UC SANTA CRUZ

institute of marine sciences

A collaborative exploration of the world's oceans and marine life, their evolution and unfolding future

The oceans matter to us all and our survival may well depend on them.

They provide us with food and energy, affect our weather and climate, and inspire and sustain us. Yet they also receive our discharge and runoff, are being overfished and abused, and have a fever, which is getting worse.

We really only have one interconnected global ocean, and it will require the best science, and the most creative minds to solve the problems we have created. We need educators to help the rest of us understand the issues and make sustainable decisions for the future. We have exactly enough time to save the oceans and the planet if we start right now.

Gary Griggs

Director, Institute of Marine Sciences

THE UC SANTA CRUZ INSTITUTE OF MARINE SCIENCES

The UC Santa Cruz Institute of Marine Sciences oversees marine research programs and facilities on the main UCSC campus and on our coastal campus, where the Long Marine Laboratory and its Center for Ocean Health and Seymour Marine Discovery Center are based. In addition to our UCSC scientists and researchers, nearly 200 associated researchers affiliated with our federal, state and non-profit partners work hand-in-hand with the institute.

an innovative center for marine research and education

UCSC's Institute of Marine Sciences is a unique collaborative effort to increase our knowledge of the world's oceans and their fascinating inhabitants, to understand their economic importance and also the impact people have on them.

Our researchers ask questions that are as old as time and as current as today's weather. What real estate will rising sea levels consume? What does deep-sea sediment tell us about earthquakes, past and future? What do marine mammals hear? And do they *listen?* How do elephant seals migrate thousands of miles with absolute precision? What can kelp forests and other marine plants tell us about the health of our coastal ocean?

Our renowned faculty and researchers conduct investigations as close to home as Monterey Bay and as distant as the ice shelves of Antarctica and the volcanic shores of the Galapagos Islands. Our partners include scientists from other educational institutions and organizations, and from federal and state agencies, including the US Geological Survey, National Marine Fisheries Service, and California Department of Fish and Wildlife. What we learn is used to protect endangered species, to help prepare for climate change and future seismic events, and to develop sustainable fishing strategies.

We have organized our research teams into clusters that span time and space from coastal biology and environmental toxicology to paleoceanography and global change. The subjects overlap and so our research is almost always interdisciplinary.

Here are some highlights from scores of front-line research projects led by UCSC marine scientists:

Tagging of Pacific Predators

Dan Costa and his team tag and track marine mammals and sea birds throughout the Pacific Basin—including Sooty Shearwaters, pigeon-size birds that fly as far as 600 miles per day and dive as deep as 200 feet to catch fish. By following them from nesting burrows in New Zealand to the California coast, we are learning about diving physiology as well as discovering the secrets of the ocean's richest fisheries.

Salmon travels

Rachel Barnett-Johnson and her team analyze the tiny ear bones—otoliths—in salmon to discover their life history. Similar to the record captured in tree growth rings, the otoliths contain a record of each body of water the fish have passed through. This information is creating a roadmap for conservationists trying to determine how to restore spawning grounds that will help bring back threatened population.

Sea otter recovery

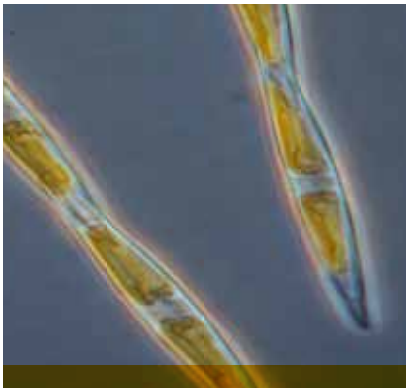
Jim Estes, Tim Tinker and Melissa Miller and their team continue UCSC's pioneering 30-year-long study of this threatened species. Sea otters are considered a keystone species that faced near-extinction as a result of being hunted for their fur. Their recovery has been slow in California and this team investigates the reasons—which range from oil contamination, toxins from algal blooms, and shark bites.

Going back 56 million years

Jim Zachos and his team use deep-sea drilling to explore the Paleocene-Eocene thermal maximum, a period 56 million years ago when global temperatures rose abruptly and melted most of the global ice. We know that something released a lot of carbon dioxide into the atmosphere to create a huge greenhouse gas type of surge—but what was it?

Hawaiian monk seal

Terrie Williams and her team are trying to find out why only 1,000 members of this endangered species exist today, and determine how to improve and expand the population. Several stranded or abandoned monk seals were given temporary residence in the seawater pools at the Long Marine Lab, where their behaviors and needs for survival in the wild are studied.



Harmful algal blooms

Raphe Kudela and his team are documenting factors that cause blooms of toxic algae and studying their effects up the food chain, from mussels and crabs to marine mammals and birds. This research feeds directly into the California Department of Public Health, which monitors seafood to ensure its safety for human consumption.

