TAMPERE UNIVERSITY OF TECHNOLOGY

FINAL PROGRAMME

BUILDING PHYSICS IN THE NORDIC COUNTRIES

NSB 2011

9th Nordic Symposium on Building Physics
Tampere, Finland 29 May – 2 June 2011

WELCOME TO NSB 2011

The Nordic Symposium on Building Physics, NSB 2011, is now being organised for the ninth time hosted by TUT in Tampere. Over time, the symposium has become the biggest international conference focusing on building physics. It is our pleasure and honour to serve as hosts of this symposium.

The symposium includes 160 presentations on different areas of building physics. Moisture and mould problems of envelope assemblies as well as energy efficiency of buildings are nowadays very topical themes all over the world which is also reflected in the presentations of this symposium. Many other interesting and traditional subject fields, such as air-tightness of buildings, hygrothermal behaviour of envelope assemblies, determination of building material properties, development of HAM simulation models, thermal comfort and effects of climate change will also be highlighted.

Three keynote presentations will also be given at the symposium. Associate Professor Ingemar Samuelson and D.Sc. Juhani Pirinen will describe the moisture and mould problems of buildings while Professor Svend Svendsen will outline the improvement of the energy efficiency of the building stock and related challenges.

This time the symposium also has a quite varied range of side events explained in more detail on the inside pages of this programme.

I want to thank all the parties that took part in the implementation of this symposium, especially the members of the Organising and Scientific Committees for their great work in organising it.

I hope that you will enjoy the symposium and its side events!

Tampere, May 2011

Juha Vinha
Chairman of Symposium

ORGANISING COMMITTEE

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M.Sc. Kati Salminen
M.Sc. Kimmo Lähdesmäki
B.Sc. Elina Manelius
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Dr. Hartwig Künzel, Germany
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Lic. Tech. Teppo Lehtinen, Finland
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Dr. Phalguni Mukhopadhyaya, Canada
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Dr. Juhani Pirinen, Finland
Prof. Carsten Rode, Denmark
Prof. Staf Roels, Belgium
Assoc. Prof. Ingemar Samuelson, Sweden
Dr. Chris Sanders, United Kingdom
Assoc. Prof. Angela Sasic Kalagasidis, Sweden
Ass. Prof. Jos van Schijndel, Netherlands
M.Sc. Jón Sigurjónsson, Iceland
Prof. Svend Svendsen, Denmark
Prof. Jan Vincent Thue, Norway
Dr. Berit Time, Norway
Assoc. Prof. Juha Vinha, Finland
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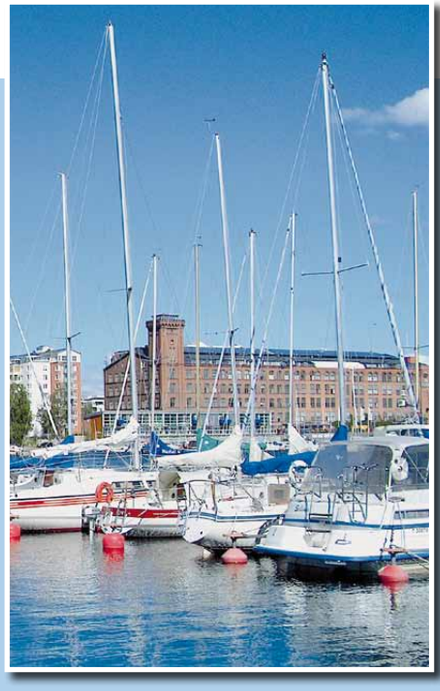
TAMPERE UNIVERSITY OF TECHNOLOGY

Tampere University of Technology (TUT) conducts research in the fields of technology and architecture and provides higher education based on this research. Established in 1965, the University has a staff of 2,000 professionals in different fields and a total of 10,400 undergraduate and postgraduate students. TUT is a sought-after cooperation partner among the scientific community and business life.

TUT's scientific activities are founded on a combination of strong research of the natural sciences and technology and research related to industry and business. Many research fields play a central role in addressing global challenges, such as climate change and demographic ageing. The most extensive and established of the international leading-edge fields of research at TUT are signal processing, nanophotonics and intelligent machines.

TUT offers its students an opportunity for a broad, cross-disciplinary education. In terms of student numbers, the largest fields of study at TUT are information technology and electrical, mechanical, automation and civil engineering.



TAMPERE

Tampere is the largest inland city in the Nordic countries, situated in beautiful Finnish lakeland. The capital of a vibrant region of 300,000 inhabitants, Tampere is renowned as a strong national and international competence centre for the ICT, mechanical engineering and automation industries as well as health technology. Did you know that the world's first GSM phone call was made in Tampere? Other world-firsts from Tampere include bioabsorbable surgical implants and walking forest machines.

Tampere is a safe city with excellent services. Plenty of high and popular culture and various events, numerous sports facilities and pristine nature mean that an experience is never far away.

PROGRAMME 29 May – 2 June 2011

Time	Sunday May 29th	Monday May 30th	Tuesday May 31st	Wednesday June 1st	Thursday June 2nd
7.30		Registration 7.30 – 12.00	Registration 7.30 – 12.00	Registration 7.30 – 12.00	Registration 7.30 – 12.00
8		**Symposium Opening 8.15 – 8.45** **Keynote session 1 8.45 – 10.00**			**Sessions A10, B10, C10 8.30 – 10.00**
9			**Keynote session 2 8.45 – 10.00**	**Keynote session 3 8.45 – 10.00**	
10		Coffee Break 10.00 – 10.30	Coffee Break 10.00 – 10.30	Coffee Break 10.00 – 10.30	Coffee Break 10.00 – 10.30
11		**Sessions A1, B1, C1 10.30 – 12.00**	**Sessions A4, B4, C4 10.30 – 12.00**	**Sessions A7, B7, C7 10.30 – 12.00**	**Sessions A11, B11, C11 10.30 – 12.00** **Symposium Closing 12.00 – 12.15**
12		Lunch Break 12.00 – 13.15	Lunch Break 12.00 – 13.15	Lunch Break 12.00 – 13.15	Lunch 12.15 – 13.15
13		**Sessions A2, B2, C2 13.15 – 14.45**	**Sessions A5, B5, C5 13.15 – 15.00**	**Sessions A8, B8, C8 13.15 – 14.45**	Laboratory tour 13.15 – 16.15
14		Coffee Break 14.45 – 15.15	Coffee Break 15.00 – 15.30	Coffee Break 14.45 – 15.15	
15		**Sessions A3, B3, C3 15.15 – 16.45**	**Sessions A6, B6, C6 15.30 – 17.15**	**Sessions A9, B9, C9 15.15 – 16.45**	
16	Registration in Tampere Hall 16.00 – 18.00				
17					
18	Welcome Reception 18.00 – 20.00	Cocktails 18.00 – 19.30		Boat trip 17.45 – 23.00	
19		Scientific Committee Dinner 19.30 – 22.00	Symposium Banquet 19.00 – 02.00		
20					

WELCOME RECEPTION

Welcome Reception is organised at the restaurant of **Museum Centre Vapriikki on Sunday May 29th at 18.00–20.00.** There is a bus transport from Tampere Hall to Vapriikki at 17.45 and 18.15. Participation requires preregistration.

