

## GENERAL BACKGROUND

### PROFILE AND TECHNICAL SKILLS

- Certificate in **Women in Leadership, Cornell University, 2021.**
- Ph.D. in building engineering with professional training in architecture, and in-depth experience in both disciplines.
- Experienced in dynamic energy modeling of buildings and renewable energy systems, employing various software (e.g. MATLAB, MATCAD, HOT2000, e-Quest, AGI 32, EnergyPlus, ESP-r, RETScreen, SketchUP, AutoCAD, 3-D Max).
- Experienced in various research techniques including scientific methods of experimental design, data recording, and data analysis employing statistical methods.
- Proficient in technical writing and editing, with more than 21 journal papers, and 15 refereed conference papers.
- Possessing significant visual and verbal communication skills, such as preparing presentations and communicating ideas.
- Personality traits contributing to productivity, including organization, punctuality, independent and creative thinking, being hard working and industrious, good team membership and team leadership.

### EDUCATION

- 2012 **PH.D. STUDIES IN BUILDING ENGINEERING.**  
Concordia University, Montreal, Quebec.  
Research Topic: Investigation of design parameters for increased solar potential of dwellings and neighborhoods, aimed at developing design guidelines for optimization of solar potential of building shapes and neighborhood patterns. Thesis Rank: Excellent.
- 2008 **MSC. IN BUILDING ENGINEERING**  
Concordia University, Montreal, Quebec.  
Research Topic: Microbial Volatile Organic Compounds in Full-Scale Stud Cavities – Identification and Transport Analysis.
- 2004 **MSC. IN ARCHITECTURE AND URBAN PLANNING**  
Technion - Israel Institute of Technology, Haifa, Israel.  
Research topic: Deployable systems in nature – structural characterization and architectural applications. Graduated *summa cum laude*.
- 1999 **DIPLOME D'ETUDE SUPERIEUR ((DES) A COMBINED BA-MSC DEGREE IN ARCHITECTURE**  
Holy Spirit University, Beirut, Lebanon.  
Final Project and thesis: Design of cultural center for re-evaluation of arts, influenced by the *Purgatory of Dante*, and integrating the project into the urban center of Beirut in Lebanon. Graduated valedictorian.

### ACADEMIC EXPERIENCE

- 2023-present **Associate Professor**  
Concordia University, Department of Building, Civil & Environmental Engineering, Gina Cody School of Engineering and Computer Science, Concordia University.
- 2019-2022 **Associate Professor**  
University of Calgary, School of Architecture, Planning and Landscape (SAPL, former EVDS) Calgary, Canada. Research area includes climate resilient, high performance buildings and neighborhoods, renewable and alternative energy, and net-zero carbon buildings and neighborhoods. Teaching topics include building technologies and systems, and building physics, and energy performance studio crits.
- 2014-2019: **Assistant Professor**  
University of Calgary, Faculty of Environmental Design (EVDs), Department of Architecture, Calgary, Canada. Research area includes energy efficiency in buildings and neighborhoods, solar energy capture and utilization, building envelope design and optimization, and Net-zero energy and carbon buildings. Teaching topics relate mainly to building technologies and systems, and building physics.

2012-2014: **Postdoctoral Fellowship**

NSERC *Smart Energy Buildings Strategic Research Network* (SNEBRN), at Concordia University, Department of Building, Civil and Environmental Engineering.

Responsibilities included: design of sustainable mixed-use developments (including residential and office buildings) and analysis of their energy performance, development and modeling of new concepts for building integrated photovoltaic/thermal systems.

2008- 2012: **Graduate research assistantship**

Concordia University, Faculty of Engineering, department of Building, Civil and Environmental Engineering, in the topic of solar optimized housing and neighborhoods. Accomplishments include:

- Identification of key solar design parameters and quantifying their effect on the solar potential of housing shapes and neighborhood patterns.
- Developing design methodology for net-zero energy neighborhoods.
- Publications (4 journal papers and 8 conference papers), involvement in various energy-related projects (see below), international workshops (organization and participation) and presentation in seminars (e.g. Natural Resources Canada (NRCAN), Dawson College Montreal, etc.).

2005-2008: **Graduate research assistantship**

Concordia University Faculty of Engineering, department of Building, Civil and Environmental Engineering, in the topic of mold growth in buildings. Accomplishments include:

- Identification of MVOCs in stud cavities and their transport to the indoor space.
- Conducting full-scale experiments, and statistical analysis of the results.
- Publications (2 journal papers and 3 conference papers), publication of a book based on the thesis.

2001-2004: **Graduate research assistantship**

Technion Institute of Technology, Haifa, Israel, Department of Architecture and Town Planning, on the topic of deployable structures in nature and their application to architecture. Accomplishments include:

- Study of deployable structures in nature and their application to architecture.
- Publications (4 journal papers and a conference paper), winning of the IASS (International Association for Shell and Spatial Structures) Hangai prize for young researchers.

## PROFESSIONAL EXPERIENCE

### *INTERIOR ARCHITECTURE*

- 1999-2004:
- Interior designs for residential homes in Southern Lebanon.
  - Interior design projects in North Israel, including a shopping mall lobby and entrance, restaurant and several dwellings.
- 1995-1999:
- Architectural practice in the offices of Profs Charles Btaich and Henri Hawa (Beirut). Wide exposure to different types of projects including public spaces (restaurants, shops, etc.) and residential houses.
- The training comprises: designing, detailed drawings and implementation of different interior spaces.

### *ARCHITECTURE*

- 2001-2005
- Design and supervision of residential houses in Israel
- 1999-2000:
- Founding and managing a private architectural practice. Design and supervision of multiple housing projects in Southern Lebanon.

## *EXTRACURRICULAR ACTIVITIES*

Beyond my academic activities, I am a painter. I have produced hundreds of acrylic and oil paintings and mixed media over the last eighteen years and continue to be active in this field. I participated in several exhibitions and won the **excellence prize in one major competition in Jerusalem**, in 2003. Some of my latest exhibitions include:

- **Venice Biennial Art Exhibition “Personal Structures” 2022**, organized by the European Cultural Centre – Worldwide; at Palazzo Bembo, Palazzo Mora and the Marinaressa Gardens, from 23rd of April 2022 until 27th of November 2022. **My project of Invisible Cities-Visualized is currently exhibited in Palazzo Bembo**, and it contains 43 paintings expressing various aspects of urban developments, including issues such as sprawl, pollution, over consumption and others
- **Unsustainable: Plasteel, 2020** Artwork presented at ACLCA Conference: Art in Science, as a first initiative to include artistic presentations along scientific research.
- **Personal Structures, Saint-Adèle, Québec, 2017**

## RESEARCH ACTIVITIES

### *INTERNATIONAL AND NATIONAL ACADEMIC LEADERSHIP*

- International Energy Agency Tasks (IEA) (2018-2023): I am currently the Subtask Leader for the new IEA 63- Solar Neighborhood Planning, focusing on developing strategies for net zero energy/carbon neighborhoods.
- Climate resilience ROADMAP for 2050 (led by the Canadian Academy of Engineering) (CAE)): I am one of 20 experts on the national committee of Resilient Ultra-low Energy Built Environment with Deep Integration of Renewables in 2050, which aims at achieving at least an 80% reduction in GHG emissions in new and existing buildings and associated community infrastructure.
- Initiated collaboration with the University of Thessaly (Greece) and the University of Florida for knowledge dissemination through the international *Conference on Energy, Sustainability and Climate Change* (ESCC, 2018). I am one of the main chairs of the conference for the year 2018.
- Establishing and leading a new collaboration with Palermo University (Palermo, Italy), where I was invited to deliver lectures for the summer school in July 2017 and a seminar in April 2018. The collaboration is supported by *Eyes High* International Collaborative Grant for new researchers, and it resulted in a journal paper and a conference paper, with two additional papers in preparation.
- Initiated Collaboration with Schullish school of Engineering (Group of Dr. Joules Bergerson), as part of my ongoing project on mixed-use net zero energy neighborhoods.
- Leader of the project *Design of Net- Zero Energy Communities* as part of NSERC *Smart Net -Zero Energy Building Research Network* (SNEBRN) (2015-2016).
- National expert in the International Energy Association (IEA) Task 51- *Solar Energy in Urban Planning*. I was one of the three main Canadian representatives of the International Energy Agency (IEA)(2013-2017). The main objective of Task 51 was to provide urban planners, authorities and architects with means to achieve urban integrated solar energy solutions (active and passive) and a long-term urban energy strategy.
- National expert in the International Energy Association (IEA)-Task 41, *Solar energy and Architecture* (2009-2012). The objective of this task was to assist in achieving high quality buildings integrated solar energy systems and to make architectural design a driving force for the use of solar energy
- Invited speaker in many countries including Australia, Chile, Norway Italy and Greece (See presentations and invited lectures below).

