

ERIC DAVID VETHA

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ABOUT ME

I am an aspiring robotics engineer with a strong foundation in computer, electrical, and mechanical engineering. I have hands-on experience with autonomous systems, RF-based sensing, and digital signal processing. In my research as a undergraduate and graduate student, I developed a novel ultra-wideband sensing system to measure soil moisture, and I am currently working on expanding its capabilities. Additionally, I have completed numerous projects such as flight dynamics simulation, imitation learning with robotic arms, and autonomous navigation with wheeled robots. I am now seeking an opportunity to join an interdisciplinary team to tackle new and exciting challenges.

EDUCATION

MS. in Electrical and Computer Engineering September 2024 - Present
University of California, Santa Cruz, MS. Santa Cruz, CA

- Concentration in Robotics, Control, and Cyberphysical Systems
- Fully funded through Graduate Research Fellowships
- **Coursework:** Models of Robotic Manipulation, Linear Dynamical Systems, Convex Optimization, Small-Scale UAV Theory and Practice, Digital Signal Processing, Machine Learning

BS. in Robotics Engineering September 2020 - June 2024
University of California, Santa Cruz, BS. Santa Cruz, CA

- GPA: 3.81, Cum Laude Honors
- **Coursework:** Logic Design, Data Structures and Algorithms, Embedded Systems and C Programming, Signals and Systems, Microcontroller System Design, Mechatronics, Feedback Control Systems, Sensors and Sensing Technology

HONORS

2023	Earth Frontiers Institute Frontiers Fellowship recipient	EFI
2024	Carbon Fund Research Award recipient	Carbon Fund
2024	Graduate Student Researcher funding, University of California, Santa Cruz	
2025	Agricultural Experiment Station (AES) Graduate Student Research Fellowship recipient	AES
2025	Dean's Award for Outstanding Thesis	UCSC

PROFESSIONAL EXPERIENCE

Embedded Systems & Signal Processing Research Engineer Santa Cruz, CA
jLab in Smart Sensing @ University of California, Santa Cruz June 2024 - Present

- Designed a novel soil health sensing system using PCB ultra wideband radar and ultra low-power backscatter tags.
- Deployed real-time digital signal processing algorithms in C on embedded BeagleBone Black running Linux.
- Optimized signal processing pipeline using MATLAB's code generation and Simulink applications.
- Developed ROS2 wrapper for IMX IMU in C++ and set up RTK corrections using radio modem for long-range accurate localization of drones and quadruped robots.

Teaching Assistant in Embedded Systems Santa Cruz, CA
University of California, Santa Cruz January 2025 - March 2025

- Assisted students in developing embedded projects using various sensor technologies, including ping sensors, IMUs, and resistive sensors.
- Tutored students on fundamental issues in sensing of temperature, motion, sound, light, position, etc.

Autonomous Sensing & Embedded Systems Research Engineer Santa Cruz, CA
jLab in Smart Sensing @ University of California, Santa Cruz March 2023 - June 2024

- Designed autonomous interfacing scripts using MATLAB to streamline data processing with embedded BeagleBone Black.
- Improved novel soil moisture sensing system through experimental validation of various RF components.

PUBLICATIONS

Poster: Wireless Soil Monitoring Using Energy Harvesting
E. Vetha, A. Darbonne, C. Josephson

SenSys 2025
ENSsys 2025

Thesis: Remote Soil Moisture Sensing Using RF Backscatter Tags
E. Vetha

B.S.
University of California Santa Cruz

PROJECTS

UAV Simulation for Drones

quadrotor-vtol

Control and UAV Theory, Python

UCSC

Github

- Developed a custom physics-based simulation modeling the dynamics and aerodynamics of a quadrotor drone.
- Designed a modular platform for inputting and simulating various drones as needed.

Convex Optimization for Signal Denoising

Enhancing Backscatter Localization Using Convex Total Variation

Convex Optimization Theory, Python

UCSC

Report

- Successfully demonstrated the application of convex optimization in signal denoising.
- Achieved an 8.5% improvement in soil moisture measurement accuracy with minimal preprocessing time.

Imitation Learning in Robotic Manipulations

Grab-o-Matic 3000

Machine Learning, Robotic Manipulation Kinematics, Python

UCSC

Demo Github

- A robotic system for ball-catching tasks, employing imitation learning and inverse kinematics.
- Uses imitation learning to imitate expert-like ball-catching actions based on visual observations.
- Automatically uses inverse kinematics calculations to determine optimal joint velocities for the robotic arm to intercept projected ball trajectories smoothly.

Sensor Based Instrumental Gloves

Slug Symphony

Embedded C, State Machines, Sensor Programming

UCSC

Demo Github

- Gloves that emulate the saxophone, guitar, drums, piano, and trumpet.
- Flex and 9-DOF sensors integrated with UNO 32 microcontroller for accurate instrument replication.
- Uses state machines to transition between instruments, ensuring user-friendly interaction seamlessly.

Autonomous Ball Shooting Robot

Slug World Cup

Embedded C, Mechatronics, State Machines

UCSC

Demo Github

- An autonomous robot capable of autonomously traversing a field and dispensing balls in a defended goal.
- Uses state machine architecture, ensuring the robot's precise navigation, goal detection, and autonomous scoring capabilities.

SKILLS

Languages: MATLAB (Proficient), C (Proficient), ROS2 (Experienced), Python (Experienced), Linux (Experienced), C++ (Experienced), Docker (Moderately Experienced).

Technologies: Experience with embedded programming and communication methods (I2C, SPI, UART); worked with Gazebo simulation tools; created imitation learning models and flight control systems; experience with PCB tools (KiCad and Altium); worked with RF Hardware.

General: Capable of working well both individually and in groups; Comfortable with technical writing.

Projects: UAV Simulation for Drones; Convex Optimization for Signal Denoising; Imitation Learning in Robotic Manipulations; Sensor Based Instrumental Globes; Autonomous Ball Shooting Robot.