Alan Hsu

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alanjhsu08@gmail.com (858)-442-2909

Freshman at Purdue University with experience in engineering and programming, interested in electrical and aerospace engineering, and passionate about rapid prototyping and fast iteration cycles.

Education

Purdue University, College of Engineering, West Lafayette, IN *Aug. 2023 – present*

- First Year Engineering, planning to enter Electrical and Computer Engineering

Thomas Jefferson High School for Science and Technology, Alexandria, VA *Aug. 2019 – June 2023*

- Graduated with a 4.450 weighted GPA; National Merit Scholarship Finalist
- *Advanced Courses*: Multivariable Calculus, Linear Algebra, Differential Equations, Complex Analysis, Artificial Intelligence, Machine Learning, Robotics, Prototyping, Electronics, Combined Engineering Research Lab

Work Experience

Starpath Robotics, San Francisco, CA *June – Aug. 2022; June – Aug. 2023*

Electrical Engineer Intern

- Designed and manufactured power electronics, avionics PCBs, motor controller interface PCBs, shielded motor harnessing, and BMS system for rovers designed to collect water ice on the moon
- Used KiCAD to design PCBs, and used Solidworks to design small mechanisms and dust sealing parts and to ensure mechanical compatibility
- Contributed technical documentation to Starpath's NASA Break the Ice Challenge technical paper

Teams

Purdue Solar Racing | *Solar Team* *Aug. 2023 – Present*

- Leading the development of a custom high-voltage Maximum Power Point Tracking boost converter for charging a car's battery from solar power

TJ UAV Club | *Team Captain & Electronics Lead* *Sept. 2022 – June 2023*

- Oversaw the overall project development of Avalon X, a fixed wing aircraft that competed in the 2023 SUAS competition; led flight line operations, safety, and logistics at competition
- Designed and built two iterations of the aircraft's electronics bay, which achieves autonomous flight with a Pixhawk 2.4.8 and image processing with a Raspberry Pi 4
- Designed, fabricated, and twice-iterated a self-stabilizing camera gimbal, tuned camera settings, and developed code for automated image capture and retrieval using gphoto2

TJ UAV Club | *Electronics Lead* *Sept. 2021 – June 2022*

- Developed wiring and avionics for Avalon Mk3.5, a fixed wing aircraft that competed in the 2022 SUAS competition; designed parts for 3D printing and laser cutting on the airframe

TJ Space Program | *Senior Advisor* *Sept. 2022 – June 2023*

- Designed, built, and iterated a Raspberry Pi and Iridium-based CubeSat bus to provide a low cost and easy to use platform for future missions; worked with underclassmen to transfer knowledge

TJ Space Program | *TJREVERB Technical Lead* *Sept. 2021 – Jan. 2023*

- Served as a technical lead for TJREVERB, a 2U CubeSat deployed on December 29, 2022 to determine the feasibility of Iridium Short Burst Data (SBD) as a telemetry radio for CubeSats
- Led technical development of electrical hardware and low level programming, including hardware drivers for the electrical power system and radios, a custom flight computer PCB design, and custom communications and data encoding system for the Iridium SBD radio
- Assisted in final assembly, vibration testing, and brought the satellite to Houston for final integration into the Nanoracks deployer
- Oversaw mission operations after deployment, including attempts for initial contact

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Skills

Electrical

- Schematic design and board layout with KiCAD
- Board assembly (SMD/THT), troubleshooting, modification, and revision
- Lab equipment including power supplies, DC loads, and oscilloscopes
- DC power electronics design, including power supplies and motor drivers
- Remote Control electronics, Pixhawk/Ardupilot, and LiPo safety
- Shielded wire harnessing

Programming

- OOP, automation, and machine learning using Python
- Microcontroller programming, AVR and ARM register manipulation, and optimization using C
- Basic PID control loops, simple signal filtering, bitwise math, and low level hardware interfacing
- OS installation, terminal usage, package management in Raspberry Pi and Linux

Mechanical

- Experience with Fusion 360 and Solidworks
- Design for and fabrication with 3D printing, laser cutting, and aluminum extrusion
- Design of mechanisms, parts, and assemblies
- Vacuum materials selection for CubeSats

Personal Projects

Piridium CubeSat Bus

- Low Cost CubeSat Bus design based on experience from TJREVERB and design philosophy of Pycubed

PCB Reflow Hotplate

- Hotplate for PCB reflow consisting of an aluminum PCB and associated PID control circuitry

Hands On Throttle and Stick

- Custom HOTAS which emulates cockpit controls for playing flight simulators

Additional information and additional projects are posted at https://www.alanjhsu.com/projects.

Interests

Photography

- I shoot mainly 35mm and 120 format color film, but also have APSC digital
- Street, landscape, and long exposure photography; fascinated by the mechanics of film and film cameras
- Currently use a Nikon F3HP, Mamiya RB67, and Sony a6000; favorite stocks are Portra 400 and Cinestill 800T
- Photos available at https://www.alanjhsu.com/photos

Music

- Classically trained pianist, self taught on guitar and electric bass

Reading

- *Pale Blue Dot*, *Three Body Problem*, and *All the Light We Cannot See* are some favorites

Downhill Skiing

- I try not to die in backbowls

Biking

- Love biking and modifying/upgrading cheap bicycles