

Cold Climate HVAC 2018

**The 9th International Cold Climate Conference
Sustainable new and renovated buildings in cold climates
Kiruna – Sweden 12-15, March 2018**





Welcome to Kiruna and the Cold Climate HVAC 2018 conference!

Dennis Johansson

Conference Chair

Lund University

Building Services

dennis.johansson@hvac.lth.se

Hans Bagge

Conference Co-Chair

Lund University

Building Physics

hans.bagge@byggtek.lth.se

Åsa Wahlström

Senior Advisor

Lund University

Building Services

asa.wahlstrom@hvac.lth.se





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Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
12:00 - 16:00 Pre conference tour	8:00 - 9:30 Bussride to mine Keynote speakers Guided tour	Keynote speaker	Fieldtrip	9:00 - 13:30 Post conference Outdoor activities Lunch
15:00 - 16:30 Meet and greet	9:30 - 10:00 10:00 - 12:00	Coffe, exhibition Paper sessions	Coffe, exhibition Paper sessions	
17:00 - 17:15 Opening	12:00 - 13:00 13:00 - 14:30	Lunch, exhibition Paper sessions	Lunch, exhibition Paper sessions	14:00 - 23:00 Post conference tour Abisko Guided Tour Aurora Hunting
17:15 - 19:00 Keynote speakers	14:30 - 15:00 15:00 - 17:00	Coffe, exhibition Fieldtrip Icehotel	Coffe, exhibition Keynote speaker	
19:00 - late Welcome reception		Scientific committe dinner	Conference dinner	



Monday

12:00 – 16:30 Pre conference tour to Esrange space center (Separate registration required)



15:00 – 17:00 Meet & Greet at Scandic Ferrum

17:00 Opening, Nåjdens sal, Kirunas Folkets Hus

17:15 Keynote speaker: Lars Bäckström – Head of Urban Development, Kiruna Municipality

Lars will be presenting some general information about Kiruna and the business life in Kiruna and the ongoing city transformation due to the expanding iron ore mine.

18:00 Keynote speaker: Kristina Mjörnell – Business and innovation area manager for Sustainable Cities and Communities, RISE Research Institutes of Sweden, Adjunct Professor in Building Physics, Lund University.

Kristina will be presenting transdisciplinary aspects on renovation in cold climates.

19:00 – 21:00 Welcome reception at Kiruna City Hall, Busses leave from Scandic Ferrum





Tuesday

Group 1

8:00 Bus leaves from Scandic Ferrum to the Iron ore mine.

8:30 Guided tour

9:30 Keynote speaker: Ulf Svennemyr and Håkan Ylvin – Project managers, Sweco
Ulf and Håkan will be presenting experiences from relocation of heritage buildings due to the expanding iron ore mine in Kiruna.

10:30 Bus leaves to Scandic Ferrum

Group 2

9:00 Bus leaves from Scandic Ferrum to the iron ore mine

9:30 Keynote speaker: Ulf Svennemyr and Håkan Ylvin – Project managers, Sweco
Ulf and Håkan will be presenting experiences from relocation of heritage buildings due to the expanding iron ore mine in Kiruna.

10:30 Guided tour

11:30 Bus leaves to Scandic Ferrum

11:30 Lunch at Scandic Ferrum

13:00 – 14:30 Parallel paper sessions, detailed program on next page

- Renovation of buildings

- Building simulation

- Indoor environment and health

14:30 – 15:00 Afternoon coffee, exhibition

15:00 – 17:00 Parallel paper sessions, detailed program on next page

- Efficient HVAC components, Energy and power efficiency and low energy buildings

- Buildings in operation

- Moisture safety and water damage, Trans disciplinary connections and social aspects