KEY FACILITIES

Our marine research facilities include laboratories on the UCSC campus and at our Coastal Science Campus, where the renowned Joseph M. Long Marine Laboratory is located. Additional operations are based at four UC Natural Reserve System field locations: Younger Lagoon, Año Nuevo Island, Landels-Hill Big Creek, and Fort Ord natural reserves. Our research teams travel the world, from the deep-sea scientific drilling vessel boring into the fault that triggered the massive 2011 Japanese earthquake to remote sites in Antarctica and Tahiti.

MAIN CAMPUS

Earth & Marine Sciences Building

The Earth & Marine Sciences building on the main UCSC campus houses the headquarters of the Institute of Marine Sciences and many of its affiliated faculty and researchers. Also based here are the Marine Analytical Laboratory and the MEGAMER (Microbial Environmental Genomics, Applications, Modeling, Experimentation, & Remote Sensing) research technology. These facilities allow for remote collection of real-time ocean data, as well as sample processing and analysis by UCSC and visiting scientists.

COASTAL CAMPUS

Joseph M. Long Marine Laboratory

SEYMOUR MARINE DISCOVERY CENTER

The Seymour Center at the Long Marine Lab is a gateway for the public to learn about marine research and ocean conservation. It replicates the look and feel of a working marine laboratory, with hands-on exhibits that feature the everyday tools of scientific exploration. Visitors learn about the types of questions scientists ask and get a glimpse of the processes that generate insights and understanding. The goal is to instill in visitors — local and beyond, young and old — a deep and lasting appreciation of the role research plays in understanding and protecting the world's oceans.

CENTER FOR OCEAN HEALTH BUILDING AND MARINE MAMMAL RESEARCH FACILITIES.

Located on the edge of the Monterey Bay National Marine Sanctuary, the research and education facilities of the Long Marine Lab provide a state-of-the-art home for interdisciplinary research and teaching on marine life, coastal conservation, water science, climate change impacts and other marine and coastal science issues. The Center for Ocean Health houses offices and laboratories for our world-class faculty, researchers, associates and graduate students. The adjacent seawater pools shelter marine mammals—including seals, sea lions and dolphins—being studied by researchers.

HOW WE GREW

1972: The University of California launches an interdisciplinary marine studies program on the Santa Cruz campus. Ken Norris is founding director of what later will be named the Institute of Marine Sciences.

1974: Donald and Marion Younger donate 40 acres of coastal bluff and freshwater lagoon to UCSC for the establishment of a marine laboratory and for wetland preservation

1978: Long Marine Laboratory opens at Younger Lagoon. Retired engineer Jack Baskin and Longs Drugs co-founder Joseph Long are major benefactors

1979: A blue whale—the world's largest mammal—washes ashore on the coast north of Santa Cruz. Her 87-foot long skeleton is preserved and reconstructed on the grounds of Long Marine Laboratory. Nicknamed "Ms. Blue," she is the largest blue whale skeleton displayed anywhere in the world.

1992: The Monterey Bay National Marine Sanctuary is created, with significant support and leadership from marine scientists at UCSC

1993: The Earth and Marine Sciences Building opens on the main UCSC campus, a significant new base for teaching and research laboratories

1998: California Department of Fish and Game opens the Marine Wildlife Center on the coastal campus

UCSC

1999: UCSC purchases 60 acres surrounding the Long Marine Lab, increasing the size of the coastal campus to 100 acres

2000: NOAA's National Marine Fisheries Service opens its research lab on the coastal campus, with a focus on salmon, rockfish and fisheries management

2000: Seymour Marine Discovery Center opens at Long Marine Lab, providing a major public education resource. H. Boyd Seymour Jr. of San Francisco is a major benefactor

2001: The Ocean Health Building at Long Marine Lab opens with 23,000 square feet of laboratory, office and classroom space

DONOR SUPPORT MATTERS

Private support has been critical to the success of our marine and coastal sciences research and public education. It leverages and validates the work done with public funding, opens new doors and provides new opportunities. We are seeking significant new philanthropic investment in our programs and facilities. In addition to funding research, it is critical that we keep our facilities safe, up-to-date, and usable for our many diverse research and educational efforts.

Expansion and upgrade of our marine mammal research pools—where we shelter and study dolphins, seals and sea lions, otters and other animals—and the Center for Ocean Health are key priorities. We are also seeking an endowment for the Seymour Marine Discovery Center to ensure its continued mission of educating the public and inspiring scientists of the future, and we hope to establish a new Coastal Conference Center/Auditorium that further engages the national and international research community and also expands our local public outreach.

We know and deeply appreciate that it is private donors who provide the measure of support that has made possible this amazing resource of learning and discovery.

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Learn More

We invite you to visit our Institute of Marine Sciences web site **ims.ucsc.edu** and the Seymour Marine Discovery Center **seymourcenter.ucsc.edu** on our coastal campus overlooking Monterey Bay.

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