

Final
ANNOUNCEMENT
Program, Keynotes, Registration


MEEP 2023
Microbial/Enzymatic Electrochemistry Platform

Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors

Fuel Cells & Electrolyser Systems

5th International

MEEP Symposium

5-7 July 2023, Lucerne Switzerland 

Symposium Chairs **Prof. Ioannis Ieropoulos**
University of Southampton, UK
Asst. Prof. Ludovic Jourdin
Delft University of Technology, NL

Keynotes

K1: From Microbes to Power – Gemma Reguera

K2: Biophotovoltaics – Chris Howe

Featuring

- Biofilm Optimization & Modelling
- MES Microbial Electrosynthesis
- MFC Applications
- New Materials, Biohybrids & Surfaces
- Electromethanogenesis
- Diffusion Control & Education

Organised in conjunction with:
PHOENIX – Cost Action – www.COST-Phoenix.eu
EFCF – European Electrolyser & Fuel Cell Forum

www.I-MEEP.com



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5th Symposium

MEEP 2023

Lucerne, Switzerland 5 - 7 July

Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors

Bio-Electrochemical Systems
Fuel Cells, Electrolysers

Chaired by

Prof. Ioannis Ieropoulos University of Southampton, UK

Asst. Prof. Ludovic Jourdin Delft University of Technology, The Netherlands

Keynotes:

K1 **From Microbes to Power**

Gemma Reguera, Michigan State University, East Lansing, Michigan/USA

K2 **Biophotovoltaics: Extracellular electricity production
from photosynthetic microorganisms**

Chris Howe, Department of Biochemistry, Cambridge University, UK

Invited Speakers:

- I1: **Eileen Yu** Develop electrochemical enzymatic biosensors for Superoxide ($O_2^{\cdot-}$) in blood
- I2: **Makarand Ghangrekar** Bio-electrochemical wastewater treatment technologies to facilitate reuse of treated water and resource recovery
- I3: **Paniz Izadi** CO_2 and electrons as only substrates for electrobiorefineries
- I4: **Catarina Paquete** Exploring the extracellular electron uptake pathway of Sideroxydans lithotrophicus ES-1
- I5: **Andrea Pietrelli** Protection, resilience and rehabilitation of damaged environments - EU COST ACTION CA19123



Scope of the Symposium

www.i-MEEP.com/Scope

The **5th International MEEP 2023 Symposium** features all Microbial & Enzymatic Electrochemical Reactors, focusing on Microbial and Enzymatic Electrosynthesis, Microbial Fuel Cells, Microbial Electrolysis Cells, Bioelectrochemical sensors and Applications. It is organised in conjunction with **PHOENIX**, a **COST- EU Cooperation** in Science and Technology - action www.COST-Phoenix.eu. It covers science and engineering, materials and manufacturing, components and systems, design, testing, integration, and applications, and aims to further establish this biannual Microbial/Enzymatic Electrochemistry Platform (MEEP).

It offers students, researchers, suppliers and industry, the opportunity to come together and share information and insights into these continually evolving and important technologies. In 9 sessions 37 oral presentations - including 2 high level keynotes, 5 invited speakers and 2 extended poster sessions, **more than 50 presentations over a 2 day period** will be given.

This event will be held alongside the already well established and highly respected European Fuel Cell Forum (www.EFCF.com, since 1994, 400-500 attendees). This offers further opportunities to exchange with researchers and industry members in the fields of low temperature Fuel Cell, Electrolysers & H_2 research from around the world as well as to visit the accompanying exhibition with 20-30 exhibitors.

MEEP 2023 will also offer **virtual access** for those who are unable to attend in person. **70-100 MEEP stakeholders** are expected in Lucerne and will benefit from face-to-face networking, while virtual attendees will be able to follow the scientific presentations live or watch them later at a convenient time.

5th MEEP Symposium 2023

Fuel Cells & Electrolyser Systems

Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors

Chaired by: Prof. Ioannis Ieropoulos, University of Southampton, UK
Asst. Prof. Ludovic Jourdin, Delft University of Technology, The Netherlands

5 – 7 July, KKL,
Lucerne, Switzerland

www.i-MEEP.com/Registration



Session Program

Club Rooms

Overview

Wednesday, July 5

- 11:30 **M01** Welcome, Keynote on Microbes to Power, Biofilm optimization
13:10 **M02** Poster Session
14:30 **M03** Microbial electrosynthesis I
16:30 **M04** MFC applications I

Thursday, July 6

- 09:00 **M05** Keynote on Biophotovoltaics
New materials, Biohybrids & Surfaces
11:10 **M06** Microbial electrosynthesis II
13:25 **M07** Poster Session
13:45 **M08** Electromethanogenesis & MFC applications II
16:00 **M09** Diffusion control, education & MFC applications III Closing

