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Instrumentation and Measurement for Life



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TECHNICAL  
PAPERS

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**Wednesday, May 8**

**09:00 - 11:35**

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**Chair:** *Federico Tramarin (CNR & University of Padova, Italy)*

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**Room:** Pavilion

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**Room:** Pavilion

**Chair:** *Renata Styblikova (Czech Metrology Institute, Czech Republic)*

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**Room:** Pavilion

**Chair:** Mohammad Tayeb Ghasr (Missouri University of Science and Technology, USA)

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*S.C. Mukhopadhyay (Massey University, New Zealand)*

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*P.L. Yu (Massey University, New Zealand)*

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**09:30 - 11:35**

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**Room:** Great Hall

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*Eduardo Cortina Gil (Université Catholique de Louvain, Belgium)*

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Room: Hiawatha 2

Chairs: Bruno Andò (University of Catania, Italy), Salvatore Baglio (University of Catania, Italy)

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Remi Dubois (SIGMA Lab, ESPCI ParisTech, France)

Gerard Dreyfus (SIGMA Lab, ESPCI ParisTech, France)

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Chair: Luca De Vito (University of Sannio, Italy)

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Wei-Chung Wang (National Tsing Hua University, Taiwan)

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**Room:** Pavilion

**Chair:** Luca De Vito (*University of Sannio, Italy*)

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*E.G. Costa (Federal University of Campina Grande, UFCG, Brazil)*

*N.S.S. da Fonsêca (Federal University of Campina Grande, UFCG, Brazil)*

*M.A.O. Rodrigues (Federal University of Campina Grande, UFCG, Brazil)*

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**Chair:** Juan Moises Mauricio Villanueva (*Universidade Federal da Paraíba, Brazil*)

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**Room:** Pavilion

**Chair:** Juan Moises Mauricio Villanueva (*Universidade Federal da Paraíba, Brazil*)

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Tommi J. Kärkkäinen (*Lappeenranta University of Technology, Finland*)  
Pertti Silventoinen (*Lappeenranta University of Technology, Finland*)  
Mikko Kuisma (*Lappeenranta University of Technology, Finland*)

**PS4E (Poster Session): Signal and Image Processing Techniques**

**Room:** Pavilion

**Chair:** Marian Kampik (*Politechnika Slaska, Poland*)

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**Room:** Pavilion

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José L.S. Neto (Universidade Federal do Rio de Janeiro, Brazil)  
Marcelo M. Werneck (Universidade Federal do Rio de Janeiro, Brazil)  
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**S6A: Measurement Systems and Theory**

**Room:** Great Hall

**Chair:** Rik Pintelon (Vrije Universiteit Brussel, Belgium)

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**SS5: Technology Transfer and Expert Panel Discussion**

**Room:** Hiawatha 1

**Chair:** Reza Zoughi (Missouri University of Science and Technoogy, USA)

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**SS4 (Part 2): Wireless Sensors Networks for Assisted Living**

**Room:** Hiawatha 2

**Chairs:** Bruno Andò (University of catania, Italy), Salvatore Baglio (University of Catania, Italy)

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**SS2 (Part 4): Emerging Methods for Measuring, Modeling, and Instrumentation in Medical Applications**

**Room:** Hiawatha 3

**Chair:** *Wendy Van Moer (Vrije Universiteit Brussel, Belgium)*

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*M. D'Apuzzo (University Federico II of Naples, Italy)*

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*Rosario Morello (University Mediterranea of Reggio Calabria, Italy)*  
*Claudio De Capua (University Mediterranea of Reggio Calabria, Italy)*  
*Francesco Lamonaca (University of Calabria, Italy)*

**Optimization for temperature estimation using magnetic nanoparticle: a set of equations solving solution investigation ..... 1329**

*Jing Zhong (Huazhong University of Science and Technology, P.R. China)*  
*Wenzhong Liu (Huazhong University of Science and Technology, P.R. China)*  
*Shiqiang Pi (Huazhong University of Science and Technology, P.R. China)*  
*Pu Zhang (Huazhong University of Science and Technology, P.R. China)*

**New Semantic Web rules and new medical reasoning framework..... 1332**

*Nassim Douali (Pierre and Marie Currie University, France)*  
*Jos De Roo (Agfa HealthCare, Belgium)*  
*Jean Marc Vanel (Deduction Sarl, France)*  
*Marie-Christine Jaulent (Pierre and Marie Currie University, France)*

**SS3 (Part 4): Instrumentation and Measurement for Improving Quality, Reliability and Safety**

**Room:** Rock Island

**Chair:** *Marcantonio Catelani (University of Florence, Italy)*

**Real-Time Processing of Multi-Frequency Eddy Currents Testing Signals ..... 1336**

*Luis S. Rosado (Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal)*  
*Tiago Catarrunas (Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal)*  
*Moisés Piedade (Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal)*  
*Pedro M. Ramos (Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal)*

**A Kalman filter based method for locating and georeferencing car accidents..... 1342**  
*Leopoldo Angrisani (Università degli Studi di Napoli Federico II, Italy)*  
*Antonio Iodice (Università degli Studi di Napoli Federico II, Italy)*  
*Nicola Pasquino (Università degli Studi di Napoli Federico II, Italy)*  
*Rosario Schiano Lo Moriello (Università degli Studi di Napoli Federico II, Italy)*

**Hydrogen Sensing using Impedance Measurements of Nanocrystalline Palladium ..... 1347**  
*Martin Kocanda (Northern Illinois University, USA)*  
*Michael Haji-Sheikh (Northern Illinois University, USA)*  
*Christina Johnson (Northern Illinois University, USA)*  
*Edward King (Northern Illinois University, USA)*  
*David S. Ballantine (Northern Illinois University, USA)*  
*A.R. Syaifudin (Malaysian Agricultural Research & Development Institute, Malaysia)*  
*S.C. Mukhopadhyay (Massey University, New Zealand)*

**Vibration Frequency Peak Detection and Sorting Technique for Passenger Vehicles ..... 1353**  
*M. Santacruz (Universidad Autonoma de Baja California & Universidad Estatal de Sonora, Mexico)*  
*M. Félix (Universidad Autónoma de Baja California, Mexico)*  
*J. Ocampo (Universidad Autónoma de Baja California, Mexico)*  
*G.Luna (Universidad Estatal de Sonora, Mexico)*

**An Improved Printed Balun For A Dual Device Load Board..... 1358**  
*Claudio M. Montiel (Texas A&M University at Kingsville, USA)*

**Thursday, May 9**

**08:00 - 10:05**

**S7A: Measurement Applications**

**Room:** Great Hall

**Chair:** *Subhas Mukhopadhyay (Massey University, New Zealand)*

**A Reluctance-Hall Effect based Linear Digital Angle Sensor..... 1362**  
*C.S. Anoop (Indian Institute of Technology Madras, India)*  
*Boby George (Indian Institute of Technology Madras, India)*

**Selective Measurement of Volcanic Ash Flow-Rate..... 1367**  
*B.Andò (University of Catania, Italy)*  
*S.Baglio (University of Catania, Italy)*  
*V. Marletta (University of Catania, Italy)*

