

**Workshops, presentations and hands-on training on Modelica,
FMI-based co-simulation, and BIM to Modelica translations**

Organized by IBPSA France and IEA EBC Annex 60

Context

As buildings become increasingly integrated to reduce energy and peak power and to increase occupant health and productivity, new challenges are posed to engineers when using building simulation programs to support decision making during product development, building design, commissioning and operation.

The school is intended to present and teach through hands-on training latest developments in modular simulation tools for building and district energy systems based on Modelica and the Functional Mockup Interface standards. It will also discuss future R&D needs which will affect the focus of the first IBPSA R&D project called Project 1 "BIM/GIS and Modelica framework for building and community energy system design and operation," to be started in summer 2017.

The training courses are directed towards simulation and modeling specialists in building/district energy and control systems, with no, basic, or medium-level knowledge of the Modelica programming language.

The participants will be introduced to various Modelica libraries for modeling energy and control systems at the building and district levels intended for different applications or needs.

The school has a special focus dedicated to **hands-on training workshops** with the goal that the participants be able to use the Modelica libraries, build systems on their own, debug the Modelica models, and run simulations.

Expected benefits

- Create a network for scientific collaboration and knowledge exchange, identify training needs, develop new educational projects, initiate the knowledge transfer to professionals ...
- Demonstrate new generation computational tools for building and community energy system modeling, design, and optimization.
- Introduction to Modelica fundamentals and modeling language
- Hands-on training workshops: Modeling building and district energy systems using Modelica libraries, BIM and GIS to Modelica translation, Functional Mock-up Interface (FMI) and co-simulation with other tools, etc.

Scientific committee

- E. Wurtz (school director / CEA-INES, France)
- M. Wetter (LBNL, USA)
- C. Van Treeck (RWTH, Germany)
- D. Saelens (KU Leuven, Belgium)
- L. Helsen (KU Leuven, Belgium)
- F. Wurtz (G2ELAB, France)
- M. Schuman (EDF, France)
- N. Mendes (PUCPR, Brazil)
- L. Mora (I2M, France)
- S. Rouchier (LOCIE, France)
- R. Sterling (NUI, Ireland)
- S. Stratbuecker (IBP Fraunhofer, Germany)
- C. Nytsch-Geusen (Universität der Künste Berlin, Germany)

Organizing committee

- E. Wurtz (CEA-INES, France)
- M. Wetter (LBNL, USA)
- M. Ibrahim (CEA-INES, France)
- L. Mora (I2M, France)
- S. Rouchier (LOCIE, France)

Major program themes

Outline new trends and new R&D needs for the computational simulation of energy flows and demands at the building and district levels based on Modelica, FMI and related BIM/GIS translators: new software tools, design methods, performance evaluation, and efficient workflows.

Program structure

A mix of lecture presentations, workshops, software training, simulation exercises, discussions and information exchange.

Details

The scientific school will be held at CCAS in Porticcio in Corsica, France from the 24th till the 28th of October 2016.

The workshop language will be English.

**new Generation building
ENergy SIMulation tools**

**Scientific School
24 to 28 October 2016
Porticcio, Corsica (France)**

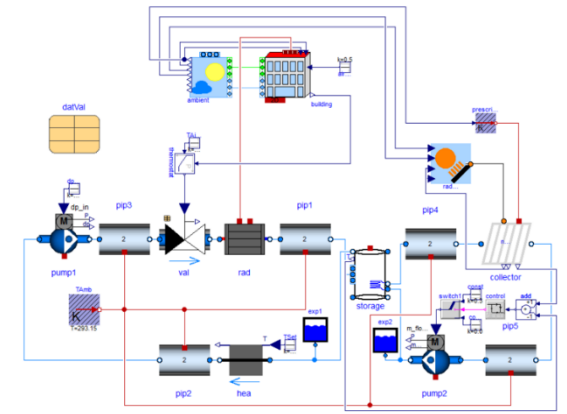
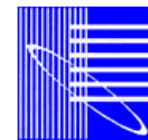


Image source: UdK Berlin

Organized by:



IBPSA France

In partnership with:



Program

Monday, Oct. 24th 2016

10:30-12:30

- Modelica overview (30 to 60 min)
- Modelica training, following <http://book.xogeny.com> (Michael Wetter, LBNL)

