

# marine science

Summer 2011



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HILO



# Marine Science

## *On the Big Island of Hawai'i*

The Marine Science program at the University of Hawai'i at Hilo is designed to take full advantage of the "Big Island" of Hawai'i's variety of marine environments ranging from deep ocean to coral reef to estuary. An exciting array of ocean activities is planned. These activities are designed to stimulate the student's interest, provide experience-oriented learning and take full advantage of the island's exotic offerings.

The Island of Hawai'i is a treasure of unique diversity. With its sometimes snow-capped mountain peaks, pasture lands, lush tropical rain forests, rainbow-arched valleys, and active volcanoes, the Big Island has been described as a tropical mini-continent. An internationally renowned site for astronomical observation the island is also home of the world-famous Hawaiian Volcanoes Observatory. The island boasts beaches of black, white or green sand providing uncrowded access to pristine waters. Scientists and visitors alike are afforded the possibility of observing glowing red lava flowing into the sea from coastal vents. The Big Island is twice the size of all the other Hawaiian Islands put together and unsurpassed in beauty by any other island in the Hawaiian chain. From its people who carry with them the "Aloha" to the richness of its lands, the Big Island of Hawai'i is the perfect place to spend the summer learning about the wonders of the sea.

The University of Hawai'i at Hilo, fully accredited by the Western Association of Schools and Colleges, is a part of the Hawai'i system of higher education. Its programs emphasize accessibility to facilities and instructors in a small campus atmosphere. Teaching is a priority concern of all UH Hilo Faculty. Professors are encouraged to involve students in their own research and publications; as a result, UH Hilo students do very well in graduate school. UH Hilo Marine Science Faculty also taps into the rich cultural heritage and environmental resources of the Big Island in such programs as the Marine Science Department, the Marine Science Summer Program, the Kalakaua Marine Education Center, and the Marine Option Program.

Combining an ideal environment, excellent curriculum, outstanding instructors, and its own new laboratory and classroom building, and research/teaching vessel, the UH Hilo Marine Science Summer Program is one of the best opportunities in the nation for undergraduates to study marine science. In recognition of this exceptional summer program the UH Hilo Marine Science Summer Program has received an "Award for Excellence of Program" from the Western Association of Summer School Administrators, an organization representing over 80 member universities in the western U.S., Canada, and Mexico.

For information about the 2011 Summer Session in Marine Science at UH Hilo contact:

UH Hilo CCECS at:

Phone: (808) 974-7664

Fax: (808) 933-8863

e-mail: [ccecs@hawaii.edu](mailto:ccecs@hawaii.edu)

Web site: <http://hilo.hawaii.edu/depts/summer>

or <http://www.kmec.uhh.hawaii.edu>

Write to:

Summer Program in Marine Science  
University of Hawai'i at Hilo - CCECS  
200 West Kawili Street  
Hilo, Hawai'i 96720-4091



## Summer 2011 Marine Science Course Offerings

### *Courses with Special Schedules, May 16-28, 2011*

CRN	Credits	Course	Sec	Title	Instructor	Days	Times	Location
12131	3	MARE 264	001	Beg QUEST	Team	UMTWRFS	8 am-10 pm	Kona
12132	3	MARE 364	001	Adv QUEST	Team	UMTWRFS	8 am-10 pm	Kona

(MARE 364 starts on May 15)

