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BS2015 HYDERABAD, INDIA



INTERVIEWS

with Jason Glazer, the man behind BLDG-SIM, Vishal Garg and Jyotirmay Mathur from research institutes in Hyderabad and Jaipur, and others

SOFTWARE NEWS

about new climate data from Climate.OneBuilding.Org; research under IEA Annexes 60 and 66; DesignBuilder; IESVE; and a proposed new ASHRAE working group on occupant behaviour

GLOBAL COMMUNITY NEWS

from IBPSA affiliates in Argentina, Australasia, France, Korea and the USA

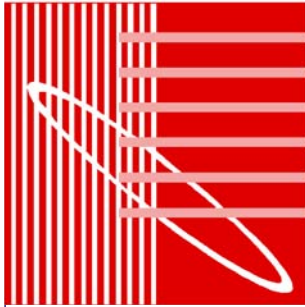
CALENDAR OF EVENTS

14 conferences and other events for your diary



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President's message

Dear IBPSA Colleagues and Friends,

Building Simulation 2015 is now "in the books." Thanks and praise go to IBPSA-India and the conference team, led by Vishal Garg and Jyotirmay Mathur, for organizing a successful and enjoyable conference in Hyderabad.

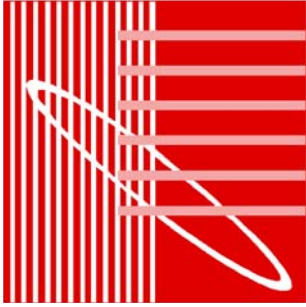
The papers presented at Building Simulation 2015 are on-line at www.ibpsa.org. They show a fascinating snapshot of current interests and developments in our field. Some trends that are continuing from past Building Simulation conferences are urban scale modeling, uncertainty, and resilience (robustness), safety, and existing building applications. Consideration of resilience is particularly interesting. While modeling of building response to extreme weather is most common, other situations are being investigated as well – performance during events such as unexpected occupancy or loss of electricity supply. This kind of analysis takes a statistical view of performance using results from multiple simulations. In addition to providing a more realistic representation of how a building might perform, this approach may begin to counter the standard rejection of performance modeling – "your prediction of my building's operating cost turned out to be off by 40%."

A quick review of the papers dealing with uncertainty and robustness indicates that all (or nearly all) come from academic sources. This illustrates perhaps the most significant challenge faced by IBPSA – how do we get our methods into practice? A high fraction of all building simulations are done to meet compliance or rating requirements. While these applications get simulation tools "in the door" in some design practices, the goal of getting an approval encourages a gaming approach rather than thoughtful design analysis. We need to do a better job conveying the value of good building performance and how modeling is key to achieving it.

The IBPSA Board of Directors met in Hyderabad in conjunction with Building Simulation 2015. Committee reports showed that our established activities continue to thrive. The Journal of Building Performance Simulation (JBPS) has again received more manuscripts than the prior year and its impact factor has increased. The Building Simulation conference series marches on – organization for Building Simulation 2017 (San Francisco) is ramping up and the Building Simulation 2019 call-for-proposals is circulating. The Board took action in a number of areas to broaden our scope:

- Initiated development of building simulation webinars for YouTube and/or other outlets.
- Set up an initial framework to host technical projects.
- Approved setting up an on-line membership management system.
- Approved a cooperation agreement with REHVA (Federation of European Heating, Ventilation and Air Conditioning Associations).
- Discussed longer-term visions for broadening sources of financial support.

President's message



All these activities depend on volunteer work and anyone can join the effort. The ipbsa.org website lists names and email addresses of Board members and committee chairs. Please contact any of us to get involved. Another good starting point is to be active in your regional affiliate. Attend regional conferences, such as BauSIM 2016, BSO 2016, eSim 2016, ASIM 2016 or SimBuild 2016. Become an IBPSA Supporting Member and receive a subscription to JBPS.

The next Board of Directors and Annual General Meetings will be held in mid-September 2016 in Newcastle, UK in conjunction with BSO 2016, the IBPSA-England conference. The meetings are open to all members. Prior to that get-together, our annual election will be held for half of the Board seats. As described on page 56, candidates are sought for the ballot. Please consider putting forward a nominee to help with running our association. Also, be sure to vote when the ballot is circulated.

Thank you for your continuing interest in IBPSA.

Jason Glazer of GARD Analytics

the man behind BLDG-SIM

At the most recent Building Simulation conference in December 2015 in Hyderabad, India, the IBPSA Innovative Application Award was awarded to Jason Glazer from GARD Analytics. The IBPSA Innovative Application Award, formerly named the IBPSA Award for Distinguished Practice, “recognizes an individual, group or firm who has made a significant contribution to the effective application or advancement of building performance simulation in practice”.

Christina J Hopfe (CJH): Congratulations first of all on your award. Unfortunately you were not able to attend the conference in order to receive your award in person. The award committee recognized your contribution by saying that you have “been quietly providing tools and procedures and promoting interactions among the building performance community for more than 20 years.”

Jason Glazer (JG): I am deeply honored to have received the Innovative Application Award from IBPSA. I want to express my deep thanks to the IBPSA Board of Directors and the Awards and Fellows Committee. I would especially like to thank Dru Crawley and Chip Barnaby for nominating me for the award. I feel like this award really should be shared with the building simulation mailing list community and with current and former Standard 90.1 ECB subcommittee members and the members of the Standard 209 committee. I feel very fortunate that I have been able to make some small contributions to the building energy modelling industry and watch it grow and evolve.



CJH: Your activities have helped to advance building performance simulation in practice and had a significant impact on industry practice. Most IBPSA members will know you as the person behind the BLDG-SIM mailing list. You have created and still operate the onebuilding.org list server system that now hosts more than 7000 simulation users. Could you maybe tell us a little about the initial idea of the mailing list and how it all began?

JG: Seventeen years ago when the BLDG-SIM mailing list was started, the building simulation industry was much smaller and less organized. It seemed like there were as many researchers as practitioners and while the researchers frequently met at IBPSA and ASHRAE conferences, at the time the practitioners had no real community. My original announcement contained the following:

Since the users of building energy simulation programs are spread across the world, this mailing list is an attempt to foster the development of a community of those users. Experienced and inexperienced users of building energy simulation programs are welcome and are expected to share their questions and insights about these programs.

I sent the announcement to other forums as well as everyone that I personally knew in the industry at the time and by the end of the next day 90 people had already subscribed and by its first anniversary we had 300

subscribers. In late 2007 we transitioned to using the onebuilding.org server. And in 2008 with input from the subscribers, we added additional mailing lists to serve the eQUEST, HAP and TRACE communities and later added lists for IES-VE and Simergy. When the TRNSYS mailing list was looking for a new home in 2014 they also joined the onebuilding.org server. Now we have almost 2500 subscribers on the BLDG-SIM mailing list with over 7000 total subscribers across all the simulation oriented lists on onebuilding.org. We have also been hosting mailing lists for some ASHRAE committees as well as IBPSA USA. I personally have made a lot of friends and contacts through the mailing lists and I hope that has been the case for many other people too. I am happy to support the building energy modelling community and if we need new mailing lists for specific software or committees, please let me know. If anyone wants to subscribe to any of the mailing lists, go to <http://onebuilding.org> to see how.

CJH: How do you handle the list on a day to day basis?

JG: Most days require only a few minutes to approve messages that have been flagged or help people to subscribe or to unsubscribe. Sometimes issues come up where people don't follow the guidelines for the site but that is rare and usually simple to resolve. The mailing lists are friendly communities with a great deal of respect for everyone, especially the volunteers that frequently answer questions. Most of my effort is done on a voluntary basis since the lists are one of my passions but once in a while something more time consuming needs to be done and my company GARD Analytics supports those efforts.

CJH: Your award summary (and as shown in this newsletter on page 13) says you have chaired the ASHRAE Standard 90.1 Energy Cost Budget sub-committee for over 10 years. You also initiated and chair the ASHRAE Committee 209 on Energy Simulation Aided Design for Buildings. Could you tell the readers what these groups are about and what the main purpose is?

JG: The Energy Cost Budget subcommittee (we usually just say ECB for short) is focused on Section 11 and Appendix G. Traditionally Section 11 was for trading off building components using building energy modelling for compliance with Standard 90.1 and Appendix G was used by beyond code programs such as USBGC's LEED as well as U.S. Federal tax credits and incentive programs by local jurisdictions and utilities. In the next version of Standard 90.1 due out late this year, Appendix G can still be used for beyond code programs but it will also be a compliance path for Standard 90.1 which means that the same energy models can be used to show compliance and to earn credit in an incentive program. I think the modelling industry will really appreciate this change once the various beyond code programs are updated.

Unlike Appendix G, which is used to determine how efficient a design is after it is complete, Standard 209 is about how to use building energy modelling throughout the design process to inform decisions being made by the design team. It includes descriptions of 11 different modelling cycles such as load reduction modelling and HVAC system selection. The committee just voted it out in January and it should be available for public review very soon. Since it is a draft standard, it is not being used yet but we hope that it will be adopted by organizations that certify high performance buildings, utilities, and agencies that provide incentive for low energy buildings as well as architects and building owners wanting a scope of work for building energy modelling in their projects. I am really excited about 209 and think that it will really benefit the modelling industry as well as encouraging the design of low energy commercial buildings.

CJH: What are your plans for the future? Are there any other exciting projects that you would like to share with the IBPSA community?

JG: We just finished an exciting research project for ASHRAE called RP-1651 Development of Maximum Technically Achievable Energy Targets for Commercial Buildings. It was a large national study using EnergyPlus to assess how energy efficient commercial and multi-family buildings can be if first cost was not an issue. We used a Python scripting library called Eppy to model 30 different measures and applied them to 16 different building models that were consistent with 90.1-2013 in 17 different climates. The results showed a nearly 50% reduction in site and source energy use on a national basis. The final report is available from ASHRAE and includes lots of details on the modelling assumptions used as well as a breakdown of the savings for each of the measures used for each building and climate combination. I expect to be presenting on the project at the June ASHRAE meeting in St. Louis as well as at the August ASHRAE/IBPSA-USA SimBuild conference in Salt Lake City. As for future plans, I can only say that I hope to see the simulation community continue to grow and evolve while contributing in whatever way possible.

CJH: Thank you Jason. ■

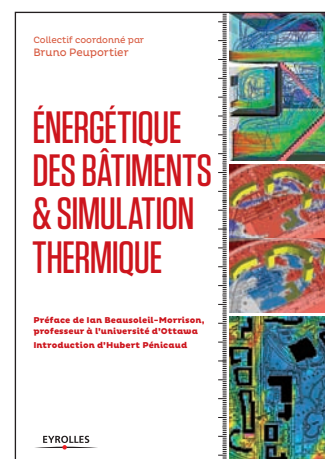
NEW BOOK: Energy performance of buildings and thermal simulation (in French)

Written for all practitioners involved in the design of new energy efficient buildings and in renovation projects – building services engineers and consultants, contractors, architects, teachers and researchers – *Energy performance of buildings and thermal simulation* presents a wide-ranging overview of the field, from the modelling of basic physical processes to the use of simulation in practice and real-world examples. The four chapters cover:

- **Models and main assumptions:** heat and mass transfer, lighting, air flow, systems, renewable energy, life cycle
- **Model validation:** benchmarks, software comparison, experimental validation
- **Performing simulation:** consistency with study objectives, input data, use of simulation and exploitation of results (including uncertainty analysis and optimization)
- **Application examples:** new construction, retrofit, innovative use of simulation, and progress towards an energy performance guarantee.

Edited by Bruno Peuportier and with a preface by Ian Beausoleil-Morrison, the book brings together contributions from many experts from academia and the design professions. It recognises that simulation is considered too complex by some practitioners, and aims to make it better understood and encourage its wider and more effective use. It includes extensive practical advice on topics such as the description of buildings, climate, users' behaviour scenarios, and the exploitation of results. Uncertainty analysis and optimization are also discussed. The last part of the book presents case studies which showcase some practical uses of the tools in the design of new and retrofit projects. It concludes with perspectives on progress towards an energy performance guarantee.

Energétique des bâtiments et simulation thermique, 446p, Ed. Bruno Peuportier, Eyrolles, Paris, 2015. There are further details in a flyer at the end of this issue of *ibpsaNEWS*.



Building Simulation 2015

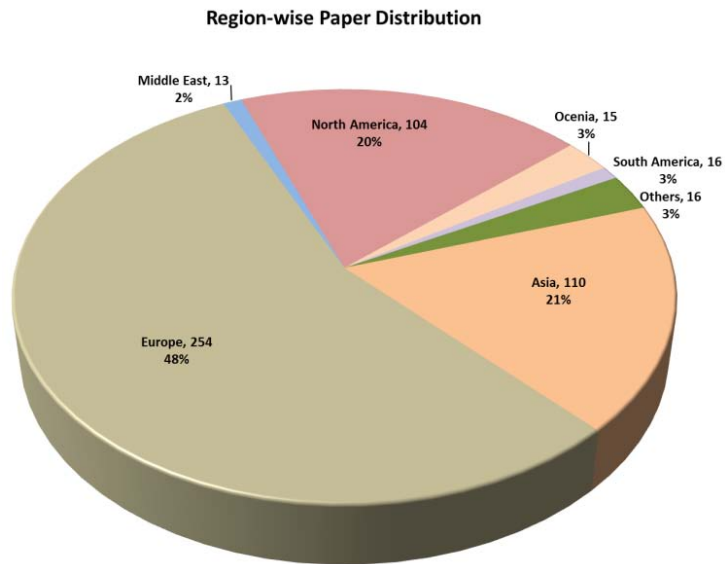
Notes from an impressive conference

Christina J Hopfe, Jyotirmay Mathur and Vishal Garg, with photographs from the conference organizers and Christina Hopfe

IBPSA's 14th International Conference and Exhibition was held at the Hyderabad International Convention Centre on 7 – 9 December 2015. The venue is India's first purpose built convention facility and its only Green Globe certified convention centre. The conference was hosted by the International Institute of Information Technology (IIIT), Hyderabad and a welcome party was held in the Novotel poolside garden on the evening prior to the official conference opening.



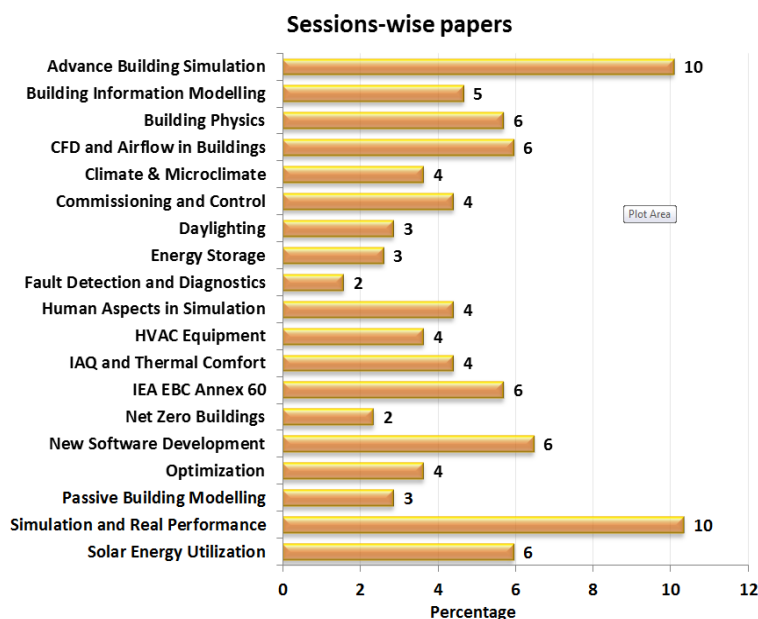
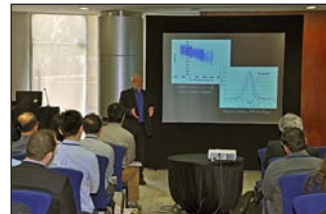
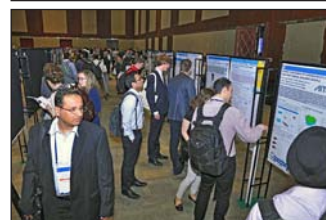
Left and above left: Professor Vishal Garg, Conference Chair and Head of the Centre for IT in Building Science at the IIIT, Hyderabad, at the opening banquet; in his welcome speech Professor Garg emphasized the crucial role of simulation in the design of high-performance buildings.



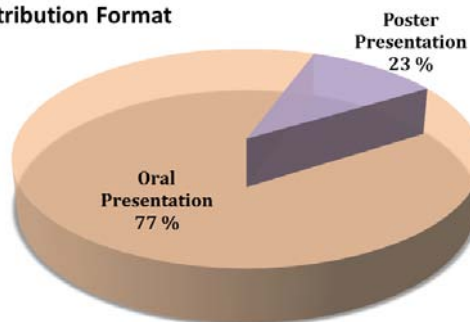
The conference attracted more than 400 participants with delegates from 43 countries. Papers were presented in seven parallel sessions, with a total of 67 sessions overall.

Below:

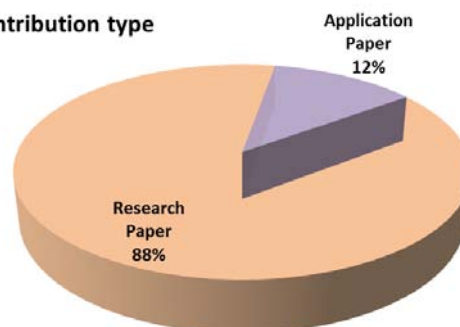
- 1 - active and well-attended sessions
- 2 - the poster exhibition
- 3 - Veronica Soebarto speaking
- 4 - Joe Clarke speaking



Contribution Format



Contribution type



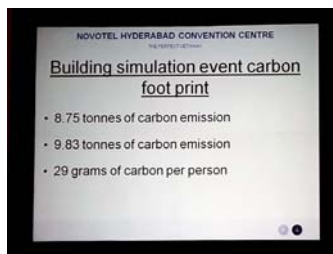
There were two keynote speeches, by Mr Padu S. Padmanaban and Professor Godfried Augenbroe (left and right below, respectively).



