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MESSAGE FROM THE CHAIRMEN

Dear IEEE SENSORS 2013 participants,

Welcome to Baltimore, Maryland, and to the 12th IEEE SENSORS conference. In addition to an outstanding technical program, an informative tutorial session, and an exciting location, this year we are delighted to present a special industrial panel and an open poster session. This conference promises to be one of the best, if not the best to date.


This year, a total of 913 abstracts were submitted, including 48 late news submissions. Of these, 236 will be presented in lecture sessions and 256 in poster sessions. An additional 16 invited lecture presentations and 22 open posters round out the program. It is important to note that the poster and lecture presentations have undergone identical peer reviews. In which session a paper is presented has no relationship to its quality; it depends only on where the paper best fits into the program. To stay relevant with rapidly evolving commercial trends, this year the program also features a special Industry Panel Session on Tuesday, Nov. 5, to address an exciting and timely topic – Wearable Sensors: the Good, the Bad, and the Alluring. Based on the pre-registrations, the attendance is expected to be between 700 and 800.

The highlights of this year’s social program will be the welcome reception and the banquet. The reception will be held on Sunday, Nov. 3, at the Renaissance Harborplace Hotel on the 6th Floor with a view of Baltimore harbor and Ft. McHenry, site of a pivotal Naval battle during the War of 1812. The banquet will be held on Tuesday, Nov. 5, at the historic B&O Railroad Museum which is recognized universally as the birthplace of American railroading (circa 1829).

We wish to recognize and thank our outstanding Keynote Speakers: Professor Masayoshi Esashi of Tohoku University, Japan; Professor Robert Puers of Katholieke Universiteit Leuven, Belgium; and Dr. Kenneth S. Johnson, Senior Scientist at the Monterey Bay Aquarium Research Institute. We are also deeply grateful to our 16 invited speakers. We appreciate their expertise and willingness to share their time with us in Baltimore.
The success of IEEE SENSORS 2013 is due to the dedication of a number of volunteers. The Technical Program Committee (TPC) included 111 volunteers, to whom we are very grateful. Special thanks to Track Chairs Svetlana Tatic-Lucic and Srinivas Tadigadapa (Track 1); Massood Atashbar and Ponnambalam Selvaganapathy (Track 2); Yu-Cheng Lin and Hongrui Jiang (Track 3); Ignacio Matias and Xiaojing Zhang (Track 4); Kukjin Chun and David Elata (Track 5); Oliver Paul and Gijs Krijnen (Track 6); Thomas Newe (Track 7); David Horsley (Track 8), and Kenichi Takahata (Track 9) – their diligence and insight were invaluable to the paper selection process. Special thanks also to Tutorial Chair Massood Tabib-Azar; Industry Panel Organizers Andrew DeHennis, Brain Jamieson, and Andy Oliver; Industrial Panel publicist Walt Besio; Open Poster Chair Troy Nagle (who contributed tirelessly in many other roles as well); Publicity Chair Eddie Grant; and Conference Treasurer Mike McShane.

We also wish to thank the professional conference organizers of Conference Catalysts, LLC, under the leadership of Chris Dyer. Chris, Judy Scharmann and the rest of their team played a vital role in organizing this conference.

The locations of IEEE SENSORS conferences rotate each year; Asia/Pacific to Europe/Africa to the Americas. Next year, IEEE SENSORS 2014 will be held in Valencia, Spain, Nov. 2-5, 2014. We hope to see you there.

IEEE sponsored or cosponsored more than 1000 conferences, and published more than 100 journals last year. The successes of IEEE are due to the more than 200,000 volunteers who serve IEEE each year.

Robert Trew
General Co-Chair

Elliott Brown
General Co-Chair

Yogesh Gianchandani
Technical Program Chair
GENERAL INFORMATION

Registration & Information Desk
The Registration and Information Desk will be open during the following times:

- Sunday, November 3  7 AM - 5:30 PM
- Monday, November 4  7 AM - 5 PM
- Tuesday, November 5  7 AM - 5 PM
- Wednesday, November 6  7 AM - 5 PM

Meeting Room Locations
- Concurrent Sessions A: Maryland Salon F
- Concurrent Sessions B: Maryland Salon E
- Concurrent Sessions C: Maryland Salon A
- Concurrent Sessions D: Maryland Salon D
- Concurrent Sessions E: Watertable ABC
- Concurrent Sessions F: Homeland
- Poster Sessions: Baltimore AB

Name Badges
All attendees must wear their name badges at all times to gain admission to all Conference events.

Electronic Proceedings
One copy of the Electronic Proceedings will be provided to you 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.

Additional Electronic Proceedings: $85 USD IEEE Member
Additional Electronic Proceedings: $100 USD Non Member

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.

Traveler’s Checks and Credit Cards
Credit cards, including MasterCard®, Visa® and American Express®, and traveler’s checks are accepted at most hotels, restaurants, and souvenir shops.

Tipping Standards
Tipping of 15% is standard for good service and 20% for outstanding service.

Smoking
All meeting rooms and seated functions are smoke free. Please adhere to the smoking policy of the Renaissance Baltimore Harborplace Hotel.

Cellular Phones
As a courtesy to your fellow attendees, please turn off your cell phone ringer during the conference
SOCIAL PROGRAM

Sunday, November 3

Event: Tutorial Lunch  
Time: 12:00 PM - 1:30 PM  
Location: Baltimore AB

Lunch Speaker: Dr. Steven LeBoeuf, Valencell, Inc.  
“Starting a Medical Monitoring Company from Scratch”

Event: Welcome Reception  
Time: 6:30 PM - 8:30 PM  
Location: Maryland/Baltimore Foyer

Join us for the Welcome Reception on Sunday, November 3, 2013 at the Renaissance Harborplace Hotel on the 6th Floor. Cocktails and hors d’oeuvres will served beginning at 6:30 p.m., with Welcome Remarks at 7:00 p.m.

Monday, November 4

Event: Conference Lunch  
Time: 12:45 PM - 2:15 PM  
Location: Maryland Salon BC

Tuesday, November 5

Event: Industry Panel Lunch  
Time: 12:00 PM – 2:00 PM  
Location: Maryland Salon BC

Event: Conference Dinner  
Time: 7:00 PM – 10:00 PM  
Location: B&O Railroad Museum

Our Conference Gala dinner will be held at The Historic B&O Railroad Museum. Located among Baltimore City’s historic southwest neighborhoods, at the original site of the historic Mt. Clare Shops, the B&O Railroad Museum is recognized universally as the birthplace of American railroading. There will be pre-dinner cocktails served as you will have the chance to tour the museum and rail cars. Dinner will follow and you will be treated to the world-class Wayne Goins Jazz Trio, throughout the night!

Transportation will be provided. The first departing bus will leave at 6 PM to take attendees to the B&O Railroad Museum from in front of the conference hotel. Busses will take attendees back to the conference hotel starting at 9 PM.

Your paid registration fee includes one banquet ticket. Guest tickets can be purchased for $65.00 USD each at the Registration Desk.

Wednesday, November 6

Event: Conference Awards Lunch  
Time: 12:15 PM – 2:00 PM  
Location: Maryland Salon BC
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Elliott Brown, Wright State University, USA

Technical Program Chair
Yogesh Gianchandani, University of Michigan, Ann Arbor, USA

Tutorial Chair
Massood Tabib-Azar, NSF, USA

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Industry Panel Moderators
Andrew DeHennis, Sensors for Medicine and Science, Inc., USA
Brian Jamieson, Scientific & Biomedical Microsystems, USA

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Andy Oliver, University of Michigan, Ann Arbor, USA
Walt Besio, University of Rhode Island, USA
Troy Nagle, North Carolina State University, USA
Elliott Brown, Wright State University, USA
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Track 1 – Phenomena, Modeling and Evaluation
Srinivas Tadigadapa, Penn State University, USA
Svetlana Tatic-Lucic, Lehigh University, USA

Track 2 – Chemical and Gas Sensors
Massood Atashbar, Western Michigan University, USA
Ponnambalam Ravi Selvaganapathy, McMaster University, USA

Track 3 – Biosensors
Yu-Cheng Lin, National Cheng Kung University, Taiwan
Hongrui Jiang, University of Wisconsin, Madison, USA

Track 4 – Optical Sensors
Ignacio R. Matias, Universidad Publica de Navarra, Spain
Xiaojing (John) Zhang, University of Texas at Austin, USA

Track 5 – Mechanical, Magnetic, and Physical Sensors
Kukjin Chun, Seoul National University, Korea
David Elata, Technion – Israel Institute of Technology, Israel

Track 6 – Sensor/Actuator Systems
Oliver Paul, IMTEK, University of Freiburg, Germany
Gijs Krijnen, MESA+ Research Institute for Nanotechnology, University of Twente, Netherlands

Track 7 – Sensor Networks
Thomas Newe, University of Limerick, Ireland

Track 8 – Applications
David A. Horsley, University of California, Davis, USA

Track 9 – Other Sensor Topics – Materials, Processes, Circuits, Signals & Interfaces, etc
Kenichi Takahata, University of British Columbia, Canada
Takashi Abe, Nigata University, Japan
Jong-Uk Bu, Senplus Inc., South Korea
Hyung-Gi Byun, Kangwon National University, South Korea
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The NSF sponsored Center for Advanced Self-Powered Systems of Integrated Sensors and Technologies (ASSIST) is developing nano-enabled energy harvesting and storage, ultra-low power electronics, radios and sensors to create innovative battery-free, body-powered, and wearable health and environment monitoring systems. ASSIST devices will monitor individual health parameters and personal environmental exposures. Long-term sensing will enable patients, doctors, and scientists to make direct correlations between health and environmental toxins leading to chronic disease prediction, management and treatment. ASSIST advances will accelerate environmental health research and clinical trials as well as inform environmental policy.

CST of America, Inc.

Better Sensor through Simulation! CST EM STUDIO ® is a 3D electromagnetic simulation software that can help engineers to design and optimize sensors, coils, magnets, actuators, shielding, biomedical devices, magnetic recording, induction heating and transformers. Comprehensive mechanical imports complement robust solving technology and allow many operating conditions to be assessed. Outputs include electric and magnetic field and current distribution, force, torque, inductance, capacitance, flux linkage, heating and mechanical deformation.

GaTech – Institute for Electronics and Nanotechnology

GaTech – Institute for Electronics and Nanotechnology (IEN) is comprised of multiple Electronics and Nanotechnology Research Centers, each offering a unique intellectual focus ranging from basic discovery and innovation to systems realization. IEN provides advanced Nano, Micro, and Bio Laboratories valued in excess of $400M, with dedicated process and tool support expertise. These open-user, fee based laboratories are available to global academic, industry, and government clientele, offering a unique and comprehensive laboratory and teaming environment. The exhibit booth will provide information and consultation related to the resources available at IEN to the researchers both from Industry and academia.
IEEE GOLD

IEEE Graduates of the Last Decade (GOLD) is a vibrant community of engineers, scientists, and technical experts with member representation across the globe and throughout IEEE societies. It is a membership program to help students transition to young professionals within the larger IEEE community. IEEE young professionals are automatically added to the GOLD member community as they graduate.

IEEE SENSORS Council

The IEEE Sensors Council's purpose is to advance and coordinate work in the field of sensors carried out throughout the IEEE. The Council sponsors the annual IEEE Sensors Conference is responsible for the publication of the IEEE Sensors Journal. The Council's official field of interest is the theory, design, fabrication, manufacturing and application of devices for sensing and transducing physical, chemical, and biological phenomena, with emphasis on the electronics, physics and reliability aspects of sensors and integrated sensor-actuators. More information about the Sensors Council is available at www.ieee-sensors.org

Measurement Science and Technology Journal

With 12 issues per year, Measurement Science and Technology publishes articles on new measurement techniques and associated instrumentation. Papers that describe experiments must represent an advance in measurement science or measurement technique rather than the application of established experimental technique. Authors must make this novel aspect clear, bearing in mind the multidisciplinary readership of the journal. Subject coverage includes the theory, practice and application of measurement in physics, chemistry, engineering and the environmental and life sciences from inception to commercial exploitation.
SPIE

SPIE is the international society for optics and photonics, and organizes dozens of conferences annually, including SPIE Photonics West and SPIE Defense, Security, and Sensing. The SPIE Digital Library houses more than 400,000 technical papers in cutting-edge technologies such as sensors, lasers, imaging, robotics, nanotechnology, solar energy, biophotonics, and communications.

TeraPico

TeraPico is a new start-up company located in Dayton, OH and specializing in THz Sensor Technology. This includes novel THz sources such as 1550-nm driven photoconductive switches and photomixers, novel THz components such as structured-surface-plasmonic wire-grid polarizers and filters, and novel instruments such as THz impulse generators and ultrawideband tunable sweep oscillators. In addition, TeraPico intends to engage in the development of biomedical and biological sensor systems in collaboration with strategic research partners such as U.S. Medical Schools.

Texas Instruments

Engineering a Smarter Grid - TI is your global smart grid systems partner for secure, economical and future-proof grid infrastructure, smart meter and home or building automation solutions. -Grid Infrastructure -Smart Electricity Meters -Smart Flow Meters for Gas, Water and Heat -Smart Buildings and IoT -Communication With millions of energy meter ICs shipped over the past decade, Texas Instruments is the global systems provider for innovative, secure, economical and future-proof solutions for the worldwide smart grid. TI offers the industry’s broadest smart grid portfolio of metrology expertise, application processors, communication systems, RFID and analog components in readily available silicon with advanced software, tools and support for compliant solutions. Learn more at www.ti.com/smartgrid.
"Wearable Sensors: the Good, the Bad, and the Alluring"

This special Industry Lunch Panel will be held on Tuesday, November 5th from 12:30 p.m. - 2:00 p.m. in Maryland Ballroom BC at the Renaissance Harborplace Hotel (IEEE SENSORS 2013 hotel) on the topic of wearable sensors. Lunch will begin at 12:00 NOON.

Our distinguished group of panelists include:
Ross Alcazar, XM Squared
Abhi Chavan, Corventis Inc
Kevin M. Haley, Under Armour, Inc.
Amar Kendale, MC10
Maurizio Macagno, Heapsylon
Babak Parviz, Google

Industry Panel Moderators
Andrew DeHennis, Sensors for Medicine and Science, Inc., USA
Brian Jamieson, Scientific & Biomedical Microsystems, USA

Overview:
With their ability to provide real-time feedback about our bodies, our movements, our activities, and our interaction with the world around us, wearable sensors promise to be a pervasive part of our everyday lives. Embedded systems provide wearable sensors with wireless connectivity and grant them a level of computing power undreamed of just a few years ago. This panel will facilitate a discussion about the possibilities for this emerging market as well as some remaining technology challenges, the solution to which will usher in this new revolution.

The panel discussion will focus on are various factors that must guide the design and development process for wearable sensors. 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 allow these devices to become an accepted (or even sought-after) feature of our daily attire. The panelists have a wide variety of approaches and applications for wearable technology and the session will highlight the benefits of their technology and platforms and lessons learned through the development process.
The technical program consists of three Keynote Sessions, six parallel Lecture/Special Sessions of contributed papers, and three Poster Sessions that include Late News and Open Posters.

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 = Maryland Salon F
B = Maryland Salon E
C = Maryland Salon A
D = Maryland Salon D
E = Watertable ABC
F = Homeland

*Please see the session grids, starting on page 21
Poster Sessions
Three poster sessions will be held in Baltimore AB, from 2:15 p.m. - 3:45 p.m. on Monday, 2:00 p.m. - 3:30 p.m. on Tuesday, and 10:15 a.m. - 12:15 p.m. on Wednesday. Posters will be on display 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 on display.

Guide to Understanding Poster Numbering
Each poster in the technical program is assigned a unique number, which clearly indicates when 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:

Typical Poster Number*: B3P-K

The first character (i.e., B) indicates the day of the Conference that the poster will be on display:

A = Monday; B = Tuesday; C = Wednesday

The second character (i.e., 3) indicates the time of the day the session is held:

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

The third character (i.e., P) indicates that the paper is a poster.

The fourth character (i.e. K) indicates the category of the poster for that day. *Please see the poster room layouts, starting on page 28

MONDAY
G= Chemical and Gas Sensors
H= Biosensors
J= Mechanical, Magnetic, and Physical Sensors
K= Optical Sensors
L= Sensor/Actuator Systems
M= Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.

TUESDAY
G= Chemical and Gas Sensors
H= Biosensors
J= Mechanical, Magnetic, and Physical Sensors
K= Phenomena, Modeling and Evaluation
L= Sensor Networks
M= Applications
N= Open Posters

WEDNESDAY
G= Chemical and Gas Sensors
H= Applications
J= Mechanical, Magnetic, and Physical Sensors
K= Optical Sensors
L= Sensor Networks
M= Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.
N= Open Posters
<table>
<thead>
<tr>
<th>Time</th>
<th>Track A: Novel Trends in Sensing</th>
<th>Track B: Inertial Measurement</th>
<th>Track C: Bioelectronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM - 8:30 AM</td>
<td>TUTORIAL REGISTRATION AND CHECK-IN – MARYLAND FOYER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:30 AM - 5:30 PM</td>
<td>CONFERENCE REGISTRATION – MARYLAND FOYER</td>
<td>BIOELECTRONICS: ITS FUTURE IN YOUR HEALTH AND WELL BEING</td>
<td>ENERGY CONSIDERATIONS AND SELF-POWERED DEVICES</td>
</tr>
<tr>
<td>8:30 AM - 10:20 AM</td>
<td>COLD ATOM GYROS</td>
<td>MEMS INERTIAL SENSORS: A TECHNOLOGY OVERVIEW</td>
<td></td>
</tr>
<tr>
<td>10:20 AM - 10:40 AM</td>
<td>COFFEE BREAK – MARYLAND FOYER</td>
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<tr>
<td>10:40 AM - 12:00 PM</td>
<td>FAST DNA SEQUENCING BY ELECTRICAL MEANS</td>
<td>DESIGN AND ANALYSIS OF MEMS GYROSCOPES</td>
<td>TECHNOLOGIES FOR WIRELESS BIOSYSTEMS</td>
</tr>
<tr>
<td>12:00 PM - 1:30 PM</td>
<td>LUNCH – BALTIMORE AB</td>
<td>&quot;STARTING A MEDICAL MONITORING COMPANY FROM SCRATCH&quot;</td>
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<tr>
<td>1:30 PM - 2:50 PM</td>
<td>ULTIMATE MEMS SENSORS</td>
<td>DESIGN AND ANALYSIS OF MEMS ACCELEROMETERS</td>
<td>TECHNOLOGIES FOR AN IMPLANTABLE NANO-BIO-SENSING LABORATORY</td>
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<tr>
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<td>COFFEE BREAK – MARYLAND FOYER</td>
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<td></td>
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<tr>
<td>3:10 PM - 5:00 PM</td>
<td>OPTOMECHANICAL SENSORS</td>
<td>INTERFACE CIRCUITS AND SYSTEMS FOR INERTIAL SENSORS</td>
<td>SYSTEM-INTEGRATION: EXAMPLES OF INNOVATIVE HEALTH PRODUCTS</td>
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<tr>
<td>5:00 PM - 5:30 PM</td>
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<td></td>
<td>DEMONSTRATIONS OF MHEALTH MEDICAL DEVICES AND APPS</td>
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<tr>
<td>6:30 PM - 8:30 PM</td>
<td>WELCOME RECEPTION – MARYLAND/BALTIMORE FOYER</td>
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</tr>
<tr>
<td>Time</td>
<td>Location</td>
<td>Session</td>
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<tr>
<td>7:00 AM - 5:00 PM</td>
<td>WATERFALL A</td>
<td>KEYNOTE PRESENTATION 1 – MARYLAND BC &quot;INTEGRATED MEMS BY ADHESIVE BONDING&quot;</td>
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<td>8:30 AM - 9:15 AM</td>
<td>MARYLAND E</td>
<td>A1L-A: GAS CHROMATOGRAPHY</td>
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<td>9:30 AM - 10:45 AM</td>
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<td>A1L-B: PHOTONICS</td>
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<tr>
<td>10:45 AM - 11:15 AM</td>
<td>MARYLAND D</td>
<td>A1L-C: PHYSICAL SENSORS I</td>
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<tr>
<td>11:15 AM - 12:45 PM</td>
<td>MARYLAND E</td>
<td>A1L-D: OPTICAL SENSORS IN HEALTHCARE</td>
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<tr>
<td>12:45 PM - 2:15 PM</td>
<td>MARYLAND F</td>
<td>A1L-E: SENSOR SYSTEMS</td>
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<tr>
<td>2:15 PM - 3:45 PM</td>
<td>MARYLAND D</td>
<td>A2L-B: ELECTROCHEMICAL AL/MICROWAVE</td>
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<td>MARYLAND E</td>
<td>A2L-C: INERTIAL SENSORS</td>
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<td>MARYLAND FOYER</td>
<td>OPENING REMARKS – MARYLAND BC</td>
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<td>A1L-A: GAS SENSORS I</td>
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<td>8:45 AM - 9:00 AM</td>
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<tr>
<td>9:00 AM - 9:15 AM</td>
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<td>A1L-B: PHOTONICS</td>
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<tr>
<td>9:15 AM - 9:30 AM</td>
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<td>A1L-C: PHYSICAL SENSORS I</td>
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<td>9:30 AM - 9:45 AM</td>
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<td>A1L-D: OPTICAL SENSORS IN HEALTHCARE</td>
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<tr>
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<td>A1L-E: SENSOR SYSTEMS</td>
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<tr>
<td>10:00 AM - 10:15 AM</td>
<td>MARYLAND E</td>
<td>A2L-B: ELECTROCHEMICAL AL/MICROWAVE</td>
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<td>MARYLAND D</td>
<td>A2L-C: INERTIAL SENSORS</td>
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<tr>
<td>10:30 AM - 10:45 AM</td>
<td>MARYLAND E</td>
<td>A2L-D: OPTICAL SENSORS FOR PHYSICAL MEASUREMENTS</td>
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<td>10:45 AM - 11:00 AM</td>
<td>MARYLAND D</td>
<td>A2L-E: SYSTEMS FOR HEALTH MONITORING</td>
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<tr>
<td>11:00 AM - 11:15 AM</td>
<td>MARYLAND E</td>
<td>A2L-F: MISCELLANEOUS SENSORS</td>
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<td>11:15 AM - 12:00 PM</td>
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<td>A2L-F: MISCELLANEOUS SENSORS</td>
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<td>12:00 PM - 12:45 PM</td>
<td>MARYLAND F</td>
<td>A4L-A: GAS SENSORS II</td>
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<td>12:45 PM - 1:00 PM</td>
<td>MARYLAND E</td>
<td>A4L-B: BIOMOLECULAR SENSORS</td>
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<td>1:00 PM - 1:15 PM</td>
<td>MARYLAND D</td>
<td>A4L-C: MAGNETIC SENSORS</td>
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<td>1:15 PM - 1:30 PM</td>
<td>MARYLAND E</td>
<td>A4L-D: OPTICAL SENSORS FOR CHEMICAL ANALYSES</td>
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<td>1:30 PM - 1:45 PM</td>
<td>MARYLAND D</td>
<td>A4L-E: ACTUATOR SYSTEMS</td>
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<tr>
<td>1:45 PM - 2:00 PM</td>
<td>MARYLAND E</td>
<td>A4L-F: MATERIALS &amp; FABRICATION I</td>
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<tr>
<td>2:00 PM - 2:15 PM</td>
<td>MARYLAND D</td>
<td>A4L-F: MATERIALS &amp; FABRICATION I</td>
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**SESSION GRID – MONDAY, NOVEMBER 4TH**
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<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Description</th>
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<tr>
<td>7:00 AM - 5:00 PM</td>
<td>REGISTRATION – MARYLAND FOYER</td>
<td>MARYLAND F</td>
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<tr>
<td>8:00 AM - 8:45 AM</td>
<td>KEYNOTE PRESENTATION 2 – MARYLAND BC</td>
<td>MARYLAND E</td>
<td>&quot;IMPLANTABLE CHIPS &amp; SENSORS: QUO VADIS?&quot;</td>
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<tr>
<td></td>
<td>PROFESSOR ROBERT PUERS</td>
<td>MARYLAND A</td>
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<tr>
<td>9:00 AM - 10:15 AM</td>
<td>B1L-A: HUMIDITY SENSORS</td>
<td>MARYLAND D</td>
<td>B1L-C: ACOUSTIC SENSORS</td>
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<tr>
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<td>B1L-B: INTERFACE</td>
<td>WATERTABLE ABC</td>
<td>B1L-D: ELECTROMAGNETIC SENSORS &amp; PHENOMENA</td>
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<td>HOMELAND</td>
<td>B1L-E: WIRELESS SENSOR NETWORKS FOR HEALTH I</td>
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<td>B1L-F: INDUSTRIAL &amp; ENVIRONMENTAL</td>
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<tr>
<td>10:15 AM - 10:45 AM</td>
<td>COFFEE BREAK – MARYLAND FOYER</td>
<td>MARYLAND FOYER</td>
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<tr>
<td>10:45 AM - 12:00 PM</td>
<td>B2L-A: LIQUID BASED SENSORS</td>
<td>MARYLAND E</td>
<td>B2L-C: TACTILE SENSORS</td>
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<td>B2L-B: MECHANICAL</td>
<td>MARYLAND D</td>
<td>B2L-D: SENSORS PHENOMENA</td>
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<td>WATERTABLE ABC</td>
<td>B2L-E: WIRELESS SENSOR NETWORKS FOR HEALTH II</td>
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<td>HOMELAND</td>
<td>B2L-F: MICROSYSTEMS APPLICATIONS</td>
</tr>
<tr>
<td>12:00 PM - 2:00 PM</td>
<td>INDUSTRY PANEL LUNCH – MARYLAND BC</td>
<td>MARYLAND A</td>
<td>&quot;WEARABLE SENSORS: THE GOOD, THE BAD, AND THE ALLURING&quot;</td>
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<tr>
<td>2:00 PM - 3:30 PM</td>
<td>POSTER SESSION – POSTER AREA – BALTIMORE AB</td>
<td>MARYLAND E</td>
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<tr>
<td>3:30 PM - 5:00 PM</td>
<td>B4L-A: CARBON NANOTUBES &amp; GRAPHENE</td>
<td>MARYLAND D</td>
<td>B4L-C: PRESSURE SENSORS</td>
</tr>
<tr>
<td></td>
<td>B4L-B: INTEGRATION</td>
<td>WATERTABLE ABC</td>
<td>B4L-D: INERTIAL SYSTEMS MODELING</td>
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<td>HOMELAND</td>
<td>B4L-E: WIRELESS SENSOR NETWORKS FOR ENVIRONMENTAL MONITORING</td>
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<td></td>
<td>B4L-F: MEDICAL APPLICATIONS</td>
</tr>
<tr>
<td>7:00 PM - 10:00 PM</td>
<td>CONFERENCE DINNER – B&amp;O RAILROAD MUSEUM</td>
<td>MARYLAND E</td>
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<td></td>
<td>TRANSPORTATION TO B&amp;O RAILROAD MUSEUM BEGINS AT 6:00PM – PICKUP LOCATION IS IN FRONT OF THE HOTEL</td>
<td>MARYLAND D</td>
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# SESSION GRID – WEDNESDAY, NOVEMBER 6TH

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>MARYLAND F</th>
<th>MARYLAND E</th>
<th>MARYLAND A</th>
<th>MARYLAND D</th>
<th>WATERTABLE ABC</th>
<th>HOME LAND</th>
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<tr>
<td>7:00 AM - 5:00 PM</td>
<td>Registration – MARYLAND FOYER</td>
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<tr>
<td>8:00 AM - 8:45 AM</td>
<td>Keynote Presentation – MARYLAND BC</td>
<td>&quot;BIOARGO: A GLOBAL SCALE CHEMICAL SENSOR NETWORK TO OBSERVE CARBON, OXYGEN, AND NITROGEN CYCLES IN THE OCEAN&quot;</td>
<td>DR. KENNETH S. JOHNSON</td>
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<tr>
<td>9:00 AM - 10:15 AM</td>
<td>C1L-A: Electrochemical Sensors</td>
<td>C1L-B: Power Applications</td>
<td>C1L-C: Viscosity, Density and Flow Sensors</td>
<td>C1L-D: Optical Imaging Sensors</td>
<td>C1L-E: Wireless Sensor Networks for Targets &amp; Objects</td>
<td>C1L-F: Materials &amp; Fabrication II</td>
<td></td>
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<tr>
<td>10:15 AM - 12:15 PM</td>
<td>Poster Session – Poster Area – Baltimore AB</td>
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<tr>
<td>12:15 PM - 2:00 PM</td>
<td>Conference Awards Lunch – MARYLAND BC</td>
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<tr>
<td>2:00 PM - 3:15 PM</td>
<td>C3L-A: Chemical &amp; Gas Sensors I</td>
<td>C3L-B: Sensor Applications for Life and Society</td>
<td>C3L-C: Physical Sensors II</td>
<td>C3L-D: Optical Sensors on Silicon</td>
<td>C3L-E: Late News I</td>
<td>C3L-F: Harvesting &amp; Converters</td>
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<tr>
<td>3:15 PM - 3:45 PM</td>
<td>Coffee Break – MARYLAND FOYER</td>
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<tr>
<td>3:45 PM - 5:00 PM</td>
<td>C4L-D: Optical Sensor Signal Analyses</td>
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<td>5:00 PM</td>
<td>Conference Adjourns</td>
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RENAISSANCE BALTIMORE HARBORPLACE
FLOOR PLAN
Exhibitors are listed below as of October 7th, 2013.