### *Summer Session II, June 13-July 22, 2011*

12096	2	MARE 101L	001	Marine Science Field Lab	J Turner & J Adolf	W	8 am-12 pm	MSB 104
12097	3	MARE 140	001	Intro to Hawn Coral Reefs	JS Turner	MTRF	10-11:50 am	MSB 104
12098	1	MARE 140L	001	Hawn Coral Reefs Lab	S Turner	M	1-5 pm	MSB 104
12099	3	MARE/BIOL 171	001	Marine Biology	JS Turner	MTRF	8-9:50 am	MSB 104
12157	3	MARE 294	001	Polynesian Sail & Navigation	I Pilago	MTRF	1-2:50 pm	MSB 101
12158	1	MARE 294L	001	Polynesian Sail & Navigation Lab	I Pilago	W	1-5 pm	MSB 101
12133	3	MARE 366	001	Trop Marine Resarch Investigations	S Colbert	MTRF	8-9:50 am	MSB 101
12159	3	MARE 394	001	Natural Hist of Sharks/Rays	J Turner	MTRF	8-9:50 am	MSB 103
12165	1	MARE 394L	001	Nat Hist of Sharks/Rays Lab	J Turner	F	6-10 pm	MSB 104
12101	3	MARE 490	001	Marine Reptile Conservation & Ecology	J Turner	MTRF	10-11:50 am	MSB 103
12102	1	MARE 490L	001	Marine Reptile Cons & Ecol Lab	J Turner	W	1-5 pm	MSB 104
12153	3	MARE 494	001	Phytoplankton Ecology	J Adolf	MTRF	10-11:50 am	MSB 101
12154	1	MARE 494L	001	Phytoplankton Ecol Lab	J Adolf	F	1-5 pm	MSB 104

# Summer 2011

## Marine Science Course Descriptions

### **MARE 101L, Introduction to Marine Science Field Laboratory - Dr. Jason Turner & Dr Jason Adolf**

Map the sea floor of Hawai'i's bays from aboard a UH Hilo research vessel. Collect samples of marine sediments using a corer and investigate ocean currents by tracking drogues as they drift along the island's shores. Plot oceanographic data on a computer and interpret the results using the latest scientific software. Map the temperature and salinity patterns in scenic Hilo Bay. Collect plankton from a UH Hilo research vessel and identify them in the laboratory. Learn to identify many of the common Hawaiian reef fishes, and have the opportunity to practice *in situ* techniques used to visually census fishes. Conduct snorkel surveys of green sea turtles (*Chelonia mydas*), as part of an ongoing study to assess their health, population numbers, and movement patterns. This is an introductory first course with no prerequisites. \$250 lab fee payable upon registration.

### **MARE 140 & 140L, Introduction to Hawaiian Coral Reefs, - Ms. Jennifer Turner**

Explore the underwater world of the Big Island of Hawai'i while learning about unique marine ecosystems found nowhere else on Earth. Students will acquire an appreciation for local aquatic fauna in the classroom including the basics of marine biology and natural history. Then they will enter the natural laboratory that is Hawai'i and investigate coral reefs, coastal beach, and tide pool systems with mask, snorkel, and fins. Learn to identify common marine inhabitants while enjoying an unparalleled educational experience under the sea. This is an introductory course and lab with no prerequisites. Concurrent enrollment in lecture and lab is required. \$250 lab fee for Mare 140L payable upon registration.

### **MARE/BIOL 171, Marine Biology – Diversity - Ms. Jennifer Turner**

This course provides a comprehensive examination of the exciting world beneath the waves. Subjects will include an introduction and history of marine biology, how organisms deal with the marine environment, marine ecological concepts, and factors involved with reproduction, migration, and dispersal of marine larvae. Important marine taxonomic groups and processes will be investigated across a diverse landscape of aquatic habitats including open ocean, deep sea, benthic, and coastal ecosystems including coral reefs, seagrasses,

mangroves, and estuaries. Aspects of human impacts upon the marine environment and the management and conservation of marine resources will be discussed. This is an introductory course, however a previous biology course is recommended.

### **MARE 264, Quantitative Underwater Ecological Survey Techniques – QUEST - Team**

Students who enroll in QUEST will learn commonly utilized nearshore underwater ecological surveying techniques and then apply these in the field using SCUBA as a research tool. Students will review the identification of common Hawaiian reef invertebrates, fishes and seaweeds. They will be introduced to scientific diving methodology and a variety of surveying techniques including: visual surveying of fishes, surveying of benthic invertebrates, and photographic surveying of fishes and invertebrates. Additional lectures will cover basics in experimental design, statistical analysis, data reduction, graphic representation, reef geomorphology, sedimentology and physical oceanography. Students will utilize SCUBA in the field to survey the coral reefs on the Kona side of Hawai'i. This class affords students a unique opportunity to learn and apply diving research techniques in a truly beautiful environment. Admission by advance consent of the instructors and authorization as a scientific diver in training before the start of the course required. \$700 lab fee payable upon registration.


