



**SMART GRID CENTER**  
TEXAS A&M ENGINEERING EXPERIMENT STATION

## SMART GRID WORKSHOP

# Challenges in Evaluating Smart Grid Solutions: Metric, Testing, Certification, Modeling and Simulation, Testbeds

Memorial Student Center

Texas A&M University

April 21, 2015

### Program

- 7:30 **Registration, Room 2400**
- 8:00 **Opening Remarks:** Workshop Goals and Objectives, and Smart Grid Center Role, [Mladen Kezunovic](#), Director, Smart Grid Center, TEES ([Presentation Slides](#))
- 8:10 **Welcome:** [Glen A. Laine](#), Vice President for Research, TAMU
- 8:20 **Invited Talk 1:** “[Evaluation of Business Cases for Smart Grid Solutions](#),” [Kenneth M. Mercado](#), Senior Vice President, Electric Utility Business, CenterPoint Energy ([Presentation Slides](#))
- 8:45 **Invited Talk 2:** “[The Future Synergy of Large-Scale Testbeds and Training Simulators](#),” [Robin Podmore](#), President and CEO, IncSys ([Presentation Slides](#))
- 9:10 **Panel 1:** [State of the Art: Modeling, Simulation, Testing and Calibration Facilities](#)
- Chair: [Lance Spross](#), Oncor
- Co-Chair: [Miroslav Begovic](#), TAMU
- “Test and User Facilities at NREL,” [James Cale](#), NREL
- “PV and Microgrid Test Facilities at TAMUQ,” [Haitham Abu-Rub](#), TAMU-Qatar ([Presentation Slides](#))
- “Cybersecurity Test and Evaluation Facilities at Texas A&M,” [Karen Butler](#), TAMU ([Presentation Slides](#))
- “Open Platform for Developing and Testing Smart Grid IEDs,” [Igor Alvarado](#), National Instruments ([Presentation Slides](#))

10:10 **Break (Room 2400) and Posters (Room 2401)**

10:30 **Focus Group Sessions:**

[Big Data, Weather Impacts, Asset & Outage Management](#)

**Rm 2400**

Chair: [Mike Mihuc](#), OSIsoft Co-  
Chair: [Anita Rapp](#), TAMU  
Presenter: [Zenón Medina-Cetina](#),  
TAMU

[EMS, DMS, Cybersecurity, Substation Automation](#)

**Rm 2500**

Chair: [Dmitry Ishchenko](#), ABB  
Co-Chair: [Alex Sprintson](#),  
TAMU  
([Presentation Slides](#))

[Demand-Side Management, Ancillary Services, Markets](#)

**Rm 2501**

Chair: [Julia Matevosyan](#), ERCOT Co-  
Chair: [Steven Puller](#), TAMU  
([Presentation Slides](#))

11:30 **Plenary Session:** Report-out by Focus Groups (Room 2400)

12:00 **Lunch (Room 2406) and Posters (Room 2401)**

**Welcome:** [Miroslav Begovic](#), President, IEEE Power & Energy Society and Department Head of ECEN at TAMU

**Keynote Talk:** “[Stakeholder Beliefs about Smart Grid’s Influence on Energy Cybersecurity, Reliability and Supply](#),” [Tarla Rai Peterson](#), Professor, The Boone and Crockett Chair, TAMU ([Presentation Slides](#))

13:30 **Focus Group Sessions**

[Microgrids, EVs, Distributed Generation, Energy Storage](#)

**Rm 2400**

Chair: [Nick Haschka](#), NRG  
Energy  
Co-Chair: [Natarajan Gautam](#),  
TAMU  
Presenter: [Lance Spross](#), Oncor  
([Presentation Slides](#))

[Building Energy Management, Smart Meters, Sensors](#)

**Rm 2500**

Chair: [Sang Hoon Lee](#),  
Lawrence Berkeley Natl. Lab  
([Presentation Slides](#))  
Co-Chair: [Charlie Culp](#), TAMU  
Presenter: Steve Blanc, PG&E  
([Presentation Slides](#))

[Synchrophasor Systems, PMUs & PDCs, GPS](#)

**Rm 2501**

Chair: [Glauco Taranto](#), COPPE, Brazil  
Co-Chair: [Le Xie](#), TAMU  
([Presentation Slides](#))

