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MESSAGE FROM THE CHAIRPERSONS

Dear IEEE SENSORS 2016 participants, welcome to Orlando, Florida!

On behalf of the Organizing committee of the 15th IEEE SENSORS Conference, it is a great honor and pleasure to welcome you to USA and to Orlando, Florida, an exciting destination for all in late October! The conference will be held in the convention center at the Caribe Royale hotel, which is perfect in size for our conference and close to all Orlando attractions and downtown.

In a major departure from previous years, IEEE SENSORS 2016 has solicited peer-reviewed 3-page conference papers for the first time, which has been received with great enthusiasm by our community. A total of 1049 submissions were received of which 617 were accepted (58.82%). Total submissions at 1049 are close to the largest since 2010 (1082 for IEEE SENSORS 2010 in Hawaii). All accepted papers went through the same peer-review process and will be published in the conference proceedings on IEEE Xplore, however, they are divided into oral (198) and poster (420) presentations depending upon author preference, suitability, session planning and similar considerations. Submissions are mostly from academia (85%), with a growing participation from research facilities and government laboratories (10%). Submitted papers have come from all regions of IEEE, with about a third each coming from the Americas, Asia/Pacific and Europe.

With 20 tracks, including 12 topic focused tracks, five Focused sessions, a Live Demos session, 3 Keynote speeches, and an Open Posters session, the conference promises to be packed with exciting presentations, posters and demos highlighting all areas of sensors. The five focused sessions are on flexible and wearable sensors, resonators, 3D printed sensors, energy harvesting and ultra-low power sensors and machine olfaction. The Demo Session has grown as well, this year, with 13 demonstrations accepted for presentation.

2016 is the second year in which we are continuing the successful Industry Day program. Organized by Industry Committee Chairs, Gerry Heyes and Andy DeHennis, Industry day (Wednesday, November 2) includes a number of talks on Sensors and IoT, a panel luncheon on sensing technology enabling UAVs, a big truck outside showcasing mobile technologies, live demonstrations and an evening networking event. We have the largest number of exhibits and patronages in our conference history, thanks to all the sponsors, listed on the conference website. Please stop by their booths and participate in events arranged by them.

Our Young Professionals Chair, Sinead O'Keefe, will be hosting a Young Professionals reception on Monday evening at 5:30 p.m. If you are within 10 years of your first degree, please join her for this networking event.

The success of a conference depends not only on the technical program but also on the social program. The highlights of this year's social program will be the outdoor welcome reception at the Caribe Royale hotel near the swimming pool. The conference banquet will be held at the amazing Walt Disney World Epcot® World ShowPlace Pavilion. The dinner will be accompanied by live entertainment, music and a magical IllumiNations fireworks show viewing!

On Wednesday morning following the Keynote, a short awards ceremony is included for the 2016 SENSORS Best Student Papers and Posters

Contest, Industry Best Paper Award, and the IEEE Sensors Council awards, Best Journal Paper, Technical Achievement Award and Meritorious Service Awards.

IEEE has more than 426,000 members in more than 160 countries worldwide, with more than 117,000 student members. IEEE has 39 societies and six technical councils representing the wide range of IEEE Technical interests. IEEE SENSORS conference is sponsored by the IEEE Sensors Council which has 25 member IEEE Societies. The Council is a multidisciplinary technical area of mutual interest, primarily through conferences and publications.

The success of IEEE SENSORS 2016 is due to the dedication of more than 400 (331 reviewers+43 Organizing committee + 24 Track Chairs + 7 Focused Track Chairs + 2 Demo Chairs) volunteers. The Technical Program Committee (TPC) alone consisted of 360 volunteers.

Thanks to all the volunteers who contributed. The technical core of the conference excels because of the authors who are sharing their technical research and knowledge with the professional community. Our Technical Program Chairs are Srinivas Tadigapada (Penn State) and Donald Malocha (University of Central Florida). Our special thanks to all the 24 Track Chairs, 7 focused Session Chairs, and 2 Demo Chairs, David Elata (Technion University, Israel), Bernhard Jacoby (Johannes Kepler University, Austria), Christian Zorman (Case Western University, Ohio), Fabien Josse (Marquette University, Wisconsin), Gjis Krijnen (University of Twente, The Netherlands), Jun-Kondoh (Shizuoka University, Japan), Karthik Shankar (University of Alberta, Canada), Haluk Kulah (Middle Eastern Technical University, Turkey), Ryutaro Maeda (AIST, Japan), Massood Zandi Atashbar (Western Michigan University, Michigan), Mina Rais-Zadeh (University of Michigan, Michigan), Mehdi Kiani (Penn State University, Pennsylvania), Michael Vellekoop (University of Bremen, Germany), Paddy French (Delft University, The Netherlands), Lina Sarro (Delft University, The Netherlands), Ryuji Yokokawa (University of Kyoto, Japan), Siyang Zheng (Penn State University, Pennsylvania), Kenichi Takahata (University of British Columbia, Canada), Yuji Suzuki (University of Tokyo, Japan), Philip Feng (Case Western University, Ohio), Robert Chris Roberts (University of Hong Kong, Hong Kong), Matteo Rinaldi (Northeaster University, Massachusetts), Alper Erturk (Georgia Institute of Technology, Georgia), Susan Schiffman (North Carolina State University, North Carolina), Troy Nagle, (North Carolina State University, North Carolina), Peter Hesketh (Georgia Institute of Technology, Georgia), Gjis Krijnen (University of Twente, The Netherlands), Eric MacDonald (University of Texas, El Paso), Zeynep Celik-Butler (University of Texas at Arlington, Texas), Ravinder Dahiya (University of Glasgow, Scotland), and Hua Wang (Georgia Institute of Technology, Georgia).

Organizational success was achieved with the volunteer skills of the Tutorial Chair Anna Grazia Mignani, Publicity Chair Stephen Bart, Exhibits Co-Chairs Joseph Brown and Roger Grace, Best Paper Award Chair Svetlana Tatic-Lucic, Conference Treasurers Eddie Grant and Jill Gosten, Local Arrangement Co-Chairs Shekhar Bhansali and Toshi Nishida, and Social Media Chair Hadi Haidari.

We recognize and thank our Keynote Speakers: Dr. Troy Olson of DARPA, USA; Prof. Paul Havinga of University of Twente, The Netherlands; Prof. Chwee-Teck Lim of the University of Singapore; whose participation in this conference is invaluable. We appreciate their expertise and willingness to share their time with us in Orlando.

We thank the professional conference organizers Conference Catalysts, LLC, under the leadership of Chris Dyer, who has been fantastic at efficiency, organization, budgeting and selection and Tom Wehner of ePapers for providing online conference paper submission, reviewing support and associated logistics.

IEEE SENSORS is the flagship conference of the IEEE Sensors Council. The international location rotates geographically on a three-year cycle; 1. Asia/Pacific, 2. Americas, 3. Europe/Africa. Next year, IEEE SENSORS 2017 will be held in Glasgow, Scotland, UK, October 29 – November 1, 2016. In 2018, IEEE SENSORS 2018 will be held in New Delhi, India.

Thank you for participating in IEEE SENSORS 2016. We hope to see you in Glasgow and New Delhi in future years!

Venkat Bhethanabotla
General Co-Chair

David Horsley
General Co-Chair

Srinivas Tadigadapa
Technical Program Co-Chair

Don Malocha
Technical Program Co-Chair

GENERAL INFORMATION

Registration & Information Desk
The Registration and Information Desk is located in Grand Sierra North. Registration hours:

Sunday, October 30	8:00 AM - 6:00 PM
Monday, October 31	8:00 AM - 6:00 PM
Tuesday, November 1	8:00 AM - 5:00 PM
Wednesday, November 2	8:00 AM - 5:00 PM

Meeting Room Locations
Concurrent Sessions A: Curacao 1-2
Concurrent Sessions B: Curacao 3-4
Concurrent Sessions C: Curacao 5-6
Concurrent Sessions D: Curacao 7-8
Concurrent Sessions E: Bonaire 1-2
Concurrent Sessions F: Bonaire 3-4
Concurrent Sessions G: Bonaire 5-6
Concurrent Sessions H: Bonaire 7-8
Poster Sessions: Grand Sierra D-I

Name Badges
Name badges are required for access to all Conference events.

Electronic Proceedings
One copy of the electronic proceedings will be provided to each attendee on a flash drive. Additional copies may be purchased at the Conference registration desk. The purchase price of the electronic proceedings will increase after the Conference, so be sure to order your additional copies in advance. In addition to the proceedings on the flash drive, a download option is also available to attendees during the week of the Conference.

Message and Job Market Board
The Message and Job Market Board will be located near the Conference Registration Desk. Posting is allowed by job seekers. Recruiters are not allowed to post.

Conference Attire
Attire during the duration of the Conference is business casual.

Coffee Breaks
Coffee and light snacks are available each morning and afternoon to registered attendees. Conference breaks are located in the Grand Sierra D-I.

Lunches
Lunch is provided each day to Conference registrants in the Carribean I-II. Tickets are provided in attendee badges. Attendees are required to remit a valid lunch ticket for entrance.

Wi-Fi
Wi-Fi access is available to attendees. Login information is available at registration.

Cellular Phones
As a courtesy to fellow attendees, please silence electronic devices.

Speaker Breakfasts
There will be a breakfast organized each morning for session chairs and oral session speakers to meet and for speakers to load their presentations on the presentation laptops. The breakfast on Sunday is strictly for Tutorial Speakers.

Sunday, October 30	8:00 AM - 8:45 AM
Monday, October 31	8:00 AM - 8:45 AM
Tuesday, November 1	8:00 AM - 8:45 AM
Wednesday, November 2	8:00 AM - 8:45 AM

Local Information
Tourism information is located in the hotel lobby and will be available during registration hours.

Smoking
Caribe Royal is a non-smoking facility. Please use designated smoking areas outside the building.

Restrooms
Restrooms are located on each floor. Refer to the venue map for additional information.

Social Media
Capture the spirit of IEEE SENSORS 2016 in a Tweet using #IEEESENSORS for the chance to win a set of Wireless Earbud Headphones. Two prizes available daily.

Conference App
Download the IEEE SENSORS 2016 app to enhance your Conference experience. The app is available for Android, iOS, and Windows Phone. Search for “Whova” to download the app then sync the IEEE SENSORS 2016 schedule.

Exhibits
Exhibits are located in Grand Sierra D-I

Exhibit hours:
Monday, October 31 – 8:00 AM - 4:00 PM
Tuesday, November 1 – 8:00 AM - 4:00 PM
Wednesday, November 2 – 8:00 AM - 4:00 PM

SOCIAL PROGRAM

SUNDAY, OCTOBER 30

Event: Tutorial Lunch
Time: 12:30 PM - 2:00 PM
Location: Grand Sierra C
**Available to tutorial registrants only*

Event: Welcome Reception
Time: 6:00 PM - 8:00 PM
Location: Caribe Royale Pool Deck

The hotel features a 250,000 gallon free-form pool complete with a winding 75-foot waterslide and two rejuvenating outdoor whirlpools. The sprawling pool-deck area is dotted with lounge chairs, tables, umbrellas and cabanas, and adorned by tropical foliage and swaying palms. It's the perfect setting to network with fellow attendees and unwind at the sound of cascading waterfalls.

MONDAY, OCTOBER 31

Event: Conference Lunch & Speaker Chester N. Kennedy
Time: 12:00 PM - 1:00 PM
Location: Carribean I-II
Chester Kennedy, CEO, ICAMR will speak during the conference lunch.

Event: Young Professionals Reception
Time: 5:30 PM - 7:00 PM
Location: Antigua 1-4

Young Professionals are defined as post-Student members who are within 15 years of receiving their first professional degree. Join us for refreshments, hors d'oeuvres and networking.

TUESDAY, NOVEMBER 1

Event: Conference Lunch
Time: 12:00 PM - 1:00 PM
Location: Carribean I-II

Event: Gala Dinner – Disney World of Senses
Time: 6:00 PM - 9:30 PM
Location: Walt Disney World Epcot® World ShowPlace Pavilion
*Busses Leave at 5:30 PM

Conference Dinner on Tuesday, November 1 at the amazing Walt Disney World Epcot® World ShowPlace Pavilion. The dinner will be accompanied by live entertainment, music and a magical IllumiNations viewing!

SOCIAL PROGRAM

WEDNESDAY, NOVEMBER 2

Event: Conference Lunch and Industry Panel
Time: 12:30 PM - 1:30 PM
Location: Carribean I-II

The Sensing Technology Enabling Unmanned Aerial Vehicles (UAVs) …. Drones!

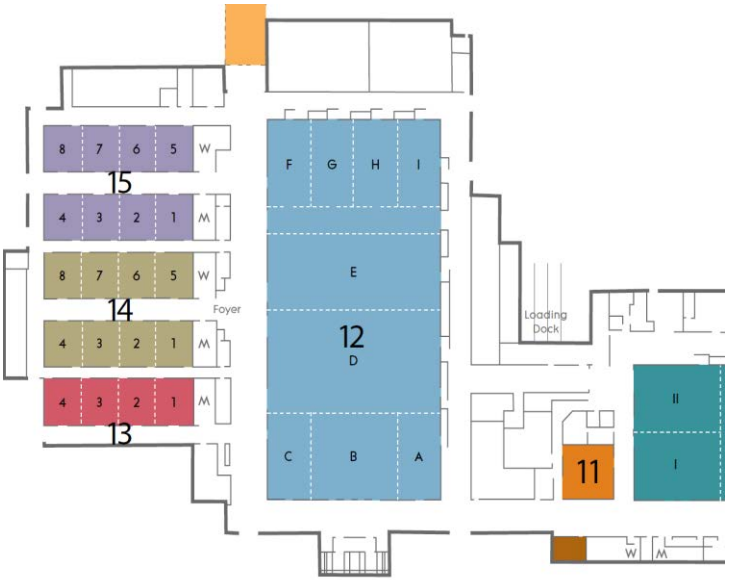
With their integration into a number of different industries and government organizations, UAV technology continues to become part of our daily lives. In addition, the technology that enables these systems is enabling new developments in low power, highly embedded, smart systems that have many applications. Embedded technologies for sensors, batteries, microsystems, and environmental stability are all a part of the efforts in UAVs and the technology use in the current and future systems is on the cutting edge. This panel will facilitate a discussion about the possibilities for this emerging market as well as some remaining technology challenges, with a couple of the proposed areas being:

- Regulation of Drones
- Making full drone systems
- Making Sub systems in drones
- Using Drones for Industrial Application
- Using Drones for hobbyists

The panel discussion will focus on various factors that must guide the design and development process for UAVs. In addition to the more common tradeoffs such as battery life, integration level, and feature set, these systems need to address human factors that will further enable these systems.

Event: Industry Day Reception
Time: 5:30 PM - 7:00 PM
Location: Grand Sierra Foyer

CARIBE ROYALE FLOOR PLAN



GRAND SIERRA A-C (KEYNOTE SESSIONS)

GRAND SIERRA D-I (POSTERS/EXHIBITS/BREAKS)

CARIBBEAN I-III (LUNCHES)

CURACAO 1-8 (SESSION ROOMS)

BONAIRE 1-8 (SESSION ROOMS)

ANTIGUA 1-4 (YP RECEPTION)

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TRACK 4: Fluidics and Biosensors
Paddy French, *Delft University, The Netherlands*
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TRACK 5: Optical Sensors
Ignacio R. Matias, *Public University of Navarra, Spain*
Huikai Xie, *University of Florida, USA*

TRACK 6: Physical Sensors: Temperature, Mechanical, Magnetic, and other
Bernhard Jakoby, *Johannes Kepler University, Linz, Austria*
Phillip Feng, *Case Western Reserve University, USA*

TRACK 7: Acoustic and Ultrasound Sensors (New Track)
Matteo Rinaldi, *Northeastern University, USA*
Jun-Kondoh, *Shizuoka University, Japan*

TRACK 8: Sensor Packaging and Systems
Christian Zorman, *Case Western Reserve University, USA*
Mina Rias Zadeh, *University of Michigan, USA*

TRACK 9: Sensor Networks
Ryutaro Maeda, *AIST, Tsukuba, Japan*
Fabien Josse, *Marquette University, USA*

TRACK 10: Sensor Applications
Gijs Krijnen, *University of Twente, The Netherlands*
Robert Roberts, *University of Hong Kong, Hong Kong*

TRACK 11: Wired and Wireless Sensor Systems: Signals, Transceivers, and Interfaces
Kenichi Takahata, *University of British Columbia, Canada*
Mehdi Kiani, *The Pennsylvania State University, USA*

TRACK 12: Actuators and Sensor Power Systems (New Track)
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Thilo Sauter, *Danube University Krems, Austria*

Industry Applications
(Open)

Instrumentation and Measurement
Georg Brasseur, *Graz University of Technology, Austria*

Magnetics
Pavel Ripka, *Czech Technical University in Prague, Czech Republic*

IEEE SENSORS COUNCIL OFFICIALS, *CONTINUED*

Microwave Theory and Techniques
Michael Shur, *Rensselaer Polytechnic Institute, USA*

Oceanic Engineering
Christopher Waldmann, *MARUM, Germany*

Photonics
(Open)

Power and Energy
(Open)

Reliability
Jeffrey Voas, *NIST, USA*

Robotics and Automation
Ravinder Dahiya, *University of Glasgow, Scotland, UK*

Signal Processing
Randolph Moses, *The Ohio State University, USA*

Solid State Circuits
Darrin Young, *University of Utah, USA*

Ultrasonics, Ferroelectrics, and Frequency Control
Ashwin Seshia, *University of Cambridge, UK*

Vehicular Technology
Rolland Vida, *Budapest University of Technology and Economics, Hungary*

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ACS Sensors, led by Editor-in-Chief J. Justin Gooding from the University of New South Wales, is an interdisciplinary journal devoted to the dissemination of new and original knowledge on all aspects of sensor science. This monthly journal provides a high-quality, broadly scoped forum for sensor research that is integral to chemistry and other allied fields of study related to chemical sciences. Read the aims and scope of the journal and the first issue for FREE at pubs.acs.org/acssensors.

http://www.acutronic.com/us/

ACUTRONIC is the world leader in the development, design and manufacture of precision motion simulators for the aeronautics, space, defense, automotive and consumer industries. ACUTRONIC was chosen 2015 Northrop Grumman WORLD CLASS SUPPLIER OF THE YEAR.

http://www.asygn.com/

ASYGN is a connected sensors electronics specialist. ASYGN serves the MEMS, imaging and RF industries by delivering ICs, instruments and software for the design, verification and characterization of complete sensor systems. ASYGN's offer includes the AS3125 chip for high-performance multi-sensor control and the dBox-Z1 instrument for high-frequency resonant sensors characterization.

http://www.brewerscience.com

Brewer Science is a global technology leader in developing and manufacturing innovative materials, processes, and equipment for the fabrication of semiconductors and microelectronic devices. Brewer Science is prepared for the next generation. Are you? Find out at http://www.brewerscience.com.

www.enterpriseflorida.com/

Enterprise Florida, Inc. (EFI) serves as the principal economic development organization for Florida. EFI's business development mission is focused on expanding and diversifying the state's economy through job creation in targeted, high-value market segments such as the MEMS and sensor industry. Central to this initiative is the recent establishment of the International Consortium for Advanced Manufacturing Research (ICAMR) an advanced materials, manufacturing development center focused on the integration of semiconductor based processes and materials into future sensor and photonics devices. The facility is also home to the North American design center of imec, the world-leading nanoelectronics research institute.

http://www.focalspec.com/

FocalSpec is a privately held Finnish high tech company offering laboratory level measurement precision for online quality control and manufacturing line process optimization. Our product range consists of sensors, 2D profilers and 3D at-line scanners for metal, electronics, plastics and medical industries as well as for systems integrators. Our headquarters is located in Oulu, Finland and it operates globally through its subsidiary in Atlanta, USA and a skilled network of integrators and distribution partners. Our innovation is built on line confocal imaging (LCI) ensuring the most accurate measurement results without the limitations of the traditional measurement methods. Our technology works even on the most challenging surfaces such as dark matt, glossy and transparent surfaces. There is no speckle noise nor interference and a sub-micron measurement accuracy is guaranteed be the samples moving or not.

http://www.ien.gatech.edu/

The IEN at the Georgia Institute of Technology is an Interdisciplinary Research Institute purposed with the advancement of electronics and nanotechnology. The IEN faculty and staff perform research, educate students, and provide fabrication facilities to enable basic to applied research, technology transfer and commercialization of electronics and nanotechnologies. Our research and education efforts are led by prominent, Georgia Tech faculty, many of whom are members of the National Academy of Engineers. The IEN's physical infrastructure includes several research buildings and facilities, valued in excess of US$400M, and state-of the-art, fee-based, open access, shared-user fabrication, characterization, test, and packaging laboratories where global academia, industry and government agencies can work collaboratively. Users are supported by a professional staff of technicians, engineers, and scientists. Additionally, IEN is proud to be the southeastern regional hub for the National Science Foundation's (NSF's) National Nanotechnology Coordinated Infrastructure (NNCI) and the national headquarters for NNCI Educational programs.

http://www.icamr.net/

ICAMR, The International Consortium for Advanced Manufacturing Research, invites leading global companies with Internet-of-Everything manufacturing endeavors to participate in an industry-friendly consortium for advanced sensors, photonics and optics, and other advanced device manufacturing opportunities. ICAMR is initially targeting the mega-growth technologies that will lead to over 50 billion devices being connected by sensors by the beginning of the next decade. ICAMR will develop innovative manufacturable processes, materials, and equipment for advanced sensors and other future high-tech products (emitters, modulators, energy and communications devices/systems). By leveraging unique emerging technology capabilities, processes, and background IP, ICAMR will develop advanced lab/fab and universal technology platforms with the economy of scale needed for cost-effective manufacturing.

www.ideal-aerosmith.com/
For more than 75 years, customers have relied on Ideal Aerosmith's expertise to help them develop products of the absolute highest quality and reliability. We provide innovative technology and leading-edge testing solutions for companies from aerospace and energy exploration to automotive, hardware-in-the-loop (HWIL), and MEMs testing.

IEEE Internet of Things
http://iot.ieee.org/

http://www.ieee-sensors.org/
The IEEE Sensors Council focuses on the theory, design, fabrication, manufacturing and application of devices for sensing and transducing physical, chemical, and biological phenomena. With an emphasis on the electronics, physics, and reliability aspects of sensors and integrated sensor-actuators, the Council sponsors well-recognized, international conferences and publications.

http://ioppublishing.org/

IOP Publishing is a wholly owned subsidiary of the Institute of Physics. The Institute is a leading scientific society promoting physics and bringing physicists together for the benefit of all. It has a worldwide membership of around 50,000 comprising physicists from all sectors. It works to advance physics research, application and education, and engages with policy makers and the public to develop awareness and understanding of physics. Any profits generated by the publishing company are used by the Institute to support science and scientists in both the developed and developing world. IOP Publishing provides a range of journals, ebooks, magazines, conference proceedings and websites for the scientific community. These products and services enable researchers and research organisations to reach the widest possible audience for their research. We combine the culture of a learned society with global reach and highly efficient and effective publishing systems and processes. With offices in the UK, US, China and Japan, and staff in many other locations including Mexico and Russia, we serve researchers in the physical and related sciences in all parts of the world.

http://www.lynceetec.com/

Lyncée Tec SA is the reference company in the field of 4D microscopy. Its unique technology, based on digital holography (DHM®), provides simultaneously high acquisition rate and interferometric resolution. It opens new quality control possibilities and novel research opportunities, enabling applications that were not possible before. Lyncée offers complete solutions, from sample handling to data analysis, in the field of micro production, MEMS, semi conductor, micro-optics, watch industry, and cell imaging.

http://www.micralyne.com/

Micralyne is a provider of novel MEMS solutions and architectures for BioMed, Optical and Industrial Sensor applications. For more than 30 years, Micralyne has delivered world-class MEMS sensor solutions used in various applications like pressure sensors, gas sensors, accelerometers, thermal imaging sensors and optical communications. These products find application in number of industries such as: life sciences, aerospace, automotive, oil and gas, military, commercial and environment. Micralyne has a complete offering of capabilities to support the customer's needs from concept to volume production. These capabilities include state of the art cleanroom facilities, volume wafer production, Wafer Level Packaging – MicraSilQ, discrete packaging, and custom sub-assembly services.

http://mist-center.org/

The MIST Center is a collaborative research center that focuses on precompetitive research for next-generation smart systems. Operating under the auspices of the NSF's Industry/University Cooperative Research Centers Program, our portfolio comprises experts in fields ranging from novel materials and processing technologies to devices/transducers, RF circuits and systems, power, packaging and multi-physics modeling.

http://www.nanoplus.com/en/welcome/

nanoplus provides DFB and FP lasers at any customer specific wavelength from 760 nm to 14000 nm. The lasers' excellent performance is due to their very high spectral purity, narrow linewidth and excellent reliability. They are the perfect light source for extremely precise sensing applications in industry and research.

http://neutronixinc.com/

Neutronix-Quintel (NXQ) Mask Aligners are optimized to fit your exacting requirements. We offer a large variety of value add features, such as our integrated BSA /IR (backside to front side) alignment with on the fly switch over, allows the user to see the live front to back alignment overlay pre-exposure. The NXQ 8000 performs the fastest and most accurate alignments available today. Our ease of use, feature rich software & onsite upgradeability make the NXQ 8000 the superior mask aligner.

http://www.ravenano.com/

Our two divisions support advanced sensor and IoT product development and manufacturing. Advanced Micro Patterning (AMP) provides maskless lithography systems for fabricating these devices. EcoSnow provides CO2 cleaning systems for advanced inertial sensors, including packaging devices. Both groups offer exceptional technology, low cost of ownership and field proven product design.

http://www.smartmicrosystems.com

SMART Microsystems creates turn-key solutions for microelectronic package assembly challenges to move MEMS sensor technology from development to production. With an engineering team experienced in manufacturing and state-of-the-art facilities, SMART Microsystems accelerates the transition of new MEMS sensor products to market, providing the lowest overall development time and cost to satisfy full life cycle requirements.

http://spie.org/
SPIE is the international society for optics and photonics, and organizes dozens of conferences annually, including SPIE Photonics West and SPIE Defense + Commercial Sensing. The SPIE Digital Library is the world's largest collection of optics and photonics applied research and houses more than 450,000 technical papers in cutting-edge technologies such as sensors, lasers, imaging, robotics, nanotechnology, solar energy, biophotonics, and communications. The Society is a not-for-profit organization founded in 1955 to advance light-based technologies and serves nearly 260,000 constituents from approximately 162 countries.

http://www.sstsensing.com/
Based in Scotland, SST Sensing's goal is to deliver sensing and control solutions to our customers which exactly meet their technical and commercial requirements. This can be achieved through our standard range of sensors or by providing customer specific sensing solutions. Our innovative LuminOx sensor employs the principle of fluorescence quenching to measure oxygen over a wide range and without the drawbacks and limitations associated with other oxygen sensing technologies. It is an intelligent electronic sensor with integrated temperature and pressure compensation and its lifetime is completely unaffected by the amount of oxygen in the environment. LuminOx adds to SST's diverse and ever-growing range of gas and liquid sensing products.

www.stonybrook.edu/

The Laboratory for Optoelectronic Sensors is an important element of the Center for Advanced Sensor Technologies (Sensor CAT) at Stony Brook University. Established in 1998 by the New York State, the Center conducts industry-cosponsored R&D aimed at growing the science-based manufacturing in NYS. The Sensor CAT caters to industry needs, utilizing such enabling technologies as optoelectronics, nanomaterials, advanced signal processing, etc. Successful applications developed by the Center include sensors of various gases, as well as humidity, temperature, icing, and other sensors for industrial, biomedical, and environmental applications. The economic impact of the Sensor CAT since its inception exceeds $350M.

http://www.luvitera.com/

UAB LUVITERA© is Lithuanian – Slovenian joint stock company established as a result of successful cooperation between Center for Physical Sciences and Technology (LT), University of Ljubljana (SI), Centre of Excellence "NAMASTE“ (SI) and Science and Technology Park of Institute of Physics (LT).

http://wims2.org/

The Center for Wireless Integrated MicroSensing and Systems (WIMS2) advances the investigation, development, and application of sensor-enabled microsystems, through research, education, and industry collaboration. The Center, created in 2000 with NSF support, conducts research in MEMS, micropower circuits, and RF technologies, with applications in healthcare, environmental sensing and infrastructure monitoring.

TECHNICAL PROGRAM INFORMATION

The technical program consists of three Keynote Sessions, six parallel Lecture/Special Sessions of contributed papers, three Poster Sessions, a dedicated Demo session, a track for Professional Development, and a full Industry Day track.

Guide to Understanding Session Numbering
Each session in the technical program is assigned a unique number, which clearly indicates when and where the session is presented. The number of each session is shown before the session title. A typical number is shown below:

Typical Session Number*: **B2L-A**

The first character (i.e., B) indicates the day of the Conference:

A = Monday; **B** = Tuesday; **C** = Wednesday

The second character (i.e., 2) indicates the session time:

1 = morning; **2** = mid-morning; **3** = afternoon; **4** = late-afternoon

The third character (i.e., L) indicates what type of paper the session is:

L = Lecture Session **P** = Poster Session

The fourth character (i.e., A) indicates which room the session is held in:

A= Curacao 1-2
B= Curacao 3-4
C= Curacao 5-6
D= Curacao 7-8
E= Bonaire 1-2
F= Bonaire 3-4
G= Bonaire 5-6
H= Bonaire 7-8

TECHNICAL PROGRAM - POSTER INFORMATION

Three poster sessions will be held in Grand Sierra D/E/F/G/H/I after the lunch each day on Monday, Tuesday, and Wednesday. Posters will be on display for the duration of the conference and authors will be available for questions during their appointed time. All poster papers are listed in this program on the day that they are presented.

Each poster in the technical program is assigned a unique number, which clearly indicates the paper track and where the poster is presented. The number of each poster is shown on the left-hand side, before the title. A typical number is shown below:

A-1-35
Paper Title

The letter indicates the day of presentation (A=Monday, B=Tuesday, C=Wednesday) and the first number indicates the paper track. The second number indicates the board location. Please refer to the poster board layout handout in the attendee bag.

1	Sensor Phenomenon, Modeling, and Evaluation
2	Sensor Materials, Processing, and Fabrication
3	Chemical and Gas Sensors
4	Fluidics and Biosensors
5	Optical Sensors
6	Physical Sensors: Temperature, Mechanical, Magnetic, and Other
7	Acoustic and Ultrasound Sensors
8	Sensor Packaging and Systems
9	Sensor Networks
10	Sensor Applications
11	Wired and Wireless Sensor Systems: Signals, Transceivers, and Interfaces
12	Actuators and Sensor Power Systems
13	FOCUSED SESSION Flexible and Wearable Sensors
14	FOCUSED SESSION Resonators
15	FOCUSED SESSION 3D Printed Sensors
16	FOCUSED SESSION Energy Harvesting and Ultra Low Power Sensors
17	FOCUSED SESSION Machine Olfaction for Environmental Monitoring
18	Live Demos
19	Keynote
20	Open Posters

SENSORS JOURNAL

The *IEEE Sensors Journal* is a peer-reviewed scientific journal covering research on sensors and sensing phenomena. It is published monthly on-line and bi-monthly in print by the IEEE Sensors Council. According to the Journal Citation Reports, the *IEEE Sensors Journal* has a current impact factor of 1.889. The average time for making an editorial decision on regular papers is just below 2 months.

The topics of interest of the *IEEE Sensors Journal* include:
"all types of sensing: mechanical, thermal, optical, magnetic, radiation, microwave, chemical, biological, mass, etc., both on the macro and micro levels. Also of interest are sensor packaging, interconnection, modeling, wireless sensing, CAD, stability (e.g., noise), characterization, sensor signal processing, sensor arrays (e.g., e-nose), sensor systems, intelligent sensors, sensor actuators, and applications."

SUBMISSION: Submissions, original papers only, are to be made electronically through IEEE Manuscript Central, over its Webpage. This site contains instructions on how authors proceed with a submission. Please do not send submissions or revisions directly to the Editor-in-Chief or Associate Editors: mc.manuscriptcentral.com/sensors

Authors are required to prepare manuscripts employing the double column style template developed by IEEE. Information for authors, on article preparation and submission, templates, etc. can be found at:
www.ieee-sensors.org/information-for-authors The *IEEE Sensors Journal* does not republish papers that have appeared in conference proceedings unless the paper has been expanded; i.e., unless the paper contains substantial new material. (See the special instructions for expanding conference papers on our website). The IEEE Sensors Journal also publishes "letters".

www.ieee-sensors.org/journals

SENSORS JOURNAL

**The Professional Development Track will include Journal author and reviewer training sessions*

PRESENTATION DOWNLOADS

Because of the parallel sessions, IEEE SENSORS 2016 participants will probably miss some important presentations they would have liked to see. Therefore, as an extra benefit for conference participants, about 170* presentations are being recorded (with the presenters' consent). The recordings consist of the authors' slides and voice (no video).

The recordings are available for downloading, free to conference attendees only, from the day after the presentation until noon, Eastern USA time, Friday, 11 November. Last year, more than 14,000 presentations were downloaded by attendees; 719 of the attendees downloaded at least one presentation.

The presentations may be downloaded at **http://ieee-sensors2016online.org/**

After 11 November, the plan is to make the recorded presentations available in IEEE Xplore together with the customary proceedings articles.

**We regret that poster papers and presentations by authors who opted out of being recorded will not be available for downloading. Authors who opted out and now wish to be recorded - please sign a new copyright form at least a half day before your talk, at the registration desk, and we will try to add your paper to the list of papers to be recorded.*

KEYNOTE SPEAKERS

MONDAY, OCTOBER 31

Troy Olsson – DARPA, USA

"Event Driven Persistent Sensing: Overcoming the Energy and Lifetime Limitations in Unattended Wireless Sensors"

The DARPA Near Zero Power RF and Sensor Operations (N-ZERO) program seeks to overcome the power limitations of persistent sensing by developing wireless, event-driven sensing capabilities that allow physical, electromagnetic and other sensors to remain dormant—effectively asleep yet aware—until an event of interest awakens them. State-of-the-art (SOA) sensors use active electronics to monitor the environment for such external triggers. The power consumed by these electronic circuits limits the sensor lifetime to durations of weeks to months. In contrast, N-ZERO seeks to exploit the energy in signal signatures to detect and recognize attention-worthy events, such as the presence of a particular machinery type or radio communications protocol, while rejecting noise and interference. This paper will discuss the new architectural approaches and component technologies being developed under the N-ZERO program, which are predicted to extend the lifetime of wireless sensors to several years under many operational scenarios.

TUESDAY, NOVEMBER 1

Chwee Teck Lim – National University of Singapore, Singapore

"Highly Flexible and Wearable Microfluidic Sensors"

There has been an increased use of body sensors for monitoring physiological signals and bodily movements in recent years. However, current conventional sensors are typically rigid and bulky. Here, we develop highly flexible, robust and wearable liquid-based resistive sensors that consist of soft elastomer-based microfluidic templates that encapsulate conductive liquid as the sensing element. As a proof-of-concept, we demonstrate the recognition, differentiation, and measurement of distinct muscle-induced hand motions as well as handgrip strength and localized dynamic foot pressure. Overall, this work highlights the potential use of these liquid-based microfluidic sensors in a wide range of biomedical applications including that of rehabilitation.

KEYNOTE SPEAKERS

WEDNESDAY, NOVEMBER 2

Paul Havinga - University of Twente, The Netherlands

"Pervasive Systems, Sensor Networks, IOT - Animal Monitoring and Poacher Detection Using Wireless Sensor Networks"

In this presentation animal monitoring using wireless sensor networks will be addressed from various points of view, ranging from agriculture, sports, and wildlife monitoring. A special focus will be given to wildlife monitoring, as this requires the most complex and complete solution. In particular mechanisms and techniques to detect poachers in a wildlife park will be addressed. There are various studies on the deployment of sensor nodes for animal tracking. Environmental scientists and zoologists have been increasingly using these technologies to collect data from wild terrestrial areas and transmit them to the remote databases. In some of these applications, the sensor nodes are attached to the animals, forming an ad hoc wireless network of mobile nodes. Detecting poachers is even much more complicated, and requires a process of planning, installation, execution, data collection, and data interpretation. We use a combination of wireless sensing techniques, ranging from monitoring disturbances of herds of animals in the field, (virtual) fence detection, and air borne sensing.