**A Simple Analog Front-End Circuit for Grounded Capacitive Sensors with Offset Capacitance ..... 1372**  
*Cyril Baby K (Indian Institute of Technology Madras, India)*  
*Boby George (Indian Institute of Technology Madras, India)*

**Ubiquitous Motion Sensing Service Using Wearable Shoe Module and Mobile Device ..... 1376**  
*Ying-Xun Lai (National Cheng Kung University, Taiwan)*  
*Yi-Wei Ma (National Cheng Kung University, Taiwan)*  
*Yueh-Min Huang (National Cheng Kung University, Taiwan)*  
*Jiann-Liang Chen (National Taiwan University of Science and Technology, Taiwan)*  
*Subhas Chandra Mukhopadhyay (Massey University, New Zealand)*

**Dynamic Neuro-fuzzy Estimation of the Weld Penetration in GTAW Process ..... 1380**  
*YuKang Liu (University of Kentucky, USA)*  
*WeiJie Zhang (University of Kentucky, USA)*  
*YuMing Zhang (University of Kentucky, USA)*

**S7B: Robotics and Controls**

**Room:** Hiawatha 1

**Chair:** Semih Aslan (Texas State University, USA)

**Visual UAV Control System Using LED Panel and On-board Camera ..... 1386**

*Hiroyuki Ukida (The University of Tokushima, Japan)*  
*Masafumi Miwa (The University of Tokushima, Japan)*  
*Yoshio Tanimoto (Kibikogen Rehabilitation Center, Japan)*  
*Tetsuya Sano (System Enterprise Co., Ltd, Japan)*  
*Hideki Yamamoto (Kibikogen Rehabilitation Center, Japan)*

**A Miniature, Low-cost MEMS AHRS with Application to Posture Control of Robotic Fish ..... 1392**

*Yonghui Hu (North China Electric Power University, P.R. China)*  
*Yong Yan (University of Kent, United Kingdom)*  
*Jianhong Liang (Beihang University, P.R. China)*  
*Lijuan Wang (North China Electric Power University, P.R. China)*

**Sparse-grid Quadrature Kalman Filter based on the Kronrod-Patterson Rule ..... 1396**

*Cheng Xianghong (Southeast University, P.R. China)*  
*Ran Changyan (Southeast University, P.R. China)*  
*Wang Haipeng (Southeast University, P.R. China)*

**Image-Based Floor Segmentation in Visual Inertial Navigation..... 1402**

*Guillem Casas Barceló (KTH Royal Institute of Technology, Sweden)*  
*Ghazaleh Panahandeh (KTH Royal Institute of Technology, Sweden)*  
*Magnus Jansson (KTH Royal Institute of Technology, Sweden)*

**Design Flow for Complex Scene Visual Object Tracking and Avoidance System ..... 1408**

*Thomas Gonnot (Illinois Institute of Technology, USA)*  
*Jafar Saniie (Illinois Institute of Technology, USA)*

**S7C: Advances in Instrumentation and Measurement Developments and Techniques**

**Room:** Hiawatha 2

**Chair:** Voicu Groza (University of Ottawa, Canada)

**The Forthcoming IEEE Standard 1696 on Test Methods for Characterizing Circuit Probes ..... 1412**

*Nicholas G. Paulter, Jr. (National Institute of Standards and Technology, USA)*  
*Mike McTigue (Agilent Technologies, USA)*  
*Bill Hagerup (Tektronix, USA)*  
*Thomas Linnenbrink (Hittite Microwave Corp., USA)*

**Uncertainty Analysis Of Three-Dimensional Three-Component (3C3D) Microflow Imaging and Velocity Measurement System Using Monte-Carlo Simulation ..... 1416**

*Mona Abdolrazaghi (University of Alberta, Canada)*

**Numerical Model for Predicting and Managing Heat Dissipation from a Neural Probe ..... 1420**

*Matthew P. Christian (United States Naval Academy, USA)*  
*Andrew N. Smith (United States Naval Academy, USA)*  
*Samara L. Firebaugh (United States Naval Academy, USA)*

**Parasitic Effect - Independent Approach for Dissipation Factor Measurement in Power Transformers ..... 1426**

*Lorenzo Peretto (University of Bologna, Italy)*  
*Roberto Tinarelli (University of Bologna, Italy)*  
*Mauro Puricelli (ISA s.r.l., Italy)*

**New Method of the Precise Propagation Delay Measurement ..... 1431**

*Yi-Jiun Huang (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*  
*Huang-Tien Lin (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*  
*Chia-Shu Liao (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*  
*Wen-Hung Tseng (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*  
*Jia-Lun Wang (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*  
*Fang-dar Chu (Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Taiwan)*

**08:50 - 10:05**

**SS6 (Part 1): RF/Microwave Materials and Characterization**

**Room:** Hiawatha 3

**Chair:** *Samir Trabelsi (USDA, USA)*

**Finite Flange Correction for Microwave and Millimeter-Wave Nondestructive Material Characterization ..... 1435**

*Matthew Kempin (Missouri University of Science and Technology, USA)*  
*Mohammad Tayeb Ghasr (Missouri University of Science and Technology, USA)*  
*Reza Zoughi (Missouri University of Science and Technology, USA)*

**In Vivo Microwave Dielectric Spectroscopy of Breast Tumor Xenografts with Intra-Tumoral Injections of SWCNT Dispersions ..... 1441**

*Fuqiang Gao (University of Wisconsin-Madison, USA)*  
*Susan C. Hagness (University of Wisconsin, Madison, USA)*  
*John H. Booske (University of Wisconsin-Madison, USA)*  
*Shawn X. Xie (Stony Brook University, USA)*  
*Balaji Sitharaman (Stony Brook University, USA)*

**A Calibration Technique for Measuring the Complex Permittivity of Materials with Planar Transmission Lines ..... 1445**

*Jochem Roelvink (United States Department of Agriculture, USA)*  
*Samir Trabelsi (United States Department of Agriculture, USA)*

**SS7 (Part 1): Advanced Measurement and Data Processing for Engineering System Health Monitoring**

**Room:** Rock Island

**Chair:** *Ruqiang Yan (Southeast University, P.R. China)*

**Acoustic-Based Wireless Data Transmission for Process Monitoring ..... 1449**

*Z. Fan (University of Connecticut, USA)*  
*R.X. Gao (University of Connecticut, USA)*  
*D.O. Kazmer (University of Massachusetts, Lowell, USA)*

**Pseudo Non-dyadic Second Generation Wavelet Tight Frame for Machine Fault Diagnosis..... 1453**

*Binqiang Chen (Xi'an Jiaotong University, P.R. China)*  
*Zhou suo Zhang (Xi'an Jiaotong University, P.R. China)*  
*Jie Zhang (Xi'an Jiaotong University, P.R. China)*  
*Zhibo Yang (Xi'an Jiaotong University, P.R. China)*  
*Zhengjia He (Xi'an Jiaotong University, P.R. China)*

