# Pratik Rathore

*US Citizen | Secret Clearance*

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## Education

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

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

## Research & Industry Experiences

5/2020 Present **Electrical Engineering Intern**, *Systems & Technology Research*, Woburn, MA.
*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 8/2019 **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, 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 – 8/2018 **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

6/2016 – 8/2016 **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

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
3/2021 NSF GRFP Honorable Mention
3/2021 University of Maryland Department of Electrical and Computer Engineering Chair's Award
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$^{th}$ 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$^{th}$ place team in the nation
10/2017 Virginia Tech Regional Math Contest, Ranked 15$^{th}$ 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)

## Publications

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

## Teaching Experiences

1/2021 – 5/2021 **Undergraduate Teaching Fellow**, ENEE150: Intermediate Programming Concepts for Engineers, University of Maryland.

## 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)

## Leadership/Extracurricular Activities

9/2020 – Present: Peer Mentor, University Honors, University of Maryland

9/2017 – Present: Puzzle Writer, University of Maryland Puzzle Club

8/2016 – 6/2017: Captain, Montgomery Blair Math Team

12/2015 – 3/2017: Coach, Robert Frost Middle School MathCounts Team

## Skills

**Programming Languages** Java, C, Python, C++, MATLAB, R, Arduino, LaTeX, Verilog

**Modeling Envirs.** Simulink, Mathematica, Xilinx