

WELCOME TO GALVESTON, TEXAS, FOR THE 2013 IEEE SENSORS APPLICATIONS SYMPOSIUM

Welcome to the 8th IEEE Sensors Applications Symposium (SAS 2013) in Galveston, Texas. We were last in the Houston metropolitan area for SAS 2006, when we had to relocate the symposium here from the originally planned location of New Orleans, Louisiana, following the devastation of Hurricane Katrina. As a symbol of solidarity with the city, we returned to New Orleans for SAS 2009. As many of you know, the island of Galveston suffered the full brunt of the fury of Hurricane Ike. On September 13, 2008, the eye of Hurricane Ike made landfall over the east end of Galveston with a high storm surge, and travelled north up Galveston Bay, along the east side of Houston. Large parts of the island were devastated. It is a testament to the resilience of the residents of Galveston and the spirit of Texas that the island has been rebuilt and restored. We are pleased to show our support to Galveston by hosting SAS 2013 here and are certain that you will enjoy the amenities of this fine resort on the Gulf coast of the United States.

SAS continues to draw the community of sensor developers, users and innovators and provides a forum for exploring new applications in sensor technology. At SAS 2013, sensor networking is the most popular topic addressed by the majority of papers, followed by smart sensors and standards and multi-sensor data fusion. There is a healthy focus on MEMS, bio-sensors, homeland security and commercial development. As in past years, the symposium continues to see international participation with the largest number of attendees from the Asia/Pacific region (IEEE Region 10) followed by Europe (Region 8) and the United States (Regions 1-7). An international team of over 40 reviewers, ably led by our Technical Program Committee Chair, is responsible for the quality and selection of the papers that are being presented at this conference.

The organizers have planned for the next three days to be busy and hopefully productive for you as you engage with the sensor applications community. As always, we value your suggestions for improving SAS, and we encourage you to provide feedback to the organizers. The size and format of this symposium is meant to encourage informal interactions – so please take advantage of this special environment at SAS.

Some of the SAS 2013 highlights include:

- The keynote address on Tuesday morning by Professor Rong Zheng on recent advances in wireless structural health monitoring
- The banquet on Wednesday evening at the Lone Star Flight Museum; bus transportation will be provided from the conference hotel
- Travel and best-paper awards presented to student authors, with the support of the IEEE Instrumentation & Measurement Society
- A Special Issue in the IEEE Transactions on Instrumentation & Measurement which will contain up to ten papers selected on the basis of the results of regular peer review of the manuscripts submitted for consideration by the participants of SAS 2013

About Galveston, our host city:

Galveston Island is located on the Gulf Coast of Texas just 50 miles south of Houston. The city offers 32 miles of beaches, relaxed atmosphere, abundant leisure activities, first-rate restaurants, numerous attractions and a vibrant historic downtown that offers cruising, shopping, arts and entertainment. The island is host to the University of Texas Medical Branch (UTMB) Galveston, which is a premier medical research and education facility. Its ethnically diverse citizens have worked together to make their city better since the early days of its founding in 1836. Other than the beach, the top destination for Galveston visitors is the 242-acre Moody Gardens which houses a 10-story rainforest, one of the world's largest aquariums, and an educational Discovery Museum. The highpoint of dining in Galveston is freshly cooked, freshly caught Gulf Coast cuisine. The island has seen its share of calamities, yet Galveston continues its journey of recovery and rediscovery.

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KEYNOTE

Rong Zheng, Associate Professor
McMaster University, Canada

Abstract:

Structure health monitoring is crucial in ensuring the safe operation of civil structures such as bridges and highways both at the early stage of constructions as well as during operations. Smart aggregate (SA) is a multi-functional Piezo-electric transducer based sensor that can be utilized for passive and active sensing. In this talk, we present the hardware design, software architecture and algorithm development utilizing SAs for autonomous structure health monitoring and impact detection.

Bio:

Rong Zheng received her Ph.D. degree from Dept. of Computer Science, University of Illinois at Urbana-Champaign and earned her M.E. and B.E. in Electrical Engineering from Tsinghua University, P.R. China. She is on the faculty of the Department of Computer and Software, McMaster University, Canada.

