# Entomological Collections Network



# Annual Meeting

November 6–7, 2026

Columbus, Ohio, USA

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## SCHEDULE AT A GLANCE

### Friday, November 6th


| | | |
|---|---|---|
| 8:05 am – 10:18 am | **Machine Learning, Collections, and You: Collections Centered AI Tools and Applications** | 4 – 10 |
| 10:33 am – 11:58 am | **Contributed Talks, Session 1** | 11 – 14 |
| 1:30 pm – 3:11 pm | **Uncovering the Hidden Gems in our Museums** | 16 – 20 |
| 3:11 pm – 4:07 pm | **Contributed Talks, Session 2** | 22 – 24 |
| 4:07 pm – 5:44 pm | **Behind the Scenes of Behind the Scenes** | 26 – 29 |
| 5:50 pm – 6:20 pm | **ECN Business Meeting** | 29 |
| 7:00 pm – 10:30 pm | **ECN Reception** | 29 |


### Saturday, November 7th


| | | |
|---|---|---|
| 8:00 am – 8:12 am | **The History of ECN** | 30 |
| 8:12 am – 8:34 am | **Growing into an Entomologist** | 30 – 32 |
| 8:34 am – 9:44 am | **Teaching Collections: Development, Management, and Innovation** | 34–37 |
| 9:59 am – 11:58 am | **Contributed Talks, Session 3** | 38 – 46 |
| 1:33 pm – 3:26 pm | **Collections for Conservation: Addressing the Use of Insect Collections in Conservation Science** | 47 – 53 |
| 3:41 pm – 5:42 pm | **Contributed Talks, Session 4** | 54 – 62 |

# ACKNOWLEDGMENTS

Thank you so much to our corporate and institutional sponsors and their continued generosity in helping our meetings be successful. Our members and officers greatly appreciate their support.

Crane Hollow Preserve, Dipterists Society, Ecology Supplies, Entomological Society of Washington, EntoQuip, ESA-SysEB, Furth Museum Consulting, HH Elements Inc., International Society of Hymenopterists, Macroscopic Solutions, Pensoft Publishers, Picturae, Pin-It Entomological Supply, Species File Group, The Coleopterists Society, The Lepidopterists Society, and The Pacific Coast Entomological Society

Thank you to our individual donors and *sustaining members* for their continued generosity:
*Christy Bills*, William Clark, Ann Dunn, Mike Ferro, Dave Furth, Chris Grinter, Gail Kampmeier, York Niu, Peter Oboyski, Margaret Thayer, Jack Whisenant, and Chris Wirth

We are also very thankful for our continued partnership with the Entomological Society of America (ESA).

ECN 2026 Organizers: Isa Betancourt, Patrick Gorring, Adam Haberski, Andrew Johnston, Oliver Keller, Peter Oboyski, Ashleigh Whiffin, Jack Whisenant, and Chris Wirth

ECN Social Media Team: Isa Betancourt and Ashleigh Whiffin

Program layout and design: Chris Wirth and Adam Haberski

Cover image: The Zebra Swallowtail (*Eurytides marcellus*), proposed as Ohio's state butterfly. Specimen collected in Clermont County, Ohio on May 8, 1977 by Milan K. Busching and deposited in the Purdue Entomological Research Collection.

# Entomological Collections Network

## Annual Meeting

Friday, November 6th & Saturday, November 7th, 2026
Hilton Columbus Downtown
Columbus, OH, U.S.A.
#ECN2026 https://ecnweb.net

### Friday, November 6th

Hilton Columbus Downtown
Kojo Kamau C

7:00 am – 8:00 am **Registration**

8:00 am – 8:05 am **Welcome and Announcements**

**Peter Oboyski**
*Essig Museum of Entomology, University of California Berkeley, Berkeley, CA, U.S.A.*



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# MEMBER SYMPOSIUM 1

## Machine Learning, Collections, and You: Collections Centered AI Tools and Applications

Organizers/Moderators: **Brennan T. Hays**, *Arizona State University, Tempe, AZ, U.S.A.,* **Alyson East**, & **Sydne Record**, *University of Maine, Orono, ME, U.S.A.*

8:05 am – 8:07 am **Introduction**

8:07 am – 8:19 am **From specimens to data: optimizing biodiversity imaging for computer vision**

**Isadora Fluck Essig**
*University of Wisconsin–Madison, Madison, WI, U.S.A.*
*fluckessig@wisc.edu*

Biodiversity has been documented for centuries through the collection and preservation of biological specimens. Early digitization efforts made these collections increasingly accessible, and the resulting images now take on new significance as advances in artificial intelligence and machine learning enable the automatic extraction of taxonomic and morphological information, including traits such as body size, shape, and coloration. However, most digitization protocols were developed primarily for human interpretation rather than computational analysis, creating a mismatch between current imaging practices and computer vision requirements. To address this gap, we brought together expertise in computer science, ecology, taxonomy, and biological collections to develop practical recommendations for imaging specimens for computer vision. These recommendations cover key aspects of image acquisition and data quality, aiming to minimize sources of bias in automated trait measurements and species identification. They include specimen positioning and orientation, size and color calibration, imaging multiple specimens in a single image, background selection, lighting, and resolution and magnification. Importantly, maximizing the value of specimen images also requires careful documentation and data management. This includes appropriate

file formats, storage and sharing practices, and metadata that link images to unique specimens or batch identifiers and record imaging conditions, thereby keeping each image connected to its biological context. Together, these practices support FAIR principles: findability, accessibility, interoperability, and reusability, facilitating opportunities for collection images to be integrated across datasets and research applications. Ultimately, our recommendations improve the reliability of taxonomic identification and trait extraction, as well as compatibility across datasets, helping researchers leverage centuries of preserved biodiversity data as new analytical tools emerge.

8:19 am – 8:31 am **From FAIR to FAIR4AI: A metadata-first approach to Open Data and AI-Readiness**

**Elizabeth Campolongo**[1], Eric R. Sokol[2], Hilmar Lapp[3], Greg Maurer[4], Christine Laney[2], Marty Downs[5], Matthew Thompson[1], Sydne Record[6], Max Tarjan[7], Arnab Nandi[1], & Tanya Berger-Wolf[1]
[1]*The Ohio State University, Columbus, OH, U.S.A.;* [2]*National Ecological Observatory Network (NEON), Battelle, Boulder, CO, U.S.A.;* [3]*Neuromatch Inc., Beaverton, OR, U.S.A.;* [4]*New Mexico State University, University Park, NM, U.S.A.;* [5]*Long Term Ecological Research Network, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA, U.S.A.;* [6]*University of Maine, Orono, ME, U.S.A.;* [7]*NatureServe, Arlington, VA, U.S.A.*
*campolongo.4@osu.edu*

Extensive digitization efforts by global natural history collections are providing data about our natural world to the broader community at an astounding rate. These expert-annotated images are rich in morphometric and related biological data, whose extraction and alignment with the ecological metadata of the collections at the pace and scale of digitization exceeds the capacity of traditional methods. In this talk, we will discuss some recent advances and ongoing community initiatives designed to help bridge this gap, enabling researchers to harness this colossal trove of biodiversity data for broader analysis. In particular, we will highlight

visualization and analysis techniques built on biological foundation models and introduce the FAIR4AI infrastructure initiative, designed to unlock these resources at scale. There is no AI without data, and by facilitating large-scale content-based analysis across diverse collections, we aim to ensure the scientists generating the data reap the benefits of these AI-enabled advances.

8:31 am – 8:43 am **Google Gemini as an AI tool for species level inventories of pinned entomology specimens at the Museum of Comparative Zoology.**

**Whit Farnum**
*Museum of Comparative Zoology, Harvard University, Cambridge, MA, U.S.A.*
*cfarnum@g.harvard.edu*

The Museum of Comparative Zoology Entomology collection has ~8 million sorted and identified specimens, but only ~625,000 specimens are digitized. It is time consuming to create species lists, curate specimens, and verify names. Technology can help. Using phone cameras to photograph specimen drawers and a Google's AI Gemini Gem to extract species names and bioregions from unit tray header cards in the images. Text was parsed into standard fields of scientific name, number of unit trays, and bioregions. The text recognition error rate for names was 6.1% across 136,071 characters and 356 drawers. The Gem speeds up data input and matches the error rate of typing names. Bioregion color recognition by the Gem has a failure rate of 25%, with the color Gray having an error rate of 74%, or 38% of all failures. Bioregions must still be confirmed manually.

8:43 am – 8:55 am **From Vial to Database: Using AI to database aquatic insect collections**

**Natalie Saxton**[1], Jacob Munger[1], & Paul Frandsen[1]
[1]*Bean Life Sciences Museum, Brigham Young University, Provo, UT, U.S.A.*
*nsaxton@byu.edu*

The BYU Bean Museum houses vast North American aquatic insect collections with particularly strong holdings in both Plecoptera and Trichoptera. Decades of extensive collection and identification efforts of past curators and collaborators have generated significant, historical water quality data that is largely inaccessible to researchers and policy makers. Making these data publicly available is a major priority of our current databasing efforts. Here, we discuss how we are leveraging transcription AI tools to more rapidly digitize the valuable natural history and collection data stored in these collections. We present preliminary results of processing collector field data sheets as well as wet collection label data and discuss the success (and pitfalls) of our workflows. Our results demonstrate how AI transcription tools can help to unlock the vast amounts of historical data stored in our collections.

8:55 am – 9:10 am **Break**

9:10 am – 9:22 am **AI-assisted conveyor-driven mass digitization of entomological collections to the MIDS-2 level**

**Hannu Saarenmaa**[1], Niko Lappalainen[1], Janne Karppinen[1], Päivi Lyytikäinen-Saarenmaa[1], & Jere Kahanpää[2]
[1]*Bioshare Digitization, Joensuu, Finland;* [2]*Finnish Museum of Natural History, University of Helsinki, Helsinki, Finland*
*info@bioshare.com*

Insect collections are particularly challenging to digitize. Label data are often obscured by the specimen itself or by overlapping labels. Handling individual labels is slow and delicate. Ideally, labels would not be handled at all, but instead imaged while the pins remain untouched. We propose a mass-digitization workflow in which comprehensive label digitization (MIDS-3) is deferred to a later stage, while initial capture focuses on MIDS-2 data from the uppermost visible label. This approach avoids the time and risk associated with manipulating pinned specimens and their labels, substantially increasing digitization throughput. We argue that MIDS-2 data are sufficient for initial specimen discovery and collection-level access, while more detailed transcription and imaging can be performed later when required for research. A synthetic label can automatically be constructed from partially visible labels. AI will play a

major role in this process. We present a prototype which can be installed on automated conveyor-driven imaging lines.