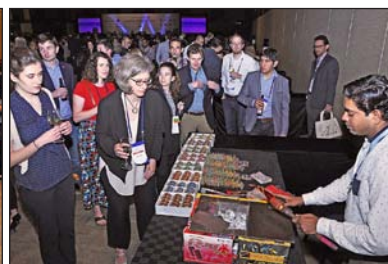
Mr Padmanaban presented the opening speech on Monday 7 December, speaking without the aid of PowerPoint. Mr Padmanaban, the former Program Director of the South Asia Regional Initiative for Energy Integration (SARI/EI) and Senior Energy Advisor for USAID/India's bilateral economic assistance programme, explained that India is the fifth largest nation in the world in terms of energy generation capacity, yet there is a huge gap between demand and supply. This creates an urgent need to bring demand under control and to design energy efficient and high performance buildings, as well as using renewable energy wherever possible.

Professor Godfried Augenbroe gave the second keynote speech on Tuesday 8 December. He directs the PhD and MSc programs in High Performance Building in the School of Architecture at Georgia Tech, Atlanta, USA, and has a 35 year track record in research and teaching in building performance simulation. Professor Augenbroe was awarded an IBPSA Fellowship in 2013 and on this occasion he was honoured with an IBPSA Distinguished Achievement Award (see page 14). His talk challenged the audience with 10 questions about model fidelity and the role uncertainty plays in practice, closing the performance gap, occupancy modelling and other domains.

The conference banquet was held in the conference centre on Tuesday evening. An opening presentation by the kitchen's chefs, explaining their carbon footprint, deeply impressed all attendants - followed by a mouth-watering summary of the evening's dishes and assorted drinks.



The conference organizers had spared no effort in their presentation of regional crafts, art, music and dancing. Below, traditional dancers (left), conference dancing (centre), and arts and crafts exhibition (right).



On the morning of Wednesday 9 December, the new IBPSA Fellows were announced (see pages 18 and 19 for more information).



Finally, towards the end of the conference, it was officially announced that IBPSA-US would host Building Simulation 2017 in San Francisco. This was followed by a brief presentation from the Conference Organizing Committee Chair, Dr Philip Haves (picture, left).

BS 2015 has left us all deeply impressed by the volume of high quality presentations, workshops, and posters which it included. It will be remembered as an event that was hosted with overwhelming kindness, delicious food, memorable events, and last but not least a colourfulness that has brightened everyone's spirit.

Below, more scenes from the conference: Board members enjoying beer in the warm outside temperatures (top left); the Building Simulation Modelling Competition award ceremony (top, right); the conference organising committee (bottom left); and Ruben Baetens receiving his IBPSA Young Contributor award, with Chip Barnaby and Pieter de Wilde (bottom right).



All papers from Building Simulation 2015 are now available online at www.ibpsa.org/?page_id=619.

An interview with both Jyotirmay Mathur and Vishal Garg can be found in this newsletter on page 27.

Photographs taken during the conference by conference staff can be found at www.bs2015.in/photo_gallery.php ■

And the award winners are ...

The Journal of Building Performance Simulation Best Paper Award 2015

Thermal simulation software outputs: a framework to produce meaningful information for design decision-making

Clarice Bleil de Souza, Simon Tucker

Journal of Building Performance Simulation Vol. 8, Iss. 2, 2015

Student travel awards 2015

Graeme Flett – University of Strathclyde, UK

Paper: *Household-differentiated demand modelling for communities*

Ki UhnAhn - SungKyunKwan University, South Korea

Paper: *Time series correlation between occupants and energy consumption*

Matthew Horrigan – University College Dublin, Ireland

Paper: *A holistic life-cycle data analysis approach to bridge the energy performance gap in buildings*

Qinpeng Wang – Georgia Institute of Technology, USA

Paper: *A framework for meta-analysis of the role of occupancy variables in the energy use of commercial buildings*

Yanfei Li – University of Alabama, USA

Paper: *Evaluating Control Performance on Building HVAC Controller*

IBPSA paper/poster awards

Paper award winners:

- 1** *Multi-dimensional Simulation of Underground Spaces coupled with Geoenergy Systems*
Adnan Mortada, Ruchi Chaudhary, Kenichi Soga
- 2** *On Modelling and Simulation of Occupant Models*
H. Burak Gunay, William O'Brien, Ian Beausoleil-Morrison, Simona D'Oca, Stefano Corgnati
- 3** *A Stochastic and Holistic Method to Support Decision Making in Early Building Design*
Torben Ostegard, Steffen E. Maagaard, Rasmus Lund Jensen

Poster award winners:

- 1** *Correlation between Occupants and Energy Consumption*
Ki-Uhn Ahn, Cheol-Soo Park
- 2** *Evaluating Performance of Simulated Annealing and Genetic Algorithm Based Approach in Building Envelope Optimisation*
Piyush Varma, Bishwajit Bhattacharjee

The IBPSA Awards

IBPSA makes awards for outstanding work in the building performance simulation field. These awards are made on a biennial basis at each Building Simulation Conference, providing there is a qualified candidate.

The categories awarded are:

- IBPSA Outstanding Young Contributor Award
- IBPSA Innovative Application Award
- IBPSA Distinguished Achievement Award

Nominations for awards must be made by an independent third party.

IBPSA Outstanding Young Contributor Award

This award recognizes an individual at the beginning of their career who has demonstrated potential for significant contributions to the field of building simulation.

This year's award goes to Ruben Baetens, KU Leuven. Ruben Baetens completed his PhD in June of this year, but has already contributed to IBPSA at a number of different conferences. He has consistently published and presented high quality work that is dedicated to the improvement of building performance simulation.



Some of Ruben Baetens' key contributions are as follows:

- He is actively involved in the IEA ECBCS Annex 60 "New generation computational tools for building and community energy systems based on the Modelica and Functional Mockup Interface standards".
- His PhD research investigated optimized energy networks for buildings; his work on bottom-up modelling of energy and grid demand of buildings for optimisation toward smart energy networks has led to a large number of peer-reviewed conference and journal papers.
- During his PhD and his time at KU Leuven he was involved in lecturing activities and he teaches classes on Energy, Indoor Environment, Building Services, and Building Simulations
- He has an impressive publication track record. Despite being at the beginning of his career, Ruben has published 12 journal papers with two additional papers in the making. His papers vary from dynamic daylight control, phase change materials to rule based demand side management. His number of citations already exceeds 1100.

IBPSA Innovative Application Award

This award, formerly named the IBPSA Award for Distinguished Practice, recognizes an individual, group or firm who has made a significant contribution to the effective application or advancement of building performance simulation in practice. The award may be given for a unique or noteworthy use of simulation in practice; development of simulation software or supporting software that has had a significant impact on industry practice; or other contribution that has advanced building performance simulation in practice.

This year's award goes to Jason Glazer, Gard Analytics

Jason Glazer has a long career of activities that support and standardize the use of building performance simulation. Several of these items deserve some amplification:

- Jason created and operates the onebuilding.org listserver system, dedicated to "discussions to improve building performance." This system hosts the widely-used BLDG-SIM mailing list that has facilitated idea exchange for more than 16 years among more than



2000 simulation users. Perhaps less well known is that onebuilding.org also supports other lists such as TRNSYS-users, several standards and technical committee lists, and the IBPSA-USA list. These lists are a significant part of the simulation community infrastructure and are provided with no funding by Jason's firm.

- Jason has, for over 10 years, chaired the ASHRAE Standard 90.1 Energy Cost Budget sub-committee. He has been instrumental in fostering use of simulation as the basis for demonstrating compliance with energy regulations.
- Building on his Standard 90.1 work, Jason initiated and chairs ASHRAE Committee 209 on Energy Simulation Aided Design for Buildings except Low-Rise Residential Buildings. This is developing a consensus standard for application of building simulation in design practice.
- Finally, it should be noted that many of the “little utilities” that surround EnergyPlus were written by Jason. These components are used every day by hundreds of EnergyPlus users. Without them, use of EnergyPlus would be much less convenient. Jason also created one of the first simple EnergyPlus interfaces – EP-Quick.

In summary, Jason Glazer has been quietly providing tools and procedures and promoting interactions among the building performance community for more than 20 years.

IBPSA Distinguished Achievement Award

This award, formerly named the IBPSA Award for Distinguished Service to Building Simulation, recognizes an individual who has a distinguished record of contributions to the field of building performance simulation, over a long period.

There are many individuals who have made great and often unacknowledged contributions to our field over their careers, so selection of candidates for the Distinguished Achievement Award always leads to a difficult choice. This year, the Board has decided to bestow this honour on Godfried Augenbroe, Georgia Institute of Technology

The achievements and contributions to the field of building simulation that are evident in his 36 year track-record are:

- the conception and leadership of large international research projects of over \$20M;
- mentoring of 30 PhD & 80 MSc students, many of whom are now successful academics;
- nurturing the intellectual development and sustenance of the Building Performance team at Georgia Tech, including an MSc program in High Performance Buildings;
- his service in leading roles on numerous editorial and conference boards, including the IBPSA board;
- and his influence in shaping and advising research programs in the US and internationally.

Regarding his specific intellectual contributions, the following are noteworthy:

- His supervision of the PhD thesis of Sten de Wit marked the beginning of his pioneering work on uncertainty analysis in 2002, and continues to inform new research to date.
- The COMBINE project has been deeply influential in shaping the future of computer models in the building industry.



- Prof Augenbroe's work on knowledge management bridges the gap across building simulation and the construction sector.
- His work on performance assessment standards was influential in the development of the current ISO-CEN 13790, which is now adopted and used extensively across Europe.
- His papers on integrating building performance in the design process influenced a large bulk of early simulation development in the 1990s and 2000s.

His seminal papers - Trends in Building Simulation (2002), Knowledge Management in the Architecture, Engineering, and Construction Industry (2002), Calibration & Uncertainty (2002, 2012) remain the main reference to this date on these topics.

Finally, a single quality that marks Godfried Augenbroe as one of the key influential figures in the field of building simulation is his ability to inspire and mentor other researchers. All of his past students, both MSc and PhD, remain deeply grateful to him and are likely to attribute their success to his mentorship. The highly successful careers of many of his past students are a testimony of Fried's influence in the field across three generations of researchers.

Student modelling competition

IBPSA ran a student modelling competition as part of BS2015, as it has at previous Building Simulation conferences. The general aim of the competition is to facilitate wider participation in the conference and to provide a competitive forum for student members of the building simulation community. The brief was to use computer simulation to design and test a mixed-mode operation strategy for a new office building located in the composite climate of New Delhi in India.

All participants had to prepare a detailed report summarizing their methodology, simulation results, findings and conclusions. The winners received complimentary registration to participate in BS2015 and a cash prize of \$US500 (per group/individual) and a certificate.

10 group entries and 5 individual entries were submitted from India, USA, UK, Germany, Switzerland and Romania.

Entries were judged before the conference, and three awards were made: one for the winner of the group entrants, and others for the first and second placed individual entrants:

Winning Group entry: Raphael Wu, Joonas Karjalainen and Marc Lallemand, ETH Zurich

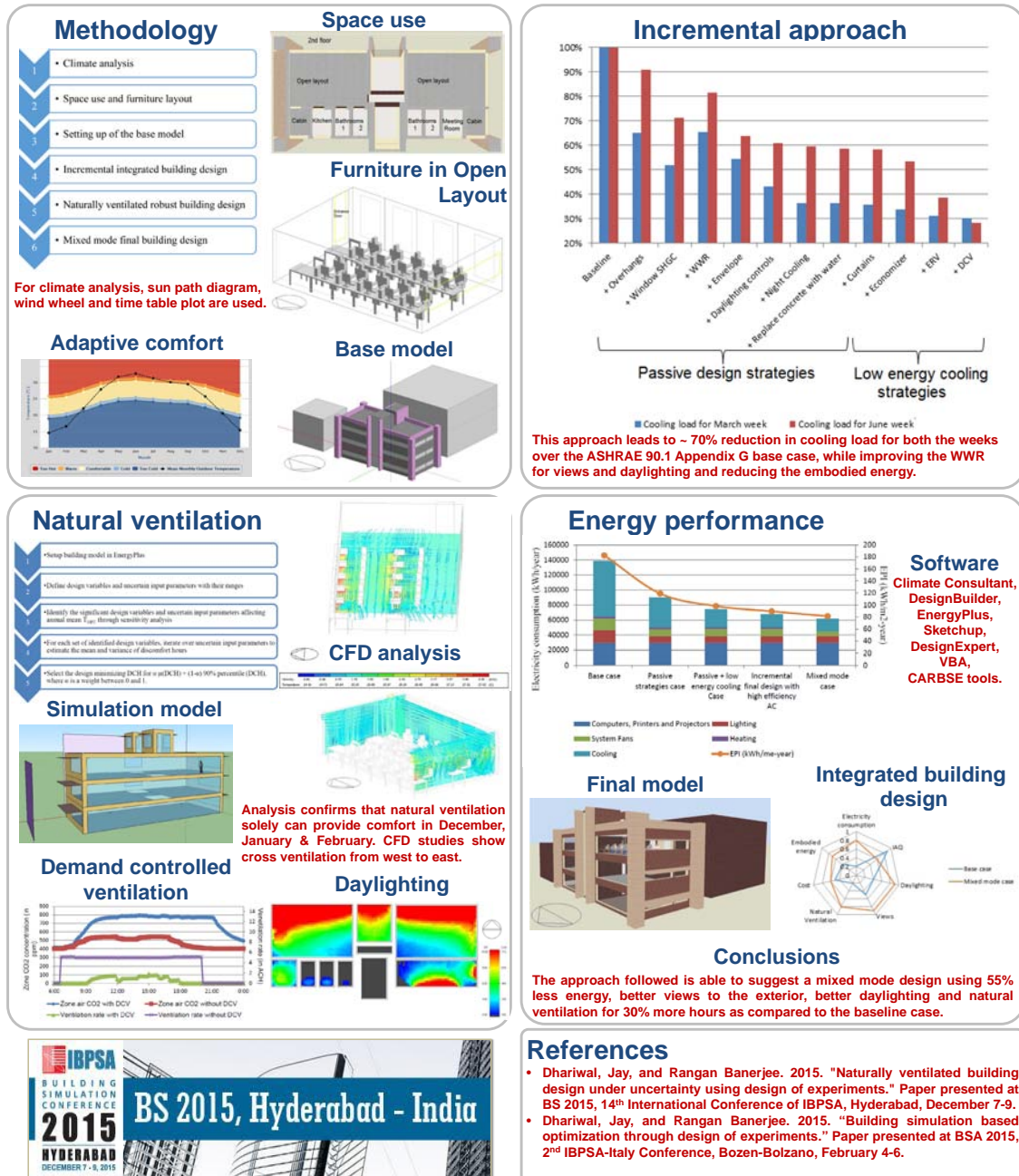
Winning Individual entries: Jay Dhariwal, IIT Bombay
Dimitri von Gunten, Lucerne University of Sciences and Arts

This year's winner of the group submission and one of the individual entrant awards kindly prepared a poster summary from their report, included here on the following two pages. Thank you all for sharing your submission with us, and congratulations again on winning the competition. ■

DESIGN AND SIMULATION OF A MIXED-MODE OFFICE BUILDING

Jay Dhariwal, IIT Bombay, India

An office building in New Delhi climate is analysed for integrated building design. Passive design, low energy cooling and natural ventilation strategies are used to reduce the cooling load, while improving on the other aspects over the base case.



MODELLING COMPETITION

Designing a Mixed-Mode Office Building

J. Karjalainen, M. Lallemand, R. Wu – ETH Zurich

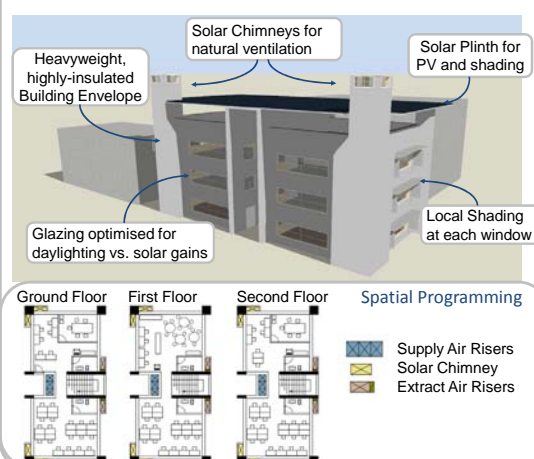
ETH zürich



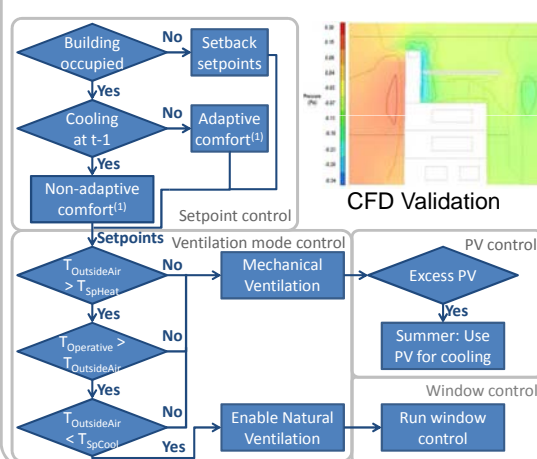
Introduction

The student modelling competition's objective was to design and simulate a mixed-mode office building in New Delhi. This contribution focused on maximising natural ventilation and minimising the net imported energy, while ensuring user comfort.

