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Track 4: Microfluidics and Biosensors

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Track 6: Physical Sensors – Temperature, Mechanical, Magnetic and Others

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Track 7: Acoustic and Ultrasonic Sensors

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Track 8: Sensor Packaging (including on Flexible Materials)

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Eric MacDonald, Youngstown State University, USA

Track 9: Sensor Networks (including IoT and Related Areas)

Jorge Sá Silva, University of Coimbra, Portugal
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Track 10: Emerging Sensor Applications

Volker Nock, University of Canterbury, New Zealand

Track 11: Sensor Systems: Signals, Processing and Interfaces

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Track 12: Actuators and Sensor Power Systems

Xiaohong (Ellen) Wang, Tsinghua University, China

Track 13: Sensors in Industrial Practices (Only for industry i.e. first author from industry)

István Gódor, Ericsson Research, Hungary
Stoyan Nihtianov, Delft University of Technology, The Netherlands

Track 14: Live Demonstration of Sensors and Sensing Technologies

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Track 15: Focus Sessions

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Track 16: Sensors Letters/Sensors Journal

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**The IEEE Sensors Council's
YouTube Channel is growing!**

Because of the parallel sessions, IEEE SENSORS 2020 participants will probably miss some important presentations they would have liked to see. Therefore, as an extra benefit for conference participants, consented presentations are being captured through the duration of the conference.

You may view these presentations after the conference concludes by visiting the IEEE Sensors Council YouTube Channel (bit.ly/SensorsCouncilYouTube). Subscribe to our channel today to stay up to date with all the latest videos!



Keynote Speakers

“DEEP-TRENCH ISOLATION : THE HOLY GRAIL FOR IMAGE SENSORS?”



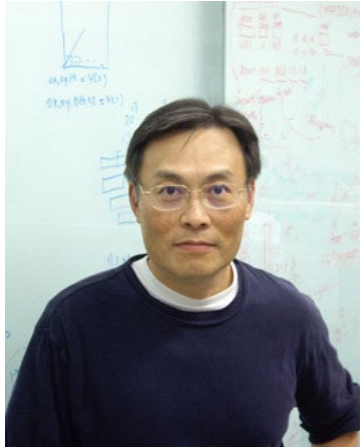
Albert Theuwissen, Professor, Harvest Imaging & Professor TU Delft

For many years, pixel size shrinkage was the main R&D focus in the field of CMOS image sensors (CIS). The innovations have been mainly driven by the mobile phone industry. However, a pixel size of 1 μm seemed to be the lower limit of what could be mass-fabricated in a CMOS image sensor process, maintaining a low cost and maintaining a decent performance. Recently Deep Trench Isolation (DTI) was introduced in the CIS production process. This opened a completely new horizon for smaller pixels and/or higher performance pixels, without sacrificing performance. Pixel shrinkage re-continued and 0.5 μm seems to become the new target.

An overview will be given of the DTI developments needed to implement this technology in CIS without creating negative effects on the pixel performance (optical effects, electrical effects, leakage current, etc). But now that the DTI technology is made CIS compatible, new dimensions and new features can be added to CMOS image sensors. Examples are wide dynamic range (for automotive and industrial applications), enhanced near-IR sensitivity (for distance measurements and security applications), vertical photodiodes (fabricated in the third dimension), image sensors stacked to a processing die, global shutter pixels, etc. The various new applications will be reviewed in the presentation, together with a future outlook of what CMOS image sensors can bring : Will the main CIS focus still be the consumer stuff? Will the mobile phone industry remain the driving force behind CIS innovation?

Keynote Speakers

“Developing anti-SARS-CoV-2 nucleocapsid protein antibodies with phage-displayed synthetic antibody libraries designed with computational methods”



An-Suei Yang, Professor, Georgia Institute of Technology

The SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) outbreak in late-2019 in Wuhan China has led to global COVID-19 (coronavirus infectious disease 2019) pandemic, declared by the World Health Organization in March 11, 2020. During the outbreak of infectious diseases, tests to detect infected patients are urgently needed. RT-PCR-based detection of viral genetic materials and antibody IgG and IgM responding to the pathogen infection in human blood can be deployed quickly once the pathogen’s genome sequence become known, but the downsides of these tests limit the broad deployment of the PCR-based tests, or do not provide information on the real-time contagiousness of the pathogen infection in the antibody tests. A third kind of test based on lateral flow immunoassay (LFIA) on viral antigens could provide infection information for disease treatment and prevention without additional facility and instrumentation with turnaround times of 15–20 minutes – much like existing rapid influenza diagnostic tests, and is of particular value for infectious disease outbreak control in regions of insufficient resources. The key component of the LFIA for an antigen is the capture and detection antibody pair binding the target antigen with high affinity and specificity on two distinctively separate epitopes on the antigen. Because attaining suitable antibodies could be time-consuming and labor/cost-intensive, the LFIA devices are usually the most difficult to achieve rapidly among the three kinds of tests. Facing the challenge, we generated antibodies in IgG form that recognize both SARS-CoV-2 and the original SARS-CoV nucleocapsid (N) proteins. None of the IgGs bind the N protein of other human coronavirus strains. Our group accomplished antibody discoveries in 19 days, by working with our phage-displayed synthetic antibody libraries¹, which had been designed with artificial intelligence models trained on antibody-antigen interactions², constructed with chemically synthesized DNA, and expressed and then stored with phage display systems³. The antibody discovery processes were carried out in bacterial cultures, without need for animal facilities, thus mitigating time, material and environmental costs while enabling successful development of useful monoclonal antibodies. After completing the anti-N protein IgG development, our group completed a LFIA device prototype within one month. This work establishes a technological platform for rapidly developing LFIA devices in responding not only to the current COVID-19 pandemic but also in managing other infectious disease outbreaks in humans and animals. Indeed, we applied the technological platform to develop LFIA devices for avian influenza virus antigen in 2016 (manuscript submitted) and for African swine fever virus antigen in 2019 (manuscript in preparation). Developing solutions in responding to the challenges from the COVID-19 pandemic, we have demonstrated that the phage-displayed synthetic antibody libraries designed with computational methodologies could drive innovations in treating and preventing diseases.

Keynote Speakers

“SENSING IN 3D PRINTED MULTI-FUNCTIONAL STRUCTURES”



Eric MacDonald, Professor, Mechanical Engineering, The University of Texas at El Paso

3D printing has been historically relegated to fabricating conceptual models and prototypes; however, increasingly, research is now focusing on fabricating functional end-use products. As patents for 3D printing expire, new low-cost systems are being adopted more widely and this trend is leading to a diversity of new applications, processes and available materials. However, currently the technology is generally confined to fabricating single-material structures. For additively-manufactured products to be economically meaningful, sensing is required to be incorporated (printed directly or robotically placed) to provide electronic, electromechanical, electromagnetic, thermodynamic, chemical and optical content. By interrupting the 3D printing and employing complementary manufacturing processes, additional functional content can be included in mass-customized structures. This presentation will review work in multi-process 3D printing for creating structures with embedded sensors for anatomy-specific wearable electronics, electromagnetics, propulsion, embedded sensors in soft tooling and even in metal and ceramic structures

Invited Speakers

Track ID	Track Name	Name	Paper Title
1	Sensor Phenomenology, Modeling and Evaluation	Antti Vehkaoja	Effect of skin tone and activity to the performance of wrist-worn optical beat-to-beat heart rate monitoring
2	Sensor Materials, Processing and Fabrication (including Printing)	Sam Emaminejad	Emerging Wearable Bioelectronics: Creating a New Era of Personalized Medicine
3	Chemical, Electrochemical and Gas Sensors	Jonhn Atkinson	The use of printing technology for the production of potentiometric and amperometric chemical sensors
4	Microfluidics and Biosensors	Omer Inan	Multi-Modal Local Physiological Sensing at the Intravenous Catheter Insertion Site
5	Optical Sensors	Sahin Ozdemir	Sensing at Exceptional Points
6	Physical Sensors - Temperature, Mechanical, Magnetic and Others	Johannes Classen	Evolution of Bosch Inertial Measurement Units for Consumer Electronics
7	Acoustic and Ultrasonic Sensors	Amit Lal	CMOS integrated Gigahertz Ultrasonic Sensors and Actuators
8	Sensor Packaging (including on Flexible Materials)	Shweta Agarwala	Printing Conformal Electronics on Unconventional Substrates: Emergence of new class of devices
9	Sensor Networks (including IoT and related areas)	Guoyi Xu	Indoor Object Sensing Using Radio-Frequency Identification with Inverse Solutions
10	Emerging Sensor Applications	Steve Mann	Sensing of the Self, Society, and the Environment
11	Sensor Systems: Signals, Processing and Interfaces	Tomoki Uno	Detection of Chemical Trail on the Floor by Mobile Robot: Using Fans to Enhance Chemical Reception at Gas Sensors
12	Actuators and Sensor Power Systems	Xin Zhang	Functional metamaterials enabled by microsystems
13	Sensors in Industrial Practices (Only for industry i.e. first author from industry)	Holger Rumpf	Laser Reseal – Combination of Accelerometer and Gyroscope Sensors in a Single MEMS Chip
15.1	Emerging Technologies for Flexible and Printed Energy Autonomous Sensing Systems	Francisco Molina-Lopez	Emerging Thermoelectric Generators Based on Printed and Flexible Electronics Technology
15.2	Sensor Systems for Assisted Living and Effective Telehealth	Steve Xu	
15.3	Sensors and Sensor Systems for AgriFood and Connected Farming	Yosi Shacham-Diamand	A Study on the Dielectric Behaviour of Plant Cell Suspensions using Wideband Electrical Impedance Spectroscopy (WB-EIS)
15.4	Quantum Sensors	Milos Nesladek	
15.5	Bioresorbable and Biodegradable Sensors	Guiseppe Barillaro	Bioresorbable and Biodegradable Electronics and Photonics

Program Grid – Sunday, October 25

All times listed in UTC +1

14:00 – 15:30	Tutorial Track 1: Optical Sensing “Distributed Optical Fibre Sensing: Can a single strand of optical fibre replace 100,000 sensors?” Ali Masoudi	Tutorial Track 2: Printed, flexible, and mobile sensing “Flexible and Printed Sensors: Materials, Technology and Selected Applications” Sharmistha Bhadra
15:30 – 16:00	BREAK	
16:00 – 17:30	Tutorial Track 1: Optical Sensing “Handheld Near-Infrared Spectroscopy: Realistic Quality Control and Protection against Product Counterfeiting versus Empty Promises” Heinz W. Siesler	Tutorial Track 2: Printed, flexible, and mobile sensing “Getting most out of your SENSORS: Mixed-Methods Research Methodology Enabling Identification, Modelling and Predicting Human Aspects of Mobile Sensing “In the Wild” Katarzyna Wac & Alexandre De Masi
17:30 – 18:30	Young Professionals	

Program Grid – Monday, October 26

All times listed in UTC +1

11:30 – 12:00	Digital Conference Brunner / Meet & Greet						
12:30 – 14:00	A1L-01: Sensor Systems: Signals, Processing & Interfaces I	A1L-02: Physical Sensors: Inertial & Resonant Devices	A1L-04: Chemical, Electrochemical & Gas Sensors I	A1L-05: Sensor Networks I	A1L-06: Emerging Sensor Applications I	Poster A1	
14:00 – 14:30	Opening & Welcome // S2021 Announcement						
14:30 – 15:30	Keynote 1						
15:30 – 16:30	Lunch / Panel Discussion						
16:30 – 18:00	A2L-01: Acoustic & Ultrasonic Transducers	A2L-02: Microfluidics & Biosensors I	A2L-04: Sensor Phenomenology I	A2L-05: Optical Sensors I	A2L-06: Sensor Materials, Processing & Fabrication (including Printing) I	A2L-07: Sensors for AgriFood & Connected Farming I	Poster A2

Program Grid – Tuesday, October 27

All times listed in UTC +1

12:00 - 12:30	Digital Conference Brunner / Meet & Greet					
12:30 - 14:00	B1L-01: Sensor Systems: Signals, Processing & Interfaces II	B1L-02: Sensors in Industrial Practices I	B1L-04: Chemical, Electrochemical & Gas Sensors III	B1L-05: Sensor Networks II	B1L-06: Emerging Sensor Applications II	B1P-08: Live Demonstrations
14:00 - 14:30	Break / Sensor Council Awards					
14:30 - 15:30	Keynote 2					
15:30 - 16:30	Lunch / Industry Panel Discussion					
16:30 - 18:00	B2L-01: Sensor Systems: Signals, Processing & Interfaces III	B2L-02: Physical Sensors: Mechanical Sensors	B2L-04: Packaging I	B2L-05: Sensors for AgriFood & Connected Farming II	B2L-06: Quantum Sensors	Poster B2

Program Grid – Wednesday, October 28

All times listed in UTC +1

12:00 - 12:30	Digital Conference Brunner / Meet & Greet					
12:30 - 14:00	C1L-01: Actuators & Sensor Power Systems I	C1L-02: Microfluidics & Biosensors II	C1L-04: Sensor Phenomenology II	C1L-05: Wearable Sensors for Telemedicine	C1L-06: Emerging Technologies for Flexible & Printed Energy Autonomous Sensing Systems I	Poster C1
14:00 - 14:30	Break / / Conference Awards					
14:30 - 15:30	Keynote 3					
15:30 - 16:30	Lunch / Panel Discussion					
16:30 - 18:00	C2L-01: Sensor Systems: Signals, Processing & Interfaces IV	C2L-02: Physical Sensors: Magnetic & Electric Devices	C2L-04: Bioresorbable & Biodegradable Sensors	C2L-05: Optical Sensors II	C2L-06: Emerging Sensor Applications III	Poster C2

Live DEMONstrations

This year's program will include Live Demonstrations. Demos give attendees the opportunity to have an interactive experience with new technological devices. Demonstrations will reveal the essence of the research and provide further understanding for attendees.

Demos will be on Tuesday, October 27 at 12:30. The number preceding the demo indicates the demo position on the layout.

12:30 – 14:00

BIP-08: LIVE DEMONSTRATION

Session Chairs: Behraad Bahreyni, Simon Fraser University & Tao Li, University of Cincinnati

BIP-08-1

LIVE DEMONSTRATION: SENCU – A POWER-EFFICIENT SENSOR SYSTEM

*Ssu-Ying Chen, Chih-Chyau Yang, Fu-Cheng Cheng, Yu-An Kuo, Jin-Ju Chue, Chen-Chia Chen, Chien-Ming Wu, Chun-Ming Huang
Taiwan Semiconductor Research Institute, Taiwan*

BIP-08-2

LIVE DEMONSTRATION: PASSIVE SENSOR SETUP FOR ROAD CONDITION MONITORING

*Felix Kortmann^{1}, Julin Horstkötter^{1}, Alexander Warnecke^{1}, Nicolas Meier^{2}, Jens Heger^{2}, Burkhardt Funk^{2}, Paul Drews^{2}
^{1}HELLA GmbH & Co. KGaA, Germany; ^{2}Leuphana University Luxneburg, Germany*

BIP-08-3

DYNAMIC GRIP-FORCE CONTROL USING REAL-TIME FRICTION ESTIMATION FROM INCIPIENT SLIP EVENTS

*Heba Khamis^{2}, Benjamin Xia^{2}, Stephen Redmond^{1}
^{1}University College Dublin, Ireland; ^{2}UNSW Sydney, Australia*

BIP-08-4

LIVE DEMONSTRATION: A TRIMODAL TIME-OF-FLIGHT CAMERA FEATURING MATERIAL SENSING

*Miguel Heredia Conde^{2}, Thomas Kerstein^{1}, Bernd Buxbaum^{1}, Otmar Loffeld^{2}
^{1}pmdtechnologies ag, Germany; ^{2}University of Siegen, Germany*

12:30 – 14:00

AIL-01: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES I

Session Chair: Patrick K. Kroh, Friedrich-Alexander-Universität Erlangen-Nürnberg

12:30

DETECTION OF CHEMICAL TRAIL ON THE FLOOR BY MOBILE ROBOT: USING FANS TO ENHANCE CHEMICAL RECEPTION AT GAS SENSORS

*Tomoki Uno^{2}, Maki Sawano^{2}, Haruka Matsukura^{1}, Hiroshi Ishida^{2}
{1}Osaka University, Japan; {2}Tokyo University of Agriculture and Technology, Japan*

13:00

SMART SENSORS HW/SW INTERFACE BASED ON BRAIN-ACTUATED PERSONAL CARE ROBOT FOR AMBIENT ASSISTED LIVING

*Giovanni Mezzina, Daniela De Venuto
Politecnico di Bari, Italy*

3:15

AUTONOMOUS NEURO-NAVIGATION SYSTEM FOR NEUROSURGICAL ROBOTICS

*Pon V Deepika^{1}, Sriram Marisetty^{1}, Pavan Kumar Reddy^{1}, Vinay C K^{1}, Srikanth T K^{1}, Vikas Vazhayil^{2}, Madhav Rao^{1}
{1}IIT-Bangalore, India; {2}NIMHANS, India*

13:30

TOWARDS A COMPACT, HIGH-SPEED OPTICAL LINK-BASED 3D OPTOACOUSTIC IMAGER

*Çağla Özsoy, Andrea Cossettini, Pascal Hager, Sergei Vostrikov, Xosé Luís Deán-Ben, Luca Benini, Daniel Razansky
ETH Zurich, Switzerland*

13:45

A COMPACT AND INFRASTRUCTURE-FREE CONFINED SPACE SENSOR FOR 3D SCANNING AND SLAM

*Daqian Cheng^{2}, Haowen Shi^{2}, Michael Schwerin^{2}, Michelle Crivella^{1}, Lu Li^{2}, Howie Choset^{2}
{1}Boeing Research & Technology, United States; {2}Carnegie Mellon University, United States*

12:30 – 14:00

AIL-02: PHYSICAL SENSORS: INERTIAL & RESONANT DEVICES

Session Chair: Boris Stoeber, The University of British Columbia

12:30

EVOLUTION OF BOSCH INERTIAL MEASUREMENT UNITS FOR CONSUMER ELECTRONICS

*Johannes Classen^{1}, Florian Kult^{1}, Dušan Radović^{1}, Thomas Zebrowski^{1}, Amin Jemili^{1}, Andrea Visconti^{1}, Chinwuba Ezekwe^{3}, Alexander Buhmann^{2}, Manuel Dietrich^{2}, Axel Grosse^{2}, Robert Maul^{2}, Carsten Geckeler^{2}, Rudy Eid^{2}
{1}Bosch Sensortec GmbH, Germany; {2}Robert Bosch GmbH, Germany; {3}Robert Bosch LLC, United States*

13:00

50-KHZ MEMS GYROSCOPES BASED ON NEMS SENSING WITH 1.3 MDPS/ $\sqrt{\text{HZ}}$ ARW AND 0.5 $^{\circ}/\text{H}$ STABILITY

Marco Gadola^{1}, Federico Maspero^{1}, Giacomo Langfelder^{1}, Marc Sansa^{2}, Thierry Verdot^{2}, Audrey Berthelot^{2}, Philippe Robert^{2}
^{1}Politecnico di Milano, Italy; ^{2}Univ. Grenoble Alpes, CEA, LETI, France

13:15

MEMS REAL-TIME CLOCKS BASED ON EPITAXIAL POLYSILICON: SYSTEM-LEVEL REQUIREMENTS AND EXPERIMENTAL CHARACTERIZATION

Giorgio Mussi^{1}, Paolo Frigerio^{1}, Gabriele Gattere^{2}, Giacomo Langfelder^{1}
^{1}Politecnico di Milano, Italy; ^{2}STMicroelectronics, Italy

13:30

A NOVEL THERMAL PIEZORESISTIVE COUPLED RESONATOR IMPLEMENTING MODE LOCALIZATION FOR MASS SENSING

Shashwat Bhattacharya, Jyoti Satija, Shyam Trivedi, Sheng-Shian Li
National Tsing Hua University, Taiwan

13:45

OPTICAL FIBER-TIP HEAT SENSOR FEATURING A MULTIPOSITIONAL FABRY-PÉROT CAVITY RESONATOR

Jeremiah Williams^{2}, Jonathan Smith^{2}, Joseph Suelzer^{1}, Nicholas Usechak^{1}, Hengky Chandralalim^{2}
^{1}Air Force Research Laboratory, United States; ^{2}The US Air Force Institute of Technology, United States

12:30 – 14:00

AIL-04: CHEMICAL, ELECTROCHEMICAL & GAS SENSORS I

Session Chairs: Marios Sophocleous, University of Cyprus & Thomas Thundat, University of Buffalo

12:30

THE USE OF PRINTING TECHNOLOGY FOR THE PRODUCTION OF POTENTIOMETRIC AND AMPEROMETRIC CHEMICAL SENSORS

John K Atkinson
University of Southampton, United Kingdom

13:00

3D ASSEMBLY OF WS₂ NANOMATERIAL FOR H₂S GAS SENSING APPLICATION

Aanchal Alagh^{1}, Fatima Ezahra Annanouch^{1}, Jean François Colomer^{2}, Eduard Llobet^{1}
^{1}Universitat Rovira I Virgili, Spain; ^{2}University of Namur, Belgium

