

## CIEE Study Center fall / spring ☀️ 👤

coral reef ecology / environmental studies / independent research / marine biology / marine conservation / marine ecology / research methods / scientific diving



### program snapshot

- Focus on coral reef ecology and ecosystems on a beautiful Caribbean reef
- Log up to 50 scientific dives for class and independent research
- Collaborate on research projects with the Bonaire National Marine Park, Sea Turtle Conservation Bonaire, and CIEE Research Station Bonaire
- Publish the results of your research in the student scientific journal *Physis: Journal of Marine Science*

### what you'll learn

The goal of the Tropical Marine Ecology and Conservation program is to offer students an interdisciplinary learning experience that stresses the interconnectedness of tropical ecosystems and explores how global issues are affecting coral reefs. Specifically, the program offers students a comprehensive and complex view of the many facets of conservation, marine ecology, and scientific methods through an in-depth look at issues ranging from cultural heritage to natural resource management while placed in a tropical marine setting.

## thoughts from abroad

For the ninth consecutive year, Bonaire was voted the number one Overall Dive Destination in the Atlantic/Caribbean region according to *Scuba Diving Magazine*. The CIEE Study Center in Bonaire provides a program for Biology majors who want to learn about the biology, ecology, and conservation of coral reefs and associated ecosystems in a living classroom, the Bonaire National Marine Park. Bonaire has distinguished itself as a world famous marine conservation park by placing the conservation of nature, above and below the water, at the forefront of its economic plan.

The program focuses on how science is used to protect and understand nature. Spend your days in the water to discover “The Enchanted Braid” of life that makes up a coral reef ecosystem. You’ll design and conduct experiments that may lead to the discovery of new species, a better understanding of how species are conserved, or how to effectively restore a damaged coral reef; your experience culminates in a presentation of research to the local community and publication of your work in a scientific journal. Come to Bonaire and interact with the scientific, management, and conservation organizations working in Bonaire, and take home the experience of a lifetime.

— Rita Peachey, Resident Director

### About the Resident Director

Dr. Rita Peachey earned her B.S. in Biology and M.S. in Zoology from the University of South Florida and her Ph.D. in Marine Science from the University of South Alabama. Her research interests include coral biology and how UV affects the early stages of life in the ocean. Currently, Dr. Peachey is conducting research on the recent recruitment of the invasive lionfish in Bonaire.

### About Other CIEE Staff

Anouschka van de Ven, Assistant Resident Director, is a native of the Netherlands. She has a B.A. in advertising and is a certified dive instructor. Anouschka’s roles are many, including managing CIEE facilities in Bonaire, marketing and finance, and instruction in both scuba and local culture of Bonaire and the Dutch Antilles.

Prof. Caren Eckrich is the Dive Safety Officer for CIEE and holds a B.S. in Wildlife and Fisheries Management from Texas A&M University and a M.S. in Biological Oceanography from the University of Puerto Rico in Mayaguez. Prof. Eckrich has been a CIEE instructor in Bonaire for five years and is conducting research on crustose coralline algae that is overgrowing corals in Lac Bay.

Dr. Eva Toth has a B.S. in Biology and an M.S. in Ethology from Utrecht University in the Netherlands and a Ph.D. in Ecology and Evolutionary Biology from Rice University. Dr. Toth taught biology courses at Trinity University and conservation biology at the School for Field Studies in the Turks and Caicos. In Panama, Dr. Toth worked as a research scientist studying ecological interactions of sponge-dwelling snapping shrimp colonies.

## about bonaire

Located in the Dutch Antilles, Bonaire is a desert island located 50 miles off the coast of Venezuela. Bonaire offers a diverse topography with volcanic hills and flat salt pans that lay atop ancient coral reefs. Claimed but undeveloped by Spain in 1499, the Dutch took possession in 1633; subsequently creating a plantation island using African slave labor. Environmental awareness on the island has led to a ban of spear fishing, protection of sea turtles, and the development of the Bonaire National Marine Park.

## academics

### Academic Program

The CIEE Study Center in Bonaire began as a summer program in 2005. The semester program began in 2006 and is open to biology majors who have completed an introductory biology sequence (2 semesters) and an upper level biology course such as ecology, invertebrate zoology, marine biology, vertebrate zoology, ichthyology, or the equivalent. With its setting in the southern Caribbean sea, the program provides a unique, integrated academic experience involving class work, field research, and lab research and offers a full semester of upper-level courses for biology majors. As requirements vary between schools, students should contact their study abroad office for course equivalents and credit toward their degree. All courses are taught in English.

