

Haoran Li

Curriculum Vitae, October 2026

Department of Mathematics and Statistics

Auburn University, Alabama, USA

Phone: +1 (530) 574-9176

Email: hzl0152@auburn.edu

Website: haoranli.github.io



Research Interests

My research spans high-dimensional statistics and applied probability theory, with a particular focus on random matrix theory and its applications. My research interests include: High-dimensional statistical inference, Time series analysis, Change-point detection, Applications to climate science and neuroscience.

Professional Experience

Assistant Professor (tenure track)

Department of Mathematics and Statistics, Auburn University, Alabama, USA

August 2022–Present

Term Assistant Professor in Statistics (non-tenure track)

Department of Statistics, Columbia University, New York, USA

July 2019–June 2022

Education

Ph.D. in Statistics

University of California, Davis, 2014–2019

Supervisors: Debashis Paul and Alexander Aue

M.Sc. in Statistics

University of California, Davis, 2013–2014

B.Sc. in Mathematics and Statistics

Shandong University, Jinan, China, 2009–2013

Publications

[CAS: 2025 CAS Division] [IF: 2025 Journal Impact Factor].

- **H. Li** (2026). Ridge-regularized largest root test for high-dimensional general linear hypotheses. *The Annals of Statistics*, **54**(6). [CAS: 1; IF: 3.7]
- **H. Li**, A. Aue, D. Paul, J. Peng, and P. Wang (2020). An adaptable generalization of Hotelling's T^2 test in high dimension. *The Annals of Statistics*, **48**(3), 1815–1847. [CAS: 1; IF: 3.7]
2017 ICSA Best Student Paper Award, International Chinese Statistical Association.
- **H. Li**, A. Aue, D. Paul, and J. Peng (2024). Testing general linear hypotheses under a high-dimensional multivariate regression model with spiked noise covariance. *Journal of the American Statistical Association*, **119**(548), 2799–2810. [CAS: 2; IF: 4.0]
- **H. Li**, A. Aue, and D. Paul (2020). High-dimensional general linear hypothesis tests via non-linear spectral shrinkage. *Bernoulli*, **26**(4), 2541–2571. [CAS: 2; IF: 1.8]
- **H. Li** and Y. Li (2026). Regularized fingerprinting with linearly optimal weight matrix in detection and attribution of climate change. *Journal of Climate*, **39**(19), 5625–5641. [CAS: 2; IF: 4.3]

- **H. Li** (2025). Analysis of the limiting spectral distribution of large random matrices of the Marčenko–Pastur type. *Random Matrices: Theory and Applications*, **14**(3), 2550007. [CAS: 4; IF: 0.9]
- Q. Qasaimeh, **H. Li**, S. Hamasha, and J. Liu (2025). A machine learning framework with Shapley’s additive explanations to assess solder joint reliability for electronic packaging. *Journal of Electronic Materials*, **54**(9), 7586–7608. [CAS: 4; IF: 2.8]
- Q. Qasaimeh, **H. Li**, S. Hamasha, J. Evans, and J. Liu (2024). Interpretable machine learning models can outperform statistical models in solder joint reliability. *23rd IEEE ITherm Conference*.
- **H. Li** and H. Xu (2025). Adaptable high-dimensional change-point detection via ridge regularization. Under review at *Statistica Sinica*. [arXiv:2605.24838]
- **H. Li** and Y. Li (2025). Adaptable fingerprinting with nonlinear shrinkage for climate change detection and attribution under variance heterogeneity. Under review at *Journal of Climate*. [arXiv:2608.12496]
- **H. Li** and Y. Li (2026). Fingerprint analysis for climate change detection and attribution under a latent factor model. Under review at *Journal of the Royal Statistical Society, Series C*. [arXiv:2609.13488]
- **H. Li** (2026). Adaptable regularized CCA tests for independence of high-dimensional random vectors. Under review at *Electronic Journal of Statistics*. [arXiv:2607.10500]
- **H. Li** (2026). Detecting structural changes in high-dimensional multivariate regression models. Under review at *Journal of Statistical Planning and Inference*. [arXiv:2609.28462]

Ongoing Research

- **ENSO-aligned variability mismatches between observations and simulations alter climate fingerprint detection.** **H. Li**, Y. Li, and C. Li. Work in progress.
- **Functional connectome classification in the tangent space of Bures–Wasserstein geometry.** M. Zirpoli, J. Zheng, and **H. Li**. Work in progress.
- **Local laws and edge fluctuations for deformed quadratic matrices.** **H. Li** and L. Chen. Work in progress.

Student Supervision

- **Nozara Sundus**, Ph.D. student, Auburn University. Co-advised with Yan Li.
- **Xinyi Wang**, master’s student supervised at Columbia University. Currently a Ph.D. student at the University of California, Davis.

Selected Teaching Experience

Auburn University (2022–Present)

- STAT 7600/7610: Statistical Theory and Methods I/II (Ph.D. core courses)
- STAT 7850: Theory of Statistical Inference (graduate course)
- STAT 7780: Survival Analysis (graduate course)
- STAT 7860: Applied Time Series Analysis (graduate course)
- STAT 3600: Probability and Statistics (undergraduate course)

Columbia University (2019–2022)

- GR5263: Time Series & Statistical Inferences (M.A. in Financial Mathematics)
- GR5221: Time Series Analysis (M.A. in Statistics)
- UN1001: Elementary Statistics (undergraduate core course)

Awards

- Best Student Paper Award, ICSA, 2017
- Student Travel Award, ICSA, 2017
- Teaching Recognition Award, UC Davis, 2018
- Peter G. Hall Graduate Research Award, UC Davis, 2018

Software

- **ARHT**: R package; author and maintainer. Implements adaptable two-sample mean tests in high dimensions, Monte Carlo sampling from multivariate χ^2 distributions, and consistent estimation of spectral moments of population covariance matrices.
- **ReguGLH**: R package; author and maintainer. Implements high-dimensional general linear hypothesis tests with a fixed number of predictors using nonlinear spectral shrinkage. Supports linear, polynomial, and general shrinkage functions, with individual and composite testing procedures.
- **RidgeLRGLH**: R package; author and maintainer. Implements ridge-regularized largest-root tests for a large number of simultaneous linear hypotheses.
- **spikedGLHT**: R package; author and maintainer. Implements the high dimensional likelihood ratio test for general linear hypothesis under a spiked covariance model.

Selected Conferences & Presentations

- 2016 Joint Statistical Meetings, contributed talk
- 2017 ICSA Applied Statistics Symposium, Student Paper Award talk
- 2018 IISA International Conference on Statistics, invited talk
- 2019 Department of Statistics, National University of Singapore, invited talk
- 2019 Department of Statistics, Queen's University, Canada, invited talk
- 2019 CMStatistics, London, invited talk
- 2022 CMStatistics, London, invited talk
- 2024 2nd Joint Conference on Statistics and Data Science in China, Kunming, China, invited talk
- 2024 Ecosta, Beijing, China, invited talk

Referee Service

Annals of Statistics, Bernoulli, Journal of Statistical Planning and Inference, Statistica Sinica, Journal of Multivariate Analysis, Journal of the American Statistical Association, Journal of Time Series Analysis, Electronic Journal of Statistics, Advances in Computational Mathematics.

Computing Skills

R, Python, MATLAB, SQL.

Languages

English (fluent); Mandarin Chinese (native).