

spring 2003

*where science and
nature converge*

NEWS FROM THE

ORGANIZATION FOR TROPICAL STUDIES

li·a·na \lī-'ān-ə, 'an-ə\ n. **1** : A climbing herbaceous or woody vine especially of tropical rain forests that roots in the ground, **2** : The bi-annual newsletter published for friends of the Organization for Tropical Studies.

The Organization for Tropical Studies is a nonprofit consortium of 64 universities and research institutions in the U.S., Costa Rica, Peru, Canada, Mexico, South Africa, and Australia. Founded in 1963, OTS is dedicated to providing leadership in education, research and the responsible use of natural resources in the tropics. To this end, OTS offers graduate, undergraduate and professional education, facilitates research, participates in conservation activities, conducts environmental education programs and maintains three biological stations in Costa Rica: La Selva Biological Station in the Atlantic lowland rain forest; Palo Verde Biological Station in the Pacific deciduous dry forest; and Las Cruces Biological Station in the premontane cloud forest near the Panamanian border.

40th Anniversary Commemorative Edition



Tropical Science
for the
21st Century

 **Organization for
Tropical Studies**

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Message from the President

In the late 1950's and early 1960's many biologists in the U.S. and Costa Rica recognized the need for graduate-level, science-based field courses in the tropics. Graduate students were not being exposed to field research in one of the most complex environments on earth and home to nearly 70% of the world's biodiversity. (In fact, the term biodiversity had yet to be coined.) After several years of meetings and conferences these biologists persevered in 1963. With the help of the U.S. National Science Foundation they formed the Organization for Tropical Studies (OTS) as a university consortium dedicated to graduate training in tropical biology. The OTS consortium has evolved in size and scope in 40 years and now stands as a consortium of 64 universities and research institutions from seven countries on four continents.

Soon after the first courses were in the field, the need for protected areas with permanent facilities and equipment was recognized. Over the next decade OTS established three biological stations in Costa Rica in contrasting ecosystems: La Selva, Las Cruces and Palo Verde. Then, and now, researchers came to these protected sites to conduct their research and consequently, have served tirelessly as lecturers and resource people in OTS courses, helping the consortium to train the next generation of scientists and environmentally-aware leaders. Partnerships with the communities surrounding the stations on environmental issues, conservation and employment, have established OTS as an active and responsible corporate citizen. Today, we work with the Costa Rican government to conserve more than 100,000 hectares of tropical ecosystems and their biodiversity.

OTS was fused together by three core principles: science, education and conservation. Our perennial training program is vital to ensure scientific discovery that enables sound conservation decisions. In the words of Baba Dioum, "In the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught."

We dedicate our 40th year to all the eternal students — seeking knowledge from nature, from each other and from the human potential inside us.



Gary S. Hartshorn, Ph.D.
OTS President and CEO



OTS timeline

40 Years of Education, Research and Conservation in the Tropics

1963 Consortium Founded

Dan Janzen
Student in
Fundamentals
Course



1968

La Selva
Biological Station
Purchased

Jack Spencer
Named
Executive Director

First NSF
Research Grant
Awarded
for Comparative
Studies at
La Selva and
Palo Verde

Founders:

- Norman Hartweg,
University of Michigan
- Stephen Spurr,
University of Michigan
- John De Abate,
University of Costa Rica
- Rafael Lucas Rodríguez Caballero,
University of Costa Rica
- Henry Leigh,
University of Miami
- Eugene Man,
University of Miami
- James Bethel,
University of Washington
- Ray Noggle,
University of Florida
- Hugh Popenoe,
University of Florida
- Reed Rollins,
Harvard University
- Edward O. Wilson,
Harvard University
- Leslie Chambers,
University of Southern California
- Jay Savage,
University of Southern California
- Bill Argersinger,
University of Kansas

1965

Dan Janzen and
Norman Scott
Reformat
Graduate Courses
into a
Problem-Oriented
Field Biology
Program

1964

Bill Hatheway
First Executive
Director

Fundamentals
Course Led
by Les Holdridge,
Bill Hatheway
and
Dan Janzen

1965

Tropical Forest
Ecology Course
Led by
P.W. Richards

Steve Preston
Named
Executive Director

1967

Jorge Campabadal
Hired as
Resident Director
in Costa Rica

1969

Mildred Mathias
becomes President

Palo Verde
Biological Station
Leased



Charter Universities:

- University of Michigan
- University of Costa Rica
- University of Miami
- University of Washington
- University of Southern California
- University of Florida
- Harvard University
- University of Kansas
- University of California



