



STRATEGIC PLAN 2018-2023

MOSS LANDING MARINE LABORATORIES

Operated by San José State University
for the California State University

EXECUTIVE SUMMARY

Moss Landing Marine Laboratories (MLML) is a world-class institution built on the fundamental belief that an integration of teaching, research, and mentorship will build excellent students, scientists, and stewards of the marine environment. MLML occupies six different properties along Monterey Bay, on one of the richest and most diverse coastlines in North America and at the head of one of the largest submarine canyons on the West Coast. MLML empowers future marine science leaders by providing them with unparalleled access to the education, tools, environment, and community necessary to understand marine processes and their interactions with social issues. This Strategic Plan for the next five years is based on four intersecting priorities: **Education and Student Success, Research, Societal Benefits**, and **Infrastructure and Funding**. The purpose of this Plan is to position MLML to be successful in research and education and to thrive in perpetuity. Improving **education and student success** will take the form of increasing efficiency in the current M.S. program and curriculum, and increasing the number and diversity of students we serve with new nontraditional courses, new academic programs in aquaculture, and increased student funding.

Expanding MLML's **research** activities will involve a reassessment of faculty empowerment and incentives, better integration of the Research Faculty into the academic program, thoughtful recruitments of new faculty, and repositioning MLML as an Institute for Marine Science within the SJSU structure. MLML understands that the public value of a marine lab is dependent upon how well we address and inform societal needs. Improved outreach with **societal benefits** will involve enhancing our online presence, strengthening our partnerships with outside institutions, and creating an Outreach Coordinator position to develop new weekend public education courses, expand K-12 educational outreach, and increase the visibility of our annual Open House weekend event. All of these plans and their success are dependent on state-of-the-art facilities and **infrastructure**. Occupying 36.7 acres with 89,100 sq. ft. of buildings, MLML has many diverse sites, instruments, field equipment, and staff in a unique and conducive setting. Working within the SJSU research and administrative structure, we currently have plans for a new Academic Village (e.g. housing, conference center, labs) on one site that will greatly expand our educational capabilities for undergraduate and K-12 education, and provide affordable housing for undergraduate and graduate students.

MLML is considering offering a joint Ph.D. program with a nearby UC campus, possibly Santa Cruz, Davis, or Merced. We are also in discussions to develop a new jointly-operated research vessel with the UC system that will provide an outstanding platform for all forms of educational and research opportunities along the California coastline. We also have plans to greatly expand the Aquaculture Facility and obtain "Center" status as an ORTU. All of these infrastructural plans are dependent on increased and more stable **funding** and are only possible with the strong support of the SJSU administration. Thus we are in discussions with SJSU Advancement about a large fund-raising effort, and propose a reassessment of current barriers in MLML administration and finance. With proper funding, planning, and efforts, MLML has the opportunity and ability to thrive and prosper, for the next five years and beyond. The success of this Strategic Plan is contingent on the continued partnership among MLML, SJSU, and the SJSURF. We have a commitment to excellence in marine education and science, and the vision and drive to improve our value and productivity using this Plan as our guide.



INTRODUCTION

MLML was established in 1966 when the SJSU Foundation, with the assistance of 4 other CSU foundations and an National Science Foundation grant, purchased the facilities of the Beaudette Foundation for Biological Research in Moss Landing. In its 51-year existence, MLML has operated as a consortium, serving as similar to a Department of Marine Science for 7 CSU campuses—San José, Monterey Bay, San Francisco, East Bay, Stanislaus, Fresno, and Sacramento. Funding for MLML has come primarily from the CSU (in the early years) and from SJSU. The educational goal is to produce broadly trained marine scientists with strong research skills.

Access to nearby unique marine environments has supported this goal by enabling us to integrate field research into our educational program. More than 640 students have earned their M.S. in Marine Science from MLML. One quarter of our last 238 graduates have gone on to PhD programs, and 9 have earned other additional degrees (e.g. DVM, JD, MBA). These recent alumni serve across the fields of marine science: one-quarter are employed by federal, state, and regional agencies (e.g. NOAA, NASA, NIH, ONR, EPA, USGS, CDFW, ADFG, ODFW), one-sixth are employed by non-profits and NGOs (e.g. Elkhorn Slough, Monterey Bay Aquarium, Oikonos, The Marine Mammal Center), and one-eighth are employed at Universities, including 11 who hold academic positions.

To maintain its level of excellence and continue to thrive, MLML has undertaken a strategic planning process for the next 5 years (2018-2023). The process included forming a committee of faculty and staff; creating an outline; surveying the MLML community; drafting a plan; seeking feedback from the MLML community; and finally gaining approval of the plan by the MLML faculty, SJSU administration, and the MLML Governing Board. The essence of this Strategic Plan is to enhance our academic program, expand our research activity, improve our outreach, and add further structural, financial, and human resources to our institution, in order to further serve the needs of graduate and undergraduate education and research in the marine sciences throughout California.

Marine laboratories are vital, cost-effective, place-based “windows on the sea,” providing education and research capabilities to understand socially and environmentally important issues associated with our oceans.



An aerial view of MLML's 60,000 square-foot main facility in Moss Landing. The lab is situated in an ideal location to study the marine world. The Monterey Submarine Canyon, the largest such feature on the west coast of North America, begins a few hundred meters offshore. To the east of the facility is the Elkhorn Slough, the largest tract of tidal salt marsh in California outside of San Francisco Bay, and just to the west is the Old Salinas River Channel, connecting the mouth of Elkhorn Slough and the Moss Landing Harbor to the Salinas River Lagoon. To the north and south are sand dunes, sandy beaches, extensive kelp forest habitats and intertidal areas, and two large upwelling centers. The building, completed in 2000, was the first in the CSU system to receive the US Green Building Council's Gold Certification for Leadership in Energy and Environmental Design (LEED).

VISION

A thriving institution of education and research working to help advance marine science, serve society, and transform public discourse and policy towards sustainable human interaction with the world.

MISSION

Empower future and current marine science leaders by offering students and researchers unparalleled access to the education, tools, environment, and community necessary to understand marine and coastal processes—creating new understanding and solutions in a changing world.

