

4th MEEP Symposium 2022

6 – 7 July, KKL,
Lucerne, Switzerland

Bio-Electrochemical Systems, Fuel Cells & Electrolysers

Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors

Chaired by: Prof. Johannes Gescher; Technical University of Hamburg, Germany

Co-organizers

European Electrolyser & Fuel Cell Forum
Phoenix Cost Action: CA1912

MEEP SCOPE

The MEEP Symposium 2022 features all Microbial & Enzymatic Electrochemical Reactors, especially Microbial Fuel Cells, Electrolysers and Applications. It covers science and engineering, materials and manufacturing, components and systems, design, testing, integration and applications. The 4th International MEEP Symposium 2022 aims to further establish the 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. This event will be held alongside the already well established and highly respected European Electrolyser & Fuel Cell Forum (www.EFCF.com, since 1994), offering further opportunities to exchange with researchers and industry members in other fields of Fuel Cell & Electrolysers and Hydrogen research from around the world.

Session program

Wednesday, July 6

KKL, Club Rooms

11:00	On-site MEEP registration		
	Welcome		S-Chair: Ioannis Ieropoulos
13:00	M01 Keynote on LCA & Economic Evaluation Bioelectrochemistry for Energy		
	M0101 Welcome by the Organizers	Michael Spirig, Fiona Moore, Olivier Bucheli	European Electrolyser & Fuel Cell Forum, Lucerne/Switzerland
	M0102 Welcome by the Symposium Chair	Johannes Gescher	Technical University of Hamburg, Germany
Keynote	M0103 K1: Tales of benefits and burdens: life cycle assessment and economic evaluation of METs	Sven Kerzenmacher	Research Group Environmental Process Engineering, University of Bremen, Bremen, Germany
	M0104 8926 - Technologies and nature-based solutions in sustainable actions on European Union' cities	Minas Angelidis	National Technical University of Athens, Athens/Greece
	M0105 8887 - A bioelectrochemical system for flexible biogas production	Janek R. Weiler, Melanie T. Knoll, Nikolai Jürgensen, An-Ping Zeng, Johannes Gescher	Institute of Technical Microbiology, Hamburg University of Technology (TUHH), Hamburg/Germany
14:15	Coffee Break &		
	M02 Poster Session I (all topics, contributions see Poster Session II)		S-Chairs: Johannes Gescher / Ioannis Ieropoulos
15:00	M03 Microbial Reactors: Fuel Cells & Hydrogen Syntrophy		S-Chair:
	M0301 8896 - Revealing hydrogen syntrophy of human gut microbes with a bioelectrochemical system	Ulrike Biehain, Sofia Esquivel-Elizondo, Tianran Sun, Nils Rohbohm, Ruth E. Ley, Ir. Largus T. Angenent	University of Tübingen, Tübingen/Germany
	M0302 8900 - Dynamic configuration assessment of a Microbial Fuel Cell stack/cascade fed on human urine	George Papaharalabos, John Greenman, Andrew Stinchcombe, Ioannis A. Ieropoulos	University of the west of England, Bristol/England
	M0303 8899 - Comparative study of different cathode strategies in single chamber microbial fuel cells	Asimina Tremouli, Theofilos Kamperidis, Pavlos K. Pandis, Christos Argiris, Vassilis N. Stathopoulos, Ioannis	National Technical University of Athens, Athens /Greece
	M0304 8922 - Assessment of different configuration of microbial fuel cells to enhance bioelectricity production	Carlotta Cosentini, Gabriele G. Gagliardi, Domenico Borello	University La Sapienza, Rome/Italy
	M0305 8920 - Comparative analysis of electrical performance and degradation rate in PMFC exposed to Malachite Green contamination	Domenico Borello, Gabriele Gagliardi, Andrea Pietrelli, Naoufel Haddour, Michele Martone, Grégory Bataillou	University La Sapienza, Rome/Italy
