

# **2015 IEEE International Conference on Smart Grid Communications (SmartGridComm 2015)**

**Miami, Florida, USA  
2-5 November 2015**



**IEEE Catalog Number: CFP15SGC-POD  
ISBN: 978-1-4673-8290-8**

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IEEE Catalog Number:	CFP15SGC-POD
ISBN (Print-On-Demand):	978-1-4673-8290-8
ISBN (Online):	978-1-4673-8289-2

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## **Monday, November 2**

**Monday, November 2, 08:00 - 08:50**

**R: Registration**

Room: Foyer - L3

**Monday, November 2, 08:50 - 09:00**

**Opening: Workshop Day Opening**

Dr. Michael Koch, General Co-Chair

Room: E

**Monday, November 2, 09:00 - 10:30**

**TU1: Using Microgrids to Enhance Energy Security and Resilience**

Dr. Jianhui Wang, Section Lead for Advanced Power Grid Modeling at the Energy Systems Division at Argonne National Laboratory, Argonne, IL

Room: Watson Island

Microgrids are small-scale power systems which could be either grid-connected or islanded. When connected to the main utility grid, microgrids can function as normal local distribution systems. In comparison, when there is a major fault on the utility grid, microgrids can automatically island themselves and supply the local demand by onsite generation such as diesel units or distributed renewable generation and storage devices. Due to the flexibility of microgrid operation modes, the deployment of microgrids can achieve a variety of objectives including improved energy economics, increased power supply reliability and resilience, etc. In particular, after the recent extreme weather events in the U.S. such as hurricane Sandy, microgrids have been recognized as one of the most effective technologies to enhance energy supply security and resilience. This tutorial is to introduce the basic concept of microgrids and the associated technologies. A variety of advanced control and energy management techniques used for microgrid security, operation and planning will be discussed.

**WS1: Evaluation Tools and Testbeds for Smart Grid Systems**

Gurdip Singh, Michael Coddington, Ali Tajer, Amin Khodayi, Timothy R. McJunkin, Jesse Gantz

Room: GHJK

Chairs: Saroj Biswas (Temple University, USA), Walid Saad (Virginia Tech, USA), Arif Sarwat (Florida International University, USA)

Smart grid technologies utilize increased monitoring and control of the electric grid to improve reliability and efficiency. The Smart Grid initiatives leverage an increased dependency of information and communication technologies (ICT) to integrate more accurate physical parameter measurements and

intelligent controller devices. However, due to limited access to smart grid infrastructure both in terms of assets and the communication network, the evaluation of proposed techniques for several Smart Grid problems such as control, data collection, cyber-attacks, fault detection etc. is a challenging task for researchers. There are numerous ways for the researchers from their own domains to conduct assessment and evaluation. These tools include simulators, emulators and small testbeds. Nonetheless, these tools fall short in accurately and realistically assessing the performance. For instance, there is a need for co-simulation tools to integrate power simulators with network simulators. In addition, there needs to be mechanisms to emulate attacker behaviors on different components of Smart Grid. The goal of this workshop is to bring together academic and industrial researchers to identify and discuss technical challenges and recent results related to Smart Grid evaluation tools.

## **Monday, November 2, 10:30 - 11:00**

### **CB: Coffee Break**

Room: Foyer - L3

## **Monday, November 2, 11:00 - 12:30**

### **TU1: Using Microgrids to Enhance Energy Security and Resilience**

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### **Monday, November 2, 12:30 - 14:00**

#### **L: Lunch**

Room: F

### **Monday, November 2, 14:00 - 15:30**

#### **TU2: Smart Grid Frontiers: Smart Sensors, Signal Processing, and Data Analysis Applications**

Kartikeya Tripathi (Tollgrade Communications, Reston, Virginia, USA), Carlos Duque (Federal University of Juiz de Fora, Brazil)

Room: Watson Island

Managing asset health on the power grid is a constant challenge for utilities, particularly when there may be related community impacts. A large percentage of their budget is regularly apportioned to operational and capital expenses for this purpose. This tutorial explores some new directions of asset management and monitoring that utilities are beginning to employ using Smart Sensors and data processing. The discussion touches on advanced processing techniques to evaluate system performance within in the smart grid context: analyzing time varying harmonics, harmonic impedance estimation, gapless power quality data recording, spectral analysis, and physical sag tracking on overhead conductors. The objective is to present an overview of some recent work in these areas.

#### **WS2: Smart Cities - Challenges and Opportunities from a Grid Modernization Perspective**

Wei Sun (University of Central Florida, USA), A. Selcuk Uluagac (Florida International University, USA), Kevin Corcoran (Tollgrade Inc, USA)

Room: GHJK

Chairs: Hao Liang (University of Alberta, Canada), Junho Hong (ABB USCRC, USA)

The rapidly changing socio-economic and geo-political climate of the world has necessitated serious thought and action toward designing and building Smart Cities - urban communities that capitalize on deep but accessible technology and good governance principles to provide a sustainable yet high standard of living and a vibrant and collaborative economic climate to their citizens. These places are

envisioned to have sophisticated systems in place to meet their critical needs and operations: energy and power, transportation, water, sanitation, health services, law enforcement etc. Recognizing the limitations of the existing, and in many cases, crumbling, infrastructure behind these elements, there is tremendous opportunity here to harness cutting edge digital technologies, their interconnections, and the insights from data that they have been generating, to impact the development efforts in a transformative manner. Time is short: the antagonistic forces of increasingly scarce resources and rising demand and costs are changing the world rapidly. Action is needed immediately. Recent and on-going innovations in energy delivery, management and control of power grids, and the ability to actively participate in one's energy consumption, place the domain of Smart Grids in a unique position to shape the vision and reality behind Smart Cities. Many utilities, companies, academicians and government agencies are already working on defining architectures and testing technologies that will affect the quality and sustainability of power - from generation and distribution to consumption and monitoring. This panel brings together experts from these varied fields to discuss their experiences and perceptions.

### **Monday, November 2, 15:30 - 16:00**

#### **CB: Coffee Break**

Room: Foyer - L3

### **Monday, November 2, 16:00 - 17:30**

#### **TU2: Smart Grid Frontiers: Smart Sensors, Signal Processing, and Data Analysis Applications**

Kartikeya Tripathi (Tollgrade Communications, Reston, Virginia, USA), Carlos Duque (Federal University of Juiz de Fora, Brazil)

Room: Watson Island

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#### **WS2: Smart Cities - Challenges and Opportunities from a Grid Modernization Perspective**

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## **Monday, November 2, 17:30 - 18:30**

### **DEM: Demo and Exhibits**

Rooms: Foyer - L3, Grand Ballroom

Exhibitors:

- Wiley
- Florida Power and Light (FPL)
- University of Florida

Demos:

- Florida Power and Light (FPL) Mobile Command Center Demo
- Smart Grid Testbed Laboratory at Florida International University (4 Tours per day)

## **Tuesday, November 3**

### **Tuesday, November 3, 08:00 - 08:30**

#### **R: Registration**

Room: Foyer - L3

**Tuesday, November 3, 08:30 - 08:50**

**Opening: Conference Opening**

Prof. Haniph A. Latchman  
Room: E

**Tuesday, November 3, 08:50 - 09:50**

**K1: Keynote 1: "Improving Customer Value by Driving Smart Grid Performace"**

David L Herlong, Florida Power and Light (FPL), USA  
Room: E

This talk will present the journey of Florida Power & Light (FP&L) to become one of the most resilient and intelligent electrical power utilities in the nation. The presentation will describe the fascinating transformation of FP&L from the early days of smart meters, to FPL's massive Energy Smart Florida program, to distribution automation and the self-healing grid, to smart street lights and sensors, to mobile solutions, and to predictive data analytics, all driven by innovation, technology, and flawless execution. The talk will focus on the vision and action plan for FP&, to grow its smart grid infrastructure with the needs of the State of Florida for highly reliable, low cost electricity. By expanding FP&L's digital footprint, enabling the work force of the future and transforming data into actionable information are key anchor points for successfully attaining this vision, with a relentless focus on continuous process and customer experience improvement.

