

Welcome to Queenstown, New Zealand, for the 2014 IEEE Sensors Applications Symposium

Welcome to the 9th IEEE Sensors Applications Symposium (SAS 2014) in Queenstown, New Zealand, the adventure capital of the world!

SAS is one of the flagship conferences of the IEEE Instrumentation and Measurement Society. This is the first time that SAS is being held outside North America and Europe. SAS continues to bring together the community of sensor developers, innovators, and users, and provides a forum for exploring new applications in sensor technology. For SAS 2014, 111 papers were submitted of which 76 were accepted for presentation at the conference. This results in an acceptance rate of 68%. The submission rules were modified for 2014 and required authors to submit a full paper instead of a simple abstract, thus improving the overall quality of the review process. Over the years there has been a marked improvement in the quality of the papers and we wish to see this upward trend continue in the future.

Apart from the two plenary talks by world renowned scientists, SAS 2014 will have five Special Sessions on niche topics in the area of sensors and sensor applications. In keeping with the trend of the past few years, this year too there are many papers on sensor networking, multi-sensor data fusion, smart sensors, non-destructive sensing, remote sensing and biomedical applications. A good number of papers are on environmental and agritech related sensors, a topic which is of great significance in the context of New Zealand's economy. Additionally, SAS 2014 hosts the First Sensor Application Development Workshop, focused on Seattle project (with Sensibility Testbed), which provides a unified programmable interface to sensors on smartphones.

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 1-6). An international Technical Program Committee of about 50 reviewers, ably led by our Technical Program Committee Co-Chairs together with the Associate Technical Program Chairs, 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 2014 highlights include:

- The keynote address on Tuesday morning by Dr. Alan Finkel on 'Characterisation of currents in nature's ion-flow nanomachines underpins development of new medicines'
- The plenary invited talk on Wednesday morning by Commander Blake McBride on 'An Overview of ONR (Office of Naval Research) Global's Science Support Tools and an update on the renewed Arctic focus'
- Five Special Sessions on the following topics:
 - Systems with multiple electromagnetic sensors
 - Computer Vision and Machine learning for vision based applications - Organized by TC-32 (Fault-Tolerant Measurement Systems Technical Com.) of IEEE I&M Society.
 - Environmental and Agritech Related Sensors (two sessions)
 - Efficient Sensor Network Processing
 - Sensors and Systems for Emergency and First Response
- The banquet on Wednesday evening at the Skyline Restaurant with a spectacular view of Queenstown from the top of the hill.
- 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 2014

About Queenstown, our host city:

Queenstown is one of the most picturesque places on earth with its majestic mountains and crystal clear lakes. Queenstown's stunning scenery is inspiring and revitalising. There are plenty of things to do in Queenstown if you enjoy the great outdoors, superb food and wine, and a more relaxed pace. You can indulge in many outdoor activities such as trekking, biking, jet-boating, bungee jumping, skiing, hang gliding and fishing. It is not without good reasons that Queenstown is called the adventure capital of the world!

Queenstown is a world class wine destination. The region is home to over 75 wineries producing a wide range of wine varieties.

Queenstown's striking landscape and laidback lifestyle inspires many wonderful artists and craftspeople including photographers, film makers, musicians, jewellers and painters. You can view and purchase local art and crafts at any of Queenstown's galleries, studios or weekly craft markets. Alternatively, learn about the region's culture and heritage with a visit to a museum, or a stroll down the main street of historic Arrowtown nearby.

SAS 2014 Organizing Committee

General Co-Chairs:

Gourab Sen Gupta, Massey University, New Zealand
Alessandra Flammini, University of Brescia, Italy

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Serge Demidenko, RMIT International University Vietnam, Vietnam
Eric Matson, Purdue University, USA
Adam Osseiran, Edith Cowan University, Australia
Ian Woodhead, Lincoln Agritech Limited, New Zealand

1st Sensor Applications Development Workshop:

Justin Cappos (Chair), Polytechnic University of New York, USA
Deniz Gurkan, University of Houston, USA
Yanyan Zhuang, Polytechnic University of New York, USA
Gourab Sen Gupta, Massey University, New Zealand
Alessandra Flammini, University of Brescia, Italy
Salvatore Baglio, University of Catania, Italy

Conference Management:

Conference Catalysts, LLC

Keynote Speaker

Alan Finkel, AM PhD FTSE

Topic:

Characterisation of currents in nature's ion-flow nanomachines underpins development of new medicines

Synopsis:

Nature is replete with working molecules, many of which are extraordinary nanomachines. Of particular interest to neuroscientists and medicinal chemists are the "ion-channels" that mediate the flow of ions across cell membranes into and out of cells. The sequenced activation of ion channels underpins the electrical signaling within the brain and between the brain and other organs. The vast quantities of ion channels in each of the tens of billions of active brain cells contribute to the processing power that enables you to be reading this synopsis.

The individual ion-channel currents are tiny, of the order of a picoamp, with activation durations of a fraction of a millisecond. Thus, to record the flow of currents the measurement system needs to have a bandwidth of ten kilohertz or more. Extraneous and thermal noise start to overwhelm the signal, but sensitive picoammeters and signal detection software are up to the task.

