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Webinaire du CIRRELT Webinar

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Dynamic Travel Demand Estimation: the Cornerstone of Future Urban Mobility Services

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 effiicient 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.

Bio: Carolina Osorio is an Associate Professor in the Department of Decision Sciences at HEC Montreal, where Osorio holds the SCALE AI Research Chair in Artificial Intelligence for Urban Mobility and Logistics. Osorio is also a Research Scientist at Google Research. Osorio's work develops operations research techniques to inform the design and operations of urban mobility systems. It focuses on simulation-based optimization algorithms for, and analytical probabilistic modeling of, congested urban mobility networks. Osorio was recognized as one of the outstanding early-career engineers in the US by the National Academy of Engineering's EU-US Frontiers of Engineering Symposium, and is the recipient of a US National Science Foundation CAREER Award, an MIT CEE Maseeh Excellence in Teaching Award, an MIT Technology Review EmTech Colombia TR35 Award, an IBM Faculty Award and a European Association of Operational Research Societies (EURO) Doctoral Dissertation Award.

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Mardi / Tuesday

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Martin Trépanier

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