**Coastal Critical Zone Summer Undergraduate Internship**

Dates of internship: June 9 – August 15, 2025

Location: Michael Lab, University of Delaware, Newark, DE 19716 and Delmarva Peninsula sites, 1 hr drive from University of Delaware.

Number of positions available: 1

Faculty Mentor: Holly Michael, hmichael@udel.edu

Post-Doc Mentor: Claudia Zoccarato, czoccara@udel.edu

**Overview:** The Coastal Critical Zone Network is an interdisciplinary team project researching the effects of changing climate and sea level rise on the Delmarva Peninsula, which includes Delaware and parts of Maryland and Virginia. The project is funded by the National Science Foundation, a prestigious, taxpayer-supported federal science agency. The Critical Zone team is inviting applications for paid undergraduate research internships for summer 2024; interns will be part of sub-teams in hydrology, biogeochemistry or ecosystem research. Research will involve a combination of laboratory, outdoor field work and/or computational environments. We seek a diverse group of undergraduate students to join our team in a welcoming, collaborative environment.

**Project Title: Coastal Critical Zone: Geotechnical characterization of salt marshes**

**Project Sub-team:** Hydrogeology

**Research Description:**

Salt marshes provide vital ecosystem services locally and globally by their ability to sequester and cycle large quantities of carbon, store and filter out pollutants and excess nutrients, and host critical biogeochemical activity. The transition zone between upland and marsh ecosystems is an area of great importance as sea-level rise (SLR) causes ecosystem change and salt-marsh migration. The Delmarva Peninsula is especially vulnerable to sea level rise (SLR) because of its low lying topography. Understanding the drivers of sediments dynamics (accretion and consolidation) in these ecosystems is crucial to understand their future long-term evolution.

The student will seek to determine the geotechnical properties of shallow soils where plant roots are present through experimental laboratory and field tests, but the project itself can be tailored to match the research goals of the student. The student will also be trained in time and data management and fieldwork skills.

**Research Questions:**

1. How do soil roots affect the geomechanical properties of shallow tidal marsh sediments?
2. What is the role of consolidation in shaping the tidal marsh topography?

**Student Learning Objectives: Professional and Research Skills**

This internship focuses on the development of the following professional and scientific skills.

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| Broad Professional Skills | Specific Skills |
| Planning and time management | Ability to set and complete specific goals of varying scope |
| Work independently | Independent work ethic - work independently to problem-solve |
| Collaborative skills | Learning to complete tasks efficiently and effectively with others |
| Express ideas in writing and verbally | Communicate with diverse audiences - Development of impactful poster and oral presentations. Honing ability to deliver scientific results/impacts to people of multidisciplinary backgrounds. |
| Broad Scientific Research Skills | **Specific Skills** |
| Understand relationships between levels of biological organization | Make connections between biological processes at the organismal, population, and community scales |
| Recognize simple patterns in research data | Comparing hydrological responses (over time, across gradients) |
| Build skills in field research | Contribute to research at field sites. |
| Understand, apply, and explain scientific concepts and theories | Express questions and plan methods for answering them. Learning to communicate results through oral presentations and posters. |

**Prerequisites:**

A background in geology, hydrology, geotechnical engineering or related fields is preferred. Fieldwork outdoors during summer will be required, and therefore, prior outdoors experience (scientific or professional) is preferred.

**Work Environment and Expectations:**

Laboratory environment: Penny Hall, University of Delaware Newark, DE and Fisher’s Greenhouse 531 South College Avenue Newark, DE 19716

Field work environment: Delmarva Peninsula sites, 1 hr drive from University of Delaware.

Computational environment:

The internship is full-time, with exact hours and expectations determined between student and mentor. Students will also participate in a June 2025 Critical Zone group orientation in person, weekly Zoom team meetings, and end of internship poster session.

**Stipend:**

$6,000 - Direct deposit is required. In addition, for undergraduate researchers who do not live locally, housing assistance may be available.

**Funding Source:**

National Science Foundation Coastal Critical Zone Network

**Application deadline: Friday, February 27, 2025**

**How to apply:** <https://forms.gle/ZQL4mG7aTSj69mVo6>