# 2014 IEEE International Workshop on Applied Measurements for Power Systems Proceedings

(AMPS 2014)

Aachen, Germany 24-26 September 2014



**IEEE Catalog Number: ISBN:** 

CFP14AMS-POD 978-1-4799-5644-9

# **TABLE OF CONTENTS**

Wednesday, September 24, 2014
Wednesday, September 24, 2014
Where is the power of the IEEE 1459-2010?  Johan Rens (Potchefstroom Campus of the North-West University, South Africa)  Tian van Rooyen (Potchefstroom Campus of the North-West University, South Africa)  Francois De Jager (Potchefstroom Campus of the North-West University, South Africa)
11:00 - 12:30 Characterization of Measurement Transducers
Non-Conventional Instrument Current Transformer Test set for Industrial Applications
Gabriella Crotti (Istituto Nazionale di Ricerca Metrologia, Italy) Daniele Gallo (Department of Industrial and Information Engineering Second University of Naples, Italy) Domenico Giordano (Istituto Nazionale di Ricerca Metrologica, Italy) Carmine Landi (Department of Industrial and Information Engineering Second University of Naples, Italy) Mario Luiso (Department of Industrial and Information Engineering Second University of Naples, Italy)
Procedure for the Assessment of Metrological Characteristics of Window-type Current Transformers in Three-Phase Power Systems
On-Field Instrument Transformers Calibration Using Optical Current and Voltage Transformes  Josemir C. Santos (University of Sao Paulo, Brazil)  Antonio C. de Silos (University of Sao Paulo, Brazil)  Carlos G. S. Nascimento (Companhia de Eletricidade do Estado da Bahia (COELBA), Brazil)
14:00 - 15:30 Phasor Measurement Units I
The amended standard C37.118.1a and its implications for frequency-tracking M-class Phasor Measurement Units (PMUs)

Compressive Sensing plus Taylor-Fourier Transform for Synchrophasor Estimation
A Real-Valued Taylor Weighted Least Squares Synchrophasor Estimator
16:00 - 17:30 Voltage and Current Transducers
Offset Error reduction in Open Loop Hall Effect Current Sensors  Powered with Single Voltage Source
Simulation and Optimization of Conductor Structural Parameters of Free-space Hall-Effect Current Sensor
Giant magnetoresistive based galvanically isolated voltage measurement

Thursday, September 25, 2014
09:00 - 11:00 Phasor Measurement Units II
An Enhanced Interpolated-Modulated Sliding DFT for High Reporting Rate PMUs
Experimental Characterization of Dynamic Methods for Synchrophasor Measurements
Adaptive Fault Location for Three-Terminal Lines Using Synchrophasors
Optimal Placement of Phasor Measurement Units Considering Communication Unavailability
11:30 - 12:30 Measurements of Distorted Quantities
Detection and analysis of rapid voltage changes in power system networks  M. de Apraiz (University of Cantabria, Spain)  J. Barros (University of Cantabria, Spain)  R.I. Diego (University of Cantabria, Spain)  J.J. Gutiérrez (University of the Basque Country (UPV/EHU), Spain)  K. Redondo (University of the Basque Country (UPV/EHU), Spain)  I. Azcarate (University of the Basque Country (UPV/EHU), Spain)
Arc Fault Detection for AC Solid State Power Controllers
14:00 - 15:30 Architectures for Monitoring of Modern Distribution Grids I
A platform for testing monitoring systems for the power distribution grid

# Friday, September 26, 2014

09:00 - 10:30 Measurements on Power System Components	
Traceability of Measurement Systems for the Assessment of HVDC Converter Efficiency  J. Meisner (Physikalisch-Technische Bundesanstalt (PTB), Germany)  E. Mohns (Physikalisch-Technische Bundesanstalt (PTB), Germany)  O. Binder (TU Braunschweig, Germany)  M. Kurrat (TU Braunschweig, Germany)	127
Fault Diagnosis of Star-Connected Auto-Transformer Based 24-Pulse Rectifier  Wei Wu (Northwestern Polytechnical University, China)  Xiaobin Zhang (Northwestern Polytechnical University, China)  Wenli Yao (Northwestern Polytechnical University, China)  Weilin Li (Northwestern Polytechnical University, China)	132
Testing of a Diagnostic Technique for a Single PEM Fuel Cell Based on a DC/DC Converter	138
11:00 - 12:30 Measurements for Active Electric Grids	
Uncertainty Sensitivity Analysis of WLS-based Grid State Estimators  David Macii (DII - University of Trento, Italy)  Grazia Barchi (DISI - University of Trento, Italy)  Dario Petri (DII - University of Trento, Italy)	143
Demand Side Management Verification System for Electric Vehicles  M. Ferdowsi (E. ON Energy Research Center - RWTH Aachen University, Germany)  A. Monti (E. ON Energy Research Center - RWTH Aachen University, Germany)  F. Ponci (E. ON Energy Research Center - RWTH Aachen University, Germany)  G. Fathi (Creative Data AG, Germany)	149
Flexible and Mobile Deployment of Synchronized Measurement Systems for Active Distribution Grids  Mihail Popa (University Politehnica of Bucharest, Romania)  Mihai Calin (University Politehnica of Bucharest, Romania)  Ana Maria Dumitrescu (University Politehnica of Bucharest, Romania)  Sebastian Ciornei (Technical University "Gh. Asachi" of Iasi, Romania)	155
AUTHOR INDEX	161

#### Mesage from the Chairpersons

AMPS 2014, promoted by TC-39 of the IEEE Instrumentation and Measurement Society (Measurements in Power Systems), is the 5<sup>th</sup> edition of the IEEE International Workshop on Applied Measurements for Power Systems. The workshop deals with all the aspects related to measurement applications in current power systems and in future Smart Grids and has the main goal of encouraging discussion on these topics among experts coming from academia, industry and utilities.

The continuous evolution of measurement applications in power grids stresses the need to develop new and more performing measurement systems and to define innovative procedures to ensure the quality of the measured data. As a consequence, in the previous four editions of the AMPS workshop, the subjects around which the event was originally proposed, mainly represented by the design and characterization of innovative transducers, the definition and measurements of nonsinusoidal quantities, the power quality issues, etc., have been accompanied by new topics, like the ones related to the management of the electric grids in the presence of renewable energy sources and to the wide diffusion of Phasor Measurement Units. AMPS 2014 continues to follow this rapid evolution and is expected to represent a qualified forum for providing contributions to the advancement of scientific and technical knowledge on these topics.

Welcome to AMPS 2014!

#### **General Co-Chairs**

Carlo Muscas (University of Cagliari, Italy) Lorenzo Peretto (University of Bologna, Italy)

#### **Technical Program Chair**

Antonello Monti (E.ON Energy Research Center RWTH Aachen University, Germany)

## **IEEE AMPS 2014 Organizers**

#### **General Chairs**

Lorenzo Peretto, University of Bologna, Italy Carlo Muscas, University of Cagliari, Italy

#### **Technical Program Chair**

Antonello Monti, E.ON Energy Research Center RWTH Aachen University, Germany

## **Steering Committee**

Mihaela Albu, Politehnica University of Bucharest, Romania Julio Barro, University of Cantabria, Spain Alessandro Ferrero, Polytechnic of Milano, Italy Ferndinanda Ponci, E.ON Energy Research Center RWTH Aachen University, Germany Andrew Roscoe, University of Strathclyde, Scotland Sara Sulis, University of Cagliari, Italy Roberto Tinarelli, University of Bologna, Italy

#### **Conference Management**

Conference Catalysts, LLC, USA