Divij Muthu

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CURRENT POSITION
Undergraduate Student
University of California, Berkeley
Electrical Engineering and Computer Sciences Department

EDUCATION

University of California, Berkeley   **Expected: Fall 2027**

B.S., Electrical Engineering and Computer Sciences
Coursework: Data Structures & Efficient Algorithms (CS61B, CS170), Computer Architecture (CS61C), Computer Security & Networking (CS161), Convex Optimization (EECS127), Machine Learning (CS189), Signal Processing (EE120), Probability & Stochastic Processes (EECS126)
Advisors: Liwei Lin, Laura Waller
Clubs & Societies: Eta Kappa Nu, Mu Chapter (EECS Honors Society), Code for Good (software development for nonprofits)

AWARDS AND DISTINCTIONS
- Presented at Rice University's Gulf Coast Undergraduate Research Symposium
- Inducted member of Eta Kappa Nu, Mu Chapter
- Inducted member of Tau Beta Pi, CA-Alpha Chapter
- Dean's List, College of Engineering (3x)
- National Merit Scholar
- 3x AIME qualifier

RESEARCH POSITIONS

Liwei Lin Lab – Berkeley Sensor and Actuator Center   **Berkeley, CA**
Undergraduate Researcher   April 2025 - present

- *3D Imaging via Piezoelectric Micromachined Ultrasound Transducers & Compressed Sensing*
  - Built an automated data acquisition pipeline using Python, C++, and PySerial to interface with Teensy/Arduino MEGA microcontrollers, including firmware for precise sub-microsecond pulse timing, retrieving real-time oscilloscope ADC data via SPI, and signal processing via background subtraction, Butterworth filtering from SciPy.
  - Adapted MATLAB simulation from EE367: Computational Imaging to test novel setup for 3D image reconstruction via ultrasound transducers (PMUTs), compressed sensing, and reconstruction algorithms (FISTA, ADMM-TV).
  - Designing a custom mixed-signal PCB in KiCad to miniaturize the system, integrating a Teensy 4.1, transmit/receive switching, signal amplification (TI VCA5807), and an 18-bit ADC into a compact device for portable deployment.
  - Paper accepted to <u>IEEE MEMS 2026</u> for an oral presentation, presented findings at <u>Rice GCURS</u>, collaborating with Berkeley AI Research (Waller Lab) to accelerate reconstruction pipelines using machine learning techniques.

TopSeeds LLC   **Pleasant Hill, CA**
Software Development Intern   December 2025 - present

- Developing an AI-powered executive recruiting platform using React and Node.js, integrating the Gemini LLM API to automate screening various roles for candidate fit and generate natural language advice on pursuing these openings.

- Engineering secure backend microservices to synchronize live data with Google Sheets and Excel Online, implementing OAuth 2.0 authentication flows to ensure data integrity and security.

- Collaborating on the full-stack architecture for a system designed to process 50+ candidates weekly, optimizing database interactions to reduce latency in candidate-to-recruiter matching.

Moccet   **Berkeley, CA**
Innovation Architect Intern   August 2025 - September 2025

- Built an AI-powered Customer Relationship Management (CRM) pipeline in Node.js incorporating Firebase cloud functions to analyze uploaded leads for client engagement and leveraging the Gemini AI API to generate responses.

- Implemented a continuous learning loop for the CRM pipeline to automatically refine its outreach activities.

Take2 Movies and Shows   **Virtual**
Full Stack Software Engineering Intern   March 2025 - August 2025

- Spearheaded full-stack feature development for a social media app within a Google Cloud (GCP) and Firebase ecosystem, building core functionalities with Firebase Auth, Cloud Firestore (NoSQL), and React Native.

- Engineered several intuitive user-facing features, including app-wide movie/show and notification preference systems, front-end and back-end list sorting via a reusable component, and UI fixes for Android and dark mode.

- Reduced network latency for filtering by 20% and improved application performance by implementing batch updates, local caching, and optimized data fetching strategies with RESTful APIs e.g. TMDB API for movie/show data.

Real-Time Sensor Simulation and Activity Classification with C++, PyTorch

- Implemented C++ modules to simulate noisy sensor data streams (IMU, GPS, Compass, Barometer), and extract features including mean, variance of 3D coordinates, DFT for motion frequencies, modeling activities like walking, jumping

- Trained a lightweight neural network in PyTorch to classify the activity being performed from a live data window of 256 samples via extracted features, observing ~98% accuracy & 0.98 f1-score with 100 Hz sampling rate and 6 activities.

- Built an interactive demo in PyGame with ~59 fps, ~30 us to simulate data in C++, ~0.05 ms to classify with ML.

Secure File Sharing System in Go

- Developed a secure file sharing system using Golang, tested thoroughly for vulnerabilities with Ginkgo, and incorporated a provided cryptographic library with AES-256 symmetric encryption and HMAC-SHA256 authentication, as well as RSA-2048 asymmetric encryption and Digital Signatures.

- Allows users to create accounts, store and efficiently append to files, and both share and revoke access to their files in a manner secure from adversaries who can read & manipulate the underlying database as well as hostile revoked users who seek to regain access.

**Analysis, Implementation of Machine Learning Approaches to
Identifying DDoS & Benign Network Traffic**

- Guided by Georgia Tech postdoc, published in UCIxGATI journal: `https://scienceyouth.org/web/viewer.php?id=175`.
- Observed ~90% accuracy in traffic identification for an industry benchmark dataset involving simulated DDoS attacks.
- Compared and contrasted pros and cons of tested ML models from scikit-learn such as Decision Tree, Random Forest, SVM for cleaned dataset using SMOTE, provided recommendations on future approaches.

Tabu Search-guided Sigmoid Heuristic for the MLCS Problem

- Designed a new heuristic-based solution in contrast to typical deterministic methods for this NP-Hard problem.
- Evaluated the algorithm in Java using a benchmark dataset for the state-of-the-art Beam Search algorithm, consistently generated a subsequence ~70% the length of the true longest subsequence in 1-2 seconds for 1000 character sequences.
- Created a piece of generative art using the algorithm's output for a Lindenmayer System.

SERVICE

Eta Kappa Nu, Mu Chapter: **Berkeley, CA**
Prodev Officer, Serv Member   Fall 2024 - present

- Officer for the Professional Development Committee, providing resume review services and career advice for members of the EECS community at Berkeley.
- Supporting the Service Committee with running the CS Lab for (Jr) EECS Day, introducing middle and high schoolers to topics like implementing Connect Four in Python.

TEACHING

EECS16A: Foundations of Signal Processing, Dynamical Systems   **Berkeley, CA**
Lab Tutor   Fall 2025 - present

- Supporting students' learning of key linear algebra and signal processing concepts, aiding completion of challenging labs e.g. performing Principal Component Analysis with NumPy.

SKILLS

Programming Languages:
Python, MATLAB, C, C++, Java, HTML, JavaScript, CSS, TypeScript, Go, SQL

Developer Tools:
Visual Studio Code, IntelliJ, GitHub, Postman, Jira, XCode, Android Emulator, GDB, JUnit, Ginkgo (Go Testing Framework)

Technologies & Frameworks:
Node, React, MongoDB, Google Cloud Platform (GCP), Firebase/Firestore, RESTful APIs, Expo Router, Pandas, Matplotlib, NumPy, Scikit-learn, Arduino, SciPy, RISC-V CPU & ISA, LTSpice, KiCad, Linux OS