Rong Zheng's research interests include network monitoring and diagnosis, cyber physical systems, and sequential learning and decision theory. She received the National Science Foundation CAREER Award in 2006, and University of Houston Research Award in 2010. She serves on the technical program committees of leading networking conferences; and was the program chair for the first ACM workshop on medical grade wireless networks and the 7th International Conference on Wireless Algorithms, Systems and Applications. She served as a guest editor for EURASIP Journal on Advances in Signal Processing, Special issue on wireless location estimation and tracking, Elsevier's Computer Communications – Special Issue on Cyber Physical Systems.

CONFERENCE PROGRAM

Tuesday, February 19

- 8:00** **Registration Opens**
- 9:00** **Welcome and Introductory Remarks**
Shreekanth Mandayam (Rowan University, USA) &
Deniz Gurkan (University of Houston, USA)
- 9:20 - 10:40** **Keynote: Some Recent Advancement in Wireless Structure Health Monitoring**
Rong Zheng (McMaster University, Canada)
- 10:40 - 11:00** **Break**
- 11:00 - 12:40** **Session I: Sensor Networking I**
Session Chair: *Deniz Gurkan (University of Houston, USA)*
- 11:00** **Wireless Multichannel Bus Communication Using CDMA Coding for Single Frequency Radios**
Hamid Fahim Rezaei (University of Iowa, USA)
Anton Kruger (University of Iowa, USA)
- 11:20** **Energy and Lifetime Analysis of Compressed Wireless Sensor Network Communication**
Celalettin Karakuş (TOBB University of Economics and Technology, Turkey)
Ali C Gurbuz (TOBB University of Economics and Technology, Turkey)
Bulent Tavli (TOBB University of Economics and Technology, Turkey)
- 11:40** **Design and Measurement of a Planar Dual-Band Antenna for the Tyndall Multiradio Wireless Sensing Platform**
Loizos Loizou (Tyndall National Institute & University College Cork, Ireland)
John Laurence Buckley (Tyndall National Institute & University College Cork, Ireland)
Brendan O'Flynn (Tyndall National Institute, Ireland)
John Barton (Tyndall National Institute, Ireland)
Cian Ó Mathúna (Tyndall National Institute, Ireland)
Emanuel M. Popovici (University College Cork, Ireland)
- 12:00** **Low Weight Double Layer Coded CDMA as a Novel Physical Layer for OneWire Bus Communication in Sensor Networks**
Hamid Fahim Rezaei (University of Iowa, USA)
Anton Kruger (University of Iowa, USA)
- 12:20** **Analysis of Routing and Quality of Service (QoS) Issues for Various Traffic Types in Wireless Mesh Networks Based on IEEE802.11s Protocol**
Adeel Hassan (Northwestern Polytechnical University, P.R. China)
- 12:40 - 14:00** **Lunch**

- 14:00 - 15:40** **Session II: Multisensor Data Fusion I**
Session Chair: *Shreekanth Mandayam (Rowan University, USA)*
- 14:00** **On Redundancy Identification in Randomly Deployed WSNs, Another Perspective**
Peter Damuut (University of Essex, United Kingdom)
Dongbing Gu (University of Essex, United Kingdom)
- 14:20** **Combining Multiple GPS Receivers to Enhance Relative Distance Measurements**
Eddy Trinklein (Michigan Technological University, USA)
Gordon Parker (Michigan Technological University, USA)
- 14:40** **Indoor Localization Using A Smart Phone**
Rui Zhang (University of Freiburg, Germany)
Amir Bannoura (University of Freiburg, Germany)
Fabian Höflinger (University of Freiburg, Germany)
Leonhard Reindl (IMTEK - Institute for Microsystem Technology, Germany)
Christian Schindelhauer (University of Freiburg, Germany)
- 15:00** **Smartphone Based Localization Solution for Construction Site Management**
Chiara Maria De Dominicis (University of Brescia, Italy)
Alessandro Depari (University of Brescia, Italy)
Alessandra Flammini (University of Brescia, Italy)
Stefano Rinaldi (University of Brescia, Italy)
Emiliano Sisinni (University of Brescia, Italy)
- 15:20** **Wireless Sensor Network Based Smart Home: Sensor Selection, Deployment and Monitoring**
Debraj Basu (Massey University, New Zealand)
Giovanni Moretti (Massey University, New Zealand)
Gourab Sen Gupta (Massey University, New Zealand)
Stephen Marsland (Massey University, New Zealand)
- 15:40 - 16:00** **Break**
- 16:00 - 17:40** **Session III: Homeland Security**
Session Chair: *Alessandra Flammini (University of Brescia, Italy)*
- 16:00** **Encryption in Mobile Devices Using Sensors**
Joy Bose (Samsung India Software Operations, India)
Tasleem Arif (Samsung India Software Operations, India)
- 16:20** **Developing a Multi-Mode PZT Sensing Solution for Active SHM in Concrete Structures**
Costas Providakis (Technical University of Crete, Greece)
Kalliopi Stefanaki (Technical University of Crete, Greece)
Maristella Voutetaki (Technical University of Crete, Greece)
John Tsompanakis (Technical University of Crete, Greece)
Maria Stavroulaki (Technical University of Crete, Greece)

