Connor Lawless

CONTACT

Cornell University
Operations Research & Information Engineering
294 Rhodes Hall, Ithaca, NY 14853

(234) 244-7572
cal379@cornell.edu
conlaw.github.io

RESEARCH INTERESTS

Operations research, mathematical programming, statistical learning, integer programming, fair machine learning, interpretable ai

EDUCATION

Cornell University *August 2019 - Present*
Ph.D. in Operations Research (4.0 GPA) *Ithaca, NY*
Thesis Topic: Integer programming methods for trustworthy machine learning
Advisor: Professor Oktay Gunluk

University of Toronto *September 2014 - June 2019*
B.Asc. in Industrial Engineering (4.0 GPA) *Toronto, ON*
Undergraduate Thesis: The Multi-Armed Investor: Modelling investment decisions through the lens of a multi-armed bandit problem (advised by Prof. Chi-Guhn Lee)

PAPERS

C. Lawless, O. Gunluk. Fair and Interpretable Decision Rules for Binary Classification. *Optimization for Machine Learning Workshop, Neurips 2020.*
C. Lawless, S. Dash, O. Gunluk, D. Wei. Interpretable and Fair Decision Rules via Column Generation. *Under review at the Machine Learning Journal.*
C. Lawless, J. Kalagnanam, L. Nguyen, D. Phan, C. Reddy. Interpretable Clustering via Multi-Polytope Machines. *AAAI 2022.*
C. Lawless, S. Ntanavaras, A. Wikum. A Two-Stage Approach to Routing with Driver Preferences via Heatmaps. *Proceedings of the Amazon-MIT Last Mile Vehicle Routing Challenge, 2022.*

PATENTS

H. Burhani et al. Trade platform with reinforcement learning. *US Patent Application* 16426196

ACADEMIC PRESENTATIONS

Fair and Interpretable Decision Rules for Binary Classification
- ORACL Workshop, Cornell University *June 2019*
- AI for Social Good Workshop, IJCAI (Remote) *January 2021*
- Machine Learning NeEDs Mathematical Optimization Seminar Series *February 2021*
- European Conference on Operational Research (Remote) *July 2021*
- INFORMs, Anaheim CA *October 2021*

Interpretable Clustering via Multi-Polytope Machines
- IBM Research Applied AI Seminar *August 2021*
- Cornell ORIE PhD Colloquium *October 2021*

TEACHING EXPERIENCE

Data Science, Head Teacher *June 2020 - August 2020*
iXperience *Cape Town (Remote)*
- Taught a 6 week intensive data science bootcamp covering python development, machine learning, and data visualization to 30 undergraduate students from the world's top universities.
- Supervised 10+ remote industry internships for our students at startups located in South Africa, Europe, and the US.
- Previously was a teaching assistant for the course in 2019 in Cape Town.

Guest Lecturer
Cornell University *Ithaca, NY*
- ENGRI 1101 - Engineering Applications of Operations Research November, 2019
- ORIE 6140 - Mathematical Modelling of Operational Systems October, 2020

Teaching Assistant
Cornell University *Ithaca, NY*
- ORIE5300: Optimization I, Fall 2019
- ORIE47471: Learning with Big Messy Data, Fall 2021

Honours

Ontario Professional Engineers Foundation for Education Gold Medal *2019*
- Awarded to the graduating engineering student at the University of Toronto with the top academic average across all engineering disciplines (1st out of 1000+ students).

W.S. Wilson Medal *2019*
- Awarded to the top graduating industrial engineering student at the University of Toronto (1st out of 100+ students).

Edward L. Donegan Scholarship ($100K) *2014 - 2019*
- Awarded a full undergraduate academic scholarship to study engineering by the University of Toronto on the basis of scholastic and leadership achievements.

Ben Bernholtz Memorial Prize in Operations Research *2016*
- Awarded to the top undergraduate student at the University of Toronto in operations research on the basis of performance in undergraduate optimization courses.

