

BSA 2022

Building Simulation Applications

5th IBPSA-Italy Conference
Bozen-Bolzano 29.6.2022 – 1.7.2022



Freie Universität Bozen
Libera Università di Bolzano
Università Lìedia de Bulsan

Wednesday June 29th

3rd Students School on Building Performance Simulation Applications

09.00-09.15

PROFESSIONAL APPLICATIONS OF BUILDING PERFORMANCE SIMULATION ANALYSES:

Welcome and introduction - Room F6

Giovanni Pernigotto - Free University of Bozen-Bolzano

09.15-11.00

Application of Building Performance Simulation in the LEED, WELL and BREEAM rating systems - Room F6

Paola Moschini, Marco Ricci - Macro Design Studio

11.15-12.00

State of the Art in BIM2BEM methods and outlook to new approaches - Room F6

Dietmar Siegele, Ilaria Di Blasio - Fraunhofer Italia

12.00-14.00

Lunch Break (not provided)

14.00-14.15

MODELLING OF FENESTRATION SYSTEMS AND (DAY)LIGHTING SIMULATIONS:

Introduction - Room E3.22

Giovanni Pernigotto - Free University of Bozen-Bolzano

14.15-15.30

Integrated design of glass and shading systems - Room E3.22

Luca Papaiz - Pellini SpA & GlassAdvisor srl

15.30-16.30

Daylighting and lighting analysis of two public buildings in Bolzano - Room E3.22

Giovanni Pernigotto, Federico Battini - Free University of Bozen-Bolzano

18.30-19.30

Welcome aperitif - Room F6

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Thursday June 30th

8.30-9.00

Participant registration

9.00-9.30

Welcome speeches - Room D1.02

Andrea Gasparella - Free University of Bozen-Bolzano & President of IBPSA-Italy
Lori McElroy - President of IBPSA

9.30-10.15

Thursday Keynote Speech - Room D1.02

Simulation and optimization: supporting building decarbonization
Paolo Baggio - University of Trento

10.15-10.45

Coffee Break

10.45-12.30

Technical Sessions (in parallel)

**A - Building Envelope Materials (chair: Dr. Piero Bevilacqua, Prof. Alessandro Prada)
- Room D1.02**

107 *Heat and mass transfer modelling for moisture-related risks in walls retrofitted by timber materials*

Gianpiero Evola, Alessandra Urso, Vincenzo Costanzo, Francesco Nocera, Luigi Marletta

167 *Effects of different moisture sorption curves on hygrothermal simulations of timber buildings*

Michele Libralato, Maja Danovska, Giovanni Pernigotto, Andrea Gasparella, Paolo Baggio, Paola D'Agaro, Giovanni Cortella

131 *Validation of energy simulations of a sustainable wooden house in a Mediterranean climate*

Piero Bevilacqua, Roberto Bruno, Daniela Cirone, Stefania Perrella, Natalia Shushunova, Natale Arcuri

- 120 *In situ measurement of wall thermal properties: parametric investigation of the heat flow methods through virtual experiments data*
Andrea Alongi, Luca Sala, Adriana Angelotti, Livio Mazzarella
- 165 *Modelling simulation: comparison on a single-family house made of traditional bricks with insulation and negative CO2 hemp bricks in South Tirol*
Silvia Ricciuti, Irene Lara-Ibeas, Annamaria Belleri, Francesco Babich
- 150 *Polyamide waste thermal and acoustic properties: experimental and numerical investigation on possible reuse for indoor comfort improvement*
Manuela Neri, Eva Cuerva, Alfredo Zabaleta, Pablo Pujadas, Elisa Levi, Ondrej Sikula
- B - Acoustic Simulation (chair: Prof. Gino Iannace, Dr. Federica Morandi) - Room D.103**
- 103 *Intelligibility prediction in scholar classrooms*
Samantha Di Loreto, Fabio Serpilli, Valter Lori, Costanzo Di Perna
- 110 *Influence of sound-absorbing ceiling on the reverberation time. Comparison between software and calculation method EN 12354-6*
Nicola Granzotto, Paolo Ruggeri, Fabio Peron, Marco Caniato, Andrea Gasparella
- 105 *The acoustic adaptation of the Aula Magna at the University of Bologna: Auditorium and Conference Hall scenarios simulated in the main nave of Santa Lucia's church*
 Ruoran Yan, Antonella Bevilacqua, Maria Cristina Tommasino
- 115 *A project focused on sound diffusion: the acoustics of the Auditorium Yves St Laurent of Marrakech in combination with its innovative architectural design*
 Lamberto Tronchin, Antonella Bevilacqua, Ruoran Yan
- 144 *The Amintore Galli Theatre in Rimini: a dataset of building simulation tools for its acoustic design*
Antonella Bevilacqua, Massimiliano Manfren, Maria Cristina Tommasino, Ruoran Yan, Lamberto Tronchin
- 172 *Smart sensors and auditory sensitivity: acoustic optimization of dedicated spaces*
 Federica Bettarello, Giuseppina Scavuzzo, Marco Caniato, Arianna Marzi, Andrea Gasparella

