

Bioelectronic Interfaces: Materials, Devices and Applications (CyBioEl)

Limassol, Cyprus, 2024 October 22nd - 25th

Conference organizers: Eleni Stavrinidou and Achilleas Savva

Conference Program

October 22nd - Day 1 (Tuesday) 1	
08:30 - 09:20	Registration
09:20 - 09:30	Opening
	Session 1.1 Chair: Eleni Stavrinidou
09:30 - 10:00	<u>George Malliaras</u> (<i>Department of Engineering, University of Cambridge, Cambridge CB3 0FA, U.K.</i>)
1.1-11	Technology for Bioelectronic Medicine
10:00 - 10:15	<u>Viviana Rincón Montes</u> (<i>Institute of Biological Information Processing (IBI-3) - Bioelectronics, Forschungszentrum Jülich</i>), Marie Jung,
1.1-01	Jamal Abu Shihada, Martin Kasavetov, Erkan Yilmaz, Lina Koschinski, Simon Decke, Simon Musall, Andreas Offenhäusser Three-Dimensional Neural Probes: Increasing the Topological Dimensionality in In Vitro and In Vivo Neural Applications
10:15 - 10:30	<u>Denys Nikolayev</u> (<i>IETR Laboratory, CNRS</i>)
1.1-02	Wireless Miniature Battery-free Bioelectronic Devices
10:30 - 11:00	Coffee Break
	Session 1.2 Chair: Achilleas Savva
11:00 - 11:30	<u>Andreas Offenhäusser</u> (<i>Institute of Biological Information Processing (IBI-3) - Bioelectronics, Forschungszentrum Jülich</i>), Colin Fernandes
1.2-11	Effect of High Aspect Ratio Subcellular Nanopillars on Cell-Electrode Coupling for Neuroelectronic Interfacing
11:30 - 12:00	<u>Wouter A. Serdijn</u> (<i>Section Bioelectronics, Delft University of Technology, the Netherlands</i>)
1.2-12	NeuroDots for brain-network modulation: why and which technology is needed?
12:00 - 12:15	<u>Léo Siffringer</u> (<i>Laboratory of Biosensors and Bioelectronics, ETH and University of Zurich, Switzerland</i>), Alex Fratzl, Blandine Clément, Parth
1.2-01	Chansoria, Leah Mönkemöller, Jens Duru, Stephan Ihle, Simon Steffens, Anna Beltraminelli, Eylul Ceylan, Benedikt Maurer, Sean Weaver, Christina Tringides, Katarina Vulic, Srinivas Madduri, Marcy Zenobi-Wong, Botond Roska, Janos Vörös, Tobias Ruff A biohybrid multichannel nerve model towards neural interfaces
12:15 - 12:30	<u>Marle Vleugels</u> (<i>Laboratory of Organic Electronics, Dep. of Science and Technology, Linköping University, Norrköping (Sweden)</i>), Donghak
1.2-02	Byun, Iwona Bernacka Wojcik, Nikolaus Poremba, Christian Bayer, Sebastian Hecko, Martin Wilkovitsch, Theresia Arbring Sjöström, Linda Waldherr, Rainer Schindl, Daniel Simon, Hannes Mikula, Johannes Binting Iontronic devices for controlled drug release with electronic precision
12:30 - 12:45	<u>Verena Handl</u> (<i>Gottfried Schatz Research Center - Biophysics, Medical University of Graz, 8010 Graz, Austria</i>), Franciska Telebar-Žbulj, Ian
1.2-03	Bogdan, Iwona Bernacka Wojcik, Helena Saarela, Marta Nowakowska, Sabine Erschen, Astrid Gorischek, Tamara Tomin, Stefan Ropele, Muammer Ücal, Daniel T. Simon, Rainer Schindl, Linda Waldherr Long-Term Treatment for Brain Tumors: Sustained Drug Delivery with Iontronic Pumps
12:45 - 14:30	Lunch Break
	Session 1.3 Chair: Tiago Costa
14:30 - 15:00	<u>Annalisa Bonfiglio</u> (<i>Scuola Universitaria Superiore IUSS, Piazza della Vittoria 15, 27100 - Pavia, Italy</i>), Andrea Spanu, Davood Hatami, J.
1.3-11	Dostalek, R. Hasler, W. Knoll, S. Szunerits Dual-Mode Biosensing: Comparing SPR and OFET for Advanced Surface Modification Analysis
15:00 - 15:30	<u>Mario Caironi</u> (<i>Center for Nano Science Technology, Istituto Italiano di Tecnologia, Milano, Italy;</i>)
1.3-12	Transduction of Intracellular Action Potentials in Cardiomyocytes using Printed Electrolyte-Gated Polymer Field-Effect Transistors
15:30 - 15:45	<u>Erica Zeglio</u> (<i>Department of Materials and Environmental Chemistry, Stockholm University, Sweden</i>)
1.3-01	Towards sustainable strategies for electrochemical transistor design
15:45 - 16:00	<u>Naroa Lopez-Larrea</u> (<i>POLYMAT, University of the Basque Country UPV/EHU, Avda. Tolosa 72, Donostia - San Sebastián 20018, Spain</i>),
1.3-02	Shofarul Wustoni, Mario Iván Peñas, Johana Uribe, Antonio Dominguez-Alfaro, Antonela Gallastegui, Sahika Inal, David Mecerreyes PNIPAM/PEDOT:PSS Hydrogels for Multifunctional Organic Electrochemical Transistors

