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# Entomological Collections Network

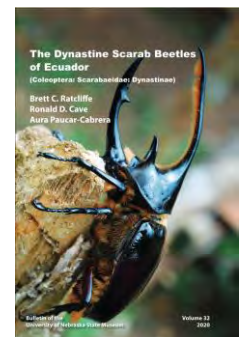
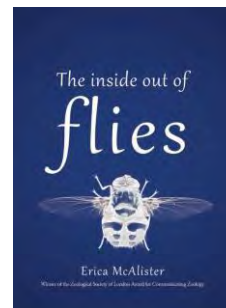
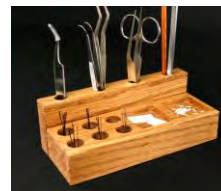
Annual Meeting  
9 – 11, November 2020  
#ECN2020



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



# **MONDAY, NOVEMBER 9th**

(All times in Pacific Standard Time (GMT-8))

8:00 am – 8:10 am

## **Introduction**

**Chris Grinter**

*The California Academy of Sciences, San Francisco, CA, U.S.A.*

## **COLLECTIONS OF THE WORLD SESSION 1**

**Moderator:** *Nicole Gunter, Cleveland Museum of Natural History, Cleveland, OH, U.S.A.*

8:10 am – 8:20 am

## **Department of Entomology, University of Agricultural Sciences**

**H. M. Yeshwanth**

*Department of Entomology, University of Agricultural Sciences, GKVK, Bangalore, India*

8:20 am – 8:30 am

## **The National Museum South Africa**

**Gimo Daniel**

*The National Museum, Bloemfontein, South Africa*

8:30 am – 8:40 am

## **Ditsong National Museum of Natural History**

**Werner P. Strümpher**

*Ditsong National Museum of Natural History, Pretoria, South Africa*

8:40 am – 8:50 am

## **Senckenberg German Entomological Institute**

**Marianna Simões**

*Senckenberg German Entomological Institute, Müncheberg, Germany*

8:50 am – 9:00 am

## **Finnish Museum of Natural History**

Jaakko Mattila<sup>1</sup>, Pasi Sihvonen<sup>1</sup>, and **Sergei Tarasov**<sup>1</sup>

<sup>1</sup>*Finnish Museum of Natural History, Helsinki, Finland*

9:00 am – 9:10 am

## **BREAK**

9:10 am – 9:20 am

## **National Museums Scotland**

**Ashleigh Whiffin**

*National Museums Scotland, Edinburgh, Scotland*

9:20 am – 9:30 am **The National Museum of Ireland**

**Aidan O’Hanlon**

*The National Museum of Ireland, Dublin, Ireland*

9:30 am – 9:40 am **Rio Grande do Norte**

**Ana Dal Molin**

*Rio Grande do Norte, Natal, Brazil*

9:40 am – 9:50 am **Pontifica Universidad Javeriana**

**Giovanny Fagua**

*Pontifica Universidad Javeriana, Bogotá, Colombia*

9:50 am – 10:00 am **Sponsor Videos**

10:00 am – 11:30 am **BREAK**



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# ENTOMOLOGY COLLECTIONS DURING A GLOBAL PANDEMIC

**Moderators: Tommy McElrath**, *Illinois Natural History Survey, Champaign, IL, U.S.A.*  
**and Oliver Keller**, *University of Florida, Gainesville, FL, U.S.A.*

11:30 am – 11:35 pm    **Introduction 1**

**Tommy McElrath<sup>1</sup> and Oliver Keller<sup>2</sup>**

<sup>1</sup>*Illinois Natural History Survey, Champaign, IL, U.S.A.*; <sup>2</sup>*University of Florida, Gainesville, FL, U.S.A.*

11:35 am – 11:48 pm    **HOPE in Covid times**

**Zoë Simmons**

*Oxford University Museum of Natural History, Oxford, United Kingdom*

‘HOPE for the Future’ is a three-year £1.3 million project at Oxford University Museum of Natural History funded by the National Lottery Heritage Fund. Starting in September 2019 with an ambitious collections move and numerous in-person outreach elements, the project has now experienced significant delay due to Covid-19, with team members either attempting to work at home without access to the collections or furloughed. Since returning to on-site work, planned outreach activities have had to be reimagined, collection priorities re-evaluated, and workflows adapted in order to meet the ‘new normal’ whilst remaining true to the core values of the project. Hear about the thinking behind this work, our (hopeful) triumphs, and how a new hope returns.

11:48 am – 12:01 pm    **Murder Hornet Mayhem: Fear of Asian Giant Hornets and the Impact of Arthropod Identification Clinics**

**Michael Skvarla<sup>1</sup> and Matt Bertone<sup>2</sup>**

<sup>1</sup>Department of Entomology, Penn State University, State College, PA, U.S.A. <sup>2</sup>Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC, U.S.A.

On 2 May 2020, the New York Times published a story on "murder hornets" (*Vespa mandarinia*). The impact on entomologists and arthropod identification clinics was immediate and intense as concerned clients, already on edge due to the COVID-19 pandemic, flooded inboxes and social media with photos of European hornets and other wasps. But what exactly was the impact of this viral story and is it different from other sensationalist stories, such as the fear of kissing bugs? We parse the data from multiple arthropod ID clinics to find out.

12:01 pm – 12:14 pm **First to Close, Last to Open: Maintaining 46 Million Objects at the California Academy of Sciences During a Pandemic**

**Chris Grinter**

*The California Academy of Sciences, San Francisco, CA, U.S.A.*

As our doors closed on March 13th, collections staff was left with only a few days to write a pandemic playbook. While the Academy has faced prolonged closures in the past (most notably the 1906 earthquake and fire), we did not anticipate the extent to which this would impact staff access, research, loans, budgets, etc. I will discuss strategies, challenges, and lessons learned, and how we have facilitated working on collections from home.

12:14 pm – 12:27 pm **Maintaining Productivity During a Pandemic**

**Karen W. Wright<sup>1</sup> and John D. Oswald<sup>1</sup>**

*<sup>1</sup>Texas A&M University, Department of Entomology, College Station, TX, U.S.A.*

As curators and collection managers, we are often responsible for managing grants while maintaining the day to day operations of our collections. These grants are wonderful periods of heightened productivity that aid in large reorganization efforts, rehousing parts of the collection that have previously suffered neglect, digitization of huge sections of the collection, and also offer employment opportunities for undergrads. As a large, university-based collection, Texas A&M University Insect Collection welcomed being awarded a NSF CSBR grant in 2018 and a TCN digitization grant in 2019... and then 2020 hit. Our work flows all needed to be modified to accommodate remote work and our 30 undergraduate employees needed retraining, and fast. Here we will present the work accomplished prior to Covid-19, the adjustments we made during the pandemic, changes to productivity, and how we plan to proceed. Regardless of the future course of Covid-19, we acknowledge that many of the work flow innovations and technological workarounds that were developed during this time will lead to long-term, permanent changes to our day-to-day operations and employee management strategies.

12:27 pm – 12:40 pm **BREAK**



12:40 pm – 12:53 pm     **COVID-19 Impacts on the National Museum of Natural History**

**Floyd Shockley**

*Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.*

Given its sheer physical size and complexity, the National Museum of Natural History (NMNH) has faced unprecedented challenges to its operations during the 2020 COVID-19 pandemic and the resulting closure of its facilities. We have fared better than other museums thanks in large measure to our federal support, but we have had to slow or discontinue entirely many of the services that the scientific community has typically relied on us to provide because of a lack of onsite staff and prioritization on other aspects of the museum. This has led to increasing frustration among our colleagues as other museums have forged ahead with reopening. In addition to needing to rapidly change course relative to highly volatile case numbers in the Delmarva region, NMNH has many intrinsic factors that have contributed to this slow and cautious approach to reopening even among the SI facilities including, but not limited to: 1) the large number of people that work in the building, including many non-SI staff; 2) the high number of our staff and volunteers that are considered high-risk based on one or more risk factors as outlined by the CDC; 3) number of staff commuting from states outside of DC, each following their own asynchronous closing and reopening procedures and guidelines; 4) varied impacts on staff with school aged children based on differences among school districts (full onsite, hybrid, or full online learning) and childcare; 5) reduced staffing in critical mission-enabling units of the Smithsonian (security, facilities, etc.) because many fall into these high risk categories as well as redistribution of those staff to support reopened facilities; and 6) the extensive amount of infrastructural changes needed to improve safety before staff are allowed back in and before we reopen to the public. None of these things are particularly unique to NMNH, but their scale at NMNH has impacted the pace at which we have moved towards reopening. This talk will focus on some of these factors in greater detail and will discuss what we have done, what we are doing, and what is planned as we work to reopen the largest and most heavily visited natural history museum in the world.

