2015 24th International Conference on Computer Communication and Networks (ICCCN 2015)

Las Vegas, Nevada, USA
3-6 August 2015

August 3 (Monday) 8:50-10:20

Keynote I: 5G Cellular Systems: Research Challenges

Speaker: Ian Akyildiz, Georgia Tech, USA
Chair: Aaron Striegel (University of Notre Dame)
Room: Acacia D

August 3 (Monday) 10:40-12:20

Session 1: SPT 1

Chair: Gaspar Modelo-Howard (Symantec, Inc.)
Room: Palo Verde A

- **Privacy-Preserving Optimization of Cross-domain Firewalls with Dynamic Rule Updates   95**
  Zheng Qin (Hunan University), Lu Ou (Hunan University), Bruhadeshwar Bezawada (Nanjing University), Xingchen Huang (Hunan University), Sisi Peng (Hunan University), Fei Chen (BloomReach Inc.), Keqin Li (State University of New York, New Paltz), Ann L. Wang (Michigan State University), Fu-Cai Zhou (Northeastern University), Huigui Rong (Hunan University)
- **Efficient Location Privacy for Moving Clients in Database-driven Dynamic Spectrum Access   79**
  Erald Troja (City University of New York), Spiridon Bakiras (City University of New York)
- **A Privacy-Preserving and Efficient Traffic Jam Information Sharing Scheme for Secure VANET Communication   87**
  Zijian Zhang (Beijing Institute of Technology), Cong Guo (Beijing Institute of Technology), Liehuang Zhu (Beijing Institute of Technology), Jie Liu (Capital Normal University), Zhengtao Yu (Kunming University of Science and Technology)
- **DIAMoND: Distributed Intrusion/Anomaly Monitoring for Nonparametric Detection   103**
  Maciej Korczynski (Delft University of Technology), Ali Hamieh (Rutgers University), Jun Huh Ho (Honeywell ACS Labs), Henrik Holm (Forest Glen Research, LLC), Siva Rajagopalan (Honeywell ACS Labs), Nina Fefferman (Rutgers University)

Session 1: WAM 1

Chair: Petr Novotny (Imperial College London)
Room: Acacia D

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- **Disseminating Authorized Content in Interest-centric Opportunistic Social Networks   119**
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  Peng Liu (Hangzhou Dianzi University), Biao Xu (Hangzhou Dianzi University), Zhen Jiang (West Chester University), Jie Wu (Temple University)
- **RobustGeo: a Disruption-Tolerant Geo-routing Protocol   111**
  Ruolin Fan (UCLA), Yu-Ting Yu (Qualcomm Research), Mario Gerla (UCLA)

Session 1: CAAME 1

Chair: Feng Lu (Huazhong University of Science and Technology)
Room: Palo Verde B

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  Tarek Abdelzaher (University of Illinois at Urbana Champaign), Jongdeog Lee (University of Illinois at Urbana Champaign), Akash Kapoor (University of Illinois at Urbana Champaign), Md Tanvir Al Amin (University of Illinois at Urbana Champaign), Zeyuan Zhang (University of Illinois at Urbana Champaign), Radhika Goyal (University of Illinois at Urbana Champaign), Zhehao Wang (University of California at Los Angeles)
- **Snowballing Effects in Preferential Attachment: The Impact of The Initial Links   1**
  Huanyang Zheng (Temple University), Jie Wu (Temple University)
- **Minimizing Bandwidth Cost of CCN: a Coordinated In-network Caching Approach   29**
  Yuemei Xu (Beijing Foreign Studies University), Yang Li (Chinese Academy of Science), Tao Lin (Chinese Academy of Science), Wei An (Chinese Academy of Science), Zihou Wang (Coordination Center of China), Song Ci (University of Nebraska-Lincoln)

August 3 (Monday) 13:30-15:00

Panel I: Networking Cyber-physical Applications in a Data-centric World

Moderator: Tarek Abdelzaher (UIUC)
Room: Acacia D
Panelists:

- Jie Wu (Temple University)
- Sajal Das (Missouri Univ of Science and Tech)
- Jeff Burke (UCLA)
- Azer Bestavros (Boston University)

