

**COASTAL ENVIRONMENTAL QUALITY INITIATIVE AWARDS: 2000-2001 COMPETITION  
GRADUATE STUDENT AWARDS**

NAME	DEPARTMENT and CAMPUS	PROPOSAL TITLE	CATEGORY	PROPOSAL SUMMARY
<b>Veronica Ardi</b> Faculty Adviser: Betty H. Olson, Ph.D.	Dept. of Environ- mental Toxicology, UCI	Occurrence of <i>Aeromonas hydrophila</i> in Southern California's Coastal Waters and Virulence Factors Associated with Infections	Graduate Fellowship	Recent epidemiological studies have shown that storm drain discharges into the coastal waters of Santa Monica Bay are associated with an increase in traditional waterborne (gastroenteritis) and nontraditional (nondiarrheal) disease especially among children. A <i>hydrophila</i> has been isolated from drinking and recreational waters and is associated with gastroenteritis, <i>Aeromonas sepsis</i> , and wound and ocular infections. We propose to examine the frequency and density of <i>A. hydrophila</i> and the related virulence genes at the interface between fresh and coastal waters of major rivers in the LA, Ventura, OC, and San Diego Counties as well as the associated surf zones.
<b>Anna Armitage</b> Faculty Adviser: Peggy Fong, Ph.D.	Dept. of Organismic Biology, Ecology and Evolution, UCLA	Reestablishment of trophic interactions in restored coastal wetlands: the relative importance of top-down and bottom-up forces in structuring <i>Cerithidea californica</i>	Graduate Fellowship	The few remaining coastal wetlands in California are heavily impacted by development, pollution, and eutrophication. Habitat restoration is an increasingly important method for preserving wetland species, but whether reestablishment of plant infrastructure results in recovery of habitat functions remains unknown. I propose to use an experimental approach to investigate the functional recovery of wetlands. Specifically, I will examine the effects of top-down (predation) and bottom-up (food availability) forces on a common gastropod, <i>Cerithidea californica</i> , in Southern California coastal wetlands.
<b>Maddalena Bearzi</b> Faculty Adviser: William Hamner, Ph.D.	Dept. of Organismic Biology, Ecology, and Evolution, UCLA	Long term study on marine mammal populations, with emphasis on nearshore habitats, in the highly impacted waters of the Santa Monica Bay, CA	Graduate Fellowship	Despite scientific advances and increases in public interest in whales and dolphins, much information is still lacking to properly understand these animals living in an environment often threatened by human activities. The purpose of this proposal is to provide a means to fill the need for critical information in the area. Gathering data on dolphins, known as bio-indicators of the status of the environment, and monitoring trends in their populations, is an excellent way of protecting all marine organisms living in the local ecosystem.
<b>Edwin Beckenbach</b> Faculty Adviser: Libe Washburn, Ph.D.	Dept. of Marine Sciences, UCSB	Linking coastal circulation and pollutant dispersal in the Santa Barbara channel using high-frequency radar	Graduate Fellowship	The coastal of Southern California that stretches from Point Conception into Baja California, known as the Southern California Bight, is populated by approximately 24 million Californians. As a result of human activities in the region, large quantities of pollutants are discharged into the marine environment of Southern California from urban and agricultural sources. The problem I intend to address will be the high-resolution characterization and analysis of forcing mechanisms of circulation in the eastern Santa Barbara Channel using high frequency radar technology.
<b>Michael Behrens</b> Faculty Adviser: Kevin Lafferty, Ph.D.	Dept. of Ecology Evolution, and Marine Biology, UCSB	The Role of Temperature in the Latitudinal Diversity Gradient in Herbivorous Fishes: Implications of Global Climate Change	Graduate Fellowship	In temperature latitudes, algae often dominate shallow-water marine habitats, which can lead to net primary productivity as high as anywhere on earth, including tropical rain forests. Climate change has been shown to shift the geographic ranges of species towards higher latitudes and cause declines in algal productivity. The results of these studies will help me determine (1) what factors limit herbivorous fishes to the tropics and (2) the effect herbivorous fishes may have on benthic algal assemblages in response to global climate change.
