

59TH INTERNATIONAL CONFERENCE OF SCANDINAVIAN SIMULATION SOCIETY



September 26 - 27, 2018
SIMS conference keynote and technical presentations

September 28, 2018
SIMS conference study visit

Welcome

Oslo Metropolitan University (OsloMET) in collaboration with University of South-Eastern Norway (USN), Norwegian University of Science and Technology (NTNU) and Norwegian Society of Electric and Automatic Control (NFEA) is proud to arrange the 59th International Conference of Scandinavian Simulation Society (SIMS2018) in Oslo, Norway.

The SIMS2018 conference will cover broad aspects of simulation, modeling and optimization in engineering, especially in energy applications. The scientific program will include technical sessions with submitted and invited papers.

SIMS stands for the Scandinavia Simulation Society with members from five Nordic countries, Denmark, Finland, Norway, Sweden and Iceland. The goal of SIMS is to develop further the science and practice of modelling and simulation in all application areas and to be a forum for information interchange between professionals and non-professionals in the Nordic countries.

Thanks to all participants, authors, keynote speakers and presenters for their contribution to this conference.

Keynote speakers:

Jens Pålsson is a project manager and senior staff at Modelon. His educational background includes a PhD and an MSc in Mechanical Engineering from Lund University, and Swiss federal institute of technology, with specialty in energy sciences. Jens sees large potential in model based development as a way to cut cost and lead times, and to come up with optimized solutions.

Carlos Grande is a Senior Research Scientist at SINTEF Materials and Chemistry, Department of Sorbent Technologies. His educational background includes a PhD in Chemical Engineering from the University of Porto. He is the project manager for European projects MATESA: Advanced Materials and Electric Swing Adsorption Process for CO₂ Capture and PRINTCR3DIT: Process Intensification through Adaptable Catalytic Reactors made by 3D Printing.

PRACTICAL INFORMATION

Venue:

The SIMS2018 conference will be held at Oslo Metropolitan University Pilestredet 46, Oslo, Norway.

Travel:

Oslo is easily reached. There are flights to Oslo from most major cities in Europe, and from some cities in North America and Asia.

Oslo Airport is located at Gardermoen, 47 km northeast of Oslo. There are shuttle buses, trains and taxis for transport between airport and Oslo.

All you need to know you can find here:

<https://www.visitoslo.com/en/transport/transport-airport/oslo-gardermoen/>

Welcome to Oslo! We are sure that you will enjoy your stay in the capital of Norway. Oslo has been the capital of Norway since 1814 and occupies 454 square kilometers, 242 of which are forests. Tourist attractions in the city includes; the National Museum of Art, Architecture and Design, the Norwegian Opera and Ballet and the National Theatre.

Hotel:

For accommodation near the conference venue we recommend:

Scandic Holberg Hotel

Holbergs Plass 1, 0166 Oslo

Thon Hotel Slottsparken

Wergelandsveien 5, 0166 Oslo

Scandic St. Olavs plass

St. Olavs plass 1, 0165 Oslo

For other hotels in Oslo, check www.visitoslo.com/en

Conference fee:

	Early registration (Before april 1.)	Late registration (After april1.)	Late reg.. (After Sept. 1)
Regular	€490	€510	€540
Student	€100	€120	€120

The registration fee includes lunches, banquet dinner and the proceedings.

Committees:

Program Chairs

Lars Erik Øi (USN)

Tiina Komulainen (OsloMet)

National Organizing Committee (NOC)

Oslo Metropolitan University (OsloMet):

Tiina Komulainen, Evi Zouganeli, Alex Alcocer and Alfredo Carella

University College of Southeast Norway (USN):

Lars Erik Øi, Bernt Lie and Finn Haugen
Norwegian University of Science and Technology (NTNU):

Lars Nord, Dipo Olaitan and Robin T. Bye
University of Oslo (UiO):

David Cameron

PhD-student committee chairs:

Samee Maharjan (USN) and Laura Marcano (OsloMet)

International Program Committee (IPC)

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Shobhana Singh (AAU)

Brian Elmegaard (DTU)

Hamid Reza Shaker (SDU)

Weria Pezeshkian (SDU)

Finland:

Esko Juuso (Oulu Univ.)

