

Celebrating 10 years 🌿 2004-2014

THE MCGUIRE CENTER
for Lepidoptera and Biodiversity

FY 2004-2013 Impact by numbers

Staff and Faculty Teaching

- 49 Courses taught
- 37 Graduate committees chaired
- 50 Graduate committees served
- 7 Ph.D. graduates
- 17 Master's graduates

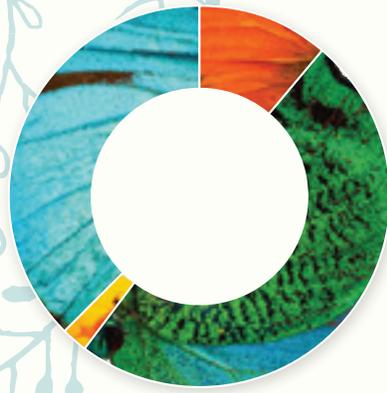
Collections and Research

- 576 Scientific publications by staff and students
- 1,320 Scientific visitors to the collection
- 348 Collections and libraries donated
- 39 New and Continuing grants and contracts worth more than \$3 million.
- 200 Conference presentations and seminars
- 100 Expeditions led by staff
- 3 Scientific journals produced: *Tropical Lepidoptera Research*, *Bulletin of Allyn Museum* and *Lepidoptera Novae*
- 20 Books authored or edited
- 23 Book chapters
- 13 Scientific conferences hosted

Attendance and Outreach

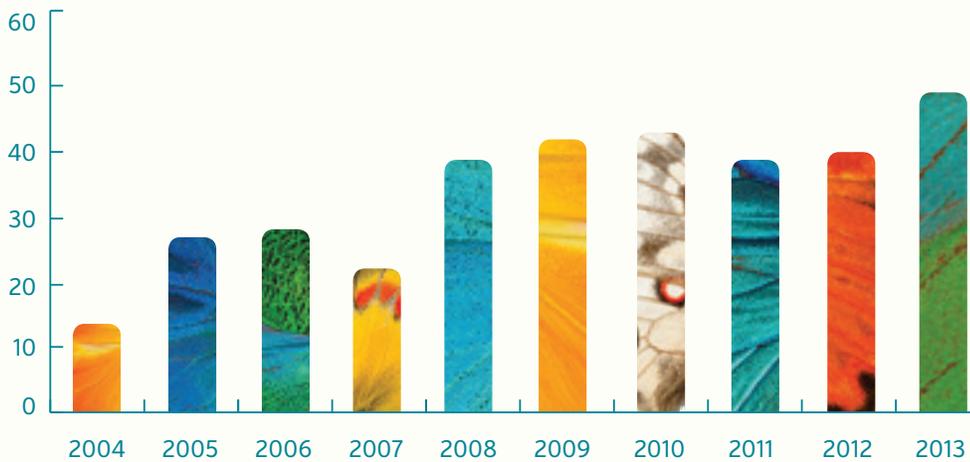
- 25,707 Hours donated by 109 volunteers
- 6,000 Hours donated by 303 Junior Volunteers
- 967,121 Butterfly Rainforest attendance
- 2,378 Butterfly Rainforest school group visits totaling 10,987 children
- 558,610 Educational brochures distributed
- 40,000 ButterflyFest visitors
- 1.9 Million website visits
- 218 Web pages
- 5,342 Website images
- 109 Lepidoptera pages added to the UF-IFAS *Featured Creatures* website
- 160,000 Images of 8,300 species on *Butterflies of America* website