Booth # 1 – CST of America, Inc
Booth # 2 – Measurement Science and Technology Journal
Booth # 3 – SPIE
Booth # 4 – TeraPico
Booth # 5 – Texas Instruments
Booth # 6 – IEEE GOLD
Booth # 7 – IEEE Sensors Council
Booth # 8 – GaTech – Institute for Electronics and Nanotechnology
Booth # 9 – ASSIST
The Monday poster session floor plan shows the position of each numbered poster. The three letter and number prefix of each poster has been omitted from this diagram. The following groups, or tracks, are featured in this poster session:

G= Chemical and Gas Sensors  
H= Biosensors  
J= Mechanical, Magnetic, and Physical Sensors  
K= Optical Sensors  
L= Sensor/Actuator Systems  
M= Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.

*Please reference the Poster Numbers from the program listing starting on page 49. (Ex. The 1st paper listed on page 49 of this program book is G1 and this poster is located in front-right area of the poster room as indicated on the diagram on the following page.)
<table>
<thead>
<tr>
<th>Column</th>
<th>G8</th>
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**MONDAY POSTER SESSION - BALTIMORE AB**
The Tuesday poster session floor plan shows the position of each numbered poster. The three letter and number prefix of each poster has been omitted from this diagram. The following groups, or tracks, are featured in this poster session:

G= Chemical and Gas Sensors
H= Biosensors
J= Mechanical, Magnetic, and Physical Sensors
K= Phenomena, Modeling and Evaluation
L= Sensor Networks
M= Applications
N= Open Posters

*Please reference the Poster Numbers from the program listing starting on page 75. (Ex. The 1st paper listed on page 75 of this program book is G1 and this poster is located in front-right area of the poster room as indicated on the diagram on the following page.)
The Wednesday poster session floor plan shows the position of each numbered poster. The three letter and number prefix of each poster has been omitted from this diagram. The following groups, or tracks, are featured in this poster session:

G = Chemical and Gas Sensors
H = Applications
J = Mechanical, Magnetic, and Physical Sensors
K = Optical Sensors
L = Sensor Networks
M = Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.
N = Open Posters

*Please reference the Poster Numbers from the program listing starting on page 98. (Ex. The 1st paper listed on page 98 of this program book is G1 and this poster is located in front-right area of the poster room as indicated on the diagram on the following page.)
Monday, November 4th - Professor Masayoshi Esashi

"Integrated MEMS by Adhesive Bonding"

Professor Masayoshi Esashi received the B.E. degree in electronic engineering in 1971 and the Doctor of Engineering degree in 1976 at Tohoku University. He served as a research associate from 1976 and an associate professor from 1981 at the Department of Electronic Engineering, Tohoku University. Since 1990 he has been a professor and he is now in The World Premier International Research Center Advanced Institute for Materials Research (WPI-AIMR) and concurrently in Micro System Integration Center (μSIC) (director) in Tohoku University. He was a President of Sensor-Micromachine Society in Institute of Electrical Engineers in Japan (2002-2003), a President of Japan Society of Next Generation Sensor Technology (2010–), and a Chairman of MEMS Park Consortium in Sendai (2004). He served as a general co-chairman of the 4th IEEE Micro Electro Mechanical Workshop in 1991 held in Nara, Japan, a general chairman of the 10th International Conference on Solid-State Sensors and Actuators (Transducers 99) in 1999 held in Sendai, Japan and also as the Technical Program Chairman of IEEE Sensors 2006 held in Daegu, Korea. He has been studying microsensors and integrated microsystems.

Tuesday, November 5th - Professor Robert Puers

"Implantable chips and sensors: quo vadis?"

Robert (Bob) Puers received his Ph.D. in 1986 at the Katholieke Universiteit te Leuven. He is a European pioneer in the research on micromachining, MEMS and packaging techniques, mainly for biomedical implantable systems. To this purpose, he installed a dedicated clean room for sensor and electronic packaging technology, that now runs for more than 25 years under his guidance. In 2014, a new research facility will house his research team. Recently, microfluidic and optical MEMS based on polymers have been added to the backbone of his sensor research. Besides MEMS, his work also focuses on low power systems, smart interfaces, inductive power and wireless communication. Devices developed range from bladder pressure and eye pressure monitoring, over instrumented orthopedic implants, to implanted pumps for assisted blood perfusion. One spinout of this research team are the design guidelines to improve the efficiency of power induction (with coil systems), that have been bundled in two books. He took major efforts to increase the impact of MEMS and Microsystems in both the international research community as well as in industry. He helped to launch three spin-off companies, ICSense, Zenso and MinDCet. Dr. Puers is also an IEEE and IoP fellow.
Wednesday, November 6th - Dr. Kenneth S. Johnson

“BioArgo: a global scale chemical sensor network to observe carbon, oxygen, and nitrogen cycles in the ocean”

Kenneth S. Johnson is a Senior Scientist at the Monterey Bay Aquarium Research Institute. He received his B.S. in Chemistry and Oceanography from the University of Washington and his Ph.D. in Oceanography from Oregon State University. His research interests are focused on the development of chemical sensors that can be deployed in large scale, wireless sensor networks and application of these tools to studies of chemical cycling throughout the ocean. His lab group has developed sensors for a variety of seawater nutrients, pH and field portable, analytical systems for trace elements such as iron, cobalt, manganese and zinc. The sensors are integrated into commercially available platforms and sensor networks are deployed throughout the coastal ocean and in remote regions of the open ocean where they report back to the Internet in real time. These sensors and analyzers have been used in a variety of pioneering studies, including the first open ocean iron fertilization experiments. He is author of more than 130 papers in scientific journals, including 16 papers in the journals Science and Nature. Johnson was elected Fellow of the American Geophysical Union in 2011.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>7:00 AM - 8:30 AM</td>
<td>REGISTRATION</td>
<td>Maryland Foyer</td>
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<tr>
<td>8:30 AM - 10:20 AM</td>
<td>Track A: Novel Trends in Sensing</td>
<td>Homeland</td>
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<td>COLD ATOM GYROS</td>
<td>Todd Gustavson, AOSense, Inc.</td>
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<tr>
<td>8:30 AM - 10:20 AM</td>
<td>Track B: Inertial Measurement</td>
<td>Federal Hill</td>
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<td>MEMS INERTIAL SENSORS: A TECHNOLOGY OVERVIEW</td>
<td>Farrokh Ayazi, Georgia Tech Institute</td>
</tr>
<tr>
<td>8:30 AM - 9 AM</td>
<td>Track C: Bioelectronics</td>
<td>Fells Point</td>
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<td></td>
<td>BIOELECTRONICS: ITS FUTURE IN YOUR HEALTH AND WELL BEING</td>
<td>Veena Misra, NCSU ERC for Advanced Self-Powered Systems of Integrated Sensors and Technologies</td>
</tr>
<tr>
<td>9:00 AM - 10:20 AM</td>
<td>Track C: Bioelectronics</td>
<td>Fells Point</td>
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<td>ENERGY CONSIDERATIONS AND SELF-POWERED DEVICES</td>
<td>John Muth, NCSU ERC for Advanced Self-Powered Systems of Integrated Sensors and Technologies</td>
</tr>
<tr>
<td>10:20 AM - 10:40 AM</td>
<td>Coffee Break</td>
<td>Maryland Foyer</td>
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<tr>
<td>10:40 AM - 12 PM</td>
<td>Track A: Novel Trends in Sensing</td>
<td>Homeland</td>
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<tr>
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<td>FAST DNA SEQUENCING BY ELECTRICAL MEANS</td>
<td>Massimiliano Di Ventra, UC San Diego</td>
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<td>Time</td>
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</table>
| 10:40 AM – 12:00 PM | Track B: Inertial Measurement | DESIGN AND ANALYSIS OF MEMS GYROSCOPES  
Faisal Zaman, Qualtré |  
| 10:40 AM - 12 PM   | Track C: Bioelectronics | TECHNOLOGIES FOR WIRELESS BIOSYSTEMS  
Maysam Ghovanloo, Georgia Institute of Technology |  
| 12:00 PM - 1:30 PM | Lunch               | Luncheon Speaker: Dr. Steven LeBoeuf, Valencell, Inc.     |  
| 1:30 PM - 2:50 PM  | Track A: Novel Trends in Sensing  
Siavash Pourkamali, University of Texas at Dallas | STARTING A MEDICAL MONITORING COMPANY FROM SCRATCH |  
| 1:30 PM - 2:50 PM  | Track B: Inertial Measurement  
Diego E. Serrano, Qualtré | TECHNOLOGIES FOR AN IMPLANTABLE NANO-BIO-SENSING LABORATORY  
Sandro Carrara, Swiss Federal Institute of Technology – Lausanne |  
| 2:50 PM - 3:10 PM  | Coffee Break         |  
|                   | Room: Maryland Foyer |  
|                   |                     |  

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<tr>
<th>Time</th>
<th>Track A: Novel Trends in Sensing</th>
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| 3:10 PM – 5:00 PM | OPTOMECHANICAL SENSORS  
Gaurav Bahl, *University of Illinois at Urbana-Champaign, USA* |

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<tr>
<th>Time</th>
<th>Track B: Inertial Measurement</th>
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</table>
| 3:10 PM – 5:00 PM | INTERFACE CIRCUITS AND SYSTEMS FOR INERTIAL SENSORS  
Arashk N. P. Shirazi, *Georgia Tech University* |

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<tr>
<th>Time</th>
<th>Track C: Bioelectronics</th>
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| 3:10 PM – 5:00 PM | SYSTEM-INTEGRATION: EXAMPLES OF INNOVATIVE HEALTH PRODUCTS  
James Weiland, *USC ERC for Biomimetic MicroElectronic Systems* |

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<tr>
<th>Time</th>
<th>Track C: Bioelectronics</th>
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| 5 PM - 5:30 PM | DEMONSTRATIONS OF MHEALTH MEDICAL DEVICES AND APPS  
Amy Schiffman, *Capital Health Advocates & Capital House Calls*  
H. Troy Nagle, *NC State* |

<table>
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<tr>
<th>Time</th>
<th>Track C: Bioelectronics</th>
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</table>
| 6:30 PM – 8:30 PM | Welcome Reception  
Room: Maryland/Baltimore Foyer |
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<tr>
<th>Time</th>
<th>Session Details</th>
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<tr>
<td>8:00 AM – 8:30 AM</td>
<td>Maryland BC OPENING REMARKS</td>
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<td>8:30 AM - 9:15 AM</td>
<td>PLENARY – KEYNOTE – PROFESSOR MASAYOSHI ESASHI Maryland BC Session Chair: Elliott Brown (Wright State University, USA)</td>
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<tr>
<td>9:30 AM - 10:45 AM</td>
<td>INTEGRATED MEMS BY ADHESIVE BONDING Masayoshi Esashi, Shuji Tanaka Tohoku University, Japan</td>
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<tr>
<td>9:30 AM – 10:45 AM</td>
<td>A1L-A: GAS CHROMATOGRAPHY Maryland F Session Chairs: Massood Atashbar (Western Michigan University, USA), Ponnambalam Ravi Selvaganapathy (McMaster University, Canada)</td>
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<tr>
<td>9:30 AM</td>
<td>INVITED TALK: SMART MULTI-DIMENSIONAL GAS CHROMATOGRAPHY Xudong Fan University of Michigan, United States</td>
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<td>10:00 AM</td>
<td>WIDTH-MODULATED MICROGAS CHROMATOGRAPHY SEPARATION COLUMNS WITH SILICA NANOPARTICLES STATIONARY PHASE Hamza Shakeel, Dong Wang, Randy Heflin, Masoud Agah Virginia Tech, United States</td>
</tr>
<tr>
<td>10:15 AM</td>
<td>DETECTION OF EXPLOSIVES USING ORTHOGONAL GAS SENSORS Yun Chu, Daniel Mallin, Matin Amani, Otto Gregory University of Rhode Island, United States</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>MICROSENSOR ANALYSES FOR TRACE TARGETS OVER EXTENDED TIMES IN A SIMULATED MARTIAN ENVIRONMENT Kurt D. Benkstein¹, Philip H. Rogers¹, Christopher B. Montgomery¹, Steve Semancik¹, C. Jerry Jin², Baranidharan Raman² ¹National Institute of Standards and Technology, United States; ²Washington University in St. Louis, United States</td>
</tr>
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</table>
9:30 AM - 10:45 AM
A1L-B: PHOTONICS
Maryland E
Session Chairs: Christopher Salthouse (University of Massachusetts, Amherst, USA), Zheyao Wang (Tsinghua University, China)

9:30 AM
INVITED TALK: ELECTRONIC LABEL-FREE BIOSENSING ASSAYS
Mark Reed
Yale University, United States

10:00 AM
FABRICATION AND CHARACTERIZATION OF A DUAL-MODE SPR/SERS SENSOR BASED ON PLASMONIC NANODOME ARRAYS
Charles Choi, Steve Semancik
National Institute of Standards and Technology, United States

10:15 AM
LABEL-FREE PLASMONIC IMMUNOSENSING FOR PLASMODIUM IN WHOLE BLOOD
Sang-Yeon Cho¹, Jayson Briscoe¹, Immo Hansen¹, Jesse Smith¹, Yoomi Chang¹, Igal Brener²
¹New Mexico State University, United States; ²Sandia National Laboratories, United States

10:30 AM
COMPACT, LOW COST CMOS INTEGRATED SPR BIOSENSOR SYSTEM
Santosh Koppa, Youngjoong Joo
University of Texas at San Antonio, United States

9:30 AM - 10:45 AM
A1L-C: PHYSICAL SENSORS I
Maryland A
Session Chairs: Mitsuhiro Shikida (Nagoya University, Japan), David Elata (Technion - Israel Institute of Technology, Israel)

9:30 AM
MEMS ELECTRIC-FIELD SENSOR WITH LEAD ZIRCONATE TITANATE (PZT)-ACTUATED ELECTRODES
Simon Ghionea, Gabriel Smith, Jeffrey Pulskaemp, Sarah Bedair, Christopher Meyer, David Hull
US Army Research Laboratory, United States

9:45 AM
A MICRODISCHARGE-BASED NEUTRON RADIATION DETECTOR UTILIZING SPUTTERED GADOLINIUM FILMS FOR NEUTRON CONVERSION
Ravish Malhotra, Yogesh B. Gianchandani
University of Michigan, United States
10:00 AM
GRANULAR RADIO ENERGY-SENSING NODE (GREEN): A 0.56 CM³ WIRELESS STICK-ON NODE FOR NON-INTRUSIVE ENERGY MONITORING
Rafael Send¹, Qiliang Richard Xu¹, Igor Paprotny², Richard White¹, Paul Wright¹
¹University of California, Berkeley, United States; ²University of Illinois, United States

10:15 AM
INTEGRATED PASSIVE AND WIRELESS SENSOR FOR MAGNETIC FIELDS, TEMPERATURE AND HUMIDITY
Bodong Li, Omar Yassine, Jürgen Kosel
King Abudllah University of Science and Technology, Saudi Arabia

10:30 AM
A NOVEL IN-LINE TYPE FREQUENCY DETECTOR BASED ON MEMS MEMBRANE FOR X-BAND APPLICATION
Zhenxiang Yi, Xiaoping Liao
Southeast University, China

9:30 AM - 10:45 AM
A1L-D: OPTICAL SENSORS IN HEALTHCARE
Maryland D
Session Chairs: Elfed Lewis (University of Limerick, Ireland) Candid Reig (University of Valencia, Spain)

9:30 AM
TACTILE AND HYPERSPECTRAL IMAGING SENSORS FOR MAMMARY TUMOR CHARACTERIZATION
Amrita Sahu, Firdous Saleheen, Vira Oleksyuk, Yi Chen, Chang-Hee Won
Temple University, United States

9:45 AM
A FABRY-PEROT INTERFEROMETRY BASED MRI-COMPATIBLE MINIATURE UNIAXIAL FORCE SENSOR FOR PERCUTANEOUS NEEDLE PLACEMENT
Weijian Shang, Hao Su, Gang Li, Cosme Furlong, Gregory Fischer
Worcester Polytechnic Institute, United States

10:00 AM
HIGH RESOLUTION FLUORESCENCE-BASED TEMPERATURE SENSOR FOR STAND-OFF DETECTION IN PHYSIOLOGICAL RANGE
Timothy Kuester, Ryan Robucci, Hung Lam, Govind Rao, Yordan Kostov
University of Maryland Baltimore County, United States

10:15 AM
THE CONTACTLESS ACTIVE OPTICAL SENSOR FOR VEHICLE DRIVER FATIGUE DETECTION
Krzysztof Murawski¹, Tadeusz Sondej², Krzysztof Różanowski¹, Olaf Truszczynski¹, Marian Macander¹, Łukasz Macander¹
¹Military Institute of Aviation Medicine, Poland; ²Military University of Technology, Poland
10:30 AM
CMOS CHIP WITH MULTI JUNCTION PHOTO DETECTOR FOR SENSING BIOMEDICAL SIGNALS
Stefan Schidl, Eugenijus Kaniusas, Horst Zimmermann
Technische Universität Wien, Austria

9:30 AM - 10:45 AM
A1L-E: SENSOR SYSTEMS
Watertable ABC
Session Chairs: Konandur Rajanna (IIS Bangalore, India), Oliver Paul (University of Freiburg - IMTEK, Germany)

9:30 AM
FLOW MEASUREMENT IN OPEN CHANNELS BY USING AN ULTRASONIC PHASED ARRAY SENSOR
Manuel Haide, Wolfgang Schroer
Ulm University of Applied Sciences, Germany

9:45 AM
QUANTIFYING MODAL SHAPES IN SMART PIEZOELECTRIC ULTRASONIC TRANSDUCER ARRAY: MODELING AND EXPERIMENT
M.A. Matin1, K. Ozaki2, Y. Numata2, D. Akai2, K. Sawada2, M. Ishida2
1Bangladesh University of Engineering and Technology, Bangladesh; 2Toyohashi University of Technology, Japan

10:00 AM
ROOM TEMPERATURE IONIC-LIQUID ELECTROCHEMICAL GAS SENSOR ARRAY SYSTEM FOR REAL-TIME MINE SAFETY MONITORING
Haitao Li1, Xiaoyi Mu1, Zhe Wang2, Min Guo2, Xiangqun Zeng2, Andrew Mason1
1Michigan State University, United States; 2Oakland University, United States

10:15 AM
HIGH SENSITIVITY ACCELEROMETER OPERATING ON THE BORDER OF STABILITY WITH DIGITAL SLIDING MODE CONTROL
Elie Hanna Sarraf, Ahmad Sharkia, Siamak Moori, Mrigank Sharma, Edmond Cretu
University of British Columbia, Canada

10:30 AM
PULSED EDDY CURRENT IMAGING DEVICE FOR NON DESTRUCTIVE EVALUATION APPLICATIONS
Pierre-Yves Joubert2, Yohan Le Diraison1, Zhou Xi1, Eric Vourc’h1
1Ecole Normale Supérieure de Cachan, France; 2Université Paris Sud, France
9:30 AM - 10:45 AM

A1L-F: SENSING TECHNIQUES

Homeland

Session Chairs: Hong Yu (Arizona State University, USA), Gaurav Bahl (University of Illinois at Urbana-Champaign, USA)

9:30 AM

A STANDARD LOW-NOISE SENSOR INTERFACE FOR 0.66NJ/STEP-ENERGY-EFFICIENT, MOBILE BAROMETRIC-PRESSURE-BASED ALTITUDE SENSING

Marko Mailand, Stefan Getzlaff, Raik Richter, Steffen Apel, Daniel Breitmeyer, Ute Meyer, Enno Böhme, Ronald Schreiber, Kornelius Töws, Dieter Günther

Zentrum Mikroelektronik Dresden AG, Germany

9:45 AM

READOUT SCHEME FOR RESISTIVE CHIPLESS WIRELESS SENSORS

Martin Schüßler, Bernd Kubina, Christian Mandel, Rolf Jakoby

Technische Universität Darmstadt, Germany

10:00 AM

ANALYSIS AND EFFICIENT ONSET TIME DETECTION OF ACOUSTIC EMISSION SIGNALS WITH POWER CONSTRAINED SENSOR PLATFORMS

Benjamin Babjak, Sandor Szilvasi, Peter Volgyesi, Ozgur Yapar, Prodyot K. Basu

Vanderbilt University, United States

10:15 AM

POSFET TACTILE SENSING CHIPS USING CMOS TECHNOLOGY

Ravinder S. Dahiya, Andrea Adami, Cristian Collini, Maurizio Valle, Leandro Lorenzelli

1Fondazione Bruno Kessler, Italy; 2Università degli Studi di Genova, Italy; 3University of Glasgow, United Kingdom

10:30 AM

TERAHERTZ EMISSION AND DETECTION USING TWO DIMENSIONAL PLASMONS IN SEMICONDUCTOR NANO-HETEROSTRUCTURES FOR SENSING APPLICATIONS

Täichi Otsuji, Takayuki Watanabe, Stephane Boubanga Tombet, Tetsuya Suemitsu, Victor Ryzhii, Vyacheslav Popov, Wojciech Knap

1University of Montpellier-CNRS, France; 2Kotelnikov Institute of Radio Engineering and Electronics (Saratov Branch), Russia; 3Tohoku University, Japan
11:15 AM - 12:45 PM
A2L-A: GAS SENSORS I
Maryland F
Session Chairs: Oliver Brand (Georgia Institute of Technology, USA), Goutam Koley (University of South Carolina, USA)

11:15 AM
DEVELOPMENT OF MICRO-HOTPLATE WITH TAN HEATER BASED CU-DOPED SNO2 GAS SENSOR FOR LOW CONCENTRATION OF H2S GAS
Jin-Chern Chiou¹, Shang-Wei Tsai¹, Chia-Yang Lin¹
¹National Chiao-Tung University, Taiwan; ² China Medical University, Taiwan

11:30 AM
MOLECULARLY IMPRINTED POLYMER COATED Au NANOPARTICLE SENSOR FOR ALPHA-PINENE VAPOR DETECTION
Bin Chen, Chuanjun Liu, Xiao Sun, Kenshi Hayashi
Kyushu University, Japan

11:45 AM
A DUAL MODE SOI CMOS MEMS BASED THERMAL CONDUCTIVITY AND IR ABSORPTION GAS SENSOR
Sohab Sarfraz, Vasant Kumar, Florin Udrea
University of Cambridge, United Kingdom

12:00 PM
A MICRO HELIUM-DISCHARGE PHOTOIONIZATION DETECTOR FOR GAS SENSING
Shree Narayanan¹, Masoud Agah¹, Gary Rice²
¹Virginia Tech, United States; ²College of William and Mary, United States

12:15 PM
FULLY INTEGRATED SYSTEM-ON CHIP GAS SENSOR IN CMOS TECHNOLOGY
Christoph Gamauf³, Martin Siegele³, Alexander Nemecek³, Giorgio Mutinati², Stephan Steinhauser³, Elise Brunet³, Anton Köck², Jochen Kraft¹, Joerg Siegert¹, Franz Schrank¹
¹ams AG, Austria; ²Austrian Institute of Technology GmbH, Austria; ³University of Applied Sciences Wiener Neustadt, Austria

12:30 PM
THERMALLY-ASSISTED TRANSIENT ANALYSIS FOR REDUCING THE RESPONSE TIME OF MICROHOTPLATE GAS SENSORS
Alexander Vergara, Kurt D. Benkstein, Steve Semancik
National Institute of Standards and Technology, United States
11:15 AM - 12:45 PM
A2L-B: ELECTROCHEMICAL/MICROWAVE
Maryland E
Session Chairs: Long Que (Louisiana Tech University, USA), Zhihong Li (Peking University, China)

11:15 AM
RAPID DETECTION OF PROGESTERONE BY COMMERCIALLY AVAILABLE MICROELECTRODE CHIPS
Haochen Cui, Cheng Cheng, Jayne Wu, Shigetoshi Eda
University of Tennessee, Knoxville, United States

11:30 AM
THE EFFECT OF VITAMIN C FOR POINT-OF-CARE BLOOD ANALYSIS APPLICATIONS USING AN ELECTROCHEMICAL BIOSENSOR
Hadar Ben-Yoav¹, Sheryl Chocron¹, Thomas Winkler¹, Eunkyoung Kim⁰, Gregory Payne¹, Reza Ghodssi¹, Deanna Kelly²
¹University of Maryland, United States; ²University of Maryland School of Medicine, United States

11:45 AM
HIGH THROUGHPUT LOW COST ELECTROCHEMICAL DEVICE FOR S. AUREUS BACTERIA DETECTION
Mohammadali Safavieh, Minhaz Uddin Ahmed, Mohammed Zourob
Université du Québec, Canada

12:00 PM
A CELL IMPEDANCE SENSOR CHIP FOR CANCER CELLS DETECTION WITH SINGLE CELL RESOLUTION
Tien Anh Nguyen, Tsung-I Yin, Gerald Urban
IMTEK, University of Freiburg, Germany

12:15 PM
THZ SIGNATURES OF DNA IN NANOCHANNELS UNDER ELECTROPHORETIC CONTROL
Elliott Brown³, Edgar Mendoza¹, Yulia Kuznetsova², Alexander Neumann², Steven Brueck²
¹Redondo Optics, Inc., United States; ²University of New Mexico, United States; ³Wright State University, United States

12:30 PM
A NEW DIELECTRIC DISPERSION ANALYSIS USING MICROWAVE BIO-MICROSENSOR FOR MINUTE DROPLET OF LIPOSOME SUSPENSION WITH TARGET BIOMOLECULES BY S-PARAMETER METHOD
Keisuke Takada, Kaoru Yamashita, Minoru Noda
Kyoto Institute of Technology, Japan
11:15 AM - 12:45 PM
A2L-C: INERTIAL SENSORS
Maryland A
Session Chairs: Kukjin Chun (Seoul National University, South Korea), David Horsley (University of California, Davis, USA)

11:15 AM
INVITED TALK: BIOINSPIRED TOUCH SENSORS FOR MEDICAL APPLICATIONS
Chang Liu
Northwestern University, United States

11:45 AM
MEMS DISK RESONATOR GYROSCOPE WITH INTEGRATED ANALOG FRONT-END
Tsang-Hung Su, Sarah Nitzan, Parsa Taheri-Tehrani, Mitchell Kline, Bernhard Boser, David Horsley
1University of California, Berkeley, United States; 2University of California, Davis, United States

12:00 PM
DESIGN, FABRICATION AND CHARACTERISATION OF A BIOMIMETIC ACCELEROMETER INSPIRED BY THE CRICKET'S CLAVATE HAIR
Harmen Droogendijk, Meint de Boer, Remco Sanders, Gijs J.M Krijnen
University of Twente, Netherlands

12:15 PM
SUB-1G MEMS ACCELEROMETER
Daisuke Yamane, Toshifumi Konishi, Takaaki Matsushima, Gou Motohashi, Ken Kagaya, Hiroyuki Ito, Noboru Ishihara, Hiroshi Toshiyoshi, Katsuyuki Machida, Kazuya Masu
1NTT Advanced Technology Corporation, Japan; 2Tokyo Institute of Technology, Japan; 3University of Tokyo, Japan

12:30 PM
A SENSITIVE THREE-AXIS MICROMACHINED ACCELEROMETER BASED ON AN ELECTROSTATICALLY SUSPENDED PROOF MASS
Fengtian Han, Boqian Sun, Linlin Li, Gaoyin Ma
1Beijing Institute of Aerospace Control Device, China; 2Tsinghua University, China

11:15 AM - 12:45 PM
A2L-D: OPTICAL SENSORS FOR PHYSICAL MEASUREMENTS
Maryland D
Session Chairs: Francisco J. Arregui (Universidad Publica de Navarra, Spain), Yong-Lae Park (Carnegie Mellon University, USA)