13:15

A NEW DUAL RF SENSOR IN GAS DETECTION AND HUMIDITY INFLUENCE

Julien George^{4}, Hamida Hallil^{2}, Corinne Dejous^{1}, Eric Cloutet^{3}, Aurelien Perigaud^{4}, Stephane Bila^{4}, Dominique Baillargeat^{4}
^{1}Univ. Bordeaux, Bordeaux INP, CNRS, IMS, UMR 5218, France; ^{2}Univ. Bordeaux, Bordeaux INP, CNRS, IMS, UMR 5218, France; ^{3} Université de Bordeaux, LCPO, UMR 5629, France; ^{4}University of Limoges, CNRS, XLIM UMR 7252, France

13:30

ULTRA-HIGH SENSITIVE SERS GAS SENSOR TO DETECT GEOSMIN

*Lin Chen^{1}, Noriko Shiramatsu^{1}, Bin Chen^{1}, Fumihiko Sassa^{1}, Shoichi Sameshima^{3}, Tatsuya Seki^{2}, Kenshi Hayashi^{1}
^{1}Kyushu University, Japan; ^{2}Meiden Aqua Business Company, Japan; ^{3}Meidensha Corporation, Japan*

13:45

AU NANOFLOWERS MODIFIED MAGNETIC AND FLEXIBLE BIOSENSOR FOR BISULFITE-FREE HCC GLOBAL DNA METHYLATION DETECTION

*Bobo Huang, Yitao Liang, Bin Zhang, Qingpeng Cao, Tingting Tu, Xuesong Ye, Bo Liang
Zhejiang University, China*

12:30 – 14:00

AI1-05: SENSOR NETWORKS I

Session Chairs: Binbin Chen, Singapore University Of Technology and Design & Jorge Sá Silva, University of Coimbra

12:30

INDOOR OBJECT SENSING USING RADIO-FREQUENCY IDENTIFICATION WITH INVERSE SOLUTIONS

*Guoyi Xu, Pragya Sharma, Edwin C. Kan
Cornell University, United States*

13:00

RESPIRE: ROBUST SENSOR PLACEMENT OPTIMIZATION IN PROBABILISTIC ENVIRONMENTS

*Onat Gungor^{3}, Tajana Simunic Rosing^{2}, Baris Aksanli^{1}
^{1}San Diego State University, United States; ^{2}University of California San Diego, United States; ^{3}University of California San Diego & San Diego State University, United States*

13:15

DISTRIBUTED MEASUREMENT OF LIGHT CONDITIONS FOR INDOOR PHOTOVOLTAIC APPLICATIONS

*Sebastian Bader, Xinyu Ma, Bengt Oelmann
Mid Sweden University, Sweden*

13:30

SOLAR-POWERED CRYSTAL-FREE 802.15.4 WIRELESS TEMPERATURE SENSOR

*Alex Moreno^{2}, Austin Patel^{2}, Titan Yuan^{2}, Andrew Fearing^{2}, Jan Rentmeister^{1}, Jason Stauth^{1}, Kristofer Pister^{2}
^{1}Dartmouth College, United States; ^{2}University of California, Berkeley, United States*

12:30 – 14:00

AIL-06: EMERGING SENSOR APPLICATIONS I

Session Chair: Rolland Vida, Budapest University of Technology and Economics

12:30

SENSING OF THE SELF, SOCIETY, AND THE ENVIRONMENT

*Steve Mann, Cayden Pierce, Aman Bhargava, Christopher Tong, Khantil Desai, Kyle O'Shaughnessy
MannLab Canada, Canada*

13:00

INTERNET OF BIRDS (IOB): SONG BASED BIRD SENSING VIA MACHINE LEARNING IN THE CLOUD: HOW TO SENSE, IDENTIFY, CLASSIFY BIRDS BASED ON THEIR SONGS?

*Krista Nagy, Tibor Cinkler, Csaba Simon, Rolland Vida
BME-TMIT, Hungary*

13:15

CHARACTERIZING AND OPTIMIZING PIEZO HARVESTERS FOR TRAIN INTERIORS

*Milan Saliya, Nikolaos Kouvelas, R. Venkatesha Prasad, Niels Hokke
TU Delft, Netherlands*

13:30

ESPORTS PLAYERS PROFESSIONAL LEVEL AND TIREDNESS PREDICTION USING EEG AND MACHINE LEARNING

*Nikita Melentev^{3}, Andrey Somov^{3}, Evgeny Burnaev^{3}, Irina Strelnikova^{1}, Galina Strelnikova^{1}, Elizaveta Melenteva^{2}, Alexander Menshchikov^{3}
^{1}Moscow State Academy of Physical Education, Russia; ^{2}Pirogov Russian National Research Medical University, Russia; ^{3}Skoltech, Russia*

13:45

ALGORITHM-CIRCUIT CROSS-LAYER CONTROL FOR DIGITAL PIXEL IMAGE SENSORS

*Mandovi Mukherjee, Burhan Ahmad Mudassar, Minah Lee, Saibal Mukhopadhyay
Georgia Institute of Technology, United States*

12:30 – 14:00

AIP-08: ACOUSTIC & ULTRASONIC SENSORS

Session Chairs: Krishnan Balasubrama, Indian Institute of Technology Madras & Sheng-Shian Li, National Tsing Hua University

AIP-08-1

MODE IDENTIFICATION OF DENOISED SH GUIDED WAVES USING VARIATIONAL MODE DECOMPOSITION METHOD

*Hongyu Sun^{2}, Lisha Peng^{2}, Songling Huang^{2}, Shen Wang^{2}, Qing Wang^{1}, Wei Zhao^{2}
{1}Durham University, United Kingdom; {2}Tsinghua University, China*

AIP-08-2

HIGH-SENSITIVITY PHOTONIC CRYSTAL DIAPHRAGM BASED SAPPHIRE FABRY-PEROT ACOUSTIC SENSOR FOR HIGH-TEMPERATURE APPLICATIONS

*Jiayan Wang, Weizheng Yuan, Zhibo Ma, Tongxin Guo
Northwestern Polytechnical University, China*

AIP-08-3

PHASE SHIFT BASED LEVEL SENSING USING TWO GUIDED WAVE MODE T (0, 1) AND F(1,1) ON A THIN WAVEGUIDE

*Nishanth Raja, Krishnan Balasubramanian
Indian Institute of Technology -Madras, India*

AIP-08-4

THEORETICAL STUDY AND FINITE ELEMENT SIMULATION OF ZNO/GAAS HIGHER-ORDER LAMB WAVES FOR MICROSENSOR APPLICATION IN LIQUID MEDIA

*Muhammad Hamidullah, Céline Élie-Caille, Thérèse Leblois
FEMTO-ST Institute, France*

AIP-08-5

NUMERICAL ANALYSIS OF A TUBULAR PHONONIC CRYSTAL SENSOR

*Abdellatif Gueddida^{1}, Yan Pennec^{1}, Stéphanie Hémon^{1}, Frieder Lucklum^{2}, Michael Vellekoop^{2}, Nikolay Mukhin^{4}, Ralf Lucklum^{4}, Bernard Bonello^{3}, Bahram Djafari-Rouhani^{1}
{1}IEMN, France; {2}IMSAS, Germany; {3}INSP, France; {4}OVGU, Germany*

AIP-08-6

ATTENUATION OF ULTRASONIC GUIDED WAVE ON BURIED ILLUMINATION PILLAR

*Hiroyuki Nakamoto, Akiko Kaji
Kobe University, Japan*

AIP-08-7

MEASUREMENTS OF MICROPHONE ARRAY PHASE AND AMPLITUDE BEHAVIOR TOWARDS CONTROLLABLE BEAMFORMING

*Yiqi Jia, Bonnie Gray, Rodney Vaughan
Simon Fraser University, Canada*

AIP-08-8

ENHANCED NON-CONTACT ULTRASONIC TESTING USING AN AIR-COUPLED OPTICAL MICROPHONE

*Georg Kaniak^{2}, Wolfgang Rohringer^{2}, Matthias Brauns^{2}, Nils Panzer^{2}, Fabian Lücking^{2}, Balthasar Fischer^{2}, Sebastian Brand^{1}, Christian Große^{1}
{1}Fraunhofer Institute for Microstructure of Materials and Systems, Germany; {2}XARION Laser Acoustics GmbH, Austria*

AIP-08-9

HYBRIDIZATION OF LOVE SURFACE ACOUSTIC WAVES IN SIO₂/ST-QUARTZ STRUCTURE WITH RESONANT PILLARS GRAFTED ON THE META-SURFACE

*Yuxin Liu^{2}, Abdelkrim Talbi^{2}, Cécile Ghouila-Houri^{2}, El Houssaine El Boudouti^{1}, Olivier Bou Matar^{2}, Philippe Pernod^{2}, Djafari Rouhani^{2}
{1}LPMR, Department of Physics, Faculty of Sciences, University Mohammed I, Morocco; {2}Univ. Lille, CNRS, Centrale Lille, ISEN, Univ. Valenciennes, UMR 8520 - IEMN & LIA LICS/LEMAR, France*

12:30 – 14:00

AIP-09: MICROFLUIDICS & BIOSENSORS III

Session Chairs: Leandro Lorenzelli, Fondazione Bruno Kessler (FBK) & Lucanos Strambini, Consiglio Nazionale delle Ricerche - CNR

AIP-09-1

TRACKING OXYGEN CONSUMPTION IN 3D CELL CULTURES WITH PHOSPHORESCENT BIOSENSORS

*Kristina Rivera^{1}, Madison Craft^{1}, Scott Magness^{2}, Michael Daniele^{1}
{1}North Carolina State University, United States; {2}University of North Carolina at Chapel Hill, United States*

AIP-09-2

A NOVEL SWEAT RATE AND CONDUCTIVITY SENSOR PATCH MADE WITH LOW-COST FABRICATION TECHNIQUES

*Annemarijn Steijlen, Jeroen Bastemeijer, Kaspar Jansen, Patrick French, Andre Bossche
Delft University of Technology, Netherlands*

AIP-09-3

VERSATILE FABRICATION AND INTEGRATION METHOD OF OPTICAL OXYGEN SENSORS IN ORGAN-ON-CHIPS

*Elsbeth Bossink, Juliëtte Slob, Dorothee Wasserberg, Loes Segerink, Mathieu Odijk
BIOS Lab on a Chip, University of Twente, Netherlands*

AIP-09-4

QUANTIFICATION OF CEA FROM HUMAN PLASMA USING PLASMONIC ENHANCEMENT OF FLUORESCENCE AND ACOUSTIC STREAMING

*Yuqi Huang, Venkat Bhethanabotla
University of South Florida, United States*

AIP-09-5

MICROELECTRODE ARRAY DESIGNING FOR DUMMIES: CONTRIBUTION OF THE TRACKS TO THE IMPEDANCE BEHAVIOR AND THE NOISE LEVEL

*Tomi Ryyänen, Pasi Kallio
Tampere University, Finland*

AIP-09-6

MODELING AND DESIGN CONSIDERATIONS FOR RESISTIVE IMPEDANCE-BASED FLOW CYTOMETRY

*Jacob Dawes, Jinwon Kim, Matthew Johnston
Oregon State University, United States*

AIP-09-7

ROLE OF SHAPE OF GOLD NANOPARTICLES IN SENSING BIOMOLECULES USING RADIO-FREQUENCY BASED SENSORS

*Annesha Mazumder, Syed Azeemuddin, Tapan Kumar Sau, Prabhakar Bhimalapuram
International Institute of Information Technology, Hyderabad, India*

12:30 – 14:00

AIP-10: OPTICAL SENSORS III

Session Chair: Minghong Yang, Wuhan University of Technology

AIP-10-1

THERMO-COUPLED TEMPERATURE SENSORS BY SEVEN-CORE MCF STRUCTURES

*Farhan Mumtaz^{2}, Yutang Dai^{2}, Wenbin Hu^{2}, Muhammad Aqueel Ashraf^{1}, Shu Cheng^{2}, Pu Cheng^{2}
{1}Quaid-i-Azam University, Islamabad., Pakistan; {2}Wuhan University of Technology, China*

AIP-10-2

STRAIN SENSING USING COLLOIDAL QUANTUM DOTS INTEGRATED WITH EPOXY

*Michael Sherburne^{2}, Candice Roberts^{2}, John Brewer Jr.^{2}, Thomas Weber^{1}, Tod Laurvick^{2}, Hengky Chandralim^{2}
{1}Los Alamos National Laboratory, United States; {2}The US Air Force Institute of Technology, United States*

AIP-10-3

A HIGH-SENSITIVITY OPTICAL MEMS ACCELEROMETER BASED ON SOI DOUBLE-SIDE MICROMACHINING

*Ziqiang Qu^{1}, Huafeng Liu^{1}, Hao Ouyang^{1}, Chenyuan Hu^{1}, Liangcheng Tu^{2}
{1}Huazhong University of Science and Technology, China; {2}Sun Yat-sen University, China*

AIP-10-4

COPPER OXIDE COATED D-SHAPED OPTICAL FIBERS FOR THE DEVELOPMENT OF LMR REFRACTOMETERS

*Aritz Ozcariz, Ignacio Vitoria, Francisco Javier Arregui, Carlos Ruiz Zamarreño
Public University of Navarra, Spain*

AIP-10-5

NOISE REDUCTION EFFECT OF FOLDING-INTEGRATION ADC IN AN 8K IMAGE SENSOR DRIVEN AT VARIOUS FRAME RATES

*Kohei Tomioka^{1}, Toshio Yasue^{1}, Ryohei Funatsu^{1}, Kodai Kikuchi^{1}, Tomoki Matsubara^{1}, Takayuki Yamashita^{1}, Shoji Kawahito^{2}
{1}Japan Broadcasting Corporation (NHK) Science and Technology Research Laboratories, Japan; {2}Shizuoka University, Japan*

AIP-10-6

LOSSY MODE RESONANCE SENSORS BASED ON TUNGSTEN OXIDE THIN FILMS

*Ignacio Del Villar^{2}, Dina Bohorquez^{2}, Domenico Caputo^{3}, Alessio Buzzin^{3}, Francesco Chiavaioli^{1}, Francesco Baldini^{1}, Carlos R. Zamarreño^{2}, Ignacio R. Matias^{2}
{1}National Research Council of Italy CNR, Italy; {2}Public University of Navarra, Spain; {3}University of Rome, Italy*

AIP-10-7

HYBRID SI ETCHING FOR PERFORMANCE ENHANCEMENT OF THE ATMOSPHERIC CMOS MEMS INFRARED SENSOR

*Pen-Sheng Lin, Yijia Wang, Ming-Ching Cheng, Yu-Chen Chen, Yu-Cheng Huang, Weileun Fang
National Tsing Hua University, Taiwan*

AIP-10-8

COMPREHENSIVE MODELING OF PHOTON DETECTION PROBABILITY IN CMOS-BASED SPADS

Saman Kohneh Poushi, Hiwa Mahmoudi, Bernhard Steindl, Michael Hofbauer, Horst Zimmermann

EMCE, Vienna University of Technology, Austria

AIP-10-9

A 1ST ORDER INCREMENTAL SIGMA-DELTA WITH REFINED DIGITALLY IMPLEMENTED FEED-FORWARD FOR 2-STAGE ADC

Toshio Yasue^{2}, Fortunato Frazzica^{5}, Annachiara Spagnolo^{1}, David San Segundo Bello^{3}, Maarten De Bock^{4}, Piet Wambacq^{1}, Jan Craninckx^{1}

^{1}imec, Belgium; ^{2}Japan Broadcasting Corporation, Japan; ^{3}Pyxalis, France; ^{4}Spectricity, Belgium; ^{5}Vrije Universiteit Brussel, Belgium

AIP-10-10

DYNAMIC RESPONSE OF GOLD-COATED OPTICAL FIBER SENSORS SUBJECTED TO VOLTAGE VARIATIONS

Asier Rodriguez-Garde^{2}, Abian Bentor Socorro-Leranoz^{1}, Maria Elena Martinez^{2}, Javier Goicoechea^{2}, Ignacio Raul Matias^{2}

^{1}Public University of Navarra, Spain; ^{2}Public University of Navarra, Spain

AIP-10-11

DEVELOPMENT OF AN OPTICAL SENSOR FOR THE NON-DESTRUCTIVE TESTING OF GRINDING BURN

Andras Kovacs, Isman Khazi, Ali Zahedi, Ulrich Mescheder, Bahman Azarhoushang Hochschule Furtwangen University, Germany

AIP-10-12

AN ULTRAFAST ACTIVE QUENCHING CIRCUIT FOR SPAD IN CMOS 28NM FDSOI TECHNOLOGY

Mohammadreza Dolatpoor Lakeh^{1}, Jean-Baptiste Kammerer^{1}, Wilfried Uhring^{1}, Jean-Baptiste Schell^{1}, Francis Calmon^{2}

^{1}ICube, University of Strasbourg and CNRS, France; ^{2}Institut des Nanotechnologies de Lyon, UMR CNRS 5270, Université de Lyon, France

12:30 – 14:00

AIP-11: SENSOR MATERIALS, PROCESSING & FABRICATION (INCLUDING PRINTING)-II

Session Chairs: Sone Masato, Tokyo Institute of Technology & Shubhra Gangopadhyay, National Science Foundation

AIP-11-1

CHARACTERIZATION OF HIGHLY-STRETCHABLE SCREEN-PRINTED LIQUID METAL PRESSURE SENSORS

*Johanna Zikulnig^{2}, Gregor Fritz^{1}, Lukas Rauter^{2}, Lisa-Marie Faller^{1}
{1}Carinthia University of Applied Sciences, Austria; {2}Silicon Austria Labs GmbH, Austria*

AIP-11-2

FLOW NOISE AROUND UNDERWATER AXISYMMETRIC MODELS WITH BIO-INSPIRED COATING

*Zhonggang Zhang, Wei Gao, Shanzhong Wang, Binghe Ma, Jian Luo, Jinjun Deng
Laboratory of Micro/Nano Systems for Aerospace, Northwestern Polytechnical University, China*

AIP-11-3

POLYSILICON THIN FILM DEVELOPED ON ULTRA-THIN FLEXIBLE GLASS FOR TEMPERATURE SENSOR

*Juan Quintana, Thanh Nguyen, Chong Ahn
Microsystems and BioMEMS Laboratory, United States*

AIP-11-4

COMPARISON OF REGENERATED FIBER BRAGG GRATINGS PROPERTIES IN STANDARD AND B/GE CO-DOPED SINGLE-MODE SILICA FIBERS

*Nazila Safari Yazd, Karima Chah, Christophe Caucheteur, Patrice Mégret
University of Mons, Belgium*

AIP-11-5

IN-SITU MONITORING OF LAYER-WISE FABRICATION BY ELECTRICAL RESISTANCE MEASUREMENTS IN 3D PRINTING

*Alexander Dijkshoorn, Patrick Neuvel, Stefano Stramigioli, Gijs Krijnen
University of Twente, Netherlands*

AIP-11-6

ELECTRICAL CHARACTERISATION OF β -Ga₂O₃ SCHOTTKY DIODE FOR DEEP UV SENSOR APPLICATIONS

*Douglas Vieira^{1}, N Badiei^{2}, Je Evans^{2}, Neri Alves^{3}, Jeff Kettle^{1}, Lijie Li^{2}
{1}Bangor University, United Kingdom; {2}Swansea University, United Kingdom; {3}UNESP, Brazil*

AIP-11-7

THIOGLYCOLIC ACID FUNCTIONALIZED MOS₂ BASED Hg²⁺ AND Cd²⁺ ION DETECTION

*Santanab Majumder, Avik Sett, Dipak K Goswami, Tarun K Bhattacharyya
IIT Kharagpur, India*

AIP-11-8

3D-PRINTED CALORIMETRIC FLOW SENSOR

*Gerjan Wolterink, Ameya Umrani, Martijn Schouten, Remco Sanders, Gijs Krijnen
University of Twente, Netherlands*

AIP-11-9

A FACILE FABRICATION OF POROUS AND BREATHABLE DIELECTRIC FILM FOR CAPACITIVE PRESSURE SENSOR

*Azmal Chowdhury, Iman Khakpour, Borzooye Jafarizadeh, Nezh Pala, Chunlei Wang
Florida International University, United States*

A1P-11-10

EFFECT OF SURFACE MICROSTRUCTURE ON THE LONG-TERM ANTI-BACTERIAL PERFORMANCE FOR SLIPPERY LIQUID INFUSED POROUS SURFACES

Guangyi Cai, Qi Zeng, Tianzhun Wu

Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

A1P-11-11

PEDOT:PSS HYDROGEL BASED FLEXIBLE ELECTRODES FOR WEARABLE ECG MONITORING

Shiyi Xu, Tianyu Li, Hangxu Ren, Xiyu Mao, Xuesong Ye, Bo Liang

Zhejiang University, China

14:00 – 14:30

OPENING & WELCOME // S2021 ANNOUNCEMENT

14:30 – 15:30

KEYNOTE TALK 1

15:30 – 16:30

LUNCH // PANEL DISCUSSION

16:30 – 18:00

A2L-01: ACOUSTIC & ULTRASONIC TRANSDUCERS

Session Chairs: Krishnan Balasubrama, Indian Institute of Technology Madras & Sheng-Shian Li, National Tsing Hua University

