

Marine Biology @ URI: A Sea of Opportunities

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URI Marine Biology Website

www.web.uri.edu/marbio

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Portrait of a Freshman Class

Class of 2015 (n=98, out of 106)

- 82%** from out-of-state
12-15 states/year, incl. CA, FL, WI, AZ, TX - [URI = ~60% out-of-state]
And - Europe, India, China
- 76%** came to URI specifically for the Marine Biology major
- 64%** took marine or environment-related courses in HS
- 24%** participated in marine or environment-related extracurricular activities
- 46%** entered with some sort of AP credit (**17%** w/AP Biology credit)
- 16%** in the Honors Program
- 16%** are Scholar-Athletes
- 76%** had travelled outside of the US (>59 different countries/islands)
- 34%** already had their basic SCUBA certification
- 46%** had visited a coral reef

Nationally Competitive Scholarships

- NOAA Hollings Scholarships - 20 since 2009
– 2017 - 4 finalists.....
- Goldwater Scholarships – 2
- Fulbright Scholarship - 1
- Several NSF Graduate Research Fellowships



Marine Biology Faculty

- ~30 Marine Biologists in CELS and GSO
- 7 new faculty hires in Marine Biology in past two years:
 - Marine Animal Physiology (CELS)
 - Evolution of Marine Populations (CELS)
 - Biogeochemistry (GSO)
 - Phytoplankton Ecology (GSO)
 - Hydrothermal Vents and Methane Seeps (GSO)
- First George and Barbara Young Chair in Biology awarded to a Marine Biology faculty member
- In 2015, Marine Biology faculty in CELS received >\$5 million in federal research grants
 - NSF, NIH, Rhode Island Sea Grant

The BS Marine Biology Degree

Department of Biological Sciences,
College of the Environment and Life Sciences (CELS)

- Introductory Biology with Lab (= AP Bio)
- Two years of Chemistry (incl. Organic Chemistry and Biochemistry)
- One year of Calculus/Statistics
- One year of Physics with Lab
- Foundation:
 - One semester of Marine Biology
 - One semester of Oceanography

The BS Marine Biology Degree

- **Biology/Marine Biology Courses**
- **Core Courses = Breadth**
 - Sub-disciplines of Biology
- **Marine Biology Electives = Depth**
 - lecture/lab
 - field courses (on shore/at sea)
 - J-term
 - Spring Break
 - Summer
 - Research credits
 - CELS – Kingston Campus
 - GSO – Narragansett Bay Campus



Marine Biology Courses (2016-2017)

Fall

- Marine Biology (L)
- Marine Environ. Physiology (L)
- Invertebrate Zoology (L)
- Ecology of Marine Plants (L)
- Salt Marsh Ecology (L)
- Deep Sea Biology
- Seminar on Marine Mammals
- Biological Oceanography (L)
- Fisheries Science
- Fish Physiology

Spring

- Marine Biology (L)
- Marine Environmental Physiology (L)
- Invertebrate Zoology (L)
- The Invisible Living Ocean
- Bermuda Marine Biodiversity (L, Spring Break)
- Biology of Algae (L)
- Evolution & Diversity of Fishes (L)
- Marine Ecology (L)
- Marine Bioacoustics
- Marine Pollution

J-Term

- Coral Reef Conservation and Analysis (Bonaire)

L = laboratory included in course

For an Interdisciplinary Perspective – Double Majors or Minors in:

- Marine Affairs
- Geology and Geological Oceanography
- Wildlife and Conservation Biology
- Environmental Science and Management
- Environmental Economics and Management
- Oceanography (minor only)
- Marine Archaeology (minor only)

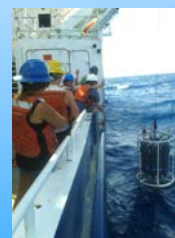
5th Year Master of Oceanography

Acceptance to the Graduate School of Oceanography prior to completion of BS (e.g., in Marine Biology) – senior year

- 60 credits completed
- 3.2 GPA and at \geq B in prerequisite courses
 - Biology, Chemistry, Physics, Calculus

Choose one track:

- General Oceanography
- Fisheries
- Coastal Systems
- Ocean Technology and Data



URI Diving Safety Program



Diving Education and Training

- SCUBA Certification
- Advanced Certifications
- Dive Master & Instructor

Supervision of:

- Diving Facilities
- Diving Operations



Anya Hanson – URI Diving Safety Officer
Alexandra Moen – Assistant Safety Office, Lecturer

The “Out of Classroom” Experience

- **Field Work in Marine Biology Courses** - Fall, Spring
- **Research Opportunities at URI and elsewhere**
 - ~30 marine biology faculty in CELS & GSO (+ other marine scientists)
 - Programs: Coastal and Environmental Fellows, EPSCOR SURF, etc.
 - National Science Foundation-REU’s, National Oceanic and Atmospheric Administration Hollings Internships
- **Study Abroad and National Student Exchange** – e.g., SEA Semester, Bermuda Institute of Ocean Sciences, James Cook University, U. Hawaii
- **Field Courses** – Summer, J-term, Spring Break
 - Locally and globally, ashore and aboard ship
 - Other institutions – Shoals Marine Laboratory, Friday Harbor Labs
- **Internships** (education, outreach, exploration) – NGO’s, Exploration Trust, NE Aquarium, Mystic Aquarium, etc.

Rhode Island, all US coasts, Georges Bank, Gulf of California, Caribbean, Mediterranean, South Africa, Australia/New Zealand, Antarctica

Bio 360 – Marine Biology (sophomores)

- A month of field labs:
 - Salt Marsh Ecology
 - Rocky Intertidal Ecology
 - Mystic Aquarium
 - Narragansett Bay Trawl - *Cap'n Bert*



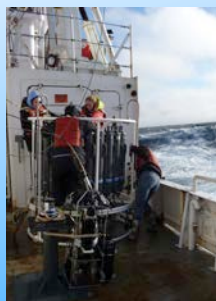
Field Work in Local Habitats



Rhode Island *Endeavor* Program



State/University partnership to enhance use of R/V *Endeavor* in research and education



Pelagic Ecology

Dr. Brad Seibel (CELS) - August 2014

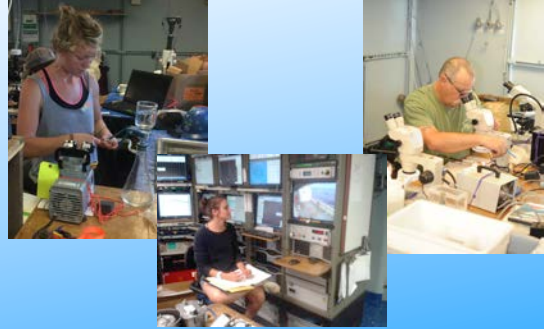
- One week - classroom/lab
 - zooplankton and micronekton
 - diel vertical migration
 - depth zonation
 - bioluminescence
 - biogeochemical cycles
- One week cruise (R/V *Endeavor*):
 - Midwater trawls - Tucker Trawl, 3 m-square mouth
 - Bluewater SCUBA diving
 - CTD deployment - depth profiles of light, temperature, oxygen, salinity
 - Seawater chemistry, primary productivity measurement



Life Aboard Ship



Working In the Lab



Working on Deck



Collecting Organisms - Tucker Trawl



Up-Close and Personal



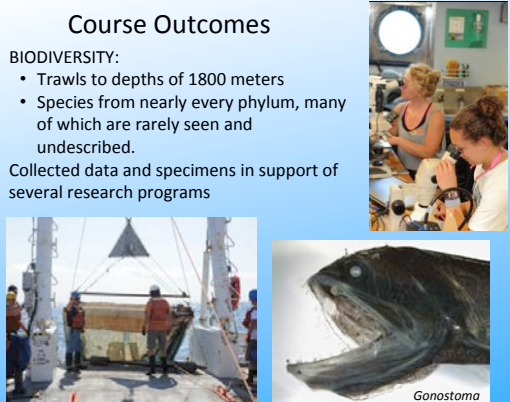
Portuguese Man O'War

Diversity of Pelagic Organisms



Course Outcomes

- BIODIVERSITY:
 - Trawls to depths of 1800 meters
 - Species from nearly every phylum, many of which are rarely seen and undescribed.
- Collected data and specimens in support of several research programs



