
WILLIAM (LIAM) O'BRIEN, Ph.D., P.Eng.

Cell : 613-804-9082, Office: 613-520-2600, ext. 8037

E-mail: liam.obrien@carleton.ca

Website: www.carleton.ca/HBILab

Google Scholar: <https://scholar.google.ca/citations?user=xG1lbcSAAAAJ&hl=en>

Citizenship: Canadian and American (dual)

CAREER OBJECTIVES:

- Engage the public, industry, and students about high-performance building and city design and operation
- Develop new knowledge and research methods on building occupants through multidisciplinary collaboration
- Inspire and train students through creative teaching techniques, real applications, and challenging projects
- Maintain and build close ties with government agencies and laboratories, industry, and international researchers to disseminate research findings and demonstrate technologies

EDUCATION

- 2007 to 2011 Ph.D., Concordia University, Building Engineering. Sups.: A. Athienitis and T. Kesik (Toronto) *The development and methodology of a conceptual solar house design tool*
- 2005 to 2007 M.A.Sc., UTIAS (University of Toronto Institute for Aerospace Studies). *Development of fully functional nanosatellites deployers*. All five deployers were successful after launch from India on April 28, 2008.
- 2001 to 2005 B. Eng. Honours, Ryerson University, Aerospace Engineering. *A study of the economic feasibility of generating wind power in an urban environment*.

RECENT CAREER HIGHLIGHTS

- **2 co-edited textbooks: one on net-zero energy buildings and one on building occupant research methods; 53 published or submitted journal articles**, and 59 conference papers; **3 best paper awards**.
- Approx. **\$2.4-million in research funding (\$2.2-million as PI)** from NSERC, OCE, the Ontario and Canadian Governments, ASHRAE, and 12 industry and government laboratory partners in the past five years.
- Founder and PI of Human Building Interaction Laboratory, an interdisciplinary team (civil, environmental, mechanical, and electrical engineering; architecture; psychology) of approx. 12 graduate students and staff
- Numerous Canadian and international keynote and plenary talks, such as a TEDxTalk
- Elected President of IBPSA-Canada for two terms since 2014; chaired 2 conferences and 3 industry workshops
- My first supervised PhD student, **Burak Gunay won the Governor General's Medal and Senate Medal and received a tenure-track assistant professor position at Carleton; my second PhD student also received an assistant professor position**.
- Extensive national and international interdisciplinary collaboration (e.g., **Co-Operating Agent for new IEA EBC Annex Occupant behavior-centric building design and operation** (at proposal stage); subtask co-leader of International Energy Agency Energy in Buildings and Communities Programme Annex 66: Definition and Simulation of Occupant Behaviour in Buildings; researcher of NSERC Smart Net-zero Energy Buildings Strategic Network; researcher of NSERC CREATE Heritage Engineering)
- Development of novel occupant models covering occupancy, lighting, thermostats, and window blinds; implementation and public release of about 20 occupant models into EnergyPlus and training exercises.
- Construction of a living lab, whereby we have complete access to develop and test novel building control schemes. We have **reduced heating and cooling energy by 75% from the original controls**.
- Recipient of the **Ontario Building Envelope Council Rising Star Award, IBPSA Outstanding Young Contributor Award, Ontario Early Researcher Award (\$150K), Carleton Research Achievement Award (\$15K), and Carleton Research Excellence Fund (\$60K)**.
- Program advisor and professor for Carleton's Architectural Conservation and Sustainability Engineering.
- Consulting for energy and sustainability of 12 different building projects using building simulation.

TECHNICAL SKILLS

- Occupant behaviour monitoring and modelling to support building performance simulation
- Multi-scale energy modelling from renewable energy and building systems to the urban scale
- Dynamic energy modelling, design, and visualization of the design space of buildings and renewable energy systems; working knowledge of building energy codes: ASHRAE Standards. 90.1, 55, and 62.1, Ontario Building Code, Canadian Building Code
- Strong MATLAB programming skills: scripting, file I/O, graphical user interface design, image recognition and processing
- Software: MS Office, EnergyPlus, OpenStudio, ESP-r, TRNSYS, EE4 (DOE-2.1), LBNL WINDOW 6, RETScreen, SketchUP, CATIA, SolidEdge, AutoCAD, IDEAS, Daysim, IA-QUEST, CONTAM, HOT3000, AGI 32
- Life cycle analysis: energy, cost, and emissions
- Lab and experimental experience: analysis of monitored buildings, vibration testing, thermal shocking and thermal vacuum testing, aerodynamics/wind tunnels, fluids, heat transfer, materials science, green roof monitoring

PROFESSIONAL ACADEMIC EXPERIENCE

July 2011 to present **Associate Professor (tenured as of Dec. 2014; promoted to Associate Professor July 2016) and Program Advisor, Architectural Conservation and Sustainability Engineering, Department of Civil and Environmental Engineering (cross-appointment with Mechanical and Aerospace Engineering), Carleton University, Ottawa, Canada**

- Principal Investigator of the Human Building Interaction Lab (2012-)
- Founding member of the Carleton Building Performance Research Centre (with five other professors)
- Developed new curriculum for and taught the following courses:
 - ENVE 4105: Green Building Design (undergraduate); enrolled by engineering and architecture students
 - ENVE 4106/5104: Indoor Air Quality (undergrad/grad)
 - ENVE 4106/5104: Indoor Environmental Quality (undergrad/grad)
 - ENVE 5917: Research Methods for Building Engineering (grad)
- Taught the following courses:
 - ECOR 4995: Professional Practice (for engineering)
 - ENVE 4918: 4th Year Engineering Design Project
- Cumulative teaching evaluation since 2011 of 4.50/5
- Innovative use of educational technology:
 - Introduced ePortfolios as a method for students to reflect on their work in the context of learning outcomes of their fourth-year design project
 - Co-developed, co-taught, and administered Carleton's largest online course (Professional Practice) with about 500-600 students/year
 - Developed online resource to provide students with understanding of building design and construction process using a new Carleton building as a case study (resource includes online repository of recorded interviews, guest lectures, technical tours, building energy data, drawings, and contract documents)
 - Developed many classroom experiments (e.g., Heliodon daylight testing device, 3D printed solar shading devices, kit of indoor environmental quality measurement devices)
- Completed 12-week Certificate in University Teaching at Carleton

- Thesis defense committees: 7 MASc, 2 PhD
- Faculty Advisor, ASHRAE Carleton University Student Chapter (2012-)
- Faculty Advisor, Team Ontario: Solar Decathlon (2011-2013)
 - Advised on simulation-based design methodologies and modelling approaches for advanced building systems
- Committees:
 - Chair of an assistant professor hiring committee; member of several others
 - Graduate Attributes (development of system for assessing engineering graduates based on Canadian Engineering Accreditation Board)
 - Green Revolving Fund committee: a \$1-million fund that was established to identify and select proposals for Carleton campus retrofits that are both economically and environmentally sustainable
 - Carleton Sustainability Committee
 - Outreach committee (attend numerous recruitment events and give presentations and technical tours, and lead hands-on activities for potential new students)

OTHER RESEARCH AND RELATED WORK EXPERIENCE

- 2011 **Researcher, Natural Resources Canada (3-month contract)**
- Worked on joint research project with Lawrence Berkeley National Labs (LBNL) to optimize the controls of commercial buildings to reduce peak loads and ultimately energy costs.
- 2007 to 2011 **Research Assistant, NSERC Solar Buildings Research Network (SBRN)**
- Facilitated 6-day PhD Workshop on net-zero energy buildings for 35 international students taught by 15 professors and industry professionals.
 - Coordinated three-day meeting for 90 national and international solar energy and building researchers and industry experts. Organized four expert panel sessions on net-zero energy housing, commercial buildings, building-integrated solar systems, and communities.
 - Assisted in applying for \$7.6-million federal grant for an NSERC research network (“Smart Net-zero Energy Buildings Research Network”), which was granted in 2011.
 - Participated in International Energy Agency Solar Heating and Cooling Task 40: “Towards net-zero solar energy buildings”. I have produced several technical reports as a result of my participation. I chaired monthly experts’ meetings, including creating agendas, facilitating research efforts, keeping minutes, and managing the online workspace.
 - Organized building-integrated solar photovoltaics workshop for architects and researchers. Gave one-hour lecture with theory and case studies.
 - Organized public speaking workshop at Ryerson University
 - Developed technical reports and website promotional material for solar energy demonstration projects
- 2006-2007 **Research Assistant, Space Flight Lab**
- Designed, manufactured, and qualified spacecraft systems through rigorous thermal-vacuum and vibration testing.
 - Assembled spacecraft systems in clean room according to military standards.