Museum Centre Vapriikki is settled in a region which used to be the cradle for engineering works of Tampella Ltd. In addition to exhibition spaces, Vapriikki provides facilities for collections, preservation, photo archives, a reference library, an auditorium, education of school children as well as space for research and offices. By the time of the Welcome Reception there is also an exhibition on the history of Tampere.

History

The industrial history of the Tampella area began in the 1840s with a small blast furnace. In 1856, Gustaf August Wasastjerna, the owner of the Seinäjoki iron works, founded a machine shop by the rapids, while Adolf Törngren, Master of Laws, founded a linen mill. Five years later the two merged to form the Tampere Linen and Iron Industry Limited Company (since named Tampella), which had a wide range of production including locomotives, turbines and damask cloths of linen. The textile production ended in the 1970s, and industrial use of the last buildings by the rapids ceased in the 1990s. The Swedish word ‘fabrik’ became the Finnish ‘vapriikki’ in the last century, and the museum centre was named Vapriikki to emphasise the significance of its location in Finnish industrial history.

The oldest parts of Vapriikki were built in the 1880s. The largest exhibition hall, a hundred metres long and sixteen metres high, dates back to the 1910s and 1920s. Factors influencing Vapriikki’s architectural design for museum use included its eventful industrial history and location in the heart of one of the country’s national scenic areas. The purpose of use, clearly different from the past, became the challenging basis for design, which aimed not at converting a factory into a museum or a museum focussing on industry only, but at creating a modern museum building respecting its heritage. The result preserves the basic character of the building, which reflects industrial history.

The construction stage proceeded step by step, while the first facilities opened for the public in 1996. All of the premises were finally completed in 2000.

COCKTAILS

Cocktails will be held at **Tampere Old City Hall on Monday May 30th at 18.00–19.30.** Participation requires preregistration.

History

New renaissance-style Old City Hall is located at the Tampere centre square.The building was designed by Georg Schreck and built in 1890. At the first City Hall was a place for all the main offices and it was used by city administrative court, city court and city police department. City Hall’s assembly hall was also used as a conference room for the city council in the years 1890–1925 and 1962–1975.

In the Civil War in 1918 the building played an important role and it was badly damaged during the last fights. In the middle of 1960s the city of Tampere decided to restore City Hall so that it could be used as premises for social receptions. Whole building was decorated and refurnished.

The major part of City Hall’s valuable art collection, which nowadays covers many famous Finnish artists, is gotten as a donation. These days about 220 ceremonies in a year is taking place in Old City Hall.

SYMPOSIUM BANQUET

Symposium Banquet will take place in **Music Theatre Palace in Tuulensuu Building on Tuesday May 31st at 19.00–02.00.** Participation requires preregistration. Conference guests can bring their spouse to the banquet by informing about it in pursuance of registration.

Night includes a music show by Blues Brothers & Laura Voutilainen and dancing, solo artist Johanna Debreczeni

History

The Tuulensuu Building was erected in 1929 according to the drawings of Bertel Stömmer, the City Architect of Tampere. On its completion, the Tuulensuu Building was the largest multi-storey residential building in Tampere, with the Tuulensuu cinema seating 720 people occupying a large part of it. The imposing building constructed in the neoclassical style features architectural forms dating back to Greco-Roman antiquity both as concerns the basics of composition and principles of organising surfaces. The ornamentation has clearly been influenced by cubism. The cinema with its painstakingly crafted details constitutes an integral part of the whole – its luxurious décor featured e.g. a striking curtain adorned with brass lynxes (the heraldic beast of Häme Province). A live orchestra in the pit in front of the screen accompanied silent films.

Sculptor Väinö Richard Rautalin and stucco plasterer Arvid Nurhonen, both from Tampere, decorated the building. Especially well known are the reliefs around the stage opening, eight on either side consisting of a total of 24 nude women and nine nude men. The reliefs seem to express different moods: joy, sadness, anger, love, jealousy, etc.

The Building served as a cinema until 1991. In October 2008 theatre director Petri Lairikko and writer Katariina Leino opened Music Theatre Palace on the premises. The idea was to combine extravagant musicals and shows with high-class restaurant services into a stylish treat.

BOAT TRIP

Guided boat trip to Viikinsaari island will take place on **Wednesday June 1st at 17.45.** Boat tickets, sauna fee and refreshments are included to the participation fee. Participation requires preregistration. Conference guests can bring their spouse to the trip by informing about it in pursuance of registration.

On Viikinsaari island it is possible to barbeque sausages, swim and to enjoy Finnish sauna. There is also a nice restaurant on the island, where participants can also spend their time.

Departure from Laukontori market place exactly at 18.00 and and return either by oneself or with the group at 22.30. Women can go to sauna at first around 18.30. Return departures from the island always at half past the hour and **the last one at 22.30.**

History

At the beginning of the 19th century Viikinsaari island was owned by Pirkkala Nuoliala village's Nikkilä farm and it was called Kaidesaari island. Then the island became a part of Viikki manor and it was named Viikinsaari island.

Viikinsaari island's restaurant Viikinsaari is one of the oldest restaurants in Tampere. It was designed by an architect Lambert Petterson and built in 1900 after the 1st and 2nd restaurant buildings had been destroyed in fires.



LABORATORY TOUR

Guided tour of the Structural engineering laboratory will be held at **Tampere University of Technology on Thursday 2nd June at 13.15–16.15.** There is a bus transport from Tampere Hall to the laboratory at 13.15 and return at 16.00. Symposium fee includes the laboratory tour. Participation requires preregistration.

At the research unit of Structural Engineering is carried out applied and basic research including product development in collaboration with the building industry. Purposeful research has been conducted in cooperation with the industry for over 20 years and the cooperation has allowed our researchers to gain wide experience and knowledge from various areas of structural engineering.

Approximately 40 researchers work at the research unit of Structural Engineering. About two-thirds of the laboratory's income is derived from commissioned research. This extensive external funding is an indication of the fact that the research activities carried out at the Structural Engineering are very useful to the building industry.

Building physics is one of the main research areas. The building physics research group performs different research and tests associated with hygrothermal performance of envelope assemblies, indoor air quality and energy consumption. Research projects may include many different types of studies and tests tailored for the project in question. Services in building physics can be divided into four main groups: material tests, structural tests, research of buildings and calculation modelling.

SEMINAR FOR PhD-STUDENTS AND YOUNG RESEARCHERS

A seminar for PhD-students and young researchers will be arranged on **Tuesday afternoon 31st May at 13.15–17.00 at Tampere Hall.** The seminar is a networking event where young researchers can meet and be introduced to each others' projects and where good ties are created among participants. Each participant in the seminar will give a short presentation about their project. Participation requires preregistration.

