Ryan Cory-Wright

PhD Candidate · Operations Research Center-MIT

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Education

Massachusetts Institute of Technology *Cambridge, MA*

PhD in Operations Research *May 2022 (expected)*

Advisor: Dimitris Bertsimas | GPA: 5.0/5.0

Coursework: Optimization (Linear, Integer, Robust, Semidefinite), Statistical Learning, Operations Management

University of Auckland *Auckland, New Zealand*

BE (1st Class Hons) *May 2017*

Advisors: Golbon Zakeri, Andy Philpott | GPA: 8.84/9.00 | Thesis: Pricing Wind Under Uncertainty

Research Interests

Methodological: Optimization (discrete/conic/stochastic/robust), machine learning, statistics (interpretable, high-dimensional).
Applications: Finance, energy (market design/renewable integration), operations, business analytics.

Publications

From Predictions to Prescriptions: A Data-Driven Response to COVID-19
with Dimitris Bertsimas et. al., minor revision in Health Care Management Science, 2020.
- Winner, INFORMS Healthcare Applications Society William Pierskalla Best Paper Award (2020).

On Stochastic Auctions in Risk-Averse Electricity Markets With Uncertain Supply
with Golbon Zakeri, Operations Research Letters, 48(3):376-384, 2020.

On Polyhedral and Second-Order Cone Decompositions of Semidefinite Optimization Problems
with Dimitris Bertsimas, Operations Research Letters. 48(1):78-85, 2020.

Payment Mechanisms for Electricity Markets With Uncertain Supply
with Andy Philpott and Golbon Zakeri, Operations Research Letters. 46(1):116-121, 2018.
- Winner, Operations Research Society of New Zealand Young Practitioner's Prize (2016).

Completed Works

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints
with Dimitris Bertsimas and Jean Pauphilet, Operations Research, under review.
- Winner, INFORMS George Nicholson Student Paper Competition (2020).

Solving Large-Scale Sparse PCA to Certifiable (Near) Optimality
with Dimitris Bertsimas and Jean Pauphilet, Journal of Machine Learning Research, under review.

A Unified Approach to Mixed-Integer Optimization: Nonlinear Formulations and Scalable Algorithms
with Dimitris Bertsimas and Jean Pauphilet, SIAM Journal on Optimization, under review.
- Winner, INFORMS Computing Society Student Paper Competition (2019).
- Finalist, MIP Workshop student poster competition (2020).

A Scalable Algorithm for Sparse Portfolio Selection
with Dimitris Bertsimas, INFORMS Journal on Computing, under review.

Books in Preparation

High-Dimensional Optimization Over Integers and Matrices
with Dimitris Bertsimas and Jean Pauphilet, Dynamic Ideas Press, to appear in 2022 (expected).

Selected Awards

2020 **Winner, George Nicholson Student Paper Competition**, INFORMS
Winner, William Pierskalla Best Paper Award, INFORMS Healthcare Applications Society
Finalist, Best Student Poster Competition, MIP Workshop

2019 **Winner, ICS Best Student Paper Award**, INFORMS Computing Society

2017 **Senior Scholar Award (top of graduating class)**, University of Auckland

2016 **Winner, Young Practitioner's Prize**, Operations Research Society of New Zealand

2014-16 **Deans Honours List**, Faculty of Engineering, University of Auckland
First in Course Award x5, University of Auckland

2013 **Outstanding Scholar (top 50 high-school students in New Zealand)**, NZQA

Research Experience

COVID Analytics: Core Team Member *Cambridge, MA*
Principal Investigator: Dimitris Bertsimas *2020*
- Lead effort to extract features from over 200 COVID-related clinical research papers early in the pandemic, which allowed the core team to more accurately tune parameters in machine learning tools developed to combat the COVID-19 pandemic.
- Core team awarded the 2020 William Pierskalla best paper award for their efforts.
- Material from the effort available at: covidanalytics.io

Operations Research Center-MIT: Research Assistant *Cambridge, MA*
Supervisor: Dimitris Bertsimas *Sept. 2017 - Present*
- Developed techniques for solving central problems in OR/ML literatures, with focus on certifiable optimality, scalability.
- Made methodological and algorithmic contributions to the fields of discrete and conic optimization, including developing new algorithms for solving cardinality and rank constrained problems to certifiable optimality.

