

# Program



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Norwegian University of Life Sciences



## Tuesday, June 14, 2016

### 8.30/9.00 Welcome – Registration

### 9.00/9.30 Opening Ceremony

Session 1: Snow drift I	
Chair: P. Irwin, T. Fukuhara	
09.30	<i>Keynote Lecture</i> - Numerical simulation of snowdrift around buildings: past achievements and future perspectives <i>Yoshihide Tominaga</i> <i>Niigata Institute of Technology, Department of Architecture and Building Engineering, Japan</i>
10.00	Improvements of the viscous treatment of the snow phase in two-way coupled Eulerian- Eulerian simulations of drifting snow         Ziad Boutanios <sup>1,2</sup> and Hrvoje Jasak <sup>2</sup> <sup>1</sup> Binkz Incorporated, Canada <sup>2</sup> CFD Lab, FSB, University of Zagreb, Croatia
10.20	CFD prediction of snowdrift in a building array Tsubasa Okaze <sup>1</sup> , Saeka Kato <sup>2</sup> , Yoshihide Tominaga <sup>3</sup> , Akashi Mochida <sup>4</sup> <sup>1</sup> Tokyo Institute of Technology, Japan <sup>2</sup> Takenaka Corporation, Japan <sup>3</sup> Niigata Institute of Technology, Japan <sup>4</sup> Tohoku University, Japan
10.40	Coffee break
11.10	Outdoors experiments of snowdrift on typical cubes based on axial flow fan matrix in Harbin Mengmeng Liu <sup>1,2</sup> , Qingwen Zhang <sup>1,2</sup> , and Feng Fan <sup>1,2</sup> <sup>1</sup> School of Civil Engineering, Harbin Institute of Technology, China <sup>2</sup> Key Lab of Structures Dynamic Behavior and Control of China Ministry of Education, Harbin Institute of Technology, China
11.30	Numerical simulation of snowdrift on a membrane roof and wind-induced response analysis under coupled wind and snow loads Sun Xiaoying, He Rijin, Wu Yue Key Lab of Structure Dynamic Behaviour and Control of the Ministry of Education, Harbin Institute of Technology, China
11.50	Developing experimental method for investigating snow deposition around buildings using snow substitutes Jennifer Fiebig, Hans Holger Hundborg Koss Technical University of Denmark (DTU), Dep. of Civil Engineering, Denmark
12.10	Use of numerical simulations of snow drift in planning of infrastructure – A case study from Northern Norway Thomas Kringlebotn Thiis <sup>1, 2</sup> <sup>1</sup> Norwegian University of Life Sciences, Norway <sup>2</sup> Multiconsult ASA, Norway Lunch



Session 2 : Structural Loading I	
Chair: T. Takahashi, M. O'Rourke	
13.50	Keynote Lecture - Probabilistic concepts in snow engineering - from observations to the specification of consistent design values including climate changeMichael KasperskiRuhr-Universität Bochum, Research Team EKIB, Germany
14.20	<b>Climate Change: impact on snow loads on structures</b> <i>Pietro Croce, Paolo Formichi, Filippo Landi and Francesca Marsili</i> <i>University of Pisa, Department of Civil and Industrial Engineering-Structural Division, Italy</i>
14.40	European snow load map – past and present Jerzy Antoni Żurański and Grzegorz Kimbar Instytut Techniki Budowlanej, ul. Filtrowa 1, 00-611 Warszawa, Poland
15.00	Some ongoing researches to improve codified structural design under snow loads in China Feng Fan <sup>1, 2</sup> Huamei Mo <sup>1</sup> , Qingwen Zhang <sup>1, 2</sup> , Guolong Zhang <sup>1</sup> and Mengmeng Liu <sup>1</sup> <sup>1</sup> School of Civil Engineering, Harbin Institute of Technology, Harbin, 150090, China <sup>2</sup> Key Lab of Structures Dynamics Behavior and Control of the Ministry of Education (Harbin Inst. of Tech.), Harbin, 150090, China
15.20	Coffee break
15.40	Poster session Chair : T. Thiis, P. Delpech
16.00	Specification of the design value of the ground snow load considering measurements of the snow height – part 1: single stations Benjamin Czwikla, Michael Kasperski Ruhr-Universität Bochum, Research Team EKIB., Germany
16.20	<b>Research on reliability of roof structures designed by Chinese codes</b> Shengguan Qiang, Xuanyi Zhou, Ming Gu State Key Laboratory of Disaster Reduction in Civil Engineering, Tongji University, China
16.40	Correction Of The Snow Load Design Values In The Places Of Height Discontinuity Sergey Pichugin <sup>1</sup> , Yuriy Dryzhyruk <sup>2</sup> <sup>1</sup> Department of Metal, Wooden and Plastic Structures, Poltava National Technical Yuri Kondratyuk University,36000, Poltava, Ukraine <sup>2</sup> Department of Engineering Management and Technology and Occupation Safety, Poltava National Technical Yuri Kondratyuk University, 36000, Poltava, Ukrainee
17.00	End day 1



