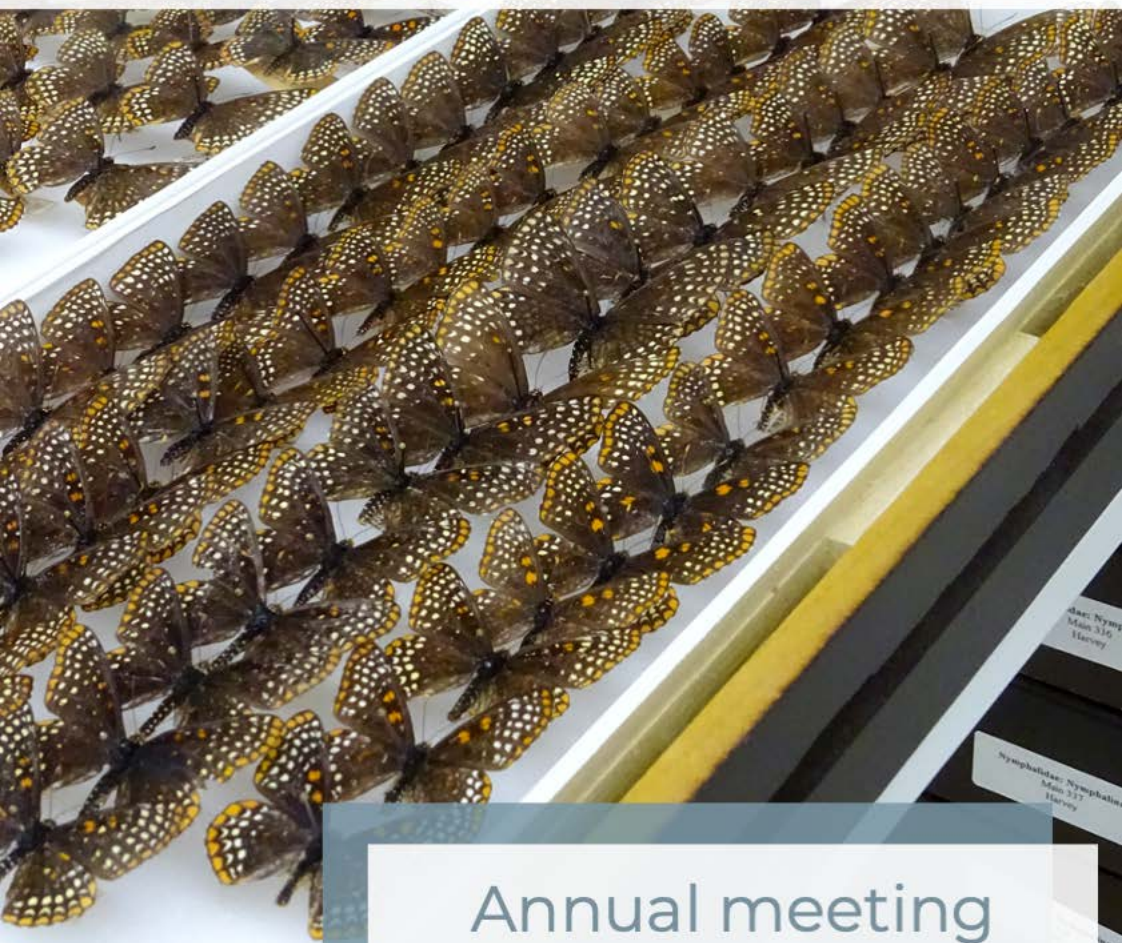




Entomological Collections Network



Annual meeting
November 4-5, 2023

National Harbor, Maryland, USA

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Cover Image: Baltimore Checkerspot Butterfly (*Euphydryas phaeton*), the state butterfly of Maryland.

Picture courtesy of Ashleigh Whiffin and the USNM.

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

Entomological Collections Network

Annual Meeting

Saturday, November 4th and Sunday, November 5th, 2023

Gaylord National Resort & Conference Center

National Harbor, MD

#ECN2023 <https://ecnweb.net>

SATURDAY, NOVEMBER 4th

Gaylord National Resort & Conference Center

National Harbor 2

7:00am–8:10am

Registration

8:10am–8:15am

Welcome and Announcements

Ainsley Seago

*Carnegie Museum of Natural History, PA,
U.S.A.*

CONTRIBUTED TALKS

Moderator: **Kristin Jayd**

8:15am–8:30am

**To Gridfinity and Beyond! In Search
of a Simple, Scalable System for
Sorting and Storing Spirit Samples**

Craig Brabant

*Wisconsin Insect Research Collection,
University of Wisconsin, Madison, WI, U.S.A.;
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During the past two decades, much attention in natural history collections has been focused on the digitization of collection objects and

their associated occurrence data. These efforts have been primarily used to develop the software and pipelines needed to create, store, and share these data with a broad suite of end users. However, there hasn't been a commensurate focus (with notable exceptions) on improving or modernizing the hardware needed for digitization, nor for collection curation in general. A year and a half has passed since BioQuip, the major entomological equipment supplier in the United States, ceased operation. Frustrated with the limited number of vendors for entomological supplies and inspired during a visit last summer to the Milwaukee Public Museum, I purchased a 3D printer and found the activation energy needed to begin learning how to use 3D modeling software. Fused Deposition Modeling (FDM) is a 3D printing process which allows for rapid prototyping and on-demand printing of equipment to fulfill specific needs or to precisely solve problems in natural history collections. I will discuss a couple of use cases that motivated me to explore 3D printing and share a variety of objects I've designed, printed, and tested to improve or enhance our digitization workflows and to fit specific curatorial needs in our collection. Over the past few years, filament printers have become much simpler to use while simultaneously becoming much more affordable. I hope this presentation inspires some of you to consider adding a 3D printer to your collection toolset.



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8:30am–8:45am

Specimen and Data Use at the Frost Entomological Museum

Laura Porturas¹ & Andrew Deans¹

*¹Frost Entomological Museum, The Pennsylvania State University, University Park, PA, U.S.A.;
ldp5188@psu.edu*

The Frost Entomological Museum is the third largest insect collection in Pennsylvania, comprising approximately 1.3 million specimens. In this talk we present the different ways that specimens and their data have been used through time at the Frost. We examine specimen and data request records dating back to the museum's founding in 1969 through the present and report trends in research foci and taxa studied. Staff at the Frost has been digitizing the collection since 2013, which has greatly expanded the accessibility of our data. Therefore, we also examine how specimen digitization has changed the trajectory of specimen use at our museum over the past decade. Implications of the findings for future plans at the Frost are discussed.

8:45am–9:00am

Compactorizing the CUIC: Expanding Collections in a Static Footprint

**Jacki Whisenant¹, Jason Dombroskie¹
& Corrie Moreau¹**

*¹Cornell University Insect Collection, Cornell University, Ithaca, NY, U.S.A.;
jacki.whisenant@gmail.com*

The Cornell University Insect Collection has undergone major changes in the past few months to maximize space, adding 96 cabinets and 800 drawers in the most recent facilities update. We discuss the trials and tribulations of such an extensive move, and share lessons learned and future recommendations for any collections undergoing similar renovations.

9:00am–9:15am

**Behind the Exhibit: Journey from
Collections to the Gilder Center
Insectarium**

**Brittney Hahn¹, Jessica Ware¹ & Ruth
Salas¹**

*¹American Museum of Natural History, New
York, NY, U.S.A.;
bhahn@amnh.org*

To maintain the longevity and preservation of insect specimens, they are best left in controlled storage environments. There are times when their transport and manipulation are necessary for loans and research. The exhibition of insect collections, however, is a unique situation in which specimens are publicly displayed long-term in conditions that would otherwise be typically avoided or mitigated to the best of collections staff's ability. Interdepartmental collaboration to design exhibition content further dictates which specimens are chosen, how they should appear, and what their inclusion should convey to visitors. As such, collections management ends up being just one of several facets in the exhibit development process that must cooperate with the others. In this presentation, we offer our experiences working on the Susan and Peter J. Solomon Insectarium at the American Museum of Natural History's new Richard Gilder Center for Science, Education, and Innovation as a case study and guide for other institutions building their own insect exhibits from their collections. We describe our specimen preparation methods, data workflow, and the coordination needed to create an engaging and scientifically accurate museum exhibit from interdisciplinary perspectives.

