Abstract: There is an increased interest among both private and public urban transportation stakeholders to develop and use urban mobility models to inform the design and the operation of their services. Additionally, as the resolution (i.e., granularity) of urban mobility data increases, so does that of the corresponding models. This leads to reduced computational efficiency. There is a pressing need for computationally efficient algorithms that enable the calibration of these higher resolution, yet inefficient, models. The calibration problems faced by practitioners are difficult optimization problems. They are high-dimensional, simulation-based and non-convex problems. Hence, the design of efficient algorithms is challenging. This talk presents computationally efficient algorithms for high-dimensional, static and dynamic, demand calibration problems. To tackle these problems, we formulate analytical metamodels with a complexity that scales linearly with network size, making them suitable for large-scale networks. We benchmark the approach versus standard calibration algorithms, and discuss Berlin and Singapore case studies. We also discuss ongoing work in the design of algorithms for discrete simulation-based optimization problems.

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