12:53 pm – 1:06 pm     **Taking Advantage of the Covid-19 Pandemic; A Private Coleopteran Collection in Semi-lockdown North Dakota Finds Time for Field Exploration and Reorganization of Neglected Groups**

**Guy Hanley**

*Northern Plains Entomology*

The Covid-19 Pandemic has affected almost all areas of our lives. Lockdowns and





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## Entomology Unit Trays and Drawers

The Covid-19 Pandemic has affected almost all areas of our lives. Lockdowns and social distancing have slowed or stopped work in museum collections worldwide, but in the case of a private collection, available downtime can be of great benefit. The Guy Hanley Coleopteran collection consists of approximately 14,000 specimens, primarily from North Dakota and the Northern Great Plains. As the local coleopteran fauna is not overly diverse, all coleopteran families collected during various survey projects, including non-focus bycatch, have been preserved for future research. The Covid-19 Pandemic provided welcome/unwelcome time for novel field exploration, curation of backlog specimens, and for the organization of non-focus families which have languished in disarray for many years. The drawer of “looks like a tenebrionid” had to be visited! Although institutional collections were by necessity shuttered during pandemic lockdowns, private collections were smart in utilizing this time to increase their scientific value, adding to the credibility and importance of independent researchers during strange times.

1:06 pm – 1:19 pm      **Bat Bugs and Viruses: Managing Ectoparasite Collections with At-risk Host Species**

**Alexandra H. Sauk<sup>1</sup> and Hugh G. Broders<sup>1</sup>**

*<sup>1</sup>Department of Biology, University of Waterloo, Waterloo, ON, Canada.*

Part of our research program is to collect and identify bat ectoparasites to study the interactions within these host-parasite systems and monitor community changes over time. Our collection includes over 1600 specimens of fleas, mites, and bugs from five Canadian provinces. With the onset of the COVID-19 pandemic, institutional and field site access was restricted, preventing further identification of archived specimens and the collection of new specimens. As the shutdown continued, a new concern was emerging in the North American bat research community: what would happen to our already troubled bat species if they caught COVID-19? With fears of compounding the threat of white-nose syndrome and creating a coronavirus reservoir in North American bats, agencies in the USA and Canada issued guidelines to halt research involving bat handling for the 2020 field season. These recommendations prevented the continuation of bat field research and ectoparasite collection even as national and provincial parks began reopening. As result, we have lost a year of specimen collection and how future collection will be affected by COVID-19 remains to be seen.

1:19 pm – 1:30 pm      **Sponsor Videos**

1:30 pm – 2:30 pm      **BREAK**

2:30 pm – 2:35 pm

## **Introduction 2**

**Tommy McElrath<sup>1</sup> and Oliver Keller<sup>2</sup>**

*<sup>1</sup>Illinois Natural History Survey, Champaign, IL, U.S.A.; <sup>2</sup>University of Florida, Gainesville, FL, U.S.A.*

2:35 pm – 2:48 pm

## **Ensuring the Visibility, Relevance, and Community Connectedness of Natural History Collections During a Global Health Crisis**

**Jennifer M. Zaspel<sup>1,2</sup>, Katja C. Seltsmann<sup>3</sup>, Julie Allen<sup>4</sup>, and Kathryn Sullivan<sup>1,2</sup>**

*<sup>1</sup>Department of Zoology, Milwaukee Public Museum, 800 W Wells Street, Milwaukee, WI 53233, U.S.A. <sup>2</sup>Department of Biological Sciences, Marquette University, 530 N 15th St, Milwaukee, WI 53233, U.S.A. <sup>3</sup>Cheadle Center for Biodiversity and Ecological Restoration, University of California Santa Barbara, Santa Barbara, CA 93117, U.S.A. <sup>4</sup>Department of Biology, University of Nevada Reno, Reno, NV, U.S.A.*

The current global health crisis has created new challenges for natural history collections and collections-based researchers. Access to physical collections, field sites and laboratory spaces has been severely limited and in-person workshops and conferences have been suspended or adapted to suit virtual environments. Despite these difficulties, many new and exciting opportunities have emerged, particularly in the context of collections research. The expanded use of virtual communication tools has allowed us to extend our interactivity and further outreach efforts. Our community has also experienced infrastructure advancements and increases in online data delivery, exploration and use. Collectively, we have raised visibility and demonstrated relevance to broader audiences through publication of high-profile articles, editorials, and interviews. Specifically, the entomological collections community has improved digitization workflows, produced remote transcription expeditions, developed controlled vocabularies for species interactions, and organized working groups for sharing taxonomic information and georeferencing guidelines. Throughout the pandemic, we have shared and highlighted numerous projects in virtual formats, which has increased access and broadened participation across collections and beyond.

2:48 pm – 3:01 pm

## **Accidental Pandemic Preparation - How Updating Digital Infrastructure at the INHS Insect Collection Allowed us to Stay Productive During the COVID-19 Lockdown**

**Tommy McElrath**

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

In November of 2019, the Illinois Natural History Survey Insect Collection completed a years-long process of migrating our specimen data to TaxonWorks, a biodiversity data management platform. As a result, numerous projects focused on managing digital assets were manageable during the COVID-19 pandemic lockdown and subsequent limited return to research. These digital assets included: 1) uploading 28,000+ scanned slide images, 2) transcribing 7,000+ staged specimen and label images generated through the Terrestrial Parasite Tracker project, 3) volunteers transcribing verbatim label data from ~10,000 staged specimen and label images from previous projects, and 4) allowing for management of digital data remotely, leading to 1928 backlogged specimens being mounted, labeled, digitized, and identified to family. Slack and Zoom were used for increased communication efficiency. The inability to communicate in person led to the development of numerous new standard operating procedures, including a COVID-19 safety document. As some restrictions were lifted, the digital infrastructure already in place allowed for a gradual return to limited museum access, with priority being placed on grant-funded projects that generated more digital assets, and other deferred collection maintenance.

3:01 pm – 3:14 pm      **Philippine Lepidoptera: Discoveries During the Pandemic**

**Jade Aster Badon**

*Silliman University & The Philippine Lepidoptera, Inc.*

The pandemic may have halted people from travelling, but this also provided an opportunity for some to make discoveries right outside their properties. People in the Philippines are now engaged in gardening, during which they also started noticing insects that were feeding in some of their plants. The Philippine Lepidoptera Butterflies and Moths, Inc. (PhiLep), which is a centralized platform for Philippine Lepidoptera databases, provided information on species identification and some available knowledge on the biology of the species. Of the many photo submissions in our Facebook pages, there were some documentations and discoveries that were new to science. Here, we present some of these discoveries made in the Philippines during the pandemic, such as the life history notes of the Near-Threatened butterfly, *Euploea swainson*, the biology and life history of the endemic butterfly, *Athyma gutama*, preliminary observation of the life history of *Menelaides hipponous*, and first ever photographs of some rare butterflies in the country.

