California State University Monterey Bay

Marine Sciences Program
Guide for Prospective Students

MSCI Courses

Science Diving

Research Opportunity
Welcome to the Department of Marine Science!

This guide summarizes just a few of the key features of the Marine Science Program at CSU Monterey Bay. We recommend that you schedule a meeting if you have specific questions that cannot be answered through the guide and Marine Science web site.

Contents

- Curriculum Overview
  - Degree Programs
    - MSCI Bachelor of Sciences (BS) Degree
    - MSCI Master of Sciences (MS) Degree - MLML
  - MSCI Capstone
- Research Programs
  - CSUMB Research Diving Program
  - Marine Science Research web site (homepage)
    - Faculty Profiles
    - Past & Ongoing Projects
- Marine Science Library Research Guide
- Monterey Bay Research / Map

Dr. James Lindholm
Department Chair
jlindholm@csumb.edu
831.582.4662

Sarena Hineser-Harwood
Acad. Support Coordinator
shineserharwood@csumb.edu
831.582.4665
What is Marine Science? Marine Science at CSUMB is the interdisciplinary study of the marine environment, with emphases on (1) the use of state-of-the-art technologies to collect & analyze scientific data, and (2) the application of the resultant information to management & policy-making.

Why get a BS in Marine Science? Marine Science students receive training in scientific diving, remote sensing, molecular techniques, geographic information systems (GIS), science communication, and many other marketable laboratory & field skills, all of which are in high demand by employers and will lay the foundation for graduate study in a variety of disciplines.

How does Marine Science differ from other majors on campus and at other Institutions around the region? Marine Science is not the same as marine biology. The CSUMB Marine Science program has an emphasis on interdisciplinary skills rather than on biology alone. However, a Minor in Biology is available on campus to augment training in specific areas of biology. Our Marine Science program differs from other marine-focused programs for its required emphasis on the application of science to management & policy. No other local programs require this integration.
Bachelor of Science Degree

CSUMB offers a single, interdisciplinary undergraduate degree in marine science that prepares students for a wide variety of jobs and graduate school programs.

csumb.edu/catalog/marine-science-bs

Marine Science BS

Learning Outcomes

Students in the Marine Science major apply a wide range of technologies to studying marine ecosystems. Through applied learning and research, you will gain the skills necessary to develop a sustainable balance between the unique environmental, recreational, cultural and economic opportunities in the Monterey Bay region.

Through lab and field experience, you will apply techniques of experimental design, data acquisition, analysis and presentation that provide you with the skills needed to monitor and analyze marine science problems. You are encouraged to interact with other Monterey Bay institutions, such as the Moss Landing Marine Labs, to take advantage of additional local expertise in marine and coastal ecology.

Graduates of the Marine Science major are prepared for a variety of career pathways in the public and private sector. Graduates are also poised to continue their education via graduate studies and research in ecology, environmental science and related fields.

Required Courses

Learning Outcomes

MLO 1: Quantitative, Research, and Communication Skills

All marine science graduates use quantitative evidence to evaluate hypotheses. They display and analyze data to interpret and communicate marine patterns and processes in written and oral formats.

MLO 2: Personal, Professional, and Social Responsibility

Marine science graduates work professionally and ethically to promote inclusive environmental decision-making based on diverse stakeholder perspectives.

MLO 3: Marine Science Depth of Knowledge

Marine science graduates demonstrate marine science content knowledge appropriate for marine science careers or graduate school.

MLO 4: Marine Science Integration and Synthesis

Marine science graduates synthesize, connect, and apply knowledge, skills, and experiences across the interdisciplinary field of marine science (e.g., biology, oceanography, spatial statistics, etc.) allowing them to address new and complex challenges facing the oceans.
CSUMB offers a Master of Science in Marine Science through Moss Landing Marine Labs. Both campuses are located near the shores of Monterey Bay, an extraordinary place that is home to one of the greatest concentrations of marine science research and education institutions anywhere in the world. CSUMB is located only 20 minutes south of MLML and is by far the closest of the seven CSU consortium campuses affiliated with MLML.

