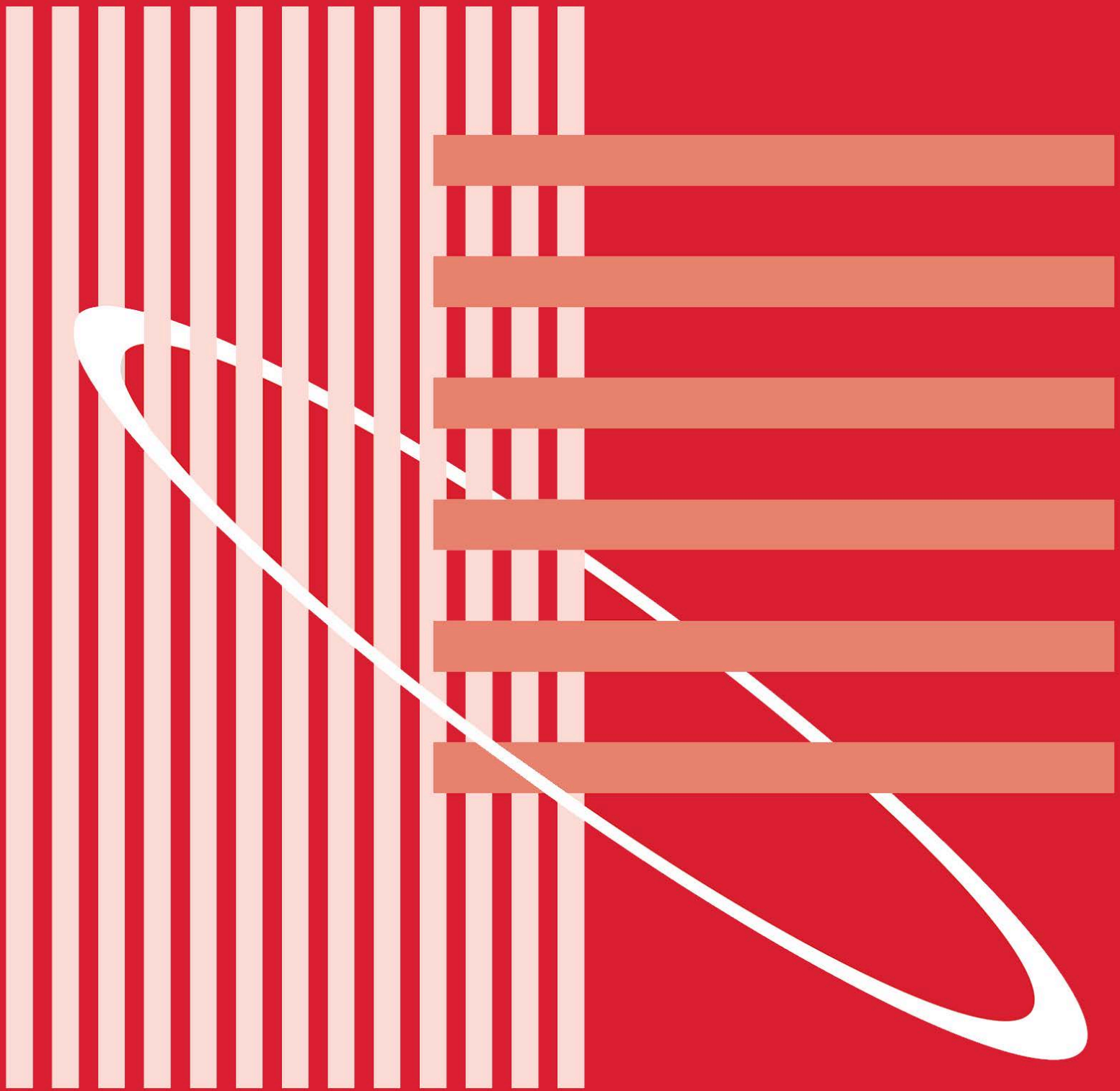
International Conference Organized by IBPSA-Nordic
13th-14th October 2020, Oslo

Programme

BuildSim Nordic 2020



Welcome to BSN2020 !

You are cordially invited to join the *BuildSim Nordic 2020* conference, to be held on the **13th & 14th October 2020**, organized in cooperation between the Nordic chapter of IBPSA, and hosted as a virtual conference by OsloMet.

The purpose of the event is to create a platform for exchanging ideas, issues and research findings, in the field of building performance simulation. It facilities national & international collaboration, and the meeting of minds between practitioners, researchers and students.

Participants

The conference will appeal to all who are interested in state-of-the-art in building simulation, including system design, HVAC, energy production/use, indoor climate and environmental issues. We have developed a programme covers a wide range of topics and workshops of relevance not only to building simulation researchers but also practitioners in the building industry.

