

**CALL FOR PAPERS**  
Virtual & Physical participation

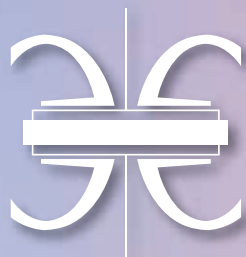
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**EFCF** 2021

Low-Temperature

# Electrolysers, Fuel Cells & H<sub>2</sub> processing

Research, Development & Application



25<sup>th</sup> Conference in Series  
with Exhibition & FCH/EIS Tutorials

**29 June – 2 July 2021**

Lucerne, Switzerland

Chaired by

**Prof. Thomas J. Schmidt**

**Dr. Emiliana Fabbri**

PSI Paul Scherrer Institute  
Villigen, Switzerland

Featuring

**Hydrogen Fuel Cells**

**Direct Fuel Cells**

**H<sub>2</sub> Processing**

**Water Electrolysis & CO<sub>2</sub> Reduction**

**[www.EFCF.com](http://www.EFCF.com)**

EUROPEAN ELECTROLYSER & FUEL CELL FORUM

 **SWISS**  
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# Fuel Cells Electrolysers & H<sub>2</sub> Processing

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# EFCF 2021

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- Hydrogen Fuel Cells
- Direct Fuel Cells
- Water Electrolysis & CO<sub>2</sub> Reduction
- H<sub>2</sub> Processing

## Scope of the Forum

[www.EFCF.com/Scope](http://www.EFCF.com/Scope)

The EFCF 2021 addresses issues of low-temperature **FUEL CELLS** - PEFC, HT-PEM, AFC, PAFC and **ELECTROLYZERS** - PEM, Alkaline incl. **CO<sub>2</sub> REDUCTION**. These technologies are also strongly linked to **HYDROGEN** and its **PROCESSING**. The conference topics range from fundamental understanding of the relevant materials as well as the kinetics and mass / heat / water transport processes, H<sub>2</sub> purification, compression, storage & distribution, all the way to the implementation in real-world devices, requiring optimized engineering designs. The EFCF 2021 continues the strong tradition as one of the leading international meetings in the field.

A Scientific Advisory Committee [www.EFCF.com/SAC](http://www.EFCF.com/SAC) has been formed to evaluate & structure the technical program. This panel exercises full scientific independence in all technical matters. All presented papers (oral & poster) will be collated in electronic proceedings available to registered participants. If the authors wish, all contributions with an extended abstract are published with their own DOI in [www.EFCF.com/Library](http://www.EFCF.com/Library). In addition, other scientific publication options are offered (see Publication Policy).

The 25<sup>th</sup> Forum in series continues the tradition as a well recognized international event for science and industry in these fields. Due to Covid pandemic uncertainties the EFCF 2021 is planned as a physical & virtual event (hybrid) and offers participants from all continents the opportunity to contribute & attend. The Forum has evolved since 2013 into the largest international event & leading meeting place in Europe dedicated to Hydrogen FC and electrolysers. It is an excellent platform for scientists, engineers & manufactures to present recent technical progress, industrial achievements & inventions. New contacts are established in the unique networking events, which allow a fruitful exchange on technology & business.

**Technical Status and Achievements: The following companies have presented in the previous EFCF editions:**

Automotive OEM: Audi, BMW, Daimler, Fiat, Hyundai, Honda, Nissan, Renault, Toyota

Electrolyser and Hydrogen Industry: AirLiquide, AREVA/Helion, Giner, Hydrogenics, IHT, ITM, Linde, NEL/Proton OnSite, Shell, Siemens.

## Technical Program

[www.EFCF.com/Conference](http://www.EFCF.com/Conference)

The three day technical conference will feature parallel lectures of invited and contributed papers and posters. Care will be taken by the Scientific Advisory Committee to ensure that all presentations are of consistent high quality, yet understandable for participants with limited exposure to the subjects.

