Centre for Zero Energy Building Studies
Centre d'études sur le bâtiment
à consommation nulle d'énergie

EURAC research

IEA-SHC Task 56

Building Integrated Solar Envelope Systems for HVAC and Lighting

Agenda

6th Meeting

hosted by

Centre for Zero Energy Building Studies
Concordia University, Montreal

19-21 September 2018

Centre for Zero Energy Building Studies
Centre d'études sur le bâtiment
à consommation nulle d'énergie

EURAC research

IEA-SHC Task 56

Building Integrated Solar Envelope Systems for HVAC and Lighting

This Task focuses on the critical analysis, simulation, laboratory test and onsite monitoring of envelope systems entailing elements that use and/or control incident solar energy, having one or more of the following uses:

- To deliver renewable thermal or/and electric energy to the systems providing heating, cooling and ventilation to buildings
- To reduce heating and cooling demands of buildings, while controlling daylight

Integration of Solar Envelope solutions into the building's HVAC and lighting systems through a systemic approach is central in this Task. Energy performance, indoor comfort and architectural integration are addressed all along the Task duration.

The Task will focus on solutions looking at the mass market through an industrialized integration of active components into envelope elements.

Useful information:

Travel Visa:

To travel to Canada you will need a travel Visa.

By clicking on the next web-site you can check what type of Visa you need.

https://www.canada.ca/en/immigration-refugees-citizenship/services/visit-canada.html

I believe that all the European citizens need an eTA (Electronic Travel Authorization).

Once you get it, it will be linked to your passport, till your passport expires.

You can stay in Canada up to three months with it.

https://www.canada.ca/en/immigration-refugees-citizenship/services/visit-canada/eta.html

The process usually takes less than a day. Sometimes even few minutes and it costs 7Cad, approx. 5 Euro.

Important:

1) When you receive the eTA, make sure to **print** it. Most of the times, they ask for it at the counters where you do the luggage drop-off. Otherwise you will have to login and find it online, process that will take time, or even do a new-one on the spot.
2) When you **first** arrive in a Canadian airport you will pass by the passport check.
3) This process might take some time (30 mins and sometimes more, depending on the number of the people passing the boarders).
4) If you arrive in Montreal with a layover in another Canadian airport (ex Toronto), this process will happen there. If you miss your connecting flight to Montreal due to this delay, they will find you a spot on the next flight available to Montreal (from Toronto it is almost every hour).
5) If you arrive in Montreal with a layover in another Canadian airport, you will have to pick up your luggage and then drop it off again. Usually there is a separate exit for correspondences, after the luggage pick-up, where you don't have to exit the airport and re-enter.
6) When you pass the passport check, you **should not** tell them that you travel for work. They will understand that you want to work in Canada and will complex your entry. Instead you should tell them that you travel for a conference and for pleasure.

Airport to Downtown:

1) Taxi to downtown: It is flat rate of 40 CAD (usually cash) + around 5 CAD tip (not compulsory)
2) Bus to downtown: 747 bus to several metro and bus stops downtown.

