



S F S THE SCHOOL
FOR FIELD STUDIES

16

SEMESTER & SUMMER PROGRAMS



Environmental Field Studies Abroad

AUSTRALIA
BHUTAN
CAMBODIA
COSTA RICA
PANAMA
PERU
TANZANIA
TURKS & CAICOS ISLANDS

cat.fieldstudies.org

The world needs environmental leaders.

Will you be one of them?

Each of us has a critical role to play in protecting our environment for the present and future of plant, animal, and human life. We face unprecedented, complex challenges including climate change, population growth, and biodiversity loss.

The School for Field Studies (SFS) was founded 35 years ago to inspire and educate students to address these challenges head-on. In some of the world's most biodiverse and iconic ecosystems, our students examine and research local environmental issues from multiple disciplinary perspectives—ecology, resource management, economics, applied anthropology, and political science.

Regardless of your area of study, SFS programs augment your college classroom education, bringing concepts to life through hands-on field

work, practical and transferable research skills, and meaningful personal and cross-cultural experiences. The data from research you conduct inform wildlife officials, government organizations, and other environmental agencies. Whether in the Peruvian rainforest or the mountains of Bhutan, you have the opportunity to help preserve the balance and vibrancy of human communities and the ecosystems around them.

More than 16,500 students have participated in our programs, and our alumni frequently tell us that SFS ignited passion and direction for their careers. SFS alumni are environmental leaders in the worlds of academia, activism, business, and government. Their work is living proof that the valuable research, critical thinking, and leadership skills that you develop on an SFS program will make you a strong candidate for graduate school and lay the groundwork for your future career.



“12 weeks ago, 34 of us arrived on South Caicos as total strangers. Our interactions with each other and the time we have spent with the people of South Caicos have had a profound impact on what we see, what we feel, and how we interpret our role on planet Earth. It's impossible to spend a semester here and not have your perception on any of these individual entities changed.

We understand that leaders will be needed as the global push for the preservation of our natural world continues. Not only a simple acknowledgement, but a true and pronounced understanding of our individual roles will be necessary in this push for change. Too often, we are informed of the detrimental mistakes of the past which have led to the fragility of Earth's ecosystems; yet over the past 12 weeks, it's safe to say that we've realized the capacity for progress which can be brought about by collective understanding and action.

Students study abroad for many reasons—to engage a sense of adventure, to experience a new culture, to build a resume. But beyond all of these benefits, SFS lets you become part of something greater than yourself. Your work strengthens the sustainability of your host community, so that even when you return home, your impact continues to grow.

SFS programs challenge and inspire, but they also provide you with the skills to make a global difference. The world is waiting for the next generation of environmental leaders. Will you be one of them?





SFS: At a Glance

A Legacy of Environmental Leadership

In the early 1980s, some of our nation's top colleges and universities introduced environmental studies into their curricula, pioneering the notion that effective stewardship of our planet and its finite resources must include not only scientists, but also informed and concerned individuals from all walks of life and in all professions. In the summer of 1981, The School for Field Studies (SFS) sent our first group of 75 students into the field.

Building on three and a half decades of environmental field education and research, SFS is widely known as the premier environmental study abroad program. At our global network of field stations, students learn how to collaborate with local community partners and engage in scientific inquiry to address critical environmental problems and create long-term solutions.

Who Studies With SFS?

- Nearly 600 students from 175 universities in groups of 12-34 students at each Center
- Students of all disciplines participate—biology, environmental science, history, anthropology, political science, art, education, economics, pre-vet and pre-med, engineering, business, communications, area studies such as Asian and Latin American studies, and many others.

Semester and Summer Programs

- SFS' interdisciplinary, experiential approach to education is designed to actively engage students in the learning process.
- Students learn through classroom lectures, field lectures and exercises, group projects, Directed Research, and other activities.
- Semester programs comprise four courses—three topical courses and a Directed Research course—and in many programs, an additional culture and language course.
- Summer programs consist of a single four-week course (or six weeks in Bhutan) that combines lectures with field exercises, expeditions, and short research projects. Two summer courses can be taken back-to-back for a total of eight weeks.
- Program activities take place six days a week with part of one day devoted to community engagement, and one day off per week.
- All SFS courses are taught in English.

What is Directed Research?

Through Directed Research (DR)—as opposed to basic, applied, or independent research—students conduct research on a specific topic that is part of the SFS Center's long-term strategic research plan, which has been developed in partnership with local community stakeholders and clients.

The course, taught by resident SFS faculty, provides students with the opportunity to apply the scientific process in a mentored field research project that addresses a local environmental issue. Through the DR project, students contribute to a growing body of scientific research that informs local conservation and resource management decisions.

Emphasis on Skill-Building

Students learn a suite of skills and techniques used in natural and social science field research.

- Practice field methods as varied as species identification, animal behavior observations, habitat assessment and mapping, survey design, field research ethics, water quality assessment, ecological restoration techniques, and animal and plant population sampling techniques.
- Develop important, transferable skills such as research study design, time management, data analysis, and science communication.
- Live and work as part of a community, exercising leadership and developing critical thinking and team-building skills.

Community and Culture

- SFS programs provide cultural experiences through a community-based model. We are permanent residents in the communities where we operate and have developed long-term strategic research plans in collaboration with local partners.
- The SFS academic model is cross-cultural. Through coursework, research, and community engagement, students learn firsthand the value of incorporating local knowledge into the process of defining problems and collaboratively exploring solutions.
- At the end of each program, SFS students present their DR findings to local community members and stakeholders, thereby making relevant contributions that address the environmental issues faced by our partners.
- Our close relationships with local communities provide ample opportunities for service and engagement. Students participate in a variety of cultural events and celebrations. Many SFS programs include a brief homestay.

Safety in the Field

The health and safety of students is of utmost importance to SFS. Our dedicated Safety and Student Life team oversees a comprehensive global risk management system, which incorporates the Forum on Education Abroad's safety standards and touches every element of an SFS program. For a more detailed description of our safety model and for contact information, please visit cat.fieldstudies.org/safety.



Wow. That is the first word that comes to me when I reflect on my semester spent with SFS. The eye-opening experiences, the intriguing lectures, the intelligent and engaging professors, and my amazing fellow students all made the semester one of the most enriching experiences of my life.

— **Hayden Shea**
Middlebury College
Costa Rica Fall '11



Research Philosophy

Although your SFS experience will be much more than your research project, SFS' approach to research informs how we work and sets us apart from other study abroad options.

SFS is recognized by partner universities in the U.S. for giving students challenging, mentored field research experiences. At SFS, research is embedded within our long-term commitment to the communities where we live and work. Each SFS Center partners with local and national stakeholders to collaboratively develop long-term strategic research plans. These plans inform the Center's research objectives, as well as students' research projects, promoting a continuous exchange of knowledge among the Center, the students, and local community members. Community reciprocity is a central part of our mission.

Participating in research is an important component of undergraduate education because it improves critical thinking and analytical skills, understanding of scientific literature, and the ability to conceptualize and communicate complex ideas. Conducting research as an undergraduate also helps students clarify career aspirations, build persistence, balance collaborative and individual work, and grow as leaders and teammates.

SFS practices "applied, user-inspired research." In a nutshell, this means that on an SFS program, your research project can help our host community to answer its important environmental questions. At SFS, you put a face on environmental issues, discover their complexities, grapple with conflicts occurring between local stakeholders' resource needs and finite natural resources, and propose solutions for sustainable resource use. At SFS we:

- **Focus on problem-solving.** You examine real-world environmental issues critical to local communities.
- **Utilize a community-based approach.** You interact with community members and agencies to execute research projects that meet community-defined goals.
- **Use an interdisciplinary model.** Environmental problems have complex solutions, requiring an integrated academic approach that incorporates disciplines including biology, ecology, policy, management, ethics, and socioeconomic.
- **Encourage collaborative team efforts.** You jointly design and conduct research projects to find solutions to environmental issues.
- **Employ experiential learning.** You take knowledge and concepts from the classroom and apply them to an actual environmental problem in the real world.
- **Emphasize dissemination and scientific communication.** We encourage you to present your research in national and international forums, and our students frequently co-author articles in peer-reviewed publications.

As you leave your SFS program—in addition to having an incredible study abroad experience—you will have an international field research experience that sets you apart from your undergraduate classmates, gives you transferable and marketable skills, and enhances your personal, academic, and professional pursuits for years to come.

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AUSTRALIA

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 5

Fall 2016: August 29 – December 1



Tropical Rainforest Studies

THE ENVIRONMENTAL CONTEXT

For thousands of years, the tropical rainforests of Far North Queensland, Australia, have been home to Aboriginal groups that play a vital role in co-managing the Wet Tropics World Heritage Area, as well as to numerous plants, birds, and marsupials found nowhere else in the world. Daintree National Park, where the rainforest-covered mountains meet the coast, contains some of the oldest living plants on Earth. Giant strangler figs, woody climbing vines, epiphytes, large pythons, colorful parrots, giant cassowaries, bandicoots, and tree kangaroos fill the Wet Tropics with color, sound, and complexity.

Northeastern Queensland's ancient rainforests preserve millions of years of evolutionary history, though unfortunately, these repositories have been greatly affected by habitat loss, fragmentation, and climate change. The area once supported extensive rainforests, but logging, mining, and agricultural production over the past two centuries have destroyed and degraded rainforest habitats, disrupting the patterns and processes that keep these forests vibrant.

In addition to habitat fragmentation, climate change is also contributing to the loss of plant and animal species. The Wet Tropics of Far North Queensland are viewed as the “canary in the coal mine” for observing the effects of climate change. Climate models predict a significant rise in local temperatures over the next century, causing devastating impacts across the region. The rise in temperature is predicted to result in the loss of more than half of all regionally endemic bird and mammal species.

Australia continues to be a global front-runner in recognizing the significance of ecosystem services and restoration ecology practices to maintain and ensure healthy rainforests. The country has largely halted rainforest destruction, established effective protected areas, and is confronting the threat of forest species loss from climate change more proactively than most tropical countries. Still, the integrity and survival of these ancient, unique, and majestic rainforests hinge upon developing management solutions that consider both global and local impacts on biodiversity while also supporting economic and social sustainability for local communities.



“The program offered classes that were challenging, fun, and practical. By integrating real-life examples, performing hands-on exercises in and out of the classroom, and focusing on critical thinking skills, I developed a better understanding of the material.”

— **Briana Snyder**
Ohio Wesleyan University
Australia Spring '14



THE SFS CENTER FOR RAINFOREST STUDIES

The Center lies on the edge of the Atherton Tablelands in the heart of the traditional land of the Yidinji people, not far from the small town of Yungaburra. Protected World Heritage forests and farmland surround rolling hills covered in tropical foliage. Student cabins are nestled within the rainforest, which comprises 97 percent of the property's 153 acres. The site is alive with the sounds of the rainforest, and sightings of tropical birds, bandicoots, pademelons, musky rat kangaroos, amethystine pythons, and other rainforest species are common. Students share eight-person cabins with separate shower and bathroom facilities. The main building of the field station houses the classroom, dining area, and a common room, while the lab is just a short walk away.



OUR CURRICULUM AND RESEARCH

While representing only a small percentage of the world's rainforest, the astonishing biodiversity of Australia's rainforests and the country's dynamic conservation efforts make Queensland an extraordinary laboratory for students to study rainforest management and restoration. Cyclones and other extreme weather events continue to threaten the remaining rainforest fragments, raising questions about how to manage these hyper-disturbed areas in times of change. Management strategies developed here may serve as a model for conserving and restoring other rainforests around the world.

The ecological and economic benefits of rainforests are increasingly well understood; however, less is known about rainforest ecosystem dynamics and—particularly in this part of the world—how to effectively restore and manage highly fragmented rainforest habitats. Our goals are to examine the dynamics of rainforest ecosystems, including the long-term impacts of fragmentation and climate change, and, in turn, to develop rainforest conservation and restoration strategies that benefit both ecosystems and human communities.

The program's curriculum and strategic research plan address the critical local and regional environmental problem of loss and fragmentation of once extensive rainforests, and examine environmental policies on local and national levels. SFS staff and students, in collaboration with local landholders and stakeholder organizations, focus on enhancing the condition of tropical rainforests and determining how to regenerate and restore the rainforest of the Atherton Tablelands. Students also explore the connection between the cultures and livelihoods of Aboriginal communities and their surrounding environments.

Students learn field research techniques as they collect data on topics as diverse as:

- Potential responses of biotic communities to climate change
- Habitat use and animal behaviors
- Resilience to cyclonic events
- Sustainable tourism
- Local resident involvement in restoration projects
- Cost-effective and ecologically beneficial methods of rainforest restoration

COURSES

Semester students are registered in four academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3020	Environmental Policy and Socioeconomic Values	04
SFS 3690	Rainforest Ecology	04
SFS 3700	Principles of Forest Management	04
SFS 4910	Directed Research	04

Please see page 48 for course descriptions

Program Highlights

- Live in the heart of the rainforest, study ecology and conservation, and explore environmental policies and practices that shape sustainable development in the region
- Camp in Chillagoe and explore the Outback's caves, rock formations, remnant dry rainforests, and eucalypt savanna
- Enjoy a multi-day excursion to Cape Tribulation and Daintree National Park, home to one of the oldest tropical rainforests in the world: hike through lowland rainforests, mangrove forests, and palm forests; traverse the Daintree River, famous for its crocodiles; visit the canopy tower at the Daintree Discovery Centre

Field Exercises & Skills Development

- Lend a hand at the TREAT (Trees for the Evelyn and Atherton Tablelands Inc.) nursery
- Explore the countries of local Aboriginal groups, gaining an understanding of indigenous culture and their use and management of natural resources
- Assess local residents' and tourists' attitudes toward nature and restoration
- Learn about the geology and historical biogeography of the Atherton Tablelands
- Identify rainforest plants and assess forest community types across the region
- Study the endemic fauna of Australia and gain an understanding of their ecological services in the tropical rainforest; learn about how invasive species impact Australian ecosystems
- Get hands-on experience with rainforest restoration practices, such as propagating seedlings, planting new rainforests, and monitoring restoration plantings
- Study the threat that climate change poses to tropical rainforests and use modeling tools to predict its impact in the Wet Tropics
- Develop field research skills including GIS, animal identification and observation techniques, rainforest management strategies, social science research methods, data recording and analysis, research design, restoration techniques, climate modeling, scientific writing, and oral presentation



Directed Research Project Examples

- Working alongside the Mandingalbay Yidinji people to help determine barriers to and opportunities for the development of eco-cultural tourism
- Climate modeling, rainforest corridor plantings, and restoration
- Evaluating the efficacy of policies used to address environmental problems
- Studying patterns of colonization of restored rainforest by vertebrates
- Assessing habitat use by yellow-bellied gliders and tree kangaroos
- Using plant functional traits to predict drought and cyclone resistance
- Determining carbon sequestration values of restored rainforests
- Assessing nature-based tourism and its role in the Wet Tropics
- Studying long-term effects and recovery of forests from selective logging

SFS at Work

While SFS students come away with countless memories, new perspectives, skills, and friends, they also leave something of value behind. Our ongoing research and close ties with community stakeholders allow students to make contributions including:

- Assisting community members with propagating, planting, and maintaining more than 15,000 trees over the last few years to restore degraded forests, improve water quality, and sequester carbon
- Assessing tree seedling recruitment and growth, while working toward recommending best practices for successful restoration
- Helping community members to restore and return more than one mile of rainforest from grassland along the lower Peterson Creek
- Contributing to research that informs biodiversity management action plans for species such as the Lumholtz's Tree Kangaroo

Get Involved With the Community

The Atherton Tablelands and Wet Tropics have been home to The SFS Center for Rainforest Studies for more than 25 years. SFS is an active and engaged partner with many community organizations including TREAT, Landcare, Tablelands National Park Volunteers, and Tree Kangaroo and Mammal Group. Our research provides scientific data and has direct policy implications for local decision makers. It also creates important linkages between our Center and the diverse stakeholders involved in rainforest restoration and management and the development of sustainable communities and industries.

Our students forge strong connections with residents who are passionate and knowledgeable about environmental stewardship. Participating in restoration projects alongside citizen volunteers, students come to understand rainforest ecosystems and management from a local perspective.

SFS students and staff add significantly to the social fabric of the community by getting involved in community volunteer projects and social activities such as:

- Helping local conservation groups and communities plant rainforest trees
- Participating in community fauna surveys
- Attending special lectures on wildlife in conjunction with local conservation groups
- Hosting community dinners and participating in short homestays
- Attending bush dances and community festivals, visiting the Malanda theatre, and socializing at the local pubs and sporting competitions
- Engaging with Aboriginal elders to learn more about their culture and efforts to reclaim their role in land management



The Directed Research portion of this program is one of the most valuable experiences I have ever had.

The work we did focused on assisting the Aboriginal community with their goal of forming an indigenous-run ecotourism program by conducting preliminary research on the ranger program they had in place. Addressing both environmental and cultural concerns in my research left me realizing my



two areas of study could be combined within my future profession. People have always asked me what I wish to do with my degree, and I never had an answer until now.

