

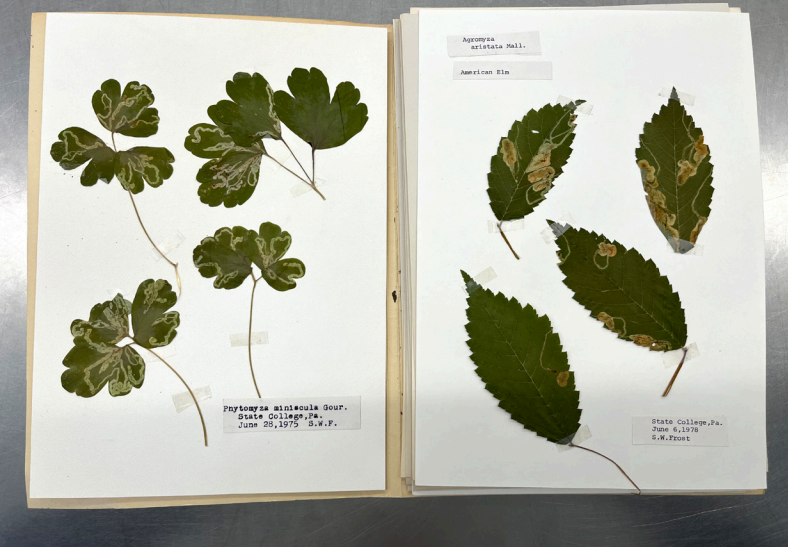
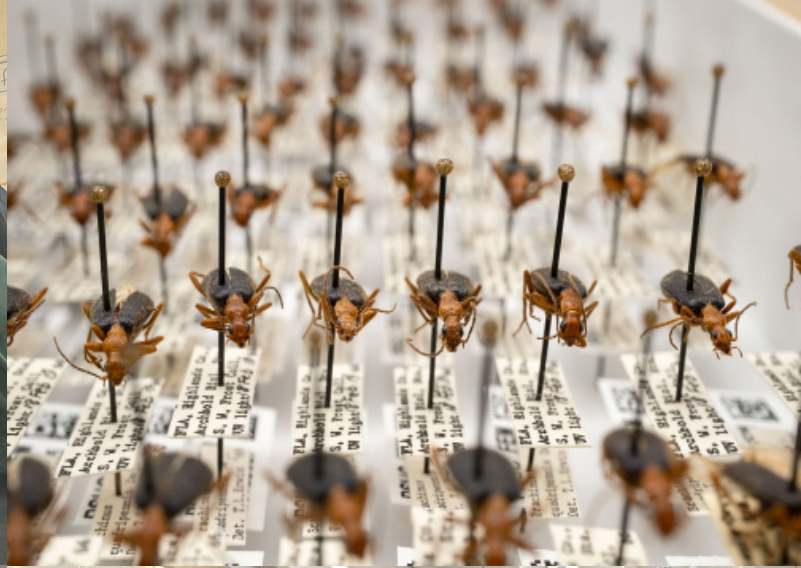


ANNUAL REPORT 2023

FROST ENTOMOLOGICAL MUSEUM



PennState
College of Agricultural Sciences





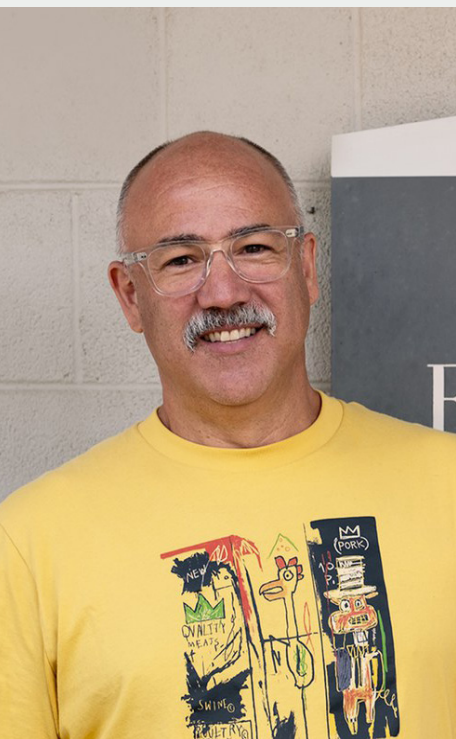
MISSION

The mission of the Frost Entomological Museum is to preserve in perpetuity the collections of the Department of Entomology at Penn State and its partners, to facilitate research on arthropods and on collections practices, to disseminate research results broadly, to serve as a resource for science education and training, to foster a sense of curiosity about the natural world, and to instill responsibility in all people to make our world a better place.

