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# EUROPEAN FUEL CELL

CONFERENCE & EXHIBITION

NAPLES Hotel Royal Continental

9 > 11 December, 2019



## Final Program



ATENA  
FUTURE TECHNOLOGY



Agencia nazionale per le nuove tecnologie,  
l'energia e lo sviluppo economico sostenibile



UNIVERSITÀ  
DEGLI STUDI  
DI NAPOLI  
"PARTHENOPE"



UNIVERSITÀ  
DEGLI STUDI  
DI PERUGIA

EUROPEAN FUEL CELL 2019

# Final Program

To Piero Lunghi. We miss you a lot. To you our gratitude for ever.

This book is dedicated to the memory of Piero Lunghi, creator of the European Fuel Cell Technology and Applications Conference, dear friend and colleague, who prematurely passed away in a car accident on damned November 9, 2007.

Piero made significant contributions in the field of fuel cells in the course of his too short career. He was the leading figure in the formation of the fuel cell research group at the University of Perugia and several activities and research projects initiated by him are still ongoing. This means that, thanks to Piero, many young people are working in this exciting research field and are coming to Naples to present their results. Therefore, Piero's memory is in the conference name but Piero's contribution is still in the contents of this book.

The memory of our friend Piero, his great personal generosity and energy, survives in our hearts, his contribution and his tenacity survive in the work of young people who carry on his vision throughout the world.

This year three best paper awards have been established in memory of Piero Lunghi, following his ideas and his actions "Plan as if you should live forever and work as if you should die tomorrow". The prize that has been made possible by his parents and his sister, Paola, aims to be a message to young researchers everywhere: your ideas, your projects can change the world.

Give them your passion, your strength, and make all necessary effort to realize them. There is no greater satisfaction than seeing one's ideas become reality and become part of the future of our world. Piero strongly desired this, and constantly followed this through with conviction, passion and dedication.

For a better future, we need young researchers of this kind.





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December **9<sup>th</sup>**

# Plenary Session

## **What's cooking in the world kitchen on H2 and Fuel Cells**

Hydrogen can address multiple energy policy goals at the same time: the transition to a cleaner energy system, diversifying the fuel mix and improving energy security. The world is moving forward: most countries worldwide have started to accelerate actions for climate change mitigation and reduction of harmful pollution, and growing concern about the sustainability of their economy's supply chains is driving the political agenda.

In this evolving panorama, several cross-country Hydrogen Initiatives have been implemented, that bring together all major stakeholders in the hydrogen-fuel cell value chain and aim to address all the issues above, leveraging on the real progress and scale-up that the technology has undergone in the last decade. There is a wind of change in the air for hydrogen, and it smells like opportunity: for business, for industry and for technological development, as well as for more healthy living for citizens around the world. This plenary session will look at the menu that makes up this "new meal", assessing success stories, international collaboration, and joint action.

**Location:** Hotel Royal Continental – Auditorium

- 08:30** — **Registration**
- 09:00** — **Welcome and Opening Ceremony Angelo MORENO**  
President of H2IT – Italian Hydrogen and Fuel Cell Association and EFC19 Chairman  
Italian Ministry of Economic development
- 09:30** — **Bart Biebuyck**  
Achievements of FCH2 JU Value Chain Study, priorities and future of H2&FC technologies  
Executive Director of FCH JU – Fuel Cells and Hydrogen Joint Undertaking
- 09:50** — **Martyn Chamberlain**  
Policy Officer of Clean Energy Transition, European Commission  
Hydrogen in Mission Innovation and the Horizon Europe Framework Programme
- 10:10** — **David Hart**  
E4tech FCH Value Chain
- 10:30** — **Eiji Ohira**  
Director General, Fuel Cell and Hydrogen Technology Office, NEDO, Japan  
The effort to promote hydrogen in Japan
- 10:50** — **Coffee break**
- 11:30** — **Cory Shumaker**  
California Hydrogen Business Council Hydrogen and Fuel cells Initiative in California, US
- 11:50** — **Paula Vieira**  
Director – Transportation and Alternative Fuels Division  
Natural Resources Canada  
Updates on the Clean Energy Ministerial (CEM) Hydrogen Initiative and Canada's pivoting role for Hydrogen deployment
- 12:10** — **Angelo MORENO**  
Round table and conclusions
- 13:30** — **Lunch**

