



# Entomological Collections Network

Annual Meeting Program  
November 12-13, 2022  
Vancouver, BC Canada  
#ECN2022

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More of Paul's art can be found at

<https://www.instagram.com/paulwindsornwcoast/>

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

# Entomological Collections Network

## Annual Meeting

Saturday November 12<sup>th</sup> and Sunday November 13<sup>th</sup>, 2022

Fairmont Hotel

Vancouver, Canada

#ECN2022 <https://ecnweb.net>

### Saturday, November 12<sup>th</sup>

Fairmont Hotel

7:00am–8:10am      **Registration**

8:10am–8:15am      **Welcome and announcements**

**Ainsley Seago**

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

## CONTRIBUTED TALKS SESSION 1

Moderator: Oliver Keller, *Florida Department of Agriculture and  
Consumer Services, Florida State Collection of Arthropods, Gainesville, FL,  
U.S.A.*

8:15am–8:30am      **Terrestrial Parasite Tracker (TPT):  
Beyond the TCN project sustainability**

**Erika Tucker<sup>1</sup> & Jennifer Zaspel<sup>1</sup>**

<sup>1</sup>*Milwaukee Public Museum, Milwaukee, WI, U.S.A.;*  
*emtuckerlab@gmail.com*

The Terrestrial Parasite Tracker (TPT) project is a large-scale effort to digitize and make publicly available over 1.2 million parasite specimen records from over 30 collections, collaborating institutions, and partners across the US. The TPT project started in 2019 and is funded by the National Science Foundation (NSF) under a Thematic Collection Network (TCN) grant and two additional Partners to Existing Networks (PEN) grants. As the project starts to near its completion in its 4<sup>th</sup> and final year, our broader goals have shifted to planning for sustainability

by building connections within the entomological and collections communities and creating helpful resources that are free and easy to use, modify, reuse, and cite well into the future.

8:30am–8:45am

## **The Terrestrial Parasite Tracker project and beyond: A decade of digitization at the CUAC**

**Anthony Deczynski<sup>1</sup>, Michael Caterino<sup>1</sup> & Michael L. Ferro<sup>1</sup>**

*<sup>1</sup>Clemson University Arthropod Collection (CUAC),  
Clemson University, SC, U.S.A.;  
adeczyn@g.clemson.edu*

The Terrestrial Parasite Tracker (TPT) project is an NSF funded Advancing Digitization of Biodiversity Collections (ADBC) program focused on documenting museum holdings of ectoparasitic arthropods from museums around the country to make these data accessible to researchers studying the impact of disease vectors on humans, wildlife, and livestock. The Clemson University Arthropod Collection (CUAC) is a participating institution where we have worked to fully database our holdings of biting flies. We are also databasing the global black fly (Simuliidae) collection of Dr. Peter Adler. All of Dr. Adler's pinned black fly specimens have been captured, while databasing of his alcohol collection continues. Other databasing programs in the collection including Notes from Nature, by-catch digitization, and other projects are also discussed.

### Collections and Museum Consulting Services



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furthmuseums@gmail.com  
1-703-869-2077  
furthmuseumconsulting.com

8:45am–9:00am

**Empowering volunteers in a large scale digitization effort; highlights from Field Museum’s Terrestrial Parasite Tracker project**

**Zoe Albion<sup>1</sup> & Colin Bailey<sup>1</sup>**

*<sup>1</sup>Field Museum of Natural History, Chicago, IL, U.S.A.; zalbion@fieldmuseum.org, cbailey@fieldmuseum.org*

The Field Museum sustains a robust community of volunteers, many of whom are eager to engage in museum studies. The Field Museum is currently working to digitize its 189,000 slide-mounted parasitic arthropod collection as part of the Terrestrial Parasite Tracker Project. This large-scale digitization effort requires a great deal of people power, and volunteers have played a crucial role in our progress. By creating a volunteer program that fosters communication, education, and peer engagement, we have established healthy, long-term volunteer-staff relations. In this talk, we highlight volunteer management strategies which we have found useful and discuss how empowering volunteers can drive large-scale digitization progress forward.

9:00am–9:15am

**The regulatory and academic value of the FSCA Coccoidea and Aleyrodidae collection**

**Erin C. Powell**

*Florida Department of Agriculture and Consumer Services, Florida State Collection of Arthropods (FSCA), Gainesville, FL, U.S.A.; Erin.Powell@fdacs.gov*

The Florida State Collection of Arthropods (FSCA) is one of the top insect collections in the southeastern United States with over eight million specimens. This collection is unique in that it both serves as an important academic collection and as a reference collection supporting the mission of the Florida Department of Agriculture and Consumer Services (FDACS) to protect Florida agriculture from adventive pests. Florida receives an average of one to three new invasive species per month, many of which are true bugs in the order Hemiptera. Scale insects, mealybugs, and whiteflies (Coccoidea and Aleyrodidae) are some of the most economically important plant pests in the world. This

group is easily transported on plant material due to their small size and cryptic nature. Their biology makes them particularly resistant to pesticides and some species are parthenogenic, meaning that just a single female can start a new infestation. Scale insects, mealybugs, and whiteflies must be slide-mounted for identification. The FSCA Coccoidea and Aleyrodidae collection is one of the top five in the country, with in excess of 75,000 curated slides representing nearly 1000 species. Only the USNM, CDFA, and UC Davis Coccoidea collections have more slides or species diversity than our collection. In addition, our holdings also include dry material and alcohol specimens for over 300 species. The FSCA Coccoidea and Aleyrodidae are well curated with catalogs of our entire slide, dry, and alcohol collections completed and digitization underway.

9:15am–9:30am

***Trichodesma* (Coleoptera: Ptinidae): A study in the importance of insect collections**

**Kyle Schnepf**

*Florida Department of Agriculture and Consumer Services, Florida State Collection of Arthropods (FSCA), Gainesville, FL, U.S.A.;*  
*Kyle.Schnepf@fdacs.gov*

Collections are an integral part of scientific research but are often neglected and instead support is given to projects that are thought of as high impact. In addition to the accumulation and maintenance of collections for collections sake are a number of critical and beneficial concepts and data. These museums are imperative in understanding and advancing knowledge around species diversity, ecology, natural history, habitat loss, and extinction. In addition, organization and an understanding of each collection are required for full utilization of what collections have to offer. I will discuss the importance of some of these as it pertains to research on *Trichodesma* LeConte (Coleoptera: Ptinidae).



**The Pacific Coast  
Entomological Society**





9:30am–9:45am

**Beyond the label: Compiling a gazetteer of Willis S. Blatchley’s collecting localities**

**Christopher Wirth**

*Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.; christophercwirth@gmail.com*

Willis Stanley Blatchley (1859–1940), self-described “ichtho-bota-orni-geo-concho-entom-etc.-gist,” teacher, and author, was most productive as an entomologist and is best remembered as one today. He collected insects from ~1885 to 1930, primarily in Indiana, where he traveled widely as State Geologist (1894–1910), and Florida, where he had a winter home. Blatchley supported these collecting efforts in part by selling duplicate, often unmounted specimens to other entomologists and museums. However, Blatchley’s specimen labels are frustratingly brief, giving only the county or city, state, his initials, and date. But, many specimens bear a minute label with a handwritten accession number, corresponding to an entry in a pocket notebook. Blatchley carried these notebooks in the field and at times “would write for ten or fifteen minutes or more.” But, the location—or fate—of Blatchley’s “more than 40” notebooks is presently unknown. Here I introduce a project to compile a gazetteer of Blatchley’s collecting localities from his publications, an unpublished manuscript, scientific correspondence, and scrapbooks.

9:45am–10:00am

**7+ years of digitization at the INHS insect collection in one update: New data export and cleaning tools in TaxonWorks**

**Thomas McElrath<sup>1</sup>, Matt Yoder<sup>1</sup> & Dmitry Dmitriev<sup>1</sup>**

*<sup>1</sup>Illinois Natural History Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign, Champaign, IL, U.S.A.; monotomidae@gmail.com*

The INHS Insect Collection recently migrated from several disparate collection management systems into TaxonWorks, a biodiversity informatics management platform built and maintained by the Species File Group and its collaborators. Until recently, collection object



(specimen) data import, export, and cleaning tools were limited, except for record-by-record manipulation, and export to CSV for a limited number of DWC-formatted fields.

Recent development efforts have, however, largely solved these issues. First, we were able to import numerous DWC archives that came along with recent accessions using TaxonWorks' built in importer. Second, various filtering and batch-upload tools (e.g., providing parsed determinations en-masse for similar verbatim data) helped to speed the resolution of existing problems. Third, via the ever-growing number of data-mappings we were able to export the results of 7+ years of digitization tools as a DWC archive with nearly all the necessary & useful fields.

