California State University Monterey Bay

Marine Sciences Program

Guide for Prospective Students

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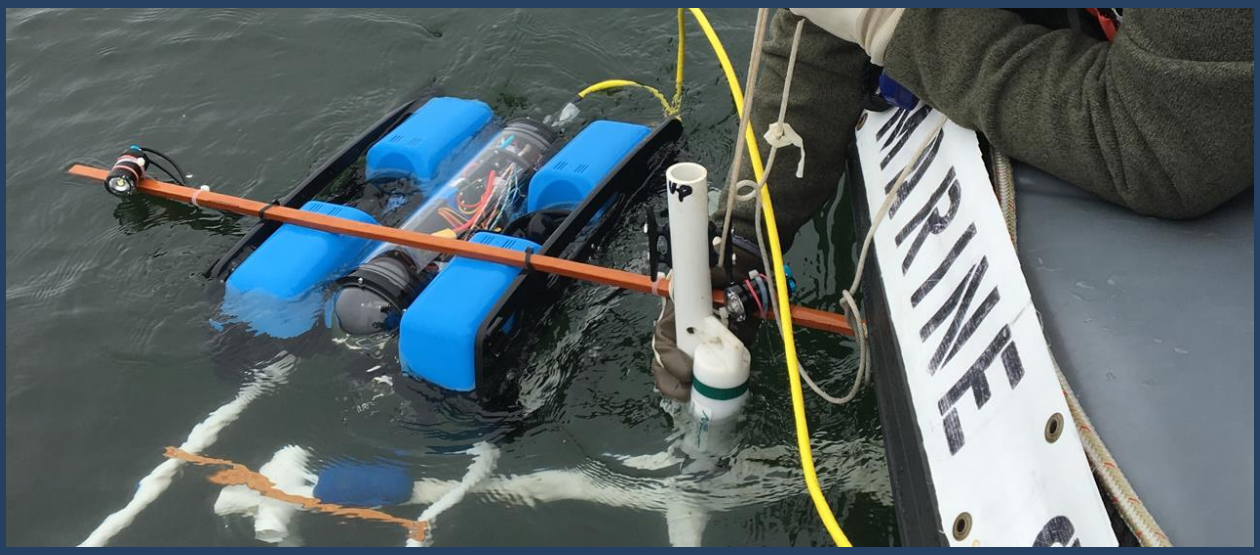


California State University Monterey Bay

Marine Science

Bachelor of Science Degree

Find all MSCI-related information at: https://csumb.edu/marinescience

What is Marine Science?

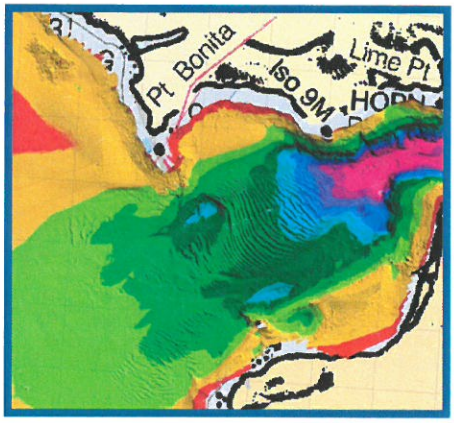
Marine science at CSUMB is the inter-disciplinary study of the marine environment, with emphases on 1) the use of state-of-the-art technologies to collect and analyze scientific data, and 2) the application of the resultant information to management and policy-making.

Why get a BS in Marine Science?

Marine Science students receive training in scientific diving, seafloor mapping and other types of remote sensing, Geographic Information Systems (GIS), science communication, and many other 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?

