



**Séminaire conjoint / Joint Seminar**  
Chaire de recherche du Canada en logistique et en transport et  
Chaire de recherche du Canada en distributique

**Bruno Petrato Bruck**  
University of Modena and Reggio Emilia, Italie / Italy



## **NON-ELEMENTARY FORMULATIONS FOR THE SINGLE VEHICLE ROUTING PROBLEM WITH DELIVERIES AND SELECTIVE PICKUPS**

**Abstract:** In the single vehicle routing problem with deliveries and selective pickups, a vehicle departs from a depot to perform a tour through a given set of customers, each requiring either a delivery, a pickup, or both (combined demand). While all deliveries must be performed, the pickups are optional and generate a revenue if performed. In the case of a combined demand, the vehicle is allowed to visit either once or twice the customer. The objective is to minimize the total cost, which is given by the total transportation cost minus the revenue generated by the performed pickups. The problem is important because it models several real-world applications, including beverage and electronic components distributions, courier service transportation, and reverse logistics. Through the use of several optimization techniques, we are able to outmatch previous results in the literature and obtain the optimal solution for all the available benchmark instances. In addition, we generalize the algorithm to several problem variants, including the case of split-deliveries, temporary drop-offs, and mandatory pickups.

**Note:** Bruno Petrato Bruck is a Ph.D. student in Industrial Innovation Engineering at the University of Modena and Reggio Emilia and is currently doing an internship at CIRRELT until mid-December. He has experience in mathematical programming and metaheuristics and is working mainly with exact algorithms applied to vehicle routing problems.

MERCREDI / WEDNESDAY

26 novembre 2014 /  
November 26<sup>th</sup>, 2014  
10h30

Salle / Room 5441  
Pavillon André-Aisenstadt  
Université de Montréal

Ouvert à tous / Open to all

**Organisateur / Organizer**  
**Jean-François Cordeau**



UNIVERSITÉ  
LAVAL



McGill



UNIVERSITÉ  
Concordia  
UNIVERSITY



Le génie pour l'industrie

UQÀM

HEC MONTRÉAL



POLYTECHNIQUE  
MONTRÉAL

Université  
de Montréal