Richard Vallejo Jr

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EDUCATION

University of California San Diego (UCSD) | Cumulative GPA 3.46 — La Jolla, CA
Bachelor of Science: Mechanical Engineering | Specialization: Controls and Robotics — *Expected Graduation: June 2025*
Relevant Courses: Engineering Graphics and Design, Statics and Intro to Dynamics, Engineering Outreach, Managing Diverse Teams

SKILLS

Software: SolidWorks, SolidWorks Simulation (Static), Fusion360, AutoCAD, Ultimaker Cura, MATLAB
Manufacturing: Shop manufacturing, Lasercamm, 3D printing

EXPERIENCE

Triton Robotics | *Sentry Robot Lead* | La Jolla, CA — September 2021 - Present

- Manage a subteam of 6 members to create the "Sentry" robot, including design, manufacturing, and documentation.
  - Function as a systems engineer and organize weekly meetings and assign tasks to maintain progress.
  - Designed a base structure with adjustable mounting that can sufficiently support a rotating turret in SolidWorks.
- Assist with the recruitment of new members to the organization, including reviewing applications and providing training.
- Researched and implemented pneumatic systems to control a pneumatic claw to grab minerals for the "Engineer" robot.
  - Conducted pneumatic reserve pressure and volume calculations to determine air tank and regulator requirements.
  - Designed using SolidWorks and manufactured a rack and pinion system to extend and retract the pneumatic claw.

Qi Engineering Education Research Lab | *Research Assistant* | La Jolla, CA — October 2022 - Present

- Co-author on a publication about the effectiveness of inquiry-based learning activities in engineering education.
- Designed a low-cost pulley demonstration in Fusion360 to be used in Statics and Mechanics of Materials classes.
- Manufactured hands-on truss models using a Lasercamm for students to perform experiments within Statics classes.

FIRST Tech Challenge Team Blueprints 7767 | *Team Captain, Club President* | Pomona, CA — August 2017 – October 2020

- Founded the high school robotics program by recruiting future members at my local middle school.
- Designed and manufactured a mecanum wheel drive allowing for consistent execution of an autonomous program.
- Designed and manufactured a lifting robot by latching onto a hook and curling the chassis into a cube shape.
- Designed and manufactured a drawer slide and servos to create a lifting claw mechanism controlled by a pulley system.
- Hosted interactive STEM Family Nights for underserved elementary schools in the Pomona Unified School District, impacting over 400+ families at 11 different elementary school locations.
  - Events had interactive booths teaching students about the engineering design process, circuits, and robotics.

FTC Mentor | *Volunteer* | Pomona, CA — October 2020 - Present

- Mentor for FTC Team Blueprints 7767, aiding with competition strategy, GD&T, and DFM.
- Assist with the development of student's communication skills through presentation practices and questioning.
- Volunteer at FTC events, performing duties such as robot and field inspection, queuing, and pit administration.

MAE 198 - Engineering Outreach | *Volunteer* | La Jolla, CA — January 2022 – March 2022

- Exposed K-12 students in San Diego to mechanical engineering and provided peer-to-peer mentorship.
- Taught lessons in basic CAD and isometric drawing to students at Chollas-Mead Elementary School and Hoover High School.

PROJECTS

6 DOF Robotic Arm — March 2023 - Present

- Designing a 6 DOF robotic arm as a passion project, using servos, an Arduino, and 3D printed components.
- Learning the basics of Arduino control and circuits in order to actuate the arm using a series of switches.

MAE 3 Robot Contest — October 2022 – December 2022

- Designed a parallelogram four-bar linkage claw mechanism used to grab and place objects inside of a small container.
- Calculated the required torque in order to grip each object and used a 5:2 gear ratio to have a factor of safety higher than 2.
- Received an award for best presentation in the contest based on the analysis of the four-bar linkage claw mechanism.

MAE 3 Pendulum Clock — September 2022 – October 2022

- Designed a pendulum clock in Fusion360, which functioned via an escapement wheel mechanism.
- Calculated the period of oscillation of the pendulum using a rigid-body assumption and compared it to experimental values to determine possible sources of error.