OTHER TEACHING EXPERIENCE

2008-2012

Miscellaneous teaching/lecturing

- Facilitated, prepared material for, and taught EnergyPlus introductory workshop to 15 graduate students, after having seen a gap in knowledge among peers
- Guest lecture for sustainable buildings course in Faculty of Architecture, University of Toronto
- Guest lecture for Daylight and Illumination course at Concordia University
- Two guest lectures to computational arts class, Concordia: “Sustainable building design”
- Private tutoring for daylighting and illumination course

2008

Teaching Fellow: Building Systems Engineering, Concordia University

- Prepared for and delivered five lectures to a class of 70 students
- Prepared teaching material and exams, and evaluated students

2008

Teaching Assistant and Lecturer: Acoustics and Illumination, Concordia University

- Prepared for and gave lectures to 45 senior building engineering students
- Wrote final exam, and graded assignments and presentations
- Gave course for specialized illumination software (AGI32)

2005-2007

Teaching Assistant: Engineering Strategies and Practice, U. of Toronto

- Led tutorials of 30-35 engineering students through the design process for real client projects
- Authored *Project Manager Manual* to teach future professors the course principles and guidelines

OTHER EXPERIENCE

2008-present

Consultant: building energy modelling and design and sustainability assessments

- Design charrette participant and consultant for three large Carleton University buildings (2014-2017)
- Preliminary energy performance assessment for Yellowknife EcoHome.
- Thermal comfort assessment of advanced dynamic window systems for EcoTay Inc.
- Performed whole-building modeling for a large Toronto high school project using eQUEST. Wrote all documentation to demonstrate compliance with building energy codes (Ontario Building Code and ASHRAE Std. 90.1).
- Performed optimization of temperature controls to reduce peak loads using DRQAT software for NRCan CanmetENERGY.
- Performed retrofit analysis of off-grid Interpretive Centre at Misery Bay, Manitoulin Island, Ontario. Modelled building in EnergyPlus and sized solar collectors to achieve independence from diesel generator.
- Organized design charrette and led eight-person engineering team to design a low-energy office and housing facility in Uganda for Concordia Volunteer Abroad Program. Led the writing of an engineering report for delivery to a local (Ugandan) engineer and builder.

- Worked with Concordia University building managers to optimize window shade control in new 16-storey John Molson School of Business building to enhance passive solar performance and reduce energy costs.
- Contracted by NRCan to create energy model for NRCan Varennes facility using EnergyPlus.
- Developed toolkit for Tremco Inc. to assess cost reduction measures and payback periods, using Excel and VBA.
- Performed feasibility study for a community-scale solar domestic hot water system for Toronto Community Housing Corporation (TCHC) Block 21 and 23. Consulted for Baird Sampson Neuert Architects.
- Performed energy systems design for off-grid luxury cottage (5000 sq. ft.) in Montebello for private client. Provided a simulated-based feasibility for multiple heating system options.
- Parametric optimization of louver geometry to minimize heating and cooling loads for Unicel Inc. for a commercial building in Toronto using EnergyPlus.
- Acted as an energy consultant for the new Mission 2050 building at the University of Guelph, a \$150-million planned net-zero energy agri-science facility. Attended a three-day design charrette to discuss design concepts with other experts.
- Created building energy model for the University of Toronto Mining Engineering building upgrade project; worked with architects (Baird Sampson Neuert Architects) to explore different strategies to minimize energy and resource use; wrote 15-page report outlining results.
- Modelled large number of possible high-rise apartment building upgrades using ESP-r to determine energy savings potential. Created script to automatically generate input files and perform batch runs. The outcome was included in the Toronto Mayor's Tower Renewal Guidelines – a comprehensive study of performance upgrades to Toronto's 5000 high-rise residential buildings.

Summer 2004

Bombardier Aerospace/DeHavilland

- Facilitated the mechanical design of Control Cable Tension Regulators for the Q400 Aircraft
- Wrote a MATLAB program to optimize the mechanism to maintain near-constant tension
- Used CATIA and AutoCAD to model the design
- Stress analysis (FEM) using CATIA
- Was selected as the presenter to showcase my design to a large group of government officials, senior managers, and academics

CERTIFICATES AND AWARDS (OTHER THAN RESEARCH GRANTS)

- Ontario Building Envelope Council - Rising Star Award (2017)
- IEA EBC Annex 66 – Distinguished Service Award (2017)
- IBPSA (International Building Performance Simulation Association) Outstanding Young Contributor Award (US\$500) (2017)
- Ontario Early Researcher Award (\$150,000 over 5 years) (2015)
- Carleton Research Achievement Award (\$15,000) (2015)
- Nominated for Carleton Graduate Supervision Award (2014 and 2016)
- Certificate in University Teaching (12-week course) (2012)
- ASHRAE Grant-in-Aid Award (\$10,000) (2009-2010)
- SimBuild 2010 Student Travel Award (2010)
- Graduate Student Association Conference Travel Award (Concordia) (2010)

- IBPSA-Canada Student Travel Award (2009)
- Modular Building Institute Green Building design competition winner (2008)
 - Details available here: <https://secure.mbinet.org/Awards/AwardEntryDetail.aspx?awardentryid=420>
 - The design was since built for a Virginia school board
- Health & Safety on construction sites course (2008)
- Ontario Graduate Scholarship (OGS) \$15,000 (2006-2007)
- MASc Fellowship, University of Toronto (2005-2007)
- Pratt & Whitney Canada Scholarship (2004)
- NSERC USRA Award (2004)
- Dean's List, Ryerson (2002-2004)
- Golden Key International Honour Society Member (2003-present)
- Standard First Aid/CPR (2002)
- 1st place in Ryerson Engineering Design Competition (2001)
- Entrance Scholarship, Ryerson Aerospace Engineering (2001)
- 1st Place in age division in Waterloo-Kitchener Marathon (42km) (1999)

PROFESSIONAL MEMBERSHIPS AND LEADERSHIP

- President (elected), International Building Performance Simulation Association (IBPSA)–Canada (2014-2016; 2016-2018)
- Member, Ontario Building Envelope Council (2017-present)
- Affiliate Director (Canada), IBPSA (2014-present)
- Vice President, International Building Performance Simulation Association – Canada (2012-2014)
- Member and Professional Engineer, Professional Engineers of Ontario (PEO) (2016-present)
- Member/Engineer in training, Professional Engineers of Ontario (PEO) (2001-2016)
- Member, International Building Performance Simulation Association (IBPSA) (2007-present)
- Member, Illuminating Engineering Society of North America (2015-2016)
- Associate Member, American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) (2008-present)
- Canadian Green Building Council, Ottawa Chapter (CaGBC) (2011-2014)

SELECT PRESENTATIONS AND INVITED TALKS

- Panelist: *The Role of Occupant Behaviour in Reducing GHG Emissions*. Reshaping Energy 2018, The Conference Board of Canada, Ottawa, Ontario (2018)
- Keynote: *Humans in buildings: From the room to campus scale*. International Facilities Management Association. Ottawa, Ontario (2018)
- Keynote: *Data visualization for building and campus performance* (co-presented with Burak Gunay and Zixiao Shi). Data Viz Meetup. Ottawa, Ontario (2017)
- Panelist for two panels: *Daylight metrics* and *Occupant modelling and simulation*. Building Simulation conference, San Francisco (2017)
- Plenary talk: *Occupant behaviour and comfort in the workplace*. 2017 Real Property Institute of Canada - Forum on the Workplace. Ottawa, Ontario (2017)

