

HONGBO LI

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EDUCATION

Michigan State University	East Lansing, MI	Aug 2025 – Present
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Doctoral Program in Statistics, College of Natural Science

- Selected Courses: Linear Model Methodology (PhD), Theory of Probability I (PhD)

Johns Hopkins University	Baltimore, MD	Aug 2023 – May 2025
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Master of Science in Financial Mathematics, Whiting School of Engineering

Major GPA in Math: 3.96/4.0

- Selected Courses: Nonlinear optimization (PhD), Advanced Financial Theory (PhD), Applied Statistics & Data Analysis, Stochastic Process, Monte Carlo, Machine Learning in Finance, Time Series, Bayesian Statistics

Huazhong University of Science and Technology	Wuhan, China	Sep 2018 – Jun 2022
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Bachelor of Science in Statistics, School of Mathematics and Statistics

Major GPA in Math and CS: 3.8/4.0

- Selected Courses: Real Analysis, Probability Theory, Modern Algebra, Mathematical Statistics, Multivariate Statistics, Operations Research, Optimization Method, Partial Differential Equations, Advanced Numerical Methods
- Thesis: “Robust Facial Recognition based on CNN”

PUBLICATIONS

[1] Hongbo Li and James C. Spall. “Zeroth-Order Langevin Monte Carlo via SPSA under Noisy Function Measurements,” manuscript in final polish; planned submission in Dec 2025; 1-page brief and view-only draft available upon request

[2] Hongbo Li and Helyette Geman. “Fine-tuning FinBERT with Few-Shot Weak Supervision for Financial News Sentiment,” manuscript in preparation, 18 pages completed

RESEARCH EXPERIENCE

Zero-Order Langevin Monte Carlo via SPSA under Noisy Function Measurements	Jan 2025 – Present
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Supervised by Prof. James Spall, Johns Hopkins University

- Motivation & method:** Bridged **gradient-based** samplers and **gradient-inaccessible** settings in practice (simulation-based inference, model-free reinforcement learning, and stochastic control) by proposing Langevin Monte Carlo-Simultaneous Perturbation Stochastic Approximation (**LMC-SPSA**) in noisy settings—gradient-free Langevin sampler with only **two noisy function** queries per iteration (dimension-independent)
- Convergence:** Proved Wasserstein-2 convergence of LMC-SPSA under noise and resolved **open step size question** by deriving **diminishing-step size window** ensuring convergence, extending prior constant-step size analysis
- Sharper dimension dependence:** Improved the **theoretical dominant dimension dependence** of the Wasserstein-2 error bound under standard smoothness/noise conditions, with numerical results supporting the theory
- Empirical results under equal budgets:** LMC-SPSA attains the **lowest, most stable MSE** and **moment errors** (mean/variance/kurtosis), outperforming LMC-Finite Difference Stochastic Approximation and LMC-Random direction Stochastic Approximation

Fine-tuning FinBERT with Few-Shot Weak Supervision for Financial News Sentiment	Aug 2024 – Feb 2025
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Supervised by Prof. Helyette Geman, Johns Hopkins University

- **Motivation & method:** Applied **few-shot in-context labeling** with gold examples to generate **weak labels** at scale, using consistency voting and confidence filtering for **denoising**; then **fine-tuned FinBERT (LoRA)** with temporal splits and probability calibration. The fine-tuned model outperformed the baseline FinBERT in accuracy
- **Multi-ticker disambiguation:** Designed three datasets for multi-ticker articles (single-ticker, most-mentioned, and mention-share weighting); **most-mentioned** gave the highest accuracy and strongest 2-day Granger-prediction
- **Exploratory identification:** Applied Difference-in-Differences around pre-specified shocks and Regression Discontinuity Design at set thresholds, uncovering potential **causality** between sentiment factors and stock returns

Causal Inference on High-Dimensional Time Series using LLM-Guided Discovery

Oct 2024 – Feb 2025

Supervised by Prof. Helyette Geman, Johns Hopkins University

- Developed novel framework leveraging causal order priors generated by LLMs to constrain discovery algorithms, enabling efficient learning of sparse structures and mitigating the curse of dimensionality
- Designed and implemented soft constraints, conflict checks, and multi-round prompting, to minimize impact of spurious directions from imperfect LLM outputs, ensuring robustness and reliability of the inferred graphs

TEACHING EXPERIENCE

Teaching Assistant	Michigan State University	Aug 2025 – Present
Teach three weekly sections of STT 200 (Statistical Methods)		

PRESENTATION

Statistics and Data Science Workshop, Universidad de los Andes	Bogota, Colombia	Dec 2025
Presentation accepted for: Zeroth-Order Langevin Monte Carlo via SPSA under Noisy Function Measurements		
Financial Mathematics Seminar, Johns Hopkins University	Baltimore, MD	Oct 2024
Presentation for summer intern as Quantitative Researcher		

INTERN EXPERIENCE

China Merchants Securities Co., Ltd.	Beijing, China	Jul 2024 – Nov 2024
Quantitative Researcher		

- **Applied Kalman filter** to denoise intraday signals and enhance accuracy of trading decisions, improved win rate, profit–loss ratio, and full-period information ratio vs. out-of-sample baseline
- **Built cointegration-based** statistical arbitrage framework: screened economically linked FX pairs, **tested cointegration** (Engle–Granger, Johansen), estimated hedge ratios and mean-reversion **half-life**, then **validated out-of-sample** with rolling retests

SCHOLARSHIPS & AWARDS

Dean’s Scholarship, Huazhong University of Science and Technology	2018
National Innovation Training Program for Undergraduate Research	2022

COMPUTER SKILLS

- Programming Skills: Python (NumPy, Pandas, Scikit-learn, Pytorch), MATLAB, R, C++, MySQL
- Machine Learning: Transformer, Diffusion, Informer