Shushu Zhang

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EDUCATION

Ph.D. in Statistics, University of Michigan-Ann Arbor *Aug. 2021 - May 2026 (Expected)*
(Advisors: Xuming He, Kean Ming Tan, GPA: 4.0/4.0)

M.S. in Statistics, University of Wisconsin-Madison *Sept. 2019 - May 2021*
(Advisor: Vivak Patel, GPA: 4.0/4.0)

B.S. in Statistics, East China Normal University *Sept. 2016 - Jul. 2020*
(GPA: 3.87/4.0, Rank: 1/126)
Study Abroad at University of Wisconsin-Madison *Sept. 2019 - May 2020*
(GPA: 4.0/4.0)

INDUSTRY EXPERIENCES

Quantitative Researcher Intern @ Point72 Asset Management *May 2025 - Aug. 2025*

- Interned at the Internal Alpha Capture (IAC) team.
- Developed a novel signal for equity trading using internal analyst data under a machine learning framework.

RESEARCH EXPERIENCES

Expected Shortfall Regression using Random Forest
Dept. of Statistics, University of Michigan, Ann Arbor *May 2023 - Present*

- Expected shortfall (ES) is defined as the average over the tail below (or above) a certain quantile of a probability distribution. In finance, the ES is a popular risk measure that quantifies the expected loss of a portfolio under adverse scenarios. We proposed the ES (causal) random forest to estimate the nonlinear relationship between covariates and the ES of the response, and the heterogeneous treatment effect of the response.

Linear Expected Shortfall Regression
Dept. of Statistics, University of Michigan, Ann Arbor *Jan. 2022 - Feb. 2024*

- Proposed lasso-penalized ES regression with high-dimensional covariates and established non-asymptotic error bounds and statistical inference for the proposed estimator, and applied to health disparity research for high cotinine populations.
- Proposed a novel optimization-based approach for the linear ES regression with minimal assumptions. We provided a prototype implementation of the proposed method and established the consistency and the asymptotic normality of the proposed estimator.

Stochastic Optimization
Dept. of Statistics, UW Madison *Aug. 2019 - Aug. 2021*

- Established global convergence of the stochastic gradient descent under less restrictive assumptions, expanding its applicability to more stochastic optimization problems.
- Adapted stochastic approximation methods, including Stochastic Gradient Descent (SGD) and Kalman-based Stochastic Gradient Descent (kSGD), to high-frequency observations in data assimilation that produce high-quality estimates and avoid computational problems.

SELECTED PUBLICATIONS

Published Manuscripts

- **Zhang, S.**, He, X., Tan, K., & Zhou, W. (2025). High-Dimensional Expected Shortfall Regression. *Journal of the American Statistical Association.* [paper]
- Patel, V., **Zhang, S.**, Tian, B. (2022). Global Convergence and Stability of Stochastic Gradient Descent. *Advances in Neural Information Processing Systems 35 (2022): 36014-36025.* [paper]

Submitted Manuscripts

- Li, Y.*, **Zhang, S.***, He, X. (2025). Expected Shortfall Regression via Optimization. Resubmitted to *Journal of the American Statistical Association.*

* Equal contribution.

Manuscripts in Preparation

- **Zhang, S.**, He, X., Tan, K., & Zhou, W. (2025+). Expected Shortfall Regression for Heterogeneous Treatment Effect Estimation using Random Forest.
- **Zhang, S.**, Patel, V. (2021). Stochastic Approximation for High-frequency Observations in Data Assimilation. [arXiv].

SELECTED PRESENTATIONS

- (**Poster with award**) "Expected Shortfall Regression via Optimization."
  Workshop for Translational Research on Data Heterogeneity at Washington University in St. Louis, Apr. 6-7, 2024.
- (**Poster with award**) "High-Dimensional Expected Shortfall Regression."
  Michael Woodroofe Memorial Conference, Sep. 9-10, 2023.
- (**Invited talk with award**) "High-Dimensional Expected Shortfall Regression."
  Joint Statistical Meetings, SLDS Student Paper Awards Session, Toronto, Aug. 5-10, 2023.
- "Stochastic Approximation for High-frequency Observations in Data Assimilation."
  SIAM Conference on Computational Science and Engineering, Digital, Mar. 1-5, 2021.

SELECTED AWARDS, FELLOWSHIPS, AND SCHOLARSHIPS

Statistical Learning and Data Science Student Paper Award, American Statistical Association (ASA). *2023*

Rackham International Students Fellowship, University of Michigan, Ann Arbor. *2022*

Outstanding First Year PhD Student, Department of Statistics, University of Michigan, Ann Arbor. *2022*

Lingzi Lu Memorial Award, American Statistical Association (ASA). *2021*

Academic Excellence Award, Department of Statistics, UW Madison. *2020*

Presidential Scholarship, East China Normal University. *2018*

Outstanding Student, East China Normal University. *2017-2019*

China National Scholarship (top 1% of cohort), Ministry of Education of the People's Republic of China. *2017*

TECHNICAL SKILLS

Python, R (rSTAN, Rcpp), C++, Vim, SQL