ENRIQUE GARCIA

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EDUCATION

Washington University in St. Louis, McKelvey School of Engineering *Expected: May 2027*
Bachelor of Science in Mechanical Engineering, Minors in Aerospace Engineering and Mechatronics 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:** Flight dynamics, stability and control, aerodynamic modeling, structural analysis (FEA), thermal modeling, sensor fusion and state estimation.
- **Software and Hardware Systems:** Python, C++, MATLAB and Simulink, SolidWorks, ANSYS, Pixhawk 6C with PX4, Teensy 4.0, Arduino IDE, Hardware in the Loop testing, IMU and GPS integration, 3D printing, CNC machining, Soldering and Wiring

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 Navier Stokes solver using the Stable Fluids method with real time vector field visualization, semi Lagrangian advection, and optimized Gauss Seidel pressure projection.
- **Multi Sensor Flight Navigation EKF System (C++/Python):** Implemented a 12 state Extended Kalman Filter on a Teensy to fuse IMU, GPS, and barometer data, resolving drift through synchronized sensor streams and noise characterization.
- **Adaptive Cruise Control Dynamics Model (MATLAB):** Modeled longitudinal vehicle dynamics and designed a PID controller with Runge Kutta integration to evaluate closed loop stability, overshoot, and robustness under sensor latency.
- **Autonomous Ambulance Navigation System (Arduino):** Built an embedded navigation system using ultrasonic sensing, PWM motor control, and obstacle detection, tuning control logic through repeated testing.