



# IEEE SENSORS 2023

October 29 – November 1, 2023  
Vienna, Austria



## SENSORS 2023 CONFERENCE PROGRAM

Please visit our website for more information!  
[2023.ieee-sensorsconference.org](https://2023.ieee-sensorsconference.org)

SPONSORS AND ORGANIZERS



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# Welcome Message



Servus! Welcome to Vienna, and welcome to IEEE SENSORS 2023! After 19 years, the conference is back in the heart of Europe, and on behalf of the organizing committee, we are excited to welcome you to Austria. IEEE SENSORS 2023 will be held from Oct. 29 – Nov. 1, 2023, at the Hilton Vienna Park, just a stone's throw away from the city's historic center.

The IEEE SENSORS conference is a premier platform for researchers, engineers, practitioners, and society leaders from around the world to present and discuss their latest research, ideas, and opinions. This year's edition is special in many respects. First and foremost, it is the climax of the silver jubilee year for IEEE Sensors Council, and we have planned several memorable activities for you. Formally constituted in June 1998 with presidents of 14 IEEE societies the IEEE Sensors Council now serves its 26 IEEE member societies in the multi-disciplinary technical areas of

sensors. From design to fabrication and applications, IEEE SENSORS council covers all aspects of sensors and sensing systems... The 25 years of service to the Sensors Community has been a remarkable journey with outstanding successes in several areas with impact across the world. We hope to continue this path with the constant support of our member societies and the involvement of the sensors community. Second, we are thrilled to be fully back to a time of no more travel restrictions, and benefiting from face-to-face meetings and networking opportunities. The organizing committee has taken this into account when planning the layout of the conference, the breaks, and most of all the social events which we hope you will enjoy!

This year, we are trying out several innovations to enhance the attendee experience and provide additional opportunities to get involved resulting in the highest ever attendance to IEEE SENSORS. For the first time, we are hosting workshops on the first day together with the tutorials. These workshops are a possibility for organizers to propose their own satellite event, with no formal strings attached. The format is free and can be anything from invited lectures to panel discussions or hands-on interactions with the audience. It is an experiment, and the 5 workshops that have been accepted promise to be exciting. IEEE SENSORS intends to continue this trend in the future. Another innovation concerns the extension of the journal-conference synergy program launched by IEEE Sensors Council last year. Like in 2022, we have invited authors of selected popular articles published recently in the IEEE Sensors Journal to present their work at the conference. In addition, we extended the invitations to authors of articles in the IEEE Sensors Letters. 73 international speakers have accepted our invitation, and 53 will present their works in 12 lecture sessions. This not being enough, we offered two different routes of submission to IEEE SENSORS 2023. The first was the classical conference paper submission, while the second option was to submit directly to IEEE Sensors Letters. From the 212 original and 86 revised submissions during the review process, 120 were ultimately accepted via IEEE Sensors Letters route, and 115 of these will be presented at the conference. You will recognize all of these previously published journal articles in the program by their included DOIs.



Besides the submissions via the IEEE Sensors Letters, we received a total of 870 regular/classic conference submissions (in total 1082 submissions via both classical conference paper submission route and IEEE Sensors Letters route) to the 14 technical tracks, the 4 focused sessions, and the live demonstration track. 482 papers were accepted after a rigorous review process. The submissions came from all over the world, with 41.3% from Europe, 41.8% from Asia/Pacific, 11.7% from North America, 2.2% from Latin America,

# Welcome Message (cont.)

and 3.1% from Middle East/Africa. Taking everything together, IEEE SENSORS 2023 features 319 lectures and 328 poster presentations. 19 of the lectures are invited presentations given by renowned international speakers who were selected in their respective tracks based on their expertise and accomplishments and finally, 42 open posters sharing latest work round off the program.

IEEE SENSORS 2023 features three keynote speakers who are renowned experts with long years of experience in diverse areas of sensing technologies and applications. On Monday, Kimberly Foster from Tulane University, USA, will look at “Nonlinearity and Sensing: a 30 Year Journey”. Michael L. Roukes from Caltech, USA, will share with us his thoughts on “NEMS and sensing – from classical to quantum” on Tuesday. Finally, on Wednesday, Archana Sharma from CERN will present her talk on “Secrets of the universe, technological advances and why should I care!”

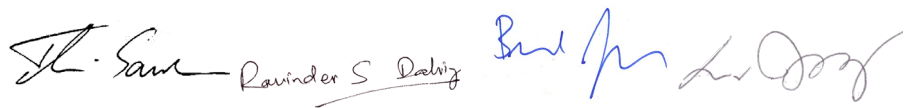
This year, we have also put more emphasis on industry involvement, reflecting a general strategy of the IEEE Sensors Council, which emphasizes greater engagement with industry. As a result, we have 16 exhibitors, an Industry Track session on Monday, and an industry-organized workshop on electronic skin patches on Tuesday. And there is more waiting for you to learn and network: On Sunday, 9 tutorials will be offered in parallel with the workshops. The Young Professionals (YP) Committee has organized a reception and poster session at the general welcome reception on Sunday, and a panel discussion on Monday. The Women in Sensors (WiSe) committee invites you to their speaker session on Monday and a networking lunch on Wednesday. Continuing last year's success, YP and WiSe have come together to sponsor the Big Idea Pitch competition on Wednesday, which is aimed to motivate young students and researchers to pursue business ideas based on their research and learn from coaches and judges how to pitch their visions. Furthermore, WiSe has organized a Mentor/Mentee session during Lunch on Tuesday. On Sunday, we will have a special session on research funding with speakers from the European Research Council and the US National Science Foundation. Last but not least, on Wednesday, conference participants have the opportunity to meet and discuss with Editors-in-Chief of Sensors Council sponsored journals, including IEEE Sensors Journal, IEEE Sensors Letters, IEEE Journal of Selected Areas in Sensors, IEEE Internet of Things Journal, and IEEE Journal on Flexible Electronics.

A conference is unthinkable without social events. This year's welcome reception will be held on Sunday in the Vienna City Hall, a magnificent neo-gothic building at the Ringstrasse, Vienna's famous boulevard around the city center. Supported by the Vienna City Council, we will enjoy not only the splendor of the festive hall, but also a selection of Austrian and especially Viennese food and wine. The highlight of the conference will undeniably be the IEEE Sensors Council's 25th Anniversary Ball on Tuesday. We also be joined by the Presidents of Sensors Council's member societies, or their representatives and distinguished guests from IEEE. As a culmination point of its jubilee year, the IEEE Sensors Council invites us to a memorable night at the Hofburg. Vienna's Royal Palace in the city center is a place where history has been made throughout the centuries, and it still is the venue for splendid gala events and many of the more than 400 annual balls in Vienna. Bring your dancing shoes, and join us in what the Viennese ball tradition stands for: socializing, networking, and enjoying life!

Sustainability is a main concern not only of our time, but also a theme of IEEE SENSORS 2023. This aligns with IEEE Sensors Council's 25th Anniversary theme, i.e., ‘Sensors for Sustainable Future’. There are several sessions in the program revolving around sensors and sensor applications for the environment, and also the 25th Anniversary session on Tuesday will be devoted to this topic. In addition, the entire conference is organized as a Green Meeting according to the requirements of the Austrian Ecolabel, which means that we prevent waste, use recyclable products, employ environmentally friendly travel options, and use regional sources of ingredients for catering.

# Welcome Message (cont.)

Organizing a conference like IEEE SENSORS 2023 is a collaborative effort of many people working together over a long time. In our case, the IEEE SENSORS 2023 journey has started in 2019, long before the pandemic, and has become increasingly intense in the last year. We are grateful to all the organizing committee and program committee members for volunteering and devoting their time to prepare the conference. And of course we thank you, the authors and participants, for coming to Vienna and sharing your work and ideas with us. Let us enjoy the time together!



Thilo Sauter  
General Co-Chair  
IEEE SENSORS 2023

Ravinder Dahiya  
General Co-Chair  
IEEE SENSORS 2023

Bernhard Jakoby  
Technical Program  
Co-Chair  
IEEE SENSORS 2023

Jeong Bong (JB) Lee  
Technical Program Co-  
Chair  
IEEE SENSORS 2023

# Organizing Committee

## General Co-Chairs

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Ravinder Dahiya, *Northeastern University, Boston, USA*

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Jeong Bong (JB) Lee, *Baylor University, USA*  
Bernhard Jakoby, *Johannes Kepler Univ. Linz, Austria*

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Krikor Ozanyan, *The University of Manchester, UK*  
Anil Roy, *DA-IICT Gandhinagar, India*

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## WISE Co-Chairs

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Ashwin Seshia, *University of Cambridge, UK*

## Awards Chair

Svetlana Tatic-Lucic, *Lehigh University and National Science Foundation, USA*  
Yi Chiu, *National Yang Ming Chiao Tung University, Taiwan*

## Industry Co-Chairs

Enrico Alessi, *STMicroelectronics, Italy*  
Yuko Akabane, *TDC Corporation, Japan*  
Dan McGrath, *TechInsights, USA*

## Live Demo Co-Chairs

Anna Grazia Mignani, *CNR-Istituto di Fisica Applicata "Nello Carrara", Italy*  
Calogero Maria Oddo, *School of Advanced Studies, Pisa, Italy*

## Publicity Chair

John Vig, *Sensors Council VP Conferences, USA*

# Track Chairs

## **Track 1: Sensor Phenomenology, Modeling and Evaluation**

Tarikul Islam, *Jamia Millia Islamia (Central University), India*

Tao Li, *University of Cincinnati, USA*

## **Track 2: Sensor Materials, Fabrication and Packaging**

Ulrich Schmid, *TU Wien, Austria*

Arum Han, *Texas A&M University, USA*

## **Track 3: Chemical, Electrochemical and Gas Sensors**

Xiaoshan Zhu, *University of Nevada Reno, USA*

Hamida Hallil, *Bordeaux University, France*

## **Track 4: Microfluidics and Biosensors**

Uwe Schnakenberg, *RWTH Aachen University, Germany*

Hyejin Moon, *University of Texas at Arlington, USA*

## **Track 5: Optical Sensors**

Cristian Manzoni, *Polytechnico Milano, Italy*

Rona Chandrawati, *University of New South Wales (UNSW Sydney), Australia*

## **Track 6: Physical Sensors: Temperature, Mechanical, Magnetic and Others**

Siavash Pourkamali, *University of Texas at Dallas, USA*

Dong-Weon Lee, *Chonnam National University, Korea*

## **Track 7: Acoustic and Ultrasonic Sensors**

Haifeng Zhang, *University of North Texas, USA*

Hongyu Yu, *Hong Kong University of Science and Technology, China*

## **Track 8: Sensor Networks and IOT**

Yacine Ghamri-Doudane, *La Rochelle University, France*

Domenico Balsamo, *Newcastle University, UK*

## **Track 9: Emerging Sensor Technologies and Applications**

Mark Cheng, *The University of Alabama, USA*

Joost Lötters, *University of Twente & TU Delft, The Netherlands*

## **Track 10: Sensor Systems: Signals, Processing and Interfaces**

Sara Moccia, *School of Advanced Studies, Pisa, Italy*

Changhee Won, *Temple University, USA*

## **Track 11: Actuators, Energy Harvesting and Powering Sensors**

Smitha Rao Hatti, *Michigan Technological University, USA*

Hongsoo Choi, *Daegu Gyeongbuk Institute of Science and Technology, Korea*

## **Track 12: Sensor Data Processing**

Marco Jose da Silva, *Johannes Kepler University Linz, Austria*

Chao Tan, *Tianjin University, China*

# Track Chairs (cont.)

## **Track 13: Wearable Sensors and Systems**

Jürgen Kosel, *Silicon Austria Labs, Austria*

Shahika Inal, *King Abdullah University of Science and Technology, Saudi Arabia*

## **Track 14: Sensors in Industrial Practices**

Stephen F. Bart, *TDK InvenSense, USA*

Amit Kumar, *BioAxis DNA Research Centre, Hyderabad, India*

## **Track 15: Live Demonstration of Sensors and Sensing Technologies**

Calogero Maria Oddo, *School of Advanced Studies, Pisa, Italy*

Anna Grazia Mignani, *CNR-Istituto di Fisica Applicata "Nello Carrara", Italy*

## **Track 16.1 Focused Session: Sensor Technologies for Sustainable Development**

Sofia Sandhu, *University of Glasgow, UK*

Shawana Tabassum, *The University of Texas at Tyler, USA*

## **Track 16.2 Focused Session: Bio-Remote Sensing and Integrated Artificial Intelligence Systems**

Kianoush Rassels, *TU-Delft, The Netherlands*

Paddy French, *TU-Delft, The Netherlands*

## **Track 16.3 Focused Session: Chemical Agent Detection: Sensing Technologies and Sensor Applications**

Arne Ficks, *Bundeswehr Research Institute for Protective Technologies and CBRN-Protection, Germany*

Maria Allers, *Bundeswehr Research Institute for Protective Technologies and CBRN-Protection, Germany*

## **Track 16.4 Focused Session: Smart Biomedical Sensor Platforms in Resource-Constrained Settings**

Shantanu Bhattacharya, *Indian Institute of Technology Kanpur, India*

Siddharth Tallur, *IIT Bombay, India*

Andrew Ward, *University of Strathclyde, UK*

# IEEE Sensors Council EXCOM & ADCOM

**President (2022-2023)**

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Sandro Carrara, *EPFL Lausanne, Switzerland*

**Vice President – Conferences (2022-2023)**

John Vig, *Consultant, Colts Neck, NJ USA*

**Vice President – Technical Operations (2022-2023)**

Anil K. Roy, *DA-IICT, India*

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Chonggang Wang, *InterDigital Communications, USA*

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**Distinguished Lecturer Program Chair**

Anil K. Roy, *DA-IICT, India*

**Editor-in-Chief for Council Website**

John Vig, *Consultant, USA*

**IEEE Fellows Committee Chair**

Sandro Carrara, *EPFL, Lausanne, Switzerland*

**Historian**

John Vig, *Consultant, USA*

**Nominations Committee Chair**

Andrei Shkel, *University of California, Irvine, USA*

# IEEE Sensors Council EXCOM & ADCOM (cont.)

## **Publicity Chair**

Mike McShane, *Texas A&M University, USA*

## **Women in Sensors Committee Chair**

Saakshi Dhanekar, *Indian Institute of Technology, India*

## **IEEE SENSORS COUNCIL EXCOM & ADCOM (CONT.)**

## **Young Professionals Program Committee Chair**

Oliver Ozioko, *University of Derby Derby, UK*

## **Diversity and Inclusion Chair**

Anna Mignani, *CNR – Nello Carrara Institute of Applied Physics (IFAC) Impruneta, Italy*

## **JOURNAL EDITORS-IN-CHIEF (100% SPONSORED JOURNALS)**

### **IEEE Sensors Journal Editor-in-Chief**

Sandro Carrara, *EPFL Lausanne, Switzerland*

### **IEEE Sensors Letters Editor-in-Chief**

Andrei Shkel, *University of California, Irvine, CA USA*

## **COUNCIL SUPPORT**

### **Operations Manager**

Brooke Johnson, *Conference Catalysts, LLC, USA*

### **Conference Manager**

Caroline Kravec, *Conference Catalysts, LLC, USA*

### **Technical Program Papers Support**

Tom Wehner, *ePapers, USA*

# IEEE Sensors Council EXCOM & ADCOM (cont.)

## Sensors Council Appointments to Other Organizations

|                                                                                                             |                                                            |                                                           |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------|
| IEEE TAB Finance corresponding member                                                                       | Srinivas Tadigadapa                                        | Northeastern University, Boston, MA, USA                  |
| IEEE TAB Conference Publications Committee corresponding member                                             | John Vig                                                   | Consultant, Colts Neck, NJ USA                            |
| IEEE TAB/PSPB Products and Services corresponding member                                                    | Krikor Ozanyan                                             | University of Manchester                                  |
| IEEE TAB Periodicals Committee corresponding member                                                         | Krikor Ozanyan                                             | University of Manchester                                  |
| IEEE TAB Awards and Recognition Committee corresponding member                                              | Fabrice Labeabu                                            | McGill University, Montreal, Canada                       |
| IEEE TAB Strategic Planning Committee corresponding member                                                  | Ravinder Dahiya                                            | Northeastern University, Boston, MA, USA                  |
| IEEE TAB Committee on Technical Community Outreach, Engagement, and Society Membership corresponding member | Deepak Uttamchandani                                       | University of Strathclyde Glasgow, UK                     |
| SmartGrid representative                                                                                    | Kim Kiseon                                                 | Kwangju Institute of Science and Technology, South Korea  |
| IEEE USA Government Relations – Medical Technology Policy                                                   | Mike McShane                                               | Texas A&M University College Station, TX, USA             |
| IEEE USA Government Relations – Intellectual Property Committee                                             | Vladimir Lumelsky                                          | University of Wisconsin, Madison, WI 53706                |
| IEEE USA Government Relations – Committee on Transportation and Aerospace Policy                            | Chris Schober                                              | Honeywell, Inc. Minneapolis, MN USA                       |
| History Committee corresponding member appointee                                                            | John Vig                                                   | Consultant, Colts Neck, NJ, USA                           |
| IEEE USA Government Relations – Committee on Energy Policy                                                  | John Vig                                                   | Consultant, Colts Neck, NJ, USA                           |
| IEEE Cloud Computing Initiative (CCI)                                                                       | Mahmoud Daneshmand                                         | Stevens Institute of Technology, Hoboken, New Jersey, USA |
| IEEE Transactions on GAMES                                                                                  | Ricardo Gutierrez; Paul Chao; Gianluca Lazzi; Mike McShane |                                                           |

# IEEE Sensors Council EXCOM & ADCOM (cont.)

## Life AdCom Members

Christina M. Schober, *Honeywell, Inc, USA*  
John Vig, *Consultant, USA*  
H. Troy Nagle, *Electrical and Computer Engineering NC State University, USA*  
Vladimir Lumelsky, *University of Wisconsin, USA*

## Senior AdCom Members-at-Large

Zeynep Celik - Senior MaL (2023-2024) - *University of Texas at Arlington, USA*  
Krikor B. Ozanyan - Senior MaL (2023-2024) - *University of Manchester, United Kingdom*  
Christina M. Schober - Senior MaL (2022-2023) - *Honeywell, Inc., USA*

## AdCom Members-at-Large

Hamida Hallil - Member-at-Large (2023-2024) - *University of Bordeaux, France*  
Ignacio Matias - Member-at-Large (2022-2023) - *Institute of Smart Cities Public University of Navarre, Spain*  
Hadi Heidari - Member-at-Large (2022-2023) - *University of Glasgow, UK*  
Saakshi Dhanekar - Member-at-Large (2022-2023) - *Indian Institute of Technology (IIT), India*  
Stoyan Nihtianov - Member-at-Large (2022-2023) - *TU Delft, The Netherlands*  
Marco Jose da Silva - Member-at-Large (2022-2023) - *Federal University of Technology – Parana, Brazil*

# IEEE Sensors Council EXCOM & ADCOM (cont.)

| Member Society                        | Name                         | Affiliation                                                                                          |
|---------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------|
| Aerospace and Electronic Systems      | Paola Andrea Escobari Vargas | Bolivian Space Agency, Bolivia                                                                       |
| Antennas and Propagation              | Jiro Hirokawa                | Tokyo Institute of Technology, Japan                                                                 |
| Broadcast Technology                  | Paul Shulins                 | Burk Technology, Littleton, MA, USA                                                                  |
| Circuits and Systems                  | Danilo Demarchi              | Politecnico di Torino, Italy                                                                         |
| Communications                        | Mahmoud Daneshmand           | Stevens Institute of Technology, USA                                                                 |
| Computer                              | John Johnson                 | Deloitte, USA                                                                                        |
| Consumer Technology                   | Chih-Peng Fan                | National Chung Hsing University, Taiwan                                                              |
| Dielectrics and Electrical Insulation | TBD                          |                                                                                                      |
| Electromagnetic Compatibility         | Chuck Bunting                | Oklahoma State University, USA                                                                       |
| Electron Devices                      | Chen Yang                    | Analog Devices, USA                                                                                  |
| Electronics Packaging Society         | Shafi Saiyed                 | Analog Devices, Wilmington, MA, USA                                                                  |
| Engineering in Medicine and Biology   | Emil Jovanov                 | University of Alabama in Huntsville, AL                                                              |
| Industrial Electronics                | Ren Luo                      | National Taiwan University, Taiwan                                                                   |
| Industry Applications                 | Marco Antônio Dalla Costa    | Federal University of Santa Maria, Brazil                                                            |
| Instrumentation and Measurement       | Nicola Donato                | University of Messina, Italy                                                                         |
| Magnetics                             | Susana Cardoso de Freitas    | INESC Microsystems & Nanotechnologies & Instituto Superior Técnico, Universidade de Lisboa, Portugal |
| Microwave Theory and Technology       | TBD                          |                                                                                                      |
| Oceanic Engineering                   | Christopher Whitt            | JASCO Applied Sciences, Canada                                                                       |
| Photonics                             | Carlos Ruiz Zamarreño        | Universidad Pública de Navarra, Spain                                                                |
| Power and Energy                      | Farnoosh Rahmatian           | NuGrid Power Corp, Canada                                                                            |
| Reliability Society                   | Jeff Voas                    | NIST                                                                                                 |
| Robotics and Automation               | Kaspar Althoefer             | Queen Mary University of London, UK                                                                  |
| Signal Processing                     | Peter Willett                | University of Connecticut, Storrs, CT USA                                                            |
| Solid State Circuits                  | Dan McGrath                  | Texas Instruments, Inc.                                                                              |

# IEEE Sensors Council EXCOM & ADCOM (cont.)

|                                                      |                          |                                                |
|------------------------------------------------------|--------------------------|------------------------------------------------|
| Ultrasonics, Ferroelectrics and<br>Frequency Control | James Spicer             | Johns Hopkins University, Baltimore,<br>MD USA |
| Vehicular Technology                                 | Thanuka<br>Wickramaratne | University of Massachusetts Lowell             |

# Patrons

## GOLD PATRON



## SILVER PATRONS



## AWARD PATRON



## LOCAL PARTNERS



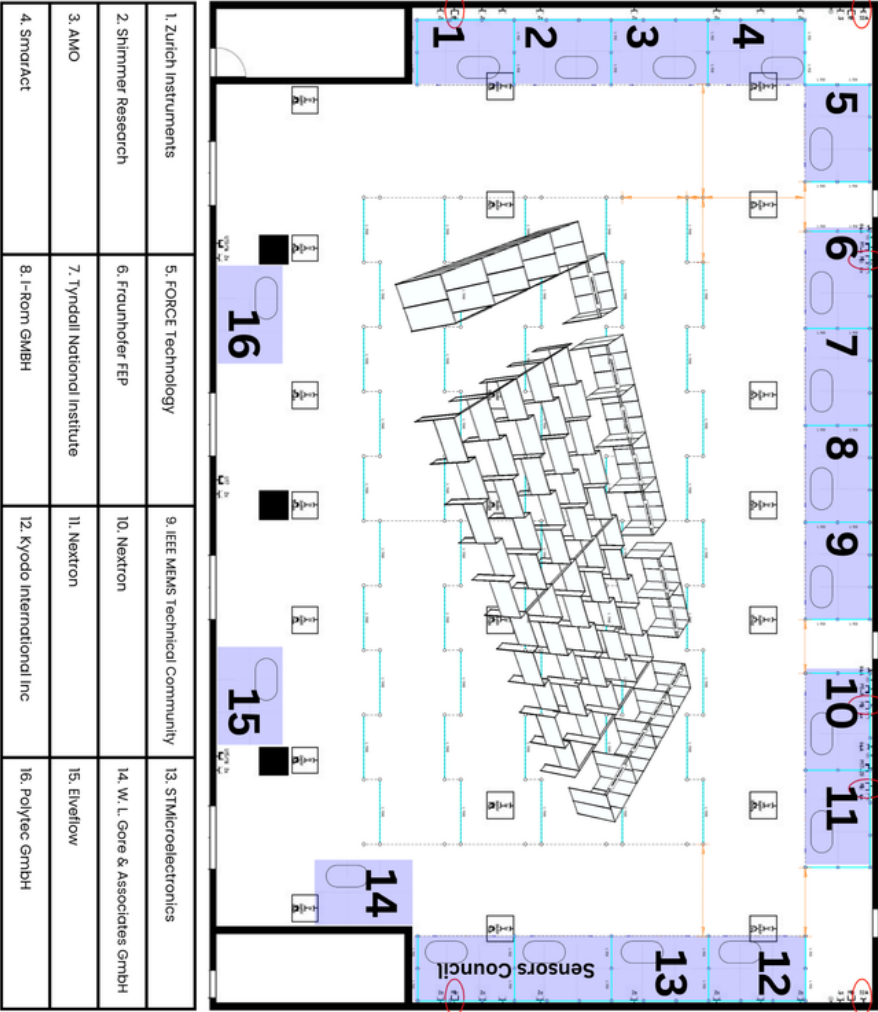
Exhibitors



## Exhibitors (cont.)



# Exhibit Hall Layout



## Exhibit Hall Hours

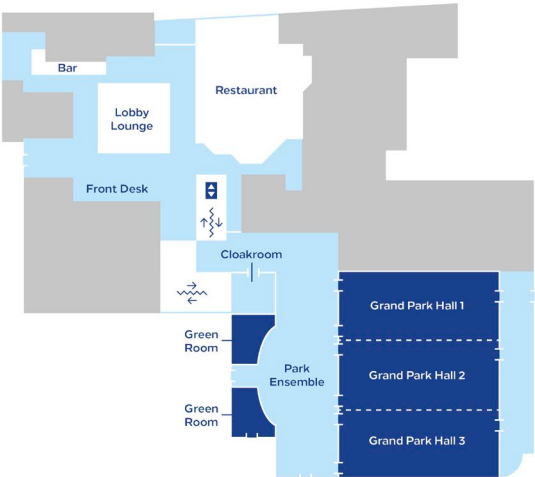
- Monday
- 10:00 – 10:30 | 13:30 – 15:30
- Tuesday
- 13:00 – 11:00 | 15:30 – 16:00
- Wednesday
- 10:00 – 10:30 | 13:30 – 15:00

# Venue Map

## Ground Floor

### FLOOR MAP KEY

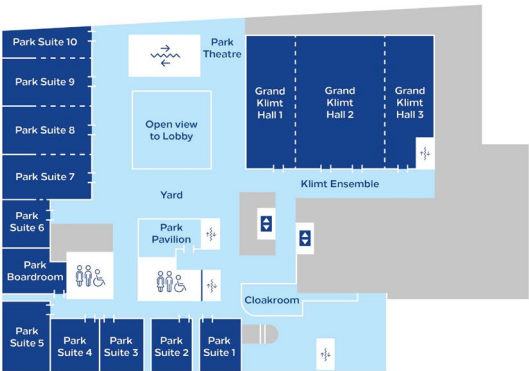
- Meeting/Conference Rooms
- Foyer/Public Space
- Private



## Mezzanine M1

### FLOOR MAP KEY

- Meeting/Conference Rooms
- Foyer/Public Space
- Private



# Keynote Speakers



**Kimberly Foster**

Tulane University, USA

[Biography](#)

## Nonlinearity and Sensing: a 30 Year Journey

**Monday | October 30, 2023 | 9:00 - 10:00**

My work with nonlinearity and microelectromechanical systems began nearly 30 years ago when I began graduate school at Cornell. In this talk, I will look back at the progression of the field over the past 30 years, and use examples from my own work and others, to demonstrate how nonlinearity has played a large role in the sensor revolution. I will touch on not only key inventions and demonstrations, but also discuss how modeling and testing have evolved to enable faster and more effective progress. The increases in sensitivity and bandwidth, along with more sophisticated control algorithms have enabled MEMS to be a key element in smart homes, automobiles and healthcare



**Michael L.  
Roukes**

Caltech, USA

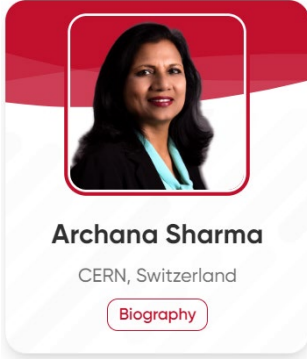
[Biography](#)

## NEMS and Sensing – From Classical to Quantum

**Tuesday | October 31, 2023 | 11:00 - 12:00**

It has been over thirty years since my first efforts in 1991 that launched the field of NEMS. Since that time, NEMS has become a truly global endeavor that has engendered amazing milestones from many laboratories. I will survey this landscape, and then turn to some of the exciting possibilities in classical and quantum sensing with NEMS being pursued today.

## Keynote Speakers (cont.)



**Secrets of the Universe, Technological Advances and Why Should I Care!**

**Wednesday | November 1, 2023 | 9:00 - 10:00**

Imagine a life without the words www or http? They emerged one fine day from a scientific laboratory! The Large Hadron Collider (LHC) at CERN Geneva, Switzerland is home to thousands of high energy physicists. By exploiting large sophisticated radiation sensors, designed and constructed over decades we are cumulatively, seeking answers to questions about the origin, evolution and composition of our universe. At this forefront of scientific pursuit, working hand in hand with industries, spin off

technologies have completely changed our lives. With the world wide web, medical imaging, diagnostic and treatment techniques, high-performance computing, space exploration, art restoration to name a few - the audacious, innovative cutting edge technologies of particle physics have entered and transformed mainstream society. In this talk I will trace the adventure of knowledge and technology transfer at CERN and how we can collectively fight pandemics, unknown and some known catastrophes and silent challenges like cancer.

## Sensors Council 25th Anniversary Speakers



**Technologies for a Sustainable Future!**

**Tuesday | October 31, 2023 | 15:45 - 17:00**

Climate change poses a major threat to the world population across many dimensions, including coastal and inland flooding, wildfires, elevated temperatures, food security and increased storm intensity. Sustainability is of increasing importance as we seek the benefits of circular economy with increasing life cycle energy and environmental efficacy. IEEE is responding by supporting the development of technologies to measure, adapt and mitigate the effects of climate change and address global sustainability using its full range of capabilities, including convening researchers and practitioners at conferences and events, supporting the dissemination of knowledge through world

class publications, enabling the development of standards, engaging with policy makers, and engaging in educational activities spanning K12, the general public, media, practitioners and researchers distributed across the planet in the full topical breadth of 47 Societies and Councils, engaging the full capabilities of the IEEE to support the engineering and technology community in this critical effort. Learn how you can join the effort through many different engagement paths.

# Sensors Council 25th Anniversary Speakers (cont.)



**Fred Schindler**

IEEE VP-elect Technical Activities

[Biography](#)

## Conference Sustainability Considerations

Tuesday | October 31, 2023 | 15:45 - 17:00

Sustainability is a pressing issue in society in general. Sustainability and how it relates to conferences has become a concern. In traditional conferences hundreds or thousands of people travel hundreds or thousands of kilometers to meet. How do we account for the carbon cost of this travel? What are conferences' other carbon costs? Are there, or can there be, offsetting benefits? What have we learned from our virtual experiences during the COVID pandemic, and from the reopening after the pandemic? We will review these questions and what IEEE is doing and can do to address these concerns.

## Other Anniversary Speakers



**Jessica Bian**

President, IEEE Power & Energy Society



**Dragan Damjanovic**

President-Elect, IEEE Ultrasonics, Ferroelectrics, & Frequency Control Society



**Manuel Delgado-Resstituto**

President, IEEE Circuits and Systems Society



**Christian Hansen**

VP Conferences, IEEE Reliability Society



**Branislav Notaros**

President-Elect, IEEE Antennas and Propagation Society



**Vignesh Rajamani**

President, IEEE Electromagnetic Compatibility Society



**Manuel Ramirez**

President, IEEE Instrumentation and Measurement Society



**Mariusz Malinowski**

President, IEEE Industrial Electronics Society



**Deepak Uttamchandani**

President-Elect, IEEE Sensors Council



**John Vig**

Founding President, IEEE Sensors Council



**Dongsoo Har**

Kaist, South Korea

Biography

## Deep Learning Techniques useful for Designing Sensors and Sensor Networks

Sunday | October 29, 2023 | 8:30 - 10:00

The rapid evolution of deep learning techniques has significantly enhanced the development of high-end Sensors and Sensor Networks. Sensors can now benefit from unparalleled accuracy, adaptability, and fault-tolerance mechanisms. Sensor networks can be empowered with efficient resource allocation, ensuring optimal utilization of resources and minimizing energy consumption. This ability is especially crucial for battery-powered sensors and Internet of Things (IoT) devices, where prolonging battery life is essential for sustainable and cost-effective operations. The integration of advanced algorithms and data

processing capabilities empowers sensors and sensor networks to thrive in dynamic environments. The interconnectivity of intelligent sensors enhances data analysis efficiency and fosters collaborative decision-making across industries. This tutorial will present deep learning's profound potential in the context of designing sensors and sensor networks, showcasing how this cutting-edge approach has surpassed conventional limitations and revolutionized problem-solving within the domain of sensors sensor networks.



**Sangeeta Kale**

Defense Institute of  
Advanced Technology (DIAT),  
India

Biography

## Metamaterial-inspired Miniaturized Radio-frequency Resonators for Versatile Industrial Sensing Applications

Sunday | October 29, 2023 | 8:30 - 10:00

Sensor Technology juxtaposed with IoT plays a crucial role in modern industrialization era because these sensors collect data from the physical world and convert it into digital signals, which can drive any industrial component (system or process) from a remote location. The sensor market is set to double in upcoming 5 years, as is projected in IoT Analytics in 2023 (<https://iot-analytics.com/5-iot-sensor-technologies/>). With around 14 billion current IoT connections, more than 50 billion connected sensors have been deployed. In this context, metamaterials, which are artificially engineered and periodically arranged structures, which have been in the scientific research domain for

almost a decade now, have attracted immense attention. Using the conventional radio-frequency range and harnessing the properties of the electronic resonator structures offering negative permittivity (and permeability), one can synthesize unit cells of such metamaterial-inspired structures and sensing applications can be envisaged. These are versatile platforms for wide range of industrial applications.

**More Info**

## Tutorials (cont.)



**Radislav A.  
Potyrailo**

GE Global Research, USA

[Biography](#)

### Next Generation of Gas Sensors: Anticipated and Unanticipated Advantages Over Last-Century Sensor Designs

**Sunday | October 29, 2023 | 10:30 - 12:00**

It is conventionally expected that the performance of existing gas sensors may degrade in the field compared to laboratory conditions because (i) a sensor may lose its accuracy in the presence of chemical interferences and (ii) variations of ambient conditions over time may induce sensor-response fluctuations (i.e., drift). Breaking this status quo in poor sensor performance requires understanding the origins of design principles of existing sensors and bringing new principles to sensor designs. Existing gas sensors are single-output (e.g., resistance, electrical current, work function, light intensity) sensors, also known as zero-order sensors. Any zero-order sensor is undesirably affected by variable

chemical background and sensor drift that cannot be distinguished from the response to an analyte. [More Info](#)



**Michael Shur**

Rensselaer Polytechnic  
Institute, USA

[Biography](#)

### Sensing Using Terahertz Radiation

**Sunday | October 29, 2023 | 10:30 - 12:00**

Terahertz (THz) sensing is enabling technology for 6G communication, detection of biological and chemical hazardous agents, cancer detection, monitoring of industrial processes and products, and detection of mines and explosives. THz sensors support security in buildings, airports, and other public spaces. They found important applications in radioastronomy and space research and, more recently, in Artificial Intelligence-driven THz sensing of MMICs and VLSI. Exploding demand for data transfers will require using the 300 GHz band after 2028 or even before and will make the deployment of THz sensing electronics inevitable. This lecture will discuss the new physics of THz sensing and THz sensing devices. It will also review software for THz sensing and

THz sensor design, the THz sensing market, and key THz sensor companies. [More Info](#)

# Tutorials (cont.)



**Joseph Andrews**

University of Wisconsin-  
Madison, USA

[Biography](#)

## **COPLANAR CAPACITIVE SENSORS: DESIGN, OPTIMIZATION, AND APPLICATIONS**

**Sunday | October 29, 2023 | 10:30 - 12:00**

Coplanar capacitive sensors contain a transducer consisting of two or more coplanar electrodes. The sensing paradigm offers many advantages but is especially favorable for fabrication through printing techniques due to the single-layer structure. For transduction, the technique relies on a fringing electric field, which occurs when a differential voltage is applied to the two electrodes. This fringing electric field interacts with overlaid materials, and the measured capacitance is influenced directly by the relative permittivity of the material set. This influence can be utilized to sense various parameters that induce the relative

permittivity change such as pressure, humidity, biological interaction, and others. In this tutorial, I will present a theoretical framework for understanding the transduction in a variety of scenarios. This framework, which can be utilized for sensor optimization, is validated through finite element modeling techniques. Coplanar capacitive sensors have been used in many demonstrations, including moisture sensing, pressure sensing, and biological sensing. Each of these applications will be used as a case-study into the advantages and disadvantages of the technique. Ultimately, this tutorial will provide burgeoning and experienced researchers an opportunity to learn more about the sensing paradigm and how it can potentially be used within their research. [More Info](#)



**Pedro Bertemes-  
Filho**

Universidade do Estado de  
Santa Catarina, Brazil

[Biography](#)

## **Biospectroscopy-based Biosensing Platforms**

**Sunday | October 29, 2023 | 13:30 - 15:00**

The latest innovations in biosensors and emerging applications have been used to deliver easy-to-use diagnostic systems for healthcare. Today's leading biotechnology companies are developing novel semi-synthetic ligands, aptamers, peptides, and conducting polymers to produce functional systems that can deliver precise molecular information for early diagnosis of diseases. Biosensors are powerful tools for environmental, human and animal health monitoring, especially when they are used with bioimpedance spectroscopy. The main topic of this tutorial is about Bioimpedance Analysis (BIA) using biosensors as miniaturized and disposable detection devices for specific chemical (or set of chemicals), biomolecules, adulterants and microorganism analysis in different fields concerning health point-

of-care, food quality, food safety and pollution. For that, this tutorial aims to gather original articles and reviews showing research advances, fabrication, innovative applications, new challenges and future perspectives of BIA-based (Bio)sensors in important areas as biomedical engineering, health, IoT, agri-food and environmental. [More Info](#)

# Tutorials (cont.)



**Marco Del Sarto**

STMicroelectronics, France

[Biography](#)

## Heterogeneous Integration: Sensors Point of View

**Sunday | October 29, 2023 | 13:30 - 15:00**

IEEE Heterogeneous Integration Roadmap started to define clearly the nomenclature and meaning related to what we can call “more than Moore” development for microelectronics circuits.

Our workshop will give its participants a comparison of advanced packaging solution with the ones used on MEMS and sensor environment highlighting similarities and difference with the scope to define common understanding and language also on the sensor package arena. [More Info](#)



**Tushar Kanti  
Bera**

NIT Durgapur, India

[Biography](#)

## Sensors and Sensing Technologies for Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs)

**Sunday | October 29, 2023 | 15:30 - 17:00**

Electrical Vehicle (EV) is introduced to reduce the consumption of the fossil-fuel and to reduce the environmental pollution in transportation. The EVs are driven by electric motors which are fed by electrical power stored in the rechargeable-batteries connected in series and parallel to form a battery-bank. In EV and plugged-in hybrid EVs (PHEVs), the EV battery banks play a significant role and hence are designed carefully to ensure the desired vehicle-performance, safety, weight and the driving-range. To obtain the controlled operation of the EVs, a number of sensors are used on its various parts including the battery banks.

The temperature, state of charge, voltage, current, temperature, cell balancing conditions are monitored by the installed-sensors and controlled by the battery management systems (BMS). Sensors are also used to monitor the motor RPM, torque, power along with other standard sensors. The proposed tutorial, designed for the students, scholars and young faculties will discuss the sensors and sensing technologies used for modern battery electric vehicles (BEVs) and hybrid electric vehicles (HEV). The applications, advantages and recent trends of different sensors will be discussed followed by the limitation and challenges. The battery pack modelling and simulation will be discussed in the hands-on session. [More Info](#)

# Tutorials (cont.)



**Andreas Schütze**

Universität des Saarlandes,  
Germany

[Biography](#)

## Setting Standards for Indoor Air Quality Sensors Based on VOCs

**Sunday | October 29, 2023 | 15:30 - 17:00**

Environmental pollution is still one of the greatest challenges for Europe and worldwide. While outdoor air quality is frequently discussed in terms of NO<sub>x</sub> or ozone levels, indoor pollution is often overlooked. However, as many people spend most of their time indoors and because of increased building insulation and reduced air exchange, indoor pollution levels can be significantly higher and actually contribute similarly to the overall burden of disease.

