

# Qingyuan Zhao

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## Current positions

**Aug 2019–** University Assistant Professor (previously University Lecturer) in Statistics, Department of Pure Mathematics and Mathematical Statistics, University of Cambridge.

**Feb 2020–** Fellow, Corpus Christi College, Cambridge.

**May 2021–** Associate Faculty, Cambridge Centre for AI in Medicine.

## Education

**Sep 2007–Jun 2011** B.S. in Mathematics, University of Science and Technology of China.

**Sep 2011–Sep 2016** Ph.D. in Statistics, Stanford University. (Advisor: Trevor Hastie)

## Research grants

**Sep 2020–Aug 2021** Isaac Newton Trust Early Career Support Grant (£54,962; sole PI).

**May 2022–Apr 2025** EPSRC New Investigator Award “Statistical Inference for Novel Study Designs” (£246,805; sole PI).

## Supervision

### Postdoctoral research associates

**Sep 2020–Aug 2021** Katarzyna Reluga.

**Sep 2022–Jun 2023** Zijun Gao.

**Sep 2023–** Jieru Shi.

### PhD students

**Sep 2018–Jan 2023** Matt Tudball (co-supervised with Kate Tilling, Rachel Hughes, Jack Bowden, and George Davey Smith).

Oct 2020– Tobias Freidling.

Oct 2021– Joakim Blach Anderson.

Oct 2022– Max Zhu (co-supervised with Pietro Lio).

Oct 2023– Martina Scauda (co-supervised with Simon Deakin).

## Undergraduate research students

Jul 2020–Sep 2020 Etaash Katiyar, University of Cambridge.

Jul 2021–Sep 2021 Naomi Wei, University of Cambridge (co-supervised with Jingshu Wang).

Jul 2021–Sep 2021 Thalia Seale, Durham University (co-supervised with Alec Christie).

Jun 2022–Aug 2022 Junshi Wang, Hong Kong University.

Apr 2023–Jul 2023 Timothée Foutot, ENS Paris-Saclay.

Aug 2023–Oct 2023 Julia Gontarek, University of Cambridge.

## Cambridge undergraduate course supervision

2019–2020 IB Statistics.

2020–2023 IA Probability; IB Statistics.

## Publications

### Peer-reviewed articles in statistics journals

1. D. Iong, Q. Zhao, and Y. Chen, “A latent mixture model for heterogeneous causal mechanisms in Mendelian randomization,” *Annals of Applied Statistics*, in press, 2023+. arXiv: [2007.06476](https://arxiv.org/abs/2007.06476) [stat.AP].
2. Y. Zhang and Q. Zhao, “What is a randomization test?” *Journal of the American Statistical Association*, to appear, 2023. DOI: [10.1080/01621459.2023.2199814](https://doi.org/10.1080/01621459.2023.2199814).
3. M. J. Tudball, R. A. Hughes, K. Tilling, J. Bowden, and Q. Zhao, “Sample-constrained partial identification with application to selection bias,” *Biometrika*, vol. 110, no. 2, pp. 485–498, 2023. DOI: [10.1093/biomet/asac042](https://doi.org/10.1093/biomet/asac042).
4. Q. Zhao, “Small data, big time—a retrospect of the first weeks of COVID-19,” *Journal of the Royal Statistical Society (Series A, Statistics in Society)*, vol. 185, no. 4, pp. 1793–1814, 2022, (with discussion). DOI: [10.1111/rssa.12874](https://doi.org/10.1111/rssa.12874).
5. T. Ye, J. Shao, Y. Yi, and Q. Zhao, “Toward better practice of covariate adjustment in analyzing randomized clinical trials,” *Journal of the American Statistical Association*, in press, 2022+. DOI: [10.1080/01621459.2022.2049278](https://doi.org/10.1080/01621459.2022.2049278).

