Adam H. Zarak

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EDUCATION

B.S. Mechanical Engineering, GPA 3.6 **May 2025**

University of Central Florida - CECS **Orlando, FL**

Minor in Computer Science

WORK EXPERIENCE

Internship – Control Systems Engineer **May 2024 – Aug 2024**

Automated Logic Corporation

- Created Databases within the ALC WEBCTRL application to be utilized by contracted clients
- Designed control system panel layouts using Microsoft Visio for high-performance automated systems
- Assisted in troubleshooting and validating control logic for HVAC automation, ensuring systems met efficiency and performance standards
- Conducted system integration testing to verify seamless communication between controllers, sensors, and software interfaces

RESEARCH

Undergraduate Research Assistant **Sept 2023 – Apr 2024**

UCF Biomechanics Laboratory

- Utilized 3DSlicer and Sequence Registration to visualize 3D cardiac cycle models from 2D resonance images
- Applied computational analysis to simulate and validate biomechanical properties of biological systems
- Assisted in preprocessing MRI datasets and segmenting anatomical structures to prepare inputs for finite element modeling
- Collaborated with graduate researchers to optimize simulation parameters for cardiac models

PROJECTS

GNC Lead – RTLS Rocketry Team Purple **Aug 2024 – Apr 2025**

UCF Senior Design

- Spearheaded development of a Return-To-Launch-Site trajectory control algorithm in MATLAB with adaptive PD gains for real-time course correction under variable wind conditions
- Led full-system integration of avionics components including GPS, IMU, barometer, magnetometer, and radio, calibrating for sensor drift and environmental interference
- Simulated 3D descent scenarios with Monte Carlo analysis and Kalman-filtered sensor fusion, demonstrating landing accuracy within 800 ft of target across 1000 randomized trials
- Implemented hardware-in-the-loop (HIL) testing by deploying the RTLS algorithm on an ESP32 microcontroller, actuating servo-driven parafoil control using simulated sensor data
- Built a dual-core embedded system architecture separating flight algorithm logic and sensor simulation, integrated with a telemetry radio and SD data logging
- Authored comprehensive technical documentation on GNC software development, validation strategies, and embedded deployment for project final report and presentation

Spotify Wrapped Analysis **Nov 2024**

Python Personal Project

- Designed and implemented a FastAPI-based web application for music preference analysis
- Developed data parsing algorithms to computer user preference overlap and generate a “basicness score”
- Integrated OpenAI’s GPT model for dynamic feedback, optimizing user engagement

UCF Great Naval Orange Race - Autonomous Boat Development **Jan 2022 – Apr 2022**

UCF Intro to Engineering Project

- Designed a load-bearing, buoyant vessel using SolidWorks to ensure stability and efficiency
- Programmed an Arduino-based autonomous navigation system, integrating sensors and wiring for self-guided operation around a pond.

SKILLS

- **Programming & Software:** C, C++, Java, Python, MATLAB, Simulink, Arduino, FastAPI, Git/GitHub, Hterm
- **Mechanical Systems:** SolidWorks, ANSYS, Paraview, 3DSlicer, AutoCAD, FEA, Thermodynamics, Fluid Mechanics, Heat Transfer
- **Soft-Skills/Teamwork:** Technical Documentation, Project Leadership, Team Collaboration, Public Speaking
- **Manufacturing/Prototyping Experience:** 3D Printing, Laser Cutting, Basic Machining Skills, CAD-to-Hardware Integration
- **Electronics:** ESP32, Arduino, UART/I2C/SPI Protocols, IMU, Servo Motor Control, Telemetry Radios