	M0306 8903 - A scalable Rotating Disc Bioelectrochemical Reactor (RDBER) suitable for the cultivation of both cathodic and anodic biofilms	Max Hackbarth, Johannes Reiner, Harald Horn	DVGW Research Centre, Karlsruhe/Germany
P	M0310 8919 - Ultra-low power consumption charge pumps for electrochemical reactors	Paula López, Ó. Pereira-Rial, L. Vicente-García, Juan M. Carrillo-Calleja	Centro Singular de Investigación en Tecnoloxías Intelixentes (CITIUS), Santiago de Compostela/Spain
P	M0311 8907 - Investigation of the optimal design to produce biosurfactants and electricity from waste vegetable oil in air-cathode microbial fuel cells	Aleksander de Rosset, Grzegorz Pasternak	Wroclaw University of Science and Technology, Wroclaw/Poland
P	M0312 8904 - Describing polarization curves and potential changes of a Microbial Electrolysis Cell	Nikolai Jürgensen, An-Ping Zeng, Johannes Gescher	University of Technology Hamburg, Hamburg/Germany
P	M0313 8898 - Microbial Gardens: A design-led proposal for the creation of a human-bacteria cohabitation unit for inhabiting extreme environments based on microbial fuel cell and benthic fuel cell technologies.	Anna Vershinina, Rachel Armstrong	KU Leuven, Dep. of Architecture, Ghent/Belgium
P	M0314 8916 - Plant microbial fuel cells: a sustainable engineering biosystem for recovering contaminated soils	Valeria Ancona, Giorgia Aimola, Gabriele Gagliardi, Paola Grenni, Carlotta Cosentini, Anna Barra Caracciolo, Domenico Borello,	Water Research Institute, Italian National Council, Bari/Italy
P	M0315 8924 - Research on biofilm/biofilter systems efficiency on pollutant-removal from municipal wastewaters	Nicoleta Nicula, Carmen Mateescu, Gimi Rîmbu, Marius Lungulescu, Ortansa Csutak	National Institute for R&D in Electrical Engineering ICPE-CA, Bucharest/Romania
P	M0316 8925 - Microbial Fuel Cell Capacity for Distributed Computing Wireless Sensor Networks	Fabien Mieyeville, Andrea Pietrelli, Vincenzo Ferrara	Université Claude Bernard, Lyon/France
P	M0317 8893 - BABYN YAR: A design-led proposal for a memorial site where bioelectrical technologies form an active symbiosis between the soil systems and rituals of loss producing visible acts of regeneration	Tria Amalia Ningsih, Rachel Armstrong	Faculty of Architecture, Ghent/Belgium
P	M0318 8928 - Plant-Microbial Fuel Cells to power environmental sensors in Green Walls	Ana Cristina Rodrigues, Ana Ferraz, Patrícia Moreira da Fonte, Gilberto Martin, Luciana Peixoto	Instituto Politécnico de Viana do Castelo, Viana do Castelo/ Portugal
16:30	Brain Recreation		
16:45	M04 Bioelectrochemical systems: Reactors, design and insights		S-Chair:
	M0401 8902 - Multiscale computational modelling as enabler for the rational design of microbial electrosynthesis reactors for CO2 reduction to C2-C6 organics	Oriol Cabau-Peinado, Adrie J.J. Straathof, Ludovic Jourdin	Delft University of Technology, Delft/Belgium
	M0402 8911 - Microbial electrosymbiosis for CO2 reduction using a co-culture of Rhodobacter capsulatus and Sporomusa ovata	Suman Bajracharya, Adolf Krige, Leonidas Matsakas, Ulrika Rova, Paul Christakopoulos	Luleå University of Technology, Luleå/Sweden
	M0403 8883 - An interesting insight into growth kinetics and energy efficiency for a microbial electrosynthesis process with Kyrpidia spormannii	Leonie Rominger, Max Hackbarth, Tobias Jung, Harald Horn, Johannes Gescher	Hamburg University of Technology (TUHH), Hamburg/Germany

