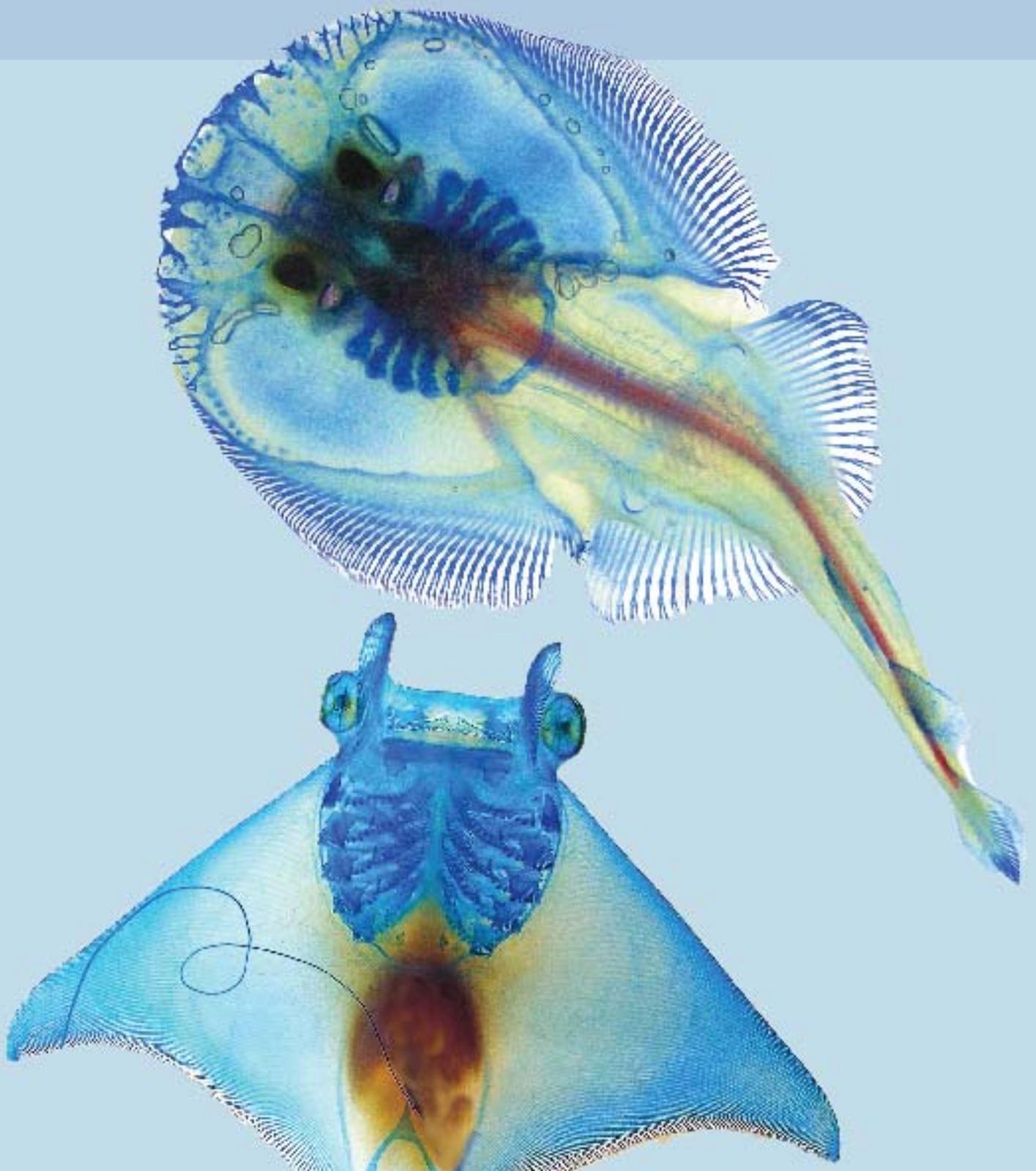


University of Washington **2011**

Friday Harbor Laboratories

Opportunities for Research and Education



Friday Harbor Laboratories

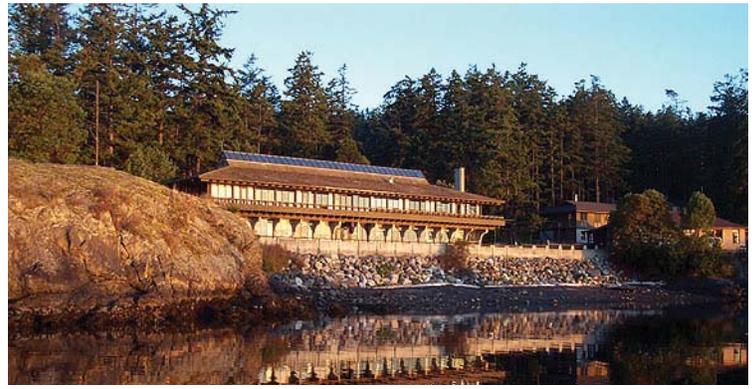
The Friday Harbor Laboratories (FHL) are well-situated for research on marine biology and oceanography. The waters around San Juan Island are relatively free from pollution and although the salinity is often like that of the open ocean, there are a few estuarine locations of low salinity. There are swift tideways as well as quiet bays and lagoons. A tidal range of about three meters exposes diverse intertidal areas of rock, sand, and mud. The flora and fauna are exceptionally rich. Representatives of nearly all major groups of marine algae and invertebrates can be collected at the shore and depths down to 300 meters can be explored by dredging and other collecting techniques. Organisms important for research in physiology, development, and ecology are available.

The islands of the San Juan Archipelago are generally rocky, forested and rimmed by precipitous shores. The islands were strongly glaciated and have valleys with lakes, swamps and bogs. The varied terrestrial and freshwater habitats offer diverse flora and fauna for classes and researchers.

The 484-acre tract of land on which the Laboratories are sited, and the marine waters of the region in general, are biological preserves. The Laboratories also manage biological preserves at False Bay and Argyle Lagoon on San Juan Island, at Point George and Cedar Rock on Shaw Island, and other areas. These preserves provide a wide range of protected terrestrial and marine environments for short-term and long-term research projects.