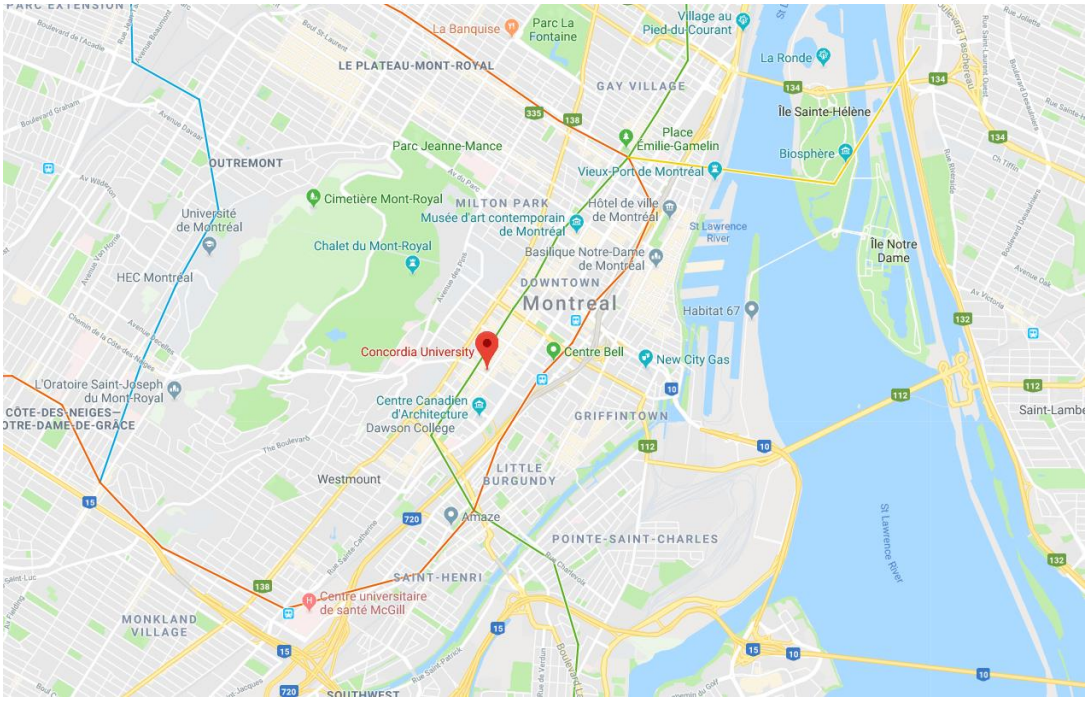
   http://www.stm.info/en/info/networks/bus/shuttle/line-747-east

   You can take the bus with:

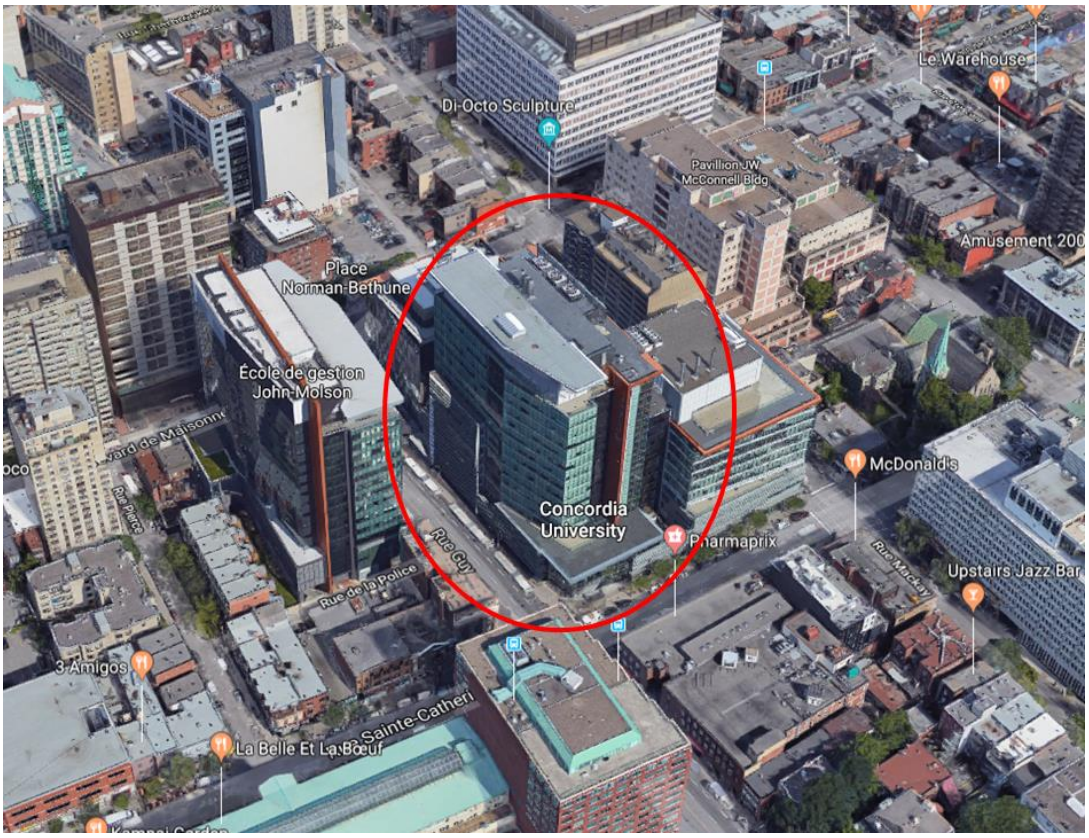
   - 1 day ticket (10 CAD, valid for 24 hours from the time it is validated. Access to all busses and metro)
   - 3 day ticket (19 CAD, ends at 23.59 of the 3rd day. Less than 3x24 hours. Access to all busses and metro)
   - Unlimited weekend (13.75 CAD between 16.00 on Friday and 5.00 on Monday. Access to all busses and metro)
   - Weekly pass (26.25 CAD from Monday until 11:59 p.m. on Sunday. Access to all bus and metro)