KEYNOTE SPEAKERS

Ingemar Samuelson

Ingemar Samuelson has been working with research and development in Building Physics at SP Technical Research Institute of Sweden from 1977. He has been associated professor at Lund University, the Faculty of Engineering, Department of Building Physics, from 1997 and associated professor at the University of Borås, from 2002. He is head of "FuktCentrum" from 2008. FuktCentrum is a moisture research center comprising three departments at Lund University, one at CTH, one at KTH and one at a department of SP. Assoc. Prof. Samuelson has also been Coordinator of CIB working commission W040, Heat and Moisture Transfer in Buildings 1993 - 2008. Among others he has done extensive work on investigations, development of measures and recommendations for construction in houses with EIFS-walls.

Presentation and highlights

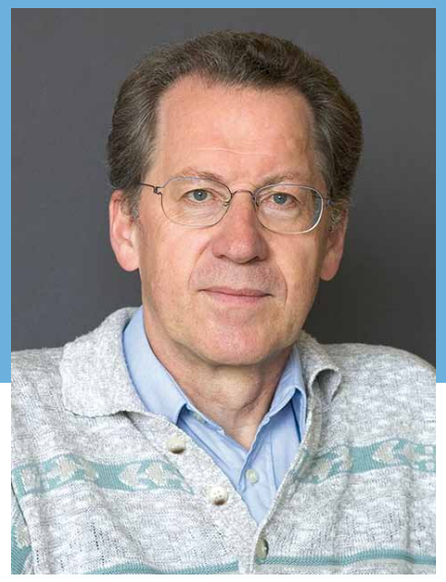
Forty years of Building physics research – for what benefit

• Buildings and their design details have become increasingly complicated in order to meet the requirements for good comfort, energy efficiency and limited costs.

• While building physics research into moisture, moisture transport and the damage caused by moisture has been going on, the actual number of cases of moisture damage seems to have become greater and greater. The more the research, the more damage is found, or so it seems.

• Perhaps we should ask whether we have been looking at the right problem areas, i.e. whether research has been relevant to the needs that exist, and whether the results of the research are finding their way to the building sector.

Svend Svendsen



Svend Svendsen is a professor in Building Energy at the Department of Civil Engineering, Technical University of Denmark, DTU. He started in 1974 his work at DTU on research and teaching in the area of active and passive solar heating including high performance windows and seasonal heat storages. Since he became a professor in 1994 he focused his work on the development of low energy buildings with renewable energy supply in order to realize the total independency of fossil fuels. Prof. Svendsen has been active in many national and international research projects and innovation projects in close cooperation with the building sector. He is leading research groups on Building Energy and Services with 24 faculties, researchers and PhD-students working with development of high performance products and integrated energy design of nearly zero energy buildings.

Presentation and highlights

Low-energy buildings – the basis for realizing the strategy for independency of fossil fuels in 2050

• The EPBD requirements in 2020 of nearly zero energy buildings with no use of fossil fuels can be accomplished by combining low energy buildings with renewable energy supply via low temperature district heating in cities and suburbs and via heat pumps for low density settlements.

• The very big and quick change of the energy performance of buildings is a challenge for the building sector but it can be solved by improving the methods of product developments as well as the methods of designing, constructing and operating buildings by including simulation based analysis and optimization of performances with respect to indoor environment and energy use as well as durability.

• The building sector may be transformed from an experience based sector to a knowledge and research based sector with high quality sustainable products and very good business.

Juhani Pirinen

Juhani Pirinen is a 50 years old moisture and mould inspector. He started as a Director of the Finnish Programme for Moisture and Mould for 2010-2014 in The Ministry of the Environment in December 2010. Earlier he was the Manager of Reconstruction of Moisture and Mould Problem Houses in Pulmonary Association of Finland for eleven years. His background before focusing in mouldy houses was in construction planning and site organising. He has also worked as a teacher in North Carelian University of Applied Sciences.

Dr. Pirinen did his masters degree of polyurethane-elements in 1987, licentiate thesis of constructions' moisture planning history in 1999 and doctoral thesis of small houses' mould problems in 2006 in Tampere University of Technology. He has also a lower level university degree in microbiology.

Presentation and highlights

Building inspections in Finland – fighting against moulds

•A lot of research has been done in building physics during the last two decades, but moisture is continually a huge problem in Finnish houses. About 600 000 – 800 000 Finns are exposed to indoor air mould daily.

• Finnish mould problems can partly be explained by the age of the buildings, because most of them were built in 1960s and 1970s. The renovations have delayed because the owners don't understand that buildings get old.

• There are two approaches to building condition estimations. The conservative one concentrates in building, and the newer approach deals more with the health affects for the inhabitants and the airborne particles and volatile compounds found in the air. These two approaches have mixed together and very rare inspectors can use both ways correctly.

•The field of building inspection is young and “wild” in Finland. The building owners have little understanding about the indoor air problems, so the temptation to hire the cheapest inspector is strong. If the inspections are done wrongly, the results are wrong and the renovation fails.

NSB 2011 – Sessions on Monday 30th May

Monday 8:15–8:45

Symposium Opening

Juha Vinha, Place: Small Auditorium

Monday 8:45–10:00

Keynote session 1, Chair: Juha Vinha, Place: Small Auditorium

Forty years of building physics research – for what benefit?
Ingemar Samuelson

Monday 10:30–12:00, Sessions A1, B1 & C1

Small Auditorium

10:30–12:00

A1 - Air-tightness of buildings Chair: Miimu Airaksinen

Dwelling air-tightness in a 55 years old estate
Hugo Hens

Usability of data from commissioned tests for estimating trends and distribution of air tightness in the building stock
Sverre Bjørn Holøs, Thor-Oskar Relander & Sverre Inge Heimdal

Important factors to achieve an airtight building
Paula Wahlgren

Air tightness of structural elements and internal air leakages in a multi-apartment building
Anu Aaltonen, Kimmo Lähdesmäki & Juha Vinha

Measurements and modelling of airflows in houses using passive sampling and HAM software
Emmanuel Adu Essah

Sopraano conference room

10:30–12:00

B1 - Computational fluid dynamics simulations Chair: John Grunewald

Simulation and Experimental Validation of Chaotic Behavior of Airflow in a Ventilated Room
Jos van Schijndel

Numerical Simulation of Building Components - Towards an Efficient Implementation of Air Convection in HAM-models
Jelle Langmans, Andreas Nicolai, Ralf Klein, John Grunewald & Staf Roels

Influence of ambient air speed on convective heat transfer coefficient at natural convection regime
Peter Mihálka, Milan Držík & Peter Matiašovský

Numerical modeling of wind-induced cavity ventilation for a low-rise building
Kristine Nore, Bert Blocken & Jan Vincent Thue

