

# Two PhD Students Needed

## Two PhD Research Assistantships- Starting SPRING 2020

The Roberts Lab at the Louisiana Universities Marine Consortium (LUMCON) (<https://lumcon.edu/broberts/>) and the Nelson lab at the University of Louisiana Lafayette (<https://www.nelsonecolab.net/>) are seeking two highly motivated, enthusiastic, and organized individuals to study the relationship of human disturbance to ecosystem services in offshore sand shoal habitats in coastal Louisiana. The Nelson and Roberts labs conduct interdisciplinary research in coastal ecosystems to understand how marine organisms respond to changing environmental conditions. We use a variety of techniques in our work including field surveys, experimental approaches, stable isotope analysis, biogeochemical analysis, mathematical modeling, and remote sensing. One candidate will work primarily with Dr. Nelson on the faunal response of shoal organisms to dredging, the other candidate will work primarily with Dr. Roberts on the response of sediment biogeochemistry and primary production to dredging. Additional information about the project can be found below.

Interested candidates should email a C.V. and brief statement of interest with the subject "Shoal Project PhD" to [andbroberts@lumcon.edu](mailto:andbroberts@lumcon.edu).

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### **Project Title: *Responses of Ecological Function of the Ship Shoal Biological Communities Subjected to Dredging***

**Abstract:** Ship Shoal is a large transgressive sand shoal located approximately 10 miles off the central coast of Louisiana. Recently, Ship Shoal became an active dredging site to aid coastal restoration in Louisiana because it contains over three billion cubic meters of high quality sand. The shoal is a highly productive and dynamic benthic habitat that is utilized by a diverse and important assemblage of species, including several federally managed species. The shoal is also spawning habitat for commercially important species such as blue crabs, and other nekton as well. To properly manage dredging activity and retain the critical ecological function of the shoal it is necessary to understand the responses of the shoal ecosystem to the changes in physical and biological drivers induced by dredging. We propose to use a modified Before-After Control Impact (BACI) design to determine the biological, physical, and chemical responses of borrow areas on Ship Shoal compared to control sites. Seasonal and diel samples will be collected over the project period that will bracket the period of dredging. We will use bathymetric and side-scan sonar to map each site prior to and after dredging. During each seasonal sampling period we will use box cores, trawling, long line, gillnets and high resolution sonar imaging to quantify the abundances of benthic infauna and to estimate abundance and observe fine-scale behavior of nekton during the day and at night at both control and dredge sites. We will collect tissue samples from nekton, benthic invertebrates, and all potential primary producers to determine

food web structure using stable isotope analyses. We will measure primary production rates of phytobenthos to determine effects of dredging on benthic PP. These data will provide a basis for modeling impacts of dredging on the biological function of Ship Shoal. BOEM has devoted funding through two ongoing projects toward better understanding how dredging pits evolve in Ship Shoal and the potential impacts to infrastructure and/or resources of concern located adjacent to the pits. This new proposed ecology project will build upon the data and resources from current BOEM-funded projects to increase BOEM's decision making ability regarding the safety and protection of ecological, environmental and cultural resources.