ANDRE AUGUSTO CIRE

January 2023

Department of Management, University of Toronto Scarborough
Rotman School of Management, University of Toronto (cross-appoint.)
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RESEARCH OBJECTIVES

My research leverages the interface between computer science and operations to address prescriptive problems arising in the practice of Management, more specifically in discrete optimization, scheduling, routing, and healthcare applications. My work primarily focuses on rigorous optimization methodologies and approximations strategies, combining concepts from mathematical programming, dynamic programming, and artificial intelligence to derive actionable insights and computationally efficient techniques.

ACADEMIC APPOINTMENTS

July 2021 - Present
Associate Professor, Operations Management
Department of Management, University of Toronto Scarborough
Rotman School of Management (Cross-Appointed)
University of Toronto

July 2014 – July 2021
Assistant Professor, Operations Management
Department of Management, University of Toronto Scarborough
Rotman School of Management (Cross-Appointed)
University of Toronto

EDUCATION

August 2014
Ph.D., Operations Research
Tepper School of Business, Carnegie Mellon University
Dissertation Title: Decision Diagrams for Optimization
Advisors: *Dr. Willem-Jan van Hoeve* and *Dr. John Hooker*

August 2011
M.Sc., Operations Research
Tepper School of Business, Carnegie Mellon University

June 2009
M.Sc., Computer Science
Institute of Computing, State University of Campinas
Advisors: *Dr. Arnaldo Moura* and *Dr. Cid C. de Souza*

December 2006
B.Sc., Computer Science
Institute of Computing, State University of Campinas

PUBLICATIONS

Author's Order and Publication Notes

- In operations management, authors are listed in either alphabetical or reverse alphabetical order. All collaborators must have contributed significantly to the paper to be listed.
- Students and trainees (i.e., MSc, Ph.D., and post-doctoral fellows) at the time of publication are listed first on the author list. They are marked with * in the publications below.
- Publications are listed in reverse chronological order of appearance/acceptance.
- A DOI or an official link is also added to the reference whenever possible.

Journal Papers

1. N. Chen, A. A. Cire, M. Hu, S. Lagzi*. Model-free Assortment Pricing with Transaction Data. *Management Science*, forthcoming 2022 [Link]
2. A. A. Cire, A. Diamant. Dynamic Scheduling of Home Care Patients to Medical Providers. *Production and Operations Management*, forthcoming 2022 [Link]
3. M. Castro*, A. A. Cire, J.C. Beck. Decision Diagrams for Discrete Optimization: A Survey of Recent Advances. *INFORMS Journal on Computing*, forthcoming 2022 [Link]
4. M. Castro*, A. A. Cire, J.C. Beck. A Combinatorial Cut-and-Lift Procedure with an Application to 0-1 Second-Order Conic Programming. *Mathematical Programming*, forthcoming 2022. [Link]
5. D. Bergman, M. Bodur, C. Cardonha, A. A. Cire. Network Models for Multiobjective Discrete Optimization. *INFORMS Journal on Computing*, 34:2, 990-1005, 2022 [Link]
6. S. Nadarajah, A. A. Cire. Network-Based Approximate Linear Programming for Discrete Optimization**.** *Operations Research*, 68(6):1767-1786, 2020. [Link]
7. J. Gonzales*, A. A. Cire, A. Lodi, L.-M. Rousseau. BDD-Based Optimization for the Quadratic Stable Set Problem. *Discrete Optimization*, in press, 2020. [Link]
8. M. Castro*, A. A. Cire, J.C. Beck. An MDD-based Lagrangian Approach to the Multi-Commodity Pickup-and-Delivery TSP. *INFORMS Journal on Computing*, 32(2): 263-278, 2020. [Link]
9. M. Castro*, C. Piacentini*, A. A. Cire, J.C. Beck. Solving Delete Free Planning with Relaxed Decision Diagram Based Heuristics. *Journal of Artificial Intelligence Research (JAIR)*, Vol. 67, 2020. [Link]
10. J. Gonzales*, A. A. Cire, A. Lodi, L.-M. Rousseau. Integrated Integer Programming and Decision Diagram Search Tree with an Application to the Maximum Independent Set Problem. *Constraints 25, 23–46,* 2020. [Link]
11. A. A. Cire, A. Diamant, T. H. Yunes, Alejandro Carrasco. A Network-Based Formulation for Scheduling Clinical Rotations. *Production and Operations Management*, 28: 1186-1205, 2019. [Link]
12. D. Bergman, C. Cardonha, A. A. Cire, A. Raghunathan. On the Minimum Chordal Completion Polytope. *Operations Research*, 67(2): 532-547, 2019. [Link]
13. D. Bergman, A. A. Cire. Discrete Nonlinear Optimization by State-Space Decompositions. *Management Science*, 64(10): 4700-4720, 2018. [Link]
14. J. Kinable*, A. A. Cire, W.-J. van Hoeve. Hybrid Optimization Methods for Time-Dependent Sequencing Problems. *European Journal of Operational Research*, 259(3): 887-897, 2017. [Link]
15. A. A. Cire, J. N. Hooker, Tallys Yunes. Modeling with Metaconstraints and Semantic Typing of Variables. *INFORMS Journal on Computing*, 28(1): 1-13, 2016. [Link]