### **MARE 294, Special Topics: Polynesian Sailing and Navigation, 3 credits – Mr. Kaleo Pilago**

(*Papa Wa'akauua*, Hawaiian Double-hulled Canoe Sailing)

This introductory course will focus on traditional and contemporary Polynesian double-hulled canoe sailing culture. Topics include: Hawaiian seafaring, canoe building, celestial navigation, oceanography, protocols, and related *mo'olelo* (stories). Pre: Basic knowledge of Hawaiian language and culture (and/or willingness to learn), and current First Aid and CPR certification. Concurrent registration in MARE 294 required.

### **MARE 294L, Special Topics: Polynesian Sailing and Navigation Laboratory, 1 credit – Mr. Kaleo Pilago**

(*Papa Wa'akauua*, Hawaiian Double-hulled Canoe Sailing)



Introduction to basic Polynesian double-hulled canoe sailing principles, safety procedures/precautions, protocols, ocean skills development, and sailing techniques. Pre: Concurrent registration in MARE 294, basic swimming skills (must be able to swim 100M and tread water for 15 minutes). All students will be required to complete swimming assessment. \$250 lab fee payable upon registration.

### **MARE 364, Advanced Quantitative Underwater Ecological Survey Techniques - Team**

Students who have completed MARE 264 with at least a "B" grade may apply for admission to Advanced QUEST. Applicants who are accepted, will be assigned as dive team leaders for the basic QUEST course (MARE 264) and will be trained in team leadership and management skills. In this leadership role, advanced QUEST students will work with the diving safety officer and course faculty to monitor the safe diving practice of each member of their team. Team leaders will also assist in training students in identification of organisms. They will supervise the dive team's recording of data in the field as well as subsequent data analysis, and anchor the team's written report and oral presentation, and provide leadership for the team in all aspects of the QUEST experience. Admission by advance consent of the instructors and authorization as a scientific diver in training before the start of the course required. \$200 lab fee payable upon registration.

### **MARE/BIOL 366, Tropical Marine Research Investigations, 3 credits - Dr. Steve Colbert**

Research projects on marine-related problems. Students will do a literature search; develop experimental design; collect, reduce and analyze data; do a written final report; and present findings at a symposium. Projects will be selected from a list of topics or can be original with the consent of the instructor. Pre: instructor's consent. \$250 lab fee payable upon registration.

### **MARE 394 & 394L, Natural History of Sharks, Rays, and Skates - Dr. Jason Turner & Ms. Jennifer Turner**

This course will examine the natural history of the Elasmobranchs, an ancient group of fishes that have existed for almost 450 million years. Comprehensive investigations of sharks, rays, skates, sawfishes, and chimera along with representative species from Hawai'i will be conducted. Subjects will include evolution, taxonomy, anatomy, physiology, ecology, conservation and management of these unique animals. Discussions of current research papers along with group research projects will be covered during lectures. Laboratory sessions will involve detailed dissections of shark functional anatomy. Students will also participate in a tagging study of coastal shark species throughout the Big Island of Hawai'i. Prior college-level marine biology recommended. MARE 394 & 394L must be taken concurrently. \$250 lab fee for MARE 394L payable upon registration.

**MARE 490, Marine Reptile Conservation & Ecology, 3 credits - Dr. Jason Turner & Ms. Jennifer Turner**

All-encompassing look at the natural history of these ancient marine vertebrates. Topics include investigations of sea turtles, sea snakes, saltwater crocodiles and marine iguanas throughout the world. Subjects will consist of conservation and management, human impacts, reproductive and feeding ecology, evolution, taxonomy, and anatomy and physiology of these unique marine animals. Pre: prior college-level marine biology course recommended, or equivalent or instructor's consent. Pre: Concurrent registration in MARE 490L.

**MARE 490L, Marine Reptile Conservation & Ecology Laboratory, 1 credit - Dr. Jason Turner & Ms. Jennifer Turner**

Field and lab techniques employed by sea turtle biologists including shore and underwater photo-surveys, forage surveys, and evaluation of nests and hatchlings. Investigations will focus on local species of sea turtles. Pre: Concurrent registration in MARE490. \$250 lab fee payable upon registration.