Address of Meeting Place

Zoomed out:



3D View:



Meeting place:

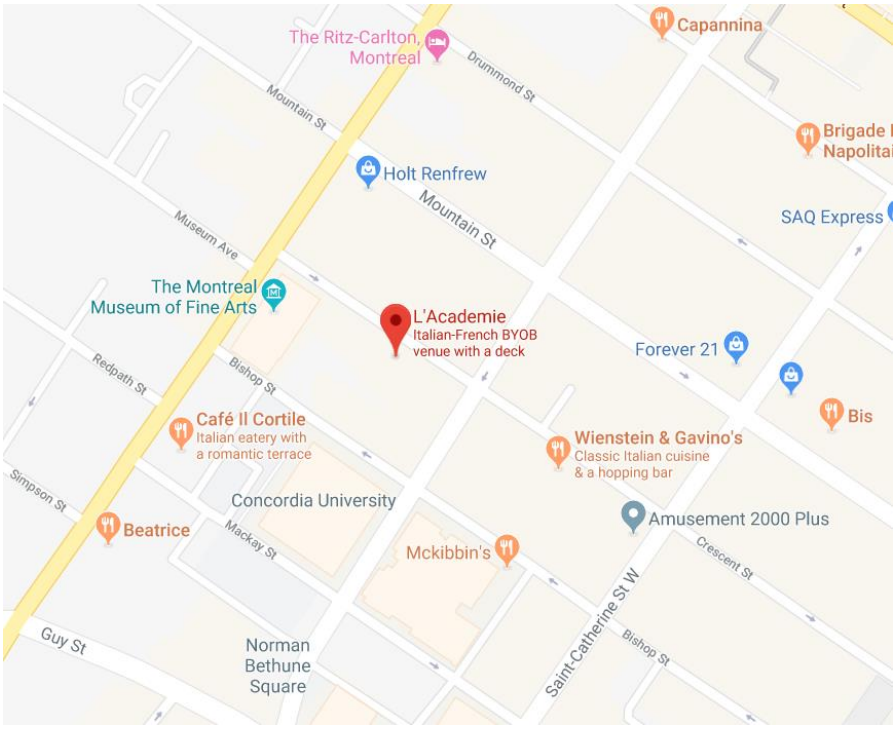
Pavillon Ev Building
1515 Saint-Catherine St W, Montreal, QC H3G 1S6
45.495273, -73.577815

Dinner #1: Unofficial Dinner (Not covered by Concordia University)

Date: 19.09.2018 **Time:** 19h30

Place: L'Academie (Bring your one wine).