16. A. A. Cire, E. Çoban, J. N. Hooker. Logic-based Benders Decomposition for Planning and Scheduling: A Computational Analysis. *Knowledge Engineering Review*, 31(5): 440-451, 2016. [Link]

17. D. Bergman, A. A. Cire. Theoretical Insights and Algorithmic Tools for Decision Diagram-based Optimization. *Constraints*, 21(4): 533-566, 2016. [Link]

18. D. Bergman, A. A. Cire, W.-J. van Hoeve, J. N. Hooker. Discrete Optimization with Decision Diagrams. *INFORMS Journal on Computing*, 28(1): 47-66, 2016. [Link]

19. D. Bergman, A. A. Cire, W.-J. van Hoeve. Lagrangian Bounds from Decision Diagrams. *Constraints*, 20(3): 346-361, 2015. [Link]

20. D. Bergman, A. A. Cire, W.-J. van Hoeve. MDD Propagation for Sequence Constraints. *Journal of Artificial Intelligence Research (JAIR)*, Vol. 50: 697-722, 2014. [Link]

21. D. Bergman, A. A. Cire, W.-J. van Hoeve, and T. Yunes. BDD-Based Heuristics for Binary Optimization. *Journal of Heuristics*, 20(2): 211-234, 2014. [Link]

22. A. A. Cire, W.-J. van Hoeve. Multivalued Decision Diagrams for Sequencing Problems. *Operations Research* 61(6): 1411-1428, 2013. [Link]

23. D. Bergman, A. A. Cire, W.-J. van Hoeve, J. N. Hooker. Optimization Bounds from Binary Decision Diagrams. *INFORMS Journal on Computing* 26(2): 253-258, 2014. [Link]

24. T. Lopes, A. Moura, C. de Souza, A. A. Cire. Planning the Operation of a Large Real-World Oil Pipeline. *Computers & Chemical Engineering*, Volume 46, 2012, pp. 17-28. [Link]

25. T. Lopes, A. A. Cire, C. de Souza, A. Moura. A Hybrid Model for a Multiproduct Pipeline Planning and Scheduling Problem. *Constraints* 15(2): 151-189, 2010. [Link]

Books

1. D. Bergman, A. A. Cire, W.-J. van Hoeve, J. N. Hooker. **Decision Diagrams for Optimization**. Springer, 2016. [Link]

Peer-Reviewed Conference Proceedings

1. X. Guillard*, V. Coppé, P. Schaus, A.A. Cire. *Improving the filtering of Branch-and-Bound MDD Solver. In CPAIOR'21: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming,* 2021.

2. C. E. de Andrade, A.A. Mahimkar, R.K. Sinha, W. Zhang, A.A. Cire, G. Rana, Z. Ge, S. Puthenra, J. Yates, R. Riding. *Minimizing Effort and Risk with Network Change Deployment Planning*. In Proceedings of the IFIP Networking Conference, 2021.

3. Q. Cappart, T. Moisan, L.-M. Rousseau, I. Prémont-Schwarz, A.A. Cire. Combining Reinforcement Learning and Constraint Programming for Combinatorial Optimization. In *AAAI 2021: Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence*, 2021. [Link]

4. R.T. Icarte*, L. Illanes*, M. Castro*, A. A. Cire, S.A. McIlraith, J.C. Beck. Training Binarized Neural Networks using MIP and CP. In *CP'19: Proceedings of the Twenty-Fifth International Conference on Principles and Practice of Constraint Programming*, 2019. [Link]

5. A. Hosseininasab*, W.-J. van Hoeve, A.A. Cire. Constraint-based Sequential Pattern Mining with Decision Diagrams. In *AAAI 2019: Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence*, 2019. [Link]

6. M. Castro*, C. Piacentini*, A.A. Cire, J.C. Beck, Relaxed BDDs: An Admissible Heuristic for Delete-Free Planning Based on a Discrete Relaxation. In *ICAPS 2019: Proceedings of the Twenty-Ninth Conference on Automated Planning and Scheduling*, 2019. [Link]

7. M. Romer[*], A.A. Cire, L.-M. Rousseau. A Local Search Framework for Compiling Relaxed Decision Diagrams. In *CPAIOR'18: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, 2018. [Link]

8. C. Piacentini[*], M.P. Castro[*], A. A. Cire, J.C. Beck. Compiling Optimal Numeric Planning to Mixed-Integer Linear Programming. In *ICAPS 2018: Proceedings of the Twenty-Eighth International Conference on Automated Planning and Scheduling*, 2018. [Link]

9. C. Piacentini[*], M.P. Castro[*], A. A. Cire, J.C. Beck. Linear and Integer Programming-based Heuristics for Cost-optimal Numeric Planning. In *AAAI 2018: Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence*, 2018. [Link]

10. O.S. Bajgiran[*], A.A. Cire, L.-M. Rousseau. A First Look at Picking Dual Variables for Maximizing Reduced Cost Fixing. In *CPAIOR'17: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, 2017. [Link]

11. D. Bergman, A.A. Cire. On Finding the Optimal BDD Relaxation. In *CPAIOR'17: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, 2017. [Link]

12. B. Say[*], A. A. Cire, J. C. Beck. Mathematical Programming Models for Optimizing Partial Order Plan Flexibility. In *ECAI 2016: Proceedings of the Twenty-Second European Conference on Artificial Intelligence*, 1044-1052, 2016. [Link]