### Academic Culture

This program is offered for CIEE students only and contains extensive experiential components. The program integrates lectures, field experience, student group work, and readings. Professors prepare students in the classroom and accompany them on field trips. Diving is an integral part of the program, and given the number of dives and island excursions required, students should expect an intense and demanding, yet rewarding experience. Emphasis is placed on hands-on field observation of ecological pro-

cesses, as well as human-nature interactions and their application to the conservation of natural and cultural resources.

### Nature of Classes

Participants take classes with other CIEE students only.

### Grading System

Student learning is assessed through quizzes, written exams, laboratory reports, a detailed field notebook, presentations, and participation. Letter grades of A, B, C, D, and F are given with pluses and minuses.



## where you'll study

The CIEE Study Center and Research Station is located one block from the sea and provides housing, a lecture hall, and a laboratory. The prevailing weather conditions, with trade winds 90 percent of the year, result in comfortable air temperatures. The fringing coral reef is located within 100 yards of the shore in most places and is easily accessible using shore entry for both diving and snorkeling. The climate is mild, the sea is calm on the leeward side of the island where the Study Center is located, and the ocean water is crystal clear providing excellent diving conditions nearly year around.

## living

### Housing and Meals

The CIEE Study Center is located one block from the waterfront in the northern part of the capital, Kralendijk. The hospital, drug stores, restaurants, and shopping are within five to 15 minutes walking distance. Housing and 14 meals per week are included in the program fee. Students are responsible for breakfasts with the exception of Sundays, when brunch is provided. The residence hall has seven suites, each with a private bath, providing shared accommodation for CIEE students. There is a large, fully-equipped kitchen, dining areas inside and out, a living room, TV/lounge area, and dive lockers. Study desks are located throughout the residence hall. The Study Center is located across the street from the residence hall and has two lecture rooms, a large laboratory, and faculty offices. Both buildings have wireless Internet and telephones.

### Online Pre-Departure and On-Site Orientations

Students begin their study abroad experience in Bonaire before leaving home—by participating in a CIEE Online Pre-Departure Orientation. Meeting with students online, the Resident Director shares information about the program and site, highlighting issues that alumni have said are important, and giving students time to ask questions before leaving home. The online orientation allows students to connect with others in the group, reflect on what they want to get out of the program, and learn what others in the group would like to accomplish. The CIEE goal for the pre-departure orientation is simple: to help students understand more about the program and site, as well as their goals for the program, so that they arrive to the program well-informed and return home having made significant progress toward their goals.

A mandatory orientation session at the beginning of the program introduces students to the country, culture, academic program, staff, and program logistics. Course syllabi, readings, and other expectations are presented. Ongoing support is provided on an individual and group basis throughout the program.

### Internet

Students access the Internet at the CIEE Study Center and are encouraged to bring wireless-enabled laptops. There are a few on site computers for student use.

## research

*Physis: Journal of Marine Science* is the scientific journal produced each semester by CIEE students. Each student's Independent Research Project results are included in the Journal. To view past issues, visit [www.ciee.org/study](http://www.ciee.org/study).

## culture

### Cultural Activities and Field Trips

In order to learn about the cultural history of Bonaire, the program includes excursions to significant cultural activities such as Carnival, Queen's Day, and the Harvest Festival. The environmental history of Bonaire is closely tied to the culture of the people on the island and there are a number of field trips to areas of significant cultural or environmental importance such as the slave huts, Washington Slagbaai National Park, Lac Bay, Klein Bonaire, Rincon (the oldest town in the Netherlands Antilles), caves, salt pans, flamingo sanctuaries, mangroves, pre-historic cave paintings, and seagrass beds. In addition, students have free time to explore Bonaire.

### Volunteering

CIEE students have participated in volunteer projects involving marine conservation and generating community involvement in reducing human impact on sensitive environmental areas on the island of Bonaire. The projects change based on needs of the community, and in the past have included hosting a children's festival with a marine ecology theme and a recent project involved using painted rocks to mark the best shore diving entry sites to decrease the impact of shore divers by directing them to a specific entry area. Students have also participated in underwater cleanup dives. The volunteer service projects have had excellent participation from the local community and recognition from the Bonaire National Marine Park.