December **9<sup>th</sup>**

# Parallel Session

## Session .01

	<b>1a / AUDITORIUM</b> C-fuelled SOFC	<b>1b / MIRABILIS I</b> Maritime Applications	<b>1c / MIRABILIS II</b> PEM Testing	<b>1d / GIARDINO</b> Microbial & Enzymatic Bioelectrochemical Systems
<b>14:30-14:50</b>	<b>EFC19192 / Bochentyn Beata</b> Ce <sub>0.8</sub> Ln <sub>0.2</sub> O <sub>2-δ</sub> (Ln= Gd, Sm, La, Nd, Pr) compounds applied as effective anode catalytic layers for biogas fueled SOFCs	<b>EFC19161 / Taccani Rodolfo</b> Comparison of different plant layout and engineering solutions for fuel cells utilization on a small ferry	<b>EFC19187 / Baricci Andrea</b> Experimental characterization of Polymer Electrolyte Membrane Fuel Cells with low platinum loading operated under dry gas feed	<b>EFC19265 / Cristiani Pierangela</b> Microbial fuel cells technology real applicatinos far or just around the corner: soil remediation, sensing and power-to-X
<b>14:50-15:10</b>	<b>EFC19072 / Skrzypkiewicz Marek</b> Experimental study of the performance of the anode supported solid oxide fuel cells (SOFC) fed with aerosol contaminated fuel	<b>EFC19146 / Lamberti Thomas</b> Experimental assessment of FCS for marine application	<b>EFC19123 / Aßmann Pia</b> Investigation of operando accelerated stress test for MEA components of PEM fuel cells	<b>EFC19247 / Aulenta Federico</b> <b>KEYNOTE LECTURE</b> Electric currents power petroleum hydrocarbons bioremediation in contaminated sediments
<b>15:10-15:30</b>	<b>EFC19059 / Enrico Squizzato</b> Solid Oxide Cells operating with C-containing fuels: overcoming the Ni based limitation	<b>EFC19180 / Rivarolo Massimo</b> Preliminary Design of innovative low emissions systems for different maritime applications	<b>EFC19113 / Bednarek Tomasz</b> A new parallel flow field single PEM fuel cell testing hardware for high power densities examination	<b>EFC19260 / Cristiani Pierangela</b> Terracotta and biochar derived electrodes for bioelectrochemical systems
<b>15:30-15:50</b>	<b>EFC19232 / Sarruf Bernardo</b> Solid Oxide Fuel Cells with Ni-Free Anodes for the direct utilization of carbonaceous fuels and special balance of plant	<b>EFC19013 / Ballester Sierra Cristina</b> H2PORTS. Hydrogen refuelling system development in the port of Valencia	<b>EFC19102 / Pivac Ivan</b> Characterization of PEM Water Electrolysis Cell with Electrochemical Impedance Spectroscopy	<b>EFC19038 / Aimola Giorgia</b> The use of Microbial Fuel Cells for soil remediation: a preliminary study on DDE.

# Session .02

December 9<sup>th</sup>

	<b>2a / AUDITORIUM</b> Diagnostics and Monitoring	<b>2b / MIRABILIS I</b> PEM Electrolysis	<b>2c / MIRABILIS II</b> PEMFC Performance & Durability	<b>2d / GIARDINO</b> Microbial & Enzymatic Bioelectrochemical Systems
<b>16:00–16:20</b>	<b>EFC19099 / Wachel Pawel</b> Strategies For Health Monitoring And Diagnostics Of Commercial Solid Oxide Fuel Cell Systems Based on Real-Time Modelling	<b>EFC19051 / Aricò A. Salvatore</b> High performance pem electrolyser for power-to-gas applications - hpem2gas	<b>EFC19100 / Bisello Andrea</b> The effects of platinum oxide species on performance degradation in polymer electrolyte fuel cells	<b>EFC19178 / Dziegielowski Jakub</b> Design optimisation of soil microbial fuel cells for energy harvesting in remote areas
<b>16:20–16:40</b>	<b>EFC19229 / Polverino Pierpaolo</b> Development of a model-based algorithm for online degradation estimation of Solid Oxide Fuel Cells	<b>EFC19133 / Pantò Fabiola</b> High-pressure water electrolysis and corresponding safety issues: the role of platinum-based recombination catalyst	<b>EFC19070 / David Bernhard</b> Degradation Behavior of State of the Art PtCo Catalyst: An Ex- and In - Situ Analysis	<b>EFC19104 / Gonzalez Solino Carla</b> Non-invasive glucose/oxygen fuel cell for continuous monitoring of glucose
<b>16:40–17:00</b>	<b>EFC19228 / Gallo Marco</b> Advanced Model-Based aging estimation of Solid Oxide Fuel Cell stacks	<b>EFC19117 / Shirvanian Paige</b> Ultra-Low Loading Catalyst Layer Development for Anode Electrode in PEM Water Electrolyzer (PEMWE) Cells	<b>EFC19011 / Chisaka Mitsuharu</b> Enhancement of Oxygen Reduction Reaction Activity on Phosphor and Nitrogen Co-doped TiO <sub>2</sub> catalyst for Polymer Electrolyte Fuel Cell Cathodes	<b>EFC19226 / Buaki-Sogo Mireia</b> Enzymatic BIOelectrodes for BioSENSors and Biofuel CELLS - BIOSENSECELL
<b>17:00–17:20</b>	<b>EFC19093 / Oh Hwanyeong</b> Fault Diagnosis for Thermal Management System of a Residential Fuel Cell System		<b>EFC19125 / Rossetti Gabriele</b> Towards stable and low-PGM fuel cell cathode with Hierarchical Nanostructured Thin Film as non-carbon support	<b>EFC19240 / Ghanam Abdelghani</b> Copper-adapted biofilms for cu <sup>2+</sup> ions monitoring with microbial fuel cell based biosensors
<b>17:30–18:30</b>	<b>Cocktail &amp; Poster Session</b>			



