

The Oregon Institute of Marine Biology

Introduction

Oregon Institute of Marine Biology (OIMB) is the marine laboratory of University of Oregon. The largest of the eight public colleges and universities in Oregon, University of Oregon has an enrollment of approximately 16,500 students. Since its founding in 1876, it has provided undergraduate instruction and graduate training within a comprehensive research university.

OIMB reflects the mission of its parent organization by focusing on both education and research. Like most marine laboratories and field stations, OIMB recognizes its role as a national resource, and strives to provide a wide array of opportunities for visiting students and scientists. The combination of its location on the spectacular Oregon coast and its modern facilities makes OIMB an attractive place to work and study.

History

The University of Oregon has been teaching and conducting research in marine biology in the Coos Bay area since 1924. For several years, summer classes traveled to Sunset Bay, a few miles south of OIMB's current site, where they used tents as dormitories and laboratories.



Fig. 1. The OIMB campus.

In the winter of 1928-1929, a portion of the Coos Head Military Reservation was selected as the permanent site for the University's marine program. In 1931, >40 ha of the Reservation, including a collection of old Army Corps of Engineers buildings, was deeded to the University of Oregon. These buildings became the first permanent classrooms, laboratories and dormitories. In 1937, the Oregon State System of Higher Education shifted stewardship of OIMB to Oregon State University (then Oregon State College) until the Second World War, when the site was reclaimed by the federal government. After the war, OIMB was returned, first to Oregon State College, then in 1955 to the University of Oregon. Until the mid-1960s, like many ma-

rine laboratories along the coast, the facility served as a summer field station. In 1966, the University began a 2-year program of extensive building repairs and began using the marine station as a permanent, year-round research facility. A few years later, year-round educational programs were added to the existing summer teaching program. These teaching programs, as well as the research mission, continue to the present.

In 1985, OIMB underwent major renovations. By 1986, the newly constructed buildings provided expanded research facilities, teaching laboratories, dormitories, dining hall, and cottages for visiting faculty and investigators (Fig. 1). Renovations have modernized some of the older buildings that now serve as the administra-



Fig. 2. The OIMB auditorium at Coos Head.

tion building, library, and service buildings. Between 1990 and 1993, four new faculty positions were added, bringing the resident faculty to six. Their research programs, combined with those of courtesy faculty and visiting scientists, provide an exciting scientific atmosphere for research and education.

Location

OIMB is located in the fishing village of Charleston, situated on Coos Head (Fig. 2), a rocky headland at the entrance to Coos Bay. Charleston, an unincorporated village, lies south of the cities of Coos Bay and North Bend whose combined populations total approximately 25,000. The marine lab is approximately 190 km southwest of the University of Oregon's main campus in Eugene.

OIMB offers access to an unusual range of habitat diversity. All along the Oregon coast, the American Plate is overriding the Juan de Fuca Plate. The resulting coastline is steep, with rugged sea cliffs and headlands leading sharply up to the Coastal Ranges. In comparison to the passive margin of the east coast of the United States, estuaries and sand beaches are rare along the active margin of the West Coast.

The laboratory's site, however, provides access to a wide variety of coastal and upland habitats. To the south, a typical West Coast system of rocky headlands, rocky intertidal zones, and a few protected sandy coves are contained within State Parks (Fig. 3). To the north, the Oregon Dunes System of high-energy sandy beaches, shifting coastal dunes, and permanent and temporary lakes extends for 65 km and is protected as the Oregon National Dunes Recreation Area. Coos Bay itself, like most West Coast estuaries, is a drowned river mouth resulting from sea level rise following the end of the last ice age. It is the largest estuary entirely within Oregon, and contains an extensive network of tidal channels, sand bars, mudflats, eelgrass beds, and salt marshes (Fig. 4).

South Slough National Estuarine Research Reserve (SSNERR) was established near OIMB in 1974 as a 2000-ha natural area that is dedicated to scientific research, long-term monitoring, and public education about estuaries and coastal watershed habitats. Faculty members and students from OIMB were instrumental in the nomination and designation of SSNERR as the founding member of the national system of Reserves, and the SSNERR serves as an important focal point for collaboration between academic researchers, graduate students, and agency resource managers.

Offshore, a narrow continental shelf provides easy access to coastal waters that are characterized by a strong upwelling system with its associated nutrient-rich waters. The surrounding coastal forests include a 32-ha reserve within OIMB and a 2000-ha reserve within the SSNERR. The coniferous forest is dominated by Douglas-fir, Sitka spruce, western redcedar, and western hemlock, with a shrubby understory of salal and various huckleberry species. Red alder is common in the riparian zone. Very little old growth remains in Coos County, but the OIMB reserve has not been cut in 70 years, making it one of the oldest stands in the county.