LUNCH SPEAKER - MONDAY, OCTOBER 31

Chester N. Kennedy, CEO, International Consortium For Advanced Manufacturing Research (ICAMR)

Chester N. Kennedy has more than 35 years experience in the aerospace and commercial electronics industries. During his three-decade tenure at Lockheed Martin, Kennedy held a number of key leadership roles in the areas of engineering, program management and business development.

As CEO of ICAMR, Kennedy plans to build upon the organization's early entry into the highly competitive smart sensor market sector. He will focus on facilitating the partnerships required to help industry transition to the new era driven by the Internet of Things.

Kennedy served as Vice President and Chief Engineer of Training and Logistics Solutions at Lockheed Martin Mission Systems and Training. He led a 2,000+ member global engineering team responsible for developing a wide variety of products, including support equipment, flight and ground simulators, training curriculums, automated test equipment and some of the most sophisticated Information Technology based logistics solutions in the world. Kennedy was accountable for program performance, managed department budgets, controlled engineering rates, and directed technology strategies to promote sustainability and support future growth.

Kennedy's diverse experience includes a rotation at Lockheed Martin's headquarters where he was responsible for corporate-wide technology strategies and independent assessments of operational risks. He also actively participated in every phase of the program life cycle, from concept development through mature product sustainment.

Kennedy is an outspoken supporter of STEM outreach and serves on Florida's For Inspiration and Recognition of Science and Technology (FIRST) executive advisory board. He is an active member of the Board of Directors of the Orlando Aero Club, an Associate Fellow of the American Institute of Aeronautics Astronautics, a Senior Member of the Institute of Electrical and Electronics Engineers, and is Vice Chairman of the Martin Federal Credit Union Board of Directors. He also holds positions on Industry Advisory Boards for the University of Central Florida and University of Florida. Additionally, Kennedy has served on the Naval Research Advisory Council by appointment of the Secretary of the Navy.

Kennedy holds a Bachelor of Science in Electrical Engineering and a Master's Degree in Business Administration.

DEMOS

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 Monday, October 31 immediately following the poster session and will be held in room Bonaire 7-8. The letter preceding the demo indicates the demo position.

3:00 PM - 4:00 PM
LIVE DEMONSTRATIONS & SPECIAL POSTERS
LOCATION: Bonaire 7-8
SESSION CHAIRS:
Ravinder Dahiya, University of Glasgow
Hua Wang, Georgia Institute of Technology

A: A 1024-PIXEL CMOS MULTI-MODALITY SENSING ARRAY FOR CELL-BASED ASSAYS
Jong Seok Park, Georgia Institute of Technology

B: CHARACTERIZATION OF 3D PRINTED PIEZOELECTRIC SENSORS
Max Kirkpatrick, University of South Carolina

C: AN IR-BASED FACIAL EXPRESSION TRACKING SENSOR FOR HEAD-MOUNTED DISPLAYS
Jaekwang Cha, Yonsei University

D: BIOSLEEVE, A WEARABLE HANDS-FREE GESTURE CONTROL INTERFACE
Christopher Asssad, Jet Propulsion Laboratory

E: HIGH-DEFINITION WIRELESS PERSONAL AREA TRACKING USING AC MAGNETIC FIELD
Mohit Singh, Purdue University

F: A WIRELESS MULTI-CHANNEL PHYSIOLOGICAL SIGNAL ACQUISITION SYSTEM-ON-CHIP FOR WEARABLE DEVICES
Sheng-chen Lee, National Chiao Tung University

G: EXTREME ENVIRONMENT ANALOGUE ELECTRONICS FOR SENSOR NODES
Huaa-Khee Chan, Newcastle University

H: PRINTED E-NOSE FOR UNIVERSAL APPLICATIONS
Mustashin Adib, Karlsruher Institute Fur Technologie

I: CHIP-SCALE, NANO-ENGINEERED, ENVIRONMENTAL GAS SENSORS
Brian Thomson, N5 Sensors, Inc

J: PULSE TRANSIT TIME MEASUREMENT ON A MODIFIED WEIGHING SCALE FOR CUFFLESS BLOOD PRESSURE ESTIMATION
Andrew Carek, Georgia Institute of Technology

K: FEMTO- TO-MACRO SCALE INTERDISCIPLINARY SENSING WITH TENSIONED METASTABLE FLUID DETECTORS
Rusi Taleyarkhan, Purdue University

PROFESSIONAL DEVELOPMENT PROGRAM

The Profesional Development Program will be held on Monday, October 31.

1:00 PM - 3:00 PM
Professional Development Program I
LOCATION: Bonaire 5-6

1:00
IMPROVE YOUR PRESENTATION SKILLS
Oana Cimpean, University of South Florida

1:30
KNOW YOUR AUDIENCE:
TIPS FOR COMMUNICATING WITH THE MEDIA.
Brittany Sears, University of South Florida St Petersburg

2:00
PUBLISHING 101 - AUTHOR TRAINING
FOR PUBLISHING IN JOURNALS & PROCEEDINGS
John Vig, IEEE Sensors Council VP Publications

2:30
DELIVERING HIGH-QUALITY PEER REVIEW
Krikor Ozanyan, IEEE Sensors Journal Editor-in-Chief

4:00 PM - 5:30 PM
Professional Development Program II
LOCATION: Bonaire 5-6

4:00
IEEE SENSORS COUNCIL: ACTIVITIES AND OPPORTUNITIES
Andrei Shkel, IEEE Sensors Council VP Technical Operations

4:15
BEYOND GRADUATE SCHOOL – ACADEMIA, INDUSTRY, OR ENTREPRENEURSHIP?
Rajinder Khosla, NC State University

4:45
PUBLIC ENGAGEMENT – WHY BOTHER?
Ravinder Dahiya, University of Glasgow

5:00
WOMEN IN SENSORS
Christina Schober, Honeywell Inc.
Jill Gostin, Georgia Institute of Technology
Hulya Kirkici, University of South Alabama
Veena Misra, North Carolina State University

INDUSTRY TRACK

New this year: Industry Track will be held on Wednesday, November 2.

11:00 AM - 12:30 PM
INDUSTRY DAY OVERVIEW AND SENSORS APPLICATIONS FOR IOT
LOCATION: Bonaire 5-6

11:00
IEEE SENSORS COUNCIL WELCOME
Gerard Hayes, WRCNC
Andrew Dehennis, Sensionics

11:15
WIND RIVER DEMONSTRATION PLATFORM & WORKSHOPS
Whitney Young, Wind River

11:30
IOT, SENSORS AND SMART LIVING OF THE FUTURE
Teresa Pace, ICMAR

12:00
UAV SENSOR APPLICATIONS
Tyler Collins, Precision Hawk

12:30 PM - 1:30 PM
LUNCH/PANEL - UAV REGULATIONS AND OPPORTUNITIES
LOCATION: Caribbean I-III

Kyle Snyder, NCSU/ASSURE
Tyler Collins, Precision Hawk

1:30 PM - 3:00 PM
SENSOR APPLICATIONS AND IOT INITIATIVES
LOCATION: Bonaire 5-6

1:30
SENSORS FOR FIRSTNET AND FIRST RESPONDERS
Allan Sadowski, NC FirstNet

2:00
SENSOR BASED INFORMATION INNOVATION BETWEEN SATELLITES, UAVS, AND IOT PLATFORMS
Richard Spangler, PlazaBridge Group

2:30
RIOT AND 2017 INITIATIVES
Tom Snyder, RIoT
Larry Steffann, WRCNC

3:00 PM - 3:30 PM
COFFEE BREAK
LOCATION: Grand Sierra D-I

3:30 PM - 5:00 PM
INDUSTRY RESOURCES AND IEEE SENSORS COUNCIL INDUSTRY INITIATIVES
LOCATION: Bonaire 5-6

3:30
IEEE SC STANDARDS: IOT HARMONIZATION
William Miller, MaCT USA

4:00
SIMULATION TOOLS FOR INTEGRATED SENSORS
Greg Babbitt, ANSYS

4:30
IEEE SENSORS COUNCIL INDUSTRY INITIATIVES
Gerard Hayes, WRCNC
Andrew Dehennis, Sensionics

5:30 PM - 7:00 PM
INDUSTRY DAY SOCIAL
LOCATION: Grand Sierra Foyer

SPONSORED BY ANSYS, AND RIOT

SESSION GRID: SUNDAY, OCTOBER 30 (TUTORIALS - AM)

	Antigua 1	Curacao 1-2	Curacao 3-4	Grand Sierra Registration North
8:00 – 18:00				Registration
8:00 – 8:30	Instructors Breakfast			
8:30 – 9:20		TUTORIAL 1A - Terahertz sensing technology	TUTORIAL 1B - Sensing at the nanoscale – chemical gas sensors based on quasi 1D nanowires	
9:20 – 10:10		TUTORIAL 2A - Inertial microsensors	TUTORIAL 2B - Smart gas sensors for mobile applications	
10:10 – 10:30				Morning Break
10:30 – 11:20		TUTORIAL 3A - Expeditions in self-powered sensing	TUTORIAL 3B - Emerging frontiers of breath analysis	
11:20 – 12:10		TUTORIAL 4A - Context-aware, ultra-low power, energy harvested IoT sensor nodes	TUTORIAL 4B - Human gas capsules	
12:10 – 1:30	Lunch - Grand Sierra C			

SESSION GRID: SUNDAY, OCTOBER 30 (TUTORIALS - PM)

	Curacao 1-2	Curacao 3-4	Grand Sierra Registration North
1:30 – 2:20	TUTORIAL 5A - Photonic electric field sensors	TUTORIAL 5B - Machine olfaction technologies - odor sensing system and olfactory display	
2:20 – 3:10	TUTORIAL 6A - Optical fiber manipulations using nanomaterials: a way towards miniaturized smart sensors	TUTORIAL 6B - Bending mode acoustic transducers	
3:10 – 3:30			Afternoon Break
3:30 – 4:20	TUTORIAL 7A - BIOFOS: micro-ring resonator-based biophotonic system for food analysis	TUTORIAL 7B - 3D-printing: technology, materials and selected applications	
4:20 – 5:10	TUTORIAL 8A - Scanning micromirrors and their sensing applications	TUTORIAL 8B - Sustainability in sensors and sensor systems technologies	
6:00 – 8:00	WELCOME RECEPTION - Caribe Royale Pool Area		

SESSION GRID: MONDAY, OCTOBER 31 - AM

	Curacao 1-2	Curacao 3-4	Curacao 5-6	Curacao 7-8	Bonaire 1-2	Bonaire 3-4	Bonaire 5-6	Bonaire 7-8
8:50 – 9:10	OPENING - Grand Sierra A-C							
9:10 – 10:00	PLENARY TALK 1 - Troy Olsson - Grand Sierra A-C							
10:00 – 10:30	Morning Break - Grand Sierra D-I							
10:30 – 12:00	A2L-A Fundamentals of Resonating Sensors	A2L-B Materials & Nanostructures for Electrochemical & Chemiresistive Sensors	A2L-C Optical Chemical Sensors	A2L-D Robotic Sensing	A2L-E Focused Session: Flexible and Wearable Sensors	A2L-F Actuators & Sensor Power Systems I		
12:00 – 1:00	Lunch - Caribbean I-III – Lunch Speaker: Chester N. Kennedy, CEO, ICAMR							

SESSION GRID: MONDAY, OCTOBER 31 - PM

	Curacao 1-2	Curacao 3-4	Curacao 5-6	Curacao 7-8	Bonaire 1-2	Bonaire 3-4	Bonaire 5-6	Bonaire 7-8
1:00 – 3:00	POSTER SESSION 1 - Grand Sierra D-I						Professional Development	
3:00 – 3:30	Afternoon Break - Grand Sierra D-I							
3:00 – 4:00								Live Demo Session
4:00 – 5:30	A5L-A New Sensing Principles & Applications	A5L-B Fabrication & Integration Issues in Mechanical & Chemobiological Sensors	A5L-C Light Detection	A5L-D Sensing Applications I	A5L-E Focused Session: Wearables	A5L-F Chemical & Gas Sensing Devices	Professional Development	
5:30 – 7:00	Young Professionals Reception - Antigua 1-4							

SESSION GRID: TUESDAY, NOVEMBER 1

	Curacao 1-2	Curacao 3-4	Curacao 5-6	Curacao 7-8	Bonaire 1-2	Bonaire 3-4
9:00 – 10:00	PLENARY TALK 2 - Chwee Teck Lim - Grand Sierra A-C					
10:00 – 10:30	Morning Break - Grand Sierra D-I					
10:30 – 12:00	B2L-A Physical Sensors I: Sensor Systems & Instrumentation	B2L-B Acoustic Sensors	B2L-C Optical Biosensors	B2L-D Sensing Applications II	B2L-E Focused Session: 3D Printed Sensors	B2L-F Chemical & Gas Sensing at Nanoscale
12:00 – 1:00	Lunch - Caribbean I-III					
1:00 – 3:00	POSTER SESSION 2 - Grand Sierra D-I					
3:00 – 3:30	Afternoon Break - Grand Sierra D-I					
3:30 – 5:00	B4L-A Physical Sensors II: Crystalline & CMOS Sensors	B4L-B Ultrasound Sensors	B4L-C Optical Physical Sensors I	B4L-D Medical Sensing Applications	B4L-E Focused Session: Resonators	B4L-F Chemical & Gas Sensing from Fabrication to Application
5:30 – 9:30	Gala Dinner - Disney World of Senses (Buses leave at 5:30 from Convention Center)					

SESSION GRID: WEDNESDAY, NOVEMBER 2

	Curacao 1-2	Curacao 3-4	Curacao 5-6	Curacao 7-8	Bonaire 1-2	Bonaire 3-4	Bonaire 5-6
9:00 – 10:30	PLENARY TALK 3 - Paul Havinga & Sensors Council Awards, Best Student Paper Awards Presentation - Grand Sierra A-C						Industry Day
10:30 – 11:00	Morning Break - Grand Sierra D-I						
11:00 – 12:30	C2L-A Physical Sensors III: Magnetometers & Inertial Sensors	C2L-B Biomedical Sensors	C2L-C Machine Olfaction for Environmental Monitoring	C2L-D Electromagnetic Based Sensing Applications	C2L-E Sensor Network, Method & Evaluation	C2L-F Focused Session: Energy Harvesting & Low-Power Sensors I	
12:30 – 1:30	Lunch & Industry Panel - Caribbean I-III						
1:30 – 3:30	POSTER SESSION 3 - Grand Sierra D-I						Industry Day
3:30 – 4:00	Afternoon Break - Grand Sierra D-I						
4:00 – 5:30	C4L-A Physical Sensors IV: Mechanical & Thermal Sensors	C4L-B Physical Biosensors & Fluidics	C4L-C Wireless Sensors & Interfaces	C4L-D Sensors & Systems for Health Monitoring & Harsh Environments	C4L-E Sensor Network, Applications and IoT	C4L-F Focused Session: Energy Harvesting & Low-Power Sensors II	
5:30 – 7:00	Industry Day Reception - Grand Sierra Foyer						

8:00 AM – 5:00 PM
REGISTRATION
LOCATION: Grand Sierra Registration North

Tutorials - Track 1

8:30 AM - 9:20 AM
LOCATION: Curacao 1-2
TERAHERTZ SENSING TECHNOLOGY
Michael S. Shur, *Rensselaer Polytechnic Institute, USA*

9:20 AM - 10:10 AM
LOCATION: Curacao 1-2
INERTIAL MICROSYSTEMS
Andrei M. Shkel, *University of California, USA*

10:10 AM – 10:30 AM
COFFEE BREAK
LOCATION: Grand Sierra North Foyer

10:30 AM - 11:20 AM
LOCATION: Curacao 1-2
EXPEDITIONS IN SELF-POWERED SENSING
Shantanu Chkrabartty, *Washington University in St. Louis, USA*

11:20 AM - 12:10 PM
LOCATION: Curacao 1-2
CONTEXT-AWARE, ULTRA-LOW POWER, ENERGY HARVESTED IOT SENSOR NODES
Arjit Raychowdhury, *Georgia Institute of Technology, USA*
Shreyas Sen, *ECE Purdue University, USA*

12:10 PM - 13:30 PM
LUNCH
LOCATION: Grand Sierra C

1:30 PM - 2:20 PM
LOCATION: Curacao 1-2
PHOTONIC ELECTRIC FIELD SENSORS
James E. Toney, *SRICO, INC., USA*

2:20 PM - 3:10 PM
LOCATION: Curacao 1-2
OPTICAL FIBER MANIPULATIONS USING NANOMATERIALS: A WAY TOWARDS MINIATURIZED SMART SENSORS
Sangeeta Kale, *Defense Institute of Advanced Technology, India*

3:10 PM – 3:30 PM
COFFEE BREAK
LOCATION: Grand Sierra North Foyer

3:30 PM - 4:20 PM
LOCATION: Curacao 1-2
BIOFOS: MICRO-RING RESONATOR-BASED BIOPHOTONIC SYSTEM FOR FOOD ANALYSIS
Ioanna Zergioti, *National Technical University of Athens, Greece*

4:20 PM - 5:10 PM
LOCATION: Curacao 1-2
Scanning Micromirrors and their Sensing Applications
Huikai Xie, *University of Florida, USA*

Tutorials - Track 2

8:30 AM - 9:20 AM
LOCATION: Curacao 3-4
SENSING AT THE NANOSCALE – CHEMICAL GAS SENSORS BASED ON QUASI 1D NANOWIRES
Camilla Baratto, *SENSOR Lab, National Council for Researcher - National Institute of Optics (CNR-INO), Italy*

9:20 AM - 10:10 AM
LOCATION: Curacao 3-4
SMART GAS SENSORS FOR MOBILE APPLICATIONS
Jan Mitrovics, *JLM Innovation GmbH, Germany*

10:10 AM – 10:30 AM
COFFEE BREAK
LOCATION: Grand Sierra North Foyer

10:30 AM - 11:20 AM
LOCATION: Curacao 3-4
EMERGING FRONTIERS OF BREATH ANALYSIS
Christina Davis, *University of California, Davis, USA*

11:20 AM - 12:10 PM
LOCATION: Curacao 3-4
HUMAN GAS CAPSULES
Kourosh Kalantar-Zadeh, *Center for Advanced Electronics and Sensors (CADES), Australia*

12:10 PM - 3:30 PM
LUNCH
LOCATION: Grand Sierra C

1:30 PM - 2:20 PM
LOCATION: Curacao 3-4
MACHINE OLFACTION TECHNOLOGIES - ODOR SENSING SYSTEM AND OLFACTORY DISPLAY
Takamichi Nakamoto, *Tokyo Insititute of Technology, Japan*

2:20 PM - 3:10 PM
LOCATION: Curacao 3-4
BENDING MADE ACOUSTIC TRANSDUCERS
Mark Sheplak, *University of Florida, USA*

3:10 PM – 3:30 PM
COFFEE BREAK
LOCATION: Grand Sierra North Foyer

3:30 PM - 4:20 PM
LOCATION: Curacao 3-4
3D-PRINTING: TECHNOLOGY, MATERIALS AND SELECTED APPLICATIONS
Vasssili Karanassios, *University Waterloo, Canada*

4:20 PM - 5:10 PM
LOCATION: Curacao 3-4
SUSTAINABILITY IN SENSORS AND SENSOR SYSTEMS TECHNOLOGIES
Denise Wilson, *University of Washington, USA*

6:00 PM - 8:00 PM
CONFERENCE WELCOME RECEPTION
LOCATION: Caribe Royale Pool Area

8:50 AM - 9:10 AM
OPENING REMARKS
LOCATION: Grand Sierra A-C

9:10 AM - 10:00 AM
A1L-A: PLENARY 1
LOCATION: Grand Sierra A-C
SESSION CHAIR:
Venkat Bhethanabotla, University of South Florida

EVENT DRIVEN PERSISTENT SENSING: OVERCOMING THE ENERGY AND LIFETIME LIMITATIONS IN UNATTENDED WIRELESS SENSORS
Roy Olsson III{2}, Radoslav Bogoslovov{3}, Christal Gordon{1}
{1}Booz Allen Hamilton, United States; {2}Defense Advanced Research Projects Agency, United States; {3}Defense Advanced Research Projects Agency / ECS Federal, LLC, United States

The DARPA Near Zero Power RF and Sensor Operations (N-ZERO) program seeks to overcome the power limitations of persistent sensing by developing wireless, event-driven sensing capabilities that allow physical, electromagnetic and other sensors to remain dormant—effectively asleep yet aware—until an event of interest awakens them. State-of-the-art (SOA) sensors use active electronics to monitor the environment for such external triggers. The power consumed by these electronic circuits limits the sensor lifetime to durations of weeks to months. In contrast, N-ZERO seeks to exploit the energy in signal signatures to detect and recognize attention-worthy events, such as the presence of a particular machinery type or radio communications protocol, while rejecting noise and interference. This paper will discuss the new architectural approaches and component technologies being developed under the N-ZERO program, which are predicted to extend the lifetime of wireless sensors to several years under many operational scenarios.

10:30 AM - 11:00 AM
COFFEE BREAK
LOCATION: Grand Sierra D-I

10:30 AM - 12:00 PM
A2L-A: FUNDAMENTALS OF RESONATING SENSORS
LOCATION: Curacao 1-2
SESSION CHAIRS:
Michael Vellekoop, University of Bremen
David Elata, Technion - Israel Institute of Technology

10:30
INVITED: MODE-LOCALIZED SENSING IN MICRO- AND NANOMECHANICAL RESONATOR ARRAYS
Ashwin Seshia
Cambridge University, United Kingdom

11:00
PREDICTIVE ANALYTICAL MODEL OF FUNDAMENTAL FREQUENCY AND IMPERFECTIONS IN GLASSBLOWN FUSED QUARTZ HEMI-TOROIDAL 3D MICRO SHELLS
Yusheng Wang, Mohammad Asadian, Andrei Shkel
University of California, Irvine, United States

11:15
ON ORDERING OF FUNDAMENTAL WINEGLASS MODES IN TOROIDAL RING GYROSCOPE
Alexandra Efimovskaya, Danmeng Wang, Yu-Wei Lin, Andrei Shkel
University of California, Irvine, United States

11:30
HIGH FREQUENCY CHARACTERIZATION OF LEAKY WAVES FOR LIQUID DELAY LINE SENSORS
Marshall Smith, Donald Malocha
University of Central Florida, United States

11:45
TEMPERATURE AND PRESSURE CHARACTERIZATION OF THE QUALITY FACTOR IN A CMOS-MEMS RESONATOR
Saoni Banerji, Jordi Madrenas, Daniel Fernández
Universitat Politècnica de Catalunya, Spain

10:30 AM - 12:00 PM
A2L-B: MATERIALS & NANOSTRUCTURES FOR ELECTROCHEMICAL & CHEMIRESISTIVE SENSORS
LOCATION: Curacao 3-4
SESSION CHAIRS:
Lina Sarro, Delft University of Technology
Trinh Chu Duc, Vietnam National University, Hanoi, VNU

10:30
INVITED: 1D OXIDE NANOSTRUCTURES BASED CHEMICAL SENSORS FOR NONINVASIVE MEDICAL DIAGNOSIS
Giwan Katwal, Banki Manmadha Rao, Oomman K Varghese
University of Houston, United States

11:00
THICKNESS-DEPENDENT SENSITIVITY OF COPPER PHTHALOCYANINE CHEMIRESISTIVE NITROGEN DIOXIDE SENSORS
Liping Sharon Chia{1}, Suresh Palale{2}, Pooi See Lee{1}
{1}Nanyang Technological University, Singapore; {2}Robert Bosch (SEA) Pte Ltd, Singapore

11:15
ONE-STEP RAPID SYNTHESIS OF AU-PT NANOFERNS FOR ELECTROCHEMICAL SENSING AND BIOSENSING
Irene Taurino{1}, Gabriella Sanzó{2}, Sandro Carrara{1}, Giovanni De Micheli{1}, Gabriele Favero{2}, Franco Mazzei{2}, Riccarda Antiochia{2}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Sapienza - Università di Roma, Italy

11:30
OZONE SENSING PROPERTIES OF NICKEL PHTHALOCYANINE:ZNO NANOROD HETEROSTRUCTURES
Niravkumar Joshi{1}, Flávio Makoto Shimizu{1}, Iram T. Awan{1}, Jean-Claude M'Peko{1}, Valmor R. Mastelaro{1}, Osvaldo Novais Oliveira Jr.{1}, Luís F. Da Silva{2}
{1}Universidade de São Paulo, Brazil; {2}Universidade Estadual Paulista Júlio de Mesquita Filho, Brazil

11:45
SENSOR SUBSTRATES BASED ON BIODEGRADABLE GLASS MATERIALS
Kassan Unda{2}, Ali Mohammadkhah{2}, Kwang-Man Lee{1}, Delbert E. Day{2}, Matthew J. O'Keefe{2}, Chang-Soo Kim{2}
{1}Jeju National University, United States; {2}Missouri University of Science and Technology, United States

10:30 AM - 12:00 PM
A2L-C: Optical Chemical Sensors
LOCATION: Curacao 5-6
SESSION CHAIRS:
Ignacio Matias, Public University of Navarre
Deepak Uttamchandani, University of Strathclyde

10:30
COST-EFFECTIVE TUNABLE LASER GAS-SENSOR MODULE FOR HIGH-VOLUME APPLICATIONS, USING DFB LASER DIODES IN THE NIR, AND ICL IN THE MIR
Lars Hildebrandt{1}, Robert Weih{1}, Michael Legge{1}, Nicolas Koslowski{1}, Marc Fischer{1}, Michael von Edlinger{1}, Julian Scheuermann{1}, Steffen Becker{1}, Karl Rößner{1}, Wolfgang Zeller{1}, Lars Nähle{1}, Johannes Koeth{1}, Martin Kamp{2}, Sven Höf
{1}nanoplus Nanosystems and Technologies GmbH, Germany; {2}Universität Würzburg, Germany

10:45
OPTICAL-BASED DIAGNOSTIC TECHNIQUE FOR DETECTION OF TOOTH CARIES USING LASER-INDUCED BREAKDOWN SPECTROSCOPY
Satoshi Ikezawa{3}, Toshitsugu Ueda{3}, Masataka Fujimoto{2}, Shinji Yoshii{1}, Chiaki Kitamura{1}
{1}Kyushu Dental University, Japan; {2}Kyushu Dental University / Waseda University, Japan; {3}Waseda University, Japan

11:00
DEVELOPMENT OF POLARIZATION INTERFEROMETER BIOSENSOR FOR DETECTION OF MYCOTOXINS
Ali Al-Jawdah{1}, Alexei Nabok{1}, Alan Holloway{1}, Anna Tsargorodska{2}
{1}Sheffield Hallam University, United Kingdom; {2}Sheffield University, United Kingdom

11:15
MONTE CARLO AND PARTICLE SWARM METHODS APPLIED TO THE DESIGN OF SURFACE PLASMON RESONANCE SENSORS
Leonardo Machado Cavalcanti, Eduardo Fontana
Universidade Federal de Pernambuco, Brazil

11:30
SURFACE-ENHANCED NEAR-INFRARED ABSORPTION (SENIRA) SPECTROSCOPY
Wei-Chuan Shih, Fusheng Zhao, Oussama Zenasni, Masud Arnob, Yu-Lung Sung
University of Houston, United States

11:45
INTEGRATION OF LINEAR VARIABLE FILTERS ON CMOS FOR COMPACT EMISSION AND ABSORPTION SENSING
John Carlson, Yuhang Wan, Benjamin Kesler, Wang Peng, Saoud Al-Mulla, Patrick Su, John Dallesasse, Brian T. Cunningham
University of Illinois at Urbana–Champaign, United States

10:30 AM - 12:00 PM
A2L-D: Robotic Sensing Applications
LOCATION: Curacao 7-8
SESSION CHAIRS:
Robert Roberts, University of Hong Kong
Gijs Krijnen, University of Twente

10:30
INVITED: ELECTROMAGNETIC TRACKER FOR ACTIVE HANDHELD ROBOTIC SYSTEMS
Robert MacLachlan{1}, Nicholas Parody{1}, Ralph Hollis{1}, Cameron Riviere{1}, Joseph Martel{2}, Louis Lobes Jr.{2}
{1}Carnegie Mellon University, United States; {2}University of Pittsburgh, United States

11:00
SENSOR BASED CONTROLLED LEG TYPE AUTOMATIC LANDING SYSTEM FOR AERIAL VEHICLES
Yusuke Komatsuzaki{1}, Takahiro Doi{1}, Kenjiro Tadakuma{2}
{1}Kanazawa Institute of Technology, Japan; {2}Tohoku University, Japan

11:15
SENSING SKIN FOR DETECTING WING DEFORMATION WITH EMBEDDED SOFT STRAIN SENSORS
Hee-Sup Shin{2}, Lina Maria Castano{2}, James Sean Humbert{1}, Sarah Bergbreiter{2}
{1}University of Colorado, Boulder, United States; {2}University of Maryland, College Park, United States

11:30
SENSORS FUSION PARADIGM FOR SMART INTERACTIONS BETWEEN DRIVER AND VEHICLE
Alessandro Mecocci{7}, Moshe Shahar{1}, Per Ericsson{6}, Sébastien Piccand{3}, Ilse Ravyse{5}, Tim Llewellyn{4}, Davide Di Censo{2}
{1}Ceva D.S.P LTD, Israel; {2}Harman Becker GmbH, Germany; {3}KeyLemon S.A., Switzerland; {4}nViso S.A., Switzerland; {5}Softkinetic Software, Belgium; {6}Tobii Technology, Sweden; {7}Università degli Studi di Siena, Italy

11:45
MRI-GUIDED NEEDLE STEERING FOR TARGETS IN MOTION BASED ON FIBER BRAGG GRATING SENSORS
Jiangzhen Guo, Ehsan Azimi, Berk Gonenc, Iulian Iordachita
Johns Hopkins University, United States

10:30 AM - 12:00 PM
A2L-E: Focused Session: Flexible and Wearable Sensors
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Zeynep Celik-Butler, University of Texas at Arlington
Reza Abdolvand, University of Central Florida

10:30
INVITED: LARGE AREA ELECTRONIC SKIN
Ravinder Dahiya
University of Glasgow, United Kingdom

11:00
INKJET-PRINTED PAPER SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS) SENSORS: PORTABLE, LOW COST DIAGNOSTICS FOR MICRORNA
Stephen Restaino, Ian White
University of Maryland, College Park, United States

11:15
MEMS-BASED PASSIVE WIRELESS RESPIRATION PROFILE SENSOR
Sina Moradian, Reza Abdolvand
University of Central Florida, United States

11:30
ALL-SOFT SENSING PLATFORM BASED ON LIQUID METAL FOR LIQUID- AND GAS-PHASE VOC DETECTION
Min-Gu Kim, Hommood Alrowais, Choongsoon Kim, Oliver Brand
Georgia Institute of Technology, United States

11:45
FABRICATION OF STRETCHABLE COMPOSITES WITH ANISOTROPIC ELECTRICAL CONDUCTIVITY FOR COMPLIANT PRESSURE TRANSDUCERS
Oluwaseun Araromi, Conor Walsh, Robert Wood
Harvard University, United States

10:30 AM - 12:00 PM
A2L-F: Actuators & Sensor Power Systems I
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Yuji Suzuki, The University of Tokyo
Hal uk Külah, Middle East Technical University

10:30
INVITED: ADVANCEMENTS IN ELECTRODYNAMIC WIRELESS POWER TRANSMISSION
Alexandra Garraud, David Arnold
University of Florida, United States

11:00
ELECTROPERMANENT MAGNET BASED WIRELESS MICROACTUATOR FOR MICROFLUIDIC SYSTEMS: ACTUATOR CONTROL AND ENERGY CONSUMPTION ASPECTS
Dulsha Kularatna Abeywardana, Patrick Hu, Zoran Salcic
University of Auckland, New Zealand

11:15
HIGH-EFFICIENT BETAVOLTAIC BATTERIES USING GRAPHENE COATED TIO2 NANOTUBE ARRAYS
Changsong Chen{1}, Na Wang{1}, Haisheng San{2}, Zaijun Cheng{3}
{1}Pen-Tung Sah Institute of Micro-Nano Science and Technology of Xiamen University, China; {2}Xiamen University, China; {3}Xiamen University of Technology, China

11:30
A MEMS INERTIAL SWITCH WITH COMPACT CONSTRAINT STRUCTURES FOR LOWERING OFF-AXIS SENSITIVITY
Qihuan Zhang, Zhuoqing Yang, Qiu Xu, Mengyuan Zhao, Jinyuan Yao, Guifu Ding, Xiaolin Zhao
Shanghai Jiao Tong University, China

11:45
MODELING AND FABRICATION OF LOW-COST ELECTROWETTING ACTUATORS FOR FLEXIBLE MICROFLUIDIC DISPLAY APPLICATIONS
Andreas Tröls, Herbert Enser, Bernhard Jakoby
Johannes Kepler University, Austria

MONDAY, OCTOBER 31

12:00 PM - 1:00 PM
LUNCH
LOCATION: Caribbean I-III

Lunch Speaker: Chester Kennedy, CEO, ICAMR

1:00 PM - 3:00 PM
Professional Development Program I
LOCATION: Bonaire 5-6

1:00
IMPROVE YOUR PRESENTATION SKILLS
Oana Cimpean, University of South Florida

1:30
KNOW YOUR AUDIENCE:
TIPS FOR COMMUNICATING WITH THE MEDIA.
Brittany Sears, University of South Florida St Petersburg

2:00
PUBLISHING 101 - AUTHOR TRAINING
FOR PUBLISHING IN JOURNALS & PROCEEDINGS
John Vig, IEEE Sensors Council VP Publications

2:30
DELIVERING HIGH-QUALITY PEER REVIEW
Krikor Ozanyan, IEEE Sensors Journal Editor-in-Chief

MONDAY, OCTOBER 31 – POSTER SESSION

1:00 PM - 3:00 PM
A3P-G: Sensor Phenomenon, Modeling, & Evaluation I: Resonators
LOCATION: Poster Area
SESSION CHAIR:
Stefan Rupitsch, Friedrich-Alexander-Universität

A-1-1
MULTI-ORDER SYSTEM DYNAMIC MODEL OF THE CENTER SUPPORT QUADRUPLE MASS GYRO (CSQMG)
Tian Zhang, Bin Zhou, Peng Yin, Siwei Li, Rong Zhang
Tsinghua University, China

A-1-3
STUDY OF THE SELF-RESONANCE FREQUENCY OF A FLAT COIL FOR AN EDDY-CURRENT POSITION SENSOR
Johan Vogel, Stoyan Nihtianov
Technische Universiteit Delft, Netherlands

A-1-5
A SELF-CLOCKED READOUT CIRCUIT FOR MEMS GYROSCOPE TO AVOID FREQUENCY ALIASING
Longcan Jiang, Dingbang Xiao, Zhihua Chen, Qiang Xu, Shuai Guan, Yi Wang, Xuezhong Wu
National University of Defense Technology, China

A-1-7
DESIGN FRAMEWORK FOR A GAS SENSOR BASED ON AN OPEN PHOTOACOUSTIC RESONATOR
Benjamin Lang{1}, Alexander Bergmann{2}
{1}FH Joanneum, Austria; {2}Graz University of Technology, Austria

A-1-9
A SIMPLE METHOD FOR DETERMINING THE COEFFICIENTS OF THERMAL EXPANSION OF POLYSILICON THIN FILMS BY USING RESONANCE FREQUENCY MEASUREMENTS
Haiyun Liu
Hohai University, China

A-1-11
POSITION SELF-SENSING FOR PIEZOELECTRIC ACTUATORS UTILIZING AN ANTI-RESONANT CIRCUIT
Max Arzberger{1}, Rudolf Seethaler{2}
{1}Technische Universität München, Germany; {2}University of British columbia, Canada

