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WELCOME TO THE FIRST APPLIED SENSING CONFERENCE (APSCON) 2023

On behalf of the organizing committee of the IEEE APSCON Conference, we are excited to welcome you to the City of Bengaluru, India. The IEEE APSCON Conference will be held on January 23 – 25, 2023 at the Conrad Bengaluru Hotel.

We are enthusiastic and excited about the first APSCON conference, which is the first major event of the 25th year of the constitution of IEEE Sensors Council. Formally constituted in June 1998, with presidents of 14 IEEE Societies signing the petition for its formation, today, the council serves its 26 IEEE member societies and the sensors community in the multi-disciplinary technical area of sensors, covering all aspects of sensors and sensing systems, from design to fabrication and applications. The council has seen numerous achievements over the years and has provided highly successful avenues for the sensors community to publish, gather and interact. These include the IEEE Sensors Journal, which is one of the world’s largest journals in sensor engineering and technology, IEEE Sensors Letters, and the flagship IEEE Sensors Conference. In the recent years the council has spawned several new conferences including IEEE Inertial, IEEE FLEPS, IEEE Biosensors and industry focused events such as Sensors in Spotlight (SenSiS), and Sensor Interfaces Meeting (SIM). In addition, the council is co-sponsor of IEEE Internet of Things Journal, and IEEE Journal of Flexible Electronics (JFLEX), IEEE Journal of Indoor Positioning and Seamless Navigation (JISPIN), IEEE Transactions on AgriFood Electronics (TAFE) and more. IEEE Sensors Council also offers several other exciting education programs such as Summer Schools, Webinars, Distinguished Lecturer Program, and YouTube channel providing free access to a large number of conference presentations recorded over more than a decade. In addition, council has several vibrant Chapters around the world, and highly active diversity initiatives in the field of sensors through Women in Sensors and Young Professionals Programs. The 25 years of journey has been a remarkable one with outstanding successes and impact across the world. We hope to continue this path through your continued involvement and participation. Thank you!

The organizing committee, has been working hard to design this first applications focused conference on Sensors and sensing systems. The technical program committee and the track chairs have used high standards to ensure the quality of the papers selected for oral and poster presentation. In addition, we have planned several special focus and social programs, and recruited invited speakers from various backgrounds to enhance the attendees’ experience. We hope IEEE APSCON conference will become the premier platform for researchers to share their latest research and findings on applications of sensors and sensing systems and will
provide a synergistic environment for building a community of researchers, practitioners, and students in the field.

The APSCON 2023 features four keynote speakers. Dr. Valérie Renaudin, Professor at the University Gustave Eiffel, France will present a talk entitled “Smart Processing with Wearable Devices: Shall We Consider the Human Influence?”. Dr. Giorgio Metta, Scientific Director at the Istituto Italiano di Tecnologia (IIT), Italy will present a talk entitled “Peripersonal space and margin of safety around the body: learning visuo-tactile associations in a humanoid robot with artificial skin”. Dr. Navakanta Bhat, Dean and Professor at the Indian Institute of Science, Bangalore will present a talk entitled “Towards Smart Bio-Chemical Sensing Platforms” and Dr. Cian Ó Mathúna, Head of Micro Nano Systems Center, at the Tyndall National Institute, Ireland will present a talk entitled “Micro Sensor Systems for the Future Internet of Everything (IoE)”.

IEEE APSCON is also offered the authors of high-quality papers an opportunity to publish in IEEE Sensors Letters and also present their papers in conference as normal. This is part of IEEE Sensors Council’s initiative started recently to enhance the interaction between its journal publications and conferences. APSCON 2023 Conference invited selected authors of high-quality papers to submit their final papers to IEEE Sensors Letters, which were further peer reviewed and the outcome decided prior to the APSCON conference. Out of a total of 16 such invitations, 10 papers were accepted to IEEE Sensors Letters Journal following a rigorous but expedited peer review process and will be presented by the authors at the conference. These papers will not be part of the conference proceedings but instead will be linked to IEEE Sensors Letters issue where they are published. The selected author invitations were based on the recommendation provided by the Technical Program Committee and Track Chairs who evaluated all submitted abstracts between September and October 2022. In addition, we have a session on invited papers from articles that have been published in IEEE Sensors Journal.

The program consists of 14 Sessions covering various aspects of Sensor Applications and two special sessions. A total of 309 abstracts were submitted of which 205 have been accepted for presentation at the conference. These submissions will be presented during the conference, as 127 oral and 78 poster presentations. A total of 20 invited speakers are also included in the technical program. Submissions were from academia (95%), research facilities and government laboratories (2%), and industry (3%). The submitted papers came from all the regions of the world, with about 84% from Asia/Pacific, 10% from Europe, 4% from North America, and about 2% from Latin America and Middle East/Africa. Two Best Student Oral and Two Best Poster
presentation awards will be presented at the banquet on January 24th and at lunch on January 25th respectively. Accepted papers not published in IEEE Sensors Letters and IEEE Sensors Journal will be published in the Conference Proceedings and electronically archived in the IEEE Xplore digital library.

In the 25th anniversary year, IEEE Sensors Councils has decided to organize additional events focusing on Sustainable technologies and practices. As part of this initiative, we will be having a Panel discussion on the topic on Tuesday, January 24. The topic of this panel discussion is ‘Sustainability Priorities in the Local & Global context’. The Social Event and Gala banquet dinner after the panel discussion also part of IEEE Sensors Council’s 25th Anniversary celebrations. Additionally, the Women-in-Sensors and Young Professionals are organizing events such as Big Idea Pitch session, Sensors Standards Opportunity Session, and Young Professionals Panel discussion on Current and Future Trends in Applied Sensing. Further, there will be a live demo session in the morning session on January 25th. We also invite all attendees to join us in the reception in the evening of January 22, 2023.

IEEE APSCON 2023 conference welcomes everyone to participate in the multidisciplinary conversation in order to accelerate technologies advancing applications of sensors and sensing systems for benefiting and enriching the society at large. We sincerely thank all the organizing committee and technical committee members for volunteering and their hard work to organize this conference and the support from everyone involved.

We welcome everyone to Bengaluru India and look forward to seeing you all!

**General Chairs:** Anil Roy and Srinivas Tadigadapa

**Technical Program Chairs:** Ramgopal Rao and Chonggang Wang
IEEE APSCON 2023 ORGANIZING COMMITTEE

General Co-Chairs
Anil K. Roy, DA-IICT Gandhinagar (India)
Srinivas Tadigadapa, Northeastern University (USA)

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Chonggang Wang, InterDigital (USA)

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Zeynep Celik, University of Texas at Arlington (USA)

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Vidyashankar Buravalla, GE Bangalore (India)
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Bruce Hecht, Analog Devices (USA)

Sensors Startup Summit Co-Chairs
Muzzamil Hussain, Tika Data (India)
Raghu Venkat, Co-Founder and CTO, Actyv (USA)

Sensors Standards Opportunities Co-Chairs
H. Troy Nagle, NC State University (USA)
Gerard Hayes, Wireless Research Center (USA)

Focused Session Co-Chairs
Ajay Agrawal, IIT Jodhpur (India)
Praveen Pankajakshnan, CropIn (India)

Young Professionals Co-Chairs
Mitradip Bhattacharjee, Indian Institute of Science Education and Research (IISER) Bhopal (India)
Amit Kumar, BioAxis DNA Research Centre (P) Ltd (India)

WiSE Co-Chairs
Saakshi Dhanekar, IIT Jodhpur (India)
Veda Sandeep Nagaraja, Tyndall National Institute, University College Cork (Ireland)

Live Demo Co-Chairs
Bishakh Bhattacharya, IIT Kanpur (India)
Svetlana Tatic-Lucic, Lehigh University (USA)
Students Research Forum Co-Chairs
  Chun-Wei Tsai, National Sun Yat-sen University (Taiwan)
  Vinay Palaparthi, DA-IICT Gandhinagar (India)

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  Hamida Hallil, University of Bordeaux, Paris (France)

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  Rajath V, BMS College of Engineering Bangalore (India)

Local Organizing Committee Co-Chairs
  Shubhangi Bhardwaj, Centre For Nano Science and Engineering (CeNSE),
  Indian Institute of Science (IISc), Bangalore (India)
  Khuushi, Center for Nano Science and Engineering Indian Institute of
  Science, Bengaluru (India)
International Advisory Committee

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Rudra Pratap, Plaksha University (India)
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Subhas Mukhopadhyay, Macquarie University (Australia)
Takamichi Nakamoto, SENSORS 2024 (Japan)
Thomas Thundat, University of Buffalo (USA)
Veena Misra, North Carolina State University (USA)
Yogesh Gianchandani, University of Michigan (USA)
Yu-Cheng Lin, National Yang Ming Chiao Tung University (Taiwan)
IEEE APSCON 2023 TRACK CHAIRS

Track 1: Sensing for Agriculture
Gondi Kondaiah Ananthasuresh, IISc Bangalore (India)
Yun-Wei Lin, National Yang Ming Chiao Tung University (Taiwan)

Track 2: Sensing for e-Mobility
B.K. Panigrahi, IIT Delhi (India)
Reza Malekian, Malmö University (Sweden)

Track 3: Joint Sensing, Communications and Localization
Sudip Misra, Department of Computer Science & Engineering, IIT Kharagpur (India)
Solmaz Kia, UC Irvine (USA)

Track 4: Sensing for Smart and Connected Healthcare
Sri-Rajasekhar Kothapalli, Penn State University (USA)
Prosenjit Sen, IISc (India)

Track 5: Crowdsensing and Intelligent Sensing
Anuj Dhawan, IIT Delhi (India)
Shiv Govind Singh, IIT Hyderabad (India)

Track 6: Habitat and Environment Monitoring
Dipankar Bandyopadhyay, IIT Guwahati (India)
Ruidong Li, Kanazawa University (Japan)

Track 7: Sensing for Critical Infrastructure
Dipti Gupta, IIT Bombay (India)
Philip Pong, New Jersey Institute of Technology (USA)

Track 8: Internet of Senses
T K Bhattacharya, IIT Kharagpur (India)
Liang Zhou, Nanjing University of Posts and Telecommunications (China)

Track 9: Sensing for Industry 4.0
Vinay Jammu, Physical-Digital Technologies at GE Digital (India)
Paul (C.-P.) Chao, National Yang Ming Chiao Tung University (Taiwan)

Track 10: Sensing for Energy
K S Reddy, IIT Madras (India)
Moayad Aloqaily, Mohamed Bin Zayed University of Artificial Intelligence (MBZUAI) (UAE)
Track 11: Sensing in Security
  P.J. Narayanan, IIIT Hyderabad (India)
  Thomas Thundat, University of Buffalo (USA)
  Danda Rawat, Howard University (USA)

Track 12: Sensing for Smart City and Village
  Edith C. H. Ngai, The University of Hong Kong (China)
  Maryam Shojaei, IIT Bombay (India)

Track 13: Sensing for Sports and Entertainment
  Elena Bergamini, University of Rome “Foro Italico” (Italy)
  Chih-Chieh Hung, National Chung Hsing University (Taiwan)

Track 14: Sensing for Education
  JaeSeung Song, Sejong University (South Korea)
  L.S. Shashidhara, IISER Pune & Ashoka University (India)
PLATINUM PATRON

Institute of Smart Structures and Systems (ISSS)

SILVER PATRON

adani Petrochemicals

AWARD PATRON

GHA GLOBAL HEALTHCARE ACADEMY

TEA BREAK PATRON

Plaksha UNIVERSITY
PLENARY SPEAKERS

Peripersonal Space and Margin of Safety Around the Body: Learning Visuo-Tactile Associations in a Humanoid Robot with Artificial Skin