13. D. Bergman, A. A. Cire. Multiobjective Optimization by Decision Diagrams. In *CP'16: Proceedings of the International Conference on Principles and Practice of Constraint Programming*, LNCS 9892, Springer, 2016. [Link]

14. D. Bergman, A. A. Cire. Decomposition Based on Decision Diagrams. In *CPAIOR'16: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, LNCS 9676. Springer, 2016. [Link]

15. D. Bergman, A. A. Cire, W.-J. van Hoeve. Improved Constraint Propagation via Lagrangian Decomposition. In *CP'15: Proceedings of the International Conference on Principles and Practice of Constraint Programming*, LNCS 9255, pp. 30-38. Springer, 2015. [Link]

16. A. Cire, S. Kadioglu, M. Sellmann. Parallel Restarted Search. In *AAAI'14: Proceedings of the Twenty-Eighth AAAI Conference on Artificial Intelligence*: pp 842-848, Springer, 2014. [Link]

17. D. Bergman, A. A. Cire, A. Sabharwal, H. Samulowitz, V. A.Saraswat, W.-J. van Hoeve. Parallel Combinatorial Optimization with Decision Diagrams. In *CPAIOR'14: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, LNCS 8451, pp. 351-367. Springer, 2014. [Link]

18. A. Cire, E. Coban, J. N. Hooker. Mixed Integer Programming vs. Logic-based Benders Decomposition for Planning and Scheduling. In *CPAIOR'13: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, LNCS 7874, pp. 325-331. Springer, 2013. [Link]

19. A. Cire and W.-J. van Hoeve. MDD Propagation for Disjunctive Scheduling. In *ICAPS'12: Proceedings of the International Conference on Automated Planning and Scheduling*, pp. 11-19. AAAI Press, 2012. [Link]

20. D. Bergman, A. A. Cire, W.-J. van Hoeve, J. N. Hooker. Variable Ordering for the Application of BDDs to the Maximum Independent Set Problem. In *CPAIOR'12: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, LNCS 7298, pp. 34-49. Springer, 2012. [Link]

21. A. Cire, E. Coban, W.-J. van Hoeve. Flow-Based Combinatorial Chance Constraints. In *CPAIOR'12: Proceedings of the International Conference on Integration of AI and OR Techniques in Constraint Programming*, LNCS 7298, pp. 129-145. Springer, 2012. [Link]

22. A. Botea, A. A. Cire. Incremental Heuristic Search for Planning with Temporally Extended Goals and Uncontrollable Events. In *IJCAI'09: Proceedings of the International Joint Conference on Artificial Intelligence*, Pasadena, USA, 2009. [Link]

23. A. Cire, A. Botea. Learning in Planning with Temporally Extended Goals and Uncontrollable Events. In *ECAI'08: Proceedings of the European Conference on Artificial Intelligence*, Patras, Greece, 2008. [Link]

24. T. Lopes, A. A. Cire, C. de Souza, A. Moura. Planning and Scheduling the Operation of a Very Large Oil Pipeline Network. In *CP'08: Proceedings of the International Conference on Principles and Practice of Constraint Programming*, LNCS 5202, pp. 36-51. Springer, 2008. [Link]

25. Moura, C. de Souza, A. A. Cire, T. Lopes. Heuristics and Constraint Programming Hybridizations for a Real Pipeline Planning and Scheduling Problem. In *CSE'08: Proceedings of the 11th IEEE International Conf. on Computational Science and Engineering*, pp. 455-462, 2008. [Link]

Working Papers

26. S. Nadarajah, A.A. Cire. Self-adaptative Models for Weakly-Coupled Markov Decision Processes. Submitted. (Major revision at *Management Science*).

27. M. Bodur, M. Cevik, A. A. Cire, M. Ruschin, J. Wang. Multistage Stochastic Fractionated Intensity Modulated Radiation Therapy Planning. Submitted. (Minor revision at *Computers and O.R.*).

28. L. Lozano, D. Bergman, A. A. Cire. Constrained Shortest-Path Reformulations for Discrete Bilevel and Robust Optimization. Submitted.

29. C. Cardonha, A. A. Cire, L.C.V. Real. On Fast Sequencing Policies for Linear Data Storage: Analysis of Online and Offline Policies. Submitted.

30. Hosseininasab*, W.-J. van Hoeve, A.A. Cire. Pattern Mining for Interpretable Data-driven Sequential Decision Making. Submitted.

31. S. Savaser*, O. Baron, A. A. Cire. Store Sequencing for Online Order Fulfillment in an Omni-channel Retailer. Submitted.

32. O. Baron, O. Bergman, A.A. Cire, V. Roshanei. An Almost-Robust Approach for Home Healthcare Network Design. In progress.