Address: 2100 Crescent St, Montreal, QC H3G 2B8 Phone: +1 514 664 4455



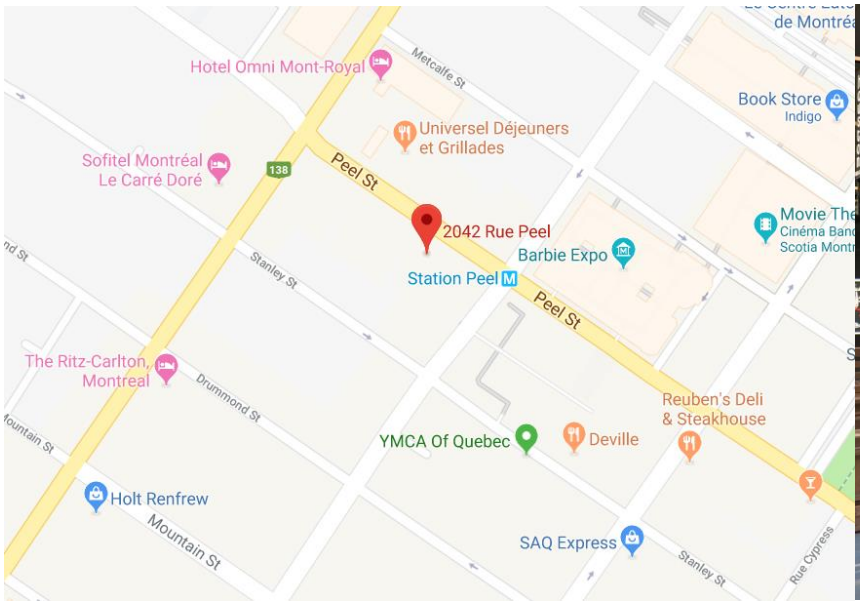
Dinner #2: Official Dinner (Drinks are not covered by Concordia)

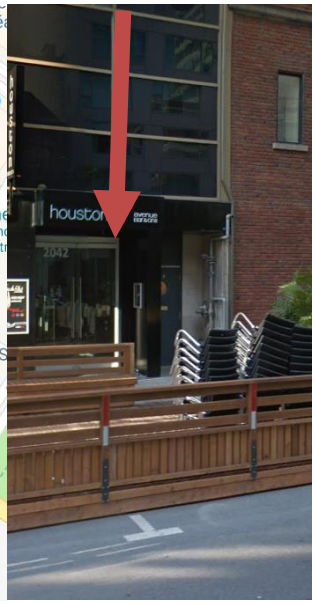
Date: 20.09.2018 **Time:** 19h30

<u>Alcohol is not included</u>

Place: Silk Road Restaurant

Address: 2042A Peel Street (at the right of Houston Avenue Bar & Grill)





No Participation fee

Accommodation:

