HIL'19 SUMMER SCHOOL:
FPGA in the Loop for Renewable systems with INTEL-ALTERA SoC platforms
24 - 27 June 2019, Belfort France

University of Bourgogne – Franche-Comte (UBFC) together with Anglia Ruskin University, FEMTO-ST laboratory, FCLAB Research Federation and the CNFM are organizing the first FPGA in the Loop for Renewable systems Summer School in Belfort, France. The event provides Master and PhD students, lecturer, researchers and engineers from academia the opportunity to design/implement and hardware/software co-simulate a renewable energy system.

General Chair:
Prof. Mickaël Hilairet (FR)

General Co-chairs:
Dr. Alin Tisan (UK)

Organizing committee:
Prof. M. Hilairet (FR)
Dr. A. Tisan (UK)
Miss K. Diez (FR)
Mr. G. Burgunder (FR)
Prof. D. Hissel (FR)
Dr. M. Becherif (FR)

Registration:
Miss Karine Diez (FR)

Contact/Inscription/
Scientific Program and
administrative matters
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Objectives of the summer school

HIL'19 aims to providing a four-day intensive course on designing from scratch a bare-metal INTEL-ALTERA DE1_SoC FPGA based Hardware in the Loop platform of a fuel cell electrical system. The event combines lectures and hands-on provided by academic and an industry expert from INTEL-ALTERA, with a real case study.
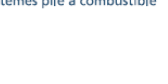
The following topics will be addressed:
► Understanding the fundamentals of a fuel cell system;
► Modelling and control of a fuel cell system;
► Co-simulation and FPGA in the Loop simulation of a MEPT controller;
► SoC FPGA Hardware/software co-design of a fuel cell system with DE1-SoC boards (HPS Dual-core ARM Cortex-A9 processor, I/O, Timers, Interrupts), DAC and ADC converters, PWM, Power converters on-chip modelling, etc.
► FPGA in the Loop in a Chip;

Keynote speakers, lectures:
► Mr. Paolini, INTEL-ALTERA expert, Italie
► Dr. Alin Tisan, Anglia Ruskin University, UK
► Dr. Tarek Ould Bachir, Polytechnique Montréal - Department of Electrical Engineering, Canada
► Prof. Daniel Hissel, UFC, FEMTO-ST, FCLAB director
► Dr. Mohamed Becherif, UTBM, FEMTO-ST, FCLAB

Registration fee (250€) includes:
► Access to summer school lab facilities,
► Breakfast, coffee break and lunch,
► Gala dinner at the booling of Belfort,
► Accommodation at CROUS of Belfort

Scientific and technical program

	1st day	2nd day	3rd day	4thday
8h-8h45	Welcome reception	Design of the HIL platform with ARM (hard) M. Paolini (INTEL-ALTERA, Italie)	Presentation 1 : TBD	Presentation 3 : Power converters on-chip modelling Dr. T. Ould Bachir, Polytechnique Montréal, CA
			Presentation 2 : TBD	
8h45-10h15	Opening summer school + objectives of the HIL summer school + introduction about HIL		Design of the emulator with DE1_SoC boards Dr. A. Tisan (Anglia Ruskin Univ,UK)	Integration of the peripherals Dr. T. Ould Bachir, Polytechnique Montréal, CA
	Coffee break	Coffee break	Coffee break	Cofffee break
10h40 - 12h30	Modelling and control of a fuel cell system Prof. D. Hissel (UFC, FEMTO-ST)	Timers, I/O, Interrupts M. Paolini (INTEL-ALTERA, Italie)	Design of the PWM decoder Dr. A. Tisan (Anglia Ruskin Univ,UK)	Validation of the HIL platform Dr. T. Ould Bachir, Polytechnique Montréal, CA
	Architecture of the fuel cell HIL platform		Design of the DAC coder (sensors)	
	Matlab/Simulink simulation of the system Dr. M. Becherif (UTBM, FEMTO-ST)		Dr. A. Tisan (Anglia Ruskin Univ,UK)	
12h30 - 14h	Lunch	Lunch	Lunch	Lunch
14h-16h	Matlab/Simulink simulation of the system Dr. M. Becherif (UTBM, FEMTO-ST)	Design of the HIL platform with ARM (soft)	Design of the controller Dr. A. Tisan (Anglia Ruskin Univ,UK)	Validation of the HIL platform Prof. M. Hilairet (UFC, FEMTO-ST)
		Timers, I/O, Interrupts M. Paolini (INTEL-ALTERA, Italie)	Design of one PWM Dr. A. Tisan (Anglia Ruskin Univ,UK)	
16h-16h20	Coffee break	Coffee break	Coffee break	Cofee break
16h20 -18h	Co-simulation Dr. A. Tisan (Anglia Ruskin University, UK)	M. Paolini (INTEL-ALTERA, Italie)	Design of ADC decoder Dr. A. Tisan (Anglia Ruskin Univ,UK)	Validation of the HIL platform, Prof. M. Hilairet (UFC, FEMTO-ST)
18h	FCLAB visit http://eng.fclab.fr/			
19h			Gala dinner at the booling of Belfort	

Venue

The Summer school will be held at:

IUT of Belfort-Montbéliard
Department GEII at Belfort, building A
19, rue du Maréchal Juin, BP 527
90016 Belfort, FRANCE
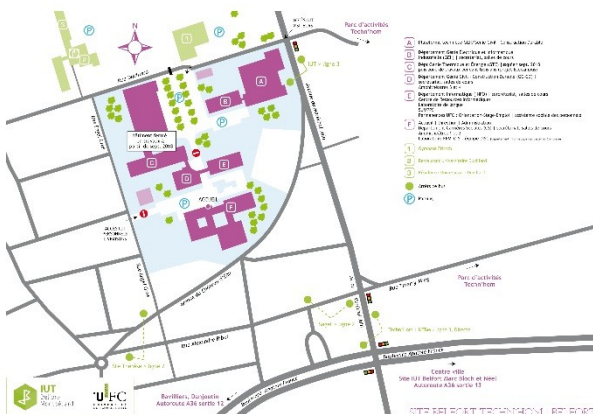
Transportation

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" then regular buses connect the TGV train station to Belfort center, or station "Belfort ville"

Accomodation

Accomodation will be at the CROUS of Belfort near the IUT including breakfasts
Rooms can be obtain sunday 23th after 16.00, potential departure on friday 28th