Willa Akey

Grinnell College
Australia Spring '14

For details and how to apply, visit: cat.fieldstudies.org/australia



AUSTRALIA & NEW ZEALAND

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

Session I: June 6 – July 6

Session II: July 11 – August 10



Tropical Rainforest Studies

Rainforest ecosystems harbor some of the world's highest levels of biodiversity. In Australia and New Zealand, rainforests also host extraordinary remnants of the world's oldest species of plants and animals. Large areas of northeastern Queensland, Australia, were once covered in spectacular tropical rainforests, preserving millions of years of evolutionary history. Over the centuries, however, logging, farming, and development have destroyed and disrupted rainforest ecosystems and habitats, leaving fragile fragments that are often too small or isolated to sustain some species.

Though many of Australia's tropical forests and species are now protected under World Heritage legislation, they continue to be threatened by climate change and invasive species. Similarly, in northern New Zealand, only fragments of ancient forests remain to house endemic fauna and flora, as well as provide food, medicine, spiritual, and economic value to residents and visitors.

SESSION I: RAINFOREST MANAGEMENT STUDIES IN AUSTRALIA AND NEW ZEALAND

Students compare and contrast the ecological, geographic, social, economic, and historical factors that have shaped natural resource management in northeastern Australia and northern New Zealand. These two countries share a similar Gondwanan history; however, European settlement patterns, indigenous histories, and economic development differ significantly between the two countries.

In New Zealand, students discover its critically endangered flora and fauna and the impacts that have led to their decline. In Australia, students build on their New Zealand experiences by examining similarities and differences in political structure, co-management arrangements, land-use patterns, and biogeography in the two countries.

Field Expeditions and Exercises

- Examine the influence of fragmentation and other pressures on abiotic and biotic elements of forest communities in Australia and New Zealand
- Visit the ancient rainforest refugia at Mossman Gorge and Daintree National Park
- Explore the ancient podocarp and Kauri forests of northern New Zealand
- Examine historic Aboriginal and Maori land-use practices in Australia and New Zealand and experience contemporary indigenous culture

SESSION II: TECHNIQUES FOR RAINFOREST RESEARCH IN AUSTRALIA

In this second summer session, the emphasis is on learning and practicing field research methods in ecology, resource management, and social science. Examining the effects of habitat loss and fragmentation in rainforest systems and changes to the human communities living near them, students explore Australia's tropical rainforests and develop effective field skills while learning about rainforest restoration, conservation, and sustainable development.

Field Expeditions and Exercises

- Learn sampling design, plant identification, forest survey techniques, animal survey methods, and social science research techniques
- Experience largely intact lowland rainforest and contrast these with the fragmentation effects impacting the rainforests of the Atherton Tablelands

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or in combination to provide a thorough introduction to biodiversity conservation and the socioeconomic factors influencing land and resource management in two countries. Students participating in both sessions receive a \$1,000 discount.

For details and how to apply, visit: cat.fieldstudies.org/australia

COURSES

Summer students are registered in one or two academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3540	Rainforest Management Studies in Australia & New Zealand	04
SFS 3550	Techniques for Rainforest Research in Australia	04

Please see page 51 for course descriptions



“Being immersed in the rainforest allowed me to learn about its ecology, as well as important management strategies, in such a way that never would have been possible in a classroom. In addition to gaining a plethora of knowledge and insight into the rainforest, I also made lifelong friends who share a passion for the environment.

— Meridith McClure
University of Tennessee at Chattanooga
Australia Summer '14



BHUTAN

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Fall 2016: August 29 – December 7



Himalayan Environment and Society in Transition

THE ENVIRONMENTAL CONTEXT

The Kingdom of Bhutan, a small, landlocked country nestled in the rugged eastern Himalayas, sits between two of Asia's geopolitical giants, India and China. Incredibly mountainous, Bhutan ranges from 400 feet above sea level at its southern border to more than 24,000 feet. Despite having the same latitude as Miami, the northern reaches of Bhutan have permanent glaciers, which feed the rivers that are vital to the economy and ecology of the country.

Bhutan's geography creates numerous eco-zones, providing habitats for a vast array of plant and animal species. Located in one of the major biodiversity hot spots in the world, the country is home to myriad birds, butterflies, and rhododendrons. The takin, snow leopard, golden langur, black-necked crane, and tiger are among Bhutan's diverse and charismatic fauna. The high percentage of forest cover is an increasingly valuable resource that the Bhutanese strive to manage sustainably and for the benefit of both humans and nature.

The country's rich cultural traditions and social and political institutions reflect the Buddhist principle of The Middle Path, integrating people and nature, traditional knowledge, and modern science. Bhutan's four pillars of development—equitable socioeconomic growth, preservation and promotion of culture, conservation of environment, and good governance—are geared towards increasing Gross National Happiness, an approach to development that measures progress and prosperity with the physical, spiritual, social, and environmental health of citizens and the natural environment.

Because the majority of people still reside in rural areas and practice small-scale agriculture and forest product extraction, sustainable management of local natural resources is critical for achieving the country's holistic development goals.



“Reverence to the land is intrinsic with respect to religion, policy, and social conduct and has created an ethic that pervades Bhutanese life; that, I think, should serve as a reference point for other societies of the world.”

— Markus MacNamara

Guilford College
Bhutan Summer '12



UGYEN WANGCHUCK INSTITUTE FOR CONSERVATION AND ENVIRONMENT

The Ugyen Wangchuck Institute for Conservation and Environment (UWICE) is a government institution that serves as a center for research, policy dialogue, and training in the fields of conservation and environmental sciences. SFS students live and study on the UWICE campus in the town of Jakar (Choeckhor), set in Bumthang Valley. The facility is the former palace of Bhutan's first king, built in traditional Bhutanese architecture with colorful decorations both inside and out. The dormitories and cafeteria are just steps away from the *dzong* where classes are held. The UWICE campus offers magnificent views of the surrounding valley, the mountains swathed in clouds, and cattle or ponies grazing in the yard.





OUR CURRICULUM AND RESEARCH

The program curriculum and research agenda address issues related to modernization in Bhutan: the support of rural livelihoods and the conservation of biodiversity in the face of a changing society and landscape. By getting to know the local and national institutions that contribute to the management and governance of environmental resources, students gain an appreciation of the complexity of identifying and addressing conservation issues in a developing region.

SFS staff and students, in collaboration with our partner, the Ugyen Wangchuck Institute for Conservation and Environment (UWICE), focus on enhancing the condition of forest, river, and mountain ecosystems while balancing modernization and cultural preservation. SFS students contribute to the advancement of the Institute's research agenda in several priority areas including sustainable forestry, conservation biology, water resources, socioeconomics, and policy. Underlying themes of the joint research we undertake include climate change adaptation, natural resource and water management, rural-urban migration, and sustainable livelihoods.

The semester curriculum comprises three thematic components, all centered on the environment:

- **People's relationship with nature:** Students explore the human-nature interface through the lenses of religion, society, and culture. We strive to uncover the knowledge, perceptions, beliefs, and attitudes about nature from an array of stakeholders. Students evaluate human dependence on and vulnerabilities to the processes, resources, and events in nature.
- **Democratization, governance, and rural development:** Students learn about the policies and institutions in Bhutan that provide conditions necessary for livelihood security, good governance, and equitable socioeconomic development.
- **Ecology, conservation, and resource management:** Students study key species and their habitats, as well as Bhutan's conservation and natural resource management strategies—main pillars supporting human welfare and economic development in Bhutan.

The three-month program operates primarily in the forests, fields, and villages of the central district of Bumthang. Trekking across valleys and ridges and through villages, students learn about culture, Buddhist philosophy, and environmental issues, and gain an intimate knowledge of the local ecosystems and rural livelihoods. Students develop skills in assessing environmental problems, defining research questions, conducting field research, and communicating results.

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3040	Political and Socioeconomic Dimensions of Environment	04
SFS 3060	Mountain Ecology	04
SFS 3050	Land Use, Natural Resources, and Conservation	04
SFS 4910	Directed Research	04
SFS 2010	Religion and Culture of Bhutan	02

Please see page 48 for course descriptions

Program Highlights

- Explore Thimphu—the only capital city in the world without traffic lights—and experience the friendly people of Bhutan while engaging the senses visiting shops, temples, and market stands
- Visit some of the most influential and inspiring places of Buddhist worship in the Kingdom including Taktsang Dzong (Tiger's Nest Monastery), as well as Trongsa Dzong and Punakha Dzong
- Participate in a multi-day trek through villages, old-growth forests, and riverine ecosystems up to 14,000 feet above sea level

Field Exercises & Skills Development

- Explore Phobjikha Valley, an important wetland conservation area for the threatened black-necked crane
- Conduct biodiversity studies and habitat assessments in forests, fields, and along rivers
- Study traditional agricultural systems and practices, and assess how modernization affects the agro-ecosystem and rural household economies
- Explore lower-elevation subtropical Himalayan broadleaf forests (around 4,000 feet above sea level) to observe unique flora and fauna
- Pursue socioeconomic research in towns, on farms, and with businesses to assess how development in the Kingdom has influenced well-being
- Visit monasteries to learn about the role of Buddhism in Bhutanese society and culture, especially as it relates to environmental concerns and national happiness
- Develop field research skills including species identification, biodiversity assessment, survey design and interviewing techniques, environmental impact and protected-areas assessment, GIS or remote sensing, habitat assessment and mapping species distributions, scientific writing, and oral presentation



Directed Research Project Examples

- Compare timber productivity in community forests and private forests
- Examine the effect of cattle grazing on blue pine encroachment
- Study the connections between land use and water quality
- Assess the abundance and status of key economic species; perform baseline biodiversity analyses
- Investigate the impact of roads on community forest and agrarian livelihoods
- Determine how rural-to-urban migration impacts food security and nutrition across the country
- Examine the interest in and potential for payment for ecosystem services

Get Involved With the Community

Community reciprocity is at the heart of the SFS organizational and educational model. SFS students face the real-world complexities of issues affecting our host communities. With the results of our research, we offer data and recommendations that inform decision makers and build relationships between SFS and local stakeholders involved in biodiversity conservation and resource management.

As at our other Centers throughout the world, SFS is a part of the social fabric of the communities in which we are hosted. SFS students get involved in community volunteer projects and social activities such as:

- Stream cleanup in Jakar town
- Environmental education with nature clubs in local schools
- Sports and cultural exchanges
- Trail maintenance and landscaping on UWICE campus
- Service to the monastic community
- Day-stays with local families
- Attending local *tsechus* (festivals)

Our Partner in Bhutan

Ugyen Wangchuck Institute for Conservation and Environment (UWICE) is a governmental institution founded in 2008 and housed within the Royal Government of Bhutan's Ministry of Agriculture and Forests, whose mandate is to provide a center for research, policy dialogue, and training on issues related to environmental conservation.

Building on five years of collaboration, SFS and UWICE partnered to provide students with a field-based environmental studies semester program to explore the ecological, societal, and economic aspects of critical environmental issues in Bhutan. The program is delivered by SFS faculty and an international team of scientists, including leading Bhutanese experts in conservation and resource management. The research that SFS students conduct as part of this program is closely aligned with the research priorities of UWICE and the Bhutanese government.

Note: The program operates in rugged and rural environments, and we live and study at altitude (around 10,000 feet elevation). Our work takes us (often by foot) to higher altitudes. The trek and field work require participants to be in excellent physical condition. Our facilities and other rural infrastructure are rustic, and the Bhutanese diet is fairly simple.



“It was incredible hiking around the Himalayas, knowing it was part of my schoolwork.”

There were so many moments where I would stop and try and grasp what I was doing in that moment and it would absolutely take my breath away. There I was, with a Bhutanese elder who had barely had contact with foreigners before, teaching me about his land and sacred water. He had such a strong respect for the land around him, a type of respect that seemed innate. I feel that it could be rooted to the strong Buddhist beliefs that



are engraved in Bhutanese society. To them, water isn't solely viewed as a resource to be protected for human purposes, but rather treated as sacred, with its own intrinsic value.

Kelsey Davison

Salem State University
Bhutan Summer '14

For details and how to apply, visit: cat.fieldstudies.org/bhutan



BHUTAN

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

June 6 - July 14



Eastern Himalayan Forests and Rural Livelihoods

In Bhutan—a Himalayan country with towering mountains, lush forests, and a distinct cultural heritage—progress is measured not just by economic growth, but also through good governance, cultural preservation, and environmental conservation. Bhutanese communities maintain rich cultural traditions, and the country has developed social and political institutions imbued with Buddhist principles of The Middle Path, balancing people and nature, traditional knowledge, and modern science. Sustainable management of natural resources—including soil, water, biodiversity, and minerals—is critical for Bhutan, as these resources are fundamental to the national identity, as well as the local and national economies.

Bhutan's recent transition to a constitutional monarchy and the trends in rural-urban migration put new pressures on the environment. Issues related to human-wildlife conflicts in rural areas, agricultural production and food security, forest resource governance, and environmental policy create a complex web that ultimately affects the well-being of humans and nature.

Curriculum and Research Focus

Traveling through Bhutan, students learn about culture and history, religious traditions, environmental issues, and conservation policies, all while exploring the role that environmental services and natural resources play in rural livelihoods and national development. On this program, the country itself becomes the classroom, as we explore local environmental issues and rural livelihoods through a broad array of learning opportunities including lectures from local experts, field exercises, treks, and a short research project.

Through their research, students contribute to the advancement of SFS' joint research agenda with the Ugyen Wangchuck Institute for Conservation and Environment (UWICE) in areas including sustainable forestry, watershed management, and rural development. Students develop skills in assessing environmental problems, defining research questions, conducting field research, and communicating results to local stakeholders.

In this six-week program, students conduct a research project on themes related to natural resource management. Project themes have included the following:

- Social, economic, and environmental impacts of community forestry
- Payment for ecosystem services assessment
- Blue pine forest encroachment and the potential for private forestry development
- Climate change, water management issues, and flood preparedness

Field Exercises and Expeditions

- Conduct interviews with Bhutanese citizens who have resource-based livelihoods, exploring the relationship between human well-being and natural resources
- Guided by UWICE staff, learn important features of local forest species, including species composition and community dynamics; practice field techniques for tree measurement and how to estimate timber volume
- Consider how religion influences attitudes about the treatment of the environment
- Take a multi-day trek through cultural and natural landscapes, up and over the ridge, between Chamkhar and Tang valley
- Visit the stunning Punakha Dzong and Bumthang monasteries

The cultural elements of the program include multiple interactions with local schools and government institutions, visits to monasteries, and participation in local festivals. Sports and other activities with UWICE staff and local children keep us rooted in community.

Note: The program operates in rugged and rural environments, and we live and study at altitude (around 10,000 feet elevation). Our work takes us (often by foot) to higher altitudes. The trek and field work require participants to be in excellent physical condition. Our facilities and other rural infrastructure are rustic, and the Bhutanese diet is fairly simple.

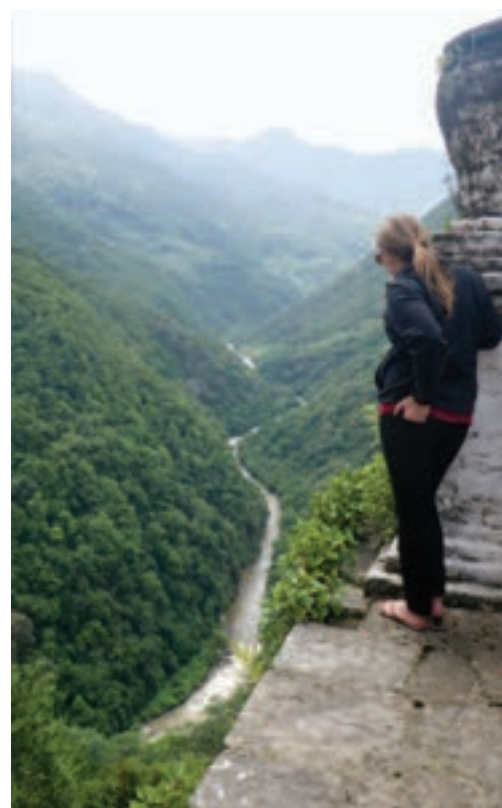
For details and how to apply, visit: cat.fieldstudies.org/bhutan

COURSES

Summer students are registered in one academic course accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3580	Eastern Himalayan Forests and Rural Livelihoods	06

Please see page 51 for course descriptions



“Although there was a large cultural shift involved with my time abroad, the experience was more worthwhile and life-changing than I ever could have imagined. Traveling to Bhutan was one of the greatest experiences of my life, and now that I've been there I can't wait to travel again.

— Jena Trolie

Pennsylvania State University
Bhutan Summer '13



CAMBODIA

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 11

Fall 2016: August 29 – December 7



River Ecosystems and Environmental Ethics

THE ENVIRONMENTAL CONTEXT

The mighty Mekong River, with headwaters originating in the Tibetan plateau and emptying into the massive delta in Vietnam, is a ribbon of life which provides habitats to threatened species and sustains millions of people. About two percent of the entire world's catch of fish comes from waters associated with the Mekong; countless fishers, farmers, and merchants owe their livelihoods to the river. The Mekong River basin is home to the Irrawaddy dolphin, Cantor's giant softshell turtle, and other endangered species. The Mekong also hosts diverse terrestrial eco-regions, including tropical forests, flooded forests, and estuarine mangroves.