Renovation of buildings

Room: 1, Chair: Kristina Mjörnell

Building simulation

Room: 2, Chair: Jesper Arvidsson

Indoor environment and health

Room: 3, Chair: Lars-Erik Harderup

13:00	1111: Energy Efficient Construction Materials for Cold Climate Homes Gül Nihal Gügöl	1121: Assessment of thermal bridging heat loss by means of the infrared thermography technique Malgorzata O'Grady, Agnieszka Lechowska, Jacek Schnotale, Annette Harte	1131: Assessment of indoor air quality and hygrothermal conditions of boarders during autumn, winter and spring in two of Estonian straw-bale houses Jane Raamets, Aime Ruus, Mari Ivask
13:18	1112: Tenants' priority of renovation measures and their willingness to pay higher rent to implement these Kristina Mjörnell, Carolina Hiller	1122: An Evaluation on the Effect of Window Shading on Thermal Mass to Reduce Overheating Carlos Jimenez-Bescos	1132: Study on the Concentration Level and Influence Factors of the Indoor Particles in the Office Building Liang Yu, Ji Jia
13:36	1113: Upgrading of a Typical Norwegian Existing Wooden House According to the EnerPHit-Standard Bozena Dorota Hrynyszyn, Laurina Cornelia Felius	1123: Method for probabilistic energy calculations – Passive house case study Stephen Burke, Johnny Kronvall, Magnus Wiktorsson, Per Sahlin, Anders Ljungberg	1133: Investigating recommended temperature zones and clothing assumptions in the assessment of classrooms' thermal environment Despoina Teli, Jan-Olof Dalenbäck
13:54	1114: Adding glazing as an energy saving renovation measure in cold climates Birgitta Nordquist, Kimmo Hillaaho, Petter Wallenten	1124: Validation of a zonal model to capture the detailed indoor thermal environment of a room heated by a wood stove Martin Thalfeldt, Laurent Georges, Øyvind Skreiberg	1134: Indoor temperature variations in Swedish households: implications for thermal comfort Despoina Teli, Sarka Langer, Lars Ekberg, Jan-Olof Dalenbäck
14:12	1115: The most cost-effective energy solution in renovating a multi-family house Elaheh Jalilzadehazhari, Krushna Mahapatra	1125: TEKNOsim 6 Test Results according to CIBSE TM33 Tests for Software Accreditation and Verification Marwan Abugabbara, Saqib Javed	1135: Wood as an exposed building material for indoor climate adaptation Kristine Nore, Dimitrios Kraniotis

Efficient HVAC components

Energy and power efficiency and low energy buildings

Room: 1, Chair: Jan-Olof Dahlenbäck

Buildings in operation

Room: 2, Chair: Martin Kotol

Trans disciplinary connections and social aspects

Moisture safety and water damage

Room: 3, Chair: Paula Femenias

15:00	1211: Passive house construction above the Arctic Circle Stefan Dehlin, Catrin Heincke, Peter Koskinen	1221: Inverse model identification of the thermal dynamics of a Norwegian zero emission house Pierre Vogler-Finck, John Clauß, Laurent Georges, Igor Sartori, Rafael Wisniewski	1231: Determination of Maximum Moisture Zone on Enclosing Structures Владимир Гагарин, Владимир Козлов, Кирилл Зубарев
15:18	1212: In-situ thermal resistance testing of a high performance building envelope in the Canadian Arctic Carsen Banister, Michael Swinton, Travis Moore, Dennis Kryz	1222: Sustainable architecture in northern subarctic and arctic climate Ulf Nordwall, Thomas Olofsson	1232: Moisture Safety of Tall Timber Facades Joakim Norén, Anna Pousette, Karin Sandberg
15:36	1213: Energy consumption of a high performance building envelope in the Canadian Arctic Carsen Banister, Michael Swinton, Travis Moore, Dennis Kryz	1223: When buildings become intelligent – a network analysis of building automation, operation and competencies Marianne Forman, Nils Lykke Sørensen	1233: Business model analysis of Geo-TABS buildings with predictive control systems Qian Wang, Suleyman Dag
15:54	1214: Sol-air thermometer measurement of heat transfer coefficient at building outdoor surfaces Anders Ohlsson, Ronny Östin, Thomas Olofsson		1234: Atrium in residential buildings – a design to enhance social interaction in urban areas in Nordic climates Itai Danielski, Malin Krook, Kerstin Veimer
16:12	1215: What should the minimum ventilation rate be in a Demand Controlled Ventilation strategy? Mads Mysen, Aileen Yang, Sverre Holøs, Kari Thunshelle, Peter Schild	1225: Does the Obligatory Ventilation Control fulfill its Purpose? Kristina Fyhr, Caroline Markusson, Svein Ruud	1235: Comparative evaluation of residents perspectives on household energy use based on housing tenure: survey results from Northern Sweden Gireesh Nair, Thomas Olofsson, Annika Nordlund, Christine Hudson
16:30	1216: Dynamic thermal performance and controllability of dry fan-coil unit Taha Arghand, Anders Trüschel, Saqib Javed, Jan-Olof Dalenbäck	1226: Evaluation study of the performance of dual core energy recovery system for dwellings in the Arctic Boualem Ouazia, Ganapathy Gnanamurugan	1236: Black Carbon Concentrations Inside and Outside Occupied Residences Aneta Wierzbicka, Hamza Licina, Yuliya Omelekina, Patrik T. Nilsson, Anders Gudmundsson