Giorgio Metta, Istituto Italiano di Tecnologia (IIT), Italy

In this talk I discuss the development of a large area electronic skin and its application to create a biologically motivated model of peripersonal space in a humanoid robot. Guided by the present understanding of the neurophysiology of the fronto-parietal system, we developed a computational model inspired by the receptive fields of polymodal neurons identified, for example, in brain areas F4 and VIP. The experiments on the iCub humanoid robot show that the peripersonal space representation i) can be learned efficiently and in real-time via a simple interaction between the robot and the environment, ii) can lead to the generation of behaviors like avoidance and reaching, and iii) can contribute to the understanding the biological principle of motor equivalence. More specifically, with respect to i) the present model contributes to hypothesizing a learning mechanisms for peripersonal space. In relation to point ii) we show how a relatively simple controller can exploit the learned receptive fields to generate either avoidance or reaching of an incoming stimulus and for iii) we show how the robot can select arbitrary body parts as the controlled end-point of an avoidance or reaching movement.
Towards Smart Bio–Chemical Sensing Platforms

Navakanta Bhat, Indian Institute of Science, Bangalore

Multiplexed sensing platforms will be the key enablers of smart electronic systems of the future. Such platforms will require the integration of miniaturized sensor arrays at the system/chip level, using heterogeneous technologies. While we have made substantial progress in vision, tactile and auditory sensing applications, an equivalent of Moore’s law is missing in biological and chemical sensing applications. With phenomenal advances in semiconductor nanotechnology and printed/flexible electronics, the stage is now set for a new wave of sensor systems to be equipped with massive sensory functions, specifically with biological and chemical sensor arrays. In this talk, I will present two case studies from our research: (i) Biosensor systems for point of care diagnostics: the story of managing the sensing of multiple analytes in blood and urine with an eventual goal to realize “Lab on Palm” (ii) Gas sensor systems for environmental monitoring, breath analysis and hazardous gas leakage detection, with an eventual goal to realize the “Electronic Nose.” With this backdrop, I will end my talk with some thoughts on future challenges in achieving highly complex and intelligent nanoscale sensory systems.
Micro Sensor Systems for the Future Internet of Everything (IoE)

Cian Ó Mathúna, Tyndall National Institute, Ireland

The Internet of Everything (IoE) has been described as “the networked connections between devices, people, processes and data” and it has been widely predicted that, by 2025, the IoE will exceed 100 billion connected devices, each attached to at least 10 sensors collecting data. This is anticipated to result in a one trillion-sensor economy driving a digital revolution in data with market reports estimating that the IoE will generate almost $20 trillion of newly created value. This digital transformation, the beginning of which we are already experiencing, is expected to dramatically enhance the health and well-being of the global population as well as the sustainability of our planet, encompassing both our built and natural environments. This vision of the IoE has the potential to enhance the management of our core local and global infrastructures and ecosystems and enable personal health, and well-being as well as global sustainability encompassing food production, air and water quality, energy, communications, transport and security. This talk will present some of the state-of-the-art research being undertaken at Tyndall National Institute, University College Cork, Ireland in the “making and powering of the smart things” that will make up this future Internet of Everything. These smart things, or intelligent autonomous wireless sensor nodes, typically comprise multiple sensors, signal and data processing, some form of actuation, wireless communication and a power source. To illustrate the range of technologies that need to be considered, a number of representative case studies will be presented that address applications including precision agriculture and environmental monitoring, bio-pharma processing, medical devices addressing in-the-body diagnostics and therapeutics, wearable electronics for health and well-being as well as interfacing with robotics in advanced manufacturing. The need for energy harvesting or scavenging platforms will also be presented as an alternative, or complimentary technology to batteries. The concept of sustainable or compostable electronics will be introduced as a future direction for consideration. Finally, the talk will introduce opportunities and challenges of using Artificial Intelligence to enable intelligence at the “Edge of the Edge” of the IoE.
PLENARY SPEAKERS (CONT.)

Smart Processing with Wearable Devices: Shall We Consider the Human Influence?

Valérie Renaudin, University Gustave Eiffel, France

Wearable devices embed inertial sensors whose records are processed for navigation instructions, health assessment, sports training or change in mobility behaviour. The applications are processing inertial or telecommunication signals sensed in our clothes, shoes and glasses. Complex methods, more and more based on artificial intelligence, are developed to process these data but they sometimes forget that human behaviour defies the developed methods. Defining the minimum performance requirements for a targeted application, calibrating embedded sensors and accounting for the hardware constraints of the wearables are classical R&D steps. The influence that humans can have on the quality of measurements (signal attenuation by the human body, change of behaviour, ageing, etc.) is however often forgotten. In this presentation, we will analyse the observability of gait parameters and navigation data with signals sensed by devices worn on different body parts (upper/lower body). We will also observe the human gait variation for the same person in different kinematic contexts (visually impaired people guided by a cane or a dog). The analysis will be supported by a theoretical and experimental approach with inertial signals and GNSS phase and pseudo-ranges data collected by pedestrians.
1014: Multi-Level Fusion of Multi-Spectral Images to Detect the Artificially Ripened Banana
Narayan Vetrekar{1}, Raghavendra Ramachandra{2}, Rajendra Gad{1}
{1}Goa University, India; {2}Norwegian University of Science and Technology, Norway

1193: Experimental Investigation of Leaf Wetness Sensing Properties of MoS2 Nanoflowers Based Flexible Leaf Wetness Sensor
Priyanka Khaparde, Kamlesh S Patle, Yash Agrawal, Anil Roy, Vinay S Palaparthy
Dhirubhai Ambani Institute of Information and Communication Technology, India

1131: Sensing System Assisted Novel PID Controller for Electric Vehicles
Dayarnab Baidya, Shreya Dhopte, Mitradip Bhattacharjee
Indian Institute of Science Education and Research, Bhopal, India

1128: PEDOT:PSS Based Disposable Humidity Sensor for Skin Moisture Monitoring
Ajay Beniwal{2}, Ravinder Dahiyat{1}
{1}Northeastern University, United States; {2}University of Glasgow, United Kingdom

1231: Characterizing the Dynamics of Surface Electromyography Signals in Muscle Fatigue Through Visibility Motif Networks
Navaneethakrishna Makaram{1}, Ramakrishnan Swaminathan{2}
{1}Boston Childrens Hospital, United States; {2}Indian Institute of Technology Madras, India

1108: Effect of Rapid Thermal Annealing on Material, Electrical and Sensing Characteristics of Ag-Doped CaTiO3-CuO Thin Film Carbon Dioxide Gas Sensors
Rudrswamy S B{2}, Shwetha H R{3}, Navakanta Bhat{1}
{1}Indian Institute of Science, India; {2}Jagadguru Sri Shivarathreeshwara Science and Technology University, India; {3}Jawaharlal Nehru National College of Engineering, India

1155: Tracking Moored Vessel Movement in Multiple DOF Using Active Sensing Methods
Robin Kerstens{2}, Wouter Jansen{2}, Gauthier de Borrekens{2}, Stefaan Ides{1}, Jan Steckel{2}
{1}Port of Antwerp–Bruges, Belgium; {2}University of Antwerp, Belgium

1141: Distributed Fiber-Optic Calorimetric Dosimeter
Aleksey Tregubov, Victor Prikhodko, Alexander Alekseyev, Sergey Novikov, Galina Tertyshnikova, Andrey Zhukov
Ulyanovsk State University, Russia
1088: Acoustic Based Machine Anomaly Detection Using Beamforming and Sequential Transform Learning
Saurabh Sahu{2}, Kriti Kumar{2}, Angshul Majumdar{1}, A Anil Kumar{2}, M Girish Chandra{2}
{1}Indraprastha Institute of Information Technology Delhi, India; {2}Tata Consultancy Services, India

1144: Spectroscopic Studies and Numerical Modelling on Nanoparticle Based Toxic Heavy Metal Sensor for the Development of a Low Cost Prototype in Field Use
Nivedita Pan{2}, Ria Ghosh{2}, Debdatta Mukherjee{6}, Neha Bhattacharyya{5}, Lopamudra Roy{5}, Amrita Banerjee{1}, Soumen Bra Singh{2}, R. T. Goswami{4}, Mala Mitra{3}, Arpita Chattopadhyay{4}, Samir Kumar Pal{2}
{1}Jadavpur University, India; {2}S.N.Bose National Centre for basic Sciences, India; {3}Sister Nivedita University, India; {4}Techno International, India; {5}University of Calcutta, India; {6}University of Kalyani, India
1321: A Fingerprinting Based Audio-Seismic Systems for Human Target Localization in an Outdoor Environment Using Regression
Priyankar Choudhary, Neeraj Goel, Mukesh Saini
Indian Institute of Technology Ropar, India

1310: Molecular Imprinting with Polyaniline on ENIG Finish PCB Electrodes for Electrochemical Detection of Melamine
Ruchira Nandeshwar, Madhumita P. Date
Indian Institute of Technology Bombay, India

1315: Cortical Source Domain Based Motor Imagery and Motor Execution Framework for Enhanced Brain Computer Interface Applications
Lalan Kumar, Amita Giri, Tapan K. Gandhi
Indian Institute of Technology Delhi, India

1311: Ammonia Sensing Performance of RGO-Based Chemiresistive Gas Sensor Decorated with Exfoliated MoSe2 Nanosheets
Ravindra Jha[1], Aman Nanda[2], Navakanta Bhat[2]
[1]CSIR–Central Electronics Engineering Research Institute, India; [2]Indian Institute of Science, India

1317: Potential of Impedance Spectroscopy Towards Quantified Analysis of Gas Sensors: a Tutorial
Koushik Dutta
Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India

1318: A VLSI-Based Hybrid ECG Compression Scheme for Wearable Sensor Node
Jitumani Sarma, Rakesh Biswas
Indian Institute of Information Technology Guwahati, India

1305: Laser-Assisted Gaussian Microstructure Patterned PDMS Encapsulated Ti3C2Tx (MXene)-Based Pressure Sensor for Object and Touch Detection
Parikshit Sahatiya, Vivek Adepu, Krutarth Kamath, Venkat Mattela
Birla Institute of Technology and Science, Pilani, India

1322: The Machine Learnings Leading the Cuffless PPG Blood Pressure Sensors Into the Next Stage
Duc Huy Nguyen, Paul C.-P. Chao, Chih-Cheng Wu
National Yang Ming Chiao Tung University, Taiwan
1313: Metal/Metal Oxide Modified Graphene Nanostructures for Electrical Biosensing Applications: a Review
Chirasree RoyChaudhuri, Bhaswati Chakraborty
Indian Institute of Engineering Science and Technology, India

1302: An Energy-Efficient Power Allocation Scheme for NOMA-Based IoT Sensor Networks in 6G
Rishu Raj, Abhishek Dixit
Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, India
# PROGRAM AT A GLANCE

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<td>Opening Ceremony</td>
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<td>IEEE Sensors Council President’s address</td>
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<td>Plenary: Giorgio Metta</td>
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<td>Sensing for Agriculture-I</td>
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<td>Sensing &amp; Communication I</td>
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<td>Sensing for Industry 4.0-I</td>
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<td>Student Research Forum II</td>
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<td>Critical Infrastructure I</td>
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<td>Smart and Connected Healthcare-III</td>
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<td>Sensing for Smart City &amp; Village I</td>
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<td>Alternative Diagnostics &amp; Therapies</td>
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<td>Infrastructure Industry Talks</td>
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<td>Sensors Standards Opportunity</td>
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<td>Sensors Startup Summit &amp; BioMedical Industry Talks</td>
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<td>16:00</td>
<td>Wise/YP Panel</td>
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<td>17:00</td>
<td>Sustainability Priorities in the Local &amp; Global context: What, How and When?</td>
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<td>YP/Wise networking event</td>
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<td>Cultural Event</td>
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<td>25 Year Anniversary Celebration Banquet</td>
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PROGRAM AT A GLANCE