The people living in the region's many rural villages rely on the Mekong's productive soils. Their livelihood strategies include subsistence and small-scale commercial farming of rice and other crops. The river system also provides rich grounds for fishing and aquaculture. As cultural and ecological tourism in the Tonle Sap—the great lake of the Mekong—and the Angkor temples become a more dominant economic force, there are increasing opportunities for livelihoods in the service sector.

While there are high levels of biodiversity in the lower Mekong, conservation efforts, including the implementation of environmental policies, are just beginning. Cambodia and Vietnam, both post-conflict nations, are engaged in rapid economic development. Each country's path toward prosperity will have distinct yet profound effects on the natural and cultural landscapes of the region and the livelihoods of their residents.

Drivers of environmental change in the lower Mekong—including economic development, tourism, and climate change—are influencing the development trajectories of current and future generations. The primary focus of this program is identifying these drivers and ways to mitigate damage to natural systems while maintaining human livelihoods. The program also explores the ethical challenges surrounding environmental change and development.



“This semester has been an exceptional blend of fascinating field trips, awesome cultural activities, and beautiful sights.

— **Kayla Deur**
Hollins University
Cambodia Spring '15



THE SFS CENTER FOR MEKONG STUDIES

The program is based in Siem Reap, Cambodia, adjacent to the temples of Angkor, Phnom Kulen National Park, and the Tonle Sap lake. SFS has exclusive use of a guesthouse in town which serves as our field station. The top floor of the guesthouse serves as an open-air dining area and student lounge. Students have easy access to the bustling life of Siem Reap, which enhances opportunities for cultural engagement. The Center is just a short distance away from our primary field sites in the forests, lake, and temples. While at Can Tho University in Vietnam, students stay in an international student dorm.



OUR CURRICULUM AND RESEARCH

Students in this program learn about the complexity and fundamental importance of the Mekong River to the region's ecosystems, livelihoods, and development. Through coursework, field excursions, and Directed Research, students focus on conservation, environmental ethics, and rural development. Students study the interface between livelihoods and the environment, assess aquatic biodiversity and ecology, and gain an understanding of natural resource use and governance.

The greater Siem Reap region provides countless riverine and terrestrial habitats to explore. The UNESCO World Heritage Site of Angkor serves as a backdrop for understanding Cambodian culture and religious pluralism, blending Buddhist, animist, and Hindu beliefs. Buddhism in Cambodia is not only a religion, but also a way of life that reflects the cultural beliefs of the community. Students explore the potential Buddhism has to direct societal norms and principles regarding environmental protection.

Students follow the Mekong River during a month of travel across rural and urban Cambodia. While on the road, students visit key conservation sites along the Mekong, gain appreciation for Cambodia's recent history in Phnom Penh, and discover coastal ecosystems and development pressures in Kampot Province.

The program then travels overland to the Mekong Delta in Vietnam, where students experience a contrasting political, social, and economic system from Cambodia. Students explore the environmental issues in the Mekong Delta including climate change, water resource use, and agricultural development. Program components and topics include:

- Ecology of the flora and fauna of the region and threats to biodiversity
- Drivers of change and pressures on rural livelihoods
- Ethical issues surrounding environmental change and economic development, and the role of ethics in environmental governance and policy
- Scientific principles and practical elements of conservation management
- Comparison of Cambodian and Vietnamese state approaches to conservation, development, and resource management
- Community-based natural resource management and ecotourism models
- Fishers' and farmers' utilization of natural resources for daily sustenance and livelihoods

Program Highlights

- Spend almost a month traveling within Cambodia and Vietnam, studying the diverse habitats and livelihoods that are supported by the Mekong River system
- Evaluate opportunities and challenges in tourism development while exploring the resplendent Khmer temple complex of Angkor, one of the most important archaeological sites in Southeast Asia
- Participate in baseline biodiversity surveys in the Tonle Sap Biosphere Reserve, and investigate the status of migratory bird species

Field Exercises & Skills Development

- Visit the Angkor Center for Conservation and Biodiversity and learn how captive endangered species are being cared for before they are reintroduced into the wild
- Explore Phnom Kulen National Park and Kbal Spean while undertaking qualitative research on natural resource use by local villagers
- Get to know the many major social justice and environmental organizations that operate in Siem Reap and Phnom Penh, and learn about the international non-governmental organization (NGO) community
- Study conservation efforts for the endangered Irrawaddy dolphin and Cantor's giant softshell turtle in rural Kratie
- Observe how the Angkor Butterfly Center raises "trophy" species of butterflies and encourages rural families to begin small-scale caterpillar businesses to augment their incomes
- Visit Phnom Bokor National Park to assess development approaches in a protected area
- Study mangrove restoration projects on the Cambodian coast in Kampot
- Develop field research skills including aquatic and terrestrial organism behavioral observations, biodiversity assessment, survey design and interviewing techniques, environmental impact and protected-areas assessment, scientific writing, and oral presentation

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3800	Conservation Science and Practice	04
SFS 3810	Ecosystems and Livelihoods along the Mekong	04
SFS 3820	Environmental Ethics and Development	04
SFS 4910	Directed Research	04
SFS 2080	Language and Culture of Cambodia and Vietnam	02

Please see page 48 for course descriptions



Vietnam Component

- Explore Tra Su natural reserve, one of the last few places in Southeast Asia that sustains a Melaleuca forest and is home to a number of endangered and endemic birds, reptiles, amphibians, and fish
- Learn from Vietnamese scholars about issues like climate change and the physical dynamics of river systems
- Visit the farms of Sam Mountain—the “rice bowl” of Vietnam—and explore the conservation challenges of rice and shrimp farming in the region
- Observe the built environment of the delta region including complex irrigation systems and flood mitigation structures that control the confluence of the Mekong River and the South China Sea

Directed Research Project Examples

- Assessing livelihood strategies of local residents on the Tonle Sap and in the forested Kulen highlands
- Studying biodiversity in the Tonle Sap aquatic ecosystem
- Evaluating the range of medicinal plant usage in rural communities
- Understanding the role of monks and Buddhism in environmental education, environmental ethics, and wildlife conservation
- Examining approaches to natural resource governance and management in protected areas

Get Involved With the Community

Community reciprocity is at the heart of the SFS organizational and educational model. SFS students face the real-world complexities of issues affecting our host communities. With the results of our research, we offer data and recommendations that inform decision makers and build relationships between SFS and local stakeholders involved in biodiversity conservation and resource management.

As at our other Centers throughout the world, SFS is a part of the social fabric of the communities in which we are hosted. SFS students get involved in community volunteer projects and social activities such as:

- Engaging with the rich cultural heritage of Cambodia and Vietnam, including Khmer language lessons and local homestays
- Hosting community lectures
- Interacting with local students inside and outside of Can Tho University's campus
- Attending community festivals, pagodas, and traditional Apsara dance performances
- Partnering with local NGOs and institutions to address environmental issues
- Exploring local markets to practice language skills and try unique foods



“As students of this program, we are tasked with the joy of discovering the complexity and importance of the Mekong River to the region’s ecosystems and socioeconomic systems.

We just finished our final exams, though we didn’t need to spend hours burrowing our heads in a pile of books to prepare, for when you spend so much time in the field it is much easier to master the material. When you have



the opportunity to live along the Mekong like we do, you get the chance to genuinely realize the rich biodiversity and culture within the great Kingdom of Cambodia.

Jake Meyers

Washington & Jefferson College
Cambodia Fall '14

For details and how to apply, visit: cat.fieldstudies.org/mekong



COSTA RICA

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 11

Fall 2016: August 29 – December 7



Sustainable Development Studies

THE ENVIRONMENTAL CONTEXT

Costa Rica is internationally recognized for its efforts to ensure biodiversity conservation and protection of its natural resources. The country supports more than five percent of the world's species and boasts 230 protected areas—about 26 percent of the land area of the country. Its cloud forests, rainforests, volcanoes, coastal environments, and mountaintops shelter as many as 9,000 plant species, including at least 1,300 species of orchids alone. Costa Rica's various tropical ecosystems contain more than 12,000 species of butterflies and 900 species of birds, such as quetzals, toucans, hummingbirds, and scarlet macaws. This remarkable biodiversity provides a rich platform for nature-based tourism, which is one of the country's primary economic drivers. The diverse landscape mosaic of forests, pastures, coffee farms, and agricultural fields, and the stunning beaches and extensive mangroves, offer residents and tourists alike a natural haven for good food, rich culture, and the exploration of tropical biodiversity.

Costa Rica faces a challenge common to developing countries: preserving beautiful—and economically valuable—natural resources while increasing prosperity and encouraging economic development. The Costa Rican “paradise” is increasingly threatened by population growth, urban development, inappropriate waste disposal, and monoculture expansion. The rapid conversion of rural agricultural landscapes into urban areas, the consequent loss and fragmentation of forests, and the increasing demand for water are challenging the country's sustainable development efforts. Finding long-term solutions in sustainable practices is imperative for Costa Rica's future.



“Each class, community outreach, and field trip taught me so much about the seriousness of climate change, deforestation, and the impact that humans have on the environment.

— Robyn Anes
Albion College
Costa Rica Fall '14



THE SFS CENTER FOR SUSTAINABLE DEVELOPMENT STUDIES

The Center, located an hour from the capital city of San José, comprises a campus facility integrated with a small Rainforest Alliance Certified™ mango and orange farm overlooking the fertile Central Valley. Practicing sustainability is part of the student learning and living experience. The Center's facilities include a dormitory and cafeteria, indoor and outdoor classrooms, an organic garden and greenhouse, a soccer field, a basketball court, a swimming pool, and a forested area with trails. The campus is part of the small neighborhood of La Presa/Los Angeles, and the friendly town of Atenas is only three miles from campus. Costa Rica's tropical forests, beaches, mountains, and volcanoes are all within a day's travel.





OUR CURRICULUM AND RESEARCH

Costa Rica is currently undergoing a period of rapid economic and social change. As this resource-rich and biodiverse country continues along a path of rapid development, it is increasingly influenced by globalized markets and policies, such as free-trade agreements with the United States, China, Canada, Mexico, and Chile, among others. Costa Rica's economy has shifted from one based chiefly on agriculture to one driven by services. At the same time, rapid rural-to-urban conversion is straining natural resources in ecologically fragile areas. The country is at a critical juncture as resource management decisions are being made in an effort to keep pace with competitive global markets.

The program examines different development and resource management models that Costa Rica uses to protect the biodiversity of its ecosystems while promoting socioeconomic benefits for its people. Students will examine the effects of globalization on development issues such as agriculture, biodiversity protection, economic development, urban sprawl, population growth, waste management, and water quality. Students can see how the SFS Center farm compares with other sustainable farms in the region through an assessment of ecosystem services in the agricultural landscape.

This program focuses on evaluating the actual success of Costa Rica's world-renowned conservation systems and developing alternative strategies for economic development and biodiversity conservation, such as land-use planning, organic agriculture, and conservation outside of protected areas. Visits to cloud forests, dry forests, volcanoes, lowland rainforests, farms, and plantations offer opportunities to examine management schemes, identify benefits of protected areas, and determine which systems offer the best options for economic development, the maintenance of cultural norms, and the preservation of biodiversity. Understanding the priorities for Costa Rica's policies, within the context of environmental changes, is crucial as students analyze potential sustainable solutions for Costa Rica and the Central American region.

Program Highlights

- Take an extended field expedition to Nicaragua to compare and contrast development and resource-use issues: hike the volcanoes of Isla Ometepe; explore the rich cultural history of Granada; and study impacts of tourism in the region
- Visit several national parks to investigate the pressures of ecotourism on small gateway communities and learn about tropical forest ecology
- Explore Monteverde Cloud Forest Reserve, a protected area rich in biodiversity and cultural significance

Field Exercises & Skills Development

- Learn about bio-indicators of ecosystem health and rainforest ecology
- Explore Poás Volcano National Park, learning about the geology of Costa Rica and highland ecosystems, management strategies in national parks, and park usage by visitors
- Develop management policies by continuing long-term bird monitoring programs and analyzing the impact of roads on fauna in protected areas
- Spend time in the community of El Sur, hiking through primary rainforest and examining sustainable tourism practices
- Conduct social science research to better understand both residents' and tourists' perceptions about the surrounding environment
- Visit Finca El Toledo, a family-owned and shade-grown organic coffee farm, and learn firsthand about a successful model for integrating conservation and agricultural production in the tropics
- Explore rare and threatened tropical dry forest ecosystems while camping in the national parks of the Guanacaste Province and studying one of the most successful management models for protected areas in Latin America
- Develop field research skills including habitat assessment and mapping, species identification, infrastructure assessment in protected areas, GIS or remote sensing, scientific writing and oral presentation, and survey design and interview techniques

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3030	Economic and Ethical Issues in Sustainable Development	04
SFS 3770	Tropical Ecology and Sustainable Development	04
SFS 3740	Principles of Resource Management	04
SFS 4910	Directed Research	04
SFS 2050	Language, Culture, and Society of Costa Rica	02

Please see page 48 for course descriptions



Directed Research Project Examples

- Investigation of Carara National Park's management practices in response to increased tourism
- Evaluation of the socioeconomic benefits of Costa Rica's national parks for neighboring communities
- Analysis of impact of road traffic noise on the avifauna of national parks
- Measurement of ecosystem services, including biodiversity conservation and carbon sequestration, in agroforestry systems such as shade-grown coffee farms
- Evaluation of the impacts of artificial feeders on the ecology of hummingbirds in Monteverde Cloud Forest Reserve
- Assessment of public perception of the problems and solutions associated with environmental impacts resulting from climate change, urbanization, or management of solid wastes

SFS at Work

While SFS students come away with countless memories, new perspectives, skills, and friends, they also leave something of value behind. Our ongoing research and close ties with community stakeholders allow students to make contributions including:

- Evaluating the impact of invasive species on plant diversity in the Municipal Forest of Atenas
- Conducting biophysical assessments of micro-watersheds for local authorities such as the Ministry of Environment, the Ministry of Health, and the Atenas municipality
- Evaluating the ecological status of freshwater springs in the Cerro Atenas Protected Zone
- Monitoring visitation in national parks of the Central Volcanic Mountain Range Conservation Area

Get Involved With the Community

Conversations and collaborations with local residents, small business owners, and farmers about their perspectives and needs provide the framework for SFS research plans. Our Center is an important stakeholder and partner for local municipalities and ministries, development organizations, and many national parks. The Center has maintained a collaboration agreement with the National System of Conservation Areas for the last 15 years, and more recently has established relationships with local NGOs and universities.

A cornerstone of the program is the opportunity for student engagement in Atenas and surrounding areas. The Center collaborates with local organizations on projects such as:

- Engaging in long-term community projects: U.S. culture and English taught in the elementary schools; environmental education at the Municipal Forest; and recycling projects
- Establishing nurseries of native tree species, and reforestation and watershed conservation projects with local organizations
- Participating in soccer games, community festivals, and short homestay visits



“With a hands-on experience of learning by doing, we were able to learn in a different style compared to classic classroom lectures.

We traveled to biological reserves, national parks, and coffee farms, amongst many other locations, to learn the sustainable (or unsustainable) methods that are practiced



throughout Costa Rica. I was only abroad for three months, but from my time there, it has helped me gain a new perspective on how I see waste in my own life in America.

Yuka Fuchino

Clark University
Costa Rica Fall '14

For details and how to apply, visit: cat.fieldstudies.org/costarica



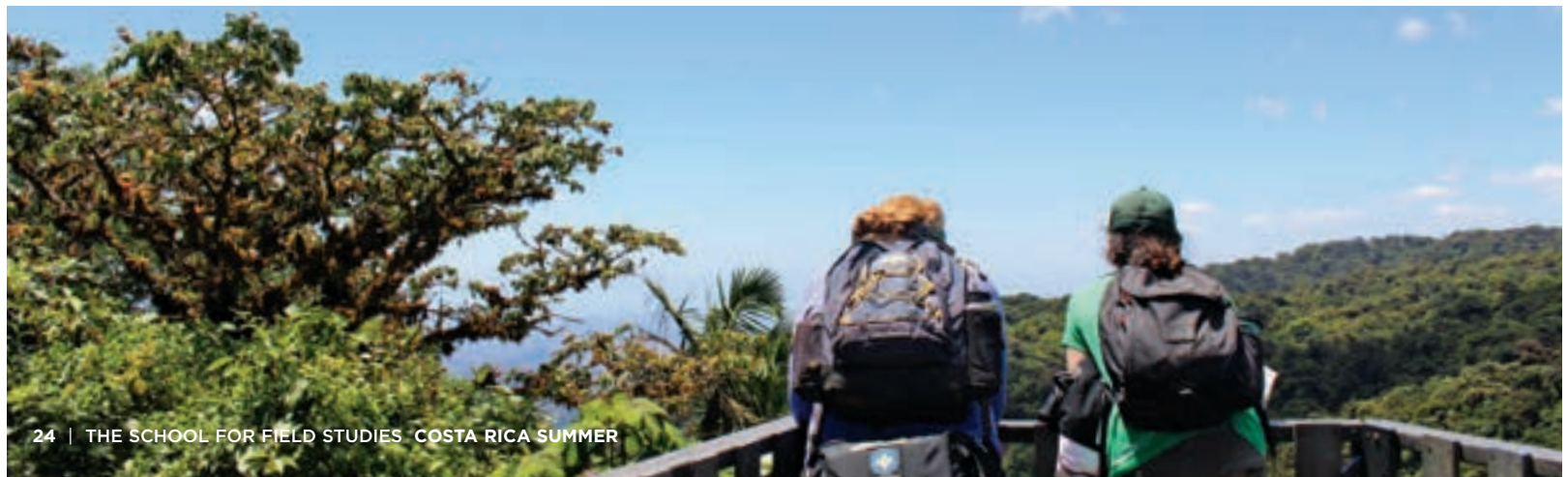
COSTA RICA

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

Session I: June 6 – July 6

Session II: July 11 – August 10



Sustainable Development Studies

Costa Rica is known worldwide for its conservation efforts, which have attracted millions of tourists to its natural protected areas. Accelerated economic growth and urban development, however, frequently take place without coordination of land-use planning, consideration of water and energy sustainability, and the use of adequate waste management systems. These pressures, in combination with climate change impacts, are challenging the sustainable development goals of the country and threatening its biodiversity.

