

# ENRIQUE GARCIA

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## EDUCATION

### Washington University in St. Louis, McKelvey School of Engineering

Bachelor of Science in Mechanical Engineering, Minors in Aerospace Engineering and Mechatronics

Expected: May 2027

GPA: 3.62/4.00

**Relevant Coursework:** Aerodynamics, Fluid Mechanics, Heat Transfer, Thermodynamics, Solid Mechanics, Vibrations, Design of Thermal Systems, Numerical Methods (MATLAB), Materials Science, Modeling, Simulation, and Control

## SKILLS

- **Technical Competencies:** Optical fundamentals, imaging system behavior, basic lens modeling, structural and thermal analysis (FEA), vibration and alignment considerations, signal processing, calibration, sensor fusion for motion estimation.
- **Software and Hardware Systems:** Python, C++, MATLAB and Simulink, SolidWorks, ANSYS, opto-mechanical components (Thorlabs/Edmund), Teensy 4.0, Arduino IDE, IMU/GPS integration, data acquisition pipelines, 3D printing

## EXPERIENCE

### WashU Vertical Takeoff and Landing (VTOL) – Lead Avionics Engineer, St. Louis, MO

Sep 2025 – Present

- Led development of the avionics and control architecture for a semi autonomous VTOL aircraft, integrating flight critical sensors, power systems, and wiring while isolating avionics from high current propulsion noise.
- Configured Pixhawk 6C and PX4 firmware, tuning PID gains for hover stability, defining fail safe logic, and verifying behavior through Hardware in the Loop testing.
- Debugged firmware, communication links, and sensor fusion issues by analyzing flight logs and test data, improving reliability and autonomous mode stability.
- Collaborated with mechanical and electrical subteams on subsystem integration, EMI mitigation, instrumentation layout, and flight test preparation for iterative control system refinement.

### Robotics Lab, UMKC – Research Intern, Kansas City, MO

May 2025 – Aug 2025

- Developed a multimodal sensing system on a Teensy 4.0, capturing synchronized EMG and IMU data at 1 kHz with Python pipelines for acquisition and state estimation.
- Built a vision based tracking system using ArUco markers and integrated an Extended Kalman Filter in MATLAB for drift free motion estimation aligned with EMG and MMG signals.
- Designed calibration and signal conditioning procedures, including IMU alignment, MMG filtering, and noise and timing verification to ensure high fidelity measurements.
- Validated system performance through human subject testing and analyzed fused EMG, MMG, and kinematic data, presenting results at the IEEE Body Sensor Networks Conference.

### WashU Design Build Fly (DBF) – Aerodynamics & Payload Engineer, St. Louis, MO

Sep 2024 – Present

- Designed NACA based wings and control surfaces using XFLR5, CFD, and analytical methods to optimize lift, stability, and overall performance.
- Performed 2.5 g structural and mass distribution analyses in SolidWorks and Ansys and iterated payload release mechanisms through CAD prototyping and ground testing.
- Analyzed fixed wing flight test data to evaluate aerodynamic efficiency, stability margins, and control response under varying conditions.
- Produced aerodynamic documentation and simulation workflows to ensure repeatable analysis and consistent methodology across the team.

### Federal Express Corporation – Material Handler, Kansas City, MO

Jun 2024 – Aug 2024

- Processed 100+ packages/hour with 99.8% accuracy using industrial material handling systems.
- Reduced manual errors by 15% and defects by 20% through optimized loading patterns and handling practices.
- Supported workflow organization and ensured safety compliance while routing over 5,000 daily shipments.
- Collaborated with logistics teams to streamline package sorting and improve operational efficiency.

## PERSONAL AND ACADEMIC PROJECTS

- **WebTunnel CFD Simulator (JavaScript):** Built a browser-based Stable Fluids solver with semi-Lagrangian advection and Gauss-Seidel projection for real-time flow visualization.
- **Multi Sensor Flight Navigation EKF System (C++/Python):** Implemented a 12-state EKF on a Teensy to fuse IMU, GPS, and barometer data, validating drift reduction through repeatable tests.
- **Adaptive Cruise Control Dynamics Model (MATLAB):** Modeled longitudinal vehicle dynamics and tuned PID gains using Runge-Kutta integration to assess robustness under sensor latency.
- **Autonomous Ambulance Navigation System (Arduino):** Built an ultrasonic-based navigation system with PWM motor control and tested obstacle detection through iterative prototyping.