9:22 am – 9:34 am **Automating Specimen Digitization: Scalable Tray Extraction and One-Shot Fine-Grained Segmentation**

**Fangxun Liu**[1] & S.M. Rayeed[2]
[1]*The Ohio State University, Columbus, OH, U.S.A.;*
[2]*Rensselaer Polytechnic Institute, Troy, NY, U.S.A.*
*liu.12122@osu.edu*

Biologists usually organize physical specimens in trays, yet manual extraction and segmentation remain labor-intensive bottlenecks. In this talk, we present two open-source computer vision workflows from the Imageomics initiative: BeetleFlow and SST. We first introduce BeetleFlow, an automated pipeline specifically tailored to detect, crop, and segment pinned beetles and associated labels from tray scans. We then focus on SST, a more versatile framework applicable across diverse organisms. SST features one-shot segmentation: users annotate only a single reference image for a target species, and the model can segment all remaining images of that species. From domain-specific tray extraction to label-efficient segmentation, these tools reduce repetitive manual labeling for high-throughput biological discovery.

9:34 am – 9:46 am **Autonomous Field Guides: Sparse Autoencoders and Heuristic Ranking for Diagnostic Trait Learning**

**Jacob Beattie**
*Computer Science and Engineering, The Ohio State University, Columbus, OH, U.S.A.*
*beattie.74@osu.edu*

Morphological traits used to distinguish between species, also known as diagnostic traits, are widely used by ecologists and researchers. Despite their utility, they are hard to extract or discover at scale due to their frequently qualitative nature. We test whether sparse autoencoders (SAEs) trained on vision foundation model embeddings can recover diagnostic traits automatically, using *Heliconius* butterfly mimicry as a case study. We train Matryoshka SAEs on DINOv3 patch embeddings and rank the

resulting features using two simple heuristics: selectivity, a classifier-free score based on the Mann-Whitney U statistic, and Wasserstein distance between activation distributions. Across three mimic pairs with documented diagnostic traits, the top-ranked SAE features consistently correspond to the known diagnostic traits. We also investigate two failure cases: feature splitting, and a mimic pair for which our method does not surface a convincing candidate trait. Overall, our results suggest SAE features can serve as reasonable, quantified candidates for automatic diagnostic trait discovery.

9:46 am – 9:58 am **From collection trays to AI-ready data: An operational framework for automated batch entomological specimen processing at the NEON Biorepository**

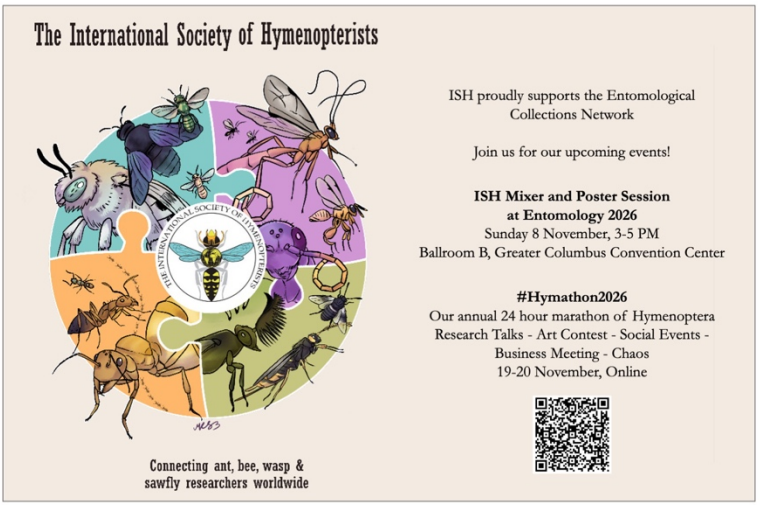
**Alyson East**[1,2], S.M. Rayeed[3], Elizabeth G. Campolongo[4], Nathan Cain[5], Chandra Earl[6], Michael Belitz[7], Isa Betancourt[6], Eric R Sokol[8], Leah Cotton[9], Jacqueline Dominguez[9], Brennan Hays[9], Fangxun Liu[5], Samuel Stevens[5], Charles Stewart[5], Tanya Berger-Wolf[4,5], Wei-Lun Chao[10], Hilmar Lapp[11], & Sydne Record[1,2]
[1]*Department of Wildlife, Fisheries, and Conservation Biology, University of Maine;* [2]*Maine Agriculture and Forest Experiment Station, University of Maine;* [3]*Rensselaer Polytechnic Institute;* [4]*Imageomics Institute & ABC Global Center, The Ohio State University;* [5]*Computer Science and Engineering, The Ohio State University;* [6]*NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University;* [7]*Department of Entomology, University of Wisconsin-Madison;* [8]*NEON, Battelle;* [9]*School of Life Sciences, Arizona State University;* [10]*Department of Electrical and Computer Engineering, Boston University;* [11]*Neuromatch Inc.*
*Alyson.east@maine.edu, sydne.record@maine.edu*

Batch photography of multiple specimens improves throughput, but linking detected individuals to database records at scale remains an unsolved operational challenge. The National Ecological Observatory Network (NEON) collects specimens from across the US alongside co-located biotic and abiotic data providing an unprecedented opportunity to explore how digitization efforts can be linked to extended specimen data across space and time. Notably NEON's curation practice of ordering specimens logically in alignment with metadata enables linking image regions to individual metadata from images containing multiple specimens in a unit tray. We present an accessible framework for high-throughput batch imaging and individual specimen extraction from pinned entomological collections, demonstrated on 65,236 ground beetles (Carabidae) from the NEON Biorepository.

9:58 am – 10:18 am **Machine Learning, Collections, and You Panel Discussion**

**Brennan T. Hays**
*Arizona State University, Tempe, AZ, U.S.A.*
*bthays@asu.edu*

10:18 am – 10:33 am **Break**



# CONTRIBUTED TALKS SESSION 1

Moderators: **Adam Haberski**, *Mississippi Entomological Museum, Mississippi State University, MS, U.S.A.,* & **Christopher C. Wirth**, *Purdue Entomological Research Collection, Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.*

10:33 am – 10:38 am **A Museum in the Kill Jar: The Current State of the Academy of Natural Sciences**

**Isa Betancourt[1] & Joshua Kulak[2]**
*[1]NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.; [2]The Academy of Natural Sciences of Drexel University, Philadelphia, PA, U.S.A.*
*isabetabug@gmail.com, joshkphilly@gmail.com*

Against the background of global environmental crises, our collections have never been more important, yet they have also been never more imperiled. On September 1st 2026, Drexel University and the Academy of Natural Sciences (ANSP) Boards announced that the Academy of Natural Sciences public museum would be closing at the end of the month. With a single month's notice for the oldest natural history museum in the Americas, no capital campaign, and no acceptance of the William Penn Foundation's offer to fund the museum operations for a full year while solutions could be explored, it is not surprising that the closure has been widely questioned and protested. This status update addresses the uncertain future of the Academy, which houses 19 million research specimens, 4 million of which are insects, and offers action items to support the institution along with valuable lessons for the broader biological collections community.

10:38 am – 10:50 am **DIY Entomology**

**Michael Ferro**
*Clemson University, Clemson, SC, U.S.A.*
*spongymesophyll@gmail.com*

Do it yourself entomology takes on four major manifestations: 1) organizations; 2) research; 3) gadgets and methods; and 4) teaching. Developing a support system for these endeavors and the people who engage in them is important. Organizations: give money and volunteer. Research: give money to support grants. Gadgets and methods: we need a formal system where developers get credit and users can find products. Teaching: we need a system where classes can be advertised and want ads can be placed. Who should do these things? If not YOU, who else?

10:50 am – 11:02 am **Double Mounts: History & Materials**

**Seung-hwan Leo Kim**
*The Pennsylvania State University, University Park, PA, U.S.A.*
*slkim@psu.edu*

To modern entomologists, the idea that anything except foam or silicone blocks may be used for double-mounting insects may seem bizarre. However, elder (*Sambucus*) pith was widely used as an easily and inexpensively procured material since the conception of double mounts, and polypore fungus can be found in use in collections even today. In this talk, I summarize the history of double mounts based on archival research and review typically used materials, with special notes on conservation.

11:02 am – 11:14 am **Fixing mistakes of the past: new biogeographic schema of the California Academy of Sciences Entomological collection**

**Denise C. Montelongo**[1] & Christopher C. Grinter[1]
[1]*The California Academy of Sciences, San Francisco, CA, U.S.A.*
*dmontelongo@calacademy.org*

Biogeographic organization schemes have been falling out of use due to their racially charged color usage and lack of color-blind accessibility, among other reasons. To address this issue and provide adaptable solutions to the collections community, we overhauled the label-making process in the Entomology collection of the California Academy of Sciences. The goal was to achieve a more inclusive and accessible specimen curation

method, while expanding the number of bioregions and carefully choosing representative colors. We transitioned from making labels in Microsoft Word to using BarTender and sourced pre-sized perforated rolls of paper to save countless hours of manual cutting.

11:14 am – 11:29 am **Break**

11:29 am – 11:41 am **10 Amazing Hacks for Collecting and Curating Insects**

**Craig Brabant**
*University of Wisconsin–Madison, Madison, WI, U.S.A.*
*brabant@entomology.wisc.edu*

Purchasing off-the-shelf products to use for collecting and curating insects can be an exercise in compromise. Commercial options do not always include the precise solutions needed for specific purposes or tasks. Sub-optimal equipment is often bought because it's the best available choice. Low cost (or free) 3D modeling software and an inexpensive FDM printer can be used to design and print objects that fulfill a wide range of collecting and curating needs. Sometimes the ideal tool for a task is commercially available, but is difficult to discover and buy because the manufacturer or vendor does not directly advertise to the entomological or collections communities. I discuss several examples of equipment and tools I've found and purchased from non-traditional sources that we regularly use for capturing insects in the field or for sorting, curating, imaging, and storing specimens in the collection.

11:41 am – 11:53 am **We could do that too: wet collection tips and tricks from outside entomology**

**Ann Dunn**
*Independent Taxonomist, Florida, USA*
*ard224@cornell.edu*

Insects are preserved in ethanol in certain scenarios, but other groups of invertebrates are nearly exclusively stored "wet". I work on whatever needs working on, so I have spent considerable time collecting and curating non-insect arthropods and other invertebrate phyla. In this talk, I

will present tips and insights into wet specimen collection and storage that I have come across outside of entomology proper, in the hopes of streamlining this aspect of curation for everyone.

11:53 am – 11:58 am **From Chance to Certainty: A Systematic Sweep Across 893 MCZ Cabinets**

**Jennalee Ramnarine**[1], Crystal A. Maier[1], Whit Farnum[1], & Samuel Z. Howard[1],
[1]*Museum of Comparative Zoology, Harvard University, Cambridge, MA, U.S.A.*
*jramnarine@fas.harvard.edu*

As museums shifted away from pesticide use to protect their collections in favor of an Integrated Pest Management (IPM) approach, it became clear that there is no one-size-fits-all strategy. While core IPM principles stay the same, the specific methods and execution must be tailored to each organization. Within any robust IPM program, continuous monitoring remains an essential component. Although trap monitoring provides key insights, it comes with notable drawbacks. Sticky traps rely entirely on chance pest movements, while the cost of pheromone lures can restrict widespread application. Even with these monitoring tools, the full scope of potential threats may remain obscured, leaving the risk that undetected pests are actively damaging a collection. To bridge this gap, our four-member team undertook a yearlong initiative to systematically inspect every drawer in the Museum of Comparative Zoology (MCZ) Entomology collection—covering 18,800 drawers across 893 cabinets. This comprehensive check enabled us to identify live pest activity, pinpoint hotspots, and develop action thresholds. Additionally, tracking our time demonstrated that thorough drawer-by-drawer assessments are a realistic and manageable practice for large-scale collections.