Peter Ylén (VTT)

Mika Ruusunen (Oulu Univ.)

Kaj Juslin (Enbuscon)

Kai Zenger (Aalto)

Iceland:

Silja Rán Sigurðardóttir (OS)

Sweden:

Erik Dahlquist (MDH)

Lars Eriksson (LiU)

Bengt Carlsson (Uppsala University)

Norway:

The national organizing committee and:

Ottar L. Osen (NTNU)

Ibrahim A. Hameed (NTNU)

Britt Moldestad (USN)

Anis Yazidi (OsloMet)

Luca Riboldi (NTNU)

Practical arrangements:

Barbro Berg Bakken (NFEA)

WEDNESDAY 26 SEPTEMBER

08:30
Registration

09:00
Opening: Astrid Oust Janbu, OsloMet

09:20 P46-PA113
Keynote: Jens Pålsson
Can one do it all? The coming of unified system simulation tools including steady state, dynamics and optimization features

10:00
Coffe (and registration)

Session I

A: P46-PA113

Chair: Magnus Komperød, Nexans Norway AS

B: P46-PA110

Chair: Finn Aakre Haugen, USN

10:20 - 10:45	Exergy Analysis for Combined Heat and Power (CHP) Plants Jairo Rúa (NTNU) and Lars O. Nord (NTNU)	Intelligent Multimodel Simulation in Decomposed Systems Esko Juuso (Oulu Univ.)
10:45 - 11:10	Simulation of condensation in compressed raw biogas using Aspen HYSYS Lars Erik Øi (USN) and Jon Hovland (SINTEF)	Developing Simulation Tools for Interdisciplinary Modelling Sigve Karoliuss (NTNU) and Heinz Preisig (NTNU)
11:10 - 11:35	Process simulation as a tool for design of a novel low temperature methanol synthesis process using air-blown autothermal reformer Christian Ahoba-Sam (USN), Lars Erik Øi (USN) and Klaus-Joachim Jens (USN)	Study of fluidized bed regimes using Computational Particle Fluid Dynamics Rajan Jaiswal (USN), Cornelius E. Agu (USN), Britt M. E. Moldestad (USN) and Rajan Kumar Thapa (USN)
11:35 - 12:00	Study of Effectiveness of Operator Training Simulators in the Oil and Gas Industry Ravikanth Kallakuri (UPES) , Prakash Chandra Bahuguna (UPES), Donald Glaser (Simulation Solutions) and Sanjay Shivalkar (Dolphin Energy)	Linearization for Analysis of a Hydropower Model using Python API for OpenModelica Liubomyr Vytvytskyi (USN) and Bernt Lie (USN)

12:00 - 13:00
Lunch
Fyrhuset, Pilestredet 52

12:00
SIMS Board meeting (P46- PA355)

Session II

A: P46-PA113

Chair: Lars Erik Øi, USN

B: P46-PA110

Chair: Bernt Lie, USN

13:00 - 13:25	Distribution of Solids in a Fluidized Bed Operated without a Gas Distributor Cornelius Agu (USN) and Britt Moldestad (USN)	Oil and Gas digital twins after twenty years. How can they be made sustainable, maintainable and useful? David Cameron (UiO), Arild Waaler (UiO) and Tiina Komulainen (OsloMet)
13:25 - 13:50	Improving bench scale pilot reactor design for polymerisation of green CO₂-polymers Thomas S. Larsen (USN), Kai A. Sætre (Norner), Sara Ronasi (Norner), Hildegunn H. Haugen (USN) and Britt M. E. Moldestad (USN)	Comparison of different state estimator algorithms applied to a simulated anaerobic digestion reactor Shadi Attar (USN) and Finn Aakre Haugen (USN)
13:50 - 14:15	Process simulation of plastic waste pyrolysis in to environmental friendly fuel Marius Andersen (USN), Carlos Pfeiffer (USN), Kai Arne Sætre (Norner) and Siw Bodil Fredriksen (Norner)	FMI4j: A Software Package for working with Functional Mock-up Units on the Java Virtual Machine Lars Ivar Hatledal (NTNU), Houxiang Zhang (NTNU), Arne Styve (NTNU) and Geir Hovland (UiA)
14:15 - 14:40	Experimental and Computational study of Chemical Looping Combustion Rajan K. Thapa (USN) and Britt M. E. Moldestad (USN)	Decision Trees for Human Activity Recognition in Smart House Environments Veralia Gabriela Sanchez (USN) and Nils-Olav Skeie (USN)

