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 — *2023-*

MIT-IBM Research Lab, IBM Research — *Cambridge, MA*
Herman Goldstine Postdoctoral Fellow — *2022-2023*

Education

Massachusetts Institute of Technology — *Cambridge, MA*
Ph.D. in Operations Research — *2017-2022*
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 — *2014-2016*

Research Interests

Methodological: Optimization (Integer, Semidefinite, Conic, Under Uncertainty), Machine Learning (Interpretability, Scientific Discovery), Statistics (Cross-Validation, High-Dimensional, Rank Constraints, Sparsity Constraints)
Applications: Business Analytics, Energy (Decarbonization, Pricing Schemes), Finance

Selected Honors and Awards

2023 IBM 2023 Accomplishment Award, IBM Department of Mathematical Sciences
Finalist, Practice-Based Research Competition, M&SOM Society
2022 IBM Herman Goldstine Fellowship, IBM Department of Mathematical Sciences
2021 First place, Student Paper Competition, INFORMS Data Mining Society
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
2013 Outstanding Scholar (top 50 high-school students in New Zealand), NZQA

Working Papers

5. *Gain Confidence, Reduce Disappointment: A New Approach to Cross-Validation for Sparse Regression*
R. Cory-Wright and A. Gómez, submitted.

4. *Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions*
D. Bertsimas, R. Cory-Wright, S. Lo and J. Pauphilet, submitted.

3. *Sparse PCA With Multiple Components*
R. Cory-Wright and J. Pauphilet, submitted.

2. *AI Hilbert: A New Paradigm for Scientific Discovery by Unifying Data and Background Knowledge*
R. Cory-Wright, B. El Khadir, C. Cornelio, S. Dash and L. Horesh, revision at **Nature Communications**.
   - IBM Research Accomplishment Award (2023).

1. *A Stochastic Benders Decomposition Scheme for Large-Scale Data-Driven Network Design*
   D. Bertsimas, R. Cory-Wright, J. Pauphilet and P. Petridis, major revision at **INFORMS Journal on Computing**.

Journal Papers

11. *Decarbonizing OCP*
    D. Bertsimas, R. Cory-Wright and V. Digalakis Jr., **Manufacturing & Service Operations Management**, 2023+.
    - Finalist, M&SOM practice-based research competition (2023)
    - Honorable mention, MIT Operations Research Center Student Paper Competition (Digalakis, 2023)

10. *Sparse Plus Low-Rank Matrix Decomposition: A Discrete Optimization Approach*
    D. Bertsimas, R. Cory-Wright and N. A. G. Johnson, **Journal of Machine Learning Research**, 24(267):1–51, 2023.
    - First place, INFORMS Data Mining Society Student Paper Competition (2021)

9. *A New Perspective on Low-Rank Optimization*
   D. Bertsimas, R. Cory-Wright and J. Pauphilet, **Mathematical Programming**, 202(1-2):47–92, 2023.

8. *Mixed-Projection Conic Optimization: A New Paradigm for Modeling Rank Constraints*
   D. Bertsimas, R. Cory-Wright and J. 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*
   D. Bertsimas and R. Cory-Wright, **INFORMS Journal on Computing**, 34(3):1489-1511, 2022.

6. *Solving Large-Scale Sparse PCA to Certifiable (Near) Optimality*
   D. Bertsimas, R. Cory-Wright and J. Pauphilet, **Journal of Machine Learning Research**, 23(13):1-35, 2022.

5. *A Unified Approach to Mixed-Integer Optimization Problems With Logical Constraints*
   D. Bertsimas, R. Cory-Wright and J. 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*
   D. Bertsimas, L. Bouissoux, R. Cory-Wright 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*
   R. Cory-Wright and G. Zakeri, **Operations Research Letters**, 48(3):376-384, 2020.

2. *On Polyhedral and Second-Order Cone Decompositions of Semidefinite Optimization Problems*
   D. Bertsimas and R. Cory-Wright, **Operations Research Letters**, 48(1):78-85, 2020.

1. *Payment Mechanisms for Electricity Markets With Uncertain Supply*
   R. Cory-Wright, A. Philpott and G. Zakeri, **Operations Research Letters**, 46(1):116-121, 2018.
   - First place, Operations Research Society of New Zealand Young Practitioner's Prize (2016).
   - Preliminary version entitled "Cost-recovering, revenue-adequate single settlement schemes for electricity markets" appeared in Proceedings of the 2016 Joint NZSA and ORSNZ conference.

Books in Preparation

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

Teaching

Introduction to Machine Learning in Python (Masters of AI Class) — *Imperial-X, Autumn 2024 (scheduled)*

Decision Making Under Uncertainty (MRes/PhD Class) — *Imperial Business School, Spring 2024*

Data Structures and Algorithms (Undergraduate Class) — *Imperial Business School, Spring 2024*

Optimisation and Decision Models (MSc Business Analytics) — *Imperial Business School, Spring 2024*

Teaching prior to Imperial

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

- Lingjun Meng, Imperial Business School MRes candidate
  - Co-advisor (co-advisor: W. Wiesemann)
- Nicholas Johnson, MIT ORC PhD Candidate
  - Co-author (advisor: D. Bertsimas)
- Periklis Petridis, MIT ORC PhD Candidate
  - Co-author (advisor: D. Bertsimas)
- Vassilis Digalakis Jr., MIT ORC PhD, grad. in 2023
  - Co-authored job market paper (advisor: D. Bertsimas).
  - Initial placement: Assistant Professor of Operations Management, HEC Paris.
- Sean Lo, MIT Sloan MBAn, grad. in 2022
  - Co-author (MBAn advisor: D. Bertsimas)
  - Initial placement: MIT Operations Research Center PhD program

Presentations

Presentations at Academic Institutions

Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions
Toronto Rotman Young Scholar's Seminar Series, November 2023; Imperial College London Control and Optimization, November 2023.

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 Single-Track 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
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

2024	London Operations Research Day, Co-Organizer
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, Computing Society, Optimization Society)
	Member, Mathematical Optimization Society

Peer Review

Ad-Hoc Journal Referee

Operations Research, Management Science, Manufacturing and Service Operations Management, Journal of Machine Learning Research, 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, and other journals.

Ad-Hoc Conference Referee

Integer Programming and Combinatorial Optimization (IPCO)