A-1-14
CORE TEMPERATURE MEASUREMENT USING INDUCTIVELY COUPLED NOISE THERMOMETRY AT 522MHZ
Colm Mc Caffrey, Heikki Seppä, Pekka Pursula
VTT Technical Research Centre of Finland, Finland

1:00 PM - 3:00 PM
A3P-H: Advances in Design & Fabrication for Sensing Devices
LOCATION: Poster Area
SESSION CHAIR:
Nirav Joshi, University of Sao Paulo

A-2-31
FABRICATION OF ULTRA-THIN SILICON CHIPS USING THERMALLY DECOMPOSABLE TEMPORARY BONDING ADHESIVE
Xingjun Xue, Shujie Yang, Dong Wu, Liyang Pan, Zheyao Wang
Tsinghua University, China

A-2-34
IMPROVEMENT OF BONDING STRENGTH UNIFORMITY VIA ANCHOR DESIGN FOR SILICON-ON-GLASS PROCESS
Usung Park, Jun Eon An, Jaewook Rhim
Agency for Defense Development, Korea, South

A-2-37
NEW COATING SYSTEM FOR DIRECT-DEPOSITION OF SENSORS ON COMPONENTS OF ARBITRARY SIZE: A NOVEL APPROACH ALLOWING FOR THINNER SENSORS WITH HIGHER MEASURING ACCURACY
Daniel Klaas{1}, Jürgen Becker{1}, Marc Christopher Wurz{1}, Jan Schlosser{2}, Matthias Kunze{2}
{1}Leibniz Universität Hannover, Germany; {2}scia Systems GmbH, Germany

A-2-40
A NEW FABRICATION PROCESS OF TGV SUBSTRATE USING DOUBLE SIDE GLASS IN SILICON REFLOW PROCESS
Wenyin Li, Dingbang Xiao, Xuezhong Wu, Zhanqiang Hou, Zhihua Chen, Xinghua Wang
National University of Defense Technology, China

A-2-43
ELECTROCHEMICAL FORMATION OF N-TYPE GAN AND N-TYPE INP POROUS STRUCTURES FOR CHEMICAL SENSOR APPLICATIONS
Taketomo Sato, Xiaoyi Zhang, Keisuke Ito, Satoru Matsumoto, Yusuke Kumazaki
Hokkaido University, Japan

A-2-46
SIMULATION STUDY OF SU-8 STRUCTURES REALIZED BY SINGLE-STEP PROJECTION PHOTOLITHOGRAPHY
Katsuo Nakamura{2}, Yoshikazu Hirai{2}, Toshiyuki Tsuchiya{2}, Osamu Tabata{2}, Florian Larramendy{1}, Oliver Paul{1}
{1}Albert-Ludwigs-Universität Freiburg, Germany; {2}Kyoto University, Japan

A-2-49
PIEZOELECTRIC TRANSFORMER-DRIVEN SPRAY COATING FOR MEMBRANE SENSOR FABRICATION
Zeinab Ramshani{2}, Massood Zandi Atashbar{2}, Peng Gao{1}, William Phillip{1}, David Go{1}
{1}University of Notre Dame , United States; {2}Western Michigan University, United States

A-2-52
A 48-WELL TRANSPARENT MICROELECTRODE ARRAY FABRICATED UTILIZING A FLEXIBLE, "WRAPPED AROUND" INTERCONNECT TECHNOLOGY
Phillip Tyler{1}, Swaminathan Rajaraman{2}
{1}Axion BioSystems Inc., United States; {2}University of Central Florida, United States

A-2-55
FLEXIBLE NH3 SENSOR BASED ON SPRAY DEPOSITION AND INKJET PRINTING
Ahmed Abdelhalim, Aniello Falco, Florin Loghin, Paolo Lugli, Jose F. Salmeron, Almudena Rivadeneyra
Technische Universität München, Germany

A-2-57
FABRICATION OF NANOELECTRODE ENSEMBLES USING SILICON NANOWIRES IN AN ELECTROCHEMICAL GLUCOSE SENSOR
Sanghamitra Mandal, Mohammed Marie, Omar Manasreh
University of Arkansas, United States

A-2-59
EMBEDDED WIRE-ELECTRODE INTO BIODEGRADABLE MICRONEEDLE DEVICE FOR BRAIN-MACHINE INTERFACE
Yuki Nabekura, Yoshihiro Hasegawa, Mitsuhiro Shikida
Hiroshima City University, Japan

A-2-60
EXPERIMENTAL DETERMINATION OF 2ND ORDER PHASE MATCHING TURNING POINTS IN LONG PERIOD GRATINGS
James Barrington, Matthew Partridge, Stephen James, Ralph Tatam
Cranfield University, United Kingdom

1:00 PM - 3:00 PM
A3P-J: Gas Sensing
LOCATION: Poster Area
SESSION CHAIR:
Jan Mitrovics, JLM Innovation

A-3-61
MICROWAVE GAS SENSOR BASED ON INTERDIGITAL CAPACITOR: REFLECTION & TRANSMISSION MEASUREMENTS
Amal Harrabi, Guillaume Bailly, Jerome Rossignol, Stuerga Stuerga, Pierre Pribetich, Jean Pierre Bellat, Igor Bezverkhyy, Bruno Domenichini
Université Bourgogne - Franche-Comté, France

A-3-64
EFFECT OF PT, PD, AG, Y ADDITIVES ON THE SURFACE AND IN THE BULK OF TIN DIOXIDE THIN NANOCRYSTALLINE FILMS ON CHARACTERISTICS OF RESISTIVE HYDROGEN SENSORS
Alexey Almaev, Nadezhda Maksimova, Evgeny Sevastyanov, Evgeny Chernikov
Tomsk State University, Russia

A-3-67
ENHANCED LITHIUM NIOBATE PYROELECTRIC IONIZER FOR CHIP-SCALE ION MOBILITY-BASED GAS SENSING
K.B. Vinayakumar, V Gund, N Lambert, S Lodha, A Lal
Cornell University, United States

A-3-70
RGO-CU2O NANOCOMPOSITES FOR ENHANCED NH3 GAS SENSING AT ROOM TEMPERATURE
Yong Zhou, Xiangyi Zhu, Guoqing Liu, Xiaogang Lin, Yukun Huang, Hao Ren, Yongcai Guo
Chongqing University, China

A-3-73
GAS SPECTROSCOPY WITH 245 GHZ CIRCUITS IN SIGE BICMOS AND FRAC-N PLL FOR FREQUENCY RAMPS
Klaus Schmalz{2}, Johannes Borngräber{2}, Selahattin Berk Yilmaz{3}, Nick Rothbart{1}, Dietmar Kissinger{2}, Heinz-Wilhelm Hübers{1}
{1}Deutsches Zentrum für Luft- und Raumfahrt e.V., Germany; {2}Leibniz-Institut für innovative Mikroelektronik, Germany; {3}Silicon Radar GmbH, Germany

A-3-76
IMPROVEMENT OF POF HUMIDITY SENSOR WITH SWELLING POLYMER CLADDING VIA BENDING
Masayuki Morisawa, Hiroshi Yamaoka, Yutaka Suzuki
University of Yamanashi, Japan

A-3-79
MICROWAVE NEAR-FIELD SENSOR FOR CONTACTLESS GAS PRESSURE DETERMINATION
Birk Hattenhorst, Christoph Baer, Thomas Musch
Ruhr-Universität Bochum, Germany

A-3-82
POLYMER-CARBON NANOTUBES COMPOSITE SENSITIVE FILM AND FLEXIBLE PAPER SUBSTRATE BASED VOC VAPOR SENSING
Prince Bahoumina{2}, Hamida Hallil{2}, Jean-Luc Lachaud{2}, Roman Tasso{2}, S. Destor{2}, Dominique Rebière{2}, Corinne Dejous{2}, Kamel Frigui{3}, Stephane Bila{3}, Dominique Baillargeat{3}, Philippe Coquet{1}, Carlos Paragua{4}, Emmanuelle Pichonat{4},
{1}Nanyang Technological University, Singapore; {2}Université de Bordeaux, France; {3}Université de Limoges, France; {4}Université Lille 1, France

A-3-85
AMMONIA GAS SENSORS INK-JET PRINTED ON TEXTILE SUBSTRATES
Zbigniew Stempien{2}, Marek Kozicki{2}, Ryszard Pawlak{2}, Ewa Korzeniewska{2}, Grzegorz Owczarek{1}, Adam Poscik{1}, Dariusz Sajna{3}
{1}Centralny Instytut Ochrony Pracy - Państwowy Instytut Badawczy, Poland; {2}Lodz University of Technology, Poland; {3}MAT Ltd., Poland

A-3-88
CHARACTERIZING THE INFLUENCE OF GATE BIAS ON ELECTRICAL AND CATALYTICAL PROPERTIES OF A POROUS PLATINUM GATE ON FIELD EFFECT GAS SENSORS
Manuel Bastuck{2}, Donatella Puglisi{1}, Anita Lloyd Spetz{1}, Andreas Schütze{2}, Mike Andersson{1}
{1}Linköping University, Sweden; {2}Universität des Saarlandes, Germany

A-3-91
CO/ZNO NANORODS SYSTEM FOR MAGNETIC GAS SENSING APPLICATIONS
Camilla Baratto{3}, Federica Rigoni{3}, Nicola Cattabiani{3}, Matteo Ferroni{3}, Giorgio Sberveglieri{3}, Gabriele Barrera{1}, Paola Tiberto{1}, Paolo Allia{2}
{1}Istituto Nazionale di Ricerca Metrologica, Italy; {2}Politecnico di Torino, Italy; {3}Università degli Studi di Brescia / Istituto Nazionale di Ottica, Italy

A-3-94
CHARACTERIZATION OF AN O2 SENSOR USING MICROELECTRODES
Yusra Obeidat, Tom Chen
Colorado State University, United States

A-3-96
ROOM TEMPERATURE CO2 DETECTION USING INTERDIGITATED CAPACITORS WITH HETEROPOLYSILOXANE SENSING FILMS
Choongsoon Kim, Spyridon Pavlidis, Min-Gu Kim, Oliver Brand, Hang Chen
Georgia Institute of Technology, United States

A-3-98
A BLACK PHOSPHORUS HUMIDITY SENSOR WITH HIGH SENSITIVITY AND FAST RESPONSE
Wen-Hao Chen, Jian-Qiu Huang, Chong-Yang Zhu, Qing-An Huang
Southeast University, China

A-3-100
OXYGEN PLASMA TREATED GRAPHENE/INN NANOWIRE HETEROJUNCTION BASED SENSORS FOR TOXIC GAS DETECTION
Ifat Jahangir{3}, Alina Wilson{2}, Md Ahsan Uddin{1}, MVS Chandrashekhar{3}, Goutam Koley{1}
{1}Clemson University, United States; {2}Midlands Technical College, United States; {3}University of South Carolina, United States

1:00 PM - 3:00 PM
A3P-K: Medical
LOCATION: Poster Area
SESSION CHAIR:
Masayuki Sohgawa, Niigata University

A-4-106
MOLECULARLY IMPRINTED PLASMONIC BIOSENSORS FOR HEMOGLOBIN DETECTION
Yeseren Saylan, Adil Denizli
Hacettepe University, Turkey

A-4-109
LABEL-FREE TUMOR CELL DETECTION AND DIFFERENTIATION BASED ON ELECTRICAL IMPEDANCE SPECTROSCOPY
Rajapaksha Gajasinghe, Onur Tigli, Michelle Jones, Tan Ince
University of Miami, United States

A-4-112
2D MOS2/GLASSY CARBON BASED ELECTROCHEMICAL SENSOR FOR PICO-MOLAR DETECTION OF HYDROGEN PEROXIDE AND HYPOCHLOROUS ACID
Ankur Gupta, Craig Neal, Soumen Das, Sudipta Seal
University of Central Florida, United States

A-4-115
A HIGHLY SENSITIVE AMYLOID-B DETECTION BY CANTILEVER MICROSENSOR IMMOBILIZED WITH LIPOSOME WITH INCORPORATED CHOLESTEROL AND PHOSPHATIDYLCHOLINE LIPID WITH SHORT HYDROPHOBIC ACYL CHAINS
Yuki Murakami{1}, Tomoya Taniguchi{1}, Ziyang Zhang{1}, Kaoru Yamashita{1}, Minoru Noda{1}, Masayuki Sohgawa{2}
{1}Kyoto Institute of Technology, Japan; {2}Niigata University, Japan

A-4-118
MICROCALORIMETRIC DETECTION OF CREATININE IN URINE
David Gaddes III, Srinivas Tadigadapa
Pennsylvania State University, United States

A-4-121
CONTROLLED DRUG LOADING AND RELEASE ENABLED BY NANOPORE THIN FILM AND LAYER-BY-LAYER NANOASSEMBLY
Chao Song, Xiangchen Che, Long Que
Iowa State University, United States

A-4-124
TOWARDS A SWEAT-BASED WIRELESS AND WEARABLE ELECTROCHEMICAL SENSOR
James Dieffenderfer, Michael Wilkins, Charles Hood, Eric Beppler, Michael Daniele, Alper Bozkurt
North Carolina State University, United States

1:00 PM - 3:00 PM
A3P-L: Optical Physical Sensors II
LOCATION: Poster Area
SESSION CHAIR:
Satoshi Ikezawa, Waseda University

A-5-126
AN AFFORDABLE AND EASY-TO-USE INTERFEROMETER WITH A DEDICATED ACQUISITION SYSTEM
Walid Adel Merzouk{2}, Barthélemy Cagneau{2}, Khalid Hilouane{2}, Luc Chassagne{2}, Florent Gardillou{1}
{1}TeemPhotonics, France; {2}Université de Versailles Saint-Quentin-en-Yvelines, France

A-5-128
PRESSURE SENSING BY SURFACE PLASMON RESONANCE IN THE OTTO CONFIGURATION
José Otávio Maciel Neto{3}, Gustavo Oliveira Cavalcanti{4}, Ignacio Llamas-Garro{1}, Jung-Mu Kim{2}, Eduardo Fontana{5}
{1}Centre Tecnològic de Telecomunicacions de Catalunya, Spain; {2}Chonbuk National University, Korea, South; {3}Instituto Federal de Pernambuco, Brazil; {4}Universidade de Pernambuco, Brazil; {5}Universidade Federal de Pernambuco, Brazil

A-5-130
NUMERICAL ANALYSIS OF A NOVEL REFRACTIVE INDEX AND TEMPERATURE SENSOR BASED ON A KAGOMÉ HOLLOW-CORE PHOTONIC CRYSTAL FIBER
Haihu Yu, Jian Ma, Xiaofu Li, Huiyong Guo, Minghong Yang
Wuhan University of Technology, China

A-5-132
THEORETICAL CALCULATIONS OF CROSSTALK AND TIME DELAY IN IDENTICAL FBG ARRAY IN PM FIBER
Yu Zheng, Haihu Yu, Huiyong Guo, Xiaofu Li, Desheng Jiang
Wuhan University of Technology, China

A-5-134
NOISE REDUCTION, ERROR ANALYSIS AND EXPERIMENTAL FIABILITY FOR 3D DEFORMATION MEASUREMENT WITH DIGITAL COLOR HOLOGRAPHY
Silvio Montrésor{2}, Pascal Picart{2}, Oleksandr Sakharuk{1}, Leonid Muravsky{1}
{1}Lviv Institute of Physics and Mechanics, Ukraine; {2}Université du Maine, France

A-5-136
STUDY ON LASER MICROPHONE USING SELF-COUPING EFFECT OF SEMICONDUCTOR LASER FOR SENSITIVITY IMPROVEMENT
Daisuke Mizushima, Norio Tsuda, Jun Yamada
Aichi Institute of Technology, Japan

A-5-138
A HYBRID CMOS-IMAGER WITH PEROVSKITES AS PHOTOACTIVE LAYER
Pei-Wen Yen{1}, Yan-Rung Lin{1}, Sheng-Min Yu{1}, Shiu-Cheng Lou{1}, Kai-Ping Chuang{1}, Bor-Nian Chuang{1}, Yen-Chih Chiou{2}, Chih-Cheng Hsieh{2}
{1}Industrial Technology Research Institute, Taiwan; {2}National Tsing Hua University, Taiwan

A-5-140
FABRICATION OF A MID-IR SENSITIVE THERMOPILE DETECTOR
Shakeel Ashraf, Claes Mattsson, Göran Thungström
Mid Sweden University, Sweden

A-5-142
A PILOT STUDY: EVALUATION OF SENSOR SYSTEM DESIGN FOR OPTICAL FIBRE HUMIDITY SENSORS SUBJECTED TO AGGRESSIVE AIR SEWER ENVIRONMENT
Lourdes Alwis{2}, Heriberto Bustamante{4}, Kort Bremer{3}, Bernhard Roth{3}, Tong Sun{1}, Kenneth Grattan{1}
{1}City University London, United Kingdom; {2}Edinburgh Napier University, United Kingdom; {3}Leibniz Universität Hannover, Germany; {4}Sydney Water Corporation, Australia

A-5-144
AN OPTICAL SENSOR FOR TRACKING HAND ARTICULATIONS
Lefan Wang, Turgut Meydan, Paul Williams
Cardiff University, United Kingdom

A-5-146
SOI SENSOR BASED ON MMI-COUPLED RING-ASSISTED MACH ZEHNDER INTERFEROMETER (RAMZI)
Owen Marsh, Yule Xiong, Winnie Ye
Carleton University, Canada

A-5-148
RADIATION SENSOR IN A OIL BOILER BASED ON FLAME SPECTRAL ANALYSIS
Hugo O. Garcés{1}, Alejandro J. Rojas{2}, Víctor Valdebenito{3}, Alejandro Navarro{3}, Cristian Pereira{3}
{1}Universidad Católica de la Santísima Concepción, Chile; {2}Universidad de Concepción, Chile; {3}Universidad Técnica Federico Santa María, Sede Concepción, Chile

A-5-150
COMPACT INTERFEROMETRIC DISPLACEMENT GAUGE WITH SUB-NANOMETER RESOLUTION AND MILIMETER RANGE
Simon Rerucha, Miroslava Hola, Martin Sarbort, Jindrich Oulehla, Bretislav Mikel, Josef Lazar, Ondrej Cip
ISI Brno, Czech Rep.

A-5-152
190-1100 NM WAVEBAND MULTISPECTRAL IMAGING SYSTEM USING HIGH LIGHT RESISTANCE WIDE DYNAMIC RANGE CMOS IMAGE SENSOR
Yasuyuki Fujihara, Satoshi Nasuno, Shunichi Wakashima, Yusuke Aoyagi, Rihito Kuroda, Shigetoshi Sugawa
Tohoku University, Japan

A-5-154
MAGNETIC FIELD OPTICAL SENSOR BASED ON LOSSY MODE RESONANCES
Joaquin Ascorbe, Jesus Corres, Francisco Javier Arregui, Ignacio Raul Matías
Universidad Pública de Navarra, Spain

A-5-156
A LOW-COST LASER BARRIER BASED VECTORIAL VELOCITY MEASUREMENT SYSTEM
Stefan Lindner, Robert Weigel, Alexander Koelpin
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

A-5-158
AUTOMATED VEHICLE DETECTION USING OPTICAL FIBER COMMUNICATION
Samarth Gupta, Vikas Upadhyaya
NIIT University, India

A-5-160
DEVELOPMENT OF FBG INTERROGATION SYSTEM USING WAVELENGTH SWEEPING OF FDML LASER
Tatsuya Yamaguchi{2}, Yukitaka Shinoda{1}
{1}Nihon Univeristy, Japan; {2}Nihon University, Japan

A-5-162
FABRICATION AND EVALUATION OF DENTAL ENDOSCOPIC INSTRUMENTS USING FIBER-OPTIC SYSTEM
Masataka Fujimoto{2}, Shinji Yoshii{1}, Chiaki Kitamura{1}, Satoshi Ikezawa{3}, Toshitsugu Ueda{3}
{1}Kyushu Dental University, Japan; {2}Kyushu Dental University / Waseda University, Japan; {3}Waseda University, Japan

A-5-164
HIGH THROUGHPUT INTERROGATION PLATFORM FOR REAL TIME AND HIGHLY MULTIPLEXED PHOTONIC DETECTION USING PHOTONIC BANDGAP STRUCTUR
Francisco Prats, Raffaele Caroselli, Ángela Ruiz-Tórtola, Jaime García-Rupérez
Universitat Politècnica de València, Spain

A-5-166
HIGH PIXEL DENSITY CONCENTRIC SI SPATIALLY RESOLVED DIFFUSE REFLECTANCE PROBE: WIDE ABSORPTION RANGE PHANTOM STUDY
Ozlem Senlik, Callie Woods, Nan Jokerst
Duke University, United States

A-5-167
A MULTIMODE FIBER REFRACTIVE INDEX SENSOR
Haris Apriyanto{1}, Gautier Ravet{1}, Olivier Bernal{1}, Michel Cattoen{1}, Francoise Lizion{1}, Han Cheng Seat{1}, Valerie Chavagnac{2}
{1}Laboratoire d'Analyse et d'Architecture des Systèmes / Université de Toulouse, France; {2}Observatoire Midi-Pyrénées / Université de Toulouse, France

A-5-168
FLEXIBLE NEAR INFRARED PHOTORESISTORS BASED ON RECRYSTALLIZED AMORPHOUS GERMANIUM THIN FILMS
Andrea Ferrone{2}, Luca Maiolo{2}, Antonio Minotti{2}, Alessandro Pecora{2}, Andrea De Iacovo{2}, Lorenzo Colace{2}, Siamack V. Grayli{1}, Gary W. Leach{1}, Behraad Bahreyni{1}
{1}Simon Fraser University, Canada; {2}Università degli Studi Roma Tre, Italy

A-5-169
BLUE-ENHANCED AND BANDWIDTH-EXTENDED PHOTODIODE IN STANDARD 0.35-µM CMOS
Bassem Fahs{1}, Asif Chowdhury{1}, Yiwen Zhang{1}, Javad Ghasemi{2}, Collin Hitchcock{1}, Payman Zarkesh-Ha{2}, Mona Hella{1}
{1}Rensselaer Polytechnic Institute, United States; {2}University of New Mexico, United States

A-5-170
OPTICAL 3D µ-PRINTING OF FERRULE-TOP POLYMER SUSPENDED-MIRROR DEVICES
Mian Yao, P. K. A. Wai, Jushuai Wu, A. Ping Zhang, Hwa-Yaw Tam
Hong Kong Polytechnic University, Hong Kong

1:00 PM - 3:00 PM
A3P-M: Physical Sensors V: Electromagnetic
LOCATION: Poster Area
SESSION CHAIR:
Mehdi Kiani, Penn State University

A-6-171
MULTI-FUNCTIONAL CAPACITIVE PROXIMITY SENSING SYSTEM FOR INDUSTRIAL SAFETY APPLICATIONS
Fan Xia, Behraad Bahreyni, Fabio Campi
Simon Fraser University, Canada

A-6-173
AMPLITUDE MEASUREMENT WITH LIMITING AMPLIFIER FOR GMI MAGNETIC SENSOR
Aktham Asfour, Jean-Paul Yonnet, Papa Silly Traoré, Manel Zidi
Ecoles d'ingénieurs et formations de docteurs, France

A-6-175
A MEASUREMENT SYSTEM OF SHORTWAVE PHASE SHIFT IN GRAIN STORAGE
Fangming Wu, Bingfang Wu, Leidong Yang
Chinese Academy of Sciences, China

A-6-177
MONITORING OF YOGURT FORMATION USING A CONTACTLESS RADIOFREQUENCY DIELECTRIC SENSOR
Thi Hing Nhung Dinh{2}, E. Martincic{2}, Pierre-Yves Joubert{1}, Stephane Serfaty{2}
{1}Université Paris Sud, France; {2}Université Paris-Sud / Université Paris Saclay, France

A-6-179
A WEARABLE CONDUCTIVITY SENSOR FOR SWEAT AND BLOOD LEAKAGE MONITORING DURING HEMODIALYSIS
Yi-Chun Du{2}, Wei-Ting Chen{2}, Cheng-Hsin Chuang{2}, Ming-Jui Wu{1}
{1}Kaohsiung Veterans General Hospital, Taiwan; {2}Southern Taiwan University of Science and Technology, Taiwan

A-6-181
CARBON FIBER TOW ANGLE DETERMINATION USING MICROWAVE REFLECTOMETRY
William Wilson, Jason Moore, Peter Juarez
Langley Research Center , United States

A-6-183
MAGNETIC GRADIOMETER WITH SELF COMPENSATION OF OFFSET DRIFT
Mattia Butta, Michal Janosek
Czech Technical University in Prague, Czech Rep.

A-6-185
A LOW-COST MICROWAVE-BASED SENSOR FOR WATER CONTENT DETECTION
Igor Bier{1}, Mathias Hampe{1}, Taylor Zigon{2}, Walter Leon-Salas{2}, Michael Harris{2}
{1}Ostfalia Hochschule für angewandte Wissenschaften, Germany; {2}Purdue University, United States

A-6-187
TOWARDS HIGH-BANDWIDTH CAPACITIVE IMAGING
Rakesh Kumar, Jeffrey Lang, Tyler Hamer, David Trumper
Massachusetts Institute of Technology, United States

A-6-189
MAGNETOELECTRIC INTRINSIC GRADIOMETER WITH HIGH DETECTION SENSITIVITY AND AMBIENT NOISE REJECTION
Mingji Zhang, Siu Wing Or, Yiu Man Yip
Hong Kong Polytechnic University, Hong Kong

A-6-191
A DC CURRENT SENSOR BASED ON DISK-TYPE MAGNETOELECTRIC LAMINATE COMPOSITE
Guofeng Lou, Xinjie Yu, Rui Ban
Tsinghua University, China

A-6-193
A LORENTZ FORCE MEMS MAGNETOMETER
Sedat Pala, Meltem Çiçek, Kıvanç Azgın
Middle East Technical University, Turkey

A-6-195
FREQUENCY MODULATED ELECTROSTATICALLY COUPLED RESONATORS FOR SENSING APPLICATIONS
Alireza Ramezany, Vahid Qaradaghi, Varun Kumar, Siavash Pourkamali
University of Texas at Dallas, United States

A-6-197
NONCONTACT ELECTRO-OPTIC NEAR FIELD PROBE FOR SURFACE ELECTRIC FIELD PROFILING
James Toney, Andrea Pollick, Jason Retz, Sri Sriram
SRICO, Inc., United States

A-6-199
A WIRELESS MULTI-CHANNEL PHYSIOLOGICAL SIGNAL ACQUISITION SYSTEM-ON-CHIP FOR WEARABLE DEVICES
Sheng-Cheng Lee, Yu-Shan Lin, Yu-Jui Chen, Herming Chiueh
National Chiao Tung University, Taiwan

1:00 PM - 3:00 PM
A3P-N: Physical Sensors VIII: Thermal, Flow
LOCATION: Poster Area
SESSION CHAIR:
Robert Roberts, University of Hong Kong

A-6-201
AN ON-CHIP THERMAL STRESS EVALUATION METHOD FOR SILICON RESONANT ACCELEROMETER
Guo-Ming Xia{1}, Qin Shi{1}, Anping Qiu{1}, Xue-Hao Yu{2}, Zhonghai Pei{2}
{1}Nanjing University of Science and Technology, China; {2}Shanghai Aerospace Control Technology Institute, China

A-6-203
AN OXIDE ELECTROTHERMAL FILTER IN STANDARD CMOS
Lorenzo Pedalà{1}, Uğur Sönmez{1}, Fabio Sebastiano{1}, Kofi Makinwa{1}, Krishnaswamy Nagaraj{2}, Joonsung Park{2}
{1}Technische Universiteit Delft, Netherlands; {2}Texas Instruments, United States

A-6-205
A LEVITATING SPHERE VISCOMETER OPERATING IN A ROTATIONAL MODE
Stefan Clara, Hannes Antlinger, Ali Abdallah, Erwin K. Reichel, Wolfgang Hilber, Bernhard Jakoby
Johannes Kepler University, Austria

A-6-207
MEASUREMENT OF HEARTBEAT SIGNALS FROM AIRFLOW AT MOUTH IN RAT BY CATHETER FLOW SENSOR
Hidetaka Kawaoka{1}, Yoshihiro Hasegawa{1}, Mitsuhiro Shikida{1}, Miyoko Matsushima{2}, Tsutomu Kawabe{2}
{1}Hiroshima City University, Japan; {2}Nagoya University, Japan

A-6-209
EUTECTIC GA-IN LIQUID METAL BASED FLEXIBLE CAPACITIVE PRESSURE SENSOR
Mohammed Mohammed Ali, Binu Narakathu, Sepehr Emamian, Amer Chlaihawi, Farah Aljanabi, Dinesh Maddipatla, Bradley Bazuin, Massood Zandi Atashbar
Western Michigan University, United States

A-6-211
CHARACTERIZATION OF A THERMOPILE-BASED CALORIMETRIC FLOW SENSOR
Thilo Sauter{3}, Samir Cerimovic{2}, Harald Steiner{2}, Thomas Glatzl{2}, Marlies Schlauf{1}, Franz Kohl{2}
{1}Attophotonics Lifesciences GmbH, Austria; {2}Danube University Krems, Austria; {3}Technische Universität Wien / Danube University Krems, Austria

A-6-213
DEVELOPMENT OF CYLINDER HOLLOW STRUCTURE WITH FLOW SENSOR BY FILM TRANSFER TECHNOLOGY
Chiaki Okihara{1}, Yoshihiro Hasegawa{1}, Mitsuhiro Shikida{1}, Miyoko Matsushima{2}, Tsutomu Kawabe{2}
{1}Hiroshima City University, Japan; {2}Nagoya University, Japan

1:00 PM - 3:00 PM
A3P-O: Tactile, Motion, & Gesture Tracking Applications
LOCATION: Poster Area
SESSION CHAIR:
Philip Feng, Case Western Reserve University

A-10-237
APPLICATION OF MEMS ACCELEROMETERS IN SENSING PASSIVE EYE RESPONSE AS A SURROGATE FOR BRAIN RESPONSE TO HEAD ACCELERATION
Yuan Meng{1}, Mark Adams{1}, Lei Liu{2}, Mark Bolding{2}
{1}Auburn University, United States; {2}University of Alabama at Birmingham, United States

A-10-239
CONVOLUTION NEUTRAL NETWORK ENHANCED BINARY SENSOR NETWORK FOR HUMAN ACTIVITY RECOGNITION
Guocheng Liu, Jinhao Liang, Gongjin Lan, Qi Hao, Mei Chen
South University of Science and Technology of China, China

A-10-241
PERSONAL DEAD RECKONING USING IMU DEVICE AT UPPER TORSO FOR WALKING AND RUNNING
Tri Nhut Do, Ran Liu, Chau Yuen, U-Xuan Tan
Singapore University of Technology and Design, Singapore

A-10-243
STATIC GESTURES RECOGNITION FOR BRAZILIAN SIGN LANGUAGE WITH KINECT SENSOR
Sergio Carneiro{1}, Edson Santos{1}, Talles M. G. de A. Barbosa{1}, José Ferreira{1}, Symone Soares Alcalá{3}, Adson Da Rocha{2}
{1}Pontifícia Universidade Católica de Goiás, Brazil; {2}Universidade de Brasília, Brazil; {3}Universidade Federal de Goiás, Brazil

A-10-245
SENSOR FUSED THREE-DIMENSIONAL LOCALIZATION USING IMU, CAMERA AND LIDAR
Hanieh Deilamsalehy, Timothy Havens
Michigan Technological University, United States

A-10-247
HANDMAGIC: TOWARDS USER INTERACTION WITH INERTIAL MEASURING UNITS
Jules Calella, Francisco Ortega, Naphtai Rishe, Jonathan Bernal, Armando Barreto
Florida International University, United States

A-10-249
GYROSCOPE DRIFT CORRECTION ALGORITHM FOR INERTIAL MEASUREMENT UNIT USED IN HAND MOTION TRACKING
Nonnarit O-Larnnithipong, Armando Barreto
Florida International University, United States

A-10-251
INDOOR POSITIONING USING VISUAL AND INERTIAL SENSORS
Ashish Gupta, Alper Yilmaz
Ohio State University, United States

A-10-253
FALL DETECTION USING ULTRA-WIDEBAND POSITIONING
Alessio Vecchio, Guglielmo Cola
Università di Pisa, Italy

A-10-255
PEDESTRIAN DETECTION WITH HIGH RESOLUTION INERTIAL MEASUREMENT UNIT
Arto Perttula, Jussi Parviainen, Jussi Collin
Tampere University of Technology, Finland

A-10-257
A FINGER TOUCH FORCE DETECTION METHOD FOR TEXTILE BASED CAPACITIVE TACTILE SENSOR ARRAYS
Talha Agcayazi, Michael McKnight, Hannah Kausche, Tushar Ghosh, Alper Bozkurt
North Carolina State University, United States

A-10-259
WIRELESS SENSOR FOR DETERMINING THE IMPEDANCE OF HUMAN SKIN
Gregory Salsbery, Massood Tabib-Azar
University of Utah, United States

1:00 PM - 3:00 PM
A3P-P: Geological & Agricultural Sensing Applications
LOCATION: Poster Area
SESSION CHAIR:
Robert Roberts, University of Hong Kong

A-10-261
DIFFERENTIATION OF ORGANIC AND NON-ORGANIC APPLES USING NEAR INFRARED REFLECTANCE SPECTROSCOPY – A PATTERN RECOGNITION APPROACH
Weiran Song, Hui Wang, Paul Maguire, Omar Nibouche
Ulster University, United Kingdom

A-10-263
MICROSCALE PHLOEM SAP EXTRACTION SENSOR DEVICE FOR MEASURING BIOLOGICAL INFORMATION IN PLANT BRANCHES
Akihito Ono{2}, Akihito Yoneda{1}, Yuichi Tao{2}, Kyohei Terao{2}, Hidekuni Takao{2}, Ryuji Ichihashi{2}, Tsuyoshi Kobayashi{2}, Ikuo Kataoka{2}, Fusao Shimokawa{2}
{1}Civil Aviation College, Japan; {2}Kagawa University, Japan

A-10-265
APPLICATION OF NIR HYPERSPECTRAL IMAGING FOR WATER DISTRIBUTION MEASUREMENTS IN PLANT ROOTS AND SOIL
Thomas Arnold{1}, Raimund Leitner{1}, Gernot Bodner{2}
{1}CTR Carinthian Tech Research AG, Austria; {2}Universität für Bodenkultur Wien, Austria

A-10-267
SENSOR-BASED ESTIMATION OF BTEX CONCENTRATIONS IN WATER SAMPLES USING RECURSIVE LEAST SQUARES AND KALMAN FILTER TECHNIQUES
Karthick Sothivelr{1}, Florian Bender{1}, Fabien Josse{1}, Edwin Yaz{1}, Antonio Ricco{2}
{1}Marquette University, United States; {2}Stanford University, United States

A-10-269
MACROSCOPIC KELVIN PROBE FOR CONTACTLESS CORROSION ASSESSMENT OF STRUCTURES BURIED IN SOIL
Alberto A. Sagüés, Leonidas P. Emmenegger, Enrique A. Paz Velásquez, William C. Ruth
University of South Florida, United States

A-10-271
DETECTION OF FUNGUS THROUGH AN OPTICAL SENSOR SYSTEM USING THE HISTOGRAM OF ORIENTED GRADIENTS
Muhammad Waseem Tahir, Nayyer Abbas Zaidi, Roland Blank, Poornachandra P Vinayaka, Michael J. Vellekoop, Walter Lang
Universität Bremen, Germany

A-10-273
MEASUREMENT OF COMPLEX DIELECTRIC MATERIAL PROPERTIES OF ICE USING ELECTRICAL IMPEDANCE SPECTROSCOPY
Matthias Flatscher, Markus Neumayer, Thomas Bretterklieber, Bernhard Schweighofer
Graz University of Technology, Austria

A-10-275
SPECTROSCOPIC IDENTIFICATION OF ANTI-PERSONNEL MINE SURROGATES FROM PLANAR SENSOR MEASUREMENTS
Liam Marsh{1}, John L. Davidson{1}, Michael O'Toole{1}, Anthony Peyton{1}, Davorin Ambruš{2}, Darko Vasić{2}, Vedran Bilas{2}
{1}University of Manchester, United Kingdom; {2}University of Zagreb, Croatia

