**Coastal Critical Zone Summer Undergraduate Internships**

Dates of internship: June 3 – August 9, 2024

Location: Coastal Ecogeomorphology Lab, Virginia Institute of Marine Science, William & Mary, Gloucester Point, VA 23062

Number of positions available: 2

Faculty Mentor: Matthew Kirwan

Graduate Student Mentor: Tyler Messerschmidt

Professional Staff Mentor: Tyler Messerschmidt

**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 2023; 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:** Sea-level driven transformations of coastal vegetation and soils

**Project Sub-team:** Ecology and Geomorphology

**Research Description:**

Sea level rise is driving the transformation and migration of coastal ecosystems. More than 500,000 acres of farmland and forestland in the Chesapeake Bay region is expected to convert to wetlands by the end of the century, and our research is devoted to understanding the mechanisms and consequences of that change. We are seeking a student to assist with our annual collection of long-term vegetation and soils data from a network of sites along the mid-Atlantic coast, where tidal migration into forests and farmland is particularly rapid. The student will assist with field work on a variety of ecological and geomorphic projects, and lead the lab-based analysis of soil and vegetation samples. Particular areas of interest are identified in the research questions below but center on the response of coastal landscapes, vegetation, and soils to accelerated sea level rise and salt water intrusion.

**Research Questions:**

* What vegetation changes are indicators of sea level rise, and what role does the invasive species Phragmites australis play?
* Does sea level rise strengthen or weaken the strength of the coastal carbon sink?
* Does ecogeomorphology amplify or mediate the effects of sea level rise on the coast?

**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 |
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| 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** |
| Conduct field work | Field work in challenging coastal environments, including RTK-GPS topographic surveys, collecting sediment cores, and measuring characteristics of ecosystem health  |
|  |  |
| Use scientific tools | Lab work to measure soil salinity, carbon content, plant biomass |
| Recognize simple patterns in research data | Applying geological and ecological concepts to qualitative and quantitative data. |
|  |  |
| Analyze research data  | Excel, Matlab, and/or R utilization to form effective figures and tables. |
| Understand, apply, and explain scientific concepts and theories | Freedom to form questions and plan methods for addressing challenges. Learning to communicate results through oral presentations and posters. |

**Prerequisites:**

Introductory knowledge in geology, ecology, or a related field. Experience with field work, remote sensing, or lab work preferred but not required. All supplies and equipment will be provided.

**Work Environment and Expectations:**

Laboratory environment: basic vegetation and soils lab

Field work environment: challenging sites in Virginia, Maryland, and DE. Field travel expenses will be paid.

Computational environment:

The internship is full-time, with exact hours and expectations determined between student and mentor. Students will also participate in a June 2023 Critical Zone group orientation in person, Zoom team meetings, communications project and end of internship poster session.

**Stipend:** $6,000 - Direct deposit is required. In addition, for undergraduate researchers who do not live locally up to $2,000 per research intern may be available in housing assistance.

**Funding Source:**

National Science Foundation Coastal Critical Zone Network

**Application deadline: Friday, March 15, 2024**

**How to apply:** <https://forms.gle/a8M3VWXntmNWxLCU9>