**An Improved Independent Component Analysis by Reference Signals and Its Application on Source Contribution Estimation..... 1459**

*Jie Zhang (Xi'an Jiaotong University, P.R. China)*  
*Zhousuo Zhang (Xi'an Jiaotong University, P.R. China)*  
*Binqiang Chen (Xi'an Jiaotong University, P.R. China)*  
*Wei Cheng (Xi'an Jiaotong University, P.R. China)*  
*Zhibo Yang (Xi'an Jiaotong University, P.R. China)*  
*Zhengjia He (Xi'an Jiaotong University, P.R. China)*

**10:05 - 12:40**

**PS5A (Poster Session): Biomedical Systems**

**Room:** Pavilion

**Chair:** *Sergey Kharkovsky (University of Western Sydney & UWS, Australia)*

**Measurement of Driving Routes and Correlation to Optimal Navigation Paths..... 1465**

*Bruce Wallace (Carleton University, Canada)*  
*Rafik Goubran (Carleton University, Canada)*  
*Frank Knoefel (Bruyère Research Institute & University of Ottawa & Carleton University, Canada)*

**Cognitive Stress Recognition ..... 1471**

*Taylor K. Calibo (United States Naval Academy, USA)*  
*Justin A. Blanco (United States Naval Academy, USA)*  
*Samara L. Firebaugh (United States Naval Academy, USA)*

**Sensitivity of an optical sensor that operates at angular or wavelength interrogation mode..... 1476**

*L.C. Oliveira (UFCEG, Campina Grande, Brazil)*  
*T.A.T. de Sousa (UFCEG, Campina Grande, Brazil)*  
*F.C.C. Loureiro (UFCEG, Campina Grande, Brazil)*  
*E.U.K. Melcher (UFCEG, Campina Grande & Northeast Center for Strategic Technologies, Recife, Brazil)*  
*A.M.N. Lima (UFCEG, Campina Grande, Brazil)*  
*H.Neff (UFCEG, Campina Grande & Northeast Center for Strategic Technologies, Recife, Brazil)*

**Transmission Reliability of Implantable Wireless Temperature Loggers for Laboratory Rats .... 1482**

*Ásgeir Bjarnason (Tampere University of Technology & Star-Oddi Ltd., Finland)*  
*Hákon Guðmundsson (Star-Oddi Ltd., Iceland)*  
*Sigurður Gunnlaugsson (Star-Oddi Ltd., Iceland)*  
*Andrés Gunnarsson (Star-Oddi Ltd., Iceland)*  
*Kjaran Sveinsson (Star-Oddi Ltd., Iceland)*  
*Sigmar Guðbjörnsson (Star-Oddi Ltd., Iceland)*

**PS5B (Poster Session): Non-Invasive Measurement Techniques and Instrumentation**

**Room:** Pavilion

**Chair:** *Sergey Kharkovsky (University of Western Sydney & UWS, Australia)*

**Detecting the Presence of Large Biomass Particles in Pneumatic Conveying Pipelines Using an Acoustic Sensor..... 1487**

*Duo Sun (University of Kent, United Kingdom)*  
*Yong Yan (University of Kent, United Kingdom)*  
*Robert M. Carter (University of Kent, United Kingdom)*  
*Gang Lu (University of Kent, United Kingdom)*  
*Gerry Riley (RWE npower, United Kingdom)*  
*Matthew Wood (RWE npower, United Kingdom)*

**Illumination Design in Vision-based Measurement Systems ..... 1491**

*Giuseppe Di Leo (University of Salerno, Italy)*  
*Consolatina Liguori (University of Salerno, Italy)*  
*Antonio Pietrosanto (University of Salerno, Italy)*  
*Vincenzo Paciello (University of Salerno, Italy)*  
*Alfredo Paolillo (University of Salerno, Italy)*

**Analysis of Different Coating Thickness on New Type of Planar Interdigital Sensors for Endotoxin Detection ..... 1496**

*A.R. Mohd Syaifudin (Massey University, New Zealand)*  
*P.L. Yu (Massey University, New Zealand)*  
*S.C. Mukhopadhyay (Massey University, New Zealand)*  
*C.P. Gooneratne (King Abdullah University of Science and Technology, Saudi Arabia)*  
*J. Kosel (King Abdullah University of Science and Technology, Saudi Arabia)*

**UWB Microwave Imaging Array for Nondestructive Testing Applications ..... 1502**

*S.F. Hatfield (Missouri University of Science and Technology, USA)*  
*M.A. Hillstrom (Missouri University of Science and Technology, USA)*  
*D.N. Schultz (Missouri University of Science and Technology, USA)*  
*T.M. Werckmann (Missouri University of Science and Technology, USA)*  
*M.T. Ghasr (Missouri University of Science and Technology, USA)*  
*K.M. Donnell (Missouri University of Science and Technology, USA)*

**An Experiment Set-Up for Analysis of Lateralization Judgments of Binaural Stimuli ..... 1507**

*J.S. Nogueira (Universidade Federal da Bahia, Brazil)*  
*A.I. Cunha (Universidade Federal da Bahia, Brazil)*  
*M.C.B.F.M. Braghiroli (Universidade Federal da Bahia, Brazil)*  
*R.C.S. Freire (Univ. Federal de Campina Grande, Brazil)*

**PS5C (Poster Session): Measurement and Instrumentation for Industrial Applications**

**Room:** Pavilion

**Chair:** Marco Landi (University of Salerno, Italy)

**Calibration Technique for Sensitivity Variation in RVDT Type Accelerator Position Sensor ..... 1512**

*Jong-Kyoung Lee (Korea Advanced Institute of Science and Technology (KAIST), Korea)*  
*Young-Hun Ko (Korea Advanced Institute of Science and Technology (KAIST), Korea)*  
*Sang-Gug Lee (Korea Advanced Institute of Science and Technology (KAIST), Korea)*

**Two-Dimensional (2D) Plane Accuracy of Linear Motor Feeding Stages Enhanced by Using the Numerical Algorithm Compensation Method ..... 1517**

*Wen-Tse Hsiao (Instrument Technology Research Center, National Applied Research Laboratories, Taiwan)*  
*Shih-Feng Tseng (Instrument Technology Research Center, National Applied Research Laboratories, Taiwan)*  
*Chien-Kai Chung (Instrument Technology Research Center, National Applied Research Laboratories, Taiwan)*  
*Chun-Jen Chen (Instrument Technology Research Center, National Applied Research Laboratories, Taiwan)*  
*Kuo-Cheng Huang (Instrument Technology Research Center, Taiwan)*  
*Ming-Fei Chen (National Changhua University of Education, Taiwan)*

<b>Power Efficient Analog to Digital Conversion for the Li-ion Battery Voltage Monitoring and Measurement .....</b>	<b>1522</b>
<i>Saeed Mian Qaisar (Free Lance, France)</i>	
<i>Dominique Dallet (IMS-ENSEIRB, CNRS UMR 5218, France)</i>	
<i>Sébastien Benjamin (SAFT, France)</i>	
<i>Philippe Desprez (SAFT, France)</i>	
<i>Reda Yahiaoui (Femto-ST, France)</i>	