SESSION I: SUSTAINING TROPICAL ECOSYSTEMS: BIODIVERSITY, CONSERVATION, AND DEVELOPMENT

Students explore and address key features of sustainable development strategies including the most pressing challenges occurring at the intersection of conservation and economic progress.

Students learn about Costa Rica's historical and current sustainable development strategies, as well as tropical ecosystem function and connectivity, allowing them to understand the impacts of development on the environment and on society. The course introduces students to models of economic development and biodiversity conservation with field exercises, lectures, and trips in and around Costa Rica's protected areas. A short field research project gives students a practical introduction to research design and methods for achieving conservation goals.

Field Expeditions and Exercises

- Explore the biological diversity of the rainforests of Braulio Carrillo National Park in the Volcanic Cordillera Conservation Area
- Compare and contrast biodiversity protection in examples of conventional and organic agriculture
- Evaluate tourism services and park management practices in Poás Volcano National Park

SESSION II: APPLIED RESEARCH TECHNIQUES AND STRATEGIES TOWARD SUSTAINABILITY

Students learn about the ecological, natural resource management, and socioeconomic factors impacting protected areas and surrounding communities and farms in Costa Rica. In this research-intensive program, the focus is on developing relevant research questions that address local issues related to sustainability. Students propose alternative approaches toward sustainable development in an effort to help address challenges to conservation goals.

Field Expeditions and Exercises

- Explore Poco Sol forest as a natural laboratory in which to practice field observation and hypothesis testing
- Hike the oak forest and páramo ecosystems of the highlands of Cerro de La Muerte
- Visit Arenal Volcano National Park and evaluate the consequences of increased tourism in an effort to inform park managers about opportunities to foster better relationships with surrounding communities

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or in combination to provide a thorough introduction to the sustainability of tropical ecosystems, as well as field research techniques for addressing conservation questions. Students participating in both sessions receive a \$1,000 discount.

SUMMER COMBINED IN PANAMA AND COSTA RICA: SESSIONS I + II

This eight-week combined summer program gives students an opportunity to gain a two-country comparative perspective on the impacts of tourism and development on the natural environment and human communities (see page 30). By engaging in field-based research, students come away with both a conceptual framework for understanding the challenges of addressing complex conservation questions, as well as direct, hands-on experience in two different Central American countries. Students participating in both sessions receive a \$1,000 discount.

For details and how to apply, visit: cat.fieldstudies.org/costarica

COURSES

Summer students are registered in one or two academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3520	Sustaining Tropical Ecosystems: Biodiversity, Conservation, and Development	04
SFS 4930	Applied Research Techniques and Strategies Toward Sustainability	04

Please see page 51 for course descriptions



“Living and conducting research with a group of students with so many diverse interests and personalities was very rewarding. Everyone cared deeply about their connection to the place and their academic passions were wonderfully varied, ranging from soil science to economics. The mix of academic strengths made class projects and discussions insightful and stimulating.”

— Natalie Hurd
The College of William & Mary
Costa Rica Summer '14



PANAMA

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 11

Fall 2016: August 29 – December 7



Tropical Island Biodiversity Studies

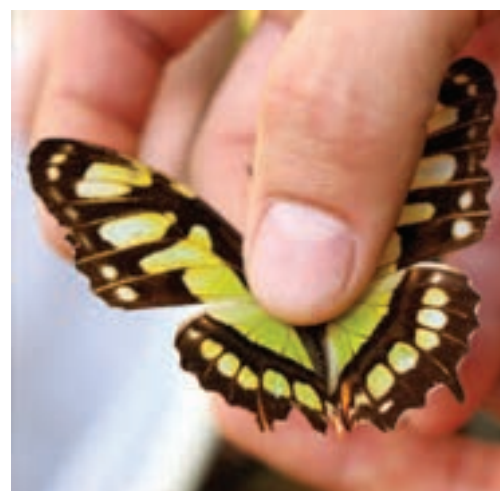
THE ENVIRONMENTAL CONTEXT

Panama is the great connector between two continents, a corridor that links the natural riches of Central America to South America. Few places on Earth can claim the density of species and ecosystem richness of this isthmus. The Bocas del Toro Archipelago, located on the Caribbean side of the country, is a complex and biologically diverse area composed of islands, mangrove forests, coral reefs, and seagrass meadows. The islands themselves are covered with diverse terrestrial ecosystems—from humid lowland rainforests to freshwater marshes—that are important habitats for an abundance of birds, monkeys, sloths, butterflies, arachnids, and the distinctive poison dart frog. Many of the islands' beaches are important nesting grounds for threatened marine turtles. Commonly referred to as the “Galápagos of the Caribbean,” the island systems of Bocas del Toro contain a remarkable wealth of natural resources.

Bocas del Toro is at a critical juncture. Due to a boom in tourism, poorly managed development, and inadequate municipal services, the region's coastal ecosystems are rapidly being converted into tourist infrastructure, resulting in a loss of biodiversity. Population growth, unchecked extraction of resources, water and waste management issues, pollution, and increased recreational practices of humans have put strains on the natural places of the archipelago, many of which form the basis of tourism in the region. Sustainable natural resource harvesting, conservation, and monitoring are critical components of maintaining the economic, societal, and ecological stability of the region.

The degradation of the islands' marine ecosystems and commercial overfishing in the region have also compromised the livelihoods of the indigenous and West Indian groups who live in the archipelago. The area's burgeoning service economy is attracting a growing corps of low-scale wage earners. While this income is important, the adverse effects of this economy are particularly apparent for indigenous people who are the most economically vulnerable. The emerging tourism-based service economy has promoted a transition from traditional nature-based livelihoods for locals to livelihoods based on cash earnings. This change has resulted in a loss of connection between people and their environment, and may compromise the stewardship of local habitats and key natural resources.

The goal of this program is to assess the state of the archipelago's fragile natural habitats and understand the community's goals in natural resource management. We assess which activities are harmful to the flora and fauna, and which support species and habitat conservation, and ultimately, local livelihoods.



“The Bocas del Toro Archipelago is a beautiful Caribbean island setting, which has allowed students here to experience marine life, forest ecosystems, and Central American culture all at once.

— Alex Janssen
University of Denver
Panama Fall '14



THE SFS CENTER FOR TROPICAL ISLAND BIODIVERSITY STUDIES

The Center is located on Isla Colón, the most populous island in the Bocas del Toro Archipelago. Located a short distance from Bocas Town, the field station sits on a quiet waterfront. It is common to hear the sounds of frogs, birds, and monkeys in the surrounding area. Caribbean waters are the backyard of the Center, providing plenty of activities for students including snorkeling, volleyball, and swimming. The classroom is located over the water with views of nearby islands. Due to the Center's central location, the coral reefs, jungles, and beaches of Bocas are only short distances away. The facility includes a dining/classroom area, outdoor classroom, student lounge, pool, plenty of hammocks, and a library/laboratory.



OUR CURRICULUM AND RESEARCH

Bocas del Toro is home to biologically diverse marine and terrestrial ecosystems, such as coral reefs, mangrove cays, white sand beaches, and tropical rainforests; however, the unplanned development of these areas and unmanaged resource use by residents and tourists alike has put increasing pressures on the ecosystems and has threatened the human communities that depend on them.

The curriculum of the program focuses on defining key island systems, both natural and human, and how they interface. Our research in Bocas del Toro has already revealed patterns and processes at the nexus of biodiversity, conservation, and human livelihoods that merit ongoing study. Through field observations and research, students identify and understand the pressures, both direct and indirect, on the environment and social systems.

Students also evaluate the responses by local stakeholders and policymakers aimed at mitigating pressures and restoring balance in the environment. Studies with residents of the Bocas del Toro region about their livelihood strategies, approaches to farming, and use of natural resources help us to assess the sustainability of land and resource use in the region. While Bocas del Toro is home to an eclectic mix of people—including Latinos, West Indians, indigenous people, and expatriates—each group occupies a niche in the social and economic systems of the islands, and each has a distinctive way of relating to the environment. The archipelago offers myriad opportunities to examine how natural systems and human systems are able to mutually exist—but not necessarily without conflict—in this small island region of the rural Caribbean.

Through coursework and research, students gain an understanding of the interdependence of the livelihood strategies of island residents, population structure of key species, and habitat arrangements and conditions. Equipped with foundational knowledge, students then apply sustainability principles to define potential management strategies. Lectures by Panamanian and international researchers and government environmental officials help students to understand the social, economic, and policy context for environmental management.

Program Highlights

- Explore lowland humid rainforests, viewing diverse insects, birds, monkeys, plants, and numerous species of poison dart frogs
- Snorkel for field research and species identification on coral reefs, seagrass beds, and other marine habitats
- Visit indigenous communities and learn about livelihood strategies including farming, fishing, and forest gathering

Field Exercises & Skills Development

- Take shallow-water excursions to the fragile intertidal surf zones where cushion sea stars and spiny sea urchins abound
- Interview and interact with local stakeholders including government agencies, nonprofits, and educational and business leaders to understand the complex implications of management on ecosystems
- Visit and participate in sea turtle conservation projects, patrolling nesting beaches and working with local sea turtle researchers
- Tour several plantations, including cacao, banana, and coffee, within the archipelago and on the mainland to understand the impact of commercial agriculture on the local economy and coastal environment
- Observe dolphin behavior and assess the impact of tourist interaction on resident dolphin populations
- Visit eco-lodges and resort hotels to understand how different types of land development put varied pressures on fragile marine habitats and ecosystems
- Participate in public forums on community-based tourism projects
- Develop field research skills including marine and terrestrial organism behavioral observations, biodiversity assessment, survey design and interviewing techniques, environmental impact and protected-areas assessment, scientific writing and oral presentation, GIS or remote sensing, habitat assessment and mapping species distributions

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3020	Environmental Policy and Socioeconomic Values	04
SFS 3790	Tropical Coastal Ecology	04
SFS 3740	Principles of Resource Management	04
SFS 4910	Directed Research	04
SFS 2070	Language, Culture, and Society of Panama	02

Please see page 48 for course descriptions



Directed Research Project Examples

- Status of key species, including corals, lobsters, and reef fish, and the importance of these species to the livelihoods of local fishers
- Condition of marine and terrestrial habitats, including coral reefs, seagrass beds, mangroves, and humid forests, and strategies for monitoring changes over time
- Effect of edge disturbance as an indicator of forest species diversity and health
- Investigation of changes in marine species abundance and diversity in proximity to Bocas Town
- Food security in a changing landscape, with particular focus on food sourcing and impacts of tourism on local production of food
- The viability of poison dart frogs in fragile ecosystems affected by anthropogenic factors such as habitat loss, land cover changes, and a warming climate
- Livelihood strategies of residents, such as fisheries, ecotourism, agriculture, ranching, and forestry; and decision-making processes of families that extract natural products for subsistence and income generation

Get Involved With the Community

Conservation, resource use, forest preservation, and marine species monitoring are important to local farmers and fishers, resource managers, and concerned community groups. With the results of our research, we offer data and recommendations that inform decision makers and build relationships between SFS and the stakeholders involved in tropical island system conservation and management.

SFS students get involved in community volunteer projects and social activities such as:

- Participating in service trips to help local conservation groups and communities, such as monitoring sea turtle nesting and baby sea turtle emergence (seasonal), as well as beautification or recycling efforts
- Meeting with members of the indigenous Ngöbe community to learn more about their culture and efforts to promote their role in land management and sustainable natural resource use
- Hosting community lectures or demonstrations
- Attending community festivals and sporting competitions
- Tutoring or mentoring school children in English language skills and environmental education



“It is mind-blowing the extent of biodiversity that is right at our fingertips.

The juxtaposition of the calm Caribbean Sea and clear skies one day and the dense deciduous forest blown around by the storm the next is exactly what life is like in the tropical rainforest: diverse and unpredictable in the most exhilarating of ways...



Caroline Hobbs
Skidmore College
Panama Fall '14

For details and how to apply, visit: cat.fieldstudies.org/panama



PANAMA

NEW PROGRAM

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

Session I: June 6 – July 6



Tropical Island Biodiversity Studies

A lush tropical landscape and warm coastal waters make the Bocas del Toro Archipelago a magnet for tourism. The rapid growth in tourism over the last two decades is having a significant impact, however, on the terrestrial and marine environments of the region, as well as the physical infrastructure requirements for potable water, waste management, housing, transportation, and agriculture.

Tourism has also changed the social and economic dynamic of the region, and not always in a positive way. The extent and rate of social and economic change resulting from a tourism-based economy is important to identify, document, and assess in order to mitigate its impact on the people and ecosystems of Bocas del Toro.

NEW SESSION I: TOURISM AND ISLAND SYSTEMS: ASSESSMENT OF SUSTAINABLE PRACTICES

This course introduces students to the marine and terrestrial ecosystems of Bocas del Toro and the challenges presented by a growing reliance on tourism for economic development. Students assess the impact of tourism on the natural environment, including cultural, economic, and political dimensions. Students gain an understanding of the challenges of developing environmental policies that effectively conserve the region's natural resources while providing economic sustainability for local communities.

Students become familiar with the biodiversity of the islands, paying particular attention to the natural elements that attract tourists to the region. Trekking on land through farms, forests, and rangeland, and snorkeling in the clear waters of the archipelago expose students to a variety of tropical habitats—coral reefs, mangroves, and lowland rainforest—and fauna, from poison dart frogs to howler monkeys, sloths, and bottlenose dolphins. Students visit popular tourist destinations, observe tourist activities, and learn to use various assessment techniques to measure and analyze potential correlations between tourism practices and ecosystem function.

By interacting with local stakeholders—indigenous community members, seasonal residents, nonprofits, business owners, and government agencies—students collect data and information on belief systems, traditions, and livelihood practices and how they play a role in the management and protection of this fragile island ecosystem.

Field Expeditions and Exercises

- Interview local stakeholders regarding their perceptions of tourism and its role in Bocas del Toro
- Practice environmental assessment techniques to identify drivers of human-induced stress in natural systems
- Visit national parks in the archipelago to determine how tourism can support protected areas
- Compare ecotourism lodges with large-scale resort hotels and assess their impacts on social, economic, and environmental systems
- Perform cost-benefit analyses on tourist activities and identify the positive and negative effects on natural systems and livelihoods in the archipelago
- Study the impacts and policies related to tourism centered on watching wild animals in their natural habitats (e.g., whale and dolphin watching)
- Draft model plans for optimizing sustainable tourism in Bocas del Toro

SUMMER COMBINED IN PANAMA AND COSTA RICA: SESSIONS I + II

This summer program offers one four-credit course that may be taken individually or in combination with a four-credit course in Costa Rica (see page 24) to provide a thorough introduction to environmental management, tourism, and sustainable development in tropical ecosystems.

The eight-week combined summer program gives students an opportunity to gain a two-country comparative perspective on the impacts of tourism and development on the natural environment and human communities. By engaging in field-based research, students come away with both a conceptual framework for understanding the challenges of addressing complex conservation questions, as well as direct, hands-on experience in two different Central American countries. Students participating in both sessions receive a \$1,000 discount.

For details and how to apply, visit: cat.fieldstudies.org/panama

COURSES

Summer students are registered in one academic course accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3000	Tourism and Island Systems: Assessment of Sustainable Practices	04

Please see page 51 for course descriptions





PERU

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 15 – May 25

Fall 2016: August 29 – December 7



Biodiversity and Development in the Andes-Amazon

THE ENVIRONMENTAL CONTEXT

With extensive humid tropical rainforest, highland forests that make up the upper reach of the Amazon watershed, and the dramatic elevation gradient upward to the continental towers of the Andes Mountains, Peru easily earns itself a place among the five most mega-diverse countries in the world. The endemic biodiversity in the Andean high tropical forests influences the dynamics of the Amazon basin below. The complex topography and array of habitats support diverse flora and fauna and are also home to many indigenous groups. Because of the wealth of social and ecological diversity in Peru, it is a leading destination for biodiversity enthusiasts, anthropologists, scientists, educators, and students from around the world.