MOTIVATION

In a time of rapid change, there is renewed urgency to understand the oceans and the coastal zone, the processes and systems that affect them, and their interactions with social issues. We strive to understand this complex world not just for the sake of knowledge but also for the mutual stewardship of human and natural communities.

VALUES

Scientific integrity, interdisciplinarity, collegiality, innovation, creativity, social responsibility, stewardship, leadership, diversity, equity, learning, teaching, and joy



The spectacular view of the Monterey Bay from the entry terrace of the main MLML facility is named “John Martin’s Point of View,” in honor of MLML’s late director and founding faculty member Dr. John Holland Martin. A memorial display written by MLML students reads, “With our deepest appreciation for your inspiration, guidance, and direction. Your vision will remain.”

ABOUT MLML

GOVERNANCE

MLML began as a consortium of several CSU campuses, but SJSU serves a prominent position as the administrative campus, employing all full-time faculty and staff and providing all administrative and research support. The Director of MLML reports to the SJSU Dean of the College of Science. A Governing Board of representatives from the CSU consortium campuses provides oversight regarding the curriculum and SJSU has oversight regarding the budget, facilities, and faculty and staff appointments.

PERSONNEL

MLML has 9 tenure-track SJSU faculty, 10 SJSU research faculty (PIs with an educational role), 12 research affiliates (PIs with a minimal educational role), ~100 students (~90% M.S. students), and about 140 administrative, operations, and research staff. In total, MLML is comprised of about 250 people (students and CSU and SJSURF employees).

DISCIPLINES

MLML has faculty and researchers studying Physical, Geological, Chemical, and Biological Oceanography, Phycology, Invertebrate Zoology, Ichthyology, Ecology of Birds and Mammals, and Molecular Ecology. MLML also has researchers studying Water Quality, Wetlands Restoration, Fisheries, Aquaculture, and Nutrient Dynamics.

CURRICULUM

MLML offers 14 undergraduate and 26 graduate courses (including graduate seminars on topical subjects), with most classes taught one day a week (lecture in the morning, lab in the afternoon) during fall and spring semesters. An emphasis is placed on integrating education with research, and providing students with professional skills (e.g. critical thinking, scientific writing, speaking, planning and executing research projects, diving, and analytical skills). The student body is composed of MLML M.S. students, graduate and undergraduate students from consortium campuses, other students from neighboring institutions and extension students (Open University). Nearly all courses offered are taught by SJSU tenure-line faculty; a small number are taught by SJSU research faculty.

FACILITIES

MLML has 6 properties, with the Main Lab as a state academic building and the 5 other properties owned by the SJSURF: 1) Main Lab (classrooms, research library, administration, faculty offices and labs, shop, and aquarium facilities); 2) Norte (research labs, offices); 3) Shorelab (Aquaculture Facility, seawater pump station); 4) Small Boats and Diving Facility (12 research vessels of 12-56 ft. and full SCUBA support); 5) Del Mar (future space for large vessel, fisheries offloading); and 6) Sandholdt (currently small amount of housing and offices; future site of Academic Village comprising housing, conference center, labs).

OUTREACH

MLML outreach includes an annual Open House weekend event (which attracts a minimum of 2,000-3,000 people and includes seminars, displays, a puppet show, food, and activities), a public seminar series, participation in local programs and festivals, semiannual newsletters, press releases, a graduate student blog, Facebook, Twitter, and Instagram feeds, a YouTube channel, and student-led public tours of the laboratories.



On the weekend of August 6-7 2016, we celebrated MLML's 50th anniversary with over 450 people as current and past faculty, staff, and students came together, talked, laughed, and reminisced. The weekend festivities included a VIP reception, a mini Open House, tours of the current labs, an outdoor party Saturday night including live music, and a Sunday brunch.

STRATEGIC PRIORITIES for 2018-2023

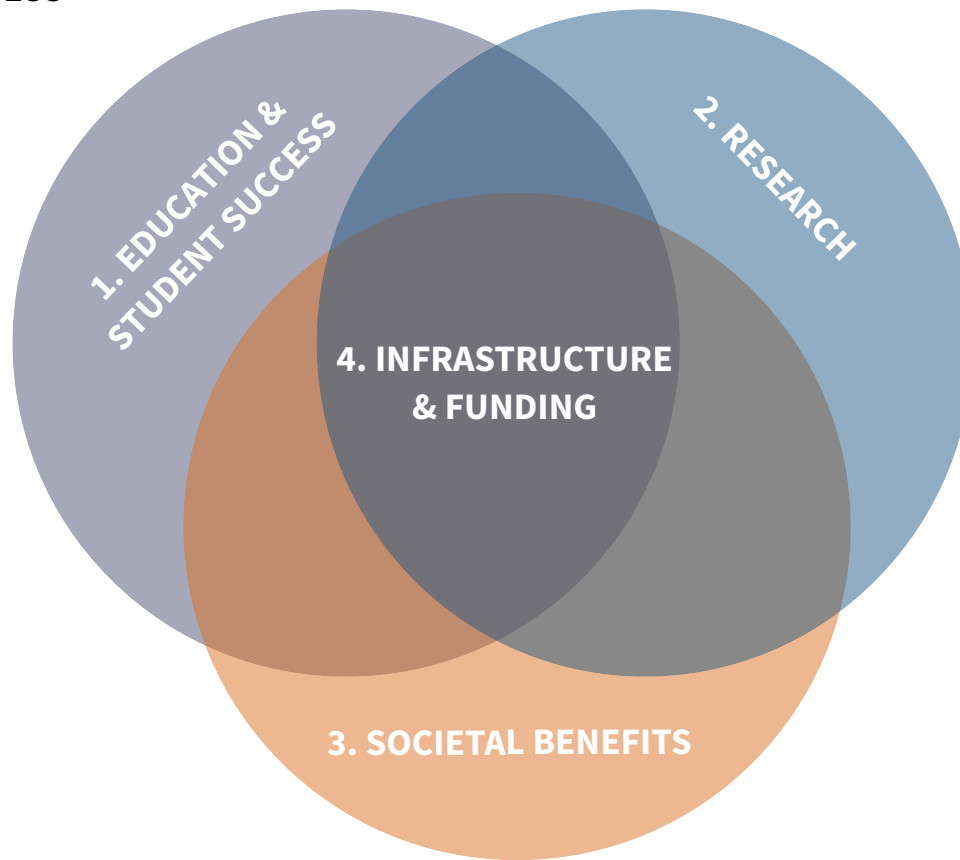
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1

EDUCATION & STUDENT SUCCESS

2

RESEARCH



3

SOCIETAL BENEFITS

4

INFRASTRUCTURE & FUNDING

OVERVIEW: where we excel

The MLML M.S. program includes both rigorous coursework and independent research. It is designed to prepare students for successful careers and leadership roles in marine science, policy, and outreach. A broad range of courses in oceanography, marine science, and research methodology are offered during fall and spring semesters. The program also requires the proposal and execution of an independent research project. The success of the MLML M.S. program depends on this integration of coursework and independent research.