Building Design



Control and Comfort



Tools and Techniques

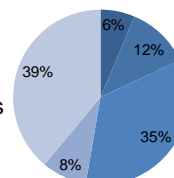
- Site Analysis (Climate Consultant⁽²⁾)
- Whole Building Simulation (DesignBuilder⁽³⁾, EnergyPlus⁽⁴⁾)
 - Building Modelling
 - Façade & Window Optimisation
 - Control Strategy Implementation
 - Annual Energy Simulation
- CFD Analysis (DesignBuilder)
 - Exterior for Nat. Vent. Validation
 - Interior for Air Flow Comfort Analysis
- Result Analysis (Excel)
 - Simulation comparison with an internally developed, Macro-based Tool
- Sensitivities / Uncertainties
 - Interior Air Flows in CFD Analysis

Conclusions and Outlook

Simulated Performance

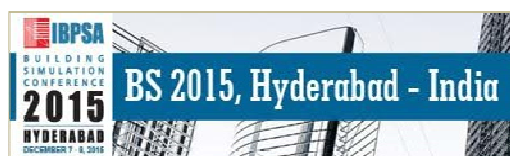
- 90% Energy Self-Sufficiency
- 2600 Natural Ventilation Hours
- 460 Occupied Nat. Vent. Hours
- 94% of Occupied Hours within Comfort Limits⁽¹⁾

Energy Consumption



Suggested Further Investigation

- PV Plinth & Solar Chimney Cost-Benefit Analysis
- Detailed Control and Air Flow Simulations
- Outdoor Air Quality Implications for Nat. Vent.



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Fellows Class of 2015

The following colleagues were inducted as Fellows:



Charles 'Chip' Barnaby

Charles S. "Chip" Barnaby's 40 year career has focused on implementation of building energy software using his broad understanding of building physics, HVAC engineering, and modern software techniques. He has led the development of many applications ranging from CALPAS3, an early microcomputer-based hourly simulator, to his current work on CSE, a state-of-the art residential model. He has also contributed to several research projects that extended the practical range of heat-balance methods and is shepherding development of ASHRAE standards for equipment performance data formats.

Darren Robinson

Professor Darren Robinson is Chair of Building and Urban Physics at the University of Nottingham, UK, where his research activities lie at the intersection between social physics (people), building physics (buildings) and urban physics (city). Previously he led the Sustainable Urban Development research group at the Swiss Federal Institute of Technology (EPFL) in Lausanne. His research specializes in simulating physical processes to better understand how to optimize the sustainability of urban systems, predominantly from environmental, but also from social and economic perspectives.

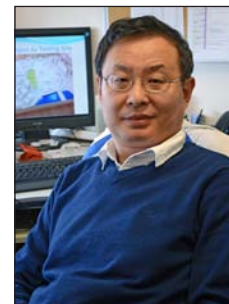


Ian Beausoleil-Morrison

Ian Beausoleil-Morrison is amongst the most well known people in the building performance simulation field. His many research contributions are impressive. He is also known for introducing innovative teaching materials both at university level and continuing professional development level. He has also made distinctive contributions to the field through his editorship of the Journal of Building Performance Simulation, which he co-founded, and as a director - now immediately past president - of IBPSA.

Jian-lei Niu

Professor Niu is a world-famous professor and academic in the area of CFD and heat transfer modeling, building environment and energy design as well as IAQ and thermal comfort analysis. He is highly praised for his unusual distinction in the fields of heating, refrigeration, air conditioning, ventilation and built environment and his substantial contribution to these arts and sciences through invention, research, teaching, design and original work. He is Editor-in-Chief for the journal Energy and Buildings. He also serves as editor of several other high quality journals. He is an elected fellow of ASHRAE, CIBSE and HKIE. As a researcher, he has won many awards for his outstanding contributions.





Jonathan Wright

Jonathan Wright is one of the key actors in the building performance simulation community in the UK and worldwide, with an international standing at the highest level. Jon has contributed significantly to the mission of IBPSA. He is a founder and board member of IBPSA-England and as such he has made a tremendous contribution towards developing IBPSA into the organisation it is today. In terms of research, Jonathan Wright was among the first to complete a PhD in the field of building optimization. Since then he has actively pursued the topic of optimization. Perhaps his most significant contribution to the field of building optimization is the early introduction of Evolutionary Algorithms and their application to multi-objective building optimization.

Kwang Woo Kim

Prof. Kim has a track record of more than 30 years in teaching and research in the areas of performance simulation of radiant floor heating systems, solar access simulation of high-rise residential buildings, quantification of stack effect, facade design, dynamic control of blinds, etc. He has supervised 18 Ph.D. theses and 64 Masters theses, has published 400+ papers and (co-) authored 19 books. He has served as president of IBPSA-Korea since it launched in 2011.



Linda Lawrie

Linda's work has permanently influenced the field of building thermal simulation as evidenced by her 40+ years of outstanding contributions to the U.S. Army's Construction Engineering Research Laboratory (USACERL), and the ever-present Q&A that she provides to EnergyPlus users through the USDOE's EnergyPlus list server. Linda was one of the founding members of IBPSA in 1986 and served as a Board Member of IBPSA from 1990 to 1991. She is also a Life member of ASHRAE and a voting member of the Association of Computing Machinery. Linda coordinated the merger of DOE-2 and BLAST to form EnergyPlus.

Radu Zmeureanu

Professor Zmeureanu is a professor in the department of Building, Civil and Environmental Engineering at Concordia University, Canada. He is a highly-regarded researcher in the field of HVAC systems and building simulation. He has made significant contributions in the following fields: optimization of green buildings; exergy analysis of HVAC systems; life cycle costs and energy analysis of net-zero energy buildings; ongoing commissioning of HVAC systems. Professor Zmeureanu is also an excellent teacher in the fields of HVAC systems and building simulation. He has trained many graduate students that now contribute to the profession. ■



A User-Centred Approach to Building Performance Simulation:

User needs and performance assessment management

a position paper by Clarice Bleil de Souza¹ and Simon Tucker²

Improvements in the design of low energy buildings could be achieved if the stakeholders involved in the process were able to more effectively use building performance simulation (BPS) to support decision making. However, current BPS software tends to follow an 'engineered systems' philosophy, which delivers specific functions and processes effectively but does not support the way many of the users (and potential users) communicate and interact with their work.

This position paper argues that the simulation community should take a user-centered approach to building performance simulation. This approach implies identifying:

- *The potential uses that different professionals might have for BPS in their practices and*
 - *How performance assessment can be undertaken by non-experts in these different contexts*
-

State of the art and problem definition

Past and current attempts to address BPS users' needs, as found in the simulation literature, rarely focus on the users. Simulation researchers have not yet accounted for the many ways people interact with computer and digital artefacts as described in the extensive literature on Human-Computer Interaction, User-Centred Design and other closely related fields. They instead concentrate on technical and operational aspects involved in the use of simulation and aim at formalising and specifying procedures and/or methods to guarantee consistency and quality of results. Examples of these include: understanding the significance of results, ascribing levels of uncertainty to results, deciding how detailed a model needs to be, and ensuring the meaningful use of analytical techniques such as 'optimisation' and sensitivity analysis. These areas are routinely dealt with by the BPS community and represent the expert knowledge built up within that community.

Evidence of mismatches between these types of research initiative and, for example, building designers' expectations when using simulation tools are found in the literature: proposals for different types of displays exploring graphic and multimedia representation systems and different types of output interfaces (e.g. Prazeres and Clarke, 2005; Papamichael, 1999; Stravrovadis and Marsh, 2005; Dondeti and Reinhart, 2011) tend to be limited in terms of exploring the possibilities for how the user can control or experiment with the simulation process and its outputs. Attempts to create more experimental environments (e.g. Chlela et al. 2009; Pratt and Bosworth, 2011; Petersen and Svendsen, 2012; Ochoa and Capeluto, 2009; Radford and Gero, 1980; Mardaljevic, 2004; Caldas and Norford, 2002; Caldas et al. 2003; Marsh and Haghparsat, 2004) are generally restrictive in terms

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of the analytical methods available for designers to experiment with, providing input/output interfaces designed to cope with either optimization or parametric tests only. Finally, more comprehensive initiatives, frameworks, that attempt to propose solutions to integrate BPS throughout the whole design process (e.g. Clarke et al. 1995: Clarke and MacRandal, 1993: de Wilde and van der Voorden, 2004: de Wilde et al. 2002: Augenbroe et al. 2004: SERI, 1985: Mahdavi, 1999: Mahdavi and Suter, 1998: Mahdavi, 2004: Mahdavi and Gurtekin, 2001) assume that building designers will be prepared to become literate in building performance analysis and happy to adopt a systematic and scientifically based approach to design.

User requirements and related performance assessment methods are essentially connected through simulation outputs and simulation post-processing. Mismatches between customers' expectations and simulation outputs occur because different users have different modelling objectives (Franconi, 2011). Therefore, questions that may be formulated include: What are the objectives of each different user and how these can be met while ensuring that technical aspects of simulation are correctly addressed? How could performance assessment be structured such that building designers, students, control engineers, etc. will find the results valuable to their work?

Approach required and justification

This position paper proposes that the time is overdue for the simulation community to place the user at the centre of further BPS development so that they can have more control over how, why and when to use the tools to support their working processes. This might mean adopting a 'product design' approach to further develop BPS tools and their user interfaces, similar to commonly accepted practices taken in the design of digital products and artefacts. Such practices employ design techniques and research methods that have been developed since the 1980's in the extensive and multidisciplinary research on: Human-Computer Interaction (see Annual Proceedings of the ACM CHI Human Factors in Computing Systems Conference, 1982-2013), User Experience Design (UX) (e.g. Norman, 1988: 2005), Interactive Systems Design (e.g. Newman and Lamming, 1995), and Interaction Design (e.g. Cooper et al. 2007: Rogers et al. 2007). Interaction Design, for example, teaches us that software should be designed for the user who is seen as a consumer of a product that will help her to be successful in practice because it is useful to her in achieving her goals. This involves understanding user goals, developing solutions that enable these goals to be achieved, prototyping and assessing the solutions developed; extensively working with 'trials' before implementing them at the level of computer / interfaces. The challenge for the BPS community is still at the level of understanding user goals and of developing solutions to enable them to be achieved.

The authors of this position paper adopted such an approach and identified how different building designers wished to make use of BPS in such a way that it would support their professional practice. The work included a proposal for a framework within which BPS processes and outputs could be developed through collaboration between the user and the BPS developer (Bleil de Souza and Tucker 2015a), and a proposal for recording and storing similar or predictable patterns of using BPS performance assessment for design decision making (Tucker and Bleil de Souza 2015). The paper series finishes with a conceptual data model composed of a number of interrelated open ended tables linked to an appropriate set of coding to construct displays to produce, store and retrieve meaningful dynamic thermal simulation output information for design decision making (Bleil de Souza and Tucker 2015b).

The aforementioned papers show that a user-centred approach is possible and that working with users, people immersed in different social contexts with complex needs, involves the development of a clear research agenda, such that the resulting knowledge and practice-based problems can be brought into future BPS software research and development. Important parts of this agenda are:

- **User objectives and BPS:** involves the use of appropriate research methods to identify not only the potential goals in using BPS but also how BPS might fit into the different users' *modus operandi* (e.g. some building designers require BPS to be flexible to fit within the different types of experiments that they undertake, whereas those using BPS for compliance might only require tools to set up protocols to quality assure repetitive tasks).
- **Performance assessment methods and management:** involves the use of appropriate research methods to enable the identification, recording and storage of the actual and potential uses that simulation can have for the different users once aligned with each different user's *modus operandi*. It also involves the formulation of flexible methods or procedures that satisfy this range of uses.
- **User centred BPS systems and interfaces:** involves the use of appropriate research methods to deliver BPS information to the user by integrating existing software and operating systems with effective user interfaces.

An outcome of this approach would be a process of knowledge transfer from the BPS expert to the non-expert user, packaged in appropriate ways to directly apply expert knowledge when carrying out performance assessment. Ultimately the approach would encourage communication between simulation experts and simulation user on how BPS can best be used to design low energy buildings.

Possible actions, time scales and support provided by IBPSA

Given the potential of the field and the fact that the theme is underexplored, what is needed is a task force of a number of people with an interest in this area, within the IBPSA, to discuss and help to formulate a route forward for the community. Potential initial outputs from the task force could include:

- The creation of a discussion forum for this theme on the IBPSA website
- The organisation of one or more events to discuss the topic
- A special issue on the topic in the Journal of Building Performance Simulation.

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Interview with the authors

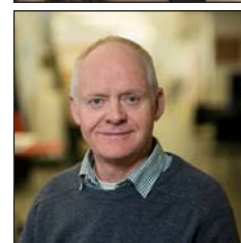
Christina Hopfe interviewed the authors of the position paper, Clarice Bleil de Souza and Simon Tucker, to ask about the background to their position paper and their ideas for future work.

Christina Hopfe (CJH): First of all congratulations! This position paper refers to and partly is based upon, your work entitled “Thermal simulation software outputs: a conceptual data model of information presentation for building design decision making” that recently won the JBPS best paper award for 2014-15 (www.tandfonline.com/doi/full/10.1080/19401493.2015.1030450).

Clarice Bleil de Souza (CBdeS)/Simon Tucker (ST): Many thanks for the congratulations, we were very happy with the award and the opportunity to talk about our work in this newsletter since it has shown us that the simulation community is now ready to think more about the different and potential BPS users, an essential step towards building better BPS user interfaces.

CJH: Could you start by telling us a bit more about the background to your paper and how the idea for this position paper arose?

CBdeS/ST: This work started with the EPSRC grant *Developing better outputs from building thermal simulation tools to improve decision making in the design of low energy buildings*, a 15 month project in which we worked together, constantly questioning and thinking creatively about how BPS could have a better uptake from building designers.



We realised that on one hand, simulation outputs are incompatible with designers' constructivist / experimental / 'learning by doing' way of approaching problem-solving and on the other hand, software developers are rarely provided with adequate information about how simulation results can be used to inform design decisions. Responses to the problem tend to be interpretations of what the simulation community assumes the building designer needs and are generally based on research methods (e.g. interviews, questionnaires, etc.) that are ineffective in matching needs with appropriate solutions, simply describing the problem without showing how it can be solved.

We wanted to change this paradigm and adopted the viewpoint of designers to do so. We wanted designers to take part in the research; we wanted to experiment with different research methods which could be more effective in terms of not only examining the problem but at the same time proposing potential solutions to it. To the best of our knowledge, this was the first time a methodologically user centred approach has been used in the BPS field, combining research methods from Social Sciences, Design Research and Interaction Design. We presented the work initially at BS 2013 in Chambéry (Bleil de Souza and Tucker 2013 and Tucker and Bleil de Souza 2013) and then more extensively in JBPS (Bleil de Souza and Tucker 2015a, and 2015b, Tucker and Bleil de Souza 2015).

During BS 2013 in France we were invited to provide a contribution to a white paper to be produced by the IBPSA Futures committee. We accepted the challenge and produced a draft which contributed to the paper published in JBPS by Clarke 2015: "A vision for building performance simulation: a position paper prepared on behalf of the IBPSA Board". Seeking to further discuss this topic, we decided to produce the positional paper published in this newsletter, dedicated exclusively to stimulating the BPS community to further reflect on how BPS could be more user-centric – inviting the BPS community to set up new fundamentals to build better user interfaces.

CJH: You state that a user-centred BPS approach is possible and that the agenda towards it would include three important parts. Who will be the user of such an approach to BPS and what background knowledge will be required?

CBdeS/ST: The user is seen potentially as any stakeholder involved in low energy building design but who does not necessarily have a particular interest in BPS itself, i.e. someone who does not know the details and particularities involved in modelling and simulation but can see a use for it in their professional tasks. The approach and methods we propose essentially emphasize that BPS developers should understand who the user is and what s/he does, i.e. that they understand and list potential goals each different stakeholder has in using BPS and that they examine carefully how BPS can fit into these different stakeholders' 'modus operandi'. As part of that, any interface to be developed should also be able to accommodate the different levels of knowledge each user may have about the fundamentals of using BPS. Interaction Design literature provides examples of how to cater for beginner, intermediate and expert users when designing interfaces and these could be taken into account once BPS user-centred approaches are put into practice. Wouldn't it be a total success for developers if a simple interest in low energy design could provide enough motivation for the different stakeholders to use BPS?

CJH: How do you tackle the problem of quality assurance?

CBdeS/ST: At the moment, quality assurance (QA) depends on the user having sufficient domain knowledge and skills to understand how to carry out simulation. If we want different types of users with different levels of knowledge of BPS to have access to BPS this paradigm has to change. Why can't the various aspects of modelling, simulation and the correct interpretation of results be communicated to the user through an interactive interface linked to a knowledge database? Why can't we teach the user about it through a set of

pre-set procedures or patterns, that are themselves quality assured, and which are presented according to the different levels of knowledge this user has? In other words, QA knowledge could be built into the system, QA procedures could be accessed through a highly interactive interface and run semi-automatically. We discuss this issue further in Tucker and Bleil de Souza 2015.

When we considered building designers as BPS users for example, we noticed that often these users have recurring performance questions (possibly concerning the same building type, in the same climate) for each project they undertake. These questions along with construction of customised simulation procedures and outputs could be recorded and re-used such that QA is largely carried out on a semi-automated way.

CJH: You outline some possible actions and list potential initial outputs. Which of these (if at all) do you see yourself driving forward and how?

CBdeS/ST: Since the award and this newsletter are providing an opportunity for us to provoke the simulation community to think more about the different and potential BPS users, we would like to open this discussion to include software developers, building designers, HCI experts etc. in order to expand and critique the topic and identify areas for future research, development and implementation.

On one hand, it would be good to have some support from IBPSA to get this started, perhaps through a meeting or workshop, so that this could lead to the formation of an IBPSA user-centred working group which could explore the topic further in more formal ways, e.g. a special issue of JBPS, seminars, etc. On the other hand, we are really keen to discuss our findings with BPS software developers directly so that we can put our ideas into practice.

CJH: Thank you very much! ■

Two research institutes in India:

the International Institute of Information Technology, Hyderabad and the Malaviya National Institute of Technology, Jaipur

an interview with Vishal Garg and Jyotirmay Mathur

In this edition of ibpsaNEWS, our regular feature describing the work of research institutes, university faculties and other organisations that are actively involved with IBPSA related research focuses on two different Indian organisations. Christina Hopfe interviewed Vishal Garg, Associate Professor and Head of the Center for IT in Building Science at the International Institute of Information Technology, Hyderabad, and Jyotirmay Mathur, Head of the Centre for Energy and Environment at the Malaviya National Institute of Technology, Jaipur. Vishal Garg was the Organising Chair of BS 2015 and Jyotirmay Mathur was its Scientific Committee Chair.