Details

Wednesday, July 5

Club Rooms

10:00	On-site MEEP Registration Warm-up: Possibility to view & discuss mounted posters	Poster Presenters are asked to arrive early to put up their posters so that they can be seen by those stakeholders already at the venue	
11:30	M01 Keynote on Microbes to Power Biofilm optimization		S-Chair: I. Ieropoulos, L. Jourdin
M0101	Welcome by the Organizers	Michael Spirig, Fiona Moore, Olivier Bucheli	EFCF, Lucerne/Switzerland
M0102	Welcome by the Symposium Chairs	Ioannis Ieropoulos (1), Ludovic Jourdin (2)	(1) University of Southampton, Southampton/UK (2) Delft University of Technology, Delft/The Netherlands
Keynote	M0103 K1: From Microbes to Power	Gemma Reguera	Michigan State University, East Lansing, Michigan/USA
M0104	Analysis and optimization of biofilm formation by the knallgas bacterium <i>C. necator</i> in microbial electrosynthesis cells	Miriam Edel, Johannes Gescher	Hamburg University of Technology, Technical Microbiology, Hamburg/Germany
M0106	Artificial conductive biofilms in <i>Shewanella oneidensis</i>	Lukas Kneuer, Leah Kobza, Edina Klein, Johannes Gescher	Institute of Technical Microbiology, Hamburg University of Technology, Hamburg/Germany
13:00	Coffee break, snack & poster discussion		
M02	Poster Session		S-Chair: I. Ieropoulos
14:30	M03 Microbial electrosynthesis I		S-Chair: G. Reguera, J. Gescher
Invited	M0301 I1: Develop electrochemical enzymatic biosensors for Superoxide (O₂⁻) in blood	Eileen Yu	Loughborough University, Loughborough, Leicestershire/UK
M0303	Hydrogenophaga pseudoflava DSM 1084, a promising sustainable producer of long-chain fatty acids, is able to grow electroautotrophically	Beshr Al Khateeb, Johannes Gescher	Institute of Technical Microbiology, Hamburg Technical University, Hamburg/Germany
M0304	Hydrogen Production in Microbial Electrolysis Cells Based on Bacterial Anodes Encapsulated in a Small Bioreactor Platform	Irina Amar Dubrovin (1), Lea Ouaknin Hirsh (1), Shmuel Rozenfeld (1), Bharath Gandu (1,2), Ofir Menashe (3,4), Alex Schechter (5), Rivka Cahan (1)	(1) Chemical Engineering Dept, Ariel Uni, Israel; (2) Environmental Studies Dept, Delhi Uni, India; (3) Water Industry Engineering, Kinneret Academic College, Israel; (4) BioCastle Water Technologies Ltd., Israel; (5) Chemistry Dept, Ariel Uni., Israel
M0305	The role of selenocysteine in CO ₂ reduction by an electrocatalytic formate dehydrogenase	Feilong Li (1,2), Silvan Scheller (1), Michael Lienemann (2)	(1) Department of Bioproducts and Biosystems, Aalto University, Espoo/Finland; (2) VTT Technical Research Centre of Finland, Espoo/Finland
M0306	Bioinorganic electrosynthesis system for microbial protein production from biogas and sustainable electricity	Mingyi Xu, Yifeng Zhang	Department of Environmental Engineering, Technical University of Denmark, Kongens Lyngby/Denmark
P	M0307 Electrocatalytic CO₂ biotransformation into acetic acid with <i>Sporomusa ovata</i>	Jérémie Noël (1), Sunny Maye (1), Loredana Di Maggio (1), Fabian Fischer (1,2)	(1) HES-SO Valais-Wallis, Institut Technologie du Vivant, (2) HESS-SO Valais Wallis, Institute of Sustainable Energy, Sion/Switzerland
P	M0308 A growth-based screening strategy for directed evolution of an electroactive formate dehydrogenase	Feilong Li, Michael Lienemann	VTT Technical Research Centre of Finland, Espoo/Finland
P	M0309 Agro-Industry Waste Fed Microbial Electrolysis Cell For Hydrogen Production Leap towards Circular Economy	Uttam Kumar Ghosh, Rahul Gautam	Indian Institute of Technology (IIT), Roorkee, India
P	M0310 Microbial Electrolysis Cell for the production of hydrogen based on an anode encapsulated in a dialysis bag	Abhishiktha Chiliveru (1), Rozenfeld Shmuel (1), Gandu Bharath (1), Hirsch Lea Ouaknin (1), Dubrovin Irina (1), Schechter Alex (2), Cahan Rivka (1)	(1) Department of Chemical Engineering, Ariel University, Ariel/Israel; (2) Department of Chemical Sciences, Ariel University, Ariel/Israel

