

Paid Summer Design Opportunity for Engineering Students

Creating an Easy-to-Use Device to Sample Contaminated Bodies of Water

Summer 2019 at Duke University

PROGRAM GOAL

Contaminated water is a constant concern for working divers such as military, police, and commercial divers because they cannot select the locations of their dives; instead, the sites are dictated by the work needed. The current guidance for military divers regarding contamination is sparse at best, with little to no information on how to determine if the water at a dive site is contaminated.

One sample taken at one location, called a grab sample, provides only the information at that location in the water column at that time, and does not provide information on a diver's overall level of exposure through the entire course of the dive.

The goal of this summer project is to design and build a small, portable sampling device that will take a cumulative water sample through the whole water column (from the surface down to ~60 feet of sea water), and require no specialized training to use.

PROGRAM SPECIFICS

We will hire three undergraduate engineering students. The students may be from any accredited university, but in order to apply they must be completing their junior or senior year of an engineering degree in the spring semester of 2019, and must be legally permitted to work in the United States. Students should expect to work on the Duke University campus, but housing and relocation funds are not available. The program will last for 13 weeks, and students will be paid \$15/hour for up to 40 hours/week. The program will officially begin after the completion of final exams in early May. However, students should expect to attend one brief kickoff meeting prior to this period (can be attended remotely).

Students should have an interest in the mechanical design and production aspects of engineering, as the bulk of the program will focus on the development and construction of a working sampler as well as the manufacture of a select number of prototypes to test their function.

The students will be working out of the Duke Hyperbaric Medicine Facility at the Duke University School of Medicine, on campus. There, they will be immersed in the science of diving and underwater medicine, and also have access to machining and prototyping facilities. They will be supervised by a design engineer at Hyperbarics, and also work with water sampling experts from a Duke research lab.

HOW TO APPLY

- Email resume, cover letter, and description of 1-2 preliminary design ideas to rachel.lance@duke.edu by March 31, 2019, with subject line "STEM outreach application."
- Applicants will be notified by April 4 if they will be scheduled for a phone interview.
- Design ideas should include clear illustrations of the concepts. Illustrations can be neatly hand-drawn; no preference will be given for 3D models or technical drawings.
- *Questions?* Please email rachel.lance@duke.edu, and include the phrase "STEM outreach" in the subject line.