6. C. Y. Shapland, Q. Zhao, and J. Bowden, "Profile-likelihood bayesian model averaging for two-sample summary data mendelian randomization in the presence of horizontal pleiotropy," *Statistics in Medicine*, vol. 41, no. 6, pp. 1100–1119, 2022. DOI: [10.1002/sim.9320](https://doi.org/10.1002/sim.9320).
7. Q. Zhao, D. S. Small, and A. Ertefaie, "Selective inference for effect modification via the lasso," *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, vol. 84, no. 2, pp. 382–413, 2022. DOI: [10.1111/rssb.12483](https://doi.org/10.1111/rssb.12483).
8. Q. Zhao, N. Ju, S. Bacallado, and R. D. Shah, "BETS: The dangers of selection bias in early analyses of the coronavirus disease (COVID-19) pandemic," *Annals of Applied Statistics*, vol. 15, no. 1, pp. 363–390, 2021. DOI: [10.1214/20-aos1401](https://doi.org/10.1214/20-aos1401).
9. B. Zhang, J. Weiss, D. S. Small, and Q. Zhao, "Selecting and ranking individualized treatment rules with unmeasured confounding," *Journal of the American Statistical Association*, vol. 116, no. 533, pp. 295–308, 2020. DOI: [10.1080/01621459.2020.1736083](https://doi.org/10.1080/01621459.2020.1736083).
10. Q. Zhao, J. Wang, G. Hemani, J. Bowden, and D. S. Small, "Statistical inference in two-sample summary-data Mendelian randomization using robust adjusted profile score," *Annals of Statistics*, vol. 48, no. 3, pp. 1742–1769, 2020. DOI: [10.1214/19-aos1866](https://doi.org/10.1214/19-aos1866).
11. Q. Zhao, D. S. Small, and B. B. Bhattacharya, "Sensitivity analysis for inverse probability weighting estimators via the percentile bootstrap," *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, vol. 81, no. 4, pp. 735–761, 2019. DOI: [10.1111/rssb.12327](https://doi.org/10.1111/rssb.12327).
12. Q. Zhao, J. Wang, W. Spiller, J. Bowden, and D. S. Small, "Two-sample instrumental variable analyses using heterogeneous samples," *Statistical Science*, vol. 34, no. 2, pp. 317–333, 2019. DOI: [10.1214/18-sts692](https://doi.org/10.1214/18-sts692).
13. Q. Zhao, D. S. Small, and W. Su, "Multiple testing when many  $p$ -values are uniformly conservative, with application to testing qualitative interaction in educational interventions," *Journal of the American Statistical Association*, vol. 114, no. 527, pp. 1291–1304, 2018. DOI: [10.1080/01621459.2018.1497499](https://doi.org/10.1080/01621459.2018.1497499).
14. H. Y. He, K. Basu, Q. Zhao, and A. B. Owen, "Permutation  $p$ -value approximation via generalized Stolarsky invariance," *Annals of Statistics*, vol. 47, no. 1, pp. 583–611, 2019. DOI: [10.1214/18-aos1702](https://doi.org/10.1214/18-aos1702).
15. Q. Zhao, "Covariate balancing propensity score by tailored loss functions," *Annals of Statistics*, vol. 47, no. 2, pp. 965–993, 2019. DOI: [10.1214/18-aos1698](https://doi.org/10.1214/18-aos1698).
16. Q. Zhao, "On sensitivity value of pair-matched observational studies," *Journal of the American Statistical Association*, vol. 114, no. 526, pp. 713–722, 2018. DOI: [10.1080/01621459.2018.1429277](https://doi.org/10.1080/01621459.2018.1429277).
17. Q. Zhao, D. S. Small, and P. R. Rosenbaum, "Cross-screening in observational studies that test many hypotheses," *Journal of the American Statistical Association*, vol. 113, no. 523, pp. 1070–1084, 2018. DOI: [10.1080/01621459.2017.1407770](https://doi.org/10.1080/01621459.2017.1407770).
18. J. Wang, Q. Zhao, T. Hastie, and A. B. Owen, "Confounder adjustment in multiple hypothesis testing," *Annals of Statistics*, vol. 45, no. 5, pp. 1863–1894, 2017. DOI: [10.1214/16-aos1511](https://doi.org/10.1214/16-aos1511).

19. Q. Zhao and D. Percival, "Entropy balancing is doubly robust," *Journal of Causal Inference*, vol. 5, no. 1, 2016. DOI: [10.1515/jci-2016-0010](https://doi.org/10.1515/jci-2016-0010).