# Wednesday, June 15, 2016

#### 08.30 Welcome

Session 3 : Avalanche / Snow physics Chair : S. Margreth, A. Klein-Paste	
08.50	Keynote Lecture - Importance of field measurements and observation systems in snow engineering: from avalanches dynamics to drifting snow         Florence Naaïm         Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture, France
09.20	Effect of reporting rate on vulnerability with an example for snow avalanche risk to backcountry recreationists in Canada Bruce Jamieson <sup>1,2</sup> and Alan S.T. Jones <sup>3</sup> <sup>1</sup> Snowline Associates Ltd., Canada <sup>2</sup> Dept. of Civil Engineering, University of Calgary, Canada <sup>3</sup> Dynamic Avalanche Consulting Ltd., Canada
9.40	Seismic responses of snowpack on a slope in a vibration experiment Yusuke Harada <sup>1</sup> , Wataru Takahashi <sup>1</sup> , Satoshi Omiya <sup>1</sup> , Hiroki Matsushita <sup>2</sup> , Takahiro Chiba <sup>3</sup> and Masaru Matsuzawa <sup>1</sup> <sup>1</sup> PWRI, Civil Engineering Research Institute for Cold Region, Japan <sup>2</sup> PWRI, Snow Avalanche and Land Slide Research Center, Japan <sup>3</sup> Hokkaido University of Science, Japan
10.00	Friction along a slider on snow Werner Nachbauer <sup>1,</sup> Sebastian Rohm <sup>1</sup> , Christoph Knoflach <sup>1</sup> , Joost van Putten <sup>2</sup> , Michael Hasler <sup>2</sup> <sup>1</sup> Department of Sports Science, University of Innsbruck, Austria <sup>2</sup> Centre of Technology of Ski and Alpine Sports, University of Innsbruck, Austria
10.20	Gliding friction of back country climbing skins Michael Hasler <sup>1</sup> , Sebastian Rohm <sup>1</sup> , Christoph Knoflach <sup>1</sup> , Joost van Putten <sup>2</sup> and Werner Nachbauer <sup>1,2</sup> <sup>1</sup> Centre of Technology of Ski and Alpine Sports, University of Innsbruck, Austria <sup>2</sup> Department of Sports Science, University of Innsbruck, Austria

#### 10.40 Coffee break

Session 4 : Snow Physics / Snow drift II	
Chair : K.	Sziaer, Y. Tominaga
11.10	Characterizing the snowpack stratigraphy and its mechanical stability with hardness profiles measured by the Avatech SP1
	Pascal Hagenmuller, Thibault Pilloix
	Météo-France/CNRS, CNRM-GAME/CEN, France
11.30	Improvement of requirements for modeling snowdrifts in wind tunnels based on the measurements at Harbin
	Qingwen Zhang <sup>1, 2</sup> , Guolong Zhang <sup>1, 2</sup> and Feng Fan <sup>1, 2</sup>
	<sup>1</sup> School of Civil Engineering, Harbin Institute of Technology, China
	<sup>2</sup> Key Lab of Structures Dynamic Behavior and Control of China Ministry of Education, Harbin Institute of Technology, China
11.50	A new method for predicting snowdrift on flat roofs
	Luyang Kang, Xuanyi Zhou and Ming Gu
	State Key Lab of Disaster Reduction in Civil Engineering, Tongji University, China