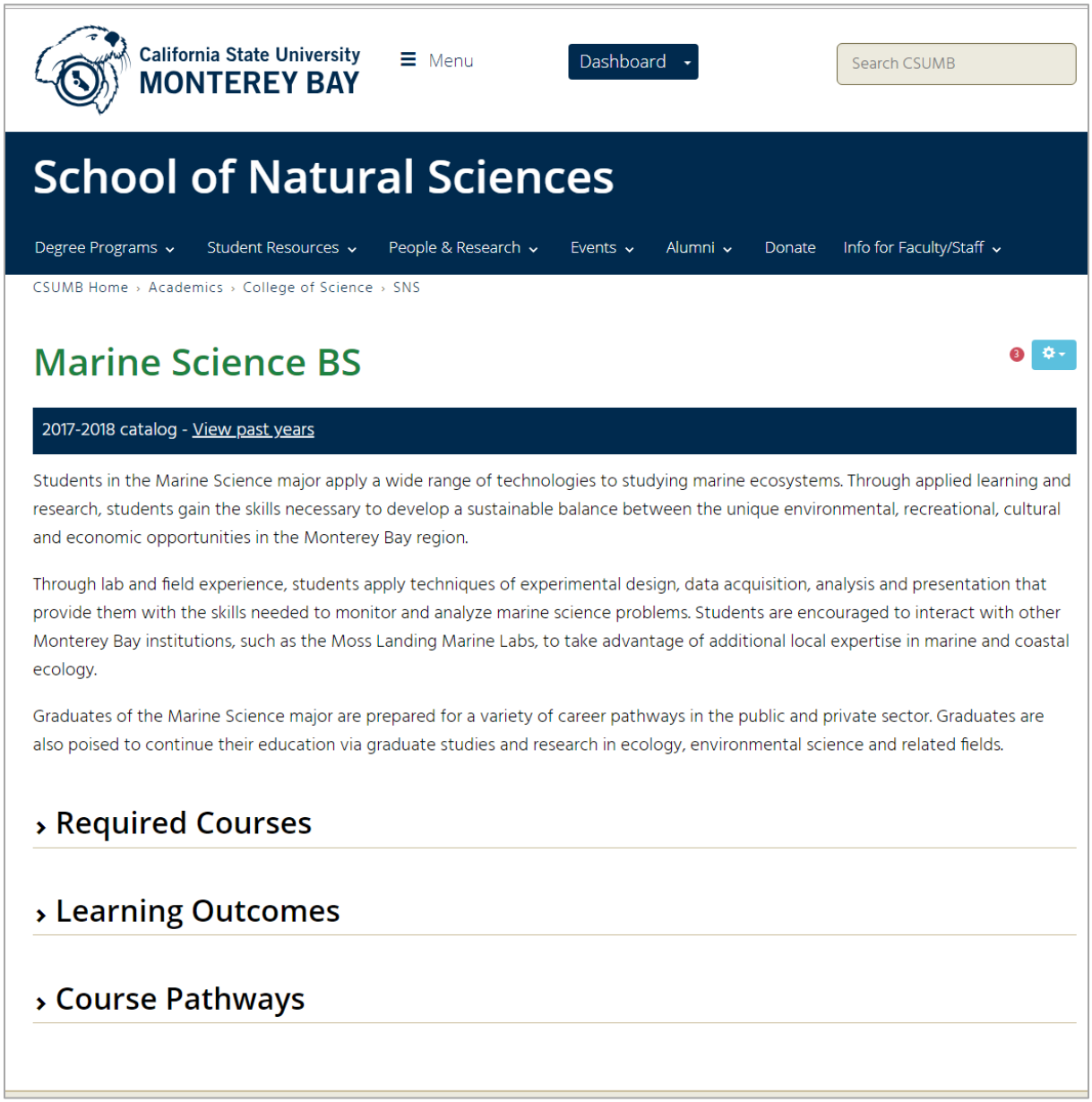
Marine Science is *not* the same as marine biology, with an emphasis on interdisciplinary skills rather than on biology alone. However, a Minor in Biology is available on campus to augment training is specific areas of biology. The Marine Science program at CSUMB differs from other marine-focused programs in the Monterey Bay area for its *required* emphasis on the application of science to management and policy. No other programs require this integration.



https://csumb.edu/naturalsciences/marine-science-bs

Degree Programs

CSUMB offers a single, interdisciplinary undergraduate degree in marine science that prepares students for a wide variety of jobs and graduate school programs. A masters degree in marine science is also available through a collaboration with Moss Landing Marine Labs.