**PS5D (Poster Session): Signal and Image Processing Techniques**

**Room:** Pavilion

**Chair:** Marco Landi (University of Salerno, Italy)

<b>ADC Spectral Testing Allowing Amplitude Clipping .....</b>	<b>1526</b>
<i>Li Xu (Iowa State University, USA)</i>	
<i>Degang Chen (Iowa State University, USA)</i>	

<b>The Implementation and Performance Analysis of AWMMF Parallel Algorithm on GPU.....</b>	<b>1530</b>
<i>Weiyang Mu (Harbin Institute of Technology, P.R. China)</i>	
<i>Jing Jin (Harbin institute of Technology, P.R. China)</i>	
<i>Hongqi Feng (China Astronaut Research and Training Center, P.R. China)</i>	
<i>Qiang Wang (Harbin Institute of Technology, P.R. China)</i>	

<b>Adaptive Window Multistage Median Filter for Image Salt-and-pepper Denoising.....</b>	<b>1535</b>
<i>Weiyang Mu (Harbin Institute of Technology, P.R. China)</i>	
<i>Jing Jin (Harbin institute of Technology, P.R. China)</i>	
<i>Hongqi Feng (China Astronaut Research and Training Center, P.R. China)</i>	
<i>Qiang Wang (Harbin Institute of Technology, P.R. China)</i>	

<b>A Novel 3D Approach for the Extraction of the Wetting Front in CT Images of Soil Profiles .....</b>	<b>1540</b>
<i>Dionicio Vásquez (Federal University of Rio Grande do Sul, Brazil)</i>	
<i>Jacob Scharcanski (Federal University of Rio Grande do Sul, Brazil)</i>	
<i>Alexander Wong (University of Waterloo, Canada)</i>	
<i>Silvio Crestana (EMBRAPA, Brazil)</i>	

**PS5E (Poster Session): Data Acquisition Systems and Techniques**

**Room:** Pavilion

**Chair:** Michael Schmitz (North Dakota State University, USA)

<b>Data Compression Using Mixed Cascade of Nonlinear Logic .....</b>	<b>1544</b>
<i>Sunil R. Das (Troy University, USA &amp; University of Ottawa, Canada)</i>	
<i>Danny L. Shaw (Troy University, USA)</i>	
<i>Satyendra N. Biswas (Independent University, Bangladesh)</i>	
<i>Mansour H. Assaf (University of the South Pacific, Fiji)</i>	
<i>Scott Morton (Troy University, USA)</i>	
<i>Irem Ozkarahan (Troy University, USA)</i>	
<i>Emil M. Petriu (University of Ottawa, Canada)</i>	
<i>Voicu Groza (University of Ottawa, Canada)</i>	

<b>Performance Analysis of Reconfigurable Ultrasonic System-on-Chip Hardware Platform.....</b>	<b>1550</b>
<i>Pramod Govindan (Illinois Institute of Technology, USA)</i>	
<i>Spenser Gilliland (Illinois Institute of Technology, USA)</i>	
<i>Alireza Kasaeifard (Illinois Institute of Technology, USA)</i>	
<i>Thomas Gonnot (Illinois Institute of Technology, USA)</i>	
<i>Jafar Saniie (Illinois Institute of Technology, USA)</i>	

**A Random Demodulation Hardware System with Automatic Synchronization Function ..... 1554**

*Ning Fu (Harbin Institute of Technology, P.R. China)*  
*Pingfan Song (Harbin Institute of Technology, P.R. China)*  
*Jingchao Zhang (Harbin Institute of Technology, P.R. China)*  
*Ying Liu (Beijing Aerospace Automatic Control Institute, P.R. China)*  
*Gang Wang (Harbin Institute of Technology, P.R. China)*

**8-bit Folding ADC Based on Switched Capacitor ..... 1559**

*Wendell E.M. Costa (IFTO Palmas & UFCG Campina Grande, Paraiba, Brazil)*  
*Sabiniano A. Rodrigues (IFPB João Pessoa-Paraíba & UFCG Campina Grande, Paraiba, Brazil)*  
*Raimundo C.S. Freire (UFCG Campina Grande, Paraiba, Brazil)*  
*Sebastian Yuri Catunda (UFRN Natal, Rio Grande do Norte, Brazil)*  
*Fernando Rangel de Sousa (UFSC Santa Catarina, Brazil)*

**PS5F (Poster Session): Measurement of Electric and Magnetic Quantities**

**Room:** Pavilion

**Chair:** *Michael Schmitz (North Dakota State University, USA)*

**Complex Dielectric Permittivity and Magnetic Permeability Measurement of Ferrite  
Powders at Millimeter Wavelength ..... 1564**

*Liu Chao (Tufts University, USA)*  
*Mohammed N. Afsar (Tufts University, USA)*

**Operation of the Van Veen Loop In a Shielded Chamber ..... 1567**

*James McLean (TDK R&D Corp, USA)*  
*Hidetsugu Sako (TDK R&D Corp, USA)*  
*Armando Medina (TDK R&D Corp, USA)*  
*Robert Sutton (TDK R&D Corp, USA)*

**Non-Contact EM Measurement of the Properties of Power Station Steels Taken from Service .. 1573**

*N. Karimian (University of Manchester, United Kingdom)*  
*W. Yin (University of Manchester, United Kingdom)*  
*J. Liu (University of Birmingham, United Kingdom)*  
*X.J. Hao (University of Birmingham, United Kingdom)*  
*M. Strangwood (University of Birmingham, United Kingdom)*  
*C.L. Davis (University of Birmingham, United Kingdom)*  
*A.J. Peyton (University of Manchester, United Kingdom)*

**Design Criteria of Digital Filters for Synchrophasor Estimation ..... 1579**

*David Macii (University of Trento, Italy)*  
*Grazia Barchi (University of Trento, Italy)*  
*Dario Petri (University of Trento, Italy)*

**Design and Uncertainty Analysis of a Bioimpedance Measurement Channel ..... 1585**

*Adalberto Schuck, Jr. (UFRGS, Brazil)*  
*Alexandre Balbinot (UFRGS, Brazil)*  
*Rodrigo Wolff Porto (UNIVATES, Brazil)*

**PS5G (Poster Session): Instrumentation and Measurement for Improving Quality, Reliability and Safety**

**Room:** Pavilion

**Chair:** *Marcantonio Catelani (University of Florence, Italy)*

**Design and Development of an Accelerated Testing Architecture for Embedded Systems Fault Monitoring ..... 1590**

*Valeria L. Scarano (University of Florence, Italy)*  
*Marcantonio Catelani (University of Florence, Italy)*  
*Daniele Mazzei (University of Pisa, Italy)*  
*Andrea Carignano (I&S Global Design - bioMérieux Italia S.p.A., Italy)*  
*Giacomo Baldi (Errequadro Srl, Italy)*

