

Charles Rahal

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Leverhulme Centre for Demographic Science

• Demographic Science Unit

• University of Oxford

Academic Positions Held

University of Oxford: Associate Member of the Department of Sociology	10/2024-Present
University of Oxford: Associate Professor in Data Science and Informatics	04/2024-Present
Public Knowledge Project: Honorary Academic Associate	12/2023-Present
University of Oxford: Senior Departmental Research Lecturer in Data Science and Informatics	09/2022-04/2024
University of Oxford: Associate Member, Nuffield College	01/2021-Present
University of Oxford: Departmental Research Lecturer in Data Science and Informatics	09/2019-08/2022
University of Oxford: British Academy Postdoctoral Fellow in Data Science and Informatics	01/2018-12/2020
University of Oxford: Non-Stipendiary Research Fellow, Nuffield College	07/2017-12/2020
University of Oxford: Postdoctoral Research Fellow in Data Science and Informatics	07/2016-12/2017
University of Birmingham: Research Fellow in Social Policy and Social Data Science	08/2015-07/2016
University of Birmingham: Visiting Lecturer in Economics and Econometrics	06/2013-03/2019

Education

PhD in Computational Econometrics University of Birmingham	BIRMINGHAM, UK. 2011-2016
<ul style="list-style-type: none">• Core courses: Advanced Econometrics, Advanced Microeconomics, Advanced Macroeconomics.• Thesis title: 'Computational Econometrics with Applications to Housing Markets'.• Visiting PhD student in Agent Based Computational Economics (University of Essex).• Examiners: Professor Stephen Hall (external) and Professor Anindya Banerjee (internal).	
Postgraduate Certificate in Advanced Research Methods University of Birmingham (Distinction)	BIRMINGHAM, UK 2014-2015
MSc Economics University of Birmingham (Distinction)	BIRMINGHAM, UK 2010-2011
Graduate Diploma in Economics University of Birmingham (Distinction)	BIRMINGHAM, UK 2008-2009
BSc Investment and Finance University of Reading (First Class Hons)	READING, UK 2005-2008

Peer Reviewed Academic Articles

1. Rahal, C. and Mohan, J., (2024), 'The Role of the Third Sector in Public Health Provision: Evidence from 25,338 heterogenous procurement datasets', *Journal of the Royal Statistical Society, Series A*, pp.1-22. *SocArXiv* version: doi.org/10.31235/osf.io/t4x52.
2. Domingue, B. [et al, including Rahal, C.] (2024), 'The InterModel Vigorish as a lens for understanding (and quantifying) the value of item response models for dichotomously coded items', *Psychometrika.*, pp.1-21. *PsyArXiv* version: doi.org/10.31234/osf.io/q3djt.
3. Newman, S.J., Schulte, K., Morellini, M.M., Rahal, C., and Leasure, D., (2024), 'Offshoring Emissions through Used Vehicle Exports', *Nature Climate Change*, pp. 1-4.. Impact Factor: 31.4.
4. Rahal, C., Verhagen, M., and Kirk, D., (2022), 'The Rise of Machine Learning in the Academic Social Sciences', *AI & Society*, pp. 1-3.
5. Aburto, JM. [et al, including Rahal, C.], (2022), 'Quantifying impacts of the COVID-19 pandemic through life expectancy losses: A population-level study of 29 countries', *International Journal of Epidemiology*, **51** (1), pp. 63-74. Impact Factor: 9.685. Altmetric score: 2782. Citations: 356.
6. Mills, M. C. and Rahal, C., (2021), 'Population Studies at 75 Years: A scientometric review', *Population Studies*, **7**, pp. 7-25.

