Graduate Research Opportunities at the UBC Building Decisions Research Group

The BDRG (previously the ETA Lab) is an interdisciplinary research group at the University of British Columbia (UBC), based at the UBC Centre of Interactive Research on Sustainability. The BDRG comprises engineers, designers, and building scientists working together. We seek to establish new connections within the aligned fields of building energy systems, building performance simulation, indoor environmental quality, statistics and uncertainty analysis, robust decision-making, and machine learning. Find out more about our research at http://bdrg.io

Open Graduate Research Positions for Fall 2021

Supported positions: Eligible candidates may pursue a MASc. (Mech. Eng), PhD (Mech. Eng.), Master's of Advanced Studies in Architecture

Start Date: September 1, 2021

Number of positions: 3

Remuneration: 100%

New Research Projects for 2021:

BCR8 Evolve | Construction of Canada's largest digitally-monitored Passive House residential building

The Evolve project is a five-year R&D project to oversee, study, and evaluate the construction of a 100+ unit, 6 storey Passive House-certified residential building in Vancouver, Canada. BCR8 Evolve will be the largest high-performance residential building in Canada to be performance monitored with a large number of sensors, include minute-by-minute thermal tracking of its heat pumps to similar monitoring of indoor plug loads, baseboard electric heating demand, occupancy patterns, weather, indoor air quality etc. It is being constructed at UBC immediately adjacent to a code-compliant "typical" building that will be similarly monitored. The Evolve project will address a number of questions facing Canada's decarbonization agenda in the post-pandemic area: Do large Passive House buildings improve livability? Are they resilient to climate change? Do they perform as predicted? Do they save long-term costs? Are Passive Houses a viable future for low-carbon building construction?

DAVE | Digital twin for Air quality & Ventilation Evaluation

DAVE is a two-year project to develop a calibrated digital twin of air flow, energy, and indoor environmental quality of care home settings. The project, to be undertaken in collaboration with Vancouver Coastal Health and UBC Aerosol Research Laboratory, will seek to evaluate the relationship between disease transmission (i.e., COVID-19), HVAC, natural ventilation, and building design particularly in the setting of elderly care homes in Canada.

Who are we looking for?

The BDRG is looking for candidates with a Bachelor's or Master's degree in engineering, architecture or the related physical sciences. Students with a strong interest and experience with data-driven methods, energy simulation & modelling of energy systems, statistical uncertainty & optimization are desired. Programming experience in Python (or similar) is an asset. Candidates should have excellent reading, writing, and speaking skills in English. More than anything, candidates should have a passion for undertaking independent research, but in a supportive team environment. All qualified candidates are encouraged to apply. The BDRG does not discriminate based on race, gender, religion, ethnicity, or nationality.

Supported Research Topics:

- The displacement of the global workforce post-COVID and its effects on building energy use and emissions;

- The relationship between productivity, health, indoor environmental quality, energy use, and emissions;

- Data analytics of large building performance datasets at the individual building and city-scale; sub-topics include load disaggregation of primary energy meter data, Bayesian inference of occupant behavior, presence, air quality, energy, and carbon emissions;

- Post-occupancy evaluation and calibrated energy modelling of net-zero energy buildings;

- Technoeconomic analysis of building-integrated electric vehicle charging systems;

- Combined analysis of building retrofit performance and real estate value across Canada;

- Digital twins of air flow and indoor air quality in care home settings (i.e., CFD modelling if post-pandemic care home settings);

- Climate-adaptive radiant heating and cooling in naturally-ventilated buildings (new technology, design, simulation, and experimental testing);

- Measurement of indoor environmental quality using deployable networks of IoT sensors

Interested in applying?

Please send a cover letter and CV to Dr. Adam Rysanek, BDRG Director, at:
arysanek@sala.ubc.ca

About UBC

The University of British Columbia is consistently ranking among the 40 best globally, and now places among the top 20 public universities in the world. UBC strives to create an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. UBC is nestled within the Metro Vancouver area, an internationally-renowned city – and the 3rd largest in Canada. Consistently ranked one of the world's most livable cities, it is where snow-capped mountains meet the ocean, breathtaking views greet you around every corner, and a diversity of communities, cultures, and spirit meet you at its core.