Borzou Rostami

Curriculum Vitae

Operations & Decision Sciences (ODS)
Lazaridis School of Business & Economic
Wilfrid Laurier University
519.884.0710 x2276
brostami@wlu.ca

Academic Employment

2019 – **Lazaridis School of Business & Economic, Wilfrid Laurier University**, *Waterloo, ON, Canada*.
Assistant Professor of Operations and Decision Sciences

2019 – **Canada Excellence Research Chair in Data Science for Real-Time Decision-Making, Polytechnique Montreal**, *Montreal, QC, Canada*.
Researcher

Oct. 2017– June 2019 **Polytechnique Montreal, CIRRELT, GERAD**, *Montreal, QC, Canada*.
Postdoctoral researcher

Oct. 2016– Sept. 2017 **École de technologie supérieure, CIRRELT, and GERAD**, *Montreal, QC, Canada*.
Postdoctoral researcher

Oct. 2014– Sept. 2016 **TU Dortmund University**, *Dortmund, Germany*.
Postdoctoral researcher

2006– 2010 **University of Kurdistan**, *Sanandaj, Iran*.
Faculty Member and Lecturer in the Department of Mathematics

Education

2011– 2014 **Polytechnic University of Milan**, *Milan, Italy*.
Ph.D. in Information and Technology (Operations Research), Advisor: Prof. Federico Malucelli

Jan 2013– August 2013 **Clemson University**, *Clemson, SC, USA*.
Visiting scholar, Hosted by Dr. Pietro Belotti

2003– 2006 **University of Kurdistan**, *Sanandaj, Iran*.
M.S. in Operations Research

1999– 2003 **University of Kurdistan**, *Sanandaj, Iran*.
B.S. in Applied Mathematics

Research Interests

Methodology Large-scale Optimization, Mixed-integer Nonlinear Programming, Decision Making under Uncertainty, Machine Learning, Recomender System

Application Transportation and Logistics, Supply Chain Management, Network Design, Computer Vision

Grants

2020-2025 NSERC discovery grant, Natural Sciences and Engineering Research Council of Canada ($130,000), " Discrete Optimization under Interactions and Uncertainty", Principal Applicant.

2020-2025 NSERC - Discovery Launch Supplement, Natural Sciences and Engineering Research Council of Canada ($12,500), Principal Applicant.

2020-2021 CN (Canadian National Railway) through the Centre for Supply Chain Management at Wilfrid Laurier Universit ($9,405), "Drone Delivery in Smart Cities: Applications and Challenges", Principal Applicant.

2021-2022 CN (Canadian National Railway) through the Centre for Supply Chain Management at Wilfrid Laurier Universit ($8,835), "Data-driven Approaches to Analyze Coopetition and Supply Chain Relationships", Principal Applicant.

2021-2022 CN (Canadian National Railway) through the Centre for Supply Chain Management at Wilfrid Laurier University ($6,166), "Improving Store-wide Shelf Space Planning in Physical Retailing", Principal Applicant.

2016-2017 Internationalization Research Fund (Fonds d'internationalisation de la recherche (FIR), École de technologie supérieure - ÉTS ($30,000), Co-applicant.

2015-2018 German Research Foundation (Deutsche Forschungsgemeinschaft DFG) ($385,800), Co-applicant.

Publications

Published Papers

[1] A convex reformulation and an outer approximation for a class of quadratic binary programming, with A. Lodi, and F. Errico, ***Operations Research*** *(accepted)*, 2021.

[2] Single-allocation hub location with heterogeneous economies of scale, with O. Arslan, M. Chitsaz, G. Laporte and A. Lodi, ***Operations Research*** *(forthcoming)*, 2021.

[3] Branch-Price-and-Cut Algorithms for the Vehicle Routing Problem with Stochastic and Correlated Travel Times, with G. Desaulniers, F. Errico, A. Lodi, ***Operations Research***, 2021.

[4] Stochastic single-allocation hub location, with N. Kämmerling, C. Buchheim, J. Naoum-Sawaya, and U. Clausen, ***European Journal of Operational Research 289 (3)***, Pp 1087–1106, 2021.