The currents through the nanoscale proteins are measured using fine tipped microelectrodes and planar electrodes that can measure the current through individual ion channels. Automated equipments using these electrodes as sensors are used for pharmaceutical drug discovery and safety profiling. The industry also uses extremely sensitive fluorescence and luminescence systems that will be briefly described.

Speaker Biography:

Alan Finkel AM PhD FTSE is Chancellor of Monash University and President of the Australian Academy of Technological Sciences and Engineering. He is the co-founder and chairman of Cosmos Magazine, the chairman of the Australian Centre of Excellence for All-Sky Astrophysics and the CEO of Stile Education.

For three years until 2012 Alan was involved in the provision of low-emissions electricity to operate electric vehicles. Previously, for nearly twenty-five years, Alan was the CEO of Axon Instruments, a California-based company that made precision scientific instruments used at pharmaceutical companies and universities for the discovery of new medicines.

Alan is passionate about educating the next generation. He established the Australian Course in Advanced Neuroscience to provide advanced training to early-career scientists and he leads a secondary school science program named STELR that is currently running in nearly 350 secondary schools around Australia.

Plenary Speaker

Commander Blake McBride

Topic:

An Overview of ONR Global's Science Support Tools and an update on the renewed Arctic focus

Synopsis:

The Office of Naval Research Global (ONRG) works with scientists around the world to improve scientific understanding through international collaboration. This presentation will present an overview of the funding programs ONRG uses to foster collaboration around the world. The presentation will also give a short overview of the U.S. interest in the changing Arctic by covering recent developments, research focus areas and opportunities for future research.

Speaker Biography:

Commander Blake McBride was commissioned an Ensign in the United States Navy in 1993 at Officer Candidate School in Newport, Rhode Island. He then served as a forecast duty officer at Fleet Numerical Meteorology and Oceanography Center, in Monterey California. He later qualified and served as a category "A" hydrographer for the Naval Oceanographic Office where he collected data used in the production of nautical charts. In 2002 he reported aboard the USS BONHOMME RICHARD (LHD 6) where he served as ship's Meteorologist and Legal Officer completing two deployments during operations Enduring Freedom and Iraqi Freedom. His subsequent tours were as the Executive Officer (XO) of the U.S. National/Naval Ice Center in Suitland, Maryland where he directed the analysis and forecasting of sea ice in both the Arctic and Antarctic; and Director of Staff for the Deployable Joint Task Force at NATO's Southern Headquarters in Naples, Italy.

His most recent tour was as the Arctic Affairs Officer and acting Deputy Director for the Navy's Task Force Climate Change on the staff of the Oceanographer of the Navy (OPNAV N2/N6E) in Washington DC. He currently serves as an Associate Director (AD) of research for Meteorology and Arctic Technologies for the Office of Naval Research (ONR) Global in Tokyo, Japan.

His education includes a Bachelor of Science degree in Physics from Stephen F. Austin State University; a Master of Science degree in Meteorology and Physical Oceanography from the U.S. Naval Postgraduate School in Monterey, California; a Master of Science degree in Hydrographic Science from the University of Southern Mississippi; and a Master of Arts degree in National Security and Strategic Studies from the U.S. Naval War College. CDR McBride is a Meteorology and Oceanography (METOC) officer, a Joint Qualified Officer (JQO) and a qualified Information Dominance Warfare Officer (IDWO) and Surface Warfare Officer (SWO).

Tuesday, February 18

09:00 - 09:10

Opening Remarks

Room: *Queenstown Room*

09:10 - 10:10

Keynote Speaker: *Dr. Alan Finkel*

Characterization of currents in nature's ion-flow nanomachines underpins development of new medicines

Chair: *Serge Demidenko (Massey University, New Zealand)*

Room: *Queenstown Room*

10:10 - 10:30

Morning Break

10:30 - 12:10

Special Session: Systems with Multiple Electromagnetic Sensors

Session Chairs: *Vedran Bilas (University of Zagreb, Croatia)*

Mohd Zaid Abdullah (University Sains Malaysia)

Room: *Queenstown Room*

10:30

Wide-Slot Antenna for Breast Imaging Applications

S.S. Tiang (Universiti Sains Malaysia, Malaysia)

M.S. Hathal (University Sains Malaysia, Malaysia)

N.S. Nik Anwar (Universiti Sains Malaysia, Malaysia)

M.F. Ain (Universiti Sains Malaysia, Malaysia)

M.Z. Abdullah (Universiti Sains Malaysia, Malaysia)

10:50

Measurement Uncertainties in Differential Radar Applied to Breast Imaging

E. Porter (McGill University, Canada)

A. Santorelli (McGill University, Canada)

M. Popović (McGill University, Canada)

11:10

Contactless Determination of Gas Concentration and Pressure Based on a Low Jitter mmWave FMCW Radar

Christoph Baer (Institute of Electronic Circuits, Ruhr-University Bochum, Germany)