**MARE 494 & 494L, Applied Methods in Phytoplankton Ecology - Dr. Jason Adolf**

Phytoplankton are the microbial primary producers in marine ecosystems and are a sensitive indicator of ecosystem change. This lecture-, laboratory-, and field-based course will give students hands on experience isolating and growing local phytoplankton cultures; examining phytoplankton using light- and epifluorescent microscopy techniques; measuring phytoplankton biomass and diversity in different local environments; and working with UH Hilo's real time continuous monitoring buoy and data telemetry system in Hilo Bay. MARE 494 & 494L must be taken concurrently. \$250 lab fee for MARE 494L payable upon registration.





## *Summer Session in Marine Science*

### **Sample Schedule**

Summer session students should take no more than eight or nine credit hours of course work, not counting QUEST.

**Sample courses loads are shown below:**

#### ***Example A - Introductory Courses - Marine Biology Focus***

- |  |           |
|--|-----------|
| 1) Marine Biology (MARE 171)                     | 3 credits |
| 2) Intro to Hawaiian Coral Reefs (MARE 140)      | 3 credits |
| 3) Intro to Hawaiian Coral Reefs Lab (MARE 140L) | 1 credit  |

Total = 7 credit hours

#### ***Example B - Introductory Courses - Oceanography Focus***

- |                                   |           |
|-----------------------------------|-----------|
| 1) Marine Science Lab (MARE 101L) | 2 credits |
| 2) Marine Biology (MARE 171)      | 3 credits |

Total = 5 credit hours

#### ***Example C - Advanced Courses***

- |  |           |
|--|-----------|
| 1) Natural History of Sharks, Rays, & Skates (MARE 394)      | 3 credits |
| 2) Natural History of Sharks, Rays, & Skates Lab (MARE 394L) | 1 credit  |
| 3) Applied Methods in Phytoplankton Ecology (MARE 494)       | 3 credits |
| 4) Applied Methods in Phytoplankton Ecology Lab (MARE 494L)  | 1 credit  |

Total = 8 credit hours

# Faculty

*The UH Hilo Summer Marine Science faculty exemplifies the best in national educators*

**Dr. Jason Adolf**, Assistant Professor of Marine Science, is a phytoplankton ecologist who has worked in Chesapeake Bay, the Mid-Atlantic Bight, Southwestern Australia and the U.K. His current research on the phytoplankton dynamics in coastal waters of Hawai'i Island uses real time continuous monitoring buoys and high-speed surface mapping of water quality, in addition to traditional techniques, to investigate the natural and anthropogenic forces shaping coastal phytoplankton populations. Dr. Adolf strongly believes that hands-on learning is critical to science education and his classes reflect that philosophy. <jadolff@hawaii.edu>

**Website:** <http://www.plankton.uhh.hawaii.edu/>

**Dr. Steven Colbert**, Visiting Assistant Professor in Marine Science, is a coastal oceanographer and hydrologist in the Marine Science Department at UH Hilo. He has participated in ten major oceanographic research cruises and conducted fieldwork in Hawai'i, southern California, Puget Sound, and New Caledonia. He studies sea-

water flow through sediments and has published articles on circulation within beach sands and benthic animals pumping water through sediments. Dr. Colbert has also published articles on the use of groundwater discharge to develop circulation models for the coastal ocean.