December 10<sup>th</sup>

# Workshop H<sub>2</sub>Rail

Government and industry technology developers world-wide are realizing the potential for hydrogen rail applications and this workshop will help identify needed research to accelerate technology development and industry commercialization.

In collaboration with Department of Transportation's Federal Railroad Administration and as part of Department of Energy's H<sub>2</sub>@Scale Initiative, we welcome workshop participants and look forward to exploring opportunities for cooperation and collaboration on hydrogen rail areas of interest.

The objectives of this workshop are to:

- Assess the state of the art on electric rail power propulsion specifically using fuel cells.
- Discuss operational requirements and lessons learned on early fuel cell rail projects.

Understand current technology gaps and identify collaborative R&D topics.

**Location:** Hotel Royal Continental – Auditorium

**08:30** — **Registration**

**09:00** — Welcome and Scoping **Angelo MORENO**

President of H2IT – Italian Hydrogen and Fuel Cell Association and EFC19 Chairman

**09:30** — **Bart Biebuyck**

The use of Fuel Cells and Hydrogen in the Railway Environment: FCH JU' perspective

FCH2 JU – Fuel Cells and Hydrogen 2 Joint Undertaking, H2Train WS

**10:00** — **Michele Viale**

ALSTOM: last developments and future strategies, SoA in Europe (Germany, UK, France, Italy)

Presidente e Amministratore Delegato Italia&Svizzera Alstom Ferroviaria

**11:00** — **Coffee break**

**11:30** — **Giulia Costagli**

L'applicazione dell'idrogeno nel trasporto ferroviario: stato dell'arte e prospettive in Italia

RFI

## **POLITICAL PERSPECTIVE AND POLICY LANDSCAPE**

**12:00** — Round Table

**13:30** — **Lunch**

# December 10<sup>th</sup>

## Session .03

	3a / AUDITORIUM -	3b / MIRABILIS I -	3c / MIRABILIS II -	3d / GIARDINO Microbial & Enzymatic Bioelectrochemical Systems
9:00-9:20				<b>EFC19267</b> / Ieropoulos Ioannis An introduction to Microbial fuel cells for industrialized and emerging countries
9:20-9:40				<b>EFC19266</b> / Gorby Yuri <b>KEYNOTE LECTURE</b> Bacterial Direct Electron-transfer Mechanisms
9:40-10:00				<b>EFC19233</b> / Tucci Matteo Influence of environmental factors on mfc-based sensor for wastewater monitoring
10:00-10:20				<b>EFC19244</b> / Walter Xavier Alexis MFCs running low-power applications without any power-management circuitry
10:20-10:40				<b>EFC19138</b> / You Jiseon Different types of real household greywater and urine used in microbial fuel cell: power generation and treatment efficiency
14:00-11:00				<b>EFC19135</b> / Tremouli Asimina Performance assessment of MFC units fed with digestate

Workshop H<sub>2</sub> Rail

## Session .04

December 10<sup>th</sup>

	4a / AUDITORIUM -	4b / MIRABILIS I -	4c / MIRABILIS II -	4d / GIARDINO Microbial & Enzymatic Bioelectrochemical Systems
11:30-11:50				<b>EFC19147 / Flagiello Fabio</b> Assessing the bioelectricity production in Air-cathode MFCs using different organic substrates
11:50-12:10				<b>EFC19242 / Salar García M. José</b> Effect of pedot-pss modified anodes on the power output by urine-fed microbial fuel cells
12:10-12:30				<b>EFC19139 / Sisani Elena</b> Energy and environmental performances assessment of MFCs applied to the animal-waste slurry treatment
12:30-12:50				<b>EFC19256 / You Jiseon</b> Adaptive Dynamic Cell Reconfiguration of Microbial Fuel Cells for Power Stability
12:50-13:10				<b>EFC19241 / Franzetti Andrea</b> Functional characterisation of hydrocarbon degrading microbial communities in bioelectrochemical systems