33. Y. Wu*, I. Averbakh, O. Baron, A.A. Cire. Heuristics for Semi-emergency calls. In progress.

34. A. Alganar, A.A. Cire, A. Diamant. A Distributionally Robust Approach to Network Rebalancing. In progress.

Papers in Media and Interviews

1. *COVID-19 vaccines are being injected in Canada now, so when am I getting mine.* Toronto Star, Business/Opinion (2020). Co-authored with Sinem Savaser*, Opher Baron. [Link]

2. *Why do my holiday gifts often arrive late when I order online? The answer can be found in logistics.* Toronto Star, Business/Opinion (2019). Co-authored with Sinem Savaser*, Opher Baron. [Link]

3. *How UTSC is teaming up with community groups to bring better services to Scarborough's newcomers.* UTSC Communications, Interview (2018) [Link]

AWARDS AND HONORS

Personal Awards

1. *Research Excellence Award* — *2019*
   Department of Management, University of Toronto Scarborough
2. *ACP Doctoral Dissertation Award* — *2016*
   Association for Constraint Programming
3. *Gerald L. Thompson Doctoral Dissertation Award in Management Science* — *2015*
   Carnegie Mellon University, USA
4. *INFORMS Computing Society Best Student Paper Award* — *2014*
   INFORMS Computing Society, USA
5. *Egon Balas Award - Best Student Paper in Operations Research* — *2011*
   Carnegie Mellon University, USA
6. *William L. Mellon Fellowship* — *2009-2011*
   Carnegie Mellon University
7. *Latin American Master's Thesis Contest in Informatics, Second Place* — *2009*
   Latin American Center for Informatics Studies
8. *Best Paper Award, Applications Track* — *2008*
   CP'08: The 14th International Conference on Principles and Practice of Constraint Programming
   Paper title: Planning and Scheduling the Operation of a Very Large Oil Pipeline Network
9. *Scientific Initiation Prize, First Place* — *2005*
   Brazilian Operational Research Society

Student Awards

1. *Best Student Paper Award* — *2021*
   Xavier Gillard, Ph.D. Student (main supervisor: Pierre Schaus)
   CPAIOR'21: The 18th International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research
   Paper title: Improving the Filtering of Branch-and-bound MDD Solvers
2. *First Place, Supply Chain & Logistics Management Best Student Research Paper* — *2021*
   Sinem Kinay, Ph.D. student (also co-supervised by Prof O. Baron)
   Centre for Research in Sustainable Supply Chain Analytics, Dalhousie University
3. *Runner-up, Canadian Operations Research Society Best Student Paper Award* — *2021*
   Saman Lagzi, Ph.D. student (also co-supervised by Profs Ningyuan Chen, Ming Hu)
4. *First Place, Canadian Operations Research Society Best Student Paper Award* — *2020*
   Margarita Castro, Ph.D. student (also co-supervised by Prof J. C. Beck)
5. *Runner-up, INFORMS Computing Society Best Student Paper Award* — *2020*
   Margarita Castro, Ph.D. student (also co-supervised by Prof J. C. Beck)

Grants

6. *NSERC Discovery Grant* — *2020-2025*
   Natural Sciences and Engineering Research Council of Canada
   Project title: Network-based Models for Scheduling Under Uncertainty
7. *CIHR: Addressing the Wider Health Impacts of COVID-19 (Group grant)* — *2022-2024*
   Canadian Institutes of Health Research
   Role: Co-applicant (led by York University, Ontario Health)
   Project: Understanding How COVID-19 has Affected Hospital Performance

8. *Suburban Mobilities Cluster of Scholarly Prominence (Cluster grant)* *2020-2023*
University of Toronto Scarborough
Role: Cluster Team Member (Cluster lead: Prof. Steven Farber)
Project: Joint grant involving faculty from the Dept. of Management, Human Geography, Sociology, Public Health, and Political Sciences to investigate social and transportation suburban problems

9. *NSERC Discovery Grant* *2015-2020*
Natural Sciences and Engineering Research Council of Canada
Project title: Optimization with Decision Diagrams: Theory and Applications

10. *NSERC Engage Grant* *2018*
Natural Sciences and Engineering Research Council of Canada
Project title: Data Analytics for Ore Blending Schedules

11. *Connaught Research Award* *2016-2017*
University of Toronto
Project title: Decision Analytics for Home Health Care

12. *UTSC Research Competitiveness Fund* *2014*
University of Toronto Scarborough
Project title: New Optimization Methods based on Decision Diagrams for Planning and Scheduling

INTERNSHIPS AND VISITING POSITIONS

1. *IBM Research, Yorktown Heights, USA* *Summer 2013*
Internship at the AI for Optimization Group
Project: Lagrangian and Parallel methods for Large-scale Integer Programming

2. *Google, California, USA* *July 2012*
Research Visitor, Optimization Group

3. *Zuze Institute Berlin (ZIB), Berlin, Germany* *Summer 2010*
Research Visitor
Project: Operational Planning for Home Health Care

4. *Australian National University / NICTA, Canberra, Australia* *Summer 2007*
Internship at the Knowledge and Representation Group, NICTA
Project: Model-based Supervision of Composite Systems

TALKS

Invited Speaker in University Seminars

1. Round Table on Data Analytics in Healthcare, Rotman School of Management. *Dynamic Scheduling of Home Health Care Patients to Medical Providers*, Invited Speaker, 2018.

2. CIRRELT Invited Speaker Series. *Dynamic Scheduling of Home Health Care Patients*. Invited Seminar Speaker, Université de Montréal, 2017.

3. DeGroote School of Management, McMaster University. *Decision Diagrams for Optimization*, Invited Seminar Speaker, 2017.