The MLML M.S. degree is a 30-unit program, which includes a minimum of 3 100-level core courses (4 units each) and 15 or more units of 200-level courses (including thesis units). Students generally take 2 courses per semester for the first 2 years of the program. A broad view of marine systems is provided through the core 100-level courses, whereas the 200-level classes develop depth of knowledge within a discipline, quantitative skills, and further develop writing skills.

MLML values critical thinking and hands-on learning, which promote a high level of independence in student research and prepare students for leadership roles in their careers and in life. Students learn by applying the scientific method in the lab and in the field, and gain hands-on experience in all aspects of research: proposal and scientific paper writing, permitting processes, field and lab experiences, and mentoring. These values will guide development of the M.S. program to meet current and future challenges, including our goals for the next 5 years.

THE WAY FORWARD

Our primary educational goals for the next 5 years are

- A** Shorten the time to the M.S. degree
- B** Increase the diversity and number of students we serve
- C** Offer a joint Ph.D. degree with a UC campus

To achieve these goals, we will employ the following 5 strategies

- i** INCREASED ACCOUNTABILITY
- ii** STREAMLINED CORE COURSES
- iii** INCREASED STUDENT FUNDING
- iv** WEEKEND, SUMMER, AND ONLINE COURSES
- v** CREATION OF AN AQUACULTURE PROGRAM
- vi** CONTINUED DISCUSSIONS WITH THE UC REGARDING A JOINT Ph.D.



MLML graduate student Stephanie Schneider (L) and Professor Tom Connolly (R) onboard the MLML *R/V John Martin* during a class cruise for MS 142: Physical Oceanography.



INCREASED ACCOUNTABILITY

A full-time Graduate Program Coordinator currently tracks student progress, deadlines, and milestones while assisting with students' program development. The creation of this position has already helped reduce the time to graduation, but there are still opportunities to improve. In the next 5 years,

- Annual thesis committee meetings will be established to set a yearly milestone for students and hold advisors accountable to their fellow committee members for their students' progress.
- In their second year, graduate students will give short presentations on their potential thesis research at a lab-wide symposium, in order to support timely thesis proposal development.
- Faculty will reevaluate current guidelines for thesis proposals across labs, and revise as needed, so that the thesis proposal process is as efficient as possible.



STREAMLINED CORE COURSES

Marine science is inherently interdisciplinary. Marine systems encompass many types of organisms, as well as chemical, physical and geological processes. In the next 5 years,

- Core courses will be streamlined following a systems approach, reorganizing the core disciplinary and quantitative curriculum so that all students receive standardized instruction and avoid gaps in their mastery of marine science, and both students and faculty will be able to focus more on advanced courses.
- This streamlining of the core 100-level curriculum will also promote timely development of the thesis proposal and allow students to further integrate their research with their coursework.
- In a first step towards this streamlining, faculty share periodic feedback on topics and structure of existing core classes. This will identify existing strengths and redundancies and will guide the development of the streamlined curriculum.



INCREASED STUDENT FUNDING

The financial constraints imposed by limited funding are a consistent challenge for our students, which affects time to degree. Increasing student funding will allow them to focus more on their studies. In the next 5 years, we plan to

- Increase Graduate Assistant wages
- Establish a fellowship to support a few incoming students each year
- Provide hands-on training in proposal writing, and encourage students to apply for grants and fellowships

WEEKEND, SUMMER, AND ONLINE COURSES



Offering new courses in addition to the traditional curriculum will give more students access to marine science education and research at MLML, increasing the number and diversity of the students we serve. In the next 5 years,

- We will offer weekend courses. In past weekend courses, MLML benefitted from exposure to potential graduate students. These classes can serve as formative experiences that open new interests in marine science and attract new students.
- We will offer summer courses. At many other marine labs, summer classes successfully attract students exploring marine science as a career, and marine science students who want to experience a different environment, culture, or expertise than their home institution offers. Reaching out to a diverse population of students, including high school and undergraduate students, throughout the Bay Area, is key to increasing awareness of marine science among underserved populations.
- Summer and weekend courses would both depend on improved infrastructure for housing.
- Online courses can also increase exposure to undergraduates, at CSU campuses and beyond. Development of a preliminary online course in introductory marine science is underway.

CREATION OF AN AQUACULTURE PROGRAM



With the recent completion of MLML's Aquaculture facility (www.mlml.calstate.edu/aquaculture/), it will be possible to serve the growing interest in aquaculture education and research throughout the CSU. In the next 5 years,

- A CSU-wide certificate/degree program will develop leadership for this industry. We are planning on adding aquaculture as a M.S. degree path for MLML students.
- MLML will partner with California Sea Grant to host an Aquaculture specialist, who will help develop this program and curriculum. The search for this position is currently underway.

JOINT Ph.D. PROGRAM



During the past 10 years there have been various conversations with UC Santa Cruz about the possibility of a joint Ph.D. program in marine sciences. UCSC is interested but various specifics regarding funding and expectations created barriers. In the next 5 years, we plan to

- Meet again with UCSC representatives and SJSU administration
- Possibly meet with other nearby UC campuses (Davis and Merced)
- Develop a plan for a joint Ph.D. program

METRICS OF SUCCESS

To measure the success of these initiatives, both quantitative and qualitative data will be used.