**Tuesday, November 3, 09:50 - 10:20**

**CB: Coffee Break**

Room: Foyer - L3

**Tuesday, November 3, 10:20 - 12:00**

**S1-1: PLC for Smart Grid 1**

Room: ABCD

Chair: Marzieh Parandehgheibi (Massachusetts Institute of Technology (MIT), USA)

**Efficient Diversity Technique for Hybrid Narrowband-Powerline/Wireless Smart Grid Communications**

Mostafa Sayed (University of Texas at Dallas, USA); Ghadi Sebaali (UT Austin, USA); Brian L Evans (The University of Texas at Austin, USA); Naofal Al-Dhahir (University of Texas at Dallas, USA)

pp. 1-6

**Noise Generated By Modern Lamps and the Influence on the Smart-Grid Communication Network**

Allan Emleh (University of Johannesburg, South Africa)  
pp. 7-12

**Considerations on Narrowband and Broadband Power Line Communication for Smart Grids**

Andrea M Tonello (University of Klagenfurt & WiTiKee srl, Austria); Alberto Pittolo (University of Udine, Italy)  
pp. 13-18

**Multi-armed Bandit Channel Selection for Power Line Communication**

Babak Nikfar (University of Duisburg-Essen, Germany); Setareh Maghsudi (University of Manitoba, Germany); Han Vinck (University of Duisburg-Essen, Germany)  
pp. 19-24

**S2-1: Privacy 1**

Room: E

Chair: Selcuk Uluagac (Florida International University, USA)

**Worried About Privacy? Let Your PV Converter Cover Your Electricity Consumption Fingerprints**

**Fingerprints**

Andreas Reinhardt (TU Clausthal, Germany); Georgios Konstantinou (UNSW Australia, Australia); Dominik Egarter (University of Klagenfurt, Austria); Delphine Reinhardt (née Christin) (University of Bonn and Fraunhofer FKIE, Germany)  
pp. 25-30

**How the Quantity and Quality of Training Data Impacts Re-identification of Smart Meter Users?**

Mustafa Faisal (University of Texas at Dallas, USA); Alvaro A. Cárdenas (University of Texas, Dallas, USA); Daisuke Mashima (Fujitsu Laboratories of America, USA)  
pp. 31-36

**Privacy-Preserving and Secure Communication Scheme for Power Injection in Smart Grid**

Prem Kumar Akula (Tennessee Technological University, USA); Mohamed M E A Mahmoud (Tennessee Tech University, USA); Kemal Akkaya (Florida International University, USA); Min Song (Michigan Technological University, USA)  
pp. 37-42

**Privacy-preserving Spectral Estimation in Smart Grid**

Yue Tong (OSIsoft LLC, USA); Jinyuan (Stella) Sun and Kai Sun (University of Tennessee, USA)  
pp. 43-48

**S3-1: Microgrid Control and Simulation 1**

Room: GHJK

Chair: He Hao (Pacific Northwest National Laboratory, USA)

**Heuristic Algorithm for Coordinating Smart Houses in MicroGrid**

Mohamed Arikiez (University of Liverpool & University of Tripoli, United Kingdom); Floriana Grasso and Michele Zito (University of Liverpool, United Kingdom)  
pp. 49-54

**Market-based Microgrid Optimal Scheduling**

Sina Parhizi and Amin Khodaei (University of Denver, USA)  
pp. 55-60

**A Framework for Computing Power Consumption Scheduling Functions Under Uncertainty**

Olivier Beaude (Laboratory of Signals and Systems, France); Achal Agrawal (University Paris 11, France); Samson E Lasaulce (CNRS - Supelec, France)  
pp. 61-66

**Generalized Aggregation and Coordination of Residential Loads in a Smart Community**

He Hao, Abhishek Somani, Jianming Lian and Thomas E. Carroll (Pacific Northwest National Laboratory, USA)  
pp. 67-72

**MDSM: Generalized Multiagent Coordination for Demand Side Management**

Andreas Veit (Cornell University, USA)  
pp. 73-78

**S4-1: Power Grid Analytics**

Room: Watson Island (L2)

Chair: Lalitha Sankar (Arizona State University, USA)

**Secure Operating Region Simplification in Dynamic Security Assessment**

Dongchan Lee, Pirathayini Srikantha and Deepa Kundur (University of Toronto, Canada)  
pp. 79-84

**Cluster-and-Connect: A More Realistic Model for the Electric Power Network Topology**

Jiale Hu and Lalitha Sankar (Arizona State University, USA); Darakhshan Mir (Wellesley College & Bucknell University, USA)  
pp. 85-90

**Machine Learning for Inferring Phase Connectivity in Distribution Networks**

Sambaran Bandyopadhyay and Ramachandra Kota (IBM Research, India); Rajendu Mitra (IBM -- Research, India); Vijay Arya (IBM Research - India, India); Brian Sullivan, Heather Storey, Richard Mueller and Gerard Labut (DTE Energy, USA)  
pp. 91-96

**Demand Modelling in Electricity Market with Day-Ahead Dynamic Pricing**

Qian Ma and Xiao-Jun Zeng (University of Manchester, United Kingdom)  
pp. 97-102

**Tuesday, November 3, 12:00 - 13:30**

**L: Lunch**

Room: F

**Tuesday, November 3, 13:30 - 15:10**

**S1-2: PLC for Smart Grid 2**

Room: ABCD

Chair: Gregorio López (Universidad Carlos III de Madrid, Spain)

**Powerline-PNC: Boosting Throughput of Powerline Networks with Physical-Layer Network Coding**

Qing Yang, Hao Wang, Taotao Wang, Lizhao You, Lu Lu and Soung Chang Liew (The Chinese University of Hong Kong, Hong Kong)  
pp. 103-108

**MIMO-OFDM NB-PLC Transmission Through Distribution Transformers: Modeling and Achievable Data Rates**

Andreas Chrysochos (Aristotle University of Thessaloniki, Greece); Ahmed ElSamadouny (University of Texas at Dallas, USA); Theofilos A. Papadopoulos (Democritus University of Thrace, Greece); Grigoris K Papagiannis (Aristotle University of Thessaloniki, Greece); Naofal Al-Dhahir (University of Texas at Dallas, USA)  
pp. 109-114

**Shortened Frame Design for Narrowband Powerline Communication Systems**

Mehul Soman and Il Han Kim (Texas Instruments, USA)  
pp. 115-120

**Electric Current Based Power Line Communication for Plug-Load Device Auto Identification**

Hiroyuki Ikegami (the University of Tokyo, Japan); Manabu Tsukada (the University of Tokyo, Japan); Hideya Ochiai (The University of Tokyo, Japan); Hideaki Nii (IIJ Innovation Institute, Japan); Hiroshi Esaki (The University of Tokyo, Japan)  
pp. 121-126