**Reliability and availability analysis of an automatic highway toll collection system ..... 1594**

*Marcantonio Catelani (University of Florence, Italy)*  
*Lorenzo Ciani (University of Florence, Italy)*  
*Emiliano S. Paolilli (University of Florence, Italy)*

**Design and Implementation of a on-board Device for Photovoltaic Panels monitoring ..... 1599**

*Lorenzo Ciani (Università degli Studi di Firenze, Italy)*  
*Loredana Cristaldi (Politecnico di Milano, Italy)*  
*Marco Faifer (Politecnico di Milano, Italy)*  
*Massimo Lazzaroni (Università degli Studi di Milano, Italy)*  
*Marco Rossi (Politecnico di Milano, Italy)*

**A Yawning Measurement Method Using Embedded Smart Cameras ..... 1605**

*Shabnam Abtahi (University of Ottawa, Canada)*  
*Shervin Shirmohammadi (University of Ottawa, Canada)*  
*Behnoosh Hariri (Google Inc., USA)*  
*Daniel Laroche (CogniVue Corp., Canada)*  
*Luc Martel (CogniVue Corp., Canada)*

**10:35 - 12:40**

**S8A: Measurement Applications**

**Room:** Great Hall

**Chair:** *Julio Barros (University of Cantabria, Spain)*

**Performance Measurements of an Optical Detector Designed for Monolithic Integration with a Power VDMOS ..... 1609**

*Raha Vafaei (University of Grenoble & CNRS, G2Elab, France)*  
*Jean-Christophe Crebier (University of Grenoble & CNRS, G2Elab, France)*  
*Nicolas Rouger (University of Grenoble & CNRS, G2Elab, France)*

**High Memory Passive RFID Tags with Multi-modal Sensor Design and Application to Asset Monitoring In-transit ..... 1615**

*Haifeng Niu (Missouri University of Science and Technology, USA)*  
*S. Jagannathan (Missouri University of Science and Technology, USA)*

**The UHF Gen 2 RFID System for Transcutaneous Operation for Orthopedic Implants ..... 1620**

*Xiaoyu Liu (University of Pittsburgh, USA)*  
*Joshua R. Stachel (University of Pittsburgh, USA)*  
*Ervin Sejdić (University of Pittsburgh, USA)*  
*Marlin H. Mickle (University of Pittsburgh, USA)*  
*J. Lee Berger (Ortho-tag Inc, USA)*

**Innovative Software Solution for Special Data Evaluation in Mass Spectrometry** ..... 1624  
*Heidi Fleischer (University of Rostock, Germany)*  
*Kerstin Thurow (Center for Life Science Automation, Celisca, Germany)*

**A Holographic In-Line Imaging System for Meteorological Applications** ..... 1630  
*Ville A. Kaikkonen (University of Oulu, Finland)*  
*Dmitry Ekimov (Petrozavodsk State University, Russia)*  
*Anssi J. Mäkynen (University of Oulu, Finland)*

**S8B: Real-Time Measurement**

**Room:** Hiawatha 1

**Chair:** *Vincenzo Piuri (University of Milan, Italy)*

**Correlation Based Detection and Localization of R/C Electronic Devices Using Array Detectors** ..... 1636  
*Vivek Thotla (Missouri University of Science and Technology, USA)*  
*Maciej Zawodniok (Missouri University of Science and Technology, USA)*  
*S. Jagannathan (Missouri University of Science and Technology, USA)*  
*Sanjeev Agarwal (Night Vision and Electronic Sensors Directorate, USA)*

**Real-time Measurement of the Weld Pool Surface in GTAW Process** ..... 1640  
*WeiJie Zhang (University of Kentucky, USA)*  
*YuKang Liu (University of Kentucky, USA)*  
*YuMing Zhang (University of Kentucky, USA)*

**On Benchmarking Non-Blind Deconvolution Algorithms: A Sample Driven Comparison of Image De-blurring Methods for Automated Visual Inspection Systems** ..... 1646  
*Dorian Schneider (RWTH Aachen University, Germany)*  
*Tilo van Ekeris (RWTH Aachen University, Germany)*  
*Joschka zur Jacobsmuehlen (RWTH Aachen University, Germany)*  
*Sebastian Gross (RWTH Aachen University, Germany)*

**Robust Pattern Recognition of Three Dimensional Weld Pool Surface in Gas Tungsten Arc Welding** ..... 1652  
*WeiJie Zhang (University of Kentucky, USA)*  
*Xiang Zhang (University of Kentucky, USA)*  
*YuKang Liu (University of Kentucky, USA)*  
*YuMing Zhang (University of Kentucky, USA)*

**S8C: Advances in Instrumentation and Measurement Developments and Techniques**

**Room:** Hiawatha 2

**Chair:** *Mohammed Al-Janabi (University of Westminster, London, United Kingdom)*

**Flame Stability Monitoring Through Statistical Analysis of Medial Axis** ..... 1658  
*Tian Qiu (University of Kent, United Kingdom)*  
*Yong Yan (University of Kent, United Kingdom)*  
*Gang Lu (University of Kent, United Kingdom)*

**FPGA based Architectures for High Performance Adaptive FIR Filter Systems** ..... 1662  
*Sufeng Niu (Illinois Institute of Technology, USA)*  
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## Welcome Message from the Chairpersons

On behalf of the organizing, technical and local committees of IEEE International Instrumentation and Measurement Technology Conference (I2MTC 2013), we welcome you to Minneapolis. And for those who attended I2MTC 1998, welcome back to the Twin Cities. Minnesota is known as Life Science Alley and we chose "Instrumentation and Measurement for Life" as our theme to reflect the local focus. The broad and yet focused excellent technical program covers the traditional span of instrumentation and measurement fields. However, the program also contains three special sessions on medical applications, with four more covering quality, microwaves-THz, materials measurement and a new session and panel discussion on technology transfer.

The program begins with a very full day of tutorials offering 4 tracks and more than a dozen fascinating topics. Our esteemed keynote speakers set the tone for the three days of the conference which consists of five tracks of oral and one track of poster presentations. Dr. Kevin Bennet, Chairman of the Division of Engineering at the Mayo Clinic, will provide insight into the interface of instrumentation and medicine. Professor Susan C. Hagness of the University of Wisconsin-Madison provides a look into a medical application of microwave measurements aimed at improving women's health. Recipient of the 2013 IEEE Joseph F. Keithley Award in Instrumentation and Measurement, Dr. Dylan Williams of the National Institute of Standards and Technology will discuss his groundbreaking work on Vector Network Analysis of Printed Transmission Lines. All of this adds up to a cornucopia of exciting and thought provoking technical ideas and information.

We chose the historic Milwaukee Road Depot, which has been converted into a modern hotel without losing its charm. Around each corner you can catch a glimpse of the grain milling industry that grew up along the picturesque Saint Anthony Falls in the 1800s and the steam trains that brought grain here from the great plains of a new country spreading westward. Take a peaceful walk along the river, or find excitement in the nightlife of downtown Minneapolis only blocks away. Take in a play at the Guthrie, visit the Minneapolis Institute of Arts, or go shopping at the largest shopping mall in the United States. Enjoy your stay in Minneapolis and enjoy the conference. Thank you for attending.