- Plenary talk: *Applying lessons learned from occupants to new and existing buildings*. Sustainable Labs Conference. Edmonton, Alberta (2016)
- Keynote: *Acting on lessons learned from building occupants*. Ottawa Better Buildings Breakfast (2016)
- Keynote: *Carleton University campus as a living laboratory and educational opportunity*. ASHRAE Ottawa Valley Chapter (industry dinner with ~100 audience members) (2016)
- *Simulating passive buildings*. Ontario Association of Architects Challenge 2030 Continuing Education Lecture Series. Toronto and Ottawa (2014, 2015, 2016)
- *Introduction to occupant modelling*. Half-day educational workshop at eSim 2016 Conference. Hamilton (2016)
- *Considering occupant behaviour in new building design*. Selected seminar presenter at IIDEX (Canada's largest interior design show). Toronto (2015)
- *Design of resilient, low-energy condominiums*. Panelist in CZEBS-iiBSE-APEC Symposium. Montreal (2015)
- *High-performance buildings: The human factor*. FED Talks - Carleton's community lecture series. Ottawa (2014)
- *Occupant behaviour in next generation green buildings*. Next Generation Green Buildings Workshop. Vancouver, Canada (2014)
- Panelist: *A three-tiered approach to addressing occupant behaviour in new building design*. Open Forum on Occupant Behaviour. Hong Kong (2014)
- *Incorporating occupant behaviour into new building design*. Canada Green Building Council Seminar Series, Ottawa, Canada (2014)
- *Approaches to addressing occupant behaviour in Net-Zero Energy Buildings*. Asia-Pacific Economic Cooperation Workshop on Net-Zero Energy Buildings, Beijing, China (2013)
- *Lessons learned from Net-zero energy buildings*. Net-zero energy building workshop. Montreal (2013)
- *EcoTerra Net-zero energy house: design, performance, and recommendations*. NZEB Workshop, Chambéry, France (2013)
- *Occupant-conscious building design*. TEDxRideau Canal (2012) (<http://www.youtube.com/watch?v=mwOzFrt2J70>)
- *Applied Building Performance Simulation*. Seminar for Department of Mechanical and Aerospace Engineering, Carleton University (2012)
- *Applied Building Performance Simulation*. Seminar for Department of Civil and Environmental Engineering, Carleton University (2012)
- *Sustainable Buildings: Design, Technology, and Energy Sources*, Professional Engineers of Ontario (PEO), Ottawa Chapter (2011)
- *Successes and Failures in Sustainable Buildings*, Association for Canadian Studies in the Netherlands (ACSN), Rotterdam, The Netherlands (2011)
- *Conceptual Design of Solar Houses*, PhD Workshop on Net-zero Energy Buildings, Concordia University, Montreal (2011)
- *Design of Solar Buildings*. Building Ecology, Science, and Technology (BEST) Lecture Series, University of Toronto; audience of over 200 researchers, consultants, and architects (2011)
- *Thermal Comfort and Related Modelling Issues in the EcoTerra House*. Canada Housing and Mortgage Corporation Equilibrium™ Housing Forum (2010)
- *Applications of Building Performance Simulation*. Computer Graphics Department, Cornell University (2010)
- *Design of a control cable tension regulator for Bombardier aircraft*. Ryerson University (2004)
- About 15 conference presentations (listed under conference papers)

MEDIA APPEARANCES (SELECT)

- *If your high performance building isn't performing, try talking to the people inside*. Daily Commerce Journal (2017)

- *The things people do to foil energy-saving buildings.* Smithsonian Magazine (2017)
- *Architecture's UX problem.* Co.Design website (2017)
- *High-efficiency building bloopers revealed.* Science Daily (2017)
- *Massive new energy use data resource coming this January.* Forbes (2016)
- *Residential energy submetering.* CBC Radio interview (2014)
- *Design process of Uganda building and facility design.* CBC Radio interview (2011)
- *Featured several times in Carleton's online Research Stories magazine*

ADDITIONAL OUTREACH AND MENTORSHIP (SELECT)

- Outreach leader for Architectural Conservation and Sustainability Engineering program (developed presentations, developed and led hands-on activities, gave technical tours, discuss educational and career prospects with high school students and their families)
- Science day camp guest instructor – day-long daylighting design activity
- Led numerous technical tours for public (Toronto Exhibition Place wind turbine, mechanical rooms of Carleton buildings, walking tour of green buildings)
- Regular blogger (e.g., on LinkedIn) about topics of occupant behaviour, green buildings, energy, and indoor environmental quality
- Panelist for several educational sessions aimed at graduate students (e.g., How to get an academic job, How to publish a journal article)

STUDENT AND RESEARCH ASSISTANT SUPERVISION

	Undergraduate research assistant	MASc/MArch	PhD	Post-doctoral fellow	Research assistant
In progress	0	4	6	3	4
Completed	15	4	3	0	2

Duration	Student name	Title of thesis/project; notes	Current position
Graduate students/post-doctoral fellows			
2018-	MASc: Adrian Soble	Application of generative design to office retrofits	
2018-	RA: Anuvrat Mishra	Quantification of potential of hotelling office management in Canada	
2017-	M.Arch: Noor Alkhalili (co-supervised with Ted Kesik, Architecture, Toronto)	Methodology and metrics to assess visual privacy in buildings in urban environments	
2017-	Post-doc: Mohamed Ouf	Project 1: development of a program to engage occupants in a sustainable community Project 2: Occupant modelling for building	

		design and energy codes: roadmap, feasibility study, best practices guidebook, and tested case study	
2017-	PhD: Tareq Abuimara (co-supervised with Burak Gunay)	Statistical design applications in occupant modelling for building performance simulation	
2017-	PhD: Haily Fernald (co-supervised with Scott Bucking)	Advanced building model calibration	
2016-	PhD: Jayson Bursill (co-supervised by Ian Beausoleil-Morrison)	Development, implementation, and field testing of innovative adaptive building controls	
2016-	MASc: Maxime St-Jacques (co-supervised with Scott Bucking)	Modelling greenhouse gas emissions of electrical grids in Canada	
2016-	MASc: Andrew Hicks (co-supervised with Scott Bucking)	Development of occupant-in-the-loop controls for Zibi	
2015-	PhD: Aylin Ozkan (U. of Toronto; co-supervised by Ted Kesik, U of Toronto)	Methodology for assessing the comfort and resilience of condominiums	(in progress)
2015-2017	MASc: Justin Berquist	Energy-related faults analysis in existing offices	Researcher, National Research Council
2015-	MASc: Mihai Mateescu (co-supervised with Ian Beausoleil-Morrison)	Development of model predictive control for blinds on a research house	Engineer, Trane
2015- 2016 (stopped due to illness)	BEng and MASc: Anthony Fuller	Development of an algorithm to count occupants in photos of indoor spaces	Research assistant for HBI Lab
2014-2017; 2017-2018	PhD; post-doc (half-time): Aly Abdelalim	Methodology for using building information models and energy models to advise building operators	Assistant Professor, Arab Academy for Science, Technology & Maritime Transport
2014-2017; 2017-2018	PhD; post-doc: Sara Gilani	Monitoring, modelling, and simulation of occupants in offices; Occupant modelling for building design and energy codes: roadmap, feasibility study, best practices guidebook, and tested case study	Post-doc in HBI Lab
2014-2015	Research Assistant: Vera Hu	Development of occupant engagement strategies for a major residential property manager.	Researcher, National Research Council

2014-2018	PhD: Shawn Shi	Novel building zone-level fault detection and diagnostics (two best paper awards)	Researcher, National Research Council
2013-2017	BEng (2013-2015) and MSc (2015-2017): Isis Bennet	Development of methods to reduce energy use in an office tower (Ontario Graduate Scholarship)	Research assistant, CIMS Lab
2013-2015	MSc: Austin Selvig (co-supervised with Craig Merrett)	Optimization of mass-produced net-zero energy houses.	Arborus Consulting
2013-2014	Research Assistant: Laura Scrimgeour	Consultant for a variety of survey development projects	Private consultant
2012-2016	PhD: Burak Gunay (co-supervised with Ian Beausoleil-Morrison)	Development of adaptive building controls that learn individualized occupant comfort expectations, habits, and behaviours. Burak is the recipient of numerous awards (e.g., Governor General's Medal, Senate Medal, NSERC PGS, OGS, ASHRAE Grant in aid, BS2015 conference best paper award, and many internal awards). Dr. Gunay was hired as an assistant professor at Carleton immediately upon completion of his PhD.	Assistant professor, Carleton University
2012-2014; 2017-	MSc (co-supervised with Cynthia Cruickshank); PhD (co-supervised with Scott Sanner, Toronto): Brent Huchuk	Development of predictive controls of window shades for energy and comfort performance optimization. Brent's thesis was nominated for a Senate Medal. PhD: Machine Learning for Residential Building HVAC Analytics Platform	Ecobee/PhD student
Undergraduate research students			
2016/2017	BEng: Saptak Dutta	Development of building zone-level virtual sensors	M.A.Sc. student, Carleton
2016/2017	BEng: Noor Alkhalili	Development and testing of occupant view and privacy metrics for residential buildings	M.Arch. student and research assistant, Toronto
2016/2017	BEng: John Thomson	Methodology for determining optimal thermostat location to avoid solar exposure	Project Coordinator, Demathieu Bard
2016-2018 (summers)	BEng: Ruth Tamas (co-supervised with Burak Gunay in 2017)	Field study of LEED condos and occupant behaviour	(undergrad student)
2016	BEng: Ninoshka Rodrigues (Memorial University, Newfoundland)	Datamining of smart thermostat data	Project coordinator, Wired Synergy
2015/2016	BEng: Joel Becker	Design and construction of a micro-	Morrison Hershfield