October 23rd - Day 2 (Wednesday) 2

08:55 - 09:00	nanoGe announcement of the day
	Session 2.1 Chair: Ilaria Abdel Aziz
09:00 - 09:30 2.1-11	Camilla Galli, Nicolo' Salvarani, Carlotta Ronchi, Gabriele Tullii, Camilla Marzuoli, Marco Malferrari, Stefania Rapino, <u>Maria Rosa Antognazza</u> (<i>Center for Nano Science and Technology @Polimi, Istituto Italiano di Tecnologia, via Pascoli 70/3, 20133 Milano, Italy</i>), Elisa Di Pasquale Organic Semiconductor photomodulation enhances maturation of PSC-derived cardiomyocytes
09:30 - 10:00 2.1-12	<u>Klas Tybrandt</u> (<i>Laboratory of Organic Electronics, Dep. of Science and Technology, Linköping University, Norrköping (Sweden)</i>) Soft and stretchable neural electrodes based on gold nanowire composites
10:00 - 10:15 2.1-01	<u>Julien Hurtaud</u> (<i>Istituto Italiano di Tecnologia (IIT)</i>), Alessio Boschi, Giuseppina Iachetta, Michele Dipalo, Francesco De Angelis Non-invasive label-free electrical and optical parallel recordings of electrophysiological action potentials of hiPS cardiomyocytes
10:15 - 10:30 2.1-02	<u>Adrica Kyndiah</u> (<i>Center for Nano Science and Technology, Istituto Italiano di Tecnologia</i>), Giulia Zoe Zemignani, Luca Sala, Gabriele Tullii, Aleksandr Khudiakov, Peter J Schwartz, Gabriel Gomila, Francesco De Angelis, Simone Fabiano, Maria Rosa Antognazza, Mario Caironi The Crucial Role of Cell/Polymer Interface for the Transduction of Action Potentials via Printed Electrolyte-Gated Polymer Field-Effect Transistors
10:30 - 11:00	Coffee Break
	Session 2.2 Chair: Christina Tringides
11:00 - 11:30 2.2-11	<u>Francesco De Angelis</u> (<i>Istituto Italiano di Tecnologia, via Morego 30, Genova, IT-16163 Italy</i>) Hybrid interfaces between living cells and nanosensors
11:30 - 12:00 2.2-12	<u>Francesca Santoro</u> (<i>Institute of Biological Information Processing IBI-3, Forschungszentrum Juelich, Germany</i>) Organic neuromorphic biointerfaces
12:00 - 12:15 2.2-01	<u>Chiara Musumeci</u> (<i>Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, 60174 Norrköping, Sweden</i>), Hanne Biesmans, Alex Bersellini Farinotti, Diana Priyadarshini, Jennifer Y. Gerasimov, Tobias Abrahamsson, Katriann Arja, Daniel Simon, Camilla Svensson, Magnus Berggren Enzymatically polymerized conductive polymers anchored on lipid membranes
12:15 - 12:30 2.2-02	<u>Miryam Criado-Gonzalez</u> (<i>POLYMAT - University of the Basque Country UPV/EHU, 20018 San Sebastián (Spain)</i>), Camilla Marzuoli, Luca Bondi, Edgar Gutierrez-Fernandez, Gabriele Tullii, Tobias Cramer, Maria Rosa Antognazza, David Mecerreyes Porous semiconducting polymer nanomaterials as intracellular biophotonic mediators to modulate ROS balance
12:30 - 12:45 2.2-03	<u>Linda Waldherr</u> (<i>Gottfried Schatz Research Center for Cell Signaling, Metabolism and Aging, Medical Physics and Biophysics Division, Medical University of Graz, Graz</i>) With great controllability comes great toxicity: high-precision drug delivery for brain tumors and pancreatic cancer