**The EFCF 2021 conference topics are set, but not limited to:**

### Fundamentals of fuel cells

- Electrocatalysis of the oxygen reduction and the hydrogen oxidation reaction
- Membrane materials for acidic and alkaline fuel cell
- MEAs  
Design of membrane electrode assemblies
- Pt and Pt-free electrocatalysts
- Catalyst and MEA degradation mechanisms

### Advanced diagnostics and modeling

- Transport characterization in porous transport layers
- Analysis of MEA degradation and evaluation of mitigation strategies
- Operando analysis
- Modeling of kinetics and transport

### Electrolysis and electrolysers

- Electrocatalysts for the oxygen and hydrogen evolution reactions
- Electrolysis in alkaline and acidic media
- CO<sub>2</sub> reduction to fuels and chemicals
- Direct fuel cells – all oxidation variants

### Applications and design of fuel cells, electrolysers and systems

- Design of MEAs and flow-fields for high current density operation
- Stack & stack component design and operation
- Stack & system characterization and integration
- Durability, lifetime, and LCA
- Balance of plant components for fuel cells and electrolysers
- Application integration and testing

### Hydrogen processing

- Purification & Compression
- Materials and devices for on- and off-board storage
- Distribution and Fuelling
- Balance of plant components

### Market and Deployment

- Rollout & Operation:  
Portable, stationary, mobile incl. infrastructure (road, water, air, space)
- Business and economy models, scenarios with competing and competing technologies
- H<sub>2</sub>-Technologies as enabler for renewables, assessment and applicability
- Major regional and company demonstration and developments

## Publication Policy

[www.EFCF.com/PP](http://www.EFCF.com/PP), [www.EFCF.com/Library](http://www.EFCF.com/Library)

EFCF offers to all contributions, which deliver an **extended abstract** the opportunity to be **published with** an own DOI in the **EFCF community** of the general-purpose **open-access repository** [www.Zenodo.org](http://www.Zenodo.org). Since 2012 a limited number of contributions will be additionally invited to be included in a **Special Issue** in the peer reviewed Journal "Fuel Cells – From Fundamentals to Systems" published by Wiley-VCH, e.g.: EFCF 2013 – Volume 14, Issue 5, pg 671–774; EFCF 2019 – Volume 20, Issue 4, pg 383-514 (see [www.EFCF.com/SI](http://www.EFCF.com/SI)). Authors who do wish to **publish "elsewhere"**, can opt out. All copyrights remain with the authors.

Further on, the programme and event details are distributed in the **Final Announcement** by letter post, email and on [www.EFCF.com/FA](http://www.EFCF.com/FA). All one-page abstracts of the oral & poster presentations are published in the **Book of Abstracts**. Together with all extended abstracts, they are made available in the electronic **Proceedings of the conference**. They are distributed to the EFCF participants only, as a temporary reference during the conference and as ongoing internal reference in the EFCF memberzone. The **final EFCF Proceedings** will be a synthesis of the Book of Abstracts and the access infos to the available, event related publications. It is open access available on [www.EFCF.com/Proceedings](http://www.EFCF.com/Proceedings) together with all other event infos.

## Abstract Submission

[www.EFCF.com/AuthorCentre](http://www.EFCF.com/AuthorCentre)

Members of academic institutions, R&D organizations, engineering firms and industry are invited to submit contributions for oral or poster presentation at the EFCF 2021 featuring Low-Temperature Fuel Cells & Electrolysers and H<sub>2</sub> Processing. **The submission procedure is:**

1. Download Abstract Template, Instructions & Samples from [www.EFCF.com/Download](http://www.EFCF.com/Download) **Inform via [www.EFCF.com/Like2Present](http://www.EFCF.com/Like2Present). Evaluation**
2. Upload your one-page abstracts at [www.EFCF.com/Upload](http://www.EFCF.com/Upload) **MISSED the DEADLINE for ORAL! for oral has started, POSTER can longer be accepted.**
3. Receive notification about acceptance in March 2021. This requires you to submit an extended abstract/paper by **31 May 2021**.

