Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

Thesis Projects (MIE498 H/Y) 2018–2019

Title/Topic: Improving a Bayesian optimization method for small-scale hydro energy harvesters.

Description:

Many engineering design optimization problems rely on CFD simulations; these simulations are computationally-expensive and require an optimization method that is efficient with its simulation calls. Bayesian optimization is an optimization method based on surrogate-modeling that is well suited to problems like this. It has been gaining traction in the machine learning fields but is not yet widely used in engineering design.

This project is part of our research into the optimization of small-scale hydro turbines. It will focus on the implementation of a Bayesian optimization method and the benchmarking of possible improvements to the method. The method will also be applied to a CFD turbine model in order to gauge its effectiveness for engineering design problems.

Possible pre-requisites: Some experience with CFD (ANSYS CFX), proficiency in computer programming (MATLAB, Python), previous courses on numerical methods, statistics, and/or optimization.

Contact: Prof. Amy Bilton | bilton@mie.utoronto.ca