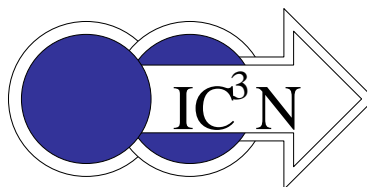# ICCCN 2016

**25th International Conference on**

**Computer Communications and Networks**

## August 1 – August 4, 2016

## Final Program



IC³N

# Message from the General Chair



It gives me great pleasure to welcome you to the 25th International Conference on Computer Communications and Networks (ICCCN) held in Hawaii, USA, on August 1st-4th, 2016. Since its inception in 1991, ICCCN has been quite successful in bringing together a richdiversity of authors, researchers, and speakers from academia, industry, and government all overthe world. ICCCN is a tremendous venue forsharing ideas and the latest research outcomes in the wide spectrum of communications andnetworking areas. As we enter our 25th anniversary year, I would also to welcome faces both new and old to the conference as we celebrate twenty-five years of exceptional research.

The success would not have been possible without the extensive contributions from more than one thousand volunteers. First, I would like to acknowledge the tremendous efforts of the Technical ProgramCommittee Chairs, Kui Ren (State University of New York - Buffalo, USA) and Tommaso Melodia (Northeastern University, USA), for making an outstanding technical program. The three-day conference program featuresthree keynote talks and two plenary panels given by world-renowned scholars covering a wide variety of contemporary research topics.

I would also like to thank Yingfei Dong (University of Hawaii, USA) who served asthe Workshop Chair and who assembled an excellent set of workshops for August 4th. Our Publicity Chairs, Zhi Sun (State University of New York - Buffalo,USA) and CongWang (City University of Hong Kong, Hong Kong) did an outstanding job sharing important information for ICCCN. Our Publication Chairs, Lu Su (State University of New York - Buffalo, USA) and Yunfei Hou (CSU San Bernandino, USA) did a wonderful job on the program. Finally, I would like to thank Kewei Sha for helping to assist with managing Travel Grants as well as Enrico Santagati (Northeastern University, USA) who served as Web Chair.

We are very grateful to all technical program track chairs, along with Technical Program Committeemembers and reviewers, who have been working around the clock to make the whole process very smooth.Special thanks to Keynote Speakers Patrick McDaniel, Baochun Li, and Edward Knightly for theirinsightful vision on rethinking core principles of networking ranging from the interplay of machine learning and security to datacenter optimization to wireless uplink consideration. I also strongly appreciate the generosity of our sponsors: IEEE and IEEE Communications Society. Furthermore, it is important to thank Dr. E. K. Park, the Chair of theICCCN Steering Committee, without whose exceptional stewardship, ICCCN would not be possible.

Finally, I would like to thank all conference participants for making ICCCN 2016 a success, and hope that you have an enjoyable and fruitful stay in Hawaii.

**Aaron Striegel**, University of Notre Dame, USA
ICCCN 2016 General Chair

# Message from the Program Co-Chairs

Welcome to ICCCN 2016! ICCCN has established itself as a worldwide reference for the dissemination of high-quality research in all aspects of computer communications and networking, and for fostering interaction and exchange of ideas. ICCCN 2016 was fortunate to attract a high interest among the community, and the main conference received over 250 submissions. The submissions span thirteen tracks. The high number of submissions provided an excellent opportunity for a high-quality program but also called for a demanding and laborious paper evaluation process. The 440+ members of the Technical Program Committee worked efficiently and responsibly under tight time constraints to produce at least three reviews for each paper, which provided the basis for the final paper selection.

The reviewing and selection process resulted in an acceptance rate of 30%. Given the large number of submitted manuscripts and the tight time and space constraints, many strong submissions could not be accepted. To allow the conference participants to benefit from further worthwhile and stimulating research results, some of the papers were accepted for presentation at the workshops co-located with the main conference. The main program of ICCCN 2016 covers three days and includes streams of up to three parallel sessions. The program is further enriched by three keynote presentations and two plenary panel discussions offered by world-renowned researchers in the field. The main program is also complemented by a diverse set of high-quality workshops. We are grateful to all authors who trusted us with their work; without them there would be no conference. The final result would not have been possible without the dedication and hard work of many colleagues. Special thanks are due to the outstanding track chairs, workshop chairs, the members of the Technical Program Committees, the General Chairs, and to all external referees for the quality and depth of the reviews, and their sense of responsibility and responsiveness under very tight deadlines.

**Kui Ren**, University at Buffalo, The State University of New York, USA
**Tommaso Melodia**, Northeastern University, USA
ICCCN 2016 Technical Program Co-Chairs

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- Jun Yi
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- Rui Zhang

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# Keynote Speakers

## The Limitations of Machine Learning in Adversarial Settings

Prof. Patrick McDaniel
School of Electrical Engineering and Computer Science
Pennsylvania State University

**Abstract:** Advances in machine learning have enabled to new applications and services to computationally process inputs in previously unthinkably complex environments. Autonomous cars, automated analytics, adaptive communication systems and self-aware software systems are now revolutionizing markets and blurring the lines between computer systems and real intelligence. In this talk, I consider whether the current use of machine learning in security-sensitive contexts is vulnerable to nonobvious and potentially dangerous manipulation. Here, we examine sensitivity in any application whose misuse might lead to harm—for instance, forcing adaptive network in an unstable state, crashing an autonomous vehicle or bypassing anadult content filter. I explore the use of machine learning in this area particularly in light of recent discoveries in the creation of adversarial samples, and posit on future attacks on machine learning. The talk is concluded with a discussion of the unavoidable vulnerabilities of systems built on probabilistic machine learning, and outline areas for defensive research in the future.

**Biography:**



**Patrick McDaniel** is a Distinguished Professor in the School of Electrical Engineering and Computer Science at The Pennsylvania State University, co-director of the Systems and Internet Infrastructure Security Laboratory, and Fellow of IEEE and ACM. Dr. McDaniel is also the program manager and lead scientist for the Army Research Laboratory's Cyber-Security Collaborative Research Alliance. Patrick's research centrally focuses on a wide range of topics in security and technical public policy. Prior to pursuing his Ph.D. at the University of Michigan, Patrick was a software architect and project manager in the telecommunications industry.

# Remember the Uplink: Hidden Costs and Solutions for Lagging Uplink WLAN Capabilities

Prof. Edward Knightly
Department of Electrical and Computer Engineering
Rice University

**Abstract:** Advanced transmission techniques including multiuser MIMO and massive MIMO have enabled multi-gigabit per second scale downlink transmission speeds, not only in the lab, but also in standards and commercial systems. Unfortunately, the uplink has been a relative laggard. While it may seem that a slower uplink compared to downlink naturally matches inherent traffic asymmetries, I will show that there are hidden costs to an asymmetric system design. Moreover, I will describe the design, implementation, and testbed trials, of a new class of techniques for scalable uplink multiuser wireless LANs.

**Biography:**



**Edward Knightly** is a professor and the department chair of Electrical and Computer Engineering at Rice University in Houston, Texas. He received his Ph.D. and M.S. from the University of California at Berkeley and his B.S. from Auburn University. He is an IEEE Fellow, a Sloan Fellow, and a recipient of the National Science Foundation CAREER Award. He received best paper awards from ACM MobiCom, IEEE SECON, and the IEEE Workshop on Cognitive Radio Architectures for Broadband. He has chaired ACM MobiHoc, ACM MobiSys, IEEE INFOCOM, and IEEE SECON. He serves as an editor-at-large for IEEE/ACM Transactions on Networking and serves on the IMDEA Networks Scientific Council.

Professor Knightly's research interests are in the areas of mobile and wireless networks with a focus on protocol design, performance evaluation, and at-scale field trials. He leads the Rice Networks Group. The group's current projects include deployment, operation, and management of a large-scale urban wireless network in a Houston under-resourced community. This network, Technology For All (TFA) Wireless, is serving over 4,000 users in several square kilometers and employs custom-built programmable and observable access points. The network is the first to provide residential access in frequencies spanning from unused UHF TV bands to legacy WiFi bands (500 MHz to 5 GHz). His group developed the first multi-user beam-forming WLAN system that demonstrates a key performance feature provided by IEEE 802.11ac. His group also co-developed a clean-slate-design hardwareplatform for high-performance wireless networks, TAPs and WARP.

# Fair Scheduling in Cloud Datacenters with Multiple Resource Types

Prof. Baochun Li
Department of Electrical and Computer Engineering
University of Toronto

**Abstract:** In the age of big data, it has been the norm for cloud datacenters to run data analytic applications at a large scale. Yet, as multiple applications share resources in these datacenters, it is important to design scheduling disciplines for datacenter resources to be shared in a fair and efficient manner. In this talk, I will present a new class of scheduling disciplines that are specifically designed for sharing multiple resource types in cloud datacenters. I will first discuss how multiple resource types are to be shared in space, and present a new design that allocates resources to applications by scheduling their computing tasks onto datacenter nodes. I will then focus on the problem that an increasing number of datacenter jobs specify placement constraints and can only run on a particular class of machines that meet specific hardware/software requirements (e.g., GPUs). Our recent research shows that directly extending existing policies to constrained jobs either compromises isolation guarantees or allows users to gain more resources by deceiving the scheduler. It remains unclear how multi-resource fair sharing is to be defined and achieved in the presence of placement constraints. I will briefly introduce a new sharing policy, called task share fairness (TSF), that we designed to provide provable isolation guarantees and to be strategy-proof against gaming the allocation policy. I will conclude the talk with challenges and observations in real-world implementations.

**Biography:**

**Baochun Li** received his B.Engr. degree from the Department of Computer Science and Technology, Tsinghua University, China, in 1995 and his M.S. and Ph.D. degrees from the Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, in 1997 and 2000.

