Boshi Zhao

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Education

Northern Illinois University

Ph.D. in Mathematical Sciences (Defense scheduled January 2026) | GPA: 3.7/4.0

University of Missouri-Columbia

M.S. in Economics | GPA: 3.8/4.0

Southwest University of Finance and Economics

B.S. in Statistics | GPA: 90/100

Working Experience

Northern Illinois University

Biostatistician (Aug 2022 – Present)

- Queried, cleaned, and processed more than 300,000 All of Us cohort records using SQL, R, and SAS to build high-quality analytic datasets.
- Designed and implemented multivariable and multinomial logistic regression models to study social determinants of health, low back pain, and perceived healthcare discrimination.
- Identified key predictors of health disparities and informed data-driven strategies for improving clinical equity.
- Contributed to multiple manuscripts using All of Us data, including one peer-reviewed publication in Pain Management Nursing (2025), one manuscript currently under review at The Journal of Pain, and additional papers in preparation focused on interaction modeling, waist circumference, and a genomic analysis project conducted in collaboration with UAB.

Consulting Project Manager (Jul 2021 – Present)

- Collaborated with 15+ clients across healthcare, education, and commercial sectors to design and implement statistical analysis plans, ensuring alignment with project goals and regulatory standards.
- Argonne National Laboratory ALCF project
    - Led and executed email survey campaigns, managing 2,000+ responses to assess high-performance computing resource utilization, technical support, and service effectiveness at ALCF.
    - Performed frequency analysis in Python to evaluate survey responses in different operating environments.
    - Conducted comparative analysis using T-tests and ANOVA, detecting statistically significant changes in satisfaction, resource usage, and system performance over time.
- Pace Bus Services
    - Conducted statistical modeling using weighted mean and pooled standard error to analyze passenger miles, ridership patterns, and operational efficiency across carriers, achieving precision levels consistently below 5% at the 95% confidence level.
    - Developed and automated R-based computational pipelines, reducing processing time by 40%, significantly improving the efficiency and accuracy of data-driven decision-making.

Projects

Bayesian Functional FA & PCA (Jun 2023 – Present)

- Developed a variogram-based FPCA method to estimate covariance surfaces and recover eigenfunctions efficiently via Karhunen–Loève expansion.
- Built a Bayesian Functional Factor Analysis model with temporal priors and a full Gibbs sampler for loadings, latent factors, and noise variances.
- Applied factor alignment and smoothing techniques to obtain stable temporal factor curves and compared four estimation methods through simulation experiments, evaluating performance based on MSE and Frobenius norms to determine the best performing approach.

Bayesian Functional FA & PCA for Discrete Time Points (Jul 2021 – May 2023)

- Designed Bayesian PCA/FA models for high-dimensional discrete-time data with AR(1) temporal dependence and implemented MCMC for parameter estimation.
- Applied factor alignment and spline smoothing to extract consistent latent patterns across time points.
- Analyzed the Utah 2017 collaborative learning dataset, identifying temporal trends in children's social engagement signals.

Technical Skills

- **Programming:** SAS, R, Python, SQL, Julia, SPSS
- **Statistical Methods:** Bayesian Analysis, Multivariable Regression, Survival Analysis, Machine Learning, High-Dimensional Data Analysis
- **Tools:** HPC, Data Visualization (ggplot2, Matplotlib), Version Control (Git)