16:00	Coffee break in the poster area		
16:30	M04	MFC applications I	S-Chair: P. Cristiani, L. Jourdin
Invited	M0401	I2: Bio-electrochemical wastewater treatment technologies to facilitate reuse of treated water and resource recovery	Makarand Ghangrekar Indian Institute of Technology Kharagpur, Kharagpur/India
	M0402	Electrowetland pilot of 50 m²: operation and characterization under real conditions for 1 year	Pau Bosch-Jimenez, Clara Corbella, Ainhoa Gaudes, Pau Lopez, Daniele Molognoni, Eduard Borrás LEITAT Technological Center, Terrassa/Spain
	M0403	Plant-Microbial Fuel Cells as a natural power source for remote wireless sensor applications	Daniel Groen (1), Hadi Rajaei (1), Pim de Jager (1,2) (1) R&D department, Plant-e Ltd, Renkum/The Netherlands, (2) Faculty of Environmental Technology, Wageningen Uni & Research, Wageningen/The Netherlands
	M0404	Tailored Preparation of Ternary Biochar-Copper-Hydroxyapatite Multicomposites for Electromethanogenesis Cathode Materials	Sebastiano Campisi (1), Giorgia Ghiara (2), Michele Bigica (1), Antonella Gervasini (1), Pierangela Cristiani (3) (1) Università degli Studi di Milano, Dipartimento di Chimica; (2) Università degli Studi di Milano, Dipartimento di Scienze, Milan/Italy; (3) Ricerca sul Sistema Energetico - RSE S.p.A., Milan/Italy
	M0405	Assessing efficiency and biofilm kinetics in bioelectrochemical systems fed with industrial wastewater	Ahmed Elreedy, Johannes Gescher Institute of Technical Microbiology, Hamburg University of Technology, Hamburg/Germany
P	M0407	Zinc recovery from synthetic leachate using a microbial electrolysis cell	Sabine Spiess (1), Jiri Kucera (2), Sarah Haneschläger (1), Clemens Habermaier (1), Rebeka Frühholz (1), Marianne Haberbauer (1) (1) K1-MET GmbH, Linz/Austria; (2) Department of Biochemistry, Faculty of Science, Masaryk University, Brno/Czechia
P	M0408	Scrap stainless steel anode and earthenware separator based single chamber microbial fuel cell for the treatment of real textile wastewater	Rahul Kandpal (1), Syed Wazed Ali (2), Shaikh Ziauddin Ahammad (3) (1) School of Interdisciplinary Research, Indian Inst. of Technology, (2) Dept. of Textile & Fibre Engineering, Indian Inst. of Technology, (3) Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology, New Delhi/India
P	M0409	Scale-up of microbial fuel cells using large area gas diffusion electrodes	Laura Landwehr (1), Dennis Haupt (2), Ulrich Kunz (1), Michael Sievers (2) (1) Clausthal University of Technology, Institute of Chemical and Electrochemical Process Engineering; (2) Clausthal University of Technology, Environmental Technology Research Centre, Clausthal-Zellerfeld/Germany
P	M0410	Application of Weak MFCs in Power Management	Carlos Augusto Berlitz (1, 2), Andrea Pietrelli (2), Gaël Pilonnet (1), Bruno Allard (2) (1) CEA-Leti, Univ. Grenoble Alpes, Grenoble/France; (2) Université de Lyon, INSA Lyon, ECL, Villeurbanne/France
P	M0411	Life cycle assessment and circular economy: As a case study the development of PV-photovoltaic systems in urban areas of Greece.	Agisilaos Economou National Technical University of Athens, Athens/Greece
P	M0412	Lifetime and capabilities monitoring of bio-electrochemical systems through tiny machine learning	Andrea Pietrelli (1), Fabien Mieyeville (1), Bruno Allard (1) Vincenzo Ferrara (2) (1) Univ Lyon, Université Claude Bernard Lyon 1, Villeurbanne/France; (2) Sapienza University, Department of Information engineering, electronics and telecommunication, Rome/Italy
P	M0413	Application of electrocoagulated sludge-derived Fe-Al-Mg composite catalyst for the cathodic remediation of tetracycline in bio-electro-Fenton system	Azhan Ahmad (1), Monali Priyadarshini (2), Shradha Yadav (2), Makarand M. Ghangrekar (1,2) (1) Department of Civil Engineering, Indian Institute of Technology, (2) School of Environmental Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur/India
P	M0414	Metal recovery from acid mine drainage: effect of hydrochar doping on microbial fuel cell anode	Yelitza Delgado, Alvaro Ramirez, Ester López, Martín Muñoz, Javier Llanos, Francisco Jesus Fernandez Morales Department of Chemical Engineering, Faculty of Chemical Sciences and Technologies, University of Castilla La Mancha.Ciudad Real/Spain
P	M0415	Eradication of <i>Saccharomyces cerevisiae</i> by Pulsed Electric Field Treatments	Ester Hanya (1), Efrat Emanuel (1), Irina Dubrovin (1), Gad A Pinhasi (1), Roman Pogreb (2), Rivka Cahan (1) (1) Department of Chemical Engineering and Biotechnology, Ariel University, Ariel/Israel; (2) Department of Physics, Ariel University, Ariel/Israel
18:00	End of Sessions		
18:30	MEEP Network Evening (meet ground floor at the registration, KKL or City Tour, Dinner, Tickets CHF 120.-)		

Thursday, July 6

Club Rooms

09:00	M05	Keynote on Biophotovoltaics New materials, Biohybrids & Surfaces	S-Chair: C. Paquete, I. Ieropoulos
Keynote	M0501	K2: Biophotovoltaics Extracellular electricity production from photosynthetic microorganisms	Chris Howe Department of Biochemistry, Cambridge University, Cambridge/UK
	M0502	Exploring the Microenvironment of Electroactive Microbes Embedded in Polymer Matrices	Ramya Veerubhotla (1,2), Ugo Marzocchi (1,2) (1) Section for Microbiology, Department of Biology (2) Center for Electromicrobiology, Department of Biology, Aarhus University, Aarhus/Denmark
	M0503	Understanding the influence of the cathode on the performance of MFC biosensors	Anna Salvian, Claudio Avignone-Rossa, John Varcoe, Siddharth Gadkari University of Surrey, Guildford/UK
	M0504	When microbial electrochemistry meets additive manufacturing technique: Designing free-standing 3D pyrolytic carbon electrode for effective H₂O₂ production	Rusen Zou, Yifeng Zhang Department of Environmental Engineering, Technical University of Denmark, Lyngby/Denmark
	M0505	Biophotovoltaics possible areas of application	Paolo Bombelli, Christopher Howe Department of Biochemistry, University of Cambridge, Cambridge/UK

