Edwin Lock

Research Fellow Nuffield College, University of Oxford

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Research areas

Algorithmic Game Theory, Algorithmic Design, Societal Computing

Employment

2021-present Non-Stipendiary Research Fellow, Nuffield College, University of Oxford.
2021-present Postdoctoral researcher, University of Oxford.

Education

- 2017–2022 **DPhil in Computer Science**, *University of Oxford*. Advisor: Paul W. Goldberg
- 2016–2017 MSc in Mathematics and Foundations of Computer Science, University of Oxford, Distinction.

Thesis: "Analysing and optimising kidney paired donation markets"

2013-2016 **BSc in Mathematics**, *FernUniversität in Hagen*, Germany, **First-class honours**. Thesis: "On characterising g_B-game perfect graphs"

Publications

- 2023 S Finster, PW Goldberg, and E Lock. *Substitutes markets with budget constraints: solving for competitive and optimal prices.* 19th Conference on Web and Internet Economics (WINE'23). https://arxiv.org/abs/2310.03692
- 2023 E Baldwin, PW Goldberg, P Klemperer, E Lock. *Solving Strong-Substitutes Product-Mix Auctions.* Mathematics of Operations Research. https://doi.org/10.1287/moor.2019.0248
- 2023 S Finster, M González Amador, E Lock, F Marmolejo Cossío, E Micha, A D Procaccia. *Welfare-Maximizing Pooled Testing.* 24th ACM Conference on Economics and Computation (EC'23). https://doi.org/10.1145/3580507.3597709
- 2022 PW Goldberg, E Lock and F Marmolejo-Cossío. *Learning Strong Substitutes Demand via Queries.* ACM Transactions on Economics and Computation. https://doi.org/10.1145/3546604
- 2021 L Benavides-Vázquez, H A Guzmán-Gutiérrez, J Jonnerby, P Lazos, E Lock, F J Marmolejo-Cossío, N Rajgopal and J R Tello-Ayala. *Optimal Testing and Containment Strategies for Universities in Mexico amid COVID-19.* 1st ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO'21). https://doi.org/10.1145/3465416.3483300
- 2020 PW Goldberg, E Lock and F Marmolejo-Cossío. *Learning Strong Substitutes Demand via Queries.* 16th Conference on Web and Internet Economics (WINE'20). https://doi.org/10.1007/978-3-030-64946-3_28
- 2020 J Jonnerby, P Lazos, E Lock, F Marmolejo-Cossío, CB Ramsey and D Sridhar. *Test and Contain: A Resource-Optimal Testing Strategy for COVID-19.* AI for Social Good 2020, Harvard CRCS Workshop.
- 2019 SD Andres and E Lock. *Characterising and Recognising Game-Perfect Graphs*. Discrete Mathematics and Theoretical Computer Science, 21(6), 2019. https://doi.org/10.23638/ DMTCS-21-1-6
- pre-print J Jonnerby, P Lazos, E Lock, F Marmolejo-Cossío, CB Ramsey, M Shukla, D Sridhar. *Maximising the Benefits of an Acutely Limited Number of COVID-19 Tests*. https://arxiv.org/ abs/2004.13650

Working papers

E Baldwin, P Klemperer, E Lock. *The Language of Product-Mix Auctions.* E Lock, Z Qiu, A Teytelboym. *The Computational Complexity of the Housing Market.* PW Goldberg, E Lock. *Decentralised Trading on Networks.*

Teaching

- 2020-2022 **Stipendiary lecturer**, *Balliol College*, *University of Oxford*. Taught undergraduate computer science students in first- and second-year undergraduate courses. Assisted with the admission of undergraduate students in Computer Science to Balliol College. Set and marked College collections.
- 2019-2022 **College tutor**, *University of Oxford*. Conducted one-to-one teaching of undergraduates in Computer Science and Mathematics in a tutorial setting.
- 2018-2021 **Departmental teacher**, *Department of Computer Science, University of Oxford*. Classroom teaching for the computational complexity course. Supervised and demonstrated practicals accompanying various lecture courses.
- April, 2019 **Organiser and tutor**, *Dr. HN Science Centre*, Gauribidanur, India. Organised, ran and taught at a science workshop in rural India. Introduced approx. 200 students to scientific techniques, provided hands-on experience with scientific equipment and familiarised students with cutting-edge research topics.