- To measure efficiency, the Graduate Program Coordinator will continue to track individual student progress at all stages, including the draft and submission of the proposal and thesis.
- We will have current students perform program evaluations after each year of the program, using this information to modify the program as needed to ensure we are empowering students to succeed in the program, and incorporating students into our program assessment.
- We will also survey alumni to ensure that students are getting the skills and preparation that they need to be successful after graduation.
- We will track the number of students served both in the graduate program and in new courses. We expect that by making MLML more accessible to more undergraduate students, the diversity and size of our student body will increase by 20-30%.
- We will also track the number of grants and fellowships that our students receive, and expect that those numbers will also increase if our initiatives are successful.



MLML Professor Ivano Aiello (second from left) and his MS 141: Geological Oceanography class, on a field trip to Fremont Peak.

OVERVIEW: where we excel

MLML has long valued the importance of research as a transformative activity for students. Research is a necessity for a graduate program in science, involving experiential learning, problem solving, critical thinking, skill development, funding opportunities, and emergence in the community of scientists. MLML offers excellent infrastructure to make this happen: instrumentation, diving facilities, marine operations, staff support, and the expertise of a willing faculty. The research enterprise at MLML, supported by the SJSURF and infrastructure, is also enhanced by MLML's variety of researchers.

THE WAY FORWARD

Our primary goals in the next 5 years are

- A** Improve and expand our research activities
- B** Integration with SJSU activities (e.g. Science, Engineering, Social Sciences, Business)

To achieve this goal, we developed the following 4 initiatives

- i** FACULTY EMPOWERMENT & RESEARCH INCENTIVES
- ii** INTEGRATION OF RESEARCH FACULTY/FACULTY
- iii** INSTITUTE FOR MARINE SCIENCE
- iv** FACULTY RECRUITMENTS



MLML Research Faculty member Rick Starr (R) and graduate student Jimmy Williamson (L), serving as part of the science crew for the Old Bay Bridge demolition project in the San Francisco Bay in November 2015. MLML students benefit greatly from the research activities of the Research Faculty and Affiliated Researchers.



FACULTY EMPOWERMENT & RESEARCH INCENTIVES provided by the SJSU College of Science Dean's Office

Research is integrated throughout every fiber of MLML. The MLML M.S. degree requires high-quality student research, and virtually all faculty research at MLML engages students. Student involvement in research, as well as significant and successful grantsmanship, are strong expectations articulated in every faculty appointment letter, and all faculty are encouraged to develop courses around their area of research. Successful research proposals and a strong research program are also aspects of the SJSU Departmental RTP Guidelines at MLML and tenure expectations at SJSU.

Recent changes in the CSU in how research is supported and considered as valuable as teaching are welcomed; the challenge for research-active faculty is the balance of research and teaching. The use of Assigned Time to help enable more time for research is one mechanism for promoting research. For the past three years, the SJSU College of Science has provided release time to the most active tenure-line faculty, and the MLML faculty have been among the recipients. The College has also provided teaching credit (WTUs) for mentoring students enrolled in MS298 and MS299 research courses. The recent RSCA initiative of SJSU will allow flexibility in release time for all the research-intensive MLML faculty. Faculty can buyout of courses when they have grant support to do so, thus freeing funding for lecturers and Taships. Thus, in the next 5 years, we propose

- The formula that provides for summer faculty salaries and “buy-out” from the WTU process needs to be reassessed to allow faculty to raise more than 25% overload through extramural contracts and grants, which has to be addressed within the Collective Bargaining Agreement.

INTEGRATION OF RESEARCH FACULTY/FACULTY into academic program at MLML and SJSU



MLML Research Faculty and Affiliated Researchers are responsible for over half of MLML's extramural contract and grant activity, and in many cases have established themselves as leaders in their fields at the state, federal, and international levels. They also greatly contribute to research opportunities for students; students funded through these research programs have been to the Arctic, the Antarctic, and most ocean spaces in between. Research faculty also act as primary advisors to MLML student theses, with oversight from tenure-track faculty. But because their positions are not funded by the CSU, their appointment does not require academic participation, and thus they may become academically isolated from students and the teaching faculty at MLML. The uncertain “soft money” aspect of their employment can also be destabilizing to both the researchers and to MLML's academic mission. Closer integration of these research programs with the academic mission of MLML offers opportunities for greater student enrichment, increased thesis and funding opportunities, as well as enhanced academic fellowship. Toward this end, in the next 5 years we will

- Promote greater use of MLML Research Faculty and Research Affiliates as committee members and course lecturers, where appropriate
- Develop institutional support for student Research Assistantships in these programs, to benefit both the research enterprise and the academic mission
- Make any new appointments of Research Faculty and Research Affiliates with this philosophy in mind

INSTITUTE FOR MARINE SCIENCE



MLML is not a traditional department. It is listed as an “equivalent academic unit,” operationally similar to a department, is composed of 5 different faculty disciplines (i.e. geology, chemistry, physics, biology, and library science), and is located off-campus, with many functions of a traditional campus (e.g. facilities personnel, IT, library, safety officers, vehicles, and more). A reassessment of MLML's structure and designation would allow us to attain a similar position as other world-renowned marine labs (such as Scripps Institution of Oceanography and Woods Hole Oceanographic Institution), promote our stature and expansion, and increase our visibility on CSU campuses. In the next 5 years we therefore propose

- A restructuring of MLML as an Institute for Marine Science within SJSU, with the Director of MLML reporting to the future SJSU Vice President for Research and Innovation, and the RTP process for MLML faculty functioning through the SJSU College of Science



FACULTY RECRUITMENTS

Research areas of the MLML Tenure-Track Faculty span the basic disciplines in Marine Science, while interests of the Research Faculty and Affiliates complement these foci. In the next 5 years, MLML expects some turnover in both faculty and affiliates and thus needs to recruit new faculty and researchers with complementary skills. Some topic areas:

- Marine Microbiology and Microbial Ecology
- Marine Toxicology
- Biostatistics and Ecosystem Modeling
- Large Data, Integrated Ocean Observing Systems
- Remote Sensing/Satellite Imaging and Hyperspectral Analysis
- Aquaculture and Sustainable Integrated Aquaculture

The priority with which these new subject areas are filled depends upon the specific skills and interests of the candidates. The most successful candidates would have strong local interests with global perspectives. Those who would be able to utilize the resources and habitats of the Monterey Bay would be preferred and would need to be approved through the normal SJSU recruitment process.