Research at FHL is conducted throughout the year. It is a principal function of the Friday Harbor Laboratories to provide facilities for visiting investigators from national and international institutions. FHL also has a permanent resident research program. Laboratory space and housing for investigators and visiting classes are available year-round. Investigators and students are encouraged to use the facilities outside the busy instructional period in summer. Accommodations are also available for college-level educational groups, for field trips, meetings and symposia. Individuals who wish to apply for research space and housing should do so online at http://depts.washington.edu/fhl/res_index.html. This Web site also includes a list of researchers at Friday Harbor Laboratories for previous years and their publications.

FHL endorses San Juan County's Marine Stewardship Area. FHL visitors are asked to assist in protecting fish and invertebrates through rigorous efforts to minimize harvest. At the end of a visit, FHL visitors are asked to return organisms to their original site or to pass them on to other scientists or students.



The Friday Harbor Laboratories are located on San Juan Island in Washington state, part of an archipelago that lies near the Canada-USA border. The town of Friday Harbor may be reached by scheduled airline service from Seattle, and by Washington State Ferries from Anacortes about 75 miles north of Seattle.

Courses and Research Apprenticeships

FHL offers educational opportunities for students in spring, summer and autumn. Students earn credits through the University of Washington (UW) but do not need be currently enrolled at UW to attend. Courses and apprenticeships are taught by faculty of the University of Washington as well as other universities and research institutions.

Research Apprenticeships are intense, full-time research training experiences offered to qualified undergraduates and post-baccalaureates in spring and autumn (10-11 weeks). Small groups (6-12 students) work on a focused research study guided by faculty and graduate student mentors.

