MESSAGE FROM THE CHAIRPERSONS

Welcome to 2011 IEEE Conference on Smart Measurements for Future Grids - better known as SMFG 2011! This conference is sponsored by the IEEE Instrumentation and Measurement Society and technically co-sponsored by the IEEE Power and Energy Society, the IEEE Power Electronic Society, the IEEE Communication Society, the IEEE Computer Society and the IEEE Control Systems Society within the IEEE Smart Grid initiative. It is the first international conference on Smart Measurements for Future Grids and has been designed to highlight measurement issues that surface in the future scenario of power networks.

The power industry is undergoing transformation to develop energy infrastructure that can meet emerging needs. The network must become smarter to enable customers to actively participate in their energy choices, accommodate all generation and storage options, provide power quality and reliability demanded by a digital economy, optimize the use of assets by operating them more efficiently, and enable distributed logic for self-healing, condition response, and system resiliency. The power grids of the future will come into reality by enabling intelligent communication across sensing, measurement, and control layers that are embedded into the existing power systems. Through this transformation smart grid operators face several challenges that stem from synchronized measurements; new automatic calibration procedures; sensor reliability; and new measurement parameters. ICT infrastructure supporting modern measurement systems of power grids will be critically important to providing the accuracy and certainty required for reliable, secure and stable power systems in the future.

The SMFG 2011 conference is a forum for specialists in power systems, measurements, sensors, power electronics, control, signal processing and communication, to exchange expertise, build upon collective experience, and become aware of the problems faced by the different areas. SMFG 0211 brings together academia, industry and electric utility personnel to encourage discussion among all "smart grid-ers" enabling the different technical fields involved by the new measurement needs to work together to better understand the emerging challenges and address them. Discussions will revolve around addressing topical areas such as uncertainties associated with incomplete knowledge arising from the instruments and the system model; data relevancy and security; the new real time smart grid operating paradigm; data compression versus information lost; synchronized measurements of dynamic quantities while preserving the phasor paradigm; measurement quality definitions used for planning the future grids; the need for new instrument transformers as input converters for last generation measurement and control devices; standards and calibration procedures crossing the borders of power engineering and metrology science and on "smart metering" dictionary around the world.

The papers collected in these Proceedings provide some interesting answers to the above topics, by merging the methodological aspects with the concerns arising from practical applications.

This conference will represent a qualified forum for highlighting problems, proposing solutions and identifying contributions to the evolution of the next generation of smart measurements in the future grids.

Welcome to SMFG 2011! It promises to be timely, productive, and well worth your investment.

General Co-Chairs

Alessandro Ferrero, *Politecnico di Milano - Milano, Italy*
Wanda Reder, *VP – S&C Electric Company, Power Systems Services – Chicago, IL, USA*

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8:30 - 9:00   Registration

9:00 - 9:15
Opening Session
Room: *Imperiale Room*

9:15 - 10:00
Keynote Speech
Room: *Imperiale Room*

10:00 - 10:30   Coffee Break

10:30 - 12:30
Session I: The Measurement Dimension of Smart Meters
Room: *Imperiale Room*
Chair: *Mihaela Albu*

> **A Simulation Framework for Smart Meter Security Evaluation**
> *Joel Chinnow (Technische Universität Berlin, Germany)*
> *Karsten Bsufka (Technische Universität Berlin, Germany)*
> *Aubrey-Derrick Schmidt (Technische Universität Berlin & DAI-Labor, Germany)*
> *Rainer Bye (Berlin Institute of Technology, Germany)*
> *Ahmet Camtepe (Technische Universität Berlin, Germany)*
> *Sahin Albayrak (Technische Universität Berlin, Germany)*

> **Some problems of smart meter algorithms for electric power quality**
> *A. Lipsky (Ariel University Center of Samria, Israel)*
> *Neda Miteva (Ariel University Center of Samria, Israel)*

> **Energy smart meters integration in favor of the end user**
> *Norma Anglani (University of Pavia, Italy)*
> *Ezio Bassi (University of Pavia, Italy)*
> *Francesco Benzi (University of Pavia, Italy)*
> *Lucia Frosini (University of Pavia, Italy)*
> *Tommaso Traino (University of Pavia, Italy)*

> **The Sense of Time in Open Metering System**
> *Alessandra Flammini (University of Brescia, Italy*
> *Stefano Rinaldi (University of Brescia, Italy)*
> *Angelo Vezzoli (University of Brescia, Italy)*