Wednesday

8:00 Keynote speaker: Arne Bergh – Creative Director, ICEHOTEL, Jukkasjärvi

Arne will talk about the icehotel and the new design and construction of ICEHOTEL 365, a new year round icehotel.

9:30 – 10:00 Morning coffee, exhibition

10:00 – 11:30 Parallel paper sessions

Energy and power efficiency and low energy buildings
Heat pump and geothermal systems
Buildings in operation, Building simulation

11:30 Lunch at Scandic Ferrum

13:00 – 14:30 Parallel paper sessions

Renovation of buildings
District and city energy systems
Building simulation

14:30 – 15:00 Afternoon coffee, exhibition

Fieldtrip to Icehotel Jukkasjärvi, guided tour.

Group A: Bus leaves Scandic Ferrum 15:00, bus leaves Icehotel 17:00

Group B: Bus leaves Scandic Ferrum 15:30, bus leaves Icehotel 17:30

Group C: Bus leaves Scandic Ferrum 16:00, bus leaves Icehotel 18:00

Conference dinner at Camp Ripan (separate registration required) busses leave Scandic Ferrum 18:30



Energy and power efficiency and low energy buildings

Room: 1, Chair: Jutta Schade

Heat pump and geothermal systems

Room: 2, Chair: Saqib Javed

Buildings in operation
Building simulation

Room: 3, Chair: Ulla Janson

10:00	2111: Increasing buildings automation systems efficiency with real-time simulation through improved machine self-learning algorithms Andris Krūmiņš, Nikolajs Bogdanovs, Romualds Belinskis, Kristīne Mežale, Mīks Garjāns	2121: Design of Horizontal Ground Heat Exchangers in Sub-Arctic Conditions Robbin Garber-Slaght, Jeffrey Spitler	2131: Vertical temperature gradients in apartments with hydronic radiator heating Mats Dahlblom, Birgitta Nordquist, Petter Wallentén, Lars-Erik Harderup, Lars Jensen
10:18	2112: Analysis of various ventilation solutions for residential and non-residential buildings in Latvia and Estonia Jurgis Zemītis, Anatolijs Borodinecs, Kalamees Targo	2122: Baby, It's Cold Outside: Lessons Learned From Geothermal Heat Pump Installations in the United States Katherine Johnson	2132: Renovation of an office building with prefabricated wooden element - Case Hedensbyn Karin Sandberg, Anders Gustafsson, Mohsen Soleimani-Mohseni
10:36	2113: Performances of gas-water direct-contact heat transfer Feng Li, Lin Duanmu, Lin Fu, Xiling Zhao	2123: Artificial Neural Network Analysis of the Solar-Assisted Heat Pumps Performance for Domestic Hot Water Production Alireza Zendejboudi, Xianting Li, Siyuan Ran	2133: How to extend the service-life of a school building Antti Knuuti
10:54	2114: Impacts of Energy Efficient Constant Output Heating on the Moisture Conditions of Unoccupied Summer Cottages in Finland Juha Vinha, Jarkko Piironen, Mihkel Kiviste	2124: Evaluation of Two Ground Source Heat Pump Systems in Nearly Zero Energy Buildings Caroline Haglund Stignor, Ola Gustafsson, Jon Persson	2134: A Net ZEB case study – Experiences from freezing in ventilation heat exchanger and measured energy performance Björn Berggren
11:12	2115: Setback efficiency of limited-power heating systems in cold climate Tuule Mall Kull, Raimo Simson, Jarek Kurnitski	2125: Cold Climate Heat Pump using Tandem Vapor-Injection Compressors Bo Shen, Omar Abdelaziz, Van Baxter, Edvard Vineyard	2135: Real Time Measurement of Dynamic Metabolic Factor (D-MET) Jakub Wladyslaw Dziedzic, Da Yan, Vojislav Novakovic
11:30	2116: Experimental comparison of performance between single and dual core energy recovery ventilation systems Boualem Ouazia, Ganapathy Gnanamurugan, Chantal Arseneault, Heather Knudsen		2136: How does low relative humidity affect perceived air quality, thermal comfort and symptoms in modern office buildings in cold climates? Merethe Lind, Sverre Holøs, Kari Thunshelle, Aileen Yang, Mads Mysen