FY 2004-2013 Financials



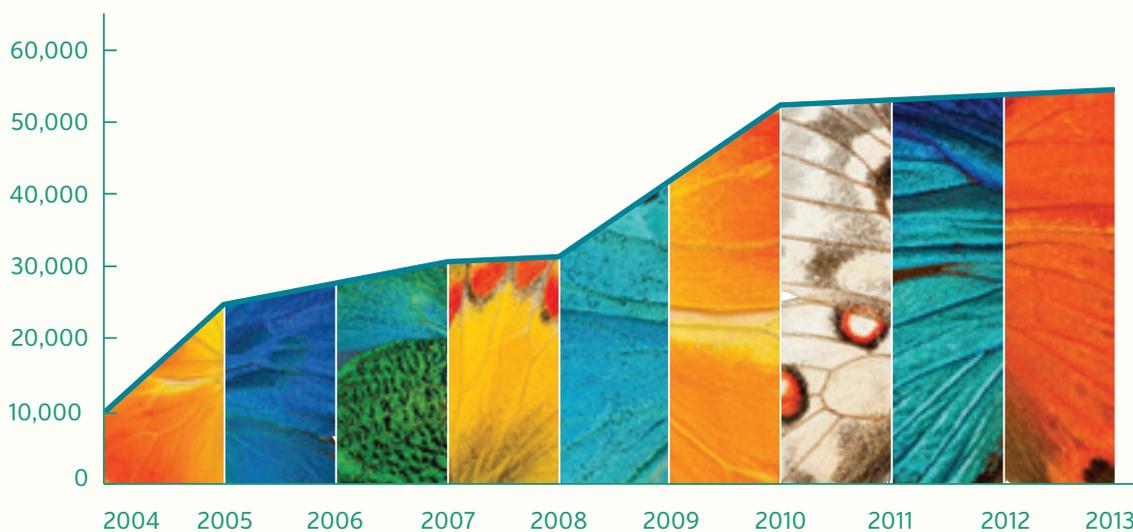
	Grants and contracts	\$ 3,020,000
	UF/State support	\$13,132,184
	Earned income	\$ 577,852
	Private gifts	\$ 9,986,594

Total number of accessions by year since opening [donated individual collections or libraries]



Year	No. of accessions
2004	14
2005	27
2006	28
2007	22
2008	40
2009	43
2010	44
2011	39
2012	42
2013	49

Collection Growth 2004 -2013 [approximate number of drawers-cumulative]



Year	No. of drawers
2004	10,000
2005	25,000
2006	28,000
2007	31,000
2008	32,000
2009	42,000
2010	52,000
2011	53,000
2012	54,000
2013	54,000



A message from the Founding Director

Since the McGuire Center opened to the public in August 2004, the ensuing decade has been one of exciting advancement, astonishing growth and constant strides to keep up with cutting-edge improvements in technology and research methods for the study of Lepidoptera and biodiversity.

The Center collection started with about 4 million specimens from the Lepidoptera holdings of the Allyn Museum of Entomology and the Florida State Collection of Arthropods, along with collections from faculty in the University of Florida departments of Zoology and Entomology. These were assembled under the umbrella of the state's McGuire Center at the Florida Museum of Natural History on the University of Florida campus. Today, the holdings of adult and immature Lepidoptera number more than 10 million, as a result of nearly 40 private and public collection donations per year, and from a program of carefully targeted worldwide collecting expeditions by staff, students and more than 100 active research associates.



New techniques in molecular biology, physiology and genetics, as well as developments in GIS or other electronic applications, have enabled our scientists to make advances in many research areas. The methods are allowing researchers to address long-perplexing evolutionary and taxonomic questions, provide insights into the geographic origins of migrating monarchs, and reveal mechanisms of symbioses between ants and butterflies. New instruments have allowed our researchers to photograph pollination of long-throated orchids by nocturnal sphinx moths, study defensive sound production in moths being pursued by bats, and assess the presence and impact of toxic environmental poisons in butterflies during larval growth that enable us to pinpoint the presence of poisons in our cities and natural areas.



Top: McGuire Center Founding Director Thomas Emmel displays specimens in the McGuire collections. Photo by Jeff Gage. Center: *Phoebis philea thalestris* butterflies from the Dominican Republic. Photo by Kristen Grace. Bottom: Preparators Lorraine Duerden and Brett Boyd pin and label specimens at a public display window during a McGuire Center tour. Photo by Jeff Gage.

Every year brings new advances and approaches to explore the incredible diversity of ways more than 20,000 butterfly species and an estimated 245,000 species of moths have evolved as such a successful group of animals and, at the same time, serve as prominent indicator species for the health of the environment. Even though we have achieved the status of having the largest research training center and most extensive educational programs in the world for advanced Lepidoptera study in just 10 years, the McGuire Center is not resting on its academic laurels. We look forward to new challenges and opportunities, together with new growth in expanded facilities, during the decades ahead. Please come visit the McGuire Center regularly and help us achieve these goals with your interest, involvement and support!

