

# SSB 2018

**LIEGE – DECEMBER 10-12, 2018**

*10th International Conference on System Simulation in Buildings*

**Thermodynamics Laboratory & BEMS  
University of Liege**

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Editors: V. Lemort – Conference Chairman  
P. André – Scientific Committee Chairman  
F. Ransy – Conference Secretary

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## Welcome

On behalf of ULiège and the Organizing Committee we would like to welcome you to System Simulation in Buildings 2018, the 10<sup>th</sup> International Conference of this kind organized by the Thermodynamics Laboratory and Building Energy Monitoring and Simulation (BEMS). The purpose of the conference is to bring together academics, professionals and practitioners involved in development and application of simulation tools for buildings and HVAC systems. Given the large scope of this area and the diversity of developments in this very active domain, the conference addresses multiple applications: modeling and integration of HVAC systems in buildings, energy storage, district heating networks, ventilation, control and management, integration in smart energy grids, renewable energy sources and heat pumps.

Different stages of building life cycle are covered by the 36 peer-reviewed papers submitted to the conference and the two plenary sessions: from conceptual design through building operation and to renovation.

The conference takes place in the beautiful city of Liège, with its particular prior Christmas atmosphere.

We hope that you will find the program interesting and enjoyable.

Vincent Lemort  
Conference Chairman



## General information

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### Location

The conference will be held at the Bocholtz hotel, which is located in the city center of Liege (Place Saint-Michel 80, 4000 Liège).

### Internet Access

Wi-Fi access is freely available in the conference room. The password will be available in the participant registration pack.

### Technical Information

Oral presentations will have a 20-minutes speaking timeslot, followed by 5 minutes for discussion. It is essential that all presentations are pre-loaded on the projection computer before the session. Please submit all presentations to the secretary as soon as possible.

### Social Events Program

Participant registration pack can be retrieved on the Monday morning at the entrance hall of the Bocholtz hotel from 8:30 am to 9:30 am.

A welcome drink will be held at the Bocholtz hotel on Monday evening just after the conference from 6:00 pm to 7:30 pm.

A tour and a gala dinner will be organized at the “Théâtre de Liège” building in the city center on Tuesday from 6:30 pm to 7:30 pm for the tour and from 7:30 pm to 11:00 pm for the dinner.



## Conference Program

### Monday 10 December 2018: Morning sessions

08:30 – 10:00	PARTICIPANTS REGISTRATION
SESSION 1 10:00 – 10:30	<h3 style="margin: 0;">OPENING SESSION</h3>
10:30 – 11:00	COFFEE BREAK
SESSION 2 11:00 – 12:45	BUILDING ENERGY SIMULATION 1
	SESSION CHAIRMAN: LIEVE HELSEN
	<i>Modeling framework for the simulation and control of greenhouse climate</i> <b>Queralt Altes-Buch – University of Liege</b>
	<i>Equivalent wall method for dynamic modelling of thermal bridges in low-energy building: application and parametric study</i> <b>Julien Quinten – Umons</b>
	<i>Study on the Krylov Subspace Method for Computationally Efficient Building Energy Simulations</i> <b>Donghun Kim – Purdue University</b> <u>Speaker: Davide Ziviani</u>
<i>Positive Energy Houses, envelope and systems integrated optimization by means of dynamic simulations</i> <b>Pauline Abrahams – University of Liege</b>	
12:45 – 14:00	LUNCH BREAK

### Monday 10 December 2018: Afternoon sessions

<b>SESSION 3</b> <b>14:00 – 14:50</b>	PLENARY SESSION
	<p><i>Emerging trends in HVAC&amp;R</i></p> <p><b>Eric Winandy</b> Director Integrated Solutions at Emerson Commercial &amp; Residential Solutions</p>
<b>SESSION 4</b> <b>14:50– 15:45</b>	DISTRICT HEATING NETWORKS
	SESSION CHAIRMAN: PIERRE DEWALLEF
	<p><i>Economic and environmental comparison of a centralized and a decentralized heat production for a district heating network implementation</i></p> <p><b>Thibaut Résimont – University of Liege</b></p>
	<p><i>Impact and detection of malfunctions on district heating networks</i></p> <p><b>Antoine Fabre – Ecole des Mines de Paris</b></p>
<b>15:45 – 16:15</b>	COFFEE BREAK
<b>SESSION 5</b> <b>16:15 – 18:00</b>	INTEGRATION OF BUILDINGS IN ELECTRICITY GRIDS
	SESSION CHAIRMAN: MICHAEL KUMMERT
	<p><i>Hybrid Heat Pump Scenarios as a Transition towards more Flexible Buildings</i></p> <p><b>Anke Uytterhoeven – KU Leuven</b></p>
	<p><i>Heat Pump Ready for Smart Grid – Evaluation of Operation Strategies</i></p> <p><b>Wolfram Stephan – Technische Hochschule Nürnberg</b></p>
	<p><i>A methodology to evaluate hourly CO2 factors of the electricity mix to deploy the energy flexibility potential of Norwegian buildings</i></p> <p><b>John Clauß – Norwegian University</b></p>
	<p><i>Modelling of a village-scale Multi-Energy System (MES) for the integrated supply of electric and thermal energy</i></p> <p><b>Francesco Lombardi – Politecnico di Milano</b></p>