		heliodon	
2015/2016	BEng: Krista McWilliam	3D printing of innovative daylight shading devices	(unknown)
2015/2016	BEng: Abhijit Dhanda	Systematic assessment energy-saving potential in an existing building	Researcher, CIMS Lab
2014/2015	BEng: Kristen Jorgensen	Measurement and statistical analysis of daylight distribution and plug loads in offices	Engineer, Windmill Developments
2014	BEng: Nicholas Dumoulin	Assessment of thermal and visual comfort in perimeter zones of buildings	Engineer, Regulvar
2013	BEng: Christopher Henningsen	Development of correlations between indoor illuminance and advanced daylight glare metrics (funded by ASHRAE Senior Undergraduate Project Grant)	Engineering design technologist, telecommunications
2012/2013	BEng: Peter Hutchins	Web interface development for the Carleton green roof	Engineering consultant
2012/2013	BEng: Erqin Zeng	Measurement and occupant survey of thermal comfort in Carleton's academic buildings (funded by ASHRAE Senior Undergraduate Project Grant)	MASc student
2012/2013	BEng: Lindsay Cook	Study of window blind use in high-rise office buildings	EIT, City of Winnipeg
2011/2012	BEng: Robyn Chatwin-Davies	Instrumentation of the Carleton University green roof	MASc student

RESEARCH FUNDING

Total research funding (2012-present)	~\$2.4M; ~\$2.2M awarded as PI; ~\$2M in review; ~\$7M in preparation
--	---

Year funding was awarded	Funding source/name	Amount (100% to Liam O'Brien unless otherwise noted)
2011	Start-up grant, Carleton University	\$30,000
2012	ASHRAE undergraduate project award grant: Indoor air quality measuring equipment	US\$5,000
2012	NSERC Engage Grant: Development of occupant behaviour models for use in building simulation (partnered with Autodesk Inc.)	\$25,000 cash; \$20,000 in-kind
2013	NSERC Engage Grant: Development of predictive shades control with experimental mock-up (partnered with Regulvar Inc.)	\$25,000 cash; \$9,000 in-kind

2013	Natural Resources Canada research contract: Literature review of occupant behaviour modelling	\$14,080
2013	NSERC Interaction Grant: Travel funding to visit and initiate research with Delta Controls, Vancouver, BC	\$5,000
2013	Natural Resources Canada sub-contract: OpenStudio software training	\$20,500
2013	ASHRAE undergraduate project award grant: Toolkit for measuring comfort in perimeter zones of buildings	US\$5,000
2013	Cooke Trust Grant: Passive Solar Design Guidebook (co-applicant with Ted Kesik)	\$47,500 total (40%)
2013	NSERC Engage Grant: Development of predictive building control strategies using high-resolution weather data	\$25,000 cash; \$5,000 in-kind
2013-2019	NSERC Discovery Grant: Robust design of solar homes: methodology and technology	\$150,000 (\$25,000/year for 6 years)
2013-2016	Carleton Research Excellence Fund: Digital Campus Innovation – Creation of a Building Information Modelling (BIM) model to assessment of Carleton building sustainability (with Autodesk)	\$60,000 cash; \$150,000 in-kind
2013-2014	Internal Carleton University award (I-CUREUS) Measurement of apartment temperatures in the heating season	\$1,125
2013 and 2014	Carleton USRA with Isis Bennet (undergrad B.Eng. student): various observational studies to support occupant behaviour research	\$8,500
2011-2016	NSERC Smart Net-Zero Energy Buildings Research Network (SNEBRN) – Strategic Network (PI: Andreas Athienitis)	\$70,000 total for 2014-2016 (of \$7.6-million awarded from NSERC)
2014	Ontario Centres of Excellence (OCE)/Natural Sciences and Engineering Research Council (NSERC)/Connect Canada with s2e Technologies Inc.: Development of a robust design methodology for net-zero energy residential buildings	\$55,000 cash + \$15,000 in-kind
2014	Natural Resources Canada (NRCan) research contract: Implementation of occupant behaviour models into EnergyPlus Simulation software	\$24,960
2014-2015	ASHRAE Undergrad Senior Project Grant: Toolkit to develop learning lighting and blind controls	US\$5,000
2014	Networks of Centres of Excellence - Graphics, Animation, and New Media (GRAND) Phase 1: New Media for Sustainable Living (co-applicant)	\$10,700 (of \$23-million)
2014-2017	NSERC Collaborative Research & Development Grant (with Delta Controls Inc.): Development of occupant-learning controls (co-applicant: Ian Beausoleil-Morrison)	\$90,000 cash + \$130,000 in-kind total for 3 years
2014-2017	NSERC Collaborative Research & Development Grant (with Autodesk Research): Methodology for using BIM for campus energy management and operations	\$108,000 cash + \$140,000 in-kind for 3 years

2014	Research contract with Ottawa Community Housing to quantify measured benefit of advanced heating in high-rise apartment buildings	\$10,000
2014	NSERC Engage Grant with Morrison Hershfield Ltd.: Simulation-based investigation of residential building envelope systems	\$25,000 cash; \$6,600 in-kind
2015-2020	Ontario Early Researcher Award: Methodology for high-performance condominium design	\$150,000
2015	Research contract to develop a green behaviour report card for Centretown Citizens Ottawa Corporation	\$25,000
2015	NSERC Engage Grant with Hidi Rae: Use of occupant behaviour models in the design process for offices	\$25,000 cash; \$7,500 in-kind
2015	Natural Resources Canada research contract: Guidelines for developing and using occupant behaviour models	\$17,100
2015-2016	Carleton University Research Achievement Award – Demonstration of occupant behaviour models in the building design process	\$15,000
2015-2016	ASHRAE Undergrad Senior Project Grant: Equipment to build heliodon and test performance of 3D-printed solar shading systems	US\$5,000
2015-2021	NSERC CREATE: Heritage Engineering (PI: Mario Santana)	~\$165,000 (10% of \$1.65M), co-PI
2015	NSERC Engage with Bentall Kennedy (Canada): Leveraging electricity submetering data for high-rise office buildings to reduce energy use	\$25,000 (+ \$13,000 in-kind)
2015	NSERC Connect Level 3: Digital tools for sustainability management of campuses and building clusters	\$25,000
2015	BC Housing Research & Education Grants: Design guidelines and buyer guide for resilient and comfortable condominiums in British Columbia (co-PI with Ted Kesik)	\$40,000 (50%)
2016	ASHRAE Ottawa Valley Chapter - research fund donation for building controls research	\$5,000
2016	Natural Resources Canada research contract: implementation of existing occupant models into OpenStudio	\$16,500
2016	NSERC Engage with RWDI: Field monitoring of occupants' energy-related actions and presence in offices	\$25,000 (+ \$8,000 in-kind)
2016-2017	ASHRAE Undergrad Senior Project Grant: Equipment to estimate zone level energy and mass flows	US\$5,000
2016-2019	NSERC CRD with Delta Controls: Development and implementation of adaptive building controls (co-applicant: Ian Beausoleil-Morrison)	\$180,000
2016	CFI-JELF/ORF: Advanced building controls hardware and software for the Health Sciences Building: Use of 25 offices as an in-situ research and student training facility. (This proposal was also submitted as part of a \$20M Sustainable Infrastructure Fund (SIF), under which it was ultimately	\$400,000 cash and \$167,000 in-kind