**[More Info](#)**

# Workshops

## Sustainable Agri Food and Environment (SAFE) Sensors

Sunday | October 29, 2023 | 8:30 - 12:00

The workshop provide an overview of advancement with microelectrodes array technology. The development and application of these sensors have become increasingly important in various fields, including biomedical, environmental, and industrial applications. We will cover the basic principles of microelectrode sensor design and fabrication and explore various simulation tools available for designing and optimizing sensor performance. It will display how these electrodes can be simulated using COMSOL highlighting different application. We will show the importance of sustainability in sensor development and discuss strategies for reducing the environmental impact of sensor manufacturing and disposal. The workshop will also focus on techniques like surface acoustic wave and electrochemical-based sensors. In hands on/ demo session we will also demonstrate microelectrodes sensor with application like milk stability testing, gas sensing and soil nutrient detection. [More Info](#)



**Alan O'Riordan**

Tyndall National Institute,  
Ireland



**Tarun Narayan**

Tyndall National Institute,  
Ireland



**Kathleen Kennedy**

Tyndall National Institute,  
Ireland



**Daniela  
Lacopino**

Tyndall National Institute,  
Ireland

[Biography](#)



**Han Shao**

Tyndall National Institute,  
Ireland



**Shane O'Sullivan**

Tyndall National Institute,  
Ireland



**WISE CO-CHAIR**

**Veda Sandeep  
Nagaraja**

Tyndall National Institute,  
Ireland

[Biography](#)

# Workshops (cont.)

## ZeroAMP – Logic, Memory, Sensors and More for Harsh Environments

**Sunday | October 29, 2023 | 8:30 - 17:00**

The European H2020 ZeroAMP project (<https://www.zeroamp.eu>) is developing foundations for future use of nanoelectromechanical (NEM) switches in integrated circuits (ICs). As NEM switches can tolerate operating temperatures of up to 300°C and radiation levels of 5 Mrad, they are ideally suited to bring electronics into harsh environments which are not accessible for conventional CMOS-based ICs.

Our workshop will give its participants a general overview of the NEM technology platform developed in ZeroAMP. Initial applications and their potential for future sensor and status monitoring devices will be discussed and a path towards commercial exploitation of the technology in ZeroAMP's follow-up Horizon Europe project i-EDGE (<https://www.i-edge-project.eu>) will be outlined. The workshop will feature an interactive panel session to allow participant to familiarize themselves with basic NEM switch and integration concepts, the current state of the art and potential application scenarios for NEM switch-based ICs.



**Piers Tremlett**

Microchip Technology Inc.,  
USA

[Biography](#)



**Dinesh Pamunuwa**

University of Bristol, UK

## Consumer Inertial MEMS – High Tech in Your Hands

**Sunday | October 29, 2023 | 13:30 - 17:00**

Micro Electro-Mechanical Systems (MEMS) devices are used in many applications nowadays. This workshop aims to reveal more details on one group of MEMS sensors, namely MEMS based Inertial Measurement Units (IMUs). Those are being widely used in consumer electronic products for a large variety of applications. We also give each participant opportunity to learn more by “playing” with inertial sensors in their smart phones / tablets (they bring with) or using demo sensor board which will be available during the workshop. **More Info**



**Dušan Radović**

Bosch Sensortec

[Biography](#)



**Rainer Schillinger**

Bosch Sensortec

# Workshops (cont.)

## Bioimpedance-based Sensing Platforms

Sunday | October 29, 2023 | 8:30 - 17:00

This workshop aims to gather original articles on advances, fabrication, innovative applications, new challenges and future perspectives of BIA-based (Bio)sensors in important areas of biomedical engineering, health, IoT, agri-food and environmental. There will be 3 oral presentations in the morning with a break between. The other 2 oral presentations will after lunch break, followed by a practical presentation by ScioSpec showing how to perform a biological impedance analysis using the company's spectrometer. At the end, a panel discussion will be formed to discuss feature trends on bioimpedance sensing platforms for industrial applications.



**Yekta Ülgen**

Acibadem University, Turkey

Biography



**Martin Bulst**

Sciospec Scientific  
Instruments GmbH, Germany



**Tushar Kanti  
Bera**

NIT Durgapur, India

Biography



**Jie Hou**

University of Oslo, Norway



**Fred-Johan  
Pettersen**

Oslo University Hospital and  
University of Oslo, Norway

Biography



**Ørjan G. Martinsen**

University of Oslo, Norway

# Special Session on Research Funding



**Usha Varshney**

National Science Foundation  
(NSF), USA

[Biography](#)

## Mode of International Collaboration at the US National Science Foundation

**Sunday | October 29, 2023 | 17:00 - 18:00**

The U.S. National Science Foundation (NSF) is an independent federal agency that supports science and engineering in all U.S. states and territories. NSF was established by Congress in 1950 to promote the progress of science; advance the national health, prosperity, and welfare; and secure the national defense. NSF investments account for about 25% of federal support to America's colleges and universities for basic research.

The NSF's directorates and offices invest in researchers to support basic research across all fields of fundamental science and engineering for discovery and innovation; development of research infrastructure and state-of-the-art tools to sustain the nation's scientific enterprise; and education and training programs for individuals from diverse backgrounds. In addition, NSF supports research partnerships between colleges and universities, industry, nonprofits, government, and other organizations within the U.S. and across the globe. NSF fulfills its mission primarily using a grant mechanism based on a peer review process. NSF supports researchers at all levels ranging from senior researchers, early-career researchers, postdoctoral researchers, graduate and undergraduate students, preK-12, as well as entrepreneurs.

This presentation will provide an overview of NSF Directorates and Divisions that are aligned with the theme of this conference. The mode of collaboration for international researchers to partner with U.S. researchers through various programs and initiatives at NSF will be presented.



**Luiz Santos**

European Research  
Council Executive Agency

[Biography](#)

## European Research Council – Funding Opportunities for Creative Minds From All Over the World

**Sunday | October 29, 2023 | 17:00 - 18:00**

The European Research Council (ERC) is an institution of the European Union, whose mission is to encourage the highest quality research in Europe through competitive funding and to support investigator-initiated frontier research across all fields, based on scientific excellence.

It funds creative researchers of any nationality to run projects based across Europe.

At the IEEE SENSORS 2023, we would like to present to this prestigious community the ERC funding schemes and its Work Programme 2024.

# WiSe Session

Women in Sensors (WiSe) aims to promote globally, the presence and advancement of persons who identify as women in the technical area and professions related to sensors. It is targeted at professional women in sensing technology, from industry or academia, and will provide the opportunity to create communities to facilitate knowledge sharing and provide support through highly interactive sessions designed to foster discussion and collaboration. Visit us at <https://ieee-sensors.org/women-in-sensors-wise/>



## Celebrating the Success Stories of Women Achievers in Sensor Domains

**Monday | October 30, 2023 | 13:30 - 15:30**

**Panelists | 13:30 - 14:45**



**Daniela Lacopino**  
Tyndall National Institute,  
Ireland  
[Biography](#)



**Enakshi Bhattacharya**  
IIT Madras, India  
[Biography](#)



**Usha Varshney**  
National Science Foundation  
(NSF), USA  
[Biography](#)



**Erika Györvary**  
CSEM, Switzerland  
[Biography](#)



**Kimberly Foster**  
Tulane University, USA  
[Biography](#)

**Panelists (Start ups)  
14:45 - 15:30**



**MODERATOR**  
**Siziwe Gqoba**  
University of Witwatersrand,  
Johannesburg



**Cécile Deterre**  
Blue Planet Ecosystems  
[Biography](#)



**Grazyna Palecka**  
One: Solutions Engineering  
GmbH  
[Biography](#)



**Arbresha Talla**  
University of Vienna, Austria  
[Biography](#)



**Selma Prodanovic**  
EBAN  
[Biography](#)

# WiSe & YP Big Idea Pitch Competition

Wednesday | November 1, 2023 | 13:30 - 15:30

This competition is to motivate young students/researchers to develop entrepreneurial and business mindsets with their skills and training on sensor research and development

### Judges



**Smitha Rao**  
Michigan Tech, USA  
[Biography](#)



**Han Shao**  
Tyndall National Institute,  
Ireland



**LAURA M. LECHUGA**



**ALICIA DE ANDRÉS MIGUEL**



**KATALIN KARIKO**



**LUISA TORISI**



**MARY-CLAIRE KING**



**KATE JOLLIFFE**



**ROSALY LOPAZ**



**EMMANUELLE CHARPENTIER**



**MITALI MUKERJI**



**NOSIPHO MOLOTO**



**ZHENAN BAO**

**WOMEN  
SCIENTISTS  
By  
WiSe**

# YP Panel Discussion



## Poster Session

**Sunday | October 29, 2023 | 19:00 - 21:00**

This poster session is dedicated to young professionals (YP) to showcase their research work to the sensor community. The presenter of this poster must be a YP.

IEEE Young Professionals (YP) is a group of IEEE members and volunteers who have graduated from their first professional degree within the past 15 years.

One can present their consolidated thesis work, start-up activities, and any research articles of their own on a poster. Start-ups also can present their research/product development. The content must contain technical and research works only. The poster will be evaluated and awards will be given to the best poster and runner-up.

## Career Opportunities for Young Professionals in Sensors and Related Industries

**Monday | October 30, 2023 | 15:30 - 16:30**

### Panelists

|                                                                                                                                                                 |                                                                                                                                             |                                                                                                                                                                   |                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>INDUSTRY CO-CHAIR</b><br/><b>Dan McGrath</b><br/>TechInsights, USA</p> |  <p><b>Sara Pellegrini</b><br/>STMicroelectronics, UK</p> |  <p><b>Amit Kumar</b><br/>BioAxis DNA Research Centre,<br/>Hyderabad, India</p> |  <p><b>Stephen Bart</b><br/>TDK InvenSense, USA</p> |
| <a href="#">Biography</a>                                                                                                                                       | <a href="#">Biography</a>                                                                                                                   | <a href="#">Biography</a>                                                                                                                                         | <a href="#">Biography</a>                                                                                                             |

### Moderator



**WISE CO-CHAIR**  
**Veda Sandeep Nagaraja**  
Tyndall National Institute,  
Ireland

[Biography](#)

## Industry Session

Monday | October 30, 2023 | 13:30 - 15:30



**Gilles  
Lunzenfichter**  
Medisante-Group

[Biography](#)



**Andreas  
Drauschke**  
Technikum Wien, Austria

[Biography](#)



**Brian Lohse**  
Force Technology

[Biography](#)



**Uwe Artmann**  
Image Engineering GmbH

[Biography](#)

Featuring the following presentations:

- Cellular IoT: Why Healthcare is Lagging Other Industries in IoT Adoption?
- Centre for Advanced Sensor Technology (CAST) -Challenges in current and future Corrosion Sensors
- IEEE-P2020 - Automotive Image Quality - Overview of all KPIs described by the standard
- Potentials of Interferometric Sensors in Medical Engineering

## Industry Workshop: Electronic Skin Patches: Convergent Technologies for Vital Signs Monitoring

Tuesday | October 31, 2023 | 8:30 - 15:30

Vital Signs Monitoring (VSM) is the process of measuring and tracking important physiological parameters to assess the overall health and well-being of an individual. Monitoring human body activity is now opening the way to new opportunities for both wellness/fitness and medical applications, ranging from heart analysis, respiration rate and SpO2 to blood pressure and body temperature. Nowadays, common practice is to have just punctual snapshots of vital signs by electrocardiograms, glycemia level, spO2 and blood pressure through medical examination. New technologies are enablers for a continuous measurement of these health parameters to infer and predict organs/ tissues, and metabolic pathways malfunctions. For instance, continuous glucose monitoring (CGM) best illustrates this revolution with significant improvement in diabetic patients well-being. [More Info](#)



**INDUSTRY CO-CHAIR**  
**Enrico Alessi**  
STMicroelectronics, Italy

[Biography](#)



**Gregory  
Blackman**  
DuPont, USA

[Biography](#)



**Ville Vartiavaara**  
GE HealthCare, Finland

[Biography](#)



**Leonardo  
Baldassarre**  
TDK InvenSense, Milan

[Biography](#)

# IEEE Sensors Council 25th Anniversary

Sensors Council is celebrating its 25<sup>th</sup> Anniversary this year! To commemorate this milestone, the Council will have a variety of events and activities throughout the year culminating with the celebratory Ball at IEEE SENSORS 2023.

## IEEE Sensors Council 25th Anniversary Speaker Session

**Tuesday | October 31, 2023 | 15:45 – 17:00**

**Location:** Grand Park Hall

- 15:45 | IEEE President's Message
- 15:50 | IEEE Sensors Council Milestones
- 15:53 | Sustainability in IEEE Sensors Council
- 16:03 | Technologies for a Sustainable Future
- 16:28 | Conference Sustainability Considerations
- 16:38 | IEEE Member Society Presidents

## IEEE Sensors Council Award Ceremony

**Tuesday | October 31, 2023 | 17:00 – 17:30**

**Location:** Grand Park Hall

## IEEE Sensors Council 25th Anniversary Ball

**Tuesday | October 31, 2023 | 19:00 – 23:30**

**Location:** The Hofburg, 1010 Vienna, Austria

### YP WELCOME RECEPTION & POSTER SESSION

This poster session is dedicated to young professionals (YP) to showcase their research work to the sensor community. The presenter of this poster must be a YP.

**Sunday | October 29, 2023 | 19:00 – 21:00**

**Location:** Vienna City Hall, Entrance Lichtenfelsgasse 2, 1010 Vienna



# SUNDAY, OCTOBER, 29, 2023

|       | Park Suite 1                                                                                                   | Park Suite 2                                                                 | Park Suite 3 | Park Suite 4                             | Park Suite 5                                             | Park Suite 7                                                         |
|-------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------|------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|
| 7:00  |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 7:30  | Registration<br>Room: Grand Park Lobby                                                                         |                                                                              |              |                                          |                                                          |                                                                      |
| 8:00  |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 8:30  | T: Metamaterial-inspired Miniaturized Radio-frequency Resonators for Versatile Industrial Sensing Applications | T: Deep Learning Techniques useful for Designing Sensors and Sensor Networks |              | WS: Bioimpedance-based Sensing Platforms | WS: Sustainable Agri Food and Environment (SAFE) Sensors | WS: ZeroAMP – Logic, Memory, Sensors and More for Harsh Environments |
| 9:00  |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 9:30  |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 10:00 | Coffee Break   Room: The Yard                                                                                  |                                                                              |              |                                          |                                                          |                                                                      |
| 10:30 | T: Sensing Using Terahertz Radiation                                                                           |                                                                              |              |                                          |                                                          |                                                                      |
| 11:00 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 11:30 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 12:00 | Lunch<br>Room: Restaurant LENZ & Selleny's Bar                                                                 |                                                                              |              |                                          |                                                          |                                                                      |
| 12:30 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 13:00 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 13:30 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |
| 14:00 | T: Biospectroscopy-based Biosensing Platforms                                                                  | T: Heterogeneous Integration: Sensors Point of View                          |              | WS: Bioimpedance-based Sensing Platforms | WS: Consumer Inertial MEMS – High Tech in Your Hands     | WS: ZeroAMP – Logic, Memory, Sensors and More for Harsh Environments |
| 14:30 |                                                                                                                |                                                                              |              |                                          |                                                          |                                                                      |



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|       | Park Suite 1                                              | Park Suite 2                             | Park Suite 3                                  | Park Suite 4                   | Park Suite 5                                 | Park Suite 6                                    | Park Suite 7                  | Park Suite 8                                | Park Suite 9                          | Green Room 1           |
|-------|-----------------------------------------------------------|------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------|-------------------------------------------------|-------------------------------|---------------------------------------------|---------------------------------------|------------------------|
| 7:30  | Registration                                              |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 8:00  | Room: Grand Park Lobby                                    |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 8:30  | Opening Ceremony   Room: Grand Park Hall                  |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 9:00  | KN: Kimberly Foster<br>Room: Grand Park Hall              |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 9:30  |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 10:00 | Coffee Break   Room: Grand Klimt Hall                     |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 10:30 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 11:00 | Materials and Testing                                     | Integrated and MEMS Sensing Technologies | Sensor Materials, Fabrication and Packaging I | Wearable Sensors and Systems I | Emerging Sensors for Biomedical Applications | Sensor Technologies for Sustainable Development | Sensor Systems in Health Care | Chemical, Electrochemical and Gas Sensors I | Biomedical and Other Physical Sensors | Meet the Editors Panel |
| 11:30 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 12:00 | Lunch                                                     |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 12:30 | Room: Restaurant LENZ & Selleny's Bar                     |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 13:00 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 13:30 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 14:00 | Poster Session 1   Coffee Break<br>Room: Grand Klimt Hall |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 14:30 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |
| 15:00 |                                                           |                                          |                                               |                                |                                              |                                                 |                               |                                             |                                       |                        |

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|       | Park Suite 1                                   | Park Suite 2                                 | Park Suite 3                                  | Park Suite 4                           | Park Suite 5                                                   | Park Suite 6                                | Park Suite 7                                  | Park Suite 8                                        | Park Suite 9                                                                    |
|-------|------------------------------------------------|----------------------------------------------|-----------------------------------------------|----------------------------------------|----------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|
| 7:30  | Registration<br>Room: Grand Park Lobby         |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 8:00  |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 8:30  | Condition Monitoring                           | Systems: Machine Learning and Motion Control | Advanced Localization and Tracking Techniques | Wearable, Flexible and Textile Sensing | Sensor Materials, Fabrication and Packaging II                 | Optical Sensors: Materials and Applications | Chemical, Electrochemical and Gas Sensors III | Sensor Phenomenology, Modeling I and Evaluation I   | WS: Electronic Skin Patches: Convergent Technologies for Vital Signs Monitoring |
| 9:00  |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 9:30  | Pressure and Magnetic Sensors                  | Networks and IoT                             | Imaging                                       | Advanced Image Sensing Techniques      | Terahertz and Optical Sensors                                  | MEMS Technology and Applications            | Chemical, Electrochemical and Gas Sensors IV  | Sensor Phenomenology, Modeling II and Evaluation II |                                                                                 |
| 10:00 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 10:30 | Coffee Break   Room: Grand Klimt Hall          |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 11:00 | KN: Michael L. Roukes<br>Room: Grand Park Hall |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 11:30 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 12:00 | Lunch<br>Room: Restaurant LENZ & Selleny's Bar |                                              |                                               |                                        | WiSe Networking Lunch<br>Room: Restaurant LENZ & Selleny's Bar |                                             |                                               |                                                     |                                                                                 |
| 12:30 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 13:00 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 13:30 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 14:00 | Biosensors: Materials and Applications         |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 14:30 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |
| 15:00 |                                                |                                              |                                               |                                        |                                                                |                                             |                                               |                                                     |                                                                                 |



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2023

|       | Park Suite 1                                                                                          | Park Suite 2 | Park Suite 3 | Park Suite 4 | Park Suite 5 | Park Suite 6 | Park Suite 7 | Park Suite 8 | Park Suite 9 |
|-------|-------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 15:30 | Coffee Break   Room: Grand Klimt Hall                                                                 |              |              |              |              |              |              |              |              |
| 16:00 | Sensors Council 25th Anniversary Talk: Technologies for a Sustainable Future<br>Room: Grand Park Hall |              |              |              |              |              |              |              |              |
| 16:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 17:00 | Council Awards   Room: Grand Park Hall                                                                |              |              |              |              |              |              |              |              |
| 17:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 18:00 |                                                                                                       |              |              |              |              |              |              |              |              |
| 18:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 19:00 | Gala Dinner<br>Room: The Hofburg                                                                      |              |              |              |              |              |              |              |              |
| 19:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 20:00 |                                                                                                       |              |              |              |              |              |              |              |              |
| 20:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 21:00 |                                                                                                       |              |              |              |              |              |              |              |              |
| 21:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 22:00 |                                                                                                       |              |              |              |              |              |              |              |              |
| 22:30 |                                                                                                       |              |              |              |              |              |              |              |              |
| 23:00 |                                                                                                       |              |              |              |              |              |              |              |              |

**IEEE SENS**

|       | Park Suite 1                                   | Park Suite 2     | Park Suite 3                                                      | Park Suite 4                                                            | Park Suite 5                                               | Park Suite 6                                                       | Park Suite 7                    | Park Suite 8                                                     | Park Suite 9                                       |                                      |
|-------|------------------------------------------------|------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------|----------------------------------------------------|--------------------------------------|
| 8:00  | Registration<br>Room: Grand Park Lobby         |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 8:30  |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 9:00  |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 9:30  | KN: Archana Sharma<br>Room: Grand Park Hall    |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 10:00 | Coffee Break   Room: Grand Klimt Hall          |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 10:30 | Healthcare: Diagnostics and Monitoring         | Chemical Sensors | Bio-Remote Sensing and Integrated Artificial Intelligence Systems | Chemical Agent Detection, Sensing Technologies and Sensing Applications | Session: Actuators, Energy Harvesters and Powering Sensors | Smart Biomedical Sensor Platforms in Resource Constrained Settings | Optical Sensors II              | Sensor Data Processing & AI: Localization and Navigation Sensors | Chemical, Electrochemical and Gas Sensors II       |                                      |
| 11:00 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 11:30 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 12:00 | Lunch<br>Room: Restaurant LENZ & Selleny's Bar |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 12:30 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 13:00 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 13:30 | Poster Session 2<br>Room: Grand Klimt Hall     |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 14:00 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 14:30 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |
| 15:00 | Healthcare: AI and Assistive Technologies      |                  | Environmental Monitoring                                          | LIDAR, Radar, and RF Sensors                                            | Novel Interfacing Techniques for Sensing Systems           | Recent Advancement in Sensing Techniques                           | Sensors in Industrial Practices | Optical Sensors III                                              | Sensor Data Processing & AI: Automotive Perception | Magnetometers and Navigation Sensors |
| 15:30 | Healthcare: AI and Assistive Technologies      |                  | Environmental Monitoring                                          | LIDAR, Radar, and RF Sensors                                            | Novel Interfacing Techniques for Sensing Systems           | Recent Advancement in Sensing Techniques                           | Sensors in Industrial Practices | Optical Sensors III                                              | Sensor Data Processing & AI: Automotive Perception |                                      |
| 16:00 |                                                |                  |                                                                   |                                                                         |                                                            |                                                                    |                                 |                                                                  |                                                    |                                      |



|       | Park Suite 1                                                                                                                       | Park Suite 2 | Park Suite 3 | Park Suite 4 | Park Suite 5 | Park Suite 6 | Park Suite 7 | Park Suite 8 | Park Suite 9 |
|-------|------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 16:30 | Conference Award Ceremony (supported by the IEEE MEMS Technical Community) / 2024 Conference Announcement<br>Room: Grand Park Hall |              |              |              |              |              |              |              |              |
| 17:00 |                                                                                                                                    |              |              |              |              |              |              |              |              |
| 17:30 | Closing Remarks   Room: Grand Park Hall                                                                                            |              |              |              |              |              |              |              |              |

# Technical Program: Sunday, October 29

7:30 - 8:30

**Registration**

Room: Grand Park Lobby

8:30 - 10:00

**Tutorial: Metamaterial-inspired Miniaturized Radio-frequency Resonators for Versatile Industrial Sensing Applications**

Room: Park Suite 1

8:30 - 10:00

**Tutorial: Deep Learning Techniques useful for Designing Sensors and Sensor Networks**

Room: Park Suite 2

8:30 - 17:00

**Workshop: Bioimpedance-based Sensing Platforms**

Room: Park Suite 4

8:30 - 12:00

**Workshop: Sustainable Agri Food and Environment (SAFE) Sensors**

Room: Park Suite 5

8:30 - 17:00

**Workshop: ZeroAMP – Logic, Memory, Sensors and More for Harsh Environments**

Room: Park Suite 7

10:00 - 10:30

**Coffee Break**

Room: The Yard

10:30 - 12:00

**Tutorial: Sensing Using Terahertz Radiation**

Room: Park Suite 1

10:30 - 12:00

**Tutorial: Next Generation of Gas Sensors: Anticipated and Unanticipated Advantages Over Last-Century Sensor Designs**

Room: Park Suite 2

10:30 - 12:00

**Tutorial: Coplanar Capacitive Sensors: Design, Optimization, and Applications**

Room: Park Suite 3

12:00 - 13:30

**Lunch**

Room: Restaurant LENZ & Selleny's Bar

# Technical Program: Sunday, October 29

13:30 - 15:00

**Tutorial: Biospectroscopy-based Biosensing Platforms**

Room: Park Suite 1

13:30 - 15:00

**Tutorial: Heterogeneous Integration: Sensors Point of View**

Room: Park Suite 2

13:30 - 17:00

**Workshop: Consumer Inertial MEMS – High Tech in Your Hands**

Room: Park Suite 5

15:00 - 15:30

**Coffee Break**

Room: The Yard

15:30 - 17:00

**Tutorial: Sensors and Sensing Technologies for Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs)**

Room: Park Suite 1

15:30 - 17:00

**Tutorial: Setting Standards for Indoor Air Quality Sensors Based on VOCs**

Room: Park Suite 2

17:00 - 18:00

**Special Session on Research Funding**

Room: Grand Park Hall

19:00 - 21:00

**YP Welcome Reception & Poster Session**

Room: Vienna City Hall

# Technical Program: Monday, October 30

7:30 - 8:30

**Registration**

Room: Grand Park Lobby

8:30 - 9:00

**Opening Ceremony**

Room: Grand Park Hall

9:00 - 10:00

**Keynote: Nonlinearity and Sensing: a 30 Year Journey**

Kimberly Foster, *Tulane University, USA*

Room: Grand Park Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

Ravinder Dahiya, *Northeastern University, Boston*

10:00 - 10:30

**Coffee Break/Exhibit Hall**

Room: Grand Klimt Hall

10:30 - 12:00

**Meet the Editors Panel**

Room: Green Room 1

Moderator: Krikor Ozanyan, *The University of Manchester, UK*

10:30 - 12:00

**A1L-01: Materials and Testing**

Room: Park Suite 1

Session Chair(s): Sandro Carrara, *École Polytechnique Fédérale de Lausanne*

Mitradip Bhattacharjee, *Indian Institute of Science Education and Research, Bhopal*

10:30

 **Sensors Letters Paper**

**2065: Mono-Layer Graphene Transfer on a Multi-Layered Flexible Substrate for Bio-Sensor Fabrication**

Kamalesh Tripathy, Mitradip Bhattacharjee

Indian Institute of Science Education and Research, Bhopal, India

10:45

 **Sensors Letters Paper**

**2104: Organic and Metallic Sensors on Complex 3-D Object Using an Original Method: Water Transfer Printing**

Rafika Selmi, Jean Charles Fustec, Maxime Harnois, France Le Bihan

Université de Rennes, France

# Technical Program: Monday, October 30

11:00



*Sensors Letters Paper*

**1932: Losses-Assisted Sensitivity Enhancement in Reflective Mode-Phase-Variation Permittivity Sensors Based on Weakly Coupled Distributed Resonators**

Pau Casacuberta, Paris Véléz, Jonathan Muñoz-Enano, Lijuan Su, Ferran Martín  
Universitat Autònoma de Barcelona, Spain

11:15



*Sensors Letters Paper*

**2099: Characterization of Curved Piezoelectric Micromachined Ultrasound Transducers (pMUTs) Fabricated by Chip-Scale Glass Blowing Technique**

Chichen Huang{1}, Shubham Khandare{2}, Sri-Rajasekhar Kothapalli{2}, Srinivas Tadigadapa{1}  
{1}Northeastern University, United States; {2}Pennsylvania State University, United States

11:30



*Sensors Letters Paper*

**2100: GHz Fingerprint Acoustic Imaging by Mechanically Scanning a Soft Conductive Probe on Epitaxial PbTiO<sub>3</sub> Films**

Yuna Koike, Yusuke Sato, Takahiko Yanagitani  
Waseda University, Japan

11:45



*Sensors Letters Paper*

**2120: Non-Destructive Measurement of Micro Coating Thickness Using Sweep Frequency Photoacoustic Sensing Technique**

Abhijeet Gorey, Chirabrata Bhaumik, Tapas Chakravarty, Annesha Mazumder, Arijit Sinharay, Subhadeep Basu, Rajat Das, Arpan Pal  
TATA Consultancy Services Limited, India

10:30 - 12:00

**A1L-02: Integrated and MEMS Sensing Technologies**

Room: Park Suite 2

Session Chair(s): J.-C. Chiao, *SMU*

Mark Cheng, *The University of Alabama*

10:30



*Invited Journal Author*

**[10.1109/JSEN.2023.3250401](#): High Resolution Dielectric Characterization of Single Cells and Microparticles Using Integrated Microfluidic Microwave Sensors**

Arda Secme, Uzey Tefek, Burak Sari, Hadi Sedaghat Pisheh, Hatice Dilara Uslu, Ozge Akbulut, Berk Kucukoglu, Ramazan Tufan Erdogan, Hashim Alhmoud, Ozgur Sahin, Mehmet Selim Hanay  
Bilkent University, Turkey

10:45



*Invited Journal Author*

**[10.1109/JSEN.2023.3243783](#): Bayesian Sensor Calibration of a CMOS-Integrated Hall Sensor Against Thermomechanical Cross-Sensitivities**

Moritz Berger{1}, Christian Schott{2}, Oliver Paul{1}  
{1}Albert-Ludwigs-Universität Freiburg, Germany; {2}Melexis Technologies SA, Switzerland

# Technical Program: Monday, October 30

11:00



**Invited Journal Author**

**[10.1109/JSEN.2023.3244663](#): A VCO-Based ADC with Direct Connection to a Microphone MEMS, 80-dB Peak SNDR and 438?W Power Consumption**

Carlos Perez{1}, Ruben Garvi{1}, Guillermo Lopez{1}, Andres Quintero{2}, Francois Leger{3}, Pedro Amaral{3}, Andreas Wiesbauer{3}, Luis Hernandez{1}

{1}Carlos III University, Spain; {2}Infineon Technologies AG, Austria; {3}Infineon Technologies Austria AG, Austria

11:15



**Invited Journal Author**

**[10.1109/JSEN.2023.3262682](#): A 17.6-Bit 800-SPS Energy-Efficient Read-Out IC with Input Impedance Boosting**

Jooyeol Rhee{1}, Wooyoung Kim{2}, Suhwan Kim{2}

{1}Gachon University, Korea; {2}Seoul National University, Korea

11:30



**Invited Journal Author**

**[10.1109/JSEN.2023.3255415](#): Thermal Stress Resistance for the Structure of MEMS-Based Silicon Differential Resonant Accelerometer**

Jing Zhang{1}, Tianhao Wu{1}, Yudong Liu{1}, Chen Lin{2}, Yan Su{1}

{1}Nanjing University of Science and Technology, China; {2}Tsinghua University, China

11:45



**Sensors Letters Paper**

**2093: Initial Demonstration of Fused Silica Dual-Shell Gyroscope Using Indirect Method of Piezoelectric Excitation**

Danmeng Wang{2}, Nicholas Strnad{1}, Andrei Shkel{2}

{1}DEVCOM Army Research Laboratory, United States; {2}MicroSystems Laboratory, University of California, Irvine, United States

10:30 - 12:00

**A1L-03: Sensor Materials, Fabrication and Packaging - 1**

Room: Park Suite 3

Session Chair(s): Arum Han, *Texas A&M University*

Ulrich Schmid, *TU Wien*

10:30



**INVITED**

**1922: Microstructures on Demand: 3D Printing Across Length-Scales and Materials - A Key Enabler for Device and System Engineering**

Frederik Kotz-Helmer{2}, Dorothea Helmer{2}, Bastian Rapp{1}

{1}Freiburg Material Research Center, University of Freiburg, Germany; {2}Glassomer GmbH, University of Freiburg, Germany

# Technical Program: Monday, October 30

11:00

## **1305: Piezoelectret Sensors from Direct 3D-Printing Onto Bulk Films**

Youssef Sellami, Omar Ben Dali, Romol Chadda, Sergey Zhukov, Mahdi Guermazi, Alexander Anton Altmann, Heinz von Seggern, Bastian Latsch, Niklas Schäfer, Mario Kupnik  
Technische Universität Darmstadt, Germany

11:15

## **1473: Simple Fabrication Process for High-Sensitive Flexible Capacitive Force Sensor Using PDMS**

Pranav Deshpande, Prasanna Kumar Routray, Soumya Dutta, Manivannan M  
Indian Institute of Technology Madras, India

11:30

## **1900: Ultrasound Transducer Made of Nanoporous PVDF for Underwater Communications**

Fairoz Abida{1}, Rong Fu{1}, Aijun Song{1}, Pai-Yen Chen{2}, Mark Ming-Cheng Cheng{1}  
{1}University of Alabama, United States; {2}University of Illinois Chicago, United States

11:45

## **1818: Chronic Dielectric Performance of Parylene-Modified Polydimethylsiloxane for Insulating Stretchable Electronics**

Kaushal Sumaria, Hongyao Geng, Tingyi Liu  
University of Massachusetts Amherst, United States

10:30 - 12:00

## **A1L-04: Wearable Sensors and Systems - 1**

Room: Park Suite 4

Session Chair(s): Sahika Inal, *King Abdullah University of Science and Technology (KAUST)*  
Jürgen Kosel, *Silicon Austria Labs (SAL)*

10:30

## **★ ★ INVITED**

## **2074: Why patient-to-Patient Variations Limit Diagnostically Relevant Biosensors**

Janos Vörös  
Institute for Biomedical Engineering, Laboratory of Biosensors and Bioelectronics, ETH Zürich, Switzerland

11:00

## **1452: ModAu: Modernized Auscultation**

Dennis Laurijssen{1}, Toon Stas{2}, Rens Baeyens{2}, Kris Ides{2}, Peter Delputte{2}, Stijn Verhulst{2}, Walter Daems{1}, Jan Steckel{1}  
{1}FTI Cosys-Lab, University of Antwerp, Belgium; {2}University of Antwerp, Belgium

11:15

## **1113: EMG-Based Human Motion Analysis: A Novel Approach Using Towel Electrodes and Transfer Learning**

Chenyu Tang, Wentian Yi, Jong Min Kim, Luigi G. Occhipinti  
University of Cambridge, United Kingdom

# Technical Program: Monday, October 30

11:30

**1209: Implantable Sensors and Biosensors to Monitor Bone Regeneration - Wireless Smart System for On-Line Monitoring of pH, Temperature, Strain Sensors and TGF $\beta$ 1 During Bone Healing**

Elena Guerrero SanVicente{2}, Cédric Hennemann{1}, Jérémy Disser{1}, Ruta Grinyte{2}, Nenad Marjanovi{1}, Joan Cabot{2}

{1}CSEM, Switzerland; {2}LEITAT Technological Center, Spain

11:45

**1234: Wireless Bilateral Breath Monitoring System Using Temperature-Based Wearable Technology in Motion**

Martina Di Leta, Alessio Mostaccio, Nicoletta Panunzio, Gaetano Marrocco

Università degli Studi di Roma Tor Vergata, Italy

10:30 - 12:00

**A1L-05: Emerging Sensors for Biomedical Applications**

Room: Park Suite 5

Session Chair(s): Joost Lötters, *University of Twente*

10:30

**★ ★ INVITED**

**1916: Modular Platform and Building Blocks for Sensing and Actuation in Organ-on-Chip Applications**

Mathieu Odijk

University of Twente, Netherlands

11:00

**1889: Remote Sensing of Exhaled Components Using Whistle Sounds**

Rinka Yoshioka, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh

University of Tokyo, Japan

11:15

**1640: A Smart Intra-Oral Wearable for Wireless Electrooculogram Measurement**

Han Nguyen, Sharmistha Bhadra

McGill University, Canada

11:30

**1863: Application of a Photoacoustic Sensor for Colon Cancer Imaging: A Case Report**

Ashkan Ghanbarzadeh-Dagheyan{2}, Francis Kalloor Joseph{2}, Cyrille Mooij{1}, Stefan van der Stel{1}, Teo Ruers{1}

{1}National Cancer Institute NKI, Netherlands; {2}University of Twente, Netherlands

11:45

**1560: A Comparison of Sensing Technologies on a Room-Exit Detection System**

Kaito Fukuda, Katsufumi Matsunaga, Yutaro Tabuchi, Ryutaro Ninomiya, Vasily Moshnyaga

Fukuoka University, Japan

# Technical Program: Monday, October 30

10:30 - 12:00

## **A1L-06: Sensor Technologies for Sustainable Development**

Room: Park Suite 6

Session Chair(s): Ravinder Dahiya, *Northeastern University*

10:30

**\*\* INVITED**

### **1921: Implantable and bioresorbable Chemical Sensors and Systems for in-Vivo Monitoring of clinical-Diagnostic Markers**

Giuseppe Barillaro

Università di Pisa, Italy

11:00

### **1849: CRISPR-Based Diagnostic for In-Field Detection of Plant Pathogens**

Amy Heathcote, Nicole Weckman

University of Toronto, Canada

11:15

### **1725: DTS Data Correlation Analysis for Environmental Monitoring and Infrastructure Protection**

Fabien Ravet{1}, Cristian Silva{2}, Jorge Muguruza{2}, Alexandre Goy{3}, Etienne Rochat{3}, Yvan Jacquat{1}

{1}Gradesens, Switzerland; {2}Hunt LNG Operating Company, Peru; {3}Omnisens, Switzerland

11:30

### **1692: Stone-Based Substrates for Thin-Film Thermistor Temperature Sensors**

Niloofar Saeedzadeh Khaanghah{1}, Hugo de Souza Oliveira{1}, Alejandro Carrasco-Pena{1}, Giuseppe Cantarella{2}, Michael Haller{1}, Nicholas Rapagnani{1}, Aart Van Bezooijen{1}, Michael Nippa{1}, Niko Münzenrieder{1}

{1}Free University of Bozen-Bolzano, Italy; {2}Università di Modena e Reggio Emilia, Italy

11:45

### **1570: Degradable Mo-Based Phosphate Sensor for In-Soil Agricultural Monitoring**

Elizabeth Schell, Jack Murphy, Jon Hawkings, Alain Plante, Mark Allen

University of Pennsylvania, United States

10:30 - 12:00

## **A1L-07: Sensor Systems in Health Care**

Room: Park Suite 7

Session Chair(s): Chang-hee Won, *Temple University*

10:30

**\*\* INVITED**

### **1913: Sim2real Approaches for Multi-Modal Robot Sensors and Sensor Skins**

Hubert Zangl{2}, Serkan Ergun{1}, Tobias Mitterer{1}

{1}University of Klagenfurt, Austria; {2}University of Klagenfurt, AAU SAL Ubiquitous Sensing Lab, Austria

# Technical Program: Monday, October 30

11:00

**1622: Novel Handheld Hair Texture-Scanner Capable of Acquiring Delicate Haptic Changes in Human Hair**

Masahito Komatsubara{1}, Gakuto Tanaka{1}, Satoshi Hisayasu{1}, Takaya Ohishi{1}, Yusaku Maeda{2}, Hiroto Oikaze{3}, Yasunori Matsui{3}, Hidekuni Takao{1}  
{1}Kagawa University, Japan; {2}Kagawa University, National Institute of Technology KOSEN, Kagawa College, Japan; {3}Panasonic, Japan

11:15

**1196: 3D-Printer-Based Test-Bench for Contactless Respiratory Monitoring Systems**

Marco Pogliano, Irene Buraoli, Alessandro Sanginario, Danilo Demarchi, Paolo Motto Ros  
Politecnico di Torino, Italy

11:30

**1528: Bio-Inspired Gesture Recognition with Baffled Transducers Using Temporal and Spectral Features**

Dennis Laurijssen{1}, Anthony Schenck{3}, Girmi Schouten{3}, Robin Kerstens{3}, Sebastiaan Aussems{3}, Eric Paillet{3}, Randy Gomez{2}, Keisuke Nakamura{2}, Walter Daems{1}, Jan Steckel{1}  
{1}FTI Cosys-Lab, University of Antwerp, Belgium; {2}Honda Research Institute, Japan; {3}University of Antwerp, Belgium