## Tuesday 11 December 2018: Morning sessions

<b>SESSION 1</b> <b>08:45 – 10:30</b>	VENTILATION AND AIR HANDLING PROCESSES
	SESSION CHAIRMAN: SAMUEL GENDEBIEN
	<i>Model development of a new enthalpy exchanger under wet conditions in the frame of a single room ventilation</i> <b>Antoine Parthoens – University of Liege</b>
	<i>Cascaded liquid desiccant displacement ventilation combined with liquid desiccant membrane chilled ceiling</i> <b>Kamel Ghali – American University of Beirut</b>
	<i>Flexible design of a hybrid air conditioning system</i> <b>Rasha Mustapha – Ecole des Mines de Paris</b>
<i>Experimental and numerical investigation on winter performance of hybrid liquid desiccant system</i> <b>Ying Xie – Tsinghua University</b>	
<b>10:30 – 11:00</b>	COFFEE BREAK
<b>SESSION 2</b> <b>11:00 – 12:45</b>	MODELING, SIMULATION AND TESTING OF HEAT PUMPS
	SESSION CHAIRMAN: DAVIDE ZIVIANI
	<i>Modeling of an exhaust air heat pump used for heating and domestic hot water production</i> <b>Frédéric Ransy – University of Liege</b>
	<i>Multi-criteria Air Source Heat Pump Water Heater optimization combining optimized thermodynamic performance and control</i> <b>Kevin Ruben Deutz – EDF R&amp;D</b>
	<i>Modeling of an air-to-water heat pump for heating and domestic hot water</i> <b>Cristian Cuevas – Universidad de Concepción</b>
<i>Experimental Characterization of Fault Impacts on the Functioning Variables of Inverter Driven Heat Pumps</i> <b>Derek Noël – EDF &amp; Ecole des Mines de Paris</b>	
<b>12:45– 14:00</b>	LUNCH BREAK

### Tuesday 11 December 2018: Afternoon sessions

	PLENARY SESSION
<b>SESSION 3</b>  14:00 – 14:50	<i>Simulation based Optimization Processes for Buildings and City Districts</i> <b>Dirk Muller – RWTH Aachen University</b>
	INTEGRATION OF COLLECTIVE HEATING SYSTEMS IN BUILDINGS
	SESSION CHAIRMAN: WOLFRAM STEPHAN
	<i>An energetic comparison between collective heating systems and individual heating systems in apartment buildings</i> <b>Margot De Pauw – Kenniscentrum Energie Thomas More Geel</b>
<b>SESSION 4</b>  14:50–16:10	<i>Hydronic integration of heat pumps in collective heating system of buildings</i> <b>Freek Van Riet – UAntwerpen</b>
	<i>Solar and Heat Pump Systems: parallel vs series configurations analysis</i> <b>Javier Vega – Universidad de Concepción</b>
<b>16:10 – 16:40</b>	COFFEE BREAK
	BUILDING ENERGY SIMULATION 2
	SESSION CHAIRMAN: MADJID MADJIDI
	<i>Assessment of the Energy Performance of building facades through different testing conditions and analysis techniques</i> <b>Gabrielle Masy – UCL</b>
<b>SESSION 5</b>  16:40– 18:00	<i>Impact of air-conditioning waste heat on air temperature in Paris during heat waves</i> <b>Brice Tremeac – CNAM</b>
	<i>Validation of a BES model of an all-air HVAC educational building</i> <b>Bart Merema – KU Leuven</b>



