

TMA 2013 Program

CCSES

The 2nd IEEE INFOCOM Workshop on Communications and Control for Smart Energy Systems (CCSES 2013)

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Technical Program

Friday, April 19

9:00-10:00

Plenary Session I -- (Chaired by Tamer Başar)

Speaker: William H. Sanders, University of Illinois at Urbana-Champaign

10:00-10:40

Session I: Consumer Behavior -- Chair: Tamer Başar

Sustainable Energy Consumption Monitoring in Residential Settings

Akshay Utama Nambi (Indian Institute of Science, India); Thanasis Papaioannou (EPFL, Switzerland); Dipanjan Chakraborty (IBM Research, India); Karl Aberer (EPFL, Switzerland)

Real Time Market Models and Prosumer Profiling

Ugo Montanari (University of Pisa, Italy); Alain Tcheukam Siwe (IMT Institute for Advanced Studies Lucca, Italy)

10:40-11:00 Coffee break

11:00-12:00

Session II: Energy Efficiency in the Smart Grid -- Chair: Thanasis Papaioannou

Real-Time Welfare-Maximizing Regulation Allocation in Aggregator-EVs Systems

Sun Sun (University of Toronto, Canada); Min Dong (University of Ontario Institute of Technology, Canada); Ben Liang (University of Toronto, Canada)

A Cross-Layer Perspective on Energy Harvesting Aided Green Communications over Fading Channels

Tian Zhang (Tsinghua University & Shandong University, P.R. China); Wei Chen (Tsinghua University, P.R. China); Zhu Han (University of Houston, USA); Zhigang Cao (Tsinghua

University, P.R. China)

Cost-aware optimization models for communication networks with renewable energy sources

Giulio Betti (Politecnico di Milano, Italy); Edoardo Amaldi (Politecnico di Milano, Italy); Antonio Capone (Politecnico di Milano, Italy); Giulia Ercolani (Politecnico di Milano, USA)

12:00-13:30 Lunch break

13:30-14:30

[Plenary Session II](#) -- (Chaired by Tamer Başar)

Speaker: Anna Scaglione, University of California, Davis

14:30-15:30

Session III: Smart Grid Communications -- Chair: Christian Wietfeld

Advanced Metering and Demand Response Communication Performance in Zigbee based HANs

Velin Kounev (University of Pittsburgh, USA); David Tipper (University of Pittsburgh, USA)

Elderberry: A peer-to-peer, privacy-aware smart metering protocol

Sören Finster (Karlsruhe Institute of Technology (KIT), Germany); Ingmar Baumgart (Karlsruhe Institute of Technology (KIT), Germany)

Performance Evaluation of Time-critical Communication Networks for Smart Grids based on IEC 61850

Hanno Georg (TU Dortmund University, Germany); Nils Dorsch (TU Dortmund University, Germany); Markus Putzke (TU Dortmund University, Germany); Christian Wietfeld (TU Dortmund University & Communication Networks Institute, Germany)

15:30-16:00 Coffee break

16:00-17:00

Session IV: Smart Grid Security -- Chair: Sören Finster

A Novel Method to Detect Bad Data Injection Attack in Smart Grid

Ting Liu (Xi'an Jiaotong University, PRC, P.R. China); Gu Yun (Xi'an Jiaotong University, P.R. China); Dai Wang (Xi'an Jiaotong University, P.R. China); Yuhong Gui (Xi'an Jiaotong University, P.R. China)

Robust Privacy-Preserving Authentication Scheme for Communication Between Electric Vehicle as Power Energy Storage and Power Stations

Hasen Nicanfar (The University of British Columbia, Canada); Seyedali Hosseini-zhad (University of British Columbia, Canada); Peyman TalebiFard (The University of British Columbia, Canada); Victor CM Leung (The University of British Columbia, Canada)

A Reverse Transmission Mechanism for Surveillance Network in Smart Grid

Liang Tang (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science, P.R. China); Yun Rui (Shanghai Advanced Research Institute Chinese Academy of Sciences, P.R. China); Qian Wang (Wuhan University, P.R. China); Husheng Li (University of Tennessee, USA); Zhiyong Bu (Shanghai Institute of Microsystem and Information Technology, CAS, P.R. China)

17:00-18:00

Panel Discussion

Panel Topic: ***Smart Grid Communications: From Theoretical Foundations to Practical Implementations***

Panel Members: *Anna Scaglione, William H. Sanders, and Tamer Başar (Moderator)*

Plenary Session I

Analysis of Process Control Network Firewall Configurations for Compliance with Global Policy

Abstract

This talk describes some of the research underway at the DOE- and DHS-funded Trustworthy Cyber Infrastructure for the Power Grid (TCIPG) Center which is aimed at ensuring that the power grid cyber infrastructure is protected both from accidental failures and malicious attacks from adversaries ranging from casual hackers to nation states.