7. Block, P. [et al, including Rahal, C.], (2020), 'Social network-based distancing strategies to flatten the Covid-19 curve in a post-lockdown world', *Nature Human Behaviour*, **4**, pp. 588-596. Impact Factor: 29.9. Altmetric score: 2276. Citations: 550.
8. Mills, M. C. and Rahal, C., (2020), 'The GWAS Diversity Monitor tracks diversity by disease in real time', *Nature Genetics*, **52** (3), pp. 242-243. Impact Factor: 41.38. Accompanying dashboard: gwasdiversitymonitor.com.
9. Rahal, C., (2019), 'Tools for Transparency in Central Government Spending', *International Journal of Population Data Science*, **4** (4), pp. 1-9.
10. Mills, M. C. and Rahal, C., (2019) 'The Scientometrics of Genome Wide Association Studies', *Communications Biology*, **2** (3), pp. 1-13. Citation Count: 391.
11. Rahal, C., (2018), 'The Keys to Unlocking Public Payments Data', *Kyklos*, **71** (2), pp. 310-337.
12. Reeves, A., Friedman, S., Rahal, C. and Flemmen, M., (2017), 'The Decline and Persistence of the Old Boy: Private Schools and Elite Recruitment 1897 to 2016', *American Sociological Review*, **82** (6), pp. 1139-1166. Awarded 2018 Prize for Best Article, European Academy of Sociology.
13. Tropf, F. [et al, including Rahal, C.], (2017), 'Hidden Heritability due to Heterogeneity Across Seven Populations', *Nature Human Behaviour*, **1** (10), pp. 757-765. Impact Factor: 29.9.
14. Rahal, C., (2016), 'Housing Markets and Unconventional Monetary Policy', *Journal of Housing Economics*, **32**, pp. 67-80.
15. Rahal, C., (2015), 'A Guide to the StatFact EViews Add-in', *Computational Economics*, **48** (1) pp.1-6.

Invitations to Resubmit

16. Rahal, C. and Yan, J., (2024), 'On the Unknowable Limits to Prediction in Social Systems', arXiv, arxiv.org/abs/2411.19223. Revisions Requested at *Nature Computational Science*.
17. Wolfram, T., Tropf, F.C., and Rahal, C., (2023), 'Short Essays Written During Childhood Predict Current Cognition and Final Educational Attainment Close to Expert Assessment', *SocArXiv*, doi.org/10.31235/osf.io/a8ht9. Revisions Requested at *Communications Psychology*.
18. Muggleton, N., Rahal, C., and Reeves, A., (2023), 'Capitalising on a Crisis: A computational analysis of corporate elites across all 5 million British firms'. Revisions Requested at *Journal of Computational Social Science*. Available on request.
19. Domingue, B., Rahal, C. [et al.], (2023), 'InterModel Vigorish (IMV): A novel approach for quantifying the predictive accuracy of binary outcomes', *SocArXiv*, doi.org/10.31235/osf.io/gu3ap. Revisions Requested at *Plos One*.

In Progress

20. Rahal, C. [et al.], (2024), 'On the Responsible use of Pseudo-Random Number Generators in Scientific Research'. Extended abstract available on request, replication materials at github.com/crahal/seeds.
21. Muggleton, N., Reeves, A., Rahal, C. [et al.], (2024), 'Health by Wealth: An analysis of 19m probate records in the United Kingdom, 1855-1992'.
22. Wang, P., Rahal, C., [et al.], (2024), 'The InterModel Vigorish for Machine and Deep Learning', in progress for conference proceedings'.
23. Willinsky, J. [et al, including Rahal, C.], (2024), 'Representation of and Networks within Open Journal Systems in the Global South', Public Knowledge Project collaboration.
24. Valdenegro Ibarra, D., Rahal, C. and Yan, J., (2024), 'Introducing Robustify: An efficient multiversal library with model selection, averaging, and out-of-sample analysis'.
25. Valdenegro, D., Petrillo, M., Rahal, C. [et al.], (2024), 'The Cost of Care: Estimating structural inequalities in the cost of providing unpaid social care'. Accepted for presentation at *Population Association of America*. arXiv: <https://arxiv.org/abs/2411.10314>
26. Rahal, C. [et al.], (2024), 'GWAS Diversity by Funder'.
27. Zhang, L., Kanopka, K., Rahal, C. [et al.], (2023), 'The InterModel Vigorish for Model Comparison in Confirmatory Factor Analysis with Binary Outcomes', *PsyArXiv*, osf.io/preprints/psyarxiv/tv9bd. Reject and Resubmit at *Structural Equation Modelling*.

28. Kanopka, K. [et al., including Rahal, C.], (2023), 'Bookmaking for Categorical Responses: Extending the InterModel Vigorish to Quantify the Performance of Polytomous Item Response Models'. Available on request.
29. Newman, S. J., Rahal, C. [et al.], (2023), 'Inequalities in the Creation of Air Pollution: Observational evidence from 392m emissions tests'. In preparation.
30. Chasalow, K., Rahal, C., Verhagen, M., and Mills, M.C., (2022), 'The Anatomy of Interdisciplinarity'. In progress.
31. Rahal, C., Reeves, A., and Tropf, F., (2020), 'The Legacy of Longevity: Persistent inequalities in UK life expectancy 1500-2016'. In progress.
32. Rahal, C. (2019), 'A Grid Based Approach to Analysing Spatial Weighting Matrix Specification', *SocArXiv*, doi.org/10.31235/osf.io/nt2yq.
33. Rahal, C. and Barassi, M., (2017), 'Random Factor Composition and Diffusion Index Forecast Performance'. Available on request.

