IEEE BIOSENSORS 2024
CAMBRIDGE, UK || JULY 28-30, 2024

IEEE BIOSENSORS 2024
CONFERENCE PROGRAM

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Dear Colleagues, dear Friends,

On behalf of the entire Organizing Committee, we cordially welcome you to the second IEEE BioSensors Conference (IEEE BioSensors 2024), following the success of our inaugural conference in London in 2023. This year the conference will be held at the Wellcome Genome Campus in Hinxton, Cambridge UK.

The Campus was founded in 1993, as the home to the Wellcome Sanger Institute (then called the Sanger Centre), the Medical Research Council’s Human Genome Mapping Project Resource Centre, the European Molecular Biology Laboratory’s European Bioinformatics Institute (EMBL-EBI), to consolidate expertise, facilities and knowledge in one place and played a major role in the Human Genome Project. Since its foundation, one third of the human genome was sequenced for the first time by the Wellcome Trust Sanger Institute and data stored and shared through EMBL-EBI. This was the largest single contribution of any centre to the Human Genome Project, making the Campus and its collaborations uniquely important in the history of genomics.

The IEEE BioSensors conference aims to bring together the research community and industry to showcase and discuss the latest developments in biosensors. IEEE BioSensors is sponsored by the IEEE Sensors Council and is the only IEEE event exclusively dedicated to biosensor, related systems and applications.

This conference and exhibition offers a rare opportunity to meet and network with leaders in the field of biosensors through the informal atmosphere of a focused international technical gathering. We hope the atmosphere, breadth and depth of research topics, combined with the quality of invited and contributed technical presentations, will make IEEE BioSensors a ‘must attend’ event for you every year.

IEEE BioSensors aspires to establish itself as the premier forum for reporting the latest research, development, and commercialization results in modern biosensor technology. You will hear from world experts about the latest in biosensor modalities, manufacturing and materials for biosensors, Lab-on-chip technology, DNA chips, wearable and implantable biosensor systems, immunosensors, enzyme-based biosensors, environmental biosensors, instrumentation, algorithms, modeling, and machine learning for biosensors in addition to a growing number of new applications and business opportunities.

This year, our program will begin on Sunday, July 28th, with three tutorials offered on the topics of (i) Disruptive Soft Biosensors for Connected Healthcare, (ii) CMOS Biochips: History, Opportunities and Challenges, (iii) Interface Circuits for Electro-Chemical and Molecular Sensing, given respectively by Wenlong Cheng, Arjang Hassibi, Carolina Mora Lopez.

The technical program covers two days of technical presentations (July 29th and 30th). By design, this is a single-track conference with high quality oral presentations and exhibitions. Each presentation was carefully reviewed and selected by our Technical Program Committee, after a careful evaluation by at least three independent reviewers – the technical experts in the field.
Our two Plenary speakers, Prof. Luisa Torsi and Prof. Shana Kelly will open each day with stimulating topics in the areas of single-molecule bioassays for point-of-care testing and novel biosensors for continuous monitoring of protein biomarkers.

The contributed papers will be presented in oral and poster formats. Of the 20 lectures given for contributed papers, four contributions are invited talks to kick off each of the platform presentation sessions.

On Sunday evening, our Welcome reception will also host the Young Professional 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.

The Digest of Technical Papers for the 2024 IEEE BioSensors conference contains four-page versions of the “regular technical papers.” all provided to attendees in an electronic form. Most presented papers will be available through IEEE Xplore after the symposium. In addition, some papers were submitted to a special biosensors issue of the IEEE Sensors Letters, and the full 4-page version of those papers will be published in the journal rather than the conference proceedings.

The Technical Program Committee will also select one Best Student Paper (as well as first and second runner up papers). The Awards will be announced Tuesday during the Gala Dinner, which will be held at the King’s College, one of the most iconic Cambridge colleges set on the banks of the River Cam, at the heart of the city of Cambridge, which was founded by King Henry VI in 1441, and continuously striven to uphold Henry’s love for ‘education, religion, learning and research’.

We would like to express our special thanks to the Oversight Committee, the Technical Program Committee, and many experts who contributed their time to evaluate 139 paper submissions representing 31 countries from across the globe.

We thank the IEEE Sensors Council for sponsoring the 2024 IEEE BioSensors conference as well as our Patrons and Exhibitors. Our special thanks to Caroline Kravec and the entire staff at Conference Catalysts, LLC for administrative support.

Finally, we thank all speakers, presenters, and attendees for making the 2024 IEEE BioSensors conference such a productive event. We hope that you find the IEEE BioSensors 2024 inspiring, intellectually stimulating, professionally rewarding, and personally enjoyable; of course, we are looking forward to seeing you back next year for IEEE BioSensors 2025.
Organizing and Technical Program Committee

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Pantelis Georgiou, Imperial College London, UK

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Mike McShane, Texas A&M University, USA

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Yuling Wang, Macquarie University, Australia
Roland Thewes, TU Berlin, Germany
Pedram Mohseni, Case Western Reserve University, USA

WiSe Co-Chairs
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Ashleigh Ruane, Cambridge University, UK
Ruchi Gupta, University of Birmingham, UK
Paola Saccomandi, Politecnico di Milano, Italy

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Nicole Weckman, Toronto, Canada
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Spyridon Pavlidis, North Carolina State University, USA
Laura Lechuga, Catalan Inst Nanosci & Nanotech (ICN2), Spain
Mehdi Javanmard, Rutgers University, USA
Sam Mabbott, Texas A&M University, USA
Limei Tian, Texas A&M University, USA
Weihua Guan, Penn State, USA
Benchaporn, (Jern) Lertanantawong, Mahidol, Thailand
Jun Kameoka, Waseda, Japan
Wei-Chuan Shih, University of Houston, USA
Ruchi Gupta, Birmingham, UK
Pranjal Chandra, IIT-BHU, India
Julien Reboud, University of Glasgow, UK
Leyla Soleymani, McMaster University, Canada
Sven Ingebrandt, Aachen University, Germany
Xuexin Duan, Tianjin, China
Erdem Arzum, Ege University, Turkey