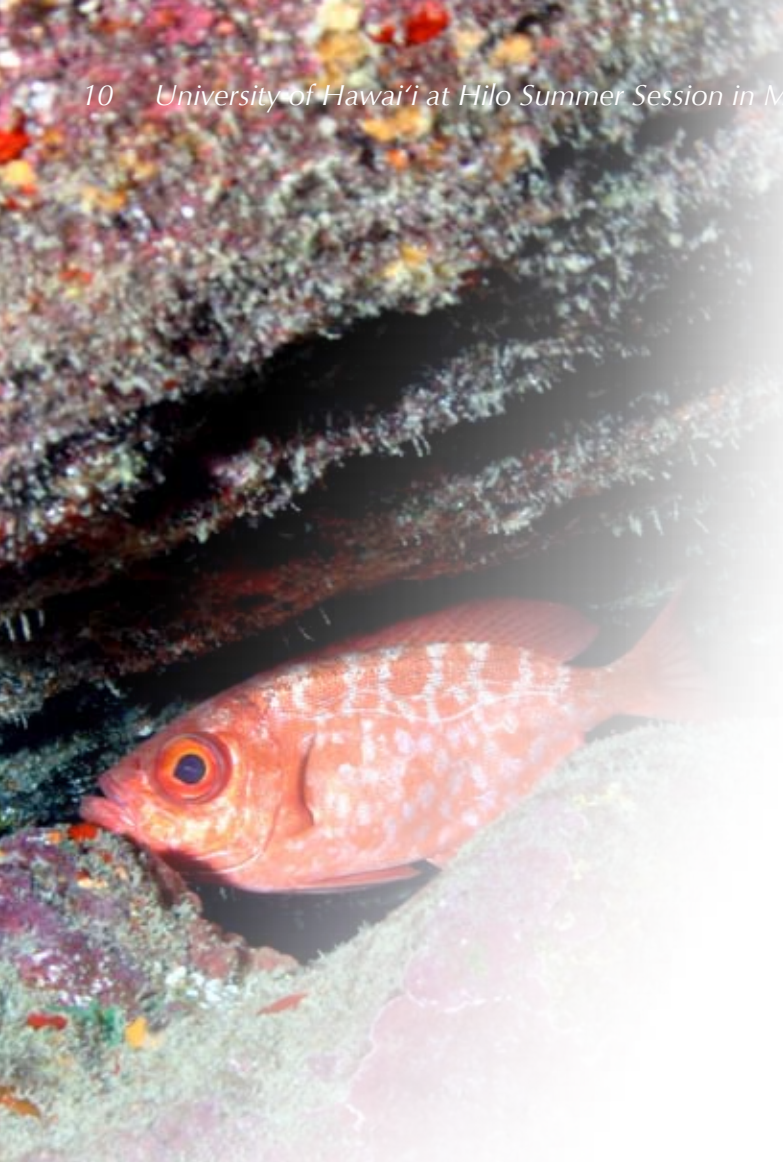
**Captain John Coney**, is staff coordinator of the UH Hilo Marine Option Program, Educational Specialist for the Kalakaua Marine Education Center and Manager of the UH Hilo scanning electron microscope laboratory. He has a degree in computer science and serves as our staff computer expert, supervising field instrumentation and computer data logging onboard the *Makani `Aha*. Born in Hawai'i, he is an experienced sailor, power boat operator and licensed captain. Mr. Coney is also the Unit Diving Coordinator for all scientific diving operations at UH Hilo and a NAUI Dive Instructor. <jconey@hawaii.edu>

**Meghan Dailer**, is a Jr. Researcher at the University of Hawai'i, Manoa, Department of Botany. She has a B.S. in Marine Science from Long Island University Southampton Campus and a M.S. in Botany and Ecology, Evolution and Conservation Biology from the University of Hawai'i. She has worked as a Marine Biologist in Hawai'i for seven years, specifically focusing on nutrient driven algal blooms in coastal waters. She is currently conducting research along the West Hawai'i coastline through the Hawai'i Coral Reef Initiative.

**B. K. Griesemer\***, is Professor of Psychology at Maui Community College. She holds a MA in Psychology as well as an MBA. She is a QUEST graduate and has been on the QUEST faculty for over 10 years working mainly with the MARE 364 (Advanced QUEST) student team leaders. She is a mediator and facilitator for a community mediation center and has consulted widely in leadership, team building, management and communications. bkg@hawaii.edu

