

**EDUCATION:**

Senior in the Science, Math, and Computer Science STEM magnet program at Poolesville High School.

Relevant courses: 3 years of Magnet Computer Science (including Analysis of Algorithms, Algorithms and Data Structures), Foundations of Technology, Introduction to Engineering and Design

**EXPERIENCE:****Falcon Flight Project:**

- Led my engineering team to design and build a balloon-supported gondola in coordination with the US Naval Surface Warfare Center (Carderock, MD), using a low-cost SBC and four motors to provide lateral, rotational, and vertical movement while conserving energy. The blimp weighed under 85g, and was completely wifi-operated, with a live camera capable of AprilTag and facial recognition.

- Beyond the scope of the original project, implemented facial recognition functionality on the SBC provided for the project, and achieved a working concept that could detect and differentiate my face in a room of other people, even on the limited computing power of the SBC.

- A year later, designed an embedded flight control PCB with USB-C charging, two batteries, 4 drone motor drivers, a Raspberry Pi GPIO interface, and a sensor suite containing an accelerometer, gyroscope, and magnetometer. Additionally wrote the corresponding library to interface with the sensor suite and motors, and open-sourced all hardware and software to next generation students, as well as gained school funding to produce assembled boards for them.

**Project Falconia:**

- Collaborated with my engineering team to develop a wifi-controlled rover to collect ultrasonic, visible, and spectral data in order to identify crater features on an artificial extraterrestrial planet, and used a camera stream leveraging VNC to display what my rover was viewing and capture, relay and record sensor data while I operated my rover in another room.

- Stepped into a leadership role and helped my team stay focused and motivated in order to meet deadlines and progress through the project ahead of schedule. Was able to finish the project 2 weeks ahead of schedule in order to achieve goals above the scope of the project, and presented a slideshow detailing the build process, data collection, data analysis, and conclusions. Went on to present research with my colleagues at the Mixed Reality Symposium at John Hopkins University APL Facility, with a live demo.

**Thermal Camera:** Designed, built, coded, and tested a fully functional thermal camera with visible camera overlay for use in detecting thermal runaway and overheating issues on circuits and ICs, using a low-cost SBC, custom-designed PCB, and affordable FIR (Far-Infrared) thermopile array.

**Distributed Computing System:** Designed, built, coded, and tested a fully functional computing array using 14 recycled ARM-based (Cortex-A9) SBCs with a custom cooling solution, running a custom-picked Armbian distro and centralized processor control using MPI, including Python/C++ compatibility.

Engaged with high performance-per-watt computing, parallel processing, and low-power, high efficiency computing architectures.

**Robot Arm:** Designed, built, coded, and tested a 5-DoF robot arm, composed mostly of 3D printed parts.

Standing at nearly 80 cm in height, this robot arm leveraged a novel bi-coupled planetary gear train for a high torque gearing ratio in a compact package, and was driven with NEMA23 stepper motors and a custom designed PCB for controller logic.

**Application Development:** As an app developer for a student-driven application organization focused on providing mental health services to high schoolers, delivered a robust application ahead of schedule, leading to a confirmed contract with local education administrators and an initial pilot at 4 high schools.

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**Skills:**

- EDA + CAD Design Software
- Embedded Systems Development
- Proficient in Java, Python, React Native
- Linux filesystems
- Github + Git version control
- Presentation development & delivery