



## WHITNEY R. HARRIS WORLD ECOLOGY CENTER

**Whitney Harris** is known primarily as one of the prosecutors to bring Nazi leaders to justice during the Nuremberg trials in 1946. He is also a long-time supporter of the ecology program at UM-St. Louis and a foundation member of the Center's Council.

In recognition of his support, the University of Missouri-St. Louis has named its International Center for Tropical Ecology in his honor. His wonderful support through a gift of \$1.5 million will be used to further and expand the mission of the **Whitney R. Harris World Ecology Center**.

"Mr. Harris' gift to the Center speaks volumes of his support," said UM-St. Louis **Chancellor Tom George**. "It will ensure that we will continue to support the largest concentration of tropical biologists in the United States, and strengthen our commitment and work in tropical ecology, botany, the environment and zoological studies."

*Piper* is a pan-tropical plant genus of mostly shrubs, but including a few vines, herbs, and small trees. The most famous species is *Piper nigrum* from which black and white pepper are derived. *Piper* species are hardy plants with numerous medicinal properties that have made them important to humans throughout the world. At least 1,000 species are known, mostly from the New World and Asian tropics. The fruits are a very important food for many bat species.



*Kenneth Kranzberg, Chair, Harris World Ecology Center Council, Anna Harris, Whitney Harris, Tom Eschen, Vice-Chancellor (Development), University of Missouri-St. Louis and Patrick Osborne, Executive Director, Whitney R. Harris World Ecology Center following the presentation of a jacket with the Center's new logo to Whitney Harris, September 22, 2006.*

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Whitney's vision in establishing the Whitney R. Harris World Ecology Center will promote the conservation of tropical and temperate ecosystems. His generosity supports the Center's mission in educating the next generation of ecologists at a time when the conservation and wise use of the world's natural resources is of paramount importance.

As a retired attorney, Whitney continues to keep abreast of issues pertaining to international law relating to war crimes and crimes against humanity. He travels extensively to lecture about Nuremberg, and currently serves as an advocate of the International Criminal Court at The Hague in the Netherlands, which tries cases of aggressive war, war crimes, and crimes against humanity, and was established to replace *ad hoc* tribunals established by the United Nations.

Whitney Harris is no stranger to the Center. The Whitney and Anna Harris Conservation Forum is held annually to raise public awareness of conservation issues. The Jane and Whitney Harris Lecture, also held annually, features an internationally recognized scholar in tropical biology, ecology or conservation. "*Today we are reckless with precious, irreplaceable resources,*" said **Whitney Harris**. "*For humans to survive on planet Earth, we must assure the survivability of all forms of plant and animal life. We must study and learn to appreciate the balance of life – plant, animal and human life upon our precious planet. I think this will be possible through the Whitney R. Harris World Ecology Center's work.*"

## PETER RAVEN TO RECEIVE WORLD ECOLOGY AWARD

**Dr. Peter H. Raven**, President, **Missouri Botanical Garden** will receive the 2007 World Ecology Award from the Whitney R. Harris World Ecology Center.

Peter Raven is one of the world's leading botanists and advocates for conservation and biodiversity. He is past President and Chairman of the Board of the American Association for the Advancement of Science, Chairman of the National Geographic Society's Committee for Research and Exploration, and Chair of the Division of Earth and Life Studies of the National Research Council. For over 35 years he has guided the Missouri Botanical Garden to become a world-class center for botanical research, education, and horticulture display. The Garden is a leader in botanical research in Latin America, Africa, and Asia, with strong programs in North America as well. The Garden's education program in the St. Louis region reaches more than 100,000 students each year and provides professional development for teachers. The splendid horticultural displays attract more than 750,000 visitors to the Garden annually.

Described by TIME magazine as a *Hero for the Planet*, Dr. Raven champions research around the world to preserve endangered plants and promotes the cause for biodiversity conservation and sustainable development. He is the recipient of numerous prizes and awards, including the prestigious International Prize for Biology from the government of Japan; Environmental Prize of the Institute de la Vie; Volvo Environment Prize; the Tyler Prize for Environmental Achievement, and the Sasakawa Environment Prize. He has held Guggenheim and John D. and Catherine T. MacArthur Foundation Fellowships.

He was a member of the President's Committee of Advisors on Science and Technology during the Clinton Administration. In 2001, he received from the President of the United States the National Medal



*Dr. Peter Raven,  
President, Missouri  
Botanical Garden.*

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of Science, the highest award for scientific accomplishment in this country. He served for 12 years as Home Secretary of the National Academy of Sciences, is a member of the academies of science in Argentina, Brazil, China, Denmark, India, Italy, Mexico, Russia, Sweden, the U.K. and the Pontifical Academy of Sciences.

