# Final Session Schedule
# **European Fuel Cell Forum 2009**
29 June to 2 July 2009, Lucerne / Switzerland

## A-Series

### Tuesday, June 30

**09:00 – 10:30 AB01 Opening Session**
**11:00 – 12:30 AB02 PEMFC Applications**
**14:00 – 15:30 A03 Fuel Cell Applications**
**16:00 – 17:30 A04 Fuel Cell Program Overviews**

### Wednesday, July 1

**09:00 – 10:30 A05 PEMFC: Cells and Components – 1**
**11:00 – 12:30 A06 PEMFC: Cells and Components – 2**
**14:00 – 15:30 A07 PEMFC: Cells and Components – 3**
**16:00 – 18:00 AB08 Posters & Exhibition**

### Thursday, July 2

**09:00 – 10:30 A09 PEMFC Control Strategies, Modelling and Characterization – 1**
**11:00 – 12:30 A10 PEMFC Control Strategies, Modelling and Characterization – 2**
**14:00 – 15:30 A11 Protionics**
**16:00 – 17:00 AB12 Closing Ceremony**

## B-Series

### Tuesday, June 30

**14:00 – 15:30 B03 HT Fuel Cell Systems and Balance of Plant – 1**
**16:00 – 17:30 B04 HT Fuel Cell Systems and Balance of Plant – 2**

### Wednesday, July 1

**09:00 – 10:30 B05 SOFC: Cells and Components - 1**
**11:00 – 12:30 B06 SOFC: Cells and Components - 2**
**14:00 – 15:30 B07 SOFC: Cells and Components - 3**
**16:00 – 18:00 AB08 Posters & Exhibition**

### Thursday, July 2

**09:00 – 10:30 B09 Hydrogen and Reforming – 1**
**11:00 – 12:30 B10 Hydrogen and Reforming – 2**
**14:00 – 15:30 B11 Fuel Cells for Direct Fuel Conversion**

# Oral Program of the EUROPEAN FUEL CELL FORUM 2009

# Lecture Series A

## Tuesday, June 30

**09:00 – 10:30**

## AB01 Opening Session

### Welcome by the Organizer
**Ulf Bossel,** European Fuel Cell Forum, Oberrohrdorf / Switzerland

### Welcome by the Chairman
**Frank de Bruijn,** ECN, Petten / The Netherlands

### Welcome to Switzerland
**(to be announced)**

### Welcome to Lucerne
**(to be announced)**

### The German Hydrogen and Fuel Cell Program
**Klaus Bonhoff**, Managing Director (Chair)
National Organization Hydrogen and Fuel Cell Technologies, Berlin / Germany

**11:00 – 12:30**

## AB02 Fuel Cell Applications

### Review of International Status on Future Priorities for Fuel Cells
**John N. Loughhead**, Co-chair of the IPHE Implementation and Liaison Committee
**UK Energy Research Centre, London / United Kingdom**

### Perspective on Fuel Cells for Stationary Applications
**Jonathan Lewis**, Chairman
Joint Technology Initiative (JTI) for Stationary Applications
Rolls-Royce Fuel Cell Systems Ltd., Loughborough / United Kingdom

### HotModule - the Proven Carbonate Fuel Cell Solution for Cogeneration
**Michael Bode,** Director
MTU Onsite GmbH, Munich / Germany

**14:00 – 15:30**

# A03 PEMFC Applications

## Micro CHP Application: Fuel Cells in Competition with Gas Engines

**Jörg Heinen,** Martin Kramer
RWE Energy AG, Dortmund / Germany

## Demonstration of Micro CHP Based on Danish Fuel Cells

(Phase 1+ first part of Phase 2)
**Aksel Hauge Pedersen,** Per Balslev (Danfoss A/S)
DONG Energy A/S, Gentofte / Denmark