Workshop H<sub>2</sub> Rail

# December 10<sup>th</sup>

## Session .05

	5a / AUDITORIUM SOFC Manufacturing	5b / MIRABILIS I Energy Storage and Hydrogen Production	5c / MIRABILIS II PEMFC Materials	5d / GIARDINO Microbial & Enzymatic Bioelectrochemical Systems
14:30-14:50	<b>EFC19196 / Nieto Emilio</b> Fabrication and characterization of a planar Solid Oxide Fuel Cell by tape casting and spraying techniques	<b>EFC19012 / Ancona M. Alessandra</b> Modelling and validation of a small-scale hybrid photovoltaic-battery-electrolyzer system	<b>EFC19054 / Paritosh K. Mohanta</b> Effects of catalyst support materials and ionomer amounts in the cathode catalyst layers on membrane electrode assembly performances at high current loads	<b>EFC19248 / Goryanin Igor</b> Long-term operation of a bio electrical systems treating distillery wastewater
14:50-15:10	<b>EFC19103 / Hornés Aitor</b> 3D Printing of Functional Ceramics for the Industrial Fabrication of Solid Oxide Fuel Cells (SOFCs)	<b>EFC19095 / De Lorenzo Giuseppe</b> Renewable hydrogen production through the integration of an soec stack with a solar parabolic collector	<b>EFC19048 / Mariani Marco</b> Enhancement of durability of microporous layers for PEM fuel cells based on graphene nanoplatelets.	<b>EFC19225 / Molognoni Daniele</b> Low-cost oxygen reduction cathodes for bioelectrochemical systems: application in microbial desalination cells
15:10-15:30	<b>EFC19121 / Litke Anton</b> Artificial neural networks for automatic detection and classification of functional defects in multilayered solid oxide membranes	<b>EFC19075 / Colbertaldo Paolo</b> Sizing of integrated solar photovoltaic and electrolysis systems for clean hydrogen production	<b>EFC19230 / Frédéric Fouda-onana</b> Impact of GDL modifications on the gas transport properties and PEMFC performances	<b>EFC19227 / Aliaguilla Martí</b> Low energy desalination in Microbial Desalination Cells using new ion exchange membranes
15:30-15:50	<b>EFC19190 / Sietmann Michael</b> Quality assurance of bipolar plates using X-Ray tomography	<b>EFC19001 / Nieto Gallego Emilio</b> Design and development of a hydrogen production system based on solid oxide electrolysis technology	<b>EFC19041 / Kartouzian Dena</b> Impact of Porosity Gradients within Catalyst Layer and MPL of a PEM Fuel Cell on the Water Management and Performance: A Neutron Radiography Investigation	

# Session .06

December 10<sup>th</sup>

	6a / AUDITORIUM Multiple-generation Systems	6b / MIRABILIS I Energy Storage and Hydrogen Use	6c / MIRABILIS II PEMFC Modelling	6d / GIARDINO Microbial & Enzymatic Bioelectrochemical Systems
16:00-16:20	<b>EFC19176 / Crema Luigi</b> CH2P: Cogeneration of Hydrogen and Power using solid oxide-based system fed by methane rich gas	<b>EFC19165 / Funez Guerra Carlos</b> Viability analysis of green methanol production plant in chile and subsequently transport to japan.	<b>EFC19184 / Kravos Andraž</b> Parameter sensitivity analysis of a thermodynamically consistent electrochemical PEMFC model for virtual observers	<b>EFC19208 / Nastro Rosa Anna</b> Re-directing microbial metabolism: bioelectrochemical systems improve CO2 assimilation in Clostridium spp. and Cupriavidus necator
16:20-16:40	<b>EFC19223 / Kang Yoon Seung</b> Modeling and analysis of complex multi-hub PAFC system for heat,power and hydrogen generation	<b>EFC19140 / Monforti F. Andrea</b> A techno-economic analysis of on-grid solar hydrogen production by electrolysis in the North of Chile and the case of exportation from Atacama Desert to Japan.	<b>EFC19212 / Charbonne Chloé</b> Comparative Study by Design of Experiments of linear and nonlinear constitutive models and geometric parameters effects on PEMFC performances	<b>EFC19160 / Arena Federica</b> Bioelectrochemical TiN/FDH Catalyst for CO2 Reduction to HCOOH
16:40-17:00	<b>EFC19086 / Bloom Robert</b> The economics of hydrogen for residential heating: An assessment of how hydrogen and fuel cell systems fare compared to other low-carbon options across Europe	<b>EFC19043 / Crespi Elena</b> Supply of solar electricity to uninterruptible loads via seasonal storage with Power-to-Power systems	<b>EFC19252 / Imen Elferjani</b> Modelling polymer electrolyte membrane degradation: from bipolar plates to membrane...	<b>EFC19243 / Squadrito Gaetano</b> Testing electro-stimulation of thermotoga neapolitana metabolism
17:00-17:20	<b>EFC19216 / Baldinelli Arianna</b> MicroCHP in rural areas: market opportunities for Solid Oxide Fuel Cells	<b>EFC19206 / Carcasi Giuseppe</b> Use of hydrogen trains on non-electrified railway sections: assessment of costs and emissions and comparison with alternatives.	<b>EFC19019 / Andersson Martin</b> System Level Modelling and Simulation of Transient Behavior for Polymer Electrolyte Fuel Cells	
17:20-17:40		<b>EFC19263 / Di Giorgio Paolo</b> Hybrid energy storage system for a plug-in fuel cell electric scooter	<b>EFC19264 / Di Trolio Pasquale</b> Fully integrated power system for lightweight plug-in fuel cell electric vehicles	
17:40-18:40	<b>Cocktail &amp; Poster Session</b>			

