (1999). Under his direction his group has had game changing impact on Microsoft's cloud computing infrastructures both in their datacenters and in wide-area networking. Dr. Bahl is a Fellow of ACM, IEEE, and AAAS
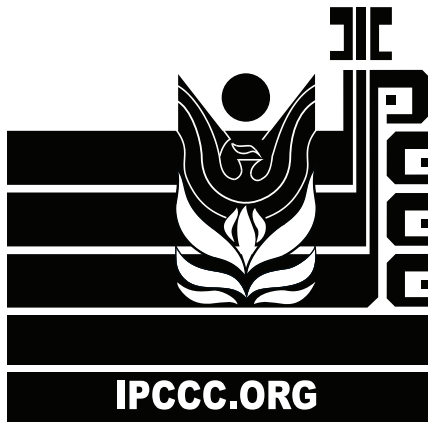
36th IEEE Performance, Computing and Communications Conference
San Diego, CA USA

Call for Papers
December 2017

IPCCC.ORG

Sponsored by the IEEE Computer Society

The International Performance, Computing, and Communications Conference is the premier IEEE conference presenting research in the performance of computer and communication systems.
For over three decades, IPCCC has been a research forum for academic, industrial and government researchers. We encourage submission of high-quality papers reporting original work in both theoretical and experimental research areas. Visit www.ipccc.org for more information.

General Co-Chairs IPCCC 2017

Mea Wang
University of Calgary, Canada

Weichao Wang
University of North Carolina at Charlotte, USA

IPCCC Board (Steering Committee)

Nasr Ullah - Board Chair
Samsung Inc., USA

Song Fu
University of North Texas, USA

Zhipeng Cai
Georgia State University, USA

Richard Oliver
New Mexico State University, USA

Yu Wang
University of North Carolina at
Charlotte, USA

Kuai Xu
Arizona State University, USA

Guoliang (Larry) Xue
Arizona State University, USA

Sheng Zhong
Nanjing University, China

Hot Topics For IPCCC 2017

Topics of interest include, but are not limited to:

- Big Data Processing and Analytics
- Cache, Memory, and Disk Storage Systems
- Cloud Computing
- Crowdsourcing Systems
- Cyber Physical Systems
- Data Centers
- Embedded Systems
- Fundamental Theory and Algorithms
- Internet of Things
- Internet Services and Network Management
- Mobile Ad Hoc, Sensor and Mesh Networks
- Multimedia Networking
- Many-core and Heterogeneous Computing
- Network Data Mining
- Network Information Assurance and Security
- Network Protocols
- Online Social Network Analysis
- Parallel and Distributed Systems
- Performance Evaluation and Modeling
- Security and Privacy
- Smart Grid and Intelligent Mission Critical Operations
- 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

Submissions Procedures

FULL PAPERS: Submissions should not exceed 8 pages in general. However, if authors are willing to pay an over-length fee of $100/page, 2 additional pages are allowed for their submission. This over-length fee will be charged once the paper is accepted.
• http://www.ieee.org/conferences_events/conferences/publishing/templates.html

POSTERS: We welcome submissions of poster applications in the form of a two-page extended abstract in PDF formatted with the same template for full papers. A subset of full paper submissions will also be invited to the IEEE IPCCC Poster Session.

IMPORTANT DATES: Paper Abstract Due: July 25, 2017   Acceptance Notification: October 2, 2017
                  Full Paper Due: August 8, 2017   Camera Ready Due: October 16, 2017
                  Poster Paper Due: September 1, 2017