16:30

CMOS INTEGRATED GIGAHERTZ ULTRASONIC SENSORS AND ACTUATORS

Amit Lal

17:00

ULTRA-COMPACT CLAMP-ON LIQUID LEVEL SENSOR BASED ON A LOW-VOLTAGE CMUT

*Fabian Merbeler^{2}, Sebastian Anzinger^{1}, Christian Bretthauer^{2}, Mario Kupnik^{3}
^{1}Albert-Ludwigs Universität Freiburg, Germany; ^{2}Infineon Technologies AG, Germany;
^{3}Technischer Universität Darmstadt, Germany*

17:15

POLYMER PMUT ARRAY FOR HIGH-BANDWIDTH UNDERWATER COMMUNICATIONS

*Pieter Gijsenbergh, Alexandre Halbach, Yongbin Jeong, David Cheyens, Xavier Rottenberg, Veronique Rochus
IMEC, Belgium*

17:30

EMBEDDED AIR-COUPLED ULTRASONIC 3D SONAR SYSTEM WITH GPU ACCELERATION

*Gianni Allevalo, Matthias Rutsch, Jan Hinrichs, Marius Pesavento, Mario Kupnik
Technische Universität Darmstadt, Germany*

17:45

AI SPEAKER: A SCOPE OF UTILIZING SUBWAVELENGTH DIRECTIONAL SENSING OF BIO-INSPIRED MEMS DIRECTIONAL MICROPHONE

Ashiqur Rahaman, Byungki Kim

Korea University of Technology and Education, Korea

16:30 – 18:00

A2L-02: MICROFLUIDICS & BIOSENSORS I

Session Chairs: Giuseppe Barillaro, University of Pisa & Loes Segerink, University of Twente

16:30

MULTI-MODAL LOCAL PHYSIOLOGICAL SENSING AT THE INTRAVENOUS CATHETER INSERTION SITE

Samer Mabrouk^{2}, Zahidee Rodriguez^{1}, Subhendu De^{1}, Kevin Maher^{1}, Leanne West^{3}, Lynn Pogue^{1}, Amy Parker^{1}, Adith Srivatsava^{2}, Arjun Sonti^{2}, Omer Inan^{2}^{1}Childrens Healthcare of Atlanta, United States; ^{2}Georgia Institute of Technology, United States; ^{3}Georgia Tech Research Institute, United States

17:00

A DUAL LOVE WAVE AND IMPEDANCE-BASED SENSOR: RESPONSE ENRICHMENT

Maxence Rube^{2}, Ollivier Tamarin^{2}, Martine Sebeloue^{2}, Hamida Hallil^{1}, Laurent Linguet^{2}, Dominique Rebiere^{1}, Corinne Dejous^{1}^{1}Université de Bordeaux - IMS, France; ^{2}University of French GUIANA, France

17:15

MEASURING THERMAL CONDUCTIVITY IN A MICROFLUIDIC DEVICE WITH THE TRANSIENT THERMAL OFFSET (TTO) METHOD

Gilles Oudebrouckx^{1}, Thijs Vandenryt^{1}, Seppe Bormans^{1}, Patrick Wagner^{2}, Ronald Thoelen^{1}^{1}Hasselt University, Belgium; ^{2}KU Leuven, Belgium

17:30

ULTRA-HIGH FREQUENCY (500 MHZ) CAPACITANCE SPECTROSCOPY FOR NANOBIOSENSING

Andrea Cossettini^{3}, Denis Brandalise^{5}, Pierpaolo Palestri^{6}, Alessandro Bertacchini^{5}, Michele Ramponi^{1}, Frans Widdershoven^{4}, Luca Benini^{2}, Luca Selmi^{5}^{1}Active Technologies S.r.l., Italy; ^{2}ETH Zurich, University of Bologna, Switzerland; ^{3}ETH Zurich, University of Udine, Switzerland; ^{4}NXP Semiconductors, Delft University of Technology, Netherlands; ^{5}University of Modena and Reggio Emilia, Italy

17:45

MONITORING FIBRIN POLYMERIZATION EFFECTS ON WHOLE BLOOD COAGULATION USING A MICROFLUIDIC DIELECTRIC SENSOR

Sina Pourang, Debnath Maji, Ujjal Sekhon, Anirban Sen Gupta, Michael Suster, Pedram Mohseni
Case Western Reserve University, United States

16:30 – 18:00

A2L-04: SENSOR PHENOMENOLOGY I

Session Chairs: Ravinder Dahiya, University of Glasgow & Shubhra Gangopadhyay, National Science Foundation

16:30

EFFECT OF SKIN TONE AND ACTIVITY ON THE PERFORMANCE OF WRIST-WORN OPTICAL BEAT-TO-BEAT HEART RATE MONITORING

Antti Puranen^{2}, Tuomas Halkola^{1}, Ole Kirkeby^{1}, Antti Vehkaoja^{2}^{1}PulseOn Oy, Finland; ^{2}Tampere University, Finland



17:00

DESIGN OF MICROWAVE SENSOR ARRAY FOR NEXT-GENERATION NEUTRINO MASS MEASUREMENTS

Mark Jones, Maurio Grando

Pacific Northwest National Laboratory, United States

17:15

INSTABILITIES DUE TO ELECTROSTATIC TUNING OF FREQUENCY-SPLIT IN CORIOLIS VIBRATORY GYROSCOPES

Daryosh Vatanparvar, Andrei Shkel

University of California, Irvine, United States

17:30

COMBINING PHYSICS-BASED SIMULATION AND MACHINE LEARNING FOR EIT-BASED TACTILE SENSING

Niccolò Biasi, Nicola Carbonaro, Lucia Arcarisi, Alessandro Tognetti

University of Pisa, Italy

17:45

ANALYSIS AND EXPERIMENT ON THE PARAMETRICALLY AMPLIFIED AND PUSH-PULL DRIVEN RESONATORS

Kai Wu, Kuo Lu, Qingsong Li, Yi Xu, Dingbang Xiao, Xuezhong Wu

National University of Defense Technology, China

16:30 – 18:00

A2L-05: OPTICAL SENSORS I

Session Chair: Hengky Chandralalim, The US Air Force Institute of Technology

16:30

SENSING AT EXCEPTIONAL POINTS

Sahin Ozdemir

Pennsylvania State University, United States

17:00

F-TOUCH SENSOR FOR THREE-AXIS FORCES MEASUREMENT AND GEOMETRY OBSERVATION

Wanlin Li^{2}, Yohan Noh^{1}, Akram Alomainy^{2}, Ivan Vitanov^{2}, Yu Zheng^{3}, Peng Qi^{4}, Kaspar Althoefer^{2}

^{1}Brunel University London, United Kingdom; ^{2}Queen Mary University of London, United Kingdom; ^{3}Tencent, China; ^{4}Tongji University, China

17:15

FIBER CROSS-COUPPLING MECHANISMS IN OPTICAL PRESSURE SENSOR ARRAYS

Christian-Alexander Bunge^{1}, Jan Kallweit^{2}, Levent Colakoglu^{2}, Thomas Gries^{2}

^{1}Hochschule Technik, Wirtschaft und Kultur Leipzig (HTWK), Germany; ^{2}Institut of Textiltechnik, RWTH Aachen University, Germany

17:30

OPTICAL ABSORPTION SENSING WITH DUAL-SPECTRUM SILICON LEDS IN SOI-CMOS TECHNOLOGY

Satadal Dutta, Peter Steeneken, Gerard Verbiest

TU Delft, Netherlands

17:45

EVALUATION OF THE THERMAL RESPONSE OF LIVER TISSUE UNDERGOING MICROWAVE TREATMENT BY MEANS OF FIBER BRAGG GRATING SENSORS

Martina Zaltieri^{1}, Elena De Vita^{2}, Francesca De Tommasi^{1}, Carlo Massaroni^{1}, Eliodoro Faiella^{1}, Bruno Beomonte Zobel^{1}, Agostino Iadicicco^{2}, Emiliano Schena^{1}, Rosario Francesco Grasso^{1}, Stefania Campopiano^{2}
^{1}Università Campus Bio-Medico di Roma, Italy; ^{2}University of Naples, Italy

16:30 – 18:00

A2L-06: SENSOR MATERIALS, PROCESSING & FABRICATION (INCLUDING PRINTING) I

Session Chairs: Shubhra Gangopadhyay, National Science Foundation & Sone Masato, Tokyo Institute of Technology

16:30

EMERGING WEARABLE BIOELECTRONICS: CREATING A NEW ERA OF PERSONALIZED MEDICINE

Sam Emaminejad

Track 2 Sensor Materials, Processing and Fabrication (including Printing), United States

17:00

FLEXIBLE GRAPHENE-ON-PDMS SENSOR FOR HUMAN MOTION MONITORING APPLICATIONS

Debarun Sengupta, Vigneshraj Muthuram, Ajay Giri Prakash Kottapalli

University of Groningen, Netherlands

17:15

HIGHLY SENSITIVE FLEXIBLE/STRETCHABLE SMART INSOLE PRESSURE SENSOR WITH MULTI-WALLED CARBON NANOTUBES AND POLYDIMETHYLSILOXANE DOUBLE-LAYER COMPOSITES

Jae Sang Heo^{2}, Daniel Goldberg^{1}, Edward Large^{1}, Insoo Kim^{2}

^{1}University of Connecticut, United States; ^{2}University of Connecticut School of Medicine, United States

17:30

PDMS FLOW SENSORS WITH GRAPHENE PIEZORESISTORS USING 3D-PRINTING AND SOFT LITHOGRAPHY

Amar Kamat, Bayu Jayawardhana, Ajay Giri Prakash Kottapalli

University of Groningen, Netherlands

17:45

FABRICATION PROCESS FOR FREE-STANDING SMART HYDROGEL PILLARS FOR SENSING APPLICATIONS

Navid Farhoudi, Jules J. Magda, Florian Solzbacher, Christopher F. Reiche

University of Utah, United States

16:30 – 18:00

A2L-07: SENSORS FOR AGRIFOOD & CONNECTED FARMING I

Session Chairs: Marios Sophocleous, University of Cyprus & Alper Bozkurt, North Carolina State University

16:30

A STUDY ON THE DIELECTRIC BEHAVIOUR OF PLANT CELL SUSPENSIONS USING WIDEBAND ELECTRICAL IMPEDANCE SPECTROSCOPY (WB-EIS)

Kian Kadan-Jamal^{1}, Aakash Jog^{1}, Marios Sophocleous^{2}, Dayananda Desagani^{1}, Orian Teig-Sussholz^{1}, Julius Georgiou^{2}, Adi Avni^{1}, Yosi Shacham-Diamand^{1}
^{1}Tel Aviv University, Israel; ^{2}University of Cyprus, Cyprus

17:00

RF COILS CHARACTERIZATION IN SOIL FOR WIRELESS SOIL SENSING APPLICATIONS

Weijie Luo^{1}, Ramesh Goel^{1}, Shad Roundy^{1}, Cody Zesiger^{2}, Darrin Young^{1}
^{1}University of Utah, United States; ^{2}Utah State University Extension, United States

17:15

AN ENVIRONMENTAL STATION WITH BIOIMPEDANCE CAPABILITIES FOR AGRICULTURAL DEPLOYMENT

James Reynolds, Matthew Taggart, Michael Daniele, Thomas Ruffy, Alper Bozkurt
NC State University, United States

17:30

ULTRA-LOW ENERGY PEST DETECTION FOR SMART AGRICULTURE

Davide Brunelli^{3}, Tommaso Polonelli^{2}, Luca Benini^{1}
^{1}ETH, Switzerland; ^{2}University of Bologna, Italy; ^{3}University of Trento, Italy

17:45

FEASIBILITY OF SIGNAL TRANSMISSION FOR PLANT BODY CHANNEL COMMUNICATION IN TOBACCO

Aakash Jog, Lee Bar-On, Adi Avni, Yosi Shacham-Diamand
Tel Aviv University, Israel

16:30 – 18:00

A2P-08: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES V

Session Chair: Michael Daniele, NCSU

A2P-08-1

CONVOLUTIONAL AUTOENCODERS FOR HEALTH INDICATORS EXTRACTION IN PIEZOELECTRIC SENSORS

*Ivan Kraljevski^{2}, Frank Duckhorn^{2}, Constanze Tschoepe^{2}, Matthias Wolff^{1}
{1}Chair of Communications Engineering, BTU Cottbus-Senftenberg, Cottbus, Germany;
{2}Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany*

A2P-08-2

NEW CORRECTION METHODS FOR NONORTHOGONALITY AND AMPLITUDE MISMATCH OF ANGLE POSITION SENSOR BY USING ATAN2-FUNCTION

Jie Zhou^{2}, Markus Dietrich^{2}, Paul Walden^{2}, Johannes Kolb^{3}, Martin Doppelbauer^{1}

{1}Karlsruhe Institute of Technology, Germany; {2}Schaeffler Automotive Buehl GmbH & Co. KG, Germany; {3}Schaeffler Technologies AG & Co. KG - SHARE at KIT, Karlsruhe, Germany

A2P-08-3

MAGNETIC POSITION TRACKING USING INDUCTOR COILS AND IMU

*Mohit Singh, Ravi Abhishek Shankar, Byunghoo Jung
Purdue University, United States*

A2P-08-4

A PRACTICAL APPROACH FOR THE EVALUATION OF NOISE IN OSCILLATOR-BASED RESISTIVE SENSOR INTERFACES

Rafael Puyol^{1}, Yannick Molle^{1}, Sylvain Pétré^{2}, Thomas Walewyns^{3}, Laurent Francis^{1}, Denis Flandre^{1}

{1}UCLouvain, Belgium; {2}UCLouvain & VOCsSens, Belgium; {3}VOCsSens, Belgium

A2P-08-5

ISFET DIGITAL READOUT CIRCUIT WITH AN ON-CHIP MIPS PROCESSOR

*Shaghayegh Aslanzadeh, Ava Hedayatipour, Nicole McFarlane
University of Tennessee, Knoxville, United States*

A2P-08-6

CMOS-BASED READOUT AND CONTROL ELECTRONICS FOR MICROGRIPPERS

*Diego Barrettino, Marco Mattavelli
Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland*

A2P-08-7

HIGH DYNAMIC RANGE (HDR) SIGNAL PROCESSING ON SOFTWARE-DEFINED RADIO

*Phillip Do, Jesse Hernandez, Zhao Lu, Danson Garcia, Steve Mann
MannLab Canada, Canada*

A2P-08-8

HDR AGC SIGNAL OPTIMIZATION APPLIED TO AUDIO

*Jesse Hernandez, Danson Evan Garcia, Steve Mann
Mannlab, Canada*

A2P-08-1

**CONVOLUTIONAL AUTOENCODERS FOR HEALTH INDICATORS EXTRACTION IN
PIEZOELECTRIC SENSORS**

A2P-08-9

SYNCHRONIZATION OF MULTIPLE TIME-OF-FLIGHT CAMERAS USING PHOTODIODES

*Thorben Wübbenhorst, Felix Wermke, Beate Meffert
Humboldt-Universität zu Berlin, Germany*

A2P-08-10

**INERTIAL MEMS SENSORS ACCURACY IMPROVEMENT BY INTERVAL FUSION WITH
PREFERENCE AGGREGATION**

*Sergey Muravyov, Pavel Baranov, Liudmila Khudonogova, Minh Dai Ho
TPU, Russia*

A2P-08-11

**DEEP-LEARNING FOR HAND-GESTURE RECOGNITION WITH SIMULTANEOUS THERMAL AND
RADAR SENSORS**

*Sruthy Skaria^{1}, Da Huang^{1}, Akram Al-Hourani^{1}, Robin J.Evans^{2}, Margaret Lech^{1}
^{1}RMIT University, Australia; ^{2}The University of Melbourne, Australia*

16:30 – 18:00

A2P-09: SENSOR NETWORKS III

Session Chairs: Binbin Chen, Singapore University Of Technology and Design & Jorge Sá Silva, University of Coimbra

A2P-09-1

WIRELESS INERTIAL MEASUREMENTS ON A WIND TURBINE ROTOR BLADE

*Frank Berkemeyer, Walter Lang
University of Bremen, Germany*

A2P-09-2

SMART CITY BATTERY OPERATED IOT BASED INDOOR AIR QUALITY MONITORING SYSTEM

*Siavash Esfahani, Piers Rollins, Jan Specht, Marina Cole, Julian Gardner
University of Warwick, United Kingdom*

A2P-09-3

WEARABLE IOT ELECTRONIC NOSE FOR URINARY INCONTINENCE DETECTION

*Siavash Esfahani, Michael Shanta, Jan Specht, Yuxin Xing, Marina Cole, Julian Gardner
University of Warwick, United Kingdom*

A2P-09-4

ADAPTIVE TOA ESTIMATION WITH IMPERFECT LOS AND NLOS KNOWLEDGE IN UWB POSITIONING SYSTEMS

*Iker Sobron, Iratxe Landa, Iñaki Eizmendi, Manuel Velez
University of the Basque Country (UPV/EHU), Spain*

A2P-09-5

AN OPEN SOURCE IOT FRAMEWORK FOR A DISTRIBUTED MODULAR LOW-COST LASER-BASED SENSING PLATFORM

*Jan Bauer^{1}, Yannic Toschke^{2}, Alexander Tessmer^{2}, Björn Bourdon ^{2}, Nils Aschenbruck^{2}, Mirco Imlau^{2}
^{1}Fraunhofer FKIE, Germany; ^{2}Univ. of Osnabrueck, Germany*

A2P-09-6

A TWO-ARM ARCHIMEDEAN CIRCULARLY POLARIZED SPIRAL SLOT ANTENNA FOR IOT DEVICES IN 5G NETWORK

*Maryam Eshaghi, Rashid Rashidzadeh
University of Windsor, Canada*

A2P-09-7

QOS-AWARE SMALL-CELL-OVERLAID HETEROGENEOUS SENSOR NETWORK DEPLOYMENT FOR EHEALTH

*Hao Ran Chi, M Fatima Domingues, Ayman Radwan
Instituto de Telecomunicações, Portugal*

A2P-09-8

LOW-COST SYNCHRONIZATION FOR WLAN SENSORS

*Thomas Feys^{2}, Stijn Crul^{1}, Geoffrey Ottoy^{2}
^{1}Barco NV, Belgium; ^{2}KU Leuven, Belgium*

A2P-09-9

DEVELOPMENT OF A PORTABLE MONITORING SYSTEM FOR INDOOR E-CIGARETTES EMISSION

*Michael Lim, Bongmook Lee
North Carolina State University, United States*

A2P-09-10

WIRELESS GRAPHENE TEMPERATURE SENSOR

*Andrey Somov^{1}, Evgeniya Kovalska^{2}, Anna Baldycheva^{3}
^{1}Skolkovo Institute of Science and Technology, Russia; ^{2}University of Chemistry and Technology, Czech Rep.; ^{3}University of Exeter, United Kingdom*

A2P-09-11

A CROSS LAYER PROTOCOL PHY/MAC FOR BODY PATHLOSS IN IEEE 802.11AH IOT NETWORKS

*Prasaja Wikanta, Andy Triwinarko, Iyad Dayoub, Elhadj Dogheche
UPHF, France*

A2P-09-12

THE VIRTUAL SENSOR CONCEPT - SEPARATING SENSOR SOFTWARE FROM THE HARDWARE

*Jarrod Trevathan^{1}, Wayne Read^{1}, Abdul Sattar^{1}, Simon Schmidtke^{2}, Tony Sharp^{2}
^{1}Griffith University, Australia; ^{2}Substation33, Australia*

A2P-09-13

AN ONLINE QUANTITATIVE MEASURE OF DENSITY FOR LOW-POWER IOT NETWORKS

*Marlon Santos, Yuri Melo, Lucas Barbosa, André Riker, Marília Curado
Federal University of Pará, Portugal; Federal University of Pará, Brazil*

A2P-09-14

PROTECTING HEALTH CARE WORKERS FROM INFECTIOUS DISEASES USING PHYSICAL PROXIMITY NETWORKS (PPN)

*Asanka Rathnayaka, Md Abdulla Al Mamun, Fan Wu, Stephanie Curtis, Andrew Stewardson, Mehmet Yuçe
Monash University, Australia*

16:30 – 18:00

A2P-10: CHEMICAL, ELECTROCHEMICAL & GAS SENSORS III

**Session Chairs: Marios Sophocleous, University of Cyprus & Thomas Thundat,
University of Buffalo**

A2P-10-1

COMPARATIVE STUDY OF SPIN-COATED AND VAPOUR DEPOSITED NICKEL OXIDES FOR DETECTING VOCS

*Sai Kiran Ayyala^{2}, Jone Him Tsang^{1}, Chris Blackman^{1}, James Antony Covington^{2}
^{1}University College London, United Kingdom; ^{2}University of Warwick, United Kingdom*

A2P-10-2

HETERO-CORE FIBER SPR SENSOR WITH IONIC LIQUID GEL COATING FOR CO₂ DETECTION

*Mitsuhiro Suzuki, Michiko Nishiyama, Kazuhiro Watanabe, Junichi Ida
SOKA University, Japan*

