Digital intelligence for sustainable mobility

Program, March 17, 2026

HEC Montréal –Hélène-Desmarais Building

501, de la Gauchetière West st., room A.668, Montreal QC

Joint symposium:

CIRRELT

GERAD

CORS · SCRO

Fonds de recherche Québec

13:00 Opening

13 :05 to 14 :35 Part 1

13 :05 to 13 :35 **Martin Trépanier**, Polytechnique Montréal

The Role of Carsharing in Urban Demotorization: Insights from Data-Driven Analysis

Carsharing plays a critical role in the demotorization of populations living in central urban areas, particularly in Montréal, where thousands of shared vehicles are available on-street and in dedicated parking facilities. This presentation provides an overview of how data can be used to analyze the behavior of carsharing members and to assess the extent to which carsharing services contribute to reducing the impacts of private automobile use in cities. Using multiple datasets, we examine under what conditions carsharing effectively replaces car ownership, reduces vehicle kilometers traveled, and supports more sustainable mobility patterns. The presentation draws on several research projects conducted over the years by students, in close collaboration with the carsharing operator Communauto, and highlights key methodological insights as well as empirical findings relevant to urban mobility policy and planning.

Martin Trépanier is civil engineer and professor of logistics and transportation in the Department of Mathematics and Industrial Engineering at Polytechnique Montréal. His primary research areas in transportation planning include public transit, shared mobility, parking management, logistics, and winter maintenance. Until the end of 2024, he served as the director of the Interuniversity Research Center on Enterprise Networks, Logistics, and Transportation (CIRRELT).

13 :35 to 14 :05 **Emma Frejinger**, Université de Montréal

User-Centric Design of Urban EV Charging Networks

In areas with access to clean, renewable electricity, such as Quebec, increasing the adoption of electric vehicles (EVs) has the potential to reduce greenhouse gas emissions. User adoption requires a charging infrastructure that meets their specific needs and preferences. Therefore, we take a user-centric view when addressing a strategic charging station placement planning problem. This results in a bilevel optimization model that is intractable for all but the simplest instances. We introduce efficient ways to solve the problem and discuss methods for estimating demand distributions from historical data. Results based on data from Hydro-Québec show high variability among user preferences, and that that leveraging related demand distributions leads to high-quality charging network design solutions. *This talk is based on joint work with Margarida Carvalho and Steven Lamontagne.*

Emma Frejinger is a professor at the Department of Computer Science and Operations Research at Université de Montréal, where she holds both a Canada Research Chair and an Industrial Research Chair funded by the Canadian National Railway Company. Her research is application-driven and focuses on developing innovative combinations of machine learning and operations research methodologies to address large-scale decision-making problems. Emma has extensive experience collaborating with industry, particularly within the transportation sector. Since 2018, she has also served as a scientific advisor for IVADO Labs, contributing to the development of AI solutions for the supply chain industry. In addition, she provides expert witness services and is an academic affiliate of Analysis Group. Before joining Université de Montréal in 2013, Emma was a faculty member at KTH Royal Institute of Technology in Sweden.

14 :05 to 14 :35 **Lijun Sun**, McGill University

Seeing the Invisible: Solving Inverse Problems in Transportation

Transportation systems present a fundamental "inverse problem": while we can observe symptoms such as traffic counts, speeds, and congestion, the underlying causes—including Origin-Destination (OD) demand and human behavioral preferences—remain hidden. Recovering these hidden variables is mathematically challenging due to the non-uniqueness of solutions, noisy sensor data, and the high dimensionality of urban networks. This talk introduces a paradigm shift in transportation modeling, moving from deterministic point estimates to a probabilistic framework that explicitly quantifies uncertainty. By inferring ranges of plausible causes rather than forcing a single answer, this approach enables more robust infrastructure planning, policy evaluation, and the development of trustworthy AI systems that transparently communicate their own reliability.

Lijun Sun is an Associate Professor and William Dawson Scholar in the Department of Civil Engineering at McGill University. He directs the Smart Transportation Lab, where his research integrates statistical learning, spatiotemporal modeling, and Bayesian inference to address efficiency and resilience in complex urban networks. His current work focuses on probabilistic time series forecasting, tensor analysis, and modeling human driving behavior under uncertainty. Dr. Sun received his PhD in Civil Engineering (Transportation) from the National University of Singapore in 2015 and his Bachelor's degree from Tsinghua University in 2011.

14 :35 to 15 :00 Coffee break

15 :00 to 16 :30 Part 2

15 :00 to 15 :30 **Francesco Ciari,** Polytechnique Montréal

The Environmental Impact of Shared Autonomous Vehicles: How to Deal with Intercity Travel?

Francesco obtained his master degree in Environmental engineering at the University of Florence in 2003. He obtained his PhD in transportation planning in 2012 with a dissertation titled Sharing as a key to rethink urban mobility at the Swiss Federal Institute of Technology (ETH) in Zurich, where he worked as a senior researcher until 2017. Between 2017 and 2018, he joined Joanneum Research in Graz (Austria) as head of the Urban Living Lab research unit.

15 :30 to 16 :00 **Jiangbo Yu,** McGill University

Early-Stage Agentic Transportation Systems (AgTS): Networked AI Agents for Sustainable, Adaptive, and Human-Centered Urban Mobility

As AI agents rapidly enter the transportation industry, they bring both significant opportunities and substantial risks for society. Many current deployments across the planning, construction, and management of mobility systems remain siloed and weakly adaptive to evolving societal and environmental objectives. This talk introduces the AgTS framework, which conceptualizes next-generation mobility systems as coordinated, goal-driven AI agents. The presentation will highlight three agentic systems currently under development, illustrating how they can collaboratively support: (1) public opinion elicitation and demand forecasting, (2) strategic infrastructure investment, and (3) inclusive mobility service operations. Together, these examples demonstrate how early-stage AgTS can integrate fragmented efforts to promote beneficial outcomes, while surfacing key research and policy implications.

