

INVITATION

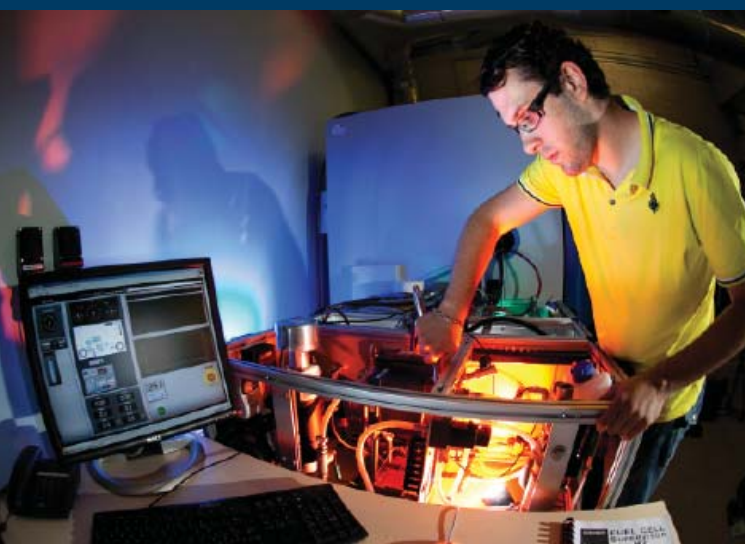
We are pleased to invite you to the international summer school "from Diagnostics to Fault Tolerant Control of Fuel Cells", that will be held, from July 4th to July 8th, 2016, in Belfort, FRANCE.

The aim of this summer school is to provide a forum for researchers and industrials around topics such as fuel cell degradation mechanisms, diagnostics, prognostics and control, as well as aspects related to the social and economic challenges for a larger diffusion of fuel cell systems. The 5-days summer school comprises several courses projects and practical work. The lectures will be given by experts in the field, and real case studies demonstrations with experimentations on PEMFC platforms will be achieved. The following topics will be addressed:

- Understanding degradation modes and ageing mechanisms in PEM fuel cells.
- Characterization of the PEMFC system.
- Diagnostics of FC.
- Prognostics of Fuel cells.
- Fault-Tolerant Control (FTC) of FC systems.

We look forward to welcoming you in Belfort,

THE ORGANIZING TEAM



SCIENTIFIC AND TECHNICAL SCOPE

The fuel cell systems' lifetime, reliability, and cost, remain principal hurdles to their large deployment on the market. In fact, fuel cells are complex systems where several phenomena occur at different scales. To ensure efficient and reliable operation with competitive lifetime span, they should be maintained in a narrow controlled range of operating conditions, blocking and mitigating the faulty operation modes that result in performance loss, system shutdown or even irreversible failure. Methods that allow increasing tolerance to faults and therefore increasing reliability and lifetime are needed.

Prognostics and Health Management PHM is a new emerging research area. It is the process of using diagnostics and prognostics information in order to manage the use and maintenance of a system by providing adequate decisions either to mitigate, prevent or avoid catastrophic failures.

The results are therefore:

- to extend the lifetime of the system by avoiding irreversible failures,
- to increase the reliability of the FC system by preventing incidents,
- to increase the availability of the system, and
- to optimize the maintenance scheduling (reduce frequency and costs) by enabling the change from reactive or scheduled maintenance to proactive (predictive) one.

During the summer school, the following topics will be addressed:

- Understanding degradation modes and ageing mechanisms in PEM fuel cells.
- Characterization of the PEMFC system.
- Diagnostics of FC
- Prognostics of Fuel cells
- Fault-Tolerant Control (FTC) of FC systems.

SCIENTIFIC AND TECHNICAL PROGRAM

| | Monday 4 | Tuesday 5 | Wednesday 6 | Thursday 7 | Friday 8 |
|---------|---|--|---|--|--|
| 9:00 | Registration | Registration | Registration | | |
| 9:30 | Introduction to fuel cells and Hydrogen energy | Fuel Cell Degradation Mechanisms | Diagnostics of Fuel Cells | Control of Fuel Cells | Socio-economic aspects |
| 10:30 | Coffee break | Coffee break | Coffee break | Coffee break | Coffee break |
| 11:00 | Fuel cell systems: modelling and characterisation | Imaging as a diagnostic tool for PEFC – membrane degradation by pinholes | Prognostics and Health Management of Fuel Cells | Fault Tolerant Control of PEM Fuel Cells | Round table, actual and remaining issues |
| 12:00 | Lunch | Lunch | Lunch | Lunch | Lunch |
| 1:30 PM | Experimental work | PEM fuel cell degradation mechanisms: a multi-scale approach | Experimental work | Student project | |
| 3:30 PM | Coffee break | Coffee break | Excursion | Coffee break | |
| 4:00 PM | Student project | Student project | Social event | Student project | |
| 6:00 PM | Lab visit | Lab visit | | | |
| 7:00 PM | | | | | |

