

YIYANG GAO

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I am a quantitative sociologist specialising in educational inequality and ethnic segregation research. My work examines how educational systems both reflect and reproduce social inequalities, with particular focus on multilevel analysis of hierarchical data structures. I have extensive experience with large administrative datasets, advanced statistical methods including multilevel modelling, and a strong track record in both quantitative analysis and collaborative research projects.

EDUCATION

University of Exeter

PhD Advanced Quantitative Methods (AQM) in Social Sciences

2018-2024

❖ Thesis: Ethnic School Segregation in England

- Developed novel multi-group, multi-scale analytical framework combining entropy-based measures with decomposition techniques
- Applied multilevel modelling to analyse hierarchical educational data across multiple geographical scales

❖ Supervisors: Prof Alexey Bessudnov and Dr Chris Playford

University College London

MSc Quantitative Research Methods

2016-2017

❖ Thesis: Evaluating the Causal Impact of Autonomous Admission Policies in Chinese Universities

- Employed quasi-experimental methods combining Difference-in-Differences with Propensity Score Matching
- Analysed longitudinal data from Beijing College Students Panel Survey
- Revealed heterogeneous policy effects across different university tiers
- Provided evidence-based policy recommendations for differentiated implementation approaches

Shandong University

BSc in Sociology, GPA: 91.44/100, first-ranking (1/56)

2012-2016

RELEVANT RESEARCH PROJECTS

Investigating the Recruitment and Retention of Ethnic Minority Teachers, and Its Relationship to School Outcomes

2023-2025

This ESRC funded project ([ES/X00208X/1](#)) investigates mismatch between teacher workforce and student populations in terms of ethnic disproportionality and why it matters for teachers and students. My duties include:

❖ **Advanced Quantitative Analysis:** Led multiple studies applying multilevel modelling and survival

analysis to examine ethnic disparities in teacher retention and career progression using the School Workforce Census.

- ❖ **Large Dataset Management:** Secured access to and managed multiple large administrative datasets through the ONS Secure Research Service, including School Workforce Census spanning all teachers in state-funded schools in England (2010-2022).
- ❖ **Methodological Innovation:** Pioneered application of survival analysis to teacher retention data, implementing sophisticated multi-cohort design to track 10 consecutive cohorts.
- ❖ **Intersectionality Research:** Examined how intersecting factors of ethnicity, gender, and geography impact career outcomes in education.
- ❖ **Policy-Relevant Research:** Conducted research directly relevant to policy on educational inequality and teacher workforce diversity.
- ❖ **Impact and Dissemination:** Organized stakeholder events and managed project communications.
- ❖ **Project Administration:** Led SRS project applications, ethics applications, and data management processes.
- ❖ **Mixed Methods Expertise:** Integrated quantitative analysis with qualitative interviews (33 completed) to provide comprehensive understanding of educational inequalities.
- ❖ **Publication Output:** Authored multiple peer-reviewed papers and working papers addressing educational inequalities and ethnic disparities.

PhD Research

2018-2024

Ethnic School Segregation in England

- ❖ **Multilevel Analysis:** Applied multilevel models to analyze nested educational data structures (students within schools within geographical areas).
- ❖ **Spatial Analysis:** Conducted geographical analysis of segregation patterns across multiple regional scales in England.
- ❖ **Longitudinal Analysis:** Tracked changes in segregation patterns over time using administrative data.
- ❖ **Large Dataset Management:** Worked with National Pupil Database and administrative datasets through secured research environments.
- ❖ **Methodological Innovation:** Developed novel framework combining entropy-based measures with decomposition techniques.
- ❖ **Publication Output:** Generated multiple peer-reviewed papers documenting patterns of educational inequality.

GRANT APPLICATION

Educational Equity in England: Examining Accessibility, Transport, and School Segregation

- ❖ Co-investigator. Submitted to the Nuffield Foundation, ESRC, and Spencer Foundation. Collaborating with Leeds Institute for Data Analytics and Glasgow Urban Big Data Centre. In progress and decision pending.

Ethnic Variations in Graduate Spatial Mobility: Impacts and Implication

- ❖ Co-investigator. Submitted to the ESRC responsive mode: research grants round two, standard application. Collaborating with Oxford, Birmingham, and Newcastle University. In progress and decision pending.

SKILLS

Statistical Methods & Software

- ❖ **Multilevel Modelling:** Extensive experience with hierarchical linear models using MLwiN and R, specifically applied to educational data.
- ❖ **Statistical Software:** R (advanced), Stata, Python, GeoDa, QGIS, Git.
- ❖ **Advanced Statistical Techniques:** Decomposition analysis, quasi-experimental methods, longitudinal data analysis, structural equation modelling, spatial regression.
- ❖ **Data Visualisation:** Advanced skills in R Markdown for reproducible research, ggplot2, interactive dashboards, spatial data visualization.

Data Management & Analysis

- ❖ **Large Administrative Datasets:** Extensive experience with the School Workforce Census, National Pupil Database, and UCAS through ONS Secure Research Service.
- ❖ **Survey Data:** Experience with Understanding Society, Millennium Cohort Study in the UK Data Service Secure Lab.
- ❖ **Data Cleaning & Preparation:** Proficiency in data validation, documentation, and preparation for complex analyses using R.
- ❖ **Survey Implementation:** Experience designing and implementing nationwide surveys using Qualtrics.

Research Methods

- ❖ **Mixed-Methods Research:** Integration of quantitative analysis with qualitative interviews.
- ❖ **Systematic Reviews:** Led multiple systematic reviews consolidating thousands of research items.
- ❖ **Qualitative Analysis:** Experience with NVivo for qualitative data analysis.

