FOR RUTGERS SCIENTISTS A CRITICAL LOCATION FOR SCIENCE IN THE COASTAL OCEAN IS AT THE SHORE

An aerial view from a drone of Rutgers University Marine Field Station at Tuckerton. The field station at Tuckerton has been a center for fishery research for decades. This strategic jewel has Rutgers programs fully integrated with the Jersey shore communities. The station provides a site for long-term studies that help researchers understand the effects of changes in marine and estuarine environments over decades to allow us to understand how a changing climate will affect our local ecosystems. The station is a one-of-a-kind asset that allows researchers to understand the ecology of marine and estuarine fishes and invertebrates across a range of natural to human-altered environments. The station is one of the few locations for baseline studies of the natural history of estuarine habitats, plants, animals, and ecosystems. RUMFS provides insights into improved management of coastal fisheries. Finally Tuckerton provides a unique experience for undergraduate and graduate students who are productive team members in research field research projects.
Are local coastal waters changing?

Estuaries are important nurseries for fish of recreational and commercial importance. These same estuaries are highly susceptible to climate change because they are relatively shallow and influenced by variable inputs from the ocean and their watershed. One index of climate change, is evidence of increasing temperatures in the Mullica River-Great Bay estuary in southern New Jersey (see figure below). Rutgers scientists are studying the effects of increasing temperatures by extensive sampling in this estuary over the last 27+ years by personnel at the Rutgers University Marine Field Station. Once-a-week sampling for larval fish on night flood tides in Little Sheepshead Creek samples Atlantic Ocean waters as it enters the estuary on high tide. This larval fish time series anchors studies of species composition and timing of entrance into the estuary, analysis of population dynamics and biology of economically important species such as summer flounder, winter flounder, American eel, Atlantic menhaden, and ecologically important species such as gobies. Analysis of this time-series suggests changes in abundance of some species are the result of climate change that could only be detected with a long-term time series such as collected by Rutgers scientists.

The increasing abundance of some southern species indicate migration to the north from south of the Cape Hatteras and the decreasing abundance of northern species of fish that now cannot tolerate the warmer temperatures.

Rutgers scientists anchor creation of the world’s largest coral gene database

Coral reefs are critical ecosystems for an enormous array of coastal biota and are resilient species having survived five global extinction events over the last 250 million years. Despite their success, corals face major threats from human activity. From the detonation of grenades and release of poison used to kill fish for food, nutrient pollution from sewage or agricultural runoff, increased heat stress due to regional/global change, and increasing ocean acidification that can dissolve their bodies. Nearly all corals are colonial organisms and are among the most complex organisms on Earth. They are found in many forms that include stony, shallow-water, soft, and deep-water corals. Given the stresses on and the biological complexity of the corals, Rutgers scientists, with partners, two years ago planned an analysis of 20 coral genomic datasets. Their ambitious goal was to provide a comprehensive understanding of coral evolution since the organisms appeared on Earth 525 million years ago. The net result of this effort is the world’s most comprehensive analysis of coral genes, focusing on how their evolution has allowed corals to interact with and adapt to the environment. Results were published in the scientific journal eLife. A second study used insights for the first time to understand
the protein basis for stony corals to create their hard skeletons and was published in the Proceedings of the Royal Society. Congratulations to the leaders of the effort Debashish Bhattacharya and Paul Falkowski.

**Congratulations to Oscar Schofield for his promotion to the rank of Distinguished Professor**

Oscar joined Rutgers in 1995 and has been building programs spanning the development of technologies to understanding the evolution of plants in the ocean. Work conducted in partnership with Scott Glenn formed RU COOL, arguably one of the more visible oceanographic research programs in the world. The lab has been a recognized innovator of technologies, education and outreach. He also developed extensive collaborations with Rutgers marine microbial researchers studying evolution, biogeochemistry, plankton ecology, and the biological responses to climate change in the Southern Ocean. Scientific accomplishments include over 200 publications published in leading journals, over 75 million in grant awards and being in 2 international science documentary movies.

**June welcomes the undergraduate RIOS summer interns for a summer of hands-on research and friendship**

Earlier in June we welcomed this year’s participants in the Research Internships in Ocean Sciences (RIOS) program. RIOS is supported by the National Science Foundation’s Research Experiences for Undergraduates (REU) program, in which students participate in a ten-week internship in the Department of Marine and Coastal Sciences. Students from around the country are paired with Rutgers scientists and participate in a wide range of research projects based in New Brunswick, at the Rutgers University Marine Field Station, or at the Haskin Shellfish Research Laboratory. During the first week of the program, students participate in multiple field trips and are exposed to the different research areas of the DMCS community. This year, the activities included a Raritan River cruise on the R/V Caleta, where they collected water quality data and documented the transition from saltwater to freshwater in the Raritan River Estuary and a Mullica River-Great Bay Estuary cruise aboard the R/V Arabella, where they documented a rich biodiversity of fish and invertebrates. The RIOS students also explored the Grassle Marsh Nature Trail, learned about horseshoe crabs at Graveling Point Beach, assisted with long-term sampling in the RUMFS boat basin, and visited the Tuckerton Seaport.
GET YOUR RU OCEAN SWAG!!!!

Rutgers Oceanography tee-shirts are here. Proudly wear the Rutgers Oceanography tee-shirts - funds are raised to host science socials for the undergraduate and graduate students. Tee-shirts go for $15 and will make you look athletic, smart, and dashing. Such a great deal for a great cause. Contact Sarah Kasule if interested (kasule@marine.rutgers.edu). To see the quality people your contribution would support check out our featured graduate students at http://marine.rutgers.edu/main/Featured-Student/.

Above graduate student Brittany Schiel- er at sea recovering a CTD rosette

Please help us enable Rutgers oceanography to support the next generation!

Rutgers oceanography needs your support to meet the environmental and educational challenges facing the world today. Your support is critical to enabling high risk and high reward research, developing students to be the leaders of tomorrow and bringing the public with our scientists into the ocean. Your private gifts will create new laboratories, student fellowships, endowments and feed ambitious new programs. Come join us! Even the smallest gifts have huge impacts by getting students out on the water or getting a student to a professional meeting. So please join us explore the world. Go RU!

New Publications

Jelen BI, Giovannelli D and Falkowski PG. 2016 The Role of Microbial Electron Transfer in the Coevolution of the Biosphere and Geo- sphere. Annual Review Microbiology, 70: 45-62