11:15 AM
INVITED TALK: OPTOELECTRONIC TWEEZERS AND LIGHT ACTUATED MICROFLUIDICS
Ming Wu
University of California, Berkeley, United States
11:45 AM
MICRO-MACHINED FABRY-PÉROT INTERFEROMETER FOR THERMAL INFRARED
Mikko Tuohiniemi, Antti Näsilä, Jarkko Antila, Heikki Saari, Martti Blomberg
¹VTT Memsfab Ltd, Finland; ²VTT Technical Research Centre of Finland, Finland

12:00 PM
A LOW MODE CONFINEMENT INTEGRATED WAVEGUIDE PLATFORM FOR HIGH RESOLUTION DISPLACEMENT SENSING
Marcel Pruessner, Doewon Park, Todd Stievater, William Rabinovich
Naval Research Laboratory, United States

12:15 PM
OPTICAL SENSOR TECHNOLOGY FOR SIMULTANEOUS MEASUREMENT OF PARTICLE SPEED AND CONCENTRATION OF MICRO Sized PARTICLES
Casper Clausen, Anpan Han, Martin Kristensen, Anders Bentien
Aarhus University, Denmark

12:30 PM
OPTICAL BACKSCATTER MEASUREMENT OF CLOUD PARTICULATES
Rahul Dixit, Walter Zheng, Ashley Hatfield, J. Gerardi, G. Hickman, William Doak, Paul Chiarot, David Klotzkin
¹Binghamton University, United States; ²Innovative Dynamics Inc., United States

11:15 AM - 12:45 PM
A2L-E: SYSTEMS FOR HEALTH MONITORING
Watertable ABC
Session Chairs: Tarun Bhattacharya (Indian Institute of Technology, Kharagpur, India), Mitsuhiro Shikida (Nagoya University, Japan)

11:15 AM
GLUCOSE SENSING AND DRIVEN "ORGANIC ENGINE" WITH CO-IMMOBILIZED ENZYME MEMBRANE FOR ACTUATION BY BLOOD SUGAR IN DIABETES
Munkhbayar Munkhjargal, Kumiko Miyajima, Yuki Matsuura, Kohdai Hatayama, Ming Ye, Takahiro Arakawa, Hiroyuki Kudo, Kohji Mitsubayashi
Tokyo Medical and Dental University, Japan

11:30 AM
EMBEDDED DEVICE FOR SIMULTANEOUS RECORDING AND STIMULATION FOR RETINA IMPLANT RESEARCH
Mario Schloesser, Oscar Cota, Roger Heil, Janis Brusius, Andreas Offenhäusser, Stefan van Waasen, Michael Schiek
Forschungszentrum Juelich GmbH, Germany
11:45 AM
A CONTACT LENS SENSOR SYSTEM WITH A MICRO-CAPACITOR FOR WIRELESS INTRAOCULAR PRESSURE MONITORING
Yu-Chieh Huang¹, Guan-Ting Yeh¹, Tzu-Sen Yang¹, Jin-Chern Chiou¹,²
¹National Chiao Tung University, Taiwan; ²China Medical University Hospital, Taiwan

12:00 PM
AN IMPACT SENSING PLATFORM FOR SPINAL CORD INJURY EXPERIMENTS
Manuel Ochoa, Rahim Rahimi, Babak Ziaie, Riyi Shi
Purdue University, United States

12:15 PM
SKIN-SURFACE-COUPLED PERSONAL HEALTH MONITORING SYSTEM
Yu-Pin Hsu, Darrin Young
University of Utah, United States

12:30 PM
ACTIVE SENSING OF INDOOR HUMAN SCENARIOS THROUGH MOBILE PYROELECTRIC INFRARED SENSORS
Rui Ma², Qi Hao², Xueyong Li³
¹Shandong University, China; ²University of Alabama, United States

11:15 AM - 12:45 PM
A2L-F: MISCELLANEOUS SENSORS
Homeland
Session Chairs: Kenichi Takahata (University of British Columbia, Canada), Andrew Mason (Michigan State University, USA)

11:15 AM
PASSIVE DISPLACEMENT SENSING USING BACKSCATTER RFID WITH MULTIPLE LOADS
Jonathan Becker, Matthew Trotter, Joshua Griffin
Disney Research, United States

11:30 AM
MWCNT/COTTON-BASED FLEXIBLE ELECTRODE FOR ELECTROCARDIOGRAPHY
Chee Leong Lam, Nik Nur Zuliyyana Rajdi, Dedy Wicaksono
Universiti Teknologi Malaysia, Malaysia

11:45 AM
LOW-COST FLUORESCENCE-BASED TEMPERATURE SENSING SYSTEM FOR NEONATAL CARE
Kirit Chatterjee, Hung Lam, Ryan Robucci, Govind Rao, Yordan Kostov
University of Maryland Baltimore County, United States

12:00 PM
WIRELESS HIGH-TEMPERATURE SENSING WITH A CHIPLESS TAG BASED ON A DIELECTRIC RESONATOR ANTENNA
Bernd Kubina, Martin Schüßler, Christian Mandel, Arshad Mehmood, Rolf Jakoby
Technische Universität Darmstadt, Germany
12:15 PM
ENERGY-EFFICIENT MRAM ACCESS SCHEME USING HYBRID CIRCUITS BASED ON SPIN-TORQUE SENSORS
Mrigank Sharad, Rangharajan Venkatesan, Xuanyao Fong, Anand Raghunathan, Kaushik Roy
Purdue University, United States

12:30 PM
MULTICOLOR COLLOIDAL QUANTUM DOT BASED LIGHT Emitting Diodes Using A Solution Processed Electron Transporting Layer
Gauri Bhave, Youngkyu Lee, Kazunori Hoshino, Xiaojing Zhang
University of Texas, Austin, United States
2:15 PM - 3:45 PM
A3P-G: GAS SENSORS III
Poster Area - Baltimore AB
Session Chairs: Marcel Pruessner (Naval Research Laboratory, USA), I-Yu Huang (National Sun Yat-sen University, Taiwan)

A3P-G1
DETECTION OF STYRENE BY SAW SENSOR BASED ON HYDROGEN-BOND ACIDIC POLYMER
Yang Wang, Xiaosong Du, Yin Long, Yi Li, Yadong Jiang
University of Electronic Science and Technology of China, China

A3P-G2
FERRITE MATERIALS FOR GAS SENSING APPLICATIONS
Thanasak Sathiwityakul1, Emma Newton3, Ivan Parkin3, Maxim Kuznetsov1, Russell Binions2
1All-Russian Research Institute on Problems of Civil Defence and EMERCOM, Russia; 2Queen Mary, University of London, United Kingdom; 3University College London, United Kingdom

A3P-G3
SIC GAS SENSOR ARRAYS FOR EXTREME ENVIRONMENTS
Sandip Roy, Ben Furnival, Neal Wood, Konstantin Vassilevski, Nick Wright, Alton Horsfall, Chris O'Malley
Newcastle University, United Kingdom

A3P-G4
INN NANOWIRES BASED MULTI-MODAL ENVIRONMENTAL SENSORS
Alina Wilson, Ifat Jahangir, Ehtesham Quddus, Amol Singh, Goutam Koley
University of South Carolina, United States

A3P-G5
ULTRATHIN RECONFIGURABLE MOLECULAR FILTER FOR GAS-SELECTIVE SENSING
Masahiro Imahashi, You Chiyomaru, Kenshi Hayashi
Kyushu University, Japan

A3P-G6
ENHANCED AMMONIA SENSING PROPERTIES USING Au DECORATED ZNO NANORODS
V.P. Dinesh2, P. Biji2, Arun K. Prasad1, Ashok K. Tyagi1
1Indira Gandhi Centre for Atomic Research, India; 2PSG Institute of Advanced Studies, India

A3P-G7
VOLATILE ORGANIC COMPOUNDS OPTICAL FIBER GAS SENSOR BASED ON EVANESCENT FIELD COUPLING AND SOLVATOCHROMISM
Jae-Sung Lee2, Sang-Won Lee2, Hyun-Min Jeong2, Sung-Woo Lim2, Eun-Yoon Jang2, Na-Rae Yoon1, Dae-Hyuk Kwon1, Shin-Won Kang2
1Kyungil University, Korea, South; 2Kyungpook National University, Korea, South
A3P-G8
HIERARCHICAL POROUS SNO2 TOPOLOGICALLY TRANSFERRED FROM TIN OXALATE FOR FAST RESPONSE SENSORS TO TRACE FORMALDEHYDE
Keng Xu, Dawen Zeng
Huazhong University of Science and Technology, China

A3P-G9
OPERATING TEMPERATURE EFFECT IN WO3 FILMS FOR GAS SENSING
Malcolm Govender¹, David Motaung¹, Bonex Mwakikunga¹, Siva Umapathy², Sanchita Sili², Arun K. Prasad³, Augusto Machatine⁴, Herbert Kunert⁴
¹Council for Scientific and Industrial Research, South Africa; ²Indian Institute of Science, India; ³Indira Gandhi Centre for Atomic Research, India; ⁴University of Pretoria, South Africa

A3P-G10
RESPONSE ENHANCEMENT OF WO3 GAS SENSORS BY METALLIC NANOGRAINS
Mehdi Othman¹,², Dave Lollman¹, Khalifa Aguir¹, Philippe Méninii², Wajdi Belkacem³, Najeh Mliki³
¹IM2NP, Aix Marseille Université, France; ²LAAS-CNRS, France; ³Université Tunis El Manar, Tunisia

A3P-G11
METHODS FOR OPTIMIZING AND EXTENDING THE PERFORMANCE OF CHEMIRESISTIVE GAS MICROSENSORS
Kurt D. Benkstein¹, Alexander Vergara¹, Christopher B. Montgomery¹, Steve Semancik¹, Baranidharan Raman²
¹National Institute of Standards and Technology, United States; ²Washington University in St. Louis, United States

A3P-G12
CHEMOSELECTIVE SENSOR DEVELOPMENT USING CARBON MEMS MICROSYSTEMS
Cody M. Washburn, Mike Rector, Patrick S. Finnegan, D. Bruce Burckel, Lee T. Massey, Greg V. White II, Robert Bernstein, Timothy N. Lambert
Sandia National Laboratories, United States

A3P-G13
ANALYSIS OF BIOLOGICAL AND ARTIFICIAL CHEMICAL SENSOR RESPONSES TO ODOR MIXTURES
Nalin Katta, Debajit Saha, Kevin Leong, Junnan Wu, Naveen Gandra, Wei-Ning Wang, Parag Banerjee, Srikanth Singamenni, Pratim Biswas, Baranidharan Raman
Washington University in St. Louis, United States

A3P-G14
FAST QUARTZ RESONANT METHOD FOR HIGH HUMIDITY MEASUREMENT
Jing Nie, Xiaofeng Meng
Beihang University, China
A3P-H1
CHARACTERIZATION OF A NEEDLE-TYPE PROBE GMR SENSOR FOR BIOMEDICAL APPLICATIONS
Hamidreza Shirzadfar\(^2\), Mustapha Nadi\(^2\), Djilali Kourtiche\(^2\), Sotoshi Yamada\(^1\)
\(^1\)Kanazawa University, Japan; \(^2\)Université de Lorraine – CNRS, France

A3P-H2
NON-CONTACT, CAPACITIVE BIOSENSOR ELECTRODES FOR ELECTROSTATIC CHARGE REDUCTION
Guochen Peng, Mark Sterling, Mark Bocko
University of Rochester, United States

A3P-H3
A GLUCOSE SENSOR WITH RELAY-RELEASED MECHANISM FOR LONG TIME GLUCOSE MONITORING
Lu Fang, Bo Liang, Qin Zhu, Bobo Huang, Xuesong Ye
ZheJiang University, China

A3P-H4
ELECTROWETTING ENABLED MAGNETIC PARTICLE IMMUNOASSAY WITH ON-CHIP MAGNETIC WASHING
Nikhil Bhalla\(^1,2\), Wen Yaw Danny Chung\(^1\), Kerwin Wang\(^2\), Teddy Lessmana\(^1\), Pedro Estrela\(^3\)
\(^1\)Chung Yuan Christian University, Taiwan; \(^2\)National ChangHua University of Education, Taiwan; \(^3\)University of Bath, United Kingdom

A3P-H5
HIGH SENSITIVITY CMOS PORTABLE BIOSENSOR WITH FLEXIBLE MICROFLUIDIC INTEGRATION
Hasan Göktas, Mona Zaghloul
George Washington University, United States

A3P-H6
3 MM DEEP MICROELECTRODE NEEDLE ARRAY BASED ON ALUMINUM FOR NEURAL APPLICATIONS
Alexandre Peixoto\(^1\), Beatriz Goncalves\(^1\), Alexandre Silva\(^1\), Nuno Dias\(^1,2\), José Correia\(^1\)
\(^1\)University of Minho, Portugal; \(^2\)Polytechnic Institute of Cavado and the Ave, Portugal

A3P-H7
ORGANIC AND AQUEOUS DISPERSIBLE TETRAPODS FOR BIOSENSING APPLICATIONS
Mayur Sadawana, Arpit Katiyar, Roshni Ramachandran, Jayesh Bellare, Rohit Srivastava
Indian Institute of Technology Bombay, India
A3P-H8
FEMTO-MOLAR SENSITIVE FIELD EFFECT TRANSISTOR BIOSENSORS BASED ON SILICON NANOWIRES AND ANTIBODIES
Francesca Puppo1, Marie-Agnès Doucey3, Thomas Moh2, Gregory Pandraud2, Pasqualina M. Sarro2, Giovanni De Micheli1, Sandro Carrara1
1Ecole Polytechnique Fédérale de Lausanne, Switzerland; 2Delft University of Technology, Netherlands; 3Université de Lausanne, Switzerland

A3P-H9
ELECTROCHEMICAL DETECTION OF DOPAMINE AT OVEROXIDIZED POLYPYRROLE/GRAPHENE/AU ELECTRODE ARRAY
Yuhua Yu, Jianfeng Chen, Guowei Tao, Jia Zhou
Fudan University, China

A3P-H10
REAL-TIME SENSING OF E.COLI BIOFILM GROWTH USING EPITAXIAL GRAPHENE
Kevin Daniels, Nirupam Aich, Kristen Miller, Joseph Andrews, Shamaita Shetu, B. K. Daas, Tangali Sudarshan, Alan Decho, Navid Saleh, Mvs Chandrashekhar
University of South Carolina, United States

A3P-H11
A PORTABLE IMPEDANCE BIOSENSOR FOR DETECTION OF MULTIPLE AVIAN INFLUENZA VIRUSES
Benhua Zhang1,2, Ronghui Wang1, Yixiang Wang1, Yanbin Li1
1University of Arkansas, United States; 2Shenyang Agriculture University, United States

A3P-H12
APPLICATION OF ION SENSITIVE FIELD EFFECT TRANSISTORS (ISFET) FOR ION CHANNEL DRUG DISCOVERY
Yihao Zhu, Nicholas Deroller, Amol Singh, Ahsan Uddin, Kenneth Walsh, Goutam Koley
University of South Carolina, United States

A3P-H13
USING THE BIOSENSOR BASED ON IMPEDANCE MEASUREMENT AND SANDWICH IMMUNOASSAY FOR CARCINOEMBRYONIC ANTIGEN DETECTION
Chia-Hsien Yeh1, Kuan-Feng Su2, Yu-Cheng Lin2, Pi-Lan Shen1
1Firstep Bioresearch, Inc., Taiwan; 2National Cheng Kung University, Taiwan

A3P-H14
IN-VIVO SENSING OF GLUTAMATE LEVELS IN THE BASOLATERAL AMYGDALA ACROSS SLEEP-WAKE STATES
Min Kim1, Hargsoon Yoon2, Laurie Wellman1, Larry Sanford1
1Eastern Virginia Medical School, United States; 2Norfolk State University, United States
A3P-H15
COMPACT SILICON BIOSENSOR FOR THE CLINICAL RANGE ESTIMATION OF BLOOD SERUM TRIGLYCERIDE
Mohanasundaram Sulur Veeramani, Noel Prashant Ratchagar, Enakshi Bhattacharya, Shanthi Pavan, Shyam Prakash, Anju Chadha
Indian Institute of Technology Madras, India

2:15 PM - 3:45 PM
A3P-J: PHYSICAL, INERTIAL & MAGNETIC SENSORS
Poster Area - Baltimore AB
Session Chairs: Joan Hoffmann (Johns Hopkins University, USA), Tao Li (University of Michigan, USA)

A3P-J1
ENHANCED SENSITIVITY OF A NEW SURFACE ACOUSTIC WAVE BASED RATE SENSOR INCORPORATING METALLIC DOT ARRAYS
Wen Wang, Xiuting Shao, Shitang He
Chinese Academy of Sciences, China

A3P-J2
NET-OVERHANG COUPLED MICROCANTILEVERS FOR SENSITIVE MASS DETECTION
Guibing Cai, Rui Zhang, Zhiqiang Wang, Lurui Zhao, Wengang Wu
Peking University, China

A3P-J3
A RELATIVE GRAVIMETER FEATURING A SUPERCONDUCTING PLANAR SPRING AND THE ELECTROMAGNETIC LEVITATION
Sang Woo Lee¹, Myeong-Jong Yu¹, Chan Seok Kang², In Sun Kim²
¹Agency for Defense Development, Korea, South; ²Korea Research Institute of Standards and Science, Korea, South

A3P-J4
MODAL COUPLING ERROR SUPPRESSION IN MICROMACHINED GYROSCOPES BY UV LASER TRIMMING
Zhanqiang Hou, Xuezhong Wu, Dingbang Xiao, Songqi Hu, Xinghua Wang, Zhihua Chen
National University of Defense Technology, China

A3P-J5
SOFT-MATTER ELECTRONICS WITH STENCIL LITHOGRAPHY
James Wissman, Tong Lu, Carmel Majidi
Carnegie Mellon University, United States

A3P-J6
A MINIATURIZED NON-RADIOACTIVE ELECTRON EMITTER INCLUDING A VACUUM PRESSURE GAUGE BASED ON ELECTRIC RETARDING FIELD ION CURRENTS
Philipp Cochems, Daniel Mazarin, Stefan Zimmermann
Leibniz University Hannover, Germany
A3P-J7
MAGNETIC TUNNEL JUNCTION (MTJ) SENSORS FOR INTEGRATED CIRCUITS (IC) ELECTRIC CURRENT MEASUREMENT
Maria-Dolores Cubells, Càndid Reig, Andrea De Marcellis, Andrés Roldán, Juan-Bautista Roldán, Susana Cardoso, Paulo P. Freitas
1INESC-MN, Portugal; 2University of Granada, Spain; 3University of L'Aquila, Italy; 4University of València, Spain

A3P-J8
A MICROMACHINED VIBRATING WHEEL GYROSCOPE WITH FOLDED BEAMS
Qiancheng Zhao, Longtao Lin, Zhenchuan Yang, Liguo Dong, Guizhen Yan
Peking University, China

A3P-J9
MULTILAYER GIANT MAGNETO-IMPEDANCE SENSOR FOR LOW FIELD SENSING
Saman Nazari Nejad, Arash Akhavan Fomani, Raafat Mansour
University of Waterloo, Canada

2:15 PM - 3:45 PM
A3P-K: OPTICAL SENSORS I
Poster Area - Baltimore AB
Session Chair: John X.J. Zhang (University of Texas at Austin, USA)

A3P-K1
C-REACTIVE PROTEIN APTASENSOR FOR EARLY SEPSIS DIAGNOSIS BY MEANS OF AN OPTICAL FIBER DEVICE
Carlos Ruiz Zamarreño, Ignacio Ardaiz, Leyre Ruete, Francisco Muñoz, Ignacio Raul Matías, Francisco Javier Arregui
1Public University of Navarra (UPNA), Spain; 2CSIC/GN, Spain

A3P-K2
LOW DRIFT AND HIGH RESOLUTION MINIATURE OPTICAL FIBER COMBINED PRESSURE- AND TEMPERATURE SENSOR FOR CARDIO-VASCULAR AND OTHER MEDICAL APPLICATIONS
Sven Poeggel, Daniele Tosi, Gabriel Leen, Elfed Lewis
University of Limerick, Ireland

A3P-K3
PALMTOP WAVEGUIDE-MODE SENSOR: COMPARISON OF SENSITIVITY AND SUBTYPING OF INFLUENZA VIRUSES WITH SPR, ELISA AND IMMUNOCROMATOGRAPHY
Koichi Awazu, Makoto Fujimaki, Subash C.B. Gopinath
National Institute of Advanced Industrial Science and Technology (NIST), Japan

A3P-K4
MEASUREMENT OF PROJECTILE ATTITUDE ANGLES USING A LASER SCANNING SYSTEM
Harbans Dhadwal, Jahangir Rastegar, Daichi Horimai, Neha Aggarwal
Omnitek Partners, LLC, United States
A3P-K5
IDENTIFICATION OF ADULTERATED VEGETABLE COOKING OILS USING FLUORESCENCE QUENCHING METHOD WITH AQUEOUS CTAB-COATED CdSe/ZnS QUANTUM DOTS AS PROBES
Lizhou Xu1, Xiaohong Xu3, Hua Xiong3, Lingxin Chen1, Yanbin Li1,2,4
1Chinese Academy of Sciences, China; 2Nanchang University, China; 3ZheJiang University, China; 4University of Arkansas, China

A3P-K6
HUMAN AND VEHICLE CLASSIFICATION USING A PYROELECTRIC INFRARED DETECTOR
Dongfeng Xie, Baoqing Li, Qianwei Zhou, Enliang Song, Xiaobing Yuan
Shanghai Institute of Microsystem and Information Technology, China

A3P-K7
RAPID DETECTION OF ACRYLAMIDE IN FOOD USING A FLUORESCENT SENSING METHOD BASED ON FUNCTIONAL CdSe/ZnS QUANTUM DOTS
Qinqin Hu1, Xiaohong Xu1, Zhanming Li1, Ying Zhang1, Jianping Wang1, Yanbin Li1,2
1Zhejiang University, China; 2University of Arkansas, United States

A3P-K8
DETECTION OF HOGWASH OIL IN CHINESE SOYBEAN OILS USING DUAL-BAND ABSORPTION MEASUREMENTS
Anna Grazia Mignani1, Leonardo Ciaccheri1, Andrea Azelio Mencaglia1, Jian Xing2, Xing-Hua Yang2, Weimin Sun2, Libo Yuan2
1CNR Istituto di Fisica Applicata "Nello Carrara", Italy; 2Harbin Engineering University, China

A3P-K9
ADVANCED PLANAR-OPTICAL SPR BASED BIOSENSOR USING MAGNETIC-DIELECTRIC CORE-SHELL-PARTICLES AS MOBILE SUBSTRATE
Toni Haugwitz, Niels Neumann, Tobias Schuster, Dirk Plettemeier
Technische Universität Dresden, Germany

A3P-K10
NOVEL FIBER-OPTIC PROBE BASED ON SINGLE-MULTI-MODE FIBER COUPLER FOR FLUORESCENCE DETECTION
Feng Long1, Anna Zhu2, Hanchang Shi2
1Renmin University of China, China; 2Tsinghua University, China

A3P-K11
DISPOSABLE AND MINIMAL INVASIVE OPTICAL FIBER SENSORS FOR THE MEASUREMENT OF PH AND DISSOLVED OXYGEN
N. Deepa, U.V. Dharani Kumar, A. Balaji Ganesh
Velammal Engineering College, India

A3P-K12
SELECTIVITY AND REUSABILITY STUDY OF FUNCTIONALIZED ALD TiO2 EVANESCENT WAVE SENSORS
Agung Purniawan, Paddy French, Marinka Almering, Gregory Pandraud, Pasqualina M. Sarro
Delft University of Technology, Netherlands
A3P-L1
A LOW-POWER NEUROMORPHIC CMOS SENSOR CIRCUIT FOR THE IMPLANTED BIOMOLECULAR DETECTIONS
Yang-Guo Li, Mohammad Haider
University of Alabama at Birmingham, United States

A3P-L2
CONTACT SENSING IN A BIO-INSPIRED WHISKER DRIVEN BY ELECTROACTIVE POLYMER ARTIFICIAL MUSCLES
Tareq Assaf, Jonathan Rossiter, Martin Pearson
University of Bristol and University of West of England, United Kingdom

A3P-L3
INTEGRATED ELECTROCHEMICAL SENSOR BASED ON ELECTROWETTING-ON-DIELECTRIC MICROFLUIDIC CHIP
Jianfeng Chen, Yuhua Yu, Jia Zhou
Fudan University, China

A3P-L4
A NOVEL APPROACH FOR DROPLET POSITION SENSING IN ELECTROWETTING DEVICES
Shiraz Sohail, Karabi Biswas
Indian Institute of Technology, India

A3P-L5
TEST AND EVALUATION OF A SILICON RESONANT ACCELEROMETER IMPLEMENTED IN SOI TECHNOLOGY
Guo-ming Xia, An-ping Qiu, Qin Shi, Yan Su
Nanjing University of Science and Technology, China

A3P-L6
DEVELOPMENT OF A TRI-AXIS VORTEX CONVECTIVE GYROSCOPE WITH SUSPENDED SILICON THERMIOTORS
Honglong Chang, Pingwei Zhou, Xianghui Gong, Jianbing Xie, Weizheng Yuan
Northwestern Polytechnical University, China

A3P-L7
NANO-PRECISION FORCE AND DISPLACEMENT MEASUREMENTS USING MEMS RESONANT STRUCTURES
Emad Mehdizadeh, Xiaobo Guo, Siavash Pourkamali, Arash Hajjam, Amir Rahafrooz
1University of Denver, United States; 2University of Texas at Dallas, United States

A3P-L8
QUANTUM DOTS/POLYMER COMPOSITE SYSTEM FOR TURN-ON FLUORESCENT DETECTION OF PEROXIDE HYDROGEN
Defeng Zhu, Kangyi Hua, Qingguo He, Jiangong Cheng, Huimin Cao
Chinese Academy of Sciences, China
A3P-L9
SHAPE COMBS AND PARAMETRIC AMPLIFICATION IN INERTIAL MEMS SENSORS
Mrigank Sharma, Elie Hanna Sarraf, Edmond Cretu
University of British Columbia, Canada

A3P-L10
A TUNABLE HIGH PERFORMANCE MICROWAVE EQUALIZER BASED ON RF MEMS SWITCHES
Lei Han, Wen Jiang, Yan-Qing Zhu, Ming-Xia Jiang
Southeast University, China

A3P-L11
A ROBUST AND RELIABLE RF-MEMS SWITCH FABRICATED THANKS TO AN ORIGINAL DIELECTRIC FREE DESIGN AND AN INNOVATIVE PROCESS FLOW
Frederic Souchon¹, Bruno Reig¹, Christel Dieppedale¹, Henri Sibuet¹, Benjamin Blampey², Jean-Marc Duchamp²
¹CEA-LETI, MINATEC Campus, France; ²Grenoble INP, MINATEC Campus, France

A3P-L12
OPEN CAVITY SENSORS FOR ATTITUDE CONTROL USING A SCANNING REFERENCE SOURCE
Harbans Dhadwal, Jahangir Rastegar
Omnitek Partners, LLC, United States

A3P-L13
MULTILAYER SAW DEVICE FOR FLOW RATE SENSING IN A MICROFLUIDIC CHANNEL
Bui Thu Hang, Chu Duc Trinh
Vietnam National University, Vietnam

A3P-L14
3D PRINTED CAPACITIVE SENSORS
Corey Shemelya, Fernando Cedillos, Efrain Aguilera, Elaine Maestas, Jorge Ramos, David Espalin, Dan Muse, Ryan Wicker, Eric Macdonald
University of Texas at El Paso, United States

A3P-L15
A NEW CIRCUITUAL SOLUTION FOR POWER HARVESTING FROM RANDOM AND LOW-AMPLITUDE VOLTAGES BY USING BISTABLE MECHANICAL SWITCH
Fabio Giusa, Carlo Trigona, Bruno Andò, Salvatore Baglio
Università degli Studi di Catania, Italy

A3P-L16
NOVEL SWITCHED CAPACITOR (SC) APPROACH BASED ON THE BISTABLE MECHANICAL SWITCHES
Alessio Noto, Carlo Trigona, Bruno Andò, Salvatore Baglio
Università degli Studi di Catania, Italy
A3P-L17
A 0.85%-PRECISION, 6-DECADE-RANGE, I2C -PROGRAMMABLE FRONT-END ASIC FOR RESISTIVE GAS-SENSOR ARRAYS WITH 20-INPUT ANALOG MUX, DIGITAL OUTPUT, AND 1.5°C-ACCURACY DYNAMIC TEMPERATURE SYNTHESIS
Fabrizio Conso², Marco Grassi¹, Claudio De Berti¹, Piero Malcovati², Andrea Baschirotto¹
¹University of Milano - Bicocca, Italy; ²University of Pavia, Italy