## Session .07

	<b>7a / AUDITORIUM</b> Solid Oxide Cells	<b>7b / MIRABILIS I</b> Hydrogen Storage and Distribution	<b>7c / MIRABILIS II</b> Hydrogen Refuelling	<b>7d / GIARDINO</b> PEMFC Membrane & Catalyst
<b>9:00–9:20</b>	<b>KEYNOTE LECTURE</b>	<b>KEYNOTE LECTURE</b>	<b>KEYNOTE LECTURE</b>	<b>EFC19182 / Robert Mylène</b> Conjoint effects of chemical and mechanical stress on fuel cell PFSA membranes
<b>9:20–9:40</b>	<b>EFC19204 / Zhou Xiao-dong</b> Solid Oxide Cells for Energy Conversion and Storage: Challenges and Opportunities	<b>EFC19259 / Baricco Marcello</b> Challenges for Hydrogen Storage and Handling	<b>EFC19262 / Crema Luigi</b> Development of hydrogen refuelling stations in europe	<b>EFC19010 / Basso P. Andrea</b> Graphene oxide-based composite membranes as novel electrolytes for PEM fuel cells
<b>9:40–10:00</b>	<b>EFC19058 / Eguchi Koichi</b> Degradation Factors of Cathode during Operation of Solid Oxide Fuel Cells	<b>EFC19066 / Genovese Matteo</b> Technical-Economic Analysis of Hydrogen Green Production and Storage for three Calabrian sites (Italy)	<b>EFC19142 / Di Micco Simona</b> From biogas to bio-hydrogen for refueling stations: analysis on the plant availability and economic evaluations	<b>EFC19044 / Gagliardi G. Guglielmo</b> Optimization of operating parameters on the direct methanol fuel cell using Nafion-graphene oxide multilayer membrane
<b>10:00–10:20</b>	<b>EFC19022 / Vladikova Daria</b> Impedance Studies of Ex-Situ Artificially Aged Ni-YSZ Anode for Accelerated Stress Tests	<b>EFC19156 / Testi Matteo</b> HyCARE: Hydrogen CArrier for Renewable Energy storage	<b>EFC19136 / Stamatakis Emmanuel</b> Integration of Metal Hydride Hydrogen Compressors (MHC) in Hydrogen Refueling Stations (HRS): Benchmarking & Market deployment aspects	<b>EFC19238 / Mohseninia Arezou</b> Tailored Catalyst Layer and Micro-Porous Layer Porosity and the Effect on the Performance and Water Content in PEMFC
<b>10:20–10:40</b>	<b>EFC19168 / Mugikura Yoshihiro</b> Performance analysis of SOFC stacks under severe operating conditions	<b>EFC19234 / Tchorek Grzegorz</b> Different Modes of the Hydrogen Value Chain – how far from LNG to liquid H <sub>2</sub>	<b>EFC19164 / Funez Guerra Carlos</b> Viability analysis of trains hydrogen refueling stations using electrolyzers.	<b>EFC19014 / Stoilova Anamarija</b> Estimating temperature in the catalyst layer of the PEM fuel cell
<b>10:40–11:00</b>	<b>Coffee Break</b>			

