Marine Biology @ URI: A Sea of Opportunities

Dr. Jacqueline Webb
Director, URI Marine Program

Jacqueline_webb@uri.edu
web.uri.edu/marbio

URI Marine Biology Website
www.web.uri.edu/marbio

- Information for Prospective Students
- Kudos and Congratulations
- Marine Biology Lecture Series
- Marine Biology Faculty
- Undergraduate Study in Marine Biology
- Study Abroad Opportunities
- Research Opportunities & Internships
- Marine Field Courses
- Marine Biology Student Awards
- Scholarships for Undergraduates
- Outreach Activities
- Marine Biology Alumni
- URI Diving Program

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 ≥ B in prerequisite courses
  - Biology, Chemistry, Physics, Calculus

Choose one track:
- General Oceanography
- Fisheries
- Coastal Systems
- Ocean Technology and Data

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

Diversity of Pelagic Organisms

Portuguese Man O'War
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

Real “Hands-On” Learning

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

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

NRS 475 - Coral Reef Conservation and Analysis
Dr. Graham Forrester (NRS/CELS)

J-term in Bonaire

AND:
• Effectiveness of Marine Protected Areas
• Causes of Long-Term Reef Declines

Project: Impact of Lionfish Invasion

http://www.eathimeres.org
AFS 433 - Scientific Diving
Anya Watson, DSO

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

Bermuda Institute of Ocean Sciences (BIOS)
Fall Semester (junior or senior year)

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

Independent Research Projects
- mentored by BIOS faculty
- in the field and in the lab

www.sea.edu
www.bios.edu
Research Cruise: Krill Ecology in the Antarctic

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]

• 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
• San Diego State/UC Davis
• Scripps/UCSD
• Stony Brook University
• Texas A & M (6)
• Tufts Univ. Vet. School (2)
• UMass Dartmouth (2)
• Univ. Pennsylvania Vet. School
• University of Alabama
• 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
• University of New England (2)
• University of New Hampshire
• University of South Carolina
• University of South Florida
• University of Virginia
• Walden 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)

• Soundwatch Program, Friday Harbor (2)
• New Logic Marine Science Camp (6)
• Seacamp and Newfound 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 (1)
• Camp Senaee
• SeaQuest Program at Camp Fuller
• Naturalist Whale Watching, Alaska (4)

Alumni in Marine Science Outreach & Informal Education

• Project Oceanoilogy
• Connecticut Science Center
• Green Street Arts Center (Director, CT)
• Sea Education Association
• CEE – Bonaire
• Bermuda Institute for Ocean Sciences
• Chippewa High School in Chippewa, 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
• Sholls Marine Laboratory (Asst. Dir.)

Classes of 2001-2015

• Portrait of Marine Biology Graduates
• A Happy Crew

web.uri.edu/marbio
Jacqueline_webb@uri.edu

Photo credits: Graham Forrester, Brad Selver, Ted Duclos, Bethany Jenkins, Anya Hansen, WHOI, Susanne Menden-Deuer, Karen Wishner, Niels Viggo-Hobbs, SEA, Ryan Walsh, Marine Biology Program students
Public Outreach
America’s Cup Event