**S2-2: Cyber Physical Security**

Room: E

Chair: Stephen D. Wolthusen (Royal Holloway, University of London, United Kingdom)

**Sequential Cyber-Attack Detection in the Large-Scale Smart Grid System**

Shang Li (Columbia University, USA); Yasin Yilmaz (University of Michigan, USA); Xiaodong Wang (Columbia University, USA)  
pp. 127-132

**A Co-Simulation Environment for Integrated Cyber and Power Systems**

Chih-Che Sun (Washington State University, USA); Junho Hong (ABB USCRC, USA); Chen-Ching Liu (Washington State University, USA)  
pp. 133-138

**Towards Cyber-Physical Intrusion Tolerance**

Shamina Hossain (University of Illinois, USA); Sriharsha Etigowni (Rutgers University, USA); Katherine Davis (PowerWorld Corporation, USA); Saman Zonouz (Rutgers University, USA)  
pp. 139-144

**Detecting Malicious Manipulation of Synchrophasor Data**

Seemita Pal (Rensselaer Polytechnic Institute, USA); Biplab Sikdar (National University of Singapore, Singapore); Joe H. Chow (Rensselaer Polytechnic Institute, USA)  
pp. 145-150

**Real-time Situational Awareness for Critical Infrastructure Protection**

Stefan Jucken, Nick Saunders, Bakul Khanna, Timothy Collins and Steve Lusk (ViaSat Inc., USA)  
pp. 151-156

**S3-2: Efficient Load Operation**

Room: GHJK

Chair: Hamed Mohsenian-Rad (University of California at Riverside, USA)

**Load Balancing in Smart DC Micro-grid Using Delay Tolerant User Demands**

Daud Mustafa Minhas (The University of Lahore, Pakistan)  
pp. 157-162

**Distributed Energy Matching and Exchange Scheme for Demand-side Optimal Operation**

Shantanu Chakraborty and Toshiya Okabe (NEC Corporation, Japan)  
pp. 163-168

**Multi-Agent Device-Level Modeling Framework for Demand Scheduling**

Andreas Veit (Cornell University, USA); Hans-Arno Jacobsen (Technical University Munich, Germany)  
pp. 169-174

**Optimal End User Energy Storage Sharing in Demand Response**

Jiyun Yao and Parv Venkitasubramaniam (Lehigh University, USA)  
pp. 175-180

**A Control System Framework for Privacy Preserving Demand Response of Thermal Inertial Loads**

Abhishek Halder and Xinbo Geng (Texas A&M University, USA); Gaurav Sharma (Texas A&M Univ, USA); Le Xie and P R Kumar (Texas A&M University, USA)  
pp. 181-186

## **S4-2: Game Theoretic Analysis in Smart Grid**

Room: Watson Island

Chair: Hao Liang (University of Alberta, Canada)

### **A Game Theoretic Approach for Load-Shifting in the Smart Grid**

Murat Erkoc, Eeyad Al-Ahmadi and Nurcin Celik (University of Miami, USA); Walid Saad (Virginia Tech, USA)

pp. 187-192

### **A Firm-Union Bargaining Game Approach for PHEV Charging Access Control**

Yuan Liu and Hao Liang (University of Alberta, Canada)

pp. 193-198

### **Optimal Time of Use of Renewable Electricity Pricing: Three-Player Games Model**

Siham Khoussi (Mohammadia School of Engineers - Mohammed V University of Rabat, USA); Hasnae Bilil (Mohammadia School of Engineers - Mohammed V University of Rabat & National Institute of Standards and Technology, Morocco); Ghassane Aniba (Mohammadia School of Engineers - Mohammed V University of Rabat, Morocco)

pp. 199-204

### **An Autonomous Demand Response Program in Smart Grid with Foresighted Users**

Shahab Bahrami and Vincent W.S. Wong (University of British Columbia, Canada)

pp. 205-210

## **Tuesday, November 3, 15:10 - 15:40**

### **CB: Coffee Break**

Room: Foyer - L3

## **Tuesday, November 3, 15:40 - 17:40**

### **PS-1: Panel Session-Communication Technologies for Smart Grids-Experiences from Installation and Pilots**

Panelists: Joel Silverman (Megachips, USA), Holger Hirsch (University of Duisburg-Essen, Germany), Rasmus Krigslund (Kamstrup A/S, Denmark), Jörg Benze (T-Systems Multimedia Solutions GmbH, Germany)

Room: Watson Island

Chair: Michael Koch (Devolvo AG, Germany)

Communications between the elements of energy systems are at the heart of Smart Grids. There are many technological approaches to achieve this. Some communication technologies are based on powerline communications, others on wireless approaches etc. Business models range from telecommunication operator models to own operation by the Distribution Network Operators (DNO)s. This industry panel aims to discuss experiences, lessons learned and challenges from installations and results of pilot field trials.

### **S1-3: Smart Metering Networks**

Rooms: ABCD, Grand Ballroom

Chair: Mehul Soman (Texas Instruments, USA)

#### **Path Error-Aware RTO Design for Smart Meter Data Traffic in IEEE 802.11s-based AMI Networks**

Nico Saputro, Kemal Akkaya and Ali Ihsan Yurekli (Florida International University, USA)  
pp. 211-216

#### **Joint Optimization of Power Allocation and Relay Selection for Smart Grid Neighborhood Area Networks**

Dehua Li and Xiaoli Chu (University of Sheffield, United Kingdom); Jie Zhang (University of Sheffield, Dept. of Electronic and Electrical Engineering, United Kingdom)  
pp. 217-222

#### **Optimized Scalable Decentralized Hybrid Advanced Metering Infrastructure for Smart Grid**

Alireza Ghasempour (Utah State University, USA)  
pp. 223-228

#### **Envisioning Cloud of Energy**

Leila Sharifi (Instituto Superior Técnico, Portugal); Felix Freitag (Technical University of Catalonia, Spain); Luís Veiga (INESC-ID Lisboa / Instituto Superior Técnico, Universidade de Lisboa, Portugal)  
pp. 229-234

### **S3-3: Renewable Power Generation I**

Room: E

Chair: Vincent W.S. Wong (University of British Columbia, Canada)

#### **Robust Dispatch with Power Flow Routing and Renewables**

Junhao Lin (The University of Hong Kong, Hong Kong); Victor O. K. Li (University of Hong Kong, P.R. China); Ka-Cheong Leung (The University of Hong Kong, Hong Kong)  
pp. 235-240

#### **Smart Grid Energy Management for a Shared Facility Controller with Renewables**

Wayes Tushar (Singapore University of Technology and Design, Singapore); Jian A. Zhang (CSIRO, Australia); Chau Yuen (Singapore University of Technology and Design, Singapore); David B Smith (National ICT Australia, Australia); H. Vincent Poor (Princeton University, USA)  
pp. 241-246

#### **Optimal Centralized Renewable Energy Transfer Scheduling for Electrical Vehicles**

Abdurrahman Arikan, Ruofan Jin, Bing Wang and Song Han (University of Connecticut, USA); Kyoungwon Suh (Illinois State University, USA); Peng Zhang (University of Connecticut, USA)  
pp. 247-252

#### **DC Fault Analysis of Multi-terminal HVDC for Wind Power Transmission**

Xia Chen (The University of Hong Kong, Hong Kong)