Thomas Musch (Institute of Electronic Circuits, Ruhr-University Bochum, Germany)

Timo Jaeschke (Institute for Integrated Systems, Ruhr-University Bochum, Germany)

Nils Pohl (Fraunhofer FHR, Germany)

11:30

Simple Linear Inversion of Soil Electromagnetic Properties from Analytical Model of Electromagnetic Induction Sensor

Darko Vasić (University of Zagreb, Croatia)

Davorin Ambruš (University of Zagreb, Croatia)

Vedran Bilas (University of Zagreb, Croatia)

11:50

A Water Content Sensor for Baked Products

Ian Woodhead (Lincoln Agritech Limited, New Zealand)

John Christie (Lincoln Agritech Limited, New Zealand)

Kenji Irie (Lincoln Agritech Limited, New Zealand)

Richard Fenton (Automation Design Limited, New Zealand)

10:30 - 12:10

Nondestructive Evaluation and Remote Sensing

Session Chair: *Salvatore Baglio (University of Catania, Italy)*

Room: *Clancys Room*

10:30 Structural Health Monitoring of Bridges Using Cost-Effective 1-axis Accelerometers

Chih-Hsing Lin (National Chip Implementation Center, Taiwan)

Ssu-Ying Chen (National Chip Implementation Center, Taiwan)

Chih-Chyau Yang (National Chip Implementation Center, Taiwan)

Chien-Ming Wu (National Chip Implementation Center, Taiwan)

Chun-Ming Huang (National Chip Implementation Center, Taiwan)

Chih-Ting Kuo (National Chip Implementation Center, Taiwan)

Yu-Da Huang (National Chip Implementation Center, Taiwan)

10:50 Development of a Frequency-Shifted Feedback Fiber Laser at 777.5 nm for Range Sensing Applications

Michael Hofbauer (Vienna University of Technology, Austria)

Johannes Seiter (Vienna University of Technology, Austria)

Horst Zimmermann (Vienna University of Technology, Austria)

11:10 Solar Panel Sensor Modeling and Fiscal Modeling

Steven T. Griffin (University of Memphis, USA)

Thomas E. Wyatt (University of Memphis, USA)

11:30 2-D Vector Field Visualization of Corrosion in a Small-bore Piping System using Bobbin-type Integrated Hall and GMR Sensors Arrays

Minhhuy Le (Chosun University, Korea)

Hwa Sik Do (KEPCO Plant Service & Engineering Co., LTD, Korea)

Jungmin Kim (Chosun University, Korea)

Jinyi Lee (Chosun University, Korea)

11:50 Non-Destructive Evaluation of Far-Side Corrosion around the Multi-Layered Rivet by using the Solid-State Hall Sensor Array

Jungmin Kim (Chosun University, Korea)

Jinyi Lee (Chosun University, Korea)

Minhhuy Le (Chosun University, Korea)

12:10 - 13:20 Lunch

13:20 – 15:00

Special Session: Efficient Sensor Network Processing

Session Chair: *Matthias Vodel (Chemnitz University of Technology, Germany)*

Room: *Queenstown Room*

13:20

Modelling, Quantification, Optimisation - Energy Efficiency in Distributed, Embedded Systems

Matthias Vodel (Chemnitz University of Technology, Germany)

René Bergelt (Chemnitz University of Technology, Germany)

Wolfram Hardt (Chemnitz University of Technology, Germany)

13:40

Energy Efficient Handling of Big Data in Embedded, Wireless Sensor Networks

René Bergelt (Chemnitz University of Technology, Germany)

Matthias Vodel (Chemnitz University of Technology, Germany)

Wolfram Hardt (Chemnitz University of Technology, Germany)

14:00

FPGA-based Approach for Runway Boundary Detection in High-resolution Colour Images

Stephan Blokzyl (Chemnitz University of Technology, Germany)

Matthias Vodel (Chemnitz University of Technology, Germany)

Wolfram Hardt (Chemnitz University of Technology, Germany)

14:20

Distributed Detection in Neural Network based Multihop Wireless Sensor Network

Jabal Ravai (TCS Innovation Labs Mumbai, Tata Consultancy Services, India)

Bhushan Jagyasi (TCS Innovation Labs Mumbai, Tata Consultancy Services, India)

14:40

Investigation into the Impact of Protocol Design on Energy Consumption of Low Power Wireless Sensors

Debraj Basu (Massey University, New Zealand)

Gourab Sen Gupta (Massey University, New Zealand)

Giovanni Moretti (Massey University, New Zealand)

Xiang Gui (Massey University, New Zealand)

13:20 – 15:00

Sensors in Biomedical Applications

Session Chair: *Alessandra Flammini (University of Brescia, Italy)*

Room: *Clancys Room*

13:20

A Compact Back-Plaster Sensor Node for Dementia and Alzheimer Patient Care

Andre Schwarzmeier (Institute for Electronics Engineering, University of Erlangen- Nuremberg, Germany)

Jürgen Besser (Wilhelm Löhe Hochschule, Germany)

Robert Weigel (Institute for Electronics Engineering, University of Erlangen- Nuremberg, Germany)