Since 2000, he has been with the Department of Electrical and Computer Engineering at the University of Toronto, where he is currently a Professor. He holds the Nortel Networks Junior Chair in Network Architecture and Services from October 2003 to June 2005, and the Bell Canada Endowed Chair in Computer Engineering since August 2005. His research interests include large-scale distributed systems, cloud computing, datacenter networks, applications of network coding, mobile computing, and wireless networks.

Dr. Li has co-authored more than 300 research papers, with a total of over 15000 citations, an H-index of 64 and an i10-index of 210, according to Google Scholar Citations. He was the recipient of the IEEE Communications Society Leonard G. Abraham Award in the Field of Communications Systems in 2000. In 2009, he was a recipient of the Multimedia Communications Best Paper Award from the IEEE Communications Society, and a recipient of the University of Toronto McLean Award. He is a member of ACM and a Fellow of IEEE.

# Panel I: Emerging Research Challenges in the Era of IOT

Organizer: Kui Ren, SUNY Buffalo, USA
Panelists:
>Jiangchuan Liu, Simon Fraser University, Canada
>Tommaso Melodia, Northeastern University, USA
>Aaron Striegel, University of Notre Dame, USA
>Jie Wu, Temple University, USA
>Matteo Rinaldi, Northeastern University, USA

**Biography:**

**Kui Ren** is a professor of Computer Science and Engineering and the director of UbiSeC Lab at State University of New York at Buffalo. He received his PhD degree from Worcester Polytechnic Institute. Kui's current research interest spans Cloud & Outsourcing Security, Wireless & Wearable Systems Security, and Mobile Sensing & Crowdsourcing. His research has been supported by NSF, DoE, AFRL, MSR, and Amazon. He received UB SEAS Senior Researcher of the Year Award in 2015, Sigma Xi/IIT Research Excellence Award in 2012, and NSF CAREER Award in 2011. Kui has published 160 peer-review journal and conference papers and received several Best Paper Awards including IEEE ICNP 2011. He currently serves as an associate editor for IEEE Transactions on Dependable and Secure Computing, IEEE Transactions on Mobile Computing, IEEE Wireless Communications, IEEE Internet of Things Journal, and IEEE Transactions on Smart Grid. Kui is a Fellow of IEEE, a Distinguished Lecturer of IEEE, a member of ACM, and a past board member of Internet Privacy Task Force, State of Illinois.

**Jiangchuan Liu** is a Full Professor (with University Professorship) in the School of Computing Science at Simon Fraser University, British Columbia, Canada, and an NSERC E.W.R. Steacie Memorial Fellow. He is also an EMC-Endowed Visiting Chair Professor of Tsinghua University, Beijing, China. He was a Microsoft Research Fellow, and worked at Microsoft Research Asia (MSRA) in the summers of 2000, 2001, 2002, 2007, and 2011.

He received BEng (Cum Laude) from Tsinghua University in 1999, and PhD from The Hong Kong University of Science and Technology in 2003 (through HKUST's MED program with recommendation from Education Ministry of China and scholarship from Hong Kong Jockey Club; recipient of 2004 Hong Kong Young Scientist Award for the PhD work). From 2003 to 2004, he was an Assistant Professor in the Department of Computer Science and Engineering at The Chinese University of Hong Kong.

**Aaron Striegel** is currently an Associate Professor and serves as Associate Chair in the Department of Computer Science & Engineering at the University of Notre Dame. He also serves on the Executive Committee of the Wireless Institute at the University of Notre Dame. He received his Ph.D in December 2002 in Computer Engineering at Iowa State University. Prof. Striegel's research interests include focusing on understanding wireless in the large with a focus on crowded and / or challenged venues. Particular focus topics include the interplay of WiFi and LTE, network dynamics for 5G and content distribution, and management of heterogeneous wireless networks. Further research interests include computer security and the visualization of network dynamics. Prof. Striegel has received several best paper awards and has received over $6M of federal and industry funding including NSF, NIH, DARPA, Sprint, Google, and Nokia.

**Tommaso Melodia** is an Associate Professor with the Department of Electrical and Computer Engineering at Northeastern University, where he directs the Wireless Networks and Embedded Systems Laboratory. He received his Ph.D. in Electrical and Computer Engineering from the Georgia Institute of Technology in 2007. He had previously received his M.S. in Telecommunications Engineering and Doctorate from the University of Rome "La Sapienza", Rome, Italy, in 2001 and 2005. He is an Associate Editor for IEEE Transactions on Wireless Communications, IEEE Transactions on Mobile Computing, IEEE Transactions on Multimedia, and Computer Networks. His research is currently supported by several grants from the National Science Foundation, the Air Force Research Laboratory, the Office of Naval Research, and local and national industrial partners. He received a National Science Foundation CAREER award, and coauthored a paper that was recognized as the "Fast Breaking Paper in the field of Computer Science" by Thomson ISI Essential Science Indicators and a paper that received the "Elsevier Top Cited Paper Award". His research interests are in modeling, optimization, and experimental evaluation of wireless networks, with applications to ultrasonic intra-body area networks, multimedia sensor networks, underwater networks, cognitive and cooperative networks.

**Jie Wu** is the Associate Vice Provost for International Affairs at Temple University. He also serves as the Chair and Laura H. Carnell professor in the Department of Computer and Information Sciences. Prior to joining Tempe University, he was a program director at the National Science Foundation and was a distinguished professor at Florida Atlantic University. His current research interests include mobile computing and wireless networks, routing protocols, cloud and green computing, network trust and security, and social network applications. Dr. Wu regularly publishes in scholarly journals, conference proceedings, and books. He serves on several editorial boards, including IEEE Transactions on Service Computing and the Journal of Parallel and Distributed Computing. Dr. Wu was general co-chair/chair for IEEE MASS 2006, IEEE IPDPS 2008, IEEE ICDCS 2013, and ACM MobiHoc 2014, as well as program co-chair for IEEE INFOCOM 2011 and CCF CNCC 2013. He was an IEEE Computer Society Distinguished Visitor, ACM Distinguished Speaker, and chair for the IEEE Technical Committee on Distributed Processing (TCDP). Dr. Wu is a CCF Distinguished Speaker and a Fellow of the IEEE. He is the recipient of the 2011 China Computer Federation (CCF) Overseas Outstanding Achievement Award.

**Matteo Rinaldi** received his Ph.D. degree in Electrical and Systems Engineering from the University of Pennsylvania in 2010. He joined the Electrical and Computer Engineering department at Northeastern University as an Assistant Professor in January 2012.

Dr. Rinaldi's research focuses on understanding and exploiting the fundamental properties of micro/nanomechanical structures and advanced nanomaterials to engineer new classes of micro and nanoelectromechanical systems (M/NEMS) with unique and enabling features applied to the areas of chemical, physical and biological sensing and low power reconfigurable radio communication systems. In particular, his group has been actively working on experimental research topics and practical applications to ultra-low power MEMS/NEMS sensors (infrared, magnetic, chemical and biological), plasmonic micro and nano electromechanical devices, medical micro systems and implantable micro devices for intra-body networks, reconfigurable radio frequency devices and systems, phase change material switches, 2D material enabled micro and nano mechanical devices.

The research in Dr. Rinaldi's group is supported by several Federal grants (including DARPA, NSF, DHS) and the Keck foundation.

Dr. Rinaldi has co-authored more than 60 publications in the aforementioned research areas and also holds 9 device patent applications in the field of MEMS/NEMS.

Dr. Rinaldi was the recipient of the IEEE Sensors Council Early Career Award in 2015, the NSF CAREER Award in 2014 and the DARPA Young Faculty Award class of 2012. He received the Best Student Paper Award at the 2009, 2011 and 2015 (with his student) IEEE International Frequency Control Symposiums and the Outstanding Paper Award at the 18th International Conference on Solid-State Sensors, Actuators and Microsystems, Transducers 2015 (with his student).

# Panel II: Research Challenges in Big Data and Cloud Computing

Organizer: Min Song, Michigan Technological University, USA
Panelists:
    Krishna Kant, Temple University, USA
    Hong Jiang, University of Texas at Arlington, USA
    Hui Zang, Huawei, USA
    Mehmet Can Vuran, University of Nebraska-Lincoln, USA

**Biography:**

**Dr. Min Song** served as Program Director with the NSF from October 2010 to October 2014. Through his outstanding contributions in promoting NSF's international engagement and leadership, Min received the prestigious NSF Director's award in 2012 for collaborative integration and the successful launch of groundbreaking international initiatives. Min's research interests include design, analysis, and evaluation of wireless communication networks, network security, cyber physical systems, and mobile computing. During the past 15 years, Min has secured more than $3.4 million in research funding from NSF, DOE, NASA, and private Foundations, and published more than 160 technical papers. Min was the recipient of NSF CAREER award in 2007.

Min's professional career comprises 26 years in industry, academia, and government. Over the course of his career, Min has held various leadership positions and gained substantial experience in performing a wide range of duties and responsibilities. As an NSF Program Director in the Division of Computer and Network Systems, Min initiated three new programs: Enhancing Access to the Radio Spectrum (EARS), Wireless Innovation between Finland and US (WiFiUS), and US-Japan Big Data and Disaster (BDD) research program, and managed 11 programs in the field of wireless communications and wireless networking. He oversaw hundreds of communications and networking research and educational projects with a total funding budget of over $80 million. Min launched and served as Editor-in-Chief of two international journals. He also served as Editor or Guest Editor of 14 international journals, and as General Chair, Technical Program Chair, and Panel Chair for many conferences, including General Chair of INFOCOM 2016 and TPC Vice-Chair of GLOBECOM 2015. Min is currently serving as the IEEE Communications Society Director of Conference Operations.