Data validation provided by GBIF & iDigBio provided targets for data cleaning, resulting in numerous fixed records. In total, the number of occurrences hosted on GBIF, iDigBio, and SCAN jumped from 656,321 to 1,078,785. The tools involved are no-code, and require only a hosted endpoint, making this process accessible to any user who wants to disseminate and improve their data. While a solid foundation is in place making TaxonWorks viable collection management software the tool is far from done. Improved exporting, including extension for Biological Associations, new specimen based summaries, a sophisticated containerization interface, an extended loan management dashboard are all in the plans in the months and years to come.



## The Lepidopterists' Society

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10:00am–10:15am **“Fighting the long defeat”. Entomology collections in an age of increasing relevance and decreasing recognition**

**Maxwell Barclay**

*Natural History Museum, London, UK;  
m.barclay@nhm.ac.uk*

In the face of what has been called 'a sixth mass extinction', the need to document and archive the natural world has never been greater. Collection managers and taxonomists build and maintain a 'new fossil record' of the biodiversity of the planet, to make it available for study by present and future generations. This is particularly pressing in entomology, where a large proportion of Earth's vanishing diversity is still unknown.

One would expect such an urgent activity to be supported as a priority, but instead, popular attention and funding streams are frequently diverted elsewhere, and laws are enacted that impede the study of biodiversity without slowing its destruction. I will discuss public and leadership understanding of the study of biodiversity, and its impact on Entomological Collections.

10:15am–10:30am **Break**

10:30am–10:45am **A survey of the current state of fluid-preserved insects in United States entomology collections**

**Genevieve Anderegg<sup>1,2</sup> & Christy McCain<sup>2,3</sup>**

*<sup>1</sup>Denver Museum of Nature & Science, Department of Zoology, Denver, CO, U.S.A.; <sup>2</sup>Museum of Natural History, University of Colorado Boulder, Boulder, CO, U.S.A.; <sup>3</sup>Department of Ecology & Evolutionary Biology, University of Boulder, Boulder, CO, U.S.A.;  
genevieve.anderegg@dmns.org*

Entomology collections contain vast amounts of insects stored in fluid preservatives, representing important biodiversity data from various taxa, life stages, and collection methods that are not as well represented

in pinned specimens. However, the management best practices for fluid-preserved insects are largely unestablished or based on recommendations from other taxonomic groups. In order to make recommendations on how to best store and manage fluid-preserved insect specimens, the current state of these collections must be assessed. Here, I conduct a survey of fluid-preserved specimens in entomology collections in the United States to determine how they are currently stored and managed, and interview experts in entomology collections management and fluid preservation to gather their tacit knowledge to inform best practice recommendations. With the entomology collections survey and experts interviews, I identified three areas where entomology collections can improve their management and storage of fluid preserved specimens, including fluid level and concentration measurement and remediation, storage methods that balance accessibility and specimen preservation, and increased cataloging and preservation state tracking. Determining how these specimens can best be managed and informing the entomology community ensures that these specimens remain adequately preserved for scientific research.



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10:45am–11:00am

**Managing entomological collections for non-traditional users: lessons learned from the National Ecological Observatory Network Biorepository**

**M. Andrew Johnston**

*Biodiversity Knowledge Integration Center, Arizona State University, Tempe, AZ, U.S.A.;*  
*ajohnston@asu.edu*

The National Ecological Observatory Network (NEON) is an NSF-funded program that collects standardized data including biological samples from across 81 sites in the United States. The NEON Biorepository at Arizona State University curates these physical collections for long-term preservation and distribution to research groups, particularly to macrosystems ecologists. The nature of these collections, and the intended primary users, requires tweaks to typical collections management strategies employed by natural history museums. This talk will first briefly cover several topics related to collections management for nontraditional users. First, curation and arrangement strategies will be discussed; second, newly developed tools will be discussed to increase collection object accessibility to people from diverse communities of practice; and third talk about initial reception and uptake of these types of collections.

11:00am–11:15am

**Life in the lava tubes: Digitizing the Hawaiian cave arthropod collection**

**Jeremy Frank**

*Bernice P. Bishop Museum, Honolulu, HI, U.S.A.;*  
*jeremy.frank@bishopmuseum.org*

The Hawaiian Cave Arthropod Collection (HCAC) consists of over 40,000 lots of specimens collected from Hawaiian lava tubes, largely collected through the efforts of Hawaii scientists Francis Howarth and Fred Stone. In addition to its biological significance, the HCAC is also important historically, as it developed from the very first discoveries of cave-adapted life in Hawaii, and ecologically, as Hawaiian lava tubes are fragile environments and contain federally endangered species such as the Kaua’I cave wolf spider and cave amphipod. The Bernice P. Bishop Museum is currently engaging in an effort to preserve this

collection through both physical management and digitization, making this resource available to scientists in Hawaii and beyond. This presentation will discuss both the challenges and opportunities in working to digitize this narrowly-focused, but broadly significant collection with strong ties to imperiled, culturally significant environments and species.

11:15am–11:30am **The Wisconsin Insect Research collection was awarded a LepNet PEN grant—so why should you care?**

**Craig Brabant**

*Wisconsin Insect Research Collection (WIRC),  
University of Wisconsin, Madison, WI, U.S.A.;  
brabant@entomology.wisc.edu*

The Lepidoptera of North America (LepNet) Thematic Collections Network (TCN) included 27 core research collections and had the ambitious goal of digitizing the occurrence data of at least 1.7 million butterfly and moth specimens. In 2020, the Wisconsin Insect Research Collection (WIRC) was awarded a Partnerships in Enhancing Networks (PEN) grant to support the mobilization of occurrence data from an additional 68,000 North American Lepidoptera specimens housed in the WIRC. Although the Milwaukee Public Museum (MPM) and the WIRC are both located in Wisconsin, their significant Lepidoptera holdings largely complement, rather than duplicate, each other. The Neotropical Lepidoptera fauna is well-represented at the MPM, while intensive collecting efforts and significant specimen donations have led to strong regional representation in the WIRC's Lepidoptera holdings. Bogs and fens are unique habitats; the WIRC has benefited from intense and focused collecting efforts from these under-sampled habitats in the upper Midwest. The informal assemblage of micro-Lepidoptera is also often overlooked by collectors who favor larger and more easily curated meso- and macro-Lepidoptera. The WIRC has strong, well-curated representation of the micro-Lepidoptera fauna of the Midwest and beyond. Finally, we would argue support for any natural history collection is a win for all natural history collections and should be acknowledged and celebrated whenever possible.

11:30am–11:45am

## **Digitizing the USNM dragonfly and damselfly collection**

**Torsten Dikow<sup>1</sup>, Jessica Bird<sup>1</sup>, Erin Kolski<sup>1</sup>, Jeanine Nault<sup>2</sup> & Peter Grisafi<sup>3</sup>**

*<sup>1</sup>Department of Entomology, National Museum of Natural History (NMNH, USNM), Smithsonian Institution, Washington, DC, U.S.A.; <sup>2</sup>Digitization Program Office, Smithsonian Institution, Washington, DC, U.S.A.; <sup>3</sup>Picturae, Heerhugowaard, The Netherlands; DikowT@si.edu*

The USNM Odonata collection (dragonflies and damselflies) is with some 109,000+ specimens, representing more than 3,200 species, one of the largest collections of its kind. It is unique within the USNM insect collection in that it is the only diverse insect order that has been fully databased at the specimen level (data captured between 2001–2005) and data are provided to GBIF since then. Because the Odonata specimens are housed in glycine envelopes and flat, just like herbarium sheets, they lend themselves very easily to be photographed on a conveyor belt-type system. To further the digital availability of USNM insect specimens, a collaborative project between the Department of Entomology, the Smithsonian Digitization Program Office (DPO), and Picturae was formed to utilize the existing herbarium conveyor system at the Smithsonian NMNH to photograph each envelope. While a conveyor system was initially planned, the specimens have been photographed in a static workflow by two digitization technicians to reduce the potential movement of the specimen during imaging at 2,100 ppi. A single photo of the front of the envelope is taken including a color chart and each resulting photo was visually inspected before moving on to the next specimen. The imaging team has been able to accomplish an average throughput of 1,700 specimens during an 8-hour workday. The project ran for 17 weeks (May–September 2022) and will be the 1st major institutional Odonata collection entirely digitized — data captured, georeferenced, and photographed.