Georg Fischer (Institute for Electronics Engineering, University of Erlangen- Nuremberg, Germany)

Dietmar Kissinger (Institute for Electronics Engineering, University of Erlangen- Nuremberg, Germany)

- 13:40** **High Inductance Coil Embedded On On-chip Magnetic Sensor for Biomagnetism Measurements**
HyunJune Lyu (Kyungpook National University, Korea)
Yun Sik Bae (Kyungpook National University, Korea)
Vijith Vijayakumaran Nair (Kyungpook National University, Korea)
Jun Rim Choi (Kyungpook University, Korea)
- 14:00** **Acquisition and Elaboration of Cardiac Signal in Android Smartphone Devices**
C.M. De Dominicis (University of Brescia, Italy)
A. Depari (University of Brescia, Italy)
A. Flammini (University of Brescia, Italy)
S. Rinaldi (University of Brescia, Italy)
E. Sisinni (University of Brescia, Italy)
A. Vezzoli (University of Brescia, Italy)
- 14:20** **Real-time remote vital sign detection using a portable Doppler sensor system**
Wei Hu (University of Science and Technology of China, P.R. China)
Haiying Zhang (University of Science and Technology of China, P.R. China)
Zhangyan Zhao (Institute of Microelectronics of CAS, P.R. China)
Yunfeng Wang (Institute of Microelectronics of CAS, P.R. China)
Xize Wang (Institute of Microelectronics of CAS, P.R. China)
- 14:40** **Patch Type Integrated Sensor System for Measuring Electrical and Mechanical Cardiac Activities**
Eunjuh Hyun (Seoul National University, Korea)
Seungwoo Noh (Seoul National University, Korea)
Chiyul Yoon (Seoul National University, Korea)
Hee Chan Kim (Seoul National University, Korea)
- 15:00 - 15:20** **Afternoon Break**
- 15:20 – 17:00**
Sensors and Systems for Homeland Security
Session Chair: *Donald Bailey (Massey University, New Zealand)*
Room: *Queenstown Room*
- 15:20** **Probabilistic Method to Determine Human Subjects for Low-Resolution Thermal Imaging Sensor**
Yongwoo Jeong (Samsung S1 Corporation, South Korea)
Kwanwoo Yoon (Samsung S1 Corporation, South Korea)
KyoungHo Joung (Samsung S1 Corporation, South Korea)
- 15:40** **Two-Frequency Surveillance Technique for Intrusion- Detection Sensor with Leaky Coaxial Cables**
Kenji Inomata (Mitsubishi Electric Corp., Japan)
Wataru Tsujita (Mitsubishi Electric Corp., Japan)
Takashi Hirai (Mitsubishi Electric Corp., Japan)
- 16:00** **Emergency Management through Sensors of Enterprise Systems**
Deniz Gurkan (University of Houston, USA)
Kiran Vemuri (University of Houston, USA)
Parth Gala (University of Houston, USA)
Anatoliy Malishevski (University of Houston, USA)
Anand Daga (University of Houston, USA)

- 16:20** **High-Resolution Measurement of Magnetic Field Generated from Cryptographic LSIs**
Nguyen Ngoc Mai-Khanh (VLSI Design and Education Center (VDEC), The University of Tokyo, Japan)
Tetsuya Iizuka (The University of Tokyo, Japan)
Akihiko Sasaki (Morita-Tech Co., Ltd, Japan)
Makoto Yamada (Morita-Tech Co., Ltd, Japan)
Osamu Morita (Morita-Tech Co., Ltd, Japan)
Kunihiro Asada (VLSI Design and Education Center (VDEC), The University of Tokyo, Japan)
- 16:40** **A Novel Cataluminescence (CTL) Sensor System Based on Two Sensing Units to Detect and Distinguish Ketone Vapors**
Ruiya Xing (Guangzhou University, P.R. China)
Xiaoan Cao (Guangzhou University, P.R. China)
Ling Xu (Guangzhou University, P.R. China)
Zhengni Wang (Guangzhou University, P.R. China)
Yonghui Liu (Guangzhou University, P.R. China)
- 15:20 – 17:00**
Sensor Array and Multisensor Data Fusion
Session Chairs: *Vedran Bilas (University of Zagreb, Croatia)*
Mohd Zaid Abdullah (University Sains Malaysia)
- Room:** *Clancys Room*
- 15:20** **Design and Implementation of Array Readout Integrated Circuit and Image System for Current Mode Sensors**
Tai Ping Sun (National Chi Nan University Nantou County, & Nan Kai University of Technology Nantou County, Taiwan)
Jia-Hao Li (National Chi Nan University Nantou County, Taiwan)
Hsiu-Li Shieh (National Chi Nan University Nantou County, Taiwan)
Lai-Li Kang (National Chi Nan University Nantou County, Taiwan)
Yi-Chuan Lu (National Chi Nan University Nantou County, Taiwan)
Teng-Yi Wang (National Chi Nan University, Taiwan)
- 15:40** **Expansion of Sound Source Emphasis to Multiple Areas**
Marco Politakis (University of Canterbury, New Zealand)
Yusuke Hioka (University of Canterbury, New Zealand)
- 16:00** **Localisation of a Sound Source in Different Positions Using Kinect Sensors**
Jason Orchard (University of Canterbury, New Zealand)
Yusuke Hioka (University of Canterbury, New Zealand)
- 16:20** **Power Sensor Applications in a Load Management Network for a Residential Microgrid**
Philip Diefenderfer (Bucknell University, USA)
Peter Mark Jansson (Bucknell University, USA)
- 16:40** **An Advanced Tracking Solution Fully Based on Native Sensing Features of Smartphone**
Bruno Andò (University of Catania, Italy)
Salvatore Baglio (University of Catania, Italy)
Cristian O. Lombardo (University of Catania, Italy)
V. Marletta (University of Catania, Italy)