Gonostoma

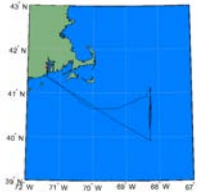
Real "Hands-On" Learning



Sea Going Oceanography

Dr. Susanne Menden-Deuer (GSO)
Spring Semester/Spring Break 2015

- Pre-cruise organizational meetings during semester
- 1 week research cruise, students filled available berths
 - Followed offshore-onshore transect - physical, biological, chemical and geological measurements
- Goal - REAL Oceanography



Students learned about:

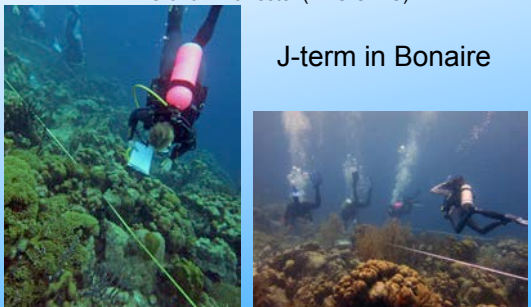
- the importance of chemical and physical properties for oceanic ecosystems
- principle factors driving the oceanic ecosystem
- the influence of the ocean on humans and visa versa




NRS 475 - Coral Reef Conservation and Analysis

Dr. Graham Forrester (NRS/CELS)

J-term in Bonaire



Project: Impact of Lionfish Invasion




<http://www.earthtimes.org>

AND:

- Effectiveness of Marine Protected Areas
- Causes of Long-Term Reef Declines

AFS 433 - Scientific Diving

Anya Watson, DSO
Spring Semester/Spring Break in Bonaire (2014, 2015)



A collage of three underwater photographs showing divers in various scientific diving scenarios, including one diver with a large white bag and another with a yellow buoy.

SEA Semester

SEA Education Association
"Environmental Studies in Woods Hole and at Sea"



Programs, two ships, two oceans:

- Ocean Exploration
- The Global Ocean
- Oceans and Climate
- Sustainability in Polynesian Island Cultures and Ecosystems
- Colonization to Conservation in the Caribbean
- Marine Biodiversity and Conservation
- Transatlantic Crossing
- Protecting the Phoenix Islands
- Historic Seaports of Western Europe

4-12 weeks, Fall, Spring, Summer
3-18 credits

www.sea.edu



A collage of five photographs showing students in a classroom setting, on a boat, and in a field. The text "www.sea.edu" is centered at the bottom.

www.sea.edu

Credits: SEA, Ryan Walsh



Bermuda Institute of Ocean Sciences (BIOS)

Fall Semester (junior or senior year)

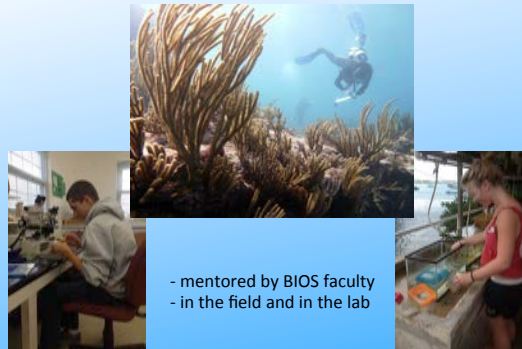


A collage of three photographs: a rocky coastline with waves, a close-up of purple coral, and a diver underwater.

- Tropical Marine Invertebrates
- Coral Reef Ecology
- Scientific Diving (AAUS)
- Independent Research

www.bios.edu


Independent Research Projects




A collage of three photographs: a student in a lab, a large coral structure, and a student in a field.