This is a condition to be included in the final program either as an oral or poster and to be given the opportunity to be published with a DOI.

Please consult the list of fees for details of privileges offered for early registration. EFCF cannot provide financial support to authors of papers. Presenting authors are required to register for the forum and to pay the appropriate registration fee.

Attractive rebates are offered for group registration (starting from 3 people) and exhibitors are entitled to up to a 55% rebate on conference fees, and may additionally profit from 'Early Bird' and loyalty discounts on booth fees. See below „Why exhibit at EFCF“ your products and services. For Frequently Asked Questions please visit [www.EFCF.com/FAQ](http://www.EFCF.com/FAQ) or email [PSI@efcf.com](mailto:PSI@efcf.com).

## Exhibition

[www.EFCF.com/Exhibition](http://www.EFCF.com/Exhibition) **Book your Booth on [www.EFCF.com/ByB](http://www.EFCF.com/ByB)**

### Why exhibit at EFCF?

**Efficient & Effective**  
Contact with exactly the right people, who understand and benefit from your added values and impact the decision process.

**Valuable Contacts**

### Complete & Convenient

Booth fees include kit, services, VAT, etc. and you profit from striking offers e.g. fully equipped booth from 800 CHF, when 2 participants are booked.

**All Inclusive**

### 100% Visibility

in the core of the Fuel Cell, Electrolyser & Hydrogen community boosts

**Product Request**

## Forum

### Time Schedule and Events

[www.EFCF.com/Schedule](http://www.EFCF.com/Schedule), [www.EFCF.com/Events](http://www.EFCF.com/Events)

15 February 2021		Deadline for submission of abstracts via website – <a href="http://www.EFCF.com/Upload">www.EFCF.com/Upload</a>	<b>MISSED the DEADLINE</b> Catch the last chance! For ORAL inform immediately via <a href="http://www.EFCF.com/Like2Present">www.EFCF.com/Like2Present</a> when you submit. Evaluation for oral has started, POSTER can longer be accepted.
31 March 2021		Notification about acceptance in the EFCF programme	
15 April 2021		Final Announcement with definitive oral program poster and exhibitor list	
31 Mai 2021		Deadline for submission of extended abstract/paper – <a href="http://www.EFCF.com/Upload">www.EFCF.com/Upload</a>	
29 June 2021	11:00 –16:00	Exhibition & poster set-up, 16:00 Opening of Exhibition and Registration, 18:00 “Welcome Reception”	
	10:00 –17:00	Tutorials: 1. EIS: Electrochemical Impedance Spectroscopy; 2. FC&H <sub>2</sub> : Fuel Cells. Electrolyser & H <sub>2</sub>	
30 June 2021	09:00 –18:00	International and Industrial Overviews – Keynotes – Oral and Poster Sessions, Exhibition	
	18:30	“Swiss Surprise Night“: An enjoyable exchange event with Swiss cuisine, folklore, culture and drinks	
1 July 2021	09:00 –18:00	Keynotes – Oral and Poster Sessions, Exhibition, Special Events	
	19:30	“Dinner on the Lake“: Unique pleasure boat tour with music and picturesque scenery, an unforgettable networking event	
2 July 2021	09:00 –17:00	Oral and Poster Sessions – Plenary Keynotes, Exhibition, Schoenbein Medal Award, Closing Ceremony	

### Virtual & physical attendance - Access & Venue

[www.EFCF.com/Join](http://www.EFCF.com/Join), [www.EFCF.com/Lucerne](http://www.EFCF.com/Lucerne)

EFCF events are traditionally held at the Culture and Convention Centre Lucerne (KKL) in conjunction with the Fuel Cell, Electrolyser & H<sub>2</sub> Technology and Supplier Exhibition and the popular FC, EL & H<sub>2</sub> Tutorial (FCH). An Electrochemical Impedance Spectroscopy (EIS) Tutorial and special symposium for Microbial Electrochemistry are additionally organised. The KKL conference centre is a well-known location on the picturesque waterfront of the Lake Lucerne, easy to reach by plane and train, and within a short walk from charming hotels and the historical town centre.