## eligibility

- Overall GPA 2.75
- 2 semesters of college-level biology required
- Upper-level coursework in ecology and/or zoology recommended
- Nationally recognized Scuba certification or PADI referral (Professional Association of Diving Instruction; see [www.PADI.com](http://www.PADI.com))

## duration

### Fall

15 weeks: early September—mid-December

### Spring

15 weeks: mid-January—early May



## diving

### Scuba Certification

Non-certified students who choose to participate in the program must have a PADI referral, as PADI certifications are only issued on site. A PADI referral has two components: knowledge development and scuba skills development. Students must arrange, complete, and pay for the referral prior to arrival in Bonaire. The fee varies depending on the dive shop, so students should check with their local PADI facility. Students must bring a completed PADI referral form (proof of passing the course and completing the pool work) to Bonaire. CIEE collects the fee for the open certification dives in Bonaire. When the students complete PADI certification, they receive a C-card that certifies them as an Open Water Diver. A C-card is a requirement to dive at most locations around the world.

### Dive Physical and Dive Insurance

The CIEE Study Center in Bonaire is an organizational member of the American Academy of Underwater Scientists (AAUS—[www.aaus.org](http://www.aaus.org)). All dive activities adhere to a set of standards recognized as the "standard of practice" within the scientific diving community. Students dive extensively with CIEE Study Center staff, and in accordance with AAUS standards must complete an intense dive physical before arriving in Bonaire. The physical includes a chest x-ray, spirometry, medical history, and blood and urine tests. Students must also purchase an inexpensive, yet comprehensive dive medical insurance policy from Divers Alert Network (DAN).

## costs

### CIEE Fees

Fall 2011: \$16,100

Spring 2012: available 8/15/11

The CIEE program fees for 2011–12 include an optional on-site airport meet and greet, full-time leadership and support, tuition, housing, 14 meals per week, orientation, cultural activities, local excursions, field trips, national park entry fees, scientific equipment, dive tanks and fills, local transportation, pre-departure advising, and a CIEE iNext travel card which provides insurance and other travel benefits.

### Estimated Additional Costs (Fall 2011)

Transportation (round-trip based on U.S. East Coast departure)	\$ 1,375
Personal Expenses	\$ 1,500
Additional Meals	\$ 750
Scuba Equipment Rental	\$ 1,200
Four Open Water Dives (to complete PADI certification)	\$ 350
Books and Supplies	\$ 100
Local Transportation	\$ 70
Dive Certificates	\$ 200
<b>Total Estimated Additional Costs</b>	<b>\$ 5,545</b>

Check our website for current fees.

## coursework

### Program Requirements

Students are required to take all of the courses offered: Coral Reef Ecology, Cultural and Environmental History of Bonaire, Tropical Marine Conservation Biology, Independent Research Project in Marine Biology and Ecology, Advanced Scuba, and Marine Ecology Field Research Methods.

### Credit

Total recommended credit is 17 semester/25.5 quarter hours.

Contact hours range from 15 to 60 hours and recommended credit is 1–4 semester/1.5–6 quarter hours for each course. See individual course descriptions for details.

### Language of Instruction

English

### Faculty

All courses are taught by CIEE staff.

## a student's story

It's August and I am getting ready to dive into the giant ocean tank to feed the sting rays, which has become one of my daily tasks as an intern at the New England Aquarium. There was a time when I swore that I would never scuba dive. But now I am looking into graduate schools that have concentrations in marine biology in the hopes that one day I will make a living studying, conserving, and diving in the world's oceans.

Out of all the academic work we did throughout the semester, the Independent Research Project was in a league of its own. It was a rigorous battle trying to develop a manageable research project, carry out the data collection, perform an analysis, present the findings, and publish all within four months. With help from our advisors and each other, we were able to get through it and the end brought an immense amount of satisfaction at actually having designed and carried out our own research experiment. The research publication journal, *Physis*, is a standing testament to our hard work and dedication, and it is something that we can look back on years from now and wonder how we were able to pull it off so well.