Christina Hopfe (CJH): First of all, congratulations on organizing the most recent BS conference. It was truly a memorable event. Would you like to briefly share your experience of organising this conference?



Vishal Garg (VG, left): Thank you Christina for your kind words. Organizing the conference was a big task and the dedication of the team helped us in executing this conference successfully. There were two core teams, one from MNIT-J that was looking at the scientific aspects and the other from IIIT-H that was looking at the conference logistics. Our student volunteers worked round the clock to help organize conference activities and ensure things ran smoothly. They had an opportunity to learn many things in the process and met some of the best-known people in this field. The conference also received a lot of media attention in India and it helped convey the message of using simulation to design energy efficient buildings.



It was the peak season for various kinds of travellers; tourists, business travellers, and many hotels turned into offices due to floods in Chennai. We had great difficulty in managing the accommodation even though we had booked several hotels in advance.

We wanted to provide a glimpse into the art and cultural scene in India and we were glad to see the astounding success of the cultural programs organised by our committee. There was active participation from delegates around the world.

Jyotirmay Mathur (JM, above): Organizing BS15 as Scientific Chair was a great experience. Right from announcing the call for papers until the final publishing of proceedings, it gave us a variety of experiences,

ranging from a thrilling sense of achievement to anxiety and pressure, incorporating learning and most importantly exposure. It gave me an opportunity to cooperate with more than 250 reviewers across the globe. The task of synchronising and compiling the recommendations, then addressing the queries and objections of many individual authors, arranging papers in sessions whilst trying to accommodate the preferences of authors without disturbing the theme of the sessions, and finally ensuring the smooth conduct of the sessions, presented a number of challenges. Fortunately, we had a good team of researchers and students who helped us a great deal in sailing through all the rough waters that we faced in this journey.

CJH: Could you please explain a little bit about the two different institutions that you are working at. What is the primary aim of these different institutions? Are they more research focussed, or interested in industry collaboration? Or is it a combination of both? What are the different research streams that you follow?

VG: The International Institute of Information Technology, Hyderabad (www.iiit.ac.in) is a research university focused on the core areas of Information Technology, such as Computer Science, Electronics and Communications, and their applications in other domains. The institute has evolved strong research programmes in a host of areas, with computation or IT providing the connecting thread, and with an emphasis on the development of technology and applications which can be transferred for use in industry and society. This requires carrying out basic research that can be used to solve real life problems. As a result, a synergistic relationship has come to exist at the Institute between basic and applied research. The faculty carries out a number of academic industrial projects, and a few companies have been incubated based on the research done at the Institute.

One of the features of IIIT-H is that it is organized as research centres and labs, instead of the conventional departments, to facilitate inter-disciplinary research and a seamless flow of knowledge within the Institute. Faculty assigned to the centers and labs conduct research, as well as academic programs, which are owned by the Institute, and not by individual research centers.

Another feature of IIIT-H is that students, even at the undergraduate level, get to participate in ongoing research and technology development - an opportunity unprecedented in India. As a result, a vibrant undergraduate programme co-exists with a strong postgraduate programme.

The Center for IT in Building Science is one of several domain centers in IIIT-H. In this center, we are working on various aspects of IT applications to buildings, which include building energy simulations and automation. Currently there are four PhD. and two MS by Research students. There are also three undergraduate students from the Building Science and Engineering program. There are several staff and undergraduate students associated with the center. I would like to highlight a unique program in IIIT-H – the Building Science and Engineering, 5 years' dual degree program. The programme focuses on developing an environmentally sustainable habitat by integrating environment, materials, services, science and engineering while making use of the latest technology in computer science and electronics.

JM: The Centre for Energy and Environment is an interdisciplinary centre at MNIT Jaipur (www.mnit.ac.in). The Institute is fully funded by the Government of India and is governed by the Ministry of Human Resource Development. MNIT Jaipur is a 53 year old institute, offering 8 undergraduate programs and 27 postgraduate programs in almost all major disciplines, housing more than 6000 students on its campus. The Centre for Energy and Environment offers a postgraduate program in Renewable Energy and a Ph.D. program related to various topics on the theme of energy and environment. The Centre's major areas of focus are energy conservation in buildings, passive and low energy cooling, thermal comfort studies, building integrated photovoltaic systems,

energy policy modelling, biofuels, energy storage, sustainable buildings, indoor environment quality, and environmental impact assessment. It has an inter-disciplinary team of 8 faculty members and 20 research scholars associated with it. It is identified as a centre for imparting training on energy efficiency in buildings, solar photovoltaic systems and environmental impact assessment by various nodal agencies in the country.

CJH: What are the main links nationally and internationally, such as collaborations with other universities and partners? Tell us about ongoing projects, e.g. the one with Loughborough University and Berkeley, or others?

VG: The Centre is collaborating with several national and international institutions and has been focusing on three main activities:

- Consulting
- Research
- Policy support

Some of our consulting activities include facilitation of green certification for buildings by providing energy simulation support. Two such recent projects are green initiatives at the National Remote Sensing Centre (NRSC) www.nrsc.gov.in/Green_Initiative which received the LEED India - NC Platinum Rating, and at the ANTRIX Corporation www.antrix.gov.in in Bangalore, India, which received the LEED India - NC Gold certification.

Our ongoing research includes two major projects:

- Center for Building Energy Research and Development (CBERD) (www.cberd.org) that has active academia and industry collaboration. In this project, we are collaborating mainly with Lawrence Berkeley National Laboratory (LBNL), University of California, Berkeley (UCB), Rensselaer Polytechnic Institute (RPI), CEPT University Ahmedabad, Indian Institute of Management (IIM), Ahmedabad and Malaviya National Institute of Technology (MNIT), Jaipur.
- Another project is a controlled experiment for estimating the energy saving potential and indoor thermal comfort improvement by use of high albedo surfaces on a pitched concrete roof, funded by the Indo-French Centre for the Promotion of Advanced Research, CEFIPRA.

We also work very closely with the Indian Green Building Council (IGBC), Administrative Staff College of India (ASCI), Indian Society of Heating and Refrigeration Engineers (ISHRAE), and Bureau of Energy Efficiency (BEE) on development, implementation, and capacity building for various rating systems, standards and codes in the area of green building and energy efficiency.

JM: Our group mainly undertakes research projects; however, we also have some consulting assignments from time to time. In addition, we have been actively involved in the development of National Codes and Standards related to our field of work by providing research based inputs. The National Building Code, Energy Conservation Building Code, Chiller Standard Rating Standard, Indoor Environment Quality Standard to name a few. We have been identified as the Institutional partner of the Bureau of Energy Efficiency, Government of India, for training of trainers for implementation of the Energy Conservation Building Code in the country. Our active international linkages include several Universities/Institutes worldwide, such as USA, UK and Germany. We are also quite active on various technical committees of ASHRAE. Presently, we are working actively with faculty/researchers from LBNL, ORNL, UCB, CMU and Salford University.

Like IIIT-H, we are also partners in the Center for Building Energy Research and Development (CBERD) project (www.cberd.org), which has active academia and industry collaboration. In this project, we are focusing on advanced HVAC with special focus on radiant cooling systems and DOAS, as well as the development of an

Indian thermal comfort zone on a psychrometric chart and subsequently Indian Building Bio-climatic Design Charts for different passive cooling strategies, through a combination of field measurements and simulation based studies.

Besides this, we are working on a project funded by the Indian Society for Heating Refrigeration and Air-conditioning Engineers (ISHRAE), for updating the Weather Data Book for Indian cities. And finally, we are doing work on Building Integrated Photovoltaic Systems and developing a design aid for estimating the transient performance of Earth Air Tunnels.

CJH: Could you provide an example of current research in the field of modelling and simulation? What is your current focus in this field?

VG: Currently we are working on the following research topics:

We are developing an Early Design Optimisation Tool (eDOT) that helps design teams to visualize the spectrum of building design solutions for energy efficiency. eDOT performs annual energy simulations using EnergyPlus. It uses two approaches: a parametric approach that simulates all the given combinations, and an approach that uses an optimization tool (GenOpt) in the back end to find the optimal solution by simulating a fraction of the combinations simulated in the parametric approach.

We are also developing an Energy Conservation Building Code (ECBC) compliance tool. Further, we are also focusing on automatic Fault Detection and Diagnostics (FDD) in HVAC systems, and personalised task control for energy savings.

JM: The present focus of our modelling and simulation work has three wings. One is related to the simulation of radiant cooling systems with different design and control strategies of DOAS. It includes simulation using EnergyPlus and CFD tools such as Fluent, and scStream. The second wing is involved with the simulation of passive cooling systems such as earth tubes, solar chimneys and thermal mass and linking it with thermal comfort analysis. The third wing is focusing on supporting the development of codes and standards through simulation based analysis. This wing is also working on linking long term policy modelling tools with building level modelling so as to provide an integrated planning tool.

CJH: What do you think is or are your (greatest) asset(s)? This might include specialist knowledge in a particular area, or a specific piece of lab equipment, or some key software development or personnel?

VG: Our greatest strength is the way IIIT-H facilitates close interaction between the IT and domain areas. Our centre is able to attract some of the best CS students in the institute who are doing their projects in the domain of buildings. Just to give an idea how competitive it is to get admission to the UG programme at IIIT-H, our lowest entry grading for the UG CSE program is within the top 2000 of about a million students who take the all India entrance exam. Based on various surveys, IIIT-H is ranked number one in placements and top five in research. This is commendable for an institute which is just 18 years old.

JM: The strengths of the Centre for Energy and Environment are: a good and hard working team of researchers; the inter-disciplinary expertise of colleagues at our Centre; and a long standing strong partnership with institutes like IIIT-H. Good support from industry as well as nodal government agencies/departments, and support from international partners/collaborators, have also been very useful for us. Close interaction and support from Bureau of Energy Efficiency (Government of India); Indian Society for Heating Refrigeration and

Air-conditioning Engineers (ISHRAE); Indian Green Building Council (IGBC); Ministry of New and Renewable Energy (Government of India), have been to our advantage too.

CJH: Where do you expect your institution to be in 5 years and in 20 years' time? Are you aiming for organic growth or are you actively seeking more expertise in a different area?

VG: The International Institute of Information Technology is growing at a rapid pace; however on current plans we would like to keep our size small and focus on high impact research. There are plans to expand our centre and we want to develop low cost tools and technologies which can be used by the construction industry. The Indian construction industry is growing rapidly. We are in a phase where we are expecting to double our building stock in the next couple of decades, thus there is an urgent need to ensure that we construct energy efficient buildings. This needs tremendous efforts in capacity building, policy development and implementation, and tools and technology that are relevant for the Indian market. I think we would like to support this in the best possible way. We are looking for new faculty members to join us in our endeavours.

JM: The Malaviya National Institute of Technology is continuously growing and on current plans it is likely to double its capacity over next 20 years. Presently there are eight Centres of Excellence that are also planned to be increased according to global priorities and needs. At our Centre, over the next 5 years we are planning to start a new postgraduate program in energy conservation which will have buildings as one major area. Expansion in other directions such as bio-fuels and climate change studies is also on the cards. We are also attempting to introduce more and more contemporary courses at undergraduate level, rather than confining these to postgraduate and Ph.D. levels. We expect to expand by a combination of organic growth and planned diversification of expertise.

CJH: Thank you very much for participating in this very informative interview.

For more information about the two organisations, or if you are interested in collaboration or knowledge exchange, please contact Vishal Garg, vishal@iiit.ac.in and Jyotirmay Mathur, jmathur.mech@mnit.ac.in.



Left to right:

Charles Barnaby - IBPSA President
Jyotirmay Mathur - BS2015 Scientific
Committee Chair
Vishal Garg - BS2015 Conference Chair
Paul Strachan - IBPSA Conference Committee
Chair

If you would like to publicise the work of your faculty or research group in a future *ibpsaNEWS* interview please contact Christina Hopfe (C.J.Hopfe@lboro.ac.uk). ■

Forthcoming events

Date(s)	Event	Web site
2016		
03-06 May 2016	eSim Hamilton, Ontario, Canada	www.esim.ca
22-25 May 2016	CLIMA 2016, 12th REHVA conference Aalborg, Denmark	www.clima2016.org
23-24 May 2016	Biennial IBPSA-France Congress Marne la Vallée, France	www.ibpsa.fr
25-29 June 2016	ASHRAE 2016 Annual Conference St Louis, Missouri, USA	http://ashraem.confex.com/ashraem/s16/cfp.cgi
11-13 July 2016	PLEA 2016 Los Angeles, California, USA	http://plea2016.org
11-14 July 2016	Purdue Conferences West Lafayette, Indiana, USA	https://engineering.purdue.edu/HerrickConf
10-12 August 2016	SimBuild 2016: Building Performance Modelling - ASHRAE & IBPSA-USA Salt Lake City, Utah, USA	www.ashrae.org/simbuild2016
12-14 September 2016	Building Simulation and Optimization BSO16 Newcastle upon Tyne, UK	www.bso16.org
05-09 September 2016	Urban Transitions Global Summit 2016 Shanghai, China	www.urbantransitionsconference.com
14-16 September 2016	BauSIM Dresden, Germany	www.cesbp2016.de/bausim
27-29 November 2016	ASIM Jeju, South Korea	www.conftool.com/asim2016/
07-09 December 2016	ASA Conference Adelaide, Australia	www.architecture.adelaide.edu.au/asa2016/
2017		
11-14 June 2017	NSB, 11th Symposium on Building Physics Trondheim, Norway	www.ntnu.edu/web/nsb2017/about
07-09 August 2017	BS17, Building Simulation 2017 San Francisco, California, USA	http://buildingsimulation.org

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

03-06 May 2016
Hamilton, Ontario,
Canada
www.esim.ca



eSim 2016: IBPSA-Canada's 9th biennial conference

eSim 2016 will be held at McMaster University in Hamilton, a port city on Lake Ontario in southern Canada. The conference consists of two days with over 75 peer-reviewed paper presentations expected, as well as two days of theory and software-based educational workshops, a technical tour, and a banquet. This year's conference is expected to attract over 200 delegates as the well-established eSim event continues to grow. IBPSA-Canada is among the largest IBPSA regional affiliates and eSim traditionally attracts delegates from 10 or more countries.

McMaster University is a large, high-ranking educational institution. Hamilton is a city of about 700,000 located just west of Toronto in the Golden Horseshoe region of Southern Ontario, a prosperous region of 9 million people with major transportation hubs and numerous tourist attractions. Local scenic natural features include Lake Ontario, Niagara Falls and the Niagara Escarpment. Typical May weather sees clear days and highs of 20°C, so there should be ample opportunity to enjoy the local natural beauty.

Conference themes include all aspects of building simulation, ranging from the simulators themselves to results of modeling. Coverage includes modeling physical processes (energy, occupant comfort, daylighting, etc.); the use of simulation in experimental research; control methods; community energy systems; building simulation tools; the use of tools with building code/incentive programs; and performance visualization/validation. Specific themes include:

- Modelling Physical Processes: Recent developments for modelling the physical processes relevant to building performance (thermal, air flow, moisture, lighting)
- Experimental Research: The use of experimental approaches to support modelling and simulation research work
- Algorithms: Methods and algorithms for modelling conventional and innovative building systems (including envelope, lighting, controls, HVAC, renewable energy and distributed generation systems)
- Whole Building Performance: Methods for modelling and characterizing whole building performance, including interactions between systems within the building, and interactions between the building and its surrounding neighbourhood and community
- Occupant Comfort: Methods for modelling and characterizing occupant comfort and well-being (including thermal comfort, acoustic performance, air-quality, ventilation and lighting)
- Occupant behaviour: Methods for simulating occupant behaviour in buildings
- Software Development: Building simulation software development and quality control approaches

- Simulation Tools Use 1: Use of building simulation tools in building design, optimisation, code compliance and incentive programs
- Simulation Tools Use 2: Use of building simulation tools in stock- and sector-modelling studies at neighbourhood, community, municipal and national scales
- Moving simulation into practice: Case studies of innovative simulation approaches
- Validation: Application of validation methods and techniques to building simulation software
- Interface: User interface and software interoperability issues
- Visualization: Architectural and engineering data visualisation and animation

Further information

For more information please visit the conference website, www.eSim.ca. Direct questions to eSim 2016 Chair, Marilyn Lighthouse (lightsm@mcmaster.ca) or Co-chair, Jeff Blake (jeff.blake@canada.ca). ■

11-13 July 2016
Los Angeles,
California, USA
www.plea2016.org



PLEA 2016: Cities, Buildings, People — Towards Regenerative Environments

The Passive and Low Energy Architecture Association (PLEA), Cal Poly Pomona, the University of Southern California, and Cal Poly San Luis Obispo are hosting the 2016 PLEA Conference in Los Angeles, California, from 11 to 13 July 2016. This is the first time since its inauguration in 1981 that the United States will have hosted a PLEA conference.

The theme of PLEA 2016 is *Cities, Buildings, People: Towards Regenerative Environments*, exploring the interactions between people and buildings to achieve livable, regenerative environments at multiple scales. PLEA values both research and practice, and each track will strive to combine exemplary case-studies and research papers. All papers will be considered, with special consideration to those addressing:

- **Strategies, Tools and Simulation Methods:** Advances in computing power and software development have made performance analysis tools widely available. This track will explore measurement and performance in all areas and scales including energy, transportation, and daylight.
- **Passive Strategies for Resilient Cities:** The importance of passive cooling and heating techniques has long been recognized. This track will explore recent advances and their contribution to the development of resilient buildings and cities.
- **Carbon Neutral Design:** Synergies and opportunities to achieve net-zero energy and carbon-neutrality in buildings, neighborhoods, districts and cities. This track will explore new directions in city planning and urban design.
- **Sustainable Design Education:** It is impossible to solve today's environmental problems without the knowledge necessary to implement appropriate design strategies at multiple scales. This track will explore design education and best practices at all levels including innovative methods, experiences and teaching techniques.