# Session .08

December 11<sup>th</sup>

	8a / AUDITORIUM Bio-fuelled SOFC	8b / MIRABILIS I High-temperature Corrosion & Catalysis	8c / MIRABILIS II Automotive Applications	8d / GIARDINO Stack Design
11:00–11:20	<b>EFC19005 / Ferrero Domenico</b> CFD model for tubular SOFC cells fed directly by biomass – a complete integrated system	<b>EFC19127 / Coquoz Pierre</b> Influence of spinel protective coating on Crofer interconnects conductivity	<b>EFC19083 / Grimaldi Amedeo</b> Simulation, analysis and control of Fuel Cell Electric Vehicle	<b>EFC19194 / Linhart Andreas</b> Overview of the developments and results of the Design2Service project
11:20–11:40	<b>EFC19157 / Bocci Enrico</b> First results of the H2020-LC-SC3-RES-11 BLAZE project: Biomass Low cost Advanced Zero Emission small-to-medium scale integrated gasifier fuel cell combined heat and power plant	<b>EFC19115 / Frangini Stefano</b> Dual atmosphere corrosion of coated and uncoated aisi 441 and crofer 22 apu ferritic stainless steels under solid oxide electrolysis conditions	<b>EFC19092 / Montaner Ríos Gema</b> Efficient thermal management strategies for cold start of automotive pemfc systems	<b>EFC19116 / Ivanova Mariya E.</b> ProtOMem Project: Achievements and challenges on the way to industrially relevant planar cell design
11:40–12:00	<b>EFC19003 / Beneito Ruben</b> Integration of a Solid Oxide Fuel Cell for the sustainable power generation from wastes in a winery industry	<b>EFC19055 / Martino Marco</b> Chemical conversion coating technique in the preparation of structured catalysts for the CO–Water Gas Shift reaction	<b>EFC19004 / Misz Ulrich</b> Development of standardized test methods for in-situ validation of system materials for the use in automotive fuel cell systems	<b>EFC19088 / Loreti Gabriele</b> Automotive derivative energy system: modelling driven pemfc chp prototype development
12:00–12:20	<b>EFC19084 / Gandiglio Marta</b> Solid oxide fuel cells as best practice for combined heat and power generation from biogas	<b>EFC19141 / Sanna Caterina</b> LSCF/GDC co-electrospun nanofiber cathodes for application in IT-SOFCs.	<b>EFC19108 / Barelli Linda</b> Definition of efficient and extended-lifetime-oriented power management for transportation fuel cell auxiliary power unit	<b>EFC19213 / Jung Chiyong</b> An ultra-light-weight polymer electrolyte fuel cell based on 0.1 mm thick carbon fiber bipolar plate



## Session .09

	9a / AUDITORIUM Enabling the Energy Transition	9b / MIRABILIS I Symmetrical SOC	9c / MIRABILIS II PEMFC Bipolar Plates	9d / GIARDINO Redox Flow Batteries
12:30-12:50	<b>EFC19087</b> / Ashurst Steven Fuel cell micro-CHP: European market status and future outlook	<b>EFC19181</b> / Andersson Martin Simulation of a novel anode supported double-sided SOFC	<b>EFC19033</b> / Novalin Timon Investigating iron release rate from metallic bipolar plates in proton exchange membrane fuel cells	<b>EFC19085</b> / Messaggi Mirko Experimental and numerical study of performance heterogeneities in a vanadium redox flow battery
12:50-13:10	<b>EFC19028</b> / Akabane Shunnosuke High electrical efficient SOFC generator for pure hydrogen with a multi-stage SOFC and regeneration systems	<b>EFC19074</b> / Felli Andrea Synthesis and Characterization of Ni-doped Double Perovskite Sr <sub>2</sub> FeNi <sub>0.4</sub> Mo <sub>0.6</sub> O <sub>6-δ</sub> as electrode for Symmetrical Solid Oxide Cell	<b>EFC19020</b> / Brendan Huitorel Towards composite bipolar plates made by injection molding for PEMFC application: formulation, compounding and physical properties	<b>EFC19091</b> / Cecchetti Marco Exploiting through-plate reference hydrogen electrode to study cross-contamination and performance in Vanadium Redox Flow Battery.
13:10-13:30	<b>EFC19090</b> / Crespi Elena Grasshopper project: grid assisting modular hydrogen pem power plant	<b>EFC19040</b> / Wierzbicki Michał CO assisted electrolysis of H <sub>2</sub> O in quasi-symmetrical Ni-YSZ/YSZ/Ni-YSZ cell	<b>EFC19186</b> / Roncaglia Fabrizio Investigation of molding parameters on graphite/epoxy composite-based Bipolar plates	<b>EFC19218</b> / Chinannai M. Faizan Analysis of performance improvement of hydrogen/bromine flow batteries by using bromate electrolyte
13:30-14:30	<b>Lunch</b>			