11:45

**1572: Signal Decomposition Method with Sensor-Fusion for Reducing Motion Artifacts in Intra-Oral EEG**

Shibam Debbarma, Sharmistha Bhadra  
McGill University, Canada

10:30 - 12:00

**A1L-08: Chemical, Electrochemical and Gas Sensors - 1**

Room: Park Suite 8

Session Chair(s): Xiaoshan Zhu, *University of Nevada Reno*  
Hamida Hallil Abbas, *Bordeaux University*

10:30

**★★ INVITED**

**1912: Materials Design for High Performance of Metal Oxide Semiconductor Gas Sensors**

Kengo Shimano, Koichi Suematsu, Ken Watanabe  
Kyushu University, Japan

11:00

**1834: Performance of a Monolithic E-Nose Array Integrating MEMS and ALD Processing**

Yilu Zhou{1}, James Dieffenderfer{1}, Erdem Sennik{1}, Mahaboobatcha Aleem{1}, Jakob Speight{1}, Shrey Vasist{1}, Ömer Oralkan{1}, Bongmook Lee{2}, Veena Misra{1}  
{1}North Carolina State University, United States; {2}State University of New York Polytechnic Institute, United States

# Technical Program: Monday, October 30

11:15

**1804: Pristine, Au and Cu Decorated Nanoporous NiO Films for Selective CO and NO<sub>2</sub> Gas Sensing**  
Tesfalem Welearegay{3}, Johannes Glöckler{2}, Marta Padilla{1}, Jan Mitrovics{1}, Boris Mizaikoff{2}, Lars Österlund{3}  
{1}JLM Innovation, Germany; {2}Universität Ulm, Germany; {3}Uppsala University, Sweden

11:30

**1660: Room Temperature Detection of ppb Level NO<sub>2</sub> by WS<sub>2</sub> Sensors**  
Shuja Bashir Malik, Fatima Ezahra Annanouch, Eduard Llobet  
Universitat Rovira i Virgili, Spain

11:45

**1632: Flexible Sensor Utilizing Polypyrrole Laser-Induced Graphene Nanocomposite for Room Temperature Ammonia Detection**  
Jose Carlos Santos-Ceballos{2}, Foad Salehnia{1}, Alfonso Romero{1}, Xavier Vilanova{1}  
{1}Universitat Rovira i Virgili, Spain; {2}Universitat Rovira i Virgili, Microsystems Nanotechnologies for Chemical Analysis MINOS, Spain

10:30 - 12:00

## A1L-09: Biomedical and Other Physical Sensors

Room: Park Suite 9

Session Chair(s): Dong-Weon Lee, *Chonnam National University*  
Hyejin Moon, *The University of Texas at Arlington*

10:30

**\*\* INVITED**

**1925: Self-Powered/Wireless-Powered Physical Sensors for Healthcare Applications**  
Inkyu Park{2}, Jungrok Choi{2}, Jimin Gu{2}, Junseong Ahn{2}, Yong Suk Oh{1}, Seokjoo Cho{2}, Hyeonseok Han{2}  
{1}Korea Advanced Institute of Science & Technology, Korea; {2}Korea Advanced Institute of Science and Technology, Korea

11:00

**1454: Bioimpedance as a Signature for Characterizing Human Ventricular Myocardium**  
Twinkle Twinkle{1}, Anil Vishnu G K{2}, Prasanna Simha Mohan Rao{3}, Hardik Jeetendra Pandya{1}  
{1}Indian Institute of Science, India; {2}Indian Institute of Science, Bangalore, India; {3}Sri Jayadeva Institute of Cardiovascular Sciences and Research, India

11:15

**1820: Thermoelectrical Characterization of Cells Using a Pyroelectric Sensor**  
Salvatore Andrea Pullano{1}, Marta Greco{1}, Syed Kamrul Islam{2}, Antonino S. Fiorillo{1}  
{1}Università degli studi Magna Græcia di Catanzaro, Italy; {2}University of Missouri, United States

11:30

**1593: Non-Contact Monitoring of Kiwifruit Ripening Using a High-Sensitivity Multi-Frequency Inductive Sensor**  
Hana Boukharouba{1}, Alexiane Pasquier{1}, Yohan Le Diraison{2}, Stéphane Serfaty{2}, Pierre-Yves Joubert{3}  
{1}C2N, Université Paris Saclay, France; {2}SATIE, CY Cergy Paris Université, France; {3}Université Paris Saclay, France

# Technical Program: Monday, October 30

11:45

**1718: Capacitive Sensor for Flame Detection in Pipes**

Sebastian Fizek, Markus Spelet, Florian Poltschak  
Johannes Kepler Universität Linz, Austria

12:00 - 13:30

**Lunch**

Room: Restaurant LENZ & Selleny's Bar

13:30 - 15:30

**WiSe Speaker Session**

Room: Park Suite 9

Session Chair(s): Veda Sandeep Nagaraja, *Tyndall National Institute*  
Shawana Tabassum, *The University of Texas at Tyler*  
Saakshi Dhanekar, *Indian Institute of Technology, Jodhpur*

13:30 - 15:30

**Industry Session**

Room: Green Room 1

Session Chair(s): Chonggang Wang, *Columbia University*

13:30 - 15:30

**A2P-10: Sensor Phenomenology, Modeling and Evaluation - A**

Room: Grand Klimt Hall

Session Chair(s): Tao Li, *University of Cincinnati*

**1074: A Disturbance Observer-Based Technique to Achieve System Modeling and Parameter Identification of Micro Heater**

Jiuwu Hui, Wei Xu, Yi-Kuen Lee  
Hong Kong University of Science and Technology, Hong Kong

**1464: Analysis of Charge Accumulation Effect in Micro-Shell Resonator Gyroscope**

Ming Ze Gao, Jiang Kun Sun, Sheng Yu, Jun Feng, Yong Meng Zhang, Xue Zhong Wu, Ding Bang Xiao  
National University of Defense Technology, China

**1545: Mitigation of Electrical/Ionic Interference in Iontronic Neurostimulation/Neurosensing Platforms: A Simulation Study**

Jacopo Nicolini<sup>{2}</sup>, Federico Leva<sup>{2}</sup>, Pierpaolo Palestri<sup>{1}</sup>, Luca Selmi<sup>{2}</sup>  
<sup>{1}</sup>Università degli Studi di Udine, Italy; <sup>{2}</sup>Università di Modena e Reggio Emilia, Italy

**1810: Smart Fault Detection Approach Leveraging Soft Sensor and Model-Free Control: Application to Robot Manipulator**

Heni Belgacem<sup>{3}</sup>, Atal Anil Kumar<sup>{1}</sup>, Inès Chihi<sup>{1}</sup>, Lilia Sidhom<sup>{2}</sup>  
<sup>{1}</sup>FSTM, University of Luxembourg, Luxembourg; <sup>{2}</sup>University of El Manar, Tunisia; <sup>{3}</sup>University of Luxembourg, Luxembourg

**1892: Comprehensive LiDAR Sensor Noise Model and Application to Texture and Object Classification Using Custom Deep Learning**

Hobeom Han<sup>{1}</sup>, Sang Won Yoon<sup>{2}</sup>  
<sup>{1}</sup>Hanyang University, Korea; <sup>{2}</sup>Seoul National University, Korea

# Technical Program: Monday, October 30

## **1412: Can LSE Reduce Noise in Sensing Applications?**

Andrea Fagnani{1}, Paolo Frigerio{1}, Marco Zamprogno{2}, Giacomo Langfelder{1}  
{1}Politecnico di Milano, Italy; {2}STMicroelectronics, Italy

13:30 - 15:30

### **A2P-11: Sensor Materials, Fabrication and Packaging - A**

Room: Grand Klimt Hall

Session Chair(s): Arum Han, *Texas A&M University*

## **1170: Novel Package Approach for MEMS Pressure Sensor**

Luca Maggi, Marco Del Sarto, Tiziano Chiarillo, Enri Duqi, Lorenzo Baldo, Adriano Abbisogni, Filippo Daniele  
STMicroelectronics, Italy

## **1525: Influence of Material Properties on the Performance of Highly Stretchable Pneumatic Strain Gauges**

Vilma Lampinen, Anastasia Koivikko, Veikko Sariola  
Tampere University, Finland

## **1531: Low Creep 3D-Printed Piezoresistive Force Sensor for Structural Integration**

Bastian Latsch{2}, Omar Ben Dali{2}, Romol Chadda{2}, Niklas Schäfer{2}, Alexander Anton Altmann{2}, Martin Grimmer{2}, Philipp Beckerle{1}, Mario Kupnik{2}  
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Technische Universität Darmstadt, Germany

## **1716: Strain Microsensors Based on Carbon Nanotube/Polyimide Thin Films**

Marco Antonio Cen Puc, Tim de Rijk, Andreas Schander, Minerva Vargas Gleason, Walter Lang  
Institute for Microsensors, Actuators and Systems IMSAS, University of Bremen, Germany

## **1893: Precision Temperature Control of Microsystems Using On-Package Heaters and Sensors**

Mohammadreza Hajipour, Fatemeh Eshaghi, Mikhail Kanygin, Behraad Bahreyni  
Simon Fraser University, Canada

13:30 - 15:30

### **A2P-12: Chemical, Electrochemical and Gas Sensors - A**

Room: Grand Klimt Hall

Session Chair(s): Xiaoshan Zhu, *University of Nevada Reno*  
Hamida Hallil Abbas, *Bordeaux University*

## **1083: Design and Evaluation of a Miniaturized Non-Resonant Photoacoustic CO<sub>2</sub> Gas Sensor with Integrated Electronics**

Ananya Srivastava{1}, Nan Zhang{4}, Xiaolin Li{3}, Yuanchun Li{3}, Zhenyue Zhou{3}, Achim Bittner{1}, Xiaofeng Zhou{4}, Alfons Dehé{2}  
{1}Hahn-Schickard-Gesellschaft, Germany; {2}Hahn-Schickard-Gesellschaft, Albert-Ludwigs-Universität Freiburg, Germany; {3}Hahn-Schickard-Semiconductor Tech. Co. Ltd., China; {4}Hahn-Schickard-Semiconductor Tech. Co. Ltd. / East China Normal University, China

# Technical Program: Monday, October 30

## **1099: CMOS-Based Multimodal Image Sensor Enabling Simultaneous Visualization of Light and Ph**

Runa Honjo, Yoshiko Noda, Daisuke Akai, Takeshi Hizawa, Yasuyuki Kimura, Yong-Joon Choi, Kazuhiro Takahashi, Kazuaki Sawada, Toshihiko Noda  
Toyohashi University of Technology, Japan

## **1123: A SUB-Micron Double-Layer Capacitance of a Microwell Array for Avidin Sensing**

Qiu-Zhe Xie, Chih-Ting Lin  
Graduate Institute of Electronics Engineering, National Taiwan University, Taiwan

## **1146: Room Temperature Ammonia Sensor Based on Electrodeposited Polyaniline Film**

Aihemaiti Kayishaer{2}, Caroline Duc{1}, Nathalie Redon{1}, Claire Magnenet{2}, Boris Lakard{2}, Sophie Lakard{2}  
{1}Center for Energy and Environment, IMT Nord Europe, Institut Mines-Télécom, University of Lille, France; {2}Institut UTINAM, CNRS, Université de Franche-Comté, France

## **1162: Direct Electrode Modification of Paper-Based Microfluidic Sensors Through Electrodeposition and Electropolymerization**

Mohammad Hossein Ghanbari, Bastian J. M. Etzold  
Technische Universität Darmstadt, Germany

## **1180: 2D SERS Gas Sensor for Visualization and Localization of the Odor Source**

Lin Chen, Cong Wang, Hao Guo, Fumihiko Sassa, Kenshi Hayashi  
Kyushu University, Japan

## **1198: Preparation of PVP Encapsulated Pd:WO<sub>3</sub> Nanocomposites for H<sub>2</sub> Gas Sensing**

Rubaya Yeasmin, Hyungtak Seo  
Ajou University, Korea

## **1199: Ammonia Leakage Detection for Naval Transport - First Step Towards On-Board Detection in Presence of Water Vapour**

Alexis Lasserre, Jerome Rossignol, Didier Stuerge, Leo Simon, Ludmilla Grzelak  
Laboratoire Interdisciplinaire Carnot de Bourgogne, Université de Bourgogne, France

## **1210: Fabrication of CMOS Sucrose Image Sensor to Visualize Photosynthetic Products in Plants**

Yusuke Matsushita, Taichi Yoshida, Hideo Doi, Yong-Joon Choi, Kazuhiro Takahashi, Kotaro Takayama, Kazuaki Sawada, Toshihiko Noda  
Toyohashi University of Technology, Japan

## **1224: Polymer-Based Virtual Sensor Array Leveraging Fringing Field Capacitance for VOC Detection**

Gian Carlo Antony Raj, Youssef Ezzat Elnemr, Pavithra Munirathinam, Yumna Birjis, Calvin Love, Arezoo Emadi  
University of Windsor, Canada

## **1236: Gas Mixture Estimation Using Power-Law Models of Arrayed Chemiresistive Metal-Oxide Sensors**

Ilya Gurin, Nishit Goel, Stephen Bart  
TDK-InvenSense, United States

# Technical Program: Monday, October 30

## **1279: NO<sub>2</sub> Adsorption/Desorption Thermodynamics in Single Tungsten Oxide Nanowire Gas Sensors**

Helena Simunkova{1}, Petr Smisitel{2}, Ondrej Chmela{2}, Stella Vallejos{3}, Jaromir Hubalek{2}  
{1}Brno University of Technology, Central European Institute of Technology, Czech Rep.; {2}Central European Institute of Technology, Czech Rep.; {3}Instituto de Microelectrónica de Barcelona, IMB-CNM CSIC, Spain

## **1335: MEMS Gas Sensors with Metal-Oxide Semiconductor Materials Patterned at Wafer-Level by Photolithography Technique**

Xiaojiang Liu, Gaoqiang Niu, Jin Li, Yi Zhuang, Xitong Sun, Fei Wang  
Southern University of Science and Technology, China

## **1371: Super-Nernstian Floating-Extended Gate Ion Sensitive Field Effect Transistor for pH Sensing**

Ananya Tiwari, Sooraj Sanjay, Navakanta Bhat  
Indian Institute of Science, India

## **1391: A Quartz Crystal Resonator Modified with a Metal-Organic Framework for Sensing of Benzene, Ethylbenzene, Toluene and Xylenes in Water**

Jaskaran Singh Malhotra, Per Holger Reichert, Jonas Sundberg  
Technical University of Denmark, Denmark

## **1400: A Terahertz Metamaterial Absorber-Based Biosensor for Ascorbic Acid**

Yakai Zhang, Xiaomeng Bian, Misheng Liang, Rui You  
Beijing Information Science and Technology University, China

## **1423: Ex-Situ Formed PANI/WS<sub>2</sub> Composite for Improved Selectivity Towards Ammonia Gas**

Siziwe Gqoba, Zamangwane Hlongwane, Laercia Bila, Paul Fadojutimi  
University of the Witwatersrand, South Africa

## **1877: Prevention of Biofouling on Iridium Oxide Based pH Sensors Using Polyvinyl Alcohol Hydrogels**

Hrishita Sharma{1}, Deepjyoti Kalita{1}, Ritik Panda{2}, Khalid B Mirza{1}  
{1}National Institute of Technology, Rourkela, India; {2}NIT Rourkela, India

13:30 - 15:30

### **A2P-13: Biosensors and Microfluidics - A**

Room: Grand Klimt Hall

Session Chair(s): Hyejin Moon, *The University of Texas at Arlington*

Uwe Schnakenberg, *RWTH Aachen University*

## **1003: Low-Cost Portable Medical Device for the Detection and Quantification of Exosomes**

Diego Barrettino{3}, Christoph Zumbühl{3}, Raphael Kummer{3}, Markus Thalmann{3}, Carolina Balbi{2}, Giuseppe Vassalli{2}, Rosane Moura Dos Santos{1}, Jean-Michel Sallèse{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Istituto Cardiocentro Ticino, Switzerland; {3}Lucerne University of Applied Sciences and Arts, Hochschule Luzern, Switzerland

## **1028: A Thermal Microfluidic Flow Sensor Screen-Printed Onto an Ultrathin PMMA Foil**

Rafael Ecker, Tina Mitteramskogler, Bernhard Jakoby  
Johannes Kepler Universität Linz, Austria

## **1132: Estimation of Analyte's Vertical Positions Above the Surface of Nanocapacitor Array Biosensors**

Daniele Goldoni, Claudio Ongaro, Leonardo Orazi, Luigi Rovati, Luca Selmi  
Università di Modena e Reggio Emilia, Italy

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## **1156: Development of a Microfluidic Platform for High-Throughput Characterization of Multiple Biophysical Properties of Single-Cell Membranes**

Hongfei Yu{2}, Xiao Chen{4}, Yi Zhang{3}, Shuhao Yang{2}, Lili Gui{2}, Deyong Chen{1}, Junbo Wang{1}, Jian Chen{1}, Ke Wang{2}

{1}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China; {2}Beijing University of Posts and Telecommunications, China; {3}Peking University, China; {4}University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

## **1171: A Study on Nanostructured Substrates of a LSPR Biosensor for Sensitive Detection of $\beta$ -Synuclein Amyloid Proteins**

Yuuto Kimura{2}, Kotaro Kamitani{1}, Carl Frederik Werner{1}, Minoru Takeda{1}, Masayuki Fukuzawa{1}, Minoru Noda{1}

{1}Kyoto Institute of Technology, Japan; {2}Kyoto Institute of Technology, Karlsruher Institut für Technologie, Japan

## **1178: Development of a Mobile Measurement System for Simultaneous Measurement of Multiple Microcantilever Based Biosensors**

Kazuki Miyaoka{1}, Yuya Takahashi{1}, Carl Frederik Werner{1}, Masayuki Sohigawa{2}, Minoru Noda{1}

{1}Kyoto Institute of Technology, Japan; {2}Niigata University, Japan

## **1223: Analysis of Liquid Morphologies in Curved Open Microchannels**

Tina Mitteramskogler{2}, Rafael Ecker{2}, Andreas Fuchsluger{2}, Thomas Wilfinger{1}, Robert Wille{3}, Bernhard Jakob{2}

{1}Ernst Wittner GmbH, Austria; {2}Johannes Kepler Universität Linz, Austria; {3}Technische Universität München, Germany

## **1248: Electrical Recording of Effects of Chemotherapeutic Treatment on Cancer Spheroids**

Maximilian Ell, Mai Thu Bui, Sonia Prado-López, Günther Zeck

Technische Universität Wien, Austria

## **1292: A Conductive Hydrogel-Paper Sensor for Cell Metabolism Monitoring**

Zhichao Ye{2}, Yuyang Yuan{2}, Shanshan Zhang{2}, Lu Fang{1}, Congcong Zhou{2}, Bo Liang{2}, Tianyu Li{2}

{1}Hangzhou Dianzi University, China; {2}Zhejiang University, China

## **1332: Development of a High-Sensitivity Printed Impedance Based Electrochemical Sensor for Detecting *E. coli***

Parinaz Eskandari, Alimohammad Haji Adineh, Dinesh Maddipatla, Massood Atashbar

Western Michigan University, United States

## **1404: Thermally Driven Sol-Gel Transition of Gelatin in a 3D-Printed Microfluidic Chip**

Abdul Mohizin, Yujeong Won, Baekkyoung Sung

KIST Europe Forschungsgesellschaft mbH, Germany

## **1592: Microfluidic System for Recording Fast Ion Channel Kinetics with Electrical Impedance Spectroscopy**

Yuan Cao, Linhan Cheng, Oscar Liborio, Ralf Hausmann, Uwe Schnakenberg

RWTH Aachen University, Germany

# Technical Program: Monday, October 30

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## **A2P-14: Optical Sensors - A**

Room: Grand Klimt Hall

Session Chair(s): Martin Cizek, *Institute of Theoretical Physics, Charles University*

### **1018: Analog Pyroelectric Infrared Sensor for Non-Invasive Beehive Monitoring**

Herbert Aumann{1}, Antony Aumann{2}

{1}MaineBiosensors LLC, United States; {2}Northern Michigan University, United States

### **1024: Continuous Measurement of Individual Formaldehyde Exposure with a DIY Photometer**

Lisa Petani, Markus Lorenz, Christian Pylatiuk

Karlsruher Institut für Technologie, Germany

### **1032: Highly Sensitive Humidity Sensor Based on Optical Fiber Fabry-Perot Interferometer**

Chen Zhu{2}, Jie Huang{1}

{1}Missouri University of Science and Technology, United States; {2}Zhejiang Lab, China

### **1112: A Low Power Optical Sensing System for Leaf Area Index (LAI) Measurement with Dynamically Adjustable Field of View**

Jonathan Larochele, Johannes Klüppel, Laura Maria Comella

Albert-Ludwigs-Universität Freiburg, Germany

### **1115: Noninvasive Glucose Monitoring Evaluation with Diffused Transmitted NIRS in Soft Silicone-Based Tissue Phantoms**

Jongdeog Kim, Bong Kyu Kim, Chul Huh

Electronics and Telecommunications Research Institute, Korea

### **1141: Ambient Light Sensor with 358pW / cm<sup>2</sup> Equivalent Noise Floor for Behind Screen Operation**

Jeffrey Raynor, Samuel Foulon, Christophe Premont, Jean-Jacques Rouger, Régis Rousset, Guillaume Marchand, Olivier LeNeel

STMicroelectronics, France; STMicroelectronics, United Kingdom

### **1193: Fiber Optic State of Charge Sensor for Vanadium Redox Flow Batteries**

Niklas Janshen{2}, Florian Rittweger{2}, Christian Modrzynski{1}, Karl-Ragmar Riemschneider{2},

Antonio Chica Lara{3}, Thorsten Struckmann{2}

{1}DECHEMA-Forschungsinstitut, Germany; {2}Hamburg University of Applied Sciences, Germany;

{3}Instituto de Tecnología Química, Universitat Politècnica de València-CSIC, Spain

### **1195: Flexible Liquid-Filled Scintillating Fibers for X-Ray Detection**

Magnus Lindblom{1}, Maximilian Patzauer{1}, Ulrich Vogt{2}, Scott Wilbur{3}, Nazila Safari Yazd{1},

Kenny Hey Tow{1}, Walter Margulis{1}, Åsa Claesson{1}, Sven-Christian Ebenhag{1}

{1}Research Institutes of Sweden AB, Sweden; {2}Royal Institute of Technology, Sweden; {3}University of Sheffield, United Kingdom

### **1284: Polymer-Functionalized Fiber-Optic Optrode Towards the Monitoring of Breathing Parameters**

Amaya Álvarez-Jiménez, Nerea De Acha, Kontxi Aginaga-Etxamendi, Aitor Urrutia, Abián Bentor

Socorro-Leránoz, Ignacio Raúl Matías

Universidad Pública de Navarra, Spain

# Technical Program: Monday, October 30

**1286: Design and Validation of a Vehicle-Mounted Near-IR 1f Wavelength Modulation Spectroscopy System for On-Road Measurements of Ambient Water Vapour in Gandhinagar-Ahmedabad, India**  
Shruti De{2}, Durlav Paul{2}, Kenneth T V Grattan{1}, Arup Lal Chakraborty{2}  
{1}City, University of London, United Kingdom; {2}Indian Institute of Technology Gandhinagar, India

**1291: Low-Cost, Portable In-Situ Spectral Analysis Sensor for Monitoring Water Contamination**  
Pedro D. Lopes, Camila M. Penso, Cátia F. Carneiro, Luís M. Gonçalves  
Universidade do Minho, Portugal

13:30 - 15:30

## **A2P-15: Physical Sensors - A**

Room: Grand Klimt Hall

Session Chair(s): Dong-Weon Lee, *Chonnam National University*  
Hyejin Moon, *The University of Texas at Arlington*

**1025: Gas Flow Rate Sensing by Curvature Change of Micro Quartz Resonators**  
Xiangzheng Li{2}, Ye Chang{2}, Xueyou Sun{2}, Yue Feng{2}, Weiwei Cui{1}, Hao Zhang{2}  
{1}State Key Laboratory of Precision Measurements Technology and Instrument, Tianjin University, China; {2}Tianjin University, China

**1049: Design and Test of MEMS Resonant Accelerometer with a Novel Die-Attach Structure**  
Yukun Ma{1}, Shaohang Wang{2}, Wenyi Xu{2}, Rong Zhang{2}, Fengtian Han{2}  
{1}State Key Laboratory of Precision Measurement Technology and Instruments, Tsinghua University, China; {2}Tsinghua University, China

**1058: Sensor Resistance Based Sensitivity Temperature Drift Tracking of Integrated 3D Hall Sensors**  
Dennis Krause{1}, Markus Stahl-Offergeld{1}, Markus Sand{3}, Christian Kohlbrenner{1}, Robert Weigel{2}  
{1}Fraunhofer Institute for Integrated Circuits IIS, Germany; {2}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {3}LZE GmbH, Germany

**1082: Development of Power Divider in 28 GHz Band Using Si Semiconductor Process**  
Gapseop Sim{2}, Woojin Yun{3}, Chung-Mo Yang{3}, Choul-Young Kim{1}  
{1}Chungnam National University, Korea; {2}Chungnam National University, National NanoFab Center, Korea; {3}National NanoFab Center, Korea

**1100: Measurement of the Ultrasound Induced Temperature Change in an Ultrasonic Assisted Silver Sintering Process**  
Steffen Hadeler{2}, Yangyang Long{1}, Jens Twiefel{1}, Marc Christopher Wurz{2}  
{1}Institute of Dynamics and Vibration Research, Leibniz University Hannover, Germany; {2}Institute of Micro Production Technology, Leibniz University Hannover, Germany

**1101: Sensor Inserts on Spherical Surfaces for Temperature Measurement in Wear Contacts**  
Selina Raugel{2}, Marc Christopher Wurz{1}  
{1}Institute of Micro Production Technology, Leibniz University Hannover, Germany; {2}Leibniz Universität Hannover, Germany

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## **1109: Conformable Thin-Film Temperature Sensors on Heat-Shrinkable Substrate for Irregular Surfaces**

Federica Catania{1}, Albert Heinrich Lanthaler{1}, Alejandro Carrasco-Pena{1}, Giuseppe Cantarella{2}, Niko Münzenrieder{1}

{1}Free University of Bozen-Bolzano, Italy; {2}Università di Modena e Reggio Emilia, Italy

## **1116: High Performance Bidirectional Thermal Gas Flow Sensor of (100) Silicon Single-Sided Fabrication by 45°-Tilted Dicing**

Yan Zhang{1}, Dongcheng Xie{1}, Yujie Yang{2}, Ruichen Liu{2}, Chong Xing{2}, Feng Xue{2}, Dongliang Chen{2}, Lei Xu{1}

{1}Micro Nano Sensing Hefei Technology Co., Ltd., China; {2}University of Science and Technology of China, China

## **1267: Design, Fabrication, and Test of 4H-SiC Accelerometer**

Yu Yang, You Zhao, Lukang Wang, Yabing Wang, Yulong Zhao

Xi'an Jiaotong University, China

## **1276: Suppressing Damping in a Diamagnetically Levitated Dielectric Sphere via Charge Neutralization**

Xunmin Zhu{1}, Tong Wu{1}, Jing Yang{1}, Zhiming Chen{1}, Leilei Guo{1}, Huizhu Hu{2}, Zhenhai Fu{2}, Cuihong Li{1}

{1}Zhejiang Lab, China; {2}Zhejiang Lab, Zhejiang University, China

## **1285: 3D-Printed Strain Gauges Based on Conductive Filament for Experimental Stress Analysis**

Romol Chadda, Omar Ben Dali, Bastian Latsch, Esan Sundaralingam, Mario Kupnik

Technische Universität Darmstadt, Germany

## **1295: Self-Powered Pressure Sensor Based on Flexible Magnetic Material**

Chengxi Guo{1}, Lijie Kong{1}, Yian Chen{1}, Yuan Jiang{1}, Qinyan Zhang{1}, Xilin Qian{1}, Yifeng Li{1}, Jianqiu Huang{2}, Huiyang Yu{1}

{1}Nanjing Tech University, China; {2}Southeast University, China

## **1313: Design and Optimization of a Soft Magnetic Tactile Sensor**

Chengjin Du, Federico Bernabei, Matteo Lo Preti, Lucia Beccai

Istituto Italiano di Tecnologia, Italy

## **1337: Flexible Ag-Nanowire-Doped PEDOT:PSS Split Ring Resonator for Liquid Detection**

Marzieh Dordanihaghighi{1}, Ali Maleki Gargari{1}, Mahmoud Wagih{2}, Mohammad Arjmand{1}, Mohammad H. Zarifi{1}

{1}University of British Columbia, Canada; {2}University of Glasgow, United Kingdom

## **1348: A Resonant Pressure Microsensor Optimized by DETF Resonators**

Xingyu Li{1}, Bo Xie{1}, Yulan Lu{1}, Junbo Wang{2}, Deyong Chen{2}, Jian Chen{2}, Nan Li{1}, Xiaoye Huo{1}

{1}Aerospace Information Research Institute, Chinese Academy of Sciences, China; {2}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

# Technical Program: Monday, October 30

13:30 - 15:30

## **A2P-16: Acoustic and Ultrasonic Sensors - A**

Room: Grand Klimt Hall

Session Chair(s): Hongyu YU, *Hong Kong University of Science and Technology*

Haifeng Zhang, *University of North Texas*

### **1125: Method for Enhancing Transduction of Antisymmetric Lamb Waves**

Sunghyun Kim{2}, Hyung Jin Lee{1}, Yoon Young Kim{2}

{1}Korea Research Institute of Standards and Science KRISS, Korea; {2}Seoul National University, Korea

### **1131: High-Accuracy Dry-Bulb Temperature Sensing with Short-Time Fourier Transform (STFT) Using PSON pMUTs**

Mantelena Sarafianou{1}, Nai Liang Hii{2}, David Sze Wai Choong{1}, Duan Jian Goh{1}, Yul Koh{1}

{1}Institute of Microelectronics, Agency for Science, Technology and Research, Singapore; {2}SiT,

Digipen Institute of Technology, IME, Agency for Science, Technology and Research, Singapore

### **1138: A Pulse Wave Velocity Estimation Method for a Wearable Monitoring Device: Feasibility and Preliminary Experimental Results**

Paolo Mattesini{3}, Marco Travagliati{2}, Claudio Simeone{1}, Leonardo Baldassarre{2}, Stephen Bart{2}, Alessandro Ramalli{3}

{1}Efesys S.r.l., Italy; {2}TDK-InvenSense, United States; {2}TDK-InvenSense, Italy; {3}Università degli Studi di Firenze, Italy

### **1140: Detecting and Classifying Bio-Inspired Artificial Landmarks Using In-Air 3D Sonar**

Maarten de Backer{2}, Wouter Jansen{3}, Dennis Laurijssen{2}, Ralph Simon{1}, Walter Daems{2}, Jan Steckel{2}

{1}Behavioural Ecology and Conservation Lab, Nuremberg Zoo, Germany; {2}FTI Cosys-Lab, University of Antwerp, Belgium; {3}University of Antwerp, Belgium

### **1175: Iterative Analysis Approach Using Interactive Python-FEM to Estimate the Residual Stresses in PMUTs**

Prakasha Chigahalli Ramegowda{1}, David Sze Wai Choong{1}, Duan Jian Goh{1}, Liu Jihang{1}, Srinivas Merugu{1}, Peter Hyun Kee Chang{1}, Alberto Leotti{2}, Domenico Giusti{2}, Carlo Prelini{2}, Sagnik Ghosh{1}, Joshua En-Yuan Lee{1}, Yul Koh{1}

{1}Institute of Microelectronics, Agency for Science, Technology and Research, Italy; {1}Institute of Microelectronics, Agency for Science, Technology and Research, Singapore; {2}STMicroelectronics, Singapore; {2}STMicroelectronics, Italy

### **2024: Millimeter-Scale Leak Detection Using Distributed Acoustic and Temperature Gradient Sensing**

Guilherme Heim Weber{3}, Danilo Fernandes Gomes{3}, Eduardo Nunes Dos Santos{3}, Ana Luiza Beltrão Santana{3}, Jean Carlos Cardozo Da Silva{3}, Cicero Martelli{3}, Daniel Rodrigues Pipa{3}, Rigoberto E. M. Morales{3}, Sérgio Taveira de Camargo Júnior{2}, Manoel Feliciano Da Silva{2}, Marco Jose Da Silva{1}

{1}Johannes Kepler Universität Linz, Austria; {2}Petrobras Research and Development Program, Brazil; {3}Universidade Tecnológica Federal do Paraná, Brazil

# Technical Program: Monday, October 30

13:30 - 15:30

## **A2P-17: Sensor Networks and IOT - A**

Room: Grand Klimt Hall

Session Chair(s): Domenico Balsamo, *Newcastle University*

Yacine GHAMRI-DOUDANE, *La Rochelle University*

### **1052: Model-Based Sensor-Fault Detection and Isolation in Natural-Gas Pipelines for Transient Flow**

Khadija Shaheen{1}, Apoorva Chawla{1}, Ferdinand Evert Uilhoorn{2}, Pierluigi Salvo Rossi{1}

{1}Norwegian University of Science and Technology, Norway; {2}Warsaw University of Technology, Poland

### **1280: High-Precision Time-Frequency Synchronization for Mobile Distributed Coherent Systems**

Xiye Guo, Suyang Liu, Zhijun Meng, Kai Liu, Enqi Yan

National University of Defense Technology, China

### **1633: Advancing Urban Air Quality Monitoring: A Hybrid Mobile-Stationary Approach**

Yurii Tsyban, Eckard Le Roux, Aiman Fakieh, Ibrahim Hoteit, Khaled Nabil Salama

King Abdullah University of Science and Technology, South Africa; King Abdullah University of Science and Technology, Egypt; King Abdullah University of Science and Technology, Ukraine; King Abdullah University of Science and Technology, Saudi Arabia

### **1773: Wireless Sensor Network Powered with Data Analytics for Small Hydro Reliability Enhancement**

Fabien Ravet{1}, Didier Nicoulaz{1}, Yvan Jacquat{1}, Cédric Morier{2}, Nicolas André{2}

{1}Gradesens, Switzerland; {2}Société Electrique des Forces de l'Aubonne SA, Switzerland

### **1805: How Challenging Is It to Design a Practical Superdirective Antenna Array?**

Stylianios Assimonis

Queen's University Belfast, United Kingdom

### **1008: Impedance Tomographic Sensor for Monitoring Bioprinted Cell Cultures**

Kaue Morcelles, Pedro Bertemes-Filho

State University of Santa Catarina, Brazil

13:30 - 15:30

## **A2P-18: Emerging Sensors in Biomedical Applications - A**

Room: Grand Klimt Hall

Session Chair(s): Mark Cheng, *The University of Alabama*

### **1034: On the Road to the Development of Noninvasive Highly Sensitive Electromagnetic Bio-Sensor for Bone Crack Detection**

Ravi Anand, Debarati Dutta, Anirban Sarkar

Indian Institute of Technology Mandi, India

### **1053: Real-Time Hyperspectral Imaging for Non-Invasive Monitoring of Tissue Ischemia**

Anoek Strumane{1}, Jens De Winne{1}, Danilo Babin{1}, Jan Aelterman{1}, Hiep Luong{1}, Wilfried Philips{2}

{1}Ghent University, Imec, Belgium; {2}TELIN-IPI, Ghent University - imec, Belgium

# Technical Program: Monday, October 30

**1241: Magnetic Imaging of Thimble Tube Using Integrated Array TMR Sensors**

Jingyi Wang{2}, Xiaoguang Li{1}, Ming Li{1}, Chaofeng Ye{2}  
{1}CGNPC Inspection Technology Co., Ltd., China; {2}ShanghaiTech University, China

**1595: A 3D Printed Sensor Based on Microwave Transversal Signal Interference Principle with Simultaneous Angular Displacement and Inclination Detection**

Desen Li, Chi-Hou Chio, Kam-Weng Tam  
University of Macau, Macau

**1780: A Flexible Inductive Sensor for Non-Invasive Arterial Pulse Measurement**

Nimal Jagadeesh Kumar{2}, Alexander Johnson{2}, Robert Cobden{2}, George Valsamakis{2}, Gene Grinstead{2}, Arash Pouryazdan{2}, Daniel Roggen{2}, Niko Münzenrieder{1}  
{1}Free University of Bozen-Bolzano, Italy; {2}University of Sussex, United Kingdom

**1845: Low Power Flexible Sensor for Ambient Light-Based Blood Oxygen Saturation Measurement**

Hossein Anabestani, Shahab Mahmoudi Sadaghiani, Sharmistha Bhadra  
McGill University, Canada

**1620: Low-Cost Sweating-Rate Sensor for Dehydration Monitoring in Sports**

Andrea Ria{2}, Massimo Piotto{2}, Xavier Muñoz-Berbel{1}, Paolo Bruschi{2}, Michele Dei{2}  
{1}Institute of Microelectronics of Barcelona, Spain; {2}Università di Pisa, Italy

13:30 - 15:30

**A2P-19: Sensor Systems - A**

Room: Grand Klimt Hall

Session Chair(s): Chang-hee Won, *Temple University*

**1030: A ZPM-Based Resistive Sensor Array Readout System with a Novel Compensation Method**

Fabian Näf{2}, Diogo Miguel Bárbara Caetano{1}, Susana Cardoso{1}, Gonçalo Nuno Tavares{3}  
{1}INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {2}INESC-ID, INESC MN, Instituto Superior Técnico, Portugal; {3}INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal

**1110: Compact Low Noise AC Acquisition System for Wheatstone Bridge Sensors**

Fabian Näf{3}, Pedro Ribeiro{2}, Gonçalo Nuno Tavares{4}, Lorenzo Jamone{1}, Susana Cardoso{2}  
{1}Advanced Robotics at Queen Mary ARQ, United Kingdom; {2}INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {3}INESC-ID, INESC MN, Instituto Superior Técnico, Portugal; {4}INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal

**1148: Alleviating Slot Collisions in UHF RFID Systems**

Hamed Salah, Georgi Gaydadjiev  
University of Groningen, Netherlands

**1217: Improved Signal Processing Algorithm to Enhance the Performance of Electrostatic Sensors for Particle Velocity Measurement**

Kamel Reda{2}, Tao Wang{2}, Yong Yan{1}  
{1}University of Kent, United Kingdom; {2}Walsn Limited, United Kingdom

# Technical Program: Monday, October 30

## **1317: A Constant Fraction Discriminator with Shape-Agnostic Fraction Triggering and Sub-Ns Walk for the Solar Probe Analyzer for Ions**

Lydia Lee{2}, Robert Abiad{1}, Roberto Livi{1}, Mia Mirkovic{2}, Kenneth Hatch{1}, Hilary Brunner{1}, Davin Larson{1}, Kristofer Pister{2}  
{1}Space Sciences Laboratory, University of California, Berkeley, United States; {2}University of California, Berkeley, United States

## **1344: A Linear Non-Contact Measurement of Dielectric Thickness with $\mu\text{m}$ -Resolution**

Surbhika Rastogi, Surya Varchasvi Devaraj, Rajesh Zele  
Indian Institute of Technology Bombay, India

## **1373: Pilot Study: Response of a Piezoelectric Polymer Based Sensing System to Indentation**

Mohamad Yaacoub{2}, Yahya Abbass{1}, Christian Gianoglio{1}, Lucia Seminara{1}, Maurizio Valle{1}  
{1}Università degli studi di Genova, Italy; {2}Università di Genova, Italy

## **1405: Vehicle Detection Device Using 2-Axis Magneto-Impedance Sensors for Traffic Monitoring**

Ruixuan Yao, Tsuyoshi Uchiyama  
Nagoya University, Japan

## **1119: Enhancing DF-INS for Accurate Zero-Velocity Detection in ILBS: A Dual Foot Synergistic Method**

Renjie Wu, Boon Giin Lee, Matthew Pike, Linzhen Zhu, Xiaoqing Chai, Yongfu Wang  
University of Nottingham Ningbo China, China

## **1130: Gas Prediction Method Based on Dynamic Response Analysis of Metal Oxide Sensors Under Temperature Modulation**

Ya-Han Fan{2}, Ting-I Chou{2}, Shih-Wen Chiu{1}, Kea-Tiong Tang{2}  
{1}Enosim Bio-tech Co., Ltd., Taiwan; {2}National Tsing Hua University, Taiwan