TEACHING EXPERIENCE AND EXPERTISE

University of Durham

2023-present

Module Teacher: Secondary Data in Education Research Analysis

- ❖ Designed and delivered research methods training for master's students
- ❖ Developed practical sessions using major educational datasets (NPD, PISA, TALIS, TIMSS, PIRLS)
- ❖ Supervised student research projects
- ❖ Provided individualized support in quantitative analysis with SPSS and Excel

University of Exeter

2020-2022

Laboratory Instructor: R Programming Bootcamp

- ❖ Developed teaching materials in R Markdown
- ❖ Delivered teaching with the focus on R visualization and reproducible research

Module Teacher: Social Science Data Analysis II

- ❖ Delivered a laboratory course on the R programming and social statistics (linear and logistic regression)
- ❖ Supported students from diverse academic backgrounds (Sociology, Criminology, Politics, IR)

Teaching Assistant: Social Science Data Analysis III

- ❖ Provided onsite support for coding
- ❖ Provided coursework evaluation, marking, and feedback on Github Classroom
- ❖ One-to-one support for Git, data wrangling with dplyr, data visualisation with ggplot2, web scraping and data mining using Twitter API
- ❖ Provided dissertation supervision support

PUBLICATIONS

Gao, Y., 2025. Evolving Patterns of Ethnic Segregation in English Schools: A Decomposition Analysis, *Population, Space and Place*, <https://dx.doi.org/10.1002/psp.70060>

SELECTED CONFERENCES AND PRESENTATIONS

UPCOMING

Data Collision: Where Social Meets Health **Cardiff, 2025.09**

- ❖ Datathon combining social and health data. Hosted by ADR Wales and Datacise.

The British Society of Population Studies (BSPS) Annual Conference **Swansea, 2025.09**

- ❖ Session Convenor: Systems and simulation approaches in population research
 - Organised collaborative session focusing on spatial microsimulation, agent-based models (ABMs), and system dynamics models
 - Collaborated with researchers from University of Glasgow, Durham University, and University of Oxford

ADR UK Conference 2025 **Cardiff, 2025.09**

- ❖ Paper presentation, “From Records to Retention: Using Administrative Data to Examine Ethnic Differences in Teacher Career Trajectories” under the sub-theme “Data Linking and Analysis Methods, Systems, and Innovations”.

The Royal Geographical Society Annual International Conference 2025 **Birmingham, 2025.09**

- ❖ Paper presentation, “Moving Up or Moving Out? Spatial-Temporal Patterns of Teacher Career Advancement and Regional Mobility in English Schools” under the sub-theme “Spatial Methods for Spatial Populations”, sponsored by Quantitative Methods Research Group and the Population Geography Research Group.

PAST

The 12th International Conference on Population Geographies **Belfast, 2024.07**

- ❖ Presented “Evolving Patterns of Ethnic School Segregation in England”

Quantitative Spatial Science Group Seminar **Bristol, 2023.11**

The British Society of Population Studies (BSPS) Annual Conference **Winchester, 2022.09**

- ❖ Presented “Geographical variation in multi-group, multi-scale ethnic school segregation in England” at the session of “Ethnic segregation, diversity and neighbourhood”

The Royal Geographical Society Annual International Conference **Newcastle, 2022.08**

- ❖ Presented “Trends of ethnic school segregation in England since the 2000s” at the session of “Geography of education across the North-East and Beyond”

European Consortium of Sociological Research (ECSR) Spring School

Turin, Italy, 2022.03

- ❖ Presented “An overview of the multi-group, multi-scale ethnic school segregation in England” at the Geography, Mobility, and Social Stratification Spring School

MEMBERSHIP

- ❖ ONS Accredited Researcher, issued by the Office for National Statistics in 01/2019. Valid until 10/2027.
- ❖ Accredited Researcher for UK Data Service Secure Lab, issued in 10/2022. To be renewed.
- ❖ Full member of the British Society of Population Studies (2022-)

OTHER SELECTED TRAININGS

- ❖ Introduction to Spatial Data and Using R as a GIS, National Centre of Research Methods, Oct 2022
- ❖ (Admitted) BIGSSS-CSS Computational Social Sciences Summer School on Social Cohesion, the Cultural Swarms project, University of Groningen, Netherlands, June 2022
- ❖ Introduction to Multilevel Modelling, Centre of Multilevel Modelling, University of Bristol, Jan 2022
- ❖ Introduction to Latent Growth Models and Structural Equation Models, National Centre of Research Methods, June 2021
- ❖ PhD Work Placement, Data Science Lab, Department for Education, London, Jan 2020
- ❖ Identifying Causation through Experimental and Quasi-Experimental Research, Essex Summer School in Social Science Data Analysis, August 2019

REFERENCES

- ❖ Professor Alexey Bessudnov (A.Bessudnov@exeter.ac.uk)
Relationship: First Supervisor
Associate Professor in Sociology
Centre for Computational Social Science, Department of Sociology and Philosophy, University of Exeter
- ❖ Dr Chris Playford (C.J.Playford@exeter.ac.uk)
Relationship: Second Supervisor
Senior Lecturer in Sociology
Centre for Computational Social Science, Department of Sociology and Philosophy, University of Exeter
- ❖ Professor Richard Harris (Rich.Harris@bristol.ac.uk)
Relationship: External Examiner and Mentor
Professor of Quantitative Social Geography
School of Geographical Sciences, University of Bristol
- ❖ Professor Nadia Siddiqui FAcSS (nadia.siddiqui@durham.ac.uk)
Relationship: Employer
Professor of Child Development
School of Education, University of Durham