**Max Cortner and Reza Zoughi**  
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## I<sup>2</sup>MTC 2013 Keynote Speakers

**Kevin E. Bennet**

*Chairman, Division of Engineering, Mayo Clinic*



*Keynote Tuesday, May 7, 2013*

*“Next Generation Deep Brain Stimulation: Collaborative Engineering Solutions”*

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**Susan C. Hagness**

*University of Wisconsin-Madison*



*Keynote Tuesday, May 7, 2013*

*“Microwave Breast Imaging: A New Mammography?”*

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**Dylan F. Williams**

*National Institute of Standards and Technology*



*Keynote Wednesday, May 8, 2013*

*“Vector Network Analysis in Printed Transmission Lines”*

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Stellar Technology manufactures pressure transducers, load cells, temperature transducers, and displacement sensors used in test and measurement applications across a wide range of industries including aerospace, oil and gas, automotive, medical, and industrial automation and control. Stellar Technology couples innovative electronics with proven sensor technology to provide a range of sensor solutions unmatched in the industry. Our unique combination of design experience, manufacturing capability and application knowledge provides sensor solutions ranging from standard products to highly engineered custom products.



U.S. and international test equipment sales and rentals from the friendly professionals at Continental Resources, Inc. (ConRes), your authorized source for test equipment sales and rentals including oscilloscopes, signal generators, network and spectrum analyzers, wireless communications testers, field testing and general purpose test equipment. If you're an engineer in manufacturing, R&D, QC, design, field test, or education, you can rely on ConRes for test equipment with warranties and calibrated in our ISO-registered, NIST-traceable metrology lab.



Whether you need a small R&D LabVIEW application to gather and analyze measurement data or a full-fledged test or automation system — Saint Bernard Engineering has the experience to get the job done right. Our team members have advanced degrees (physics, EE, biomedical engineering) and 17 to 21 years development experience. With our one year software warranty, you can be confident in the quality we deliver. Visit our booth to learn more or check out [www.saintbernardengineering.com](http://www.saintbernardengineering.com).



Electro Rent Corporation provides electronic equipment for rental, lease, and sale. The company's portfolio consists of general purpose test and measurement instruments, electric and power test equipment, personal computers, and servers. Electro Rent has over \$650 Million in test equipment inventory for rent, lease or sale making it one of the largest vendors of rental test equipment. Electro Rent Corporation serves its customers through sales offices, and calibration and service centers in the United States, Canada, China, and Europe.



Flow Technology recognized worldwide for providing high accuracy flow metering solutions, offers an unmatched flow measurement resource, including 50+ years experience solving the most difficult liquid and gas flow applications. We offer multiple flow technologies to provide you with the optimal solution: electromagnetic, turbine, ultrasonic and positive displacement. Flow Technology also calibrates all flow meter types in its ISO/IEC 17025 and ANSI Z540 accredited calibration lab.



Gantner Instruments is a leader in the development of flexible measurement and control systems targeted at test automation applications. By delivering high-speed, high-accuracy, distributed data acquisition, & control products required in today's demanding testing environments, such as engine testing, component testing, electric motor/battery testing, and long term fatigue/durability testing, Gantner Instruments is able to provide complete and open platform solutions for OEM's, systems integrators, and end users alike.



Since its founding, Dytran has built a solid 30 year industry reputation for trusted, field proven experience in the design and manufacture of sensors for dynamic testing. Today, Dytran's broad product line also includes single axis and triaxial DC MEMS style accelerometers utilizing state-of-the-art variable capacitance accelerometer sensing elements. The company continues to operate as a privately held, family owned business.



Since 1976, National Instruments has equipped engineers and scientists with tools that accelerate productivity, innovation, and discovery. NI's graphical system design approach provides an integrated software and hardware platform that simplifies development of any system that needs measurement and control. Engineers and scientists use this platform from design to production in multiple industries, advanced research, and academia. The company's long-term vision and focus on improving society through its technology has led to strong, consistent company growth and success of its customers, employees, suppliers, and shareholders.



Transducers and Measurement Instruments, Inc. - Sales of sensors, signal-conditioning, environmental and data-acquisition equipment in the Midwest since 1987.

## Awards and Distinctions

Each year the IEEE Instrumentation and Measurement Society accepts nominations for its Awards. The AdCom Awards Committee manages the nominations process, reviews the candidates, and recommends a slate. The slate of candidates is then submitted to the Society AdCom for approval and the awards are presented at our annual Awards Banquet held as part of the I<sup>2</sup>MTC conference. The Awards Committee is pleased to announce the 2011 winners

### 2012 Transactions Outstanding Associate Editors

Salvatore Baglio, *University of Catania*  
Kurt Barbé, *Vrije Universiteit Brussel*  
Serge Demidenko, *RMIT International University*  
Sergey Kharkovsky, *University of Western Sydney*  
Thomas Lipe, *NIST*  
Subhas Mukhopadhyay, *Massey University*  
Carlo Muscas, *Università di Cagliari Dipartimento di Ingegneria Elettrica ed Elettronica (DIEE)*  
Dario Petri, *Università degli Studi di Trento*  
Shervin Shirmohammadi, *University of Ottawa*  
Wendy Van Moer, *Vrije Universiteit Brussel*  
George Xiao, *Institute for Microstructural Science, National Research Council*

### IEEE Instrumentation and Measurement Society Andy Chi Best Paper Award

The I&M Society Andy Chi Best Paper Award is awarded to recognize an author or authors of a paper published in the IEEE Transactions on Instrumentation and Measurement.

The 2012 Andy Chi Best Paper Award recipients are:

For the paper *Design of a 12-Bit 2.5 MS/s Integrated Multi-Channel Single-Ramp Analogto-Digital Converter for Imaging Detector Systems*

**Wu Gao**, Northwestern Polytechnical University, Xi'an, China

**Deyuan Gao**, Northwestern Polytechnical University, Xi'an, China

**Christine Hu-Guo**, Institut Pluridisciplinaire Hubert Curien, Strasbourg, France

**Yann Hu**, Institut Pluridisciplinaire Hubert Curien, Strasbourg, France

**IEEE Instrumentation and Measurement Society  
Outstanding Young Engineer Award**

The I&M Outstanding Young Engineer Award recognizes an outstanding young I&M member who has distinguished him or herself through achievements, which are technical, of exemplary service to the I&M Society, or a combination of both, early in their career. The nominee must not have reached their 39th birthday and must be an I&M member at the time of nomination.