Jiangbo Yu is an Assistant Professor in the Department of Civil Engineering at McGill University, where he leads research on human–AI collaborative transportation planning and management. His laboratory envisions future sustainable mobility systems and develops tools and methods to translate these visions into practical solutions. His recent work focuses on the impacts of Agentic AI on transportation systems, examining how AI agents may reshape mobility services, infrastructure planning, and system operations while identifying strategies to maximize societal benefits and mitigate associated risks. Prior to McGill, he served as a research associate at MIT and worked as an engineering and management consultant at firms including AECOM and Cambridge Systematics, advising both public and private sector clients on high-stakes decision-making. He is a registered Professional Engineer (PE) and a certified Professional Transportation Planner (PTP).

16 :00 to 16 :30 **Maryam Darvish,** Université Laval

Smart Mobility Solutions for the Last Mile

Last-mile delivery represents a significant share of urban freight costs and greenhouse gas emissions. In this talk, urban delivery systems are examined through the combined use of consolidation strategies, route optimization, and fleet electrification. The presentation builds on several real-world urban studies and considers three main configurations: the use of mini hubs in dense urban areas, mixed fleets combining electric vehicles and conventional trucks, and multimodal delivery systems integrating trucks and cargo bikes. These cases are used to analyze how alternative city logistics concepts influence delivery costs and emissions, and to emphasize the role of route optimization in making such configurations operationally viable. The results indicate that last-mile deliveries can be organized more efficiently, with fewer vehicles, improved capacity utilization, and a lower environmental footprint. The analysis also brings out several practical and organizational constraints associated with the deployment of these initiatives, which in turn point to several directions for further research.

Maryam Darvish is an Associate Professor in the Department of Operations and Decision Systems at the Faculty of Business Administration, Université Laval. Her research focuses on the integration of logistics decisions and the development of optimization algorithms to improve the economic and environmental performance of supply chains. She has published in leading operations research and transportation journals and regularly collaborates with public and industrial partners on urban mobility and freight optimization projects. She is an active member of CIRRELT and a co-founder of MobilOpt, a research group established in 2020 at Université Laval, dedicated to the optimization of mobility systems.

16 :30 to 16 :45 Coffee break

16 :45 to 18 :30 Panel moderated by Martin Trépanier

Panelists : **Hamzeh Alizadeh** (ARTM), **Nicolas Filion** (AMD),
Anne Mercier (GIRO), **Sam Vermette** (Transit)

Martin Trépanier is civil engineer and professor of logistics and transportation in the Department of Mathematics and Industrial Engineering at Polytechnique Montréal. His primary research areas in transportation planning include public transit, shared mobility, parking management, logistics, and winter maintenance. Until the end of 2024, he served as the director of the Interuniversity Research Center on Enterprise Networks, Logistics, and Transportation (CIRRELT).

Hamzeh Alizadeh leads the Data and Analytics team at the Regional Metropolitan Transportation Authority (ARTM), where he contributes to the development and promotion of data to support mobility planning and decision-making in the Montreal metropolitan area. In this capacity, he oversees several initiatives related to the collection, analysis, and governance of mobility data. His team develops advanced analytical methods, geomatics tools, and indicators to better understand travel dynamics and support public transit planning. He also leads the evolution of transportation demand modeling approaches at the ARTM and ensures the implementation of an analytical and data enhancement environment as part of the transformation of the metropolitan ticketing system.

Nicolas Filion has been Senior Director of Technology at the Montreal Sustainable Mobility Agency since 2019. He stands out for his commitment to promoting sustainable and accessible urban mobility through innovative digital solutions. His leadership within the Agency brings a thoughtful and strategic approach to the growing challenges of urban mobility, while actively contributing to the achievement of Montreal's goals to become a more connected and efficient city. With a bachelor's degree in electrical engineering from the École de technologie supérieure and more than 20 years of experience in information technology and management, Nicolas combines his expertise in IT governance, cybersecurity, digital transformation, and strategic portfolio management to lead major initiatives as part of a profound organizational transformation. Nicolas began his career as a web developer before joining Bell Canada as a network architect. In 2010, he joined Videotron, where he first worked as a network engineer and then moved on to several management positions in information technology, assuming increasing leadership responsibilities. Nicolas is a member of the Ordre des Ingénieurs du Québec and also sits on the boards of directors of the ACTION TI Network and the Canadian Parking Association, where he continues to actively contribute to the evolution of technological practices in the field of mobility.

Anne Mercier is Director, Innovation – Algorithms & AI, at GIRO. She ensures that GIRO's innovation initiatives in algorithms and artificial intelligence meet the needs of the public transit industry and leverage the latest advances from academic research. With more than 15 years of experience in optimization systems for public transportation, Anne has worked as a scientist, university lecturer, and leader of GIRO's rail and bus solutions teams. She advises public transit operators on the best use of technology for the planning, scheduling and operations management of their human and material resources. Anne also oversees GIRO's research partnerships with leading universities and institutes. She holds a master's degree in Operations Research from HEC Montréal and a Ph.D. in Applied Mathematics from Polytechnique Montréal.

Sam Vermette is the co-founder and CEO of Transit, the mobile app that makes life easier for people living in cities without cars. A designer by training, he co-founded Transit in 2012 with the simple desire to make public transportation more accessible. Today, Transit is used daily by millions of people in more than 1,000 cities around the world. Sam dreams of greener, fairer cities that are great places to live, and believes that Transit can be an important agent of change in achieving this.

18 :30 to 20 :00 Cocktail

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