1:00 PM - 3:00 PM
A3P-Q: Medical Sensing Applications I
LOCATION: Poster Area
SESSION CHAIR:
Christian Zorman, Case Western Reserve University

A-10-277
MULTI-SENSOR PLATFORM FOR AUTOMATIC DISORDERS DETECTION IN CIRCADIAN RHYTHM
Alessandro Leone, Andrea Caroppo, Giovanni Diraco, Gabriele Rescio, Pietro Siciliano
Consiglio Nazionale delle Ricerche, Italy

A-10-279
INTRA-TISSUE PRESSURE MEASUREMENT DURING LASER ABLATION WITH FIBER-OPTIC EXTRINSIC FABRY-PEROT SENSOR
Daniele Tosi{1}, Paola Saccomandi{2}, Emiliano Schena{2}, Sergio Silvestri{2}, Dinesh Babu Duraibabu{3}, Sven Poeggel{3}, Gabriel Leen{3}, Elfed Lewis{3}
{1}Nazarbayev University, Russia; {2}Università Campus Bio-Medico di Roma, Italy; {3}University of Limerick, Ireland

A-10-281
APPLICATION OF ION-SENSTITIVE FIELD EFFECT TRANSISTORS FOR MEASURING GLIAL CELL K+ TRANSPORT
Yihao Zhu{1}, Goutam Koley{1}, Kenneth Walsh{2}, Ashley Galloway{2}, Pavel Ortinski{2}
{1}Clemson University, United States; {2}University of South Carolina, United States

A-10-283
AUTOMATING LASER CALIBRATION FOR MEDICAL LINEAR ACCELERATORS
Brandon VanGenderen{1}, Cameron Appeldoorn{1}, Ramani Ramaseshan{1}, Caroline Dearden{2}, Josha Ho{2}, Xiao Lin Long{2}
{1}BC Cancer Agency, Canada; {2}University of the Fraser Valley, Canada

A-10-285
PORTABLE EMBEDDED SYSTEMS FOR PROSTHETIC INTERFACE STRESS MAPPING OF LOWER LIMBS AMPUTEES
Maurizio Rossi{2}, Andrea Rizzi{2}, Leandro Lorenzelli{1}, Davide Brunelli{2}
{1}Fondazione Bruno Kessler, Italy; {2}Università degli Studi di Trento, Italy

A-10-287
CONTACTLESS DIRECT HEART-MOTION SENSOR USING FEMTOFARAD-LEVEL CAPACITANCE-VARIATION DETECTOR WITH VHF-BAND LC-OSCILLATOR
Hisashi Nishikawa, Yuta Kambara, Yuya Shimizu, Kei Igarashi, Ami Tanaka, Takakuni Douseki
Ritsumeikan University, Japan

A-10-289
TEMPERATURE MONITORING DURING THERMAL ABLATION ON EX-VIVO ORGANS BY FIBER BRAGG GRATINGS
Giovanna Palumbo{3}, Agostino Iadicicco{3}, Nicola Campopiano{2}, Daniele Tosi{1}, Paolo Verze{2}, Stefania Carlomagno{3}, Vincenzo Tammaro{2}, Juliet Ippolito{2}
{1}Nazarbayev University, Russia; {2}Università degli Studi di Napoli Federico II, Italy; {3}Università degli Studi di Napoli Parthenope, Italy

1:00 PM - 3:00 PM
A3P-R: Actuators & Sensor Power Systems II
LOCATION: Poster Area
SESSION CHAIRS:
Yuji Suzuki, The University of Tokyo
Haluk Külah, Middle East Technical University

A-12-317
DEVELOPING A STICK-SLIP BASED KINESTHETIC TOUCHSCREEN SYSTEM FOR REALTIME STYLUS MANIPULATION
Ahmed Farooq{2}, Philipp Weitz{2}, Grigori Evreinov{2}, Roope Raisamo{2}, Daisuke Takahata{1}
{1}FUKOKU Co., Ltd., Japan; {2}University of Tampere , Finland

A-12-318
FABRICATION OF ACOUSTIC EJECTORS WITH REPLACEABLE ACOUSTIC LENS BY USING SOFT-LITHOGRAPHY
You-Lin Tu{1}, Jin-An Wu{1}, Shih-Jui Chen{1}, Barthélemy Cagneau{2}, Luc Chassagne{2}
{1}National Central University, Taiwan; {2}Université de Versailles Saint-Quentin-en-Yvelines, France

A-12-319
RF-MEMS FOR 5G MOBILE COMMUNICATIONS: A BASIC ATTENUATOR MODULE DEMONSTRATED UP TO 50 GHZ
Jacopo Iannacci{1}, Christian Tschoban{2}, Jacob Reyes{2}, Uwe Maaß{2}, Max Huhn{2}, Ivan Ndip{2}, Harald Pötter{2}
{1}Fondazione Bruno Kessler, Italy; {2}Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration, Germany

A-12-320
DESIGN AND FABRICATION OF AN ELECTRO-THERMAL LINEAR MOTOR WITH LARGE OUTPUT FORCE AND DISPLACEMENT
Tengjiang Hu{2}, Yulong Zhao{2}, Xiuyuan Li{2}, You Zhao{2}, Yingwei Bai{1}
{1}Shaanxi Applied Physical Chemistry Research Institute, China; {2}Xi'an Jiaotong University, China

A-12-321
MEMS ACTUATOR FOR SPLINTER-LIKE SKIN PENETRATION IN GLUCOSE-SENSING APPLICATIONS: DESIGN AND DEMONSTRATION
Martin Berka, Orly Yadid-Pecht, Martin Mintchev, Gang Wang
University of Calgary, Canada

A-12-322
REDUCED GRAPHENE OXIDE AND GEL POLYMER BASED THIN FILM SUPERCAPACITOR
Yingqi Jiang{1}, Chen Yang{1}, Qian Zhang{1}, Ken Yang{1}, Suppanat Kosolwattana{2}, Jarin Joyner{2}, Hemtej Gullapalli{2}, Robert Vajtai{2}
{1}Analog Devices, Inc., United States; {2}Rice University, United States

A-12-323
MANUFACTURING OF LINI0.5MN1.5O4/LIPON/SINX STRUCTURED FLEXIBLE LITHIUM MICROBATTERIES
Haena Yim{1}, Ji-Won Choi{1}, Min-Seok Jeon{2}, Yung-Eun Sung{3}
{1}Korea Institute of Science and Technology, Korea, South; {2}Korea Testing Laboratory, Korea, South; {3}Seoul National University, Korea, South

A-12-324
MICRO BATTERIES FOR DRIVING GLUCOSE SENSORS ON SMART LENSES
Hyunseok Lee{1}, Narendra Parmar{1}, Ji-Won Choi{1}, Min-Seok Jeon{2}, Kwang-Bum Kim{3}
{1}Korea Institute of Science and Technology, Korea, South; {2}Korea Testing Laboratory, Korea, South; {3}Yonsei University, Korea, South

1:00 PM - 3:00 PM
A3P-S: Open Poster I
LOCATION: Poster Area
SESSION CHAIR: Stephen Bart, MKS Instruments

A-20-387
A NON-INVASIVE BIO-SENSING SYSTEM FOR INSPECTION OF OXY- AND DEOXY- HEMOGLOBIN WITHIN THE BLOOD VARIES ACCORDING TO THE OXYGEN CONTENT
Yao-Chin Wang{1}, Zu-Po Yang{2}, Bor-Shyh Lin{2}
{1}Hungkuang University, Taiwan; {2}National Chiao Tung University, Taiwan

A-20-389
DESIGN OF TOOL OF DIAGNOSIS AID USING PIEZOELECTRIC SENSORS NETWORK FOR LOCALISATION OF DEFECTS IN AUTOMOBILE
Gaston Mboungui{2}, Jean Christophe Moundjigui{1}
{1}enset, France; {2}Tshwane University of Technology, South Africa

A-20-391
REAL-TIME RAPID, AND DIRECT QUANTIFICATION OF ENTEROVIRUS 71 PARTICLES UTILIZING PORTABLE SPR SENSOR
Briliant Adhi Prabowo, Azharul Alom, Muhammad Khari Secario, Jia-Lung Liu, Po-Ting Ou, Robert Y.L. Wang, Kou-Chen Liu
Chang Gung University, Taiwan

A-20-393
NOVEL CONDITION ASSESSMENT TECHNOLOGY FOR LIVE UNDERGROOUND CABLES
John Lauletta{1}, Jose De Abrue-Garcia{2}, Yilmaz Sozer{2}, Matthew Granger{2}
{1}Exacter, Inc., United States; {2}University of Akron, United States

A-20-395
MEMS RESONATOR BASED MULTISENSORY SYSTEM
Kuei Ann Wen
National Chiao Tung University, Taiwan

A-20-397
IMPROVEMENT IN THE DIRECTIVITY OF AN ARRAY TRANSMITTER FOR AN ULTRASONIC DEPTH SENSOR OPERATING IN AIR BY RANDOM PHASE SHIFT OF TRANSMITTING ELEMENTS
Hideo Furuhashi, Sahdev Kumar
Aichi Institute of Technology, Japan

A-20-399
ADVANCES IN FET AND SCHOTTKY DIODE CHEMICAL GAS SENSING DEVICES
Tesfalem Geremariam Welearegay, Raul Calavia, Eduard Llobet, Radu Ionescu
University Rovira i Virgili, Spain

A-20-401
NON-CONTACT AC VOLTAGE SENSING TECHNIQUES USING ELECTRIC FIELD ENERGY HARVESTING
Seokwon Yang, Sungmuk Kang, Junho Kim, Hoseong Kim
Chung-Ang University, Korea

A-20-403
HIGH SENSITIVITY FLUORESCENCE DETECTION USING SMARTPHONE CAMERAS
Zhendong Cao, Hsiu-Yang Tseng, Katrina Salvante, Pablo Nepomnaschy, Ash Parameswaran
simon fraser university, Canada

A-20-407
LOW-COST SOIL MATRIC POTENTIAL SENSOR BY THIN-FILM ELECTRODES WITH GYPSUM PLATE
Ryo Shigeta{3}, Naoya Miyamoto{2}, Yuki Kojima{1}, Yoshihiro Kawahara{3}, Tohru Asami{3}
{1}Faculty of Engineering, Gifu University, Japan; {2}Graduate School of Agricultural and Life Sciences, The University of Tokyo, Japan; {3}Graduate School of Information Science and Technology, The University of Tokyo, Japan

A-20-409
NON-ENZYMATIC CONTINUOUS GLUCOSE MONITORING TECHNOLOGY USING ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY
Sean Moore, Byoung Hee You, Namwon Kim, In-Hyouk Song
Texas State University, United States

A-20-411
STANDARDS NEEDED FOR ELECTRONIC TASTE AND SMELL
Susan Schiffman, H Troy Nagle
NC State University, United States

A-20-413
HETERO-CORE FIBER OPTIC TIP SENSOR FOR PROVIDING TOUCH SENSATION FOR ROBOTIC FINGERS
Hiroshi Yamazaki, Michiko Nishiyama, Kazuhiro Watanabe
SOKA university, Japan

A-20-415
DEVELOPMENT OF A HETERO-CORE OPTICAL FIBER SPR SENSOR USING BEND-INSENSITIVE FIBERS
Hiroyuki Sueyoshi, Hiroshi Yamazaki, Ai Hosoki, Michiko Nishiyama, Kazuhiro Watanabe
Soka University, Japan

A-20-417
SWALLOWING MEASUREMENT USING HETERO-CORE OPTICAL FIBER SENSOR
Toshiaki Hara, Masahiko Ito, Yuya Koyama, Michiko Nishiyama, Kazihiro Watanabe
Soka university, Japan

A-20-420
MOBILE HEALTH SENSORS FOR PERSONAL EXPOSURE ASSESSMENT
Chenwen Lin, Di Wang, Xiaojun Xian, Francis Tsow, Xingcai Qin, Jingjing Yu, Nongjian Tao
arizona state university, United States

1:00 PM - 3:00 PM
A3P-T: Focused Session Posters: Piezoelectric Energy Harvesting
LOCATION: Poster Area
SESSION CHAIR:
Fang Chen, State Key Lab of Transducer Technology

A-16-350
A NOVEL TOGGLE-TYPE MEMS VIBRATION ENERGY HARVESTER FOR INTERNET OF THINGS APPLICATIONS
Jacopo Iannacci{1}, Guido Sordo{1}, Michael Schneider{2}, Ulrich Schmid{2}, Antonio Camarda{3}, Aldo Romani{3}
{1}Fondazione Bruno Kessler, Italy; {2}Technische Universität Wien, Austria; {3}Università di Bologna, Italy

A-16-353
A MULTIFUNCTIONAL DEVICE AS BOTH STRAIN SENSOR AND ENERGY HARVESTER FOR STRUCTURAL HEALTH MONITORING
Zheng Jun Chew{2}, Tingwen Ruan{2}, Meiling Zhu{2}, Marise Bafleur{1}, Jean-Marie Dilhac{1}
{1}Laboratoire d'Analyse et d'Architecture des Systèmes / Université de Toulouse, France; {2}University of Exeter, United Kingdom

A-16-356
COMBINED POWER EXTRACTION WITH ADAPTIVE POWER MANAGEMENT MODULE FOR INCREASED PIEZOELECTRIC ENERGY HARVESTING TO POWER WIRELESS SENSOR NODES
Zheng Jun Chew, Meiling Zhu
University of Exeter, United Kingdom

A-16-359
FLEXIBLE FIBER-BASED TRIBOELECTRIC GENERATOR FOR SELF-POWERED SENSORS
Jiwon Park, A Young Choi, Chang Jun Lee, Youn Tae Kim
Chosun University, Korea, South

A-16-362
SUB-G VIBRATION-THRESHOLD TRIGGERED DUAL FUNCTIONS OF ENERGY-HARVESTING AND VIBRATION-SENSING
Qisheng He, Zao Ni, Fang Chen, Jiachou Wang, Xinxin Li
Shanghai Institute of Microsystem and Information Technology / Chinese Academy of Sciences, China

A-16-365
HIGHLY FLEXIBLE P(VDF-TRFE) FILM-BASED PIEZOELECTRIC SELF-POWERED ENERGY HARVESTER
Soaram Kim, Itmenon Towfeeq, Ferhat Bayram, Digangana Khan, Goutam Koley
Clemson University, United States

A-16-368
ACCURACY AND MULTI DOMAIN PIEZOELECTRIC POWER HARVESTING MODEL USING VHDL-AMS AND SPICE
Flavilene Da Silva Souza{1}, Nobuo Oki{1}, Jozué V. Filho{1}, Richard Loendersloot{2}, Arthur P. Berkhoff{2}
{1}Universidade Estadual Paulista Júlio de Mesquita Filho, Brazil; {2}Universiteit Twente, Netherlands

A-16-371
A PIEZOELECTRIC BASED VIBRATION ENERGY HARVESTER FABRICATED USING SCREEN PRINTING TECHNIQUE
Sepehr Emamian, Amer Chlaihawi, Binu Narakathu, Bradley Bazuin, Massood Zandi Atashbar
Western Michigan University, United States

A-16-374
A PIEZOELECTRIC VIBRATION ENERGY HARVESTER USING MULTIPLE NONLINEAR TECHNIQUES
Xiang Wang, Peng Zhou, Haisheng San
Xiamen University, China

3:00 PM - 3:30 PM
COFFEE BREAK
LOCATION: Grand Sierra D-I

3:00 PM - 4:00 PM
A4P-G: Live Demos
LOCATION: Bonaire 7-8
SESSION CHAIRS:
Ravinder Dahiya, University of Glasgow
Hua Wang, Georgia Institute of Technology

A-18-376
LIVE DEMONSTRATION: A 1024-PIXEL CMOS MULTI-MODALITY SENSING ARRAY FOR CELL-BASED ASSAYS
Jong Seok Park{2}, Moez Aziz{2}, Taiyun Chi{2}, Amy Su{2}, Andrew Zhao{1}, Hee Cheol Cho{1}, Mark Styczynski{2}, Hua Wang{2}
{1}Emory University, United States; {2}Georgia Institute of Technology, United States

A-18-377
LIVE DEMONSTRATION: CHARACTERIZATION OF 3D PRINTED PIEZOELECTRIC SENSORS
Max Kirkpatrick{2}, Joshua Tarbutton{2}, Tue Le{2}, Chabum Lee{1}
{1}Tennessee Technical University, United States; {2}University of South Carolina, United States

A-18-378
LIVE DEMONSTRATION: AN IR-BASED FACIAL EXPRESSION TRACKING SENSOR FOR HEAD-MOUNTED DISPLAYS
Jaekwang Cha, Jinhyuk Kim, Shiho Kim
Yonsei University, Korea, South

A-18-379
LIVE DEMONSTRATION: BIOSLEEVE, A WEARABLE HANDS-FREE GESTURE CONTROL INTERFACE
Christopher Assad, Jaakko Karras, Javier Rodriguez, Elijah Pivo, Calvin Huang, Michael Wolf, Marc Pomerantz, Adrian Stoica
Jet Propulsion Laboratory, United States

A-18-380
LIVE DEMONSTRATION: HIGH-DEFINITION WIRELESS PERSONAL AREA TRACKING USING AC MAGNETIC FIELD
Mohit Singh, Byunghoo Jung
Purdue University, United States

A-18-381
LIVE DEMONSTRATION: A WIRELESS MULTI-CHANNEL PHYSIOLOGICAL SIGNAL ACQUISITION SYSTEM-ON-CHIP FOR WEARABLE DEVICES
Sheng-Cheng Lee, Yu-Shan Lin, Yu-Jui Chen, Herming Chiueh
National Chiao Tung University, Taiwan

A-18-382
LIVE DEMONSTRATION: EXTREME ENVIRONMENT ANALOGUE ELECTRONICS FOR SENSOR NODES
Hua-Khee Chan, Nick Wright, Alton Horsfall
Newcastle University, United Kingdom

A-18-383
LIVE DEMONSTRATION: PRINTED E-NOSE FOR UNIVERSAL APPLICATIONS
Mustahsin Adib, Martin Sommer
Karlsruher Institut für Technologie, Germany

A-18-384
LIVE DEMONSTRATION: CHIP-SCALE, NANO-ENGINEERED, ENVIRONMENTAL GAS SENSORS
Brian Thomson{2}, Ratan Debnath{2}, Baomei Wen{2}, Audie Castillo{2}, Ting Xie{3}, Asha Rani{1}, Abhishek Motayed{2}
{1}George Washington University, United States; {2}N5 Sensors Inc, United States; {3}University of Maryland, United States

A-18-385
LIVE DEMONSTRATION: PULSE TRANSIT TIME MEASUREMENT ON A MODIFIED WEIGHING SCALE FOR CUFFLESS BLOOD PRESSURE ESTIMATION
Andrew Carek, Jordan Conant, Omer Inan
Georgia Institute of Technology, United States

A-18-386
LIVE DEMONSTRATION: FEMTO- TO-MACRO SCALE INTERDISCIPLINARY SENSING WITH TENSIONED METASTABLE FLUID DETECTORS
Rusi Taleyarkhan{1}, Alexander Hagen{1}, Anthony Sansone{1}, Brian Archambault{2} {1}Purdue University, United States; {2}Sagamore Adams Laboratories, LLC, United States

4:00 PM - 5:30 PM
A5L-A: New Sensing Principles & Applications
LOCATION: Curacao 1-2
SESSION CHAIRS:
David Elata, Technion - Israel Institute of Technology
Michael Vellekoop, University of Bremen

4:00
ELECTRIC FIELD DRIVEN EXTENSIONAL RHEOMETRY OF SYNOVIAL FLUID
Erwin K. Reichel{2}, Thomas Voglhuber-Brunnmaier{2}, Lisa Wolf{3}, Roman Beigelbeck{1}, Bernhard Jakoby{2}
{1}Danube University Krems / Technische Universität Wien, Austria; {2}Johannes Kepler University, Austria; {3}Justus Liebig University Gießen, Germany

4:15
STUDY OF A SILICON PARALLEL PLATE CAPACITOR AS A DEW POINT SENSOR
Jochen Stehle{1}, Oliver Ambacher{2}, Gary Yama{2}, Uma Krishnamoorthy{2}
{1}Albert-Ludwigs-Universität Freiburg, Germany; {2}Robert Bosch Research and Technology Center, United States

4:30
DIRECT OPTICAL STRESS SENSING IN SEMICONDUCTOR MANUFACTURING USING RAMAN MICRO-SPECTROMETRY
Martin De Biasio{1}, Martin Kraft{1}, Michael Roesner{3}, Christoph Bergmann{3}, Maria Mercedes Cerezuela-Barreto{2}, Dirk Lewke{2}, Martin Schellenberger{2}
{1}CTR Carinthian Tech Research AG, Austria; {2}Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie, Germany; {3}Infineon Technologies Austria AG, Austria

4:45
CAPACITIVE DIRECT-IMAGING SENSOR FOR TWO-PHASE FLOW VISUALIZATION
Aluisio Do Nasciment Wrasse, Tiago P. Vendruscolo, Eduardo N. Santos, Fernando C. Castaldo, Rigoberto E. M. Morales, Marco Jose Da Silva
Universidade Tecnológica Federal do Paraná, Brazil

5:00
BUCKLING RESPONSE OF ELECTROTHERMALLY ACTUATED MICRO-BEAMS TO PARALLEL AND TRANSVERSE FLOW
Yoav Kessler, Alex Liberzon, Slava Krylov
Tel Aviv University, Israel

5:15
DESIGN PRINCIPLES FOR DIFFUSION CHARGERS SENSING PARTICLE NUMBER CONCENTRATION
Mario Anton Schriefl, Alexander Bergmann
Graz University of Technology, Austria

4:00 PM - 5:30 PM
A5L-B: Fabrication & Integration Issues in Mechanical & Chemobiological Sensors
LOCATION: Curacao 3-4
SESSION CHAIRS:
Karthik Shankar, University of Alberta
Jacopo Iannacci, FBK, Trento, Italy

4:00
FABRICATION CHALLENGES OF LAB-ON-CHIP
Chris Backhouse
University of Waterloo, Canada

4:30
A NANOFOREST-BASED SERS SENSOR FABRICATED BY BOSCH PROCESS FOR MULTIPLEXED CHEMICAL DETECTION
Yuan He, Chao Song, Long Que, Chao Wang, Chenxu Yu
Iowa State University, United States

4:45
PATTERNING OF NANOPHOTONIC STRUCTURES AT OPTICAL FIBER TIP FOR REFRACTIVE INDEX SENSING
Shawana Tabassum, Yifei Wang, Jikang Qu, Qiugu Wang, Seval Oren, Robert J. Weber, Meng Lu, Ratnesh Kumar, Liang Dong
Iowa State University, United States

5:00
ALL LASER PRINTED RESISTIVE CHEMICAL SENSOR: FABRICATION AND EVALUATION
Symeon Papazoglou{2}, Marina Makrygianni{2}, Ioanna Zergioti{2}, Myrto Filippidou{1}, Stavros Chatzandroulis{1}
{1}National Centre of Scientific Research Demokritos, Greece; {2}National Technical University of Athens, Greece

5:15
CHALLENGES OF MONOLITHIC INTEGRATION FOR SIGE MEMS TECHNOLOGY
Ashesh Ray Chaudhuri{2}, Simone Severi{1}, Philippe Helin{1}, Laurent A. Francis{3}, Harrie A.C. Tilmans{1}
{1}IMEC, Belgium; {2}IMEC / Université Catholique de Louvain, Belgium; {3}Université Catholique de Louvain, Belgium

4:00 PM - 5:30 PM
A5L-C: Light Detection
LOCATION: Curacao 5-6
SESSION CHAIRS:
Eduardo Fontana, Universidade Federal de Pernambuco
Carlos Ruiz-Zamarreño, Public University of Navarra

4:00
A VECTOR LIGHT DETECTOR FOR PROXIMITY SENSING APPLICATIONS
Ibrahim El-chami, Siamack Vosoogh-Grayli, Donghao Zhuo, Behraad Bahreyni
Simon Fraser University, Canada

4:15
SIMULATION AND FABRICATION OF POLARIZED ORGANIC PHOTODIODES
Aniello Falco{1}, Robin Nagel{1}, Paolo Lugli{1}, Emanuele Bezzeccheri{2}, Rosalba Liguori{2}, Alfredo Rubino{2}
{1}Technische Universität München, Germany; {2}Università degli Studi di Salerno, Italy

4:30
AN EMBEDDED 2D IMAGER FOR MICROSCALE FLOWMETRY BASED ON OPTICAL FEEDBACK INTERFEROMETRY
Raul Da Costa Moreira, Adam Quotb, Clement Tronche, Francis Jayat, Antonio Luna-Arriaga, Thierry Bosch, Julien Perchoux
Laboratoire d'Analyse et d'Architecture des Systèmes / Université de Toulouse, France

4:45
EPITAXIAL GRAPHENE (EG)/SIC BASED SCHOTTKY EMITTER BIPOLAR PHOTOTRANSISTORS FOR UV DETECTION AND EFFECT OF HYDROGEN INTERCALATION ON DEVICE I-V CHARACTERISTICS
Venkata S.N. Chava{2}, MVS Chandrashekhar{2}, Kevin M. Daniels{1}, Bobby G. Barker{2}, Andrew B. Greytak{2}
{1}U.S. Naval Research Laboratory, United States; {2}University of South Carolina, United States

5:00
IMPROVED SIGNAL TO NOISE RATIO ACROSS THE SPECTRAL RANGE FOR CMOS SILICON PHOTOMULTIPLIERS
Mohammad Habib, Mst Shawkat, Nicole McFarlane
University of Tennessee, United States

5:15
A CMOS IMAGE SENSOR WITH NEARLY UNITY-GAIN SOURCE FOLLOWER AND OPTIMIZED COLUMN AMPLIFIER
Xiaoliang Ge, Albert Theuwissen
Technische Universiteit Delft, Netherlands

4:00 PM - 5:30 PM
A5L-D: Sensing Applications I
LOCATION: Curacao 7-8
SESSION CHAIRS:
Bernard Jakoby, Johannes Kepler University Linz, Austria
Jianzhen Ou, Royal Melbourne Institute of Technology, Australia

4:00
HUMAN ACTIVITY RECOGNITION WITH INERTIAL SENSORS USING A DEEP LEARNING APPROACH
Tahmina Zebin, Patricia J. Scully, Krikor B. Ozanyan
University of Manchester, United Kingdom

4:15
A NOVEL RECURSIVE ZERO-VELOCITY DETECTION APPROACH FOR SMARTPHONE BASED PEDESTRIAN DEAD RECKONING SYSTEMS
Yizhen Wang{2}, Lingxiang Zheng{2}, Biyu Tang{2}, Ao Peng{2}, Lulu Yuan{2}, Qi Yang{2}, Haibin Shi{2}, Xiaoyang Ruan{2}, Huiru Zheng{1}
{1}University of Ulster, United Kingdom; {2}Xiamen University, China

4:30
APPLICATION OF POLYPYRROLE-BASED SELECTIVE ELECTRODES IN ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY TO DETERMINE NITRATE CONCENTRATION
Meghdad Hajimorad{1}, Saqer Alhloul{2}, Hadil Mustafa{1}, Monica So{1}, Hitesh Oswal{1}
{1}California State University, Chico, United States; {2}Eastern Washington University, United States

4:45
IONOGEL-BASED NITRATE SENSOR DEVICE
Janire Saez, Fernando Benito-Lopez, Gorka Arana, Luis Angel Fernandez-Cuadrado
Universidad del País Vasco, Spain

5:00
NON CONDUCTING OBJECT DETECTION USING LOW FREQUENCY ELECTRIC FIELD IMAGING: POSSIBLE APPLICATION TO ANOMALY DETECTION IN INSULATING MATERIALS
Olivier Mareschal, Basile Dufay, Sylvain Lebargy, Gilles Allègre, Matthieu Denoual, Didier Robbes
Université de Caen, France

5:15
CLICK CHEMISTRY BASED BIOMOLECULAR CONJUGATION MONITORING USING SURFACE-ENHANCED RAMAN SPECTROSCOPY MAPPING
Mirko Palla{1}, Shiv Kumar{1}, Zengmin Li{1}, Steffen Jockusch{1}, James Russo{1}, Jingyue Ju{1}, Filippo Bosco{2}, Tomas Rindzevicius{2}, Tommy S. Alstrom{2}, Michael S. Schmidt{2}, Anja Boisen{2}
{1}Columbia University, United States; {2}Technical University of Denmark, Denmark

4:00 PM - 5:30 PM
A5L-E: Focused Session: Wearables
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Mark Ming-Cheng Cheng, Wayne State University
Zeynep Celik-Butler, University of Texas at Arlington

4:00
TACTILE SENSORIZED GLOVE FOR FORCE AND MOTION SENSING
Joo Chuan Yeo{1}, Cassidy Lee{1}, Zhiping Wang{2}, Chwee Teck Lim{1}
{1}National University of Singapore, Singapore; {2}Singapore Institute of Manufacturing Technology, Singapore

4:15
CMOS HALL SENSOR WITH REDUCED SENSITIVITY DRIFT BY SYNCHRONOUS EXCITATION CALIBRATION FOR WEARABLE BIOMAGNETIC SENSOR IN SYSTEM-ON-CHIP
Tiger Chang, Kai-Cheung Juang
Industrial Technology Research Institute, Taiwan

4:30
ELECTRONIC BRACELET FOR MONITORING OF ALCOHOL LIFESTYLE
David Kinnamon{2}, Anjan Panneer Selvam{2}, Shalini Prasad{2}, Sriram Muthukumar{1}
{1}EnLiSense LLC., United States; {2}University of Texas at Dallas, United States

4:45
WEARABLE ANEMOMETER FOR 2D WIND DETECTION
Shuai Zhao, Peng Jiang, Rong Zhu, Ruiyi Que
Tsinghua University, China

5:00
FLEXIBLE SENSOR FOR MEASUREMENT OF SKIN PRESSURE AND TEMPERATURE IN A CLINICAL SETTING
John McNeill{2}, Matthew Crivello{2}, Yitzhak Mendelson{2}, Devdip Sen{2}, Raymond Dunn{1}, Kelli Hickle{1}
{1}University of Massachusetts Medical School, United States; {2}Worcester Polytechnic Institute, United States

5:15
TEXTILE-BASED WEARABLE SENSORS USING METAL-NANOWIRE EMBEDDED CONDUCTIVE FIBERS
Jimi Eom, Woobin Lee, Yong-Hoon Kim
Sungkyunkwan University, Korea, South

4:00 PM - 5:30 PM
A5L-F: Chemical & Gas Sensing Devices
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Massood Atashbar, Western Michigan University
Ramgopal Rao, IIT Delhi

4:00
INVITED: ORGANIC FIELD EFFECT TRANSISTORS FOR EXPLOSIVE AND RADIATION DOSIMETRY APPLICATIONS
Valipe Ramgopal Rao, Sandeep G Surya
Indian Institute of Technology Bombay, India

4:30
A NOVEL IN-LINE FIBRE-OPTIC SENSOR FOR THE DETECTION OF HYDRATE INHIBITORS WITHIN THE OIL AND GAS INDUSTRY
Gary McDowell{2}, Mahesh Uttamlal{2}, Sheila Holmes-Smith{2}, Alan Graham{1}
{1}FMC Technologies, United Kingdom; {2}Glasgow Caledonian University, United Kingdom

4:45
RAMAN ENHANCED STRUCTURE WITH RECONFIGURED MOLECULARLY-IMPRINTED-POLYMER FOR GAS DETECITON
Satoshi Araki, Masashi Watanabe, Fumihiro Sassa, Kenshi Hayashi
Kyushu University, Japan

5:00
DETECTION OF AROMATIC COMPOUNDS IN ARTIFICIAL GASOLINE WITH HYBRID SURFACE ACOUSTIC WAVE SENSOR ARRAY AND A SHORT PACKED COLUMN (SAW-GC)
Caroline Carriel Schmitt, Michael Rapp, Achim Voigt, Nicolaus Dahmen
Karlsruher Institut für Technologie, Germany

5:15
VOC DETECTION USING MULTIMODE E-NOSE COMPOSED OF BULK ACOUSTIC WAVE RESONATOR AND SILICON NANOWIRE FIELD EFFECT TRANSISTOR ARRAY
Ye Chang{1}, Hemi Qu{1}, Xuexin Duan{1}, Luye Mu{2}, Mark Reed{2}
{1}Tianjin University, China; {2}Yale University, United States

4:00 PM - 5:30 PM
Professional Development Program II
LOCATION: Bonaire 5-6

4:00
IEEE SENSORS COUNCIL: ACTIVITIES AND OPPORTUNITIES
Andrei Shkel, IEEE Sensors Council VP Technical Operations

4:15
BEYOND GRADUATE SCHOOL – ACADEMIA, INDUSTRY, OR ENTREPRENEURSHIP?
Rajinder Khosla, NC State University

4:45
PUBLIC ENGAGEMENT – WHY BOTHER?
Ravinder Dahiya, University of Glasgow

5:00
WOMEN IN SENSORS
Christina Schober, Honeywell Inc.
Jill Gostin, Georgia Institute of Technology
Hulya Kirkici, University of South Alabama
Veena Misra, North Carolina State University

5:30 PM - 7:00 PM
YOUNG PROFESSIONALS RECEPTION
LOCATION: Antigua 1-4

9:00 AM - 10:00 AM
B1L-A: Plenary 2
LOCATION: Grand Sierra A-C
SESSION CHAIR:
Srinivas Tadigadapa, Pennsylvania State University

"Highly Flexible and Wearable Microfluidic Sensors"
Chwee Teck Lim, National University of Singapore

There has been an increased use of body sensors for monitoring physiological signals and bodily movements in recent years. However, current conventional sensors are typically rigid and bulky. Here, we develop highly flexible, robust and wearable liquid-based resistive sensors that consist of soft elastomer-based microfluidic templates that encapsulate conductive liquid as the sensing element. As a proof-of-concept, we demonstrate the recognition, differentiation, and measurement of distinct muscle-induced hand motions as well as handgrip strength and localized dynamic foot pressure. Overall, this work highlights the potential use of these liquid-based microfluidic sensors in a wide range of biomedical applications including that of rehabilitation.