11:45am–12:00pm

## **Boiler-bees: The bees of the Purdue Entomological Research Collection**

**Hannah Kernen<sup>1</sup> & Christopher Wirth<sup>1</sup>**

*<sup>1</sup>Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.; hkernen@purdue.edu*

The Purdue Entomological Research Collection (PERC) is the largest collection of insects in Indiana and has been a key resource for entomological research in the state for over one hundred years. Among the PERC's 1.3 million specimens are approximately 45,000 bees, including, though not widely recognized, significant historic material. These specimens were collected across Indiana by Purdue students, staff, and faculty, with significant U.S. and worldwide comparative material added by exchanges and donations. The PERC bees have been used in foundational research on Indiana and eastern U.S. bees, and today continue to be used in research at Purdue and beyond. In this presentation we will highlight important periods of growth—primarily the 1950s and 1960s— notable bee workers, and their contributions to the collection. We will also discuss current research involving PERC bees, including ongoing thesis research with bumblebee specimens and our current bee digitization efforts.

12:00pm–12:15pm    **Libraries old and new**

**Michael L. Ferro**

*Clemson University Arthropod Collection (CUAC),  
Clemson University, SC, U.S.A.;  
spongymesophyll@gmail.com*

Physical and electronic versions of literature and books each carry costs and benefits. A series of anecdotes, misadventures, and follies will be presented illustrating unique advantages of paper, challenges when switching mediums, and speculations on the future.

12:15pm–12:30pm    **Ten years of fruitful collaboration with  
Bangladesh entomologists**

**Luc LeBlanc<sup>1</sup> & M. Aftab Hossain<sup>2</sup>**

*<sup>1</sup>University of Idaho, W.F. Barr Entomological  
Museum, Department of Entomology, Plant  
Pathology and Nematology (EPPN), 875 Perimeter  
Drive MS 2329, Moscow, Idaho, U.S.A.; <sup>2</sup>Insect  
biotechnology Division, Institute of Food and  
radiation Biology, Atomic Energy Research  
Establishment, Ganakbari, Savar, Dhaka 1349,  
Bangladesh; leblanc1@uidaho.edu*



The dacine fruit flies (Diptera: Tephritidae: Dacini) is a large group native to the Old World tropics, with 1,015 described species, 83 of which are significant pests of cultivated fruit and cucurbits. A serendipitous request from the co-author to the lead author in 2013 to help identify fruit flies collected in Bangladesh has resulted in an ongoing fruitful international collaboration. Through broad surveys in agricultural environments and Protected Forest Areas, the number of species known in the country has grown from seven to 34, and we published five peer-reviewed papers. The collaboration has since grown to also involve taxonomists from USNM and the Florida State Collection of Arthropods. We focus in our presentation on the challenging, yet greatly enriching experience of field work in a country off the beaten tourist path.







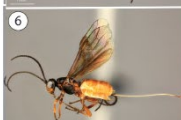

12:30pm–2:00pm **Lunch break**



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*Figure by the Hymenoptera Unit, Systematic Entomology Laboratory, ARS-USDA*

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# MEMBER SYMPOSIUM 1

## Collections of the World

Organizers/Moderators: **Nicole Gunter**, *Cleveland Museum of Natural History, Cleveland, OH, U.S.A.* & **Jennifer Girón**, *Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.*

2:00pm–2:05pm

### **Introduction**

**Nicole Gunter<sup>1</sup> and Jennifer C. Girón<sup>2</sup>**

<sup>1</sup>*Cleveland Museum of Natural History, Cleveland, OH, U.S.A.*; <sup>2</sup>*Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.*

2:05pm–2:20pm

### **Florida State Collection of Arthropods (FSCA)**

**Gareth Powell**

*Florida Department of Agriculture and Consumer Services, Florida State Collection of Arthropods (FSCA), Gainesville, FL, U.S.A.*;  
*Gareth.Powell@fdacs.gov*

2:20pm–2:35pm

### **The entomological collection of the Instituto de Ciencias Naturales**

**Dimitri Forero<sup>1</sup> & Carlos Sarmiento<sup>1</sup>**

<sup>1</sup>*Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia*;  
*iforero@unal.edu.co*

The entomological collection of the Instituto de Ciencias Naturales (ICN), of the Universidad Nacional de Colombia, is one of the oldest and most important in Colombia. Here we present data on its collections and its future. It contains about 2,150 drawers for the pin dry collection and four large compactors for ethanol preserved specimens. It also includes a large number of type specimens. The collection is built

mainly upon teaching collecting efforts from field trips to many localities around Colombia. The historical nature of many of its holdings provide valuable information about biodiversity changes across the country. Through time, we have had curators who have greatly improved the representation of focal groups such as Lepidoptera (Papilionoidea, Saturniidae), Hymenoptera (Formicidae, Braconidae, Vespidae, and other Aculeata), Coleoptera (Scarabaeoidea), Diptera (Agromyzidae, Simuliidae), and Hemiptera (Membracidae, and more recently Heteroptera). Other collections worth mentioning are the wasp nest collection, and the Simuliidae and Vespidae slide collections of karyotypes and fine histology, respectively. The major challenge now is how to better preserve specimens for different data sets such as morphology and DNA, with the limited resources available.

2:35pm–2:50pm

**The entomological collection of the  
Bean Life Sciences Museum, BYU**

**Shawn Clarke<sup>1</sup>**, Teagan Mulford<sup>1</sup>,  
Rebekah Page<sup>1</sup> & Anna Monson<sup>1</sup>

<sup>1</sup>*Bean Life Sciences Museum, Brigham Young  
University, Provo, UT, U.S.A.;*  
*shawn\_clark@byu.edu*

2:50pm–3:05pm

**The Canadian National Collection  
(CNC) of Insects, Arachnids and  
Nematodes**

**Owen Lonsdale<sup>1</sup>**, Pat Bouchard<sup>1</sup>, Hume  
Douglas<sup>1</sup> & Adam Brunke<sup>1</sup>

<sup>1</sup>*Canadian National Collection, Ottawa, ON,  
Canada; owen.lonsdale@agr.gc.ca*

3:05pm–3:20pm

**Museo de Artrópodos de Baja  
California**

**William H. Clark<sup>1</sup>** & Sara Ceccarelli<sup>1</sup>

<sup>1</sup>*Museo de Artrópodos de Baja California;*  
*clarkfam1@mindspring.com*

3:20pm–3:35pm

**Collection of Insects of the University  
of Costa Rica**

**Humberto Lezama<sup>1</sup>, Isaac Arias C.<sup>1</sup> & Fabián Barrantes J.<sup>1</sup>**

*<sup>1</sup>Museo de Insectos, CIPROC, Escuela de Agronomía, Universidad de Costa Rica, San José, Costa Rica; oncideres@gmail.com*

3:35pm–3:45pm

**Break**

3:45pm–4:00pm

**The Lepidoptera and Scarabaeoidea (Coleoptera) collections of the Instituto Alexander von Humboldt**

**Jhon César Neita Moreno<sup>1</sup>, Miguel Ángel Torres Pineda<sup>1</sup> & Edwin D. Torres Pineda<sup>1</sup>**

*<sup>1</sup>Instituto de investigación de recursos biológicos Alexander von Humboldt, Villa de Leyva, Boyacá, Colombia; jneita@humboldt.org.co*

4:00pm–4:15pm

**Museo de Zoología QCAZ Invertebrados de la PUCE, el principal y más grande repositorio de especímenes del Ecuador**

**Fernanda Salazar-Buenaño<sup>1</sup>, Taryn Ghia<sup>1</sup>, Florencio Maza<sup>1</sup> & Rafael Cárdenas<sup>1</sup>**

*Escuela de Ciencias Biológicas, Museo de Zoología QCAZ y Herbario QCA, Pontificia Universidad Católica del Ecuador, Quito, Ecuador; recardenas@puce.edu.ec*

4:15pm–4:30pm

**C.P. Gillette Museum, Colorado State University**

**Marek Borowiec<sup>1</sup>, Crystal Cooke<sup>1</sup> & Chuck Harp<sup>1</sup>**

*C.P. Gillette Museum, Colorado State University, Fort Collins, CO, U.S.A.; marek.borowiec@colostate.edu*



*Majkowski*  
Woodworking Company

## Entomology Unit Trays and Drawers

4:30pm–4:45pm

**La Colección Taxonómica Nacional de Insectos “Luis María Murillo” (CTNI), una colección con énfasis Agrícola en Colombia**

**Erika Valentina Vergara-Navarro<sup>1</sup>,  
Luisa María Montenegro-Silva<sup>1</sup> & Yuly  
Paola Sandoval-Cáceres<sup>1</sup>**