Wednesday, February 19

08:15 - 09:00

Workshop Tutorial

Room: *Wakatipu Room*

09:00 - 10:00

Plenary Speaker: *Commander Blake McBride*

An Overview of ONR Global's Science Support Tools and an update on the renewed Arctic focus

Session Chair: *Salvatore Baglio (University of Catania, Italy)*

Room: *Queenstown Room*

09:00 - 11:30

Sensor Application Development Workshop

Room: *Wakatipu Room*

10:00 - 10:20

Morning Break

10:20 – 12:00

Special Session: Environmental and Agritech Related Sensors I

Session Chairs: *Ian Woodhead (Lincoln Agritech Limited, New Zealand)*

Ian Platt (Lincoln Agritech, Limited, New Zealand)

Room: *Queenstown Room*

10:20

Free-Space Microwave Moisture Content Measurement of Moist Sand

Sean Richards (Lincoln Agritech Limited, New Zealand)

Adrian Tan (Lincoln Agritech Limited, New Zealand)

Ian G Platt (Lincoln Agritech Limited, New Zealand)

Ian M Woodhead (Lincoln Agritech Limited, New Zealand)

10:40

Antenna Design for a Proximal Soil Moisture Mapping Sensor

Adrian Eng-Choon Tan (Lincoln Agritech Limited, Lincoln University, New Zealand)

Sean Richards (Lincoln Agritech Limited, Lincoln University, New Zealand)

Ian Platt (Lincoln Agritech Limited, Lincoln University, New Zealand)

Ian Woodhead (Lincoln Agritech Limited, Lincoln University, New Zealand)

11:00

RFID Coordinate Registration for Agricultural Process Sensing

Ian G. Platt (Lincoln Agritech Limited, New Zealand)

Ian M Woodhead (Lincoln Agritech Limited, New Zealand)

Adrian Tan (Lincoln Agritech Limited, New Zealand)

Sean Richards (Lincoln Agritech Limited, New Zealand)

Michael Hagedorn (Lincoln Agritech Limited, New Zealand)

11:20

Moisture Content: What is it and how can it be measured?

John Christie (Lincoln Agritech Limited, New Zealand)

Ian G. Platt (Lincoln Agritech Limited, New Zealand)

11:40

Using Directional Antennas as Sensors to Assist Fire-fighting Robots in Large Scale Fires

Byung-Cheol Min (M2M Lab-RICE Research Center, Purdue University, USA)

Eric T. Matson (M2M Lab-RICE Research Center, Purdue University, USA)

Anthony Smith (M2M Lab-RICE Research Center, Purdue University, USA)

J. Eric Dietz (Purdue Homeland Security Institute, Purdue University, USA)

10:20 – 12:00

Micro and Nano-Sensors I

Session Chairs: *Serge Demidenko (RMIT International University, Vietnam)*

Melanie Ooi (Monash University, Malaysia)

Room: *Clancys Room*

10:20 Anti-Phase Coupled Bistable Transducers: a review of recent progress

C. Trigona (DIEEI, University of Catania, Italy)

F. Giusa (DIEEI, University of Catania, Italy)

F. Maiorca (DIEEI, University of Catania, Italy)

A. Noto (DIEEI, University of Catania, Italy)

B. Andò (DIEEI, University of Catania, Italy)

S. Baglio (DIEEI, University of Catania, Italy)

10:40 Design and Simulation of Nano-mechanical Resonator for Virus Detection

Gaurav Chaudhary (BITS Pilani, Dubai, UAE)

K.K. Singh (BITS Pilani, Dubai, UAE)

Anyaa Mittal (BITS Pilani, Dubai, UAE)

Neeru Sood (BITS Pilani, Dubai, UAE)

11:00 An Easy-fabricated Hydrogen Gas Sensor Based on Palladium-decorated Polyurethane Nanofibers

Ran Chen (The State Key Lab of Fluid Power Transmission and Control, P.R. China)

Weiting Liu (The State Key Lab of Fluid Power Transmission and Control, P.R. China)

Xin Fu (The State Key Lab of Fluid Power Transmission and Control, P.R. China)

Paolo Dario (Polo Sant'Anna Valdera, Italy)

