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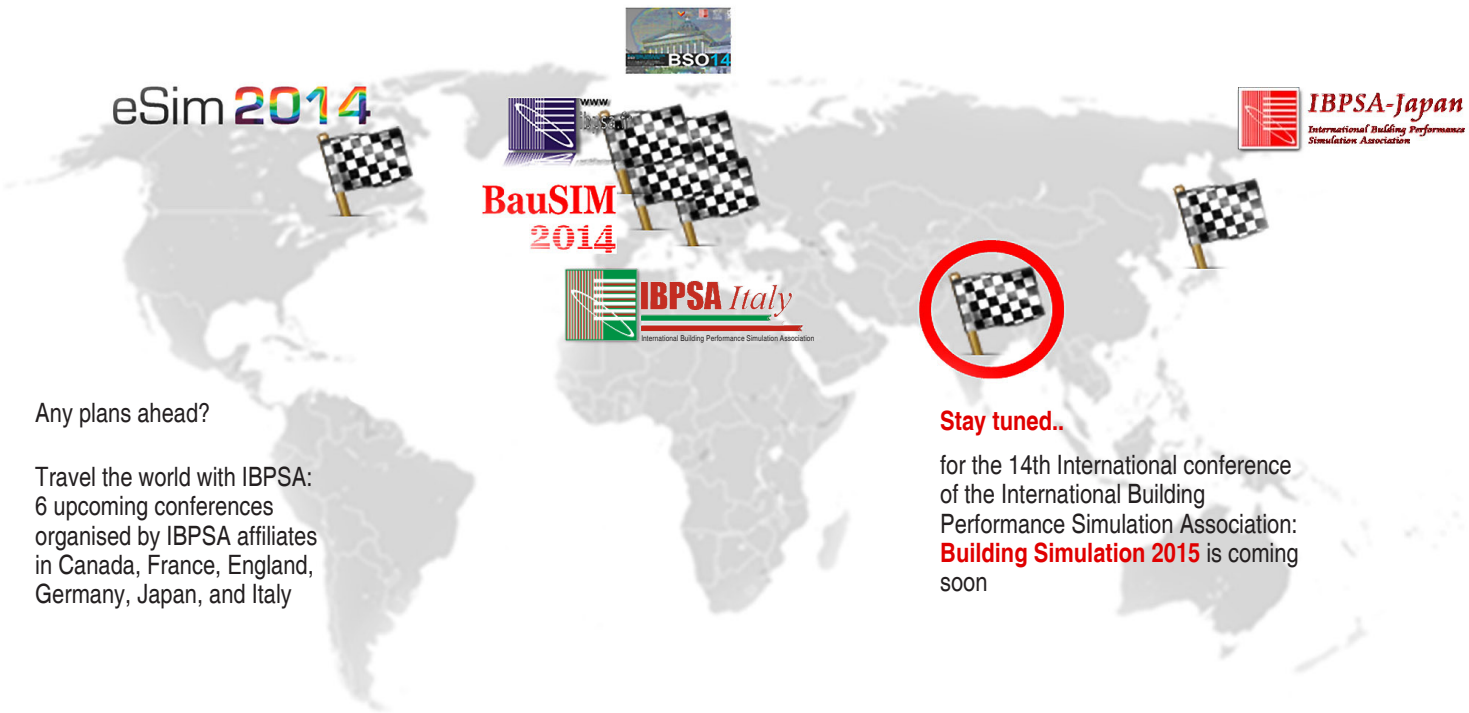
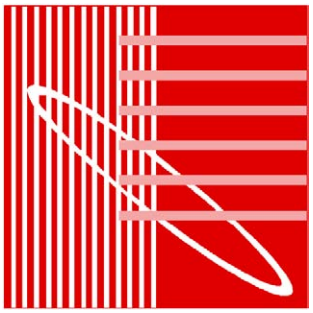


Any plans ahead?

Travel the world with IBPSA: 6 upcoming conferences organised by IBPSA affiliates in Canada, France, England, Germany, Japan, and Italy

Stay tuned..

for the 14th International conference of the International Building Performance Simulation Association: **Building Simulation 2015** is coming soon



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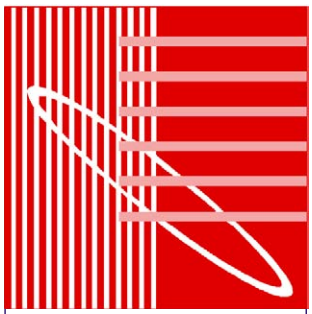

The International Building Performance Simulation Association exists to advance and promote the science of building performance simulation in order to improve the design, construction, operation and maintenance of new and existing buildings worldwide.

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President's message

Dear IBPSA colleagues and friends,

Many of you are probably just now preparing papers and presentations for an upcoming IBPSA regional conference, such as ASim (Japan), BSO (UK), BSA (Italy), BauSim (Germany), SimBuild (USA), or eSim (Canada). Being smaller than the international *Building Simulation* conferences, these events afford excellent opportunities to meet and network with the leading practitioners, tool developers, and researchers in specific regions. Many also offer BPS tool training courses and workshops in conjunction with the conferences. Having participated in a number of these events in the past, I can attest to how useful they can be. I highly encourage everyone to make it to at least one of these conferences over the coming year.

While on the topic of conferences, I encourage you to start thinking now about your contributions for the next international *Building Simulation* conference, to be held in Hyderabad, India, in December 2015.

In previous newsletters I have talked about the growth of the organization in recent years. Many new affiliates have been added and the membership has increased significantly. This attests to the growing importance of the BPS field, and well as the relevance of IBPSA in serving the needs of the domain. But growth can also create challenges for an organization, so organizations must evolve and adapt. Prompted by a change in the laws governing not-for-profit corporations such as IBPSA, the organization is currently examining its governance structure with a view to simplifying and improving the organization's operations. This is an important step for IBPSA to continue to manage its growth in a positive manner. As a consequence of these changes to the constitution of IBPSA, within the next half year the membership will be asked to consider and vote upon these changes. More information will be provided in due course.

Once the above has taken effect, the first order of business will be the selection of a new Board of Directors and President. It is important for the health and vibrancy of the organization that the membership engage in these elections. New election procedures aimed at improving participation by the membership were discussed and agreed upon at last year's board meeting. I am pleased that Veronica Soebarto has agreed to act as IBPSA's Elections Officer to implement these new procedures, which will be communicated to the full membership when the time comes.

Happy simulating to all.

Alternative Metrics

SCImago Journal Rank & Source Normalised Impact per Paper (SNIP)

Introduction

The SJR (SCImago Journal Rank) indicator is a metric which weights citations based on the impact of the citing journal but using Scopus as its data source rather than Thomson Reuters citation databases. SJR is similar to the Thomson Reuters Article Influence™ Score and also takes journal size into account. However, it is based on a three-year publication window instead of a five-year window and the weightings are different so the two measures are not comparable.

SJR rankings are freely available on the SCImago Journal & Country Rank website, www.scimagojr.com.

The SNIP, or the Source Normalised Impact per Paper metric, is based on data from the Scopus citation database which is produced by Elsevier. This means that SNIPs use a different data source to Impact Factors, Eigenfactors™ and Article Influence™ Scores which are based on the Thomson Reuters Citation Indexes. SNIPs will be available for titles listed in Scopus, so even if your journal does not have an Impact Factor it may well have a SNIP.

SNIPs were launched in January 2010 and are freely available on the CWTS website www.journalindicators.com and the Elsevier site www.journalmetrics.com as well as being integrated into the Scopus Journal Analyzer.

SCImago Journal Ranks (SJRs) were incorporated into the Elsevier site and the Scopus Journal Analyzer at the same time as the SNIP launch.

SCImago Journal Rank

The *Journal of Building Performance Simulation* has seen an increase in SJR ranking since its inclusion, from 0.353 in 2010 to 1.113 in 2012. The positive increase in ranking can be seen in **figure 1**. The increase relative to three

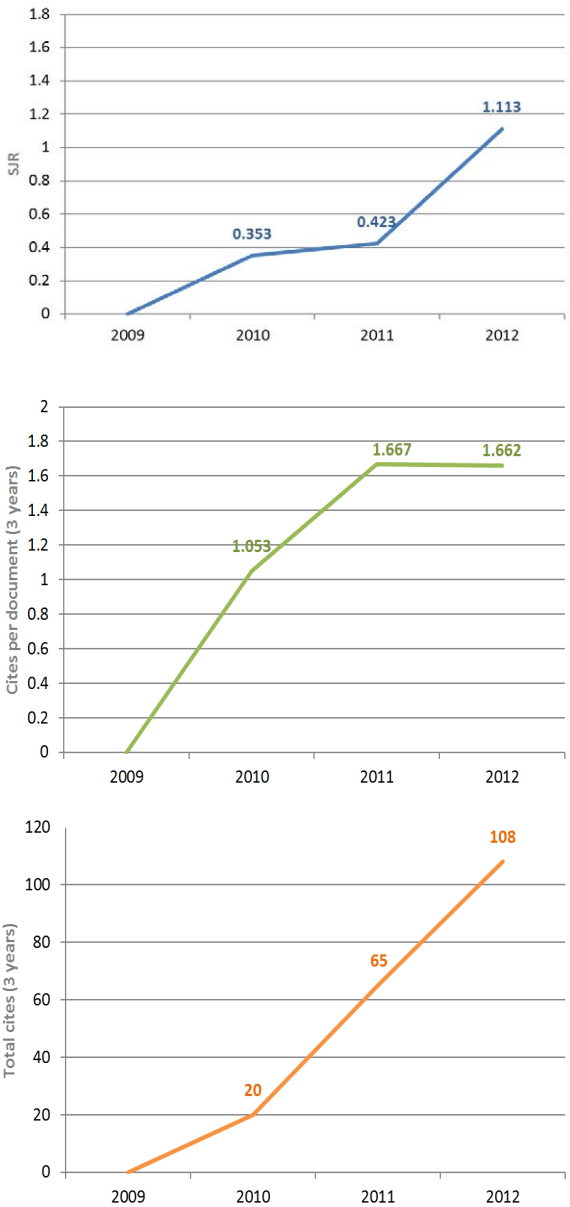

Fig 1: Journal of Building Performance Simulation SCImago Journal Ranking 2009-2012

competitor journals (*Building Services Engineering Research and Technology*; *Energy and Buildings*; *Building and Environment*) is shown in **figure 2.**

The percentage of uncited papers decreased from 2010 with the number of citations increasing. This will have a positive impact on the Journal with regards to the calculated SJP. **Figure 3** shows the number of cited vs. uncited papers in two year groups.

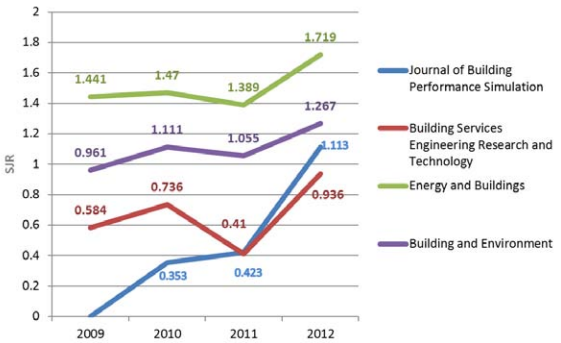

Fig 2: Journal of Building Performance Simulation relative to competitor titles 2009-2012

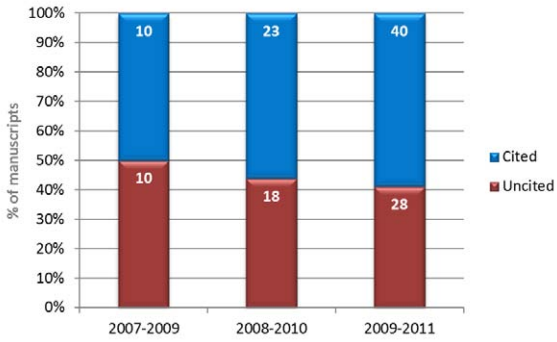

Fig 3: Distribution of citations for Journal of Building Performance Simulation

SNIP

The Journal has seen an increase in SNIP value from 2010 in conjunction with an increased number of published papers. This can be seen in **figure 4**.

The placing of the Journal compared to competitor titles can be seen in **figure 5**.

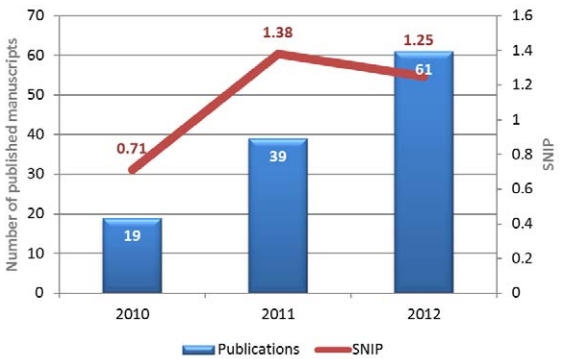

Fig 4: Journal of Building Performance Simulation SNIP 2010-2012

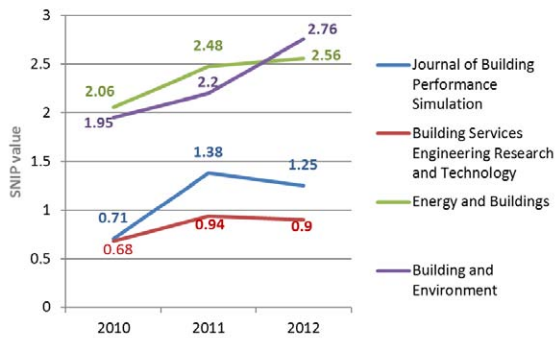

Fig 5: Journal of Building Performance Simulation SNIP relative to competitor titles 2010-2012

SCImago. (2007). SJR — SCImago Journal & Country Rank. Retrieved March 11, 2014, from www.scimagojr.com

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© 2013 Centre for Science and Technology Studies, Leiden University, The Netherlands - See more at www.journalindicators.com/#sthash.YFLz1DwX.dpuf

Projects and work at the Lawrence Berkeley National Laboratory:
an interview with Phil Haves and Michael Wetter

IBPSA related research: Tell us more about your work!

*We continue ibpsa*NEWS's *new feature describing the work of research institutes, university faculties and other organizations that are actively involved with IBPSA related research. This is intended to provide more insight into organisations around the world and to answer questions that cannot be easily found on a website, to update you about news and openings, or to showcase potential collaboration opportunities.*

*In the last ibpsa*NEWS *(October 2013), we introduced the BS2013 conference hosts,the Université de Savoie – LOCIE, INES and CEA. This time, we are focusing on the work of two members of the Simulation Research Group at Lawrence Berkeley National Laboratory (LBNL).*

Christina Hopfe (CJH) spoke to Phil Haves (PH) the Leader of the Simulation Research Group at LBNL and Michael Wetter (MW) the Deputy Leader about their projects and work on the West Coast of the United States. Both of them are IBPSA Fellows and belong to the group driving building simulation. Phil was one of the first IBPSA Fellows announced at BS 2011 in Sydney/ Australia, and Michael was awarded his Fellowship at BS2013 in France.

