2019 Spring Semester
Duke Marine Lab Undergraduate Research Independent Study Projects
(updated 12-Oct-2018)

Humberto Diaz - Tropical marine ecology; aquaculture
Room 210, Lab 7 (Bookhout); (252) 504-7611; hdiaz@duke.edu

Effects of acidity on:
1) Settlement and early growth of barnacles.
Larval culture and settlement of the barnacle Amphibalanus amphitites on glass panels coated with silicone will be registered under an under laboratory conditions at different pH conditions. Barnacle growth will be measured weekly using digital photography. After 4 weeks, barnacle adhesion will be determined.
2) Orientation responses of hermit crabs in presence of different chemical cues.
While under the influence of several odor sources that evoke the presence of refuge or predators, we will study the changes in orientation responses that might occur when media pH varies.
3) Food ingestion ratio of pink shrimps.
Food ingestion will be determined under artificial increased levels of acidity as well as a response to competition for food while in a confined space.

Jim Hench - Shallow-water physical oceanography, physical-biological interactions, and marine technology
Room 308/309, Lab 7 (Bookhout); (650) 759-6639; jim.hench@duke.edu

In marine systems, all chemical and biological processes are imbedded in moving fluid. Fluid motion affects the transport of contaminants, sediment, fluxes of particulates seen by benthic organisms, forces imposed on organisms, and larval dispersion and connectivity of marine populations. Thus, understanding water motion is central to many questions in marine science and conservation. Research in the Hench Lab focuses on hydrodynamics of estuaries and coral reefs and its effects on transport processes. For Spring 2019 we have openings for undergraduate researchers on these topics: 1) Spatial and temporal analysis of coral reef temperature data; 2) Understanding high-frequency internal waves and dissolved oxygen in a highly stratified shallow estuary; 3) Modeling residence times over coral reefs. In all projects, students will receive training in quantitative data analysis methods and modeling techniques. Experience using Matlab preferred but not required. More information can be found on Hench's website: http://people.duke.edu/~jlh82/ and by contacting Dr. Hench.

Dana Hunt - Marine microbial ecology; drivers of bacterial diversity; bacterial responses to emerging pollutants
Pilkey 104C; (252) 504-7542; dana.hunt@duke.edu

The Hunt lab conducts research on Marine Microbial Ecology. Bacteria are the most diverse organisms on earth and play a pivotal role in planetary cycling of nutrients and energy. Yet, we have a poor understanding of the factors that drive their diversity and dynamics in the environment. Independent study students in the Hunt Lab use a range of tools from culturing to PCR to learn more about the ecology of marine microbes. Past undergraduate students have assisted with local field work, examined how climate change may alter microbial populations, and identified new types of bacteria from marine organisms. Some background in microbiology or molecular biology is preferred but not required. For more information about the research see Dr. Hunt's website (http://oceanography.ml.duke.edu/hunt/).

Zackary Johnson - Biological oceanography and biotechnology
Room 104, Pilkey Lab; (252) 504-7543; zij@duke.edu

The Johnson Lab studies the abundance, diversity and activity of marine microbes – the most abundant and important organisms in the global ocean. We study biological oceanography, marine molecular ecology, marine microbiology and biogeochemistry. Together with Hunt lab our group will be conducting experiments on the effects of ocean acidification and temperature rise on microbial populations in coastal and open ocean waters. Students interested in working with our group on this project should email Dr. Johnson to discuss further details.

Dave Johnston -
Room 315, Lab 7 (Bookhout); (252) 504-7593; david.johnston@duke.edu

Interested students are encouraged to contact Dr. Johnston to discuss project ideas.

Doug Nowacek - Marine conservation, bioacoustics, marine mammals
Room 117, Lab 7 (Bookhout); (252) 504-7566 doug.nowacek@duke.edu

Interested students are encouraged to contact Dr. Nowacek to discuss project ideas.

Andy Read – Marine mammals and conservation biology
Room 104, Lab 7 (Bookhout); (252) 504-7590 aread@duke.edu

Interested students are encouraged to contact Dr. Read to discuss project ideas.

Dan Rittschof – Animal behavior, behavioral and chemical ecology, toxicology
Room 310, Lab 7 (Bookhout); (252) 504-7634; ritt@duke.edu

Topics: 1) Location and impacts of fluorescent nanoplastics consumed by anemones, local corals, or invertebrate larvae; 2) Identification of feeding stimulants for snails, crabs and barnacles from clean plastics; 3) Proteomics of blue crab larval release pheromones; 4) Analysis of basketball teams using optimal foraging theory for comparison with humpback whale foraging; 5) Customized projects with local invertebrates based on your personal interests.

Tom Schultz – Marine genetics and genomics
Room 214, Lab 7 (Bookhout); (252) 504-7641; tom.schultz@duke.edu

My lab uses genetic and genomic approaches to address questions in conservation genetics. Specific topics include hybridization of landlocked river herring species, genetic analyses of juvenile summer flounder, analyses of blue crab populations, and genetic adaptations of *Fundulus* to toxic PAH contamination at an EPA Superfund site. In addition we have been using next-generation sequencing to characterize tidal rhythms at a molecular level in mole crabs.

Brian Silliman - Marine conservation biology

Room 104A, Pilkey Lab; (252) 504-7635; brian.silliman@duke.edu

Dr. Silliman is on sabbatical and so not able to advise projects during Spring 2019.

Cindy Van Dover – Deep sea science, marine technology
Lab 5, office on 2nd floor office; (252) 504-7655; c.vandover@duke.edu

Dr. Van Dover will not be able to advise new projects during Spring 2019.

Joseph Fader– Marine conservation biology, marine mammal ecology
Pilkey Research Laboratory (first floor office space); (513) 515-1401; jef41@duke.edu

Short-finned pilot whales (*Globicephala macrorhynchus*) are highly social toothed whales that forage along the continental shelf-break of the US East Coast. Over the past several decades, pilot whales have begun consuming tuna and swordfish captured by commercial longline fishermen, a process known as depredation. This behavior is costly to fishermen and a serious conservation issue for the animals because they can become hooked or entangled in the fishing gear, often leading to serious injury or mortality. We do not know how widespread this behavior is in the western North Atlantic population of pilot whales. One way to determine whether an individual animal has engaged in depredation behavior is to look for evidence of scarring from past entanglements in fishing gear in photographs of individual animals. We are looking for a student to systematically process photographic images in our large database of pilot whales to identify and characterize the types of scarring observed on individual animals.