Ryan Cory-Wright

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Academic Appointments

Imperial College London, Imperial College Business School — *London, UK*
Assistant Professor of Analytics and Operations — *Jul. 2023-present*
Affiliated Faculty, Imperial-X AI Initiative — *Jul. 2023-present*

IBM Research — *Cambridge, MA*
Herman Goldstine Postdoctoral Fellow — *Jul. 2022-Jun. 2023*

Education

Massachusetts Institute of Technology, Operations Research Center — *Cambridge, MA*
Ph.D. in Operations Research — *Sept. 2017-May. 2022*
Advisor: Dimitris Bertsimas
Thesis: Integer and matrix optimization: A nonlinear approach [link to 5-page summary] | GPA: 5.0/5.0

University of Auckland, Faculty of Engineering — *Auckland, New Zealand*
B.E. (1st Class Honors) in Engineering Science — *Feb. 2014-Oct. 2016*
Four-year degree completed in three years via accelerated pathway (extra class per semester)
Thesis: Pricing wind under uncertainty | Senior Scholar Award (top of cohort)

Research Interests

- Optimization: integer, semidefinite, conic, polynomial, under uncertainty, data-driven
- Machine learning and statistics: interpretability, scientific discovery, cross-validation, low-rank
- Applications: business analytics, energy (decarbonization, pricing schemes), finance

Honors and Awards

Note: * denotes student paper award won by collaborator for coauthored work

2024 Finalist, **INFORMS DMDA Paper Award**, Theoretical Track
2024 **Meritorious Reviewer Award**, INFORMS Journal on Computing
2024 **Outstanding Technical Accomplishment Award**, IBM Research
2023 Honorable Mention, **Student Paper Award**, MIT ORC (Digalakis Jr.*)
2023 Finalist, **Practice-Based Research Competition**, M&SOM Society
2022 **A. E. Grant Poster Award for Best Algorithm**, CAARMS (Johnson*)
2022 **IBM Herman Goldstine Fellowship**, IBM Department of Mathematical Sciences
2021 First place, **Student Paper Award**, INFORMS Data Mining Society
2020 First place, **Nicholson Student Paper Award**, INFORMS
2020 First place, **Pierskalla Paper Award**, INFORMS Health Applications Society
2019 First place, **Student Paper Award**, INFORMS Computing Society
2017 **Senior Scholar Award** (top of cohort), University of Auckland
2016 First place, **Student Paper Award**, Operations Research Society New Zealand
2014-16 **Dean's List** (top 5% of cohort), Faculty of Engineering, University of Auckland
2013 **Outstanding Scholar** (top 50 high-school students in New Zealand), NZQA

Journal Papers

J13. *A Stochastic Benders Decomposition Scheme for Large-Scale Stochastic Network Design*
D. Bertsimas, **R. Cory-Wright**, J. Pauphilet and P. Petridis, minor revision at **INFORMS Journal on Computing**.

J12. *Evolving Scientific Discovery by Unifying Data and Background Knowledge with AI Hilbert*
R. Cory-Wright, C. Cornelio, S. Dash, B. El Khadir, and L. Horesh, **Nature Communications** 15:5922, 2024.
- **IBM Outstanding Technical Accomplishment Award (2024)**

- Featured in IBM Research blog "Meet AI Hilbert, a new algorithm for transforming scientific discovery" [link]

J11. *Decarbonizing OCP*
D. Bertsimas, **R. Cory-Wright** and V. Digalakis Jr., **Manufacturing & Service Operations Management**, 2024.
- **Finalist, M&SOM practice-based research competition (2023)**
- **Honorable mention, MIT Operations Research Center Student Paper Award (Digalakis, 2023)**
- Featured in Imperial Business news article "Optimising renewables: a model for profitable decarbonisation" [link]

J10. *Sparse Plus Low-Rank Matrix Decomposition: A Discrete Optimization Approach*
D. Bertsimas, **R. Cory-Wright**, N. A. G. Johnson, **Journal of Machine Learning Research**, 24(267):1–51, 2023.
- **First place, INFORMS Data Mining Society Student Paper Award (2021)**
- **A. E. Grant Poster Award for Best Algorithm, CAARMS (Johnson, 2022)**

J9. *A New Perspective on Low-Rank Optimization*
D. Bertsimas, **R. Cory-Wright** and J. Pauphilet, **Mathematical Programming**, 202(1-2):47–92, 2023.

J8. *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 Award (2020)**

J7. *A Scalable Algorithm for Sparse Portfolio Selection*
D. Bertsimas and **R. Cory-Wright**, **INFORMS Journal on Computing**, 34(3):1489-1511, 2022.

J6. *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.

J5. *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 Award (2019)**

J4. *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 Paper Award (2020)**

J3. *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.

J2. *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.

J1. *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 Student Paper Award (2016)**

Working Papers

W3. *Stability-Adjusted Cross-Validation for Sparse Linear Regression*
R. Cory-Wright and A. Gómez, in preparation, draft available at arXiv 2306.14851.

W2. *Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions*
D. Bertsimas, **R. Cory-Wright**, S. Lo and J. Pauphilet, submitted.