Wednesday, January 25

8:00
Registration

9:00
Plenary: Valérie Renaudin

10:00
Tea Break

11:00
Poster Session
Live Demo Session

12:00
Sensing in Agriculture III
Mixed Session Education II, Industry 4.0
Smart Energy I
Mixed Session Localization III & Security Session

13:00
Lunch

14:00
Sensing in Agriculture IV
Smart & Connected Healthcare IV
Mixed Session Sensing of e-Mobility I & Crowdsensing and Intelligent Sensing

15:00
Smart Energy III
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>8:00 - 8:45</td>
<td>Registration</td>
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<tr>
<td></td>
<td>Room: Pre-Function Area</td>
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<tr>
<td>8:45 - 9:00</td>
<td>Opening Ceremony</td>
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<td>Room: Grand Ballroom</td>
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<td></td>
<td>Session Chair(s): Anil Roy &amp; Srinivas Tadigadapa &amp; V. Ramgopal Rao</td>
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<tr>
<td>9:00 - 9:10</td>
<td>IEEE Sensors Council President’s Address</td>
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<td>Room: Grand Ballroom</td>
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<td></td>
<td>Ravinder Dahiya</td>
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<tr>
<td>9:10 - 10:10</td>
<td>Peripersonal space and margin of safety around the body: learning visuo-tactile associations in a humanoid robot with artificial skin</td>
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<td>Giorgio Metta</td>
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<td>Room: Grand Ballroom</td>
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<td>Session Chair(s): Ravinder Dahiya</td>
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<td>10:10 - 10:40</td>
<td>Tea Break</td>
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<td>Room: Pre-Function Area</td>
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<tr>
<td>10:40 - 11:40</td>
<td>A1aP-05: Habitat &amp; Environment Monitoring 3</td>
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<td>Room: Poster Area</td>
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<tr>
<td></td>
<td>1037: Development of Landslide Forecasting System Using Deep Learning</td>
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<td></td>
<td>Amrita Joshi{2}, Debi Prasanna Kanungo{1}, Rajib Kumar Panigrahi{2}</td>
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<td></td>
<td>{1}CSIR-Central Building Research Institute, India; {2}Indian Institute of Technology Roorkee, India</td>
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<tr>
<td></td>
<td>1056: DL-RAP: Deep-Learning Based Real-Time Accident Diffusion Prediction</td>
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<td>Bo Zhang, Xuhui Zhao, Hui Chen</td>
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<td>Zhengzhou University, China</td>
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<td>1112: Evaluation of Low-Cost Particulate Matter Sensor in Indoor and Outdoor Micro-Environments</td>
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<td>Aswin Giri J, Shiva Nagendra SM</td>
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<td></td>
<td>Indian Institute of Technology Madras, India</td>
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</tbody>
</table>
1123: Design and Development of Low-Cost Environmental Sensors for Urban Noise Measurements
Lakshmi Pradeep, S M Shiva Nagendra
Indian Institute of Technology Madras, India

1146: Analysis of Multi-Indices from Hyperspectral Strip Along Climatic Gradient as Surrogates of Climate Change
Maxim Shoshany\{2\}, Jisung Chang\{2\}, Yisok Oh\{1\}
\{1\}Hongik University, Korea; \{2\}Technion, Israel Institute of Technology, Israel

1177: ACR2UNet: Semantic Segmentation of Remotely Sensed Images Using Residual-Recurrent UNet and Asymmetric Convolutions
Aarabhi Putty, Annappa B.
National Institute of Technology Karnataka, India

10:40 – 11:40
A1aP-06: Habitat & Environment Monitoring 4
Room: Poster Area

1100: Chemosensor for Colorimetric Detection of Fluoroquinolone Antibiotics
Tennyson Mathai, Tathagata Pal, Soumyo Mukherji
Indian Institute of Technology Bombay, India

1102: Gold Nanoparticles Coated Aptamer-Based Fiber Optic LSPR Biosensor for Arsenic Detection
Ashish Shukla, Tathagata Pal, Soumyo Mukherji
Indian Institute of Technology Bombay, India

1162: Fully Automated, Real-Time Monitoring of Ambient Water Vapour Using a Compact 1392 nm Tunable Diode Laser-Based System
Durlav Paul\{2\}, Shruti De\{2\}, Kenneth T V Grattan\{1\}, Arup Lal Chakraborty\{2\}
\{1\}City, University of London, United Kingdom; \{2\}Indian Institute of Technology Gandhinagar, India

1175: Lossy Mode Resonance Based Optical Fiber Sensor Using Polyvinylpyrrolidone/Chitosan Composite for Identification of Cadmium Ions in Water
A Prasanth\{3\}, M Velumani\{1\}, S Narasimman\{2\}, Zachariah C Alex\{3\}
\{1\}Madanapalle Institute of Technology and Science, India; \{2\}Sri Venkateswara College of Engineering and Technology, India; \{3\}Vellore Institute of Technology, India
1181: Fabrication and Characterization of Liquid Phase Exfoliated MoS2 Nanosheet for Gas Sensing Application
Rahul Gond, Akhilesh Rawat, Mayank Baghoria, Bhanu Prakash, Brajesh Rawat
Indian Institute of Technology Ropar, India

1242: Reusable Porous Alumina-Based Adsorber for Removal of Copper Ions from Top Sediments Layers of Water Bodies and Effluents Discards
Vikram Maharshi{1}, Priya Vinayak{1}, Madhusudan Singh{1}, Ajay Agarwal{2}, Bhaskar Mitra{1}
{1}Indian Institute of Technology Delhi, India; {2}Indian Institute of Technology Jodhpur, India

1048: Printed and Flexible Capacitive Pressure Sensors for Soft Robotics
Mani Teja Vijjapu{2}, Sherjeel Khan{2}, Syed Hassaan Abdullah{2}, Manoj Jose{2}, Johanna Zikulnig{2}, Lukas Rauter{2}, Lisa-Marie Faller{1}, Jürgen Kosel{2}
{1}Carinthia University of Applied Sciences, ADMiRE Lab, Austria; {2}Silicon Austria Labs GmbH, Austria

1049: Electricity Usage Forecasting Using Intelligent Electricity Meters and Edge Computing Device
Zepei Yu{1}, Xingjie Zeng{1}, Yuming Nie{1}, Zhicheng Bao{1}, Liang Xu{2}, Huansheng Ning{2}, Weishan Zhang{1}
{1}China University of Petroleum, China; {2}University of Science and Technology Beijing, China

1062: A Novel and Compact Photoacoustic Sensing System to Estimate Thermophysical Properties of the Lubricant Oil
Abhijeet Gorey, Arijit Sinharay, Chirabrata Bhaumik, Tapas Chakravarty, Arpan Pal
Tata Consultancy Services, India

1109: Efficient Prediction of Segment Kinematics and Dynamics from Motion Capture Data Using Deep Learning
Debneil Nag Chowdhury{1}, Aziz Ahmed{2}, Manish Sreenivasa{2}
{1}Indian Institute of Technology Kharagpur, India; {2}University of Wollongong, Australia

1142: DigiFresh – Quality Assurance of High Value Foods
Jayita Dutta, Parijat Deshpande, Selvan SS, Beena Rai
Tata Consultancy Services, India
1156: Modelling of a Highly Sensitive Polymer Composite Tactile Pressure Sensor
Syed Hassaan Abdullah{2}, Lisa-Marie Faller{1}, Mani Teja Vijjapu{2}, Jürgen Kosel{2}, Sherjeel Khan{2}
{1}Carinthia University of Applied Sciences, ADMiRE Lab, Austria; {2}Silicon Austria Labs GmbH, Austria

1182: Photo-Electric Characteristics Analysis of Quantum Corrected Strained Nanowire Drift-Diffusion Model Based Si/Si0.98C0.02 Asymmetrical Super-Lattice Near Infrared Photo-Detector
Saunak Bhattacharya{2}, Abhijit Kundu{2}, Debraj Chakraborty{1}, Angsuman Sarkar{3}, Moumita Mukherjee{1}
{1}Adamas University, India; {2}Chaibasa Engineering College, India; {3}Kalyani Govt. Engineering College, India

1206: CMOS–MEMS Nano Force Sensor with Sub-µm U-Channel Suspended Gate SOIFET
Pramod Martha{1}, Naveen Kadayinti{2}, V. Seena{1}
{1}Indian Institute of Space Science and Technology, India; {2}Indian Institute of Technology Dharwad, India

1225: A Two-Axis Force Sensor Using a Decoupling Compliant Mechanism for Calibrating Magnetic Robots
Sudhanva Bhat, G K Ananthasuresh
Indian Institute of Science, India

1246: Micromolding-in-Capillary Based Fabrication of Liquid Metal Patterned Structures for Soft Robotics
Radu Chirila {1}, Abhishek Singh Dahiya {1}, Ravinder Dahiya {2}
{1} University of Glasgow, United Kingdom; {2} Northeastern University

10:40 - 11:40
A1aP-08: Smart Energy 2
Room: Poster Area

1063: Reliability-Aware Energy-Efficient Joint Resource Allocation for Edge Computing
Haiying Peng, Jingjue Zhang, Zhidu Li, Tong Tang
Chongqing University of Posts and Telecommunications, China
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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
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<tr>
<td>10:40 - 11:40</td>
<td><strong>A1aP-09: Sensing for Smart City &amp; Village 2</strong>&lt;br&gt;Room: Poster Area</td>
<td>1021: Delay-Aware Task Scheduling and Resource Allocation Optimization in the Internet of Things&lt;br&gt;Dapeng Wu, Jie Liu, Hong Zhang, Ruyan Wang&lt;br&gt;Chongqing University of Posts and Telecommunications, China</td>
<td>1067: UAV-Assisted 3D Trajectory Planning and Data Collection in Wireless Powered IoT&lt;br&gt;Zhidu Li, Hekai Li, Tong Tang&lt;br&gt;Chongqing University of Posts and Telecommunications, China</td>
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<tr>
<td></td>
<td><strong>A1aP-09: Sensing for Smart City &amp; Village 2</strong>&lt;br&gt;Room: Poster Area</td>
<td>1068: MD-RES: A Mode Decomposition Based Residual Matching Model for Short-Term Traffic Flow Prediction&lt;br&gt;Yuanyuan Zhang, Luojie Lin, Chang Liu, Yanru Chen, Hao Wang, Liangyin Chen&lt;br&gt;Sichuan University, China</td>
<td>1136: Deep Reinforcement Learning Empowered Particle Swarm Optimization for Aerial Base Station Deployment&lt;br&gt;Jinpeng Song, Bo Zhang, Junfeng Li&lt;br&gt;Zhengzhou University, China</td>
</tr>
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<td><strong>A1bP-05: Sensing for Sports &amp; Entertainment</strong>&lt;br&gt;Room: Poster Area</td>
<td>1153: Wearable Sensing Module for Table Tennis Stroke Detection&lt;br&gt;Sourin Ghosh, Yogesh Gholap, Siddharth Tallur&lt;br&gt;Indian Institute of Technology Bombay, India</td>
<td></td>
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</table>
10:40 - 11:40

**A1bP–06: Sensors for Alternative Diagnostics and E-textile Sensors**
Room: Poster Area

**1285: A Monitored Miniature Dialysis Apparatus with Silicon Nanoporous Membrane**
Abhishek Kumar, Fidal Kumar V T, Sivasundari Kannan, Sudeshna Sengupta, Enakshi Bhattacharya
Indian Institute of Technology Madras, India