14:30 **Break (Room 2400) and Posters (Room 2401)**

15:00 **Plenary Session:** Report-out by Focus Groups (Room 2400)

15:30 **Panel 2:** [Future Developments of Testbeds](#)

Chair: [Paul Boynton](#), NIST

Co-Chair: [Chanan Singh](#), TAMU

“Agile Architectures and Their Evaluations”, John Reynolds, Fractal Grid ([Presentation Slides](#))

“Future Requirements for Evaluating and Field Testing of Synchrophasors”, [Bill Blevins](#), ERCOT

“Needs for Testing Future Cyberphysical Solutions,” [Paul Skare](#), Pacific Northwest National Lab.  
([Presentation Slides](#))

“Real-time Simulators, the Next Level”, [Jean Bélanger](#), OPAL-RT Technologies ([Presentation Slides](#))

16:30 **Closing Remarks:** [Mladen Kezunovic](#), Director, Smart Grid Center, TEES

17:00 **Post-Workshop Reception (Room 2400) and Posters (Room 2401)**

18:30 **Adjourn.**

## Posters (Room 2401)

### Big Data, Weather Impacts, Asset & Outage Management

	<b>Authors</b>	<b>Title</b>
<b>1.</b>	<b>Abdullah, A.</b> , M. Kezunovic	High Speed Fault Detection in Smart Grids
<b>2.</b>	<b>Chen, P-C.</b> , T. Dokic, D. Goldberg, M. Kezunovic	Utilizing Geographical Information System (GIS) for Distribution Outage Management (OM)
<b>3.</b>	<b>Chen, P-C.</b> , T. Dokic, M. Kezunovic	The Use of Big Data for Outage Management in Distribution Systems
<b>4.</b>	<b>Dehghanian, P.</b> , T. Popovic, M. Kezunovic	Assessing the Impact of Power System Topology Control on Circuit Breaker Reliability and Electric Safety
<b>5.</b>	<b>Dokic, T.</b> , M. Kezunovic	Evaluating Impact of Weather to Insulation Coordination Using Big Data
<b>6.</b>	<b>Dokic, T.</b> , N. Stokes, P.-C. Chen, D.W. Goldberg, M. Kezunovic	Geospatial Analysis for Electric Transmission Network Outage Management

### EMS, DMS, Cybersecurity, Substation Automation

<b>7.</b>	<b>Chen, B.</b> , N. Pattanaik, A. Goulart, K. Butler-Purpy, D. Kundur	Implementing Attacks for Modbus/TCP Protocol in a Real-Time Cyber Physical System Test Bed
<b>8.</b>	<b>Lan, T.</b> , G. Huang	Transmission Line Switching in Power System Planning with Large Scale Renewable Energy
<b>9.</b>	<b>Tasdighi, M.</b> , M. Kezunovic	Impact Analysis of Network Topology Change on Transmission Distance Relay Settings
<b>10.</b>	<b>Wang, W.</b> , G. Huang	Stability Issues in Smart Grid Transmission Switching