You can enroll through CSUMB and can take advantage of CSUMB housing and other resources, while doing most of you master’s work with MLML faculty, including CSUMB faculty advisers, in MLML facilities.

The MLML master’s program is widely known and respected as one of the top marine science programs in the nation. This program will building upon your existing bachelor’s degree to give you the knowledge, skills, experience, and professional contacts you’ll need to take your marine-related career to a new level!
Marine Science MS

CSUMB offers a Master of Science in Marine Science through Moss Landing Marine Labs. Both campuses are located near the shores of Monterey Bay, an extraordinary place that is home to one of the greatest concentrations of marine science research and education institutions anywhere in the world. CSUMB is located only 20 minutes south of MLML and is by far the closest of the seven CSU consortium campuses affiliated with MLML.

You can enroll through CSUMB and can take advantage of CSUMB housing and other resources, while doing most of your masters work with MLML faculty in MLML facilities. The MLML masters program is widely known and respected as one of the top marine science programs in the nation. It will build upon your existing bachelors degree to give you the knowledge, skills, experience, and professional contacts you'll need to take your marine-related career to a new level.

> Required Courses

> Learning Outcomes

All MLML students must meet high standards of competency in the core areas of oceanography, marine biology, and quantitative analysis as described in the Learning Outcomes listed below. You are encouraged to discuss alternative assessment options with your advisor; however, the hands-on, integrative nature of the MLML program necessitates a course-based path, followed by independently conducted research, for the majority of students.

Quantitative Foundations

Ability to apply fundamental mathematical and statistical constructs used to communicate quantitative information within the context of marine science; ability to demonstrate proficiency with biological, chemical and physical data acquisition, analysis, display, and communication.

Oceanography Foundations

Ability to apply principles and methods of the major field of oceanography (physical, chemical, geological and biological).

Marine ecology Foundations

Ability to apply advanced scientific concepts and methods to solve complex problems within an integrative ecological framework; ability to examine linkages between marine organisms and their environments; ability to recognize common patterns of change in real systems, build simple models that generate those patterns, and describe potential limitations of systems models as decision-making tools.

Area of Concentration Competency

Ability to demonstrate depth in a chosen area of marine science by completing an appropriate sequence of learning experiences that fulfill the learning outcomes of a self-designed, MLML-approved concentration.

Scientific Inquiry Competency

Ability to design, conduct, and interpret independent scientific investigations of an advanced nature, and to understand the ethical norms that guide scientific processes and methods.

Effective Communication Competency

Ability to present clearly, in written and oral formats, analyses of complex scientific issues.
Marine Science Capstone

csumb.edu/marinescience

Marine Science Capstone Project

Capstone provides students an opportunity to synthesize knowledge, skills, and abilities developed over the course of their learning experience at CSUMB. MSCI capstone helps students connect their marine science and policy knowledge to critical issues of ocean stewardship, conservation, exploitation, and management at local, national, and global scales.

CSUMB Marine Science (MSCI) Capstone Options

SEP Marine Science Majors may choose one of two, and only two, available options to meet the CSUMB capstone requirement for the major.

Option 1: Marine Science Group Capstone MSCI 410 (1 units)
- Student must enroll in one of the approved MSCI Group Capstone classes (e.g., MSCI 433, 455, or 470) during his/her senior year (specifically, the year in which he/she is planning to graduate).
- Student must simultaneously enroll in MSCI 410 to receive credit for the capstone.
- May include a written report, public presentation, and/or research poster.