Influence of wind direction and urban surroundings on natural ventilation of a large football stadium
Twan van Hooff & Bert Blocken

Studio auditorium

10:30–12:00

C1 - Thermal bridge calculations Chair: Berit Time

Evaluation of the thermal bridges of prefabricated concrete large-panel and brick apartment buildings in Estonia
Simo Ilomets, Targo Kalamees & Leena Paap

A Parametric study of the thermal performance of embedded Vacuum Insulation Panels
Kjartan Gudmundsson

New Developments in Mitigation of Thermal Bridges Generated by Light Gage Steel Framing Components
Peter Engelmann, Bryan Urban & Jan Kosny

Arranging Insulation for Better Thermal Resistance in Concrete and Masonry Wall Systems
Bryan Urban, Peter Engelmann, Elisabeth Kossecka & Jan Kosny

Monday 13:15–14:45, Sessions A2, B2 & C2

Small Auditorium

13:15–14:45

A2 - Regulations and air-tightness of constructions Chair: Jan Vincent Thue

Air leakages through cross laminated timber (CLT) constructions
Hans Boye Skogstad, Lars Gullbrekken & Kristine Nore

Recent Changes in the Building Envelope Air Leakage Regulations and Practices in the US
Maria Spinu & Brian Erickson

How to ensure low radon concentrations in indoor environments
Ida Wraber & Torben Valdbjørn Rasmussen

Energy implications of different infiltration models
Matthias Haase

Experimental testing of rain tightness of wind barrier and sealing of window joints
Hans Boye Skogstad, Sivert Uvsløkk & Ola Asphaug

Sopraano conference room

13:15–14:45

B2 - HAM transport in porous material Chair: Thomas Bednar

Towards a Semi-Generic Simulation Framework for Mass and Energy Transport in Porous Materials
Andreas Nicolai & John Grunewald

Hygrothermal behaviour of a hemp concrete wall: influence of sorption isotherm modelling
Yacine Aït Oumeziane, Marjorie Bart, Sophie Moissette, Christophe Lanos, Sylvie Prétot & Florence Collet

Sensitivity analysis of total pressure gradient on wood drying
Kamilia Abahri, Rafik Belarbi, Mahfoud Tahlaiti & Boudjemaa Remki

Studio auditorium

13:15–14:45

C2 - Thermal bridge standards and calculations Chair: Staf Roels

The importance of a common method and correct calculation of thermal bridges
Björn Berggren & Maria Wall

Current calculation rules for thermal bridges and resulting problems for the practical use
Kai Schild, Wolfgang Willems & Georg Hellinger

Practical implementation of a harmonic conductance model in thermal simulation software
Tomasz Kornicki

Sensitivity analyses of thermal bridges: confrontation with the new Belgian EPB-methodology
Marc Delghust, Willem Huyghe & Arnold Janssens

A pragmatic approach to incorporate the effect of thermal bridging within the EPBD-regulation
Staf Roels, Mieke Deurinck, Marc Delghust, Arnold Janssens & Dirk Van Orshoven

Sessions on Monday 30th May

Monday 15:15–16:45, Sessions A3, B3 & C3

Small Auditorium

15:15–16:45

A3 - Validation of calculation methods and results Chair: Carl-Eric Hagentoft

Validation of a coupled CFD-HAM model with a climate chamber experiment on a small wall sample
Marnix Van Belleghem, Marijke Steeman, Arnold Janssens & Michel De Paepe

Experimental validation of two simplified thermal zone models
Pavel Kopecký

Comparison of measured and calculated temperature and relative humidity with varied and constant air flow in the façade air gap
S. Olof Hägerstedt & Lars-Erik Harderup

Comparison of calculated and measured values of wall assembly tests using Delphin 5
Anssi Laukkarinen & Juha Vinha

Importance of moisture transport, snow cover and soil freezing to ground temperature predictions
Huining Xu & Jeffrey D. Spitler

Sopraano conference room

15:15–16:45

B3 - Material properties and determination methods Chair: Phalguni Mukhopadhyaya

Determination of Hygrothermal Properties for Building Materials using Inverse Modeling Techniques
Jos van Schijndel, Sander Uittenbosch & Tom Thomassen

Properties, Requirements and Possibilities for Traditional, State-of-the-Art and Future Thermal Building Insulation Materials and Solutions
Bjørn Petter Jelle, Arild Gustavsen, Berit Time, Hans Boye Skogstad & Arvid Dalehaug

The Effect of Leakage through the Sealant in the Cup Test Method
Elina Manelius & Juha Vinha

Correlation between thermal conductivity and elastic modulus of porous building materials – power law functions of porosity
Peter Matiašovský & Lubomir Bagel

Hygrothermal Properties of Biobased Polyurethane Foam Insulation for Building Envelope Construction
Phalguni Mukhopadhyaya, Tri-Dung Ngo, Minh-Tan Ton-That, Jean-Francois Masson & Gordon Sherrer

Studio auditorium

15:15–16:45

C3 - Energy standards and life-cycle analysis Chair: Svend Svendsen

Sustainability of Polyurethane Thermal Insulation
Pasi Käkelä & Janne Jormalainen

Life Cycle Analysis as an Effective Instrument to find sustainable solutions and identify Energy- as well as Cost Saving Potentials
Frank U. Vogdt & Anika Dittmar

Zero Emission Building Envelopes - Comparison of Different Wall Constructions in a Life Cycle Perspective
Thomas Haavi & Arild Gustavsen

Method for use of economical optimization in design of nearly zero energy buildings
Sanne Hansen & Svend Svendsen

Low-energy buildings in Europe – Building envelope performance and energy standards
Katharina Thullner, Dennis Johansson & Ulla Janson

NSB 2011 – Sessions on Tuesday 31st May

Tuesday 8:45 - 10:00

Keynote session 2, Chair: Anker Nielsen, Place: Small Auditorium

Low energy buildings – the basis for realizing the strategy for independency of fossil fuels in 2050
Svend Svendsen

Tuesday 10:30–12:00, Sessions A4, B4 & C4

Small Auditorium

10:30–12:00

A4 - Roof and floor simulations Chair: Shuichi Hokoi

Cool roofing in cold climates: A contradiction or a potential for energy savings?
Mark Murphy, Steinar Grynning, Bjørn Petter Jelle, Arild Gustavsen & Matthias Haase

Proposal for a modified Glaser-Method for the risk assessment of flat timber roofs
Bernd Nusser, Thomas Bednar & Martin Teibinger

Vapour control design of wooden structures including moisture sources due to air exfiltration
Hartwig M. Künzel, Daniel Zirkelbach & Beate Schafaczek

Frost insulation of the Finnish slab on ground foundation
Miimu Airaksinen & Jorma Heikkinen

Probabilistic analysis of hygrothermal conditions and mould growth potential in cold attics
Carl-Eric Hagentoft & Angela Sasic Kalagasidis