Room: Acacia D

August 3 (Monday) 15:30-18:00

Session 2: GCIP

Chair: Paul Rad (Rackspace Inc)
Room: Palo Verde A

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- **Determining the Hop Count in Kademlia-type Systems, Grid, Cloud, Internet and Peer-to-peer Computing   233**
  Stefanie Roos Stefanie (TU Dresden), Hani Salah (TU Darmstadt), Thorsten Strufe (TU Dresden)
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  Gil Einziger (Technion, Israel), Roy Friedman (Technion, Israel)

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  Ziqi Wan (Temple University), Jie Wu (Temple University), Huanyang Zheng (Temple University)
- **HAECubie: A Highly Adaptive and Energy-Efficient Computing Demonstrator   241**
  Waltenegus Dargie (Technical University of Dresden), Franz Eichhorn (Technische Universität Dresden), Christoph Möbius (TU Dresden)

Session 2: Invited 1

Chair: Victor C. Valgenti (Petabi, Inc.)
Room: Acacia D

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  Leland Miller **(**UC Santa Cruz**),** Kevin Abas (UC Santa Cruz), Katia Obraczka (UC Santa Cruz)
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  Amitangshu Pal (Temple University), Krishna Kant (Temple University)

Session 2: CCM 1

Chair: Mario Gerla (UCLA)
Room: Palo Verde B

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- **Mitigating bufferbloat with Receiver-based TCP flow control mechanism in Cellular Networks   151**
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- **Spectrum Sensing for a Subdivided Band in Cognitive Radio Networks   175**
  Chunsheng Xin (Old Dominion University), Prosanta Paul (Old Dominion University), Min Song (Michigan Technological University), Yanxiao Zhao (South Dakota School of Mines & Technology)
- **Truthful Auction for Resource Allocation in Cooperative Cognitive Radio Networks   143**
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August 4 (Tuesday) 8:30-10:00

Keynote II: Some Advances in Wireless Networking for Cyber Physical Systems

Speaker: Tom Hou, Virginia Tech
Chair: Kewei Sha, Oklahoma City University
Room: Acacia D

August 4 (Tuesday) 10:20-12:20

Session 3: SPT 2

Chair: Abhishek Parakh (University of Nebraska at Omaha)
Room: Palo Verde A

- **Detection of Service Level Agreement (SLA) Violation in Memory Management in Virtual Machines   424**
  Xiongwei Xie (University of North Carolina at Charlotte), Weichao Wang (University of North Carolina at Charlotte), Tuanfa Qin (Guangxi University)
- **A Moving Target Defense Approach Based on POF to Thwart Blind DDoS Attack   440**
  Duohe Ma (Institute of Information Engineering), Zhen Xu (Institute of Information Engineering), Dongdai Lin (Institute of Information Engineering), Peng Liu (Huawei Technologies CO., LTD), Meng Li (Hong Kong Baptist University)
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Session 3: CAAME 2

Chair: Gokarna Sharma (Louisiana State University)
Room: Acacia D

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Session 3: WAM 2

Chair: Siguang Chen (Nanjing University of Posts and Telecommunications)
Room: Palo Verde B

- **METhoD: a Framework for the Emulation of a Delay Tolerant Network Scenario for Media-Content Distribution in Under-Served Regions   481**
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- **Community and Social Feature-based Multicast in Opportunistic Mobile Social Networks   457**
  Xiao Chen (Texas State University), Charles Shang (University of Illinois at Urbana-Champaign), Britney Wong (Cornell University), Wenzhong Li (Nanjing University), Suho Oh (Texas State University)
- **A Packet Size-aware Multi-hop Broadcast Protocol for VANETs Based on Adaptive Redundancy   465**
  Celimuge Wu (The University of Electro-communications), Xianfu Chen (VTT Technical Research Centre of Finland), Yusheng Ji (National Institute of Informatics), Satoshi Ohzahata (The University of Electro-communications), Toshihiko Kato (The University of Electro-communications)

August 4 (Tuesday) 13:30-15:00

Distinguished Invited Talk: IoT: The Promises and the Challenges

Speaker: Prof. Robin Kravets, University of Illinois at Urbana-Champaign
Chair: Aaron Striegel, University of Notre Dame
Room: Acacia D