	funded)	
2017	OCE VIP I with QuadReal (Canada): Development of a program to engage office building occupants on energy use	\$25,000 (+ \$16,000 in kind)
2017-2019	NRCan Energy Innovation Program: Occupant modelling for building design and energy codes: roadmap, feasibility study, best practices guidebook, and tested case study (with Burak Gunay and Ian Beausoleil-Morrison)	\$350,000 + \$148,000 in-kind (80%)
2017	Ontario Centres of Excellence (OCE)/Natural Sciences and Engineering Research Council (NSERC) with Windmill Developments Inc.: Occupant-in-the-loop controls for a sustainable community	\$50,000 cash + \$15,000 in-kind
2017	Ontario-Baden-Wurttemberg Faculty Exchange: two-month visit to Karlsruhe Institute of Technology (Germany)	\$5,250
2017	Natural Resources Canada research contract: Development of dynamic Sankey diagrams to represent energy flows	\$12,500
2017	NSERC Connect 2 Grant: Workshop on Modelling and Simulation of Occupants	\$8,200
2017	NSERC CRD with ecobee: Machine Learning for Residential Building HVAC Analytics Platform (PI: Scott Sanner, Toronto)	\$160,000 (50%)
2017	NSERC Engage with Homesol Building Solutions: Methodology and case study to assess occupant comfort, mechanical equipment, and energy use for an athletic facility	\$25,000
2018-2022	NSERC CRD with CopperTree: Data-driven methods for operation and maintenance of commercial buildings (PI: Burak Gunay)	\$100,000 (33%)
2018-2020	Borealis Foundation: Study of usability of residential building interfaces (co-PI, Chantal Trudel, Industrial Design, Carleton)	\$20,000
2018-2022	NSERC CRD/OCE VIP II with Brookfield Global Integrated Solutions: Development and field testing of novel approaches to improve building operations (with co-PIs: Burak Gunay, Scott Bucking, Jean Duquette)	\$480,000 (37.5%)
2017 (applied for)	CFI Cyberinfrastructure: Network of Living Campuses being submitted by Ryerson University (PI: Jenn McArthur, Ryerson)	\$1.5M (~10%)
2018-2019 (applied for)	BC Housing: Residential building interface design: an international perspective	\$40,000
2019-2022	Natural Resources Canada Green Infrastructure Fund Phase II: Next Generation actionable building energy performance metrics, data analytics, and visualization: an open-source platform (PI: Burak Gunay)	\$510,000 (33%)
2019-2024 (in preparation)	NSERC Smart Solar Buildings and Communities Strategic Research Network (PI: Andreas Athienitis, Concordia; Associate Director: Liam O'Brien)	\$7.3M (~5%)

INTERNATIONAL SCHOLARLY COMMITTEES

William (Liam) O'Brien

- Co-Operating Agent for International Energy Agency Energy (IEA) in Energy in Buildings and Communities (EBC) Annex: Occupant behavior-based building design and operation. (final proposal stage) (2018-2022)
 - Coordination of about 100 researchers from 20 countries to conduct state-of-the-art research on occupant comfort, occupant behaviour, and occupant-centric building design and operations
 - Chairing biannual three-day meetings
 - Reporting to International Energy Agency Executive Committee biannually
 - Outreach via website, newsletters, panel discussions, invited presentations, etc.
- Subtask co-leader for International Energy Agency Energy (IEA) in Energy in Buildings and Communities (EBC) Annex 66: Definition and simulation of occupant behaviour in buildings. (2014-2017)
 - Co-led group of 10 international researchers, focusing on office occupant modelling and simulation
 - Co-edited a textbook on occupant research (with six authored chapters) with 36 authors from 14 countries
 - Published six journal articles and four conference papers
 - Regular contributor or editor of newsletter
 - Organized, led and contributed to panel discussions
- Subtask co-leader for International Energy Agency (IEA) Solar Heating and Cooling Task 40/ECB Annex 52 – Towards Net-zero Energy Solar Buildings (2009-2013)
 - Co-edited a textbook on net-zero energy buildings
 - Led initiative to compile and document building case studies
 - Facilitated PhD summer school on net-zero energy buildings for 20 international PhD students

CONFERENCE LEADERSHIP AND COMMITTEES

- Scientific Committee, eSim 2018, Montreal, QC
- Scientific Committee, Building Simulation 2017, San Francisco
- Chair, Workshop on Occupant Modelling and Simulation, May 2017, Carleton University
- Scientific Committee Co-chair, SimAUD 2017, Toronto, ON,
- Chair, OB-16 (Occupant Behaviour Symposium 2016), Ottawa, ON
- Scientific and Organizing Committees, SimAUD 2011-2016
- Program Committee, NSERC Workshop on Big Data and the Built Environment, June 2016, Toronto, ON
- Chair, NSERC Workshop on Sustainable Campus Management, January 2016, Ottawa, ON
- Scientific Committee, ACEEE 2014-2015, Pacific Grove, CA
- Chair, eSim 2014, Ottawa, ON
- Chair, SimAUD 2013, San Diego, CA
- Scientific Committee, Climate Change Technology Conference 2013
- Organizing and Scientific Committees, Net-Zero Energy Customized Home Conference, 2012
- Scientific Committee, Solar Heating and Cooling Conference 2012
- Scientific Committee and workshop facilitator, eSim 2012
- Scientific Committee, International Solar Energy Society 2011
- Scientific Committee, Canadian Solar Buildings Conference 2009

JOURNAL REVIEWS AND EDITORSHIP

- Guest editor, Special Issue on Occupant Behaviour Fundamentals, Journal of Building Performance Simulation (2017)
- Guest editor, Special Issue on Architecture and Urban Design, Simulation Journal (2016)
- Reviewer for: Journal of Building Performance Simulation; Building Simulation; Building Research and Information Environment and Planning: B; Energy and Buildings; Applied Energy; Journal of Landscape Architecture; Journal of Energy Efficiency

EDITED BOOKS AND PROCEEDINGS

- [1] Wagner, A., **O'Brien, W.**, Dong., B. (2018). Exploring occupant behaviour in buildings: Methods and challenges. Cham, Switzerland: Springer Nature.
- [2] Turrin, M., Peters, B., **O'Brien, W.**, Stouffs, R., Dogan, T. Proceedings for Symposium on Simulation of Architecture and Urban Design 2017. Toronto, ON.
- [3] Athienitis, A., **O'Brien, W.** 2015. Modelling, design, and optimization of net-zero energy buildings. Berlin, Germany: Wiley and Sons. (English version translated to Chinese in 2017)
- [4] **O'Brien, W.**, Gunay, HB., Khan, A. Proceedings for Symposium on Simulation of Architecture and Urban Design 2013. San Diego, CA.

AUTHORED BOOK CHAPTERS

- [1] Wagner, A., **O'Brien, W.**, Dong., B. (2018). Introduction In A. Wagner, A., W. O'Brien. & B. Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (1-5) Springer Nature.
- [2] Schweiker, M., Carlucci, S., Andersen, R., Dong, B. **O'Brien, W.** (2018) Occupancy and occupants' actions. In A. Wagner, W. O'Brien. & B. Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (pp. 7-38). Cham, Switzerland: Springer Nature.
- [3] Dong, B., Kjoergaard, M., De Simone, M., Gunay, HB., **O'Brien., W.**, Dziedzic, J., Novakovic, V., Zhao, J. (2018). Sensing and data acquisition In A. Wagner, W. O'Brien. & B. Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (pp. 77-105). Cham, Switzerland: Springer Nature.
- [4] **O'Brien, W.**, Wagner, A., Day, J. (2018) Introduction to occupant measurement methods In A. Wagner, W. O'Brien. & B. Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (pp. 107-127). Cham, Switzerland: Springer Nature.
- [5] **O'Brien, W.**, Gilani, S., Gunay, HB. (2018) In-situ methods to study occupants In A. Wagner, W. O'Brien. & Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (pp. 129-167). Cham, Switzerland: Springer Nature.
- [6] **O'Brien, W.**, Wagner, A., Dong., B. (2018). Conclusion and future outlook. In A. Wagner, W. O'Brien. & B. Dong. *Exploring occupant behaviour in buildings: methods and challenges*. (pp. 307-310). Cham, Switzerland: Springer Nature.
- [7] Carlucci, S., Pagliano, L., **O'Brien, W.**, Kapsis, K. (2015). Comfort for Net ZEBs: Theory and design. In Athienitis, A., O'Brien W. *Modelling, Design, and Optimization of Net-Zero Energy Buildings*. (75-101) Berlin, Germany: Wiley and Sons.
- [8] **O'Brien, W.**, Bourdoukan, P., Delisle, V., Yip, S. (2015). Net ZEB design processes and tools. In Athienitis, A., O'Brien W. *Modelling, Design, and Optimization of Net-Zero Energy Buildings*. (107-166) Berlin, Germany: Wiley and Sons.
- [9] Athienitis, A., **O'Brien, W.**, (2015). Net ZEB case studies. In Athienitis, A., O'Brien W. *Modelling, Design, and Optimization of Net-Zero Energy Buildings*. (107-166) Berlin, Germany: Wiley and Sons.