<b>Risa Cohen</b> Faculty Adviser: Peggy Fong, Ph.D.	Dept. of Biology, UCLA	The effects of runoff on the physiology of <i>Enteromorpha intestinalis</i> : implications for use as a bioindicator of freshwater and nutrient influx to estuarine and coastal areas	Graduate Research Support	Southern California is a highly populated region with developed watersheds. Thus there is increased risk of pollution reaching coastal waters and estuaries: more runoff reaches marine environments in urbanized areas, and there is year-round influx of treated wastewater effluent entering a system typically exposed to freshwater during rainy season. The focus of this project is to quantify the response of <i>E. intestinalis</i> to factors associated with terrestrial influx of freshwater and nutrients in order to assess its usefulness as a bioindicator.
<b>David Field</b> Faculty Adviser: Christopher Charles, Ph.D.	Scripps Institution of Oceanography, UCSD	Retrospective Monitoring of Variability in Ocean Climate and Marine Populations in the California Current	Graduate Research Support	Any useful science-based management of coastal resources must be able to differentiate anthropogenic from natural variability and must be based on a solid understanding of how populations and habitats are affected by climatic changes. This research will define the extreme states and periodicities of change for both natural climate variability and marine populations in the California Current, a critical first step for improving forecasts of future trends.

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<b>Fredrick Fodrie</b> Faculty Adviser: Lisa Levin, Ph.D.	Scripps Institution of Oceanography, UCSD	Evaluating the Relative Importance of Coastal Habitat Types as Productive Nursery Grounds for the California Halibut	Graduate Research Support	Over the last several decades, human alterations have greatly changed the face of the California coastal zone, including the widespread loss of estuaries. The California halibut, <i>Paralichthys californicus</i> , is an ecologically and economically important finfish, and is known to depend upon inshore waters for nursery grounds. However, it remains poorly understood as to which specific habitat types (open coast, enclosed bays and estuaries, small lagoons) are most important as productive nursery grounds. This study will identify key nursery habitat for juvenile California halibut and reveal the sensitivity of halibut standing stocks to perturbations of coastal habitat types.
<b>Ryan Hechinger</b> Faculty Adviser: Armand Kuris, Ph.D.	Dept. of Ecology, Evolution and Marine Biology, UCSB	Trophically Transmitted Parasites as Wetland Assessors	Graduate Research Support	There is currently a dire need to assess the ecological function of our State's few remaining wetlands. The parasitic communities of larval trematodes that live within the abundant horn snail ( <i>Cerithidea californica</i> ) have shown great promise in serving as robust indicators of the community diversity and trophic functioning of wetlands. I propose to use video techniques, continuously sampling day and night, that will be sensitive enough to pick up any differences in final host bird and mammal site use. My observational and experimental work will refine the resolution of the snail parasite assessment tool.
<b>A. Randall Hughes</b> Faculty Adviser: Edwin Grosholz, Ph.D.	Dept. of Environmental Science and Policy, UCD	Implications of Genetic Structure in Eelgrass ( <i>Zostera marina</i> ) Populations for Ecological Processes and Restoration	Graduate Research Support	Seagrasses and related aquatic vegetation have declined extensively in the U.S. and worldwide in recent years due to habitat degradation and reduced water quality. In light of this decline and the recognized importance of eelgrass populations to the overall health of coastal systems, there is a significant need to understand patterns of genetic variation in these populations. To address these goals, I will evaluate patterns of genetic variation within and among eelgrass populations. This information will then be incorporated into experiments examining the linkages between genetic diversity, community structure, and ecosystem function. Ultimately, the results of these experiments can be utilized to plan and evaluate eelgrass restoration efforts.
<b>Jeom-Shik Hwang</b> Faculty Adviser: Ellen Druffel, Ph.D.	Dept. of Earth System Science, UCI	The fate of organic carbon in the near coastal zone of the Southern California Bight	Graduate Fellowship	Nearly half of the carbon dioxide (CO <sub>2</sub> ) put into the atmosphere by fossil fuel and biomass burning is put into the oceans. We suspect that California coasts transport net carbon to the deep sea at a greater rate than at other coastal regions because of the narrow shelf area, the altered estuarine systems, and episodic riverine fluxes. We propose to measure stable and radioactive carbon isotope ratios and samples from a range of stations from the mouth of the Santa Clara River to the deep sea.