Renovation of buildings

District and city energy systems

Building simulation

Room: 1, Chair: Thomas Olofsson

Room: 2, Chair: Leif Gustavsson

Room: 3, Chair: V.G. Gagarin

13:00	2211: Operational characterisation of neighbourhood heat energy after large-scale building retrofit Paul Beagon, Fiona Boland, James O'Donnell	2221: Smart EV Charging Systems to Improve Energy Flexibility of Zero Emission Neighbourhoods - A state-of-the-art for Norway Åse Lekang Sørensen, Inger Andresen, Igor Sartori	2231: Impacts of common simulation assumptions in Sweden on modelled energy balance of a multi-family building Ambrose Doodoo, Uniben Tettey, Leif Gustavsson
13:18	2212: Potentials and challenges for integrating PV in roof renovation of multi-residential houses – a questionnaire survey Liane Thuvander, Paula Femenias, Johan Gren, Peter Kovacs	2222: Hydronic Heating Pavement with Low Temperature: The Effect of Pre-Heating and Fluid Temperature on Anti-icing Performance Raheb Mirzanamadi, Carl-Eric Hagentoft, Pär Johansson	2232: A comparison between four dynamic energy modeling tools for simulation of space heating demand of buildings Amir Vadiee, Ambrose Doodoo, Leif Gustavsson
13:36	2213: Improving the indoor climate and energy saving in renovated apartment buildings in Estonia Anti Hamburg	2223: Life City - A Climate-Conscious Concept for Smart and Sustainable Built Environment Jussi Rönty, Paula Ala-Kotila, Riikka Holopainen	2233: Fast simulation platform for retrofitting measures in residential heating Philipp Schütz, Rossano Scoccia, Damian Gwerder, Remo Waser, David Sturzenegger, Peru Elguezabal, Benat Arregi, Marcello Aprile, Jörg Worlitschek
13:54	2214: Building Refurbishment from a Life Cycle Perspective -An Environmental Return on Investment Approach Helena Nydahl, Staffan Andersson, Anders Åstrand, Thomas Olofsson	2224: Energy Pathways for Future Residential Building Areas in Norway Natasja Nord, Ola Skrautvol, Stian Fossmo Eliassen	2234: Calibration of a high-resolution dynamic model for detailed investigation of the energy flexibility of a zero emission residential building John Clauß, Pierre Vogler-Finck, Laurent Georges
14:12	2215: Optimizing the life cycle costs of building components with regard to energy renovation Abolfazl Sousanabadi Farahani, Jan-Olof Dalenbäck	2225: Assessing the potential of energy retrofitting and renewables in the campus of Lund University Vahid Nik	2235: Simulation of Ventilation Rates and Heat Losses during Airing in Large Single Zone Buildings in Cold Climates Abolfazl Hayati, Jan Akander, Magnus Mattsson



Thursday

8:00 – 9:30 Parallel Fieldtrips

- Study visit to the mine ventilation system
- Study visit to the new city hall
- Architectural tour

9:30 – 10:00 Morning coffee, exhibition

10:00 – 11:30 Parallel paper sessions

- Renovation of buildings
- Other aspects of buildings in cold climates
- Codes, regulations, standards and policies

11:30 Lunch at Scandic Ferrum

13:00 – 14:30 Parallel paper sessions

- Energy and power efficiency and low energy buildings
- Heat pump and geothermal systems, Construction management

14:30 – 15:00 Afternoon coffee, exhibition

15:00 -17:00 Keynote speaker: William Semple, Architect, University of Alberta, NORDEC Consulting and Design, Ottawa

William will talk about Environmental and Cultural Sustainability in the Canadian North:
Engaging Indigenous Communities in the Design and Construction of Energy Efficient
Culturally Appropriate Northern Housing