A3P-L18
ELECTRICAL CHARACTERIZATION OF 26 X 26 GROUND REACTION SENSOR ARRAY INTERFACED WITH TWO PARALLEL ELECTRONIC DETECTION CHANNELS
Qingbo Guo, Rajesh Surapaneni, Yu-Pin Hsu, Carlos Mastrangelo, Darrin Young
University of Utah, United States

A3P-L19
A NOVEL SELF-CHARGING CAPACITIVE DETECTION SCHEME FOR MEMS SENSORS WITH IMPROVED TEMPERATURE ROBUSTNESS
Dingbang Xiao, Xinghua Wang, Zhihua Chen, Xuezhong Wu, Zhanqiang Hou
National University of Defense Technology, China

A3P-L20
TOWARDS A FULLY-INTEGRATED CMOS MICROCALORIMETER WITH ON-CHIP QUASI-DIGITAL OUTPUT SIGNAL
Francisco Muñoz-Contreras², Jaume Verd², Jaume Segura², Arantxa Uranga¹, Martí Riverola¹, Núria Barniol¹
¹Universitat Autònoma de Barcelona, Spain; ²Universitat de les Illes Balears, Spain

A3P-L21
CAPACITIVE CONTROL OF AN ISFET USING DIELECTRIC COATED ELECTRODES
Philip Gordon, Krishna Jayant, Joshua Phelps, Edwin Kan
Cornell University, United States

A3P-L22
A CO-PLANAR, NEAR FIELD COMMUNICATION TELEMETRY LINK FOR A FULLY-IMPLANTABLE GLUCOSE SENSOR USING HIGH PERMEABILITY FERRITES
Szymon Tankiewicz, Joshua Schaefer, Andrew Dehennis
Senseonics, Incorporated, United States

A3P-L23
MINIATURIZED LOW COST WIRELESS DATA LOGGER FOR VIBRATION RECORDING OF PHYSIOLOGICAL ACTIVITIES
Issa Jaafar, Zachary Czamecki
Assiniboine Community College, Canada
A3P-L24
NONINVASIVE CHARACTERIZATION OF GLUCOSE AQUEOUS SOLUTIONS BASED ON CONTINUOUS-WAVE PHOTOACOUSTIC TECHNIQUES: A PHANTOM-BASED APPROACH
Serge Camou, D. Stevens, Y. Higuchi, H. Koizumi
NTT Corp., Japan

A3P-L25
NONLINEAR MECHANICAL SENSITIVITY OF UNSYMMETRICALLY LAYERED AND PRE-STRESSED PIEZOELECTRIC PLATE IN LARGE DEFLECTION DUE TO LATERAL LOAD
Chun-Fu Chen, I-Wei Li
Chung-Hua University, Taiwan

2:15 PM - 3:45 PM
A3P-M: OTHER SENSORS TOPICS I
Poster Area - Baltimore AB
Session Chairs: Christopher Salthouse (University of Massachusetts, Amherst, USA), Kenichi Takahata (University of British Columbia, Canada)

A3P-M1
DESIGN OF A DUAL-MODE 1.8 V 62 UW CMOS SENSOR INTERFACE FOR INKJET-PRINTED SENSOR
Shenjie Wang, Francisco Molina-Lopez, Kerem Kapucu, Danick Briand, Catherine Dehollain
École Polytechnique Fédérale de Lausanne, Switzerland

A3P-M2
BIO-MIMETIC STRATEGIES FOR TACTILE SENSING
Wang Wei Lee, John-John Cabibihan, Nitish Thakor
National University of Singapore, Singapore

A3P-M3
SMART IMAGE SENSING SYSTEM
Jie Yang, Cong Shi, Zhongxiang Cao, Ye Han, Liyuan Liu, Nanjian Wu
Chinese Academy of Sciences, China

A3P-M4
A READOUT CIRCUIT FOR WIRELESS PASSIVE RESONANT-CIRCUIT SENSORS
Kaikai Bao, Deyong Chen, Qiang Shi, Jian Chen, Junbo Wang
Chinese Academy of Sciences, China

A3P-M5
IMPROVING ENERGY EFFICIENCY IN SENSING SUBSYSTEMS VIA NEAR-THRESHOLD COMPUTING AND DEVICE AGING
James Bradley Wendt, Miodrag Potkonjak
University of California, Los Angeles, United States

A3P-M6
DIAGNOSIS SENSOR FUSION FOR WIRE FAULT LOCATION IN CAN BUS SYSTEMS
Wafa Ben Hassen1, Fabrice Auzanneau1, François Pérès2, Ayeley Tchangani2
1CEA- LIST, France; 2Université de Toulouse, France
A3P-M7
SIMULATION OF THE BOSCH PROCESS WITH THE NARROW BAND LEVEL SET METHOD
Bei Chen, Zai-Fa Zhou, Xiaqian Li, Qing-An Huang
Southeast University, China

A3P-M8
ERROR MODEL FOR A SENSOR INTERFACE SYSTEM BASED ON THE 1ST ORDER DELTA-SIGMA MODULATOR DUE TO THE NONLINEARITY OF THE SENSOR
Tommy Halim, Karsten Leitis
Technische Hochschule Mittelhessen, Germany

A3P-M9
MILLIMETER-WAVE INTERFEROMETRIC IMAGING SENSORS
Jeffrey Nanzer
Johns Hopkins University, United States

A3P-M10
INTEGRATED SENSOR FOR SINGLE-PHOTON READOUT OF AVALANCHE DIODES IN STANDARD CMOS
Babak Nouri, Pamela Abshire
University of Maryland, United States

A3P-M11
PULSE WIDTH MODULATION CIRCUIT FOR ISFET DRIFT RESET
Sahil Shah, Jennifer Blain Christen
Arizona State University, United States

A3P-M12
A MIXED-SIGNAL LOW-COMPLEXITY CIRCUIT FOR ON-SENSOR COMPRESSION
Suvradip Ghosh², Hsuan-Tsung Wang², Walter Leon-Salas¹
¹Purdue University, United States; ²University of Missouri-Kansas City, United States

A3P-M13
CMOS POTENTIOSTAT FOR CHEMICAL SENSING APPLICATIONS
Tao Luo¹, Hongyi Wang², Hongjiang Song¹, Jennifer Blain Christen¹
¹Arizona State University, United States; ²Xi’an Jiaotong University, China

A3P-M14
A LOW-POWER, LOW-NOISE BIOINSPIRED BANDPASS BIOPOTENTIAL AMPLIFIER-FILTER BANK FOR IMPLANTABLE BIO-SENSOR
Qingyun Ma, Mohammad Haider
University of Alabama at Birmingham, United States

A3P-M15
FABRICATION OF Z-AXIS ACCELEROMETER WITH GALVANIC ETCH STOP AND ANTIFUSE ISOLATION
Xiang Jiang, Heng Yang, Yanhong Wu, Xinxin Li, Yuelin Wang
Chinese Academy of Sciences, China
A3P-M16
A TWO-DIMENSIONAL ULTRASONIC TRANSDUCER HAVING
PLANAR BACKING ARRAY ELECTRODES
Chang-Geun Ahn, Inbum Lee, Hyungwook Noh, Sooyeul Lee, Won Ick
Jang, Bong Kyu Kim
*Electronics and Telecommunications Research Institute, Korea, South*

A3P-M17
DESIGN OF CMOS CAPACITANCE TO FREQUENCY CONVERTER
FOR HIGH-TEMPERATURE MEMS SENSORS
Yucai Wang, Vamsy Chodavarapu
*McGill University, Canada*
3:45 PM - 5:00 PM  
**A4L-A: GAS SENSORS II**  
Maryland F  
**Session Chairs:** Hong Yu (Arizona State University, USA), Dae-sik Lee (ETRI, South Korea)

### 3:45 PM  
**DETECTING TRACE-LEVEL CONCENTRATIONS OF VOLATILE ORGANIC COMPOUNDS WITH METAL OXIDE GAS SENSORS**  
Marco Schüler¹, Nikolai Helwig², Andreas Schütze², Tilman Sauerwald², Gabriela Ventura¹  
¹Universidade do Porto, Portugal; ²Saarland University, Germany

### 4:00 PM  
**DESIGNING CHEMICALLY SELECTIVE MICROSENSOR ARRAYS USING IONIC LIQUID DOPED IONOMERS**  
Hwall Min, Gokhan Hatipoglu, Srinivas Tadigadapa  
Pennsylvania State University, United States

### 4:15 PM  
**CAVITY-ENHANCED MID-INFRARED ON-CHIP CHEMICAL SENSING USING HIGH-Q CHALCOGENIDE GLASS RESONATORS**  
Hongtao Lin², Yesh Chillakuru², Kati McLaughlin², Lan Li², Yi Zou², Fei Deng², Chaoying Ni², Sylvain Danto¹, J. David Musgraves³, Kathleen Richardson¹, Juejun Hu²  
¹University of Central Florida, United States; ²University of Delaware, United States; ³IRradiance Glass Inc, United States

### 4:30 PM  
**DETECTING VOLATILE ORGANIC COMPOUNDS IN THE PPB RANGE WITH PLATINUM-GATE SiC-FIELD EFFECT TRANSISTORS**  
Christian Bur¹, Mike Andersson¹, Anita Lloyd Spetz¹, Nikolai Helwig², Andreas Schütze²  
¹Linköping University, Sweden; ²Saarland University, Germany

### 4:45 PM  
**LOVE WAVE SENSOR BASED ON THIN FILM MOLEcularLY IMPRINTED POLYMER : MIP LAYER MORPHOLOGY AND NUCLEOSIDES ANALOGS DETECTION**  
Nima Omar-Aouled¹, Hamida Hallil¹, Bernard Plano¹, Dominique Rebière¹, Corinne Dejous¹, Raphael Delépée², Luigi Agrofoglio²  
¹Université Bordeaux, France; ²University of Orléans, France

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3:45 PM - 5:00 PM  
**A4L-B: BIOMOLECULAR**  
Maryland E  
**Session Chairs:** Xinxin Li (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China), Alper Bozkurt (North Carolina State University, USA)

### 3:45 PM  
**A MICROFLUIDIC NANOstructured FLUORESCENCE SENSOR FOR BIOMOLECULAR BINDING DETECTION**  
Xiang Li, Haocheng Yin, Long Que  
Louisiana Tech University, United States
4:00 PM
A MICROFLUIDIC SENSOR OF BOTULINUM NEUROTOXIN TYPE A UTILIZING SNAP-25 INCORPORATED RESPONSIVE HYDROGEL
Xiudong Wu, Chensha Li, Xuezhen Huang, Hongrui Jiang, Guangyun Lin, William Tepp, Eric A. Johnson
University of Wisconsin-Madison, United States

4:15 PM
FLUORESCENT IMMUNOASSAY SYSTEM
Xiaoqun Zhou¹, Weihua Hu², Changming Li²
¹Institute for Infocomm Research, Singapore; ²Nanyang Technological University, Singapore

4:30 PM
DIRECT VISUALIZATION OF ELECTROGENIC BACTERIA IN A MICROFABRICATED MICROBIAL FUEL CELL
Chunhui Dai, Simeng Chen, Arwa Fraiwan, Seokheun Choi
State University of New York - Binghamton, United States

4:45 PM
AN AUTOMATED MINIATURIZED CREATININE SENSING SYSTEM
Son Lai, David Gaddes, Srinivas Tadigadapa
Pennsylvania State University, United States

3:45 PM - 5:00 PM
A4L-C: MAGNETIC SENSORS
Maryland A
Session Chairs: Oliver Brand (Georgia Institute of Technology USA), Jürgen Kosel (King Abudllah Univ. of Science & Technology, Saudi Arabia)

3:45 PM
FULLY SYMMETRIC VERTICAL HALL DEVICES IN CMOS TECHNOLOGY
Christian Sander², Roiy Raz², Patrick Ruther², Oliver Paul², Timo Kaufmann¹, Martin Cornils¹, Maria-Cristina Vecchi¹
¹Micronas GmbH, Germany; ²IMTEK, Germany

4:00 PM
DUAL-CORE FLUXGATE GRADIOMETER WITH GRADIENT FEEDBACK
Michal Janosek², Antonin Platil², Jan Vyhnanek², Jan Brinek¹
¹Czech Space Research Centre Ltd., Czech Rep.; ²Czech Technical University in Prague, Czech Rep.

4:15 PM
MAGNETIC FLUX MODULATION WITH A PIEZOELECTRIC SILICON BRIDGE FOR 1/F NOISE REDUCTION IN MAGNETORESISTIVE SENSORS
Jiafei Hu, Wugang Tian, Hongfeng Pang, Jianqiang Zhao, Wenyin Li, Dixiang Chen, Mengchun Pan
National University of Defense Technology, China

4:30 PM
AMR PROXIMITY SENSOR WITH INHERENT DEMODULATION
Pavel Ripka, Jan Vyhnanek, Michal Janosek, Jan Vcelak
Czech Technical University, Czech Republic
4:45 PM
OPTIMIZATION OF LORENTZ-FORCE MEMS MAGNETOMETERS USING RAREFIED-GAS-THEORY
Attilio Frangi¹, Biagio De Masi¹, Giacomo Langfelder¹, Dario Paci²
¹Politecnico di Milano, Italy; ²ST Microelectronics, Italy

3:45 PM - 5:00 PM
A4L-D: OPTICAL SENSORS FOR CHEMICAL ANALYSES
Maryland D
Session Chairs: Ignacio R. Matias (Universidad Publica de Navarra, Spain), Anna G. Mignani (CNR IFAC, Italy)

3:45 PM
HIGH SENSITIVITY OPTICAL FIBER PH SENSOR USING POLY(ACRYLIC ACID) NANOFIBERS
Jesus Corres², Francisco Javier Arregui², Ignacio Raul Matias², Yoany Rodriguez¹
¹University of Pinar del Rio, Cuba; ²Public University of Navarra, Spain

4:00 PM
GRAVURE PRINTED PAPER BASED SUBSTRATE FOR DETECTION OF HEAVY METALS USING SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS)
Ali Eshkeiti, Morteza Rezaei, Binu Baby Narakathu, Sai Guruva Reddy Avuthu, Sepehr Emamian, Massood Zandi Atashbar
Western Michigan University, United States

4:15 PM
RAMAN PROBE FOR THE SIMULTANEOUS MEASUREMENT OF ANION CONCENTRATION IN MIXTURES OF SALT SOLUTIONS
Thomas H. Kauffmann, Kawther Ben Mabrouk, Marc D. Fontana
University of Lorraine and Supélec, France

4:30 PM
OPTIMIZING SENSOR DESIGN FOR POLYMER FIBRE OPTIC OXYGEN SENSORS
Rongsheng Chen², Hanne McPeak², Federico Formenti², Clive Hahn², Andrew Farmery², Andrew Obeid¹
¹Oxford Optronix Ltd, United Kingdom; ²University of Oxford, United Kingdom

4:45 PM
MICROFLUIDIC OPTOELECTRONIC SENSOR ARRAY FOR DETECTION OF DISSOLVED CO2 BASED ON HALOCROMIC DYE-DOPED POLYMERIC MICROBEADS
Yael Zilberman, Shideh Kabiri Ameri, Sameer Sonkusale
Tufts University, United States

3:45 PM - 5:00 PM
A4L-E: ACTUATOR SYSTEMS
Watertable ABC
Session Chairs: Gijs Krijnen (University of Twente, MESA+ Research Institute, The Netherlands), Oliver Paul (University of Freiburg - IMTEK, Germany)

3:45 PM
INVITED TALK: CMUT BASED CHEM/BIO SENSORS
Pierre Khuri-Yakub
Stanford University, United States
4:15 PM
MAGNETIC CIRCUITS BASED ON POLYMER COMPOSITES FOR CONTROLLED ACTUATION OF A FERROMAGNETIC SPHERE AT A MICROFLUIDIC JUNCTION
Wolfgang Hilber, Stefan Clara, Bernhard Jakoby
Johannes Kepler University Linz, Austria

4:30 PM
SMART PNEUMATIC ARTIFICIAL MUSCLE ACTUATOR WITH EMBEDDED MICROFLUIDIC SENSING
Yong-Lae Park¹, Robert Wood²
¹Carnegie Mellon University, United States; ²Harvard University, United States

4:45 PM
A NOVEL LOW-VOLTAGE LARGE-DISPLACEMENT BULK SILICON COMB-DRIVE ACTUATOR BASED ON POST-CMOS PROCESS
Chun-Hua Cai, Ming Qin
Southeast University, China

3:45 PM - 5:00 PM
A4L-F: MATERIALS & FABRICATION I
Homeland
Session Chairs: Eric Johnson (Clemson University, USA), Long Que (Louisiana Tech University, USA)

3:45 PM
INVITED TALK: MICROSYSTEMS FOR SENSING AND CHARACTERIZATION OF BACTERIAL BIOFILMS
Reza Ghodssi, Mariana T. Meyer, Young W. Kim
University of Maryland, United States

4:15 PM
MICROFABRICATION OF CAPACITIVE PRESSURE SENSORS USING FERROFLUID SACRIFICIAL LAYERS
Babak Assadsangabi, Xing Chen, Daniel Brox, Kenichi Takahata
University of British Columbia, Canada

4:30 PM
APPLICATION OF AEROSOL JET TECHNOLOGY IN THROUGH-VIA METAL INTERCONNECTION FOR MEMS WAFER-LEVEL PACKAGING
Zhan Zhan, Mengyue Chen, Lingke Yu, Xiaochun Qiu, Jin Wei, Xiaoping Wang, Daoheng Sun, Lingyun Wang
Xiamen University, China

4:45 PM
HOMOGENEOUS AND SHARP SI NANOPROBE ARRAY FABRICATED ON (111) SILICON WAFER
Xiao Zhang, Xiao Yu, Yi Wang, Tie Li, Yuelin Wang
Chinese Academy of Sciences, China
TUESDAY, NOVEMBER 5TH

8:00 AM - 9:00 AM
Plenary – KEYNOTE – PROFESSOR ROBERT PUERS: IMPLANTABLE CHIPS & SENSORS: QUO VADIS?
Maryland BC
Session Chair: Robert Trew (North Carolina State University, USA)

8:00 AM
IMPLANTABLE CHIPS AND SENSORS: QUO VADIS?
Robert Puers
KULeuven, ESAT-MICAS, Belgium

9:00 AM - 10:15 AM
B1L-A: HUMIDITY SENSORS
Maryland F
Session Chair: Zheyao Wang (Tsinghua University, China)

9:00 AM
ELECTRICAL AND HUMIDITY-SENSING CHARACTERIZATION OF INKJET-PRINTED MULTI-WALLED CARBON NANOTUBES FOR SMART PACKAGING
Yi Feng\textsuperscript{1}, Li Xie\textsuperscript{1}, Matti Mäntysalo\textsuperscript{2}, Qiang Chen\textsuperscript{1}, Li-Rong Zheng\textsuperscript{1,3}
\textsuperscript{1}Royal Institute of Technology, Sweden; \textsuperscript{2}Tampere University of Technology, Finland; \textsuperscript{3}State Key Lab of ASICs and Systems, ICT School, China

9:15 AM
INKJET PRINTED HUMIDITY THRESHOLD MONITORING SENSOR SOLUTION WITH IRREVERSIBLE RESISTANCE CHANGE FOR PASSIVE RFID APPLICATIONS
Sebastian Sauer\textsuperscript{2}, Alexander Türke\textsuperscript{2}, Andreas Weder\textsuperscript{1}, Wolf-Joachim Fischer\textsuperscript{1}
\textsuperscript{1}Fraunhofer IPMS, Germany; \textsuperscript{2}Technische Universität Dresden, Germany

9:30 AM
THE OPTIMIZED SAW HUMIDITY SENSOR WITH NANOFILMS OF GRAPHENE OXIDE
Sergey Balashov, Olga Balachova, Ana Valéria Braga, Maria Cecilia Bazetto, Aristides Pavani Filho
Center for Information Technology Renato Archer - CTI, Brazil

9:45 AM
FULLY PRINTED ORGANIC THIN FILM TRANSISTORS (OTFT) BASED FLEXIBLE HUMIDITY SENSORS
Sai Guruva Reddy Avuthu, Binu Baby Narakathu, Ali Eshkeiti, Bradley Bazuin, Margaret Joyce, Massood Zandi Atashbar
Western Michigan University, United States

10:00 AM
SENSITIVITY, SELECTIVITY AND NANO-DIMENSIONAL EFFECTS IN GOLD NANOCLUSTER VAPOR SENSORS
Arthur Snow, Mario Ancona
Naval Research Laboratory, United States
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
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<tr>
<td>9:00 AM</td>
<td>B1L-B</td>
<td>CHANNEL LENGTH DEPENDENT SENSOR RESPONSE OF SCHOTTKY-BARRIER FET PH SENSORS</td>
<td>Sebastian Pregl, Felix Zörgiebel, Larysa Baraban, Gianaurelio Cuniberti, Thomas Mikolajick, Claudia Richter, Walter Weber</td>
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<tr>
<td>9:00 AM</td>
<td></td>
<td>THE DNA TRANSISTOR INTERFACE: THE INTERPLAY BETWEEN PH, ELECTRIC FIELD AND MEMBRANE SCREENING DICTATES SENSITIVITY</td>
<td>Krishna Jayant, Kshitij Auluck, Edwin Kan</td>
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<td>9:30 AM</td>
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<td>A MICRO-FABRICATED NON-ENZYMATIC URINE GLUCOSE SENSOR USING NAFION COATED NANOPOROUS PT COMPOSITE ELECTRODES</td>
<td>Su Jin Lee, Yijae Lee, Jae Young Park</td>
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<tr>
<td>9:45 AM</td>
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<td>MAMMARY CANCER CELL MANIPULATION WITH EMBEDDED PASSIVATED-ELECTRODE INSULATOR-BASED DIELCTROPHORESIS (EPIDEP)</td>
<td>Tyler Shake, Vaishnavi Srinivasaraghavan, Phillip Zellner, Masoud Agah</td>
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<tr>
<td>10:00 AM</td>
<td></td>
<td>THREE STAGE SAMPLE PREPARATION FOR PURIFICATION OF PROTEINS FROM COMPLEX BIOLOGICAL SAMPLES</td>
<td>Mehdi Javanmard, Sam Emaminejad, Ron Davis, Chaitanya Gupta, Roger Howe</td>
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<tr>
<td>9:00 AM</td>
<td>B1L-C</td>
<td>A THREE PZT SETUP FOR DETERMINING PHYSICAL LIQUID PROPERTIES UTILIZING ACOUSTIC PRESSURE WAVES</td>
<td>Hannes Antlinger, Stefan Clara, Bernhard Jakoby, Roman Beigelbeck, Samir Cerimovic, Franz Keplinger</td>
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<tr>
<td>9:00 AM</td>
<td></td>
<td>A THREE PZT SETUP FOR DETERMINING PHYSICAL LIQUID PROPERTIES UTILIZING ACOUSTIC PRESSURE WAVES</td>
<td>Hannes Antlinger, Stefan Clara, Bernhard Jakoby, Roman Beigelbeck, Samir Cerimovic, Franz Keplinger</td>
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</tbody>
</table>

**B1L-B: INTERFACE**

Session Chairs: Tony Jun Huang (Pennsylvania State University, USA), Joannis Raptis (NCSR Demokritos, Greece)

**B1L-C: ACOUSTIC SENSORS**

Session Chairs: Geoffrey Cranch (Naval Research Laboratory, USA), Gijs Krijnen (University of Twente, MESA+ Research Institute, The Netherlands)
9:15 AM
A TWO-STAGE AEROSOL IMPACTOR WITH EMBEDDED MEMS RESONANT MASS BALANCES FOR PARTICULATE SIZE SEGREGATION AND MASS CONCENTRATION MONITORING
Emad Mehdizadeh$^1$, Varun Kumar$^1$, Siavash Pourkamali$^2$, Jonathan Gonzales$^1$, Reza Abdolvand$^1$
$^1$Oklahoma State University, United States; $^2$University of Texas at Dallas, United States

9:30 AM
A CROSSED-WIRE 2-DIMENSIONAL ACOUSTIC PARTICLE VELOCITY SENSOR
Olti Pjetri, Remco J Wiegerink, Theo S. J Lammerink, Gijs J.M Krijnen
University of Twente, Netherlands

9:45 AM
DUAL HIGH-FREQUENCY SURFACE ACOUSTIC WAVE RESONATOR FOR ULTRAFINE PARTICLE SENSING
Sanju Thomas, Zoltán Rácz, Marina Cole, Julian Gardner
University of Warwick, United Kingdom

10:00 AM
MINIATURIZATION OF ACOUSTIC VECTOR SENSORS ENABLED BY VISCOS FLUIDS: TOWARDS FIBER LASER HAIR SENSORS
Janet Lou$^1$, Geoffrey Cranch$^2$, Gary Miller$^2$, Clay Kirkendall$^2$
$^1$Sotera Defense Solutions, Inc., United States; $^2$US Naval Research Laboratory, United States

9:00 AM - 10:15 AM
B1L-D: ELECTROMAGNETIC SENSORS & PHENOMENA
Maryland D
Session Chair: Harrie Tilmans (Imec, Belgium)

9:00 AM
INVITED TALK: MULTI-SENSOR DATA INTEGRATION FOR PERSONAL NAVIGATION
Tamal Mukherjee
Carnegie Mellon University, United States

9:30 AM
NUMERICAL MODELING OF THE ELECTROMAGNETIC COUPLING EFFECTS FOR PHASE ERROR CORRECTION IN EIT BOREHOLE MEASUREMENT
Yulong Zhao$^1$, Egon Zimmermann$^1$, Sander Huisman$^1$, Andrea Treichel$^1$, Bernd Wolters$^1$, Stefan van Waasen$^1$, Andreas Kemna$^2$
$^1$Forschungszentrum Jülich GmbH, Germany; $^2$University of Bonn, Germany

9:45 AM
ASSESSMENT OF THE SPINNING-CURRENT EFFICIENCY IN CANCELLING THE 1/F NOISE OF VERTICAL HALL DEVICES THROUGH ACCURATE FEM MODELING
Morgan Madec, Laurent Osberger, Luc Hébrard
University of Strasbourg - CNRS, France
10:00 AM
THE MULTIPOLAR RESONANCE PROBE: EVOLUTION OF A PLASMA SENSOR
Christian Schulz, Ilona Rolfes, Tim Stymoll, Peter Awakowicz, Jens Oberrath, Thomas Mussenbrock, Ralf Peter Brinkmann, Robert Storch, Thomas Musch
Ruhr-University Bochum, Germany

9:00 AM - 10:15 AM
B1L-E: WIRELESS SENSOR NETWORKS FOR HEALTH I
Watertable ABC
Session Chair: Tracie Severson (US Naval Academy, USA)

9:00 AM
INVITED TALK: IN-SITU SOIL MOISTURE SENSING: FROM PHYSICAL MODELS TO OPTIMAL CONTROL TO SYSTEM DEPLOYMENT
Mingyan Liu
University of Michigan, United States

9:30 AM
WIDE AND HIGH ACCESSIBLE MOBILE HEALTHCARE SYSTEM IN IP-BASED WIRELESS SENSOR NETWORKS
Sang-Joong Jung, Wan-Young Chung
Pukyong National University, Korea, South

9:45 AM
RECONFIGURABLE DIFFERENTIAL ACCELEROMETER PLATFORM FOR INERTIAL BODY SENSOR NETWORKS
Jiaqi Gong, John Lach
University of Virginia, United States

10:00 AM
A NON-CONTACT WEARABLE WIRELESS BODY SENSOR NETWORK FOR MULTIPLE VITAL SIGNAL DETECTION
Ye Sun, Junliang Tao, Guangxi Wu, Xiong Yu
Case Western Reserve University, United States

9:00 AM - 10:15 AM
B1L-F: INDUSTRIAL & ENVIRONMENTAL Homeland
Session Chair: Thilo Sauter (Danube University Krems, Austria)

9:00 AM
A PORTABLE MULTI-MEGABIT OPTICAL FIBRE SONAR SENSOR SYSTEM
Ching Man, Brian Moss, Elfed Lewis, Rodney Coates
1 Analog Devices, Ireland; 2 Seiche Ltd, United Kingdom; 3 University of Limerick, Ireland

