MUMS Agent-Based Modeling and Uncertainty Quantification Workshop
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SPEAKER TITLES/ABSTRACTS

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"Practical Bayesian Optimization for Agent Based Transportation Simulators"

Simulators play a major role in analyzing multi-modal transportation networks. As complexity of simulators increases, development of calibration procedures is becoming an increasingly challenging task. Current calibration procedures often rely on heuristics, rules of thumb and sometimes on brute-force search. In this talk we consider a statistical framework for calibration that relies on Bayesian optimization. Bayesian optimization treats the simulator as a sample from a Gaussian process (GP). Tractability and sample efficiency of Gaussian processes enable computationally efficient algorithms for calibration problems. We show how the choice of prior and inference algorithm effect the outcome of our optimization procedure. We develop dimensionality reduction techniques that allow for our optimization techniques to be applicable for real-life problems. We develop a distributed, Gaussian Process Bayesian regression and active learning models. We demonstrate those to calibrate ground transportation simulation models.