Tanishq **Aggarwal**

PROGRAMMER · ENGINEER · PHYSICIST

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Skills

Programming	Python, HTML5, Javascript/JQuery, React Native, Firebase, MEAN, LAMP, Java, Android, Google Cloud Platform, ARM Assembly, Verilog, Solidity, C/C++, LaTeX, Mathematica
Other Skills	Blockchain/Hashgraph, Cybersecurity/Penetration Testing, MacOS/Windows/Linux System Administration, SOLIDWORKS, Autodesk Eagle, Embedded Systems Programming (Arduino, BeagleBone)
Hobby Projects	3D printers, RC airplanes, software projects, electronics projects
Languages	English, Hindi, Spanish

Technical Experience

Space Systems Design Studio · *Cornell University*
CONTROL SYSTEMS ENGINEER–PATHFINDING AUTONOMOUS NAVIGATION · *Aug. 2018 – Present*

- Developing control systems in C++ for two autonomously controlled CubeSats that will be launched into space on separate orbits and will be expected to autonomously dock to one another.

Space Systems Design Studio · *Ithaca, New York*
TEAM LEAD–CONTROL MOMENT GYROSCOPE POLYHEDRAL ROVER · *Sep. 2017 – May 2018*

- Wrote a complete C++-based control system for this concept rover design, a project being funded and advised by NASA's Jet Propulsion Laboratory and under the direction of Mason Peck, the former chief technology officer of NASA.
- Designed the high-level electrical architecture for the rover, including sensors, power distribution systems, and interfaces the central microcontroller (a BeagleBone Black).
- Responsible for coordinating a electrical architecture, such as a PCB design for the interface between the central microcontroller and the sensor hardware.
- Responsible for coordinating integration of mechanical and electrical architectures.

Princeton Plasma Physics Laboratory · *Princeton, New Jersey*
PROJECT INTERN–INTERACTIVE PLASMA PHYSICS EXPERIENCE (IPPEX) · *Dec. 2016 - Jun. 2017*

- Developed experience in physical computational simulation in Javascript using numerical methods and the PIXI.JS rendering framework.

New Jersey Governor's School of Engineering and Technology · *Rutgers University, New Jersey*
RESEARCHER–EXPERIMENTAL ALL-TERRAIN ROVER · *Summer 2016*

- As part of a four-person team, designed and partially constructed a 4-wheeled rover capable of navigating over rough terrain, with each wheel having 6 extendable linear actuator "spokes".
- Used SOLIDWORKS to design a multi-tiered, actuated wheel system and center-of-mass ballast arms (to alter the rover's center-of-mass.)
- Developed hierarchical control software, consisting of custom-written low-level Arduino libraries to control nearly 30 different mechanical components and sensors, as well as high-level Python code to orchestrate complex motion.
- Experimented with OpenCV as a means of accurately measuring rotary motion.
- As part of the program's robotics course, learned how to write PID-based line-following algorithms for a Raspberry-Pi based robot.

Hackathon Projects
CO-DEVELOPER

- Ratchet3D–a 3D printer concept made of materials such as cardboard, shirt straps, and LEGO Mindstorms motors that used hot glue as its additive substrate. Developed experience with 3D printer-specific technical details such as extruder design and G-code implementation.
- EarLens–an Android app using speech-to-text and text-to-speech algorithms in a way that enables deaf people to communicate more naturally.

Leadership Experience

West Windsor-Plainsboro Mathematics Tournament *West Windsor, New Jersey*

Tournament Director, Lead Developer *Oct. 2013 - Oct. 2016*

- Organized advertising, preparation and directed a 50-person team for an annual math contest with more than 500 attendees from the NY/NJ/PA area.
- Developed and managed a website and a backend tournament management system with over 10,000 lines of code and thousands of database rows, implemented in the Google Cloud Platform.
- Requested, collected and managed over $10k+ worth of funds for running the tournament, and developed communication links with dozens of school administrators from across New Jersey.

WW-P HS South Science Club *West Windsor, New Jersey*

Co-President, Science Bowl Captain, Ocean Bowl Co-Captain, Science Olympiad Co-Captain *Oct. 2016 - Jun. 2017*

- Managed tryouts and team preparation for nearly 100 people across a period of several months, including the summer.
- Organized logistics for attending four invitational competitions in the tri-state area, managing and collecting over $10k annually to finance the trips.

CTF Competitions *West Windsor, New Jersey*

Team Leader–Algorithmic Armadillos *Oct. 2015 - Jun. 2017*

- Directed our school's flagship (Capture-the-Flag) CTF competition team as an experienced mentor and colleague for my teammates.
- Developed significant skills in ethical hacking, such as web and binary exploitation, penetration testing, steganography and cyber-forensics.
- Secured single-digit placings in several national-level competitions, against hundreds of teams.

Honors & Awards

International

2016	**Semifinalist**, PennApps XIV	*Philadelphia, U.S.A*
2016	**Gold Division Qualifier**, USA Computing Olympiad	*Worldwide*

Domestic

2017	**10th Place**, National Science Bowl (Team Captain)	*Princeton, NJ*
2016	**Semifinalist**, USA Astronomy and Astrophysics Olympiad	*USA*
2016,17	**Honorable Mention**, Princeton University Physics Competition	*Princeton, NJ*
2016	**Honorable Mention**, Moody's Mega Math Challenge	*USA*
2015	**2nd Place**, sCTF	*USA*
2015	**3rd Place**, HSCTF	*USA*
2015,17	**Semifinalist**, USA Biology Olympiad	*USA*
2015,16,17	**Qualifier**, American Invitational Mathematics Examination (AIME)	*USA*
2015	**1st Place Team**, American Regions Mathematics League, B Division (Team Captain)	*USA*

Education

Cornell University *Ithaca, NY*

B.S. in Engineering *Aug. 2017 - Exp. May 2021*

- Majoring in Applied and Engineering Physics
- Minoring in Computer Science

Princeton University *Princeton, NJ*

Student of Special Status *Sep. 2016 - Feb. 2017*

- Enrolled in MAT215 (Honors Analysis) and MAT217 (Honors Linear Algebra) after exhausting all available math courses at my high school.

West Windsor-Plainsboro High School South *West Windsor, NJ*

Graduated with Distinction–Top 5% of Class *Sep. 2013 - Jun. 2017*