Option 2: Marine Science Independent Honors Capstone with CSUMB Faculty

Lead MSCI 490 (2-4 units)
- Student should discuss interest with a potential tenure-track CSUMB faculty advisor a minimum of one year prior to his/her intended graduation date.
- Student and advisor must develop a timeline for preparation of a capstone proposal.
- Proposal must achieve the equivalent of an A- from the CSUMB faculty advisor in order to proceed forward with the capstone project.
- In the student’s final semester the student should enroll in MSCI 402 to receive credit for capstone.
- Must include a written report and a public presentation assessed by advisor and 1 other faculty.
Internships: Many Marine Science Majors are encouraged to and do participate in research internship experiences as a valuable addition to their education (e.g. summer internships at partnering institutions arrange through UROC or an REU). However, Marine Science Majors wishing to use a research internship experience to fulfill their capstone graduation requirement fall under and must meet all conditions of Option 2 above.
Research Programs

**Marine Science Research** All extramurally funded research activities in the CSUMB marine science program are conducted through [Marine Science Research](http://csumb.edu/marinescience), formerly the Institute for Applied Marine Ecology (IfAME). Learn about faculty research labs, on-going research projects, vessels and equipment, and many other resources.

**Research Diving Program** All research diving activities associated with CSUMB courses, student theses, and funded projects are conducted through the [Research Diving Program](http://csumb.edu/marinescience). CSUMB is a member of the [American Academy of Underwater Sciences](http://csumb.edu/marinescience).
CSUMB Research Diving Program
csumb.edu/diving

Course Pathway – all courses offered each semester

Basic SCUBA → Techniques → Master Diver → Scientific Diving Techniques

* Off-campus training can be substituted on a case-by-case basis

Must maintain –

Diving Medical Exam – Certifications in 1st Aid, CPR, O2 Administration and Field Neuro Exam – Swim Test – Six research dives in past six months

James Lindholm
jlindholm@csumb.edu
Dive Program Chair

Andrew Morgan
amorgan@csumb.edu
Dive Safety Officer

Ali Fremont
afremont@csumb.edu
Dive Program Coordinator
Conducting relevant science to inform sound marine policy

The mission of the Marine Science Research program (formerly the Institute for Applied Marine Ecology, IAME) is to develop clear linkages between ecological phenomena and potential and realized management regimes along the California coast, across the US, and throughout the world. Using cutting-edge technology, the goal of the program is to provide insight, to reorganize thinking, and to improve paradigms for understanding the interaction of marine ecological systems and human activities.

Marine Science Research Highlights

The Department

MCB FACULTY + SUPPORT STAFF

Starting July 1, Marine Science is officially its own department! To support the rapidly expanding interest in the sciences at CSUMB, the School of Natural Sciences (SNS) voted to subdivide into more efficient administrative departments based on majors - Marine Science, Biology, and Applied Environmental Science. Come visit us in building 49.

Nod to Marine Science Program

PEER-TO-PEER

CSUMB's Marine Science program was ranked #5 of The 10 Best Colleges for Marine Biology by College Magazine, a periodical written by a team of student journalists from universities nationwide.

Upcoming Events

29 AUG

MLML Seminar Series - Galapagos Corals: Canaries in a Coal Mine

MLML Seminar Room, 4-5 p.m.

3 SEP

DR. MIKE ORBAECH, PROFESSOR EMERITUS OF MARINE AFFAIRS & POLICY, DURK UNIVERSITY

CBE Speaker Series - A Brief History of the World (and Ocean) Public Trust

ArtGeson Bldg, Room 102, Middlebury Institute, Monterey, 6:00-7:30 p.m.

5 SEP

DR. TIM WHITE, GLOBAL FISHING WATCH

Tracking Fish and Fisheries for Ocean management

MLML Seminar Room, 4-6 p.m.
Marine Science Faculty

James Lindholm
CHAIR, DEPARTMENT OF MARINE SCIENCE
JAMES H. ROTE DISTINGUISHED PROFESSOR OF MARINE SCIENCE & POLICY - ROTE PROGRAM
CHAIR OF RESEARCH DIVING PROGRAM
jlindholm@csumb.edu
www.jameslindholm.com
831.922.4662
Image Analysis Lab
California Undersea Imagery Archive

