

Pratik Rathore — US Citizen

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

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| 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

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| 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, 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

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)

3/2025

ASkotch: A Fast Method for Large-scale Kernel Ridge Regression

INFORMS Computing Society Conference (Toronto)

3/2025

Preconditioned Stochastic Gradient Algorithms for Faster Empirical Risk Minimization

* denotes equal contribution.

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| 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

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| 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

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| Weimu Lei, MS ICME <i>Projects: Physics-informed neural networks; software for fast convex optimization</i> | 6/2023-8/2024 |
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Academic Service

Reviewing.....

AISTATS 2023, ICML 2024, NeurIPS 2024, ICML 2025

Organized Sessions.....

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| INFORMS: Advances in Optimization for Machine Learning | Seattle, WA |
| <i>Co-organizer (with Zachary Frangella and Madeleine Udell)</i> | <i>10/2024</i> |

Teaching

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| CME307: Optimization | Stanford University |
| <i>Course Assistant</i> | <i>9/2024-12/2024</i> |
| CME307: Optimization | Stanford University |
| <i>Course Assistant</i> | <i>1/2024-3/2024</i> |
| EE364B: Convex Optimization II | Stanford University |
| <i>Course Assistant</i> | <i>4/2023-6/2023</i> |
| ENEE150: Intermediate Programming Concepts for Engineers | University of Maryland |
| <i>Undergraduate Teaching Fellow</i> | <i>1/2021-5/2021</i> |

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