## High Power PEMFC Backup Power Systems Operating on Pure Hydrogen and Oxygen

**Serge Besse,** Valery Chaudron, Thierry Geneston, Thomas Nietsch
Helion, Aix-en-Provence / France

## Nedstack PEM Fuel Cell Development: Products and Applications

**J. P. van der Meer**
NedStack Fuel Cell Technology BV, Arnhem / The Netherlands

## Pios Fuel Cell Motorcycle, Endurance Test of Polymer Electrolyte Fuel Cell Drive

**Jörg Dieter Weigl,** Inayati Inayati, Hamdani Saidi
Universiti Teknoknologi Malaysia, Kuala Lumpur / Malaysia

**16:00 – 17:30**

# A04 Fuel Cell Program Overviews

## The Department of Energy's Fuel Cell Subprogram

**Kevin McMurphy,** Nancy Garland (U.S. Department of Energy, Washington DC)
SENTECH, Inc., Bethesda, MD / USA

## Review of Fuel Cell & Hydrogen Strategies in Developing Countries

**Nicolas Lymberopoulos**, Associate Director
United Nations Industrial Development Organization (UNIDO)
International Centre for Hydrogen Energy Technologies (ICHET)
Istanbul / Turkey

## Danish Partnership for Hydrogen and Fuel Cells

**Aksel Mortensgaard**, Program Director
c/o Danish Energy Industries Federation, Copenhagen / Denmark

# Wednesday, July 1

**09:00 – 10:30**

## A05 PEMFC: Cells and Components - 1

### Challenges and Advances in MEA Durability and Manufacturability

**Petern Gray**
Johnson Matthey Fuel Cells Ltd, Swindon, / United Kingdom

### Low-Cost, Durable PVDF-Based Fuel Cell Membranes

**James T. Goldbach,** David Mountz, Wensheng He, Michel Foure
Arkema Inc., King of Prussia, PA / USA

### Experimental Investigation of the Local Membrane Permeation Characteristics in PEFC

**Gabriel A. Schuler,** A. Wokaun, F.N. Büchi
Paul Scherrer Institut, Villigen / Switzerland

### Poly (2,5-benzimidazole)/$ZrO_2$ Composite Membrane for High-Temperature Proton Exchange Membrane Fuel Cell

**Haitao Zheng,** Sibbele Hietkamp, Mkhulu Mathe
Council for Scientific and Industrial Research, Pretoria / South Africa

### Insights into the Local Degradation of Chemically Aged Radiation Grafted Membranes

**Mini Mol Menamparambath,** Alexander Wokaun, Günther G. Scherer, Lorenz Gubler
Paul Scherrer Institut, Villigen / Switzerland

**11:00 – 12:30**

## A06 PEMFC: Cells and Components - 2

### Analysing Electrolyte Loss Patterns while Operating HT PEMFCs Containing $H_3PO_4$-Based Electrolytes

**George Bandlamudi,** Peter Beckhaus, Jens Burfeind, Angelika Heinzel
University of Duisburg-Essen, Duisburg / Germany

### Characterization of PBI-Based PEMFC Electrodes Prepared by Magnetron Sputtering Technique

**Syed Talat Ali**, Per Møller, Lars Pleth Nielsen, Qingfend Li
Technical University of Denmark, Lyngby / Denmark

## Ultra Low Pt Anodes for Polymer Electrolyte Fuel Cells

**Bernhard Schwanitz,** H. Schulenburg, A. Wokaun, G. G. Scherer
Paul Scherrer Institut, Villigen / Switzerland

## Oxygen Reduction Kinetics of Electrodeposited PtCo Catalyst for PEMFC: Stability as Function of PtCo Composition

**Kaushik Jayasayee,** Frank de Bruijn
TU Eindhoven, Eindhoven / The Netherlands

## New Anode Material for Hydrogen PEM Fuel Cell: Pt - Cerium Oxide Composite Thin Films Deposited on DWCNT

**Vladimir Matolin,** Michal Vaclavu, Roman Fiala
Charles University in Prague. Prague / Czech Republic

**14:00 – 15:30**

# A07 PEMFC: Cells and Components - 3

## Temperature-Dependence of CO Desorption Kinetics from PtRu/C PEM Fuel Cell Anodes

**Aurelien Pitois,** Jon C. Davies, Alberto Pilenga, Georgios Tsotridis
EC Directorate-General Joint Research Centre, Petten / The Netherlands