METRICS OF SUCCESS

The ultimate measure of success in research is the number of successful proposals that are funded, the number of publications produced, and the impact in the research community. We also expect that these results contribute to the formulation of policy, development of sustainable practices, and inform societal needs. Success in our research initiatives should produce

- Changes in the RTP and AT processes to reward and incentivize faculty research and the degree to which students become active contributors to research programs; much of this is underway in the SJSU College of Science and as part of the SJSU campus RSCA support program
- Closer integration of research faculty into our academic program and involvement with students
- New faculty recruitments
- Restructuring of MLML as an Institute of Marine Science within SJSU
- Increased grant production to support student research capacity
- Increased publication quantity and quality by faculty and students
- Greater exposure to the scientific community and public



MLML's original location and facilities in Moss Landing, which were destroyed in the 1989 Loma Prieta Earthquake. Although the epicenter of the 6.9 magnitude quake was about 37 km to the north, liquifaction was enough to cause the foundation of our building to shift 1 meter towards the ocean.

3 SOCIETAL BENEFITS

OVERVIEW: where we excel

MLML faculty and researchers strive to address questions with societal relevance, and are active in both the scientific and local community—serving on advisory boards, as editors, and presenting science to a variety of groups. MLML is also part of MARINE (Monterey Area Research Institutions Network for Education), which is a collaboration between the Center for Ocean Solutions at Stanford University and 7 Monterey Bay area academic campuses that provides a forum for leadership development, education, and networking for students, helping create the marine science leaders for the future.

MLML outreach currently includes semiannual newsletters, a community lecture series (attended by 50 - 100 people), a student-led tour program, an annual Open House (which has been attended by as many 5,000 people), press releases, a Facebook page, a Twitter handle, an Instagram account, a YouTube channel, a student blog, and attendance at various local programs and festivals. The Friends of MLML organization facilitates our outreach and fundraising efforts. Even with these outreach activities we are often confused with MBARI or UCSC. We must do a better job of communicating who we are, what we do, and why we are important and relevant.

THE WAY FORWARD

Our primary goal for the next 5 years is

A Increase our Societal Impact

To achieve this goal, we developed 4 strategies

- i NEW & INCREASED PUBLIC EDUCATION
- ii ENHANCED ONLINE PRESENCE
- iii K-12 EDUCATIONAL MODULES
- iv NEW & STRENGTHENED PARTNERSHIPS



MLML graduate student Emmet Haggard (in gray T-shirt) and Invertebrate Zoology lab manager Tracy Campbell (in blue vest) encouraging young visitors' investigations of the Invertebrate Lab's Touch Tank during MLML's annual Open House event. Open House has been an MLML tradition since the very beginning, with the inaugural MLML Open House occurring in the spring of 1967, the day after MLML's official dedication ceremony. The free public event is largely student-run and its annual success is a direct result of the hard work and long hours of all student volunteers.



NEW & INCREASED PUBLIC EDUCATION

Each year, during MLML's Open House weekend, we welcome thousands of visitors to this free public event, to learn about the marine ecosystem and the research MLML is conducting. We would like to increase the amount of visitors and the amount of donations received at Open House, as well as create new public education opportunities. In the next 5 years, we will

- Increase the visibility of Open House
- Create new 1-day weekend public education courses, and offer 1 per semester
- The key to the success of both of these initiatives is the creation a new Outreach Coordinator position.



ENHANCED ONLINE PRESENCE

Social media and dynamic websites are increasingly important methods to communicate science and its relevance to the public. Although we do have a website, student blog, and a social media presence, we need to enhance our efforts to communicate our science online. In the next 5 years, we will

- Add video media on our website that is updated frequently
- Increase traditional and video blogging on our student blog
- Highlight this new content through regular social media posts
- Faculty will also consider incorporating these activities into the curriculum, as this will serve two functions, providing training in science communication for our students while also keeping our online presence current with fresh voices.
- Launch a new institutional repository and digital exhibits highlighting MLML archives and collections

K-12 EDUCATIONAL MODULES



Individual MLML researchers are often requested to speak to K-12 classes. Creating appropriate content can be time-consuming and often duplicative since faculty and students may not be aware of what has been done previously. Thus, in the next 5 years

- Faculty will work together with grad students, the SJSU Lurie College of Education, and SJSU Science Education faculty to develop 3-4 educational modules to be presented at local schools upon request.
- Potential topics include "Sounds in the Ocean," "Exploring Monterey Bay," and "Climate Change," with modifications that can be applied to fit a variety of ages
- Components of these modules would also be great additions to local festivals.
- We would publicize these modules on our website and through communication with local schools.
- Creating a new Outreach Coordinator position will be essential to this initiative.

NEW & STRENGTHENED PARTNERSHIPS



Monterey Bay is a valuable natural resource with a high density of educational and research organizations in the region. We plan to increase and strengthen our partnerships with regional research, educational, and governmental facilities and agencies. These collaborations will provide students with additional research opportunities in a diversity of research environments. In the next 5 years, we will

- Increase collaboration between researchers in the region, taking advantage of different institutes' strengths to address large-scale and global challenges too difficult for any one institute to address alone
- Strengthen our relationships with governmental agencies, to enable collaborative research addressing questions that are necessary for informed policy decisions
- Enhance our current partnership with MARINE (Monterey Area Research Institutions Network for Education) by developing more interdisciplinary, multi-institutional courses

METRICS OF SUCCESS

The success of our societal benefits initiatives will be measured using qualitative and quantitative evaluations. With the creation of an Outreach Coordinator position,

- We will improve documentation of outreach activities, in order to track if we are increasing our effort, reaching more people, and attracting more visitors and donations at Open House.
- The new Outreach Coordinator will also survey participants in our new initiatives to seek feedback on our content and activities that we can use to continually improve them.
- We will also track web and social media analytics to see what content is receiving the most attention and use this information to continually improve our online presence.
- Finally, we will track our current and new partnerships, and expect to see an increase the number of multi-institutional collaborations, courses, and grants.