**Krishna Kant** is a professor in the Computer and Information Science Department at Temple University in Philadelphia, PA where he directs the center for research in energy and configuration management. Earlier he was a research professor in the Center for Secure Information Systems (CSIS) at George Mason University. From 2008-2013 he served as a program director at the National Science Foundation (NSF) where he managed the computer systems research (CSR) program and was instrumental in the development and running of NSF-wide sustainability initiative called SEES (science, engineering and education for sustainability). His current areas of research include sustainability and energy efficiency in data centers, performance of

storage systems, robustness and security of data center configurations, smart grid security, and application of computing technologies to larger sustainability problems. Prior to NSF, he served at Intel Corporation for 11 years working on a variety of data center architecture and technology issues. From 1991 to 1997, he held the consultant position at Ericsson (formerly Bellcore) and worked on many broadband and narrowband telecommunications technologies. Prior to 1991, he was an Associate Professor of Computer Science at the Pennsylvania State University with research contributions in performance modeling and distributed systems. From 1981-1984 he was an assistant professor in the EECS department of Northwestern University. He received his Ph.D. degree in Mathematical Sciences from University of Texas at Dallas in 1981. He carries a combined 35 years of experience in academia, industry, and government. He has published in a wide variety of areas in computer science, authored a graduate textbook on performance modeling of computer systems, and coedited two books on cyberphysical infrastructure and cloud computing security. He is a Fellow of IEEE.

**Hong Jiang** received the B.Sc. degree in Computer Engineering in 1982 from Huazhong University of Science and Technology, Wuhan, China; the M.A.Sc. degree in Computer Engineering in 1987 from the University of Toronto, Toronto, Canada; and the PhD degree in Computer Science in 1991 from the Texas A&M University, College Station, Texas, USA. He is currently Chair and Wendell H. Nedderman Endowed Professor of Computer Science and Engineering Department at the University of Texas at Arlington. Prior to joining UTA, he served as a Program Director at National Science Foundation (2013.1-2015.8) and he was at University of Nebraska-Lincoln since 1991, where he was Willa Cather Professor of Computer Science and Engineering. His present research interests include computer architecture, computer storage systems and parallel I/O, high-performance computing, big data computing, cloud computing, performance evaluation. He has over 200 publications in major journals and international Conferences in these areas, and his research has been supported by NSF, DOD, the State of Texas and the State of Nebraska. Dr. Jiang is a Fellow of IEEE, and Member of ACM.

**Hui Zang** is a distinguished data scientist at Futurewei Technologies, Santa Clara, CA, USA. She was a principle data scientist at Guavus and a principle research scientist at Sprint. She received her B.S. degree in computer science from Tsinghua University, Beijing, China, and the M.S. and Ph.D. degrees in computer science from the University of California, Davis. Her research is focused on discovering insights and patterns about networks as well as theirs users from large-scale network data and guiding network optimization, operations, and marketing efforts using such discoveries. Dr. Zang was one of the guest editors of IEEE Network special issue on "Traffic Engineering in Optical Networks." She is the author of the book "WDM Mesh Networks - Management and Survivability" (Kluwer Academic, 2002). She has published over 70 conference papers and journal articles and currently has thirty US patents granted in the field of networking and communications. Dr. Zang is a senior member of IEEE.

**Mehmet Can Vuran**received his B.Sc. degree in Electrical and Electronics Engineering from Bilkent University, Ankara, Turkey in 2002. He received his M.S. and Ph.D. degrees in Electrical and Computer Engineering from Georgia Institute of Technology in 2004 and 2007, respectively.Currently, he is the Susan J. Rosowski Associate Professor of Computer Science and Engineering at the University of Nebraska-Lincoln. Dr. Vuran received an NSF CAREER award in 2010 for "Bringing Wireless Sensor Networks Underground". In 2014 and 2015, he was named a highly-cited researcher in computer science by Thomson Reuters. He received a Parents Recognition Award from UNL Parent's Association in 2016. He is an editor in Computer Networks Journal, IEEE Transactions on Wireless Communications, and IEEE Communications Surveys and Tutorials Journal. His current research interests include wireless sensor networks, underground communications, cognitive radio networks, and cyber-physical networks.

# Technical Program Overview

## August 1 (Monday)

| 7:30 | Registration desk is open(in front of Naupaka rooms).<br>Continental Breakfast (Naupaka 4) | | | |
|---|---|---|---|---|
| 8:30 - 8:50 | Opening Remarks<br>Room: Naupaka 5/6/7 | | | |
| 8:50 - 10:20 | Keynote I: The Limitations of Machine Learning in Adversarial Settings<br>Speaker: Patrick McDaniel (The Pennsylvania State University)<br>Room: Naupaka 5/6/7 | | | |
| 10:20-10:40 | Coffee break(Naupaka 4) | | | |
| 10:40-12:20 | Session 1 | Cognitive Radio Networks (4) Naupaka1 | Wireless Multimedia Streaming (4) Naupaka2 | Cloud Computing (4) Naupaka3 | Invited Session VII (3) Naupaka 5/6/7 |
| 12:20 - 13:30 | Lunch hours | | | |
| 13:30 - 15:00 | Panel I: Emerging Research Challenges in the Era of IOT<br>Moderator:Kui Ren (SUNY Buffalo)<br>Panelists: Jiangchuan Liu (Simon Fraser University), Tommaso Melodia (Northeastern University), Matteo Rinaldi (Northeastern University), Aaron Striegel (University of Notre Dame), Jie Wu (Temple University)<br>Room: Naupaka 5/6/7 | | | |
| 15:00 - 15:20 | Coffee break(Naupaka 4) | | | |
| 15:20- 17:00 | Session 2 | Mobile Cloud Computing (4) Naupaka1 | Big Data Computing (4) Naupaka 2 | Invited Session I(4) Naupaka 3 | Invited Session VIII(4) Naupaka 5/6/7 |

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|---|---|
| 18:00 - 20:00 | Reception (Paniolo Terrace) |

| August 2 (Tuesday) |
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|---|---|
| 8:00 | Registration desk is open(in front of Naupaka rooms). <br> Continental Breakfast (Naupaka 4) |

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|---|---|
| 8:30-10:00 | Keynote II: Remember the Uplink: Hidden Costs and Solutions for Lagging Uplink WLAN Capabilities <br> Speaker: Edward Knightly (Rice University) <br> Room: Naupaka 5/6/7 |

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|---|---|
| 10:00-10:20 | Coffee break(Naupaka 4) |

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|---|---|---|---|---|
| 10:20-12:00 | Session 3 | Mobile Computing (4) Naupaka1 | Software-Defined Networking (4) Naupaka2 | Invited Session II(4) Naupaka 3 |

| | |
|---|---|
| 12:00 - 13:30 | Lunchhours |

| | |
|---|---|
| 13:30 - 15:00 | Panel II: Challenges in Big Data and Cloud Computing <br> Moderator:Min Song (Michigan Technological University) <br> Panelists: Krishna Kant  (Temple University), Hong Jiang (University of Texas at Arlington), Hui Zang (Huawei, USA), Mehmet Can Vuran (University of Nebraska-Lincoln) <br> Room: Naupaka 5/6/7 |

| | |
|---|---|
| 15:00 - 15:20 | Coffee break(Naupaka  4) |

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|---|---|---|---|---|
| 15:20-17:00 | Session 4 | Information Centric Networks(4) Naupaka1 | Internet of Things (4) Naupaka2 | Invited Session III(3) Naupaka3 |

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|---|---|
| 18:00 –18:35 | Banquet Talk: "Application Driven Network: From Network Engineering to Network Science", Nicholas Zhang, Huawei Future Network Theory Lab., Naupaka 5/6/7 |

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|---|---|---|---|---|
| 18:40-20:30 | Banquet, Naupaka Lawn | | | |

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| **August 3 (Wednesday)** | |

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|---|---|
| 8:00 | Registration desk is open(in front of Naupaka rooms). Continental Breakfast (Naupaka 4) |

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|---|---|
| 8:30 - 10:00 | Keynote III: Fair Scheduling in Cloud Datacenters with Multiple Resource Types<br>Speaker: Baochun Li (University of Toronto)<br>Room: Naupaka 5/6/7 |

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|---|---|
| 10:00-10:20 | Coffee break(Naupaka 4) |

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|---|---|---|---|---|
| 10:20-12:00 | Session 5 | Security, Privacy, and Trust: I(4) Naupaka 1 | Network Management and Reliability(4) Naupaka2 | Invited Session IV(4) Naupaka3 |

| | |
|---|---|
| 12:00 - 13:30 | Lunch hours |

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|---|---|---|---|---|---|
| 13:30- 15:10 | Session 6 | Security, Privacy, and Trust: II (3) Naupaka1 | Social Networks and Computing (4) Naupaka2 | Invited Session V(4) Naupaka3 | MAC (4) Naupaka 5/6/7 |

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|---|---|
| 15:10 - 15:30 | Coffee break(Naupaka 4) |

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|---|---|---|---|---|---|
| 15:30- 17:10 | Session 7 | Sensor, Ad Hoc networks | Cellular and WLAN (4) Naupaka2 | Invited Session VI (3) | Network Modeling (4) Naupaka |

| | | (4) Naupaka1 | | Naupaka3 | 5/6/7 |
|---|---|---|---|---|---|

# Technical Program

## August 1 (Monday)

### 8:50-10:20

**Keynote I: The Limitations of Machine Learning in Adversarial Settings**

Speaker: Patrick McDaniel (The Pennsylvania State University)
Chair: Aaron Striegel (University of Notre Dame)
Room: Naupaka 5/6/7

### 10:40-12:20

**Session 1: Cognitive Radio Networks**

Chair: Haiying Shen(Clemson University)
Room: Naupaka1

- **Truthful Online Double Auctions with Real-time Stochastic Arrival of Demand and Supply**
  Chowdhury Sayeed Hyder (Michigan State University), Thomas D. Jeitschko (Michigan State University), Li Xiao (Michigan State University)

- **Bid and Time Strategyproof Online Spectrum Auctions with Dynamic User Arrival and Dynamic Spectrum Supply**
  Chowdhury Sayeed Hyder (Michigan State University), Thomas D. Jeitschko (Michigan State University), Li Xiao (Michigan State University)