Marine Science BS

2017-2018 catalog - View past years

Students in the Marine Science major apply a wide range of technologies to studying marine ecosystems. Through applied learning and research, students 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, students apply techniques of experimental design, data acquisition, analysis and presentation that provide them with the skills needed to monitor and analyze marine science problems. Students 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 Foundations

Students apply the fundamental mathematical and statistical constructs used to communicate quantitative information.

MLO 2: Science and Policy Foundations

Students apply the nomenclature, concepts and methodology of chemistry, biology, physics, earth science and economics to understand, describe and predict marine science processes.

MLO 3: Marine Science Communication

Students analyze and synthesize information from a multi-stakeholder perspective to develop alternative scenarios for marine science problems, and communicate their recommendations in oral and written formats.

MLO 4: Geospatial Technology

Students demonstrate proficiency with current technologies for acquiring, analyzing and displaying spatial data relevant to marine geospatial planning.

MLO 5: Quantitative Research Methods

Students use the scientific method and statistical analyses in the design, execution and interpretation of marine science investigations.

MLO 6: Service Learning

Students combine disciplinary knowledge and community experiences in the context of social responsibility, justice, diversity and compassion.

MLO 7: Advanced Marine Science

Students apply advanced knowledge and skills in marine science.

› Course Pathways

Marine Science BS

2017-2018 catalog - View past years

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› Required Courses

› Learning Outcomes

⌄ Course Pathways

These pathways are examples of how you might complete all the requirements for your degree in an order that makes sense given prerequisites. They are meant to give you a general sense of what your education will look like.

Your own unique situation and a number of other factors may mean your actual pathway is different. Perhaps you'll need an extra math or language class, or one of the courses we've listed isn't offered in a particular semester. Don't worry - there is flexibility built into the curriculum. You'll want to work closely with an advisor and use the academic advisement report to take all that into account and develop a pathway that's customized for you.

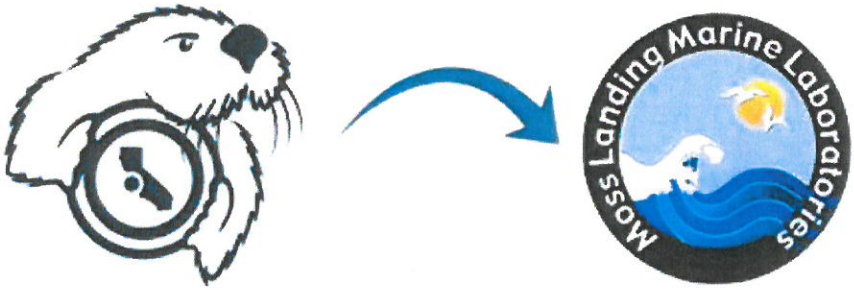
In the meantime, use this example as a starting point for choosing classes or discussing your plans with an advisor. Your advisor is your best resource when it comes to figuring out how to fit all the courses you need, in the right sequence, into your personal academic plan.

› Marine Science Freshman Pathway

› Marine Science Transfer Pathway

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 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 build 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!

CSUMB MSCI Faculty Advisers

Dr. Corey Garza – Marine Landscape Ecology Lab
Dr. Alison Haupt - Marine Conservation Lab
[redacted]
Dr. James Lindholm – IfAME Director, Image Analysis Lab
Dr. Cheryl Logan – Environmental Physiology Lab
Dr. Steve Moore – Ecosystem Electronics Lab
[redacted]

Cal State Univ Monterey Bay
csumb.edu/marinescience
Moss Landing Marine Labs
gradprog.mlml.calstate.edu