University of Auckland- Dept of Engineering Science: Research Assistant *Auckland, New Zealand*
Supervisor: Golbon Zakeri *2016-2017*
- Designed techniques for pricing electricity with uncertain supply, risk-aversion.
- Implemented pricing mechanism on a full-scale replica of the New Zealand Market.

Teaching Experience

15.071 The Analytics Edge *MIT*
Head Teaching Assistant *Fall 2020*
- Head TA for a class which introduces Sloan MBA students to data analytics. Class held virtually due to COVID-19.
- Duties: preparing/leading recitations, developing/grading assignments, holding office hours, supervising final projects.

15.S60 Computing in Operations Research and Statistics *MIT*
Session Instructor *Jan 2019, Jan 2020*
- Instructor for 3-hour session which aims to provide PhD students with an overview of state-of-the-art software tools used in optimization and statistics.

15.095 Machine Learning Under a Modern Optimization Lens *MIT*
Teaching Assistant *Fall 2019*
- TA for a course which provides masters/PhD students with a modern treatment of machine learning using the lenses of convex, robust and mixed-integer optimization.
- Duties: preparing/leading recitations, developing/grading assignments/exams, holding office hours, supervising projects.

15.093 Optimization Methods *MIT*
Teaching Assistant *Fall 2018*
- TA for course which provides masters students with a unified overview of main algorithms and applications of optimization.
- Duties: preparing/leading recitations, developing/grading assignments, answering Piazza questions, holding office hours.

Mentoring Experience

15.089 Analytics Capstone *MIT*

Project Mentor *Summer 2018, Summer 2019*

- Advised two projects completed by teams of Master of Business Analytics (MBaN) students, who respectively applied machine learning techniques to predict fund flows at the financial advisor level for a large investment management company, and applied prescriptive analytics to optimize fund flows for a large investment management company.
- Summer 2018 mentees received award for best capstone presentation in graduating class.

Industry Experience

Derceto *Auckland, New Zealand*

Assistant Optimization Engineer *2014-2016*

- Developed and maintained several VBA/SQL tools used by Derceto engineers in daily operations, including automating a 9-step process for updating historical demand curves which previously took Derceto around 30 hours per client per year.
- Assisted with installing Aquadapt (Derceto's pump scheduling optimization software) for two of Derceto's newest clients.

Presentations

Scalable Algorithms for Sparse and Low-Rank Problems.
Presented at: The University of Auckland Engineering Science Seminar Series, October 2020.

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Low-Rank Constraints.
Presented at: INFORMS George Nicholson Competition Finalists Session, November 2020; ORC Student Seminar Series, December 2020.

A Unified Approach to Mixed-Integer Optimization: Nonlinear Formulations and Scalable Algorithms.
Presented at: ICCOPT, August 2019; INFORMS, October 2019; MIT ORC Student Seminar Series, November 2019; MIT LIDS student conference, January 2020; MIP Workshop, May 2020.

A Scalable Algorithm for Sparse Portfolio Selection.
Presented at: INFORMS Annual Meeting, November 2018; ORC 65th anniversary, November 2018 (poster); LIDS student conference, January 2019; MIP Workshop, June 2019 (poster).

Payment Mechanisms and Risk-Aversion in Electricity Markets With Uncertain Supply.
Presented at: ORSNZ, December 2016, EPOC mini workshop, July 2017; ISMP, July 2018.

Professional Activities and Service

2019-20 **ORC Student Seminar Series**, (Inaugural) Coordinator
2019 **INFORMS Annual Meeting**, Session Chair
MIT ORC Qualifying Exam, Tester and Proctor

Peer Review

Referee for: European Journal of Operational Research; IEEE Transactions on Power Systems; INFORMS Journal On Computing; INFORMS Journal on Optimization; Journal on Global Optimization; Omega.

Skills and Activities

Programming: Julia (preferred), R, VBA, SQL, MATLAB, Mathematica, C++, HTML, CSS.
Software: JuMP (preferred), Gurobi (preferred), MOSEK (preferred), CPLEX, most languages/solvers.
Languages: English (native), French (conversational), German (beginner).
Extracurriculars: Skiing, Running, Hiking, Waterpolo.
Citizenship: New Zealand, Ireland.