Si Fang

A Post-doctoral Researcher in Genetic Epidemiology and Causal Inference

I am interested in (1) studying the associations between modifiable risk factors (e.g., body mass index), molecular features (gene expression, protein and DNA methylation) and healthy ageing, and (2) drug target discovery, validation and drug repurposing using genetic and observational methods. My postdoctoral research involves triangulating evidence from multiple causal inference techniques to examine the clinical outcomes of medications.

@ si.fang@bristol.ac.uk | LinkedIn: si-fang | ORCiD: 0000-0003-4934-1212

Education

PhD in Molecular, Genetic and Lifecourse Epidemiology — Bristol, United Kingdom
University of Bristol — *Sep 2019 – Nov 2023*

- **PhD Thesis:** Dissecting causal relationships and molecular mechanisms in disease using genetic risk profiles
- **Supervisors:** Dr Tom G. Richardson (primary), Prof George Davey Smith, Prof Tom R. Gaunt
- **Research Area:** Genetic and molecular epidemiology, developing open-access resources of association atlas.

MPhil in Genomic Medicine — Cambridge, United Kingdom
University of Cambridge — *Oct 2017 – Oct 2018*

- **MPhil Thesis:** Identifying cancer microRNA signatures in testicular germ cell tumours from The Cancer Genome Atlas (TCGA)
- **Supervisors:** Dr Anton Enright (primary), Dr Matthew Murray and Prof Nick Coleman
- **Research Area:** RNA-seq analysis, medical genetics

BSc in Genetics & BSc in Biological Sciences — Suzhou, China & Liverpool, UK
University of Liverpool & Xi'an Jiaotong-Liverpool University — *Sep 2013 – Jul 2017*

- **Final Year Project:** Anoxia-induced gene expression regulation in the brain of the crucian carp (*Carassius carassius*)
- **Supervisor:** Prof Andrew Cossins
- **Research Area:** RNA-seq analysis, gene set enrichment using KEGG/GO databases.

Work Experience

Institute for Environmental Medicine (IMM), Karolinska Institutet — Stockholm, Sweden
Visiting Post-doctoral Researcher — *Feb 2024 – Now*

- I was awarded a Wellcome Trust MGLE PhD Transition Fellowship from the University of Bristol to support my 6-month research visit to the CAUSALab (PI: Dr Anita Berglund) at the Karolinska Institutet, Stockholm, Sweden.
- I will gain skills in causal inference by conducting a target trial emulation study using electronic health records and other data from the Swedish national registers.

Wellcome Centre for Human Genetics, University of Oxford — Oxford, United Kingdom
Research Assistant in Diabetic Genetics — *Sep 2018 – Mar 2019*

- Compared polygenic risk score prediction software, including PRSice and LDpred, for constructing type 2 diabetes risk score model using data from the UK Biobank.
- Processed RNA-Seq raw data of 329 human pancreatic islet samples, and developed bash scripts for adding additional steps in the processing pipeline.

Publications

Fang S, Yarmolinsky J, Gill D, Bull CJ, Perks CM, the PRACTICAL Consortium, *et al.* Association between genetically proxied PCSK9 inhibition and prostate cancer risk: A Mendelian randomisation study. PLOS Medicine. 2023 Jan 3;20(1):e1003988. | *PubMed*

Fang S, Holmes MV, Gaunt TR, Davey Smith G, Richardson TG. Constructing an atlas of associations between polygenic scores from across the human phenome and circulating metabolic biomarkers. eLife. 2022 Oct 11;11:e73951. | *PubMed*

Fang S, Hemani G, Richardson TG, Gaunt TR, Davey Smith G. Evaluating and implementing block jackknife resampling Mendelian randomization to mitigate bias induced by overlapping samples. Human Molecular Genetics. 2022 Aug 6;ddac186. | *PubMed*