## **1190: Algorithm-Aware Digital Design for Analog-on-Top Chips: An ASK Demodulator Comparative Study**

Felice Tecce{1}, Matteo Abate{2}, Francesco Del Prete{1}, Giovanni Amedeo Cirillo{1}, Claudio Parrella{1}, Marco Castellano{2}  
{1}STMicroelectronics, Italy; {2}STMicroelectronics, AMS R&D, Italy

## **1355: A Quadrature Phase-Locked Loop Based Digital Closed-Loop System for MEMS Resonant Sensors**

Mengyang Zhou{1}, Jiahui Yao{1}, Yulan Lu{1}, Bo Xie{1}, Junbo Wang{2}, Deyong Chen{2}, Jian Chen{2}, Xiaoye Huo{1}, Nan Li{1}  
{1}Aerospace Information Research Institute, Chinese Academy of Sciences, China; {2}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

## **1417: Noise and Gaussian Clutter Background Descending Dimensional Subspace Signal Detector**

Zhan Zhou{2}, Guangfen Wei{2}, Xu Liu{2}, Yuan Luo{2}, Tao Jian{1}  
{1}Naval Aeronautical University, China; {2}Shandong Technology and Business University, China

## **1637: Linearization of Giant Magnetoimpedance Sensors Using a Logarithmic Amplifier**

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

# Technical Program: Monday, October 30

**1683: A Cognitive Sensor System Architecture for the Monitoring of Flexible Machining Systems**

Lukas Krupp{1}, Christian Wiede{1}, Joachim Friedhoff{2}, Anton Grabmaier{1}  
{1}Fraunhofer Institute for Microelectronic Circuits and Systems IMS, Germany; {2}University of Applied Sciences Ruhr West, Germany

**1709: Development of a Robust Vision-Based Interstory Deformation Sensing Method Using a Kernelized Correlation Filter**

Keito Tamura, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh  
University of Tokyo, Japan

**1647: Quantitative Evaluation of a Multi-Modal Camera Setup for Fusing Event Data with RGB Images**

Julian Moosmann, Jakob Mandula, Philipp Mayer, Luca Benini, Michele Magno  
ETH Zürich, Switzerland

**1669: Distributed Blind Equalization with Block-Adaptive Approach on Wireless Sensor Network**

Sulin Chi, Yosuke Sugiura, Tetsuya Shimamura  
Saitama University, Japan

**1809: Near-Zero-Power Passive Wireless Underground Soil Moisture Sensor**

Sheng Ding{1}, Shad Roundy{1}, Ramesh Goel{1}, Cody Zesiger{2}, Darrin J Young{1}  
{1}University of Utah, United States; {2}Utah State University, United States

13:30 - 15:30

**A2P-20: Sensors and Wireless Power Systems**

Room: Grand Klimt Hall  
Session Chair(s): Hongsoo Choi, *Daegu Gyeongbuk Institute*  
Smitha Rao, *Michigan Technological University*

**1205: An Energy-Efficient Current Measurement Method for Wireless Sensors**

Dailys Arronde Pérez{1}, Narendiran Anandan{1}, Hubert Zangl{2}  
{1}University of Klagenfurt, Austria; {2}University of Klagenfurt, AAU SAL Ubiquitous Sensing Lab, Austria

**1378: Electrodynamic Wireless Power and Data Transfer for Implanted Medical Devices**

Christian Barrett{2}, Hailing Fu{1}, Stephanos Theodossiades{3}  
{1}Beijing Institute of Technology, China; {2}Loughborough University, United Kingdom; {3}Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, United Kingdom

**1379: Actuation and Sensing for PZT Micromirrors Using d?? Mode Directional Interdigitated Electrodes**

Pooja Thakkar, Anton Lagosh, Madeleine Petschnigg, Dominik Holzmann, Jaka Pribošek  
Silicon Austria Labs GmbH, Austria

**1860: A Three-Phase Rotating Magnet Electrodynamic Wireless Power Transmission Receiver**

Vernon Crasto, Matthew Stormant, David Arnold  
University of Florida, United States

# Technical Program: Monday, October 30

13:30 - 15:30

## **A2P-21: Sensor Data Processing & AI - A**

Room: Grand Klimt Hall

Session Chair(s): Theerawit Wilaiprasitporn, *Vidyasirimedhi Institute of Science & Technology*

### **1045: Determining Misalignment State of Automotive Radar Sensor Using DNN**

Junho Kim{1}, Chanul Park{1}, Seongwook Lee{1}, Taewon Jeong{2}

{1}Chung-Ang University, Korea; {2}Korea Aerospace University, Korea

### **1191: Bayesian Optimisation of Existing Object Detection Methods for New Contexts**

Tim Willems{1}, Jan Aelterman{2}, David Van Hamme{3}

{1}Ghent University, Belgium; {2}Ghent University, Imec, Belgium; {3}TELIN-IPI, Ghent University - imec, Belgium

### **1201: On Orientation Distribution Representations with Reliable Uncertainties in Inertial Motion Tracking**

Ganesh Shrinivas Koparde{1}, Bertram Taetz{2}, Didier Stricker{1}

{1}Deutsches Forschungszentrum für künstliche Intelligenz GmbH, Germany; {2}International University of Applied Sciences, University of Applied Sciences Erfurt, Germany

### **1230: Towards Low-Cost Plastic Recognition Using Machine Learning and Multi-Spectra Near-Infrared Sensor**

Gregory West, Tareq Assaf, Uriel Martinez-Hernandez

University of Bath, United Kingdom

### **1252: On-Demand Provisioning of Wearable Sensors Data Processing Services in Edge Computing**

Lionel Nkenyereye{1}, Boon Giin Lee{2}, Kentaro Go{3}, Xiaoyang Mao{3}, Wan-Young Chung{1}

{1}Pukyong National University, Korea; {2}University of Nottingham Ningbo China, China; {3}University of Yamanashi, Japan

### **1272: Wavelet Transform Algorithm for Eigenfrequency Detection in a Piezoelectric Parity-Time Symmetric System**

Ying Li, Zhenyu Wei, Jianqiu Huang

Southeast University, China

### **1302: Triple-Sensing with an Ion-Sensitive-Field-Effect-Transistor via Machine-Learning Algorithm**

Sheng-Yu Chen{2}, Yi-Ting Wu{2}, Wei-En Hsu{2}, Chih-Ting Lin{1}

{1}Graduate Institute of Electronics Engineering, National Taiwan University, Taiwan; {2}National Taiwan University, Taiwan

### **1364: Extract Spatial Distribution of a Specific Gas from Mixed Gas Data Measured by the LSPR Gas Sensor**

Xiaofan Zheng, Masato Matsuoka, Kenshi Hayashi, Yoichi Tomiura

Kyushu University, Japan

### **1388: Early Detection of Faillure in Conveyor Chain Systems by Wireless Sensor Node**

Ghada Bouattour, Lidu Wang, Sajidah Al-Hammouri, Jiachen Yang, Christian Viehweger, Olfa Kanoun

Technische Universität Chemnitz, Germany

# Technical Program: Monday, October 30

## **1443: Comparing Data Representation Techniques for Tactile Sensing in Classification Tasks**

Venkata Danyamraju, Tahsin Protttoy, S M Jobayer, Vinicius Prado Da Fonseca  
Memorial University of Newfoundland, Canada

## **1445: Shallow Hierarchical CNN–LSTM for Activity Recognition to Integrate Postural Transition States**

Douglas Tilley, Uriel Martinez-Hernandez  
University of Bath, United Kingdom

## **1548: Non-Invasive Monitoring of Swallowing Function Using Multi-Channel Auscultation**

Ziyuan Yin{2}, Marc Wong{1}, Chuanlin Lan{2}, Sunny Wong{3}, Rosa Chan{2}  
{1}Chinese University of Hong Kong, Hong Kong; {2}City University of Hong Kong, Hong Kong;  
{3}Nanyang Technological University, Singapore

## **1571: A Self-Supervised Parking Spot Monitoring System Using Google Coral Edge TPU**

Dawson Drake, Wei Tang  
New Mexico State University, United States

## **1701: The Heterogeneity-Intensified and Heterogeneity Ratio-Stratified Bootstrap (HiS- and HeRS-Boot) Oversampling to Boost a Detector Performance**

Pertami J. Kunz, Syrine Ben Abid, Abdelhak Zoubir  
Technische Universität Darmstadt, Germany

## **1713: Current and Stray Flux Sensors for Anomaly Detection in PMSM Drive Based on Gradient Boosting Machine**

Nam Du Hoang Nguyen, Van Khang Huynh, Kjell Gunnar Robbersmyr  
University of Agder, Norway

## **1777: DipSAR: Deep Image Prior for Sparse Sampled Near-Field SAR Millimeter-Wave Imaging**

Rawin Assabumrungrat{3}, Nakorn Kumchaiseemak{4}, Jianping Wang{1}, Dingyang Wang{1}, Phoom Punpeng{2}, Francesco Fioranelli{1}, Theerawit Wilaiprasitporn{4}  
{1}Delft University of Technology, Netherlands; {2}Ruamrudee International School, Thailand;  
{3}Tohoku University, Japan; {4}Vidyasirimedhi Institute of Science and Technology, Thailand

## **1808: Probabilistic Fusion of Depth Maps with Local Variance Estimation**

Henry Schaub, Nico Leuze, Maximilian Hoh, Alfred Schöttl  
University of Applied Science Munich, Germany

## **1055: Optimizing Spatial Sensing Performance with Kriging and SRGAN – A Feasibility Study**

Roe Djer Tan{2}, Omkar Patade{2}, Huaxia Wang{2}, Chulho Yang{2}, Dongchan Lee{1}  
{1}Institute for Advanced Engineering, Korea; {2}Oklahoma State University, United States

## **1179: HeartRhythm: ECG-Based Music Preference Classification in Popular Music**

Phairot Autthasan{2}, Petchkla Sukontaman{1}, Theerawit Wilaiprasitporn{2}, Soravitt Sangnark{2}  
{1}Ruamrudee International School, Thailand; {2}Vidyasirimedhi Institute of Science and Technology, Thailand

# Technical Program: Monday, October 30

13:30 - 15:30

## **A2P-22: Wearable Sensors and Systems - A**

Room: Grand Klimt Hall

Session Chair(s): Sahika Inal, *King Abdullah University of Science and Technology (KAUST)*  
Jürgen Kosel, *Silicon Austria Labs (SAL)*

### **1046: A Wearable Solution for Obstructive Sleep Apnea Risk Evaluation Based on Optical Sensor**

Chih Hao Wang, Shih Jen Lu, Yang Ming Chou, Chien Yi Kao, Hsin Yi Lin  
PixArt Imaging Inc., Taiwan

### **1057: Flexible Mesostructured Capacitive Pressure Sensor for Blood Pressure Monitoring**

Shubham Kumar, Sanjay Yadav, Ashok Kumar  
CSIR National Physical Laboratory of India, India

### **1106: GaitSkin System: Wireless Vibrotactile Skin Patch with Gait Tracker for Sensorimotor Conflict Creation**

Emilio Fernández-Lavado{2}, Selim Habiby Alaoui{1}, Haotian Chen{2}, Ivan Furfaro{2}, Bruno Herbelin{1}, Olaf Blanke{1}, Stéphanie P. Lacour{2}  
{1}LNCO, Neuro-X Institute, École Polytechnique Fédérale de Lausanne, Switzerland; {2}LSBI, Neuro-X Institute, École Polytechnique Fédérale de Lausanne, Switzerland

### **1207: Evaluation of Expandable Microsphere Pressure Sensor for Arterial Pulse Wave Measurements**

Natalia Kanko, Antti Vehkaoja, Mikko Peltokangas, Matti Mäntysalo  
Tampere University, Finland

### **1411: Wearable Haptic Braille Device for Enhancing Classroom Learning**

Chinmay Sultania, Divyansh Singhal, Mayank Kabra, Anshul Madurwar, Soham Pawar, Madhav Rao  
International Institute of Information Technology Bangalore, India

13:30 - 15:30

## **A2P-23: Sensors in Industrial Practices - A**

Room: Grand Klimt Hall

Session Chair(s): Jürgen Kosel, *Silicon Austria Labs (SAL)*

### **1380: Enhancing Positioning Sensor Applications: Online Harmonic Order Determination of Atan2? Function**

Jie Zhou, Markus Dietrich, Florian Zeller, Wai-Wai Buchet  
Schaeffler Automotive Buehl GmbH & Co. KG, Germany

### **1710: A 145- $\mu$ W Always-on Touch Screen Readout and Always-on Haptic Driver IC for 1.26-Inch Circular Display of Wearable Device**

Junmin Lee, Juwon Ham, Wooseok Jang, Hamin Lee, Jongmin Oh, Sangmo Goo, Seunghoon Ko  
Kwangwoon University, Korea

# Technical Program: Monday, October 30

13:30 - 15:30

## **A2P-24: Live Demonstration of Sensors and Sensing Technologies - A**

Room: Grand Klimt Hall

Session Chair(s): Anna Grazia Mignani, *CNR-Institute of Applied Physics 'Nello Carrara', Florence Italy*  
Calogero Maria Oddo, *Sant'Anna School of Advanced Studies, Pisa, Italy*

### **1639: Live Demonstration: A LED-Based Pocket-Size and Low-Cost Fluorometer**

Andrea Azelio Mencaglia, Leonardo Ciaccheri, Barbara Adinolfi, Anna Grazia Mignani  
CNR Istituto di Fisica Applicata Nello Carrara, Italy

### **1245: Live Demonstration: Coupled-Core Fiber Bragg Grating Sensors**

Monserrat Alonso-Murias{1}, Daniel Maldonado-Hurtado{2}, Jose Flores-Bravo{4}, Florian Lindner{3}, Joerg Bierlich{3}, Katrin Wondraczek{3}, Salvador Sales{2}, Joel Villatoro{4}  
{1}Centro de Investigaciones en Óptica A. C, Mexico; {2}ITEAM Research Institute, Universitat Politècnica de València, Spain; {3}Leibniz Institute of Photonic Technology, Germany; {4}University of the Basque Country, Spain

### **1269: Live Demonstration: Optical Properties of Vanadium Oxide Films**

Irina Minailova  
Lashkarev Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, Ukraine

### **1495: Live Demonstration: Holographic Fibre Endoscope for In-Vivo Deep Tissue Imaging**

Sergey Turtaev, Jiri Hofbrucker, Hana Čížmárová, Patrick Westermann, Andre Gomes, Tomáš Čížmár  
Leibniz Institute of Photonic Technology, Germany

### **1699: Live Demonstration: ORIGIN – Optical Fibre Sensors for Radiation Dose Mapping and Source Localisation During Brachytherapy**

Sinead O'Keeffe, Jennifer Hanly  
University of Limerick, Ireland

### **1909: Live Demonstration: Novel Rotary Encoder with Multi-Axis Hall Sensors**

Bruno Brajon, Christian Schott, Gaël Close  
Melexis Technologies SA, Switzerland

### **1270: Live Demonstration: Surface Plasmon's Dispersion Properties of Vanadium Oxide Films**

Igor Matyash  
Lashkarev Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, Ukraine

13:30 - 15:30

## **A2P-25: Chemical Agent Detection: Sensing Technologies and Sensing Applications - A**

Room: Grand Klimt Hall

Session Chair(s): Frank Sabath, *Bundeswehr Research Institute for Protective Technologies and CBRN-Protection (WIS)*

### **1740: PPy & P3MT-MWCNT Nanocomposites-Based Sensors for Nerve Gas Detection at ppb Levels**

Nathalie Redon{1}, Nataliia Davydenko{3}, Nikolay Ogurtsov{3}, Marina Jamar{2}, Yuriy Noskov{3}, Alexander Pud{3}, Jean-Luc Wojkiewicz{2}  
{1}Center for Energy and Environment, IMT Nord Europe, Institut Mines-Télécom, University of Lille, France; {2}IMT Nord Europe, France; {3}V. P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry, NAS of Ukraine, Ukraine

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13:30 - 15:30

## **A2P-26: Smart Biomedical Sensor Platforms in Resource Constrained Settings - A**

Room: Grand Klimt Hall

Session Chair(s): Shantanu Bhattacharya, *Indian Institute of Technology Kanpur*

### **1401: Automated Line Detection on Lateral Flow Assays: A Paradigm Shift in Rapid Diagnostic Testing**

Mohammed Rashiku B C{1}, Kapil Manoharan{1}, Shubhra Gangopadhyay{2}, Shantanu Bhattacharya{1}  
{1}Indian Institute of Technology Kanpur, India; {2}University of Missouri, United States

### **1483: Development of a Paper Based Glutathione Detection for Point of Care Low Resource Settings**

Anubhuti Saha, Shiwangi Maurya, Shantanu Bhattacharya  
Indian Institute of Technology Kanpur, India

13:30 - 15:30

## **A2P-27: Industrial Applications**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*



### **Sensors Letters Paper**

#### **1995: Dielectric Sensing of Mass Concentration and Moisture in Coal Powders**

Thomas Suppan{1}, Markus Neumayer{1}, Thomas Brettertklieber{1}, Christoph Feilmayr{2}, Stefan Schuster{2}, Hannes Wegleiter{1}  
{1}Technische Universität Graz, Austria; {2}voestalpine Stahl GmbH, Austria



### **Sensors Letters Paper**

#### **2076: A Fast and Improved dual-PRT Doppler Technique for Industrial Flow Metering**

Fabio Rizental Coutinho{2}, Andre Luis Stakowian{2}, Marco Jose Da Silva{1}  
{1}Johannes Kepler Universität Linz, Austria; {2}Universidade Tecnológica Federal do Paraná, Brazil



### **Sensors Letters Paper**

#### **2077: Linear Variable Differential Transformer in Harsh Environments - Analysis of Temperature Drifts for Different Plunger Materials**

Gabriel Gruber, Markus Neumayer, Bernhard Schweighofer, Hannes Wegleiter  
Technische Universität Graz, Austria



### **Sensors Letters Paper**

#### **2091: Investigation of Thermal Anemometry with Thermistor Sensing Elements for Gas Flow Measurements in Harsh Environments**

Martin Schellander{1}, Bernhard Schweighofer{2}, Markus Neumayer{2}, Hannes Wegleiter{2}  
{1}Graz University of Technology, Austria; {2}Technische Universität Graz, Austria



### **Sensors Letters Paper**

#### **2115: In-Line Monitoring of a Curing Process with a multi-Sensor Concept**

Wolfgang Mühleisen{3}, Dong Yan{3}, Thorsten Wolf{1}, Markus Grinschgl{1}, Venu Prakash Kasinikota{2}, Margit Lang{2}  
{1}GIPRO GmbH, Austria; {2}Polymer Competence Center Leoben GmbH, Austria; {3}Silicon Austria Labs GmbH, Austria

# Technical Program: Monday, October 30

## **Sensors Letters Paper**

### **2125: Influence of Position on Optoelectronic Strain Measurement Systems for Flywheels**

Matthias Rath, Bernhard Schweighofer, Hannes Wegleiter  
Technische Universität Graz, Austria

13:30 - 15:30

#### **A2P-28: Gas Sensors**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

## **Sensors Letters Paper**

### **1991: Spatiotemporal Visualization of Gases Using 2D LSPR Gas Sensor**

Masato Matsuoka, Lingpu Ge, Fumihiro Sassa, Kenshi Hayashi  
Kyushu University, Japan; Kyushu University, China

## **Sensors Letters Paper**

### **2046: Ammonia Gas Optical Sensor Based on Lossy Mode Resonances**

Carlos Ruiz Zamarreno, Dayron Armas, Pablo Zubiarte, Ignacio Raúl Matías  
Universidad Pública de Navarra, Spain

## **Sensors Letters Paper**

### **1989: LMR-Based Optical Sensor for Ethylene Detection at Visible and Mid-Infrared Regions**

Carlos Ruiz Zamarreno, Elieser Ernesto Gallego, Mikel Hualde, Ignacio Raúl Matías  
Universidad Pública de Navarra, Spain

13:30 - 15:30

#### **A2P-29: Wearable Sensors**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

## **Sensors Letters Paper**

### **2056: Inductive Textile Sensing for Movement Monitoring**

Chakaveh Ahmadi Zadeh, Valeria Galli, Victor Luder, Carlo Menon  
ETH Zürich, Switzerland

## **Sensors Letters Paper**

### **2098: Ultrafast and Low-Power Graphene Wheatstone Bridge Respiratory Sensor**

Sabitha Ann Jose, Jingqin Mao, Yahya Atwa, Paul Baine, David McNeill, Hamza Shakeel  
Queen's University Belfast, United Kingdom

# Technical Program: Monday, October 30

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## A2P-30: Biosensing

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*



### *Sensors Letters Paper*

#### 1939: Redox Indicator-Based Electrochemical DNA Detection

Vanessa Thoeny{2}, Eva Melnik{2}, Pooyan Mehrabi{1}, Melanie Huetter{1}, Thomas Schalkhammer{1}, Thomas Maier{2}, Giorgio C. Mutinati{2}, Peter Lieberzeit{3}, Rainer Hainberger{2}  
{1}Attophotonics Biosciences GmbH, Austria; {2}Austrian Institute of Technology GmbH, Austria;  
{3}Universität Wien, Austria



### *Sensors Letters Paper*

#### 1977: Demonstration of New Microelectrode Design to Enhance Sensitivity of Dielectrophoretic Impedance Measurement

Michihiko Nakano{1}, Masafumi Inaba{1}, Tomoko Murakami{2}, Maho Sakurai{2}, Junya Suehiro{1}  
{1}Kyushu University, Japan; {2}Sumitomo Pharma Co. Ltd., Japan



### *Sensors Letters Paper*

#### 2083: Machine Learning-Assisted Analysis of Electrochemical Biosensors

Shreyas Deshpande{1}, Rishikesh Datar{2}, Bidhan Pramanick{3}, Gautam Bacher{2}  
{1}Birla Institute of Technology & Science, Pilani, India; {2}Birla Institute of Technology and Science, Pilani, India; {3}Indian Institute of Technology Goa, India



### *Sensors Letters Paper*

#### 2108: Effect of Metallization Ratio on the Sensitivity of GC-Ides Based Immunosensor

Shreyas Deshpande{1}, Naresh Mandal{3}, Bidhan Pramanick{3}, Gautam Bacher{2}  
{1}Birla Institute of Technology & Science, Pilani, India; {2}Birla Institute of Technology and Science, Pilani, India; {3}Indian Institute of Technology Goa, India

15:30 - 16:30

## YP Panel Discussion

Room: Park Suite 1

Session Chair(s): Veda Sandeep Nagaraja, *Tyndall National Institute*

15:30 - 17:30

## A3L-02: Advanced Modeling, Algorithm, and Machine Learning Techniques

Room: Park Suite 2

Session Chair(s): J.-C. Chiao, *SMU*

Tao Li, *University of Cincinnati*

15:30



### *Invited Journal Author*

#### [10.1109/JSEN.2023.3252178](https://doi.org/10.1109/JSEN.2023.3252178): A Multimodal 3-D Detector with Attention from the Corresponding Modal

Bo Tao, Fuwu Yan, Zhishuai Yin, Linzhen Nie, Mingze Miao, Yujun Jiao, Chunyuan Lei  
Wuhan University of Technology, China

# Technical Program: Monday, October 30

15:45



*Invited Journal Author*

[10.1109/ISENS.2023.3273733](#): Trade-Off Between Accuracy and Computational Cost with Neural Architecture Search: a Novel Strategy for Tactile Sensing Design

Christian Gianoglio, Edoardo Ragusa, Paolo Gastaldo, Maurizio Valle

Università degli studi di Genova, Italy

16:00



*Invited Journal Author*

[10.1109/ISENS.2023.3234143](#): Rapid Object Depth Estimation from Position-Referenced EMI Data Using Machine Learning

Marko Šimić, Davorin Ambruš, Vedran Bilas

University of Zagreb, Croatia

16:15



*Invited Journal Author*

[10.1109/ISENS.2022.3233577](#): Automated Site Survey for Fingerprints in Fully-Blind Indoor Environments Based on Sensor Integration

Kyoung-Min Park{2}, Eunji Lee{3}, Jeongsik Choi{1}, Soram Kim{3}, Seong-Cheol Kim{3}

{1}Kyungpook National University, Korea; {2}Samsung Research, Samsung Electronics, Korea; {3}Seoul

National University, Korea

16:30



*Sensors Letters Paper*

**2121: Pulse Heating and Machine Learning for Enhanced Gas Identification and Concentration Detection with MOS Gas Sensors**

Yi Zhuang, Xiaojiang Liu, Xue Wang, Gaoqiang Niu, Ran Cheng, Fei Wang

Southern University of Science and Technology, China

16:45



*Sensors Letters Paper*

**2144: Traffic Intensity Detection Using General-Purpose Sensing**

Aung Kaung Myat, Roberto Minerva, Attaphongse Taparugssanagorn, Rajapaksha Praboda, Noel Crespi

Telecom SudParis, Institut Polytechnique de Paris, Thailand; Telecom SudParis, Institut Polytechnique

de Paris, France

17:00



*Sensors Letters Paper*

**2140: 3D Printed Graphene-Based Piezoresistive Foam Mat for Pressure Detection Through Electrical Resistance Tomography and Machine Learning Classification Techniques**

Nicola Pesce, Marco Fortunato, Alessio Tamburrano

Sapienza Università di Roma, Italy

17:15



*Sensors Letters Paper*

**1994: A Sensor Model to Simulate the Excitation and Propagation of Lamb Waves in Lithium-Ion Pouch Cells**

Alexander Siegl, Bernhard Schweighofer, Hannes Wegleiter

Technische Universität Graz, Austria

# Technical Program: Monday, October 30

15:30 - 17:30

## **A3L-03: Advanced Sensing Systems**

Room: Park Suite 3

Session Chair(s): Anselmo Frizera Neto, *Federal University of Espirito Santo*

15:30



**Invited Journal Author**

### **[10.1109/JSEN.2022.3229227](#): Multimodal Barometric and Inertial Measurement Unit-Based Tactile Sensor for Robot Control**

Gorkem Anil Al, Uriel Martinez-Hernandez

University of Bath, United Kingdom

15:45



**Invited Journal Author**

### **[10.1109/LSENS.2023.3260733](#): Compact and Highly Efficient Midinfrared Fundamental-Mode Converter**

Arpita Mishra{1}, Krishnakant Rana{2}, Talabattula Srinivas{1}

{1}Indian Institute of Science, India; {2}National Institute of Technology Warangal, India

16:00



**Invited Journal Author**

### **[10.1109/JSEN.2023.3252340](#): Ultrasound Tomography for Lung Imaging: an Experimental Phantom Study**

Manuchehr Soleimani

University of Bath, United Kingdom

16:15



**Invited Journal Author**

### **[10.1109/JSEN.2023.3244831](#): A Highly Interpretable Framework for Generic Low-Cost UAV Attack Detection**

Shihao Wu, Yang Li, Zhaoxuan Wang, Zheng Tan, Quan Pan

Northwestern Polytechnical University, China

16:30



**Invited Journal Author**

### **[10.1109/JSEN.2022.3231434](#): High-Resolution Sensors for Mass Deposition and Low-Frequency Vibration Based on Phase-Shifted Bragg Gratings**

Leandro Macedo{1}, Eduarda Preduzzi{1}, Leticia Avellar{1}, Carlos Eduardo Castellani{1}, Marcelo

Eduardo Vieira Segatto{1}, Anselmo Frizera-Neto{1}, Carlos Marques{2}, Arnaldo Leal-Junior{1}

{1}Federal University of Espirito Santo, Brazil; {2}University of Aveiro, Portugal

16:45



**Sensors Letters Paper**

### **2138: A Comparative Study on Hall Plate Topologies in p-GaN Technology**

Marco Crescentini{1}, Marco Marchesi{2}, Gian Piero Gibiino{1}, Lucian Petrisor Ion{3}, Maria Eloisa

Castagna{2}, Ferdinando Iucolano{2}

{1}Alma Mater Studiorum – Università di Bologna, Italy; {2}STMicroelectronics, Italy; {3}University of Bologna, Italy

# Technical Program: Monday, October 30

17:00



## *Sensors Letters Paper*

### **2058: Soft 3-Axis Capacitive Force Sensor for Robotic E-Skin on Curved Surfaces**

Kieran Morton{2}, Ryusuke Ishizaki{1}, Ziqiang Chen{2}, Mirza S. Sarwar{2}, John D.W. Madden{2}  
{1}Honda R&D Co., Ltd, Frontier Robotics Honda R&D, Japan; {2}University of British Columbia, Canada

17:15



## *Sensors Letters Paper*

### **2106: Laser-Induced Graphene on Chitosan: an Enabling Technology for Sustainable Resistive Humidity Sensors**

Johanna Zikulnig{2}, Lukas Neumaier{2}, Martin Lenzhofer{2}, Sandro Carrara{1}, Jürgen Kosel{2}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Silicon Austria Labs GmbH, Austria

15:30 - 17:30

### **A3L-04: Biosensors**

Room: Park Suite 4

Session Chair(s): Hyejin Moon, *The University of Texas at Arlington*

Uwe Schnakenberg, *RWTH Aachen University*

15:30



## **INVITED**

### **1079: Sensors for General Health Diagnostics Using Biomarkers in Bodily Fluids**

Andrew Steckl

University of Cincinnati, United States

16:00

### **1183: Biosensor Based on Electrical Impedance Tomography for 3D Cancer Cell Culture Imaging**

Julien Claudel{2}, Sabine Mazerbourg{1}, Victorine Lacroix{1}, Rémi Bettenfeld{2}, Cyril Schlauder{2}, Djilali Kourtiche{2}, Stéphane Flament{1}

{1}Centre de Recherche en Automatique de Nancy, CRNS, Université de Lorraine, France; {2}Institut Jean Lamour, CNRS, Université de Lorraine, France

16:15

### **1730: Pt Dendrimer-Encapsulated Nanoparticles Modified UMEAs for Electrochemiluminescence Heterogeneous Immunoassay**

Yun Hui{1}, Weiliang Shu{1}, Jiaxin Zhu{2}, Jiamei Li{1}, Tianzhun Wu{1}, Wenhua Zhou{1}, Xuefeng Yu{1}  
{1}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; {2}University of Pennsylvania, United States

16:30

### **1890: A Highly Sensitive Immunosensor for White Spot Syndrome Virus (WSSV) Envelope Protein VP28 Detection Based on Electrochemical Impedance Spectroscopy Technique**

Linh Huynh Thi Thuy{1}, Phu Nguyen Dang{5}, Hung Cao{4}, Hung Anh Nguyen{4}, Jung-Chih Chiao{3}, Chun-Ping Jen{2}, Loc Do Quang{6}, Trinh Chu Duc{5}, Tung Thanh Bui{5}

{1}Hue University, Vietnam; {2}National Chung Cheng University, Taiwan; {3}Southern Methodist University, United States; {4}University of California, Irvine, United States; {5}University of Engineering and Technology, Vietnam National University, Vietnam; {6}Vietnam National University-Hanoi University of Science, Vietnam

# Technical Program: Monday, October 30

16:45

## **1022: Independently Operational Dual-Frequency Band Metamaterial Based EM Biosensor for Identification and Quantification of Impurities in Vegetable Oils**

Debarati Dutta, Ravi Anand, Anirban Sarkar  
Indian Institute of Technology Mandi, India

17:00

## **1092: A Highly Sensitive O<sub>2</sub> Biosensor Based on PEDOT:PSS/SA Composite Conductive Hydrogel**

Yuyang Yuan{2}, Tianyu Li{2}, Shiyi Xu{2}, Zhichao Ye{2}, Shanshan Zhang{2}, Lu Fang{1}, Bo Liang{2}  
{1}Hangzhou Dianzi University, China; {2}Zhejiang University, China

17:15

## **1392: Antifouling Iridium Oxide as a Reference Electrode for Electrochemical Sensing on Cochlear Implants**

Jolan Wellens, Olivier Deschaume, Tristan Putzeys, Nicolas Verhaert, Carmen Bartic  
Katholieke Universiteit Leuven, Belgium

15:30 - 17:30

## **A3L-05: Emerging Sensors for Remote, Environmental, and Deformation Sensing**

Room: Park Suite 5

Session Chair(s): Mark Cheng, *The University of Alabama*

15:30

## **★★ INVITED**

## **1918: Parity-Time (PT)-Symmetric Telemetry for Wireless Micro- and Nano-Sensors**

Pai-Yen Chen  
University of Illinois Chicago, United States

16:00

## **1177: Assessing Torsional Deflection of Alpine Skis - A Proof of Concept Utilizing Printed Electronics in a Laboratory Setting**

Christoph Thorwartl{3}, Andreas Tschepp{2}, Helmut Holzer{1}, Thomas Stöggli{3}  
{1}Atomic Austria GmbH, Austria; {2}Joanneum Research Forschungsgesellschaft mbH, Austria;  
{3}University of Salzburg, Austria

16:15

## **1784: Wireless Battery-Free Sub-mW Underground Soil Moisture Sensing System**

Sheng Ding{1}, Shad Roundy{1}, Ramesh Goel{1}, Cody Zesiger{2}, Darrin J Young{1}  
{1}University of Utah, United States; {2}Utah State University, United States

16:30

## **1275: Stretchable Shape-Sensing Ribbons**

Stephanie Woodman, Anjali Agrawala, Rebecca Kramer-Bottiglio  
Yale University, United States

16:45

## **1506: Exploring the Potential of Magnetically Active Polymers in Force Sensing: Material, Design, and Experimental Insights**

Yassine Ahaggach, Yassine Lamkharbech, Samira Jafari, Matthias Soddemann  
Dätwyler Holding Inc., Switzerland

# Technical Program: Monday, October 30

17:00

**1546: Log-Spiral Nanoantenna-Based Long-Wave Infrared Detectors**

Gergo Szakmany{2}, Collin Finnan{2}, Edward Kinzel{2}, Alexei Orlov{2}, Wolfgang Porod{2}, Jeffrey Yang{2}, Stephen White{1}, Gary Bernstein{2}

{1}Air Force Research Laboratory, United States; {2}University of Notre Dame, United States

17:15

**1649: Gate Oxide Induced Reliability Assessment of Junctionless FinFET-Based Hydrogen Gas Sensor**

Navneet Gandhi{1}, Rajeewa Kumar Jaisawal{1}, Sunil Rathore{1}, P N Kondekar{1}, Ankit Dixit{3}, Naveen Kumar{3}, Vihar Georgiev{3}, Navjeet Bagga{2}

{1}Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India; {2}Indian Institute of Technology Bhubaneswar, India; {3}University of Glasgow, United Kingdom

15:30 - 17:30

**A3L-06: Sensor Networks and IOT**

Room: Park Suite 6

Session Chair(s): Domenico Balsamo, *Newcastle University*

Yacine GHAMRI-DOUDANE, *La Rochelle University*

15:30

★ ★ **INVITED**

**2027: Ultra-Wideband Technology: Unlocking the Potential of Low Power IoT with Precise Localization and Energy-Efficient Wake-Up Radio**

Michele Magno

ETH Zürich, Switzerland

16:00

**1591: Enhancing Lightweight Neural Networks for Small Object Detection in IoT Applications**

Liam Boyle{1}, Nicolas Baumann{1}, Seonyeong Heo{2}, Michele Magno{1}

{1}ETH Zürich, Switzerland; {2}Kyung Hee University, Korea

16:15

**1797: Area and Power Efficient Receiver for Narrowband Internet of Things Applications**

Nishant Patil{1}, Sankaran Aniruddhan{2}

{1}Columbia University in the City of New York, United States; {2}Indian Institute of Technology Madras, India

16:30

**1806: A Compressed Sensing-Based Resolution Reconfigurable Multi-Channel Sensor Node**

Laxmeesha Somappa{1}, Shahid Malik{2}, Shuchin Aeron{3}, Sameer Sonkusale{3}, Maryam Shojaei Baghini{1}

{1}Indian Institute of Technology Bombay, India; {2}Indian Institute of Technology Delhi, India; {3}Tufts University, United States

16:45

**1888: An Orchestrator Framework for IoT-Based Disaster Prevention Simulation**

Kei Hiroi{2}, Akihito Kohiga{1}, Sho Fukaya{3}, Yoichi Shinoda{1}

{1}Japan Advanced Institute of Science and Technology, Japan; {2}Kyoto University, Japan; {3}Suwa University of Science, Japan

# Technical Program: Monday, October 30

17:00

**1050: Intra-Epochal Dynamics of Periodically-Repairable Barrier-Covering Wireless Sensor Networks**

Alexander Michael Daniel

Defence Research and Development Canada, Canada

17:15

**1169: A Novel Approach to Air Quality Monitoring: Towards Miniature, Self-Organized, and Low-Power Device**

Tao Wang{1}, Yu Wu{2}, Wangze Ni{1}, Jianhua Yang{1}, Yimin Wang{1}, Jiaqing Zhu{3}, Min Zeng{1}, Nantao Hu{1}, Zhi Yang{1}

{1}Shanghai Jiao Tong University, China; {2}Shanghai Marine Diesel Engine Research Institute, China;

{3}Shanghai University of Engineering Science, China

15:30 - 17:30

**A3L-07: Optical Sensors - 1**

Room: Park Suite 7

Session Chair(s): Jan Nissinen, *University of Oulu*

15:30

**1246: High Precision Measurement of Electric Field at the Nanoscale in Optomechanical Systems**

Cuihong Li{1}, Shaochong Zhu{1}, Jinchuan Wang{1}, Zhiming Chen{1}, Chaoxiong He{1}, Huizhu Hu{2}  
{1}Zhejiang Lab, China; {2}Zhejiang Lab, Zhejiang University, China

15:45

**1319: Magnetic Field Compensation for an Optically Pumped Magnetometer Without Iteration**

Yaqiong Niu, Chaofeng Ye

ShanghaiTech University, China

16:00

**1107: Model Updating and Force Identification from Phase-Based Motion Measurements**

Wendi Zhang, Jiwen Zhou, Xiaojian Wang, Jinhong Wang, Hongguang Li, Guang Meng

Shanghai Jiao Tong University, China

16:15

**★★ INVITED**

**1926: Hyperspectral Imaging in the Molecular Fingerprint Band and its Application in Heritage Science**

Derryck Reid{1}, Jake Charsley{1}, Marius Rutkauskas{1}, Yoann Altmann{1}, Michela Botticelli{2},  
Valentina Risdonne{2}, Margaret Smith{2}, Tess Visser{2}, Christina Young{2}

{1}Heriot-Watt University, United Kingdom; {2}University of Glasgow, United Kingdom

16:45

**1306: Automatic Camera-Based Advanced Slump Flow Testing for Improved Reliability**

Axel Dürrbaum, Farzad Rezazadeh, Andreas Kroll

Universität Kassel, Germany

17:00

**1882: Smart Telescope System with Automatic Tracking**

Kohei Shimasaki, Masaru Ito, Shaopeng Hu, Feiyue Wang, Idaku Ishii

Hiroshima University, Japan

# Technical Program: Monday, October 30

17:15

**1757: A Gas Imaging Sensor System of Automotive Exhaust Plumes for Remote Emission Sensing Application Basing on Schlieren Imaging - an Approach to Visualize and Size Vehicle Exhaust Plumes**

Hafiz Hashim Imtiaz, Paul Schaffer, Martin Kupper, Alexander Bergmann

Technische Universität Graz, Austria

15:30 - 17:30

**A3L-08: Sensor Data Processing & AI: Human Activity and Biomedical Applications**

Room: Park Suite 8

Session Chair(s): Ashish Pandharipande, *NXP Semiconductors*

15:30

**1690: Radar-Based Continuous Human Activity Recognition with Multi-Label Classification**

Ingrid Ullmann{2}, Ronny Gerhard Guendel{1}, Nicolas Christian Kruse{1}, Francesco Fioranelli{1}, Alexander Yarovoy{1}

{1}Delft University of Technology, Netherlands; {2}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

15:45

**1830: TinyTracker: Ultra-Fast and Ultra-Low-Power Edge Vision In-Sensor for Gaze Estimation**

Pietro Bonazzi, Thomas Rüegg, Sizhen Bian, Yawei Li, Michele Magno

ETH Zürich, Switzerland

16:00

**1507: Triboelectric Nanogenerators for Gait Analysis: Design, Development, and Validation**

Omar Raita{1}, Yassine Ahaggach{1}, Simon Kervyn{1}, Leszek Jakuczek{1}, Samira Jafari{1}, Anisoara Ionescu{2}

{1}Dätwyler Holding Inc., Belgium; {1}Dätwyler Holding Inc., Switzerland; {2}Dätwyler Holding Inc., École Polytechnique Fédérale de Lausanne, Switzerland