# Session .10

December 11<sup>th</sup>

	<b>10a / AUDITORIUM</b> Alternative Fuelling	<b>10b / MIRABILIS I</b> Molten Electrolytes	<b>10c / MIRABILIS II</b> Next-generation Concepts I	<b>10d / GIARDINO</b> PEMFC Transient Operation
<b>14:30–14:50</b>	<b>EFC19214 / Cinti Giovanni</b> Ammonia as a fuel in sofc: technology study and system design	<b>EFC19200 / Michel Cassir</b> Interface reactivity of oriented or polycrystalline ALD-processed ultra thin layers for single or hybrid high temperature fuel cells	<b>EFC19195 / Daletou Maria</b> Development of core components for high temperature pem fuel cells	<b>EFC19101 / Colombo Elena</b> Local degradation study of pemfc during start-up and shut-down cycling
<b>14:50–15:10</b>	<b>EFC19231 / Alemu Molla Asmare</b> Numerical Investigation of a Direct Ammonia Tubular Solid Oxide Fuel Cell in Comparison with Hydrogen using Different Supports	<b>EFC19002 / Milewski Jaroslaw</b> Theoretical investigation of using molten nitrates as electrolytes for fuel cells	<b>EFC19120 / Bozic Mojca</b> Enzymatic cross-linked chitosan-based anion exchange membranes	<b>EFC19221 / Ivanova Mariya E.</b> A transient, two-phase model of pem fuel cell – performance analysis under coolant flow variation
<b>15:10–15:30</b>	<b>EFC19067 / Audasso Emilio</b> Detailed modelling of Internal Reforming Fuel Cells for process analysis and optimisation.	<b>EFC19062 / Bove Dario</b> Simulation of Molten Carbonate Fuel Cells under dual-anion working conditions in carbon capture applications	<b>EFC19081 / Renda Simona</b> Study of the effect of Ru precursor in Ru-Ni/CeO <sub>2</sub> -ZrO <sub>2</sub> catalysts for CO <sub>2</sub> methanation	<b>EFC19018 / Chiche Ariel</b> Estimating the H <sub>2</sub> purge time for a PEM fuel cell working in dead-end mode in a closed environment
<b>15:30–15:50</b>	<b>EFC19008 / Samsun Remzi Can</b> Compact and robust diesel fuel processing systems with quick-start capability for 5–10 kW fuel cell systems	<b>EFC19193 / Cooper Ross</b> A feasibility assessment of a retrofit molten carbonate fuel cell coal-fired plant for flue gas CO <sub>2</sub> segregation	<b>EFC19047 / Marra Eva</b> Evaluating thin-film model electrodes for AEMFC	<b>EFC19183 / Vaze Mahesh</b> Pressure Gradient Method to Resolve Water Flooding in PEMFC

## Session .11

	11a / AUDITORIUM Enabling the Energy Transition	11b / MIRABILIS I Symmetrical SOC	11c / MIRABILIS II PEMFC Bipolar Plates	- -
16:00-16:20	<b>EFC19189 / Cavana Marco</b> Assessment of the hydrogen receiving potential of a distribution gas network using a multi-component and transient gas network model.	<b>EFC19143 / Lamberti Thomas</b> Recovery procedure for 30kw PEM fuel cell stacks	<b>EFC19162 / Giacoppo Giosue</b> Design and implementation of a new concept of photoelectrochemical cell for solar water splitting	
16:20-16:40	<b>EFC19185 / Bargiacchi Eleonora</b> Life Cycle Assessment of synthetic natural gas production from different CO2 point sources: a Cradle-to-Gate study	<b>EFC19021 / Gorelkov Stanislav</b> Effect of the cyclic frost exposure on the performance of PEM fuel cells	<b>EFC19197 / Bermúdez A. M. Catalina</b> Development and Investigation of a tubular HT-PEM-Fuel cell with 3D-printed anode GDL	
16:40-17:00	<b>EFC19171 / Blagoeva Darina</b> Fuel cells and hydrogen technologies: critical materials and supply chain	<b>EFC19037 / Crespi Elena</b> Comparison of humidification systems for flexible stationary PEMFC power systems	<b>EFC19039 / Quaglio Marzia</b> Integration of portable Sedimentary Microbial Fuel Cells in Autonomous Underwater Vehicles	
17:00-17:20	<b>EFC19207 / Perfetto Giuseppe</b> Energy transition by means of "bottom-up" approach: pyrosludg_ en for sustainability and local development			



# EUROPEAN FUEL CELL

CONFERENCE & EXHIBITION

NAPLES Hotel Royal Continental

9 > 11 December, 2019

## Side Event



ATENA  
FUTURE TECHNOLOGY



Agencia nazionale per le nuove tecnologie,  
l'energia e lo sviluppo economico sostenibile



UNIVERSITÀ  
DEGLI STUDI  
DI NAPOLI  
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UNIVERSITÀ  
DEGLI STUDI  
DI PERUGIA

December **11<sup>th</sup>**

# Manufacturing success: cost down and quality up

Manufacturing is a key enabler in building up a sound European technology base for the energy transition, and multiple scientific fields are challenged in transferring concept to mass product. This workshop will cultivate common approaches through collaboration between two FCH-JU funded projects (qSOFC and Cell3Ditor), the EERA Joint Programmes for Nuclear Materials and FCH, and the SPIRE Association, to assess the manufacturing processes of tomorrow for high-temperature materials. It will provide a platform where scientists, entrepreneurs, industry and policy makers can discuss advances and performance criteria as well as break-through approaches in high-temperature material manufacturing, inspection and quality assurance. Solid oxide cells (SOC) cover a vast number of potential applications in diverse fields: building heat and power, power generation, energy storage and transportation. Industrial manufacturing of SOC systems is a reality, but volumes are still low and costs are high: manual labour within the fabrication process, multiple sintering steps and high scrap rates.