1972
Ken Turnbull
Appointed
Executive Director

1974
First
Graduate Course
in Spanish
Led by Gary Stiles,
Doug Robinson
and Sergio Salas

1976
RIAS Fellowship
Program Began
◆
First NSF Grant
for La Selva
Operations



1982
Stone Bridge
Inaugurated
at La Selva

1973
Las Cruces and
Wilson Botanical
Garden Acquired
◆

Chip Taylor
Coordinated
73-1 Course

1975
First Course
in Agroecology



Don Stone
Becomes
Executive Director
◆

North American
Headquarters
Relocates from
University of
Washington to
Duke University

1979
UNA Joins
Consortium

1980
First Andrew
W. Mellon Grant
Awarded to Support
Graduate Courses
◆

Deborah and David
Clark Become
La Selva Station
Co-Directors

1982
Zona
Protectora
La Selva
Decreed to
Connect
with Braulio
Carrillo
National Park





1984

La Selva Initiates Environmental Education Program in Local Communities



1987

Wilson Botanical Garden Dedicated at Las Cruces Biological Station

1986

Peter Raven Becomes President



Road to Palo Verde Completed

1988

Gordon Orians Elected President

1985

Awarded John and Alice Tyler Prize for Environmental Achievement



1983

Recognized by Costa Rica as an "Institution of Public Benefit"



First Lab Built at La Selva



Costa Rica Natural History Published

1988

25th Anniversary Celebration and Symposium; University of Miami and Museo Nacional, Universidad de Costa Rica



First Environmental Science and Policy Courses: U.S. Decision-Makers and Latin American Decision-Makers Courses

1992

Palo Verde Biological Station, part of Rafael Lucas Rodríguez Caballero Wildlife Sanctuary, incorporated into Palo Verde National Park



Board of Visitors Established

1986

Costa Rican President Monge Declares the Zona Protectora Part of Braulio Carrillo National Park, connecting La Selva to the park



Luis Diego Gómez Appointed Las Cruces/ Wilson Garden Director



1993

Palo Verde Declared Ramsar Site (a wetland of international importance)

1996

Gary Hartshorn Becomes Executive Director

Eugenio González Named First Director of Palo Verde Biological Station



1999

First Graduate Course in Perú

Minority Scholarship Program Initiated

2003

40th Anniversary Marked by Symposium, Banquet and "Boot Camps" in Costa Rica

2002

Successful Completion of A.W. Mellon \$2.5 million Challenge for Endowments

1994

La Selva: Ecology and Natural History of a Neotropical Rain Forest Published



Las Cruces Fire

1997

First Undergraduate Semester Abroad Program

Pedro León, First Costa Rican Elected Chair of the Board



2000

ESA Award of Special Recognition and Merit

1999

James Cook University (Australia) Joins the Consortium as the First Old World Member

Electricity Installed at Palo Verde

2002

Funding Received to Initiate Undergraduate Program in South Africa

First Graduate Course Offered in South Africa and in Perú's Manu National Park

1998

Jorge Jiménez Appointed Director in Costa Rica

Bob Matlock, Jr. Named Scientific Director of La Selva Biological Station



OTS timeline

40 Years of Education, Research and Conservation in the Tropics

Tropical Science for the **21st Century**

Scientific Symposium **April 3, 2003** ■ University of Costa Rica

CARLOS MANUEL RODRÍGUEZ,
COSTA RICAN MINISTER
OF THE ENVIRONMENT AND ENERGY

“Costa Rica is only able to meet 25% of the national demand for annual payments for environmental services. Though Costa Rica has accepted 300,000 hectares of tropical forests into this program, an additional 650,000 hectares of forest lands are waiting to be included.”

GABRIEL MACAYA,
RECTOR OF THE UNIVERSITY OF COSTA RICA

“The location of OTS’ regional headquarters on the University of Costa Rica research campus will strengthen collaboration between our two institutions and promote more direct contact between foreign researchers and UCR colleagues.”

EDWARD O. WILSON, HARVARD UNIVERSITY
The Future of Tropical Biology

“All taxa inventories are occurring at precisely the right time to capitalize on the stunning advances in genomics and informatics.”

SALLY HORN, UNIVERSITY OF TENNESSEE
**Understanding Historical Effects:
Paleoecology of Costa Rica**

“Paleoecology allows us to elucidate the ‘natural’ conditions and dynamics of tropical ecosystems and to document the ways in which they have been altered by human activity and by climate variability and change.”