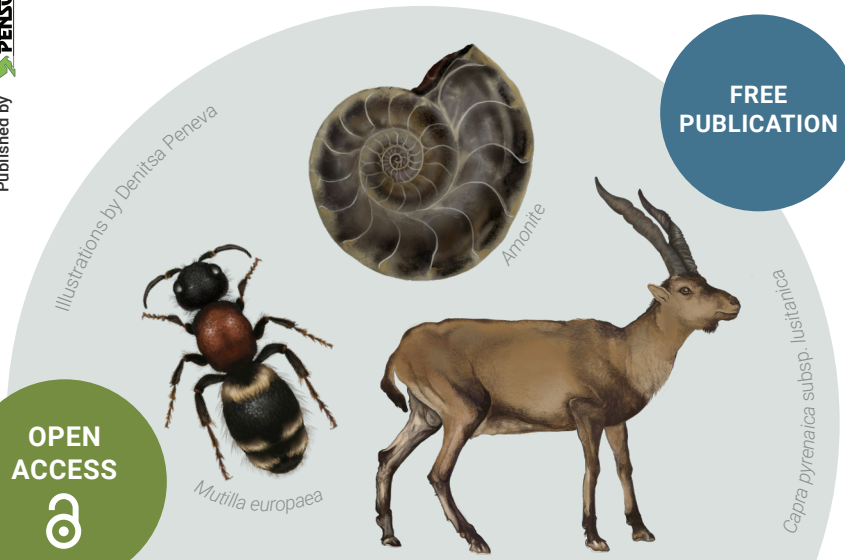
12:00 pm – 1:30 pm **Lunch Break**

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# MEMBER SYMPOSIUM 2

## Uncovering the Hidden Gems in our Museums

Organizers/Moderators: **Brittany L. Kohler**, *University of California Davis, Davis, CA, U.S.A.*, & **Luc Leblanc**, *William F. Barr Entomological Museum, Department of Entomology, Plant Pathology and Nematology, University of Idaho, Moscow, ID, U.S.A.*

1:30 pm – 1:32 pm **Introduction**

1:32 pm – 1:44 pm **Stylopized Surprise: Undescribed Strepsiptera In Museum Bees**

**Amanda Denny**[1], Julian Dupuis[1], Beryl Jones[1], & Jerry Cook[2]
[1]*University of Kentucky, Lexington, KY, U.S.A.;* [2]*Sam Houston State University, Huntsville, TX, U.S.A.*
*asdunaway@uky.edu*

Species descriptions of Stylopidae (Strepsiptera) have historically suffered from a lack of available specimens. We examined bees of known host genera from the University of Kentucky Insect Collection (UKIC) and searched for stylopized (Strepsiptera infected) specimens of *Andrena* and *Lasioglossum*. Among the stylopized *Andrena*, we found two species of undescribed *Stylops* from novel hosts. We also documented range extensions and provided supplemental descriptions for three additional species of *Stylops*, including descriptions of first instar larvae for two species. Additionally, we found three host species of *Lasioglossum* stylopized by *Halictoxenos crawfordi* (Pierce, 1909), including one novel host species. Most *H. crawfordi* specimens were adult females, but we also found male puparia, an adult male (in puparium), and first instar larvae, allowing for valuable supplemental descriptions. Additionally, we used DNA barcoding and whole genome sequencing to generate genomic data for four species of *Stylops* and *H. crawfordi* to validate species classifications.

1:44 pm – 1:56 pm **Rehousing and Digitizing the Microscope Slide Collection in the Museum of Comparative Zoology Entomology Collections**

A. Baldinger[1], E. Dankowicz[1], A. Lawson[1], **C. A. Maier** [1], N. E. Pierce[1], M. Srivastava[1], & J. W. Trimble[1]
[1]*Museum of Comparative Zoology, Harvard University, Cambridge, MA, U.S.A.*
*cmaier@fas.harvard.edu*

Microscope slide-mounted specimens are valuable resources for invertebrate biodiversity research yet are frequently passed over in digitization and curation initiatives. At the Museum of Comparative Zoology at Harvard University, slides in the Recent Invertebrate Collections, including Entomology, Invertebrate Zoology, and Malacology, are distributed across collections, with inconsistent storage methods and limited documentation. Many slides face preservation risks related to mounting media and environmental degradation. We are locating, rehousing, digitizing, and conserving approximately 50,000 slides across these collections through a National Science Foundation grant. We established a workflow that integrates specimen discovery, rehousing in centralized cabinets, label data capture, databasing, conservation triage, and high-resolution imaging. Approximately 3,000 type specimens will receive enhanced imaging to improve accessibility to the research community. To date, we have captured data and whole-slide images from over 39,000 slides, transcribed data for 22,000 slides, and captured focus-stacked images of 650 type specimens.

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ENTOMOLOGICAL SOCIETY OF AMERICA
SYSTEMATICS, EVOLUTION, AND BIODIVERSITY

1:56 pm – 2:08 pm **Virginia Tech Insect Collection: Uncovering hidden gems of Appalachian biodiversity**

**Paul Marek**
*Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, VA, U.S.A.*
*pmarek@vt.edu*

The Virginia Tech Insect Collection is the oldest and largest entomological collection in the state. Founded in 1888, its nearly half million specimens represent the terrestrial arthropod heritage of the Appalachian Region, especially Virginia. Its natural history specimens facilitate research in the department, and the investigations of the Millipede Lab. Highlights of the collection include an American burying beetle collected in town from 1879, a water scorpion found during the Vietnam war, and thousands of fluid preserved millipede specimens. With awards from the National Science Foundation and Council on Library and Information Resources, specimen data are being digitized and made accessible online. These data are photographs of specimens and labels and Darwin Core records that are placed in the public domain. Ninety-six percent of the material remains undigitized, and our mission is to improve access to these dark data to bolster global research infrastructure for the study and conservation of biodiversity.

2:08 pm – 2:20 pm **Dipterist's gems in the Barr Entomological Museum**

**Luc Leblanc**
*William F. Barr Entomological Museum, Department of Entomology, Plant Pathology and Nematology, University of Idaho, Moscow, ID, U.S.A.*
*leblancl@uidaho.edu*

The Diptera collection at University of Idaho's Barr Entomological Museum was recently entirely re-curated to incorporate large donations of mosquitoes (over 8,000 specimens and 6,500 slides) from Malaysia collected by the late Shivaji Ramalingam and of identified Nearctic Diptera collected by the late William J. Turner (almost 20,000 specimens).

With these gems added, the collection now counts over 5,000 species, 147,000 mounted specimens, 3,200 vials, and 9,000 slides.

2:20 pm – 2:35 pm **Break**

2:35 pm – 2:47 pm **Hidden Gems of the West Virginia Department of Agriculture Insect Collection**

**Clara Minnich**[1], & Curt Harden[1]
[1]*West Virginia Department of Agriculture, Charleston, WV, U.S.A.*
*cminnich@wvda.us*

The West Virginia Department of Agriculture Insect Collection is the largest insect collection in West Virginia, with an estimated 250,000 pinned specimens. The majority of specimens in the WVDA were collected in West Virginia, a biogeographically and ecologically unique state that is frequently overlooked by collectors and researchers. Although the WVDA's strength is as a well-curated, regionally focused reference collection, it also holds surprising material from other parts of North America and the world, stemming from the diverse backgrounds of past curators and their taxonomic areas of expertise. Several historically significant collections, from both professionals and amateurs, emphasize the importance of the WVDA as a repository for natural history data, and its enduring relevance to North American entomology.

2:47 pm – 2:59 pm **Revitalizing a Humboldt County insect collection - hidden gems and potential directions**

**Monica Sheffer**
*California State Polytechnic University, Humboldt, Arcata, CA, U.S.A.*
*mms295@humboldt.edu*

At Cal Poly Humboldt (formerly Humboldt State University), we primarily have a teaching collection, created and added to by generations of undergraduate General Entomology students, adding up to approximately 30,000 specimens. Several special collections are contained within the teaching collection, generated by graduate students,

featuring insects from New Guinea, S. Africa, and an exceptional collection of local insects from the Lanphere Dunes in Arcata, CA. In my talk, I will highlight the potential that this collection holds, some fun finds in our inventory, how we are leveraging the Lanphere Dunes collection for climate change research, and solicit feedback from other attendees on the best approaches for revitalizing this collection to ensure its usefulness and longevity.

2:59 pm – 3:11 pm **Gems within Bug Soup: Improving Bycatch Accessibility Through Collaboration**

**Codey Mathis**
*The Pennsylvania State University, University Park, PA, U.S.A.*
*mathiscodey@gmail.com*

Within our museums are countless specimens collected as non-target bycatch of monitoring projects, research expeditions, and donations. Ethanol vials of bycatch (affectionately termed 'bug soup') have the potential to harbor innumerable undescribed species and can provide valuable insight into the spatiotemporal distribution of arthropod populations, including range expansions of invasive pests. One way to help distribute bycatch is to identify which non-target taxa are frequently collected by common traps used in existing monitoring efforts. Within this talk, I introduce a case study of bycatch from bee traps (blue-vane traps & pan traps) deployed in Pennsylvania forests (2023-2024). I explore the benefits of sharing bycatch, identify barriers that limit our ability to do so, and propose the creation of a collaborative network to develop innovative solutions. Together, we can make bycatch accessible, reduce our ecological impact, and increase the footprint of existing collections.

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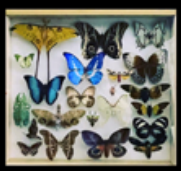



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# CONTRIBUTED TALKS SESSION 2

Moderators: **Adam Haberski**, *Mississippi Entomological Museum, Mississippi State University, MS, U.S.A.,* & **Christopher C. Wirth**, *Purdue Entomological Research Collection, Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.*

3:11 pm – 3:23 pm **Back on the Map: The Past, Present, and Future of the Enns Entomology Museum**

**Davide Dal Pos**[1], & Alessandra Pandolfi[1]
[1]*Enns Entomology Museum, University of Missouri, Columbia, MO, U.S.A.*
*davide.dalpos@missouri.edu, daveliga@gmail.com*

Founded on 1 July 1874 by C. V. Riley, Missouri's first state entomologist and the first professor of entomology at the University of Missouri, the Enns Entomology Museum has grown from a single donated cabinet into one of the largest university-owned insect collections in the world. Today it holds roughly seven million specimens and serves as the primary repository for the insect fauna of the Ozark Plateau and Missouri as a whole. Its strength rests on an exceptional regional record, anchored by 4.5 million aquatic invertebrates, alongside globally significant series in other groups such as Naucoridae, and irreplaceable historical material including specimens of the extinct Xerces Blue. For 150 years the collection has served as a foundation for research, extension, and teaching across Missouri and beyond. Yet a collection of this scale and age faces challenges familiar to all of us: limited digitization, small spaces, and decades of biodiversity data still locked on paper labels. This talk briefly traces the history, challenges, and problems of the collection, along with our plans for its future: databasing and georeferencing the collection, reactivating loans and collaborative research, growing curated holdings, and expanding outreach and instruction. In short, how we are putting the Enns Museum back on the map.