- **High-Order Hidden Bivariate Markov Model: A Novel Approach on Spectrum Prediction**
  Yanxiao Zhao (South Dakota School of MinesTechnology), Zhiming Hong (South Dakota School of MinesTechnology), Guodong Wang (South Dakota School of MinesTechnology), Jun Huang (Chongqing University of Posts and Telecommunications)

- **CII: A Light-weight Mechanism for ZigBee Performance Assurance under WiFi Interference**
  Junyu Hu (Dalian University of Technology), Zhenquan Qin (Dalian University of Technology), Yingxiao Sun (Dalian University of Technology), Bingxian Lu (Dalian University of Technology), Lei Wang (Dalian University of Technology), Lei Shu (Guangdong University of Petrochemical Technology)

**Session 1: Wireless Multimedia Streaming**

Chair: Yong Cui(Tsinghua University)
Room: Naupaka 2

- **Understanding the Power of Smartrouter-based Peer CDN for Video Streaming**
  Ming Ma (Tsinghua University), Zhi Wang (Graduate School at Shenzhen (Tsinghua University), Ke Su (Tsinghua University), Lifeng Sun (Tsinghua University)

- **On the Understanding of User Behaviors Over Multiple Video Content Providers**

Chuhan Gao (Tsinghua University), Xu Zhang (Rice University), Yong Li (Tsinghua University), Nishanth Sastry (King's College London)

- **Enhancing Industrial Video Surveillance over Wireless Mesh Networks**
Chaofan Yang (Tsinghua University), Chenshu Wu (Tsinghua University), Zheng Yang (Tsinghua University), Tongtong Liu (Tsinghua University), Zuwei Yin (Tsinghua University), Yunhao Liu (Tsinghua University), Xufei Mao (Tsinghua University)

- **ELBA: Efficient Layer Based routing Algorithm in SDN**
Ankit Gangwal (Malaviya National Institute of Technology), Megha Gupta (Malaviya National Institute of Technology), Manoj Singh Gaur (Malaviya National Institute of Technology), Vijay Laxmi (Malaviya National Institute of Technology), Mauro Conti (University of Padua)

## Session 1: Cloud Computing

Chair: Jiangchuan Liu(Simon Fraser University)
Room: Naupaka 3

- **Consensus in the Cloud: Paxos Systems Demystified**
Ailidani Ailijiang (University at Buffalo, SUNY), Aleksey Charapko (University at Buffalo, SUNY), Murat Demirbas (University at Buffalo, SUNY)

- **Network-Aware Virtual Request Partitioning Based on Spectral Clustering**
Lingnan Gao (North Carolina State University), George N. Rouskas (North Carolina State University)

- **Tasklets: "Better than Best-Effort" Computing**
Dominik Schäfer (University of Mannheim), Janick Edinger (University of Mannheim),

Sebastian VanSyckel (University of Mannheim), Justin Mazzola Paluska (MIT (CSAIL), Christian Becker (University of Mannheim)

- **Models for Evaluating Effective Throughputs for File Transfers in Mobile Computing**
Armen Dzhagaryan (The University of Alabama in Huntsville), Aleksandar Milenković (The University of Alabama in Huntsville)

## Session 1: Invited Session VII

Chair: Ke Xu(Tsinghua University)
Room: Naupaka 5/6/7

- **AMuSe: Adaptive Multicast Services to Very Large Groups - Project Overview**
Yigal Bejerano (Bell Labs), Varun Gupta (Columbia University), Craig Gutterman (Columbia University), Gil Zussman (Columbia University)

- **A Coin-Operated SDX**
James Griffioen (University of Kentucky), Tilman Wolf (University of Massachusetts Amherst), Kenneth L. Calvert (University of Kentucky)

- **Unidirectional Quorum-based Cycle Planning for Efficient Resource Utilization and Fault-Tolerance**
Cory J. Kleinheksel (Iowa State University), Arun K. Somani (Iowa State University)

## 13:30-15:00

### Panel I: Emerging Research Challenges in the Era of IOT

Moderator: Kui Ren (SUNY Buffalo)
Room: Naupaka 5/6/7
Panelists:
- Jiangchuan Liu (Simon Fraser University)
- Tommaso Melodia (Northeastern University)

- Matteo Rinaldi (Northeastern University)
- Aaron Striegel (University of Notre Dame)
- Jie Wu (Temple University)

## 15:20-17:00

### Session 2: Mobile Cloud Computing

Chair: Kui Wu(University of Victoria)
Room: Naupaka1

- **Stateless Gateways - Reducing Cellular Traffic for Event Distribution in Mobile Social Applications**
  Bjoern Richerzhagen (TU Darmstadt), Nils Richerzhagen (TU Darmstadt), Sophie Schoenherr (TU Darmstadt), Rhaban Hark (TU Darmstadt), Ralf Steinmetz (TU Darmstadt)

- **Limiting the Footprint of Monitoring in Dynamic Scenarios through Multi-dimensional Offloading**
  Nils Richerzhagen (TU Darmstadt), Björn Richerzhagen (TU Darmstadt), Rhaban Hark (TU Darmstadt), Dominik Stingl (TU Darmstadt), Ralf Steinmetz (TU Darmstadt)

- **Coordinate Transmissions Centrally: A Cross-Layer Approach for WLANs**
  Junmei Yao (The Hong Kong Polytechnic University), Chao Yang (The Hong Kong Polytechnic University), Wei Lou (The Hong Kong Polytechnic University)

- **Towards Cloud-based Crowd-augmented Spectrum Mapping for Dynamic Spectrum Access**
  Prabhu Janakaraj (Wichita State University), Pu Wang (Wichita State University), Zheng Chen (Wichita State University)

### Session 2: Big Data Computing

Chair: Murat Demirbas(University at Buffalo, SUNY)

Room: Naupaka 2

- **Profiling Optimization for Big Data Transfer Over Dedicated Channels**
  Daqing Yun (New Jersey Institute of Technology), Chase Q. Wu (New Jersey Institute of Technology), Nageswara S.V. Rao (Oak Ridge National Laboratory), Qiang Liu (Oak Ridge National Laboratory), Rajkumar Kettimuthu (Argonne National Laboratory), Eun-Sung Jung (Argonne National Laboratory)

- **Towards Minimal Tardiness of Data-intensive Applications in Heterogeneous Networks**
  Tong Li (Tsinghua University), Ke Xu (Tsinghua University), Meng Sheng (Beijing Institute of Technology), Haiyang Wang (University of Minnesota at Duluth), Kun Yang (University of Essex), Yuchao Zhang (Tsinghua University)

- **OPERA: Opportunistic and Efficient Resource Allocation in Hadoop YARN by Harnessing Idle Resources**
  Yi Yao (Northeastern University), Han Gao (Northeastern University), Jiayin Wang (University of Massachusetts Boston), Ningfang Mi (Northeastern University), Bo Sheng (University of Massachusetts Boston)

- **Optimizing MapReduce Framework through Joint Scheduling of Overlapping Phases**
  Huanyang Zheng (Temple University), Ziqi Wan (Temple University), Jie Wu (Temple University)

### Session 2: Invited Session I

Chair: Tommaso Melodia(Northeastern University)
Room: Naupaka 3

- **Programming Large-Scale Multi-Robot System with Timing Constraints**
  Shan Jiang (The Hong Kong Polytechnic University), Jiannong Cao (The Hong Kong

Polytechnic University), Yang Liu (The Hong Kong Polytechnic University), Jinlin Chen (The Hong Kong Polytechnic University), Xuefeng Liu (The Hong Kong Polytechnic University)

- **Copula Analysis of Latent Dependency Structure for Collaborative Auto-scaling of Cloud Services**
Kui Wu (University of Victoria), Fang Dong (University of Victoria), Venkatesh Srinivasan (University of Victoria), Jianping Wang (City University of Hong Kong)

- **Tailor: Trimming Coflow Completion Times in Datacenter Networks**
Jingjie Jiang (Hong Kong University of Science and Technology), Shiyao Ma (Hong Kong University of Science and Technology), Bo Li (Hong Kong University of Science and Technology), Baochun Li (University of Toronto)

- **PhoneHome: Robust Extension of Cellular Coverage**
Paul Schmitt (University of California, Santa Barbara), Daniel Iland (University of California, Santa Barbara), Elizabeth Belding (University of California, Santa

Barbara), Mariya Zheleva (University at Albany, SUNY)

## Session 2: Invited Session VIII

Chair: Kui Ren(SUNY Buffalo)
Room: Naupaka 5/6/7

- **Adaptive Latency-Aware Query Processing on Encrypted Data for the Internet of Things**
Reshma Kotamsetty (Iowa State University), Manimaran Govindarasu (Iowa State University)

- **TCP Inigo: Ambidextrous Congestion Control**
Andrew G. Shewmaker (UC Santa Cruz), Carlos Maltzahn (UC Santa Cruz), Katia Obraczka (UC Santa Cruz), Scott Brandt (UC Santa Cruz), John Bent (Seagate Government Solutions)

- **Security and Privacy in Public IoT Spaces**
Albert F. Harris (University of Illinois at Urbana-Champaign), Hari Sundaram (University of Illinois at Urbana-Champaign), Robin Kravets (University of Illinois at Urbana-Champaign)

## August 2 (Tuesday)

### 8:30-10:00

**Keynote II: Remember the Uplink: Hidden Costs and Solutions for Lagging Uplink WLAN Capabilities**

Speaker: Edward Knightly (Rice University)
Chair: Tommaso Melodia (Northeastern University)
Room: Naupaka 5/6/7

### 10:20-12:00

**Session 3: Mobile Computing**

Chair: Wei Yu(Towson University)
Room: Naupaka 1

- **RoadAware: Learning Personalized Road Information on Daily Routes with Smartphones**
  Kang Chen (Southern Illinois University), Haiying Shen (Clemson University)