[5] Reliable uncapacitated single allocation hub location problem under hub breakdowns, with N. Kämmerling, C. Buchheim, and Uwe Clausen, ***Computers & Operations Research 96***, Pp 15–29, 2018.

[6] The quadratic shortest path problem: complexity, approximability, and solution methods, with A.Chassein, M. Hopf, D. Frey, C. Buchheim, F. Malucelli, M. Goerigk, ***European Journal of Operational Research 268 (2)***, Pp 473–485, 2018.

[7] Lower bounding procedure for the asymmetric quadratic traveling salesman problem, with F. Malucelli, P. Belotti, and S. Gualandi, ***European Journal of Operational Research 253 (3)***, Pp 584–592, 2016.

[8] A decomposition approach for single allocation hub location problems with multiple capacity levels, with C. Strothmann, C. Buchheim, ***Lecture Notes in Computer Science*** *9849*, Pp 237-248, 2016.

[9] A generalized Gilmore-Lawler procedure for the quadratic assignment problem, with F. Malucelli, ***Electronic Notes in Discrete Mathematics*** *55*, Pp 77–80, 2016.

[10] A compact Linearisation of euclidean single allocation hub location problems, with J.F. Meier, U. Clausen,and C. Buchheim, ***Electronic Notes in Discrete Mathematics*** *52*, Pp 37–44, 2016.

[11] Lower bounding procedures for the single allocation hub location problem, with C. Buchheim, J.F. Meier, and U. Clausen, ***Electronic Notes in Discrete Mathematics*** *52*, Pp 69–76, 2016.

[12] Lower bounds for the quadratic minimum spanning tree Problem based on reduced cost computation, with F. Malucelli, ***Computers & Operations Research 64***, Pp 178–188, 2015.

[13] On the quadratic shortest path problem, with F. Malucelli, D. Frey, and C. Buchheim, ***Lecture Notes in Computer Science*** *9125*, Pp 379–390, 2015.

[14] A revised reformulation-linearization technique for the quadratic assignment problem, with F. Malucelli, ***Discrete Optimization 14***, Pp 97–103, 2014.

[15] A graph optimization approach to item-based collaborative filtering, with P. Cremonesi, F. Malucelli, ***Recent Advances in Computational Optimization***, Springer International Publishing, Pp 15–30, 2013.

[16] A computational approach to pivot selection in the LP relaxation of set problems, with F. Djannaty, ***Journal of Applied Mathematics and Decision Sciences***, Pp 1–11, 2006.

Revise and Resubmit

[1] A PCA-based approximation scheme for combinatorial optimization with uncertain and correlated data, with G. Desaulniers, F. Errico, A. Lodi, ***Management Science*** *(reject and resubmit)*.

[2] Attractiveness Factors in Retail Category Space Location/Allocation Problem, with S. Babaee, A. Araghi, and I. Castillo, ***International Journal of Production Research*** *(major revision)*, 2021.

Under Review

[1] A Dual Bounding Framework For Binary Quadratic Combinatorial Optimization, with M. Bayani, L.M. Rousseau, and Y. Adulyasak, ***INFORMS Journal on Computing*** *(under review)*, 2021.

[2] The Price of Anarchy in Freight Transportation Spot Markets, with M. Haughton, and S Espahbo, ***EURO Journal on Transportation and Logistics*** *(under review)*, 2021.

[3] Coordinating Transportation and Pricing Policies for Perishable Products, with S. Babaee, and M. Araghi, ***EURO Journal on Transportation and Logistics*** *(under review)*, 2021.

Working Papers

[1] Service time window design in routing optimization with stochastic and correlated travel times, with S. D. Hosseini, and M. Araghi, 2021.

[2] Benders decomposition for binary quadratic program, with C. Zetina and A. Lodi, 2021.

[3] Data-driven shelf-space planning in retail, with M. Bayani, L.M. Rousseau, and Y. Adulyasa, 2021.