A2P-10-3

CAPACITIVE PROPERTIES OF CERAMIC HUMIDITY SENSORS MADE FROM POROUS PEROVSKITE FILMS

*Hamid Farahani^{1}, Rahman Wagiran^{2}, Gerald Urban^{1}
^{1}University of Freiburg, Germany; ^{2}University Putra Malaysia (UPM), Malaysia*

A2P-10-4

TEMPERATURE CHARACTERISTICS OF HETERO-CORE OPTICAL FIBER AU/TIO₂ SPR SENSORS FABRICATED BY SPUTTERING AND LAYER-BY-LAYER STACKING TECHNIQUES

*Koji Yuhashi, Michiko Nishiyama, Jun-Ichi Ida, Shoichi Kubodera, Kazuhiro Watanabe
Soka University, Japan*

A2P-10-5

COBALT BASED SOLID STATE PHOSPHATE SENSOR WITH SUBMICROMOLAR DETECTION RANGE

*Vinay Patel, P. Ravi Selvaganapathy
McMaster University, Canada*

A2P-09-11

A CROSS LAYER PROTOCOL PHY/MAC FOR BODY PATHLOSS IN IEEE 802.11AH IOT NETWORKS

*Prasaja Wikanta, Andy Triwinarko, Iyad Dayoub, Elhadj Dogheche
UPHF, France*

A2P-10-6

INFLUENCE OF CARRIER GAS ON MICROWAVE GAS RESPONSE

*Alexis Lasserre^{1}, Ludmilla Grzelak^{2}, Jerome Rossignol^{1}, Didier Stuerga^{1}, Olivier Brousse^{3}, Pierre Pribetich^{1}, Michel Paindavoine^{3}
^{1}GERM, Dept Interfaces, Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR CNRS 6303, France; ^{2}GERM, Dept Interfaces, Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR CNRS 6303 & Yumain, France; ^{3}Yumain, France*

A2P-10-7

ODOR SOURCE DETECTION WITH HIGH SPEED MULTI GAS SENSING ROBOT SYSTEM USING AUNPS-FLUORESCENT MOLECULAR COUPLING OPT-CHEMICAL LSPR SENSOR

*Yasuhiro Kusuda, Zhongyuan Yang, Kohei Semasa, Fumihiro Sassa, Kenshi Hayashi
Kyushu University, Japan*

16:30 – 18:00

A2P-11: EMERGING SENSOR APPLICATIONS IV

Session Chair: Volker Nock, University of Canterbury

A2P-11-1

FLASH LIDAR IMAGING AND CLASSIFICATION OF VEHICLES

*Graeme Nash^{2}, Vladimyros Devrelis^{1}
^{1}Ballistic Systems Pty Ltd, Australia; ^{2}DST Group, Australia*

A2P-11-2

CAPACITANCE-BASED CONTACTLESS MONITORING OF ASEPTIC PACKAGE INTEGRITY AND CONTENT QUALITY

*Hari Krishna Salila Vijayalal Mohan, Andrew Alexander Malcolm, Fang Cheng
Advanced Remanufacturing and Technology Centre (ARTC), Singapore*

A2P-11-3

THROUGH THICK AND THIN: IMAGING THROUGH OBSCURANT USING SPAD ARRAY

*Joyce Mau^{3}, Vladimyros Devrelis^{2}, Geoffrey Day^{3}, Graeme Nash^{3}, Jochen Trumpf^{1}, Dennis Delic^{3}
^{1}ANU, Australia; ^{2}Ballistic Systems Pty Ltd, Australia; ^{3}DST Group, Australia*

A2P-11-4

SEAL INTEGRITY TESTING UTILIZING NON-DESTRUCTIVE CAPACITIVE SENSING FOR PRODUCT PACKAGING ASSURANCE

*Jieming Pan^{2}, Yida Li^{2}, Yuxuan Luo^{3}, Xiangyu Zhang^{2}, Zaifeng Yang^{1}, David Liang Tai Wong^{2}, Xuhua Niu^{2}, Chen-Khong Tham^{2}, Aaron Voon-Yew Thean^{2}
^{1}Institute of High-Performance Computing, A Star, Singapore; ^{2}National University of Singapore, Singapore; ^{3}Zhejiang University, China*

A2P-11-5

ONLINE MONITORING OF THERMOPLASTIC CRYSTALLIZATION WITH MINIATURIZED INTERDIGITAL SENSORS

*Martina Hübner^{2}, Aynur Klatt^{2}, Michael Koerdts^{1}, Walter Lang^{2}
^{1}Faserinstitut Bremen e. V., Germany; ^{2}University Bremen, Institute for Microsensor,-actuators and -systems (IMSAS), Germany*

A2P-11-6

CONCEPTUAL DESIGN OF AUTOMOTIVE SENSOR SYSTEMS

*Maike Hartstern^{2}, Viktor Rack^{1}, Wilhelm Stork^{3}
^{1}BMW AG, Germany; ^{2}BMW AG / Karlsruhe Institute of Technology (KIT), Germany; ^{3}
Karlsruhe Institute of Technology (KIT), Germany*

A2P-11-7

**DEPLOYMENT OF INALN/GAN HALL-EFFECT SENSORS FOR BUCKET TRANSFORMER
MONITORING AND FORECASTING**

*Jiya Janowitz^{2}, Max Holliday^{2}, Karen Dowling^{2}, Brandon Yeung^{2}, Sai Kumar^{2},
Ricardo Peterson^{2}, Hannah Alpert^{2}, Caitlin Chapin^{2}, Jhorge Lopez^{1}, Debbie
Senesky^{2}
^{1}Prolec GE, Mexico; ^{2}Stanford University, United States*

A2P-11-8

**DETERMINATION OF FAT CONTENT IN FOODS USING A NEAR-INFRARED SPECTROSCOPY
SENSOR**

*Barry William Mulvey
University College Dublin, Ireland*

A2P-11-9

DRAGON: DRONE FOR RADIATION DETECTION OF GAMMAS AND NEUTRONS

*Davide Brunelli^{2}, Felix Pino^{1}, Cristiano Fontana^{1}, Lucio Pancheri^{2}, Sandra
Moretto^{1}
^{1}University of Padova, Italy; ^{2}University of Trento, Italy*

A2P-11-10

**PIEZOELECTRIC ENERGY HARVESTING FROM A COMPOSITE CANTILEVER BEAM UNDER
SINUSOIDAL EXCITATION**

*Theofanis Plagianakos, Nikolaos Margelis, Nikolaos Leventakis, Georgios Bolanakis,
Panagiotis Vartholomeos, Evangelos Papadopoulos
National Technical University of Athens, Greece*

A2P-11-11

**THE AIR QUALITY PARADIGM INSIDE CAR MICROENVIRONMENTS: BALANCING BETWEEN
PM2.5 AND CO2 OFFSETS**

*Jelle Hofman, Valerio Panzica La Manna
IMEC, Netherlands*

12:30 – 14:00

BIL-01: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES II

Session Chair: Cagla Özsoy Özsoy, ETH Zurich

12:30

ARTEFACT-SUPPRESSING ANALOG SPIKE DETECTION CIRCUIT FOR FIRING-RATE MEASUREMENTS IN CLOSED-LOOP RETINAL NEUROSTIMULATORS

*Andreas Erbslöh^{2}, Reinhard Viga^{2}, Karsten Seidl^{1}, Rainer Kokozinski^{1}
^{1}Fraunhofer Institute for Microelectronic Circuits and Systems, Germany; ^{2}University of Duisburg-Essen, Germany*

12:45

PACT CAM: WEARABLE SENSOR SYSTEM TO CAPTURE THE DETAILS OF CIGARETTE SMOKING IN FREE-LIVING

*Masudul Imtiaz, Delwar Hossain, Volkan Senyurek, Prajakta Belsare, Edward Sazonov
University of Alabama, United States*

13:00

WEARABLE MOTION SENSORS AND ARTIFICIAL NEURAL NETWORK FOR THE ESTIMATION OF VERTICAL GROUND REACTION FORCES IN RUNNING

*Salvatore Tedesco^{2}, Eduardo Perez-Valero^{2}, Dimitrios Sokratis Komaris^{2}, Luke Jordan^{1}, John Barton^{2}, Liam Hennessy^{1}, Brendan O'Flynn^{2}
^{1}Setanta College, Ireland; ^{2}Tyndall National Institute, University College Cork, Ireland*

13:15

ANALYSIS OF BODY-INDUCED THERMAL SIGNATURES FOR SOCIAL DISTANCING MONITORING

*Stefano Savazzi^{2}, Vittorio Rampa^{2}, Leonardo Costa^{1}, Denis Tolochenko^{1}
^{1}Cognimade S.r.L., Italy; ^{2}Consiglio Nazionale delle Ricerche CNR-IEIT, Italy*

13:30

A ZERO VELOCITY DETECTOR FOR FOOT-MOUNTED INERTIAL NAVIGATION SYSTEMS AIDED BY DOWNWARD-FACING RANGE SENSOR

*Chi-Shih Jao, Yusheng Wang, Andrei Shkel
University of California, Irvine, United States*

13:45

REAL TIME LEVEL GROUND WALKING VS STAIR-CLIMBING LOCOMOTION MODE DETECTION

*Md Rejwanul Haque, Masudul H Imtiaz, Xiangrong Shen, Edward Sazonov
The University of Alabama, United States*

12:30 – 14:00

BIL-02: SENSORS IN INDUSTRIAL PRACTICES I

Session Chairs: Giuseppe Barillaro, University of Pisa & Alper Bozkurt, North Carolina State University

12:30

LASER RESEAL – COMBINATION OF ACCELEROMETER AND GYROSCOPE SENSORS IN A SINGLE MEMS CHIP

*Holger Rumpf, Jens Frey, Kurt Ritzau, Achim Breitling, Peter Staffeld, Mawuli Ametowobla
Robert Bosch GmbH, Germany*

13:00

A NEW METHOD FOR DETECTING LEAKS IN MEMS ACCELEROMETERS AT WAFER-LEVEL

*Ulrich Baehr^{1}, Marvin Freier^{1}, Matthew Lewis^{1}, Wolfgang Rosenstiel^{2}, Oliver Bringmann^{2}
^{1}Bosch GmbH, Germany; ^{2}University of Tuebingen, Germany*

13:15

UAS: IOT ON-LINE SENSORS FOR POWER LINE INSPECTION

*Pablo Medrano^{1}, Jesus Villadangos^{2}, Jose Javier Astrain^{2}
^{1}FuVeX, Spain; ^{2}Public University of Navarre, Spain*

13:30

RADAR-BASED SITUATIONAL AWARENESS FOR INDUSTRIAL SAFETY APPLICATIONS

*Philipp Sommer, Anton Rigner, Martin Zlatanski
ABB, Switzerland*

13:45

ENHANCED PROPERTIES OF AEROSOL JET PRINTED PZT: TOWARDS REALIZING FLEXIBLE AUTOMOTIVE SENSORS

*Ahmed Alfadhel^{1}, Jing Ouyang^{2}, Denis Cormier^{2}, David Borkholder^{2}
^{1}Research Products Development Company, Saudi Arabia; ^{2}Rochester Institute of Technology, United States*

12:30 – 14:00

BIL-04: CHEMICAL, ELECTROCHEMICAL & GAS SENSORS II

Session Chairs: Thomas Thundat, University of Buffalo & Marios Sophocleous, University of Cyprus

12:30

PENCIL GRAPHITE NEEDLE-SHAPED BIOSENSOR FOR ANAESTHETIC MONITORING IN HUMAN SERUM

*Simone Aiassa^{2}, Sinan Yilmaz^{1}, Sandro Carrara^{1}, Danilo Demarchi^{2}
^{1}École Polytechnique Fédérale de Lausanne, Switzerland; ^{2}Politecnico di Torino, Italy*

12:45

EFFECT OF LIGHT ACTIVATION ON CHEMICAL GAS SENSORS BASED ON ALIGNED NANOWIRES

*Camilla Baratto^{1}, Viktoria Golovanova^{5}, Guido Faglia^{2}, Thi Thanh Le Dang^{4}, Hanna Hakola^{3}, Tapio Niemi^{3}, Nikolai Tkachenko^{3}, Bohgan Nazarchurk^{5}, Vyacheslav Golovanov^{5}
^{1}CNR-INO, Sphera Group Brescia, Italy; ^{2}DII-University of Brescia, Italy; ^{3}Faculty of Engineering and Natural Sciences, Tampere University, Finland; ^{4}ITIMS-Hanoi University of Science and Technology, Vietnam; ^{5}South Ukrainian National University*

13:00

GLYCEROL CONCENTRATION MONITORING USING HIGH-RESOLUTION NON-CONTACT RF SENSOR

*Zahra Abbasi, Masoud Baghelani, Mojgan Daneshmand
University of Alberta, Canada*

13:15

A HIGHLY STABLE CA²⁺ ION-SELECTIVE FLEXIBLE SENSOR BASED ON TREATED PEDOT: PSS TRANSDUCING LAYER

*Chani Park, Hyosang Yoon, Md Abu Zahed, Jaeyeong Park
Kwangwoon University, Korea; Kwangwoon University, Bangladesh*

13:30

BATIO₃ SENSITIVE FILM ENHANCEMENT FOR CO₂ DETECTION

*Fabien Le Pennec, El Halabi Amine, Sandrine Bernardini, Carine Perrin-Pellegrino, Khalifa Aguir, Marc Bendahan
Aix Marseille Univ IM2NP, France*

13:45

A CHEMIREISTIVE CO₂ SENSOR BASED ON CNT-FUNCTIONAL POLYMER COMPOSITE FILMS

*Zachary Siefker^{1}, Abhi Boyina^{1}, James Braun^{1}, Xikang Zhao^{2}, Bryan Boudouris^{2}, Nikhil Bajaj^{3}, George Chiu^{3}, Jeffrey Rhoads^{3}
^{1}Ray W. Herrick Laboratories and School of Mechanical Engineering, Purdue University, United States; ^{2}Charles D. Davidson School of Chemical Engineering, Purdue University, United States; ^{3}Ray W. Herrick Laboratories, Birck Nanotechnology Center, and School of Mechanical Engineering, Purdue University, United States*

12:30 – 14:00

BIL-05: SENSOR NETWORKS II

Session Chairs: Jorge Sá Silva, University of Coimbra & Binbin Chen, Singapore University Of Technology and Design

12:30

SENSOR NETWORK FOR MONITORING LIVESTOCK BEHAVIOUR

*Jinshan Luo^{3}, Atsushi Ito^{3}, Akira Sasaki^{3}, Madoka Hasegawa^{3}, Shiori Ashibe^{3}, Yoshikazu Nagao^{3}, Yuko Hiramatsu^{1}, Kotaro Torii^{1}, Toru Aoki^{2}
^{1}Chuo University, Japan; ^{2}Tochigi Prefecture Dairy Co-operative, Japan; ^{3}Utsunomiya University, Japan*

12:45

IMPROVING LOW POWER LISTENING (LPL) MECHANISM TO SAVE ENERGY CONSUMPTION IN WSN

*Jessye Dos Santos, Guillaume Terrasson, Alvaro Llaría
ESTIA, France*

13:00

KITECAM A NOVEL APPROACH TO LOW-COST AERIAL SURVEILLANCE

*Abhinav Navnit, Deeksha Devendra, Anushka Tiwari, Aftab Hussain
International Institute of Information Technology (IIIT) Hyderabad, India*

13:15

AN EFFICIENT LEARNING METHOD FOR SOUND CLASSIFICATION USING TRANSFER LEARNING FOR HAMMERING TEST

*Tsubasa Fukumura^{4}, Masafumi Koike^{4}, Hayato Aratame^{3}, Katsuhiko Hibino^{2}, Atsushi Ito^{1}, Yoshihisa Kawamura^{2}
^{1}Chuo University, Japan; ^{2}PORT DENSHI Corporation, Japan; ^{3}Tohoku Pioneer Co., Ltd., Japan; ^{4}Utsunomiya University, Japan*

13:30

MONITORING OF ELECTRIC BUSES WITHIN AN URBAN SMART CITY ENVIRONMENT

*Jose Javier Astrain, Francisco Falcone, Antonio Lopez, Pablo Sanchis, Jesus Villadangos, Ignacio Matias
UPNA, Spain*

13:45

SMARTWATCH-BASED HUMAN ACTIVITY RECOGNITION USING HYBRID LSTM NETWORK

*Sakorn Mekruksavanich^{2}, Anuchit Jitpattanakul^{1}
^{1}Faculty of Applied Science, King Mongkut's University of Technology North Bangkok, Thailand; ^{2}School of Information and Communication Technology, University of Phayao, Thailand*

12:30 – 14:00

BIL-06: EMERGING SENSOR APPLICATIONS II

Session Chair: Volker Nock, University of Canterbury

12:30

A LOW-COST CAPACITANCE-BASED NON-DESTRUCTIVE EVALUATION PLATFORM FOR FAST MOVING CONSUMER GOODS (FMCG) INDUSTRIAL APPLICATIONS

*Hari Krishna Salila Vijayalal Mohan, Andrew Alexander Malcolm, Fang Cheng
Advanced Remanufacturing and Technology Centre (ARTC), Singapore*

12:45

PHOTOACOUSTIC SENSING INSTRUMENTATION USING 70 W 905 NM PULSED LASER SOURCE FOR PROTON-INDUCED THERMOACOUSTIC EFFECT EMULATION

*Elia Arturo Vallicelli, Mattia Oliver Cosmi, Giuseppe Chirico, Maddalena Collini, Andrea Baschirotto, Marcello De Matteis
University of Milano - Bicocca, Italy*

13:00

OPTIMIZATION OF PIEZORESISTIVE MOTION DETECTION FOR AMBIENT NEMS APPLICATIONS

*Chaoyang Ti^{3}, Atakan Ari^{3}, Miguel Gonzalez^{1}, Cenk Yanik^{4}, Ismet I Kaya^{4}, M. Selim Hanay^{2}, Kamil L Ekinci^{3}
^{1}Aramco Americas, Aramco Research Center-Houston, United States; ^{2}Bilkent University, Turkey; ^{3}Boston University, United States; ^{4}Sabanci University, Turkey*

13:15

OPTIMIZING NOVEL INORGANIC SCINTILLATION DETECTORS FOR APPLICATIONS IN MEDICAL PHYSICS

*Kevin Byrne^{2}, Skye Conlan^{2}, Magdalena Bazalova-Carter^{1}, Mark Foley^{2}
^{1}Department of Physics & Astronomy, University of Victoria, Canada; ^{2}School of Physics, National University of Ireland Galway, Galway, Ireland, Ireland*

13:30

TEMPERATURE DEPENDENCE OF NOVEL INORGANIC SCINTILLATION DETECTORS

*David Oreilly, Kashan Qayyum, Majed Alharbi, Mark Foley
School of Physics, National University of Ireland Galway, Galway, Ireland, Ireland*

13:45

CIGARETTE SMOKE EXPOSURE COMPUTATION USING BIOIMPEDANCE SENSOR

*Prajakta Belsare^{2}, Volkan Seyurek^{1}, Masudul Imtiaz^{2}, Edward Sazonov^{2}
^{1}Mississippi State University, United States; ^{2}University of Alabama, United States*

12:30 – 14:00

BIP-08: LIVE DEMONSTRATION

Session Chairs: Behraad Bahreyni, Simon Fraser University & Tao Li,
University of Cincinnati

BIP-08-1

LIVE DEMONSTRATION: SENCU – A POWER-EFFICIENT SENSOR SYSTEM

*Ssu-Ying Chen, Chih-Chyau Yang, Fu-Cheng Cheng, Yu-An Kuo, Jin-Ju Chue,
Chen-Chia Chen, Chien-Ming Wu, Chun-Ming Huang
Taiwan Semiconductor Research Institute, Taiwan*

BIP-08-2

LIVE DEMONSTRATION: PASSIVE SENSOR SETUP FOR ROAD CONDITION MONITORING

*Felix Kortmann^{1}, Julin Horstkötter^{1}, Alexander Warnecke^{1}, Nicolas Meier^{2}, Jens
Heger^{2}, Burkhardt Funk^{2}, Paul Drews^{2}
^{1}HELLA GmbH & Co. KGaA, Germany; ^{2}Leuphana University Luxenburg, Germany*

BIP-08-3

**DYNAMIC GRIP-FORCE CONTROL USING REAL-TIME FRICTION ESTIMATION FROM INCIPIENT
SLIP EVENTS**

*Heba Khamis^{2}, Benjamin Xia^{2}, Stephen Redmond^{1}
^{1}University College Dublin, Ireland; ^{2}UNSW Sydney, Australia*

BIP-08-4

**LIVE DEMONSTRATION: A TRIMODAL TIME-OF-FLIGHT CAMERA FEATURING MATERIAL
SENSING**

*Miguel Heredia Conde^{2}, Thomas Kerstein^{1}, Bernd Buxbaum^{1}, Otmar Loffeld^{2}
^{1}pmdtechnologies ag, Germany; ^{2}University of Siegen, Germany*

12:30 – 14:00

BIP-09: MICROFLUIDICS & BIOSENSORS IV

Session Chair: Leandro Lorenzelli, Fondazione Bruno Kessler (FBK)