In particular, a challenge with configuring firewalls in a process control network is to determine whether or not the configurations of all the firewalls achieve the higher level security posture that is desired. This talk considers the problem and the approach we have taken with a tool known as the Network Access Policy Tool (NetAPT). NetAPT discovers the network from analysis of firewall configurations, then analyzes all possible pathways through the network for compliance with machine-checkable global policy. NetAPT has an informative graphical user interface that supports exploration and analysis of pathways that fail some global policy rule, and general exploration of connectivity within the network. NetAPT is currently under evaluation for use in the electric distribution industry, checking for compliance with federally mandated NERC-CIP standards.

Speaker's Bio

William H. Sanders is a Donald Biggar Willett Professor of Engineering, the Director of the Coordinated Science Laboratory (csl.illinois.edu), and the founding director of the Information

Trust Institute (iti.illinois.edu) at the University of Illinois at Urbana Champaign. He is a professor in the Department of Electrical and Computer Engineering and Affiliate Professor in the Department of Computer Science. He is a Fellow of the IEEE and the ACM, a past Chair of the IEEE Technical Committee on Fault-Tolerant Computing, and past Vice-Chair of the IFIP Working Group 10.4 on Dependable Computing.

Dr. Sanders's research interests include secure and dependable computing and security and dependability metrics and evaluation, with a focus on critical infrastructures. He has published more than 250 technical papers in those areas. He is currently the Director and PI of the DOE/DHS Trustworthy Cyber Infrastructure for the Power Grid (TCIPG) Center, which is at the forefront of national efforts to make the U.S. power grid smart and resilient. He is also a member of the NIST Smart Grid Advisory Committee which advises the NIST Director on the direction of NIST's Smart Grid-related programs and activities.

He is also co-developer of three tools for assessing computer-based systems: METASAN, UltraSAN, and Möbius. Möbius and UltraSAN have been distributed widely to industry and academia; more than 500 licenses for the tools have been issued to universities, companies, and NASA for evaluating the performance, dependability, and security of a variety of systems. He is also a co-developer of the Loki distributed system fault injector, the AQuA/ITUA middlewares for providing dependability/security to distributed and networked applications, and the NetAPT (Network Access Policy Tool) for assessing the security of networked systems.

Plenary Session II

Gossip-based state estimation for resilient monitoring of the power grid
(joint work with Xiao Li)

Abstract

This talk provides a decentralized gossip based solution for estimating the state from hybrid measurements in the power grid. We propose a gossip based Gauss-Newton algorithm to implement the decentralized sensor fusion and show that with the appropriate deployment of PMUs one can ensure convergence in the face of sensing errors and random failures with only local knowledge of the physical and cyber networks.

Speaker's Bio

Prof. Anna Scaglione (M.Sc.'95, Ph.D. '99) is currently Professor in Electrical and Computer Engineering at University of California at Davis. She joined UC Davis in 2008, after leaving Cornell University, Ithaca, NY, where she started as Assistant Professor in 2001 and became Associate Professor in 2006; prior to joining Cornell she was Assistant Professor in the year 2000-2001, at the University of New Mexico.

She is a Fellow of the IEEE since 2011. She is the Editor in Chief of the IEEE Signal Processing Letters, and served as Associate Editor for the IEEE Transactions on Wireless Communications from 2002 to 2005, and from 2008 to 2011 in the Editorial Board of the IEEE Transactions on Signal Processing from 2008, where she was Area Editor in 2010-11. She has been in the Signal Processing for Communication Committee from 2004 to 2009 and is in the steering committee for the conference Smartgridcomm since 2010. She was general chair of the workshop SPAWC 2005. Dr. Scaglione is the first author of the paper that received the 2000 IEEE Signal Processing Transactions Best Paper Award; she has also received the NSF Career Award in 2002 and she is co-recipient of the Ellersick Best Paper Award (MILCOM 2005). Her expertise is in the broad area of signal processing for communication systems and networks. Her current research focuses on signal processing algorithms for networks and for sensors systems, with specific focus on Smart Grid, demand side management and reliable energy delivery.

Registration

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