## Water Management in PEM Fuel Cells, a GDL Structural Approach

**Peter M. Wilde,** Rüdiger-Bernd Schweiss, Tanja Damjanovic,
**Stanley G. Foster,** Nico Haak
SGL Technologies GmbH, Meitingen / Germany

## Study of the Mechanical Interactions Between the Gas Diffusion Layer and the Flow Field Structure in Polymer Electrolyte in Fuel Cells (PEFCs)

**Torsten Knöri,** Mathias Schulze
German Aerospace Center (DLR), Stuttgart / Germany

## Miniaturized Polymer Electrolyte Fuel Cell without Gas Diffusion Layer

**Bernhard C. Seyfang,** Pierre Boillat, Günther G. Scherer, Alexander Wokaun
Paul Scherrer Institut, Villigen / Switzerland

## Promising Metal Separator Plate Materials and Coatings for PEM Fuel Cells

**Anke Marja Berends,** Jacques H.O.J. Wijenberg, Robert C. Makkus (1), Hans H. van der Weijde
Corus Research, Ijmuiden / The Netherlands; (1) ECN, Petten / The Netherlands

**16:00 – 18:00**

## AB08 Posters & Exhibition

# Thursday, July 2

**09:00 – 10:30**

## A09 PEMFC Control Strategies, Modelling and Characterization - 1

### Investigation of Li-Battery and Fuel Cell Aging in a Fuel Cell Hybrid Car Model

**Frieder Herb** (Daimler AG), Andreas Jossen (ZSW), Martin Wöhr
Daimler AG, Kirchheim-Teck / Germany

### The Hydrogen Subsystem and Its Influence on the Characteristics of the Fuel Cell Powertrain

**Torsten Schwarz,** Thomas Turek, Ulrich Kunz, Sven Schmitz
Fraunhofer ICT c/o Volkswagen AG, Isenbüttel / Germany

### The Impact of Off-Spec Conditions on the Performance of a PEM Fuel Cell

**Robert C. Makkus**
ECN, Petten / The Netherlands

### Effects on Performance and Durability on PEMFC During Oxygen Starvation by Measuring and Modelling the Current Distribution Along the Cell

**Mathias Gerard,** Jean-Philippe Poirot-Crouvezier, Alain Memonteil, Bruno Bador
Commissariat à l'Energie Atomique (CEA), Greneoble / France

**11:00 – 12:30**

## A10 PEMFC Control Strategies, Modelling and Characterization - 2

### Modelling the Effect of Liquid Water Transport on PEM Fuel Cell Performance

**Heinz Wilkening,** Damien Veyret
EC Directorate-General Joint Research Centre, Petten / The Netherlands

## Development and Validation of a Dynamic Model for PEFC

**Maurizio Zaglio,** Felix Büchi, John Mantzaras, Alexander Wokaun
Paul Scherrer Institute, Villigen / Switzerland

## Experimental Dynamic Performance of a 30kW 90Cell PEFC Stack under Transportation Load Cycle Constraints

**Alexandre De Bernardinis,** Fabien Harel, Laurent Girardot, Denis Candusso, Daniel Hissel
INRETS, ARCUEIL / FRANCE

## Theoretical and Experimental Validation of Heat Management in PEM Fuel Cell Stacks

**Mardit Matian,** Nigel Brandon, Andrew Marquis. Dan Brett
Imperial College, London / United Kingdom

## Development of a High Voltage Impedance Spectrometer for the Characterization and Diagnosis of Large PEFC Stacks

**Sébastien Wasterlain,** Fabien Harel, Denis Candusso, Daniel Hissel
FEMTO-ST / FC LAB., Belfort / France

**14:00 – 15:30**

# A11 Protonics

## Protonics for Fuel Cells

**Truls Norby,** Anna Magrasó, Marie-Laure Fontaine
University of Oslo and SINTEF, Oslo / Norway

## PCFC Based on a New Electrolyte Material $Ba_2(In_{0.8}Ti_{0.2})_2O_{5.2-n}(OH)_{2n}$

**Eric Quarez,** Samuel Noirault, Mathieu Marrony, Olivier Joubert
Institut des Matériaux Jean Rouxel, Nantes / France

## Proton Conductivity of Nanocrystalline Undoped and Ce-Doped $Ba_2In_2O_5$ Ceramics for Use in Intermediate Temperature Ceramic Proton Exchange Fuel Cells