3:23 pm – 3:35 pm **Inside the Severin-McDaniel Insect Research Collection: A Century of South Dakota Biodiversity**

**Abigail P. Martens**
*South Dakota State University, Brookings, SD, U.S.A.*
*abigail.martens@sdstate.edu*

The Severin-McDaniel Insect Research Collection (SMIRC) at South Dakota State University is a century-old repository documenting insect biodiversity across South Dakota and the Northern Great Plains. The collection was initiated in 1888, with historical specimen contributors including John M. Aldrich, Philetus C. Truman, Harry C. Severin, and others. At present, the collection houses an estimated 1.5 to 2.0 million specimens, with particular strengths in Northern Plains Coleoptera, Hymenoptera, Orthoptera, and Lepidoptera. The collection also contains unique Hemiptera, particularly Cicadellidae material from the Yukon Territory, British Columbia, and Alaska as well as specimens from the Solomon Islands. This presentation offers an overview of the SMIRC's history, scope, and notable holdings, and discusses the collection's ongoing role supporting research and biodiversity documentation across the region, along with newly initiated efforts toward specimen databasing, label transcription, and digitization.

3:35 pm – 3:50 pm **Break**

3:50 pm – 4:02 pm **Inside Brazil's Coleoptera Collections: Diversity, Structure, and Scientific Potential**

**Letícia Vieira**[1], Isabele Vilas Boas de Araújo[1], Luis Felipe Libreros Hernández[1], Daniela Hoyos Benjumea[1], & Fernando Vaz de Mello[2]
[1]*Federal University of Lavras, Lavras, Minas Gerais, Brazil;* [2]*Federal University of Mato Grosso, Cuiabá, Mato Grasso, Brazil*
*leticia.vieira@ufla.br*

Brazil is widely recognized for its exceptional biodiversity, with beetles occupying a prominent position within its fauna. More than 40,000 species have been recorded in the country, and the number of researchers dedicated to Coleoptera has increased significantly over recent decades. As a result, several scientific collections have expanded and strengthened, supported by governmental initiatives and substantial personal investment from curators. Among the major collections are MZSP, MNRJ, CEMT, DZUP, INPA, and MPEG, all of which hold historical collections and extensive primary material. Additionally, other collections have gained relevance due to their regional diversity, maintaining representative diversity of local biomes or focusing on specific taxonomic groups. In recent years, the Brazilian government has promoted the consolidation of biological collections through investments in infrastructure, acquisition of equipment, and scientific outreach. These initiatives, together with the Brazilian Faunal Taxonomic Catalog and the National Coleoptera Institute, have contributed to advancing coleopterology in Brazil.

4:02 pm – 4:07 pm **The Sam Noble Museum Recent Invertebrates Collection: Past, Present, and Future**

**Gustavo Silva de Miranda**[1] & Shelby Hernandez[1]
[1]*Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, OK, U.S.A.*
*demiranda@ou.edu*

Established in 1899, the Recent Invertebrates Collection within the Sam Noble Oklahoma Museum of Natural History (OMNH-RI), University of Oklahoma, is located in Norman, Ok, and contains over 500,000 specimens, with about 95% of the specimens in the phylum Arthropoda. The collection has been overseen by a handful of curators, with the most notable being Dr. Harley P. Brown, an authority on riffle beetles and water penny beetles. As of 2025, the collection is in a new period of progression with clear goals established (digitalization, growth), the return of official personnel (curator, collection manager), and a community of volunteers. Ongoing effort has been put towards digitally transcribing data from specimens to catalog and digitize the entire collection while also making it openly available on digital platforms. Currently, the OMNH-RI has 158,225 specimens digitized (including 2,867 types). In this talk, we will present further details about the collection and future goals.


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# MEMBER SYMPOSIUM 3

## Behind the Scenes of Behind the Scenes

Organizers/Moderators: **Ashleigh Whiffin**, *National Museums Scotland, Edinburgh, UK,* & **Isa Betancourt**, *NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.*

4:07 pm – 4:09 pm **Introduction**

4:09 pm – 4:21 pm **Reimagining collections stewardship at Penn State**

**Andrew R. Deans**[1] & Laura Porturas[1]
[1]*Frost Entomological Museum, The Pennsylvania State University, University Park, PA, U.S.A.*
*adeans@psu.edu*

For more than a century Penn State has managed its museum assets as department or college resources. The responsibilities associated with collections policy development, care, resource provision, and staffing fall on those units. While the strategy allows for extraordinary flexibility and easy access at the unit level, the resulting management has been uneven. In this talk we explore the negative outcomes, both real and potential, of this decentralized approach to collections care. We also describe an ongoing movement to instill a new management strategy for museums at Penn State, including an effort to benchmark Penn State's collections policies and procedures against those of its peers. We end with a set of recommendations for other university-based collections to explore at their own institutions.

4:21 pm – 4:33 pm **Insect Pinning, Public Advocacy, and Productive Discomfort: Lessons from a Single Cart**

**Joshua Kulak**
*The Academy of Natural Sciences of Drexel University, Philadelphia, PA, U.S.A.*
*joshkphilly@gmail.com*

Specimen preparation constitutes only a small part of behind the scenes entomological work, but it can be one of the easiest activities to undertake in a public facing context. Pinning under the watchful eyes of members of the public however, comes with a wide variety of challenges and opportunities—for both the preparator, and the observer. This presentation will explore the trajectory of an insect pinning cart at the Academy of Natural Sciences, from beginning as a micro venue for communicating entomology, to becoming, in the public museum's final weeks, an advocacy instrument for biological collections as a whole.

4:33 pm – 4:45 pm **In or out? A shift in collection outreach approaches**

**Ashleigh L. Whiffin**
*National Museums Scotland, Edinburgh, UK*
*A.Whiffin@nms.ac.uk*

Behind the scenes tours are an immersive way of showcasing insect collections, and since 2015 they have been an important part of the outreach offerings at National Museums Scotland (NMS). Bespoke tours are regularly delivered to students, specialist societies and community groups, alongside a range of tours for the public, sometimes as part of city-wide or national initiatives (e.g. Edinburgh Science Festival and Insect Week). However, with restrictions on space, increasingly limited staff resources and pressure to generate income, behind the scenes collection tours may no longer be the best model to use. This presentation will examine the evolution of the outreach approaches taken at NMS, over the past decade.

4:45 pm – 5:00 pm **Break**

5:00 pm – 5:12 pm **Specimens & Swag: Behind-The-Scenes of Themed Tours, Merch, and More at the ASU Biocollections**

**Isa Betancourt**[1] & Sangmi Lee[2]
[1]*NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.;* [2]*Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.*
*isbetanc@asu.edu*

Themed tours, community outreach, and collections merchandise offer opportunities to engage new audiences and build support for natural history collections. At Arizona State University Biocollections, these activities connect the public with biodiversity and collections research while requiring coordination across university resources and policies. Drawing on examples from the Natural History Collections and NEON Biorepository, we describe how we developed and implemented outreach events, organized tours, and created merchandise for sales and giveaways. We highlight the institutional processes involved in event planning, promotion, staffing, tour fees, and merchandise sales, sharing practical lessons that other collections can adapt to strengthen public engagement and support outreach.

5:12 pm – 5:24 pm **Mississippi Bug Blues: lessons from growing a successful outreach program**

**Adam Haberski**[1], Jennifer Seltzer[1], Kayla Zehner[1], Leah Wisener[1], & Harry Jones[1]
[1]*Mississippi Entomological Museum, Mississippi State University, MS, U.S.A.*
*ah3953@msstate.edu*

By offering a behind-the-scenes look into scientific collections, public outreach connects communities with the wonder of insect biodiversity, increases institutional visibility, and fosters lasting local partnerships. The Mississippi Entomological Museum is primarily a research collection without a public facing museum, but since 2012 we have maintained a dedicated outreach team that delivers more than 120 in-person events and engages over 43,000 stakeholders annually. We describe our process for

building and sustaining a high-volume outreach program and share our more creative ventures from tabletop board games and podcasts to our traveling museum on wheels.

5:24 pm – 5:44 pm **Behind the Scenes of Behind the Scenes Panel Discussion**

**Ashleigh L. Whiffin[1] & Isa Betancourt[2]**
*[1]National Museums Scotland, Edinburgh, UK;*
*[2]NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.*
*A.Whiffin@nms.ac.uk, isabetabug@gmail.com*

5:45 pm – 5:50 pm **Break**

5:50 pm – 6:20 pm **ECN Business Meeting**

7:00 pm – 10:30 pm **ECN Reception**

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7:00 am – 8:00 am **Registration**

# INVITED TALK

8:00 am – 8:12 am **The History of ECN**

**Christy Bills**
*Natural History Museum of Utah, University of Utah, Salt Lake City, UT, U.S.A.*
*cbills@nhmu.utah.edu*

The Entomological Collections Network has a proud history of committed volunteer leaders, who've created a supportive, collaborative organization over many decades. ECN's consistent growth, partnerships and flexibility are all noteworthy. Most impressive though might be the ongoing gift of time, talent and energy that professional entomologists have dedicated to the running of ECN. From planning the annual meeting to figuring out the finances, individuals have created and sustained the organization many of rely on. This will be a moment to look backwards at the beginnings, highlights and heroes to see how far ECN has come.

# MEMBER SYMPOSIUM 4

## Growing into an entomologist

Organizer/Moderator: **Luc Leblanc**, *William F. Barr Entomological Museum, Department of Entomology, Plant Pathology and Nematology, University of Idaho, Moscow, ID, U.S.A.*

8:12 am – 8:14 am **Introduction**

8:14 am – 8:19 am **From my weedy vacant lot to the tropical wilderness**

**Luc Leblanc**
*William F. Barr Entomological Museum, Department of Entomology, Plant Pathology and Nematology, University of Idaho, Moscow, ID, U.S.A.*
*leblancl@uidaho.edu*

As a young child growing in an urban environment in the early 1970's, my access to nature was limited to a one-acre weedy vacant lot, with little wildlife other than insects to fascinate me. Almost prophetically, I was already dreaming of discovering and even living in the tropical countries to see the extraordinary animals featured on my small stamp collection. I am very grateful to my mentors who made me believe I could be a professional entomologist when I joined young naturalist clubs as a child and later worked in the Canadian National Collection.