Supervision

- 2022-2023 **MSc thesis supervision** of two students. Both received distinction.
- 2021-2022 **Postdoctoral supervision** of research associate hired under ACM GCEC'20 grant.
- 2021-2022 Mentoring of two student interns as part of Test and Contain research project.

Talks (selected)

- 2023 **Conference talk** on *Welfare and Revenue in Budget-Constrained Markets* at the 19th Conference on Web and InterNet Economics (WINE'23)
- 2023 **Seminar talk** on *Learning and Characterising Substitutes Demand* at the Center for Research in Economics and Statistics (CREST), Paris
- 2023 **Seminar talk** on "Welfare-Maximizing Pooled Testing" at the Institute for Societal Computing, Saarbrücken
- 2021 **Conference talk** on *Optimal Testing and Containment Strategies for Universities in Mexico amid COVID-19* at the ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO'21)
- 2021 **Conference talk** on *Solving the Strong Substitutes Product-Mix Auction* at the 6th World Congress of the Game Theory Society (GAMES'20)
- 2020 **Conference talk** on *Learning Strong-Substitutes Demand Correspondences* at the 16th Conference on Web and InterNet Economics (WINE'20)
- 2020 **Contributed talk** on *Test and Contain: A Resource-Optimal Testing Strategy for COVID-19 in Mexico* at the Global Challenges in Economics and Computation workshop (GCEC'20), held at EC'20
- 2020 **Colloquium talk** on *Learning Strong-Substitutes Demand Correspondences* at the 36th British Colloquium for Theoretical Computer Science (BCTCS'20)
- 2018 Lightning talk on *Solving Strong-Substitutes Product-Mix Auctions* at the 14th Conference on Web and InterNet Economics (WINE'18)
- 2018 **Poster** on *Solving Strong-Substitutes Product-Mix Auctions* at the 14th Conference on Web and InterNet Economics (WINE'18)
- 2016 **Conference talk** on *Characterising* g_B -*Perfect Graphs* at the Studierendenkonferenz der DMV 2016 (**Best talk award**)

Awards and grants (selected)

2023 ACM EC'23 Best paper in applied modelling track

2020	WINE'20 Best paper nomination
2020	ACM SIGecom research grant (\$25,000) for developing a COVID-19 testing and contain- ment mechanism in Mexico (see www.testandcontain.com).
2020	ACM SIGecom best poster video award at the Global Challenges for Economics and Computation workshop at the EC'20 conference.
2019	Master grant from Merton College (Oxford) for my science workshop at the Dr. HN Science Centre in Gauribidanur, India.
2017–2021	EPSRC Scholarship for a DPhil in Computer Science at Oxford.
2017	College Prize for achieving a distinction in MSc, Merton College (Oxford).
2016	Best talk award at the Studierendenkonferenz der DMV.
2014–2015	Deutschlandstipendium (German state scholarship).
2013–2014	Deutschlandstipendium (German state scholarship).
2008–2011	Organ Scholarship, Oriel College (Oxford).
	Practical projects
Test and Contain	I co-founded Test and Contain, a project to design and implement a resource-optimal test- ing and containment mechanism that helps protect the health and livelihoods of those hardest hit in low- and middle-income countries. This work was supported by an ACM

- SIGecom GCEC'20 grant. For more details see www.testandcontain.com. Debt restructuring Collaborated with staff of the International Monetary Fund (IMF) to design an auctionbased sovereign debt restructuring mechanism, on the basis of the Arctic Auction, that allows sovereign countries to renegotiate bonded debt with creditors.
- Welfare-
maximizing pooled
testingInitiated and led collaboration with the Institute for Scientific Research and Technology
(IPICYT) in Mexico on a four-week long experimental trial to pilot the pooled testing mech-
anism and algorithms set out in paper "Welfare-Maximizing Pooled Testing". For more de-
tails, see www.c-sef.com.
- Tax credit markets Worked with industry partner, Bellus Ventures, to design a market platform for developers of renewable energy projects to sell Investment Tax Credits (ITCs) to corporations who wish to offset their federal income tax.
 - GitHub My personal GitHub account (https://github.com/edwinlock/) hosts implementation of algorithms developed in conjunction with my research. For example, I provide my implementation of the product-mix auction and the web app used for the C-SEF pilot study.

Languages

Trilingual in English, German, and Dutch.