## Other peer-reviewed articles

20. E. Sanderson, M. M. Glymour, M. V. Holmes, H. Kang, J. Morrison, M. R. Munafì, T. Palmer, C. M. Schooling, C. Wallace, Q. Zhao, and G. D. Smith, "Mendelian randomization," *Nature Reviews Methods Primers*, vol. 2, no. 1, p. 6, 2022. DOI: [10.1038/s43586-021-00092-5](https://doi.org/10.1038/s43586-021-00092-5).
21. Q. Zhao, L. J. Keele, D. S. Small, and M. M. Joffe, "A note on posttreatment selection in studying racial discrimination in policing," *American Political Science Review*, vol. 116, no. 1, pp. 337–350, 2021. DOI: [10.1017/s0003055421000654](https://doi.org/10.1017/s0003055421000654).
22. Q. Zhao, J. Wang, Z. Miao, N. R. Zhang, S. Hennessy, D. S. Small, and D. J. Rader, "A Mendelian randomization study of the role of lipoprotein subfractions in coronary artery disease," *eLife*, vol. 10, e58361, 2021. DOI: [10.7554/elife.58361](https://doi.org/10.7554/elife.58361).
23. M. J. Tudball, J. Bowden, R. A. Hughes, A. Ly, M. R. Munafò, K. Tilling, Q. Zhao, and G. D. Smith, "Mendelian randomisation with coarsened exposures," *Genetic Epidemiology*, vol. 45, no. 3, pp. 338–350, 2021. DOI: [10.1002/gepi.22376](https://doi.org/10.1002/gepi.22376).
24. H. Kang, Y. Jiang, Q. Zhao, and D. S. Small, "ivmodel: An R package for inference and sensitivity analysis of instrumental variables models with one endogenous variable," *Observational Studies*, vol. 7, pp. 1–24, 2021.
25. M. T. Patrick, P. E. Stuart, H. Zhang, Q. Zhao, X. Yin, K. He, X. jie Zhou, N. N. Mehta, J. J. Voorhees, M. Boehnke, J. E. Gudjonsson, R. P. Nair, S. K. Handelman, J. T. Elder, D. J. Liu, and L. C. Tsoi, "Causal relationship and shared genetic loci between psoriasis and type 2 diabetes through trans-disease meta-analysis," *Journal of Investigative Dermatology*, vol. 141, no. 6, pp. 1493–1502, 2021. DOI: [10.1016/j.jid.2020.11.025](https://doi.org/10.1016/j.jid.2020.11.025).
26. J. Wang, Q. Zhao, J. Bowden, G. Hemani, G. D. Smith, D. S. Small, and N. R. Zhang, "Causal inference for heritable phenotypic risk factors using heterogeneous genetic instruments," *PLOS Genetics*, vol. 17, no. 6, e1009575, 2021. DOI: [10.1371/journal.pgen.1009575](https://doi.org/10.1371/journal.pgen.1009575).
27. A. P. Christie\*, ..., Q. Zhao, and W. J. Sutherland, "Quantifying and addressing the prevalence and bias of study designs in the environmental and social sciences," *Nature Communications*, vol. 11, no. 1, p. 6377, 2020, (The omitted authors (about 50) provided data. I developed the statistical model and analysis with the first author.) DOI: [10.1038/s41467-020-20142-y](https://doi.org/10.1038/s41467-020-20142-y).
28. Q. Zhao, Y. Chen, J. Wang, and D. S. Small, "Powerful three-sample genome-wide design and robust statistical inference in summary-data Mendelian randomization," *International Journal of Epidemiology*, vol. 48, no. 5, pp. 1478–1492, 2019. DOI: [10.1093/ije/dyz142](https://doi.org/10.1093/ije/dyz142).
29. L. Keele, Q. Zhao, R. R. Kelz, and D. Small, "Falsification tests for instrumental variable designs with an application to tendency to operate," *Medical Care*, vol. 57, no. 2, pp. 167–171, 2018. DOI: [10.1097/mlr.0000000000001040](https://doi.org/10.1097/mlr.0000000000001040).

30. J. Bowden, F. D. G. M, C. Minelli, Q. Zhao, D. A. Lawlor, N. A. Sheehan, J. Thompson, and G. D. Smith, "Improving the accuracy of two-sample summary-data Mendelian randomization: Moving beyond the nome assumption," *International Journal of Epidemiology*, vol. 48, no. 3, pp. 728–742, 2018. DOI: [10.1093/ije/dyy258](https://doi.org/10.1093/ije/dyy258).
31. J. H. Silber, J. G. Reiter, P. R. Rosenbaum, Q. Zhao, D. S. Small, B. A. Niknam, A. S. Hill, L. L. Hochman, R. R. Kelz, and L. A. Fleisher, "Defining multimorbidity in older surgical patients," *Medical Care*, vol. 56, no. 8, pp. 701–710, 2018. DOI: [10.1097/mlr.0000000000000947](https://doi.org/10.1097/mlr.0000000000000947).
32. Q. Zhao, M. A. Erdogdu, H. Y. He, A. Rajaraman, and J. Leskovec, "SEISMIC: A self-exciting point process model for predicting tweet popularity," in *Proceedings of the 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining - KDD '15*, ACM Press, 2015, ISBN: 9781450336642. DOI: [10.1145/2783258.2783401](https://doi.org/10.1145/2783258.2783401).