### *RESEARCH FUNDING*

#### GRANTS AWARDED

I secured in the last 8 years around one million dollars (ca. \$1,015,000 CAD) in grants; the majority through individual grant applications, as listed below.

1. Mitacs with Gestion Schefferville (Quebec) (2022-2023); (\$ 40K)
2. Mitacs with MgO Systems, (Calgary, AB), (2022) (\$30K)
3. SSHRC Connection, 2022-2023, (\$25K)
4. Natural Sciences and Engineering Research Council of Canada (NSERC) *Discovery Grant* for the years 2021-2026 (\$160K).
5. Mitacs with MgO Systems, (Calgary, AB), (2020-2021) (\$45K)

6. Mitacs with Dialog (Calgary, AB), (2020-2021), (\$58K)
7. 2 Mitacs with S2e Tech (London, Ontario), (2019-2020), (\$50K)
8. Mitacs with Dialog (Calgary, AB), (2019-2020), (\$30K)
9. NSERC SEED Grant, (2019-2020), (\$15K)
10. Natural Sciences and Engineering Research Council of Canada (NSERC) *Engage* Grant with ATCO Gas (2019-2020) (\$29.5K).
11. 2018 *Eyes High* Doctoral Recruitment Scholarship (ca. \$125K, international recruitment)
12. EVDs *MakeCalgary* Grant, 2018, (8K)
13. *Eyes High* International Collaboration (2017-2018) (\$12.5K)
14. Natural Sciences and Engineering Research Council of Canada (NSERC) *Engage* Grant, 2017 (\$25K).
15. 2016 *Eyes High* Doctoral Recruitment Scholarship (ca. \$100K)
16. *Building Excellence Research and Education Program* Grant Award, BC Canada, (2016-2017) (\$40K).
17. Natural Sciences and Engineering Research Council of Canada (NSERC) *Engage Grant*, 2016 (\$25K).
18. Natural Sciences and Engineering Research Council of Canada (NSERC) *Discovery Grant* for the years 2015-2020 (\$110K).
19. EVDS *MakeCalgary* Grant ( 2015, 2016) (\$20K)
20. NSERC *Smart Energy Building Research Network* (SNEBRN) research grant for the years 2015-2016 (ca \$55K)
21. EVDS Startup fund for the years 2014-2015 (\$20K)
22. Industry support from s2e technology Inc. (2013-2014)
23. Natural resources Canada, on an individual level, to facilitate participation and presentation of my work in two IEA tasks (IEA task 41 – Solar energy and architecture (from 2010-2012), and IEA task 51- Solar energy and urban design (from 2013-2016).

## *PUBLICATIONS*

### PAPERS IN REFEREED TECHNICAL JOURNALS

PhD students and post doctorates are identified with \*, and Master students with \*\*.

1. Hachem-Vermette, C., and Singh, K., 2022, **Energy resilience indicators and application to energy crises response strategies**, in review
2. Singh, K. and Hachem-Vermette, C., 2022, **Techniques of improving infrastructure and energy resilience in urban setting**, in review.
3. Yadav, S., Hachem-Vermette, C., Panda, S, 2022, **Design and Performance Evaluation of Greenhouse Integrated thin-film Photovoltaic (GiPVT) System with Earth Air Heat Exchanger (EAHE)**, in review.
4. Zahedi, R., hasan Ghodusinejad, M., Aslani, A. and Hachem-Vermette, C., 2022. **Modelling community-scale renewable energy and electric vehicle management for cold-climate regions using machine learning**. Energy Strategy Reviews, 43, p.100930.
5. Hachem-Vermette, C., 2022. **Role of solar energy in achieving net zero energy neighborhoods**. Solar Energy Advances, 2, p.100018.

6. Syed\*, A and Hachem-Vermette, C., **Towards the development of energy sharing methodology between different buildings for highly efficient neighborhood design**; in review.
7. Hachem-Vermette, C. and Singh\*, K, **Energy systems and energy sharing in traditional and sustainable archetypes of urban developments**, 2022, Journal of Sustainability.
8. Singh\*, K. and Hachem-Vermette, C., 2022, **Novel approach of urban energy simulations using EnergyPlus and programming language**, Energy and Buildings.
9. Aslani\*, A and Hachem-Vermette, C., 2022 **Life Cycle Assessment and the Environmental Impact of Magnesium Oxychloride Wall Panels Compared to High-performance Walls**; Journal of Construction and Building Materials.
10. Aslani\*, A and Hachem-Vermette, C., 2022. **Energy and Environmental Assessment of High-performance Building Envelope in Cold Climate**, Energy and Buildings.
11. Hachem-Vermette, C. and Singh\*, K, **Optimization of energy resources in various building cluster archetypes, submitted to Renewable & Sustainable Energy Reviews**, 2021.
12. Yadav, S., Panda, S., Hachem-Vermette, C., 2021, **Periodic Theory of Greenhouse integrated Semi-transparent Photovoltaic Thermal (GiSPVT) system integrated with Earth Air Heat Exchanger (EAHE)**; Renewable Energy.
13. Hachem-Vermette, C. and Singh, K., **Analysis of urban energy resources to achieve net-zero energy neighborhoods**. Frontiers in Sustainable Cities, p.111.
14. Yadav\* Somil, Sarat Panda, Caroline Hachem-Vermette. (2021); **Effect of Water Flow on Energy Matrices and Life-cycle Cost Analysis of Urban BiSPVT System**, Energy & Buildings.
15. Edun\*\*, A, Hachem-Vermette, C., 2022, **Post-Consumer Waste Recycling for High Performance Building Envelopes in Cold Climates: Assessing Energy and Environmental Impacts**, Journal of Cleaner Production, Accepted.
16. Edun\*\*, A, Hachem-Vermette, C., 2021, **Energy and Environmental Impact of Recycled End of Life Tires Applied in Building Envelopes**, journal of Building Engineering, 39, p.102242.
17. Singh, K, Hachem-Vermette, C., 2021, **Economical Energy Resource Planning in Sustainable Energy Neighborhood**, Renewable & Sustainable Energy Reviews.
18. Somil Yadav\*, Caroline Hachem-Vermette, Sarat Panda,. (2020). **Optimum azimuth and inclination angle of BIPV panel owing to different factors influencing the shadow of adjacent building**. Renewable Energy.
19. Yadav, S.\*, Panda, S., Hachem-Vermette, C., 2020. **Determination of Optimum Azimuth and Tilt Angle of BIPV Panel Influenced by Shadow of Adjacent Building Having Different Plan Orientations**, Journal of Applied Energy.
20. Yadav, S.\*, Panda, S., and Hachem-Vermette, C. (2020). **Exergetic Performance Assessment of Optimally Inclined BIPV Thermal System by Considering Cyclic Nature of Insolation**. Journal of Solar Energy Engineering: Including Wind Energy and Building Energy Conservation. SOL-20-1203, Accepted.
21. Hachem-Vermette, C., Singh, K\*, 2020, **Optimization Of Energy Resources Mix Within A Mixed-Use Neighborhood**, Journal of Applied Energy.
22. Guarino, F., Longo, S., Hachem-Vermette, C., Cellura, M, and La Roccaa, V. (2020). **Life cycle assessment of solar communities**. Solar Energy.
23. Yadav, S.\*, Panda, S., Hachem-Vermette, C., 2020. **Method to Improve Performance of BIPV Thermal System Having Optimum Tilt and Facing Directions**, Journal of Applied Energy.
24. Dara\*, C Hachem-Vermette, C., 2019. **Evaluation of low-impact modular housing using energy optimization and life cycle analysis**; Journal of Energy, Ecology and Environment 4 (6), 286-299.