August 4 (Tuesday) 15:30-18:00

Session 4: SNPC

Chair: Celimuge Wu (The University of Electro-communications)
Room: Palo Verde A

- **Demonstrating the Threat of Hardware Trojans in Wireless Sensor Networks   596**
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- **Tight Bounds on Localized Sensor Self-Deployment for Focused Coverage   611**
  Gokarna Sharma (Louisiana State University), Hari Krishnan (Center of computation and technology, Louisiana State University)
- **D2CS: Dynamic Duty Cycle Scheme in an Opportunistic Routing Sensor Network   588**
  Bingxin Niu (Dalian University of Technology),Keqiu Li (Dalian University of Technology),Xiulong Liu (Dalian University of Technology),Weilian Xue (Liaoning Normal University), Heng Qi (Dalian University of Technology)

- **Clustered Spatio-Temporal Compression Design for Wireless Sensor Networks 582**
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- **Optimal Deployment of Wireless Sensor Networks for Air Pollution Monitoring 604**
  Ahmed Boubrima (INSA-Lyon), Frédéric Matigot (INSA-Lyon), Walid Bechkit (INSA-Lyon), Hervé Rivano (Indria), Anne Ruas (IFSTTAR)

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Room: Acacia D
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  J.J. Garcia-Luna-Aceves (UC Santa Cruz and Xerox PARC)
- **Controlled spectrum sensing and scheduling under resource constraints 553**
  Nicolo Michelusi (University of Southern California), Urbashi Mitra (University of Southern California)
- **Making Dense Networks Work for You 574**
  Farhana Ashraf **(Google),** Robin Kravets (UIUC)

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Chair: Wei Yu (Towson University)
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- **Towards Effective Intra-flow Network Coding in Software Defined Wireless Mesh Networks 530**
  Donghai Zhu (Xi'an Jiaotong University), Xinyu Yang (Xi'an Jiaotong University), Peng Zhao (Xi'an Jiaotong University), Wei Yu (Townson University)
- **Exploiting Active Sub-areas for Multi-copy Routing in VDTNs 522**
  Bo Wu (Clemson University), Haiying Shen (Clemson University), Kang Chen (Clemson University)
- **Energy Minimization for Cellular Network Interfaces with Dynamic Link Quality 538**
  Hai Jin (Huazhong University of Science and Technology), Xiao Lei (Huazhong University of Science and Technology), Zaiyang Tang (Huazhong University of Science and Technology), Peng Li (The University of Aizu), Song Guo (The University of Aizu), Xiaofei Liao (Huazhong University of Science and Technology),Feng Lu (Huazhong University of Science and Technology)
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August 5 (Wednesday) 8:30-10:00

Keynote III: Overlay Networking in Software-Defined Networks

Speaker: Benson Schliesser, Brocade
Chair: Min Song (Michigan Tech University)
Room: Acacia D

August 5 (Wednesday) 10:20-12:20

Session 5: SPT 3

Chair: Zhiwei Wang (Nanjing University of Posts & Telecommunications)
Room: Palo Verde A

- **A Fast Implementation of MPC-KSA Side-Channel Distinguisher   729**
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- **REduce: Removing Redundancy from Regular Expression Matching in Network Security   719**
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- **Modeling and Analysis of Availability in Multi-tenant SaaS   711**
  Wenbo Su (Tsinghua University), Qu Liu (Tsinghua University), Chuang Lin (Tsinghua University), Sherman Shen (University of Waterloo)
- **Security Considerations for Negative Acknowledgment in Information-Centric Networking   736**
  Alberto Compagno (Sapienza University of Rome), Mauro Conti (University of Padua), Cesar Ghali (University of California, Irvine), Gene Tsudik (University of California, Irvine)

Session 5: Invited 3

Chair: Aleksandar Milenkovic (The University of Alabama in Huntsville),
Room: Acacia D