P	M0507	Evaluation of validated Microbial Fuel Cell reactors for Biophotovoltaic operation	Abdul Quadir MG, Michele Morgante, Loredana Di Maggio (1), Melania Reggente, Charlotte Roullier (2), Rossella Labarile (3), Ardemis Boghossian (2), Massimo Trotta (3), Fabian Fischer (1)	(1) School of Engineering, Inst. of Life Tech., HES-SO Valais, Sion; (2) Inst. of Chemical Sciences & Engineering, EPFL, Lausanne/Switzerland; (3) CNR - Institute for Physical-Chemical Processes-CNR Bari/Italy
P	M0508	Sustainable sea mining: extracting mineral resources from sea water desalination brine. An application of Microbial Desalination Cells (MDCs)	Enrica Leccisi (1), Salvatore Mellino (1), Fabio Flagiello (2), Rosa Anna Nastro (1), Sergio Ulgiati (1)	(1) Department of Science and Technology, University Parthenope of Naples, Naples/Italy; (2) En.TECH Italia srl, Gragnano/Italy
P	M0509	Environmental Education on Perspective of Sustainable Development in Albania	Etleva Hamzaraj, Anila Papparisto, Sara Bomi	Department of Biology, Faculty of Natural Sciences, University of Tirana, Tirana/Albania
P	M0510	Aspen Plus Simulation of Hydrogen Production Process via Biomass Gasification Using Korean Rice Husks	Jihyeon Son, Sanghun Lee	Department of Climate and Energy Systems Engineering, Ewha Womans University, Seoul/South Korea
P	M0511	Performance Improvement of Glucose Oxidase Biofuel Cell by Methyl Red and Chitosan Composite Electrodes	Facheng Su (1), Yujun Wu (1), Hsiharn Yang (1,2)	(1) Graduate Institute of Precision Engineering, (2) Innovation and Development Center of Sustainable Agriculture (IDCSA), National Chung Hsing University Taichung City/Taiwan
P	M0512	Anode amendment with Kaolin and Activated Carbon increases electricity generation in a Microbial Fuel Cell	Lea Ouaknin Hirsch (1), Irina Amar Dubrovin (1), Bharath Gandu (1,2) Efrat Emanuel (1), Birthe Veno Kjellerup (3), Gizem Elif Ugur (4), Alex Schechter (5), Rivka Cahan (1)	(1) Dept. of Chemical Engineering, Ariel Uni., Israel; (2) Dept. of Environmental Studies, Uni. of Delhi, India; (3) Dept. of Civil & Environmental Engineering, Uni. of Maryland; (4) Imaging & Chemical Analysis Lab, Montana State Uni., USA; (5) Dept. of Chemical Sciences, Ariel Uni., Israel;
P	M0513	Application of electrocoagulated sludge-derived Fe-Al-Mg composite catalyst for the cathodic remediation of tetracycline in bio-electro-Fenton system	Azhan Ahmad (1), Monali Priyadarshini (2), Shraddha Yadav (2), Makarand M. Ghangrekar (1,2)	(1) Department of Civil Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India (2) School of Environmental Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India
P	M0514	Bacterial Cell Immobilization on Carbon Cloth Anode with Alginate for Enhanced Hydrogen Generation in Microbial Electrolysis Cells	Avinash Jukanti (1), Bharath Gandu (1), Shmuel Rozenfeld (1), Lea Ouaknin Hirsch (1), Alex Schechter (2), Rivka Cahan (1)	(1) Department of Chemical Engineering, (2) Department of Chemical Sciences, Ariel University, Ariel/Israel
10:40 Coffee break in the poster area				
11:10 M06 Microbial electrosynthesis II			S-Chair: M. Ghangreka, RA. Nastro	
Invited	M0601	I3: CO₂ and electrons as only substrates for electrobiorefineries	Paniz Izadi	Department of Environmental Microbiology, Helmholtz Centre for Environmental Research, Leipzig/Germany
	M0602	Microbial Activity in Microbial Electrosynthesis from CO₂ in Par with Syngas and Chain Elongation Fermentations	Oriol Cabau-Peinado, Marijn Winkelhorst, Adrie J.J. Straathof, Ludovic Jourdin	Delft University of Technology, Faculty of Applied Sciences, Department of Biotechnology, Delft/Netherlands
	M0603	Bench-top validation of the electro-acetogenesis process for biogas upgradation through CO₂ utilization	Moumita Roy, Mansi, Sunil A. Patil	Department of Earth and Environmental Sciences, Indian Institute of Science Education and Research, Mohali (IISER Mohali), Punjab/India
	M0604	Transcriptome and proteome analysis of Clostridium ljungdahlii reveals key stress response pathways in microbial electrosynthesis	Sara Al Sbei (1,2), Maliheh Abdollahi Mirbadi (3), Falk Harnisch (3), Miriam A. Rosenbaum (1,2)	(1) Leibniz Inst. for Natural Product Research & Biology, Hans-Knöll-Institute, Jena; (2) Faculty of Bio Science, Friedrich-Schiller-Uni Jena/Thuringa; (3) Dept. of Env. Microbiology, Helmholtz-Centre, Leipzig/Germany
	M0605	Electron4Protein Electricity-driven single-cell protein production	Narcís Pous (1), Lluís Bañeras (2), Maria Dolors Balaguer (1), Sebastià Puig (1)	(1) LEQUiA, Institute of the Environment, (2) gEMM, Institute of Aquatic Ecology, University of Girona, Girona/Spain
12:40 Lunch				
Thursday, July 6. Afternoon				Club Rooms
13:25 M07 Poster Session			S-Chair: L. Jourdin	
13:45 M08 Electromethanogenesis & MFC applications II			S-Chair: E. Yu, S. Puig	
	M0801	Overcoming the competition of methanogenesis for acetate production through a continuous bioelectrochemical system with a mixed culture enriched with Acetobacterium Woodii	Jacopo Ferretti, Lorenzo Cristiani, Marianna Villano, Marco Zeppilli	Department of Chemistry, University of Rome Sapienza, Rome/Italy
	M0802	Pre-enrichment of electrodes with acetoclastic electroactive bacteria and hydrogenotrophic methanogens and external voltage application promotes the performance of anaerobic digestion	Hari Ananda Rao (1), Krishna P. Katuri (1), Pascal E. Saikaly (1,2)	(1) Water Desalination and Reuse Center (WDRC), (2) Environmental Science and Engineering Program, King Abdullah University of Science & Technology, Saudi Arabia
	M0803	Insights into the impact of polyethylene microplastics on methane recovery from wastewater via bioelectrochemical anaerobic digestion	Song Wang (1), Yanyan Su (2), Yifeng Zhang (1)	(1) Department of Environmental and Resource Engineering, Technical University of Denmark, Lyngby/Denmark; (2) Carlsberg Research Laboratory, Valby/Denmark
	M0804	Valorization of wastewater through electromethanogenesis: how does the pressure affect the electrochemistry?	C. Frantz (1), P. Aubin (1), G. Vanderheyden (1), H. Pourrahmani (1), B. Ayer (2), O. Paquot (1), R. Dufresne (2), M. Siegert (3), J. Van Herle (1)	(1) Group of Energy Materials, EPFL SCI-STI-JVH, Sion/Switzerland; (2) Institut de Recherche Technologies du Vivant, HES-SO, Sion/Switzerland (3) Hexem SA, Chemin du Profray, Le Châble/Switzerland
	M0805	Pseudomonas citronellolis Electroactivity in a Dual Chamber Microbial Fuel Cell	Constantina K. Varnava (1), Panagiotis Persianis (1), Ioannis Ieropoulos (2), Argyro Tsipa (1,3)	(1) Dept. of Civil & Env. Engineering, Uni. of Cyprus, Nicosia/Cyprus; (2) Water and Environmental Engineering Group, University of Southampton, Southampton/UK; (3) Nireas Int. Water Research Centre, Uni. of Cyprus, Nicosia/Cyprus
	M0806	Evaluation of ceramic microbial fuel cells as wastewater treatment and energy recovery process	Francisco J Rodríguez Valadez	Electrochemical Research Center, Querétaro/México
	M0807	Waste-derived MIL-53(Fe)Fe₃O₄@CNT supported on carbon felt enabling effective cathodic degradation of acridine orange via bio-electro-Fenton process	Monali Priyadarshini (1), Azhan Ahmad (2), Shraddha Yadava (1), Makarand M. Ghangrekar (1,2)	(1) School of Environmental Science and Engineering, (2) Department of Civil Engineering, Indian Institute of Technology Kharagpur, Kharagpur/India
P	M0808	The effect of electric voltage on bacteria, with the aim of introducing different substances into the bacterial cells and optimizing processes of discharging environmental pollutants	Ester Bar-Hanun, Ester Hanya, Rivka Cahan	Department of Chemical Engineering, Ariel University, Ariel/Israel
P	M0809	Ceramic Membrane and Cathode Optimization for Improved Power Generation of the POND MFCs	Mia Gläser	Nova Innova