If you are interested in publishing an article describing the work of your faculty or research group, please contact Christina Hopfe (C.J.Hopfe@lboro.ac.uk).

Christina J Hopfe (CJH): Could you please start by introducing your research group at LBNL, and the different research streams you follow (e.g. Modelica, Simergy, etc)?

Michael Wetter (MW): The mission of the Simulation Research Group is to develop analysis methods to advance the energy performance of buildings, and implement tools and processes leading to universal high performance and informed planning for sustainable communities. To realize this, we do research and development that covers all aspects of building simulation, ranging from product development to building design and operation. The Simulation Research Group is one of the original EnergyPlus developers. This development is augmented with projects that develop and deploy tools for rapid prototyping and testing of HVAC and controls (the Modelica Buildings library), for co-simulation and model use during operation (the Building Controls Virtual Test Bed), for interoperability of data (Building Information Modeling) and for interoperability between models and simulators (based on the Functional Mockup Interface standard). Our work on the Simergy graphical user interface targets directly the deployment of EnergyPlus.

Phil Haves (PH): The Simulation Research Group consists of around 20 people working in a number of interrelated areas as outlined by Michael. We work on both the development and the application of tools and aim to have people work in both areas, since we think work in one area informs work in the other.

MW: Our group is also co-leading two International Energy Agency projects under the umbrella of the Energy in Buildings and Communities Programme (IEA EBC): IEA EBC Annex 60 develops new generation simulation tools based on the Modelica and Functional Mockup Interface Standards, and IEA EBC Annex 66 develops and implements models of user behavior.

CJH: How many PhD students/ postdocs do you have currently working in these fields? Will there be any openings in the near future?

PH: About half the group consists of PhD students and postdocs (currently 5 to 10 post-docs and PhD students). The PhD students are mostly registered at UC Berkeley, some have been at Stanford and some are visitors from different parts of the world who typically come for 6-12 months. We are always open to students and academic visitors who share our research interests and are self-funding. Funded positions arise from time to time, linked to externally funded research projects. We will keep IBPSA members posted regarding any new opportunities.

MW: We are typically looking for bright, motivated emerging researchers who can work across disciplines and who have a strong scientific foundation that allows them to actively participate in and contribute to our current research and development.

CJH: What are the main links nationally and internationally (e.g. collaboration with other universities and partners)?

MW: Our group is currently co-leading two large projects of the IEA EBC Programme. One is Annex 60, which I co-lead with Christoph van Treeck from RWTH Aachen. Annex 60 is developing new generation computing tools for buildings and community energy systems based on the Modelica and the Functional Mockup Interface standards. We will develop and demonstrate next-generation computational tools that allow building and community energy grids to be designed and operated as integrated, robust, performance based systems. 37 institutes from 16 countries are participating in Annex 60. Tianzhen Hong from our group is co-leading, with Da Yan from Tsinghua University, the Annex 66. Its objectives are to set up a standard occupant behavior definition platform, establish a quantitative simulation methodology to model occupant behavior in buildings, and understand the influence of occupant behavior on building energy use and the indoor environment. This Annex is just starting, and currently 57 organizations from 24 countries have expressed interest in participation.

PH: We have strong links with UC Berkeley – Building Science, Electrical Engineering and Computer Science and Mechanical Engineering - and also have links with UC San Diego, Stanford, Georgia Tech, MIT, the National Renewable Energy Laboratory and Pacific Northwest National Laboratory. Internationally, our links include Tsinghua, University College London, Cambridge, Loughborough, TU Eindhoven and the Federal University of Santa Catarina. Many of these links involve people who are active in IBPSA. We have strong links with a number of large Architecture & Engineering firms and with a variety of smaller but innovative and influential firms that make extensive use of simulation.

MW: In addition, Phil Haves has a joint appointment with the University College London. These direct collaborations are augmented with various visiting scientists and faculty in our group, as well as with projects with various companies from around the world.

CJH: Do you experience problems as a result of the way that funding must always be put in place upfront, e.g. have you lost any significant potential research work because existing funding ran out?

PH: In the US, continuity of federal funding is challenging because the Congress allocates funding to agencies such as the Department of Energy on a yearly basis. We have been able to maintain a diverse set of funding sources to reduce the effect of fluctuations in funding from any one source.

MW: Having to put funding upfront is not a major problem in my view as long as the scope can somewhat be adjusted based on emerging research needs and opportunities to integrate latest results from other researchers. A bigger problem I see is that most projects are usually limited to one to two years, and frequently too small to allow a deep multidisciplinary collaboration. This makes it difficult to work towards larger goals in multidisciplinary teams that can invent across domain boundaries. This is unfortunate as the biggest potential for innovation is exactly across these boundaries of different domains. This is where research labs and universities can be in a leadership role as it is difficult for industry to work outside their core expertise. I think that, ideally, projects would involve experts from multiple disciplines and have a scope of three to five years. Of course, in this setting, there will be technology off-ramps that bring some of these developments to market in the early years, but a longer horizon and collaborating with experts from different fields would in my view lead to faster and bigger impact. The longer project duration would also allow putting in place a solid foundation as opposed to trying to implement something quickly due to limited time, funds, expertize or vision. I see that such quick implementations often lead to higher costs in later redesign and maintenance. If projects are not integrated with larger, long-term efforts, they often end up not being adopted.

"the biggest potential for innovation is across the boundaries of different domains"

CJH: Michael, I am wondering if there are any further plans with respect to GenOpt? At the moment this project appears to be dormant, is that the case? Is there anything planned for the future that Modelica for instance will facilitate in the realm of optimization, for example in terms of speeding up the optimization process?

MW: The GenOpt development is currently limited to maintenance as other projects, mainly Modelica, FMI-based co-simulation, and the Building Controls Virtual Test Bed, are of higher priority. However, we open-sourced GenOpt and put its code on github. Recently, ExpertApp implemented GenOpt in N++, a graphical user interface for EnergyPlus, and GenOpt has already been made available by TESS a few years ago as an add-on to TRNSYS.

CJH: Which project(s) would you like to see taking off in the next 5 to 20 years' time? E.g. where do you see the future of Modelica and how does this relate to, for instance, current simulation engines such as EnergyPlus?

MW: In the future, building simulation should be an integral part of the design and operation of buildings that provides the designer with quantifiable performance, under consideration of the inherent variability of building usage. Simulation will also be used to monitor and actively control the building operation, including its interaction with the electrical grid to provide elastic load management. This will lead to energy and grid-aware building operation. Building modeling will also be used to quantify performance and enforce accountability between all stages of building delivery and operation. Here, a model can serve as an executable specification of the design intent against which buildings are commissioned and the operation is being monitored.

Such processes will require a much higher level of abstraction and a separation of concerns between modeling that specifies the system, simulation that computes solutions, and applications that integrate this IT technology

into a variety of processes. I see here Modelica and the Functional Mockup Interface as two key technologies. They provide stable standards into which industry can invest, and they have the required abstraction to be integrated into a variety of processes. Both are open standards, jointly developed by academia and industry, which have large interdisciplinary ecosystems of developers. Such an interdisciplinary approach between academia and industry is critical for the development of such a technology, as it provides real world requirements, a scientifically sound basis for implementation, and is governed by a standard into which industry can invest. Collaboration with this community also brings to our building simulation community expertise that is currently not present. What these efforts create is essentially a software stack that separates modeling, code generation and simulation, and standardizes the main interfaces. This is not new in computer science. Separation of concerns has been proven useful in operating systems, in network design, in web browsers and a variety of other applications.

PH: Our key strategies are to make increasing use of improved software architectures and numerical methods, to extend the use of simulation throughout the building life-cycle, from early design to operation, to address currently unmet needs, e.g. controls, and to extend to the urban scale, including interactions between the building and the electric grid. Enhancing the usability of simulation is also a strategic goal. Major tools, such as EnergyPlus, will continue to evolve rather than being replaced. As an example, EnergyPlus can now link to Modelica through the Functional Mockup Interface.

MW: With regard to EnergyPlus, we are now working on a prototype simulation engine that is based on the Functional Mockup Interface standard. Models of HVAC and control systems will be exported from Modelica as a Functional Mockup Unit, and envelope components may be written in other languages and again exposed through the Functional Mockup Interface. A so-called master algorithm will then orchestrate the computation of a simultaneous solution. A requirement is that the user-facing applications such as OpenStudio and Simergy won't have to change, as this would require retraining and retooling. However, the engine will better address the needs of very low energy building systems, facilitate the integration of simulation in the operation of buildings, and enable the performance based building delivery and operation processes that I discussed earlier. Such a modular design will also leverage modern software technologies and advanced mathematical algorithms that are needed to properly represent the operation of buildings. The new design is built on open source components to allow others to contribute to its development, and to allow the private sector to integrate the developed technologies into their IT solutions.

CJH: Building performance simulation in 50 years' time: How do you imagine/ want it to be?

PH: Simulation methods and tools need to become more flexible, extensible and robust and also need to integrate seamlessly into evolving workflows for current and new applications. Ultimately, simulation of all kinds of phenomena and systems will become pervasive and more embedded and will more completely become a means to a variety of different ends rather than an end in itself. We will know we have made real progress when it is generally assumed that simulation will automatically be applied wherever and whenever it can be useful.

"Simulation methods and tools need to become more flexible, extensible and robust and also need to integrate seamlessly into workflows"

MW: 70 years ago, Tom Watson, chairman of IBM, predicted that there will be a world market of maybe 5 computers. 40 years ago, Ken Olson, founder of Digital Equipment Corporation, said "there is no reason anyone would want a computer in his home." 30 years ago, John C. Dvorak stated the mouse as a reason the Macintosh would fail: "The Macintosh uses an experimental pointing device called a 'mouse'. There is no evidence

that people want to use these things." I risk becoming a fool if I were to make predictions for how building simulation will be in 50 years' time. As a building simulation community, our responsibility is to ensure that we put the tools, processes and training in place that ensures that the built environment is designed and operated as a robust, performance based system that limits its ecological footprint across its whole life cycle. What makes this challenging is that in view of climate change, we only have one opportunity to get it right, and the solution must scale world-wide to existing and new buildings and communities.

"What makes this challenging is that in view of climate change, we only have one opportunity to get it right, and the solution must scale world-wide"

CJH: One final question: Are you currently looking for national or international collaborations – and if yes, in what area/ what sort of expertise are you looking for?

MW: We are always looking for national and international collaborations to further develop, test and deploy tools. We typically look for applications that have a mix between research, development and validation that extends the capabilities of today's simulation tools in areas that promise large energy savings across a sizeable fraction of the building stock. We typically search for partners who pose challenging interdisciplinary problems, who can work effectively across disciplines and who can recognize where new R&D is needed and where existing research can be integrated and adapted. My main interest is currently around Modelica, Functional Mockup Interface and co-simulation for buildings and community energy systems. We organize this collaboration within Annex 60. LBNL is also right now completing FLEXLab, a highly instrumented 650m^2 full-scale test facility that has been designed to test new building technologies. Our group supports FLEXLab from the computational side with model-based design methodologies, hardware in the loop and a virtual design studio. We are currently looking for industry partners who like to use this testing opportunity to develop and verify the performance of new building technologies.

"We are currently looking for industry partners"

PH: We are also on the look-out for collaborations and much of what we produce includes significant contributions from collaborating organizations and from individual visitors. In general, we look for people and organizations who can help us extend our capabilities and/or help us effectively deploy new technology in ways that maximize its impact.

CJH: Thank you Michael and Phil!

If you would like more information about the simulation research group at LBNL, or are interested in collaboration or knowledge exchange, please visit the group's web site at **http://simulationresearch.lbl.gov** or contact Michael Wetter or Phil Haves at:

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MS 90R3111
Berkeley CA 94720 USA
MWetter@lbl.gov or **PHaves@lbl.gov** ■

Forthcoming events

Date(s)	Event	Web site
2014		
13-16 April 2014	**SimAUD** Tampa, Florida, USA	http://simaud.org/2014
07-10 May 2014	**eSim 2014** Ottawa, Canada	http://esim.ca
11-13 May 2014	**ACEEE Energy Efficiency Finance Forum** Washington DC, USA	www.aceee.org/conferences/2014/eeff
20-21 May 2014	**IBPSA France bi-annual congress** Arras, France	http://conference2014.ibpsa.fr
23-24 June 2014	**Building Simulation and Optimization 2014** London, UK	www.bso14.org
28 June - 02 July 2014	**ASHRAE Annual Conference** Seattle, Washington, USA	www.ashrae.org
17-22 August 2014	**ACEEE Summer Study on Energy Efficiency in Buildings** Pacific Grove, California, USA	www.aceee.org/conferences/2014/ssb
08-12 September 2014	**2014 ASHRAE/IBPSA-USA Building Simulation Conference** Atlanta, Georgia, USA	www.ashrae.org/Simulation2014
22-24 September 2014	**BauSIM2014: Human-Centred Building** Aachen, Germany	http://bausim2014.ibpsa-germany.org
02-03 October 2014	**ASHRAE International Conference on Efficient Building Design** Beirut, Lebanon	www.icebd-met.com
16-18 November 2014	**ACEEE Intelligent Efficiency Conference** San Francisco, California, USA	www.aceee.org/conferences/2014/ie
28-29 November 2014	**ASim2014** Nagoya, Japan	www.ne.jp/asahi/ibpsa/japan/new
07-10 December 2014	**ACEEE Behavior, Energy, and Climate Change Conference** Washington DC, USA	www.aceee.org/conferences/2014/becc
10-12 December 2014	**System Simulation in Buildings 2014** Liège, Belgium	www.ssb2014.ulg.ac.be
16-18 December 2014	**PLEA 2014** Ahmedabad, India	www.plea2014.in
2015		
24-28 January 2015	**ASHRAE 2015 Winter Conference** Chicago, Illinois, USA	http://ashraem.confex.com/ashraem/w15/cfp.cgi

2015 (continued)		
04-06 February 2015	**2nd Building Simulation Applications Conference BSA2015** Bolzano, Italy	**www.unibz.it/en/sciencetechnology/welcome/IBPSA.html**
07-09 December 2015	**BS2015** Hyderabad, India	**www.bs2015.in**

Note that the dates in this calendar may, but do not necessarily, include pre and/or post-conference workshop days

07-10 May 2014 — eSim 2014

Ottawa, Canada
www.esim.ca

IBPSA Canada's 8th biennial eSim will be hosted by Carleton University in Ottawa on 08 and 09 May 2014, with workshops on 07 and 10 May. The conference will consist of two days with over 75 peer-reviewed paper presentations, two days of theory and software workshops, a technical tour, and a banquet. Over 200 delegates are expected.

The workshops will include:

- IES VE: (1) Advanced Daylighting Analysis (morning) & (2) Simulation and 90.1-2010 Energy Analysis for OPA Incentives (afternoon)
- ESP-r/TRNSYS Harmonizer
- Occupant behaviour and indoor environments
- Introductions to Open Studio/EnergyPlus and Open Studio Measures
- CAN-QUEST/eQUEST
- Digitizing and modelling existing buildings for sustainability
- EE4.