- **We Know What You are doing or going to do: Towards Accurate Human Activities Sensing**
  Yulong Gu (Tsinghua Univeristy), Mengjia Feng (University of Tsukuba), Yuan Yao (Tsinghua Univeristy), Weidong Liu (Tsinghua Univeristy), Jiaxing Song (Tsinghua Univeristy)

- **DroidRevealer: A Kernel Level Real-time Behavior Analysis Method for Android Application**
  Hao Ruan (Nanjing University), Xiao Fu (Nanjing University), Xiaojiang Du (Temple University), Bin Luo (Nanjing University)

- **Tracking Synchronous Gestures with WiFi**
  Zimu Zhou (Tsinghua University), Zheng Yang (Tsinghua University), Kun Qian (Tsinghua University), Chenshu Wu (Tsinghua University), Longfei Shangguan

(Princeton University), Han Xu University of Science Technology), Yunhao Liu (Tsinghua University)

**Session 3: Software-Defined Networking**

Chair: Bo Sheng(University of Massachusetts Boston)
Room: Naupaka 2

- **Heavy Hitter Detection and Identification in Software Defined Networking**
  Liang Yang (Victoria University of Wellington), Bryan Ng (Victoria University of Wellington), Winston K.G. Seah (Victoria University of Wellington)

- **Joint Optimization of Flow Latency in Routing and Scheduling for Software Defined Networks**
  Meng Shen (Beijing Institute of Technology), Liehuang Zhu (Beijing Institute of Technology), Mingwei Wei (Beijing Institute of Technology), Qiongyu Zhang (Beijing Institute of Technology), Mingzhong Wang (University of the Sunshine Coast), Fan Li (Beijing Institute of Technology)

- **The Power of Two in Consistent Network Updates: Hard Loop Freedom, Easy Flow Migration**
  Klaus-Tycho Förster (ETH Zurich), Roger Wattenhofer (ETH Zurich)

- **Firebird: Network-aware Task Scheduling for Spark Using SDNs**
  Xin He (University of Massachusetts Amherst), Prashant Shenoy (University of Massachusetts Amherst)

**Session 3: Invited Session II**

Chair: Ningfang Mi(Northeastern University)
Room: Naupaka 3

- **A Secure Data Learning Scheme in Big Data Applications**
  Shengjie Xu (University of Nebraska-Lincoln), Yi Qian (University of Nebraska-Lincoln), Rose Qingyang Hu (Utah State University)

- **ActivityHijacker: Hijacking the Android Activity Component for Sensitive Data**
  Wang Zhaoguo (Harbin Institute of Technology), Chenglong Li (CNCERT/CC), Yi Guan (Harbin Institute of Technology), Yibo Xue (Tsinghua National Lab for Information Sci. & Tech), Yingfei Dong (University of Hawaii)

- **SDNsec: Forwarding Accountability for the SDN Data Plane**
  Takayuki Sasaki (NEC Corporation), Christos Pappas (ETH Zurich), Taeho Lee (ETH Zurich), Torsten Hoefler (ETH Zurich), Adrian Perrig (ETH Zurich)

- **Enhancing Network Security through Software Defined Networking (SDN)**
  Seungwon Shin (KAIST), Lei Xu (Texas A&M University), Sungmin Hong (Texas A&M University), Guofei Gu (Texas A&M University)

## 13:30-15:00

### Panel II: Research Challenges in Big Data and Cloud Computing

Moderator: Min Song (Michigan Technological University)
Room: Naupaka 5/6/7
Panelists:
- Krishna Kant  (Temple University)
- Hong Jiang (University of Texas at Arlington)
- Hui Zang (Huawei, USA)
- Mehmet Can Vuran (University of Nebraska-Lincoln)

## 15:20-17:00

### Session 4: Information Centric Networks

Chair: Yigal Bejerano(Bell Labs)
Room: Naupaka 1

- **Hash-based Overlay Routing Architecture for Information Centric Network**
  Aytac Azgin (Huawei Research Center), Ravishankar Ravindran (Huawei Research Center), Guo-Qiang Wang (Huawei Research Center)

- **Not So Far: Improving Autonomous Content Discovery within Mobile Pedestrian Crowds**
  Juan Antonio Cordero (The Hong Kong Polytechnic University), Wei Lou (The Hong Kong Polytechnic University)

- **Modeling and Performance Analysis of Information-Centric Networks**
  Venkatesh Ramaswamy (The MITRE Corporation)

- **Fetching Popular Data from the Nearest Replica in NDN**
  Jianxun Cao (Tsinghua University), Dan Pei (Tsinghua University), Xiaoping Zhang (Tsinghua University), Beichuan Zhang (University of Arizona), Youjian Zhao (Tsinghua University)

### Session 4: Internet of Things

Chair: Dimitrios Koutsonikolas (University at Buffalo, SUNY)
Room: Naupaka 2

- **Impacts of Soil Type and Moisture on the Capacity of Multi-Carrier Modulation in Internet of Underground Things**
  Abdul Salam (University of Nebraska-Lincoln), Mehmet C. Vuran (University of Nebraska-Lincoln)

- **Active Profiling of Physical Devices at Internet Scale**
  Xuan Feng (Chinese Academy of Sciences), Qiang Li (Beijing Jiaotong University), Qi Han (Colorado School of Mines, Golden), Hongsong Zhu (Chinese Academy of Sciences), Yan Liu (Peking Universit), Jie Cui (China General Technology Research Institute), Limin Sun (Chinese Academy of Sciences)

- **Dependability Analysis of Asynchronous Radio Duty Cycling Protocols**
  Salih Serdar Guclu (Eindhoven University of Technology), Tanir Ozcelebi (Eindhoven University of Technology), Johan J. Lukkien (Eindhoven University of Technology)

- **Energy-Aware Trajectory Planning for the Localization of Mobile Devices Using an Unmanned Aerial Vehicle**
  Oleksandr Artemenko (Technische Universität Ilmenau), Omachonu Joshua Dominic (Technische Universität Ilmenau), Oleksandr Andryeyev (Technische Universität Ilmenau), Andreas Mitschele-Thiel (Technische Universität Ilmenau)

## Session 4: Invited Session III

Chair: Manimaran Govindarasu(Iowa State University)
RoomNaupaka 3

- **Secure Fine-Grained Access Control of Mobile User Data through Untrusted Cloud**
  Kai Zhou (Michigan State University), Jian Ren (Michigan State University)

- **Security Analysis of TUAK Algorithm Set for 4G-LTE Authentication and Key Agreement**
  Yin Tan (University of Waterloo), Kalikinkar Mandal (University of Washington), Teng Wu (University of Waterloo), Guang Gong (University of Waterloo)

- **An Efficient Remote Authentication Scheme Using Dynamic Usernames**
  Abdulrahman Alhothaily (The George Washington University), Chunqiang Hu (The George Washington University), Arwa Alrawais (The George Washington University), Tianyi Song (The George Washington University), Xiuzhen Cheng (The George Washington University), Dechang Chen (Uniformed Services University of the Health Sciences)

## August 3 (Wednesday)

## 8:30-10:00

### Keynote III: Fair Scheduling in Cloud Datacenters with Multiple Resource Types

Speaker: Baochun Li (University of Toronto)
Chair: Kui Ren (SUNY Buffalo)
Room: Naupaka 5/6/7

## 10:20-12:00

### Session 5: Security, Privacy, and Trust: I

Chair: Yongbin Zhou(Chinese Academy of Sciences)
Room: Naupaka 1

- **Trust in Information-Centric Networking: From Theory to Practice**
Christian Tschudin (University of Basel), Ersin Uzun (PARC), Christopher Wood (UC Irvine)

- **Source Authentication and Path Validation in Networks Using Orthogonal Sequences**
Hao Cai (University of Massachusetts Amherst), Tilman Wolf (University of Massachusetts Amherst)

- **Hilbert Transform based Vertical Preprocessing for Side-Channel Analysis**
Yuchen Cao (Chinese Academy of Sciences), Yongbin Zhou (Chinese Academy of Sciences), Hailong Zhang (Chinese Academy of Sciences), Wei Yang (Chinese Academy of Sciences)

- **The Highly Insidious Extreme Phishing Attacks**
Rui Zhao (Colorado School of Mines, Golden), Samantha John (University of Colorado Colorado Springs), Stacy Karas (University of Colorado Colorado Springs), Cara Bussell (University of Colorado Colorado Springs), Jennifer Roberts (University of Colorado Colorado Springs), Daniel Six (University of Colorado Colorado Springs), Brandon Gavett (University of Colorado Colorado Springs), Chuan Yue (Colorado School of Mines, Golden)

### Session 5: Network Management and Reliability

Chair: Phone Lin(National Taiwan University)
Room: Naupaka 2

- **A Generic Mitigation Framework against Cross-VM Covert Channels**
Wen Qi (City University of Hong Kong), Jin Wang (Soochow University), Hermine Hovhannisyan (City University of Hong Kong), Kejie Lu (University of Puerto Rico at Mayaguez), Jianping Wang (City University of Hong Kong), Junda Zhu (University of Macau)

- **ESet: Placing Data towards Efficient Recovery for Large-scale Erasure-Coded Storage Systems**
Chengjian Liu (Hong Kong Baptist University), Xiaowen Chu (Hong Kong Baptist University), Hai Liu (Hong Kong Baptist University), Yiu-Wing Leung (Hong Kong Baptist University)

- **Denial-of-Service Prevention for Software-Defined Network Controllers**
Tilman Wolf (University of Massachusetts Amherst), Jingrui Li (University of Massachusetts Amherst)

- **Distributed Faulty Node Detection in DTNs**
Wenjie Li (CNRS-CentraleSupelec-Université Paris-Sud), Laura Galluccio (University of Catania), Michel Kieffer (CNRS-CentraleSupelec-Université Paris-Sud), Francesca Bassi (CNRS-

CentraleSupelec-Université Paris-Sud; ESME-Sudria)