At the moment it is still uncertain what the COVID situation will look like in 2021 and how physical events can be organized. What is fixed is that EFCF 2021 will at least take place as a virtual event and thus will be accessible for every stakeholder regardless of restrictions and origin. The virtual registration can therefore take place very soon and an upgrade to a physical registration will be possible at any time.

### Fees - [www.EFCF.com/Fee](http://www.EFCF.com/Fee)

	Virtual		Physical		
	Early -28 Feb	Regular from 1 March	Early -30 April	Regular from 1 Mai	Late from 1 June
• Students, trainees and unemployed persons etc. with valid identification	300	+0 CHF	580	+120	+100 CHF
• Government, universities, consultants etc.	500	+100 CHF	1'280	+120	+100 CHF
• Industry and commerce			1'880*	+120	+100 CHF

### Tutorials - [www.EFCF.com/Tutorials](http://www.EFCF.com/Tutorials)

• FC, EL & H <sub>2</sub> Tutorial: Fuel Cells & Hydrogen:	Regular	220 CHF	500 CHF
• EIS Tutorial - Electrochemical Impedance Spectroscopy:	Regular	220 CHF	500 CHF
	for EFCF 2021 participants	150 CHF	350 CHF

Ask [forum@EFCF.com](mailto:forum@EFCF.com) for group rebate. All fees include the 7.7% VAT, where applicable. \*Incl. 600 CHF donation for student support One Swiss Franc (“CHF”) is valued at about 0.92 EURO, 1.1 US Dollar, 114 YEN, 6.87 CNY (Nov 2020).

**Physical fees include** access to conference and exhibition, plus all advantages of the virtual access as well as business lunches, all refreshments, welcome reception on Tuesday and the Dinner on the Lake on Thursday. Optional: Swiss Surprise on Wednesday (120 CHF pp). **Virtual fees include** virtual live and on-demand access as well as access to the virtual community rooms during and to the member zone after the conference, proceedings of the EFCF 2021 conference, rebate on EIS tutorial, EFCF membership with all additional services & rebates until the next conference (worth 400 CHF, 250 CHF for students) and post conference access to available presentations, book of abstracts and ISBN proceedings back to 1994.

### Excellent Student Support Fund

[www.EFCF.com/ESSF](http://www.EFCF.com/ESSF)

### Researcher Support & Sponsorship

[www.EFCF.com/RSS](http://www.EFCF.com/RSS)

The ESSF offers support to 3 students providing first class scientific contributions in form of free registration & a contribution for accommodation.

INDIVIDUALS with limited financial resources can get support in finding a sponsor. These SPONSORS profit from additional privileges and visibility.

# Chairs of the Conference

PSI Paul Scherrer Institute, Villigen, Switzerland



## Prof. Thomas J. Schmidt

In February 2011, Professor Thomas J. Schmidt (\*1970) became Chair of Electrochemistry at Swiss Federal Institute of Technology, Zurich, combined with the appointment as Head of the Electrochemistry Laboratory at Paul Scherrer Institute in Villigen, Switzerland. Since 2014

Prof. Schmidt is Director of the Swiss Competence Center for Energy Research (SCCER) Heat & Electricity Storage.

He received his University Diploma in Chemistry from the University of Ulm/Germany in 1996 and his PhD in Chemistry from the same University in 2000. That same year he joined the group of P.N. Ross and N.M. Markovic at Lawrence Berkeley National Laboratory as a Chemist Postdoctoral Fellow. During this period, he intensively studied the fundamentals of electrocatalysis of fuel cell reactions. He continued to work with G. G. Scherer at Paul Scherrer Institut in Villigen/Switzerland on the development of membrane electrode assemblies (MEAs) using radiation-grafted membranes and on oxygen electrocatalysis with oxide containing catalysts. Since late 2002, he was working in the industrial development of high temperature membrane electrode assemblies and their components (membranes, catalysts, electrodes) using polybenzimidazole based membranes at BASF Fuel Cell GmbH (formerly Pemeas GmbH). During these eight years in industries, Dr. Schmidt led the high-temperature MEA R&D activities as Director R&D and helped to successfully commercialize the BASF Fuel Cell Celtec® MEAs.