The rich natural resources of the Andes-Amazon region have supported human populations for millennia, including indigenous groups who still live in these forests. Today, while the highland region loses population through migration, the Amazon region draws people looking for opportunities to engage in both extractive and productive activities, including small-scale agriculture, timber and non-timber forest product management, fishing and hunting, tourism, and mining. Conservation efforts in the region provide some local residents with alternative livelihoods, resulting in changing perceptions, attitudes, and behaviors in some Andean and Amazonian communities.

The unique ecosystems, habitats, and species of the region are threatened by urban and peri-urban development, road installation, destructive logging, unregulated mining, and high-input agriculture. The social fabric of local communities is jeopardized by significant inequities in socioeconomic development and environmental degradation associated with these industries. Rapid and unorganized growth in the region threatens biodiversity, cultural integrity, and economic development. The goal of this program is to contribute to the baseline knowledge of biological diversity and understand the impacts of the rapidly changing demands on natural resources.



“I looked down at the blue outlines of cascading ridges, and for the hundredth time... I was stunned by where I was: in the cloud forest on the edge of the Peruvian Andes, at the very beginning of the Amazon rainforest.

— Annika Min
University of California, Berkeley
Peru Fall '14



THE SFS CENTER FOR ANDES-AMAZON STUDIES

Villa Carmen Biological Station and Wayqecha Cloud Forest Biological Station—both operated by the Amazon Conservation Association (ACA) and its sister organization, Asociación para la Conservación de la Cuenca Amazónica—are the primary field stations for the SFS Center for Andes-Amazon Studies program. Villa Carmen, a seven-hour drive northeast of Cusco at an elevation of 1,600 to 4,000 feet above sea level, is part of the Manú Biosphere Reserve and a short distance from the small town of Pillcopata. Wayqecha, at 10,000 feet above sea level, is situated in one of the world's most important biodiversity hotspots. At both field stations, students are housed in shared accommodations in the station's dormitory. The field stations' infrastructure includes classrooms, labs, gardens, and many miles of trails.





OUR CURRICULUM AND RESEARCH

This program seeks to understand the conflicts and synergies of conservation and development in western Amazonia and the adjacent Andean highlands. Students learn firsthand about the ecological patterns and processes that underpin the extraordinary biodiversity of the Andes-Amazon region along the eastern slope of the Peruvian Andes. Students explore the concepts of ecological resilience, dispersal and divergence of species, and the value of ecosystem services, as well as the effects of climate change and land use on regional and global biodiversity and human well-being.

Students take multi-day expeditions to both the pristine lowland Amazon rainforest and to the Sacred Valley of the Incas in the Andes to experience the cultural and biological diversity of these vastly different regions. While in the lowlands, students explore rare primary tropical rainforests and learn about the history of people whose traditions and livelihoods are intimately connected to wild places. In the Sacred Valley, an area surrounding the modern city of Cusco which has great importance to the cultural and ecological history of the region, students explore how natural resources have been managed over millennia in an environment that has extreme weather conditions and steep elevation gradients.

The rich ecosystems of the Andes-Amazon support a diversity of social actors and cultural groups who employ a suite of livelihood strategies that are both typical of resource-rich, rural areas and unique to Peru. Students consider how nature-society interactions, such as agriculture, resource extraction, tourism, and rural development, have shaped the natural landscape and the social and economic conditions in the region.

Through coursework, field exercises, and Directed Research, students experience the richness of the Andes-Amazon region, study people's dependence on the environment, examine threats to the environment and to social networks, and explore the tools and strategies that both mitigate threats and promote well-being among rural communities. Our research projects are geared towards identifying the range of socio-ecological issues, as well as basic questions about biodiversity, that help us guide and inform the program's research agenda.

Program Highlights

- Explore the lowland rainforest on a multi-day excursion, visiting oxbow lakes and flooded rainforests to understand differences in forest types and species composition
- Visit the Sacred Valley of the Incas on a multi-day expedition, investigating highland tropical forests, historical and modern methods of natural resource management, and the interface between society and the environment
- Experience a cloud forest ecosystem at Wayqecha Biological Station, studying long-term impacts of climate change in the area, and comparing the flora and fauna with that of tropical rainforests

Field Exercises & Skills Development

- Explore a variety of biomes—from lowland tropical rainforest to palm swamps and upland forest—in the Andes-Amazon region
- Study salt licks and mammal ecology
- Investigate the concept of ecosystem management in national parks
- Conduct a socioeconomic and environmental impact assessment of development initiatives in Pillcopata
- Examine urban development and tourism in the Sacred Valley and Cusco city, a UNESCO World Heritage Site renowned for its meeting of two distinct cultures—Inca and Hispanic
- Use planning tools to design conservation strategies for a local issue or an existing development project
- Learn and practice a series of field techniques to collect data on biodiversity and habitat: looking at tree fern diversity along elevation gradients, soil macro-fauna across soil types, or measuring temperature and humidity along a vegetation cover gradient
- Consider the impacts of elevation, slope, and aspect on species distributions during an excursion to the Andean highlands
- Develop field research skills including species identification, biodiversity assessment, survey design and interviewing techniques, environmental impact and protected-areas assessment, GIS or remote sensing, habitat assessment and mapping species distributions, scientific writing and oral presentation

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3830	Tropical Ecology of the Andes-Amazon	04
SFS 3840	Political Ecology of Developing Landscapes	04
SFS 3800	Conservation Science and Practice	04
SFS 4910	Directed Research	04
SFS 2090	Language, Culture, and Society of Peru	02

Please see page 48 for course descriptions



Directed Research Project Examples

- Studying effects of agricultural and extractive practices on plant community structure and composition
- Investigating and mapping fauna (e.g., jaguar and primate) habitat preferences
- Examining vulnerability of understory herbaceous species to a changing climate in a transitional forest
- Surveying livelihood strategies of residents of Andean migrant communities in the rainforest
- Assessing knowledge, attitudes, and perceptions of conservation efforts in the region among multiple social groups and organizations
- Studying food security and farmer innovation in Kosñipata Valley, where migration has impacted the transfer of knowledge and demand on resources
- Examining perceptions by local people of land use and land cover change in the Kosñipata District
- Examining urban development and tourism in rapidly-growing Amazonian towns

Get Involved With the Community

Peruvians are proud of their diverse cultures and have a very strong national identity. Appreciation of food, civility, and hard work feature strongly in the local ethics. Student engagement with the local residents is supported by studies of Spanish language and a focus on understanding and observing the cultural norms and social mores in the region.

Students have opportunities to interact with our neighbors in the nearby town of Pillcopata, with its large population of Andean migrants, as well as with two rainforest indigenous communities, Huacaria and Queros. SFS facilitates community volunteer projects and social activities such as local environmental education, recycling and waste management, and teaching English.

As in all SFS programs, with the results of our research we offer data and recommendations that inform decision makers and build relationships between SFS and local stakeholders involved in biodiversity conservation and resource management.

Our Partner in Peru

Envisioning a sustainable world, an environmentally educated and responsible human population, and thriving, healthy ecosystems, SFS and Asociación para la Conservación de la Cuenca Amazónica (ACCA) have joined together in an academic and research partnership which aims to strengthen the local scientific community and inform conservation decisions. Environmental research, reciprocity with the surrounding community, and education are at the core of the SFS and ACCA collaboration.

Note: The program operates in rugged and rural environments and within dynamic climatic zones. Students live and study at high altitude (at times over 10,000 feet elevation) for portions of the program; excursions and field work require participants to be in excellent physical condition. Our facilities and other local infrastructure are rustic. Additionally, tropical weather patterns demand flexibility in program planning, so some shifts in itinerary may be necessary, especially during the wet season.



“As I left Peru, I realized how incredible the experience had been;

I met many amazing people and saw a beautiful country. I took away more knowledge than I had come in with, and I had grown my passion for environmental justice and the environment. I grew as a person and also as a citizen of the world.



Skylar Kraatz

Franklin University
Switzerland
Peru Fall '14

For details and how to apply, visit: cat.fieldstudies.org/peru



TANZANIA

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 11

Fall 2016: August 29 – December 7



Wildlife Management Studies

THE ENVIRONMENTAL CONTEXT

Changing land-use practices and socioeconomic shifts occurring among the Maasai, Iraqw, and other ethnic groups are influencing the current conservation and rural development practices in the Maasai steppe of Tanzania. The traditional nomadic, pastoral lifestyles of the Maasai and other groups maintained the integrity of open grasslands that serve as critical migration corridors and dispersal areas for wide-ranging wildlife species, such as elephant, wildebeest, giraffe, and zebra. Today, however, their changing lifestyles—from nomadic pastoralism to a more sedentary, agro-pastoralism—pose a challenge to the long-term conservation of wildlife and other natural resources. Permanent homesteads, land subdivision, and extensive agriculture exert more pressure on the region's natural resources, including water, productive rangelands, and wildlife populations.

Increasing competition for land and other scarce resources in this semiarid region has ecological, social, and economic costs, including the fragmentation of critical wildlife dispersal areas, breakdown in land administration, disparities in land ownership, and human-wildlife conflict. With climate change also causing shifts in hydrology and habitat, protected areas—such as national parks and community wildlife sanctuaries—no longer provide a safe haven for wildlife. Habitat destruction, unplanned tourist activities, and poaching endanger biodiversity and threaten ecotourism activities, which are an important source of revenue for the government and local communities in Tanzania.

SFS, in collaboration with stakeholders and local communities, strives to identify and assess the drivers of habitat degradation and land-use change, as well as the implications for wildlife conservation and for the local and regional economies. Through our long-term research plan, students participate in evaluating and promoting the management and conservation of wildlife and other natural resources, which contributes to longstanding wildlife conservation efforts, promotes local communities' livelihood needs, and helps to reduce conflict between humans and wildlife.



“I’ll never forget the nights my peers and I spent under the stars in Serengeti National Park, surrounded by the observant eyes of spotted hyenas, hungry Cape Buffalo foraging outside our tents, and parts of the great wildebeest migration calling from the hills nearby.

— April Nicole Sperflage

Pennsylvania State University
Tanzania Fall '14



THE SFS CENTER FOR WILDLIFE MANAGEMENT STUDIES

Students live at Moyo Hill Camp (MHC) in Tanzania's Tarangire-Manyara ecosystem between Lake Manyara National Park and the famous Ngorongoro Conservation Area. This wonderfully scenic area is world-renowned for its beauty, geography, history, and wildlife. MHC is a fenced facility nestled among maize plantations and other crop fields. Students reside among the native acacia and fig trees, and birdsong fills the air in the morning. The camp consists of multiple buildings including an administrative block, a *chumba*, which serves as an eating and social activity center, a classroom and library, and a computer room. MHC is part of the small community of Rhotia where students can enjoy daily interaction with neighbors. Walking, jogging, soccer, and socializing outside of the camp round out daily life at MHC.



OUR CURRICULUM AND RESEARCH

Northern Tanzania is a hub of wildlife tourism. Home to world-famous national parks such as Tarangire, Lake Manyara, Kilimanjaro, Serengeti, and the Ngorongoro Conservation Area, this remarkably scenic area is the center of tourism in Tanzania. It has also been the home of the Maasai, Iraqw, and other ethnic groups for centuries.

Despite the seemingly negative trends of availability and quality of habitat and resources for wildlife and livestock on the Maasai steppe, there are many opportunities for effective conservation, natural resource management, and rural development. SFS' field station is surrounded by wildlife using diverse migration corridors and seasonal dispersal areas. The Maasai, and now settlers from other ethnic communities, depend on these same areas as communal grazing grounds for livestock and for growing food. As a result, they often face economic hardship due to crop damage from migrating wildlife, loss of livestock, and resource depletion and competition. Agricultural expansion, pollution, and climate change threaten the already strained water supply and the health of people, livestock, and wildlife alike.

The program explores the human elements of these the complex conservation issues. Our curriculum and research focus on how changes in land use and resource availability in the Tarangire-Manyara ecosystem can be managed to foster the well-being of local communities while safeguarding and promoting biodiversity conservation. Students learn about the socioeconomic, policy, and environmental drivers and implications of demographic change and land reform for wildlife conservation and rural development. Students hear lectures by park wardens, wildlife veterinarians, and field researchers. They also interview Maasai community members about challenges they face by the rapid loss of natural resources.

Students take a multi-day camping expedition to Serengeti National Park, a World Heritage Site whose name is derived from a Swahili word meaning "endless plains." We study the park's diverse fauna—from endemic birds to roaring hippos—with a particular emphasis on large mammal ecology and protected area management. During game drives and field activities, students may observe elephants, lions, giraffes, cheetahs, jaguars, hyenas, rhinoceroses, and even African wild dogs, one of the most endangered mammals in the world. Students practice a variety of exercises in wildlife conservation and management: observing predator-prey interactions; surveying bird and ungulate populations; evaluating species' habitat preferences and use; and assessing tourists' wildlife viewing patterns.

COURSES

Semester students are registered in five academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3020	Environmental Policy and Socioeconomic Values	04
SFS 3710	Techniques in Wildlife Management	04
SFS 3720	Wildlife Ecology	04
SFS 4910	Directed Research	04
SFS 2060	Introduction to Swahili Language and East African Tribal Communities	02

Please see page 48 for course descriptions

Program Highlights

- Multi-day field expedition and camping trip to Serengeti National Park, studying large mammal ecology, wildlife migrations, and tourist behavior in the park
- Multi-day trip to Tarangire National Park and surrounding areas for field exercises on wildlife population counting, lion ecology and behavior, conservation models, and human-wildlife conflicts
- Visit cultural *manyatta* (settlements), an opportunity to glimpse Maasai and Iraqw cultures: traditional ceremonies, demonstrations of fire-making, and dances by Maasai *morans* (warriors)

Field Exercises & Skills Development

- Explore Lake Manyara National Park to study techniques for identification of large African mammals, baboon ecology, and threats to wetlands from tourism, land-use changes, and local resource use
- Meet the Hadzabe foragers of Lake Eyasi and evaluate the ecological and sociocultural impacts of cultural tourism in Tanzania
- Visit Ngorongoro Conservation Area to learn about inclusion of communities in conservation and management of natural resources
- Attend lectures by park rangers, government representatives, village elders, and scientists from local research organizations on a range of topics in wildlife conservation and management
- Day trip to Burunge Wildlife Management Area to study the benefits and challenges of community-based management of wildlife
- Explore Olduvai Gorge, one of the most important paleoanthropological sites in the world, learning about human evolution and the geologic history of the region
- Develop field research skills including habitat assessment and mapping, species identification, research design, data collection, natural resource valuation methods, social surveys, wildlife census techniques, GIS, transect and patch sampling, and animal behavior observations, scientific writing and oral presentation



Directed Research Project Examples

- Local community strategies for coping with variation in water availability
- Assessment of attitudes and awareness about wildlife conservation among the Iraqw and Maasai communities
- Influence of ecological and social factors on the distribution of elephants
- Livelihoods and socioeconomic indicators among wildlife-conserving communities
- Effectiveness of wildlife conservation strategies between areas of differing protection levels
- Importance of habitat quality and heterogeneity on wildlife sanctuary viability
- The role of government in human-wildlife conflict resolution
- Humans' vulnerabilities and responses to climate change in rural communities

SFS at Work

While SFS students come away with countless memories, new perspectives, skills, and friends, they also leave something of value behind. Our ongoing research and close ties with community stakeholders allow students to make contributions including:

- Assessing the biodiversity and tourism potential of privately owned wildlife sanctuaries to empower communities to benefit from, as well as conserve, wildlife on their land
- Assessing water-use competition to make appropriate recommendations for water resource conservation, management, and sustainable use
- Evaluating the status of Buger community forest to understand the challenges and opportunities for joint forest management
- Working with local communities to assess human-wildlife conflicts and provide the best strategies for conflict mitigation
- Assessing the abundance and distribution of large mammalian species and habitat characterization for Manyara Ranch Conservancy to establish long-term trends and advise best range management options

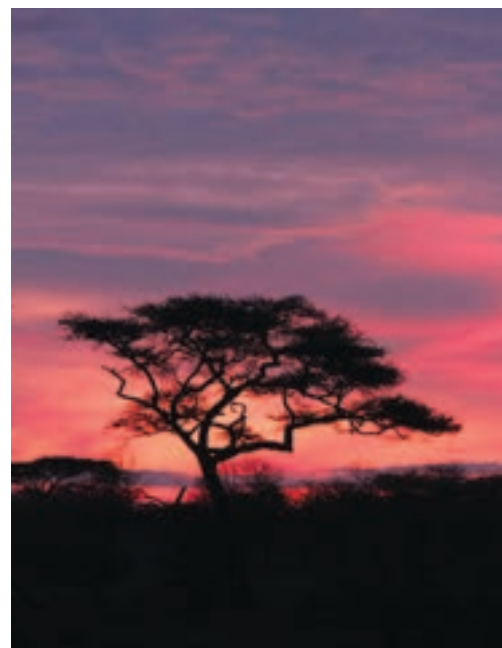
Get Involved With the Community

Students at the Center for Wildlife Management Studies in Tanzania have a special opportunity to see the intricate and complex connection between wildlife conservation and rural livelihoods. SFS faculty and staff have intimate knowledge of the challenges of conservation in Tanzania.

Local community members and government officials play an important role in guiding the Center's research. With the results of our research, we offer data and recommendations to inform decision makers. SFS works collaboratively with our stakeholders to help monitor and manage habitat degradation and land-use changes while bolstering tourism and finding balance between economic and conservation goals.