**Environment-Aware Power Generation Scheduling in Smart Grids**

Zhiheng Xu and Quanyan Zhu (New York University, USA)

pp. 253-258

**S4-3: Synchrophasor Applications in Smart Grid**

Room: GHJK

Chair: Chen Chen (Argonne National Laboratory, USA)

**Scalable and Reliable Monitoring for Power Systems**

Alexandru Moga and Thomas Locher (ABB Corporate Research, Switzerland)

pp. 259-264

**Real-Time Event Detection and Feature Extraction Using PMU Measurement Data**

Ti Xu (University of Illinois, USA); Thomas Overbye (University of Illinois at Urbana-Champaign, USA)

pp. 265-270

**DISTIL: Design and Implementation of a Scalable Synchrophasor Data Processing System**

Michael Andersen, Sam Kumar and Connor Brooks (University of California at Berkeley, USA);

Alexandra von Meier (University of California, Berkeley, USA); David Culler (University of California at Berkeley, USA)

pp. 271-277

**On-line Oscillations Monitoring Under High Penetration of Non-Synchronous Generation**

Harold Chamorro (KTH Royal Institute of Technology, Sweden)

pp. 278-282

**Tuesday, November 3, 19:30 - 21:00**

**Welcome: Welcome Reception**

Room: Bay Front Terrace South

**Wednesday, November 4**

**Wednesday, November 4, 08:00 - 08:50**

**R: Registration**

Rooms: Foyer, Grand Ballroom

**Wednesday, November 4, 08:50 - 09:50**

**K2: Keynote 2: "Enabling Research for Future Electric Energy Grid-A Perspective from NSF"**

Pramod P. Khargonekar, National Science Foundation, USA

Room: E

Electric power systems are expected to undergo major changes in the coming decades. These changes are made possible by advances in cyber-physical systems, communications, computation and controls. On the other hand, renewable electricity, distributed generation, flexible loads, demand response, and cybersecurity are some of the key drivers for the ongoing changes. In this talk, I will present a perspective on the research opportunities from my perspective at the National Science Foundation. I will begin by describing the NSF engineering directorate and give an overview of the energy research enabled by NSF. I will focus the remainder of the talk on specific directions in electric grid research supported by the NSF. I will conclude with a discussion of the challenges that lie ahead and where promising opportunities may lie.

### **Wednesday, November 4, 09:50 - 10:20**

#### **CB: Coffee Break**

Room: Foyer - L3

### **Wednesday, November 4, 10:20 - 12:00**

#### **PS-2: Panel Session- Communications, Data Fusion and Big Data Analytics in Smart Grids**

Panelists: Rui Zhang (IBM Research, USA) He Hao (Pacific Northwest National Laboratory, USA) Alexandru Moga (ABB Research, Sweden) Stefan Jucken (ViaSat Inc., USA) Daisuke Mashima (Fujitsu Laboratories of America, USA)

Room: ABCD

Chair: Hamed Mohsenian-Rad (University of California at Riverside, USA)

This industry panel aims to discuss the new and emerging applications, functionalities, and algorithms of communications, data fusion, and big data analytics in power systems and smart grids. Different application areas will be discussed, ranging from power system automation to and fault and attack detection, demand response, renewable power integration, and market operation.

#### **S2-3: Fault Tolerance and Dependability**

Room: E

Chair: Kartikeya Tripathi (Tollgrade Communication, USA)

##### **Impact of Firmware Modification Attacks on Power Systems**

Charalambos Konstantinou (New York University, USA); Michail Maniatakos (New York University Abu Dhabi, UAE)  
pp. 283-288

##### **Formal Synthesis of Dependable Configurations for Advanced Metering Infrastructures**

Mohammad Ashiqur Rahman (Tennessee Tech University, USA); Ehab Al-Shaer (University of North Carolina Charlotte, USA)  
pp. 289-294

**On Performance and Robustness of Internet-Based Smart Grid Communication: A Case Study for Germany**

Sebastian Meiling, Thomas C. Schmidt and Till Steinbach (Hamburg University of Applied Sciences, Germany)  
pp. 295-300

**Multiple Event Analysis for Large-scale Power Systems Through Cluster-based Sparse Coding**

Yang Song (University of Tennessee, Knoxville, USA); Wei Wang and Zhifei Zhang (University of Tennessee, USA); Hairong Qi (the University of Tennessee, USA); Yilu Liu (University of Tennessee, USA)  
pp. 301-306

**S3-4: Electric Vehicles**

Room: GHJK

Chair: Zhenhua Liu (California Institute of Technology, USA)

**An Electric-Vehicle-based Supplementary Power Delivery System**

Albert Y.S. Lam and Ka-Cheong Leung (The University of Hong Kong, Hong Kong); Victor O. K. Li (University of Hong Kong, P.R. China)  
pp. 307-312

**Event-based Electric Vehicle Scheduling Considering Random User Behaviors**

Bin Wang, Yubo Wang and Charlie Qiu (University of California, Los Angeles, USA); Chi-Cheng Chu and Rajit Gadh (University of California - Los Angeles, USA)  
pp. 313-318

**Optimal Scheduling for Coordination Renewable Energy and Electric Vehicles Consumption**

Long HA (CEA, France); Hervé Guillou (LSEI, France); Nicolas Martin (CEA, France); Mireille Jacomino and Van-Dat Cung (G-SCOP, France)  
pp. 319-324

**Reusing Electric Vehicle Battery for Demand Side Management Integrating Dynamic Pricing**

Shijie Tong (University of California Davis, USA); Tsz Fung and Jae Wan Park (University of California, Davis, USA)  
pp. 325-330

**S4-4: Demand Response**

Room: Watson Island

Chair: Holger Hirsch (Universität Duisburg-Essen, Germany)

**An Economic Analysis of Pervasive, Incentive-Based Demand Response**

Tri Kurniawan Wijaya and Matteo Vasirani (EPFL, Switzerland); Jonas Christoffer Villumsen (IBM Research, Ireland); Karl Aberer (EPFL, Switzerland)  
pp. 331-337

**Prediction Models for Dynamic Demand Response: Requirements, Challenges, and Insights**

Saima Aman (University of Southern California, USA); Marc E. Frincu (University of Southern California & West University of Timisoara, USA); Charalampos Chelmiss and Muhammad Noor (University of Southern California, USA); Yogesh Simmhan (Indian Institute of Science, India); Viktor K. Prasanna (University of Southern California, USA)  
pp. 338-343

**Combined Price and Event-based Demand Response Using Two-stage Model Predictive Control**

Michael D. Knudsen and Sergi Rotger-Griful (Aarhus University, Denmark)  
pp. 344-349

**Distributed Demand Curtailment Via Water-Filling**

Pirathayini Srikantha and Deepa Kundur (University of Toronto, Canada)  
pp. 350-355

**Wednesday, November 4, 12:00 - 13:30**

**L: Lunch**

Room: F

**Wednesday, November 4, 13:30 - 15:10**

**S1-4: Traffic Monitoring and Analysis**

Room: ABCD

Chair: David Bakken (Washington State University, USA)

**Modeling the Impact of Communication Loss on the Power Grid Under Emergency Control**

Marzieh Parandehgheibi (Massachusetts Institute of Technology (MIT), USA); Konstantin Turitsyn (MIT, Department for Mechanical Engineering, USA); Eytan Modiano (MIT, USA)  
pp. 356-361