9:15am–9:30am

**WID: World Ichneumonidae
Database. Towards a
Comprehensive Database for the
World Fauna of Ichneumonidae**

Davide Dal Pos¹ & Filippo Di Giovanni²

¹*University of Central Florida, Orlando, FL, U.S.A.;*

²*University of Siena, Siena, Italy;
daveliga@gmail.com*

With over 26,000 described species worldwide and an estimated 60,000 to 100,000 more yet to be documented, Ichneumonidae stands as one of the largest families within Hymenoptera. However, the formidable challenge posed by this hyper-diverse taxonomic group lies in effectively handling the sheer volume of taxonomic names and associated data, such as geographical distribution, biological associations, and ecological patterns. Historically, Taxapad served as the go-to tool for ichneumonidologists to manage this wealth of information. Unfortunately, this database has recently been discontinued, leaving researchers without an updated resource. In response to this critical gap, we propose the creation of the World Ichneumonidae Database (WID), a comprehensive database that not only revitalizes the management of ichneumonid wasp data but also introduces new capabilities for sharing and updating. WID aims to serve as a central repository for taxonomic names, nomenclatural changes, distribution records, host data, and type specimen images for ichneumonids worldwide. To ensure accessibility and collaboration, WID will be hosted on TaxonWorks, a web-based workbench developed by the Species File Group, providing a collaborative research environment for scholars. WID will be developed modularly, initially focusing on the incorporation of taxonomic names and associated citations, and subsequently expanding to encompass geographical distribution records, type series information, biological associations, and a comprehensive image repository. WID's primary objective is to offer an immediately updatable, user-friendly tool and collaborative platform that facilitates the gathering of verified and cross-validated information while supporting the development of research projects. We anticipate that WID will become an invaluable resource for scholars in this field, serving as a centralized repository for global species knowledge and fostering the creation of catalogues, interactive keys, matrices, and checklists to advance our understanding of Ichneumonidae.

9:30am–9:40am

Break

9:40am–9:55am

Diagnostic Tools to Identify Exotic Micromoths

Loren D. Jones¹ & Jason Dombroskie¹

*¹Cornell University Insect Collection, Cornell University, Ithaca, NY, U.S.A.;
Ldj37@cornell.edu*

Many moth species pose significant threats to agriculture. Of these, micromoths are some of the most destructive. The family Tortricidae, one family of these micromoths, represents 23% to 30% of all non-native North American moth species. They also happen to be huge agricultural pests and the family comprises a great number of generalists. Several species have been introduced into the U.S. from Europe, Asia, and South America. I present an overview of the tools that researchers employ when identifying micromoths, from wing pattern to genitalia dissection to DNA barcoding.

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9:55am–10:10am

**"Que sont mes amis devenus?" -
Searching for Walker's Catalogue
Chalcidoidea Specimens**

Natalie Dale-Skey

*Natural History Museum, London, United
Kingdom;*

n.dale-skey@nhm.ac.uk

In two publications dated 1846 and 1848, Francis Walker (1809-1874) published a list of the Chalcidoidea specimens in the collection of the then British Museum (now NHMUK). This purports to list every single specimen in the collection with indication of donor and collecting locality, and is a snapshot of what our collection looked at the time. How does this compare to our collection in 2023? And can the specimens listed in Walker's catalogue be found? This talk will present findings from the journey to locate those specimens.

10:10am–10:25am

**From Paradox to a New Online
Chalcidoidea Database.... from Rags
to Riches!**

**John Heraty¹, Roger Burks¹, James
Woolley², Robert Kresslein¹, Matt
Yoder³, & Deborah Paul³**

*¹University of California, Riverside, CA,
U.S.A.; ²Texas A&M University, College
Station, TX, U.S.A.; ³Species File Group,
Prairie Research Institute, University of
Illinois at Urbana-Champaign, Champaign, IL,
U.S.A.;
heraty@ucr.edu*

The Universal Chalcidoidea Database (UCD) was first released as a CD-ROM in 1999, and it was first made available online in its previous version at the Natural History Museum website in 2002. It contained original citations for all species and generic names within Chalcidoidea, as well as a comprehensive list of the various combinations and

misspellings used in the literature. In all nearly 50,000 different combinations and spellings are recorded. All names are supported by a citation of the published source from where they were obtained as are all taxonomic and nomenclatural acts noted within the database. Also included are over 120,000 host/associate records (including associations with food plants of the hosts) and more than 140,000 distribution records. The UCD has its roots in a taxonomic card catalog compiled and maintained until about 1969 by the “indexing section” of the Department of Entomology at The Natural History Museum, London. Soon after joining the staff John Noyes undertook to update and improve on this catalog and add a comprehensive bibliography of works on the superfamily. The conversion of the card catalog into an electronic database using the program Paradox was started in August 1991. This was a one-person operation. Export tables were made publically available through the UCD website by the Natural History Museum, London, with the last data update in 2019. With a grant from the National Science Foundation, the database was migrated to a new platform available in TaxonWorks through the Species File Group. The new UCD curator is now curated through a password-protected platform with the help of a curator community to update the literature and taxonomic changes from a number of different institutions worldwide. To make it more widely available and with support from a USDA-SEL award, a public interface was developed that exposes the data using APIs that assemble updated information from the curator platform in real time (<https://ucd.chalcid.org>). The database now includes information on 27,430 valid species and 2,213 genera, as well as host information and geographical distributions. Various aspects of the TW-UCD and web-UCD will be demonstrated.

10:25am–10:40am

Large-Scale μ -CT Scanning: Lessons Learned

Brendon Boudinot^{1,2}

¹National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.; ²Phyletisches Museum, Friedrich-Schiller-Universität Jena, Germany; boudinotb@gmail.com

It is imperative that we curate the physical specimens that comprise our collections; it is also necessary that we extract as much information as possible from these specimens for future generations of researchers, whether a decade or a century from now. In this presentation, I will discuss the non-destructive extraction of phenotypic information from neontological and fossil material of insects through micro-computed tomography (μ -CT). How do we best preserve specimens for scanning? What techniques are proving valuable? What can we use the data for? How can we most effectively manage these data, and what do we need to do to develop the infrastructure required to host and conserve the valuable, digital resources derived from physical specimens? Many further questions remain to be asked and answered. That the twin branches of genomics and phenomics depend at least in part on wet-preserved material further underscores the importance of ethanol collections and highlights the challenges facing museums and other repositories of irreplaceable biological specimens.

10:40am–10:50am

Break



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**UAM Diptera Collection: Past,
Present and Future Perspectives**

**Thalles Lavinsky Pereira^{1,2}, Derek
Sikes², & Steve Peek²**

*¹Museum of Comparative Zoology, Harvard
University, Cambridge, MA, U.S.A.;*

*²University of Alaska Museum, Fairbanks, AK,
U.S.A.;*

thallesplp@gmail.com

The University of Alaska Museum (UAM) Insect Collection is the only research-grade entomology collection dedicated to the Alaskan entomofauna. The UAM Insect Collection enables a broad range of user communities: primarily taxonomic entomologists and ecologists, but also paleontologists, archaeologists, artists, students, and many others, including many federal and state agencies. Diptera is one of the world's top-four-largest orders of animals and arguably the most medically important due to its many disease-vectoring species. Although, the fly collection is UAM's largest insect order and in the greatest need of curatorial attention – it has the lowest rate of digitization among the largest four orders. Years ago the UAM received two big donations of undatabased (most unlabeled) collections, the K. Sommerman pinned collection, built as part of the Northern Biting Fly Survey of 1947–1956 (15 drawers); and 2) the Collet gall-midge pinned collection (12 drawers). This year, we have received a grant from Museums Alaska of ~US\$ 20K to finishing databasing the ~15k undatabased Diptera specimens. After finishing the label digitization we plan to improve the collection through identifications, photography, and research on Alaskan Diptera. We also note these specimens will become available for DNA barcoding, which will help build an Alaskan-specific DNA barcode library. The addition of these 15k records to ARCTOS will increase the value of these shared data, specifically for biting flies like mosquitoes, which are a high priority due to their potential for transmitting diseases to humans.

11:05am–11:20am

The Ecdysis Portal: An Emerging Community Resource for Digital Specimen Data and Research

Andrew Johnston¹, Jennifer C. Girón², Samanta Orellana¹, Katja C. Seltmann³, Lindsay J. Walker¹, & Sangmi Lee¹

¹*Arizona State University, Tempe, AZ, U.S.A.;*

²*Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.;*

³*Cheadle Center for Biodiversity & Ecological Restoration, University of California, Santa Barbara, CA, U.S.A.;*

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This talk provides an overview of the Ecdysis portal (ecdysis.org) which is intended as a community resource for live-managing specimen data for collections and research projects. The portal runs off of the open-source Symbiota software (symbiota.org) which is used for many other portals such as the SCAN portal (scan-bugs.org). The goal of Ecdysis is not to become a large-scale aggregator but rather as a place to digitize, curate, and analyze occurrence records. In this talk we will share several key features of the portal such as checklists, occurrence relationships, dataset publication, and identification keys. We will also discuss the new steering committee established for the portal and their vision for how the portal can support the community as well as ways that they would like to receive feedback from the community to continue to grow this resource.