PEDRO LEÓN,
UNIVERSITY OF COSTA RICA AND CENAT
Molecular Biology’s Impact on Field Ecology

“The new tools of molecular biology, including the astonishing process of the polymerase chain reaction (PCR), make it feasible to study individuals from populations of soil bacteria to social insects, trees, birds and small mammals.”

CYNTHIA NEAL SPENCE,
SPELMAN COLLEGE AND UNCF/MELLON PROGRAMS
**The Imperative to Transform the Academy:
The Minority Recruitment and Retention Agenda**

“It is imperative that we recruit young minority scholars, who are currently almost non-existent in the sciences, to faculty positions in order to reflect the diverse environments of our existence.”

DEBORAH CLARK,
UNIVERSITY OF MISSOURI-ST. LOUIS
**Tropical Rain Forests and Global Climate Change:
Big Impacts on the Horizon**

“Given that recent findings indicate large negative impacts on tropical rain forests from the on-going changes in global climate, there is an urgent need to develop and maintain such long-term monitoring in tropical rain forests around the world.”

HARRY GREENE, CORNELL UNIVERSITY
Keeping Organisms a Central Focus in Biology

“Discoveries of new organisms and new things about organisms reset cycles of hypothesis testing and thus lead to new research directions.”



Edward O. Wilson visited La Selva, the site of his early ant research, and learned about current research underway, including Duane McKenna's (Harvard U.) rolled leaf hispine beetle project.

Posters

Student Poster Competition

Optimality and allometry in nectar foraging of the orchid bees (Apidae: Euglossini)

Brendan J. Borrell

Department of Integrative Biology, University of California, Berkeley, CA USA

Plant protection and dispersion in *T. ulmifolia*: A multiple interaction approach

Mariana Cuautle and Victor Rico-Gray

Instituto de Ecología, A.C., Veracruz, México

Reforestation planning in the West Usambara mountains of Tanzania

James J. Halperin, Theodore Shear, Heather Cheshire, Thomas Wentworth and Panteleo Munishi

Department of Forestry, North Carolina State University, USA

Faculty of Forestry and Nature Conservation, Sokoine University of Agriculture, Tanzania

Testing corridor efficacy with forest birds in the tropical dry forests of Costa Rica

Cameron S. Gillies¹, Colleen C. St. Clair¹ and Arturo Sánchez-Azofeifa²

¹ Department of Biological Sciences, University of Alberta, Edmonton, Alberta, T6G 2E9, Canada

² Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, T6G 2E3, Canada

Conservation of tropical hardwood species by private sector organizations

William Woodbridge

CAMCORE, North Carolina State University, Raleigh, NC USA

Comparative natural history and feeding ecology of two closely related ants, *Pacycondyla apicalis* and *P. obscuricomis*

Amy Savage

Western Washington University, USA

Extrafloral nectary mediated ant-plant interactions in coastal Veracruz, México: Plant richness and seasonality and ant foraging patterns

Cecilia Díaz-Castelazo¹, Victor Rico-Gray¹, Paulo S. Oliveira² and Mariana Cuautle¹

¹ Departamento de Ecología Vegetal, Instituto de Ecología, A.C., Veracruz, México

² Departamento de Zoología, Universidade Estadual de Campinas, Brasil

Effect of ovule position within the pod on the probability of seed production in *Bauhinia unguolata* (Fabaceae)

Jorge I Mena-Alf² and Oscar J. Rocha¹

¹ Escuela de Biología, Universidad de Costa Rica, San José, Costa Rica

² Dept of Biology, The Pennsylvania State University, University Park, PA USA

Cottage industries in Costa Rica: The case of butterfly farms and herpetariums

Erika Deinert and Mahmood Sasa

Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Monitoring amphibian populations in La Selva: The first year

Mahmood Sasa^{1,2}, Randall Valverde² and Marco Barquero²

¹ Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

² Instituto Clodomiro Picado, Universidad de Costa Rica, San José, Costa Rica

Consequences of time of fruit production for secondary dispersal and establishment of three palm species at La Selva, Costa Rica

Evan Notman and Ana C. Villegas

Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Genetic diversity of the green and black poison dart frog (*Dendrobates auratus*) in Costa Rica using ISSR and RAPDs

Lisa D. Patrick and Mahmood Sasa

Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Distance-dependent effects on patterns of secondary seed movement, infestation and predation of two neotropical palms

Lisa Patrick, Ana C. Villegas and Evan Notman

Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Disappearance of insectivorous birds from tropical forest fragments