10:00 AM - 10:30 AM
COFFEE BREAK
LOCATION: Grand Sierra D-I

10:30 AM - 12:00 PM
B2L-A: Physical Sensors I: Sensor Systems & Instrumentation
LOCATION: Curacao 1-2
SESSION CHAIRS:
Darrin Young, University of Utah
Robert Roberts, University of Hong Kong

10:30
INVITED: PACKAGED CAPACITIVE PRESSURE SENSOR SYSTEM FOR AIRCRAFT ENGINE HEALTH MONITORING
Maximilian Scardelletti{2}, Christian Zorman{1}
{1}Case Western Reserve University, United States; {2}Glenn Research Center , United States

11:00
AN INSTRUMENTATION GRADE WALL SHEAR STRESS SENSING SYSTEM
Casey Barnard{2}, Jessica Meloy{1}, Mark Sheplak{2}
{1}Boeing Company, United States; {2}University of Florida, United States

11:15
DOPPLER SENSING OF UNSTEADY DENSE PARTICULATE FLOWS
Benjamin Chorpening{2}, Michael Spencer{2}, Richard Stehle{2}, Jared Charley{2}, David Greve{1}
{1}Carnegie Mellon University, United States; {2}United States Department of Energy, United States

11:30
LINEARLY CHIRPED FIBER-OPTIC BRAGG GRATING AS DISTRIBUTED TEMPERATURE SENSOR FOR LASER ABLATION
Sanzhar Korganbayev{2}, Nurlan Zhakin{2}, Daniele Tosi{2}, Flavia Napoleoni{4}, Emiliano Schena{4}, Paola Saccomandi{4}, Riccardo Gassino{3}, Alberto Vallan{3}, Guido Perrone{3}, Michele Caponero{1}
{1}Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy; {2}Nazarbayev University, Russia; {3}Politecnico di Torino, Italy; {4}Università Campus Bio-Medico di Roma, Italy

11:45
A TWO-AXIS TACTILE SENSOR WITH 1μM DIAMETER TIP OF CONTACTOR FOR DETECTION ABILITY OF MICRO REGION SURFACE TEXTURE
Kazuki Watatani, Ryogo Kozai, Kyohei Terao, Fusao Shimokawa, Hidekuni Takao
Kagawa University, Japan

10:30 AM - 12:00 PM
B2L-B: Acoustic Sensors
LOCATION: Curacao 3-4
SESSION CHAIRS:
Eugene Hwang, Analog Devices
Jun Kondoh, Shizuoka University

10:30
SILICON CAVITY RESONATOR BASED ON LOCALLY RESONANT PHONONIC CRYSTAL
Wanli Jiang, Duan Feng, Dehui Xu, Bin Xiong, Yuelin Wang
Shanghai Institute of Microsystem and Information Technology / Chinese Academy of Sciences, China

10:45
3D PHONONIC-FLUIDIC CAVITY SENSOR FOR RESONANCE MEASUREMENTS OF VOLUMETRIC FLUID PROPERTIES
Frieder Lucklum, Michael J. Vellekoop
Universität Bremen, Germany

11:00
NARROWBAND MEMS RESONANT INFRARED DETECTORS BASED ON ULTRATHIN PERFECT PLASMONIC ABSORBERS
Zhenyun Qian, Sungho Kang, Vageeswar Rajaram, Matteo Rinaldi
Northeastern University, United States

11:15
DIRECTLY TRAPPING OF NANOSCALE BIOMOLECULES USING BULK ACOUSTIC WAVE RESONATORS
Wenpeng Liu, Chongling Sun, Ji liang, Zifan Tang, Hongxiang Zhang, Hao Zhang, Wei Pang, Xuexin Duan
Tianjin University, China

11:30
A DIFFRACTION FREE PRESSURE WAVE SENSOR SETUP FOR THE ACOUSTIC VISCOSITY OF LIQUIDS
Hannes Antlinger{2}, Stefan Clara{2}, Thomas Voglhuber-Brunnmaier{2}, Bernhard Jakoby{2}, Roman Beigelbeck{1}, Samir Cerimovic{3}, Franz Keplinger{3}
{1}Danube University Krems / Technische Universität Wien, Austria; {2}Johannes Kepler University, Austria; {3}Technische Universität Wien, Austria

11:45
NOVEL MEASUREMENT METHOD OF POSITION AND SOUND VELOCITY OF A LIQUID DROPLET USING A SURFACE ACOUSTIC WAVE DEVICE
Jun Kondoh, Michiyuki Yamada, Ken Sugiura
Shizuoka University, Japan

10:30 AM - 12:00 PM
B2L-C: Optical Biosensors
LOCATION: Curacao 5-6
SESSION CHAIRS:
Huikai Xie, University of Florida
Wei-Chuan Shih, University of Houston

10:30
INVITED: MICRO FBI: A MICROSYSTEM FOR FEEDBACK-BASED BIOFILM INHIBITION
Sowmya Subramanian, Ryan Huiszoon, William Bentley, Reza Ghodssi
University of Maryland, United States

11:00
POROUS PHOTONIC CRYSTAL EXTERNAL CAVITY LASER BIOSENSOR FOR DRUG SCREENING
Qinglan Huang, Jessie Peh, Paul J. Hergenrother, Brian T. Cunningham
University of Illinois at Urbana–Champaign, United States

11:15
SINGLE-MOLECULE FLUORESCENCE IMAGING OF KINESIN USING LINEAR ZERO-MODE WAVEGUIDES
Yuki Morita{2}, Kazuya Fujimoto{2}, Ryota Iino{1}, Michio Tomishige{3}, Hirofumi Shintaku{2}, Hidetoshi Kotera{2}, Ryuji Yokokawa{2}
{1}Chinese Academy of Sciences, Japan; {2}Kyoto University, Japan; {3}University of Tokyo, Japan

11:30
SINGLE STRAND DNA DETECTION BY MEANS OF LOSSY MODE RESONANCE-BASED OPTICAL FIBER DEVICES
Carlos Ruiz Zamarreño{2}, Pablo Zubiate{2}, Pedro Sanchez{2}, Ignacio Raul Matias{2}, Francisco Javier Arregui{2}, Maria Antonia Ramos-Arroyo{1}, María Moreno-Igoa{1}, Blanca Hernández-Charro{1}
{1}Complejo Hospitalario de Navarra, Spain; {2}Universidad Pública de Navarra, Spain

11:45
GOLD NANOPARTICLE DECORATED AAO FILTER MEMBRANE FOR SERS SENSING OF URINE ACETAMINOPHEN
Yu-Lung Sung, Fusheng Zhao, Jingting Li, Wei-Chuan Shih
University of Houston, United States

10:30 AM - 12:00 PM
B2L-D: Sensing Applications II
LOCATION: Curacao 7-8
SESSION CHAIRS:
Cameron Riviere, The Robotics Institute, Carnegie Mellon University
Gerrit Dumstorff, IMSAS, Universitaet Bremen

10:30
ON BED POSTURE RECOGNITION WITH PRESSURE SENSOR ARRAY SYSTEM
Qingquan Sun{2}, Eli Gonzalez{2}, Yu Sun{1}
{1}California State Polytechnic University, Pomona, United States; {2}California State University, San Bernardino, United States

10:45
EVALUATION METHOD OF FABRICS BY VISUAL AND TACTILE TEXTURE INFORMATION USING MEMS COMBO SENSOR
Kenta Takahashi{1}, Takashi Abe{1}, Masayuki Sohgawa{1}, Masanori Okuyama{2}, Haruo Noma{3}
{1}Niigata University, Japan; {2}Osaka University, Japan; {3}Ritsumeikan University, Japan

11:00
DEVELOPMENT OF A FUNGAL RISK MONITOR FOR THE NEXT GENERATION OF INTELLIGENT CONTAINERSAPER
Roland Blank, Poornachandra P Vinayaka, Muhammad Waseem Tahir, Joanne Yong, Michael J. Vellekoop, Walter Lang
Universität Bremen, Germany

11:15
FLOODEYE: REAL-TIME FLASH FLOOD PREDICTION SYSTEM FOR URBAN COMPLEX WATER FLOW
Kei Hiroi, Nobuo Kawaguchi
Nagoya University, Japan

11:30
A CONTACTLESS THREE-PHASE AUTONOMOUS POWER METER
Clemente Villani{3}, Simone Benatti{3}, Davide Brunelli{2}, Luca Benini{1}
{1}Eidgenössische Technische Hochschule Zürich / Università di Bologna, Switzerland; {2}Università degli Studi di Trento, Italy; {3}Università di Bologna, Italy

11:45
FBG-BASED TRANSVERSE AND AXIAL FORCE-SENSING MICRO-FORCEPS FOR RETINAL MICROSURGERY
Berk Gonenc, Iulian Iordachita
Johns Hopkins University, United States

10:30 AM - 12:00 PM
B2L-E: Focused Session: 3D Printed Sensors
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Gijs Krijnen, University of Twente
Eric MacDonald, University of Texas in El Paso

10:30
INVITED: POLYMER COMPOSITES FOR 3D PRINTING OF FUNCTIONAL SENSORS AND TRANSDUCERS
Simon Leigh
University of Warwick, United Kingdom

11:00
FLEXIBLE, STRUCTURED MWCNT/PDMS SENSOR FOR CHRONIC VASCULAR ACCESS MONITORING
Steve Majerus{2}, Jeremy Dunning{2}, Joseph Potkay{1}, Kath Bogie{2} {1}Ann Arbor VA Medical Center, United States; {2}Cleveland VA Medical Center, United States

11:15
3D PRINTED BIOMIMETIC WHISKER-BASED SENSOR WITH CO-PLANAR CAPACITIVE SENSING
John Delamare, Remco Sanders, Gijs Krijnen
Universiteit Twente, Netherlands

11:30
DESIGN AND DEVELOPMENT OF A NOVEL 3D PRINTED 1-DOF TACTILE SENSOR WITH CONDUCTIVE POLYMER BASED SENSING ELEMENT
A.H.T.E. De Silva{2}, W.H. Peshan Sampath{2}, N.H.L. Sameera{2}, T.D.I. Udayanga{2}, Y.W.R. Amarasinghe{2}, V. S. C. Weragoda{2}, A. Mitani{1} {1}Sapporo City University, Japan; {2}University of Moratuwa , Sri Lanka

11:45
3D PRINTED PRESSURE SENSOR WITH SCREEN-PRINTED RESISTIVE READ-OUT
Frieder Lucklum, Gerrit Dumstorff
Universität Bremen, Germany

10:30 AM - 12:00 PM
B2L-F: Chemical & Gas Sensing at Nanoscale
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Mona Zaghoul, George Washington University
Camilla Baratto, CNR National Institute of Optics

10:30
CMOS INTEGRATED TUNGSTEN OXIDE NANOWIRE NETWORKS FOR PPB-LEVEL HYDROGEN SULFIDE SENSING
Johanna Krainer{4}, Marco Deluca{4}, Eva Lackner{4}, Florentyna Sosada{4}, Robert Wimmer-Teubenbacher{4}, Anton Koeck{4}, Justyna Bekacz{2}, Anneliese Poenninger{2}, Christian Gspan{3}, Karl Rohracher{1}, Ewald Wachmann{1}, Martin Schrems{1}
{1}ams AG, Austria; {2}EV Group, Austria; {3}Institute for Electron Microscopy and Nanoanalysis, Austria; {4}Materials Center Leoben Forschung GmbH, Austria

10:45
ROOM TEMPERATURE ACETONE SENSOR BASED ON NANOSTRUCTURED K2W7O22
Danling Wang{1}, Qifeng Zhang{2}
{1}North Dakota State University, United States; {2}University of Washington, United States

11:00
SYNTHESIS OF ZNS URCHIN-LIKE NANOSTRUCTURES FOR ELECTROCHEMICAL DETERMINATION OF URIC ACID
Yao Zhao{2}, Niancai Peng{2}, Xueyong Wei{2}, Zhuangde Jiang{2}, Winson Chun Hsin Kuo{1}
{1}Texas A&M University, United States; {2}Xi'an Jiaotong University, China

11:15
PICOWATT GAS SENSING AND RESISTANCE SWITCHING IN TUNNELING NANO-GAP ELECTRODES
Aishwaryadev Banerjee, Navid Farhoudi, Chayanjit Ghosh, Carlos H Mastrangelo, Hanseup Kim, Samuel John Broadbent, Ryan E Looper
University of Utah, United States

11:30
HIGH SENSITIVE GAS SENSORS REALIZED BY A TRANSFER-FREE PROCESS OF CVD GRAPHENE
Filiberto Ricciardella{2}, Sten Vollebregt{2}, Tiziana Polichetti{1}, Brigida Alfano{1}, Ettore Massera{1}, Pasqualina M. Sarro{2}
{1}Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy; {2}Technische Universiteit Delft, Netherlands

11:45
DETECTION OF COCAINE USING GRAVURE PRINTED SILVER NANOPARTICLE BASED SERS SUBSTRATE
Farah Aljanabi, Binu Narakathu, Sepehr Emamian, Mohammed Mohammed Ali, Bradley Bazuin, Paul Fleming, Massood Zandi Atashbar
Western Michigan University, United States

TUESDAY, NOVEMBER 1

12:00 PM - 1:0 PM
LUNCH
LOCATION: Caribbean I-III

TUESDAY, NOVEMBER 1 – POSTER SESSION

1:00 PM - 3:00 PM
B3P-G: Sensor Phenomenon, Modeling, & Evaluation II: Capacitive & Tomography
LOCATION: Poster Area
SESSION CHAIR:
Stefan Rupitsch, Friedrich-Alexander-Universität

B-1-13
FAST ALGORITHM FOR IMAGE RECONSTRUCTION IN ADAPTIVE ELECTRICAL CAPACITANCE TOMOGRAPHY
Zeeshan Zeeshan{1}, Fernando Teixeira{1}, Qussai Marashdeh{2}
{1}Ohio State University, United States; {2}Tech4Imaging LLC, United States

B-1-15
HIGH-POWER HANDLING CAPACITY AND OUTPUT RESPONSE OF A CAPACITIVE MICROWAVE POWER SENSOR
Hao Yan, Xiaoping Liao, Zhenxiang Yi
Southeast University, China

B-1-17
GLASS POLARIZATION INDUCED DRIFT OF CLOSED-LOOP MICROACCELEROMETER
Wu Zhou{3}, Huijun Yu{3}, Bei Peng{3}, Ruiguo Yang{4}, Jiangguo Cai{2}, Jiangbo He{1}, Xiaoping He{1}
{1}China Academy of Engineering Physics, China; {2}Southeast University, China; {3}University of Electronic Technology and Science of China, China; {4}University of Nebraska-Lincoln, United States

B-1-19
A DECOUPLING CALIBRATION METHOD BASED ON GENETIC ALGORITHM FOR THREE DIMENSIONAL ELECTRIC FIELD SENSOR
Bing Li, Chunrong Peng, Fengjie Zheng, Biyun Ling, Bo Chen, Shanhong Xia
Chinese Academy of Sciences, China

B-1-21
CHARACTERIZATION OF FADING OF A MOS-BASED SENSOR FOR OCCUPATIONAL RADIATION DOSIMETRY
Charilaos Mousoulis{2}, Christian Elmiger{2}, Manik Singhal{2}, Yi Xuan{2}, Timothy McNamee{1}, James Thistlethwaite{1}, Paul Alexander Walerow{1}, Mark Salasky{1}, Sean Scott{1}, Daniel J. Valentino{1}, Dimitrios Peroulis{2}
{1}Landauer, Inc., United States; {2}Purdue University, United States

B-1-23
ELECTRICAL TAGGING DEVICES FOR THE REMOVAL OF FAULT LOCATION AMBIGUITIES BY REFLECTOMETRY IN COMPLEX ELECTRICAL NETWORKS
Florent Loete{1}, Michel Sorine{2}
{1}CentraleSupélec, France; {2}Institut National de Recherche en Informatique et en Automatique, France

B-1-25
ANALYTICAL MODELING OF ROTATING FIELD EDDY CURRENT SENSOR FOR NONDESTRUCTIVE TESTING OF TUBES
Darko Vasic{2}, Davorin Ambrus{2}, Vedran Bilas{2}, Pengfei Zhao{1}, Ze Liu{1}
{1}Beijing Jiaotong University, China; {2}University of Zagreb, Croatia

B-1-27
DESIGN AND MODELING OF THREE-DIMENSIONAL TIP-CLEARANCE OPTICAL PROBE BASED ON TWO-CIRCLE REFLECTIVE COAXIAL FIBER BUNDLE
Siying Xie, Xiaodong Zhang
Xi'an Jiaotong University, China

B-1-29
AUGMENTING RESOLUTION CAPABILITIES OF IMAGE RECONSTRUCTION IN ADAPTIVE ELECTRICAL CAPACITANCE TOMOGRAPHY
Zeeshan Zeeshan{1}, Fernando Teixeira{1}, Qussai Marashdeh{2}
{1}Ohio State University, United States; {2}Tech4Imaging LLC, United States

1:00 PM - 3:00 PM
B3P-H: MEMS Devices: Design, Technology & Characterization
LOCATION: Poster Area
SESSION CHAIR:
Mehdi Javanmard, Rutgers University

B-2-32
A NOVEL PACKAGING STRESS ISOLATION STRUCTURE FOR SOI BASED MEMS GYROSCOPES
Yongcun Hao, Weizheng Yuan, Jianbing Xie, Honglong Chang
Northwestern Polytechnical University, China

B-2-35
DESIGN, FABRICATION AND CHARACTERIZATION OF A HIGH PERFORMANCE MEMS ACCELEROMETER
Fatemeh Edalatfar, Bahareh Yaghootkar, Abdul Qader Ahsan Qureshi, Soheil Azimi, Behraad Bahreyni
Simon Fraser University, Canada

B-2-38
WIDEBAND PIEZOELECTRIC MEMS VIBRATION SENSOR
Bahareh Yaghootkar, Soheil Azimi, Behraad Bahreyni
Simon Fraser University, Canada

B-2-41
FABRICATION OF STRESS-FREE MEMS STRUCTURES WITH A MODIFIED SOI-ON-GLASS
Jayaprakash Reddy, Rudra Pratap
Indian Institute of Science, India

B-2-44
EFFECT OF THE INTERRUPTION OF THE PROPAGATION PATH ON THE RESPONSE OF SURFACE ACOUSTIC WAVE TRANSDUCERS
Thuhang Bui{1}, An Tran{1}, Bruno Morana{1}, Jia Wei{1}, Trinh Chu Duc{2}, Pasqualina M. Sarro{1}
{1}Technische Universiteit Delft, Netherlands; {2}Vietnam National University, Hanoi, Vietnam

B-2-47
FEASIBILITY ANALYSIS OF A NOVEL PRODUCTION METHOD FOR MONOLITHIC INTEGRATED MEMS WITH NANOGAPS
Daniel Hohnloser{1}, Denis Shuklin{1}, Carsten Schmidt{2}, Michael Kreitmaier{2}, Mario Blasini{2}, Amelie Hagelauer{1}, Robert Weigel{1}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}LFoundry S.r.l., Germany

B-2-50
ZNO THIN FILMS FOR APPLICATIONS IN SURFACE ACOUSTIC WAVE ACTUATORS
Andrzej Nowek, Rafał Stankiewicz, Magdalena Baran, Izabela Zalewska, Ernest Brzozowski
Institute of Electronic Materials Technology, Poland

B-2-53
DEVELOPMENT OF MEMS IR SOURCE BY COMPOUND RELEASE PROCESS WITH NANO-SCALE SILICON FOREST RADIATION LAYER
Weibing Liu{1}, Anjie Ming{1}, Zhenxin Tan{2}, Qiulin Tan{3}, Xilong Sun{1}, Chaobo Li{1}, Chengyue Yang{1}, Haiyang Mao{1}, Weibing Wang{1}, Jijun Xiong{3}, Dapeng Chen{1}
{1}Chinese Academy of Sciences, China; {2}Jiangsu R&D Center for Internet of Things, China; {3}National Key Laboratory for Electronic Measurement Technology, North University of China, China

1:00 PM - 3:00 PM
B3P-J: Chemical & Gas Sensing: Devices and Systems
LOCATION: Poster Area
SESSION CHAIR:
Binu Narakathu, Western Michigan University

B-3-62
A SELF-POWERED ACTIVE HYDROGEN SENSOR USING TRIBOELECTRIC EFFECT
A. S. M. Iftekhar Uddin, Gwiy-Sang Chung
University of Ulsan, Korea, South

B-3-65
LEAK DETECTION WITH LINEAR SOIL GAS SENSORS UNDER FIELD CONDITIONS - FIRST EXPERIENCES RUNNING A NEW MEASUREMENT TECHNIQUE
Patrick P. Neumann{1}, Matthias Bartholmai{1}, Detlef Lazik{2}
{1}Bundesanstalt für Materialforschung und -prüfung, Germany; {2}Helmholtz Centre for Environmental Research, Germany

B-3-68
A NOVEL PROTOTYPE OF LOW POWER CONSUMPTION MEMS SENSORS FOR HYDROGEN DETECTION
Debin Guan, Fang Yang, Qi Liu, Kun Yu, Jie Sun
China Academy of Engineering Physics, China

B-3-71
GAS SELECTIVE CHEMIRESISTOR COMPOSED OF MOLECULARLY IMPRINTED POLYMER COMPOSIT INK
Sho Shinohara, Fumihiro Sassa, Kenshi Hayashi
Kyushu University, Japan

B-3-74
DETECTION OF VOLATILE ORGANIC COMPUNDS BY HIGH-Q PIEZOTRANSDUCED SINGLE-CRYSTAL SILICON BULK ACOUSTIC RESONATOR ARRAYS
Yuan Zhao, Qingrui Yang, Ye Chang, Rui Zhang, Jin Tao, Hemi Qu, Xuexin Duan
Tianjin University, China

B-3-77
SIMULTANEOUS MODE TRACKING FOR SENSING APPLICATIONS WITH DUAL-MODE HETERODYNE NEMS OSCILLATOR
Guillaume Gourlat, Marc Sansa, Guillaume Jourdan, Patrick Villard, Gilles Sicard, Sébastien Hentz
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

B-3-80
A GUIDING METHOD TO SELECT AND REDUCE THE NUMBER OF SENSING UNITS IN ELECTRONIC TONGUES
José Alberto Giacometti, Flávio Makoto Shimizu, Olivia Carr, Osvaldo Novais Oliveira Jr.
Universidade de São Paulo, Brazil

B-3-83
SMART CAPACITIVE CO2 SENSOR
Jamila Boudaden, Armin Klumpp, Ignaz Eisele, Christoph Kutter
Fraunhofer-Einrichtung für Mikrosysteme und Festkörper , Germany

B-3-86
A FAST READOUT CIRCUIT FOR AN ORGANIC VERTICAL NANO-JUNCTION SENSOR
Trong-Hieu Tran, Paul Chang-Po Chao, Chin-I Su, Hsiao-Wen Zan
National Chiao Tung University, Taiwan

B-3-89
NUMERICAL AND EXPERIMENTAL INVESTIGATION OF THERMAL BIMORPH MICROCANTILEVER-BASED NANO-CALORIMETER FOR SENSING OF EXPLOSIVE VAPORS
Seok-Won Kang{1}, Debjyoti Banerjee{2}
{1}Korea Railroad Research Institute, Korea, South; {2}Texas A&M University, United States

B-3-92
CMOS INTEGRATED TIN DIOXIDE GAS SENSORS FUNCTIONALIZED WITH BIMETALLIC NANOPARTICLES FOR IMPROVED CARBON MONOXIDE DETECTION
Eva Lackner{3}, Johanna Krainer{3}, Robert Wimmer-Teubenbacher{3}, Florentyna Sosada{3}, Marco Deluca{3}, Anton Koeck{3}, Justyna Bekacz{2}, Elmar Laubender{4}, Olena Yurchenko{4}, Gerald Urban{4}, Karl Rohracher{1}, Ewald Wachmann{1}
{1}ams AG, Austria; {2}EV Group, Austria; {3}Materials Center Leoben Forschung GmbH, Austria; {4}Universität Freiburg, Germany

B-3-95
INTEGRATED PRE-CONCENTRATOR GAS SENSOR SYSTEM FOR IMPROVED TRACE GAS SENSING PERFORMANCE
Martin Leidinger{3}, Tilman Sauerwald{3}, Andreas Schütze{3}, Christine Alépée{2}, Max Rieger{1}
{1}Fraunhofer-Institut für Chemische Technologie, Germany; {2}SGX Sensortech, Switzerland; {3}Universität des Saarlandes, Germany

B-3-97
IN-SITU SENSOR RESPONSE OF COPPER OXIDE URCHIN-LIKE STRUCTURES
Marcelo Orlandi, Anderson Felix, Pedro Suman, José Varela, Diogo Volanti
Universidade Estadual Paulista Júlio de Mesquita Filho, Brazil

B-3-99
WIDE DYNAMIC RANGE MULTI-CHANNEL ELECTROCHEMICAL INSTRUMENT FOR IN-FIELD MEASUREMENTS
Sina Parsnejad, Yaoxing Hu, Hao Wan, Ehsan Ashoori, Andrew Mason
Michigan State University, United States

B-3-101
ACETONE SENSING USING GRAPHENE QUANTUM CAPACITANCE VARACTORS
Rui Ma, Qun Su, Jing Li, Steven Koester
University of Minnesota, United States

B-3-102
REVISITING GAS SAMPLING AND ANALYSIS WITH MICROTECHNOLOGY: FEASABILITY OF LOW COST HANDHELD GAS CHROMATOGRAPHS
Bertrand Bourlon, Bao-An Pham Ho, Florence Ricoul, Thomas Chappuis, Amelie Bellemin Comte, Olivier Constantin, Beatrice Icard
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

B-3-103
DEVELOPMENT OF A PORTABLE, LOW COST, PLASMA IONIZATION SOURCE COUPLED TO A MASS SPECTROMETER FOR SURFACE ANALYSIS
Barry Smith, Fred Jjunju, Stephen Taylor, Iain Young, Simon Maher
University of Liverpool, United Kingdom

B-3-104
MINIATURIZED GAS CHROMATOGRAPHY MODULE WITH MICRO POSTS EMBEDDED MEMS COLUMN FOR THE SEPARATION OF EXHALED BREATH GAS MIXTURES
Janghyeon Lee, Tae Ho Park, Hyun Sung Kang, Si-Hyung Lim
Kookmin University, Korea, South

B-3-105
IRRADIATION OF ON-CHIP CHALCOGENIDE GLASS WAVEGUIDE MID-INFRARED GAS SENSOR
Peter Su{1}, Zhaohong Han{1}, Derek Kita{1}, Vivek Singh{1}, Qingyang Du{1}, Lionel C. Kimerling{1}, Juejun Hu{1}, Anu Agarwal{1}, Kathleen Richardson{4}, Pao Tai Lin{3}, Dawn Tan{2}
{1}Massachusetts Institute of Technology, United States; {2}Singapore University of Technology and Design, Singapore; {3}Texas A&M University, United States; {4}University of Central Florida, United States

1:00 PM - 3:00 PM
B3P-K: Microfluidics
LOCATION: Poster Area
SESSION CHAIR:
Levent Yobas, Hong Kong University of Science and Technology

B-4-107
FLUORESCENCE INITIATED SINGLE DROPLET SORTING (FISDS) PLATFORM BASED ON DIGITAL MICROFLUIDIC
Kang Cao, Yan Su, Weiqiang Wang, Ying Wan
Nanjing University of Science and Technology, China

B-4-110
INVESTIGATION INTO THE USE OF ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY FOR CELLULAR FUNCTIONAL IMMUNOPHENOTYPING
Brian Berger{2}, Katsuo Kurabayashi{2}, Mansoor Nasir{1}
{1}Lawrence Technological University, United States; {2}University of Michigan, United States

B-4-113
A 2KPA PER STAGE AND 1.3SCCM FLOW RATE MODULAR TWO-STAGE ELECTROSTATIC GAS MICROPUMP WITH STIFFENED DRIVE ELECTRODES
Amin Sandoughsaz, Khalil Najafi, Luis P. Bernal
University of Michigan, United States

B-4-116
MICROFLUIDIC ELETROPHORETIC ION NUTRIENT SENSOR
Zhen Xu, Xinran Wang, Robert J. Weber, Ratnesh Kumar, Liang Dong
Iowa State University, United States

B-4-119
COMBINING MICROFLUIDIC CHIP AND BINARY OPTICAL ELEMENT FOR FLOW CYTOMETRY
Zhao Jingjing, You Zheng
Tsinghua University, China

B-4-122
JET FLOW FOCUSING BY CORONA DISCHARGE FOR FLUIDIC APPLICATION
Tung Thanh Bui{4}, Thien Xuan Dinh{2}, Tibor Terebessy{1}, Trinh Chu Duc{4}, Van Thanh Dau{3}
{1}Clearview Traffic Group Limited, United Kingdom; {2}Ritsumeikan University, Japan; {3}Sumitomo Chemical. Ltd, Japan; {4}Vietnam National University, Hanoi, Vietnam

1:00 PM - 3:00 PM
B3P-L: Optical Bio/Chemo Sensors
LOCATION: Poster Area
SESSION CHAIR:
Haihu Yu, Wuhan University of Technology

B-5-127
ETHYLENE GAS SENSING USING NON-DISPERSIVE INFRARED SPECTROSCOPY
Martin De Biasio{1}, Raimund Leitner{1}, Christoph Krall{1}, Matic Krivec{1}, Andreas Wilk{3}, Boris Mizaikoff{3}, Roland Waldner{2}, Franciscus Starmans{2}, Dieter Maier{2}
{1}CTR Carinthian Tech Research AG, Austria; {2}Philips Consumer Lifestyle, Austria; {3}Universität Ulm, Germany

B-5-129
SENSITIVITY IMPROVEMENT ON CW DUAL-WAVELENGTH PHOTOACOUSTIC SPECTROSCOPY USING ACOUSTIC RESONANT MODE FOR NONINVASIVE GLUCOSE MONITOR
Yujiro Tanaka, Cassandra Purtill, Takuro Tajima, Michiko Seyama, Hiroshi Koizumi
NTT Corporation, Japan

B-5-131
EFFECT OF LIGAND EXCHANGE ON THE PHOTORESPONSIVITY OF NEAR-INFRARED SENSORS BASED ON PBSE NANOCRYSTALS
Ahmad Nusir, Omar Manasreh
University of Arkansas, United States

B-5-133
PORTABLE FLUORESCENT SENSING ARRAY FOR MONITORING HEAVY METALS IN WATER
Simon Maher, Behnam Bastani, Barry Smith, Fred Jjunju, Stephen Taylor, Iain Young
University of Liverpool, United Kingdom

B-5-135
AUTOFLUORESCENT NANOPARTICLES FOR THE DETECTION OF MALARIA-INFECTION INDICATOR
Xiaoyu Ma, Jun Chen, Yu Lei, Swayandipta Dey, Jing Zhao
University of Connecticut, United States

B-5-137
FLUORESCENT CARBON NANOPARTICLES FOR SENSITIVE AND SELECTIVE DETECTION OF PALLADIUM (PD^{2+})
Sichen Zhang{1}, Xiangcheng Sun{1}, Xiaoyu Ma{1}, Jun Chen{1}, Yu Lei{1}, Yupeng Wu{2}
{1}University of Connecticut, United States; {2}University of Nottingham, United Kingdom

B-5-139
NANOSTRUCTURED ALUMINUM OXIDE THIN FILM-BASED FLUORESCENT SENSING: EFFECTS OF NANOPORE SIZE, DENSITY AND THICKNESS
Xiangchen Che, Pan Deng, Long Que
Iowa State University, United States

B-5-141
CHARIACTERISTICS OF CARBON NANOTUBE BASED NANOCOMPOSITE OXYGEN SENSING MATRICES
Rongsheng Chen, Giovanni Fioroni, Hanne McPeak, Clive Hahn, Andrew Farmery
University of Oxford, United Kingdom

B-5-143
FUNCTIONALIZED GOLD NANOPARTICLES FOR SURFACE PLASMON RESONANCE DETECTION OF LEGIONELLA PNEUMOPHILA 16S RRNA
Feriel Melaine, Maryam Tabrizian
McGill University, Canada

B-5-145
A HIGH SENSITIVITY COMPACT GAS CONCENTRATION SENSOR USING UV LIGHT AND CHARGE AMPLIFIER CIRCUIT
Hidekazu Ishii{2}, Masaaki Nagase{1}, Nobukazu Ikeda{1}, Yoshinobu Shiba{2}, Yasuyuki Shirai{2}, Rihito Kuroda{2}, Shigetoshi Sugawa{2}
{1}Fujikin Inc., Japan; {2}Tohoku University, Japan

B-5-147
A NEW FIBER BIOSENSOR FOR REAL-TIME MEASUREMENT OF PH AND OXYGEN DURING THE PROCESS OF CELL METABOLISM
Wei Tao, Yanli Hu, Hui Zhao, Kan Wang, Rong Cai
Shanghai Jiao Tong University, China

B-5-149
ULTRAVIOLET LED BASED COMPACT AND FAST CORTISOL DETECTOR WITH ULTRA HIGH SENSITIVITY
Raju Sinha, Phani Kiran Vabbina, Arash Ahmadivand, Mustafa Karabiyik, Burak Gerislioglu, Nezih Pala
Florida International University, United States

B-5-151
MULTIPARAMETER SENSING OF PAPER SHEETS USING TERAHERTZ TIME-DOMAIN SPECTROSCOPY: CALIPER, FIBER ORIENTATION, MOISTURE, AND THE ROLE OF SPATIAL INHOMOGENEITY
Hannes Merbold, Deran Maas, Dook van Mechelen
ABB Switzerland Ltd., Switzerland

B-5-153
METHANE LEAK DETECTION AND SPECTRAL ANALYSIS BY USING ONLY OPTICAL TIME DOMAIN REFLECTROMETRY IN SEMIDISTRIBUTED REMOTE OPTICAL SENSORS
Claudio Floridia{1}, Felipe Cezar Salgado{1}, João Batista Rosolem{1}, Fábio Renato Bassan{1}, João Paulo Vicentini Fracarolli{1}, Rivael Strobel Penze{1}, Larissa Maria Pereira{2}
{1}Centro de Pesquisa e Desenvolvimento em Telecomunicações, Brazil; {2}Petróleo Brasileiro S.A., Brazil

B-5-155
SKELETON-FREE TASK-SPECIFIC RAPID UPPER LIMB ERGONOMIC ASSESSMENT USING DEPTH IMAGING SENSORS
Darius Nahavandi, Mohammed Hossny
Deakin University, Australia

B-5-157
A PHOTONIC SILICON WAVEGUIDE GAS SENSOR USING EVANESCENT-WAVE ABSORPTION
Christian Ranacher{1}, Cristina Consani{1}, Ursula Hedenig{2}, Thomas Grille{2}, Ventsislav Lavchiev{3}, Bernhard Jakoby{3}
{1}CTR Carinthian Tech Research AG, Austria; {2}Infineon Technologies Austria AG, Austria; {3}Johannes Kepler University, Austria

B-5-159
HIGHLY SENSITIVE REFLECTION-TYPE OPTICAL FIBER REFRACTIVE INDEX SENSOR WITH ROUNDED-EDGE STRUCTURE
Hideki Fukano, Ryo Kataoka, Shuji Taue
Okayama University, Japan

B-5-161
FIBER OPTIC MONITORING OF LITHIUM-ION BATTERIES: A NOVEL TOOL TO UNDERSTAND THE LITHIATION OF BATTERIES
Abdulrahman Ghannoum, Krishna Iyer, Patricia Nieva, Amir Khajepour
University of Waterloo, Canada

B-5-163
SIC-ON-INSULATOR ON-CHIP PHOTONIC SENSOR IN A RADIATIVE ENVIRONMENT
Danhao Ma{1}, Zhaohong Han{1}, Qingyang Du{1}, Juejun Hu{1}, Lionel C. Kimerling{1}, Anu Agarwal{1}, Dawn Tan{2}
{1}Massachusetts Institute of Technology, United States; {2}Singapore University of Technology and Design, Singapore

B-5-165
OPTICAL SENSOR FOR DETERMINING CONCENTRATION OF GLUCOSE IN WATER
Gregory Salsbery, Massood Tabib-Azar
University of Utah, United States

1:00 PM - 3:00 PM
B3P-M: Physical Sensors VI: Inertial & Vibrational
LOCATION: Poster Area
SESSION CHAIR:
Eugene Hwang, Analog Devices

B-6-172
A TEMPERATURE COMPENSATION METHOD FOR MEMS ACCELEROMETER BASED ON LM_BP NEURAL NETWORK
Dacheng Xu{2}, Zhimei Yang{2}, Heming Zhao{2}, Xiaolong Zhou{1}
{1}Beijing Institute of Technology, China; {2}Soochow University, China

B-6-174
COMPENSATION METHOD AND MEASUREMENT ACCURACY TO FLOOR VIBRATION IN ELECTRONIC BALANCE SYSTEM
Yuji Yamakawa{2}, Takanori Yamazaki{1}
{1}Tokyo Denki University, Japan; {2}University of Tokyo, Japan

B-6-176
AN ELECTROMAGNETIC FEEDBACK METHOD TO IMPROVE LOW-FREQUENCY RESPONSE PERFORMANCE OF GEOPHONE
Kezhu Song, Shengqun Tong, Zhiguo Ding, Lei Dong
University of Science and Technology of China, China

B-6-178
A NOVEL METHOD FOR FABRICATING MEMS THREE-AXIS ACCELEROMETERS USING LOW TEMPERATURE AU-SN EUTECTIC BONDING
Serdar Tez{2}, Mustafa Mert Torunbalci{1}, Tayfun Akin{1}
{1}Middle East Technical University, Turkey; {2}Pamukkale University, Turkey

B-6-180
A CONCENTRATED SPRINGS ARCHITECTURE FOR SINGLE-DIGIT FREQUENCY SYMMETRY IN SI MEMS GYROSCOPE
Joan Giner, Yuhua Zhang, Takashi Shiota, Daisuke Maeda, Kazuo Ono, Shinya Kajiyama, Takashi Oshima, Taizo Yamawaki, Tomonori Sekiguchi
Hitachi Ltd., Japan

