Pratik Rathore

US Citizen

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Education

9/21-Present **PhD Candidate in Electrical Engineering**, *Stanford University*, Stanford, CA.
Advisor: Madeleine Udell

8/17-5/21 **B.S. in Electrical Engineering**, *University of Maryland*, College Park, MD, *summa cum laude*.

8/17-5/21 **B.S. in Mathematics**, *University of Maryland*, College Park, MD, *summa cum laude*.

Research & Industry Experiences

7/22-Present **Graduate Researcher**, *Stanford University*, Stanford, CA.
Department of Management Science & Engineering

- Developing scalable optimization algorithms using randomized numerical linear algebra
- Creating novel Quasi-Newton methods for optimization that are applicable to large-scale data science and machine learning tasks

9/21-12/21 **Graduate Researcher**, *Stanford University*, Stanford, CA.
3/22-6/22 *Autonomous Systems Laboratory*

- 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

5/20-8/21 **Electrical Engineering Intern**, *Systems & Technology Research*, Arlington, VA.
Prototype Systems & Technology Group

- 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

5/19-8/19 **Electrical Engineering Intern**, *Lockheed Martin Space*, Littleton, CO.
Military Support Programs

- 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

5/18-8/18 **Undergraduate Researcher**, *University of Maryland*, College Park, MD.
Department of Mathematics

- 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

6/16-8/16 **Student Research Intern**, *Uniformed Services University of the Health Sciences*, Bethesda, MD.
Collaborative Health Initiative Research Program

- Analyzed induced pluripotent stem cells (iPSCs) using single-cell transcriptomics technologies
- Attempted to determine optimal parameters for single-cell transcriptomics runs
- Designed code in R to apply k-means clustering, principal component analysis (PCA), and t-distributed stochastic neighbor embedding (t-SNE) to single-cell RNA data

Honors & Awards

'17 - '21 Banneker-Key Scholar – a full merit scholarship awarded to top 1% of undergraduates
'17 - '21 Dean's List – A. James Clark School of Engineering
'18 - '21 Dean's List – College of Computer, Mathematical, & Natural Sciences
'17 - '21 Honors College, University Honors, University of Maryland
5/21 University of Maryland Department of Mathematics High Honors Medal
3/21 NSF GRFP Honorable Mention
3/21 University of Maryland Department of Electrical and Computer Engineering Chair's Award
7/20 International Mathematics Competition for University Students, Second Prize
2/20 Putnam Math Competition, Ranked in Top 5% of 4200+ Participants
2/20 Member of UMD Putnam Team, 14th place team in the nation
4/19 University of Maryland Dan Shanks Award for research in number theory
3/19 Putnam Math Competition, Ranked in Top 3% of 4600+ Participants
3/19 Member of UMD Putnam Team, 9th place team in the nation
10/17 Virginia Tech Regional Math Contest, Ranked 15th out of 739 participants
5/17 United States of America Mathematical Olympiad (USAMO) Qualifier

Publications

Z. Frangella, P. Rathore, S. Zhao, and M. Udell. *SketchySGD: Reliable Stochastic Optimization via Robust Curvature Estimates* (2022), arxiv:2211.08597, Submitted

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

Teaching Experiences

4/22-Present **Course Assistant**, EE364B: Convex Optimization II, Stanford University.

1/21-5/21 **Undergraduate Teaching Fellow**, ENEE150: Intermediate Programming Concepts for Engineers, University of Maryland.

Relevant Courses

Convex Optimization I, Convex Optimization II, Theory of Statistics I, Theory of Statistics II, Numerical Linear Algebra, Reinforcement Learning: Behaviors and Applications, Introduction to Parallel Computing

Leadership/Extracurricular Activities

9/20-12/22 Peer Mentor, University Honors, University of Maryland

9/17-9/20 Puzzle Writer, University of Maryland Puzzle Club

8/16-6/17 Captain, Montgomery Blair Math Team

12/15-3/17 Coach, Robert Frost Middle School MathCounts Team

Skills

Programming Languages & Frameworks

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