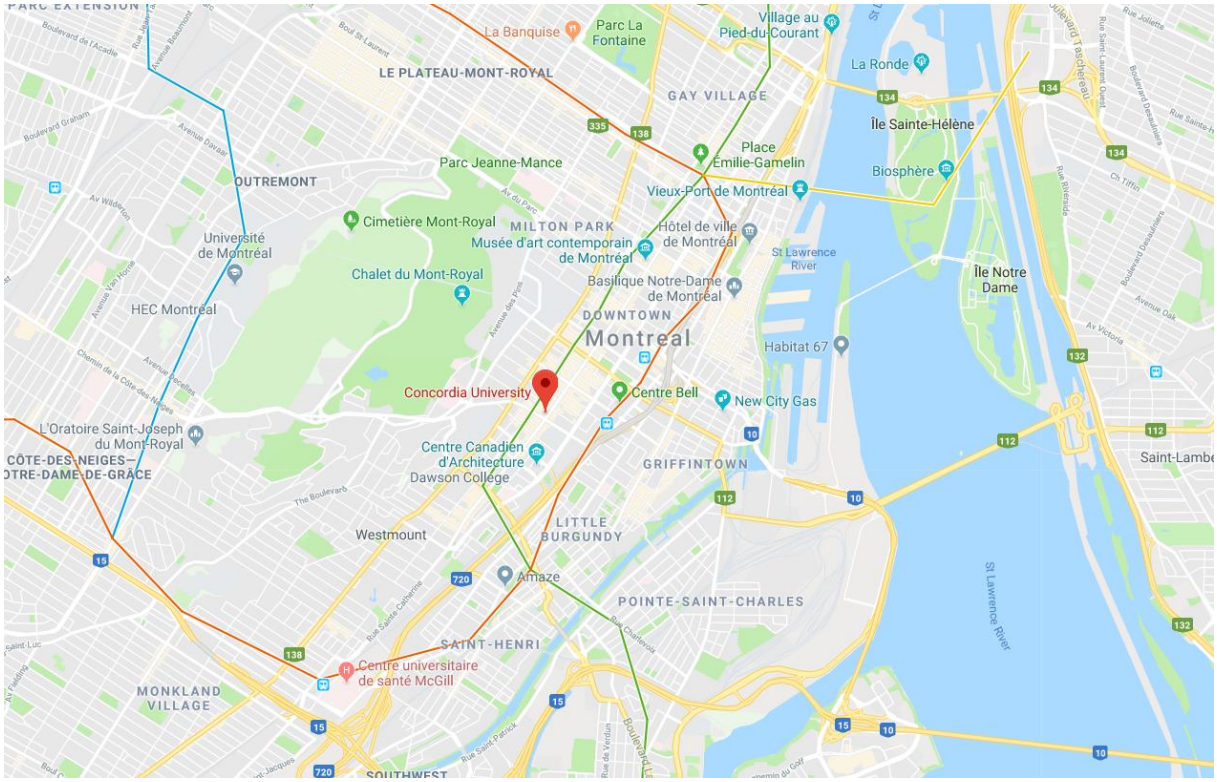
There are some hotels in the proximity that visitors of Concordia have used in the past:

- Holiday Inn Hotel & Suites Montreal Centre-ville Ouest
- Comfort Suites Downtown
- Novotel Montreal Centre
- Loews Hôtel Vogue

There are many hotels around Concordia University (corner of Guy and St. Catherine). You could use web-sites like www.booking.com or www.airbnb.com.

You can search for accommodation somewhere else in Montreal and reach Concordia University fairly easily through the Green Line of the Subway. Subway is part of STM which is the public transport agency that operates Bus and Subway in Montreal.

Metro:



The **Guy-Concordia Subway station** has an exit **directly inside** Concordia University. The Guy-Concordia Subway station is on Green Line (STM http://www.stm.info/en).

Contact persons:

Lyne Dee - lynedee@solarbuildings.ca
Zisis Ioannidis – zisis.ioannidis@gmail.com
Stratos Rounis – dstru69@gmail.com
Andreas Athienitis - andreask.athienitis@concordia.ca
Roberto Fedrizzi - roberto.fedrizzi@eurac.edu

1st day - Wed. 19th September 2018

Varennes' Library visit Meeting place: Lobby of EV building		Responsible
16.00	Welcome and organization of the meeting	EURAC
16.30	Bus to Varennes	Concordia
17.30	Visit to Varennes Library	Concordia
18.30	Bus to Concordia University	Concordia
19.30	Unofficial dinner at L'Academie	