12:45 - 14:30	Lunch Break
	Session 2.3 Chair: Georges Hadzioannou
14:30 - 15:00 2.3-11	<u>Magnus Berggren</u> (<i>Laboratory of Organic Electronics, Dep. of Science and Technology, Linköping University, Norrköping (Sweden)</i>) Bio-specific and Bio-templated Organic Bioelectronics for In-vivo Applications
15:00 - 15:30 2.3-12	<u>Sahika Inal</u> (<i>KAUST: King Abdullah University of Science and Technology</i>) Responsive polymeric mixed conductors for sensing and stimulation
15:30 - 16:00 2.3-13	<u>Jonathan Rivnay</u> (<i>Northwestern University</i>) Leveraging bioelectronics and synthetic biology to achieve implantable, biohybrid, and regulated cell therapies
16:00 - 16:20	Coffee Break
	Flash Talk session Chair: Achilleas Savva
16:20 - 16:25 session-T1	Tiago Costa, <u>Eshani Sarkar</u> (<i>Delft University of Technology (Bioelectronics Section, Dept. of Microelectronics, Faculty of Electrical Engineering, Mathematics and Computer Science)</i>) Integration of high-density phased-array piezoelectric ultrasound transducers on top of CMOS electronics for ultrasonic neurostimulation
16:25 - 16:30 session-T2	<u>Hannah Wunderlich</u> (<i>School of Computation, Information and Technology, Technical University Munich, Germany</i>), Kristen Kozielski Advances in Coatings for Magnetoelectric Nanoparticles in Brain Applications
16:30 - 16:35 session-T3	<u>Eylul Ceylan</u> (<i>Laboratory of Organic Electronics, Linköping University, 60174 Norrköping, Sweden</i>), Yangpei Qi Yi, Jibin Joseph Samuel, Klas Tybrandt Laser-fabricated shuttles for insertion of soft neural electrodes
16:35 - 16:40 session-T4	<u>Reece McCoy</u> (<i>Department of Chemical Engineering and Biotechnology, University of Cambridge, CB3 0AS, UK</i>), Jack Hankinson, Valeria Lulla, Roisin Owens 3D Bioelectronic Gut Model for Modelling Pathogenic Enteric Virus Infections in vitro
16:40 - 16:45 session-T5	<u>Darius Hoven</u> (<i>Department of Chemical Engineering and Biotechnology, University of Cambridge, Philippa Fawcett Drive, Cambridge, CB3 0AS, UK</i>), Reece McCoy, Timothy Noel, Abigail Pearce, Graham Ladds, Róisín M. Owens Investigation of G Protein-Coupled Receptor Ligand Binding Using Cell Membrane Models
16:45 - 16:50 session-T6	<u>Raphaela Silva</u> (<i>King Abdullah University of Science and Technology (KAUST)</i>), Atheer Alqatari, Adel Hama, Tianrui Chang, Luca Salvigni, Stefan T. Arold, Raik Grünberg, Sahika Inal Automated Electrode Functionalization for Protein Detection with Organic Electrochemical Transistors
16:50 - 16:55 session-T7	<u>Diana Priyadarshini</u> (<i>Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, Norrköping SE-60174, Sweden</i>) In situ synthesised conductive polymers on native lipid bilayers
16:55 - 17:00 session-T8	<u>Yunfan Lin</u> (<i>KTH Royal Institute of Technology</i>) P-type Accumulation Mode Organic Electrochemical Transistor Biosensor for Xanthine Detection in Fish