16:15

**1249: Bayesian Filter-Based Ultrasonic Continuous Hand Gesture Recognition for Low-Resource Platform**

Pixi Kang, Lingfeng Gao, Xiangyu Li

Tsinghua University, China

16:30

**1567: An Efficient Deep-Learning-Based Solution for the Recognition of Relative Changes in Mental Workload Using Wearable Sensors**

Majd Saleh{2}, Stéphane Paquetlet{2}, Pierre Castel{2}, Marc Hoarau{2}, Nico Pallamin{2}, Daniel Lewkowicz{1}

{1}Human Design Group, France; {2}Institute of Research and Technology b-com, France

16:45

**1598: Machine Learning Methods for Electroencephalogram-Based Age Prediction**

Grant Sinha{5}, Nabil Belacel{3}, Zhiyang Gu{2}, Sam Doesburg{4}, George Medvedev{1}, Urs Ribary{4}, Vasily Vakorin{4}, Pengcheng Xi{3}

{1}Fraser Health Authority, Canada; {2}McMaster University, Canada; {3}National Research Council Canada, Canada; {4}Simon Fraser University, Canada; {5}University of Waterloo, Canada

# Technical Program: Monday, October 30

17:00

**1734: Enhancing Sensor-Based Human Activity Recognition Using Efficient Channel Attention**

Anuchit Jitpattanakul{1}, Sakorn Mekruksavanich{2}

{1}King Mongkut's University of Technology North Bangkok, Thailand; {2}University of Phayao, Thailand

17:15

**1312: Data-Driven Shape Sensing of Continuum Dexterous Manipulators Using Embedded Capacitive Sensor**

Qihang Li, Wenpeng Wang, Shuya Liu, Amit Jain, Mehran Armand

Johns Hopkins University, United States

15:30 - 17:30

**A3L-09: Force and Pressure Sensors**

Room: Park Suite 9

Session Chair(s): Samuel Huber, *Eastern Switzerland University of Applied Sciences*

Massood Tabib-Azar, *University of Utah*

15:30

**1875: A 36% Scandium Aluminum Nitride pMUT - FBAR Dual Mode Pressure Sensor for IoT Applications**

Walter Gubinelli{1}, Luca Colombo{1}, Bernard Herrera Soukup{2}, Pietro Simeoni{1}, Blair Kopp{1}, Alberto Corigliano{3}, Cristian Cassella{1}, Matteo Rinaldi{1}

{1}Northeastern University, United States; {2}Northeastern University, Qualcomm Incorporated, United States; {3}Politecnico di Milano, Italy

15:45

**1513: A Novel High-Pressure Resonant Microsensor Based on Volume Compressed Sensing**

Zongze Yu{1}, Pan Qian{1}, Yulan Lu{2}, Deyong Chen{3}, Junbo Wang{3}, Bo Xie{2}, Nan Li{2}, Xiaoye Huo{2}

{1}Aerospace Information Research Institute, China; {2}Aerospace Information Research Institute, Chinese Academy of Sciences, China; {3}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

16:00

**1358: A Wide Temperature Range Weakly Coupled Resonant Micro-Pressure Sensor**

Jiaxin Qin{3}, Deyong Chen{2}, Bo Xie{1}, Junbo Wang{2}, Yulan Lu{1}, Bowen Wang{3}, Zhaoyang Zhai{3}, Jian Chen{2}, Nan Li{1}, Xiaoye Huo{1}

{1}Aerospace Information Research Institute, Chinese Academy of Sciences, China; {2}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China; {3}University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

16:15

**1297: Design and Characterization of Resonant Pressure Microsensor Based on Parametric Pump**

Wenliang Xia{1}, Bo Xie{1}, Yulan Lu{1}, Junbo Wang{2}, Deyong Chen{2}, Jian Chen{2}, Nan Li{1}, Xiaoye Huo{1}

{1}Aerospace Information Research Institute, Chinese Academy of Sciences, China; {2}AIR, University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

# Technical Program: Monday, October 30

16:30

**1345: 6-Axis Force-Torque Sensor Utilizing Four Pairs of Standing Laser-Induced Graphene Cantilevers**

Rihachiro Nakashima, Hidetoshi Takahashi

Keio University, Japan

16:45

**1349: A Quantitative Identification of “Moist Feeling” by High-Resolution Tactile Sensor Devices**

Yuto Morita, Genki Yamada, Kyohei Terao, Fusao Shimokawa, Hidekuni Takao

Kagawa University, Japan

17:00

**1429: Robust Multi-Layer Kevlar Aerogel for High Performance Force Sensor**

Jiaxin Liu, Ziyang Ke, Tielin Shi, Hu Long

Huazhong University of Science and Technology, China

17:15

**1865: A Novel Sensor for Real-Time Pressure Monitoring in Colonoscopy Training**

Anirudh Vajpeyi{2}, Anish Naidu{1}, Jeffrey Hawel{2}, Christopher Schlachta{2}, Rajni Patel{2}

{1}CSTAR, Canada; {2}Western University, CSTAR, Canada

# Technical Program: Tuesday, October 31

7:30 - 8:30

## Registration

Room: Grand Park Lobby

8:30 - 15:30

## Workshop: Electronic Skin Patches: Convergent Technologies for Vital Signs Monitoring

Room: Park Suite 9

8:30 - 9:30

## B1L-01: Condition Monitoring

Room: Park Suite 1

Session Chair(s): Yixin Wang, *Hong Kong University of Science and Technology*

Jules Moualeu, *University of the Witwatersrand*

8:30



### Sensors Letters Paper

#### 1967: Vibration Monitoring in the Compressed Domain with Energy-Efficient Sensor Networks

Edoardo Ragusa{2}, Federica Zonzini{1}, Luca De Marchi{1}, Paolo Gastaldo{2}

{1}Alma Mater Studiorum – Università di Bologna, Italy; {2}Università degli studi di Genova, Italy

8:45



### Sensors Letters Paper

#### 2054: Speeding Up System Identification Algorithms on a Parallel RISC-V MCU for Fast Near-Sensor Vibration Diagnostic

Amirhossein Moallemi, Riccardo Gaspari, Federica Zonzini, Luca De Marchi, Davide Brunelli, Luca Benini

Alma Mater Studiorum – Università di Bologna, Italy

9:00



### Sensors Letters Paper

#### 2079: Acoustic-Based Detection Technique for Identifying Worn-Out Components in Large-Scale Industrial Machinery

Christof Pichler{1}, Markus Neumayer{1}, Bernhard Schweighofer{1}, Christoph Feilmayr{2}, Stefan Schuster{2}, Hannes Wegleiter{1}

{1}Technische Universität Graz, Austria; {2}voestalpine Stahl GmbH, Austria

9:15



### Sensors Letters Paper

#### 2128: Wireless Strain and Temperature Monitoring in Reinforced Concrete Using Surface Acoustic Wave (SAW) Sensors

Pierre Jeltiri{2}, Firas Al-Mahmoud{2}, Rémi Boissière{2}, Baptiste Paulmier{2}, Tony Makdissy{2}, Elmazria Omar{2}, Nicolay Pascal{1}, Hage-Ali Sami{2}

{1}Carinthia Institute for Smart Materials CiSMAT, Carinthia University of Applied Sciences, Austria;

{2}Institut Jean Lamour, CNRS, Université de Lorraine, France

# Technical Program: Tuesday, October 31

8:30 - 9:30

## **B1L-02: Systems: Machine Learning and Motion Control**

Room: Park Suite 2

Session Chair(s): Valentina Zega, *Politecnico di Milano*

Alberto Sinibaldi, *Sapienza Università di Roma*

8:30



### ***Sensors Letters Paper***

#### **1931: Obstacle Avoidance Behavior Combining Dodging Control and Movable Soft Material**

Mitsuharu Matsumoto, Shogo Hanawa

University of Electro-Communications, Japan

8:45



### ***Sensors Letters Paper***

#### **2082: Plug-and-Play Sparse Inertial Motion Tracking with Sim-to-Real Transfer**

Simon Bachhuber{1}, Dustin Lehmann{3}, Eva Dorschky{1}, Anne D. Koelewijn{1}, Thomas Seel{2}, Ivo Weygers{1}

{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Leibniz Universität Hannover, Germany; {3}Technische Universität Berlin, Germany

9:00



### ***Sensors Letters Paper***

#### **2112: TinyRCE: Multipurpose Forward Learning for Resource Restricted Devices**

Danilo Pau{1}, Andrea Pisani{1}, Fabrizio Aymone{1}, Gianluigi Ferrari{2}

{1}STMicroelectronics, Italy; {2}Università degli Studi di Parma, Italy

9:15



### ***Sensors Letters Paper***

#### **2094: Landmine Identification from Pulse Induction Metal Detector Data Using Machine Learning**

Marko Šimić, Davorin Ambruš, Vedran Bilas

University of Zagreb, Croatia

8:30 - 9:30

## **B1L-03: Advanced Localization and Tracking Techniques**

Room: Park Suite 3

Session Chair(s): Yun-Ju Lee, *National Tsing Hua University*

Mehmet Yuce, *Monash University*

8:30



### ***Invited Journal Author***

#### **[10.1109/JSEN.2022.3232479](https://doi.org/10.1109/JSEN.2022.3232479): UWB Sensor-Based Indoor LOS/NLOS Localization with Support Vector Machine Learning**

Hongchao Yang{2}, Yunjia Wang{2}, Chee Kiat Seow{3}, Meng Sun{2}, Minghao Si{2}, Lu Huang{1}

{1}54th Research Institute of China Electronics Technology Group Corporation, China; {2}Key Laboratory of Land Environment and Disaster Monitoring, China University of Mining and Technology, China;

{3}University of Glasgow, United Kingdom

# Technical Program: Tuesday, October 31

8:45

 **Invited Journal Author**  
[10.1109/JSEN.2023.3235869](https://doi.org/10.1109/JSEN.2023.3235869): One Step of Gait Information from Sensing Walking Surface for Personal Identification

Yun-Ju Lee, Chao-Che Wu  
National Tsing Hua University, Taiwan

9:00

 **Sensors Letters Paper**  
**1964: Demodulation Methods for a Wireless Electromagnetic Tracker**

François Guerret{4}, Pauline Vehrlé{3}, Hendrik Meier{3}, Antoine Girard{2}, Christophe Prieur{1}  
{1}GIPSA-lab, France; {2}L2S, CentraleSupélec, France; {3}Sysnav, France; {4}Sysnav, Laboratoire des signaux et systèmes, CentraleSupélec, France

9:15

 **Sensors Letters Paper**  
**2064: OpenGimbal: a 3 Degrees of Freedom Open Source Sensing and Testing Platform for Nano and Micro UAVs**

Suryansh Sharma, Tristan Dijkstra, Ranga Rao Venkatesha Prasad  
Delft University of Technology, Netherlands

8:30 - 9:30

**B1L-04: Wearable, Flexible and Textile Sensing**

Room: Park Suite 4

Session Chair(s): Hyejin Moon, *The University of Texas at Arlington*  
Tao Li, *University of Cincinnati*

8:30

 **Invited Journal Author**  
[10.1109/JSEN.2022.3169504](https://doi.org/10.1109/JSEN.2022.3169504): Optically Unobtrusive Zeolite-Based Dry Electrodes for Wearable ECG Monitoring

Salvatore Andrea Pullano{1}, Deepa Kota{2}, Karthik Kakaraparty{3}, Antonino S. Fiorillo{1}, Ifana Mahbub{3}  
{1}Università degli studi Magna Græcia di Catanzaro, Italy; {2}University of North Texas, United States; {3}University of Texas Dallas, United States

8:45

 **Invited Journal Author**  
[10.1109/LENS.2023.3274682](https://doi.org/10.1109/LENS.2023.3274682): Flexible Sensor and Readout Circuitry for Continuous Ion Sensing in Sweat

Mattia Petrelli{2}, Ata Golparvar{3}, Ali Meimandi{1}, Bajramshahe Shkodra{2}, Martina Aurora Costa Angeli{2}, Aniello Falco{2}, Paolo Lugli{2}, Luisa Petti{2}, Sandro Carrara{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Free University of Bozen-Bolzano, Italy; {3}Sabanci University, École Polytechnique Fédérale de Lausanne, Switzerland

# Technical Program: Tuesday, October 31

9:00



*Invited Journal Author*

[10.1109/LENS.2023.3239991](#): Smart Glove with Fully Integrated Textile Sensors and Wireless Sensor Frontend for the Tactile Internet

Jens Wagner, Hans Winger, Chokri Cherif, Frank Ellinger  
Technische Universität Dresden, Germany

8:30 - 9:30

**B1L-05: Sensor Materials, Fabrication and Packaging - 2**

Room: Park Suite 5

Session Chair(s): Ulrich Schmid, *TU Wien*

Arum Han, *Texas A&M University*

8:30

**1366: Low-Bow Glass-Si Anodic Wafer Bonding at High Temperature by Means of CTE Engineering of Corning Novel Fusion Glass**

Ashkan Rad

SUSS MicroTec Solutions GmbH & Co. KG, Germany

8:45

**1035: Achieving Submicron Sphericity in Bowl-Shaped Micro Hemispherical Resonators Through Precision Molding Process**

Yinan Zhang, Ruixue Zhang, Haoyu Gu, Bin Zhou, Qi Wei, Rong Zhang

Tsinghua University, China

9:00

**1002: From Conventional Non-Conductive Foams to Soft Piezoresistive Pressure Sensors: A Low-Cost Approach to Large-Area Pressure-Mapping**

Manuel Reis Carneiro{1}, Luis Rosa{2}, Mahmoud Tavakoli{2}

{1}Carnegie Mellon University & University of Coimbra, Portugal; {2}University of Coimbra, Portugal

9:30

**1399: MEMS Pressure Sensor Based on Piezoresistive Effect of MoS<sub>2</sub> Film**

Xing Pang, Qi Zhang, Xiaoya Liang, Yulong Zhao

Xi'an Jiaotong University, China

8:30 - 9:30

**B1L-06: Optical Sensors: Materials and Applications**

Room: Park Suite 6

Session Chair(s): Semir El-Ahmar, *Poznan University of Technology*

Zhenyun Qian, *Northeastern University*

8:30



*Sensors Letters Paper*

**2004: Optical Limiting Sensor Based on Multilayer Optimization of Ag/VO<sub>2</sub> Phase Changing Material**

Camilla Baratto{2}, Marco Gandolfi{4}, Andrea Tognazzi{3}, Paolo Franceschini{4}, Bohan Li{1}, Rocio Camacho Morales{1}, Domenico De Ceglia{4}, Alfonso Carmelo Cino{3}, Dragomir Neshev{1}, Costantino De Angelis{4}

{1}Australian National University, Australia; {2}CNR-INO, PRISM Lab, Italy; {3}Università degli Studi di Palermo, Italy; {4}University of Brescia, Italy

# Technical Program: Tuesday, October 31

8:45



## *Sensors Letters Paper*

### **2116: Band Gap Engineering of Pb1-xCd<sub>x</sub>Se Thin Films Providing mid-IR Photoluminescent Based Light Emitting Diodes for Use in Non-Dispersive Infrared Gas Sensors**

Greg McGann{3}, Carlos Garcia Nuñez{2}, Lewis Fleming{3}, David Hutson{3}, Ewan Waddell{1}, Des Gibson{3}

{1}Alba Sense Ltd, United Kingdom; {2}University of Glasgow, United Kingdom; {3}University of the West of Scotland, United Kingdom

9:00



## *Sensors Letters Paper*

### **2072: Field Verification of Distributed Acoustic Fibre Optic Sensor System Using Customised Disturbance Simulator Equipment**

Saharudin Suhairi{1}, Mohamad Rihaan Ain Nabihah{1}, Hisham Mohd Hafizulfika{1}, Mohamed Khairom Nizam{1}, Mohd Khusni Muhammad Nur Salihin{1}, Al Bakri Anas Firdaus{2}, Amiruddin Meor Tawfik{2}  
{1}MIMOS Berhad, Malaysia; {2}Ventura IOT Sdn Bhd, Malaysia

9:15



## *Sensors Letters Paper*

### **2135: Slow-Light Enhanced CO<sub>2</sub> Sensing Using 3D Photonic Crystals Fabricated Using Two-Photon Polymerization**

Anuj Singhal, Anandvinod Dalmiya, Patrick Lynch, Igor Paprotny  
University of Illinois Chicago, United States

8:30 - 9:30

### **B1L-07: Chemical, Electrochemical and Gas Sensors - 3**

Room: Park Suite 7

Session Chair(s): Xiaoshan Zhu, *University of Nevada Reno*  
Hamida Hallil Abbas, *Bordeaux University*

8:30

### **1365: Super-Nernstian ISFET Using Scaled Coplanar Multi-Gated Channels**

Sooraj Sanjay, Navakanta Bhat  
Indian Institute of Science, India

8:45

### **1262: Performance of a Multiparametric Water Quality Sensor in a Small-Scale Water Distribution Network**

Balakumara Vignesh Muppudathi{2}, Stéphane Laporte{3}, Yan Ulanowski{3}, Senthilmurugan Subbiah{1}, Bérengère Lebental{3}  
{1}Indian Institute of Technology Guwahati, India; {2}Indian Institute of Technology Guwahati, Université Gustave Eiffel, India; {3}Université Gustave Eiffel, France

9:00

### **1242: Rapid Detection of Bacterial Infection Using Gas Phase Time Series Analysis**

Christoforos Panteli{2}, Marios Stylianou{1}, Andreas Anastasiou{2}, Chrysafis Andreou{2}  
{1}S.N. CYLABS LTD, Cyprus; {2}University of Cyprus, Cyprus

# Technical Program: Tuesday, October 31

9:15

## **1239: Ionic Liquid-Gated Graphene FET Sensors for Detecting Nitrate Nitrogen (NO<sub>3</sub>-N) in Agricultural Soil**

Naoki Shiraishi{1}, Jian Lu{2}, Ryo Imaizumi{3}, Lan Zhang{2}, Ryutaro Maeda{2}, Mutsumi Kimura{3}  
{1}National Agriculture and Food Research Organization, Japan; {2}National Institute of Advanced Industrial Science and Technology, Japan; {3}Shinshu University, Japan

8:30 - 9:30

## **B1L-08: Sensor Phenomenology, Modeling and Evaluation - 1**

Room: Park Suite 8

Session Chair(s): Tao Li, *University of Cincinnati*

8:30

## **★ ★ INVITED**

## **1919: Ultra-Low-Power Wireless Gas Sensor Network for Off-Grid Operation in Agriculture**

Hanseup Kim{3}, Shakir-UI Khan{3}, Aishwaryadev Banerjee{3}, Mohit U. Karkhanis{3}, Sayali Tope{3}, Farhan Sium{3}, Brian Hatasaka{3}, Ashrafuzzaman Bulbul{3}, Kyung-Heon Kim{1}, Rana Dalapati{3}, Seungbeom Noh{3}, Ravi Mural{2}, Mingyue Ji{3}, Ling Zang{3}, James Schnable{2}, Carlos H. Mastrangelo{3}  
{1}Gyeongsang National University, Korea; {2}University of Nebraska, United States; {3}University of Utah, United States

9:00

## **1812: Improving Tidal Volume Estimation via Fusion of Impedance Pneumography and Accelerometry**

John Berkebile, Jesus Antonio Sanchez-Perez, Goktug Ozmen, Omer Inan  
Georgia Institute of Technology, United States

9:15

## **1281: Development and Validation of a Numerical Model for Miniature Electrochemical Oxygen Sensors**

Shan Zhang{2}, Ilka Schmäser{2}, Jamie Marland{1}, Ian Underwood{1}  
{1}Institute for Integrated Micro and Nano Systems, United Kingdom; {2}University of Edinburgh, United Kingdom

9:30 - 10:30

## **B2L-01: Pressure and Magnetic Sensors**

Room: Park Suite 1

Session Chair(s): Edoardo Ragusa, *Università degli studi di Genova*

Mitradip Bhattacharjee, *Indian Institute of Science Education and Research, Bhopal*

9:30

## **Sensors Letters Paper**

## **1941: Tunable Piezoresistive NEMS Pressure Sensor Simulation Under Various Environmental Conditions**

Nitish Kumar{1}, Ankur Gupta{1}, Pushpapraj Singh{1}, Subhas Chandra Mukhopadhyay{2}  
{1}Indian Institute of Technology Delhi, India; {2}Macquarie University, Australia

# Technical Program: Tuesday, October 31

9:45



## *Sensors Letters Paper*

### **2047: A Flexible Microstructured Pressure Sensor with High Performance Based on Vertically Aligned Carbon Nanotubes and Ion-Gel**

Yixin Wang, Xingru Chen, Rui Jiao, Hongyu Yu

Hong Kong University of Science and Technology, China; Hong Kong University of Science and Technology, Hong Kong

10:00



## *Sensors Letters Paper*

### **1972: High-Temperature Stability of Sensor Platforms Designed to Detect Magnetic Fields in a Harmful Radiation Environment**

Wiktoria Reddig{2}, Marta Przychodnia{2}, Tymoteusz Ciuk{1}, Semir El-Ahmar{2}

{1}Institute of Microelectronics and Photonics, Lukaszewicz Research Network, Poland; {2}Poznan University of Technology, Poland

10:15



## *Sensors Letters Paper*

### **1933: Magnetic Field Sensor Operating from Cryogenics to Elevated Temperatures**

Semir El-Ahmar, Jakub Jankowski, Paweł Czaja, Wiktoria Reddig, Marta Przychodnia, Jan Raczyński, Wojciech Koczorowski

Poznan University of Technology, Poland

9:30 - 10:30

## **B2L-02: Networks and IoT**

Room: Park Suite 2

Session Chair(s): Mitsuharu Matsumoto, *University of Electro-Communications*  
Srinivas Tadigadapa, *Northeastern University*

9:30



## *Sensors Letters Paper*

### **2110: On the Performance of Cache- and Energy Harvesting-Assisted Noma in D2D Communications with Hardware Impairments**

Alok Kumar Shukla{1}, Jules Moualeu{3}, Prabhat Kumar Upadhyay{1}, Fambirai Takawira{3}, Pedro Nardelli{2}

{1}Indian Institute of Technology Indore, India; {2}Lappeenranta-Lahti University of Technology, Finland; {3}University of the Witwatersrand, South Africa

9:45



## *Sensors Letters Paper*

### **2133: Light Residual Network for Human Activity Recognition Using Wearable Sensor Data**

Francisco Calatrava Nicolás, Oscar Martinez Mozos  
Örebro University, Sweden

# Technical Program: Tuesday, October 31

10:00

 **Sensors Letters Paper**

**2030: An Integrated sensorized Platform for Environmental Monitoring in Healthcare**

Simona Gandah{2}, Marcello Chiurazzi{2}, Irene Domina{2}, Neri Niccolò Dei{2}, Giorgia Spreafico{2}, Francesco Scotto Di Luzio{4}, Nevio Luigi Tagliamonte{4}, Sofia Sanz Granda{1}, Giuseppe Fico{3}, Leandro Pecchia{4}, Loredana Zollo{4}, Gastone Ciuti{2}  
{1}Inetum, Spain; {2}Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna, Italy;  
{3}Universidad Politécnica de Madrid, Spain; {4}Università Campus Bio-Medico di Roma, Italy

10:15

 **Sensors Letters Paper**

**2114: Internet of Things-Based Smart-Home Time-Priority-Cost (TPC)-Aware Energy Management System for Energy Cost Reduction**

Ismail Haitham{1}, Imad Jawhar{1}, Bilal Hammoud{2}  
{1}Al Maaref University, Lebanon; {2}CNRS-L, Lebanon

9:30 - 10:30

**B2L-03: Imaging**

Room: Park Suite 3

Session Chair(s): Danilo Pau, *STMicronics*

Pau Casacuberta, *Universitat Autònoma de Barcelona*

9:30

 **Sensors Letters Paper**

**2055: A Comparison Between Fourier and Hadamard Single-Pixel Imaging in Deep Learning-Enhanced Image Reconstruction**

Xin Wang, Jia You Lim, Muhammad Razin Rosla, Jun Yi Lim, Vishnu Monn Baskaran, Yeong Shiong Chiew, Raphaël C.-W. Phan  
Monash University Malaysia, Malaysia

9:45

 **Sensors Letters Paper**

**2101: Kalman Filter-Driven Blind Source Localization for Passive 3D ToF Imaging**

Faisal Ahmed{2}, Miguel Heredia Conde{2}, Paula López Martínez{1}  
{1}CiTIUS, Universidade de Santiago de Compostela, Spain, Spain; {2}ZESS, University of Siegen, Germany

10:00

 **Sensors Letters Paper**

**2142: Towards High-Resolution Face Image Generation from Coded Aperture Camera**

Hatef Otroschi Shahreza{2}, Alexandre Veuthey{1}, Sébastien Marcel{3}  
{1}ams-OSRAM, Switzerland; {2}École Polytechnique Fédérale de Lausanne, Switzerland; {3}Idiap Research Institute, Switzerland

# Technical Program: Tuesday, October 31

10:15



## *Sensors Letters Paper*

### **1987: Synchronization of a New Light-Flashing Shield with an External-Triggered Camera**

Jose de Jesus Castillo Zamora{1}, Amaury Negre{2}, Jean-Marc Ingargiola{1}, Abdoullah Ndoeye{2}, Florian Pouthier{4}, Jonathan Dumon{2}, Sylvain Durand{3}, Nicolas Marchand{2}, Franck Ruffier{1}  
{1}Aix Marseille Université, CNRS, France; {2}GIPSA-Lab, CNRS, Université Grenoble Alpes, France;  
{3}Strasbourg University, CNRS, INSA Strasbourg, ICube, France; {4}Strasbourg University, CNRS, INSA  
Strasbourg, ICube / Université Grenoble Alpes, CNRS, GIPSA-lab, France

9:30 - 10:30

## **B2L-04: Advanced Image Sensing Techniques**

Room: Park Suite 4

Session Chair(s): Siavash Pourkamali, *University of Texas at Dallas*

9:30



## *Invited Journal Author*

### **[10.1109/LSENS.2022.3209074](#): Demonstrating the Feasibility of Subepidermal Image Sensing for Hand Posture and Gesture Recognition**

Dimas Antony Chacon Salas, Kazuhiro Shinoda, Tomoyuki Yokota, Koji Yatani  
University of Tokyo, Japan

9:45



## *Invited Journal Author*

### **[10.1109/LSENS.2022.3216894](#): Low-Complexity Lossless Coding for Memory-Efficient Representation of Event Camera Frames**

Ionut Schiopu, Radu Ciprian Bilcu  
Huawei Technologies Oy Finland Co. Ltd, Finland

10:00



## *Invited Journal Author*

### **[10.1109/JSEN.2023.3258899](#): Robotic Positioning for Quality Assurance of Feature-Sparse Components Using a Depth-Sensing Camera**

Adam Gilmour{2}, William Jackson{2}, Dayi Zhang{2}, Gordon Dobie{2}, Charles Macleod{2}, Benjamin Karkera{1}, Thomas Barber{1}  
{1}BAE Systems, United Kingdom; {2}University of Strathclyde, United Kingdom

10:15



## *Invited Journal Author*

### **[10.1109/JSEN.2023.3242007](#): A Rough Set Framework for Multihuman Tracking in Surveillance Video**

Thangaswamy Judi Vennila, Vanniappan Balamurugan  
{1}Manonmaniam Sundaranar University, India

# Technical Program: Tuesday, October 31

9:30 - 10:30

## **B2L-05: Terahertz and Optical Sensors**

Room: Park Suite 5

Session Chair(s): Fabrice Labeau, *McGill University*  
Chang-hee Won, *Temple University*

9:30



**Invited Journal Author**

[10.1109/ICEAA.2017.8065473](#): Plasmonic Nanoantennas for Advanced Terahertz Optoelectronics

Mona Jarrahi

University of California, Los Angeles, United States

9:45



**Invited Journal Author**

[10.1109/JSEN.2023.3246505](#): Excellent Responsivity and Low Dark Current Obtained with Metal-Assisted Chemical Etched Si Photodiode

Kexun Chen, Olli E. Setälä, Xiaolong Liu, Behrad Radfar, Toni P. Pasanen, Michael D. Serué, Juha

Heinonen, Hele Savin, Ville Vähänissi

Aalto University, Finland

10:00



**Invited Journal Author**

[10.1109/LENS.2022.3159761](#): A Compact and Sensitive Time-Resolved-Optical-Reader for Bioassay Using Low-Energy Excitable and Long-Lived-Fluorescence Nanolabels

Tristan Hegseth, Bryan Lee, David Aucoin, Xiaoshan Zhu

University of Nevada Reno, United States

10:15



**Invited Journal Author**

[10.1109/JSEN.2023.3242330](#): Calibrating a Radio Frequency Electrooptic Sensors for Field-Relevant Temperature Conditions in a Laboratory Setting

Michael Sherburne{2}, Cameron Harjes{1}, Hugh Pohle{1}, Jane Lehr{3}

{1}Air Force Research Laboratory, United States; {2}Johns Hopkins University Applied Physics Laboratory, United States; {3}University of New Mexico, United States

9:30 - 10:30

## **B2L-06: MEMS Technology and Applications**

Room: Park Suite 6

Session Chair(s): Ive Weygers, *Friedrich-Alexander-Universität Erlangen-Nürnberg*  
Ingrid Ullmann, *Friedrich-Alexander-Universität Erlangen-Nürnberg*

9:30



**Sensors Letters Paper**

**2107: A New Design Strategy for Innovative MEMS xz-Biaxial Accelerometers**

Chiara Galimberti{1}, Gabriele Gattere{2}, Manuel Riani{2}, Valentina Zega{1}

{1}Politecnico di Milano, Italy; {2}STMicroelectronics, Italy

# Technical Program: Tuesday, October 31

9:45



**Sensors Letters Paper**

**2126: A 9-Ma Integrated Circuit with Programmable phase-Demodulation Delays for 250-nm-gauge-Based MEMS Gyroscope with 0.015°/hr Angle Random walk**

Marco De Pace{2}, Andrea Buffoli{2}, Giacomo Langfelder{2}, Marco Gadola{2}, Philippe Robert{1}  
{1}CEA-Leti, France; {2}Politecnico di Milano, Italy

10:00



**Sensors Letters Paper**

**2127: Low Motion Amplitude Operation of Lissajous Frequency Modulated MEMS Gyroscopes for Spurious Harmonics Reduction**

Riccardo Nastri{1}, Christian Padovani{1}, Marco Bestetti{1}, Valentina Zega{1}, Luca Falorni{2}, Giacomo Langfelder{1}  
{1}Politecnico di Milano, Italy; {2}STMicroelectronics, Italy

10:15



**Sensors Letters Paper**

**2097: Metasurface-Enhanced Micromechanical Photoswitch for Zero Power Human Presence Sensing**

Sila Calisgan{1}, Sungho Kang{1}, Antea Risso{1}, Vageeswar Rajaram{1}, Bernard Herrera Soukup{2}, Zhenyun Qian{1}, Matteo Rinaldi{1}  
{1}Northeastern University, United States; {2}Northeastern University, Qualcomm Incorporated, United States

9:30 - 10:30

**B2L-07: Chemical, Electrochemical and Gas Sensors - 4**

Room: Park Suite 7

Session Chair(s): Hamida Hallil Abbas , *Bordeaux University*  
Xiaoshan Zhu, *University of Nevada Reno*

9:30

**1176: Responsive PAAM/PEDOT:PSS Hydrogel Based Electrochemical Sensor for Glutathione Detection**

Shanshan Zhang, Yue Zhou, Dong Wang, Tianyu Li, Xuesong Ye, Bo Liang  
Zhejiang University, China

9:45

**1174: Universal Data Acquisition System for Flexible and MEMS-Based Gas Sensors**

Wangze Ni{2}, Tao Wang{2}, Yu Wu{3}, Jianbo Zhu{1}, Yongwei Zhang{2}, Min Zeng{2}, Jianhua Yang{2}, Nantao Hu{2}, Zhi Yang{2}  
{1}Alwhales Electronic Technology Shanghai Co., Ltd., China; {2}Shanghai Jiao Tong University, China; {3}Shanghai Marine Diesel Engine Research Institute, China

10:00

**1558: Real-Time Monitoring of Inflammation in Metabolic Syndrome with Electrochemical Detection of Tyramine Level in Urine**

Tanzila Noushin{2}, Jinwon Jeong{1}, Jeong-Bong Lee{2}  
{1}Baylor University, United States; {2}University of Texas at Dallas, United States

# Technical Program: Tuesday, October 31

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## **1021: Odors Can Be Amplified by Noses: Sensitivity Enhancing Bio-Inspired Nasal Structures for Micro Cataluminescence Gas Sensors**

Luzheng Liu, Chuxiong Hu, Jichuan Yu, Wenxiang Zhao, Ze Wang, Yu Zhu  
Tsinghua University, China

9:30 - 10:30

## **B2L-08: Sensor Phenomenology, Modeling and Evaluation - 2**

Room: Park Suite 8

Session Chair(s): Behraad Bahreyni, *Simon Fraser University*

9:30

## **1486: Adaptive 3-Mode Thermal Flow and Velocity Sensor**

Ethan Gardner{2}, Chris Rosser{1}, Jonathan Hardie{1}, Jon Callan{1}, Cerdin Lee{1}, Syed Zeeshan Ali{1}, Florin Udrea{2}  
{1}Flusso Ltd, United Kingdom; {2}University of Cambridge, United Kingdom

9:45

## **1754: A Direct Piezoresistive Method to Transduce Electromechanical Motion in Self-Sensing Suspended Nanostructures**

Sudarsan Majumder, Soumya Dutta  
Indian Institute of Technology Madras, India

10:00

## **1293: Application of an Optimization Algorithm to Reduce Crosstalk in Voltage Feedback Methods**

Sergio Domínguez-Gimeno, Raúl Igual-Catalán, Carlos Medrano-Sánchez, Inmaculada Plaza-García  
Universidad de Zaragoza, Spain

10:15

## **1212: Identification of Axon Bendings in Neurons by Multiphysics FEM Simulations of High-Density MEA Extracellular Recordings**

Federico Leva{3}, Andrea Corna{1}, Paul Werginz{1}, Pierpaolo Palestri{2}, Günther Zeck{1}, Luca Selmi{3}  
{1}Technische Universität Wien, Austria; {2}Università degli Studi di Udine, Italy; {3}Università di Modena e Reggio Emilia, Italy

10:30 - 11:00

## **Coffee Break/Exhibit Hall**

Room: Grand Klimt Hall

11:00 - 12:00

## **Keynote NEMS and sensing – from classical to quantum**

Michael L. Roukes, *Caltech, USA*

Room: Grand Park Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*  
Ravinder Dahiya, *Northeastern University, Boston*

12:00 - 13:30

## **Lunch**

Room: Restaurant LENZ & Selleny's Bar

# Technical Program: Tuesday, October 31

12:00 - 13:30

## WiSe Networking Lunch

Room: Restaurant LENZ & Selleny's Bar

13:30 - 15:30

## B3L-01: Biosensors: Materials and Applications

Room: Park Suite 1

Session Chair(s): Sameer Sonkusale, *Tufts University*

Ajay Beniwal, *University of Glasgow*

13:30



### *Sensors Letters Paper*

#### 1988: Impedance Spectroscopy Based Detection of Viral RNA from Clinical Samples

Ranamay Saha{1}, Sri Niwas Singh{1}, Jasmine Samal{2}, Ekta Gupta{2}, Shantanu Bhattacharya{1}  
{1}Indian Institute of Technology Kanpur, India; {2}Institute of Liver and Biliary Sciences, India

13:45



### *Sensors Letters Paper*

#### 2111: Graphene-Oxide-Assisted Biosensor with Optimum Response Selection Algorithm for Detecting and Quantifying Vimentin, a Potential Biomarker for Ovarian Cancer

Ullas Pandey{2}, Tushar Deshpande{3}, Amit Agrawal{1}, Shiv Govind Singh{2}  
{1}Indian Institute of Technology Bombay, India; {2}Indian Institute of Technology Hyderabad, India;  
{3}Indian Institute of Technology, Hyderabad, India

14:00



### *Sensors Letters Paper*

#### 1949: Direct Competitive Assay for ERBB2 Detection in Breast Cancer Cell Lysates Using 1D Photonic crystals-Based Biochips

Alberto Sinibaldi{2}, Matteo Allegretti{3}, Norbert Danz{1}, Elena Giordani{3}, Peter Munzert{1},  
Agostino Occhicone{2}, Patrizio Giacomini{3}, Francesco Michelotti{2}  
{1}Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Germany; {2}Sapienza  
Università di Roma, Italy; {3}Translational Oncology Research Unit, IRCCS Regina Elena National Cancer  
Institute, Italy

14:15



### *Sensors Letters Paper*

#### 2090: Non-Enzymatic Glucose Sensing Employing a Patterned Substrate Miniaturized Device-on-Mask

Subham Das, Vibhas Chugh, Chirantan Das, Mitradip Bhattacharjee  
Indian Institute of Science Education and Research, Bhopal, India

14:30



### *Sensors Letters Paper*

#### 2087: Detection of Lactate via Amperometric Sensors Modified with Direct Electron Transfer Enzyme Containing PEDOT:PSS and Hydrogel Inks

Steffen Kurzthals{2}, Eva Melnik{2}, Paulina Plata{2}, Esra Cihan{1}, Peter Herzog{3}, Alfons Felice{3},  
Andrea Bocchino{4}, Conor O'mahony{4}, Giorgio C. Mutinati{2}, Rainer Hainberger{2}  
{1}AIT Austrian Institute of Technology GmbH, Austria; {2}Austrian Institute of Technology GmbH,  
Austria; {3}Directsens GmbH, Austria; {4}Tyndall National Institute, University College Cork, Ireland

# Technical Program: Tuesday, October 31

14:45



## **Sensors Letters Paper**

### **2016: New Insights Into the I/V Hysteretic Characteristics of Memristive Biosensors**

Kapil Bhardwaj{2}, Ata Golparvar{3}, Junrui Chen{1}, Gian Luca Barbruni{1}, Sandro Carrara{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}École Polytechnique Fédérale de Lausanne / NIT Jamshedpur, Switzerland; {3}Sabanci University, École Polytechnique Fédérale de Lausanne, Switzerland

15:00



## **Sensors Letters Paper**

### **2061: Single-Band Raman Shift Detection for Spectroscopy-Less Optical Biosensors**

Ata Golparvar{2}, Assim Boukhayma{3}, Sandro Carrara{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Sabanci University, École Polytechnique Fédérale de Lausanne, Switzerland; {3}Senbiosys SA, Switzerland

15:15



## **Sensors Letters Paper**

### **2012: Multiplexed Sensing Probe for Bioreactors for Cellular Agriculture**

Atul Sharma, Cihan Asci, Ruben Del-Rio-Ruiz, Kirsten Trinidad, Nafize Ishtiaque Hossain, David L Kaplan, Sameer Sonkusale  
Tufts University, United States

13:30 - 15:30

### **B3L-02: Advanced Chemical and Bio-Sensors**

Room: Park Suite 2

Session Chair(s): Bérengère Lebental, *Université Gustave Eiffel*

Michael Sherburne, *The Johns Hopkins University Applied Physics Laboratory*

13:30



## **Invited Journal Author**

### **[10.1109/JSEN.2022.3233571](https://doi.org/10.1109/JSEN.2022.3233571): Electric Field Sensors Approach to Determine Fidelity and Overmoding Region of GTEM Cell**

Michael Sherburne{2}, Heather Sommerdyke{1}, Nicholas Erickson{1}, Cameron Harjes{1}, Jeremy McConaha{1}, Hugh Pohle{1}  
{1}Air Force Research Laboratory, United States; {2}Johns Hopkins University Applied Physics Laboratory, United States

13:45



## **Invited Journal Author**

### **[10.1109/JSEN.2023.3238900](https://doi.org/10.1109/JSEN.2023.3238900): Uncertainty-Based Calibration Method for Environmental Sensors—Application to Chlorine and Ph Monitoring with Carbon Nanotube Sensor Array**

Guillaume Perrin, Bérengère Lebental  
Université Gustave Eiffel, France

# Technical Program: Tuesday, October 31

14:00



*Invited Journal Author*

[10.1109/JSEN.2023.3240069](#): **Molecularly Imprinted Polymer-Based Electrode for Tannic Acid Detection in Black Tea**