*<sup>1</sup>AGROSAVIA, Corporación Colombiana de Investigación Agropecuaria, Mosquera, Cundinamarca, Colombia;  
evvergara@agrosavia.co*

4:45pm–5:00pm

**CERPE: The birth of a new entomological collection in northeastern Brazil**

**Paschoal Coelho Grossi**

*Coleção Entomológica da Universidade Federal Rural de Pernambuco (CERPE), Recife, Brasil;  
paschoal.grossi@gmail.com*

5:00pm–5:15pm

**An introduction to the Strickland Entomological Museum**

**Victor Shegelski**

*Strickland Entomological Museum, University of Alberta, Edmonton, AB, Canada;  
[shegelsk@ualberta.ca](mailto:shegelsk@ualberta.ca)*

5:15pm–5:30pm

**Break**

5:30pm–6:30pm

**ECN Business Meeting**

6:30pm–8:30pm

**ECN Reception and Poster Session**

**Sunday, November 13<sup>th</sup>**  
**Fairmont Hotel**

7:00am–8:15am      **Registration**

**CONTRIBUTED TALKS SESSION 2**

Moderator: **Ainsley Seago**, *Carnegie Museum of Natural History, Pittsburgh, PA, U.S.A.*

8:15am–8:30am      **Giordani Soika’s legacy: The collection of Eumeninae at the Natural History Museum of Venice**

**Daive Dal Pos<sup>1</sup>, James M. Carpenter<sup>2</sup> & Marco Uliana<sup>3</sup>**

*<sup>1</sup>University of Central Florida, Orlando, FL, U.S.A.; <sup>2</sup>American Museum of Natural History, New York, NY, U.S.A.; <sup>3</sup>Natural History Museum of Venice Giancarlo Ligabue;*  
[daveliga@gmail.com](mailto:daveliga@gmail.com)

With over 21,000 identified specimens and 2,756 type specimens, the Giordani Soika collection covers over 60% of the world's Eumeninae species. However, the poor state of the collection upon its acquisition by the MSNV has hindered the access and study of the materials. After 2 years dedicated to its reorganization and databasing, the condition of the collection has greatly improved, and its renewed accessibility has led to the description of additional 24 new species and facilitated the issue of 20 loans to nine different taxonomists. A study case of the reorganization process is presented together with the main challenges encountered while relocating and databasing its specimens.

8:30am–8:45am      **Taxonomy Australia’ and its mission to document the continent’s biota**

**Andy Austin**

*Department of Ecology and Evolutionary Biology,  
School of Biological Sciences, The University of*



Adelaide, Adelaide, Australia;  
andy.austin@adelaide.edu.au

In the last few years there has been a quiet revolution among the continent's taxonomic scientists. This has involved, amongst other initiatives: 1) the formation of an overarching organisation – *Taxonomy Australia* – to represent the taxonomic community; 2) under the auspices of the Australian Academy of Science, the development of a decadal plan (*the Decadal Plan for Taxonomy and Biosystematics in Australia and New Zealand 2018–2027*) to guide the agenda for the next 10 years; 3) the development of a mission statement that includes an ambitious accelerated program to describe the Australian biota, advocacy for increased funding and training; and 4) a cost-benefit analysis by Deloitte Access Economics that estimates the benefits and costs of describing the Australian biota. It is early days yet, but this strategic work has already helped galvanise the taxonomic community, seen the development of a new open access on-line taxonomic journal, and allowed Taxonomy Australia to advocate at the highest level of government.

8:45am–9:00am

### **How well can we identify soil and leaf litter arthropods using DNA barcoding?**

**Ernesto Recuero<sup>1</sup>, Frank E. Etzler<sup>2</sup> & Michael S. Caterino<sup>1</sup>**

<sup>1</sup>*Department of Plant & Environmental Sciences, Clemson University, Clemson, SC, U.S.A.;*

<sup>2</sup>*Natural Resource Section, Montana Department of Agriculture, Helena, MT 59601, U.S.A.;*

*erecuer@clemson.edu*

Soil and leaf litter community studies often result in large collections of specimens representing tens or even hundreds of species corresponding to a wide range of arthropod groups, including different orders of arachnids, myriapods, crustaceans and hexapods. Depositing this material in entomological collections is crucial to allow further study and fully exploit the biological information they represent. Incorporating accurate taxonomic information associated with these specimens would indeed facilitate such study. However, correct identification of most of these samples at low taxonomic levels, particularly to genus and species, is often difficult and requires a

taxonomic expertise that is frequently inaccessible. This may be particularly challenging in groups with large morphological disparity (e. g., larval vs. adult morphotypes, extreme sexual dimorphism) or, on the contrary, extreme morphological conservatism (i.e., cryptic species). Trying to overcome the difficulty in identifying species, new methods have been developed over time, one of the most popular being DNA barcoding. This method is based on the association of DNA sequences or barcodes with a particular species. Here we evaluate the performance of DNA barcoding for species identification of soil and litter arthropods from high elevation areas of the southern Appalachians, using three different barcode databases. To assign a taxonomic identity to our recovered barcodes we used the public databases MIDORI Reference 2 for COI, Eukaryote COI Reference Set v4.0.1, and Barcode of Life Data System (BOLD). Our results indicate a general poor performance using these databases to assign correct taxonomic identities among the studied soil and litter arthropod groups. BOLD offered slightly higher number of identifications than the other two databases. We also observed differences across groups. Identification to species performed best for spiders (44–56% of samples identified to species depending on the used database). Around 20% of Coleoptera and Diptera samples were identified to species using BOLD. Performance was much poorer for mites (1–3%). Hymenoptera and Collembola could not be correctly identified to species. Performance at genus and family level was also poor. Barcode databases for soil and litter arthropods are still very incomplete and much work is still to be done before species identification via barcoding is efficient for these animals.

9:00am–9:15am

## **Wall of Insects: Lessons learned in muraling**

**Jacki Whisenant**

*University of Wisconsin, Madison, WI, U.S.A.;*  
*jacki.whisenant@gmail.com*

A mural showcasing ~300 insect families serves as educational outreach, a teaching tool, a way to draw attention to a museum collection, and provide fundraising materials. I discuss the design and painting process, pitfalls, lessons learned, and recommendations for any museum considering any similar large-scale display in the future.

9:15am–9:30am

## **A biotic survey of Sulawesi, Indonesia**

## **Peter Oboyski**

*Essig Museum, University of California, Berkeley,  
Berkeley, CA. U.S.A.; essig.museum@gmail.com*

Indonesia is a biodiversity hotspot with complex geomorphology. The island of Sulawesi in particular is composed of several paleo-islands that have merged around 5 million years ago. Our five-year survey project examines biodiversity trends over elevation gradients across several mountains that originated as islands and includes reptiles, amphibians, birds, small mammals, spiders, and moths. Although much of the fieldwork is completed, the processing and identification of Lepidoptera specimens is far from complete. Here I present an introduction to the project.

9:30am–9:45am

**Moving the Universal Chalcidoidea Database to a new home at Taxonworks: The BBQ Method**  
**Robert L. Kresslein<sup>1</sup>, Jim Woolley<sup>2</sup>, John Heraty<sup>1</sup>, Deborah Paul<sup>3</sup> & Matt Yoder<sup>3</sup>**

<sup>1</sup>*Department of Entomology, University of California, Riverside, Riverside, CA, U.S.A.;*

<sup>2</sup>*Texas A&M University, Department of Entomology, College Station, TX, U.S.A.;*

<sup>3</sup>*Species File Group, Illinois Natural History Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign, Champaign, IL, U.S.A.; rkres001@ucr.edu*

The Universal Chalcidoidea Database was created by John Noyes at the Natural History Museum, London. It is a comprehensive taxonomic database for the superfamily, based on all of the literature since the 18th century. UCD also contains considerable information on host associations, natural history, and use of chalcidoids in biological control. Although NHM is still serving an excellent public web site for UCD, it has not been updated there since 2019 due to John's retirement. In 2019 we participated in the move of UCD to its new home at Taxonworks, part of Species File Group at the University of Illinois, with support from a grant from the NSF. Following an extended period of road-testing and error checking, it is now completely operational. We have continued to incorporate the recent literature on Chalcidoidea, and it is completely up to date. However, we were faced with a three year backlog of papers to curate. In order to tackle the backlog, we have

organized a series of “BBQ’s” in which several specialists around the world have participated in curating papers in group sessions. These have been very successful, and we have reduced the backlog of papers to curate from 656 to 508 within seven two hour sessions.