9:15 AM
LARGE ANIMAL DETECTION AND CONTINUOUS TRAFFIC MONITORING ON HIGHWAYS
Abir Mukherjee, Svetlana Stolpner, Xia Liu, Ulisi Vrenozaj, Chuhong Fei, Abhijit Sinha
A.U.G. Signals Ltd., Canada
9:30 AM
SYSTEM FOR OXYGEN MEASUREMENTS IN A FISH FARM
Ruby Ghosh, Reza Loloee
Michigan State University, United States

9:45 AM
MEMS HARSH ENVIRONMENT SENSOR ARRAY-ENABLED HOT SPRING MAPPING
Jonathon Oiler, Everett Shock, Hilairy Hartnett, Hongyu Yu
Arizona State University, United States

10:00 AM
A MEASURING METHOD FOR THE MASS FLOW DETERMINATION IN A PNEUMATIC CONVEYING SYSTEM
Christoph Baer\(^2\), Philipp Mertmann\(^2\), Thomas Musch\(^2\), Timo Jaeschke\(^2\), Nils Pohl\(^1\)
\(^1\)Fraunhofer FHR, Germany; \(^2\)Ruhr-University Bochum, Germany

10:45 AM - 12:00 PM
B2L-A: LIQUID BASED SENSORS
Maryland F
Session Chair: James Stephen (Cranfield University, UK)

10:45 AM
MEMS BASED MICROSTRUCTURE ARRAY DESIGN AND ITS QUANTITATIVE ANALYSIS OF MICROPRECONCENTRATOR FOR CANCER BIOMARKER DIAGNOSIS
Naoki Kakita\(^2\), Hidetoshi Miyashita\(^2\), Satoru Kishida\(^2\), Jeong-O Lee\(^1\), Sang-Seok Lee\(^2\)
\(^1\)Korea Research Institute of Chemical Engineering, Korea, South; \(^2\)Tottori University, Japan

11:00 AM
CANTILEVER-BASED RESONANT GAS SENSORS WITH INTEGRATED RECESSES FOR LOCALIZED SENSING LAYER DEPOSITION
Christopher Carron\(^1\), Patrick Getz\(^1\), Jin-Jyh Su\(^1\), David Gottfried\(^1\), Oliver Brand\(^1\), Fabien Josse\(^2\), Stephen Heinrich\(^2\)
\(^1\)Georgia Institute of Technology, United States; \(^2\)Marquette University, United States

11:15 AM
TUNGSTEN OXIDE NANOWIRE SENSORS GROWN BY COLD WALL REACTOR AEROSOL ASSISTED CHEMICAL VAPOUR DEPOSITION
Fatima-Ezahra Annanouch\(^2\), Eduard Llobet\(^2\), Russell Binions\(^1\)
\(^1\)Queen Mary, University of London, United Kingdom; \(^2\)Universitat Rovira I Virgili, Spain

11:30 AM
OPTO-ELECTROCHEMICAL BASED DUAL DETECTION OF HEAVY METAL COMPOUNDS USING A NOVEL FLOW CELL
Binu Baby Narakathu, Sai Guruva Reddy Avuthu, Ali Eshkeiti, Bradley Bazuin, Massood Zandi Atashbar
Western Michigan University, United States
11:45 AM
TIN DIOXIDE NANO-WIRE DEVICE FOR SENSING KINETICS OF ACETONE AND ETHANOL TOWARDS DIABETES MONITORING
Bonex Mwakikunga1,4, Suprakas Ray1, Malose Mokwena2, John Dewar2, Irina Geibelhaus3, Trilok Singh3, Thomas Fischer3, Sanjay Mathur3
1DST/CSIR National Centre for Nano-Structured Materials, South Africa; 2University of South Africa, South Africa; 3University of Cologne, Germany; 4University of Malawi – The Polytechnic

10:45 AM - 12:00 PM
B2L-B: MECHANICAL
Maryland E
Session Chairs: Dae-sik Lee (ETRI, South Korea), Geunbae Lim (Pohang University of Science & Technology, South Korea)

10:45 AM
OSCILLATION-BASED TEST APPLIED TO CELL CULTURE MONITORING
Gloria Huertas1, Andrés Maldonado1, Alberto Yúfera1,2, Adoración Rueda1, José Luis Huertas1
1Instituto de Microelectronica de Sevilla, CSIC, Spain; 2Universidad de Sevilla

11:00 AM
DETECTION OF INTERACTION BETWEEN BIOLOGICAL PROTEINS AND IMMOBILIZED LIPOSOMES BY A MICRO-CANTILEVER WITH NICR THIN FILM STRAIN GAUGE
Masayuki Sohgawa2, Takashi Fujimoto1, Keisuke Takada1, Kaoru Yamashita1, Minoru Noda1
1Kyoto Institute of Technology, Japan; 2Niigata University, Japan

11:15 AM
A NOVEL, MULTIPARAMETRIC, FLEXIBLE MICROSENSOR FOR METABOLIC MONITORING IN VIVO
Andreas Weltin, Barbara Enderle, Jochen Kieninger, Gerald Urban
University of Freiburg, IMTEK, Germany

11:30 AM
MEMS BASED BLOOD PLASMA VISCOSITY SENSOR WITHOUT ELECTRICAL CONNECTIONS
Onur Cakmak2, Erhan Ermek2, Hakan Urey2, Goksenin G. Yaralioglu3, Necmettin Kilinc1
1Gebze Institute of Technology, Turkey; 2Koc University, Turkey; 3Ozyegin University, Turkey

11:45 AM
A NEW NON-INVASIVE CUFF-LESS BLOOD PRESSURE SENSOR
Tse-Yi Tu2, Paul C.-P. Chao2, Yung-Pin Lee1
1MedSense Inc., Taiwan; 2National Chaio Tung University, Taiwan
10:45 AM - 12:00 PM
B2L-C: TACTILE SENSORS
Maryland A
Session Chairs: Rajanna Konandur (Indian Institute of Science, India), Siavash Pourkamali (University of Texas at Dallas, USA)

10:45 AM
INVITED TALK: CMOS TACTILE SENSOR SYSTEMS
Patrick Ruther\textsuperscript{1}, Felix Becker\textsuperscript{1}, Matthias Herrmann\textsuperscript{1}, Christian Sander\textsuperscript{1}, Falco Schmidt\textsuperscript{2}, Bernd Lapatki\textsuperscript{2}, Oliver Paul\textsuperscript{1}
\textsuperscript{1}University of Freiburg, Germany; \textsuperscript{2}University of Ulm, Germany

11:15 AM
LARGE AREA ALL-ELASTOMER CAPACITIVE TACTILE ARRAYS
Peter Block, Sarah Bergbreiter
University of Maryland, United States

11:30 AM
A VERY HIGH DENSITY FLOATING ELECTRODE FLEXIBLE SENSOR ARRAY FOR HIGH-RESOLUTION MEASUREMENTS OF CONTACT FORCES
Rajesh Surapaneni, Qingbo Guo, Darrin Young, Carlos Mastrangelo
University of Utah, United States

11:45 AM
SELF-POWERED, TACTILE PRESSURE SENSING SKIN USING CRYSTALLINE ZNO NANOROD ARRAYS FOR ROBOTIC APPLICATIONS
Bhargav Nabar, Zeynep Celik-Butler, Donald P. Butler
University of Texas at Arlington, United States

10:45 AM - 12:00 PM
B2L-D: SENSORS PHENOMENA
Maryland D
Session Chairs: Luc Hebrard (CNRS - ICube, France), Venkata Chivukula (RF Micro Devices, USA)

10:45 AM
META-MATERIALS APPROACH TO SENSITIVITY ENHANCEMENT OF MEMS BAW RESONANT SENSORS
Xavier Rottenberg\textsuperscript{2}, Roelof Jansen\textsuperscript{2}, Vladimir Cherman\textsuperscript{2}, Ann Witvrouw\textsuperscript{2}, Harrie Tilmans\textsuperscript{2}, Mohamed Zanaty\textsuperscript{3}, Ahmed Khaled\textsuperscript{2}, Mohammed Abbas\textsuperscript{1}
\textsuperscript{1}Assiut University, Egypt; \textsuperscript{2}Imec, Belgium; \textsuperscript{3}CENA, Belgium

11:00 AM
NONLINEAR ANALYSIS OF ELECTROTHERMAL POSITION SENSORS WITH CONTOURED HEATERS
Ali Bazaei, Anthony G. Fowler, S.O. Reza Moheimani
University of Newcastle, Australia

11:15 AM
OPTIMISATION OF A TOMOGRAPHY SENSOR FOR IMAGING OF TEMPERATURE IN A GAS TURBINE ENGINE
Michael Wood, Krikor Ozanyan
University of Manchester, United Kingdom
11:30 AM
PROPOSAL OF ADVANCED NONLINEAR SIGNAL MODEL TO ANALYZE PHOTOPLETHYSMOGRAM SIGNALS
Hajime Ozaki, Yasuhsa Omura
Kansai University, Japan

11:45 AM
ULTRASONIC FLOW MEASUREMENT BY TRACKING STREAMLINES IN PIPES
Manuel Haide
University of Applied Sciences, Germany

10:45 AM - 12:00 PM
B2L-E: WIRELESS SENSOR NETWORKS FOR HEALTH II
Watertable ABC
Session Chairs: Elfed Lewis (University of Limerick, Ireland), Paddy French (TU Delft, The Netherlands)

10:45 AM
DEVELOPMENT OF A POTENTIALLY IMPLANTABLE PRESSURE SENSING PLATFORM WITH RFID INTERFACE
Michele Caldara, Benedetta Nodari, Valerio Re
University of Bergamo, Italy

11:00 AM
ULTRA LOW POWER CH4 MONITORING WITH WIRELESS SENSORS
Maurizio Rossi, Davide Brunelli
University of Trento, Italy

11:15 AM
WIRELESS SENSOR NETWORK FOR STRUCTURAL HEALTH MONITORING USING SYSTEM-ON-CHIP WITH ANDROID SMARTPHONE
Won-Jae Yi, Spenser Gilliland, Jafar Saniie
Illinois Institute of Technology, United States

11:30 AM
MULTI-AGENT BASED WIRELESS PYROELECTRIC INFRAED SENSOR NETWORKS FOR MULTI-HUMAN TRACKING AND SELF-CALIBRATION
Jiang Lu, Jiaqi Gong, Qi Hao, Fei Hu
University of Alabama, United States

11:45 AM
TOWARDS THE WORLD SMALLEST WIRELESS SENSOR NODES WITH LOW POWER CONSUMPTION FOR 'GREEN' SENSOR NETWORKS
Jian Lu, Hironao Okada, Toshihiro Itoh, Ryutaro Maeda, Takeshi Harada
1National Institute of Advanced Industrial Science and Technology, Japan; 2NMEMS Technology Research Organization, Japan
10:45 AM - 12:00 PM
B2L-F: MICROSYSTEMS APPLICATIONS
Homeland
Session Chair: Alper Bozkurt (North Carolina State University, USA)

10:45 AM
MICROFLUIDIC DEVICE FOR TRIGGERED CHIP TRANSIENCE
Niladri Banerjee, Yan Xie, Hanseup Kim, Carlos Mastrangelo
University of Utah, United States

11:00 AM
MICROFABRICATED TWO-DIMENSIONAL (2D) HEXAGONAL LATTICE TRAP
Hwanjit Rattanasonti¹, Prasanna Srinivasan¹, Michael Kraft¹, Robin Sterling², Sebastian Weidt², Kimberley Lake², Simon Webster², Winfried Hensinger²
¹University of Southampton, United Kingdom; ²University of Sussex, United Kingdom

11:15 AM
DURABLE AND COST-EFFECTIVE 3-D MICROFORCE SENSOR FOR MUSICAL TUNING ENHANCED MICRO PALPATION OF BIOLOGICAL ENTITIES
Yudong Luo, Yantao Shen, Nithya Mohan
University of Nevada, Reno, United States

11:30 AM
FACTORS AFFECTING BLIND LOCALIZATION OF A GLASS MICROPETITE USING A HIGH-DENSITY MICROELECTRODE ARRAY
Marie Engelene Obien², Andreas Hierlemann¹, Urs Frey¹,²
¹ETH Zürich, Switzerland; ²RIKEN, Japan

11:45 AM
DROPLET MIXING AND LIQUID PROPERTY TRACKING USING AN ELECTRODYNAMIC PLATE RESONATOR
Erwin K. Reichel, Martin Heinisch, Bernhard Jakoby
Johannes Kepler University, Austria
TUESDAY, NOVEMBER 5TH – POSTER SESSION

2:00 PM - 3:30 PM
B3P-G: CHEMICAL & GAS SENSORS IV
Poster Area - Baltimore AB
Session Chair: Bassam Alfeeli (Kuwait Institute for Scientific Research, Kuwait)

B3P-G1
INKJET PRINTED ELECTRODES FOR DETERMINATION OF SULFUR DIOXIDE AND ASCORBIC ACID IN WINE
Marion Schneider¹, Alexander Türke¹, Wolf-Joachim Fischer¹, Paul Kilmartin²
¹Technische Universität Dresden, Germany; ²University of Auckland, New Zealand

B3P-G2
FABRICATION OF PH-SENSING IRIIDIUM OXIDE NANOTUBES ON PATTERNED ELECTRODES USING ANODIC ALUMINUM OXIDE NANOTEMPLATE
Cuong Nguyen, Indra Gurung, Hung Cao, Smitha Rao, Jung-Chih Chiao
University of Texas at Arlington, United States

B3P-G3
A NOVEL ELECTROCHEMICAL SYNTHESIS ROUTE FOR COPPER NANOWIRE FORMATION
Cindy Schmädicke¹, Markus Pötschke¹, Lars David Renner¹, Gianaurelio Cuniberti²
¹Technische Universität Dresden, Germany; ²POSTECH

B3P-G4
WIRELESS AND PORTABLE SENSOR SYSTEM TO DIFFERENTIATE MUSTS OF DIFFERENT GRAPE VARIETIES AND DEGREE OF GRAPE RIPENESS
Manuel Aleixandre¹, Enrique Montero¹, Jose Pedro Santos¹, Isabel Sayago¹, Maria Del Carmen Horrillo¹, Juan Mariano Cabellos², Teresa Arroyo²
¹ITEF-CSIC, Spain; ²IMIDRA, Spain

B3P-G5
A CMOS PLATFORM FOR THE INTEGRATION OF HETEROGENEOUS ARRAYS OF CARBON NANOTUBES AND GRAPHENE CHEMIRESISTORS
Samuel MacNaughton, Sameer Sonkusale
Tufts University, United States

B3P-G6
TEMPERATURE-CONTROLLED ELECTROCHEMICAL MICROWELL PLATFORM FOR STUDYING BIOMOLECULAR INTERACTIONS
Zuliang Shen², Herman Sintim², Steve Semancik¹
¹National Institute of Standards and Technology, United States; ²University of Maryland, United States
B3P-G7
SELF-TUNING POROUS SILICON CHEMITRANSISTOR GAS SENSORS
Giovanni M Lazzerini, Lucanos M Strambini, Giuseppe Barillaro
Università di Pisa, Italy

B3P-G8
IN-SITU GROWN CARBON NANOTUBES FOR ENHANCED CO2 DETECTION IN NON-DISPERSIVE-INFRA-RED SYSTEM
Andrea De Luca², Zoltan Rácz⁴, Matthew Cole², Zeeshan Ali¹, Florin Udrea², Julian Gardner⁴, William Milne⁵,⁶
¹Cambridge CMOS Sensors Ltd, United Kingdom; ²University of Cambridge, United Kingdom; ³Kyung Hee University, United Kingdom; ⁴University of Warwick, United Kingdom

B3P-G9
A LOW-COST, FLEXIBLE ELECTROCHEMICAL SENSOR FOR MONITORING SILVER ION CONCENTRATION IN ALGINATE WOUND DRESSINGS
Rahim Rahimi, Manuel Ochoa, Babak Ziaie
Purdue University, United States

B3P-G10
EXTENDING UPPER CUTOFF FREQUENCY OF ELECTROCHEMICAL SEISMOMETER BY USING EXTREMELY THIN SU8 INSULATING SPACERS
Wentao He, Deyong Chen, Junbo Wang, Jian Chen, Tao Deng
Chinese Academy of Sciences, China

B3P-G11
NOVOLAC-MODIFIED SELF-SENSING PIEZOELECTRIC MICROCANTILEVER GAS SENSOR
Masoud Khabiry, Nader Jalili, Srinivas Sirdhar
Northeastern University, United States

2:00 PM - 3:30 PM
B3P-H: BIOSENSORS II
Poster Area - Baltimore AB
Session Chairs: Yu-Cheng Lin (National Cheng Kung University, Taiwan), Hongrui Jiang (University of Wisconsin, USA)

B3P-H1
WATER TOXICITY DETECTION USING CELL-BASED HYBRID BIOSENSORS
Fei Liu¹, Ioana Voiculescu¹, Anis Nurashshkin Nordin², Fang Li³
¹City College of New York, United States; ²International Islamic University Malaysia, Malaysia; ³New York Institute of Technology, United States

B3P-H2
HRP BIOSENSOR BASED ON CARBONIZED MAIZE TASSEL-MWNTS MODIFIED ELECTRODE FOR THE DETECTION OF DIVALENT TRACE METAL IONS
Mambo Moyo¹, Jonathan Okonkwo², Nana Agyei¹
¹University of Limpopo, South Africa; ²Tshwane University of Technology, South Africa
B3P-H3
A CONFORMAL SENSOR FOR WIRELESS SWEAT LEVEL MONITORING
Pinghung Wei, Briana Morey, Timothy Dyson, Nick McMahon, Yung-Yu Hsu, Sasha Gazman, Lauren Klinker, Barry Ives, Kevin Dowling, Conor Rafferty
MC10 Inc., United States

B3P-H4
PRECISION TRANSDUCER FOR FLUORESCENCE-BASED IMMUNOASSAYS
Arash Ghadar, Julian Gardner, Chris Dowson
University of Warwick, United Kingdom

B3P-H5
APPLICATION OF CHEMILUMINESCENCE INVOLVING FLOW INJECTION ANALYSIS TO DETERMINATION OF GLUCOSE, GLUTAMIC ACID AND LACTIC ACID FOR FOOD ANALYSIS
Xin Wang, Naoko Ishii, Ming Ye, Munkhbayar Munkhjargal, Kumiko Miyajima, Takahiro Arakawa, Hirokazu Saito, Hiroyuki Kudo, Hideaki Endo, Kohji Mitsubayashi
1Tokyo Medical and Dental University, Japan; 2Tokyo National College of Technology, Japan; 3Tokyo University of Marine Science and Technology, Japan

B3P-H6
IMPLANTABLE SiC BASED RF ANTENNA BIOSENSOR FOR CONTINUOUS GLUCOSE MONITORING
Shamima Afroz, Sylvia Thomas, G. Mumcu, S.E. Saddow
University of South Florida, United States

B3P-H7
SLOPE AND CANTILEVER TYPE ELECTRODE FABRICATION FOR MEASUREMENT OF NEUROSPHEROID SIGNAL
Ju-Young Jin, Boo-Yong Lee, Jin You, Jinseok Kim, Jungyul Park, Yu-Shik Hwang, Kukjin Chun
1Korea Institute of Science and Technology, Korea, South; 2Kyung Hee University, Korea, South; 3Seoul National University, Korea, South; 4Sogang University, Korea, South

B3P-H8
ULTRA LOW POWER WIRELESS ECG SENSOR TAG WITH WEARABLE ANTENNA
Hitoshi Kitayoshi, Kunio Sawaya, Hiroki Kuwano
Tohoku University, Japan

B3P-H9
TERAHERTZ CONICAL HORN WAVEGUIDE COUPLER FOR SPECTROSCOPIC ANALYSIS OF BIOMATERIALS
Weidong Zhang, Elliott Brown, Leamon Viveros
Wright State University, United States
LIQUID HEATING CAN CAUSE DENATURATION OF SENSING LAYER IN SAW BIOSENSORS
Kamlesh Suthar\textsuperscript{1}, Subramanian Sankaranarayanan\textsuperscript{1}, Mandek Richardson\textsuperscript{2}, Venkat Bhethanabotla\textsuperscript{2}
\textsuperscript{1}Argonne National Laboratory, United States; \textsuperscript{2}University of South Florida, United States

PHOTOMETRIC APATASENSOR USING BIOFUNCTIONALIZED PHOTONIC CRYSTAL SLABS
Sabrina Jahns, Yousef Nazirizadeh, Björn-Ole Meyer, Martina Gerken, Sören Gutekunst, Christine Selhuber-Unkel
Christian-Albrechts-Universität zu Kiel, Germany

DIELECTRIC CHARACTERIZATION OF IMATINIB RESISTANT K562 LEUKEMIA CELLS THROUGH ELECTROTHERAPY WITH 3-D ELECTRODES
Garsha Bahrieh, Hatice Ceylan Koydemir, Murat Erdem, Ebru Özgür, Ufuk Gündüz, Haluk Külah
Middle East Technical University (METU), Turkey

ENZYME BIOTRANSDUCERS FORMED FROM CONDUCTIVE ELECTROACTIVE POLYMERS
Guneet Bedi, Christian Kotanen, Olukayode Karunwi, Amanda Nguyen, Ferhat Bayram, Brian Hudson, Yu Zhao, Anthony Guiseppi-Elie
Clemson University, United States

ORGANOPHOSPHATE PESTICIDES DETERMINATION BASED ON LABEL-FREE LOCALIZED SURFACE PLASMON RESONANCE
Jie-Hui Li, Hong-Yan Dou, Xin-Ming Ji
Fudan University, China

EFFECTS OF ACID OXIDATION ON CARBON NANOTUBE BASED ELECTRODES FOR DETECTION OF OXIDIZED LDL
Seiji Takeda, Toshihiro Sakurai, Futaba Okhawa, Shigeki Jin, Shu-Ping Hui, Hirotoshi Fuda, Koichi Mukasa, Hitoshi Chiba, Kazuhisa Sueoka
Hokkaido University, Japan

SENSITIVITY-ENHANCED ULTRASONIC MICROSENSORS ON BUCKLED DIAPHRAGMS THROUGH STRESS BALANCE CONTROL OF MULTILAYERED STRUCTURE
Kaoru Yamashita, Hikaru Tanaka, Yi Yang, Minoru Noda
Kyoto Institute of Technology, Japan
B3P-J2
A PIEZORESISTIVE PRESSURE SENSOR WITH IMPROVED SENSITIVITY IN LOW PRESSURE CONDITION
Huiyang Yu, Ming Qin, Jianqiu Huang
Southeast University, China

B3P-J3
ONE SIDE ELECTRODE TYPE FLUIDIC BASED CAPACITIVE PRESSURE SENSOR
Mohd Norzaidi Mat Nawi, Asrulnizam Abdul Manaf, Mohamad Faizal Abd Rahman, Mohd Rizal Arshad, Othman Sidek
Universiti Sains Malaysia, Malaysia

B3P-J4
A MICRO-PRESSURE SENSOR WITH HIGH SENSITIVITY AND OVERLOAD RESISTANCE
Zhongliang Yu, Yulong Zhao, Cun Li, Yan Liu, Guanwu Zhou, Bian Tian
Xi'an Jiaotong University, China

B3P-J5
STATIC AND DYNAMIC RESPONSES OF GAN PIEZORESISTIVE MICROCANTILEVER WITH EMBEDDED ALGAN/GAN HFET FOR SENSING APPLICATIONS
Abdul Talukdar\textsuperscript{1}, Muhammad Qazi\textsuperscript{1}, Goutam Koley\textsuperscript{2}\
\textsuperscript{1}Intel Corp., United States; \textsuperscript{2}University of South Carolina, United States

B3P-J6
A DIFFERENTIAL RESONANT BAROMETRIC PRESSURE SENSOR USING SOI-MEMS TECHNOLOGY
Zhenyu Luo, Deyong Chen, Junbo Wang, Jian Chen
Chinese Academy of Sciences, China

B3P-J7
HIGH SENSITIVITY SQUARE RING CHANNEL SHAPED MOSFET EMBEDDED PRESSURE SENSOR INTEGRATED WITH A CURRENT MIRROR READOUT CIRCUITRY
Pradeep Kumar Rathore\textsuperscript{1}, Brishbhan Singh Panwar\textsuperscript{1}, Hardik Jeetendra Pandya\textsuperscript{2}\
\textsuperscript{1}Indian Institute of Technology Delhi, India; \textsuperscript{2}University of Maryland, United States

B3P-J8
FABRICATION AND CHARACTERIZATION OF FLEXIBLE PRESSURE SENSOR ARRAYS MADE BY FILM TRANSFER TECHNOLOGY
Thi-Hong-Nhung Dinh, Pierre-Yves Joubert, Emile Martincic, Elisabeth Dufour-Gergam
Université Paris-Sud, France
B3P-J9
MICRO SENSORS WITH POLYMER MEMBRANE FOR ACCURATE 3D FORCE AND DISPLACEMENT MEASUREMENTS
Nelson Ferreira¹, Thomas Krah¹, Andreas Dietzel¹, Stephanus Büttgenbach¹, Alejandro Sierra Granada², Jose Antonio Albajez García²
¹Technische Universität Braunschweig, Germany; ²Universidad de Zaragoza - EINA, Spain

B3P-J10
THREE-AXIAL FORCE SENSOR WITH CAPACITIVE READ-OUT USING A DIFFERENTIAL RELAXATION OSCILLATOR
University of Twente, Netherlands

B3P-J11
A SURFACE MICROMACHINED MEMS CAPACITIVE MICROPHONE WITH BACK-PLATE SUPPORTING PILLARS
Chang Han Je, Jaewoo Lee, Woo Seok Yang, Jong-Kee Kwon
Electronics and Telecommunications Research Institute (ETRI), Korea, South

B3P-J12
DESIGNS OF PLANAR SENSING INDUCTOR ON INVERSE-MAGNETOSTRICTIVE TYPE PRESSURE SENSOR
National Tsing Hua University, Taiwan

B3P-J13
FORCE INTENSITY AND DIRECTION MEASUREMENT IN REAL TIME USING MINIATURE TACTILE SENSOR WITH MICROCANTILEVERS EMBEDDED IN PDMS
Hokuto Yokoyama³, Masayuki Sohgawa¹,³, Takeshi Kanashima³, Masanori Okuyama³, Takashi Abe³, Haruo Noma⁴, Teruaki Azuma²
¹Niigata University, Japan; ²Nitta Corporation, Japan; ³Osaka University, Japan; ⁴Ritsumeikan University, Japan

B3P-J14
A LATERAL-AXIS MEMS TUNING FORK GYROSCOPE WITH NOZZLE-OPTIMIZED SQUEEZE-FILM SENSING ELEMENT
Minghao Nie, Dachuan Liu, Liguo Dong, Qiancheng Zhao, Zhenchuan Yang, Guizhen Yan
Peking University, China
2:00 PM - 3:30 PM
B3P-K: PHENOMENA, MODELING & EVALUATION
Poster Area - Baltimore AB
Session Chairs: Svetlana Tatic-Lucic (Lehigh University, USA), Srinivas Tadigadapa (Pennsylvania State University, USA)

B3P-K1
NANOMACHINED PYROELECTRIC DETECTOR WITH LOW THERMAL CONDUCTANCE - DESIGN AND CONCEPTS
Md Muztoba1, Noureddine Melikechi1, Mukti Rana1, Donald P. Butler2
1Delaware State University, United States; 2University of Texas at Arlington, United States

B3P-K2
2-D MODEL OF THE INDIRECTLY-HEATED TYPE MICROWAVE POWER SENSOR BASED ON GAAS MMIC PROCESS
Zhenxiang Yi, Xiaoping Liao, Hao Wu
Southeast University, China

B3P-K3
ENHANCED COUPLING OF PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS WITH INITIAL STATIC DEFOCTION
Firas Sammoura1,2, Sina Akhbari3, Liwei Lin3, Sang Gook Kim2
1Masdar Institute of Science and Technology, U.A.E.; 2Massachusetts Institute of Technology, United States; 3University of California, Berkeley, United States

B3P-K4
SIZE-DEPENDENT THERMAL EXPANSION PROPERTIES OF SILICON NANOWIRES
Wei-Wei Zhang1, Hua Zhang1, Xu-Dong Li1, Yan-Ru Li1, Hong Yu2, Qing-An Huang2
1Jiangsu Academy of Science & Technology for Development, China; 2Southeast University, China