Selected High Profile Policy Work

34. Wagner, S., Rahal, C. [et al.], (2024), 'The SHAPE of Impact', *British Academy and the Academy of Social Sciences*. ISBN: 978-0-85672-686-6, pp. 1-104.
35. Bezuidenhout, L. [et al, including Rahal, C.], (2021), 'An Inquiry into Reproducibility and Research Integrity: Written Evidence', Response submitted to the *House of Commons Science and Technology Committee*, pp. 1-13.
36. Mills, M.C., Akimova, E. and Rahal, C., (2020), 'Face masks and coverings for the general public: Behavioural knowledge, effectiveness of cloth coverings and public messaging', *Royal Society SET-C/British Academy*, pp. 1-27.
37. Mills, M.C., Rahal, C., Brazel, D., Yan, J., and Gieysztor, S. (2021), 'COVID-19 vaccine deployment: behaviour, ethics, misinformation and policy strategies', *Royal Society SET-C/British Academy*, pp.1-35.

Selected Funding Awards

- 'Pandemic Preparedness' (Co-I with Prof. M.C. Mills) c. £300,000
The Moh Family Foundation 05/2023-present
- Analysing REF2021 Impact Case Studies (Co-I with Prof. M.C. Mills et al.) £144,975
British Academy and the Academy of Social Sciences 01/2023-09/2023
- Improving Access to and use of Organisation-level Data on the Third Sector and Civil Society (Co-I with Professor John Mohan et al.) £684,578
Research Grants (Strategic). Economic and Social Research Council 10/2022-03/2025
- GWAS Diversity by Funder (Project Manager/Co-I with Prof. M.C. Mills et al.) £22,440
ESRC Impact Acceleration Account Stage 3, University of Oxford 07/2022-03/2023
- Summer Institute in Computational Social Science (Co-I with Prof. R. Kashyap) £4,900
Teaching Development and Enhancement Project, University of Oxford 07/2022-07/2022
- ESRC Centre for Care (Co-I with Prof. S. Yeandle et al.) c. £10m
ESRC Large Centres Competition 09/2021-12/2026
- Demographic Science and COVID-19 in the UK (Co-I with Prof. J.B. Dowd et al.) £49,981
UAS John Fell Fund, University of Oxford 06/2020-12/2021
- The Social Data Science of Healthcare Supply £333,899
British Academy Postdoctoral Fellowship, University of Oxford 01/2018-12/2020
- The Fertility Challenge (Co-I with Prof. M.C. Mills and Dr. F. Tropf) £49,962
ESRC Impact Acceleration Award 01/2018-12/2018
- Ear-time with the Cabinet (Co-I with Dr. P. Serôdio and Prof. D. Stuckler) £7,500
ESRC Kick-start Impact Acceleration Award, University of Oxford 01/2018-12/2019
- Computational Econometrics with Applications to Housing Markets c. £105,000
ESRC 1+3 Quota PhD Studentship 09/2010-8/2014

Awards for Excellence

- Award for Excellence Scheme 2021/22, University of Oxford. 06/2022
- O²RB Excellence in Impact Awards, ESRC IAA (co-recipient). 11/2021
- 2018 Prize for Best Article, European Academy of Sociology (co-recipient). 09/2018
- Award for Excellence Scheme 2017/18, University of Oxford. 03/2018
- College winner of Michael K. O'Rourke prize (best PhD publication). 06/2015
- 2015 Midlands Regional Business School Colloquium: Best paper award. 06/2015

