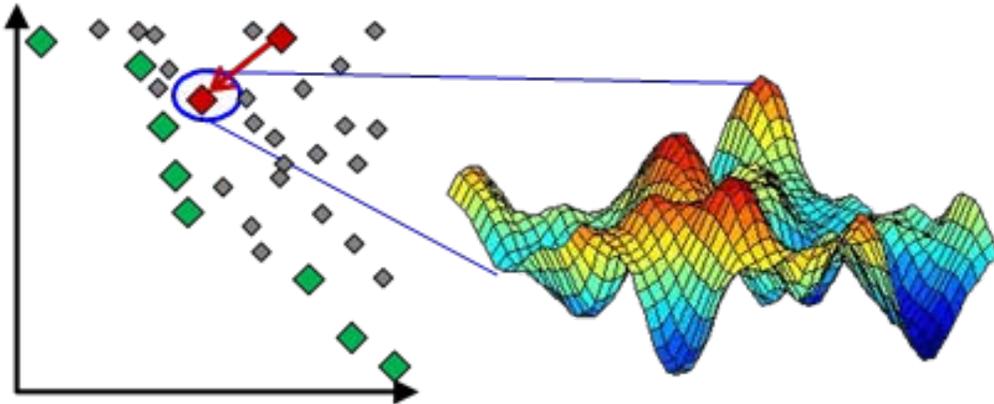


**PhD position in**  
**Applying machine learning to**  
**building and energy systems optimization**



Buildings, renewable energy generation and storage technologies and associated energy systems all pose complex, interacting design and operational challenges. Finding high-performing solutions to these problems requires a new generation of computational tools, blending aspects of simulation, optimization, machine learning and visualization.

The approach to be explored in this project is to incorporate surrogate models (simplified representations fitted using machine learning techniques) directly into an optimizer (e.g. a genetic algorithm), which then calls a simulator to evaluate candidate solutions. The research will focus on the best ways of updating the surrogate model as part of the optimization process, and how this varies across different types of problems. This position will work to combine all of these areas via a unified cloud-based portal that will make modular software components available to other researchers as well as the general public.

The position will be supervised by [Dr Ralph Evins](#) (Imperial College London, ETH Zurich), who's [Energy Systems and Sustainable Cities research group](#) is pioneering the use of advanced computational techniques to deliver the low-energy buildings, cities and energy systems of the future. The work will be carried out in the stimulating multi-disciplinary environment of the [Institute for Integrated Energy Systems](#) (IESVic) at the University of Victoria in beautiful British Columbia.

### **Research objectives**

The core tasks of this project include:

- Development of an optimization and surrogate modelling framework using Python and machine learning via [TensorFlow](#).
- Evaluating and improving the framework for the purpose of tackling challenges related to building energy use and energy systems.
- Application of the framework to case studies with partners from academia and industry.

### **Requirements**

- A Master's degree (MAsc or MEng) in engineering, computer science, mathematics or physics is required. For an exceptional candidate without a Master's, entry into the MAsc program could be possible instead.
- A good working knowledge of Python is required. For an exceptional candidate, an expert level in another programming language could be acceptable instead.
- Previous experience with machine learning and/or meta-heuristic optimization is highly desirable.
- Familiarity with building energy simulation and/or energy systems is desirable.
- Mastering the English language is required.

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 September 2018 (specify in your cover letter when you are available).

Duration: 3 years.

### **Funding**

This position is funded at a level commensurate with [NSERC scholarships](#).

Holders of such fellowships will be eligible for top-up funding.

### **How to apply**

Interested candidates should email [iesvic.admin@uvic.ca](mailto:iesvic.admin@uvic.ca) with the subject Evins PhD ML, attaching the following items:

- a detailed curriculum vitae
- a 1 page cover letter explaining your fit for the position and describing programming expertise and previous research experience
- names and contact information of at least two professional references.

Review of applications will begin in mid-June, though later submissions may be considered.

Do not apply for more than one position; indicate interest in other positions in your cover letter.