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Matthew Ellis, Cambridge University, UK

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Exhibit and Poster Hall Layout

Poster Session One

Poster Session Two
Sunday, July 28th | 10:30 -12:00
Disruptive Soft Biosensors for Connected Healthcare

Room: Francis Crick Auditorium
Instructor: Wenlong Cheng, University of Sydney, Australia

Abstract: In the context of telehealth and internet of things (IOT), there are unprecedented needs for developing remote diagnostic tools that can monitor chemical and biological markers remotely anytime anywhere, such as via a smart phone. Such sensing devices are ideally soft and thin so that they can “bio-friendly” interface with soft biological systems. In this talk, I will present our skin-like sensing devices that can remotely monitor human’s health and cardiac organoids.

Reference: (Times New Roman, 12 pt, see below for example)

- A gold nanowire-integrated soft wearable system for dynamic continuous non-invasive cardiac monitoring. Shu Gong, Lim Wei Yap, Yuxin Zhang, Jinyuan He, Jialiang Yin, Faezeh Marzbanrad, David M Kaye, Wenlong Cheng*. Biosensors and Bioelectronics 2022, 205, 114072.
Abstract: In the past 3 decades, there were many attempts to leverage integrated circuit technologies, particularly CMOS fabrication processes, to create unique biosensors capable of detecting nucleic acid molecules, proteins, and other biological and chemical analytes. While such efforts targeted a diverse set of biotechnology applications, they all shared a common motivation. CMOS biosensors (or CMOS biochips) hold the promise of delivering superior analytical accuracy alongside scalability, cost efficiency and manufacturability. Yet, the outcomes of such endeavors have been varied, and the implementation of these multidisciplinary systems has proven to be significantly more challenging and complex than initially anticipated.

In the initial part of this talk, our goal is to offer a technical overview of CMOS biochips, incorporating historical perspectives. We start by briefly reviewing the fundamentals of biosensors and classifying them based on distinct signal dynamics, background, and noise characteristics. Following this, we argue the advantages of integrating semiconductor sensors with biosensors and present the architecture and functionality of an ideal CMOS biochip system that includes fluidics and sample processing components. Subsequently, we examine in detail various types of CMOS biochips and categorized by their detection modality (such as bioluminescence, fluorescence, magnetic, electrochemical, etc.), while also highlighting key performance tradeoffs.

In the latter part of this presentation, we delve into the implementation challenges associated with CMOS biochips. Specifically, we concentrate on R&D obstacles, manufacturability requirements, regulatory approval criteria and target applications. Ultimately, drawing from the insights gained through these discussions, we offer both recommendations as well as cautionary tales.
Abstract: Accurate measurement of certain chemicals and biological substances is essential for health care and biomanufacturing. Electrochemical sensing methods are particularly useful for this purpose because they are cost-effective, can be made very small, and provide real-time data. Technologies such as pH and ion-sensitive sensors that are integrated into standard CMOS platforms (the technology used for constructing integrated circuits) have shown to be effective. For instance, large arrays of Ion-Sensitive Field-Effect Transistors (ISFET) have been instrumental in DNA sequencing. Looking ahead to advanced DNA sequencing and protein studies, innovative techniques involving nanopores are being developed for efficient, high-throughput sensing of molecules. This presentation will explore the basic principles of electrochemical sensing, with a special focus on the design of the electronic circuits involved. It will provide an overview of the latest circuit design methods used in ISFET-based sensors and will conclude by discussing specific challenges in designing circuits for nanopore-based molecular sensing.
Monday, July 29th | 9:00 – 10:00

Point-Of-Care Ultra-Portable Single-Molecule Bioassays for One-Health

Room: Francis Crick Auditorium
Presenter: Luisa Torsi, Università degli Studi di Bari Aldo Moro

Abstract: Screening asymptomatic organisms (humans, animals, plants) with a high-diagnostic accuracy using point-of-care-testing (POCT) technologies, though still visionary holds great potential. Convenient surveillance requires easy-to-use, cost-effective, ultra-portable but highly reliable, in-vitro-diagnostic devices that are ready for use wherever they are needed. Currently, there are not yet such devices available on the market, but there are a couple more promising technologies developed at readiness-level 5: the Clustered-Regularly-Interspaced-Short-Palindromic-Repeats (CRISPR) lateral-flow-strip tests and the Single-Molecule-with-a-large-Transistor (SiMoT) bioelectronic palmar devices.

They both hold key features delineated by the World-Health-Organization for POCT systems and an occurrence of false-positive and false-negative errors <1-5% resulting in diagnostic-selectivity and sensitivity >95-99%, while limit-of-detections are of few markers. CRISPR-strip is a molecular assay that, can detect down to few copies of DNA/RNA markers in blood while SiMoT immunometric and molecular test can detect down to a single oligonucleotide, protein marker, or pathogens in 0.1mL of blood, saliva, and olive-sap. These technologies can prospectively enable the systematic and reliable surveillance of asymptomatic ones prior to worsening/proliferation of illnesses allowing for timely diagnosis and swift prognosis. This could establish a proactive healthcare ecosystem that results in effective treatments for all living organisms generating diffuse and well-being at efficient costs. [1-5] [Read More]

Tuesday, July 30th | 10:30 – 12:00

Microphysiological Systems with Integrated Biosensors

Room: Francis Crick Auditorium
Instructor: Shana Kelley, Chan Zuckerberg Biohub Chicago, Neena B. Schwartz Professor at Northwestern

Abstract: To put disease-related biomarkers to work for personalized monitoring of health and disease, new high-performance technologies are needed to enable rapid and sensitive analysis of proteins and other biomarkers. Electrochemical methods providing low cost and direct biomarker readout have attracted a great deal of attention for this application. Recently we developed reagentless sensors that are powerful detectors for in vivo protein sensing (Nature Chemistry, 2021, J. am. Chem. Soc. 2023, Angew. Chem. Intl. Ed. 2023) as well as the analysis of viral particles in situ in the oral cavity (J. Am. Chem. Soc. 2021). This talk will summarize the development of these sensors, their application to a variety of clinical problems, and the development of a range of implantable sensors for in vivo monitoring.
YP Poster Session | Sunday July 28, 2024 | 18:00 – 20:00

We are pleased to invite all conference attendees to join us at the Welcome Reception/ YP Poster Session at the beautiful Hinxton Hall. This event is a wonderful opportunity to network, share insights, and celebrate the innovative work of our young professionals. Come enjoy an evening of engaging conversations, delicious refreshments, and inspiring presentations. We look forward to seeing you there!