INVITED SPEAKERS

- Dr. Samir JEMEI, UFC, France: Introduction to fuel cells technology.
- Dr. Ulf Groos, Fraunhofer ISE, Germany: Fuel cells' monitoring and characterization: from basics to more advanced.
- Dr. Philippe Moçotéguy, EIFER, Germany: FC Degradation Mechanisms.
- Dr. Felix Büchi, Paul Scherrer Institute, Switzerland: Imaging as a diagnostic tool for PEFC – membrane degradation by pinholes.
- Dr. Marion Chandersis, CEA, France: PEM fuel cell degradation mechanisms: a multi-scale modelling approach to introduce lifetime estimation into the system.
- Pr. Daniel Hissel, UFC, France: Diagnostics of fuel cells.
- Pr. Nouredinne Zerhouni, ENSMM, France: Prognostics of Fuel cells.
- Dr. Federico Zenith, SINTEF, Norway: control of fuel cells.
- Pr. Brigitte Grondin-Perez, Université de la Réunion, France: Fault Tolerant control of PEMFCs.
- Dr. Fabienne Picard, UTBM, France: socio-economic aspects, challenges for FC industrial deployment.

REGISTRATION

The school is open to students, researchers and industrials

Registration fee (150 €) includes:

- Summer School facilities;
- Proceedings;
- Coffee breaks, daily lunches, excursion and gala dinner

Possibilities of on site payment and through order forms addressed at the UFC.

<http://labex-action.fr/fr/summer-school-ftc2016>





VENUE

The Summer School will be held at:
University of Technology
of Belfort-Montbéliard

UTBM, site de Belfort
Rue Ernest Thierry Miege
90010 Belfort, France

CONTACT DETAILS

Scientific Program and administrative matters
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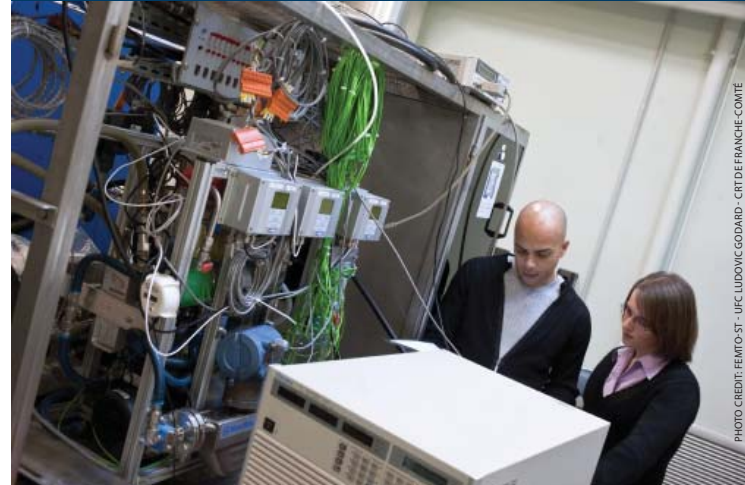
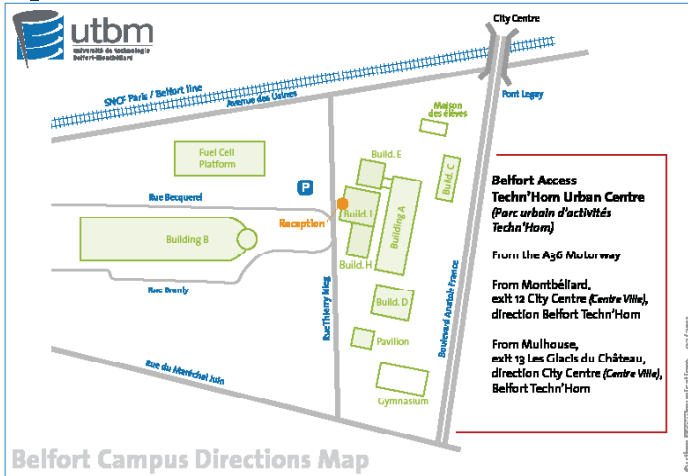
MORE INFORMATION

<http://labex-action.fr/fr/summer-school-ftc2016>
www.labex-action.fr
www.fclab.fr



INTERNATIONAL SUMMER SCHOOL

JULY
04-08
2016
Belfort
France



TRANSPORTATION

Location : Belfort – France

The nearest airport is the Basel-Mulhouse airport (70km from Belfort).

- regular trains exist between the Airport and Mulhouse Ville and between Mulhouse Ville and Belfort.

- Taxi can also connect the Airport to the city of Belfort (approximately 100€).

- By train: stations: "Belfort-Montbéliard TGV", or "Belfort Centre", then regular buses connect the train station and the UTBM.

ACCOMMODATION

All details can be consulted online.



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