12.30-13.45

Buffet lunch

13.45-14.15

“Building simulation in the profession: work in progress” - Room D1.02

A conversation, with Lori McElroy and Andrea Gasparella - Room D1.02

Andrea Gasparella - Free University of Bozen-Bolzano & President of IBPSA-Italy

Lori McElroy - President of IBPSA

14.30-16.00

Technical Sessions (in parallel)

A - Transparent elements, daylighting and passive solar solutions (chair: Prof. Ilaria Ballarini, Prof. Cristina Cornaro) - Room D1.02

- 106 *Implementation and calibration of a model to treat naturally ventilated Complex Fenestration Systems in TRNSYS*
Ingrid Demanega, Giovanni Gennaro, Giuseppe De Michele, Francesco Isaia, Fabio Favoino, Stefano Avesani
- 109 *A Review on the FIVA-project: Simulation-assisted development of highly-insulating vacuum glass windows*
Ulrich Pont, Peter Schober, Magdalena Wölzl, Matthias Schuss, Jakob Haberl
- 137 *Determining the energy benefits from passive solar design integration through the sensitivity analysis of different case studies*
Giacomo Cillari, Alessandro Franco, Fabio Fantozzi
- 161 *Light-responsive biomimetic dynamic façade inspired by the growing morphology of tree branches*
Neda Johari Moghadam, Peiman Pilehchi Ha, Reza Sharafi
- 101 *Optimization of Daylighting and Energy Performance in Bangladesh Ready-Made Garment Factories: Use of Parametric Design, Simulation Modeling, and Genetic Algorithms*
Md Ashikur Rahman Joarder, Monir Hossain, Aaron J.E. Bach, Jean P. Palutikof, Fahim Tonmoy
- 188 *Impact of solar radiation modelling on the simulated building energy performance in the climate of Bolzano, Italy*
Giovanni Pernigotto, Alessandro Prada, Aleksandr Gevorgian, Andrea Gasparella

B - Acoustic Simulation II (chair: Dr. Federica Morandi, Prof. Edoardo Alessio Piana) - Room D1.03

- 111 *Simulation of thermal and acoustic façade insulation starting from the characteristics of the individual elements*
Nicola Granzotto, Paolo Ruggeri, Fabio Peron, Marco Caniato, Andrea Gasparella
- 117 *On the prints of another horseshoe shaped historical building: acoustic studies of the Bonci theatre of Cesena*
Ruoran Yan, Antonella Bevilacqua
- 118 *Acoustic discoveries of one masterpiece by Antonio Galli Bibiena: the Municipal theatre of Bologna*
Ruoran Yan, Antonella Bevilacqua
- 132 *Thermal and acoustic simulation of a technical enclosure for high voltage control equipment*
Edoardo Alessio Piana, Somayan Basu, Francesco Palone, Simone Sacco, Roberto Spezie
- 183 *Numerical investigation of radiation efficiency of a cross laminated timber floor*
Marco Caniato, Nicola Granzotto, Federica Bettarello, Arianna Marzi, Paolo Bonfiglio, Andrea Gasparella
- 127 *Comparison between measured and calculated values in relation to noise from wind turbines*
Antonella Bevilacqua, Gino Iannace, Ilaria Lombardi, Amelia Trematerra

16.00-16.30

Coffee Break

16.30-18.15

Technical Sessions (in parallel)

A - HVAC Systems (chair: Prof. Paolo Baggio, Prof. Vincenzo Corrado) - Room D1.02

- 113 *Hourly dynamic calculation of the primary energy with heat pump generation system (EN 15316-4-2): a case study in Italy*
Giada Remia, Serena Summa, Luca Tarabelli, Costanzo Di Perna
- 104 *Hybrid heat pump systems: is predictive control worth using?*
Patricia Ercoli, Alice Mugnini, Fabio Polonara, Alessia Arteconi
- 151 *Assessment of demand-side management on the performance of a single-dwelling mechanical ventilation plus radiant floor system*
Paolo Bonato, Anton Soppelsa, Marta Avantaggiato, Roberto Fedrizzi