4. CIRRELT Seminar. *Decision Diagrams for Sequencing and Scheduling Problems*, Invited Seminar Speaker, Université de Montréal, 2015.

5. Combinatorics and Optimization, University of Waterloo, *Optimization based on Decision Diagrams*, Invited Seminar Speaker, 2015.

Conference and Workshop Talks

6. CPAIOR 2022, Keynote Speaker. *Network Models for Optimization*. Los Angeles, CA, 2022
7. INFORMS Annual Meeting 2019. *Network-based Formulation for Scheduling Clinical Rotations.* Seattle, WC, 2019. Invited Talk.
8. Production and Operations Management Conference 2019. *Network-based Formulation for Scheduling Clinical Rotations.* Washington, D.C., 2019. Session Chair.
9. Production and Operations Management Conference 2019. *Dynamic Scheduling of Home Health Care Patients to Medical Providers.* Washington, D.C., 2019. Invited Talk.
10. INFORMS Computing Society Conference 2019. *Stochastic Task Scheduling with Heterogeneous Agents*. Knoxville, TN, 2019. Invited Talk.
11. INFORMS Annual Meeting 2018. *Network-based Approximate Linear Programming*. Phoenix, AZ, 2018. Invited Talk.
12. Canadian Operational Research Society (CORS) 2018. *Network-based Approximate Linear Programming for Discrete Optimization*. Halifax, NS, 2018. Invited Talk.
13. International Symposium on Mathematical Programming (ISMP 2018). *Nonlinear State-Space Decompositions*, Bordeaux, France, 2018. Invited Talk.
14. INFORMS Annual Meeting 2017. *Dynamic Scheduling of Home Care Patients to Medical Providers*. Houston, TX, 2018. Invited Talk.
15. INFORMS Annual Meeting 2017. *Maximizing Reduced-cost-based Fixing*. Houston, TX, 2018. Invited Talk.
16. IFORS 2017. *A Decision Diagram-based Lagrangian Approach to the One-to-one Multi-commodity Pickup and Delivery Traveling Salesman Problem*. Québec City, QC, 2017. Invited Talk.
17. IFORS 2017. *Dynamic Scheduling of Home Care Patients to Medical Providers*. Québec City, QC, 2017. Invited Talk.
18. INFORMS Computing Society Conference 2017, *Dynamic Scheduling of Home Health Care Patients*, Austin, TX, 2017. Invited Talk.
19. INFORMS Annual Meeting 2016, *Decomposition by Decision Diagrams*, Nashville, TN, 2016. Invited Talk.
20. INFORMS Optimization Society Conference, *Decision Diagrams for Scheduling*, Princeton, NJ, 2016. Invited Talk.
21. Mixed Integer Programming Workshop (MIP), *Decision Diagrams for Optimization*, Chicago, IL, 2015. Invited Talk.
22. International Symposium on Optimization (ISMP), *Lagrangian Relaxation based on Decision Diagrams*, Pittsburgh, PA, 2015. Invited Talk.
23. Joint International Meeting of the Canadian Operational Research Society (CORS), *Lagrangian Relaxation Based on Decision Diagrams*, Montréal, QC, 2014. Invited Talk.
24. INFORMS Annual Meeting, *Improving Constraint Propagation via Lagrangian Decomposition*, Philadelphia, PA, 2015. Invited Talk.
25. INFORMS Computing Society Conference. *Relaxations from Multiple Decision Diagrams*. Richmond, VA, 2015. Invited Talk.
26. INFORMS Annual Meeting. *MDD-Based Lagrangian Relaxation*, Richmond, VA, 2014. Invited Talk.

27. INFORMS Annual Meeting. *Decision Diagrams for Sequencing and Scheduling*. Minneapolis, MN, 2013. Invited Talk.

28. INFORMS Annual Meeting. *A Branch and Bound Algorithm Based on Approximate Binary Decision Diagrams*. Phoenix, AZ, 2012. Invited Talk.

29. 21st International Symposium on Mathematical Programming (ISMP 2012). *MDD Propagation for Disjunctive Scheduling*. Berlin, Germany, 2012. Invited Talk.

30. 54th Annual Conference of the Canadian Operations Research Society (CORS 2012). *MDD Propagation for Disjunctive Scheduling*. Niagara Falls, Canada, 2012. Invited Talk.

31. INFORMS Annual Meeting. *Multivalued Decision Diagrams Relaxation for the Maximum Independent Set Problem*. Charlotte, NC, 2011. Invited Talk.

32. INFORMS Annual Meeting. *Logic-Based Benders Decomposition for the Home Health Care Problem*, Austin, TX, 2010. Invited Talk.

33. INFORMS Annual Meeting, *Hybrid Models for Scheduling a Real Oil Pipeline Network*. Washington, D.C., 2008. Invited Talk.

STUDENTS AND POSTDOCTORAL FELLOWS

Ph.D. Students

Current

1. *Sinem Savaser* *2018- 2023 (expected)*
   Co-supervised with Dr. Opher Baron (University of Toronto)
   Topic: Online Order Fulfillment for Omnichannel Retailers.
   Expected Completion: September 2023.