Contact: James Lindholm, jlindholm@csumb.edu, 831.582.4662

CALIFORNIA STATE UNIVERSITY MONTEREY BAY

Marine Science

Master of Science Degree

https://csumb.edu/naturalsciences/marine-science-ms

Degree Programs

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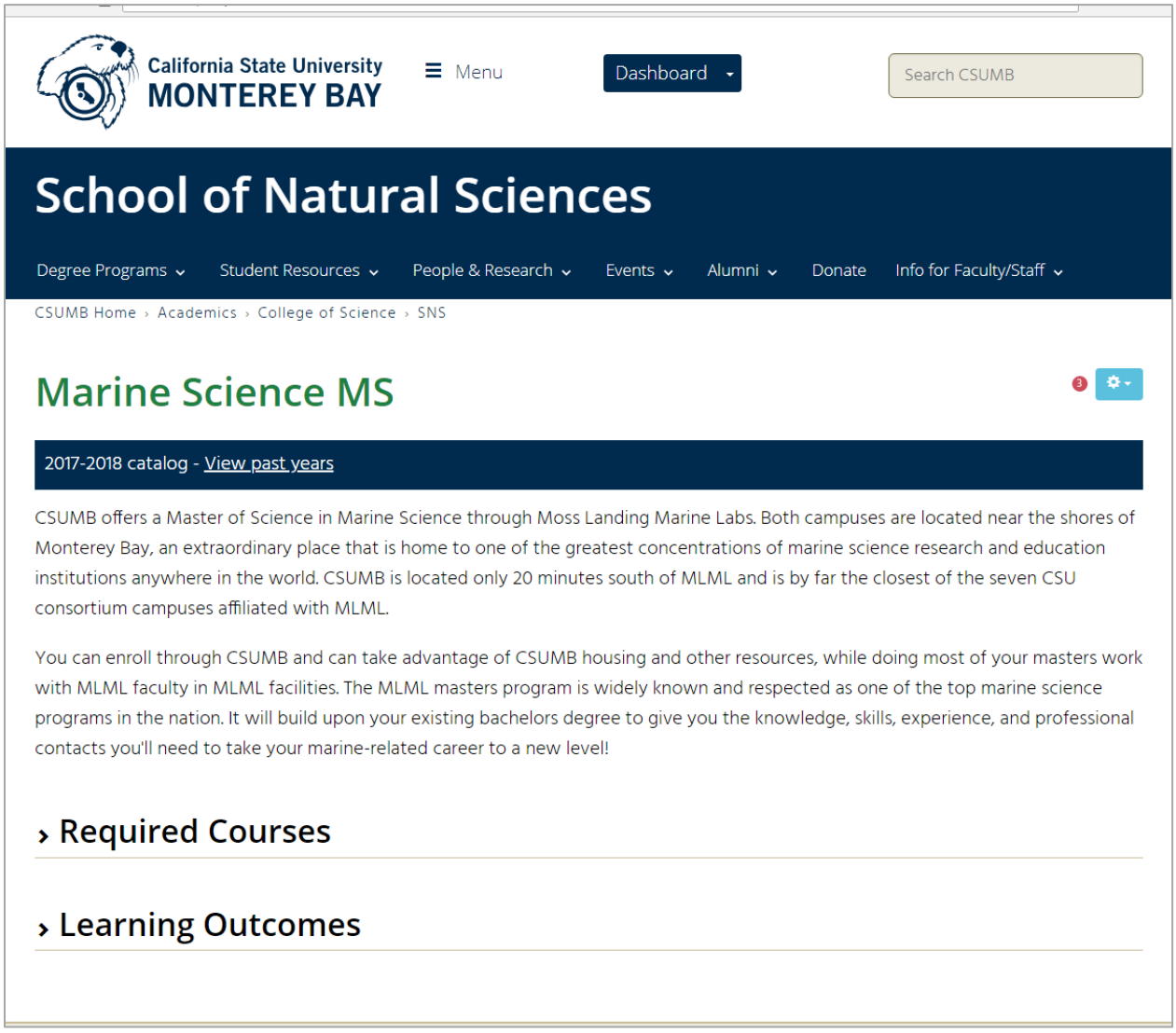

Marine Science MS

2017-2018 catalog - View past years

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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 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.