CV/Resume Review

During select portions of the conference, students will have the exclusive opportunity to participate in a comprehensive Resume/CV Review session facilitated by seasoned professionals from various industries. This unique offering aims to provide invaluable insights and constructive feedback to help students enhance their resumes and stand out in today’s competitive job market.

WiSe Session | Monday | July 29, 2024 | 16:30 - 18:00

Topic: Transformative Leadership

What is Transformative Leadership and are women in science and engineering crucial to providing this type of leadership? Transformational leadership stands in contrast to the “command” style of leadership and is characterised by leaders engaging with and influencing others by motivating them, paying attention to their needs and making decisions within a strong ethical framework. This allows transformative leaders to bring out the full potential of people and thus realise their goals in ways that benefit society, the organisation, and their colleagues.

Invited Speakers

Paola Saccomandi
Politecnico di Milano, Italy

Agnieszka Rutkowska
Myriofoam, UK

Luisa Torsi
Università degli Studi di Bari Aldo Moro

Marika Niihori
University of Cambridge, UK
## Program at a Glance

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<td><strong>Plenary: Luisa Torsi</strong></td>
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<td>Sara Ghoreishizadeh, UCL</td>
<td>Session Chair(s): Sara Ghoreishizadeh, UCL</td>
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15:30
*INVITED* 5113: Single Small Extracellular Vesicle Analysis Using Plasmonic and Fluorescence Microscopy
Nareg Ohannesian{2}, Mohammad Mallick{2}, Steven Lin{1}, Wei-Chuan Shih{2}
{1}MD Anderson Cancer Center, United States; {2}University of Houston, United States
16:00
**5102: False Sensitivities in Cortisol Immunosensors Fabricated on Gold-Screen-Printed Electrodes**
Aishath Nisha Naeem, Sara Ghoreishizadeh
University College London, United Kingdom

16:15
**5094: Detecting Low-Abundance Biomarkers via Enzyme-Free Amplification Biosensing on Lateral Flow Strips**
Menghan Zhang, Julien Reboud, Jonathan Cooper
University of Glasgow, United Kingdom

16:30
**5074: Piezoelectric Quad-Mode MEMS Biosensor for Simultaneous Detection and Control Measurements**
Alkausil Tamboli{2}, Akshay Kale{2}, Mario De Miguel Ramos{1}, Andrew Flewitt{2}
{1}Sorex Sensors Ltd, United Kingdom; {2}University of Cambridge, United Kingdom

16:45

*Sensors Letters Paper*

**5124: Selective Functionalization of Micromachined Quartz Resonator Arrays Using Electrochemical Techniques for Biosensing Applications**
Ping Kao{1}, Allara David{3}, Srinivas Tadigadapa{2}
{1}Micron Technologies, Taiwan; {2}Northeastern University, United States; {3}Pennsylvania State University, United States

17:00 – 18:00
**Industry Panel**
*Room:* Francis Crick Auditorium
John Tingay, Paragraf; Nikki Weckman, 52 North Health; Nickolai Vysokov, BrainPatch; Zhe Liu, LinkZill
*Session Chair(s):* Agnieszka Rutkowska, Myriofoam

18:00 – 20:00
**YP Welcome Reception & Poster Session**
*Room:* Hinxton Hall Lobby
7:30 – 8:30
Registration
Room: Hinxton Hall Lobby

8:30 – 9:00
Opening Remarks/ IEEE Standards
Room: Francis Crick Auditorium

9:00 – 10:00
Plenary: Point-Of-Care Ultra-Portable Single-Molecule Bioassays for One-Health
Luisa Torsi, Università degli Studi di Bari Aldo Moro
Room: Francis Crick Auditorium
Session Chair(s): Mike McShane, Texas A&M University
Michael Daniele, North Carolina State University

10:00 – 10:30
Coffee Break
Room: Hinxton Hall Lobby

10:30 – 12:00
B2L-A: Lecture Session 2
Room: Francis Crick Auditorium
Session Chair(s): Wei-Chuan Shi, University of Houston

10:30
*INVITED* 5055: Biosensing of Tuberculosis Volatile Biomarkers Using Insect Odorant Receptors
Colm Carraher, Di Brewster, Wendy Huo, Mark Agasid, Jonathan Good, Andrew Kralicek
Scentian Bio Ltd, New Zealand

11:00
5040: Towards Cerebrospinal Fluid-Free Ultrasensitive Alzheimer’s Diagnostics Using Molecularly Imprinted Polymers
Beth Norman[2], Arjun Ajith Mohan[2], Georgeta Vulpe[2], Guoyi Liu[3], Sudhaunsh Deshpande[2], Felismina Moreira[1], Sanjiv Sharma[2]
{1}Politechnic of Porto, Portugal; {2}Swansea University, United Kingdom; {3}Swansea University, Chongqing University, United Kingdom

11:15
Invited Journal Author
10.1109/JSEN.2023.3317678: Optimizing an Optical Cavity-Based Biosensor for Enhanced Sensitivity
Marzhan Sypabekova, Aidan Hagemann, Jenna Kleiss, Cooper Morlan, Seunghyun Kim
Baylor University, United States