The instructional program in summer is intended primarily for graduate students with the exception of Marine Invertebrate Zoology. Well-qualified undergraduates may be admitted to graduate-level courses with the consent of the director and the faculty of the courses. Summer courses (5 weeks) may be taken sequentially, but not concurrently.

Additional information and FHL's online application form can be found at http://depts.washington.edu/fhl/stu_index.html.

<http://depts.washington.edu/fhl>
(206) 543-1484 or (360) 378-2165

Scientific Facilities

Laboratories and Equipment The teaching and research laboratories consist of twelve buildings with running sea water. Walk-in cold rooms, microtechnique room, flume and shop are available. Analytical equipment for general use includes centrifuges, computers, scintillation counter, an HPLC, a LC-Mass spectrometer, PCR thermocyclers and other equipment for molecular biology, spectrophotometers, culture chambers, fluorescence microscope, video equipment, scanning laser confocal microscopes and electrophysiological equipment. A scanning electron microscope and transmission electron microscope may be used by investigators who have or can obtain appropriate training.

Stockroom The FHL stockroom provides reagents, labware, photographic materials, and small items of equipment at cost to students and investigators. Persons needing unusual materials, large quantities, radioisotopes or special equipment should make arrangements in advance.

Marine Equipment A 58-foot steel research vessel, the R/V Centennial, equipped for dredging, trawling, net hauling, and water sampling is available for classwork and research. The services of an R.O.V. submersible capable of working to 1,000 foot depths are also available. Rowboats and outboard powered boats can also be used.

Facilities for Scuba Diving Divers certified by the University of Washington (AAUS) may use

FHL's four boats and a limited number of tanks and weights for specific projects approved by the Diving Officer (DO). Study site information as well as check-out dives are provided by the Diving Officer.

Library The Friday Harbor Laboratories library provides a core collection of books, journals and electronic resources with a focus on the marine sciences. Areas of emphasis include developmental biology, cellular biology, oceanography, fish biology and marine ecology. Access is available to the UW libraries catalog, journal indexes, electronic references, news sources and journals.

Synoptic Collection A collection of preserved marine animals and plants is available as an aid to identification and location. In addition, files of collecting and study-site surveys and color transparencies of local marine life and habitats are maintained for reference.

Importation of Species Most imports of marine species into Washington State for research are illegal without a permit from the Washington State Department of Fish and Wildlife. Permits, when granted, will require strict quarantine of non-native organisms with no contact with the FHL seawater system.

Vertebrate Research Persons intending to work with fish at Friday Harbor Laboratories, including field collecting must have University of Washington Animal Care Committee approval before holding fish in laboratory aquaria for experimental purposes.

The Whiteley Center

The Helen Riaboff Whiteley Center provides a retreat for established scholars and artists to study, write, create and interact with collaborators in a peaceful and stimulating environment. Scholars of any discipline may work at the Center for stays of several days to three months, undisturbed by the conflicting demands of their academic and artistic careers.



Whiteley Study Center (A. Whiteley)

The Center building provides four study rooms, a meeting room, access to the internet and AV equipment. Seven cottages located adjacent to the Study Center provide housing for scholars. Arthur and Helen Whiteley established this Center as a place of collegial interaction, a tribute to the faculty of the UW, and a gift to scholars of all nations. **For additional information visit <http://depts.washington.edu/fhl/Whiteley>.**

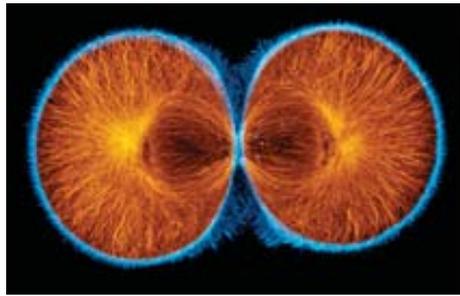
Scholarship and fellowship support is available to qualified students in need. This funding derives from generous donations from FHL alumni and friends of the Laboratories. Financial aid is awarded on the basis of need and merit; admission decisions are not influenced by financial aid requirements. Support is available to both undergraduate and graduate students. For additional information regarding scholarships and fellowships please visit <http://depts.washington.edu/fhl/studentFellowships.html>.