- 16:40** **Optical Fiber Bragg Grating Based Intrusion Detection Systems for Homeland Security**
Gary Allwood (Edith Cowan University, Australia)
Steven Hinckley (Edith Cowan University, Australia)
Graham Wild (RMIT University, Australia)
- 17:00** **Dynamic Duty Cycle Assignment for Video Surveillance Sensor Networks**
Zara Hamid (Military College of Signals, NUST, Pakistan)
Faisal Bashir (Chosun University, Korea)
Jae Pyun (Chosun University, Korea)
- 17:20** **2 in 1 Leakey Coaxial Cable for Intrusion Detection Sensor**
Kenji Inomata (Mitsubishi Electric Corp. & Advanced R&D Center, Japan)
Takashi Hirai (Mitsubishi Electric Corp., Japan)
Wataru Tsujita (Mitsubishi Electric Corp., Japan)

Wednesday, February 20

- 8:00** **Registration Opens**
- 8:40 - 10:40** **Session IV: Multisensor Data Fusion II**
Session Chair: *Shreekanth Mandayam (Rowan University, USA)*
- 8:40** **Vehicle Location Estimation Based On A Magnetic Sensor Array**
Xin Zhou (University of Wisconsin-Madison, USA)
- 9:00** **Correction of the Temperature Induced Error of the Illumination Source in a Time-of-Flight Distance Measurement Setup**
Johannes Seiter (Vienna University of Technology, Austria)
Michael Hofbauer (Vienna University of Technology, Austria)
Milos Davidovic (Vienna University of Technology, Austria)
Stefan Schidl (Vienna University of Technology, Austria)
Horst Zimmermann (Vienna University of Technology, Austria)
- 9:20** **Protocol Design for Airdropping Meteorological Parameters Measurement Network**
Fangling Pu (School of Electronic Information, Wuhan University, P.R. China)
Fangli Chen (School of Electronic Information, Wuhan University, P.R. China)
Zongyang Liu (School of Electronic Information, Wuhan University, P.R. China)
Hao Sun (School of Electronic Information, Wuhan University, P.R. China)
Xin Xu (School of Electronic Information, Wuhan University, P.R. China)
- 9:40** **Ambient Energy Harvesting and Self-sustainability for Transportation Infrastructure Monitoring Wireless Sensor Networks**
Jin Zhu (University of Northern Iowa, USA)
Laura Hattaway (University of Northern Iowa, USA)
Sultan Altamimi (University of Northern Iowa, USA)