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FROM THE DIRECTOR



DR. ANDREW R. DEANS

Museum Director and Professor of Entomology

The Frost Entomological Museum continues to grow with new accessions, new data available digitally, new research products, and more activities than ever that meet our mission to engage and educate. These accomplishments are documented on the pages of this report, which is a new vehicle we have to share and celebrate our milestones. I encourage you to peruse these pages and celebrate with us but also to think how you want to see us shape the future of the Frost. Over the last five years we have:

- Secured >\$2 million in NSF funding, to improve, digitize, and do research on our collections
- Trained >20 museum assistants, undergraduates, and interns
- Taught multiple collections-based courses that have reached more than 100 students
- Designed, fabricated, and installed all new exhibits in an expanded and renovated public space
- Established a stronger Web presence (<https://ento.psu.edu/frost>) and refined our regular newsletter

We also refined our policies and procedures to meet the needs and expectations of contemporary natural history collections. And these are just a few of our accomplishments. I am incredibly proud of the community we built and our trajectory. I welcome feedback from stakeholders, collaborators, alumni, students, and anyone else who is passionate about museums and insects. What will the Frost Entomological Museum's future look like?

THE COLLECTION

GROWTH & RESEARCH



>17,000 NEW SPECIMENS

After the new cabinet installation in 2022, the Frost has much room for continuing specimen growth. Between specimen donations from private collectors, student collections, research vouchers, and specimens moving from the FREC to University Park, the Frost research collection grew by more than 17,000 new specimens in 2023.

268 RESEARCH SPECIMENS LOANED

12 loans made to both internal and external institutions.

75 PEER-REVIEW PUBLICATIONS CITING FROST SPECIMEN DATA

Specimen data information was downloaded from the Frost Entomological Museum occurrence dataset available on GBIF or requested via personal communication to museum staff.

THE COLLECTION

GROWTH &
RESEARCH



PARASITE DIGITIZATION

Approximately **4,130** parasite specimens had label data transcribed.

This wrapped up the Terrestrial Parasite Tracker project, which saw > **23,000** of the Frost's specimens databased and made accessible through online portals and data aggregators.

Funded by NSF award number DBI-1901916.

APHID DIGITIZATION

Approximately **50,000** slides containing mounted aphid specimens were rehoused into new cabinetry, given unique identifier labels, and imaged.

>**6,300** of these collection objects have had their label data transcribed.

Funded by NSF award number DBI-2039242.

STUDENT HIGHLIGHTS



BRI PEARSALL

In the Fall, undergraduate student Bri Pearsall helped curate the ethanol preserved Lepidoptera collection. More than 1,600 specimens were processed, refreshing the preservative and creating a catalog of taxa represented.

CECIL SMITH

Awarded both the Max and Shirley Kogan Museum Experience SEN award the Erickson Discovery Grant, undergraduate student Cecil pursued both an internship and independent research at the Frost. His internship focused on curating leaf mined specimens, and culminated in creating a pocket field guide to leafmining insects for museum visitors. His research has been identifying the communities of insects reared from rosinweed (*Silphium* spp.) galls, using a combination of morphological and genetic data.