B-6-182
A DOUBLE DIFFERENTIAL TORSIONAL MICRO-ACCELEROMETER BASED ON V-SHAPE BEAM
Dewei Xia, Dingbang Xiao, Zhanqiang Hou, Qingsong Li, Xinghua Wang, Xuezhong Wu
National University of Defense Technology, China

B-6-184
TWO-AXIS TILT ANGLE DETECTION BASED ON DIELECTRIC LIQUID CAPACITIVE SENSOR
Tiep Dang Dinh{1}, Tung Thanh Bui{3}, Tuan Vu Quoc{3}, Thinh Pham Quoc{3}, Masahiro Aoyagi{2}, My Bui Ngoc{1}, Trinh Chu Duc{3}
{1}Military Institute of Science and Technology, Vietnam; {2}National Institute of Advanced Industrial Science and Technology, Japan; {3}Vietnam National University, Hanoi, Vietnam

B-6-186
A GYROSCOPE FREE INERTIAL MEASUREMENT UNIT FOR ANGULAR MOTION MEASUREMENT
Yang Yang, Xiong Yu
Case Western Reserve University, United States

B-6-188
EFFECT OF THE CATHODES ON THE CHARACTERISTICS OF THE MEMS BASED ELECTROCHEMICAL SEISMOMETER
Zhenyuan Sun, Deyong Chen, Junbo Wang, Tao Deng, Guanglei Li, Jian Chen
Chinese Academy of Sciences, China

B-6-190
A SINGLE-MASS SELF-RESONATING CLOSED-LOOP CAPACITIVE MEMS ACCELEROMETER
Talha Kose, Yunus Terzioglu, Kıvanç Azgin, Tayfun Akin
Middle East Technical University, Turkey

1:00 PM - 3:00 PM
B3P-N: Sensor Network, Theory & Evaluation
LOCATION: Poster Area
SESSION CHAIR:
Ryutaro Maeda, AIST

B-9-224
EVALUATION OF LORA AND LORAWAN FOR WIRELESS SENSOR NETWORKS
Andrew Wixted{2}, Peter Kinnaird{3}, Hadi Larijani{2}, Alan Tait{3}, Ali Ahmadinia{1}, Niall Strachan{3}
{1}California State University San Marcos, United States; {2}Glasgow Caledonian University, United Kingdom; {3}Stream Technologies, United Kingdom

B-9-228
TOWARDS WMSN PERFORMANCE USING DIFFERENT PACKET SIZE
César Alberto da Silva{2}, Marcelo Alexandre C. Ismael{1}, Cláudio Maximiliano Zaina{1}, Linnyer Beatrys Ruiz{3}
{1}Federal Institute of São Paulo, Brazil; {2}Federal University of Minas Gerais, Brazil; {3}Universidade Estadual de Maringá, Brazil

1:00 PM - 3:00 PM
B3P-O: Sensor Applications I
LOCATION: Poster Area
SESSION CHAIR:
Gijs Krijnen, University of Twente

B-10-238
GEOMETRIC OPTIMIZATION OF A FLEXIBLE ARRAYED EDDY CURRENT SENSOR FOR NON-DESTRUCTIVE TESTING
Dong Cai{2}, Cheng Zou{2}, Zhenguo Sun{2}, Qiang Chen{2}, Junbo Wang{1}
{1}Chinese Academy of Sciences, China; {2}Tsinghua University, China

B-10-240
THERMAL DRIFT OPTIMIZATION FOR SILICON MICROGYROSCOPE
Jian Zhou{1}, An-Ping Qiu{1}, Yang Zhao{1}, Guo-Ming Xia{1}, Xue-Hao Yu{2}, Zhong-Hai Xue{2}
{1}Nanjing University of Science and Technology, China; {2}Shanghai Aerospace Control Technology Institute, China

B-10-242
RESPONSE CHARACTERISTICS OF A MEMS RESONANT ACCELEROMETER TO EXTERNAL ACOUSTIC EXCITATION
Byungsu Park{1}, Sangwoo Lee{1}, Kyungjun Han{1}, Myeong-Jong Yu{1}, Byungsu Chang{2}
{1}Agency for Defense Development, Korea, South; {2}Microinfinity, Korea, South

B-10-244
A NOVEL APPROACH FOR WEAK MAGNETIC FIELD MEASUREMENT WITH MAGNETORESISTIVE SENSORS
Kris Rohrmann, Marvin Sandner, Marcus Prochaska
Ostfalia Hochschule für angewandte Wissenschaften, Germany

B-10-246
DYNAMIC PERFORMANCE OF A NOVEL TILTING ANGLE MEASUREMENT SYSTEM USING THREE ACCELEROMENTERS
Yinsheng Weng, Hongcai Zhang, Juan Ren, Shudong Wang, Xueyong Wei
Xi'an Jiaotong University, China

B-10-248
CAP-LESS AUDIO PREAMPLIFIERS FOR SILICON MICROPHONES
Marco Croce{2}, Claudio De Berti{1}, Lorenzo Crespi{1}, Piero Malcovati{2}, Andrea Baschirotto{3}
{1}Conexant System, United States; {2}Università degli Studi di Pavia, Italy; {3}Università degli Studi Milano-Bicocca, Italy

B-10-250
CONCEPT FOR PRINTED FERROELECTRIC SENSORS ON COATED METALLIC SUBSTRATES
Herbert Enser{1}, Johannes Sell{1}, Markus Krause{1}, Michaela Schatzl-Linder{2}, Bernhard Strauß{2}, Bernhard Jakoby{1}, Wolfgang Hilber{1}
{1}Johannes Kepler University, Austria; {2}voestalpine Stahl GmbH, Austria

B-10-252
IMPACT OF MULTIPLE SOUND TYPES ON ENVIRONMENTAL SOUND CLASSIFICATION
Etto Salomons{1}, Henk van Leeuwen{1}, Paul Havinga{2}
{1}Saxion University of Applied Science, Netherlands; {2}Universiteit Twente, Netherlands

B-10-254
DETECTION OF CONDUCTIVE OBJECTS WITH ELECTRICAL CAPACITANCE TOMOGRAPHY
Stephan Mühlbacher-Karrer, Hubert Zangl
Alpen-Adria-Universität Klagenfurt, Austria

B-10-256
PERFORMANCE STUDY OF MAGNETIC FIELD CONCENTRATION TECHNIQUES ON MAGNETORESISTOR/ROGOWSKI CONTACTLESS CURRENT SENSOR
Shahriar Jalal Nibir, Mehrdad Biglarbegian, Babak Parkhideh
University of North Carolina at Charlotte, United States

B-10-258
AN ON-LINE EXTREME LEARNING MACHINE WITH ADAPTIVE ARCHITECTURE FOR SOFT SENSOR DESIGN
André R. de Miranda{2}, Talles M. G. de A. Barbosa{2}, Rui Araújo{3}, Symone G. S. Alcalá{1}
{1}Federal University of Goiás, Brazil; {2}Pontifícia Universidade Católica de Goiás, Brazil; {3}University of Coimbra, Portugal

1:00 PM - 3:00 PM
B3P-P: Infrastructure Sensing Applications
LOCATION: Poster Area
SESSION CHAIR:
Gijs Krijnen, University of Twente

B-10-260
EKF-BASED STATE ESTIMATION FOR TRAIN LOCALIZATION
Damien Veillard, Frederick Mailly, Philippe Fraisse
Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier / Université de Mont, France

B-10-262
WIRELESS SUBSURFACE SENSORS FOR REMOTE TRANSPORTATION INFRASTRUCTURE MANAGEMENT
Paul Fortier, Benjamin Viall
University of Massachusetts Dartmouth, United States

B-10-264
MOBILE BRIDGE INTEGRITY ASSESSMENT
Maik Benndorf{1}, Maximilian Garsch{2}, Thomas Haenselmann{1}, Norbert Gebbeken{2}, Inna Videkhina{2}
{1}Hochschule Mittweida, Germany; {2}Universität der Bundeswehr München, Germany

B-10-266
REAL TIME ELECTRICITY THEFT DETECTION IN MICROGRIDS THROUGH WIRELESS SENSOR NETWORKS
Muhammad Tariq, Vincent Poor
Princeton University, United States

B-10-268
AIRSENSE: OPPORTUNISTIC CROWD-SENSING BASED AIR QUALITY MONITORING SYSTEM FOR SMART CITY
Joy Dutta, Firoz Gazi, Sarbani Roy, Chandreyee Chowdhury
Jadavpur University, India

B-10-270
REAL TIME MEASUREMENT OF THE DYNAMIC DISPLACEMENT FIELD OF A LARGE-SCALE ARCH-TRUSS BRIDGE BY REMOTE SENSING TECHNOLOGY
Yang Yang, Xiong Yu
Case Western Reserve University, United States

B-10-272
PRELIMINARY RESULTS OF POWERLINE RECONSTRUCTION FROM AIRBORNE LIDAR FOR SAFE AUTONOMOUS LOW-ALTITUDE URBAN OPERATIONS OF SMALL UAS
Corey Ippolito{1}, Kalmanje Krishnakumar{1}, Sebastian Hening{2}
{1}Ames Research Center, United States; {2}University of California, Santa Cruz, United States

B-10-274
A UNIVERSAL SENSOR DATA PLATFORM MODELLED FOR REALTIME ASSET CONDITION SURVEILLANCE AND BIG DATA ANALYTICS FOR RAILWAY SYSTEMS
Tony Lee, May Tso
MTR Corporation Limited, Hong Kong

B-10-276
MATERIAL INTEGRATED SENSORS FOR AN OPTIMAL BASELINE SELECTION ON A WIRELESS SHM NETWORK
Mariugenia Salas{2}, Michael Koerdt{1}, Martina Hübner{3}, Maryam Kahali{3}, Walter Lang{3}
{1}Faserinstitut Bremen e.V., Germany; {2}Friedrich-Wilhelm-Bessel-Institut Forschungsgesellschaft mbH, Germany; {3}Universität Bremen, Germany

1:00 PM - 3:00 PM
B3P-Q: Focused Session Posters: Wearable Sensors for Monitoring Human Body Physiological Parameters
LOCATION: Poster Area
SESSION CHAIR:
Rong Zhu, Tsinghua University

B-13-325
DUAL TRI-AXIS ACCELEROMETERS FOR MONITORING PHYSIOLOGICAL PARAMETERS OF HUMAN BODY IN SLEEP
Peng Jiang, Rong Zhu
Tsinghua University, China

B-13-327
ECG MEASUREMENT BY USE OF PASSIVE CAPACITIVELY COUPLED ELECTRODES
Jens Kirchner, Nils Roth, Andreas Meyer, Georg Fischer
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

B-13-329
WIRELESS AND CONTINUOUS INTRAOCULAR PRESSURE SENSORS USING TRANSPARENT GRAPHENE
Peng Zeng{1}, Qingsong Cui{2}, Michael Wu{2}, Pai-Yen Chen{2}, Mark Ming-Cheng Cheng{2}
{1}Wayne Sate University, United States; {2}Wayne State University, United States

B-13-331
MICRO-RADAR WEARABLE RESPIRATION MONITOR
Ruthvik Kukkapalli, Nilanjan Banerjee, Ryan Robucci, Dan Kostov
University of Maryland, Baltimore County , United States

B-13-333
WEARABLE GRAPHENE-BASED SENSOR ARRAY FOR FINGER TRACKING
Andrea Rinaldi, Alessandro Proietti, Alessio Tamburrano, Maria Sabrina Sarto
Sapienza - Università di Roma, Italy

B-13-335
FLEXIBLE, SELF-POWERED, VISIBLE-LIGHT DETECTOR CHARACTERIZED USING A BATTERY-OPERATED, 3D-PRINTED MICROPLASMA OPERATED AS A LIGHT SOURCE
Ruifeng Yang, Andrei Sazonov, Vassili Karanassios
University of Waterloo, Canada

B-13-337
ON-BODY SENSOR NODE LOCALIZATION USING REFERENCE RFID TAGS EMBEDDED IN WEARABLE WAVEGUIDE
Akihito Noda, Hiroyuki Shinoda
University of Tokyo, Japan

1:00 PM - 3:00 PM
B3P-R: Biomedical Interfaces
LOCATION: Poster Area
SESSION CHAIR:
Darrin Young, University of Utah

B-11-299
A 64-CHANNEL WIRELESS IMPLANTABLE SYSTEM-ON-CHIP FOR GASTRIC ELECTRICAL-WAVE RECORDING
Ahmed Ibrahim{2}, Mehdi Kiani{2}, Aydin Farajidavar{1}
{1}New York Institute of Technology, United States; {2}Pennsylvania State University, United States

B-11-301
ENHANCING THE READOUT OF PASSIVE WIRELESS SENSORS BY USING LEFT-HANDED METAMATERIALS
Lei Dong{2}, Li-Feng Wang{1}, Qing-An Huang{2}
{1}Key Laboratory of MEMS of the Ministry of Education, Southeast University, China; {2}Southeast University, China

B-11-303
LOW-ENERGY BIOMARKER DETECTION THROUGH CHARGE-BASED IMPEDANCE MEASUREMENTS
Jun-Rui Zhang{1}, Adrian Ionescu{1}, Marco Mazza{2}
{1}Ecole Polytecnique Fédérale de Lausanne, Switzerland; {2}University of Applied Science – Western Switzerland, Switzerland

B-11-305
TOWARDS MOBILE HEALTH CARE: NEUROCOGNITIVE IMPAIRMENT MONITORING BY BCI-BASED GAME
Valerio Francesco Annese, Giovanni Mezzina, Daniela De Venuto
Politecnico di Bari, Italy

B-11-307
A NOVEL METHOD BASED ON RF DETECTION ENABLING WIRELESS AND PASSIVE LC SENSING
Qiuxu Wei{2}, Yanshuang Wang{3}, Deyong Chen{1}, Jian Chen{1}, Junbo Wang{1}
{1}Chinese Academy of Sciences, China; {2}Chinese Academy of Sciences / University of Chinese Academy of Sciences, China; {3}University of Chinese Academy of Sciences, China

B-11-309
BCG-MAPPING OF THE THORAX USING DIFFERENT SENSORS: FIRST EXPERIENCES AND SIGNAL QUALITY
Nico Jähne-Raden{2}, Torsten Märtin{2}, Michael Marschollek{2}, Karsten Heusser{1}, Jens Tank{1}
{1}Medizinische Hochschule Hannover, Germany; {2}Peter L. Reichertz Institut für Medizinische Informatik / Technische Universität Braunschweig, Germany

B-11-311
A PROOF-OF-CONCEPT CLASSIFIER FOR ACOUSTIC SIGNALS FROM THE KNEE JOINT ON A FPAA
Sahil Shah, Caitlin Teague, Omer Inan, Jennifer Hasler
Georgia Institute of Technology, United States

1:00 PM - 3:00 PM
B3P-S: Open Poster II
LOCATION: Poster Area
SESSION CHAIR:
Behraad Bahrenyi, Simon Fraser University

B-20-390
FABRICATION AND CHARACTERIZATION OF RESISTIVE SENSORS ON STEEL WAFERS
Mridusmita Sarma, Eva-Maria Meyer, André Bödecker, Christian Habben, Walter Lang
Institute for Microsensors Actuators and Systems, Univerisity of Bremen, Germany

B-20-394
EVALUATION OF HETERO-CORE OPTICAL FIBER ACCELEROMETER CHARACTERISTICS
Masaya Sekimoto, Hiroshi Yamazaki, Kazhuiro Watanabe
Soka University, Japan

B-20-398
ULTRA-COMPACT RADAR SENSOR FOR COUNTLESS APPLICATIONS (120GHZ - MINIATURIZED - LOW-COST)
Berk Yilmaz
Silicon Radar GmbH, Germany

B-20-400
INDUSTRIAL SOLVENT SENSING USING METAL-INSULATOR-SEMICONDUCTOR STRUCTURES
Ryan Siddall, Sandip Roy, Chris O'Malley, Hua-Khee Chan, Nick Wright, Alton Horsfall
Newcastle University, United Kingdom

B-20-402
CORALCON: AN OPEN SOURCE, LOW-COST UNDERWATER MODEM
Emad Felemban{1}, Adil Sheikh{1}, Adnan Ashraf{2}
{1}Umm Al Qura University, Saudi Arabia; {2}Wadi Makkah, Saudi Arabia

B-20-404
CYLINDRICAL ANTENNA FOR USE IN TELEMETRY
Humberto Chaves Fer{2}, Tarcisio Barreto{2}, Almir Silva Neto{1}, Francisco Souza{2}, Adelson Lima{2}, Jorge Siqueira{2}
{1}IFPB, Brazil; {2}UFRN, Brazil

B-20-406
MINIATURIZATION STRATEGY AND TRUNCATED GROUND PLANE FOR ANTENNAS ARRAYS WITH RECTANGULAR PATCH
Humberto Fernandes{4}, Tarcisio Barreto{4}, Francisco Sousa{1}, Jorge Almeida{2}, Adelson Lima{3}
{1}IFRN, Brazil; {2}UERN, Brazil; {3}UFERSA, Brazil; {4}UFRN, Brazil

B-20-408
SUB-MILLIMETER PACKAGES FOR MICROSYSTEMS IN HARSH ENVIRONMENT APPLICATIONS
Tao Li, Yushu Ma, Yu Sui, Yogesh Gianchandani
University of Michigan, United States

B-20-410
FINGERTIP SKIN-INSPIRED MULTIMODAL ELECTRONIC SKINS
Hyunhyub Ko
Ulsan National Institute of Science and Technology, Korea

B-20-412
WEARABLE BIOSENSOR DEVICE FOR QUANTITATIVE STRESS MONITORING IN SWEAT
Anjan Panneer Selvam, Rujuta Munje, Sriram Muthukumar, Shalini Prasad
University of Texas at Dallas, United States

B-20-414
IMPLEMENTATION OF LOW COST FILM SAP FLOW SENSOR USING SILVER NANO-PARTICLE INKJET PRINTING
Hirotada Kushihata, Kazuhiro Nishioka
University of Tokyo, Japan

B-20-416
INVESTIGATION OF MICROSTRIP ANTENNAS WITH PATCHES FRACTALS SIERPINSKI TRIANGULAR
Jose Silva, Yuri Batista, Humberto Fernandes
UFRN, Brazil

B-20-418
CHIP-BASED ANALYSIS OF CELL SECRETIONS USING SERS TECHNIQUE
Lei Wu
Southeast University, China

1:00 PM - 3:00 PM
B3P-T: Focused Session Posters: Low-Power Sensors & Power Conditioning
LOCATION: Poster Area
SESSION CHAIR:
Francesco Orfei, University of Perugia

B-16-351
SELF-POWERED LIGHTNING CURRENT SENSOR
Disheng Wang, Lin Du, Shiying Wang, Liman Ran
Chongqing University, China

B-16-354
DESIGN OF POWER MANAGEMENT ASIC FOR PIEZOELECTRIC ENERGY HARVESTER
Hua Yu, Han Wu
Chongqing University, China

B-16-357
AN ANT-BASED LOW-POWER BATTERY-FREE WIRELESS CRYOGENIC TEMPERATURE PROBES FOR INDUSTRIAL PROCESS MONITORING
Nithin Raghunathan{2}, Xiaofan Jiang{2}, Arnab Ganguly{1}, Dimitrios Peroulis{2}
{1}IMA Life North America, United States; {2}Purdue University, United States

B-16-360
VIBRATIONS POWERED LORA SENSOR: AN ELECTROMECHANICAL ENERGY HARVESTER WORKING ON A REAL BRIDGE
Francesco Orfei, Chiara Benedetta Mezzetti, Francesco Cottone
Università degli Studi di Perugia, Italy

B-16-363
ULTRA-LOW-POWER RADFET SENSING CIRCUIT FOR WIRELESS SENSOR NETWORKS POWERED BY ENERGY HARVESTING
Andrey Somov{2}, Zheng Jun Chew{2}, Tingwen Ruan{2}, Meiling Zhu{2}, Simon Platt{1}
{1}University of Central Lancashire, United Kingdom; {2}University of Exeter, United Kingdom

B-16-366
SYSTEM-LEVEL MODELLING AND VALIDATION OF A STRAIN ENERGY HARVESTING SYSTEM BY DIRECTLY COUPLING FINITE ELEMENT AND ELECTRICAL CIRCUITS
Qiang Li, Yang Kuang, Meiling Zhu
University of Exeter, United Kingdom

B-16-369
AN 143NW RELAXATION OSCILLATOR FOR ULTRA-LOW POWER BIOMEDICAL SYSTEMS
Huan Hu, Subhanshu Gupta, Martin Schiavenato
Washington State University, United States

B-16-372
DEVELOPMENT OF ZERO-ENERGY COMMUNICATION SENSOR TAG SYSTEM USING AMBIENT WI-FI SIGNAL
Young-Han Kim, Hyun-Seok Ahn, Changseok Yoon, Yongseok Lim, Seung-Ok Lim
KETI (Korea Electronics Technology Institute), Korea, South

3:00 PM - 3:30 PM
COFFEE BREAK
LOCATION: Grand Sierra D-I

3:30 PM - 5:00 PM
B4L-A: Physical Sensors II: Crystalline & CMOS Sensors
LOCATION: Curacao 1-2
SESSION CHAIRS:
Hua Wang, Georgia Institute of Technology
Vikrant Gokhale, University of Michigan

3:30
INVITED: SIMULATION-BASED CHARACTERIZATION OF PIEZOCERAMIC MATERIALS
Stefan Rupitsch
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

4:00
COMPARISON OF REFERENCE SENSORS FOR NOISE CANCELLATION OF MAGNETOELECTRIC SENSORS
Jens Reermann, Christin Bald, Sebastian Salzer, Phillip Durdaut, André Piorra, Dirk Meyners, Eckhard Quandt, Michael Höft, Gerhard Schmidt
Christian-Albrechts-Universität zu Kiel, Germany

4:15
CHARACTERIZATION OF BIPOLAR TRANSISTORS FOR CRYOGENIC TEMPERATURE SENSORS IN STANDARD CMOS
Lin Song, Harald Homulle, Edoardo Charbon, Fabio Sebastiano
Technische Universiteit Delft, Netherlands

4:30
E-SKIN MODULE WITH HETEROGENEOUSLY INTEGRATED GRAPHENE TOUCH SENSORS AND CMOS CIRCUITRY
Hadi Heidari, Carlos García Núñez, Ravinder Dahiya
University of Glasgow, United Kingdom

4:45
HIGH-DENSITY CMOS MICROELECTRODE ARRAY SYSTEM FOR IMPEDANCE SPECTROSCOPY AND IMAGING OF BIOLOGICAL CELLS
Vijay Viswam, Raziyeh Bounik, Amir Shadmani, Jelena Dragas, Julia Alicia Boos, Axel Birchler, Jan Müller, Yihui Chen, Andreas Hierlemann
Eidgenössische Technische Hochschule Zürich, Switzerland

3:30 PM - 5:00 PM
B4L-B: Ultrasound Sensors
LOCATION: Curacao 3-4
SESSION CHAIRS:
Matteo Rinaldi, Northeastern University
Songbin Gong, UIUC

3:30
INVITED: A 700 KHZ ULTRASONIC LINK FOR WIRELESS POWERING OF IMPLANTABLE MEDICAL DEVICES
Raffaele Guida, Enrico Santagati, Tommaso Melodia
Northeastern University, United States

4:00
ULTRASONICALLY POWERED HYDROGEL-BASED WIRELESS IMPLANTABLE GLUCOSE SENSOR
Hamid Basaeri, David Christensen, Shad Roundy, Yuechuan Yu, Tram Nguyen, Prashant Tathireddy, Darrin Young
University of Utah, United States

4:15
HIGH-RESOLUTION ULTRASONIC SENSOR DEDICATED TO IN-SITU NUCLEAR FUEL SWELLING MEASUREMENTS
Ghita Zaz{2}, Emmanuel Le Clézio{2}, Meriem Chrifi Alaoui{2}, Gilles Despaux{2}, Yoann Calzavara{1}
{1}Institut Laue-Langevin, France; {2}Université de Montpellier, France

4:30
HOUSING INFLUENCE ON MULTI-BAND DIRECTIONAL MEMS MICROPHONES INSPIRED BY ORMIA OCHRACEA
Ralf Bauer{3}, Yansheng Zhang{3}, Joseph Jackson{3}, William Whitmer{1}, William Brimijoin{2}, Michael Akeroyd{2}, Deepak Uttamchandani{3}, James Windmill{3}
{1}MRC Institute of Hearing Resarch, United Kingdom; {2}MRC Institute of Hearing Research, United Kingdom; {3}University of Strathclyde, United Kingdom

4:45
IMPROVING EFFICIENCY OF ULTRASONIC DISTANCE SENSORS USING PULSE INTERVAL MODULATION
Seungin Shin, Min-Hyun Kim, Seibum Choi
Korea Advanced Institute of Science and Technology, Korea, South

3:30 PM - 5:00 PM
B4L-C: Optical Physical Sensors I
LOCATION: Curacao 5-6
SESSION CHAIRS:
Reza Ghodssi, University of Maryland
Long Que, Iowa State University

3:30
FIBER LASER SENSOR FOR SIMULTANEOUS ACCELERATION AND MAGNETIC MEASUREMENT
Wentao Zhang, Zhaogang Wang, Wenzhu Huang, Fang Li
Chinese Academy of Sciences, China

3:45
HIGHLY SENSITIVE MINIATURE SCALAR OPTICAL GRADIOMETER
Rui Zhang, Kenneth Smith, Rahul Mhaskar
Geometrics, Inc., United States

4:00
DYNAMIC DISPERSIVE SPECTROMETER USING A FIBER BRAGG GRATING FOR HIGH PRESSURE MEASUREMENTS
Yohan Barbarin, Alexandre Lefrançois, Frédéric Sinatti, Alexandre Bey, Matthieu Balbarie, Antoine Osmont, Jérôme Luc
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

4:15
SINGLE-SHOT BRILLOUIN OPTICAL TIME DOMAIN ANALYSIS FOR DISTRIBUTED FIBER SENSING
Jian Fang{2}, William Shieh{2}, Pengbai Xu{1}
{1}Harbin Institute of Technology, China; {2}University of Melbourne, Australia

4:30
A MEMS INFRARED THERMOPILE WITH PHONONIC CRYSTAL STRUCTURES AND CARBON NANOTUBE ABSORPTION LAYER
Kory Gray{2}, John Muth{2}, William Carr{1}
{1}New Jersey Microsystems, United States; {2}North Carolina State University, United States

4:45
EFFECTS OF MAGNETIC FIELD ON AN OPTICAL FIBRE RADIATION DOSIMETER
Sinead O'Keeffe{3}, Lingxia Chen{3}, Elfed Lewis{3}, Mark Grattan{2}, Alan Hounsell{2}, Glenn Whitten{2}, Giuseppe Schettino{1}
{1}National Physical Laboratory, United Kingdom; {2}Northern Ireland Cancer Centre, United Kingdom; {3}University of Limerick, Ireland

3:30 PM - 5:00 PM
B4L-D: Medical Sensing Applications
LOCATION: Curacao 7-8
SESSION CHAIRS:
Robert Roberts, University of Hong Kong
Gerald Gerlach, Institut fuer Festkoerperelektronik, Technische Universitaet Dresden

3:30
NON-INVASIVE INTEGRATED WIRELESS BREATHING MONITORING SYSTEM BASED ON A PYROELECTRIC TRANSDUCER
Salvatore Andrea Pullano{1}, Antonino S. Fiorillo{1}, Ifana Mahbub{2}, Syed K. Islam{2}, Mark S. Gaylord{2}, Vichien Lorch{2}
{1}Università degli studi Magna Græcia di Catanzaro, Italy; {2}University of Tennessee, United States; {2}University of Tennessee , United States

3:45
60GHZ VITAL SIGN RADAR USING 3D-PRINTED LENS
Robert Ernst{1}, Emil Nilsson{1}, Per-Arne Viberg{2}
{1}Halmstad University, Sweden; {2}Swedish Adrenaline AB, Sweden

4:00
A NEW CUFFLESS OPTICAL SENSOR FOR BLOOD PRESSURE MEASURING WITH SELF-ADAPTIVE SIGNAL PROCESSING
Yung-Hua Kao, Paul Chang-Po Chao, Tse-Yi Tu, Keng-Yueh Chiang, Chin-Long Wey
National Chiao Tung University, Taiwan

4:15
A LOW-POWER MULTI-PHYSIOLOGICAL MONITORING PROCESSOR FOR STRESS DETECTION
Nasrin Attaran{2}, Justin Brooks{1}, Tinoosh Mohsenin{2}
{1}United States Army Research Laboratory, United States; {2}University of Maryland, Baltimore County , United States

4:30
INTRALUMINAL PRESSURE AND TEMPERATURE SENSOR AIMED AT APPLICATION TO FLEXIBLE ENDOSCOPE OPERATION
Yusaku Maeda, Kohei Maeda, Hideki Kobara, Hirohito Mori, Hidekuni Takao
Kagawa University , Japan

4:45
AN ULTRASENSITIVE MAGNETOELECTRIC SENSOR SYSTEM FOR THE QUANTITATIVE DETECTION OF LIVER IRON
Hao Xi, Meng-Chien Lu, Xiaoshi Qian, Qiming Zhang, Sebastian Rupprecht, Qing Yang
Pennsylvania State University, United States

3:00 PM - 5:00 PM
B4L-E: Focused Session: Resonators
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Peter Hesketh, Georgia Institute of Technology
Oliver Brand, Georgia Institute of Technology

3:30
INVITED: SUBSTRATE-DECOUPLED 3D MICRO-SHELL RESONATORS
Vahid Tavassoli, Benoit Hamelin, Farrokh Ayazi
Georgia Institute of Technology, United States

4:00
PROBING ANCHOR LOSSES IN ALN-ON-SI CONTOUR MODE MEMS RESONATORS THROUGH LASER DOPPLER VIBROMETRY
Cheng Tu{1}, Joshua En-Yuan Lee{1}, Astrid Frank{2}, Christoph Schäffel{2}, Uwe Stehr{3}, Matthias Hein{3}
{1}City University of Hong Kong, Hong Kong; {2}Institut für Mikroelektronik- und Mechatronik-Systeme gemeinnützige GmbH, Germany; {3}Technische Universität Ilmenau, Germany

4:15
AN ALN-ON-SI RESONANT IR SENSOR ARRAY WITH A LARGE TEMPERATURE COEFFICIENT OF FREQUENCY
Milad Moosavifar, Azadeh Ansari, Mina Rais-Zadeh
University of Michigan, United States

4:30
MICROWAVE RESONATOR SENSOR INTEGRATED WITH NANOSTRUCTURED SEMICONDUCTOR MEMBRANES FOR PHOTODETECTION AND CARRIER LIFETIME MEASUREMENT
Najia Mahdi, Ryan Kisslinger, Himani Sharma, Mohammad Hossein Zarifi, Mojgan Daneshmand, Karthik Shankar
University of Alberta, Canada

4:45
ANALYSIS OF THICKNESS AND QUALITY FACTOR OF A DOUBLE PADDLE OSCILLATOR AT ROOM TEMPERATURE
Hamza Shakeel{1}, Thomas Metcalf{2}, Josh Pomeroy{1}
{1}National Institute of Standards and Technology, United States; {2}Naval Research Laboratory, United States

3:30 PM - 5:00 PM
B4L-F: Chemical & Gas Sensing from Fabrication to Application
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Kourosh Kalantarzadeh, RMIT University
Omer Oralkan, North Carolina State University

3:30
AMPLIFIED CHEMOMECHANICAL COMB GAS SENSOR
Rugved Likhite, Shashank S Pandey, Aishwaryadev Banerjee, Hanseup Kim, Carlos H Mastrangelo
University of Utah, United States

3:45
DEVELOPMENT OF A PRINTED IMPEDANCE BASED ELECTROCHEMICAL SENSOR ON PAPER SUBSTRATE
Dinesh Maddipatla, Binu Narakathu, Bradley Bazuin, Massood Zandi Atashbar
Western Michigan University, United States

4:00
ROOM TEMPERATURE SENSING OF VOCS BY ATOMIC LAYER DEPOSITION OF METAL OXIDE
Akhilesh Tanneeru, Steven Mills, Michael Lim, Marzana Mantasha Mahmud, James Dieffenderfer, Alper Bozkurt, Troy Nagle, Bongmook Lee, Veena Misra
North Carolina State University, United States

4:15
ROOM TEMPERATURE IONIC LIQUID ELECTROCHEMICAL GAS SENSOR FOR RAPID OXYGEN DETECTION WITH TRANSIENT DOUBLE POTENTIAL AMPEROMETRY
Hao Wan, Heyu Yin, Andrew Mason
Michigan State University, United States

4:30
CARBON DIOXIDE SENSOR FOR MOBILE DEVICES: A NOVEL APPROACH FOR LOW-POWER CONSUMING, HIGHLY SENSITIVE NDIR SENSORS
Louisa Scholz, Alvaro Ortiz Perez, Benedikt Bierer, Ponkanok Eaksen, Jürgen Wöllenstein, Stefan Palzer
Albert-Ludwigs-Universität Freiburg, Germany

4:45
TOWARDS A NOVEL OPTICAL TRACE OXYGEN SENSOR FOR COMMERICAL USE
Gary McDowell{1}, Francesca Farrow{1}, Mahesh Uttamlal{1}, Sheila Holmes-Smith{1}, Craig Mitchell{2}, Patrick Shannon{2}
{1}Glasgow Caledonian University, United Kingdom; {2}SST Sensing Ltd, United Kingdom

5:30 PM - 9:30 PM
CONFERENCE GALA DINNER
LOCATION: Walt Disney World Epcot® World ShowPlace Pavilion
**Buses will depart from in front of the Caribe Royale Convention Center at 5:30 PM*

9:00 AM - 9:50 AM
C1L-A: Plenary 3
LOCATION: Grand Sierra A-C
SESSION CHAIR:
David Horsley, University of California, Davis

"Pervasive Systems, Sensor Networks, IOT - Animal Monitoring and Poacher Detection Using Wireless Sensor Networks"
Paul Havinga, University of Twente, The Netherlands

In this presentation animal monitoring using wireless sensor networks will be addressed from various points of view, ranging from agriculture, sports, and wildlife monitoring. A special focus will be given to wildlife monitoring, as this requires the most complex and complete solution. In particular mechanisms and techniques to detect poachers in a wildlife park will be addressed. There are various studies on the deployment of sensor nodes for animal tracking. Environmental scientists and zoologists have been increasingly using these technologies to collect data from wild terrestrial areas and transmit them to the remote databases. In some of these applications, the sensor nodes are attached to the animals, forming an ad hoc wireless network of mobile nodes. Detecting poachers is even much more complicated, and requires a process of planning, installation, execution, data collection, and data interpretation. We use a combination of wireless sensing techniques, ranging from monitoring disturbances of herds of animals in the field, (virtual) fence detection, and air borne sensing.