Corey Garza
FACULTY, DEPARTMENT OF MARINE SCIENCE
DIRECTOR, MONTEREY BAY REGIONAL OCEAN SCIENCE (MBRO) PROGRAM
COORDINATOR, COASTAL & MARINE ECOSYSTEMS PROGRAM (CMEP)
cogarza@csumb.edu
831.922.3024
Marine Landscape Ecology Lab

Alison Haupt
FACULTY, DEPARTMENT OF MARINE SCIENCE
ahaupt@csumb.edu
831.922.3692
Coastal Ecology Lab

Rick Kvitek
ASSOCIATE FACULTY, DEPARTMENT OF MARINE SCIENCE
rickvitek@csumb.edu
831.922.3190

Cheryl Logan
FACULTY, DEPARTMENT OF MARINE SCIENCE
CSUMB CONTACT, CSU COAST UNDERGRADUATE STUDENT RESEARCH
cologan@csumb.edu
831.922.4698
Environmental Physiology Lab

Steve Moore
FACULTY, DEPARTMENT OF MARINE SCIENCE
stmoore@csumb.edu
831.922.3775
Ecosystem Electronics Lab

Sherry Palacios
FACULTY, DEPARTMENT OF MARINE SCIENCE
spalacios@csumb.edu
831.922.3657
Biological Oceanography Lab

Andrew DeVogelaere
ADJUNCT FACULTY, DEPARTMENT OF MARINE SCIENCE
Andrew DeVogelaere@noaa.gov
831.647.4213
MENMS Research Coordinator

MARINE SCIENCE SUPPORT STAFF
- Carrie Boote
  Marine Science Research & Data Program Manager
- Alexandria Tormoht
  Assistant Dive Safety Officer
- Laura Good
  Coastal & Marine Ecosystems Program (CMEP) Education Director
- Elaine Hansen Harwood
  Administrative Support Coordinator
- Pat Lamporto
  Marine Geospatial Technology Officer
- Laura Lemon
  CSU Video Archivist
- Andrew Morgan
  Dive Safety Officer
- Amy Fry
  Lab Support Technician
- Paula Salinas Ruiz
  MBET Teaching Assistant
- Kameron Strickland
  Inversion / 3D-VR Data Technician

SCIENCE DIRECTORY
California Undersea Imagery Archive (CUIA)

This physical archive of undersea video imagery collected statewide using various ROVs (including remotely operated vehicles or ROVs) constitutes a critical resource for addressing management questions in the future. Data can be mined from the imagery to answer questions that were not posed as part of the original studies that collected the imagery, and the imagery can serve as an important visual baseline against which future change (from climate change and/or other factors) can be evaluated.

Climate-driven Collapse of Mussel Beds (*Mytilus californianus*) in the Southern California Bight

This project is providing insights into the long-term effects of climate shifts on the composition of rocky intertidal communities in Southern California and the ecosystem services that they provide. The results of this study will also provide baseline data for modeling future shifts in rocky intertidal communities resulting from climate change.

Reservoir Capacity Studies

The importance of this project and related SFME efforts is underscored by the unprecedented drought California is undergoing along with the predicted loss of the state’s Sierra snowpack by mid-century.

Multiple Stressor Effects of Ocean Acidification & Hypoxia on Temperate Reef Fishes

The results of these field studies and lab experiments will be rapidly disseminated to fisheries management agencies, oceanographic observing programs, and the scientific community to provide information on climate change impacts for economically valuable groundfish.
Marine Science Research Guide

› Articles and databases

› Books and background reading

› Websites

See also

See also the CSUMB Library's guides to Biology, Earth Sciences and Environmental Studies

Your librarian

Jeff Corrigan

Senior Assistant Librarian

Library

jcorrigan@csumb.edu
(831) 582-3727

Tanimura & Antle Family Memorial Library
3164
**Proximity map** showing the highly accessible location of CSU Monterey Bay to the phenomenal Monterey Bay Canyon and other world-class marine research institutions and coastal management resources.