**qSOFC** pursues mass-manufacturing by automatization of state-of-art processes and automated in-line inspection methodologies for improving the reliability of stack fabrication. **Cell3Ditor** proposes a multi-material 3D printing technology that is a disruptive innovation of the SOFC stack manufacturing paradigm.

**Location:** Hotel Royal Continental – Auditorium



10:30–11:00

## Coffee and registration

### Introduction

11:00–11:10

**Stephen McPhail (ENEA, qSOFC)**

Setting the scene and workshop scope

11:10–11:25

**Dionisis Tsimis (FCH JU)**

The FCH JU Portfolio on fuel cell manufacturing

11:25–11:35

**Pietro Gimondi (A.SPIRE)**

SPIRE: the association

### Scaling up: How to handle millions

11:35–11:50

**Pietro Gimondi (A.SPIRE)**

Success stories going to TRL9

11:50–12:05

**Jens Forker (MüKo Maschinenbau)**

Approaches to automation

12:05–12:20

**Elisabeth Reitz (Elring Klinger)**

Mobility as a success story

12:20–12:35

**Carlos Bernuy-López (Sandvik)**

Roll-to-roll steel metal

12:35–12:50

**Anton Litke (HaikuTech)**

In-line visual inspection

13:00–14:15

### Lunch

## Manufacturing energy materials: New frontiers

14:15–14:30

**Markus Rautanen (VTT, qSOFC)**

qSOFC – quality assurance in SOFC manufacturing

14:30–14:45

**Albert Tarancón (IREC, Cel3Ditor)**

Cel3Ditor – 3D printing of Solid Oxide Cells

14:45–15:00

**Alejandro Revuelta (EERA JP NM)**

EERA JP Nuclear Materials:  
additive manufacturing of steel

15:00–15:15

**Nerea Ordas (EERA JP NM)**

Additive Manufacturing for Nuclear Fusion Energy

15:15–15:30

**Monica Ferraris (Politecnico Torino)**

Joining metals and ceramics

15:30–16:00

### Coffee break

### Key challenges and steps forward

16:00–16:15

**Matti Noponen (Elcogen)**

Scaling up SOC manufacturing

16:15–16:30

**Dario Montinaro (SolidPower)**

Industrial-scale SOFC manufacturing

16:30–16:45

**Miguel A. Laguna Bercero (ICMA-CSIC)**

Development of advanced microtubular  
Solid Oxide Cells

16:45–17:30

### Panel and audience discuss the following topics:

Common manufacturing challenges for high-temperature materials  
Manufacturing now to reach millions tomorrow  
Opportunities for funding and joint development

# Organizers



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**Moreno**

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**McPhail**

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**FUEL CELLS AND HYDROGEN**  
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## **FCH JU – Fuel Cells and Hydrogen Joint Undertaking**

The Fuel Cells and Hydrogen Joint Undertaking (FCH JU) is a unique public private partnership supporting research, technological development and demonstration (RTD) activities in fuel cell and hydrogen energy technologies in Europe. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-clean energy system. Fuel cells, as an efficient conversion technology, and hydrogen, as a clean energy carrier, have a great potential to help fight carbon dioxide emissions, to reduce dependence on hydrocarbons and to contribute to economic growth. The objective of the FCH JU is to bring these benefits to Europeans through a concentrated effort from all sectors. The three members of the FCH JU are the European Commission, fuel cell and hydrogen industries represented by Hydrogen Europe and the research community represented by Hydrogen Europe Research.

For more info, please consult : [fch.europa.eu](http://fch.europa.eu)



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ITAE develops and promotes innovative energy technologies able to conjugate the deep knowledge on electrochemical, catalytic and adsorption processes with the ability to design materials, components and energy systems. The energy technologies based on renewable sources play a central role in the novel energy system scenario, in which the distributed generation will be supported by actions towards the improvement of energy efficiency, also exploiting synergies with the information and telecommunication technologies (ITC). The novel ITAE research topics are part of this new framework, which includes current needs for a sustainable development. Accordingly, the “Energetic Sustainability” represents the common target of all the different research areas of the institute: **1.** Technologies for storage and conversion of renewable thermal energy **2.** Sustainable technologies for production and storage of electrical energy **3.** Technologies for hydrogen production and storage, eco-friendly energy vectors and CO2 recycling **4.** Integrated systems and technologies application for energy efficiency – Smart Energy Technologies **5.** Socio-economic and environmental impact of energy technologies.



### **HySchool – Hydrogen teaching resources made for teachers, by teachers**

The Hydrogen In Schools (HySchools) project is an Erasmus+ project that aims to deliver hydrogen education in schools. Educational and online resources have been created for use in secondary schools across the European partner countries, aimed at providing teachers with increased confidence to teach students about Hydrogen Fuel Cell Technology (HFCT).

HySchools aims to help schools enhance the quality of HFCT teaching to equip students with the future skills required by this growing sector.

For more info, please consult : [hyschools.eu](https://hyschools.eu)

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