11:20am–11:35am

Around They Go: Prototyping a Turntable Design for Use in Insect Digitization

**Cody Bedke¹, Alyson Wilkins¹, &
Amelia Weyerstall¹**

*¹Natural History Museum of Utah, University
of Utah, Salt Lake City, UT, U.S.A.;
cbedke@nhmu.utah.edu*

Insects are among the most diverse groups of organisms. This diversity is what makes digitization of insect specimens in natural history collections crucial, but also complex and time-consuming. Staffing and resource constraints are a further impediment in many institutions. This results in a need to find procedures and equipment that simplify and speed up the task of digitizing, while also remaining cost-effective. The Natural History Museum of Utah insect collections also faces these challenges. Due to having a dedicated staff of only two, a backlog of undigitized historic and recent collections, and the anticipation of two accessions that will increase the collection size by nearly 40%, we began prototyping a turntable stage for insect imaging. The current iteration of this prototype supports about eight medium specimens staged concurrently with those captured images uploaded to the DigiVol platform for data crowdsourcing. Our initial images were captured at about two minutes per specimen. We anticipate this to be a useful tool that can be easily integrated into existing digitization frameworks or as part of a new initiative.

11:35am–11:50am

**Cataloging, Imaging, and Digitizing
the Type Specimens of the Florida
State Collection of Arthropods**

Erin Powell¹ & Oliver Keller¹

*¹Florida State Collection of Arthropods,
Florida Department of Agriculture and
Consumer Services, Division of Plant Industry,
Gainesville, FL, U.S.A.;
erin.powell@fdacs.gov*

Catalogs detailing the type holdings of an institution are vital to facilitating research, preserving natural history collections, and are recommended by the International Commission on Zoological

Nomenclature. Annotated and illustrated catalogs provide label data and images that quickly relay information to readers, potentially reducing the need for specimen loans, expensive travel, and/or curator hours to find specimens and respond to requests. While physical specimens are irreplaceable, high-quality images and digitizing of specimens also provide an eternal backup in case specimens are damaged, destroyed, or lost due to unforeseen circumstances. The Florida State Collection of Arthropods (FSCA) in Gainesville, Florida, USA is one of the largest and most diverse insect collections in North America and the largest in the southeastern United States. We are currently working towards providing type catalogs for all holdings. In 2020, an initial catalog covering the type material of Adephaga and Myxophaga (Coleoptera) was published. In 2023, efforts to catalog, image, and digitize types have increased. The Myriapoda, Mecoptera, and Hemiptera type holdings are published or currently in press and the Diptera, Arachnida, and Coleoptera (Polyphaga) catalogs are well underway. For these, unique identifier barcodes have been added and all specimens have been digitized in TaxonWorks to be pushed to GBIF and other public aggregators. For pinned and slide-mounted specimens, high resolution images have been taken to accompany the catalogs and online database.

11:50am–12:05pm

**Digitisation of the World's Largest
Collection of Australian insects, the
Australian National Insect Collection
(ANIC)**

Nicole Fisher¹, Maddy Bakker¹, Luca
Bruck¹, Merinda Campbell¹, N. K.
Kapuscinski-Evans¹, & Mei Yang¹

*¹CSIRO National Research Collections of
Australia, Canberra, Australia;
nicole.fisher@csiro.au*

The Australian National Insect Collection (ANIC) houses the world's largest collection of Australian insects and related groups, such as mites, spiders, nematodes and centipedes, housing over 12 million specimens.

Digitisation initiatives at ANIC have recently intensified with the upcoming move to a new purpose-built facility.

We will provide an overview of the past and ongoing digitisation efforts to enhance the accessibility of ANIC's specimens. Digitisation of the primary Type specimens, mass digitisation of the microscope slide collection, imaging for biosecurity identification applications, taking of genetic samples, and integration of new technologies and tools around metadata extraction to further advance and automate data curating will be discussed. Concurrently, extensive database efforts are underway to collate specimen metadata, including taxonomic and collection data, into a centralised database. These advancements will ensure that ANIC's rich insect holdings can be accessed for scientific research in a way that has never been achieved before.

However, digitisation comes with its challenges, including the vastness of the collection, the diverse nature of specimens, the need for continued investment in personnel, hardware, and software resources, and the development of data management protocols and processes. As we go through a transformative milestone with the imminent building move, the digitisation journey continues. This comprehensive and concentrated effort to digitise the Australian National Insect Collection will advance the scientific community's ability to explore and understand Australia's insect biodiversity into the future.

12:05pm–12:10pm

**Closing Remarks and
Announcements**

12:10pm–1:30pm

Lunch Break

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POSTER SESSION

Moderator: Oliver Keller

1:30pm–1:35pm

Introduction

1:36pm–1:39pm

The Extended Specimen: What UCONN's Bee Digitization Efforts with iDigBees are Revealing About Flower Attendance

Katrina Menard¹, Madeline Shaw¹,
Hailey Baranowski¹, & Kathleen
Kozloski¹

¹*University of Connecticut, Storrs, CT, U.S.A.*
Katrina.menard@uconn.edu

The University of Connecticut was recently awarded National Science Foundation funds to digitize the bee collection as part of the iDigBeesTCN. Within the first year of the project, we have completed digitization of the Apoidea families Megachilidae and Colletidae, including specimens with data of floral attendance. Herein we focus on one such case study of three islands off of Massachusetts: Naushon, Cuttyhunk and the Penikese Islands. The sampling of these small islands included data on endemic plants the bees attended, and therefore can provide data points for ecological studies of pollination in small geographic environments. We present the preliminary data of flower attendance data for native bee species in the Megachilidae and Colletidae in our collection and compare it to the data of the non-native species *Apis mellifera* for samples from the islands as an example of the potential uses of this dataset for ecologists.

1:40pm–1:43pm

**Digitization of Bees at the Florida
State Collection of Arthropods**

Elijah Talamas¹, Jonathan Bremer¹, & Natalie McGathey¹

*¹Florida State Collection of Arthropods,
Florida Department of Agriculture and
Consumer Services, Division of Plant Industry,
Gainesville, FL, U.S.A.;
elijah.talamas@fdacs.gov*

Containing over 20,000 described species, the bees (Hymenoptera: Anthophila) inhabit nearly every terrestrial habitat on the planet. Their role as efficient pollinators makes them ecologically and economically important, and that association with and reliance on angiosperms makes them valuable indicators of environmental change. Museum collections of bees can provide a deep repository of information but can be difficult to access and synthesize since these collections are centralized. The Big Bee project is making these data accessible via the Bee Library, a database of specimen images, occurrence records, and natural history information from US collections to facilitate bee identification and ecological research. The Florida State Collection of Arthropods (FSCA) is part of this effort and houses the largest bee collection in the southeastern U.S. with diverse holdings from Central and South America. Data from FSCA specimens are uploaded to Ecdysis, a Symbiota portal for arthropod collections, and copied to the Bee Library and GBIF.

1:44pm–1:47pm

**A Century of Illinois Hover Flies
(Diptera: Syrphidae): Museum and
Citizen Science Data Reveal Recent
Range Expansions, Contractions, and
Species of Potential Conservation
Significance**

**C. Scott Clem¹, Lily V. Hart², &
Tommy McElrath²**

¹University of Georgia, Athens, GA, U.S.A.;

*²Illinois Natural History Survey, Prairie
Research Institute, University of Illinois at
Urbana-Champaign, Champaign, IL, U.S.A.;*
cscottclem@gmail.com

Hover flies of the family Syrphidae are a highly diverse group of insects that exhibit varied life histories and provide numerous ecosystem services. Despite their importance, they are highly understudied, and many biological and distributional patterns remain unknown in regions like the midwestern United States. Data from specimens exist in regional insect collections but is largely undigitized and thus inaccessible to much of the scientific community. Here, we report our efforts to identify, re-curate, and digitize thousands of specimens from the Illinois Natural History Survey Insect Collection. We then combine these data with existing datasets 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. Based on previously published data, 68 of these species are new Illinois state records and 36 expand the previously known range significantly. 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, and 27 are deemed to be of potential conservation significance with few to no recent records in the Midwest or elsewhere. Our findings illustrate the importance of routine expansion, curation, and digitization of natural history collections.

1:48pm–1:51pm

**Camp Sketchapod: A New Summer
Workshop in Entomological
Illustration**

Jacki Whisenant^{1,2}, Hailey Shanovich,
Erin Hodgson, Brian McCornack, &
Crystal Ly

¹*University of Wisconsin, Madison, WI,
U.S.A.*; ²*Cornell Insect Research Collection,
Cornell University, Ithaca, NY, U.S.A.*;
jacki.whisenant@gmail.com

John (Jack) Franclemont was a dedicated lepidopterologist, with a long legacy in the Cornell collection. His tens of thousands of immaculate specimens and precise dissections will always be a valuable resource for current and future studies in macro moths and beyond.