Madhurima Moulick{1}, Debangana Das{2}, Shreya Nag{3}, Bipan Tudu{1}, Rajib Bandyopadhyay{1}, Runu Banerjee Roy{1}  
{1}Jadavpur University, India; {2}Silicon Institute of Technology, India; {3}University of Engineering & Management, Kolkata, India

14:15



*Invited Journal Author*

[10.1109/JSEN.2023.3259420](#): **Microscopy-Guided 3-D Reconstruction of Nanodendrites in Biosensors**

Sue-Yuan Fan, Yi-Pin Huang, Sucharita Khuntia, Jen-Wen Chang, Ci-Ruei Liou, Bing Zhang, Li-Chia Tai  
National Yang Ming Chiao Tung University, Taiwan

14:30



*Invited Journal Author*

[10.1109/JSEN.2023.3240292](#): **A spectroscopy-based sensor for the AI-based classification of lipemic and hematic parameters**

Laura Carletti{2}, Davide Bagnoli{1}, Davide Paci{1}, Gastone Ciuti{2}  
{1}Medica S.p.A., Italy; {2}Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna, Italy

14:45



*Sensors Letters Paper*

**1946: Polypyrrole Nanoparticles Suspended on Graphene for the Detection of Simulant Chemical Warfare Agents**

Juan Casanova-Chafer{2}, Xavier Blanch{1}, Eduard Llobet{1}  
{1}Universitat Rovira i Virgili, Spain; {2}Université de Mons, Belgium

15:00



*Sensors Letters Paper*

**2146: Adipose tissue characterization with electrical impedance spectroscopy and machine learning**

Florian Dapsance, Jie Hou, Damien Dufour, Charlotte Boccara, Nolwenn Briand, Ørjan Grøttem Martinsen  
University of Oslo, Norway

# Technical Program: Tuesday, October 31

13:30 - 15:30

## **B3L-03: Advanced Fiber-optic Sensors**

Room: Park Suite 3

Session Chair(s): Xiaoshan Zhu, *University of Nevada Reno*  
Mona Jarrahi, *UCLA*

13:30

 *Invited Journal Author*

### **[10.1109/JSEN.2023.3240292](#): The Influence of Geometric Shape on the Performance of Refractive Index Sensors Based on Plastic Optical fibers: Simulations and Experimental Assessment**

Juan David Lopez Vargas{1}, Alex Dante{3}, Regina Celia Allil{2}, Marcelo Martins Werneck{2}  
{1}COPPE, Federal University of Rio de Janeiro, Brazil; {2}Electric Engineering Program – COPPE, Federal University of Rio de Janeiro, Brazil, Brazil; {3}International Iberian Nanotechnology Laboratory, INL, Braga 4715-330, Portugal, Portugal

13:45

 *Invited Journal Author*

### **[10.1109/JSEN.2022.3229133](#): Light Diffusing Optical Fiber Sensor for Distributed Optical Absorption Spectroscopy and Chemical Sensing**

Gianluca Persichetti{2}, Genni Testa{1}, Pasquale Imperatore{1}, Romeo Bernini{1}  
{1}CNR-IREA, Italy; {2}National Research Council of Italy CNR-IREA, Italy

14:00

 *Invited Journal Author*

### **[10.1109/JSEN.2023.3242934](#): High-Resolution Slow-Light Fiber-Bragg-Grating Microphone and Hydrophone**

Adele Zawada{1}, Arushi Arora{1}, Martin Bernier{2}, Michel Digonnet{1}  
{1}Stanford University, United States; {2}Université Laval, Canada

14:15

 *Invited Journal Author*

### **[10.1109/JSEN.2023.3236257](#): Fiber-Optic Sensor for Directional Bending Monitoring Based on a Pattern Recognition Algorithm**

Rodolfo Martínez-Manuel{1}, Jonathan Esquivel-Hernández{1}, Luis M. Valentín-Coronado{1}, Sophie Larochelle{2}  
{1}Centro de Investigaciones en Óptica, A.C., Mexico; {2}Université Laval, Canada

14:30

 *Invited Journal Author*

### **[10.1109/JSEN.2023.3258423](#): An MR Compatible Vascular Stenosis Method Based on Fiber Bragg Grating**

Tianxue Zhang{1}, Anzhu Gao{2}, Guang-Zhong Yang{2}  
{1}Beihang University, China; {2}Shanghai Jiao Tong University, China

# Technical Program: Tuesday, October 31

14:45



**Invited Journal Author**

[10.1109/JSEN.2023.3246056](#): Triaxial Accelerometer Based on a Semicircular Hetero-Core Fiber-Optic Sensor

Miyuki Kadokura{3}, Hiroshi Yamazaki{1}, Tokio Kasai{2}, Kazuhiro Watanabe{3}, Michiko Nishiyama{3}  
{1}Core System Japan Company Ltd., Japan; {2}Japan Aerospace Exploration Agency, Japan; {3}SOKA University, Jordan; {3}SOKA University, Japan

15:00



**Sensors Letters Paper**

**2102: Das Transducer for Enhanced Acoustic Sensitivity**

Danilo Fernandes Gomes{3}, Guilherme Heim Weber{3}, Daniel Rodrigues Pipa{3}, Marco Jose Da Silva{1}, Jean Carlos Cardozo Da Silva{3}, Sérgio Taveira de Camargo Júnior{2}, Manoel Feliciano Da Silva{2}, Cicero Martelli{3}  
{1}Johannes Kepler Universität Linz, Austria; {2}Petrobras Research and Development Program, Brazil; {3}Universidade Tecnológica Federal do Paraná, Brazil

13:30 - 15:30

**B3L-04: Wearable Sensors and Systems - 2**

Room: Park Suite 4

Session Chair(s): Sahika Inal, *King Abdullah University of Science and Technology (KAUST)*  
Jürgen Kosel, *Silicon Austria Labs (SAL)*

13:30

**1428: Wearable Near-Infrared Organic Photodiode Arrays for Cardiovascular Health Monitoring and Biomarker Mapping - Signal-to-Noise Ratio Enhancement Using Machine Learning**

Ahmad Khatoun, Adrian-Razvan Petre, Bart Peeters, Albert Vanbreemen, Hylke Akkerman  
TNO - Holst centre, Netherlands

13:45

**1505: Smart Insole: Stand-Alone Soft 3-Axis Force Sensing Array in a Shoe**

Jian Gao{4}, Zihao Pu{4}, Ruixin Qiu{4}, Ying Li{4}, Xiulun Yin{4}, Kieran Morton{4}, Sadan Wani{4}, Justin Wyss{4}, Michael Steszyn{3}, Ryusuke Ishizaki{2}, Fumiya Hamatsu{1}, Takeshi Ohsato{1}, John D.W. Madden{4}  
{1}Honda R&D Co., Ltd, Japan; {2}Honda R&D Co., Ltd, Frontier Robotics Honda R&D, Japan; {3}i-generator, United States; {4}University of British Columbia, Canada

14:00

**1594: Conformal Micropatterned Organic-Metal Electrodes for Physiological Recording**

Kirstie Queener{3}, Parvez Ahmmed{2}, Mauro Victorio{1}, Jack Twiddy{3}, Ashley Dehn{3}, Alec Brewer{2}, Edgar Lobaton{3}, Alper Bozkurt{2}, Vladimir Pozdin{1}, Michael Daniele{3}  
{1}Florida International University, United States; {2}North Carolina State University, United States; {3}North Carolina State University, University of North Carolina at Chapel Hill, United States

14:15

**1682: Stretchable Microscale Patterned Interconnects Formed on Micro-Corrugated Vertical Wavy Structured Substrate**

Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh  
University of Tokyo, Japan

# Technical Program: Tuesday, October 31

14:30

## **1720: Towards Wearable-Based Lung Sound Intensity Assessment Leveraging Impedance Pneumography**

Jesus Antonio Sanchez-Perez, Samer Mabrouk, Goktug Ozmen, John Berkebile, Omer Inan  
Georgia Institute of Technology, United States

14:45

## **1735: Highly Sensitive Mach-Zehnder Interferometer Glucose Biosensor with Subwavelength Grating in Flexible Substrate**

Faiz Ul-Hassan, Nabarun Saha, Giuseppe Brunetti, Caterina Ciminelli  
Politecnico di Bari, Italy

15:00

## **1761: A Metal Nanoparticles and 2D-Siloxene Sheets Incorporated Laser-Ablated Graphene-Based Epidermal Patch for Electrolytes Analysis and Monitoring**

Md Asaduzzaman, Xue Hui, Ye Young Lee, Jae Yeong Park  
Kwangwoon University, Korea

15:15

## **1874: Flexible Hybrid Intraoral Sleep Monitoring System**

Seyedfakhreddin Nabavi, John Cogan, Asim Roy, Brandon Canfield, Robert Kibler, Collin Emerick  
Dianyx Innovations LLC, United States

13:30 - 15:30

## **B3L-05: Microfluidics and Biomedical Applications**

Room: Park Suite 5

Session Chair(s): Uwe Schnakenberg, *RWTH Aachen University*

Hyejin Moon, *The University of Texas at Arlington*

13:30

## **1543: Acoustofluidic Trapping in Structured Microchannels Using Lateral Transducer Modes**

Andreas Fuchsluger{1}, Annalisa De Pastina{2}, Tina Mitteramskogler{1}, Rafael Ecker{1}, Thomas Voglhuber-Brunnmaier{1}, Nikolai Andrianov{2}, Alexander Shatalov{2}, Norbert Cselyuszk{2}, Mohssen Moridi{2}, Bernhard Jakoby{1}  
{1}Johannes Kepler Universität Linz, Austria; {2}Silicon Austria Labs GmbH, Austria

13:45

## **1744: A Pump-Free Optofluidic Biosensing Platform Based on Whispering Gallery Mode Microspheres**

Bin Guan{3}, Tuck-Weng Kok{2}, Nicolas Riesen{3}, David Lancaster{3}, Koukou Suu{1}, Craig Priest{3}  
{1}ULVAC Inc., Japan; {2}University of Adelaide, Australia; {3}University of South Australia, Australia

14:00

## **1114: Quantitative Evaluation of Dielectrophoretic Captured Fluorescent-Labeled Exosomes**

Ryu Nakabayashi, Rie Koyama, Masafumi Inaba, Michihiko Nakano, Junya Suehiro  
Kyushu University, Japan

14:15

## **1325: Deep Learning-Based Droplet Menisci Recognition for Digital Microfluidic Devices**

Negar Danesh{2}, Matin Torabinia{1}, Hyejin Moon{2}  
{1}GenMark Diagnostics, United States; {2}University of Texas at Arlington, United States

# Technical Program: Tuesday, October 31

14:30

## **1790: Microfluidic Nanospray Emitters with a Liquid Junction for Sensitive Bioanalyses**

Elizaveta Vereshchagina{2}, Tomáš Václavík{1}, Anand Summanwar{2}, Sigurd Moe{2}, Leny Nazareno{2}, Guido Sordo{2}, Anna Nordborg{3}, Andreas Vogl{2}, František Foret{1}, Roman Pěmíněk{1}

{1}Institute of Analytical Chemistry of the Czech Academy of Sciences, Czech Rep.; {2}SINTEF Digital, Norway; {3}SINTEF Industry, Norway

14:45

## **1413: Development and Evaluation of a Microwire Biosensor for the Detection of Fumarate**

Dafydd Ravenscroft, Luigi G. Occhipinti

University of Cambridge, United Kingdom

15:00

## **1408: Advancing Sensitivity in Measuring Cardiomyocyte Contraction Force Through Single-Crystal Silicon Strain Sensors**

Haolan Sun, Dong-Su Kim, Jong-Yun Kim, Yun-Jin Jeong, Dong-Weon Lee

Chonnam National University, Korea

15:15

## **1760: Implanted Stretch Sensor for Blood Pressure Measurement: Pig Study and Benchtop Evaluation**

Jeremiah Ukwela{1}, Lauren Le Barron{2}, Jeremy Dunning{3}, Jonathan Baskin{1}, Steve Majerus{1}

{1}Case Western Reserve University, United States; {2}Case Western Reserve University School of Medicine, United States; {3}Louis Stokes Cleveland Veterans Affairs Medical Center, United States

13:30 - 15:30

## **B3L-06: Acoustic and Ultrasonic Sensors**

Room: Park Suite 6

Session Chair(s): Hongyu YU, *Hong Kong University of Science and Technology*

Haifeng Zhang, *University of North Texas*

13:30

★ ★ **INVITED**

## **1915: Portable Ultrasound and Wearable Ultrasound: a Pathway to Disruptive Medical Device Technologies**

Dawei Wu

State Key Laboratory of Mechanics and Control for Aerospace Structures?Nanjing University of Aeronautics, China

13:45

## **1832: A Highly Sensitive Surface Acoustic Wave Sensor for Continuous Respiratory Monitoring**

Seyedfakhreddin Nabavi, Amir-Reza Kolahdouz Moghadam, Salar Salahi

nditive3d Inc., Canada

14:00

## **1142: Sensitivity-Enhanced Piezoelectric Humidity Sensor Based on a Parity Time Symmetric System Biased at the Exceptional Point**

Zhenyu Wei, Jianqiu Huang, Qing'An Huang

Southeast University, China

# Technical Program: Tuesday, October 31

14:15

## **1167: DC Bias Effects on Optimizing ScAlN Air-Coupled pMUT Performance Parameters**

David Sze Wai Choong{1}, Duan Jian Goh{1}, Jihang Liu{1}, Mantalena Sarafianou{1}, Srinivas Merugu{1}, Qing Xin Zhang{1}, Peter Hyun Kee Chang{1}, Alberto Leotti{3}, Goutham Koppiseti{3}, Naadaa Zakiyyan{3}, Huamao Lin{1}, Chandra Bhasetti{1}, Sagnik Ghosh{1}, Prakasha Chigahalli Ramegowda{1}, Daniel Chen{1}, Joshua En-Yuan Lee{1}, Carlo Prelini{3}, Domenico Giusti{3}, Alessandro Savoia{2}, Yul Koh{1}

{1}Institute of Microelectronics, Agency for Science, Technology and Research, Singapore; {2}Roma Tre University, Italy; {3}STMicroelectronics, Italy; {3}STMicroelectronics, Singapore

14:30

## **1476: Non-Contact Lamb Wave Defect Detection Based Solely on Air-Coupled Ultrasonic Phased Arrays**

Felix Laub, Christoph Haugwitz, Gianni Allevato, Julian Seiler, Rolf Findeisen, Mario Kupnik  
Technische Universität Darmstadt, Germany

14:45

## **1064: Ultrasonic Sensor for Pipe Joint Make-Up Assessment**

Esteban Cabanillas{1}, Julien Marianne{2}, Ghislain Despesse{1}, Nicolas Garraud{1}, Jean-Yves Burlet{1}, Baptiste Alessandri{1}, Olivier Freychet{1}, Sebastien Petit{3}, Tristan Caroff{1}

{1}CEA-Leti, France; {2}SERMA Technologies and SERMA Ingénierie, CEA, France; {3}Vallourec One R&D, France

15:00

## **1019: A MEMS Capacitive Resonator as an Acoustic Sensor for Photoacoustic Spectroscopy**

Yonggang Yin, Danyang Ren, Yuqi Wang, Da Gao, Junhui Shi  
Zhejiang Lab, China

13:30 - 15:30

## **B3L-07: Sensor Systems and Processing**

Room: Park Suite 7

Session Chair(s): Chang-hee Won, Temple University

13:30

## **1105: Length-Adaptive Linear Position Sensing System Based on De-Bruijn Sequence**

Kai-Yang Peng{1}, Heng-Sheng Hsiao{1}, Jen-Yuan Chang{2}

{1}National Tsing Hua University, Taiwan; {2}National Tsing Hua University, National Formosa University, Taiwan

13:45

## **1854: Towards Digital Synthesis of Variable Q-Factor Direct-Conversion for Low-Power Edge Sensing**

Parthojit Chakraborty, Kazuki Maari, Jim Bartels, Alexandre Varieras, Aravind Tharayil Narayan, Ludovico Minati, Shiro Dosho, Hiroyuki Ito  
Tokyo Institute of Technology, Japan

14:00

## **1792: MC-RMA: Multi-Coset Range Migration Algorithm for Near-Field MIMO-SAR Imaging**

Andrew Gigie, Rokkam Krishna Kanth, Achanna Anil Kumar, Tapas Chakravarty, Arpan Pal  
TATA Consultancy Services Limited, India

# Technical Program: Tuesday, October 31

14:15

**1608: Camera Placement Optimization for a Novel Modular Robot Tracking System**

Jan Baumgärtner{1}, Bernd Bertschinger{2}, Kathrin Hoffmann{2}, Alexander Puchta{1}, Oliver Sawodny{2}, Stephan Reichelt{2}, Jürgen Fleischer{1}  
{1}Karlsruher Institut für Technologie, Germany; {2}Universität Stuttgart, Germany

14:30

**1846: Online Demodulation of Miniatured Capacitive Angular Position Sensor Based on ASIC Implementation**

Jiahui Shi, Bowen Xing, Bin Zhou, Qi Wei, Rong Zhang  
Tsinghua University, China

14:45

**1870: Two-Dimensional Waterflow Sensor Using Multiple Absolute Pressure Sensors**

Kyota Shimada{1}, Takuto Kishimoto{1}, Hiroto Tanaka{2}, Hidetoshi Takahashi{1}  
{1}Keio University, Japan; {2}Tokyo Institute of Technology, Japan

15:00

**1631: A 30-n? Accuracy Low Power Two-Step Ratiometric Shunt Resistance Measurement System Using a Switching Regulator-Based Current Generator for Shunt-Based Current Sensors**

Shogo Kawahara, Yoshikazu Furuta, Shotaro Wada, Soya Taniguchi, Tomohiro Nezuka  
MIRISE Technologies Corporation, Japan

15:15

**1410: High Frequency Audio Devices Based Inaudible Ultrasonic Hand Tracking System Using Subspace Method**

Xu Cheng, Xiangyu Li  
Tsinghua University, China

13:30 - 15:30

**B3L-08: Sensor Data Processing & AI: Industrial and Environmental Applications**

Room: Park Suite 8

Session Chair(s): Markus Neumayer, *Graz University of Technology*

13:30

**1200: Hardware Accelerators for a Convolutional Neural Network in Condition Monitoring of CNC Machines**

Ingo Hoyer{1}, Oscar Berg{1}, Lukas Krupp{1}, Alexander Utz{1}, Christian Wiede{1}, Karsten Seidl{2}  
{1}Fraunhofer Institute for Microelectronic Circuits and Systems IMS, Germany; {2}Fraunhofer Institute for Microelectronic Circuits and Systems IMS, University of Duisburg-Essen, Germany

13:45

**1256: Fault Detection on Variable Length Multivariate Time Series from Semiconductor Manufacturing**

Philip Tchatchoua{1}, Guillaume Graton{1}, Mustapha Ouladsine{1}, Jean-François Christaud{2}  
{1}Aix Marseille Université, France; {2}STMicroelectronics, France

# Technical Program: Tuesday, October 31

14:00

**1489: Statistical Approach for Preload Monitoring of Ball Screw Drives**

Jana Mayer{2}, Vesa Klumpp{2}, Jonas Hillenbrand{1}, Benjamin Noack{3}  
{1}August Steinmeyer GmbH & Co. KG, Germany; {2}Knowtion GmbH, Germany; {3}Otto von Guericke  
Universität Magdeburg, Germany

14:15

**1347: A Low Power AI Hardware Accelerator for Microwave-Based Ice Detection**

Dima Kilani, Mohammad H. Zarifi  
University of British Columbia, Canada

14:30

**1601: Neural Networks for Defect Detection on Eddy-Currents-Based Non-Destructive Testing**

Diogo Miguel Bárbara Caetano{1}, Luis S. Rosado{3}, Jorge R. Fernandes{2}, Susana Cardoso{1}  
{1}INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {2}INESC-ID, Instituto  
Superior Técnico, Universidade de Lisboa, Portugal; {3}Instituto Superior Técnico, Universidade de  
Lisboa, Portugal

14:45

**1151: Visual Force Sensor to Estimate External Force Distributions from Shape Deformation**

Ryuichi Ikeya, Yoshifumi Nishida  
Tokyo Institute of Technology, Japan

15:00

**1059: Forecasting Task Optimization for a New Architecture of MEMS Reservoir Computing Using Stiffness Modulation**

Xiaowei Guo, Wuhao Yang, Xudong Zou  
State Key Laboratory of Transducer Technology, Aerospace Information Research Institute, UCAS, China

15:15

**1288: A Calibration Process for Environmental Sensor Array Supporting Uncertainties and Unknown Perturbing Factors: Performances on Simulated and Real Data**

Marine Dumon{1}, Bérengère Lebental{2}, Guillaume Perrin{2}  
{1}IMSE, Université Gustave Eiffel, France; {2}Université Gustave Eiffel, France

15:30 - 15:45

**Coffee Break/ Exhibit Hall**

Room: Grand Park Hall Lobby

15:45 - 17:00

**Sensors Council 25th Anniversary Talk: Technologies for a Sustainable Future**

Room: Grand Park Hall

Session Chair(s): Ravinder Dahiya, *Northeastern University, Boston*

17:00 - 17:30

**Sensors Council Awards Ceremony**

Room: Grand Park Hall

Session Chair(s): Ravinder Dahiya, *Northeastern University, Boston*

# Technical Program: Tuesday, October 31

19:00 - 23:30  
**Sensors Council 25<sup>th</sup> Anniversary Ball**  
Room: The Hofburg

# Technical Program: Wednesday, November 1

8:00 - 9:00

## Registration

Room: Grand Park Lobby

9:00 - 10:00

## Keynote: Secrets of the Universe, Technological Advances and Why Should I Care!

Archana Sharma, *CERN, Switzerland*

Room: Grand Park Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

Ravinder Dahiya, *Northeastern University, Boston*

10:00 - 10:30

## Coffee Break/ Exhibit Hall

Room: Grand Klimt Hall

10:30 - 12:00

## C1L-01: Healthcare: Diagnostics and Monitoring

Room: Park Suite 1

Session Chair(s): Jung-Chih Chiao, *Southern Methodist University*

Chang-hee Won, *Temple University*

10:30



### Sensors Letters Paper

## 2011: A Wearable and Multiplexed Electrochemical Sensor Suite for Real-Time Sweat Ionic Content and Ph Monitoring with IoT Integration

Nafize Ishtiaque Hossain, Atul Sharma, Sameer Sonkusale

Tufts University, United States

10:45



### Sensors Letters Paper

## 2096: Simultaneous Measurement of Respiratory and Pulse Information Using a Patch-Type Sensor for Sleep Apnea Hypopnea Detection

Yukino Ota{1}, Tomoki Yoshida{2}, Hiroshi Nagaoka{2}, Masaki Takahashi{1}

{1}Keio University, Japan; {2}Signtle Inc., Japan

11:00



### Sensors Letters Paper

## 1965: Heart Side-Channel: Estimation of Cardiovascular Signal Waveforms Through Skin Vibration Sensing

Shun Hinatsu{1}, Masamichi Tanji{1}, Hiroki Ishizuka{2}, Sei Ikeda{2}, Osamu Oshiro{2}

{1}Mitsubishi Electric Corporation, Japan; {2}Osaka University, Japan

11:15



### Sensors Letters Paper

## 2067: Simultaneous and Selective Detection of Etoposide and Methotrexate with Single Electrochemical Sensors for Therapeutic Drug Monitoring

Francesca Rodino{2}, Mattia Bartoli{1}, Sandro Carrara{2}

{1}Center for Sustainable Future Technologies CSFT, Politecnico di Torino, Italy; {2}École Polytechnique Fédérale de Lausanne, Switzerland

# Technical Program: Wednesday, November 1

11:30



## **Sensors Letters Paper**

### **1948: Constructing and Testing a Lightweight Model of Converting Single Stride of In-Shoe-Motion-Sensor-Measured Foot Motion to TUG-Represented Mobility**

Chenhui Huang, Fumiyuki Nihey, Kenichiro Fukushi, Hiroshi Kajitani, Yoshitaka Nozaki, Kentaro Nakahara

NEC Corporation, Japan

11:45



## **Sensors Letters Paper**

### **2086: Miura-ori Microstructure Enhanced Flexible Piezoresistive Pressure Sensor for Human Physiological Signal Monitoring**

Ruoqin Wang, Rui Jiao, Yiting Li, Yang Li, Yixin Wang, Qian Xu, Zhigang Li, Hongyu Yu

Hong Kong University of Science and Technology, China

10:30 - 12:00

## **C1L-02: Chemical Sensors**

Room: Park Suite 2

Session Chair(s): Urvashi P. Shukla, *Banasthali Vidyapith*

10:30



## **Sensors Letters Paper**

### **2070: Improvement on Potential Drifting for Sol-gel and Electroplated Iridium Oxide-Based Ph Sensing Films**

Khengdauli Chawang{1}, Xing Xia{2}, Mao-Hsiang Huang{2}, Sen Bing{1}, Mohamed Benomar{2}, Gabriella Doan{1}, Hung Cao{2}, Jung-Chih Chiao{1}

{1}Southern Methodist University, United States; {2}University of California, Irvine, United States

10:45



## **Sensors Letters Paper**

### **2105: Room Temperature Operated PEDOT:PSS Based Flexible and Disposable NO<sub>2</sub> Gas Sensor**

Ajay Beniwal{3}, Priyanka Ganguly{2}, Rahul Gond{1}, Brajesh Rawat{1}, Chong Li{3}

{1}Indian Institute of Technology Ropar, India; {2}London Metropolitan University, United Kingdom;

{3}University of Glasgow, United Kingdom

11:00



## **Sensors Letters Paper**

### **2075: Development of a sub-10-Ppm Limit of Detection Lateral Nanogap Gas Sensor**

Sayali Tope, Seungbeom Noh, Rana Dalapati, Ling Zang, Hanseup Kim

University of Utah, United States

11:15



## **Sensors Letters Paper**

### **1961: Subpixel Patterned LSPR Gas Sensor Array with Using Inkjet Printing Au/Ag Nanoparticle to Enhance the Selectivity**

Tianshu Jiang, Xiao Ye, Lingpu Ge, Hao Guo, Fumihiro Sassa, Kenshi Hayashi

Kyushu University, China; Kyushu University, Japan

# Technical Program: Wednesday, November 1

11:30



*Sensors Letters Paper*

**1955: Pattern Recognition Using Chemical Sensor for Identification of Solid Materials by Responses to Multiple Probe Gases**

Kosuke Minami, Kota Shiba, Genki Yoshikawa

National Institute for Materials Science NIMS, Japan

11:45



*Sensors Letters Paper*

**2078: Resistive Ion Sensors Based on Metal-Oxide-Semiconductor Nanostructures Formed by Heating Metal Foil**

Yoshinari Kimura, Hironori Tohmyoh

Tohoku University, Japan

10:30 - 12:00

**C1L-03: Bio-Remote Sensing and Integrated Artificial Intelligence Systems**

Room: Park Suite 3

Session Chair(s): Paddy French, *TU Delft*

Kianoush Rassels, *TU Delft*

10:30



**★ ★ INVITED**

**1917: Current Developments and Future Directions in Using IMUs for Injury Prevention in Running**

Jasper Reenalda

University of Twente, Netherlands

11:00

**1619: Detecting ADHD from Speech Using Full-Band and Sub-Band Convolution Fusion Network**

Shuanglin Li{2}, Rajesh Nair{1}, Mohsen Naqvi{2}

{1}CNTW-NHS Foundation Trust, United Kingdom; {2}Newcastle University, United Kingdom

11:15

**1376: Wireless Skin Temperature Monitoring for Microwave Hyperthermia: Feasibility Study of an Epidermal RFID Sensor Grid**

Francesco Lestini, Gaetano Marrocco, Cecilia Occhiuzzi

Università degli Studi di Roma Tor Vergata, Italy

11:30

**1481: Novel Robust-to-Motion-Artifact Detection of Atrial Fibrillation Based on PPG Only**

Ching-Hui Huang, Duc Huy Nguyen, Paul C.-P. Chao

National Yang Ming Chiao Tung University, Taiwan

11:45

**1821: Augmented Implanted Orthopedic Fixators with an Embedded Temperature Sensor for Early Detection of Deep Infections**

Carolina Miozzi{1}, Sara Amendola{1}, Cecilia Occhiuzzi{1}, Gaetano Marrocco{2}

{1}Radio6ense S.r.l., Italy; {2}Università degli Studi di Roma Tor Vergata, Italy

# Technical Program: Wednesday, November 1

10:30 - 12:00

## **C1L-04: Chemical Agent Detection: Sensing Technologies and Sensing Applications**

Room: Park Suite 4

Session Chair(s): Frank Sabath, *Bundeswehr Research Institute for Protective Technologies and CBRN-Protection (WIS)*

10:30

★★ **INVITED**

### **1163: High Kinetic Energy Ion Mobility Spectrometry - A Promising Approach for Fast and Reliable Detection of Chemical Warfare Agents**

Christoph Schaefer, Florian Schlottmann, Stefan Zimmermann

Leibniz Universität Hannover, Germany

11:00

### **1807: Development of a Lab-on-a-Chip for the Detection of Nerve Agents with a Handheld Device**

Mustafa Biyikal, Knut Rurack

Bundesanstalt für Materialforschung und -prüfung BAM, Germany

11:15

### **1098: Bout-Based Gas Source Localization Using Aerial Robot Swarms**

Felix Häusler{2}, Jan Stührenberg{2}, Patrick P. Neumann{1}, Kay Smarsly{2}

{1}Federal Institute for Materials Research and Testing, Germany; {2}Hamburg University of Technology, Germany

11:30

### **1745: Real-Time Detection of Chemical Compounds in Dust Particles Using a Single-Particle Mass Spectrometer and its Potential for Safety Applications**

Johannes Passig{5}, Julian Schade{4}, Ellen Iva Rosewig{5}, Michael Pütz{1}, Martin Seipenbusch{2}, Sven Ehlert{3}, Heinrich Ruser{4}, Thomas Adam{4}, Andreas Walte{3}, Ralf Zimmermann{6}

{1}Forensic Science Institute KTI, BKA, Germany; {2}ParteQ GmbH, Germany; {3}Photonion GmbH, Germany; {4}Universität der Bundeswehr München, Germany; {5}University of Rostock, Germany; {6}University of Rostock, Helmholtz Zentrum München, Germany

11:45

### **1841: Demonstration of a Wide Range Conductivity Sensor for Buffers On-Demand Manufacturing**

Anastasios Malissovass, Van Anh Dam, Greja Brom-Verheijden, Milou Jaspers, Marcel Zevenbergen  
Stichting IMEC Nederland, Netherlands

10:30 - 12:00

## **C1L-05: Session: Actuators, Energy Harvesters and Powering Sensors**

Room: Park Suite 5

Session Chair(s): Hongsoo Choi, *Daegu Gyeongbuk Institute*  
Smitha Rao, *Michigan Technological University*

10:30

★★ **INVITED**

### **1914: Self-Powered IoT Sensor System Based on Piezoelectric Magneto-Mechano-Electric Generator**

Jongmoon Jang

Korea Institute of Materials Science, Korea

# Technical Program: Wednesday, November 1

11:00

**1296: Wireless Telemetry for Characterization of Piezoelectric Energy Harvesters in Tires**

Cinzia Tamburini{1}, Matteo Pizzotti{1}, Leena Ryyänen{2}, Mika Penttilä{2}, Aldo Romani{1}  
{1}Alma Mater Studiorum – Università di Bologna, Italy; {2}Nokian Tyres Plc, Finland

11:15

**1518: Fabrication and Characterization of the Transparent PLZT-Based Piezoelectric Speaker**

Younghyeon Lee{1}, Jong-Jin Choi{2}, Hongsoo Choi{1}, Jongmoon Jang{2}  
{1}Daegu Gyeongbuk Institute of Science and Technology, Korea; {2}Korea Institute of Materials Science, Korea

11:30

**1557: An Enhanced Liquid Metal Triboelectric Nanogenerator (LM-TENG) Using Parallel Placement of Friction Layer**

Jinwon Jeong{1}, Tanzila Noushin{2}, Jeong Bong Lee{1}  
{1}Baylor University, United States; {2}University of Texas at Dallas, United States

11:45

**1231: Cantilever Actuator Capsule for Magnetically Triggered Drug Delivery in the GI Tract**

Joshua Levy, Michael Straker, Luke Beardslee, Reza Ghodssi  
University of Maryland, United States

10:30 - 12:00

**C1L-06: Smart Biomedical Sensor Platforms in Resource Constrained Settings**

Room: Park Suite 6

Session Chair(s): Shantanu Bhattacharya, *Indian Institute of Technology Kanpur*

10:30

**★★ INVITED**

**2049: Low Cost, Sensitive DNA-Based Point-of-Care Sensing in Under-Served Rural Communities - Development of Paper-Based Lateral Flow Tests for Infectious Diseases**

Jonathan Cooper  
University of Glasgow, United Kingdom

11:00

**1197: TinyMM: Multimodal-Multitask Machine Learning on Low-Power MCUs for Smart Glasses**

Lokmane Demagh{1}, Patrick Garda{2}, Cedric Gilbert{1}, Khalil Hachicha{2}  
{1}EssilorLuxottica, France; {2}Sorbonne Université, France

11:15

**1264: Low-Cost Chipless RFID Glucose Sensor for Diabetes Screening**

Pablo García-Cardarelli{2}, Fátima Villa-González{3}, Mireya Vinacua{2}, Jacobo Paredes-Puente{2}, Daniel Valderas{2}, Rahul Bhattacharyya{1}  
{1}Auto-ID Labs, Massachusetts Institute of Technology, United States; {2}Tecnun, Universidad de Navarra, Spain; {3}Tecnun, Universidad de Navarra, Auto-ID Labs, Massachusetts Institute of Technology, Spain

# Technical Program: Wednesday, November 1

11:30

**1542: Estimation of Splitting Interval in Second Heart Sound by Optimizing a Demixing Vector**

Shun Muramatsu, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh

University of Tokyo, Japan

11:45

**1327: Food Quality Monitoring Using a Low-Profile Multiplexed Harmonic Sensor**

Zhilu Ye{2}, Yichong Ren{2}, Minye Yang{2}, Mark Ming-Cheng Cheng{1}, Pai-Yen Chen{2}

{1}University of Alabama, United States; {2}University of Illinois Chicago, United States

10:30 - 12:00

**C1L-07: Optical Sensors - 2**

Room: Park Suite 7

Session Chair(s): Kohei Shimasaki, *Hiroshima University*

Derryck Reid, *Heriot-Watt University*

10:30

**1844: Optimization of ASE Light Source Design for Enhancement of Wavelength Stability**

Erkut Emin Akba{1}, Aylin Yertutanol{1}, Tu?ba Andaç{1}, Ekmel Özbay{1}, Yashar Azizian-Kalandaragh{2}

{1}Bilkent University Nanotechnology Research Center, Bilkent University, Turkey; {2}Gazi University, Turkey

10:45

**1524: Mid-Infrared Computational Spectrometry with Wavelength-Skewed Microbolometer Arrays**

Md. Rabiul Hasan, Amiral Nikeghbal, Adwait Deshpande, Mohit U. Karkhanis, Erfan Pourshaban, Md.

Golam Dastagir, Aishwaryadev Banerjee, Seungbeom Noh, Hanseup Kim, Carlos H. Mastrangelo

University of Utah, United States

11:00

**1727: Enhancement of Hydrogen Sensing with Multi-Reflection Raman Scattering**

Yusei Yamamoto, Satoshi Umehara, Masahiro Inoue, Kugen Teii, Yoshimine Kato

Kyushu University, Japan

11:15

**1480: Towards a System for Remote Emission Sensing Utilizing TDLAS for Concentration Measurement - A Promising Approach for Accurate and Direct Emission Measurements**

Paul Schaffer, Hafiz Hashim Imtiaz, Benjamin Lang, Martin Kupper, Alexander Bergmann

Technische Universität Graz, Austria

11:30

**1689: Monolithic Integration of Polymer and Silicon Nitride Waveguides for Optical Phased Array LiDAR Sensors**

Eun-Su Lee{2}, Kwon-Wook Chun{2}, Jinung Jin{2}, Sang-Shin Lee{1}, Min-Cheol Oh{2}

{1}Kwangwoon University, Korea; {2}Pusan National University, Korea

11:45

**1848: Microfluidic Surface-Enhanced Raman Scattering Sensors Based on Nanoimprint Resist for Sensitive Detection of Pesticides in Water**

Elizaveta Vereshchagina, Karolina Milenko, Firehun Tsige Dullo

SINTEF Digital, Norway

# Technical Program: Wednesday, November 1

10:30 - 12:00

## **C1L-08: Sensor Data Processing & AI: Localization and Navigation Sensors**

Room: Park Suite 8

Session Chair(s): Marco Da Silva, *Johannes Kepler University Linz*

10:30

★ ★ **INVITED**

### **1924: A Portfolio of Machine Learning-Based GNSS LOS/NLOS Classification in Urban Environments**

Ni Zhu, Chaimae Belemoualem, Valérie Renaudin

Université Gustave Eiffel, France

11:00

### **1124: Using Machine Learning for Target Detection and Matching in Dual Drone-Based Target Localization**

Junyu Wei{3}, Shaojing Su{3}, Zongqing Zhao{3}, Zhen Zuo{3}, Xiaoyong Sun{3}, Jiangyi Qin{1}, Tao Ou{2}

{1}Academy of Military Sciences, China; {2}Hunan University, China; {3}National University of Defense Technology, China

11:15

### **1385: SSL-VoxPart: A Novel Solid-State LiDAR-Tailored Voxel Partition Approach for 3D Perception**

Nico Leuze, Henry Schaub, Maximilian Hoh, Alfred Schöttl

University of Applied Science Munich, Germany

11:30

### **1541: LiDAR-Based Occupancy Grid Map Estimation Exploiting Spatial Sparsity**

Çağan Önen{2}, Ashish Pandharipande{2}, Geethu Joseph{1}, Nitin Myers{1}

{1}Delft University of Technology, Netherlands; {2}NXP Semiconductors, Netherlands

11:45

### **1023: Improved Multi-Path Interference Separation for Indirect 3D Time-of-Flight Using Particle Swarm Optimization**

Matthias Ludwig, Jonas Gutknecht, Teddy Loeliger

ZHAW Zürich University of Applied Sciences, Switzerland

10:30 - 12:00

## **C1L-09: Chemical, Electrochemical and Gas Sensors - 2**

Room: Park Suite 9

Session Chair(s): Hamida Hallil Abbas, *Bordeaux University*

Xiaoshan Zhu, *University of Nevada Reno*

10:30

### **1630: Cube-Shaped Inorganic Perovskite Bismuth Ferrite Nanostructures as Highly Efficient Hydrogen Gas Sensors**

Abhijit Eshore, Bidesh Mahata, Dipak Goswami, Prasanta Kumar Guha

Indian Institute of Technology Kharagpur, India

10:45

### **1618: E-Nose System Based on Ultra-Low Power Single Micro-LED Gas Sensor and Deep Learning**

Kichul Lee{1}, Incheol Cho{2}, Inkyu Park{1}

{1}Korea Advanced Institute of Science and Technology, Korea; {2}Samsung Electronics Co., Ltd., Korea

# Technical Program: Wednesday, November 1

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## **1579: Development of an Impedance Analyser with Complex Capacitance for Biosensing Applications**

Taskeen Ebrahim, Willem Perold, Anna-Mart Engelbrecht  
Stellenbosch University, South Africa

11:15

## **1071: Electrochemical Biosensor for Timely Detection of Lactococcus Lactis Bacteriophage in Milk Samples**

Stefano Bonaldo{2}, Lara Franchin{2}, Erica Cretai{1}, Elisabetta Pasqualotto{1}, Matteo Scaramuzza{1}, Alessandro Paccagnella{2}  
{1}ARC – Centro Ricerche Applicate s.r.l., Italy; {2}Università degli Studi di Padova, Italy

11:30

## **1501: ZnCr<sub>2</sub>-xFe<sub>x</sub>O<sub>4</sub> Nanoparticles-Modified Electrochemical Sensors: A Comparative Study**

Mallikarjun Madagalam{3}, Mattia Bartoli{1}, Sandro Carrara{2}, Alberto Tagliaferro{3}  
{1}Center for Sustainable Future Technologies CSFT, Politecnico di Torino, Italy; {2}École Polytechnique Fédérale de Lausanne, Switzerland; {3}Politecnico di Torino, Italy

11:45

## **1422: Gas Sensor Based on Nonlinear Coupled AlN-Piezoelectric Micromachined Resonators**

Zhengliang Fang{2}, Stephanos Theodossiades{2}, Nizar Jaber{1}, Amal Hajje-Ep-Zemni{2}  
{1}King Fahd University of Petroleum and Minerals, Saudi Arabia; {2}Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, United Kingdom

12:00 - 13:30

### **Lunch**

Room: Restaurant LENZ & Selleny's Bar

13:30 - 15:00

### **WiSe/YP Big Idea Pitch Competition**

Room: Park Suite 9

Session Chair(s): Shawana Tabassum, *The University of Texas at Tyler*

13:30 - 15:00

### **C2P-10: Sensor Phenomenology, Modeling and Evaluation - B**

Room: Grand Klimt Hall

Session Chair(s): Massood Atashbar, *Western Michigan University*

## **1020: Real-Time Resonance Frequency Tracking in Photoacoustic Spectroscopy for Gas Detection**

Danyang Ren, Yuqi Wang, Shaobo Wang, Junhui Shi, Yonggang Yin  
Zhejiang Lab, China

## **1282: A Simple and Low-Cost Technique to Measure the Magnetic Susceptibility of Ferrofluids**

Angelika Thalmayer{1}, Keyu Xiao{1}, Maximilian Lübke{1}, Dmitry Borin{2}, Stefan Odenbach{2}, Harald Unterwieser{3}, Klaus Helmreich{1}, Georg Fischer{1}  
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Technische Universität Dresden, Germany; {3}Universitätsklinikum Erlangen, Germany

# Technical Program: Wednesday, November 1

## **1569: Increasing Sensitivity of Magnetic Tactile Sensors by Optimizing Arrangement of PM Array**

Yen-Ping Lin{1}, Kai-Yang Peng{1}, Jen-Yuan Chang{2}

{1}National Tsing Hua University, Taiwan; {2}National Tsing Hua University, National Formosa University, Taiwan

## **1627: Effects of Various Head Movement Executions on Spatial Accuracy of Magnetoencephalography Systems**

Mevlüt Yalaz{2}, Markus Butz{1}, Günther Deuschl{3}, Patrick Boe{2}, Ann-Kristin Helmers{3}, Alfons Schnitzler{1}, Michael Höft{2}

{1}Heinrich Heine University Düsseldorf, Germany; {2}Kiel University, Germany; {3}University Hospital Schleswig-Holstein, Germany

## **1652: Making a Microwave Sandwich from Tunable Impedance Sheets for Complex Permittivity Extraction**

Ali Maleki Gargari, Omran Abbas, Loic Markley

University of British Columbia, Canada

## **1696: Increasing Sensitivity of Mass Detection Using Nonlinear Micro/Nano-Mechanical Resonators**

Oldřich Ševeček{1}, Petr Skalka{1}, Jiří Venský{1}, Michal Kotoul{1}, Jan Prášek{2}, Ivo Stachiv{3}

{1}Brno University of Technology, Czech Rep.; {2}CEITEC, Brno University of Technology, Czech Rep.; {3}Institute of Physics, Czech Academy of Sciences, Czech Rep.