15:30 Coffee break in the poster area

**16:00 M09 Diffusion control, education & MFC applications III
Closing**

S-Chair: F. Fischer, M. Rosenbaum

Invited M0901	I4: Exploring the extracellular electron uptake pathway of <i>Sideroxydans lithotrophicus ES-1</i>	Catarina Paquete	Nova University, Lisbon, Portugal
M0902	Study of a microfluidic septum to control diffusion inside a microbial fuel cell for biosensing applications	Giacomo Spisni (1,2), Giulia Massaglia (1,2), Candido Fabrizio Pirri (1,2), Stefano Bianco (1), Marzia Quaglio (1,2)	(1) Politecnico di Torino, Department of Applied Science and Technology, Turin/Italy; (2) Istituto Italiano di Tecnologia, CSFT@PoliTo, Turin/Italy
M0903	BREW: An easy-to-replicate and fully open-source workstation for educators and students to teach, learn and research various aspects of bioelectrochemical systems	Chyntol Kanhimbe(1), James M Courtney(2), Neil V Rees(1), Robert Steinberger Wilckens(1)	(1) University of Birmingham, Birmingham/UK; (2) Swansea University, Swansea/UK
M0904	Anaerobic microbial electrochemical fluidized membrane bioreactor for domestic wastewater treatment and reuse with energy recovery	Krishna P. Katuri (1), Hari Ananda Rao (1), Yogesh Singh (1), Pascal E. Saikaly (1,2)	(1) Water Desalination and Reuse Center; (2) Environmental Science and Engineering Program, Biological and Environmental Science and Engineering Division, King Abdullah Uni of Science & Technology, Thuwal/Saudi Arabia
Invited M0905	I5: PHOENIX: Protection, resilience and rehabilitation of damaged environments (EU COST ACTION CA19123)	Andrea Pietrelli	University of Lyon, Villeurbanne/France
M0906	Summary of the Chairs CLOSING	Ludovic Jourdin (1), Ioannis Ieropoulos (2) Michael Spirig, Fiona Moore, Olivier Bucheli (3)	(1) Delft University of Technology, Delft/The Netherlands (2) University of Southampton, Southampton/UK (3) European Fuel Cell Forum, Lucerne/Switzerland

18:00 End of sessions & end of MEEP Symposium

Networking recommendation: Stay and join the unforgettable "Dinner on the Lake" to cruise towards the sunset with your colleagues in an incredible setting

19:20 Dinner on the Lake - Unique pleasure boat trip, with dinner, drinks and music, ... and lots of networking in an inspiring atmosphere and picturesque landscape.

Boarding at 19:20, lake side of KKL pier 5/6, Departure 19.30, Back 23.00 (sponsored extra tickets for 120.- CHF pP available, short stop in Brunnen 22.30 for direct return by train)

Offer for Wednesday morning, 5 July

08:00	EFCF on-site registration, also open to register for MEEP and to book special tickets	<u>EFCF Sessions</u>
09:00	EFCF 2023: First morning session block* >>>>>>	A01: Opening, Keynotes 1-3: Overview from EU, USA and China A02: PEM Electrolysis, B02: Fuel Cell Catalysts

Possibility for Friday, 7 July

08:00	EFCF on-site registration open to book special tickets for MEEP participants	<u>EFCF Sessions</u>	
09:00	EFCF 2023: Conference, Poster area & Exhibition incl. Breaks, Documentation and Lunch* >>>>>>	A14: Keynote: Electrosynthesis of Oxygenates and Hydrocarbons A15: Life cycle analysis and economic viability A16: Performance and lifetime assesment A17: Dynamic operation A18: Closing & Keynote by the EFCF Gold Medal Winner	B14: Keynote: Advances in modeling and diagnostics by Debbie Myers B15: Structure based and dynamic modeling B16: Local Reaction Environment and Interactions B17: CO2 Electrolysis

*special tickets available at the registration desk or contact info@i-meep.com

www.i-MEEP.com

EFCF

The European Electrolyser and Fuel Cell Forum is an international reference conference, with exhibition & tutorials in the emerging field of "Fuel Cells, Electrolysers & H2 Processing". It has taken place since since 1994 and always at the beginning of July in Lucerne/Switzerland.

www.EFCF.com

Figures

Participants: MEEP symposium this year between 55 -70 expected; EFCF between 400-500

Exhibitors and Sponsors between 25-35

EFCF Tutorial participants:

- FCH: Fuel Cells & Hydrogen (kick-starter) 10-15

- EIS: Electrochemical Impedance Spectroscopy (advanced) 20-30



Attendance

Venue & Access

www.i-MEEP.com/Lucerne

MEEP events are traditionally held at the Culture and Convention Centre Lucerne (KKL) in conjunction with the European Electrolyser and Fuel Cell Forum www.EFCF.com. EFCF offers also a technology & supplier exhibition as well as the popular tutorials: FC&H₂ & EIS (each 0.5 ECTS credits). The KKL conference centre (www.i-MEEP.com/KKL) is a well-known location, on the stunning waterfront of the Lake Lucerne. It is easy to arrive by plane and train, and is located just a short walk from charming hotels and the historical town centre.