1:52pm–1:55pm

**The Impact of Research Associates
on the Growth of the Florida State
Collection of Arthropods**

Kyle E. Schnep¹, Lily Deeter¹,
Mayumi A. Needham¹, & Gareth S.
Powell¹

¹*Florida State Collection of Arthropods,
Florida Department of Agriculture and
Consumer Services, Division of Plant Industry,
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Natural history collection often lack the support needed to accomplish all of the tasks necessary for the curation, growth, and maintenance of their holdings. The Florida State Collection of Arthropods (FSCA) is no exception. Even with continued support and additions to the staff, many tasks would not be possible without the contributions of our Research Associates. Here, we highlight the impressive contributions of several past and present associates of the FSCA. Namely, 1) the accessions of historic personal collections from individuals like G. H. Nelson, Ed Geisbert, and Jim Wappes; 2) the career-long collaboration with Orthoptera worker, Tom Walker; and 3) the building of the largest odonate collection on the planet through the work of countless

associates but especially Minter Westfall and Bill Mauffrey. We summarize the growth of the FSCA through time and the major role research associates have played in that growth, as well as celebrate the curatorial and research accomplishments of these individuals.

1:56pm–1:59pm

**The Flower Flies of the
Entomological Coleccion of
Universidad de Antioquia-CEUA:
Sixteen Years Exploring, Discovering
and Describing Colombian Diversity**

Augusto León Montoya Giraldo

*Laboratorio de Colecciones Entomológicas
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aleo.montoya@udea.edu.co*

The Entomological Collection of the Universidad de Antioquia-CEUA in Medellín, Colombia was founded in 1997. Since its beginnings, the Collection has positioned itself as an international reference, harboring more than 1,000,000 specimens in 31 orders in the Insecta, Entognatha and Arachnida. The collection has been mainly focused on exploring and sampling the Tropical Andes “Hotspots” in Colombia, harboring more than 1000 type specimens among holotypes, paratypes and syntypes symbolizing more than 119 described species, of which, 56 species belong to flies (Diptera). One of the better-curated and taxonomically updated dipteran families is flower flies (Syrphidae), which in Colombia is composed of over 435 species in 70 genera, with up to 65% of this national diversity represented in the CEUA. Since 2017, eleven species have been described, two species redescribed and ecological papers published on Syrphid fauna from the Colombian high Andean Forest and Paramo ecosystems, providing invaluable data on biodiversity, distribution and endemism in the country. Within the framework of the project: “Strengthening of Biological Collections” and “Systematization and Digitization of the Entomological Collection Universidad de Antioquia-CEUA (Call 1030-2021, Project Code 88829)” the specimen taxonomy and their associated occurrence data have been compiled

through the Darwin Core template. Currently, data from our collection are being made available throughout the National Biodiversity System SIB (Colombia) with echo in the international platform GBIF. Additionally, a friendly and easy-access web platform is being developed with the potential to connect to the main biodiversity repositories, in such a way that these records will be available with photographs of appreciable quality, contributing to increasing knowledge of Colombian diversity and positioning CEUA as an important heritage, each time closer to the public at a global level.

2:00pm–2:03pm

**Notes on the Collection of
parasitoids Found Within the Nests
of *Delta dimidiatipenne*
(Hymenoptera, Vespidae)**

**Alfred Daniel Johnson¹, Michal
Segoli², Tamir Rozenberg²**

*¹Tennessee State University, Nashville, TN,
U.S.A.; ²Ben-Gurion University of the Negev,
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Potter wasps (Eumeninae) are the largest vespid wasp subfamily in the world, comprising nearly 3800 species in more than 210 currently described genera. We conducted a search in the Negev desert of Israel for parasitoids that had completed their development but were trapped within the potter wasps *Delta dimidiatipenne* nests. Our study resulted in a total of 15 parasitoid species, belonging to two orders and eight families of insects. A new association of Miltogramminae (Diptera: Sarcophagidae) with this wasp is also reported. Based on the literature, most of them are probably parasitoids of species that the potter wasps collect as prey, while some are nest parasitoids of the potter wasps themselves. Out of the eight families that were collected, five families, viz., Sarcophagidae, Tachinidae, Torymidae, Eulophidae, and Chrysidae, were most likely to be nest parasitoids, each represented by one species. Based on their known ecology, all the ichneumonids, braconids, and the encyrtid that were documented in this study, i.e., 10

out of 15 recorded species, are parasitoids of the prey caterpillars brought by the potter wasps to the nests. In this sense, it is perhaps not surprising to find them trapped within potter wasp nests, as they are not likely to have adaptations that enable them to emerge successfully through the hardened mud cell walls. Future research based on host-parasitoid rearing can shed more light on factors causing different parasitoid species' emergence failure, their developmental nutritional requirements, and their ability to break open the nest successfully.

2:04pm–2:07pm

Species Discovery in Southern African Bee Flies: A New Species in the Revised Genus *Enica*

Lisa Rollinson^{1,2}, Allan Cabrero², & Torsten Dikow²

¹Texas A&M University, College Station, TX, U.S.A.; ²Smithsonian Institute, National Museum of Natural History, Washington, D.C., U.S.A.;
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Background: Bee flies (Diptera: Bombyliidae) are a global family of true flies that are ecologically significant pollinators, especially in South Africa. Describing new species and revising taxonomies makes it easier to document bee flies for ecological and human impact studies. However, for the genera *Enica* and *Nomalonia*, the last review in 1956 by A. J. Hesse was wordy, comparative, and suggested but did not establish a synonymy of the genera. We used more than 300 specimens that had accumulated in the Iziko South African Museum, KwaZulu Natal Museum, and Smithsonian USNM to revise these two genera of South African bee flies.

Purpose: *Enica* is a monotypic genus differentiated from *Nomalonia* (6 named species) only by the presence of two cross veins in the r_1 cell and setation below the antennae. Due to similarities in body morphology, in general color pattern, setation, and male terminalia, we established *Nomalonia* to be a junior synonym of *Enica*. We redescribed all known

species, described a single new species, created a new dichotomous key with photographic references, and provided detailed distribution maps. **Conclusion:** The revision of *Enica* improved species identification for future researchers and increased knowledge of global biodiversity.

2:08pm–2:11pm

Dung Beetles The Unsung Heroes

Aparna Kalawate

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About 1300 species reported from India. From Maharashtra around 89 species in 32 genera belonging to 6 subfamilies (Jadhav & Sharma, 2012) reported. Kalawate (2018) reported 50 species represented by 25 genera, in seven subfamilies belonging to Hybosoridae, Geotrupidae and Scarabaeidae from the northern Western Ghats of Maharashtra. Still proper documentation of this group is lacking in India documenting exact diversity of this group from India.

2:12pm–2:15pm

The Taxonomic Completeness of a Museum Collection Revealed Through Large-Scale Digitisation

Beulah Garner^{1,2}, Louise Allan¹,
Robyn Crowther¹, Elizabeth
Devenish¹, Phaedra Kokkini¹, Nicola
Lowndes¹, Laurence Livermore¹,
Krisztina Lohonya¹, Ben Price¹, Peter
Wing¹, & Alfried P. Vogler^{1,2}

*¹Department of Life Sciences, Insects
Division, Natural History Museum, Cromwell
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Life Science, Silwood Park, Imperial College
London, Ascot SL5 7PY, UK.*
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Historic museum collections hold a wealth of biodiversity metadata that can be released through large-scale digitisation projects. As digitisation of natural history collections becomes embedded in curatorial practice, novel methods are needed to speed up the digitisation process, especially for the huge collections of insects that contain collecting information on small labels. In this project we piloted semi-automated specimen imaging, and digitisation and transcription of specimen labels for a large research collection of nearly 29,000 pinned insects of ground beetles (Coleoptera: Carabidae) in the subfamily Lebiinae held within the collection of the Natural History Museum London. This work has resulted in research-ready digitised records for 2,734 species, corresponding to 43% of the known species diversity of Lebiinae. The specimen-level data were made publicly available through the NHM's Data Portal and the Global Biodiversity Information Facility (GBIF) where they accounted for 88% of all occurrences of Lebiinae. The compilation of transcription data revealed the great age of this collection (average specimen age 91.4 years) and the peak time of specimen acquisition between 1880 and 1930, with greatly reduced collection activity in recent decades. Information on geography was available in 91% of identified specimens, but the time of collection was recorded only in 39.8% of specimens. Meaningful transcription information and imaging could be gathered with partially automated camera systems, but also required time-consuming manual curation of species names, collection dates, and authors. The study illustrates the huge value of the large museum collections in terms of taxonomic, geographic, and temporal extent, but modern curation methods are needed to unlock the information content at the required scale.