**1294: A Two-Dimensional (2D) WSe2 -Based Binary Composite for Ultrasensitive Trace Level Room Temperature NH3 Sensing for Non-Invasive Diagnosis**
Deepak Sharma, Ayan Pal, Navakanta Bhat
Indian Institute of Science, India

**1298: A Woven Wristband for Spatiotemporal Body Temperature Sensing for Healthcare Applications**
Kunj Golwala{1}, Shrutidhara Sarma{1}, Ajay Agarwal{1}, Yuvraj Garg{2}
{1}Indian Institute of Technology Jodhpur, India; {2}National Institute of Fashion Technology, Jodhpur, India

11:40 - 13:10

**A2L–01: Sensing in Agriculture 1**
Room: Grand Ballroom I
Session Chair(s): Jose Joseph

11:40

**1333: Silk–based piezoelectric materials for applied sensing**
Jose Joseph
Digital University Kerala, India

12:10

**1193: Experimental Investigation of Leaf Wetness Sensing Properties of MoS2 Nanoflowers Based Flexible Leaf Wetness Sensor**
Priyanka Khaparde, Kamlesh S Patle, Yash Agrawal, Anil Roy, Vinay S Palaparthy
Dhirubhai Ambani Institute of Information and Communication Technology, India

12:25

**1113: Selective Sensor Platform for the Measurement of 0.5 ppm of CH4 for Precision Agriculture**
Anjitha R G, Palash Kumar Basu
Indian Institute of Space Science and Technology, India
12:40
**1124: Printable Fused Silica Based Microchamber Integrated with Graphene Chemiresistive Sensors for Direct On-Chip Soil Testing**
Sabitha Ann Jose, Yahya Atwa, Neil Mitchell, Hamza Shakeel
Queen’s University of Belfast, United Kingdom

12:55
**1060: Soil pH Sensing with an All-Solid-Electrode Sensor**
Akshaya A V{2}, Nikila Nair{2}, Michael John Bosco{2}, Ananthasuresh G K{2}, Jose Joseph{1}
{1}Digital University Kerala, India; {2}Indian Institute of Science, India

11:40 - 13:10
**A2L-02: Smart & Connected Healthcare 1**
Room: Grand Ballroom II
Session Chair(s): Sri-Rajasekhar Kothapalli

11:40
**1334: Invited Talk by Sri-Rajasekhar Kothapalli**
Sri-Rajasekhar Kothapalli
Penn State University, United States

12:10
**1010: Optimization Strategy of Delay-Driven Health Monitoring Service Quality**
Jing Yang, Jun Luo, Hong Zhang, Dapeng Wu, Ruyan Wang
Chongqing University of Posts and Telecommunications, China

12:25
**1061: Design and Characterization of a Frequency Modulated Continuous Wave Transceiver-Based Ultrasound Imaging System**
Desh Deepak Lawania, Biswarup Mukherjee, Ankesh Jain
Indian Institute of Technology Delhi, India

12:40
**1094: Embedded Machine Learning on Accelerometer Data for Exercise Classification**
Rufyid-U- Nissa{1}, Nemai Chandra Karmakar{2}, Maryam Shojaei Baghini{1}
{1}Indian Institute of Technology Bombay, India; {2}Monash University, Australia
12:55

1098: Labour Monitoring in Pregnant Women Using Electrocardiography and Electromyography
Anushka Tiwari{1}, Shirley Chauhan{1}, Sailaja Bharatala{2}, Ajay Thammana{2}, Nilima Paleru{3}, Aftab Hussain{1}
{1}International Institute of Information Technology Hyderabad, India; {2}Prakhya Solutions OPC Pvt. Ltd., Ojas MedTech Center, IIIT Hyderabad, India; {3}Renova Neelima Hospital, India

11:40 – 13:10

A2L-03: Sensing & Communication 1
Room: Grand Ballroom III
Session Chair(s): Prasant Misra

11:40

Information Processing Techniques for Mobile Sensing at Scale
Prasant Misra
TATA Consultancy Services – Research, Bangalore, India

12:10

1059: An Improved Thompson Sampling Method for Dynamic Spectrum Access in Non-Stationary Environments
Shuai Ye, Shaowei Wang
Nanjing University, China

12:25

1087: A Photonics-Aided MMW OFDM Joint Radar and Communication System with Velocity Accuracy Improvement
Lanfeng Peng{3}, Dongxiang Luo{1}, Yaoqiang Xiao{2}, Fan Li{3}
{1}Guangzhou University, China; {2}Hunan University, China; {3}Sun Yat-sen University, China

12:40

1071: Enhanced Transmission Based on Cell Location and Calcium Concentration Sensing in Molecular Communication Networks
Peng He, Mengnan Su, Yaping Cui, Ruyan Wang, Dapeng Wu
Chongqing University of Posts and Telecommunications, China

12:55

1321: A Fingerprinting Based Audio-Seismic Systems for Human Target Localization in an Outdoor Environment Using Regression
Priyankar Choudhary, Neeraj Goel, Mukesh Saini
Indian Institute of Technology Ropar, India
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<tr>
<th>11:40 – 13:10</th>
<th>A2L-04: Sensing for Industry 4.0 1</th>
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<tbody>
<tr>
<td>Room: Junior Ballroom I</td>
<td>Session Chair(s): Vinay Jammu</td>
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**11:40**

**1332: Invited Talk by Vinay Jammu**

Vinay Jammu  
GE, India

**12:10**

**1047: An Array of Bandpass Detectors for Measuring Beam Spectral Components**

Mojtaba Jahangiri{1}, Paolo Sberna{1}, Amir Sammak{2}, Stoyan Nihtianov{1}  
{1}Delft University of Technology, Netherlands; {2}Netherlands Organisation for Applied Scientific Research, Netherlands

**12:25**

**1088: Acoustic Based Machine Anomaly Detection Using Beamforming and Sequential Transform Learning**

Saurabh Sahu{2}, Kriti Kumar{2}, Angshul Majumdar{1}, A Anil Kumar{2}, M Girish Chandra{2}  
{1}Indraprastha Institute of Information Technology Delhi, India; {2}Tata Consultancy Services, India

**12:40**

**1093: Monte Carlo Method Based Model for Augmenting Data Towards Lubricant Oil State Analysis in Heavy Machine Industry**

Subhasri Chatterjee, Abhijeet Gory, Supriya Gain, Arijit Sinharay, Chirabrata Bhaumik, Tapas Chakravarty, Arpan Pal  
Tata Consultancy Services, India

**12:55**

**1160: An Analog Linearizing Circuit for TMR Angle Sensor with Flexible Measurement Range**

Kishor Bhaskar Rao Nandapurkar  
Indian Institute of Technology Dhanbad, India

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<th>Lunch</th>
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<td>Room: Pre-Function Area</td>
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</table>
14:10 - 16:10

A3L-01: Smart & Connected Healthcare 2
Room: Grand Ballroom I
Session Chair(s): Prosenjit Sen

14:10

1341: Invited Talk by Prosenjit Sen
Prosenjit Sen
IISc Bangalore, India

14:40

1119: Advantage of Droplet Encapsulation Scheme in Microflow Cytometer Based Detection
Kshitija Mirkale, Ashis Kumar Sen
Indian Institute of Technology Madras, India

14:55

1128: PEDOT:PSS Based Disposable Humidity Sensor for Skin Moisture Monitoring
Ajay Beniwal{2}, Ravinder Dahiya{1}
{1}Northeastern University, United States; {2}University of Glasgow, United Kingdom

15:10

1140: A Reusable and Reagent-Free Solid-State Sensor for Chloride Detection
Vinay Patel, Vinayak Ramesh, Priyanka Maske, Arnab Ghosh, Rohit Srivastava
Indian Institute of Technology Bombay, India

15:25

1166: A Kirigami Inspired Biaxial Force-Sensitive Cell Fabricated with Graphene Paper Sheets
Constantinos Heracleous{1}, Julian Leong{2}, Rui Loureiro{1}
{1}University College London, United Kingdom; {2}University College London, NHS Trust, United Kingdom

15:40

1310: Molecular Imprinting with Polyaniline on ENIG Finish PCB Electrodes for Electrochemical Detection of Melamine
Ruchira Nandeshwar, Madhumita P. Date
Indian Institute of Technology Bombay, India

15:55

1315: Cortical Source Domain Based Motor Imagery and Motor Execution Framework for Enhanced Brain Computer Interface Applications
Lalan Kumar, Amita Giri, Tapan K. Gandhi
Indian Institute of Technology Delhi, India
14:10 – 16:10

**A3L-02: Habitat & Environment Monitoring 1**

**Room:** Grand Ballroom II  
**Session Chair(s):** Suphiya Khan


### 14:10

**1330: Development of Fluoride Sensors and commercially viable affordable de-fluoridation Technology**  
Suphiya Khan  
Drumlins Water Technologies Pvt LTD, India

### 14:40

**1101: Detection of Microcystin-LR in Water Using Polyaniline Coated U-Bent Fiber Optic Biosensor**  
Atindra Kanti Mandal, Tathagata Pal, Suparna Mukherji, Soumyo Mukherji  
Indian Institute of Technology Bombay, India

### 14:55

**1247: Electrochemical Detection of Fe2+ Ions in Water Using 2-Dimensional g-C3N4 Modified Glassy Carbon Electrode-Based Sensor**  
Deepan Kumar Neethipathi, Ajay Beniwal, Priyanka Ganguly, Adrian Bass, Marian Scott, Ravinder Dahiya  
{1}Northeastern University, United States; {2}University of Glasgow, United Kingdom

### 15:10

**1144: Spectroscopic Studies and Numerical Modelling on Nanoparticle Based Toxic Heavy Metal Sensor for the Development of a Low Cost Prototype in Field Use**  
Nivedita Pan, Ria Ghosh, Debdatta Mukherjee, Neha Bhattacharyya, Lopamudra Roy, Amrita Banerjee, Soumendra Singh, R. T. Goswami, Mala Mitra, Arpita Chattopadhyay, Samir Kumar Pal  
{1}Jadavpur University, India; {2}S.N. Bose National Centre for Basic Sciences, India; {3}Sister Nivedita University, India; {4}Techno International, India; {5}University of Calcutta, India; {6}University of Kalyani, India

### 15:25

**1023: Degradable Nanofibers-Based Capacitive Pressure Sensor for Underwater Monitoring**  
Xenofon Karagiorgis, Ajay Beniwal, Peter Skabara, Ravinder Dahiya  
{1}University of Glasgow, United Kingdom; Northeastern University, USA
15:40

**1311: Ammonia Sensing Performance of RGO-Based Chemiresistive Gas Sensor Decorated with Exfoliated MoSe2 Nanosheets**

Ravindra Jha{1}, Aman Nanda{2}, Navakanta Bhat{2}

{1} CSIR-Central Electronics Engineering Research Institute, India; {2} Indian Institute of Science, India

15:55

**1317: Potential of Impedance Spectroscopy Towards Quantified Analysis of Gas Sensors: a Tutorial**

Koushik Dutta

Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India

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14:10 - 16:10

**A3L-03: Critical Infrastructure 1**

Room: Grand Ballroom III

Session Chair(s): Dipti Gupta

14:10

**1331: Invited Talk by Dipti Gupta**

Dipti Gupta

IIT Bombay, India

14:40

**1116: Design and Development of a Wireless Condition Monitoring System Biased Using Through Wall Power Transfer Technique**

Amit Pal{1}, Ramya Anandanatarajan{1}, Suresh Kaluvan{2}, Uma Gandhi{1}, Umapathy Mangalanathan{1}, Guido Herrmann{3}, Thomas Bligh Scott{2}

{1} National Institute of Technology Tiruchirappalli, India; {2} University of Bristol, United Kingdom; {3} University of Manchester, United Kingdom