2. *Uta Mohring* *2022-2023 (expected)*
   Co-supervied with Dr. Philipp Afeche
   Topic: On-demand Transportation
   Expected Completion: October 2023

Past

3. *Margarita Castro* *2015 - 2020*
   Co-supervised with Dr. J. Christopher Beck (University of Toronto)
   Topic: Decision Diagrams for Planning, Scheduling, and Routing.
   First position after completion: Assistant Professor, Pontificia Universidad Católica de Chile

4. *Jaime Esteban Gonzales Jurado* *2016- 2020*
   Co-supervised with Dr. Andrea Lodi and Dr. Louis-Martin Rousseau (Université de Montréal)
   Topic: Hybrid Machine Learning and Decision Diagram Techniques
   First position after completion: Université de Montréal, Post-doctoral fellow

MSc. Students

5. *Lucas Barbosa Zattar Paganin* *2020 – 2021*
   Co-supervised with Dr. V. Sarhangian (University of Toronto)
   Topic: Integrated Modelling of Statistical Process Control and Maintenance
   First position after completion: Project Manager, BASSETTI Americas (Montréal, Quebec)

6. *Buser Say* *2014 – 2015*
Co-supervised with Dr. J. Christopher Beck (University of Toronto)
Topic: Mathematical Programming Methods for Planning
First position after completion: Ph.D. student, University of Toronto (Computer Science Dept. and the Vector Institute)

Post-doctoral Fellows

Current

7. *Aliaa Alnaggar* *Start: September 2021*
Co-supervised with Dr. Adam Diamant (York University)
Topic: Optimization under Uncertainty

Past

8. *Eugene Furman* *2020-2021*
Co-supervised with Dr. Opher Baron (Rotman), Dr. Adam Diamant (York Univ.)
Topic: Healthcare Analytics, Optimization Methods for Queuing Theory

9. *Majid Salavati Khoshghalb* *2018-2019*
Co-supervised with Dr. Adam Diamant (York University)
Topic: Scheduling of Firmware Over-The-Air Systems
First position after completion: Northwestern University, Post-doctoral fellow.

10. *Michael Römer* *2017-2019*
Co-supervised with Dr. Louis-Martin Rousseau (Université de Montréal)
Topic: Search-based techniques based on Network Reformulations
First position after completion: Martin Luther Universität Halle Wittenberg (Germany), Assistant Faculty.

11. *Omid Sanei Bajgiran* *2016-2017*
Co-supervised with Dr. Louis-Martin Rousseau (Université de Montréal)
Topic: Dual-based Search and Fixing Methods for Mathematical Programming
First position after completion: Bank of Montréal (BMO), Senior Data Scientist.

ACADEMIC SERVICE

Editorial Services

1. *Associated Editor, INFORMS Journal on Computing.* 2021-Present
Netwok Optimization: Algorithms & Applications

Senior Roles in International Conferences and Workshops

2. *Program Chair,* CPAIOR-2023 2022-2023

International Conference on the Integration of CP, AI, and OR

- Role: The CPAIOR conference series is an international venue for research in optimization, machine learning, and/or constraint programming that are of interest to multiple communities. As a program chair, I am responsible for assembling the program committee, overseeing the review process, make final accept/reject decisions, and design the conference program including invited speakers and special sessions.

3. *Area Chair (Optimization and Constraint Satisfaction), AAAI-2021*, *AAAI-2023* *2020-2021*
AAAI Conference on Artificial Intelligence

- Role: The AAAI Conference is one of the major conferences on artificial intelligence research, with more than 9,000 submissions per year. As an area chair, I am responsible for recommending senior program committee members, overseeing the review process, and recommending the final accept/reject decisions.

4. *Chair, Canadian* Healthcare *Optimization Workshop* *2020*
Co-chaired with Prof. Adam Diamant (York University)
Event co-allocated with the Canadian Operations Research Society (CORS) Annual Meeting

- Role: The Canadian Healthcare Optimization Workshop (CHOW) is the reference healthcare workshop of the Canadian Operations Research Society (CORS), gathering faculty and students from operations management, operations research, and artificial intelligence. As a co-chair, I helped develop the program, find sponsors, invite seminar speakers, and evaluate papers for a best-paper award competition, besides advertisement and communication with attendees.
- The event was postponed to 2021 due to COVID-19.

5. *Cluster Chair, Decision Diagram Track* *2019*
16th INFORMS Computing Society Conference

- Role: The INFORMS Computing Society Conference is one of the leading INFORMS conferences on topics within the interface of Operations Research and Computing. I was the chair of the Decision Diagrams track, my primary field of study. My role was to find session chairs, oversee the topics covered in the sessions, and verify submitted abstracts.

6. *Chair, Symposium for Decision Diagrams for Optimization* *2018*
Carnegie Mellon University, Pittsburgh, USA

- Role: We organized a symposium gathering international researchers in my primary field of study (decision diagrams for optimization), which a new research stream in optimization. My role was to help design the program and invite session speakers. The symposium was a two-day event with more than 30 participants from Canada, the U.S., and Europe.

7. *Chair, Operations Research Track* *2017-2018*
23rd and 24th International Conference on Principles and Practice of Constraint Programming (CP)

- Role: The CP conference is the main constraint programming event in the field, gathering researchers in artificial intelligence, computer science, and optimization. I was responsible for the Operations Research Track in 2017 and 2018. My role was to select program committee members, oversee the review process and discussions, and make final decisions concerning acceptance/rejections of papers.