11:30
5082: In-Pixel Detection of Nucleic Acid Amplification Using Neuromorphic ISFET Arrays
Prateek Tripathi, Nicolas Moser, Pantelis Georgiou
Imperial College London, United Kingdom
11:45

Invited Journal Author

10.1109/JSEN.2023.3337198: Impedimetric Screen-Printed Immunosensor for the Rapid Detection of Chagas Disease
Cecilia Yamil Chain{3}, Lara Franchin{4}, José Cisneros{3}, Andrea Villagra{1}, Carlos Labriola{2}, Alessandro Paccagnella{4}, Stefano Bonaldo{4}
{1}Hospital de Alta Complejidad El Cruce, Argentina; {2}Universidad Nacional de Buenos Aires, Argentina; {3}Universidad Nacional de La Plata, Argentina; {4}Università degli Studi di Padova, Italy

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<td>Pantelis Georgiou, Imperial College London</td>
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5004: Lithography-Assisted Assembly of Single-Layer Gold Nanoparticle Micropatterns for Plasmonic Biosensor Applications
Huimin Xie, Yangxi Zhang, Han Wang, A. Ping Zhang
Hong Kong Polytechnic University, China

5007: Nb2O5 as a High-k Alternative to Ta2O5 for Enhanced Gate Gain on Field-Effect Biosensors
Christopher Beale, Vladimir Kolkovsky, Matthias Wambold, Falah Al-Falahi, Michael Scharnweber, Laurence Kühne, Eberhard Kurth, Olaf Rüdiger Hild
Fraunhofer Institute for Photonic Microsystems IPMS, Germany

5008: Design and Modeling of a Plethysmographic Wearable Sensor for Heart Failure Non-Invasive Edema Monitoring
Sergio Maurencig, Mario Palmero, Antonio Algarin, Santiago F. Scaglusi, Pablo Pérez, Daniel Martín, Gloria Huertas, Alberto Yúfera
Universidad de Sevilla, Spain

5010: Bacterial Enrichment and Detection Using Triangle-Shaped Acoustic Streaming Tweezer
Wei Wei, Ke Jin, Bingnan Wang, Xuexin Duan
Tianjin University, China

5011: Molecularly Imprinted Polymer Based Cortisol Sensor with Organic Electrochemical Transistor for Wearable Applications
Taeil Kim{1}, Mohammad Abrar Uddin{1}, Qian Yi{2}, Rahim Esfandyarpour{2}
{1}Baylor University, United States; {2}University of California, Irvine, United States
5013: Multiphysics Model for Simulation of Electrochemical Signals for Biosensing Applications
Lara Franchin, Alessandro Paccagnella, Stefano Bonaldo
Università degli Studi di Padova, Italy

5018: Plasmonic Fiber Bragg Gratings: Towards Affordable Biosensors, Insulin Biotrapping Using Plasmofluidic Chips: A Benchmark
Médéric Loyez, Hadrien Fasseaux, Evelyne Meurisse, Ruddy Wattiez, Christophe Caucheteur
University of Mons, Belgium

5019: Capacitive Effect in Memristive Biosensors
Junrui Chen, Sandro Carrara
Bio/CMOS Interfaces Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland

5021: Laser Induced Synthesis of Copper Single Atom Catalysts for Ascorbic Acid Detection
Guillermo Tostado Blazquez, Veerapan Mani, Khaled Nabil Salama
King Abdullah University of Science and Technology, Saudi Arabia

5022: A Smart Hydrogel-Based Sensing Platform for Catheter Applications
Benozir Ahmed{2}, Christopher Reiche{2}, Florian Solzbacher{2}, Julia Körner{1}
{1}Leibniz University Hannover, Germany; {2}University of Utah, United States

5024: Electromechanical Sensors for Measurement of Mitral Valve Coaptation Pressure
Joseph Faudou{4}, Mohammed Benwadih{3}, Grégory Fels{1}, Daniel Grinberg{2}, Pierre-Jean Cottinet{1}
{1}INSA Lyon, France; {2}Louis Pradel Cardiologic Hospital, France; {3}University Grenoble Alpes, CEA Liten, France; {4}University Grenoble Alpes, CEA Liten, INSA Lyon, LGEF, France

5026: Development of a Hyperspectral System for Real-Time High Throughput Bioprocess Monitoring
Padraig McGirr{2}, Breandan Hill{1}, Robert Pollard{1}
{1}Causeway Sensors, United Kingdom; {2}Queen’s University Belfast, United Kingdom

5028: Selection and Characterization of Aptamers for the Development of a Point-of-Care Malaria Diagnostic Device
Liga Kunrade{1}, Briza Pérez-López{3}, Karlis Pleiko{2}, Laura Osīte{1}, Karina Goluba{1}, Vadims Parfejevs{1}, Eva Baldrich{3}, Una Riekstina{1}
{1}University of Latvia, Latvia; {2}University of Tartu, Institute of Biomedicine and Translational Medicine, Estonia; {3}Vall d’Hebron Hospital Institut de Recerca, Spain

5030: Organic Memristive Devices with Capacitive-Coupled Effect: A Novel Approach for Histamine Sensing
Bajramshahe Shkodra{2}, Mattia Petrelli{2}, Antonio Altana{2}, Moritz Ploner{2}, Luisa Petti{2}, Sandro Carrara{1}, Paolo Lugli{2}
{1}Bio/CMOS Interfaces Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland; {2}Free University of Bozen-Bolzano, Italy

5032: Detection of Alpha-Synuclein by LSPR with Different Lipid Layers and Self-Templating Properties
Yuto Kimura, Takumi Kinoshita, K. Yasunaga, Carl Frederik Werner, Minoru Takeda, Masayuki Fukuzawa, Minoru Noda
Kyoto Institute of Technology, Japan
5039: Optical Fiber Biosensor Packaged for Cancer Biomarker Detection: Towards Clinical Application
Zhuldyz Myrkhiyeva{1}, Kanagat Kantoreyeva{2}, Aliya Bekmurzayeva{1}, Anthony Gomez{1}, Zhannat Ashikbayeva{1}, Aidana Bissen{2}, Daniele Tosi{1}
{1}National Laboratory Astana, Nazarbayev University, Kazakhstan; {2}Nazarbayev University, Kazakhstan