<b>Joon Ha Kim</b> Faculty Adviser: Stanley Grant, Ph.D.	Dept. of Chemical and Biochemical Engineering, UCI	Spatio-temporal Patterns of Fecal Pollution at Huntington Beach	Graduate Fellowship	Beach postings and closures have become a routine feature of life in southern California. In some cases the origin of these postings and closures is obvious (e.g., sewage spills). However, in a growing number of cases, the exact cause of the surf zone pollution remains elusive. The cause celebre in this regard is the fecal pollution signal in the surf zone at Huntington State and City beaches. In this proposal, we will test the hypothesis that different sources of fecal contamination give rise to unique spatial and temporal patterns of indicator bacteria in the surf zone.
<b>Carey Kuhn</b> Faculty Adviser: Daniel Costa, Ph.D.	Dept. of Biology, UCSC	Stomach Temperature as a Measure of Pinniped Feeding Behavior	Graduate Fellowship	This proposed research is to validate the use of stomach temperature transmitters to measure the rate of food intake on free-ranging California sea lions, <i>Zalophus californiacus</i> . This study will use captive sea lions to test how well changes in stomach temperature reflect when the animals consumes prey and how much prey is consumed. By understanding the quantity of prey a single adult sea lion can remove from the environment it will be possible to understand the impact of the population on prey resources. This proposed calibration study can lead to the opportunity to use modern technology to understand not only the physiology of a dominant species but also its effects on the coastal environment.
<b>Laura Lessin</b> Faculty Adviser: Kenneth Bruland, Ph.D.	Dept. of Ocean Sciences, UCSC	A comparison of copper speciation and phytoplankton community structure in San Francisco Bay and Tomales Bay	Graduate Fellowship	San Francisco Bay and Tomales Bay are two coastal estuaries that have been chemically altered by the input of metal contaminants. Copper, in particular, poses a large threat to water quality because of its toxicity to phytoplankton, the base of the aquatic food web. We propose a two-year field and laboratory-based study to determine copper speciation in San Francisco and Tomales Bay and to assess the potential impact of present-day copper concentrations on phytoplankton. Phytoplankton are highly sensitive to copper toxicity and species exhibit a wide range of sensitivity to copper.
<b>Stuart Levenbach</b> Faculty Advisers: Sally Holbrook and Daniel Reed, Ph.Ds.	Dept. of Ecology, Evolution and Marine Biology, UCSB	Human and Natural Causes of Variation in Forage Species on Nearshore Rocky Reefs	Graduate Fellowship	Rocky reefs along the coast of California provide important habitat for at least 125 species of fish, yet they are heavily impacted by humans. These reefs are naturally dynamic and can change from a forested state with many fish, dense stands of giant kelp and foliose algae and abundant forage food for fish, to unforested "barrens" that are generally lacking in kelp, macroalgae, fish and their forage food. This proposal outlines research that seeks to identify the natural and anthropogenic factors that influence the distribution and abundance of benthic species assemblages on deforested reefs.

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<b>Tamara Lunsman</b> Faculty Adviser: Wilbert Lick, Ph.D.	Marine Science Interdepartmental Program, UCSB	Sorption of Hydrophobic Organic Chemicals to Coastal Sediment Bacteria and Biofilms	Graduate Fellowship	Many contaminants are hydrophobic and are associated with particles in wastewater from domestic, agricultural, and industrial lands. As these wastewaters run off into the coastal and estuarine environments in California, they often have a major negative impact on water quality and biota. Of these contaminants, hydrophobic organic chemicals (HOCs) are of major significance because they are often mutagenic, toxic, persistent, and they bioaccumulate in the food chain. Results (-from data analysis-) will provide information about the fundamental physical, biological, and chemical processes that determine sorption of HOCs to suspended bacteria and biofilms and the resulting toxic effects.
<b>Elena Brennan Nilsen</b> Faculty Adviser: Margaret Delaney, Ph.D.	Dept. of Ocean Sciences, UCSC	Organic Carbon in the Marine Environment: Redox State as a Measure of the Health of California Estuaries	Graduate Fellowship	Anthropogenic nutrient enrichments can have a significant effect on the redox state in estuarine systems. Increased nutrient "loading" leads to higher productivity and a subsequent increase in organic matter sedimentation. Respiration of this organic matter consumes dissolved oxygen, sometimes leading to hypoxic conditions in overlying water. Nutrients and toxins can then be released from the sediments to bottom waters, leading to catastrophic fish kills during overturn events. I will focus on characterizing the sedimentary redox conditions of two California estuaries using an automated Combustion Oxygen Demand Instrument (CoxD): San Francisco Bay, a heavily impacted system, and Elkhorn Slough, a more pristine system.