- 10:00** **Spectral Unmixing of Three-Algae Mixtures Using Hyperspectral Images**
Mehrube Mehrubeoglu (Texas A&M University-Corpus Christi, USA)
Lifford McLaughlan (Texas A&M University-Kingsville, USA)
Paul Zimba (Texas A&M University-Corpus Christi, USA)
Ming Yang Teng (Texas A&M University-Corpus Christi, USA)
- 10:20** **Presentation of SAS 2014**
- 10:40 - 11:00** **Break**
- 11:00 - 12:40** **Session V: ISHM**
Session Chair: *Alessandra Flammini (University of Brescia, Italy)*
- 11:00** **Effective Awakening Interaction Learning System that Uses Vital Sensing**
Junya Nakase (Osaka University, Japan)
Koichi Moriyama (Osaka University, Japan)
Kiyoshi Kiyokawa (Osaka University, Japan)
Masayuki Numao (Osaka University, Japan)
Mayumi Oyama (Kwansei Gakuin University, Japan)
Satoshi Kurihara (Osaka University, Japan)
- 11:20** **RF Exposure Analysis for Multiple Wi-Fi Devices In Enclosed Environment**
Shian Hwu (Barrios Technology, USA)
Rhodes Bryan (Jacobs Technology, USA)
Kanishka deSilva (Jacobs Technology, USA)
Catherine Sham (NASA/JSC, USA)
James Keiser (NASA/JSC, USA)
- 11:40** **Fuzzy Logic in Heart Rate and Blood Pressure Measuring System**
Iman Gamal Eldin Morsi (Arab Academy for Science and Technology, Egypt)
Yahia Abd El Gawad (Arab Academy for Science and Technology and Maritime Transport, Egypt)
- 12:00** **Bathroom Movements Monitoring UWB Sensor with Feature Extraction Algorithm**
Keio Kashima (The University of Kitakyushu, Japan)
Ryohei Nakamura (The University of Kitakyushu, Japan)
Akihiro Kajiwara (The University of Kitakyushu, Japan)
- 12:20** **Environment Feature Extraction and Classification for Context Aware Physical Activity Monitoring**
Golsa Moayeri pour (Purdue University, USA)
Jeffrey J. Evans (Purdue University, USA)
Philip Troped (Purdue University, USA)
- 12:40 - 14:00** **Lunch**

- 14:00 - 15:20** **Session VI: MEMS and Nanosensors**
Session Chair: *Deniz Gurkan (University of Houston, USA)*
- 14:00** **Low Power Multiply Accumulate Unit (MAC) for Future Wireless Sensor Network**
Ahmed Abdelgawad (Central Michigan University, USA)
- 14:20** **Microhotplates for Low Power, and Ultra Dense Gaseous Sensor Arrays Using Recessed Silica Aerogel for Heat Insulation**
Mohammad Seyed Jalali (University of Louisiana at Lafayette, USA)
Sanjay Kumar (University of Louisiana at Lafayette, USA)
Mohammad Madani (University of Louisiana at Lafayette, USA)
Nian-Feng Tzeng (University of Louisiana at Lafayette, USA)
- 14:40** **Analysis of Bonding Failure in CMOS MEMS Chips**
Farooq Ahmad (Universiti Teknologi PETRONAS, Malaysia)
John Ojur Dennis (Universiti Teknologi PETRONAS, Malaysia)
Mohd Haris Md Khir (Universiti Teknologi PETRONAS, Malaysia)
Nor Hisham Hamid (Universiti Teknologi PETRONAS, Malaysia)
- 15:00** **A Z-Axis MEMS Gyroscope With Improved Sensitivity**
Nikoo Naeemi Sanatdoost (Memorial University of Newfoundland, Canada)
Vlastimil Masek (Memorial University of Newfoundland, Canada)
Lihong Zhang (Memorial University of Newfoundland, Canada)
- 15:20 - 15:40** **Break**
- 15:40 - 17:00** **Session VII: Biosensors**
Session Chair: *Gourab Sen Gupta (Massey University, New Zealand)*
- 15:40** **Embedded Electronics for a Mussel-Based Biological Sensor**
Hannah Taylor (University of Iowa, USA)
James Niemeier (University of Iowa, USA)
Anton Kruger (University of Iowa, USA)
- 16:00** **Automated Sensor for Flowering and Vegetative Budburst**
Guanduo Li (University of Iowa, USA)
Anton Kruger (University of Iowa, USA)
James Niemeier (University of Iowa, USA)
Heather Lintz (Oregon State University, USA)
- 16:20** **Biomechanical Model-based Multi-sensor Motion Estimation**
Guanhong Tao (University of Chinese Academy of Sciences, P.R. China)
Zhipei Huang (University of Chinese Academy of Sciences, P.R. China)
Yingfei Sun (University of Chinese Academy of Sciences, P.R. China)
Shengyun Yao (University of Chinese Academy of Sciences, P.R. China)
Jiankang Wu (University of Chinese Academy of Sciences, P.R. China)
- 16:40** **Improved Biological Agent Sensing Integrated Circuit (BASIC)**
Yi Zheng (Virginia Tech, USA)
Joseph G Tront (Virginia Tech, USA)
- 17:45** **Busses Depart to Conference Dinner**
- 18:00 - 21:30** **Conference Dinner at Lone Star Flight Museum**