BIP-09-1

REUSABLE ACOUSTIC TWEEZERS ENABLE 2D PATTERNING OF MICROPARTICLES IN MICROCHAMBER ON A DISPOSABLE SILICON CHIP SUPERSTRATE

*Jingui Qian, Jifeng Ren, Yi Liu, Raymond H. W. Lam, Joshua E.-Y. Lee
City University of Hong Kong, Hong Kong*

BIP-09-2

IN-LINE MICROELECTRODE ARRAYS FOR IMPEDANCE MAPPING OF MICROPHYSIOLOGICAL SYSTEMS

*Ashlyn Young^{2}, Vladimir Pozdin^{1}, Michael Daniele^{2}
^{1}Florida International University, United States; ^{2}North Carolina State University, United States*

BIP-09-3

ADVANCED CHARACTERISATION OF A SENSOR SYSTEM FOR DROPLET-BASED MICROFLUIDICS

*Max Bartunik^{2}, Marco Fleischer^{2}, Werner Haselmayr^{1}, Jens Kirchner^{2}
^{1}Institute for Communications Engineering and RF-Systems, Johannes Kepler University Linz (JKU), Austria; ^{2}Institute for Electronics Engineering, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany*

BIP-09-4

MICROWAVE ABLATION APPLICATOR WITH TUMOR DETECTION ABILITY

*Markus Kochanek^{1}, Carolin Hessinger^{1}, Martin Schüßler^{1}, Rolf Jakoby^{1}, Frank Hübner^{2}, Thomas J. Vogl^{2}
^{1}Technical University of Darmstadt, Germany; ^{2}University Hospital Frankfurt, Germany*

BIP-09-5

DEVELOPMENT OF A FLEXIBLE AND WIRELESS ECG MONITORING DEVICE

*Dinesh Maddipatla, Lucas Bonek, Stephen Fenech, Nicholas Sapoznik, Anthony Hanson, Simin Masihi, Masoud Panahi, Massood Atashbar
Western michigan University, United States*

BIP-09-6

A HANDHELD DETECTION BIOSENSOR FOR RESPIRATORY PATHOGENS IN YOUNG CHILDREN

*Amal Kabalan, Ziqi Qu
Bucknell University, United States*

12:30 – 14:00

BIP-10: SENSOR LETTERS / SENSOR JOURNAL PAPERS

BIP-10-1

INVESTIGATION OF CHARGE PLASMA ENHANCED TUNNEL FIELD EFFECT TRANSISTOR FOR HYDROGEN GAS SENSING APPLICATION

*Debapriya Som^{1}, Budhaditya Majumdar^{2}, Souvik Kundu^{1}, Sayan Kanungo^{1}
^{1}BITS-Pilani, Hyderabad Campus, India; ^{2}Macquarie University, Australia*

BIP-10-2

INDUCTIVE ENERGY HARVESTING FROM CURRENT-CARRYING STRUCTURES

*Steven Wright^{1}, Michail Kiziroglou^{1}, Sasa Spasic^{2}, Nebojsa Radosevic^{2}, Eric Yeatman^{1}
^{1}Imperial College London, United Kingdom; ^{2}SENIS A. G., Switzerland*

BIP-10-3

PERSON IDENTIFICATION BASED ON MICRO-DOPPLER SIGNATURES OF SIT-TO-STAND AND STAND-TO-SIT MOVEMENTS USING A CONVOLUTIONAL NEURAL NETWORK

*Kenshi Saho, Keisuke Inuzuka, Keitaro Shioiri
Toyama Prefectural University, Japan*

BIP-10-4

INTELLIGENT MATERIAL CLASSIFICATION AND IDENTIFICATION USING A BROADBAND MILLIMETER-WAVE FREQUENCY COMB RECEIVER

*Babak Jamali, Deeban Ramalingam, Aydin Babakhani
University of California, Los Angeles, United States*

BIP-10-5

COHERENT RADIATION FROM A SWARM OF WIRELESSLY POWERED AND SYNCHRONIZED SENSOR NODES

*Hamed Rahmani, Yuxiang Sun, Mohit Kherwa, Suparno Pal, Aydin Babakhani
UCLA, United States*

BIP-10-6

TOWARDS A MACHINE-LEARNING-ASSISTED DIELECTRIC SENSING PLATFORM FOR POINT-OF-CARE WOUND MONITORING

*Hamed Rahmani, Maani Archang, Babak Jamali, Mahdi Forghani, Aaron Ambrus, Deeban Ramalingam, Zhengyang Sun, Philip Scumpia, Hilary Collier, Aydin Babakhani
UCLA, United States*

BIP-10-7

INCORPORATING A NOVEL HEXAAZATRIPHENYLENE DERIVATIVE TO A FLEXIBLE SCREEN-PRINTED ELECTROCHEMICAL SENSOR FOR COPPER ION DETECTION IN WATER SAMPLES

*Dinesh Maddipatla^{2}, Tahseen Saeed^{2}, Binu Narakathu^{2}, Sherine Obare^{1}, Massood Atashbar^{2}
^{1}University of North Carolina at Greensboro, United States; ^{2}Western Michigan University, United States*

BIP-10-8

NON-CONTACT VITAL SIGNS MONITORING THROUGH VISIBLE LIGHT SENSING

*Hisham Abuella, Sabit Ekin
Oklahoma State University, United States*

BIP-10-9

A PIEZOELECTRIC MN-DOPED PMN-PT/METGLAS MAGNETOELECTRIC GYRATOR: ENHANCED POWER EFFICIENCY AT REDUCED SIZE

*Xin Zhuang^{1}, Min Gao^{3}, Xiao Tang^{3}, Chung-Ming Leung^{3}, Junran Xu^{3}, Gopalan Srinivasan^{2}, Jiefang Li^{3}, Haosu Luo^{1}, Dwight Viehland^{3}
^{1}Chinese Academy of Sciences, China; ^{2}Oakland University, United States; ^{3}Virginia Tech, United States*

BIP-10-10

A LOW-VOLTAGE, LOW-CURRENT, DIGITAL-DRIVEN MEMS MIRROR FOR LOW-POWER LIDAR

*Dingkang Wang^{2}, Lenworth Thomas^{2}, Sanjeev Koppal^{2}, Yingtao Ding^{1}, Huikai Xie^{1}
^{1}Beijing Institute of Technology, China; ^{2}University of Florida, United States*

BIP-10-11

EXPERIMENTAL CHARACTERIZATION OF A PIEZOELECTRIC LEAF-CELL SENSOR FOR SIMULTANEOUS FLUID DENSITY AND SOUND SPEED MEASUREMENT

*Dwight Swett
Aramco Americas, United States*

12:30 – 14:00

BIP-11: PHYSICAL SENSORS I

Session Chairs: Hanseup Kim, University of Utah & Giacomo Langfelder, Politecnico di Milano

BIP-11-1

ADVANCED CAPACITOR ARRANGEMENT FOR ENHANCED SPATIAL RESOLUTION IN TACTILE SENSORS

*Shi-Yu Ke, Yu-Wen Chen, Rongshun Chen, Cheng-Yao Lo
National Tsing Hua University, Taiwan*

BIP-11-2

SENSITIVITY AND RESONANCE FREQUENCY EVALUATIONS FOR A CANTILEVER TYPE HETERO-CORE FIBER OPTIC ACCELEROMETER

*Akihito Matsuo, Miyuki Kadokura, Hiroshi Yamazaki, Michiko Nishiyama, Kazuhiro Watanabe
SOKA University, Japan*

BIP-11-3

DESIGN METHODOLOGY OF SQUARE WAVE EXCITED RING CORE FOR FLUXGATE SENSOR

*Laurent Malané^{2}, Jean-Baptiste Kammerer^{2}, Luc Hébrard^{2}, Vinciane Chereau^{1}
^{1}ECA-Robotics, France; ^{2}Laboratoire ICUBE / University of Strasbourg, France*

BIP-11-4

DEVELOPMENT OF VIBRATION SENSOR USING GIANT MAGNETOSTRICTIVE MATERIAL FOR SELF-POWERED STRUCTURAL HEALTH MONITORING SYSTEM

*Shinji Koganezawa^{2}, Tomotake Ishii^{1}, Hiroshi Tani^{2}, Renguo Lu^{2}, Norio Tagawa^{2}
^{1}Graduate School of Kansai University, Japan; ^{2}Kansai University, Japan*

BIP-11-5

GIANT HUMIDITY RESPONSIVENESS OF PLATINUM FUNCTIONALIZED WS₂ NANOSHEET BASED CHEMIREISTORS

*Aashi Gupta^{2}, Neha Sakhuja^{2}, Ravindra Jha^{1}, Navakanta Bhat^{3}
^{1}Central Electronics Engineering Research Institute (CEERI), Pilani, Rajasthan, India; ^{2}Indian Institute of Science, India; ^{3}Indian Institute of Science (IISc), India*

BIP-11-6

SOFT TACTILE SENSOR DETECTING AIR-WATER INTERFACE

*Tatsuya Usui, Hiroki Ishizuka, Takumi Kawasetsu, Koh Hosoda, Sei Ikeda, Osamu Oshiro
Osaka University, Japan*

BIP-11-7

FREQUENCY CHARACTERISTICS OF HETERO-CORE FIBER ACCELEROMETER WITH TWO ORTHOGONAL VIBRATIONAL MODES OF AN ARCH SHAPE BEAM STRUCTURE

*Miyuki Kadokura, Hiroshi Yamazaki, Michiko Nishiyama, Kazuhiro Watanabe
SOKA University, Japan*

BIP-11-8

THICKNESS MEASUREMENT OF CURVED-SURFACE BIOLOGICAL TISSUE WITH AIR GAP ELIMINATION BY TRIPLE-RING COMPLEMENTARY SPLIT-RING RESONATORS

*Yao-Hui Wang, Chin-Lung Yang
National Cheng-Kung University, Taiwan*

BIP-11-9

GIANT SENSITIVITY THROUGH FULLY-PASSIVE AND CHIP-LESS PARAMETRIC TEMPERATURE SENSORS

*Hussein Hussein, Cristian Cassella
Northeastern University, United States*

BIP-11-10

DEVELOPMENT OF HIGH-PRECISION CRYOGENIC NUCLEAR MAGNETIC RESONANCE PROBE BASED ON THE TECHNOLOGY OF LIQUID NITROGEN FLOW CONTROL

*Qingsong Cai^{2}, Rongsheng Lu^{2}, Jianxiong Hu^{1}, Zhonghua Ni^{2}, Hong Yi^{2}
^{1}Jiangsu Mag-med Medical Technology Co., LTD, China; ^{2}Southeast University, China*

BIP-11-11

A METAPLATE IN MEMS FOR INNOVATIVE APPLICATIONS: VIBRATION ISOLATION AND TUNABLE MECHANICAL FILTERS

*Zhichao Yao^{1}, Valentina Zega^{2}, Yan Su^{1}, Alberto Corigliano^{2}
^{1}Nanjing University of Science and Technology, China; ^{2}Politecnico di Milano, Italy*

BIP-11-12

STUDY OF A MINIATURIZED SANDWICH-LIKE CBT MONITORING SENSOR

*Xianglin Ren, Xuesong Ye, Congcong Zhou
Zhejiang University, China*

BIP-11-13

A MEMS TYPE DAMPING VISCOUS VACUUM GAUGE FOR HIGH VACUUM MEASUREMENT

*Chengxiang Wang, Yulie Wu, Zhanqiang Hou, Yunbin Kuang, Yongmeng Zhang,
Xuezhong Wu, Dingbang Xiao
National University of Defense Technology, China*

BIP-11-14

MAGNETIC FLUX REGULATION LARGELY BOOSTS MAGNETORESISTIVE SENSORS

*Jiafei Hu, Qingfa Du, Mengchun Pan, Peisen Li, Kun Sun, Wei Wang, Junsheng Zhang,
Junping Peng, Weicheng Qiu, Dixiang Chen
National University of Defense Technology, China*

14:00 – 14:15

BREAK

14:15 – 14:30

SENSOR COUNCIL AWARDS

14:30 – 15:30

KEYNOTE TALK 2

15:30 – 16:30

LUNCH // INDUSTRY PANEL DISCUSSION

16:30 – 18:00

B2L-01: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES III

Session Chair: Madhav Rao, IIIT-Bangalore (IIITB)

16:30

EVALUATION OF NEURAL NETWORK ARCHITECTURES FOR CLASSIFICATION OF SONAR ECHOES IN AIR

Patrick Kroh, Jan Mrochen, Stefan Rupitsch

Sensor Technology, University Erlangen-Nürnberg, Germany

16:45

DATA RECOVERY METHOD FOR MLF SIGNALS BASED ON SINC FUNCTION FOR OIL & GAS PIPELINE

Lisha Peng, Songling Huang, Shen Wang, Wei Zhao

Tsinghua University, China

17:00

TOLERANCE COMPENSATION BASED ON GAUSSIAN PROCESSES FOR ANGLE MEASUREMENTS WITH MAGNETIC SENSOR ARRAYS

Thorben Schüthe, Klaus Jünemann, Karl-Ragmar Riemschneider

Hamburg University of Applied Sciences, Germany

17:15

AVOIDING TRANSIENTS IN LOW-LEVEL SENSING OF SECONDARY ELECTRON YIELD

Matthew Vincie, Tod Laurvick, Hengky Chandralim, Richard Cobb, James Sattler

Air Force Institute of Technology, United States

17:30

GROUND TARGET CLASSIFICATION FROM SAR IMAGE WITH THE PIXEL COMPLEMENT FOR TARGET SHAPE

Hongliang Zhu^{2}, Minyi Hon^{4}, Wat Wong^{1}, Rocky Leung^{3}, Nang Lin^{5}, Kinley Lin^{2}

^{1}The Chinese University of Hong Kong, Hong Kong; ^{2}The Chinese University of Hong Kong, Shenzhen, China; ^{3}The University of Tokyo, Japan; ^{4}University of Minnesota, United States; ^{5}Washington University in St. Louis, United States

National Cheng-Kung University, Taiwan

16:30 – 18:00

B2L-02: PHYSICAL SENSORS: MECHANICAL SENSORS

Session Chairs: Sheng-Shian Li, National Tsing Hua University & Reza Abdolvand, University of Central Florida

16:30

CMOS CHIP FOR SOLID-STATE TACTILE FORCE SENSOR

Sheng-Kai Yeh^{1}, Chao-Chun Ning^{2}, Chih-Yuan Yeh^{2}, Sheng-Hsiang Tseng^{2}, Ying-Zong Juang^{2}, Weileun Fang^{1}
^{1}Department of Power Mechanical Engineering, National Tsing Hua University, Hsinchu, Taiwan, Taiwan; ^{2}Taiwan Semiconductor Research Institute, Hsinchu, Taiwan, Taiwan

16:45

DIRECT DEPOSITION OF THIN-FILM STRAIN GAUGES WITH A NEW COATING SYSTEM FOR ELEVATED TEMPERATURES

Rico Ottermann^{2}, Daniel Klaas^{2}, Folke Dencker^{2}, Dominik Hoheisel^{1}, Peter Rottengatter^{1}, Thomas Kruspe^{1}, Marc Christopher Wurz^{2}
^{1}Baker Hughes Inteq GmbH, Germany; ^{2}Institute of Micro Production Technology, Germany

17:00

FULLY 3D PRINTED MECHANICAL PRESSURE SENSORS: A COMPARISON OF SENSING MECHANISMS

Ryan van Dommelen^{1}, Julien Berger^{1}, Rubaiyet Haque^{1}, Marco Binelli^{2}, Gilberto de Freitas Siqueira^{3}, André Studart^{2}, Danick Briand^{1}
^{1}École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; ^{2}Swiss Federal Institute of Technology in Zürich (ETHZ), Switzerland; ^{3}Swiss Federal Laboratories for Materials Science and Technology (EMPA), Switzerland

17:15

AERODYNAMIC WALL PRESSURE MEASUREMENT USING A HIGH TEMPERATURE GRADIENT PIRANI MICRO-SENSOR

Cécile Ghouila-Houri^{1}, Munique Kazar-Mendes^{1}, Thomas Arnoult^{1}, Romain Viard^{3}, Quentin Gallas^{4}, Eric Garnier^{5}, Alain Merlen^{2}, Abdelkrim Talbi^{1}, Philippe Pernod^{1}
^{1}Centrale Lille - IEMN, France; ^{2}IEMN, France; ^{3}JMH Conception, France; ^{4}LMFL, France; ^{5}ONERA, France

17:30

DEVELOPMENT OF A MASS FLOW SENSOR BASED ON LOW TEMPERATURE COFIRE CERAMICS FOR ANALYSIS OF EXHAUST GAS UP TO 500 °C

Carolin Lohrberg^{2}, Christian Lenz^{2}, Lisa Kreher^{4}, Franz Bechtold^{4}, Stefan Carstens^{1}, Gert Springer^{3}, Steffen Ziesche^{2}
^{1}EngineSens Motorsensor GmbH, Germany; ^{2}Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany; ^{3}i2s Intelligente Sensorsysteme Dresden GmbH, Germany; ^{4}VIA electronic GmbH, Germany

17:45

OPTICAL FIBER TIP MICRO ANEMOMETER

Jeremiah Williams^{2}, Joseph Suelzer^{1}, Nicholas Usechak^{1}, Hengky Chandrahilim^{2}
^{1}Air Force Research Laboratory, United States; ^{2}The US Air Force Institute of Technology, United States

16:30 – 18:00

B2L-04: PACKAGING I

Session Chairs: Eric MacDonald, University of Texas & Ravi Selvaganapathy, McMaster University

16:30

PRINTING CONFORMAL ELECTRONICS ON UNCONVENTIONAL SUBSTRATES: EMERGENCE OF NEW CLASS OF DEVICES

*Shweta Agarwala
Aarhus University, Denmark*

17:00

THIN FILM TRANSFERRING VIA PVA SUBSTRATE AND CONTACTING OF SENSOR INSIDE ELASTOMER MATRIX

*Sebastian Bengsch^{2}, Eike Fischer^{2}, Ulrich Giese^{1}, Marc Christopher Wurz^{2}
^{1}Deutsches Institut für Kautschuktechnologie, Germany; ^{2}Leibniz University Hanover, Germany*

17:15

ANISOTROPIC CONDUCTIVE FILM & FLIP-CHIP BONDING FOR LOW-COST SENSOR PROTOTYPING ON RIGID & FLEX PCB

*Serguei Stoukatch^{1}, Nicolas André^{2}, Thibault Delhaye^{2}, Francois Dupont^{1}, Jean-Michel Redouté^{1}, Denis Flandre^{2}
^{1}Liege University, Belgium; ^{2}Université Catholique de Louvain, Belgium*

17:30

SEMI-AUTOMATED PACKAGING OF TRANSDUCER ARRAYS FOR 3D ULTRASOUND COMPUTER TOMOGRAPHY

*Martin Angerer, Michael Zapf, Benjamin Leyrer, Nicole V. Ruiter
Karlsruhe Institute of Technology, Germany*

17:45

A MINIATURE NON-INVASIVE WIRELESS TAIL-CUFF-BASED HEART RATE SENSOR WITH MOTION ARTIFACTS SUPPRESSION FOR REAL-TIME MONITORING OF LABORATORY MICE

*Weijie Luo, Darrin Young
University of Utah, United States*

16:30 – 18:00

B2L-05: SENSORS FOR AGRIFOOD & CONNECTED FARMING II

Session Chairs: Alper Bozkurt, North Carolina State University & Marios Sophocleous, University of Cyprus

16:30

AN INTEGRATED ELECTRONIC INTERFACE FOR BIO-ELECTROCHEMICAL PLANT-BASED SENSORS

Aakash Jog^{2}, Yahav Avigal^{2}, Assaf Avital^{2}, Jayteerth Amble^{2}, Aviv Peled^{1}, Yosi Shacham-Diamand^{2}
^{1}Cartasense Ltd., Israel; ^{2}Tel Aviv University, Israel

16:45

SPATIAL RECONSTRUCTION OF SOIL MOISTURE CONTENT USING NON-CONTACT THERMOACOUSTIC IMAGING

Aidan Fitzpatrick, Ajay Singhvi, Amin Arbabian
Stanford University, United States

17:00

WIRELESS SENSOR NODE PLATFORM FOR IN-PLANT STRESS MONITORING

Affan Abbasi, Marvin Suggs, Logan Walz, Asma Mahar, Ayesha Hassan, Robert Murphree, Sajib Roy, Trenton Roberts, Jia Di, Alan Mantooth
University of Arkansas, United States

17:15

PLANTS AND ENVIRONMENTAL SENSORS FOR SMART AGRICULTURE, AN OVERVIEW

Umberto Garlando^{1}, Lee Bar-On^{2}, Adi Avni^{2}, Yosi Shacham-Diamand^{2}, Danilo Demarchi^{1}
^{1}Politecnico di Torino, Italy; ^{2}Tel Aviv University, Israel

16:30 – 18:00

B2L-06: QUANTUM SENSORS

Session Chairs: Alton Horsfall, University of Durham & Cristian Bonato, Heriot-Watt University

16:30

WIRING UP SILICON-CARBIDE ROOM-TEMPERATURE QUANTUM SYSTEMS

Matthias Niethammer, Raphael Nold, Naoya Morioka, Jawad Ul Hassan, Takeshi Ohshima, Junichi Isoya, Florian Kaiser, Ti...