CELIA GRAEF

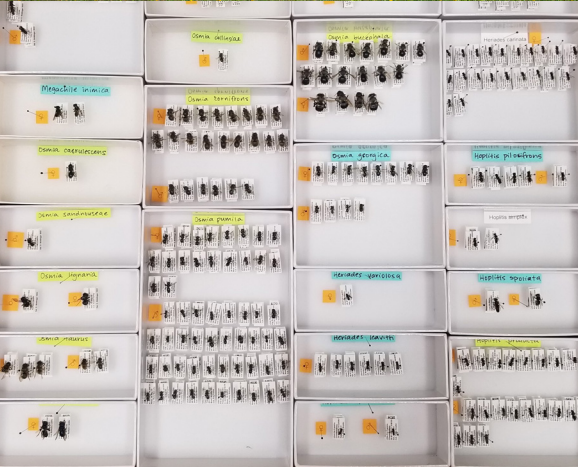
In the spring, undergraduate student Celia interned at the Frost and developed an outdoor education tool for young children that links macroinvertebrates to their winged adult forms. She used museum specimens & other biodiversity resources to build this tool. In the Fall, Celia helped curate the aphid collection by verifying taxon names, and organizing >800 trays of aphid specimens.

RESEARCH HIGHLIGHTS



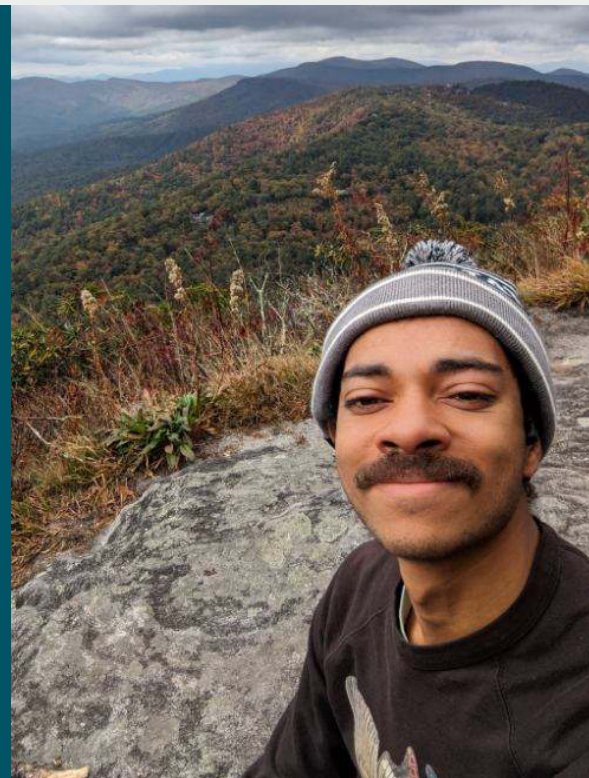
THE PENNSYLVANIA WILD BEE MONITORING PROGRAM

This state-wide effort documents the diversity & distribution of Pennsylvania bees. The program started in 2021 as a collaboration between Pennsylvania State University Master Gardener program and the López-Urbe Lab in the Department of Entomology. There are now 20 Master Gardeners trained in collecting and processing bees which are returned to PSU to be curated and identified. In 2021 and 2022 240 bee species were collected which included over 600 county records and 6 species never previously recorded in Pennsylvania. Specimen data will be publicly available through GBIF and the specimens will be housed in the collections in the López-Urbe Lab and Frost Entomological Museum.



DIASTROPHINI SYSTEMATICS

Awarded both the Society of Systematic Biologists MiniARTS award and the Highlands Biological Station's Grants in Aid of Research, graduate student Charles Davis used this support to travel across the US collecting galls from blackberries (*Rubus*) and cinquefoils (Tribe Potentilleae) to study the evolutionary history and describe new species of gall wasps in the genus *Diastrophus*. Using a combination of molecular data, wasp morphology & ecology, Charles has discovered several gall inducers that are new to science and form galls on host plant genera that gall wasps have never yet been described from.



RESEARCH HIGHLIGHTS



PENNS WOODS SURVEY

Codey Mathis is surveying Pennsylvania forest insects and comparing efficacy of commonly used biomonitoring methods across different micro-habitats. This past summer, she set traps at 10 sites throughout Penns Woods and collected insects in both the canopy and understory of edge and interior forests. Traps consisted of bee bowls, blue vein traps, and clear vane traps. She is in the process of identifying the specimens collected, and once completed, this research will yield a better understanding of non-pest insect communities of Pennsylvania forests and the extent to which trap type influences the representation of insects collected.