5050: Continuous Monitoring of Bovine Well-Being Using Wearable Biosensing Devices
Guoyi Liu{2}, Arjun Ajith Mohan{1}, Georgeta Vulpe{1}, Sudhaunsh Deshpande{1}, Joseph Neary{3}, Rob Smith{3}, Sanjiv Sharma{1}
{1}Swansea University, United Kingdom; {2}Swansea University, Chongqing University, United Kingdom; {3}University of Liverpool, United Kingdom

5054: Characterization of 3D Printed Thermoplastic Polyurethane and Lamp Black Electrodes Towards Bioanalytical Electrochemical Sensing
Philippa Ngaju, Hyun Jae Lee, Richa Pandey, Keekyoung Kim
University of Calgary, Canada

5059: Single-Cell Electric Impedance Sensor Based on Integrated Circuit Chip
Wenhao Hui, Ren Shen, Pui-In Mak, Rui P. Martins, Ka-Meng Lei, Yanwei Jia
University of Macau, Macau

5061: Modular Platform for Mobile Biosensing with Extended Gate Field-Effect Transistors
Jack Twiddy{1}, Ethan Cove{1}, Hayley Richardson{1}, Lina Acosta-Perez{1}, Mika Hatada{2}, Ellie Wilson{2}, Koji Sode{2}, Spyridon Pavlidis{1}, Michael Daniele{1}
{1}North Carolina State University, United States; {2}University of North Carolina at Chapel Hill, United States

5069: Development of a Nanobody-Based Screen-Printed Sensor for Cell Therapy Process Automation
Imen Boumar{1}, Martin Peacock{2}, Paula M. Mendes{1}
{1}University of Birmingham, United Kingdom; {2}Zimmer & Peacock, United Kingdom

5075: Sensitive Colorimetric Detection of Cholesterol Using MIL-101(Fe)-NH2 Nanozymes as Peroxidase Mimics
Indrani Nandi, Pranjal Chandra
Indian Institute of Technology (BHU) Varanasi, India

5079: Photonic Crystal Cavities for Ultrafast Antimicrobial Susceptibility Testing at the Single-Bacterium Level
Enrico Tartari{1}, Nicolas Villa{1}, Hugues de Villiers de la Noue{2}, Simon Glicenstein{5}, Khouloud Arfaoui{6}, Emmanuel Picard{5}, Marc Zelmsmann{6}, Pierre R. Marcoux{4}, Emmanuel Hadji{3}, Grégory Resch{2}, Romuald Houdré{1}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Lausanne University Hospital, Switzerland; {3}Université Grenoble Alpes, CEA-Leti, France; {4}University Grenoble Alpes, CEA-Leti, France; {5}University Grenoble Alpes, CEA, Grenoble INP, IRIG, PHELIQS, SiNaPS, France; {6}University Grenoble Alpes, CNRS, CEA-Leti, Grenoble INP, France

Invited Journal Author
10.1109/JSEN.2023.3321677: An EMG-Based Biofeedback System for Tailored Interventions Involving Distributed Muscles
Stephen Toepp, Martin Mohrenschildt, Aimee Nelson
McMaster University, Canada
5137: Electroless Au Plating of CMOS Microelectrodes: Fabrication, Characterisation and Electrochemical Measurement
Minghao Li{2}, Aishath Nisha Naeem{2}, Henry Lancashire{2}, Anne Vanhoestenberghe{1}, Sara Ghoreishizadeh{2}
{1}King’s College London, United Kingdom; {2}University College London, United Kingdom

5140: Sweat Glucose Sensor with SPCE Modified by CuO Nanorods
Porpin Pungetmongkol{2}, Kittipat Sathitaphiwan{2}, Natchanon Auwewetchanichkul{2}, Thitasiree Kaewparadai{2}, Siwagorn Limwathanagura{2}, Sittinadh Wanotayan{1}
{1}BCGeTEC, Chulalongkorn University, Thailand; {2}Chulalongkorn University, Thailand

5145: Label-Free Electrochemical Immunosensor for Monitoring Kidney Transplant Rejection with Electroactive Antibiofouling Hydrogel
Rohit Gupta, Nikolaos Salaris, Ashish Kalkal, Priya Mandal, Stavroula Babalani, Reza Motallebzadeh, Manish K Tiwari
University College London, United Kingdom

5147: Unveiling Biosensing Innovations: Laser Scattering Sensor and Gold Nanoparticle-Decorated Ti3C2 MXene Composite for Enhanced Biosensing Applications
Francesco Pisani{4}, Ayesha Zaheer{4}, Zaheer Ud Din Babar{3}, Raffaele Velotta{4}, Carmine Granata{1}, Fabrizio Tessicini{2}, Bartolomeo Della Ventura{4}, Vincenzo Iannotti{4}
{1}Consiglio Nazionale delle Ricerche ISASI, Italy; {2}Fluid-O-Tech S.R.L, Italy; {3}Scuola Superiore Meridionale, Università degli Studi di Napoli Federico II, Italy; {4}Università degli Studi di Napoli Federico II, Italy

5149: Study of AC Electrothermal Effect in Microfluidics
Zouhir Bouchaar{2}, Ying Ting Set{1}, Liesbet Lagae{2}, Camila Dalben Madeira Campos{1}
{1}imec, Belgium; {2}imec, Katholieke Universiteit Leuven, Belgium

