Pratik Rathore

301-250-6870 pratikr@stanford.edu pratikrathore pratikrathore8

Education

Stanford University **September 2021 – Present**
PhD Candidate in Electrical Engineering *Stanford, CA*

University of Maryland **August 2017 – May 2021**
B.S. in Electrical Engineering (summa cum laude), B.S. in Mathematics (summa cum laude) *College Park, MD*

Experience

Stanford University, Department of Management Science & Engineering **June 2022 – Present**
Research Assistant (advised by Madeleine Udell) *Stanford, CA*

- Developing optimization algorithms leveraging randomized numerical linear algebra to address scalability and stability challenges in training machine learning models
- Creating and maintaining high-quality, open-source implementations of these methods; adopted in popular machine learning libraries such as DeepXDE
- Applying scientific machine learning to solve PDE-governed problems in geophysics

Skyworks Solutions, Technology & Manufacturing Data Analytics Team **June 2025 – August 2025**
Machine Learning & AI Intern *Irvine, CA*

- Led development of a Python library that automates circuit topology generation and simulation configuration for designing radio frequency (RF) filters, reducing design times from one to two weeks to 7-8 hours
- Collaborated with software engineers to build a web application allowing circuit designers to interface with the automated topology library
- Designed an AI-driven circuit design automation system and implemented prototype workflows

Gridmatic, Power Trading & Optimization Team **June 2024 – September 2024**
Research Scientist Intern *Cupertino, CA*

- Applied scenario reduction to speed up linear programs in battery scheduling, while preserving profits
- Developed a new backtest framework that accounts for Gridmatic's price impact in ERCOT market
- Formulated, implemented, and tested price impact models based on residual demand curves
- Proposed an ADMM-based algorithm for price impact-aware portfolio optimization

Publications

P. Rathore, Z. Frangella, S. Garg, S. Fazliani, M. Dereziński, and M. Udell. *Turbocharging Gaussian Process Inference with Approximate Sketch-and-Project.* NeurIPS, 2025, arxiv:2505.13723

P. Rathore, Z. Frangella, J. Yang, M. Dereziński, and M. Udell. *Have ASkotch: A Neat Solution for Large-scale Kernel Ridge Regression.* Submitted, 2025, arxiv:2407.10070

Z. Frangella, **P. Rathore**, S. Zhao, and M. Udell. *SketchySGD: Reliable Stochastic Optimization via Randomized Curvature Estimates.* SIMODS, 2024, arxiv:2211.08597

P. Rathore, W. Lei, Z. Frangella, L. Lu, and M. Udell. *Challenges in Training PINNs: A Loss Landscape Perspective.* ICML, 2024, arxiv:2402.01868 **(Oral, top 1.5% of all submissions)**

Z. Frangella*, **P. Rathore***, S. Zhao, and M. Udell.[1] *PROMISE: Preconditioned Stochastic Optimization Methods by Incorporating Scalable Curvature Estimates.* JMLR, 2024, arxiv:2309.02014

Awards & Honors

University of Maryland Department of Mathematics High Honors Medal *May 2021*
NSF Graduate Research Fellowship Honorable Mention *March 2021*
University of Maryland Department of Electrical and Computer Engineering Chair's Award *March 2021*
University of Maryland Dan Shanks Award for research in number theory *April 2019*
University of Maryland Putnam Team Member (individually ranked top 3% in 2019, top 5% in 2020) *2019, 2020*
Banneker-Key Scholar – a full merit scholarship awarded to top 1% of undergraduates *August 2017 – May 2021*
United States of America Mathematical Olympiad (USAMO) Qualifier *May 2017*

Programming Skills

Proficient: Python, PyTorch, NumPy, MATLAB, LaTeX
Familiar: Pandas, C/C++, Julia, Java, R, Simulink

Relevant Coursework

Machine Learning, Machine Learning for Sequence Modeling, Machine Learning for Discrete Optimization, Reinforcement Learning, Convex Optimization, Theory of Statistics, Numerical Linear Algebra, Parallel Computing

[1] * denotes equal contribution.