M0404	8895 - Process control of autotrophic <i>Acetobacterium woodii</i> culture via lactate dependent in situ water electrolysis	Jan Herzog , An-Ping Zeng, Alexander Mook, Frank R. Bengelsdorf	Hamburg University of Technology (TUHH), Hamburg/Germany
M0405	8914 - Improved performance and overpotential reduction through electrode modification in Microbial Electrolysis Cells	Rahul Gautam, Chyntol Kanhimbe, Neil V Rees, Robert Steinberger Wilckens, Uttam K Ghosh	University of Birmingham, Birmingham/England
P M0410	8881 - Glycine production during microbial electrosynthesis with <i>C. ljungdahlii</i>	Santiago Treceño Boto, Miriam A. Rosenbaum	Leibniz Institute for Natural Product Research and Infection Biology, Hans-Knöll-Institute, Jena/Germany
P M0411	8888 - Enzymatic formation of oxaloacetate to supply the substrate for bioelectrochemical malate production	Nicholas Reimer, Ralf Dringen	Neurobiochemistry Department, University of Bremen, Bremen/Germany
P M0412	8894 - A bioelectrochemical reaction cascade with unspecific peroxygenase immobilized on Globograpthite electrode	Victoria S. Bueschler , Giovanni V. Sayoga, Hubert Beisch, An-Ping Zeng, Bodo Fiedler, Andreas Liese	Hamburg University of Technology (TUHH), Hamburg/Germany
P M0413	8906 - Bioelectrochemical Methanation of Power Plant Off gas from a Steel Plant	Marianne Haberbauer , Sabine Spiess, Amaia Sasiain, Sophie Thallner, Nina Kieberger, Georg M. Guebitz	K1-MET GmbH, Linz/Austria
P M0414	8912 - Biodegradation potential of fenthion and disulfoton on inoculated biochar through alluvial Danube sediment	Snežana Maletić, Irina Jevrosimov, Marijana Kragulj Isakovski, Dragana Tamindžija, Ana Volarić, Tamara	University of Novi Sad, Novi Sad/Republic of Serbia
P M0415	8908 - Desulfuromonas acetoxidans: unraveling the extracellular electron transfer processes to power microbial desalination cells	Catarina M. Paquete, Ricardo Soares, Alexandra Alves, Ricardo O. Louro	Instituto de Tecnologia Química e Biológica António Xavier, Lisbon/Portugal
P M0416	8910 - Bioelectrochemical degradation of crude oil by microbial consortia derived from contaminated sites	Natalia Tyszkiewicz, Grzegorz Pasternak	Wroclaw University of Science and Technology, Wroclaw/Poland

18:00 End of Sessions

19:30 MEEP Network Evening (extra tickets for 90.- pP available)

Thursday, July 7

09:00 M05 Biofilms with a Keynote

S-Chair:

Keynote	M0501	K2: Biofilms in Bioelectrochemistry	Dr. César I. Torres, Associate Professor	Biodesign Swette Center for Environmental Biotechnology, Arizona State University, USA
	M0502	8892 - Sprayable biofilm – Agarose hydrogels as 3D matrix for enhanced Productivity in Bioelectrochemical Systems	Melanie T. Knoll, Johannes Gescher	University of Technology Hamburg (TUHH), Hamburg/Germany
	M0503	8901 - Zooming in on the biocatalyst performance in biofilm-driven microbial electrosynthesis	Marijn Winkelhorst, Adrie Straathof, Ludovic Jourdin	Delft University of Technology, Delft/Belgium
	M0504	8886 - Pore Network Extraction from Simulated Biofilms	Nicole Vorhauer-Huget, Lars Beyer, Katja Bettenbrock, Robert Dürr, Emad Aamer, Achim Kienle	Institute of Process Engineering, Otto-von-Guericke-University, Magdeburg/Germany
	M0505	8915 - Carbon surface structure effects on biofilm formation and subsequent electrochemistry observed for <i>Pseudomonas fluorescens</i> under anodic microbial fuel cell conditions	Chyntol Kanhimbe, James M Courtney, Neil V Rees, Robert Steinberger Wilckens	University of Birmingham, Birmingham/England
P	M0510	8707 - Palladium Platinum Nanocomposites as Glucose Oxidation Electrocatalysts in Biofuel Cells	Ziad Khalifa	Chemical Engineering Department, Faculty of Engineering, The British University in Egypt, El Sherouk City - Cairo/Egypt
P	M0511	8909 - Cedar-wood based biochar as a performant anode material in Soil Microbial Fuel Cell	Grégory Bataillou, Naoufel Haddour, Sébastien Cecillon, Christian Voltaire	Université Claude Bernard , Lyon/France
P	M0512	8890 - In situ electrogeneration of H ₂ O ₂ using highly porous Globograpthite in a chemoenzymatic reaction system	Giovanni V. Sayoga, Hubert Beisch, Victoria S. Bueschler, Bodo Fiedler, Andreas Liese, An-Ping Zeng	Hamburg University of Technology (TUHH), Institute of Bioprocess and Biosystems engineering, Hamburg/Germany

