DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE



Speakers: Prof. Leandro C. Coelho, University of LAVAL - CANADA

Title: City logistics: measuring traffic, optimizing routes, minimizing emissions

Abstract: We review the new trend in distribution problems accounting for traffic and time-dependent delays, as is common in most big cities. We identify some shortcomings in the current state of research, and suggest alternatives for their resolution. However, the new ideas are challenging and require a new body of research to truly emerge, ranging from geomatics, engineering, optimization, database management, real-time data acquirements, and much more. We describe a practical approach to measure and compute not only traffic but also the time it takes to traverse any arc in a large network based on a large amount of data obtained through crowdsourcing. Our method is capable of providing the state of the network with 15-minute intervals for any day of the week. Using this large database, we propose new algorithms for time-dependent quickest path (point to point) and for vehicle routing problems with a comprehensive objective function encompassing not only distance, but also time, costs, and emissions. We also compare the results of classical emission estimation models against new machine learning tools that can significantly better predict emissions incurred by driving in different conditions.

Short Biography: Prof Leandro Coelho obtained his PhD from HEC Montréal in 2012. He is an associate professor at Université Laval, Canada and director of the Canada Research Chair in Integrated Logistics, and adjunct professor at Groningen University, the Netherlands. He is a member of the CIRRELT and GE-RAD, two well-known research centers on management science, optimization, transportation and logistics. His research interests lie on developing optimization algorithms (exact methods, and meta- and matheuristics) for integrated logistics problems. He has given keynote talks at different conferences and has published more than 40 papers in international journals.

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