### Invited contributions, short letters, and miscellaneous publications

33. Q. Zhao, "Zhao's reply to the discussion of 'the first discussion meeting on statistical aspects of the covid-19 pandemic'," *Journal of the Royal Statistical Society Series A: Statistics in Society*, vol. 185, no. 4, pp. 1846–1848, 2022. DOI: [10.1111/rssa.12939](https://doi.org/10.1111/rssa.12939).
34. Q. Zhao, "Statistical modeling: Returning to its roots," *Observational Studies*, vol. 7, pp. 229–234, 1 2021. DOI: [10.1353/obs.2021.0014](https://doi.org/10.1353/obs.2021.0014).
35. J. Shao, T. Ye, and Q. Zhao, *Comment on FDA draft guidance for industry FDA-2019-D-0934: Adjusting for covariates in randomized clinical trials for drugs and biological products*, <https://www.regulations.gov/comment/FDA-2019-D-0934-0034>, 2021.
36. Q. Zhao and T. Hastie, "Causal interpretations of black-box models," *Journal of Business & Economic Statistics*, vol. 39, no. 272-281, pp. 1–10, 2021. DOI: [10.1080/07350015.2019.1624293](https://doi.org/10.1080/07350015.2019.1624293).
37. S. Bacallado, Q. Zhao, and N. Ju, "Letter to the editor: Generation interval for COVID-19 based on symptom onset data," *Eurosurveillance*, vol. 25, no. 29, 2020. DOI: [10.2807/1560-7917.es.2020.25.29.2001381](https://doi.org/10.2807/1560-7917.es.2020.25.29.2001381).
38. Q. Zhao, L. J. Keele, and D. S. Small, "Comment: Will competition-winning methods for causal inference also succeed in practice?" *Statistical Science*, vol. 34, no. 1, pp. 72–76, 2019. DOI: [10.1214/18-sts680](https://doi.org/10.1214/18-sts680).
39. Q. Zhao, & S. Panigrahi. "Selective inference for effect modification: An empirical investigation," *Observational Studies* 5, 131–140, 2019.
40. Q. Zhao and D. S. Small, "Graphical diagnosis of confounding bias in instrumental variable analysis," *Epidemiology*, vol. 29, no. 4, e29–e31, 2018. DOI: [10.1097/ede.0000000000000822](https://doi.org/10.1097/ede.0000000000000822).
41. Q. Zhao, C. Zheng, T. Hastie, & R. Tibshirani. "Comment on 'Causal inference using invariant prediction,'" *Journal of the Royal Statistical Society (Series B, Statistical Methodology)*, 78(5), 1005–1007, 2016.

## Preprints

42. F. R. Guo and Q. Zhao, "Confounder selection via iterative graph expansion," 2023. arXiv: [2309.06053 \[stat.ME\]](#).
43. Z. Gao and Q. Zhao, "Simultaneous hypothesis testing using internal negative controls with an application to proteomics," 2023. arXiv: [2303.01552 \[stat.ME\]](#).
44. T. Freidling and Q. Zhao, "Sensitivity analysis with the  $R^2$ -calculus," 2022. arXiv: [2301.00040 \[stat.ME\]](#).
45. Y. Zhang and Q. Zhao, "Sharp bounds and semiparametric inference in  $L^\infty$ - and  $L^2$ -sensitivity analysis for observational studies," 2022. arXiv: [2211.04697 \[stat.ME\]](#).
46. K. Reluga, T. Ye, and Q. Zhao, "A unified analysis of regression adjustment in randomized experiments," 2022. arXiv: [2210.04360 \[stat.ME\]](#).
47. M. J. Tudball, G. D. Smith, and Q. Zhao, "Almost exact mendelian randomization," 2022. arXiv: [2208.14035 \[stat.ME\]](#).
48. F. R. Guo, A. R. Lundborg, and Q. Zhao, "Confounder selection: Objectives and approaches," 2022. arXiv: [2208.13871 \[stat.ME\]](#).
49. Y. Zhang and Q. Zhao, "Multiple conditional randomization tests," 2021. arXiv: [2104.10618 \[math.ST\]](#).
50. E. Katiyar and Q. Zhao, "On testing mean proportionality of multivariate normal variables," 2021. arXiv: [2103.05574 \[math.ST\]](#).
51. Q. Zhao, Y. Chen, and D. S. Small, "Analysis of the epidemic growth of the early 2019-nCoV outbreak using internationally confirmed cases," Feb. 2020. DOI: [10.1101/2020.02.06.20020941](#).
52. Y. Song and Q. Zhao, "Performance evaluation with latent factors," 2018. DOI: [10.2139/ssrn.3216272](#). arXiv: [3216272](#).
53. Q. Zhao, T. Hastie, and D. Pregibon, "Estimation and prediction in sparse and unbalanced tables," 2017. arXiv: [1703.02081 \[stat.CO\]](#).