25. Singh, K. and Hachem-Vermette, C., 2019. **Influence of mixed-use neighborhood developments on the performance of waste-to-energy CHP plant.** *Energy*, 189, p.116172.
26. Dara\*, C., Hachem-Vermette, C. and Assefa, G., 2019. **Life cycle assessment and life cycle costing of container-based single-family housing in Canada: A case study.** *Building and Environment*, 163, p.106332.
27. Hachem-Vermette, C. and Singh, K., 2019. **Optimization of the mixture of building types in a neighborhood and their energy and environmental performance.** *Energy and Buildings*, 204, p.109499.
28. Hachem-Vermette, C. and Singh, K., 2019. **Mixed-use neighborhoods layout patterns: Impact on solar access and resilience.** *Sustainable Cities and Society*, 51, p.101771.
29. Hachem-Vermette, C., Guarino, F., La Rocca, V. and Cellura, M., 2019. **Towards achieving net-zero energy communities: Investigation of design strategies and seasonal solar collection and storage net-zero.** *Solar Energy*, 192, pp.169-185.
30. Singh, K\*. and Hachem C., 2019. **Impact of Commercial Land Mixture on Energy and Environmental Performance of Mixed-Use Neighborhoods,** *Journal of Building and Environment*, 154, pp.182-199.
31. Hachem, C., and Singh K\*, 2019. **Investigation of the impact of residential mixture on energy and environmental performance of mixed use neighborhoods,** *Journal of Applied Energy*, 241, pp.362-379.
32. Syed\*, A., and Hachem, C. 2019. **Review of Lighting, Controls, Carbon-dioxide, Passive Design and Renewable Energy Systems for Agricultural Greenhouses,** 'Journal of Biosystems Engineering' (J. Biosyst. Eng., JBE, e-ISSN: 2234-1862, p-ISSN: 1738-1266).
33. Syed\*, A. and Hachem C., 2019. **Review of Construction, Geometry, HVAC and Indoor Climate Requirements of Agricultural Greenhouses,** Journal of Biosystems Engineering' (J. Biosyst. Eng., JBE, e-ISSN: 2234-1862, p-ISSN: 1738-1266).
34. Syed\* and Hachem, C, 2019, **Net-Zero Energy Design and Energy Sharing Potential Between Retail and Greenhouse Complex,** *Journal of Building Engineering*.
35. Hachem, C. and Beckett\*\*, R., 2018. **Early stage Design Workflow for high Energy Performance Multi-storey Residential Buildings,** *Journal of Architectural Environment & Structural Engineering Research*.
36. Syed\*, A. and hachem, C. 2018, **Climate change resilient urban prototypes – A Canadian perspective on net zero energy design for retail amenities,** *Journal of Energy Engineering*, Vol 116, No 1.
37. Hachem, C. 2018, **Multistory Building Envelope: Creative Design and Enhanced Performance,** *Journal of Solar Energy*; 159:710-721. DOI: 10.1016/j.solener.2017.11.012
38. Hachem C. and MacGregor A.\*\*, 2017, **Energy Optimized Envelope for Cold Climate Indoor Agricultural Growing Center,** *Journal of Buildings*, 7(3), 59; (This article belongs to the Special Issue Towards Decarbonization in the Building Sector: Innovating Net-zero Energy Buildings) doi:10.3390/buildings7030059 (registering DOI.)
39. Hachem C, ElSayed, M. (2016), **Patterns of façade system design for enhanced energy performance of multistory buildings,** *Journal of Energy and Building*, Volume130, 366-377. s. *This paper was selected as a key scientific article for advances in engineering* [<http://www.crebnw.com/reaching-for-the-sun/>].
40. Hachem, C., (2016). **Impact of neighborhood design on energy performance and GHG emissions,** *Journal of Applied Energy*, Volume 177, Pages 422–434.
41. Hachem C., Cubi, E. Bergerson, J. (2016). **Energy performance of a solar mixed-use community,** *Journal of Sustainable cities and communities*, Volume 27, Pages 145-151.

42. Hachem, C., (2015), **Integrated design considerations for solar communities**, *Journal of Green Buildings*, V 10, N2.
43. Hachem C., Athienitis A., Fazio P., (2014). **Energy performance enhancement in multistory residential buildings**, *Journal of Applied Energy*, 116, pp. 9-19
44. Hachem C., Fazio, P., and Athienitis, A., (2013). **Solar optimized residential neighborhoods: Evaluation and design methodology**, *Journal of Solar Energy*, 95, 42-64.
45. Hachem C., Athienitis A., (2013). **Using Passive Design**, *ASHRAE journal*, Volume 55, Issue 1, Pages 72-74.
46. Hachem C., Athienitis A., Fazio P., (2012). **Evaluation of energy supply and demand in solar neighborhoods**, *Journal of Energy and Buildings*. Volume 49, Pages 335-347.
47. Hachem C., Athienitis A., Fazio P., (2012). **Design of roofs for increased solar potential of BIPV/T systems and their applications to housing units**. *ASHRAE Transactions* RNS-00226-2011.R1.
48. Hachem C., A. Athienitis, P. Fazio, (2011), **Investigation of Solar Potential of Housing Units in Different Neighborhood Designs**, *Journal of Energy and Buildings*, Volume 43, Issue 9, Pages 2262-2273.
49. Hachem C., A. Athienitis, P. Fazio, (2011), **Parametric investigation of geometric form effects on solar potential of housing units**, *Journal of Solar Energy*, Volume 85, Issue 9, Pages 1864-1877.
50. Hachem, C., Chaubey, Y., Fazio P., Rao, J. and Bartlett, K., (2010), **Statistical analysis of microbial volatile organic compounds in an experimental project: identification and transport analysis**, *Indoor and Built Environment*, 19(2): 275-285.
51. Hachem, C., Fazio, P., Rao, J., Bartlett, K., Chaubey, Y., (2008); **Identification and Transport Investigation of Microbial Volatile Organic Compounds in Full Scale Stud Cavities**, *Building and Environment*, Volume 44, Issue 8, Pages 1691-1698.
52. Hachem, C., Karni, E., Hanaor, A., **Evaluation of Biological Deployable Systems**, *International Journal of Space Structure*, Vol.20, No 4, 2005, 189-200.
53. Hachem, C., Hanaor, A., **Folding Sleeves – Variations on a Theme of the Earthworm**, *International Journal of Space Structure*, Vol.20, No 3, 2005, 127-146.
54. Hachem, C., Hanaor, A., **Deployable Applications Based on Biological Organisms**, *Journal of the International Association for Shell and Spatial Structures*, Vol.46, No 2, 2005, 94-106.
55. Hachem, C., Karni, E., Hanaor, A., **Deployable Structures in Nature: Examples, Analysis and Realization**, *Journal of the International Association for Shell and Spatial Structures*, Vol.45, No 3, 2004, 190- 198.

#### CONFERENCE PAPERS

1. Hachem- Vermette, **Role of Neighbourhood Spatial and Energy Design in Reducing Energy Vulnerability During Power Disruption**; The 17th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Nov 2022, Cyprus.
2. Yadav, S., Hachem-Vermette, C., Panda, S., **Semi-transparent photovoltaic thermal (SPVT) greenhouse system combined with earth-air heat exchanger for cold climatic aquaculture**, Eurosun, 2022.
3. Campamà Pizarro, R.; Hachem-Vermette, C.; Grewal, K; Bernardo, R.; Kanters, J. Wall, M. **A Methodology to Streamline the Assessment of Existing Neighborhoods Towards Climate Neutrality**, Building Performance Analysis Conference and SimBuild co-organized by ASHRAE and IBPSA-USA, 2022.
4. D’Almeida, R., Hachem-Vermette, C., Singh, K., (2021), **Implementation of solar strategies within different urban layouts**, ISES Conference, online.
5. K. Singh and C. Hachem-Vermette, **Energy sharing potential in mixed-use cluster**, eSim 2020, Vancouver, Canada, 2020.



