

Editorial

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Building and system simulation, although tackled by researchers and scientists for years, still appears as a very important activity domain in engineering science. Progress is underway and still expected in many areas like extending modelling issues, improving algorithms, encapsulating knowledge, increasing confidence in simulation results and others.

In 1982, the System Simulation in Buildings (SSB) conference was launched by Professor Jean Lebrun at the University of Liège. From the very start, the scope of the conference was clearly defined: to address the scientific background of the application of simulation in buildings with a major focus on the HVAC system side, gathering a small size but highly dedicated scientific community. Every four years, the conference was repeated, keeping the same objectives and context.

In December 2010, the eighth SSB Conference was organized at the University of Liège, the first edition after Jean Lebrun's retirement. The success of this edition was in line with previous organisations as 44 papers were presented. The Scientific Committee of the conference, which I was honoured to chair, selected a subset of papers for publication within *Building Simulation: An International Journal*. This topical issue presents the first result of this selection and proposes 9 papers, covering the whole chain of energy transfers in building, examined from the simulation side.

Starting from the room and occupant level (the ultimate goal of buildings), the paper from Romain Nouvel addresses the issue of improving thermal comfort by using a novel HVAC system, analysed and optimized using simulation.

The distribution of heat and cold energy, through air or water-based networks, although having a strong impact on the global HVAC system efficiency, may have not received a great attention from the scientific community in the past.

Roel Vandenbulcke proposes an original and modular approach to tackle this non-linear problem.

Production of heat and cold still deserves a special attention from modellers. To develop and propose adequate level sufficiently robust and not over-parametrized models while able to address major issues like part-load performance is still today a challenge. Heat pumping, mechanical or sorption-based compression, receive today a lot of interest from scientists: the papers from Paul Byrne, Renato Lepore, Sébastien Thomas and Fu Xiao present different approaches and different simulation objects in that important area.

As part of production systems, special and innovative components like foundation heat exchangers receive today the required attention from modellers. Lu Xing develops such an approach for modelling buried heat exchangers where the originality is to be connected to the building structure, imposing specific boundary conditions.

Control of systems very much dependent on ambient conditions represents a crucial issue. Clara Verhelst developed dedicated algorithms for the control of heat pumps in order to optimize the global performance.

The Modelica community is evidently fastly growing today. Vladimir Vukovic presents the application of this approach to solar thermal systems as a good example of the potential of this new area.

At the end of this process, it is my pleasure to thank all authors for the valuable effort they made to produce and improve their papers, considering the very constructive and relevant remarks from reviewers. This involvement is for the conference organizers a major impulse to put SSB'2014 on tracks.

To conclude, on behalf of the SSB organizers, I would like to thank Prof. Xudong Yang and the edition staff of *Building Simulation: An International Journal* for the contribution made to the dissemination of the results of the Conference.