2:15pm–2:25pm

Break

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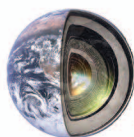
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The Everlasting Trace

Organizer/Moderator: **Jennifer Girón**, *Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.*

2:25pm–2:30pm

Introduction

2:30pm–2:45pm

Bilingual Tools to Increase Digital Representation of Latin American Collections and Entomologists

K. Samanta Orellana¹, Ed Gilbert¹, & Nico Franz¹

¹*Arizona State University, Tempe, AZ, U.S.A.; sorellana@asu.edu*

With few exceptions, most digital representation of entomological specimens collected in Latin America has been made possible by the digitization and mobilization of North American and European collections. Hence, there is a constant need to seek solutions to involve local communities and increase the visibility of Latin American collections and entomologists. Symbiota is an open source software that allows the generation of online biodiversity portals. Depending on the interests of the leading community of each portal, these platforms can function as collection management systems, as medium scale aggregators, or both. In recent years, an increased collaboration with Latin American communities allowed the Symbiota team to focus on the translation of the platform to activate a Spanish interface on the portals. Entomological communities in at least eight Latin American countries have taken advantage of this resource, sharing over 25,000 specimen records, since 2020. Using their own Symbiota portal, almost half of these records have been shared by entomological collections in Guatemala, including over a thousand type specimens housed in those

institutions. A survey performed to the Guatemalan community revealed that over 90% of the users prefer the Spanish version of the portal, evidencing the relevance of this bilingual tool to support the digitization and collection management activities. Symbiota portals can also be configured as installations to mobilize data and images to the Global Biodiversity Information Facility. This feature has allowed institutions in Guatemala and the Dominican Republic to share over 19,000 specimen records with this global aggregator, at the same time making them available for platforms like Bionomia, where local entomologists can claim their collected and identified specimens. By promoting the accessibility to bilingual versions of Symbiota portals, we expect to increase the participation of Spanish speaking communities currently working on developing local entomological collections.

2:45pm–3:00pm

**Blind Descent: Secrets of the Barr
Cave Beetle Collection**

Ainsley Seago

*Carnegie Museum of Natural History,
Pittsburgh, PA, U.S.A.;*
seagoa@carnegiemnh.org

After a lifetime spent exploring Appalachian caves, the speleologist and coleopterist Dr. Thomas C. Barr (1931–2011) donated his spectacular collection of troglobitic beetles to the Carnegie Museum of Natural History in Pittsburgh, PA. This treasure trove of eyeless wonders contains hundreds of Barr’s type specimens, as well as a massive supply of material that has supported cave beetle research long after his demise. From elusive endemics to coal mine beetles, this collection represents not only a crown jewel among the Carnegie Museum’s world-class carabid holdings but also a tremendous resource for future studies of endemism, speciation, and the effects of climate change on high-elevation insect fauna.

3:00pm–3:15pm

**Shining a Light on the Moth
Collection of Alice Blanche Balfour
(1850–1936)**

Ashleigh Whiffin¹ & Katty Baird¹

*¹National Museums Scotland, Edinburgh,
Scotland;*

a.whiffin@nms.ac.uk

100 years ago, Scottish entomologist Alice Blanche Balfour (1850-1936) was busy pursuing moths in and around her family's estate in East Lothian, Scotland. Her fascination with these insects generated a collection of over 10,000 moth specimens. As the only unmarried daughter, Alice was duty-bound to manage the estate for her bachelor brother (Politician and Prime Minister, Arthur Balfour) and as a result, spent almost all her life-based in this corner of Scotland. Although domestic duty took up a great deal of her time, she made notable achievements in science, art and travel.

Alongside Alice's specimens, the museum was gifted her archive, including her correspondence and notebooks which meticulously detail all her observations and ideas. It's these diaries and letters, which really help bring her moth catching endeavours to life and continue to generate information, long after her passing. Inspired by Alice and her accomplishments, Katty Baird has been digging deeper into these archives and digitising the collection. This work has made thousands of records available to the UK national moth recording scheme, generating information that can help guide conservation efforts.

Katty's work has helped shine a light on this important Scottish collector. Alice's specimens have now featured in numerous articles and multiple short films, including an appearance on BBC Autumnwatch. For the first time ever, a selection of her moth specimens have been displayed to the public, alongside her net, in a new gallery at the museum. Other projects are in development to continue this celebration of Alice and her collection.

3:15pm–3:30pm

**The Legacy of Charles Michener's
Bees: The World's Largest Specimen-
Level Bee Database**

Understanding the ecological roles of bees and their evolution and taxonomy has been an important endeavor – especially since the intensification of agriculture in the 1700s. Charles Michener (1918–2015) was a strong leader in the study of anthophilous Hymenoptera with a career spanning much of the 20th century. Born and educated in California, Michener spent most of his career at the Snow Entomological Collection at the University of Kansas (KUSEM) where he built a world-class bee collection and trained dozens of students. This portion of the KUSEM continues to grow and remains an active center for research today, attracting visitors from around the world. To serve the worldwide scientific community, the data from these important specimens have been digitized where they are accessible via a web portal (<https://biodiversity.ku.edu/entomology/collection-search>), and large natural history data aggregators such as Discover Life, GBIF and iDigBio. The data consist of nearly half a million occurrence records from 194 countries across all biogeographic regions, although the Nearctic and Neotropical regions are the best represented. Records span from 1854 to the present day and include 58% (11,668 species) of the species, 471 genus-groups, and 63 tribes of currently known bees. Most of the specimens are identified to species (73%), or genus level (97%). One-quarter of the records include floral visits to 170 families and 2,324 species of plants, with Asteraceae and Fabaceae containing the most records. The data are stored in a Specify database. For each specimen it generally provides information concerning the collection, geospatial details, host plants, current and historical determination, taxonomic value (type specimen, voucher, etc.), and some associated preparation types (slides, dissections, DNA extracts, etc.). The utility of the KUSEM bee collection founded by Michener has been enhanced through recent participation in the NSF-funded, multi-institution Big-Bee project which has facilitated the addition of high-resolution photographs representing many species to the database.

3:30pm–3:45pm

The People of the MCZ's Bee (Anthophila) Collection

Zoe Flores¹, Crystal Maier¹, & Charles Farnum¹

¹*Harvard MCZ Entomology Collection,
Harvard University, Cambridge, MA, U.S.A.;
zoe flores@g.harvard.edu*

Through the NSF-funded Big-Bee digitization grant, Harvard's Museum of Comparative Zoology (MCZ) entomology collection has been able to digitize 24 thousand new records of Anthophila, collected by 526 people over the past 300+ years. The ongoing digitization of natural history collection specimens allows easy access to great volumes of quality research data, though specimens with vague or missing data can present limitations in spatiotemporal research. The majority of specimens not only have valuable collection locality and date data, but also include information on the people who collected, received, and identified them; however, this anthropological history is seldom a top priority for curators and researchers, despite it being contextually beneficial for records that may lack portions of collection event data. By researching a collector's last name or initials, curators can narrow down the time and region of a specimen's collection event, or even uncover historically important collections whose legacy has been lost to time. 74+ new collectors with accompanying biographies have been added to MCZBase since November 2022. This presentation will highlight some of the key people that have contributed to the MCZ's Anthophila collection.

3:45pm–4:00pm

Break

4:00pm–4:15pm

Motivations for Sustaining a Roundtrip of Curated Links Between Collectors and their Specimen Records

David P. Shorthouse¹ & Deborah L. Paul²

¹Independent; ²Species File Group, Prairie Research Institute, University of Illinois at Urbana-Champaign, Champaign, IL, U.S.A.; davidpshorthouse@gmail.com

There has been a swell of recent interest in the disambiguation of people's names in our openly shared digital specimen records. We will explore why and how this has come to be and what are the ways we can engage with these activities. Individuals doing this work are generous with their time and ideas; they share a vision for positive benefits to entomologists and to the collections and institutions where their specimens are curated.

Constructing annotated lists of people's names and producing biographical sketches have been valuable activities in our community for hundreds of years. People's names are core pieces of provenance, are key integrators of disparate sources of information such as between field notes and publications, and help promote outreach activities. However, deducing who is who on insect labels – a critical source of people's names – is often puzzling and frequently viewed as a secondary concern with little scholarly merit. What differs now is easy and rapid access to online resources where we may synthesize structured facts with references about our colleagues in a FAIR way and to propagate these facts through the use of unique, machine-actionable identifiers and web services. Here, we discuss the characteristics of the craft of disambiguation of people's names, some of our motivations for applying this work to specimen records, and where it takes place. We will showcase how this helps reveal the breadth of work in our community, members of which may have one unnoticed were it not for this open approach. Finally and critically, we will illustrate what is a “round-trip” of links between the unique identifiers for collectors of insects and that of their specimen records with the aim of encouraging adoption in acquisitions and donations, specimen label digitization, data publication, and data curation workflows.

