



FACULTY MENTOR

Karcher Morris

PROJECT TITLE

Bringing ECE 5 to High School

PROJECT DESCRIPTION

Very few high school students have the opportunity to know what ECE has to offer. AP Calculus, AP Computer Science, and AP Physics... but there is not yet an AP ECE! This project will effectively transplant ECE 5 into the high school arena to share this wonderful world of circuits, signals, programming, controls, soldering, filtering, etc.

ECE 5 content, including labs, workshops, and lectures, will predominantly remain equivalent to the ECE 5 curriculum at UCSD. High Schools allow for ~70 in-class hours for each course per semester (~20-hour total increase compared with ECE 5 at UCSD). This extra contact time allows for significant creative additions that can cater to the aspiring high school student engineer. ECE 5 will be taught in a high school in Chula Vista this spring 2023 semester. (Note: you will not be required to travel to the high school.) We will be evaluating the effectiveness of our work, and then we will make necessary changes to improve and increase our reach in the high school setting.

This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- Completed ECE 5 and interested in teaching, hands-on curriculum, teaching at a high school level, developing a high school engineering community/culture, and/or ECE educational technologies.



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PROJECT TITLE

Tools for Marine Robotics Engineering Education

PROJECT DESCRIPTION

We treasure our oceans, but we certainly can treat them better. A wave of blue tech has swept across San Diego. Industry and academic researchers are trying to answer tough questions using novel marine robotic systems in order to understand and improve our ocean ecosystem. Our team is working with industry and the Scripps Institution of Oceanography to create educational technologies in this field, from cephalopod robot STEM education kits for middle school students to coordinating the deployment of autonomous surface vehicles and analyzing sensory data at a college level, for example. We are working to create these technologies, translate them into educational settings, and even commercialize the kits in some cases to increase their reach and impact.

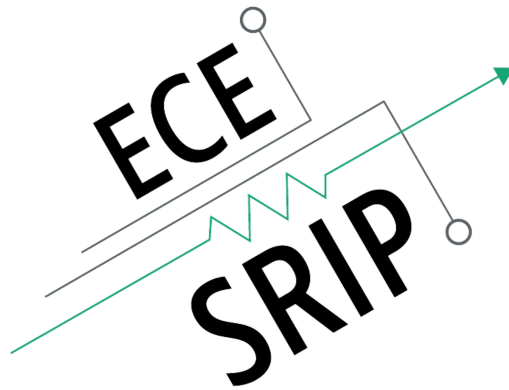
This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- Completed ECE 5 (or equivalent hands-on experience). Interested in applied ocean sciences and educational technologies.



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PROJECT TITLE

Design & Development of a Wearable Device to Measure a Surgeon's Ergonomic Performance

PROJECT DESCRIPTION

The primary goal of this research project is to develop and translate an ergonomic measurement system that objectively captures neck motion through wearable technology and analyzes motion data to improve a surgeon's ergonomic performance. This project addresses the growing need of surgeons to assess their ergonomic performance throughout a long and straining surgery so that they may adjust their posture, environment, and habits accordingly. Emphasis will be made on the design/manufacturing of wearable neck attachments, PCB design/manufacturing for microcontrollers and sensors, motion data analysis, and kinematic modeling of the cervical spine. Students will work with an interdisciplinary team.

This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- Completed ECE 5 (or hands-on equivalent) and interested in PCB design & assembly, SolidWorks/CAD, Arduino C, MATLAB or Python Data Analysis, and/or medical device technologies.