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

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

Additional Copies of This Publication Are Available From:

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Red Hook, NY 12571 USA
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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

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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

S2-1: Privacy 1

Room: E
Chair: Selcuk Uluagac (Florida International University, USA)

S3-1: Microgrid Control and Simulation 1

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

S4-1: Power Grid Analytics

Room: Watson Island (L2)
Chair: Lalitha Sankar (Arizona State University, USA)

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 Univerrsity 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

S3-2: Efficient Load Operation

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

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 (Devolo 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 challeges 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)

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)

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)

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)

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)

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)

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)

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 Chelmis 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)

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 Koohifar, 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

S3-7: Renewable Power Generation 2

Room: GHJK
Chair: Mohammad Khodayar (SMU, USA)

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 Saputro (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)

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)
pp. 871-877

Residential Appliance Monitoring Based on Low Frequency Smart Meter Measurements
Herath Gedara Chinthaka Pathum Dinesh, Pramuditha Perera, Gunawath Mudiyanselage Roshan Indika Godaliyadda and Mervyn Parakrama Ekanayake (University of Peradeniya, Sri Lanka); Janaka Ekanayake (Cardiff University, United Kingdom)
pp. 878-884

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)
pp. 885-890

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, Luxemburg); Assaad Moawad and Francois Fouquet (SnT, University of Luxembourg, Luxemburg); Yves Reckinger (Creos Luxembourg S.A., Luxemburg); Tejeddine Mouelhi (iTrust Consulting, Luxemburg); Jacques Klein (SnT, University of Luxembourg, Luxemburg); Yves Le Traon (University of Luxembourg, Luxemburg)
pp. 891-896

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)
pp. 897-902

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

Closing: Closing Remarks

Janise McNair (University of Florida)
Room: E