

Pratik Rathore — US Citizen

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Education

Stanford University <i>PhD Candidate in Electrical Engineering</i>	Stanford, CA 9/2021-Present
Stanford University <i>M.S. in Electrical Engineering</i>	Stanford, CA 9/2021-12/2024
University of Maryland <i>B.S. in Electrical Engineering, summa cum laude</i>	College Park, MD 8/2017-5/2021
University of Maryland <i>B.S. in Mathematics, summa cum laude</i>	College Park, MD 8/2017-5/2021

Research & Industry Experiences

Stanford University <i>Research Assistant</i> <i>Department of Management Science & Engineering</i>	Stanford, CA 7/2022-Present
<ul style="list-style-type: none">○ 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 <i>Machine Learning & AI Intern</i> <i>Technology & Manufacturing Data Analytics Team</i>	Irvine, CA 6/2025-8/2025
<ul style="list-style-type: none">○ 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 <i>Research Scientist Intern</i> <i>Power Trading & Optimization Team</i>	Cupertino, CA 6/2024-9/2024
<ul style="list-style-type: none">○ Applied scenario reduction to reduce runtime for solving 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	

Stanford University

Research Assistant

Autonomous Systems Laboratory

Stanford, CA

9/2021-12/2021, 3/2022-6/2022

- Developed a quantum computing-based algorithm to solve mixed-integer quadratic programs (MIQPs)
- Applied matrix sketching techniques to improve scalability of semidefinite programming-based neural network verification

STR

Electrical Engineering Intern

Prototype Systems & Technology Group

Arlington, VA

5/2020-8/2021

- Aided in the development of an object-oriented environment for radar I/Q simulation, and modeled sub-banded adaptive beamforming in phased arrays
- Contributed to data generation for a deep learning-based platform that performs automatic target recognition on maritime ISAR images
- Worked on a US Department of Defense funded SBIR research project focused on improving Inverse Synthetic Aperture Radar (ISAR) signal processing to enhance ISAR image quality

Lockheed Martin Space

Electrical Engineering Intern

Military Support Programs

Littleton, CO

5/2019-8/2019

- Led reviews for computational models (frequency sweep generator, solar array controller, attitude determination with Kalman filter) being developed for satellites in MATLAB/Simulink
- Developed test cases, added new functionality, and improved upon existing documentation in MATLAB/Simulink for these computational models
- Presented model walkthroughs and review suggestions to colleagues during meetings

University of Maryland

Undergraduate Researcher

Department of Mathematics

College Park, MD

5/2018-8/2018

- Investigated Descartes numbers, a family of odd spoof perfect numbers
- Proved new results regarding the prime factorizations of Descartes numbers
- Developed and submitted a research manuscript containing the proofs of these results to [arXiv](#)

Papers

In the pipeline.....

P. Rathore, Z. Frangella, S. Garg, S. Fazliani, M. Dereziński, and M. Udell. *Turbocharging Gaussian Process Inference with Approximate Sketch-and-Project*. Submitted, 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

Published.....

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

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

* denotes equal contribution.

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**)

Miscellaneous.....

P. Rathore. *There are no Cube-free Descartes Numbers with Exactly Seven Distinct Prime Factors* (2018), arxiv:1808.10027

Talks & Posters

INFORMS Computing Society Conference (Toronto) <i>ASkotch: A Fast Method for Large-scale Kernel Ridge Regression</i>	3/2025
INFORMS Computing Society Conference (Toronto) <i>Preconditioned Stochastic Gradient Algorithms for Faster Empirical Risk Minimization</i>	3/2025
The Alan Turing Institute (online) <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	10/2024
Bridging the Farm: AI for Science at SLAC and Stanford (Stanford) <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	10/2024
Naval Surface Warfare Center, Carderock Division (online) <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	8/2024
Oral Presentation, ICML (Vienna) <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	7/2024
Lu Group, Yale University (online) <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	2/2024
Gridmatic (Cupertino) <i>PROMISE: Preconditioned Stochastic Optimization via Scalable Curvature Estimates</i>	2/2024

Honors & Awards

Banneker-Key Scholar – a full merit scholarship awarded to top 1% of undergraduates	2017-2021
Dean's List – A. James Clark School of Engineering	2017-2021
Dean's List – College of Computer, Mathematical, & Natural Sciences	2018-2021
Honors College, University Honors, University of Maryland	2017-2021
University of Maryland Department of Mathematics High Honors Medal	5/2021
NSF GRFP Honorable Mention	3/2021
University of Maryland Department of Electrical and Computer Engineering Chair's Award	3/2021
International Mathematics Competition for University Students, Second Prize	7/2020
Putnam Math Competition, Ranked in Top 5% of 4200+ Participants	2/2020
Member of UMD Putnam Team, 14 th place team in the nation	2/2020
University of Maryland Dan Shanks Award for research in number theory	4/2019
Putnam Math Competition, Ranked in Top 3% of 4600+ Participants	3/2019
Member of UMD Putnam Team, 9 th place team in the nation	3/2019
Virginia Tech Regional Math Contest, Ranked 15 th out of 739 participants	10/2017
United States of America Mathematical Olympiad (USAMO) Qualifier	5/2017

Skills

Programming Languages & Frameworks

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

Advising

Weimu Lei, MS ICME

6/2023-8/2024

Projects: Physics-informed neural networks; software for fast convex optimization

Academic Service

Reviewing.....

AISTATS 2023, ICML 2024, NeurIPS 2024, ICML 2025, NeurIPS 2025

Organized Seminars/Sessions.....

ISL Colloquium

Stanford, CA

Co-organizer (with Connor Lawless, Irmak Sivgin, and Madeleine Udell)

9/2025-Present

INFORMS: Advances in Optimization for Machine Learning

Seattle, WA

Co-organizer (with Zachary Frangella and Madeleine Udell)

10/2024

Teaching

CME307: Optimization

Stanford University

Course Assistant

9/2025-Present

CME307: Optimization

Stanford University

Course Assistant

9/2024-12/2024

CME307: Optimization

Stanford University

Course Assistant

1/2024-3/2024

EE364B: Convex Optimization II

Stanford University

Course Assistant

4/2023-6/2023

ENEE150: Intermediate Programming Concepts for Engineers

University of Maryland

Undergraduate Teaching Fellow

1/2021-5/2021

Relevant Courses

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