> **Smart Grids for the Masses: An Agent-Based System for Remote Measurement**
> *Bruno Sanches (Federal University of ABC, Brazil)*
> *André Batista (Federal University of ABC, Brazil)*
> *Ivan Casella (Federal University of ABC, Brazil)*

12:45 - 13:45   Lunch

13:45 - 15:45
Session II: Phasor Measurement Units Deployed for Smart Grid Applications
Room: *Imperiale Room*
Chair: *Elias Kyriakides*

> **Optimal placement of PMUs with limited number of channels for incomplete observability**
> *Rajnish Kumar (Texas Tech University, USA)*
> *Vittal Rao (Texas Tech University, USA)*

Implementation overview of PMU functionalities on a regular computer
Mihail Popa (Politehnica University of Bucharest, Romania)
Mihaela Albu (Politehnica University of Bucharest, Romania)

Accuracy of a DFT Phasor Estimator at Off-Nominal Frequency in Either Steady State or Transient Conditions
Daniel Belega (University of Timisoara, Romania)
Dario Petri (University of Trento, Italy)

P-Class Phasor Measurement Unit Algorithms Using Adaptive Filtering to Enhance Accuracy at Off-Nominal Frequencies
Andrew Roscoe (University of Strathclyde, United Kingdom)
Ibrahim Abdulhadi (University of Strathclyde, United Kingdom)
Graeme Burt (University of Strathclyde, United Kingdom)

On the uncertainty evaluation in Distribution System State Estimation
Paolo Attilio Pegoraro (University of Cagliari, Italy)
Sara Sulis (University of Cagliari, Italy)

15:45 - 16:15   Coffee Break

16:15 - 17:45
Panel Session I: Smart Metering, Smart Grids & Standardization
Room: *Imperiale Room*

Tuesday, November 15, 2011

9:00 - 9:45
Keynote Speech
Room: *Imperiale Room*

9:45 - 10:15   Coffee Break

10:15 - 12:00
Session III: Measurements Systems and Devices in Smart Grids I
Room: *Saturno A Room*
Chair: *Kunde Kerstin*

Application of Non Conventional Voltage and Current Sensors in High Voltage Transmission and Distribution Systems
Joachim Schmid (Siemens, Switzerland)
Kerstin Kunde (Siemens, Germany)

A smart measurement and evaluation system for the magnetic-field generated by multiple field sources in complex 3-D arrangements
Kandia Effrosyni (University of Bologna, Italy)
Marco Landini (University of Bologna, Italy)
Giovanni Mazzanti (University of Bologna, Italy)
Gaetano Pasini (University of Bologna, Italy)

Consumer benefits of electricity-price-driven heat pump operation in future smart grids
Christoph Molitor (EON Energy Research Center - RWTH Aachen University, Germany)
Ferdinanda Ponci (RWTH Aachen University, Germany)
Antonello Monti (RWTH Aachen University, Germany)
Davide Cali (EON Energy Research Center RWTH Aachen, Germany)
Dirk Müller (EON Energy Research Center - RWTH Aachen University, Germany)

**AC Current Measurement In Multiconductor Systems
With Magnetic Sensor Array**
Menad Bourkeb (Université Claude Bernard, France)
Olivier Ondel (Université Claude Bernard, France)
Charles Joubert (Academia, France)
Laurent Morel (Université Claude Bernard, France)
Riccardo Scorretti (Université Claude Bernard, France)

10:15 - 12:00
Session IV: Measurement Systems for Diagnostic in Power Networks
Room: *Saturno B Room*
Chair: *Davide Della Giustina*

**Diagnosis of Impedance Fault in Distribution System with Distributed
Generations Using Radial Basis Function Neural Network**
Nazkhanom Rezaei (Islamic Azad University Tehran South Branch, Iran)
*Seyed Ali Mohammad Javadian (Islamic Azad University-Islamshahr Branch & Tam
Iran Khodro Company, Iran)*
Navid Khalesi (Islamic Azad University Tehran South Branch, Iran)
Mahmoud-Reza Haghifam (Tarbiat Modares University, Iran)

A Heuristic Approach for Optimal Monitor Placement for Fault Location
*Manuel Avendaño-Mora (University of Manchester & School of Electrical and
Electronic Engineering, United Kingdom)*
Jovica Milanovic (UoM, United Kingdom)