Cagan H. Sekercioglu, Paul R. Ehrlich, Gretchen C. Daily, Deniz Aygen, David Goehring, and Randi F. Sand*

Stanford University, Department of Biological Sciences, Center for Conservation Biology, USA

The impact of seed predators and herbivores on palm population dynamics

Laura Young¹ and Ana C. Villegas²

¹ Department of Integrative Biology, College of Natural Sciences, University of Texas, Austin TX USA

² Undergraduate Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Application of 0.7 and 2.8 m resolution Quickbird satellite data to studies of tropical rain forest tree demography and forest ecology

Luis Diego Alfaro¹, Carlomagno Soto¹, and David B. Clark²

¹ Universidad Nacional, Heredia, Costa Rica

² University of Missouri-St. Louis, St. Louis, MO, USA, and La Selva Biological Station, Puerto Viejo de Sarapiquí, Costa Rica

The role of insectivory in Costa Rican *Carollia* (Chiroptera: Phyllostomidae)

Heather A. York

Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, KS USA

Spatial and temporal estimation of below-ground carbon pools and fluxes in a neotropical rain forest, La Selva Biological Station, Costa Rica

Luitgard Schwendenmann and Edzo Veldkamp

Institute of Soil Science and Forest Nutrition, University of Göttingen, Germany

The ECOMAPAS Project

Marco V. Castro and Maarten Kappelle

Instituto Nacional de Biodiversidad (INBio), Costa Rica

CARBONO TOWERS — Understanding interannual net ecosystem carbon exchange variability in tropical rain forest: A new research program at La Selva

Steven F. Oberbauer¹, Deborah A. Clark², Michael G. Ryan³, Ed Rastetter⁴, and David B. Clark²

¹ Florida International University, ² University of Missouri - St. Louis,

³ Rocky Mountain Research Station, U.S. Forest Service, ⁴ Ecosystem Center, Marine Biological Laboratory

INBio

Karen Aguilar and Ana Sylvia Huertas

INBio, Costa Rica

Is cycasin in *Eumaeus minyas* (Lepidoptera: Lycaenidae) a predator deterrent?

Citlalli Castillo-Guevara and Rico-Gray Víctor

Departamento de Ecología Vegetal, Instituto de Ecología, A.C. Xalapa, Veracruz, México

Sustainable mahogany management: Regeneration within anthropogenic canopy gaps in the subtropical moist forests of Belize

Jeffrey Chow¹ and Laura K. Snook²

¹Nicholas School of the Environment and Earth Sciences, Duke University, Durham, NC USA

²Center for International Forestry Research, Jakarta, Indonesia

Species regeneration response to clearing size: A *Swietenia macrophylla* King harvested forest in northern Belize

Carissa Wong

Toronto, Ontario Canada

The effect of ecology on aggressive interactions in White-faced capuchin monkeys, *Cebus capucinus*, in a Costa Rican dry forest

Erin Vogel

Department of Ecology and Evolution, Stony Brook University, Stony Brook, NY USA

Resident and migratory aquatic birds: Use of the natural marsh (Palo Verde lagoon) and artificial marsh (Bagatzi rice fields)

Johanna Hurtado Astaiza

Programa Regional en Manejo de Vida Silvestre, Costa Rica

Proposal for changing the use of the soil in a coastal region of the Gulf of Mexico, based on the natural potential of the land

Ana Cecilia Travieso Bello, Angel Priego Santander and Patricia Moreno-Casasola

Instituto de Ecología, A.C. Xalapa, Veracruz, México

Hummingbirds as vectors of fungal spores in *Moussonia deppeana* (Gesneriaceae): Taking advantage of a mutualism?

Carlos Lara¹ and Juan Francisco Ornelas²

¹Departamento de Ecología y Comportamiento Animal, Instituto de Ecología, A.C. Xalapa, Veracruz, México

²Laboratorio de Ecología y Evolución de Comportamiento, Centro de Investigaciones Fisiológicas, Universidad Autónoma de Tlaxcala, Mexico

Community involvement in sea turtle research: Education makes a difference

Julie Osborn and Scott Pankratz

Ecology Project International, Moab, UT USA

International long-term ecological research (ILTER) towards sustainable land use and biodiversity in a mosaic of agriculture and tropical forest in Costa Rica

Bruce Haines and Chris Peterson

Plant Biology Department, University of Georgia, Athens, GA USA

Fady and botany biodiversity along the Fiherenana River, SW Madagascar

Sarah Stewart Johnson

Magdalen College, Oxford, United Kingdom

Systems of life based on biodiversity: The sustainable use of agro-biodiversity in highland forests of Ecuador