6. Caroline Hachem-Vermette. (2020). Design strategies for climate resilient Neighborhoods. CAE Roadmap to Resilient Ultra-Low Energy Built Environment with Deep Integration of Renewables in 2050
7. Alarcon Herrera, Olivia\*; Hachem-Vermette, Caroline. (2020). Developing Multi-functional Design Strategies for Facades in Net-Zero Energy High-Rise Buildings. PLEA.
8. Singh\*, K., Hachem-Vermette C. (2020). Energy Sharing Between Sustainable Residential And Conventional Commercial Buildings Cluster. PLEA.
9. Caroline Hachem-Vermette. (2020). Design and Performance of Landscape Adaptable PV Structures. Eurosun.
10. K. Grewal\* and C. Hachem, (2020). Scheduling of Hybrid Heating and Cooling System Based on Energy Resources for Mixed-Use Multistorey Building" for the 2020 ASHRAE Annual Conference.
11. K. Grewal\* and C. Hachem. (2019). Impact of waste disposal variation on performance of waste-to-energy based CHP: A case study. International Conference on Innovative Applied Energy (IAPE'19), Oxford, United Kingdom.
12. Guarino, F., Longo, S., Hachem-Vermette, C. and Cellura, M. (2019). Environmental Life Cycle Impacts of a Solar –Borehole Thermal Energy Storage Integrated District Heating System. SDEWES, Dubrovnik, Croatia.
13. Syed\* A. and Hachem-Vermette, C.,. (2019). Design Optimization and Energy Sharing Potential of Urban centric Community. 16th International Building Simulations Conference and Exhibition, Rome, Italy Conference
14. Hachem C., Guarino F., La Rocca V., Cellura, M., Thermal collection and seasonal storage potential of a mixed use neighborhood, Eurosun 2018
15. Hachem C., Dara\*, C. and Kane, R., 2018; Towards net-zero energy modular housing: a case study. Modular and Offsite Construction (MOC) Summit EN17.
16. Beckett\*\* R. and Hachem C., (2017), Building Envelope Energy Optimization for Multistory Buildings, 2017 Canada Conference on Building Science Technology (CCBST 2017), Vancouver, Canada. BC
17. MacGregor\*\* A. and Hachem C. (2016). Cold-Climate Supermarket attached Greenhouse: A Case Study, Eurosun Conference, Spain.
18. Hachem C., (2016) Environmental impact of various neighborhood designs, SimAUD 2016, London.
19. MacGregor\*\* A. and Hachem, C. (2016) Investigation of Design Strategies For Improved Energy Performance In Supermarkets: A Case Study, eSim 2016. DG
20. ElSayed M. and Hachem C. (2016). Development of optimization methodology for increased energy efficiency of PV integrated curtain wall systems, eSim 2016. SN
21. Bigalia E., Hachem, C., ElSayed M., and Athienitis, A. (2016). Solar energy potential for commercial building façade retrofit, eSim 2016.
22. Hachem C., Cubi, E. Bergerson J. (2015). Energy performance of a solar mixed-use community, 4th Climate Change Technology Conference, Montreal, Canada.SN
23. Hachem C., (2015), Design of a base case mixed-use community and its energy performance, 6th International Building Physics Conference, Torino, Italy. SN
24. C. Hachem, P. Fazio and A. Athienitis, (2013), Design of curtain wall facades in multistory buildings for improved solar potential and daylighting distribution, ISES Conference,3-7 Nov., Cancun, Mexico.
25. C. Hachem, P. Fazio and A. Athienitis, (2013), Effect of Housing Density on Energy Performance of Solar-optimized Residential Configurations, CISBAT Conference, 4-6 September, Lausanne, Switzerland.
26. Hachem C., Athienitis A., and Fazio P., Design Methodology of Solar Neighborhoods, Solar Heating and Cooling Conference, Energy Procedia, July 2012.
27. Hachem C., Athienitis A., and Fazio P., Solar Optimized Neighborhood Patterns: Evaluation and Guidelines, eSim 2012, 7th Biennial Building Simulation Conference of IBPSA-Halifax, Canada, May 2 - 3, 2012.
28. Hachem C., Fazio P., and Athienitis A., Energy Implications and Solar Energy Potential of Housing Units ‘Shapes, The 5th International Building Physics Conference (IBPC5), Kyoto, Japan, May 2012.
29. Hachem C., Athienitis, A., and Fazio P., Design of Roof Morphology for Increased Solar Potential of BIPV/T Systems, ISES Conference, Kassel, Germany, August 2011.

30. Hachem C., Athienitis, A., and Fazio, P., Evaluation of Alternative Neighborhood Patterns for BIPV Potential and Energy Performance, CISBAT, Lauzanne, Switzerland, September 2011.
31. Hachem C., Athienitis, A., and Fazio, P., Design of Solar Optimized Neighbourhood, ASHRAE conference, Montreal, June 2011.
32. Hachem C., Athienitis, A., and Fazio, P. A Study of the Influence of Housing Unit Form and Density on Solar Potential, EuroSun conference, Graz, Austria, 28 Sep.-1 Oct., 2010.
33. Hachem C., Athienitis A, Fazio P. and O'Brien W., Design of Passive Low Energy, Low Cost Housing: A Case Study, Canadian Solar Building Conference, Totonto, 2009.
34. Hachem, C., K. Bartlett, P. Fazio, J. Rao, Y. Chauby, Sampling and Evaluation of Mold Related Volatile Organic Compounds in Full Scale Stud Cavities, ASTM symposium, April 2009, Vancouver, Canada.
35. Hachem, C., Chaubey, Y., Fazio, P., Rao, J., Bartlett, K.; Statistical Analysis of Mold Related Volatile Organic Compounds in Full Scale Stud Wall Cavities, the Forth International Building Physics Conference (IBPC4), Istanbul, June (2009).
36. Hachem, C., K. Bartlett, P. Fazio, J. Rao, C. Chaubey, Investigation of Microbial Volatile Organic Compounds and Their Transport through the Building Envelope, Nordic Conference of Building Physics, Copenhagen, Denmark, June 2008.
37. Hachem, C., Karni, E., Hanaor, A., "Deployable Structures in Nature: Examples, Analysis and Realization", Shell and Spatial Structures, from Models to Realization, Proc. IASS Symposium, Montpellier, 20-24 September, 2004.

### ABSTRACTS

1. Dara\*, C. and Hachem C.; Life Cycle Assessment: Low Energy and Low Carbon modular housing in Canada, 5th International Conference on "Energy, Sustainability and Climate Change", ESCC 2018 Mykonos, Greece, June 4-6, 2018.
2. Tyler, ME, and Hachem Re-Framing Urban Design: Buildings as a primary source of electricity and GHG reduction, 5th International Conference on "Energy, Sustainability and Climate Change", ESCC 2018 Mykonos, Greece, June 4-6, 2018.
3. Tyler, ME, and Hachem, C., 2017. Transformational Design: Demonstrating Infrastructure and Projective Ecologies in a Canadian Urban Context
4. Hachem, C., 2017, Impact of Design approach of cold-climate greenhouse on Energy performance and GHG emissions, 4th International Conference on Energy, Sustainability and Climate Change, June 12-14, 2017 .
5. Robinston\* and Hachem 2017 Walkability as an Indicator of Neighbourhood Resilience (breakout presentation), Journal of Transport & Health, 2017 – Elsevier

### POSTERS

1. Hachem-Vermette, C., Singh, K., (2021), Role of solar energy in achieving net zero energy neighborhoods, ISES Conference, online.
2. Eduard Cubi and Caroline Hachem Assessment of energy options in a mixed use community in Calgary, NSERC SNEBRN Annual General Meeting, Saskatoon, 2015 May
3. Edvinas Bigalia, and Caroline Hachem, Modeling and analysis of two case studies in Saskatoon, NSERC SNEBRN Annual General meeting, Saskatoon, 2015 May
4. Hachem C., Athienitis, A., and Fazio, F., Design of Roof Morphology for Increased Solar Potential of BIPV/T Systems, ISES Conference, Kassel, Germany, August 2011.
5. Hachem C., Athienitis, A., and Fazio, F., Evaluation of Alternative Neighborhood Patterns for BIPV Potential and Energy Performance, CISBAT, Lauzanne, Switzerland, September 2011.