14:40
Coffebreak

Session III

A: P46-PA113

Chair: Rajan Thapa, USN

B: P46-PA110

Chair: David Cameron, UiO

15:10 - 15:35	Validation of an Open-Source Mean-Value Heavy-Duty Diesel Engine Model Viktor Leek (Linköping Univ.), Kristoffer Ekberg (Linköping Univ.) and Lars Eriksson (Linköping Univ.)	Predictive control of a district heating system Frode Lie-Jensen (OsloMet), Andreas Aannø (OsloMet), Elena Aleksandrova (OsloMet), Anders Westli (OsloMet), Morten Nielsen (Fortum) and Tiina M. Komulainen (OsloMet)
15:35 - 16:00	Simulation Model for Borehole Heat Exchangers Petri Hietaharju (Oulu Univ.) and Tobias Boström (UiT)	Comparison of linear controllers for nonlinear, open-loop unstable reactor Mohammad Khalili (USN) and Bernt Lie (USN)
16:00 - 16:25	A Mean Value Model for Unsteady Gas Flows and Heat Transfer in Pipes Olov Holmer (Oulu Univ.) and Lars Eriksson (Linköping Univ.)	Population balance modelling for fertilizer granulation process Ludmila Vesjolaja (USN), Bjørn Glemmestad (USN) and Bernt Lie (USN)
16:25 - 16:50	Sensitivity Analysis and Effect of Simulation parameters of CPF D Simulation in Fluidized Beds Janitha Bandara (USN), Henrik Nielsen (UiA), Britt Moldestad (USN) and Marianne Eikeland (USN)	Simulation of PI and MPC averaging level control in a wastewater treatment plant Finn Aakre Haugen (USN)

17:00

End of Wednesday technical program

17:00 - 18:00

SIMS general assembly (P46-PA113)

19:30

Dinner

Olivia Aker Brygge

Adress: Stranden 3, 0250 Oslo

THURSDAY 27 SEPTEMBER

09:00
Opening day 2

09:20 P46-PA113
Keynote: Carlos Grande
Process modelling and design as precursor to 3D printing in the chemical engineering field

10:00
Coffebreak

Session IV

A: P46-PA113

Chair: Shobhana Singh, Aalborg Univ.

B: P46-PA110

Chair: Esko Juuso, Oulu Univ.

10:20-10:40	Simulation and Economic Optimization of Amine based CO₂ Capture Process using Excess Heat at a Cement Plant Hassan Ali (USN) , Lars Erik Øi (USN) and Nils Henrik Eldrup (USN)	10:20-10:45	Comparison of simulation tools for dynamic models Sveinung M. Sund (USN), Marianne Plouvier (IMT) and Bernt Lie (USN)
10:40-11:00	Shock propagation and diffraction through cavity Arnab Chaudhuri (OsloMet)	10:45-11:10	The impact of the weather data file on the energy performance certificate, the case of Norway. Alex Gonzalez (OsloMet), Tor Arvid Vik (OsloMet) and Dimitrios G. Zenginis (Aristotle Univ.)
11:00-11:20	Comparison of simulation tools to fit and predict performance data of CO₂ absorption into monoethanol amine at CO₂ Technology Centre Mongstad (TCM) Lars Erik Øi (USN), Kai Arne Sætre (Norer) and Espen Steinseth (Equinor)	11:10-11:35	Machine Learning in Python for Weather Forecast based on Freely Available Weather Data Erik Boye Abrahamsen (USN), Ole Magnus Brastein (USN) and Bernt Lie (USN)
11:20-11:40	The effects of fan and opening of a sliding door on a cold storage room: a numerical study Azada Ayarmal (OsloMet), Ole Melhus (OsloMet) and Arnab Chaudhuri (OsloMet)	11:35-12:00	Occupancy and daily activity event modelling in smart homes for older adults with mild cognitive impairment or dementia Flávia Dias Casagrande (OsloMet) and Evi Zouganeli (OsloMet)
11:40-12:00	System Development for On-line Monitoring of CO₂ Absorption by MEA using Raman Spectroscopy M.H Wathsala N. Jinadasa (USN), K. Amila Chandra (USN) and Maths Halstensen (USN)		

12:00 - 13:00
Lunch
Fyrhuset, Pilestredet 52

Session V

A: P46-PA113

Chair: Erik Dahlquist, Mälardalen Univ.

