

# Pratik Rathore — US Citizen

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## Education

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<b>Stanford University</b> <i>PhD Candidate in Electrical Engineering</i>	<b>Stanford, CA</b> 9/2021-Present
<b>Stanford University</b> <i>M.S. in Electrical Engineering</i>	<b>Stanford, CA</b> 9/2021-12/2024
<b>University of Maryland</b> <i>B.S. in Electrical Engineering, summa cum laude</i>	<b>College Park, MD</b> 8/2017-5/2021
<b>University of Maryland</b> <i>B.S. in Mathematics, summa cum laude</i>	<b>College Park, MD</b> 8/2017-5/2021

## Research & Industry Experiences

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<b>Stanford University</b> <i>Research Assistant</i> <i>Department of Management Science &amp; Engineering</i>	<b>Stanford, CA</b> 7/2022-Present
<ul style="list-style-type: none"><li>○ Developing optimization algorithms leveraging randomized numerical linear algebra to address scalability and stability challenges in training machine learning models</li><li>○ Creating and maintaining high-quality, open-source implementations of these methods; adopted in popular machine learning libraries such as DeepXDE</li><li>○ Applying scientific machine learning to solve PDE-governed problems in geophysics</li></ul>	
<b>Skyworks Solutions</b> <i>Machine Learning &amp; AI Intern</i> <i>Technology &amp; Manufacturing Data Analytics Team</i>	<b>Irvine, CA</b> 6/2025-8/2025
<ul style="list-style-type: none"><li>○ Led development of a Python library that automates circuit topology generation and simulation configuration for designing radio frequency (RF) filters, reducing design times from one to two weeks to 7-8 hours</li><li>○ Collaborated with software engineers to build a web application allowing circuit designers to interface with the automated topology library</li><li>○ Designed an AI-driven circuit design automation system and implemented prototype workflows</li></ul>	
<b>Gridmatic</b> <i>Research Scientist Intern</i> <i>Power Trading &amp; Optimization Team</i>	<b>Cupertino, CA</b> 6/2024-9/2024
<ul style="list-style-type: none"><li>○ Applied scenario reduction to reduce runtime for solving linear programs in battery scheduling, while preserving profits</li><li>○ Developed a new backtest framework that accounts for Gridmatic's price impact in ERCOT market</li><li>○ Formulated, implemented, and tested price impact models based on residual demand curves</li><li>○ Proposed an ADMM-based algorithm for price impact-aware portfolio optimization</li></ul>	

**Stanford University***Research Assistant**Autonomous Systems Laboratory***Stanford, CA**

9/2021-12/2021, 3/2022-6/2022

- 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***Electrical Engineering Intern**Prototype Systems & Technology Group***Arlington, VA**

5/2020-8/2021

- 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.....*

**P. Rathore**, Z. Frangella, S. Garg, S. Fazliani, M. Dereziński, and M. Udell. *Turbocharging Gaussian Process Inference with Approximate Sketch-and-Project*. NeurIPS, 2025, arxiv:2505.13723

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

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\* denotes equal contribution.

**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

<b>INFORMS Computing Society Conference (Toronto)</b> <i>ASkotch: A Fast Method for Large-scale Kernel Ridge Regression</i>	3/2025
<b>INFORMS Computing Society Conference (Toronto)</b> <i>Preconditioned Stochastic Gradient Algorithms for Faster Empirical Risk Minimization</i>	3/2025
<b>The Alan Turing Institute (online)</b> <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	10/2024
<b>Bridging the Farm: AI for Science at SLAC and Stanford (Stanford)</b> <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	10/2024
<b>Naval Surface Warfare Center, Carderock Division (online)</b> <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	8/2024
<b>Oral Presentation, ICML (Vienna)</b> <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	7/2024
<b>Lu Group, Yale University (online)</b> <i>Challenges in Training PINNs: A Loss Landscape Perspective</i>	2/2024
<b>Gridmatic (Cupertino)</b> <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 <sup>th</sup> 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 <sup>th</sup> place team in the nation	3/2019
Virginia Tech Regional Math Contest, Ranked 15 <sup>th</sup> out of 739 participants	10/2017
United States of America Mathematical Olympiad (USAMO) Qualifier	5/2017

## Skills

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### Programming Languages & Frameworks

- *Proficient:* Python, PyTorch, NumPy, MATLAB, L<sup>A</sup>T<sub>E</sub>X
- *Familiar:* Pandas, C/C++, Julia, Java, R, Simulink

## Advising

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**Weimu Lei, MS ICME**

6/2023-8/2024

*Projects: Physics-informed neural networks; software for fast convex optimization*

## Academic Service

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### Reviewing.....

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

### Organized Seminars/Sessions.....

#### ISL Colloquium

*Co-organizer (with Connor Lawless, Irmak Sivgin, and Madeleine Udell)*

**Stanford, CA**

9/2025-Present

#### INFORMS: Advances in Optimization for Machine Learning

*Co-organizer (with Zachary Frangella and Madeleine Udell)*

**Seattle, WA**

10/2024

## Teaching

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### CME307: Optimization

*Course Assistant*

**Stanford University**

9/2025-Present

### 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

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Machine Learning, Machine Learning for Sequence Modeling, Machine Learning for Discrete Optimization, Reinforcement Learning, Convex Optimization, Theory of Statistics, Numerical Linear Algebra, Parallel Computing