- **Regenerative Design:** This track will explore ideas and examples of processes that restore, renew or revitalize their own sources of energy and materials maximizing closed-loop input–output systems. Special emphasis will be given to research that explores the connection between water, materials and energy at multiple scales, from systems to buildings to cities.

Early registration closes 30 April; for more information, visit www.plea2016.org.

SBSE will provide several scholarships to presenting students and with financial support from the Jeff Cook foundation will provide scholarships to presenters from less developed countries. ■

11-14 July 2016
West Lafayette,
Indiana, USA
<https://engineering.purdue.edu/HerrickConf>

Purdue Conferences

The 4th International High Performance Buildings conference at Purdue will take place on 11-14 July 2016, in parallel with the established Herrick International Compressor Engineering conference and International Refrigeration and Air Conditioning Conference at Purdue University, in West Lafayette, Indiana. The biennial conferences attract about 750 participants from academia and industry.



IBPSA Past-President Ian Beausoleil-Morrison of Carleton University will present the keynote address at the Tuesday plenary, speaking on *Maximizing the use of solar energy to radically reduce the energy needs of housing?*

As the conference titles imply, much of the programme is devoted to the detailed technical design and operation of compressors, refrigerants and other aspects of air conditioning, but one strand addresses wider aspects of low energy design. These include building envelope systems; net zero energy buildings; building data analytics & diagnostics; demand response & load management; control oriented modelling; facades and lighting; building analysis and retrofits; ventilation, passive cooling & IAQ; occupant behaviour & predictive models; building simulation & optimization; residential heat pumps; heat pump water heaters; geothermal & ground source heat pumps; property modelling, measurements & assessments; and thermal storage.

The technical sessions in the three conferences run simultaneously, enabling attendees to attend sessions of interest from any conference. Conference registration includes online access to the conference schedule, presented papers and all social networking events.

Conference Registration is available online starting at www.conf.purdue.edu/Compressor2016. Early Registration ends on 27 May 2016, and rates will increase after this date. Students receive a special discounted price.

For more information please visit <https://engineering.purdue.edu/HerrickConf>. ■

**10-12 August
2016**
**Salt Lake City, Utah,
USA**
**www.ashrae.
org/simbuild2016**



SimBuild 2016: Building Performance Modeling

SimBuild 2016 is the second conference co-organized by ASHRAE and IBPSA-USA, encompassing the ASHRAE Energy Modeling and IBPSA-USA SimBuild Conferences. A two-and-a-half day event, it will be held on 10-12 August 2016, in Salt Lake City, Utah, and will be preceded by two days of training seminars and short courses.

"The first jointly organized conference held in 2014 was a huge success in its ability to bring the building energy analysis and performance simulation communities together and provide the conference content to serve attendees," Dennis Knight, Conference chair, said. "SimBuild 2016 seeks to build upon that success and further improve the industry's ability to accurately model building performance. It seeks to keep pace with advances in computing, data and automation as well as to help modelers make better decisions through the application of simulation and modeling over the entire building life cycle."

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, with papers on:

- Energy efficiency
- HVAC component modeling and load analysis
- Urban scale modeling
- Lighting and daylighting
- Combined use of tools
- Co-simulation
- Optimization
- Algorithm advances
- Computational fluid dynamics
- Data exchange and interoperability
- Energy auditing
- Life cycle cost and economic analysis
- Model calibration and validation
- Automation and scripting
- Modeling of tall buildings
- Weather data for modeling
- Occupant comfort
- Heat, air, moisture modeling
- Uncertainty analysis
- Big data applications for large scale simulations
- Reality capture for modeling
- Data visualization and user experience

The call for papers has now closed, and 70 papers are currently being reviewed.

For more information and to register, see the conference website www.ashrae.org/membership--conferences/conferences/ashrae-conferences/ashrae-and-ibpsa-usa-simbuild-2016-building-performance-modeling-conference. ■

**12-14 September
2016**

Newcastle, UK
www.bso16.org



BSO 2016: 3rd IBPSA-England conference

IBPSA-England's 3rd conference, Building Simulation & Optimization 2016, will be held in the Great North Museum at the University of Newcastle on 12-14 September 2016. IBPSA-England's first conference, held at Loughborough University, and second, at University College London (UCL), were a major success and participant numbers continue to rise significantly.

The built environment's impact on climate, human wellbeing and natural resources underpins an increasing demand for building and urban performance modelling. The role of performance modelling has expanded from facilitating energy regulatory compliance to enabling a wider discourse on how designed buildings, from a single building to the urban scale, are predicted to perform before they are actually built. Although advances in building and urban simulation tools have leapt forward in terms of their computational power and data visualization capabilities there are still major challenges relating to data integration and interpretation. This conference seeks to explore the extent of these simulation challenges and demonstrate how optimization techniques can be used systematically to inform optimized design and operation strategies.

Conference themes

- Progress in simulation tools and optimization methods
- Application of environmental and sustainability modelling to case studies
- New directions in building environmental modelling including BIM and visualization methods
- Progress in modelling micro-urban environments

Key dates

Abstract submissions have closed. Key dates for authors of accepted abstracts are:

- Paper review deadline: 16 April 2016
- Paper review notification: 01 May 2016
- Final papers due: 01 June 2016
- Review process completed: 22 July 2016
- Final decision to authors: 30 July 2016
- Early Bird registration: 15 August to 04 September 2016

Further information

Further information is available from the conference website, www.bso16.org, or from the Conference chair Neveen.hamza@newcastle.ac.uk or Conference secretary Anne.fry@newcastle.ac.uk. ■



**14-16 September
2016**

Dresden, Germany
www.cesbp2016.de/home

**BauSIM
2016**



BauSIM 2016 & CESBP Central European Symposium on Building Physics

In the future, an increasing share of the energy used in towns and neighborhoods will come from renewable, decentralized sources. Buildings are being transformed from energy consumers into active energy suppliers. Simulation-based planning tools can help in planning more efficient but inevitably increasingly complex building energy systems. Interdisciplinary networking and integration of research results from different domains will be vital for developing the tools needed for the holistic analysis of buildings that are no longer independent, but interact increasingly with infrastructure surrounding them.

BauSIM 2016 and CESBP 2016 are hosted under a common organizational framework in order to promote networking among national and international research groups from very different fields. Through their complementary content and thematic orientation, the two conferences will offer participants many opportunities to explore new fields of knowledge and to develop their personal networks.

In addition to classic applications and new developments in building physics the CESBP 2016 conference programme includes a strong focus on complete buildings, from energy-efficient construction to plus-energy concepts for settlements and neighborhoods.

Topics include:

- Building materials and envelope systems
- Human comfort, health and indoor air quality
- Usability and safety of buildings
- Integral energy concepts for buildings and neighborhoods
- Urban physics

BauSIM 2016's complementary programme addresses a range of applications and developments in simulation-based planning tools. It has a special focus on building energy systems and services, but also addresses more general areas of construction research. Topics include:

- Building – building services – humans
- Modeling and simulation of building life cycle
- Numerical procedures, optimizing and implementation
- Dataflow, coupling of simulation programs
- Product data, databases
- Validation scenarios, quality management
- Energy-related building monitoring & optimizing operations
- Teaching, training & further education in the field of simulation
- Knowledge transfer into simulation practice, and case studies

The conference language of CESBP 2016 is English; both German and English contributions are welcome for BauSIM 2016. Early Registration is open until 15 June, and standard Registration until 06 September.

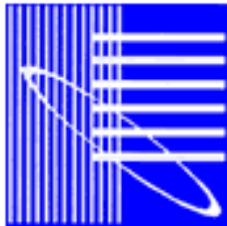
For more information visit www.cesbp2016.de/home. ■

**24-28 October
2016**

**Porticcio, Corsica,
France**
(web address tba)

Scientific School: New Generation Building ENergy SIMulation Tools

The increasing integration of buildings to reduce energy and peak power demand, and to increase occupant health and productivity, is posing new challenges for engineers using building simulation programs to support product development, building design, commissioning and operation.



Organized by IBPSA France and IEA EBC Annex 60, the GENSIM School will offer workshops, presentations and hands-on training in Modelica, Functional Mockup Interface-based co-simulation, and BIM to Modelica translations.

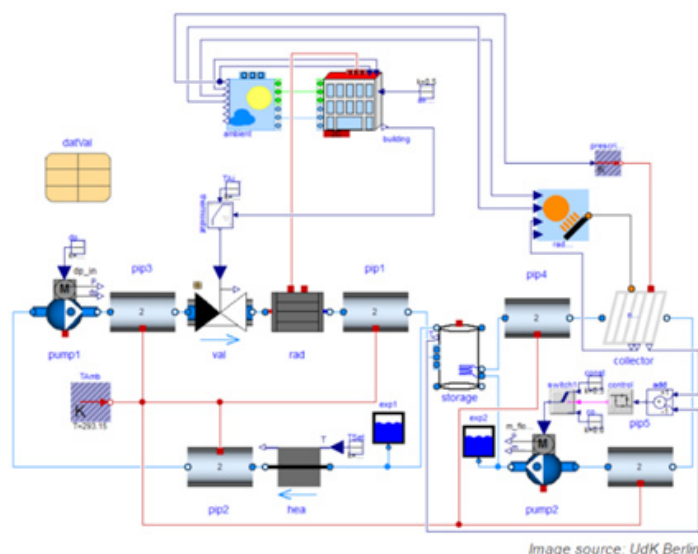
It will be suitable for simulation and modeling specialists in building/district energy and control systems, whether they have no, basic, or medium-level knowledge of the Modelica language. By the end of the School, participants can expect to be able to use the Modelica libraries, build systems on their own, debug the Modelica models, and run simulations.



The School will also outline new trends and new R&D needs for the computational simulation of energy flows and demands at the building and district levels based on Modelica, FMI and related BIM/GIS translators: new software tools, design methods, performance evaluation, and efficient workflows. In particular, it will discuss the R&D needs which will shape IBPSA's first R&D project. Focusing on BIM/GIS and Modelica framework for building and community energy system design and operation, this is due to start in summer 2017.

The official language will be English.

For more information, please contact Mohamad Ibrahim at mohamad.ibrahim@cea.fr; the School's website is still under construction. ■



**27-29 November
2016**

Jeju, South Korea
[www.ibpsa.kr/
asim2016](http://www.ibpsa.kr/asim2016)



ASIM 2016: 3rd IBPSA Asia conference

IBPSA-Korea will host the 3rd IBPSA Asia conference (ASIM 2016) on 27-29 November 2016 in Jeju (Cheju) island, South Korea. The conference is being organized by IBPSA-Korea, and co-organized by IBPSA-China and IBPSA-Japan.

IBPSA-Korea anticipates that ASIM 2016 will be geographically diverse. We look forward to welcoming many participants from Europe, North and South America as well as from other Asian countries, so please share this information with your colleagues. The ASIM 2016 venue, Jeju (Cheju) island, is one of the most attractive sightseeing places for foreign tourists and is listed as a UNESCO world heritage site.

Topics will include:

- Building physics
- Simulation and real performance
- Simulation in design practice
- Simulation for regulation/code compliance and certification
- Software/Interface development, test and validation
- Simulation to support commissioning, controls and monitoring
- Case studies of building simulation application
- Community/Urban scale modelling and simulation
- Occupant behavior in buildings
- Research on indoor environment (thermal comfort, IAQ, lighting, acoustics, etc.)
- Optimization: control, design
- BIM and BEM
- Uncertainty and sensitivity
- Machine learning and data-driven models

Abstracts of up to 300 words are invited.

The key dates are:

- Abstract submission deadline: 29 April 2016
- Abstract acceptance notification: 20 May 2016
- Draft paper submission deadline: 29 July 2016
- Paper acceptance notification: 05 September 2016
- Early registration deadline: 14 October 2016
- Registration deadline: 09 November 2016

Abstract submission is now open at www.conftool.com/asim2016.

For more information, please visit www.ibpsa.kr/asim2016. ■

**07-09 December
2016**

Adelaide, Australia
**www.architecture.
adelaide.edu.
au/asa2016**



ASA: International Conference of the Architectural Science Association
Fifty years later: Revisiting the role of architectural science in design and practice

The School of Architecture and Built Environment at The University of Adelaide is proud to host the International Conference of the Architectural Science Association (ANZAScA) on 07-09 December 2016, in Adelaide, South Australia — one of the top 5 most liveable cities in the world in the Economist Intelligence Unit's 2015 ranking. The 2016 ASA Conference will mark a very important achievement as it will be the 50th conference of the Association. It was in Adelaide that the first meeting took place in 1963.

The Conference invites architectural science and design researchers, educators, students and practitioners to present and exchange ideas that will contribute to the betterment of our environment. All papers are double blind refereed. Papers are expected to address the following challenges and opportunities arising from contemporary issues such as:

- What are the contemporary issues that architectural science researchers and educators should focus on?
- What are the real impacts of applying the knowledge explored in architectural science as implemented in various design advice, building codes and standards, on the quality of our built environment?
- How should architectural science researchers and educators respond to increased urbanisation, higher density living, and increased awareness of sustainable living?

These issues will be explored in a number of specific themes or topics, such as:

- Theory, philosophy and methodology in architectural science
- Architectural science and society
- Architectural science and urban design / landscape architecture
- Architectural science and building design
- Architectural science and historic preservation
- Architectural science and design education
- Architectural science and digital design
- Architectural science and design assessments
- Architectural science and modes of production
- Architectural science and space quality (thermal, visual, aural)
- Architectural science, construction and technology
- Architectural science, practice and industry

For more information about the conference, including key dates, program, venue and accommodation please visit www.architecture.adelaide.edu.au/asa2016. ■



Building Simulation 2017 will bring together practitioners and researchers from around the world to share information about the state of the art in simulation tools and applications and to discuss new developments. The conference will feature updates on new research to improve simulation capabilities for advanced low-energy building systems, case studies from successful projects that demonstrate the key role that simulation plays, and ongoing efforts to enable compliance and building rating software to support radiant and other energy efficient systems.

www.buildingsimulation2017.org

The Program:

- Presentations on both research and advanced practice
- Panel presentations
- Software demos and exhibition
- Tours of state-of-the-art buildings and research facilities
- Simulation competitions
- Software training

Key Objectives:

- Dialog & discussion between practitioners and researchers
- Encourage non-presenters to attend

Abstract Submission: Sep 1, 2016

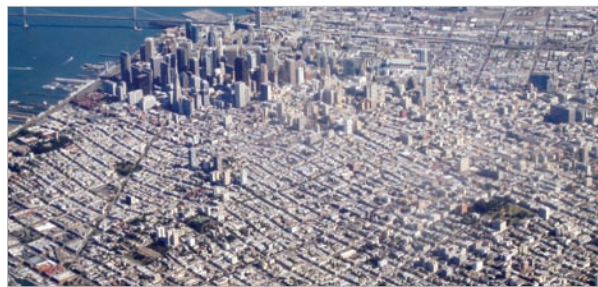
Conference Hotel:

The Hyatt Regency Embarcadero

- Central San Francisco waterfront location
- Discount conference room rates
- Moderately-priced hotels nearby
- Walk to shops, restaurants and attractions
- Easy public transportation from airport

Tours

- Lawrence Berkeley National Laboratory: FLEXLAB
- Silicon Valley: NASA Ames Sustainability Base and Stanford University
- Autodesk: Located in downtown San Francisco
- Pacific Energy Center: Pacific Gas & Electric's Hands-On Learning Center
- Alcatraz, Napa Valley, Monterey, Yosemite



Conference Organizing Executive Committee
Philip Haves, Chair • Erik Kolderup, Secretary

Scientific Committee Co-Chairs
Michael Wetter, Chip Barnaby



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

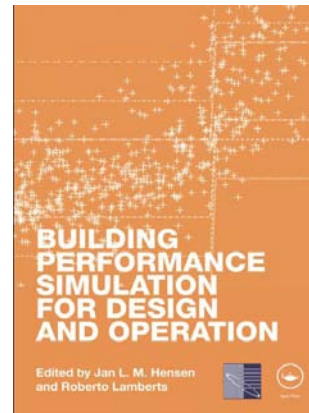
1. The Role of Simulation in Performance Based Building 2. Weather Data for Building Performance Simulation 3. People in Building Performance Simulation 4. Thermal Load and Energy Performance Prediction 5. Ventilation Performance Prediction 6. Indoor Thermal Quality Performance Prediction 7. Room Acoustics 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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Taylor & Francis Group

Software news

Climate.OneBuilding.Org: A new web resource for building simulation climate data — update

Dru Crawley and Linda Lawrie

A new web resource with free weather data in EPW format is now available: <http://climate.onebuilding.org>.

A few of the features

- Annual and **monthly design** conditions from Chapter 14, *2013 ASHRAE Handbook-Fundamentals*
- **Design conditions from another location** in the *2013 Fundamentals* substituted when none are available for that location
- Annual **design conditions calculated from source weather data** in absence of ASHRAE design conditions.
- Frequent updates as new weather data sets and design conditions are released
- Consistent, validated, specific location naming:
 - USA_VA_Arlington-Reagan.Washington.National.AP or USA_VA_Sterling-Washington.Dulles.Intl.AP instead of Washington, DC
- **Hourly precipitation** in a separate file for direct use in simulations (where source data includes precipitation)
- **Extensive quality checking** to identify and correct data errors and out of normal range values where appropriate. All changes - alternate design condition locations and corrections to data - are documented on the web site for each data set.
- **DAYSIM/Radiance wea format files** included in zip files for weather. Thanks, Rob and Tito for the help! See Radiance (<http://radsite.lbl.gov/radiance>) and DAYSIM (<http://daysim.ning.com>) sites for more information on both packages.
- **ESP-r ascii format files** (clm) included in zip files for weather. Thanks, Jon for the help! See ESP-r site (www.esru.strath.ac.uk/Programs/ESP-r.htm) for more information.

Weather Data Sets Currently Available

*Files with an asterisk * after the name are not available on DOE EnergyPlus web site*

- **JGMY*** ** NEW **
157 locations, Generated data set developed by Larry Degelman, Professor Emeritus of Architecture, Texas A&M University. The data set is synthetically generated (statistically correct) data.