Fang S, Wade KH, Hughes DA, Fitzgibbon S, Yip V, Timpson NJ, *et al.* A multivariant recall-by-genotype study of the metabolomic signature of BMI. Obesity (Silver Spring). 2022;30(6):1298–310. | *PubMed*

Richardson TG, Crouch DJM, Power GM, Morales-Berstein F, Hazelwood E, **Fang S**, *et al.* Childhood body size directly increases type 1 diabetes risk based on a lifecourse Mendelian randomization approach. Nature Communications. 2022 Apr 28;13(1):2337. | *PubMed*

Zheng J, Zhang Y, Rasheed H, Walker V, Sugawara Y, Li J, ..., **Fang S**, *et al.* Trans-ethnic Mendelian-randomization study reveals causal relationships between cardiometabolic factors and chronic kidney disease. International Journal of Epidemiology. 2021 Dec 1;50(6):1995–2010. | *PubMed*

Rasheed H, Zheng J, Rees J, Sanderson E, Thomas L, Richardson TG, **Fang S**, *et al.* The causal effects of serum lipids and apolipoproteins on kidney function: multivariable and bidirectional Mendelian-randomization analyses. International Journal of Epidemiology. 2021 Oct 1;50(5):1569–79. | *PubMed*

Richardson TG, **Fang S**, Mitchell RE, Holmes MV, Davey Smith G. Evaluating the effects of cardiometabolic exposures on circulating proteins which may contribute to severe SARS-CoV-2. eBioMedicine; 2021 Feb 1;64. | *PubMed*

Preprints

Power GM, Tyrrell J, Gkatzionis A, **Fang S**, Heron J, Davey Smith G, *et al.* Examining risk factors for weight change during midlife: A Mendelian randomization study. medRxiv; 2023. p. 2021.07.21.21260895. Available from: https://www.medrxiv.org/content/10.1101/2021.07.21.21260895v2

Lee M, Hatcher C, McGuinness L, McBride N, Battram T, Wan W, **Fang S**, *et al.* Systematic review and meta-analyses: What has the application of Mendelian randomization told us about the causal effect of adiposity on health outcomes? Wellcome Open Research. 2022;7(308). Available from: https://wellcomeopenresearch.org/articles/7-308/v1

Conference Proceedings

Poster presentation. Separating the causal effects from the exposure-indicator aspects of height in relation to coronary heart disease. **European Society of Human Genetics 2023 Annual Meeting** (Jun 2023)

Poster blitz & poster presentation. Separating the causal effects from the exposure-indicator aspects of height in relation to coronary heart disease. **CHARGE Consortium 2023 Boston Meeting** (May 2023)

Oral presentation. Genetically proxied PCSK9 inhibition provides indications of lower prostate cancer risk: a Mendelian randomization study. **American Society of Human Genetics 2022 Annual Meeting** (Oct 2022)

Oral presentation. Constructing an atlas of associations between polygenic scores from across the human phenome and circulating metabolic biomarkers. **CHARGE Consortium 2022 Seattle Meeting** (Oct 2022)

Lightning talk & poster presentation. Genetically proxied PCSK9 inhibition provides indications of lower prostate cancer risk: a Mendelian randomization study. **Target Validation using Genomics and Informatics** (May 2022)

Three-minutes thesis presentation. Dissecting causal relationships and molecular mechanisms in disease using genetic risk profiles. **UK Biobank Scientific Conference 2021** (Nov 2021)

Poster presentation. An atlas of associations between polygenic risk scores from across the human phenome and circulating metabolic biomarkers. **American Society of Human Genetics 2021 Annual Meeting** (Oct 2021)

Oral presentation. Jackknife resampling Mendelian randomization enables investigation into sex specific effects within a multivariate setting. **Mendelian randomization conference** (Jul 2021)

Poster presentation. A Mendelian randomization study to evaluate the effect of genetically predicted alcohol consumption on disease risk. **American Society of Human Genetics 2020 Annual Meeting** (Oct 2020)

Poster presentation. A recall-by-genotype study on the metabolomic signatures of body mass index. **Metabolomics 2020 Online Conference** (Oct 2020)

Awards & Achievements

Wellcome Trust MGLE PhD Transition Fellowship (2023): Approx. £30,675 from the Wellcome Trust PhD in Molecular, Genetic and Lifecourse Epidemiology Transition Fund at the University of Bristol to support a 6-month research visit at the Karolinska Institutet for my career transition.