10:30 Coffee break & exhibition

11:00 M06 Microbial dynamics: traits and fuel cell reactions

S-Chair:

	M0601	8880 - Biosurfactants production from oily wastewater using a newly isolated <i>Pseudomonas</i> bacterium: a biodegradation process with potential to be used in bio-electrochemical systems	Argyro Tsipa, Constantina Varnava, Eftychia Pinakoulaki	Environmental Biotechnology Laboratory (EmBIOSysTech lab), University of Cyprus, Nicosia/Cyprus
	M0602	8885 - Characterization of advanced exoelectrogenic biofilms using microfluidic reactors and an autonomous robotic imaging platform	René Wurst, Edina Klein, Johannes Gescher	Institute of Technical Microbiology , Hamburg/Germany
	M0603	8897 - Microfluidic BES for online physiology investigations of the model organism <i>Shewanella oneidensis</i> MR 1	Zubaish Saghir , Falk Kemper, Stefan Schwinde, Miriam A. Rosenbaum	Leibniz Institute for Natural Product Research and Infection Biology, Jena/Germany
	M0604	8527 - Prediction of organic pollutant removal from leachate in an earthen microbial fuel cell using neural networks	Manaswini Behera, Rishi Gurjar	School of Infrastructure, Indian Institute of Technology Bhubaneswar, Odisha/India
	M0605	8913 - Electroactive consortia produce biosurfactants to degrade waste crude oil and cooking oil in microbial fuel cells	Grzegorz Pasternak, Natalia Tyszkiewicz, Aleksander de Rosset, Bartosz Widera	Wroclaw University of Science and Technology, Wroclaw/Poland
	M0606	8921 - Investigation of electricity generation together with PAH degradation in microbial fuel cells	D. Borello, G. Gagliardi, C. Cosentini, V. Ancona, G. Aimola, A. Barra Caracciolo, P. Grenni, S. Rončević, S. Maletic	University La Sapienza, Rome/Italy

12:30 Lunch

Thursday, July 7

13:15 M07 Poster Session II (all topics)

S-Chairs: Ioannis Ieropoulos / Johannes Gescher

15:00 M08 Electrode materials and surface interactions

S-Chair:

	M0801	8882 - Selection of anode materials for a microbial electrolysis cell using multi-criteria decision-making techniques	Óscar Santiago Carretero, Isaac Vázquez, Julia Harders, Ivonne Petit, Christoph Hank, Sven Kerzenmacher	University of Bremen, Bremen/Germany
	M0802	8923 - Biomethanisation of CO ₂ using Boron – Doped Diamond Anode and Biocathode in a Dual-chamber Cell	Thitirat Ditkaew, Yue Zhang, Carlos Ponce De Leon Albarran	University of Southampton, Southampton/England
	M0803	8889 - Novel highly and hierarchical porous carbon foam electrode with globular morphology (Globograpthite) for H ₂ O ₂ production	Hubert Beisch , Giovanni V. Sayoga, Victoria S. Bueschler, Andreas Liese, An-Ping Zeng, Bodo Fiedler	Hamburg University of Technology (TUHH), Institute of Polymers and Composites, Hamburg/Germany
	M0804	8891 prerecorded - Reduction–oxidation of mineral by bacteria via oxygen switch	Feng Zhao, Fan Yang, Yue Zheng, Huan Wang	Chinese Academy of Sciences, Xiamen/China