Selene Baez and Henrik Balslev

Department of Systematic Botany, Institute of Biological Sciences, University of Aarhus, Risskov, Denmark

Production of tomato (*Lycopersicon esculentum* Mill) using compost prepared with residues of undergrowth, tomato, papaya and pig feces

Juan Martin Cruz Campos¹, Manuel de J. Soria Fregoso², Lizette del Carmen Borges Gómez², and Gaspar Martin Pereyda Pérez²

¹ Tizimín, Yucatan Mexico

² Conkal, Yucatan Mexico

One fish two fish: Using fish biodiversity in the Cahaba and Amazon rivers to link human impacts on local and global riparian systems in the secondary environmental science curriculum

Janet Ort

Environmental Science, Hoover High School, Hoover, AL USA

Signal differences between courtship and territorial aggression behavior in the common anole, *Norops polylepis*

John E. Steffen

Department of Biology, Auburn University, Auburn, AL USA

Organization for Tropical Studies 40th Anniversary

Celebration Banquet

April 2, 2003 ■ Costa Rican Country Club



PETE CARMICHAEL

More than 350 people attended the banquet marking the 40th anniversary of the organization.

Awards were given to founders Edward O. Wilson, Jay Savage, John De Abate, Hugh Popenoe and Ray Noggle.

In addition, Jay Savage was recognized with the 2003 Distinguished Service award for his more than 40 years of service to OTS as a founder, teacher, researcher, Board member and donor.

Founders
John DeAbate
and Jay Savage.

OTS Board Chair
Pedro León,
INBio Director
Rodrigo Gámez
and OTS
President Gary
Hartshorn.



PETE CARMICHAEL

The Instituto Nacional de Biodiversidad (INBio), a Costa Rican scientific institution that promotes awareness of the value of biodiversity, presented OTS with a special award in recognition of the organization's significant contribution to the study of Costa Rican biodiversity.



Xylota otsa

INBio honored OTS by naming a new species to science after the Organization. The flower fly, *Xylota otsa*, belongs to the family Syphidae (Díptera) and lives throughout Costa Rica at elevations between 100 and 1400 meters. The final description of this species was completed by taxonomist F. Christian Thompson, who works at the U.S. Department of Agriculture and works as a volunteer in the entomology department of INBio.

Tropical Biology (Rubber) Boot Camps

March 30-April 2, 2003 ■ Costa Rica

Record wind speeds at Palo Verde and Las Cruces and abnormal heavy downpours at La Selva (in the "dry" season no less!) did not interfere with the boot campers enthusiasm for science in the tropics. Participants ranged in age from 10 to 83 with varying levels of tropical science expertise, including Ph.D. scientists, lawyers, students, naturalists, teachers and retirees. Activities included forest orientation walks, group projects and independent research. Boot campers learned first-hand the challenges and rewards of tropical research (and had fun and made new friends along the way).



KAREN TAYLOR

Norm Scott, Palo Verde Boot Camp Coordinator, examines a boa constrictor as part of the introduction to Palo Verde fauna.



CHRIS HILDRETH

Jay Taft, Rex Parker, Karen Arras and Carol Kleis analyze data on ant distribution at La Selva.



Scott Loarie, Stanford University scientist, and Alice Danilovich, Las Cruces participant, measure birds as part of a group field project.



graduate education

Students learn about science in the field through intensive courses that travel to various ecosystems. These courses are coordinated by experienced tropical scientists and include lectures, fieldwork and independent research. An overwhelming number of alumni cite their course experience as one of the most important factors in their professional success. More than 4,000 professionals are working to address global environmental issues through their leadership roles in governmental, academic and research institutions and grassroots, regional, national and international nonprofit organizations. Currently, courses are offered in Costa Rica, Peru, Brazil, Panama and

Mexico on topics including ecology, tropical biology, plant systematics and marine ecology.





undergraduate education

The Undergraduate Program has trained

more than 400 students in semester and summer programs. The fifteen-week semester program gives students the opportunity to learn the fundamentals of tropical biology, to conduct field research, to study first-hand Costa Rica's unique history in environmental policy, and to strengthen their understanding of Spanish and Latin American culture. Field Tropical Ecology and Introduction to Field