**Block Sparsity for Joint NBI and Impulse Noise Mitigation in Hybrid PLC Wireless Communications**

Mohamed Mokhtar (University of Texas at Dallas, USA); Waheed U. Bajwa (Rutgers University, USA); Mahmoud Elgenedy and Naofal Al-Dhahir (University of Texas at Dallas, USA)  
pp. 362-367

**Interference Mitigation Techniques for Narrowband Powerline Smart Grid Communications**

Mahmoud Elgenedy, Mostafa Sayed and Mohamed Mokhtar (University of Texas at Dallas, USA); Mohamed M. Abdallah (Texas A&M University at Qatar, Qatar); Naofal Al-Dhahir (University of Texas at Dallas, USA)  
pp. 368-373

**Performance Analysis of DF Cooperative Relaying Over Bursty Impulsive Noise Channel**

MD. Sahabul Alam and Fabrice Labeau (McGill University, Canada)  
pp. 374-379

## **S2-4: Data Attacks**

Room: E

Chair: Andreas Reinhardt (TU Clausthal, Germany)

### **Smart Grid Data Injection Attacks: To Defend or Not?**

Anibal Sanjab and Walid Saad (Virginia Tech, USA)

pp. 380-385

### **Correlative Monitoring for Detection of False Data Injection Attacks in Smart Grids**

Michael Kallitsis (University of Michigan & Merit Network, Inc., USA); George Michailidis

(University of Michigan, USA); Samir Tout (Eastern Michigan University, USA)

pp. 386-391

### **Optimal Data Attacks on Power Grids: Leveraging Detection & Measurement Jamming**

Deepjyoti Deka (University of Texas, USA); Ross Baldick (The University of Texas at Austin,

USA); Sriram Vishwanath (University of Texas Austin, USA)

pp. 392-397

### **Construct Data Integrity Attacks Against Real-Time Electrical Market in Smart Grid**

Song Tan, Wen-Zhan Song and Michael Stewart (Georgia State University, USA); Lang Tong

(Cornell University, USA)

pp. 398-403

## **S3-5: Microgrid Control and Simulation 2**

Room: GHJK

Chair: Chee-Wooi Ten (Michigan Technological University, USA)

### **Multiagent-Based Decentralized Operation of Microgrids Considering Data Interoperability**

Mehmet Cintuglu and Osama Mohammed (Florida International University, USA)

pp. 404-409

### **Energy Management of Cooperative Microgrids with P2P Energy Sharing in Distribution Networks**

Tian Liu (The Hong Kong University of Science and Technology & Xi'an Jiaotong University,

Hong Kong); Xiaoqi Tan and Bo Sun (Hong Kong University of Science and Technology, Hong

Kong); Yuan Wu (Zhejiang University of Technology, P.R. China); Xiaohong Guan (Xi'an Jiaotong

University & Tsinghua University, P.R. China); Danny H.K. Tsang (HKUST, Hong Kong)

pp. 410-415

### **A Reputation-Based Centralized Energy Allocation Mechanism for Microgrids**

Tarek AlSkaif (Universitat Politècnica de Catalunya, Spain); Manel Guerrero Zapata (Technical

University of Catalonia (UPC), Spain); Boris Bellalta (Universitat Pompeu Fabra, Spain)

pp. 416-421

### **Combining Storage and Generation for Prepaid Electricity Service**

Jared Porter (University of California, Berkeley, USA); Michael Angelo A. Pedrasa (University of

the Philippines, Philippines); Andrew Woo (University of California, Berkeley, USA); Kameshwar

Poolla (University of California at Berkeley, USA)

pp. 422-427

**A Maximum A-Posteriori Based Algorithm for Dynamic Load Model Parameter Estimation**

Siming Guo and Thomas Overbye (University of Illinois at Urbana-Champaign, USA)

pp. 428-433

**S4-5: Data Management in Smart Grid**

Room: Watson Island

Chair: Alexandru Moga (ABB Corporate Research, Switzerland)

**Java Embedded Storage for Time Series and Meta Data in Smart Grids**

Stephan Cejka, Ralf Mosshammer and Alfred Einfalt (Siemens AG Österreich, Austria)

pp. 434-439

**Towards Application-Aware Data Concentration Schemes for Advanced Metering Infrastructures**

Vishnu Cherusola Dev, Uddipan Das, Vinod Namboodiri, Suvagata Chakraborty and Visvakumar Aravinthan (Wichita State University, USA); Yu Guo and Anurag Srivastava (Washington State University, USA)

pp. 440-445

**Performance Comparison Framework for Energy Disaggregation Systems**

Nicholas Czarnek, Kenneth Morton, Leslie Collins, Richard Newell and Kyle J Bradbury (Duke University, USA)

pp. 446-452

**Methodologies for Effective Demand Response Messaging**

Mohit Jain and Vikas Chandan (IBM Research India, India); Marilena Minou and George Thanos (Athens University of Economics and Business, Greece); Tri Kurniawan Wijaya (EPFL, Switzerland); Achim Lindt (RWTH, Germany); Arne Gylling (LTU, Sweden)

pp. 453-458

**Wednesday, November 4, 15:10 - 15:40**

**CB: Coffee Break**

Room: Foyer - L3

**Wednesday, November 4, 15:40 - 17:40**

**S1-5: Traffic Monitoring and Analysis**

Room: ABCD

Chair: David Bakken (Washington State University, USA)

**Tracking Appliance Usage Information Using Harmonic Signature Sensing**

Deokwoo Jung (Corporate R&D Center, SK Telecom, Seoul, Rep. of KOREA & Advanced Digital Sciences Center, Singapore); Hoang Hai Nguyen and David Yau (Advanced Digital Sciences Center, Singapore)

pp. 459-465

**IEC 61850 Traffic Analysis in Electrical Automation Networks**

Djamel Hadj Sadok and Judith Kelner (Federal University of Pernambuco, Brazil); Ubiratan Carmo (Chesf, Brazil)

pp. 466-471

**Let There Be Light: Dissecting How PRIME Networks Work Based on Actual Traffic Traces**

Miguel Seijo Simó and Gregorio López (Universidad Carlos III de Madrid, Spain); Javier Matanza (Universidad Pontificia Comillas, Spain); Jose Ignacio Moreno (Universidad Carlos III de Madrid, Spain); Fernando Martín (Unión Fenosa Distribución, Spain); Carlos Rodriguez-Morcillo and Sadot Alexandres (Universidad Pontificia Comillas, Spain)

pp. 472-477

**Effects of Bursty Event Traffic on Synchrophasor Delays in IEEE C37.118, IEC61850, and IEC60870**

Yiming Wu (Royal Institute of Technology (KTH), Sweden); Lars Nordström (Royal Institute of Technology, KTH, Sweden); David Bakken (Washington State University, USA)

pp. 478-484

**S2-5: Other Security Attacks**

Room: E

Chair: Muharrem Ayar (University of Florida, USA)