3:14 pm – 3:27 pm      **Working on Data Mobilization of Butterfly Collections at Museum Zoologicum Bogoriense, Indonesia, Supported by BIFA-GBIF, During the COVID-19 Pandemic**

**Djunijanti Peggie**

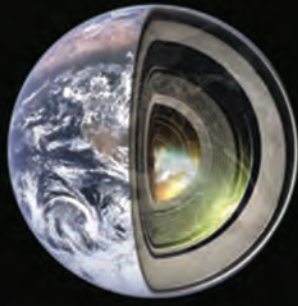
*Entomology Laboratory, Museum Zoologicum Bogoriense, Research Center for Biology, Indonesian Institute of Sciences, Indonesia*

Museum Zoologicum Bogoriense (MZB) has been holding collections of various Indonesian animal taxa since 1894. The butterfly collections at MZB include specimens in about 130 cabinets, estimated to be about 58,000 specimens. Earlier in 2019, I secured the Biodiversity Information Funds for Asia (BIFA) grant, administered by the Global Biodiversity Information Facility (GBIF) to do data mobilization of all swallowtail and a few other butterfly collections at MZB. We apply the QR code system into the data management of MZB butterfly collection. We were doing the final phase of the project when the COVID-19 pandemic forced us to work from home. During the 3-month work limitation, we could not access the specimens, thus most work was disrupted. Starting mid-June 2020 we resumed our work at the collection, only 2-3 days a week. We comply with the standard procedure by maintaining physical distancing, wearing face masks at all times, washing hands often or using hand sanitizers. We use face shield for extra protection because we are in an air-conditioned room. We completed the first year project in July 2020, and had all 8,835 specimens of Papilionidae recorded and mobilized. We also mobilized 948 specimens of highly traded non-Papilionidae butterflies. Despite the limitation during this pandemic, we indeed exceeded the initial target of 7,000 specimens by almost 40 percent. We managed to secure the BIFA grant for the second year. Starting August 2020, we worked on data mobilization of Pieridae, Riodinidae, and butterfly type specimens. Because we can only work 3 days a week, more assistants are hired. We hope to accomplish the project in July 2021.



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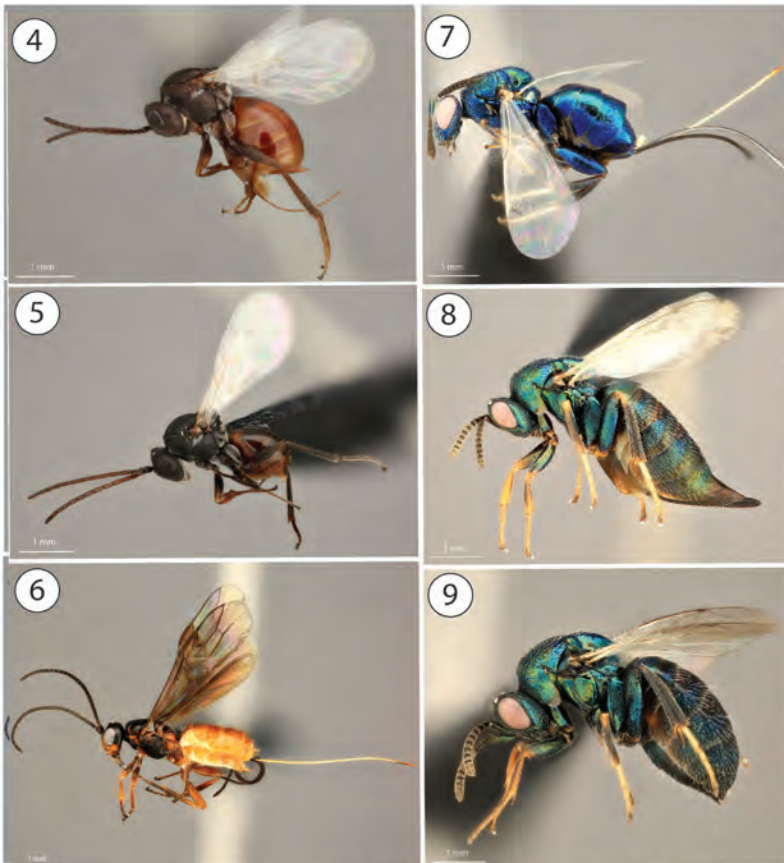
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## **TUESDAY, NOVEMBER 10th**

(All times in Pacific Standard Time (GMT-8))

8:00 am – 8:10 am      Introduction

### **CONTRIBUTED TALKS**

**Moderators:** Olivia Boyd, *Oregon State University, Department of Integrative Biology, Corvallis, OR, U.S.A.* and Cody Bedke, *unaffiliated*

8:10 am – 8:23 am      **Arachnid Collections in Russia and Adjacent Countries**

**Kirill Mikhailov**

*Zoological Museum MGU, Bolshaya Nikitskaya Str., 2 Moscow 125009 Russia*

A review of state and personal arachnid (mostly spiders; Acari excluded) collections of Russia and adjacent countries is provided. Total number of specimens exceeds one million. Several collections are in threatened condition. Lost collections are also listed.

8:23 am – 8:36 am      **The Knowledge About Digital Specimens is in the Published Literature**

**Donat Agosti<sup>1,2</sup>, Marcus Guidoti<sup>3</sup>, Torsten Dikow<sup>4</sup>, and Jeremy A. Miller<sup>5</sup>**

*<sup>1</sup>Plazi, Bern, Switzerland. <sup>2</sup>American Museum of Natural History, New York, U.S.A. <sup>3</sup>Plazi, Porto Alegre, Brazil. <sup>4</sup>National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. <sup>5</sup>Naturalis Biodiversity Center, Leiden, Netherlands*

One of the main pillars of natural history are the libraries of taxonomic publications. These publications disseminate scientific knowledge derived from the observation and analysis of specimens. Specimens cited in taxonomic treatments may be linked to other treatments where they are also cited, or to collections databases where specimens are archived, and groups of specimens cited together in treatments contribute to taxonomic concepts including defining characteristics and distribution. Thus, digitization of specimens and literature followed by providing open access to all resources allows for a seamless network of links moving from a specimen to its inclusion in publications.

Plazi is a Swiss-based international NGO that promotes and provides access to data from taxonomic publications. A total of 375,000 publications including 275,000 scientific illustrations, and 400,000 material citations are now open, findable, accessible, citable and re-usable. Data on 45,000 species, primarily of insects, are present in the

Global Biodiversity Information Facility (GBIF) only because of mobilization from literature sources.

The data are accessible through Plazi (<http://plazi.org>), Biolitrepo (<https://tinyurl.com/y4hbgr32>), Ocellus (<https://tinyurl.com/y2zhprtq>) or GBIF (<https://tinyurl.com/y6jrur2y>). A total of 218 scientific publications included data about materials cited in species treatments, and various publications illustrate the contribution of taxonomic treatments towards building a taxonomic cyber catalogue providing links to all of the referenced data.

The data conversion is based on a daily operation processing PDF-based publications of ongoing publications, and a nibbling at the huge, estimated 500M pages of legacy biodiversity publications including the entire catalogue of life that is partially accessible through the Biodiversity Heritage Library and PDF collections provided by taxonomic specialists. However publications, such as those championed by Pensoft provide all the necessary means to directly import the data and such a workflow is recommended for the future.

8:36 am – 8:49 am      **Deaccessioning in Entomology Collections**

**Rachel L. Hawkins Sipe**

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

Deaccessioning is one of the more controversial topics in the museum field. However, natural history museums have largely been left out of the public discussion about the fate of their holdings, overshadowed by art museums and cultural institutions. I aim to include natural history museums more fully in the deaccessioning discussion by understanding current and recent practices in natural history museums -- particularly in entomological collections. I will discuss how entomology collections are engaging in deaccessioning practices like exchange, culling, transferral to teaching collections, destruction, wholesale transfer, destructive sampling and retention from loans. What drives these collections management decisions? And what does the future look like for these practices?

8:49 am – 9:02 am      **Diagnostic Resources for Pest and Non-Pest Insects**

**Gene Hall**

*University of Arizona Insect Collection, Tucson, AZ, U.S.A.*

Arizona is home to the highest insect diversity in North America. Not surprisingly, outside of natural habitats many species occur in a wide variety of human-developed situations, including agriculture, residences, and industry, while others are of medical and veterinary importance. Accurate identification of pest species is essential for



proper control methods. Additionally, knowing which species are harmless or potentially beneficial helps maintain the balance of species interactions. The University of Arizona Insect Collection (UAIC), housing specimens of research, agricultural, economic, and medical importance, maintains the world's largest collection of Arizona and northern Sonoran Desert insects. In a collaborative effort with the UA's Schlinger Foundation Ancient DNA Lab and Cooperative Extension's Insect Diagnostics Clinic, the UAIC uses morphology-based and DNA Barcoding methods to provide accurate species-level identifications of pest and non-pest insects, including digitizing, georeferencing, producing high-resolution images, and informative bulletins.

