**DENIN Environmental Scholars Internships**

Dates of internship: June 6, 2022 – August 12, 2022

Location: Hybrid or Virtual position. Penny Hall, University of Delaware, Newark, DE 19711

Number of positions available: 1

Faculty Mentor: Holly A. Michael

Graduate Student Mentor: Dannielle Pratt

**Project Title:** Salinization of the Coastal Critical Zone: Drivers and feedbacks that transform landscapes and fluxes between land and sea

**Research Description:**

Gradual sea level rise is converting coastal forests and agricultural fields to salt marsh through salinization and flooding. Fast and slow hydrologic events are increasingly causing flooding and the salinization of fresh groundwater, resulting in a transition from upland vegetation to coastal salt marsh. Due to its low-lying topography, the Delmarva Peninsula is especially vulnerable to a loss of upland due to sea-level rise. We are investigating hydrologic changes at 6 forest and agricultural sites along the Delaware Bay, Chesapeake Bay, and Atlantic Coast. Instrumenting transects along the marsh-upland transition with shallow wells, soil moisture sensors, and redox probes, has allowed us to study upland response to slow rising sea level, as well as fast episodic storm events

The student will be trained to analyze time series data collected from the 6 study sites including water level, conductivity, soil water content, soil conductivity, and soil redox potential. The student will also be trained to conduct field work to maintain equipment and download project data. The latter will require learning to process and clean the data for outliers, store and organize data in the database, and plot the data for analysis. Specific project goals will be formed to cater to students’ interests, however, the student should expect to gain an experience with data management, time series data analysis, hydrlogical field work, as well as improving interpersonal skills. This internship can be virtual or hybrid, as needed. Open to all students.

**About Coastal CZN:**

The CZN (Critical Zone Network) is a network of 9 Thematic Clusters within the U.S. that study the Earth where water, atmosphere, ecosystems, soil, and rock interact. The coastal group, one of the 9 Thematic Clusters, investigates the processes that transform landscapes and fluxes between the land and sea. The coastal team is a multi-disciplinary group of faculty, professionals, and graduate students from multiple universities with expertise in hydrology, geomorphology, ecology, and biogeochemistry. The CZN enhances scientific progress and encourages collaborations amongst scientists from various disciplines (www.criticalzone.org).

**Research Questions:**

1. How is hydrology changing temporally and spatially along the marsh-upland boundary?
2. How do changes in hydrology compare at sites along different major surface water bodies?
3. How do fast (episodic events) and slow (sea level rise) changes in hydrology impact the ecology, biogeochemistry, and geomorphology?

**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, and interact with professionals to develop or improve climate data and information sharing. Honing ability to parse data and information into appealing messaging for laypeople. |
| Broad Scientific Research Skills | **Specific Skills** |
| Interpret data  | Visually analyze time series hydrological data and other climate and tidal data for updates or additions to relevant databases. |
| Data analysis | Summarizing characteristics of storms and impacts to coastal Delaware through use of software. |
| Science Communication | Summarizing and relaying scientific information via multiple types of media including oral presentations, poster |

**Prerequisites:**

Experience with Excel or spreadsheets.

Working knowledge of time-series data, Access Database, python (or other script language) preferred.

Good communication skills.

**Work Environment and Expectations:**

Penny Hall 1st floor – Department of Earth Sciences for in-person hours; work can be completed remotely with a minimum of weekly check-ins with advisor. Hours are flexibly determined between student and mentor. Students will work full time during the Summer Session. Students will also participate in a retreat, communications workshop and end of internship spring symposium. Maximum 40 hours/week.

**Stipend:**

$4,500 Direct deposit is required.

**Funding Source:**

National Science Foundation, Delaware EPSCoR Track I

**How to apply:** Submit cover letter, resume and unofficial transcript to Dr. Yolanda Williams-Bey at yolanda@udel.edu