Carleton University is in the Nation's capital city, and is scenically surrounded by the Rideau River, and the Rideau Canal, a UNESCO World Heritage Site. The Rideau Canal is also the largest skating rink in the world. However, typical May weather sees highs of 20°C, so hikes along the Canal and in the nearby parks systems would be more seasonal! As a capital city, Ottawa is a city of 1.2-million diverse residents, world-class museums, and direct flights to most Canadian cities and European and American hubs. It is also a short train ride away from Montreal, Toronto, and Quebec City.

Further information can be found at **www.esim.ca**. Please direct any questions to eSim 2014 Chair Liam O'Brien at **liam_obrien@carleton.ca**. ■

23-24 June 2014
London, UK
www.bso14.org

Building Simulation and Optimization 2014: 2nd IBPSA-England conference

The second conference on Building Simulation and Optimization will take place on the 23-24 June 2014 in London. This biennial conference, organised by IBPSA-England and CIBSE, will be hosted by UCL (University College London). Post-conference workshops, training, and other events will be held on the 25 and 26 June.

BSO14 provides a forum for the exchange of knowledge on the development and application of building performance simulation to the optimum design and operation of buildings. It has four broad themes:

- New performance models and simulation methods
- Procedures for optimizing design and operation
- Real-world case studies
- Visualisation in the built environment

Keynote addresses will be given by Professor Ursula Eicker of the University of Applied Sciences Stuttgart (**www.hft-stuttgart.de/Hochschule/Organisation/Professoren/UrsulaEicker.html/de**) and Professor Philip Haves of Lawrence Berkeley National Laboratories (**http://simulationresearch.lbl.gov/people/haves-philip**).

The conference will be held at UCL in London. UCL was established in 1826 to open up education in England for the first time to students of any race, class or religion. It was also the first university to welcome female students on equal terms with men. Today UCL attracts students from 150 countries and has active exchange and research links with more than 280 overseas universities. League tables compiled using varying methodologies rank UCL as the 4th (QS World Rankings, 2012), 17th (Times Higher World Ranking, 2012) and 21st (Shanghai Jiao Tong University, 2012) best university in the world.

A full conference flyer is attached to the back of this edition of *ibpsa*NEWS

The last date for Early Bird registration is **16 April 2014**. For full details check out the conference website **www.bso14.org**. ■

08-12 September 2014
Atlanta, Georgia, USA
www.ashrae.org/Simulation2014

2014 ASHRAE/IBPSA-USA Building Simulation Conference

On September 8-12, 2014, ASHRAE and IBPSA-USA will jointly host a conference at the Marriott Buckhead Hotel and Conference Center in Atlanta, Georgia. This conference merges the IBPSA-USA SimBuild and ASHRAE Energy Modeling Conferences. ASHRAE and IBPSA-USA are convening this conference to improve the industry's ability to accurately model building performance. The focus is on making better decisions through the application of simulation and modeling over the entire building life cycle from the earliest concept through operation and maintenance. The conference brings together the building energy analysis and performance simulation community for three days of discussion, seminars, and short courses. Modelers, software developers, owners, and researchers will address the practices of energy modeling and building performance simulation using existing simulation tools, software development, and future simulation research and applications.

Technical papers will be presented on 10-12 September, preceded by workshops and courses for a limited number of delegates on 8 and 9 September.

The theme of the conference is **BIM, BEM and SIM – Integrated Building Design and Modeling**. Technical papers will address the integration and interoperability of analytic modeling tools (BEM and SIM) with physical modeling tools (BIM) including topics such as:

- Energy efficiency
- HVAC component modeling
- Urban scale modeling
- HVAC load analysis
- Lighting and daylighting
- Combined use of tools
- Co-simulation
- Optimization
- Algorithm advances
- Computational fluid dynamics
- Data exchange
- Data Interoperability
- Energy auditing
- Life cycle cost analysis
- Economic analysis
- Model calibration
- Model validation

In addition to refereed papers, the conference will include informal seminar presentations. Vendor workshops and invited speakers will complete the conference program.

The last day for Early Bird registration is 24 July 2014.

For more information, see **www.ashrae.org/Simulation2014**. ■

BauSIM 2014: Human-Centred Building

22-24 September 2014
Aachen, Germany
http:// bausim2014.ibpsa-germany.org

The next IBPSA-Germany and Austria conference BauSIM2014 will take place from 22-24 September 2014 in Aachen, Germany, with *Human-Centred Building* as its main theme. The event will be hosted by RWTH Aachen University.

The town of Aachen (Aix-la-Chapelle) is located at the three-country border of Belgium, The Netherlands and Germany. The conference venue is located in the city centre of Aachen within walking distance of most hotels.

Abstracts are due by **30 April 2014**.

For further details please refer to the conference website **http://bausim2014.ibpsa-germany.org** . ■

SSB 2014: 9th International Conference on System Simulation in Buildings

10-12 December 2014
Liège, Belgium
www.ssb2014.ulg.ac.be/

The 9th International Conference on System Simulation in Buildings will be hosted by the Thermodynamics Laboratory at the University of Liège on 10-12 December 2014. The conference themes will be:

- Advances in modeling of building and HVAC components and systems
- Simulation assisted analysis and evaluation of building energy use
- Integration of buildings in smart energy grids
- Integration of renewable energy sources in buildings
- Near zero-energy buildings
- Impact of human behavior on building energy performance
- Advanced control of systems in buildings
- Modeling and simulation of innovative ventilation systems

Conference Calendar

A full conference flyer is attached to the back of this edition of *ibpsa*NEWS

- Deadline for submission of abstracts: 15 April 2014
- Abstract acceptance notification: 15 May 2014
- Manuscript submission deadline: 31 July 2014
- Notification of acceptance or rejection: 31 August 2014
- Deadline for early registration: 30 October 2014
- Pre-proceedings sent to registered participants: 12 November 2014

For further information, see the conference website **www.ssb2014.ulg.ac.be** or email the conference secretary, Francois Randaxhe at **ssb2014@ulg.ac.be** .■

16-18 December 2014
Ahmedabad, India
www.plea2014.in

PLEA 2014: 30th International Passive Low Energy Architecture Conference

Sustainable habitat for developing societies: choosing the way forward

Goal and Theme of PLEA 2014

PLEA is an autonomous, non-profit, network of individuals sharing expertise in the arts, sciences, planning and design of the built environment. Founded in 1981, PLEA organises international conferences and workshops; expert group meetings and consultancies; scientific and technical publications; architectural competitions and exhibitions. The goal of the 30th International PLEA Conference (PLEA 2014) is to promote discussion and debate on the learning, opportunities and challenges in passive low energy architecture and design in a rapidly growing world. Within this conference, we will deliberate on the choices we have and the choices we need to make in order to move towards a more sustainable habitat, especially for developing societies and emerging economies.

The local theme of this international conference speaks to the urgent need to reduce energy use in new and existing buildings in cities that are witnessing rapid growth and urbanization. Energy consumption in the building sector is more than one-third of the national energy use in India, and with further growth in this sector, India faces a formidable challenge in reducing its dependence on fossil fuels, natural resources and energy supply infrastructure. Buildings and cities in other emerging economies face similar challenges.

Deliberations during PLEA 2014 will help us in deploying various aspects of architectural and design science to realise buildings, neighbourhoods and cities that have minimal impact on natural resources whilst satisfying the comfort requirements and aspirations of a fast-developing society. Under this central theme, the conference will include a range of topics to understand the role of architectural practice, research and education towards addressing the issues of energy conservation, efficiency and management through design, construction and operational stages of buildings, neighbourhoods and cities.

Conference Timeline

The deadline for abstract submission has now passed.

- Full paper submission deadline: 16 May 2014
- 1st review of papers complete: 28 July 2014
- Final Paper Submission deadline; Early Bird Registration begins: 29 August 2014
- Announcement of Final papers accepted and notification of comments on Oral and Poster Presentations to Authors: 29 September 2014
- Final Programme and Timetable: 14 November 2014
- Early Bird Registration ends: 01 December 2014

About CEPT University and CARBSE

Established in 1962, CEPT University is India's premiere institute for providing education and conducting research in the areas of designing, planning, constructing and managing human habitats. The Centre for Advanced Research in Building Science & Energy (CARBSE) at CEPT University aims to provide an impetus for research on

energy efficiency in the built environment and energy resource management in general. Its objective is to conduct research in the fields of energy efficient building design, energy efficient construction processes, sustainable materials, and resource audit and management. The Centre has been awarded the status of a 'Regional Energy Efficiency Centre' on Building Energy Efficiency by the USAID ECO-III program and 'Centre of Excellence' by the Government of India's Ministry of New and Renewable Energy. CARBSE is supported by Gujarat Energy Development Agency, industry and various philanthropic organisations. CARBSE is also the Indian lead for research under the prestigious US-India Joint Centre for Building Energy Research and Development.

For further information visit **www.plea2014.in** or email **info@plea2014.in** . ■

4-6 February 2015
Bolzano, Italy
www.unibz.it/en/sciencetechnology/welcome/IBPSA.html

BSA2015: 2nd Building Simulation Applications Conference

IBPSA-Italy and the Free University of Bozen-Bolzano, Faculty of Science and Technology, are pleased to announce the second Building Simulation Applications Conference, which will take place in Bolzano on 4-6 February2015.

On the evening of 4 February delegates will be introduced to a taste of the South Tyrol with a welcome aperitif. The conference will open on the morning of 5 February with an address by the president of IBPSA International, Professor Ian Beausoleil-Morrison (Carleton University), and a keynote speech by Professor Jan Hensen (TU Eindhoven). The technical sessions will proceed in parallel all day with a pause for lunch - a special session being dedicated to the contributions of graduate students - and the first day will close with a keynote address by Professor Ardeshir Mahdavi (TU Wien). An IBPSA-Italy members' meeting will precede the conference dinner.

On the second day, 6 February, a keynote by Professor Athanasios Tzempelikos (Purdue University) will introduce the morning's technical sessions. After the coffee break, the final plenary session will be dedicated to best practices of building simulation use by professionals and design studios. Finally, the first set of IBPSA-Italy Awards will be presented for the best student papers and the best building simulation professional project.

The 1st Building Simulation Application Conference BSA2013 was held at the Free University of Bolzano on 30 January - 1 February 2013 with more than 70 delegates from many countries. It included 118 authors, 44 presentations and two keynote speeches. An electronic version of the proceedings can be downloaded free of charge from http://bupress.unibz.it/en/building-simulation-applications-bsa-2013.html .

For further details of BSA2015 and the call for papers, please visit the conference website **www.unibz.it/en/sciencetechnology/welcome/IBPSA.html** . The official conference language is English. ■

07-09 December 2015
Hyderabad, India
www.bs2015.in

Building Simulation 2015: 14th IBPSA International Conference

The International Building Performance Simulation Association's 14th international conference will be held in Hyderabad, India. The International Institute of Information Technology – Hyderabad (IIITH) will act as secretariat for this conference. BS 2015 will bring together academics, researchers and professionals from a broad range of science and engineering disciplines with the aim of sharing the latest technology and innovations and spearheading the practical application of building simulation in developing nations.

India is the second-fastest growing economy in the world and its construction sector is the country's second-largest economic activity, so we expect this conference to attract a rich mix of local and international participants.

BS 2015 will feature a wide range of topics such as:

- Thermal simulation
- Thermal comfort
- Daylight simulation
- Simulation of natural ventilation
- Simulation for passive measures
- Building-integrated photovoltaic systems
- Simulation for Code compliance
- Urban Scale simulation

The conference programme will include both oral presentations with question-and-answer sessions and poster sessions. There will be workshops on the energy performance of buildings and other building-related aspects such as acoustics, fire and water both before and after the main conference.

Conference Venue

Hyderabad is the 6th most populous city in India, with a rich mix of academic institutes and industries. It has been rated as best city in Asia for meetings, incentives, conferences and exhibitions. The city is emerging as a global hub for Information Technology, and the industry's growth is driving both commercial and residential construction. Hyderabad also leads the green building movement in India, with the local presence of the Indian Green Building Council, and it has a rich heritage of UNESCO Asia-Pacific historical sites. It was rated the best heritage city in India in March 2012.

The conference will be held in a state-of-the-art convention center managed by the Accor hospitality group. This has space for 32 breakout sessions, and the keynote session hall can accommodate over 1000 delegates.

More details about the conference can be found at **www.bs2015.in** . ■

IBPSA's role in social media:
an interview with Mike Barker

The International Telecommunication Union (ITU) has estimated that about six of the world's seven billion people had mobile phone subscriptions in 2011. According to the SilconIndia magazine the number will exceed the total number of people on the planet by the end of this year. The number of cell phone accounts will rise from 6 billion now to 7.3 billion in 2014, and in over 100 countries the number of cell phone accounts exceeds their population (Bysi Team, 2013).

Subscriptions to social media such as Twitter, Facebook and LinkedIn are growing every year. Mobile phones and mobile apps are a significant driver of social media usage because they provide easy access and make it possible to connect and exchange information with anyone, anywhere and anytime.

58% of the population have used or are currently using social media. Despite the relentless tide of telecommunication uptake which these figures suggest, it is notable that not everyone is a convert to social media. However, looking at the demographic profile of the converted an unassailable fact stands out: 98% of all 18-27 years old use social media (Browser Media, Socialnomics, 2014).

This prompts a question: if we want to attract new and young people to IBPSA, should social media play an active role in it?

It should be noted that there are however significant differences between purely social forums (such as Facebook and Snapchat) and rather more professionally intended platforms (LinkedIn, Xing, etc.)

Many people are put off by the idea of social networking in relation to work-related matters. They may be afraid to invest too much time in an activity that could be unrewarding, or they may be worried about becoming a target for spam or being forced to share private information which they prefer not to.

So the question is 'what benefit' can social media bring to IBPSA, and where do we draw the line?' To discuss this and learn more about the way IBPSA is already engaging with social media, Christina Hopfe (CJH) spoke to Mike Barker (MB), a consulting building services engineer specialising in building management and control systems. Mike has been active in IBPSA related work since 1995, and an IBPSA member since 2008.

Christina Hopfe (CJH): Mike, I'm seeing you cropping up everywhere on the internet, how many groups are you co-ordinating at the moment on LinkedIn that are linked to IBPSA related activity?

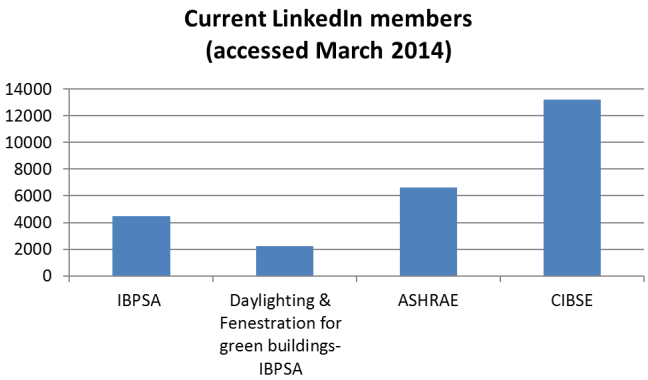
Mike Barker (MB): I kick-started the ASHRAE, CIBSE, and 2 IBPSA Groups back in 2008. I had an interest in social media and noticed that there was a lack of discussion among members of these organisations in a professional setting. Facebook did not work for professional people then, and other forums did not have a reach beyond their own narrow membership.