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13:30 - 15:00

### **C2P-11: Sensor Materials, Fabrication and Packaging - B**

Room: Grand Klimt Hall

Session Chair(s): Ulrich Schmid, *TU Wien*

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## **1367: Development of ZnO NRs-rGO Low-Impedance Electrodes for Astrocyte Cell Signal Recording**

José Ignacio Del Río De Vicente{3}, Ivano Lucarini{3}, Francesco Maita{3}, Davide Salvò{1}, Valeria Marchetti{2}, Miroslava Anderova{2}, Julio Gómez{1}, Luca Maiolo{3}

{1}Avanzare Innovación Tecnológica S.L, Spain; {2}Institute of Experimental Medicine, Academy of Sciences of the Czech Republic, Czech Rep.; {3}Istituto per la Microelettronica e i Microsistemi IMM-CNR, Italy

## **1368: Enhancing Anti-Icing Performance of Sensors with Thermoresponsive-Superhydrophobic Hybrid Surfaces**

Hyeonho Lee, Jung Bin Yang, Dong Rip Kim

Hanyang University, Korea

## **1687: Fabrication of Microtip Electrode Array with Varying Heights for Electrical Measurement of Neural Cells**

Kyeong-Taek Nam{2}, Yong-Kweon Kim{2}, Seung-Ki Lee{1}, Jae-Hyoung Park{1}

{1}Dankook University, Korea; {2}Seoul National University, Korea

## **1717: Rapid Detection of Escherichia coli Using Graphene Oxide Based Electrochemical Sensor Chip**

Vandana Kumari Chalka, Nikhil Vadera, Khushi Maheshwari, Meenu Chhabra, Kamaljit Rangra, Saakshi Dhanekar

Indian Institute of Technology Jodhpur, India

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## **1746: Room Temperature Ammonia Gas Sensing Using Polyaniline/Indium Oxide/Onion-Like Carbon Composite**

Boipelo Mathe, Clinton Masemola, John Moma, Zikhona Tetana, Ella Linganisio  
University of the Witwatersrand, South Africa

## **1788: Metglas Based Multi-Modal Sensing Employing Magnetostrictive and Triboelectric Properties**

Dibyajyoti Mukherjee, Sourav Naval, Nadeem Tariq Beigh, Dhiman Mallick  
Indian Institute of Technology Delhi, India

13:30 - 15:00

### **C2P-12: Chemical, Electrochemical and Gas Sensors - B**

Room: Grand Klimt Hall

Session Chair(s): Hamida Hallil Abbas, *Bordeaux University*  
Xiaoshan Zhu, *University of Nevada Reno*

## **1436: Plant Disease Detection Using an Electronic Nose**

Erdem Sennik{2}, Samuel Kinoshita-Millard{1}, Yeonyee Oh{2}, Christopher W. Kafer{1}, Ralph A. Dean{2}, Ömer Oralkan{2}  
{1}BASF SE, United States; {2}North Carolina State University, United States

## **1515: Development of a Micro Gas Sensor with a Suspended Micro Heater for Methyl Mercaptan Gas Detection**

Chia-Hsu Hsieh, Chuan-Chun Liu, Yao-Ching Fang, Ya-Han Lin, Chun-Hsun Lin, I-Yu Huang  
National Sun Yat-sen University, Taiwan

## **1529: Reduced SnO<sub>2</sub> for Low Power NO<sub>2</sub> Gas Sensors: From First Principles Simulations to Sensing Performance**

Soufiane Krik{2}, Barbara Fabbri{4}, Matteo Valt{3}, Elena Spagnoli{4}, Manuela Ciocca{2}, Davide Casotti{1}, Michele Della Ciana{4}, Lia Vanzetti{3}, Antonio Orlando{2}, Luisa Petti{2}, Andrea Gaiardo{3}, Vincenzo Guidi{4}  
{1}CNR-NANO, Institute of Nanoscience, National Research Council, Italy; {2}Free University of Bozen-Bolzano, Italy; {3}MNF, Sensors and Devices Center, Bruno Kessler Foundation, Italy; {4}Università degli Studi di Ferrara, Italy

## **1624: High Performance Isopropanol Sensor Employing Hierarchical WO<sub>3</sub> Microflowers**

Bidesh Mahata, Snehanjan Acharyya, Abhijit Eshore, Pallab Banerji, Prasanta Kumar Guha  
Indian Institute of Technology Kharagpur, India

## **1626: Rapid and Cost-Effective Fabrication of Biosensors for Salmonella Detection**

Ivana Kundacina{1}, Manil Kukkar{1}, Ivan Nastasijevic{2}, Sasa Jankovic{2}, Radmila Mitrovic{2}, Vasa Radonic{1}  
{1}BioSense Institute, Serbia; {2}Institute of Meat Hygiene and Technology, Serbia

## **1644: MOS Sensors Characterizing Gas Absorption Dynamics for Art Conservation**

Oliver Brieger{1}, My Sa Marschibois{1}, Gerhard Eggert{2}, Andreas Schütze{1}, Christian Bur{1}  
{1}Saarland University, Germany; {2}State Academy of Art and Design, State Academy of Fine Arts Stuttgart, Germany

## **1659: High-Performance DMMP Gas Sensor Using PtO/WS<sub>2</sub> Hybrid Nanosheets**

Fatima Ezahra Annanouch, Shuja Bashir Malik, Aanchal Alagh, Eduard Llobet  
Universitat Rovira i Virgili, Spain

# Technical Program: Wednesday, November 1

## **1662: Glucose and Lactate Amperometric Sensors on a Flexible Printed Circuit for Low-Cost Sensing Applications**

Panagiotis Kassanos, Sally Gowers, Martyn Boutelle  
Imperial College London, United Kingdom

## **1719: ZIF-67-MWCNT Nanohybrid Based Electrochemical Immunosensing Device for Diagnosing Kidney Dysfunction**

Divya Divya, Pranjali Chandra  
Indian Institute of Technology BHU Varanasi, India

## **1837: Real-Time Electrochemical Sensor for Phosphate Sensing in Water**

Tarun Narayan{1}, Mary-Kate Reidy{2}, Sarah Heelan{2}, Alan O'Riordan{1}, Han Shao{1}  
{1}Tyndall National Institute, Ireland; {2}University College Cork, Ireland

## **1842: Bio-Based Colorimetric Sensors for Detecting Ammonia in the Air**

Jochem Hagenaar, Gennady Oshovsky, Christiaan Tempelman, Matej Majstorovic, Jan Herselman  
Rotterdam University of Applied Sciences, Netherlands

## **1876: Integration of Thin Film Electrodes for Microfluidic Electrochemical Cells**

Elizaveta Vereshchagina{2}, Karolina Kolczyk-Siedlecka{1}, Zbigniew Szklarz{1}, Paul Wittendorp{2}, Aina Herbjørnrød{2}, Guido Sordo{2}, Sigurd Moe{2}, Shruti Jain{2}, Anand Summanwar{2}, Do Chi Huong Hoang{2}, Pawel Wojcik{1}  
{1}redoxme AB sp. z o.o. Oddzia? w Polsce redox.me, Poland; {2}SINTEF Digital, Norway

## **1880: Reduced Graphene Oxide-Based Chemiresistive NO<sub>2</sub> Sensor: Metal Oxide Nanoparticles Decoration Effect**

Atanu Bag, Dong-Bin Moon, Nae-Eung Lee  
Sungkyunkwan University, Korea

## **1886: High Sensitivity pH Sensor Based on Liquid Droplet Motion Over Hydrophobic Polymer**

Shalini Shalini, Khanjan M Joshi, Pushpapraj Singh, Dhiman Mallick, Ankur Goswami  
Indian Institute of Technology Delhi, India

## **1978: High-Density Integration of Multiple Independent Temperature-Controlled Micro Hotplates for MEMS Gas Sensors**

Zheng Zhang{2}, Liyang Luo{2}, Yuanyuan Luo{3}, Zhaohua Zhang{1}, Chaoyang Xing{1}, Guotao Duan{2}  
{1}Beijing Institute of Aerospace Control Devices, China; {2}Huazhong University of Science and Technology, China; {3}Institute of Solid State Physics, China

13:30 - 15:00

### **C2P-13: Biosensors and Microfluidics - B**

Room: Grand Klimt Hall

Session Chair(s): Hyejin Moon, *The University of Texas at Arlington*  
Uwe Schnakenberg, *RWTH Aachen University*

## **1339: Unmanned PCR System for Virus Monitoring Utilizing a Film Chip Roll**

Kwang Hyo Chung, Yo Han Choi, Dong Kyu Lee, Chang-Geun Ahn, Yongwon Jang, You Jin Kim  
Electronics and Telecommunications Research Institute, Korea

# Technical Program: Wednesday, November 1

## **1438: An Android Based Portable Biosensor System for Cardiac Risk-Stratification by Detecting HFABP in Human Plasma**

Partha Pratim Goswami, Swati Mohanty, Ullas Pandey, Shiv Govind Singh  
Indian Institute of Technology Hyderabad, India

## **1453: Advancing Transdermal Therapeutics: In-Vivo Assessment and Computational Insights Into Porous Microneedle-Based Drug Delivery**

Esraa Fakeih, Dana Al Sulaiman, Khaled Nabil Salama  
King Abdullah University of Science and Technology, Saudi Arabia

## **1607: Electrochemical Biosensing of Myeloperoxidase in Undiluted Serum on Screen Printed Electrodes Using PEG Coated Hierarchical Gold Nanostructures**

Anju Joshi, Ruchira Nandeshwar, Siddharth Tallur  
Indian Institute of Technology Bombay, India

## **1643: Amperometric Urine Biosensor for Rapid Point-of-Care Tuberculosis Diagnosis**

Camille Delgrange{1}, Alessandro Fulciniti{1}, Tolga Veske{1}, Romain Peseux{1}, Amar Kacic{1}, Ata Golparvar{2}, Gian Luca Barbruni{1}, Sandro Carrara{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Sabanci University, École Polytechnique Fédérale de Lausanne, Switzerland

## **1684: Two-Dimensional Passive Type Micro Mixer Using Dean Flow and Asymmetric Channel Structure**

Young-Ho Nam, Seung-Ki Lee, Jae-Hyoung Park  
Dankook University, Korea

## **1765: Dielectrophoretic Particle Focusing Using Axisymmetric Quadric Electrodes**

Negar Danesh, Vatsal Asitkumar Joshi, Alan Bowling, Michael Cho, Hyejin Moon  
University of Texas at Arlington, United States

## **1795: Multimodal Biosensor System for Exhaled Breath Based Lung Cancer Diagnosis**

Junyeong Lee{1}, Young Wung Kim{3}, Kyoung G. Lee{2}, Nam Ho Bae{2}, Daekyeong Jung{2}, Dae-Sik Lee{1}  
{1}Electronics and Telecommunications Research Institute, Korea; {2}National NanoFab Center, Korea; {3}WENS, Naver, Korea

## **1811: Graphene Biosensors Operated in DC Transistor and AC Electrochemical Modes for DNA Sensing**

Edgar Pinzón{1}, Telma Domingues{1}, Rodrigo Wrege{1}, Laís Lopes{2}, Jérôme Borme{1}, Thiago Darós{1}, João Piteira{1}, Bruno Costa{3}, Paulo Bueno{2}, Pedro Alpuim{1}  
{1}International Iberian Nanotechnology Laboratory, Portugal; {2}São Paulo State University, Brazil; {3}Universidade do Minho, Portugal

## **1864: A Predictive Point-of-Care Platform for Early Detection of Periodontal Disease**

Dafydd Ravenscroft, Luigi G. Occhipinti  
University of Cambridge, United Kingdom

## **1923: Biological Sensor Based on Silicon Nanowires for Electrical Detection of Staphylococcus Aureus Bacteria**

Anne-Claire Salaün, Laurent Pichon, Yousra Benserhir, Anne Jolivet-Gougeon, Nolwenn Oliviero, Florence Geneste, Rafika Selmi  
Université de Rennes, France

# Technical Program: Wednesday, November 1

13:30 - 15:00

## **C2P-14: Optical Sensors - B**

Room: Grand Klimt Hall

Session Chair(s): Karsten Fehse, *Fraunhofer Institute for Electron Beam and Plasma Technology FEP*

### **1383: Basic Characteristics of Optical Probe Current Sensor and Current Measurement Flowing Through Bonding Wire of SiC Power Devices**

Satoshi Sue{1}, Mitsunori Miyamoto{1}, Toshiya Kubo{1}, Makoto Sonehara{2}, Toshiro Sato{2}  
{1}CITIZEN FINEDEVICE CO.,LTD., Japan; {2}Shinshu University, Japan

### **1467: Comparing Sensitivity of Methods to Measure Acoustic Vibrations in Optical Fibers**

Martin Cizek{2}, Ondrej Cip{2}, Ondrej Mokry{1}, Petr Dejdar{1}, Petr Munster{1}, Tomas Horvath{1}  
{1}Brno University of Technology, Czech Rep.; {2}Institute of Scientific Instruments of the CAS, v. v. i., Czech Rep.

### **1468: Luminescence Spectroscopy of Mechanically Processed Lithium-Ion Battery Cells**

Roman Tschagaew{3}, Christian Röder{1}, Alexandra Kaas{2}, Johannes Heitmann{1}  
{1}IAP, Technische Universität Bergakademie Freiberg, Germany; {2}MVTAT, Technische Universität Bergakademie Freiberg, Germany; {3}Technische Universität Bergakademie Freiberg, Germany

### **1540: Fabrication of Nanostructures on Optical Fibers Using Nanosphere Lithography for Biosensing**

Hyeong-Min Kim, Young-Ho Nam, Seung-Chul Yang, Jae-Hyoung Park, Seung-Ki Lee  
Dankook University, Korea

### **1550: Molecular Imprinted Polymer on Optical Fiber Sensor for Ethanol Vapor Biomarker Detection**

Pannathorn Jitpratak{1}, Akhilesh Kumar Pathak{2}, Kankan Swargiary{1}, Charusluk Viphavakit{1}  
{1}Chulalongkorn University, Thailand; {2}Northwestern University, United States

### **1606: Seismic Monitoring of High-Rise Buildings Based on Fiber Optic Jerk Sensor**

Zhoutao Sun{2}, Jie Yi{3}, Yuntian Teng{1}, Wenzhu Huang{2}, Bin Zhao{3}, Fang Li{2}, Wentao Zhang{2}  
{1}Institute of Geophysics, China Earthquake Administration, China; {2}Institute of Semiconductors, Chinese Academy of Sciences, China; {3}Tongji University, China

### **1634: Towards Photon-Noise Limited Thermal IR Detection with Optomechanical Resonators**

Paolo Martini, Kostas Kanellopoulos, Silvan Schmid  
Technische Universität Wien, Austria

### **1813: Application of TiO2 Based Wide Bandgap Semiconductor to Intense Proton Beam Monitoring**

Pankaj Chetry{3}, Rupa Jeena{3}, Amandeep Kaur{3}, Pradeep Sarin{3}, Elizabeth George{3}, Kou Oishi{2}, Yoshinori Hashimoto{1}, Yoshinori Fukao{1}, Satoshi Mihara{1}  
{1}High Energy Accelerator Research Organization KEK, Japan; {2}Imperial College London, United Kingdom; {3}Indian Institute of Technology Bombay, India

### **1826: Micropower Active Optical Position Sensor for Decimeter-Range Sensing Gaps**

Eduard Burian  
LOX Technologies s.r.o., Slovakia

# Technical Program: Wednesday, November 1

**1858: A Stand-Alone Polarimetric Acquisition System for Producing a Long-Term Skylight Dataset**

Leo Poughon{2}, Vincent Aubry{4}, Jocelyn Monnoyer{4}, Stéphane Viollet{3}, Julien R. Serres{1}  
{1}Etienne-Jules MAREY Institute of Movement Sciences, Aix Marseille Université, France; {2}Institut des Sciences du Mouvement, France; {3}Institut des Sciences du Mouvement, Aix Marseille Université, France; {4}Stellantis N.V., France

**1899: Optical Fiber Coiled Sensors for Acoustic Oblique Wave Detection Using Distributed Acoustic Sensing**

Frederico Jahnert{2}, Beatriz Brusamarello{3}, Danilo Fernandes Gomes{3}, Sérgio Taveira de Camargo Júnior{1}, Manoel Feliciano Da Silva{1}, Jean Carlos Cardozo Da Silva{3}, Cicero Martelli{3}, Jucélio Pereira{2}, Carlos Bavastrí{2}  
{1}Petrobras Research and Development Program, Brazil; {2}Universidade Federal do Paraná, Brazil; {3}Universidade Tecnológica Federal do Paraná, Brazil

**2122: Measurement of Fluid Flow Velocity by Using Infrared and Visual Cameras: Comparison and Evaluation of Optical Flow Estimation Algorithms**

Zhe Shen, Robert Schmoll, Andreas Kroll  
Universität Kassel, Germany

13:30 - 15:00

**C2P-15: Physical Sensors - B**

Room: Grand Klimt Hall

Session Chair(s): Massood Tabib-Azar, *University of Utah*  
Siavash Pourkamali, *University of Texas at Dallas*

**1402: High Temperature Characteristics of Piezoresistive Silicon Carbide Pressure Sensors Implemented by Leadless Packaging**

Lukang Wang, You Zhao, Yu Yang, Yabing Wang, Yulong Zhao  
Xi'an Jiaotong University, China

**1477: Miniaturized Magnetoelectric Antenna for Low Frequency Electromagnetic Wave Communication**

Yuanhang Wang{1}, Tao Wang{2}, Yinan Wang{1}, Honglong Chang{1}, Jiayan Wang{1}, Qi Xi{1}, Guohao Zi{1}, Ziqiang Jia{1}, Shanlin Zhao{1}, Dishu Huang{1}, Zhibo Ma{1}  
{1}Ministry of Education Key Lab of Micro/Nano Systems for Aerospace, Northwestern Polytechnical, China; {2}Ning'bo Research Institute of Northwestern Polytechnic University, China

**1539: A Sphrical Waterflow Vector Sensor in Deep Sea**

Takuto Kishimoto{1}, Kenei Matsudaira{1}, Hiroto Tanaka{2}, Hidetoshi Takahashi{1}  
{1}Keio University, Japan; {2}Tokyo Institute of Technology, Japan

**1547: A CMOS-MEMS Pressure Sensor with Integrated Front-End for Chemical Vapor Deposition Systems**

Tsung-Heng Tsai{2}, Song-You Hong{1}  
{1}National Chung Cheng University, Taiwan; {2}National Yang Ming Chiao Tung University, Taiwan

**1609: Wireless, Battery-Free, Multi-Modal Sensor System for Continuous Monitoring of Physiological Signals of Paraplegic Patients**

Seokjoo Cho{2}, Hyeonseok Han{2}, Yong Suk Oh{1}, Inkyu Park{2}  
{1}Changwon University, Korea; {2}Korea Advanced Institute of Science and Technology, Korea

# Technical Program: Wednesday, November 1

## **1613: Initial Investigation of Physically Tightly-Coupled Single-Chip MEMS IMU for Mutual Compensation of Two Differential Resonant Accelerometers and a Mode-Matched Donut-Mass Gyroscope**

Fumito Miyazaki{1}, Daiki Ono{1}, Jumpei Ogawa{1}, Tazuko Tomioka{1}, Kei Masunishi{2}, Kengo Uchida{1}, Hideaki Murase{1}, Etsuji Ogawa{1}, Fumitaka Ishibashi{1}, Yasushi Tomizawa{1}  
{1}Toshiba Corporation, Japan; {2}Toshiba Corporation, Corporate Research & Development Center, Japan

## **1753: Novel Rotary Encoder with Multi-Axis Hall Sensors**

Christian Schott, Bruno Brajon, Gaël Close  
Melexis Technologies SA, Switzerland

## **1756: Magnetometry Package for LVICE2 Mission - Triaxial Fluxgate and Amr Magnetometer for Scientific Data Production Near Moon**

Vojtěch Petruška, David Novotný, Kajetán Šobíšek  
Czech Technical University in Prague, Czech Rep.

## **1799: Neural Network-Assisted Capacitive Sensor for Multi-Directional Force Detection**

Mengxin Zhou, Xiyue Cui, Yuanyuan Yang  
Xiamen University, China

## **1828: Determining Vegetable Oil Composition via Spectral Analysis of Faraday Rotation**

Ruben Piepgras, Marco Jose Da Silva  
Johannes Kepler Universität Linz, Austria

## **1855: Printed Flexible Polystyrene-Based Temperature Sensor with High Chemical and Mechanical Stabilities**

Ahmad Al Shboul, Ricardo Izquierdo  
École de Technologie Supérieure, Canada

## **1884: Fabrication of Structural-Color Based Force Sensor with Biocompatibility for Endoscopic Surgery**

Yusaku Maeda{2}, Masato Sagara{3}, Hidekuni Takao{1}  
{1}Kagawa University, Japan; {2}Kagawa University, National Institute of Technology KOSEN, Kagawa College, Japan; {3}National Institute of Technology, Kagawa College, Japan

## **1885: TiN-C Based CMOS MEMS Pirani Gauge for On-Chip Pressure Measurement**

Manu Garg{2}, Fang-Wei Tsai{3}, Khanjan M Joshi{1}, Yi Chiu{3}, Pushpapraj Singh{1}  
{1}Indian Institute of Technology Delhi, India; {2}Indian Institute of Technology Delhi, National Yang Ming Chiao Tung University, India; {3}National Yang Ming Chiao Tung University, Taiwan

## **1887: Force-Sensing Intelligent Vise for Cutting Dynamics Monitoring in Machining**

Po-Han Chen{1}, Tay-Jyi Lin{2}, Chingwei Yeh{2}, Pei-Zen Chang{1}, Wei-Chang Li{1}  
{1}Institute of Applied Mechanics, National Taiwan University, Taiwan; {2}SoC Research Center, National Chung Cheng University, Taiwan

## **1896: Resonance Frequency and Vibration Mode Modification of Piezoelectric MEMS Ultrasonic Sensors on Buckled Diaphragm Structures for High Sensitivity and High Resolution Measurement**

Kaoru Yamashita, Junpei Yamamoto, Zhengxin Yi  
Kyoto Institute of Technology, Japan

# Technical Program: Wednesday, November 1

**1897: Plural Kalman Filter-Based Algorithm for Suppressing Strong Magnetic Disturbance in Automotive Steering Angle Sensors**

Hyunjun Cha{1}, Yegyun Oh{1}, Hobeom Han{1}, Sang Won Yoon{2}  
{1}Hanyang University, Korea; {2}Seoul National University, Korea

**1934: Magnetic Domain Transition of Clustered Soft Magnetic Narrow Strips Caused by a Magnetic Small Particle**

Tomoo Nakai  
Industrial Technology Institute, Miyagi Prefectural Government, Japan

13:30 - 15:00

**C2P-16: Acoustic and Ultrasonic Sensors - B**

Room: Grand Klimt Hall

Session Chair(s): Haifeng Zhang, *University of North Texas*  
Hongyu YU, *Hong Kong University of Science and Technology*

**1181: Additive Manufacturing of an Insect Bio-Inspired Hair Acoustic Sensor**

Samuele Martinelli, Andrew Reid, Roger Domingo-Roca, James Windmill  
University of Strathclyde, United Kingdom

**1433: Exploration of Ultrasonic Guided Wave Resonance Technique for Damage Localization**

Supriya Gain, Subhadeep Basu, Arijit Sinharay  
TATA Consultancy Services Limited , India

**1530: Detection of Viral Particles Using a 182 MHz Surface Acoustic Wave Sensor**

Olivia Thu Lam, Massood Tabib-Azar  
University of Utah, United States

**1600: MIP Functionalized Love Wave Sensor for Detection of 4-AP Organic Compound in Turbid Solutions**

Asawari Choudhari{3}, Thomas Vignol{2}, Jean-Luc Lachaud{1}, Maxence Rube{3}, Idris Sadli{3}, Martine Sebeloue{3}, Raphaël Delépée{2}, Ollivier Tamarin{3}, Corinne Dejous{1}  
{1}Universite de Bordeaux, France; {2}Universite de Caen, France; {3}Universite de Guyane, France

13:30 - 15:00

**C2P-17: Sensor Networks and IOT - B**

Room: Grand Klimt Hall

Session Chair(s): Domenico Balsamo, *Newcastle University*  
Yacine GHAMRI-DOUDANE, *La Rochelle University*

**1240: Ultra-Low Power MEMS Inertial Switch Based Wake-Up Wireless Sensing Node for Door Lock Monitoring**

Sagnik Ghosh{2}, Duan Jian Goh{2}, Zhongshi Hu{2}, Jaibir Sharma{2}, Yong Shun Teo{2}, Marlon McCarthy{2}, Prakasha Chigahalli Ramegowda{2}, Wei Da Toh{2}, Weiguo Chen{2}, Arulchozhan Murugan{2}, Yao Zhang{2}, Yoshishige Tsuchiya{3}, Amit Lal{1}, Joshua En-Yuan Lee{2}, Yul Koh{2}  
{1}Cornell University, United States; {2}Institute of Microelectronics, Agency for Science, Technology and Research, Singapore; {3}University of Southampton, United Kingdom

# Technical Program: Wednesday, November 1

**1290: Wave Profile and Tide Monitoring System for Scalable Implementation**

João Rocha, Tiago Matos, Carlos Faria, Camila M. Penso, Marcos Martins, Pedro Gomes, Luís M. Gonçalves  
Universidade do Minho, Portugal

**1308: Wide-Band Low-Noise Amplifier for Reliable Wireless Sensor Networks**

Sarah Ouerghemmi{2}, Illef Ketata{2}, Ahmed Fakhfakh{1}, Faouzi Derbel{2}  
{1}Laboratory of Signals, Systems, Artificial Intelligence and Networks, Tunisia; {2}Leipzig University of Applied Sciences, Germany

**1789: Evaluation of a Non-Coherent Ultra-Wideband Transceiver for Micropower Sensor Nodes**

Jonah Imfeld, Silvano Cortesi, Philipp Mayer, Michele Magno  
ETH Zürich, Switzerland

13:30 - 15:00

**C2P-18: Emerging Sensors in Environmental Applications - A**

Room: Grand Klimt Hall  
Session Chair(s): Joost Lötters, *University of Twente*

**1369: Ice Sensing Using Combined Capacitive and Impedance Spectroscopic Measurements**

Markus Neumayer, Thomas Bretterklieber  
Technische Universität Graz, Austria

**1451: SNATCH: Stealing Neural Network Architecture from ML Accelerator in Intelligent Sensors**

Sudarshan Sharma, Uday Kamal, Jianming Tong, Tushar Krishna, Saibal Mukhopadhyay  
Georgia Institute of Technology, United States

**1478: Graphene/TiO2 Nanocomposite Based Electrochemical Biosensor Enhanced by Support Vector Machine Classification Model to Detect Different DENV Serotype IgG**

Tan Shi Hui, Desmond Teo Kai Xiang, Hwei-San Loh, Tomas Maul, Michelle Tien Tien Tan  
University of Nottingham Malaysia, Malaysia

**1491: Ultraviolet vs. Visible Skylight Polarization Measurements**

Antoine Moutenet{1}, Julien R. Serres{2}, Stéphane Viollet{3}  
{1}Aix Marseille Université, France; {2}Etienne-Jules MAREY Institute of Movement Sciences, Aix Marseille Université, France; {3}Institut des Sciences du Mouvement, Aix Marseille Université, France

**1763: Design and Characterization of a Data Converter in a SiC CMOS Technology for Harsh Environment Sensing Applications**

Yunfan Niu{1}, Jiarui Mo{1}, Alexander May{2}, Mathias Rommel{2}, Chiara Rossi{2}, Joost Romijn{1}, Guoqi Zhang{1}, Sten Vollebregt{1}  
{1}Delft University of Technology, Netherlands; {2}Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany

**1786: CMOS MEMS Resonator for Physical Reservoir Computing**

Yi Chiu{2}, Fang-Wei Tsai{2}, Liang-Kai Wang{2}, Yuan-Chieh Lee{2}, Manu Garg{1}, Hao-Chiao Hong{2}  
{1}Indian Institute of Technology Delhi, National Yang Ming Chiao Tung University, Taiwan; {2}National Yang Ming Chiao Tung University, Taiwan

# Technical Program: Wednesday, November 1

## **1803: Soil Water Content Sensor in the IoT Precision Agriculture**

Pisana Placidi, Carmine Villani Delle Vergini, Nicola Papini, Elia Ciancabilla, Manuela Cecconi, Andrea Scorzoni  
Università degli Studi di Perugia, Italy

## **1930: Biodegradable Humidity Sensor Based on Laser Induced Graphene Electrodes Scribed on Wood**

Lukas Neumaier, Johanna Zikulnig, Sabine Lengger, Jürgen Kosel  
Silicon Austria Labs GmbH, Austria

13:30 - 15:00

### **C2P-19: Sensor Systems - B**

Room: Grand Klimt Hall

Session Chair(s): Chang-hee Won, *Temple University*

## **1051: Breast Cancer Risk Estimation Using Patient Health Information and Tactile Sensing System**

Sung Choi{1}, Dina Caroline{2}, Chang-Hee Won{1}  
{1}Temple University, United States; {2}Temple University Hospital, United States

## **1060: An Innovative Approach to Improve Diagnostic of Arterial Stenosis Using Phonoangiography Signal**

Abdelouahad Achmamad{1}, Taoufik M'Hammedi{1}, Nourdin Yaakoubi{1}, Abdelhamid Errachid{3}, Mohamed El Fezazi{2}, Atman Jbari{2}, Larbi Bellarbi{2}  
{1}Le Mans Universite, France; {2}Mohammed V University, Morocco; {3}Université de Lyon, France

## **1149: Deep Nose Project: A Study of Multidimensional Multimodal Olfactory Intelligence System for Ultra-Trace Gas Component Detection**

Yongwon Jang, Hyung Wook Noh, Hwin Dol Park, Kwang Hyo Chung, Chang-Geun Ahn  
Electronics and Telecommunications Research Institute, Korea

## **1409: 1D CNN-LSTM Based Electronic Nose Algorithm for Disinfectant Concentration Detection**

Xiaoyu Liu, Guangfen Wei, Aixiang He, Wei Zhang, Shasha Jiao  
Shandong Technology and Business University, China

## **1415: A Continuous Smart Abdominal Fetal Heart Rate Monitor Using Photoplethysmography**

Sangeetha B, Manivannan M  
Indian Institute of Technology Madras, India

## **1475: Utilization of Artifact and Noise Affected Electrocardiogram for Simultaneous Heart Rate Computation and Motion Type Inference**

Jihwan Kim{2}, Hyun Bin Kim{2}, Dengyang Lu{3}, Byeong Woon Lee{2}, Wooseok Kim{2}, Sang Uk Park{2}, Hee Kyu Lee{2}, Jaejun Lim{2}, Yida Wang{3}, Seunghwan Seo{1}, Sang Min Won{2}  
{1}Research Laboratory of Electronics, Massachusetts Institute of Technology, United States;  
{2}Sungkyunkwan University, Korea; {3}University of Pennsylvania, United States

## **1590: Human-Inspired Stretch and Joint-Bend Sensing System Based on Flexible Sensors**

Shashank Mishra{2}, Dina Anna John{2}, Naveen Kumar{2}, Beena Rai{1}, Vihar Georgiev{2}  
{1}TATA Consultancy Services Limited , India; {2}University of Glasgow, United Kingdom

## **1726: Wearable Haptic Sensing - Enriching Accessibility of Pictorial Information for Visually Impaired**

Chinmay Sultania, Divyansh Singhal, Soham Pawar, Mayank Kabra, Anshul Madurwar, Madhav Rao  
International Institute of Information Technology Bangalore, India

# Technical Program: Wednesday, November 1

## **1768: Towards Enhanced Bladder Volume Measurement with Context-Aware Bio-Impedance Sensor Fusion**

Kanika Dheman{1}, Manuel Glahn{2}, Michele Magno{2}

{1}Center for Project Based Learning, ETH Zürich, Switzerland; {2}ETH Zürich, Switzerland

## **1816: Evaluating Orthostatic Responses with Wearable Chest-Based Photoplethysmography in Patients with Parkinson's Disease**

John Berkebile{2}, Omer Inan{2}, Paul Beach{1}

{1}Emory University School of Medicine, United States; {2}Georgia Institute of Technology, United States

## **1838: Magnetically Triggered Imaging System for Automated Validation of Magnetic Flow Cytometry Observations**

Ruben Afonso{3}, Diogo Miguel Bárbara Caetano{2}, Ana Rita Soares{1}, Moisés Piedade{4}, Gonçalo Nuno Tavares{4}, Susana Cardoso{2}

{1}INESC MN, Portugal; {2}INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {3}INESC-ID, INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {4}INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal

## **1868: The First Hand-Held Touch Feeling Measurement System Integrated with Force Sensing Mechanism**

Satoshi Hisayasu{1}, Takaya Ohishi{1}, Yusaku Maeda{2}, Kyohei Terao{1}, Fusao Shimokawa{1}, Hidekuni Takao{1}

{1}Kagawa University, Japan; {2}Kagawa University, National Institute of Technology KOSEN, Kagawa College, Japan

## **1159: AI-EMS: An Environmental Monitoring System with AI Prediction**

Chih-Chyau Yang{2}, Chih-Ting Kuo{2}, Ssu-Ying Chen{2}, Hao-Wu Liu{1}, Fu-Chen Cheng{2}, Yi-Jie Hsieh{2}, Jin-Ju Chue{2}, Chien-Ming Wu{2}, Chun-Ming Huang{2}

{1}National Taiwan University of Science and Technology, Taiwan; {2}Taiwan Semiconductor Research Institute, Taiwan

## **1597: Multi-Node Networked Indoor Air Quality Monitor**

Brandon Hippe, Adam Dezay, Manuel Garcia, Mercedes Newton, John Acken, David Burnett  
Portland State University, United States

## **1610: A Multi-Surface Acoustic Wave Sensor Platform for the Detection and Identification of Toxic Gases**

Mariem Slimani{2}, Christine Mer-Calfati{1}, Jean-Philippe Poli{1}, Franck Badets{1}, Edwin Friedman{1}, Venceslass Rat{1}, Thierry Laroche{3}, Samuel Saada{1}

{1}CEA, France; {2}CEA-LIST, France; {3}SOITEC, France

## **1154: Multi-Sensor Low-Noise Modular Magnetic Flow Cytometer for Bacteria Detection**

Ruben Afonso{3}, Diogo Miguel Bárbara Caetano{2}, Ricardo Lorena{3}, Ana Rita Soares{1}, Moisés Piedade{4}, Gonçalo Nuno Tavares{4}, Susana Cardoso{2}

{1}INESC MN, Portugal; {2}INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {3}INESC-ID, INESC MN, Instituto Superior Técnico, Universidade de Lisboa, Portugal; {4}INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal

# Technical Program: Wednesday, November 1

**1787: Contact-Less Body Temperature Monitoring by Infrared Camera: Accuracy Preliminary Assessment**

Elisabetta Leogrande, Chiara Botrugno, Teresa Natale, Francesco Dell'Olio  
Polytechnic University of Bari, Italy

**1474: A Map Feature Fusion Based Artifact Removal Method for Non-Contact Vital Sign Detection with a Single FMCW Radar**

Yuxiang Qiu, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh  
University of Tokyo, Japan

**1695: A Framework for Seamless Trajectory Estimation and Navigation of Robotic Sensor Platform with Resource-Constrained Embedded Controller**

Pankhi Kashyap, Hardik Ghoshal, Siddharth Tallur  
Indian Institute of Technology Bombay, India

13:30 - 15:00

**C2P-20: Energy Harvesting and Generators**

Room: Grand Klimt Hall

Session Chair(s): Hongsoo Choi, *Daegu Gyeongbuk Institute*

Jongmoon Jang, *Korea Institute of Materials Science (KIMS)*

**1374: Advancing the Ferroelectric-Based Triboelectric Nanogenerator via Composition Optimization**

Manisha Sahu, Sugato Hajra, Hang Gyeom Kim, Il Ryu Jang, Jeonhyeong Park, Aneeta Manjari Padhan, Hoe Joon Kim  
Daegu Gyeongbuk Institute of Science and Technology, Korea

**1561: Design of a Novel Tridimensional Silicon MEMS Thermoelectric Generator**

Alessandro Nastro{2}, Marco Baù{2}, Marco Ferrari{2}, Francesco Foncellino{1}, Flavio Francesco Villa{1}, Federico Cuneo{1}, Federica Capra{1}, Vittorio Ferrari{2}  
{1}STMicroelectronics, Italy; {2}Università degli Studi di Brescia, Italy

**1867: Development of an Energy Harvesting Tile Using Novel MXene-Cement Based Triboelectric Nanogenerator**

Valliammai Palaniappan, Alimohammad Haji Adineh, Dinesh Maddipatla, Bradley Bazuin, Massood Atashbar  
Western Michigan University, United States

**1872: Development of a Flexible Polyimide-Thermoplastic Polyurethane Based Triboelectric Nanogenerator for Energy Harvesting Applications**

Alimohammad Haji Adineh, Valliammai Palaniappan, Dinesh Maddipatla, Simin Masihi, Binu Baby Narakathu, Bradley Bazuin, Massood Atashbar  
Western Michigan University, United States

**1851: An Electrostatic Micropositioner with 3 Degrees-of-Freedom**

Seyedfakhreddin Nabavi, Michaël Ménard, Frederic Nabki  
École de Technologie Supérieure, Canada