MAGAZINE ARTICLES

- [1] Ouf, M., **O'Brien, W.**, Gunay, B (2018). Can we game code compliance through occupant modeling? ASHRAE Journal. February.
- [2] **O'Brien, W.**, Kesik, T. (2016) Condominiums & Resilience. Canadian Consulting Engineer Magazine. Pg. 16-18. URL: http://www.canadianconsultingengineer.com/wp-content/uploads/sites/21/2016/12/CCE_2016_Dec_DE.pdf
- [3] **O'Brien, W.** (2014) The occupant factor in high-performance building design. Sustainable Buildings and Architecture Magazine. URL: <http://www.sabmagazine.com/blog/2014/09/23/the-occupant-factor-in-low-energy-building-design/>

BLOG POSTS (SELECT)

- [1] **O'Brien, W.** (2018). From natural ventilation to building forensics. LinkedIn post.
- [2] **O'Brien, W.** (2017). Usability of building interfaces: a report from two months of sabbatical travel. LinkedIn post.

JOURNAL PUBLICATIONS

- [1] Abdelalim, A., **O'Brien, W.** (submitted) A Probabilistic Approach Towards Achieving Net-Zero Energy Buildings Using Stochastic Tenant Models. Science and Technology for the Built Environment.
- [2] Gunay, B., **O'Brien, W.** (submitted) Floor level occupancy count estimation: an exploratory data analysis. ASHRAE Transactions
- [3] Ouf, M., **O'Brien, W.**, Gunay, B. (submitted) Optimization of electricity use in office buildings under occupant uncertainty. Journal of Building Performance Simulation.
- [4] Ouf, M., **O'Brien, W.**, Gunay, B. (submitted) A method to derive design-sensitive schedules for light use in buildings. Building and Environment.
- [5] Huchuk, B., **O'Brien, W.**, Sanner, S. (accepted) A longitudinal study of thermostat behaviors based on climate, seasonal, and price considerations using connected thermostat data. Building and Environment.
- [6] **O'Brien, W.**, Abdelalim, A., Gunay, B. (in press) Development of an office tenant electricity use model and its application for right-sizing HVAC equipment. Energy and Buildings.
- [7] Ouf, M., **O'Brien, W.**, Gunay, B. (in press) Improving occupant-related features in building performance simulation tools. Building Simulation.
- [8] Gunay, HB., Bucking, S., **O'Brien, W.** (in press) On the energy and comfort performance benefits of early detection of building sensor and actuator faults. Building Services Engineering Research and Technology
- [9] D'Oca, S., Gunay H.B., Gilani S., **O'Brien W.** (submitted) A review of the occupant modeling approaches in offices with illustrative examples. Building Simulation.
- [10] Shi, Z, **O'Brien, W.** (accepted with revisions) Sequential state prediction and parameter estimation with Dual Constrained Extended Kalman Filter for Building Zone Thermal Responses. Energy and Buildings.
- [11] Abdelalim, A., **O'Brien, W.**, Abdelalim, A. (submitted) Sankey diagrams to support simulation-aided building design: Workflow and user test. Energy and Buildings.
- [12] Shi, Z, **O'Brien, W.** (in press) Development of a distributed building fault detection, diagnostic and evaluation system. ASHRAE Transactions.
- [13] Ozkan, A., Kesik, T., **O'Brien, W.** (in press) Development and application of time-based building energy performance metrics. Building Research and Information.
- [14] Gilani, S., **O'Brien, W.**, Gunay, B. (in press) Simulation of occupants' impact at different spatial scales. Building and Environment.
- [15] Shi, Z, **O'Brien, W.** (in press) Building energy model reduction using the Model-Cluster-Reduce Pipeline. Journal of Building Performance Simulation.
- [16] Gilani, S., **O'Brien, W.** (2018) A preliminary study of occupants' use of manual lighting controls in private offices: A case study. Energy and Buildings. 159:5720586

- [17] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I. (2018) Development and implementation of a thermostat learning algorithm. *Building and Environment*. 24(1):43-56
- [18] Bursill, J., **O'Brien, W.**, Beausoleil-Morrison, I. (2018) Software-based fault detection for multi-circuit building lighting systems. *ASHRAE Transactions*.
- [19] Bennet, I., **O'Brien, W.** (2017) Office building plug and light loads: Comparison of a multi-tenant office tower to conventional assumptions. *Energy and Buildings*. 153:461-475
- [20] Abdelalim, A., **O'Brien, W.**, Shi, Z. (2017) Data visualization and analysis of energy flow on a multi-zonal building scale. *Automation in Construction*. 84:258-273
- [21] **O'Brien, W.**, Gaetani, I., Carlucci, S., Hoes, P., Hensen. J. (2017) On occupant-centric building performance metrics. *Building and Environment*. 122:373-385
- [22] Abdelalim, A., **O'Brien, W.**, Shi, Z. (2017) Development of Sankey diagrams to visualize real HVAC performance. *Energy and Buildings*. 149:282-297
- [23] Day, J., **O'Brien, W.** (2017) Oh behave! Survey stories and lessons learned from building occupants in high-performance buildings. *Energy Research and Social Science*. 31:11-20
- [24] Gilani, S., **O'Brien, W.** (2017) Monitoring occupant behavior in an office building in Canada. *ASHRAE Transactions*. 123(1)
- [25] **O'Brien, W.**, Gunay, HB., Tahmasebi, F. Mahdavi, A. (2017) A preliminary study of representing the inter-occupant diversity in occupant modelling. *Journal of Building Performance Simulation*. 10(5-6):509-526
- [26] Bennet, I., **O'Brien, W.** (2017). Field study of thermal comfort and occupant satisfaction in Canadian condominiums. *Architectural Science Review*. 60(1):27-39
- [27] Gilani, S., **O'Brien, W.** (2017) Review of current methods, opportunities, and challenges in in-situ monitoring for occupant modeling in office spaces. *Journal of Building Performance Simulation*. 10(5-6):444-470
- [28] **O'Brien, W.**, Gaetani, I., Gilani, S., Carlucci, S., Hoes, P., Hensen. J. (2017) International survey on current occupant modelling approaches in building performance simulation. *Journal of Building Performance Simulation*. 10(5-6):653-671
- [29] Shi, Z., **O'Brien, W.**, Dicaire, D., Hu, V. (2017) Wireless heating management system and tenant usage behavior in bulk-metered apartment buildings: A Case Study. *ASHRAE Transactions*. 123
- [30] Gunay, HB., **O'Brien, W.**; Beausoleil-Morrison, I., Gilani, S. (2016) Development and implementation of an adaptive lighting and blinds control algorithm. *Building and Environment*. 113: 185-199
- [31] Gunay, HB., **O'Brien, W.**; Beausoleil-Morrison, I., Bisailon, P., Shi, Z. (2016). Development and implementation of a control-oriented model for terminal heating and cooling units. *Energy and Buildings*. 121: 78-91
- [32] Gunay, HB, **O'Brien, W.**, Beausoleil-Morrison, I., (2016) Control-oriented inverse modelling of the thermal characteristics in an office. *Science and Technology for the Built Environment*. 22(5): 586-605
- [33] Gunay, HB, **O'Brien, W.**, Beausoleil-Morrison, I., Gilani, S., (2016) Modelling plug-in equipment load patterns in private office spaces. *Energy and Buildings: Invited Special Issue on Occupant Behaviour*. 121(1): 234-249
- [34] Gilani, S., **O'Brien, W.**, Gunay, HB., Carrizo, SJ (2016). Use of dynamic occupant behavior models in the building design and LEED certification processes. *Energy and Buildings*. 117(1):260-271
- [35] **O'Brien, W.**, Bennet, I. (2016). Simulation-based evaluation of high-rise residential building thermal resilience. *ASHRAE Transactions*. 122(1)
- [36] Gunay, HB., **O'Brien, W.**; Beausoleil-Morrison, I., Bursill, J., (2016) Implementation of an adaptive occupancy and building learning temperature setback algorithm. *ASHRAE Transactions*. 122(1):179-192
- [37] Huchuk, B., Gunay, HB., **O'Brien, W.**, Cruickshank, C. (2016) Model-based predictive control of office window shades. *Building Research and Information*. 44(4):445-455
- [38] Abdelalim, A., **O'Brien, W.**, Shi, Z. (2015) Visualization of energy and water consumption and GHG emissions: a case study of a university campus. *Energy and Buildings*. 109: 334-352
- [39] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I. (2015). Implementation and comparison of existing office occupant behaviour models in EnergyPlus. *Journal of Building Performance Simulation*. 9(6):567-588