LinkedIn offered the opportunity to engage with the widest range of Practitioners, Academics and Policymakers, and the current 4500 and 2500 members come from way beyond the more focused interests of actual IBPSA members.

The CIBSE and ASHRAE Groups have also gone from strength to strength too. The ASHRAE and CIBSE Groups are held in high regard and even the current ASHRAE President and past CIBSE Presidents post online to these Groups now. The IBPSA Groups have yet to reach critical mass, although much of the current conversation has been acknowledged as having value.

CJH: How have you seen the membership in these groups growing in recent years?

MB: The two main IBPSA LinkedIn Groups have been developed to provide an interface between commercial and academic interests. 30% of the members are involved in the commercial aspects of the building materials industry, 30% are Architects with a technical bent, or practicing Energy Simulationists, and 40% are Academics or Policymakers.



There are other forums better suited for IBPSA technical and detailed academic discussion. The IBPSA mailing list is well established and works well, and it is promoted on the LinkedIn Groups.

CJH: On the IBPSA group forums, a plethora of different questions are discussed on a daily basis. I have noticed that you stay very active in replying to a number of different threads. What is your role in this?

MB: My involvement is to act as a publicist and even editor for a good deal of the goings-on, and also to drum up conversation. Often I will deliberately stir the pot in order to get things moving!

"[Group] members like to watch from the side lines - they want interesting and passionate debate"

These IBPSA LinkedIn Groups are a mixing pot. The Groups do need better support, the ratio of discussions to posts are still low – more interaction is desirable. This typically occurs once the group reaches a critical mass, and my gut feel (as observed with ASHRAE and CIBSE Groups) is that we need over 5000 members.

People want a little bit of entertainment too - that is the secret to making these Groups relevant and to keep them growing. The members like to watch from the side lines - they want interesting and passionate debate. So I will post a few controversial thoughts to get the blood pumping but these days others do it for me.

CJH: How do you see IBPSA's role in social media such as LinkedIn and how did you get involved in it yourself?

MB: Organisation Management understand that to grow their Organisations, both in terms of membership and recognition, they need to be in touch with their members, and even the members of associated organisations. There is no doubt that taking part in social media is one way forward – everyone gets a say no matter who you are and where you are.

I firmly believe that if you want to be part of an organisation you MUST contribute in some way - it can't work if everyone is a passive bystander. But how could someone sitting on the southern tip of Africa contribute?

I just happened to latch onto LinkedIn back in 2008 since I felt Facebook was not for Professionals - I started a few Groups in areas that I was working in and they took off. I then felt an obligation to continue to manage them although I have handed over most of the large ones.

"I started the National Fire Protection Agency (NFPA) LinkedIn Group … and it has 65,000 members"

A few organisations were not that keen on me setting up LinkedIn Groups under their banner in the beginning, but they now all see the benefits. For example I started the National Fire Protection Agency (NFPA) LinkedIn Group - they wanted nothing to do with it back in 2009-10 and I had to go to some lengths to promote it to their Executive. I am still a part-time manager and it has 65,000 members, and the NFPA are now quite proud of it - it allows them to talk to non-members around the world, and to expand their membership. Likewise the CIBSE and ASHRAE Groups have all grown to be very useful communications tools despite some reluctance by their management back in 2009.

CJH: What are pros and cons of using social media, such as LinkedIn?

MB: Since social media is hard to control, many people steer clear of it. Social media is almost uncontrollable and not everyone's cup of tea.

Pros and Cons? – Personally, since I am some distance from all the action, LinkedIn has helped me build an international network of experts in their field. So, instead of attending local events (as professionals would typically do in a large city in Europe or the US) I spend my time online doing much the same. I often promote particular causes, acting as a devil's advocate, a journalist, and even as a marketer.

CJH: What problems do you see IBPSA members facing?

MB: This point is most relevant from an IBPSA perspective: Building Simulation has moved out of the Lab, and it is now practiced by many people who are not Graduate Engineers or Architects. Many are draftsmen and CAD operators - they have little interest in the Academic side of things - it's just a job they do but they do have an interest in doing it well. How does IBPSA engage with them, if at all?

"How does IBPSA engage with draftsmen and CAD operators, if at all?"

There is also a group of building regulators, and building code officers - they have heard of simulation and energy models, but where can they learn more? They all need IBPSA to help them even though they don't know who IBPSA is. How do we change that? Perhaps the LinkedIn Groups can help by speaking to them, and giving them a voice? The IBPSA LinkedIn groups are there if they are needed - just another communications tool.

CJH: Quality assurance, personal/ professional boundaries etc. are topical issues in a fast moving media landscape and people need to form their own opinions on this. Do you think we need to start thinking about addressing QA problem in these online groups?

MB: IBPSA Groups are monitored and de-spammed on a continuous basis – and those who take part have suggested they have value. The Groups continue to grow so they must have some value.

CJH: Since the recent BS conference in Chambery last year, you have started the IBPSA Twitter account. Could you please update the IBPSA readership with regard to what is happening on there and tell us why you think it is worth members with twitter accounts following IBPSA?

MB: There are about 600 tweets and 200 members at the moment. Drury Crawley from Bentley Systems (IBPSA Board Director at large and regional affiliate development committee chair) will soon start to tweet, and the account is open to all committee members who wish to tweet under the IBPSA banner.

CJH: In light of the Snowdon affair have you thought of changing platforms to Trsst or one of the alternatives to today's social media and blogging platforms, which don't cede to every whim of government content inspection? In other words is there a political or ethical decision we as IBPSA members should be considering in relation to the media platforms we use?

MB: It works for now – no one can dictate anything on a social media platform – the decision will be taken by ALL involved.

"IBPSA should be testing and experimenting with all the platforms available"

It is quite possible that LinkedIn will fade away eventually and be replaced by other platforms. IBPSA should be testing and experimenting with all the platforms available. At this moment, LinkedIn allows the widest range of interested people to converge in one virtual space.

I am taking steps to archive the better conversations in the IBPSA LinkedIn Groups.

CJH: Mike, I cannot stop thinking that this must cost you an enormous amount of time. How can IBPSA help you, or better how can IBPSA members support you in this?

MB: I must admit that it has grown beyond my capacity, and I now use my own staff members to help manage membership and to de-spam the Groups.

It goes without saying that the LinkedIn and Twitter effort needs more hands on deck - if there is anyone interested in playing a part they are most welcome to get involved.

For example - we do need someone to monitor the regional IBPSA Groups, and to propagate the announcements between the various Groups – call for papers, etc. It will probably take 20 minutes a week!

CJH: Thank you, Mike, on behalf of IBPSA, for your ongoing efforts and work in social media and in promoting the Association.

If you are interested in supporting Mike on LinkedIn or Twitter, please do not hesitate to get in touch with him directly at **info@mikebarker.co.za** or via LinkedIn at **http://za.linkedin.com/in/mikebarker**. ■

Software news

Official launch of IEA Annex 66 on Definition and Simulation of Occupant Behavior in Buildings

Da Yan and Tianzhen Hong, Operating Agents

Energy related occupant behavior in buildings, for example adjusting thermostat for comfort, switching lights, opening/closing windows, pulling up/down window blinds, and moving between spaces, is a key issue for building design optimization, energy diagnosis, performance evaluation, and building energy simulation due to its significant impact on real energy use and indoor environmental quality in buildings. However the influence of occupant behavior is under-recognized or over-simplified in the design, construction, operation, and retrofit of buildings. Occupant behavior is complex, stochastic and multi-disciplinary (**Figure 1**). Having deep understanding of occupant behavior and being able to model and quantify its impact on use of building technologies and energy performance of buildings is crucial to design and operation of low energy buildings. Existing studies on occupant behavior, mainly from the perspective of sociology, lack in-depth quantitative analysis. There are over 20 groups all over the world studying occupant behavior individually. The occupant behavior models developed by different researchers are often inconsistent, with a lack of consensus in common language, in good experimental design and in modeling methodologies. Due to the complexity and the large regional variation in occupant behavior, it is a prerequisite for researchers to work together to define and simulate occupant behavior in a consistent and standard way.

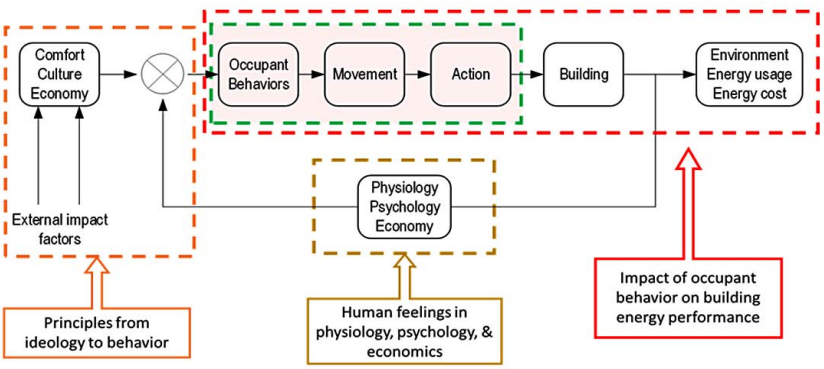


Fig 1: Relationship between occupants and buildings

The Annex 66 project was approved unanimously at the 74th Executive Committee Meeting of the IEA Energy in Buildings and Communities Programme, held on 14th November 2013 in Dublin, Ireland. The Annex aims to set up a standard occupant behavior definition platform, establish a quantitative simulation methodology to model

occupant behavior in buildings, and understand the influence of occupant behavior on building energy use and the indoor environment. The project has five subtasks:

1. **Subtask A**: Occupant movement and presence models. Simulating occupant movement and presence is fundamental for occupant behavior research. The main objective of the subtask is to provide a standard definition and simulation methodology to represent how an occupant presents in his/her office and moves between spaces.

2. **Subtask B:** Occupant action models in residential buildings. Occupant action behavior in residential buildings affects building performance significantly. This subtask aims to provide a standard description for occupant action behavior simulation, systematic measurement approach, and modeling and validation methodology in residential buildings.

3. **Subtask C**: Occupant action models in commercial buildings. Some specific challenges of occupant behavior modeling exist in commercial buildings, where occupant behavior is of high spatial and functionality diversity. This subtask aims to provide a standard description for occupant action behavior simulation, systematic measurement approach, and modeling and validation methodology in commercial buildings.

4. **Subtask D:** Integration of occupant behavior definition and models with current building energy modeling programs. This subtask will bridge between Subtasks A-C and Subtask E, enable applications by researchers, practitioners, and policy makers and promote third-party software development and integration. A framework in XML schema and a software module with occupant behavior models will be the main outcome of this subtask.

5. **Subtask E:** Applications in building design and operations. This subtask will provide case studies to demonstrate applications of the new occupant behavior definition and models. The occupant behavior definition and models can be used by building designers, energy saving evaluators, building operators, and energy policy makers. Case studies will provide verification of the applicability of the developed definition and models by comparing the measured and the simulated results.

Currently 24 countries and 57 organizations including universities, research institutes, software companies, design consultant companies, operation managers, and system control companies have confirmed strong interest in participating in the project. The preparation phase started in November 2013 and will continue until November 2014. The Working phase is planned to start in December 2014 and to last for two years. The Reporting phase will be from December 2016 to June 2017. Detailed information is available at **www.annex66.org**.

Through Annex 66, we hope to provide scientific description and clear understanding of energy related occupant behavior in buildings, as well as research methodologies

and simulation tools to bridge the gap between occupant behavior and the built environment (**Figure 2**), thus to assist building design, operation, and energy technologies evaluation through the close co-operation of researchers all over the world.

Fig2: Annex 66 - bridging the gaps between occupant behavior and the built environment

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IEA Annex 66: Definition and Simulation of Occupant Behavior in Buildings holds first Experts Meeting in Hong Kong

Liam O'Brien, Carleton University

It is well-established in the building simulation community that occupant behaviour makes one of the greatest impacts on building performance. An international collaborative effort is needed to set up a scientific framework of occupant behavior simulation and definition. IEA EBC Annex 66, the first Annex to focus exclusively on occupant behavior simulation, had its first Open Forum and Experts Meeting on 12-14 March in Taikoo Place in Hong Kong. The purpose of the meeting was to solidify the objectives of the Annex and to develop a detailed work plan. In total, 39 researchers and industry professionals from 13 countries attended.

Annex 66, *Definition and Simulation of Occupant Behavior in Buildings*, has a mandate to support more accurate building design and operation through the standardization of occupant monitoring, modelling, and simulation. The Annex is led by Dr. Da Yan of Tsinghua University and Dr. Tianzhen Hong of Lawrence Berkeley National Laboratory, the Operating and Co-operating Agents. It is divided into the five subtasks outlined in **Figure 1**. Three parallel subtasks are working on occupancy (presence and movement), residential building occupants, and commercial building occupants modelling. The three subtasks have also joined forces to establish standard protocols for occupant monitoring (e.g., sensing and experimental design) and modelling approaches. Furthermore, they are establishing a database of high-quality monitored occupant behaviour data that will be open to other researchers.

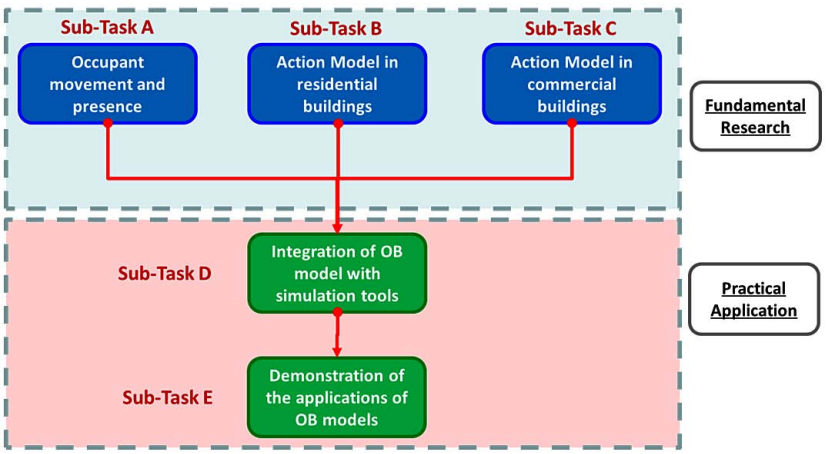


Fig1: Annex 66 research structure

Subtask D is focused on developing methods to implement occupant behaviour models into established simulation engines so that they can be more accessible to researchers, designers, and facilities managers. Finally, Subtask E is focused on demonstrating the value in occupant behaviour modelling through applications such as improved building design and operation. In all, the Annex is currently represented by 23 countries, 57 institutions, and 90 experts.

Additional experts, particularly software developers from industry, are encouraged to participate in Annex 66. The second of eight biannual Experts Meetings will be hosted by Professor Darren Robinson at the University of Nottingham in the UK on 4-6 August 2014. More information on Annex 66 can be found at **www.Annex66.org**. ■

Mr.Comfy 0.2 released: daylight co-visualization

Max C Doelling, architect

Mr.Comfy is a plugin for Rhinoceros3d's parametric modeling environment Grasshopper, written in Python, that allows designers to interactively visualize thermal and climate-based daylight building simulation results data in design or daylight simulation models.