Students often enjoy soccer games, church services, and other events with community members. Additionally, students participate in community volunteer projects and social activities such as:

- Visits to local markets and neighboring homesteads for traditional celebrations; a lecture on culture and artifacts; and conducting interviews for research work
- A visit and stay with Iraqw communities
- Community service work in local schools and orphanages
- Presentations of research findings to community stakeholders



“Having the opportunity to conduct a research project in a place as stunning as the Ngorongoro Crater, a World Heritage Site, was truly a blessing.

Just driving through the crater for a day blew me away with the amount of wildlife and natural beauty, so being able to get out and walk through the grasslands was simply amazing. The experience gained from this research project is above and beyond anything I could have done at my home university. Furthermore, having the chance to design, execute, and then write a publishable report that will be used in future management



Brennan Peterson Wood
Colorado College
Tanzania Fall '14

For details and how to apply, visit: cat.fieldstudies.org/eastafrica



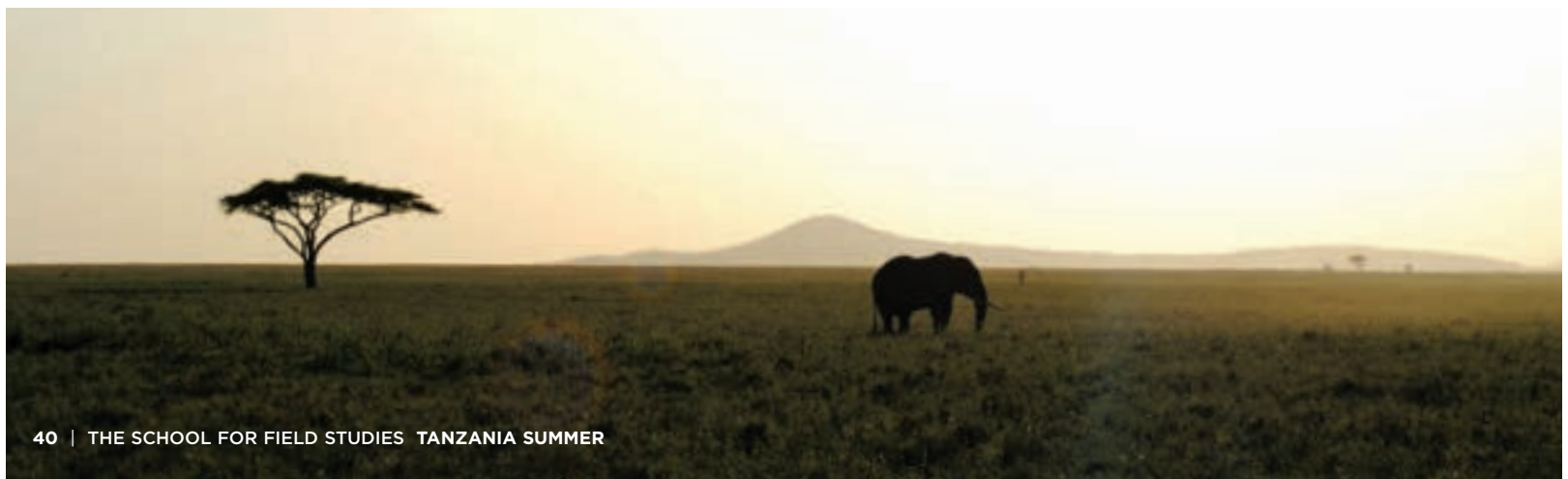
TANZANIA

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

Session I: June 6 – July 6

Session II: July 11 – August 10



Wildlife Management Studies

Northern Tanzania, home of world-famous national parks such as Tarangire, Lake Manyara, Kilimanjaro, Serengeti, and the Ngorongoro Conservation Area, offers a tightly packed hub for wildlife conservation and tourism opportunities amid a growing human population and development activities. This magnificent setting on the Maasai steppe is our classroom. Expeditions to the national parks and other protected areas offer students significant opportunities to experience hands-on learning about environmental issues and a suite of strategies for resolving them.

Both summer sessions take a multidisciplinary approach to introduce the complex realities of balancing ecological, economic, and sociocultural factors in sustainable wildlife conservation and management studies. Students learn many perspectives on wildlife management and conservation from SFS faculty and guest lecturers who have extensive field experience and knowledge of the area.

We visit key national parks and other protected areas in northern Tanzania. The program also offers a wide range of opportunities for students to interact with the local communities.

SESSION I: WILDLIFE MANAGEMENT AND CONSERVATION

Students learn about the complexities of sustainable wildlife conservation in the Tarangire-Manyara ecosystem of northern Tanzania. The course combines concepts and principles of ecology, natural resource management, and socioeconomics, all of which are components of effective and sustainable wildlife conservation. In this course, students develop field skills to explore the ecology, social organization, and behavior of common large African mammals.

Central to this first summer session is the understanding and evaluation of protected areas management in the region. Students learn methods of conserving wildlife both inside and outside protected areas amidst a rapidly changing socioeconomic and political environment. In addition, they examine constraints to the conservation of wildlife among resource-poor rural populations and identify key aspects of human-wildlife conflicts.

SESSION II: TECHNIQUES FOR WILDLIFE FIELD RESEARCH

In this second session, students learn a suite of field research techniques and methods for studying wildlife ecology and assessing management policies and conservation practices in Tanzania. The focus is on the Tarangire-Manyara ecosystem, where we practice field techniques in national parks, community wildlife management areas, and in villages.

Students learn foundational field skills in observation and evaluation of wildlife, as well as interactive methods used for assessing local community attitudes and behaviors toward conservation efforts, and apply these techniques to advance long-term research goals at our Center. Students gain an understanding of sound scientific principles and practices that can be used in other global environmental contexts.

Students practice various field skills including species identification, sampling and data analysis methods for flora and fauna, large mammal behavioral study methods, remote and on-ground sensing and spatial mapping, social survey design and interviewing skills, and communication skills.

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or back-to-back to provide a thorough introduction to community wildlife management and the research methods routinely used to assess wildlife ecology. Students participating in both sessions receive a \$1,000 discount.

For details and how to apply, visit: cat.fieldstudies.org/eastafrica

COURSES

Summer students are registered in one or two academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3500	Wildlife Management and Conservation	04
SFS 3570	Techniques for Wildlife Field Research	04

Please see page 51 for course descriptions



“While the basics of wildlife counting and observation were heavily emphasized, I appreciated the strong focus on the impact and involvement of local communities in conservation concerns. The exercises and interviews conducted within the communities we visited really put into perspective the importance of ‘people skills’ in the field of wildlife management.

— Emma Thomas
University of Wisconsin-Madison
Tanzania Summer '14



TURKS & CAICOS ISLANDS

SEMESTER PROGRAM

SEMESTER PROGRAM DATES

Spring 2016: February 1 – May 11

Fall 2016: August 29 – December 7



Marine Resource Studies

THE ENVIRONMENTAL CONTEXT

For the tourists who flock here, the Turks and Caicos Islands (TCI)—which lie at the southeastern end of the Bahama Archipelago—are a diving and angling paradise. The clear waters are considered among the world's top 10 diving destinations, where vibrant coral reefs, a dramatic sea wall, and a deep ocean trench sustain a stunning diversity of sea life. The charismatic fauna include more than 300 species of fish, many elasmobranchs such as the spotted eagle ray and lemon shark, as well as sea turtles and humpback whales. Colorful and cryptic biota is abundant in the warm waters just steps from our Center. Nearby seagrass beds, mangroves, sandy shoals, and reefs lend a patchwork appearance to the miles of shallow blue waters that surround the Islands. But beneath the turquoise waters, a delicate ecosystem is threatened.

This diverse marine environment supports the TCI economy through fisheries and tourism. The beauty and ecosystem functions of island, coastal, and ocean habitats are critical for maintaining the value of these industries. The country has an extensive network of 34 established protected areas to promote the sustainability of natural and historic resources, with four marine parks in close proximity to our field station on the island of South Caicos. However, insufficient environmental stewardship and underutilized local ecological knowledge hinder management of marine resources and therefore the effectiveness of these protected areas. Increasing demand for fisheries resources, coastal development, and the meteorological and biophysical impacts of climate change put enormous pressures on marine and coastal ecosystems and on island-based livelihoods.

Without quantitative and qualitative scientific assessments, better facilitated community management, and collaborative environmental education, the existence of many of these ecosystems and resources is threatened. SFS plays a critical role in supporting the TCI fishers, island residents, and environmental authorities through collaborative research and knowledge exchange. Together we are working to implement positive change in the social, cultural, and economic spheres, as well as to support and mitigate impacts on the coastal and marine ecosystems.



“It’s very easy to say that this program is one of the most influential things that I have done in my life.”

— Sean Arruabarrena
Westminster College
TCI Fall '14



THE SFS CENTER FOR MARINE RESOURCE STUDIES

The Center, located just steps from a crystal clear ocean laboratory, is adjacent to Cockburn Harbour, a town of about 1,200 residents. Our field station sits 40 feet above the water, looking directly out to sea. Within a three-mile radius are coral reefs, barrier islands, mangroves, seagrass beds, and carbonate platform flats offering abundant snorkel and dive sites. The facilities include a dining area, kitchen, classroom, computer room, pool, and veranda with spectacular island and ocean views. Students share living quarters in two residence wings. We are fully equipped for marine operations with access to docks, motorboats, an air compressor, and plenty of tanks and weights for scuba diving.



OUR CURRICULUM AND RESEARCH

With most local residents dependent upon marine resources for their livelihoods, and increasing resource demand by tourists, finding viable options for managing fisheries and conserving marine biodiversity is crucial.

Snorkeling and scuba diving in the waters surrounding South Caicos, students learn field research and monitoring techniques to identify and assess the health of a wide range of marine organisms and habitats. Students learn to identify and observe the behavior of marine species, assess coastal and marine habitats, quantify fisheries resources, and analyze implications of fishery policies. TCI has an extensive network of 34 protected areas, but its effectiveness is still not fully understood. With the Admiral Cockburn Land and Sea National Park and East Harbour Lobster and Conch Reserve at their doorstep, students evaluate the concept and practice of marine protected areas (MPAs) as a resource management tool.

In the community, students consider the challenges of assessing the rights and needs of local stakeholders and reconciling those with conservation goals. Fisheries management and market engagement require considered analysis of the costs and benefits of species protection, fishing techniques, and market dynamics, all in the context of global and national markets and policies. Assessing the feasibility and ecological viability of resource management and habitat conservation options, including their associated socioeconomic implications, brings students face-to-face with the real-life dilemmas that challenge governmental regulators and the residents of South Caicos.

The growing tourism industry in TCI is increasing the demand for reef fish on restaurant menus. Local fishers on South Caicos recognize this market, and commercial sale of select reef fish species is rapidly increasing. In addition to “no-take” MPAs, TCI has recently established size and other restrictions on several commercially important species. The impact of these new policies will be reflected in our research efforts. Through field observation, exercises, and research, students learn the concepts and skills needed to understand marine ecosystems and island community dynamics.

Program Highlights

- Learn about tropical marine ecology, evaluate fisheries management and policies, and practice field research skills in one of the most pristine marine habitats in the tropical Western Atlantic
- Scuba dive and snorkel for fish, coral, seagrass, and mangrove identification exercises
- Excursion to neighboring Providenciales, Middle Caicos, and North Caicos: tour aquaculture operations and desalination plants; explore the caves and bat colonies of Middle Caicos; discover the tropical dry forests of North Caicos; absorb local ecological knowledge of bush medicines and foods; study the rich cultural history of the territory

Field Exercises & Skills Development

- Study ecosystem function and anthropogenic impacts on marine environments
- Examine habitat enhancement and restoration practices
- Evaluate the abundance of queen conch inside and outside of MPAs, and interpret how the data reflects protected area effectiveness
- Attend lectures by Department of the Environment and Maritime Affairs (DEMA) officials on the government’s fisheries regulations and enforcement
- Learn to collect data relating to the health of coral colonies through an in-water coral bleaching exercise
- Participate in a site tour from a local tourism developer and discussion on plans for constructing residences and a resort
- Tag and collect morphological data on sharks and sea turtles to gain an understanding of population dynamics, contributing to the management and conservation of these species
- Explore methods for determining costs and values associated with using marine resources and produce an economic valuation report
- Visit local seafood processing plants and participate in discussions with operators
- Develop field research skills including marine species identification and behavioral observations, biodiversity assessment, survey design and interviewing techniques, field research ethics, stakeholder facilitation techniques, data management and analysis, scientific writing and oral presentation, snorkel and scuba skills, and habitat assessment and mapping

COURSES

Semester students are registered in four academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3020	Environmental Policy and Socioeconomic Values	04
SFS 3730	Tropical Marine Ecology	04
SFS 3740	Principles of Resource Management	04
SFS 4910	Directed Research	04

Please see page 48 for course descriptions



Directed Research Project Examples

- Population size assessment of potential commercial finfish species around South Caicos
- Ecological and social assessments of the impacts of climate change and ocean acidification
- Assessment of density and distribution of invasive lionfish
- Study of ecological and socioeconomic impacts of marine debris
- Examination of coral reef ecology, including growth, survival, and recruitment
- Description of residents' environmental ethic through photographs
- Analysis of interactions between mangrove and seagrass faunal communities
- Assessments of local livelihood strategies and human capital, including perceptions of tourism and fishing industries
- Study of seasonal differences in migratory and resident bird populations
- Assessment of conch population structure and regulation compliance
- Youth empowerment through marine-oriented citizen science
- Examination of elasmobranch ecology

SFS at Work

While SFS students come away with countless memories, new perspectives, skills, and friends, they also leave something of value behind. Our ongoing research and close ties with community stakeholders allow students to make contributions including:

- Lobster, conch, and finfish stock assessments, providing important information and allowing government agencies to establish sustainable fishing rules and guidelines
- Natural resource workshop with DEMA to provide TCI government workers with training on coral reefs, lobster biology, marine fishes, turtles, and sharks
- Working with DEMA and local businesses to develop a protocol for coral reef monitoring and queen conch distribution
- Applying baseline and longitudinal data to examine reef health trends, species interactions, and impacts of coral diseases

Get Involved With the Community

The community of South Caicos has hosted SFS students for more than 20 years. During that time, staff and students have integrated into the small community on multiple levels. We are dedicated to helping the community conserve its natural resources and develop sustainably. Students become involved with the community, learning about Caribbean culture and island society. Community activities may include:

- Providing swimming and snorkeling lessons for local children
- Pairing students with local families to better understand new cultures through the Friendship Family Program
- Hosting "Sea Day" at the Center to introduce local students to the marine environment
- Reading, tutoring, and other volunteer projects at the local library and grade school
- Collaborating with local youths and NGOs to conduct beach cleanups to increase environmental awareness
- Presentation of student research to disseminate findings to the local community

PADI SCUBA Certification

Because scuba diving is a valuable skill for students who are interested in pursuing a career or future studies in field research of marine ecosystems, the Center offers PADI Open Water Diver certification to semester students. Certification takes place during the first two weeks of the program. The course, taught by the Center's Dive Safety Officer and assisted by PADI Divemasters, introduces students to diving and the environment where they will be learning and researching for the next several months. PADI Advanced Open Water Diver certification is also offered to interested students during the semester.

Note: It is not necessary to use SCUBA to participate in the program; many students choose to snorkel only. Divers and snorkelers must bring their own SCUBA and snorkeling equipment, and the certification courses are offered at an additional cost. Weights and tanks are provided on-site at no cost. Please contact the SFS Admissions Office if you have any questions.



To study coral health, we went diving in teams of four and analyzed the extent to which the local communities of coral had experienced bleaching events,

a major worldwide threat to coral populations. As we performed this field study, we were learning in the classroom how large of a role healthy coral reefs play in maintaining ecosystem services, as well as increasing ecotourism. Being able to actually see a concept in real life at the same time we were studying it in the classroom was invaluable. It made the themes sink in a lot more and helped me understand the ocean environment and



how environmental managers must try to cope with issues that are not only local but also worldwide.

Zachary Adam Wilkinson

University of Denver
TCI Fall '14

For details and how to apply, visit: cat.fieldstudies.org/tci



TURKS & CAICOS ISLANDS

SUMMER PROGRAM

SUMMER 2016 PROGRAM DATES

Session I: June 6 – July 6

Session II: July 11 – August 10



Marine Resource Studies

The turquoise waters of the Turks and Caicos Islands (TCI) provide the perfect laboratory for marine studies. The relatively healthy marine and coastal ecosystems support much of the community on the island of South Caicos, with fisheries providing the primary source of livelihood. The environment is changing, however, as pollution, climate change, ocean acidification, and the unsustainable extraction of precious marine resources, coupled with growing tourism, threaten the island's fragile ecosystems. Depletion of key resources would have a dramatic impact on the social systems of South Caicos by putting pressure on food security and employment prospects.

Developing sustainable fisheries and tourism is essential if this resource-dependent coastal community is to thrive. The community appreciates the challenge of balancing economic development with environmental conservation. Understanding the ecology of key fisheries species and their habitats is the foundation for achieving this balance through resource management and conservation.