FROST SPECIMEN & DATA USE

Laura Porturas combed through historical and contemporary records of Frost specimen loans and other forms of specimen use and presented the findings at the Entomological Collections Network (ECN) meeting in the fall. Of note is the recent uptick in our collection's utility to research, in part due to digitization efforts and making specimen data broadly available, but also because of emerging fields of study addressing global change.



MUSEUM ENGAGEMENT & EDUCATION

EXHIBITS & OTHER ACTIVITIES



OBSERVATION HIVE

In the Fall, an observation hive was installed between the Honey Bee and Pollination exhibits.

MEET A PENN STATE ENTOMOLOGIST

Each semester, two Penn State Entomologists and their research are highlighted next to the entrance of the museum. This year we shared the work of four graduate students from the Department of Entomology ranging from biomonitoring techniques to sustainable IPM strategies.

2023 HEXAPOD HAIKU CHALLENGE

The Frost hosts an annual insect-themed haiku challenge with the purpose of pairing insects and poetry, as we believe it enriches the experience of entomological observation. This year, the haiku challenge had more than **800 submissions** by authors from **33 countries!** The selected haiku were exhibited at the museum from June - August.

MUSEUM ENGAGEMENT & EDUCATION

FORMAL & INFORMAL
LEARNING



>400 TEACHING SPECIMENS LOANED

14 teaching specimen loans were made to Penn State affiliates for extension, education, and outreach.

>310 GUESTS VISIT RESEARCH COLLECTION

Guests visited for collection tours and informal education.

~2,700 GUESTS VISIT PUBLIC SPACE

An estimated 230 visitors stopped in to view exhibits every month.

MUSEUM ENGAGEMENT & EDUCATION

FORMAL & INFORMAL LEARNING



12 PENN STATE COURSES ENGAGED

Nine courses & **>175 students** came to the Frost and engaged with exhibits and collections. Three courses & **>1900 students** engaged with specimens that were loaned from the Frost and used in their regular class setting.

Courses include:

- Anthropology Museum Studies (ANTH 380)
- Invertebrate Zoology (BIOL 417)
- Biology: Basic Concepts and Biodiversity (BIOL 110)
- Insect Biodiversity and Evolution (ENT 532)
- Entomology Internship (ENT 495)
- Principles of Integrated Pest Management (ENT 457)
- Insect Natural History and Collections (ENT 397)
- Spiders (ENT 297)
- Graphic Design Research Project (GD 494)
- Intensive English Communication Program, Science Writing
- Principles of Environmental Interpretation (RPTM 325)
- Field Natural History for Teachers (SCIED 118)



THE TEAM

PERSONNEL & AFFILIATES

Dr. Andrew Deans, Director and Professor of Entomology
Dr. David Biddinger, Curator of Hymenoptera and Research Professor
Dr. Heather Hines, Associate Professor of Biology & Entomology
Dr. Margarita López-Urbe, Associate Professor of Entomology
Dr. Michael Skvarla, Assistant Research Professor of Arthropod Identification
Dr. Julie Urban, Associate Research Professor
Dr. Nash Turley, Postdoctoral Researcher
Laura Porturas, Collection Manager
Michael Tribone, Multimedia Specialist
Sarah Kania, PA Bee Monitoring Program Assistant
Charles Davis, Graduate Student
Codey Mathis, Graduate Student
Louis Nastasi, Graduate Student
Logan Stenger, Graduate Student
Camilo Flórez Valencia, Graduate Student
Lucy Carlsen, Museum Assistant
Antonio Casadei, Museum Assistant
Celia Graef, Undergraduate Intern & Museum Assistant
Tara Presnall, Undergraduate Museum Assistant
Cecil Smith, Undergraduate Intern & Museum Assistant
Bri Pearsall, Undergraduate Intern & Volunteer
Jove Waschbusch, Undergraduate Intern & Volunteer
Jack Wilder, Undergraduate Volunteer
Megan Martin, Graduate Student Volunteer
Ben Partyka, Undergraduate Volunteer
Amanda Brown, Volunteer
Shao-Ju Wang, Volunteer



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160 Curtin Road
State College, PA 16803
Website: <https://ento.psu.edu/frost>



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