- **Siesta: Software-defined Energy Efficient Base Station Control for Green Cellular Networks   672**
  Sunae Shin (University of Missouri-Kansas City), Baek-Young Choi (University of Missouri-Kansas City), Sejun Song (University of Missouri-Kansas City)
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  Xiang Cao (University of Minnesota), Yingfei Dong (University of Hawaii), David H.-C. Du (University of Minnesota)
- **Software defined Network Inference with Passive/active Evolutionary-optimal pRobing (SNIPER)   648**
  Mehdi Malboubi (University of California at Davis), Yanlei Gong (University of Electronic Science and Technology of China), Wang Xiong (University of Electronic Science and Technology of China), Chen-Nee Chuah   (University of California at Davis), Puneet Sharma   (HP Labs)
- **Comparison of OXC node architectures for WDM and flex-grid optical networks   664**
  Jingxin Wu (George Washington University), Suresh Subramaniam (George Washington University), Hiroshi Hasegawa (Nagoya University, Japan)

Session 5: SDN

Chair: Jun Bi (Tsinghua University)

Room: Palo Verde B

- **Toward Latency-Aware Dynamic Middlebox Scheduling   680**
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- **OpenRouteFlow: Enable Legacy Router as a Software-Defined Routing Service for Hybrid SDN   703**
  Jun Bi (Tsinghua University), Tao Feng (Tsinghua University)
- **A Framework for Security-Aware Virtual Network Embedding   688**
  Yang Wang (La Salle University), Phanvu Chau (La Salle University), Fuyu Chen (SUNY, University at Buffalo)
- **An Effective Policy Relocation Scheme for VM Migration in Software-Defined Networks   695**
  Kun Xu (Tsinghua University), Chuang Lin (Tsinghua University), Zhen Chen (Tsinghua University), Kun Meng (Tsinghua University), Mourad Hakmaoui (Tsinghua University)

August 5 (Wednesday) 13:30-15:10

Session 6: IoT

Chair: Ernesto Exposito, (University of Toulouse)

Room: Palo Verde A

- **parkITsmart: Minimization of Cruising for Parking   795**
  Christos Tsiaras (University of Zurich), Livio Hobi (University of Zurich), Fabian Hofstetter (University of Zurich), Samuel Liniger (University of Zurich), Burkhard Stiller (University of Zurich)
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- **On Effectiveness of Smart Grid Applications using Co-simulation   810**
  Wei Yu (Towson University), Paul Moulema (Towson University), David Griffith (National Institute of Standards and Technology), Nada Golmie (National Institute of Standards and Technology)

Session 6: Invited 4

Chair: Anand Seetharam (California State University Monterey Bay)

Room: Acacia D

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- **Receiver Awareness Contention: Pilot Detection Based Channel Access in Adhoc Network   787**
  Xuan Dong (National University of Defense Technology), Chunsheng Zhu (The University of British Columbia), Shaohe Lv (National University of Defense Technology), Siguang Chen (Nanjing University of Posts and Telecommunications), Xiaodong Wang (National University of Defense Technology), Xingming Zhou (National University of Defense Technology), Victor C. M. Leung (The University of British Columbia)
- **Road Network-aware Anonymization in Mobile Systems with Reciprocity Support   771**
  Bhuvan Bamba (Nextdoor, Inc.), Ling Liu (Georgia Institute of Technology), Emre Yigitoglu (Georgia Institute of Technology)

Session 6: CAAME 3

Chair: Yang Wang (La Salle University),
Room: Palo Verde B

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- **Quantifying Benefits of Lossless Compression Utilities on Modern Smartphones   754**
  Aleksandar Milenkovic (The University of Alabama in Huntsville), Armen Dzhagarya (The University of Alabama in Huntsville), Martin Burtscher (Texas State University, San Marcos),
- **SocialQ&A: An Online Social Network Based Question and Answer System   763**
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August 5 (Wednesday) 15:30-18:00

Session 7: GREEN

Chair: Mingchu Li (DLUT)
Room: Palo Verde A

- **Flyover: A Cost-Efficient and Scale-Out Data Center Network Architecture   834**
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  Liang Chen (Shenzhen University), Suiming Guo (The Chinese University of Hong Kong), Dah Ming Chiu (The Chinese University of Hong Kong)
- **FCell: Towards the Tradeoffs in Designing Data Center Network Architectures   826**
  Dawei Li (Temple University), Jie Wu (Temple University)
- **EAFR: An Energy-Efficient Adaptive File Replication System In Data-Intensive Clusters   818**
  Haiying Shen (Clemson University), Yuhua Lin (Clemson University)
- **Robust Energy-Aware Routing with Uncertain Traffic Demands   842**
  Lin Heng (Tsinghua University), Xu Mingwei (Tsinghua University), Yang Yuan (Tsinghua University)