2nd day - Th. 20th September 2018

IEA Task 56 meeting Meeting place: Room EV 11.119 (11th floor)		Responsible
8.45	Welcome by Dr. Amir Asif, Phd, PEng, Dean of Engineering and Computer Science	
9.00	IEA to SHC-Task 56 overview and status	Dr. R. Fedrizzi, (EURAC)
9.20	Status of Subtask A	Matteo D'Antoni (EURAC)
9.40	Status of Subtask B	Christoph Maurer (FhG-ISE)
10.00	Status of Subtask C	Fabian Ochs (UIBK)
10.20	Subtask B technical meeting	Christoph Maurer (FhG-ISE)
11.20	*Coffee break*	
11.40	Subtask B technical meeting	Christoph Maurer (FhG-ISE)
13.30	*Lunch break*	
14.30	Subtask A technical meeting	Michaela Meir (AVENTA, via Skype)
16.40	*Coffee break*	
17.00	Tour of Solar Simulator and Environmental chamber, JMSB building BIPV/T Solar System, Concordia University	Zisis Ioannidis (Concordia)
17.45	*End of second day*	

19.30	**Official dinner**	**Silk Road Restaurant**

3nd day - Fri. 21st September 2018

IEA Task 56 meeting Meeting place: Room EV 11.119 (11th floor)		Responsible
8.30	Welcome and organization of the meeting	Dr. R. Fedrizzi (EURAC)
Simulation Models (Subtask C)		
8.40	Introduction to SubT C, Overview of simulation results	Fabian Ochs (UIBK)
	Simulation of the Office Building with Modellica (skype)	Alireza Afshari (Alessandro Maccarini) (SBI)
	TRNSYS model of the Solar Decathlon house	Remi Dumoulin (Concordia)
	Daylight and energy simulations of PV integrated shading device parametrically modelled in Rhino using Grasshopper, connected to Honeybee and Diva	Ellika Taveres-Cachat (NTNU)
Applications, case studies (Subtask C)		
	Modular concept for a facade integrated thermal storage system in combination with a hot water heat pump	David Venus (AEE INTEC)
	Active roofs and façades technologies	Vickie Aagesen (KUBEN Management)
	FFG project SaLüH!, Simulation results of residential building with PV, PE analysis	Fabian Ochs (UIBK)
	Heating with a PV Façade in a Passive House	Fabian Ochs (UIBK)
10.30	*Coffee break*	
Applications, case studies (cont.)		
	Project Solus	Alireza Afshari (SBI)
	Solar thermal façade systems – An interdisciplinary approach	Christoph Maurer (FHG ISE)
	Advanced daylighting systems and combined lighting and thermal simulation	David Geisler-Moroder (Bartenbach)
	"Solar efficiency index of building envelopes and load matching in low energy buildings"	Ellika Taveres-Cachat (NTNU)

	New control algorithm for solar shading	Loonen, R.C.G.M. (Tue)
12.00	Discussion	
12.20	Closing of the Task meeting	Dr. R. Fedrizzi (EURAC)
12.45	*Lunch break*	

Canada Research, Development, Demonstration and Industry Workshop		
13.30	Registration and welcome	A. Athienitis, NSERC Hydro Québec Chair & Dr. R. Fedrizzi, EURAC
14.00	Overview of the Federal Government BIPV R&D Activities	Dr. Konstantinos Kapsis CanmetENERGY
14.30	CanMETEO tool	Dr. Jose Candanedo CanmetENERGY
14.45	**Round Table Panel discussion** BIPV, STPV and BIPV/T development and adoption in building design **Chair**: Livio Nichilo (Internat Energy Solutions), Konstantinos Kapsis (CanmetENERGY) **Participants**: Livio Nichilo (Internat Energy Solutions), Samuel Doyon-Bissonnette (Unicel Architectural), Ronald Drews (Canadian Solar), John Hollick (Conserval), Ady Vyas (S2E)	
15.45	*Coffee break*	
16.00	**Round Table Panel discussion** Building integrated solar systems and grid interaction **Chair**: A. Athienitis (Concordia), Jocelyn Millette (Hydro Québec) **Participants**: A. Athienitis (Concordia), Hua Ge (Concordia), Jocelyn Millette (Hydro Québec), Ady Vyas (S2E), Annamaria Buonomano (University of Naples)	
17.00	*Closing remarks and end of the workshop*	