Ethnobiology are rigorous short courses offered in the summer. Advanced undergraduate biology students may also participate in the NSF-funded Research Experiences for Undergraduates program at La Selva. Starting in Spring 2004, the highly successful model developed for Undergraduate Programs in Costa Rica will be applied to the open-

ing of a new semester program in South Africa. For almost all of its programs, OTS awards scholarships to students from groups underrepresented in the sciences. Together, OTS undergraduate field courses help students define career objectives and provide a solid training in science and environmental policy in an international setting.



environmental science and policy

This program trains individuals whose policies have profound impacts on the natural environment. The hands-on, total immersion experience in tropical environments



that is the organization's trademark in education highlight the interdependence of social, economic, and ecological dimensions of environmental choices. Currently, this program offers training to enhance the understanding of environmental issues among present-day policy makers and training to strengthen the skill set of Latin American wildlands managers. This program has trained more than 600 people from 18 countries through the decision-maker courses and more than 90 people from 13 countries in the wildlands courses.



Las Cruces Biological Station and Wilson Botanical Garden

Las Cruces is located on Costa Rica's southern Pacific slope and is OTS' 266-hectare reserve of mid-elevation rain and cloud forest. Las Cruces is also home to the Robert and Catherine Wilson Botanical



Garden, a 10-hectare managed area consisting of one of the most important living botanical collections in Central

America. This site hosts approximately 6,500 students, researchers and natural history visitors annually. More than 480 scientific papers based on research done at Las Cruces have been published.

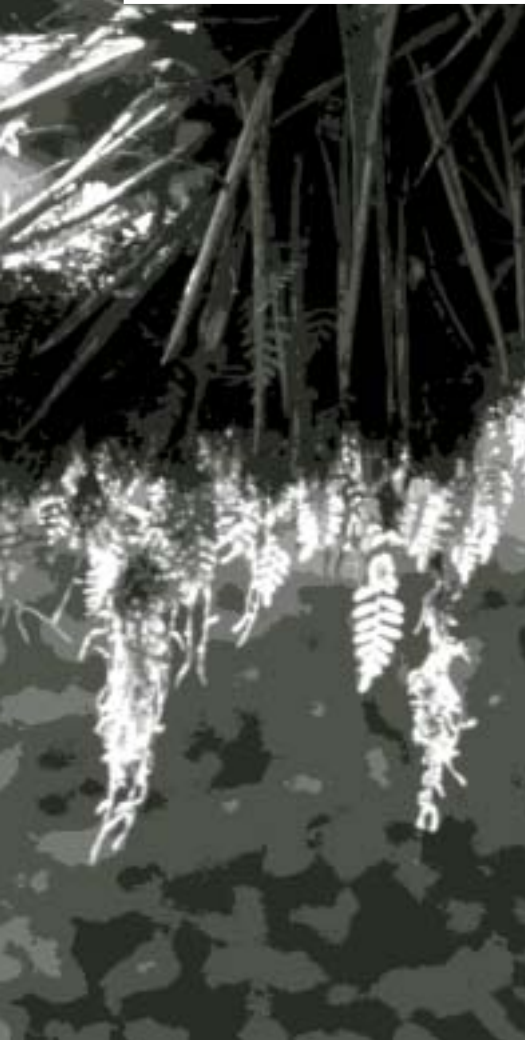




La Selva Biological Station



With its state-of-the-art laboratories, on-line geographic information system, extensive trails and large forest reserve bordering Braulio Carrillo National Park, La Selva is one of the world's most important sites for tropical forest research. La Selva is located in the Caribbean



lowlands of Costa Rica and comprises 1,516 hectares of old and secondary growth forests, plus experimental habitats. This site hosts approximately 8,700 students, researchers and natural history visitors annually. More than 2,200 scientific papers based on research done at La Selva have been published.





Palo Verde Biological Station



Unique in its landscape richness and wildlife, Palo Verde National Park contains one of the most extensive marshes and some of the oldest patches of dry forest remaining in Central America. The organization's facilities are in the heart of Palo Verde National Park, located in the northwest lowlands of Guanacaste Province. This site hosts approximately

2,300 students, researchers and natural history visitors annually. More than 460 scientific papers based on research done at Palo Verde have been published.



research



Palo Verde
Marsh
Restoration
OTS and MINAE

Nearly 200 research projects are conducted at the organization's biological stations in Costa Rica annually. Fellowships totaling more than \$70,000 each year are awarded to researchers in the early stages of their careers. These research facilitation activities, combined with efforts in helping researchers identify collaborators, secure funding and process required permits, are vital to increasing the world's knowledge of tropical ecosystems.