8:19 am – 8:24 am **From Curious Minds to Budding Entomologists: Three Student Stories from Guam**

**Nina Jean Mallari Del Rosario**[1], Anastasha Wallace[1], & Ava Jade Rios[1]
[1]*University of Guam, Mangilao, Guam, U.S.A.*
*delrosarion@gotritons.uog.edu*

This is the story of three students into the world of insects. One of us went from being afraid of spiders and butterflies to keeping tarantulas and developing a passion for invertebrate collection and research. Another held onto a lifelong love of insects through academic setbacks and career detours before finding a way back to entomology through opportunities in Micronesia. The third only associated insects with a childhood dish in the Philippines and signed up for General Entomology class because a friend was a fan of Animal Crossing. Despite our different beginnings, mentorship from Dr. Alfred Daniel Johnson transformed curiosity into opportunities for research, outreach, publications and awards, all within less than a year. Our stories show that there is no single path to becoming a budding entomologist. For some, it begins with a fascination for

arthropods; for others, with persistence and sometimes, surprisingly, with a video game and a freezer dedicated entirely to bugs.

8:24 am – 8:29 am **Three Decades of Glaring at the Ground**

**Zachary Griebenow**
*Colorado State University, Fort Collins, CO, U.S.A.*
*zachary.griebenow@colostate.edu*

I grew up in rural Kentucky in a house that was constructed by amateurs. By consequence, a wide variety of organisms, including insects, continually worked their way into this structure from outdoors. From an early age, I therefore did not maintain much distinction between human artifice and inhuman "nature", and this may have played a role in my early fascination with natural history. Thankfully, I had parents, mentors, and resources that allowed me to pursue this early interest. I did so casually at first, but then with the realization at age 15 that I wanted to be a systematic entomologist—eventually leading me to pursue a major in entomology at The Ohio State University.

8:29 am – 8:34 am **From Alaska to Ambrosia Beetles**

**Sayde Ridling**
*Michigan State University, East Lansing, MI, U.S.A.*
*sayde.ridling@gmail.com*

From Alaskan homeschooler to entomology graduate student at one of America's largest universities. How opportunities and inspiration from Alaskan entomologists has led me to study bark and ambrosia beetle systematics and taxonomy at MSU.

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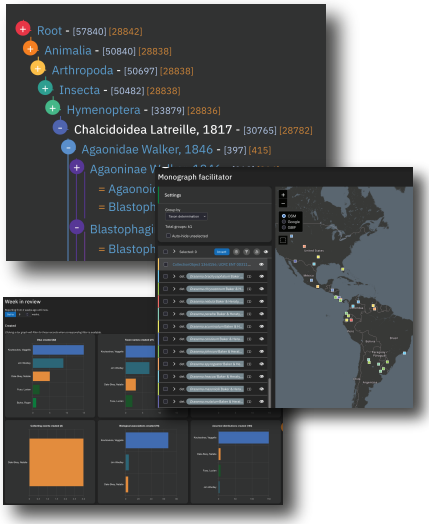
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# MEMBER SYMPOSIUM 5

## Teaching Collections: Development, Management, and Innovation

Organizer/Moderator: **Louis Nastasi**, *Department of Entomology, University of Nebraska-Lincoln, Lincoln, NE, U.S.A.*

8:34 am – 8:36 am **Introduction**

8:36 am – 8:48 am **Teaching collections for upper-level insect biodiversity courses: Strategies for management and beyond**

**Louis Nastasi**
*Department of Entomology, University of Nebraska-Lincoln, Lincoln, NE, U.S.A.*
*LNastasi2@unl.edu*

Graduate- and undergraduate-level teaching collections used in insect biodiversity courses typically include curated representatives of select taxa to facilitate student learning of their diagnostic characters. Assembling and managing specimens for this purpose can be a daunting task, but several important strategies facilitate student learning while reducing the burden of constant curation. Examples of these strategies, as applied during my recent overhauling of the teaching collections at University of Nebraska-Lincoln, will be discussed, emphasizing practical considerations that members of the ECN community can implement in their own insect biodiversity teaching collections.

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8:48 am – 9:00 am **Putting the Teaching Collection to Work — Frost Entomological Museum at Penn State**

**Laura Porturas**[1] & Andrew R. Deans[1]
[1]*Frost Entomological Museum, The Pennsylvania State University, University Park, PA, U.S.A.*
*ldp5188@psu.edu*

In 2026, the Frost Entomological Museum has collaborated with 21 undergraduate and graduate courses, and nearly 2,000 students examined specimens as part of instructional activities. Since our 5-year strategic plan was implemented at the end of 2022, we have made major efforts to broaden our educational reach, including to courses outside of our college. We've seen positive outcomes from these efforts, and so present strategies we use for managing a teaching collection and facilitating its use in university courses and other educational activities. Recognizing the importance of demonstrating our value to the institution, we also share our approach to documenting educational use and communicating that information to university administrators.

9:00 am – 9:15 am **Break**

9:15 am – 9:27 am **Teaching Insect Identification Skills in a Digital World.**

**Wyatt Hoback**
*Oklahoma State University, Stillwater, OK, U.S.A.*
*whoback@okstate.edu*

Traditional insect collections provide students with valuable opportunities to develop identification skills, but the increasing use of distance and online instruction requires new approaches for teaching taxonomy when students cannot routinely examine physical specimens. Digital biodiversity resources such as iNaturalist can provide extensive, accessible collections of insect images and observations, while also offering opportunities to compare variation among species and practice recognizing the morphological characters that define insect families. However, a particular challenge is that digital resources frequently emphasize species-level identification, potentially encouraging students to focus on names rather than learning the diagnostic structures and

characters needed for reliable family-level identification. Integrating curated digital collections, guided image-based activities, and iNaturalist observations into entomology courses can therefore adapt traditional collection-based teaching to online environments while maintaining an emphasis on observation, comparison, and recognition of family-level diagnostic characters.

9:27 am – 9:39 am **Bug Meets World: curating and maintaining resources for use with the general public**

**Pat Wooden**
*Insect Identification Lab, Virginia Polytechnic Institute and State University, Blacksburg, VA, U.S.A.*
*benthicbugologist@gmail.com*

Traditionally, teaching collections have homes in university labs where they are used by college students for standardized courses. For Extension, which requires state-wide hands-on learning, this approach is often ineffective. Master Gardeners, agents, teachers, and children all require different resources and support while covering a wide array of topics, which, combined with distance, creates unique challenges for specimen-based learning. The Virginia Tech Insect Identification Laboratory (VTIIL) maintains ethanol and pinned collections, the Museums in Miniature project, and associated supplies and equipment specifically for Extension and outreach. Methods for curating, maintaining, and altering offerings to meet stakeholder needs will be discussed, along with how they have changed over the VTIIL's 60-year history.

9:39 am – 9:44 am **From fear to curiosity: using zoological collections to promote education**

**Teresa Coelho**
*Pontifícia Universidade Católica do Rio de Janeiro, Rio de Janeiro, Brazil*
*teresa.entomologia@gmail.com*

Early practical experience with animals and nature can turn fear and disgust into familiarity and curiosity. Yet, most of our educational

approaches still lack hands-on activities concerning insects and other invertebrates. At the Pontifical Catholic University of Rio de Janeiro (PUC-Rio, Brazil), the teaching zoological collection is the basis of an outreach program in which high school students and young children handle specimens from boxes designed to be touched, both in school visits and at public events. From field collection and specimen handling to restoring a historical insect collection, students at different levels are encouraged to participate in the process of curatorial work and understand the importance of natural history museums and collections.

9:44 am – 9:59 am **Break**


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# CONTRIBUTED TALKS SESSION 3

Moderators: **Adam Haberski**, *Mississippi Entomological Museum, Mississippi State University, MS, U.S.A.,* & **Christopher C. Wirth**, *Purdue Entomological Research Collection, Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.*

9:59 am – 10:11 am **On the Move: Transporting Entomological Collections**

**Jack Whisenant**
*Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.*
*Jacki.whisenant@gmail.com*

Entomological specimens are fragile, so when collections need to be transported there are many factors to consider in keeping both specimens and people safe throughout the process. There are several ways to approach a big move, depending on the number of drawers and cabinets involved. This presentation reviews several collection moves ranging from tens to hundreds of drawers of material, and we discuss the observations and lessons learned along the way.

10:11 am – 10:23 am **For the Love of Lepidoptera: Integrating, Updating, and Reorganizing the Lepidoptera Collection of the Museum at Texas Tech**

**Elizabeth Carlson**[1] & Jennifer C. Girón Duque[1]
[1]*Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.*
*elicarls@ttu.edu*

The Museum at Texas Tech holds an estimated 4.5 million specimens in their Invertebrate Zoology Collection. The Lepidoptera collection has two main components: a legacy collection composed in part by agriculturally important species and student-collected material, primarily from the southwestern United States, and a large donation of specimens confiscated

from illegal trade, collected from around the world. These collections remained disjointed and untouched since their arrival at the Museum in 1997 and 2001 respectively. This project started with a collections assessment that incorporated extracting (and updating) species names to create a species index. Both collections were integrated, so that now updated families are organized alphabetically, and all members of the same family are grouped together instead of scattered in multiple places. The collection is now composed of 300 drawers, with some room to grow. About a third of the collection, 116 drawers, correspond to Nymphalidae, which are currently being used for research in iridescence by TTU Faculty.

10:23 am – 10:35 am **From A to Damselfly: Logistics of a Selective Collection Relocation**

**Michelle Kohler**[1] & Thomas C. McElrath[2]
[1]*Illinois Natural History Survey, Prairie Research Institute, University of Illinois, Urbana-Champaign, Champaign, IL, U.S.A.;* [2]*Covenant College, Lookout Mountain, GA, U.S.A.*
*mmkohler@illinois.edu*

At Illinois Natural History Survey Insect Collection we decided to move the enveloped Odonata collection to a new system and location. First we will discuss why we decided to move the enveloped Odonata to a separate location. We will discuss the process involved in designing and commissioning the storage boxes. We will then discuss the actual move and how it went.

Collections and Museum Consulting Services



FMC
Furth Museum Consulting

Dr. David G. Furth
5901 Mt. Eagle Dr #1516
Alexandria, VA 22303 USA
furthmuseums@gmail.com
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10:35 am – 10:47 am **Relocating and Modernizing the University of Guam Insect Collection: Lessons Learned and Best Practices**

**Alfred Daniel Johnson** [1], Aubrey Moore[1], Kai Anderson[2], & Matthew Leon Guerrero[3]
[1]*University of Guam, Mangilao, Guam, U.S.A.;* [2]*Harvest Christian Academy, Barrigada, Guam, U.S.A.;* [3]*Father Dueñas Memorial School, Mangilao, Guam, U.S.A.*
*danieljalfred@gmail.com*

The University of Guam Insect Collection, comprising approximately 30,000 specimens, represents an important repository of regional biodiversity, including endangered, extinct, and historically significant specimens. To improve preservation, organization, accessibility, and long-term management, the collection was relocated to a larger, purpose-designed facility following successful university funding. A mobile storage rack system and wall-mounted, open-faced stainless-steel cabinets improved storage efficiency, specimen organization, and accessibility. Environmental management was enhanced through dehumidification, maintaining relative humidity at approximately 30% and reducing reliance on naphthalene for pest management. Collection data were digitized using Symbiota and made publicly accessible through the Ecdysis portal. The relocation also provided an opportunity to identify logistical and curatorial challenges associated with moving and modernizing a small entomological collection. We present practical lessons and best practices for specimen handling, drawer and cabinet organization, storage optimization, environmental management, and digitization, highlighting the importance of institutional support for sustainable collection management.

