Kai R. D. Cooper

PhD Student · Operations, Information and Decisions Department

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Education

The Wharton School of the University of Pennsylvania — *Philadelphia, PA*

Ph.D. Operations, Information and Decisions — *2023 - present*

- Advisor: Dr. Dean Knox

Imperial College London — *London, UK*

MSci Mathematics — *2019-2023*

- Classification: First Class

École Polytéchnique fédérale de Lausanne (EPFL) — *Lausanne, Switzerland*

Exchange Year in Mathematics — *2021-2022*

Publications

In Preparation

† *Authors listed alphabetically*.

Cooper, K. R. D., Ma, L., Graham, D. J. Quantifying the causal effects of major engineering interventions using a temporal regression discontinuity design: Air quality impacts of the Elizabeth Line in London. *Submitted to the Annals of Applied Statistics*.

Cooper, K. R. D., Lanzalotto, G., Ge, H., Kaplan, J., Desposato, S., Knox, D., Mummolo, J. A Principled Approach to Benchmarking in Studies of Racial Discrimination in Traffic Enforcement.

Cooper, K. R. D., Duarte, G., Keele, L., Knox, D., Mummolo, J. Learning From Imperfect Identification Strategies: Automating Causal Inference When Assumptions Fail.†

Awards, Grants & Achievements

2024 **Wharton Doctoral Travel Grant**, The Wharton School — *$ 600*

2023 **Derek Moore Prize**, Imperial Mathematics. *Awarded to a final year UG student for excellence in applied mathematics or mathematical physics*.

2021 **Winton Capital Award**, Imperial Mathematics. *Awarded to second year UG students for the best group project paper and presentation*.

Presentations

Contributed Presentations

"Using Causal Inference to Unmask Racial Discrimination in Traffic Enforcement via Proxies". Poster. Foundations of Causal Inference Workshop, Isaac Newton Institute, January 2026, Cambridge, United Kingdom.

"Using Causal Inference to Unmask Racial Discrimination in Traffic Enforcement via Proxies". Oral. University of Washington Causal Reading Group, November 2025, Seattle, WA (Zoom).

"Learning From Imperfect Identification Strategies: Automating Causal Inference When Assumptions Fail." Oral and Interactive Workshop. Data Science Frontiers (Society and Politics) Conference, NYU, October 2025, New York, NY.

"Did the Elizabeth Line Improve Air Quality in London? A Causal Study with a Temporal Regression Discontinuity Design". Oral. Joint Statistical Meetings, August 2025, Nashville, TN.

"Using Causal Inference to Unmask Racial Discrimination in Traffic Enforcement via Proxies". Oral. 11th International Conference on Computational Social Science, July 2025, Norrköping, Sweden.

"Using Causal Inference to Unmask Racial Discrimination in Traffic Enforcement via Proxies". Poster. American Causal Inference Conference, May 2025, Detroit, MI.

"Synthesis of Ingram Olkin Forum on Statistical Challenges in the Analysis of Police Use of Force". Oral. Joint Statistical Meetings, August 2024, Portland, OR.

Teaching Experience

Spring '26	**OIDD(4/7)770 Introduction to Python for Data Science**, Head TA	*Wharton*
Spring '25	**OIDD7770 Introduction to Python for Data Science**, Teaching Assistant	*Wharton*
AY '22-'23	**Imperial Mathematics Year 1**, Peer Tutor	*Imperial*
Autumn '22	**MATH-352 Causal Thinking**, Teaching Assistant	*EPFL*

Mentoring

2022-present	**Riyaadh Gani**, High School Student, Johannesburg, South Africa. Currently an undergraduate at University College London in Robotics and AI.
2022-present	**Ruhan**, High School Student, London, UK. Currently an undergraduate student in Mathematics at Imperial College London.
2022-2025	**Iraklis Kantzelis**, High School Student, Milan, Italy. Currently an undergraduate at UCLA in Applied Mathematics and Economics.

Outreach & Professional Development

Service and Outreach

2021 - 2024	**Zero Gravity**, Volunteer Mentor. Guide first-generation students to attend university through the process and initial stages upon embarking on that journey.	*Remote*

Professional Memberships

Member. Society for Causal Inference.
e-Student Member. Royal Statistical Society.

Prior Work Experience

Crimson Education *Remote*
Independent Tutor; Mentor *Aug 2021 - Aug 2024*

- Designed online tutoring lessons for international students aiming for top UK and US institutions.
- Developed a suite of entry exam (MAT) questions to be used across the Crimson platform for students applying to Oxford, Imperial or Warwick Mathematics.
- Created tailored resources using LaTeX, R and Python for personalised learning and supercurricular exploration.
- Destinations of my former students include: Stanford, UCL, LSE and UCLA.

Covéa Insurance *West Malling, Kent, UK*
Life Actuarial Intern *July 2022 - Sep 2022*

- Analysed insurance quotes data in R, producing a report and a presentation on its focal points and shortcomings.
- Automated reserving calculations, experience analyses, budgeting and catastrophic claims analysis in Excel.

His Majesty's Ministry of Defence, Imperial College London *London, UK*
Undergraduate Research Assistant, with Dr Andrew Duncan *July 2021 - Sep 2021*

- Adapted shape-constrained additive models, to predict probabilities in the data-sparse lower tail of a binary testing experiment.
- Conducted intensive simulations in `R`, applying the packages `mgcv`, `scam`, and `mlrMBO`, as well as the Bayesian inference software Stan.
- Engaged in a regular feedback–improvement loop with the client in my role as a consultant.

Global PE Alliance *Remote, UK*
Private Equity Intern *Apr 2021 - Jun 2021*

- Researched investment strategies, such as impact investing, producing a written report and presentation.
- Progressed the firm's digital maturity by evaluating the corresponding performance of their competitors.
- Managed younger interns to build character and deliver projects in a team.

Bartley Green School *Birmingham, UK*
Volunteer Teaching Assistant *Jan 2018 – Mar 2019*

- Assisted in the delivery of science lessons to groups of twenty high-school students or more.
- Planned and delivered one-hour lessons to groups of thirty students.
- Delivered revision sessions to smaller groups to boost attainment.

Skills & Interests

Languages English (Native), French (Upper Intermediate: B2 Level; last evaluated 2021).
Computer MS Office; Python, R, MATLAB, LaTeX.
Sport Badminton, soccer.
Hobbies Reading and watching dystopian sci-fi, cooking, teaching