## Talks and Presentations

**2015** ACM KDD Conference, Sydney, Australia.

**2016** Rutgers University (Department of Statistics); New York University (Department of Information, Operations and Management Science); Joint Statistical Meeting (JSM), Seattle, Washington, USA.

**2017** Atlantic Causal Inference Conference, New York, New York, USA; University of Bristol (MRC Integrative Epidemiology Unit).

- 2018** University of Minnesota (Department of Statistics); Johns Hopkins University (Department of Biostatistics); UC Berkeley (School of Public Health, Division in Biostatistics); Stanford University (Department of Statistics); Atlantic Causal Inference Conference, Pittsburgh, Pennsylvania, USA; International Conference on Econometrics and Statistics (EcoSta), Hong Kong; ICSA Applied Statistics Symposium, Rutgers, New Jersey, USA; University of British Columbia (Department of Statistics); Rutgers University (Department of Biostatistics and Epidemiology); Cornell University (Department of Statistics).
- 2019** University of Washington (Department of Biostatistics); University of Southern California (Marshall School); Yale University (Department of Biostatistics); Rutgers University (Department of Statistics); University of Minnesota (Department of Statistics); University of Michigan (Department of Statistics); University of Cambridge (DPMMS); Harvard University (Department of Statistics); University of Wisconsin (Department of Statistics); Carnegie Mellon University (Department of Statistics); Bayesian Causal Inference Workshop, Ohio State University; Banff International Research Station (BIRS) Workshop; WNAR Annual Meeting, Portland, Oregon, USA; CCI Causal Inference Summer Institute, Rutgers University; Mendelian Randomization Conference, University of Bristol; MRC Biostatistics Unit, University of Cambridge; SAMSI workshop in Causal Inference, North Carolina, USA.
- 2020** University of Cambridge (CCIMI Seminar); Yale University (Department of Biostatistics); Joint Statistical Meeting (JSM); Annual Conference of International Society for Clinical Biostatistics (ISCB); Yale University (Department of Biostatistics); Ohio State University (Department of Statistics); Pacific Causal Inference Conference (PCIC); University of Science and Technology of China (Department of Statistics and Finance); Online Causal Inference Seminar.
- 2021** International Selective Inference Seminar; University of Oslo (Center for Lifespan Changes in Brain and Cognition); Infectious disease outbreaks webinar; EPFL (Department of Statistics); University of Pennsylvania (Center for Statistics in Big Data, Open Insights Seminar); RSS Annual Conference (Research Section Discussion Meeting), Manchester, UK; UC Berkeley (Causal Inference Work Group); University of Pennsylvania (Centre for Causal Inference Seminar); New England Statistics Symposium (online); Learning Meaningful Representations of Life (NeurIPS workshop, online).
- 2022** University of Warwick (CRiSM seminar); MD Anderson (Biostatistics Department); University of Toronto (Department of Statistics); Fisher in the 21st Century Conference, Gonville & Caius College, Cambridge, UK; University of Washington (Center for Statistics and the Social Sciences); University of York (Department of Mathematics); IMS Annual Meeting, London, UK; University of Hong Kong (Department of Statistics and Actuarial Science); Multiple Comparisons (MCP) Conference 2022, Bremen, Germany; Imperial College London (Statistics Seminar).
- 2023** Harvard University (Department of Statistics); Columbia University (Department of Statistics); University of Pennsylvania (Department of Statistics); European Causal Inference Meeting, Oslo, Norway; Advancements in Causal Inference Workshop, University of London; Trinity Mathematical Society, Trinity College, Cambridge; International Seminar on Selective Inference (invited discussant); Colloquium on Causality in Practice, Institute Pascal, Orsay, France; Joint Statistical Meeting 2023, Toronto, Canada.