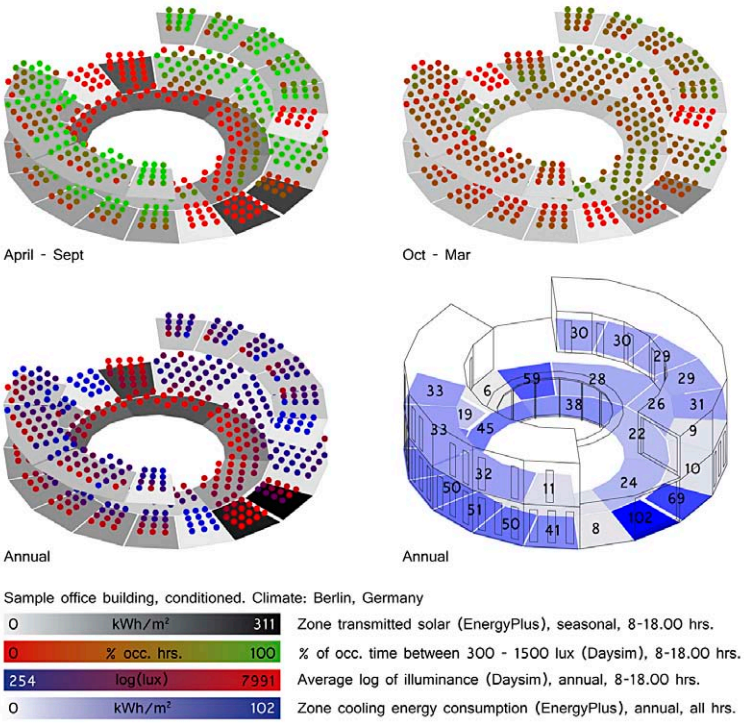
Instead of using charts or tabular formats, energy consumption, comfort, illuminance levels and any other available performance report variable are directly displayed through color-coded surfaces (and numeric values) where they occur – in the individual spaces of a design.

The increasing frequency of academic and professional integration of design and building simulation exposes new horizons to investigate how their interface is mediated and understood by individual actors, who are now often asked to work across traditional boundaries. Yet different disciplines have unique traditions in manipulating their individual cognitive models, be it through mathematical representations in engineering or spatially encoded models in architecture. Mr.Comfy bridges the gap between sustainable designers' need to analyze data spatially but still retain numeric precision and multiple data representation modes as typically exposed through traditional graphing.

By color-mapping and visually reinforcing differences between zone behaviors, designers can thus more easily diagnose which parts of a building use more energy and answer pertinent questions: ''What is happening in a design, when do the behaviours occur, where do they occur, and how do they compare to simultaneous states in other parts of the intended building?''. Answering these enables designers to find out why patterns exist, and through contextual cognition then make appropriate building morphology choices.

Mr.Comfy's features include:

- Spatial color-mapping of any EnergyPlus *.csv zone report variable
- Spatial co-mapping of Daysim/DIVA daylight and annual irradiation results
- Automatic generation of fitted or custom color gradient display bounds
- Interactive hourly scheduling & custom report time ranges to define analysis scope
- Generate average or sum report variable maps and discover minima & maxima
- Map percentages of hours (frequency mapping) that meet custom conditions
- Value normalization by zone m^2 & data conversion
- Custom report variable creation through component instantiation



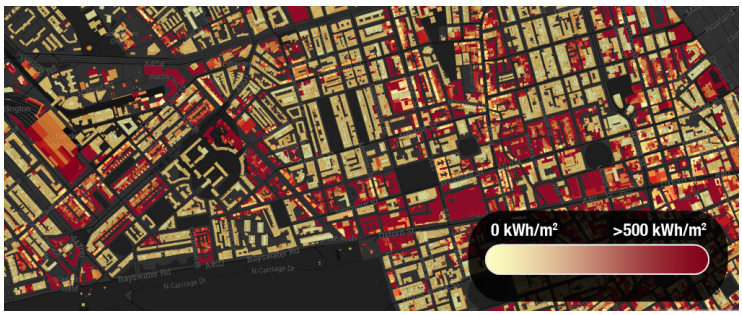
As of version 0.2 released February 2nd 2014, dynamic climate-based daylight co-visualization of Daysim/DIVA annual simulation runs has been added to the tool. Academic experiments revealed a need to simultaneously display daylight alongside thermal data to enhance pattern recognition in early-stage building design; Mr.Comfy's daylight display capabilities are therefore intended to be used alongside thermal data, enabled by drawing sensor node color maps as dithered, customizable dot overlays that do not obfuscate the underlying thermal display and remain insightful visualizations even if relatively few daylight sensors are used for a given simulation. The full range of mapping type operations as available for thermal data display are also possible for daylight data, for example peak illuminance value discovery for custom schedule and time ranges, as well as illuminance range frequency mapping to investigate custom daylight availability ranges. Formal daylight metrics such as Spatial Daylight Availability or Daylight Autonomy are currently not implemented but will potentially be included in future versions; in its current state, the tool therefore primarily acts as a customizable display and analysis method for "raw" illuminance data.

Mr.Comfy is available free of charge at **http://MrComfy.org.** Feedback from the community is very much welcome; if you like the tool and end up using it in your workflows, the author would greatly appreciate hearing about it. ■

CiMO: A new city-scale multidisciplinary simulation tool

Ruchi Choudhary, Cambridge University

The Energy Efficient Cities initiative (EECi) is a cross-disciplinary research project at the University of Cambridge spanning the built environment, transport and urban land use. Funded by the UK Engineering and Physical Sciences Research Council (2008-2013), EECi's overarching goal has been to improve understanding of how energy services and technologies interact at the city scale.



City of Westminster buildings analysis: view of annual building end-use heating demand by floor area. The project is one of the first-known applications of bottom-up, integrated engineering modeling used to predict hourly energy use and emissions at the city scale.

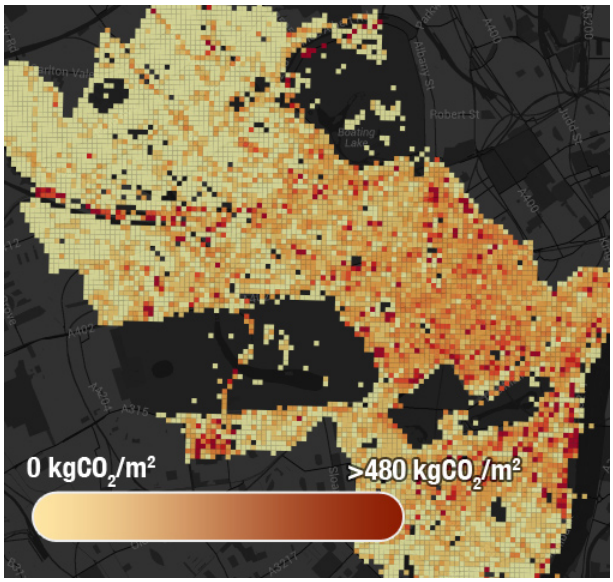
One of the key questions faced by EECi researchers is whether an integrated approach to assessing buildings, transport, and energy supply could produce improved decision-making capability for clean, energy-efficient urban planning and design. A key challenge is the transformation of simulation science to support city-scale analysis, taking into account large variability among buildings, and a highly dynamic context associated with economics, regulations, and the influence of new emerging technologies. To address this, we have quantified uncertainties for energy use in buildings using state-of-the-art Bayesian techniques and extended current capabilities in probabilistic modelling of buildings for the first time to urban scales. The research has led to new methods and tools for the simulation community:

1. a simulation platform for multi-period energy retrofits under economic uncertainties
2. a stochastic urban-scale energy model that quantifies the impact of current UK policies, and
3. a district energy network optimization tool.

These tools predict energy and emissions due to buildings at requisite time and spatial resolution. With them, we are now able to combine the impacts of future changes in buildings and transportation.

In 2013, the EECi developed a new city-scale energy and emissions simulation tool to support energy policy and urban planning decisions. CiMo (City Model) is a high-resolution exploratory tool which offers a spatially differentiated, hourly physics model of energy demand, supply, emissions and air quality at the city scale. The City of Westminster, within central London, was chosen for the first pilot application of CiMo due to its diversity of building types, transport services, and population. Westminster has a residential population of over 200,000 and a working population of over 600,000. Approximately 2.7 million road vehicles travel on its streets daily. This project brings

together the individual contributions of EECi researchers in the buildings, transport, and energy modelling fields. This has led to new insights into spatial distribution of energy consumption in cities, comparative costing of greenhouse emissions and air pollution within cities, and the identification of energy use and emissions 'hotspots'.



Total annual CO_2 emissions from buildings and road vehicles per land area

The analysis of buildings in the City of Westminster capitalised on several recent developments: in particular that physical characteristics of individual buildings in the UK can now be inferred from new research literature, and new sources of information such as EPC/DEC building performance certificate data since 2010. Furthermore, three-dimensional geometries of individual buildings within Westminster are now available from geographic databases. The result is that each individual building can be represented by a physical model. EECi researchers used the University of Cambridge's Darwin High Performance Computing cluster to undertake annual, hourly energy simulations of each of the 100,000 representational building models in the City of Westminster. CiMo enabled investigations of building retrofit and distributed energy generation viability to be performed spatially, respecting both the salient engineering and economic parameters that affect each building.

For more information, visit **www.eeci.cam.ac.uk** or contact Ruchi Choudhary at **r.choudhary@eng.cam.ac.uk**. ■

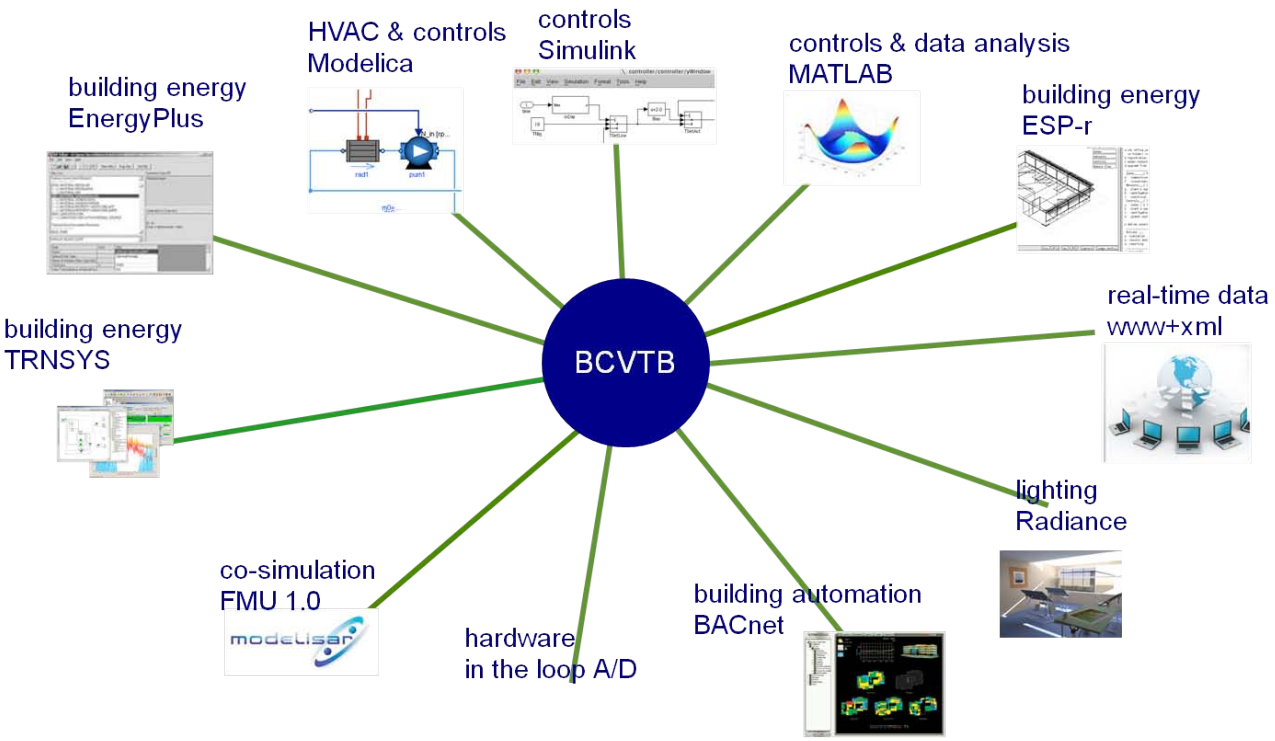
Building Controls Virtual Test Bed

Michael Wetter, Lawrence Berkeley National Laboratory

LBNL has released version 1.4.0 of the Building Controls Virtual Test Bed (BCVTB). The BCVTB allows expert users to couple different simulation programs for co-simulation, and to couple simulation programs with actual hardware. For example, the BCVTB allows simulating a building in EnergyPlus and the HVAC and control system in Modelica, while exchanging data between the software as they simulate. The BCVTB is based on the Ptolemy II software from the University of California at Berkeley. Ptolemy II provides a graphical modeling environment that can also be used to define system models for physical devices, communication systems or for post processing and real-time visualization.

Programs and hardware that are currently linked to the BCVTB are:

- the EnergyPlus whole building energy simulation program,
- the Modelica modeling and simulation environment Dymola,
- the MATLAB and Simulink tools for scientific computing,
- the Radiance ray-tracing software for lighting analysis,
- the ESP-r integrated building energy modeling program,
- the TRNSYS system simulation program,
- Functional Mock-up Units (FMU) for co-simulation,
- the BACnet stack, which allows exchanging data with BACnet compliant Building Automation System (BAS), and
- the analog/digital interface USB-1208LS from Measurement Computing Corporation that can be connected to a USB port.



In addition to using programs that are coupled to Ptolemy II, Ptolemy II's graphical modeling environment can also be used to define models for control systems, for physical devices, for communication systems or for post-processing and real-time visualization. Typical applications include:

- performance assessment of integrated building energy and controls systems,
- development of new controls algorithms, and
- formal verification of controls algorithms prior to deployment in a building in order to reduce commissioning time.

The coupling of Modelica allows using EnergyPlus for modeling the building heat flow and daylight availability and using the Modelica Buildings Library (**http://simulationresearch.lbl.gov/modelica**) to model innovative building energy and control systems. This allows advanced users to:

- define new HVAC components and systems in a modular, hierarchical, object-oriented, equation-based graphical modeling environment and couple them to EnergyPlus,
- innovate new HVAC system and control architectures for which models do not yet exist in off-the-shelf building simulation programs,
- analyze dynamic effects of HVAC systems, modeled in Modelica, and their local and supervisory control loops, modeled in MATLAB/Simulink, Modelica or Ptolemy, and
- simulate virtual experiments prior to full-scale testing in a laboratory or a real building in order to determine the range of required boundary conditions, the type of experiments that need to be conducted and, for example, to improve a control logic in simulation where iterations can be made faster than in an actual experiment.