12.30       Lunch         Session 5 : Structural Loading II         Chair : A. Flaga, A. Aldea         14.00       Specification of the design value of the ground snow load considering measurements of the snow height – part 2: regional approach         Michael Kasperski, Benjamin Czwikla         Ruhr-Universitä Bochum, Research Team EKIB. Germany         14.20       Collapse process of pipe-framed greenhouses under snow loading         Kazuya Takahashi, Yasushi Uematsu       Department of Architecture and Building Science, Tohoku University, Japan         14.40       Study on evaluation of roof snow load considering rain-on-snow surcharge: Statistical evaluation of snow cover and precipitation in winter in Japan         Masaya Otsuki, Toru Takahashi, Yasushi Uematsu       Department of Architecture, Chiba University, Japan         14.40       Study on evaluation of roof snow load considering rain-on-snow surcharge: Statistical evaluation of snow cover and precipitation in winter in Japan         Masaya Otsuki, Toru Takahashi, Yasushi Uematsu       Department of Architecture, Chiba University, Japan         * Department of Architecture, Chiba University, Japan       * Norhern Regional Building Research Institute, Japan         * Joenhart Takahashi, Takahiro Chiba <sup>2</sup> and Kazuki Nakamurel       * Department of Architecture, Chiba University, Japan         * Department of Architecture, Chiba University, Japan       * Department of Architecture, Chiba University, Japan         * Departriment of Architectur	12.10	<b>Improved Design Relations for Roof Snow Drifts</b> <i>Michael O'Rourke</i> <sup>1</sup> and John Cocca <sup>2</sup>
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<ul> <li>16.40 Theoretical and experimental study of ice accretion due to freezing rain on an inclined cylinder         <ul> <li>Krzysztof Szilder</li> <li>Aerospace, National Research Council, Canada</li> </ul> </li> <li>17.00 Parametric approach for assessing risks due to falling ice and snow         <ul> <li>Jan Dale, Scott Gamble, Albert Brooks and Jill Bond</li> <li>Rowan Williams Davies &amp; Irwin Inc., Canada</li> </ul> </li> <li>17.30 Technical tour: Ecole Centrale de Nantes</li> </ul>	16.20	Experimental study of the distribution of snow deposits on the surface of structures with complex three-dimensional shape of the roof Poddaeva Olga <sup>1</sup> , Pavel Churin <sup>2</sup> <sup>1</sup> Moscow State University Of Civil Engineering (Mgsu), Russian Federation <sup>2</sup> Moscow State University Of Civil Engineering (Mgsu) Russian Federation
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	17.30	Technical tour: Ecole Centrale de Nantes



