Hrag Djabraian

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Summary

Mechanical Engineering student specializing in Controls and Robotics with experience in aerial vehicle research, embedded electronics, and system integration. Background includes control-oriented design, prototyping, and technical leadership in competitive eVTOL and drone development. Interested in flight control, estimation, robust control, and robotics for autonomous and dynamic systems.

Skills

Programming: MATLAB, Python, C++, Linux, Git; web and app development (React, HTML/CSS).

Design & Manufacturing: CAD, CAM, CNC, manual mill/lathe, additive manufacturing, FEA, CFD.

Embedded & Electrical: Embedded electronics, wiring, soldering, power distribution, flight-control integration.

Documentation: Technical reporting, LaTeX, Excel, Notion.

Languages: English, French, Armenian, Arabic, Spanish.

Research Experience

Undergraduate Researcher | *UCSD Coordinated Robotics Lab - Prof. Thomas Bewley* Jan 2026 – Present

- Designed and fabricated a canted-rotor hexacopter for direct 6-DoF control, a six-rotor vehicle that translates in any direction while staying level, unlike a conventional multirotor that must tilt to move.
- Modeled the airframe in Onshape and 3D-printed it; derived the rotor force and mixing matrices from the cant geometry and selected the cant angle to balance lateral control authority against hover efficiency.
- Built a custom PX4 flight task that bypasses the standard four-channel mixer to command a full six-axis force-and-torque wrench, mapping pilot and attitude-feedback inputs to the six rotors.
- Brought up and tether-tested the vehicle: confirmed conventional flight, then demonstrated commanded lateral force in every direction, with the strongest axis matching the predicted geometry.

Experience

Apprentice Mechanic | *A Certified Autowork Inc.* Los Angeles, CA | Oct 2021 – Jan 2024

- Diagnosed and repaired mechanical systems across a wide range of vehicles, from early carbureted engines to modern computer-controlled drivetrains, including compact cars, high-performance sports cars, and commercial trucks.
- Serviced and overhauled advanced powertrain, suspension, and braking systems on high-performance German vehicles, performing complex repairs and preventative maintenance to strict engineering tolerances.
- Integrated OBD-II scanners, compression testers, and digital repair repositories to introduce data-driven diagnostics and engineering analysis into all operations, modernizing troubleshooting workflows and improving accuracy in complex systems.
- Prepared detailed technical reports and warranty claims that combined practical experience with mechanical engineering insight, securing over $11,000 in reimbursements for major repair operations.

Project Manager; Controls & Electronics Lead | *UCSD DBVF Team* San Diego, CA | Sep 2025 – Present

- Leading coordination across four engineering teams: Airframe, Embedded Controls, Software (Automation), and Proposal, developing a wildfire-response eVTOL for the 2025-2026 Vertical Flight Society competition.
- Directing the Embedded Controls team in the design and analysis of the aircraft's power and control systems, including batteries, PDB, ESCs, flight controller, and sensor integration.
- Managing technical documentation and team deliverables, including the Safety and Risk Plan, Wiring Plan, and Final Technical Report, organized through a dedicated Notion workspace for coordinated progress tracking.

Projects

Fluid Overflow Management Component | *Independent Project* Bavaria, Germany | Jul 2024

- Designed and built a 3D–printed chute and tubing system to capture and redirect overflow fluid from a pressurized jet apparatus used in fluid flow and heat transfer optimization research.
- Created and iterated CAD models to optimize fit, flow routing, and durability; final design successfully contained excess fluid, enabled its recovery for reuse in subsequent tests, and prevented equipment damage.
- Developed scalable solution adaptable for integration with closed-loop fluid reservoirs.

Education

University of California, San Diego Expected Sep 2026

B.S. Mechanical Engineering w/ Specialization in Controls & Robotics *GPA: 3.96/4.0*