Sincerely,

Thomas C. Emmel, Founding Director



The McGuire Center for Lepidoptera and Biodiversity serves research and public education functions. The center includes the living Butterfly Rainforest, an adjacent exhibit gallery featuring information about the biology of butterflies and moths worldwide, as well as research laboratories and a major scientific collection.

Collections and Research

The McGuire Center collections include specimens from around the world and are a result of the effort of thousands of people over the last two centuries. Thanks to many donations by amateur and professional entomologists worth many millions of dollars, the Center's holdings have more than doubled over the past 10 years, making this is the world's fastest-growing collection. The collection is comprehensive taxonomically, containing the majority of the world's described butterfly species and many of the estimated 245,000 moth species. Widely used by an increasingly global community of scientists, the collection documents past and present patterns of biological diversity and forms the basis for research on topics from climate change and emerging agricultural pests to evolution and organism conservation.



Diverse research by McGuire Center faculty, staff and students includes:

Faunal Surveys: Efforts to document the diversity, biology and distribution patterns of Lepidoptera include local surveys and wide-scale projects of various regions. An ongoing project on butterflies of Ecuador has resulted in more than 100 new described species and many insights into the ecology, distribution and evolutionary relationships of the country's butterflies. Assessment of butterflies of Rondônia, Brazil, resulted in nearly 2,000 documented species in a few square kilometers of Amazonian forest including dozens of newly described species. Other efforts to describe the world's vanishing biodiversity include Lepidoptera projects in Argentina, the Caribbean, Florida, Hawaii, Mesoamerica, Mexico, Nevada, Panama, the Philippines, Taiwan and Vietnam.



Taxonomy: With one of the world's largest and most comprehensive collections, the Center's fundamental research focuses on taxonomy to improve classification. This work has produced descriptions of many new species and larger taxonomic revisions.

Predator-prey Interactions: Predator-prey relationships offer an opportunity to explore the ecological and evolutionary dynamics



Top: McGuire Center Collections Coordinator Andrei Sourakov discusses research opportunities at the McGuire Center with a group of college students from across Florida. **Second from top:** McGuire Center Senior Collections Manager Andrew Warren holds a Gulf Fritillary, *Agraulis vanillae*, in the University of Florida Natural Area Teaching Laboratory. **Second from bottom:** Lepidoptera Assistant Curator Akito Kawahara works in the lab. Photos by Kristen Grace. **Bottom:** Lepidoptera Curator Jackie Miller showcases a collection of butterfly moths, *Castniidae*. Photo by Mary Warrick.

Research and Collections highlights continued

of species, including how moths evade bats, how Lepidoptera defend against spiders and how some butterflies exploit ants for their benefit.

Conservation: The Center is one of the leading institutions researching the conservation of insect pollinators—organisms critical to our environmental and economic well-being. Projects include at-risk butterfly recovery in South Florida and assessments of the conservation status of flagship species like Jamaica’s Homerus Swallowtail. Researchers frequently target practical applications including developing best land management practices, improving recovery techniques and evaluating the negative effects of invasive exotic organisms on native butterflies.

Evolutionary Biology: Several Center research projects focus on understanding general Lepidoptera evolution, as well as specific traits including moth blood-feeding and fruit-piercing activities, roosting behavior in longwing butterflies, sound production in hawkmoths, rarity vs. abundance in clearwing butterflies and chemical co-evolution with plants. Other studies seek to answer questions relating to biogeography, such as evolution of endemic fauna of the Hawaiian Islands or the diversification of butterflies in the Andes of South America. Projects frequently involve sophisticated modern molecular techniques and computer algorithms.

Education, Outreach and Community Impact

Youth and Undergraduate Mentoring

Over 300 Junior Volunteers (ages 12-17) contributed more than 6,000 hours working in the Lepidoptera collections, public gallery and Butterfly Rainforest. McGuire Center curators and collection managers also provided mentored research experiences to dozens of high school students and University of Florida undergraduates. Such meaningful hands-on learning opportunities help inspire and cultivate the next generation of scientists.

The World’s Largest Butterfly Website

Created and maintained by McGuire Center staff and research associates, the Butterflies of America website is a comprehensive online resource for scientists and the general public that includes information on butterfly taxonomy, identification, distribution, habitat and life history. By browsing more than 160,500 images of over 8,300 species, subspecies and undescribed geographic variants, virtually any butterfly in the New World may be identified.



