

CITY BUILDING DESIGN LAB

UNIVERSITY OF CALGARY

23 SEPTEMBER 2022

9AM - 4PM

SEMINAR ON SOLAR NEIGHBORHOODS

Strategies and Application Case Studies



THE SEMINAR



The seminar aims to bring academic and professional knowledge, of designing sustainable communities with high life quality. In addition, it will introduce and demonstrate the use of **modeling tools** in the design process to achieve specific performance goals, at urban and buildings levels.

International speakers from Australia, Switzerland, Italy, Norway, Denmark and Sweden will be presenting alongside national speakers from various **governmental research agencies and Canadian industry**. The audience of the seminar will include professionals such as architects and urban planners, city and municipality representatives, in addition to students and academic staff.

This public seminar presenting **international case studies** and demonstration **projects of sustainable urban communities**, will bring international knowledge and expertise to local professionals such as architects and urban planners. Such knowledge can assist in changing the methods utilized in traditional planning of communities, to incorporate tradeoffs of various environmental considerations.

The seminar is funded by **SSHRC** connection grant, and in-kind contribution of **Lund University** (Sweden), **Norwegian University of Science and Technology** (Trondheim, Norway), and **SAPL** (University of Calgary).

The seminar will be conducted in hybrid mode (in person presentations and online via ZOOM).

08:30 - 08:45 **REGISTRATION**

08:45 - 09:00 **MARIA WALL
CAROLINE HACHEM-VERMETTE**
WELCOME NOTES

09:00 - 09:30 **OLAF BRUUN JØRGENSEN
(DENMARK)**
SOLAR DAYLIGHT IN URBAN
PLANNING (ZOOM)

09:30 - 10:00 **GABRIELE LOBACCARO
MATTIA MANNI (NORWAY)**
SOLAR DIGITIZATION
TECHNIQUES TO ENHANCE
OPTIMAL EXPLOITATION OF
SOLAR ENERGY IN THE NORDICS

10:00 - 10:15 **COFFEE BREAK**

10:15 - 10:45 **MARK SNOW (AUSTRALIA)**
AUSTRALIAN INSIGHTS AND
CASE STUDY EXAMPLES FOR
SOLAR NEIGHBORHOOD
PLANNING

10:45 - 11:15 **ALEJANDRO PACHECO DIÉGUEZ
(SWEDEN)**
SOLAR ENERGY AND
DAYLIGHTING IN SWEDISH CASE
STUDIES

11:15 - 11:45 **GILLES DESTHIEUX
(SWITZERLAND)**
HOW TO BOOST MAJOR
SOLAR PROJECTS IN BUILDING
ENVIRONMENT: THE EXAMPLE
OF A VILLAGE IN GENEVA,
SWITZERLAND

AFTERNOON

11:45 - 13:00

LUNCH

13:00 - 13:30

SILVIA CROCE, EURAC RESEARCH (ITALY)

SUSTAINABLE AND
CLIMATE RESILIENT SOLAR
NEIGHBORHOODS

13:30 - 14:00

LUCIO MESQUITA, NRCAN (CANADA)

SOLAR-DRIVEN LOW-CARBON
COMMUNITIES: DRAKE LANDING
AND BEYOND (ZOOM)

14:00 - 15:00

ANDREAS ATHIENITIS (CONCORDIA UNIVERSITY, CANADA)

BIPV, BUILDING-GRID
INTERACTION AND DYNAMIC
PRICING OF ELECTRICITY
(ZOOM)

15:00 - 15:15

COFFEE BREAK

15:15 - 15:45

MILFRED HAMMERBACHER (S2E, LONDON ONTARIO)

SOLAR: A KEY INGREDIENT
OF HOLISTIC APPROACH TO
SUSTAINABLE COMMUNITY
DESIGN - LONDON, ONTARIO
CASE STUDIES (ZOOM)

15:45 - 16:00

CONCLUDING REMARKS

All times are reported in Calgary local time (+8H CEST)



Dr. Maria Wall is associate professor at the Division of Energy and Building Design, Lund University, Sweden. Energy aspects related to buildings have always fascinated her. She has a MSc in Architecture and a PhD in Engineering. Her research includes different aspects related to energy-efficient buildings as well as solar energy strategies. She is presently leader of the international research project IEA SHC Task 63 on Solar Neighborhood Planning (2019-2023), including both passive and active solar energy strategies. She was leader of the SHC Task 41 on Solar Energy and Architecture (2009-2012), and then leader for the SHC Task 51 on Solar Energy in Urban Planning (2013-2018).