5151: Metal Enhanced Fluorescence Immunosensor based on Gold Nanoparticles Array for Early Diagnosis of Prostate Cancer
Maria De Luca{2}, Adriano Acunzo{2}, Evelina La Civita{3}, Francesco Gentile{1}, Daniela Terracciano{3}, Raffaele Velotta{2}, Bartolomeo Della Ventura{2}
{1}Department of Experimental and Clinical Medicine, University Magna Graecia of Catanzaro, Italy; {2}Department of Physics “E. Pancini”, University of Naples Federico II, Italy; {3}Department of Translational Med. Sciences, University of Naples Federico II, Italy

5116: Live Demonstration: Ultrasensitive Textile Strain Sensing Choker for Diverse Healthcare Applications
Wentian Yi, Chenyu Tang, Muzi Xu, Luigi G. Occhipinti
University of Cambridge, United Kingdom
5118: Live Demonstration: Interactive Oral Health Monitoring with PlaqueTrack
Dafydd Ravenscroft, Luigi G. Occhipinti
University of Cambridge, United Kingdom

5127: Live Demonstration: Hacking Health: Unveiling Vulnerabilities in Wireless Wearable Sensors
Mohammad Alhussan, Francesca Boem, Sara Ghoreishizadeh, Anna Maria Mandalari
University College London, United Kingdom

Sensors Letters Paper
5150: Contact Activation in Dielectric Blood Coagulometry: a Comparison of Screen-Printed and Sputtered Gold Electrodes of ClotChip Microfluidic Sensor
Hanif Alizadeh, Calvin Abonga, Christopher Delianides, Sina Pourang, Michael Suster, Pedram Mohseni
Case Western Reserve University, United States

16:30 – 18:00
WiSe Session
Room: Francis Crick Auditorium
Session Chair(s): Ashleigh Ruane, Cambridge University

19:00 – 22:00
Gala Dinner
Kings College, University of Cambridge

*Transportation will be provided
<table>
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<th>Time</th>
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<th>Session Chair(s)</th>
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<tr>
<td>8:00 – 8:30</td>
<td>Registration</td>
<td>Hinxton Hall Lobby</td>
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<td>8:30 – 9:00</td>
<td>Opening Remarks/SC President Address</td>
<td>Hinxton Hall Lobby</td>
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| 9:00 – 10:00  | Plenary: A New Bioelectronic Approach to Continuous Monitoring of Protein Biomarkers | Francis Crick Auditorium | Michael Daniele, North Carolina State University  
                |                                                                       |                        | Mike McShane, Texas A&M University                                                 |
| 10:00 – 10:30 | Coffee Break                                                          | Hinxton Hall Lobby    |                                                                                  |
| 10:30 – 12:00 | C1L-A: Lecture Session 3                                               | Francis Crick Auditorium | Julien Reboud, University of Glasgow                                                 |

10:30

*INVITED* 5056: Aptamer-Decorated Graphene Channel Array with Liquid-Gating for Sensing Cortisol Stress Hormone
Ali Gilani{2}, Ali Saeidi{3}, Shokooofeh Sheibani{2}, Johan Longo{3}, Sadegh Kamaei{2}, Adelina Ameti{1}, Nicolas Niederländer{1}, Nelly Pitteloud{1}, Adrian Mihai Ionescu{2}
{1}Lausanne University Hospital, Switzerland; {2}Nanoelectronic Devices Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland; {3}Xsensio, Switzerland

11:00

5044: Glucose and Lactate Monitoring Using Polyphenol Subdermal Wearable Patches
Georgeta Vulpe{1}, Guoyi Liu{2}, Sam Oakley{1}, Guanghao Yang{2}, Arjun Ajith Mohan{1}, Mark Waldron{1}, Sanjiv Sharma{1}
{1}Swansea University, United Kingdom; {2}Swansea University, Chongqing University, United Kingdom

11:15

5014: CRISPR/Cas Enabled Sweat Analysis: Paving the Way for Non-Invasive Point-of-Care Detection of Pathogens by Analyzing Cas12a Trans-Cleavage Performance in Human Sweat
Jeanne Elisabeth van Dongen{2}, Emma Moonen{1}, Loes Segerink{2}, Jaap Den Toonder{1}
{1}Eindhoven University of Technology, Netherlands; {2}University of Twente, Netherlands

11:30

5092: Engineered Cobalt/Molybdenum Bimetallic MOF as Electrochemical Signal Transducer for Uric Acid Detection
Shubhangi Shubhangi, Ruchita Chaudhari, S.K. Rai, Pranjal Chandra
Indian Institute of Technology (BHU) Varanasi, India
11:45

**5107: ACE2-Based Catalytic Sensing System to Harness Antigen-Receptor Interaction for Potential Theranostic Applications**

Ijaz Gul{3}, Muhammad Akmal Raheem{3}, Xiaoyun Zhong{3}, Xi Yuan{3}, Jiansong Ji{1}, Zhenglin Chen{2}, Vijay Pandey{3}, Peiwu Qin{3}

{1}Fifth Affiliated Hospital of Wenzhou Medical University, China; {2}Fifth Affiliated Hospital of Wenzhou Medical University, Hangzhou Dianzi University, Tsinghua Uni., China; {3}Tsinghua University, China

12:00 – 13:30
**Lunch**

**Room:** Hinxton Hall Dining Room

13:30 – 15:00
**C3L-A: Lecture Session 4**

**Room:** Francis Crick Auditorium

**Session Chair(s):** Melpomeni Kalofonou, Imperial College London

Xuexin Duan, Tianjin University

13:30
**INVITED** 5042: Improvement of the Microfluidic CRISPR/Cas Assay with On-Chip Cleavage for Target-Amplification-Free Nucleic Acid Detection

Nadine Urban{1}, Johanna Groth{1}, Midori Johnston{1}, Hasti Mohsenin{2}, Wilfried Weber{2}, Can Dincer{1}

{1}University of Freiburg, Germany; {2}University of Freiburg, INM, Saarland University, Germany

14:00
**5068: Electrochemical Detection of Bioaerosols with Functionalized Electrodes in Microfluidics**

Derek Goderis, Sunanda Dey, Paige Goderis, David Hickey, Andrew Mason

Michigan State University, United States

14:15
**5064: Technological Advances in Bioproduction: An Innovative Photonic Platform for Real-Time Monitoring of Impurities**


{1}Sanofi, France; {2}Université Grenoble Alpes, CEA-Leti, France

14:30
**5072: Surface Biofunctionalization of Silicon Photonic Mach-Zehnder Interferometers for Bacterial Biosensor Development**

Hippolyte Durand, Loïc Laplatine, Ali Kheir-Aldine, Caroline Fontelaye, Doriane Eyvrard, Anne-Gaëlle Bourdat, Malika Amdaoud, Guillaume Nonglaton, Thomas Alava

Université Grenoble Alpes, CEA-Leti, France
Technical Program: Tuesday, July 30 (cont.)