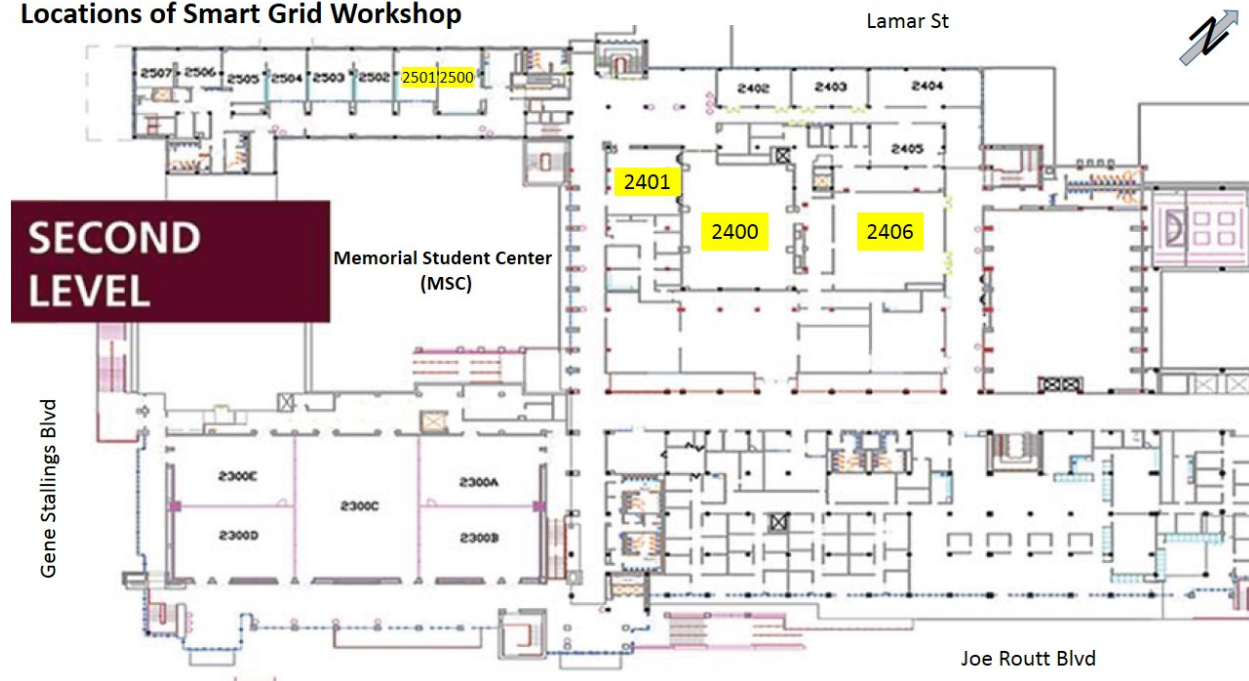
### Synchrophasor Systems, PMUs & PDCs, GPS

<b>11.</b>	<b>Becejac, T.</b> , T. Popovic, M. Kezunovic	Field End-to-End Calibration for Synchrophasor System
<b>12.</b>	<b>Esmailian, A.</b> , M. Kezunovic, T. Popovic	Development of Synchrophasor-Based Applications
<b>13.</b>	<b>Shome, P.</b> , A. Sprintson	A Software Defined Networking-based testbed for network emulation and performance evaluation of smart grid solutions
<b>14.</b>	<b>Qian, C.</b> , Tomo Popovic, Mladen Kezunovic	Implementation of Calibration and Certification Laboratory at Texas A&M University

## Microgrids, EVs, Distributed Generation, Energy Storage

15.	<b>Bamgbose, S.</b> , Y. Zhang, L. Qian	Robust Optimal Voltage Tracking for Distributed Three-phase Inverters
16.	<b>Chou, H.-M.</b> , G.M. Huang, K. Butler-Purry	Voltage Stability Induced by Reactive Power Limit in Microgrids
17.	<b>Li, J.</b> , B. Xia, X. Geng, H. Ming, S. Shakkokottai, V. Subramanian, L. Xie	Energy Coupon: A Mean Field Game Perspective on Demand Response in Smart Grids
18.	<b>Li, X.</b> , R. Balog	Analysis and Comparison of Two Active Anti-Islanding Detection Methods
19.	<b>Torabi, N.</b> , H. Toliat	Fault Diagnostics of Multilevel Inverters
20.	<b>Yan, Q.</b> , I. Manickam, L. Xie, M. Kezunovic	A Multi-Tiered Real-Time Pricing Algorithm for Electric Vehicle Charging Stations
21.	<b>Zhang, B.</b> , Mladen Kezunovic	Impact of Available Electric Vehicle Battery Power Capacity on Power System Reliability
22.	<b>Zheng, J.</b>	The Dynamic Characteristics of Photovoltaic Generation System under Partially Shaded Conditions
23.	<b>Zhou, N.</b> , L. Qian	Auxiliary Frequency and Voltage Regulation in Microgrid via Intelligent Electric Vehicle Charging

### Locations of Smart Grid Workshop



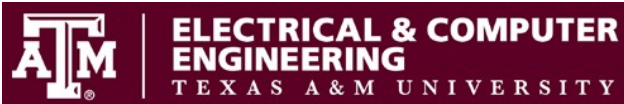
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