14:55

**1141: Distributed Fiber-Optic Calorimetric Dosimeter**

Aleksey Tregubov, Victor Prikhodko, Alexander Alekseyev, Sergey Novikov, Galina Tertyshnikova, Andrey Zhukov

Ulyanovsk State University, Russia

15:10

**1154: Design of a Sensor for Real-Time Measurement of High Molarity (12M-16M) Sodium Hydroxide**

Shri Vidhatri M M{2}, Metta Sivaramakrishna{1}, S Chitrakkumar{1}

{1} Indira Gandhi Centre for Atomic Research, India; {2} International Institute of Information Technology Hyderabad, India
15:25

**1155: Tracking Moored Vessel Movement in Multiple DOF Using Active Sensing Methods**

Robin Kerstens{2}, Wouter Jansen{2}, Gauthier de Borrekens{2}, Stefaan Ides{1}, Jan Steckel{2}

{1}Port of Antwerp–Bruges, Belgium; {2}University of Antwerp, Belgium

15:40

**1214: Silicon Nitride Microcantilever–Based Temperature Sensors**

Hemant Kumar Verma{1}, Darkasha Khan{1}, Manoj Kandpal{2}, Satya N Behra{2}, Jaspreet Singh{2}, Akshay Naik{1}

{1}Indian Institute of Science, India; {2}Semi-Conductor Laboratory Mohali, India

15:55

**1194: Real–Time Missing Data Estimation in Water Networks**

Jyotirmoy Bhardwaj{1}, Christopher Harman{2}, Harsha S. G. Pussewalage{3}, Linga Reddy Cenkeramaddi{3}

{1}Norwegian Institute for Water Research, University of Agder, Norway; {2}Norwegian Offshore Wind Cluster, Norway; {3}University of Agder, Norway

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14:10 - 16:10

**A3L-04: Internet of Senses 1**

Room: Junior Ballroom

Session Chair(s): T. K. Bhattacharyya

14:10

**1328: Invited Talk by T. K. Bhattacharyya**

T. K. Bhattacharyya

IIT Kharagpur, India

14:40

**1318: A VLSI-Based Hybrid ECG Compression Scheme for Wearable Sensor Node**

Jitumani Sarma, Rakesh Biswas

Indian Institute of Information Technology Guwahati, India

14:55

**1189: Metadata Enhanced Security Watermarks for Sensor Data Protection**

Akash Reddy Kondapuram{1}, Albert Treytl{1}, Henri Ruotsalainen{2}, Thilo Sauter{3}

{1}Danube University Krems, Austria; {2}Pölten University of Applied Sciences, Austria; {3}Technische Universität Wien, Austria
15:10
1245: Transparent Flexible Capacitive Pressure Sensor Array
Nitheesh M. Nair{2}, Dhayalan Shakthivel{2}, Ravinder Dahiya{1}
{1} Northeastern University, United States; {2} University of Glasgow, United Kingdom

15:25
1249: Understanding Conversational Usage Patterns Between English and Hindi
Nidhi Tarware, Meet Mungra, Harshit Parmar, Yash Chaudhari, Kalyan Sasidhar
Dhirubhai Ambani Institute of Information and Communication Technology, India

15:40
1305: Laser-Assisted Gaussian Microstructure Patterned PDMS Encapsulated Ti3C2Tx (MXene)-Based Pressure Sensor for Object and Touch Detection
Parikshit Sahatiya, Vivek Adepu, Krutarth Kamath, Venkat Mattela
Birla Institute of Technology and Science, Pilani, India

15:55
1046: Flying Path Optimization of Rechargeable UAV for Data Collection in Wireless Sensor Networks
Yuchao Zhu, Shaowei Wang
Nanjing University, China

14:10 - 16:10
B2L-01: Student Research Forum 1
Room: Meeting Room II
Session Chair(s): Vinay S Palaparthy & P. Sahatiya

14:10
1176: Grapevine leafroll Disease high-Throughput phenotyping Using UAV-Based Imagery with Improved YOLOv7
Zhuowei Wang{1}, Yixue Liu{2}
{1} Australian Artificial Intelligence Institute, University of Technology Sydney, Australia; {2} Northwest A&F University, China

14:25
1303: Development of Micro-Thermoelectric Cooler for Thermal Management of Integrated Photonic Sensors
Rajvinder Kaur, Amit Tanwar, N. Padmanathan, Kafil M. Razeeb
Tyndall National Institute, University College Cork, Ireland
14:40  
**1252: Polyaniline Coated Plastic Optic Fiber Based Biosensor for Detection of Aflatoxin B1 in Nuts, Cereals, Beverages, and Body Fluids**  
Tathagata Pal, Soumyo Mukherji  
Indian Institute of Technology Bombay, India  

14:55  
**1257: Design of Piezoelectric Energy Harvester for Self-Powered Sensor Applications**  
Priyabrata Biswal{2}, Banibrata Mukherjee{1}, Sougata Kumar Kar{2}  
{1}Indian Institute of Technology Kharagpur, India; {2}National Institute of Technology Rourkela, India  

15:10  
**1263: An Web Application for Bike-Sharing System Demand Prediction**  
Chao-Yen Huang  
National Sun Yat-sen University, Taiwan  

15:25  
**1262: The Development of a Biosensor for the Early Detection of Pancreatic Cancer**  
Taskeen Ebrahim  
Stellenbosch University, South Africa  

15:40  
**1179: Machine Learning Techniques for Real-Time Human Activity Recognition Using mmWave Radar**  
Girish Tiwari, Shalabh Gupta  
Indian Institute of Technology Bombay, India  

15:55  
**1259: Mining Skyline Quantify–Utility Patterns from Different Environments**  
Ranran Li  
Shandong University of Science and Technology, China  

**14:10 - 16:25**  
**B2L-02: Student Research Forum 2**  
Room: Meeting Room I  
Session Chair(s): M. Krishna & Vinay Patel  

14:10  
**1265: Development of Sensitive and Selective Solid State Gas Sensor System**  
Snehanjan Acharyya  
Indian Institute of Technology Kharagpur, India
14:25
**1266: Gas Sensor Array Prototype for Breath Collection and Analysis**  
Anumol Dominic, Manoj M. Varma, Muddukrishna P.  
Indian Institute of Science, India

14:40
**1268: Label-Free Sensor for Detection of Infectious Agents: from the Development of Novel Plasmonic Sensor to Multiplexed Sensing**  
Kuzhandai Shamlee J  
Indian Institute of Technology Madras, India

14:55
**1269: Microelectrodes Arrays Electrochemical Sensors for Applications in Soil and Water Analysis**  
Tarun Narayan, Pierre Lovera, Alan O'Riordan  
Tyndall National Institute, Ireland

15:10
**1270: Development of Thermoelectric Materials and Micro-Thermoelectric Devices for Wearable Biomedical Devices**  
Amit Tanwar, Rajvinder Kaur, N. Padmanathan, Kafil M. Razeeb  
Tyndall National Institute, University College Cork, Ireland

15:25
**1271: An Effective Neural Architecture Search for Bike-Sharing System Demand Prediction**  
Bo-Han Chen  
National Sun Yat-sen University, Taiwan

15:40
**1272: Metal-Organic Framework Coated Optical Fiber Heavy Metal Ion Sensors**  
Swetha Menon, V V Raghavendra Sai  
Indian Institute of Technology Madras, India

15:55
**1273: Optimizing Hyperparameters of Deep Learning in Bicycle Flow Prediction Based on Hybrid Metaheuristic Algorithm**  
Yun-Ye Cai  
National Sun Yat-sen University, Taiwan

16:10
**1274: Development of Diagnostic Devices for Pre- and Post-Liver Transplant Care**  
Allwyn S. Rajamani  
Indian Institute of Technology Madras, India
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>16:25 – 16:55</td>
<td><strong>Tea Break</strong></td>
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<td><strong>Room: Pre-Function Area</strong></td>
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<tr>
<td>16:55 – 18:40</td>
<td><strong>A4L-01: Sensing in Agriculture 2</strong></td>
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<td><strong>Room: Grand Ballroom I</strong></td>
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<td><strong>Session Chair(s): Rajul Patkar</strong></td>
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<td>16:55</td>
<td><strong>1327: Invited Talk by Rajul Patkar</strong></td>
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<td>Rajul Patkar</td>
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<td>Proximal Soilsens Technologies Pvt. Ltd., India</td>
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<td>17:25</td>
<td><strong>1040: Intra Plant Body Signal Transmission Using Capacitive and Galvanic Coupling</strong></td>
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<td>Gunjan Kumari, Nagendra Prasad Pathak</td>
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<td>Indian Institute of Technology Roorkee, India</td>
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<td>17:40</td>
<td><strong>1125: Design of Round Corner Rectangular Planar Sensor with DGS for Measurement of Permittivities</strong></td>
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<td></td>
<td>Swaranpreet Kaur, Surinder Singh, M.M. Sinha</td>
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<td>Sant Longowal Institute of Engineering and Technology, India</td>
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<td>17:55</td>
<td><strong>1208: A Microwave Sensor for Grain Moisture-Content Measurement Designed with Surface Wave Transmission Line</strong></td>
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<td>Swati Varun Yadav, Ashish Chittora</td>
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<td>Birla Institute of Technology and Science, Pilani, India</td>
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<td>18:10</td>
<td><strong>1219: Design and Characterization Methodology of Capacitive Sensors for Soil Moisture Sensing Applications</strong></td>
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<td></td>
<td>Surya Varchasvi Devaraj, Khalid Manzoor Shaikh, Vidushi Gaur, Laxmeesha Somappa, Maryam Shojaei Baghini</td>
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<td></td>
<td>Indian Institute of Technology Bombay, India</td>
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</table>
18:25
1235: Environmental Testing Methodology for Real-Time Soil Health Monitoring System
Tejas Rajendra Naik, Khalid Manzoor Shaikh, Surya Varchasvi Devaraj, Shambulingayya N Doddapujar, Reddygari Bhupal Dheeraj, Rajul Patkar, Maryam Shojaei Baghini
Indian Institute of Technology Bombay, India

16:55 - 18:40
A4L-02: Habitat & Environment Monitoring 2
Room: Grand Ballroom II
Session Chair(s): Dipankar Bandyopadhyay

16:55
1337: Microfluidic Nanobiosensors Targeting Multiplexed Diagnostics on a Chip
Dipankar Bandyopadhyay
IIT Guwahati, India

17:25
1296: Conducting Yarn Based Capacitive Humidity Sensor
Anupam Kumari{1}, Ajay Agarwal{1}, Angan Sengupta{1}, Yuvraj Garg{2}
{1}Indian Institute of Technology Jodhpur, India; {2}National Institute of Fashion Technology, Jodhpur, India

17:40
1066: Portable H2S Gas Detection and Alert System Prototype Using Highly Sensitive Nanocrystalline SnO2 Thin Films
Supriya Kanth{2}, Ajai Kumar Chikara{1}, Sipra Choudhury{1}, C. A Betty{1}
{1}Bhabha Atomic Research Centre, India; {2}Homi Bhabha National Institute, India

17:55
1108: Effect of Rapid Thermal Annealing on Material, Electrical and Sensing Characteristics of Ag-Doped CaTiO3–CuO Thin Film Carbon Dioxide Gas Sensors
Rudraswamy S B{2}, Shwetha H R{3}, Navakanta Bhat{1}
{1}Indian Institute of Science, India; {2}Jagadguru Sri Shivarathreeshwara Science and Technology University, India; {3}Jawaharlal Nehru National College of Engineering, India

18:10
1243: Wet Porous Electrode Glow Discharge Optical Emission Spectroscopy Chip for Low Cost Rapid Analysis of Aqueous Samples
Manjeet Kumar, Henam Sylvia Devi, Madhusudan Singh, Bhaskar Mitra
Indian Institute of Technology Delhi, India
18:25