He has written numerous books and scientific publications and is the Engelmann Professor of Botany at Washington University in St. Louis. He received his Ph.D. from the University of California, Los Angeles, in 1960 after completing his undergraduate work at the University of California, Berkeley.

### **KATHRYN FULLER RECEIVES WORLD ECOLOGY AWARD**

**Kathryn Fuller** received the World Ecology Award from the Whitney R. Harris World Ecology Center at a gala dinner held at the **Missouri Botanical Garden** on May 16, 2006. Fuller served as President and CEO of **World Wildlife Fund-US**, the world's largest international conservation organization, for sixteen years, retiring in June 2005. Under her leadership, WWF doubled its membership, tripled its revenue and expanded its presence in over 100 countries around the globe.



*Dr. Patrick Osborne, Executive Director, Whitney R. Harris World Ecology Center, Dr. Peter Raven, President, Missouri Botanical Garden, 2006 World Ecology Award recipient Kathryn Fuller, Hal Kroeger, Chair, Harris Center Advisory Board and Dr. Tom George, Chancellor, University of Missouri-St. Louis following the presentation of the World Ecology Award at the Missouri Botanical Garden on May 16, 2006.*

In her acceptance address, Kathryn Fuller indicated that global conservation efforts rest “on two very basic things. The first is science. We need good biological and social science, good data about what is

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*happening to our biosphere and why. How can we come up with effective solutions unless we invest in understanding? And the second is individual initiative. We need individuals, here in the United States and around the world, in their own lives and through their institutions, to speak up and translate that understanding into action.”* She concluded her remarks with a quote by John Sawhill, former head of The Nature Conservancy, *“In the end our society will be defined not only by what we create, but also by what we refuse to destroy.”*

## WORLD ECOLOGY CENTER TO RECRUIT DIRECTOR

The Whitney R. Harris World Ecology Center has embarked on an international search for a senior scientist to lead the Center as Director. The successful candidate will be an excellent scientist pursuing active research in tropical biology, ecology, systematics or conservation. The Director will provide visionary leadership for the Center, raise funds from a variety of sources and generally promote the Center by developing its teaching, research and outreach programs.

## WHITNEY AND ANNA HARRIS CONSERVATION FORUM

The 2006 Whitney and Anna Harris Conservation Forum will be held at the **Saint Louis Zoo** on Tuesday, October 24. The forum will address the theme: *“Biofuels and Ecological Sustainability in the 21<sup>st</sup> Century: Is Going Yellow, Green?”* Panel members and their talks are as follows: **Dr. Alex Farrell**, Assistant Professor, Energy and Resources Group and Director, Joint Center for Transportation Sustainability Research at the University of California-Berkeley: *Vehicle Fuels for the 21st Century*; **Dr. Jim McLaren**, President, StrathKirn Inc., St. Louis: *Natural Ethanol: Powering Your Car with Harvested Sunlight*; **Dr. Bruce Dale**, Professor, Department of Chemical Engineering and Materials Science, Michigan State University: *Bioethanol: Thinking Clearly about Energy and Sustainability Issues*; **Dr. G. David Tilman**, McKnight Presidential Chair in Ecology, Regents' Professor, and Director of Cedar Creek Natural History Area, University of Minnesota: *Greenhouse-Neutral Biofuels from High-Diversity Low-Input Prairie Ecosystems*.

## 2006 RESEARCH SCHOLARSHIP RECIPIENTS

The Whitney R. Harris World Ecology Center awarded the following scholarships in 2006:

*Christensen Fund Scholarship in Plant Conservation:* **Felipe Zapata:** Species limits, phylogenetic history and diversification in the genus *Escallonia* (Escalloniaceae).

*Stephen Mitchell Doyle Scholarship in Tropical Ecology:* **BriAnne Addison:** Disease pressure and maternal antibody allocation: Avian malaria and tropical birds.

*John Denver Memorial Scholarship in Tropical Ecology:* **Iris I. Levin:** Fitness consequences of *Haemoproteus* in great frigatebirds (*Fregata minor*) on Isla Genovesa, Galápagos.

*Goldie Millstone Scholarship and Jorie Butler Kent Scholarship:* **Caroline Duffie:** Determining the population structure of the flightless cormorant (*Phalacrocorax harrisi*).