**Delay and Jitter Attacks on Hierarchical State Estimation**

Alessio Baiocco and Stephen D. Wolthusen (Royal Holloway, University of London, United Kingdom)

pp. 485-490

**Tuning Out of Phase: Resonance Attacks**

Eman M. Hammad (University of Toronto, Canada); Ahmed Mostafa Khalil (University of Toronto & Cairo University, Canada); Abdallah Farraj, Deepa Kundur and Reza Iravani (University of Toronto, Canada)

pp. 491-496

**A Detection and Mitigation Model for PTP Delay Attack in a Smart Grid Substation**

Bassam Moussa (Concordia University, Canada); Mourad Debbabi (Concordia University, Montreal, Canada); Chadi Assi (Concordia University, Canada)

pp. 497-502

**Detecting Dynamic Load Altering Attacks: A Data-Driven Time-Frequency Analysis**

Sajjad Amini, Fabio Pasqualetti and Hamed Mohsenian-Rad (University of California at Riverside, USA)

pp. 503-508

**Secure Interoperability with Commercial Open Standards**

Craig Woods (ViaSat Inc., USA)

pp. 509-514

### **S3-6: Energy Storage**

Room: GHJK

Chair: Husheng Li (University of Tennessee, USA)

#### **Modeling and Control Battery Aging in Energy Harvesting Systems**

Roberto Valentini (University of L'Aquila, Italy); Nga Dang, Marco Levorato and Eli Bozorgzadeh (University of California, Irvine, USA)  
pp. 515-520

#### **Battery Internal State Estimation Using a Mixed Kalman Cubature Filter**

Venkata Pathuri Bhuvana (University of Klagenfurt, Austria); Mario Huemer (Johannes Kepler University Linz, Austria); Andrea M Tonello (University of Klagenfurt & WiTiKee srl, Austria)  
pp. 521-526

#### **Sizing and Control of Residential Solar Panel and Battery**

Neda Edalat and Mehul Motani (National University of Singapore, Singapore); Jean Walrand (University of California, Berkeley, USA)  
pp. 527-532

#### **A Mixed-Mode Management System for Grid Scale Energy Storage Units**

Babak Asghari (NEC Labs America, USA); Rakesh Patil and Di Shi (NEC Laboratories America, Inc., USA); Ratnesh Sharma (NEC Laboratories America Inc, USA)  
pp. 533-538

#### **A Method for Remote Control of EV Charging by Modifying IEC61851 Compliant EVSE Based PWM Signal**

Anders Bro Pedersen and Sergejus Martinenas (Technical University of Denmark, Denmark); Peter Andersen (Technical University Of Denmark, Denmark); Thomas Sørensen and Henning Si Høj (Technical University of Denmark, Denmark)  
pp. 539-544

### **S4-6: Pricing and Incentive Design for Smart Grid**

Room: Watson Island

Chair: Yang Weng (Stanford University, USA)

#### **A Socially Aware Incentive Strategy for Encouraging Residential Solar Uptake in Brunei**

Harshad Khadilkar (Tata Consultancy Services, India); Pratyush Kumar, Subendhu Rongali and Sampath Dechu (IBM Research, India); Iskandar Petra (University of Brunei Darussalam, Brunei Darussalam)  
pp. 545-550

#### **Day-Ahead Promised Load as Alternative to Real-Time Pricing**

Araz Ashouri (Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland); Paul Stadler and Francois Marechal (Ecole Polytechnique Federale de Lausanne, Switzerland)  
pp. 551-556

### **Incentives and Targeting Policies for Automated Demand Response Contracts**

Marilena Minou, George Stamoulis and George Thanos (Athens University of Economics and Business, Greece); Vikas Chandan (IBM Research India, India)  
pp. 557-562

### **Pricing Sequential Forward Power Contracts**

Wenyuan Tang (University of Southern California, USA); Junjie Qin (Stanford University, USA); Rahul Jain (University of Southern California, USA); Ram Rajagopal (Stanford University, USA)  
pp. 563-568

## **Wednesday, November 4, 19:30 - 22:00**

### **Dinner: Gala Dinner**

Room: Grand Ballroom South

## **Thursday, November 5**

### **Thursday, November 5, 08:00 - 08:50**

#### **R: Registration**

Rooms: Foyer, Grand Ballroom

### **Thursday, November 5, 08:50 - 09:50**

#### **K3: Keynote 3: "Design and Simulation Issues for Secure Power Networks as Resilient Smart Grid Infrastructures"**

Osama Mohammed, Florida International University, USA  
Room: E

The increased penetration levels of renewables and distributed energy resources lead to increased challenges in maintaining reliable control and operation of the grid. Deep integration between intelligent measurement nodes, communication systems, IT technology, artificial intelligence, power electronics and physical power system components is required to manage the modern smart grid resources. On one hand, this type of integration can dramatically improve grid performance and efficiency, but on the other, it can also introduce new types of vulnerability. The risk of vulnerability escalates when the level of integration between physical and cyber components of the power system increases. This talk will discuss the design and optimization of such complex systems which require coordination between the cyber and physical components in order to obtain the best performance while minimizing the risk of vulnerability.

**Thursday, November 5, 09:50 - 10:20**

**CB: Coffee Break**

Room: Foyer - L3

**Thursday, November 5, 10:20 - 12:00**

**S1-6: Communication and Networking Technologies in Smart Grid**

Room: ABCD

Chair: Mehul Soman (Texas Instruments, USA)

**Modelling and Delay Analysis of Wireless Home Area Networks in a Smart Grid**

Abdulfattah Noorwali, Raveendra Kolarramakrishna Rao and Abdallah Shami (The University of Western Ontario, Canada)

pp. 569-574

**Hybrid Wi-Fi/LTE Aggregation Architecture for Smart Meter Communications**

Farshad Koochifar, Nico Saputro, Ismail Güvenç and Kemal Akkaya (Florida International University, USA)

pp. 575-580

**Energy-aware Adaptive Restricted Access Window for IEEE 802.11ah Based Smart Grid Networks**

Yanru Wang, Yun Li, Kok Keong Chai and Yue Chen (Queen Mary University of London, United Kingdom); John Schormans (Queen Mary, University of London, United Kingdom)

pp. 581-586

**An Adaptive MAC for HomePlug Green PHY PLC to Support Realistic Smart Grid Applications**

Muharrem Ayar, Haniph A. Latchman and Janise McNair (University of Florida, USA)

pp. 587-592

**Open System for Energy Services (OS4ES)**

Jörg Benze and Andreas Lang (T-Systems Multimedia Solutions GmbH, Germany); Antonis Papanikolaou (Hypertech SA, Greece); Tim Dethlefs (Hochschule für Angewandte Wissenschaften Hamburg, Germany); Wolfgang Renz (Hamburg University of Applied Sciences, Germany); Andrea Schröder (FGH e. V., Germany)

pp. 593-598

**S2-6: Privacy 2, Authentication and Detection**

Room: E

Chair: Richard E. Newman (University of Florida, USA)

**Lynx: Authenticated Anonymous Real-Time Reporting of Electric Vehicle Information**

Hongyang Li (University of Illinois at Urbana-Champaign, USA); György Dán (KTH Royal Institute of Technology, Sweden); Klara Nahrstedt (University of Illinois, USA)

pp. 599-604

**Authenticated Down-Sampling for Privacy-Preserving Energy Usage Data Sharing**

Daisuke Mashima (Fujitsu Laboratories of America, USA)

pp. 605-610

**Combining Electric Vehicle and Rechargeable Battery for Household Load Hiding**

Yanan Sun, Lutz Lampe and Vincent W.S. Wong (University of British Columbia, Canada)

pp. 611-616

**Detection of X86 Malware in AMI Data Payloads**

Vignesh Babu (University of Illinois at Urbana-Champaign, USA); David Nicol (University of Illinois, Champaign-Urbana, USA)

pp. 617-622

**S3-7: Renewable Power Generation 2**

Room: GHJK

Chair: Mohammad Khodayar (SMU, USA)