1253: Au Deposited Carbon-Thread Electrode for Lead Ions Detection in Water Samples
Sreerama Amrutha Lahari, Khairunnisa Amreen, Satish Kumar Dubey, Ponnalagur R N, Sanket Goel
Birla Institute of Technology and Science, Pilani, India

16:55 - 18:25

A4L-03: Smart & Connected Healthcare 3
Room: Grand Ballroom III
Session Chair(s): Navaneeth Krishna

16:55

1174: Spatial Field Fusion Network (SFFNet) for Panoramic Dental X-Ray Segmentation
Ananya Mantravadi{3}, Kanak Raj{1}, Rohit Pawar{4}, Sai Chandra Teja R{2}, Nagesh Kumar S{5}
{1}Birla Institute of Technology, Mesra, India; {2}Independent Researcher, India;
{3}Indian Institute of Information Technology, Raichur, India; {4}Pune Institute of Computer Technology, India; {5}Sri Venkateswara Institute of Medical Sciences is a Medica

17:10

1186: Sensor Based Image Reconstruction in Electrical Impedance Tomography Using Open-Source Technology
Priya Chimurkar{2}, Prasad Trimukhe{2}, Deepak Berwal{1}, Maryam Shojaei Baghini{2}
{1}Florida Atlantic University, United States; {2}Indian Institute of Technology Bombay, India

17:25

1198: A Resistance Change Detection Circuitry for Thread Based Resistive Sensors
Narendranath Samaddar{1}, Mohamad Idris Wani{1}, Vikram Maharshi{1}, Sameer Sonkusale{2}, Shahid Malik{1}
{1}Indian Institute of Technology Delhi, India; {2}Tufts University, United States

17:40

1313: Metal/Metal Oxide Modified Graphene Nanostructures for Electrical Biosensing Applications: a Review
Chirasree RoyChaudhuri, Bhaswati Chakraborty
Indian Institute of Engineering Science and Technology, India
17:55

**1188: Open Source AI-Enhanced 3D-Printed Insulin Pump**
Fares Fawzi, Mostafa Sedky, Youssef Abohammar, Hossam Sharara, Mohamed Serry
American University in Cairo, Egypt

18:10

**1011: Impedimetric Study of Poly-Butyl Thiophene-Based Sensor for Detection of VOCs and Mixtures**
Palwinder Kaur, Sudeshna Bagchi, Amol P. Bhondekar
CSIR-Central Scientific Instruments Organisation, India

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<tr>
<th>16:55 - 18:25</th>
<th>A4L-04: Sensing for Smart City &amp; Village 1</th>
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<tbody>
<tr>
<td>Room: Junior Ballroom</td>
<td>Session Chair(s): Shahid Malik</td>
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</tbody>
</table>

16:55

**1335: Minimally Invasive Injectable Sensors**
Shahid Malik
SeNSE, IIT Delhi, India

17:25

**1106: Non Line of Sight (NLoS) Path Loss Evaluation of Wi-Sun in an Urban Landscape**
Aditya Gupta, Muppala Ruthwik, Advaita Saxena, Aftab Hussain
International Institute of Information Technology Hyderabad, India

17:40

**1079: An Effective Evolutionary Neural Architecture Search for Bike-Sharing System Demand Prediction**
Bo-Han Chen, Yun-Ye Cai, Chao-Yen Huang, Chun-Wei Tsai
National Sun Yat-sen University, Taiwan

17:55

**1237: Wi-Fi Sensing Based Real-Time Activity Detection in Smart Home Environment**
Ajit Kumar Sahoo, Vaishnavi Kompally, Siba Kumar Udgata
University of Hyderabad, India

18:10

**1073: DC-ST: A Short-Term Traffic Flow Prediction Approach Based on Distance Correlation and Spatial-Temporal Dependence**
Chang Liu, Luojie Lin, Yuanyuan Zhang, Yanru Chen, Hao Wang, Liangyin Chen
Sichuan University, China
<table>
<thead>
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<th>Time</th>
<th>Presentation</th>
<th>Presenter(s)</th>
<th>Institution</th>
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<tbody>
<tr>
<td>16:55</td>
<td><strong>1344: Invited Talk by Ajay Agrawal</strong></td>
<td>Ajay Agrawal</td>
<td>IIT Jodhpur, India</td>
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<tr>
<td>17:25</td>
<td><strong>1295: Trace Level Molecular Detection in Organic Honey Relevant for Therapeutic Applications</strong></td>
<td>Sarvar Singh, Sambit Kumar Keshi, Ajay Agarwal</td>
<td>Indian Institute of Technology Jodhpur, India</td>
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<td>17:40</td>
<td><strong>1297: Rapid Detection of Inflammatory Biomarkers Using Surface Enhanced Raman Spectroscopy</strong></td>
<td>Akilandeshwari B, Sarvar Singh, Ajay Agarwal, Sushmita Jha</td>
<td>Indian Institute of Technology Jodhpur, India</td>
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<tr>
<td>17:55</td>
<td><strong>1282: Fullerene- MoSe2 Nanocomposite-Based Sensor for Selective Detection of Formaldehyde</strong></td>
<td>Radha Bhardwaj, Arnab Hazra</td>
<td>Birla Institute of Technology and Science, Pilani, India</td>
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<td>18:10</td>
<td><strong>1292: Molecular Analysis of Sweat for Evidence Based Ayurvedic Diagnosis</strong></td>
<td>Prachi Soni, Sarvar Singh, Ujjwal Singh, Ajay Agarwal</td>
<td>Indian Institute of Technology Jodhpur, India</td>
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<td>18:25</td>
<td><strong>1293: Salivary Analysis for Evidence Based Ayurvedic Diagnosis</strong></td>
<td>Poushali Nandi, Sarvar Singh, Ajay Agarwal</td>
<td>Indian Institute of Technology Jodhpur, India</td>
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<td>19:00</td>
<td><strong>YP Reception</strong></td>
<td>Room: Grand Ballroom I &amp; II</td>
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<td>8:00 - 9:00</td>
<td><strong>Registration</strong></td>
<td>Pre-Function Area</td>
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<td>9:00 - 10:00</td>
<td><strong>Towards Smart Bio-Chemical Sensing Platforms</strong></td>
<td>Grand Ballroom</td>
<td>Navakanta Bhat</td>
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<td><strong>Session Chair(s): V. Ramgopal Rao</strong></td>
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<td>10:00 - 10:30</td>
<td><strong>Tea Break</strong></td>
<td>Pre-Function Area</td>
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<td>10:30 - 13:15</td>
<td><strong>Sensors Startup Summit &amp; BioMedical Industry Talks</strong></td>
<td>Grand Ballroom II</td>
<td>Chandrashekhar Nair</td>
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<td><strong>Moderator: Chandrashekhar Nair</strong></td>
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<td>10:30</td>
<td><strong>Development of Micro-Thermoelectric Generator as an Alternative Energy Source for Wearable Bio-Medical Devices</strong></td>
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<td>Kafil M Razeeb Tyndall Institute</td>
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<td>10:50</td>
<td>Rajesh Kumar Gnanasekaran GE-Healthcare</td>
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<td>11:15</td>
<td><strong>Sensors Startup Summit Panel</strong></td>
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<td>Sankar Dasiga, Wellnesys Saritha, Green Cosmos</td>
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<td>Sudhanshu, Infab Technologies Sanathana, BioPixs</td>
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<td>Chandrashekhar, MolBio / BigTech Rajul Patkar, SoilSensMoham Kumar R., FanPlay IoT</td>
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10:30 - 13:15
Aerospace Industry Talks
Room: Grand Ballroom III
Session Chair(s): Harinarayana Kota

10:30
Vishwanath Rao
GTRE-DRDO

10:50
Prasanna Ramamurthy
Collins Aerospace

11:10
Sensors in Current and next Gen Aircrafts
George Koilpillay
Honeywell

11:30
Umamaheshwar D.
GE Aerospace

11:50
Kallappa Pattada
Boeing

12:10
Panel Discussion
Adishesha C  Sivaramasastry (Moderator), Collins Aerospace
A N Vishwanatha Rao, GTRE-DRDO
Yogananda Jeppu, Honeywell
George Koilpillay, Honeywell
Umamaheshwar D, GE Aerospace
Suresh Padmanabhan, Collins Aerospace
K Vijayaraju, Ex Aeronautical Dev. Agency
Anjana Jain, NAL
10:30 - 13:15

**Infrastructure Industry Talks**
Room: Grand Ballroom I
Session Chair(s): Natarajan K

10:30
**Sensors for Autonomous Vehicles**
Nagesh Poojary
Continental

10:50
Venkatarao Ryali
GE Vernova

11:10
Nagahanumaiah
CMTI Bangalore

11:30
Jayanti Ganesh
GE Aerospace

11:50
Suraj Rengarajan
Applied Materials

12:10
**Metrology for Self-Reliance**
Venu Gopal Achanta
National Physical Laboratory, Delhi

12:30
**Panel Discussion**
10:30 - 13:15

**Sensors Standards Opportunity**
Room: Junior Ballroom
Session Chair(s): Sri Chandrasekaran & Munir Mohammed

10:30

**IEEE Sensors Council’s Standards Committee and its Activities: an Overview**
Sri Chandrasekaran
Practice Lead, Foundational Technologies IEEE Standards Association

10:50

**PI451-99: Harmonization of IoT Devices & Systems**
Gopalakrishna Kuppa
IEEE Hyderabad Section

11:10

**Trends and Applications of Sensing Technologies in power systems**
Akilur Rahman
Chief Technology Officer – Hitachi Energy India Limited