14h00-15h30

- Modelica training (continue), following <http://book.xogeny.com> (Michael Wetter, LBNL)

16h00-18:00

- Annex 60 library hands-on training (Heat transfer, fluid flow systems, control loops, HVAC systems)

Tuesday, Oct. 25th 2016

8:30-10:00

- Modelica presentation: Advanced concepts (Filip Jorissen, KU LEUVEN)
 - Explain how algebraic loops are formed and how to avoid them, conceptually.
 - Practical application of these guidelines for the configuration of hydronic and air flow circuits, and for configuring steady state/dynamic balances.
 - Practical application of these guidelines for configuring flow reversal.
 - How to choose integrator/solver based on the above performance.

10:30-12:30

- TEASER workshop for ROM modeling (55 min) (Marcus Fuchs and Moritz Lauster, RWTH Aachen).
- Coupled building and HVAC modeling hands-on training using Annex 60 library (55 min)

14:30-15:30

- FMI/Co-simulation presentation (45min) (Michael Wetter, LBNL)

16h00-18h00

- Continue Annex 60 library hands-on training, drawing examples from some libraries (IDEAS for how advanced concepts are used (50min)
- Example for how to build a simple system model following: http://simulationresearch.lbl.gov/modelica/releases/latest/help/Buildings_Examples_Tutorial_Boiler.html for how to build a simple system model) (50min)

18:30-19:30

- Poster session

Wednesday, Oct. 26th 2016

8:30-10:00

Modelica Library presentation (to highlight main features of these libraries) (15min each)

- 1- Buildings (LBNL)
- 2- AixLib (RWTH)
- 3- IDEAS (KU Leuven)
- 4- BuildingSystems (Universität der Künste Berlin)
- 5- BuildSysPro (EDF)

10:30-12:30

- BIM/GIS presentation followed by BIM training (Matthis Thorade, Universität der Künste Berlin)

14:00-18:00

- Hike/walk

18h30-19:30

- BIM training (continue)

Thursday, Oct. 27th 2016

8:30-10:00

- From building to district energy assessment – stochasticity and flexibility in a bottom-up approach (Glenn Reynders, KU LEUVEN)
 - benefits and challenges of building design evaluation on a district level.
 - stochastic occupant behavior and energy flexibility.

10:30-12:30

- Workshop/training on district energy modeling (neighborhood level case study simulated with the IDEAS library)

14:00-15:30

- Modelica Models Use in Building Operations: Learnings from the Annex 60 (R. Sterling, National University of Ireland)

16:00-18:00

Workshops: applications and case studies

- DACCOSIM, open source co-simulation master platform (J.P. Tavella, EDF)
- Application of co-simulation for modeling novel innovative cooling system (G Leroux, LOCIE/CEA)
- workflow automation tool (S Rouchier, LOCIE)

Friday, Oct. 28th 2016

8:30-10:00

- Continuation of Annex 60 as IBPSA Project 1

10:30-12:30

- Poster session

For online registration, please use the following link:



<http://goo.gl/forms/0QUxIOeosQj2nw0g1>

Registration fees

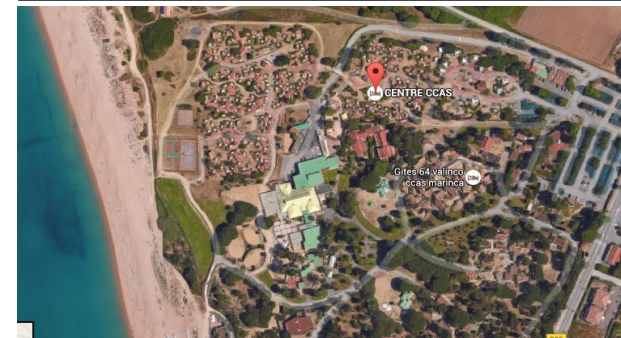
(includes housing and meals):

- PhD students and post-docs 500 Euros
600 Euros after September 30,2016
- Research institution 600 Euros
700 Euros after September 30,2016
- Industrial institution 800 Euros
900 Euros after September 30, 2016

Dates: October 24-28, 2016

Place: Centre de vacances CCAS Marinca
20166 Porticcio, Corse

<http://corse.cmcas.com/marinca-ct-porticcio/>



For more information, please contact us at:

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