

Alexander Totah

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About Me

Electrical Engineer and Computer Scientist at UC Riverside with a specialization in Robotics Engineering and AI. I am a proven leader, founder, and President of Highlander Combat Robotics and an undergraduate researcher with a passion to integrate software and hardware. My technical experiences and interests include robotics and mechatronics, control systems, hardware design, and sensor integration.

Education

UC Riverside (UCR), BS in Electrical Engineering and Computer Science Sep. 2022 - May 2026

- **B.S. in Electrical Engineering:** 3.50/4.00
- **Minor in Computer Science:** 3.45/4.00
- 4x Dean's Honor List Recipient, IEEE, ASME, Highlander Combat Robotics

Skills

Areas of Expertise: Robotics and Mechatronics, Control Systems, Hardware Design, Sensor Integration

Electronic Testing/Monitoring: Soldering, Multimeter, Function Generator, Oscilloscope, DC/AC Power Supply

Software Skills: C/C++, Python, MATLAB, PyTorch, SciPy, NumPy, Pandas, TensorFlow, ROS, Agile Development, Nvidia Jetson Deployment, HTML, JavaScript, React, OpenAI API

Applications: Simulink, Pspice, Altium, ROS, Ubuntu/Linux CLI, Arduino, SolidWorks, Docker, Overleaf/Latex

Publications

An mri-conditional flexible endoscopic robot with a hydraulic tendon-driven actuation system, Journal of Medical Robotics Research Summer 2023
<https://doi.org/10.1142/S2424905X24400038>

Remote Teleoperation System for Autonomous Vehicles: Enhancing Human Intervention in Critical Scenarios, *(Under Development)* Summer 2025

Experience

AI Engineering Intern, Learning Lab AI, Riverside, CA Jan. 2025 – Sep. 2025

- Developed an algebraic simplification server using **JavaScript** to improve program adaptability.
- Designed an intuitive front-end interface using **React** to improve usability for 100+ active users.
- Constructed a model using **OpenAI** fine-tuning to generate problems increasing development by 350%.

Autonomous Vehicle Engineer, Collaborative Intelligence Systems Lab, UCR January 2024 – Present

- Developed end-to-end autonomous F1-scale vehicle system using **ROS** and **Docker** containerization, including **RL-based navigation** models for object avoidance and physical 1/10-scale construction.
- Researching AI-driven network adaptation protocols to enhance remote operation of autonomous vehicles.
- Trained an autoencoder using **PyTorch** to condense training data by 94% while retaining 96% accuracy.

Co-Founder and Club President, Highlander Combat Robotics, UCR May 2023 – May 2025

- Secured \$5,000+ in sponsorship funding from university donors, enabling expansion of robotics initiatives.
- Designed and delivered technical workshops on SolidWorks, robot design, and Arduino programming for 30+ new members, increasing retention by 50%.
- Directed an annual competition showcasing six student-created robots with 40+ spectators.
- Engineered and integrated a manual off-switch for fire risk reduction, manually fabricated custom wiring harnesses, and led safety team training on proper PPE and emergency response protocols.
- Led the creation of an engineering space in collaboration with five student organizations, enhancing access to essential tools and resources for hands-on projects and innovation.

Systems and Control Engineer, Robotics and Medical Systems Lab, UCR

Oct. 2022 – Jan. 2024

- Designed a **PID control** system using **Matlab** to control a steerable needle with < 1 ms latency.
- Engineered intuitive **Arduino-based** controls for the remote operation of an MRI-compatible biopsy robot, reducing user error during long procedures.
- Calibrated MRI-compatible fiber optic proximity sensor using **SIMULINK** to accurately measure the bend of a steerable needle within <0.5mm using a 3D-printed test frame.

Program Advisor and Lead Instructor, Kids That Code Inc., Riverside, CA

Feb. 2024 - Present

- Advised a robust robotics education program tailored for young learners, making complex concepts simple and accessible to established company as regional leader in STEM education.
- Taught coding, robotics, and CAD to 1,000+ students per month, fostering a strong STEM foundation for elementary learners.

Projects

“JUST DANCE!” Embedded Systems Project

[Project Repo Link](#)

- Developed an interactive, motion-based game using **AVR microcontrollers** programmed in **C/C++**
- Optimized memory in LCD drawing algorithm to achieve 10ms latency and avoid task overrun.
- Established communication protocols for accelerometer using **I2C**, display using **SPI**, and remote control using Bluetooth **USART** to reduce user latency.

F1Tenth Custom Docker Container

[Project Repo Link](#)

- Constructed a **Docker** Container to run remote operation drivers on a 1/10-scale vehicle.
- Stores all necessary dependencies to operate the lidar, motor controller, and remote control drivers

Make Your Own Adventure, CLI Role-play-game

[Project Repo Link](#)

- Managed **Agile Development** workflow for a team of 4 developers, facilitating sprint planning and code reviews.
- Developed login page with connections to a **SQLite3 database**
- Created custom graph data structure to save current games from memory allowing users to revisit projects.

Autonomous Go-Kart Project

- Designed and analyzed the electrical power system for an autonomous go-kart, performing load calculations, voltage regulation, and power distribution analysis to ensure system stability.
- Manually drafted circuit schematics and utilized **PSpice** for simulations.
- Led in component selection, ensuring optimal power distribution and safety.

First Robotics Competition (FRC) Lead Programmer, 2022

[Project Repo Link](#)

- Optimized autonomous navigation, boosting team performance by 10 points enabling team to reach semi-finals of the FRC Los Angeles Regional Competition.
- Implemented **PID control** for a shooting mechanism, optimizing accuracy for efficient scoring.
- Utilized motion profiling to enhance performance and ensure integration with mechanical and electrical systems.