Justin Dumouchelle

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Education

University of Toronto

PhD in **Operations Research & Machine Learning** *September 2021 - present*

- Advisor: Elias Khalil
- Thesis: Neural Network Approximations for Mathematical Optimization

Polytechnique Montréal

MASc in **Applied Mathematics** *September 2019 - August 2021*

- Advisors: Andrea Lodi, Emma Frejinger
- Thesis: Machine Learning for Booking Control

University of Waterloo

BMath (double major) in **Computer Science** and **Combinatorics and Optimization** *September 2013 - April 2018*

Experience

Borealis AI

Machine Leaning Research Intern *July 2018 - August 2019*

- Developed data prepossessing pipeline and supervised deep learning models for time series forecasting.
- Implemented distant supervision and supervised learning techniques to extract numerical data from unstructured text.
- Worked closely with business clients to develop high-impact machine learning systems for financial applications.

University of Waterloo

Computer Science Tutor *January 2018 - December 2018*

- CS 466/666 (Algorithm Design and Analysis) in Fall 2018. Reviewed course material, worked through examples, and helped students develop an intuition for the following topics: amortized analysis, approximation algorithms, linear programming, randomized algorithms, and online algorithms.
- MTE 140 (Data Structures and Algorithms) in Winter 2018. Assisted students in understanding fundamental concepts in C++, such as pointers and object-oriented programming. Helped students understand the implementation and analysis of data structures.

Publications

- **J. Dumouchelle**, R. Patel, E. B. Khalil, and M. Bodur. Neur2SP: Neural Two-Stage Stochastic Programming. *Advances in Neural Information Processing Systems 35*, 2022. [**Paper**, **Code**, **Website**]
- A. Prouvost, **J. Dumouchelle**, L. Scavuzzo, M. Gasse, D. Chételat, and A. Lodi. Ecole: A gym-like library for machine learning in combinatorial optimization solvers. *Learning Meets Combinatorial Algorithms at NeurIPS2020*, 2020. [**Paper**, **Code**, **Website**]
- **J. Dumouchelle**, E. Frejinger, and A. Lodi. Reinforcement Learning for Freight Booking Control Problems. *arXiv preprint arXiv:2102.00092*, 2022. [**Paper**]

Extracurricular Activity

ML4CO Competition Organizer [NeurIPS 2021 Competition, **Website**] *June 2021 - December 2021*

- Developed core features in Ecole required for the competition.
- Contributed to the planning of the competition datasets, evaluation criteria, and tasks.
- Evaluated and debugged participant submissions as well as corresponded to participant questions throughout the competition.

University of Waterloo Varsity Swimming *September 2013 - April 2018*

- Captain for the 2016-2017 and 2017-2018 seasons.
- Balanced a full-time course load with a significant commitment to the team.
- 2017 and 2018 Academic All Canadian. Award is given to student-athletes with over an 80% academic average.

Skills

- Programming Languages: Python, C++.
- Technologies: Pytorch, Scikit learn, Tensorflow, Gurobi, SCIP, CPLEX.
- Machine Learning Expertise: Deep learning, reinforcement learning, graph/set neural networks.
- Operations Research Expertise: Integer programming, stochastic programming, robust optimization.