9:02 am – 9:15 am      **BREAK**

9:15 am – 9:28 am      **BugFlow: A Community-Driven Repository for Entomology Digitization Resources**

**Caitlin Chapman<sup>1</sup>, Chris C. Grinter<sup>2</sup>, Rachel L. Hawkins Sipe<sup>3</sup>, Pamela Horsley<sup>4</sup>, Erica Krimmel<sup>1</sup>, M. Andrew Johnston<sup>5</sup>, [Crystal A. Maier<sup>3</sup>](#), Tommy C. McElrath<sup>6</sup>, Deborah Paul<sup>1</sup>, Erika Tucker<sup>7</sup>, Jennifer M. Zaspel<sup>8</sup>**

*<sup>1</sup>DigBio, Florida State University, Tallahassee, FL, U.S.A. <sup>2</sup>California Academy of Sciences, San Francisco, CA, U.S.A. <sup>3</sup>Museum of Comparative Zoology, Harvard University, Cambridge, MA, U.S.A. <sup>4</sup>San Diego Museum of Natural History, San Diego, CA, U.S.A. <sup>5</sup>Arizona State University Biocollections, Tempe, AZ, U.S.A. <sup>6</sup>Illinois Natural History Survey, Urbana-Champaign, IL, U.S.A. <sup>7</sup>University of Michigan Museum of Zoology, Ann Arbor, MI, U.S.A. <sup>8</sup>Milwaukee Public Museum, Milwaukee, WI, U.S.A.*

After 10 years of entomological collections digitization, we plan to update the entomology digitization workflow modules and publish them in a versionable resource on GitHub, called BugFlow. In addition to updating these modules, plans are to capture the methods and practices used to do this work and incorporate new versioning and metadata practices for workflows developed using these modules. The repository will also serve as a central clearinghouse for digitization workflow examples. To support wider adoption and ease-of-use, the group will also endeavor to produce versions in multiple languages. The bugflow initiative will improve the sustainability of digitization efforts, and reduce duplication of effort in the development of new workflows. We encourage participation in the initiative from contributors globally, and those who would like to be involved should contact the presenters.

9:28 am – 9:41 am

## When Butterflies Don't Migrate Voluntarily: A 4,000-mile Moving Story

**Floyd W. Shockley<sup>1</sup>, Cailin Meyer<sup>2</sup>, Kelsey Falquero<sup>2</sup>, Kayla A. Kramer<sup>2</sup>, Maru Losada<sup>1</sup>, and Derek S. Sikes<sup>3</sup>**

<sup>1</sup>Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. <sup>2</sup>Collections Program, National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.

<sup>3</sup>University of Alaska Museum, University of Alaska Fairbanks, Fairbanks, AK, U.S.A.

In Fall 2019, the Department of Entomology at the Smithsonian National Museum of Natural History (NMNH) in Washington, D.C. sent a four-person team with the Collections Manager to prepare and ship approximately 45,000 Arctic Lepidoptera (butterflies and moths) stored at the University of Alaska in Fairbanks, Alaska at the Museum of the North. This collection was moved to the University after the death of the owner, Dr. Kenelm Phillip, who left it to NMNH. The team spent two weeks examining and stabilizing pinned specimens in entomology drawers, before palletizing stacks of drawers for sea and land transit to D.C. This presentation explores the practical details of stabilizing, packing, shipping, unpacking, and incorporating a large collection of extremely fragile specimens, with the aim of providing technical advice and lessons learned from the experience.

## Collections and Museum Consulting Services



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9:41 am – 9:54 am

## **Disparities in Butterfly Inventory Completeness Across North America Based on Museum Specimen and Community Observation Data**

**Vaughn Shirey<sup>1</sup>, Michael Belitz<sup>2</sup>, Vijay Barve<sup>2</sup>, and Robert Guralnick<sup>2</sup>**

*<sup>1</sup>Department of Biology, Georgetown University, Washington, DC, U.S.A.*

*<sup>2</sup>Florida Museum of Natural History University of Florida, Gainesville, FL, U.S.A.*

Butterflies are one of the best documented insect groups within the literature, natural history collections, and citizen science observations - providing a powerful resource for understanding macroscale patterns of ecological change. Despite this, opportunistic sampling of butterfly occurrences is not consistent throughout space and time. Here, we tested how complete butterfly inventories based on museum specimens and community observation data are for the entire continent of North America from 1950–2019 by using digitized range map data as a foundation. We examined how complete these inventories were at various spatial resolutions, within biomes, and across novel climate regimes and found an alarming rate of under-sampling across the continent. Finally, we present some context on regions where sampling might be prioritized in an era of increasing global change.

9:54 am – 10:07 am

## **SHIELD -- A Call for Participants**

**John Pickering<sup>1</sup>, Rosemary Gillespie<sup>2</sup>, Albert Meier<sup>3</sup>, Scott Miller<sup>4</sup>, Brian Wiegmann<sup>5</sup>, and John Wenzel<sup>6</sup>**

*<sup>1</sup>Discover Life, Athens, GA, U.S.A. <sup>2</sup>University of California, Berkeley, CA,*

*U.S.A. <sup>3</sup>Western Kentucky University, Bowling Green, KY, U.S.A. <sup>4</sup>Smithsonian*

*Institution, Washington, D.C., U.S.A. <sup>5</sup>North Carolina State University,*

*Raleigh, NC, U.S.A. <sup>6</sup>Carnegie Museum of Natural History, Pittsburgh,*

*PA, U.S.A.*

Recent advances in technology now enable us to overcome identification bottlenecks and understand ecosystem biodiversity, species interactions, and functions in ways that could greatly advance ecological theory, conservation, and land management. We and others are developing a research infrastructure proposal for SHIELD (Species, Health, and Interactions of Ecosystems Linked to Drivers). We plan to study diverse taxa and their trophic interactions within ecosystems at field stations and other sites across North and Central America and on targeted islands. We will use Malaise, light, bowl, pitfall, Berlese, beating, sound recordings, and other methods to record taxa, including arthropods, plants, fungi, microbes, and vertebrates, identifying many species with DNA barcoding. We seek experts who would like to join our proposal to help build DNA sequence libraries for their taxa and to evaluate protocols at

accumulating site assemblages and detailing community interactions. For details see <https://www.discoverlife.org/shield>. If you're interested, please contact one of us.

10:07 am – 10:20 am      **The W.S. Blatchley Collection: History, Status, and Progress Towards a Catalog of Type Specimens**

**Christopher C. Wirth**

*Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.*

Willis Stanley Blatchley (1859–1940) was a naturalist, teacher, geologist, and author, but is best remembered as an entomologist. He was active from 1886 to 1930 and described 467 taxa, predominantly (80%) Coleoptera, most from Florida or Indiana. His works include four monumental manuals to the Coleoptera (1910, 1916), Orthoptera (1920), and Hemiptera (1926) of eastern North America. These were standard references for generations of entomologists and, for some taxa or geographic areas, remain the only species-level guides available. In 1935 Blatchley, retired from entomological pursuits, sold his collection to the Department of Entomology at Purdue University. However, there is little published information on the subsequent history or specifics of the collection, particularly the amount of type material present or the type status of specimens. Here I present a history of the Blatchley collection, its current status in the Purdue Entomological Research Collection, and recent progress in creating a catalog of type specimens.

10:20 am – 11:30 am      **BREAK**



# EQUITY, JUSTICE, AND INCLUSION IN ENTO: MAKING ENTOMOLOGICAL COLLECTIONS RESEARCH MORE ACCESSIBLE

**Moderators:** Antonio Gomez, *Department of Integrative Biology, Oregon State University, Corvallis, U.S.A.*, Nat Young, *Department of Integrative Biology, Oregon State University, Corvallis, U.S.A.*, and Kendra Del Toro, *Department of Integrative Biology, Oregon State University, Corvallis, U.S.A.*

11:30 am – 11:35 am     **Introduction**

**Antonio Gomez<sup>1</sup>, Nat Young<sup>1</sup> and Kendra Del Toro<sup>1</sup>**

*<sup>1</sup>Department of Integrative Biology, Oregon State University, Corvallis, U.S.A.*

11:35 am – 11:42 am     **Fostering Diverse Thought**

**Kendra Del Toro**

*Oregon State University, Corvallis, OR, U.S.A.*

11:42 am – 11:49 am     **Promoting the Digitization of Latin American Entomological Collections Using Symbiota Portals**

**K. Samanta Orellana**

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

11:49 am – 11:56 am     **Entomologists of Color: An Initiative for Diversifying Entomology**