## Thursday, June 16, 2016

08.30 Welcome Session 6 : Building / Simulation Chair : Z. Boutanios, M. Kasperski 08.50 Keynote Lecture - Prediction of snow loads : past, present and future Peter A. Irwin Rowan Williams Davies and Irwin Inc., Canada. 09.20 CFD simulation of drift snow loads for an isolated gable-roof building Yoshihide Tominaga<sup>1</sup>, Tsubasa Okaze<sup>2</sup> and Akashi Mochida<sup>3</sup> <sup>1</sup>Niigata Institute of Technology, Japan <sup>2</sup>Tokyo Institute of Technology, Japan <sup>3</sup>Tohoku University, Japan 09.40 **Analysis of Snow Drifts on Arch Roofs** Michael O'Rourke<sup>1</sup>, Jan Potac<sup>2</sup> and Thomas Thiis<sup>3</sup> <sup>1</sup> Rensselaer Polytechnic Institute, USA <sup>2</sup> Multiconsult ASA, Norway <sup>3</sup> Norwegian University of Life Sciences, Norway 10.00 Falling snow and ice from buildings and structures: risk assessment and mitigation two case studies Stefan Margreth WSL Institute for Snow and Avalanche Research SLF, 7260 Davos Dorf, Switzerland Capture of windward drift snow 10.20 Jan Potac<sup>1</sup>, Michael O'Rourke<sup>2</sup> and Thomas K. Thiis<sup>3</sup> <sup>1</sup>Multiconsult AS, Norway <sup>2</sup>Rensselaer Polytechnic Institute, USA <sup>3</sup>Norwegian University of Life Sciences, Norway 10.40 Coffee break

 Session 6 : Building / Simulation (continued)

 Chair : Y. Uematsu, F. Naaim

 11.10
 Wind tunnel tests and analysis of snow load distribution on three different large size stadium roofs

 Andrzej Flaga<sup>1</sup>, Łukasz Flaga<sup>2</sup>

 <sup>1</sup>Prof.D.Sc.Eng. Andrzej Flaga, Wind Engineering Laboratory, Faculty of Civil Engineering, Cracow University of Technology, Poland

 <sup>2</sup>Ph.D.Eng.Arch. Łukasz Flaga, Faculty of Civil Engineering, Department of Technology of Building and Materials Processes, Częstochowa University of Technology, Poland



11.30	<b>Comparison of Physical Snow Accumulation Simulation Techniques</b> Albert Brooks, Scott Gamble, Jan Dale and Jill Bond Rowan Williams Davies and Irwin (RWDI), Guelph, Ontario, CA
11.50	Snowdrifts on two-level building roofs and modeling of snow density at Harbin Guolong Zhang <sup>1, 2</sup> , Yu Zhang <sup>1, 2</sup> and Feng Fan <sup>1, 2</sup> <sup>1</sup> School of Civil Engineering, Harbin Institute of Technology, China <sup>2</sup> Key Lab of Structures Dynamic Behavior and Control of China Ministry of Education, Harbin Institute of Technology, China
12.10	Advantages and Features of Four Different Snow Utilizing Facilities Seiji Kamimura <sup>1</sup> , Yoshiomi Ito <sup>2</sup> and Junki Zen <sup>3</sup> <sup>1</sup> Nagaoka University of Technology, Department of Mechanical Engineering, Japan <sup>2</sup> Yuki-daruma (snowman) Foundation, Japan <sup>3</sup> Nagaoka University of Technology, Graduate School of Engineering, Japan
12.30	Lunch
13.30	Technical tour: CSTB Wind tunnels : Boundary layer Wind tunnels Climatic Wind tunnel : snow test demonstration
16.00	Social program Bus transfer to Les Machines de l'île and guided walking tour of Nantes Downtown
20.00	Gala Dinner at O'Deck Restaurant