### REPORTS

1. Identification of existing tools and workflows for solar neighborhood planning; **Editors:** Jouri Kanters, Martin Thebault; **Authors:** Nicholas Baker, Rafaella Belmonte Monteiro, Alessia Boccalatte, Karine Bouty, Johannes Brozovsky, Cyril Caliot, Rafael Campamà Pizarro, Raphaël Compagnon, Agnieszka Czachura, Gilles Desthieux, Matteo Formolli, Stéphanie Giroux-Julien, Victor Guillot, Benjamin Govehovitch, **Caroline Hachem-Vermette**, Ellis Herman, Olivia Alarcon Herrera, Jérôme H. Kämpf, Gabriele Lobaccaro, Christophe Ménézo, Marjorie Musy, Giuseppe

Peronato, Arnkell Jonas Petersen, Auline Rodler, Kuljeet Singh , Viktor Sjöberg , Mark Snow, Joar Tjetland, and Yupeng Wang; SHC IEA Task 63 publications.

2. Hachem-Vermette, C. Energy resilient communities, Overview of resilience concepts, impact of disasters on energy infrastructure, and energy indicators, report submitted to Natural Resources Canada (Ottawa), March 2022.
3. Silvia Croce Caroline Hachem-Vermette, Matteo Formolli, Daniele Vettorato, Mark Snow, SHC IEA Task 63 report DB1: Surface Uses in Solar Neighborhoods, June 2022.
4. Caroline Hachem -Vermette, Kuljeet Singh , Olaf Brunn Jorgenson , Silvia Corce, Matteo Formolli, Rafael Compama Pizzaro and Gilles Desthieux, IEA Task 63 DA1: Incorporation of Solar Design Strategies in urban planning , Dec 2021.
5. Singh . K. and Hachem-Vermette , C. (2021). Renewable, alternative and conventional energy resource optimization for grid-tied mixed-use building cluster. ATCO.
6. Alireza, A. and Hachem-Vermette, C. (2021). Life Cycle Assessment of MGO Assemblies Compared with Conventional and High-Performance Building Envelope. 16. Mgo Systems.
7. Hachem-Vermette, C. (2020). Towards low-carbon communities, in support of the LCCES project. 11. Natural resources Canada.
8. Hachem-Vermette, C. (2020). Review of current international collaboration initiatives within the International Energy Agency framework on solar neighbourhoods planning regarding its applicability to the LCCES project. 11. Natural resources Canada.
9. Hachem-Vermette, C. (2019). International review on rehabilitation and retrofitting of existing neighborhood towards low-carbon communities. 13. Natural resources Canada.
10. Hachem-Vermette, C, Robinston ,N. (2018). Advanced Building Envelope Design of Multistory Buildings. 53. Homeowner Protection Office (HPO), BC Housing.
11. Contribution Percentage: 71-80
12. Caroline Hachem and Chineyere Dara. (2017). Evaluation of the Impact of Building Envelope Design on Energy Performance of Container-Based Modular Housing Units. 54. Ladacor.
13. Caroline Hachem and Anders McGregor. (2016). Growing Center's Optimized Building Envelope Design. Anethum.
14. Hachem-Vermette. (2015). Feasibility study of Net zero energy large scale neighborhood in Okotoks. 16. Natural Resources Canada.

#### BOOKS AND CHAPTERS IN BOOKS

1. Hachem-Vermette, Energy resilient neighborhoods, 2024 (in preparation, proposal accepted by Springer).
2. Hachem-Vermette, C. **Solar Buildings and Neighborhoods**: Design considerations for high energy performance, Springer, 2020.
3. Jun-Tae Kim, Jin-Hee Kim, Ahmed Hassan, **Caroline Hachem**, and Fred Edmond Boafu, 2016. *Net-zero Energy Mass Customized Houses ZEMCH: Toward the Delivery of Zero Energy Mass Custom Homes-Chapter 9* . , published by Springer.
4. Hachem, C. , Fazio P., Bartlett, K., 2010, *Microbial Volatile Organic Compounds in Full Scale Stud Cavities* (published MS thesis), LAP Lambert Academic Publishing, AG & CoKG.
5. Hachem, C. and Hanaor, A., "Folding Sleeves - Variations on a Theme of the Earthworm", 2009, in Motro R., Editor, *Structural Morphology and Configuration Processing of Space Structures*, Part B: Structural Morphology, Multi-Science, Brentwood, Essex, pp.115-138.

#### MISCELLANEOUS PUBLICATIONS AND MEDIA COVERAGE

1. Tackling the complexity of urban-level energy simulation, solarthermalworld.org <https://www.solarthermalworld.org/news/tackling-complexity-urban-level-energy-simulations>
2. Researcher paints optimistic energy future for cities, <https://ucalgary.ca/news/researcher-paints-optimistic-energy-future-cities/> U-Today, June 25th 2021.
3. Deployment of photovoltaic in Alberta, Radio Canada-Alberta (in French), June 2020, <https://myemail.constantcontact.com/News-Release---City-launches-environment-rebates-tohelp-stimulate-economy.html?soid=1127191170163&aid=ciiW3uDQdUs>
4. Passive Solar Design, C. Hachem-Vermette, Folds (D-talks), <http://thisisthefold.org/index.php/2017/05/03/passive-solar-in-cold-climates/>

5. Illustrative Prospective of Solar Energy in Urban Planning Collection of International Case Studies, June 2017; Olaf Bruun Jørgensen, Mauro Caini, Silvia Croce, Johan Dahlberg, Aymeric Delmas, Pietro Florio, Francesco Frontini, François Garde, Markus Gratzl, Virginie Grosdemouge, Caroline Hachem-Vermette, [...], IEA SHC Task 51
6. IEA SHC: Attractive Solar Solutions for Urban and Landscape Planning. September 2016, <http://www.solarthermalworld.org/content/iea-shc-attractive-solar-solutions-urban-and-landscape-planning>
7. State-of-the-Art of Education on Solar Energy in Urban Planning; Delmas, Aymeric ; Florio, Pietro ; Hachem-Vermette, Caroline ; Horvat, Miljana[...]; 2017; IEA Task 51
8. The communication process; Ehrbar, Doris ; Frontini, Francesco ; Gosztanyi, Susanne ; Hachem, Caroline[...] 2012; IEA Task 41– Solar Energy and Architecture
9. Product developments and dissemination activities, Lobaccaro, G ; Wall, M ; Munari Probst, M C ; Maturi, L, Snow, M., Gostonyi, S., Hachem, C., [...] 2012, TASK 41 – Solar Energy and Architecture
10. Interview for industry news, <http://www.crebnw.com/reaching-for-the-sun/>, Calgary, 2016 December.
11. Utoday, <https://www.ucalgary.ca/utoday/issue/2016-04-22/design-symposium-congress-2016-explores-calgarys-architecture>
12. ASHRAE funding research on building shape and density, by Jessica Krippendorf, Journal of Commerce July 4, 2011. <http://www.joconl.com/article/id45095>
13. A small but fiercely efficient chalet, Article in Montreal Gazette by Joanne Penhale, Special to THE GAZETTE 06.24.2014. <http://www.montrealgazette.com/homes/small+fiercely+efficient+chalet/9974199/story.html>

#### **THESES AND DISSERTATIONS**

1. *Investigation of Design Parameters for Increased Solar Potential of Dwellings and Neighborhoods*, Dissertation for Doctor in Philosophy (ranked excellent), Department of Building, Civil and Environmental Engineering, Concordia University, Montreal, Quebec, Canada, 2012.
2. *Microbial Volatile Organic Compounds in Full Scale Stud Cavities, Identification and Transport Analysis*, Dissertation for Master of Applied Science, Department of Building, Civil and Environmental Engineering, Concordia University, Montreal, Quebec, Canada, 2008.
3. *Biological Deployable Systems, Characterization and Architectural Application*, Thesis submitted in partial fulfillment of the requirements for the MS degree in architecture, The Technion, Israel Institute of Technology, October 2004.
4. *Le Nouvel Eldorado - Centre d'Evaluation des Arts - selon Dante*, Memoire pour le Diplôme d'Etude Supérieur en architecture (DES), University of Holy Spirit Kaslik, Lebanon, October 1999.