**Stephanie Bondockawa Mafla Mills**

*Rutgers University Newark, Newark, NJ, U.S.A.*

11:56 am – 12:03 pm     **Perspectives from a New Student**

**Kristin Jayd**

*University of Maryland, College Park, MD, U.S.A.*

12:03 pm – 12:10 pm     **White Lies of Global Collaborations and the Impact of Colonization on Bee Biodiversity Knowledge**

**Erin Krichilsky**

*Cornell University, Ithaca, NY, U.S.A.*

12:10 pm – 12:17 pm **Breaking Biodiversity Data Barriers by Empowering Individual Contributors**

**Andrew Johnston**

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

12:17 pm – 12:35 pm **EJI Panel Discussion**

12:35 pm – 12:45 pm **Poster Introduction**

12:45 pm – 1:20 pm **BREAK**

## **COLLECTIONS OF THE WORLD SESSION 2**

**Moderator:** Nicole Gunter, *Cleveland Museum of Natural History, Cleveland, OH. U.S.A.*

1:20 pm – 1:25 pm **Introduction**

**Nicole Gunter**

*Cleveland Museum of Natural History, Cleveland, OH. U.S.A.*

1:25 pm – 1:35 pm **San Marcos Natural History Museum**

**Mabel Alvarado**

*San Marcos Natural History Museum, Lima, Peru*

1:35 pm – 1:45 pm **McGuire Center for Lepidoptera and Biodiversity**

**Laurel Kaminsky**

*McGuire Center for Lepidoptera and Biodiversity, University of Florida, Gainesville, FL, U.S.A.*

1:45 pm – 1:55 pm **Purdue Entomological Research Collection**

**Christopher C. Wirth**

*Department of Entomology, Purdue University, West Lafayette, IN, U.S.A.*

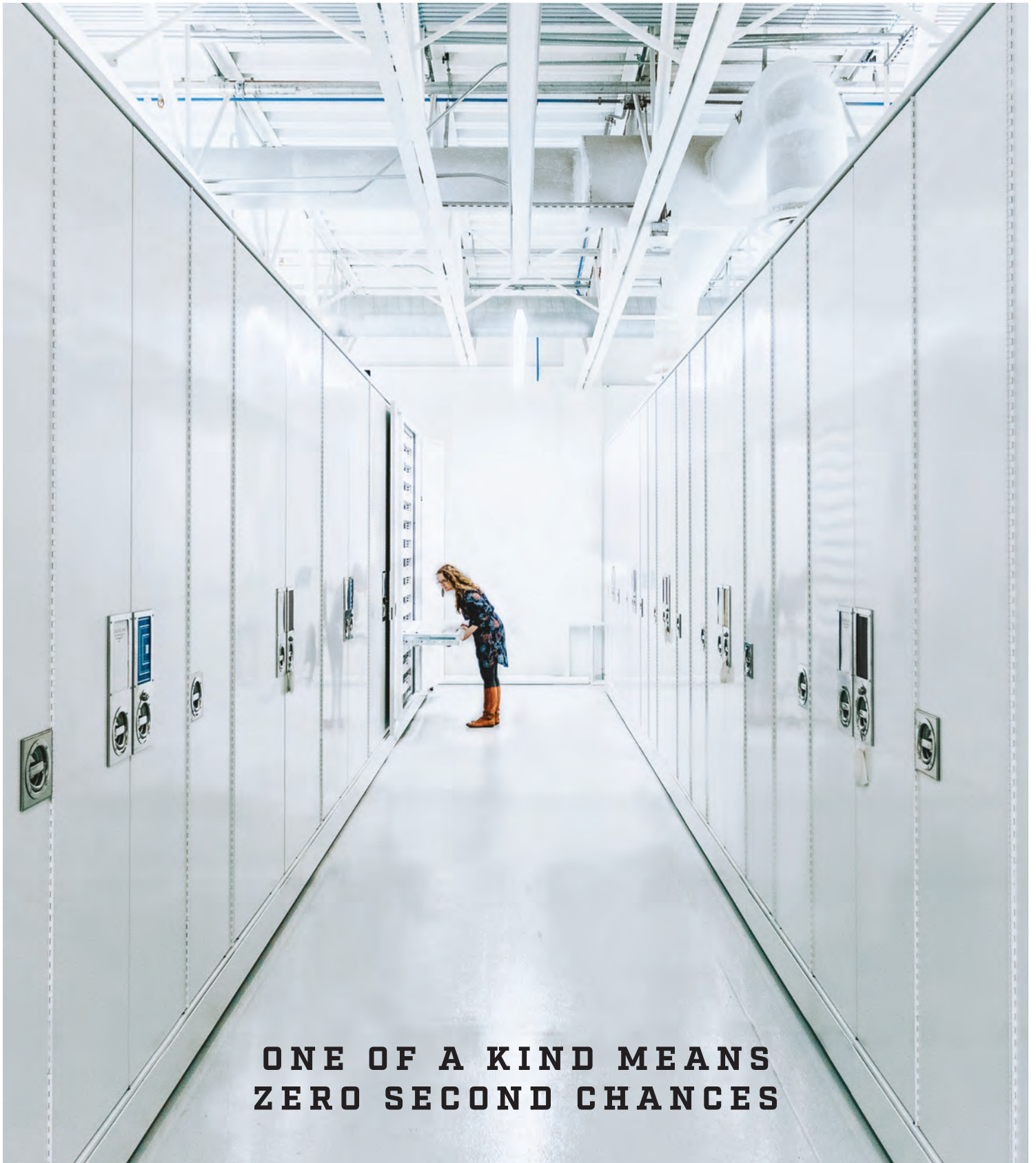


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- 1:55 pm – 2:05 pm **Carnegie Museum of Natural History**  
**Ainsley Seago**  
*Carnegie Museum of Natural History, Pittsburgh, PA, U.S.A.*
- 2:05 pm – 2:15 pm **Universidad del Valle de Guatemala**  
**Cristian Beza-Beza**  
*Universidad del Valle de Guatemala, Guatemala City, Guatemala*
- 2:15 pm – 2:25 pm **BREAK**
- 2:25 pm – 2:35 pm **National Insect Collection of the National Autonomous University of Mexico**  
**Ivonne Garzon**  
*National Insect Collection of the National Autonomous University of Mexico, Mexico City, Mexico*
- 2:35 pm – 2:45 pm **Departamento Agricultura Sociedad y Ambiente**  
**Rémy Vandame**  
*Departamento Agricultura Sociedad y Ambiente, El Colegio de la Frontera Sur, Unidad San Cristóbal de Las Casas, Mexico*
- 2:45 pm – 2:55 pm **William F. Barr Entomological Museum**  
**Luc Leblanc**  
*William F. Barr Entomological Museum, University of Idaho, Moscow, ID, U.S.A*
- 2:55 pm – 3:05 pm **Kenneth S. Norris Center for Natural History**  
**Alex Krohn**  
*Kenneth S. Norris Center for Natural History, Santa Cruz, CA, U.S.A.*
- 3:05 pm – 3:15 pm **Manaaki Whenua, New Zealand Arthropod Collection**  
**Rich Leschen**  
*Manaaki Whenua, New Zealand Arthropod Collection, Auckland, New Zealand*
- 3:15 pm – 3:25 pm **CSIRO, Australian National Insect Collection**  
**Olivia Evangelista**  
*CSIRO, Australian National Insect Collection, Canberra, Australia*



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# WEDNESDAY, NOVEMBER 11th

(All times in Pacific Standard Time (GMT-8))

## TALES FROM THE FIELD: VOL. 5

**Moderators:** Derek Woller, *USDA-APHIS-PPQ-Science & Technology Phoenix Lab, Phoenix, AZ, U.S.A.* and Michael L. Ferro, *Clemson University Arthropod Collection, Clemson, SC, U.S.A.*

9:00 am – 9:05 am      **Introduction**

**Derek Woller<sup>1</sup> and Michael L. Ferro<sup>2</sup>**

<sup>1</sup>*USDA-APHIS-PPQ-Science & Technology Phoenix Lab, Phoenix, AZ, U.S.A.;*

<sup>2</sup>*Clemson University Arthropod Collection, Clemson, SC, U.S.A.*

9:05 am – 9:16 am      **The Real Missionaries**

**Luc Leblanc**

*University of Idaho, William F. Barr Entomological Museum, Moscow, ID, U.S.A.*

9:16 am – 9:23 am      **Looking for Wasps and Finding Trouble: A Field Tale from the Realm of Monster Movies**