Time Schedule & Events

www.i-MEEP.com/Schedule

31 May 2023

Deadline for submission of **paper** – www.i-MEEP.com/Upload

4 July 2023 10.00 – 17.00

Project meetings & Tutorials:

1. FCH: Fuel Cell, Electrolyser & Hydrogen (0.5 ECTS credits, Level: kick-starter, 15-20 participants)

2. EIS: Electrochemical Impedance Spectroscopy (0.5 ECTS credits, Level: advanced, 20-30 participants)

Early arrivals are invited to visit the **EFCF exhibition** starting at 16:00 and attend the **EFCF Welcome Reception** at 18:00.

MEEP symposium 2023

5 July 2023 10:00

On-site MEEP Registration, Warm-up: View & discuss mounted posters or join 1st EFCF sessions (ask info@i-MEEP.com)

11:30 – 18:00 Welcome, Keynotes, Invited & Contributed Presentations in Oral and Poster Sessions, opportunity to visit EFCF exhibition and poster session

19:00 Possibility to join Swiss Surprise Night (reservation in advance recommended as capacity is limited, first come, first served).

6 July 2023 09:00 – 18:00

Oral & Poster Sessions – Plenary Keynotes, Exhibition, Award and Closing Ceremony

19:30 "Dinner on the Lake": Unique pleasure boat tour with music & picturesque scenery, an unforgettable networking event, together and sponsored by EFCF (reservation in advance during online registration recommended as capacity is limited, fcf)

7 July 2023 09:00 – 16:00

Reserve day to establish partnerships, board & project meetings. Possibility to join EFCF sessions (ask info@i-MEEP.com)

Services & Fees → REGISTRATION

www.i-MEEP.com/REGISTRATION

Symposium Fees*	Physical			Virtual	
	Early - 17 April	Regular from 18 April	Late from 15 May	Regular - 14 May	Late from 15 May
• Students, trainees and unemployed persons etc. with valid identification	420	+150	+100 CHF	270	+50 CHF
• Government, universities, consultants etc., industry and commerce	720	+150	+100 CHF	470	+50 CHF
• Phoenix member: Students, trainees and unemployed persons etc. with valid identification	320	+150	+100 CHF	170	+50 CHF
• Phoenix member: Government, universities, consultants etc., industry and commerce	620	+150	+100 CHF	370	+50 CHF

Tutorials

Day tickets on request.

• FC, EL & H ₂ Tutorial - Fuel Cells, Electrolysers & Hydrogen (kick-start, www.EFCF.com/FCH):	580 CHF	400	+50 CHF
• EIS Tutorial - Electrochemical Impedance Spectroscopy (advanced, www.EFCF.com/EIS)	580 CHF	400	+50 CHF

*All fees include the 7.7% VAT where applicable. Discounts are offered for group registrations of 3 or more. For further information please contact us at info@i-MEEP.com. Foreign currency exchange rates for April 2023: 1 CHF ≈ 1.02 EUR ≈ 1.11 USD ≈ 148.5 JPY ≈ 0.89 GBP (www.i-MEEP.com/Currency). Registrations are accepted as long as space is available..

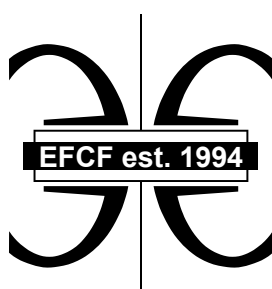
Physical fees include access to the MEEP symposium and EFCF exhibition & poster area, plus all advantages of the virtual access as well as all business lunches, all refreshments, welcome reception. But the exclusive evening networking events on Wednesday the "Swiss Surprise Night" and on Thursday the unique, very well-known and popular "Dinner on the Lake" are not included in the fee. They can easily be booked during the online registration (each CHF 120 p.p.) as long as space is available. Additionally the fees include also all the **virtual access rights**, including the MEEP membership benefits (alone worth 470 CHF, 270 CHF for students).

Virtual access includes virtual, live and on-demand access as well as access to the virtual community rooms during and to the member zone after the

Partners

www.i-MEEP.com/Partners

We are excited to offer a variety of partner- & sponsorship opportunities for those interested in supporting MEEP 2023. Sponsors will profit from direct contact with leading experts in these important emerging technologies. Sponsorship includes networking opportunities, a chance to showcase any products or services, and a great way to establish new partnerships within this diverse, international scientific community. Contact sponsor@i-mEEP.com to find out more.



Symposium Chairs



Prof. Ioannis Ieropoulos

University of Southampton, UK

is Professor and Chair of Environmental Engineering, in the Water & Environmental Engineering Group, Department of Civil, Maritime & Environmental Engineering at the University of Southampton, UK. He has an interest in waste utilisation and energy autonomy and produced the EcoBot family of robots, powered by microbial fuel cells (MFCs) fed on organic waste; the latest example is Row-bot. He leads a Gates Foundation funded program, developing MFCs for sanitation, looking also into biodegradable materials. He has published >90 peer reviewed journal papers, generated >£7M of research income in the last 8 years and is frequently invited at international conferences, such as ECS. He is a member of the EPSRC Peer Review College, a reviewer for the EU and numerous scientific Journals and the Editor in Chief for Sustainable Energy Technologies & Assessments (SETA).



Assistant Prof. Ludovic Jourdin

Delft University of Technology,
The Netherlands

leads the Microbial Electrochemistry and Technology group at the Delft University of Technology, where he also co-initiated the e-Refinery institute. His research predominantly focuses on investigating and developing microbial electrosynthesis processes for the production of chemicals, fuels, and materials from C-waste such as CO₂. His group uses multiscale and multidisciplinary approaches that combines experiments, theory, and computer simulations, and integrates expertise in the fields of microbiology, physics, chemistry, (bio)process engineering, and multi-scale modelling.