**Jasna Jankovic,** David P. Wilkinson, Rob Hui
University of British Columbia, Vancouver / Canada

## Development of Novel High Temperature Proton Conducting Fuel Cells

**Yngve Larring,** Marie-Laure Fontaine, Sen Mei, Rune Bredesen
SINTEF, Oslo / Norway

### The Properties and Chemical Stability of $BaCe_{(1-x)}M_xO_{(3-б)}$ and $SrCe_{(1-x)}M_xO_{(3-б)}$ Protonic Conductors

**Kazimierz Przybylski,** Pawel Pasierb, Janusz Prazuch, Tomasz Brylewski
AGH University of Science and Technology, Krakow / Poland

**16:00 – 17:00**

## AB12 Closing Ceremony

# B-Series

## Tuesday, June 30

**14:00 – 15:30**

## B03 HT Fuel Cell Systems and Balance of Plant - 1

### Experimental Study on Effects of Anode Recirculation to Pre-Reforming of Natural Gas

**Anna Katariina Nummela,** Matti Mauno, Johannes Noponen
Wärtsilä Fuel Cells, Espoo / Finland

### Preliminary Operational Results of a SOFC-Based Micro-CHP System within the Framework of the EU Project FlameSOFC

**Oliver Posdziech,** Stefan Voss, Stefan Kluge, Dimosthenis Trimis
EBZ GmbH, Dresden/ Germany

### Thermal Use of SOFC Exhaust Gases: Practical Experiences with Non-Catalytic Systems

**Jörg vom Schloss,** A. Bauschulte, K. Lucka, H. Koehne
Oel-Waerme-Institut , Herzogenrath / Germany

### Comparison Between One-Variable and Multivariable Closed-Loop Control in a SOFC System Simulation

**Torben Kuester,** Hans-Peter Beck, Hanno Stagge
University of Clausthal-Zellerfeld, Clausthal-Zellerfeld / Germany

### Grey-Box Modeling of SOFC Unit for Design, Control and Diagnostics Applications

**Marco Sorrentino,** Cesare Pianese
University of Salerno, Fisciano / Italy

### Solid Oxide Fuel Cell and Gas Turbine Hybrid Systems for Transportation

**Marco A. B. Santin,** Loredana Magistri
University of Genoa, Genoa / Italy

**16:00 – 17:30**

## B04 HT Fuel Cells Systems & Balance of Plant - 2

### Maintenance and Restart of the 100 kW Siemens SOFC Generator CHP100

**Gianmichele Orsello,** Gianni Disegna, Ferrante De Benedictis
TurboCare SpA, Torino / Italy

### Parallel Connection of Single Solid Oxide Fuel Cells to Increase Availability

**Hanno Stagge,** Ralf Benger, Lars Dörrer, Hans-Peter Beck
TU Clausthal, Clausthal-Zellerfeld / Germany

### Network Design Optimization of Novel Fuel Cell Systems and Distributed Energy Devices

**Whitney Colella,** Aerel Rankin, Melahn Parker
Sandia National Laboratories, Albuquerque, NM / USA

### Performance Evaluation of Catalytic Combustor for SOFC Power Generation System under Transient Load Follow-Up

**Sangseok Yu,** Dongjin Hong, Youngduk Lee, Kookyoung Ahn
Korea Institute of Machinery and Materials, Daejon / Republic of Korea

### Transient Model Validation of a Desulphuriser System

**Andrea Ferretti,** Alberto Traverso, Gary J. Saunders
Università degli Studi di Genova, Genova / Italia

### Performance of a 5 kW SOFC Stack Fed with a Mixture of Methane and Water-Diluted Ethanol

**Massimo Santarelli,** Ferrante De Benedictis, Francesco Delloro, Marcello Gariglio
Politecnico di Torino, Turin / Italy