MSCI 410: Marine Science Group Capstone (1 units)

MSCI 490: Marine Science Honors Capstone (2-4 units)

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

- 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

- 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

Institute for Applied Marine Ecology All extramurally funded research activities in the CSUMB marine science program are conducted through the Institute for Applied Marine Ecology (IfAME). Learn about IfAME's 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. CSUMB is a member of the American Academy of Underwater Sciences.

CSUMB Research Diving Program

Contacts: James Lindholm (jlindholm@csumb.edu)
Frank Degnan (fdegnan@csumb.edu)

http://csumb.edu/diving

How to Become a CSUMB Research Diver

Curriculum Pathway

Open water* (KIN 280/L) → Advanced SCUBA Rescue* (KIN 282/L) → Master Diver* (KIN 283/L) → Scientific Diving Techniques* (MSCI 380/L)

Diver in Training (DIT)
Authorized to participate in science dives only under CSUMB auspices. Cannot lead dives.

→ Diver Already Trained (DAT)
Authorized to lead dives if...

Must maintain the following:

First Aid
CPR
Oxygen Administration
Medical Physical Exam
At least 6 science/proficiency dives in past 6 months

*Prerequisite for MSCI 380

To Conduct a Research Dive

Must complete the following:

At least one week in advance:

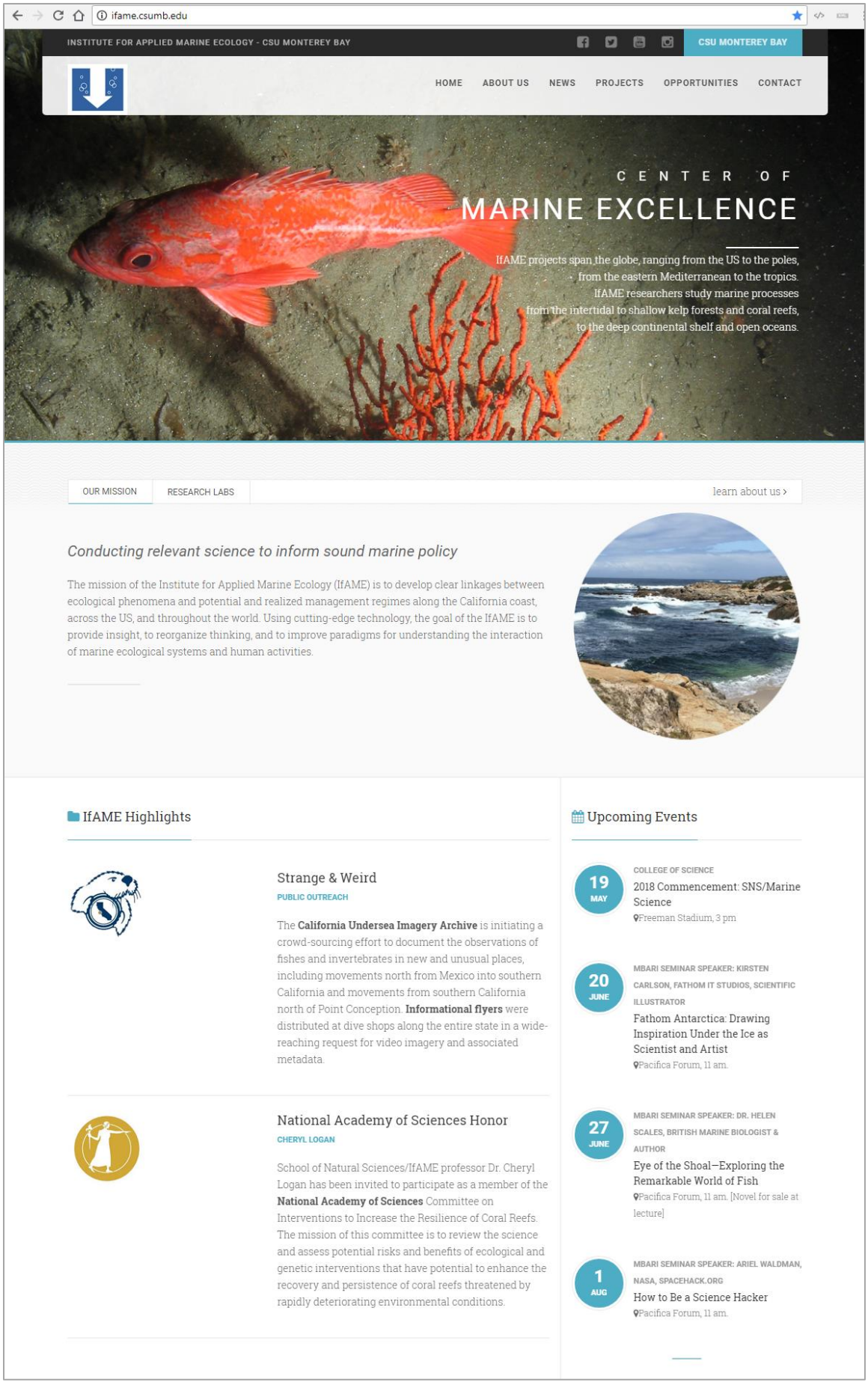
Dive proposal – Scientific approval prior to DSO approval