FHL will support a post-doctoral scientist for a two-year appointment to establish an active research program and assist the Director and Resident Associate Director in facilitating the efforts of visiting scientists and students. Applications are welcome from scientists with qualifications in any area of marine research readily supportable by FHL. For additional information regarding post-doctoral fellowships, please visit <http://depts.washington.edu/fhl/resPdocFellowInfo.html>.

Mellon Faculty Support

Mellon Foundation support is available for qualified visiting faculty and researchers who bring cultural or ethnic diversity to FHL. It is intended for independent researchers and faculty who serve as research mentors at any time of the year. Interested persons should contact the FHL director at sebens@u.washington.edu.

The Center for Cell Dynamics



Green urchin zygote completing first cleavage, stained for microtubules (orange) and actin (blue) (G. von Dassow)

The Center for Cell Dynamics (CCD) conducts innovative research that combines experimental cell and developmental biology with computer modeling. Founded with a NIH-NIGMS Center of Excellence award promoting the emerging field of computational biology, the Center is led by Dr. Garrett Odell. The Center's mandate is to cross-train scientists in bench biology and mathematics/computational modeling techniques while working on complex problems that require both approaches. Research focuses on understanding the mechanisms of morphogenesis, cell division, cell polarization and contractility, and the function and evolution of regulatory gene networks. For additional information on opportunities for collaborative student, post-doctoral and visiting faculty research, please visit the CCD Web site at www.celldynamics.org.

The Anne Hof Blinks Research Fellowship Program

The Blinks Fellowship Program offers hands-on, full-immersion summer research internships to 6-8 motivated seniors, post-baccalaureates and graduate students. The program seeks students of diverse cultural backgrounds and interests. By linking fellows with marine scientists, fellows learn both the process and the substance of scientific research. The experience exposes fellows to life and work in a marine science research laboratory. For additional information and project options, please visit <http://depts.washington.edu/fhl/REU.html>. This program is funded by the Anne Hof Blinks Fellowship and generous support of the Andrew W. Mellon Foundation, ASCB and FASEB and other sources.



Blinks student researcher (K. Ballard)

Dr. Kenneth P. Sebens, Director

"At the UW Friday Harbor Labs, we are dedicated to providing excellent facilities for research and education, in a region with high biodiversity and unique habitats. We serve a broad user group including researchers and students from many institutions, and from many countries. I hope you can join us at FHL this year."



Personnel

Administration & Support Staff

Director: Dr. Kenneth P. Sebens
Resident Associate Director: Dr. Adam Summers
Administrator: Scott Schwinge
Fiscal Specialist: Aimee Urata
Student Coordinator: Stacy Markman
Facilities Coordinator: Vikky Daucianus
Whiteley Coordinator: Kathy Cowell
Marine Supervisor: Dr. David Duggins
Diving & Boating Safety Officer: Pema Kitaeff
Sr. Computer Specialist & R/V Skipper: Dr. Craig Staude
Director of Development: Rachel Anderson
K-12 Education: Jenny Roberts & Margo Thorp

Center for Cell Dynamics

Director: Dr. Garrett Odell
Associate Director: Dr. Victoria Foe



The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran in accordance with University policy and applicable federal and state statutes and regulations. The University of Washington is committed to providing access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation in the application process, contact Friday Harbor Laboratories at fhlfac@u.washington.edu.