Please see **http://simulationresearch.lbl.gov/bcvtb** for further information. ■

MOBO: new free beta software for multi-objective building performance optimization

MOBO is generic freeware able to handle single and multi-objective optimization problems with continuous and discrete variables and constraint functions. MOBO:

- can be coupled to many external (simulation) programs
- has an extendable library of different types of algorithms (evolutionary, deterministic, hybrid, exhaustive and random)
- can handle multi-modal functions and has automatic constraint handling
- has a GUI for defining the optimization problem
- accepts input in the form of algebraic formulas using standard symbols
- generates two graphs that show the progress of the optimization
- allows parallel simulation
- is portable.

More information about MOBO is available from the paper presented at BS2013 (**www.ibpsa.org/proceedings/BS2013/p_1489.pdf**), and the software can be downloaded from **www.ibpsa-nordic.org/tools.php**. The MOBO development team is currently seeking users for MOBO beta 0.3a; please address any bug reports and questions to **matti.palonen@aalto.fi** . ■

News from IBPSA affiliates

IBPSA affiliates are asked to submit a report to the IBPSA Board each year to keep Board members informed about their activities and membership. These are too detailed to include in ibpsaNEWS, so affiliates have been asked to make their latest annual report available through their web sites, and this section includes only selected, recent news. Other news from affiliates may be available from their websites; the URLs for these are available on the IBPSA Central web site at www.ibpsa.org/?page_id=29.

IBPSA-England

Bridging the Energy Performance Gap: A one day IBPSA-England Symposium

The current views on the energy performance gap within the UK industry and academia were discussed at a symposium held at Plymouth University on 25 October 2013. The symposium was organised by Professor Pieter de Wilde and Dr Rory Jones of the Building Performance Analysis Group, for IBPSA-England. The symposium consisted of presentations by experts, as well as an open forum discussion taking stock of recent work, and further research and development needed to bridge the gap.

BUILDING PERFORMANCE ANALYSIS WITH PLYMOUTH UNIVERSITY

A significant gap exists between predictions of building energy use at the building design and engineering stage, and measurement results once buildings are operational. This energy performance gap erodes the credibility of the design and engineering sectors, and leads to general public scepticism of new high performance building concepts. Bridging the gap between predicted and measured performance is therefore crucial if the design/engineering stage is to provide serious input to the delivery of buildings that meet their (quantified) ambitions. Bridging the gap is also essential if the industry wants to deliver buildings that are robust, in terms of 'occupant proofing' or 'climate change proofing', and which are engineered to adapt to changing use conditions.

The presentations and forum discussion highlighted the following key issues and views on the performance gap:

- There are different types of performance gaps that vary over time and with context. The energy performance gap may be defined as the difference between the design at a conceptual stage and as measured once operational, as well as the performance of the design at a stage where detailed constructions have been prepared and the project goes out to tender and as measured once operational; more often than not this is not fully defined. Apart from the energy performance gap, one might look at an air quality gap, lighting gap, internal temperature gap and others.

- There is a strong tension between energy performance certificates (EPC) produced by the Standard Assessment Procedure (SAP) and Simplified Building Energy Model (SBEM) calculations, and display energy certificates (DEC) based on measured energy use. It is unfortunate that both result in very similar colour coded ratings, with categories from A to G. This is in spite of the fact that EPC and DEC differ fundamentally in the energy usages that are covered.

- Various speakers raised the issue of communication and perception, and whether the energy performance gap is in fact a perception gap rather than one of discrepancy between predicted and measured energy use.

- There is an issue of who is made responsible for a performance gap and bears the risk of litigation. Aligned with this is the question of who should take the initiative to bridge the performance gap. On the one hand there appears a challenge for building designers and engineers to make better predictions, or for building scientists to develop better prediction tools. On the other hand, the findings of the day suggest that the performance gap is due to a multitude of underlying factors and that bridging the gap therefore will require collaboration of all actors involved in the design, construction and operation of buildings.

- Most energy performance gap research currently focusses on non-domestic buildings; dwellings are largely overlooked in the discussion. This might be due to the fact that domestic buildings are less likely to be subject of transient building simulation and advanced metering/monitoring; however, it risks missing out on a key sector of buildings.

Delegates at the Energy performance Gap symposium for IBPSA-England. *Photograph by Jim Carfrae*

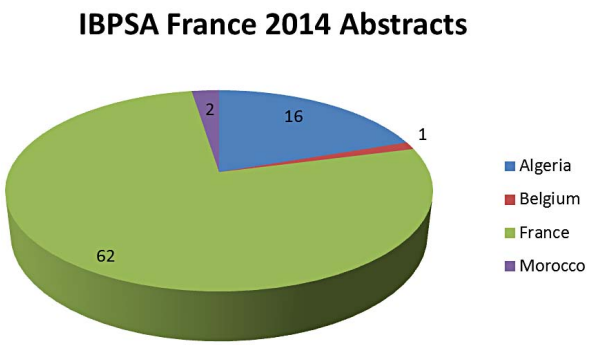
IBPSA-France

Past events

IBPSA's last world conference, BS2013, has been acclaimed a great success. As hosts, we would like to thank you all for your participation. The conference proceedings are now available at **www.ibpsa.org** in the Publications/ Papers section.

Forthcoming events

The next biannual IBPSA France congress will take place between 20-21 May 2014, at Arras, France. The congress is being organised in cooperation with Laboratory of Civil Engineering and Geo-Environment (LGCgE) of University of Artois at Arras. 81 abstracts have been received from 4 countries. The conference language is French.



IBPSA-Italy

Cooperation between IBPSA-Italy and AiCARR

A new Protocol of Cooperation for training activities has been signed between AiCARR, the Italian Society of air conditioning, heating, refrigeration, and IBPSA-Italy. The two associations agree to:

- spread each other's mission, with the aim of raising standards of building performance, energy efficiency, comfort and building modeling and giving greater impetus to the related training activities;
- arrange joint training courses to increase the awareness and the competence on the issues of building performance modeling and simulation.

The first initiative carried out in the frame of this protocol is a course organized by AiCARR Education and IBPSA-Italy on Building Dynamic Energy Simulation.

The AiCARR-IBPSA-Italy course aims at providing the fundamentals for the dynamic modelling of building, systems and plants applying the two software tools EnergyPlus and TRNSYS. The course is structured in three modules of two days each. The first module, Fundamentals, is devoted to computational models of thermal loads and plants; the other two modules provide practical notions (structure, interfaces, data input, output data, fields of use, limits) on the two software tools and the development of two exercises. ■

IBPSA-Korea

Kwang-Woo Kim, President IBPSA-Korea

A speech at the KIAEBS/IBPSA-Korea fall conference 2 November 2013

IBPSA-Korea hosted two special sessions on building simulation at the Korean Institute of Architectural Sustainable Environment and Building Systems (KIAEBS) biannual national conference on 2 November 2013. A total of 62 papers were presented. With growing interest in building simulation, the two sessions were a great success, with 12 presented papers. Topics included energy simulation using BIM, several case studies on uncertainty and sensitivity in building energy simulation, the use of a nonlinear Kalman filter to estimate unknown internal loads, the development of emulator for radiant floor heating system, and ISO 13790 energy analysis.

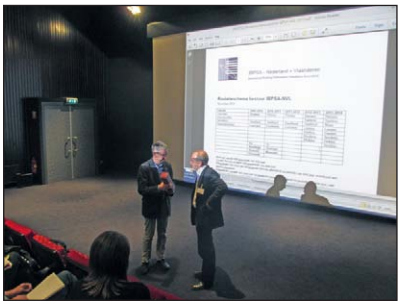
Panel discussion at the symposium on 6 September 2013

IBPSA-Korea also co-hosted a symposium on green building certification and building energy efficiency rating methods with KIAEBS on 6 September 2013. This included four keynote speeches and a panel discussion. ■

IBPSA-Netherlands

IBPSA-NVL held its annual event on 27 November 2013 at Eindhoven University of Technology, combining a technical symposium and the General Assembly.





A mixed group of novice-level and seasoned building simulation enthusiasts gathered together at the symposium to get an update on the state-of-the-art in building simulation research in the Benelux region. The event showcased highlights of recently completed and ongoing projects in a series of seven portfolio-style presentations by group leaders from the various universities and research institutes: KU Leuven, Eindhoven University of Technology, Campus de Nayer, Ghent University, Delft University of Technology and The Hague University of Applied Sciences. All presentations are available for download at **www.ibpsa-nvl.org** .

Some changes were made in the IBPSA-NVL Board during the General Assembly: Dr Luc Soethout's resignation was announced, and he was thanked for his many years of service as a Board member, as Secretary, and as website administrator, and two new members, Dr Maarten Sourbron and Ir Reinier Maas (Secretary), were elected. ■

IBPSA-Nordic

IBPSA-Nordic and Equa Simulation Finland Oy held a seminar about Simulation-Based Optimization in Innopoli II, Espoo, Finland on 18 March 2014. The programme included presentations on:

- Simulation-Based Optimization (SBO) in building performance research
  Dr Ala Hasan, VTT Technical Research Centre of Finland
- MOBO, a New Software for Multi-Objective Building Performance Optimization
  Matti Palonen, Aalto University
- Using MOBO with IDA-ICE simulation
  Lic.Sc. (Tech.) Mika Vuolle, Equa Simulation Finland Oy.

There is a brief description of MOBO in *Software news* on **page 32**, and more detailed information about it is available from a conference paper paper presented at BS2013, **www.ibpsa.org/proceedings/BS2013/p_1489.pdf**. MOBO can be downloaded from **www.ibpsa-nordic.org/tools.php**. ■

IBPSA-Singapore

IBPSA-Singapore held a meeting on energy and urban microclimate modeling on 10 March 2014 at the National University of Singapore, organized jointly with the Energy Research Institute, Nanyang Technological University, Singapore Future Cities Laboratory (FCL), Singapore-ETH Centre (SEC) and ETH Zurich. This was attended by about 31 members, and feedback was very positive. There were two presentations:

- Energy Modelling for Green Buildings in Singapore
  Dr GAO Chun Ping, Singapore Building and Construction Authority (BCA)
- Urban Microclimate Modeling: Bridging the Gap between Scientist and Planner
  Dr Steve Kardinal Jusuf, National University of Singapore (NUS)

Dr Gao, deputy director of the Green Mark Department at BCA, is responsible for implementing Singapore's Green Mark (GM) programme to promote green and energy efficient buildings, which includes development of GM criteria, modeling and simulation guidelines, project and technology assessment, and relevant policy studies. He is also actively involved in the development of green building codes and demonstration projects in the Sino-Singapore Tianjin Eco-city. Trained as an engineer, Dr Gao is a fellow of the China Green Building Council (ChinaGBC), an ASHRAE member and a LEED AP, as well as a part-time lecturer in local institutes.

Dr Jusuf is a PhD graduate in Building Science from the Department of Building at NUS. He received a World Future Foundation PhD Prize in Environmental and Sustainability Research for his work on air temperature prediction in urban climatic mapping. He is currently a Senior Research Fellow in the NUS Environmental Research Institute working in the area of urban microclimate and urban climatic mapping with Geographical Information Systems (GIS). He has worked in a number of research projects with various Singapore government agencies, mainly in the topic of urban microclimate modelling.

IBPSA-Singapore's next event will be held in June or July 2014 and will focus mainly on CFD related topics. ■

IBPSA-Switzerland

Achim Geissler & Christian Struck

IBPSA-CH activities

IBPSA-CH has held an encouraging number of well-attended activities in the past few months: a session embedded in CISBAT 2013 in September, our first member workshop, and a technical seminar. In another notable milestone, our new IBPSA-CH website went live on 31 January. We now have a modern CMS and aim to keep the site up-to-date and interesting. We hope you will visit us at **www.ibpsa.ch**.

We are particularly proud of the embedded full-day IBPSA-CH session at CISBAT 2013, a biennial international conference organized by the Solar Energy and Building Physics Laboratory at EPFL. The session included many interesting presentations and discussions.

IBPSA-CH held its first member workshop during November 2013, in Berne, to lay the ground-work for an active organizational structure. This provided a forum for discussing future activities, and gave the 25 members present the opportunity to shape the character and steer the future focus of IBPSA-CH.

In an intense and lively session, three work groups were set up to focus on:

1. Performance Simulation - Best Practice
2. Simulation Based Energy Code Compliance Certification
3. Performance Monitoring.

An organizing committee for the first IBPSA-CH Seminar was also established.

The first IBPSA-CH Seminar, hosted by Roschi & Partner, was held on 18 February in Berne. The programme included a presentation by the host and talks on the use of CFD in design practice (by Stefan Barp of AFC AG) and the validation of a building and system model of an office building in use (by Dimitrios Gyalistras of Synergy BTC AG). The talks led to a lively exchange between the 15 participating members.

At the IBPSA-CH member workshop

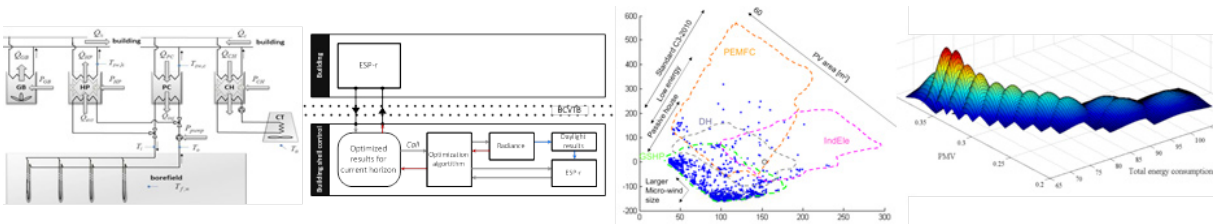
The next IBPSA-CH Seminar is planned for 24 June and will be combined with our 2014 General Assembly.

A future highlight of IBPSA-CH's 2014 programme is a session at the 18th Status-Seminar taking place on 4-5 September at ETH in Zürich. The Status-Seminar, a conference organized by brenet (www.brenet.ch) is perhaps the most important Swiss research conference held bi-annually. Please note the call for papers for the IBPSA-CH session.

We will work on keeping up the momentum and hope to give an equally enthusiastic report next year.

Workshop on Computational Optimisation of Low-Energy Buildings

Another notable event in Switzerland during 2014, not organised by IBPSA-CH but of direct interest to our members, was a workshop on Computational Optimisation of Low-Energy Buildings organised by ETH Zurich and Empa and held on 6-7 March. Aimed at bringing researchers in this growing field together for dialogue and debate, this attracted 31 participants from 14 institutions in 7 countries.



In particular, the event provided an opportunity for exchange between those working in the area of design optimisation and those on the control side, and one of the main outcomes was a better understanding of the relationships between these associated areas. Other interesting findings covered the role of optimisation in the design process, and ways of establishing the reliability of heuristic algorithms. The workshop proceedings (24 two-page abstracts) and accompanying presentations are available at www.carmeliet.arch.ethz.ch/Events/COLEB2014. The best contributions are expected to be incorporated into a Special Issue of the Journal of Building Performance Simulation. ■

IBPSA-USA

IBPSA-USA is transforming: a new Executive Director, a new mission statement, a new structure within the Board of Directors to better serve the needs of our growing organization, a new strategic plan and website in the works, new chapters around the US and a lot of exciting activity past and upcoming.