Closing



Renovation of buildings

Other aspects of buildings in cold climates

Codes, regulations, standards and policies

Room: 1, Chair: Cao Guangyu

Room: 2, Chair: Targo Kalamees

Room: 3, Chair: Jarek Kurnitski

10:00	3111: The challenge of energy efficiency in Kiruna's heritage buildings Andrea Luciani, Sofia Lidelöw, Shimantika Bhattacharjee, Tomas Örn	3121: User related input data for building energy usage calculations of low energy schools in Sweden Branko Simanic, Dennis Johansson, Birgitta Nordquist, Hans Bagge	3131: Needs of support for Swedish property owners to implement more energy-efficiency improvements during renovations Åsa Wahlström
10:18	3112: Renovating the housing stock built before 1945: Exploring the relations between energy efficiency, embodied energy and heritage values Paula Femenias, Liane Thuvander, Pär Johansson, Paula Wahlgren, Petra Eriksson	3122: Sensitivity analysis of melting and freezing of snow on roof Anker Nielsen	3132: Criteria for Sustainable Buildings in Sweden Åsa Wahlström, Catarina Warfvinge
10:36	3113: How low can the district heating supply temperature be in residential neighborhoods in Norway? Maria Justo Alonso, Igor Sartori	3123: The method of determining climatic loads on the enclosing structures taking into account global climate change Dmitry Zheldakov, Vladimir Gagarin	3133: Normalisation of measured energy use in buildings – a review of the Swedish regulations Maria Wall, Henrik Davidsson, Niko Gentile, Björn Berggren
10:54	3114: An assessment of the QUB/e method for fast in situ measurements of the thermal performance of building fabrics in cold climates Johann Meulemans	3124: Determination of Clay-Sand Plaster Hygrothermal Performance: Influence of Different Types of Clays on Sorption and Water Vapour Permeability Erik Altmäe, Aime Ruus, Jane Raamets, Ernst Tungal	3134: Environmental sustainability building criteria for an Open Classification System Nicolas Francart, Eje Sandberg, Martin Erlandsson, Björn Berggren
11:12	3115: Challenges in transdisciplinary research - example from a study on people as part of energy and ventilation systems in residential buildings (PEIRE) Eja Pedersen, J. Borell, H. Caltenco, M. Dahlblom, C. Gao, L.E. Harderup, Y. Li, B. Nordquist, K. Stålné, P. Wallentén, A. Wierzbicka	3125: Hygrothermal Performance of Timber External Walls Insulated with Natural and Industrial Materials Martti-Jaan Miljan, Jaan Miljan	3135: Review of Current Practice of Building Foundations in the Canadian North Christine Harries

Energy and power efficiency and low energy buildings

Room: 1, Chair: Boualem Ouazia

Heat pump and geothermal systems

Construction management

Room: 2, Chair: Jeffrey Spitler

Indoor environment and health

Room: 3, Chair: Olli Seppänen

13:00	3211: Integration of BIPV/T system with HRV for improved performance under extreme cold climates Riccardo Toffanin, Hua Ge	3221: Detailed performance assessment of variable capacity inverter-driven cold climate air source heat pumps Jeremy Sager, Tom Mackintosh, Martin Kegel, McDonald Eric, St-Onge Guillaume	3231: Influence of the Thermal Environment of a Bathroom after Renovation on Blood Pressure of Residents Chiemi Iba, Shuichi Hoko, Nobuyuki Masugi, Daisuke Ogura, Satoru Takada, Kenji Iida
13:18	3212: Demand controlled ventilation in residential buildings Huijuan Chen, Caroline Markusson	3222: Utilisation of Ice Rink Waste Heat by Aid of Heat Pumps Juris Pomerancevs, Jörgen Rogstam, Agnese Lickrašina	3232: Assessment of the effects of using wood stoves on indoor air quality in two types of Norwegian houses Mathieu Hamon, Guangyu Cao, Øyvind Skreiberg, Laurent Georges, Morten Seljeskog, Roger Khalil, Alexis Sevault, Hans Martin Mathisen
13:36	3213: Is it possible to build near zero energy single family buildings in very cold arctic climate? Svein Ruud	3223: Creating a state of the art, passive house, university hospital north of the polar circle Christian Koch, Martine Buser	3233: Should we differentiate ventilation requirements for different user groups? Nora Holand, Aileen Yang, Sverre Holøs, Kari Thunshelle, Mads Mysen
13:54	3214: The energy performance of green roof in sub-arctic climate Jutta Schade, Farshid Shadram	3224: Mixing Hot and Cold: Fiery soul Architects creating Sustainable Buildings in the Arctic Thongchai Lapthananchaiwong, Christian Koch	3234: Effect of filter type in ventilation systems on NO2 concentrations in classrooms Aileen Yang, Kristian Fredrik Nikolaisen, Sverre Holøs, Kari Thunshelle, Franck René Dauge, Mads Mysen
14:12	3215: Performance evaluation of a passive house in sub-arctic climate Shimantika Bhattacharjee, Sofia Lidelöw, Jutta Schade	3225: Communicating the Acoustic Performance of Innovative HVAC Solutions Soheila Bahrami, Juan Negreira, Stefan Olander, Anne Landin	3235: The Study of Energy-saving Window Technology Adaption for Green Buildings in The Severe Cold Region of Northern China Liang Yu, Xiaotong Wang