Researchers are:



Current and future carbon budgets for tropical rain forests: a cross-scale analysis
David Clark
(U. Missouri, St. Louis),
Deborah Clark
(U. Missouri, St. Louis)
and Steven Oberbauer
(Florida International University)

- learning about tree seedling survival in the dry forest, which will provide vital information to land managers involved in restoration, plantations and agroforestry.
- working with local communities to restore degraded wetlands and protect the area from floods.



The effects of forest fragmentation on forest insectivorous birds
Cagan Sekercioglu
(Stanford University)



Arthropod diversity in a lowland tropical rain forest
Robert Colwell
(U. Connecticut)
and Jack Longino
(Evergreen)

- analyzing how tropical forests interact with carbon dioxide in the atmosphere to buffer the global warming effects of burning fossil fuels.

- studying how forest fragments impact survival of bird species.
- discovering the astonishing diversity of arthropods in the rainforest.

ensuring the **next 40 years:**

The Campaign for OTS

THE CAMPAIGN FOR OTS is a \$30 million endowment and capital campaign to ensure the future of the consortium. The goals of the Campaign are \$20 million in endowment support, \$5 million for an education reserve fund to secure our core education programs and \$5 million in infrastructure support to significantly enhance our facilities and physical operations. Capital improvements at our research stations include classrooms, researcher and staff housing, laboratories, greenhouses and a visitors' center.

The Campaign also includes the \$1.2 million Richard H. Simons Center, named in memory of a Florida philanthropist to recognize the lead gift of his estate to this project. Construction on this new academic and administrative center on the research campus of the University of Costa Rica will begin in June and is slated for completion in June 2004. U.S. and Latin American students will benefit from the classrooms, library and technology center focused exclusively on tropical studies. In addition, politicians, corporate executives and community leaders will participate in an open exchange of ideas, and scientists from throughout the world will engage in a dialogue on the issues facing the tropics.

The Campaign for OTS is a bold vision of the future where core programs and key operations are financially robust through endowment funding and where infrastructure improvements benefit students and researchers. It is a vision worthy of the founders of the consortium. These pioneering biologists created field-courses that influence thousands of students and researchers. They built field stations that play a significant role in the world's understanding of tropical ecology. The Campaign for OTS will ensure that the work of these pioneering biologists continues, that the cornerstones of the consortium are secure and that the expectations for the 21st Century are fully met.



**For information on the
Campaign for OTS,
how you can help
with the Simons Center or
ensure OTS' next 40 years,
contact Jonathan Giles,
Development Director, at
(919) 684-6188 or
write to <jgiles@duke.edu>.**



Levels and Benefits of Membership

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 2003 Natural Wonders Calendar
 Friends T-shirt
 Recognition in LIANA
 and Annual Report

FRIEND \$100 +

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 2003 Natural Wonders Calendar
 Friends T-shirt
 Recognition in LIANA

SUPPORTER \$50 +

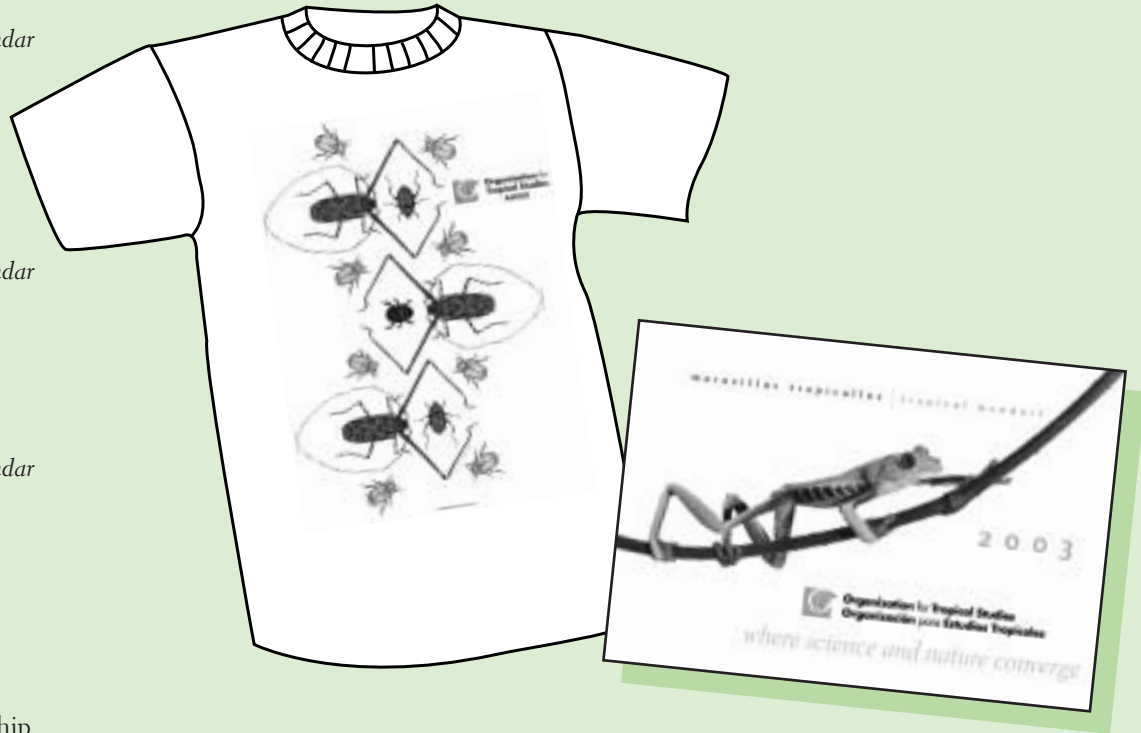
LIANA newsletters
 2003 Natural Wonders Calendar

