# 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
Selected 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

\* Ryan is a primary author on all articles, except where indicated otherwise with an asterisk. Other primary authors are bolded.

*From Predictions to Prescriptions: A Data-Driven Response to COVID-19*
with Dimitris Bertsimas et al., to appear 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, in revision at Operations Research (first decision: major revision).
- 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 Problems With Logical Constraints*
with Dimitris Bertsimas and **Jean Pauphilet**, under review at SIAM J. Optimization (first decision: minor revision).
- 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.

## Articles in Preparation

*A New Perspective on Low-Rank Optimization*
with Dimitris Bertsimas and Jean Pauphilet, targeted at Mathematics of Operations Research (Apr. 2021).

## Books in Preparation

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

## Selected Honors and 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.

## Selected Invited Talks

High-Dimensional Optimization Over Integers and Matrices.
    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 Nicholson Finalists Session, November 2020; ORC Student Seminar Series, December 2020, MIT LIDS Student Conference, January 2021.

Solving Large-Scale Sparse PCA To Certifiable (Near) Optimality.
    Presented at: INFORMS Optimization Society Conference, March 2020 (canceled due to COVID-19).

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.

## Professional Activities and Service

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| 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.