Twenty-four hours in advance:

Daily Dive Plans – detailed summaries of each day of diving

Log all dives on CSUMB's online dive log

Institute for Applied Marine Ecology (IfAME) – http://ifame.csumb.edu



Marine Science Faculty Profiles – http://ifame.csumb.edu/about.html

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IfAME Team

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  Marine Geospatial Technology Officer
- Larissa Lemon
  CUIA Video Archivist
- Michaela Miller
  CMEP Administrative Specialist

SCHOOL OF NATURAL SCIENCES PEOPLE

IfAME Faculty Research Projects (example) – http://ifame.csumb.edu/projects7.html

ifame.csumb.edu/projects7.html

INSTITUTE FOR APPLIED MARINE ECOLOGY - CSU MONTEREY BAY

CSU MONTEREY BAY

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Projects Listing

Marine Science + Policy

CSUMB SPONSORED PROGRAMS OFFICE

Projects

Assessment of Abalone and Urchin Populations in Monterey

HAUPT

This project, integrated into an undergraduate capstone class, re-examines black abalone and urchin population sizes and densities at the locations surveyed by Micheli et al. 2007 to assess population recovery over ten years. Integrating research like this into undergraduate classes is a high-impact teaching practice and provides students opportunities to contribute to authentic research as well as the ability to establish needed long-term data sets on an annual basis.

Cruising for Conservation - Group Foraging of Coral Reef Fishes in the Eastern Caribbean and the Implications for Local Diversity

LINDHOLM

This project was initiated in 2000 to study how facilitative interactions among coral reef fishes contribute to local diversity, and has since spanned the globe, including two missions to the Aquarius Undersea Laboratory. The most recent iteration of the project was initiated in 2017 as part of a new program called Cruising for Conservation, in which all research operations are conducted from a Carnival Cruise line ship.

Feeding Ecology of Market Squid in the California Current

GARZA

In the California Current Ecosystem (CCE) the distribution, abundance and growth of market squid (Doryteuthis opalescens) is thought to be largely driven by El Niño Southern Oscillation cycles, however the ecological factors that drive the observed boom and bust population dynamics have yet to be fully understood. Field studies suggest that there is a positive correlation between the abundance of juvenile market squid and the coastal krill *Thysanoessa spinifera*.

Improving the Data Available for Stock Assessments and Management of West Coast Groundfish through Collaborative Fisheries Research