9:45am–10:00am

### **ECN online: Lessons learned during the pandemic**

**Oliver Keller<sup>1</sup>, Karen Wright<sup>2</sup>, Nicole Gunter<sup>3</sup>, Christy Bills<sup>4</sup>, Isabelle Betancourt<sup>5</sup>, Christopher Grinter<sup>6</sup>, Patrick Gorryng<sup>7</sup> & Ashleigh Whiffin<sup>8</sup>**

*<sup>1</sup>Florida Department of Agriculture and Consumer Services, Florida State Collection of Arthropods (FSCA), Gainesville, FL, U.S.A.;*

*<sup>2</sup>Texas A&M University, Department of Entomology, College Station, TX, U.S.A.;*

*<sup>3</sup>Cleveland Museum of Natural History, Cleveland, OH, U.S.A.; <sup>4</sup>Natural History Museum of Utah, University of Utah, Salt Lake City, UT, U.S.A.;*

*<sup>5</sup>Academy of Natural Sciences of Drexel University, Philadelphia, PA, U.S.A.;*

*<sup>6</sup>The California Academy of Sciences, San Francisco, CA, U.S.A.;*

*<sup>7</sup>Department of Entomology, Michigan State University, Lansing, MI, U.S.A.;*

*<sup>8</sup>National Museums Scotland, Edinburgh, Scotland; [Oliver.Keller@fdacs.gov](mailto:Oliver.Keller@fdacs.gov)*

A global pandemic brought the planet to a standstill in 2020. The new standard for scientific conferences were Zoom meetings and webinars. We as the board of the Entomological Collections Network had to react fast to organize unprecedented online meetings for 2020 and 2021. This presentation discusses the challenges and the opportunities of organizing and running these online meetings.

#### **Species File Group**



10:00am–10:25am

## **Why are there so few Lepidoptera type specimen catalogues?**

**Geoff Martin<sup>1</sup>, A. Zilli<sup>1</sup>, A. Giusti<sup>1</sup>,  
Natalie Dale-Skey<sup>1</sup>, L. Allan<sup>1</sup>, P. Wing<sup>1</sup>,  
P. Kokkini<sup>1</sup>, F. Toloni<sup>1</sup>, D. C. Lees<sup>1</sup>**

<sup>1</sup>*Natural History Museum, London, UK;*  
*g.martin@nhm.ac.uk, n.dale-skey@nhm.ac.uk*

Type specimens are fundamental to taxonomic studies. Improving access to type material should be a priority for Type specimen depositories, yet type catalogues are surprisingly scarce. The Lepidoptera collections at the NHMUK are stated to contain 125,000 primary Types, however very few of these have been catalogued and made available digitally to the research community. In June 2017 we obtained funding for a two month pilot project to digitise (i.e. image both sides of specimen & labels, image genitalia, transcribe label data, verify Type status) all the Lepidoptera Type specimens from Madagascar in the NHMUK collections. Although much was achieved in two months, with some 2600 specimens imaged and a revised workflow, it became clear that far more time was needed to complete the project. Further funding was sought and obtained, and to date 5778 specimens have been imaged. Work on Typification and data verification is ongoing, with the aim of publishing an online catalogue in the near future. This talk will outline the methods used, discuss the many issues that arose and offer an insight into why there are so few Type catalogues.

10:25am–10:40am

**Break**



## MEMBER SYMPOSIUM 2

### Latin American Collections Online

Organizers/Moderators: **Jennifer Girón**, *Invertebrate Zoology Collection, Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, U.S.A.* **Samanta Orellana**, *School of Life Sciences and Biodiversity Knowledge Integration Center, Arizona State University, Tempe, AZ, U.S.A.* & **Bruno de Medeiros**, *Field Museum of Natural History, Chicago, IL, U.S.A.*

10:40am–10:45am      **Introduction**

10:45am–11:00am      **Digitization of the entomological collection of the Instituto de Ciencias Naturales**

**Lauren Raz**<sup>1</sup>, Henry D. Agudelo<sup>1</sup>,  
Dimitri Forero<sup>2</sup>

<sup>1</sup>*Universidad Nacional de Colombia, Bogotá, Colombia;* <sup>2</sup>*Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia;* *iforero@unal.edu.co*

The Instituto de Ciencias Naturales (ICN) of the Universidad Nacional de Colombia is the largest repository of biological collections in Colombia. Specimen digitization is overseen by the ICN's Biodiversity Informatics Program and to date approximately 660,000 specimens of flora and fauna have been databased (ca. 65%). Most of the herbarium has been imaged, but imaging of the zoological collections lags far behind. Since 2005, the ICN has used Specify collections management software and maintained an online collections platform at [www.biovirtual.unal.edu.co](http://www.biovirtual.unal.edu.co). The data are also shared via GBIF and SIB Colombia, the national GBIF node. Records are currently available for 51,716 insect specimens (ca. 50% of the total), including 275 types, of which 142 have associated images. In the coming months we will be working to optimize our imaging protocols.

11:00am–11:15am

**The entomology collection of the  
Instituto Alexander von Humboldt  
houses an important representation of  
the entomofauna of Colombia**

**Jhon César Neita<sup>1</sup>, Miguel Ángel Torres  
Pineda<sup>1</sup>, Edwin D. Torres Pineda<sup>1</sup> &  
Diana Patricia Espitia R.<sup>1</sup>**

*<sup>1</sup>Instituto de investigación de recursos biológicos  
Alexander von Humboldt, Villa de Leyva, Boyacá,  
Colombia; jneita@humboldt.org.co*

The entomology collection is relatively new, this collection was born with the Instituto Alexander von Humboldt, that is, 25 years ago. The collection was initially oriented to the knowledge of three flagship groups at the Instituto Alexander von Humboldt, which were Formicidae (Hymenoptera), Scarabaeinae (Coleoptera), and Lepidoptera (diurnal) used as bioindicators. With the “Diversity of insects of Colombia” project subsidized by NSF, the collection presented a very important development. In this project, it was possible to collect information through capture methods with different techniques in 26 protected country areas. Thus, in the collection we currently have 140,675 duly cataloged specimens, representing 19 orders, 259 families, 2,403 genera, and 6,025 species, of which 1,465 specimens fall within the Holotype, Allotype, and Paratype categories. A total of 14,943 data of localities with georeferencing. We make the data available through the flow of information, starting with the migration format, which is later exported to the Specify database. The information available in Specify constitutes the most important report supplied to the CEIBA Institutional data infrastructure (<http://i2d.humboldt.org.co/ceiba/>), which later provides this data to SIB-Colombia (Biodiversity Information System) (<https://biodiversidad.co/acercade/sib-colombia/>) and is finally available on the GBIF platform (<https://www.gbif.org/es/>). The information on the collection is available through the Institutional infrastructure, which is updated periodically. In this way we contribute an average of 10,000 data on an annual average of SIB-Colombia, being one of the 190 institutions that contribute to the information on the country’s biodiversity.



11:15am–11:30am

**A general Latin American insect collection: From a small academic collection to an essential tool for stakeholders**

**Juliana Cardona-Duque<sup>1,2</sup>, Camilo Flórez-V<sup>1,3</sup>, María C. Vélez-Naranjo<sup>1,2</sup>, Ana Ospina-M.<sup>4</sup>, M. Camila Agudelo-Z<sup>2</sup> & Mileidy Idárraga<sup>2</sup>**

*<sup>1</sup>Grupo Biología CES; <sup>2</sup>Colecciones Biológicas Universidad CES (CBUCES), Medellín, Colombia; <sup>3</sup>Penn State University, State College, PA, U.S.A.; <sup>4</sup>Instituto SINCHI; jcardonad@ces.edu.co*

Colombia has a privileged geographic position that causes great ecosystem diversity and a huge species richness. However, this biodiversity is extremely unknown; each year, many new species are described for science and biological collections in Colombia hold hundreds of them. The University CES Biological Collections (CBUCES in Spanish) began their work in 2014 and have been growing up through the effort of professors and young students, who had built a collection that supports the teaching, research, and outreach activities from bachelor and graduate programs. This collection includes a subcollection of Terrestrial Arthropods which holds nearly 90.000 specimens, which has been focused on ecology interactions between insects and other groups of organisms; therefore, we have a high representation of treehoppers-ant, flower weevils, pomace flies, and other groups related to pollination processes. The CBUCES are also repositories of 17 TYPE specimens including holotypes and paratypes of treehoppers and dragonflies. These specimens will contribute to increasing knowledge of Colombian biodiversity, and their associated data are being published through the GBIF. In addition, during the last few years, we have been working on urban biodiversity projects which had led us to increase our knowledge about butterflies, ants, treehoppers, weevils, and even spiders. Recently, we began to digitize specimens and designed a platform for sharing this information (<http://demo-cbucedata.pythonanywhere.com/>), tasks aligned with our open science policies that will allow information exchange with taxonomists around the world. Our continuous work will lead the CBUCES to position as one of Colombia's best-level university collections.

