



FACULTY MENTOR

Curt Schurgers

PROJECT TITLE

Engineers for Exploration

PROJECT DESCRIPTION

Engineers for Exploration, or E4E (<http://e4e.ucsd.edu>), is a one-of-a-kind program promoting multidisciplinary and collaborative research projects with the broad goals of protecting the environment, studying wildlife, uncovering mysteries related to cultural heritage, and providing hands-on learning experiences for undergraduate students. We team student engineers with scientists from a wide range of disciplines to create innovative technologies that are deployed around the world. Our projects have seen us collaborate with scientists at San Diego Zoo Global, the Atlantic World Marine Archeology Research Institute, Scripps Institution of Oceanography, Ithaca College Archaeology, the California Wolf Center, and National Geographic.

Our goal is to develop prototype systems that are then jointly deployed in the field, providing the engineers with the real constraints of practically deployable systems and the domain scientists with the new technological tools they critically need. Last year, students worked on projects including drone-based ecological classification and machine learning, wildlife radio telemetry tracking, bird call classification using machine learning, and embedded systems design of a smart surfboard fin.

This project will be in person.

INTERNS NEEDED

➤ 10

PREREQUISITES

- We place a significant value on prior experience, specifically related to system building and software development. This could include, for example, solid programming experience or having worked with machine learning, embedded software, electronics, etc.
- In your application, include all relevant experience and describe in detail what you did (include a paragraph with this information; <150 words).



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PROJECT TITLE

Software Development for Pedagogical Use

PROJECT DESCRIPTION

The goal of this project is to develop and expand on a set of software tools that were created to help instructors in the classroom. One of these tools is a web-based student response system built using Firebase that allows students to vote with their smartphones. This system needs to be expanded and made more robust, with new features added. In addition, we will explore how we can make this system standalone by relying on Wi-Fi hotspots. A second subproject is the further development of a homework site. This involves front-end and back-end web development. The project may further be expanded to involve the creation of new software tools for pedagogical uses as well.

This project can accommodate both remote and in-person students.

INTERNS NEEDED

➤ 3

PREREQUISITES

- Students need some experience with front-end web development and JavaScript.
- Having worked with Firebase is a plus.
- Please indicate any relevant software development skills and experience on your application.



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PROJECT TITLE

Circuit Board Development to Create New “Tools for Imagination”

PROJECT DESCRIPTION

In this project, you will get to work in the area of circuit board design, creating and testing new PCBs. This project is part of the Envision MakerStudio’s *Tools for Imagination* program.

The concept of *Tools for Imagination* is to provide users with dedicated platforms to help them design a wide variety of cool projects in electrical engineering. Think Arduino, but then redesigned for more specific applications, allowing users to explore possibilities in electronics, IoT, human-computer interaction, networking, wireless communication, and much more. Currently, the *Tools for Imagination* portfolio includes the following: the ESP32 Dev Board (a microcontroller with 40 pinouts and WiFi / BLE), the VU Meter Shield (a shield for the Dev Board that displays audio levels in the environment), the Motion Board (a platform for controlling motors and servos), the Touchscreen Designer (for the creation of wireless touchscreen interfaces), and BLAmp (a Bluetooth speaker platform). With these tools, any maker can create any number of projects that are both practical and educational.

The goal of this project is for you to expand this portfolio and create new *Tools for Imagination*. This means you will need to conceptualize and create new systems similar to the ones currently in the portfolio from the ground up, design the associated PCBs, build them, and test them.

This project will be in person.

INTERNS NEEDED

➤ 4

PREREQUISITES

- Basic programming knowledge.
- Preferably circuit design experience in Kicad or Altium Designer.
- Creativity and imagination.