

# Connor Lawless

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CONTACT	Cornell University Operations Research & Information Engineering 294 Rhodes Hall, 136 Hoy Road, Ithaca, NY 14853	<a href="mailto:cal379@cornell.edu">cal379@cornell.edu</a> <a href="https://conlaw.github.io">https://conlaw.github.io</a>
RESEARCH INTERESTS	My research leverages tools from <i>computational integer programming for interpretable and fair machine learning</i> .	
EDUCATION	<b>Cornell University</b> Ph.D. in <b>Operations Research and Information Engineering</b> M.S. in <b>Operations Research and Information Engineering</b> - PhD Advisor: <b>Oktay Günlük</b> - Thesis: Integer Programming Approaches for Trustworthy Machine Learning	<i>Ithaca, NY</i> <i>May 2024, expected</i> <i>December 2022</i>
	<b>University of Toronto</b> B.A.Sc. in <b>Industrial Engineering</b> , <i>High Honors</i>	<i>Toronto, ON</i> <i>April 2019</i>
RESEARCH	<b>Preference Embedding from Chat: A Hybrid LLM and Constraint Programming Framework for Interactive Optimization</b> <b>Connor Lawless</b> , Jakob Schoeffler, Bahar Sarrafzadeh, Shilad Sen, Jina Suh <i>In preparation for ACM CHI Conference on Human Factors in Computing Systems.</i>	
	<b>Cluster Explanations via Polyhedral Descriptions: A Scalable Column Generation Framework</b> <b>Connor Lawless</b> , Oktay Günlük <i>In preparation for Operations Research</i>	
	<b>Fair Minimum Representation Clustering</b> <b>Connor Lawless</b> , Oktay Günlük <i>Under review</i>	
	<b>Interpretable and Fair Decision Rules via Column Generation</b> <b>Connor Lawless</b> , Sanjeeb Dash, Oktay Günlük, Dennis Wei <i>Journal of Machine Learning Research, forthcoming</i>	
	<b>Cluster Explanation via Polyhedral Description</b> <b>Connor Lawless</b> , Oktay Günlük <i>International Conference on Machine Learning (2023)</i>	
	<b>Interpretable Clustering via Multi-Polytope Machines</b> <b>Connor Lawless</b> , Jayant Kalagnanam, Lam Nguyen, Dzung T. Phan, Chandra Reddy <i>AAAI Conference on Artificial Intelligence (2022)</i>	
	<b>Two-Stage Approach to Routing with Driver Preferences via Heatmaps</b> <b>Connor Lawless</b> , Sotiris Ntanavaras, Anders Wikum <i>Proceedings of the Amazon-MIT Last Mile Vehicle Routing Challenge (2022)</i>	
	<b>Fair and Interpretable Decision Rules for Binary Classification</b> <b>Connor Lawless</b> , Oktay Günlük <i>Workshop Paper (2020)</i> <ul style="list-style-type: none"><li>– Presented at NeurIPS Workshop on Optimization in Machine Learning (2020)</li><li>– Presented at IJCAI Workshop on AI for Social Good (2021)</li></ul>	
PATENTS	<b>Trade Platform with Reinforcement Learning</b> Hasham Burhani, Shary Mudassir, Xiao Qi Shi, <b>Connor Lawless</b>	

*Patent Application in Canada, US and Europe (2019)*

### **Interpretable Clustering via Multi-Polytope Machines**

Dzung T. Phan, **Connor Lawless**, Jayant R. Kalagnanam, Lam M. Nguyen, Chandra K. Reddy  
*Patent Application in US (2021)*

