Pratik Rathore | US Citizen

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Education

Stanford University — **Stanford, CA**
PhD Candidate in Electrical Engineering — *9/2021-Present*
Advisor: Madeleine Udell

University of Maryland — **College Park, MD**
B.S. in Electrical Engineering, summa cum laude — *8/2017-5/2021*

University of Maryland — **College Park, MD**
B.S. in Mathematics, summa cum laude — *8/2017-5/2021*

Research & Industry Experiences

Stanford University — **Stanford, CA**
Graduate Researcher — *7/2022-Present*
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

Stanford University — **Stanford, CA**
Graduate Researcher — *9/2021-12/2021, 3/2022-6/2022*
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

STR — **Arlington, VA**
Electrical Engineering Intern — *5/2020-8/2021*
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

Lockheed Martin Space — **Littleton, CO**
Electrical Engineering Intern — *5/2019-8/2019*
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

University of Maryland **College Park, MD**
Undergraduate Researcher *5/2018-8/2018*
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

Uniformed Services University of the Health Sciences **Bethesda, MD**
Student Research Intern *6/2016-8/2016*
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

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, 14th 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, 9th place team in the nation	*3/2019*
Virginia Tech Regional Math Contest, Ranked 15th out of 739 participants	*10/2017*
United States of America Mathematical Olympiad (USAMO) Qualifier	*5/2017*

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, preprint

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

* denotes equal contribution.

Miscellaneous

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

Teaching Experiences

EE364B: Convex Optimization II — **Stanford University**
Course Assistant — *4/2022-6/2022*

ENEE150: Intermediate Programming Concepts for Engineers — **University of Maryland**
Undergraduate Teaching Fellow — *1/2021-5/2021*

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, Machine Learning

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*

Skills

Programming Languages & Frameworks

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