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Modeling, Simulation, And Optimization for the
21st Century Electric Power Grid

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Program

Modeling, Simulation and Optimization for the 21st Century Electric Power Grid

October 21-25, 2012

Grand Geneva Resort
Lake Geneva, Wisconsin USA

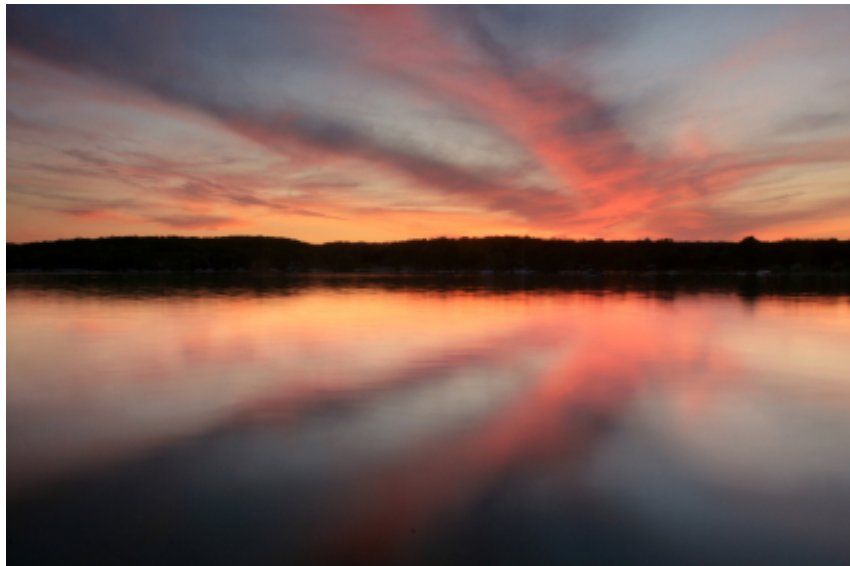
Conference Chairs

Mark C. Petri

Argonne National Laboratory

Paul Myrda

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Sunday, October 21, 2012

16:00 – 18:00 Conference Check-in / Registration (Salon C Foyer)

18:00 – 20:00 Opening Dinner (Loramoor A/B)
(Cash bar available)

NOTES

- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Technical sessions on Monday and Tuesday will be in Salon C. Technical sessions on Wednesday and Thursday will be in Salon B.
- Poster sessions will be in Evergreen 2-3.
- Breakfasts and lunches will be in Loramoor A/B.
- The conference banquet on Wednesday will be at Maple Lawn A/B.
- Speakers – Please leave at least 5 minutes for questions and discussion. Be available for discussion during meals and social periods

Monday, October 22, 2012

- 07:30 – 09:00 Continental Breakfast
- 09:00 – 09:15 **Welcome**
Mark C. Petri, Argonne National Laboratory
- Power Grid Modeling, Simulation and Optimization Needs***
- 09:15 – 09:30 **Welcome Address**
Flora Flygt, American Transmission Company
- 09:30 – 10:15 **Keynote Address**
Paul Myrda, Electric Power Research Institute
- 10:15 – 11:00 Coffee Break
- 11:00 – 12:30 ***Panel Discussion on System Operators' Perspectives on the Need for Power Grid Modeling, Simulation, and Optimization***
Moderator: Joseph H. Eto, Lawrence Berkeley National Laboratory
- Panelists:
George Angelidis, California ISO
Dhiman Chatterjee, Midwest Independent Transmission System Operator, Inc.
Dejan Sobajic, New York Independent System Operator
Paul Sotkiewicz, PJM
- 12:30 – 14:15 Lunch and Networking Opportunity
- Grid Operations and Disruptions***
Session chair: Marco C. Janssen, UTInnovation
- 14:15 – 14:40 **Improving Transmission Asset Utilization Through Advanced Mathematics and Computing**
Zhenyu (Henry) Huang, Pacific Northwest National Laboratory
- 14:40 – 15:05 **Advanced Power System Operations Through Transmission Switching**
Jianhui Wang, Argonne National Laboratory
- 15:05 – 15:30 **High-Performance Computing for Real-Time Detection of Large-Scale Power Grid Disruptions**
Mohammed M. Olama, Oak Ridge National Laboratory
- 15:30 – 16:00 Coffee Break
- 16:00 – 16:25 **Cascading Outage Analysis Using Sequential Outage Checkers**
Yezhou Wang, University of Texas at Austin

