

# 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

**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)

## 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 First place, **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, **INFORMS Journal on Computing**, accepted.
- 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

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- W3. *Stability-Adjusted Cross-Validation for Sparse Linear Regression*  
**R. Cory-Wright** and A. Gómez, submitted.
- 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**.  
  - First place, INFORMS DMDA Workshop Paper Award (Theoretical Track, 2024)

## Articles in Preparation

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- 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

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

## Teaching

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### IMPERIAL

Introduction to Machine Learning in Python (MSc AI Applications and Innovation)  
COURSE CREATOR AND INSTRUCTOR

*Imperial-X*  
*Fall 2024*

Decision Making Under Uncertainty (PhD)  
COURSE CREATOR AND INSTRUCTOR

*Imperial Business School*  
*Spring 2024, 2025*

Data Structures and Algorithms (undergraduate)  
COURSE CREATOR AND INSTRUCTOR

*Imperial Business School*  
*Spring 2024, 2025*

Optimisation and Decision Models (Online MSc Business Analytics)  
INSTRUCTOR

*Imperial Business School*  
*Spring 2024*

### MIT

15.095 Machine Learning Under a Modern Optimization Lens (MBAn/PhD)  
HEAD TEACHING ASSISTANT

*MIT*  
*Fall 2019, 2021*

15.071 The Analytics Edge (MBA)  
HEAD TEACHING ASSISTANT

*MIT*  
*Fall 2020*

15.093 Optimization Methods (MSc/PhD)  
TEACHING ASSISTANT

*MIT*  
*Fall 2018*

Kaufman Teaching Certificate Program  
PARTICIPANT, eight practice-based workshops on teaching effectiveness

*MIT Teaching and Learning Lab*  
*Fall 2021*

## Student Advising

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### 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

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### INVITED PRESENTATIONS AT ACADEMIC INSTITUTIONS AND SINGLE-TRACK WORKSHOPS

*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
- Toronto Rotman Young Scholar's Seminar Series
- Imperial College London Control and Optimization
- Mixed Integer Programming Workshop

*November 2024*

*November 2023*

*November 2023*

*May 2023*

*A New Perspective on Low-Rank Optimization*

- IBM TJ Watson Research Center
- Lehigh Industrial and Systems Engineering

October 2024  
November 2022

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

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

August 2022  
January 2022  
January 2022  
January 2022  
January 2022  
January 2022  
January 2022  
October 2021  
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  
RESEARCH ASSISTANT

Auckland, New Zealand  
Dec. 2016-Jul. 17

SUEZ Smart Solutions  
ASSISTANT OPTIMIZATION ENGINEER

Auckland, New Zealand  
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 (IJO)*, *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.