11:30am–11:45am

**Colección de Insectos del Museo de Historia natural “Luis Gonzalo Andrade (Colombia): Aportes de la entomología colombiana**  
**Insect collection of the museum of natural history “Luis Gonzalo Andrade (Colombia): Contributions to Colombian entomology**

**David Camilo Martínez<sup>1</sup>, Irina Morales<sup>1</sup> & Juan Carvajal-Cogollo<sup>2</sup>**

*<sup>1</sup>Laboratorio de Entomología, Centro de Laboratorios LS214, Universidad Pedagógica y Tecnológica de Colombia, Grupo de Investigación Biodiversidad y Conservación (GIBIOCONS), Tunja, Boyacá, Colombia; <sup>2</sup>Grupo de Investigación Biodiversidad y Conservación (GIBIOCONS), Facultad de Ciencias, Museo de Historia Natural Luis Gonzalo Andrade, Universidad Pedagógica y Tecnológica de Colombia, Tunja, Boyacá, Colombia; [irina.morales@uptc.edu.co](mailto:irina.morales@uptc.edu.co)*

The insect collection of the Museum of Natural History “Luis Gonzalo Andrade” of the Universidad Pedagógica y Tecnológica de Colombia (MHN), was established in 2006. It currently holds about 109146 individuals belonging to 16 orders, 228 families, 562 genera, and 609 species representing the five natural regions recognized by Colombia, including the Caribbean and Pacific Island regions. Among the records, there are 272 type specimens, 25 holotypes of the orders Hemiptera (24 spp.) and Coleoptera (1 sp.), and 241 paratypes of the same orders. The largest number of records are for a portion of the Andean region, in the Eastern Cordillera, in the department of Boyacá with 47%, followed by the Orinoquia region in the department of Meta with 35%. The other natural regions and departments of Colombia have a total representation of 18%. The data of the insects in the collection is organized in Darwin Core templates provided by the Colombian Biodiversity Information System (SiB Colombia) to facilitate its digitization, curation, and to provide free access to the information of the insect collection of the MHN. With the publication via the SIB-Colombia, 12 lists with 14829 records have been mobilized to the Global Biodiversity Information Facility (GBIF). Other academic products obtained from the insect

collection include 40 scientific papers published in indexed journals. Finally, as part of the actions to curate, and improve the collection, the complete publication of specimen information in national and international biodiversity repositories (Canadensys, Symbiota and GBIF), the photographic digitalization of type specimens, and the expansion of the national coverage of the deposited specimens are planned.

11:45am–12:00pm **Movilización de datos entomológicos del Caribe colombiano: un esfuerzo conjunto para acercar los registros a los usuarios**  
**Mobilization of entomological data from the Colombian Caribbean: a joint effort to bring records closer to users.**

**Ana Maestre-Guerra<sup>1</sup>**, Evelyn Villalba<sup>1</sup>,  
Mayra Fuentes<sup>1</sup>, Mayelis Barros-Barrios<sup>2</sup>,  
Juliana Cardona<sup>3</sup>, Jennifer Girón<sup>4</sup> & Larry  
Jiménez-Ferbans

<sup>1</sup>*Centro de Colecciones Biológicas, Universidad del Magdalena, Santa Marta, Colombia;* <sup>2</sup>*Maestría en Ciencias Biológicas, Facultad de Ciencias Exactas y Naturales, Universidad de Caldas, Manizales, Colombia;* <sup>3</sup>*Grupo Biología CES; Colecciones Biológicas Universidad CES (CBUCES), Medellín, Colombia;* <sup>4</sup>*Invertebrate Zoology Collection, Natural Science Research Laboratory Museum of Texas Tech University, Lubbock, TX, U.S.A.;* <sup>5</sup>*Centro de Colecciones Biológicas, Universidad del Magdalena, Santa Marta, Colombia; [ljimenezf@unimagdalena.edu.co](mailto:ljimenezf@unimagdalena.edu.co)*

Despite its diversity and high levels of endemism, the Caribbean region of Colombia (CRC) remains as one of the areas with fewer biodiversity records and studies, particularly for insects. This situation is reflected in the low representation of the CRC in GBIF records, where only 14.4% of recorded Colombian insects come from this region, dropping to 9.6% if only preserved specimens are considered. Part of the problem stems from the lack of infrastructure in local collections to process specimen data. With funding from the GBIF's Biodiversity Information for Development program, five Colombian collections concerted efforts

aiming to significantly increase the number of digitized records for insects of the CRC, by gathering data from regional collections (Universidad del Magdalena, Universidad de Sucre, and Universidad del Atlántico) and national collections (Universidad Nacional de Colombia, Universidad Javeriana, and Instituto Alexander von Humboldt). Efforts are directed towards digitizing well-represented groups in entomological collections, and with national experts that can both identify specimens and likely use the recorded data (i.e., true bugs, ants, bees, wasps, weevils, beetles, and butterflies). To date, we have digitized data for 12,731 specimens and processed 140 photographs. This information has been partially published in eight datasets via GBIF. Most specimens are identified to family and genus and are distributed across the entire CRC.

## THE COLEOPTERISTS SOCIETY



AN INTERNATIONAL SOCIETY  
DEVOTED TO THE STUDY OF BEETLES



### Attend our Annual Virtual General Meeting and Symposium

Friday, December 9<sup>th</sup>  
1:00 PM – 5:00 PM pm ET

### In-person Social Hour at Vancouver

Tuesday, November 15<sup>th</sup>  
7:30 PM - 9:00 PM  
Vancouver Convention Centre  
Meeting Room 118

Membership not required to attend these events – everyone welcome!

### Join the Society!



Individual membership: \$60 USD

Visit [www.ColeopSoc.org](http://www.ColeopSoc.org)  
Or at our ESA Exhibit Booth

12:00pm–12:15pm

## **Digitization of the MZSP Hymenoptera Collection: the challenge of 1%**

**Gabriela Camacho**

*Laboratório de Hymenoptera, Museu de Zoologia da Universidade de São Paulo, São Paulo, São Paulo, Brazil; gpcamacho@usp.br*

Natural History collections hold material going back centuries, but the digital revolution means their holdings are now open to everyone, pending the process of digitization. Properly digitizing specimens consumes enormous resources, particularly the one we all have so little of: time. In the case of the NHC in the global south, we also struggle with a lack of funding and specialized personnel. The Hymenoptera collection of the Museu de Zoologia at the Universidade de São Paulo (MZSP) dates from the beginning of the museum's foundation, and today houses around 1,000,000 specimens of ants, wasps, and bees pinned and stored in more than 2,500 entomological drawers, in addition to those preserved in alcohol, for which we have no estimation of their abundance and diversity. Currently, we are working on the digitization of the Hymenoptera collection and are close to the 100,000 mark and, as we move forward, we see the impediments and think of future solutions. First of all, sustainably curating both the physical objects and rapidly emerging digital data sets requires specialized workforce dedicated to this task. Second, it is hard to estimate the size and scale of the digitization effort without estimating the size of the collection per se. Third, digitized data are inconsistently recorded in different databases at different scales, and this data dispersion causes information to be input or archived redundantly or being of less use. Our goal for the Hymenoptera collection at MZSP is to create a database that is broadly accessible, integrated with other resources already available and well curated to avoid errors with interpreting old labels. In this sense, even though we already have almost 10% of the collection digitized, the real challenge is to bring the 1% to the level of quality necessary to return value to physical specimens by creating new layers of annotation, empowering a global community, and inserting the collections from the global south front and center to advance biodiversity discovery and conservation. You can follow our progress on <https://mz.usp.br/pt/laboratorios/hymenoptera/>.

