

Pratik Rathore — US Citizen

☎ (301) 250 6870 • ✉ pratikr@stanford.edu • 🌐 pratikrathore8.github.io
in pratikrathore • 🐙 pratikrathore8

Education

Stanford University <i>PhD Candidate in Electrical Engineering</i> <i>Advisor: Madeleine Udell</i>	Stanford, CA 9/2021-Present
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>Graduate Researcher</i> <i>Department of Management Science & Engineering</i> <ul style="list-style-type: none">Investigating approaches for improving optimization of physics-informed neural networksDeveloping efficient preconditioned stochastic gradient methods for solving large-scale problems in machine learning	Stanford, CA 7/2022-Present
Gridmatic <i>Research Scientist Intern</i> <i>Power Trading & Optimization Team</i> <ul style="list-style-type: none">Applied scenario reduction to reduce runtime for solving linear programs in battery scheduling, while preserving profitsDeveloped a new backtest framework that accounts for Gridmatic's price impact in ERCOT marketFormulated, implemented, and tested price impact models based on residual demand curvesProposed an ADMM-based algorithm for price impact-aware portfolio optimization	Cupertino, CA 6/2024-9/2024
Stanford University <i>Graduate Researcher</i> <i>Autonomous Systems Laboratory</i> <ul style="list-style-type: none">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	Stanford, CA 9/2021-12/2021, 3/2022-6/2022
STR <i>Electrical Engineering Intern</i> <i>Prototype Systems & Technology Group</i> <ul style="list-style-type: none">Aided in the development of an object-oriented environment for radar I/Q simulation, and modeled sub-banded adaptive beamforming in phased arrays	Arlington, VA 5/2020-8/2021

- 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, and M. Udell. *Have ASkotch: Fast Methods for Large-scale, Memory-constrained Kernel Ridge Regression*. Preprint, 2024, 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

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

The Alan Turing Institute (online)

10/2024

Challenges in Training PINNs: A Loss Landscape Perspective

Bridging the Farm: AI for Science at SLAC and Stanford (Stanford)

10/2024

Challenges in Training PINNs: A Loss Landscape Perspective

* denotes equal contribution.

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 <i>Projects: Physics-informed neural networks; software for fast convex optimization</i>	6/2023-8/2024
---	---------------

Academic Service

Reviewing	
AISTATS 2023, ICML 2024, NeurIPS 2024	

Organized Sessions.....

INFORMS: Advances in Optimization for Machine Learning

Co-organizer (with Zachary Frangella and Madeleine Udell)

Seattle, WA

10/2024

Teaching

CME307: Optimization

Course Assistant

Stanford University

9/2024-Present

CME307: Optimization

Course Assistant

Stanford University

1/2024-3/2024

EE364B: Convex Optimization II

Course Assistant

Stanford University

4/2023-6/2023

ENEE150: Intermediate Programming Concepts for Engineers

Undergraduate Teaching Fellow

University of Maryland

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