Ludovic is an early-career independent PI, who has published more than 20 peer reviewed journal papers, presented at over 25 international conferences, generated in excess of €3M of research funding in the last 4 years, and is a reviewer for various research agencies and international journals.

Scientific Advisory Board

www.I-MEEP.com/SAB

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Organised in conjunction with:



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IN SCIENCE & TECHNOLOGY

EFCF 2023

FINAL ANNOUNCEMENT
4 – 7 July
KKL Lucerne/Switzerland 

reduced version without
Oral Program / Poster List
see all on www.EFCF.com/FA

Low-Temperature

Fuel Cells, Electrolysers & H₂ Processing Forum

From fundamental science to accelerated integration



Chaired by
Prof. Michael H. Eikerling
Prof. Anna K. Mechler
Forschungszentrum Jülich, Germany
RWTH Aachen University

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Microbial Enzymatic
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4 July 2023
TUTORIALS:
FCH: Fuel Cell, Electrolyser & H₂
EIS: El.chem. Impedance Spectroscopy

Schedule of Events

Motto 2023: From fundamental science to accelerated integration

www.EFCF.com/Events

Tuesday, 4 July 2023

09:30 – 10:00	Registration for Tutorials – 2 nd floor club rooms above auditorium	11:00 – 16:00	Exhibition set-up
10:00 – 17:00	.../FCH: Fuel Cells & Hydrogen Tutorial Dr. G. G. Scherer, Dr. J. Van herle	16:00 – 18:00	Poster pin-up / Opening of the exhibition
	.../EIS: Electrochemical Impedance Spectroscopy Tutorial		On-site Registration open (continued on the following days)
	Dr. A. Weber, Dr. D. Klotz	18:00 – 19:00	Welcome gathering in the splendid KKL exhibition hall

Wednesday, 5 July 2023

08:00 – 16:00	On-site Registration , Speakers Warmup Coffee till 09:00, info at main desk	10:00 – 12:00	Registration for MEEP symposium 2023, 12:00-18.00 Sessions
09:00 – 18:00	Conference Sessions 1 – 6, Keynotes K1 - 4 & Invited Talks:	12:00 – 18:00	Exhibition & Poster area open. 12:30 Press Conference
	Presentations on programs & activities in EU, USA & China, Enabling H2	09:00 – 18:00	Poster Session I: All Session Topics
	Champions, plus Overview of Electrochemical H2 Adsorption and Absorption	13:15 – 15:00	Swiss Surprise night, MEEP Network Evening and
		18:30 – 23:00	H₂ Champions Dinner all with separate registration

Thursday, 6 July 2023

08:00 – 16:00	On-site Registration , Speakers Warmup Coffee till 09:00, info at main desk	09:00 – 18:00	MEEP Sessions
09:00 – 18:00	Conference Sessions 7–13, Keynotes K5 - 7 & Invited Talks:		Exhibition & Poster area open
	Specific Material Development, Electrolyser Industrialization & GW scale	13:15 – 15:00	Poster Session II
	plants, Transport in MEAs, High-throughput Experimentation, Design through	19:20 – 23:25	Great Dinner on the Lake - The unique networking event
	X-Ray Techniques, Catalysts for O ₂ Evolution,		

Friday, 7 July 2023

08:00 – 09:00	On-site Registration , Speakers Warmup Coffee till 09:00, info at main desk	15:00 – 16:15	Closing & Award Ceremony:
09:00 – 12:00	Exhibition & Poster area open		Best poster, best scientific contribution & outstanding lifetime work;
09:00 – 16:15	Conference Sessions 14–18, Keynotes K7 - 8: Advances in FC		Keynote K8 by the EFCF Gold Medal of Honour Winner 2023 -
	Modeling/Diagnostics, Advanced Electrocatalysts, Dynamic Operation of		Deborah Jones, Université Montpellier/France
	Electrolyzers, Electrosynthesis of Oxygenates & Hydrocarbons	16:15 – 17:00	Goodbye coffee and travel refreshment in front of the Luzerner Saal

Session Program

EFCF 2023

Low-Temperature Fuel Cells, Electrolysers & H2 Processing

see all details on
www.EFCF.com/FA

Session Overview		
	Luzerner Saal - www.EFCF.com/JoinA	Auditorium - www.EFCF.com/JoinB
1	A01: P1: Opening Session K1-3: EU, USA, China	
2	A02: PEM-Electrolysis	B02: Fuel Cell Catalysts
3	A03: Poster Session I (covering All Session Topics)	
4	A04: K4: Application, Market and Deployment by Enapter	
5	A05: Fuel Cell System Analysis and Degradation	B05: Ionic Media
6	A06: Alkaline Electrolysis	B06: Fuel Cells Electrode Fabrication
7	A07: K5: Improvements in Material Development by Uni Duisburg-Essen	B07: K6: Prospects for the Electrolyser Industrialization by Simon Fraser Uni
8	A08: Tailored MEA Design for Fuel Cells and Impact of Flow-Fields	B08: Alkaline (OER) Catalysts
9	A09: Advanced Electrolysis Systems & Components	B09: Advanced Testing and Diagnosis
10	A10: Poster Session II (covering All Session Topics)	
11	A11: K7: Application, Market and Deployment by Shell	
12	A12: Alternative Fuel Cell Systems and Additives	B12: AI-driven R&D
13	A13: Multiscale Characterization	B13: Catalysts for Acidic Electrolysis
14	A14: K8: Enabling Champions by Hy24	B14: K9: Modeling and Diagnostics by Argonne National Lab.
15	A15: Life Cycle Analysis and Economic Viability	B15: Structure-based and Dynamic Modeling
16	A16: Performance and Lifetime Assessment	B16: Local Reaction Environment and Interactions
17	A17: Dynamic Operation of Electrolyzer Systems	B17: CO2-Electrolysis
18	A18: P2: Closing Ceremony Kevnote by the EFCF Gold Medal of Honour Winner 2023	Legend: Px = Plenary; Kx = Keynote; Ix = Invited Talk All times are given in UTC/GMT +2 hours



How to get to Lucerne

www.EFCF.com/Lucerne

By car, train or bus:

The Gotthard trans-alpine **autobahn and railway pass through Lucerne**, and provide easy access by car, train or bus from north or south. Lucerne is ca. 1 hour from Zurich.