IBPSA-USA appointed Executive Director, Mike Wilson in January. Mike Wilson brings to the organization over 15 years of business and consulting experience in both the private and non-profit sectors. Mike, among many other things, is currently working with the IBPSA-USA Board of Directors on drafting a new strategic plan. He was instrumental in putting together a member survey to help us better understand our membership and how they relate to IBPSA-USA. Based upon those findings and after much deliberation, during our strategic retreat that took place in New York on January 17th, our Board drafted a new mission statement: *Fostering better buildings through simulation*.

Additionally the Board of Directors decided to implement a new organizational structure with committees dedicated to specific aspects of our activities (education, outreach, administration etc.). Moreover, a new website to better serve our growing member base, educational goals and developments in the field of energy modeling and simulation is in the works.

In local chapter news, North Texas and Salt Lake City are planned to be the newest additions to IBPSA-USA ongoing US expansion. As of now, local chapters operate in Boston, Chicago, Houston, Los Angeles, New York City, Raleigh-Durham, San Francisco, Seattle and Washington DC.

Our semi-annual meeting took place in New York City on January 18th. More than ninety members and friends participated, sharing updates on the industry and on the growth of our organization and networking over drinks, in a meeting that was as lively as ever. David Fano and Alan Jackson of CASE, a BIM consultancy from New York, gave a very informative presentation titled ''Driving Project Performance Through Data and Analytics''. Autodesk and NYSERDA were the generous meeting sponsors.

On the sides of our semi-annual meeting, the IBPSA-USA Education Committee held a meeting to discuss and recruit volunteers to implement our education plan. As part of our education plan since 2010 IBPSA-USA has presented the Building Energy Modeling Best Practices and Applications, HVAC Emphasis (BEM HVAC) one-day workshop twenty-one times in locations across the country. Many workshops have been presented in collaboration with ASHRAE or with other organizations. The workshops have reached almost 400 participants so far.

Following on the success of the BEM workshops with an HVAC emphasis, the IBPSA-USA Education Committee has developed an RFP for a one-day BEM workshop for Lighting and Daylighting (BEM-LAD). IBPSA-USA will use the RFP to solicit proposals from lighting and daylighting experts to develop the content for the BEM-LAD workshops. In near future activities, we are happy to announce our upcoming 2014 ASHRAE/IBPSA-USA Building Simulation Conference to take place in Atlanta, GA, on September 10th-12th. The conference merges the IBPSA-USA SimBuild and ASHRAE Energy Modeling Conferences. The focus is on making better decisions through the application of simulation and modeling over the entire building life cycle from the earliest concept through operation and maintenance.

For more information on all aspects of IBPSA-USA's multi-faceted activity, including student sponsorships, BEMBook workshops and Wiki, notable papers etc. please visit our website **www.ibpsa.us**.

New York chapter news

IBPSA-NYC Elects a New Board

Every year, the regional simulation committee elects a new set of Directors to the IBPSA NYC Board. This year, Pallavi Mantha (Arup), is appointed Chair and takes over from the outgoing Chair Arpan Bakshi (SOM). Cheryl Saldanha (Simpson Gumpertz & Heger), Saurabh Jalori (Atelier Ten) and Guangping (Gavin) Xue (Transsolar) are appointed to the Board of Directors.

New York Chapter's Monthly Event

The New York chapter of IBPSA-USA hosted part III of the series Innovative Ways to Visualize Performance Data on Thursday, February 6th, at Atelier Ten, New York. The event generated 18 in-person and 40+ online attendees. The topic for this presentation was Data Discovery and Visualization: Get More Out of Your Energy Models. The speakers from Atelier Ten presented ways to utilize static and interactive graphics to find, analyze and express relationships between a multitude of design parameters. This webinar can be accessed online at **https://vimeo.com/87005250**. The presentation was followed by the Board election results and celebratory drinks. ■

Learning and teaching news

This new section of ibpsaNEWS reports new courses, notable lectures, and PhD theses on topics of particular interest to IBPSA members. If you know of any other learning and teaching news that you believe would interest the IBPSA community please send an email to C.J.Hopfe@lboro.ac.uk.

Free online course on Sports & Building Aerodynamics

On April 28, 2014, Eindhoven University of Technology will launch its first MOOC (= Massive Open Online Course) to communicate the university's expertise to a wide international audience and to offer free education to students world-wide. This first MOOC, on Sports & Building Aerodynamics, is given by Professor Bert Blocken from the Department of the Built Environment and consists of 6 weekly sessions focusing on basic aspects of fluid flow, wind-tunnel testing, Computational Fluid Dynamics, building aerodynamics, 100 m sprint aerodynamics, and cycling aerodynamics.

Eindhoven University plans to launch 3 more MOOCs in the next year.

There is an introduction to the course on YouTube at **www.youtube.com/watch?v=TbaKkVY43Dg**; registration is at **https://www.coursera.org/course/spobuildaerodynamics**. ■

Modelling the invisible: indoor air quality and building energy - an inaugural lecture by Malcolm Cook

Christina Hopfe

The word 'inaugural' originated in the late 17th century and comes from the Latin 'inaugurare', meaning "marking the beginning of an institution, activity, or period of office". I had the pleasure of attending Malcolm Cook's inauguration as Professor of Building Performance Analysis in the building energy research group at Loughborough University on the 5 February 2014.

The lecture theatre was jam-packed, uniting IBPSA England members, family and friends with colleagues from Loughborough University and further afield.

The lecture was a beautiful example of how inspiring teaching can be and how it can engage people from the very young to the not so young with and without specialist knowledge of building simulation. Despite the large number of people in the room and the gradually diminishing indoor air quality, no one succumbed to the effects of increasing CO_2 levels. At the end of the lecture, there were standing ovations for Malcolm.

The lecture can be seen online at **www.lboro.ac.uk/news-events/events/inaugural/past-lectures/2014/malcolm-cook-.html**. ■

PhD thesis: Numerical and Experimental Analysis of Passive Cooling through Night Ventilation

Candidate Sarah Leenknegt, supervisor Dirk Saelens
Building Physics Section, Department of Civil Engineering, KU Leuven

The application of active cooling in office buildings is hardly questioned in current building practices and indeed, in temperate climates, active cooling is often assumed to be a necessary condition for good thermal comfort. However, an optimal building design can go a long way towards reducing the cooling load. For example, night cooling may maintain thermal comfort during the day, by pre-cooling the building at night using cool exterior air at high air change rates. By day, the thermal mass buffers the heat released in the building, thereby reducing and delaying air temperature peaks. Sarah Leenknegt's research addressed the processes involved with a study of the transient behavior of a room with night ventilation.

The work involved three main parts, the first numerical, the second experimental and the third focusing on implementation in BES models. The numerical 2D CFD study focussed on obtaining a better insight in the transient surface heat transfer during night ventilation. In particular, the study took into account the influence of thermal mass by including concrete slabs as floor and ceiling in the model. The transient behavior of the air-mass system was simulated for different air change rates and initial indoor-outdoor temperature differences. The influence of excluding radiation from the model was investigated, as well as the impact of geometrical variations. Three flow patterns were observed: buoyant flow, forced flow and transition flow, which is the intermediate regime between the first two flow regimes. The flow pattern strongly influenced the corresponding local surface convection. However, in a study limited to 2D with simplified geometry and constant boundary conditions, only qualitative conclusions could be drawn, and an experimental study was required to confirm the observed phenomena.

In the second part of the work, measurements were conducted in a full scale test room, comparable to a one-person cellular office, under realistic climatic boundary conditions. As in the numerical model, thermal mass was also provided, with 15 cm thick concrete slabs as floor and ceiling. The room had a SW-facing façade with an automated hopper window. Apart from the mechanical ventilation, the room was free floating. The room was fitted with more than 200 sensors for detailed monitoring of air, surface and mass temperatures, surface heat flux, air velocity and pressure differences. The air change rate was determined using tracer gas. The measurements provided a detailed insight into the phenomena occurring during night ventilation under realistic circumstances. They allowed the assumptions made in BES models to be compared with reality and confirmed key behaviours observed in the numerical study, such as the three flow regimes. A detailed analysis was made of the thermal response of the room. Though determination of convective heat transfer coefficients was not possible with sufficient accuracy, the assumptions used in BES models were compared with the measurement results. Smoke visualization experiments were conducted to determine a correlation between thermal parameters and flow behavior. These findings were compared with reports in the literature. Finally, a number of selected nights were simulated with CFD as well, showing that CFD must be used with extreme care. The final part of the study focussed on the implementation in BES models. The room was simulated in TRNSYS 17, using the results of four weeks' measurements to provide boundary conditions and verification data. The influence of multiple air nodes in one thermal zone was investigated, illustrating the difficulty of accurately modelling the intra-zonal.

The dissertation can be downloaded from **http://bwk.kuleuven.be/bwf/Publications**. ■

PhD thesis: Matching analysis for on-site building energy systems involving energy conversion, storage and hybrid grid connections

Candidate Sunliang Cao, supervisor Professor Kai Sirén
Aalto University-Finland

Sunliang Cao's research addressed the lack of a comprehensive methodology for matching analysis of the increasingly complicated on-site hybrid energy systems involving a mixture of energy sources, energy conversion technologies, storage types and grid connections. The purpose of this dissertation is to develop such a methodology applicable to both general and specific matching situations. A thorough analysis was carried out for several on-site energy systems in buildings using TRNSYS 17 as the dynamic simulation tool, including solar thermal and PV assisted ground source heat pumps. It is believed that the results will be helpful in the analysis, design and control of future on-site nZEB energy systems.

The thesis can be downloaded from **https://aaltodoc.aalto.fi/bitstream/handle/123456789/12728/isbn9789526055633.pdf?sequence=1** ■

PhD thesis: Evaluation of new active technology for low-energy houses

Candidate Henrik Davidsson, supervisor Åke Blomsterberg
Department of Energy and Building Design, Architecture and Built Environment, Lund Institute of Technology-Sweden

Henrik Davidsson's research investigated two products intended to be used in low-energy building, a PV/T solar window and a hybrid ventilation system with heat recovery.

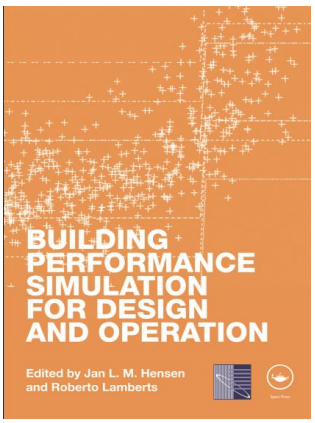
The PV/T solar window comprised PV cells laminated on solar absorbers placed in a window behind the glazing. Tiltable reflectors were included to concentrate solar radiation onto the solar cells. A model was developed in TRNSYS to simulate the electricity and hot water production.

A water-to-air heat exchanger was developed for use in naturally ventilated buildings, designed to keep the air pressure drop close to zero. System simulations using TRNSYS were carried out to investigate the impact of using natural/hybrid ventilation with heat recovery and waste water heat recovery systems, and ground source collectors.

The results showed that the solar window performs poorly compared to standard solar energy components. The hybrid ventilation system with the developed heat exchangers has the potential to be an interesting ventilation system in low-energy houses or in renovating residential buildings.

More information about the work is available at **www.ebd.lth.se/english/publications**. ■

Building Performance Simulation for Design and Operation



Jan L.M. Hensen and **Roberto Lamberts**

Effective building performance simulation can reduce the environmental impact of the built environment, improve indoor quality and productivity, and facilitate future innovation and technological progress in construction. It draws on many disciplines, including physics, mathematics, material science, biophysics and human behavioural, environmental and computational sciences. The discipline itself is continuously evolving and maturing, and improvements in model robustness and fidelity are constantly being made. This has sparked a new agenda focusing on the effectiveness of simulation in building life-cycle processes.

Building Performance Simulation for Design and Operation begins with an introduction to the concepts of performance indicators and targets, followed by a discussion on the role of building simulation in performance-based building design and operation. This sets the ground for in-depth discussion of performance prediction for energy demand, indoor environmental quality (including thermal, visual, indoor air quality and moisture phenomena), HVAC and renewable system performance, urban level modelling, building operational optimization and automation.

Produced in cooperation with the International Building Performance Simulation Association (IBPSA), and featuring contributions from fourteen internationally recognised experts in this field, this book provides a unique and comprehensive overview of building performance simulation for the complete building life-cycle from conception to demolition. It is primarily intended for advanced students in building services engineering, and in architectural, environmental or mechanical engineering; and will be useful for building and systems designers and operators.

Selected Table of Contents

1. The Role of Simulation in Performance Based Building 2. Weather Data for Building Performance Simulation 3. People in Building Performance Simulation 4. Thermal Load and Energy Performance Prediction 5. Ventilation Performance Prediction 6. Indoor Thermal Quality Performance Prediction 7. Room Acoustics Performance Prediction 8. Daylight Performance Predictions 9. Moisture Phenomena in Whole Building Performance Prediction 10. HVAC Systems Performance Prediction 11. Micro-cogeneration System Performance Prediction 12. Building Simulation for Practical Operational Optimization 13. Building Simulation in Building Automation Systems 14. Integrated Resource Flow Modelling of the Urban Built Environment 15. Building Simulation for Policy Support 16. A View on Future Building System Modelling and Simulation

January 2011 |536pp | Hb: 978-0-415-47414-6 | £65.00

About the Authors

Jan L. M. Hensen *(Ph.D. & M.S., Eindhoven University of Technology) has his background in building physics and mechanical engineering. His professional interest is performance-based design in the interdisciplinary area of building physics, indoor environment and building systems. His teaching and research focuses on the development and application of computational building performance modelling and simulation for high performance.*

Roberto Lamberts *is a Professor in Construction at the Department of Civil Engineering of the Federal University of Santa Catarina, Brazil. He is also currently a board member of the IBPSA, Vice-President of the Brazilian Session and Counsellor of the Brazilian Council for Sustainable Buildings.*

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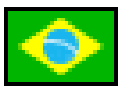

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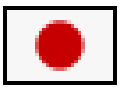

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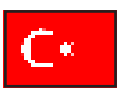

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IBPSA's mailing list has been consolidated into another listserver known as BLDG-SIM, which is a mailing list for users of building energy simulation programs worldwide, including weather data and other software support resources. To **subscribe** to BLDG-SIM, to unsubscribe or to change your subscriber details, use the online forms at **http://lists.onebuilding.org/listinfo.cgi/bldg-sim-onebuilding.org**.

To post a message to all members, send email to **bldg-sim@lists.onebuilding.org**.

The BLDG-SIM list is provided by GARD Analytics. If you have any questions, please contact the list owner Jason Glazer at **jglazer@gard.com** or +1 847 698 5686. ■

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Journal of Building Performance Simulation

Official journal of the International Building Performance Simulation Association (IBPSA)

EDITORS:
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Taylor & Francis would like to invite you to submit your article to *Journal of Building Performance Simulation*

The ***Journal of Building Performance Simulation*** (***JBPS***) is the official journal of the International Building Performance Simulation Association (IBPSA). IBPSA is a non-profit international society of computational building performance simulation researchers, developers, practitioners and users, dedicated to improving the design, construction, operation and maintenance of new and existing buildings worldwide.