Thursday, February 21

- 8:00** **Registration Opens**
- 8:40** **Closing Session**
Session Chairs: Shreekanth Mandayam (Rowan University, USA) & Deniz Gurkan (University of Houston, USA)
- 9:00 - 10:40** **Session VIII: Commercial Development**
Session Chair: *Alessandra Flammini (University of Brescia, Italy)*
- 9:00** **Ultra-wideband Monitoring Sensor with Pattern Recognition**
Hiroto Nakama (The University of Kitakyushu, Japan)
Ryohei Nakamura (The University of Kitakyushu, Japan)
Akihiro Kajiwara (The University of Kitakyushu, Japan)
- 9:20** **Terahertz (THz) Wireless Systems for Space Applications**
Shian Hwu (Barrios Technology, USA)
Kanishka deSilva (Jacobs Technology, USA)
Cindy Jih (NASA, USA)
- 9:40** **Power Supply Energy Optimization for Ultra Low-Power Wireless Sensor Nodes**
Mitko Tanevski (Ecole Polytechnique Fédérale de Lausanne, Switzerland)
Alexis Boegli (Ecole Polytechnique Fédérale de Lausanne, Switzerland)
Pierre-Andre Farine (Ecole Polytechnique Fédérale de Lausanne, Switzerland)
- 10:00** **Instrumentation and Automated Control of Aircraft Leading Edge Temperature**
Scott Finlayson (New Zealand Defence Force, New Zealand)
Gourab Sen Gupta (Massey University, New Zealand)
- 10:20** **Optical Fiber Bragg Grating Sensors Applied to Gas Turbine Engine Instrumentation and Monitoring**
Graham Wild (RMIT University, Australia)
- 10:40 - 11:00** **Break**
- 11:00 - 13:00** **Session IX: Smart Sensors**
Session Chair: *Gourab Sen Gupta (Massey University, New Zealand)*
- 11:00** **Piezoelectric Based Resonance Displacement Sensor**
Mangalanathan Umapathy (National Institute of Technology, Tiruchirappalli, India)
Sujan Y (National Institute of Technology, Tiruchirappalli, India)
Kaluvan Suresh (National Institute of Technology, Tiruchirappalli, India)
- 11:20** **A New Piezoelectric Laminated Cantilever Resonance Based Hydraulic Pump**
Vasuki B (National Institute of Technology, Tiruchirappalli, India)
Sathiya P (National Institute of Technology, Tiruchirappalli, India)
Kaluvan Suresh (National Institute of Technology, Tiruchirappalli, India)

- 11:40** **Energy Savings of Home Growing Plants by using Daylight and LED**
Sungwon Lee (Kyungpook National University, Korea)
Sekwang Park (Kyungpook National University, Korea)
- 12:00** **Design and Modeling of Piezoelectric Sifter**
Uma Gandhi (National Institute of Technology, Tiruchirappalli, India)
Varun U. Kumar (National Institute of Technology, Tiruchirappalli, India)
Santhosh B v m p (National Institute of Technology, Tiruchirappalli, India)
Kaluvan Suresh (National Institute of Technology, Tiruchirappalli, India)
- 12:20** **Application of Process Control over SOA for Smart Transducers**
Alexandre Alves de Lima Ribeiro (Universidade Estadual Paulista Júlio de Mesquita Filho - Unesp - FEIS & Instituto Federal de Educação, Ciência e Tecnologia de São Paulo - IFSP, Brazil)
Alexandre César Rodrigues da Silva (Universidade Estadual Paulista Júlio de Mesquita - Unesp-FEIS & UNESP, Brazil)
- 12:40** **Automatic Realtime Offset Calibration of Gyroscopes**
Manuel Glueck (Robert Bosch GmbH, Germany)
Dayo Oshinubi (Robert Bosch GmbH, Germany)
Yiannos Manoli (University of Freiburg, Germany)