**Effect of Aggregation for Multi-site Photovoltaic (PV) Farms**

Han Seung Jang (Korea Advanced Institute of Science and Technology, Korea); Kuk Yeol Bae (KAIST, Korea); Hong-Shik Park (Korea Advanced Institute of Science and Technology (KAIST), Korea); Dan Keun Sung (Korea Advanced Institute of Science and Technology, Korea)

pp. 623-628

**Sizing Residential Photovoltaic Systems in the State of Georgia**

Rami J. Haddad (Georgia Southern University, USA); Adel El Shahat (Georgia Southern University, USA); Bikiran Guha and Youakim Kalaani (Georgia Southern University, USA)

pp. 629-634

**Baseline Measurements of an AC Solar Photo Voltaic Micro Grid System in a Reserve Forest of India**

Kaustubh Karnataki, Akshay A Deshpande, Tejas Kumar and Kavya Darshana (FluxGen Engineering Technologies Pvt. Ltd., India); Abhishek Joshi (KLS Gogte Institute of Technology, India); Ganesh Shankar (FluxGen Engineering Technologies Pvt. Ltd., India); Mitavachan Hiremath (Center for Sustainability, Policy & Technology Management & FluxGen Engineering Technologies, India)

pp. 635-640

**Energy Storage Management in Smart Homes Based on Resident Activity of Daily Life Recognition**

Peng Zhuang and Hao Liang (University of Alberta, Canada)

pp. 641-646

**Optimal Energy Management for Microgrids with Cogeneration and Renewable Energy Sources**

Zheming Liang and Yuanxiong Guo (Oklahoma State University, USA)

pp. 647-652

#### **S4-7: Smart Building and Energy Efficiency I**

Room: Watson Island

Chair: Rui Zhang (IBM, T. J. Watson Research Center, USA)

##### **Automated Customer Segmentation Based on Smart Meter Data with Temperature and Daylight Sensitivity**

Christian Beckel and Leyna Sadamori (ETH Zurich, Switzerland); Silvia Santini (TU Dresden, Germany); Thorsten Staake (University of Bamberg, Germany)  
pp. 653-658

##### **Creating Influential Nodes in a Smart Building Social Network**

Alex Cassidy and Arye Nehorai (Washington University in St. Louis, USA)  
pp. 659-664

##### **Model Predictive Control of Integrated Room Automation Considering Occupants Preference**

Sareh Agheb and Xiaoqi Tan (Hong Kong University of Science and Technology, Hong Kong); Danny H.K. Tsang (HKUST, Hong Kong)  
pp. 665-670

##### **Dynamic Building Energy Consumption Forecast Using Weather Forecast Interpolations**

Rui Zhang (IBM, T. J. Watson Research Center, USA); Hongxia Yang (Tech Yahoo!, USA)  
pp. 671-676

**Thursday, November 5, 12:00 - 13:30**

**L: Lunch**

Room: F

**Thursday, November 5, 13:30 - 15:10**

#### **S1-7: Advancing PHY Layer for Smart Grid Communication**

Room: ABCD

Chair: Nico Sapatro (Florida International University, USA)

##### **Robust Decoding for OFDM Systems in Memory Impulse Channels**

Der-Feng Tseng and Tsung-Li Chang (National Taiwan University of Science and Technology, Taiwan)  
pp. 677-682

##### **Sum-Rate-Optimal Dual-QoS MIMO Multicasting Over Medium-Voltage NB-PLC Networks**

Ahmed ElSamadouny and Naofal Al-Dhahir (University of Texas at Dallas, USA)  
pp. 683-688

**Power Talk in DC Micro Grids: Constellation Design and Error Probability Performance**

Marko Angjelichinoski (Aalborg University, Denmark); Čedomir Stefanović (Aalborg University & University of Novi Sad, Denmark); Petar Popovski and Frede Blaabjerg (Aalborg University, Denmark)  
pp. 689-694

**Channel Occupancy - Faster, Better, Stronger**

Tanguy Ropitault (Telecom Bretagne, France); Alexander Pelov (Institut Mines-Telecom / Telecom Bretagne, France); Laurent Toutain (Telecom Bretagne, France); Ramanuja Vedantham (Texas Instruments Inc., USA); Philippe Chiummiento (ITRON, France)  
pp. 695-700

**S1-8: Cyber Physical Systems and Application Layer Technologies in Smart Grid**

Room: E

Chair: Husheng Li (University of Tennessee, USA)

**Communications for Distributed State Estimation in CPSs with Application in Smart Grids**

Husheng Li (University of Tennessee, USA); Ju Bin Song (Kyung Hee University, Korea)  
pp. 701-706

**Entropy Analysis of CPS with Application in Smart Grids: From Discrete Network to Continuum Limit**

Husheng Li (University of Tennessee, USA)  
pp. 707-712

**The CoAP-based M2M Gateway for Distribution Automation System Using DNP3.0 in Smart Grid Environment**

Injae Shin and Doo-seop Eom (Korea University, Korea); Byung-Kwen Song (SeoKyeong University, Korea)  
pp. 713-718

**A Lightweight CoAP-based Software Defined Networking for Resource Constrained AMI Devices**

Jaebeom Kim and Young-Bae Ko (Ajou University, Korea); Fethi Filali (QMIC, Qatar)  
pp. 719-724

**S3-8: Voltage and Frequency Regulation**

Room: GHJK

Chair: Saman Zonouz (Rutgers University, USA)

**Fast Localized Voltage Regulation in Single-Phase Distribution Grids**

Vassilis Kekatos (Virginia Tech, USA); Liang Zhang and Georgios B. Giannakis (University of Minnesota, USA); Ross Baldick (The University of Texas at Austin, USA)  
pp. 725-730

**Local Voltage Control in Distribution Systems: An Incremental Control Algorithm**

Masoud Farivar (California Institute of Technology, USA); Xinyang Zhou (University of Colorado, Boulder, USA); Lijun Chen (University of Colorado at Boulder, USA)

pp. 731-736

**Algorithms for Voltage Control in Distribution Networks**

Guido Cavraro (University of Padova, Italy); Ruggero Carli (University of Padova, Italy)

pp. 737-742

**Analysis of Energy- And SoC-Neutral Contracts for Frequency Regulation with Energy Storage**

Dariush Fooladivanda (University of Toronto, Canada); Catherine Rosenberg (University of Waterloo, Canada); Siddharth Garg (New York University, USA)

pp. 743-749

**Risk-averse Forward Contract for Electric Vehicle Frequency Regulation Service**

Enxin Yao, Vincent W.S. Wong and Robert Schober (University of British Columbia, Canada)

pp. 750-755

**S3-9: Microgrid Control and Simulation 3**

Room: Watson Island

Chair: Husheng Li (University of Tennessee, USA)