Session 7: MRN

Chair: Baek-Young Choi (University of Missouri-Kansas City)
Room: Acacia D

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  Hengky Susanto (University of Massachusetts Lowell), Byungguk Kim (University of Massachusetts Lowell), Benyuan Liu (University of Massachusetts Lowell)
- **Adaptive Forward Error Correction for ECG Signal Tranmission for Emtional Stress Assessment   891**
  Kun Hua (Lawrence Technological University), Hansong Xu (Lawrence Technological University), Guangchong Zhu (Lawrence Technological University), Jun Huang (University of Posts and Telecommunications)

- **Faster Web through Client-side DNS Redirection   881**
  Utkarsh Goel (Montana State University), Mike Wittie (Montana State University), Moritz Steiner (Akamai Technologies)
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Session 7: WAM 3

Chair: Lin Wang (Shanghai Jiao Tong University)
Room: Palo Verde B

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- **Inferring Network Topologies in MANETs Applied to Service Redeployment   906**
  Simone Silvestri (Missouri University of Science and Technology), Brett Holbert (Pennsylvania State University), Petr Novotny (Imperial College London), Tom La Porta (Pennsylvania State University),   Alexander Wolf (Imperial College London), Ananthram Swami (Army Research Laboratory)
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  Wenfeng He (Shenzhen University), Kaishun Wu (Hong Kong University of Science and Technology), Yongpan Zou (HKUST), Zhong Ming (Shenzhen University)
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  Nils Richerzhagen (TU Darmstadt), Dominik Stingl (TU Darmstadt), Björn Richerzhagen (TU Darmstadt), Andreas Mauthe (Lancaster University), Ralf Steinmetz (TU Darmstadt)

Integrated Workshop Schedule

Session 1: ContextQoS

Session Chair: Dr.-Ing. Patrick-Benjamin Bök, Weidmüller Group

Keynote: "Challenges for Industrial Internet"

Speaker: Dr.-Ing. Patrick-Benjamin Bök, Weidmüller Group

Abstract: The challenges of industrial internet are manifold, especially regarding the interconnection within and between production networks to perform some kind of advanced manufacturing. Context-aware approaches have to focus on the different parts of the industrial internet. Within machines, different components communicate with each other and exchange information to fulfill the production task. Within the production site, different machines will communicate with each other to exchange information and control the workflows of the production. Between production sites and, especially, between production, suppliers and distributors information will be exchanged to optimize the whole supply chain. In the future, this will not be the information at which point in time finished products will be available and delivered. Communication will begin at machine component level to have detailed information. This leads to a lot of challenges for the communication network because it will be a network of networks of networks of networks with heterogeneous technologies and protocols having varying performance requirements on the communication path between two entities. Furthermore, the security requirements of these networks are critical due to their contact to critical infrastructures, e. g. if advanced manufacturing is integrated into smart local grids. Based on scenarios having distributed production sites as a basis, the challenges of industrial internet are motivated.

Bio: Dr.-Ing. Patrick-Benjamin Bök received his B.Sc. (with honors) and his M.Sc. (with honors) at the Ruhr-University Bochum, Germany, both in Applied Computer Sciences, in 2006 and 2007, respectively. From 2007 to 2012 he was a research assistant and Ph.D. student at the Research Group for Integrated Information System in the Department of Electrical Engineering and Information Sciences at Ruhr-University Bochum, Germany, before he received his PhD (with honors). From 2012 to 2014 he was a senior scientist at the Communication Networks Institute (CNI) of the TU Dortmund University. At CNI, he was the head of "Highly Dynamic Networks, Wireless Robotics and Emergency Response Management" research group. He performed tutorials about technical improvements for computer networks and also about enterprise planning of computer networks. Today, he is Assistant to the CEO of Weidmüller Group.