9:50 AM - 10:30 AM
Awards Ceremony
LOCATION: Grand Sierra A-C

10:30 AM - 11:00 AM
COFFEE BREAK
LOCATION: Grand Sierra D-I

11:00 AM - 12:30 PM
C2L-A: Physical Sensors III: Magnetometers & Inertial Sensors
LOCATION: Curacao 1-2
SESSION CHAIRS:
Qing-An Huang, Southeast University
Philip Feng, Case Western Reserve University

11:00
A FAST DETERMINATION METHOD FOR IDENTIFYING THE SPIN EXCHANGE RELAXATION FREE REGIME OF ATOMIC MAGNETOMETER
Yanzhang Wang, Xue Zhang, Jianan Qin, Chen Chen
Jilin University, China

11:15
A DUAL QUANTIZATION ELECTROMECHANICAL SIGMA-DELTA MODULATOR VIBRATORY WHEEL GYROSCOPE
Bin Sheng{2}, Fang Chen{1}, Chao Qian{2}, Dacheng Xu{2}, Shuwen Guo{2}, Xinxin Li{1}
{1}Shanghai Institute of Microsystem and Information Technology / Chinese Academy of Sciences, China; {2}Soochow University, China

11:30
A MEMS RESONANT TILT SENSOR WITH HIGH SENSITIVITY MAINTAINED IN THE WHOLE 360° MEASUREMENT RANGE
Shudong Wang, Juan Ren, Tianyi Zhang, Yinsheng Weng, Zhuangde Jiang, Xueyong Wei
Xi'an Jiaotong University, China

11:45
A DAMPING CONSTANT MODEL FOR PROOF-MASS STRUCTURE DESIGN OF MEMS INERTIAL SENSOR BY MULTI-LAYER METAL TECHNOLOGY
Toshifumi Konishi{1}, Teruaki Safu{1}, Katsuyuki Machida{1}, Daisuke Yamane{2}, Masato Sone{2}, Kazuya Masu{2}, Hiroshi Toshiyoshi{3}
{1}NTT Advanced Technology Corporation, Japan; {2}Tokyo Institute of Technology, Japan; {3}University of Tokyo, Japan

12:00
A LOW 1/F-NOISE ACCELEROMETER FRONTEND USING CHOPPER STABILIZATION AT A FREQUENCY MATCHED WITH A NOTCH OF QUANTIZATION NOISE
Kazuo Ono, Daisuke Maeda, Takashi Oshima, Toshiaki Nakamura, Joan Giner, Tomonori Sekiguchi
Hitachi Ltd., Japan; Hitachi Ltd., Spain

12:15
DEVELOPMENT OF 2V SENSITIVITY STATIC ELECTRICITY SENSOR WITH VERTICALLY MOUNTED LARGE ELECTRODE
Atsuya Iima, Yusaku Oka, Kyohei Terao, Fusao Shimokawa, Hidekuni Takao
Kagawa University, Japan

11:00 AM - 12:30 PM
C2L-B: Biomedical Sensors
LOCATION: Curacao 3-4
SESSION CHAIRS:
Ryuji Yokokawa, Kyoto University
Giuseppe Barillaro, Università di Pisa

11:00
INVITED: CAVITAS SENSORS AND SNIFF-CAM FOR BIOMONITORING: SOFT CONTACT LENS & MOUTHGUARD SENSORS, OPTICAL BIO-SNIFFING OF HUMAN VOCS
Kohji Mitsubayashi
Tokyo Medical and Dental University, Japan

11:30
ELECTROCHEMICAL DETECTION OF A NOVEL THERAPEUTIC COMPOUND FOR SCHIZOPHRENIA
Tugba Kilic{1}, Sandro Carrara{1}, Valerie Brunner{2}, Laurent Audoly{2}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Laboratoires Pierre Fabre, France

11:45
SELF-POWERED GLUCOSE BIOSENSOR OPERATING UNDER PHYSIOLOGICAL CONDITIONS
Tanmay Kulkarni, Gymama Slaughter
University of Maryland, Baltimore County, United States

12:00
DETECTION OF ROTAVIRUS IN CLINICAL SPECIMENS USING AN IMMUNOSENSOR BASED ON THE PRINCIPLE OF FLUORESCENCE FLUCTUATION SPECTROSCOPY
Makoto Hasegawa{1}, Yuka Inoue{1}, Nanami Kimura{1}, Ernest Wandera{2}, Yoshio Ichinose{2}
{1}Nagahama Institute of Bioscience and Technology, Japan; {2}Nagasaki University, Japan

12:15
STUDIES OF CELL BEHAVIORS IN 3D MICROTISSUES IN A MICROFLUIDIC DEVICE: GROWTH AND MIGRATION
Xiangchen Che, Shenmin Gong, Long Que, Jacob Nuhn, Ian Schneider
Iowa State University, United States

11:00 AM - 12:30 PM
C2L-C: Machine Olfaction for Environmental Monitoring
LOCATION: Curacao 5-6
SESSION CHAIRS:
Troy Nagle, North Carolina State University
Susan Schiffman, North Carolina State University

11:00
INVITED: SMART SENSORS FOR AIR QUALITY MONITORING: CONCEPTS AND NEW DEVELOPMENTS
Jan Mitrovics
JLM Innovation GmbH, Germany

11:30
A NOVEL MICROPUMP DRIVER USED IN ENVIRONMENTAL SENSOR APPLICATIONS
Bernadette Kinzel{1}, Detlef Bonfert{1}, Florian Lippert{1}, Frank Vanselow{1}, Erkan Isa{1}, Doris Schmitt-Landsiedel{2}, Linus Maurer{3}
{1}Fraunhofer-Einrichtung für Mikrosysteme und Festkörper , Germany; {2}Fraunhofer-Einrichtung für Mikrosysteme und Festkörper / Technische Universität München, Germany; {3}Fraunhofer-Einrichtung für Mikrosysteme und Festkörper / Universität der Bundesw

11:45
A BATTERY-OPERATED WIRELESS MULTICHANNEL GAS SENSOR SYSTEM BASED ON A CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCER (CMUT) ARRAY
Chunkyun Seok, Marzana Mantasha Mahmud, Oluwafemi Adelegan, Xiao Zhang, Omer Oralkan
North Carolina State University, United States

12:00
DUAL CHANNEL MICROCANTILEVER HEATERS FOR SELECTIVE DETECTION AND QUANTIFICATION OF A GENERIC MIXTURE OF VOLATILE ORGANIC COMPOUNDS
Ifat Jahangir{2}, Goutam Koley{1}
{1}Clemson University, United Kingdom; {2}University of South Carolina, United States

12:15
UV EXCITED SNO2 NANOWIRE BASED PRINTED E-NOSE: POTENTIAL APPLICATION AS BURNING SMELL DETECTOR AND EXPLOSIVE DETECTOR
Mustahsin Adib, Martin Sommer
Karlsruher Institut für Technologie, Germany

11:00 AM - 12:30 PM
C2L-D: Electromagnetic Based Sensing Applications
LOCATION: Curacao 7-8
SESSION CHAIRS:
Gijs Krijnen, University of Twente
Cameron Riviere, The Robotics Insitute, Carnegie Mellon University

11:00
PULSE INDUCTION PARKING SENSOR
Stefano Guatieri, Giovanni Badaracco, Ivan Defilippis, Diego Barrettino
University of Applied Sciences and Arts of Southern Switzerland, Switzerland

11:15
UHF RFID SENSORS BASED ON FREQUENCY MODULATION
Md. Mazidul Islam{1}, Ville Viikari{1}, Joona Nikunen{3}, Marko Reinikainen{2}
{1}Aalto University, Finland; {2}Espotel Oy, Finland; {3}Metso Automation, Finland

11:30
NON-CONTACT MEASUREMENT OF SILICON THIN WAFER WARPAGE BY THZ TOMOGRAPHY AND LASER TRIANGULATION
Thomas Arnold, Johannes Schicker, Martin Kraft, Christina Hirschl
CTR Carinthian Tech Research AG, Austria

11:45
A BATTERY-FREE RFID SENSOR TAG WITH FIBER-OPTIC TAMPER DETECTION
Alexander Hoang{3}, Kip Coonley{1}, Faranak Nekoogar{2}, Matthew Reynolds{3}
{1}Duke University, United States; {2}Lawrence Livermore National Laboratory, United States; {3}University of Washington, United States

12:00
PLASMA DIAGNOSTICS IN DIELECTRIC DEPOSITION PROCESSES
Christian Schulz, Ilona Rolfes
Ruhr-Universität Bochum, Germany

12:15
A NEW APPROACH FOR VELOCITY PROFILE MEASUREMENTS WITH ELECTROMAGNETIC FLOW TOMOGRAPHY
Jan Christoph Abrolat, Thomas Musch
Ruhr-Universität Bochum, Germany

11:00 AM - 12:30 PM
C2L-E: Sensor Network, Method & Evaluation
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Huseyin Ugur Yildiz, TED University
Jian Lu, AIST

11:00
PRECISE SYNCHRONIZATION TIME STAMP GENERATION FOR BLUETOOTH LOW ENERGY
Carl Christian Rheinländer, Norbert Wehn
Technische Universität Kaiserslautern, Germany

11:15
SIMULTANEOUS SENSOR LOCALIZATION VIA SYNTHETIC APERTURE RADAR (SAR) IMAGING
Xiaojie Fu, Andreas Pedross-Engel, Daniel Arnitz, Matthew Reynolds
University of Washington, United States

11:30
SOFTWARE-DEFINED QOS PROVISIONING FOR FOG COMPUTING ADVANCED WIRELESS SENSOR NETWORKS
Lina Huang{1}, Gaolei Li{1}, Jun Wu{1}, Lan Li{1}, Jianhua Li{1}, Rosario Morello{2}
{1}Shanghai Jiao Tong University, China; {2}Università degli Studi Mediterranea di Reggio Calabria, Italy

11:45
DISTRIBUTED DETECTION OF CRITICAL NODES IN WIRELESS SENSOR NETWORKS USING CONNECTED DOMINATING SET
Orhan Dagdeviren{2}, Vahid Khalilpour Akram{2}, Bulent Tavli{4}, Huseyin Ugur Yildiz{3}, Can Atilgan{1}
{1}Dokuz Eylul University, Turkey; {2}Ege University, Turkey; {3}TED University, Turkey; {4}TOBB University of Economics and Technology, Turkey

12:00
POWER-AWARE CHANNEL-HOPPING MAC MECHANISMS FOR BATTERY-OPERATED MULTI-HOP NETWORKS
Arvind Kandhalu, Ariton Xhafa, Ramanuja Vedantham, Xiaolin Lu
Texas Instruments Incorporated, United States

12:15
MINIATURIZATION AND PACKAGING OF IMPLANTABLE WIRELESS SENSOR NODES FOR ANIMALS MONITORING
Jian Lu{2}, Lan Zhang{2}, Sohei Matsumoto{2}, Hiroshi Hiroshima{2}, Kouichi Serizawa{4}, Masanori Hayase{3}, Takafumi Gotoh{1}
{1}Kyushu University, Japan; {2}National Institute of Advanced Industrial Science and Technology, Japan; {3}Tokyo University of Science, Japan; {4}Tokyo University of Science / National Institute of Advanced Industrial Science and Technology, Japan

11:00 AM - 12:30 PM
C2L-F: Focused Session: Energy Harvesting & Low-Power Sensors I
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Zeynep Celik-Butler, University of Texas at Arlington
Yuji Suzuki, The University of Tokyo

11:00
INVITED: DESIGN OF METGLAS/POLYVINYLIDENE FLUORIDE MAGNETOELETRIC LAMINATES FOR ENERGY HARVESTING FROM POWER CORDS
Myung-Eun Song{3}, Yongke Yan{3}, Sreenivasulu Gollapudi{3}, Mirza Bichurin{1}, Vladimir Petrov{1}, Mohan Sanghadasa{2}, Shashank Priya{3} {1}Novgorod State University, Russia; {2}U.S. Army Research, Development and Engineering Command, United States; {3}Virginia Polytechnic Institute and State University, United States

11:30
MEMS COMB-DRIVE ELECTRET ENERGY HARVESTER CHARGED AFTER PACKAGING
Seonwoo Kim, Yuji Suzuki
University of Tokyo, Japan

11:45
SELF-POWERED CMOS ACTIVE RECTIFIER SUITABLE FOR LOW-VOLTAGE MECHANICAL ENERGY HARVESTERS
Abdalrahman Sayed Herbawi, Fabio Velarde, Oliver Paul, Tzeno Galchev
Albert-Ludwigs-Universität Freiburg, Germany

12:00
DESIGN AND OPTIMIZATION OF AN ELECTROSTATIC ENERGY SCAVENGER FOR LOW POWER ELECTRONICS
Shaikh Md Rubayiat Tousif, Donald Butler, Zeynep Çelik-Butler
University of Texas at Arlington, United States

12:15
EMBEDDED ELASTIC WAVE MIRRORS FOR ENHANCED ENERGY HARVESTING
Serife Tol, Fahad Vora, Levent Degertekin, Alper Erturk
Georgia Institute of Technology, United States

WEDNESDAY, NOVEMBER 2

11:00 AM - 12:30 PM
INDUSTRY DAY OVERVIEW AND SENSORS APPLICATIONS FOR IOT
LOCATION: Bonaire 5-6

11:00
IEEE SENSORS COUNCIL WELCOME
Gerard Hayes, WRCNC
Andrew Dehennis, Sensionics

11:15
WIND RIVER DEMONSTRATION PLATFORM & WORKSHOPS
Whitney Young, Wind River

11:30
IOT, SENSORS AND SMART LIVING OF THE FUTURE
Teresa Pace, ICMAR

12:00
UAV SENSOR APPLICATIONS
Tyler Collins, Precision Hawk

12:30 PM - 1:30 PM
LUNCH
LOCATION: Caribbean I-III

INDUSTRY PANEL - UAV REGULATIONS AND OPPORTUNITIES *Kyle Snyder, NCSU/ASSURE*
Tyler Collins, Precision Hawk

1:30 PM - 3:00 PM
SENSOR APPLICATIONS AND IOT INITIATIVES
LOCATION: Bonaire 5-6

1:30
SENSORS FOR FIRSTNET AND FIRST RESPONDERS
Allan Sadowski, NC FirstNet

2:00
SENSOR BASED INFORMATION INNOVATION BETWEEN SATELLITES, UAVS, AND IOT PLATFORMS
Richard Spangler, PlazaBridge Group

2:30
RIOT AND 2017 INITIATIVES
Tom Snyder, RIoT
Larry Steffann, WRCNC

WEDNESDAY, NOVEMBER 2 – POSTER SESSION

1:30 PM - 3:30 PM
C3P-G: Sensor Phenomenon, Modeling, & Evaluation III: Sensors & Applications
LOCATION: Poster Area
SESSION CHAIR:
Stefan Rupitsch, Friedrich-Alexander-Universität

C-1-2
KEY ASPECTS OF PHOTOPLETHYSMOGRAM SIGNALS FOR APPLICATION TO ALCOHOL-INTAKE DETECTION
Yasuhisa Omura, Hajime Ozaki
Kansai University, Japan

C-1-4
MICRONEEDLE THERMAL FLOW SENSOR
Hojoon Lee{2}, Sangwoong Baek{1}, Eunyong Jeon{1}, Junghoon Lee{1}
{1}Seoul National University, Korea, South; {2}Seoul National University / Samsung Electroncs Semiconductor R&D Center, Korea, South

C-1-6
DESIGN,MEASUREMENT AND EVALUATION FOR PLL APPLICATION OF A WIDEBAND MEMS PHASE DETECTOR
Juzheng Han, Xiaoping Liao
Southeast University, China

C-1-8
NOISE AND IMPEDANCE OF THE SIROF UTAH ELECTRODE ARRAY
Mohit Sharma, Avery Gardner, Jason Silver, Ross Walker
University of Utah, United States

C-1-10
SVR BASED DENSE AIR POLLUTION ESTIMATION MODEL USING STATIC AND WIRELESS SENSOR NETWORK
Ke Hu{3}, Vijay Sivaraman{3}, Hari Bhrugubanda{3}, Shiying Kang{1}, Ashfaqur Rahman{2}
{1}Chinese University of Hong Kong, Hong Kong; {2}Commonwealth Scientific and Industrial Research Organisation, Australia; {3}University of New South Wales, Australia

C-1-12
A PRACTICAL SOLUTION FOR ACCURATE STUDIES OF NDIR GAS SENSOR PRESSURE DEPENDENCE: LAB TEST BENCH, SOFTWARE AND CALCULATION ALGORITHM
Bakhram Gaynullin, Maksym Bryzgalov, Christine Hummelgård, Henrik Rödjegård
SenseAir AB, Sweden

C-1-16
EXPERIMENTAL AND THEORETICAL ANALYSES OF EFFECT OF ZNO NANOWIRE GROWTH ON MECHANICAL PROPERTIES OF MICROCANTILEVERS FOR DYNAMIC SENSING APPLICATIONS
Nikhilendu Tiwary, Arindam Kushagra, Manoj Kandpal, Valipe Ramgopal Rao
Indian Institute of Technology Bombay, India

C-1-18
MODELING AND EXPERIMENTAL CHARACTERIZATION OF FLEXIBLE GRAPHENE COMPOSITE STRAIN SENSORS
Mohamed Serry, Mahmoud Sakr
American University in Cairo, Egypt

C-1-20
MICROBIAL FUEL CELL AS A BIOSENSOR AND A POWER SOURCE FOR FLORA HEALTH MONITORING
Davide Brunelli, Pietro Tosato, Maurizio Rossi
Università degli Studi di Trento, Italy

C-1-22
LOW-COST AIR QUALITY MONITORS: MODELING AND CHARACTERIZATION OF SENSOR DRIFT IN OPTICAL PARTICLE COUNTERS
Michael Taylor
Carnegie Mellon University, United States

C-1-24
A SINGLE-CHIP ISFET BASED PH SENSOR
Mst Shawkat, Nicole McFarlane
University of Tennessee , United States

C-1-26
LD-MAC: A LOAD-DISTRIBUTED DATA TRANSMISSION IN BODY AREA NETWORK
Tanmoy Maitra, Paramita Mallick, Sarbani Roy
Jadavpur University, India

C-1-28
METAL OXIDE GAS SENSING CHARACTERIZATION BY LOW FREQUENCY NOISE SPECTROSCOPY
Michael Lim, Abhishek Malhotra, Steven Mills, John Muth, Bongmook Lee, Veena Misra
North Carolina State University, United States

C-1-30
FAST METHOD FOR THE CALCULATION OF SURFACE BENDING ON CIRCULAR MULTILAYERED PIEZOELECTRIC STRUCTURES
Thomas Voglhuber-Brunnmaier{2}, Erwin K. Reichel{2}, Bernhard Jakoby{2}, Roman Beigelbeck{1}, Patrick Mayrhofer{3}, Ulrich Schmid{3}
{1}Danube University Krems / Technische Universität Wien, Austria; {2}Johannes Kepler University, Austria; {3}Technische Universität Wien, Austria

1:30 PM - 3:30 PM
C3P-H: New Materials Platforms & Nanostructures for Sensing
LOCATION: Poster Area
SESSION CHAIR:
Mohammad Zarifi, University of Manitoba

C-2-33
CARBON NANOTUBE FOREST DEVICES WITH NEGATIVE POISSON'S RATIO
Assaf Ya'akobovitz
Ben-Gurion Univesity of the Negev, Israel

C-2-36
SILK PIEZOELECTRIC THIN FILMS : MATERIALS TO DEVICES
Jose Joseph, Sai Yaraj Saraswathi, Anshika Agarwal, Shiv Govind Singh, Siva Rama Krishna Vanjari
Indian Institute of Technology Hyderabad, India

C-2-39
IMPROVING GAS-SENSING PERFORMANCE OF REDUCED GRAPHENE OXIDE USING POLYCRYSTALLINE SNO2 NANOPARTICLES AS SENSITIZER
Jie Sun{1}, Xi Yang{1}, Guoyuan Xiao{2}
{1}China Academy of Engineering Physics, China; {2}Southwest University of Science and Technology, China

C-2-42
SELECTIVE DEPOSITION OF SILVER NANOWIRES AND ITS APPLICATION FOR WEARABLE PRESSURE SENSOR
Gui-Shi Liu{2}, Jing-Shen Qiu{2}, Bo-Ru Yang{2}, Han-Ping David Shieh{1}
{1}National Chiao Tung University, Taiwan; {2}Sun Yat-Sen University, China

C-2-45
STRAIN GAUGE PRINTED ON CARBON WEAVE FOR SENSING IN CARBON FIBER REINFORCED PLASTICS
Gerrit Dumstorff, Walter Lang
Universität Bremen, Germany

C-2-48
BIOMIMETIC HYDROGEL CUPULA FOR CANAL NEUROMASTS INSPIRED SENSORS
Meghali Bora{4}, Ajay Giri Prakash Kottapalli{4}, Mohsen Asadnia{1}, Jianmin Miao{3}, Michael S. Triantafyllou{2}
{1}Macquarie University, Australia; {2}Massachusetts Institute of Technology, United States; {3}Nanyang Technological University, Singapore; {4}Singapore-MIT Alliance for Research and Technology, Singapore

C-2-51
FOIL-BASED STRAIN GAUGES WITH NANOGRANULAR PLATINUM STRUCTURES FOR THE INTEGRATION IN ELASTOMER GASKETS
Daniel Gräbner{1}, Eva-Maria Meyer{2}, Walter Lang{2}
{1}FWBI Friedrich-Wilhelm-Bessel-Institut Forschungs GmbH, Germany; {2}Universität Bremen, Germany

C-2-54
OPTIMIZATION OF METGLAS 2605SA1 AND PZT-5A MAGNETOELECTRIC LAMINATES FOR MAGNETIC SENSING APPLICATIONS
Eugene Freeman, Joshua Harper, Nishit Goel, Steven J. Schiff, Srinivas Tadigadapa
Pennsylvania State University, United States

C-2-56
NANOCELLULOSE ELECTRODES FOR INTERFACING PLANT ELECTROCHEMISTRY
Kevin Keller{1}, Michael Wilkins{1}, James Reynolds{1}, James Dieffenderfer{1}, Charles Hood{1}, Michael Daniele{1}, Alper Bozkurt{1}, Meral Tunc-Ozdemir{2}
{1}North Carolina State University, United States; {2}University of North Carolina, United States

C-2-58
ZNO NANOPARTICLE-BASED OPTICAL SENSORS FABRICATED BY HIGH CURRENT DENSITY ELECTRODEPOSITION AND FLAME OXIDATION
Xiaochen Wang, Christopher Hughes, Sanghoon Park, Xiangmeng Ma, Hyoung Jin Cho
University of Central Florida, United States

1:30 PM - 3:30 PM
C3P-J: Chemical Sensing
LOCATION: Poster Area
SESSION CHAIR: Susan Schiffman, NC State University

C-3-63
SMARTPHONE-BASED THIN LAYER CHROMATOGRAPHY FOR THE DISCRIMINATION OF FALSIFIED MEDICINES
Hojeong Yu{3}, Huy Le{3}, Steven Lumetta{3}, Brian T. Cunningham{3}, Eliangiringa Kaale{1}, Thomas Layloff{2}
{1}Muhimbili University of Health and Allied Sciences, Tanzania; {2}Partnership for Supply Chain Management, Inc. / Management Sciences for Health, United States; {3}University of Illinois at Urbana–Champaign, United States

C-3-66
EPOXY EXPOSURE INDUCED ELECTRONIC PROPERTIES CHANGE OF GRAPHENE
Md Ahsan Uddin{1}, Ferhat Bayram{1}, Goutam Koley{1}, Yihao Zhu{2}, Amol Singh{2}, Ifat Jahangir{2}
{1}Clemson University, United States; {2}University of South Carolina, United States

C-3-69
EXPERIMENTATION OF DIOXAZABOROCANE DERIVATIVE AS FLUORESCENT MATERIAL: APPLICATION TO THE TRACE DETECTION OF HYDROGEN PEROXIDE
Celine Frenois, Thomas Caron, Eric Pasquinet, Pascal Palmas, Franck Pereira, Rodrigue Rousier
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

C-3-72
FORMATION OF ORIENTED METAL NANOSTRUCTURES BY POLARIZED LIGHT IRRADIATION FOR OPTICAL SENSING
Masashi Watanabe, Fumihiro Sassa, Kenshi Hayashi
Kyushu University, Japan

C-3-75
CALIXARENE-POLY(METHYL METHACRYLATE) COMPOSITES FOR ATR-IR SENSING OF WATER DISSOLVED AROMATIC COMPOUNDS
Charles Heath, Matthew Myers, Bobby Pejcic
Commonwealth Scientific and Industrial Research Organisation, Australia

C-3-78
DEVELOPMENT OF A FIBER-OPTIC CHEMICAL SENSOR FOR THE DETECTION OF CADMIUM
Thu Hien Nguyen, Stephen Wren, Tong Sun, Kenneth Grattan
City University London, United Kingdom

C-3-81
DEVELOPMENT OF A NOVEL MINIATURIZED LTCC-BASED WIRELESS PH SENSING SYSTEM
Houssem Eddine Amor{1}, Ammar Kouki{1}, Paul Marsh{2}, Kyoung Tae Kim{2}, Hung Cao{2}
{1}Ecole de Technologie Supérieure, Canada; {2}University of Washington, United States

C-3-84
GLUCOSE SENSING WITH GRAPHENE VARACTORS
Yao Zhang{2}, Rui Ma{2}, Yogish Kudva{1}, Philippe Bühlmann{2}, Steven Koester{2}
{1}Mayo Clinic, United States; {2}University of Minnesota, United States

C-3-87
SUSPENDED CHALCOGENIDE MICROCAVITIES FOR ULTRA-SENSITIVE CHEMICAL DETECTION
Derek Kita{1}, Hongtao Lin{1}, Junying Li{1}, Zhaohong Han{1}, Peter Su{1}, Tian Gu{1}, Anu Agarwal{1}, Anupama Yadav{2}, Kathleen Richardson{2}, Juejun Hu{1}
{1}Massachusetts Institute of Technology, United States; {2}University of Central Florida, United States

C-3-90
PARTS PER MILLION CH4 CHEMORESISTOR SENSORS BASED ON MULTI WALL CARBON NANOTUBES/METAL-OXIDE NANOPARTICLES
Michela Sainato{4}, Md Tanim Humayun{4}, Lara Gundel{2}, Paul Solomon{3}, Liliana Stan{1}, Ralu Divan{1}, Igor Paprotny{4}
{1}Argonne National Laboratory, United States; {2}Lawrence Berkeley National Laboratory, United States; {3}United States Environmental Protection Agency, United States; {4}University of Illinois at Chicago, United States

C-3-93
CORROSIVITY SENSOR BASED ON METALLIC NANOWIRES
Siddhardha Mohan Sakhamuri, Sai Prudhvi Kumar Gummadi, Ryan Toonen, Omar Rosas Camacho
University of Akron, United States

1:30 PM - 3:30 PM
C3P-K: Biosensors
LOCATION: Poster Area
SESSION CHAIR:
Chung-Yu Chang

C-4-108
STUDY OF FABRICATION CONDITIONS OF ATP BIOSENSOR BASED ON SCREEN-PRINTED ELECTRODE
Qin Zhu, Bo Liang, Yanchuang Pei, Xuesong Ye, Xiao Liang
Zhejiang University, China

C-4-111
FIBER-OPTIC IMMUNOSENSOR BASED ON LOSSY MODE RESONANCES INDUCED BY INDIUM TIN OXIDE THIN-FILMS
Abian Socorro, Ignacio Del Villar, Jesus Corres, Francisco Javier Arregui, Ignacio Raul Matias
Universidad Pública de Navarra, Spain

C-4-114
ZINC OXIDE NANOWIRE MODIFIED FLEXIBLE PLASTIC PLATFORM FOR IMMUNOSENSING
Brince Paul, R Ranga Reddy, Siva Rama Krishna Vanjari, Shiv Govind Singh
Indian Institute of Technology Hyderabad, India

C-4-117
DIELECTRIC DISPERSION ANALYSIS OF INTERACTION WITH PLURAL PHOSPHOLIPID SPECIES OF LIPOSOME BY ARRAYED CELL SYSTEM USING SMALL OPEN-ENDED COAXIAL PROBE
Masahiro Kawasaki, Kaoru Yamashita, Minoru Noda
Kyoto Institute of Technology, Japan

C-4-120
HIGHLY SELECTIVE DETECTION OF MULTI-PHOSPHORYLATED PEPTIDES VIA ARTIFICIAL RECEPTOR-IMMOBILIZED ON MAGNETIC SPHERES
Se Won Bae, Sangyong Kim, Seung-Han Shin, Dohoon Lee
Korea Institute of Industrial Technology, Korea, South

C-4-123
HIGH SENSITIVITY FLUORESCENCE DETECTION USING SMART PHONE CAMERAS
Zhendong Cao, Hsiu-Yang Tseng, Katrina Salvante, Pablo Nepomnaschy, Ash Parameswaran
Simon Fraser University, Canada

C-4-125
GOLD NANOPARTICLES AMPLIFIED SURFACE ACOUSTIC WAVE BIOSENSORS FOR IMMUNODETECTION
Shuangming Li{1}, Ying Wan{1}, Yan Su{1}, Chunhai Fan{2}, Venkat Bhethanabotla{3}
{1}Nanjing University of Science and Technology, China; {2}Nanjing University of Science and Technology / Chinese Academy of Sciences, China; {3}University of South Florida, United States

1:30 PM - 3:30 PM
C3P-L: Acoustic & Ultrasound Sensors
LOCATION: Poster Area
SESSION CHAIR:
Vikrant Gokhale, NIST

C-7-215
THE RADAR MICROPHONE: A NEW WAY OF MONITORING HONEY BEE SOUNDS
Herbert Aumann, Nuri Emanetoglu
University of Maine, United States

C-7-216
ACOUSTOELECTRIC CURRENT RESPONSE TO GAS MOLECULAR DOPING IN GRAPHENE
Shijun Zheng, Daihua Zhang
Tianjin University, China

C-7-217
CONTINUOUS MEASUREMENT OF LIQUID CONCENTRATION USING SHEAR HORIZONTAL SURFACE ACOUSTIC WAVE SENSORS WITHOUT REFERENCE LIQUID
Jun Kondoh, Kyosuke Tada
Shizuoka University, Japan

C-7-218
BIO-INSPIRED FREQUENCY AGILE ACOUSTIC SYSTEM
José Guerreiro, Joseph Jackson, James Windmill
University of Strathclyde, United Kingdom

C-7-219
ANALYSIS OF IMPEDANCE-LOADED SAW SENSORS
Ziwei Liu, Lili Fang, Chuanfang Zhang, Xuan Dai
Beijing Institute of Technology, China

C-7-220
PACKAGELESS ACOUSTIC WAVE SENSORS FOR WIRELESS BODY-CENTRIC APPLICATIONS
Sami Hage-Ali{2}, Omar Elmazria{2}, Gaël Pierson{2}, Richard Kouitat{2}, Thierry Aubert{4}, Moïse Deroh{1}, Florian Bartoli{1}, Thierry Aubert{1}, Abdelkrim Talbi{3}
{1}CentraleSupélec, France; {2}Université de Lorraine, France; {3}Université Lille 1, France; {4}Université Savoie Mont Blanc, France

C-7-221
INTEGRATED SURFACE ACOUSTIC WAVE BASED SENSORS FOR FLUIDIC APPLICATIONS
Burak Yildirim, Sukru Senveli, Rajapaksha Gajasinghe, Onur Tigli
University of Miami, United States

C-7-222
A LOW-COST ACOUSTIC MICROSENSOR BASED SYSTEM IN PACKAGE FOR AIR QUALITY MONITORING
Sanju Thomas{2}, Marina Cole{2}, Farah Villa-Lopez{2}, Julian Gardner{2}, Jan Peters{1}, Jan Theunis{1}
{1}Flemish Institute of Technological Development, Belgium; {2}University of Warwick, United Kingdom

C-7-223
SPEED-OF-SOUND BASED SENSORS FOR ENVIRONMENTAL MONITORING
Martin Doubek{2}, Vaclav Vacek{3}, Gregory Hallewell{1}, Ben Pearson{4}
{1}Aix-Marseille Université, France; {2}Czech Technical University in Prague, Czech Rep.; {3}Czech Technical University in Prague / Unicom College, Czech Rep.; {4}University of Oklahoma, United States

1:30 PM - 3:30 PM
C3P-M: Physical Sensors VII: Mechanical, Force, Pressure
LOCATION: Poster Area
SESSION CHAIR:
Vikrant Gokhale, NIST

C-6-192
WIRELESS HYDROGEN PRESSURE DOSIMETER FOR NUCLEAR HIGH DOSE MONITORING
Emilie Debourg{1}, Julien Philippe{1}, Hervé Aubert{1}, Patrick Pons{1}, Izabela Augustyniak{3}, Pawel Knapkiewicz{3}, Jan Dziuban{3}, M. Matusiak{2}, Michal Olszacki{2}
{1}Laboratoire d'Analyse et d'Architecture des Systèmes / Université de Toulouse, France; {2}National Centre for Nuclear Research, Poland; {3}Wrocław University of Technology, Poland

C-6-194
HIGH PERFORMANCE PIEZORESISTIVE LOW PRESSURE SENSORS
Lihua Li, Nickolai Belov, Michael Klitzke, Jong-Seung Park
Amphenol Advanced Sensor, United States

C-6-196
CHARACTERIZATION OF 3D PRINTED PIEZOELECTRIC SENSORS: DETERMINIATION OF D33 PIEZOELECTRIC COEFFICIENT FOR 3D PRINTED POLYVINYLIDENE FLUORIDE SENSORS
Max Kirkpatrick{2}, Joshua Tarbutton{2}, Tue Le{2}, Chabum Lee{1}
{1}Tennessee Technical University, United States; {2}University of South Carolina, United States

C-6-198
PRINTED CARBON-BASED SENSORS ARRAY FOR MEASURING 2D DYNAMIC STRAIN DISTRIBUTION AND APPLICATION IN STRUCTURAL HEALTH MONITORING
Daniel Zymelka{3}, Kazuyoshi Togashi{2}, Takahiro Yamashita{1}, Takeshi Kobayashi{1}, Seiichi Takamatsu{4}, Toshihiro Itoh{4}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}NMEMS Technology Research Organization / Dai Nippon Printing, Japan; {3}NMEMS Technology Research Organization / National Institute of Advanced Industrial Science and Techn, Ja

C-6-200
A NOVEL INTEGRATED SENSOR BASED ON MEMS STRAIN GAUGE FOR MONITORING MILLING PROCESS
Yafei Qin, Yulong Zhao, Yingxue Li, You Zhao, Peng Wang
Xi'an Jiaotong University, China

C-6-202
CAPACITIVE SENSOR NETWORK FOR COMPOSITES PRODUCTION MONITORING
Yang Yang, Bart Plovie, Thomas Vervust, Jan Vanfleteren
Universiteit Gent, Belgium

C-6-204
INTEGRATION OF HIGHLY FLEXIBLE AND SENSITIVE FILMS ON KAPTON WITH GRAPHENE OXIDE–PLATINUM NANOCOMPOSITE FOR STRAIN SENSORS
Nagarjuna Neella, Venkateswarlu Gaddam, Konandur Rajanna, M.M. Nayak
Indian Institute of Science, India

C-6-206
THREE AXIS CAPACITIVE TOUCH SENSOR FOR CLINICAL BREAST EXAMINATION TRAINING
Jayer Fernandes, Hongrui Jiang
University of Wisconsin-Madison, United States

C-6-208
MECHANICAL STRESS MEASUREMENT USING A SINGLE OCTAGONAL PIEZOTRANSDUCER
Jose Ramirez, Fabiano Fruett
University of Campinas, Brazil

C-6-210
FREQUENCY OUTPUT MEMS RESONATOR ON MEMBRANE PRESSURE SENSORS
Vahid Qaradaghi, Mohammad Mahdavi, Varun Kumar, Siavash Pourkamali
University of Texas at Dallas, United States

C-6-212
NANO-PRECISION MICROMACHINED FREQUENCY OUTPUT PROFILOMETER
Amin Abbasalipour, Mohammad Mahdavi, Varun Kumar, Siavash Pourkamali, Soheil Daryadel, Majid Minary
University of Texas at Dallas, United States

C-6-214
SILICON PRESSURE SENSOR WITH 1.5KVAC DIELECTRIC WITHSTAND-VOLTAGE CAPABILITY IN WATER
Tom Kwa
DunAn Sensing LLC, United States

1:30 PM - 3:30 PM
C3P-N: Sensor Network, Applications
LOCATION: Poster Area
SESSION CHAIR:
Ryutaro Maeda, AIST

C-9-225
C-9-225SELF-POWERED EVENT-TRIGGERED WIRELESS SENSOR NETWORK FOR MONITORING SABOTAGE ACTIVITIES
Chuan Dong{2}, Suiqiong Li{2}, Mengyang Li{2}, Qisheng He{1}, Dacheng Xu{2}, Xinxin Li{1}
{1}Shanghai Institute of Microsystem and Information Technology / Chinese Academy of Sciences, China; {2}Soochow University, China