4:15pm–4:30pm

**Who Makes the Most Impact?
Aggregators, Persistent Identifiers,
and Why you Should Care About
Where your Collection's Data Goes**

Tommy McElrath

*Illinois Natural History Survey, Prairie
Research Institute, University of Illinois at
Urbana-Champaign, Champaign, IL, U.S.A.;
monotomidae@gmail.com*

How can you make sure that the impact of your collection or your specimens are actually measured? New digital infrastructure has made it so that hypothetically, anyone can collect, digitize, and upload a digital specimen to an aggregator for that specimen to be used to answer many different scientific questions. In this talk, I will examine what tools make this possible, but also where this process breaks down, and in doing so, examine what specimens are currently making the most “impact” at the INHS Insect Collection.

4:30pm–4:45pm

**Reuniting Uncle Joe With his
Specimens: How a Security Guard,
some Sleuthing and Crowdsourcing,
Saved an Orphaned Lepidopteran
Collection from the Dustbin of
History**

Christy Bills

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

Donated natural history collections can be mysterious if full provenance is not available. Knowing the original collector can have important implications for the quality of data, legality of collecting, etc. In 2019, NHMU accepted a mostly Lepidopteran collection of approximately 1000 specimens, from California in the 1940s and 50s, with well-kept

specimens and fairly precise locality data, but were just unsure who the original collector was. After years of trying to triangulate the collection data, the localities collecting emphasis, and chasing dead ends, we finally hit on a research angle to locate the mysterious collector. Using non-traditional methods, we uncovered our enigmatic collector and have been in contact with his family who were exceedingly grateful to know where the specimens ended up and have helped us know more about this interesting naturalist.

4:45pm–5:00pm

John G. Franclemont: A Life of Moths

Jacki Whisenant¹ & Jason Dombroskie¹

*¹Cornell University Insect Collection, Cornell University, Ithaca, NY, U.S.A.;
jacki.whisenant@gmail.com*

A brand new workshop came together this summer with the persistent efforts of five dedicated entomologists and artists. We welcomed the first class of 18 students to an intensive three-day weekend of exploring various techniques used in the scientific illustration of entomological specimens and concepts, from traditional to digital. Students brought with them a range of experiences and left with a full plate of techniques to use in their future work.

5:00pm–5:15pm

Connecting Entomological Collectors through the Wikiverse

Siobhan Leachman

*Independent;
siobhan@leachman@yahoo.co.nz*

Natural history institutions hold a large amount of data about entomological collectors. However, this data is often not publicly available nor is it digitally linked to other data. This presentation will explain how Wikidata can be used to create an identifier for

entomological collectors, empowering the collation and linking of biographical data as well as the ability to link to other databases and catalogues relating to those collectors.

It will outline how the Wikidata identifier can be reused to create a Bionomia (<https://bionomia.net/>) profile for entomologists, connecting them to specimens they have collected or identified, the data about which has been placed in the Global Biodiversity Information Facility (GBIF).

Natural history institutions can reuse data contained in an entomologist's Wikidata item to improve or enrich their collection metadata. By linking to the Wikidata item, Natural history institutions can themselves become better connected in this digital environment.

The enrichment of an entomological collector's Wikidata item can also assist those collectors to hurdle the more stringent Wikipedia article notability criteria, enabling them to obtain a Wikipedia article.

5:15pm–5:20pm

**Closing Remarks and
Announcements**

5:20pm–5:30pm

Break

5:30pm–6:30pm

ECN Business Meeting

7:30pm–9:00pm

ECN Reception and Poster Session

ISH proudly supports the
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Join us on Sunday in National Harbor,
1:30pm–4:30pm, for this year's
ISH Symposium and Social Hour.

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SUNDAY, NOVEMBER 5th

Gaylord National Resort & Conference Center
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7:00am–8:00am

Registration

MEMBER SYMPOSIUM

Collections of the World

Organizer/Moderator: **Nicole Gunter**, *Cleveland Museum of Natural History, Cleveland, OH, U.S.A.* & **Oliver Keller**, *Keller Entomological Consulting LLC, Gainesville, FL, U.S.A.*

8:00am–8:05am

Introduction

8:05am–8:15am

The Hong Kong Biodiversity Museum: Developing Natural History and Education in a Concrete Jungle

Aline Oliveira

*The Hong Kong Biodiversity Museum, Hong Kong;
hkbmcuration@gmail.com*

8:15am–8:25am

Insect Collection of Seoul National University, South Korea

Seunghyun Lee^{1,2} & Seunghwan Lee¹

*¹Institute of Zoology, Chinese Academy of Sciences, Beijing, China; ²Seoul National University, Seoul, South Korea;
chiyark@snu.ac.kr*

The Seoul National University Insect Collection stands as Korea's largest university-affiliated collection, with its origins dating back to the 1930s when it was known as the Suwon Higher Agricultural School during the Japanese colonization era.

Our collection comprises approximately 700,000 insect specimens, encompassing both contemporary and historical samples spanning over a century. These specimens are categorized into three primary types: 380,000 dried specimens, 280,000 liquid-preserved specimens, and 50,000 slide-mounted specimens.

Among the collection's notable highlights are Hemiptera, which includes aphids, psyllids, scale insects, and mirid bugs, standing as the most extensively curated taxa. Furthermore, the collection encompasses a diverse range of other taxa, including longhorned beetles, sap beetles, honeybees, and parasitoid wasps. One remarkable feature of the collection is its ability to preserve recently-collected specimens suitable for DNA analysis; these specimens are stored in ethanol within freezers.

In the provided video, we offer an overview of The Seoul National University Insect Collection and Insect biosystematics laboratory with the opportunity for potential future collaborations.

8:25am–8:35am

**The Lepidoptera collections at the
Natural History Museum, London,
UK**

Geoff Martin

*National History Museum, London, United
Kingdom;
g.martin@nhm.ac.uk*

The Natural History Museum's Lepidoptera collection is one of the oldest and largest collections and certainly the most type rich. The collection contains 12.5 million pinned specimens and one million papered specimens housed in 80,000 drawers. There are 125,000 type specimens. The Lepidoptera collections are divided into two separate

collections, British/Irish and international. This whistle stop tour will highlight the important people that have contributed to the collection in one way or another in the last 270 years.

8:35am–8:45am

**The Entomological Collection of the
Museo Nacional de Historia Natural
"Prof. Eugenio de Jesús Marciano"**

**América Sánchez-Rosario¹ & Ernesto
Payano Mercado¹**

*1Museo Nacional de Historia Natural Santo
Domingo, Santo Domingo, Dominican
Republic;
a.sanchez@mnhn.gov.do*

The entomological collection of the Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marciano" (MNHNSD) houses an important historical collection dating back more than 60 years. It is the largest in the Dominican Republic, comprising 31,140 specimens across 14 orders and 1,054 species. Most are adult-pinned specimens distributed in 15 cabinets and 336 drawers. Coleoptera is the most significant order, with 13,509 specimens and 378 species (35.86%). A total of 17,168 specimens are identified to species (55.13%). Here, we will discuss the strengths and curatorial challenges of the collection.

8:45am–8:55am

**Natural History Museum, Vienna,
Austria**

Matthias Seidel

Naturhistorisches Museum, Wien, Austria
matthias.seidel@nhm-wien.ac.at

8:55am–9:05am

**The Entomological Collection of the
Museo de La Plata. Universidad
Nacional de La Plata, Argentina**

Pablo Dellape¹ & M. C. Melo¹

*¹Museo de La Plata, Universidad Nacional de La Plata, La Plata, Argentina;
pdellape@gmail.com*

La Plata Museum was created in 1884 and was the first in South America to be built to meet the specific purposes of a museum. Since 1906, it belongs to the National University of La Plata (UNLP), and it worked as scientific center and school of natural sciences. The entomological collection was created from the private collection of Carlos Bruch, and since that moment, it was nourished by the work of the naturalists working at the museum, but also by donations and purchased of private collections, such as Berg's Hemiptera collection, Breyer and Jörgensen's butterflies' collections, and Bosq's collection of harmful insects to agriculture, among others. Currently, the collection brings together an estimated number of 2.5 million specimens, and more than 10,000 type specimens, mostly cataloged in the 53 catalogs published to date, and available in the Naturalis digital repository. Most of the specimens are pinned or slide mounted, and a smaller part are in entomological envelopes, and in 70% alcohol. The collection is located in separated two sectors in accordance with the conservation standards and established safety regulations. The dry collection has controlled temperature and humidity, and the wet collection is located in a room that is also used as workplace for curators, technicians or visitors if it is required. The collection has an important representation of the Argentine fauna and neighboring countries, although in some taxa there is fauna from other parts of the world. Currently, we are working on the digitization of the specimens to make this information available on a portal linked to the Entomology Division website.

