BuildSim Nordic 2026

Book of Abstracts

12th BuildSim Nordic Conference · 4th IBPSA Nordic Conference

19–21 August 2026 · Umeå University, Sweden

Conference Chair: Prof. Thomas Olofsson
Editor: Dr. Santhan Reddy Penaka

Organisers and Sponsors

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Preface

On behalf of the Organising and Scientific Committee, it is our great pleasure to welcome you to BuildSim Nordic 2026, the 12th BuildSim Nordic conference and the 4th International Nordic Conference of IBPSA, hosted in Umeå, Sweden, from 19 to 21 August 2026.

BuildSim Nordic has grown into the leading Nordic meeting point for researchers, practitioners, educators, and students working in building performance simulation. This year's conference carries the theme Smart and Sustainable Buildings and Cities in the Nordic Countries, with a particular focus on Energy Resilience of Buildings in Cold Climate and Smart and Climate Neutral Buildings, Districts and Cities — two themes that speak directly to the challenges our region faces as we work to decarbonise the built environment while adapting to a changing climate.

Over the coming three days, the programme brings together keynote presentations, technical sessions, and workshops covering topics from building physics and CFD to digital twins, demand-side flexibility, indoor environmental quality, and zero-energy buildings. We are proud of the breadth and quality of the contributions submitted this year, all rigorously reviewed by our Scientific Committee, and we are confident that the abstracts collected in this book reflect the vitality and progress of building simulation research across the Nordic countries and beyond.

Umeå, a lively university city in northern Sweden known for its culture, architecture, and surrounding nature, provides a fitting backdrop for a conference dedicated to smart, sustainable, and resilient buildings. We hope that alongside the scientific programme you will find time to explore the city and enjoy the company of colleagues, old and new.

Umeå University, one of Sweden’s largest universities, is a broad university with education and research spanning a wide range of disciplines. The Faculty of Science and Technology is a significant part of the University, with strong research and education relevant to the themes of this conference. We are pleased to host BuildSim Nordic 2026 at Umeå University.

We extend our sincere thanks to the authors, reviewers, session chairs, sponsors, and volunteers whose efforts made this conference possible, and to IBPSA-Nordic for its continued support of this biennial gathering. We hope BuildSim Nordic 2026 provides you with new ideas, valuable connections, and inspiration to take back to your own work.

Welcome to Umeå, and welcome to BuildSim Nordic 2026.

Prof. Thomas Olofsson, Conference Chair
Dr. Santhan Reddy Penaka, Editor

About BuildSim Nordic 2026

BuildSim Nordic is the biennial conference of IBPSA-Nordic, the Nordic regional affiliate of the International Building Performance Simulation Association (IBPSA), covering Denmark, Finland, Norway, and Sweden. IBPSA-Nordic promotes the science and practice of building performance simulation and works to improve the energy, environmental, and economic performance of buildings and their systems across the region.

BuildSim Nordic 2026 marks the 12th edition of the conference and the 4th to be organised as an International Nordic Conference under the IBPSA banner. The conference brings together researchers, practitioners, educators, and students to exchange ideas, share research findings, and discuss emerging challenges in building performance simulation, spanning building physics, energy systems, indoor environmental quality, and digital methods for design and operation.

This year's scientific programme is organised around the theme Smart and Sustainable Buildings and Cities in the Nordic Countries, with dedicated focus areas on Energy Resilience of Buildings in Cold Climate and Smart and Climate Neutral Buildings, Districts and Cities. Contributions span a wide range of topics, including building acoustics, Building Information Modelling (BIM), CFD and air flow, commissioning, daylighting and fenestration, digital twins, demand-side flexibility, education in simulation, hybrid systems, indoor environmental quality, optimisation of system performance, renewable energy and storage, urban-scale simulation, validation and calibration, weather data and climate adaptation, zero-energy buildings, and emissions and life-cycle analysis.

The scope and objectives of the conference reflect the pressing need for the Nordic building sector to decarbonise while maintaining resilience against an increasingly variable climate. By convening the region's simulation community alongside colleagues from the wider IBPSA world, BuildSim Nordic 2026 aims to accelerate the translation of research into practice and to strengthen collaboration across academia, industry, and public authorities working toward smart, sustainable, and climate-neutral buildings and cities.

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Abstracts

Bio-based Phase Change Composites with multi-scale modeling

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Abstract:
The growing demand for sustainable energy solutions has spurred interest in bio-based phase change materials (PCMs) for thermal energy storage applications. This study focuses on the development and characterization of bio-based phase change composites, integrating natural materials with enhanced thermal stability and latent heat capacity. Through a multi-scale modeling approach, we investigate the thermal behavior and phase transition dynamics from the molecular to the macroscopic scale. Molecular dynamics simulations provide insight into the interactions between bio-based polymers and PCM molecules, while finite element models are employed to simulate heat transfer in composite systems. The integration of experimental data with computational models enables accurate prediction of performance under realistic conditions. This research highlights the potential of bio-derived composites as efficient and eco-friendly thermal storage media, paving the way for their application in building energy systems and renewable energy technologies.

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