# Technical Program: Wednesday, November 1

13:30 - 15:00

## **C2P-21: Sensor Data Processing & AI - B**

Room: Grand Klimt Hall

Session Chair(s): Ni Zhu, *Université Gustave Eiffel*

### **1087: Combating Sensor Drift with an LSTM Neural Network Enhanced by Autoencoder Preprocessing**

Junming Wang, Jing Shu, Zheng Li, Kai-Yu Tong

Chinese University of Hong Kong, Hong Kong

### **1122: A Robust Multi-Frame mmWave Radar Point Cloud-Based Human Skeleton Estimation Approach with Point Cloud Reliability Assessment**

Xintong Shi, Tomoaki Ohtsuki

Keio University, Japan

### **1153: A Double-Level Interleaved Group Convolutional Network in the Frequency Domain for E-Nose Gas Recognition**

Zijian Wang, Mingye Han, Huisheng Zhang, Jia Yan

Southwest University, China

### **1189: Spatial-Temporal Graph Attention Fuser for Calibration in IoT Air Pollution Monitoring Systems**

Keivan Faghih Niresi{1}, Mengjie Zhao{1}, Hugo Bissig{2}, Henri Baumann{2}, Olga Fink{1}

{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Eidgenössisches Institut für Metrologie METAS, Switzerland

### **1243: LSTM-Driven Vehicle Counting for Bridge Health Monitoring with a Magnetostrictive Vibration Sensor**

Shinji Koganezawa, Futa Matsumoto, Hiroshi Tani, Renguo Lu, Shouhei Kawada

Kansai University, Japan

### **1420: HFR Video-Based Hornet Detection Approach Using Wing-Beat Frequency Analysis**

Junhao Li{1}, Kohei Shimasaki{1}, Abudourehman Tuniyazi{1}, Idaku Ishii{1}, Mari Ogihara{2}, Mikio Yoshiyama{2}

{1}Hiroshima University, Japan; {2}National Agriculture and Food Research Organization, Japan

### **1421: A Smart Robotic System for Industrial Plant Supervision**

Dulce Adriana Gómez Rosal{1}, Max Bergau{3}, Georg Kurt Johannes Fischer{5}, Andreas Wachaja{2}, Johannes Gräter{2}, Matthias Odenweller{4}, Uwe Piechottka{4}, Fabian Hoeflinger{7}, Nikhil Gosala{1}, Niklas Wetzel{1}, Daniel Büscher{1}, Abhinav Valada{1}, Wolfram Burgard{6}

{1}Albert-Ludwigs-Universität Freiburg, Germany; {2}dotscene GmbH, Germany; {3}Endress-Hauser Process Solutions GmbH, Germany; {4}Evonik Industries AG, Germany; {5}Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI, Germany; {6}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {7}Telocate GmbH, Germany

### **1533: Edge Device for Ultraviolet Fluorescence Inspection of Photovoltaic Panels**

André Biffe Di Renzo{2}, Carlos Ruiz Zamarreño{1}, Cicero Martelli{2}, Jean Carlos Cardozo Da Silva{2}

{1}Universidad Pública de Navarra, Spain; {2}Universidade Tecnológica Federal do Paraná, Brazil

### **1612: An Asymmetric Radar-Camera Fusion Framework for Autonomous Driving**

Zhiyi Su, Binbin Ming, Wei Hua

Zhejiang Lab, China

# Technical Program: Wednesday, November 1

**1650: Energy-Efficient Sensor Platform Using Reliable Analog-to-Feature Extraction**

Minah Lee, Sudarshan Sharma, Wei Chun Wang, Saibal Mukhopadhyay  
Georgia Institute of Technology, United States

**1672: Evaluation of Time-Series Imaging for Visual Analytics and Processing of an Indoor Air Quality Sensors Network**

Hugo O. Garcés{2}, Eduardo Espinosa{1}, Mohamed A. Ahmed{3}, Alejandro J. Rojas{2}, Tongwen Chen{4}, Sirish Shah{4}  
{1}Universidad Católica de la Santísima Concepción, Chile; {2}Universidad de Concepción, Chile;  
{3}Universidad Técnica Federico Santa María, Chile; {4}University of Alberta, Canada

**1675: Lane Detection and Estimation from Surround View Camera Sensing Systems**

Ting Yuan{2}, Wenqi Cao{2}, Shuqi Zhang{2}, Kaipei Yang{3}, Markus Schoen{1}, Bharanidhar Duraisamy{1}  
{1}Daimler AG, Germany; {2}Shanghai Jiao Tong University, China; {3}University of Connecticut, United States

**1700: R2L-SLAM: Sensor Fusion-Driven SLAM Using mmWave Radar, LiDAR and Deep Neural Networks**

Niels Balemans{2}, Lucas Hooft{3}, Philippe Reiter{2}, Ali Anwar{2}, Jan Steckel{1}, Siegfried Mercelis{2}  
{1}FTI Cosys-Lab, University of Antwerp, Belgium; {2}IDLab, University of Antwerp, Belgium;  
{3}University of Antwerp, Belgium

**1767: Data Augmentation for Fault Classification of Railway Track Irregularities in Track-Vehicle Scale Model**

Euiyoul Kim, Héctor Alberto Fernández-Bobadilla, Xiaoyue Chen  
Universität Stuttgart, Germany

**1859: Quantifying Uncertainty in Environmental Sensing with Evidential Deep Learning**

Simon Mittermaier, Subhankar Patra, Cecilia Carbonelli  
Infineon Technologies AG, Germany

**1891: Point-Cloud-Based Change Detection for Steep Slope Vineyard Agriculture**

Mark Oliver Mints, Nick Theisen, Peer Neubert, Dietrich Paulus  
Universität Koblenz, Germany

**1585: Dual Contrastive Learning for Self-Supervised ECG Mapping to Emotions and Glucose Levels**

Noy Lalzary, Lior Wolf  
Tel Aviv University, Israel

13:30 - 15:00

**C2P-22: Wearable Sensors and Systems - B**

Room: Grand Klimt Hall

Session Chair(s): Sahika Inal, *King Abdullah University of Science and Technology (KAUST)*  
Jürgen Kosel, *Silicon Austria Labs (SAL)*

**1461: A Cost Effective Smart Insole System for Real Time Gait Analysis**

Nikos Antoniou{2}, Antonis Hadjiantonis{1}, Costas Kyriacou{2}, Andreas Konstantinidis{2}  
{1}CyRIC, Cyprus; {2}Frederick University, Cyprus

# Technical Program: Wednesday, November 1

## **1511: Integrated Skin Microperfusion System for Lactate Concentration Monitoring**

Noriko Tsuruoka, Kenta Tsugueda, Yoichi Haga  
Tohoku University, Japan

## **1583: Low Power Flexible MXene-Graphene Oxide Based Heaters for Wearable Clothing**

Roopa Jayaramaiah{1}, Shonkho Shuvro{1}, Sourin Das{2}, Saurabh Kumar{3}, Prosenjit Sen{1}  
{1}Indian Institute of Science, India; {2}Indian Institute of Science Education and Research, Bhopal, India; {3}National Institute of Pharmaceutical Education and Research, Guwahati, India

## **1728: An Electrochemical Microneedle Biosensor with Wide Linear Range for Continuous Glucose Monitoring**

Md Selim Reza{2}, Hyesu Song{2}, Ye Young Lee{2}, Md Asaduzzaman{2}, Cheolung Cha{1}, Jae Yeong Park{2}  
{1}Korea Electronics Technology Institute, Korea; {2}Kwangwoon University, Korea

## **1802: Breath Rate Sensor AM Integration Concept for E-Textiles**

Maximilian Scherf{2}, Pavel Kulha{2}, Georgios Kokkinis{3}, Rudi Heer{3}, Pascal Stark{1}  
{1}Inter-Spitzen AG, Switzerland; {2}PROFACTOR GmbH, Austria; {3}Silicon Austria Labs GmbH, Austria

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13:30 - 15:00

### **C2P-23: Robotics**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

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### **Sensors Letters Paper**

## **2039: Active Optical Sensor Micro-Robot Equipped with Multi-DoF Gripper Arm Based on Kinetic Electronics**

Riku Otsuka, Shiyi Zhang, Kenshi Hayashi, Fumihiro Sassa  
Kyushu University, Japan



### **Sensors Letters Paper**

## **2103: Smart Foot Based on FBG Integrated in Composite Material and Adaptive Fuzzy Controller**

Marcos Dinis Lavarda, Danilo Fernandes Gomes, Talita Paes, Renata Oliveira de Sousa, Uilian José Dreyer, Jean Carlos Cardozo Da Silva, Cicero Martelli  
Universidade Tecnológica Federal do Paraná, Brazil

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13:30 - 15:00

### **C2P-24: Live Demonstration of Sensors and Sensing Technologies - B**

Room: Grand Klimt Hall

Session Chair(s): Calogero Maria Oddo, *Sant'Anna School of Advanced Studies, Pisa, Italy*  
Anna Grazia Mignani, *CNR-Institute of Applied Physics 'Nello Carrara', Florence Italy*

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## **1068: Live Demonstration: Low-Power Flexible Platform for Laser-Scribed Graphene Sensors**

José Ilton de Oliveira Filho, Murilo Calil Faleiros, Daísy Camargo Ferreira, Khaled Nabil Salama  
King Abdullah University of Science and Technology, Saudi Arabia

# Technical Program: Wednesday, November 1

**1271: Live Demonstration: Mobile Environmental Monitoring System**

Yurii Tsyban, Eckaard Le Roux, Aiman Fakieh, José Ilton de Oliveira Filho, Khaled Nabil Salama  
King Abdullah University of Science and Technology, South Africa; King Abdullah University of Science and Technology, Egypt; King Abdullah University of Science and Technology, Saudi Arabia; King Abdullah University of Science and Technology, Ukraine; King Abdullah University of Science and Technology, Brazil

**1301: Live Demonstration: IoT Based Smart Vertical Farming Framework with Sensor Network and Mobile Application for Real-Time Monitoring**

Ankita Awasthi, Astha Rangare, Roshni Kaushik, Jose Immanuel  
Indian Institute of Technology Bhilai, India

**1354: Live Demonstration: Prevention and Prediction of Biomechanical Risks in Work Environment**

Enrico Valli, Gianluca Milani, Lorenzo Rapetti, Dario Sortino, Gianmarco Gatti, Daniele Pucci  
Istituto Italiano di Tecnologia, Italy

**1559: Live Demonstration: Soft Flexible Capacitive Sensing Arrays for Pressure, Shear, and Proximity**

Jian Gao{3}, Kieran Morton{3}, Ryusuke Ishizaki{2}, Fumiya Hamatsu{1}, Takeshi Ohsato{1}, John D.W. Madden{3}  
{1}Honda R&D Co., Ltd, Japan; {2}Honda R&D Co., Ltd, Frontier Robotics Honda R&D, Japan; {3}University of British Columbia, Canada

**1498: Live Demonstration: AI-Assisted Magnetic Skin Tracker for Speech Recognition**

Montserrat Ramirez-De Angel{1}, Abdullah Saud Almansouri{2}, Khaled Nabil Salama{1}  
{1}King Abdullah University of Science and Technology, Saudi Arabia; {2}University of Jeddah, Saudi Arabia

**1516: Live Demonstration: An AI Driven Multiplexed Diagnostic Platform for Improving Cancer Care**

Saif Ahmad, Ama Frimpong, Mireia Crispin-Ortuzar, Nicole Weckman  
52 North Health, United Kingdom

13:30 - 15:00

**C2P-25: Sensor Technologies for Sustainable Development - A**

Room: Grand Klimt Hall

Session Chair(s): Jae-Hyoung Park, *Dankook University, Korea*

**1133: A Portable Sensor System for Structural Health Monitoring with Printed Sensors on Biodegradable Substrates**

Lukas Rauter{2}, Harald Gietler{3}, Johanna Zikulnig{2}, Mohammed Khalifa{1}, Hubert Zangl{4}, Jürgen Kosel{2}  
{1}Kompetenzzentrum Holz GmbH, Austria; {2}Silicon Austria Labs GmbH, Austria; {3}University of Klagenfurt, Austria; {4}University of Klagenfurt, AAU SAL Ubiquitous Sensing Lab, Austria

**1321: OSC Based Gas Sensor for Detecting Agriculture Ammonia Water Pollution**

Chih-Lu Chiang{3}, Yu-Yu Huang{1}, Te-Yao Liu{4}, Yi-Yu Chen{4}, Hsin-Fei Meng{2}, Li-Yin Chen{4}, Hsiao-Wen Zan{4}  
{1}Farm Management Division, Taiwan Agricultural Research Institute, Taiwan; {2}Institute of Physics, National Yang Ming Chiao Tung University, Taiwan; {3}Institute of Pioneer Semiconductor Innovation, National Yang Ming Chiao Tung University, Taiwan; {4}National Yang Ming Chiao Tung University, Taiwan

# Technical Program: Wednesday, November 1

## **1424: Polymer-Based Conductometric Sensor for Acidic and Alkaline Vapors for Firefighting and CBRN Disaster Control**

Mark Viebrock, Ramón Joachimstaller, Georg S. Duesberg, Tanja Stimpel-Lindner  
Universität der Bundeswehr München, Germany

13:30 - 15:00

## **C2P-26: Bio-Remote Sensing and Integrated Artificial Intelligence Systems - A**

Room: Grand Klimt Hall

Session Chair(s): Albert Treytl, *Danube University Krems*

Paul C.-P. Chao, *Independent Researcher / USA*

## **1225: Significant Improvement in Precision of Real-Time Blood Pressure Prediction Based on Complete Cycles of Measured PPGs**

Duc Huy Nguyen, Paul C.-P. Chao

National Yang Ming Chiao Tung University, Taiwan

## **1459: Implementing a Personalized Model in Edge via FPGA for Non-Invasive Blood Flow Volume Measurement Based on PPG for Security**

Hung-Chi Wu, Duc Huy Nguyen, Paul C.-P. Chao

National Yang Ming Chiao Tung University, Taiwan

13:30 - 15:00

## **C2P-27: Optical Sensors**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*



### ***Sensors Letters Paper***

## **2085: Repetition Rate and Gauge Length Impact on DTGS Temperature Reconstruction**

Danilo Fernandes Gomes{3}, Guilherme Heim Weber{3}, Eduardo Henrique Dureck{3}, Daniel Rodrigues Pipa{3}, Marco Jose Da Silva{1}, Jean Carlos Cardozo Da Silva{3}, Sérgio Taveira de Camargo Júnior{2}, Manoel Feliciano Da Silva{2}, Cicero Martelli{3}

{1}Johannes Kepler Universität Linz, Austria; {2}Petrobras Research and Development Program, Brazil;

{3}Universidade Tecnológica Federal do Paraná, Brazil



### ***Sensors Letters Paper***

## **2124: Extended Characterization of an Optical Sag Sensor for High-Temperature Low-Sag Lines**

Himanshi Singh, Grzegorz Fusiek, Pawel Niewczas

University of Strathclyde, United Kingdom



### ***Sensors Letters Paper***

## **2129: Planar Waveguide LMR Based Sensors: Engineering the Depth of Characteristic Curves**

Anand Shrivastav{2}, Ignacio Del Villar{3}, Joaquin Ascorbe{1}, Jesus Corres{3}, Ignacio Raúl Matías{3}

{1}Nadetch Innovations, Spain; {2}SRM Institute of Science & Technology, India; {3}Universidad Pública de Navarra, Spain



### ***Sensors Letters Paper***

## **2131: Self-Powered Signal Conditioning Circuit for an HVDC Optical Current Sensor**

Alfred Amiolemen, Grzegorz Fusiek, Pawel Niewczas

University of Strathclyde, United Kingdom

# Technical Program: Wednesday, November 1

## *Sensors Letters Paper*

### **1944: UV Light Detection with Side Polished CYTOP Fiber**

Ada Ayechu{2}, Desiree Santano{2}, Juan David Lopez Vargas{1}, Ignacio Raúl Matías{2}, Ignacio Del Villar{2}

{1}COPPE, Federal University of Rio de Janeiro, Brazil; {2}Universidad Pública de Navarra, Spain

13:30 - 15:00

### **C2P-28: Physical Sensors and MEMS**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*

## *Sensors Letters Paper*

### **1982: Soft Tactile Sensor with Multimodal Data Processing for Texture Recognition**

Uriel Martinez-Hernandez, Tareq Assaf

University of Bath, United Kingdom

## *Sensors Letters Paper*

### **1998: Performance Evaluation of MEMS Pirani Sensors with Differently Packaged Structures**

Lan Zhang, Jian Lu, Yuichi Kurashima, Hideki Takagi

National Institute of Advanced Industrial Science and Technology, Japan

## *Sensors Letters Paper*

### **2109: SOI Integrated Micromagnets for Mechanical Magnetic Field Detection**

Philip Schmitt{2}, Björn Gojdka{1}, Thomas Lisec{1}, Matthias Kroll{2}, Martin Hoffmann{2}

{1}Fraunhofer Institute for Silicon Technology ISIT, Germany; {2}Ruhr-Universität Bochum, Germany

## *Sensors Letters Paper*

### **2141: The Strong Effect of NiCr Adhesion Layers in Surface Micromachined MEMS Sensors**

Tamar Tepper-Faran{1}, Haran Neiberg{1}, Noam Yitzhak{1}, David Elata{2}

{1}RAFAEL Advanced Defense Systems Ltd, Israel; {2}Technion - Israel Institute of Technology, Israel

## *Sensors Letters Paper*

### **2143: Bistable rotational SOI actuator with a planar tripod compliant suspension**

Erez Benjamin{2}, Ronen Maimon{1}, Slava Krylov{2}

{1}RAFAEL Advanced Defense Systems Ltd, Israel; {2}Tel Aviv University, Israel

# Technical Program: Wednesday, November 1

13:30 - 15:00

## **C2P-29: Materials and Emerging Technologies**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*



### **Sensors Letters Paper**

#### **2137: Investigation of the Coulombic Efficiency and the Superior Differential Capacity Degradation Analysis**

Daniel Schürholz, Bernhard Schweighofer, Markus Neumayer, Hannes Wegleiter

Technische Universität Graz, Austria

13:30 - 15:00

## **C2P-30: Wireless Networks and IoT**

Room: Grand Klimt Hall

Session Chair(s): Thilo Sauter, *TU Wien and Danube University Krems*



### **Sensors Letters Paper**

#### **2060: Tactile Light Switch Using Chipless RFID**

Abdullah Saud Almansouri

University of Jeddah, Saudi Arabia



### **Sensors Letters Paper**

#### **2113: Applying t-Distributed Stochastic Neighbor Embedding for Improving Fingerprinting-Based Localization System**

Getaneh Berie Tarekegn{3}, Li-Chia Tai{3}, Hsin-Piao Lin{1}, Belayneh Abebe Tesfa{1}, Rong-Terng Juang{1}, Hsu Hsu{3}, Kai-Lun Huang Kai-Lun Huang{2}, Kanishk Singh{3}

{1}National Taipei University, Taiwan; {2}National Tsing Hua University, Taiwan; {3}National Yang Ming Chiao Tung University, Taiwan



### **Sensors Letters Paper**

#### **2145: Bragg reflector type shear mode BAW transformer based on c-axis zig-zag ScAlN multilayer for rectifying antenna**

Kazutaka Shiraiwa, Takahiko Yanagitani

Waseda University, Japan

15:00 - 16:30

## **C3L-01: Healthcare: AI and Assistive Technologies**

Room: Park Suite 1

Session Chair(s): Kosuke Minami, *National Institute for Materials Science NIMS*

Ata Golparvar, *Sabanci University, École Polytechnique Fédérale de Lausanne*

15:00



### **Sensors Letters Paper**

#### **2119: Tactile Sensing System and Convolutional Neural Network for Mechanical Property Classification**

Vira Oleksyuk, Nazia Rahman, Chang-Hee Won

Temple University, United States

# Technical Program: Wednesday, November 1

15:15



*Sensors Letters Paper*

## **2069: Particle Filter Based Diagnosis and Prognosis for Human Hydration States**

Guangxing Niu{2}, Sen Bing{1}, Bin Zhang{2}, Jung-Chih Chiao{1}

{1}Southern Methodist University, United States; {2}University of South Carolina, United States

15:30



*Sensors Letters Paper*

## **2089: Novel Features Extraction from EEG Signals for Epilepsy Detection Using Machine Learning Model**

Vandana Pandya{2}, Urvashi P. Shukla{1}, Amit Mahesh Joshi{2}

{1}Banasthali Vidyapith, India; {2}Malaviya National Institute of Technology, Jaipur, India

15:45



*Sensors Letters Paper*

## **2123: Gait Measurement System Utilizing Missing Point Clouds Caused by Feet with Apple Lidar Camera**

Mitsuhiro Takahashi{1}, Masaki Takahashi{2}

{1}Graduate School of Science and Technology, Keio University, Japan; {2}Keio University, Japan

16:00



*Sensors Letters Paper*

## **2117: A Haptic Feedback System for Spatial Orientation in the Visually Impaired: a Comprehensive Approach**

Eldad Holdengreber, Dvir Kleinberg, Roi Yozevitch, Ido Abekasis, Yuval Israel

Ariel University, Israel

16:15



*Sensors Letters Paper*

## **2095: Fully Flexible Smart Gloves and Deep Learning Motion Intention Prediction for Ultra-Low Latency VR Interactions**

Yang Li{3}, Jiacheng Jiang{3}, Ruqin Wang{3}, Zanxiang Mao{3}, Lin Fang{3}, Yirui Qi{3}, Junsheng Zhang{1}, Chili Wu{2}, Hongyu Yu{3}

{1}Fok Ying Tung Research Institute, Hong Kong University of Science and Technology, China; {2}Hong Kong Polytechnic University, Hong Kong; {3}Hong Kong University of Science and Technology, Hong Kong

# Technical Program: Wednesday, November 1

15:00 - 16:30

## **C3L-02: Environmental Monitoring**

Room: Park Suite 2

Session Chair(s): Steffen Kurzthals, *Austrian Institute of Technology GmbH*

15:00



### **Sensors Letters Paper**

#### **2080: Electrochemical Sensors for Lead Ion Detection Using Sodium Alginate Crosslinked with 2-Acrylamido-2-Methyl Propane Sulfonic Acid and Aluminum Microparticles**

Pouya Borjian, Mohammadreza Chimerad, Pawan Pathak, Andre Childs, Swaminath Rajaraman, Hyung Jin Cho

University of Central Florida, United States

15:15



### **Sensors Letters Paper**

#### **1992: Hydrofluoroolefins Leakage Detection by non-Dispersive Infrared Gas Sensor Using InAsSb Light Emitting Diodes and Photodiodes**

Hiromi Fujita, Daiki Yasuda, Shinya Ota, Hirotaka Geka, Edson Camargo, Shota Isshiki, Toshiaki Fukunaka, Naohiro Kuze

Asahi Kasei Microdevices Corporation, Japan

15:30



### **Sensors Letters Paper**

#### **2084: Enhancing Water Safety in Decentralized Water Reuse Systems with Low-Cost Prussian Blue Amperometric Sensors for Free Chlorine Monitoring**

Gaétan Herold{1}, Francesca Rodino{1}, Ata Golparvar{3}, Eva Reynaert{2}, Sandro Carrara{1}  
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}ETH Zürich, Switzerland; {3}Sabanci University, École Polytechnique Fédérale de Lausanne, Switzerland

15:45



### **Sensors Letters Paper**

#### **2032: Circular Sensing of Nitrate Levels in Water with Flexible screen-Printed Sensors on Biodegradable Cellulose Substrate**

A K M Sarwar Inam{3}, Md. Najmul Islam{3}, Shah Zayed Riam{3}, Francisco Perez{3}, Christopher Delhom{1}, Nouredine Abidi{2}, Shawana Tabassum{3}

{1}Agricultural Research Service, United States; {2}Texas Tech University, United States; {3}University of Texas at Tyler, United States

16:00



### **Sensors Letters Paper**

#### **2132: 1D-CNN Network Based real-Time Aerosol Particle Classification with single-Particle Mass Spectrometry**

Guanzhong Wang{1}, Heinrich Ruser{1}, Julian Schade{1}, Johannes Passig{2}, Thomas Adam{1}, Günther Dollinger{1}, Ralf Zimmermann{3}

{1}Universität der Bundeswehr München, Germany; {2}University of Rostock, Germany; {3}University of Rostock, Helmholtz Zentrum München, Germany

# Technical Program: Wednesday, November 1

16:15

 *Sensors Letters Paper*

## **2134: Rapid Detection of Paraquat Pesticide in Honey Using Sers Based Portable Nanosensing Platform**

Sarvar Singh{1}, Saira Bano{2}, Sambit K Keshi{3}, Ujjwal Singh{1}, Ajay Agarwal{1}  
{1}Indian Institute of Technology Jodhpur, India; {2}Jodhpur City Knowledge and Innovation Foundation, India; {3}Smart Healthcare IDRP, Indian Institute of Technology Jodhpur, India

15:00 - 16:30

## **C3L-03: LiDAR, Radar, and RF Sensors**

Room: Park Suite 3

Session Chair(s): Mehmet Yuce, *Monash University*

15:00

 *Invited Journal Author*

## **[10.1109/JSEN.2023.3245219](#): Automatic One-Shot LiDAR Alignment Inspection System Using NIR Camera**

Hyeong-Seok Song, Young-Keun Kim  
Handong Global University, Korea

15:15

 *Invited Journal Author*

## **[10.1109/JSENS.2023.3249645](#): Memory Conscious Machine Learning Method to Extract Time-of-Flight Data from Flash Lidars**

Pooya Poolad, Anthony Chan Carusone  
University of Toronto, Canada

15:30

 *Invited Journal Author*

## **[10.1109/JSEN.2023.3250708](#): A 2D LiDAR-Slam Algorithm for Indoor Similar Environment with Deep Visual Loop-Closure**

Zongkun Zhou{2}, Chi Guo{2}, Yanyue Pan{1}, Xiang Li{1}, Weiping Jiang{2}  
{1}Artificial Intelligence Institute, Wuhan University, China; {2}GNSS Research Center, Wuhan University, China

15:45

 *Invited Journal Author*

## **[10.1109/JSEN.2023.3250708](#): Semantic Feature-Enhanced Graph Attention Network for Radar Target Recognition in Heterogeneous Radar Network**

Han Meng{1}, Yuexing Peng{1}, Wei Xiang{2}, Xu Pang{1}, Wenbo Wang{1}  
{1}Beijing University of Posts and Telecommunications, China; {2}La Trobe University, Australia

16:00

 *Invited Journal Author*

## **[10.1109/JSEN.2023.3242985](#): RF-Based Drone Classification Under Complex Electromagnetic Environments Using Deep Learning**

Hanshuo Zhang{3}, Tao Li{3}, Yongzhao Li{3}, Jinhui Li{1}, Octavia A Dobre{2}, Zhijin Wen{1}  
{1}Laboratory of Electromagnetic Space Cognition and Intelligent Control, China; {2}Memorial University of Newfoundland, Canada; {3}Xidian University, China

# Technical Program: Wednesday, November 1

16:15

 **Sensors Letters Paper**

**2073: UWB Bistatic Radar sensor: Across Channels Evaluation**

Luca Santoro{2}, Matteo Nardello{2}, Daniele Fontanelli{2}, Davide Brunelli{1}  
{1}Alma Mater Studiorum – Università di Bologna, Italy; {2}University of Trento, Italy

15:00 - 16:30

**C3L-04: Novel Interfacing Techniques for Sensing Systems**

Room: Park Suite 4

Session Chair(s): Wei Tang, *New Mexico State University*

15:00

 **Invited Journal Author**

[10.1109/ISENS.2022.3219628](#): Design of a Quantitative Readout in a Point-of-Care Device for Cisplatin Detection

Edoardo Ragusa{2}, Rodolfo Zunino{2}, Valentina Mastronardi{1}, Mauro Moglianetti{1}, Pier Paolo Pompa{1}, Paolo Gastaldo{2}  
{1}Istituto Italiano di Tecnologia, Italy; {2}Università degli studi di Genova, Italy

15:15

 **Invited Journal Author**

[10.1109/JSEN.2023.3238074](#): Parameter Estimation of the Randles Equivalent Electrical Circuit Using Only Real Part of the Impedance

Mitar Simic{1}, Adrian K. Stavrakis{1}, Tijana Koji{2}, Varun Jeoti{1}, Goran M. Stojanovi{1}  
{1}Faculty of Technical Sciences University of Novi Sad, Serbia; {2}Naturality Research & Development, Spain

15:30

 **Invited Journal Author**

[10.1109/JSEN.2023.3243460](#): Real-Time In-Sensor Slope Level-Crossing Sampling for Key Sampling Points Selection for Wearable and IoT Devices

Mario Renteria-Pinon, Xiaochen Tang  
New Mexico State University, United States

15:45

 **Invited Journal Author**

[10.1109/ISENS.2023.3259301](#): 1-B Delta-Sigma ADC Based Power Side-Channel Attack Detection Sensor

Shota Konno, Anupam Golder, Arijit Raychowdhury  
Georgia Institute of Technology, United States

16:00

 **Invited Journal Author**

[10.1109/ISENS.2023.3268888](#): Soft Tactile Sensors Having Two Channels with Different Slopes for Contact Position and Pressure Estimation

Hirono Ohashi{3}, Takuto Yasuda{2}, Takumi Kawasetsu{2}, Koh Hosoda{1}  
{1}Kyoto University, Japan; {2}Osaka University, Japan; {3}Tokyo University of Agriculture, Japan

# Technical Program: Wednesday, November 1

16:15

 **Sensors Letters Paper**

**2066: A Novel Capacitance-to-Time Converter for Differential-Type Capacitive Sensor Insensitive to Offset Mismatch and Parasitic Capacitance**

Narayanan P P, Sreenath Vijayakumar  
Indian Institute of Technology Palakkad, India

15:00 - 16:30

**C3L-05: Recent Advancement in Sensing Techniques**

Room: Park Suite 5

Session Chair(s): Mark Cheng, *The University of Alabama*

15:00

 **Invited Journal Author**

[10.1109/LENS.2022.3203465](#): Quantum Shot Noise Limit in Rydberg RF Receivers Compared to Thermal Noise Limit in Conventional Antenna

Liam Bussey{2}, Fraser Burton{1}, Kai Bongs{4}, Jonathan Goldwin{3}, Tim Whitley{1}  
{1}BT, United Kingdom; {2}BT & University of Birmingham, United Kingdom; {3}ColdQuanta, United States; {4}University of Birmingham, German Aerospace Center, United Kingdom

15:15

 **Invited Journal Author**

[10.1109/JSEN.2022.3229771](#): Pyroelectrically Polarity Switched Electret for Flexible Invisible Digital Memory and Self-Powered Sensors

Pedro González-Losada, Marco Martins, K.B. Vinayakumar  
International Iberian Nanotechnology Laboratory, Portugal

15:30

 **Invited Journal Author**

[10.1109/LENS.2023.3268377](#): Graphene-Based Smart Insole Sensor for Pedobarometry and Gait Analysis

Babar Ali, Negin Faramarzi, Umar Farooq, Hossein Cheraghi Bidsorkhi, Alessandro Giuseppe D'Aloia, Alessio Tamburrano, Maria Sabrina Sarto  
Sapienza Università di Roma, Italy

15:45

 **Invited Journal Author**

[10.1109/LENS.2022.3202789](#): Real-Time DDoS Detection and Alleviation in Software-Defined In-Vehicle Networks

Chin-Ya Huang, Teng-Chia Huang, Yu-Chi Chen  
National Taiwan University of Science and Technology, Taiwan

16:00

 **Invited Journal Author**

[10.1109/LENS.2023.3277889](#): An Embroidery Touch Sensor with Layered Structure of Conductive and Nonconductive Threads

Kazuhiro Shinoda{2}, D. Antony Chacon{1}, Koji Yatani{2}  
{1}University of Melbourne, University of Tokyo, Australia; {2}University of Tokyo, Japan

# Technical Program: Wednesday, November 1

16:15

 **Sensors Letters Paper**

**2148: Dipole charge detection: towards the readout of bi-stable charge states in Molecular QCA**

Mohammad Istiaque Rahaman, Gergo P Szakmany, Alexei O Orlov, Gregory L Snider  
University of Nore Dame, United States

15:00 - 16:30

**C3L-06: Sensors in Industrial Practices**

Room: Park Suite 6

Session Chair(s): Domenico Balsamo, *Newcastle University*

15:00

**\*\* INVITED**

**2088: Unfolding the Future with Smart Road Lighting and Sensing Technology**

Adrien Piot

Silicon Austria Labs GmbH, Austria

15:30

**1485: Smart Cantilever Probe with Integrated Force and Acoustic Emission Sensor**

Florian Tremmel{1}, Oliver Nagler{1}, Christoph Kutter{3}, Rainer Holmer{2}

{1}Infineon Technologies AG, Germany; {2}Regensburg University of Applied Sciences, Germany;

{3}Universität der Bundeswehr München, Germany

15:45

**1535: Accuracy Evaluation of a Low-Cost Differential Global Positioning System for Mobile Robotics**

Christian Blesing, Jan Finke, Sebastian Hoose, Anneliese Schweigert, Jonas Stenzel

Fraunhofer Institute for Material Flow and Logistics IML, Germany

15:00 - 16:30

**C3L-07: Optical Sensors - 3**

Room: Park Suite 7

Session Chair(s): Axel Dürbaum, *Kassel Universitaet*

Elizaveta Vereshchagina, *Sintef Digital*

15:00

**1216: CMOS Transceiver with Time-Gated 4x8 SPAD Array and Width-Controlled Laser Diode Pulser for Time-Domain Diffuse Optics Measurements**

Marko Pakaslahti, Ilkka Nissinen, Jan Nissinen

University of Oulu, Finland

15:15

**1623: Optical CMOS Transceiver with 8x32 SPAD Array, 32 TDCs and Laser Diode Driver for Wearable Time-Domain Diffuse Optics Applications**

Jan Nissinen, Marko Pakaslahti, Tore Leikanger, Juha Häkkinen, Jaakko Huikari, Ilkka Nissinen

University of Oulu, Finland

# Technical Program: Wednesday, November 1

15:30

**1426: Differential Measurement of a Compact LSPR Biosensor System by Two Filter-Free Wavelength Sensors for Improved Molecular Selectivity**

Tsugumi Sakae, Yong-Joon Choi, Tomoya Ide, Kazuhiro Takahashi, Toshihiko Noda, Kazuaki Sawada  
Toyohashi University of Technology, Japan

15:45

**1895: Automatic Light Intensity Modulation Using TNC-Based Artificial Iris for Smart Contact Lens**

Adwait Deshpande, Chayanjit Ghosh, Mohit U. Karkhanis, Aishwaryadev Banerjee, Erfan Pourshaban, Md. Rabiul Hasan, Amirali Nikeghbal, Md Golam Dastgir, Hanseup Kim, Carlos H. Mastrangelo  
University of Utah, United States

16:00

**1766: Novel Single Bubble Haptic Sensor: SubbleSight**

Debadutta Subudhi, Manivannan M  
Indian Institute of Technology Madras, India

16:15

**1135: Combination of Organic and Inorganic Semiconductor for Sensing Applications**

Karsten Fehse, Michael Toerker, Dirk Schlebusch, Stephan Brenner, Judith Baumgarten, Martin Rolle, Philipp Wartenberg, Bernd Richter, Uwe Vogel  
Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP, Germany

15:00 - 16:30

**C3L-08: Sensor Data Processing & AI: Automotive Perception**

Room: Park Suite 8

Session Chair(s): Ingrid Ullmann, *Friedrich-Alexander-Universität Erlangen-Nürnberg*  
Ive Weygers, *Friedrich-Alexander-Universität Erlangen-Nürnberg*

15:00

**1908: MIMO Digital Radar Processing with Spatial Nulling for Self-Interference Mitigation**

Pietro Stagnaro{2}, Ashish Pandharipande{2}, Jeroen Overvest{2}, Hamdi Joudeh{1}  
{1}Eindhoven University of Technology, Netherlands; {2}NXP Semiconductors, Netherlands

15:15

**1044: Deep Learning-Based Resolution Enhancement in SAR Image for Automotive Radar Sensors**

Sung-Wook Kang, Hahng-Jun Cho, Hojung Lee, Seongwook Lee  
Chung-Ang University, Korea

15:30

**1532: Sensor Fusion by Spatial Encoding for Autonomous Driving**

Quoc-Vinh Lai-Dang, Jihui Lee, Bumgeun Park, Dongsoo Har  
Korea Advanced Institute of Science and Technology, Korea

15:45

**1235: Joint Probabilistic Data Fusion for Pedestrian Detection in Multimodal Images**

Zuhaib Ahmed Shaikh{1}, David Van Hamme{2}, Peter Veelaert{2}, Wilfried Philips{2}  
{1}Ghent University, Imec, Belgium; {2}TELIN-IPI, Ghent University - imec, Belgium

# Technical Program: Wednesday, November 1

16:00

**1346: Multispectral Pedestrian Detection with Visible and Far-Infrared Images Under Drifting Ambient Light and Temperature**

Masato Okuda, Kota Yoshida, Takeshi Fujino  
Ritsumeikan University, Japan

16:15

**1188: Multi-LiDAR Localization and Mapping Pipeline for Urban Autonomous Driving**

Florian Sauerbeck, Dominik Kulmer, Markus Pielmeier, Maximilian Leitenstern, Christoph Weiß, Johannes Betz  
Technische Universität München, Germany

15:00 - 16:30

**C3L-09: Magnetometers and Navigation Sensors**

Room: Park Suite 9

Session Chair(s): Christian Schott, *Melexis Technologies*  
Salvatore Pullano, *University of Catanzaro*

15:00

**1604: Wide Dynamic Range of a MEMS Differential Resonant Accelerometer with Asymmetric T-Shaped Electrodes**

Kei Masunishi, Etsuji Ogawa, Daiki Ono, Fumito Miyazaki, Kengo Uchida, Jumpei Ogawa, Hideaki Murase, Fumitaka Ishibashi, Yasushi Tomizawa  
Toshiba Corporation, Corporate Research & Development Center, Japan

15:15

**1381: Electrostatically Actuated SOI In-Plane Motion Platform for In-Situ Calibration of Micro Gyroscopes**

Erez Benjamin{2}, Ronen Maimon{1}, Aviv Ronen{1}, Eldad Yichie{1}, Slava Krylov{2}  
{1}RAFAEL Advanced Defense Systems Ltd, Israel; {2}Tel Aviv University, Israel

15:30

**1007: Yttrium Iron Garnet Magnetometers with 1 nT/?Hz Sensitivity**

Massood Tabib-Azar, Olivia Thu Lam  
University of Utah, United States

15:45

**1211: Active Compensation of Non-Orthogonality in CMOS Vertical Hall Based Angle Sensors**

Tobias Gnos{2}, Reto Besserer{2}, Yves Mermoud{2}, Serge Reymond{1}, Pierre-Francois Bourdelle{1}, Pavel Kejik{1}, Christoph Würsch{2}, Samuel Huber{2}  
{1}MPS Tech Switzerland Sàrl, Switzerland; {2}University of Applied Sciences of Eastern Switzerland, Switzerland; {2}University of Applied Sciences of Eastern Switzerland, Switzerland

16:00

**1751: Pitot Tube Type Compact Waterproof Airflow Sensor for Seabird Biologging**

Takuto Hirayama, Takuto Kishimoto, Hidetoshi Takahashi  
Keio University, Japan

# Technical Program: Wednesday, November 1

16:15

**1824: Flight-Testing of a MEMS Wall Shear Stress Thermal Sensor on a Microlight Aircraft**

Cecile Ghouila-Houri{2}, Thomas Arnoult{2}, Aurelien Mazzamurro{2}, Sylvain Kern{2}, Romain Viard{3}, Damien Teillet{1}, Emma Palfi{1}, Eric Garnier{4}, Abdelkrim Talbi{2}, Philippe Pernod{2}  
{1}ARESIA, France; {2}Centrale Lille, France; {3}JMH Conception, France; {4}ONERA, France

16:30 - 17:30

**Conference Award Ceremony (supported by the IEEE MEMS Technical Community) / 2024 Conference Announcement**

Room: Grand Park Hall

Session Chair(s): Svetlana Tatic-Lucic, *Lehigh University*  
Yi Chiu, *National Yang Ming Chiao Tung University*

17:30 - 18:00

**Closing Remarks**

Room: Grand Park Hall

# Notes