Although it is geographically a small island, Bonaire has a rich and varied past that we had the pleasure of learning about firsthand by immersing ourselves in it for four straight months. I feel privileged to know so much about it since many people have never even heard of Bonaire. It was a busy, engaging, and eye-opening semester that exposed us to this small fragment of the globe that is truly an island full of life and intrigue.

— Christine Marie San Antonio, University of Vermont

## COURSES

### BIOL 3001 BONA/INDE 3003 BONA

#### Independent Research in Marine Biology and Ecology

Students carry out a project in a topic of their choice in one of the subject areas: coral reef ecology, human ecology, marine conservation management, scientific diving, or another subject matter accepted by the instructors. The project culminates in a research paper that is published in the CIEE journal *Physis: Journal of Marine Science* and a presentation of their projects in a public forum. Students learn the basic steps of the independent research process: finding a topic, formulating a research question and seeking answers, verbalizing research findings, and presenting findings to an audience. Contact hours: 60. Recommended credit: 4 semester/6 quarter hours. *Instructors: Dr. Rita Peachey and Dr. Eva Toth*

### ECOL 3001 BONA

#### Coral Reef Ecology

This course introduces students to basic ecological principles such as competition, diversity, symbiosis, disturbance, adaptation, reproduction, and trophic relationships, as well as basic identification of the major taxa living in coral reef ecosystems. Students also examine the importance of sea grass and mangrove ecosystems. In-water observations and research accompany the majority of the lectures and are essential to the learning process. Contact hours: 60. Recommended credit: 4 semester/6 quarter hours. *Instructor: Prof. Caren Eckrich*

### ECOL 3003 BONA

#### Cultural and Environmental History of Bonaire

A strong conservation ethic has been developed on the island of Bonaire, which has a distinctive and interesting multicultural heritage. The Cultural and Environmental History of Bonaire investigates the environmental and cultural changes in Bonaire from pre-history through the present. Bonaire is examined from a historical vantage point, including an examination of its indigenous roots and the impact of colonization, slavery, the salt industry, and tourism on the island. Bonaire's ongoing social, political, and environmental issues are examined in order to help students deepen their insights into the interplay between culture and environment. Topics include sustainable development, eco-spirituality, environmental valuation, consumerism, natural resources and violence, and the precautionary principle. Contact hours: 30. Recommended credit: 2 semester/3 quarter hours. *Instructor: Dr. Rita Peachey*

### ENVI 3002 BONA/MARI 3003 BONA

#### Tropical Marine Conservation Biology

This course examines the properties of tropical ecosystems; the fundamental relationships between species; the dynamic biological, ecological, physical, and chemical properties of the marine environment; marine animal ecology; the management challenges the marine environment poses; the human impacts on marine species and ecosystems; the role of marine reserves and protected areas in conservation; and the role of participatory management in conservation. Examples and case studies are drawn from around the Caribbean, particularly Bonaire, to illustrate concepts in the conservation and management of tropical marine ecosystems and species. Topics include: invasive species, restoration ecology, overfishing, reserve design, collaborative and community-based management, population ecology, coral disease, and nutrient enrichment. The class participates in collaborative field research with the Bonaire National Marine Park and Sea Turtle Conservation Bonaire. Contact hours: 45. Recommended credit: 3 semester/4.5 quarter hours. *Instructor: Dr. Eva Toth*

### MARI 3004 BONA

#### Advanced Scuba

Students expand their understanding of scuba diving beyond the recreational level in order to participate fully in the scientific dive program in Bonaire. Students learn techniques that improve their diving skills, and they learn to respond to medical emergencies in or out of the water. By completing the course, students gain certifications in Open Water Diving, Advanced Open Water Diving, Rescue Diving, Emergency First Responder, and Diver's Alert Network Oxygen First Aid. Contact hours: 15. Recommended credit: 1 semester/1.5 quarter hours. *Instructor: Prof. Caren Eckrich*

### MARI 3005 BONA

#### Marine Ecology Field Research Methods

Students apply internationally recognized field research methods in an inquiry-driven approach to understanding coral reef ecology. The course focuses on training students in field observation, data collection, record keeping, and data analysis in order to study coral reef populations and communities. During the course, students conduct fieldwork with scuba and are involved in ongoing research projects in collaboration with the Bonaire National Marine Park and Sea Turtle Conservation Bonaire. Contact hours: 45. Recommended credit: 3 semester/4.5 quarter hours. *Instructor: Prof. Caren Eckrich*