620 University Road
Friday Harbor, Washington 98250

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Seattle, Washington

Address Correction Requested



Friday Harbor Laboratories (K. Ballard)
Front cover photo: cleared & stained embryos (A. Summers)

Courses - 2011

UW Friday Harbor Labs

SPRING QUARTER

March 28-June 3, 2011 (Application Deadline: January 10)

THE ZOO-BOT QUARTER

Three integrated courses:

This trio of courses surveys the marine invertebrates and plants represented in the San Juan Archipelago: natural history, adaptations, evolution and taxonomy.

Marine Zoology (Biol 430 – UG, 5 credits)

Dr. Megan Dethier

Marine Botany (Biol 445 – UG, 5 credits)

Dr. Charles O'Kelly

**Research Apprenticeship:
Intertidal Ecology & Physiology**

(Biol/Ocean/Fish 479 – UG, 6 credits)

Dr. Megan Dethier & Dr. Adam Summers

BEAM REACH PROGRAM

March 28–June 3 or Aug 22-Oct 28 (Ocean 360 + Ocean 365)

SUMMER SESSION A

June 20-July 22, 2011 (Application Deadline: February 1)

Marine Invertebrate Zoology (Biol 432-UG, 9 credits)

Dr. Gustav Paulay & Dr. Jonathan Geller

This course takes advantage of the rich marine biota of the Friday Harbor region to teach experientially about marine invertebrate biodiversity, form, function and evolution.

Comparative Invertebrate Embryology

(Biol 536-G, 9 credits)

Dr. Richard Strathmann & Dr. Christopher Lowe

Diversity in development from fertilization through metamorphosis: with live material from >10 phyla for developmental, evolutionary and marine biologists.

Marine Bioacoustics (Fish 507-G, 9 credits)

Dr. Charles H. Greene, Dr. John Horne & Louise McGarry

This course trains advanced undergraduates, graduate students and post-doctoral investigators in the fundamental principles and methods of marine bioacoustics research.

Ocean Acidification (Biol 533-G, 9 credits)

Dr. Terrie Klinger, Dr. Michael O'Donnell & Dr. Andrew Dickson

Essential topics and methods in geochemistry for biologists and others, de-mystifying this essential piece of ocean acidification research.

SUMMER SESSION B

July 25-August 26, 2011 (Applications Deadline: February 1)

Evolution & Development of the Metazoans

(Biol 533-G, 9 credits) Dr. Billie J. Swalla & Dr. Kenneth M. Halanych

Reviews current hypotheses of metazoan phylogenies, using datasets from current databases.

Marine Birds & Mammals (Biol 4xx-UG, 9 cr)

Breck Tyler and Dr. Eric Anderson

The biology of marine mammals and birds - an immersive introduction to the ecology, behavior and physiology of these animals in their natural environment.

Fish Swimming (Fish 565-G, 9 credits)

Dr. Paolo Domenici & Dr. John F. Steffensen

A multidisciplinary course that encompasses biomechanics, physiology, ecology and behavior.

Marine Algae (Biol 539-G, 9 credits)

Dr. Charles O'Kelly & Dr. Paul Gabrielson

A field and lab course focused on algal biodiversity employing classical and molecular methods to characterize and identify local algae.

BLINKS-NSF REU RESEARCH FELLOWSHIP

Summer: June – August (8-12 weeks) Application Deadline: February 1

Targeting undergraduates and post-baccalaureates for hands-on research internships; includes financial support.

SCIENTIFIC DIVING (Sept. 6-18 non-credit short course) *In addition to*

AAUS certification this course prepares students who are already certified divers to use SCUBA as tool toward subtidal research.

AUTUMN QUARTER

September 28-December 9, 2011 (Application Deadline: July 1)

MARINE BIOLOGY QUARTER

3 of the following 6 courses, 13-16 total credits

Marine Biology (Biol 250, Ocean 250 or Fish 250-UG, 5 cr)

Dr. Emily Carrington

An introduction to the diversity of organisms inhabiting the marine environment.