# Wednesday, July 1

**09:00 – 10:30**

## B05 SOFC: Cells and Components - 1

### Sulfur and Carbon Resistance of Ni-GDC and Ni-YSZ Anode

**Jan Pieter Ouweltjes,** Frans van Berkel, Bert Rietveld
ECN, Petten, The Netherlands

## Experimental Study Assessment of Mitigation of Carbon Formation on Ni/YSZ and Ni/CGO SOFC Anodes Operating on Biomass Gasification Syngas and Tars

**Joshua Mermelstein,** Nigel Brandon, Marcos Millan
Imperial College, London / United Kingdom

## Influence of Tars on the Maximum Hydrogen Utilization in SOFCs with Biogeneous Gases

**Martin Hauth,** Nadine Frank, Jürgen Karl
Graz University of Technology, Graz / Austria

## Innovative Catalysis for Sulfur-Tolerant SOFC Anodes

**Ravindranathan Thampi,** Augustin J. McEvoy
EPFL, Lausanne / Switzerland

## Impedance Studies on doped $CeO_2$ Anodes for Intermediate Temperature Solid Oxide Fuel Cells Using Hydrocarbon Fuels

**Shidong Song,** Jonathan Kearney, Richard T. Baker
University of St Andrews, St Andrews / United Kingdom

## Tailoring Samaria Doped Ceria for IT-SOFC

**Carlos Sánchez-Bautista, Antonio J. Dos Santos-García, Jesús Canales-Vázquez**
Universidad de Castilla-La Mancha, Albacete / Spain

**11:00 – 12:30**

# B06 SOFC: Cells and Components - 2

## Multi-Element Substitution for Improving the Electrocatalytic Properties of IT-SOFC Cathodes

**José M. Serra,** Vicente B. Vert
Instituto de Tecnología Química, Valencia / Spain

## Cycling Performance of Micro-Tubular, Single-Chamber Solid Oxide Fuel Cells (MT-SC-SOFCs)

**Naveed Akhtar,** Stephen P. Decent, Kevin Kendall
University of Birmingham, Birmingham / United Kingdom

## Performance Analysis of Solid Oxide Fuel Cell Fabricated Using a Sheet Joining Process

**Kwangjin Park,** Changbo Lee, Joongmyeon Bae
KAIST, Daejeon / Republic of KOREA

## Modification of Cell Microstructure and Compositions for High and Stable Performance of Low- Temperature SOFCs

**Ye Zhang-Steenwinkel (1),** Marc M. A. van Tuel (1), Frans P. F. van Berkel (1), Bert Rietveld (1), Radenka Maric (2), Sven Uhlenbruck (3) and Frank Tietz (3)
(1) ECN, Petten / The Netherlands, (2) NRC, Vancouver / Canada; (3) FZJ, Jülich / Germany

## Residual Stresses in a SOFC

**Julie Villanova,** Olivier Sicardy, Roland Fortunier, Jean-Sébastien **Micha**
CEA, Grenoble / France

## Progress in Metal-Supported SOFCs

**Michael Tucker,** Craig Jacobson, Steven Visco, Lutgard DeJonghe
Lawrence Berkeley National Laboratory, Berkeley, CA / USA

**14:00 – 15:30**

# B07 SOFC: Cells and Components - 3

## Anode Supported Tubular Cell Fabrication and Large Scale Cell Development

**Hong Ryul Lee,** Kyung Bok Min, Jong Ho Jung, Jong Sik Yoon, Han Ul Yoo
Samsung Electromechanics Co. Ltd., Suwon / South Korea