In parallel since 2009, he has been working as lecturer for Physical Chemistry at Provdadis School of International Management and Technology, University of Applied Sciences in Frankfurt/Germany.

He recently served as co-editor of the book entitled Polymer Electrolyte Fuel Cell Durability published by Springer. Since fall 2009, he has been also serving as instructor of the Short Course PEM Fuel Cells held at the fall meetings of the Electrochemical Society. Dr. Schmidt was chairman and co-organizer of several conferences, e.g., the Gordon Research Conference on Fuel Cells (2005) and the ECS Polymer Electrolyte Fuel Cells Symposia (2010 to 2013). Prof. Schmidt currently serves as Associate Editor of the Journal of the Electrochemical Society and the ECS Electrochemistry Letters.

In autumn 2010, he received the Charles W. Tobias Young Investigator Award from the Electrochemical Society. He was awarded the Otto-Monsted Visiting Professorship at the Technical University of Denmark (Lyngby) in 2013.



## Dr. Emiliana Fabbri

Emiliana Fabbri received her PhD in Materials Science from the University of Rome Tor Vergata, Italy on December 2008. A significant part of her PhD studies were carried out in the group of Prof. E. Wachsman at the University of Florida, Gainesville USA. In 2009 she was appointed as

tenured scientist at the International Center for Material Nanoarchitectonics (MANA) at the National Institute for Materials Science (NIMS), Japan. Emiliana Fabbri deeply investigated conduction mechanisms in solid state ionic conductors as well as electrochemical reactions related to fuel cells. Since January 2012, Emiliana Fabbri joined the Paul Scherrer Institute in Switzerland as senior scientist working on materials for electrochemical energy storage and conversion, with emphasis on metal oxides. To gain a fundamental understanding of electrochemical reaction mechanisms and catalytic activity descriptors, she is particularly interested in the catalyst surface chemistry and electronic structure investigated by operando X-ray photoelectron spectroscopy and X-ray absorption spectroscopy, respectively.

Dr. Fabbri is the author of more than 100-refereed articles and she has received the Kepler Prize from the European Academy of Sciences and the American Ceramic Society Ross Coffin Purdy Award in 2012 and 2012, respectively. She was co-organizer of the Material Research Society (MRS) Fall meeting in 2014 and of the 223 Electrochemical Society (ECS) meeting.

### Scientific Advisory Committee

[www.EFCF.com/SAC](http://www.EFCF.com/SAC)

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[www.EFCF.com/Library](http://www.EFCF.com/Library)

Publication of Proceedings, Presentations, Special issues

## EFCF 2021

### Low-Temperature Electrolysers, Fuel Cells & H<sub>2</sub> Processing

29 June – 2 July 2021, Lucerne, Switzerland

- This 25<sup>th</sup> high-level international event offers an honest presentation of the state-of-the-art technology in beautiful Switzerland
- Up-to 300 technical contributions with full length manuscripts, available to download as Proceedings
- Modern conference facilities with top services, excellent food and refreshments – however virtual attendance is also possible.
- Unique networking events: "Welcome Reception", "Swiss Surprise", and "Dinner on the Lake"
- Pleasant walking from hotels to conference centre

International Exhibition of fuel cell, electrolyser and hydrogen products and components. See [www.EFCF.com/IMPRESSIONS](http://www.EFCF.com/IMPRESSIONS)



Official Carrier



### Organised by the EUROPEAN FUEL CELL FORUM

Olivier Bucheli & Michael Spirig  
Obgardihalde 2, CH-6043 Luzern-Adligenswil, Switzerland  
Tel: +41-44-586-5644  
[forum@efcf.com](mailto:forum@efcf.com) · [www.EFCF.com](http://www.EFCF.com)