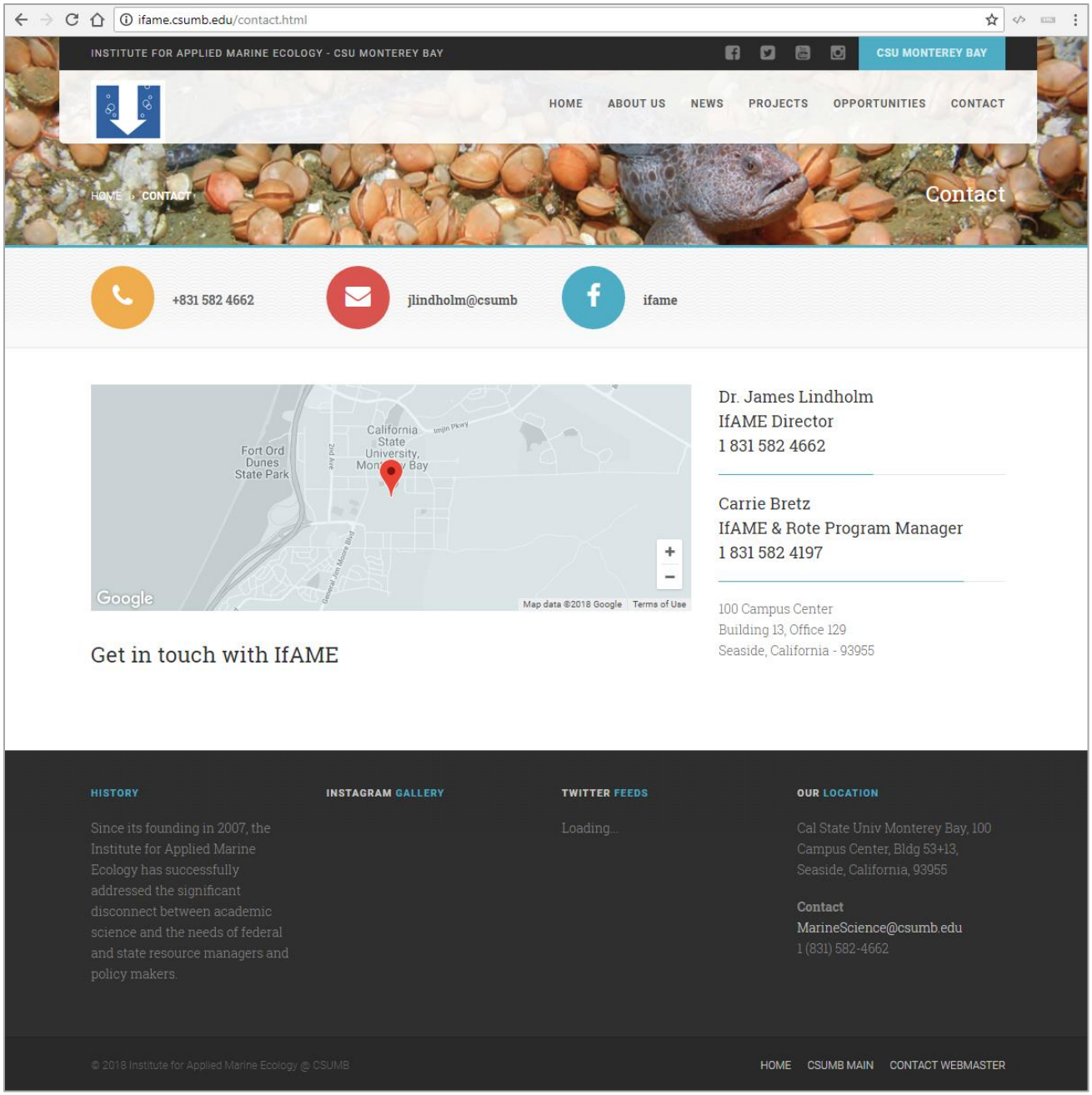
LINDHOLM

The West Coast of the US critically needs robust information on its nearshore groundfish, as the precautionary approach used in fisheries management when data are limited necessarily reduce access and concomitantly the potential social and economic benefits of California's nearshore fisheries.

‹ 1 2 3 4 5 6 7 8 9 ›

Research Labs

- Ecosystem Electronics Lab
- Marine Conservation Lab
- Environmental Physiology Lab
- Image Analysis Lab
- Marine Landscape Ecology Lab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HISTORY
Since its founding in 2007, the Institute for Applied Marine Ecology has successfully addressed the significant disconnect between academic science and the needs of federal and state resource managers and policy makers.
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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.