

# Ryan Cory-Wright

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## Academic Experience

**Imperial College Business School**, Imperial College London  
Assistant Professor of Analytics and Operations

London, UK  
July 2023-

**IBM Research**  
Herman Goldstine Postdoctoral Fellow

Cambridge, MA  
2022-2023

## Education

**Massachusetts Institute of Technology**

Cambridge, MA

PH.D. IN OPERATIONS RESEARCH

May 2022

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

**University of Auckland**

Auckland, New Zealand

B.E. (1ST CLASS HONORS) IN ENGINEERING SCIENCE

May 2017

## Research Interests

Methodological: Analytics, Optimization, Machine Learning, Statistics.

Applications: Energy, Finance, Healthcare.

## Selected Honors and Awards

- 2022 IBM Herman Goldstine Fellowship, IBM Department of Mathematical Sciences
- 2021 First place, Student Paper Competition, INFORMS Data Mining Section
- 2020 First place, George Nicholson Student Paper Competition, INFORMS  
First place, William Pierskalla Paper Award, INFORMS Health Applications Society
- 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

## Publications

*Solving Large-Scale Sparse PCA to Certifiable (Near) Optimality*  
with Dimitris Bertsimas, Jean Pauphilet, Journal of Machine Learning Research, 23(13):1-35, 2022.

*A Scalable Algorithm for Sparse Portfolio Selection*  
with Dimitris Bertsimas, INFORMS Journal on Computing, Articles in Advance, 2022.

*Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints*  
with Dimitris Bertsimas, Jean Pauphilet, Operations Research, Articles in Advance, 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

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- 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 Math. Programming (first decision: major revision).

## Books in Preparation

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

## Research Experience

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- 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 (As TA)

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- 15.095 Machine Learning Under a Modern Optimization Lens** MIT  
**HEAD TEACHING ASSISTANT** Fall 2019, 2021
- Head TA for a course which provides masters/Ph.D. 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.

## 15.093 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.

## Other Teaching Experience

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### 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 included: designing a course, preparing a lesson plan, assessing and providing feedback to students, etc.

## 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 Ph.D. students with overview of software tools used in optimization, including the Julia language, the JuMP package for optimization, and distributed computing.

## 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 (/30 teams).

## Industry Experience

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### 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.
- Assisted with installing Aquadapt (SUEZ's pump scheduling optimization software) for two of SUEZ's newest clients.

## Selected Invited Talks

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### A New Perspective on Low-Rank Optimization

ICCOPT, July 2022; INFORMS Optimization Society, March 2022; INFORMS, October 2021.

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

Rice CAAM, January 2022; CMU Tepper OR, January 2022; USC Viterbi ISE, January 2022; Georgia Tech ISyE, January 2022; Johns Hopkins Carey OM, January 2022; Princeton ORFE, January 2022; Imperial College London Analytics and Operations, October 2021; MIT LIDS & Stats Tea, March 2021; MIT ORC Student, December 2020; INFORMS Nicholson, November 2020; University of Auckland Engineering Science, October 2020.

### Solving Large-Scale Sparse PCA To Certifiable (Near) Optimality

Guest lecture for MIT Class 15.095 Machine Learning Under a Modern Optimization Lens, November 2021

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

MIP Workshop, May 2020; INFORMS, October 2019; ICCOPT, August 2019.

### A Scalable Algorithm for Sparse Portfolio Selection

INFORMS, November 2018.

### Payment Mechanisms and Risk-Aversion in Electricity Markets With Uncertain Supply

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

## Professional Activities and Service

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- 2022    INFORMS Optimization Society Meeting, Session Chair
- 2019, 21    INFORMS Annual Meeting, Session Chair
- 2019    ORC Student Seminar Series, Coordinator
- 2017-    Member, INFORMS (Society, Computing Society, Optimization Society)  
          Member, Mathematical Optimization Society

## Peer Review \_\_\_\_\_

### **Reviewer**

*Operations Research, INFORMS Journal On Computing, INFORMS Journal on Optimization, Mathematics of Operations Research, SIAM Journal on Mathematics of Data Science, European Journal of Operational Research, IEEE Transactions on Power Systems, Journal of Global Optimization, and 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).

Citizenship: New Zealand, Ireland.