W1. *Sparse PCA With Multiple Components*
R. Cory-Wright and J. Pauphilet, major revision at **Operations Research**.
- **Finalist, INFORMS DMDA Workshop Paper Award (Theoretical Track, 2024)**

Articles in Preparation

P4. *Thinking Coherently About Interpretability*
R. Cory-Wright and A. Jacquillat, in progress.

P3. *Semidefinite Programming Relaxation for Copositive Dual Pricing*
C. Guo, B. Yang, and **R. Cory-Wright**, in progress.

P2. *A Scalable Approximation Algorithm for Distributionally Robust Optimization*
L. Meng, **R. Cory-Wright**, and W. Wiesemann, in progress.

P1. *A Matrix Generalization of the Goemans-Williamson Algorithm With Application to Orthogonality Constraints*
R. Cory-Wright and J. Pauphilet, in progress.

Books in Preparation

B1. *Integer and Matrix Optimization: A Nonlinear Approach*
D. Bertsimas, **R. Cory-Wright**, and J. Pauphilet, in preparation.

Teaching

Imperial

Introduction to Machine Learning in Python (MSc AI Applications and Innovation) — *Imperial-X*
Course Creator and Instructor — *Fall 2024*

Decision Making Under Uncertainty (PhD) — *Imperial Business School*
Course Creator and Instructor — *Spring 2024, 2025*

Data Structures and Algorithms (undergraduate) — *Imperial Business School*
Course Creator and Instructor — *Spring 2024, 2025*

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

MIT

15.095 Machine Learning Under a Modern Optimization Lens (MBAn/PhD) — *MIT*
Head Teaching Assistant — *Fall 2019, 2021*

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

15.093 Optimization Methods (MSc/PhD) — *MIT*
Teaching Assistant — *Fall 2018*

Kaufman Teaching Certificate Program — *MIT Teaching and Learning Lab*
Participant, eight practice-based workshops on teaching effectiveness — *Fall 2021*

Student Advising

Doctoral Students

1. Lingjun Meng, *Second year PhD student at Imperial Business School* (co-advised with Wolfram Wiesemann, research on optimization under uncertainty).

Oral Presentations

Invited Presentations at Academic Institutions and Single-Track Workshops

Title TBD
- IBM TJ Watson Research Center — *October 2024*

Evolving Scientific Discovery by Unifying Data and Background Knowledge with AI Hilbert
- Summer Workshop on Innovations in Management Science — *July 2024*

Optimal Low-Rank Matrix Completion: Semidefinite Relaxations and Eigenvector Disjunctions
- Imperial-X AI Seminar Series — *November 2024*
- Toronto Rotman Young Scholar's Seminar Series — *November 2023*
- Imperial College London Control and Optimization — *November 2023*
- Mixed Integer Programming Workshop — *May 2023*

A New Perspective on Low-Rank Optimization

- Lehigh Industrial and Systems Engineering *November 2022*

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

- IBM Thomas J Watson Research Center *August 2022*
- Rice Computational Applied Mathematics and Operations Research *January 2022*
- CMU Tepper Operations Research *January 2022*
- USC Viterbi Industrial and Systems Engineering *January 2022*
- Georgia Tech Industrial and Systems Engineering *January 2022*
- Johns Hopkins Carey Operations Management *January 2022*
- Princeton Operations Research and Financial Engineering *January 2022*
- Imperial College London Analytics and Operations *October 2021*
- University of Auckland Engineering Science *October 2020*

Invited Presentations at Companies

The Future of Artificial Intelligence

- South Port New Zealand Board of Directors Meeting *September 2024*

Other Academic and Industry Experience

University of Auckland, Department of Engineering Science *Auckland, New Zealand*
Research Assistant *Dec. 2016-Jul. 17*

SUEZ Smart Solutions *Auckland, New Zealand*
Assistant Optimization Engineer *Dec. 2014-Feb. 2016*

Activities and Service

Organizing seminars and workshops

2024- Co-organizer, London Operations Research Day (LORD) [web link],
2019- Session chair, INFORMS Annual Meeting, ICCOPT, IOS, SIOPT, other conferences
2019 Co-organizer, MIT ORC student seminar series

External

2024 Judge, M&SOM Student Paper Competition,
2017- Member, INFORMS (Main, Computing Society, Optimization Society)
Member, Mathematical Optimization Society

Imperial

2024- Program co-lead, Imperial-X executive education,
2024 PhD early stage assessment committee, Zhongze Cai
2024 PhD early stage assessment committee, Yanwei Sun

Peer Review

Reviewer for academic journals: *Operations Research (OR), Management Science (MS), Manufacturing and Service Operations Management (M&SOM), Mathematical Programming (MAPR), Journal of Machine Learning Research (JMLR), Mathematics of Operations Research (MOOR), Integer Programming and Combinatorial Optimization (IPCO), Foundations of Computational Mathematics (FOCM), INFORMS Journal On Computing (IJOC), INFORMS Journal on Optimization (IJOO), SIAM Journal on Optimization (SIOPT), Transportation Science (TS), SIAM Journal on Matrix Analysis and Applications (SIMAX), SIAM Journal on Mathematics of Data Science (SIMODS), Operations Research Letters (ORL), European Journal of Operational Research (EJOR), etc.*

- 2024 Meritorious Reviewer Award, INFORMS Journal on Computing.