International Travel Award for Early-Career Investigator (2023): Up to $2,750 awarded to researchers from outside the United States to present a high-scoring abstract at the 2023 Boston CHARGE meeting.

International Travel Award for Early-Career Investigator (2022): Up to $2,500 awarded to researchers from outside the United States to present a high-scoring abstract at the 2022 Seattle CHARGE meeting.

Wellcome Trust Four-year PhD Studentships in Science (2019): Awarded to 3 students (including 1 oversea student) per year to study in the Molecular, Genetic and Lifecourse Epidemiology PhD program. The studentship includes a stipend, PhD registration fees, and research expenses totalling £40,000 over 4 years.

Retention of University Entry Scholarship (2014): RMB ¥33,000 (equivalent to approx. £3,800) awarded to University Entry Scholarship awardees who achieved an overall score ranking in the top 20% of their cohort.

University Entry Scholarship (2013): RMB ¥33,000 (equivalent to approx. £3,800) awarded to students who achieved top scores in the National College Entrance Examination of China.

Research Recognition

Peer reviewer (2022 – now) for BMJ Medicine, BMJ Oncology, BMC Medicine, International Journal of

Epidemiology, Human Molecular Genetics and PLOS One.

Teaching Experience

Bristal Medical School Short Course Tutor Bristol, UK
University of Bristol *2022*

- **Introduction to Data Visualisation and Web Applications Using R:** provided tutorials on advanced R graphics, R Markdown, and Shiny app.
- **Genetic Epidemiology:** tutored on bioinformatics (mapping genomic variant to function) and omics techniques (eQTL and meQTL analysis) practicals.

Volunteer Experience

Group meeting organiser (2022) of MRC Integrative Epidemiology Unit Program 1 monthly meetings.

Helper at induction events (2022), gave talks on "lessons I learnt as a PhD student" and "introduction to genetic epidemiology".

PhD student buddy (2020 – 2022) for new starters in the same program or with similar backgrounds. Helped them become familiar with the campus and encouraged their participation in PGR social events.

Mentor for MSc students (2020 – 2022), offered advice on academic careers and life as researchers for MSc students who are interested in pursuing a PhD degree.

Skills

Research methods: Polygenic scores, Mendelian randomization (summary-level MR, individual-level MR, drug target MR, within-family MR), colocalization, genome-wide association study, survival analysis, analysis of high-dimensional dataset, simulation studies, LD score regression.

Programming: R language (tidyverse, R Markdown), Shell scripting (Bash), Stata, Git, LaTeX, experience with working on high-performance computing servers.

Academic skills: Academic writing, collaborative research, public speaking, project management, problem-solving, ability to learn quickly.

Languages: Chinese (Native), English (Professional).

Relevant Training

Internal: Linear and Logistic Regressions, Systematic Review and Meta-analysis, Genetic Epidemiology, Causal Inference, Mendelian randomization, Data Analysis and Visualization Using R, Missing Data Imputation, Analysis of Repeated Measures

External: Summer Institute in Statistical Genetics (SISG) (University of Washington), International Statistical Genetics Workshop (University of Colorado, Boulder), Advanced Confounding Adjustment, Target Trial Emulation (Harvard T.H. Chan School of Public Health)

References

Dr Tom G. Richardson University of Bristol & GlaxoSmithKline, tom.g.richardson@bristol.ac.uk

Prof Tom R. Gaunt University of Bristol, tom.gaunt@bristol.ac.uk

Prof George Davey Smith University of Bristol, kz.davey-smith@bristol.ac.uk