17:00

ANALYSIS OF PHOTODIODE SENSING DEVICES IN A PHOTONIC INTEGRATED CHIP SOLUTION FOR QUANTUM COMPUTING

*Luca Gemma^{2}, Martino Bernard^{1}, Mher Ghulinyan^{1}, Davide Brunelli^{2}
^{1}FBK Fondazione Bruno Kessler, Italy; ^{2}University of Trento, Italy*

17:15

HIGH TC SUPERCONDUCTING TUNNEL JUNCTIONS FOR CRYOGENIC TEMPERATURE MEASUREMENT

*Krishna Balasubramanian
Indian Institute of Technology Kanpur, India*

16:30 – 18:00

B2P-08: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES VI

Session Chairs: Michael Daniele, NCSU & Francisco Falcone, UPNA

B2P-08-1

A DATA-DRIVEN ARCHITECTURE FOR SENSOR VALIDATION BASED ON NEURAL NETWORKS

*Hossein Darvishi^{2}, Domenico Ciuonzo^{3}, Eivind Rosón Eide^{1}, Pierluigi Salvo Rossi^{2}
^{1}Kongsberg Digital AS, Norway; ^{2}Norwegian University of Science and Technology,
Norway; ^{3}University of Naples "Federico II," Italy*

B2P-08-2

IMPROVEMENT OF ODOR IMPRESSION PREDICTIVE MODEL USING MACHINE LEARNING

*Keisuke Ito, Takamichi Nakamoto
Tokyo Institute of Technology, Japan*

B2P-08-3

OPTICAL SYNCHRONIZATION OF MULTIPLE TIME-OF-FLIGHT CAMERAS IMPLEMENTING TDMA

*Felix Wermke, Thorben Wübbenhorst, Beate Meffert
Humboldt-Universität zu Berlin, Germany*

B2P-08-4

DATA FUSION FOR SUBSEA OIL SPILL DETECTION THROUGH WIRELESS SENSOR NETWORKS

*Gianluca Tabella^{1}, Nicola Paltrinieri^{1}, Valerio Cozzani^{2}, Pierluigi Salvo Rossi^{1}
^{1}NTNU Norwegian University of Science and Technology, Norway; ^{2}University of
Bologna, Italy*

B2P-08-5

SEMI-GRADIENT FOR COLOR PIXEL RECONSTRUCTION IN A RGBZ CMOS SENSOR

*Valentin Rebiere^{1}, Antoine Drouot^{2}, Bertrand Granado^{1}, Arnaud Bourge^{2}, Andrea
Pinna^{1}
^{1}Lip6, France; ^{2}STMicroelectronics, France*

B2P-08-6

**GPU-ACCELERATED TENSOR DECOMPOSITION FOR MOVING OBJECT DETECTION FROM
MULTIMODAL IMAGING**

*Junchi Bin, Meng Kang, Zheng Liu
University of British Columbia, Okanagan Campus, Canada*

B2P-08-7

SURFACE CHARACTERIZATION OF AIRCRAFT INTERIOR PARTS

*Christian Eitzinger, Alexander Walch, Lukas Hartung
Profactor GmbH, Austria*

B2P-08-8

ACQUISITION OF MULTIPLE EVENTS IN DIRECT TIME-OF-FLIGHT LIDAR USING SINGLE-PHOTON AVALANCHE DIODES

*Andre Buchner^{1}, Bedrich Hosticka^{1}, Olaf Schrey^{1}, Jan Frederik Haase^{1}, Jennifer Ruskowski^{1}, Anton Grabmaier^{2}
^{1}Fraunhofer IMS, Germany; ^{2}University of Duisburg-Essen, Germany*

B2P-08-9

COMPRESSIVE SENSING BASED DATA-LOSS RECOVERY ENABLES ROBUST ESTIMATION OF DAMAGE INDEX IN ULTRASONIC STRUCTURAL HEALTH MONITORING

*Shruti Sawant, Sauvik Banerjee, Siddharth Tallur
Indian Institute of Technology Bombay, India*

B2P-08-10

TRANSFER LEARNING FOR NEURONAL NETWORKS DEPLOYED ON THE SENSORS EDGE

*Phil Meier, Kris Rohrmann, Marvin Sandner, Marcus Prochaska
Ostfalia University of Applied Sciences, Germany*

B2P-08-11

RADAR MICRO-DOPPLER-BASED ROTARY DRONE DETECTION USING PARAMETRIC SPECTRAL ESTIMATION METHODS

*Andi Huang^{1}, Bhashyam Balaji^{2}, Sreeraman Rajan^{1}, Pascale Sevigny^{2}
^{1}Carleton University, Canada; ^{2}DRDC, Canada*

B2P-08-12

MAPPING AIR QUALITY IN IOT CITIES: CLOUD CALIBRATION AND AIR QUALITY INFERENCE OF SENSOR DATA

*Jelle Hofman^{1}, Martha E. Nikolaou^{1}, Tien Huu Do^{3}, Xuening Qin^{2}, Esther Rodrigo^{3}, Wilfried Philips^{2}, Nikos Deligiannis^{3}, Valerio Panzica La Manna^{1}
^{1}imec The Netherlands, Netherlands; ^{2}University Ghent, Belgium; ^{3}Vrije Universiteit Brussel, Belgium*

16:30 – 18:00

B2P-09: SENSORS IN INDUSTRIAL PRACTICES II

Session Chairs: Jorge Sá Silva, University of Coimbra & Loes Segerink, University of Twente

B2P-09-1

WHERE IS MY DEER?—WILDLIFE TRACKING AND COUNTING VIA EDGE COMPUTING AND DEEP LEARNING

*Bilal Arshad^{2}, Johan Barthelemy^{1}, Elliott Pilton^{2}, Pascal Perez^{1}
{1}SMART Infrastructure Facility, University of Wollongong, Australia; {2}Wize Dynamics Pty Ltd, Australia*

B2P-09-2

ULTRASOUND-BASED SENSOR FOR NON-INVASIVELY DETECTING OBSTRUCTIONS WITHIN NATURAL GAS PIPELINE

*Philip Stephanou^{1}, David Xu^{2}
{1}Atlas Sensors, United States; {2}Pacific Gas & Electric, United States*

B2P-09-3

COMMERCIAL PRODUCTION OF LOW-K PZT FILM USING SPUTTERING METHOD

*Mario Kiuchi^{1}, Ryoma Miyake^{1}, Shinya Yoshida^{2}, Shuji Tanaka^{2}, Tsuyoshi Takemoto^{1}, Yukitaka Yamaguchi^{1}, Kenji Komaki^{1}
{1}Sumitomo Precision Products Co., Ltd., Japan; {2}Tohoku University, Japan*

B2P-09-4

THE RESOLUTION OF ATAN2-FUNCTION

*Jie Zhou^{2}, Markus Dietrich^{2}, Paul Walden^{2}, Johannes Kolb^{3}, Martin Doppelbauer^{1}
{1}Karlsruhe Institute of Technology, Germany; {2}Schaeffler Automotive Buehl GmbH & Co. KG, Germany; {3}Schaeffler Technologies AG & Co. KG - SHARE at KIT, Karlsruhe, Germany*

16:30 – 18:00

B2P-10: OPTICAL SENSORS IV

Session Chair: Hengky Chandralalim, The US Air Force Institute of Technology

B2P-10-1

NIGHT VISION OBSTACLE DETECTION AND AVOIDANCE BASED ON BIO-INSPIRED VISION SENSORS

Jawad Naveed Yasin^{3}, Sherif A.S. Mohamed^{3}, Mohammad-Hashem Haghbayan^{3}, Jukka Heikkonen^{3}, Hannu Tenhunen^{2}, Muhammad Mehboob Yasin^{1}, Juha Plosila^{3}^{1}King Faisal University, Saudi Arabia; ^{2}KTH Royal Institute of Technology, Sweden; ^{3}University of Turku, Finland

B2P-10-2

FIBER OPTIC SENSOR BASED ON FLUORESCENCE QUENCHING FOR HEAVY METAL DETECTION

Yadira Fuentes-Rubio^{1}, Rene Domínguez-Cruz^{2}, Oscar Baldovino- Pantaleón^{1}, Carlos Ruiz- Zamarreño^{3}, Francisco Arregui^{3}^{1}Autonomous University of Tamaulipas, Mexico; ^{2}Universidad Autónoma de Tamaulipas, Mexico; ^{3}Universidad Publica de Navarra, Spain

B2P-10-3

FAST FBG SENSOR INTERROGATION METHOD BASED ON SILICON MICRORING RESONATORS

*Anna Giacobbe, Lorenzo Tozzetti, Fabrizio Di Pasquale, Stefano Faralli
Scuola Superiore Sant'Anna, Italy*

B2P-10-4

CURRENT SENSOR BASED ON A FIBER BRAGG GRATING COATED BY ELECTROPLATED MAGNETOSTRICTIVE MATERIAL

*Héctor García, Lorena Cebrián, Javier Madrigal, Salvador Sales
Universitat Politècnica de València, Spain*

B2P-10-6

LOW-COST GESTURAL INTERACTION BASED ON MOTION ESTIMATION OF A PROJECTED DOT PATTERN

Heinrich Ruser^{2}, André Kaltenbach^{3}, Lars Mechold^{3}, Felix Obée^{1}, Felix Piela^{1}^{1}August & Piela Konstruktiv GbR, Berlin, Germany; ^{2}Bundeswehr University Munich, Germany; ^{3}Laser Components GmbH, Olching, Germany

B2P-10-7

SIMULTANEOUS MEASUREMENT OF REFRACTIVE INDEX AND TEMPERATURE USING LMR ON PLANAR WAVEGUIDE

*Omar Fuentes, Jesús M. Corres, Ismel Domínguez, Ignacio Del Villar, Ignacio Raúl Matías
Public University of Navarra, Spain*

B2P-10-8

ENHANCED PERFORMANCE SHORT CAVITY BRILLOUIN FIBER RING LASER FOR HIGH-STABILITY BOTDA SENSING

*Leonardo Rossi^{1}, Diego Marini^{1}, Filippo Bastianini^{2}, Gabriele Bolognini^{1}
^{1}Consiglio Nazionale delle Ricerche, Italy; ^{2}Sestosensor srl, Italy*

B2P-10-9

A BULK DRIVEN TRANSIMPEDANCE AMPLIFIER FOR PORTABLE SIPM BASED DETECTORS

*Shahram Hatefi Hesari, Ava Hedayatipour, Mohammad Aminul Haque, Nicole McFarlane
University of Tennessee, Electrical Engineering and Computer Science Department,
United States*

B2P-10-10

COHERENT AND INCOHERENT REGIMES FOR MICROWAVE PHOTONICS FIBER SENSING

*Demetrio Sartiano, Javier Madrigal, Salvador Sales
Universitat Politecnica de Valencia, Spain*

B2P-10-11

FABRICATION AND CHARACTERIZATION OF ARC-INDUCED LONG PERIOD GRATINGS IN OPTICAL FIBERS WITH MICRO-CHANNELS

*Anubhav Srivastava^{2}, Flavio Esposito^{2}, Joao M. B. Pereira^{1}, Stefania
Campopiano^{2}, Agostino Iadicicco^{2}
^{1}RISE Acreo, Sweden; ^{2}University of Naples Parthenope, Italy*

B2P-10-12

RHEUMATOID ARTHRITIS MIRNA BIOMARKER DETECTION BY MEANS OF LMR BASED FIBER-OPTIC BIOSENSOR

*José Javier Imas^{2}, Carlos Ruiz-Zamarreño^{2}, Pablo Zubiarte^{2}, Javier Campión^{1},
Lorena Sánchez-Martín^{1}, Ignacio Raúl Matías^{2}
^{1}Making Genetics S.L., Spain; ^{2}Public University of Navarra (UPNA), Spain*

B2P-10-13

OPTICAL FIBER REFRACTIVE INDEX SENSOR BASED ON THE SPR USING A MULTIPLE D-SHAPED AG NANOWIRE

*Riadh A.Kadhim^{3}, Al-Hemeary Nawar^{1}, Abdul Kareem K.Abdul^{4}, Liming Yuan^{3},
Jiang Wu^{2}
^{1}Pazmany Peter Catholic University, Hungary; ^{2}University of Electronic Science and
Technology of China (UESTC, China); ^{3}University of Electronic Science and Technology
of China (UESTC), China; ^{4}University of Technology, Iraq*

B2P-10-14

OPTICAL MEMS ACCELEROMETER BASED ON WAVEGUIDE BRAGG GRATING INTEGRATED WITH CRAB-LEG BEAM

*Balasubramanian Malayappan^{1}, Narayan Krishnaswamy^{2}, Prasant Kumar Pattnaik^{1}
^{1}BITS-Pilani, Hyderabad Campus, India; ^{2}Sai Vidya Institute of Technology, Bengaluru,
India, India*

B2P-10-15

SEARCHING FOR GRAVITATIONAL WAVES WITH OPTICALLY LEVITATED NANOSENSORS

*Eric Howard
Macquarie University, Australia*

16:30 – 18:00

B2P-11: EMERGING SENSOR APPLICATIONS V

Session Chair: Volker Nock, University of Canterbury

B2P-11-1

THE IMPACT OF FIRST METATARSOPHALANGEAL ANGLE ON THE GAIT FEATURES MEASURED BY AN IN-SHOE MOTION SENSOR

Chenhui Huang^{1}, Kenichiro Fukushi^{1}, Zhenwei Wang^{1}, Hiroshi Kajitani^{1}, Hannah Pokka^{2}, Hiroko Narasaki^{2}, Fumiyuki Nihey^{1}, Hiroaki Nakano^{2}, Kentaro Nakahara^{1}^{1}Biometrics Research Labs, NEC Corp., Japan; ^{2}Business Innovation Unit, NEC Corp., Japan

B2P-11-2

SURFACE EMG SIGNAL CLASSIFICATION FOR UNSUPERVISED MUSICAL KEYBOARD LEARNING APPLICATION

Sharmila Mani^{2}, Vinay C K^{1}, Pon Deepika^{1}, Madhav Rao^{1}^{1}International Institute of Information Technology Bangalore, India; ^{2}Samsung Research India, Bangalore, India

B2P-11-3

EVALUATION OF PERSONALLY WORN AND CEILING-BASED SENSORS IN CIRCADIAN RHYTHM MONITORING

*Charikleia Papatsimpa
Eindhoven University of Technology, Netherlands*

B2P-11-4

IMPEDANCE-OPTICAL DUAL-MODAL SENSOR AND IMAGE RECONSTRUCTION FOR CELL SPHEROIDS IMAGING

*Zhe Liu, Xiaozhou Kang, Pierre Bagnaninchi, Yunjie Yang
The University of Edinburgh, United Kingdom*

B2P-11-5

CONTACT FORCE ESTIMATION FROM RAW PHOTOPLETHYSMOGRAM SIGNAL

*Pascal Fortin, Jeffrey Blum, Antoine Weill-Duflos, Jeremy Cooperstock
Shared Reality Lab, McGill University, Canada*

B2P-11-6

MICROMETER-THIN SOI SENSORS FOR E-SKIN APPLICATIONS

Wei Peng^{1}, Nicolas André^{2}, Xi Zeng^{2}, Iman Sabri Alirezaei^{2}, Guoli Li^{1}, Mohamed Bouterfa^{2}, Laurent Francis^{2}, Denis Flandre^{2}^{1}Hunan University, China; ^{2}Université catholique de Louvain, Belgium

B2P-11-7

AN IOT BASED LOW-COST HEART RATE MEASUREMENT SYSTEM EMPLOYING PPG SENSORS

*Lena Gohlke, Frederik Dreyer, Monica Pimiento Álvarez, Jens Anders
Institute of Smart Sensors, University of Stuttgart, Germany*

B2P-11-8

A NOVEL APPROACH TO EEG NEUROFEEDBACK VIA REINFORCEMENT LEARNING

*Aman Bhargava, Kyle O'Shaughnessy, Steve Mann
MannLab Canada, Canada*

B2P-11-9

3D PRINTED WEARABLE EXOSKELETON HUMAN-MACHINE INTERFACING DEVICE

Radu Chirila^{1}, Markellos Ntagios^{2}, Ravinder Dahiya^{1}^{1}University of Glasgow, United Kingdom; ^{2}University of Glasogow, United Kingdom

B2P-11-10

A MINIATURE WEARABLE MICROPHONE SENSOR FOR CARDIOPULMONARY MONITORING

*Vivian Koh, Rex Tan, Yi Yang Ang
AEvice Health Pte Ltd, Singapore*

12:30 – 14:00

CIL-01: ACTUATORS & SENSOR POWER SYSTEMS I

Session Chair: Behraad Bahreyni, Simon Fraser University

12:30

FUNCTIONAL METAMATERIALS ENABLED BY MICROSYSTEMS

Xin Zhang

Boston University, United States

13:00

EMBEDDED HAPTIC WAVEGUIDES TO IMPROVE TACTILE FEEDBACK: DESIGNING A CUSTOM 3D-PRINTED SURFACE TO ENHANCE SIGNAL MEDIATION

Ahmed Farooq^{3}, Hong Tan^{2}, Antoine Weill-Duflos^{1}, Jeremy Cooperstock^{1}, Roope Raisamo^{3}

^{1}McGill University, Canada; ^{2}Purdue University, United States;

^{3}Tampere University, Finland

13:15

TACTILE SENSOR ARRAY LADEN 3D-PRINTED SOFT ROBOTIC GRIPPER

Jacob Nichols Cook, Abhishek Sabarwal, Harley Clewer, William Navaraj

Nottingham Trent University, United Kingdom

13:30

BUBBLE-INDUCED VOLTAGE GENERATION ON GRAPHENE LAYER

Zhenyu Zhou, Shuxing Bao, Jingjin Shen, Rongqing Xu

Nanjing University of Posts and Telecommunications, China

13:45

MAGNETIC OPHTHALMIC REALIGNMENT SYSTEM FOR EXTRA-OCULAR MUSCLE LOSS TREATMENT

Vida Pashaei^{1}, Michael S. Abrams^{2}, Soumyajit Mandal^{3}

^{1}Case Western Reserve University, United States; ^{2}University Hospitals, United States;

^{3}University of Florida, United States

12:30 – 14:00

CIL-02: MICROFLUIDICS & BIOSENSORS II

Session Chairs: Giuseppe Barillaro, University of Pisa & Loes Segerink, University of Twente

12:30

AN AUTOMATED RAPID TEST FOR VIRAL NANOPARTICLES BASED ON SPATIOTEMPORAL DEEP LEARNING

*Konstantin Wüstefeld, Frank Weichert
TU Dortmund University, Germany*

12:45

TWO-PHOTON POLYMERIZED FLOW SENSOR INTEGRATED IN A MICROFLUIDIC CHANNEL WITH OPTOELECTRONIC READOUT

*Sina Reede, Ingo Eichhorn, Martin Oellers, Andreas Schander, Michael Johannes Vellekoop
Institute for Microsensors, -actuators and -systems (IMSAS),
University of Bremen, Germany*

13:00

DEVELOPMENT OF A MICROFLUIDIC COLORECTAL CANCER CELL CULTURE SYSTEM WITH INTEGRATED OPTICAL SENSORS FOR RAPID PHAGE SELECTION

*Pedro Condalipes^{1}, Pedro Fontes^{1,2}, Katerina Nikolaidou^{1}, Vanda Marques^{2}, Eduardo Brás^{1,4}, Marta Afonso^{2}, Cecília Rodrigues^{2}, João Gonçalves^{2}, Virginia Chu^{1}, João Pedro Conde^{1,3}
^{1}Instituto de Engenharia de Sistemas e Computadores – Microsistemas e Nanotecnologias (INESC MN), Portugal; ^{2}Research Institute for Medicines (iMed. ULisboa), Faculty of Pharmacy, Universidade de Lisboa, Portugal; ^{3}Department of Bioengineering, Instituto Superior Técnico, Universidade de Lisboa, Portugal; ^{4}IBB – Institute for Bioengineering and Biosciences, Instituto Superior Técnico, Universidade de Lisboa, Portugal*

13:15

FIBER OPTIC BIOSENSOR FOR INFLAMMATORY MARKERS BASED ON LONG PERIOD GRATING

*Flavio Esposito^{2}, Lucia Sansone^{1}, Anubhav Srivastava^{2}, Francesco Baldini^{1}, Stefania Campopiano^{2}, Francesco Chiavaioli^{1}, Michele Giordano^{1}, Ambra Giannetti^{1}, Agostino Iadicicco^{2}
^{1}National Research Council of Italy, Italy; ^{2}University of Naples Parthenope, Italy*

13:30

SHAPE EFFECTS OF PLASMONIC GOLD NANOPARTICLES FOR CIRCULATING TUMOR DNA SCREENING

*Amogha Tadimety^{1}, Ziqian Wu^{1}, John Molinski^{1}, Russell Beckerman^{1}, Congran Jin^{1}, Lauren Zhang^{3}, Timothy Palinski^{2}, John X.J. Zhang^{1}
^{1}Dartmouth College Thayer School of Engineering, United States; ^{2}NASA Glenn Research Center, United States; ^{3}The Lawrenceville School, United States*