C-9-227
A WIRELESS SENSOR NETWORK PLATFORM FOR WATER QUALITY MONITORING
Tomoaki Kageyama{2}, Masashi Miura{2}, Akihiro Maeda{1}, Akihiro Mori{1}, Sang-Seok Lee{2}
{1}Environment Sanitation Research Center, Japan; {2}Tottori University, Japan

C-9-229
A STUDY ON LOW-LATENCY WIRELESS SENSING IN TIME-CRITICAL SATELLITE APPLICATIONS
Martin Drobczyk, Hauke Martens
Deutsches Zentrum für Luft- und Raumfahrt e.V., Germany

C-9-230
LOW-POWER AND HIGH-SENSITIVE PH SENSOR FOR MONITORING OF COW-RUMEN IN REAL TIME
Lan Zhang{3}, Jian Lu{3}, Hironao Okada{3}, Hirofumi Nogami{1}, Toshihiro Itoh{4}, Shozo Arai{2}
{1}Kyushu University, Japan; {2}National Agriculture and Food Research Organization, Japan; {3}National Institute of Advanced Industrial Science and Technology, Japan; {4}University of Tokyo / National Institute of Advanced Industrial Science and Technolo

C-9-231
DRITRI: AN IN-VEHICLE WIRELESS SENSOR NETWORK PLATFORM FOR DAILY HEALTH MONITORING
Xian Li, Hui Huang, Ye Sun
Michigan Technological University, United States

C-9-232
A MODULAR WIRELESS SENSOR NETWORK FOR ARCHITECTURE OF AUTONOMOUS UAV USING DUAL PLATFORM FOR ASSISTING RESCUE OPERATION
Heekyung Kim, Ken Choi
Illinois Institute of Technology, United States

C-9-233
ANALYSIS ON FREQUENCY-DEPENDENCY OF CONDUCTIVE SIGNAL TRANSMISSION CHANNEL FOR BIOSENSOR NETWORK
Janghyun Lee, Kunho Park, Min Joo Jeong, Jong Jin Baek, Youn Tae Kim
Chosun University, Korea, South

C-9-234
LOCALIZATION AND AREA LOCALIZATION IN IMPULSE-RADIO WIRELESS SENSOR NETWORKS
Haruka Kubota, Jun-Nosuke Teramae, Naoki Wakamiya
Osaka University, Japan

C-9-235
SPATIAL FOOTSTEP RECOGNITION BY CONVOLUTIONAL NEURAL NETWORKS FOR BIOMETRIC APPLICATIONS
Omar Costilla-Reyes{2}, Ruben Vera-Rodriguez{1}, Patricia J. Scully{2}, Krikor B. Ozanyan{2}
{1}Universidad Autónoma de Madrid, Spain; {2}University of Manchester, United Kingdom

C-9-236
OPTIMAL TRANSMISSION POWER LEVEL SETS FOR LIFETIME MAXIMIZATION IN WIRELESS SENSOR NETWORKS
Cagla Tantur{1}, Ugur Yildiz{2}, Sinan Kurt{1}, Bulent Tavli{3}
{1}ASELSAN Inc. / TOBB University of Economics and Technology, Turkey; {2}TED University, Turkey; {3}TOBB University of Economics and Technology, Turkey

1:30 PM - 3:30 PM
C3P-O: Sensor Applications II
LOCATION: Poster Area
SESSION CHAIR:
Robert Roberts, University of Hong Kong

C-10-278
RESPONSES OF SILICON PIN DIODE TO LOW ENERGY GAMMA RAYS
Seungcheol Lee, Hyebin Jeon, Hwanbae Park, Kookhyun Kang, Taehun Kim
Kyungpook National University, Korea, South

C-10-280
QUANTIFYING HEAT PRODUCED DURING SPONTANEOUS COMBUSTION OF H2/O2 NANOBUBBLES
Shourya Jain{2}, Aamer Mahmood{1}, Li Qiao{2}
{1}Hamad Bin Khalifa University, Qatar; {2}Purdue University, United States

C-10-282
EVALUATION OF LYOPHILISATES WITH TASTE-MASKING MICROSHPERES BY ELECTRONIC TONGUE
Malgorzata Wesoły{2}, Patrycja Ciosek-Skibińska{2}, Aleksandra Amelian{1}, Katarzyna Winnicka{1}
{1}Medical University of Bialystok, Poland; {2}Warsaw University of Technology, Poland

C-10-284
A 4.3μW 28NM-CMOS PIXEL FRONT-END WITH SWITCHED INVERTER-BASED COMPARATOR
Federica Resta{2}, Alessandra Pipino{2}, Alessandro Pezzotta{2}, Marcello De Matteis{2}, Marco Croce{1}, Andrea Baschirotto{2}
{1}Università degli Studi di Pavia, Italy; {2}Università degli Studi Milano-Bicocca, Italy

C-10-286
DEVELOPMENT OF PARTICLE CONTAMINANTS MONITOR SYSTEM FOR GEARBOX LUBRICANT PROGNOSTICS
John Manyala, Massood Zandi Atashbar
Western Michigan University, United States

C-10-288
AN LED-BASED IMAGE SENSOR WITH ENERGY HARVESTING AND PROJECTION CAPABILITIES
Xiaozhe Fan{1}, Walter Leon-Salas{1}, Thomas Fischer{1}, Angel Perez-Olvera{2}
{1}Purdue University, United States; {2}Universidad Tecnológica de Querétaro / Purdue University, Mexico

C-10-290
TACTILE SENSING METHOD FOR ESTIMATING THE INSERTION STATE OF A CONNECTOR
Kouji Murakami
Kyushu Sangyo University, Japan

C-10-291
UNSUPERVISED GAS DISCRIMINATION IN UNCONTROLLED ENVIRONMENTS BY EXPLOITING DENSITY PEAKS
Han Fan, Victor Hernandez Bennetts, Erik Schaffernicht, Achim J. Lilienthal
Örebro Universitet, Sweden

C-10-292
LIGHTWEIGHT SECURE SENSING USING HARDWARE ISOLATION
Mengmei Ye, Nianhang Hu, Sheng Wei
University of Nebraska-Lincoln, United States

1:30 PM - 3:30 PM
C3P-P: Medical Sensing Applications II
LOCATION: Poster Area
SESSION CHAIR:
Christian Zorman, Case Western Reserve University

C-10-293
COMPARISONS BETWEEN NOVEL APPROACHES IN SILICA OPTICAL FIBRE AND PLASTIC FIBRE FOR USE IN CLINICAL IN-VIVO DOSIMETRY
Lingxia Chen{2}, Elfed Lewis{2}, Peter Woulfe{1}, Sinead O'Keeffe{2}
{1}Galway Clinic, Ireland; {2}University of Limerick, Ireland

C-10-294
WIRELESS PAPER-BASED BIOSENSOR READER FOR THE DETECTION OF INFECTIOUS DISEASES AT THE POINT OF CARE
Evdokia Pilavaki, Claudio Parolo, Rachel McKendry, Andreas Demosthenous
University College London, United Kingdom

C-10-295
DESIGN AND DEVELOPMENT OF CONTINUOUS CUFF-LESS BLOOD PRESSURE MONITORING DEVICES
Devon Griggs{2}, Manuja Sharma{1}, Arian Naghibi{2}, Colton Wallin{1}, Victor Ho{1}, Karinne Barbosa{2}, Tadesse Ghirmai{1}, Hung Cao{1}, Sandeep K. Krishnan{1}
{1}University of Washington, United States; {2}University of Washington Bothell , United States

C-10-296
SELF ASSEMBLED MONOLAYERS VERSUS IRON OXIDE NANOPARTICLES MODIFIED SURFACES: TWO FUNCTIONALIZATION STRATEGIES FOR FEMTOMOLAR DETECTION OF PROSTATE SPECIFIC ANTIGEN
Nesrine Blel{3}, Najla Fourati{1}, Chouki Zerrouki{1}, Mina Souiri{3}, Nourdin Yaakoubi{4}, Asma Omezzine{2}, Ali Othmane{3}
{1}Conservatoire National des Arts et Métiers, France; {2}Hôpital Universitaire Sahloul, Tunisia; {3}Université de Monastir, Tunisia; {4}Université du Maine, France

C-10-297
FBG-BASED LARGE DEFLECTION SHAPE SENSING OF A CONTINUUM MANIPULATOR: MANUFACTURING OPTIMIZATION
Shahriar Sefati, Farshid Alambeigi, Iulian Iordachita, Mehran Armand, Ryan Murphy
Johns Hopkins University, United States

C-10-298
CLOUD-BASED REAL-TIME HEART MONITORING AND ECG SIGNAL PROCESSING
Fatima Bamarouf, Claire Crandell, Shannon Tsuyuki, Jose Sanchez, Yufeng Lu
Bradley University, United States

C-10-388
BIOMIMETIC FLOW SENSORS FOR BIOMEDICAL FLOW SENSING IN INTRAVENOUS TUBES
Zhiyuan Shen{1}, Ajay Giri Prakash Kottapalli{1}, Vignesh Subramaniam{1}, Jianmin Miao{4}, Michael Triantafyllo{3}, Mohsen Asadnia{2}
{1}CENSAM, Singapore; {2}Macquarie University, Australia; {3}MIT, United States; {4}Nanyang Technological Univ., Singapore

1:30 PM - 3:30 PM
C3P-Q: Focused Session Posters: Wearable Tactile/Pressure Sensors & Skin Monitoring
LOCATION: Poster Area
SESSION CHAIRS:
Mustafa Ilker Beyaz, Antalya International University
Hung Cao, University of Washington

C-13-326
A FULLY-SHIELDED FLEXIBLE AND STRETCHABLE MICROWAVE TRANSMISSION-LINE TACTILE PRESSURE SENSOR
Matthew D'Asaro, Daniel Sheen, Jeffrey Lang
Massachusetts Institute of Technology, United States

C-13-328
HIGH ACCURACY WEARABLE BIOMETRIC DEVICES USING MULTI-WAVELENGTH SKIN TISSUE OPTICS
Young Chang Jo{1}, Hae Na Kim{1}, Hyuck Ki Hong{1}, Teon Shik Choi{1}, Suk Won Jung{1}, Jae-Hwan Kang{2}, Sung-Phil Kim{2}
{1}Korea Electronics Technology Institute, Korea, South; {2}Ulsan National Institute of Science and Technology, Korea, South

C-13-330
SOFT, FLEXIBLE 3D PRINTED FIBERS FOR CAPACITIVE TACTILE SENSING
Ashish Kapoor, Michael McKnight, Kony Chatterjee, Talha Agcayazi, Hannah Kausche, Tushar Ghosh, Alper Bozkurt
North Carolina State University, United States

C-13-332
A WEARABLE FABRIC-BASED RFID SKIN TEMPERATURE MONITORING PATCH
Saisai Wen, Hadi Heidari, Anastasios Vilouras, Ravinder Dahiya
University of Glasgow, United Kingdom

C-13-334
AN IR-BASED FACIAL EXPRESSION TRACKING SENSOR FOR HEAD-MOUNTED DISPLAYS
Jaekwang Cha, Jinhyuk Kim, Shiho Kim
Yonsei University, Korea, South

C-13-336
TEXTILE PIEZORESISTIVE SENSORS FOR ON-BODY MEASUREMENT OF SPINAL EXTENSION
Jennifer Deignan{1}, Matthew Jacobs{1}, Larisa Florea{1}, Shirley Coyle{1}, Dermot Diamond{1}, Maria Pacelli{2}, Rita Paradiso{2}
{1}Dublin City University, Ireland; {2}Smartex Srl, Italy

C-13-338
WRIST-WEARABLE BIOELECTRICAL IMPEDANCE ANALYZER WITH CONTACT RESISTANCE COMPENSATION FUNCTION
Myoung Hoon Jung, Kak Namkoong, Yeolho Lee, Young Jun Koh, Kunsun Eom, Hyeongseok Jang, Jungmok Bae, Jongae Park
Samsung Advanced Institute of Technology, Korea, South

C-13-339
INKJET-PRINTING RAPID PROTOTYPING OF A ROBUST AND FLEXIBLE CAPACITIVE TOUCH PANEL
Lisa-Marie Faller, Stephan Mühlbacher-Karrer, Hubert Zangl
Alpen-Adria-Universität Klagenfurt, Austria

1:30 PM - 3:30 PM
C3P-R: Wired & Wireless Sensor Systems
LOCATION: Poster Area
SESSION CHAIR:
Shad Roundy, University of Utah

C-11-300
TRANSMISSION CHARACTERISTICS OF RFID SENSOR SYSTEMS EMBEDDED IN CONCRETE
Matthias Bartholmai, Sergej Johann, Michael Kammermeier, Maximilian Mueller, Christoph Strangfeld
Bundesanstalt für Materialforschung und -prüfung, Germany

C-11-302
FREQUENCY-RESPONSE-ASSOCIATED DELAY-DISPERSION ISSUE IN TIME-DELAY MEASURING SENSORS
Gibran Limi Jaya, Shoushun Chen
Nanyang Technological University, Singapore

C-11-304
WIRELESS PRESSURE MEASUREMENT IN AIR BLAST USING PVDF SENSORS
Jérémie Fourmann{2}, Antony Coustou{2}, Hervé Aubert{2}, Patrick Pons{2}, Jerôme Luc{1}, Alexandre Lefrançois{1}, Maylis Lavayssière{1}, Antoine Osmont{1}
{1}Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France; {2}Laboratoire d'Analyse et d'Architecture des Systèmes / Université de Toulouse, France

C-11-306
A NODE DEPLOYMENT MECHANISM ACCOUNTING INTO RECEIVED SIGNAL STRENGTH AND FREQUENCY DIVERSITY FOR A WIRELESS SENSOR NETWORK
Mrinmoy Sen{1}, Indrajit Banerjee{1}, Mainak Chatterjee{2}, Tuhina Samanta{1}
{1}Indian Institute of Engineering Science and Technology, Shibpur, India; {2}University of Central Florida, United States

C-11-308
MODULAR SENSOR SYSTEM (MSS) FOR URBAN AIR POLLUTION MONITORING
Wei-Ying Yi{1}, Kwong-Sak Leung{1}, Yee Leung{1}, Mei-Ling Meng{1}, Terrence Mak{2}
{1}Chinese University of Hong Kong, Hong Kong; {2}University of Southampton, United Kingdom

C-11-310
A STANDALONE STRUCTURED-LIGHT 3D CAMERA
Kukjin Han, Sukhan Lee
Sung Kyun Kwan University, Korea, South

C-11-312
A WIRELESS SAFETY DETECTION SENSOR SYSTEM
Riad Kanan, Obaidallah Elhassan, Rofaida Bensalem, Abeer Husein
Abu Dhabi University, U.A.E.

C-11-313
ACTIVATION AND IDENTIFICATION OF FULLY PASSIVE WIRELESS SENSORS
Colm Mc Caffrey, Nadine Pesonen, Pekka Pursula
VTT Technical Research Centre of Finland, Finland

C-11-314
A 1.3 MW, 12-BIT LOCK-IN AMPLIFIER BASED READOUT CIRCUIT DEDICATED TO PHOTO-ACOUSTIC GAS SENSING
Franck Badets, Jean-Guillaume Coutard, Patrice Russo, Elisa Dina, Alain Glière, Sergio Nicoletti
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

C-11-315
MEDIUM RANGE UNDERWATER COMMUNICATION DEVELOPMENT SYSTEM
Anton Netchaev, Jordan Klein, Clayton Thurmer, Brandon Carver, James Evans
U.S. Army Engineer Research and Development Center, United States

C-11-316
CALIBRATION OF SMARTPHONE LIGHT SENSORS WITH A NEAR FIELD COMMUNICATION ENABLED REFERENCE
Tore Leikanger, Christian Schuss, Juha Häkkinen
University of Oulu, Finland

1:30 PM - 3:30 PM
C3P-S: Focused Session Posters: Resonators
LOCATION: Poster Area
SESSION CHAIR:
Vikrant Gokhale, University of Michigan

C-14-340
THE EFFECT OF SHORT BEAM LENGTH AND GAP DISTANCE ON THE RESONANCE FREQUENCIES IN FISHBONE-SHAPED MICROELECTROMECHANICAL SYSTEM RESONATOR
Ryo Takahashi, Hidetoshi Miyashita, Kentaro Kinoshita, Sang-Seok Lee
Tottori University, Japan

C-14-341
FULLY-DIFFERENTIAL ALN-ON-SI WINE GLASS MODE RESONATOR FOR ENHANCED CHARACTERIZATION IN WATER
Abid Ali, Joshua En-Yuan Lee
City University of Hong Kong, Hong Kong

C-14-342
DEVELOPMENT OF OPTIMAL ELECTROPLATED PLATINUM-BLACK CATALYST FOR QUARTZ HYDROGEN SENSORS
Hiroshi Oigawa{1}, Koichi Harima{1}, Fusao Kohsaka{2}, Tooru Tsuno{2}, Toshitsugu Ueda{2}
{1}KOA Corporation, Japan; {2}Waseda University, Japan

C-14-343
TORSIONAL NANO-RESONATOR: CHARACTERIZATION OF A NONLINEAR HARDENING BEHAVIOR AND NOISE ANALYSIS
Ludovic Laurent, Jean-Jacques Yon, Jean-Sébastien Moulet, Pierre Imperinetti, Laurent Duraffourg
Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France

C-14-344
ALGAN/GAN HFET EMBEDDED GAN MICROCANTILEVERS BASED POTENTIOMETRIC SENSOR
Ferhat Bayram, Digangana Khan, Soaram Kim, Goutam Koley
Clemson University, United States

C-14-345
A NOVEL CHARACTERIZATION METHOD FOR MEMS BASED ELECTROSTATIC RESONATORS FOR Q ENHANCEMENT AND FEEDTHROUGH CURRENT ELIMINATION
Eren Aydin{1}, Mustafa Kangül{1}, Furkan Gökçe{1}, özge Zorlu{2}, Haluk Külah{1}
{1}Middle East Technical University, Turkey; {2}Mikrobiyo Sistemler Elektronik Sanayi A.Ş., Turkey

C-14-346
AN ACCURATE CONTACTLESS POSITION SENSOR WITH PLANAR RESONATORS
Bingnan Wang, Koon Hoo Teo, Phil Orlik
Mitsubishi Electric Research Laboratories, United States

C-14-347
BILAYER NANO-WAVEGUIDE RESONATORS FOR SENSING APPLICATIONS
Mayur Ghatge, Roozbeh Tabrizian
University of Florida, United States

C-14-348
A 2D RESONANT MEMS SCANNER WITH AN ULTRACOMPACT WEDGE-LIKE MULTIPLIED ANGLE AMPLIFICATION FOR MINIATURE LIDAR APPLICATION
Liangchen Ye{2}, Gaofei Zhang{2}, Zhen You{2}, Chi Zhang{1}
{1}Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China; {2}Tsinghua University, China

C-14-349
CONTACTLESS ASPHALTENE SOLID PARTICLE DEPOSITION MONITORING USING ACTIVE MICROWAVE RESONATORS
Mohammad Abdolrazzaghi{2}, Mohammad Hossein Zarifi{2}, Mojgan Daneshmand{2}, Cedric F. A. Floquet{1}
{1}Schlumberger DBR Technology Center, Canada; {2}University of Alberta, Canada

1:30 PM - 3:30 PM
C3P-T: Focused Session Posters: MEMS Energy Harvesting & Devices
LOCATION: Poster Area
SESSION CHAIR:
Qian Zhang, Analog Devices, Inc.

C-16-352
ENERGY HARVESTING FROM MOVING DROPLET BY WATERSOLID SURFACE CONTACT ELECTRIFICATION WITH MEMS COMPATIBLE PROCESS TECHNOLOGY
Chaoran Liu{2}, Xiaofeng Zhou{1}, Lufeng Che{1}
{1}Shanghai Institute of Microsystem and Information Technology / Chinese Academy of Sciences, China; {2}Shanghai Institute of Microsystem and Information Technology / University of Chinese Academy of Scie, China

C-16-355
CONFIRMATION OF HIGH EFFICIENCY ON RECTENNA WITH HIGH IMPEDANCE ANTENNA AND OPTIMIZED GATE CONTROLLED DIODE FOR RF ENERGY HARVESTING
Junpei Iwata, Jiro Ida, Takahiro Furuta, Keisuke Noguchi, Kenji Itoh
Kanazawa Institute of Technology, Japan

C-16-358
ON THE POWER OPTIMIZATION OF THE VIBRATION-BASED ENERGY HARVESTERS UNDER SWEPT INPUT ACCELERATION
Thuy Le{1}, Binh Truong{2}, Cuong Le{2}, Sebastian Sager{1}
{1}Otto-von-Guericke-Universität Magdeburg, Germany; {2}University College of Southeast Norway, Norway

C-16-361
A MICROSCALE BIOPHOTOVOLTAIC DEVICE
Xuejian Wei, Maedeh Mohammadifar, Weiyang Yang, Seokheun Choi
State University of New York at Binghamton, United States

C-16-364
WIDEBAND MEMS ELECTROSTATIC ENERGY HARVESTER WITH DUAL RESONANT STRUCTURE
Yulong Zhang, Anxin Luo, Yixin Xu, Tianyang Wang, Fei Wang
South University of Science and Technology of China, China

C-16-367
AN ORIGAMI-INSPIRED MULTICELL BIOBATTERY STACK
Maedeh Mohammadifar, Yang Gao, Seokheun Choi
State University of New York at Binghamton, United States

C-16-370
NOVEL SCREEN PRINTED AND FLEXIBLE LOW FREQUENCY MAGNETO-ELECTRIC ENERGY HARVESTER
Amer Chlaihawi, Sepehr Emamian, Binu Narakathu, Bradley Bazuin, Massood Zandi Atashbar
Western Michigan University, United States

C-16-373
MICROMACHINED "RANDOM MECHANICAL SWITCHING HARVESTER ON INDUCTOR" TO RECOVERY ENERGY FROM VERY LOW-AMPLITUDE VIBRATIONS WITH ZERO-VOLTAGE THRESHOLD
Carlo Trigona, Salvatore Giuffrida, Bruno Andò, Salvatore Baglio
Università degli Studi di Catania, Italy

C-16-375
KINETIC ENERGY HARVESTING USING IMPROVED ECCENTRIC ROTOR ARCHITECTURE FOR WEARABLE SENSORS
Qian Zhang{1}, Lei Gu{1}, Ken Yang{1}, Miah Halim{2}, Robert Rantz{2}, Shad Roundy{2}
{1}Analog Devices, Inc., United States; {2}University of Utah, United States

3:30 PM - 4:00 PM
COFFEE BREAK
LOCATION: Grand Sierra D-I

3:30 PM - 5:00 PM
INDUSTRY RESOURCES AND IEEE SENSORS COUNCIL INDUSTRY INITIATIVES
LOCATION: Bonaire 5-6

3:30
IEEE SC STANDARDS: IOT HARMONIZATION
William Miller, MaCT USA

4:00
SIMULATION TOOLS FOR INTEGRATED SENSORS
Greg Babbitt, ANSYS

4:30
IEEE SENSORS COUNCIL INDUSTRY INITIATIVES
Gerard Hayes, WRCNC
Andrew Dehennis, Sensionics

4:00 PM - 5:30 PM
C4L-A: Physical Sensors IV: Mechanical & Thermal Sensors
LOCATION: Curacao 1-2
SESSION CHAIRS:
Roman Beigelbeck, Krems University
Bernard Jakoby, Johannes Kepler University Linz, Austria

4:00
DEVELOPING A PASSIVE DC CURRENT SENSOR
Huan Liu{1}, Dingkang Wang{2}, Dong F. Wang{1}
{1}Jilin University, China; {2}University of Florida, United States

4:15
MICROPLASMA DRAWING OF THERMOCOUPLE SENSORS
Ahmed M. Abdul-Wahed, Anindya Roy, Kenichi Takahata
University of British Columbia, Canada

4:30
FLUORESCENCE-BASED TEMPERATURE SENSOR FOR IN-SITU IMAGING LOCAL TEMPERATURE OF ALUMINUM NANOPARTICLES ON PLASMONIC GRATINGS
Biyan Chen, Haisheng Zheng, Junsang Yoon, Sangho Bok, Cherian Mathai, Keshab Gangopadhyay, Shubhra Gangopadhyay, Matthew R. Maschmann
University of Missouri, United States

4:45
CHARACTERIZATION OF PIEZORESISTIVE AND ELECTROTHERMAL SENSORS IN MEMS DEVICES
Mohammad Maroufi, S. O. Reza Moheimani
University of Texas at Dallas, United States

5:00
TOWARDS A TRI-AXIAL FLEXIBLE FORCE SENSOR FOR CATHETER CONTACT FORCE MEASUREMENT
Hardik Pandya{1}, Jun Sheng{2}, Jaydev Desai{2}
{1}Brigham and Women's Hospital / Harvard Medical School, United States; {2}Georgia Institute of Technology, United States

5:15
GRAPHENE OXIDE BASED SENSOR WITH DIFFERENTIAL STRUCTURE FOR HUMIDITY AND TEMPERATURE DETECTION
Xiaohui Leng, Xingwei Chen, Fei Wang
South University of Science and Technology of China, China

4:00 PM - 5:30 PM
C4L-B: Physical Biosensors & Fluidics
LOCATION: Curacao 3-4
SESSION CHAIRS:
Paddy French, TU Delft
Michael Vellekoop, University of Bremen

4:00
A HIGHLY INTEGRATABLE MICROFLUIDIC BIOSENSING CHIP BASED ON MAGNETOELASTIC-SENSOR AND PLANAR COIL
Qiushi Jiang{2}, Ping Chen{2}, Suiqiong Li{2}, Heming Zhao{2}, Yuzhe Liu{1}, Shin Horikawa{1}, Bryan Chin{1}
{1}Auburn University, United States; {2}Soochow University, China

4:15
SENSITIVITY ENHANCEMENT OF SPLIT RING RESONATOR BASED LIQUID SENSORS
Mohammad Abdolrazzaghi, Mohammad Hossein Zarifi, Mojgan Daneshmand
University of Alberta, Canada

4:30
A NOVEL SCREENING PLATFORM FOR ELECTROMICROBIOLOGY: A 3-D PAPER-BASED SENSING ARRAY WITH CONDUCTIVE PEDOT:PSS
Yang Gao{1}, Maedeh Mohammadifar{1}, Daniel Hassett{2}, Seokheun Choi{1}
{1}State University of New York at Binghamton, United States; {2}University of Cincinnati College of Medicine, United States

4:45
RAPID DETECTION OF THEOPHYLLINE USING APTAMER-BASED NANOPORE THIN FILM SENSOR
Silu Feng, Xiangchen Che, Long Que, Changtian Chen, Wei Wang
Iowa State University, United States

5:00
AN AUTOMATED MICROFLUIDIC ASSAY FOR THE DETECTION OF CANCER BIOMARKERS IN SERUM USING PHOTONIC CRYSTAL ENHANCED FLUORESCENCE
Lydia Kwon, Caitlin Race, Myles Foreman, Brian T. Cunningham
University of Illinois at Urbana–Champaign, United States

5:15
ACHIEVING UNIFORMITY AND REPRODUCIBILITY FOR PHOTONIC CRYSTAL FLUORESCENCE ENHANCED DISEASE DIAGNOSTIC MICROARRAYS
Caitlin Race, Lydia Kwon, Brian T. Cunningham
University of Illinois at Urbana–Champaign, United States

4:00 PM - 5:30 PM
C4L-C: Wireless Sensors & Interfaces
LOCATION: Curacao 5-6
SESSION CHAIRS:
Mehdi Kiani, Penn State University
Ryutaro Maeda, AIST

4:00
INVITED: WIRELESS HYDROGEL-BASED GLUCOSE SENSOR FOR FUTURE IMPLANTABLE APPLICATIONS
Yuechuan Yu, Tram Nguyen, Prashant Tathireddy, Darrin Young, Shad Roundy
University of Utah, United States

4:30
SELF-POWERED AND TRANSPARENT ALL-GRAPHENE BIOSENSOR
Ali Shahini{2}, Mehdi Hajizadegan{2}, Maryam Sakhdari{2}, Mark Ming-Cheng Cheng{2}, Pai-Yen Chen{2}, Haiyu Huang{1}
{1}Maxim Integrated Inc., United States; {2}Wayne State University, United States

4:45
PASSIVELY-POWERED WIRELESS MICROMACHINED QUARTZ MAGNETOFLEXOELASTIC MAGNETOMETER
Paul Nordeen{2}, Grergory P. Carman{2}, Eugene Freeman{1}, Gokhan Hatipoglu{1}, Srinivas Tadigadapa{1}
{1}Pennsylvania State University, United States; {2}University of California, Los Angeles, United States

5:00
AN EMBEDDED SYSTEM TO CONTROL CONDUCTING INTERPENETRATING POLYMER NETWORKS ACTUATORS
Tien Anh Nguyen{3}, Luc Chassagne{3}, Barthélemy Cagneau{3}, Adelyne Fannir{2}, Kätlin Rohtlaid{2}, Tran Minh Giao Nguyen{2}, Cedric Plesse{2}, Frédéric Vidal{2}, Chia-Ju Peng{1}, Shih-Jui Chen{1}
{1}National Central University, Taiwan; {2}Université de Cergy-Pontoise, France; {3}Université de Versailles Saint-Quentin-en-Yvelines, France

5:15
PROGRAMMABLE MULTIMODE, MULTICHANNEL UNIVERSAL WIRELESS RECEIVER WITH FFT-BASED MULTICARRIER DEMODULATOR FOR BATTERYLESS WIRELESS SENSORS
Hisashi Nishikawa, Kei Igarashi, Takeshi Nishihashi, Yuya Shimizu, Ryota Suematsu, Ami Tanaka, Takakuni Douseki
Ritsumeikan University, Japan

4:00 PM - 5:30 PM
C4L-D: Sensors & Systems for Health Monitoring & Harsh Environments
LOCATION: Curacao 7-8
SESSION CHAIR:
Christian Zorman, Case Western Reserve University

4:00
INVITED: WIRELESS BLADDER PRESSURE MONITOR FOR CLOSED-LOOP BLADDER NEUROMODULATION
Steve Majerus{3}, Anisha S. Basu{1}, Iryna Makovey{2}, Peng Wang{1}, Hui Zhui{3}, Christian Zorman{1}, Wen Ko{1}, Margot Damaser{3}
{1}Case Western Reserve University, United States; {2}Cleveland Clinic, United States; {3}Cleveland VA Medical Center, United States

4:30
MHEALTH DIPSTICK ANALYZER FOR MONITORING OF PREGNANCY COMPLICATIONS
Karthik Konnaiyan{1}, Surya Cheemalapati{1}, Anna Pyayt{1}, Michael Gubanov{2}
{1}University of South Florida, United States; {2}University of Texas at San Antonio, United States

4:45
ROBUST IMPLANTABLE BLOOD PRESSURE SENSOR PACKAGING FOR LONG-TERM LABORATORY ANIMALS MONITORING
Xing Chen, Darrin Young
University of Utah, United States

5:00
MULTI-SENSOR MODULE FOR A MOBILE ROBOT OPERATING IN HARSH ENVIRONMENTS
Guangfen Wei{1}, Julian Gardner{2}, Marina Cole{2}, Yuxin Xing{2}
{1}Shandong Technology and Business University, China; {2}University of Warwick, United Kingdom

5:15
GLASS MICROBUBBLE ON-CHIP PACKAGED FERROFLUID BASED MAGNETOVISCOUS MAGNETOMETER
Chenchen Zhang, Eugene Freeman, Srinivas Tadigadapa
Pennsylvania State University, United States

4:00 PM - 5:30 PM
C4L-E: Sensor Network, Applications and IoT
LOCATION: Bonaire 1-2
SESSION CHAIRS:
Fabien Josse, Marquette University
Sang-Seok Lee, Tottori University

4:00
INVITED: ULTRA-THIN PIEZOELECTRIC STRAIN SENSOR ARRAY INTEGRATED ON FLEXIBLE PRINTED CIRCUIT FOR STRUCTURAL HEALTH MONITORING
Takahiro Yamashita{2}, Hironao Okada{2}, Takeshi Kobayashi{2}, Daniel Zymelka{3}, Kazuyoshi Togashi{1}, Seiichi Takamatsu{4}, Toshihiro Itoh{4} {1}Dai Nippon Printing Co., Ltd., Japan; {2}National Institute of Advanced Industrial Science and Technology, Japan; {3}NMEMS Technology Research Organization / National Institute of Advanced Industrial Science and Techn, Japan; {4}University of Tokyo / N

4:30
VIBRATING BEAM MEMS SEISMOMETER FOR FOOTSTEP AND VEHICLE DETECTION
Raphael Levy, Julien Moras, Benjamin Pannetier
Office National d'Etudes et de Recherches Aérospatiales, France

4:45
INTEGRATION OF HIGH-SPEED VISUAL AND TACTILE SENSORS WITH SYNCHRONIZATION IN A SENSOR NETWORK SYSTEM
Yuji Yamakawa, Masatoshi Ishikawa, Makoto Shimojo, Akihito Noda
University of Tokyo, Japan

5:00
WAGGLE: AN OPEN SENSOR PLATFORM FOR EDGE COMPUTING
Pete Beckman, Rajesh Sankaran, Charlie Catlett, Nicola Ferrier, Robert Jacob, Michael Papka
Argonne National Laboratory, United States

5:15
A NEW DISTRIBUTED ALGORITHM FOR ENVIRONMENTAL MONITORING BY WIRELESS SENSOR NETWORKS WITH LIMITED COMMUNICATION
Jing Wang{1}, In Soo Ahn{1}, Yufeng Lu{1}, Gennady Staskevich{2} {1}Bradley University, United States; {2}U.S. Air Force Research Laboratory, United States

4:00 PM - 5:30 PM
C4L-F: Focused Session: Energy Harvesting & Low-Power Sensors II
LOCATION: Bonaire 3-4
SESSION CHAIRS:
Shashank Priya, Virginia Tech
Ryohei Takei, National Institute of Advanced Industrial Science and Technology

4:00
WIRELESS VIBRATION SENSING SYSTEM POWERED BY A PIEZOELECTRIC MEMS VIBRATION ENERGY HARVESTER
Ryohei Takei{2}, Hironao Okada{2}, Takeshi Kobayashi{2}, Daiji Noda{1}, Ryo Ohta{1}, Toshihiro Itoh{3}
{1}Micromachine Center, Japan; {2}National Institute of Advanced Industrial Science and Technology, Japan; {3}University of Tokyo / National Institute of Advanced Industrial Science and Technology, Japan

4:15
FORCE IMPACT EFFECT IN CONTACT-MODE TRIBOELECTRIC ENERGY HARVESTERS: CHARACTERIZATION AND MODELING
Marco Lasagni, Paolo Pavan, Alessandro Bertacchini, Luca Larcher
Università degli Studi di Modena e Reggio Emilia, Italy

4:30
A FULLY INTEGRATED ELECTROMAGNETIC ENERGY HARVESTING CIRCUIT WITH AN ON-CHIP ANTENNA FOR BIOMEDICAL IMPLANTS IN 180 NM SOI CMOS
Hamed Rahmani, Aydin Babakhani
Rice University, United States

4:45
SELF-POWERED WIRELESS URINARY-INCONTINENCE SENSOR DETERMINES TIME FOR DIAPER CHANGE FROM SPACING BETWEEN SENSING SIGNALS
Ami Tanaka, Ryota Suematsu, Hiroya Sakamoto, Takakuni Douseki
Ritsumeikan University, Japan

5:00
TEMPERATURE BEAT: PERSISTENT AND ENERGY HARVESTING WIRELESS TEMPERATURE SENSING SCHEME
Ryohei Takitoge, Shohei Ishigaki, Tsuyoshi Ishige, Koichiro Ishibashi
University of Electro-Communications, Japan

5:15
HIGH PERFORMANCE PAPER-BASED MICROBIAL FUEL CELLS USING NANOSTRUCTURED POLYMERS
Maedeh Mohammadifar, Jing Zhang, Idris Yazgan, Victor Kariuki, Omowunmi Sadik, Seokheun Choi
State University of New York at Binghamton, United States

5:30 PM - 7:00 PM
INDUSTRY DAY RECEPTION
LOCATION: Grand Sierra Foyer

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