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Canadian Operational Research Society
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CORS Micro-Event (online):
Agricultural Supply Chain Networks Under Uncertainty

Presented by

Anna Nagurney, Professor, University of Massachusetts, USA

Anna Nagurney is the Eugene M. Isenberg Chair in Integrative Studies at the Isenberg School of Management at the University of Massachusetts Amherst and the Director of the Virtual Center for Supernetworks, which she founded in 2001. She holds ScB, AB, ScM and PhD degrees from Brown University in Providence, RI. She is the author/editor of 17 books, more than 235 refereed journal articles, and over 50 book chapters. Professor Nagurney has been a Fulbrighter twice (in Austria and Italy), was a Visiting Professor at the School of Business, Economics and Law at the University of Gothenburg in Sweden, and was a Distinguished Guest Visiting Professor at the Royal Institute of Technology (KTH) in Stockholm. She was a Visiting Fellow at All Souls College at Oxford University during the 2016 Trinity Term and a Summer Fellow at the Radcliffe Institute for Advanced Study at Harvard in 2017 and 2018. Anna has held visiting appointments at MIT and at Brown University and was a Science Fellow at the Radcliffe Institute for Advanced Study at Harvard University in 2005-2006. She has been recognized for her research on networks with the Kempe Prize from the University of Umea, the Faculty Award for Women from the US National Science Foundation, the University Medal from the University of Catania in Italy, the 2019 Constantin Caratheodory Prize, and the 2020 Harold Larnder Prize, and was elected a Fellow of the RSAI (Regional Science Association International) as well as INFORMS (Institute for Operations Research and the Management Sciences) and the Network Science Society, among other awards. She was the 2022 IFORS Distinguished Lecturer and the 2024 Blackett Lecturer. Anna has also been recognized with several awards for her mentorship of students and her female leadership with the WORMS Award, for example. Her research has garnered support from the AT&T Foundation, the Rockefeller Foundation through its Bellagio Center programs, the Institute for International Education, and the National Science Foundation. She has given plenary/keynote talks and tutorials on 5 continents. She is an active member of professional societies, including INFORMS, POMS, and RSAI.

Anna's research focuses on network systems from transportation and logistical ones, including supply chains, to financial, economic, social networks and their integration, along with the Internet. She studies and models complex behaviors on networks with a goal towards providing frameworks and tools for understanding their structure, performance, and resilience and has contributed also to the understanding of the Braess paradox in transportation networks and the Internet. She has also been researching sustainability and quality issues with applications ranging from pharmaceutical and blood supply chains to perishable food products and fast fashion to humanitarian logistics. She has advanced methodological tools used in game theory, network theory, equilibrium analysis, and dynamical systems. She was a Co-PI on a multi-university NSF grant with UMass Amherst as the lead: Network Innovation Through Choice, which was part of the Future Internet Architecture (FIA) program and was recently a Co-PI on an NSF EAGER grant.

Abstract

Agricultural supply chain networks are essential to food security and are a major component of global trade. In this talk, I will describe how optimization and game theory are being utilized to model and solve agricultural supply chain problems subject to a spectrum of trade instruments; how to capture fresh produce quality in multitiered supply chains, and how to measure resilience in order to mitigate against disruptions under uncertainty and conditions such as the pandemic, climate change, and wars. I will also discuss how we can better promote our research contributions in order to influence policy and effect positive change.

Register at: https://forms.gle/goMEB2sAmze63KYA7

Questions? Email:president@cors.ca

Organized by: Anjali Awasthi, President CORS and CORS Montreal Local Section

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CORS Micro-Event (online):
A Model-Free Approach for Solving Choice-Based Competitive Facility Location Problems Using Simulation and Submodularity
Presented by
Emma Frejinger, Professor, University of Montreal, Canada

Emma Frejinger is a professor in the Department of Computer Science and Operations Research at Université de Montréal where she holds a Canada Research Chair and an industrial chair funded by the Canadian National Railway Company. Her research is application-driven and focuses on innovative combinations of methodologies from machine learning and operations research to solve large-scale decision-making problems. Emma has extensive experience working with industry, particularly within the transportation sector, where she has led collaborative research projects. Since 2018, she also works as a scientific advisor for IVADO Labs developing AI solutions for the supply chain industry. Before joining Université de Montréal in 2013, Emma was a faculty member at KTH Royal Institute of Technology in Sweden. She holds a Ph.D. in mathematics from EPFL (Switzerland).

Abstract

This talk will focus on facility location problems in which a firm entering a market seeks to open facilities on a subset of candidate locations so as to maximize its expected market share, assuming that customers choose the available alternative that maximizes a random utility function. We outline an approach based on simulated utilities that generalizes a sample average approximation from the literature. To solve it, we develop a partial Benders reformulation in which the contribution to the objective of the least influential preference profiles is aggregated and bounded by submodular cuts. This set of profiles is selected by a knee detection method that seeks to identify the best tradeoff between the fraction of the demand that is retained in the master problem and the size of the model. Computational experiments on existing and new benchmark sets indicate that our approach dominates the classical sample average approximation method on large instances of the competitive facility location problem, can outperform the best heuristic method from the literature under the multinomial logit model, and achieves state-of-the-art results under the mixed multinomial logit model. We characterize a broader class of problems, which includes assortment optimization, to which the solving methodology and the analyses developed in this paper can be extended.

The talk is based on a paper co-authored with Robin Legault.

Register at: https://forms.gle/goMEB2sAmze63KYA7

Questions? Email: president@cors.ca