13:45

MICROSENSOR DEVICE FOR MINIMALLY INVASIVE MEASUREMENT OF MOISTURE STORAGE IN PLANTS SHOOTS

*Fumiya Ino, Kazuma Ishida, Kyohei Terao, Hidekuni Takao, Fusao Shimokawa
Faculty of Engineering Kagawa University, Japan*

12:30 – 14:00

CIL-04: SENSOR PHENOMENOLOGY II

Session Chairs: Ensieh Hosseini, University of Glasgow & Tao Li, University of Cincinnati

12:30

A COMPREHENSIVE MODELLING APPROACH FOR BIO-EDLC SYSTEMS

*Roslyn Massey, Rana Amache, Siziwe Bebe, Ravi Prakash
Carleton University, Canada*

12:45

TOWARDS DRIFT MODELING OF GRAPHENE-BASED GAS SENSORS USING STOCHASTIC SIMULATION TECHNIQUES

*Sebastian Schober^{1}, Cecilia Carbonelli^{1}, Alexandra Roth^{1}, Alexander Zoepfl^{1},
Robert Wille^{2}
^{1}Infinion Technologies AG, Germany; ^{2}Institute for Integrated Circuits, Johannes
Kepler University Linz, Austria*

13:00

A PRELIMINARY MICROWAVE FREQUENCY CHARACTERIZATION OF A NAFION-BASED CHIPLESS SENSOR FOR HUMIDITY MONITORING

*Giada Marchi^{1}, Viviana Mulloni^{1}, Mohammedhusen Manekiya^{2}, Massimo Donelli^{2},
Leandro Lorenzelli^{1}
^{1}Fondazione Bruno Kessler, Italy; ^{2}University of Trento, Italy*

13:15

PIEZOELECTRIC MICROMIRRORS WITH GEOMETRIC AND MATERIAL NONLINEARITIES: EXPERIMENTAL STUDY AND NUMERICAL MODELING

*Andrea Opreni^{1}, Attilio Frangi^{1}, Nicolò Boni^{2}, Gianluca Mendicino^{2}, Massimiliano Merli^{2}, Roberto Carminati^{2}
^{1}Politecnico di Milano, Italy; ^{2}STMicroelectronics, Italy*

13:30

INTERPOLATION BASED REDUCED ORDER MODELLING FOR NON-LINEARITIES IN MEMS

*Giorgio Gobat, Attilio Frangi, Valentina Zega
Politecnico di Milano, Italy*

13:45

THE ANALYSIS OF THE SUBHARMONIC EXCITATION IN A DISK MEMS GYROSCOPE

*Kuo Lu, Qingsong Li, Dingbang Xiao, Xin Zhou, Kai Wu, Yi Xu, Jiangkun Sun, Tao Zhao,
Xuezhong Wu
National University of Defense Technology, China*

12:30 – 14:00

C1L-05: WEARABLE SENSORS FOR TELEMEDICINE

Session Chairs: Omer Oralkan, NC State University & Veena Misra, NC State University

12:30

SUBJECT-INDEPENDENT SLOW FALL DETECTION WITH WEARABLE SENSORS VIA DEEP LEARNING

Xiaoshuai Chen^{1}, Shuo Jiang^{2}, Benny Lo^{1}

^{1}Imperial College London, United Kingdom; ^{2}Shanghai Jiao Tong University, China

12:45

WEARABLE SWEAT RATE SENSORS

*Murat Yokus, Talha Agcayazi, Matt Traenkle, Alper Bozkurt, Michael Daniele
North Carolina State University, United States*

13:00

PORTABLE GAIT LAB: INSTANTANEOUS CENTRE OF MASS VELOCITY USING THREE INERTIAL MEASUREMENT UNITS

Mohamed Irfan Mohamed Refai^{2}, Bert-Jan F. van Beijnum^{2}, Jaap H. Buurke^{1}, Peter H. Veltink^{2}

^{1}Roessingh Research and Development, Netherlands; ^{2}University of Twente, Netherlands

13:15

PRELIMINARY ASSESSMENT OF HUMAN BIOLOGICAL RESPONSES TO LOW-LEVEL OZONE

Alper Bozkurt^{1}, Tahmid Latif^{1}, Laura Gonzalez^{2}, James Dieffenderfer^{1}, Yuwei Liao^{2}, Michelle Hernandez^{3}, Veena Misra^{1}, Edgar Lobaton^{1}

^{1}NC State University, United States; ^{2}SAS Institute Inc., United States; ^{3}University of North Carolina at Chapel Hill, United States

12:30 – 14:00

CIL-06: EMERGING TECHNOLOGIES FOR FLEXIBLE & PRINTED ENERGY AUTONOMOUS SENSING SYSTEMS I

Session Chairs: Almudena Rivadeneyra, University of Granada & Luisa Petti, Free University of Bolzano-Bozen

12:30

EMERGING THERMOELECTRIC GENERATORS BASED ON PRINTED AND FLEXIBLE ELECTRONICS TECHNOLOGY

*Francisco Molina-Lopez
KU Leuven, Belgium*

13:00

ELECTRONIC SKIN WITH ENERGY AUTONOMOUS PROXIMITY SENSING FOR HUMAN-ROBOT INTERACTION

*Pablo Escobedo, Markellos Ntagios, Ravinder Dahiya
University of Glasgow, United Kingdom*

13:15

ELECTRONIC NASAL POD: A 3D PRINTED DEVICE TO FILTER AND ELECTROCHEMICALLY DETECT POLLUTANTS

*Avinash Kothuru, Sanket Goel
BITS Pilani, Hyderabad Campus, India*

13:30

COPPER WIRE BASED ELECTRICAL CONTACTS FOR DIRECT INTERFACING OF STRETCHABLE SENSORS

*Leonardo García-García^{2}, Júlio Costa^{2}, Pasindu Lugoda^{2}, Daniel Roggen^{2}, Niko Muenzenrieder^{1}
^{1}Free University of Bozen-Bolzano, Italy; ^{2}Sensor Technology Research Centre, University of Sussex, United Kingdom*

13:45

LASER-FABRICATED FLEXIBLE NANOGRAFENE-BASED SENSOR FOR PH DETECTION IN SALIVA

*Biresaw Demelash Abera^{3}, Francisco J Romero^{2}, Inmaculada Ortiz-Gomez^{1}, Luisa Petti^{3}, Alfonso Salinas-Castillo^{1}, Diego P Morales^{2}, Paolo Lugli^{3}, Noel Rodriguez^{2}, Almudena Rivadeneyra^{2}
^{1}Department of Analytical Chemistry, University of Granada, Spain; ^{2}Department of Electronics and Computer Technology, University of Granada, Spain; ^{3}Faculty of Science and Technology - Free University of Bolzano, Italy*

12:30 – 14:00

CIP-08: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES VII

Session Chair: Francisco Falcone, UPNA

CIP-08-1

DEEP COMPLEX-VALUED NETWORK FOR EGO-VELOCITY ESTIMATION WITH MILLIMETER-WAVE RADAR

*Hyun-Woong Cho, Sungdo Choi, Young-Rae Cho, Jongseok Kim
Samsung Advanced Institute of Technology, Korea*

CIP-08-2

CHALLENGES ON THE APPLICABILITY OF ADAPTIVE RELEVANCE VECTOR MACHINE FOR IMAGE RECONSTRUCTION IN SOFT-FIELD TOMOGRAPHY

*Daniel Ospina Acero^{2}, Qussai Marashdeh^{1}, Fernando Teixeira^{2}
^{1}Tech4Imaging LLC, United States; ^{2}The Ohio State University, United States*

CIP-08-3

ENHANCEMENT OF OMNI-DIRECTIONAL EMAT SIGNAL USING A OPTIMIZED MAGNETIC CIRCUIT DESIGN

*Zhe Wang, Zaifu Zhan, Shen Wang, Wei Zhao, Songling Huang
Tsinghua University, China*

CIP-08-4

DEVELOPMENT OF MAGNETIC FOOD TEXTURE SENSOR WITH SPRING AND SLIDING MECHANISM

*Kento Kusumi^{2}, Hiroyuki Nakamoto^{2}, Futoshi Kobayashi^{2}, Yuya Nagahata^{1}
^{1}J-Oil Mills, Inc., Japan; ^{2}Kobe University, Japan*

CIP-08-5

A 24MHZ RELAXATION OSCILLATOR USING SINGLE CURRENT MODE COMPARATOR WITH $\pm 1.67\%$ DRIFT FROM -40°C TO $+175^{\circ}\text{C}$ FOR AUTOMOTIVE SENSOR APPLICATION

*Shenjie Wang^{2}, Cesare Ghezzi^{1}, Christian Camp^{2}, Arnaud Laville^{2}
^{1}Meleixs, Switzerland; ^{2}Melexis, Switzerland*

CIP-08-6

SIMULTANEOUS PRESSURE SENSORS MONITORING SYSTEM FOR HAND GESTURES RECOGNITION

*Bilel Ben Atitallah^{3}, Muhammed Bilal Abbasi^{3}, Rim Barioul^{3}, Dhouha Bouchaala^{1},
Nabil Derbel^{2}, Olfa Kanoun^{3}
^{1}Digital Researsh Center of Sfax, Tunisia; ^{2}National Engineering School of Sfax,
Tunisia; ^{3}TU Chemnitz, Germany*

CIP-08-7

UNCERTAINTY CHARACTERIZATION IN ACTIVE SENSOR SYSTEMS WITH DNN-BASED FEEDBACK CONTROL

*Burhan Ahmad Mudassar, Priyabrata Saha, Saibal Mukhopadhyay
Georgia Institute of Technology, United States*

C1P-08-8

UNSUPERVISED DOMAIN ADAPTATION FOR POSITION-INDEPENDENT IMU BASED GAIT ANALYSIS

*Fangzhi Mu, Xiao Gu, Yao Guo, Benny Lo
Imperial College London, United Kingdom*

C1P-08-9

RANDOM FOREST CLASSIFICATION OF FINGER MOVEMENTS USING ELECTROMYOGRAM (EMG) SIGNALS

*Mücahit Findik, Seyma Yilmaz, Mehmet Koseoglu
Hacettepe University, Turkey*

C1P-08-10

A DRY ELECTRODE-BASED ECG SENSOR WITH MOTION ARTIFACTS CANCELLATION AND SIGNAL ANALYSIS FOR HEART IRREGULARITY DETECTION

*Nishat Tarannum Tasneem^{2}, Deepa Kota^{2}, Ifana Mahbub^{2}, Gayatri Mehta^{2},
Kamesh Namuduri^{2}, Ari Cedars^{1}
^{1}Johns Hopkins Medicine, United States; ^{2}University of North Texas, United States*

C1P-08-11

BELIEF FUNCTION FUSION BASED SELF-CALIBRATION FOR NON-DISPERSIVE INFRARED GAS SENSOR

*Yang You, Anran Xu, Tobias Oechtering
KTH Royal Institute of Technology, Sweden, Sweden*

C1P-08-12

HYSTERESIS COMPENSATION OF 3D PRINTED SENSORS USING A POWER LAW MODEL FOR VARIOUS INPUT SIGNALS

*Martijn Schouten, Dimitrios Kosmas, Gijs Krijnen
University of Twente, Netherlands*

12:30 – 14:00

CIP-09: PACKAGING II

Session Chairs: Ravi Selvaganapathy, McMaster University & Eric MacDonald, University of Texas

CIP-09-1

3D PRINTED PACKAGING OF PHOTOVOLTAIC CELLS FOR ENERGY AUTONOMOUS EMBEDDED SENSORS

*Markellos Ntagios, Pablo Escobedo, Ravinder Dahiya
University of Glasgow, United Kingdom*

12:30 – 14:00

CIP-10: CHEMICAL, ELECTROCHEMICAL & GAS SENSORS IV

Session Chairs: Thomas Thundat, University of Buffalo & Marios Sophocleous, University of Cyprus

CIP-10-1

FET-BASED INTEGRATED CHARGE SENSOR FOR ORGAN-ON-CHIP APPLICATIONS

*Hande Aydogmus^{2}, Milica Dostanić^{2}, Mojtaba Jahangiri^{2}, Rajarshi Sinha^{2}, William Fausto Quirós-Solano^{1}, Massimo Mastrangeli^{2}, Pasqualina Maria Sarro^{2}
^{1}BIOND Solutions BV, ECTM, Department of Microelectronics, TU Delft, Netherlands; ^{2}ECTM, Department of Microelectronics, TU Delft, Netherlands*

CIP-10-2

2D LSPR GAS SENSOR WITH AU/AG CORE-SHELL STRUCTURE COATED BY FLUORESCENT DYES

*Kohei Semasa, Fumihiko Sassa, Kenshi Hayashi
Kyushu University, Japan*

CIP-10-3

A FLEXIBLE ELECTROCHEMICAL-PHYSIOLOGICAL EPIDERMAL HYBRID PATCH FOR CHRONIC DISEASE MANAGEMENT

*Sanghyuk Yoon, Hyosang Yoon, Seokgyu Ko, Chani Park, Md Abu Zahed, Jaeyeong Park
Kwangwoon University, Korea*

CIP-10-4

QUARTZ CRYSTAL MICROBALANCE SENSOR BASED ON PEPTIDE ANCHORED SINGLE-WALLED CARBON NANOTUBES FOR HIGHLY SELECTIVE TNT EXPLOSIVE DETECTION

*Jin Wang^{1}, Masayoshi Tanaka^{2}, Mina Okochi^{2}
^{1}Okayama University, Japan; ^{2}Tokyo Institute of Technology, Japan*

CIP-10-5

INVESTIGATION OF THE SELF-CALIBRATION FUNCTION FOR IROX-BASED PH SENSORS

*Paul Marsh^{2}, Fatemeh Mohseni^{2}, J.-C. Chiao^{1}, Hung Cao^{2}
^{1}Southern Methodist University, United States; ^{2}University of California Irvine, United States*

CIP-10-6

IEEE P2520.1 – STANDARD FOR BASELINE PERFORMANCE OF ODOR ANALYSIS DEVICES & SYSTEMS

*James A. Covington^{1}, Susan S. Schiffman^{2}, H. Troy Nagle^{2}
^{1}University of Warwick, United Kingdom; ^{2}North Carolina State University, United States*

12:30 – 14:00

CIP-11: PHYSICAL SENSORS II

Session Chair: Boris Stoeber, The University of British Columbia

CIP-11-1

MICROPOWER OBJECT RANGE AND BEARING SENSOR FOR SMART CONTACT LENSES

Chayanjit Ghosh^{1}, Alex Mastrangelo^{2}, Aishwaryadev Banerjee^{1}, Hanseup Kim^{1}, Carlos H. Mastrangelo^{1}
{1}University of Utah, United States; {2}University of Washington, United States

CIP-11-2

POWER LED JUNCTION TEMPERATURE READOUT CIRCUIT BASED ON AN OFF-THE-SHELF LED DRIVER

Demetrio Iero, Massimo Merenda, Sonia Polimeni, Riccardo Carotenuto, Fortunato Pezzimenti, Sandro Rao, Francesco Giuseppe Della Corte
Mediterranea University of Reggio Calabria, Italy

CIP-11-3

ULTRA-LOW POWER STRESS SENSING BY LEAKAGE CURRENT OF P-N JUNCTIONS

Zhiqiang Feng, Xuefeng He, Junru Li, Shen Li, Zhengguo Shang
Chongqing University, Chile; Chongqing University, China

CIP-11-4

DISRUPTIVE FORCE SENSOR BASED ON LASER-BASED POWDER-BED-FUSION

Romol Chadda^{2}, Johanna Probst^{2}, Claas Hartmann^{2}, Martin Link^{2}, Markus Hessinger^{1}, Eberhard Abele^{2}, Matthias Weigold^{2}, Mario Kupnik^{2}
{1}Core Sensing, Germany; {2}Technische Universität Darmstadt, Germany

CIP-11-5

MICROFABRICATED EDDY-CURRENT SENSORS FOR NON-DESTRUCTIVE TESTING OF THE MICRO GRINDING BURN

Isman Khazi, Andras Kovacs, Ali Zahedi, Ulrich Mescheder, Bahman Azarhoushang
Hochschule Furtwangen University, Germany

CIP-11-6

REAL-TIME DETECTION OF OIL VISCOSITY USING COPLANAR CAPACITIVE SENSORS

Mahdi Saleh^{1}, Imad H. Elhadj^{1}, Daniel Asmar^{1}, Sally Antoun^{2}
{1}American University of Beirut, Lebanon; {2}University of Balamand, Lebanon

CIP-11-7

ALL OPTICAL READOUT SCHEME FOR PHOTOLUMINESCENCE BASED MAGNETIC FIELD SENSORS

Ludwig Horsthemke^{3}, Christian Bischoff^{3}, Peter Glösekötter^{3}, Bernd Burchard^{2}, Robert Staacke^{1}, Jan Meijer^{1}
{1}Applied Quantum Systems Felix-Bloch Institute for Solid-State Physics, Leipzig University, Germany; {2}Elmos Semiconductor AG, Germany; {3}FH Münster, Germany

CIP-11-8

THE DUAL-CRYOGENIC CURRENT COMPARATOR (DCCC) AS A NEW PROTOTYPE CCC FOR BEAMLINE MONITORING

Max Stapelfeld^{3}, Frank Schmidl^{3}, Paul Seidel^{3}, Sabine Stück^{3}, Volker Tympel^{2}, Thomas Stöhlker^{1}, David Haider^{1}, Marcus Schwickert^{1}, Thomas Sieber^{1}, Matthias Schmelz^{5}, T. Schönau^{4}, R. Stolz^{4}
{1}GSI Helmholtz Center for Heavy Ion Research, Germany; {2}Helmholtz Institute Jena, Germany; {3}Institut fuer Festkoerperphysik (IFK) FSU Jena, Germany; {4}Leibniz Institute of Photonic Technology, Germany; {5}Leibniz Institute of Photonic Technology, L

C1P-11-9

MEMS BASED GRAVIMETRIC SENSOR FOR THE DETECTION OF ULTRA-FINE AEROSOL PARTICLES

*Malar Chellasivalingam^{2}, Laxmeesha Somappa^{1}, Adam M. Boies^{2}, Maryam Shojaei Baghini^{1}, Ashwin A. Seshia^{2}
^{1}Indian Institute of Technology Bombay, India; ^{2}University of Cambridge, United Kingdom*

C1P-11-10

EXTENSIVE VALIDATION OF A REAL-TIME TIME DERIVATIVE FILTER FOR QUANTIZED TEMPERATURE MEASUREMENTS

*Alexander Kozlov, Ilya Tarygin
Lomonosov Moscow State University, Russia*

C1P-11-11

HIGH FREQUENCY THIN-FILM PIEZOELECTRIC RESONANT MICRO-ACCELEROMETERS WITH CAPACITIVE MASS-SPRING TRANSDUCER

*Ankesh Todi, Hakhamanesh Mansoorzare, Sina Moradian, Reza Abdolvand
University of Central Florida, United States*

C1P-11-12

IN-SITU SUB-SURFACE STRAIN MEASUREMENT IN DEEP ROLLING PROCESSES

*Daniel Gräbner, Walter Lang
University of Bremen, Germany*

C1P-11-13

HIGH DYNAMIC RANGE DIGITAL FLUXGATE MAGNETOMETER

*David Novotný, Vojtěch Petrucha
CTU FEE Prague, Czech Rep.*

C1P-11-14

WEARABLE FLUIDIC STRAIN SENSOR FOR HUMAN MOTION SENSING

*Chi Tran Nhu^{3}, An Nguyen Ngoc^{3}, Trinh Chu Duc^{3}, Van Dau Thanh^{2}, Tung Bui Thanh^{3}, Chieu Le Van^{1}
^{1}Faculty of Environmental Science, University of Science, Vietnam National University, Hanoi, Vietna, Vietnam; ^{2}Griffith University, Australia; ^{3}Vietnam National University, Ha Noi - University of Engineering Technology, Vietnam*

C1P-11-15

PACKAGED-INDUCED OFFSET DRIFT OF AN ULTRA-LOW PIEZORESISTIVE PRESSURE SENSOR

*Fernando Alfaro
Achen University, Germany*

14:00 – 14:15

BREAK

14:15 – 14:30

SENSOR COUNCIL AWARDS

14:30 – 15:30

KEYNOTE TALK 3

15:30 – 16:30

LUNCH // PANEL DISCUSSION

16:30 – 18:00

C2L-01: SENSOR SYSTEMS: SIGNALS, PROCESSING & INTERFACES IV
Session Chair: Behraad Bahreyni, Simon Fraser University

16:30

MAGNETIC LOCALIZATION OF WIRELESS SENSORS FOR INTERNALLY ILLUMINATED PHOTOREACTORS

David Demetz, Alexander Sutor

UMIT-Private University for Health Sciences, Medical Informatics and Technology, Austria

16:45

A PORTABLE POWER-EFFICIENT PM2.5 SENSOR SYSTEM

Chih-Chyau Yang, Yi-Jie Hsieh, Wei-Lin Lai, Chun-Yu Chen, Jin-Ju Chue, Chien-Ming Wu, Chun-Ming Huang

