

Pratik Rathore — US Citizen

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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>	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	
Stanford University <i>Graduate Researcher</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 <i>Electrical Engineering Intern</i> <i>Military Support Programs</i>	Littleton, CO 5/2019-8/2019
<ul style="list-style-type: none">○ 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.....

Z. Frangella*, **P. Rathore***, S. Zhao, and M. Udell. *PROMISE: Preconditioned Stochastic Optimization Methods by Incorporating Scalable Curvature Estimates* (2023), arxiv:2309.02014, submitted to JMLR

Z. Frangella, **P. Rathore**, S. Zhao, and M. Udell. *SketchySGD: Reliable Stochastic Optimization via Randomized Curvature Estimates* (2022), arxiv:2211.08597, in revision at SIMODS

Published.....

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

Miscellaneous.....

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

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

* denotes equal contribution.

Skills

Programming Languages & Frameworks

- *Proficient*: Python, NumPy, MATLAB, L^AT_EX
- *Familiar*: PyTorch, C/C++, Julia, Java, R, Simulink

Teaching Experiences

CME307: Optimization

Course Assistant

Stanford University

1/2024-Present

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, Reinforcement Learning, Convex Optimization, Theory of Statistics, Numerical Linear Algebra, Parallel Computing

Leadership/Extracurricular Activities

Peer Mentor, University Honors, University of Maryland

9/2020-12/2022

Puzzle Writer, University of Maryland Puzzle Club

9/2017-9/2020

Captain, Montgomery Blair Math Team

8/2016-6/2017

Coach, Robert Frost Middle School MathCounts Team

12/2015-3/2017