Topics

The conference includes workshops papers on topics involving the use for integration of modeling tools for better building design, performance, and operation. The topics for the conference include (but are not limited to)

- Building acoustics
- Building Information Modelling (BIM)
- Building physics
- CFD and air flow
- Commissioning and control
- Daylighting and lighting
- Developments in simulation
- Education in building performance simulation
- Energy storage
- Heating, Ventilation and Air Conditioning (HVAC)
- Human behavior in simulation
- Indoor Environmental Quality (IEQ)
- New software developments
- Optimization
- Simulation at urban scale
- Simulation to support regulations
- Simulation vs reality
- Solar energy systems
- Validation, calibration and uncertainty
- Weather data & Climate adaptation
- Fenestration (windows & shading)
- Zero Energy Buildings (ZEB)
- Emissions and Life Cycle Analysis

How to join the virtual conference

Register on the following website. The fee is only approx. € 50. The website gives full access to full papers and events (Zoom sessions/workshops, and Wonder social events):

https://www.conftool.org/buildsim-nordic-2020/sessions.php

Organizing Committee

- Matthias Haase, President of Organizing Committee
- Vojislav Novakovic, NTNU, President of Scientific Committee
- Laurent Georges, NTNU, Scientific Programme
- Peter G. Schild, OsloMet, Host organizer, Book-of-Abstracts ed.
- Habtamu Madessa, OsloMet, Secretariat, Prize committee
- Heidi Liavåg, OsloMet, Secretariat
- Petter Wallentén, LTH
- Jørgen Erik Christensen, DTU
- Mandana Sarey Khanie, DTU

International Scientific Committee

We are grateful to the scientific committee their help in reviewing. Their names are listed in the Proceedings.

Conference sponsor

We are very grateful for financial support of EQUA.

Programme overview

Monday 12/Oct/2020, evening

7:00pm - 8:45pm	**Welcome reception on Wonder (a.k.a. YoTribe)** *Chairs: Jørgen E. Christensen, Heidi Liavåg, Matthias Haase* **We have created a virtual lounge for the welcome reception, with a greeting by the President, and information by the organizers. The lounge has many different topic-areas, for you to informally mingle, and make new acquaintances with common interests!**

Tuesday, 13/Oct/2020, morning

9:00am - 10:30am	**Opening Session: BSN2020 Opening Session and Keynote Lecture** *Chairs: Matthias Haase, Peter G. Schild, Vojislav Novakovic* Keynote lecture**: The Great Energy Predictor III Kaggle Competition - How can we bridge physics-based and data-driven modeling?** *Speaker: Clayton MILLER, Department of Building, School of Design and Environment, National University of Singapore*
10:30am - 12:00pm	**Session 1: UBEM, District Heating and Large Buildings** *Chairs: Santeri Siren, Chair: Matthias Haase* **A top-down digital mapping of spatial energy use for municipality-owned buildings: a case study in Borlänge, Sweden** *Samer Quintana, Pei Huang, Mengjie Han, Xingxing Zhang* **Requirements for representative models for comfort and energy simulations in districts** *Matthias Haase* **Planning a low carbon urban area in Helsinki with dynamic energy simulations** *Santeri Siren* **Integration of a high-temperature borehole thermal energy storage in a local heating grid for a neighborhood** *Michael Jokiel, Daniel Rohde, Hanne Kauko, Harald Taxt Walnum* **A novel modelling approach of ground source heat pump application for district heating and cooling, developed for a case study of an urban district in Finland** *Oleg Todorov, Kari Alanne, Markku Virtanen, Risto Kosonen* **Clustering and classification of building structures and their construction years with respect to monthly electricity consumption** *Mengjie Han, Mohsin Raza, Xingxing Zhang, Samer Quintana* **Validation of Norwegian Residential Building Archetypes Based on Empirical Data and Numerical Simulations** *Kamilla Heimar Andersen, Synne Krekling Lien, Hanne Liland Bottolfsen, Aksel Garvik Fagerheim, Igor Sartori* **Numerical Simulations in Transient Condition of a University Building with Complex Topology Equipped with Greenhouses in Winter Conditions** *Eusébio Z. E. Conceição, Mª Manuela Lúcio, Hazim Awbi*

