GUAN'AO YAN

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RESEARCH AREA

My research interests lies in developing new statistical methods for understanding the real world data. Specific research topics include

- Bioinformatics
  - Statistical methods for analyzing high-dimensional single-cell and spatial omics data
  - Using synthetic data to enhance the statistical rigor in single-cell and spatial omics data analysis
- Statistics: High-dimensional model inference and variable selection
- Education: Statistical methods for enforcing education equity (reported by Forbes)

EDUCATION

University of California, Los Angeles 09/2020 - Present
Ph.D. Candidate in Statistics
Advisor: Dr. Jingyi Jessica Li

Zhejiang University 09/2017 - 03/2020
M.Sc in Probability and Mathematical Statistics
Advisor: Dr. Yi Zhang

Shandong University 09/2013 - 06/2017
B.Sc in Mathematics and Applied Mathematics
B.Ec in Economics

AWARDS

JXTX+CSHL Genome Informatics 2023 Scholarship — Cold Spring Harbor Laboratory, 2023
Don Ylvisaker Award for the Best Practice of Statistics — University of California, Los Angeles, 2023
Interdisciplinary Opportunity Award — NSF-Simons Center for Multiscale Cell Fate Research, 2022
Most Promising Statistician Award — University of California, Los Angeles, 2022
Summer Mentored Research Fellowship — University of California, Los Angeles, 2021
China National Scholarship — Chinese Government, 2018
Merit Graduate Student Award — Zhejiang University, 2018
Outstanding Student Award — Shandong University, 2014 - 2016
Hua Loo-Keng Talent Scholarship — Chinese Academy of Sciences, 2015

PUBLICATIONS

†*Indicating co-first author*

G. Yan, J.J. Li and M. Biggin (2024). Question-Score Identity Detection (Q-SID): A statistical algorithm to detect collusion groups with error quantification from exam question scores. arXiv, 2407.07420. [Website] [Forbes article] [Podcast] (Under review at *Journal of the American Statistical Association*)

G. Yan, S. Hua and J.J. Li (2024). Categorization of 31 computational methods to detect spatially variable genes from spatially resolved transcriptomics data. arXiv, 2405.18779. (Under revision at *Nature Communications*)

G. Yan, D. Song and J.J. Li (2023). scReadSim: a single-cell RNA-seq and ATAC-seq read simulator. Nature Communications, 14(1), 7428. [Software] [Website]

D. Song, Q. Wang, **G. Yan**, T. Liu and J.J. Li (2023). scDesign3 generates realistic in silico data for multimodal single-cell and spatial omics. Nature Biotechnology, 1-6. [Software]

Z. Li, Z. M. Patel, D. Song, **G. Yan**, J. J. Li and L. Pinello (2023). Benchmarking computational methods to identify spatially variable genes and peaks. bioRxiv, 2023-12. (Under review at *Nature Methods*)

S. Tang, H. Wang, **G. Yan**, L. Zhang (2022). Empirical likelihood based tests for detecting the presence of significant predictors in marginal quantile regression. Metrika, 1-31.

S. Chen†, **G. Yan**†, W. Zhang, J. Li, R. Jiang and Z. Lin (2021). RA3 is a reference-guided approach for epigenetic characterization of single cells. Nature Communications, 12(1), 1-13. [Software]

J. Zhao, **G. Yan** and Y. Zhang (2021). Robust estimation and shrinkage in ultrahigh dimensional expectile regression with heavy tails and variance heterogeneity. Statistical Papers, 1-28.

J. Zhao†, **G. Yan**† and Y. Zhang (2019). Semiparametric expectile regression for high-dimensional heavy-tailed and heterogeneous data. arXiv, 1908.06431.

