

Ryan Cory-Wright

PHD CANDIDATE · OPERATIONS RESEARCH CENTER-MIT

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Education

Massachusetts Institute of Technology

Cambridge, MA

PHD IN OPERATIONS RESEARCH

June 2022

Advisor: Dimitris Bertsimas | Thesis: Integer and Matrix Optimization: A Nonlinear Approach

University of Auckland

Auckland, New Zealand

BE (1ST CLASS HONORS) IN ENGINEERING SCIENCE

May 2017

Advisors: Golbon Zakeri, Andy Philpott | Thesis: Pricing Wind Under Uncertainty

Research Interests

Methodological: Analytics, Optimization, Machine Learning, Statistics. Applications: Energy, Finance, Healthcare.

Honors and Awards

- 2021 Finalist, Student Poster Competition, Mixed-Integer Programming Workshop
- 2020 First place, George Nicholson Student Paper Competition, INFORMS
First place, William Pierskalla Paper Award, INFORMS Health Appl. Society
Finalist, Student Poster Competition, Mixed-Integer Programming Workshop
- 2019 First place, ICS Student Paper Award, INFORMS Computing Society
- 2017 Senior Scholar Award (top of graduating class), University of Auckland
- 2016 First place, Young Practitioner's Prize, Operations Research Society New Zealand
- 2014-16 Deans List (top 5% of cohort), Faculty of Engineering, University of Auckland
- 2013 Outstanding Scholar (top 50 high-school students in New Zealand), NZQA

Publications

Solving Large-Scale Sparse PCA to Certifiable (Near) Optimality

with Dimitris Bertsimas, Jean Pauphilet, JMLR, Conditionally Accepted, 2021.

A Scalable Algorithm for Sparse Portfolio Selection

with Dimitris Bertsimas, INFORMS Journal on Computing, Minor Revision, 2021.

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints

with Dimitris Bertsimas, Jean Pauphilet, Operations Research, Accepted, 2021.

- First place, INFORMS George Nicholson Student Paper Competition (2020).
- Finalist, MIP Workshop student poster competition (2021).

A Unified Approach to Mixed-Integer Optimization Problems With Logical Constraints

with Dimitris Bertsimas, Jean Pauphilet, SIAM Journal on Optimization, Accepted, 2021.

- First place, INFORMS Computing Society Student Paper Competition (2019).
- Finalist, MIP Workshop student poster competition (2020).

From Predictions to Prescriptions: A Data-Driven Response to COVID-19

with Dimitris Bertsimas et al., Health Care Management Science, 2021.

- First place, 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.
• First place, Operations Research Society of New Zealand Young Practitioner's Prize (2016).

Articles Under Review

A New Perspective on Low-Rank Optimization
with Dimitris Bertsimas, Jean Pauphilet, under review at Mathematical Programming.

Articles in Preparation

Sparse And Low-Rank Matrix Decomposition: A Discrete Optimization Approach
with Dimitris Bertsimas and Nicholas Johnson, targeted at JMLR (target submission date: August 2021).

Optimizing Solar Panel Capacity Expansion for a Large Industrial Consumer
with Dimitris Bertsimas and Kailyn Bryk, targeted at MSOM (target submission date: January 2022).

Books in Preparation

Integer and Matrix Optimization: A Nonlinear Approach
with Dimitris Bertsimas and Jean Pauphilet, Dynamic Ideas Press, targeted to appear in 2023.

Research Experience

COVID Analytics: Core Team Member Cambridge, MA
PRINCIPAL INVESTIGATOR: DIMITRIS BERTSIMAS 2020

- Lead effort to extract features from COVID-related clinical research papers early in the pandemic, which allowed us to more accurately tune parameters in machine learning tools developed to combat the pandemic.
- Core team awarded the 2020 William Pierskalla INFORMS Health Applications Society paper award for our efforts.
- Material from the effort available at: covidanalytics.io

Operations Research Center-MIT: Research Assistant Cambridge, MA
SUPERVISOR: DIMITRIS BERTSIMAS 2017 - Present

- Developed techniques for solving central problems in OR/ML, 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

15.095 Machine Learning Under a Modern Optimization Lens

MIT

HEAD TEACHING ASSISTANT

Fall 2019, 2021

- TA (co-head in 2019, head in 2021) 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: leading recitations, developing/grading assignments/exams, holding office hours, supervising projects.

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 projects.

15.S60 Computing in Operations Research and Statistics

MIT

SESSION INSTRUCTOR: ADVANCED COMPUTATIONAL OPTIMIZATION

Jan 2019, Jan 2020

- Instructor for 3-hour session which provides PhD students with overview of software tools used in optimization.

15.093 Optimization Methods

MIT

TEACHING ASSISTANT

Fall 2018

- TA for course which provides masters students with overview of main algorithms/applications of optimization.
- Duties: 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 two Master of Business Analytics (MBAN) students, who applied machine learning techniques to predict/prescribe fund flows for a large investment management company.
- Summer 2018 mentees received award for best capstone presentation in graduating class.

OTHER MENTORING

2017-

- Co-advised an undergraduate research assistant over summer 2021.
- Informally mentored several MIT Operations Research Center Masters and PhD students.

Industry Experience

SUEZ Smart Solutions

Auckland, New Zealand

ASSISTANT OPTIMIZATION ENGINEER

2014-2016

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

Selected Invited Talks

High-Dimensional Optimization Over Integers and Matrices.

Presented at: University of Auckland Engineering Science Seminar Series, October 2020.

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Low-Rank Constraints.

Presented at: INFORMS Nicholson Finalists Session, November 2020; ORC Student Seminar Series, December 2020, MIT LIDS & Stats Tea Talks Series, March 2021, IPCO, May 2021 (poster), MIP Workshop, May 2021 (poster).

A Unified Approach to Mixed-Integer Optimization Problems With Logical Constraints.

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 Young Practitioner's Prize Finalists Session, December 2016, ISMP, July 2018.

Professional Activities and Service

- 2019, 21 INFORMS Annual Meeting, Session Chair
- 2020 MIT Business Analytics Capstone Project Matching, Wrote software to allocate 60 masters students to industry projects, accounting for student preferences
- 2019 ORC Student Seminar Series, (Inaugural) Coordinator
- 2019 MIT ORC Qualifying Exam, Tester and Proctor
- 2017- Member, INFORMS (Main, Computing Society, Optimization Society)
Member, Mathematical Optimization Society

Peer Review

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

Skills and Activities

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