Insect science

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INFORMATION OF ACADEMIC ACTIVITY

A new institution devoted to insect science: The Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity

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Abstract The Florida Museum of Natural History's McGuire Center for Lepidoptera and Biodiversity, on the University of Florida campus in Gainesville, Florida, has become one of the world's largest institutions for research on butterflies and moths, and an important research facility for insect science. The facility was constructed by combining the staff and merging the Lepidoptera holdings from the Allyn Museum of Entomology, the Florida State Collection of Arthropods and other University of Florida collections, and now includes over ten million specimens from all over the world, rivaling some of the largest Lepidoptera research collections globally. The facility includes a team of domestic and international researchers studying many areas of lepidopterology, including behavior, biodiversity, biogeography, ecology, genomics, physiology, systematics and taxonomy. In this paper, we introduce the McGuire Center, its staff, and the many research activities for researchers across entomological disciplines.

Key words Florida Museum of Natural History, Lepidoptera, lepidopterology, McGuire Center, moth, new research facility

The McGuire center

The McGuire Center for Lepidoptera and Biodiversity, part of the Florida Museum of Natural History at the University of Florida campus in Gainesville, Florida, is quickly becoming one of the world's largest research facilities on Lepidoptera (Fig. 1). The Center serves as a research institution while promoting public education. The facility was constructed in 2004 by merging the Lepidoptera holdings from the Allyn Museum of Entomology, the Florida State Collection of Arthropods and other University of Florida collections. Since then, the McGuire Center has expanded its collection through donations of specimens and collecting expeditions. The center receives 20–30 donations each year, including collections that contain several hundred thousand to two million specimens. To accommodate the large number of incoming specimens, the museum is currently preparing for a new wing to expand its research and collections space.

The McGuire Center was built with an initial $4.2 million gift from the William and Nadine McGuire Family Foundation. This gift was one of the largest private gifts for research in insect science and was matched from the State of Florida to bring the total building funds to $8.4 million. An additional $3 million donation from the McGuires allowed the completion of the facility that was originally intended only for research, but now includes public exhibits, such as one of the world's largest live butterfly enclosures.

The facility has 3 600 square meters of space devoted to research laboratories and collections (Fig. 2). The main building has research areas that include laboratories

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Fig. 1 McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History.

Fig. 2 Millions of specimens of Lepidoptera are preserved in the McGuire Center collection for research. Shown here is Dr. Thomas Emmel, Director, among one of the many aisles in the collection.

focusing on molecular systematics and genomics, morphology, scanning electron microscopy, optical imaging analysis, physiology, conservation and propagation of endangered species, and bioacoustics. The building was designed so that "viewing windows" allow the public to observe activity within the research laboratories and collections, and the specimen preparation area is one of the most favored by the visitors. Visitors can also experience the "Wall of Wings", a 100-m long, 10-m high wall covered with Lepidoptera specimens, photographs, plasma screens and information panels illustrating Lepidoptera diversity (Fig. 3).

Fifteen faculty and curatorial-level staff currently work at the McGuire Center: Charles V. Covell Jr., Jaret C. Daniels, Thomas C. Emmel, James Hayden, John B. Heppner, Akito Y. Kawahara, Delano S. Lewis, Vladimir Lukhtanov, Deborah Matthews-Lott, Jacqueline Y. Miller, Kyu-Tek Park, Andrei Sourakov, J. D. Turner, Andrew Warren and Keith Willmott. The researchers' primary areas of focus include: Lepidoptera behavior, biodiversity, biogeography, biological control, conservation biology, larval biology, outreach, phylogenomics, and molecular and morphological systematics. While the majority of research is focused on Nearctic and Neotropical Lepidoptera, there are also projects centered in Africa, Asia and Europe.

More than three dozen graduate students, post-doctoral fellows and undergraduate students conduct their research at the facility. Most of the students affiliated with the Center are enrolled in the Department of Biology and the Department of Entomology and Nematology, at the University of Florida, through which McGuire Center's staff also offers courses and seminars.

Many international researchers visit the museum for their studies, and the facility hosts bi-weekly presentations given by local or visiting Lepidopterists. The McGuire Center has also hosted academic conferences on Lepidoptera, such as annual meetings of the Lepidopterists' Society, Association for Tropical Lepidoptera, Southern Lepidopterists' Society, as well as many forums related to butterfly conservation. The 2013 Lepidopterists' Society annual meeting will be held at the McGuire Center.

Lepidoptera-related professional journals and newsletters are produced at the McGuire Center, including the *Bulletin of the Allyn Museum*, *Tropical Lepidoptera Research*, *Holarctic Lepidoptera* and the *McGuire Center News*. Additionally, the McGuire Center's staff publishes many popular books and brochures, such as butterfly and moth identification guides, manuals on butterfly gardening and on use of butterflies as educational tools in the classrooms of American public schools.

The facility's exhibits that promote insect science includes the Butterfly Rainforest, a 2 000 square meter, 4-story high screened enclosure housing 1 500–2 000 live tropical butterflies of over 110 species along with over 650 species of nectar-producing tropical and subtropical plants. These live butterflies come as pupae from butterfly farms in the Americas, Asia, Europe and Africa. The enclosure also includes waterfalls and a high-pressure fog system that controls humidity and temperature. The Butterfly Rainforest, which employs eight full and part-time employees, receives close to 100 000 visitors each year. It also serves for research and education: information panels on butterfly biology and behavior are placed along its walkways, and students have conducted research projects on butterfly behavior inside the enclosure.

As part of the public outreach activities, the McGuire Center and the Florida Museum of Natural History host an annual "ButterflyFest" during a weekend in October

Fig. 3 The 100-m long, "Wall of Wings". The wall is covered with butterfly and moth specimens, photographs, plasma screens and information panels illustrating Lepidoptera diversity and biology.

(http://www.flmnh.ufl.edu/butterflyfest/). Held during a peak flight time for Florida butterfly activity and abundant fall wildflowers, the festival is organized to promote scientific education and provide a call to action for the conservation and preservation of pollinators, backyard wildlife and native habitat. There are a number of special activities, such as educational activities for children, field trips, native plant sales, rainforest and collection/lab tours, gardening, pollinators, photography workshops, lectures by noted speakers, and live butterfly-rearing demonstrations and entertainment. Monarch butterflies (*Danaus plexippus*) are also tagged for migration studies and released during the festival. Through events such as ButterflyFest, the museum heightens public awareness of butterflies and educates the public in how they can become actively involved in biodiversity conservation.

The museum also offers tours for insect research through Expedition Travel, a local travel agency that conducts multiple trips in concert with the Center and the Florida Museum each year around the world. In the past there have been expeditions to Alaska, Arizona, Costa Rica, Ecuador, Galápagos, Ghana, Guatemala, Madagascar, Malawi, Panama, Papua New Guinea, Peru, Philippines and Vietnam, among others. Interested readers should visit the McGuire Center website: http://www.flmnh.ufl.edu/mcguire for further information about this new facility devoted to research on Lepidoptera.

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