



**Séminaire conjoint / Joint Seminar**  
CRI<sup>2</sup>GS (Centre sur l'intelligence<sup>2</sup> en gestion de systèmes complexes)  
École des sciences de la gestion (ESG) - UQAM

**Rossana Cavagnini**

Università di Bergamo, Italie/Italy

**CRI<sup>2</sup>GS**  
Centre sur l'intelligence<sup>2</sup> en  
gestion de systèmes complexes



## STOCHASTIC PROGRAMMING MODELS FOR DISTRIBUTION LOGISTICS, BIKESHARING AND PRODUCTION MANAGEMENT

**Abstract:** In this seminar, four different problems, all characterized by the presence of uncertainty, are presented. The first two deal with a distribution system in which transshipment and/or backordering are allowed. For the first problem [1], we propose a two-stage stochastic program, provide complexity results and show that considering uncertainty explicitly in the model leads to better solutions with respect to the ones provided by the corresponding deterministic program, especially when limited recourse actions are admitted. For the second distribution problem [2], we propose a multi-stage stochastic model. As the complexity increases with the number of stages, we first derive optimal policies useful for address two polynomially solvable cases. Then, for the general case, we show that the rolling horizon heuristic performs well by properly decomposing the time horizon. For the third problem ([3]), we derive a two-stage stochastic model to optimize the desired inventory and rebalancing activities in a bikesharing system. After showing the benefits of modeling uncertainty, we compare the solution of our stochastic program with the real implemented system. For the fourth problem [4], we propose a two-stage stochastic programming model that quantifies the impact of worker assignment decisions to produce through an exponential stochastic learning curve. After linearizing it through a mixed integer program that can be solved efficiently, we perform a rigorously designed computational study and statistical analysis to derive tactics and managerial insights for how an organization should plan its production operations about assignment, cross-training and practicing.

**Note :** Rossana Cavagnini is a PhD student at the department of Management, Economics and Quantitative Methods. She is doing an internship at CIRRELT, under the supervision of Professors Teodor Gabriel Crainic and Walter Rei.

MERCREDI / WEDNESDAY  
21 novembre 2018 /  
November 21st, 2018  
11h00

Salle / Room 5441  
Pavillon André-Aisenstadt  
Université de Montréal

**Ouvert à tous / Open to all**

Organisateur / Organizer  
**Teodor Gabriel Crainic**



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