On the Benefits of Clustered Capillary Networks for Congestion Control in Machine Type 44
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Rachaen Mahfuz Huq (KTH), Kevin Perez Moreno (KTH), Hui Zhu (KTH), Jue Zhang (KTH), Oscar Ohlsson (Ericsson), Mohammad Istiak Hossain (KTH)

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Session Chair: Abhishek Parakh (University of Nebraska at Omaha)

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Session 1: MASONS

Session Chair: Amitava Biswas, Cisco Systems, USA

Keynote: "Security and the Software Defined Network"

Speaker: Phillip Porras, Program Director - Internet Security Group, SRI International

Abstract: Modern networks are undergoing an exciting transition toward a paradigm of greater programmability and dynamic flow management. For the network security community, this transformation is opening attractive opportunities for more innovative forms of threat mitigation. It is also raising interesting challenges in how to reconcile our legacy notions of well-defined security policy enforcement. I will discuss some of the ongoing work toward securing software-defined networks (SDNs), as well as some interesting new SDN-enabled security and management applications.

Bio: Phillip Porras is a Program Director, an SRI Fellow, and leader of SRI's Internet Security Group in the Computer Science Laboratory at SRI International. Phillip is an established leader in live Internet malware analysis, with strong alliances with the whitehat community, and maintains ongoing collaborations with the top INFOSEC researchers in academia and the private sector. He has been a Principal Investigator for many research projects sponsored by DARPA, DoD, DHS, NSF, NSA, commercial customers, and others. Phillip has led multi-organizational large-scale projects with mixed academic and commercial collaborators, led many advanced research projects, and has been highly productive in acquiring government, military, and commercial projects involving Cyber Security R&D. He is an active researcher, publishing and conducting technology development in intrusion detection, alarm correlation, malware analysis, active networks, and wireless security. Previously, Phillip was a manager in the Trusted Computer Systems Department of the Aerospace Corporation, where he was also an experienced trusted product evaluator for NSA (which includes security testing, risk assessment, and penetration testing of systems and networks). He has participated on numerous program committees, and editorial boards, and on multiple commercial company technical advisory boards. Phillip's research technologies have transitioned as lead products in multiple companies, holds fourteen U.S. patents involving INFOSEC technologies, and have been awarded Best Paper honors in 1995, 1999, and 2008.

Session 1: WiMAN

Session Chair: Habib M. Ammari, University of Michigan-Dearborn, USA

Keynote: "Taking VANET to the Clouds"

Speaker: Prof. Stephan Olariu, Old Dominion University, USA

Abstract: Inspired by the success of conventional cloud services, a number of researchers have recently introduced the concept of a Vehicular Cloud (VC). In this keynote address, we envision a VC involving cars in the parking lot of a major airport. The patrons of such a parking lot are typically on travel for several days, providing a pool of cars that can serve as the basis for a data center at the airport. We anticipate a scenario where the cars that participate in the vehicular cloud are plugged into a standard power outlet and are provided wireless connection to a central server at the airport. The defining difference between vehicular and conventional clouds lie in the distributed ownership and, consequently, the unpredictable availability of computational resources. As cars enter and leave the parking lot, new computational resources become available while others depart creating a dynamic environment where the task of efficiently assigning cars to jobs becomes very challenging.

Bio: Professor Olariu has held many different roles and responsibilities as a member of numerous organizations and teams. Much of his experience has been with the design and implementation of robust protocols for wireless networks and in particular sensor networks and their applications. Professor Olariu is an Associate Editor-in-Chief of IEEE Transactions on Parallel and Distributed Systems and serves on the editorial board of IEEE Transactions on Computers, Networks, Journal of Parallel and Distributed Computing, Journal of Ad hoc and Sensor Networks, and Parallel, Emergent and Distributed Systems.Professor Olariu is applying mathematical modeling and analytical frameworks to the resolution of problems ranging from securing communications, to predicting the behavior of complex systems, to evaluating performance of wireless networks. His research interests are in the area of complex intelligent systems enabled by large-scale deployments of sensors and actors and more specifically in securing systems of systems.

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   Josh Bailey, Google
   Deepak Bansal, Manager, Microsoft
   Douglas Freimuth, STSM - Master Inventor, IBM Research
   Dr. Ashutosh Dutta, Lead Member of Technical Staff - Mobility & Cloud Security, AT&T

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Concluding Remarks