B: P46-PA110

Chair: Lars Nord, NTNU

13:00-13:25	<p>CFD Simulation of Solidification of non-Newtonian Fluid Flowing in a Complex Geometry Pipeline in Turbulent Flow Regime</p> <p>Ludmila Vesjolaja (USN), Jakub M Bujalski (Yara International) and Knut Vaagsaether (USN)</p>	<p>CFD study on the effect of Archimedes number and heating rate on the thermal stratification of a ventilated office</p> <p>Mehrdad Rabani (OsloMet), Habtamu Bayera Madessa (OsloMet) and Natasa Nord (NTNU)</p>
13:25-13:50	<p>Optimal Experimental Design and Modeling for Propylene Oxide - CO₂-Poly (Propylene Carbonate) Solutions</p> <p>Kai Arne Sætre (Norner), Umesh Pandey (USN), Jostein Mathiassen (Norner), Sara Ronasi (Norner), Siw Bodil Fredriksen (Norner) and Carlos F. Pfeiffer (USN)</p>	<p>Simulation of CO₂ storage in the North Sea</p> <p>Arne O. Torsen (USN), Harris J. Smistad (USN), Håkon Tveit (USN), Ole C. Hansen (USN), Vegard G. Bjørtuft (USN), Nora C. I. Furuviik (USN) and Britt M. E. Moldestad (USN)</p>
13:50-14:15	<p>FVM-Modeling of Continuity-Coupled Electrical Charge Submitted to Incompressible Flow with OpenFOAM®</p> <p>Donato Rubineti (FHNW) and Daniel A. Weiss (FHNW)</p>	<p>Deriving the Beam Equation using the Minimum Total Potential Energy Principle and Solving the Equation Numerically</p> <p>Magnus Komperød(Nexans)</p>
14:15-14:40	<p>Second Order KP Scheme for the Solution of flow in a Venturi Channel</p> <p>Susantha Dissanayake (USN), Roshan Sharma (USN) and Bernt Lie (USN)</p>	<p>Numerical Solution of the Beam Equation for Beams subject to Large Deflections</p> <p>Magnus Komperød (Nexans)</p>

**14:40
Coffebreak**

Session VI

A: P46-PA113

Chair: Britt Moldestad, USN

B: P46-PA110

Chair: Evi Zouganelli, OsloMet

15:10-15:35	<p>Convective Melting Modeling Approach for Phase Change Materials with Variable Boundary Heating</p> <p>Donato Rubinetti (FHNW), Daniel A. Weiss (FHNW), Arnab Chaudhuri (OsloMet) and Dimitrios Kraniotis (OsloMet)</p>	<p>Using the concept of data enclosing tunnel as an online feedback tool for simulator training</p> <p>Laura Marcano (OsloMet), Anis Yazidi (OsloMet), Davide Manca (Politecnico Milano) and Tiina Komulainen (OsloMet)</p>
15:35-16:00	<p>Modeling and Simulation of Triclosan Kinetics and Distribution in Humans Using PBPK Model</p> <p>Vincenza Cascella (USN), Monica Andreassen (Folkehelseinstituttet), Trine Husøy (Folkehelseinstituttet), Hubert Dirven (Folkehelseinstituttet) and Bernt Lie (USN)</p>	<p>A Data-Driven Sensitivity Analysis Approach for Dynamically Positioned Vessels</p> <p>Xu Cheng (NTNU), Robert Skulstad (NTNU), Guoyuan Li (NTNU), Shengyong Chen (Tianjin Univ.), Hans Petter Hildre (NTNU) and Houxiang Zhang (NTNU)</p>
16:00-16:25	<p>Model-order selection of output-error models - BSM1 as case study</p> <p>Christian Wallin (ABB) and Jesús Zambrano (Mälardalen Univ.)</p>	<p>Web Enabled High Fidelity Drilling Computer Model with User-Friendly Interface for Education, Research and Innovation</p> <p>Robert Ewald (NORCE), Jan Einar Gravdal (NORCE), Dan Sui (UiS) and Roman Shor (Univ. of Calgary)</p>
16:25-16:50	<p>Optimization of Bioreactor Volumes in Steady-State - A Simulation Study</p> <p>Hanna Molin (Sweco), Jesús Zambrano (Mälardalen Univ.) and Bengt Carlsson (Uppsala Univ.)</p>	<p>Dynamic model of a heat pump based house heating system</p> <p>Shobhana Singh (Aalborg Univ.) and Kim Sørensen (Aalborg Univ.)</p>

