BORAN GAO

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EDUCATION

University of Michigan, Ann Arbor, MI

- **Doctor of Philosophy** in Biostatistics (GPA: 4.0) *Expected April 2023*
- **Master of Science** in Biostatistics (GPA: 4.0) *April 2017*
- **Master of Public Health** in Epidemiology (GPA: 4.0) *April 2017*

Soochow University, Suzhou, China

- **Bachelor of Medicine, Bachelor of Surgery** (GPA: 3.2) *July 2011*

RESEARCH EXPERIENCE

Graduate Student Research Assistant,University of Michigan, Ann Arbor *Jan 2018 - Present*

- Methods Development
  - Genetic correlation estimation by incorporating environmental correlation and integrating functional annotations. Derive the implement composite likelihood based optimization algorithm, perform simulation and real data analysis comparing with existing methods LDSC regression and GNOVA.
  - Mendelian Randomization method for identifying the causal relationship between complex traits, derive and implement composite likelihood approach based optimization algorithm
  - Fine-mapping across multiple ancestries, develop variational inference algorithm for sum of single effect model, do simulation and real data analysis comparing with existing methods MsCaviar, Paintor, SuSie.
  - Extend MAPIT using liability threshold model for epistasis detection in binary traits, perform simulation and real data analysis comparing with existing methods.
- Data Analysis
  - Performed eQTL and transcriptome-wide association analysis across multiple ancestry groups in MEAS study.

TEACHING AND SUPERVISOR EXPERIENCE

Graduate Student Instructor, University of Michigan, Ann Arbor *Jan 2016 - Jan 2017*

- Awarded Best Graduates Instructor.
- Taught 100+ total graduate students in courses Strategies and Uses of Epidemiology, Statistical Methods for Epidemiology.
- Wrote and presented 30-minute lab lectures once per week for 24 weeks, to teach study design, research methods and statistical approaches in Epidemiology.

LEADERSHIP AND SERVICES

- **Diversity, Equity and Inclusion Committee** of Biostatistics *Sep 2019 - July 2021*
  - Host events that promote intercultural exchanges like Lunar New Year celebration

- Discussion of DEI-related research topics in DEI Research Seminar

SOFTWARE AND SKILLS

- R, Python, SAS
- Statistical genetic tools and softwares
  - PLINK, vcftools, LDSC, GNOVA, METAXCAN,GEMMA, GCTA, Metal, Metasoft, MR-MEGA, MsCaviar, Paintor

R, SAS, Python

PUBLICATIONS

Peer-reviewed Publications

1. **Gao, B.**, Yang, C., Liu, J., Zhou, X. (2021). Accurate genetic and environmental covariance estimation with composite likelihood in genome-wide association studies. *PLoS genetics*, 17(1), e1009293.
2. Wang, L., **Gao, B.**, Fan, Y., Xue, F., Zhou, X. (2021). Mendelian randomization under the omnigenic architecture. *Briefings in Bioinformatics*, 22(6), bbab322.

Papers in Progress

1. Crawford L., **Gao, B.**, Zhou, X. Genome-wide Marginal Epistatic Association Mapping in Case-Control Studies. *The Annals of Applied Statistics Under Revision*
2. Feng Q., **Gao, B.**, Zhang D., Scott L., Lee S., Zhou, X. Transcriptome-wide association studies in lipid traits in diverse study populations. *In preparation*