## ACADEMIC PRESENTATIONS

### **Fair Minimum Representation Clustering**

- NYC Joint PhD Colloquium

*May 2023*

### **Cluster Explanation via Polyhedral Description**

- Cornell ORIE PhD Colloquium, Ithaca NY *September 2022*
- Making Sense of Explainable ML, Lorentz Center at the University of Leiden *October 2022*
- Fidelity AI Center Seminar, Remote *April 2023*
- Thematic Einstein Seminar on Optimization and ML, Berlin Germany *April 2023*
- NYC Operations Day (Poster), NYC NY *April 2023*
- SIAM Optimization Conference, Seattle WA *May 2023*
- International Federation of Operations Research Society Meeting, Santiago Chile *July 2023*
- ICML (Poster), Honolulu HI *July 2023*

### **Interpretable Clustering via Multi-Polytope Machines**

- IBM Research Applied AI Seminar, Remote *August 2021*
- Cornell ORIE PhD Colloquium, Ithaca NY *October 2021*
- INFORMs Optimization Society, Greenville SC *March 2022*
- European Conference on Operational Research, Espoo Finland *July 2022*

### **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*

## TEACHING EXPERIENCE

<b>Instructor</b>	ORIE 5270: Big Data Technologies, <i>Spring 2023 - Cornell</i>
<b>Instructor</b>	ORIE 6125: Computational Methods in OR, <i>Spring 2023 - Cornell</i>
<b>Instructor</b>	<b>Data Analytics</b> 2021-2022 - <i>iXperience</i>
<b>Teaching Assistant</b>	ORIE 5135: Computational IP, <i>Spring 2022 - Cornell</i>
<b>Teaching Assistant</b>	ORIE 4740: Learning with Big Messy Data, <i>Fall 2021 - Cornell</i>
<b>Instructor</b>	<b>Data Science Bootcamp</b> 2020 - 2021 <i>iXperience</i>
<b>Guest Lecturer</b>	ORIE 6140: Optimization, <i>Fall 2020 - Cornell</i>
<b>Teaching Assistant</b>	ORIE 3300: Optimization, <i>Fall 2019 - Cornell</i>
<b>Guest Lecturer</b>	ENGRI 1101: Optimization, <i>Fall 2019 - Cornell</i>

## HONOURS

Outstanding Graduate Instructor, Cornell ORIE	<i>2023</i>
Michigan Institute for Data Science Future Leaders Summit Selected Attendee	<i>2023</i>
Outstanding Reviewer, AISTATS	<i>2023</i>
FAccT Doctoral Consortium Selected Attendee	<i>2022</i>
Ontario Professional Engineers Foundation for Education Gold Medal, University of Toronto	<i>2019</i>
W.S. Wilson Medal, University of Toronto	<i>2019</i>
Dean's List, University of Toronto	<i>2014-2019</i>
Edward L. Donegan Scholarship (\$100K), University of Toronto	<i>2014-2019</i>
Ben Bernholtz Memorial Prize in Operations Research, University of Toronto	<i>2016</i>

## SERVICE

### **In Cornell:**

- *Mentoring*: Graduate Student Mentor with Operations Research Graduate Association (*2020-2023*)

- *Operations Research Graduate Association*: Co-President (2021-2022), Visit Weekend Coordinator (2020 - 2021), Mentorship Director (2022 - 2023), URM PhD Application Support Program Officer (2023 - 2024)

**In Conferences:**

- *Session Chair*: INFORMS Annual Meeting, EURO Annual Meeting, IFORS Triennial Meeting
- *Referee*: AISTATS, FAccT, ICML, AAAI, NeurIPS

**In Journals:**

- *Referee*: INFORMS Journal of Computing, Operations Research

INDUSTRY  
EXPERIENCE

**Research Intern**

*May 2023 - August 2023*

**Microsoft Research**

*Redmond, WA*

- Worked with the Human Understanding and Empathy (HUE) team and Office of Applied Research on a hybrid LLM and Constraint Programming algorithm for meeting scheduling.

**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.

RELEVANT  
SKILLS

**Languages:**

English - Native  
French, German, Spanish - Beginner

**Programming:**

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

**Development:**

Git, SVN

PROFESSIONAL  
MEMBERSHIPS

Institute for Operations Research and the Management Sciences (INFORMS)  
Queer in AI  
Out in STEM