# Friday, June 17, 2016

08.30 Welcome

Session 7 : Transport	
Chair: P.	Hagenmuller, A. Mc Callum
9.00	Modelling the thermal conductivity of melting snow layers on heated pavementsAnne Nuijten <sup>1</sup> , Knut Vilhelm Høyland <sup>1,2,</sup> Cor Kasbergen <sup>3</sup> and Tom Scarpas <sup>3</sup> <sup>1</sup> NTNU, Department of Civil and Transport Engineering, Norway <sup>2</sup> Sustainable Arctic Marine and Coastal Technology (SAMCoT), Centre for Research-basedInnovation (CRI), Norwegian University of Science and Technology, Norway <sup>3</sup> TU Delft, Department of Structural Engineering, the Netherlands
9.20	<b>Snow engineering questions related to road and rail vehicles</b> Jean-Paul Bouchet, Sylvain Aguinaga, Pierre Palier and Philippe Delpech, Centre Scientifique et Technique du Bâtiment, CAPE Department, France
9.40	Appreciation of road surface temperature in an urban context to appreciate the possibility of snow accumulation and ice occurrence on pavement Abderrahmen Khalifa <sup>1,2,5</sup> Mario Marchetti <sup>2</sup> , Ludovic Bouilloud <sup>3</sup> , Eric Martin <sup>4</sup> , Michel Bues <sup>5</sup> and Katia. Chancibaut <sup>1</sup> <sup>1</sup> IFSTTAR, Centre de Nantes, France <sup>2</sup> Cerema - DTer Est - LR Nancy, France <sup>3</sup> Météo France, Direction de la Production, France <sup>4</sup> CNRM-GAME (Météo-France, CNRS), France <sup>5</sup> Université de Lorraine, UMR 7359-GeoRessources CNRS/UL/CREGU, ENSG, France
10.00	Anti- and de-icing of walking and cycle paths – Field trials of new follow-up techniques for quantifying salt amount and resulting ice quality Göran Blomqvist, Bengt Lindström, Ida Järlskog, Emelie Karlsson and Anna Niska Swedish National Road and Transport Research Institute (VTI), Sweden
10.20	Shallow Geothermal Switch Point Heating System Lars Staudacher <sup>1</sup> , Damian Schink <sup>2</sup> , Dr. Roman Zorn <sup>3</sup> , Dr. Hagen Steger <sup>4</sup> <sup>1</sup> Bavarian Center for Applied Energy Research, Germany <sup>2</sup> Pintsch Aben geotherm GmbH, Germany <sup>3</sup> European Institute f. Energy Research (EIFER), Germany <sup>4</sup> Karlsruher Institut für Technologie (KIT) Institut für Angewandte Geowissenschaften, Germany
10.40	Coffee break
Session 7 : Transport (continued)         Chair : G. Blomqvist, B. Jamieson	
11.10	A Method for Estimating Road Friction Coefficients with Ice Film Subjected to Melting by De-icing Agents Akihiro Fujimoto <sup>1</sup> , Shunsuke Tanaka <sup>1</sup> , Kenji Sato <sup>1</sup> , Roberto Tokunaga <sup>1</sup> , Naoto Takahashi <sup>1</sup> , Tateki Ishida <sup>1</sup> and Kiyoshi Takeichi <sup>2</sup> <sup>1</sup> PWRI, CERI, Japan <sup>2</sup> Hokkai-Gakuen University, Japan
11.30	<b>Airplane braking friction on dry snow, wet snow or slush contaminated runways</b> <i>Alex Klein-Paste</i>

NTNU, dept. of Civil and Transport Engineering, Winter Maintenance Research Group, Norway



11.50	<b>Engineered Pavements of Snow and Ice</b> Adrian McCallum and Greg White University of the Sunshine Coast, Australia
12.10	Performance of remote road surface sensor on different pavement types Naoto Takahashi, Kenji Sato and Roberto Tokunaga Civil Engineering Research Institute for Cold Region, Traffic Engineering Research Team, Japan
12.30	Concluding Remark
12.30	Lunch



### **Poster session**

#### The Protection of Roads from Blizzards

Tatiana Samodurovaa, Olga Gladysheva, Jurij Baklanov and Konstantin Panferov Voronezh State University of Architecture and Civil Engineering, Russia

#### Influence of sunshine hours in fine weather on the rate of Wintry Accidents

Akira Saida, Masayuki Hirasawa, Naoto Takahashi and Tateki Ishida Civil Engineering Research Institute for Cold Region, Public Works Research Institute, National Research and Development Agency, Japan

#### **Roof Snow Slide-off Experiments Using Membrane Deformation**

Hiroaki Terasaki and Teruyuki Fukuhara University of Fukui, faculty of engineering, Japan.