11:20 Design and Simulation of a Micro Hotplate for MEMS Based Integrated Gas Sensing System

Hardeep Kumar (BITS Pilani, Dubai, UAE)

K.K. Singh (BITS Pilani, Dubai, UAE)

Neeru Singh (BITS Pilani, Dubai, UAE)

Anuj Kumar (BITS Pilani, Dubai, UAE)

R.K. Mittal (BITS Pilani, Dubai, UAE)

11:40 An Inkjet Printed Sensor for Load Measurement

Bruno Andò (DIEEI, University of Catania, Italy)

Salvatore Baglio (DIEEI, University of Catania, Italy)

Cristian O. Lombardo (DIEEI, University of Catania, Italy)

V. Marletta (DIEEI, University of Catania, Italy)

12:00 - 13:20 Lunch

12:00 – 14:30

Sensor Application Development Workshop: App Development

Room: *Wakatipu Room*

13:20 - 14:40

Special Session: Computer Vision and Machine Learning for Vision Based Applications, Organized by TC-32 (Fault-Tolerant Measurement Systems) of IEEE I&M Society

Session Chairs: *Serge Demidenko (RMIT International University, Vietnam)*
Melanie Ooi (Monash University, Malaysia)

Room: *Queenstown Room*

13:20 Fast and Robust Zebrafish Segmentation and Detection Algorithm under Different Spectrum Conditions

Jei Shian Tan (Monash University, Malaysia)
Tak Kwin Chang (Monash University, Malaysia)
Melanie Po-Leen Ooi (Monash University, Malaysia)
Ye Chow Kuang (Monash University, Malaysia)
Chee Pin Tan (Monash University, Malaysia)
Takashi Kitahashi (Monash University, Malaysia)

13:40 Detecting Spongiosis in Stained Histopathological Specimen using Multispectral Imaging and Machine Learning

Sanush Abeysekera (Monash University, Malaysia)
Melanie Po-Leen Ooi (Monash University, Malaysia)
Ye Chow Kuang (Monash University, Malaysia)
Chee Pin Tan (Monash University, Malaysia)
Sharifah Syed Hassan (Monash University, Malaysia)

14:00 Vision Inspection System for Pharmaceuticals

N.M. Duong (RMIT International University Vietnam, Vietnam)
M.T. Chew (RMIT International University Vietnam, Vietnam & Massey University, New Zealand)
S. Demidenko (RMIT International University Vietnam, Vietnam & Massey University, New Zealand)
Q.H. Pham (National Instruments Vietnam, Vietnam)
D.K. Pham (National Instruments Vietnam, Vietnam)
M. P.-L. Ooi (Monash University, Malaysia)
Y.C. Kuang (Monash University, Malaysia)

14:20 Standard Uncertainty Estimation on Polynomial Regression Models

Arvind Rajan (Monash University Malaysia, Malaysia)
Ye Chow Kuang (Monash University Malaysia, Malaysia)
Melanie Po-Leen Ooi (Monash University Malaysia, Malaysia)
Serge Demidenko (RMIT International University, Vietnam & Massey University, New Zealand)

13:20 – 14:40

Magnetic Sensors and Applications

Session Chair: *Salvatore Baglio (University of Catania, Italy)*

Room: *Clancys Room*

13:20 Microfluidic Injector Simulation with SAW Sensor for 3D Integration

Hang Bui Thu (University of Engineering and Technology, Vietnam National University, Vietnam)
Trinh Chu Duc (University of Engineering and Technology, Vietnam National University, Vietnam)

- 13:40** **Predicting Cole-Cole Parameters of Microfluids with Microstrip Technology**
Adam Santorelli (McGill University, Canada)
Joshua Schwartz (Trinity University, USA)
- 14:00** **A Coupled Nonlinear Circuit for E-field and B-field Detection**
B. Andò (University of Catania, Italy)
S. Baglio (University of Catania, Italy)
A. Beninato (University of Catania, Italy)
A.R. Bulsara (Space and Naval Warfare Center, San Diego, USA)
T. Emery (Space and Naval Warfare Center, San Diego, USA)
C. Jenkins (Advanced Light Source, Lawrence Berkeley National Laboratory, USA)
V. Palkar (Indian Institute of Technology, Mumbai, India)
- 14:20** **Applications of Nanoparticle-based Fluxgate Magnetometers for Positioning and Location**
John Kennedy (GNS Science, New Zealand)
Jérôme Leveueur (GNS Science, New Zealand)
James Turner (GNS Science, New Zealand)
John Futter (GNS Science, New Zealand)
Grant V.M. Williams (Victoria University, New Zealand)
- 14:40 - 15:10** **Afternoon Break**
- 15:10 – 15:20**
SAS 2015 Presentation
Vedran Bilas (University of Zagreb, Croatia)
Room: *Queenstown Room*
- 15:20 – 17:00**
Special Session: Environmental and Agritech Related Sensors II
Session Chairs: *Ian Woodhead (Lincoln Agritech Limited, New Zealand)*
Ian Platt (Lincoln Agritech Limited, New Zealand)
Room: *Queenstown Room*
- 15:20** **A Miniaturized Soil Moisture Sensor Based on Time Domain Transmissometry**
Bianca Will (Ruhr-University Bochum, Germany)
Ilona Rolfes (Ruhr-University Bochum, Germany)
- 15:40** **Spatial Time Domain Reflectometry (spatial TDR) in Geo-environmental Engineering**
A. Scheuermann (The University of Queensland, Australia)
C. Gonzales (The University of Queensland, Australia)
J. Fan (The University of Queensland, Australia)
B. Braga (The University of Queensland, Australia)
T. Baumgartl (The University of Queensland, Australia)
D. Lockington (The University of Queensland, Australia)
S. Schlaeger (sceme GmbH, Germany)
R. Becker (Rhein-Waal University of Applied Science, Germany)
N. Wagner (Bauhaus-University Weimar, Germany)
C. Hübner (University of Applied Sciences Mannheim, Germany)