#### **SELECTED SEMINARS, INVITED TALKS AND PANELS**

##### **SEMINARS**

1. Seminar on Solar neighborhoods: strategies and application case studies, organized (by Hachem-Vermette, C.) as part of International Energy Agency Task 63, 23rd of September 2022.
2. ISES Webinar - IEA SHC Solar Academy: Task 63: Solar Neighborhood Planning, 23 and 25<sup>th</sup> of November 2021, Solar planning strategies and concepts.
3. Seminar on Climate resilience ROADMAP for 2050 (led by the Canadian Academy of Engineering) (CAE)), Feb 2021-Oct 2021.
4. Invited speaker to the Energy Efficiency Technologies Conference, Cape Town, on the subject of Nexus between energy efficiency and resilience of communities, August 2021, Web seminar.
5. Invited speaker to the University of Alaska, Department of Mechanical Engineering on the subject of net zero energy neighborhoods, November 2019, Web seminar.
6. Invited speaker in the Workshop on Roadmap to Resilient Ultra-low Energy Built Environment with Deep Integration of Renewables in 2050, (March 2019).Montreal, Canada

7. Invited speaker- seminar for the Alberta Government, on October 1<sup>st</sup>, 2018 on the subject of planning resilient solar communities.
8. Invited keynote speaker at the 5<sup>th</sup> Energy, Sustainability and climate change (ESCC) 2018, on the subject of Design considerations of net-zero energy, low carbon, communities.
9. PhD seminar, Design of Solar net-zero energy communities, Palermo, Italy, 2018.
10. Invited speaker at the Illumination Engineering Society (IES) Chapter, Calgary 2017 on the subject of the impact of building envelope design on energy efficiency.
11. Design of Net-zero energy communities: bridging gaps between architecture and engineering, NSERC SNEBRN Workshop: Net-zero energy communities, Montreal, Canada, 2016 December.
12. Chair and speaker at the Interdisciplinary congress (May 2016), Energizing by Design.
13. Invited speaker in the International Seminar – Arquitectura E Ingenieria De Envloventes De Edificios, organized by the schools of Architecture and Engineering of Pontifical Catholic University of Chile, Nov 2015. <http://web.ing.puc.cl/~live/simposio/expositores.html>.
14. Invited speaker and chairing a session in CZEBS-iiSBE-APEC Symposium, Towards climate change resilient neighborhoods, Montreal, Canada, August 2015.
15. Invited speaker in Open Symposium on Solar Energy in Urban Planning, Trondheim, Norway, March 2015.
16. Invited speaker for 2013 Building Saskatchewan Green Conference, Oct 25th.
17. Seminar on the subject of Planning and Designing Solar Neighborhoods, in Australia/Canada/Sweden joint seminar, organized by CRC for Low Carbon Living. Held in Sydney, Australia, February, 2013.
18. Health Symposium, on the subject of Sick Buildings Syndromes – Identification of Mold in wall cavities, Montreal, May 2012.
19. Seminar on the subject of design parameters for energy efficiency buildings and communities, at Dawson College, Montreal, February 2012.
20. Seminar on the subject of Net-zero Energy Communities, at Illinois Institute of Technology Chicago, January 2012.
21. Seminar on the design of large-scale solar communities, delivered for a group from the industry sector in collaboration with National Resources Canada (NRCan), Calgary, October 2011.
22. PhD International Workshop (for international PhD students), on the subject of architectural integration of solar technologies in buildings, Concordia University, June 2011.

#### PANEL DISCUSSIONS

1. Net-zero energy buildings and Communities, Montreal, Canada, SNEBRN Smart Net-zero Energy Buildings Research Network (Dec. 2016).
2. Resilient neighborhoods, University of Calgary, TURN Science in the Pub Night (Nov 2016).
3. Moderating a panel discussion on the Topic of “Designing Cities”, as part of the Interdisciplinary congress (May 2016), Calgary, Canada.
4. Panelist, the City Dark (24 Nov 2015), IES Calgary Section.
5. Panelist, Towards climate change resilient neighborhoods , Montreal, Canada, CZEBS-iiSBE-APEC Symposium (Aug 2015)
6. Net-zero Energy buildings and communities, Saskatoon, Canada, NSERC SNEBRN. The workshop brought together construction and technology industry leaders and large number of researchers/academics in Canada (May 2015).
7. Panelist on the subject of Building Integrated Photovoltaic Systems, at CANSIA (2012), Toronto Canada.

*HIGHLY QUALIFIED PERSONNEL (HQP)*

Since 2015, I acted as supervisor for a more than 24 graduate students and research fellows (Post doctorates and research associates). I also fulfilled several other co-supervisory roles. Six of my Master students have already graduated, in addition to two PhDs. **The total number of HQPs I am supervising include:**

- 5 PhD students (2 graduated in 2021), in addition to another PhD starting in Sep 2022
- 7 Master students (5 graduated in 2017 -2021)
- 2 Master students in Sustainable Energy Development (SEDV) Graduate Program (one graduated in 2020)
- 1 visiting PhD student for a duration of one year
- 2 Post doctorate fellows, and additional postdoc will be starting in Sept. 2022
- 1 Research Associate
- 12+Research assistants (part time).
- 1 Undergraduate-visiting student

***Additional Supervisory roles:***

- Serving on the PhD supervisory committee of 2 PhD students.
- Supervision of a group of PhD and Master students (Sep- Dec. 2013), under the Community Energy Management Team, for the pilot project of a large-scale smart community design launched by s2e Technologies Inc. (see below in Public and Professional Activities).

*AWARDS, DISTINCTIONS AND FELLOWSHIPS*

- Peak Scholars in Entrepreneurship, Innovation & Knowledge Engagement Award, 2019. The University of Calgary. This award is dedicated to academic individuals which have demonstrated excellence in entrepreneurship, innovation and/or knowledge engagement, where the individual's academic work has had a proven impact outside of the academy.
- 2016 Sustainability Award for the Campus as a Learning Laboratory, given by the office of sustainability, the University of Calgary, for the course of Sustainability in the built environment.
- Award for Outstanding Contribution: Innovative Direction in Modeling, awarded for the paper "Solar Optimized Neighborhood: Evaluation and Guidelines", e-Sim Conference (IBSA Canada), Halifax, May 2012.
- Thesis Accelerator Award, Concordia University, for the academic year 2012.
- National Research Canada (NRCan) grant for the participation in IEA task 41- Solar Energy and Architecture, 2010-2013.
- ASHRAE grant-in aid scholarship, for the year 2011-2012.
- Professor Hugh McQueen Award for excellence, for the academic year 2010 -2011.
- Bill Graham- NSERC scholarship, for the academic years 2010-2012.
- J. W. McConnell Memorial Graduate Fellowship Concordia University, for the academic years 2009-2011.
- Frederick Lowy scholars, Concordia University, for the academic years 2008-2011
- Graduate Student Association Conference Travel Award, Concordia University, for the academic years 2009 and 2010.
- Power Corporation of Canada graduate fellowship, Concordia University, for the academic year 2008-2009.
- Campaign for a New Millennium Graduate Scholarship, Concordia University, for the academic year 2006-2007.
- Concordia University Graduate Shuffle Scholarship, Concordia University for the academic year 2005-2006.

- International tuition fee remission award, Concordia University, Quebec, Canada, for the academic year 2005-2006.
- Thesis Research Prize of Excellence for the Thesis *Biological Deployable Systems - Characterization and Architectural Application*, for MS degree in architecture, Technion -Israel Institute of Technology, 2005.
- Hangai Prize for young researchers in the field of space structures for paper titled "Deployable Structures in Nature: Examples, Analysis and Realization" presented at the 2004 IASS symposium at Montpellier, France. The prize is awarded annually at the international IASS symposium to four young researchers, based on rigorous review.
- Technion, Israel Institute of Technology scholarship, Academic years 2001-2002, 2002.
- The excellence prize in a major art competition in Jerusalem, in 2003.