<b>Dawn Osborn</b> Faculty Adviser: John Pearse, Ph.D.	Dept. of Ocean Science, UCSC	The Importance of Substrate Types in the Composition of Rocky Intertidal Communities	Graduate Research Support	Despite its significance and protected status, the intertidal region is being increasingly impacted by human activities such as harvesting, trampling, disposal of effluents and development. Major coastal engineering projects in Santa Cruz County armor eroding cliffs to stabilize the shoreline, reducing sand production and the amount of native substrate available for intertidal flora and fauna. My approach is to characterize physical attributes of the different rock types including porosity, rugosity and thermal capacity. I will perform series of clearings to see how recruitment varies on different rock types.
<b>Jeff Riffell</b> Faculty Adviser: Richard Zimmer, Ph.D.	Dept. of Biology, UCLA	Fertilization in the Sea: Establishing the minimum population sizes and environmental conditions for successful fertilization in abalone.	Graduate Fellowship	Southern California has historically supported 5 species of commercial abalone. Within the past fifteen years, all of these species have seen dramatic declines in population. Now, abalones occur at such low population densities that in 1996 the California Fish and Game Commission was forced to order an emergency closure to all abalone harvesting in southern California. In this proposal, we seek to determine the effects of population size and distribution, and hydrodynamic conditions on fertilization success. Such information will be critical for marine resource managers to establish proper procedures to aid in the recovery of the remaining abalone populations in southern California.
<b>Jessica Riquetti</b> Faculty Adviser: Ellen Simms, Ph.D.	Dept. of Integrative Biology, UCB	Ammophila arenaria control in California sand dunes	Graduate Research Support	<i>Ammophila arenaria</i> (European Beachgrass) is a dune grass native to the North West European sea coast. It was introduced to northern California as a dune stabilizer and is invasive north through Washington State. The degree to which <i>A. arenaria</i> alters dune wind patterns and excludes the causes of <i>Ammophila</i> degeneration we may better equipped to protect California's fragile dune habitat and the rare plant species within it.
<b>Kara Schmelzer</b> Faculty Adviser: Ronald Tjeerdema, Ph.D.	Dept. of Environ- mental Toxicology, UCD	Analyzing the Potential Threat of Azaspiracid to California Coastal Ecosystem	Graduate Fellowship	The purpose of this study is to develop analytical techniques that will accurately and sensitively monitor azaspiracid (AZP) along the California coast. AZP is a new algal toxin that is produced during harmful algal blooms by the dinoflagellate, <i>Protoperidinium</i> , sp. This toxin is responsible for a number of recent intoxication in Europe resulting from shellfish ingestion. The potential presence of AZP in the California coastal ecosystem poses a serious threat to human and environmental health. I propose to develop an immuno affinity extraction technique, coupled with analysis by liquid chromatography, to increase the efficiency and sensitivity of AZP detection. Subsequently, I will survey the California Coast for the presence of the toxin. The recognition and effective monitoring of AZP from such blooms is necessary for regulatory agencies to insure that tainted seafood does not reach the marketplace. In addition, the improved detection methods will facilitate the study of AZP effects on the marine ecosystem, in terms of environmental fate and toxicity.
<b>Cope Willis</b> Faculty Adviser: Gary Griggs, Ph.D.	Dept. of Earth Science, UCSC	Assessing Human Alterations to Fluvial Sediment Delivery and the Impacts to Beach Sustainability, Central California	Graduate Fellowship	While ephemeral beach erosion and storm wave inundation of coastal properties occur frequently, particularly during the last two major El Niño events, there has been no comprehensive study to date of regional beach changes documenting long-term trends of erosion that would justify artificially adding sand to California's beaches. This study seeks to quantify the impacts of coastal dams and timber harvesting on coastal sediment supply by (1) using historical records of stream sediment flux to quantify the volume of sand that has been impounded by coastal dams and (2) measuring current stream sediment loads within watersheds with different logging histories to assess its effects on sediment yield.

