

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">○ Investigating approaches for improving optimization of physics-informed neural networks○ Developing efficient preconditioned stochastic gradient methods for solving large-scale problems in machine learning	
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 <i>Research Assistant</i> <i>Autonomous Systems Laboratory</i>	Stanford, CA 9/2021-12/2021, 3/2022-6/2022
<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	
STR <i>Electrical Engineering Intern</i> <i>Prototype Systems & Technology Group</i>	Arlington, VA 5/2020-8/2021
<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	

- 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, J. Yang, M. Dereziński, and M. Udell. *Have ASkotch: A Neat Solution for Large-scale Kernel Ridge Regression*. Submitted, 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	6/2023-8/2024
<i>Projects: Physics-informed neural networks; software for fast convex optimization</i>	

Academic Service

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

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

9/2024-12/2024

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