## Session 5: Invited Session IV

Chair: Jian Ren(Michigan State University)
Room: Naupaka 3

- **Voice Pattern Hiding for VoIP Communications**
  Jialue Fang (Iowa State University), Ye Zhu (Cleveland State University), Yong Guan (Iowa State University)

- **Secure and Connected Telehealth Approach to Mitigating Concussion Risks in Student Athletes**
  Matthew Morrison (University of Mississippi), George Humphrey (University of Mississippi), John Daigle (University of Mississippi), John Ralston (X2 Biosystems), Jason Thibado (X2 Biosystems), Andreas Ralston (X2 Biosystems)

- **Data Aggregation based on Canonical Correlation Analysis in Deadline-Constrained Wireless Sensor Networks**
  Yan Wu (Southwest University), Songtao Guo (Southwest University), Yuanyuan Yang (Stony Brook University), Xiaofeng Liao (Southwest University)

- **Ultra-Dense Networks: State of the Art and Future Directions**
  Wei Yu (Towson University), Hansong Xu (Towson University), Hanlin Zhang (Towson University), David Griffith (National Institute of Standards Technology), Nada Golmie (National Institute of Standards Technology)

## 13:30-15:10

## Session 6: Security, Privacy, and Trust: II

Chair: Chunyi Peng(The Ohio State University)
Room: Naupaka 1

- **Malware Variant Detection using Opcode Image Recognition with Small Training Sets**
  Jixin Zhang (Hunan University), Zheng Qin (Hunan University), Hui Yin (Hunan University), Lu Ou (Hunan University), Sheng Xiao (Hunan University), Yupeng Hu (Hunan University)

- **A Gaussian-Mixture Model Based Detection Scheme against Data Integrity Attacks in the Smart Grid**
  Xinyu Yang (Xi'an Jiaotong University), Xialei Zhang (Xi'an Jiaotong University), Jie Lin (Xi'an Jiaotong University), Wei Yu (Towson University), Peng Zhao (Xi'an Jiaotong University)

- **Process Behavior Monitoring via API Hooking Using Virtualization**
  Jieyong Yang (HUST), Weizhong Qiang (HUST), Hai Jin (HUST), Kan Hu (HUST)

## Session 6: Social Networks and Computing

Chair: Xiaowen Chu(Hong Kong Baptist University)
Room: Naupaka 2

- **Minimizing the Subscription Aggregation Cost in the Content-based Pub/Sub System**
  Ning Wang (Temple University), Jie Wu (Temple University)

- **A New Mobile Online Social Network based Location Sharing with Enhanced Privacy Protection**
  Junggab Son (Kennesaw State University), Donghyun Kim (Kennesaw State University), Rahman Tashakkori (Appalachian State University), Alade O. Tokuta (North Carolina Central University), Heekuck Oh (Hanyang University)

- **We Know Where You Are: Home Location Identification in Location-Based Social Networks**
  Yulong Gu (Tsinghua Univeristy), Yuan Yao (Tsinghua Univeristy), Weidong Liu (Tsinghua Univeristy), Jiaxing Song (Tsinghua Univeristy)

- **Relationship Privacy Leakage in Network Traffics**
  Jie Hu (Tsinghua University), Chuang Lin (Tsinghua University), Xiangyang Li (University of Science Technology of China)

## Session 6: Invited Session V

Chair:Yingfei Dong(University of Hawaii)
RoomNaupaka: 3

- **Power-Aware Wireless Transmission for Computation Offloading in Mobile Cloud**
  Lei Zhang (Simon Fraser University), Cong Zhang (Simon Fraser University), Jiangchuan Liu (Simon Fraser University), Xiaowen Chu (Hong Kong Baptist University), Ke Xu (Tsinghua University), Haiyang Wang (University of Minnesota at Duluth), Yong Jiang (Tsinghua University)

- **EDASH: Energy-Aware QoE Optimization for Adaptive Video Delivery over LTE Networks**
  Jian Song (Tsinghua University), Yong Cui (Tsinghua University), Zongpeng Li (University of Calgary), Yayun Bao (Beijing University of Posts and Telecommunications), Lanshan Zhang (Beijing University of Posts and Telecommunications), Yangjun Zhang (Tsinghua University)

- **A Connection-Driven Mechanism for Energy Saving of Small-Cell Networks**
  En-Hau Yeh (National Taiwan University), Phone Lin (National Taiwan University), Yi-Bing Lin (National Chiao Tung University), Chia-Peng Lee (National Taiwan University)

- **Long-term Renewable Energy Usage Maximization in a Microgrid**
  Tong Liu (Shanghai Jiao Tong University), Yanmin Zhu (Shanghai Jiao Tong University), Hongzi Zhu (Shanghai Jiao Tong University), Jiadi Yu (Shanghai Jiao Tong University), Yuanyuan Yang (Stony Brook University), Fan Ye (Stony Brook University)

## Session 6: MAC

Chair: Waltenegus Dargie(Technical University Dresden)
Room: Naupaka 5/6/7

- **Uncoordinated MAC for Adaptive Multi-Beam Directional Networks: Analysis and Evaluation**
  Greg Kuperman (MIT Lincoln Laboratory), Robert Margolies (MIT Lincoln Laboratory), Nathaniel M. Jones (MIT Lincoln Laboratory), Brian Proulx (MIT Lincoln Laboratory), Aradhana Narula-Tam (MIT Lincoln Laboratory)

- **A Joint Duty Cycle and Network Coding MAC Protocol for Underwater Wireless Sensor Networks**
  Zhenquan Qin (Dalian University of Technology), Yingxiao Sun (Dalian University of Technology), Liang Sun (Dalian University of Technology), Lei Wang (Dalian University of Technology), Wenzhe Zhang (Dalian University of Technology), Bingxian Lu (Dalian University of Technology), Lei Shu (Guangdong University of Petrochemical Technology)

- **Efficient Online Burst Transmission Scheme for Wireless Sensor Networks**
  Zeeshan Ansar (Technical University Dresden), Jianjun Wen (Technical University Dresden), Waltenegus Dargie (Technical University Dresden)

- **Rotatable Sensor Scheduling for Multi-demand of Coverage in Directional Sensor Networks**
  Chong Han (Nanjing University of Posts and Telecommunications; Huaiyin Institute of Technology), Lijuan Sun (Nanjing University of Posts and Telecommunications), Jian Guo (Nanjing University of Posts and Telecommunications), Changchao Chen (Nanjing University of Posts and Telecommunications)

## 15:30-17:10

### Session 7: Sensor, Ad Hoc Networks
Chair: Christian Becker(University of Mannheim)
Room: Naupaka 1

- **A System Architecture for Managing Complex Experiments in Wireless Sensor Networks**
  Jianjun Wen (TU Dresden), Zeeshan Ansar (TU Dresden), Waltenegus Dargie (TU Dresden)

- **On the Feasibility of Distributed Sampling Rate Adaptation in Heterogeneous and Collaborative Wireless Sensor Networks**
  Amitangshu Pal (Temple University), Krishna Kant (Temple University)

- **A Buffer Management Strategy Based on Power-Law Distributed Contacts in Delay Tolerant Networks**
  Tuan Le (UCLA), Haik Kalantarian (UCLA), Mario Gerla (UCLA)

- **ExperimentalAnalysis of the Channel Busy Time in Vehicular Ad-hoc Networks**
  Torsten Lorenzen (Leibniz Universität Hannover)

### Session 7: Cellular and WLAN
Chair: Pu Wang (Wichita State University)

Room: Naupaka 2

- **Demystify Undesired Handoff in Cellular Networks**
  Chunyi Peng (The Ohio State University), Yuanjie Li (University of California, Los Angeles)

- **Reducing State of Openflow Switches in a Mobile Core Network by Flow Rule Aggregation**
  Ramin Khalili (Huawei Technologies, European Research Center, Munich), Wint Yi Poe (Huawei Technologies, European Research Center, Munich), Zoran Despotovic (Huawei Technologies, European Research Center, Munich), Artur Hecker (Huawei Technologies, European Research Center, Munich)

- **A Feasibility Study of 60 GHz Indoor WLANs**
  Swetank Kumar Saha (University at Buffalo, The State University of New York), Viral Vijay Vira (University at Buffalo, The State University of New York), Anuj Garg (University at Buffalo, The State University of New York), Dimitrios Koutsonikolas (University at Buffalo, The State University of New York)

- **Characterizing the Effect of Channel Estimation Error on Distributed Reception with Hard Decision Exchanges**
  Sabah Razavi (Worcester Polytechnic Institute), Donald Richard Brown III (Worcester Polytechnic Institute)

### Session 7: Invited Session VI
Chair: Tilman Wolf(University of Massachusetts Amherst)
Room:Naupaka 3

- **Cooperative Discovery of Personal Places from Location Traces**

Sudip Vhaduri (University of Notre Dame), Christian Poellabauer (University of Notre Dame)

- **Optimizing Downloads over Random Duration Links in Mobile Networks**
Amber Bhargava (USC), Spencer Congero (USC), Timothy Ferrell (USC), Alex Jones (UCSB), Leo Linsky (USC), Jayashree Mohan (NITK), Bhaskar Krishnamachari (USC)

- **IP Address Consolidation and Reconfiguration In Enterprise Networks**
Ibrahim El-Shekeil (Temple University), Amitangshu Pal (Temple University), Krishna Kant (Temple University)

## Session 7: Network Modeling

Chair: Kewei Sha(University of Houston - Clear Lake)
Room: Naupaka 5/6/7

- **A Simpler Constant Factor Approximation for The k-connected m-domination Set Problem in Unit Disk Graph**

Bei Liu (Xi'an Jiaotong University), Wei Wang (Xi'an Jiaotong University), Donghyun Kim (North Carolina Central University), Yingshu Li (Georgia State University), Sung-Sik Kwon (North Carolina Central University)

- **Learning Network Graph of SIR Epidemic Cascades Using Minimal Hitting Set based Approach**
Zhuozhao Li (Clemson University), Haiying Shen (Clemson University), Kang Chen (Southern Illinois University)
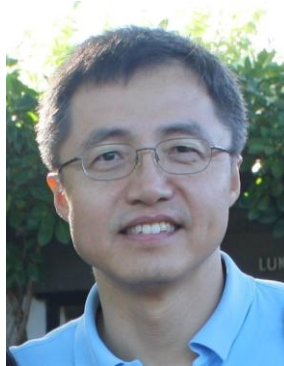
- **Modeling and Understanding Dual-Mode Energy Saving Policy for High-Speed Ethernet**
Jinli Meng (Tsinghua University), Fengyuan Ren (Tsinghua University)

- **Link Scheduling In Cooperative Communication With SINR-Based Interference**
Chenxi Qiu (Clemson University), Haiying Shen (Clemson University)

# Message from the Workshop Chair



Welcome to the ICCCN 2016 workshops! The ICCCN workshops focus on state-of-art hot research issues, provide an international platform for broad researchers to discuss, exchange, and share their ideas and results, and show off their ongoing research projects. Especially, these workshops emphasize the current investigation of emerging research topics in computer communications and networks. The workshop committees had the great privilege to work with many researchers across the world and organized four workshops on hot research areas, as follows.