The 2012 Outstanding Young Engineer Award recipient is:



**Kristen M. Donnell**

*Missouri University of Science and Technology  
USA*

*“For contribution to the development of dual-differential embedded modulated scatterer technique for microwave materials characterization.”*

**Kristen M. Donnell** received the B.S.E.E. degree from Colorado State University, Fort Collins, in 2001, the M.S.E.E degree from the University of Missouri–Rolla, Rolla, in 2003, and the Ph.D. degree in electrical engineering from Missouri University of Science and Technology, Rolla, in 2010. Her Ph.D. research was conducted at the Applied Microwave Nondestructive Testing Laboratory (*amntl*). Kristen has been with the *amntl* since 1998 as both an Undergraduate and Graduate Research Assistant. Her current research interests include modulated antennas/scatterers, materials characterization, and microwave/millimeter wave nondestructive testing. Prior to starting her Ph.D. work, Kristen was employed by Raytheon Company, in Tewksbury, MA, from 2003 to 2006 as a Systems Engineer and Electrical Engineer. She is currently employed at Missouri S&T as an Assistant Professor in the Electrical and Computer Engineering Department.

Kristen is involved with the IEEE Instrumentation and Measurement Society. She served as an appointed member of the Administrative Committee (AdCom) from 2007-2011, and is currently serving her first term as an at-large AdCom member. She served as the Graduate Student Representative from 2007-2009, and currently holds the positions of Vice President of the Membership Development Committee and Chair of the Distinguished Lecturer Program. She is also a member of the Selection Committees for the Graduate Student Fellowship Award and Faculty Course Development Award. She serves as a Reviewer for the IEEE Transactions on Instrumentation and Measurement and the IEEE Sensors Journal. She is also a member of the Technical Program Committee for I<sup>2</sup>MTC 2013. Kristen is also a registered Engineer in Training (EIT) in the state of Colorado.

**IEEE Instrumentation and Measurement Society  
Technical Award**

The I&M Technical Award is given to an individual or group of individuals for outstanding contribution or leadership in advancing instrumentation design or measurement technique.

The 2012 Technical Award recipient is:



**Paolo Ferrari**  
*University of Brescia*  
*Italy*

*“For his contribution to the analysis and experimental evaluation of clock synchronization in real-time applications for industry.”*

**Paolo Ferrari** got the Master degree with honors in Electronics in 1999, and the PhD in Electronic Instrumentation at the University of Brescia in 2003. Since 2004, he works at the Faculty of Engineering of the University of Brescia as an Assistant Professor in the field of Electric and Electronic Instrumentation and Measurements.

The research areas are: signal processing of sensor output; performance measurement and optimization of industrial communication networks, time synchronization of distributed networks. During the period from 2004 to 2012 he held various positions within the technical committees of national and international regulations, including CEI (Italian Electrotechnical Committee) and IEC (International Electrotechnical Commission) in the field of industrial communications, fieldbuses and wireless sensors.

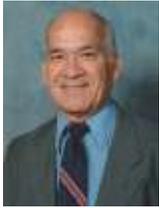
He served in the Program Committee of several international conferences, including ETFA, ISPCS, SAS and I2MTC, all of them organized by the IEEE. He is regular reviewer of several international journals, including IEEE Transactions on Instrumentation and Measurements, IEEE Sensors Journal, IEEE Transactions on Industrial Informatics, IEEE Transactions on Automation Science and Engineering, IEEE Communications Letters, Elsevier Sensors & Actuators: A. Physical, Elsevier Mechatronics Journal. He is responsible for several “applied research” contracts between the Department and companies or consortia in the field of Real-time networks and sensor networks for industry. Since 2004, he manages the activities of the "PROFIBUS and PROFINET Competence Center" accredited with the PROFIBUS International Association. Since 2002 he was supervisor of more than 50 thesis works.

Currently, he is the author of more than 80 international papers (scientific journals and conference proceedings).

**IEEE Instrumentation and Measurement Society  
Distinguished Service Award**

The I&M Society Distinguished Service Award is presented each year to an individual who has given outstanding service to the Society and to the profession.

The 2012 Distinguished Service Award recipient is:



**Frank Reyes**

*Retired*  
*USA*

*“For tirelessly providing outstanding, extremely valuable and critical service to the I&M Society, in a sustained manner as I&M Administrative Committee Member-at-Large.*

Frank Reyes worked in the Aerospace Industry for Northrop as a design engineer for over 20 years and in Engineering Management for over 10 years. He was involved in all areas of testing of the Division products; electronic and electro-optic (day and night vision systems and lasers). He was the responsible Manager for all testing activities at a Division of Northrop including design and development of factory test equipment, ground support equipment, Reliability testing, Environmental testing and Field testing. Frank has supported IEEE activities since 1990. He has served as VP Finance and Treasurer for the Instrumentation and Measurement Society (I&M), and as VP Finance for the Aerospace and Electronic Systems Society (AESS). He has also served as a Committee Chair for Autotestcon, and on the Board of Directors for Autotestcon. He is currently Treasurer for the I&M Society, on the Board of Governors for AESS and on the Autotestcon Board of Directors.

Frank received the B.S.E.E. degree from UCLA, Certificate in Computer Science from UC Irvine, and the Engineering Management Program at the California Institute of Technology.

**IEEE Instrumentation and Measurement Society  
Career Excellence Award**

The I&M Society Career Excellence Award is awarded to recognize a lifetime career of meritorious achievement and outstanding technical contribution by an individual in the field of instrumentation and measurement.

The 2012 Career Excellence Award recipient is:



**Solomon Max**  
*LTX – Credence Corporation*  
USA

*“For pioneering automatic test equipment design, CODEC & DSP test methodology and monumental improvements in signal generation and digitization hardware &*

*calibration.”*

**Solomon Max** was a cofounder of LTX Corporation in 1976. He received a BEE magna cum laude from CCNY and MS and EE degrees from MIT. He worked as Chief Engineer at Adage, Analogic, Teradyne, and at LTX Corporation. He is a Senior Life Member of IEEE and a member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu. He is a contributor to several IEEE Standards. He holds four patents. He currently holds the position of Staff Scientist at LTX-Credence Corporation. He has presented many papers at ITC and I<sup>2</sup>MTC on topics relating to data converters and ATE.

## 2013 I&M Society Fellows

**Salvatore Baglio**  
University of Catania  
Catania, Italy

*“For contributions to development of microsensors and magnetometers.”*

**Branislav V. Djokić**  
National Research Council of Canada  
Ottawa, Ontario, Canada

*“For contributions to precision metrology in electrical power applications.”*

**Peter Pupalaiakis**  
LeCroy Corporation  
NY, USA

*“For contributions to high-speed waveform digitizing instruments.”*

## 2012 I&M Society Senior Member Elevations

Leopoldo Angrisani  
Francois Auger  
Silvano Balemi  
Lee Barford  
Stephen Bart  
Niclas Bjorsell  
Luiz Borges Da Silva  
Rui Cao  
Richard Weng Yew Chang  
Andrea Cozza  
John Daley  
Erik Daniel  
Luca De Vito  
Thomas Dean  
Ramon Diego  
Kristen Donnell  
Johan Driesen  
Roger Ellingson  
Francisco Ferrero  
Trond Folkestad  
Jose Antonio Gazquez  
Dimitrios Georgakopoulos  
Mohammad Ghasr  
James Gilbert  
Jose Gonzalez de la Rosa  
Teddy Surya Gunawan  
Ernest Houtzager  
Yong Hu  
Fakhralden Huliehel  
Chi Hung Hwang  
Milo Hyde  
Sheroz Khan  
Ye Chow Kuang