**Jeremy Frank**

*Currently unaffiliated*

9:23 am – 9:31 am      **Badass Bots. Fun with Oestrids**

**Erica McAlister**

*Natural History Museum, London, U.K.*

9:31 am – 9:34 am      **On the Search of Floreana Island Invaders**

**Andrea Acurio<sup>1</sup>, Lenyn Betancourt<sup>1</sup>, and Patricia Jaramillo Díaz<sup>2</sup>**

<sup>1</sup>*Terrestrial Invertebrates Collection Charles Darwin Research Station.*

<sup>2</sup>*Galapagos Verde 2050 Project, Herbarium Curator and Natural History Collections Coordinator. Charles Darwin Foundation. Galapagos, Ecuador.*

- 9:34 am – 9:46 am      **Stuck in the Same Place: A Tale of South African Dune Collecting**
- Aaron D. Smith**  
*Purdue University, Department of Entomology, West Lafayette, IL, U.S.A.*
- 9:46 am – 9:51 am      **Secure Mite Collecting in Colombia**
- Hans Klompen**  
*Ohio State University, Columbus, OH, U.S.A.*
- 9:51 am – 10:02 am      **BREAK**
- 10:02 am – 10:14 am      **Searching for Bees in the Land of Oz**
- Kit Prendergast**  
*Curtin University, Bentley, Australia*
- 10:14 am – 10:19 am      **Monkey Business**
- Anthony Cognato<sup>1</sup> and Sarah Smith<sup>1</sup>**  
*<sup>1</sup>Michigan State University, Department of Entomology, East Lansing, MI, U.S.A.*
- 10:19 am – 10:26 am      **Halophilic Ground Beetles (Genus *Dyschirius*) and Collecting PhD Research Specimens in the Times Before COVID-19**
- R. Antonio Gomez**  
*Oregon State University, Corvallis, OR, U.S.A.*
- 10:26am – 10:39 am      **Insect Collecting Trip to Papua-New-Guinea, 2012–2013, Flies and Failures**
- Laibale Friedman**  
*The Steinhardt Museum of Natural History, Tel Aviv University, Tel Aviv, Israel.*
- 10:39 am – 10:44 am      **How Awesome LED Light Traps Almost Cost me my Ph.D.**
- Derek A. Woller**  
*USDA-APHIS-PPQ-Science & Technology Phoenix Lab, Phoenix, AZ, U.S.A.*

10:44 am – 10:54 am **18,000 Miles Forward and 20 Meters Up: Chasing Palm-Associated Weevils in Brazil**

**Bruno de Medeiros**

*Smithsonian Tropical Research Institute, Panama*

10:54 am – 12:15 pm **BREAK**

## **DIGITIZATION**

**Moderator:** Kristin Jayd, *University of Maryland, College Park, MD, U.S.A.*

12:15 pm – 12:20 pm **Introduction**

**Kristin Jayd**

*University of Maryland, College Park, MD, U.S.A.*

12:20 pm – 12:35 pm **iDigBees Network: Towards Complete Digitization of US Bee Collections to Promote Ecological-evolutionary Research in a Keystone Clade**

**Neil S. Cobb<sup>4,15</sup>, MaryLiz Jameson<sup>42</sup>, Susan Weller<sup>33</sup>, Bob Androw<sup>7</sup>, Anne Basham<sup>4</sup>, Bob Blinn<sup>16</sup>, Silas Bossert<sup>41</sup>, Craig Brabant<sup>36</sup>, Michael Branstetter<sup>38</sup>, Deane Bowers<sup>27</sup>, Scott Bundy<sup>14</sup>, Eric Chapman<sup>31</sup>, Paige Chesshire<sup>15</sup>, Shawn Clark<sup>5</sup>, Anthony Cognato<sup>12</sup>, Stephen Cook<sup>30</sup>, Greg Cowper<sup>1</sup>, Bryan Danforth<sup>10</sup>, Michael Denslow<sup>17</sup>, Michael Dillon<sup>37</sup>, Jason Dombroskie<sup>10</sup>, Sam Droege<sup>39</sup>, Evin Dunn<sup>4</sup>, Julian Dupuis<sup>31</sup>, James Fetzner<sup>7</sup>, Nico Franz<sup>3</sup>, Jon Gelhaus<sup>1</sup>, Terry Griswold<sup>38</sup>, Rob Guralnick<sup>17</sup>, Gene Hall<sup>24</sup>, Chuck Harp<sup>9</sup>, Jenny Hazlehurst<sup>6</sup>, JoVonn Hill<sup>13</sup>, Ralph Holzenthal<sup>32</sup>, David Inouye<sup>19</sup>, Rebecca Irwin<sup>16,19</sup>, Christine Johnson<sup>2</sup>, Timothy Judd<sup>21</sup>, Megan King<sup>20</sup>, Boris Kondratieff<sup>9</sup>, Michele Lanan<sup>22</sup>, Luc Leblanc<sup>30</sup>, Sangmi Lee<sup>3</sup>, Lindsie McCabe<sup>38</sup>, Tommy McElrath<sup>11</sup>, Kent McFarland<sup>40</sup>, Joe McHugh<sup>29</sup>, Katrina Menard<sup>28</sup>, Robert Minckley<sup>34</sup>, Anna Monfils<sup>8</sup>, Wendy Moore<sup>24</sup>, Elizabeth Murray<sup>41</sup>, Pete Oboyski<sup>25</sup>, John Oswald<sup>23</sup>, Matthew Paulsen<sup>33</sup>, Dana Price<sup>20</sup>, Brett Ratcliffe<sup>33</sup>, Nelson Rios<sup>43</sup>, Virginia Scott<sup>27</sup>, Robin Thomson<sup>32</sup>, Jason Weintraub<sup>1</sup>, Michael Whiting<sup>5</sup>, Alex Wild<sup>35</sup>, Hollis Woodard<sup>26</sup>, Karen W. Wright<sup>23</sup>, Doug Yanega<sup>26</sup>, and Daniel Young<sup>36</sup>**

<sup>1</sup>Academy of Natural Sciences, <sup>2</sup>American Museum of Natural History,

<sup>3</sup>Arizona State University, <sup>4</sup>Biodiversity Outreach Network, <sup>5</sup>Brigham Young

*University, <sup>6</sup>California State University, East Bay, <sup>7</sup>Carnegie Museum of Natural History, <sup>8</sup>Central Michigan University, <sup>9</sup>Colorado State University, <sup>10</sup>Cornell University, <sup>11</sup>Illinois Natural History Survey, <sup>12</sup>Michigan State University, <sup>13</sup>Mississippi State University, <sup>14</sup>New Mexico State University, <sup>15</sup>Northern Arizona University, <sup>16</sup>North Carolina State University, <sup>17</sup>Notes from Nature, <sup>18</sup>Oregon State University, <sup>19</sup>Rocky Mountain Biological Station, <sup>20</sup>Rutgers University, <sup>21</sup>Southeast Missouri State University, <sup>22</sup>Southwest Research Station, <sup>23</sup>Texas A&M University, <sup>24</sup>University of Arizona, <sup>25</sup>University of California-Berkeley, <sup>26</sup>University of California-Riverside, <sup>27</sup>University of Colorado-Boulder, <sup>28</sup>University of Connecticut, <sup>29</sup>University of Georgia, <sup>30</sup>University of Idaho, <sup>31</sup>University of Kentucky, <sup>32</sup>University of Minnesota, <sup>33</sup>University of Nebraska, <sup>34</sup>University of Rochester, <sup>35</sup>University of Texas-Austin, <sup>36</sup>University of Wisconsin-Madison, <sup>37</sup>University of Wyoming, <sup>38</sup>USDA ARS Bee Lab, <sup>39</sup>USGS Native Bee Inventory and Monitoring Lab, <sup>40</sup>Vermont Center for Ecostudies, <sup>41</sup>Washington State University, <sup>42</sup>Wichita State University, <sup>43</sup>Yale University*

Bees are the most important pollinators in both managed and natural ecosystems, and yet concerns about bee declines are growing. Unfortunately, only a fraction of the 20,000 known bee species has adequate data to assess the status of species and susceptibility of populations to decline. The iDigBees Thematic Collections Network (TCN), comprised of 42 institutions, addresses this need and extends the scope of ADBC insect digitization in three fundamental ways. First, it will achieve near-complete digitization of all bee holdings in the United States, greatly increasing data depth and breadth for use in a wide spectrum of ecological-evolutionary research. Second, iDigBees will incorporate innovations including molecular identification, phenology and phylogeny plugins, R-based workflows, and additional linkages to BOLD and GBIF. LightningBug imaging will be introduced to increase transcription rates by four-fold and train a workforce to use simple robotics, machine learning, and computer vision. Third, in collaboration with a currently funded USDA-RCN project, iDigBees will integrate specimen data with ongoing biodiversity research, education, and outreach programs. We have targeted over 30 biodiversity outreach programs that will be leveraged for k-16 educational efforts. The iDigBees network will accelerate our understanding of mechanisms that mediate species distributions, plant associations, and changes over time. iDigBees provides a foundation to more fully test hypotheses regarding trajectories of species and bee-plant associations and help inform future inventory, monitoring and conservation efforts across the spectrum of human-dominated ecosystems.