Andreas K Athienitis, Eng., PhD, FCAE, FASHRAE, FIBPSA

Dr. Andreas K. Athienitis is a Professor of Building Engineering at Concordia University. He holds a Senior NSERC/Hydro Quebec Industrial Research Chair and a Concordia University Research Chair, Tier I. He obtained a B.Sc. in Mechanical Engineering (1981) from the University of New Brunswick and a PhD in Mechanical Engineering from the University of Waterloo (1985). He was profiled as one of 25 top innovators in Quebec by Actualité Magazine (Sep. 15, 2009). He is a Fellow is of the Canadian Academy of Engineering, Fellow of IBPSA and Fellow of ASHRAE. His research expertise is in solar energy engineering, energy efficiency, optimization and control of building thermal systems, building-integrated photovoltaics and daylighting. He is the author/co-author of more than 200 refereed papers, three books on building thermal and solar modelling and design, and more recently an advanced book on modelling and design of net-zero energy buildings.

Ady Vyas, Vice President, Energy Solutions, s2e technologies

Mr. Vyas heads the Energy Solutions and Intelligent Mobility business at s2e Technologies leading all activities in the segment including business development, feasibility engineering, design & analysis, financial analysis, project planning and execution. He is also championing a nested hybrid microgrid in West5 – A 70-acre net zero community in London, ON integrating renewable energy generation (PV), with energy storage, and an embedded DC bus within the AC grid. Mr. Vyas has B.S in Electrical Engineering from Sardar Patel University, GJ, India and M.S degree in Electrical Engineering from Texas Tech University, TX, USA. He also holds Black Belt certification from UMASS Donahue Institute, MA, USA.

Konstantinos (Costa) Kapsis, PhD, NRCan CanmetENERGY

Konstantinos (Costa) Kapsis joined NRCan CanmetENERGY in 2017 where his research focuses on building integrated photovoltaic (BIPV) technologies, passive solar building design, daylighting and occupancy behaviour. He is the Canadian participant under IEA PVPS Task 15 Before joining NRCan, he was a research associate at the Centre for Zero Energy Building Studies. He has also designed several low energy and zero energy buildings and BIPV systems in Canada and abroad as a project consultant. He obtained B.Sc. in Physics from the University of Athens, M.A.Sc. and Ph.D in Building Engineering from Concordia University. He is the author of four book chapters and several peer-reviewed journal articles".

Livio Nichilo P.Eng, CEM, M.Eng , Engineering Manager Internat Energy Solutions Canada Inc.

Livio is the CEO and Engineering Manager of Internat Energy Solutions Canada for its offices in Toronto and Calgary. Over the past ten years, Livio has been very active in IESC's marquee engineering projects and has built a strong organization that has gained experience in building sciences and renewable energy development. He has worked with diverse stakeholders in private sector, government organizations as well as non for profit entities. He is a Professional Engineer (P.Eng.) in the province of Ontario and in the province of Alberta and is also certified as an Energy Manager. Livio has a Bachelor of Science in Mechanical Engineering from Queen's University (2003) and a Master of Engineering with a collaborative in Environmental Studies (School of Environment) from the University of Toronto (2013).

Hua Ge, PhD, P. E, Associate Professor, Building, Civil, and Environmental Engineering

Dr. Ge received her Ph.D. from the Building Engineering program at Concordia University in 2003. She was the Director of Building Science Centre of Excellence at British Columbia Institute of Technology from 2004-2009. After working in the department of Architectural Science at Ryerson University, she joined the department of Building, Civil and Environmental Engineering at Concordia. She has published over 50 technical papers in peer reviewed Journals and conference proceedings. Her current research focuses on high performance and durable building envelopes including innovative wood-frame constructions and plus-energy curtain walls, quantifying wind-driven rain loads by field measurements and modeling, and optimum building envelope design for future climates.