B3P-K5
THE ROLE OF INTERFACE IN UNPASSIVATED SI3-XGEX HETEROSTRUCTURE NANOWIRES ALONG THE <111> DIRECTION
Yi Li, Shuang-Ying Lei, Rui-Feng Han, Hong Yu, Jie Chen, Qing-An Huang
Southeast University, China

B3P-K6
MICROFLUIDICS-BASED ACOUSTIC MICROBUBBLE BIOSENSOR
Ying Zhou, Ashwin A. Seshia, Elizabeth A. H. Hall
University of Cambridge, United Kingdom

B3P-K7
FOUR-PROBE BRIDGES FOR IN SITU DETERMINATION OF GEOMETRICAL PARAMETERS OF SURFACE MICROMACHINED THIN FILMS
Hai-Yun Liu, Wei-Hua Li, Zai-Fa Zhou, Qing-An Huang
Southeast University, China
B3P-K8
INTERFACE DISSIPATION IN PIEZOELECTRIC MEMS RESONATORS: AN EXPERIMENTAL AND NUMERICAL INVESTIGATION
Attilio Frangi¹, Massimiliano Cremonesi¹, Antti Jaakkola², Tuomas Pensala³
¹Politecnico di Milano, Italy; ²VTT Technical Research Centre of Finland, Finland

B3P-K9
DIMENSION OPTIMIZATION FOR A MINIATURE HIGH-FREQUENCY QUARTZ RESONATOR
Jing Ji, Meng Zhao, Yupeng Zhang, Satoshi Ikezawa, Toshitsugu Ueda
Waseda University, Japan

B3P-K10
ELECTRIC FIELD SENSING: WHAT IS BROUGHT BY DUALITY FROM FLUX GATES?
Didier Robbes², Corentin Jorel², Emmanuel Olivier², Laurence Méchin², Sylvain Lebargy², Rachid Bouregba¹, Gilles Poullain¹, Christophe Cibert¹
¹ENSICAEN, France; ²UNICAEN, France

B3P-K11
TERAHERTZ DETECTION OF BACILLUS THURINGIENSIS SPORES IN DIPEL®
Leamon Viveros, Weidong Zhang, Elliott Brown
Wright State University, United States

B3P-K12
DESIGN AND OPTIMIZATION OF AN ELECTROSTATIC MICRO-HARVESTER FOR SENSORS APPLICATIONS
Yi Li, Zeynep Celik-Butler, Donald P. Butler
University of Texas at Arlington, United States

B3P-K13
THICKNESS DEPENDENT ADHESION FORCE AND ITS CORRELATION TO SURFACE ROUGHNESS IN MULTILAYERED GRAPHENE
Hoorad Pourzand, Pradeep Pai, Massood Tabib-Azar
University of Utah, United States

B3P-K14
MODELING OF MOVING COIL CAPACITANCE IN AN IRONLESS INDUCTIVE POSITION SENSOR
Alessandro Danisi¹, Alessandro Masi¹, Roberto Losito¹, Luca Sabato²
¹European Organization for Nuclear Research (CERN), Switzerland; ²Universita degli Studi del Sannio, Italy

B3P-K15
ENHANCING THE ACOUSTIC STREAMING INDUCED REMOVAL OF NON-SPECIFICALLY BOUND PROTEINS IN QUARTZ BASED SAW BIOSSENSORS USING A ZNO WAVEGUIDE
Kamlesh Suthar¹, Subramanian Sankaranarayanan¹, Gayathri Mistri², Mandek Richardson³, Venkat Bhethanabotla³
¹Argonne National Laboratory, United States; ²University of Illinois at Chicago, United States; ³University of South Florida, United States
B3P-K16
MODELING OF PIEZOELECTRIC TUBE RESONATORS FOR LIQUID SENSING APPLICATIONS
Thomas Voglhuber-Brunnmaier¹, Hannes Antlinger¹, Bernhard Jakoby¹, Roman Beigelbeck²
¹Johannes Kepler University, Austria; ²Vienna University of Technology, Austria

B3P-K17
EFFECT OF DESIGN PARAMETERS ON THE ROTATIONAL RESPONSE OF A NOVEL DISK RESONATOR FOR LIQUID-PHASE SENSING: ANALYTICAL RESULTS
Mohamad Sotoudegan², Stephen Heinrich², Fabien Josse², Nicholas Nigro³, Isabelle Dufour³, Oliver Brand¹
¹Georgia Institute of Technology, United States; ²Marquette University, United States; ³Universite de Bordeaux, France

B3P-K18
SYMMETRY BREAKING OSCILLATIONS IN ELECTROSTATIC MEMS UNDER SUPERHARMONIC EXCITATION
Anindya Lal Roy, Tarun Kanti Bhattacharyya
Indian Institute of Technology, India

B3P-K19
HIGH PERFORMANCE NEMS ULTRAHIGH SENSITIVE RADIATION SENSOR BASED ON PLATINUM NANORODS CAPACITOR
Abdelhameed Sharaf¹², Asmaa Gamal¹, Mohamed Serry¹
¹The American University in Cairo, Egypt; ²NCRT, Egyptian Atomic Energy Authority, Egypt

2:00 PM - 3:30 PM
B3P-L: SENSOR NETWORKS I
Poster Area - Baltimore AB
Session Chair: Elliott Brown (Wright State University, USA)

B3P-L1
A LOW-POWER WIRELESS UHF / LF SENSOR NETWORK WITH WEB-BASED REMOTE SUPERVISION - IMPLEMENTATION IN THE INTELLIGENT CONTAINER
University of Bremen, Germany

B3P-L2
TIMESTAMPING AND LATENCY ANALYSIS FOR MULTI-SENSOR PERCEPTION SYSTEMS
Mohamed Brahmí², Kai Schueler³, Essayed Bouzouraa¹, Markus Maurer², Karl-Heinz Siedersberger¹, Ulrich Hofmann¹
¹AUDI AG, Germany; ²Technische Universität Braunschweig, Germany; ³Technische Universität München, Germany

B3P-L3
A HOME MONITORING SYSTEM FOR ELDERLY PEOPLE BASED ON MEMS SENSORS AND WIRELESS NETWORKS
 Fangxiu Jia, Yujia Sun, Jiyan Yu, Xiaoming Wang
Nanjing University of Science and Technology, China
B3P-L4
RECONFIGURABLE ARCHITECTURE FOR SMART SENSOR NODE BASED ON IEEE 1451 STANDARD
Arturo Fatecha, Jean Guevara, Enrique Vargas
Catholic University Asuncion, Paraguay

B3P-L5
COVERAGE ESTIMATION IN HETEROGENEOUS FLOORPLAN VISUAL SENSOR NETWORKS
Ahmad Movahedian Attar1, Shantia Yarahmadian2, Shadrokh Samavi1
1Isfahan University of Technology, Iran; 2Mississippi State University, United States

B3P-L6
A SEMANTICALLY-ADAPTIVE STRATEGY FOR ENERGY-EFFICIENCY IN WIRELESS MEDICAL MONITORING DEVICES
Vishwa Goudar, Miodrag Potkonjak
University of California, Los Angeles, United States

B3P-L7
DEVELOPMENT OF SERVICE NETWORK FOR WEARABLE TYPE ACUTE MYOCARDIAL INFARCTION DIAGNOSIS SYSTEM
Jaehyo Jung, Jihwan Lee, Jihoon Lee, Youn Tae Kim
Chosun University, Korea, South

B3P-L8
DESIGN AND VALIDATION OF A WIRELESS SENSOR NODE FOR LONG TERM STRUCTURAL HEALTH MONITORING
Fabio Federici, Roberto Alesii, Andrea Colarieti, Fabio Graziosi, Marco Faccio
University of L’Aquila, Italy

2:00 PM - 3:30 PM
B3P-M: APPLICATION I
Poster Area - Baltimore AB
Session Chair: David Horsley (University of California, Davis, USA)

B3P-M1
OPTICAL CHARACTERIZATION OF MICROPATTERNED ANODIC ALUMINUM OXIDE (AAO) USING UV LIGHT FOR ITS FLUORESCENCE APPLICATIONS
Xiang Li, Haocheng Yin, Tingting Wang, Long Que
Louisiana Tech University, United States

B3P-M2
MEASUREMENT OF HUMAN BODY STIFFNESS FOR LIFTING-UP MOTION GENERATION USING NURSING-CARE ASSISTANT ROBOT - RIBA
Ming Ding2, Ryojun Ikeura1, Yuki Mori2, Toshiharu Mukai2, Shigeyuki Hosoe2
1Mie University, Japan; 2RIKEN, Japan
B3P-M3
NON CONTACT MEASUREMENT OF BODY TEMPERATURE FOR THE IDENTIFICATION OF THERMOREGULATION ABILITIES IN PRETERM PATIENTS
Ilaria Ercoli, Paolo Marchionni, Lorenzo Scalise, Enrico Primo Tomasini, Virgilio Paolo Carneieli
Università Politecnica delle Marche, Italy

B3P-M4
DETERMINATION OF BURN DEPTH ON BIOLOGICAL TISSUES BY DIELECTRIC MEASUREMENT AT MICROWAVE FREQUENCIES
Matthieu Brusson\(^1\), Jérôme Rossignol\(^2\), Stéphane Binczak\(^3\), Gabriel Laurent\(^1\)
\(^1\)Centre Hospitalier Universitaire, France; \(^2\)Université de Bourgogne, France

B3P-M5
DEVELOPMENT AND PERFORMANCE EVALUATION OF PORTABLE BRAILLE SCANNER USING SIMPLE PLATE SPRING SENSOR
Hiroyuki Takanashi\(^1\), Ryosuke Mimura\(^1\), Tetsushi Mimuro\(^1\), Hiroyuki Kodama\(^2\), Takeshi Ito\(^2\)
\(^1\)Akita Prefectural University, Japan; \(^2\)Akita Techno Design Co, Ltd, Japan

B3P-M6
METAL-LENGTH SENSOR WITH ANTENNA RESONANT DETECTOR FOR PRESCRIPTION GUIDANCE OF ORAL PILL MEDICATION
Hisashi Nishikawa, Takahiro Yamanaka, Hirofumi Yoshioka, Ami Tanaka, Takakuni Douseki
Ritsumeikan University, Japan

B3P-M7
EEG-FMRI FEATURES ANALYSIS IN ODORANTS STIMULI WITH CITRALVA AND 2-MERCAPTOETHANOL
Won-Seok Kang\(^1\), Hyung-Oh Kwon\(^1\), Cheil Moon\(^1\), Jin Kook Kim\(^2\), Sanghun Yun\(^1\), Samhwan Kim\(^1\)
\(^1\)Daegu Gyeongbuk Institute of Science and Technology, Korea, South; \(^2\)Konkuk University Medical Center, Korea, South

B3P-M8
PAPER-BASED SUPER-CAPACITOR USING MICRO AND NANO PARTICLE DEPOSITION FOR PAPER-BASED DIAGNOSTICS
Pooria Mostafalu, Sameer Sonkusale
Tufts University, United States

B3P-M9
STRUCTURAL RELIABILITY AND THERMAL INSULATION PERFORMANCE OF FLEXIBLE THERMOELECTRIC GENERATOR FOR WEARABLE SENSORS
Luca Francioso\(^1\), Chiara De Pascali\(^1\), Pietro Siciliano\(^1\), Ruben Bartali\(^2\), Elisa Morganti\(^1\), Leandro Lorenzelli\(^2\), Arturo De Risi\(^3\)
\(^1\)Institute for Microelectronics and Microsystems, Italy; \(^2\)FBK Bruno Kessler Foundation, Italy; \(^3\)University of Salento, Italy
B3P-M10
USING TACTILE SENSORS TO ESTIMATE CARE RECEIVER POSITION ON DUAL ARMS OF ROBOT
Yuki Mori\textsuperscript{2}, Ryojun Ikeura\textsuperscript{1}, Ming Ding\textsuperscript{*}
\textsuperscript{1}Mie University, Japan; \textsuperscript{2}RIKEN, Japan

B3P-M11
MONITOR COLOR SENSING USING LOW-COST FILTER ARRAY SPECTRUM SENSOR
Cheng-Chun Chang\textsuperscript{2}, Chia-Jui Chuang\textsuperscript{2}, Yung-Chi Chuang\textsuperscript{2}, Byung Il Choi\textsuperscript{1}, Kwansik Lee\textsuperscript{1}, Seongsu Woo\textsuperscript{1}
\textsuperscript{1}nanoLambda Incorporated, Korea, South; \textsuperscript{2}National Taipei University of Technology, Taiwan

B3P-M12
AN EVALUATION OF ELECTRIC FIELD SENSORS FOR PROJECTILE DETECTION
Cassandra Browning\textsuperscript{2}, Stephen Vinci\textsuperscript{2}, Maciej Noras\textsuperscript{1}, Jack Zhu\textsuperscript{2}, David Hull\textsuperscript{2}
\textsuperscript{1}University of North Carolina at Charlotte, United States; \textsuperscript{2}US Army Research Laboratory, United States

B3P-M13
IN-SITU SOOT PARTICLE SENSING IN AN AERO-ENGINE EXHAUST PLUME
David McCormick\textsuperscript{2}, Krikor Ozanyan\textsuperscript{2}, John Black\textsuperscript{1}, Yutong Feng\textsuperscript{3}
\textsuperscript{1}Rolls-Royce plc, United Kingdom; \textsuperscript{2}University of Manchester, United Kingdom; \textsuperscript{3}University of Southampton, United Kingdom

B3P-M14
SENSOR DESIGN FOR WATER HARDNESS DETECTION
Tonmoy Bhattacharjee, Hongrui Jiang, Nader Behdad
University of Wisconsin-Madison, United States

B3P-M15
MYOELECTRIC CONTROL METHOD FOR CONTROLLABLE ELECTROLARYNX
Katsutoshi Ooe, Reina Kishimoto, Yuya Hasimoto
Daiichi Institute of Technology, Japan

B3P-M16
UTILIZING TACTILE FEEDBACK FOR BIOMIMETIC GRASPING CONTROL IN UPPER LIMB PROSTHESSES
Luke Osborn\textsuperscript{2}, Nitish Thakor\textsuperscript{2}, Rahul Kaliki\textsuperscript{1}
\textsuperscript{1}Infinite Biomedical Technologies, United States; \textsuperscript{2}Johns Hopkins University, United States

B3P-M17
A NOVEL WIRELESS MOTION SENSOR FOR ANALYZING GOLF SWING
Zhijian Yin\textsuperscript{2}, Haojie Ning\textsuperscript{2}, Yoshio Inoue\textsuperscript{3}, Meimei Han\textsuperscript{1}, Tao Liu\textsuperscript{2,3}
\textsuperscript{1}INSENCO R&D Lab. Inc., Japan; \textsuperscript{2}Jiangxi Science & Technology Normal University, Japan; \textsuperscript{3}Kochi University of Technology, Japan;
2:00 PM - 3:30 PM
B3P-N: OPEN POSTER I
Poster Area - Baltimore AB
Session Chair: Troy Nagle (North Carolina State University, USA)

B3P-N1
REMOTE IDENTIFICATION AND WIRELESS TEMPERATURE SENSING BASED ON UWB PASSIVE CHIPLESS TIME-CODED RFID TAGS WITH LOS AND NLOS SCENARIOS
Mina Wahib¹, Martin Schüßler², Bernd Kubina², Rolf Jakoby²
¹German University in Cairo, Egypt, Egypt; ²Technical University of Darmstadt, Germany

B3P-N2
A WEARABLE SYSTEM FOR NON-INVASIVE BEAT-TO-BEAT BLOOD PRESSURE ESTIMATIONS
Marcus Pieltzsch¹, Martin Zimmerling¹, Wolf-Joachim Fischer²
¹Fraunhofer IPMS, Germany; ²TU Dresden, Germany

B3P-N3
NON-INVASIVE ASSESSMENT OF SKIN HYDRATION
Jose Abraham
Kimberly Clark Corporation, United States

B3P-N4
EMBEDDED DAQ SYSTEM FOR SENSOR EVALUATION AND MOBILE AUTARKIC APPLICATIONS IN RESEARCH AND EDUCATION
Roger Heil, Mario Schlösser, Stefan van Waassen, Michael Schiek
ZEA-2, Germany

B3P-N5
PH SENSOR BASED ON LOW-LIGHT FLUORESCENCE DETECTION FOR DIAGNOSIS OF GASTROESOPHAGEAL REFLUX DISEASE
Paul Mintchev, Raymond Turner, Orly Yadid-Pecht
University of Calgary, Canada

B3P-N6
USING MACHINE OLFACITION TO ASSIST HUMAN ODOR PANELS
Susan Schiffman, Troy Nagle
North Carolina State University, United States

B3P-N7
MOS TUNNELING CURRENT SENSING FOR RESONANT SENSORS
Li Zhu, Bryan Snatchko, Shamus McNamara
University of Louisville, United States

B3P-N8
A NON-INVASIVE ACTIVE DRY ELECTRODE FOR WIRELESS HUMAN-TO-COMPUTER INTERFACING
Jeong A Lee¹, Olufemi Adeluyi¹, Kiseon Kim²
¹Chosun University, Nigeria; ²GIST, Korea, South

B3P-N9
MONITORING YOUTH SOCCER PLAYER PERFORMANCE TO REDUCE INJURY AND OPTIMA SUBSTITUTION STRATEGIES
Phil Attoh-Okine¹, Yaw Adu-Gyamfi²
¹Archmere Academy, United States; ²University of Virginia, United States
3:30 PM - 5:00 PM
B4L-A: CARBON NANOTUBES & GRAPHENE
Maryland F
Session Chairs: EH Yang (Stevens Institute of Technology, USA), Joan Hoffmann (Johns Hopkins University, USA)

3:30 PM
INVITED TALK: ULTRANANOCRYSTALLINE DIAMOND: NEW OPPORTUNITIES FOR THE FABRICATION OF NOVEL SENSORS
Anirudha V. Sumant
Argonne National Laboratory, United States

4:00 PM
CNT SENSOR ARRAYS WITH P-I-N DIODES
Thomas Charisoulis2, Abbas Jamshidi-Roudbari2, Nack-Bong Choi2, Miltos Natalis1, Yijiang Lu1, Jing Li1
1NASA Ames Research Center, United States; 2Lehigh University, United States

4:15 PM
PT-FUNCTIONALIZED GRAPHENE/SI HETEROSTRUCTURE FOR HYDROGEN SENSING
Ahsan Uddin, Amol Singh, Tangali Sudarshan, Goutam Koley
University of South Carolina, United States

4:30 PM
GAS SENSING BY GRAPHENE/SILICON HETEROSTRUCTURE
Amol Singh, Ahsan Uddin, Tangali Sudarshan, Goutam Koley
University of South Carolina, United States

4:45 PM
TUNABLE GRAPHENE/INDIUM NITRIDE HETEROSTRUCTURE DIODE SENSOR
Alina Wilson1, Ifat Jahangir1, Amol Singh1, Nick Sbrockey1, Elane Coleman1, Gary Tompa1, Goutam Koley2
1Structured Materials Industries, Inc., United States; 2University of South Carolina, United States

3:30 PM - 5:00 PM
B4L-B: INTEGRATION
Maryland E
Session Chairs: Hongrui Jiang (University of Wisconsin - Madison, USA), Babak Ziaie (Purdue University, USA)

INVITED TALK: 3:30 PM
CARBON-NANOTUBE BASED FLEXIBLE ELECTRODES FOR RETINAL RECORDING AND STIMULATION
Moshe David-Pur, Lilach Bareket-Keren, Giora Beil-Yaakov, Dorit Raz-Prag, David Rand, Yael Hanein
Tel-Aviv University, Israel

4:00 PM
MULTIPLE SENSOR ARRAYS FOR SINGLE CELL METABOLIC ANALYSIS
Ganquan Song, Rishabh Shetty, Haixin Zhu, Shashanka Ashili, Liqiang Zhang, Grace Kim, Andrew Shabilla, Wacey Teller, Qian Mei, Laimonas Kelbauskas, Yanqing Tian, Hong Wang, Roger H. Johnson, Deirdre R. Meldrum
Arizona State University, United States
4:15 PM
FABRICATION OF MICRODEVICES FOR SEPARATION OF CIRCULATING TUMOR CELL USING LATERAL MAGNETOPHORESIS AND IMMUNOMAGNETIC NANOBeads
Dae-Sik Lee, Jeong Won Park, Nae-Lim Lee, Mun Yeon Jung, Sung-Mok Cho
Electronics Telecommunications Research Institute (ETRI), Korea, South

4:30 PM
A LOW POWER AUTO-RECONFIGURABLE PIPELINED ADC FOR IMPLANTABLE BIOMEDICAL APPLICATIONS
Terence Randall, Ifana Mahbub, Syed Kamrul Islam
University of Tennessee, Knoxville, United States

4:45 PM
A NEW GAS SENSOR OF A THIN-FILM DIODE AND LOW-POWER, AREA-EFFICIENT READOUT CIRCUIT
Hung-Che Chen, Paul C.-P. Chao, Wei-Chu Lin, Hsiang-Fang Sun, Ming-Zhi Dai, Hsiao-Wen Zan
National Chiao Tung University, Taiwan

3:30 PM - 5:00 PM
B4L-C: PRESSURE SENSORS
Maryland A
Session Chairs: Bernhard Jakoby (Johannes Kepler University Linz, Austria), Paddy French (TU Delft, The Netherlands)

3:30 PM
A WIRELESS PRESSURE SENSOR BASED ON SURFACE TRAPPED FERROFLUID PLUG
Albert Kim, Babak Ziaie, Girish Chitnis
Purdue University, United States

3:45 PM
A MONOCRYSTALLINE ABSOLUTE PRESSURE SENSOR WITH A PSEUDO-MOSFET READ-OUT DEVICE FOR LIFE-SCIENCE APPLICATIONS
Sven Ebschke, Remigius Poloczek, Klaus Kallis, Horst Fiedler
TU Dortmund, Germany

4:00 PM
DISTRIBUTED PIEZOELECTRIC THIN FILM SENSOR ARRAY FOR MONITORING IMPACT EVENTS
Sudeep Joshi, Manjunath M Nayak, Konandur Rajanna
Indian Institute of Science, India

4:15 PM
WEARABLE AND FLEXIBLE PEDOBAROGRAPHIC INSOLE FOR CONTINUOUS PRESSURE MONITORING
Stefano Stassi¹,², Giancarlo Canavese¹, Valentina Cauda¹, Carmelo Fallauto¹, Simone Corbellini², Paolo Motto², Danilo Demarchi¹, Candido Fabrizio Pirri¹,²
¹Istituto Italiano di Tecnologia, Italy; ²Politecnico di Torino, Italy
4:30 PM
ALL-ELASTOMER IN-PLANE MEMS CAPACITIVE TACTILE SENSOR FOR NORMAL FORCE DETECTION
Alexi Charalambides, Sarah Bergbreiter
University of Maryland, United States

3:30 PM - 5:00 PM
B4L-D: INERTIAL SYSTEMS MODELING
Maryland D
Session Chair: Qing-An Huang (Southeast University, China)

3:30 PM
EFFECTS OF IMPERFECTIONS ON SOLID-WAVE GYROSCOPE DYNAMICS
Erdal Yilmaz, David Bindel
Cornell University, United States

3:45 PM
ADVANCED METHODS FOR CALCULATING QUADRATURE ERRORS OF MEMS GYROSCOPES
Steven Kehrberg¹, Markus Dorwarth², Markus Heitz², Carsten Geckeler², Jan Mehner¹
¹Chernitz University of Technology, Germany; ²Robert Bosch GmbH, Germany

4:00 PM
EUTECTIC TRIMMING OF POLYSILICON MICRO HEMISPHERICAL RESONATING GYROSCOPE
Benoit Hamelin, Vahid Tavassoli, Farrokh Ayazi
Georgia Institute of Technology, United States

4:15 PM
AN IN-SITU MEASUREMENT METHOD FOR THERMALLY INDUCED PACKAGING STRESS IN DISTRIBUTED RF MEMS PHASE SHIFTERS
Cheng Zhao, Jing Song, Lifeng Wang, Lei Han, Qing-An Huang
Southeast University, China

4:30 PM
IMPACT OF MECHANICAL STRESS ON BIPOLAR TRANSISTOR CURRENT GAIN AND EARLY VOLTAGE
Richard Jaeger, Safina Hussain, Jeffrey Suhling, Parameshwaran Gnanachchelvi, Bogdan Wilamowski, Michael Hamilton
Auburn University, United States

4:45 PM
A PERFECT ELECTROSTATIC ANTI-SPRING
Shai Shmulevich, Inbar Hotzen, David Elata
Technion - Israel Institute of Technology, Israel
3:30 PM - 5:00 PM
B4L-E: WIRELESS SENSOR NETWORKS FOR ENVIRONMENTAL MONITORING
Watertable ABC
Session Chair: Hong Yu (Arizona State University, USA)

3:30 PM
QUANTIFYING SPATIAL DISTRIBUTION OF SOIL MOISTURE USING A COSMIC RAY AND CAPACITANCE SENSOR NETWORK
Auro Almeida¹, Craig Baillie¹, Dale Worledge¹, Philip Smethurst¹, Ritaban Dutta¹, Andrew Terhorst¹, Trenton Franz²
¹Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; ²University of Arizona, United States

3:45 PM
BACKSCATTER SENSOR NETWORK FOR EXTENDED RANGES AND LOW COST WITH FREQUENCY MODULATORS: APPLICATION ON WIRELESS HUMIDITY SENSING
Eleftherios Kampianakis, John Kimionis, Konstantinos Tountas, Christos Konstantopoulos, Efthichios Koutroulis, Aggelos Bletsas
Technical University of Crete, Greece

4:00 PM
QUAD-TREE APPROACH FOR OBSTACLE DISCOVERY AND TRACKING IN WIRELESS SENSOR NETWORKS
Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee
Bengal Engineering and Science University, Shibpur, India

4:15 PM
DETECTION OF TARGETS USING DISTRIBUTED MULTI-MODAL SENSORS WITH CORRELATED OBSERVATIONS
Thyagaraju Damarla², Asif Mehmood¹
¹Booz Allen Hamilton, United States; ²US Army Research Laboratory, United States

4:30 PM
ACCURATE AND EARLY DETECTION OF LOCALIZED HEAVY RAIN BY INTEGRATING MULTIVENDOR SENSORS IN VARIOUS INSTALLATION ENVIRONMENTS
Kei Hiroi¹, Yoshihito Seto², Futoshi Matsumoto², Yuzo Taenaka³, Hideya Ochiai⁴, Haruo Ando², Hitoshi Yokoyama², Masaya Nakayama³, Hideki Sunahara¹
¹Keio University, Japan; ²Tokyo Metropolitan Research Institute for Environmental Protection, Japan; ³University of Tokyo, Japan; ⁴VLSI Design and Education Center, University of Tokyo, Japan

4:45 PM
STRUCTURAL DAMAGE DETECTION OF NUCLEAR REACTOR SITES USING SENSOR NETWORKS
Sainath Chidambar Munavalli, Niki Pissinou, Leonel Lagos, Xinyu Jin
Florida International University, United States
3:30 PM - 5:00 PM
B4L-F: MEDICAL APPLICATIONS
Homeland
Session Chair: Elfed Lewis (University of Limerick, Ireland)

3:30 PM
AN EMG BIOFEEDBACK DEVICE FOR VIDEO GAME USE IN FOREARM PHYSIOTHERAPY
Hayes Converse, Teressa Ferraro, Daniel Jean, Laura Jones, Vikas Mendhiratta, Emily Naviasky, Mang Par, Thomas Rimlinger, Steven Southall, Jason Sprenkle, Pamela Abshire
University of Maryland, United States

3:45 PM
HALL-EFFECT MAGNETIC TRACKING DEVICE FOR MAGNETIC RESONANCE IMAGING
Jean-Baptiste Schell, Loic Cuvelier, Daniel Gounot, Elodie Breton, Jean-Baptiste Kammerer, Luc Hébrard, Michel de Mathelin
Université de Strasbourg (CNRS), France

4:00 PM
BIOLOGY ANALYSIS USING A QUADRUPLE INFRARED SENSOR
Valeria Fioravanti², Emanuel Weber², Sander van Den Driesche², Michael Johannes Vellekoop², Daniela Pucciarelli¹, Heimo Breiteneder¹, Christine Hafner¹
¹Medical University of Vienna, Austria; ²University of Bremen, Germany

4:15 PM
QUANTIFICATION OF EDEMA IN HUMAN BRAIN TISSUE BY DETERMINATION OF ELECTROMAGNETIC PARAMETERS
Tobias Reinecke², Lars Hagemeier¹, Verena Schulte², Michael Klintschar¹, Stefan Zimmermann²
¹Hannover Medical School, Germany; ²Leibniz University Hannover, Germany