12:15am–12:30pm

**Digitization in the live and rapidly growing entomological collection at Mato Grosso Federal University**

Fernando Vaz-de-Mello

*Coleção Zoológica da Universidade Federal do Mato Grosso, Cuiabá, Brazil;*  
*vazdemello@gmail.com*

The primary function of Biological collections is to systematically document and preserve the material records of biodiversity, with the basic purpose of serving society through progressive education and research initiatives. Brazil does not have an exact record of the number of existing biological collections in its territory; According to the Biodiversity Information System (SiBBr), about 255 fauna collections are registered on this platform, of which 35 are specific to entomology. One of these collections is the Setor de Entomologia da Coleção Zoológica of the Mato Grosso Federal University (CEMT), located 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 the order Coleoptera was started, to become a collection of National and International relevance, with high productivity in taxonomy and significant advances in curatorship and organization techniques following international standards. Today the collection includes more than 300 thousand specimens prepared and identified, including over 140 families of worldwide Coleoptera, 24,000 separated Brazilian species of Coleoptera (identified at least to genus-level), and more than 7,500 species of Scarabaeoidea with species-level identification from around the world (and at least this number of species that are identified to genus-level only). In addition, the collection has more than 2000 type specimens of over 540 species, of which more than 170 are primary types. Throughout this time, the collection has tried different strategies for digitizing the data associated with the deposited individuals. However, due mainly to the lack of personnel resources (the collection is fed by the work of students of all levels, not permanent human resources but the curator) this process has not developed, as it should. In addition, the CEMT is a constantly growing collection with more than 6.5 million specimens still waiting to be mounted and incorporated. Currently the collection does not manage a database that is available to external users, this because the high volume of specimens, bibliography,

photographs, and other tools, which are intended to be offer to the general public, a data manager that incorporates all the elements required for the collection has not been found. In online services, the collection participates in the SiBBr with 25,541 available records and the speciesLink system with 56,423 records. Currently, the specimens that enter the collection as a result of some taxonomic revision or ecological work are being incorporated with collection and QR codes and the associated data is digitized in spreadsheets using the standard data separation used in the Specify software. In this moment, the data of around 150 thousand specimens have been digitized, being for internal use while the best tool to manage this data is found. The next product that will be available is the catalog of type specimens deposited at CEMT.

12:30pm–12:35pm    **ECN Annual Meeting Concluding  
Remarks**

## **CONTRIBUTED POSTERS**

### POSTER 1

#### **The Royal Saskatchewan Museum bee collection: One of the largest and most diverse in Canada**

**Ryan Oram**

*Royal Saskatchewan Museum, Regina, SK, Canada;  
ryan.oram@gov.sk.ca*

Natural history museums are scientific institutions which house preserved specimens from the natural world (e.g., animals, plants, fungi, geological and paleontological). The Royal Saskatchewan Museum's (RSKM) Invertebrate Zoology department houses specimens mainly from Saskatchewan, but also much of Canada, with some international material - the more recent focus of research is bees (Hymenoptera: Anthophila) of Canada. One of the goals for the RSKM is to continue to build the collection of Canadian/North American bee specimens through collaboration with researchers in partnerships from across the country, as well as contributing to science through research by specialists and students working at the museum. The databased material in the Hymenoptera collection at the RSKM has increased in size by over 150 x in the last decade, with well over 850 species of bees and 550 species of wasps. This is due to extensive collecting by RSKM personnel, as well as collaborations with colleagues in British Columbia and the Territories. The collection of specimens at the RSKM are databased, identified by specialists, and carefully curated and housed in the collections at the RSKM. These collections are then used by in-house specialists as well as taxonomists across Canada and North America when doing taxonomic and other forms of research on bees and wasps of North America.

### POSTER 2

#### **Digitizing legacy material from the wild bees of Montana project**

**Chloe Rice<sup>1</sup>, Casey Delphia<sup>1</sup> & Michael A. Ivie<sup>1</sup>**

*<sup>1</sup>Montana State University, Bozeman, MT, U.S.A.;  
chloelouise.rice@montana.edu*



The Montana Entomology Collection houses an estimated 75,000 digitized bee specimens. An additional 6,500 specimens are legacy specimens from historic collections resulting from decades-old fieldwork. Digitizing these specimens will make these records available not only for faunistic work in Montana, but also to fill distributional gaps for North American bee species. To digitize them, we applied a low-cost approach allowing for simultaneous label data capture and photography of specimens.

POSTER 3

**Got parasites? We do! The Illinois Natural History Survey's workflows for the Terrestrial Parasite Tracker TCN using TaxonWorks**

**Lily V. Hart<sup>1</sup>**, Michelle Kohler<sup>1</sup>, Sara Mason<sup>1</sup>, Emily Struckhoff<sup>1,2</sup> & Tommy McElrath<sup>1</sup>

*<sup>1</sup>Illinois Natural History Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign, Champaign, IL, U.S.A.; <sup>2</sup>Penn State University Extension, State College, PA, U.S.A.;  
lvhart2@illinois.edu*

**Background:** The Illinois Natural History Survey (INHS) Insect Collection is one of the oldest and largest entomological collections in North America. In 2019, we began to digitize our parasitic insect and arthropod collections to contribute to the Terrestrial Parasite Tracker Thematic Collections Network (TPT). At that time, we were transitioning to a new biodiversity informatics management system called TaxonWorks<sup>TM</sup>, created and developed by the taxonomists and engineers of the Species File Group, an endowed group also supported by the National Science Foundation.

**Purpose:** This poster aims to showcase some of the TaxonWorks workflows used by the INHS Insect Collection to digitize parasite specimens as our contribution to the Terrestrial Parasite Tracker TCN project. The workflows highlighted in the poster include the following tasks: Comprehensive Specimen Digitization, New Image, and Grid Digitizer.

**Conclusion:** Many of these tasks allowed us to remain vigilant in our digitization efforts from home during the Covid-19 pandemic lockdown

due to TaxonWorks' accessibility. We are still using these workflows today to continue digitizing parasite specimens. Currently, the INHS Insect Collection has digitized over 73,000 specimens for the TPT TCN project using the aforementioned workflows in TaxonWorks. The TaxonWorks community is still growing and may be able to assist other collections' projects and needs.

POSTER 4

**A few treasures from the Natural History Museum, London Chalcidoidea collection**

**Natalie Dale-Skey**

*Natural History Museum, London, UK*

*n.dale-skey@nhm.ac.uk*

Specimens in museum collections can be valuable for a variety of reasons other than their scientific importance – such as their link to important historical figures or their cultural value. The poster will showcase some specimens from the Chalcidoidea collection at the London Natural History Museum which, though they might never figure in a taxonomic article, deserve some time in the limelight.



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POSTER 5

**Show and tell: Finding other ways of knowing in digitized specimens**

**Alyssa Caywood<sup>1</sup>, Maisie Buntin<sup>1</sup>, Julia Colby<sup>1</sup>, Christopher Tyrell<sup>1</sup> & Jennifer Zaspel<sup>1</sup>**

*<sup>1</sup>Milwaukee Public Museum, Milwaukee, WI, U.S.A.; caywood@mpm.edu*

In 2021, the Milwaukee Public Museum created a new interactive experience in their Butterflies Alive gallery space, which is designed for children. A curiosity cabinet displays model specimens of Wisconsin insects and their associated plants, including: the rusty patched bumblebee, common cattail, purple prairie clover, butterfly weed, the Luna moth, monarch butterfly, ebony jewel wing damselfly, cabbage white butterfly, red pine, pixie cup lichen, and the scarlet lichen moth. Visitors are invited to match the model specimens' barcode number to a button on the desk below. When a button is pressed, the digitized records associated with the specimen along with label data and more information about the organism is displayed on a screen mounted above the cabinet. This screen also displays a short informational video about why museum specimens are critical for generating new knowledge. Thus far, a significant portion of the exhibit content has been translated into the two most frequent second languages in Wisconsin, Spanish and Hmong, and is available to visitors as laminated booklets on the cabinet's desk. In addition to expanding these translations to Indigenous languages, we also plan to produce additional educational materials that will focus on Indigenous ways of knowing plants and insects in Wisconsin. To accomplish this, we are partnering with members of Wisconsin Indigenous communities to determine which species to feature in the newly translated materials, and suggest other plant or insect species that would enrich the storytelling and provide other perspectives on what it's like to share the Wisconsin landscape with these organisms.

POSTER 6

**From moth trap to museum: Digitising the collection & archive of Edward Pelham-Clinton**

**Ashleigh Whiffin<sup>1</sup> & Vladimir Blagoderov<sup>1</sup>**  
*<sup>1</sup>National Museums Scotland, Edinburgh, Scotland;*  
*a.whiffin@nms.ac.uk*

Edward Charles Pelham-Clinton (1920-1988), a former curator at National Museums Scotland, made substantial contributions to British Entomology during his lifetime. With a focus on Lepidoptera, he devoted 53 years to collecting and recording, compiling one of the most comprehensive collections of British moths (35,600 specimens). Pelham-Clinton's collection is frequently consulted by the moth recording community, and of particular interest is his accompanying archive. He developed a bespoke recording system and kept the most meticulous notes of his findings, not just noting details of those that he collected, but also all his observations too. This wealth of information is contained within 64 field diaries. Due to the significance of his archive, a digitisation project was initiated during the pandemic. Drawers containing his specimens have now been photographed and 17,000 pages from his field diaries have been scanned. With the help of volunteers, transcription is now in progress, and we aim to mobilise more than 160,000 moth observations.