October 24th - Day 3 (Thursday) 3

08:55 - 09:00

nanoGe announcement of the day

Session 3.1

Chair: Erica Zeglio

09:00 - 09:30

Beatrice Fraboni (*Department of Physics and Astronomy, University of Bologna, Via Bert Pichat 6/2, 40127 Bologna (IT).*)

3.1-I1

Fully-organic flexible detectors for real-time dose monitoring during radio/proton therapy

09:30 - 10:00

Nir Tessler (*Sara and Moshe Zisapel Nano-electronic Center, Electrical and Computer Electronics, Technion Israel Institute of Technology, Haifa, Israel*), Sapir Bitton

3.1-I2

A fresh look at the OECT electrochemical model

10:00 - 10:15

Nicola Ria (*Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Campus UAB, Bellaterra, Spain.*), Eduard

3.1-O1

Masvidal, Michal Prokop, Ahmed Eladly, Xavi Illa, Anton Guimerà, K. Hills, Ramon Garcia, Samuel Flaherty, Rob Wykes, Kostas Kostarelos, Jose A. Garrido

High-resolution bidirectional neural interfaces in Parkinson's disease

10:15 - 10:30

Isabelle Holzer (*Department of Chemistry, Biochemistry and Pharmaceutical Sciences, University of Bern, Freiestrasse 3, 3012 Bern, Switzerland.*), Demetra Tsokkou, Shubhradip Guchait, Badr Jismy, Martin Brinkmann, Nicolas Leclerc, Natalie Banerji

3.1-O2

Exploring Transport Characteristics of In-plane Oriented Organic Mixed-Electronic Conductors

10:30 - 11:00

Coffee Break

Session 3.2

Chair: Eleni Stavriniidou

11:00 - 11:30

Yifei Luo (*Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR)*)

3.2-I1

Wearable Electrophysiology Sensors for Plant Health Monitoring and Beyond

11:30 - 12:00

Ardemis Boghossian (*Ecole Polytechnique Federale de Lausanne*)

3.2-I2

Mind the Gap! Bridging Microbes and Electrodes through NanoBioengineering

12:00 - 12:15

Adam Armada-Moreira, Abdul Manan Dar (*Laboratory of Organic Electronics, Department of Science and Technology, Linköping University, SE-60174, Norrköping, Sweden.*), Zifang Zhao, Claudia Cea, Jennifer Gelinas, Magnus Berggren, Alex Costa, Dion Khodagholy, Eleni Stavriniidou

3.2-O1

Conformable Multielectrode Array for Plant Electrophysiology

12:15 - 12:30

Latifah Almulla (*Department of Engineering Science, Institute of Biomedical Engineering (IBME), University of Oxford, Oxford OX3 7DQ, UK*), Massimo Mariello, Christopher M Proctor

3.2-O2

Fully Laser Micropatterned Resistive Flow Sensors for Biological Interfaces

12:30 - 12:45

Ilaria Abdel Aziz (*POLYMAT - University of the Basque Country UPV/EHU, 20018 San Sebastián (Spain).*)

3.2-O3

Harnessing electrochemical doping in glycolated polythiophene: from mechanical actuators to drug delivery

12:45 - 14:30

Lunch Break

14:30 - 15:30

"Communicating and publishing your research insights from a Nature Editor" Workshop

October 25th - Day 4 (Friday) 4

08:55 - 09:00

nanoGe announcement of the day

Session 4.1

Chair: Achilleas Savva

09:00 - 09:30

4.1-11

Hassan Rivandi, Gandhika Wardhana, Eshani Sarkar, Masoumeh Aqamolaei, Samuel Desmarais, Tiago Costa (*Delft University of Technology, Mekelweg 5, 2628 CD Delft, Netherlands*)