Ocean Circulation (Ocean 210-UG, 3 credits)

Dr. Michael O'Donnell

Explore the processes that control the large-scale surface and deep water circulation of the ocean.

Social Change & the Marine Environment

(Envir 450 or Soc 401-UG, 5 credits) Dr. Susan Thistle

Examines key problems facing the marine environment, focusing on social groups shaping the problems and their solutions.

Farming, Fish & Local Food (5 credits)

Dr. Susan Thistle *Sustainable agriculture and aquaculture*

Ichthyology (Biol/Fish 311, 5 credits) Dr. Adam Summers

An overview of the wonderful world of fishes.

Research Apprenticeship:

Marine Environment Research

(Biol & Fish or Ocean 479 or Envir 499 –UG, 6 credits)

Dr. Susan Thistle, Staff

This apprenticeship guides students in original research from a natural or social science perspective.

Other Research Apprenticeships:

Pelagic Ecosystem Function in the San Juan Archipelago (Ocean 492-UG, 15 credits)

Dr. Jan Newton & Breck Tyler

This apprenticeship investigates the San Juan Archipelago's pelagic ecosystem from top to bottom.

Spatial Ecology of the Salish Sea Benthos

(Biol 479-UG, 15 credits)

Dr. H. Gary Greene & Dr. Kenneth Sebens

Using acoustical seafloor images, SCUBA and remote sampling, the relationship between the benthic organisms substrate, and habitat types will be quantified.

For full description of classes visit our website:
<http://depts.washington.edu/fhl/>