*ContextQoS: International Workshop on Context- aware Performance Engineering for the Internet of Things*

*MobiPST: International Workshop on Privacy, Security, and Trust in Mobile and Wireless Systems*

*NSAA: Workshop on Network Security Analytics and Automation*

*WiMAN: Workshop on Wireless Mesh and Ad-Hoc Networking*

We like to thank all of the workshop organizers for their leadership and hard work in putting together these excellent workshops. Organizing a workshop is a wonderful experience to give back to the research community and requires tremendous efforts. We also like to thank all the workshop committee members and external reviewers for volunteering their precious time to review the papers within a very short period. We are grateful to all the authors for contributing their excellent work to the workshops. Last but not least, we like to thank the ICCCN 2016 General Chair Prof. Aaron Striegel (University of Notre Dame) and the ICCCN 2016 Program Co-Chairs Prof. Kui Ren (SUNY Buffalo) and Prof. Tomasso Melodia (Northeastern University) for their generous support and advising on all aspects of the workshop. Especially, we thank the Steering Committee Chair, Prof. E. K. Park (Kennesaw State University), for his vision and dedication of maintaining ICCCN as a premier international conference.


**Yingfei Dong,** University of Hawaii, USA
ICCCN 2016 Workshop Chair

# Workshop Technical Committees

## MobiPST 2016

**Workshop Program Co-Chairs**
- Zhiwei Wang, Nanjing University of Posts & Telecommunications, China
- Abhishek Parakh, University of Nebraska at Omaha, USA

**Technical Program Committee**
- Atsuko Miyaji, Japan Advanced Institute of Science and Technology
- Parag Rughani, IFS, Gujarat Forensic Sciences University
- Wenjia Li, New York Institute of Technology
- Weichao Wang, UNC-Charlotte
- William Mahoney, University of Nebraska at Omaha
- Keke Chen, Wright State University
- Wei Cheng, Virginia Commonwealth University
- Siu Ming Yiu, The University of Hong Kong
- Man Ho Au, Hong Kong Polytechnic University
- Jeffrey McDonald, University of South Alabama
- Mike Wittie, Montana State University
- Al-Sakib Khan Pathan, UAP and SEU, Bangladesh/ Islamic University in Madinah, KSA
- Dongwan Shin, New Mexico Tech
- Qianhong Wu, Beihan University
- Chun-I Fan, National Sun Yat-sen University
- Todd Andel, University of South Alabama
- Rashid Saeed, Sudan University of Science & Technology
- Jiankun Hu, UNSW@ADFA
- Rongxing Lu, Nanyang Technological University
- Qiang Tang, University of Luxembourg
- Kewei Sha, University of Houston - Clear Lake

**Steering Committee**
- Kewei Sha, University of Houston - Clear Lake,USA
- Abhishek Parakh, University of Nebraska at Omaha, USA
- Zhiwei Wang, Nanjing University of Posts & Telecommunications, China

## ContextQoS 2016

**Organizing Chairs**
- Dr.-Ing. Patrick-Benjamin Bök, Weidmüller Group, Germany
- Prof. Dr. Nader F. Mir, San Jose State University, USA

- Prof. Dr.-Ing. Dipl.-Wirtsch.-Ing. York Tüchelmann, Ruhr-University Bochum, Germany

**Technical Program Committee**
- PD Dr. Roland Bless, Karlsruhe Institute of Technology, Germany
- Dr.-Ing. Patrick-Benjamin Bök, Weidmüller Group, Germany
- Dr. Ranganai Chaparadza, IPv6Forum, Europe
- Rebecca Copeland, Telecom SudParis, France
- Ph.D. Pablo Alonso García, Vodafone, Spain
- Dr.-Ing. Andreas Hamburg, TÜV Rheinland, Germany
- Ph.D. Evangelia Kalyvianaki, Imperial College London, United Kingdom
- Dr. Markus Köster, Weidmüller Group, Germany
- Prof. Dr. Nader F. Mir, San Jose State University, USA
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- Prof. Dr. Andreas Noack, University of Applied Sciences Stralsund, Germany
- Prof. Jens Myrup Pedersen, Aalborg University, Denmark
- Dr. Tom Pfeifer, TU Berlin, Germany
- Prof. Dr. Jörg Schwenk, Horst-Görtz Institute for IT-Security, Germany
- Andre Westhoff, DB Systel, Germany
- Prof. Dr. Christian Wietfeld, TU Dortmund University, Germany
- Dr. Parviz Yegani, Juniper Networks (CA), USA


## WiMAN 2016

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- Habib Ammari, UMich Dearborn
- Christian Poellabauer, Univ of Notre Dame
- Liqiang Zhang, Indiana Univ South Bend

**Workshop Co-Chairs**
- Shaoen Wu, swu@bsu.edu, Ball State University
- Sherali Zeadally, szeadally@uky.edu, University of Kentucky
- Mohamed Riduan Abid, R.Abid@aui.ma, Al Akhawayn University in Ifrane

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- Mustafa Akbas; University of Central Florida
- Zubair Baig; Edith Cowan University
- Bridget Benson; California Polytechnic State University
- Mohammed Boulmalf; International University of Rabat UIR
- Eduardo Cerqueira; Federal University of Santa Catarina
- Lei Chen; Georgia Southern University
- Qiang Duan; Pennsylvania State University
- Maria Gorlatova; Columbia University

- Guy Grebla; Google Inc.
- Hock Lim; Nanyang Technological University
- Anyi Liu; Indiana University–Purdue University Fort Wayne
- Victoria Manfredi; Raytheon BBN Technologies
- Bing Qi; Methodist University
- Abdelhakim Senhaji; University of Montreal
- Bo Sheng; University of Massachusetts Boston
- Lanny Sitanayah; University College Cork
- Manghui Tu; Purdue University Calumet
- Wei Wang; San Diego State University
- Dalei Wu; University of Tennessee at Chattanooga
- Liang Xiao; Xiamen University
- Hongmei Xie; Seagate Technology
- Kaiping Xue; University of Science and Technology of China
- Qing Yang; Montana State University
- Na Yu; Qualcomm

## NSAA 2016

**Program Chairs**
- Dr. Bill Chu, University of North Carolina at Charlotte, USA
- Dr. Anna Yu, North Carolina A&T State University, USA

**Technical Program Committee**
- Ehab Al-Shaer, University of North Carolina at Charlotte, USA
- Zahid Anwar, University of North Carolinat at Charlotte, USA
- Gerry Dozier, North Carolina A&T State University, USA
- Bill Chu, University of North Carolina at Charlotte, USA  (Co-Chair)
- Huirong Fu, Oakland University, USA
- Donghui Hu, Hefei University of Technology, China
- Hongxin Hu, Clemson University, USA
- Di Ma, Univeristy of Michigan-Dearborn, USA
- Ashiq Rahman, Tennessee Institute of Technology, USA
- Jason Watson, University of Northern Alabama, USA
- Jing Xie, FireEye, USA
- Anna Yu, North Carolina A&T State University, USA (Co-Chair)
- Xianqing Yu, IBM, USA
- Justin Zhan, University of Nevada, Las Vegas, USA
- Jun Zhu, PayPal, USA

# Workshop Program Overview

| August 4 (Thursday) ICCCN 2016 Workshops | | | | | |
|---|---|---|---|---|---|
| 7:30 | Registration desk is open (in front of Naupaka rooms 1/2/3). Continental Breakfast (Naupaka 4) | | | | |
| 8:30 – 10:00 | Session 1 | ContextQoS 1 (Naupaka2) | MobiPST 1 (Naupaka3) | NSAA 1 (Naupaka7) | WiMAN 1 (Naupaka 1) |
| 10:00 – 10:20 | Coffee break(Naupaka Lawn Foyer) | | | | |
| 10:20 – 11:50 | Session 2 | ContextQoS 2 (Naupaka2) | MobiPST 2 (Naupaka3) | NSAA 2 (Naupaka7) | WiMAN 2 (Naupaka1) |
| 11:50 – 13:30 | Lunch hours | | | | |
| 13:30 – 15:00 | | | MobiPST 3 (Naupaka3) | NSAA 3 (Naupaka7) | WiMAN 3 (Naupaka 1) |
| 15:00 – 15:20 | Coffee break(Naupaka Lawn Foyer) | | | | |
| 15:20 – 16:50 | | | | | WiMAN 4 (Naupaka 1) |

# Integrated Workshop Schedule

## Session 1: ContextQoS 1

Chair: Patrick-Benjamin Bök (Weidmüller Group, Germany)
Room: Naupaka 2

- **The State of Simulation Tools for P2P Networks on Mobile Ad-Hoc and Opportunistic Networks**
Ahmad Cheraghi (University of Duesseldorf), Tobias Amft (University of Duesseldorf), Salem Sati (University of Duesseldorf), Philipp Hagemeister (University of Duesseldorf), Kalman Graffi (University of Duesseldorf)