17:00

End of Thursday technical program

Thank you for attending SIMS 2018

FRIDAY 28 SEPTEMBER

SIMS conference study visit to VEAS water treatment plant

VEAS treats wastewater for 600 000 people living in the Oslo area, in 2016 97 million m³. VEAS produces biogas, electricity, ammonium nitrate and soil. Researchers at USN have been working on modeling and control of the VEAS water treatment system, and will share their insights.

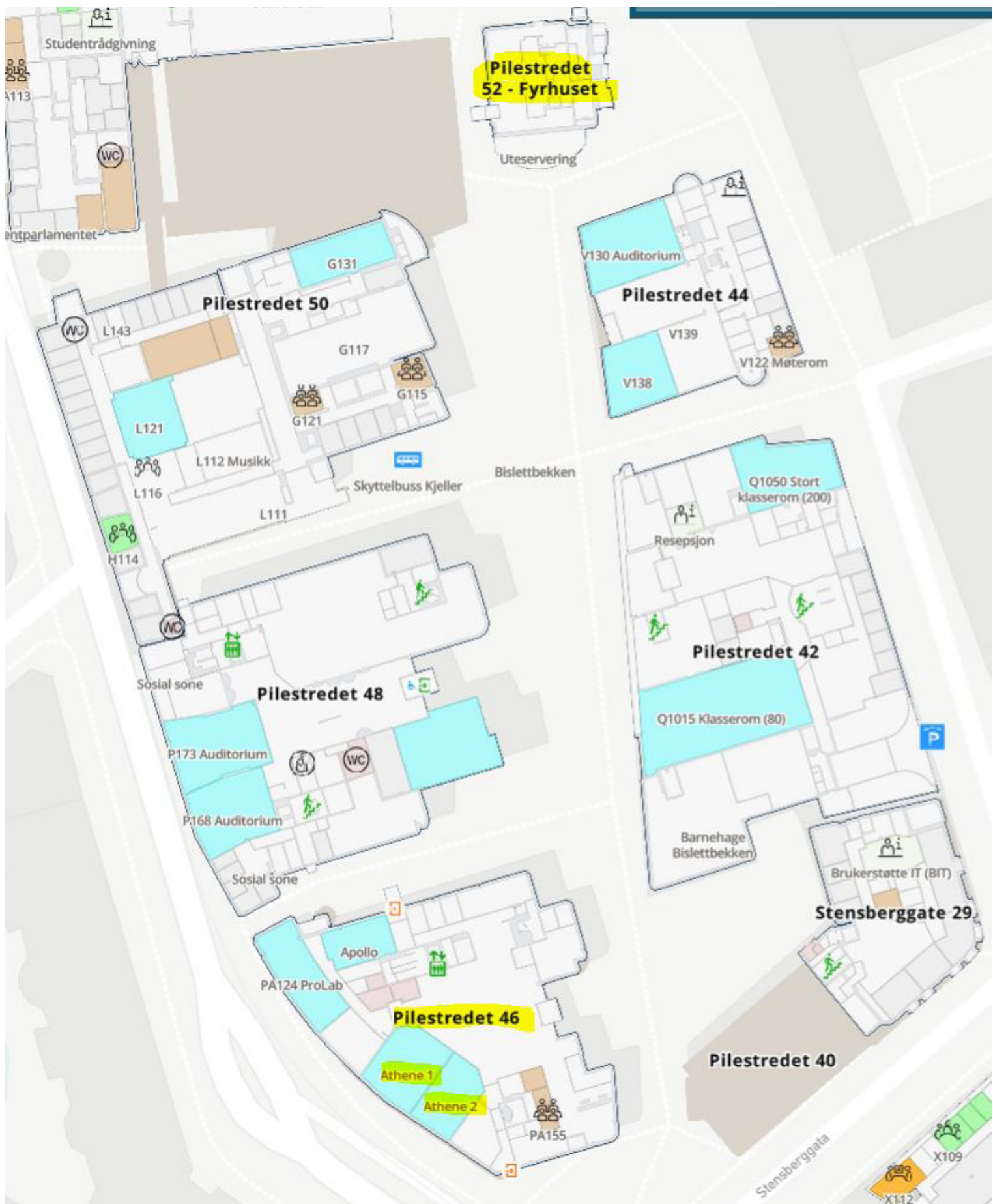
PROGRAM

- 09:00 Transportation from OsloMet will leave
- 10:00 The technical presentation will be given at the Oslo Fjord Museum
- 11:00 A guided tour at the VEAS water treatment plant starts.
- 12:00 Lunch at VEAS cafeteria.
- 12:30 Transportation back to Oslo Metropolitan University leaves

List of participants

First name	Surname	Affiliation
Cornelius Emeka	Agu	University of South-Eastern Norway
Hassan	Ali	University of South-Eastern Norway
Azada	Ayarmal	Oslo Metropolitan University
Barbro Berg	Bakken	NFEA
Robin T.	Bye	Norwegian University of Science and Technology
David	Cameron	Universitetet i Oslo
Alfredo	Carella	Oslo Metropolitan University
Arnab	Chaudhuri	Oslo Metropolitan University
Xu	Cheng	Norwegian University of Science and Technology
Erik	Dahlquist	Mälardalen University
Flávia	Dias Casagrande	Oslo Metropolitan University
Rubinetti	Donato	FHNW - University of Applied Sciences and Arts Northwestern Switzerland
Robert	Ewald	NORCE- Norwegian Research Centre AS
Alex	Gonzales	Oslo Metropolitan University
Carlos	Grande	SINTEF Materials and chemistry
Ole Chr.	Hansen	University of South-Eastern Norway
Finn Aakre	Haugen	University of South-Eastern Norway