12:35 pm – 12:48 pm    **Progress on the Incorporation of the Mackay Ant Collection into the UTEP Biodiversity Collections**

**Vicky (Mingna) Zhuang**

*University of Texas at El Paso, El Paso, TX, U.S.A.*

A recent donation from entomology curator Dr. William P. Mackay to the UTEP Biodiversity Collections (UTEP-BC) expanded insect holdings at the University of Texas at El Paso (UTEP) from several thousand to over 230,000 pinned individual insect specimens. Thanks to a recently obtained Digitization PEN grant, the UTEP-BC has been able to process approximately half of the pinned specimen collection. The collection includes 211 paratype records used in Mackay's long career in entomology. 60 of these records have been imaged thanks to collaborators at Northern Arizona University. We discuss the history of the UTEP insect collections, challenges and progress on migrating the Mackay collection's former database in Access to the Arctos collection management system, as well as outreach activities involving the insect collections. Data from Arctos is harvested by several aggregators to increase the accessibility of the data to researchers and educators.

12:48 pm – 1:01 pm    **Digitization and Biodiversity Data News: An Update From TDWG 2020, ADBC TCNs, and the International Community**

**Katja C. Seltmann<sup>1</sup> and Deborah L. Paul<sup>2</sup>**

*<sup>1</sup>Director, Cheadle Center for Biodiversity and Ecological Restoration, University of California Santa Barbara, Santa Barbara, CA 93117, U.S.A. <sup>2</sup>Biodiversity Informatics Community Liaison, Species File Group, Prairie Research Institute, INHS, Champaign, IL, U.S.A.*

The Biodiversity Information Standards (TDWG) meeting this year includes many talks relevant to the ECN community. TDWG is a scientific and educational organization and community dedicated to developing biodiversity information standards and establishing international collaboration among the creators, managers, and users of biodiversity information. The annual meeting includes symposia such as "Enabling digital specimen and extended specimen concepts in current tools and services," and "Using collections to mitigate and prevent zoonotic disease: data mobilization and integration." Seltmann and Paul will provide a report-back from #TDWG2020 outlining exciting developments and information of interest to the ECN community. Please see a few hints in the Abstracts (<https://biss.pensoft.net/collection/222>) and the conference schedule (<https://www.tdwg.org/conferences/2020/session-list>) for some timely subjects we may feature such as agrobiodiversity data, bio-logging, image re-use, the future of automated image recognition, taxon concepts and linking, collections management software of the future, indigenous rights for genetic resources, people (i.e. agent) data, georeferencing, citizen science, outlier detection, data visualization, sound

data, and data quality. In addition, snippets from the ADBC TCN projects discussed at this year's iDigBio ADBC Summit 2020 will be presented. You can find presentations from the summit, including from marine invertebrates and paleontology at [https://www.idigbio.org/wiki/index.php/ADBC\\_Summit\\_2020](https://www.idigbio.org/wiki/index.php/ADBC_Summit_2020). Along with our endeavor here to keep you posted, we also want to hear from you about your latest news and ideas for mobilizing collections data, and the collections community.

1:01 pm – 1:10 pm      **BREAK**

1:10 pm – 1:24 pm      **Building a Global Index of Arthropod Collections**

**[Neil S. Cobb](#)<sup>1</sup>, Nicole Fisher<sup>2</sup>, Neal Evenhuis<sup>3</sup>, Jesús Napoles<sup>4</sup>, Petra Sierwald<sup>5</sup>, Evin Dunn<sup>6</sup>, Lindsie McCabe<sup>7</sup>, and Paige Chesshire<sup>8</sup>**

<sup>1</sup>Northern Arizona University: Biodiversity Outreach Network. <sup>2</sup>CSIRO Digital Collections. <sup>3</sup>Bishop Museum. <sup>4</sup>Universidad Nacional Autónoma de México.

<sup>5</sup>The Field Museum of Natural History. <sup>6</sup>Biodiversity Outreach Network.

<sup>7</sup>USDA-ARS. <sup>8</sup>Northern Arizona University

We are developing an online database of all arthropod research collections in the world <https://bug-collections.org>. The Arthropod Index is an extension of the directory developed by Arnett and now maintained on <http://hbs.bishopmuseum.org/codens/>. This global index of arthropod collections will increase awareness of arthropod holdings and collection planning efforts. It will promote collaborations among collections in sharing curatorial knowledge, identifying biodiversity gaps, and collaborating on global-scale projects. Initially we targeted >300 collections from North American (Canada, Mexico, and United States) and Australian collections. We are now adding information for an additional 700 collections. Basic information on collections includes location, geographic and taxonomic extent of holdings, personnel, digital resources, education-Outreach programs, and community science projects. The database links to clickable maps allowing easy access to basic collection information. The database will also promote long-term planning (e.g., funding streams, administrative structure, sustainability plans). Collections can self-register and edit their information. All public information will be linked to each collection's website so they can easily edit information without leaving their collection website. The database will have API connections to other databases (e.g., GBIF) to highlight further collection holdings, programs, and ongoing field campaigns. We will employ best practices developed by the "Advancing the Catalogue of the World's Natural History Collections" project. Based on preliminary comparisons we provide justification for the need to triple the number of entomology collections in the world in order to adequately assess the full diversity of arthropods.

1:24 pm – 1:38 pm

## Digitization Efforts in the Division of Invertebrate Zoology at the American Museum of Natural History

**Chistine A. Johnson**

*American Museum of Natural History, Division of Invertebrate Zoology, New York, NY, U.S.A.*

The Division of Invertebrate Zoology Collections at the American Museum of Natural History consists of Invertebrate Zoology marine invertebrates and terrestrial arthropods, as well as Entomology collections, with an estimated 26 million specimens in total. The Entomology collection consists of about 16 million of those specimens, many of which date back to the mid-1800s and early 1900s. The enormity and age of the collection has made it necessary to prioritize digitization efforts along themes with external funding to hire personnel and volunteers to supplement our support staff, who manage loans and visitors and work with curators. IZ efforts to digitize the collection date back to the Planetary Biodiversity Inventory grants and have grown from there. We recently adopted and implemented the EMu database to manage our collections. Thus far, we have either migrated or added a total of 614,130 catalog records representing ~66,000 taxonomic names and ~48,000 localities, of which 33,730 localities have been georeferenced. Our catalog records are available <https://sci-web-001.amnh.org/imulive/iz.html> and we are sharing collection subset data with GBIF and iDigBio. Here I discuss past, present, and future digitization efforts for the various parts of the collections, as well as our efforts to accelerate the specimen digitization process.



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1:38 pm – 1:54 pm

## **Making Every Type Count: Type Digitisation Pipeline at the Australian National Insect Collection**

**Nicole Fisher<sup>1</sup>, Federica Turco<sup>2</sup>, Isabella Robinson<sup>1</sup>, David Yuan<sup>1</sup>, Andreas Zwick<sup>2</sup>, and David Yeates<sup>2</sup>**

*<sup>1</sup>CSIRO Digital Collection, Canberra, Australia, <sup>2</sup>Australian National Insect Collection, CSIRO, Canberra, Australia*

The CSIRO's Australian National Insect Collection (ANIC) is the world's largest repository of Australian insect diversity. The ANIC manages 12 Million specimens belonging to 100,000 species and currently holds more than 22,000 primary type specimens. Management of type specimens in large entomological collections is not always adequate given the importance of these name-bearing specimens in science. Accordingly, often locating, identifying and accessing type specimens held in large collections can prove challenging.