- mentored by BIOS faculty
- in the field and in the lab

Research Cruise: Krill Ecology in the Antarctic



RVIB Nothaniel B. Palmer



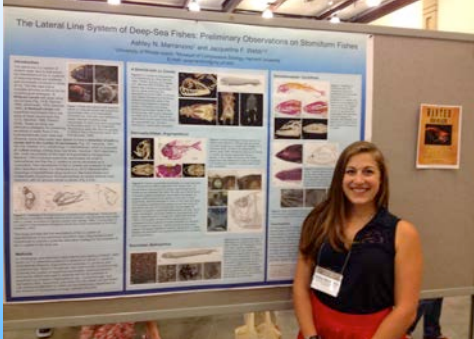
World's Best Reason to Skip Graduation





Michelle and Ian were both awarded a "Bachelor of Antarctic Science with a Minor in Krill Biology" with diplomas signed by the Captain of R/V Palmer.

Students Present their Research at Local, National and International Scientific Conferences



.....A Sea of Opportunities

- Traditional Courses (Classroom and Lab/Field)
- Independent Research – at URI, around the US
- Study Abroad – SEA Semester, Bermuda, Australia, and elsewhere
- Internships – locally, nationally, globally
- Field Courses – local, global; on shore, at sea
- Research Cruises – Atlantic, Pacific, Antarctica



Where are they now??



SDSU/UCD



NOAA Corps
U. Alaska
U. Hawaii

Alumni in Graduate School (as of June 30, 2015)

| | | |
|--|--|---|
| <ul style="list-style-type: none"> • URI (16, CELS & GSO) • Cal State - Northridge (3) • Cal State - Long Beach • Central Connecticut State University • College of Charleston (2) • College of the Atlantic • Cornell University • Delaware State University • Florida State University • Georgetown University • James Cook University • North Carolina State Univ. • Northeastern University • Nova Southeastern Univ. (3) • Old Dominion University • Penn State Univ. • Purdue University • Roger Williams Law School | <ul style="list-style-type: none"> • San Diego State/UC Davis • Scripps/UCSD • Stony Brook University • Texas A & M (3) • Tufts Univ. Vet. School (2) • UMass Dartmouth (2) • Univ. Pennsylvania Vet. School • University of Alaska • Univ. California - Berkeley • University of Cape Town • University of Connecticut • University of Florida • University of Hawaii (2) • University of Maine (2) • Univ. Maryland-E. Shore • Univ. Massachusetts - Boston • University of Miami • University of Michigan | <ul style="list-style-type: none"> • University of New England (2) • University of New Hampshire • University of South Carolina • University of South Florida • University of Virgin Islands • Walla Walla University • Wesleyan University • Western Washington University |
|--|--|---|

Classes of 2004-2015:
73 students - 57 students at 45 different schools + 16 students at URI (GSO or CELS; almost all for MS)

Alumni in Marine Science Outreach & Informal Education

| | |
|---|--|
| <ul style="list-style-type: none"> • Soundwatch Program, Friday Harbor (2) • New Logic Marine Science Camp (NJ) • Seacamp and Newfoundland Harbor Marine Institute, Big Pine Key, FL (2) • Save The Bay (5) • Americorps & OSEEC (Ocean State Environmental Education Collaborative) • Pow!Science! LLC • Massachusetts' Audubon Society • US Fish and Wildlife Service • Little St. Simons Island, Georgia • Pittsburgh Zoo & PPG Aquarium • Catalina Island Marine Institute (2) • Camp Emerald Bay, Catalina Island, CA • SeaWorld Orlando (2) • Camp Seewee • SeaQuest Program at Camp Fuller • Naturalist Whale Watching, Alaska (4) | <ul style="list-style-type: none"> • Project Oceanology • Connecticut Science Center • Green Street Arts Center (Director, CT) • Sea Education Association • CIEE - Bonaire • Bermuda Institute for Ocean Sciences • Chicopee High School in Chicopee, MA • Mystic Aquarium • Seacoast Science Center, NH • New England Aquarium (4) • Buttonwood Park Zoo • RI Lobstermen's Association (Director) • GSO Office of Marine Programs at URI • Shoals Marine Laboratory (Assist. Dir.) |
|---|--|

Classes of 2001-2015

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Photo credits: Graham Forrester, Brad Seibel, Ted Durbin, Bethany Jenkins, Anya Hanson, WHOI, Susanne Menden-Deuer, Karen Wishner, Niels Viggo-Hobbs, SEA, Ryan Walsh, Marine Biology Program students



Portrait of Marine Biology Graduates

A Happy Crew