*Henry B. Cowhey Scholarship in Tropical Conservation and Leo and Kay Drey Scholarship:* **Benjamin Nims:** Genetic structure and diversity, past and present, in the endangered Galápagos Penguin.

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*Jane Harris Scholarship in Tropical Botany:*  
**John Atwood:** A taxonomic revision of *Schlotheimia* section *Stegotheca* (Orthotrichaceae, Musci).

*Jane and Stanley Birge Tropical Research Scholarship:* **Patricia Baião:** The impacts of parasites on phenotypes involved in courtship and mate selection: The case of the red-footed boobies (*Sula sula*) in the Galápagos Islands.

*Parker-Gentry Tropical Research Fellowship:*  
**Adriana Rodriguez-Ferraro:** Community ecology and phylogeography of bird assemblages in arid zones of northern Venezuela.

2006 *Antoinette McGrath Memorial Scholarship:* **BriAnne Addison** and **Iris Levin.**

## SPOTLIGHT ON FUNDED RESEARCH PROJECTS

### FRIGATEBIRDS ON THE GALAPAGOS ISLANDS

Ph.D. student **Iris Levin** (advisor: **Patricia Parker**) headed to the Galápagos Islands for a month in July 2006 with graduate students **Patty Baião** and **Jane Merkel**, UM-St. Louis development officer **Michele Rutledge**, and Missouri community college biology professors **Shari Harden** and **Gavin O'Connor**. Iris' research, funded in part by the Whitney R. Harris World Ecology Center and a Fund for Conservation Research grant from the **Saint Louis Zoo**, focuses on parasites of great frigatebirds, and how these parasites might affect survival and reproductive success. Upon landing on Genovesa, one of the smaller, northern islands in the archipelago, the first things one sees are several hundred frigatebirds nesting along the shore in the saltbush. These are bizarre birds for several reasons: unlike most seabirds they are sexually dimorphic, with males having an inflatable throat pouch used during courtship display; and although they are pelagic, they do not dive for fish as they lack waterproofing on

their feathers. Instead, they snatch fish from the surface of the water, or harass other seabirds until they drop their catch.



*Female frigatebird with chick.*

Iris had never worked with birds larger than storm petrels, so catching and sampling a large seabird took some getting used to. Jane, who is also a full time employee at the **Saint Louis Zoo**, was instrumental in training both Iris and Patty in how to take disease samples. Each individual had eye, choana, and cloaca swabbed, a blood sample taken, ectoparasites sampled, and in some cases, a fecal sample was collected. Back at the makeshift lab (centrifuges run off solar panels and car batteries), the blood was separated into serum and plasma, and packed cell volume (a quick measure of anemia and dehydration) and total serum protein was measured. The team sampled 170 frigatebirds: 126 breeding adults, 24 juveniles, and 20 chicks. Three years ago, a protozoan parasite, *Haemoproteus*, was discovered in these birds, so the next step is to determine whether the infection is still present, at what prevalence and intensity, and whether this parasite (among others) has an impact on these individuals. Additionally, Iris recoded spatial data (distance to the nearest nest and the number of nests within 10 m) while sampling in the colony, in

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order to understand the effects of sociality on disease prevalence and intensity.



*Male frigatebird on Genovesa.*

#### AVIAN MALARIA AND TROPICAL BIRDS

The recipient of the **Stephen Mitchell Doyle Scholarship in Tropical Ecology**, **BriAnne Addison** (advisor: **Robert Ricklefs**), spent the spring months in Gamboa, Panama with the **Smithsonian Tropical Research Institute** (STRI), collecting data for her project: *Disease pressure and maternal antibody allocation: Avian malaria and tropical birds*. With the field assistance of **Jorge Herrera** (University of Panama), **Ruby Zambrano** (STRI) and **Lisa Miller** (Oregon State University), she collected pilot data on disease pressure in different habitats around and in the tropical lowland rain forest, and egg yolk for analysis of maternally derived

antibodies from more than 15 common bird species. Her study of disease pressure involved using domestic quail as sentinels of avian malaria, by keeping the birds in different locations in the forest. This method of disease sampling is similar to the kind of disease monitoring formerly carried out by the Panama Canal authority, in the early days of canal construction and use. The quail sentinels thoroughly enjoyed living in the forest where there were plenty of insects to eat, and showed no sign of illness during the monitoring.