Sopraano conference room

10:30–12:00

B4 - Hysteresis effect Chair: Peter Matiašovský

Inverse analysis of the bound water diffusion coefficient in small samples of wood from sorption tests
Romain Rémond, Giana Almeida & Patrick Perré

Sorption behavior of various lignocellulosic building materials
Giana Almeida, Romain Rémond & Patrick Perré

Critical moisture contents – during water absorption and drying
Peter Matiašovský & Lubomir Bagel

Hysteresis and Temperature Dependency of Moisture Sorption –New Measurements
Carsten Rode & Kurt K. Hansen

Water vapour sorption of building materials – modelling of scanning curves
Olga Koronthalyova

Studio auditorium

10:30–12:00

C4 - Thermal comfort Chair: Lars-Erik Harderup

Potential influence of the heating demand by choice of thermal mass and comfort interval
Fredrik Ståhl

Effect of Energy Renovation on Thermal Sensation and Comfort during Heating Season
Riikka Holopainen & Pekka Tuomaala

Field study of the thermal environment created by a radiant heating system in a detached house for sleep thermal comfort
Christopher Leung & Hua Ge

Evaluating Occupant Comfort in Social Housing Following Building Envelope Upgrades
Kurtis Topping & Philip Parker

Tuesday 13:15–15:00, Sessions A5, B5 & C5

Small Auditorium

13:15–15:00

A5 - Roof solutions in lab and field experiments **Chair: Folke Björk**

Experimental and numerical investigations to compare the thermal performance of IR reflecting insulation and mineral wool
Matthias Kersken & Almuth Schade

A new method for drying out low pitched cold deck roofs
Niels Peter Kloch

Frost Damage in Roof Tiles in Relatively Warm Areas in Japan: Water Absorption and Freezing-Thawing Experiments
Chiemi Iba & Shuichi Hokoi

Application of risk assessment technique to attics
Kimmo Kurkinen & Carl-Eric Hagentoft

Study of the thermal performance of an integrated photovoltaic-thermal hybrid air collector coupled with a ventilation device
Ya Brigitte Assoa, Olivier Flechon, Benjamin Boillot & François Sauzedde

Technical analysis of moisture transfer qualities of mildly sloping roofs
Ari-Veikko Kettunen

Sopraano conference room

13:15–15:00

B5 - Water vapour transport **Chair: Hans Janssen**

Inverse analysis of water vapour transport in building materials using genetic algorithm
Jan Kočí, Jiří Maděra, Jaromír Žumár, Zbyšek Pavlík & Robert Černý

Vapour permeability and water absorption of different exterior paint systems
Ruta Miniotaite

Analysis of the cell wall distribution in a growth ring on the water vapour transport in Spruce wood
Wolfgang Zillig, Dominique Derome & Jan Carmeliet

A transient method for determination of water vapour diffusion coefficient of building materials as function of relative humidity
Zbyšek Pavlík, Jaromír Žumár, Milena Pavlíková, Miloš Jerman & Robert Cerný

Thermal diffusion of water vapour in porous materials: true or false?
Hans Janssen

Studio auditorium

13:15–15:00

C5 - Indoor climate **Chair: Helmi Kokotti**

The influence of external wall thermal mass on indoor air parameters stability
Anatolijs Borodinecs, Baiba Gaujena, Valdis Varavs & Andris Kreslins

Indoor Climate and Humidity Loads in Old Rural Houses with Different Usage Profiles
Üllar Alev, Targo Kalamees & Endrik Arumägi

Sustainable Retrofitting Strategies for Museum Buildings - Development and Assessment of Retrofitting Strategies
Sven Steinbach, Michaela Hoppe, Volker Huckemann, Anke Schenk, Lars Klemm & Heiko Werdin

User behaviour regarding natural ventilation – state of the art and research needs
Christine Mayer & Florian Antretter

Investigation on moisture and indoor environment in eight Danish houses
Kasper Risgaard Jensen, Rasmus Lund Jensen, Jesper Nørgaard, Rasmus O. Justesen & Niels C. Bergsøe

Passive sampling as a method for air exchange measurements for whole building simulation of historic buildings
Ralf Kilian, Stefan Bichlmair, Barbara Wehle & Andreas Holm

Sessions on Tuesday 31st May

Tuesday 15:30–17:15, Sessions A6, B6 & C6

Small Auditorium

15:30–17:15

A6 - ETICS and new wall solutions **Chair: Jesper Arfvidsson**

Hygrothermal behaviour of ETICS – Numerical and experimental study
Eva Barreira & Vasco Peixoto de Freitas

Vacuum Insulated Glass Sandwiches: Assembly, characteristics and application of the new high insulating facade panel
Tanja Skottke & Wolfgang Willems

Development of a moisture safe connection for stud walls
Johan Jönsson & Miklós Molnár

An Innovative Approach to Retrofitting Multi-Unit Residential Buildings Using a Nested Thermal Envelope DesignTM
Marianne Touchie, Kim Pressnail, Russell Richman & Erin Dixon

Heated External Insulation Composite Systems to avoid Biological Defacement
Julia v. Werder, Daniel Kogan, Michael Sack, Helmuth Venzmer & Winfried Malorny

Renovation of a detached single-family house into an energy efficient low energy house
Tine Steen Larsen, Steffen Maagaard & Rasmus Lund Jensen

Sopraano conference room

15:30–17:15

B6 - Material damages and durability **Chair: Stig Geving**

Effect of variable hygro-thermal conditions on chemical degradation of concrete structures due to alkali-silica reaction
Dariusz Gawin, Francesco Pesavento, Witold Grymin & Mateusz Wyrzykowski

Setpoint control for air heating in a church to minimize moisture related mechanical stress in wooden interior parts
Henk Schellen & Jos van Schijndel

Non-uniform moisture influence on multilayer corrugated plywood shell
Jānis Šliseris & Kārlis Rocēns

Influence of moisture sorption on deformations of building materials
Ruta Miniotaite

Characterization of damage-induced evolution of building materials hygric properties
Simon Rouchier, Monika Woloszyn, Geneviève Foray & Jean-Jacques Roux

Studio auditorium

15:30–17:15

C6 - Cooling and other low energy systems **Chair: Angela Sasic Kalagasidis**

A study on the integration of upgraded weather forecast in a predictive control of building cooling systems
Angela Sasic Kalagasidis

Exergy analysis of cooling systems and strategies
Marco Molinari & Petra Karlström

Relevance of modelling insulation layer in ground storage system design
Alberto Lazzarotto

Low Exergy Systems for High-Performance Buildings and Communities
Dietrich Schmidt & Guðni Jóhannesson

Development of a quasi-steady-state assessment method of night cooling
Hilde Breesch, Kim Goethals & Arnold Janssens

Evaluation of the applicability of the quasi-steady-state overheating indicator for offices and schools
Kim Goethals & Arnold Janssens