SESSION I: TROPICAL MARINE ECOSYSTEMS: MONITORING & MANAGEMENT

Students explore the ecological and socioeconomic aspects of various tropical marine ecosystems, learning how to assess and maintain their health. This includes understanding key factors, such as the need to conserve biodiversity and critical habitats; the nature of sustainable management for important fisheries species, such as queen conch and spiny lobster; and the importance of ensuring that environmental management objectives are cognizant of community livelihood goals. Students also consider how climate change and ocean acidification may impact TCI's marine ecosystems. The course helps prepare students to conduct marine research while working with local clients and stakeholders.

SESSION II: APPLIED MARINE RESEARCH TECHNIQUES

This course enables students to apply the scientific process in a field research project that addresses a local issue related to the management of tropical marine environments in TCI. Students learn how to develop a scientific approach to identify risks to the health of coral reefs, seagrass beds, and mangrove stands that surround the island. These risks include both local phenomena such as overfishing and increased coastal development, as well as global issues like climate change and ocean acidification.

Field Expeditions and Exercises in Both Sessions

The spectacular reefs, turquoise waters, and island community of South Caicos serve as the laboratories for studies and field work. Research sites, field exercises, and excursions in these summer courses include:

- Exploring coral reefs, fringe and island mangrove ecosystems, and extensive seagrass meadows
- Touring current coastal development projects and seafood processing plants
- Attending skills workshops, including stakeholder engagement and science communication
- Examining anthropogenic impacts to nearshore ecosystems
- Valuing ecosystems of TCI for coastal planning decisions

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or in combination to provide a thorough introduction to tropical marine ecology and environmental management, as well as field research techniques for addressing conservation questions. Students participating in both sessions receive a \$1,000 discount.

PADI SCUBA Certification

The Center for Marine Resource Studies offers PADI Open Water Diver certification to Session I students. The course is taught by the Center's Dive Safety Officer and assisted by PADI Divemasters. The PADI Advanced Open Water Diver course is offered to certified divers during Session II.

Note: It is not necessary to use SCUBA to participate in the program; many students choose to snorkel only. Divers and snorkelers must bring their own SCUBA and snorkeling equipment, and the certification courses are offered at an additional cost. Weights and tanks are provided on-site at no cost. Please contact the SFS Admissions Office if you have any questions.

For details and how to apply, visit: cat.fieldstudies.org/tci

COURSES

Summer students are registered in one or two academic courses accredited through the University of Minnesota:

Course No.	Name	Credits
SFS 3530	Tropical Marine Ecosystems: Monitoring and Management	04
SFS 3560	Applied Marine Research Techniques	04

Please see page 51 for course descriptions



“This course is very intense but it is also refreshing in the sense that it provides a very different type of challenge. As soon as we learn something, we go straight to the field to apply it.”

— **Brittany Stopp**

Northwest Missouri State University
TCI Summer '13



Semester Course Descriptions

AUSTRALIA

SFS 3690 RAINFOREST ECOLOGY introduces structure and function of tropical rainforests including floral and faunal components. Ecological processes that maintain biodiversity and the evolutionary processes that generate it are presented. We examine the dynamic relationships between plants and animals, including pollination and seed dispersal. On a larger scale, we examine tropical vegetation patterns along climatic gradients and discuss mechanisms for preserving and restoring tropical ecosystems.

SFS 3700 PRINCIPLES OF FOREST MANAGEMENT presents the ecological and analytical tools used in the management of terrestrial, living resources. Students use examples from the tropics to stress the theories and skills that provide the foundation for land management worldwide. The assessment and minimization of adverse environmental impacts caused by resource development, as well as the restoration and rehabilitation of areas suffering from chronic human-induced disturbances, provide key foci for applying principles learned.

SFS 3020 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand sociocultural context including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that effect change and their historical basis; and legal basis for enforcement of environmental policy. Students are introduced to major constituencies that effect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

BHUTAN

SFS 3040 POLITICAL AND SOCIOECONOMIC DIMENSIONS OF ENVIRONMENT focuses on the dynamics among people, society, and environment. We do this through the interdisciplinary lens of political ecology, examining the political, economic, and social factors of environmental issues and changes. The course provides a conceptual framework for understanding how nature-society interactions, such as agriculture, natural resource management, biodiversity conservation, and rural development, shape both the natural landscape and the social and economic conditions in Bhutan. The course provides the conceptual and practical skills and tools to critically examine and assess the human-environment nexus in the field. Students also consider the theories and ethics of sustainable and unsustainable development and the need to view these issues in ways that are inclusive and just.

SFS 3060 MOUNTAIN ECOLOGY provides a conceptual and practical understanding of the ecology of the Eastern Himalaya region. Students look at the physical features of mountain ecosystems: the geology and hydrology, climate, and weather. The course highlights the special features of mountain animals as well as the diverse flora. Finally, students look at the physical threats mountains pose to communities, such as glacial lake outburst flooding, and the vulnerabilities of the mountain ecosystems due to climate change and human development. Frequent field trips expose students to an array of ecosystems—some in natural states, some heavily modified by people. Rivers, forests, and farmland are examined in various locations and along different altitude gradients, showcasing the ecological diversity within this small mountain state.

SFS 3050 LAND USE, NATURAL RESOURCES, AND CONSERVATION considers the suite of natural resources that are tied to both local livelihoods and the national economy—including arable soils, water, timber, non-timber forest products, and grasslands. Students study the livestock and agriculture systems of Bhutan, both historical and current, and understand why and how these are changing, and what the implications are for household economies, the environment, and national issues. An important topic students consider is food security, at both the household and national levels. By integrating field and classroom approaches, students explore the science behind current local and global issues in natural resource management, food production, biodiversity, and climate change.

SFS 2010 RELIGION AND CULTURE OF BHUTAN allows students to develop a conceptual and practical understanding of religious principles that underlie Bhutanese attitudes and approaches to environment. Students learn the basic principles of Buddhism and other religions practiced in the region and look for religion in the landscape and in society. Students look at religion and environment, culture and environment, and Bhutanese attitudes toward environment. Students get some language training in Dzongkha.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

CAMBODIA

SFS 3810 ECOSYSTEMS AND LIVELIHOODS ALONG THE MEKONG focuses on the natural history of the Mekong River, its associated waterways, and the human landscape that envelops it. We explore the physical forces of the river and understand the hydrological cycles of the entire basin. Students examine the ecology of the region and learn about the functions of organisms and ecosystems. This examination of the natural and physical systems is coupled with study of how fishers, farmers, and merchants utilize the Mekong River watershed daily for sustenance and livelihoods. Students examine how humans have altered the landscape and explore the impacts that large upstream dams will have on downriver conditions and dynamics. Field exercises are carried out in several major ecosystems: the river, the lake, the forests, the delta, and the coast.

SFS 3820 ENVIRONMENTAL ETHICS AND DEVELOPMENT uses lenses from philosophy and social science to examine the moral relationship between human beings and the environment and its non-human contents. This course presents ethics as a lens of inquiry, recognizing that environmental problems can be complicated, in moral, social, political, and ecological terms. Students study environmental ethics in relation to economic growth and development, and consider the purpose of nature and humans' role in managing it while still encouraging responsible development.

SFS 3800 CONSERVATION SCIENCE AND PRACTICE introduces the concepts, tools, and incentives to effect conservation of the environment and natural resources. The field of conservation is focused on protecting biological diversity—including ecosystems, species, and genetic diversity—by promoting processes, both ecological and social, that support biodiversity. The course focuses on five core themes: what biodiversity is; why biodiversity is important; threats to biodiversity; strategies for conservation; and the concept of sustainability. We focus the practical aspects on local case studies, considering the array of conservation strategies in the region, and using this lens to evaluate global concerns on a local scale.

SFS 2080 LANGUAGE AND CULTURE OF CAMBODIA AND VIETNAM contains two distinct but related modules: society and culture of Cambodia and Vietnam, and Khmer language. This course provides a basic introduction to spoken and written Khmer as well as the history and culture of Southeast Asia. The Khmer language module offers listening, oral, and limited written practice of the Khmer language at a beginner/basic level of proficiency to increase students' communication and comprehension skills. The sociocultural model helps students develop a more refined understanding of Cambodian and Vietnamese cultures while learning about the rich history of the region. Both modules are designed to help students experience immersion into regional culture and work more effectively in their community-based Directed Research efforts.



SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

COSTA RICA

SFS 3770 TROPICAL ECOLOGY AND SUSTAINABLE DEVELOPMENT examines the ecological impact of human activity, especially agriculture, in a tropical country. Students study the agro-ecology of important crops, with emphasis on biodiversity as the source of production means and materials. Students identify renewable and nonrenewable resources and examine their historical use. We study the long-term and large-scale impact of local agricultural and other practices on the national and global environment (e.g., water pollution, waste management, climate change). Options for alternative resources use, land restoration, and preservation are examined from ecological, sociopolitical, and economic viewpoints. Basic field techniques and measurements are also covered.

SFS 3740 PRINCIPLES OF RESOURCE MANAGEMENT is designed to examine the connection between society and natural resources, and how application of management tools can lead to biodiversity conservation and sustainable livelihoods. This course introduces underlying concepts and practical tools used in addressing complex environmental problems, including protected area planning and management, guidelines for ecologically sustainable development, and environmental impact assessment. Local case studies are examined using the theory and practice learned in this course.

SFS 3030 ECONOMIC AND ETHICAL ISSUES IN SUSTAINABLE DEVELOPMENT addresses the principles and applications of the scientific and management aspects of sustainability. Allocation, distribution, and scale are presented as parameters to assess the sustainability of development models (at macro and micro levels). Basic concepts of ecological economics cost-benefit valuation techniques are presented and applied. The roles of local people, government, and private, national, and bilateral aid agencies are examined as constraints for the implementation of sustainable development models. The empowerment of local people and their reaction to non-local proposals for sustainable development are examined through the review of specific case studies.

SFS 2050 LANGUAGE, CULTURE, AND SOCIETY OF COSTA RICA contains two distinct but integrated modules. The Spanish language module offers listening, oral, and written practice of the Spanish language at beginner, intermediate, and advanced levels of proficiency. Students engage in oral and written grammar and vocabulary exercises, and develop Spanish language skills and tools required for their research projects. The sociocultural module helps students to develop a more refined understanding of Costa Rican culture and the various communities with which we work. Students participate in lectures, field exercises, and other activities including a homestay—all of which teach them strategies and skills for working with people in a community-based research context and help them to assist with community extension projects.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

PANAMA

SFS 3790 TROPICAL COASTAL ECOLOGY introduces students to the ecology of coastal and marine ecosystems as well as terrestrial systems that affect the marine environment. Students learn to identify species in these habitats. The concept of island biogeography helps to frame the examination of the status and delicate nature of tropical island systems. Climate change and impacts on small islands are addressed. Field exercises are held in forests and coastal waters where students encounter mud and monkeys one second, damselfish and moray eels the next.

SFS 3740 PRINCIPLES OF RESOURCE MANAGEMENT examines fisheries management (commercial and artisanal) focusing on local fisheries, including finfish, lobster, and sport fish. We study the environment from the lens of tourism, examining the impact of tourism on fragile habitats. Another theme of the course is land use and land cover change—especially in regard to increasing pastureland and plantation land under cultivation (mostly banana) in close proximity to the ocean and important watershed habitats. An additional theme is climate change and how this affects natural resources and livelihoods based on land, sea, and forest resources, including timber and non-timber forest products.

SFS 3020 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides a critical look at the livelihood strategies of island residents, the land use and environmental regulations in place, and actual or recommended responses by society (including government, civil society, and individuals) aimed at mitigating pressures and restoring balance in the environment. Students gain an understanding of the local perceptions of conservation of natural resources and the pressure points between development and preservation. The economic importance of tourism may be measured and examined against habitat degradation. Common property issues are addressed in relation to land use of indigenous islanders and new property owners wishing to build on once sovereign land. Gauging environmental awareness and literacy of tourists helps students to understand their impact on the future of endangered island ecosystems that will be put under continuous pressure with the climbing number of visitors.

SFS 2070 LANGUAGE, CULTURE, AND SOCIETY OF PANAMA contains two distinct but integrated modules. The Spanish language module offers listening, oral, and written practice of the Spanish language at beginner, intermediate, and advanced levels of proficiency. Students engage in oral and written grammar and vocabulary exercises, and develop Spanish language skills and tools required for their research projects. The sociocultural module helps students to develop a more refined understanding of Panamanian culture and the various communities with which we work. Students participate in lectures, field exercises, and other activities—all of which teach them strategies and skills for working with people in a community-based research context and help them to assist with community extension projects.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

PERU

SFS 3830 TROPICAL ECOLOGY OF THE ANDES-AMAZON examines biodiversity of the region from multiple scales, including region, landscape, ecosystem, community, species, and gene. We study the patterns and processes of biodiversity in our exploration of ecology. Students learn to identify and characterize a variety of the diverse flora and fauna in the Andes-Amazon region, understand the patterns and processes that support this diversity, and appreciate the importance of biodiversity to people. Students examine the fundamental principles of tropical ecology through the study of a diverse mosaic of ecosystems, habitats, and species along an elevational gradient, successional gradients, and geomorphic patterns.

SFS 3840 POLITICAL ECOLOGY OF DEVELOPING LANDSCAPES focuses on human interactions with and impacts on local natural systems, and vice versa. We consider these interactions through the interdisciplinary lens of political ecology, examining the political, economic, and social factors of environmental issues and changes. The course provides the conceptual and practical skills and tools to critically examine and assess the human-environment nexus. We also consider the theories and ethics of sustainable and unsustainable development, and the need to view these issues in ways that are inclusive and just. Practical exercises in the field help students to understand the distinct situation in the Koshipata valley and southern Peru.



SFS 3800 CONSERVATION SCIENCE AND PRACTICE introduces the concepts, tools, and incentives to effect conservation of the environment and natural resources. The field of conservation is focused on protecting biological diversity—including ecosystems, species, and genetic diversity—by promoting processes, both ecological and social, that support biodiversity. The course focuses on five core themes: what biodiversity is; why biodiversity is important; threats to biodiversity; strategies for conservation; and the concept of sustainability. We focus the practical aspects on local case studies, considering the array of conservation strategies in the region, and using this lens to evaluate global concerns on a local scale.

SFS 2090 LANGUAGE, CULTURE, AND SOCIETY OF PERU provides two integrated modules: Spanish language instruction and Peruvian society and culture. The language module offers listening, oral, and written practice of Spanish to increase students' communication and comprehension skills. The sociocultural module is designed to help students experience immersion in the culture and therefore become more adept at working effectively in their community-based Directed Research efforts. Both modules emphasize the understanding of, and direct interaction with, the local communities with which the Center works. This exposure to culture and language is reviewed and processed through lectures, field exercises, community outreach, and classroom discussion.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

TANZANIA

SFS 3710 TECHNIQUES IN WILDLIFE MANAGEMENT introduces students to the questions, principles, and tools used by resource managers in Tanzania's savanna ecosystem. Students study habitat assessment, plant and animal identification, associations and distributions, and other approaches to evaluating ecosystems. Students examine the behavioral, physiological, and social responses of animals to a changing environment. Field and laboratory techniques for monitoring ungulate populations and optimizing management practices are presented. Decision-making processes on which wildlife management programs are based are addressed.

SFS 3720 WILDLIFE ECOLOGY presents students with the information and conceptual background necessary to understand the underlying ecological principles of Tanzania's savanna ecosystem. We focus on the fundamental processes and interrelationships between the biotic and abiotic environment. We begin with basic ecological principles, setting them against the background of Tanzania. Students examine the factors underlying distributions, population biology, and behavioral ecology, along with competition and predation, using African examples. Theoretical models are discussed in light of observations on field trips.

SFS 3020 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand sociocultural context, including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that effect change and their historical basis; and legal basis for enforcement of environmental policy. Students are introduced to major constituencies that effect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

SFS 2060 INTRODUCTION TO SWAHILI LANGUAGE AND TANZANIAN TRIBAL COMMUNITIES contains two distinct but integrated modules. The Swahili language module offers listening, oral, and written practice of the Swahili language, at a basic level of proficiency, to increase students' communication and comprehension skills. Much of the Maasai population does not speak Swahili, but it is the national language in Tanzania—this phenomenon will be explained in the second course module. The sociocultural aspects of Tanzanian tribes module emphasizes understanding of, and direct contact and interaction with, the native communities with which SFS works, primarily the Maasai. This exposure to culture and language is reviewed and processed through lectures, field exercises, and classroom discussion. The sociocultural module is designed to help students experience intense immersion in the culture and be therefore more adept at working effectively in their community-based Directed Research efforts.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.

TURKS & CAICOS ISLANDS

SFS 3730 TROPICAL MARINE ECOLOGY discusses the interactions that determine the distribution and abundance patterns of tropical marine organisms, with emphasis on the ecology of nearshore areas. Basic principles of ecology are integrated with an understanding of the sea as a habitat for life. Physical, chemical, and geological oceanography are discussed. Major groups of dominant marine organisms of the region are examined in the field. Major nearshore marine habitats are examined, along with their associated biotic communities. Coral reef ecosystems are emphasized to illustrate basic concepts. Applications to the management of indigenous marine resources are discussed and demonstrated.