*Quail chicks used as sentinel species.*

Results from molecular analysis of the small blood samples collected will tell how prevalent avian malaria disease is in the area, and how the sentinels fought off infection. Collection of egg yolks was difficult, as unusual environmental conditions seemed to lower breeding propensity in many species in Gamboa this year. Nonetheless, these data present the first comparative look at yolk antibody levels. Mother birds are known to put antibodies into their egg yolks during egg formation. These antibodies help the chicks to combat disease early in life, but the long-term consequences of yolk antibodies are not well understood, and nothing is known about how ecological factors influence

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yolk antibody levels. This study aims to fill in these knowledge gaps, and we hope these pilot data give the first clues.

#### POPULATION STRUCTURE OF THE FLIGHTLESS CORMORANT (*PHALACROCORAX HARRISI*)

**Caroline Duffie** (advisor: **Patricia Parker**) is studying how environmental forces influence the genetic structure of populations, and in turn, how this interaction influences population health and stability over time. She is using a molecular approach to investigate the population structure of the flightless cormorant (*Phalacrocorax harrisi*), a rare seabird endemic to the Galápagos Islands, Ecuador.



*Flightless cormorant (Phalacrocorax harrisi),  
Punta Espinosa Sur, Fernandina Island.*

The population of flightless cormorants is small (roughly 900 breeding pairs) and is subdivided into geographically discrete breeding colonies, which are clustered along areas of suitable coastline on two islands in the Galápagos archipelago. Previous studies have attempted to infer the distribution of genetic variation among colonies based on observations of movement of individuals. With the help of the **Goldie Millstone Scholarship** and the **Jorie Butler Kent Scholarship** from the Whitney R.

Harris World Ecology Center, Caroline used microsatellite markers to genotype 221 individual cormorants from across the bird's range. These data show that genetic structure between colonies increases with geographic distance, suggesting that gene flow is restricted due to low long-distance dispersal rates. Furthermore, this study shows that overall genetic variability is low due to population effects (*e.g.*, restricted gene flow, genetic drift), and likely also to historical events (genetic bottlenecks).

#### PHYLOGENY OF *ESCALLONIA*

**Felipe Zapata** (Advisor: **Peter Stevens**) studies *Escallonia*, a member of the plant family Escalloniaceae, that includes around 40 species of herbs, shrubs and trees found throughout the Andes, the South Atlantic Forest in Brazil, Juan Fernández Island and, remarkably, La Réunion in the Indian Ocean. Although *Escallonia* is clearly defined by both vegetative and reproductive characters, it is considered taxonomically complex and there has been much disagreement over how many species it contains and uncertainty over its phylogeny. Felipe's research integrates genetic, morphological and spatial analyses to determine species limits and to shed some light on the biological processes generating and maintaining molecular, morphological and ecological diversity in this genus.

Felipe is reconstructing a complete phylogeny of *Escallonia* using molecular sequence data from different loci. This phylogeny will allow him to identify not only evolutionary lineages, but it will also provide an indirect record of the speciation events that have led to the extant diversity in this genus. By combining this phylogeny with information on geographical distribution, ecology and explicit analyses of morphological variation, Felipe will reassess species limits and will investigate the

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mechanisms associated with the diversification of *Escallonia* in the highlands of South America and its dispersal to remote oceanic islands. With financial support from the Whitney R. Harris World Ecology Center (**Christensen Fund Scholarship in Plant Conservation**) and other sources, Felipe has been able to do field work in Colombia, Chile and will soon collect in Brazil. These funds have also allowed him to start work in the molecular laboratory and to visit different herbaria to study *Escallonia* collections.

## NEWS OF HARRIS CENTER FACULTY, STUDENTS AND ALUMNI

**Bette Loiselle** has been elected Chairperson, Board of Directors for the **Organization for Tropical Studies**. This consortium of over 60 universities and research institutions from the United States, Latin America and Australia provides leadership in education, research and the responsible use of natural resources in the tropics. OTS provides graduate and undergraduate education opportunities, facilitates research, participates in tropical forest conservation, maintains three biological stations in Costa Rica and conducts environmental education programs. The University of Missouri-St. Louis is a member of OTS and the Harris Center is an active participant in the Organization's programs.

Three research scholarships were awarded to Harris Center associates by the Fund for Conservation Research of the **Saint Louis Zoo**. **Iris Levin** (*Fitness consequences of Haemoproteus in great frigatebirds (Fregata minor) on Isla Genovesa, Galápagos*) received \$9,989; **Patricia Baião** (*The impacts of parasites on phenotypes involved in courtship and mate selection: The case of the red-footed boobies (Sula sula) in the Galápagos Islands*) received \$10,000 and **Benjamin Nims** (*Genetic structure and diversity, past and present, in the*

*endangered Galápagos Penguin*) received \$3,350.