CONTRIBUTOR \$30 +

LIANA newsletters

STUDENT \$20 +

LIANA newsletters



At all levels, your membership supports the education, research and conservation needs of the tropics, home to nearly 70% of the earth's biodiversity.

Join the Organization for Tropical Studies and become a part of education, research and conservation in the tropics.

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- XXL XL L M S

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All OTS members automatically receive *Tropinet*, a quarterly newsletter published jointly by OTS, the Association for Tropical Biology, and the Smithsonian Institution. *Tropinet* contains tropical biology, forestry, agroforestry, and ecology news from around the world. If you would prefer not to receive *Tropinet*, please indicate below.

- Please do not send *Tropinet*.

As a 501(c)(3), contributions to OTS are tax-deductible to the fullest extent allowed by law.

Spring 2003

PLEASE SEND ME ADDITIONAL INFORMATION ON:

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explore the tropical world with OTS



Bring Your Students to Costa Rica

Let OTS customize a visit to Costa Rica for your students. Your students will benefit from hands-on, experiential learning in the field at the world famous OTS biological field stations. Each of our sites provides the housing and dining facilities, laboratories, libraries, computer facilities and lecture halls needed for a successful field expedition to the tropics. You can't find a more interesting and enlightening experience for your students.

Individual Visitors

OTS Biological Stations in Costa Rica are outstanding sites for natural history visitors who are interested in learning and experiencing the wonders of tropical ecosystems. Come join us for a half- or full- day guided walk, or overnight visit.

Tropical Biology (Rubber) Boot Camp

MARCH 28-APRIL 1, 2004


Back by popular demand. Mark your calendars and prepare to get your boots dirty in Costa Rica during this intense introduction to hands-on science. The rubber boot camp will include participants with varying levels of tropical science experience. Learn how to conduct research in one of the most complex environments on earth—the tropics, home to nearly 70% of the world's biodiversity.

Chautauqua Tropical Forests in Costa Rica

Barbara Bentley (University of Utah) will lead this short course designed specifically for college teachers who teach environmental science, field biology or related courses. The 5-day program will provide an introduction to the complexity and diversity of tropical forest ecosystems. Destinations include La Selva and Palo Verde biological stations. Activities will include hands-on field exercises, introductory walks, lectures, and an introduction to research and teaching techniques in the field.

Professor Preview Tour

JANUARY 2-12, 2004

Join us for a 10-day trip to Costa Rica. Dr. Barbara Bentley (University of Utah) will lead you to the world-class OTS biological stations, as well as to Manuel Antonio National Park on the Pacific coast, and show you how to complement your classroom courses with an OTS-sponsored field trip to Costa Rica. At La Selva, Las Cruces and Palo Verde biological stations you will be introduced to the facilities and ecosystems, discuss research possibilities with station directors, and gain hands-on experience conducting research projects. Cost is airfare plus \$799. 



For complete information or reservations contact nao@duke.edu or (919) 684-5774.

“Trees are sanctuaries. Whoever knows how to speak to them, whoever knows how to listen to them, can learn the truth. They do not preach learning and precept, they preach, undeterred by particulars, the ancient law of life.”

HERMAN HESSE,
GERMAN-SWISS WRITER

Organization for Tropical Studies

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