## SSZ-Ni and YSZ-Ni Anode Supporten Microtubular SOFCs. Electrochemical Characterization and Thermal Cycling

**Roberto Campana Prada,** R.I. Merino, A. Larrea, V. M. Orer
I.C.M.A. and IKERLAN S Coop,. Zaragoza / Spain

## Solid Oxide Fuel Cell (SOFC) Joining Process with Ag-Based Brazed Alloys

**Jens Hamje,** Christian Schmid, Volker Wesling
Clausthal University of Technology, Clausthal-Zellerfeld / Germany

## Synthesis by Fusion Process and Characterisation of Lanthanum and Strontium Mixed Manganites

**Constance Morel,** Francis Millot, Samuel Marlin
Saint-Gobain Cree, Cavaillon / France

## Flow Distribution Analysis of the Solid Oxide Fuel Cell Stack under Electric Load Conditions

**Janusz Jewulski,** Marcin Blesznowski, Michal Stepien
Institute of Power Engineering, Warszawa / Poland

**16:00 – 18:00**
## AB08 Posters & Exhibition

# Thursday, July 2

**09:00 – 10:30**
## B09 Hydrogen and Reforming - 1

### Challenges of Biogas Upgrading to Fuel Cell Quality
**Wolfgang Urban,** Jorge Iván Salazar Gómez, Heiko Lohmann
Fraunhofer Institute UMSICHT, Oberhausen / Germany

### PEM Electrolyser Development at Helion / AREVA
**Thomas Nietsch,** Christophe Bidault, Serge Besse, Valéry Chaudron
HELION, Aix-en-Provence / France

### Solid Ammonia as Energy Carrier: Possibilities and Technology Development
**Debasish Chakraborty,** Henrik Nybo Petersen, Tue Johannessen
Amminex A/S, Soeborg / Denmark

### Electrical Efficiency and Electrochemical Stability of Cathode Supported Electrolyzers
**Jan Pieter Ouweltjes,** Marc van Tuel, Frans van Berkel, Bert Rietveld
ECN, Petten / The Netherlands

### Specifying Solid Oxide Electrolyser Cells for Wind Turbine and Nuclear Power Scenarios
**John Bøgild Hansen,** Thomas Nietsch (1)
Haldor Topsøe A/S, Lyngby / Denmark, (1) (1) Helion, Aix-en-Provence / France

**11:00 -12:30**
## B10 Hydrogen and Reforming - 2

### Desulfurization of Jet Fuel for Fuel Cell Systems in Aircraft Applications
**Joachim Pasel, Jochen Latz, Yong Wang, Ralf Peters, Detlef Stolten**
Forschungszentrum Jülich, Juelich / Germany

### Start-up Procedure for a LPG Powered Fuel Cell APU
**Christian Spitta, Carsten Spieker, Michael Steffen, Angelika Heinzel**
Zentrum für BrennstoffzellenTechnik, Duisburg / Germany

## Diesel Fuel Processing for PEMFC

**H. A. J. van Dijk,** R. W. van den Brink
ECN, Petten / The Netherlands

## Investigations on the Operation of a Steam Reformer for Gasoil Integrated in a PEFC-System for Stationary Applications

**Roland Wruck** (EVT), Melanie Grote (Oel-Waerme-Institut), Mathias Duisberg (Umicore), Martin Brenner (Behr), Frank Beckmann (Inhouse Engineering)
EVT Gesellschaft für Energieverfahrenstechnik mbH, Herzogenrath / Germany

**14:00 – 15:30**

# B11 Fuel Cells for Direct Fuel Conversion

## Designing a Direct Carbon Fuel Cell and System

**Kas Hemmes**
Delft University of Technology, Delft / The Netherlands

## Numerical Prediction of Performance of SOFCs Operating on Coal Syngas

**Ismail Celik,** Francisco Elizalde-Blancas, Suryanarayana Pakalapati, Fatma Cayan
West Virginia University, Morgantown, WV / U.S.A.

## Performance Evaluation of Different Configurations of Biogas-Fuelled SOFC Systems for Residential Applications

**Siamak Farhad (1),** Yeong Yoo (2), Feridun Hamdullahpur (1)
(1)Carleton University, Ottawa / Canada; NRC, Ottawa / Canada

## Bioreactor/Fuel Cell Integrated System - Thermal, Electrical and Sizing Issues

**Elsa C. M. Agante,** D. J. L. Brett and N. P. Brandon
Imperial College, London / United Kingdom

## The Effect of pH to the Electrooxidation of Small Alcohols on Pt-Based Catalyst Materials: a RDE and DAFC Study

**Annukka Santasalo,** Tanja Kallio, Kyösti Kontturi
Helsinki University Technology, Espoo / Finland

## Novel Materials for Microbial Fuel Cells

**Gilbert Van Bogaert,** Deepak Pant, Karolein Vanbroekhoven
VITO - Flemish Institute for Technological Research, Mol / Belgium