Selected Academic and Policy Presentations

1. 'On the Responsible use of Pseudo-Random Number Generators in Scientific Research' European Consortium of Sociological Research (Methods Section), Barcelona 09/2024
2. 'On the Responsible use of Pseudo-Random Number Generators in Scientific Research' International Conference on Social Computing, Hong Kong University of Science and Technology 08/2024
3. 'Publishing Academic Social Science and the Generation of Impact' Invited Roundtable Panel Member, University of Sheffield 03/2024
4. 'On the Responsible use of Pseudo-Random Number Generators in Scientific Research' Computational and Classical Social Science Reading Group, University of Oxford 03/2024
5. 'Open, Reproducible, and Responsible Social Science' Invited Seminar, Warwick Business School, University of Warwick 03/2024
6. 'Inequalities in Health by Wealth' Invited Seminar, Department of Sociology, University of Zurich 03/2024
7. 'On the Responsible use of Pseudo-Random Number Generators in Scientific Research' Oxford | Berlin Autumn School on Open and Responsible Research 11/2023
8. 'Adventures in Open and Reproducible Social Science' Invited Seminar, Methods Hub, University of Hong Kong 08/2023
9. 'The Legacy of Longevity: Persistent inequalities in UK life expectancy 1500-2016' Invited Seminar, Beijing, Hong Kong, Macao and Taiwan Population Aging Summer Camp. 07/2023
10. 'Armchair Auditing: What could possibly go wrong?' Invited Research Talk, Data Science for Governance, Office for National Statistics. 07/2023
11. 'Adventures in Open and Transparent Social Science' Invited Research Visit, Jinhe Centre for Economic Research, Xi'an Jiaotong University. 06/2023
12. 'The Legacy of Longevity: Persistent inequalities in UK life expectancy 1500-2016' Invited Seminar, Institute for Social and Economic Research, University of Essex. 06/2023
13. 'Adventures in Open and Transparent Social Science' Department of Social Policy and Intervention, University of Oxford. 05/2023
14. 'GWAS Diversity by Funder' Invited Seminar, link23 and Genomics England. 03/2023
15. 'Open and Reproducible Research with Semi-Structured Data' Invited Seminar, Department of Sociology, Oxford. 11/2021
16. 'The Legacy of Longevity: Persistent inequalities in UK life expectancy 1500-2016' Invited Seminar, Nuffield College, Oxford. 02/2020
17. 'The Legacy of Longevity: Persistent inequalities in UK life expectancy 1500-2016' Invited Seminar, Center for Research in Economics and Statistics, Paris. 09/2019
18. 'Government Procurement Data for Public Policy Making' British Academy Workshop: Realizing the Promise of Big Data. 10/2018
19. 'Public Procurement from the Private Sector' International Conference for Administrative Data Research, Queen's University, Belfast. 06/2018

20. 'The Architecture of Genome Wide Association' 06/2018
Departmental Seminar Series, Department of Sociology, University of Oxford.
21. 'A Big Data Approach to Inequalities in Real Estate Markets' 01/2017
Invited Seminar, Huddersfield Business School, University of Huddersfield.
22. 'Exact and Approximate Methods for Public Payments' 09/2016
Data for Policy, University of Cambridge.
23. 'Generating Public Payments Databases for Charity Funding Analysis' 03/2016
ESRC Charity Data Dive, Manchester Central Library.
24. 'A Grid Based Approach for Spatial Weighting Matrix Specification' 02/2016
Econometrics Seminar, Department of Economics, University of Birmingham.
25. 'Computational Forecasting with FRED' 01/2016
Royal Economic Society PhD Meeting, University of Westminster.
26. 'Computational Forecasting with FRED' 12/2015
Computational and Financial Econometrics (CFE) Network, University of London.
27. 'Computational Forecasting with FRED' 12/2014
Inaugural PhD Economics Conference 2014, University of Leicester.
28. 'Real Estate Forecasting with Big Data', 11/2014
Birmingham Means Business, Birmingham Town Hall, ESRC Festival of Science.
29. 'Forecasting with Factors' 05/2014
ESRC Final Year Doctoral Conference, University of Edinburgh.
30. 'Housing Markets and Monetary Policy' 10/2013
ESRC Festival of Science, Birmingham Central Library.

Administrative Experiences and Academic Citizenship

- Academic Service:** Consultant for Banco de la Republica de Colombia 01/2024-Present
- Academic Service:** ONS Adult Social Care Workforce Methods Advisory Group 01/2024-Present
- Committee:** DPhil Admissions Committee, Oxford Population Health 12/2023-Present
- Committee:** Community Project Steering Group, UK Reproducibility Network 11/2023-Present
- Committee:** Research Practice Group, University of Oxford 09/2023-Present
- Academic Service:** Local Network Co-ordinator, UK Reproducibility Network 03/2023-Present
- Committee:** MPhil and DPhil Admissions Committee, Department of Sociology, Oxford 02/2023
- Academic Service:** Director of Taught Courses, Leverhulme Centre for Demographic Science 09/2022-Present
- Member:** International Society for Scientometrics and Informatics 09/2021-Present
- Committee:** Capacity Building Group at the ESRC Centre for Care 01/2022-Present
- Committee:** Ethics and Data Management Committee at the ESRC Centre for Care 01/2022-Present
- Member:** Pandemic Sciences Institute, University of Oxford 1/2022-Present
- Steering Group:** Senior Management Board of the Leverhulme Centre for Demographic Science 01/2021-Present
- Co-Convenor:** Summer Institute in Computational Social Science (Oxford) 09/2019-09/2022
- Steering Group:** ESRC, MRC and WT committee for a Population Research Resource 03/2019-09/2020
- Steering Group:** Department of Sociology, University of Oxford 04/2017-05/2019, 09/2021-09/2022
- Local Organizer:** ESRC Regional Doctoral Training Centre Conference 06/2014
- Local Organizer:** Midlands Regional Doctoral Colloquium, University of Birmingham 06/2013
- Steering Group:** ESRC Doctoral Training Centre, University of Birmingham 09/2012-09/2015
- Steering Group:** Department of Economics, University of Birmingham 09/2012-09/2015