The climate is mild, with summer

temperatures rarely exceeding 80°F, and winter highs generally in the 40s and 50s. The prevailing winter winds are from the south and southwest, bringing warm, moist air to the region. Winter storms bring dramatic high winds and heavy rains. The summer is generally dry and cool, characterized by northwesterly winds and coastal upwelling. Coastal fog is common.

Education

OIMB offers one of the nation's leading undergraduate and graduate teaching programs in marine biology. Formal courses in the fall, spring, and summer terms are geared toward upperclass and graduate majors in biology, general science, and environmental studies. During the spring and fall teaching terms, up to 45 undergraduates are in residence at OIMB. Approximately 100 students are served in our summer term. During spring and fall terms, students at OIMB must be registered at the University of Oregon, although the status of guest or exchange student can be arranged. Summer term students attend OIMB from colleges and universities around the country. The winter term provides a period of relatively uninterrupted research for both faculty and graduate students. Graduate students are in residence during all four terms of the academic year, pur-



Fig. 3. Middle Cove of Cape Arago, Cape Arago State Park.



Fig. 4. The Metcalf Marsh, South Slough National Estuarine Research Reserve.

suings research leading to either the M.S. or the Ph.D. degree.

This spring, OIMB course offerings will include Invertebrate Zoology, Biological Oceanography, Animal Behavior, and Watersheds, Streams and Fish. During the term, a one-week camping trip to Monterey Bay will provide an opportunity to explore habitats and compare the coasts of Oregon and California. The summer term will feature 8 week courses in Invertebrate Zoology, Biology of Fishes, Marine Birds and Mammals and Marine Ecology, and several short courses and weekend workshops including Biological Illustration, Biological Invasions, and Invertebrate Larval Ecology. At the end of the summer term, we will offer a special course on the use of molecular probes in marine ecology, taught by Dr. Chuck Wimpee (University of Wisconsin–Milwaukee).

For more information about the teaching programs, including a description of courses offered and graduate programs, see the Web page (<http://darkwing.uoregon.edu/~oimb>) or contact the Educational Coordinator, Dr. Janet Hodder, at OIMB, PO Box 5389 Charleston, OR 97420 (jhodder@oimb.uoregon.edu).

Resident research

Research programs at OIMB are led by resident faculty, all of whom maintain active, nationally recognized research programs on marine organisms and marine environments. Some of these research programs are focused on the local environments; others are concerned with more general questions that are not site specific.

Richard Emlet studies the functional morphology, biomechanics, ecology, and evolution of invertebrate organisms, especially larvae. He is interested in how developmental and evolutionary processes interact to produce morphological and life history patterns among marine organisms. Current research is focused on two areas: (1) the evolution of sea urchin development, and (2) the influence of larval nutritional history on early juvenile performance and its implications for both life history and population biology.

Alan Shanks is interested in the interaction of the behavior of marine organisms with the physics of the ocean, and how these interactions affect the distribution, survival, and movement of the organisms. Currently his research is focused on the following areas: (1) the near-shore cross-shelf dispersal of larval invertebrates, (2) predation of meroplankton, (3) the timing of spawning in intertidal organisms in relation to coastal oceanography, (4) tidally driven transport of larvae into and within es-

tuaries, and (5) the development of an identification guide to the local meroplankton.

Lynda Shapiro studies the biology of pelagic marine phytoplankton. Currently, her research is focused on three general areas: (1) the distribution and abundance of specific phytoplankton taxa in the Coos Bay area, and on the utilization of these taxa in local food webs, (2) the distribution and abundance of toxic phytoplankton species along the Oregon coast, and (3) the relationship between marine phytoplankton and their associated bacteria. In collaboration with Dr. Kenneth Neilson (University of Wisconsin–Milwaukee) she is analyzing the populations of bacteria surrounding phytoplankton to determine whether there are replicable assemblages of bacteria that live in close association with phytoplankton.

Nora Terwilliger studies respiratory proteins and their role in oxygen transport in marine invertebrates. She is interested in the relationship between the structure, respiratory properties, and physiological functions of these hemoglobins, hemocyanins and hemerhthirins. Current research includes: (1) how expression of these oxygen transport proteins during development is influenced by internal physiological factors including hormones and external environmental factors such as temperature, food, and salinity, and (2) the molecular phylogeny of crustacean hemocyanin and several related members of the



Fig. 5. An OIMB research laboratory.



Fig. 6. The guest cottages at OIMB.

hemocyanin gene family.