Petri	Hietaharju	University of Oulu
Olov	Holmer	Linköping University
Jon	Hovland	SINTEF AS
Rajan	Jaiswal	University of South-Eastern Norway
Wathsala	Jinadasa	University of South-Eastern Norway
Esko	Juuso	University of Oulu
Ravikanth	Kallakuri	UPES-University of Petroleum and Energy Studies
Sigve	Karolius	Norwegian University of Science and Technology
Mohammad	Khalili	University of South-Eastern Norway
Magnus	Komperød	Nexans Norway AS
Tiina	Komulainen	Oslo Metropolitan University
Dimitrios	Kraniotis	Oslo Metropolitan University
Viktor	Leek	Linköping University
Bernt	Lie	University of South-Eastern Norway
Frode	Lie-Jensen	Oslo Metropolitan University
Laura	Marcano	Oslo Metropolitan University
Britt	Moldestad	University of South-Eastern Norway
Hanna	Molin	Sweco Environment AB
Lars	Nord	Norwegian University of Science and Technology
Marianne	Plouvier	IMT Mines Albi
Jens	Pålsson	Modelon AB
Mehrdad	Rabani	Oslo Metropolitan University
Jairo	Rûa	Norwegian University of Science and Technology
Veralia Gabriela	Sanchez	University of South-Eastern Norway
Shobhana	Singh	Aalborg University
Arne	Styve	Norwegian University of Science and Technology
Kai Arne	Sætre	Norner Research
Rajan Kumar	Thapa	University of South-Eastern Norway
Håkon	Tveit	University of South-Eastern Norway
Ludmila	Vesjolaja	University of South-Eastern Norway
Liubomyr	Vytvytskyi	University of South-Eastern Norway
Christian	Wallin	ABB Power Generation
Evi	Zouganeli	Oslo Metropolitan University
Lars Erik	Øi	University of South-Eastern Norway

MAP PILESTREDET:



Pilestredet 46: Conference venue. Rooms PA113(Athene 1) + PA110(Athene 2)
Pilestredet 52: Lunch venue, Fyrhuset