11:30

**Manufacturing of Gyros**
S Venu
Senior Deputy General Manager of Servo System Division

11:50

**Inertial Guidance sensors**
Jagannath Nayak
DRDO Outstanding Scientist and Director CHESS

12:10

**Seismic Sensors for Atomic Energy installations**
J. Subiram
Electronics Corp of India (ECIL)- Hyd

12:30

**Lexisearch based Multi sensor based data fusion with high order singular value**
Srinivas Koduri
ISRO
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<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
<th>Chair(s)</th>
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<tr>
<td>10:30 – 13:15</td>
<td><strong>WiSe/YP Big Idea Pitch Competition</strong></td>
<td>Meeting Room I</td>
<td>Amit Kumar, Mitradip Bhattacharjee, Saakshi Dhanekar &amp; Veda Sandeep Nagaraja</td>
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<td>13:15 – 14:15</td>
<td><strong>Lunch</strong></td>
<td>Pre-Function Area</td>
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<td>15:15 – 15:45</td>
<td><strong>Tea Break</strong></td>
<td>Pre-Function Area</td>
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<tr>
<td>16:45 – 17:45</td>
<td><strong>Panel: Sustainability Priorities in the Local &amp; Global context: What, How and When?</strong></td>
<td>Grand Ballroom</td>
<td>Gayatri Chauhan, Bruno Meyer, IEEE Fellow, Vice President Technical Activities 2022, K. VijayRaghavan, Padma Shri awardee (2013), FRS, ex-Principal Scientific Adviser to the Govt. of India, Anil Gupta, Padma Shri awardee (2004), the Executive Vice-Chair at the National Innovation Foundation, Founder of the Honey Bee Network, ex- Professor, Indian Institute of Management, Ahmedabad, Fabrice Labeau, McGill University</td>
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<td>17:45 – 18:45</td>
<td>WiSe/YP Networking Event</td>
<td>Pre-Function Area</td>
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<td>18:45 – 19:45</td>
<td>Cultural Event</td>
<td>Grand Ballroom</td>
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<td>19:45 – 21:45</td>
<td>Sensors Council 25th Anniversary Celebration Dinner</td>
<td>Grand Ballroom</td>
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<td>Time</td>
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<td>8:00 - 9:00</td>
<td><strong>Registration</strong></td>
<td>Room: Grand Ballroom</td>
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<td>9:00 - 10:00</td>
<td><strong>Smart Processing with Wearable Devices: Shall We Consider the Human Influence?</strong></td>
<td>Valérie Renaudin&lt;br&gt;Room: Grand Ballroom&lt;br&gt;Session Chair(s): Anil Roy</td>
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<td>10:00 - 10:30</td>
<td><strong>Tea Break</strong></td>
<td>Room: Pre-Function Area</td>
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<td>10:30 - 11:30</td>
<td><strong>C1aP-05: Live Demonstrations</strong></td>
<td>Room: Pre-Function Area</td>
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<td>Session Chair(s): Bishakh Bhattacharya &amp; Svetlana Tatic-Lucic</td>
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<tr>
<td>1279: MYOSA (Make Your Own Sensors Applications)</td>
<td>Abhishek Jani{2}, Anil Roy{1}  &lt;br&gt;{1}Dhirubhai Ambani Institute of Information and Communication Technology, India; {2}eInfochips, an Arrow Electronics Company, India</td>
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<td>1280: Ai Based, Acoustic Traffic Preemption System</td>
<td>Bhuvana B M, K M Vanitha, Shruti S, Prerana Malashetti, H M Lakshmi  &lt;br&gt;Ramaiah Institute of Technology, India</td>
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<td>1286: Optical Pickup Unit: Synchronous Detection and DC Method for Measuring Focus Error Signal</td>
<td>Rekha S. Sekar, Abhinav R., Kanimozhi V., Vandana P., Arvind Ajoy  &lt;br&gt;Indian Institute of Technology Palakkad, India</td>
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<td>1287: A Compact Tunable Diode Laser-Based System for Continuous Monitoring of Ambient Water Vapour</td>
<td>Durilav Paul{2}, Shruti De{2}, Kenneth T V Grattan{1}, Arup Lal Chakraborty{2}  &lt;br&gt;{1}City, University of London, United Kingdom; {2}Indian Institute of Technology Gandhinagar, India</td>
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Demonstration of portable moisture melie and rapid soil testing device, Nuteisens
Rajul Patkar, Mukul Singh
Proximal Soilsens Technologies, India

10:30 - 11:30
C1aP-06: Sensing in Agriculture 5
Room: Pre-Function Area

1143: Analysis of Impedance Sensor Probes for Electric Field Treatment During Post-Harvest Processing
Thomas Mohan, Suja K J, Sunitha K
National Institute of Technology Calicut, India

1215: UAV Sensing-Based Semantic Image Segmentation of Litchi Tree Crown Using Deep Learning
Debarun Chakraborty, Bhabesh Deka
Tezpur University, India

1222: System Architecture and Software Design of a Handheld High Throughput Phenotyping Device: AgRECA
Kartik Cholachgudda, Rajashekhar Biradar, Kouame Yann Olivier Akansie, Aditya Sannabhadti, Geetha Devanagavi
REVA University, India

1251: Extracting Leaf Wetness Duration Using Baseline Correction Through Group-Sparse Total Variation Method for LW Sensor
Riya Saini, Kamlesh S Patle, Sukruti Shah, Ahlad Kumar, Vinay S Palaparthy
Dhirubhai Ambani Institute of Information and Communication Technology, India

10:30 - 11:30
C1aP-07: Sensing of e-Mobility 2
Room: Pre-Function Area

1095: Aeroelastic Analysis in a Hybrid Composite by Embedding Shape Memory Alloy
Kartik Tandel, Rammohan Bhanumurthy, Harathi Meghashyam
Dayananda Sagar University, India
1135: Design and Development of a Novel Bluetooth Based Vehicle Scanner
Ashish Kulkarni{1}, Narendra Kumar{1}, Kalaga Ramachandra Rao{2}
{1}Delhi Technological University, India; {2}Indian Institute of Technology Delhi, India

1039: Cooperative Caching and Transmitting in Sensor Networks Based on Cognitive Radio
Haiying Peng, Zhuangzhaung Jin, Hong Zhang, Dapeng Wu, Ruyan Wang
Chongqing University of Posts and Telecommunications, China

1229: Design and Simulation of Tactical Grade Capacitive Based MEMS Vibratory Ring Gyroscope
Vinay Venkataram, Pradnya Chabbi, Venkatesh KP Rao
Birla Institute of Technology and Science, Pilani, India

1234: RFID-Enhanced Connected Lane Markings: Design Constraints and Requirements
Dajiang Suo{1}, Rahul Bhattacharyya{1}, Joan Melià-Seguí{2}, Sanjay Sarma{1}
{1}Massachusetts Institute of Technology, United States; {2}Universitat Oberta de Catalunya, Spain

10:30 - 11:30
C1aP-08: Sensing & Communication 2
Room: Pre-Function Area

1196: Sensing the Environment with 5G Scattered Signals (5G-CommSense): A Feasibility Analysis
Sandip Jana{1}, Amit Kumar Mishra{2}, Mohammed Zafar Ali Khan{1}
{1}Indian Institute of Technology Hyderabad, India; {2}University of Cape Town, South Africa

10:30 - 11:30
C1aP-09: Smart & Connected Healthcare 5
Room: Pre-Function Area

1016: A Study on Pulse Wave Signals Based on Fibre Bragg Grating Arrays
Manish Mishra, Prasant Kumar Sahu
Indian Institute of Technology Bhubaneswar, India

1020: An Accelerometer-Based Voice Assessment in Muscle Tension Dysphonia
Ashok Dan{2}, Arvind Kumar Kairo{1}, S. Pravin Kumar{3}, Deepak Joshi{2}
{1}All India Institute of Medical Science, India; {2}Indian Institute of Technology Delhi, India; {3}Sri Sivasubramaniya Nadar College of Engineering, India
1050: Discrimination of VOCs Using Chemiresistive Sensor Array – Towards Electronic Nose Applications
Nikhil Vadera, Saakshi Dhanekar
Indian Institute of Technology Jodhpur, India

1065: Detecting Moments of Distraction During Meditation Practice Based on Changes in the EEG Signal
Pankaj Pandey{3}, Julio Rodriguez-Larios{1}, Krishna Prasad Miyapuram{3}, Derek Lomas{2}
{1}Columbia University, United States; {2}Delft University of Technology, Netherlands; {3}Indian Institute of Technology Gandhinagar, India

1074: Directed Transmission of Ca2+ Signals in Three-Dimension Biological Cell Networks
Peng He, Mengnan Su, Yaping Cui, Yifan Chen, Maolin Hua, Kai Wang
Chongqing University of Posts and Telecommunications, China

1096: Analysis of Interpolation Techniques for a Flexible Sensor Mat for Plantar Pressure Measurement
Anis Fatema, Ivin Kuriakose, Rohan Gupta, Aftab Hussain
International Institute of Information Technology Hyderabad, India

1099: Fabrication and Characterization of a Flexible Transparent Nozzle/Diffuser Micropump
Shreya Malkurthi, Dhyanithi Niteesh, Sumana Bhattacharjee, Aftab Hussain
International Institute of Information Technology Hyderabad, India

1117: Brain Activity Recognition Using Deep Electroencephalography Representation
Riddhi Johri{2}, Pankaj Pandey{2}, Krishna Prasad Miyapuram{2}, Derek Lomas{1}
{1}Delft University of Technology, Netherlands; {2}Indian Institute of Technology Gandhinagar, India

1120: Design and Optimization of a Wearable Sonomyography Sensor for Dynamic Muscle Activity Monitoring
Anne Tryphosa Kamatham, Biswarup Mukherjee
Indian Institute of Technology Delhi, India

1129: Sensitivity Analysis of a Flexible Piezoresistive Sensor for Efficient Packaging
Lakhvir Singh, Mitradip Bhattacharjee
Indian Institute of Science Education and Research, Bhopal, India
1163: Optimizing of Bathing Water Heater Using Microwave and Microcontroller Technology
Prashobh Karunakaran{3}, M. Shahril Osman{3}, Badrul Hisham Hossain{3}, Keren John{3}, Prashanth Karunakaran{2}, Shanthi Karunakaran{2}, Arjun Karunakaran{1}
{1} National Institute of Technology, Tomakomai College, Japan; {2} Swinburne University of Technology, Malaysia; {3} University of Technology Sarawak, Malaysia

1180: Weighted Frequency Subband Compounding in Ultrasonic Imaging Sensor Consisting of a Single Transducer and a Random Coding Mask
Mohammad Syaryadhi, Norio Tagawa, Ming Yang
Tokyo Metropolitan University, Japan

1184: Mental Stress Detection Using EEG and Recurrent Deep Learning
Abhi Patel, Dinesh Nariani, Akhand Rai
Ahmedabad University, India

1192: Design of Round Corner Rectangular Planar Sensor with Circular Slot for Estimation of Permittivity and Conductivity of Material
Swaranpreet Kaur, Surinder Singh, M.M. Sinha
Sant Longowal Institute of Engineering and Technology, India

1197: Development and Validation of Offset Current Compensation Technique for Optical Sensors
Sumit Kumar{2}, Sadan Saquib Khan{2}, Rohan Patil{2}, Meraj Ahmad{3}, Laxmeesha Somappa{1}, Shahid Malik{2}
{1} Indian Institute of Technology Bombay, India; {2} Indian Institute of Technology Delhi, India; {3} University of Glasgow, United Kingdom

1211: Acetone and Benzene Detection Using MEMS Electro-Thermal Actuation
Vandana Chalka, Megha Chauhan, Saakshi Dhanekar, Kamaljit Rangra
Indian Institute of Technology Jodhpur, India

1248: A Wearable Device for Detecting and Analyzing Gait Changes
Aniruddh Muley, Kalyan Sasidhar, Ronak Dhokai
Dhirubhai Ambani Institute of Information and Communication Technology, India

1275: SrTiO3–TiO2 Heterostructured Nanotubes Array for Selective Acetone Sensing
Radha Bhardwaj, Arnab Hazra
Birla Institute of Technology and Science, Pilani, India
10:30 - 11:30  
C1bP-05: Critical Infrastructure 2  
Room: Pre-Function Area

1202: Comparative Study and Experimental Validation of Phase-Sensitive-Detection Techniques for Sensor Lock-In Amplifiers  
Rohan Patil{2}, Mohamad Idris Wani{2}, Tarikul Islam{3}, Maryam Shojaei Baghini{1}, Laxmeesha Somappa{1}, Shahid Malik{2}  
{1}Indian Institute of Technology Bombay, India; {2}Indian Institute of Technology Delhi, India; {3}Jamia Millia Islamia, India

10:30 - 11:30  
C1bP-06: Internet of Senses 2  
Room: Pre-Function Area

1008: Efficient But Effective Perceptual Quality Model of Screen Content Image  
Tong Tang, Chuan You, Ruoying Zhang  
Chongqing University of Posts and Telecommunications, China

1027: Cross-Modal Visual Inpainting for Internet of Senses  
Junqi Liao, Zizhu Miao, Yuyuan Yao  
Nanjing University of Posts and Telecommunications, China

1036: Cross-Modal Signal Recovery for Internet of Senses: from Haptic to Visual  
Zizhu Miao, Jiahao Zhang, Meng Zhang, Hengfa Liu  
Nanjing University of Posts and Telecommunications, China

1043: Resource Allocation in Large-Scale Cognitive Self-Organizing Industrial Internet of Things  
Fan Yang, Shilong Zhang, Jie Huang, Tao Yu  
Chongqing University of Technology, China

1069: Floodet: A Lightweight Edge AI Model for Intelligent Flood Detection  
Wenzhong Ou, Liekang Zeng, Xu Chen  
Sun Yat-sen University, China