Miniaturized and conformable focused ultrasound neurostimulators

09:30 - 09:45

4.1-03

Linta Sohail (*Department of Information Technology, Faculty of Engineering and Architecture, Ghent University, Technologiepark Zwijnaarde 126, 9052 Zwijnaarde, Belgium*), George Spyropoulos

Acousto-sensitive ion-based transistors and soft electronics for artificial basilar membrane

09:45 - 10:00

4.1-04

Douglas van Niekirk (*Bioelectronic Systems Technology Laboratory, Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, United Kingdom.*), Tomi Baikie, Róisín Owens

Redefining Reference Electrode Design Principles for Enhanced Sensitivity in Tissue Monitoring

10:00 - 10:15

4.1-01

Vasiliki Giagka (*Delft University of Technology*)

Transparent neuroelectronics for multimodal neural interfacing

10:15 - 10:30

4.1-02

Mustafeez Shah (*Regenerative Bioelectronic Technologies (ReBoot) Group, Section Bioelectronics, Department of Microelectronics, Faculty of EEMCS, Delft University of Technology, Delft, The Netherlands.*), Achilleas Savva

Real-time electrical monitoring and analysis of stem-cell proliferation and differentiation using organic microelectrode arrays.

10:30 - 11:00

Coffee Break

Session 4.2

Chair: Linda Waldherr

11:00 - 11:30

4.2-11

Christina Tringides (*Department of Information Technology and Electrical Engineering, ETH Zurich, Zurich, Switzerland.*)

Building 3D hydrogel platforms to modulate neural cells

11:30 - 12:00

4.2-12

Roisin Owens (*University of Cambridge, Department of Chemical Engineering and Biotechnology, Cambridge CB3 0AS, UK.*)

Bioelectronic tools to study the gut-brain axis

12:00 - 12:15

4.2-01

Eleonora Martinelli (*Ecole Polytechnique Fédérale de Lausanne (EPFL)*), Ivan Furfaro, Laurine Kolly, Tala El Kaissi, Julian Thomas Bar, Camille Lucette Gabrielle Delgrange, Sina Justine Rollin, Loris Gomez Baisac, Luc Stoppini, Adrien Roux, Stéphanie Lacour

Towards Mimicking Brain Mechanical Loads: Stretchable Microelectrode Arrays for Brain Spheroid Electrophysiology

12:15 - 12:30

4.2-02

Liwen Wang (*Regenerative Bioelectronic Technologies (ReBoot) Group, Section Bioelectronics, Department of Microelectronics, Faculty of EEMCS, Delft University of Technology, Delft, The Netherlands.*), Yannik Hajee, Mani Diba, Achilleas Savva

Biocompatible, Electroactive Hydrogels for Stem Cell Differentiation into 3D Neural Networks

12:30 - 12:45

4.2-03

Anthea Villano (*Department of Physics, Politecnico di Milano, Milan (Italy)*), Paola Lagonegro, Elena Mancinelli, Vanessa Spagnolo, Maria Rosa Antognazza

Conjugated Polymers Based Platform and Keratinocytes: a Friendship Tale

12:45 - 14:30

Lunch Break

Session 4.3

Chair: Eleni Stavrinidou

14:30 - 15:00

4.3-11

Sophia C. Hayes (*Molecular Spectroscopy Laboratory, Department of Chemistry, University of Cyprus*)

On using direct molecular probes to decipher the effect of bimolecular interactions of a conjugated polyelectrolyte self-assembled with ss-DNA on photophysical behavior

15:00 - 15:30

4.3-12

Iain McCulloch (*Andlinger Center for Energy and the Environment, Princeton University, Princeton, NJ 08544, United States*)

Semiconducting Polymers for OECT Devices

15:30 - 15:45

4.3-01

Shaila Thakur (*POLITECNICO DI TORINO Department of Applied Science and Technology - DISAT*), Nicola Cavallini, Debora Ferrari, Laura Fabris

Interaction of oligonucleotides with gold nanoparticles: Factors beyond electrostatic and van-der Waals forces

16:00 - 16:10

Closing