She was the main initiator and developer, and was the Director of the 2-year Master's Programme in Energy-efficient and Environmental Building Design at Lund University, during 2012-2022. This programme is enrolling international students from different backgrounds, both in architecture and in engineering, since interdisciplinary teamwork is needed when designing sustainable buildings and neighbourhood.



Dr. Caroline Hachem-Vermette has two master's degrees in architecture, and an additional master's, and PhD in Building Engineering from Concordia University. Her research program is highly multidisciplinary, involving diverse disciplines such as architecture, urban planning, and building engineering.

Her research is multidisciplinary, bridging building engineering and architectural and urban design. It investigates multifunctional energy-efficient, resilient neighborhood patterns, solar potential and energy implications of building shapes, building envelope design, developing multifunctional facades for multistory buildings, and others. Her current research aims at developing concepts and strategies for the design of sustainable and climate resilient, self-sufficient, smart communities and urban developments. Part of this research program concentrates on the design of urban green infrastructure that aims at improving the health and wellbeing of urban inhabitants, especially in times of stress (including pandemics).

She is leading a subtask on developing strategies for net-zero energy solar communities, within the International Agency Energy Task (IEA) 63- Planning Solar Neighborhoods. She is widely published on the topic of energy efficiency and solar energy, including a book on designing solar buildings and neighborhoods. She is a recipient of several awards, including the 2019 Peak Scholar Award, 2016 sustainability award, e-sim/IBPSA award for innovation in modelling, and Hangai prize for young researchers.



Dr. Olaf Bruun Jørgensen has more than 30 years of experience in energy engineering. He has over 20 years' experience as project leader and strong expertise in sustainable and energy efficient R&D projects. He has specialized in optimization, design and implementation of active and passive solar energy systems in buildings.

Moreover, Olaf has extensive experience with the use of the Integrated Energy Design process which ensures a positive relation between form function, architecture, and sustainability through a close dialogue with all stakeholders involved in the construction project.

Previous projects include social housing, eco-housing and urban planning projects in Denmark and Europe. His experiences include working with national regulations and international frameworks (namely the SDGs). His clients include private and public organisations.



Alejandro Pacheco Diéguez has been working since 2014 as an architect specialized in digital tools applied to environmental design.

Alejandro's background includes optimization of building design and urban planning for environmental aspects such as energy use, daylighting, microclimate or environmental impact. Since 2019, he focuses on the development of accessible digital tools to evaluate various environmental performance aspects during building design in the early stages.



Dr. Mark Snow is a leading international expert on Building integrated PV with over 20 years of expertise. He has produced best practice BIPV guidelines for the Australian Government, developed solar design knowledge products for the Australian Institute of Architects and provided comprehensive state of the art reports for international governments on urban solar applications - including on PV as a building material for the recently completed Australian Cooperative Research Centre (CRC) for Low Carbon Living.

Dr. Snow has also worked extensively as an Australian representative on numerous International Energy Agency (IEA) tasks on Solar Energy programs including Solar Heating and Cooling Task 63 on Solar Neighbourhood Planning as well as co-authoring an internationally acclaimed book on designing with Solar Power.



Dr. Gabriele Lobaccaro is Associate Professor and Coordinator of Building and Technology Research Group at the Department of Civil and Environmental Engineering, Faculty of Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. He is co-leader of Subtask D on “Case studies” in the IEA SHC Task 63 “Solar Neighborhood Planning”.

His research focuses on solar energy design and digitalization, environmental analysis, energy and building technology, sustainable and resilient built environment.

Gabriele is currently the project manager and primary investigator of the research project NFR-FRIPRO FRINATEK – HELIOS - enHancing optimal ExpLoitatioOn of Solar energy in Nordic cities through digitalization of built environment. The project is supported by the Research Council of Norway (project. No. 324243).



Dr. Mattia Manni is a Postdoc Fellow at the Department of Civil and Environmental Engineering, Faculty of Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. He is co-leader of Subtask D “Case studies” in the IEA SHC Task 63 “Solar Neighborhood Planning”.

His research core concerns solar energy digitalization, combining experimental monitoring activities with numerical solar and energy analyses.

