

Arael A. Anaya

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EDUCATION

Colorado School of Mines, Golden, CO

Masters: Master of Science in Robotics Engineering

May 2027

GPA: 4.0

Major: Bachelor of Science in Mechanical Engineering; Focus: Automation & Control

GPA: 3.7

Minor: Robotics and Intelligent Systems

WORK EXPERIENCE

MPALA Lab, Research Assistant

Jan 2025 - Present

- Developed a ROS2-integrated aerial swarm platform using Crazyflie drones and OptiTrack motion capture to study distributed consensus algorithms in real-world networks.
- Implemented resilient consensus algorithms (W-MSR), tuned Kalman filters, and system dynamics to improve stability, localization accuracy, and robustness under adversarial interference.
- Bridged theory and practice by translating consensus models into real-time experiments, conducting flight tests, and performing real-time debugging.
- Collaborated in agile development workflows, contributing high-quality C++ & Python code to the research team.

MIRROR Lab, Research Assistant

Aug 2024 - Aug 2025

- Integrated multiple laboratory robots using ROS and upgraded DIARC-based multi-teleop interfaces with new features by incorporating user feedback to improve user experience.
- Designed an ML-assisted robotics support system for a NASA-funded project, improving robot adaptability and human-in-the-loop decision-making in high-stress environments.
- Performed software debugging/validation using Linux/Bash scripts and ROS packages, strengthening reliability.

RELEVANT PROJECT EXPERIENCE

Crank Generator (Human-Powered Device)

2025

- Designed and prototyped a human-powered generator, performing SolidWorks modeling, FEA validation, and design-for-manufacturing optimization.
- Led fabrication and testing efforts, validating structural integrity and real-world performance.

Quadcopter Altitude Control System

2025

- Designed and simulated a closed-loop altitude controller in MATLAB/Simulink, analyzing step and sinusoidal responses.
- Evaluated rise time, settling time, overshoot, and steady-state error; improved disturbance rejection and control performance by approximately 20%.
- Developed a repeatable gain-tuning and validation workflow, including automated testing scripts and structured code reviews.

Rescue Drone

2024

- Designed and built a fully custom quadcopter system with claw mechanism for search-and-rescue payload delivery.
- Integrated multiple microcontrollers in a distributed embedded architecture, programming real-time firmware in C++.
- Performed full mechanical, electrical, and software integration, including CAD, additive manufacturing, soldering, and flight testing.

ENGINEERING AND TECHNICAL SKILL

- Programming:** Python, C++, MATLAB, Java, JavaSwing, JavaScript, LabVIEW, EES, HTML, CSS, Mathcad
- Tools/Platforms:** ROS2, Linux, Git, Docker, Latex, Agile development, CMake, catkin build system, Prompting
- Hardware & Electronics:** Microcontroller Programming, Electrical Soldering, Additive Manufacturing, Lidar
- CAD & Fabrication:** SolidWorks (CSWP, Weldments CSWP-S, and MBD Certified), CNC, Drill Press, Lathe
- Soft Skills:** Fluent in English and Spanish, Team Leadership, Project Management, Effective communication

AWARDS AND PUBLICATIONS

- SPIRSE Travel Grant - \$3,000 award by IEEE to attend CASE - Recognized for robotics research potential 2025
- SURF 2025 Scholar - Summer Undergraduate Research Fellowship 2025
- MURF 2026 Scholar - Undergraduate Research Fellowship 2025
- [PENDING PAPER] Understanding Human Operator Needs in Multi-Robot Tasking Interfaces 2025