

# ALFREDO REINA CORONA

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## EDUCATION

### University of Southern California

Master of Science in Computer Science | GPA: 3.15

Expected May 2026

Los Angeles, CA

### University of Texas at Arlington

Bachelor of Science in Computer Science | GPA: 3.234

Unmanned Vehicle Systems Certificate | Certificate GPA: 4.0

May 2024

Arlington, TX

## PROJECTS

### Autonomous Land Rover | Group

- Directed development of an autonomous-capable land rover, managing team collaboration and resolving conflicts to ensure project success
- Optimized a Simulink model to provide the vehicle a more efficient real-time feedback system, contributing to a **22%** decrease in course traversal compared to the original model
- Implemented MQTT to distribute processing tasks to a secondary computer within the network, allowing for near-real-time operation despite hardware limitations
- Created a script to analyze sensor data and identify recurring issues, improving debugging efficiency by correlating errors with common problems
- Consolidated data from multiple internal and external sensors, using Extended Kalman Filters, to autonomously traverse varying indoor environments

### Autonomous Vehicle: Motion Planning & Electronics | Group

- Assumed leadership of a project transitioned from a previous team
- Developed a path-planning system using Kalman filters and A\* search to ensure a locally safe path for the vehicle
- Developed real-time data cleaning scripts to filter out null or outlier values, improving accuracy of sensor testing
- Integrated ROS2 with the CubeOrange to leverage onboard sensor fusion (IMU + GPS) for improved vehicle localization and calibration.
- Implemented ROS2-Gazebo simulations with integrated sensor and actuator models to test vehicle behavior across diverse scenarios before real-world trials

## EXPERIENCE

### AutoDrive Lab

Student Researcher | Part-time

April 2025 – Present

Los Angeles, CA

- \* Researched methods to develop more effective model-free RL policies for mid-to-end driving
- \* Researched model-free approaches to autonomous vehicle development by testing, modifying, and validating reinforcement learning models, simulators, and decision-making algorithms.

### Project SPICES LLC

Full-Stack Market Research Intern | Part-time

August 2024 – January 2025

Los Angeles, CA

- Developed, deployed, and maintained an internal Full-Stack application to aggregate and analyze financial data from diverse sources, improving data accessibility, enhancing client targeting strategies and market analysis within the company
- Implemented basic ETL and data cleaning scripts to source and consolidate fragmented data into a unified CSV file, decreasing data preparation time by **20%**, leading to more efficient client analysis
- Enhanced data workflow by optimizing company specific algorithms to generate more accurate numerical outputs representing a company's viability for targeting purposes

## SKILLS

**Programming Languages:** Python, C++, C, JavaScript

**Technologies:** TensorFlow/Keras, PyTorch, ROS2, Stonefish Sim, ROS, CubePilot, Teensy, PostgreSQL, MPC, MuJoCo, CARLA, Gazebo, OpenCV, PCL (Point Cloud Library), Microcontrollers, Next.js, SQL, MATLAB, MySQL, Flask, MQTT, Beautiful Soup, DuckDB, Git, Simulink, CSS, HTML, OBD-II, Docker

**Research Areas:** High-Speed Autonomous Driving, Planning, Controls, Robust Adversarial Environment Traversal, Reinforcement Learning

## EXTRACURRICULAR

### Track / Cross-Country

Team Captain & Athlete

August 2021 – Present

University of Southern California | University of Texas at Arlington

- Team captain of a 2x national championship-winning team
- Improved UTA Cross-Country's regional rank 11 places (20th → 9th) by coordinating practices, improving training cycles, and individualizing training plans
- Refined recovery regimen, decreasing athlete injury rate by **50%** (\*9+/yr → \*4+/yr)
- Coordinated with head and assistant coaches to discuss team needs and future plans