Mattia is currently leading the WP1 - Modelling and simulation and WP2 - Experiment and monitoring of the research project HELIOS - enHancing optimal ExpLoitat!On of Solar energy in Nordic cities through digitalization of built environment. The project is supported by the Research Council of Norway (project. No. 324243).



Dr. Gilles Desthieux is an associate professor at the Geneva Institute of Landscape, Engineering and Architecture (HES-hepia) and a senior consultant in urban energy planning in the company Amstein+Walthert Genève.

He holds an MA in environmental engineering and sciences and a PhD from the Swiss Federal Institute of Technology Lausanne (EPFL). His expertise deals with integrated urban and energy planning, development of GIS tools for energy mapping and planning, 3D urban modeling for environmental assessment – solar energy.



Dr. Silvia Croce is a Post-Doc researcher at the Institute for Renewable Energy, Eurac Research (Italy). She is a building engineer - architect by training, and holds a PhD in Engineering at the University of Padova.

Her research work aims at gaining insights into solutions for an integrated design of the urban built and natural environment, with focus on outdoor microclimate, thermal comfort, energy savings and renewable energy production. At the same time, it intends to raise awareness on the interlinkages of those topics and to activate different actors in developing integrated and systemic solutions.

She is co-leading the H2020 project JUSTNature, and active in several European projects. She was actively involved in IEA SHC Task 51 “Solar energy in urban planning”, and currently is co-leading sub-task B “Economic strategies and stakeholder engagement” of IEA SHC Task 63 “Solar neighborhoods planning”.



Dr. Lucio Mesquita is a Senior Research Engineer at CanmetENERGY-Ottawa/ Natural Resources Canada. He has over 30 years of experience and skills in the research, design, and testing of solar thermal and thermal storage products and systems for heating and cooling applications in industrial, commercial and residential markets in several countries including Canada, Brazil, China, and the United States. He also has experience with sorption process through his doctoral research on the development of liquid-desiccant components and systems.

Dr. Mesquita work is currently focused on sustainable community energy systems and thermal storage technologies. He holds a PhD in Mechanical Engineering from Queen's University and a Bachelor of Science in Mechanical Engineering from the Federal University of Minas Gerais (UFMG-Brazil).

Dr. Mesquita is actively involved with International Energy Agency Technical Collaboration Programmes on Solar Heating and Cooling, District Heating and Cooling, and Energy Storage.



Dr. Andreas K. Athienitis is a Professor of Building Engineering and Director of the Centre for Zero Energy Building Studies that he founded at Concordia University.

He obtained a PhD in Mechanical Engineering from the University of Waterloo (1985). He holds the NSERC/Hydro Québec Industrial Research Chair “Optimized Operation and Energy Efficiency: Towards High Performance Buildings” and a Concordia University Research Chair in Solar Energy. He is internationally recognized and a leader in smart net-zero energy solar buildings - a Fellow of the Canadian Academy of Engineering, Fellow of IBPSA and Fellow of ASHRAE. He led as Principal Investigator the NSERC Smart Net-zero Energy Buildings Strategic Research Network and the NSERC Solar Buildings Research Network with over 30 researchers from 15 Canadian Universities and about 30 industry and public sector partners.

He was profiled as one of 25 top innovators in Québec by Actualité Magazine. He has published over 300 refereed papers, including eight that received best paper awards, and several books. He played a leading role in the conception and realization of several award-winning innovative buildings such as the Varennes net-zero energy Library, EcoTerra House and his own award-winning solar home. He currently co-chairs the Canadian Academy of Engineering Roadmap to Resilient, Ultra-Low Energy Built Environment with Deep Integration of Renewables.



Milfred Hammerbacher has lived and managed businesses in four countries with 30 plus years of photovoltaic and energy experience.

As co- founder and CEO of S2E Technologies, Inc, his team built the largest solar factory in Canada at the time, partnered with Samsung to build the largest solar farms in Canada at the time, and developed or supplied over 800MW's of solar projects operating today. 9 years ago, the company began a transition into sustainable community and Building development, with projects in London, Ontario and Punta De Mita, Mexico.



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Flachem Vermette and Kuljeet Singh, University of Calgary

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Shading time



Many thanks to the sponsors of the seminar:

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**UNIVERSITY OF
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Solar Energy and Community Design Lab
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