Refereeing Services

International Journal of Forecasting, Economic Modeling, Journal of Housing Economics, Oxford Bulletin of Economics and Statistics, Environmental and Resource Economics, Critical Public Health, Empirical Economics, Voluntary Sector Review, UKRI, ESR, China: An International Journal, PNAS, Computational Economics, Frontiers in Public Health, Communications Biology, Sage Publications, British Academy, Scientific Reports, Financial Stability, Socio-Economic Review, Social Science and Humanities Communications, European Society, Economic and Social Research Council, Empirical Economics, BMJ Open, Population Studies, Nature Communications, Wellcome Trust, ZonMw.

Selected Recent Teaching (and Teaching-related Events)

Lecturer and Mentor	Summer School in Quantitative Methods for Social Care	09-2024
Convenor	Summer Lecture Series in Demographic Data Science	06/07-2024
Convenor	Introducing Robustify via an open, all day Hackathon	06-2024
Convenor	Realising the Benefits of being Open and Reproducible in Research	06-2024
Convenor	Carpentries Workshop: Git, Command Line Interface, and R	02-2024
Module Co-Designer:	RP02 Open Research Practices, University of Oxford	2023-Present
Co-Convenor/Lecturer:	Ox Ber Autumn School on Responsible Research, University of Oxford	2021-Present
Convenor:	Life Course Research, University of Oxford	2020-2023
Co-Convenor:	Demographic Analysis, University of Oxford	2020-2023
Convenor:	Replication and Open Social Science, University of Oxford	2019-2020
Lecturer:	An Introduction to Bash for Sociogenomics, University of Oxford (NCRM)	2017
Guest Lecturer:	Advanced Quantitative Methods, University of Oxford	04-2019
Lecturer:	Python for Social Scientists, University of Oxford	2017-2020
Teaching Assistant:	Time Series Econometrics, University of Birmingham	2015-2016
Lecturer:	An Introduction to Econometric Software, University of Birmingham	2013-2016

Postgraduate Supervision

Successfully supervised DPhil candidates:	1	Current DPhil candidates:	4
Successfully supervised MPhil candidates:	5	Current MPhil candidates:	0
Successfully supervised MSc candidates:	24	Current MSc candidates:	0

Selected Additional Training

- **AWS:** Certified Machine Learning Professional (Forthcoming: 2024)
- **AWS:** Certified Cloud Practitioner (Forthcoming: 2024)
- **Training:** Media Interviews: Method and delivery (Extended) 05/2023
- **Hanyu Shuiping Kaoshi:** Level 1 (Mandarin) Test 05/2023
- **Certified Data Carpentries Instructor:** The Data Carpentries (Community Initiative) 06/2022
- **Secure Research Service Accreditation:** Office for National Statistics 10/2021
- **Advanced Research Methods:** DPIR Spring School, University of Oxford 04/2019
- **Coursera:** Data Mining Specialization 12/2018–Present
- **Course:** Introduction to Data Linkage, Said Business School, University of Oxford 05/2018
- **Evaluation of Data Linkage:** Said Business School, University of Oxford 05/2018
- **Introduction to Hospital Episode Statistics:** University of Southampton 04/2018
- **Coursera:** Genomic Data Science Specialization 02/2018
- **Coursera:** Python for Informatics Specialization 12/2016
- **Cemmap MasterClass on Machine Learning:** Institute for Fiscal Studies 05/2016
- **Essex Workshop on Statistics in Social Sciences:** University of Essex 06/2015
- **The Science and Art of DSGE Modeling:** University of Surrey 08/2014
- **London Summer School of Economics:** EC341 (Industrial Organization) 07/2010
- **Investment Management Certificate:** Unit I, II & III 11/2009

Academic Referees

Professor Melinda C. Mills
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