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<b>Louis Zeidberg</b> Faculty Adviser: William Hamner, Ph.D.	Dept. of Organismic Biology, Ecology and Evolution, UCLA	The California Market Squid, <i>Loligo opalescens</i> , Paralarvae (Hatchling) Distribution	Graduate Fellowship	The California market squid, <i>Loligo opalescens</i> , is the largest fishery in the state in terms of tonnage and dollars. Squid is potentially the largest biomass of any forage species in California waters. The effective management of this fishery is of paramount importance not only to the people involved, but also to the millions of fish, birds, and marine mammals that compete for this resource. Without an effective management plan, this species will be fished in an unsustainable manner. With two more years of funding I can follow the squid paralarvae through an El Niño cycle, from la Niña (1999) through three years of normal oceanic temperatures and to the next El Niño year. With this research I can best advise the managers on the state of the population through the El Niño fluctuation. Given the importance of <i>Loligo opalescens</i> as a forage species, sustainable yield is a necessity. I shall provide the managers with necessary information to sustain the resource for the needs of humans, marine mammals, birds, and fish.

### PRINCIPLE INVESTIGATOR AWARDS

NAME	DEPARTMENT and CAMPUS	PROPOSAL TITLE	CATEGORY	PROPOSAL SUMMARY
<b>John Largier and Margaret Deksheniaks</b>	Scripps Institution of Oceanography, UCSD and Dept. of Ocean Sciences	The University of California Marine Laboratories Coastal Environmental Observation Network	Multi-Campus Grant	The coastal ocean environment displays variability across a wide array of time scales. This environmental variability confounds many coastal environmental concerns, e.g., water quality, fisheries, community ecology, and conservation. There is a need for long-term high-quality data over a network of sites. We propose to establish such a coastal environment observation network, with sites at seven of the UC campuses. The goal is to provide a simple high-quality record for the next century.
<b>Nicolas Gruber</b>	Dept. of Atmospheric Sciences, UCLA	Coastal Ocean Observing System Elements for the Southern California Bight and Santa Monica Bay	Smaller Scale Project	We propose to establish, maintain, and augment the sensors for UCLA's oceanographic mooring near the edge of the continental shelf in Santa Monica bay; extensively sample the water quality within the surrounding region; and interpret the measurements in combination with satellite sensing and three dimensional, fine-scale numerical simulation of the local region.
<b>Kaustuv Roy</b>	Dept. of Biology, UCSD	Anthropogenic activities and local extinctions of species in Southern California's rocky intertidal habitats: Compiling historical baseline and quantifying the extent of the problem	Smaller Scale Project	The rocky shore habitats along the coast of southern California contain a rich diversity of invertebrate, plant and fish species but these habitats are increasingly being impacted by the activities of a rapidly growing human population. Negative impacts on the intertidal biota include sewage discharge and industrial pollution, trampling of the intertidal by foot traffic, harvesting of organisms for food, fish bait, aquariums and other needs and moving of rocks and other materials that serve as habitats for many intertidal invertebrates. Our goal here is to quantify how species compositions in the rocky intertidal habitats of southern California have changed over the past decades.
<b>Mary Silver</b>	Dept. of Ocean Sciences, UCSC	Phytoplankton Toxins in the California Coastal Zone	Smaller Scale Project	Toxic algae are increasingly a problem in coastal oceans around the world. In California, species responsible for paralytic shellfish poisoning (PSP) have been monitored since the 1920s, but the recent discovery of additional algal toxins indicates that considerably greater dangers exist than recognized previously. The purpose of this proposal is to (1) quantify for the first time the temporal patterns of the full suite of toxic species over a 2 year period (2) determine whether the newly discovered toxins interfere with the mass bioassay for PSP, the federal and state's approved method for measuring PSP, and (3) measure the toxins in field collected samples.
<b>Libe Washburn</b>	Institute for Computa- tional Earth System Science, UCSB	Links between coastal circulation and pollutant dispersal in the Santa Barbara Channel	Smaller Scale Project	The Southern California Bight (SCB), the curving section of coastline stretching from Point Conception to Cabo Colonet in Baja California, is home to almost 24 millions Californians. Each year large quantities of pollutants are discharged into the waters of the SCB from urban and agricultural sources. Surprisingly, circulation in the SCB is poorly understood compared with other California coastal regions such the shelf north of San Francisco. This research would examine the evolving coastal circulation in the eastern Santa Barbara Channel with the goal of understanding the dispersion and transport of pollutants into regional ocean waters.