Monday, October 22, 2012 (continued)

16:25 – 16:50

Geomagnetic Disturbance Analysis of HV and EHV Grids

Roger Dugan, Electric Power Research Institute

16:50 – 17:30

Break

17:30 – 19:00

Poster Session / Reception with refreshments

Host: Northwestern University, Initiative for Sustainability and Energy at Northwestern (ISEN)

Tuesday, October 23, 2012

- 07:45 – 08:30 Continental Breakfast
- Unit Commitment and Market Optimization***
Session chair: Ross Guttromson, Sandia National Laboratory
- 08:30 – 08:55 **Stochastic Unit Commitment for the Day-Ahead Market and Resource Adequacy Assessment**
Sarah M. Ryan, Iowa State University
- 08:55 – 09:20 **Stochastic Market Clearing: Advances in Computation and Economic Impacts**
Victor M. Zavala, Argonne National Laboratory
- 09:20 – 09:45 **Exploring the Market Power in a Deregulated Electricity Market: A Computational Approach**
Brian Gaucher, IBM Research
- 09:45 – 10:10 **Integrating Small-Scale Distributed Energy Generation, Storage, and Demand-Side Management in the Unit Commitment Problem**
Johann Hurink, University of Twente
- 10:10 – 11:00 Coffee Break
- 11:00 – 11:45 ***Keynote Address***
Richard O'Neill, Chief Economic Advisor, Federal Energy Regulatory Commission
- 11:45 – 13:30 Box Lunch
- 13:30 – 16:30 Networking Opportunity / *ad hoc* Sessions / Free Time
- Planning and Integration of Renewable Generation***
Session chair: Paul Myrda, Electric Power Research Institute
- 16:30 – 16:55 **Stochastic Generation Expansion Planning**
David Woodruff, University of California, Davis
- 16:55 – 17:20 **How Important is Sub-Hourly Modeling in Renewable Integration Studies?**
Paul Denholm, National Renewable Energy Laboratory
- 17:20 – 17:45 **Characterizing and Modeling Wind Power Forecast Errors from Operational Systems for Use in Wind Integration Planning Studies**
Bri-Mathias Hodge, National Renewable Energy Laboratory
- 17:45 – 18:00 Stretch Break
- 18:00 – 18:25 **Real-Time Dynamic Models for Wind Power Plants**
Bri-Mathias Hodge, National Renewable Energy Laboratory

Tuesday, October 23, 2012 (continued)

- 18:25 – 18:50 **SIMWIND: A Geospatial Infrastructure Model for Optimizing Wind Power Generation and Transmission**
Benjamin R. Phillips, SRA International, Inc. / U.S. Department of Energy
- 19:00 – 20:30 ***Poster Session / Reception with refreshments***