UW RESEARCHERS AT FHL – 2010

Robert Andersen, UW-FHL

Algal systematics to assemble the heterokont tree of life

Kevin Britton-Simmons, UW-FHL

Marine community ecology, kelp ecology

Emily Carrington, UW-Biology

Physiological ecology and biomechanics

Megan N. Dethier, UW-Biology

Shoreline ecology and monitoring change

David O. Duggins, UW-FHL

Distribution & utilization of macrophyte detritus

Victoria Foe, UW-Biology

Cytokinesis in echinoderm cells

H. Gary Greene, UW-FHL

Geology and habitat characterization of Salish Sea

Danny Grunbaum, UW-Oceanography

Larval biology, biomechanics and behavior

Thomas Kleinteich, UW-FHL

Evolution of feeding system in amphibians

Terrie Klinger, UW-School of Marine Affairs

Nearshore ecology, marine conservation biology

Robin Kodner, UW-Oceanography

Metagenomics of phytoplankton populations

Claudia E. Mills, UW-Biology

Biology of medusae, ctenophores, & siphonophore

M. Patricia Morse, UW-FHL

Molluscan meiofauna of San Juan area

James W. Murray, UW-Oceanography

Investigations of ocean acidification in the NE Pacific

Jan A. Newton, UW-Applied Physics, Oceanography

Coastal oceanography, climate and human impacts

Michael O'Donnell, UW-FHL

Biomechanics of intertidal communities

Charles O'Kelly, UW-FHL

Research on smaller green algae and amoebae

Garrett Odell, UW-Biology

Cell dynamics and computational biology

Shigeko Ooishi, UW-FHL

Taxonomy of copepods associated with ascidians

Kenneth Sebens, UW-Biology, SAFS

Community ecology of the subtidal zone

Craig Staudé, UW-FHL

Biology of gammaridean amphipods and leptostracans

Richard Strathmann, UW-Biology

Evolution and ecology of embryos and larvae

Adam Summers, UW-Biology, SAFS

Functional morphology and ecology of fishes

Billie Swalla, UW-Biology

Evolution & development of chordates and immune systems

Pedro Verdugo, UW-Bioengineering

Polymer physics of marine biopolymers

Sandy Wyllie-Echeverria, UW-Forestry

Ecology and restoration of eelgrass

Tina Wyllie-Echeverria, UW-FHL

Investigations of fish and their habitats

VISITING RESEARCHERS - 2010

Chris Amemiya, Virginia Mason Research Center & UW

Functional genome of a basal vertebrate

Andres Barria, University of Washington

The role of NR2 subunits on synaptogenesis

Russel Barsh, Kwiacht

Persistent pollutants in aquatic ecosystems

Jack Bell, Los Medanos College & UW

Analytical chemistry of marine environments

Beth Brainerd, Brown University- Investigations

of functional morphology & ecology of marine fishes

Eliot A. Brenowitz, University of Washington

Seasonal patterns of song behavior in songbirds

Lyle L. Britt, Alaska Fisheries Science Center, NOAA

Ontogeny of feeding and vision in fish

C. Titus Brown, Michigan State University

Means & modes of chordate/vertebrate evolution

Jennifer Burnaford, CA State University, Fullerton

Species interactions in the intertidal zone

Shaun D. Cain, Eastern Oregon University

Behavior in seaslugs, squirts, and sponges

Wei Cheng, University of Washington

Primary productivity of Portlock Bank in Alaska

Wei-Chun Chin, University of California, Merced

Secretary processes in phytoplankton

Horacio de la Iglesia, University of Washington

Biological clocks in crabs

Mark W. Denny, Stanford University

Biomechanics of marine organisms

Kelly Dorgan, University of California Berkeley

Interactions of infaunal animals with their environment

Alexandra Eaves, BC Centre for Aquatic Health Sciences

Comparative invertebrate zoology

Joel Elliot, University of Puget Sound

Marine predator-prey and symbiotic interactions

Candice Emmons, NOAA/NMFS

Acoustic behavior of killer whales

Lisa Ferrier, Department of Natural Resources

Research on eelgrass (*Zostera marina*) stressors

Lara Ferry, Arizona State University

Functional morphology of marine fishes

Lisbeth Francis, Western Washington University

Cnidarian behavior and ecology

Carolyn Friedman, University of Washington

Ecology of marine disease

Joe Gaydos, Seadoc Society- Marine mammal pathologies

Sal Genovese, Northeastern University

Program Director – Three Seas Program

Sophie George, Georgia Southern University

Development and distribution of echinoderm larvae

Sarah Gilman, The Claremont Colleges: Effect of

temperature changes on predator-prey interactions

Raymon M. Glantz, Rice University

Neurophysiology of polarization vision in crustacea

Albert Gordon, University of Washington

How calcium regulates muscle contractions

John Gosline, University of British Columbia

Biomechanics of marine organisms

Charles Greene, Cornell University

Responses of global ocean ecosystems to climate

Martha Groom, University of Washington

Dynamics & restoration of eelgrass (*Zostera marina*) beds

Kenneth Halanynch, Auburn University

Evolutionary history of marine invertebrates

Brad Hanson, NOAA/NWFSC- Foraging ecology of killer whales

Michael Hart, Simon Fraser University

Proteins in sperm & eggs of some sea star species

