

## **Kyoto Smart City Expo 2018**

# **From Smart Buildings to Smart, Sustainable & Resilient Cities: Contributions of Concordia University, Montréal**

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**Vice-President, Research and Graduate Studies**

# Concordia University at a glance

## CONCORDIA

47,752  
STUDENTS

CONCORDIA  
CONFERRED:

1,864  
GRADUATE DEGREES

5,221  
UNDERGRADUATE DEGREES

110



RESEARCH CHAIRS

211,000  
ALUMNI  
AROUND  
THE WORLD



2,696  
CENTRE FOR CONTINUING EDUCATION STUDENTS

8,571  
GRADUATE STUDENTS

36,485  
UNDERGRADUATE STUDENTS

18.5%  
INTERNATIONAL  
STUDENTS

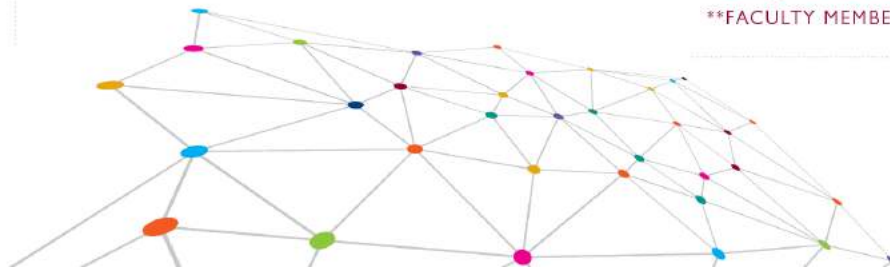
6,051

\*TOTAL EMPLOYEES

2,033

\*\*FACULTY MEMBERS

11  
ALUMNI  
CHAPTERS IN  
CITIES ACROSS  
NORTH AMERICA,  
EUROPE AND ASIA



# Our research ecosystem

- ❑ Concordia University hailed by Quacquarelli Symonds (QS) since 2017 as the top Canadian university in its Top 50 Under 50
- ❑ Strategic research plan anchored around The Person and Society, and Technology, Industry and the Environment – currently under review
- ❑ 32 federally-funded research chairs
- ❑ 66 Concordia University Research Chairs
- ❑ 21 research units formally recognized by Senate

# Our research focus

Major international trends in high performance buildings:

- ❑ Adoption by ASHRAE and developed countries of net-zero energy/zero carbon as a long term goal (*ASHRAE Vision 2020*)
- ❑ Energy flexibility in buildings with measures to reduce or shift peak electricity demand from buildings, thus reducing the need to build new power plants
- ❑ Optimized interaction with smart grids
- ❑ Efficient integration of new energy technologies such as building-integrated photovoltaic, thermal and electrical storage
- ❑ Increased use of IoT and AI to integrate and efficiently use building automation, security and information systems

# Smart solar building research at Concordia

N SERC Smart Solar Buildings and Communities  
Strategic Network - [www.solarbuildings.ca](http://www.solarbuildings.ca)

- ❑ Promoting incident solar energy, geothermal energy and energy efficiency technologies for smart buildings and communities in order to optimize their energy performance and energy resilience
- ❑ Full integration of smart energy techniques (AI) and predictive control at the building and community scales
- ❑ Energy resilience focus mainly at the community scale, applied also to extreme weather situations (e.g. ice storm of '98) and Arctic or remote communities
- ❑ Impartial input to national policy related to climate change

# Smart solar building research at Concordia

## NSERC Solar Buildings and Communities Strategic Network - [www.solarbuildings.ca](http://www.solarbuildings.ca)

- The first initiative of its kind to focus on net-zero energy building (NZEB), the network has been active since 2005
- Partner and project driven with a strong emphasis on training the next generation:
  - From 2005-2010, the network held four conferences, trained over 100 graduate students and published over 400 papers
  - From 2011-2016 the network continued and expanded the work of the previous cycle with a new focus on smart NZEB; three conferences were held and 146 graduate students were trained





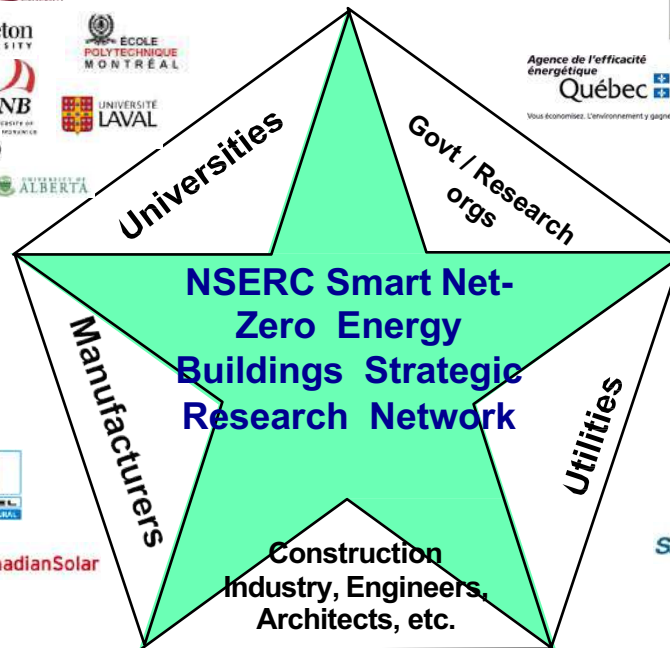
**NSERC SMART NET-ZERO ENERGY  
BUILDINGS STRATEGIC RESEARCH NETWORK**

**RÉSEAU DE RECHERCHE STRATÉGIQUE DU CRSNG  
SUR LES BÂTIMENTS INTELLIGENTS À CONSOMMATION  
ÉNERGÉTIQUE NETTE ZÉRO**



**Natural Resources  
Canada**

**Ressources naturelles  
Canada**



# John Molson School of Business





# Varennnes Library



A living lab, the Library is Canada's first institutional solar NZEB

# Looking to the future

Concordia University recently awarded a Canada Excellence Research Chair in Smart, Sustainable and Resilient Communities and Cities, a \$20 M investment (\$10 M from CERC, \$10 from CERC partners) – chair holder recruited, start date to be confirmed

Transdisciplinary and intersectoral research thrusts:

- ❑ Clean energy
- ❑ Integrated built environment design
- ❑ Smart technologies and optimized community operation
- ❑ Collaborative community, knowledge mobilization and policy

# Our philosophy

- ❑ Contributing to Canadian leadership in clean energy technologies and their integration into a smart and comfortable built environment
- ❑ Researching state-of-the-art innovative and integrated clean energy solutions for high performance resilient buildings and communities
- ❑ Training the next generation in the latest smart, solar and geothermal technologies and their integration with energy efficiency technologies
- ❑ Promising technologies and their integration will be studied to provide input to national policies – e.g. potential towards GHG reduction until 2050 – while achieving energy resilience

CONCORDIA.CA

**NEXT.GEN**