[4] Vehicle utilization in hub network design, with J. Naoum-Sawaya, 2021.

[5] UAV-assisted parcel delivery: A data-driven approach, with A. Karimi, 2021.

Conference Proceedings

[1] Quadratic TSP: A lower bounding procedure and a column generation approach, with F. Malucelli, P. Belotti, and S. Gualandi, Federated Conference on Computer Science and Information Systems -***FedCSIS 2013***, Pp 377–384, 2013.

[2] An application of bicriterion shortest paths to collaborative filtering, with P. Cremonesi, F. Malucelli, Federated Conference on Computer Science and Information Systems - ***FedCSIS 2012***, Pp 423–429, 2012.

Technical Report

[1] The uncapacitated single allocation p-hub median problem with stepwise cost function, with C. Buchheim, PDF, 2017.

[2] A Tight Lower Bound for the Adjacent Quadratic Assignment Problem, with F. Malucelli and P. Belotti, PDF, 2014.

[3] Application of graph models in recommender systems, *Technical Report 2012.30*, *Department of Electronics, information and Bioengineering, Polytechnic University of Milan, Milan, Italy*, 2012.

PhD Dissertation

[1] Decomposition methods for zero-one quadratic optimization problems, Department of Electronics, information and Bioengineering, Polytechnic University of Milan, 2014.

Students Supervision

Postdoc fellows

Sept 2020- Davod Hosseini, "Improving routing optimization under different risk and reliability measures", Wilfrid Laurier University, Waterloo, Canada.

May 2021- Akbar Karimi, "Unmanned aerial vehicle in parcel delivery and emergency systems", Wilfrid Laurier University, Waterloo, Canada.

PhD students

2021- Parang Zadtootaghaj (supervisor), "New technologies in transportation and logistics", Wilfrid Laurier University, Waterloo, Canada.

2021- Atousa Akhlaghy (supervisor), "Data-driven routing optimization", Wilfrid Laurier University, Waterloo, Canada.

2020-2021 Sara Babaee (co-supervisor), "Integrated process optimization in retail", Wilfrid Laurier University, Waterloo, Canada.

2019- Mahdis Bayani (co-supervisor), "Integration of Machine Learning and discrete optimization under the presence of interactions", Polytechnique Montreal, Montreal, Canada.

MBA students

2019 Pierre Gautreau, "Analysis of Environmental, Social, and Economic Impacts of Drone Delivery", Wilfrid Laurier University, Waterloo, Canada.

2020 J. Eric Oyono, "Data-driven Approaches to Analyze Coopetition and Supply Chain Relationships", Wilfrid Laurier University, Waterloo, Canada.

Master's Thesis

2016 Benjamin Schmidt, "Hub breakdown in network design with single allocation",Master thesis, TU Dortmund University, Dortmund, Germany.

2015 Patrick Segieth, "Decomposition Approaches for the Quadratic Assignment Problem",Master thesis, TU Dortmund University, Dortmund, Germany.

2015 Nadine Kapias, "Lower Bounds for the Quadratic Assignment Problem", Master thesis, TU Dortmund University, Dortmund, Germany.

Invited Talks and Conference Presentations

[1] Interactions in routing optimization, *CORS Annual Conferences*, Virtual Conference, 2021.

[2] Stochastic single-allocation hub location, *Optimization Days*, , Montreal, Canada, 2019.

[3] A convex reformulation and an outer approximation for a class of binary quadratic programs, *ISMP 2018*, Bordeaux, France, 2018.

[4] Approximate schemes for combinatorial optimization problems with uncertain and correlated data, *CORS Annual Conferences*, Halifax, Canada, 2018.

[5] A convex reformulation and an outer approximation for a class of binary quadratic programs, *Optimization Days*, , Montreal, Canada, 2018.

[6] Approximate schemes for combinatorial optimization problems with uncertain and correlated data with application in CVRP, *Optimization Days*, Montreal, Canada, 2018.

[7] The vehicle routing problem with stochastic and correlated travel times, *21st Conference of the International Federation of Operational Research Societies - IFORS*, Quebec City, Canada, 2017.