9:05am–9:15am

**Museo de Zoología LOUNAZ, an
Emergent Museum in Southern
Ecuador**

Aura Paucar-Cabrera

*Museo de Zoología LOUNAZ, Universidad
Nacional de Loja, Loja, Ecuador;
aurapaucar@gmail.com*

The Museo de Zoología LOUNAZ, at the Universidad Nacional de Loja, was established in southern Ecuador in 2007 to contribute to the study and conservation of the southern Ecuadorian fauna through the management of zoological collections, scientific research, environmental education, and community outreach. An important mission in this region that is being degraded at an accelerated pace.

Although the museum was created in 2007, its invertebrate collection started at the end of 2019, with a brief pause due to the pandemic. However, due to ecological studies of the associated students and museum projects on insect conservation, taxonomy and ecosystem services, the collection has grown to have nearly 17,000 insects. The collection also holds 66 type specimens of Coleoptera (Scarabaeidae), Hymenoptera and Mollusca. Part of the collections data has been placed in the GBIF-Ecuador Node, with the projection to make all the museum database available in the following years.

Furthermore, this month, the LOUNAZ Museum received the donation of a collection held in the Agronomy Department at the same university that will be curated, databased and included in the LOUNAZ museum collection. Additionally, the museum also holds a collection of isolated bacteria associated with dung beetles, this collection is projected to expand to other taxa with the mission to find ecological relationships and ecosystem services to restore degraded habitats.

The museum has filled a gap cataloguing and understanding biodiversity in the southern region of Ecuador and providing a scenario where students acquire new understanding of the natural world and appreciation of the importance of conservation and the sustainable management of biodiversity to bring solutions to the region.

9:15am–9:25am

**Lepidoptera y Euglossini de la
colección del Museo de Historia
Natural de la Universidad del Cauca**

**María Cristina Gallego Ropero¹, José
Fernando Ordoñez Paja², Alfonso
Villalobos Moreno³, Favizia Freitas de
Oliveira⁴**

¹Profesora Titular Departamento de Biología, PhD, Curadora Colección Entomología, Museo de Historia Natural, Universidad del Cauca; ²Ingeniero Ambiental y Fotógrafo; ³Entomólogo, PhD, Director Grupo GENA; ⁴Profesora, PhD, Curadora de Invertebrados Terrestres - Museu de História Natural / Zoologia - MHNBA/MZUFBA, Instituto de Biologia, Universidade Federal da Bahia. mgallego@unicauca.edu.co

El Museo de Historia Natural de la Universidad de Cauca, fue fundado en 1936, y solo hasta 1987 se inició la colección entomológica, bajo la supervisión del profesor Álvaro José Negret (q.e.p.d.). Durante muchos años no contó con curadores, pero durante la última década, mediante proyectos de investigación, se ha invertido en implementos (cajas entomológicas, cajas guarda, alfileres entomológicos, extensores), equipos de estereoscopia y un compactador para cajas entomológicas, entre otros; así mismo, se ha avanzado en los procesos de curaduría, vitales para preservar el material biológico. La colección se alimenta del material biológico recolectado en las salidas de campo en el marco de asignaturas y electivas profesionales, del desarrollo de proyectos de investigación de trabajos de pregrado y maestría, y de financiación externa. La Colección Entomológica registra 18 órdenes y reúne 20.527 especímenes, de los cuales, 3.248 ejemplares pertenecen al orden Lepidoptera y 1.542 a la tribu Euglossini. Se puede afirmar que la Colección de Entomología del MHN- UNICAUCA juega un importante papel como fuente de información y conservación de la diversidad biológica del suroccidente colombiano, incluyendo los departamentos de Cauca, Nariño, Putumayo, Caquetá, Huila, entre otros, haciendo de este un archivo histórico vital para seguir explorando y conservando.

9:25am–9:35am

**Catalogue of type material
deposited in the Coleção
Entomológica de Mato Grosso
Eurides Furtado - CEMT (Cuiabá,
Mato Grosso, Brazil)**

**Jorge A. Arias-Buriticá¹, Diego F. Rodrigues², Emanuel R. R. Gama²,
Fernando Z. Vaz-de-Mello³**

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The Coleção Entomológica de Mato Grosso Eurides Furtado – CEMT (Cuiabá, Mato Grosso, Brazil) was officially created in 1987. Since 2008, the CEMT has been undergoing a process of transformation towards a reference entomological collection (mainly of Coleoptera), which is now recognized nationally and internationally, actually the principal research and curator is Prof. Dr. Fernando Z. Vaz-de-Mello. Today, the collection includes more than 700 thousand prepared and identified specimens, but the CEMT is a constantly growing collection with more than 6.5 million specimens still waiting to be mounted and incorporated. Due to high productivity in taxonomy and strategic alliances, a lot of material is deposited in this collection, including type material from many recent taxonomic revisions. Therefore, the aim of this work was to create a catalog of the type material deposited at the CEMT. For this purpose, a bibliographic search was made of all taxonomic publications describing new species with material deposited at the CEMT. Subsequently, the specimens cited in the publications were searched, as well as type material from the FZVM collection (included in CEMT since 2008) and material not cited in the publications, deposited by donations to the curator. Each specimen was labeled with collection and QR codes, and the associated data were digitized into spreadsheets using the standard data separation in Darwin Core. Description of the labels and the transcription *ipsis litteris* of the data were carried out. The holotypes

were kept in individual “acrylic boxes” (when their size allowed) and separated from the other specimens in the collection. Actually, with preliminary results, the collection contains 6102 type specimens with 185 holotypes, 2 lectotypes, 3 neotypes and 5912 paratypes of four orders, 24 families, 221 genera and 624 species; Coleoptera representing 99.9% of the type material and Hymenoptera, Diptera and Neuroptera together representing to 0.1% of the type specimens. However, the inclusion of the Lepidoptera type material is lacking, since the personal collection of the researcher Eurides Furtado has recently been added to the collection.

9:35am–9:45am

**Colecciones de artrópodos del
Instituto Argentino de
Investigaciones de Zonas Áridas
(IADIZA)**

Diego Miras

*Instituto Argentino de Investigaciones de
Zonas Áridas, Mendoza, Argentina;
dmiras@mendoza-conicet.gob.ar*

9:45am–9:55am

**EAPZ, the Insect Collection at
Zamorano, Honduras**

Jesús Orozco

*Escuela Agrícola Panamericana Zamorano,
Zamorano, Honduras;
Cucarron1@gmail.com*

9:55am–10:05am

**University of Kentucky Insect
Collection**

Julian Dupuis

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jrowedupuis@gmail.com*

The University of Kentucky Insect Collection (UKIC) is the largest entomological collection in Kentucky and a major collection in the east-central USA. Dating back to 1889, the collection houses somewhere between 750 thousand and one million pinned specimens in ~1,900 drawers. Major strengths include leafhoppers (>250 drawers) and Lepidoptera (730 drawers). The collection is Kentucky centric, but has specimens from all over the US, and more exotic locations in Central and South America (Costa Rica, Panama, Venezuela), Asia (Japan, Philippines, Thailand), and the Middle East (Saudi Arabia). Here, I will discuss recent curation, digitization, and databasing efforts in the UKIC.



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10:05am–10:15am

Break

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MEMBER SYMPOSIUM

The Power of People

Organizer/Moderator: **Jennifer Girón**, *Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.*

10:15am–10:20am

Introduction

10:20am–10:35am

**The Museum Research
Apprenticeship Program at the
University of Alaska Museum**

Derek Sikes¹, Adam Haberski¹, Ashley Smith¹, & Voss Whitmore¹

¹*University of Alaska Museum, University of Alaska, Fairbanks, AK, U.S.A.;
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The University of Alaska Museum (UAM) offers 1 and 2-credit courses called “Museum Research Apprenticeships” (MRAP) in which a student is mentored by a curator to complete a project during the semester. In spring 2020, before the pandemic, two University of Alaska Fairbanks undergraduates, Ashley Smith and Voss Whitmore, conducted MRAPs in the UAM Entomology Department. Ashley assessed the digitization completeness of the pinned collection and Voss tried to determine the accuracy of our “guesstimation” protocol for vial contents in the wet collection. Although the semester ended early due to the pandemic, both projects resulted in editor-reviewed publications. The pinned collection was determined to be 90% digitized. All but four orders were found to be 100% digitized. The four orders that were not yet 100% digitized were Coleoptera (99%), Hymenoptera (90%), Diptera (83%), and Hemiptera (74%). In the wet collection, 27 vials were randomly chosen to have their contents exactly counted. We found that 70% of

the original counts were too low and 30% were too high. The sum of the original counts of the 1,099 vials that had estimated counts was 272,033 specimens. Assuming our subsample of 27 was representative, we estimate these 1,099 vials probably hold closer to 421,749 specimens. This indicates our prior “guesstimation” protocol systematically under-count vial contents.

