

# Pratik Rathore

*US Citizen / Secret Clearance*

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## Education

8/2017 **B.S. in Electrical Engineering**, *University of Maryland*, College Park, MD, GPA: 3.99/4.  
Present

8/2017 **B.S. in Mathematics**, *University of Maryland*, College Park, MD, GPA: 3.99/4.  
Present

## Research & Industry Experiences

5/2020 **Electrical Engineering Intern**, *Systems & Technology Research*, Woburn, MA.  
Present *Prototype Systems & Technology Group*

**Current Project** Developing a deep learning-based platform to perform automatic target recognition on maritime ISAR images.

- Developed an algorithm that provides a time series of roll and pitch angles given a CAD model of a ship
- Designing algorithms to automatically extract ship features (e.g. dimensions, moments of inertia, damping coefficients) from CAD models

**Previous Project** 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.

- Implemented Kalman filtering to develop a tracking algorithm for estimating target motion in MATLAB
- Designed a MATLAB simulation using quaternion theory to assess quality of Kalman filter motion estimates
- Developed image processing algorithms in MATLAB to use target motion estimates to form a high-resolution, rotational motion compensated image
- Contributed to project technical report and presented results at group meetings

5/2019 **Electrical Engineering Intern**, *Lockheed Martin Space*, Littleton, CO.

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, edited, and documented test cases in MATLAB for these models
- Used Simulink to add new functionality and improve upon the existing documentation for these models
- Presented model walkthroughs and review suggestions to colleagues during meetings

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

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](#)

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

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## Honors & Awards

All semesters Banneker-Key Scholar – a full merit scholarship awarded to top 1% of undergraduates

All semesters Dean's List – A. James Clark School of Engineering

All semesters Dean's List – College of Computer, Mathematical, & Natural Sciences

All semesters Honors College, University Honors, University of Maryland

7/2020 International Mathematics Competition for University Students, Second Prize

2/2020 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

4/2019 University of Maryland Dan Shanks Award for research in number theory

3/2019 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

10/2017 Virginia Tech Regional Math Contest, Ranked 15<sup>th</sup> out of 739 participants

5/2017 United States of America Mathematical Olympiad (USAMO) Qualifier

3/2016 United States of America Biology Olympiad (USABO) Semifinalist

6/2015 Program in Mathematics for Young Scientists (PROMYS)

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## Publications

Rathore, P., *There are no Cube-free Descartes Numbers with Exactly Seven Distinct Prime Factors* (2018), <https://arxiv.org/abs/1808.10027>, preprint.

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## Teaching Experiences

1/2021 **Undergraduate Teaching Fellow**, ENEE150: Intermediate Programming Concepts for

5/2021 Engineers, University of Maryland.

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## Relevant Courses

- Electrical Engineering** Discrete Signal Analysis, Signal & System Theory, Communication Systems, Control Theory, Machine Learning, Device Physics, Analog and Digital Electronics (course + lab)
- Mathematics** Linear Algebra, Real Analysis, Statistics, Probability Theory, Applied Harmonic Analysis, Abstract Algebra, Numerical Analysis, Combinatorics & Graph Theory
- Coursera** Machine Learning (Stanford University), Game Theory (Stanford University & The University of British Columbia)

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## Leadership/Extracurricular Activities

- 9/2020 Peer Mentor, University Honors, University of Maryland  
Present
- 9/2020 Puzzle Writer, University of Maryland Puzzle Club  
Present
- 8/2016 Captain, Montgomery Blair Math Team  
6/2017
- 12/2015 Coach, Robert Frost Middle School MathCounts Team  
3/2017

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## Skills

- Programming Languages** Java, C, Python, C++, MATLAB, R, Arduino,  $\LaTeX$ , Verilog
- Modeling Envir.** Simulink, Mathematica, Xilinx