## Software

1. [bets.covid19](#) on CRAN for likelihood inference for early epidemic data (author and maintainer).
2. [bootsens](#) on GitHub for sensitivity analysis using bootstrap (sole contributor and maintainer).
3. [mr.raps](#) on CRAN for Mendelian randomization via robust adjusted profile score (sole contributor and maintainer).
4. [GRAPPLE](#) on GitHub for multivariable Mendelian randomization (contributor).
5. [ivmodel](#) on CRAN for instrumental variable modeling (contributor for two diagnostics functions, `iv.diagnosis` and `iv.diagnosis.plot`).
6. [CrossScreening](#) on CRAN for cross-screening in observational studies that test many hypotheses (sole contributor and maintainer).
7. [cate](#) on CRAN for high dimensional factor analysis and confounder adjusted testing and estimation (contributor and maintainer).
8. [seismic](#) on CRAN for predicting information cascade by self-exciting point process (contributor and maintainer).

## Professional activities

### Editorial service

Jan 2023 – Associate Editor, Journal of the Royal Statistical Society (Series B: Statistical Methodology).

### Peer review for scientific journals

1. American Journal of Epidemiology.
2. American Journal of Human Genetics.
3. Annals of Applied Statistics.
4. Annals of Statistics.
5. Arteriosclerosis, Thrombosis, and Vascular Biology.
6. Bioinformatics.
7. Biometrics.
8. Biometrika.
9. Canadian Journal of Statistics.
10. Electronic Journal of Statistics.



11. eLife.
12. IEEE Transactions on Knowledge and Data Engineering.
13. IEEE Transactions on Pattern Analysis and Machine Intelligence.
14. International Journal of Data Science and Analytics.
15. Journal of the Americal Statistical Association.
16. Journal of Business & Economic Statistics.
17. Journal of Causal Inference.
18. Journal of Econometrics.
19. Journal of Machine Learning Research.
20. Journal of the Royal Statistical Society (Series A, Statistics in Society).
21. Journal of the Royal Statistical Society (Series B, Statistical Methodology).
22. Management Science.
23. Molecular Psychiatry.
24. Nature Communications.
25. Observational Studies.
26. Proceedings of the National Academy of Sciences.
27. PLOS ONE.
28. PLOS Genetics.
29. Scandinavian Journal of Statistics.
30. Statistics in Medicine.
31. Statistica Sinica.

## Peer review for grant proposals

1. Singapore Ministry of Education Academic Research Fund.
2. Medical Research Council (MRC).
3. Engineering and Physical Sciences Research Council (EPSRC).

## Other services

**Jul 2021**– Co-organizer of **Online Causal Inference Seminar** (with Michael Celentano, Guido Imbens, Ying Jin, Georgia Papadogeorgou, Ema Perkovic, and Dominik Rothenhäusler).

## Teaching

### Full courses

1. Statistical Modelling (Part II), University of Cambridge, Michaelmas 2020, 2021, 2022.
2. Causal Inference (Part III), University of Cambridge, Michaelmas 2019, 2020, 2021, 2022.

### Short courses/Guest lectures

1. Causal Inference in the Social Sciences (Social Science Research Methods Programme, bite-sized modules). (March 2020)
2. Machine Learning Meets Biostatistics—A crash course on causal inference, CCAIM summer school. (September 2022)
3. Graphical models, Systems Biology Part III, University of Cambridge. (January 2021, January 2022, January 2023)
4. Introduction to causal inference, MPhil in Population Health Science, Module in Advanced Biostatistics for Epidemiology. (February 2022, April 2023)
5. Summer Institute for Statistics for Clinical and Epidemiological Research (SISCER), University of Washington. (July 2022, July 2023)

## Previous employments and appointments

**Sep 2011–Jun 2016** Teaching and research assistant, Department of Statistics, Stanford University.

**Jun 2013–Sep 2013** Generative research intern, eBay (search ranking team, mentor: Shaji Sebastian).

**Jun 2014–Sep 2014** Decision support analyst intern, Google (advertiser analytics team, mentor: Daniel Percival).

**Jun 2015–Sep 2015** Decision support analyst intern, Google (cloud analytics team, mentor: Sangho Yoon).

**Aug 2016–Jul 2019** Postdoctoral Researcher, Department of Statistics, University of Pennsylvania. (Supervisor: Dylan Small)

**Oct 2021–Sep 2023** Fellow, The Alan Turing Institute.