MASc or PhD position in
Deep energy retrofits to improve energy use and climate resilience

The longevity of the building stock means that deep energy building retrofits are critical to meeting future carbon emissions targets, since high-performance new buildings alone cannot achieve the required reductions. This project will investigate the benefits of improving the energy use and climate resiliency of buildings. This will cover energy efficiency to reduce bills and GHG emissions, and to improve resiliency to extreme weather and utility outages. The findings will inform a roadmap that compares the benefits of addressing climate resilience through mitigation and adaptation with the costs of failure to do so.

The position will be supervised by Dr Ralph Evins (Imperial College London, ETH Zurich) in the Energy Systems and Sustainable Cities research group together with Andrew Pape-Salmon, an Adjunct Professor in Civil Engineering and Executive Director of the Buildings and Safety Standards Branch of the BC government. The work will be carried out in the stimulating multi-disciplinary environment of the Institute for Integrated Energy Systems (IESVic) and the new green Civil Engineering department at the University of Victoria in beautiful British Columbia, Canada.

Research objectives
The core tasks of this project include:
- Development of archetypes that are indicative of the building stock.
- Simulation of all archetypes in EnergyPlus for various locations and future climate scenarios.
- Assessment against metrics of carbon emissions, energy use, energy cost, thermal comfort, overheating risk, resilience to utility outages and upgrade costs.
- Investigation of the adaptability of certain archetype buildings, for example by later retrofitting a passive house with shades to prevent overheating.
- Scaling results to the whole regional building stock to explore options for transition, accounting for predicted retrofit and replacement rates.
Requirements
- For a PhD position, a Master's degree (MASc or MEng) in engineering, computer science, mathematics or physics is required.
- For an MASc position, a Bachelor's degree (BSc or BEng) in engineering, computer science, mathematics or physics is required.
- A good working knowledge of Python is required. For an exceptional candidate, an expert level in another programming language could be acceptable instead.
- Mastering the English language is required.
- Familiarity with building energy modelling is desirable.

The University of Victoria is an equity employer and encourages applications from persons with disabilities, visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University.

Timeline
Start date: ideally January 2020 but earlier or later is possible - specify in your cover letter when you are available.
Duration: 2 years (MASc) or 3 years (PhD).

Funding
This position is funded at a level commensurate with NSERC Masters or Doctoral scholarships. Holders of such fellowships will be eligible for top-up funding.

How to apply
Interested candidates should email iesvic.admin@uvic.ca with the subject Evins Archetypes, attaching the following items:
- a 1 page cover letter explaining your fit for the position and describing programming expertise and previous research experience
- a detailed curriculum vitae
- names and contact information of at least two professional references.

Applications not following these instructions will not be considered.
Review of applications will begin in mid-September, though later submissions may be considered. Do not apply for more than one position; indicate interest in multiple positions in your cover letter.