**Box-Dimension as a Correlation Measure for Data Mining of Power Socket
Sensor Data**
Sanja Veleva (University Ss. Cyril and Methodius-Skopje, Macedonia
Marija Kacarska (University Ss. Cyril and Methodius-Skopje, Macedonia)
*Danco Davcev (University for Information Science and Technology-Ohrid,
Macedonia)*

A real-time harmonic monitoring aimed at improving smart grid power quality
Francesco Muzi (University of L'Aquila, Italy)
Mario Barbati (University of L'Aquila, Italy)

Probabilistic Fault Location Using Erroneous Measurement Devices
Nicholas Woolley (University of Manchester, United Kingdom)
*Manuel Avendaño-Mora (University of Manchester & School of Electrical and
Electronic Engineering, United Kingdom)*
Alice Woolley (N/A, United Kingdom)
Jovica Milanovic (UoM, United Kingdom)

12:00 - 13:00   Lunch

13:15 - 15:15
Session V: Measurement Issues in ICT Applied to Smart Grids
Room: *Imperiale Room*
Chair: *Dario Petri*

**Theory of Evidence-Based Automated Decision Making in Cyber-Physical
Systems**
Christos Siaterlis (Joint Research Centre, Italy)
Bela Genge (Joint Research Centre, European Commission, Italy)

Comprehensive Validation of an ICT Platform to support Energy Efficiency in future Smart Grid Scenarios
Gregorio López (Universidad Carlos III de Madrid, Spain)
Pedro Moura (Institute of Systems and Robotics - University of Coimbra, Portugal)
Marek Sikora (Honeywell Prague Laboratory, Czech Republic)
Jose Ignacio Moreno (Universidad Carlos III de Madrid, Spain)
Aníbal T. de Almeida (University of Coimbra, Portugal)

The Role of INTEGRIS in the A2A Reti Elettriche's Roadmap Toward the Smart
Davide Della Giustina (A2A Reti Elettriche SpA, Italy)
Stefano Zanini (A2A Reti Elettriche SpA, Italy)
Salvatore Pugliese (A2A Reti Elettriche SpA, Italy)
Lucio Cremaschini (A2A Reti Elettriche SpA, Italy)

A Case for IEEE Std. 1451 in Smart Microgrid Environments
Matteo Bertocco (University of Padova, Italy)
Giada Giorgi (University of Padova, Italy)
Claudio Narduzzi (Universita' di Padova, Italy)
Federico Tramarin (University of Padova, Italy)

Research on Backbone Communication Network in Smart Grid by using OPNET
Di Cao (University of Strathclyde, United Kingdom)
Ivan Andonovic (University of Strathclyde, United Kingdom)

15:15 - 15:45   Coffee Break

15:45 - 17:15
Panel Session II: Synchronized Measurements
Room: *Imperiale Room*

19:30   Social Dinner

Wednesday, November 16, 2011

9:00 - 9:45
Keynote Speech
Room: *Giove Room*

9:45 - 10:15   Coffee Break

10:15 - 12:15
Session VI: Measurements Systems and Devices in Smart Grids II
Room: *Saturno A Room*
Chair: *Roscoe Andrew*

Overhead Conductor Dynamic Thermal Rating Measurement and Prediction
Mohamad Musavi (University of Maine, USA)
David Chamberlain (University of Maine, USA)
Qi Li (University of Maine, USA)

Overhead Conductor Thermal Rating Using Neural Networks
Qi Li (University of Maine, USA)
Mohamad Musavi (University of Maine, USA)
David Chamberlain (University of Maine, USA)

Considerations on Using UMA with Smart Grids
Dan Apetrei (SC Electrica SA, Romania)
Ralf Neurohr (Politehnica University of Bucharest & Techn.-Wiss. Büro Dr. Neurohr, Germany)
Petru Postolache (UPB, Romania)
Ioan Silvaş (Electrica, Romania)
Dumitru Federenciuc (Electrica S.A., Romania)
Cristian Popescu (SC Electrica SA, Romania)

A method for estimating and monitoring the power generated by a photovoltaic module based on supervised adaptive neural networks
Sergio C. Brofferio (Politecnico Di Milano, Italy)
Alessio Antonini (Politecnico di Milano, Italy)
Gianluca Galimberti (Politecnico di Milano, Italy
Dario Galeri (Berries Technology Solution, Italy)

A Knowledge Management Platform for supporting Smart Grids based on Peer to Peer and Service Oriented Architecture technologies
Amalia Sergaki (Technical University of Crete, Greece)
Kostas Kalaitzakis (Technical University of Crete, Greece)

12:30
Closing Session
Room: *Saturno A Room*