- [40] Yan, D., **O'Brien, W.**, Hong, T., Feng, X., Gunay, B., Tahmasebi, F., Mahdavi, A. (2015) Occupant behavior modeling for building performance simulation: current state and future challenges. *Building and Environment*. 107(15): 264-278.
- [41] **O'Brien, W.**, Gunay, HB. (2015) Mitigating office performance uncertainty of occupant use of window blinds and lighting using robust design. *Building Simulation: An International Journal*. 8(6): 621-636.
- [42] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I. (2015). Development of an occupancy learning algorithm for terminal heating and cooling units. *Building and Environment*. 93(2):71-85
- [43] Gunay, HB., Bursill, J., Huchuk, B., **O'Brien, W.**, Beausoleil-Morrison, I. (2014) Shortest-prediction-horizon model-based predictive control for individual offices. *Building & Environment*. 82(1) 408-419
- [44] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, Perna, A. (2014) On behavioral effects of residential electricity submetering. *Building & Environment*. 81(1) 396-403
- [45] **O'Brien, W.**, Gunay, HB. (2014) The contextual factors contributing to occupants' adaptive comfort behaviors in offices — a review and proposed modeling framework. *Building and Environment* 77 (7): 77-87
- [46] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, Huchuk, B. (2014) On adaptive occupant-learning window blind and lighting controls. *Building Research & Information*. 42(6): 739-756
- [47] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I., Goldstein, R., Breslav, S., Khan., A. (2014) Coupling stochastic occupant models to building performance simulation using the Discrete Event System Specification (DEVS) formalism. *Journal of Building Performance Simulation*. 7(6): 457-478.
- [48] **O'Brien, W.** Kesik, T., Athienitis, A. (2014) Solar Design Days: A tool for passive solar house design. *ASHRAE Transactions*. 120 (1).
- [49] Gunay, HB, **O'Brien, W.**, Beausoleil-Morrison, I. (2013) A Critical review of state-of-the-art energy and comfort related occupant behavior in office buildings. *Building and Environment*. 70. 31-47.
- [50] **O'Brien, W.**, Kapsis, K., Athienitis, A. (2013) Manually-operated window shade patterns in office buildings: a critical review. *Building and Environment* 60(2): 319-338.
- [51] Attia, S., Hamdy, M., **O'Brien, W.**, Carlucci, S. (2013) Assessing the Gaps and Needs for Integrating Building Performance Optimization Tools in Net Zero Energy Buildings Design, *Energy and Buildings Journal*. 60(5): 110-124
- [52] **O'Brien, W.**, Athienitis, A., Kesik, T. (2011). Parametric analysis to support the integrated design and performance modelling of net-zero energy houses. *ASHRAE Transactions*. 117(1).
- [53] Doiron, M., **O'Brien, W.**, Athienitis, A. (2011). Energy performance, thermal comfort, and lessons learned from a near net-zero energy house. *ASHRAE Transactions* 117(2).
- [54] Candanedo, L.M., Athienitis, A.K., Candanedo, J.A., **O'Brien, W.**, and Chen, Y. (2011) Transient and steady state models for open loop air based BIPV/T Systems. *ASHRAE Transactions*, 116(1).
- [55] **O'Brien, W.**, Athienitis, A. Kesik, T. (2011). Thermal zoning and interzonal airflow in the design and simulation of solar houses: a sensitivity analysis. *Journal of Building Performance Simulation*. 4(3): 239-256.
- [56] **O'Brien, W.**, Kennedy, C., Athienitis, A. Kesik, T. (2010). The relationship between personal net energy use and the urban density of solar buildings. *Environment and Planning: B*. 37(6): 1002-1021.

REFEREED CONFERENCE PROCEEDINGS (*PRESENTED BY LIAM O'BRIEN)

- [1] Gilani, S., **O'Brien, W.** On the appropriateness of occupancy models for various temporal and spatial scales. *eSim 2018*. May 9-10, Montreal, QC
- [2] Fernald, H., Hong, S., Bucking, S., **O'Brien, W.** BIM to BEM translation workflows and their challenges: A case study using a detailed BIM model. *eSim 2018*. May 9-10, Montreal, QC
- [3] Hicks, A., Ouf, M., **O'Brien, W.** Bucking, S. The effect of occupant behaviour on energy consumption in conventional vs. high-performance residential buildings. *eSim 2018*. May 9-10, Montreal, QC
- [4] Shi, Z., **O'Brien, W.** Using Building Performance Simulation for Fault Impact Evaluation. *eSim 2018*. May 9-10, Montreal, QC

- [5] Abdelalim, A., **O'Brien, W.** An approach Towards Achieving Net-Zero Energy Buildings Based on Realistic Occupant-Related Loads. eSim 2018. May 9-10, Montreal, QC
- [6] Gunay, B., **O'Brien, W.** An OpenStudio measure to incorporate data-driven occupant models in EnergyPlus. eSim 2018. May 9-10, Montreal, QC
- [7] Ouf, M., **O'Brien, W.**, Gunay, B. A Framework to Improve Occupant Modeling Capabilities in Building Simulation Tools. eSim 2018. May 9-10, Montreal, QC
- [8] Bursill, J., **O'Brien, W.**, Beausoleil-Morrison, I. An approach to virtual sensing of cooling systems using state-space inverse modelling and gradient descent. eSim 2018. May 9-10, Montreal, QC
- [9] Abuimara, T., **O'Brien, W.**, Gunay, B., Carrizo, S. Assessing the impact of occupants on building design decision making. eSim 2018. May 9-10, Montreal, QC
- [10] Abuimara, T., **O'Brien, W.**, Gunay, B., Abdelalim, A., Ouf, M., Gilani, S. Modelling occupants in buildings: Stakeholders' workshop on current barriers, challenges, and needs. eSim 2018. May 9-10, Montreal, QC
- [11] Tamas, R., **O'Brien, W.**, Gunay, B. Summer window use behaviour in air-conditioned condominiums. eSim 2018. May 9-10, Montreal, QC
- [12] **O'Brien, W.**, Gunay, B., Beausoleil-Morrison, Kesik, T. Carrizo, S., Danks, R., Ouf, M., Gilani, S., Abdelalim, A., Occupant Modelling for Building Codes and Standards – Technology Roadmap. eSim 2018. May 9-10, Montreal, QC
- [13] Mahdavi, A., Tahmasebi, F., Gunay, B., **O'Brien, W.**, The diversity challenge in models of occupants' presence in buildings, Proceedings of Building Simulation Conference 2017
- [14] Abdelalim, A., **O'Brien, W.** Visualization of building performance using Sankey diagrams to enhance the decision-making process. SimAUD 2017. Toronto, ON
- [15] Berquist, J., Tessier, A., **O'Brien, W.**, Attar, R. Generative design for heating, ventilation, and air-conditioning. SimAUD 2017. Toronto, ON
- [16] Ozkan, A., Kesik, T., **O'Brien, W.** Visualization of passive performance parameters through time-based metrics and discussion of a survey for validation of the approach. Building Simulation Conference 2017. Aug 5-7. San Francisco, CA.*
- [17] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I., Newsham, G., Macdonald, I. The effect of zone level occupancy characteristics on adaptive controls. Building Simulation Conference 2017. Aug 5-7. San Francisco, CA.
- [18] Gilani, S., **O'Brien, W.** Modelling and simulation of lighting use patterns in office spaces. Building Simulation Conference 2017. Aug 5-7. San Francisco, CA.
- [19] Shi, Z., **O'Brien, W.** Building energy model reduction using principal component analysis and affinity propagation clustering of thermal zones. ASim 2016. Nov 27-29, Korea. (**Best paper award**)
- [20] Ozkan, A., Kesik, T., **O'Brien, W.** Correlating the time-based metrics of thermal autonomy and passive survivability to the energy performance of multi-unit residential buildings. ICBEST 2017. May 15-18. Istanbul, Turkey.
- [21] Ozkan, A., Kesik, T., **O'Brien, W.** The influence of passive measures on building energy demands for space heating and cooling in multi-unit residential buildings. eSim 2016. May 3-5, Hamilton, ON.
- [22] Gilani, S., **O'Brien, W.** Potential for virtual daylight sensors using daylight simulation and high-resolution measurement of solar radiation. eSim 2016. May 3-5, Hamilton, ON.*
- [23] Gunay, HB., Fuller, A., **O'Brien, W.**, Beausoleil-Morrison, I. Detecting occupants' presence in office spaces: a case study. eSim 2016. May 3-5, Hamilton, ON.
- [24] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I. A starter toolkit for developing data-driven occupant behaviour and presence models. eSim 2016. May 3-5, Hamilton, ON.
- [25] **O'Brien, W.**, Gunay, HB. Modelling occupant diversity and its applications. eSim 2016. May 3-5, Hamilton, ON.*
- [26] Abdelalim, A., Shi, Z., **O'Brien, W.** Energy flow analysis on a multi-zonal building scale using Sankey diagrams. eSim 2016. May 3-5, Hamilton, ON.
- [27] Shi, Z., **O'Brien, W.** A web-based interactive 3D visualization tool for building data. eSim 2016. May 3-5, Hamilton, ON.