1218: Software Reconfigurable Frequency Readouts with Coarse Voltage Quantizers for Sensor Applications  
Laxmeesha Somappa{1}, Shahid Malik{2}, Maryam Shojaei Baghini{1}  
{1}Indian Institute of Technology Bombay, India; {2}Indian Institute of Technology Delhi, India
1228: Fabrication of Silk Nanofibers with In-Situ Crystallization for Large-Area Tactile Sensing
Chithra Parameswaran {1}, Dhayalan Shakthivel {1}, Ravinder Dahiya {2}
{1}University of Glasgow, United Kingdom; {2} Northeastern University, USA

10:30 - 11:30
C1bP-07: Sensing in Security
Room: Pre-Function Area

1207: Analysis on the Avalanche Phase Delay of Optically Modulated ATT Based Organic Photo-Sensor at Terahertz Regime
Debraj Chakraborty{1}, S D Nyar{1}, Ajanta Palit{2}, Moumita Mukherjee{1}
{1}Adamas University, India; {2}Maulana Abul Kalam Azad University of Technology, India

1236: Development of MoSe2/Ti3C2Tx (MXene) Nanohybrid Based Flexible Electromechanical Sensor for Artificial E-Skin Application
Vivek Adepu, Chandrasekhar Reddy Kolli, Parikshit Sahatiya
Birla Institute of Technology and Science, Pilani, India

10:30 - 11:30
C1bP-08: Crowdsensing & Intelligent Sensing
Room: Pre-Function Area

1028: Evolutionary Game-Based Crowd Cooperation Sensing Incentive Mechanism
Puning Zhang, Ziyun Xian, Xiaming Fan
Chongqing University of Posts and Telecommunications, China

11:30 - 13:00
C2L-01: Sensing in Agriculture 3
Room: Grand Ballroom I
Session Chair(s): G K Ananthasuresh

11:30
1326: Invited Talk by G K Ananthasuresh
G K Ananthasuresh
Indian Institute of Science, India

12:00
1014: Multi-Level Fusion of Multi-Spectral Images to Detect the Artificially Ripened Banana
Narayan Vetrekar{1}, Raghavendra Ramachandra{2}, Rajendra Gad{1}
{1}Goa University, India; {2}Norwegian University of Science and Technology, Norway
12:15
1115: IoT Based Data Sensing System for AutoGrow, an Autonomous Greenhouse System for Precision Agriculture
Pavan Patil{2}, Ramesh Kestur{2}, Madhav Rao{2}, Aswath C{1}
{1}Indian Institute of Horticultural Research, India; {2}International Institute of Information Technology Bangalore, India

12:30
1203: Multi Task Learning for Plant Leaf Segmentation and Counting
Bharathi Chaudhury{1}, Vasudha Joshi{1}, Anand S Sahadevan{2}, Pabitra Mitra{1}
{1}Indian Institute of Technology Kharagpur, India; {2}Indian Space Research Organization, India

12:45
1220: Impact of Annealing on Soil Moisture Sensing Properties of Graphene Oxide
Kamlesh S Patle, Priyanka Khaparde, Shivangni Jain, Sukruti Shah, Yash Sheth, Yash Agrawal, Vinay S Palaparthi
Dhirubhai Ambani Institute of Information and Communication Technology, India

11:30 – 12:45
C4L–02: Mixed Session Education 2, Industry 4.0
Room: Grand Ballroom II
Session Chair(s): L. S. Shashidhara

11:30
1342: Invited Talk by L. S. Shashidhara
L. S. Shashidhara
Ashoka University, India

12:00
1103: Flexible Writing Pad Based on a Piezoresistive Thin Film Sensor Matrix
Mohee Datta Gupta, L. Lakshmanan, Anis Fatema, Aftab Hussain
International Institute of Information Technology Hyderabad, India

12:15
1210: A Novel Dual Torsional MEMS Suspended Gate FET (DTM-SGFET) Accelerometer
Raeann Jesma R, N Mahesh Sreevatsava, V. Seena
Indian Institute of Space Science and Technology, India
12:30

**1322: The Machine Learnings Leading the Cuffless PPG Blood Pressure Sensors Into the Next Stage**

Duc Huy Nguyen, Paul C.-P. Chao, Chih-Cheng Wu
National Yang Ming Chiao Tung University, Taiwan

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<td>11:30 – 12:45</td>
<td><strong>C2L-03: Smart Energy 1</strong></td>
<td>Grand Ballroom III, K S Reddy</td>
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<td>11:30</td>
<td><strong>1340: Invited Talk by K S Reddy</strong></td>
<td>K S Reddy                                      IIT Madras, India</td>
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| 12:00        | **1051: Remote Sensing Using Drone and Machine Learning for Computation of Rooftop Solar Energy Potential** | Prakash P S{1}, Pavan R. Vyas{2}  
{1}National University of Ireland Galway, Ireland; {2}Visvesvaraya Technological University, India |
| 12:15        | **1097: A Dual-Slope RDC Using T-Network for Low Resistance Measurement** | Gopal Singh{2}, Shiraz Sohail{2}, Tarikul Islam{1}  
{1}Jamia Millia Islamia, India; {2}National Institute of Technology Tiruchirappalli, India |
| 12:30        | **1169: Handling Gas Entrainment Issues in Coriolis Flow Sensors** | Saketh Mahalingam{1}, Muhammad Arsalan{2}  
{1}Aramco Overseas Company, United Kingdom; {2}Saudi Aramco, Saudi Arabia |

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<td>11:30 – 12:45</td>
<td><strong>C4L-04: Mixed Session Localization 3 &amp; Security Session</strong></td>
<td>Junior Ballroom I</td>
<td>Thilo Sauter</td>
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<td>11:30</td>
<td><strong>1339: IoT Concepts in Automation Systems and their Impact on Security</strong></td>
<td>Vienna University of Technology and University for Continuing Education Krems, Austria</td>
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12:00

**1091: MoS2 Based Nanomechanical Bolometer for Combined Radiation Sensing and the Estimation of Material Properties**
Shubham Saxena, Tewodros Ashagre, Dibakar Rakshit, Samaresh Das, Valipe Ramgopal Rao
Indian Institute of Technology Delhi, India

12:15

**1201: Development of Time-Multiplexed Magnetic-Induction Based Ranging Systems**
Mudra Chavda{2}, Ashwani Chandola{2}, Shahid Malik{2}, Catherine O’Sullivan{1}, Andrew S. Holmes{1}
{1}Imperial College London, United Kingdom; {2}Indian Institute of Technology Delhi, India

12:30

**1024: Dynamic Collaborative Caching Strategy for Responsive Data Search in IoT**
Dapeng Wu, Meiyu Sun, Puning Zhang, Zhigang Yang
Chongqing University of Posts and Telecommunications, China

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**13:00 - 14:00**

**Lunch**
Room: Pre-Function Area

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**14:00 - 15:15**

**C3L-01: Sensing in Agriculture 4**
Room: Grand Ballroom III
Session Chair(s): Alan O’Reardon

14:00

**1338: Sensors for Agri-Food and the Environment**
Alan O’Reardon
Tyndall National Institute, Ireland

14:30

**1132: Yes/No Type Swab Based Colorimetric Paper Biosensor for Detection of Chlorpyrifos on Agricultural Produce: A Nondestructive Sensing Approach**
Tathagata Pal, Soumyo Mukherji
Indian Institute of Technology Bombay, India
14:45
**1250: A Battery-Less NFC Sensor Transponder for Cattle Health Monitoring**
Dinesh R. Gawade{1}, Roy B. V. B. Simorangkir{1}, Sanjeev Kumar{1}, Melusine Pigeon{2}, Marco Belcastro{1}, Nadeem Rather{1}, John L. Buckley{1}, Brendan O’Flynn{1}
{1}Tyndall National Institute, University College Cork, Ireland; {2}University of Bath, United Kingdom

15:00
**1230: Visual Sensor Network Based Early Onset Disease Detection for Strawberry Plants**
Usman Dar{1}, Hossein Anisi{1}, Vahid Abolghasemi{1}, Chris Newenham{2}, Andrey Ivanov{2}
{1}University of Essex, United Kingdom; {2}Wilkin & Sons Ltd., United Kingdom

**14:00 – 15:30**
**C3L-02: Smart & Connected Healthcare 4**
Room: Junior Ballroom
Session Chair(s): Jerald Yoo

14:00
**1343: Invited Talk by Jerald Yoo**
Jerald Yoo
National University of Singapore, Singapore

14:30
**1204: A ∆C Detection Circuit for Capacitive Sensing Based Prosthetic Control Applications**
Bhavesh Nakum, Mohamad Idris Wani, Khan Mohammad Ehsan, Shahid Malik
Indian Institute of Technology Delhi, India

14:45
**1231: Characterizing the Dynamics of Surface Electromyography Signals in Muscle Fatigue Through Visibility Motif Networks**
Navaneethakrishna Makaram{1}, Ramakrishnan Swaminathan{2}
{1}Boston Childrens Hospital, United States; {2}Indian Institute of Technology Madras, India

15:00
**1238: Non-Linearity Switching in PMUTs for Enhanced Sensitivity**
Sri Harsha Paladugu, Priyanka Singh, Annapoorni Rangarajan, Rudra Pratap
Indian Institute of Science, India
15:15

**1255: Modified Carbon-Thread Based Miniaturized Electrochemical Platform for Real Time Serotonin Detection**
Sanjeet Kumar, Khairunnisa Amreen, Satish Kumar Dubey, Sanket Goel
Birla Institute of Technology and Science, Pilani, India

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<td>Room: Grand Ballroom II</td>
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<td>Session Chair(s): Shiv Govind Singh</td>
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14:00

**1329: Invited Talk by Shiv Govind Singh**
Shiv Govind Singh
IIT Hyderbad, India

14:30

**1114: Radar and Camera Fusion for Multi-Task Sensing in Autonomous Driving**
Kun Shi, Shibo He, Jiming Chen
Zhejiang University, China

14:45

**1131: Sensing System Assisted Novel PID Controller for Electric Vehicles**
Dayarnab Baidya, Shreya Dhopte, Mitradip Bhattacharjee
Indian Institute of Science Education and Research, Bhopal, India

15:00

**1147: Fitness Activity Classification Using mmWave Radar Point-Cloud and Machine Learning**
Girish Tiwari, Shalabh Gupta
Indian Institute of Technology Bombay, India
14:00 - 15:30

**Smart Energy 3**
Room: Grand Ballroom I
Session Chair(s): Antonio Puliafito

14:00
**Integrating the Cyber World with the Internet of Things: How to transform cities and industries into smarter places**
Antonio Puliafito
University of Messina, Italy

14:30
**1185: Design and Experimental Analysis of Triboelectric Energy Harvester with In-House Set-Up**
Souvik Khan, Banibrata Mukherjee
Indian Institute of Technology Kharagpur, India

14:45
**1200: Enhanced TCR Results of TiOx Thin Films for Uncooled Infrared Microbolometers**
Y. Ashok Kumar Reddy{1}, P.V. Karthik Yadav{1}, T. Ramya Barathy{1}, B. Ajitha{3}, Isha Yadav{2}, Sudha Gupta{2}
{1}Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram, India; {2}Solid State Physics Laboratory, Defence Research & Development Organization, India; {3}Vellore Institute of Technology, India

15:00
**1212: Flexible Vibrational Energy Harvester with Groove Design Using BTO/PVDF-TrFE Film for Higher Output**
Sandeep Singh Chauhan, Nadeem Tariq Beigh, Dibyajyoti Mukherjee, Dhiman Mallick
Indian Institute of Technology Delhi, India

15:15
**1302: An Energy-Efficient Power Allocation Scheme for NOMA-Based IoT Sensor Networks in 6G**
Rishu Raj, Abhishek Dixit
Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, India