#### Accuracy of Snow Depth Measurements on Roods measured with Photogrammetry

Takahiro Chiba<sup>1</sup> and Thomas Thiis<sup>2</sup> <sup>1</sup>Department of Architecture, Faculty of Engineering, Hokkaido University of Science, Japan <sup>2</sup>Department of Mathematical Science and Technology, Norwegian University of Life Science, Ås, Norway

#### A new ring-shaped wind tunnel facility to study wind-packing of snow

Christian G. Sommer<sup>1,2</sup>, Michael Lehning<sup>1,2</sup> and Charles Fierz<sup>1</sup> <sup>1</sup>WSL Institute for Snow and Avalanche Research SLF, Switzerland <sup>2</sup>CRYOS, School of Architecture, Civil and Environmental Engineering, EPFL, Switzerland

#### The use of sheet piles as measures against rapid mass flows

Árni Jónsson<sup>1</sup>, Guðmundur Heiðreksson<sup>2</sup>, Torfi B. Jóhannsson<sup>3</sup>, Magnús Steinarsson<sup>3</sup>

- <sup>1</sup>Norwegian Geotechnical Institute (NGI), Norway
- <sup>2</sup> Icelandic Road and Coastal Administration (IRCA) Iceland

<sup>3</sup> MogT Engineering, Iceland

### The usage of ratio of geographical height to determine the snow loads in mountain districts in transcarpathian region

Roman Kinasz<sup>1,3,</sup> Jaroslav Huck<sup>2</sup> and Roman Tkach<sup>3</sup>

<sup>1</sup> Faculty of Mining and Geoengineering, AGH University of Science and Technology, Poland

<sup>2</sup> Uzhgorod National University, Ukraine

<sup>3</sup> National University "Lviv Polytechnic", Ukraine

#### In flight wet snow particles characterisation

Philippe Delpech<sup>1</sup>, Guy Febvre<sup>2</sup>, Christophe Gourbeyre<sup>2</sup>, Dominique Lenoir<sup>1</sup> and Fabrice De Oliveira<sup>1</sup> <sup>1</sup>Centre Scientifique et Technique du Bâtiment, France <sup>2</sup>Laboratoire de Météorologie physique, UMR 6016, France

#### CR 1-1-3/2012 - the snow loads code in Romania

Alexandru Aldea, Sorin Demetriu, Dan Lungu, Cristian Neagu, Radu Vacareanu and Cristian Arion Technical University of Civil Engineering Bucharest, Romania



## **Sponsors**









# Technical and Social Program

### Wednesday, June 15, 2016

#### 17.40 to 18.30 Ecole Centrale de Nantes

One specialty of the Nantes region is ocean engineering. ICSE participants have the opportunity to visit unique facilities operated by Ecole Centrale de Nantes: Towing tank and Wave tank. (Next door to the conference hall)



### Thursday, June 16, 2016

#### 14.00 to 16.00 CSTB, Centre Scientifique et Technique du Bâtiment

Centre Scientifique et Technique du Bâtiment (CSTB) is a public research establishment in the construction sector in France. CSTB core activity covers four major fields: research, technical consultancy, quality assessment and knowledge dissemination.

Visit of CSTB wind tunnels: atmospheric boundary layer wind tunnel, climatic wind tunnel (snow test demonstration).



# **16.30 to 18.00** Visit of the Galerie des Machines de l'ile (*transfer by bus*) The Machines de l'Ile is an unprecedented artistic project. Born from the imagination of François Delarozière and Pierre Orefice, it is located at the crossroads of "invented worlds" of Jules Verne, the mechanical universe of Leonardo da Vinci and the industrial history of Nantes, on the exceptional site of former shipyards.



18.00 to 19.30 Guided walking tour of Nantes Downtown





#### 20.00 to 22.00 Gala Dinner at O'Deck restaurant

O'Deck restaurant offers gourmet cuisine changing with the seasons, drawing inspiration both from the French tradition and the world.







Norwegian University of Life Sciences