[8] Benders decomposition for binary quadratic programming, *5th EUROPT Workshop on Advances in Continuous Optimization*, Montreal, Canada, 2017.

[9] The vehicle routing problem with stochastic and correlated travel times, *Optimization Days 2017*, Montreal, Canada, 2017.

[10] Single Allocation Hub Location with Heterogeneous Economies of Scale, *CORS Annual Conferences*, Saskatoon, Canada, 2019.

[11] An exact solution approach for single allocation hub location problems with multiple capacity levels, *28th European Conference on Operational Research*, Poznan, Poland, 2016.

[12] Improved Lower Bound for the Quadratic Minimum Spanning Tree Problem, *3rd International Symposium on Combinatorial Optimization - ISCO*, Lisbon, Portugal, 2014.

[13] An application of bicriterion shortest paths to collaborative filtering, *43rd Annual Conference of the Italian Operational Research Society - AIRO*, Vietri sul Mare, Italy, 2012.

[14] A New Variant of Two-Phase Simplex Algorithm, *23th International Conference of The Gangeon Mathematical Society*, Iran (2010).

[15] An Improving Variant of Karmarkar's Interior Point Algorithm, *Proceedings of 4th Iranian Conference On Applied Mathematics* (2010).

Teaching Experience

Graduate Instructor

Winter -2021 Decision Making with Analytics, MMA Program, Lazaridis School of Business & Economic, Wilfrid Laurier University, Waterloo, ON, Canada.

Winter -2021 Advanced Business Analytics, MBA Program, Lazaridis School of Business & Economic, Wilfrid Laurier University, Waterloo, ON, Canada.

Fall -2020 Machin Learning for Business, MMA Program, Lazaridis School of Business & Economic, Wilfrid Laurier University, Waterloo, ON, Canada.

Spring -2020 Advanced Business Analytics, MBA Program, Lazaridis School of Business & Economic, Wilfrid Laurier University, Waterloo, ON, Canada.

Spring 2016 Aspects of Mathematical Modeling: Optimization, MSc, TU Dortmund University, Dortmund, Germany.

Graduate Co-instructor

Fall 2012 Recommender system (part of the course "Interactive TV and Recommender System"), MSc, Computer Science Engineering, Polytechnic University of Milan, Milan, Italy.

Undergraduate Instructor

Winter -2020 Business Decision Models, Lazaridis School of Business & Economic, Wilfrid Laurier University, Waterloo, ON, Canada.

2006-2010 Operations research1 and Operations research2, Bachelor students in Management science, Industrial engineering, and Applied mathematics, University of Kurdistan, Sanandaj, Iran.

2006-2010 The C++ programming language and Graph theory, Bachelor students in Applied mathematics, University of Kurdistan, Sanandaj, Iran.

2006-2010 Numerical Analysis, Calculus, Statistics, Differential equations, Bachelor students in Mathematics and Computer Science Engineering, University of Kurdistan, Sanandaj, Iran.

Scholarly and Professional Activities

Internal Grants Committee

- Office of Research Services, Wilfrid Laurier University, 2020

Graduate Admission Committee

- Master of Management Analytics, Wilfrid Laurier University, 2021
- Master of Supply Chain Management, Wilfrid Laurier University, 2021
- PhD in Supply Chain, Operations and Technology Management, Wilfrid Laurier University, 2020

Tenure-track hiring committee

- ODS area, Wilfrid Laurier University, 2021

Ad-Hoc Reviewer

- Transportation Science
- Transportation Research Part B: Methodological
- European Journal of Operational Research
- Networks
- SIAM Journal on Imaging Sciences
- Theoretical Computer Science
- Computers & Operations Research
- INFORMS Journal on Computing
- Discrete Applied Mathematics
- Mathematical Methods of Operations Research

Session organizer in International conferences

- Canadian Operational Research Society 2018, 2019, 2021
- Optimization Days 2018

- International Federation of Operational Research Societies 2017
- International Symposium on Combinatorial Optimization 2016.