■ **TMY** ** NEW **

12 locations, TMY data set developed by the National Renewable Energy Laboratory. These 12 locations are not duplicated in the later TMY3/TMY3a data. Names and some locations were changed.

■ **KISR** ** NEW **

2 locations, Kuwait developed by the Kuwait Institute for Scientific Research (KISR) based on measured meteorological data for Kuwait International Airport and KISR's coastal weather station.

■ **IMGW** ** NEW **

61 locations, Poland developed by the Polish Ministerstwo Infrastruktury based on data from the Instytutu Meteorologii Gospodarki Wodnej (IMGW).

■ **TMY3a** (update of TMY3 Jan 2015*) ** UPDATED - added wea and clm files **

1020 locations, United States of America, Puerto Rico, US Virgin Islands, and Guam Pacific, developed by National Renewable Energy Laboratory. In addition to the updates made to create the TMY3a, extensive verification and updating of location names (635 files), 99 locations corrected (including lat/long, time zone, elevation -- in selected), and 285 files data issues fixed.

■ **ISHRAE 2014*** ** UPDATED - added wea and clm files **

India 59 locations

■ **INMET*** and **TRY*** ** UPDATED - added wea and clm files **

411 locations and 17 locations, respectively, Brazil and one location in Antarctica

■ **SWERA** ** UPDATED - added wea and clm files **

87 locations, 11 countries (8 Bangladesh, 1 Belize, 18 Cuba, 9 Ethiopia, 1 Ghana, 5 Guatemala, 8 Honduras, 23 Kenya, 2 Maldives, 3 Nicaragua, 9 Sri Lanka, locations in Brazil and China not included)

■ **City University of Hong Kong** ** UPDATED - added wea and clm files **

1 location (Hong Kong) jointly developed by Dr TT Chow and ALS Chan of the City University of Hong Kong supported by a CERG grant from the Research Grants Council of the Hong Kong Special Administrative Region of China. Solar radiation measured from observatory station at 22.32 N, 114.17 E, 65 m above mean sea level.

■ **ITMY** ** UPDATED - added wea and clm files **

6 locations, Iran, developed by Iran Building and Housing Research Center

■ **RMY 2012*** ** UPDATED - added wea and clm files **

69 locations, Australia, 50% (A), 33% (B) and 17% (C) solar weight versions, developed for the Australian National House Energy Rating Scheme (NatHERS) 2012 by NIWA

■ **IMS*** ** UPDATED - added wea and clm files **

4 locations, Israel, developed by Technion using data from the Israel Meteorological Service (IMS)

■ **BBSR*** ** UPDATED - added wea and clm files **

15 locations, Germany, current (jahr, somm, wint) and 2035 (jahr, somm, wint) versions, developed by BBSR (Bundesinstitut für Bau-, Stadt- und Raumforschung) and DWD (Deutscher Wetterdienst)

■ **NIWA** ** UPDATED - added wea and clm files **

18 locations, New Zealand, developed by NIWA (New Zealand National Institute of Water & Atmospheric Research) for EECA (Energy Efficiency and Conservation Authority)

■ **CWEC** ** UPDATED - added wea and clm files **

80 locations, Canada, developed by Numerical Logics in collaboration with Environment Canada and the National Research Council of Canada

■ **California Climate Zone Data** ** UPDATED - added wea and clm files **

16 locations (CTZ v2) and 86 locations (CTZ 2010*), California Title 24, United States of America, developed for the California Energy Commission

■ **Chinese Standard Weather Data (CSWD)** ** UPDATED - added wea and clm files **

270 locations, China, developed by Department of Building Science and Technology at Tsinghua University and China Meteorological Bureau

New Data Sets in Progress

We have just started working with a few others. ■

IEA EBC Annex 66

Preliminary results from survey of BPS user attitudes and practice on occupant modelling

William O'Brien, Sara Gilani, Isabella Gaetani, Pieter-Jan Hoes, Salvatore Carlucci, Jan L. M. Hensen

As part of IEA EBC Annex 66, a four-year, 90-researcher international research project on occupant behaviour modelling and simulation, we surveyed BPS users on their attitudes and practice on occupant modelling. The objectives of the study were to understand BPS users':

- current assumptions relative to occupant observations
- willingness to use more rigorous occupant modelling approaches
- appetite for uncertainty quantification and representation

Ultimately, this information is critical for software developers, occupant behaviour researchers, educators, and building code developers. The 38-question online survey was completed by 274 BPS users from 37 countries. The target population – non-researchers – were the predominant participants with 206. However, responses from researchers will enable us to contrast the results of various user groups, upon further analysis.

About 44% of participants responded that occupant behaviour is the single biggest

source of discrepancy between modelled and measured building performance. But only a slight majority (56%) of participants responded that they agree or somewhat agree that occupants use more energy than predicted in BPS.

Many participants (58%) feel that properly modelling occupants is necessary and that it is not adequate justification to model them inaccurately merely because the assumptions are consistent throughout all simulated design variants (**Figure 1**). This is in contrast to most code compliance modelling approaches, which use relatively simple but consistent occupant modelling assumptions across the reference and proposed building designs.

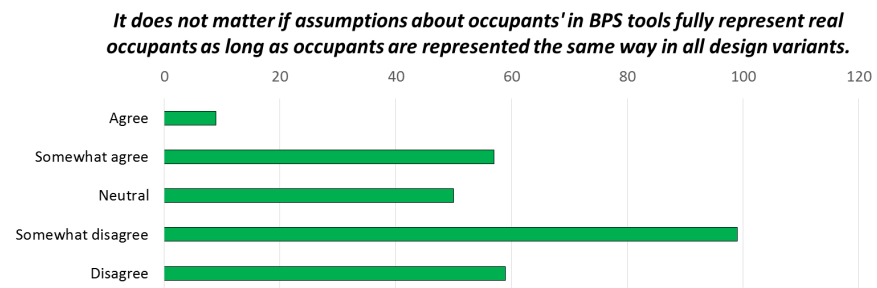


Fig 1: Participants' attitudes about the accuracy of occupant modelling approaches

Participants tend to be only moderately confident in the assumptions they make about occupants. Of the six occupant-related domains we asked about, participants were least confident about modelling blinds and most confident about modelling thermostat use. The mean response about confidence levels is near-neutral (neither confident nor unconfident) (**Figure 2**). Many of the participants named domestic water consumption, occupant clothing level, and metabolic rate assumptions as important domains that the survey should have included and that should be better addressed in BPS. Quite interestingly, about 37% of participants believe their clients would lose confidence in them or BPS if they properly expressed uncertainty. Perhaps this result indicates that the community needs to better inform clients of the uncertainty of BPS results to manage clients' expectations. About 77% of survey participants believe BPS users should better communicate the uncertainty of results.

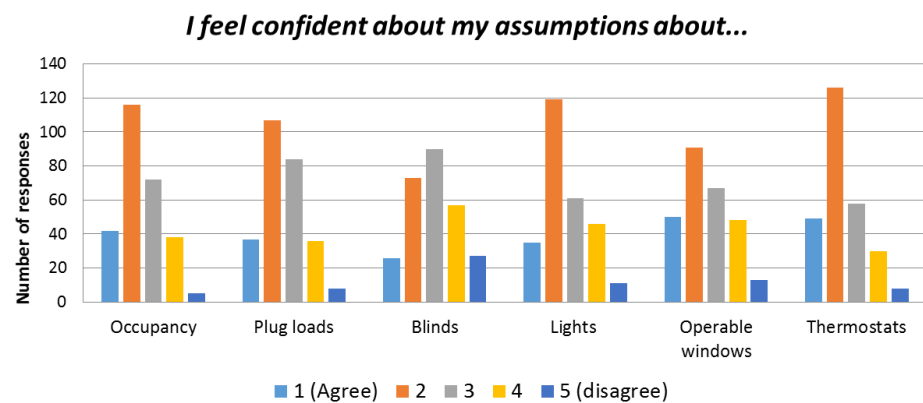


Fig 2: Confidence of surveyed simulation users for six occupant modelling domains

Most participants rate their knowledge of occupant modelling as “moderate”, followed by “basic”, and “advanced”. However, the vast majority of participants (81%) stated that they would be willing to invest considerable time in learning more about occupant modelling if the appropriate resources were available. This indicates a significant market for occupant modelling educational material and tool functionality.

In conclusion, the results of this survey suggest that considerable effort is needed to improve occupant modelling approaches, the corresponding BPS tool capabilities, and education. They also suggest that the field of BPS uncertainty, in general, has considerable room for maturation. However, participants mostly expressed a keen interest to learn more and devote more time to modelling occupants.

The goal of this article is to highlight some of the survey findings. The authors will publish the full results and a detailed report will be available on www.Annex66.org in mid-summer 2016.

The Occupant Behavior Modeling Tools Webinar

A public webinar was organized by Dr Tianzhen Hong of LBNL on 15 March 2016 to introduce and demonstrate three occupant behavior modeling tools. About 100 people from eight countries participated in the webinar. The LBNL occupant behavior research project was sponsored by the United States Department of Energy under the U.S.-China Clean Energy Research Center for Building Energy Efficiency Consortium. The LBNL team collaborated with a team led by Dr Da Yan of Tsinghua University, China. The project leverages the work of the International Energy Agency, Energy in Buildings and Communities Program, Annex 66: *Definition and simulation of occupant behavior in buildings*.

The 90-minute webinar included four parts:

- Karma Sawyer, Technology Manager at U.S. Department of Energy, gave an overview of R&D Directions and Opportunities at the Building Technologies Office of USDOE;
- Jimmy Tran, Operations Manager of U.S.-China Clean Energy Research Center (CERC) for Building Energy Efficiency (BEE) Consortium, gave an overview of objectives, key research activities and outcomes from the CERC-BEE 1.0 (2011-2016) Program and the upcoming CERC-BEE 2.0 (2016-2021) Program;
- Tianzhen Hong, Staff Scientist, and Yixing Chen, Senior Scientific Engineering Associate, of the Building Technology and Urban Systems Division of LBNL, provided an overview of the occupant behavior research project under CERC-BEE 1.0, and introduced and demonstrated the three occupant behavior modeling tools; and
- Questions and Answers.

The three occupant behavior modeling tools are:

- the Occupancy Simulator, a web-based application for simulating occupant presence and movement in buildings. It provides a layered simple GUI for user input, and generates occupant schedules for each space and each occupant, which can be downloaded as csv and EnergyPlus IDF files.

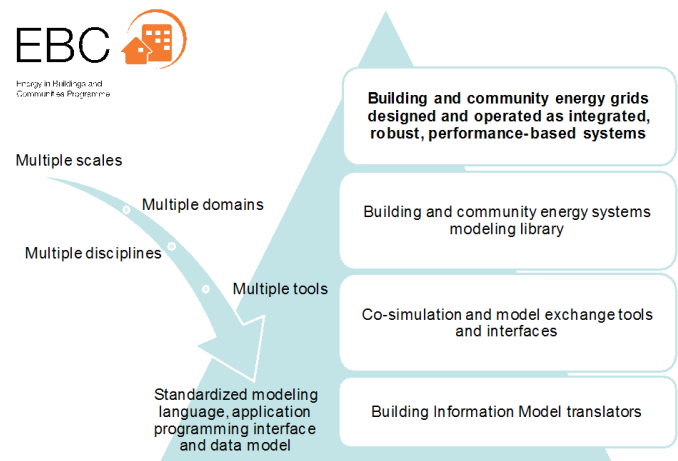
- obXML, an XML schema to represent occupant behavior models in buildings. obXML is built upon the DNAS ontology which aims to describe occupant behavior in buildings using four elements: Drivers, Needs, Actions and Systems.
- obFMU, a Functional Mockup Unit of occupant behavior models, which co-simulates with whole building simulation programs (e.g. EnergyPlus) to better capture occupant activities and their impact on building performance.

For more information on LBNL's behavior research, please visit <http://behavior.lbl.gov>. The slides presented at the webinar are available at <http://behavior.lbl.gov/?q=node/5>.

More details about Annex 66 can be found at <http://Annex66.org>. ■

IEA EBC Annex 60 Modelica project for building and district energy systems to be continued as a 5-year IBPSA project

Under the umbrella of the International Energy Agency's Energy in Buildings and Community Programme, a team of 41 institutes from 16 countries are collaborating on the development of Modelica, FMI and Building Information Modeling (BIM) for building and community energy systems (see <http://www.iea-annex60.org>). This project lasts from 2012 to 2017. To ensure continued collaboration in this application area, the co-operating agents Michael Wetter from Berkeley Lab, and Christoph van Treeck from RWTH Aachen University, applied for a continuation under the umbrella of IBPSA.



On 10 December 2015 in Hyderabad, India, the Board of IBPSA approved the project "BIM/GIS and Modelica framework for building and community energy system design and operation". The project will start in June 2017 for a duration of 5 years, led by Michael Wetter and Christoph van Treeck. Detailed planning will start around spring/summer 2016, and the project is expected to start officially in June 2017. Interested participants should contact Michael Wetter (mwetter@lbl.gov) and Christoph van Treeck (treeck@e3d.rwth-aachen.de). ■

ASHRAE Multi-Disciplinary Group on Occupant Behavior in Buildings (MTG.OBB)

A proposal to establish an ASHRAE Multidisciplinary Task Group (MTG) on Occupant Behavior in Buildings (OBB) was developed in August 2015 by Dr Tianzhen Hong, Staff Scientist of the Lawrence Berkeley National Laboratory (LBNL). In January 2016, the revised proposal was approved at the ASHRAE Orlando conference.

The core idea of the MTG.OBB is to focus on the human dimension of energy use, to potentially contribute to ASHRAE's energy efficiency and decarbonization targets in the buildings sector.

MTG.OBB will focus on the understanding of occupant behavior in buildings and how to meet individuals' needs of indoor environmental quality (IAQ, thermal, visual and acoustic comfort), health, and productivity, as well as to improve occupant interactions with building energy and control systems to reduce energy use. The MTG.OBB aims to promote and harmonize activities of related ASHRAE technical and standards committees to facilitate the development of data, tools, technologies, and guidelines enabling integration of occupant behavior over the entire building lifecycle – including design, operation, and retrofit phases – of new and existing commercial and residential buildings.

The scope of the MTG.OBB includes directing efforts in education, modeling, research, standards, marketing, advocacy, and fundraising within ASHRAE. In order to support the execution of the objectives of this MTG, actions and activities will be coordinated among Technical Committees (TC), Task Groups (TG) and Technical Resource Groups (TRG). Leveraging on these contributions, the MTG.OBB will provide updates on related parts of ASHRAE Handbooks and Standards (particularly energy and indoor environmental calculations, standards 55, 62.1, 62.2, 90.1, 90.2 and 189.1), and will develop related education programs for buildings designers, operators, and occupants.

The MTG.OBB will also monitor human behavior research activities outside of ASHRAE, such as the IEA EBC Annex 66. A face-to-face inaugural committee meeting is scheduled for the coming ASHRAE conference in St. Louis in June 2016. Individuals and organizations interested in the MTG.OBB, please contact the MTG Chair, Tianzhen Hong (thong@lbl.gov). ■

Public review of ASHRAE Standard 209P Energy Simulation Aided Design for Buildings opens

Jason Glazer, GARD Analytics

The first public review of ASHRAE Standard 209P *Energy Simulation Aided Design for Buildings except Low-Rise Residential Buildings* opened at the end of March.

The purpose and scope of the draft standard is:

1 PURPOSE

Define minimum requirements for providing energy design assistance using building energy simulation and analysis.

2 SCOPE

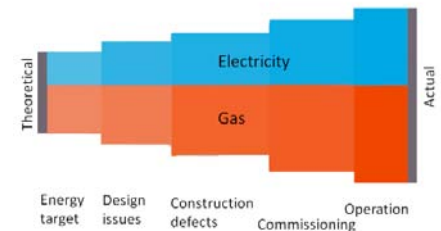
This standard applies to new buildings or major renovations of, or additions to, existing buildings utilizing energy simulation during the design process. This standard does not apply to single-family houses, multi-family structures of three stories or fewer above grade, manufactured houses (mobile homes) and modular homes.

The 45 day public review ends on 09 May 2016. The review draft can be accessed at www.ashrae.org/public-review-drafts, which also includes instructions for submission of comments. ■



HIT2GAP: reducing the energy performance gap

Differences between the expected and actual energy consumption of buildings arise from problems with design, construction, commissioning and operation. Often exceeding 50% of the overall energy consumption, the gap has detrimental implications for achievement of EU energy targets.



The HIT2GAP project aims to reduce this gap in the operational phase with a new paradigm for the development of energy management platforms in buildings, integrating existing expertise and resources and providing a smart open platform that is marketable and enables third-party suppliers to add additional modules. A Horizon 2020 EU-funded project involving 22 European partners, HIT2GAP started in September 2015 and will last four years.

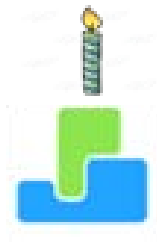
HIT2GAP will develop an information platform and a suite of modules to improve the way building services are controlled. This will help building stakeholders at all levels to attain better energy efficiency levels without adversely affecting occupier satisfaction or productivity. The project will provide:

- **a data platform** to collect and store information about a building
- **modelling** to predict energy requirements (forecasting, benchmarking)
- **modules and an apps store** to interpret data and present it in a user-friendly style, tailored to particular audiences
- **a smart open platform** to allow external developers to provide third-party modules.

The overall system will provide advanced data processing, all the way from raw data, collected around a building, to well-presented advice, tailored for different audiences. The core functionalities will be:

- **management**: ensuring a coherent platform for data storage, processing, modules and third party products
- **connectivity**: open communication protocols
- **data processing & statistics**: real time analysis of data, from raw data to detailed information and knowledge
- **visualisation**: presenting information in a manner that is tailored to provide advice to specific types of building users.

For more information or to download the HIT2GAP newsletter visit www.hit2gap.eu/blog/first-hit2gap-project-newsletter. To receive future editions please email hit2gap@bre.co.uk. ■



A Decade for DesignBuilder!