Ronald Drews M.A., Director Business Development, Special Projects

Mr. Drews is the lead executive in Canadian Solar focused on BIPV/T and STPV commercialization and business development in Canada and China. Active in the development of renewable energy projects and solutions for over a decade, he has initiated projects in Canada, China, Southeast Asia, Latin America and Africa, often working through diplomatic channels.

Based in Ottawa, he has generated millions of dollars in financing and developed several hybrid projects in collaboration with First Nations in Canada. He further established funding to start Canadian Solar's Microgrid Test Centre, located in Guelph Ontario. Ron has presented at the MaRS Innovation Hub and various renewable energy conferences on the use of solar to reduce dependency on carbon-based fuels.

Samuel Doyon-Bissonnette, P.ENG, LEED AP, Director of Engineering Unicel Architectural Corp.

Mr. Doyon-Bissonnette is the Director of Engineering at Unicel Architectural Corp. located in Longueuil, Qc. Unicel Architectural has built a reputation for the most advanced aluminum and glass solutions. These solutions encompass curtain wall, skylights, louvered glazing and more. Unicel is committed to sustainability and it's R&D efforts are focused on developing, fabricating and installing BIPV and BIPV/T. Mr. Doyon-Bissonnette has obtained B.Eng. in Civil Engineering from the McGill University and is working towards a M.A.Sc. in Building Engineering at Concordia University.

Annamaria Buonomano, PhD, Assistant Professor at University of Naples Federico II

Annamaria Buonomano is an Assistant Profesor at the University of Naples Federico II and has a Ph.D. in Energetics from University of Palermo. She is a visiting scientist at Concordia University (Montreal, Canada), where she was appointed as Affiliate Assistant Professor in the Department of Building, Civil and Environmental Engineering in 2017. She is actively involved in research topics regarding building energy efficiency, with a particular focus on the development of performance simulation models and investigation of innovative building-plant solutions, based on integrated construction techniques, innovative HVAC systems and novel renewable energy technologies including solar heating and cooling systems. She is also involved in collaborative research activities relative to the design of net zero energy buildings and the integration of passive solar thermal systems in buildings.

John Hollick, CEO, Conserval Engineering Inc. Toronto Canada

A professional engineer by training and inventor of SolarWall, John Hollick has one of the longest track records in solar heating, spanning four decades. His SolarWall® invention has set the standard for building integrated solar air heating because of its high efficiency and low cost. He is CEO of Conserval and has been involved in solar projects in over 30 countries including the PVT project on our John Molson School of Business.

José Agustín Candanedo, PhD Affiliate Assistant Professor Concordia

José A. Candanedo completed his Ph.D. in Building Engineering at Concordia University. His doctoral research focused on control strategies for net-zero energy solar homes. José is the author of several conference and journal publications and is the recipient of an NSERC Alexander Graham Bell Doctoral Scholarship. José has also been part of the Canadian delegation participating in the IEA Task 40/Annex 52 since its inception. His academic interests include building-integration of renewable energy technologies, system identification, modeling complexity in building simulation, thermal energy storage, predictive control strategies, and load management. His vision is to contribute to solar building engineering with a practical, problem-solving outlook based on the scientific method, while focusing on creative and far-reaching measures.

Jocelyn Millette Ph.D, P.Eng, Hydro Quebec

Jocelyn Millette is back as a researcher at the Hydro-Québec's LTE research lab in energy conversion, heat and mass transfer and building physic. From 2011 to 2018, he was involved in LTE management. Focusing on energy-use technologies, LTE - the Hydro-Québec research institute's energy technology laboratory - puts technological innovation to work for the company's customers.

He got is B.Sc in physics, M.Sc.A and Ph.D. in mechanical engineering (heat and mass transfer) from Sherbrooke University. He is a professional engineer in Québec. As a scientist, he worked in building energetic. He also co-founded and managed a company in biomass boiler industry.