# Jake Yoshimoto

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## ABOUT ME

Robotics Engineering student at the University of California, Santa Cruz with a minor in Electrical Engineering. I have experience designing and integrating hardware–software systems, with a focus on embedded systems, control systems, and real-time software. My work spans robotics, electromechanical systems, and data-driven engineering tools, with an emphasis on building reliable systems under real-world constraints.

## EDUCATION

**University of California, Santa Cruz**

Robotics Engineering, B.S. | Minor in Electrical Engineering

GPA: 3.7 | Expected Graduation: June 2026

**Punahou School**

High School Diploma | May 2022

## HONORS & AWARDS

- Eagle Scout, Boy Scouts of America
- Undergraduate Dean's Award, University of California, Santa Cruz (4-year scholarship)
- Humanizing Technology Certificate, University of California, Santa Cruz
- John Henry Felix Community Service Award, Boy Scouts of America

## SKILLS

**Programming & Software**

Python, C/C++, TypeScript/JavaScript, MATLAB, Git, Linux, Modular Software Design, Debugging & Testing

**Control Systems & Robotics**

Feedback Control Systems, State Machines, Motion Control, Sensor Integration, Autonomous Systems

**Embedded & Real-Time Systems**

Microcontrollers, Embedded C/C++, Real-Time Systems, ADC Measurement, Serial Communication, Signal Processing

**Systems Integration & Tools**

Hardware–Software Integration, Electromechanical Systems, Prototyping, Testing & Validation, ROS, CoppeliaSim, MuJoCo, SolidWorks, Fusion 360, AutoCAD, Onshape

## RELEVANT COURSEWORK

**Control & Robotics:** Mechatronics, Feedback Control Systems, Robot Kinematics & Dynamics, Bio-Inspired Locomotion

**Signals, Data & Estimation:** Signals & Systems, Sensing and Sensor Technologies, Probability Theory, Machine Learning

**Embedded & Electrical Systems:** Microcontroller System Design, Analog Electronics, Electronic Circuits, Logic Design

**Software & Computer Systems:** Data Structures & Algorithms, Computer Systems (C & Assembly), Programming Abstractions (Python), Discrete Mathematics

## EXPERIENCE

**Mechatronics Tutor** | UC Santa Cruz | Santa Cruz, CA — Mar. 2026 - Present

- Support students in debugging embedded systems, control logic, and hardware–software integration in a mechatronics course
- Guide system design understanding across sensors, actuators, and state-based control architectures
- Verify lab milestones and evaluate system behavior for correctness and completeness
- Reinforce core concepts in embedded programming, control systems, and system integration through hands-on instruction

**Summer Games Intern** | Booz Allen Hamilton | Honolulu, HI — Jun. 2025 - Aug. 2025

- Developed a simulation-based decision-support system to evaluate complex operational scenarios
- Implemented modular software logic to model system behavior and constraints under varying conditions
- Analyzed simulation outputs to assess performance, cost, and effectiveness across multiple strategies
- Presented system architecture, modeling approach, and results to senior leadership
- Built using React, TypeScript, and map-based visualization tools (Leaflet)

**Engineering Technology Student** | Apple, Inc. | Cupertino, CA Jul. 2021 - Aug. 2021

- Selected as 1 of 25 students nationwide to collaborate with Apple engineers in a multidisciplinary design environment
- Led mechanical subsystem design using CAD and supported system integration across electrical and software components
- Contributed to system assembly, testing, and debugging of an electromechanical prototype
- Presented technical design decisions and tradeoffs to Apple engineers and executives

**Founder & President** | O-Bots Foundation | Honolulu, HI Oct. 2019 - Nov. 2022

- Founded and led a nonprofit organization focused on expanding access to STEM and robotics education
- Organized and supported robotics programs for students, including mentoring teams and facilitating hands-on learning
- Managed fundraising efforts and coordinated outreach initiatives to support program growth
- Led organizational planning, team coordination, and technical mentorship across multiple projects

**CAD / Programming Lead** | FIRST Tech Challenge | Honolulu, HI 2017 - 2022

- Led design and development of competition robots, integrating mechanical, electrical, and software subsystems
- Designed and fabricated robot components using CAD and rapid prototyping techniques
- Implemented control logic and feedback systems to improve robot performance and reliability
- Iterated through full design cycle, including prototyping, testing, and system-level debugging
- Contributed to team achieving 3 Hawaii State Championship wins and consistent high-level performance

## PROJECTS

**On-Chip ECG Classification System | Machine Learning & Signal Processing**

- Developed an end-to-end ECG classification pipeline under strict power, latency, and memory constraints
- Designed signal-processing stages including filtering, segmentation, and feature preparation for time-series data
- Trained and evaluated machine learning models using PyTorch with GPU acceleration
- Explored spiking neural network (SNN) approaches for low-power, event-driven inference
- Analyzed tradeoffs between model accuracy, computational cost, and deployability on embedded systems

**FlexStrong Closed-Loop Grip Assistance System** | Sensing Technologies Final Project

- Developed a real-time embedded control system on an STM32 microcontroller for adaptive electrical muscle stimulation
- Designed state-based control logic to manage user interaction, safety constraints, and actuator behavior
- Implemented a closed-loop PI controller using force feedback to dynamically regulate stimulation output
- Integrated flex sensors, force resistive sensors, and encoder inputs into a unified sensing pipeline for responsive control
- Evaluated system performance through testing and tuning, balancing responsiveness, stability, and user safety

**WALL-E Autonomous Sorting Robot** | Graduate-Level Mechatronics

- Designed and implemented a hierarchical state machine in C to coordinate perception, navigation, and object-sorting
- Developed modular software architecture separating sensor acquisition, decision-making, and actuation for robotic control
- Integrated IR and color sensors with calibrated ADC measurement and signal conditioning for environmental perception
- Implemented closed-loop motor control to achieve consistent motion performance under varying operating conditions
- Validated system behavior through iterative testing and debugging, using structured logging and performance evaluation

**DOOMBA Ant-Weight Combat Robot** | Electromechanical Design & System Integration

- Designed and built a compact combat robot under strict size, weight, and durability constraints
- Developed CAD-driven mechanical structures optimized for strength, weight, and rapid iteration
- Integrated motors, power distribution, and control electronics within tightly constrained packaging
- Performed iterative testing under high-impact conditions to identify and resolve mechanical and electrical failure modes
- Improved system robustness and serviceability through failure-driven design iteration