Friday

Morning

Parallel activities

Dog-sledding and lunch (Separate registration required)

Ice-fishing, short snowmobile ride and lunch (Separate registration required)

Snowmobile ride and lunch (Separate registration required)

Afternoon

Guided tour to Abisko (Separate registration required)

The bus leaves Kiruna at 14:00 and arrives in Abisko at 15:30. In Abisko there will be a guided walk along the canyon. Dinner in Abisko at 18:00. The bus leaves for Kiruna at 20:30 PM. During the drive back to Kiruna there will be stops to look for northern light “Aurora Hunting”.



Scientific committee

Angela Sasic	Chalmers University of Technology
Berit Time	SINTEF
Bert Phillips	UNIES Ltd.
Bill Semple	University of Calgary
Björn Marteinsson	University of Iceland
Boualem Ouazia	National Research Council Canada
Carey Simonson	University of Saskatchewan
Carl-Erik Hagentoft	Chalmers University of Technology
D.Y. Zheldakov	Res. Inst. of building physics of RAACS, Moscow
Eckhard Groll	Purdue University
Erich Binder	WorleyParsons LTD
Guangyu Cao	Norwegian University of Science and Technology
Hans Martin Mathisen	Norwegian University of Science and Technology
Henrik Davidsson	Lund University
Hiroshi Yoshino	Tohoku University
Hua Ge	Concordia University
Ivo Martinac	Royal Institute of Techonolgy, Stockholm
Jan Sundell	Tsinghua University
Jan-Olof Dalenbäck	Chalmers University of Technology
Jarek Kurnitski	Tallin University of Technology
Jeff Spitler	Oklahoma State University
Jesper Arfvidsson	Lund University
Juha Vinha	Tampere University of Technology
Jutta Schade	Luleå Technical University
Karel Kabele	Czech Technical University in Prague
Kristina Mjörnell	RISE
Kwang Woo Kim	Seoul National University
Lars-Erik Harderup	Lund University



Scientific committee

Leif Gustafsson	Växjö Linnaeus University
Lin Duanmu	Dalian University of Technology
Linda Hägerhed	University of Borås
Marianna Brodach	Moscow Architectural Institute
Martin Kotol	Technical University of Denmark
Mika Vuolle	EQUA
Olli Seppanen	FINVAC
Paula Femenias	Chalmers University of Technology
Pawel Wargocki	Technical University of Denmark
Petra Vladykova Bednarova	Swegon
Robert Cerný	Czech Technical University in Prague
Saqib Javed	Lund University
Shuichi Hokoi	Kyoto University
Stefan Olander	Lund University
Sven Werner	Halmstad University
Svend Svendsen	Technical University of Denmark
Targo Kalames	Tallinn University of Technology
Thomas Lützkendorf	Karlsruhe Institute of Technology
Thomas Olofsson	Luleå Technical University
Thoms Olofsson	Umeå University
Toke rammer Nielsen	Technical University of Denmark
Ulla Janson	Skanska
V.G. Gagarin	Res. Inst. of building physics of RAACS, Moscow
Vojislav Novakovic	Norwegian University of Science and Technology
Xudong Yang	Tsinghua University
Åke Blomsterberg	Lund University





Conference organizing committee

Dennis Johansson, Conference Chair

Lund University, Building Services

dennis.johansson@hvac.lth.se

Hans Bagge, Conference Co-Chair

Lund University, Building Physics

hans.bagge@byggtek.lth.se

Åsa Wahlström, Senior Advisor

Lund University, Building Services

asa.wahlstrom@hvac.lth.se