**On Using Distributed Energy Resources to Reshape the Dynamics of Power Systems During Transients**

Abdallah Farraj, Eman M. Hammad and Deepa Kundur (University of Toronto, Canada)

pp. 756-761

**Multi-Threading Based Parallel Dynamic Simulator for Transient Behavior Analysis of Power Systems**

Jie Wu (University of Notre Dame, USA); Peter Feldmann (D. E. Shaw Research, USA); Jinjun Xiong (IBM Thomas J. Watson Research Center, USA); Yiyu Shi (Missouri Univ of Science & Technology, USA)

pp. 762-767

**A Systematic Approach to Delay-Adaptive Control Design for Smart Grids**

Abdallah Farraj, Eman M. Hammad and Deepa Kundur (University of Toronto, Canada)

pp. 768-773

**Multi-Domain Modeling of Distributed Energy Systems -- The MOCES Approach**

Lukas Exel, Felix Felgner and Georg Frey (Saarland University, Germany)

pp. 774-779

**Stochastic Control of Energy Efficient Buildings: A Semidefinite Programming Approach**

Xiao Ma (University of Tennessee, USA); Jin Dong (University of Tennessee, Knoxville, USA); Seddik M. Djouadi (University of Tennessee, USA); James Nutaro and Teja Kuruganti (Oak Ridge National Laboratory, USA)

pp. 780-785

**Thursday, November 5, 15:10 - 15:40**

**CB: Coffee Break**

Room: Foyer - L3

**Thursday, November 5, 15:40 - 17:20**

**S1-9: Modeling and Performance Analysis**

Room: ABCD

Chair: Nico Saputro (Florida International University, USA)

**Holistic Modelling Approach for Techno-Economic Evaluation of ICT Infrastructures for Smart Grids**

Nils Dorsch, Stefan Böcker and Christian Hägerling (TU Dortmund University, Germany);  
Christian Wietfeld (TU Dortmund University & Communication Networks Institute, Germany)  
pp. 786-791

**PeRF-Mesh: A Performance Analysis Tool for Large Scale RF-mesh-based Smart Meter Networks with FHSS**

Filippo Malandra (Polytechnique Montreal & Ecole Polytechnique de Montreal, Canada); Brunilde Sansò (Ecole Polytechnique de Montreal, Canada)  
pp. 792-797

**Large-scale ASP-based HEMS Utilizing Interactive Web Technologies**

Temuulen Enkhee, Go Hasegawa, Yuya Tarutani, Kazuhiro Matsuda and Morito Matsuoka (Osaka University, Japan)  
pp. 798-803

**Real-time Pricing Strategy with Multi-Retailers Based on Network Stability**

Huwei Chen (Shanghai University, P.R. China); Zhou Su (Waseda University, Japan); Dongfeng Fang and Hui Hui (Shanghai University, P.R. China)  
pp. 804-808

**S3-10: Power System Resilience**

Room: E

Chair: Chee-Wooi Ten (Michigan Technological University, USA)

**PLCloud: Comprehensive Power Grid PLC Security Monitoring with Zero Safety Disruption**

Henry Senyondo (University of Miami, USA); Pengfei Sun (Rutgers University, USA); Robin Berthier (University of Illinois at Urbana-Champaign, USA); Saman Zonouz (Rutgers University, USA)  
pp. 809-815

**Transmission Network Restoration Considering AC Power Flow Constraints**

Ali Arab (University of Houston, USA); Amin Khodaei (University of Denver, USA); Suresh Khator and Zhu Han (University of Houston, USA)

pp. 816-821

**Dynamic Resilience for Power Distribution System and Customers**

Chuanyi Ji and Yun Wei (Georgia Institute of Technology, USA)

pp. 822-827

**Resilient Control Design for Wind Turbines Using Markov Jump Linear System Model with Levy Noise**

Juntao Chen and Quanyan Zhu (New York University, USA); Liuwei Zhou (New York University & Polytechnic School of Engineering, USA)

pp. 828-833

**A Communication Framework for an Ad-hoc Microgrid for Disaster Response**

Hussain Al Suwaidan, Salman Mohagheghi and Qi Han (Colorado School of Mines, USA)

pp. 834-839

**S4-8: Energy Management and Control in Smart Grid**

Room: GHJK

Chairs: Yuanxiong Guo (Oklahoma State University, USA), Yang Weng (Stanford University, USA)

**Coordinated Energy Management for Colocation Data Centers in Smart Grids**

Yuanxiong Guo (Oklahoma State University, USA); Miao Pan (University of Houston, USA)

pp. 840-845

**Optimal Battery Energy Storage System Control in Microgrid with Renewable Energy Generation**

Wanrong Tang and Ying Jun (Angela) Zhang (The Chinese University of Hong Kong, Hong Kong)

pp. 846-851

**Delivering Smart Load-shedding for Highly-stressed Grids**

Noman Bashir (Center for Advance Studies in Energy, National University of Science and Technology, Pakistan, Pakistan); Zohaib Sharani, Khushboo Qayyum and Affan Syed (SysNet Lab, National University of Computer and Emerging Sciences, Islamabad, Pakistan, Pakistan)

pp. 852-858

**SHE: Smart Home Energy Management System Based on Social and Motion Behavior Cognition**

Siyun Chen (Xi'an Jiaotong University, P.R. China); Ting Liu (Xi'an Jiaotong University, PRC, P.R. China); Yadong Zhou and Chao Shen (Xi'an Jiaotong University, P.R. China); Feng Gao (Xi'an JiaoTong University, P.R. China); Yulin Che and Zhanbo Xu (Xi'an Jiaotong University, P.R. China)

pp. 859-864

**Probabilistic Estimation of the Potentials of Intervention-Based Demand Side Energy Management**

Jiafan Yu, Yang Weng, Chin-Woo Tan and Ram Rajagopal (Stanford University, USA)

pp. 865-870

## **S4-9: Smart Building and Energy Efficiency II**

Room: Watson Island

Chair: Kirk Spence (University of the West Indies, Jamaica)

### **A Fully Unsupervised Nonintrusive Load Monitoring Framework**

Ruoxi Jia, Yang Gao and Costas Spanos (UC Berkeley, USA)

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### **Residential Appliance Monitoring Based on Low Frequency Smart Meter Measurements**

Herath Gedara Chinthaka Pathum Dinesh, Pramuditha Perera, Gunawath Mudiyansele Roshan

Indika Godaliyadda and Mervyn Parakrama Ekanayake (University of Peradeniya, Sri Lanka);

Janaka Ekanayake (Cardiff University, United Kingdom)

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### **Smart Home Energy Management Systems Based on Non-Intrusive Load Monitoring**

Wenjin (Jason) Li, Xiaoqi Tan and Danny H. K. Tsang (Hong Kong University of Science and Technology, Hong Kong)

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### **Suspicious Electric Consumption Detection Based on Multi-Profiling Using Live Machine Learning**

Thomas Hartmann (Interdisciplinary Centre for Security, Reliability and Trust (SnT), University of Luxembourg, Luxembourg); Assaad Moawad and Francois Fouquet (SnT, University of Luxembourg, Luxembourg); Yves Reckinger (Creos Luxembourg S.A., Luxembourg); Tejeddine

Mouelhi (iTrust Consulting, Luxembourg); Jacques Klein (SnT, University of Luxembourg, Luxembourg); Yves Le Traon (University of Luxembourg, Luxembourg)

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### **The Meter Tells You are At Home! Non-Intrusive Occupancy Detection Via Load Curve Data**

Guoming Tang and Kui Wu (University of Victoria, Canada); Jingsheng Lei (Shanghai University of Electric Power, P.R. China); Weidong Xiao (National University of Defense and Technology, P.R. China)

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**Thursday, November 5, 17:20 - 17:30**

### **Closing: Closing Remarks**

Janise McNair (University of Florida)

Room: E