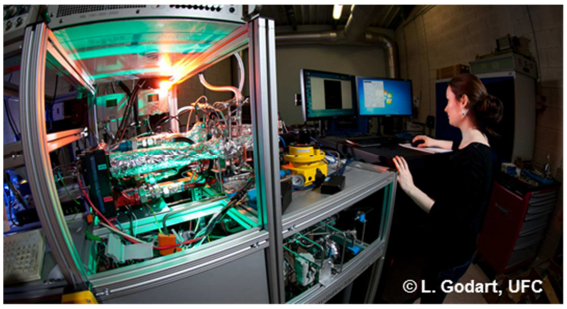
Summer School

Diagnostics and Prognostics of Fuel Cell Systems

01-04 July 2014, FCLAB, Belfort, France

https://propice.ens2m.fr/ecole-diag-pron-PAC.html

Motivations and objectives



Fuel Cell Systems (FCS) appear to be a promising energy conversion device to face some of the economic and environmental challenges of modern society. However, even if this technology is close to being competitive, it is not yet ready to be considered for large scale industrial deployment: FCS still must be optimized, particularly by increasing their limited lifespan. Indeed, Proton Exchange Membrane Fuel Cell systems (PEMFC) usually have a life duration of around 2000 hours, whereas 6000 hours are required for some applications, including transportation... Enhancing FCS durability involves not only developing a better understanding of ageing phenomena but also requires the ability to emulate the behavior of the whole system to support the development of improvements to those systems. Prognostics and Health Management (PHM) of FCS is an emerging field of scientific and technological developments that has the potential to provide and enable improvements in the life management, use and support of Fuel Cell Systems.

Objectives and program

The aim of this summer school is to provide a forum for researchers and practitioners to discuss PHM of Fuel Cell Systems, and identify actual and future research challenges in the area. Topics of “degradation mechanisms, diagnostic and prognostics of FCS”, as well as aspects related to the “social and economic challenges for a larger diffusion of FCS” will be addressed. Courses will combine:

- Academic and industrial lectures given by experts in the field;
- Real case studies demonstrations with experimental manipulation on PEMFC platforms.

Program (see reverse side for more details)

- Day 1: Introduction to Fuel Cell Technology
- Day 2: Diagnostics and prognostics - backgrounds
- Day 3: Socio-economic and industrial perspectives
- Day 4: Case studies and demonstrations

Participants and registration

The school is open to both academics (from University) and professionals (from Industry). Scientists and practitioners interest in PHM technologies and application to Proton Exchange Membrane Fuel Cell (PEMFC) are encouraged to register. Registration fee (online registration, 200 €) includes:

- Summer School facilities;
- Proceedings (hard copy);
- Coffee breaks, daily lunches and gala dinner.

Committees

Scientific committee

Co-chairs

- Rafael Gouriveau (FCLAB)
- Belkacem O-Bouamama (LAGIS)

Members

- Yu K. Evdokimov (KNRTU)
- Mickaël Hilairet (FCLAB)
- Daniel Hissel (FCLAB)
- Samir Jemeï (FCLAB)
- Marie-Cécile Péra (FCLAB)
- Mathieu Marrony (EIFER)
- Serguei Martemianov (Pprime)
- Philippe Moçoteguy (EIFER)
- Fabienne Picard (FCLAB)
- J-Philippe Poirot (CEA LITEN)
- Bénédicte Rey (FCLAB)
- Noureddine Zerhouni (FCLAB)

Local organization committee

Members

- Mathieu Bressel
- Isabelle Gabet
- Kamran Javed
- Marine Jouin
- Argyro Karathanou
- Elodie Lechartier
- Laurence Mary
- Simon Morando
- Elodie Pahon

Detailed program

Day 1: Introduction to Fuel Cell Technology	
9h00-10h00	Welcome and opening of the summer school
10h00-12h30	Hydrogen vector and Fuel Cell technology
Lunch	
14h00-16h00	Degradation mechanisms & characterization of FCS
16h30-17h30	Visit of FCLAB facilities
Day 2: Diagnostics and prognostics – backgrounds	
9h00-10h30	Prognostics and Health Management – an overview
11h00-12h30	Diagnostics of Fuel Cell – concepts and approaches
Lunch	
14h00-15h30	Prognostics of Fuel Cell – concepts and approaches
16h00-17h30	To be confirmed : 2 options - PHM-based decision making for Fuel Cell – some trends - Feedback: IEEE 2014 PHM Challenge on PHM of FCS
Day 3: Socio-economic and industrial perspectives	
9h00-10h00	Diffusion process – social and economics bottlenecks
10h30-11h30	Lessons learned from industry
11h30-12h30	Round table : industrial dissemination
Lunch	
Social event and Gala diner	
Day 4: Case studies and demonstrations	
9h30-12h00	Choice of two workshops ; limited places - Monitoring and characterization of fuel cells - Signal-based and data-based diagnostics of fuel cells - Model-based diagnostics of fuel cells - Data-based prognostics of fuel cells - Model based and hybrid prognostics of fuel cells
Lunch	
13h30-16h00	Same as in the morning
16h30	Closing session