- 189 *Effect of the Time Interval Base on the Calculation of the Renewable Quota of Building in an Alpine Context*
Margherita Povolato, Alessandro Prada, Paolo Baggio
- 155 *Energetic optimisation of the domestic hot water system in a residential building by means of dynamic simulations*
Paolo Valdiserri, Aminhossein Jahanbin, Giovanni Semprini
- 186 *Performance simulation of desiccant wheel: comparison between dynamic and steady-state models*
Simone Dugaria, Andrea Gasparella
- B - Methods for Building Performance Simulation I (chair: Dr. Ulrich Pont, Prof. Alessandro Prada) - Room D1.03**
- 162 *A comparison among three whole-building dynamic simulation software and their applicability to the indoor climate modelling of historical buildings*
 Francesca Frasca, Elena Verticchio, Michele Libralato, Paola D'Agaro, Giovanni Cortella, Anna Maria Siani, Cristina Cornaro
- 149 *Estimated versus actual heating energy use of residential buildings*
Matthias Schuss, Martin Fleischhacker, Ardeshir Mahdavi
- 143 *Energy signature modelling towards digital twins – Lessons learned from a case study with TRV and GAHP technologies*
 Massimiliano Manfren, Maria Cristina Tommasino, Lamberto Tronchin (presenting: Antonella Bevilacqua)
- 187 *BIM and Mixed reality for visualizing building energy data*
 Dietmar Siegele, Paola Penna, Ilaria Di Blasio, Michael Riedl
- 180 *Design of Energy-Neutral Smart Buildings: An Ontological Framework to Integrate LCA, BIM and PLM*
 Tarun Kumar, Monto Mani
- 135 *An Investigation into thermal performance of buildings built using upcycled End-of-Life Photovoltaic panels*
Roshan R Rao, Suchi Priyadarshani, Monto Mani
- 191 *Innovative Approaches for Teaching BPS: first implementations of business games*
Andrea Gasparella

18.30-19.00

IBPSA Italy General Meeting - Room D1.02

20.00-22.30

Conference dinner at the Castel Flavon / Haselburg (transportation included)

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Friday July 1st

8.30-9.15

Friday Keynote Speech - Room D.102

Going Digital – Infrastructure Modeling for Resilience and Decarbonization
Drury B. Crawley - Bentley Systems

9.30-11.00

Technical Sessions (in parallel)

A - Existing buildings: analysis, retrofitting and optimization (chair: Dr. Francesco Babich, Prof. Gianpiero Evola) - Room D1.02

- 112 *Climate change impact on historical buildings: a case study within the Interreg Ita-Slo Secap Project*
Marco Manzan, Amedeo Pezzi
- 158 *Assessing the Climate Resilience of Passive Cooling Solutions for Italian Residential buildings*
Mamak P. Tootkaboni, Ilaria Ballarini, Vincenzo Corrado
- 122 *The management of the energy performance simulation of a complex building portfolio. The case of the school building asset of an Italian municipality*
Claudia Bo, Enrico De Angelis, Andrea Augello
- 123 *Hourly-simplified calculation to identify cost-optimal energy performance requirements for the Italian building stock*
Matteo Piro, Franz Bianco Mauthe Degerfeld, Giovanna De Luca, Ilaria Ballarini, Vincenzo Corrado
- 169 *Energy performance evaluation and economical analysis by means of simulation activities for a renovated building reaching different nZEB definitions targets*
Riccardo Gazzin, Jennifer Adami, Mattia Dallapiccola, Davide Brandolini, Miren Juaristi Gutierrez, Diego Tamburrini, Paolo Bonato, Martino Gubert, Stefano Avesani

- 173 *Simulation application for the assessment of the energy performance of a building renovated using I-BEST system (Innovative Building Envelope through Smart Technology)*
Cristina Carpino, Mario Maiolo, Patrizia Piro, Roberto Bruno, Natale Arcuri
B - Methods for Building Performance Simulation II (chair: Prof. Matthias Schuss, Prof. Cristina Cornaro) - Room D1.03
- 182 *Application of a simplification algorithm for Urban Building Energy Modeling to complex shaped educational buildings*
Matteo Merli, Federico Battini, Giovanni Pernigotto, Andrea Gasparella
- 181 *Assessing the performance of a simplification algorithm for Urban Building Energy Modeling in Multi-Objective Optimization*
Federico Battini, Giovanni Pernigotto, Andrea Gasparella
- 145 *Data-driven building energy modelling – Generalisation potential of energy signatures through interpretable machine learning*
Massimiliano Manfren, Maria Cristina Tommasino, Lamberto Tronchin (presenting: Antonella Bevilacqua)
- 166 *A Fully Automated and Scalable Approach for Indoor Temperature Forecasting in Buildings Using Artificial Neural Networks*
Jakob Bjørnskov, Muhyiddine Jradi, Christian Veje
- 177 *Calibration of the Energy Simulation Model of a Library with a Meta-Model-Based Optimization Approach*
Maja Danovska, Alessandro Prada, Paolo Baggio
- 171 *Preliminary CFD parametric simulations of low- and medium-density urban layouts*
Ritesh Wankhade, Giovanni Pernigotto, Michele Larcher
C - Student Competition (chair: Prof. Francesca Cappelletti, Dr. Giovanni Pernigotto) - Room Do.03
- 134 *Investigating the role of humidity on indoor wellness in vernacular and conventional building typologies*
Suchi Priyadarshani, Roshan R Rao, Monto Mani, Daniel Maskell
- 138 *A novel Personal Comfort System: a radiant desk with a Loop Heat Pipe*
Roberto Rugani, Marco Bernagozzi, Marco Picco, Giacomo Salvadori, Fabio Fantozzi
- 178 *Development of a detailed model of hybrid system composed by air-to-water heat pump and boiler*
Erica Roccatello, Alessandra Prada, Marco Baratieri, Paolo Baggio