The ***JBPS*** is an international refereed journal, publishing only articles of the highest quality that are original, cutting-edge, well-researched and of significance to the international community. The journal also publishes original review papers and researched case studies of international significance.

The wide scope of ***JBPS*** embraces research, technology and tool development related to building performance modelling and simulation, as well as their applications to design, operation and management of the built environment. This includes modelling and simulation aspects of building performance in relation to other research areas such as building physics, environmental engineering, mechanical engineering, control engineering, facility management, architecture, ergonomics, psychology, physiology, computational engineering, information technology and education. The scope of topics includes the following:

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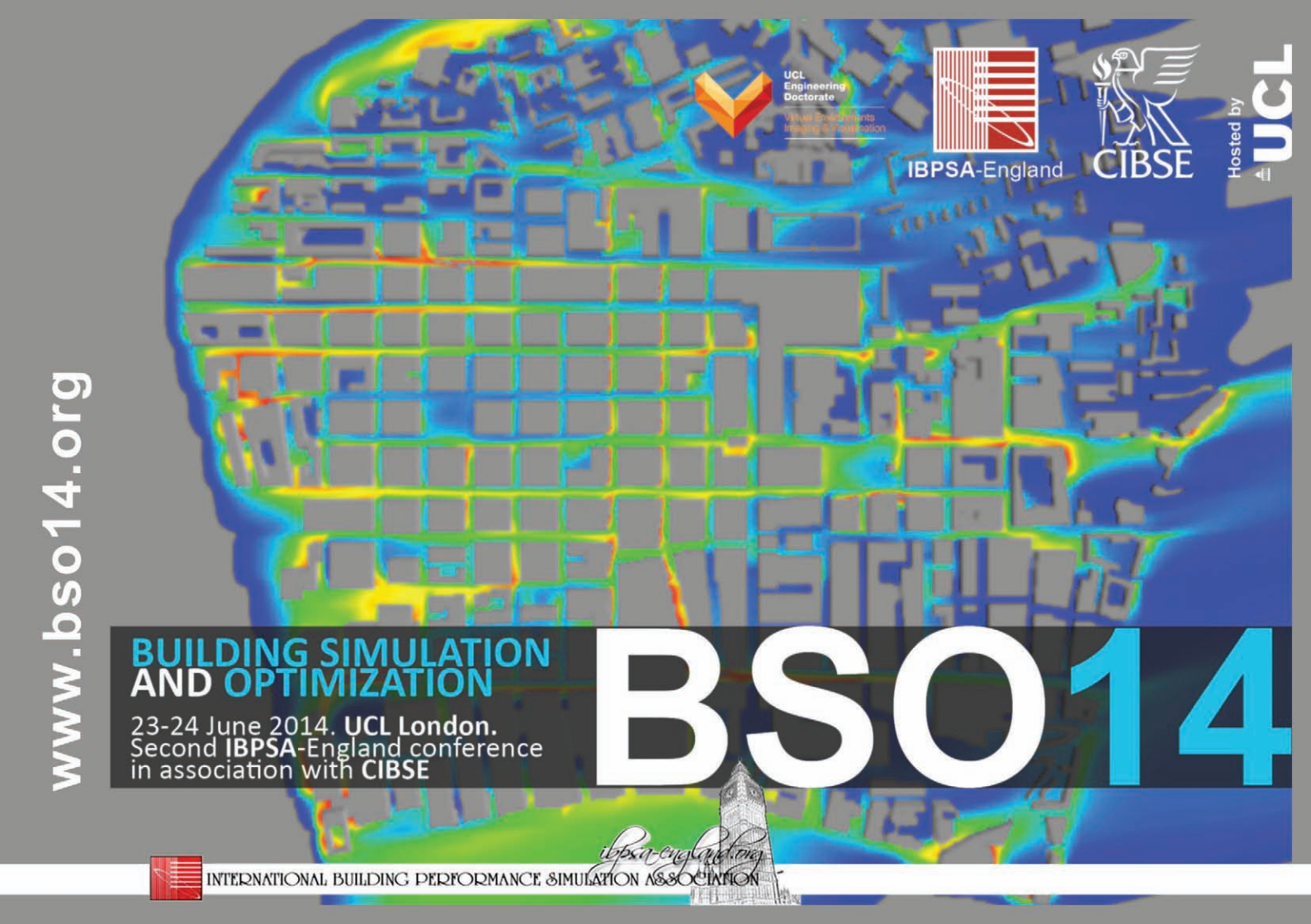
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Important dates:

20.09.2013
Abstract submission

01.11.2013
Abstract review notification

16.01.2014
Paper submission

23-24 June 2014
Conference

Venue in the context of BSO14:
(Karl) Pearson Building - the first university statistics department in the world
Wilkins Building - the first Chair in Architecture in the UK, 1841

Building Walk/Technical Tour: Architecture of London

from Christopher Wren's St. Paul (1666)
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BSO14

BSO14 Conference Themes:

- New performance models and simulation methods
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- Real-world case studies
- Visualisation in built environment

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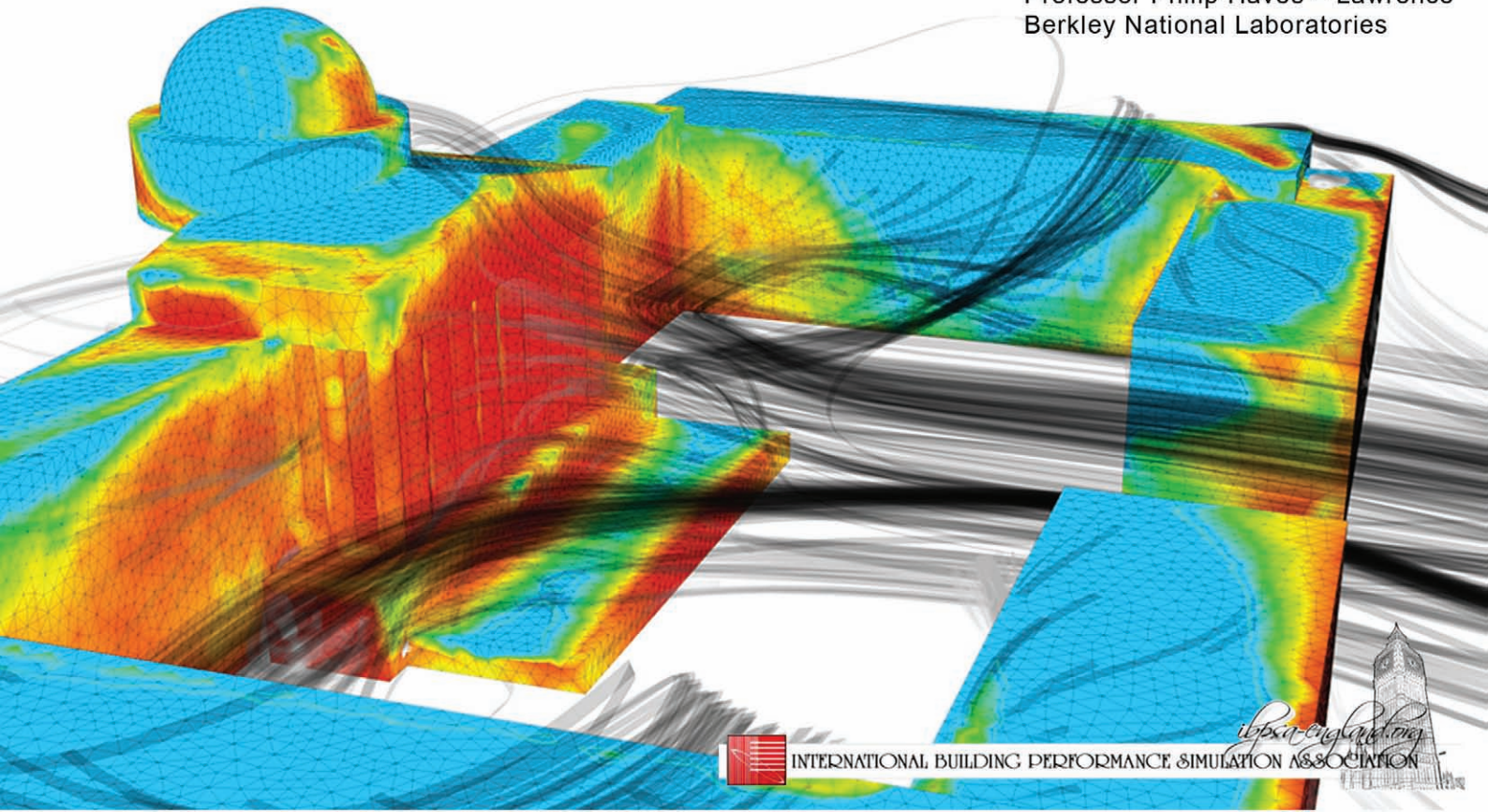
Professor Philip Haves – Lawrence Berkley National Laboratories



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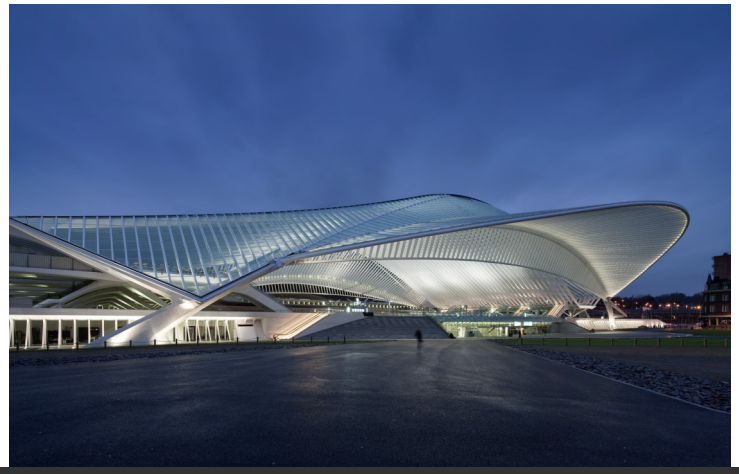

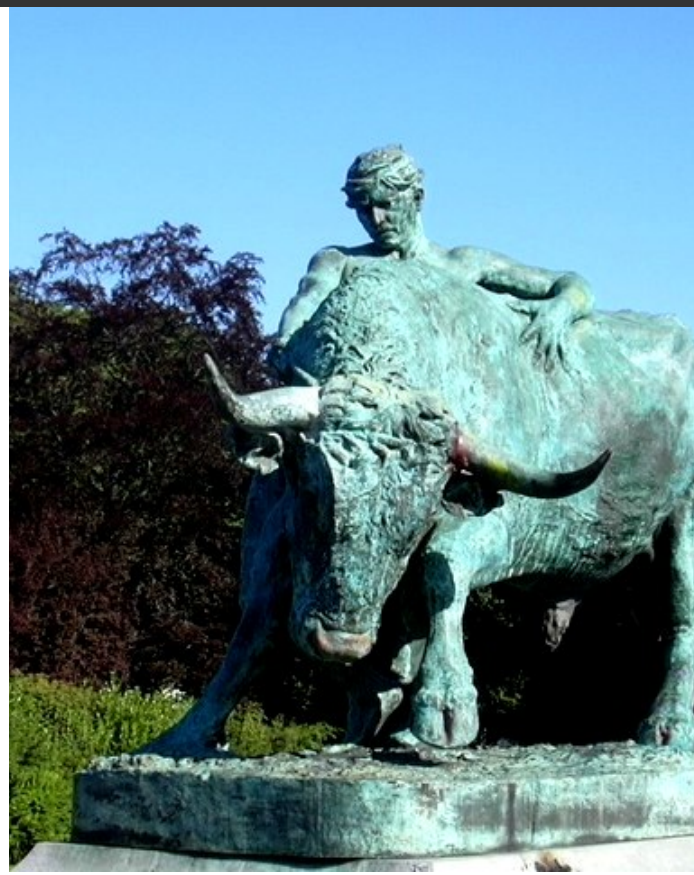

SSB 2014

10-12 December

Liège, Belgium

9th International Conference on System Simulation in Buildings

Thermodynamics Laboratory
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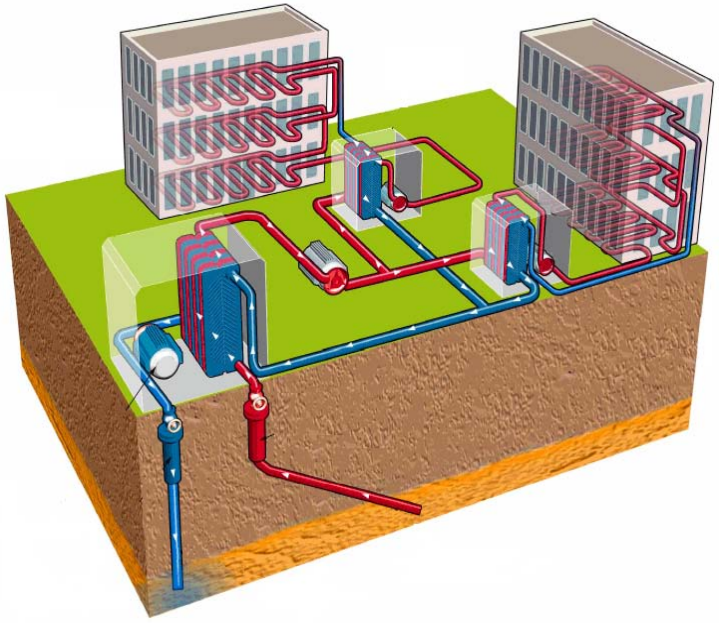

Scope of the Conference

Since 1982, SSB conference is an opportunity for researchers and specialists in Building and HVAC systems simulation to present high quality papers and attend sessions and discussions on last developments and progresses in this challenging and evolving sector.

Once again, the conference will be organized in very close cooperation with the International Energy Agency (IEA, « Energy in Buildings and Communities » programme) and with the Federation of European Heating, Ventilation and Air-conditioning Associations (RHEVA).

Conference Venue

The conference will be held in the city center of Liège.

Registration fees

Before October 30, 2014

- Authors 450€
- Participants 550€
- Students 275€

After October 30, 2014

- Authors 550€
- Participants 650€
- Students 275€

Submissions & Registration

Registration, abstract and paper submissions can be done on the conference website:

www.ssb2014.ulg.ac.be

Proceedings

The proceedings will be published (book and CD) after the conference. A selection of papers will be published in « Building Simulation : An International Journal ».

Conference Topics

- Advances in modeling of building and HVAC components and systems
- Simulation assisted analysis and evaluation of building energy use
- Integration of buildings in smart energy grids
- Integration of renewable energy sources in buildings
- Near zero-energy buildings
- Impact of human behavior on building energy performance
- Advanced control of systems in buildings
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Calendar

Deadline for abstract submission	**31 March 2014**
Abstract acceptance notification and instructions to authors	**15 May 2014**
Manuscripts submission deadline	**31 July 2014**
Notification to presenting authors of acceptance or rejection of manuscripts	**31 August 2014**
Deadline for conference early registration	**30 October 2014**
Pre-proceedings sent to registered participants	**12 November 2014**
Conference	**10-12 Dec. 2014**