14:45

Sensors Letters Paper
5139: Bacteria-Based Biosensor for the Detection of Lactococcus lactis Bacteriophage in Agrifood Industry
Stefano Bonaldo{3}, Lara Franchin{3}, Erica Cretaio{3}, Elisabetta Pasqualotto{2}, Matteo Scaramuzza{1}, Teresa Bertozzi{3}, Alessandro Paccagnella{3}
{1}ARC-Centro Ricerche applicate s.r.l., Italy; {2}ARCADIA s.r.l., Italy; {3}Università degli Studi di Padova, Italy

15:00 – 16:30
Coffee Break | C4P-B: Poster Session 2 | B3P-C: Live Demos
Room: Hinxton Hall Lobby
Session Chair(s): Luigi Occhipinti, Cambridge University
Pantelis Georgiou, Imperial College London

5081: Methods to Immobilise CRP Antibodies on High-κ Dielectric Substrates for ImmunoFET Development
Tasha Walker, Lewis Keeble, Florent Seichepine, Diego Estrada-Rivadeneyra, Michael Levin, Pantelis Georgiou, Shea Hamilton, Nicolas Moser
Imperial College London, United Kingdom

5087: Detection of Cellular Interaction with Small Peptides Immobilized on SPR Biosensors
Ahmar Hasnain, Heiko Heilmann, Muhammad Usman Anwar, Bernd Buße, Alexey Tarasov
Kaiserslautern University of Applied Sciences, Germany

5089: An EMG Based Wearable System for Chinese Sign Language Recognition
Jing Gong{2}, Cong Li{1}, Chenyu Tang{3}, Xuhang Chen{3}, Shuo Gao{1}
{1}Beihang University, China; {2}Tsinghua University, China; {3}University of Cambridge, United Kingdom

5096: Neural Synchrony for Neuromorphic ISFET Cluster Calibration
Tanmay Lad, Prateek Tripathi, Costanza Gulli, Nicolas Moser, Pantelis Georgiou
Imperial College London, United Kingdom

5099: A Pill-Sized Low Frequency Implantable Magnetolectric Antenna for Near-Field Data Transfer and Therapeutic Applications
Dibyajyoti Mukherjee, Dhiman Mallick
Indian Institute of Technology Delhi, India

5100: Exploring Memristive Biosensing Dynamics: A COMSOL Multiphysics Approach
Manel Bouzouita{4}, Fakhreddine Zayer{3}, Ioulia Tzouvadaki{2}, Sandro Carrara{1}, Hamdi Belgacem{4}
{1}Bio/CMOS Interfaces Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland; {2}Ghent University, IMEC, Belgium; {3}Khalifa University, U.A.E.; {4}University of Monastir, Tunisia

5103: Decoding Human Motor Intention: Integrating EEG, EMG, and Camera Recordings for Comprehensive Analysis
Renáta Kubacska{1}, Csanád Hende{1}, János Csiper{2}, Gergely Márton{2}
{1}Budapest University of Technology and Economics, Hungary; {2}MindRove Kft., Hungary
5110: Design of a Cuff Electrode - Inspired Wearable Bioimpedance Plant Sensor
Enayet Rahman{1}, Bojan Nikolic{1}, Matt Freeman{2}, Sebastian Goralik{2}, Panos Ioakim{2}, Iasonas Triantis{1}
{1}City, University of London, United Kingdom; {2}Delta-T Devices Ltd, United Kingdom

5111: Development of a Compact Plasmonic Biosensing Platform Based on Chemically Synthesized Gold Triangular Nanoprism
Payel Ghosh{2}, Nvs Praneeth{2}, Gayatri Joshi{2}, Arup Lal Chakraborty{2}, Sharmistha Dutta Choudhury{1}, Vv Raghavendra Sai{3}, Saumyakanti Khatua{2}
{1}Bhabha Atomic Research Center, India; {2}Indian Institute of Technology Gandhinagar, India; {3}Indian Institute of Technology Madras, India

5117: Single Atom Molybdenum Nanozyme Constructed Electrochemical Flexible Chips for Sensitive Sensing of Dopamine
Fang Xin Hu{2}, Yan Zheng{1}, Luigi G. Occhipinti{2}
{1}Suzhou University of Science and Technology, China; {2}University of Cambridge, United Kingdom

5120: Drift Behavior Analysis of ISFET Models Using COMSOL Multiphysics
Utku Noyan, Sahil Shah, Pamela Abshire
University of Maryland, United States

5122: Eco-Conscious Approach to Wireless Gas Monitoring with a Hybrid Printed Passive Sensor Tag
Johanna Zikulnig{2}, Muhammad-Hassan Malik{2}, Lukas Rauter{2}, Martin Lenzhofer{2}, Sandro Carrara{1}, Jürgen Kosel{2}
{1}Bio/CMOS Interfaces Laboratory, École Polytechnique Fédérale de Lausanne, Switzerland; {2}Silicon Austria Labs GmbH, Austria

5123: Development of Electrochemical Biosensor for Ethanol Monitoring in Fermentation Media
Aliyeh Hasanzadeh, Negin Yousefi, Behdad Shokrollahi Yancheshmeh, Mohammad Amin Mohammadifar, Krist V. Gernaey
Technical University of Denmark, Denmark