Tuesday, 13/Oct/2020, afternoon

1:00pm - 2:30pm	**Workshop 1: IDA-ICE workshop** *Chair: Mika Vuolle* **IDA Indoor Climate and Energy 5.0 - New features**	
2:30pm - 4:00pm	**Session 2: Airflows and Computational Fluid Dynamics (CFD)** *Chairs: Eusébio Z. E. Conceição, Peter G. Schild* **Calculation of airflow rate with displacement ventilation in dynamic conditions** *Natalia Lastovets, Risto Kosonen, Juha Jokisalo* **POD-interpolation based prediction of indoor airflows** *Mats Kluftødegård, Arnab Chaudhuri* **Analysis of the interfacial mixing in the gravity-driven counterflow through a large vertical opening using Large Eddy Simulation** *Elyas Larkermani, Laurent Georges* **Simulation study on the influence of urban street intersection greening on ventilation performance** *Xin Guo, Zhi Gao* **CFD Simulation Delivered as SaaS for Building and HVAC Design Testing** *Jon Wilde* **Application of Coupling of CFD and Human and Clothing Thermal Response in Ceiling Mounted Localized Air Distribution Systems in Winter Conditions** *Eusébio Z. E. Conceição, Mª Manuela Lúcio, Mª Inês Conceição, Hazim Awbi*	**Session 3: Energy Flexibility, Control and Energy Storage** *Chairs: Igor Sartori, Kim B Wittchen* **A coordinated control to improve energy performance for a building cluster with energy storage, EVs, and energy sharing** *Pei Huang, Xingxing Zhang, Chris Bales, Tomas Persson* **Virtual testbed of the KTH Live-In Lab: development and validation** *Marco Molinari, Davide Rolando* **Influence of space heating distribution systems on the energy flexibility of Norwegian residential buildings** *Christoph Nickl, John Clauß, Laurent Georges* **Model predictive control of District Heating substations for flexible heating of buildings** *Harald Taxt Walnum, Igor Sartori, Marius Bagle* **Analyses of thermal storage capacity and smart grid flexibility in Danish single-family houses** *Kim B. Wittchen, Ole Michael Jensen, Jaume Palmer, Henrik Madsen* **Insight on a local energy community: Agent based model of a peer to peer (P2P) interaction for a group of prosumers** *Marco Lovati, Carl Olsmats, Xingxing Zhang*

4:30pm - 6:00pm	**Session 4: Building Envelope, Daylighting and Thermal Design** *Chairs: Steffen Petersen, Petter Wallentén* **Experimental and numerical studies on thermal performance of an office cubicle having gypsum boards coated with PCM-enhanced spackling** *Tor Arvid Vik, Habtamu Bayera Madessa, Arnab Chaudhuri, Andreas Aamodt, Chakkrit Phengphan, Ebenezer Twumasi Afriyie* **Visualizing user perception of daylighting: a comparison between VR and reality** *Muhammad Hegazy, Ken Ichiriyama, Kensuke Yasufuku, Hirokazu Abe* **The Potential of the Multi-Angled Facade System in Improving Natural Ventilation** *Loay Hannoudi, Noha Saleeb* **Adapting to future climate change by integration of Phase Change Materials (PCMs) into the building envelope: a case study in Stockholm, Sweden** *Benedetta Copertaro, Jingchun Shen, Lorenzo Sangelantoni, Pei Huang, Xingxing Zhang* **The Effect of Local Climate Data and Climate Change Scenarios on the Thermal Design of Office Buildings in Denmark** *Steffen Petersen* **Definitions of Floor Area and Evaluating Impacts in Energy Simulation** *Nicholas Frederick Allen-Sandoz* **A parametric tool for combined overheating and daylighting assessments** *Eleni Gkouvelou, Dimitra Moskoveli, Mandana Sarey Khanie*

Tuesday 13/Oct/2020, evening

7:00pm - 9:00pm	**BuildSim Lounge on Wonder (a.k.a. YoTribe)** *Chairs: Jørgen E. Christensen, Heidi Liavåg, Matthias Haase* **We informally meet again in the virtual BuildSim Lounge to relax, mingle and chat about the conference.**