PATENTS

M. Biggin, J.J. Li, **G. Yan**. Systems and methods for detecting collusion in student testing using graded scores or answers for individual questions (Serial No. 17/450,984; US Patent 11,915,615 B2)

SOFTWARE

Q-SID An online anti-collusion proctoring system, 2022. [Website]

scReadSim Python package of synthetic reads simulator designed for the single-cell multiomics data, 2022. [Software]

RA3 R package of "RA3 is a reference-guided approach for epigenetic characterization of single cells", 2021. [Software]

PRESENTATIONS & POSTERS

Oral Presentations

- Joint Statistical Meetings (JSM) Portland, 08/2024
- Institute for Computational and Experimental Research in Mathematics (ICERM) Providence, 12/2023
- Jonsson Comprehensive Cancer Center Gene Regulation Seminar Los Angeles, 11/2023
- Institute for Quantitative and Computational Biosciences Research Seminar Los Angeles, 12/2022
- NSF-Simons Center for Multiscale Cell Fate 5th Annual Symposium Irvine, 10/2022
- The 7th International Conference on Statistics and Probability, IMS-China Dalian, China, 07/2019

Posters

- Cold Spring Harbor Laboratory Genome Informatics Conference New York, 12/2023
- RECOMB/ISCB Conference on Regulatory & Systems Genomics Los Angeles, 11/2023
- CZI Single-Cell Biology 2023 Annual Meeting Carlsbad, 11/2023
- Intelligent Systems for Molecular Biology/European Conference on Computational Biology Lyon, France, 07/2023
- LA Bioscience Ecosystem Summit Los Angeles, 05/2023
- Jonsson Comprehensive Cancer Center Retreat Poster Session Los Angeles, 05/2023

· Institute for Quantitative and Computational Biosciences Poster Session — Los Angeles, 09/2022

TEACHING & MENTORING

Teaching Assistant

· STATS 205, Hierarchical Linear Models — UCLA, Spring 2024
· STATS 203, Large Sample Theory — UCLA, Winter 2024
· MATH 1001, Advanced Mathematics — Zhejiang University, Fall 2019
· MATH 1001, Advanced Mathematics — Zhejiang University, Fall 2018

Guest lecture

· STATS 205, Hierarchical Linear Models — UCLA, Spring 2024
· BIOINFO 229, Current Topics in Bioinformatics — UCLA, Winter 2024

Student Mentoring

· Weijian Wang, Zhejiang University — 12/2022 - Present
· Zhiyin Liu, Hong Kong University of Science and Technology — 12/2022 - Present
· Shuo Hua, Tsinghua University — 06/2022 - 12/2022

PROFESSIONAL EXPERIENCE

Graduate Student Reseracher — 09/2021 – Present
Department of Statistics & Data Science
University of California, Los Angeles
Advisor: Dr. Jingyi Jessica Li

Research Scientist Intern — 06/2024 – 09/2024
Data and Statistical Sciences
Product Development Department
Genentech

Research Scientist Intern — 06/2023 – 09/2023
Data and Statistical Sciences
Product Development Department
Genentech

Research Assistant — 06/2019 – 04/2020
Department of Statistics
The Chinese University of Hong Kong
Advisor: Dr. Zhixiang Lin

Undergraduate Researcher — 06/2016 – 06/2017
Academy of Mathematics and Systems Science
Chinese Academy of Sciences
Advisor: Dr. Jianming Xia

PROFESSIONAL SERVICE

Reviewer for Scientific Journals:
Bioinformatics (5)

Co-reviewer for Scientific Journals:
Cell (2), Nature Biotechnology (1), Nature Methods (3), Nature Communications (3), Nature Machine Intelligence (1), Genome Biology (2), Bioinformatics (2), Journal of the American Statistical Association

(1), Annals of Applied Statistics (1), NAR Genomics and Bioinformatics (5), Science Bulletin (1), Statistics in Medicine (1)

Co-reviewer for Scientific Conferences:
Research in Computational Molecular Biology (5), Intelligent Systems for Molecular Biology (5)

PROFESSIONAL AFFILIATIONS

Institute of Mathematical Statistics
American Statistical Association
American Society of Human Genetics
UCLA Jonsson Comprehensive Cancer Centers
International Indian Statistical Association