5131: Electrochemical Biosensor Enhanced with Graphite Ink and Multi-Walled Carbon Nanotube for High Sensitivity Detection of Serotonin
Zhuoya Liao, Jixin Shang, Toru Ohgih, Jun Kameoka
Waseda University, United States; Waseda University, China; Waseda University, Japan

5047: Using Wearable Sensors to Capture the Synchrony of Circadian Rhythms Across Physiological Processes in Free-Living Conditions
Christopher Thornton, Billy C. Smith, Guillermo Besné, Yujiang Wang
CNNP Lab, Newcastle University, United Kingdom

5051: A Ferroelectric CMOS Microelectrode Array with ZrO2 Recording and Stimulation Sites for In-Vitro Neural Interfacing
Maximilian Becker{1}, Andrea Corna{4}, Bohan Xu{2}, Uwe Schroeder{2}, Oliver Amft{1}, Stefan Keil{3}, Roland Thewes{3}, Günther Zeck{4}
{1}Hahn-Schickard, Germany; {2}Namlab gGmbH, Germany; {3}Technische Universität Berlin, Germany; {4}Technische Universität Wien, Austria
5058: A Strabismus Widespread Screening Method Based on Wearable Eye Tracker
Zihe Zhao{1}, Shangru Li{1}, Jiaqi Wang{1}, Xiaqing Li{2}, Shuo Gao{1}
{1}Beihang University, China; {2}Peking University First Hospital, China

5060: Sub-Micron Molecularly Imprinted Polymer Particles for Cortisol Detection
Gavin Summers{2}, Graham Anderson{1}, Luigi G. Occhipinti{2}, Christopher Proctor{3}
{1}Beko PLC, United Kingdom; {2}University of Cambridge, United Kingdom; {3}University of Oxford, United Kingdom

5067: Bimetallic Copper/Zinc Metal Organic Framework-MoS2 Nanohybrid Based Electrochemical Sensor
Divya Divya, Shubhangi Shubhangi, Pranjal Chandra
Indian Institute of Technology (BHU) Varanasi, India

5070: Screen-Printed Microfluidic Channel with Hydrophobic-Hydrophilic Treatments for Air Bubble Prevention
Tashfia Ahmed{1}, Enayet Rahman{1}, Matt Bryan{2}, Michael Powner{1}, Iasonas Triantis{1}
{1}City, University of London, United Kingdom; {2}SmartCare Medical Limited, United Kingdom

5078: Detecting Deterioration in Electrochemical Sensing Au Electrodes with Admittance Measurement
Xin Zhang, Sara Ghoreishizadeh
University College London, United Kingdom

Sensors Letters Paper

5132: Field Study Correlating Nutrient Absorption and Transpiration in Lettuce Hydroponics Using an IoT-Interfaced Solid-State Ion Sensor Array
{1}National Pingtung University of Science and Technology, Taiwan; {2}National Taiwan University, Taiwan; {3}Tamkang University, Taiwan

Invited Journal Author

10.1109/JSEN.2022.3182785: Automatic Measurement System for Nitrite and Nitrate in Water Bodies
Martin Brandl
University for Continuing Education Krems, Austria

Invited Journal Author

10.1109/JSEN.2023.3264942: A Wearable Multisensor Patch for Breathing Pattern Recognition
Mohammed Ahamed, Simon Rondeau-Gagne
University of Windsor, Canada

Sensors Letters Paper

5141: Enhanced Performance of Calcium-Ion Selective Electrode Based on Chitosan/MXene/ZnO Modification
Yixuan Liu, Jiawei Zhai, Hongtu Dong, Bin Luo, Xiaodong Wang
Beijing Academy of Agriculture and Forestry Sciences, Intelligent Equipment Research Center, China
5146: Development of molecular-Imprinted Electrochemical Sensor for linolenic Acid
Aixue Li, Jianhua Cui, Heng Zhang, Ke Liu, Zhiling Zhou
Beijing Academy of Agriculture and Forestry Sciences, China

10.1109/LSENS.2024.3406787: Influence of Surface Passivation on Campylobacter jejuni Specificity of an Impedimetric Genosensor for Poultry Infection Monitoring in Agri-Food Industry
Lara Franchin, Alessandro Paccagnella, Stefano Bonaldo
Università degli Studi di Padova, Italy

5152: Bacterial biosensor supported in nanoclays intercalated with ionic liquids for general toxicity assessment
Sergio A. Ospina-Rodríguez{1}, Natalia Prieto-Castañeda{1}{2}, Nuria Vigués{3}, Xavier Muñoz–Berbel{4}
{1}Facultad de Ciencias Exactas y Naturales, Universidad de Caldas, Manizales CP 170004, Colombia;
{2}Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Colombia, Manizales CP 170001,
Colombia; {3}Universitat Autònoma de Barcelona, CP 08193 Barcelona, Spain; {4}Instituto de
Microelectrónica de Barcelona (IMB-CN, CSIC), CP 08193 Barcelona, Spain

5116: Live Demonstration: Ultrasensitive Textile Strain Sensing Choker for Diverse Healthcare Applications
Wentian Yi, Chenyu Tang, Muzi Xu, Luigi G. Occhipinti
University of Cambridge, United Kingdom

5118: Live Demonstration: Interactive Oral Health Monitoring with PlaqueTrack
Dafydd Ravenscroft, Luigi G. Occhipinti
University of Cambridge, United Kingdom

5127: Live Demonstration: Hacking Health: Unveiling Vulnerabilities in Wireless Wearable Sensors
Mohammad Alhussan, Francesca Boem, Sara Ghoreishizadeh, Anna Maria Mandalari
University College London, United Kingdom

16:30 – 17:00
Award Ceremony and Closing Remarks
Room: Francis Crick Auditorium
Session Chair(s): Luigi Occhipinti, Cambridge University
Pantelis Georgiou, Imperial College London