**Jeff Kuwabara**, is the campus coordinator for the UH Manoa Marine Option Program (MOP). He completed a BS in Zoology and a Marine Option Program Certificate at UH Manoa in 1995, and a Master's degree in Public Administration. As an education specialist, Kuwabara played a major role in developing UH Sea Grant's Hanauma Bay Education Program from 1996-2003. He





then went on to manage NOAA's discovery center on the Northwestern Hawaiian Islands on Hilo's bayfront where he developed educational, volunteer, and community outreach programs. In 2005, Jeff took his current position with MOP where he helps students navigate their way to a MOP Certificate. Mr. Kuwabara has been actively involved with QUEST since 1992 and is an avid diver and longboarder and an amateur underwater photographer. <manoamop@hawaii.edu>

**Kaleo Pilago**, works as a Student Development Specialist under the Department of Student Affairs for the Kipuka Native Hawaiian Student Center. He has a B.A. in English Literature from UH Hilo and is a student in the Masters of Education Program. Kaleo also has a current Lifeguard Certification and has held a Captain's License since 1997. His voyaging experience includes 15+ years on Hawaiian double-hulled sailing canoes. The vessels that he has crewed include *E`ala*, *Hokule`a*, and most recently *Hokualaka`i*. Kaleo has sailed several times around the State of Hawai'i, and in 2007, voyaged to Nihoa and Mokumanamana in the Northwestern Hawaiian Islands. Currently, he is the Captain of two

double-hulled sailing canoes, 27' *Ho`okena* and 33' *Lauhoe*. Both vessels have been used directly for education and community development for the past 11 years. Before working for UH Hilo, Kaleo was, for four years, the Coordinator for a leadership program that used the double-hulled canoe as the training platform. In addition to sailing, Kaleo is a cultural practitioner, avid surfer, diver, and subsistence fisherman.

**Dr. Misaki Takabayashi**, is a marine molecular ecologist in the Marine Science Department at UH Hilo. She was educated in Australia and has worked extensively on coral reefs in the wider Pacific as well as in the Caribbean. She has published numerous papers from her work on ecology, physiology and genetic diversity of corals and symbiotic algae, zooxanthellae as well as marine diatoms. Dr. Takabayashi is currently conducting a wide variety of research projects, ranging from corals to microbes, around the island of Hawai'i.

<misakita@hawaii.edu>

Website: <http://weblog.uhh.hawaii.edu/~misaki/Welcome.html>

**Ms. Jennifer Turner**, is a broadly trained biologist working at UH Hilo in the Departments of Marine Science and Biology. She has been working in biological research and academics for the past 14 years, with a Bachelor's Degree in Marine Biology and a Master's Degree in Environmental Biology. Jennifer has been involved in a wide variety of research programs including medical research, shrimp mariculture, molecular and population genetics, and marine mammal biology.

<turnerjs@hawaii.edu>

**Dr. Jason Turner\*\***, is a marine biologist in the Marine Science Department at UH Hilo. He has conducted research on marine mammal biology, connectivity of aquatic food webs and feeding studies in larval and juvenile fishes, and has conducted fisheries surveys throughout the Gulf of Mexico. Dr. Turner has published research results in scientific papers in marine biology, marine ecology, and marine mammal journals.

<jpturner@hawaii.edu>

Website - <http://www.foodweb.uhh.hawaii.edu/>

\*Recipient of the University of Hawai'i Board of Regents Medal for Excellence in Teaching.

\*\*Recipient of the University of Hawai'i Frances David Award for Excellence in Teaching.

## What Marine Science Summer session students have to say about the program:

*"It was a wonderful experience, I learned so much."*

*"Instead of just staying in the classroom, we were able to get out and have hands on experience."*

*"Professors were excellent and very friendly and personable. They added so much to the class material."*

*"I think that the subject matter was perfect."*

*"I loved turtle tagging — it was such a wonderful experience and I learned so much."*

*"I loved being on the boat!"*

*"Great classes!"*

*"My favorite classes that I've ever taken."*

*"Awesome"*

UH Hilo recognizes its obligations to provide students with disabilities with equal access to its programs, services and activities. This publication is available in alternate format upon request. Contact the Office of the Vice Chancellor for Student Affairs at (808) 974-7335 (V/TTY) or the University Disability Service (ADA office) at 933-0816 or 974-7335 (TTY) for disability access information and services.



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*Special thanks to John Coney and the students of the UH Hilo Marine Science Program  
for the use of photographs for this publication.*