NSB 2011 – Sessions on Wednesday 1st June

Wednesday 8:45–10:00

Keynote session 3, Chair: Ralf Lindberg, Place: Small Auditorium

Building inspections in Finland – fighting against moulds
Juhani Pirinen

Wednesday 10:30 - 12:00, Sessions A7, B7 & C7

Small Auditorium

10:30–12:00

A7 - Walls in field measurements Chair: Monika Woloszyn

Infrared measurements on a ventilated cladding for assessing its surface temperature and heat transfer calculation
Matthieu Labat, Geraldine Garnier, Monika Woloszyn & Jean Jeacques Roux

Rehabilitation of basement walls with moisture problems by the use of vapour open exterior thermal insulation
Stig Geving, Marius Kvalvik & Espen Martinsen

Long-term measurement and hygrothermal simulation of an interior insulation consisting of reed panels and clay plaster
Paul Wegerer & Thomas Bednar

Moisture and mould in prefabricated timber frame constructions during production until enclosure of the house
Lars Olsson, Kristina Mjörnell & Pernilla Johansson

Sopraano conference room

10:30–12:00

B7 - Moisture problems and design solutions Chair: Juhani Pirinen

Methods for investigation of technical status before renovation and evaluation of renovation measures for the building envelope
Kristina Mjörnell, Thorbjörn Gustavsson & Angela Sasic Kalagasidis

Interior Mould Growth Risk Reduction - Application of Nonlinear Programming for Envelope Optimisation
Nuno Ramos, Isabel Ribeiro, João Delgado, Vasco Peixoto de Freitas & Teresa Esteves

Rising damp, a reoccurring problem in basements – a case study with different attempts to stop the moisture
Eva Birgit Møller & Birgit Olsen

Testing methods for moisture content in concrete, dealing with floor coverings: State-of-the-Art in Finland
Sami Niemi & Juha Komonen

Studio auditorium

10:30–12:00

C7 - Energy efficiency in office buildings Chair: Juhani Heljo

The potential for energy efficient building design - differences between Europe and the Arctic
Petra Vladykova & Carsten Rode

Validation and Analysis of Energy Performance Using Dynamic Simulations and Comparisons with Detailed Measurements
Azra Korjenic, Tanja Höfer, Christoph Deseyve & Thomas Bednar

Impact of Outdoor Climate and Life Style on the Total Energy Use in Office Buildings
Markus Leeb, Christoph Deseyve, Tanja Höfer, Azra Korjenic & Thomas Bednar

Evaluating effects of different scenarios in the design phase on the carbon footprint of an office building
Pellervo Matilainen & Miimu Airaksinen

Wednesday 13:15–14:45, Sessions A8, B8 & C8

Small Auditorium

13:15–14:45

A8 - Wall simulations **Chair: Hua Ge**

Assessment of the Risk for Mold Growth in a Wall Retrofitted with Vacuum Insulation Panels
Pär Johansson

Is ventilation of timber façades essential?
Daniel Kehl, Severin Hauswirth & Heinz Weber

A numerical study of the hygrothermal performance of capillary active interior insulation systems
Evy Vereecken & Staf Roels

Walls with Rising Damp Problems: Predicting Water Capillary Rise
Ana Sofia Guimarães, João Quesado Delgado & Vasco Peixoto de Freitas

Considerations to the hygrothermal behavior of exterior walls in timber frame construction with direct rendering
Britta Rosenau

Sopraano conference room

13:15–14:45

B8 - Moisture problems and technical solutions **Chair: Matti Pentti**

Humidity Control in Historic Buildings through Adaptive Ventilation - A Case Study
Tor Broström, Carl-Eric Hagentoft & Magnus Wessberg

Evaluation of the climate for conservation of the adoration of the mystic lamb in the St. Bavo Cathedral in Ghent
Lien De Backer, Marnix Van Belleghem, Marijke Steeman, Arnold Janssens & Michel De Paepe

Control strategies for demand controlled ventilation in dwellings
Toke Rammer Nielsen & Christian Drivsholm

The hygrothermal performance in Hellerup Church, Denmark
Poul Klenz Larsen

Studio auditorium

13:15–14:45

C8 - Energy efficiency in schools and day-care buildings **Chair: Guðni Jóhannesson**

Evaluation and Parametric Optimization of the Heating Load and Comfort Conditions in a School Building
Ricardo Almeida & Vasco Peixoto de Freitas

Implementation of realistic boundary conditions – analysis of their effect on the net annual heating demand in passive schools
Barbara Wauman, Hilde Breesch & Dirk Saelens

Simulation as a Tool for Optimizing Energy Demand of Rooms as a Part of the Strategy "Towards Green Campuses in Egypt"
Mina Michel Samaan, Ahmed Nabih Ahmed, Osama M.A. Farag & Magdi El-Sayed Khalil

Investigation of ventilation strategies for the day-care institutions
Olena Kalyanova Larsen, Alireza Afshari & Per Heiselberg

Energy-Surplus Day-care Centre for Children
Michaela Hoppe, Anna Hoier, Hans Erhorn & Bernhard Asböck

Sessions on Wednesday 1st June

Wednesday 15:15–16:45, Sessions A9, B9 & C9

Small Auditorium

15:15–16:45

A9 - Walls in lab tests **Chair: Ingemar Samuelson**

Rising Damp in Historic Buildings: The Wall Base Ventilation System
Ana Sofia Guimarães, João Quesado Delgado & Vasco Peixoto de Freitas

Hygrothermal response of highly insulated timber frame walls with an exterior air barrier system: laboratory investigation
Jelle Langmans, Ralf Klein & Staf Roels

Tensile cracking of ventilated rendered rain-screen cladding systems
Miklós Molnár, Carl-Magnus Capener, Johan Jönsson & Kenneth Sandin

An experimental method for assessing heat and moisture response of a massive timber wall exposed to summer climatic conditions
Helisoa Rafidiarison, Eric Mougel & Alexis Nicolas

Water penetration through clay brick veneer wall
Vera Straka

Sopraano conference room

15:15–16:45

B9 - Effects of climate change simulations **Chair: Jos van Schijndel**

Modeling multiple indoor climates in historic buildings due to the effect of climate change
Jos van Schijndel, Henk Schellen & Marco Martens

Effect of hot weather periods in moderate climate regions on approach to slab thermal design in residential buildings
Anna Staszczuk, Tadeusz Kuczyński & Jan Radoń

Computational modelling of the impact of climate change on the indoor environment of a historic building in the Netherlands
Zara Huijbregts, Rick Kramer, Jos van Schijndel & Henk Schellen

Mould Growth inside an Attic concerning Four Different Future Climate Scenarios
Vahid Nik

An approach to assess future climate change effects on indoor climate of a historic stone church
Florian Antretter, Teresa Schöpfer & Ralf Kilian

Studio auditorium

15:15–16:45

C9 - Windows and solar shadings **Chair: Jarek Kurnitski**

Solar Shading Systems and Thermal Performance of Windows in Nordic Climates
Steinar Grynning, Arild Gustavsen & Berit Time

