

HAOLIN ZOU

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New York, NY 10025, United States

RESEARCH EXPERTISE

Research Interest: I have a broad interest in the theoretical foundations of machine learning and AI, primarily using high-dimensional statistical theory both to analyze existing methods and to design new, more reliable algorithms.

Core areas: proportional high dimensional asymptotics, risk estimation and cross validation methods, machine unlearning, data evaluation and interpretability.

EDUCATION

- **Columbia University** Sep 2020 - May 2026
New York, USA
Ph.D in Statistics
 - Advisor: Arain Maleki, Victor de la Peña.
 - Advanced Coursework: High-Dim Statistics, Decoupling and Self Normalization, Probability (A+), Stats Inference.
- **Columbia University** Sep 2018 - Dec 2019
New York, USA
Master in Actuarial Science
- **Peking University** Sep 2014 - Jul 2018
Beijing, China
Bachelor of Applied Mathematics, Bachelor of Economics (double major)
 - Strong foundation in mathematical analysis, computational methods, quantitative finance and economics.

PUBLICATIONS

- **Key Publications**
 - **Zou, H.** et al. (2025). Certified Machine Unlearning Under High Dimensional Regime. Accepted for publication in *Journal of Machine Learning Research (JMLR)*.
 - **Zou, H.** et al. (2025). Theoretical Analysis of Leave-one-out Cross Validation for Non-differentiable Penalties under High-dimensional Settings. *AISTATS 2025*, PMLR 258:4033-4041. [**Acceptance rate: 31%**]
 - Auddy, A., **Zou, H.**, Rahnama Rad, K. and Maleki, A. (2024) Approximate Leave-one-out Cross Validation for Regression with L1 Regularizers. *IEEE Transactions on Information Theory*, 70(11):8040–8071.
 - Auddy, A., **Zou, H.**, Rahnama Rad, K. and Maleki, A. (2024) Approximate Leave-one-out Cross Validation for Regression with L1 Regularizers. *AISTATS 2024*, PMLR 238:2377-2385. [**Selected for oral presentation, 9%**]
- **Additional Publications**
 - **Zou, H.** et al. (2025). Newfluence: Boosting Model Interpretability and Understanding in High Dimensions. *ICML 2025, Workshop: Assessing World Models: Methods and Metrics for Evaluating Understanding*.
 - Baydil, B., de la Peña, V., **Zou, H.** and Yao, H. (2025). Unbiased estimation of the Gini coefficient. *Statistics and Probability Letters*, 222:110376.
 - de la Peña, V., Gzyl, H., Mayoral, S., **Zou, H.** and Alemayehu, D. (2024). Prediction and estimation of random variables with infinite mean or variance. *Communications in Statistics - Theory and Methods*, 54(1):1-15.
- **Preprints and Working Papers**
 - Panley, A., Auddy, A., **Zou, H.**, Maleki, A. and Kulkarni, S. (2025). Gaussian Certified Unlearning in High Dimensions: A Hypothesis Testing Approach. Submitted to *ICLR 2026*.
 - **Zou, H.** et al. (2025). A Scalable Formula for the Moments of a Family of Self-Normalized Statistics. Submitted to *Statistics and Probability Letters*.
 - **Zou, H.** et al. (2025). Error Analysis of K-fold Cross Validation Under High-dimensional Settings. *Working Paper*.

PRESENTATIONS

- **Minghui Yu Memorial Conference 2025** Apr 2025
Presentation on approximate data removal
- **AISTATS 2024** May 2024
Paper S.1 Selected for oral presentation in Oral Session 9 ("Statistics")
- **Minghui Yu Memorial Conference 2024** Apr 2024
Presentation on approximate leave-one-out cross validation
- **INFORMS 2022** Oct 2022
Session chair ("Heavi-tailedness, Dependence and Robustness"), presentation on the bias of Gini coefficient
- **Columbia Statistics Seminar** Nov 2024
Presentation on high dimensional statistics

TEACHING EXPERIENCE

- **Instructor** Jan 2024 - May 2024
Columbia University
 - Weekly recitation for Stat Inference and Modeling.
- **Co-instructor** Apr 2024
Short Course on Decoupling and Self-normalized Inequalities, Georgia Institute of Technology
 - Co-instructed with Prof. Victor de la Peña on the application of decoupling and self-normalization on bandit and sorting problems.
- **Teaching Associate** Sep 2020 - Now
Columbia University
 - Core MS course: Probability Theory (2 semesters), Statistical Inference (4 semesters)
 - Advanced methods: Generalized Linear Models (1 semester)
 - Undergraduate course: Introduction to Statistics (4 semesters)

INDUSTRY EXPERIENCE

- **Voleon Capital Management** May 2025 - Aug 2025
Quantitative Research Intern
 - Conducted quantitative research in bond pricing and comparison among algorithms.

SERVICES

- **Peer Reviewing**
 - Annals of Applied Statistics
 - Journal of the Royal Statistical Society
 - IEEE Transactions on Information Theory
 - Conference on Neural Information Processing Systems (NeurIPS)

AWARDS AND DISTINCTIONS

- **Second Prize** Sep 2017
China Contemporary Undergraduate Mathematical Contest in Modeling (CUMCM)
- **First Class Scholarship** Sep 2017
Yizheng Alumni Scholarship
- **First Prize** Oct 2014
China Undergraduate Contest in Physics

ADDITIONAL INFORMATION

Coding and Computing: Python (proficient), R, MS Office, STATA, STAN (advanced)
Languages: English (proficient), Chinese (native), Japanese (proficient), Latin (basic).