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 | GPA: 5.0/5.0

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 Winner, Student Paper Competition, INFORMS Data Mining Section
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 Applications 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, Accepted, 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, 31(3):2340-2367, 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, 24:253-272, 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

Sparse Plus Low-Rank Matrix Decomposition: A Discrete Optimization Approach
with Dimitris Bertsimas and Nicholas Johnson, under review at JMLR.
- First place, INFORMS Data Mining Section Student Paper Competition (2021)

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

Articles in Preparation

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

INFORMS Teaching Effectiveness Colloquium — *INFORMS*

Participant — *October 2021*

- Participant in an day-long teaching colloquium on best practices in OR/MS/Analytics pedagogy.

Kaufman Teaching Certificate Program — *MIT Teaching and Learning Lab*

Participant — *Fall 2021*

- Participant in an intensive semester long workshop series on teaching best practices.
- Topics include: designing a course, preparing a lesson plan, assessing and providing feedback to students, creating an effective and welcoming classroom climate, among others.

15.095 Machine Learning Under a Modern Optimization Lens — *MIT*

Head Teaching Assistant — *Fall 2019, 2021*

- Head 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: 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, including the Julia language, the JuMP package for optimization, and distributed computing.

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-*

- Advised an undergraduate research assistant over summer 2021, involving meeting daily.
- 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

A New Perspective on Low-Rank Optimization.

Presented at: INFORMS Annual Meeting, October 2021. Session VCM66, Monday Oct 25 11-$12{:}30$ PDT (1 of 4)

& Session TC26 Tuesday Oct 26 11-12:30 PDT (4 of 4).

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), Cornell ORIE Young Researchers Workshop, October 2021 (poster), Imperial College Seminar Series, October 2021 (virtual).

High-Dimensional Optimization Over Integers and Matrices.
Presented at: University of Auckland Engineering Science Seminar Series, October 2020.

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.

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, SIAM Journal on Mathematics of Data Science.

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.

References

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