16:00 Coffee break & exhibition

16:30 M09 Bioelectrochemical Systems with a Keynote on Up-scaling

S-Chair:

M0901	8905 - Advanced three-dimensional anode structure for improved biological photovoltaic (BPV) system operation	Maira Anam, Helena Gomes, Geoffrey Rivers, Rachel Gomes, Ricky Wildman	University of Nottingham, Nottingham/England
M0902	8918 - Bioelectrochemical systems for sustainable treatment of acid mine drainage coupled with resource recovery	Annie Modestra Jampala, Suman Bajracharya, Adolf Krige, Leonidas Matsakas, Ulrika Rova, Paul	Luleå University of Technology, Luleå/Sweden
M0903	8927 - Energy security and resilience of cities, new challenges. Case study: Greece.	Agisilaos Economou	National Technical University of Athens, Athens/Greece
M0904	K3: Bioelectrochemical Systems Scale-up from Micro m to Cubic m	Dr. Abraham Esteve Nunez, Associate Professor	Associate Researcher of Imdea Water, University of Alcalá, Madrid, Spain
M0905	Summary and Closing CLOSING	Johannes Gescher (1), Ioannis Ieropoulos (2), Michael Spirig, Fiona Moore, Olivier	(1) Technical University of Hamburg, Hamburg/Germany (2) University of Southampton, Southampton/UK

18:00 End of sessions & end of official part of MEEP Symposium

19:20 **Dinner on the Lake** - Boarding at 19:20, lake side of KKL pier 5/6, Departure 19.30, Back 23.00 (get supported tickets for 120.- CHF pP, stop in Brunnen 22.30 for direct return by train)
Recommended: Stay & network on the unique pleasure boat tour with dinner & music. An incredible excursion in the middle of the mountains to the historic "Rütliwiese", where Switzerland was founded.

Offer for Wednesday morning, 6 July

08:00 EFCF on-site registration, also open to MEEP participants, *special tickets available

09:00 **EFCF 2022: first morning session block*** >>>>>>

12:30 EFCF lunch on KKL Terrace - also for MEE participants*

13:15 EFCF poster session & exhibition visit (free)

A01: Opening Session

A02: **Keynotes: EU, USA, JP & Korean Programs/Partnerships**

A03: **Technology status at industry**

B02: **Fuel Electrodes**

B03: **Fuel & Oxygen Electrodes**

Only with special invitation:

10:00 MEEP Scientific Advisory Board meeting

Possibility for Friday, 8 July

08:00 EFCF on-site registration open *special tickets available

09:00 **EFCF 2022: Conference, Poster area & Exhibition** >>>>>>

- incl. Breaks, Documentation and Lunch - also for GSM participants*

16:15 www.EFCF.com/FA

EFCF Sessions

A13: Keynote: H2 production paths & future mix

A14: Other Fuels

A15: SOC Integration & E-System Perspectives

A16: Products, Demonstration & Novel Concepts

A17: Closing & Gold Medal Winner Keynote

B13: Cells Design & Manufacturing II

B14: Lifetime Assessment & Advanced Characterisation

B15: Advanced Characterisations

B16: Material Modelling

www.i-MEEP.com

EFCF

The European Electrolyser & Fuel Cell Forum is the European reference event with exhibition & tutorials in the emerging field of "Fuel Cells, Electrolysers & H2 Processing". It takes place since 1994 (26th time), always at the beginning of July in Lucerne/Switzerland.

www.EFCF.com

Figures

Participants: MEEP symposium this year between 60-80 expected; EFCF total usually between 350-550;

Exhibitors/Sponsors/Demo usually between 25-35;

EFCF Tutorial participants:

- FCH: Fuel Cells & Hydrogen (kick-starter) 15-25;

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