MLML's main entrance on a recent Open House weekend

OVERVIEW: where we excel

Excellence in marine science education and research require not just a unique set of specialized facilities, but also that these facilities be located in unique locations, proximal to the environment where research and education are conducted. As an institution with intense geographical constraints and needs for access to the coastal and harbor environments, MLML, SJSURF, and the CSU have been strategic and proactive in securing key Moss Landing properties, vital to our mission. In an “island community” in central coastal California, high property values, intense competitive pressures, and rapid coastal development have required MLML to work creatively with landowners, agencies, funders, and the county to develop infrastructure in support of both current and future MLML needs. Thus the existing infrastructure consists of a diverse portfolio of facilities and properties, varying in size, function, level of development, and complexity (Table 1).

MLML is supported via funding primarily from SJSU (97.9%), with the remaining 2.1% coming from the other six consortium campuses. The research infrastructure is further funded via the return of a portion of the indirects charged on contracts and grants that are administered by the SJSURF. This amounts to about \$500,000 annually. MLML has not had a strong history of fundraising, and this has to change.

TABLE 1. Properties Comprising the MLML Campus

The SJSURF holds title to 5 of the properties operated by MLML, and is one of the largest landowners in Moss Landing, yet the building footprint to acreage ratio (5.6%) is low, indicating strong potential for development while still retaining greenspace.

Facility	Address	Acres	Buildings
Main Laboratory Complex	8272 Moss Landing Road	21.3	60,000 ft ²
Sandholdt Center	8222 Moss Landing Road	9.2	3,500 ft ²
Shore Lab Southern Complex	7722 Sandholdt Road	2.3	3,600 ft ²
Shore Lab Northern Complex	7544 Sandholdt Road	1.7	20,000 ft ²
Marine Operations	7539 Sandholdt Road	2.2	2,000 ft ²
Totals		36.7	89,100 ft ²

MLML/SJSURF is fortunate to have secured a firm institutional foothold on one of the richest and most diverse coastlines in North America.



An aerial view of Moss Landing from the South, showing Moss Landing State Beach, the Moss Landing harbor channel and mouth of the Elkhorn Slough, and the Old Salinas River channel.

THE MAIN LABORATORY COMPLEX is the heart of MLML operations and contains 4 classrooms, a seminar room, meeting space, laboratories, facilities support, administration, library, warehouse, aquarium, and faculty and staff offices. This is where the majority of the academic mission is performed. Earthquake reconstruction of this facility was completed in 2000 and represented a 10% increase in size over the previous laboratory complex. Thus it represents square footage only slightly larger than existed over 34 years ago.

THE SANDHOLDT CENTER, immediately adjacent to the Main Lab, was purchased by the SJSURF in order to protect expansion options for MLML and to provide critical functionality that has become increasingly important. This is now the site of student and visiting faculty housing (in two farm houses) and the Central Coast Wetland Group, a non-profit environmental group specializing in restoration and mitigation that also provides student employment and research opportunities.

THE SHORE LAB SOUTHERN COMPLEX houses the Seawater Pumping facility, the Aquaculture Building and associated grow-out facilities, and is experiencing increased pressure to accommodate additional research functions in the areas of aquaculture, biofuels, and meteorology. The Seawater Pumping facility provides life-support for aquaria, fishermen, aquaculture, and facilities throughout Moss Landing. Originally this was the site of the Sandholdt Pier, a 500-ft. pier supporting fishing and commerce dating back to the late 1800's and in use as a research pier until 2002. A replacement pier has been designed that will restore and augment scientific functionality and coastal access at all times of day and weather conditions. The project will also provide needed erosional protection for the entire site and a more reliable seawater supply.

THE SHORE LAB NORTHERN COMPLEX is home to the Marine Pollution Studies Laboratories, Environmental Biotechnology Lab, Sea Lion Research/ Training Facilities, and offices for affiliated research staff and faculty. Researchers at this site have provided many student employment and thesis opportunities and bring in as much as \$15 million/year in extramural contract and grant activity. The main building was converted in 2002 from a warehouse that used to house an engine repair business, surfboard manufacture, and an aquaculture company, to create the current office and lab spaces.



The Grand Opening ceremony of MLML's Aquaculture Facility, at MLML's Shore Lab Southern Complex, on August 22, 2014. Attendees from various scientific, business, academic, and community sectors enjoyed the event's aquaculture demonstrations and discussions. The Facility continues to attract both public and private interest, is experiencing increased pressure to accommodate additional research activities, and is expected to be revenue-generating in the future.

MARINE OPERATIONS, including the small boats and research diving program, straddles two parcels on the harbor side of the island. The Marine Operations complex is the operational headquarters and home port for the MLML research fleet, support and repair facilities. Co-located are support facilities for the research diving program, including dive lockers, tanks, compressors, and equipment. The southern portion of this complex includes an outdoor corporation yard and a wetfish offloading facility, currently rented to Del Mar Seafoods. The goal of the proposed future development at this site is to integrate the infrastructure in support of diverse port-side operations including Marine Research Operations, Scientific Diving and Sustainable Fisheries into several buildings.

THE RESEARCH FLEET provides critical access to study sites and supports both research and educational activities of faculty, staff, and students. It is comprised of the 56' *R/V John Martin*, 32' *R/V Sheila B.*, a 22' RHIB, 4 Boston Whalers, a shallow-draft slough boat, several Zodiac-style inflatables and various paddlecraft. The fleet is well sized and purposed to serve student needs for local trips under fair conditions. Since the loss of the 135' *R/V Point Sur*, however, MLML cannot adequately serve the needs of larger classes, overnight, nor remote deployments. In addition, the load handling and sea-keeping/livability of this fleet is limited. MLML is thus in the process of working with the CSU and the UC to identify an appropriate vessel to help fill the gap between these small vessels and the larger, more expensive federal ocean- or global- class vessels now used for research offshore.