- 164 *QGIS-based tools to evaluate air flow rate by natural ventilation in buildings at urban scale*
Silvia Santantonio, Guglielmina Mutani
- 179 *The role of ventilation in indoor spaces during the covid-19 pandemic: comprehensive analysis of ASHRAE Standard 62.1*
Giovanni Francesco Giuzio, Giovanni Barone, Annamaria Buonomano, Gianluca Del Papa, Cesare Forzano, Adolfo Palombo, Giuseppe Russo
- 126 *Integrated approach to assess the energy and environmental payback time of buildings refurbishment: a case study*
Marta Roncone, Francesco Asdrubali, Gianluca Grazieschi, Chiara Tonelli

11.00-11.30

Coffee Break

11.30-13.00

Technical Sessions (in parallel)

A - Ventilation and IAQ (chair: Dr. Simone Dugaria, Dr. Giovanni Pernigotto) - Room D1.02

- 102 *Transient three-dimensional CFD modelling of ceiling fans: a comparison between detailed and simplified models*
Francesco Babich, Akshit Gupta, Wilmer Pasut
- 121 *Investigating the performance of different Window Opening Styles for single-sided wind-driven Natural Ventilation using CFD Simulations*
Akshit Gupta, Annamaria Belleri, Francesco Babich
- 159 *Ventilation of residential buildings in Alpine region: a comparison between natural, mechanical, and mixed-mode strategies*
Francesca Avella, Paolo Bonato, Annamaria Belleri, Francesco Babich
- 175 *Modeling and Measurements in Natural Ventilation of Massive Buildings: A Case Study*
 Francesco Asdrubali, Luca Evangelisti, Claudia Guattari, Marta Roncone, Lucia Fontana, Ginevra Salerno, Chiara Tonelli, Valeria Vitale
- 124 *A novel methodology for risk assessment of airborne transmission due to Covid-19 in university classrooms*
Giulia Lamberti, Roberto Rugani, Fabio Fantozzi
- 184 *Assessment of Contagion Risk due to Covid-19 for a multi-zone building model of offices*
Riccardo Albertin, Alessandro Pernici, Giovanni Pernigotto, Andrea Gasparella

B - IEQ and occupants' behavior (chair: Prof. Roberto Bruno, Prof. Francesca Cappelletti) - Room D1.03

- 108 *Multi-objective optimization of thermo-acoustic comfort of school buildings*
Daniele Colarossi, Samantha Di Loreto, Eleonora Tagliolini, Paolo Principi, Fabio Serpilli
- 130 *Thermo-hygrometric comfort analysis in a real public conference room to support a digital-twin targeted to parametric investigations*
Roberto Bruno, Piero Bevilacqua, Daniela Cirone, Natale Arcuri
- 152 *Passive design strategies for the improvement of summer indoor comfort conditions in lightweight steel-framed buildings*
Nicola Callegaro, Max Wieser, Giovanni Manzini, Ivan Kharlamov, Rossano Albatici
- 185 *Impact of visual, thermal and Indoor Air Quality conditions on students' wellbeing and learning performance in a primary school of Bolzano, Italy*
Giovanni Demozzi, Luca Zaniboni, Giovanni Pernigotto, Andrea Gasparella
- 190 *Clothing adaptation models: comparison and proposal for a new seasonal approach*
Jorge Conejo Fernández, Francesca Cappelletti, Andrea Gasparella
- 174 *Building performance simulation of classrooms: influence of different indirect measurements of the ventilation rate*
Federica Morandi, Julian Donges, Alessandro Prada, Francesca Cappelletti, Andrea Gasparella

13.00-13.30

Student Award and closing ceremony - Room D.102

13.30-14.30

Buffet lunch

14.30-17.30

BSA2022 IBPSA Italy Round Table for Designers and Practitioners - Room D.102

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