**Felipe Zapata** received a \$700 grant from the **American Society of Plant Taxonomists** for his dissertation research.

**Danielle Lee** received a \$7,000 **TWA Scholarship** for her dissertation research.

**Adriana Rodriguez-Ferraro** received the 2006 Frank M. Chapman Memorial Fund research scholarship for her project *Comparative phylogeography of bird assemblages in arid zones of northern Venezuela*.



*Arid scrub in northern Venezuela.*

**Nicole Wulff** has been appointed as a full-time lecturer in the Natural Resource Management program at the **University of Belize**. Nicole completed her M.S. as a MOSTEP Fellow and the Graduate Certificate in Tropical Biology and Conservation with an internship with **Laboratorio de Investigaciones Ecologicas de las yungas (LIEY)** in Argentina.

**Renata Durães** received a field equipment grant from **Idea Wild** for her project on lekking dynamics and sexual selection in the Blue-crowned manakin (*Lepidothrix coronata*) in Ecuador. She attended the North American Ornithological Society's 4th meeting in Veracruz, Mexico and received the 2006 **Arnold Grobman Award** from the Biology Department.

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**Debbie Boege-Tobin (Ph.D. 2005)** has accepted a tenure-track position as Assistant Professor of Biology at the **University of Alaska-Anchorage**, Kachemak Bay Campus.

**Paulo Camara** had a successful collecting trip in Peninsular Malaysia, Borneo and Singapore using support from the **Missouri Botanical Garden** and **Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)**. He gave seminars at the **University of Malaysia, Kuala Lumpur** and **University of Malaysia, Sabah**.

**Beth Congdon** completed a successful field season studying capybara behavior in Venezuela. Beth received the **Henry B. Cowhey Scholarship** from the Harris Center and was awarded a dissertation research grant from the **National Science Foundation**. While in Venezuela, Beth was filmed as part of a documentary about Costa Rica, Peru and Venezuela called *From rich coast to savannah: A country lad in Latin America* by **David A. J. Rabbitts** for distribution in the United Kingdom.

Her research will also be featured in an upcoming episode of *Tierzeit* (Animal Time); a weekly TV show in Germany that features ecological research on a different species each week.

### NEW FELLOWSHIP STUDENTS

Three students have joined the graduate program in the Department of Biology through fellowship awards to the Harris Center. **Muse Opiang** (Papua New Guinea) is funded through the **East-West Center (Hawaii)**, **Saint Louis Zoo**, **UM-St. Louis (Graduate School)** and the **Wildlife Conservation Society-PNG**. **Banak Gamui**, also from Papua New Guinea is funded through the **WCS Christensen program**, the **Wildlife Conservation Society-PNG** and **UM-St. Louis (Graduate School)**. **Diego Salazar** joins the **Robert Marquis** laboratory as a **Christensen Fund Fellow** with support also from the **UM-St. Louis (Graduate School)**.



*Capybara family at Hato el Cedral, Venezuela.*



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The Harris Center gratefully acknowledges the following for their generous support from July 1, 2005 to June 30, 2006.

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*PiperNotes* is the biannual newsletter of the **Whitney R. Harris World Ecology Center**. In collaboration with the **Missouri Botanical Garden** and the **Saint Louis Zoo**, the Center promotes research and education in biodiversity conservation and the sustainable use of natural resources and ecosystems. The Center provides an academic, international environment for graduate education in ecology, evolution, systematics and conservation. The Center supports undergraduate education in conservation biology and promotes awareness within the St. Louis community of the importance of conservation and environmentally sustainable policies and practices.

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## TOP STORIES



**THE INTERNATIONAL CENTER FOR TROPICAL ECOLOGY BECOMES THE WHITNEY R. HARRIS WORLD ECOLOGY CENTER** *through a gift to the Center of \$1.5 million.*

**KATHRYN FULLER RECEIVES WORLD ECOLOGY AWARD** *for contributions to global conservation as President of the World Wildlife Fund – May 16, 2006.*

**PETER RAVEN TO RECEIVE 2007 WORLD ECOLOGY AWARD** *for visionary leadership in botany, plant conservation and environmental education.*

**WORLD ECOLOGY CENTER TO RECRUIT DIRECTOR.**

**2006 WHITNEY AND ANNA HARRIS CONSERVATION FORUM** *to focus on energy conservation and biofuels.*



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