

Alejandro Romero-Lozano

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Education

University of Arizona	B.S Electrical & Computer Engineering	Expected May 2025	GPA: 3.75/4
	M.S Electrical & Computer Engineering	Expected May 2026	

Professional Experience

Engineering Intern May 2024 – August 2024

Caterpillar Inc – Electrical Integration for Large Mining Trucks (LMT) Tucson, AZ

- Planned and executed electrical load test on LMT, revamping and standardizing planning document for future tests
- Gathered information and presented novel mounting solution, helping convince key decision makers
- Designed small harness testing fixture and provided design recommendations for general electrical integration

Engineering Intern May 2023 – August 2023

Caterpillar Inc – Software Validation for Hydraulic Mining Shovels (HMS) Peoria, IL

- Full-stack development of web-based application to display machine health information in real-time
- Configured and setup LEMP stack web server and designed the MySQL database to integrate batched machine data
- Collaborated with cross-functional teams to gather requirements, design solutions, and ensure project success

Researcher August 2022 – May 2023

NASA Space Grant – Erika Hamden's Super-LOTIS Lab Tucson, AZ

- Designed CAD for, and implemented prototype, of a custom, five axis, six-figure, ultra-high vacuum (UHV), peripheral system for ground based robotic telescope
- Coordinated with manufacturers to adapt design to effectively balance function versus cost of UHV system
- Modified balloon-borne telescope's calibration assembly's motion system to reduce complexity

Engineering Intern June 2022 – August 2022

Department of Defense National Security Innovation Network – X-Force Fellow Crane, IN

- Designed replacement for legacy stabilization system for small ship mounted weapon by producing a novel gyroscopic system which was 20 times more cost efficient at 60% of the legacy system's performance
- Designed and built a small-scale, 3-D printed electrical gyroscopic system to show proof-of-concept for control
- Modeled full-scale solution and to verify MATLAB calculations of system performance in physics-based simulation

Projects & Leadership

Electrical Lead May 2023 – May 2024, May 2022 – May 2023

BAJA SAE – University of Arizona Wildcat Racing Tucson, AZ

- Leading the end-to-end development of a robust, medium-range, embedded telemetry system for performance monitoring of an off-road vehicle in real-time, including custom PCBs
- Maintaining and continually testing a 5000+ line codebase in C++ and Python, that feature a completely custom data visualization GUI using PyQt5, SQLite, running on Raspbian OS
- Leveraged limited Arduino hardware through event-based microcontroller states and custom data encoding to produce a full duplex telemetry system with a top data rate of 3.1 kB/s

CPU Designer December 2023

ECE 369 – Computer Architecture Tucson, AZ

- Designed and validated custom MIPS based 128-core CPU using Verilog for class competition, breaking class record
- Architected CPU's pipeline, iteratively improving design through parallelization and tested on FPGA board

Technical Skills

Programming: C/C++, Python, Kotlin, SQL, Matlab, JavaScript, CSS, HTML, PHP, Verilog

Software: Solidworks, Creo, Fusion360, Git/Github, KiCAD, Ubuntu, Xilinx, Office Suite, Nginx, VSCode, Android Studio, KiCad

Manufacturing: 3D Printing, Multimeter, Woodworking, Soldering, Saw, Crimpers, Lathe, Drill Press

Languages: English, Spanish

Publications

Romero-Lozano A., Correa D., Larsson M., Pimienta J., Byerly M., Hall L., Goco B., Missbrener J., White C., Owen A., Lee J. (2024). Hardware-Software Co-Design of Integrative Telemetry System for Off-Road Racing Vehicle. International Telemetering Conference Proceedings, accepted

Romero-Lozano, A., Byerly, M., Doan, M., Overbeck, H., Loudhabachi, S., Sjostrom, O., Eladawy, A., Lee, J., & Irfan, H. (2023). Implementation of a Proprietary Embedded Real-Time Telemetry Protocol for Off-Road Racing Vehicle. International Telemetering Conference Proceedings, 58.