GROUP II EQUIPMENT requirements for a marine lab are more intensive than for most other university departments. Not only is the normal suite of contemporary teaching equipment and facilities required, but sophisticated lab equipment and extensive field sampling and underwater or over-the-side equipment are also necessary. Specialized library resources are required to help interpret new findings. Fabrication capabilities are needed to develop innovative tools for the marine environment. Toward this end, MLML has a successful track record of grant funding for equipment through NSF MRI and FSML, ONR DURIP, Federal Surplus, and private foundation initiatives. Such awards have enabled the acquisition of the mobile Library shelving, ICPMS, Main Lab computer network, Scanning Electron Microscope, Research Flume, Laser Particle Sizer, SCUBA air and Nitrox compressor, and some machine equipment.



With the loss of the 135' *R/V Point Sur*, the 56' *R/V John H. Martin* is currently the largest vessel in MLML's Research Fleet.



THE WAY FORWARD

Our primary goals in the next 5 years are

- A** Improve & expand MLML's infrastructure
- B** Improve structural hurdles in MLML's financing

To achieve these goals, we've developed the following initiatives

- i** CONTINUED DEVELOPMENT OF MLML PROPERTIES
- ii** CONTINUED INVOLVEMENT IN COUNTY PLANNING
- iii** STAFF DEVELOPMENT
- iv** GREATER GENERATION OF INDIRECTS
- v** PHILANTHROPIC DEVELOPMENT



CONTINUED DEVELOPMENT OF MLML PROPERTIES

- **THE MAIN LABORATORY COMPLEX**

A new 25,000 sq. ft. wing of this building complex is being planned to include additional laboratories, offices, and meeting spaces.

- **THE SANDHOLDT CENTER**

A 30,000 sq. ft., mixed-use Academic Village is being planned for this site. It would provide affordable housing for grad students during the academic year, research labs, parking, and habitat restoration. It would also accommodate conferences and field courses during the summer. This is a revenue-generating project.

- **THE SHORE LAB SOUTHERN COMPLEX**

The replacement pier project is at 50% engineering and awaits funding; the Aquaculture Facility has attracted great interest from agencies and private enterprises and is expected to be revenue-generating.

- **THE SHORE LAB NORTHERN COMPLEX**

Planned for this site is the construction of another steel building with 2000 sq. ft. of warehouse space for secure staging of fieldwork, boat storage, and an additional 600 sq. ft. of offices.

- **MARINE OPERATIONS, including small boats & research diving**

The build-out would include a 2-story structure (warehouse, offices, shops, dive support, showers, storage) and offloading facilities (pumps, ice machine, and retail sales) totaling 36,000 sq. ft. of mixed-use buildings and 15,000 sq. ft. of dock/wharf area, with parking for 20-30 full-time employees.

- **THE RESEARCH FLEET**

MLML is currently in discussions with the UC to develop a jointly-operated vessel between 90-110 feet (400-500 tons) that could be safely operated by a day crew of 4, a daytime scientific complement of 30, and load handling of 20,000 lbs. This vessel would have a range of 5,000 miles and a trip duration of >2 weeks, and be flexibly configured to accommodate a full spectrum of oceanographic sampling and observing missions.

- **GROUP II EQUIPMENT**

MLML has a successful track record of grant funding for equipment including the mobile Library shelving, ICPMS, Main Lab computer network, Scanning Electron Microscope, Research Flume, Laser Particle Sizer, SCUBA air and Nitrox compressor, and some machine equipment. Although this equipment has greatly served our program and our students, one-time equipment funding cannot maintain and repair this inventory, and thus we need funding to do so.

CONTINUED INVOLVEMENT IN COUNTY PLANNING



MLML has been a key participant in the formation of the Moss Landing Community Plan by Monterey County (initiated in 2010) and, through the Resource Management Agency, the development of the EIR that includes the above projects. The goals of this planning process are to provide: 1) the planning framework that will guide policy; 2) updated zoning designations; and 3) a project-specific EIR that can be used in developing these projects. All of the above will make the permitting process for these projects easier, but they also will require approval from the CA Coastal Commission and SJSU. In the next 5 years and beyond,

- It is essential that MLML stay actively involved in this planning process to ensure the highest use potential for MLML properties.

STAFF DEVELOPMENT



MLML currently employs 16 full-time staff members, all of whom are SJSU employees, plus 6 part-time student assistants. The skill sets required of staff are increasingly becoming multidimensional and more technically focused while maintaining an ethic of community service. MLML needs staff who are specialists at their primary assignment (aquaculture, marine pollution, microbiology, etc.), and generalists with respect to all other functions and priorities of MLML. The current MLML staff accomplishes this very well and are highly valued resources for the entire MLML community. With added institutional scope and complexity, MLML will need to recruit individuals with similar traits, yet additional and complementary skills. In the next 5 years and beyond,

- The proposed infrastructure projects double the developed square footage footprint of the labs; a rough estimate for staffing would thus be a doubling in staff positions, part-time student assistants, and of custodial services (currently contracted out).



GREATER GENERATION OF INDIRECTS

From Fiscal Year 2012-13 to 2016-17, MLML generated an average of \$15.4 million in research grants and contracts while being supported by an average of \$3.5 million in State funding from SJSU. Thus, for every dollar of State support, MLML generated an average of \$4.6 dollars in extramural funding. This represents high productivity by MLML researchers, as noted by past program reviewers, but this is coupled with a lack of sufficient and stable operational funding. This contributes to fiscal instability in the MLML enterprise. Thus, in the next 5 years and beyond,

- We need to receive a greater return on the indirects generated by MLML, which will require efficiencies at SJSURF and MLML.
- Projects that generate revenue while providing needed services should be prioritized (Sandholdt Center, Marine Ops, Aquaculture Facility), but a more efficient mechanism to support contracts and grants at MLML, and an increase in the operational base budget—one that recognizes the true cost of facility support—would have an even greater and immediate impact.



PHILANTHROPIC DEVELOPMENT

Other marine labs and related enterprises also have active philanthropic programs. Endowments and planned giving funds at MLML comprise about 5% of the annual operating cost. There exists, however, great potential to develop philanthropic programs at MLML. There are many in both the Monterey Bay and Silicon Valley who are interested in the ocean and the environment and resonate with MLML's mission and values. Thus, in the next 5 years and beyond,

- A targeted program of philanthropic giving and development would help strengthen MLML's fiscal portfolio while engaging the public and influential donors.
- Toward this end, MLML is currently working with SJSU University Advancement to initiate a substantial and transformational fund-raising campaign.