## TEACHING AND ACADEMIC ACTIVITIES

### COURSES

- 2014-2022
- Design Decisions: Energy Performance, Selective crits-based course, designed to support design decisions in Studio courses (2020-2022).
  - Sustainability in the Built Environment (2015- 2016, 2018-2020), EVDs, University of Calgary, Core course for Foundation year (and open to other students, from industry and other faculties), ~70 students.
  - Solar Building Envelope Design (2015- 2020), EVDS, University of Calgary, Elective course, Max of 15 students.
  - Environmental Systems (2015- 2020), EVDs, University of Calgary, Core course for M1 students. ~65 students
  - Lighting in Architecture (2014-2020), EVDs, University of Calgary, Core course for M1 students. ~65 students
- 2013-2014:
- Building Performance Simulation, Ryerson University, Faculty of Architecture (Program of Architectural Sciences) (Winter 2014).
- 2012-2013:
- Acoustic and Illumination (BLDG366), Concordia University, Faculty of Building Engineering, Winter 2013.
- 2001-2002:
- Secondary and high school teaching in Israel – subjects include Applied Art, French literature and Mathematics.

### DIRECTED STUDIES

#### *Course-based directed studies with graduate students*

- EVDS 783.87 Directed Study in EVDS, W2017 Design of energy efficient mechanical systems for energy buildings.
- EVDS 783.57 Directed Study in EVDS, W2016, Towards net-zero energy stand-alone cabin.

### INVITED EDUCATIONAL LECTURES

- Building envelope- 2017 (40 students), University of Palermo, Italy, Concentrated one day course, given to graduate level Engineering students in the summer school.
- Guest lecture in many courses (average of 2 courses per year).

## LEARNING AND PROFESSIONAL DEVELOPMENT

Courses and workshop listed below were taken at the University of Calgary, and (that unless mentioned otherwise ) are mainly offered by the Taylor Institute of Teaching and learning

- Certificate of Women in Leadership, Cornell University, February-April 2021.
- Course on digital teaching deliveries (4 lectures by TFDL, University of Calgary, 2021)
- 2 ArcGIS courses (Online resources, 2020)
- ISW, Instructional Skills Workshop for Faculty Members and Graduate Students; 3 days, (September 2016).

Course Objective: To ameliorate teaching abilities and learn new methods in enhancing students learning.

- Effectiveness in the Academy: Personal Leadership for Enhanced Career Productivity; 6 weeks, (starting 2015 October).



Course Objective: To enhance personal leadership in academic environment.

- Using Groups and Teams: A Practical Approach, 1 day, (2015 November).

Course Objective: it focuses on how to use groups / teams in the classroom.

- Building teaching portfolio, 1 day, (2016 July).

Course Objective: Explaining how to build a teaching dossier for Tenure and Promotion.

- Flipped lesson course, 2 days, (2016 October).

Course Objective: Learning new method in teaching and learning: Flipped lessons.

- Course Design, 3 days, (2016 November)

Course Objective: Designing a course.

- National Educators' Conference on Wood Education, Ottawa, Canada, 1 day, (2016 October).

Course Objective: Learning about different initiatives in wood education.

- NSERC Discovery grant Workshop, 1 day, (2014 August);

The workshop was designed to help in the application to NSERC Discovery grant.

- Supervisor workshop, 1 day, (2015 April);

The workshop aimed at introducing and clarifying the supervisory duties at U of C.

- Toward Low Carbon Energy Workshop, 1 day, (2014 November);

The workshop aims at introducing and discussing low carbon initiatives, in Calgary.

- Making the Most of the First Day of Class Workshop, 1 day, (2014 September).

The objective of the workshop is to share tips about teaching the first day of class.

- Desire2Learn Essentials: Content and Communication Tools Workshop, 1 day, (2014 August).

The workshop aims at introducing Desire2Learn.

## ACADEMIC AND COMMUNITY PROFESSIONAL SERVICES

### *ENERGY-RELATED ADVISORY SERVICES*

- Member of the National Advisory Committee for the step-by-step guide for building cost-effective and sustainable affordable housing in Canada (2018-2019).
- Member of Buildings and Energy Systems Working Group, City of Calgary (2017).
- Project leader NSERC Smart net-zero energy research network, Design of New Net-zero Energy Communities (2015-2016).
- Solar Energy Positive Cabin (Miller cabin). This cabin, located in a remote area of the Kananaskis County is a research facility for the University's biological faculty to house a number of students as they perform their research (2015-2016).
- Solar energy research consulting for new mixed-use community, West Campus, Calgary (2015).
- Solar community design – feasibility study for Okotoks new community (2015-2017).
- Research & Design Team Leader – Community Energy Management Team, working on the Smart Community (pilot community) research team for s2e Technologies Inc. upcoming development efforts near London, ON. This initiative aims at exploring the application of environmental design principles in practice. These principles include both normative, well-established forms of interventions as well as the development of new, emergent approaches in architecture, planning, and environmental design (2013-2015).
- A member of the study team of Large Scale Solar Seasonal Storage (led by Natural Resources Canada-NRCan). This project aims at applying solar seasonal thermal energy storage system, together with passive solar design of housing units and neighborhoods to a large community (1000+ units) (2011-2012).

### *ORGANIZATION OF WORKSHOPS AND CONFERENCES*

- Organizing and chairing the IEA Task 63 international summer school 2022- Solar Neighborhoods Planning: Gauging various perspectives.
- Organizing the international public seminar - Solar neighbourhoods: strategies and application case studies, Sep 2022.
- Organizing the semi-annual IEA Task 63- Solar Neighborhood Planning, international meeting, Sep 20<sup>th</sup>-22<sup>nd</sup>, 2020- 2021.
- Organizing and chairing an international fall school 2021- Tackling the complexity of urban level simulations (September 30<sup>th</sup> -October 21<sup>st</sup>; with students from 6 countries, and instructors from 9 international institutions).
- Co-chairing the 11<sup>th</sup> conference of International Solar Energy Society (ISES), (as one of the three executive and scientific chairs), 2021.
- Co-chairing and organizing the Canadian Association of Engineers CAE 2021 International - Low-Carbon and Positive Energy Resilient Communities Webinar, October 2021.
- Organizer and moderator, International Energy Agency- Task 63, workshop on Design criteria of net-zero energy neighborhood archetypes, Bolzano, Italy, Workshop, 2019/3 - 2019/3.
- Organizer and moderator, Design and simulation methods for solar, new and existing neighborhoods, Lund, Sweden, Workshop, 2018/10 - 2018/10.

- Co-organizing and chairing the international conference of Energy, Sustainability and Climate Change (ESCC 2018 and 2019), Greece.
- Co-organizing and co-chairing the Interdisciplinary congress (May 2016), Energizing by Design, University of Calgary.
- Co-organizing and chairing a workshop on net-zero energy buildings and communities (May 2015), Saskatchewan, Canada. The workshop brought together construction and technology industry leaders and large number of researchers/academics in Canada.
- Co-organizing and co-chairing a workshop on Design of NZEB. The main theme of this workshop was the evolution/integration of low-energy and sustainable techniques/technologies from buildings to communities ([www.solarbuildings.ca](http://www.solarbuildings.ca), SNEBRN Newsletter Issue 3 - December 2014), Montreal, Canada.
- Organizing a workshop on Energy-positive facades and perimeter zones. This workshop brought together researchers and senior PhD students from 15 Canadian universities, working on issues related to energy efficient/energy generator building envelopes and perimeter zones, Ottawa, Canada.
- Assisted in organizing a 6-day PhD Workshop on energy buildings for 35 international students taught by 15 professors and industry professionals.
- Assisted in organizing a three-day meeting for 90 national and international solar energy and building researchers and industry experts.

