



Postdoctoral Research Associates – Coastal Hydrology, Biogeochemistry, and Ecology
The Coastal Critical Zone Cluster (<https://czn.coastal.udel.edu/>) invites applications for three postdoctoral research associates - one in coastal hydrology, one in coastal biogeochemistry, and one in landscape ecology. The Hydrology postdoc will be housed primarily at the University of Delaware and work with Dr. Holly Michael in close collaboration with Sergio Fagherazzi (Boston University), Matthew Kirwan (Virginia Institute of Marine Science), Keryn Gedan (George Washington University), and Stephanie Stotts (University of Maryland Eastern Shore). The Biogeochemistry postdoc will be housed primarily at the University of Maryland and work with Dr. Kate Tully in close collaboration with Dr. Angelia Seyfferth and Dr. Yu-Ping Chin (University of Delaware). In addition, a landscape ecology postdoc position under the direction of Matthew Kirwan (Virginia Institute of Marine Science) will likely open in Fall 2023 or Spring 2024; potential applicants should contact him directly (kirwan@vims.edu). The postdocs will collaborate across the interdisciplinary team of PIs, students, and professionals. The positions will begin in Summer or Fall 2023.

Project Description: The coastal critical zone of the Delaware, Maryland, and Virginia (Delmarva) Peninsula is experiencing some of the fastest rates of sea-level rise in the world due to low elevation and exposure to Atlantic storm events. Fast (storms and high tides) and slow (sea-level rise) drivers are converting coastal forests and agricultural fields to salt marshes through two hydrologic mechanisms: flooding and salinization. Both mechanisms involve feedbacks among coupled hydrological, ecological, geomorphological, and biogeochemical processes. The occurrence of these mechanisms and the nature of their feedbacks, which differ between forested and agricultural land, determine the rate and extent of landscape transformation and the associated changes in elemental stores and fluxes in the coastal critical zone. The coastal critical zone is a hotspot of biogeochemical activity, where large quantities of nutrients and Blue Carbon are cycled and stored. Thus, changes to coastal marshes and transformation of coastal landscapes have important implications not only for the global economy, but also for global elemental fluxes.

Responsibilities: The postdocs will join a highly collaborative and multi-disciplinary study at a network of sites to understand and predict current and future changes in a coupled hydrological, ecological, geomorphological, and biogeochemical system.

Hydrology

The primary objective of the position is to develop a numerical groundwater model coupled to a marsh geomorphological model to simulate and predict landscape/ecological evolution and associated changes in hydrology. The successful applicant will also develop independent research topics consistent with the goals of the Coastal Critical Zone, including opportunities for data collection, time series analysis, and layered mentoring of graduate and undergraduate students. Contracts will be 1-year, renewable for up to 2 years.

Biogeochemistry

The biogeochemistry postdoc will collaborate with the hydrology postdoc to estimate fluxes of carbon and nutrients (nitrogen and phosphorus) between the land and sea using a combination of biogeochemical and hydrologic data. The postdoc will be responsible for synthesizing data on nutrients and carbon in soils, plants, and surface water as well as developing their own experiments to improve our understanding of coupled ecological-hydrological-geomorphological, and biogeochemical feedbacks in the coastal critical zone. We welcome applications from candidates across environmental science disciplines who are excited to work in an interdisciplinary team and work across spatial and temporal scales.

Hydrology Qualifications: At the time of hiring, the candidates will hold an earned doctorate (Ph.D.) or equivalent in geology, environmental science, environmental engineering, or related field. Strong quantitative skills and a proven research background, strong writing skills, and the ability to work with a highly interdisciplinary and collaborative team of researchers and students is required. Preference will be given to those candidates with experience in numerical modeling, and other quantitative methods associated with how coastal ecosystems and their landscapes respond to changing hydrodynamics.

Biogeochemistry Qualifications: At the time of hiring, the candidates will hold an earned doctorate (Ph.D.) in ecology, soil science, environmental geochemistry, environmental science, or related field. Strong quantitative skills and a proven research background, field and laboratory skills, strong writing skills, and the ability to work with a highly interdisciplinary and collaborative team of researchers and students is also required. Experience with biogeochemical tools and/or synthesis of analytical data and/or transport modeling are desired but not required.

Applicants should have received their PhD in the last five years.

Requested Application Materials:

- 1) a one-page cover letter identifying availability for the position and addressing all required and preferred qualifications;
- 2) a full curriculum vitae;
- 3) at least 1 peer-reviewed publication with relevance to the position; and
- 4) the names, addresses (including titles and institutions), e-mail addresses and telephone numbers of 3 professional references.

Application materials should be addressed to:

Holly Michael, hmichael@udel.edu (Hydrology)

Kate Tully, ktully@umd.edu (Biogeochemistry)