MLML graduate student Sharon Hsu captured this photo while working with MLML faculty and collaborators from local institutions tagging Humpback whales in the Monterey Bay.

METRICS OF SUCCESS

This Strategic Plan is ambitious and embraces projects that have been goals for MLML for the last two decades. Completion of these projects is not the metric of success for this plan. This plan requires diligent and progressive efforts in order to realize successful outcomes. Because the funding climate for these projects and improvements is uncertain, the metrics of success should be the ability to show monotonic improvements in design, planning, institutional and agency relationships, and fundraising. Such improvements would include:

- Improvement of structural hurdles in MLML administration and finance
- Development of increased philanthropic revenue for capital projects
- Initiation of appropriate staffing of programs, such as aquaculture
- Conceptual planning for The Sandholdt Center and Academic Village development
- Reevaluation of the 50% pier design with an eye towards site protection
- Continued Design scoping and evaluation for a research vessel
- Development and submission of Proposals for equipment and facilities
- Continued participation in the Moss Landing Community Planning process
- Investigation of mechanisms such as public/private partnerships for proposed build-outs (Academic Village, Research Pier, Marine Operations Complex)
- The approval of this Strategic Plan by the MLML faculty, SJSU, and the CSU



MLML students, staff, and faculty enjoying a sunset over the Monterey Bay together on the boardwalk of MLML's main facility

CONCLUSIONS: How this Plan Serves our Mission & Values

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The success of this Strategic Plan, and the future of MLML, is ultimately and intimately tied to the partnership of MLML, SJSU, and SJSURF. We have outlined an ambitious Plan to greatly expand the footprint and impact of MLML in the world of marine science. All the players are in place but it takes dedication to a common goal to achieve it. We welcome the challenge, will strive for excellence, and look forward to the bright future this Plan articulates.

1

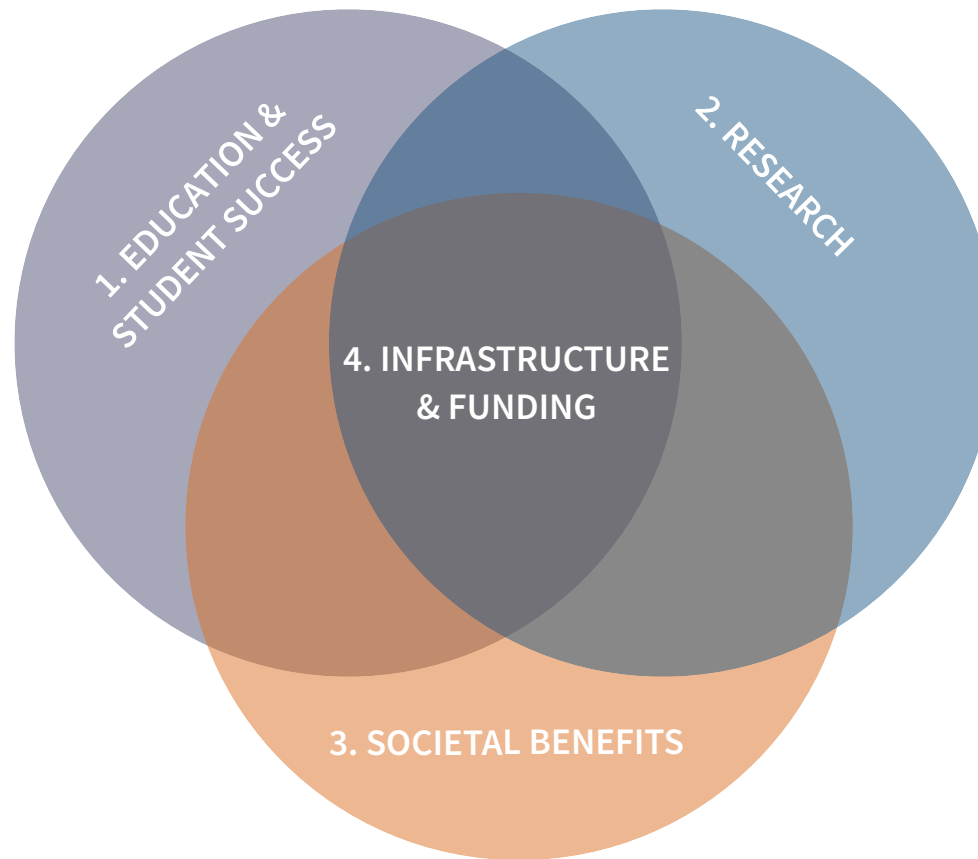
EDUCATION & STUDENT SUCCESS

The values that guide our M.S. program and curriculum—critical thinking, hands-on learning, and integrated independent research—will continue to remain strong in the future. The research-based M.S. program will gain strength by becoming more efficient, while new curriculum, programs, courses, and student funding will increase access to MLML and help attract new and diverse students to marine science.

3

SOCIETAL BENEFITS

Increased public education and outreach will enhance the science communication skills of our graduate students while engaging the public, which is essential if we are to address global environmental issues and promote sustainable stewardship. Increased collaboration with institutions throughout the Monterey Bay region will provide our students with increased research opportunities and develop the skills necessary to be successful marine science leaders. It also models the teamwork and collegiality that is essential to solve global problems.



2

RESEARCH

Empowering future marine science leaders will be accomplished only through an integrated research and academic program. Restructuring MLML as an Institute for Marine Science, faculty and researcher empowerment, and new recruitments will infuse the program with the resources to provide unparalleled access to future discoveries. Research is integral to our values of collegiality, teamwork, innovation and creativity.

4

INFRASTRUCTURE & FUNDING

Much like the community that comprises MLML, the infrastructure, properties, equipment, and facilities lie at the heart of the institution. The ability to conduct our mission comes directly from these resources, how we use them and share them with others. They constitute the physical things of our institution and an expression of our vision and values.



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