4:30 PM
CHARACTERISATION OF RADIOLUMINESCENCE BASED OPTICAL FIBRE DOSIMETER IN RADIOTHERAPY BEAM APPLICATIONS
Peter Woulfe²,³, Sinead O’Keeffe³, Denis McCarthy³, Mark Grattan¹, Alan Hounsell¹, John Cronin², Elfed Lewis³
¹Belfast City Hospital, United Kingdom; ²Galway Clinic, Ireland; ³University of Limerick, Ireland

4:45 PM
IDENTIFICATION OF DIFFERENT RESPIRATORY RATE BY A PIEZO POLYMER BASED NASAL SENSOR
Roopa G. Manjunatha, N. Ranjith, Y.V. Meghashree, Konandur Rajanna, D. Roy Mahapatra
Indian Institute of Science, India
WEDNESDAY, NOVEMBER 6TH

8:00 AM - 8:45 AM
PLENARY – KEYNOTE – DR. KENNETH S. JOHNSON: BIOARGO: A GLOBAL SCALE CHEMICAL SENSOR NETWORK TO OBSERVE CARBON, OXYGEN, AND NITROGEN CYCLES IN THE OCEAN
Maryland BC
Session Chair: Yogesh Gianchandani (University of Michigan, Ann Arbor, USA)

8:00 AM
BIOARGO: A GLOBAL SCALE CHEMICAL SENSOR NETWORK TO OBSERVE CARBON, OXYGEN, AND NITROGEN CYCLES IN THE OCEAN
Kenneth S. Johnson
Monterey Bay Aquarium Research Institute, United States

9:00 AM - 10:15 AM
C1L-A: ELECTROCHEMICAL SENSORS
Maryland F
Session Chairs: Joannis Raptis (NCSR Demokritos, Greece), Babak Ziaie (Purdue University, USA)

9:00 AM
ACOUSTIC TWEEZERS: MANIPULATING PARTICLES, CELLS, AND ORGANISMS USING STANDING SURFACE ACOUSTIC WAVES (SSAW)
Tony Jun Huang
Pennsylvania State University, United States

9:30 AM
MICROSTRUCTURING CONDUCTING POLYMERS AND MOLECULARLY IMPRINTED POLYMERS BY LIGHT-ACTIVATED ELECTROPOLYMERIZATION ON MICROMACHINED SILICON. APPLICATIONS IN ELECTROCHEMICAL SENSING
Elisabetta Mazzotta¹, Cosimino Malitesta¹, Salvo Surdo², Giuseppe Barillaro²
¹Università del Salento, Italy; ²Università di Pisa, Italy

9:45 AM
SCALE-DOWN EFFECTS: TOWARDS MINIATURIZATION OF AN ELECTROCHEMICAL SENSOR USING BIOMOLECULES
Faheng Zang, Xiao Zhu Fan, Konstantinos Gerasopoulos, Hadar Ben-Yoav, Adam Brown, James Culver, Reza Ghodssi
University of Maryland, United States

10:00 AM
ULTRA-HIGH SCANNING SPEED CHEMICAL IMAGE SENSOR BASED ON LIGHT ADDRESSABLE POTENTIOMETRIC SENSOR WITH ANALOG MICRO-MIRROR
Anirban Das, Tsung-Cheng Chen, Yi-Ting Lin, Chao-Sung Lai, Yuan-Hui Liao, Chia-Ming Yang
Chang Gung University, Taiwan
9:00 AM - 10:15 AM  
**C1L-B: POWER APPLICATIONS**  
Maryland E  
Session Chairs: Mitsuhiro Shikida (Nagoya University, Japan), Ruby Ghosh (Michigan State University, USA)

9:00 AM  
**DEVELOPMENT OF A THIN-FILM THERMOCOUPLE MATRIX FOR IN-SITU TEMPERATURE MEASUREMENT IN A LITHIUM ION POUCH CELL**  
Nora Martiny\(^1\), Jan Geder\(^2\), Yuxi Wang\(^2\), Werner Kraus\(^1\), Andreas Jossen\(^1\)  
\(^1\)Technical University of Munich, Germany; \(^2\)TUM CREATE, Singapore

9:15 AM  
**A FLUIDIC MICROENERGY GENERATOR ENABLED BY HYBRID NANOMATERIAL NANOFLOIDS**  
Yuan He, Shiva Vasiraju, Long Que  
Louisiana Tech University, United States

9:30 AM  
**ACHIEVING MAXIMUM POWER EFFICIENCY OF A NOVEL RECTIFIER CHARGE PUMP BY IMPEDANCE MATCHING IN AN ENERGY HARVESTER SUITED FOR SELF-POWERED SENSORS**  
Paul C.-P. Chao, Chao-Te Chiang, Tzu-Chia Huang, Chun-Kai Chang  
National Chiao Tung University, Taiwan

9:45 AM  
**HIGH-VOLTAGE GENERATION USING A CMOS IMAGE SENSOR WITH DUAL PHOTO-SENSING AND ENERGY HARVESTING CAPABILITIES**  
Hsuan-Tsung Wang\(^2\), Walter Leon-Salas\(^1\)  
\(^1\)Purdue University, United States; \(^2\)University of Missouri-Kansas City, United States

10:00 AM  
**A SELF-POWERED PHOTORECEIVER SWITCH DETECTS ONLY RISING EDGE OF INFRARED-LIGHT PULSE FOR WIRELESS ZERO-STANDBY-POWER WAKE-UP RECEIVER**  
Fumiyasu Utsunomiya, Ami Tanaka, Takakuni Douseki  
Ritsumeikan University, Japan

9:00 AM - 10:15 AM  
**C1L-C: VISCOSITY, DENSITY AND FLOW SENSORS**  
Maryland A  
Session Chair: Patrick Ruther (University of Freiburg, Germany)

9:00 AM  
**EXPERIMENTAL AND THEORETICAL EVALUATION OF THE ACHIEVABLE ACCURACIES OF RESONATING VISCOSSITY AND MASS DENSITY SENSORS**  
Martin Heinisch, Thomas Voglhuber-Brunnmaier, Erwin K. Reichel, Bernhard Jakoby  
Johannes Kepler University, Austria
9:15 AM
VISCOSITY AND DENSITY SENSOR PRINCIPLE BASED ON DIAMAGNETIC LEVITATION USING PYROLYTIC GRAPHITE
Stefan Clara, Hannes Antlinger, Wolfgang Hilber, Bernhard Jakoby
Johannes Kepler University, Austria

9:30 AM
MODELING APPROACHES FOR ELECTRODYNAMICALLY DRIVEN VISCOSITY AND MASS DENSITY SENSORS OPERATED IN THE KHZ RANGE AND EXPERIMENTAL VERIFICATIONS
Martin Heinisch, Thomas Voglhuber-Brunnmaier, Erwin K. Reichel, Bernhard Jakoby
Johannes Kepler University, Austria

9:45 AM
LOW PRESSURE SPHERICAL THERMAL ANEMOMETER FOR SPACE MISSIONS
Lukasz Kowalski, Vicente Jiménez, Manuel Domínguez-Pumar, Sergi Gorreta, Santiago Silvestre, Luis Castañer
Universitat Politècnica de Catalunya (UPC), Spain

10:00 AM
A NEW METHOD FOR THE VELOCITY MEASUREMENT OF GAS-LIQUID TWO-PHASE FLOW
Ying Zhou, Zhiyao Huang, Baoliang Wang, Haifeng Ji, Haiqing Li
ZheJiang University, China

9:00 AM - 10:15 AM
C1L-D: OPTICAL IMAGING SENSORS
Maryland D
Session Chairs: John X.J. Zhang (University of Texas at Austin, USA), Michiel Vellekoop (University of Bremen - IMSAS, Germany)

9:00 AM
TRENDS IN SMALL-FORMAT INFRARED ARRAY SENSORS
Masafumi Kimata
Ritsumeikan University, Japan

9:30 AM
A HIGH-SPEED POLAR-SYMMETRIC IMAGER FOR REAL-TIME CALIBRATION OF ROTATIONAL INERTIAL SENSORS
Ben Johnson, Changhyuk Lee, Sriram Sivaramakrishnan, Al Molnar
Cornell University, United States

9:45 AM
A COMBINED TACTILE AND PROXIMITY SENSING EMPLOYING A COMPOUND-EYE CAMERA
Kazuhiro Shimonomura, Hiroto Nakashima
Ritsumeikan University, Japan

10:00 AM
CMOS SENSOR FOR SUN TRACKING
Hongyi Wang¹, Tao Luo¹, Hongjiang Song¹, Jennifer Blain Christen¹
¹Arizona State University, United States; ²Xi’an Jiaotong University, China
9:00 AM - 10:15 AM
C1L-E: WIRELESS SENSOR NETWORKS FOR TARGETS & OBJECTS
Watertable ABC
Session Chairs: Geoffrey Cranch, Tracie Severson (US Naval Academy, USA)

9:30 AM
ITERATIVE INTERFERENCE MANAGEMENT IN CODED PASSIVE WIRELESS SENSORS
Ali Abedi\textsuperscript{2}, Kristen Zyck\textsuperscript{1}
\textsuperscript{1}University of Florida, United States; \textsuperscript{2}University of Maine, United States

9:45 AM
DISTRIBUTED MULTI-TARGET SEARCH AND TRACK ASSIGNMENT USING CONSENSUS-BASED COORDINATION
Tracie Severson, Derek Paley
University of Maryland, United States

10:00 AM
TOWARDS A PERPETUAL WIRELESS SENSOR NODE
Ariton Xhafa\textsuperscript{1}, Bradford Campbell\textsuperscript{2}, Srinath Hosur\textsuperscript{1}
\textsuperscript{1}Texas Instruments, Inc., United States; \textsuperscript{2}University of Michigan, United States

9:00 AM - 10:15 AM
C1L-F: MATERIALS & FABRICATION II
Homeland
Session Chairs: Tao Li (University of Michigan, USA), Eugene Hwang (Analog Devices, USA)

9:00 AM
TITANIUM NITRIDE (TIN) AS A GATE MATERIAL IN BICMOS DEVICES FOR BIOMEDICAL IMPLANTS
Nishant Lawand\textsuperscript{2}, Henk van Zeijl\textsuperscript{2}, Paddy French\textsuperscript{2}, Jeroen Briaire\textsuperscript{1}, Johan Frijns\textsuperscript{1}
\textsuperscript{1}Leiden University Medical Centre, Netherlands; \textsuperscript{2}Delft University of Technology, Netherlands

9:15 AM
A CMOS-COMPATIBLE METAMATERIAL TO ENHANCE THE FRONT TO BACK RADIATION RATIO IN TERAHERTZ ANTENNA FOR SENSING APPLICATION
Giuseppe Fiorentino, Waqas Syed, Fabio Santagata, Marco Spirito, Gregory Pandraud, Andrea Neto, Pasqualina M. Sarro, Aurele J.L. Adam
Technische Universiteit Delft, Netherlands

9:30 AM
POLYCRYSTALLINE DIAMOND CIRCULAR RESONANT DIAPHRAGMS WITH LOW ONSET OF NONLINEAR RESPONSE
Andrew Barnes, Christian Zorman
Case Western Reserve University, United States
9:45 AM
NOVEL IMPEDANCE MATCHING MATERIALS AND STRATEGIES FOR AIR-COUPLED PIEZOELECTRIC TRANSDUCERS
Tomas Gómez Álvarez-Arenas, Luis Díez
Spanish National Research Council (CSIC), Spain

10:00 AM
DESIGN AND IMPLEMENTATION OF COLLAGEN-BASED CAPACITIVE RELATIVE HUMIDITY SENSORS
Steven Shapardanis, Mathew Hudspeth, Tolga Kaya
Central Michigan University, United States
C2P-G1
N719-DYE SENSITIZED AMORPHOUS ZINC OXIDE FILMS FOR NO2 DETECTION UNDER VISIBLE-LIGHT ILLUMINATION
Chao Zhang, Marjorie Olivier, Marc Debliquy
University of Mons, Belgium

C2P-G2
ODOR SPATIAL DISTRIBUTION VISUALIZED BY A FLUORESCENT IMAGING SENSOR
Chuanjun Liu, Ryohei Yokoyama, Seiichi Uchida, Koji Nakano, Kenshi Hayashi
Kyushu University, Japan

C2P-G3
GAS SENSING STUDIES OF AN N-N HETEROJUNCTION METAL OXIDE SEMICONDUCTOR SENSOR ARRAY BASED ON WO3 AND ZNO COMPOSITES
Anupriya Naik², Ivan Parkin², Russell Binions¹
¹Queen Mary University of London, United Kingdom; ²University College London, United Kingdom

C2P-G4
INVESTIGATION OF SH-SAW SENSORS FOR TOXIC HEAVY METAL DETECTION
Zeinab Ramshani, Binu Baby Narakathu, Sepehr Emamian, Sai Guruva Reddy Avuthu, Massood Zandi Atashbar
Western Michigan University, United States

C2P-G5
TOWARDS THE REALIZATION OF A MEMS-BASED PHOTOACOUSTIC CHEMICAL SENSOR USING ULTRACOMPACT EC-QCL (SPRITEIR)
Ellen Holthoff, Logan Marcus, Paul Pellegrino
US Army Research Laboratory, United States

C2P-G6
DIELECTRIC POWDER CHARACTERIZATION BY RADIO FREQUENCY MEASUREMENTS TECHNIQUE FOR HYDROGEN SENSOR APPLICATIONS: APPLICATION TO IRON OXIDE
Naimi Boubekour, Hatem El Matbouly, Frederic Domingue
Université du Québec à Trois-Rivières, Canada

C2P-G7
FUNCTIONALIZED SINGLE ZNO-METAL JUNCTION AS A PH SENSOR
Paolo Motto², Valentina Cauda¹, Stefano Stassi², Giancarlo Canavese², Danilo Demarchi¹,²
¹Istituto Italiano di Tecnologia, Italy; ²Politecnico di Torino, Italy
C2P-G8
CALIBRATION OF SMALL RESISTIVE COMMERCIAL SENSORS TO MEASURE OZONE WITH THE INTERFERENCE OF TEMPERATURE AND HUMIDITY
Manuel Aleixandre\textsuperscript{1}, Maria Del Carmen Horrillo\textsuperscript{1}, Michel Gerboles\textsuperscript{2}, Laurent Spinelle\textsuperscript{2}
\textsuperscript{1}ITEFI-CSIC, Spain; \textsuperscript{2}Joint Research Centre, Italy

C2P-G9
CU2O BASED ELECTROCHEMICAL SENSOR FOR DIRECT GLUCOSE DETECTION
Petra Majzlikova\textsuperscript{1}, Jan Prasek, Jana Chomoucka\textsuperscript{1}, Jana Drbohlavova\textsuperscript{1}, Jan Pekarek\textsuperscript{1}, Radim Hrdy\textsuperscript{1}, Jaromir Hubalek\textsuperscript{1}, Libuse Trnkova\textsuperscript{2}
\textsuperscript{1}Brno University of Technology, Czech Republic; \textsuperscript{2}Masaryk University, Czech Republic

C2P-G10
ATOMIC LAYER DEPOSITED TiO2 THIN FILMS FOR ENVIRONMENTAL GAS SENSING
Steven Mills, Bongmook Lee, Veena Misra
North Carolina State University, United States

C2P-G11
SELECTIVE MULTIMODAL GAS SENSING IN EPITAXIAL GRAPHENE BY FOURIER TRANSFORM INFRARED SPECTROSCOPY
Shamaita Shetu, B. K. Daas, Kevin Daniels, Tangali Sudarshan, Goutam Koley, Mvs Chandrashekhar
University of South Carolina, United States

C2P-G12
POLYNUCLEOTIDE-FUNCTIONALIZED GOLD NANOPARTICLES AS CHEMIRESISTIVE VAPOR SENSING ELEMENTS
Kan Fu\textsuperscript{1}, Wyatt Pedrick\textsuperscript{2}, Han Wang\textsuperscript{2}, Andrew LaMarche\textsuperscript{2}, Xiaoqiang Jiang\textsuperscript{2}, Brian Willis\textsuperscript{2}, Shihui Li\textsuperscript{1}, Yong Wang\textsuperscript{1}
\textsuperscript{1}Pennsylvania State University, United States; \textsuperscript{2}University of Connecticut, United States

10:15 AM - 12:15 PM
C2P-H: APPLICATIONS II
Poster Area - Baltimore AB
Session Chair: David Horsley (University of California, Davis, USA)

C2P-H1
A CMOS INTELLIGENT LIGHT SENSING CHIP FOR AUTOMATIC BRIGHTNESS TUNING APPLICATIONS
Cheng-Ta Chiang, Jia-Yao Liou
National Chia Yi University, Taiwan

C2P-H2
DUAL SIX-PORT BASED DIRECTION-OF-ARRIVAL DETECTOR FOR FMCW RADAR TRACKING IN THE ISM BAND AT 24 GHZ
Gabor Vinci\textsuperscript{1}, Stefan Lindner\textsuperscript{1}, Sebastian Mann\textsuperscript{1}, Francesco Barbon\textsuperscript{1}, Robert Weigel\textsuperscript{1}, Alexander Koelpin\textsuperscript{1}
\textsuperscript{1}University of Erlangen-Nuremberg Germany; \textsuperscript{2}InnoSenT GmbH, Germany
C2P-H3
A WIRELESS LASER SENSOR WEB FOR HUMAN GAIT DISORDER RECOGNITION BASED ON THE BUFFON'S NEEDLE MODEL
Rui Ma, Qi Hao
University of Alabama, United States

C2P-H4
SUPERVISED MACHINE LEARNING SCHEME FOR TRI-AXIAL ACCELEROMETER-BASED FALL DETECTOR
Alessandro Leone, Gabriele Rescio, Pietro Siciliano
CNR-Institute for Microelectronics and Microsystems, Italy

C2P-H5
MOBILE APPLICATION BASED SUSTAINABLE IRRIGATION WATER USAGE DECISION SUPPORT SYSTEM: AN INTELLIGENT SENSOR CLOUD APPROACH
Cecil Li¹, Ritaban Dutta¹, Corne Kloppers¹, Claire D'Este¹, Ahsan Morshed¹, Auro Almeida¹, Aruneema Das², Jagannath Aryal²
¹Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; ²University of Tasmania, Australia

C2P-H6
ROCK COLLAPSE FORECASTING: A NOVEL APPROACH BASED ON THE CLASSIFICATION OF MICRO-ACOUSTIC SIGNALS IN THE WAVELET DOMAIN
Stavros Ntalampiras, Manuel Roveri
Politecnico di Milano, Italy

C2P-H7
S³MD, STRESS SENSITIVE SURFACE MOUNTED DEVICES FOR IN-SITU MONITORING OF MECHANICAL PROCESSES IN PCB MANUFACTURING
Soeren Majcherek, Soeren Hirsch, Bertram Schmidt
Otto-von-Guericke-University Magdeburg, Germany

C2P-H8
SELF-POWERED WIRELESS DIGITAL TACHOMETER SCHEME WITHOUT SENSORS FOR MEASURING SPIN OF YO-YO
Itaru Asakura, Ami Tanaka, Hisashi Nishikawa, Takakuni Douseki
Ritsumeikan University, Japan

C2P-H9
SELF-POWERED WIRELESS DIGITAL TACHOMETER SCHEME WITHOUT SENSORS FOR MEASURING SPIN OF YO-YO
Itaru Asakura, Ami Tanaka, Hisashi Nishikawa, Takakuni Douseki
Ritsumeikan University, Japan

C2P-H10
DETECTION OF TATP PRECURSORS WITH MOX GAS SENSORS COMBINED WITH SOLID PHASE MICRO EXTRACTION
Jesús Lozano, José Ignacio Suárez, José Manuel Ordiales, Teodoro Aguilera
University of Extremadura, Spain
C2P-H11
PARTICLE FILTERING TO IMPROVE THE DYNAMIC ACCURACY OF ELECTROMAGNETIC TRACKING
Hasan Sen, Peter Kazanzides
Johns Hopkins University, United States

C2P-H12
COMPARATIVE STUDY OF MOISTURE MEASUREMENTS BY TIME DOMAIN TRANSMISSOMETRY
Bianca Will, Ilona Rolfes
Ruhr-University Bochum, Germany

C2P-H13
WATER VELOCIMETER AND TURBIDITY-METER USING VISIBLE LIGHT COMMUNICATION MODULES
Cheng-Chun Chang¹, Chien-Ta Wu², Yung-Bin Lin¹, Meng-Huang Gu¹
¹National Center for Research on Earthquake Engineering, Taiwan; ²National Taipei University of Technology, Taiwan

C2P-H14
WEARABLE MULTI-SENSOR GESTURE RECOGNITION FOR PARALYSIS PATIENTS
Alexander Nelson², Prashanth Shyamkumar¹, William Wilkins¹, David Lachut⁴, Nilanjan Banerjee⁴, Sami Rollins⁵, James Parkerson¹, Vijay Varadan¹
¹University of Arkansas, United States; ²University of Maryland, Baltimore County, United States; ³University of San Francisco, United States

C2P-H15
A WIRELESS-ENABLED SENSOR SYSTEM FOR DISTRIBUTED RADIATION DETECTION ON ANDROID CELLPHONES
Yu Sui, Tao Li
University of Michigan, United States

10:15 AM - 12:15 PM
C2P-J: FLUIDIC AND MISCELLANEOUS SENSORS
Poster Area - Baltimore AB
Session Chair: Babak Ziaie (Purdue University, USA)

C2P-J1
METALLIC AND CERAMIC THIN FILM THERMOCOUPLES FOR GAS TURBINE ENGINE APPLICATIONS
Ian Tougas, Otto Gregory
University of Rhode Island, United States

C2P-J2
AIRBORNE ULTRASONIC SENSOR NODE FOR DISTANCE MEASUREMENT
Enrique A. Vargas Cabral, Isidro Valdez
Catholic University Asuncion, Paraguay
C2P-J3
TEMPERATURE-COMPENSATED CATHETER FLOW SENSOR AND ITS APPLICATION TO BREATHING MEASUREMENT IN A MOUSE
Takayuki Yamada, Yudai Yamazaki, Takuya Matsuyama, Mitsuhiro Shikida, Miyoko Matsushima, Tsutomu Kawabe
Nagoya University, Japan

C2P-J4
ORBITING SPHERE VISCOMETER OPERATED IN RESONANT ORBITING MODE
Stefan Clara, Hannes Antlinger, Wolfgang Hilber, Bernhard Jakoby
Johannes Kepler University, Austria

C2P-J5
PROPOSAL OF SHEAR STRESS SENSOR BASED ON OPTICAL DETECTION
Yuta Eto, Syunji Shibata, Mitsuhiro Shikida
Nagoya University, Japan

C2P-J6
PARAMETRIC AMPLIFICATION IN A MICRO CORIOLIS MASS FLOW SENSOR: REDUCTION OF POWER DISSIPATION WITHOUT LOSS OF SENSITIVITY
University of Twente, Netherlands

C2P-J7
WIDE SPAN THERMAL WIND SENSOR SYSTEM WITH DUAL CHIPS
Lin Zhou, Sheng-Qi Cheng, Tian-Yu Xiang, Ming Qin, Bei Chen, Qing-An Huang
Southeast University, China

C2P-J8
A NEW SENSOR FOR THE VOID FRACTION MEASUREMENT OF GAS-LIQUID TWO-PHASE FLOW
Ya Chang, Zhiyao Huang, Baoliang Wang, Haifeng Ji, Haiqing Li
Zhejiang University, China

C2P-J9
GAS CONCENTRATION AND FLOW SPEED MEASUREMENTS USING A POLYMER-BASED MEMBRANE SENSOR
Christoph Hepp¹, Florian Krogmann¹, Gerald Urban²
¹Innovative Sensor Technology IST AG, Switzerland; ²University of Freiburg, Germany

C2P-J10
ENERGY-EFFICIENT, 0.1 NJ/CONVERSION TEMPERATURE SENSOR WITH TIME-TO-DIGITAL CONVERTER AND 1 °C ACCURACY IN -6 TO 64 °C RANGE
Oleg Nizhnik¹, Kohei Higuchi¹, Kazusuke Maenaka¹, Travis Bartley²
¹Japan Science and Technology Agency, Japan; ²Tohoku University, Japan
C2P-J11
PAPER-BASED MEMS HAIR CELL ARRAY
Kevin Crowley, Diana Nakidde, Jeffrey Travis, Masoud Agah
Virginia Tech, United States

C2P-J12
MICROWAVE DOPPLER FLOW SENSOR FOR CHEMICAL LOOPING COMBUSTION SYSTEMS
David Greve¹, Irving Oppenheim¹, Benjamin Chorpening², Jared Charley²,³
¹Carnegie Mellon University, United States; ²National Energy Technology Laboratory, United States; ³URS Corporation, United States

10:15 AM - 12:15 PM
C2P-K: OPTICAL SENSORS II
Poster Area - Baltimore AB
Session Chairs: Carlos Ruiz-Zamarreno (Universidad Publica de Navarra, Spain), Ignacio R. Matias (Universidad Publica de Navarra, Spain)

C2P-K1
TEMPERATURE EFFECTS IN CHROMATIC CONFOCAL DISTANCE SENSORS
Garry Berkovic, Shlomo Zilberman, Ehud Shafir
Soreq NRC, Israel

C2P-K2
AN EVENT-DETECTION HIGH DYNAMIC RANGE CMOS IMAGE SENSOR
Gözen Köklü, Dechao Sun, Yusuf Leblebici, Giovanni De Micheli, Sandro Carrara
Swiss Federal Institute of Technology (EPFL), Switzerland

C2P-K3
DISTRIBUTED TEMPERATURE MONITORING USING OFDR-BASED RAYLEIGH BACKSCATTERING FOR LIQUID SODIUM LEAKAGE DETECTION
Romain Cotillard¹, Guillaume Laffont¹, Ekaterina Boldyreva¹, Pierre Ferdinand¹, Denis Cambet², Serge Albaladéjo², Pierre Charvet², Jean-Philippe Jeannot², Gilles Rodriguez²
¹CEA, LIST, France; ²CEA, DTN, France

C2P-K4
OPTOFLUIDIC OUT-OF-PLANE INTERFEROMETER
Lukas Brandhoff, Michael Johannes Vellekoop
University of Bremen, Germany

C2P-K5
SENSITIVITY ENHANCEMENT OF A HUMIDITY SENSOR BASED ON POLY(SODIUM PHOSPHATE) AND POLY(ALLYLAMINE HYDROCHLORIDE)
Miguel Hernaez, Diego Lopez-Torres, Cesar Elosua, Ignacio Raul Matias, Francisco Javier Arregui
Public University of Navarra, Spain
C2P-K6
VIBRATION MONITORING WITH A SILICON MICRO-FABRICATED DEVICE COUPLED TO AN OPTICAL FIBER
Jose Mireles Jr.1,2, Angel Sauceda2, Juan Ibarra2, Ivan Muñoz2, Gustavo Lara2, Roberto Ambrosio2, Abimael Jimenez2, Estrada V. Horacio1
1Centro Nacional de Metrologia, Mexico; 2Universidad Autonoma de Ciudad Juarez, Mexico

C2P-K7
DEFECT-ASSISTED PLASMONIC SENSING
Jayson Briscoe1, Sang-Yeon Cho1, Igal Brener2
1New Mexico State University, United States; 2Sandia National Laboratories, United States

C2P-K8
A 3T LINEAR-LOGARITHMIC CMOS IMAGE SENSOR
Santosh Koppa, Youngjoong Joo
University of Texas at San Antonio, United States

C2P-K9
A 10.6µM X 10.6µM CMOS SPAD WITH INTEGRATED READOUT
Khandaker A. Al Mamun, Mohammad Habib, David Bishai, Nicole McFarlane
University of Tennessee, Knoxville, United States

C2P-K10
PLASMONIC AND BOLOMETRIC TERAHERTZ GRAPHENE SENSORS
Michael Shur2, Andrey Muraviev2, Sergey Rumyantsev2, Wojtech Knap3, Guanxiong Liu1, Alexander Balandin1
1University of California, Riverside, United States; 2Rensselaer Polytechnic Institute, United States; 3Université Montpellier 2, France

C2P-K11
PORTABLE OPTICAL SENSOR USING TUNABLE OPTICAL MULTILAYERS
Andras Kovacs, Aina Malisauskaite, Alexey Ivanov, Ulrich Mescheder
Hochschule Furtwangen University, Germany

C2P-K12
IN-FIBER INTERFEROMETERS FOR TEMPERATURE CORRECTED REFRACTIVE INDEX SENSING WITH GUIDED AND LEAKY MODES
Jeremie Harris, Ping Lu, Hugo Larocque, Liang Chen, Xiaoyi Bao
University of Ottawa, Canada