- [28] Shi, Z., **O'Brien, W.** Building zone fault detection with Kalman filter Based methods. eSim 2016. May 3-5, Hamilton, ON. (**Best paper award.**)
- [29] Abdelalim, A., Shi, Z., **O'Brien, W.** An approach towards developing methods to analyze and visualize energy flow of HVAC systems. SimAUD 2016
- [30] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I., D'Oca, S., Corgnati, S. On modelling and simulation of occupant models. Building Simulation Conference 2015. (**Best paper award**)
- [31] Shi, Z., Abdelalim, A., **O'Brien, W.**, Attar, R., Akiki, P., Graham, K., Waarden, B. V., Fai, S., Tessier, A., Khan, A. (2015). Digital Campus Innovation Project : Integration of building information modelling with building performance simulation and building diagnostics. *SimAUD 2015*.
- [32] Bennet, I., **O'Brien, W.**, Gunay, HB. Effect of window blind use in residential buildings: Observation and simulation study. eSim 2014. Ottawa, Canada. May 8-9.
- [33] Huchuk, B., Cruickshank, C., **O'Brien, W.**, Gunay, HB. Recursive thermal building model training using Ensemble Kalman Filters. eSim 2014. Ottawa, Canada. May 8-9.
- [34] Selvig, A., **O'Brien, W.**, Merrett, C. 2013 Solar Decathlon: Technologies, modelling tools, and Canadian applications. eSim 2014. Ottawa, Canada. May 8-9.
- [35] Carrizo, JS, **O'Brien, W.**, Santana, M. Lasers, Light, and God: 3-D scanning assisted lighting analysis of a house of worship. eSim 2014. Ottawa, Canada. May 8-9.
- [36] Kesik, K., **O'Brien, W.** Feasible upper boundaries of passive solar space heating fraction potentials by climate zone. eSim 2014. Ottawa, Canada. May 8-9.
- [37] Gunay, HB., **O'Brien, W.**, Beausoleil-Morrison, I., Huchuk, B., Palmer, M., Fletcher, J., Pavlovski, A. The effect of input uncertainty in model-based predictive control. eSim 2014. Ottawa, Canada. May 8-9.
- [38] Kapsis, K., **O'Brien, W.**, Athienitis, A. (2013) time-lapse photography and image recognition to monitor occupant-controlled shade patterns: analysis and results. Building Simulation Conference. August 26-29.
- [39] Attia, S., Hamdy, M., **O'Brien, W.**, Carlucci, S. (2013) Computational optimisation for zero energy buildings design: interviews results with twenty-eight international experts. IBPSA Building Simulation Conference. August 26-29.
- [40] **O'Brien, W.** (2013) Evaluating the performance robustness of fixed and movable shading devices against diverse occupant behaviors. SimAUD. San Diego, CA. April 7-10.*
- [41] Huchuk, B., **O'Brien, W.**, Cruickshank, C. (2013) Preliminary Results of Model Predictive Control of Shading Systems. SimAUD. San Diego, CA. April 7-10.*
- [42] Gunay, H., **O'Brien, W.**, Goldstein, R., Breslav, S., Khan, A. (2013) Development of Discrete Event System Specification (DEVS) building performance models for building energy design. SimAUD. San Diego, CA. April 7-10.
- [43] **O'Brien, W.** (2013) Occupant-proof buildings: can we design buildings that are robust against occupant behaviour? Building Simulation. Chambéry, France. August 26-29.*
- [44] **O'Brien, W.** (2012) Use of Sankey Diagrams to Enhance Building Performance Simulation-Supported Design. SimAUD. Orlando, FL. March 26-29.*
- [45] Kesik, T., **O'Brien, W.** (2012) Design Methodology Embodying the Energy and Economic Performance of Solar Houses. eSim 2012. Halifax, NS. May 2-4.*
- [46] **O'Brien, W.**, A. K. Athienitis, S. Bucking, M. Doiron, and T. Kesik (2010). A Study of Design Tools and Processes Through a Near Net-Zero Energy House Redesign. EuroSun 2010. Graz, Austria.
- [47] S. Bucking, A. K. Athienitis, R. Zmeureanu, **W. O'Brien**, and M. Doiron (2010). Design Optimization Methodology for a Near Net Zero Energy Demonstration Home. EuroSun 2010. Graz, Austria.
- [48] Athienitis, A., Torcellini, P., Hirsch, A., **O'Brien, W.**, Cellura, M., Klein, R., Delisle, V., Attia, S., Bourdoukan, P., Carlucci, S. (2010). Design, Optimization, and Modelling Issues of Net-Zero Energy Solar Buildings. EuroSun 2010. Graz, Austria.
- [49] **O'Brien, W.**, K. Kapsis, A. K. Athienitis and T. Kesik (2010). Methodology for quantifying the performance implications of intelligent shade control in existing buildings in an urban context. SimBuild 2010. New York City.*

- [50] **O'Brien, W.**, A. K. Athienitis and T. Kesik (2010). Implementation of a management system for multiple design concepts and their performance in a solar house design tool. eSim 2010. Winnipeg, MB.*
- [51] **O'Brien, W.**, Athienitis, A., Kesik, T. The development of a solar house design tool. 11th International Building Performance Simulation Association Conference, Glasgow, Scotland. July 27-30, 2009. *
- [52] Candanedo, L., Athienitis, A., **O'Brien, W.** Development of an air-based open loop building-integrated photovoltaic/thermal systems. 11th International Building Performance Simulation Association Conference, Glasgow, Scotland. July 27-30, 2009.
- [53] **O'Brien, W.**, Athienitis, A. Kesik, T. The methodology and development of a solar house design tool. 4th Canadian Solar Buildings Conference, Toronto, ON. June 25-27, 2009. *
- [54] **O'Brien, W.**, Kennedy, C., Athienitis, A. Kesik, T. The relationship between personal net energy use and the urban density of solar buildings. 4th Canadian Solar Buildings Conference, Toronto, June 25-27, 2009. *
- [55] Hachem, C., Athienitis, A. Fazio, P, **O'Brien, W.** Evaluation of low energy, low cost housing: case study. 4th Canadian Solar Buildings Conference, Toronto, ON. June 25-27, 2009.
- [56] Candanedo, L., Athienitis, A., Candanedo, J., **O'Brien, W.**, Chen, Y., Simplified model for open-loop air-based BIPV/T systems. 4th Canadian Solar Buildings Conference, Toronto, ON. June 25-27, 2009. (**Best paper award**)
- [57] **O'Brien, W.**, Athienitis, A. Kesik, T. Roofs as extended solar collectors: practical issues and design methodology. 12th Canadian Conference on Building Science and Technology, Montreal, QC. May 6-8, 2009.*
- [58] **O'Brien, W.**, Athienitis, A., Kesik, T. Sensitivity analysis for a passive solar house energy model. International Solar Energy Society – Asia Pacific Conference, Sydney, Australia. November 25-28, 2008.
- [59] **O'Brien, W.**, Kesik, T., Athienitis, A. The use of solar design days in a passive solar house conceptual design tool. 3rd Canadian Solar Buildings Conference, Fredericton, NB, August 20-22, 2008. *

HOBBIES

- Gardening and pursuing other hobbies on my countryside property (**2016-present**)
- Curling (**1995-present**)
- Ultimate Frisbee (**2001-present**)