10:47 am – 11:02 am **Break**

11:02 am – 11:07 am **Illustrated catalogue of the primary types deposited in the Coleção Entomológica de Mato Grosso Eurides Furtado – CEMT (Cuiabá, Mato Grosso, Brazil)**

**Emanuel Rodrigues Ribas Gama**[1,2], Diego F. Rodrigues[1,2] , Jorge Armando Arias-Buriticá Fernando[1] , & Z. Vaz-de-Mello[1],[3],[4]

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The Coleção Entomológica de Mato Grosso Eurides Furtado (CEMT) is located in the Mato Grosso Federal University (UFMT), in Cuiabá, Mato Grosso (Brazil). It was officially created in 1987, with the goal of being a regional collection. Since 2008, the CEMT continues to be a regional collection for most insect groups; however, a process of transformation to a reference collection of Insecta was started. Today, the CEMT is recognized as an entomological collection of national and international significance, owing to the importance of its holdings, the incorporation of collections from domestic and international researchers, and the taxonomic work conducted there. This work has resulted in the deposition of a vast amount of type material. The first phase of the project was recently published in the Catalogue of Type Specimens, listing 7,250 type specimens, including 233 holotypes, six paralectotypes, four neotypes, and 7,007 paratypes. These specimens represent eight orders, 39 families, 284 genera, and 758 species as of 2024. The current project is the second phase and involves creating an illustrated catalog of the holotypes in the collection. To this end, high-resolution photographs have been taken of every specimen, as well as their respective locality and identification labels. This makes 270 of holotypes available for reference.

11:07 am – 11:19 am **Bridging the Dark Data Gap: Digitizing pollinating insects on a Pinned Insect Conveyor**

**Torsten Dikow**[1], Jessica Bird[1], Sylvia Orli[2], Erin Mazzei[3], Luis Villanueva[3], Corey DiPietro[3], & Heather Herbstritt[4]
[1]*Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.;* [2]*Deptarment of Botany, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.;* [3]*Office of Digital and Innivation, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.;* [4]*Picturae, Heerhugowaard, North Holland, Netherlands*
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The Smithsonian National Museum of Natural History (NMNH) has embarked on using a Pinned Insect Digitization Conveyor developed by Picturae to digitize 360,000+ specimens from its entomological collection. Curators select a particular genus of pinned pollinators for digitization, and all species and specimens of that genus in the collection will be digitized and photographed in three views (dorsal, lateral, and frontal) with focus-stacked images of up to 30 individual image slices. All labels will be removed and photographed. With three operators, the conveyor can process up to 1,500 specimens per day. Pre-curation technicians prepare each drawer, and an informatics specialist does QC on both the images and transcribed label data in a custom system called Osprey. As of late August 2026, 773 drawers have been delivered to the conveyor for digitization, 219,392 specimens have been photographed, and through EMu, 89,389 specimen records with 272,518 images are available in GBIF.

11:19 am – 11:24 am **The future of Entomological databases**

**Beulah Garner**[1], Maria Correia Pestana[1], Yilei Wu[2], Fiona Carpenter[2], James Evans[2], Aileen Scott[2], & Alfried Vogler[1],[2]
[1]*Natural History Museum, London, UK;* [2]*The Imperial College of Science, Technology and Medicine, London, UK*
*b.garner@nhm.ac.uk*

Entomology no longer suffers from a shortage of data, but from a shortage of integration. Decades of field surveys, collections, digitisation and genomics have generated vast morphological, geographic, barcode and phylogenetic datasets, yet these remain fragmented across largely independent systems. This talk presents a strategy for linking these resources within a unified, species-level tree of life. We introduce SITE-100, built around whole insect communities sampled from high-diversity tropical sites. Specimens are imaged, selected taxa are sequenced for genomes and mitogenomes, and communities are metabarcoded, creating a phylogenetic scaffold onto which external data can be integrated from resources including iNaturalist, BOLD, NCBI, GBIF, ENA, Open Tree of Life and taxonomic databases. By bringing phylogenetic trees, geographic distributions, images and taxonomic information together in a single user-friendly interface, SITE-100 provides a practical framework for connecting biodiversity data and strengthening both entomological research and conservation.

11:24 am – 11:36 am **Databasing Coleoptera completely in the UKIC**

**Julian Dupuis**[1] & Eric G. Chapman[1]
[1]*University of Kentucky, Lexington, KY, U.S.A.*
*julian.dupuis@uky.edu*

Databasing efforts in the University of Kentucky Insect Collection (UKIC) began in January 2020, and in November 2025, we achieved our first ordinal milestone by databasing all beetle holdings within the collection. This amounted to ~79k specimens of the currently databased >112k specimens. Through this process, we have focused on generating faunal inventories, state checklists, and identification tools for various beetle groups. These efforts are particularly valuable, given that the state of

Kentucky seems to be poorly represented in biodiversity databases in general, even for widely distributed, common species of charismatic insect groups. In this talk, I will share the story of our beetle databasing saga, and in doing so, focus on our digitization process, characteristics of our coleopteran holdings, our focal efforts on particular groups, and what we have learned about Kentucky's beetles.

11:36 am – 11:41 am **From Drawer to Database: Bringing the MCZ Ant Collection into the Digital Age**

**Samuel Howard**
*Museum of Comparative Zoology, Harvard University, Cambridge, MA, U.S.A.*
*samuelhoward@fas.harvard.edu*

The Museum of Comparative Zoology (MCZ) houses one of the world's most significant and type-rich ant collections. There has been much effort put into digitizing individual specimens, however, location tracking of specimens within drawers has lagged behind other parts of the collection. To bridge this gap, we ground-truthed the locations of these specimens in the collection and added them to our collection database, MCZbase. To date, half of the collection has been surveyed for databased but un-located specimens, resulting in 55,000 specimens mapped to digital containers in MCZbase, reflecting their real world locations. This workflow has also uncovered 744 un-databased types previously absent from physical logbooks whose only prior repository location existed in historical literature, if at all. Fully databasing these hidden specimens enables researchers and staff to easily locate them, while also placing primary types in the pipeline for digitization, further enriching their associated data in MCZbase.

11:41 am – 11:53 am **Trayopia: Whole-Drawer Imaging with What You Have**

**Wei Han Lau**
*Canadian Museum of Nature, Ottawa, Ontario, Canada*
*wlau@nature.ca*

Whole-drawer imaging offers a fast and scalable approach to digitizing entomological collections, but existing workflows can require specialized equipment or involve trade-offs between imaging speed and the information captured. We developed Trayopia, a simple image-processing pipeline designed to make whole-drawer imaging more accessible using readily available camera equipment. Trayopia combines computer vision and machine-learning tools to detect specimen trays and labels, register images taken at different positions and magnifications, and automatically select the highest-quality view of each unit tray. Images of individual unit trays from their optimal viewing angle are then assembled into a standardized composite image that maximizes the visibility of specimens and associated label data. The workflow is being developed and tested at the Canadian Museum of Nature as part of a broader pilot exploring scalable approaches to entomological collection digitization. Trayopia demonstrates how software-based approaches can help overcome some of the basic practical limitations of whole-drawer imaging without requiring specialized imaging systems.

11:53 am – 11:58 am **Lamina: 3D digitization of insect specimens at ultra-high resolution and under 5 minutes**

**Pierre Estienne**[1,2] & Felix Dodd[1]

[1]*Lamina Systems Ltd, London, UK;* [2]*Centre for Functional and Metabolic Mapping, Western University, London, Ontario, Canada*
*pierre.estienne@outlook.com*

Focus stacking is a bottleneck in specimen digitization: a single high-quality stack can take several minutes, making the acquisition of a large number of extended-depth of field images for 3D digitization of large collections impractical. We present Lamina (lamina-systems.com), a fully automated

macro imaging system that captures an entire specimen from every angle in around three minutes, roughly the time of a single focus stack today. Lamina images at up to 50 frames per second and over 100 megapixels, so each stack feels like a single shot, and sweeps the specimen through a full 360° set of extended-depth-of-field images. Every set is then automatically reconstructed into a 3D model without slowing capture. Integrated lighting and motorized positioning produce consistent images of specimens from 3 to 200 mm. Operating Lamina requires almost no training, and Lamina can use DSLRs or machine vision cameras for high-volume use, enabling large-scale and low-cost 3D digitization.

12:00 pm – 1:30 pm **Lunch Break**

1:30 pm – 1:33 pm **Introducing ECN's Specimen Spotlight**

**Ashleigh L. Whiffin**[1] **& Isa Betancourt**[2]
*[1]National Museums Scotland, Edinburgh, UK; [2]NEON Biorepository, Arizona State University Biocollections, School of Life Sciences, Arizona State University, Tempe, AZ, U.S.A.*
*A.Whiffin@nms.ac.uk, isabetabug@gmail.com*

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# MEMBER SYMPOSIUM 6

## Collections for Conservation: Addressing the use of insect collections in conservation science

Organizer/Moderator: **Sarah Schroeder**, *University of California Riverside, Riverside, CA, U.S.A.*

1:33 pm – 1:35 pm **Introduction**

1:35 pm – 1:47 pm **Using Museomics and Species Distribution Modeling to Evaluate Stonefly Diversity and Conservation Need**

**Anna Eichert**[1], Jude Mirghani[2], Katherine Schmalz[3], Amanda Markee[1], & Jessica Ware[1]
[1]*Division of Invertebrate Zoology, American Museum of Natural History, New York, NY, U.S.A.;* [2]*Northwestern University, Evanston, Illinois, U.S.A.;* [3]*Department of Entomology, University of Kentucky, Lexington, KY, U.S.A.*
*aeichert@amnh.org*

Stoneflies provide pivotal ecosystem services in both aquatic and terrestrial ecosystems: they are food sources for predators, indicators of water quality, and mediate nutrient cycling and energy flow. As bioindicators, each stonefly species has adapted to particular climate regimes and thus can have different requirements to subsist in their habitat. Like many insects, stonefly populations have experienced a significant loss of biodiversity. Understanding the impacts that specific climatic and anthropogenic variables have on the distribution and ability of stoneflies to survive is necessary to protect vulnerable stonefly populations in the age of an insect apocalypse and sixth extinction. Here, I discuss the conservation need for three Nemouridae stoneflies that live in high latitudinal environments using constructed COI haplotype networks and species distribution models. For ongoing monitoring efforts, it is of utmost importance to implement and integrate molecular methods into traditional bioassessment to identify populations at risk of extirpation.