Work Experience

Research Intern *May 2021 - August 2021*
IBM Research *Yorktown Heights, NY*
- Worked on the Applied AI team to develop a novel algorithm for interpretable clustering that works by simultaneously clustering points and constructing a polytope around each cluster to describe it. Work was accepted to AAAI 2022.

Summer Analyst *June 2018 - August 2018*
BlackRock *London, UK*
- Developed a new micro service to disentangle a database dependency from the existing trade management server; reduced downtime of critical system that processed over 1M orders daily.
- Designed and implemented a new group finder and collaboration tool to improve employee moral; project was awarded first place at the internal intern hackathon (out of 10 teams).

AI Scientist *September 2017 - June 2018*
Royal Bank of Canada *Toronto, ON*
- Worked on a team of 3 to build the first reinforcement learning based trade execution algorithm in Canada (patent pending); the algorithm is currently in production and has traded over $1 billion dollars notionally across Canada and the US between 2017 and 2019.
- Built a custom user interface using React JS and Python to track the algorithm's performance; the interface exposed critical errors in the algorithm, reducing development time, and was distributed to the electronic traders, building trust and increasing the algorithm's adoption rate on the trading floor.
- Presented key milestones to senior management, including the head of RBC Global Markets, and wrote speaking points circulated to the CEO.

Summer Analyst *June 2017 - August 2017*
BlackRock *Seattle, WA*
- Developed a new tool to visualize and analyze customer reporting distribution metrics; currently being rolled out globally on the Aladdin platform to BlackRock's 13,000 employees.
- Rewrote an existing stored procedure to fetch customer profiles; reduced querying time of common use case from 5 minutes to 15 seconds
- Added functionality to sync CRM contacts to sales personnel's phones as part of an internal team intern hackathon; advanced to the national finals (4 out 30 teams) and presented our product to the global head of product management.

Data Science Intern *June 2016 - August 2016*
GetSmarter *Cape Town, SA*

- Developed a ridge regression model to discover that GetSmarter was spending 15% more than they needed on academic advisor support; presented the results to the Director of Education and CFO.
- Integrated data from GetSmarter's database, phone call logs, and CRM system to create the company's first data pipeline for statistical modelling.

Leadership Experience

Co-President *March 2021- Present*
Operations Research Graduate Association *Ithaca, NY*

- Coordinating departmental initiatives for the Cornell ORIE PhD student body.
- Previously served as the activities planner in 2020.

Managing Director, Start-up *April 2020 - February 2019*
You're Next Career Network *Toronto, ON*

- Led a team of 10 to run Canada's largest Startup Career Fair with 90 startups, and 3000+ students (revenue = $40,000+)
- Pioneered Entrepreneurship Week, a week-long case competition to expose students to entrepreneurship, that connected 8 startup mentors to 100+ students

Archivist *March 2015 - March 2016*
University of Toronto Engineering Society *Toronto, ON*

- Led a team of 15 to manage the faculty's historical artifacts; expanded the portfolio to include community outreach, an online services team, and a documentary filmmaking team comprising over 80 volunteers.
- Awarded Project Director of the Year, an award given to the three engineering society project directors deemed to have done the best job with their respective positions over the 2015-16 year out of 22 project directors.

Relevant Skills

Languages: English - Proficient
French, German - Intermediate

Programming: Python, R, Java, SQL, MATLAB, C, Gurobi
LaTeX, ReactJS, HTML, Windows/Unix Environment

Development: Git, SVN

Graduate Coursework

Cornell University

MATH	4130	Honors Real Analysis
MATH	4330	Honors Linear Algebra
ORIE	6300	Mathematical Programming
ORIE	6330	Graph Theory
ORIE	6500	Applied Stochastic Processes
ORIE	6700	Statistical Principles
ORIE	6746	Causal Inference
ORIE	6750	Optimal Learning
ORIE	7790	High Dimensional Probability & Statistics

Professional Memberships

Institute for Operations Research and the Management Sciences (INFORMS)
National Organization of Gay & Lesbian Science and Technology Professionals (NOGLSTP)
Queer in AI