

Marcelino Luis Alaniz

E C E @ R i c e U n i v e r s i t y

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EDUCATION

B.S. Electrical and Computer Engineering (3.46)

Expected May 2027

Minor in Operations Research

Rice University | Houston, TX

A.A. General Studies (4.00)

Graduated May 2023

San Jacinto College | Pasadena, TX

PROJECTS

Lunar Rover (Rice Robotics Rover ELEC Team Lead)

Fall 2024 - Present

<https://github.com/BrianoAden/Rover-ELEC.git>

- **Facilitating 10 members during weekly meetings and check-ins** to coordinate development, assign tasks, and **troubleshoot system issues** in preparation for the University Rover Competition next summer.
- Created a **36V/5A** power-distribution system for a lunar rover, ensuring **stable power delivery** to motors, drivers, and LIDAR for reliable **autonomous operation**.
- Developed **C/C++**-based navigation protocols for **Arduino** and **ESP32**, enabling efficient GPIO-based communication for precise movement control.

Autonomous Lane-Keeping RC Car

Spring 2025 - Jun 2025

<https://www.hackster.io/team-meow-mobile/the-meow-mobile-91b0bd>

- Developed **C**-based driver for **Raspberry Pi 5** to enable real-time autonomous lane-following, improving system responsiveness and road detection accuracy.
- Designed and implemented a real-time lane-keeping algorithm with **OpenCV**, allowing the RC car to accurately detect and follow road markings, enhancing navigation precision.
- Developed **Linux** system calls and kernel modules to streamline vehicle control, enabling seamless interaction between software and hardware components.

Speed Gun using MSPS003F3

Spring 2025 - Jun 2025

<https://nkh5.github.io/ELEC327-Final-Project/>

- Designed and programmed a **custom speed measurement device** using an **ultrasonic sensor** and **MSPS003F3** microcontroller, implementing a real-time **finite state machine** (FSM) to calculate speeds up to 20 MPH with **millisecond precision**.
- Fabricated a **custom PCB** and developed supporting circuitry, including **voltage regulation** and **level shifting**, integrating components like buzzers and multicolor LEDs within a **3D-printed enclosure**.
- Wrote **interrupt-driven embedded C code** to perform **pulse-width measurement**, distance and speed calculations, and **power-efficient control** using WFE (Wait-For-Event) and PWM for peripheral management.

EXPERIENCE

Field Engineering and Operations Intern (Traffic Division)

May 2025 - Present

Office of The County Engineer | Harris County, TX

- Analyzed speed limits and intersection geometry to **reduce wait-time by 32%** across **1,153** Harris County traffic signals, improving **safety** and **efficiency** over the standard 3-second amber phases.
- Assigned 5 traffic studies alongside **Graduate Engineers and PMs** to improve county infrastructure by conducting **field visits**, creating **AutoCAD drawings**, and analyzing crash data to **improve public safety and traffic efficiency**
- Worked closely with **Traffic Signal Technicians** to collect and analyze **data (flood zones, school zones, railroads, etc.)** to determine need for additional monitoring systems to keep intersections safe.

Technology Teaching Assistant

Fall 2024 - Present

Rice University Office of Information Technology | Houston, TX

- Provide real-time technical support for faculty using **Zoom** and Canvas, ensuring **uninterrupted course delivery** and improving remote learning efficiency.
- Troubleshoot and resolve **technical issues** in classroom technology, maintaining **smooth operation** of educational tools for faculty and students.
- Coordinate and manage technology setups for **high-profile presentations and events**, ensuring seamless execution and minimal disruptions.

ER4 Robotics Intern

Summer 2023

National Aeronautics and Space Administration | Houston, TX

- Gained hands-on experience in **mechanical systems design** and **security protocols**, applying knowledge to space vehicle systems development.
- Supported NASA's robotics initiatives by maintaining and troubleshooting the **Space Exploration Vehicle and Microchariot**, ensuring operational readiness.
- Studied and applied principles of **advanced robotics** and space vehicle design, focusing on protection against **pressure, radiation, and environmental hazards**.

SKILLS

Programming: Python (*Pandas, NumPy, Scikit-learn*), C/C++, Verilog, Bash, JavaScript

Data Analysis: Statistical Modeling, Machine Learning, OpenCV, Tableau

Systems: Linux, Embedded Systems, Real-time Computing, Bare-Metal Programming, MSPM0+ Microcontrollers

Tools: Git, ARM Architecture, Microcontrollers

Mathematics: Probability, Statistics, Linear Algebra, Optimization