Chethan Kumar Y B  
Carmine Landi  
Shahedul Laskar  
Aime Lay-Ekuakille  
Huang Chen Lee  
Zhen An Liu  
Fernando Lopez Pena  
Jianwei Ma  
Carl Mccants  
Melanie Ooi  
Mang Ou-Yang  
Mile Petkovski  
Amal Punchihewa  
Diego Ramirez  
Gert Rietveld  
Jose Rivera Mejia  
Giovanni Rossi  
Eduardo Rubio  
Roberto Saletti  
Fernando Sedano  
Yong Shin  
Gerard Stenbakken  
Valeria Teppati  
Kavita Thakur  
Nicholas Usechak  
Michele Vadursi  
Alberto Vallan  
Mitch Van Ochten  
James Vanderwiele  
Robert Vice  
Raymond Wallace  
William Williams  
Glenn Wright

## I<sup>2</sup>MTC Tradition

The first *IEEE Instrumentation and Measurement Technology Conference* was held in 1984 aboard the Queen Mary in Long Beach, California, but its origins stretch back nearly 20 years earlier to the *Electrical and Electronic Measurement and Test Instrument Conference* held each year from 1966 until 1981 in Ottawa, Canada. The latter was revived by the IEEE Instrumentation and Measurement Society with a new focus on all aspects of instrumentation and measurement. The following list contains locations and themes of the I<sup>2</sup>MTC conferences:

- 1984 – Long Beach, CA, USA, *Automation-Quality-Productivity*
- 1985 – Tampa, FL, USA, *Measurement Science*
- 1986 – Boulder, CO, USA, *Standards of Excellence*
- 1987 – Boston, MA, USA, *The Changing Face of I&M Technologies*
- 1988 – San Diego, CA, USA, *Intelligence in Instrumentation*
- 1989 – Washington, DC, USA, *Persuasive I&M Technology – A Resource*
- 1990 – San Jose, CA, USA, *Emerging Measurement Technologies*
- 1991 – Atlanta, GA, USA, *Enhancing Productivity with Instrumentation and Measurement Technologies*
- 1992 – Meadowlands, NJ, USA, *Smart People, Smart Instruments, Smart Measurements*
- 1993 – Irvine, CA, USA, *Innovative Ideas for Industry*
- 1994 – Hamamatsu, JAPAN, *Advanced Technologies in Instrumentation and Measurement*
- 1995 – Waltham, MA, USA, *I3C – Integrating Intelligent Instrumentation and Control*
- 1996 – Brussels, BELGIUM, *Quality Measurements – The Indispensable Bridge between Theory and Reality (No Measurements? No Science!)*
- 1997 – Ottawa, CANADA, *Sensing, Processing, Networking*
- 1998 – St. Paul, MN, USA, *Where Instrumentation is Going*
- 1999 – Venice, ITALY, *Measurements for the New Millennium*
- 2000 – Baltimore, MD USA, *Smart Connectivity: Integrating Measurement and Control*
- 2001 – Budapest, HUNGARY, *Rediscovering Measurement in the Age of Informatics*
- 2002 – Anchorage, AK, USA, *The Frontier of Instrumentation and Measurement*
- 2003 – Vail, CO, USA, *Instrumentation and Measurement at the Summit*
- 2004 – Lake Como, ITALY, *From the Electrometer to the Networked Instruments: A Giant Step toward a Deeper Knowledge*
- 2005 – Ottawa, CANADA, *The 22nd Reunion*
- 2006 – Sorrento, ITALY, *A View on the New Technologies for Instrumentation and Measurement*
- 2007 – Warsaw, POLAND, *Synergy of Science and Technology in Instrumentation and Measurement*
- 2008 – Victoria, British Columbia, CANADA, *Advances in the Science of Measurement Technology*
- 2009 – Singapore, *Always On: Instrumentation and Measurement in the Networked World*
- 2010 – Austin, TX, USA, *Innovative and Integrated Applications of I&M*
- 2011 – Binjiang, Hangzhou, CHINA, *Instrumentation and Measurement for Improving Quality of Life*
- 2012 – Graz, Austria, *Smart Measurements for a Sustainable Environment*

# IEEE Instrumentation and Measurement Society

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Senior Past-President: Alessandro Ferrero, *Politecnico di Milano, Italy*  
Junior Past-President: Kim Fowler, *Kansas State University, USA*

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### 2010-2013

Serge Demidenko  
Max Cortner  
Ferdinanda Ponci  
Reza Zoughi

### 2011-2014

Georg Brasseur  
Jorge F. Daher  
Michael F. Gard  
Dario Petri

### 2012-2015

Pasquale Daponte  
Kristen Donnell  
Wendy Van Moer  
Jenny Wirandi

### 2013-2016

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Alessandra Flammini  
Richard C. Hochberg  
Mark Yeary

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Graduate Student Representative, Erik Timpson, *University of Missouri-Columbia, USA*

GOLD Representative, Andrew Timm, *National Instruments, USA*

Society Executive Assistant, Judy Scharmman, *Conference Catalysts, LLC, USA*

## Editors

### **Editor-in-Chief, IEEE Transactions on Instrumentation & Measurement**

Alessandro Ferrero, *Politecnico di Milano, Italy*

### **Associate Editor-in-Chief, IEEE Transactions on Instrumentation and Measurement**

Shervin Shirmohammadi, *University of Ottawa, Canada*

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Serge Demidenko, *RMIT International University, Vietnam*

Edoardo Fiorucci, *Università degli Studi dell'Aquila, Italy*

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Domenico Grimaldi, *Univesita Della Calabria, Italy*

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Jesus Urena, *University of Alcala, Spain*

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George Xiao, *Institute for Microstructural Science, Canada*

Ruqiang Yan, *Southeast University, P.R, China*

Yong Yan, *University of Kent, UK*

Wuqiang Yang, *University of Manchester, UK*

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Maciej Zawodniok, *Missouri University of Science & Technology, USA*

Reza Zoughi, *Missouri University of Science & Technology, USA*

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**Society Awards Subcommittee:** Georg Brasseur, *Graz University of Technology, Austria*

**Conferences:** Dario Petri, *University of Trento, Italy*

**Education:** Ferdinanda Ponci, *RWTH Aachen University, Germany*

**Society Representatives, Directed Delegates and Liaisons:** Reza Zoughi, *Missouri University of Science & Technology, USA*

**Finance:** Ruth Dyer, *Kansas State University, USA*

**Nominations and Appointments:** Kim Fowler, *Kansas State University, USA*

**Membership Development:** Kristen M. Donnell, *Missouri University of Science & Technology, USA*

**Publications:** Wendy Van Moer, *Vrije Universiteit Brussel*

**Society Management:** Reza Zoughi, *Missouri University of Science & Technology, USA*

**Technical Committees and Standards:** Mihaela Albu, *Politehnica University of Bucharest, Romania*