Ryan Cory-Wright

r.cory-wright@imperial.ac.uk | ryancorywright.github.io | ryancorywright

Academic Appointments

Imperial College Business School, Imperial College London — *London, UK*
Assistant Professor of Analytics and Operations | Affiliated with Imperial-X — *July 2023-*

IBM Research — *Cambridge, MA*
Herman Goldstine Postdoctoral Fellow — *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: Optimization, Machine Learning, Statistics. Applications: Energy, Finance.

Selected Honors and Awards

2023 Finalist, Practice-Based Research Competition, M&SOM
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

9. *A New Perspective on Low-Rank Optimization*
with Dimitris Bertsimas and Jean Pauphilet, Mathematical Programming, 2023.

8. *Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints*
with Dimitris Bertsimas, Jean Pauphilet, Operations Research, 70(6):3321–3344, 2022.
   - First place, INFORMS George Nicholson Student Paper Competition (2020).

7. *A Scalable Algorithm for Sparse Portfolio Selection*
with Dimitris Bertsimas, INFORMS Journal on Computing, 34(3):1489-1511, 2022.

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

5. *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).
   - Abridged eight-page version features in the 2020 INFORMS Computing Society Newsletter.

4. *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).
3. *On Stochastic Auctions in Risk-Averse Electricity Markets With Uncertain Supply*
   with Golbon Zakeri, Operations Research Letters, 48(3):376-384, 2020.
2. *On Polyhedral and Second-Order Cone Decompositions of Semidefinite Optimization Problems*
   with Dimitris Bertsimas, Operations Research Letters. 48(1):78-85, 2020.
1. *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

6. *Gain Confidence, Reduce Disappointment: A New Approach to Cross-Validation for Sparse Regression*
   with Andrés Gómez, submitted.
5. *Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions*
   with Dimitris Bertsimas, Sean Lo, and Jean Pauphilet, submitted.
4. *Sparse PCA With Multiple Components*
   with Jean Pauphilet, submitted.
3. *A Stochastic Benders Decomposition Scheme for Large-Scale Data-Driven Network Design*
   with Dimitris Bertsimas, Jean Pauphilet, and Periklis Petridis, major revision at IJOC.
2. *Decarbonizing OCP*
   with Dimitris Bertsimas and Vassilis Digalakis Jr., major revision at M&SOM.
   - Finalist, M&SOM practice-based research competition (2023)
   - Honorable mention, MIT Operations Research Center Student Paper Competition (Digalakis, 2023)
1. *Sparse Plus Low-Rank Matrix Decomposition: A Discrete Optimization Approach*
   with Dimitris Bertsimas and Nicholas Johnson, reject & resubmit at JMLR.
   - First place, INFORMS Data Mining Section Student Paper Competition (2021)

Articles in Preparation

1. *AI Hilbert: From Data and Background Knowledge to Automated Scientific Discovery via Polynomial Optimization*
   with Bachir El Khadir, Cristina Cornelio, Sanjeeb Dash, and Lior Horesh, soon to be submitted.

Books in Preparation

Integer and Matrix Optimization: A Nonlinear Approach
with Dimitris Bertsimas and Jean Pauphilet, Dynamic Ideas Press.

Teaching (As PhD Candidate)

15.095 Machine Learning Under a Modern Optimization Lens — *MIT*
Head Teaching Assistant — *Fall 2019, 2021*

Kaufman Teaching Certificate Program — *MIT Teaching and Learning Lab*
Participant in Eight Practice-Based Workshops on Teaching Effectiveness — *Fall 2021*

15.071 The Analytics Edge — *MIT*
Head Teaching Assistant — *Fall 2020*

15.S60 Computing in Optimization and Statistics — *MIT*
Instructor — *Jan 2019, Jan 2020*

15.093 Optimization Methods — *MIT*
Teaching Assistant — *Fall 2018*

15.089 Master of Business Analytics Capstone — *MIT*
Capstone Project Mentor — *Summer 2018, Summer 2019*

Student Advising

- Co-author: Sean Lo, PhD Candidate in Operations Research, MIT
- Co-author: Periklis Petridis, PhD Candidate in Operations Research, MIT
- Co-author: Nicholas Johnson, PhD Candidate in Operations Research, MIT

Presentations

Presentations at Academic Institutions

A New Perspective on Low-Rank Optimization
Lehigh ISE, November 2022.

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints
IBM TJ Watson Research Center, August 2022; 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; University of Auckland Engineering Science, October 2020.

Presentations at Invited Workshops

Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions
MIP Workshop, May 2023.

Conference Presentations and Guest Lectures

Decarbonizing OCP
MSOM Practice-Based Research Finalists, June 2023.

Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions
INFORMS, October 2023; SIAM Conference on Optimization, June 2023

Sparse PCA With Multiple Components
INFORMS, October 2022.

A New Perspective on Low-Rank Optimization
ICCOPT, July 2022; IOS, March 2022; INFORMS, October 2021.

Mixed-Projection Conic Optimization: A New Paradigm for Modeling Low-Rank Constraints
INFORMS Nicholson Finalists, November 2020.

Solving Large-Scale Sparse PCA To Certifiable (Near) Optimality
Guest Lecture for MIT Class 15.095, November 2021; IOS, March 2020 (canceled, COVID-19).

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

Industry Experience

SUEZ Smart Solutions — *Auckland, New Zealand*
Assistant Optimization Engineer — *2014-2016*

Selected External Activities and Service

2023	SIAM Conference on Optimization, Mini-Symposium Organizer
2022	INFORMS Optimization Society Meeting, Session Chair
2019, 21, 23	INFORMS Annual Meeting, Session Chair
2019	ORC Student Seminar Series, Coordinator
2017-	Member, INFORMS (Main Body, Computing Society, Optimization Society)
	Member, Mathematical Optimization Society

Peer Review

Ad-Hoc Journal Referee

Operations Research, Management Science, Manufacturing and Service Operations Management, Mathematics of Operations Research, Foundations of Computational Mathematics, INFORMS Journal On Computing, INFORMS Journal on Optimization, SIAM Journal on Optimization, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Mathematics of Data Science, European Journal of Operational Research, IEEE Transactions on Power Systems, Journal of Global Optimization, Journal of Optimization Theory and Applications, and Omega.