EFCF also offers info and support, if you would like to get picked up by a taxi or bus, preferable when you travel in groups, and/or intend to add a business or private trip possibly with accompanying persons, please send your requests to forum@efcf.com.

By airplane:

Zurich is the gateway for the European Fuel Cell Forum. Choose **Zurich as your destination**. From Zurich airport you can take a direct **train to Lucerne**. The train station is below the airport terminal complex, and direct trains leave at 15 and 38 minutes past the hour. There are three more trains per hour that require easy changing in Zurich. The pleasant train journey takes a little over 1 hour. Most hotels are within walking distance from the Lucerne train station and the conference location at the KKL.

We hope you have a pleasant journey and we look forward to welcoming you in Lucerne!



European Fuel Cell Forum AG

Olivier Bucheli & Michael Spirig
Obgardihalde 2
CH-6043 Luzern-Adligenswil / Switzerland
Tel. +41 44-586-5644
forum@EFCF.com, www.EFCF.com



EFCE 2023 international ELECTROLYSER, FUEL CELL & HYDROGEN event

Keynote & Invited Talks on EU, USA & China Country Overviews and on Market, Deployment, Investment, Industrialization and Diagnostics, H₂ Adsorption/Absorption, Transport in MEAs, High-throughput Experimentation, Design through X-Ray Techniques, Catalysts for O₂ Evolution, Advanced Electrocatalysts, Dynamic Operation of Electrolyzers, Electrosynthesis of Oxygenates & Hydrocarbons

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Obgardihalde 2
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FCH Tutorial

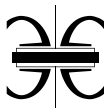
- ✓ Basic understanding of chemical, physical & technical principles
- ✓ Application requirements & practical examples of current developments
- ✓ Strong base to exchange with your partners & clients

Tutors:



Dr. Günther G. Scherer
formerly PSI, Switzerland

MER Dr. Jan Van Herle
EPFL, Switzerland (right)



www.EFCE.com/FCH

Related with **EFCE 2023**, 4 - 7 July
**Low temperature FUEL CELLS,
ELECTROLYSERS & H₂ Processing**
27th Int. Conference Series, Tutorials & Exhibition est. 1994

PROGRAM



FCH Tutorial: Live 5 July 2023

www.EFCF.com/FCH

09:30 Registration, welcome refreshments

10:00 Welcome and Introduction

10:00 **Lecture 1 Fundamentals of Electrochemical Energy Conversion**

11:00 **Lecture 2 Characteristics of the important Fuel Cell & Electrolyser Technologies**

11:45 Coffee break

12:00 **Lecture 3 Fuels for fuel cells, fuel processing**

12:45 Lunch break

14:00 **Lecture 4 Applications of Polymer Electrolyte Technologies** such as PEFC, DMFC, H2FC, ...

14:45 **Lecture 5 System aspects, applications of Solid Oxide Technologies** such as SOFC, SOE, SOMR

15:30 Coffee break

15:45 **Lecture 6 State-of-the-art, challenges, summary - Summary**

17:00 End of FCH Tutorial, Visit the exhibition of the EFCF

The Tutorial language is English.

Registration, Services & Fees

Both **on-site** & **virtual** participation are available & include:
Complete documentation of the tutorial lectures, exchange with EIS experts & users, admission to the EFCF exhibition, VAT & the **certificate of attendance** with confirmation of **0.5 ECTS credits**.
Additionally for onsite participants: Welcome refreshments, business lunch, snacks, drinks & access to the poster session.

On-line Registration : www.EFCF.com/TutReg

CHF 580 for live, on-site participation
CHF 400 for live, virtual participation (+CHF 50 late fee from 15 May)
CHF 350 for on-demand access to recorded lectures
- ca. 2-3 weeks after live performance published
- email exchange with the tutors possible
Exhibitors & groups are entitled to rebates. Ask forum@efcf.com.



Electrochemical Impedance Spectroscopy

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Booster, 0.5 ECTS
for
→ Medium - Top Experienced

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EIS Tutorial

- ✓ Basic principles of EIS for analysing Electrochemical Reactor Technologies
- ✓ Advanced applications, sophisticated cases & practical details
- ✓ Discussions & exchange of experience with top-class experts

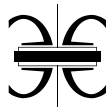
Tutors:



Dr. André Weber
KIT, Germany



Dr. Dino Klotz
Zurich Instruments AG, Zurich



www.EFCE.com/EIS

Related with **EFCE 2023**, 4 - 7 July
**Low temperature FUEL CELLS,
ELECTROLYSERS & H₂ Processing**
27th Int. Conference Series, Tutorials & Exhibition est. 1994

PROGRAM



EIS Tutorial: Live 4 July 2023

www.EFCF.com/EIS

09:30 Registration, welcome refreshments

10:00 Welcome and Introduction

10:10 **Lecture 1 Fundamentals of Electrochemical Impedance Spectroscopy**

11:00 **Lecture 2 Impedance Spectra Eval., Kramers-Kronig Test, DRT-Analysis, CNLS Fit**

11:45 Coffee break

12:00 **Lecture 3 Applications I - Analysis - Materials and (Model-) Electrodes**

12:45 Lunch break

14:00 **Lecture 4 Applications II - Analysis - Single Cells and Stacks**

14:45 **Lecture 5 Impedance Modelling and Simulation**

15:30 Coffee break

15:45 **Lecture 6 "EIS challenge" - Summary**

17:00 End of EIS Tutorial, Visit the virtual exhibition of EFCF

The EIS Tutorial language is English.

Registration, Services & Fees

Both **on-site** & **virtual** participation are available & include:
Complete documentation of the tutorial lectures, exchange with EIS experts & users, admission to the EFCF exhibition, VAT & the **certificate of attendance** with confirmation of **0.5 ECTS credits**.
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