Environmental Science Graduate Program Seminar Series

Increasing Air Quality by Applying Bayesian Optimization to Parallelized Large-Eddy Simulation Model (PALM)

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Smith Laboratory, Room 3150

Abstract

Bayesian Optimization (BO) is a range of techniques used in optimization of black-box and grey-box problems. Building upon work done by Yazbeck et al (2021), we are applying BO techniques towards Large-Eddy Simulations using the Parallelized Large-Eddy Simulation Model (PALM) for atmospheric and oceanic flows. This work seeks to build a BO wrapper around PALM so that we can run the model over many iterations, with the previous models output informing the next model's setup. Each iteration we will vary domain topography and tree distribution to mimic different forms of suburbia. We are looking at momentum transfers that induce ejections (strong bursts) and sweeps (gusts) and maximizing these momentum transfers will give the surrounding trees the greatest ability to uptake air pollutants. The results of this study will help enable urban planners to better plan our cities, both in suburbia, but also in other parts of our cities.

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