- 16:00** **Estimation of the Soil Water Characteristics from Dielectric Relaxation Spectra**
Norman Wagner (Bauhaus-University Weimar, Germany)
Frank Daschner (University of Kiel, Germany)
Alexander Scheuermann (The University of Queensland, Australia)
Moritz Schwing (University of Queensland, Australia)
- 16:20** **Non-destructive Coaxial Transmission Line Measurements for Dielectric Soil Characterization**
M. Schwing (The University of Queensland, Australia)
Z. Chen (The University of Queensland, Australia)
A. Scheuermann (The University of Queensland, Australia)
N. Wagner (Bauhaus-University Weimar, Germany)
- 16:40** **A Comparison of Two Ranging Approaches in an Active, Optical Plant Canopy Sensor**
Michael T. Schaefer (University of New England & CSIRO, Australia)
David W. Lamb (University of New England & Precision Agriculture Research Group, Australia)
Ron Bradbury (University of New England, Australia)
- 15:20 – 17:00**
Sensors Applications in Robotics and Automation
Session Chair: *Gourab Sen Gupta (Massey University, New Zealand)*
Room: *Clancys Room*
- 15:20** **Direction of Arrival Estimation of Kiwi Call in Noisy and Reverberant Bush**
Craig Gray (University of Canterbury, New Zealand)
Yusuke Hioaka (University of Canterbury, New Zealand)
- 15:40** **A New Approach On Advanced Compact Plasma Sensors for Industrial Plasma Applications**
Christian Schulz (Ruhr-University Bochum, Germany)
Ilona Rolfes (Ruhr-University Bochum, Germany)
- 16:00** **Real-time Classification of Industrial Products Based on the Photonic-mixer-device Sensor Technology**
Stephan Hussmann (West Coast University of Applied Sciences, Germany)
Jörn Sandner (West Coast University of Applied Sciences, Germany)
- 16:20** **Phase-Height Relationship by Plane Analysis in 3D Shape Measurement using Fringe Pattern Projector**
Byeong-Mook Chung (Yeungnam University, South Korea)
Yoon-Chang Park (Sunmoo University, South Korea)
Jin-Yeong Do (AVACO Co., Ltd, South Korea)
- 16:40** **PointsBug Versus TangentBug Algorithm, A Performance Comparison In Unknown Static Environment**
N. Buniyamin (Universiti Teknologi MARA, Malaysia)
W.A.J. Wan Ngah (Universiti Teknologi MARA, Malaysia)
Zainuddin Mohamad (Universiti Teknologi MARA, Malaysia)
- 17:00**
Sensor Application Development Workshop: 5 Minute Pitches
Room: *Queenstown Room*
- 19:00** **Symposium Dinner** *Skyline Queenstown Restaurant*

Thursday, February 20

08:45 - 09:00

Closing Remarks

Room: *Queenstown Room*

09:00 - 10:20

Sensors Applications in Robotics and Automation II

Session Chair: *Gourab Sen Gupta (Massey University, New Zealand)*

Room: *Queenstown Room*

09:00 **Sensing and Processing of Bio-metric Signals for use in Low Cost Bio-robotic Systems**

Christopher Scott (Massey University, New Zealand)

Gourab Sen Gupta (Massey University, New Zealand)

Liqiong Tang (Massey University, New Zealand)

09:20 **Investigation of Force Sensors for use in Bipedal Humanoid Dynamic Gait Generation**

Rick Pierce (Massey University, New Zealand)

Gourab Sen Gupta (Massey University, New Zealand)

09:40 **Sensor Signal Filtering in Quadrotor Control**

S.T. Pham (RMIT International University Vietnam, Vietnam)

M.T. Chew (RMIT International University Vietnam, Vietnam)

10:00 **Automating Monitoring of Cat Feeding Behaviour**

Donald Bailey (Massey University, New Zealand)

David Thomas (Massey University, New Zealand)

Michelle Cho (Massey University, New Zealand)

Said Al-Souti (Massey University, New Zealand)

9:00 - 10:40

Wireless Sensor Networks I

Session Chair: *Alessandra Flammini (University of Brescia, Italy)*

Room: *Clancys Room*

09:00 **Wireless Aircraft Fuel Quantity Indication System**

Jason Bommer (The Boeing Company, USA)