Janet Hodder, OIMB's Educational Coordinator, who works primarily with undergraduate research students, studies breeding behavior of marine birds and mammals, and the ecological consequences of introduced species.

Steven Rumrill, Research Coordinator of SSNERR and adjunct faculty member, serves on the advisory committees of many of our graduate students, and interacts with research programs at OIMB where the South Slough National Estuarine Research Reserve maintains its research laboratory. His current research interests are: (1) factors affecting successful invertebrate larval recruitment in the Coos Estuary, (2) estuarine and riparian habitat restoration, and (3) ecological impacts of shoreline development on natural communities. He and his research group have recently completed a descriptive profile of the flora and fauna of the SSNERR.

OIMB serves as repository for data relating to the Coos Bay estuary system and surrounding coastal region. The OIMB library houses baseline data used to establish the South Slough as the first National Estuarine Research Reserve, student research reports dating back to 1967, and biological inventories of local areas. Ongoing ecological monitoring studies include a 30-year record of seawater temperature and salinity, and a 3-year record of phytoplankton abundances. The salinity and temperature records are forwarded to the

Scripps Institute of Oceanography, where they are incorporated into the "Shore Stations Data Base" which covers the West Coast of the United States. OIMB is the only collection point in Oregon for this data base. Additional permanent monitoring stations have been established in the SSNERR to assess short-term variability and long-term changes in estuarine water quality, local weather conditions, stream flows, sediment inputs, and biotic parameters.

Facilities

Physical facilities at OIMB consist of 23 buildings on 40 ha of land. Within the research buildings, several research stations are designed specifically for visiting investigators. There are two constant-temperature rooms, a molecular biology laboratory, a darkroom, and microscope rooms. A running seawater system, with holding facilities for marine organisms, extends into all research buildings and teaching laboratories. Laboratories are well equipped with centrifuges, ultracold freezers, spectrophotometers, fluorometers, and general use equipment (Fig 5). Additional specialized laboratory equipment is housed in the research laboratories of the resident faculty, and is available to visitors by special arrangement with specific faculty members, especially where mutual research interests suggest collaborations.

Five teaching laboratories, three dormitories, a dining hall, and recreational facilities serve graduate and

undergraduate students. Four of the teaching laboratories have running seawater and two can be connected to the Internet.

OIMB's internal computer network is serviced by a NT server that can support both Windows 95 and Mac environments, and work stations supporting both formats are available to visitors. The network is linked by a T1 line to the University of Oregon and the Internet. Visitors may also Telnet to their home institutions.

In further support of research, OIMB offers a shop, dock, a fleet of smaller boats suitable for work in Coos Bay and the immediate coastal ocean, storage facilities, and five cottages (Fig. 6) for visiting faculty and guest investigators.

The OIMB Library collection consists of over 2,500 monographs and 60 current periodical subscriptions in the subject areas of oceanography, marine ecology, estuarine studies, larval biology, physiology, invertebrate biology, phycology, and marine vertebrate biology and ecology. Library holdings are listed in the University of Oregon online catalog which can be searched via Telnet (janus.uoregon.edu) or the World Wide Web (<http://janus.uoregon.edu/screens/opacmenu.html>). Uncataloged materials include a unique set of student reports on biological and ecological issues of concern in the Coos Bay/Charleston area, as well as a map and slide collection used in the teaching program. Prompt interlibrary loan service supplements the core library collection.

Visiting research

Visiting scientists come to OIMB to take advantage of the wide range of habitats and their associated faunal and floral diversity, and to utilize the laboratory's modern facilities. Recent visitors have themselves been a diverse community, coming here to study topics including mapping surface currents in the nearshore ocean, introduced species, population ecology of *Strongylocentrotus* (sea urchin) species, *Pseudo-nitzschia* (diatom) species associated with amnesic shellfish poisoning, physiology of lo-

comotion in the Dungeness crab *Cancer magister*, ecology of intertidal ophiuroids, fossil echinoids, fossil plants, **structure of the ear of mysticete whales**, ecology of high-energy sandy beaches, marsh stratigraphy and large-scale earthquake events, effect of oyster culture on sea grass productivity, and techniques for examining cell cycle in cnidarian tissue culture. Each of these visiting researchers has enriched the scientific environment of OIMB and contributed to the ongoing educational programs.

Laboratory space is available to visiting investigators for a nominal fee. For more information about visiting OIMB, contact the Director, Dr. Lynda Shapiro, at OIMB, PO Box 5389 Charleston, OR 97420 (lshapiro@oimb.uoregon.edu). **Or**, see the OIMB web page (<http://darkwing.uoregon.edu/~oimb>).

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