## COMMITTEES

### DOCTORAL

- PhD Candidacy Committee Member , George Ike, , University of Calgary, September 2022.
- Doctor PhD examining committee, candidacy oral examination Tinuke Chineme – Dec 2021 (while on RSL).
- Doctor PhD examining committee, oral examination (as a supervisor), September 2021. Student: Ali Syed.
- Doctor PhD examining committee, oral examination (as a supervisor), May 2021 and Dec 2021. Student: Chinyere Dara.
- PhD Candidacy Committee Member, Youness Youssefi, University of Calgary, December 2020
- PhD Candidacy Committee Member, Olivia Herrera Alarcon, University of Calgary, July, 2020.
- PhD Candidacy Committee Member, Naveed Mazhar, University of Calgary, April, 2020
- Doctor PhD examining committee Candidacy examination (as a supervisor), April 2019. Student: Ali Syed.
- Doctor PhD examining committee Candidacy examination, December 2018. Student: Mehdi Zahedani.
- Doctor PhD examining committee Candidacy examination (as a supervisor), December 2018. Student: Chinyere Dara.
- PhD examining committee (External to program examiner), thesis examination, December 2018. Student: Mohamed Imam.
- PhD examining committee (External to program examiner) thesis examination, August 2017. Student: Godo Stoyke.

- PhD examining committee (External to program examiner) thesis examination, January, 2017. Student: Serhan Hakgudener .
- Doctor PhD examining committee Candidacy examination, April 2016. Student: Mohamed Imam.

**MEDES**

- Master's Oral Exam Member, Ajit jassal, University of Calgary (as supervisor), June 2021
- Master's Oral Exam Member, Ayoyimika Edun (as supervisor), University of Calgary, Dec 2020
- MEDes Examining committee, thesis examination, August 2019. Student: Kristin Forward
- MEDes Examining committee (as supervisor), thesis examination April 2018. Student: Natalie Robertson.
- MEDes Examining committee (as supervisor), thesis examination, September 2017. Student: Anders McGregor.
- MEDes Examining committee. Thesis examination, September 2017. Student: Amr Saadon.

**NEUTRAL CHAIR**

- Arturo Marino Echegaray, PhD, July 5th 2022
- Alex Wilkinson Candidacy Exam, June 2020
- Kamran Noori, PhD, EVDs, December 2018.
- Sara Alinaghi Pour, PhD, EVDs, April 2018.
- Jennifer Payne, Master, CMD, January 2017.
- Katie Rasmussen, MEDes, August 2014.

**EXTERNAL EXAMINER**

- PhD thesis examination, Sareh Naji, University of Melbourne , July 2020
- PhD thesis examination, Francesco Cappai, ETS, July 2019.
- Master thesis examination of Dmitri Konkov, MSc student, BCIT, May 28 2018.

**SAPL/EVDs COMMITTEES**

- Academic committee to refocus and redesign the building science curriculum, 2022.
- Academic Search and Hiring Committee for 2 new positions at the rank of assistant professor in Architecture (2019-2020).
- Tenure and Promotion Committee, (2019-2020)
- Academic Merit Committee, to review the Biannual evaluation of all faculty members, (2019).
- SAPL/EVDs Admission committee for students of the first year of the professional degree in Architecture (M1) (yearly role). Role: Reviewing and evaluating around hundred applications.
- SAPL/EVDs Award committee, for 5 years. Role: reviewing more than 50 applications, twice a year for various awards.
- Evaluation of courses equivalence for new students. Role: reviewing dozens of students' applications (per year) to determine potential overlapping in students courses (for the

courses of Sustainability in the Built Environment, Architectural. and Environmental systems).

- Reviewer on various design courses. Role: Give feedback on students' design, particularly related to energy design and sustainability.
- Technical review committee (from 2016-to present), to assist M1 students in their comprehensive studio. Role: I volunteer more than 24 hours in winter term for students review, to give feedback on environmental systems to support the comprehensive design project.
- Development of Portfolio for prospect students. Role: Assisting students in developing their professional portfolio for successful applications for the Master in architecture (professional stream).

### UNIVERSITY COMMITTEES

- Institutional Sustainability Strategy Site Visit committee member, 2021-2022.
- Co-lead of the scoping effort on the subject of Environmental impact of energy systems, for Canada First Research Excellence Fund (CFREF) research programs, Future Energy Systems (FES) at the University of Alberta and Global Research Initiative in Sustainable Low Carbon Unconventional Resources (GRI) (2020-2021).
- USRI committee consultation 2020.
- Academic Search and Hiring committee, for the School of Engineering, CRC Tier 2 chair in Sustainable Infrastructure (2019-2020).
- Graduate Awards Competition (GAC) Spring 2015 – Spring 2020. Role: evaluator of scholarship applications. I read about 80 to 100 applications per year for student NSERC and internal university scholarship competitions.
- Member of Committee of (SSE and EVDS), with the objective to develop a concentration course in Building engineering, that offers to students' courses from EVDS and Engineering (2017-2018).
- Jury of Sustainability awards (April 2017). Role: reviewing a number of applications, for 6 different categories, for the annual award of sustainability.
- Faculty of Environmental Design Representative for 2014-2015 to the Faculty of Nursing Full Council.

### SCIENTIFIC AND TECHNICAL COMMITTEES

- Member of the scientific committee, and co-chairing parallel sessions, of the 5TH International Conference On Building Energy And Environment COBEE 2021-2022 July 2022.
- Member editorial board of Scientific Reports, the largest open access journal published by Nature Portfolio, the publishers of Nature.
- NSERC Discovery evaluation group- Mechanical Engineering (2021-2024).
- Jury member for the Renewable Transformation Challenge 2021, organized by the International Solar Energy Society (ISES).
- Scientific co-chair of the International Solar Energy Society (ISES) conference 2020-2021.
- NRCan Steering Committee for the Low carbon community energy systems (LCCES) project 2020-2023.
- Scientific committee for the seminar on Climate resilience ROADAMAP for 2050 (led by the Canadian Academy of Engineering) (CAE)), Feb 2021-Oct 2021.

- Technical committee –Montreal symposium 2020 of the Climate resilience ROADAMAP for 2050 (led by the Canadian Academy of Engineering) (CAE)) (2019-2020).
- Editor in Chief for the Journal of Sustainability, Special Issue on: Strategies for Achieving Energy-Efficient Sustainable Neighborhoods, (2019, 2020).
- Member on the Editorial Board of the Journal of Architectural Environment & Structural Engineering Research, Bilingual Publishing CO (2018-2019).
- Eurosun (2018 and 2016), Member of the scientific committee, Role: Review of a number of abstracts and papers.
- Modular and Offsite Construction 2018, Member of Scientific committee. Role: Review of a number of articles for the conference.
- ISES SWC 2017, Member of the scientific committee, Role: Review of a number of abstracts and papers.
- Esim (2018 and 2016), Member of the scientific committee, Role: Review of a number of abstracts and papers.
- ACSA 2016, Member of the scientific committee, Role: Review of a number of abstracts and papers.
- Reviewer for national grant applications including NSERC and Mitacs (2016-2018).
- Reviewer for more than 10 refereed journals including Applied Energy, Solar Energy, Energy and Buildings, Renewable Energy, Buildings and Environment, Sustainable buildings and Cities, Energy, Building Simulations, Indoor and Built environment and International Journal of Space Structures.
- Associate Editor for the journal Indoor and Built Environment (2013-2016).
- Leader of the education committee created by the Smart Energy Strategic Research Network (SNEBRN), aiming at disseminating lessons learned and expertise of designing NZEBs to the architectural community, and at identifying education issues (for architects and engineers) to facilitate/enable efficient design of NZEBs. The committee included academic individuals from different universities (Concordia, Carleton, Dalhousie and Ryerson) (2013-2014).

#### INTERNATIONAL EXPERT

- Subtask leader for the new International Energy Agency (IEA) task- Solar energy and neighborhood Planning, 2018- 2023).
- Canadian expert for the IEA task 51, Solar Energy in Urban Planning, 2013-2017.
- Canadian expert for the IEA task 41, Solar Energy and Architecture, 2009-2012.