SFS 3740 PRINCIPLES OF RESOURCE MANAGEMENT is designed to examine the connection between society and natural resources, and how application of management tools can lead toward biodiversity conservation and sustainable livelihoods. This course introduces underlying concepts and practical tools used in addressing complex environmental problems, including protected area planning and management, guidelines for ecologically sustainable development, and environmental impact assessment. Local case studies are examined using the theory and practice learned in this course.

SFS 3020 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand sociocultural context, including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that effect change and their historical basis; and legal basis for enforcement of environmental policy. Students are introduced to major constituencies that effect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

SFS 4910 DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic and tabular presentation of results, and effective delivery of oral presentations are emphasized.



Summer Course Descriptions

Any Session I course (Bhutan excluded) can be paired with any Session II course to gain field experience in two countries and ecosystems. Please contact SFS Admissions with questions about pairing summer sessions in different countries.

AUSTRALIA & NEW ZEALAND

These courses can be taken individually or back-to-back.

SFS 3540 RAINFOREST MANAGEMENT STUDIES IN AUSTRALIA & NEW ZEALAND (SESSION I) compares and contrasts the ecological, geographic, social, economic, and historical factors that have shaped natural resource management in Australia and New Zealand. Students gain an understanding of the drivers of species extinctions and current conservation problems including management of endangered species. In both countries, students examine the influence of fragmentation on abiotic and biotic attributes of forest communities during field exercises, and identify management techniques with regard to biological systems, national boundaries, and political structures.

SFS 3550 TECHNIQUES FOR RAINFOREST RESEARCH IN AUSTRALIA (SESSION II) includes a wide range of lectures and hands-on field activities that concentrate on developing management recommendations for reforestation practices on the Tablelands of Australia. We explore the ecological roles, environmental services, and economic benefits of tropical rainforests. Students examine the structure and function of Australian tropical rainforests and the roles that humans have played, and are playing, in current forest dynamics. We examine reforestation applications on the Tablelands: the goals, techniques, successes, and failures. Finally, we develop and maintain an actual rainforest restoration project.

BHUTAN

SFS 3580 EASTERN HIMALAYAN FORESTS AND RURAL LIVELIHOODS is an interdisciplinary, field-based course where students get to know a country in a region that is recognized worldwide for its dramatic mountain landscapes and rich flora and fauna. We travel in Bhutan, learning about how environmental issues and rural development goals intersect. Trekking across valleys and ridges and through villages, students gain an intimate knowledge of the local environments and rural livelihoods. Students develop skills in assessing environmental problems, defining research questions, conducting field research, and communicating results. They gain an appreciation of the complexity of identifying and addressing conservation issues in a rapidly developing region.

COSTA RICA

These courses can be taken individually or back-to-back. Session II in Costa Rica may also be taken in combination with Session I in Panama.

SFS 3520 SUSTAINING TROPICAL ECOSYSTEMS: BIODIVERSITY, CONSERVATION, AND DEVELOPMENT (SESSION I) provides students with the practical field skills necessary to develop and participate in community and tropical ecosystem-based research projects. Students are introduced to the ecological, economic, and natural resource management issues that surround protected areas and tourism management, parks and people relations, and biodiversity assessment and protection, with the intent of exploring sustainable development and management strategies.

SFS 4930 APPLIED RESEARCH TECHNIQUES AND STRATEGIES TOWARD SUSTAINABILITY IN COSTA RICA (SESSION II) provides students the opportunity to apply the scientific process in a field research project that addresses a local environmental issue. Students' exposure to several parks and protected areas will help them design a field research project related to sustainable development, as part of the strategic research plan of the Center. Participants will collect, manage, and analyze data, and communicate research results to interested audiences.

PANAMA

This course can be taken individually or in combination with Session II in Costa Rica.

SFS 3000 TOURISM AND ISLAND SYSTEMS: ASSESSMENT OF SUSTAINABLE PRACTICES (SESSION I) introduces students to the marine and terrestrial ecosystems of Bocas del Toro and the challenges presented by a growing reliance on tourism for economic development in this part of the Caribbean. Students evaluate the impact of tourism on the natural environment and engage with local stakeholders to determine how the tourist industry affects, positively or negatively, social, cultural, and political dynamics within the archipelago. Sustainable practice will be a major lens of inquiry during this course. Students will be tasked with assessing the balance between conservation of the region's natural resources and economic opportunities for local communities.

TANZANIA

These courses can be taken individually or back-to-back.

SFS 3500 WILDLIFE MANAGEMENT AND CONSERVATION (SESSION I) exposes students to wildlife management practices and the complex issues involving sustainable wildlife conservation in the Tarangire-Manyara ecosystem of Tanzania. The course combines concepts and principles of ecology, natural resource management, and socioeconomics, which are central to effective and sustainable wildlife conservation.

SFS 3570 TECHNIQUES FOR WILDLIFE FIELD RESEARCH (SESSION II) exposes students to a suite of wildlife field techniques and methods routinely used to assess wildlife ecology and management policies and practices in Tanzania, with specific application to Tanzania's Tarangire-Manyara ecosystem conservation areas. The focus is multidisciplinary and reflects the complex realities of balancing ecological, economic, and sociocultural factors in sustainable wildlife conservation and management studies. Students learn foundational skills in observation and evaluations of wildlife, as well as interactive methods used for assessing local community attitudes and behaviors toward conservation efforts, and apply these techniques to advance long-term research goals at the Center.

TURKS & CAICOS ISLANDS

These courses can be taken individually or back-to-back.

SFS 3530 TROPICAL MARINE ECOSYSTEMS: MONITORING AND MANAGEMENT (SESSION I) is an interdisciplinary course that highlights key aspects of environmental assessment and management of tropical marine ecosystems. In addition, it explores sustainable development strategies for the Turks and Caicos Islands on a local and global scale. Students gain knowledge of subtropical marine ecosystem function and connectivity, and begin to understand the most pressing challenges at the intersection of marine conservation and economic development. Students learn how to engage in management of local fisheries and coastal development and how to respond to the global phenomena of climate change and ocean acidification.

SFS 3560 APPLIED MARINE RESEARCH TECHNIQUES (SESSION II) provides students with the opportunity to apply the scientific process in a field research project addressing a local issue related to the management of tropical marine environments. This course prepares students to develop scientific approaches to identify key problems affecting the health of coral reefs, seagrass beds, and mangrove forests that surround the island. Students learn to implement the scientific research process while contributing to a growing body of research that informs local marine conservation and resource management decisions.

Admissions: Getting Started

When to Apply

The School for Field Studies (SFS) reviews applications on a rolling basis and students may apply up to a year in advance. While there is no admissions deadline, students should apply early to ensure admission to their program of choice, and check with their home institutions regarding school-specific study abroad application deadlines.

Before You Apply

Due to the field-based nature of our programs, the SFS academic experience is very different from that of your home school and other study abroad programs. Before applying, be sure to read about the SFS program model and learning objectives, and review all of the information related to your program of interest.

Academic Credit

Students come from more than 175 colleges to attend SFS programs each year and most are able to transfer credit for their participation. The final decision regarding credit and grade transfer rests with your home institution. Check with your academic or study abroad advisor and registrar's office before applying to learn how your SFS coursework will be applicable for credit in your degree program.

SFS students receive academic credit in one of two ways: (1) Students from non-affiliate schools receive transcripts from the University of Minnesota, the School of Record for SFS programs; (2) Students from SFS Affiliate institutions usually receive credit directly from their home schools.

SFS semester programs in Australia and the Turks and Caicos Islands include four courses and carry a total of 16 semester-hour credits, usually transferred as biology or environmental studies. Semester programs in Cambodia, Peru, Bhutan, Costa Rica, Panama, and Tanzania carry 18 semester-hour credits, usually transferred as biology, environmental studies, and language. Summer courses carry four semester-hour credits except for the Bhutan program which offers six credits. Participants receive official transcripts from the University of Minnesota or The School for Field Studies approximately four weeks after the conclusion of the program.

SFS Affiliate Partners

All students, regardless of their home institution's partnership status, are welcome to apply to SFS programs. Affiliate institutions typically provide direct academic credit for SFS participation and have preapproved SFS courses. Students from Affiliate institutions receive priority admissions based on the availability of space, and each Affiliate institution has at least one representative who is available to provide on-campus advising on SFS programs. Please contact SFS or your study abroad office for a list of these representatives.

Visit cat.fieldstudies.org/advisors/partners for an up-to-date listing of Affiliate institutions.

Important Things to Know

- You must be at least 18 years of age to participate in an SFS program.
- You must be in good academic and disciplinary standing on your home campus.
- We recommend that students complete one semester of college prior to the start of the program, but gap-year students are welcome to apply, provided they fulfill the prerequisites.
- Recent college graduates are welcome to apply.

Course Prerequisites

- One college-level ecology, biology, or environmental studies/science course (or related coursework, as assessed by SFS) with a grade of C or better prior to the start of an SFS semester program
- There are no course prerequisites for summer programs.
- For SFS semester programs in Costa Rica, Panama, and Peru, your program experience will be enhanced if you have at least one semester of college-level Spanish (or three years of high school Spanish).
- Students are encouraged, but not required, to have taken coursework in statistics, anthropology, international development, and economics.
- If you have questions about whether a course you have taken fulfills SFS prerequisites, please contact an SFS Admissions Counselor.

How to Apply

- Complete the **SFS APPLICATION FOR ADMISSION** online or download the application PDF from our website.
- **NON-REFUNDABLE APPLICATION FEE OF \$50.** Credit card or check made payable to The School for Field Studies.
- **SFS ACADEMIC REFERENCE FORM** to be completed by a teacher, professor, or academic advisor who is well acquainted with your current academic performance
- **SFS CHARACTER REFERENCE FORM** to be completed by someone who knows you well, such as another academic advisor, a job supervisor, volunteer advisor, athletic coach, etc. It is not appropriate for this reference to be completed by a relative, peer, or family friend.
- **CURRENT OFFICIAL TRANSCRIPTS** from all schools attended. It is not necessary for college students to submit high school transcripts after a full academic year of college coursework has been completed.
- **PARTICIPATION APPROVAL FORM** to be completed by your study abroad advisor or appropriate authority on campus

We encourage you to apply online. If you do submit print application materials, please send them to:

The School for Field Studies Admissions
100 Cummings Center, Suite 534-G
Beverly, MA 01915-6239

After You Apply

Once we receive your application, you may check the status of your application materials by logging in to your SFS account to view your Admissions Checklist. If your application is incomplete, it is your responsibility to send any remaining materials as we cannot begin the application review process until all materials are received. Once your application is complete, we will contact qualified candidates to schedule a short phone interview. Admissions decisions are generally available within two weeks of completing your application.

Medical Approval

To ensure that you will be able to meet the physical challenges of SFS programs without undue risk to yourself or others, your ability to participate is contingent upon receiving medical approval from the SFS Safety Department. You may be disqualified from participating on medical grounds. All students must have medical insurance that covers them in-country for the duration of the program.

Dietary Restrictions

SFS makes every effort to accommodate dietary needs within the limitations of local supply, availability, cultural practices, and cost. All dietary restrictions require discussion with and approval by SFS prior to arrival.

Disability Information

SFS welcomes students with disabilities. If you are requesting accommodations, please notify SFS in writing within 10 business days of acceptance. For accommodations of physical disabilities, please contact the SFS Safety Department. For learning accommodations, please contact the SFS Office of Academic Affairs. Because of the limitations inherent in international field stations, the level of accessibility, services, and accommodations to which you may have access at your home campus may not be available.

Non-discrimination Policy

SFS is an equal opportunity institution. SFS admits students of any sex, religion, race, color, national or ethnic origin, sexual orientation, or economic status to all the rights, privileges, programs, and activities generally accorded or made available to students of SFS. SFS does not discriminate on the basis of sex, religion, race, color, sexual orientation, national or ethnic origin, physical or mental disability, or other protected status in the administration of its educational policies, admissions policies, scholarship and loan programs, and other School administered programs.

Questions?

Email us at admissions@fieldstudies.org

Call us at **800-989-4418**

Chat with us at cat.fieldstudies.org

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Tuition, Financial Aid, and Scholarships

The benefits of an SFS program will last a lifetime, but paying for it—much like paying for college—may seem daunting, confusing, or just plain impossible at first. This is why SFS works closely with you and your home school to understand and meet your financial needs. SFS awards more than \$350,000 in financial aid each year, and you are automatically considered for more than 12 scholarships, grants, and loans when you submit an SFS Financial Aid Application. Don't let costs deter you from applying to an SFS program!

SFS Aid and Home School Aid

Many applicants receive aid through their home institutions or other outside sources, so check with your financial aid office to see what aid you can apply to an SFS program. You may also look into applying for additional funds, including loans, through your home school prior to applying for SFS aid. In addition to the possibility of transferring institutional aid from your home school, your school should be able to process a Stafford Loan or other federal sources of support to help pay for your SFS program. You may qualify for SFS assistance even if you are not receiving aid from your home school.

How to Apply for Financial Aid

All students accepted to SFS are eligible for and encouraged to apply for financial aid. SFS awards need-based aid to 90% of students who apply!

To download the SFS Financial Aid Application, visit: cat.fieldstudies.org/admissions/aid

- Complete the SFS Financial Aid Application after you have been accepted to an SFS program.
 - Part I – Completed and signed by you
 - Part II – Completed by your home school financial aid office
- Submit the application no later than 60 days prior to the start of a semester program or 30 days prior to a summer program.
- SFS reviews your application and considers you for all of the scholarships, grants, and loans offered by SFS.
- You will be notified of your financial aid award via email.

Scholarships, Grants, and Loans

Visit our website for complete descriptions of SFS need-based scholarships.

SFS General Scholarship

SFS strives to eliminate or reduce the gap between what a student pays on his or her home campus and the cost of studying abroad.

Pell Grant Match Award

SFS matches Federal Pell Grant funding for semester students who use their Pell Grant to help pay for an SFS program.

Trailblazer Grant

Awarded to students attending the Cambodia, Peru, or Bhutan semester programs

Andreas Family Scholarship

Available to students attending U.S. public colleges and universities

Diversity Scholarship*

To broaden participation of minorities, first-generation college students, and underrepresented groups in study abroad

Heritage Scholarship*

Available for students with a cultural and/or ancestral connection to the country in which they plan to study abroad with SFS

Stephen F. Lee Memorial Scholarship

Supports students attending SFS marine programs

Heather Jo Leibowitz Memorial Scholarship

Supports students attending SFS' Tanzania program. Preference is given to students who demonstrate a commitment, as Heather Jo did, to making a difference in the lives of resource-dependent communities in Tanzania.

McKee Scholarship

Awarded to financially deserving students

Tozer Scholarship

Awarded to financially deserving students

Fountain Scholarship

Awarded to students who grew up in an urban environment

Roy A. Hunt Foundation Scholarship

Awarded to financially deserving students

Travel Grant

Designed to help students offset the cost of travel

Zero-Interest Loan

Created through the generosity of the Merck Family Foundation. Semester loans must be repaid within two years and summer loans within one year of program completion.

Low-Interest Loan

Designed to assist semester students in bridging the gap between their financial resources and total program cost. This loan is set at a competitive market rate with manageable repayment terms.

**An additional personal statement is required to be considered for this scholarship.*

SEMESTER COSTS FALL 2015 – SPRING 2016

Program	Tuition	Room & Board	Total Program Cost
Australia	\$17,320	\$5,280	\$22,600
Bhutan	\$19,800	\$6,950	\$26,750
Cambodia	\$16,830	\$4,420	\$21,250
Costa Rica	\$16,650	\$4,800	\$21,450
Panama	\$16,460	\$4,490	\$20,950
Peru	\$16,620	\$4,630	\$21,250
Tanzania	\$16,810	\$4,690	\$21,500
Turks & Caicos Islands	\$17,270	\$4,980	\$22,250

SUMMER COSTS 2016

Program	Tuition	Room & Board	Total Program Cost
Australia	\$4,650	\$1,545	\$6,195
Australia/New Zealand	\$4,670	\$2,325	\$6,995
Bhutan	\$6,680	\$3,615	\$10,295
Costa Rica	\$4,400	\$1,395	\$5,795
Panama	\$4,400	\$1,395	\$5,795
Tanzania	\$4,890	\$2,285	\$7,175
Turks & Caicos Islands	\$4,550	\$1,445	\$5,995

What's Included:

- Pre-departure advising services from an SFS Admissions Counselor
- Accommodations at the field station
- Meals and snacks
- On-site orientation
- Field excursions and expeditions, including park entrance and research fees, and program-related ground transportation
- 24-hour support and emergency assistance from on-site residential staff
- Emergency medical evacuation and repatriation insurance
- Official transcript with 16-18 credits for semester programs, or 4-8 credits for summer programs

For complete course budgets, including out-of-pocket expenses, please visit cat.fieldstudies.org

Deposits and Tuition

All tuition deposit payments are non-refundable except in cases where SFS financial aid is sought and the subsequent award is inadequate. Please see our website for complete information about our refund policies.



100 Cummings Center, Suite 534-G
Beverly, MA 01915-6239 USA

P 800.989.4418

F 978.922.3835

admissions@fieldstudies.org

cat.fieldstudies.org



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