Andy Robb (The Boeing Company, USA)

René Martinez (Intermec Technologies Corp., USA)

Shashi Ramamurthy (Intermec Technologies Corp., USA)

Jason Harrigan (Intermec Technologies Corp., USA)

Harikiran Muniganti (Indian Institute of Science, India)

Vivekanand Mannangi (Indian Institute of Science, India)

K.J. Vinoy (Indian Institute of Science, India)

09:20 **Mobility-Aware Hybrid Medium Access Control Protocol for Wireless Sensor Network (WSN)**

Abdul Razaque (University of Bridgeport, USA)

Khaled M. Elleithy (University of Bridgeport, USA)

- 09:40** **Low-power Wireless Interface for Handheld Smart Metering Devices**
L. Berghella (University of Brescia, Italy)
A. Depari (University of Brescia, Italy)
P. Ferrari (University of Brescia, Italy)
A. Flammini (University of Brescia, Italy)
S. Rinaldi (University of Brescia, Italy)
E. Sisinni (University of Brescia, Italy)
A. Vezzoli (University of Brescia, Italy)
- 10:00** **An Empirical Path Loss Model for Wireless Sensor Network Deployment in a Dense Tree Environment**
Abdulaziz Al-Sayyari (Florida Institute of Technology, USA)
Ivica Kostanic (Florida Institute of Technology, USA)
Carlos E. Otero (Florida Institute of Technology, USA)
- 10:20** **BlurSense: Dynamic Fine-Grained Access Control for Smartphone Privacy**
Justin Cappos (NYU-Poly, USA)
Lai Wang (NYU-Poly, USA)
Richard Weiss (Evergreen State College, USA)
Yi Yang (Fontbonne University, USA)
Yanyan Zhuang (University of British Columbia, Canada)
- 10:40 – 11:00** **Morning Break**
- 11:00 – 12:40**
Wireless Sensor Networks II
Session Chair: *Bruno Andò (University of Catania, Italy)*
Room: *Queenstown Room*
- 11:00** **What is the First Step in Designing an Application Protocol for Wireless Sensor Networks (WSNs)?**
Quazi Mamun (Charles Sturt University, Australia)
Mohammed Kaosar (Charles Sturt University, Australia)
- 11:20** **UWB Sensor Network on 2-D Waveguide Sheet**
Yuta Kudo (University of Tokyo, Japan)
Akihito Noda (University of Tokyo, Japan)
Hiroyuki Shinoda (University of Tokyo, Japan)
- 11:40** **A Networked High-Speed Vision System for Vehicle Tracking**
Akihito Noda (The University of Tokyo, Japan)
Masahiro Hirano (The University of Tokyo, Japan)
Yuji Yamakawa (The University of Tokyo, Japan)
Masatoshi Ishikawa (The University of Tokyo, Japan)
- 12:00** **Fuzzy Logic Control Mechanism for Flash Flood Monitoring Station**
Pupamit Jankoo (Chiang Mai University, Thailand)
Paskorn Champrasert (Chiang Mai University, Thailand)
Benya Suntaranont (Chiang Mai University, Thailand)

12:20 **A Processing Approach for a Correlating Time-of-Flight Range Sensor Based on a Least Squares Method**
Michael Hofbauer (Vienna University of Technology, Austria)
Johannes Seiter (Vienna University of Technology, Austria)
Milos Davidovic (Vienna University of Technology, Austria)
Horst Zimmermann (Vienna University of Technology, Austria)

11:00 – 12:20

Special Session: Sensors and Systems for Emergency and First Response

Session Chairs: *Eric T. Matson (M2M Lab-RICE Research Center, Purdue University, USA)*

Room: *Clancys Room*

11:00 **An Efficient Area Coverage Algorithm using Passive RFID System**
Sangyup Lee (Kyunghee University, Korea)
Choong-Yong Lee (Kyunghee University, Korea)
Wonse Jo (Kyunghee University, Korea)
Dong-Han Kim (Kyunghee University, Korea)

11:20 **Infrared Depth Sensor Kinect™-based Smart Room Controller**
Arthur Silitonga (President University, Indonesia)
Sugianto Thoeng (President University, Indonesia)

11:40 **Fluvial Monitoring and Flood Response**
Shi-Wei Lo (National Center for High-Performance Computing, Taiwan)
Jyh-Horng Wu (National Center for High-Performance Computing, Taiwan)
Lun-Chi Chen (National Center for High-Performance Computing, Taiwan)
Chien-Hao Tseng (National Center for High-Performance Computing, Taiwan)
Fang-Pang Lin (National Center for High-Performance Computing, Taiwan)

12:00 **Uncertainty analysis for optical time-of-flight sensors based on four-phase-shift range calculation**
Torsten Edeler (University of Applied Sciences Hamburg, Germany)
Stephan Hussmann (West Coast University of Applied Sciences, Germany)
Florian Knoll (West Coast University of Applied Sciences, Germany)