### Wednesday 12 December 2018: Morning sessions

<b>SESSION 1</b> <b>09:10 – 10:00</b>	BUILDING ENERGY SIMULATION 3
	SESSION CHAIRMAN: GABRIELLE MASY
	<i>Connecting Thermal Building Simulation to Computational Fluid Dynamics - an experience report for TRNSYS and FDS</i> <b>Madjid Madjidi – University of Applied Sciences Munich</b>
	<i>A new approach to model transport delay in branched pipes</i> <b>Freek Van Riet – UAntwerpen</b>
<b>10:00 – 10:30</b>	COFFEE BREAK
<b>SESSION 2</b> <b>10:30 – 12:45</b>	ENERGY STORAGE IN BUILDINGS
	SESSION CHAIRMAN: ASSAAD ZOUGHAIB
	Thermodynamic simulation of quasi-isothermal compressed air energy storage <b>Ghady Dib – INSA de Lyon</b>
	<i>Development and Evaluation of a Rule-Based Heuristic Control Strategy for Ice Storage Systems in Residential Buildings</i> <b>Aaron Tam – Purdue University</b> <b><u>Speaker:</u> Davide Ziviani</b>
	<i>Towards a subsurface predictive-model environment to simulate aquifer thermal energy storage for demand-side management applications</i> <b>Tanguy Robert – University of Liege</b>
	<i>Optimized control for standing column wells in cold climate</i> <b>Camille Beurcq – Polytechnique Montréal</b>
Development of sophisticated heat pump heating systems considering different storage technologies: A comparative simulation study <b>Christian Vering – RWTH Aachen University</b>	
<b>12:45 – 13:30</b>	LUNCH BREAK

### Wednesday 12 December 2018: Afternoon sessions

<b>SESSION 3</b>  <b>13:30 – 15:40</b>	NON-CONVENTIONAL HVAC SYSTEMS
	SESSION CHAIRMAN: SYLVAIN QUOILIN
	<i>Numerical investigation of energy potential and performance of a residential building-integrated solar micro-cogeneration system</i> <b>Simon Martinez – Université de La Rochelle</b>
	<i>Cascading implementation of a magnetocaloric heat pump for building space heating applications</i> <b>Hicham Johra – Aalborg University</b>
	<i>Simulation of solar collectors with two low temperature heat engines for buildings applications</i> <b>Vaclav Novotny – Czech Technical University in Prague</b>
	<i>Dynamic modelling and control strategy of a heating system based on wood pellet boiler-stove</i> <b>Van Long Lê – CENAERO</b>
	<i>Evaluation of micro Combined Heat and Power systems in the Walloon residential sector through dynamic simulation</i> <b>Vincent Cousin – University of Liege</b> <u>Speaker:</u> Philippe Andre
<b>15:40– 16:40</b>	<b>CLOSING SESSION</b>

## Sponsors & Supporters



IEA-EBC - International Energy Agency – Energy in Buildings and Communities Programme



Federation of European Heating, Ventilation and Air Conditioning Associations



University of Liège



Association Royale de la Technique du chauffage, de la ventilation et de la climatisation - Koninklijke Vereniging van de Verwarmings-, ventilatie- en klimaatbeheersingstechniek



IBPSA - Journal of Building Performance Simulation



Building Simulation: An International Journal – Springer Press

## Organization Committee



**Vincent Lemort**  
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## Scientific Committee

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DEWALLEF Pierre (Belgium)

FISSORE Adelqui (Chile)

FRERE Marc (Belgium)

HEISELBERG Per (Denmark)

HELSEN Lieve (Belgium)

JIANJUN Xia (China)

KUMMERT Michael (Canada)

LEBRUN Jean (Belgium)

MADJIDI Madjid (Germany)

MASY Gabrielle (Belgium)

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SAELENS Dirk (Belgium)

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XIAOHUA Liu (China)

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## Participant list

Altès-Buch Queralt	ULiège	Belgium
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Baiwir Romain	ULiège	Belgium
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Hannay Jules	JCJ Energetics	Belgium
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Marguerite Charlotte	CENAERO	Belgium
Martinez Simon	UNIVERSITE DE LA ROCHELLE-LaSIE	France
Masy Gabrielle	UCL	Belgium
Merema Bart	KU Leuven	Belgium
Müller Dirk	RWTH Aachen University	Germany
Mustapha Rasha	MINES PARISTECH	France
Noël Derek	EDF R&D	France
Novotny Vaclav	Czech Technical University	Czech Republic
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Quinten Julien	UMons	Belgium
Quoilin Sylvain	ULiège	Belgium
Ransy Frédéric	ULiège	Belgium
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Robert Tanguy	University of Liège	Belgium
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Tréméac Brice	Conservatoire National des Arts et Métiers Laboratoire du Froid	France
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Van der Veken Jeroen	CSTC	Belgium
Van Riet Freek	UAntwerpen	Belgium
Vega Javier	ULiège	Belgium
Vering Christian	RWTH Aachen University	Germany
Winandy Eric	Emerson Climate Technologies	Belgium
Xie Ying	Tsinghua University	China
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