Top: McGuire Center for Lepidoptera and Biodiversity Director Jaret Daniels leads a workshop on native plants, butterflies and insects at Morningside Nature Center. Photo by Jeff Gage. **Second from top:** Associate Curator of Lepidoptera Keith Willmott conducts field work in Anangu, Ecuador. Photo by Julia Willmott. **Second from bottom:** Technical research assistant Stephanie Sanchez shows Museum visitors an endangered Miami blue butterfly caterpillar during the McGuire Center grand opening. Photo by Jeff Gage. **Bottom:** Junior volunteers pin butterfly and moth specimens in the McGuire Center collections. Photo by Kristen Grace.

National 4-H Curriculum

In collaboration with the Museum's Center for Science Learning, UF Institute of Food and Agricultural Sciences and 4-H, the Center assisted in the development of *Project Butterfly WINGS: Winning Investigative Network for Great Science*. Designed to engage youth in grades 4-8 in studies of butterflies, the program was approved by 4-H as one of the first National Science, Engineering and Technology curricula to help address the increased demand for science and technology professionals.

Citizen Science

Collaboration with Disney's Animal Programs, the Association of Zoos and Aquariums, Florida Natural Areas Inventory and the Florida Fish and Wildlife Conservation Commission led to the creation of the Florida Butterfly Monitoring Network, which brings together volunteers and scientists to collect information on distribution and population trends of Florida butterflies.

Community Events

Showcasing butterflies as fun, fascinating ambassadors to the natural world, ButterflyFest has become a signature annual, family-friendly festival that promotes science inquiry and backyard wildlife conservation. Now in its ninth year, ButterflyFest has attracted nearly 40,000 visitors and generated over \$230,000 in revenue for the Florida Museum.

Educational Brochures

Aimed to increase public awareness about the connection between native plants and butterflies, the Center produced the *Florida Wildflowers & Butterflies*, *Monarchs & Milkweeds: Southeast* and *Monarchs & Milkweeds: East Region* brochures. In partnership with the U.S. Forest Service, nearly 600,000 copies have been distributed free to individuals, schools and other organizations nationwide. The interest and reach of these brochures makes them the Museum's most successful print-based educational products.

Professional Training

To help strengthen other institutions' butterfly conservation efforts, the Center launched the *Imperiled Butterfly Conservation and Management* training program. Over three years, participants from 33 institutions learned about the latest techniques and resources during a series of six national workshops.

Ecotourism

Each year through the Museum travel program, Center staff and students lead ecotourism expeditions to various locations around the globe. Visits to the overwintering colonies of monarch butterflies in Mexico have become a signature component of the program, resulting in 17 trips and nearly 350 participants. The Center also works with the UF Department of Entomology and Nematology to offer undergraduate and graduate ecotourism degree tracts.

Top: Butterfly Rainforest employee Emily Winters shows Girl Scouts an Owl butterfly, *Caligo memnon*. Center: Schaus' Swallowtail caterpillars are raised in the McGuire Center as part of a recovery program to help save the endangered butterfly. Photos by Kristen Grace. Bottom: Monarchs drink from puddles on a warm day in Michoacán, Mexico. Photo by Court Whelan.





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New endowment honors founding director Thomas C. Emmel

In thankful recognition of the leadership and vision provided by Thomas Emmel during the planning, development and first 10 years of growth of the McGuire Center for Lepidoptera and Biodiversity, the Florida Museum has created the **Thomas C. Emmel Founding Director's Endowment**.

The McGuire Center for Lepidoptera and Biodiversity has grown to include one of the world's largest and most comprehensive Lepidoptera collections. **The Thomas C. Emmel Founding Director's Endowment** will equally support collections improvement and collection-based research (in the form of graduate research fellowships and project grants) at the McGuire Center. Fund administrator Andrew Warren, along with the McGuire Center staff and director, will be responsible for annual decisions regarding disbursement from the endowment earnings.

Please join us in supporting this important endowment to ensure the continuation of our long-term mission. Gifts may be made in several ways including one-time cash gifts, pledges over several years, gifts of stock, insurance or property and bequests.

If you would like to make a credit card gift, please visit the Florida Museum website at www.flmnh.ufl.edu/mcguire019211 and designate your gift to the **Thomas C. Emmel Founding Director's Endowment**.

Please make checks payable to the UF Foundation and indicate the **Thomas C. Emmel Founding Director's Endowment** on the check and mail to:

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