Catherine Drew Harvell, Cornell University

How water temperature & acidity impact parasitism

Andreas Hejnol, University of Bergen

Biology of the brachiopod *Terebratalia transversa*

Scottie Henderson, California State University, Fullerton

Life-histories of marine invertebrates

Jason Hodin, Stanford University

Life stage transitions in marine invertebrates

A. Rus Hoelzel, Durham University

Minke whale feeding ecology and habitat use

Fumio Iwata, Hokkaido University

Taxonomic studies of nemerteans

Jeffrey Jensen, University of Maryland

Capture success of pile perch preying on limpets

Sönke Johnsen, Duke University

Illg Distinguished Lecturer for 2010

Hannah Julich, WA Dept. of Natural Resources

Stressors affecting eelgrass recovery and survival

Carrie Kappel, University of California, Santa Barbara

Effects of invasive mammals on marine communities

Andrea Kohn, University of Florida

Evolution of neurons & complex brains nervous systems

Floyd Kregenow, Systems biology

approach to identify polar granule parts

Carolyn Kurle, University of California, San Diego

Effects of invasive mammals on marine communities

Charles Lambert, California State University, Fullerton

Calcium levels in ascidian oocyte maturation

Gretchen Lambert, California State University, Fullerton

Investigations of phlebobranch ascidians

Sara Lindsay, University of Maine

Effects of injury on surface deposit feeding spionid polychaetes

Roger Longley, Pacific Sciences Institute

Development of serotonergic neurons

George Mackie, University of Victoria- Steering in hydromedusae

Kathryn McDonald, Developing invertebrate embryos

Robert Meech, University of Bristol

Evolution of neuromuscular control and its molecular basis

Rachel Merz, Swathmore College

Mechanics and morphology of chaetal microstructure

Kathy Ann Miller, Wrigley Marine Science Center

Research and teaching of marine botany

Leonid Moroz, University of Florida

Nitric oxide signaling and comparative neurogenomics

Thomas R. Mumford, Washington Department of Natural Resources

Investigations of causes of recent declines in eelgrass in San Juans

James Murray, California State University, East Bay

Orientation and navigation in *Tritonia diomedea*

Tigran Norekian, Neuronal mechanisms of feeding in *Clione limacina*

Bob Pacunski, Washington Department of Fish & Wildlife

Surveys of bottomfish populations in the San Juan Islands

Dianna Padilla, Stony Brook University

Invasive species ecology, evolution of mollusks

Yale Passamanek, University of Hawaii

Developmental evolution of marine invertebrates

Thomas Pirtle, Grand Canyon University

Cellular mechanisms of locomotor speed change in *Clione limacina*

Robert Podolsky, College of Charleston

Physiological ecology of development in the intertidal

Ann Potter, Washington Dept. of Fish & Wildlife

Distribution of endemic butterfly, the Island Marble

Rebecca Price, University of Washington, Bothell

Elucidation of the role of abiotic and biotic factors

Stephen Reller, University of Puget Sound

Predation in marine environments between sea stars & mussels

Mary Rice, Smithsonian Marine Station

Reproduction, development & phylogeny of Sipuncula

Lynn Riddiford, HHMI-Janiela Farm Research Campus

Developmental endocrinology of arthropod embryogenesis

Francois Robin, University of Aix-Marseille II

Cortical tension, adhesion, cell & embryo shape

Laura Rogers-Bennett, University of California, Davis

Early life history of northern abalone

Anja Schanz, Washington Dept. of Natural Resources

Seagrass stressor research in Westcott Bay

Charles Shuster, New Mexico State University

Cytokinesis in echinoderm cells

Craig Smith, University of Hawaii at Manoa

Whale-fall communities, sources of organic loading

Steve Stricker, University of New Mexico

Mechanisms of oocyte maturation

James Truman, HHMI-Janiela Farm Research Campus

Endocrinology of arthropod embryogenesis

W. Breck Tyler, University of California, Santa Cruz

Ecology and conservation of Pacific seabirds

Scott Veirs, Marine Science & Sustainability School

Beam Reach Program, killer whale acoustics

Val Veirs, Marine Science & Sustainability School

Beam Reach Program, killer whale acoustics

Robert Waaland, University of Washington

Seaweed biology, diversity, distribution and productivity

Allison Welch, College of Charleston

Heritability of sexually selected characteristics in gray tree frogs

David Wethey, University of South Carolina

Bioadvection by the lugworm *Abarenicola pacifica*

Marjorie Wonham, Quest University Canada

Marine invertebrate ecology in the Pacific Northwest

Jason Wood, Marine Science & Sustainability School

Beam Reach Program, killer whale acoustics

Sarah Woodin, University of South Carolina

Effect of infaunal activities on pore water dynamics

Linda Wordeman, University of Washington

Chromosome segregation in live echinoderms

Russel Zimmer, University of Southern California

Developmental biology of lophophorate phyla