1:47 pm – 1:59 pm **Historical collections, dark taxa, and lost species**

**Jessica Awad**
*Naturalis Biodiversity Center, Leiden, Netherlands*
*jessica.awad@naturalis.nl*

The conservation status of most insect species remains completely unknown. Both taxonomic and ecological impediments make it difficult to establish whether a species is rare, endangered, extinct, or scientifically neglected. Alternative conservation frameworks are needed to address declines in lesser-known insects. The lost species concept is well-suited for evaluating the conservation status of dark taxa. We apply this concept to the apparent extirpation of *Isocybus grandis* (Hymenoptera: Platygastridae) in Germany. Through comparative examination of historical and contemporary insect specimens, we propose a potential scenario to explain its disappearance. Lost species and dark taxa fall along the spectrum of shadow diversity, an alternative conservation paradigm which accounts for unknown life. Many "described" species are potentially lost, having never been recorded since their original descriptions. Natural history collections hold critical taxonomic and ecological information needed for effective search effort and are essential to establishing historical baselines for poorly-known insect species.

1:59 pm – 2:11 pm **Combining iNaturalist and collections-based data to examine trends in Illinois syrphid diversity over time: Challenges, limitations, and considerations**

**Scott Clem**[1], Lily V. Hart[2], & Thomas C. McElrath[3]
[1]*Illinois State University, Normal, IL, U.S.A.;* [2]*Illinois Natural History Survey, Prairie Research Institute, University of Illinois, Urbana-Champaign, Champaign, IL, U.S.A.;* [3]*Covenant College, Lookout Mountain, GA, U.S.A.*
*cscottclem@gmail.com*

Examining trends in biodiversity over time using historical collections data has numerous challenges. Data from specimens exists in regional insect collections but is largely undigitized and thus inaccessible to much

of the scientific community. Even when data is available, the absence of standardized sampling makes examining trends in historical diversity difficult to comprehend. Here, I present our efforts to identify, recurate, and digitize thousands of hover fly specimens (Syrphidae) from the Illinois Natural History Survey Insect Collection. We then combine these data with existing datasets (iNaturalist, GBIF) to compile a comprehensive checklist of Illinois hover fly fauna, assess for temporal range expansion/contraction trends, and identify species of potential conservation significance. All total, the over 20,000 specimens/records we examined revealed 209 species within 71 genera and all 4 subfamilies of Syrphidae to have ever occurred in Illinois. Numerous species found in Illinois historically have only recently been reported further north, while others of historically southern distribution appear to be extending their range northward, possibly due to anthropogenic factors like climate change. Furthermore, 73 species have not been reported in Illinois since at least 1995, 27 of which may be of potential conservation significance with few to no recent records in the Midwest or elsewhere. I discuss the challenges and limitations of using datasets such as these to understand historical trends.

2:11 pm – 2:23 pm **Looking back, looking forward: a key role for collections in conservation**

**Megan Barkdull**
*Entomology Department, Natural History Museum of Los Angeles, Los Angeles, CA, U.S.A.*
*mbarkdull@nhm.org*

Natural history collections have strong potential to contribute to conservation efforts, particularly due to synergy between existing material in collections and new material added by collections workers. Here, I explore this potential through the lens of the California Insect Barcode Initiative, a large, state-funded project to generate a DNA barcode and voucher specimen for every species of insect in the state. After sequencing more than one million specimens, we show that California is home to more than 60,000 insect species, whose patterns of species richness do not mirror those for other taxa that are used in state conservation planning. This initiative was complemented by efforts to barcode authoritatively identified material in state natural history collections, such that Linnean names can be linked to newly-collected and sequenced specimens. These efforts demonstrate the impact that natural history collections can have on

conservation, while also urgently calling attention to the need to support collections through funding and ongoing collecting effort.

2:23 pm – 2:35 pm **Phylogenetic diversity reveals eco-evolutionary structuring of bee assemblages from Colombia to Canada**

Maël Doré (Co-first Author)[1,2,3], Angela Nava-Bolanos (Co-first Author)[4,5], Erica E. Fischer[6,7], Michael G. Branstetter[8], Silas Bossert[9,10], Nicholas Dowdy[11], Laura Melissa Guzman[13], James Hung[14], **Oscar Martínez-López**[15], Luis Osorio-Olvera[5,16], & Neil S. Cobb[17]

[1]*Center for Integrative Biodiversity Discovery, Museum für Naturkunde, Leibniz-Institute for Evolution and Biodiversity Science;* [2]*California Academy of Sciences;* [3]*Biodiversity and Biocomplexity Unit, Okinawa Institute of Science and Technology Graduate University;* [4]*Unidad Multidisciplinaria de Docencia e Investigación, Facultad de Ciencias, Campus Juriquilla, Universidad Nacional Autónoma de México;* [5]*Laboratorio Nacional de Biología del Cambio Climático, Secretaría de Ciencia, Humanidades, Tecnología e Innovación;* [6]*Department of Biology, Grand Valley State University;* [7]*Museum of Life Sciences, King's College London;* [8]*USDA-ARS, Pollinating Insects Research Unit, Utah State University;* [9]*Department of Entomology, Washington State University;* [10]*Department of Entomology, National Museum of Natural History, Smithsonian Institution;* [11]*Department of Zoology, Milwaukee Public Museum;* [12]*Department of Biological Sciences, Marquette University;* [13]*Department of Entomology, Cornell University;* [14]*Toronto Metropolitan University;* [15]*University of California Riverside;* [16]*Laboratorio de Ecoinformática, Instituto de Ecología, Unidad Mérida, Universidad Nacional Autónoma de México;* [17]*Biodiversity Outreach Network*
*oscarm@ucr.edu*

Bees are crucial pollinators, yet large-scale biogeographic patterns that shape bee diversity and their distribution remain unclear. Using ecological niche modeling, we generated potential distribution models for 5,430 native bee species across Colombia, Central and North America, integrating phylogenetic analyses. We focus on three principal bee diversity hotspots and a previously underappreciated hotspot in the northeastern US. Although bee richness primarily associated with xeric environments, hotspots differed significantly in phylogenetic structure and environmental conditions. Temperature, precipitation, forest structure, and soil characteristics drove species distributions differently across regions. We also identified major distribution patterns by bee family. Our results suggest that contemporary bee diversity across parts of the American continent reflects interactions between climatic niche conservatism and regional environmental filtering. This work addresses knowledge gaps about regional bee distributions and highlights the importance of data availability across space and time with its limitations for understanding biodiversity patterns and its conservation.

2:35 pm – 2:50 pm **Break**

2:50 pm – 3:02 pm **Partnerships with Collections in the Conservation of Insects**

**Ross Winton**[1], Alex Wild[2], & Hannah Gray[2]
[1]*Washington Department of Fish and Wildlife, Olympia, WA, U.S.A.;* [2]*The University of Texas at Austin, Austin, TX, U.S.A.;* [3]*Texas Parks and Wildlife Department, Austin, TX, U.S.A.*
*ross.winton@dfw.wa.gov*

Insect conservation practitioners have identified data-deficiency as one of the largest barriers to identifying priority species and their conservation needs. Funding for wildlife species is often prioritized towards better understood or more charismatic taxa. Many states and territories have expanded their conservation priorities to include insects and other invertebrates. These same states and territories have identified insect Species of Greatest Conservation Need (SGCN) but often lack data to inform decisions about where to focus conservation actions. The prioritization of insect species for conservation creates opportunities for collaboration across the many fields of entomological study, including

collections. Recent efforts to digitize many collections nationally has revealed a large amount of entomological data that can be used to assess the conservation status of many of our native species and leverage funding for additional collaboration, taxonomists, and conservation entomologists. Efforts in Texas have expanded state level support of collections and the digitization of collections along with the development of data driven tools and are an example of the robust collaboration that can exist between managers of collections and wildlife species.

3:02 pm – 3:14 pm **Genomes from the Past: Natural History Collections and Bee Conservation**

**Michael G. Branstetter**
*USDA-ARS, Pollinating Insects Research Unit, Utah State University, Logan, UT, U.S.A.*
*michael.branstetter@usda.gov*

Natural history collections preserve irreplaceable records of past biodiversity and environmental change. Advances in DNA sequencing now allow these specimens to provide genomic information relevant to contemporary conservation. In this talk, I will highlight how museomics can help reconstruct evolutionary relationships, document historical genetic diversity, and establish baselines for evaluating species decline. Examples from research on threatened and declining bees, including Franklin's bumble bee, *Bombus franklini*, will illustrate both the promise and challenges of working with historical specimens. These projects demonstrate how continued investment in natural history collections and genomic resources can strengthen our ability to understand and conserve insect biodiversity.

3:14 pm – 3:26 pm **The importance of collections for wild bee conservation: opportunities and limitations**

**S. Hollis Woodard**[1] & Brianne Du Clos[2]
[1]*University of California Riverside, Riverside, CA, U.S.A.;* [2]*Louisiana Universities Marine Consortium, Chauvin, LA, U.S.A.*
*hollis.woodard@ucr.edu*

There has been considerable discussion in the literature about the role of entomological collections in supporting bee monitoring and conservation

efforts. In this presentation, we highlight both the opportunities and limitations of collections for supporting wild bee conservation. Specimens deposited in collections provide incredible value to support taxonomy and specimen identifications. Specimens and their associated records have been used to assess species spatial distribution, traits, morphology, interactions, and habitat, and have as yet untapped potential to explore other aspects of biodiversity knowledge. All of these play a general role in species conservation, but there are also more specific ways bee conservation has been advanced thanks to the availability of collections. These more specific ways include the integration of collections-based information into the extinction risk assessment and species status assessment methodologies that are widely used to support on-the-ground species conservation. We share three stories of bee conservation being supported by information in entomological collections and identify paths forward to address needs for expanding conservation applications of collections materials.

3:26 pm – 3:41 pm **Break and Silent Auction Close I**

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# CONTRIBUTED TALKS SESSION 4

Moderator: **Oliver Keller**, *Microbes, Parasites, and Biodiversity Initiative, University of Michigan, Ann Arbor, MI, U.S.A.*

3:41 pm – 3:53 pm **Might Be Ugly, Mite Be Valuable: What worn moth specimens reveal about host-parasite interactions**

**Allie Fletcher**[1], Mary Mitchell[2], & Eric LoPresti[2]
[1]*University of Michigan, Ann Arbor, MI, U.S.A.;* [2]*University of South Carolina, Columbia, SC, U.S.A.*
*akfletch@umich.edu*

Historic insect collections provide opportunities to assess long-term changes in communities and ecological interactions, but their utility depends on understanding collection biases. We examined changes in host-parasite interactions using *Dicrocheles* ear mites of noctuoid moths, which complete their life cycle within the moth's thoracic ears. We screened historical moths collected at a single site in coastal South Carolina from 1965–1976 and modern specimens from 2023–2025 and observed substantially lower mite infestation rates in modern collections. We hypothesized that this decline reflected sampling bias, as historical collections disproportionately contain pristine specimens. Using several hundred *Leucania linita*, we quantified wing and body wear and tested its relationship with mite presence. Mite infestation was strongly associated with specimen condition: the most worn individuals were more than four times as likely to harbor mites as pristine individuals. We encourage collectors to keep their ugly specimens and caution against temporal comparisons without considering collection practices.