V4.6 Release

This year DesignBuilder celebrates its 10th Birthday, and v4.6 is now ready for download. The new version includes a wide range of fixes and improvements and is available to all current v4 and annual licence holders. UK Energy Assessors should generally continue to use v4.2, or as advised on our Approvals webpage.

Optimisation Online Training

DesignBuilder offers multi-criteria optimisation software, enabling users to undertake an advanced form of cost-benefit analysis. A one-day online training course has been developed to help users get to grips with some of the key optimisation concepts and techniques and start running optimisation studies in DesignBuilder. This will be available on 14 and 26 April and 13 May 2016 at different times to suit time zones around the world. More information is available at www.designbuilder.co.uk/content/view/181/295.

UK Simulation Training Date Confirmed

DesignBuilder Simulation Training courses allow users to learn best practice use of the software from the experts. They are suitable for new and experienced users alike and provide an excellent opportunity to learn best modelling techniques.

The next face-to-face course will be held at Oxford-Brookes on 18-22 April 2016. This course will cover The Modeller, Basic Simulation and Daylighting, Natural Ventilation, Detailed HVAC and CFD, in a structured classroom environment.

The course will offer effective training in an interactive 'hands-on' format at a cost of £250 per delegate per day. Places can be booked online at www.designbuilder.co.uk/content/view/180/294 or for further information, to apply for an academic discount or for a discount for attending 4 or more days, please contact the Sales Team.

Users unable to attend classroom training can still learn the most important steps in using the software from DesignBuilder's freely available Video Tutorials and YouTube Channel. You can also follow us on LinkedIn.

On-demand Training

In addition to scheduled classroom simulation training courses DesignBuilder is now also offering “on-demand” training, delivered either online or in person at users’ premises. This can either be based on the standard classroom training material or tailored to meet users’ specific needs. For more information about on-demand training please contact the Sales Team. ■

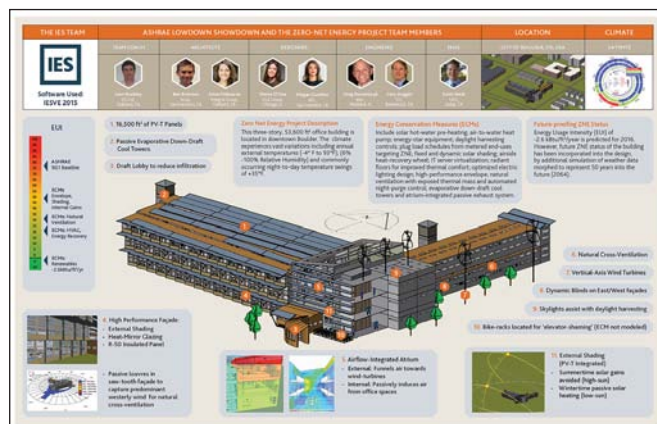
News from IESVE

IESVE has several upcoming training events throughout the US and Canada, including Chicago, Toronto, Seattle, Philadelphia, and St. Louis. A full calendar is available at www.iesve.com/training/events.

IESVE has now been approved for use with the State of Minnesota SB 2030 requirements. Details are in a press release: www.iesve.com/news/article/IES-Software-approved-for-Minnesota-SB-2030-Energy-Standard/4813?modal=1.

Prospective users can register for a free web demo of the latest version of IESVE at www.iesve.com/software/web-demo.

Team IES Wins ASHRAE 'LowDown Showdown'



A team representing Integrated Environmental Solutions (IES) earned the highest prize for delivering the lowest energy use in the “LowDown Showdown” at the recent ASHRAE Energy Modeling Conference. The ASHRAE Energy Modeling Conference is an annual event that brings together building energy modeling (BEM) stakeholders. The “LowDown Showdown” is a new design competition intended to showcase workflow capabilities. Eight corporate teams participated. The challenge was to design a three-storey, 53,600 ft² (4980 m²) office building that includes a 200 ft² (19 m²) server room. A

number of minimum design requirements were specified, although many details were kept flexible. Projects were judged on energy efficiency, design creativity, workflow innovation, and teamwork and collaboration. The team representing IES, which included professionals from several companies, was recognized for producing the lowest energy design. It included an innovative atrium to cool and ventilate the entire building. ■

IBPSA announcements

MOU between IBPSA and REHVA signed

IBPSA recently signed a Memorandum of Understanding (MOU) with REHVA, the Federation of European Heating, Ventilation and Air Conditioning Associations. The MOU aims to strengthen the relationship between REHVA and IBPSA and to promote substantial and tangible actions to increase the co-operation between the two associations. This historic event took place in Hyderabad, India, on 10 December 2015, following the Building Simulation Conference. ■



The MOU between IBPSA and REHVA was signed by IBPSA President, Chip Barnaby, and REHVA President, Karel Kabele

Building Simulation 2019: Call for Proposals

The board of IBPSA is pleased to issue the following call for proposals from parties interested in hosting Building Simulation 2019. A complete proposal should be sent to the Conference Committee chair, Paul Strachan (p.a.strachan@strath.ac.uk), no later than 31st May, 2016. Discussions with the Conference Committee chair of potential proposals prior to the due date are strongly encouraged. The proposal should address the following items:

- proposed venue
- dates
- details of conference secretariat
- organization time line
- details of rooms for plenary sessions, parallel sessions and posters
- availability of free Wifi connections for participants
- detailed budget in local currency and in US dollars
- discussion of possibilities for sponsorship
- details of the conference presentation schedule (e.g. number of parallel and plenary sessions), including innovative ideas for conference delivery methods and audience interaction
- publication of proceedings
- details of accommodation, including costs, for delegates and students
- social events
- options for pre- and post-conference tours, software demos and courses
- options for programme for accompanying persons

- involvement of existing or planned IBPSA Regional Affiliate(s)
- experience of the organizing committee with IBPSA and with organization of similar conferences.

To assist your decision there are several documents available (please email the Conference Chair for information):

- The IBPSA Regionalization Guide (available at www.ibpsa.org/downloads/IBPSA-Regionalization-Guide.pdf) describes IBPSA's regionalization plans: we schedule all of the Building Simulation conferences in regions with existing affiliates or regions that are starting a new affiliate organization. In a region currently without an affiliate, we will only consider holding the conference there if a regional affiliate organization will be in place by the time of the conference.
- Final reports for previous Building Simulation conferences, which include details of organization, finances (e.g. planned budget and actual expenses), post-conference surveys and other information useful to organizers of future Building Simulation conferences.
- A document on sponsorship contains suggestions regarding the exposure and benefits of Building Simulation sponsors.
- A recent Memorandum of Understanding serves as an example for the contract which will be agreed between IBPSA and the organizers of Building Simulation 2019.
- A budget template.

Proposals will be evaluated using the following criteria:

- Attractiveness and accessibility of location - is this location likely to attract delegates from around the world? (10%)
- Affordability of venue - is the combination of registration fee and accommodation costs likely to be acceptable to potential delegates? (In this respect, a range of accommodation types including student hostels is a benefit.) (10%)
- Quality of conference plan and facilities - are the facilities and conference plan conducive to a well-run conference? (10%)
- Likelihood of financial success - will the conference financial plan likely lead to breaking even (at least)? A financial plan that does not rely on unconfirmed sponsorships to break even is strongly preferred. (30%)
- Support of IBPSA goals - will choosing this proposal help draw new members into IBPSA (in new regions) or support membership in existing regions? (10%)
- Diversity of location - is this location sufficiently distant from recent conferences? (10%)
- Regional participation - is the proposal well-supported by volunteer effort from the regional affiliate and/or nearby regional affiliates? (10%)
- Experience of members of the organizing committee with IBPSA, and with organizing IBPSA affiliate conferences or conferences similar to Building Simulation. (10%)

The final decision regarding the location of Building Simulation 2019 resides with the IBPSA Board of Directors and will be made following a thorough evaluation of all submitted proposals. ■

IBPSA Publications sub-committee seeks suggestions

The publications sub-committee of IBPSA has a broad mandate which includes managing, administering and developing policies for IBPSA publications, including the proceedings of the biennial conference. Part of this is to encourage and initiate new publications by IBPSA and its affiliates that seek to advance or promote the science of building performance simulation. Therefore if you have any suggestions for topics you would like to see covered by IBPSA publications, please contact the chair person of the publications committee (**Malcolm.cook@lboro.ac.uk**) at any time. It is not necessary to identify possible authors, although this would assist the publications committee considerably. When sending us your suggestions, please be as explicit as possible in the coverage of the publication, perhaps by including a draft table of contents. We look forward to receiving your suggestions. ■

IBPSA Board Of Directors 2016 Election: Call For Nominations

The IBPSA Board of Directors consists of ten At-Large Directors and one Affiliate Director from each affiliate. The Directors serve 2 year terms with half of the Board elected every other year.

Six At-Large Directors and fourteen Affiliate Directors will complete their terms in 2016. The fourteen Affiliate Directors are from Canada, Chile, Czech, Danube, Egypt, Germany, Ireland, Korea, Nordic, Poland, Slovakia, Turkey, UAE and USA.

While the fourteen new Affiliate Directors will be directly nominated by the Affiliates, all IBPSA members have the opportunity to nominate persons from any Affiliates, including nominating themselves, to the position of At-Large Directors.

The election to the IBPSA Board of Directors for the period of 2016-2017 will take place in June 2016 and nominations will open from 1 to 31 May 2016. Members are invited to send their nominations to the Chair of the IBPSA Board Election Sub Committee, Veronica Soebarto, **veronica.soebarto@adelaide.edu.au**. ■

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-Argentina

IBPSA-Argentina has had a busy year, hosting its second Building Simulation Conference and holding elections of their board representatives, among other activities. 2015 has also been a year of consolidation, striving to continue developing Argentina's BPS sector, and representing the growing community of members, both from academia and the private sector.

New Board for IBPSA-Argentina

Elections were held in June 2015, after a successful first term which established the foundations for the development of the affiliate. The affiliate is pleased to announce its current board of directors: President: Santiago Velez (Zonda Engineering), Vice-President: Dr Raul Ajmat (ILAV-UNT-CONICET), Secretary: Dr Halimi Sulaiman (UNSJ-CONICET), Treasurer: Prof Javier Nuñez (FADU-UBA), Members-at-large: Andrés Schwarz (NRG-AR), Dr Celina Filippin (UNLPam CONICET), Anderson Letti (EstudioGF), and Dr Victoria Mercado (CONICET Mendoza); General Auditor: Gustavo Goldman (Goldman Consulting).

2nd South American Building Simulation Performance Congress (IBPSA-Ar 2015)

The congress was held from 10-13 November, within the XXXVIII Meeting of Argentina Renewable Energy and Environment (ASADES), at San Rafael, Mendoza, Argentina. IBPSA-Argentina's involvement included research article presentations, training workshops and two keynote speaker presentations. The event was well received by the ASADES community; professionals from around the country traveled to participate in the IBPSA-Argentina activities. None of this would have been possible without the cooperation of ASADES associates, for which IBPSA-Argentina is truly grateful.



Workshops

Two workshops were held during the Congress, with a participation of about 50 people of varied background. Simulation Workshop I, led by Dr Victoria Mercado and Dr Gustavo Barea, focused on *Energyplus*, a prediction tool for the analyses of architectural projects, and Workshop II, led by Santiago Velez ASHRAE BEMP, on *Natural ventilation simulation strategies with Energyplus*.

Keynote speakers

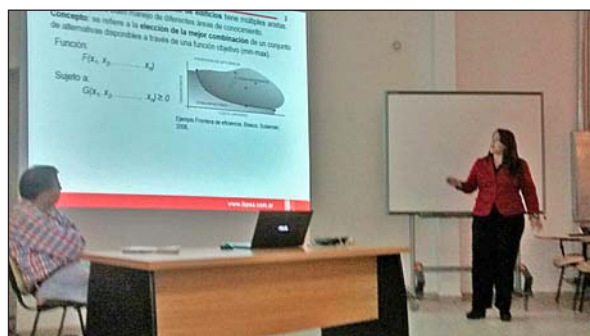
ASADES granted two spaces in the schedule for IBPSA-Argentina Keynote speaker presentations. Dr Celina Filippin and Dr Victoria Mercado presented *Strengths and challenges of thermal simulation during design, construction and occupation of bioclimatic buildings*, and Dr Halimi Sulaiman presented *Simulation based optimization: current trends and challenges*.



Other activities

The ASADES meeting included recreational activities, including a dinner-party and visits to local landmarks.

The congress provided an opportunity for networking and discussions on the current situation in the country and how to develop the sector. This was very successful, with a good level of participation, and resulted in new members for the affiliate. This was also the case for the congress held in 2014.



On this occasion there were no members from either IBPSA Brazil or IBPSA Chile. This is far from ideal but the affiliates are now working together to coordinate a true regional event, which will hopefully take place in 2017.

IBPSA Argentina representation in BS2015 Hyderabad, INDIA

Dr. Raul Ajmat, IBPSA-Argentina's Representative and Director-at-Large of IBPSA, participated in the conference and the IBPSA Board meetings. He also presented a paper on *Potential Impact of using Building Performance Simulation in Urban Central Areas for Architecture And Urban Planning Design* by Raul Fernando Ajmat, Victoria Longhini and Jose Domingo Sandoval.

Cooperation and reciprocity agreements

The affiliate continues to develop relationships with local associations with common interests: ASADES, ASHRAE Argentina, AHK (Argentina Germany Commerce Association), BIM-FADU Seminar. Reciprocity agreements involve IBPSA-Argentina's participation in the events being held, by providing keynote speakers, taking a stand in the exhibitors' area, hosting workshops and/or exchanging free advertising on websites and in the publicity material for events.



Next steps

IBPSA-Argentina is planning to continue with its activities and hoping to add more benefits for its members, who receive among other things: discounts in workshops, training courses, and conference entrance fees, seminars and various networking possibilities. The goal for this year is to add a series of webinars on different subjects to reach a broader audience and communicate the work being done in different parts of the country.

This year's simulation conference will be held in October at the Buenos Aires University, this time not during an ASADES meeting. Although past experiences with ASADES were successful, the goal is to work towards an independent event, which will become regional in the near future. ■

IBPSA-Australasia

After-work seminar series

IBPSA-Australasia is running three after-work seminars in the period July 2015-June 2016. The first of these was on 22 February at the Aecom offices in Melbourne and was attended by 24 people from a range of academic and commercial backgrounds. Three talks were presented:

- Façade Analysis: Going Completely Digital? – Mark Luther, Deakin University
- Simulation of end-use energy and water consumption in Australian housing – Zhengren Ren, CSIRO
- Workshop: The Proposed AIRAH DA Simulation Guidelines – Ania Hampton, Edeifice

All talks were received very well. Further seminars are planned for Wellington in May and Sydney in June.

AIRAH Simulation Guidelines

The proposed AIRAH Simulation Guidelines document is an exciting initiative with substantial IBPSA involvement, which is aiming to produce a “go-to” guide for commercial users of simulation packages and a handy reference for all simulators. Dr Paul Bannister, IBPSA Board Member at Large and President of the IBPSA Australasian Affiliate is the managing author for the publication, which is expected to be released in 2017. ■

IBPSA-France

Past events

The 2015 SIMUREX scientific school took place on 26-31 October 2015 at Porticcio in Corsica, France. Work focussed on three major themes:

- Users’ role in the energy simulation of buildings
- District level considerations in building simulation
- Environmental performance of buildings using simulation.

For more information please visit <http://simurex.ibpsa.fr>.

Forthcoming events

The next biennial IBPSA-France congress will take place on 23-24 May 2016, at Marne la Vallée. The congress is hosted by CSTB (French Scientific and Technical Centre for Buildings). The main themes of the conference are:

- Energy and Building Systems
- Ambient comfort
- Designing buildings, neighbourhoods, towns and regions with high energy and environmental efficiency
- Energy performance guarantee.

Paper submission is now closed and reviewing is in progress. For more information please visit <http://conference2016.ibpsa.fr>.

This year's Scientific School on New Generation Building ENergy SIMulation Tools - GENSIM - will take place on 24-28 October 2016, at Porticcio in Corsica. It is organised by IBPSA France and IEA EBC Annex 60 in partnership with INEF4, Efficacity and INES. This school aims to outline new trends and new R&D needs for the computational simulation of energy flows and demands at the building and district levels based on Modelica, FMI and related BIM/GIS translators: new software tools, design methods, performance evaluation, and efficient workflows. The program includes a mixture of lecture presentations, workshops, software training, simulation exercises, discussions and information exchange.

For more information please see page 39 of this *ibpsaNEWS* or visit the IBPSA France website <http://ibpsa.fr>. ■

IBPSA-Korea

Kwang-Woo Kim, President, IBPSA-Korea

Sessions on building simulation at the KIAEBS biennial national conference

IBPSA-Korea hosted two special sessions on building simulation at the Korean Institute of Architectural Sustainable Environment and Building Systems (KIAEBS) biennial national conference on 13 November 2015. Topics addressed in the sessions included: data-driven models for optimal control; impact of occupant behavior on energy prediction; data filtering and fault detection of VAV systems; assessment of Energy Conservation Measures (ECM) by ISO 13790 vs. EnergyPlus; thermal performance simulation of sandwich panel walls; and quantification of infiltration in a high-rise office building. With growing interest in building simulation, these were a great success with 11 papers presented — a significant share of the total 62 papers presented at the conference.



EnergyPlus training course

IBPSA-Korea offered an interactive EnergyPlus training course on 18 February 2016. The first part dealt with the fundamentals of dynamic simulation and provided hands-on modeling practice on EnergyPlus, and the second with topics such as uncertainty, sensitivity, normative calculation (ISO 13790) vs. dynamic simulation, calibration (deterministic vs. stochastic), and model-based control.



3rd IBPSA Asia conference

IBPSA-Korea, in collaboration with IBPSA-China and IBPSA-Japan, is preparing for the 3rd IBPSA Asia conference (ASIM 2016) on 27-29 November 2016 in Jeju Island, South Korea. The deadline for abstract submission is 29 April 2016. For more information, please see page 40 in this *ibpsaNEWS* and visit the conference website www.ibpsa.kr/asim2016. ■

IBPSA-USA

IBPSA-USA Research Committee Report: Focus Group on Emerging Trends in Building Simulation

Earlier this year, the IBPSA-USA Research Committee convened a focus group to identify and discuss trends and shortcomings in the building performance simulation field. Needs identified by the focus group will shape the direction of the Research Committee.

