Alec Levy

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Skills

Languages: C++, Python, C, Java, MATLAB, Javascript, etc.

Embedded & Hardware: ESP32, STM32, Raspberry Pi, I2C/SPI/BLE, ESP-IDF

Web & Cloud: React, Flask, SQLAlchemy, REST APIs, Docker, AWS (EC2, S3, RDS, CloudFront), PostgreSQL

Tools: Git, GDB/OpenOCD, Mediapipe, Pydub

Education

University of California, Santa Cruz – Bachelor of Science in Computer Engineering (3.89 GPA) December 2026

Relevant Coursework: Embedded Systems Design, Parallel Computing, Signal Processing, Data Structures and Algorithms, Computer Architecture, Discrete Math, Differential Equations, Linear Algebra, Probability and Statistics

Experience

Wireless Sensor Network Developer December 2023 – Present

jLab in Smart Sensing – Santa Cruz, CA

- Developed an embedded wireless sensor network platform used by 40+ researchers (ENTS)
- Led development of DirtViz, an open-source data visualization platform built with **JavaScript**, **React**, and **SQL**, supporting analysis of **50M+** sensor data points for 5+ research labs (Stanford, Georgia Tech, Northwestern, UCSD, UCSC, etc).
- Optimized scalability by managing **AWS** infrastructure (EC2, S3, RDS, CloudFront), allowing for **18x** data growth**.**
- Improved contributor engagement by utilizing **Docker** environments, enabling **15** open-source contributors to seamlessly set up development environments and accelerate feature implementation.
- Developed an adaptive data logging algorithm that reduces power hungry transmissions by upwards of **98%**

Web Development Lecturer August 2025 – December 2025

University of California, Santa Cruz

- Taught **5** undergraduate students core full-stack web development skills, including **Flask, React**, and **RESTful API design**
- Oversaw student contributions to **end-to-end web applications**, guiding architecture, code quality, and version control practices

Projects

ALIA (Adaptive Latency-Integrated Algorithm) | Python, C, STM32

- Designed and implemented an event-driven adaptive reporting algorithm for power-constrained wireless sensor network edge nodes, reducing transmissions by up to **98%** compared to fixed-rate periodic reporting
- Transmission is the dominant power draw on ENTS nodes (~130mA vs. ~15mA for sensing), making transmission reduction the primary lever for extending battery-solar deployment lifetime
- Validated algorithm performance in simulation using 10 months of real volumetric water content (VWC) field data collected from the UCSC Farm, covering stable, periodic, transient, and mixed signal conditions
- Co-authored ENTS: Experiences in Co-Designed Environmental Sensing, accepted at ACM SenSys '26

ESP32-C3 Embedded Systems | C, ESP-IDF, NimBLE

- Implemented I2C sensor integration for temperature, humidity, and display peripherals on the ESP32-C3 using native ESP-IDF v5 APIs
- Developed a BLE HID peripheral using NimBLE, enabling the ESP32-C3 to function as a wireless mouse via custom accelerometer-driven input
- Built a multi-sensor weather station aggregating environmental readings with real-time display output

Publications and Honors

- **Madden,J., et al.** *ENTS: Experiences in Co-Designed Environmental Sensing* ACM SenSys ’26 (Paper)
- **Levy, A., et al.** Hardware to Unleash Novel Energy Sources for Outdoor Sensor Networks. ACM SenSys ’25 (Demo)
- Invited hardware demonstration to **U.S. Congresswoman Zoe Lofgren**
- **Runner-Up Award**, ACM Student Research Competition SIGBED @ ESWEEK, 2025