C2P-K13
DISCRIMINATION OF TEMPERATURE AND AXIAL STRAIN USING DISPERSION EFFECTS OF HIGH-ORDER-MODE FIBERS
Yanping Xu2, Ping Lu1,2, Jia Song2, Liang Chen2, Xiaoyi Bao2, Xiaopeng Dong3
1National Research Council Canada, Canada; 2University of Ottawa, Canada; 3Xiamen University, China
C2P-L1
EFFECT OF LOCATION ON THE LATENCY IN CLUSTER-BASED WSNS
Deepa Padmanabhan, Fabrice Labeau
McGill University, Canada

C2P-L2
DEVELOPMENT OF SUSPENDED PLANAR TWO PORT MICRO TRANSFORMER FOR RF WIRELESS APPLICATION
I-Yu Huang, Wen-Hui Huang, Chian-Hao Sun
National Sun Yat-sen University, Taiwan

C2P-L3
A NEW NON-INVASIVE VOLTAGE MEASUREMENT METHOD FOR WIRELESS ANALYSIS OF ELECTRICAL PARAMETERS AND POWER QUALITY
Domenico Balsamo¹, Danilo Porcarelli², Luca Benini², Davide Brunelli¹
¹University of Trento, Italy; ²University of Bologna, Italy

C2P-L4
PERFORMANCE OF DMSA ALGORITHM IN HYBRID SENSOR NETWORKS
Ariton Xhafa, Xiaolin Lu, Ryan Nuzzaci, Jianwei Zhou
Texas Instruments, Inc., United States

C2P-L5
LIGHTWEIGHT DIGITAL HARDWARE RANDOM NUMBER GENERATORS
Teng Xu, Miodrag Potkonjak
University of California, Los Angeles, United States

C2P-L6
VOLTAGE-BASED ESTIMATION OF RESIDUAL BATTERY ENERGY IN WIRELESS SENSOR SYSTEMS
Jaeung Kim, Dong Kun Noh
Soongsil University, Korea, South

C2P-L7
CLUSTER HEAD LOAD DISTRIBUTION SCHEME FOR WIRELESS SENSOR NETWORKS
Prasenjit Chanak, Tuhina Samanta, Indrajit Banerjee
Bengal Engineering and Science University, Shibpir, India

C2P-L8
DISTRIBUTED CLUSTERING ALGORITHM FOR MOBILE WIRELESS SENSORS NETWORKS
Fatih Djemili², Wessam Ajib¹, Abdellatif Obaid¹
¹Université du Quebec a Montréal, Canada; ²Badji Mokhtar-Annaba University, Algeria
C2P-L9
REGION BASED THREE DIMENSIONAL REAL-TIME ROUTING PROTOCOL FOR WIRELESS SENSOR NETWORKS
Sarab Al Rubeaai, Brajendra Singh, Mehmmood Abd, Kemal Tepe
University of Windsor, Canada

10:15 AM - 12:15 PM
C2P-M: OTHER SENSORS TOPICS II
Poster Area - Baltimore AB
Session Chair: Goutam Koley (University of South Carolina, USA)

C2P-M1
CALIBRATION OF GRADIOMETER BY SOLVING NONLINEAR EQUATIONS AND ITS PARAMETERS GENERALITY TEST
Hongfeng Pang, Mengchun Pan, Jiafei Hu, Dixiang Chen, Feilu Luo
National University of Defense Technology, China

C2P-M2
ANALYSIS OF MECHANICAL STRENGTHENING OF SI CANTILEVER BY CHEMICAL KOH ETCHING
Yosuke Niimi, Tatsuya Hasegawa, Tomoaki Sugino, Satoshi Hamaoka, Kenji Fukuzawa, Mitsuhiro Shikida
Nagoya University, Japan

C2P-M3
STUDY OF NON-SPECIFIC PROTEIN ABSORPTION OF GLUCOSE SENSORS COATED WITH ELECTRO-POLYMERIZED ZWITTERIONIC HYDROGEL
Yichuan Hu, Guang Yang, Bo Liang, Lu Fang, Keda Shi, Xuesong Ye
Zhejiang University, China

C2P-M4
DESIGN AND IMPLEMENTATION OF A SELF-CALIBRATING, COMPACT MICRO STRIP SENSOR FOR IN-SITU DIELECTRIC SPECTROSCOPY AND DATA TRANSMISSION
Gunjan Pandey, Ratnesh Kumar, Robert Weber
Iowa State University, United States

C2P-M5
THE EFFECT OF TRUE HUMAN SYNOVIAL FLUID ON THE FUNCTIONALITY OF AN IN VIVO PRESSURE SENSOR ELEMENT
Ingelin Clausen, Lars Geir Whist Tvedt, Sigurd Moe, Andreas Vogl
SINTEF, Norway

C2P-M6
AN EXOTHERMAL ENERGY RELEASE LAYER FOR MICROCHIP TRANSIENCE
Shashank Pandey, Carlos Mastrangelo
University of Utah, United States

C2P-M7
ACOUSTIC AND ELECTRICAL PROPERTIES OF CA3TAGA3Si2O14 PIEZOELECTRIC RESONATORS AT ELEVATED TEMPERATURES
Ward Johnson¹, Michal Schulz¹, Holger Fritze¹
¹Clausthal University of Technology, Germany; ²National Institute of Standards and Technology, United States
C2P-M8
DEEP NLD PLASMA ETCHING OF FUSED SILICA AND BOROSILICATE GLASS
Mohammed Jalal Ahamed, Doruk Senkal, Alexander Trusov, Andrei Shkel
University of California, Irvine, United States

C2P-M9
LONG-TERM THERMAL MECHANICAL STABILITY OF PECVD AMORPHOUS SILICON CARBIDE FILMS FOR HARSH ENVIRONMENT MICROELECTROMECHANICAL SYSTEMS
Michael LaBarbera¹, Christian Zorman¹, Maximilian Scardelletti²
¹Case Western Reserve University, United States; ²NASA Glenn Research Center, United States

C2P-M10
TIOX MEMRISTORS WITH VARIABLE TURN-ON VOLTAGE USING FIELD-EFFECT FOR NON-VOLATILE MEMORY
Pradeep Pai, Faisal Chowdhury, Tien-Vinh Dang-Tran, Massood Tabib-Azar
University of Utah, United States

C2P-M11
MOX GAS SENSORS USING MULTILAYER AEROGEL
Sanjay Kumar, Mohammad Madani, Mohammad Seyedjalali
University of Louisiana at Lafayette, United States

C2P-M12
A ROBUST VACNF PLATFORM FOR ELECTROCHEMICAL BIOSENSOR
Khandaker A. Al Mamun³, Fahmida S. Tulip³, Kimberly MacArthur³, Nicole McFarlane³, Syed Kamrul Islam³, Dale Hensley¹, Ivan I. Kravchenko¹
¹Oak Ridge National Laboratory, United States; ²University of Tennessee, Knoxville, United States

C2P-M13
SHORT-RANGE REMOTE POWERING FOR LONG-TERM IMPLANTED SENSOR SYSTEMS IN FREELY MOVING SMALL ANIMALS
Enver G. Kilinc¹, Franco Maloberti², Catherine Dehollain¹
¹Ecole Polytechnique Federale de Lausanne, Switzerland; ²Università degli Studi di Pavia, Italy

C2P-M14
POWER-ERROR ANALYSIS OF SENSOR ARRAY REGRESSION ALGORITHMS FOR GAS MIXTURE QUANTIFICATION IN LOW-POWER MICROSYSTEMS
Yuning Yang, Jinfeng Yi, Rong Jin, Andrew Mason
Michigan State University, United States

C2P-M15
A BULK MICROMACHINED SILICON NEURAL PROBE WITH NANOPOROUS PLATINUM ELECTRODE FOR LOW IMPEDANCE RECORDING
Yijae Lee, Su Jin Lee, Hyosang Yoon, Jae Young Park
Kwangwoon University, Korea, South
C2P-M16
ENHANCING MEASUREMENT ACCURACY OF POSITION SENSITIVE DETECTOR (PSD) SYSTEMS USING THE KALMAN FILTER AND DISTORTION RECTIFYING
Yudong Luo, Yantao Shen, Jose Cordero, Josette Zaklit
University of Nevada, Reno, United States

C2P-M17
SPECTRAL ESTIMATION USING DUAL SENSORS WITH UNCORRELATED NOISE
Andrew Fleming, Brett Ninness, Adrian Wills
University of Newcastle, Australia

C2P-M18
RESOLUTION OF SENSORS WITH CAPACITIVE SOURCE IMPEDANCE
Yik Ren Teo, Andrew Fleming
University of Newcastle, Australia

10:15 AM - 12:15 PM
C2P-N: OPEN POSTER II
Poster Area - Baltimore AB
Session Chairs: Troy Nagle (North Carolina State University, USA)

C2P-N1
OPTICAL PHASE-SHIFT EFFECTS FROM SURFACE ADSORPTION IN TRANSPARENT POLYMERS: APPLICATION OF WAVEFRONT DISTORTION MEASUREMENTS TO CHEMICAL SENSORS
Donald Snyder
Eastern Michigan University, United States

C2P-N2
ROGOWSKI COIL SENSOR AND INTEGRATOR: OPERATION AND DEPENDENCE ON VARIOUS PHYSICAL PARAMETERS
Arash Hajjam, Sam Seyfi, C. Scott Brown, George Langer, Mitch Morse
Magnelab Inc, United States

C2P-N3
FREQUENCY DOMAIN MEASUREMENTS FOR VIBRATIONAL NOISE REMOVAL
William Wilson\(^1\), Gary Atkinson\(^2\)
\(^1\)NASA Langley Research Center, United States; \(^2\)Virginia Commonwealth University, United States

C2P-N4
DEVELOPMENT OF A HIGH SPEED AIR-COUPLED DUAL-CHANNEL IMPULSE GROUND PENETRATING RADAR FOR TRANSPORTATION INFRASTRUCTURE SAFETY INSPECTION
Yu Zhang, Anbu Venkatac, Tian Xia, Dryver Huston
University of Vermont, United States
C2P-N5
IMAGE-BASED SPECTROSCOPY FOR ENVIRONMENTAL MONITORING
Alpha Mansaray, Rosalind Wynne, Eduard Bachmakov, Carolyn Molina
Villanova University, United States

C2P-N6
WEBCAM AND SMART-PHONE FOR PASSIVE EMISSION COLORIMETRIC SENSORS OF FORMALDEHYDE
Jietae Lee3, Seungjae Lee2, Young Hoon Na1, Sin Kim3, Jiryang Lee1
1Corny Tech Inc., Korea, South; 2Johns Hopkins University, United States; 3Kyungpook National University, Korea, South

C2P-N7
AC/DC LINEAR MAGNETIC SCANNER FOR BUILDING INDUSTRY
Ales Zikmund2, Jan Vyhnanek2, Michal Janosek1
1FEE, CTU in Prague, Czech Republic; 2UCEEB, CTU in Prague, Czech Republic

C2P-N8
FLEXIBLE NEEL EFFECT CURRENT SENSOR
Eric Vourc'H3, Pierre-Yves Joubert1, Lionel Cima2
1IEF CNRS, France; 2Neelogy, France; 3SATIE CNRS, France

C2P-N9
WORK FUNCTION FLUCTUATIONS FOR SENSING BY POLYANILINE FILMS
Ryan West2, Mira Josowicz1, Jiri Janata1
1Georgia Institute of Technology, United States; 2National Institute of Standards and Technology, United States

C2P-N10
DESIGN AND ELECTRO-THERMAL ANALYSIS OF SURFACE MICROMACHINED PERFORATED MEMBRANE HOTPLATE FOR CHEMICAL GAS SENSOR APPLICATIONS
Amit Kumar, Golla Eranna
CSIR-CEERI, India

C2P-N11
A COMPACT, VERSATILE SIX-PORT RADAR SENSOR FOR INDUSTRIAL AND MEDICAL APPLICATIONS
Sarah Linz2, Gabor Vinci1, Stefan Lindner2, Sebastian Mann2, Francescos Barbon2, Robert Weigel2, Alexander Koelpin2
1InnoSenT GmbH, Germany; 2University of Erlangen-Nuremberg, Germany

C2P-N12
TRL: RAY TRACING-ASSISTED SENSOR LOCALIZATION FOR UNDERWATER ACOUSTIC SENSOR NETWORKS
Y Kim, C Kim
GIST, Korea, South

C2P-N13
THICKNESS MEASUREMENT OF HEAVY & LIGHT OIL USING BLUE LIGHTS
Sangwoo Oh, Moonjin Lee
KIOST, Korea, South
2:00 PM - 3:15 PM
C3L-A: CHEMICAL & GAS SENSORS I
Maryland F
Session Chair: Don L. DeVoe (University of Maryland, USA)

2:00 PM
A NOVEL SMECTITE-POLYMER NANOCOMPOSITE (SPN) MICROSTRIP SENSOR FOR RAPID QUANTITATIVE DETECTION OF AFLATOXINS
He Hu, Jun Zou, Youjun Deng
Texas A&M University, United States

2:15 PM
CONTROLLED DRUG RELEASE IN A MICROFLUIDIC DEVICE WITH DROPLET MERGING AND STORAGE FUNCTIONS
Wen-Chuan Cheng, Yuan He, Long Que
Louisiana Tech University, United States

2:30 PM
SENSITIVE DETECTION OF MELAMINE WITH SILICON NANOWIRE FIELD EFFECT TRANSISTOR BIOSENSOR
Ruhai Tian\textsuperscript{1}, Suresh Regonda\textsuperscript{2}, Serena Greene\textsuperscript{1}, Gang Zhi\textsuperscript{3}, Jiahuan Ding\textsuperscript{1}, Walter Hu\textsuperscript{2}
\textsuperscript{1}Diagtronix Inc., United States; \textsuperscript{2}University of Texas at Dallas, United States; \textsuperscript{3}Global Foundry, United States; \textsuperscript{4}National Institute of Biological Sciences, China

2:45 PM
DEVELOPMENT OF A LOW COST HEMIN BASED DISSOLVED OXYGEN SENSOR WITH ANTI-BIOFOULING COATING FOR WATER MONITORING
Huan-Hsuan Hsu, P. Ravi Selvaganapathy
McMaster University, Canada

3:00 PM
FREE-STANDING PARYLENE C THIN FILMS AS FLEXIBLE PH SENSING MEMBRANES
Tatiana Trantidou, Mehvesh Tariq, Yu-Chun Chang, Christofer Toumazou, Themistoklis Prodromakis
Imperial College London, United Kingdom

2:00 PM - 3:15 PM
C3L-B: SENSOR APPLICATIONS FOR LIFE AND SOCIETY
Maryland E
Session Chairs: Geoffrey Cranch (Naval Research Laboratory, USA), Tao Li (University of Michigan, USA)

2:00 PM
RANDOM WALK AND LIGHTING CONTROL
Matthew Aldrich, Akash Badshah, Brian Mayton, Nan Zhao, Joseph Paradiso
Massachusetts Institute of Technology, United States
2:15 PM
WIRELESS SENSOR NODE FOR BACKSCATTERING ELECTRICAL SIGNALS GENERATED BY PLANTS
Christos Konstantopoulos, Eleftherios Kampianakis, Eftichios Kourtouolis, Aggelos Bletsas
Technical University of Crete, Greece

2:30 PM
COTS-BASED STICK-ON ELECTRICITY METERS FOR BUILDING SUBMETERING
Michael Lorek\(^2\), Fabien Chraith\(^2\), Steven Lanzisera\(^1\), Kristofer Pister\(^2\)
\(^1\)Lawrence Berkeley National Laboratory, United States; \(^2\)University of California, Berkeley, United States

2:45 PM
PARETO-OPTIMAL SIGNAL PROCESSING ON LOW-POWER MICROPROCESSORS
Peter Christ, Gregor Sievers, Julian Einhaus, Thorsten Jungeblut, Mario Porrmann, Ulrich Rückert
Bielefeld University, Germany

3:00 PM
IMAGE SENSING SYSTEM FOR NAVIGATING VISUALLY IMPAIRED PEOPLE
Thomas Gonnot, Jafar Saniie
Illinois Institute of Technology, United States

2:00 PM - 3:15 PM
C3L-C: PHYSICAL SENSORS II
Maryland A
Session Chairs: Goutam Koley (University of South Carolina, USA), Gaurav Bahl (University of Illinois at Urbana-Champaign, USA)

2:00 PM
FATIGUE CRACK DETECTION OF CFRP COMPOSITE PRESSURE VESSEL USING MECHANOLUMINESCENT SENSOR
Naohiro Ueno\(^3\), Chao-Nan Xu\(^2,4\), Shogo Watanabe\(^1\)
\(^1\)HyTReC, Japan; \(^2\)National Institute of Advanced Industrial Science and Technology (AIST), Japan; \(^3\)Saga University, Japan, \(^4\)Kyushu University

2:15 PM
A PASSIVE, WIRELESS STRAIN SENSOR USING A MICROFABRICATED MAGNETOELASTIC BEAM ELEMENT
Venkatram Pepakayala, Yogesh B. Gianchandani
University of Michigan, United States

2:30 PM
MULTI-POINT BEARING CAGE WIRELESS TEMPERATURE SENSOR
Amir Shahidi, Lokesh Gupta, Dimitrios Peroulis
Purdue University, United States

3:00 PM
FABRICATION OF A SANDWICH TYPE THREE AXIS CAPACITIVE MEMS ACCELEROMETER
Serdar Tez, Tayfun Akin
Middle East Technical University, Turkey
2:00 PM - 3:15 PM
C3L-D: OPTICAL SENSORS ON SILICON
Maryland D
Session Chair: Michael Shur (Rensselaer Polytechnic Institute, USA)

2:00 PM
SILICON PHOTOMULTIPLIER TECHNOLOGY FOR LOW-LIGHT INTENSITY DETECTION
Massimo Mazzillo, Ferenc Nagy, Delfo Sanfilippo, Giusy Valvo, Beatrice Carbone, Angelo Piana, Giorgio Fallica
STMicroelectronics, Italy

2:15 PM
A NEW POSITION-SENSITIVE SILICON PHOTOMULTIPLIER WITH SUBMILLIMETER SPATIAL RESOLUTION FOR PHOTON-CLUSTER IDENTIFICATION
Ilaria Sacco², Peter Fischer², Alberto Gola¹, Claudio Piemonte¹
¹Fondazione Bruno Kessler, Italy; ²Heidelberg University, Germany

2:30 PM
OUTPUT RESPONSE CHARACTERISTICS OF RESONANT-TYPE GUIDED-WAVE OPTICAL ACOUSTIC EMISSION SENSOR
Sotaro Tachibana, Masashi Ohkawa, Takashi Sato
Niigata University, Japan

2:45 PM
OPTICAL SPECTRAL RESPONSE FOR RELATIVE HUMIDITY MEASURED WITH POLYVINYLPYRROLIDONE-COATED MACH-ZEHNDER INTERFEROMETER
Myoung Jin Kim, Eun Joo Jung, Woo Jin Lee, Sung Hwan Hwang, Byung Sup Rho
Korea Photonics Technology Institute, Korea, South

3:00 PM
UV-SENSITIVE LOW DARK-COUNT PUREB SINGLE-PHOTON AVALANCHE DIODE
Lin Qi², K.R.C. Mok², Edoardo Charbon², Lis K. Nanver², Mahdi Aminian¹
¹Ecole Polytechnique Fédérale de Lausanne, Switzerland; ²Delft University of Technology, Netherlands

2:00 PM - 3:15 PM
C3L-E: LATE NEWS I
Watertable ABC
Session Chair: Usha Varshney (National Science Foundation, USA)

2:00 PM
DIRECT DETECTION OF ADENOVIRUS IN ENVIRONMENTAL WASTE WATERS BY PORTABLE OPTICAL FIBER SENSOR PLATFORM
Nimet Yildirim¹, Dan Li², Feng Long², April Gu¹
¹Northeastern University, United States; ²Tsinghua University, China
2:15 PM
LOW-NOISE SMART SENSOR BASED ON SILICON NANOWIRE FOR MEMS RESISTIVE MICROPHONE
Jamel Nebhen\textsuperscript{1}, Eric Savary\textsuperscript{2}, Wenceslas Rahajandraibe\textsuperscript{2}, Christian Dufaza\textsuperscript{2}, Stephane Meillère\textsuperscript{3}, E. Kussener\textsuperscript{4}, Herve Barthélémy\textsuperscript{2}, J. Czarny\textsuperscript{1}, Arnaud Walther\textsuperscript{1}
\textsuperscript{1}CEA-LETI, France; \textsuperscript{2}Aix Marseille University, France

2:30 PM
POLYMER-BASED MICROFLUIDIC DEVICES FOR RARE CELL DETECTION BY ULTRASOUNDS
Itziar Gonzalez\textsuperscript{1}, Victor Acosta\textsuperscript{1}, Maria Tijero\textsuperscript{3}, Javier Berganzo\textsuperscript{3}, Adela Castillejo\textsuperscript{2}, Jose Luis Soto\textsuperscript{2}, Alain Martin\textsuperscript{4}, Mounir Bouali\textsuperscript{4}
\textsuperscript{1}CSIC, Spain; \textsuperscript{2}Hospital General Universitario de Elche, Spain; \textsuperscript{3}IKERLAN, Spain; \textsuperscript{4}University Politecnica Mondragon, Spain

2:45 PM
A NOVEL INKJET-PRINTED CHIPLESS RFID-BASED PASSIVE FLUID SENSOR PLATFORM
Sangkil Kim\textsuperscript{2}, James Cooper\textsuperscript{2}, Manos Tentzeris\textsuperscript{2}, Robert Herre\textsuperscript{1}, Sijia Gu\textsuperscript{1}, Tuami Lasri\textsuperscript{3}
\textsuperscript{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; \textsuperscript{2}Georgia Institute of Technology, United States; \textsuperscript{3}Université Lille 1, France

3:00 PM
PLATINUM FUNCTIONALIZED TITANIA NANOTUBE ARRAY SENSOR FOR DETECTION OF TRICHLOROETHYLENE IN WATER
Harikrishnan Jayamohan, York Smith, Bruce Gale, Manoranjan Misra, Swomitra Mohanty
University of Utah, United States

2:00 PM - 3:15 PM
C3L-F: HARVESTING & CONVERTERS
Homeland
Session Chairs: Christopher Salthouse (University of Massachusetts Amherst, USA), Christian Zorman (Case Western Reserve University, USA)

2:00 PM
A MULTI-ANODE PAPER-BASED MICROBIAL FUEL CELL FOR DISPOSABLE BIOSENSORS
Arwa Fraiwan, Seokheun Choi
Binghamton University, United States

2:15 PM
AN ULTRA-LOW-POWER ACTIVE AC-DC CMOS CONVERTER FOR SUB-1V INTEGRATED ENERGY HARVESTING APPLICATIONS
Abdalrahman Sayed Herbawi, Oliver Paul, Tzeno Galchev
University of Freiburg, Germany

2:30 PM
PERFORMANCE METRICS FOR THERMEOLECTRIC ENERGY HARVESTING STUDIED USING A NOVEL PLANAR 65 NM SILICON CMOS-BASED THERMOPILE
Hal Edwards, Jeff Debord, Toan Tran, Dave Freeman, Ken Maggio
Texas Instruments, Inc., United States
2:45 PM
SCHEME FOR IMPROVED INTEGRATION AND LIFETIME FOR PIEZOELECTRIC ENERGY HARVESTERS
Alwyn Elliott¹, James Dicken¹, Lindsay Miller², Paul Wright², Paul Mitcheson¹
¹Imperial College London, United Kingdom; ²University of California, Berkeley, United States

3:00 PM
TOWARDS A SELF-SUSTAINED MOISTURE AND TEMPERATURE MONITORING SYSTEM USING SOIL ENERGY
Fu-To Lin¹, Jen-Chien Hsieh¹, Fu-Chun Wen¹, Wei-Kuan Wang¹, Huang-Chen Lee¹, Yu-Te Liao¹,²
¹National Chung-Cheng University, Taiwan; ²National Chiao-Tung University

3:45 PM - 5:00 PM
C4L-D: OPTICAL SENSOR SIGNAL ANALYSES
Maryland D
Session Chairs: Paddy French (TU Delft, The Netherlands), Carlos Ruiz-Zamarreno (Universidad Publica de Navarra, Spain)

3:45 PM
MRI-COMPATIBLE OPTICALLY-SENSED CELLO
Avrum Hollinger, Marcelo Wanderley
McGill University, Canada

4:00 PM
SIGNAL PROCESSING FOR ELECTRO-OPTIC VOLTAGE SENSOR
Olivier Steiger¹, Sergio Marchese¹, Joris Pascal¹, Klaus Bohnert¹, Stephan Wildermuth²
¹ABB Switzerland Inc., Switzerland; ²ABB Germany Inc., Germany

4:15 PM
A COMPARISON OF TECHNIQUES FOR EXTRACTING TRANSVERSE SPEED FROM PHOTON DOPPLER VELOCIMETRY SIGNAL CONTENT
Erik Moro, Matthew Briggs, Lawrence Hull
Los Alamos National Laboratory, United States

4:30 PM
SILICON NITRIDE BASED MID-INFRARED MICROPHOTONICS FOR SENSOR APPLICATIONS
Pao Lin, Vivek Singh, Lionel Kimerling, Anuradha Agarwal
Massachusetts Institute of Technology, United States
3:45 PM
A MIXED APPROACH LOAD BALANCING AND EFFICIENT ENERGY FOR MULTI-PATH ROUTING IN MOBILE AD HOC NETWORKS
Fatiha Djemili, Cherif Tolba
Badji Mokhtar-Annaba University, Algeria

4:00 PM
INDOOR POSITIONING WITH MAXIMUM LIKELIHOOD CLASSIFICATION OF WI-FI SIGNALS
Noah Pritt
Frederick Community College, United States

4:15 PM
MICROCONTROLLER-BASED POWER MANAGEMENT FOR NANOWATT AND MICROWATT ENERGY HARVESTERS
Dusan Vuckovic
DELTA – IdemoLab/Technical University of Denmark, Denmark

4:30 PM
DESIGN AND PERFORMANCE OF A REAL-TIME ACOUSTIC BEAMFORMING SYSTEM
Alaa Abdeen, Laura Ray
Dartmouth College, United States

4:45 PM
OPEN ARCHITECTURE FOR WSN BASED ON RUNTIME RECONFIGURABLE SYSTEMS AND THE IEEE 1451
Jean Guevara¹, Enrique Vargas¹, Fernando Brunetti², Federico Barrero²
¹Universidad Catolica Nuestra Señora de la Asuncion, Paraguay;
²Universidad de Sevilla, Spain
3:45 PM - 5:00 PM
C4L-F: CHARACTERIZATION & TESTING
Homeland
Session Chairs: Babak Ziaie (Purdue University, USA), Christian Zorman (Case Western Reserve University, USA)

3:45 PM
WAVELENGTH DISPERSION OF VERDET CONSTANT IN E-FIELD ORIENTED IRON OXIDE DOPED POLYMER NANOCOMPOSITES
Ganapathy Kumar, Satish Mahajan
Tennessee Technological University, United States

4:00 PM
HETEROGENEOUS INTEGRATION OF AN INAS NANOWIRE WITH ENERGY-EFFICIENT CMOS DELTA-SIGMA MODULATOR
Kenji Michimata, Hiroaki Kotani, Tatsuro Watanabe, Hiroaki Funayama, Shin Murakami, Kazuhiko Shimomura, Takao Waho
Sophia University, Japan

4:15 PM
IMPACT OF GAMMA RADIATION ON RANGE FINDING SENSOR PERFORMANCE
Zachary Diggins, Nagabhushan Mahadevan, Dan Herbison, Eric Barth, Arthur Witulski
Vanderbilt University, United States

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A NEW APPROACH ON MEMS SENSOR BATCH TESTING USING AN ANALOGUE PARALLEL TEST METHODOLOGY FOR MASSIVE REDUCTION OF TEST TIME
Florian Oesterle, Robert Weigel, Alexander Koelpin
University of Erlangen-Nürnberg, Germany

4:45 PM
DEVELOPMENT OF NOVEL POLYMERIC SENSORS FOR TASTE SENSING: ELECTRONIC TONGUE
Basudam Adhikari¹, Manmatha Mahato², Tridib Sinha², Arnab Halder², Nabarun Bhattacharya¹
¹Centre For Development Of Advanced Computing (C-DAC), India; ²Indian Institute of Technology Kharagpur, India
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