Wednesday, 14/Oct/2020, morning

9:00am - 10:30am	**Session 5: Heat Pumps and Air-Conditioning Systems** *Chairs: Nelson Sommerfeldt, Habtamu Bayera Madessa* **Simulation and parametric study of a building integrated transpired solar collector heat pump system for a multifamily building cluster in Sweden** *Puneet Saini, Frank Fiedler, Emmanouil Psimopoulos, Benedetta Copertaro, Joakim Widén, Xingxing Zhang* **Impact of AC Outdoor Unit Placement on Energy Efficiency** *Krishna Patel, Rajan Rawal* **Energy performance of ground-source heat pump and photovoltaic/thermal (PV/T) in retrofitted and new buildings: Two case studies using simulation and on-site measurements** *Arefeh Hesaraki, Hatef Madani Larijani* **Quasi-Dynamic Modelling of DC operated Ground-Source Heat Pump** *Patrik Anders Ollas, Caroline Markusson, Jörgen Eriksson, Huijuan Chen, Markus Lindahl, Torbjörn Thiringer* **Parametric analysis of ground source heat pump system for heating of office buildings in Nordic climate** *Mehrdad Rabani, Habtamu Bayera Madessa, Jørgen Torgersen, Natasa Nord* **Solar PVT for heat pumps: Collector development, systems integration, and market potential** *Nelson Sommerfeldt, Francisco Beltran, Hatef Madani*	
10:30am - 12:00pm	**Session 6: HVAC general, IEQ and ZEB** *Chairs: Janne Petteri Hirvonen, Jørgen Erik Christensen* **Chilled water temperature control of self-regulating active chilled beams** *Peter Filipsson, Anders Trüschel, Jonas Gräslund, Jan-Olof Dalenbäck* **Energy performance of an office building by using adaptive approach to occupant behaviour and environment control** *Himanshu Patel Tuniki, Andrius Jurelionis, Monika Dobrovolskyte* **Domestic hot water decomposition from measured total heat load in Norwegian buildings** *Synne K. Lien, Dmytro Ivanko, Igor Sartori* **Numerical analysis of heat recovery options in old Finnish apartment buildings** *Janne Petteri Hirvonen, Juha Jokisalo, Risto Kosonen* **Simplified Tool for Pre-Designing Ventilation Air Flow in Greenland** *Jørgen Erik Christensen, William K. K. Vergo, Joan Ferris Gimeno* **From TEK17 to ZEB-O - A case study for a residential building in northern Norway** *John Clauß, Eivind Nygård, Judith Thomsen*	**Session 7: Data-driven Models and BPS education** *Chairs: Hicham Johra, Laurent Georges* **Influence of Data Pre-Processing Techniques and Data Quality for Low-Order Stochastic Grey-Box Models of Residential Buildings** *Xingji Yu, Laurent Georges* **Data-based calibration of physics-based thermal models of single-family houses** *Virginia Amato, Michael Dahl Knudsen, Steffen Petersen* **Datasets for grey-box model identification from representative archetypes of apartment blocks in Norway** *Hanne Liland Bottolfsen, Kamilla Heimar Andersen, John Clauß, Igor Sartori* **Identifying grey-box models of Norwegian apartment block archetypes** *Marius Eide Bagle, Harald Taxt Walnum, Igor Sartori* **Global Marginal Carbon Footprint Evaluation of Internet Services with Building Energy Models** *Eric Mahendra Kumar, Erica Cochran Hameen, Wei Liang* **A Grey Box Model of the Heat Dynamics of a School Building** *Frederik Banis, Christian Anker Hviid, Hjörleifur G. Bergsteinsson, Peder Bacher, Davide Cali, Henrik Madsen, Niels Kjølstad Poulsen* **Video game-based learning for teaching building thermodynamics and control of HVAC systems** *Hicham Johra, Lasse Rohde, Ekaterina Petrova* **Discussing daylight simulations in a proposal for online daylighting education** *Federica Giuliani, Mandana Sarey Khanie, Natalia Sokół, Niko Gentile*

Wednesday, 14/Oct/2020, afternoon

<table>
<tr><td>1:00pm
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2:30pm</td><td>Workshop 2: Master-planning based on NZEB for Positive-Energy Districts
Chair: Matthias Haase
Master planning based on NZEB for Positive Energy Districts</td><td>Workshop 3: Building Performance Simulation Accuracy and High-Resolution
Chairs: Jon William Hand, Petter Wallentén
Workshop on high resolution modelling</td></tr>
<tr><td>2:30pm
-
4:00pm</td><td colspan="2">Session 8: Input data workflow, boundary conditions, user interface, BIM
Chairs: Vojislav Novakovic, Jon William Hand
Using inference from user attribution of models to support high resolution modelling
Jon William Hand
Working with a Small and Predictable Performance Gap
Marc Azar, Par Carling
Exploring possibilities to quantify the qualitative description of occupant behavior
Jakub Wladyslaw Dziedzic, Da Yan, Vojislav Novakovic
Undefined modelling parameters impact on building simulation results: using IDA ICE according to the Estonian methodology for calculating building performance
Henri Sarevet, Martin Kiil, Raimo Simson, Martin Thalfeldt, Jarek Kurnitski
The right way to do building simulations? Using Monte Carlo simulations, sensitivity analysis, and metamodeling on a design case
Torben Østergård, Lars Broder Nielsen, Rasmus Lund Jensen
Update of a living building-simulation tool
Ole Michael Jensen, Kim B. Wittchen, Christian Grau Sørensen, Jesper Kragh, Jørgen Rose, Nanna Dyrup Svane, Karl Grau Sørensen
Semi-automatic geometry extract from Revit for earlier and faster building performance simulations
Nanna Dyrup Svane, Artūras Pranskunas, Lars Broder Lindgren, Rasmus Lund Jensen</td></tr>
<tr><td>4:00pm
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4:30pm</td><td colspan="2">Closing Session: BSN2020 Closing Session and Best Paper Awards
Chairs: Matthias Haase, Peter G. Schild, Vojislav Novakovic</td></tr>
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