



## Séminaire conjoint / Joint Seminar

Chaire CN en intermodalité des transports /  
CN Research Chair in Intermodal Transportation



# Carolina Osorio

Massachusetts Institute of Technology  
Cambridge, Massachusetts, USA

### LARGE-SCALE URBAN TRANSPORTATION SYSTEM DESIGN AND OPERATIONS IN THE ERA OF CONNECTED, AUTONOMOUS AND REAL-TIME RESPONSIVE VEHICLES AND TRAVELERS

**Abstract:** With the increase in connectivity (vehicle-to-vehicle, vehicle-to-infrastructure) and in real-time responsiveness (e.g., on-demand mobility services), travelers and vehicles are becoming "real-time optimizers" of their trips. The urban mobility challenges and breakthroughs of the next decades will be marked by our capacity to optimize the aggregate performance of large-scale transportation systems while accounting for how the hundreds of thousands of "real-time optimizers" will locally interact among themselves and with the infrastructure. In this talk, we present modeling and optimization methodologies that address this challenge. We discuss case studies carried out in collaboration with transportation agencies that use these methodologies for large-scale urban traffic management and lead to enhanced network sustainability, efficiency, reliability and robustness. We present simulation-based optimization algorithms for large-scale dynamic problems, as well as ongoing work for real-time problems. We also discuss the most recent results on the design of urban traffic management algorithms that account for the presence of autonomous vehicles.

**Note:** Carolina Osorio is an assistant professor in the Department of Civil and Environmental Engineering (CEE) and in the Operations Research Center (ORC) at MIT. Her work develops operations research techniques to inform the design and operations of urban transportation systems. It focuses on simulation-based optimization algorithms for, and analytical probabilistic modeling of, congested urban road networks. She is the recipient of a US National Science Foundation CAREER Award, an MIT CEE Maseeh Excellence in Teaching Award, a European Association of Operational Research Societies (EURO) Doctoral Dissertation Award, and has been recently honored as an invited speaker to the National Academy of Engineering's EU-US Frontiers of Engineering Symposium. [osorioc@mit.edu](mailto:osorioc@mit.edu) and <http://cee.mit.edu/osorio>

VENDREDI / FRIDAY

20 mai 2016 /  
May 20th, 2016  
14h30

Salle / Room 5441  
Pavillon André-Aisenstadt  
Université de Montréal

Ouvert à tous / Open to all

Organisateur / Organizer  
Emma Frejinger



UNIVERSITÉ  
LAVAL



McGill



UNIVERSITÉ  
Concordia  
UNIVERSITY



Le génie pour l'industrie

UQÀM

HEC MONTRÉAL



POLYTECHNIQUE  
MONTRÉAL

Université  
de Montréal