8. *Chair – Planning, Search, and Optimization Workshop (PlanSOpt)* *2018*
28th International Conference on Automated Planning and Scheduling (ICAPS)
Co-chaired with Dr. Michael Cashmore (King's College London) and Chiara Piacentini (Augmenta AI)

- Role: I chaired a workshop on the use of mathematical programming models for planning in Artificial Intelligence for ICAPS, a well-known conference on artificial intelligence. My role was to review the papers submitted to the workshop, choose seminar speakers, and help organize the program.

9. *Chair, Doctoral Research Award in Constraint Programming* *2018*
Association for Constraint Programming

- Role: The Association for Constraint Programming (ACP) gives a yearly Doctoral Research Award for a young researcher who has recently completed their doctoral dissertation. I chaired the award committee in 2018. My role was to select the committee members, evaluate the dissertations, and choose the first place and runner up.

10. *Chair, ACP Summer School on Constraint Programming* *2016, 2022*
Association for Constraint Programming
Co-chaired with Prof. David Bergman (University of Connecticut)

- Role: The ACP summer school is an international event targeted towards Ph.D. students and post-doctoral fellows in the Operations area that work with methodologies from constraint programming. We hosted the event at the University of Toronto Scarborough, exposing participants to new trends and advanced concepts through lectures given by leaders in the field. My role was to find sponsors, invite speakers, prepare the program, and organize the event at UTSC.

Program Committees

1.	International Conference on Machine Learning (ICML)	*2020-22*
2.	Conference on Neural Information Processing Systems (NeurIPS)	*2020-22*
3.	AAAI Conference on Artificial Intelligence (AAAI)	*2015-22*
4.	Int. Conference on Integration of AI and OR Techniques in CP (CPAIOR)	*2015-22*
5.	Int. Conference on Principles and Practice of Constraint Programming (CP)	*2017-22*
6.	Int. Conference on Machine Learning, Optimization, and Data Science (LOD)	*2022*
7.	Int.Joint Conference on Artificial Intelligence (IJCAI)	*2013, 2015-22*
8.	Int. Conference on Automated Planning and Scheduling (ICAPS)	*2018-22*
9.	Learning and Intelligent Optimization Conference (LION)	*2016-18*
10.	Int. Conference on Operations Research and Enterprise Systems (ICORES)	*2017-2020*
11.	Doctoral Program, CP	*2015-16*

Ph.D. Thesis Examiner (Total: 1)

1. Amin Hosseininasab *2020*
Carnegie Mellon University

Ad-hoc reviewer (2012-present):

Management Science, Operations Research, Mathematical Programming, INFORMS Journal on Computing, Manufacturing & Service Operations Management, Networks, Naval Research Logistics, Computers & Operations Research, Information System and Operational Research (INFOR), Transportation Research, Computers & Industrial Engineering, International Symposium on Combinatorial Search (SoCS 2016), CP (2012-16), SI 2012, Naval Research Logistics, MITACS Accelerate, NSERC Discovery Grant.

UNIVERSITY SERVICE

Service at the UTSC Campus and Rotman School of Management

1. *Academic Director, the BRIDGE* *2021-2022*
   Department of Management, University of Toronto Scarborough

   - Role: To help design academic initiatives related to work-integrated learning, foster research collaboration between faculty and partnering organizations, and enhance co-curricular activities related to data analytics

2. *Teaching Committee* *2021-present*
   Department of Management, University of Toronto Scarborough

   - Role: I am a member of the committee tasked at evaluating online/in-person teaching, providing teaching support to faculty, and assessing course alignment with strategic area goals

3. *Job Search Committee Member, Operations & Analytics Area* *2019-2020*
   Department of Management, University of Toronto Scarborough

   - Role: I was a member of the search committee tasked at filling an open position at the Operations & Analytics area at the Department of Management, UTSC. I have thoroughly contributed to the evaluation of each applicant, interviews, and selection of candidates for the final offer.

4. *Core-Review Committee Member* *2019-current*
   Department of Management, University of Toronto Scarborough

   - Role: I am a member of a committee tasked at reevaluating the core course offerings for the undergraduate BBA program at the Department of Management, UTSC. At this point, I have contributed to the re-evaluation of the goals of the Operations area, contacted industrial partners to obtain feedback on our Operations courses, and participated in meetings with other Management areas.

5. *Newcomers Needs and Trends Initiative, Data Analysis* *2018-current*
   Department of Management, University of Toronto Scarborough (BRIDGE)
   Toronto East Quadrant Local Immigration Partnership (TEQ-LIP)

   - Role: I am one of the leading members of a project to collect, organize, and analyze data provided by refugee agencies in Scarborough. Our goal is to identify newcomer trends, patterns of service access, and other insight to support agencies in improving their services. The project is a collaboration between the TEQ-LIP and the Business, Research, and Innovation (BRIDGE) lab at the Department of Management, UTSC. My role is to support the data analytics process of the project, including data collection training to agencies via free workshops, data cleaning, support of co-op students, reporting, and data visualization. Since its inception, the project already includes approximately ten newcomer agencies and initial data analysis of more than 100,000 service accesses since 2018.