In 2018 we commenced a dedicated program for locating, documenting and digitisation our primary type specimens. The genetic sampling of primary type specimens in ANIC began for the first time one year later. This initiative has several aims; (1) to audit our type specimens, (2) promote their long-term safety and accessibility, (3) make images of them available digitally to a global user-group, and (4) establish the molecular identity of our types, thereby anchoring the species in genetic space.

The digitisation pipeline comprises several workflow steps; locating and assessing type status by comparing specimen information with relevant literature, imaging specimens, digital image processing, databasing specimen label information, taking a genetic sample and curating all data for online availability through the Atlas of Living Australia. The resulting program is capitalising on synergies across the collections, digitisation and molecular domains. This talk will outline the individual processes and workflow pipeline for this mammoth task.

1:54 pm – 2:30 pm

**BREAK**

2:30 pm – 3:30 pm

**ECN Business Meeting**

3:30 pm – 3:45 pm

**ECN Annual Meeting Concluding Remarks**



# CONTRIBUTED POSTERS

Poster 1

## **Using Specimen Databases to Generate a Checklist of El Paso Ants**

**Alonso Corral<sup>1</sup> and Vicky Zhuang<sup>1</sup>**

<sup>1</sup>*University of Texas at El Paso, El Paso, TX, U.S.A.*

El Paso County is a part of the Chihuahuan Desert and is also home to many species of ants. Previous studies identified 291 species of ants in Texas, but may not have included the Mackay ant collection because many records had not been databased. The recent incorporation of the massive Mackay ant collection into the UTEP Biodiversity Collections makes these ant records easily accessible to the public and has several applications, including improving the knowledge of ant distributions in a local area. We generated a checklist of species and an updated map of ants of El Paso County, using Arctos and other databases like the Symbiota Collections of Arthropod Network (SCAN). Records that only contained textual data were georeferenced. Of the records cataloged so far, the Mackay collection has 8 genera and 16 species. The SCAN database added 19 genera and 59 species. Using the generated map and checklist, we identify sampling gaps in the county. With this data future researchers can use historical distribution data from applications in Arctos or SCAN.

Poster 2

## **Determining *Minagenia* (Pompilidae: Pepsinae) Phylogeny and Biogeography from Museum Specimens**

**Brenna Decker**

*Department of Biology, Utah State University, Logan, Utah, U.S.A.*

*Minagenia* Banks, 1934 (Hymenoptera: Pompilidae: Pepsinae) are small spider wasps with a global distribution, yet to date only 20 species have been described, 15 of which found in the New World. However, there are many undescribed species of *Minagenia* globally, including variation within already described species that may constitute new species designations. Presented here is a global phylogeny of *Minagenia*, using ultra-conserved elements from museum specimens, to infer biogeographical and distribution patterns, and to verify sex associations and monophyly within species known for their high morphological variance.

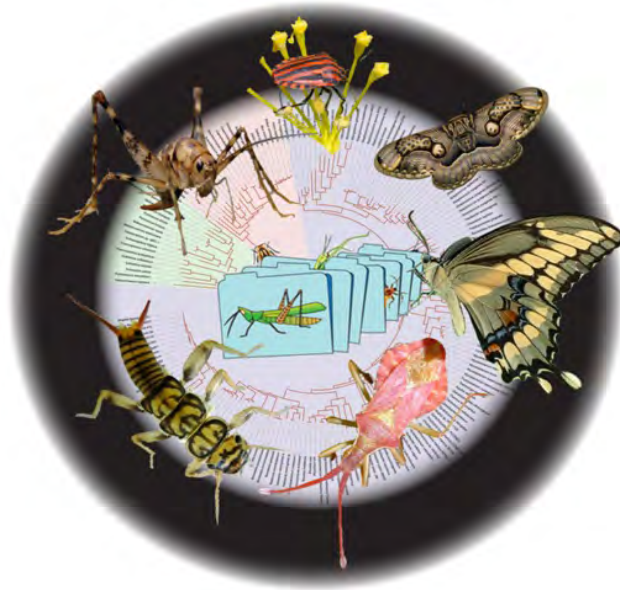
## A Century of Mosquito Control in Albania: Past, Present and Future Challenges and its Role in Malaria Eradication

**Elton Rogozi<sup>1</sup>, Teita Myrseli<sup>1</sup>, Viola Jani<sup>1</sup>, Blerina Kolgjini<sup>2</sup>**

<sup>1</sup>*Control of Infectious Diseases Department, Institute of Public Health, Str: "A. Moisiu", No. 80, Tirana, Albania.* <sup>2</sup>*Department of Textile and Fashion, Polytechnic University of Tirana*

The beginnings of mosquito control studies in Albania date to 1922 by Dr. Ashta. *Gambusia affinis*, a larvivorous fish, was introduced in 1931 as an effective biological method for mosquito larvae control. During 1931-1933, the American Rockefeller Foundation supported widely draining marshes throughout the country. Malaria was hyper endemic in Albania and a real public health problem in the beginning of 19th Century. A full campaign on malaria eradication started in 1947, and was achieved within twenty years. DDT was widely used in 1946 and in 1957, following the WHO recommendations, a strategic plan for malaria eradication was implemented. The drainage of the marshes, total reclamation of water irrigation and drainage system, as well as door to door campaign for the diagnosis of malaria in humans were performed. Agricultural, environmental and economical interventions were multilaterally comprehended in the program. Total malaria control in Albania was achieved in 1967. Further studies on malaria *Anopheles* vectors showed a gained insecticide resistance, except malathion. The increase of malaria imported cases in recent years, raised awareness of reemerging potential in the country. There was an interruption in mosquito control during the 90's, meanwhile 2014 marked the beginning of the national program on mosquito larval control based in biological agents, conducted yearly to date by the Institute of Public Health. Future challenges in the mosquito control would be focused on nano-tech repellent, extraction of new substances from different plants, their impregnation in textiles and the evaluation process of the efficacy against mosquito bites in the field.

# 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, <http://taxonworks.org>, a workbench for taxonomists, lead by Matt Yoder & Dmitry Dmitriev.
- Global Names Architecture, <http://globalnames.org>, finding and resolving taxon names from literature, lead by Dmitry Mozzherin.
- Catalogue of Life, <http://www.catalogueoflife.org>, editorial group, and data assembly hub, led by Yury Roskov and Geoff Ower.
- Taxonomic/Systematic Research, supporting taxonomic research on Plecoptera (Ed DeWalt), Cicadellidae (Dmitriev), and micro-Hymenoptera (Yoder).

Please welcome a new SFG member, Deb Paul, who will serve as a community liaison and trainer for TaxonWorks. We are excited that she has joined our team.

We provide modest grants to fill nomenclatural gaps (valid taxa, synonyms, homonyms, distribution) in the Catalogue of Life. This year we continue our focus on Coleoptera. Past winners are Thomas McElrath, Matthew Gimmel, and Gareth Powell working on Cucujoidea and Marcin Kaminski working on Sepidiini.

We encourage applications through the following form

<https://docs.google.com/forms/d/1F33LxYTMqjZO-S8t0v6SDTYCTo6WZ12t1oFvDRZo6cE/viewform>.

Please apply by 31 December. Applicants will be informed of our decision by January 15, 2020. If you have questions about your application, please contact Ed DeWalt ([dewalt@illinois.edu](mailto:dewalt@illinois.edu)).



# Entomological Collections Network

## Code of Conduct

The ECN seeks to promote a welcoming environment that is safe, collaborative, supportive, and productive for all participants. We expect all ECN members to adhere to this code, which applies to all forums hosted by the society including but not limited to: conferences (in-person or virtual), social media, and the Listserv. The 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.

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 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.
- Contact info may be found here: <https://ecnweb.net/about/officers/> or email [board@ecnweb.org](mailto:board@ecnweb.org).

Thank you for attending ECN. We are grateful for your contributions in making ECN a welcoming place of many diverse voices.

# THE COLEOPTERISTS SOCIETY



[www.ColeopSoc.org](http://www.ColeopSoc.org)

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