Wednesday, October 24, 2012

- 07:45 – 08:30 Continental Breakfast
- Demand Response and Energy Storage***
Session chair: Steven J. Fernandez, Oak Ridge National Laboratory
- 08:30 – 08:55 **Modeling Constrained Demand Response in a Production Cost Model**
Paul Denholm, National Renewable Energy Laboratory
- 08:55 – 09:20 **Primary Frequency Response Ancillary Service in the Market Design**
Erik Ela, National Renewable Energy Laboratory
- 09:20 – 09:45 **Evaluation of Energy Storage Technologies for Damping Control**
Raymond H. Byrne, Sandia National Laboratories
- 09:45 – 10:30 Coffee Break
- 10:30 – 11:15 ***Keynote Address***
Gilbert Bindewald III, Office of Electricity Delivery and Energy Reliability, U.S. Department of Energy
- 11:15 – 12:45 Lunch
- Computational Methods***
Session chair: Jianhui Wang, Argonne National Laboratory
- 12:45 – 13:15 ***Keynote Address***
Brian P. Gaucher, Manager, Smarter Energy, IBM Research
- 13:15 – 13:40 **Solving Network Reconfiguration by Semi-Definite Programming**
Cong Liu, Argonne National Laboratory
- 13:40 – 14:05 **A GPU-Based Real-Time Event Detection Framework for Power System Frequency Data Streams**
Olufemi A. Omitaomu, Oak Ridge National Laboratory
- 14:05 – 14:30 **The Split-System Method for Simulating Cyber-Physical Systems**
James Nutaro, Oak Ridge National Laboratory
- 14:30 – 15:15 Coffee Break
- 15:15 – 15:40 **A More Scalable Approach to Linear Programming for Energy Market Optimization**
Stephen Elbert, Pacific Northwest National Laboratory
- 15:40 – 16:05 **Using PETSc as a Testbed for Developing and Benchmarking Parallel Power System Applications**
Shrirang Abhyankar, Argonne National Laboratory
- 16:05 – 18:00 Free time
- 18:00 – 20:00 Conference Banquet

Thursday, October 25, 2012

07:45 – 08:30 Continental Breakfast

08:30 – 10:15 ***Panel Discussion on Synergies and Cross-Cutting Themes***

Moderator: Mark C. Petri, Argonne National Laboratory

Panelists:

Gilbert Bindewald III, Department of Energy, Office of Electricity

Bri-Mathias Hodge, National Renewable Energy Laboratory

Raymond H. Byrne, Sandia National Laboratories

Victor M. Zavala, Argonne National Laboratory

James Nutaro, Oak Ridge National Laboratory

10:15 – 10:30 Wrap-up

Mark C. Petri, Argonne National Laboratory

Poster List

1. **A Frequency Data Recorder for Multiple Generator Tracking**
Bogdan Vacaliuc, Oak Ridge National Laboratory, USA
2. **PySP: Scalable Stochastic Programming in Python**
Jean-Paul Watson, Sandia National Laboratories, USA
3. **Eastern Seaboard Electric Grid Fragility Maps Supporting Persistent Availability**
Kimberly A. Walker, Indiana University, USA
4. **Locational Marginal Price for Distribution System Considering Demand Response**
Farshid Shariatzadeh, Washington State University, USA
5. **Load Model Parameter Estimation in the Presence of Noise**
Siming Guo, University of Illinois at Urbana-Champaign, USA
6. **A Study of Electromechanical Disturbance Propagation in Power Systems**
Saurav Mohapatra, University of Illinois at Urbana-Champaign, USA
7. **Issues Related to Geomagnetically Induced Current Modeling and Simulation**
Trevor Hutchins, University of Illinois at Urbana-Champaign, USA
8. **Improving Electrical Distribution System (EDS) in a Nuclear Power Plant Utilizing ETAP – Post-Fukushima Study**
Mahdi Sadiqi, University of North Carolina at Charlotte, USA
9. **Design and Cost Optimization of a Hybrid Power System for Rural Communities in Afghanistan**
Mahdi Sadiqi, University of North Carolina at Charlotte, USA
10. **Stochastic Optimization of a Microgrid with Solar Power Generation Using Benders' Decomposition**
Robin Broder Hytowitz, Arizona State University, USA
11. **Measurement-Based Power System Model for Dynamic Response Estimation**
Yong Liu, the University of Tennessee at Knoxville, USA
12. **Real-Time Situational Awareness Applications for Petaflop Computing**
S.J. Fernandez, Oak Ridge National Laboratory, USA
13. **Dynamic State Based Protection**
Zhenyu Tan, Georgia Institute of Technology, USA
14. **Autonomous Optimization Using State Estimation Based Protection**
Renke Huang, Georgia Institute of Technology, USA
15. **Transmission Expansion Planning Using a Linearized AC Model**
Hui Zhang, Arizona State University, USA
16. **A Decentralized Multi-Agent Architecture for Operation of a Microgrid**
Niannian Cai, Michigan State University, USA
17. **Sub-hour Solar Data for Power System Modeling from Static Spatial Variability Analysis**
Paul Denholm, National Renewable Energy Laboratory, USA