6. *Interviews - Management and International Business (MIB) Co-op Program* *2016-2020*
   Department of Management, University of Toronto Scarborough

   - Role: I contribute to the interviews of the undergraduate MIB program at the Department of Management, UTSC. Every year I help conduct 4 to 10 interviews of highly qualified Canadian and international candidates who apply to our program.

7. *Interviews – Master of Management Analytics* *2018-2019*
   Rotman School of Management

- Role: I contribute to the interviews of the highly qualified candidates applying to the MMA program at Rotman. Every year I conduct 4-6 interviews (now consolidated in a single day per year).

8. *Faculty Coaching - Master of Management Analytics (MMA) Analytics Practicum* *2018*
Rotman School of Management

   - Role: I helped support a student team for the Practicum project at Rotman. Such a project offers students the opportunity to work with data analytics challenges faced by a company, interacting directly with managers and practitioners. My role was to support a student team through meetings discussing project planning and data analysis.

9. *Faculty Coaching – Master of Management Analytics (MMA) Datathon* *2018*
Rotman School of Management

   - Role: The Datathon is a data analytics competition hosted by Rotman. In 2018, I was the coach of one of the teams, offering assistance in their data analysis and visualization.

10. *Judge - LIVE - Future Leaders Challenge* *2017*
Department of Management, University of Toronto Scarborough

    - Role: I was one of the judges for the Future Leaders Challenge 2017, a full-day multidisciplinary business competition targeted at high-school students.

Ph.D. Thesis Examiner

1. Buser Say *2020*
Topics: Operations Research, Machine Learning
2. Longyuan Du *2018*
Topics: Operations Management, Revenue Management
3. Wen-Yang Ku *2017*
Topics: Scheduling, Operations Research

Ph.D. Committee Meetings

1. Gueng Guo *2019, 2020*
Topics: Mathematical Programming, Stochastic Scheduling
2. Maryam Daryalal *2019*
Topics: Stochastic Programming

MSc Thesis Examiner

1. Tanya Tang 2020
Topics: Decomposition Methods, Operations Research
2. Leyi Chang 2019
Topics: Operations Management, Staff Allocation
3. Stefana Filipova 2018
Topics: Constraint Satisfaction, Optimization

TEACHING

Undergraduate Courses

1. **Introductory/Advanced Business Data Analytics (MGOC15 / MGOD30H3 / MGOD31H)**
Department of Management, University of Toronto Scarborough
Audience: 3rd – 4th-year students (D-level course)

- Summary: The course provides skills in data manipulation, data cleaning, and predictive models (such as decision trees, random forests, and neural networks) for Management students, emphasizing managerial insights and principles of evidence-based decision making.
- Terms Taught: Winter 2018 , Winter 2019, Summer 2019, Winter 2020, Summer 2020, Summer 2021, Winter 2022
- Fully designed course curriculum and lecture notes.

2. **Operations Management: A Mathematical Approach** (MGOC20H3)
   Department of Management, University of Toronto Scarborough
   Audience: 2nd – 4th-year students (C-level course)
   - Summary: The course provides skills in practical quantitative approaches to assess and improve upon decisions underlying the strategic goals of a firm. Topics include project management, forecasting, total quality, supply chain, inventory management, and basics of revenue management.
   - Terms Taught: Fall 2016, Winter 2018
   - Redesigned course material (lecture notes)
3. **Analysis for Decision Making** (MGOC10H3)
   Department of Management, University of Toronto Scarborough
   Audience: 2nd – 4th-year students (C-level course)
   - Summary: The course provides skills in prescriptive analytics models to enhance decision making and analysis of outcomes. Topics include decision analysis, mathematical programming, multi-criteria decision making, and queuing models using Excel.
   - Terms: Fall 2014, Fall 2015
   - Redesigned course material (lecture notes)
4. **Mathematical Models for Consulting**,
   Tepper School of Business, Carnegie Mellon University
   Course taught during my Ph.D. and before joining the University of Toronto Scarborough
   - Summary: The course provides skills in mathematical programming techniques for decision making, including linear and integer programming.
   - Audience: 4th-year students
   - Terms Taught: Spring 2013

Graduate Courses

1. **Business Data Analytics Finance (MAF3003H3)**
   Department of Management, University of Toronto Scarborough
   Audience: Master of Accounting and Finance (MaccFin) students
   - Summary: The course provides skills in data manipulation, data cleaning, and predictive models emphasizing applications in Accounting and Finance.
   - Terms Taught/Evaluations: Summer 2019, Summer 2020
   - Fully designed course curriculum and lecture notes.
2. **Optimizing Supply Chain and Logistics Analytics**
   Rotman School of Management, University of Toronto
   Audience: Master of Management Analytics (MMA)
   - Summary: The course provides optimization skills in supply chain operations, and topics include network design, aggregate planning, routing, and pricing.

- Terms Taught/Evaluations: Fall 2021, Fall 2022
- Designed new lecture notes based on existing material .

3. **Duality in Optimization** (Advanced Methods in Linear and Non-linear Optimization, RSM3046)
   Rotman School of Management, University of Toronto
   Audience: Ph.D. students in Operations
   - Summary: The course investigates the use of duality in optimization and classical results in the field, including topics in polyhedral analysis, convex analysis, and decomposition methods.
   - Terms Taught: Winter 2018
   - Fully designed course curriculum and lecture notes.