- **Internet-of-Things Based Smart Resource Management System: A Case Study Intelligent Chair System**
Jing Selena He (Kennesaw State University), Amir Atabekov (Kennesaw State University), Hisham M. Haddad (Kennesaw State University)

- **A Survey of Mobile Crowdsensing Techniques: A Critical Component for The Internet of Things**
Jinwei Liu (Clemson University), Haiying Shen (Clemson University), Xiang Zhang (Clemson University)

## Session 1: MobiPST 1

Chair: Abhishek Parakh(University of Nebraska Omaha)
Room: Naupaka 3

- **Lightweight Attribute-based Encryption for the Internet of Things**
Nouha Oualha (CEA, LIST)

- **Leakage-Resilient Key-Aggregate Cryptosystem with Auxiliary Input**
Zhiwei Wang (Nanjing University of Posts and Telecommunications), Lingyu Zhou (Nanjing University of Posts and Telecommunications)

- **Trust-based Neighbor Unreachability Detection for RPL**
Sila Ozen Guclu (Eindhoven University of Technology), Tanir Ozcelebi (Eindhoven University of Technology), Johan J. Lukkien (Eindhoven University of Technology)

## Session 1: NSAA 1

Chair: Li Yang (University of Tennessee Chattanooga)
Room: Naupaka 7

- **Adversarial Authorship, Author Webs, and Entropy-Based Evolutionary Clustering**
Siobahn Day (NC A&T State University), James Brown (NC A&T State University), Zachery Thomas (NC A&T State University), India Gregory (NC A&T State University), Lowell Bass (NC A&T State University), Joseph Shelton (NC A&T State University), Gerry Dozier (NC A&T State University)

- **Strategic Cyber Threat Intelligence Sharing: A Case Study of IDS Logs**
Spike Dog (UNCC), Alex Tweed (UNCC), LeRoy Rouse (UNCC), Bill Chu (UNCC), Duan Qi (UNCC), Yueqi Hu (UNCC), Jing Yang (UNCC), Ehab Al-Shaer (UNCC)

- **Identifying the Same Person across Two Social Networks in a Unified Way: Globally and Locally**
Zhongbao Zhang (Beijing University of Posts and Telecommunications), Qihang Gu (Beijing University of Posts and Telecommunications), Sen Su (Beijing University of Posts and Telecommunications), Qiaoyu Deng (Beijing University of Posts and Telecommunications)

## Session 1:WiMAN1

Chair: Siguang Chen(Nanjing University of Posts and Telecommunications)
Room: Naupaka 1

- **DCT Based Adaptive Data Compression in Wireless Sensor Networks**
Siguang Chen (Nanjing University of Posts and Telecommunications), Jincheng Liu (Nanjing University of Posts and Telecommunications), Meng Wu (Nanjing University of Posts and Telecommunications), Zhixin Sun (Nanjing University of Posts and Telecommunications)

- **QAAC: Quality-Assured Adaptive Data Compression for Sensor Data**
Aseel Basheer (University of Baghdad), Kewei Sha (University of Houston - Clear Lake)

- **Analysis of Buffer Management Policies for Opportunistic Networks**
Salem Sati (University of Duesseldorf), Christopher Probst (University of Duesseldorf), Kalman Graffi (University of Duesseldorf)

## Session 2:ContextQoS 2

Chair: Patrick-Benjamin Bök (Weidmüller Group, Germany)
Room: Naupaka 2

- **Message Passing for Analysis and Resilient Design of Self-Healing Interdependent Cyber-Physical Networks**
Ali Behfarnia (Wichita State University), Ali Eslami (Wichita State University)

- **Cooperative Distributed Energy Scheduling for Smart Homes Applying Stochastic Model Predictive Control**

Mehdi Rahmani-andebili (Clemson University), Haiying Shen (Clemson University)

## Session 2: MobiPST 2

Chair: Zhiwei Wang (Nanjing University of Posts & Telecommunications)
Room: Naupaka 3

- **A comprehensive investigation of user privacy leakage to Android applications**
Yuming Ge (China Academy of Telecommunication Research), Bo Deng (Chinese Academy of Sciences), Yi Sun (Chinese Academy of Sciences), Libo Tang (China Academy of Telecommunication Research), Dajiang Sheng (Zhongchuang Telecom), Yantao Zhao (Zhongchuang Telecom), Gaogang Xie (Chinese Academy of Sciences), Kave Salamatian (University of Savoie)

- **Simulating Security of Quantum Protocols Under Channel Error Conditions**
J. Joel Vanbrandwijk (University of Nebraska Omaha), Abhishek Parakh (University of Nebraska Omaha)

- **Enhancement of VPN authentication Using GPS Information with Geo-privacy Protection**
Yong Jin (Tokyo Institute of Technology), Masahiko Tomoishi (Tokyo Institute of Technology), Satoshi Matsuura (Tokyo Institute of Technology)

## Session 2: NSAA 2

Chair: Mohd Anwar (North Carolina A&T State University)
Room: Naupaka 7

- **High-Performance Intrusion Response Planning on Many-Core Architectures**
Stefano Iannucci (Mississippi State University), Qian Chen (Savannah State

University), Sherif Abdelwahed (Mississippi State University)

- **Picture PassDoodle: An Authentication Alternative to Text Passwords**
  Oliver Nichols (University of Tennessee at Chattanooga), Li Yang (University of Tennessee at Chattanooga)

## Session 2: WiMAN 2

Chair: Siguang Chen(Nanjing University of Posts and Telecommunications)
Room: Naupaka 1

**Topic: Routing**

- **Cooperative Routing via Overlapping Coalition Formation Game in Cognitive Radio Networks**
  Chowdhury Hyder (Michigan State University), Li Xiao (Michigan State University)

- **Diamond-Shaped Mesh Network Routing with Cross-Layer Design to Explore the Benefits of Multi-Beam Smart Antennas**
  Ke Bao (University of Alabama), Fei Hu (Univ of Alabama), Sunil Kumar (San Diego State University)

- **Novel Energy-balanced Routing Method Based on VPF**
  Zhen Ma (Tianjin University of Technology), Degan Zhang (Tianjin University of Technology), Wenbin Li (Tianjin University of Technology), Si Liu (Tianjin University of Technology)

## Session 3: MobiPST 3

Chair: Kewei Sha (University of Houston - Clear Lake)
Room: Naupaka 3

- **Foundations for Cyber Zone Defense**
  Robert Mitchell (Sandia National Laboratories), Paul Sery (Sandia National Laboratories), Tom Klitsner (Sandia National Laboratories)

- **A Comprehensive Analysis of Packet Loss in MANETs**
  Muhammad Saleem Khan (COMSATS Institute of Information Technology), Saira Waris (COMSATS Institute of Information Technology), Idrees Ahmed (COMSATS Institute of Information Technology), Majid Iqbal Khan (COMSATS Institute of Information Technology)

## Session 3: NSAA 3

Chair: Stefano Iannucci(Mississippi State University)
Room: Naupaka 7

- **An Evolutionary General Regression Neural Network Classifier for Intrusion Detection**
  James Brown (North Carolina A&T State University), Mohd Anwar (North Carolina A&T State University), Gerry Dozier (North Carolina A&T State University)

- **Behavioral Modeling Intrusion Detection System (BMIDS) using Internet of Things (IoT) Behavior-based Anomaly Detection via Immunity-inspired Algorithms**
  Rahmira Rufus (North Carolina A&T State University), Albert Esterline (North Carolina A&T State University), Briana Arrington (North Carolina A&T State University), Liesa Barnett (North Carolina A&T State University)

- **Advertisement Networks and Violation of AndroidUser Privacy**
  Eralda Caushaj (Lawrence Technological University), Huirong Fu (Oakland University), Rahul Chandrashekar (Lawrence Technological University), Sai Praveen (Lawrence Technological University), Ishwar Sethi (Oakland University), Ye Zhu (Cleveland State University), Ivan Ivanov (Empire State College)

Andreas Mitschele-Thiel (Ilmenau University of Technology)

## Session 3: WiMAN 3

Chair: Oleksandr Andryeyev(Ilmenau University of Technology)
Room:Naupaka 1

**Topic: Emerging Networks**

- **WiFO: Hybrid WiFi and Free-Space Optical Communication System with PAM Optimal Decoding**
  Yu-Jung Chu (Oregon State University), Thinh Nguyen (Oregon State University), Zachary Stark (Oregon State University)

- **Design and Implementation Principles for the mmWave based Pre-5G UE Layer 2/3 Protocol Stack**
  Nak Woon Sung (ETRI), Yong Seouk Choi (ETRI)

- **SkySAIL: a Flexible Software-Defined Radio Enabled Micro Aerial Vehicle**
  Oleksandr Andryeyev (Ilmenau University of Technology), Alina Rubina (Ilmenau University of Technology), Oleg Golokolenko (Ilmenau University of Technology), Oleksandr Artemenko (Ilmenau University of Technology),

## Session 4: WiMAN 4

Chair: Xiaojun Yuan(ShanghaiTech University)
Room: Naupaka 1

**Topic: Network Performance**

- **Performance Analysis of a Hop-by-hop Relay Selection Strategy in Multi-hop Networks**
  Hui Sun (Louisiana State University), Mort Naraghi-Pour (Louisiana State University)

- **Performance of Opportunistic Distributed RF Operations in Uncertain and Challenged Network Environments**
  David Shur (Applied Communication Sciences), Yow-Jian Lin (Applied Communication Sciences), Anthony McAuley (Applied Communication Sciences), John Chapin (DARPA)

- **Throughput Bounds for Training-Based Multiuser MIMO Systems**
  Congmin Fan (The Chinese University of Hong Kong), Xiaojun Yuan (ShanghaiTech University), Ying Jun Zhang (The Chinese University of Hong Kong)

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