POSTER 7

**The Coleoptera collections of the Natural History Museum, London**

**Maxwell Barclay<sup>1</sup>, Michael Geiser<sup>1</sup>, Dmitry Telnov<sup>1</sup> & Keita Matsumoto<sup>1</sup>**

*<sup>1</sup>Natural History Museum, London, UK;*  
*m.barclay@nhm.ac.uk*

The collections and the present collections management staff of the Coleoptera Section of the Natural History Museum, London are introduced. Projects to make the collections more comprehensive and more accessible to the scientific community are discussed. Entomologist visitors to the collections are enthusiastically welcomed.

POSTER 8

**Micropublications in taxonomy and natural history**

## **Colin Favret**

*University of Montreal, Montreal, QC, Canada;  
colinfavret@aphidnet.org*

Two new journals, bilingual and open access, publish short articles focusing on natural history specimens. These specimens are held in collection and their collection data published in machine-readable format and therefore acquired by the Global Biodiversity Information Facility. Micropublications (two pages maximum) at Specimen are peer-reviewed and publish new geographical, morphological, and biological interaction records, new species, and catalogs, always based on specimens. Non-peer-reviewed articles at Collection publish data from recently preserved specimen sets, e.g., voucher specimens supporting ecological research, specimen donations received by a museum, collection specimens recently re-curated. Authors sought are primarily amateur natural historians, students, researchers with small one-off contributions, and anyone who interacts with natural history specimens.



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POSTER 9

**Primary type management and digitisation**

**David Yuan<sup>1</sup> & Nicole Fisher<sup>1</sup>**

<sup>1</sup>*Australian National Insect Collection*

Three independent initiatives were pulled together to concentrate efforts across the collection, digitisation and molecular genomics teams. The resulting program is capitalising on synergistic efforts to enable the setting of new taxonomic standards for globally relevant specimens.

POSTER 10

**Proposal: Addressing mosquito population dynamics in South Florida with geographic distribution and genomic variation analysis using a community-based mosquito surveillance program**

**Helen Wagner<sup>1</sup>, Jessica Quinones<sup>1</sup>, Michael Ramon<sup>1</sup>, Gabriel Perez<sup>1</sup>, Kristian Lopez<sup>1</sup>, Dr. Andre da Costa da Silva<sup>1</sup>, Dr. Anthony Bellantuono<sup>1</sup>, Dr. Sparkle Malone<sup>1</sup> & Dr. Matthew DeGennaro<sup>1</sup>**

<sup>1</sup>*Florida International University, Miami, FL, U.S.A.*

Populations of *Aedes aegypti*, the main vector for dengue virus transmission and other infectious diseases, are expanding throughout Florida due to the state's tropical and subtropical climate. In Florida, the exposure of insecticides is not evenly distributed through every county, potentially generating genetic diversity in target populations of *Ae. aegypti*. The aims of this project include analysis of *Ae. aegypti* whole genomes in order to determine the level of genetic variance in Florida. Currently, low levels of genetic variability have been observed throughout South Florida. Using the AaegL5 version of the reference genome, *Ae. aegypti* whole genomes could serve as a potent tool to reveal different levels of gene flow and variability. After studying the interactions between the spatial patterns of my data and the

ecological covariates, I can apply some of the landscape ecology methods to look for interactions between landscape features and my genomic data. A preliminary boosted regression tree model shows Vegetation and Land Surface Temperature as the main contributors to the model for mosquito infestation based on egg density indices. A Principal Component Analysis will be the next step to process *Ae. aegypti* genetic diversity. The relationship between genetic discontinuities and environmental features is a key component of understanding gene flow and population genetic structure through landscape genetics, and studying both will allow for the identification of genetic patterns within South Florida. The resulting information can provide vector control management programs with knowledge on the influence of mosquito expansion throughout the state to calculate vector capacity.



# Entomological Collections Network Code of Conduct

ECN seeks to promote a welcoming environment at our conferences that is safe, collaborative, supportive, and productive for all attendees. ECN values the diversity of views and backgrounds reflected among all attendees; as such we are committed to providing a positive environment for all, regardless of gender, sexual orientation, ability, religion, socioeconomic status, career status or ethnicity. All conference attendees are expected to adhere to the Code of Conduct.

Our respectful dialogue policy asks that participants make every effort to maintain constructive discourse with other conference attendees at all times. This includes speakers honoring designated time limits, attendees being aware of balancing speaking and listening time and welcoming newer members into conversation.

## **Expected Behavior**

- Treat everyone with respect and consideration.
- Respect the rules and policies of the conference center and all venues as associated with the conference.
- If you see inappropriate or disrespectful behavior or language, please speak up, either to the offender or conference organizers.

## **Unacceptable Behavior**

- Harassment and intimidation, including any verbal, written, or physical conduct designed to denigrate, threaten, intimidate, or coerce another attendee, conference organizers or staff;
- Discrimination based on gender or gender identity, sexual orientation, age, disability, physical appearance, body size, race, religion, national origin, or culture;
- Physical or verbal abuse of any attendee, speaker, volunteer, exhibitor or service provider.



## Consequences

- Anyone requested to stop unacceptable behavior is expected to comply immediately.
- ECN officers may take any action deemed necessary and appropriate, including immediate removal from the meeting without warning and without refund.
- ECN reserves the right to prohibit attendance at any future meeting. Reporting Unacceptable Behavior
- If you are the subject of unacceptable behavior or have witnessed any such behavior, please immediately notify any ECN officer.
- For matters of immediate physical safety, you may also approach the venue security staff.

### Collections and Museum Consulting Services



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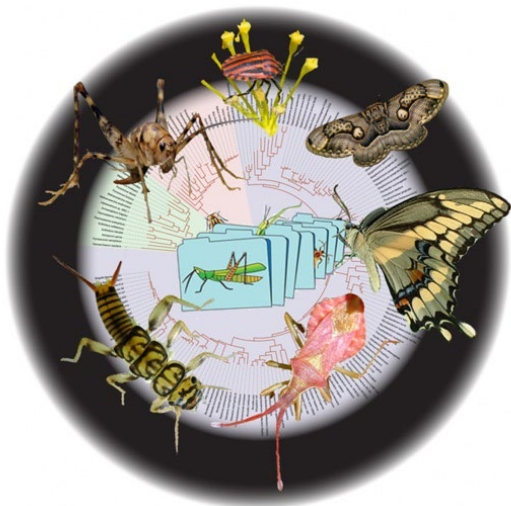
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## Species File Group



The [Species File Group \(SFG\)](#) is an endowment-funded collective of specialists whose broader goal is the advancement of biodiversity informatics. We are located at the University of Illinois, Illinois Natural History Survey. Our group supports the following software/activities:

- [TaxonWorks](#) - a workbench for taxonomists from the TaxonWorks Community
- [Global Names Architecture](#) - finding, parsing, and resolving taxon names from literature. Lead Developer: Dmitry Mozzherin.
- [Catalogue of Life](#) - editorial group, and data assembly hub. Executive Editor Yury Roskov and Database Manager Geoff Ower.
- Taxonomic/Systematic Research supporting taxonomic research on [Plecoptera](#) (DeWalt), [Cicadellidae](#) (Dmitriev), and [micro-Hymenoptera](#) (Yoder).

Our Biodiversity Informatics Community Liaison, Deborah Paul welcomes and invites you to bring your questions, and add your expertise and insights. See our [Events page](#) for ways to contact us and explore opportunities for us to serve your biodiversity research needs. For example:

### SFG Updates

SFG is taking a hiatus from the Small Grant Program and redirecting funds this year to other taxonomy-related priorities. We will be back in the future.

Past winners:

- Thomas McElrath, Matthew Gimmel, and Gareth Powell: World Cucujoidea. *In progress.*
- Marcin Kaminski: World [Sepidiini](https://doi.org/10.48580/d4sl-3qm) <https://doi.org/10.48580/d4sl-3qm>. Finished
- Michele Rossini: World dung beetles of subfamily Bolboceratinae (Coleoptera: Scarabaeoidea: Geotrupidae). *In progress.*
- Vinicius S. Ferreira: Lycidae (Coleoptera: Elateroidea) of the World. *In progress.*

Catch up on what happened at TaxonWorks Together 2022 in our [Propodeum Blog](#).

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