10:35am–10:50am

Undergraduate Entomologist: Learning on the Fly

Emma Eakins¹ & Luc LeBlanc¹

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Entomology, Plant Pathology and
Nematology (EPPN), Moscow, ID, U.S.A.;
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Entomology is a field that provides a plethora of opportunities for students to gain experience and growth outside of the classroom and this extends to undergraduates like myself and many of my peers. One place that has provided me with the chance to learn curatorial and taxonomic skills is the William F. Barr Entomology Museum at the University of Idaho (UI) where I have pinned, labeled, and digitized specimens, along with aiding in the recovery of our ethanol collection. In addition to these valuable skills, working in this field has also allowed me to start my publication portfolio by photographing 98 species of Buprestidae that are found in the state of Idaho and arranging them into an extension poster. Outreach has been a large part of my entomological experience in the museum between my poster publication, giving tours, and collaborating with the Aldrich Entomology Student Club at UI for community events like our annual Haunted Museum Halloween event. My time as an undergraduate in the EPPN Department at the University of Idaho, the Barr Museum, and the field of entomology as a whole has been extremely rewarding thus far thanks to many wonderful opportunities and inspiring individuals.

10:50am–11:05am

**A Hidden Gem in the Sparkling City
by the Bay: The Corpus Christi
Museum of Science and History
Insect Collection**

Ashley Schmitz

*The Corpus Christi Museum of Science and
History, Corpus Christi, TX, U.S.A.
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The Corpus Christi Museum of Science and History is historically known for housing an insect collection. Most information about the collection has been retained at the museum. In February of 2020, I met with the then curator Jen McCullough to discuss the work that could be done to get the collection up to contemporary museum standards. Phase 1, would entail sorting the collection from the former storage boxes into new Cornell drawers, using current Taxonomy. The additional phases would be focused on remounts; identifications, updates to the database, and relabeling the specimens from the existing “Green” museum labels. Since 2020, this work has led to being asked to speak to children during camps and to area schools throughout the year.

This, and other outreach activities have made it possible to find future entomologists. Having such access to the Museum makes it possible to develop the interests of these children and dive into their passion as future scientists, with an emphasis on entomology. Several such individuals have been found and will be introduced. We are currently in the planning stages of other outreach programs which will include collecting expeditions; volunteer opportunities for area high schoolers to work with the natural history collection; and working with area science teachers to pinpoint future scientists among their students.

11:05am–11:20am

**CURE-ation Education: Course-based
Undergraduate Research
Experiences to Enhance Museum
Collections Training**

**Jason L. Williams¹, Andrea Lucky¹,
Anthony Auletta¹, Aswaj Punmath¹, &
John S. LaPolla²**

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Taxonomy is facing challenges that threaten its sustainability as a scientific discipline, including a lack of adequate funding and limited training opportunities. Numerous solutions have been proposed to reinvigorate taxonomy, such as increased funding, support for taxonomic positions, and the integration of new technologies to describe biodiversity. However, these proposals often overlook a critical aspect: the need to attract students and enhance the training process. The conventional apprenticeship model for taxonomic training, often characterized as a "cottage industry," is no longer viable. It relies on students already possessing an inherent interest in taxonomy and actively seeking mentors. Unfortunately, the declining emphasis on organismic and specimen-focused education at universities has resulted in fewer students developing an early interest in taxonomy. We must proactively engage and recruit the next generation of taxonomy students rather than waiting for them to seek our mentorship. Natural history museums are regarded as the "last bastions" of taxonomy. We propose a solution that leverages the Course-based Undergraduate Research Experiences (CURE) model to immerse students in museum collections and engage them in hands-on, collections-based work. CUREs seamlessly integrate research experiences into undergraduate curricula, offering impactful opportunities for a diverse student body to actively participate in publishable scientific endeavors. This approach brings in students who may not have previously considered taxonomy. We present specific examples illustrating how CUREs can revolutionize taxonomic training by connecting students with museum collections, fostering authentic research experiences, and widening the pool of future taxonomists by exposing a broader range of students to the discipline.

11:20am–11:35am

Undergraduate Journeys in Confocal Laser Scanning Microscopy for Insect Collection Digitization

Aaron Hoag¹, Tucker White¹, Mark Townley¹, & István Mikó¹

¹*University of New Hampshire, Durham, NH, U.S.A.;*

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With 700,000 specimens the UNH Collection of Insects and Other Arthropods is the largest arthropod depository and research collection in northern New England. Recent support from the National Science Foundation has enabled the collection to develop undergraduate-driven digitization workflows. These developments enhance collection accessibility and incorporate various methods of imaging specimens. This process explored the potential of generating 3D data of slide-mounted specimens using confocal laser scanning microscopy (CLSM), and streamlined a workflow that utilizes the autofluorescence of arthropod cuticles. Undergraduate experiences and perspectives were considered throughout this process. In addition to its time and cost efficiency in digitization, CLSM serves as a source of inspiration and practical support for undergraduate research projects. These projects include the investigation of seal lice setal types, and the improvement of our understanding of morphology and evolution in male bee genitalia. CLSM is an advanced digitization method that should be employed by university entomological collections.

11:35am–11:50am

It Takes a Village to Wake Up a Sleeping Giant

Jennifer C. Girón

Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.;
entiminae@gmail.com

The Invertebrate Zoology Collection (ICZ) is one of four collections within the Natural Science Research Laboratory, which is one of six collecting divisions in the Museum of Texas Tech University (MoTTU). At an estimated 4.5 million specimens (including bulk samples and about 1.5 million dry-pinned insects), the ICZ is the largest collection at the MoTTU. The collection started as part of the former Entomology Department (currently part of the Plant and Soil Science Department) and was transferred to the MoTTU in the late 1990's. At the Museum, the collection grew to incorporate a collection of about 30,000 slide-mounted invertebrates of medical importance, and over 40,000 specimens confiscated by the US Fish and Wildlife service in the early 2000's (mainly represented by beetles, moths, and butterflies). In 2015 the person in charge of the collection retired, leaving the collection closed for about three years. In this presentation I will talk about the process of reactivating the collection and the people (students, volunteers, faculty, administrators) that have contributed to get this (local) giant awake.

11:50am–12:05pm

A Couple's Journey with Bugs and Animacules

Catherine C. Galley¹ & Carl R. Seaquist¹

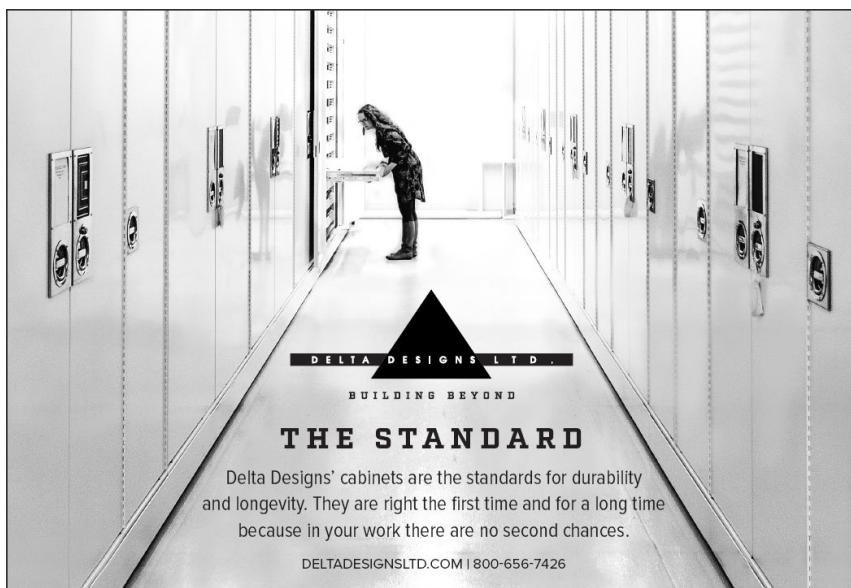
¹Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.; ccgalley@gmail.com

The path leading to an entomological collection can be quite surprising. Initially, we associated invertebrate collections with the antiquated concept of 18th-century curiosity cabinets, envisioning them as obscure repositories of ancient artifacts reserved solely for a select group of devoted specialists. However, the rise of citizen science, particularly platforms such as iNaturalist, is transforming these collections into welcoming havens for a burgeoning community of nature enthusiasts. Thanks to active outreach from some curators and their openness to

engage with enthusiastic amateurs, an invertebrate collection evolved into a fertile ground for nurturing mutually beneficial partnerships.

12:05pm–12:10pm

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Catalogue of Life



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