Energy savings potential with electrochromic switchable glazing
Mark Murphy, Arild Gustavsen, Bjørn Petter Jelle & Matthias Haase

Assimilation of solar heat gains in residential buildings
Hans Bagge

Heat transfer in ventilated double facades with obstructions
Matthias Haase

Assessment of solar shading systems for building envelopes
Leonardo Marques Monteiro & Anesia Barros Frota

Thursday 8:30–10:00, Sessions A10, B10 & C10

Small Auditorium

8:30–10:00

A10 - Simulation methods and snow-on-roof models **Chair: Targo Kalamees**

Snow melting and freezing on older townhouses
Anker Nielsen & Johan Claesson

Drying out capacity and snow melting risk for ventilated wooden roofs - a parameter study
Sivert Uvsløkk

Application of ADI Splitting Methods to Two-Dimensional Building Envelope System Solvers
Anne Paepcke, Andreas Nicolai & John Grunewald

An Extensible Calculation Framework for Climate Data and Boundary Conditions
Stefan Vogelsang & Andreas Nicolai

Performance Assessment of Interior Insulations by a Stochastic Method
Jianhua Zhao, Rudolf Plagge & John Grunewald

Sopraano conference room

8:30–10:00

B10 - Mould growth models **Chair: Hannu Viitanen**

Mould growth on building materials in laboratory and field experiments
Kimmo Lähdesmäki, Kati Salminen, Juha Vinha, Hannu Viitanen, Tuomo Ojanen & Ruut Peuhkuri

Classification of material sensitivity – New approach for mould growth modeling
Tuomo Ojanen, Ruut Peuhkuri, Hannu Viitanen, Kimmo Lähdesmäki, Juha Vinha & Kati Salminen

Modelling reliability of structure with respect to incipient mould growth
Krystyna Pietrzyk, Ingemar Samuelson & Pernilla Johansson

m-model: a method to assess the risk for mould growth in wood structures with fluctuating hygrothermal conditions
Åse Togerö, Charlotte Svensson Tengberg & Bengt Bengtsson

Mould Growth in Attics and Crawlspaces
Pernilla Johansson, Gunilla Bok & Annika Ekstrand-Tobin

Studio auditorium

8:30–10:00

C10 - Energy efficiency in residential buildings **Chair: Vasco Peixoto de Freitas**

Natural ventilation around open ground floor with pilotis in highrise residential buildings in tropical areas
Abdul Razak Sapian, Noor Hanita Abdul Majid & Shuichi Hokoi

Holistic energy retrofitting of multi-storey building to low energy level
Martin Morelli, Henrik M. Tommerup, Morten K. Tafdrup & Svend Svendsen

Costs of retrofit measures in the Swedish residential building stock – an evaluation for three scenarios on future energy prices
Érika Mata, Angela Sasic Kalagasidis & Filip Johnsson

The impact of physical rebound effects on the heat losses in a retrofitted dwelling
Mieke Deurinck, Dirk Saelens & Staf Roels

Analyses of sustainability and environmental impacts of steel framed buildings – Example from practice in Romania
Viorel Ungureanu, Adrian Ciutina & Dan Dubina

Sessions on Thursday 2nd June

Thursday 10:30–12:00, Sessions A11, B11 & C11

Small Auditorium

10:30–12:00

A11 - Night-time cooling and moisture buffering experiments **Chair: Hugo Hens**

Humidity buffering of building interiors by absorbent materials
Tim Padfield & Lars Aasbjerg Jensen

Initial development of a combined PCM and TABS solution for heat storage and cooling
Michal Pomianowski, Per Heiselberg & Rasmus Jensen

Experimental investigation of the influence of different flooring emissivity on night-time cooling using displacement ventilation
Jérôme Le Dréau, Line Karlsen, Michal Litewnicki, Lars Michaelsen, Anders Møllerskov, Håkon Ødegaard, Louise Svendsen, Rasmus Lund Jensen, Anna Marszal

Experimental investigation of the influence of obstacle in the room on passive night-time cooling using displacement ventilation
Michal Pomianowski, Farzad Khalegi, Giedrius Domarkas, Jonas Taminskas, Karol Bandurski, Kit Madsen, Søren Gedsø, Rasmus Jensen

Experimental investigation of the heat transfer in a room using night-time cooling by mixing ventilation
Rasmus Lund Jensen, Jesper Nørgaard, Ole Daniels, Rasmus O. Justesen, Morten S. Madsen, Kenneth B. Mikkelsen & Claus Topp

Sopraano conference room

10:30–12:00

B11 - Durability of structures **Chair: Jón Sigurjónsson**

Influence of Climate Change to Concrete Buildings – Preliminary study
Jukka Lahdensivu, Hanna Tietäväinen & Pentti Pirinen

Building Envelope Commissioning for Extreme Climates
David de Sola, Kevin D. Knight & Bryan J. Boyle

Deterioration of building envelope of wooden apartment buildings built before 1940 based on external survey
Paul Klõšeiko, Tõnis Agasild & Targo Kalamees

Modelling of service life and durability of wooden structures
Hannu Viitanen, Tomi Toratti, Lasse Makkonen, Sven Thelandersson, Tord Isaksson, Eva Früwald, Jöran Jermer, Fin Englund & Ed Suttie

Designing Single-ply Membrane “Cool Roof” Systems for Service and Durability
Thomas Hutchinson

Studio auditorium

10:30–12:00

C11 - Energy efficiency in single-family houses **Chair: Carsten Rode**

Integrating Renewable Energy Generation through Demand-Side-Management
Kai Morgenstern, Herena Torio & Christina Sager