3:53 pm – 4:05 pm **Dr Jeremy Holloway and his legacy to the collections at the Natural History Museum, London**

**Geoff Martin**[1] & Robyn Crowther[1]
[1]*Natural History Museum, London, UK*
*g.martin@nhm.ac.uk*

Dr. Jeremy Daniel Holloway (1945–2025), perhaps best known as author of the 18 volumes of The Moths of Borneo, sadly passed last year. This talk will focus on Jeremy's impact on the collections at the Natural History Museum, London. There are two strands to this namely his fieldwork and subsequent donations to the collection and his taxonomic work on these specimens which has led to a large number of new taxa being described, with the type material deposited in the collections

4:05 pm – 4:17 pm **From Field to Field Guide: Connecting Insect Collections, Biodiversity, and Outreach in Guam**

**Jehan Dela Cruz**[1], Anastasha Wallace[1], Ila Swier[2], Hana Fiedler[3], Kai Anderson[4], & Alfred Daniel Johnson[1]
[1]*University of Guam, Mangilao, Guam, U.S.A.;* [2]*Michigan Technological University, Guam, U.S.A.;* [3]*Temple University, Tokyo, Japan;* [4]*Harvest Christian Academy, Barrigada, Guam, U.S.A.*
*delacruzj16268@gotritons.uog.edu*

The Insects of Guam brochure documents 392 insect species and represents one of the first image-rich efforts to showcase Guam's insect diversity in an accessible format for farmers, youth, naturalists, and the broader community. Insects were collected throughout Guam and brought to the laboratory, where specimens were photographed against a standardized white background to provide consistent images for identification. Following photography, specimens were pinned, preserved, uniquely coded, and incorporated into the University of Guam Insect Collection, creating a direct connection between the visual identification resource and permanently preserved biological material. This approach demonstrates how entomological collections can support biodiversity

documentation, education, Extension, and public engagement. The project highlights the importance of regional insect collections as repositories of Guam's biological heritage and demonstrates how collections can be transformed into practical resources for community outreach. In this presentation, we share our summer experience developing the brochure, including field collection, specimen preparation, photography, curation, identification, and transforming collection-based information into an accessible resource for Guam.

4:17 pm – 4:29 pm **Soil arthropod biodiversity in California sampled with subterranean pitfall trapping**

**Carter Young**[1], Santiago Alvear[1], Nicholas Collins[1], Derek Pantel[1], Luisa F. Vasquez-Valverde[1], & Paul E. Marek[1]
[1]*Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, VA, U.S.A.*
*cjyoung42@vt.edu*

Subterranean arthropods are important components of soil ecosystems, but their diversity and community composition remain poorly understood, despite their elevated risk of extinction resulting from limited dispersal and endemism. We used subterranean pitfall traps to sample across five ecologically distinct sites from south to central California, a heterogeneous and biodiverse region in which no extensive survey of subterranean arthropods has previously been conducted. Five 50-75cm PVC pipe pitfalls were deployed at each site, capturing samples from a range of depths. A total of 14,672 arthropod specimens were collected, constituting 345 morphospecies from 9 classes, 43 orders, and 61 families. COI barcodes were obtained using non-destructive DNA extraction, providing a molecular library of under-sampled taxa while retaining physical voucher specimens curated in the Virginia Tech Insect Collection for further morphological analysis, such as identification of rare species or description of cryptic species.

4:29 pm – 4:41 pm **How Collections and Participatory Science Can Complement Each Other to Mitigate Biodiversity Shortfalls**

**Alessandra Pandolfi**[1], Sandor Kelly[2], David Jenkins[3], & Davide Dal Pos[1]
[1]*Enns Entomology Museum, University of Missouri, Columbia, MO, U.S.A.;* [2]*University of Central Florida Collection of Arthropods, University of Central Florida, Orlando, FL, U.S.A.;* [3]*University of Central Florida, Orlando, FL, U.S.A.*
*pndalessandra@gmail.com*

Global environmental change has intensified the need for reliable biodiversity data, yet major knowledge gaps persist in species identities and geographic distributions, known as the Linnean and Wallacean shortfalls. Participatory-science platforms have greatly expanded biodiversity occurrence data, but these records are often unevenly distributed across space and time and biased toward conspicuous taxa. Natural history collections provide a complementary resource, offering permanent, verifiable specimens that can be reexamined as taxonomy advances and digitized for broad accessibility. In this presentation, we present the complementary contributions of participatory-science observations in Florida and digitized entomological collections to taxonomic and distributional knowledge of insects, using the University of Central Florida Collection of Arthropods as a case study. Using openly accessible GBIF records and following FAIR (Findable, Accessible, Interoperable, and Reusable) data principles, we compare the strengths and limitations of these data sources in assessing biodiversity knowledge gaps. Finally, we highlight opportunities for integrating curated collections and community-generated observations to strengthen biodiversity monitoring and conservation.

4:41 pm – 4:56 pm **Break and Silent Auction Close II**

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4:56 pm – 5:01 pm **Finding what you're not looking for**

**Natalie Dale-Skey**
*Natural History Museum, London, UK*
*n.dale-skey@nhm.ac.uk*

This talk will highlight how a collection tour set up originally around Lepidoptera specimens collected by Frederick Parkhurst Dodd, "the butterfly man of Kuranda," led to the discovery of unregistered type material as well as a new host record in the Hymenoptera collection.

5:01 pm – 5:13 pm **The Stoneflies of Arkansas: building a museum specimen dataset & phylogeny to assess Species of Greatest Conservation Need**

**Lily Hart**[1] & R. E. DeWalt[1]
[1]*Illinois Natural History Survey, Prairie Research Institute, University of Illinois, Urbana-Champaign, Champaign, IL, U.S.A.*
*lvhart2@illinois.edu*

Stoneflies (Order Plecoptera) are key bioindicators of freshwater ecosystem health, yet comprehensive data on their presence, distributions, evolutionary histories and relationships are lacking for the state of Arkansas. First, I discuss progress in creating an occurrence dataset of Arkansas stoneflies to aid the Arkansas Game & Fish Commission in finalizing their Wildlife Action Plan. Furthermore, this presentation will discuss a phylogenetic analysis of a subset of eastern Nearctic *Acroneuria* species (Family Perlidae), which includes *Acroneuria ozarkensis*, recently elevated to SGCN status in Arkansas by the AGFC. Preliminary DNA barcoding of the mitochondrial cytochrome c oxidase subunit 1 gene revealed interesting results, including a probable synonymy of the species *A. ozarkensis* and *A. covelli*, the latter having been described more recently from specimens taken from locations east of the Mississippi River. This work highlights the importance of collections in conservation assessment studies and how they allow us to answer questions we did not intend to ask.

5:13 pm – 5:25 pm **BenthicNet: aquatic invertebrate reference specimen collaborative for regulatory and community science**

**Craig Brabant**[1], Jessica Orlofske[2], Jeffrey Dimick[3], & Christopher Tyrrell[4]
[1]*Wisconsin Insect Research Collection, University of Wisconsin, Madison, WI, U.S.A.;* [2]*University of Wisconsin–Parkside, Somers, WI, U.S.A.;* [3]*University of Wisconsin–Stevens Point, Stevens Point, WI, U.S.A.;* [4]*Department of Botany, Milwaukee Public Museum, Milwaukee, WI, U.S.A.*
*brabant@entomology.wisc.edu*

BenthicNet is a new, novel, integrative, network of collaborators at three University of Wisconsin campuses and the Milwaukee Public Museum. Our primary goal is to prepare students to generate, interpret, and disseminate critical information about aquatic invertebrate communities for freshwater assessment, management, and restoration. We are simultaneously modernizing and digitizing nationally significant benthic macroinvertebrate collections to reinvigorate fundamental research in specimen and trait-based biomonitoring at the state, national, and international level by providing access to these historically important specimens. BenthicNet is producing highly qualified students to serve in key positions that generate, use, or manage these data and is the first of its kind anywhere in the country. This program can be a student retention and recruitment tool, attract partners (private and public) that need to draw on expertise for their regulatory monitoring requirements or community science programs, and could provide a model for expansion with future federal support.

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5:25 pm – 5:37 pm **Small Beetles, Big Dataset: Rising Entomologists and the Next Chapter for the Field Museum's Pselaphinae Collection**

**Jessica Wadleigh**[1] & Tatiana Sepulveda[1]
[1]*Field Museum, Chicago, IL, U.S.A.*
*jwadleigh@fieldmuseum.org*

Over the last year, the Field Museum has made significant progress across its 100,000+ specimen Pselaphinae collection, with several new projects on the horizon. Building on our prior curation and digitization efforts, we hired two Women in Science interns this summer to transcribe label data for our North American Trichonychini into our database. In just six weeks, they transcribed over 12,000 specimens, tripling our prior digitized Pselaphinae counts. We are also reorganizing our Pselaphinae Type collection by separating those not yet imaged, confirming taxonomy, and investigating manuscript (MS) types — working towards a comprehensive Type catalog. Additionally, this Fall, another intern has begun building a new dataset on myrmecophile relationships by digitizing ant-associated specimens and data. This talk will discuss what we learned from these internships, the challenges of processing this massive dataset, and our active projects expanding this collection's discoverability and usability.

5:37 pm – 5:42 pm **Long-term datasets hidden in museum collections**

**Giar-Ann Kung**
*Entomology Department, Natural History Museum of Los Angeles, Los Angeles, CA, U.S.A.*
*gkung@nhm.org*

The Natural History Museum of Los Angeles County houses material from two recent long-term surveys, which we invite researchers to consider for their studies. In 2012 the museum launched the Biodiversity Science: City and Nature initiative (BioSCAN) to survey insect fauna in primarily urban environments. Malaise traps were deployed throughout the Los Angeles basin, yielding 4,239 samples in 7 years. For most years of sampling, Diptera, Hymenoptera, and Lepidoptera were sorted to order, while other taxa remain unsorted. From 2022-2025 NHMLA participated in the California Insect Barcode Initiative, sampling statewide primarily with

Malaise traps. 325 samples were not used for barcoding and remain at the museum. Included in those are 96 samples from one site in the Mojave Desert, Burns Piñon Ridge Reserve, sampled nearly weekly from 2022-2025. We encourage you to reach out as these datasets could be useful for your research, including temporal and spatial analyses.

5:45 pm – 5:50 pm **ECN Annual Meeting Concluding Remarks**

**Peter Oboyski**
*Essig Museum of Entomology, University of California Berkeley, Berkeley, CA, U.S.A.*



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- Respect the rules and policies of the conference center and all venues as sociated with the conference.
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**NOTES**


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