

2022 COOPERATIVE SUMMER FELLOWSHIP PROGRAM – PROJECT PROPOSAL

APPLICANT TYPE: ANY;

PROJECT TITLE: NATURAL FLOOD AND DROUGHT VARIABILITY IN LACUSTINE ARCHIVES

Jessica Rodysill,

Discipline: Hazards;Climate Science;Surface Water;

PROJECT DESCRIPTION

BACKGROUND

We use the geologic record to reconstruct past climate and environmental conditions. Specifically, we measure biological, geochemical, and geophysical properties of sediment cores including loss-on-ignition, grain size, XRF, C:N ratios, and magnetic susceptibility along with GPR and seismic stratigraphy to reconstruct past lake levels. The mid-Holocene was a period of dry conditions across the North American continent, but few high resolution records exist in the southeastern US. We use sediment lithology and sub-bottom stratigraphy from multiple lakes in northern Florida to determine the history of lake low-stands to determine the history of drought in the region.

We previously collected sediment cores, GPR data, and CHIRP seismic data from five lakes in northern Florida. The GPR and CHIRP seismic data were processed and analyzed by an NAGT intern in 2021 to determine relationships between sediment layers at the bottom of four of these lakes. The sediment cores from two locations in Little Rattlesnake Lake need to be analyzed in the lab to determine where there are transitions in lake levels that can be correlated with lake low-stands inferred from the sub-bottom stratigraphy. Once these tasks are completed, we will be able to compare the timing of low-stands from all 5 sites and determine if/when there were regional droughts during the Holocene.

INTERN TASKS

The intern's tasks will depend on safety and restrictions related to COVID-19 at the time of the internship. If lab work is possible, the intern will learn how to describe the sediment lithology using macroscopic and microscopic observations using a petrographic microscope. The intern will also remove small samples of sediment from cores, dry the sediment to measure water content, burn the sediment to determine organic content, and sieve the sediment to determine grain size. Other lab analyses may be required. If partial or full work-from-home status is required at the time of the internship, the intern can spend some or all of their time creating bathymetric maps from GPR and CHIRP seismic data and producing 3D reconstructions of the sub-bottom stratigraphy. Some work with Lidar data to determine paleoshorelines may be possible.

BENEFITS TO INTERN

The intern will not only advance important USGS research, they will also learn basic lab safety and etiquette, ethical research practices, and computer skills that may be applicable to any career. Further, the intern will learn the basics of classic sedimentology, which is a fundamental basis for the geosciences. This internship is designed to expose the candidate to a wide variety of lab analyses that are relevant to a broad sector of the geosciences. The project chief will spend quality time advising the intern on subjects related to the project, such as data

interpretation and application of the findings to important climate questions. Additionally, the project chief will mentor the intern about academic and government career opportunities and graduate school, offering networking connections to assist in their next steps after the internship. Regardless of COVID-19 restrictions at the time of the internship, the intern will produce enough data to compile a presentation for the science center or at a conference to gain experience collating and presenting research results in a public setting. Previous interns with this advisor have continued on to attend graduate school or are employed long-term with the USGS.

MENTORING PLAN

Throughout the internship, the intern will meet with the advisor twice a week at first to learn the background and methods necessary to complete the work. After the first 2-4 weeks, the project chief will meet at least weekly with the intern to assess progress, adjust methods, and ensure a positive experience for the intern. Additional meetings will be added as desired and can include topics such as education and career paths. We will adjust work schedules to allow the intern to participate in CSFP mentoring events, and participation is always highly encouraged. I typically provide advice and handouts from my graduate school that addresses resume/CV and cover letters. When talking about the graduate school process, if the intern is interested, I put them in contact with researchers in the intern's area(s) of interest who might be good advisors. I discuss the grad school application process, what is expected and accomplished during grad school, and what types of jobs are available for various levels of education based on my own personal experience as well as connections I have made over the years with former interns, former students, and colleagues who have changed career paths.

ADDITIONAL DETAILS

STUDENT SKILLS AND INTERESTS

The intern will ideally have a background in the geosciences and experience or coursework in sedimentology/stratigraphy. The intern will ideally have good communication skills in both written and oral formats as well as basic computer skills. My preference is that the intern has used basic spreadsheet software such as Excel. Experience with R or Matlab is desired but not required. Experience with GIS is desired but not required.

LOCATION: Reston, VA

ACTIVITY LEVEL:

Level 8-2: The work requires some physical exertion such as long periods of standing, walking over rough, uneven, or rocky surfaces; recurring bending, crouching, stooping, stretching, reaching, or similar activities; or recurring lifting of moderately heavy items. The work may require specific, but common, physical characteristics and abilities such as above-average agility and dexterity.

FIELD WORK 0-25% VIRTUAL? My preference is for lab work, but safety comes first. If the pandemic situation is not appropriate for in-person lab work, or if the candidate doesn't feel comfortable with in-person lab work, remote work options are available.

LAB WORK 75-100%

OFFICE WORK 25-50%

OTHER None

PROJECTED START DATE 6/6/2022

EXPECTED DURATION 12 weeks