The Focus Group on Emerging Trends in Building Simulation met on 26 January 2016 at 1 pm EST--during the ASHRAE Winter Conference. The meeting was attended by nineteen participants from the conference representing five countries. They included practitioners, researchers, developers, and academics, with most attendees falling into multiple categories.



Committee member Nathaniel Jones invites you to review and comment on the report of the focus group findings: www.ibpsa.us/sites/default/files/u2777/IBPSA_Research_Focus_Group_Draft_160215.pdf. Please direct your comments to him at nljones@mit.edu. Comments on this draft will be integrated into the final report.

Learn more about the IBPSA-USA Research Committee at www.ibpsa.us/committee/research-committee.

IBPSA-USA Winter Meeting in Orlando 2016

IBPSA-USA members and friends gathered at Cuba Libre Restaurant & Rum Bar in Orlando for our 2016 Winter meeting, which was held Saturday, 23 January, during the 2016 ASHRAE Winter Conference. More than 70 attendees showed up to hear and share IBPSA-USA news, and to enjoy the guest presenters for the evening. Also, the new format for the event -- with a focus on networking, socialization and interactive presentations -- was a rousing success for guests!

"Members told us they wanted a more interactive format and more networking and that's exactly what we gave them," said Executive Director Mike Wilson.

This sentiment was echoed by other attendees, including Krishnan Gowri, Principal Engineer at Autodesk. "This bi-annual event continues to be a valuable avenue to share our progress and learn from the industry experts in advancing the use of simulation during early design. This year's event was special because of the new program format and the opportunity to interact with the members," he explained. "With the recent release of Insight 360, we hope to get valuable feedback from the IBPSA community."

We thank Autodesk for providing sunglasses to all attendees, and for their continued support as a Platinum Sponsor.

The main theme for the night was "Automatic Generation of Baseline Buildings for Energy Performance Standards," and the night kicked-off with a lively interactive discussion. This was an opportunity to explore how IBPSA-USA might mobilize and coordinate stakeholder reviews and input to future versions of such processes -- especially those processes that have received substantial public funding. We invited a number of software developers to demonstrate the baseline building generation capabilities of their simulation software.

“Automated baselines have tremendous potential to save energy modelers valuable time and effort that could be better spent in refining their building designs,” said Dimitri Contoyannis, PE, Director, Sustainability Services at NORESO. “This year’s IBPSA-USA Winter Meeting brought together all the key players in this area for a focused discussion on the available software tools, implementation challenges, and future development plans. It was an extremely informative discussion and I was excited to participate.” We thank NORESO for their support as a Bronze Sponsor.

IBPSA-USA member Liam Buckley, Project Manager and Business Development Manager at IES, also had positive things to say about the discussion.

“The theme of ‘Compliance’ affects most of us in some way, and the audience enjoyed hearing multiple balanced perspectives from the various software vendors,” he said. “I hope we can continue to get more forward thinking practitioners involved for future panel discussions.” We thank IES for their support as a Bronze Sponsor.



The night continued with a happy hour, short presentations, more discussion, an IBPSA-USA Business Update, and closed with an audience driven Q/A panel discussion after dinner. Overall, folks had a good time chatting with colleagues throughout, and sharing information as professionals in the field of building energy modeling.

“I enjoyed meeting others from the building energy modeling industry and hearing different perspectives on software development,” said Caitlin Kincaid Bohnert, C.D.S. Marketing Engineer at Trane Commercial Systems.

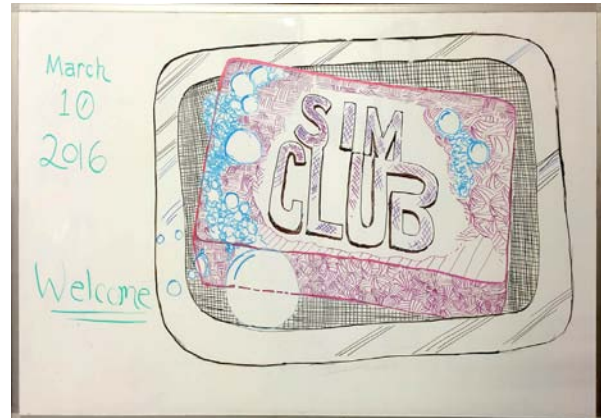
We thank everyone for attending, and we’re glad our new format met with approval! We’ll continue working to

deliver high-quality events that are useful, and engaging, to our members. We hope to see everyone at our 2016 Summer Meeting in St. Louis! Please be on the lookout for further details.

See photos from the event on Dropbox: www.dropbox.com/sh/yukhrlda6708nr/AAAkG8eatz2AxnKDs2VhhrYra?dl=0.

IBPSA-USA Denver Chapter Update

The newly formed IBPSA-USA Denver chapter is hosting meetings once a month on a variety of simulation topics. It has had a successful run so far with many interesting presentations, tours and happy hours since its inception. This year started with an action-packed presentation by Joel Neymark on ASHRAE Standard 140 followed by Sukreet Singh & Amir Rezaei-Bazkiaei on High Performance Building Analysis. Moving forward, it has planned presentations on topics such as passivHauz, cloud daylighting, 179D tax deduction modeling, ASHRAE 90.1 2016 preview and many other interesting topics. Below are photographs from this month's event with the backdrop of the chapter's nick name – SimClub. Thanks to Michael O'Keefe for the graphic. ■



Attendees and IBPSA-USA Denver Chapter 2016 Committee: Sukreet Singh, Dan Macumber, Amir Rezaei-Bazkiaei, Aaron Boranian, Matt Steen

Student competition

Improving the energy performance of a building on South Africa's most famous street

A student competition has been announced for university teams from English-speaking Africa to improve the energy and environmental performance of a small building located on South Africa's most famous street, also home to two Nobel Laureates, Archbishop Tutu and Nelson Mandela.

The building is based on the original 1944 design that was used for houses on Vilakazi Street, Orland West, many of which are still occupied today. This house is similar to the original Mandela home.

Background

The aim is to provide a competitive forum for student members of the Southern and East African architectural and engineering community. It is expected that tutors of relevant courses in Universities in Africa could use this as part of their teaching material or as a case study in environmental and sustainability building design. Entries will be judged by a panel made up of members of IBPSA and the UK Chartered Institute of Building Services Engineers (CIBSE) Building Simulation Group, chaired by Dr Dru Crawley. The results will be finalised in September 2016 and announced at the IBPSA-England Building Simulation and Optimization Conference (12 September 2016), and the awards made at the Southern African Association for Energy Efficiency (SAEE) Conference (November 2016). Details will be posted on the SAEE, IBPSA and South African Institute of Electrical Engineers (SAIEE) and CIBSE websites.

Judging Criteria

The key factors influencing the judges' decision will be:

- accurate and intelligent use of building simulation
- most important are the thermal and visual comfort of the occupants
- indoor air quality criteria must be met (CO₂ levels or air changes per hour)
- the simultaneous demand and production of on-site energy (load matching)

Drawings and partially completed models will be made available to teams to speed the simulation process and lighten the load. Prizes will be awarded for a range of achievements. Three software packages, BSIMAC, DesignBuilder and IES VE, will be made available for use in the competition only after consultation with the local agents.

For further information or to register a team contact:

Press Liaison – Mike Barker (mike@BuildingPhysics.co.za)

For information on the modelling software contact:

IES - Jeanne Parker-Weekes (jeanne.parker-weekes@iesve.com)

DesignBuilder - Francois Joubert (francois@greenplan.co.za)

BSIMAC - Dr Alec Johannsen (alecj@lantic.net) ■

Professor Milorad Bojić, Ph.D.Sci.

Marija S. Todorovi



Our respected and dear colleague, Dr Milorad Bojić (1951–2016) passed away on 22 January 2016, after a long and serious illness. He was a full-time professor at the Faculty of Engineering Sciences of Kragujevac, a full member of the Academy of Engineering Sciences of Serbia and a corresponding member of the Serbian Academy of Sciences and Arts, a visiting professor at numerous universities worldwide, and an honorary member of SMEITS (Serbian Union of Mechanical and Electrical Engineers and Technicians). Professor Bojić's death is a great loss for the academic, professional and scientific community. His contribution to the development of the Faculty of Mechanical Engineering and the Faculty of Engineering Sciences of Kragujevac was exceptional. He will remain in our memory as an outstanding scientist, dedicated lecturer, mentor/advisor and public figure.

Milorad Bojić was born on 4 January 1951 in Zemun. He graduated from the Faculty of Mechanical Engineering of Belgrade in 1974, received his Master's degree at the University of Syracuse, USA in 1977 and PhD degree at the University of Kragujevac in 1984.

At the Faculty of Mechanical Engineering of the University of Kragujevac he worked as a teaching fellow (1974–1984), assistant professor (1984–1990), associate professor (1990–1995), and full professor (since 1995). He was a research assistant at the University of Syracuse (1976–1978); a professorial research fellow at the Hong Kong Polytechnic University, (1999–2001); a visiting professor at Nagoya University, Japan (1997), at the Hong Kong Polytechnic University (2001 – 2003), the University of la Reunion (Madagascar) (2009–2011) and at the National Institute of Applied Sciences (INSA) of Lyon, France (2012).

At the Faculty of Mechanical Engineering of the University of Kragujevac, he was the vice-dean for science, the chairman of the Department for Energy and Process Engineering, the director of the Centre for Energy Technologies, the director of the Regional Centre for Energy Management and the director of the Centre for Heating, Air-Conditioning and Solar Energy.

He received a Fulbright scholarship for his stay in the USA (1976–78), a grant from the Serbian Ministry of Science for his visits to Imperial College London (1987) and Loughborough University, UK (1990), a fellowship from WUS Austria for his visit to University College London for the purpose of research in education, and a fellowship from the Research Council of Norway (2004) for involvement in the project *Clean Environment with Highly Efficient Device for Heating That Uses Hybrid Solar Collector and Heat Pump*. He was a member of the Scientific Society of Serbia from 1995.

He delivered a series of undergraduate courses: at the University of Kragujevac on Thermodynamics, Heating and Air-Conditioning, Use of Solar Energy, and at Hong Kong Polytechnic University on Analysis of HVAC&R Systems. In Kragujevac he taught graduate students in the field of Thermodynamics and Thermal Engineering. He was a mentor/advisor for 3 doctoral and 5 master dissertations and one specialist academic study.

Milorad Bojić was a member of the international scientific committee of the European Commission's conference *Energy & Agriculture Towards the Third Millennium* in Athens (1999) and the ISIAQ conference *Healthy Buildings 2003* in Singapore (2003). He was a moderator of the sub-regional education and training seminar in the field of renewable energy sources in Bulgaria (2003). At the Faculty of Mechanical Engineering of the University of Kragujevac, he organized several workshops: two on thermal industrial software (1993), one on the application of expert systems in industry (1992), and one on sustainable rural development through the integration of renewable energy sources (1996).

He worked on a UNESCO project for the establishment of the European network for education and training in the field of renewable energy sources (from 2003), and on three Hong Kong Polytechnic University projects: *Building Technologies in Dense Urban Environment* project (1999-2002), *Development of Adaptable Façades* (2003 - 2004), and *Sustainable Rural Development by Integration of Renewable Energy Sources in Poor European Regions* (2004). He also managed the planning of several strategic national projects.

He was a reviewer for several domestic and a large number of foreign journals (Energy, Renewable Energy, ASHRAE Transactions, Energy and Buildings, and Indoor Air). He received a letter of gratitude as a scientific reviewer for the conference Building Simulation in 2003 and the recognition of Pergamon Press for his essential contribution in ensuring the permanent quality of the journal Energy (2002). He was a member of the editorial and scientific board of the International Journal of Nuclear Governance, Economy and Ecology (2004) published by Inderscience, and associate editor of the journal Energy published by Pergamon (from 2007).

In his scientific papers he dealt with optimization of energy systems in industry and buildings, the use of different refuse energy flows in industry, the use of solar energy accumulated in soil, insulation distribution in the building envelope, building shape design in order to reduce heating demands, and other topics. He provided various engineering solutions for heat pumps, and participated in the projects of the national energy efficiency programme of the Serbian Ministry of Science and Environment.

Milorad Bojić was a member of the Board of Directors of the Serbian HVAC&R Society (KGH) and played a leading role in international cooperation in this field, especially in the joint activities of the Serbian HVAC&R Society and the Romanian organization AIIR (Asotiatia Inginerilor de Instalatii din Romania – Association of Installation Engineers of Romania), directly and within ASHRAE Danube Chapter (ASHRAE – the American Society for Heating, Refrigerating and Air-Conditioning – American and international organization), as the chairman of the Student Activities Committee (2008-2009), the chairman of the Chapter (2012/2013) and the chairman of the Membership Promotion Committee (2014/2015).

In 2006 he received the KGH Plaque, the highest recognition in the HVAC&R profession in his country, for his long and productive activities and contribution to the HVAC&R profession and science, his extraordinary accomplishments in the development of laboratory, field and theoretical research, and education of the young and their successful introduction and involvement in professional and scientific activities. In previous Student Programmes of the HVAC&R Congress, many of his students were attendees as lecturers, and in the student competitions of the European association, REHVA, his students were the best representatives of Serbia.

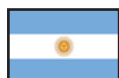
Finally, Milorad Bojić made a special contribution in the field of research and development of numerical investigation by simulation of building energy performance dynamics. Not only was he an active member of IBPSA-Danube, contributing to its development and advancement, but he was also responsible for the formation of its branch in Serbia by his lectures and presentations at IBPSA thematic conferences and published papers, and for international recognition of the scientific and professional maturity of Serbia and the wider

region of the Danube Chapter in relevant fields of activities of IBPSA in general. Professor Milorad Bojić's death has left IBPSA-Danube without its chair for the period 2015/2016.

He leaves his wife Slavica and son Ljubiša, a communicologist and journalist with a PhD in political sciences. They can be proud of his work as an outstanding educator who gathered young people around him and to whom he generously transferred his knowledge and enthusiasm, encouraging them to be dedicated to learning, innovation, research, science, and to present the results of their work at conferences at home and abroad. That is how professor and academician Bojić will be remembered by us who had an opportunity to cooperate with him within the activities of the Serbian Society for HVAC&R, IBPSA-Danube, as well as within ASHRAE-Danube. We will never forget his collegial friendship, generosity, enthusiastic professionalism and his devotion to both teaching students and conducting challenging research. ■

IBPSA affiliates

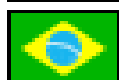
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For additional information about IBPSA, please visit the Association's web site at www.ibpsa.org. For information on joining, contact your nearest regional affiliate.

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

EDITORS:

Ian Beausoleil-Morrison, Carleton University, Canada

Jan Hensen, Eindhoven University of Technology, The Netherlands

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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:

- Theoretical aspects of building performance modelling and simulation.
- Methodology and application of building performance simulation for any stage of design, construction, commissioning, operation or management of buildings and the systems which service them.
- Uncertainty, sensitivity analysis, calibration, and optimization.
- Methods and algorithms for performance optimization of building and the systems which service them.
- Methods and algorithms for software design, validation, verification and solution methods.

Submissions

Manuscripts will be considered on the condition that they have been submitted only to *Journal of Building Performance Simulation*, that they have not been published already, and that they are not under consideration for publication or in press elsewhere. All submissions should be in English. Papers for submission should be sent to the Editors at j.hensen@tue.nl. For full submission details, please see the journal's homepage www.informaworld.com/jbps and click on the "Instructions for Authors" tab.

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ÉNERGÉTIQUE DES BÂTIMENTS & SIMULATION THERMIQUE

Ouvrage coordonné par Bruno Peuportier

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Préface de Ian Beausoleil-Morrison, professeur à l'université d'Ottawa

Introduction d'Ubert Pénicaud

Œuvrant tous à la **conception ou la réhabilitation énergétique des bâtiments**, domaine de plus en plus important où les objectifs environnementaux d'une part et la réglementation de l'autre encouragent à l'amélioration des performances, les auteurs exposent dans ce livre de référence quels sont les différents modèles d'outils de **simulation énergétique**. Ce sont notamment la **thermique**, l'**aéraulique**, l'**éclairage** et les transferts de masse, l'**enveloppe** et les équipements sur le **cycle de vie des bâtiments**. Une **description des outils les plus employés en France**

ainsi que plusieurs études sur la **validation des modèles** complètent cet ensemble.

On y trouvera de nombreux **conseils** portant sur les données disponibles d'un bâtiment, le climat, les scénarios d'usage et l'exploitation des résultats; les aspects d'incertitudes et d'optimisation sont eux aussi étudiés. La **conception de bâtiments neufs** et les **réhabilitations** font l'objet d'exemples particuliers. Enfin, les auteurs tracent des perspectives pour progresser vers la **garantie de performance énergétique**.

- 1. Modèles et principales hypothèses :** modélisation thermique du bâtiment, éclairage, aéraulique, transferts de masse, systèmes thermiques et électriques, ENR, cycle de vie
- 2. Validation des modèles :** bancs d'essais, comparaisons inter-logiciels, validation expérimentale
- 3. Mise en œuvre de la simulation :** adéquation aux objectifs de l'étude, données d'entrée, utilisation de la simulation et exploitation des résultats (incertitudes, optimisation)
- 4. Exemples d'applications :** construction neuve, réhabilitation, nouvelles utilisations de la simulation (vers la garantie de performance énergétique)

Chez le même éditeur :

Alain Triboix & Jean-Baptiste Bouvenot, *Les transferts thermiques par l'exemple. Conduction, convection, rayonnement, échangeurs de chaleur ; méthodes numériques*, 496 p.

Richard Franck, Guy Jover & Frank Hovorka, *L'efficacité énergétique du bâtiment. Optimiser les performances énergétiques, le confort et la valeur des bâtiments tertiaires et industriels*, 532 p.

Dominique Pajani, *La thermographie du bâtiment. Principes et applications du diagnostic thermographique*, 216 p.

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