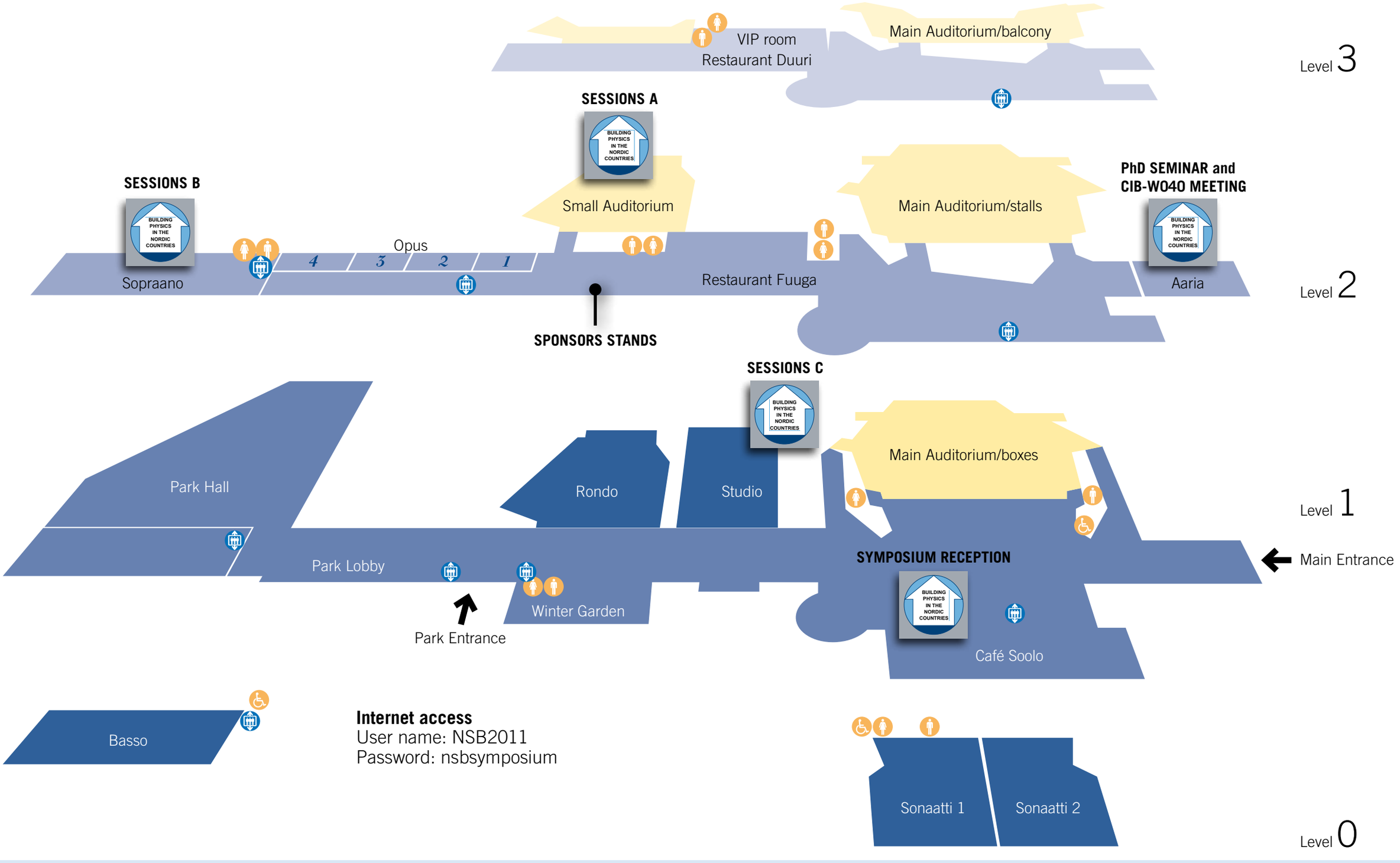
A Low-energy Building under Arctic Conditions - Experiences After Five Years of Operation
Carsten Rode, Petra Vladykova & Martin Kotol

Net zero-energy family house – simple approach and built example
Jan Tywoniak & Kamil Staněk

Implementing zero energy buildings in harsh Nordic climate conditions
Janne Jormalainen

12:00 - 12:15 Small Auditorium **Symposium Closing** Juha Vinha

Tampere Hall



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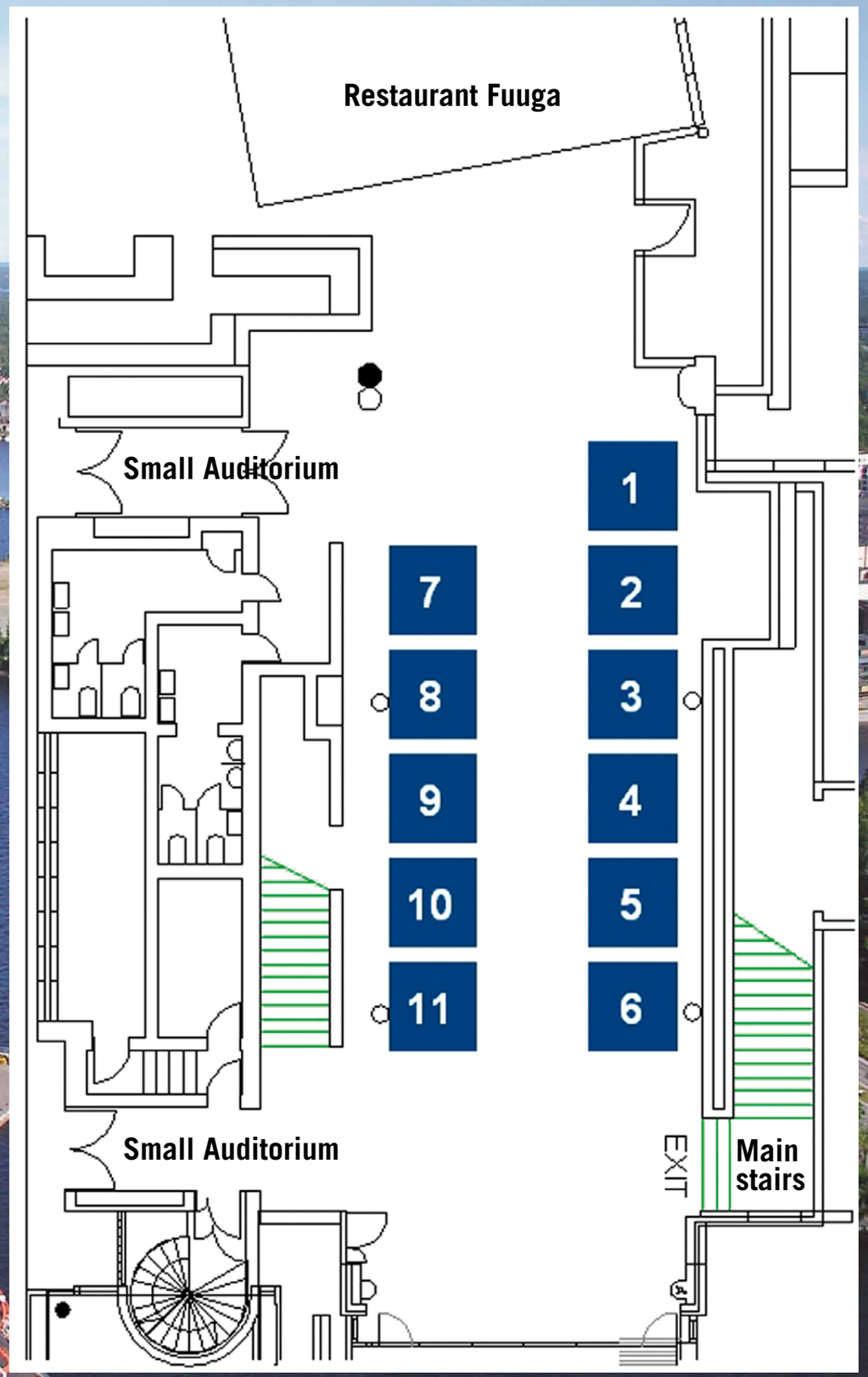

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