Taiwan Semiconductor Research Institute, Taiwan

17:00

A LOW NOISE CMOS SENSOR FRONTEND FOR A TMR-BASED BIOSENSING PLATFORM

Ayman Mohamed^{2}, Matthias Schmid^{2}, Asfand Tanwear^{1}, Hadi Heidari^{1}, Jens Anders^{2}

^{1}University of Glasgow, United Kingdom; ^{2}University of Stuttgart, Germany

17:15

DYNAMIC IMPEDANCE MATCHING NETWORK BASED ON REAL-TIME MEASUREMENT OF TRANSDUCER IMPEDANCE FOR HIGH-INTENSITY FOCUSED ULTRASOUND

Jinming Liu, Jingfeng Bai, Cong Yang, Yazhu Chen, Xiang Ji

Biomedical Instrument Institute, School of Biomedical Engineering, Shanghai Jiao Tong University, China

17:30

PIEZOELECTRIC MEMS VIBRATION SENSOR MODULE FOR MACHINING QUALITY PREDICTION

Shyam Trivedi, Ranjith Hosur Ganesh, Tung Shen, Po-Wen Huang, Sheng-Shian Li
National Tsing Hua University, Taiwan

16:30 – 18:00

C2L-02: PHYSICAL SENSORS: MAGNETIC & ELECTRIC DEVICES

Session Chair: Giacomo Langfelder, Politecnico di Milano

16:30

FIRST FOUNDRY THREE-DIMENSIONAL HALL EFFECT SENSOR FOR SYSTEM-ON-CHIP INTEGRATION

Eng Huat Toh, Yongshun Sun, Ping Zheng, Mathew Shajan, Patrick Cao, Mohd Nurul Islam, Jian-Yi Wong, Praveen Arikath, Ruchil Jain, Tam Lyn Tan, Elgin Quek
GLOBALFOUNDRIES, Singapore

16:45

A TUNABLE MAGNET-BASED TACTILE SENSOR FRAMEWORK

Evan Harber, Evan Schindewolf, Vickie Webster-Wood, Howie Choset, Lu Li
Carnegie Mellon University, United States

17:00

STABILIZED MAGNETIC VACUUM USING A ROTATING FLUXGATE SENSOR

Michal Janošek^{1}, Michal Dressler^{1}, Elda Saunderson^{2}
^{1}Czech Technical University in Prague, Czech Rep.; ^{2}South African National Space Agency, South Africa

17:15

SECURITY MONITORING SYSTEM USING MAGNETICALLY-ACTIVATED RFID TAGS

Cihan Ascı, Wei Wang, Sameer Sonkusale
Tufts University, United States

17:30

MAGNETIC FIELD SENSOR BASED ON HYBRID OF MAGNETOSTRICTIVE AND PIEZOELECTRIC MATERIALS

Mohammad Akita Indianto, Masaya Toda, Takahito Ono
Graduate School of Engineering, Tohoku University, Japan

17:45

NON-CONTACT MEASUREMENT OF DC POTENTIALS WITH APPLICATIONS IN STATIC CHARGE IMAGING

Arash Pouryazdan^{2}, Júlio Costa^{2}, Filippo Spina^{2}, Robert J Prance^{2}, Helen Prance^{2}, Niko Münzenrieder^{1}
^{1}Free University of Bozen-Bolzano, Italy; ^{2}University of Sussex, United Kingdom

16:30 – 18:00

C2L-04: BIORESORBABLE & BIODEGRADABLE SENSORS

Session Chairs: Ensieh Hosseini, University of Glasgow & Ravinder Dahiya, University of Glasgow

16:30

BIORESORBABLE AND BIODEGRADABLE ELECTRONICS AND PHOTONICS

*Antonino Amedeo La Mattina, Stefano Mariani, Alessandro Paghi, Martina Corsi, Giuseppe Barillaro
University Of Pisa, Italy*

17:00

BIODEGRADABLE, FLEXIBLE AND TRANSPARENT TACTILE PRESSURE SENSOR BASED ON RUBBER LEAF SKELETONS

*Anastasia Koivikko, Vipul Sharma, Vilma Lampinen, Kyriacos Yiannacou, Veikko Sariola
Tampere University, Finland*

17:15

BIODEGRADABLE AMINO ACID-BASED PRESSURE SENSOR

*Ensieh Hosseini, Ravinder Dahiya
University of Glasgow, United Kingdom*

17:30

DISPOSABLE AND FLEXIBLE SENSOR PATCH FOR A-AMYLASE DETECTION IN HUMAN BLOOD SERUM

*Ravinder Dahiya^{2}, Mitradiip Bhattacharjee^{1}, Pablo Escobedo^{2}
^{1}IISER Bhopal, India; ^{2}University of Glasgow, United Kingdom*

16:30 – 18:00

C2L-05: OPTICAL SENSORS II

Session Chair: Minghong Yang, Wuhan University of Technology

16:30

FIBER BRAGG GRATING SENSORS FOR THERMOMETRY DURING GOLD NANORODS-MEDIATED PHOTOTHERMAL THERAPY IN TUMOR MODEL

*Leonardo Bianchi^{2}, Rachael Mooney^{1}, Yvonne Cornejo^{1}, Caitlyn Hyde^{1}, Emiliano Schena^{4}, Jacob Berlin^{3}, Karen Aboody^{1}, Paola Saccomandi^{2}
^{1}Department of Developmental & Stem Cell Biology, Beckman Research Institute at City of Hope, United States; ^{2}Department of Mechanical Engineering, Politecnico di Milano, Italy; ^{3}Department of Molecular Medicine, Beckman Research Institute at City of Hope, United States; ^{4}Università Campus Bio-Medico di Roma, Italy*

16:45

4000 SERIAL FBG SENSORS INTERROGATED WITH A HYBRID CDM-WDM SYSTEM

*Marek Götten^{3,4}, Steffen Lochmann^{3}, Andreas Ahrens^{3}, Eric Lindner^{2}, Johan Vlekken^{1}, Jan Van Roosbroeck^{1}
^{1}FBGS International NV, Belgium; ^{2}FBGS Technologies GmbH, Germany; ^{3}Hochschule Wismar, Germany; ^{4}Universidad Politécnica de Madrid, Spain*

17:00

EXPLOITING CHLOROPHYLL FLUORESCENCE FOR BUILDING ROBUST LOW-COST MOWING AREA DETECTORS

*Nils Rottmann, Ralf Bruder, Achim Schweikard, Elmar Rueckert
University of Luebeck, Germany*

17:15

FIBER OPTIC SENSORS FOR DISTRIBUTED AND QUASI-DISTRIBUTED TEMPERATURE MEASUREMENT

*Sanzhar Korganbayev, Martina De Landro, Federica Morra, Alfredo Cidaga, Paola Saccomandi
Department of Mechanical Engineering, Politecnico di Milano, Italy*

17:30

SILICON PHOTONICS ENABLED ON-CHIP OPTICAL READOUT OF PIEZOMEMS RESONATORS

*Viphretuo Mere, Sudhanshu Tiwari, Aneesh Dash, Rakshitha Kallega, Akshay Naik, Rudra Pratap, Shankar Kumar Selvaraja
Indian Institute of Science, India*

16:30 – 18:00

C2L-06: EMERGING SENSOR APPLICATIONS III

Session Chair: Pal Varga, Budapest University of Technology and Economics

16:30

STATIONARY LIDAR SENSORS FOR INDOOR QUADCOPTER LOCALIZATION

Marcell Rausch, Gabor Feher

Budapest University of Technology and Economics, Hungary

16:45

COMPARISON OF 2D LOCALIZATION USING RADAR AND LIDAR IN LONG CORRIDORS

Alan Zhang, Mohamed Atia

Carleton University, Canada

17:00

SENSOR SYSTEM AND SIGNAL PROCESSING FOR AUTOMATED BLADE COLLISION DETECTION ON WIND TURBINES

Kyle Clocker, Matthew Johnston

Oregon State University, United States

17:15

ASL RECOGNITION BASED ON KINEMATICS DERIVED FROM A MULTI-FREQUENCY RF SENSOR NETWORK

Sevgi Gurbuz^{2}, Ali Gurbuz^{1}, Evie Malaia^{2}, Darrin Griffin^{2}, Chris Crawford^{2}, Emre Kurtoglu^{2}, Mohammed Rahman^{2}, Ridvan Aksu^{2}, Robiulhossain Mdrafi^{1}

^{1}Mississippi State University, United States; ^{2}The University of Alabama, United States

17:30

NEAR-INFRARED, DEPTH, MATERIAL: TOWARDS A TRIMODAL TIME-OF-FLIGHT CAMERA

Miguel Heredia Conde^{2}, Thomas Kerstein^{1}, Bernd Buxbaum^{1}, Otmar Loffeld^{2}

^{1}pmdtechnologies ag, Germany; ^{2}University of Siegen, Germany

17:45

AN ACCELEROMETER BASED EYEGLASS TO MONITOR FOOD INTAKE IN FREE-LIVING AND LAB ENVIRONMENT

Arun Arun, Sharmistha Bhadra

McGill University, Canada

16:30 – 18:00

C2P-08: ACTUATORS & SENSOR POWER SYSTEMS II

Session Chair: Reza Abdolvand, University of Central Florida

C2P-08-1

4X4 FINGERTIP TACTILE MATRIX ACTUATOR WITH EDGE DETECTION SCANNING ROI SIMULATOR

*Alexander Abad, Daniel Swarup, David Reid, Anuradha Ranasinghe
Liverpool Hope University, United Kingdom*

C2P-08-2

WATER-BASED PRIMARY CELL FOR POWERING OF WIRELESS SENSORS

*Dmitry Petrov, Ulrich Hilleringmann
Paderborn University, Germany*

C2P-08-3

A BELL-INSPIRED PIEZOELECTRIC KINETIC ENERGY HARVESTER

*Xuefeng He, Hongjiang Zhang, Senlin Jiang
Chongqing University, China*

C2P-08-4

ROTOR-INDUCED AIRFLOW FOR ODOR SOURCE DETECTION ON NANO-QUADCOPTERS

*Alexander Castro, Leo Peckerar, Pamela Abshire, Timothy Horiuchi
University of Maryland College Park, United States*

C2P-08-5

OPTIMUM MPPT STRATEGY FOR LOW-POWER PENDULUM-TYPE WAVE ENERGY CONVERTERS

*Matias Carandell, Daniel Mihai Toma, Joaquín del Río, Manel Gasulla
Universitat Politecnica de Catalunya, Spain*

16:30 – 18:00

C2P-09: SENSORS FOR AGRIFOOD & CONNECTED FARMING III

Session Chairs: Alper Bozkurt, North Carolina State University & Marios Sophocleous, University of Cyprus

C2P-09-1

FEASIBILITY STUDY OF WATER STRESS DETECTION IN PLANTS USING A HIGH-THROUGHPUT LOW-COST SYSTEM

Rafael Luiz Da Silva, Nathan Starliper, Dinesh Bhosale, Matthew Taggart, Rakshita Ranganath, Trupti Sarje, Michael Daniele, Alper Boskurt, Thomas Rufty, Edgar Lobaton North Carolina State University, United States

C2P-09-2

A VERSATILE, STAND-ALONE SYSTEM FOR A SCREEN-PRINTED, SOIL-SENSING ARRAY FOR PRECISION AGRICULTURE

Marios Sophocleous, Andreas Karkotis, Julius Georgiou University of Cyprus, Cyprus

C2P-09-3

TOWARDS SOLID-STATE, THICK-FILM K⁺ AND NA⁺ ION SENSORS FOR SOIL QUALITY ASSESSMENT

Marios Sophocleous^{2}, Laura Contat-Rodrigo^{1}, Eduardo García-Breijo^{1}, Julius Georgiou^{2}^{1}Universitat Politècnica de València, Spain; ^{2}University of Cyprus, Cyprus

C2P-09-4

LOW-COST SMART CAMERA SYSTEM FOR WATER STRESS DETECTION IN CROPS

Paula Ramos- Giraldo^{1}, S. Chris Reberg-Horton^{1}, Steven Mirsky^{2}, Edgar Lobaton^{1}, Anna M. Locke^{2}, Esleyther Henriquez^{1}, Ane Zuniga^{1}, Artem Minin^{1}^{1}NCSU, United States; ^{2}USDA-ARS, United States

16:30 – 18:00

C2P-10: EMERGING TECHNOLOGIES FOR FLEXIBLE & PRINTED ENERGY AUTONOMOUS SENSING SYSTEMS II

Session Chairs: Luisa Petti, Free University of Bolzano-Bozen & Almudena Rivadeneyra, University of Granada

C2P-10-1

SELECTIVE LASER SINTERING OF BLADE-COATED THERMOELECTRIC MATERIALS WITH TUNABLE THICKNESS

*Yuan Tian, Kostadin Loskoski, Sebastian Meyers, Brecht Van Hooreweder, Francisco Molina-Lopez
KU Leuven, Belgium*

C2P-10-2

TEMPERATURE SENSING BY LASER REDUCED GRAPHENE OXIDE AT DIFFERENT LASER POWER LEVELS

*Francisco J Romero{2}, Inmaculada Ortiz-Gomez{1}, Alfonso Salinas-Castillo{1}, Diego P Morales{2}, Noel Rodriguez{2}, Almudena Rivadeneyra{2}
{1}Department of Analytical Chemistry, University of Granada, Spain; {2}Department of Electronics and Computer Technology, University of Granada, Spain*

16:30 – 18:00

C2P-11: WEARABLE SENSORS FOR REMOTE HEALTH MONITORING

Session Chairs: Veena Misra, NC State University & Omer Oralkan, NC State University

C2P-11-1

WIRELESS SYNCHRONOUS CARBON NANOTUBE-PATCH MECHANOMYOGRAPHY OF LEG MUSCLES

Dedy Wicaksono^{1}, James Soetjipto^{1}, Fuad Ughi^{1}, Aulia Iskandar^{1}, Farida Santi^{2}, Vitriana Biben^{2}

^{1}Swiss German University, Indonesia; ^{2}University of Padjadjaran, Indonesia

C2P-11-2

A LOW-COST LUNG MONITORING POINT-OF-CARE DEVICE BASED ON A FLEXIBLE PIEZORESISTIVE FLOW SENSOR

Uttariyo Saha, Amar Kamat, Debarun Sengupta, Bayu Jayawardhana, Ajay Giri Prakash Kottapalli

University of Groningen, Netherlands

C2P-11-3

A PRELIMINARY STUDY ON A NEW LIGHTWEIGHT AND FLEXIBLE SENSING SOCK FOR GAIT ANALYSIS

Nicola Carbonaro, Lucia Arcarisi, Francesco Di Rienzo, Antonio Viridis, Carlo Vallati, Alessandro Tognetti

University of Pisa, Italy

C2P-11-4

SENSORIZED FABRIC GLOVE AS GAME CONTROLLER FOR REHABILITATION

Joo Chuan Yeo, Sejal Ghate, Longteng Yu, Kang Du, Chwee Teck Lim

National University of Singapore, Singapore

16:30 – 18:00

C2P-12: SENSOR PHENOMENOLOGY III

Session Chairs: Sheng-Shian Li, National Tsing Hua University & Sone Masato, Tokyo Institute of Technology

C2P-12-1

MICROELECTROMECHANICAL PHASE DETECTORS FOR PHASE-LOCKED LOOP APPLICATIONS

Israel Dunk, Hengky Chandrahilim

The US Air Force Institute of Technology, United States

C2P-12-2

MEASURING POWER USAGE AND SENSITIVITY TO MOVEMENT FOR EVENT-BASED CAMERAS

Christopher Voelkel^{1}, Tyler Lovelly^{2}, Andrew Pineda^{2}, Peter McMahon-Crabtree^{2}, Gabriel Mounce^{2}

^{1}New Mexico Institute of Mining and Technology, United States; ^{2}U.S. Air Force Research Laboratory, United States

C2P-12-3

COMPARABLE DATA EVALUATION METHOD FOR A RADIO-NUCLEAR SENSOR WHEN USED ON AN UAV

Claudia Rudolph, Benjamin Knoedler, Josef Heinskill

Fraunhofer FKIE, Germany

C2P-12-4

EFFECT OF EXCITATION SIGNAL FREQUENCY ON THE ELECTRICAL RESPONSE OF A MWCNT/HEC COMPOSITE BASED HUMIDITY SENSOR

Xingzhe Zhang^{2}, Dinesh Maddipatla^{2}, Arnesh Bose^{2}, Binu Narakathu^{2}, John Williams^{1}, Michael Mitchell^{1}, Massood Atashbar^{2}

^{1}The Boeing Company, United States; ^{2}Western Michigan University, United States

C2P-12-5

OPEN-ENDED-LINE REFLECTIVE-MODE PHASE-VARIATION SENSORS FOR DIELECTRIC CONSTANT MEASUREMENTS

Jonathan Muñoz-Enano^{2}, Pau Casacuberta^{2}, Lijuan Su^{2}, Paris Vélez^{2}, Marta Gil^{1}, Ferran Martín^{2}

^{1}Universidad Politécnica de Madrid, Spain; ^{2}Universitat Autònoma de Barcelona, Spain

C2P-12-6

TRAJECTORY GENERATION OF FBG-SENSORIZED NEEDLES FOR INSERTIONS INTO MULTI-LAYER TISSUE

Dimitri Lezcano, Iulian Iordachita, Jin Seob Kim

Johns Hopkins University, United States

C2P-12-7

EMPIRICAL TEMPERATURE MODEL OF SELF-DIRECTED CHANNEL MEMRISTOR

Thanasin Bunnam^{2}, Ahmed Soltan^{3}, Danil Sokolov^{2}, Oleg Maevsky^{1}, Patrick Degenaar^{2}, Alex Yakovlev^{2}

^{1}Nanodevices LTD, Russia; ^{2}Newcastle University, United Kingdom; ^{3}Nile University, Egypt

C2P-12-8

ELECTRO-MECHANICAL CO-OPTIMIZATION OF MEMS DEVICES IN PYTHON

*Rui Amendoeira Esteves^{1}, Chen Wang^{1}, Joana Vaz Pinto^{2}, Michael Kraft^{1}
^{1}KU Leuven, Belgium; ^{2}NOVA School of Science and Technology, Portugal*

C2P-12-9

ON-DEMAND MEMS ACCELEROMETER DYNAMIC RESPONSE ACQUISITION AND OUTPUT DITHERING VIA SELF TEST PIN ACTUATION

*Panos Ioakim, Iasonas Triantis
City, University of London, United Kingdom*

C2P-12-10

TOWARDS AN OBJECTIVE AND PRECISE MOISTURE CONTENT MEASUREMENT OF TEXTILES USING A CHIPLESS RFID TAG-SENSOR

*Fatemeh Babaeian^{2}, Nemai Chandra Karmakar^{2}, Zahra Komeily-Nia^{1}, Alessandra Sutti^{1}
^{1}Deakin University, Australia; ^{2}Monash University, Australia*

C2P-12-11

ANALYSIS OF PITOT TUBE AIRFLOW VELOCITY SENSOR BEHAVIOR IN BLOCKAGE SITUATIONS

*Ata Golparvar^{1}, Murat Kaya Yapici^{2}
^{1}EPFL, Switzerland; ^{2}Sabanci University, Turkey*

16:30 – 18:00

C2P-13: SENSOR PHENOMENOLOGY IV (MODELING & EVALUTATION)

Session Chair: Pal Varga, Budapest University of Technology and Economics

C2P-13-1

A HIGHLY-LINEAR, INTEGRATION-COMPATIBLE OUTPUT METRIC FOR AMPLITUDE-MODULATED RESONANT SENSORS BASED ON WEAKLY-COUPLED RESONATORS

Jérôme Juillard^{1}, Ali Mostafa^{1}, Pietro Maris Ferreira^{1}, Manon Gouspy^{1}, Michael Kraft^{2}

^{1}GEEPS/CentraleSupÅlec, France; ^{2}MICAS/KU Leuven, Belgium

C2P-13-2

PHASE-LOCKED LOOP MODELLING BASED ON BROADBAND POWER COMBINER AND CAPACITIVE MEMS POWER SENSOR

Juzheng Han, Rushan Chen

Nanjing University of Science and Technology, China

C2P-13-3

MODELLING OF A FLOW METER THROUGH MACHINE LEARNING

Bing Yan^{1}, Jianyong Zhang^{3}, Ruixue Cheng^{3}, Chenhua Liu^{2}

^{1}North University of China, China; ^{2}Taiyuan University of Science and Technol, China; ^{3}Teesside University, United Kingdom

C2P-13-4

EFFECT OF SPATIAL SENSITIVITY OF SENSOR ON PARTICULATE VELOCITY MEASUREMENT DERIVED BASED ON CROSS CORRELATION TECHNIQUES

Ruixue Cheng^{2}, Jianyong Zhang^{2}, Bin Zhou^{1}

^{1}Southeast University, China; ^{2}Teesside University, United Kingdom

C2P-13-5

COMPACT MODEL OF RING-CORE SENSING ELEMENT OF 2D FLUXGATE MAGNETOMETER

Laurent Malané^{2}, Jean-Baptiste Kammerer^{2}, Luc Hébrard^{2}, Vinciane Chereau^{1}

^{1}ECA-Robotics, France; ^{2}Laboratoire ICUBE / University of Strasbourg, France

