

**Entomological Collections Network Annual Meeting**  
**Saturday, November 4 – Sunday, November 5, 2017**  
**Denver Convention Center, Denver, CO**

**Saturday, November 4, 2017**

**Denver Convention Center, Meeting Room 607**

7:00–8:10 am          Registration and Coffee

8:10–8:15 am          Welcome and Announcements

**CONTRIBUTED TALKS SESSION 1**

Moderator: **Andrew B.T. Smith**, *Canadian Museum of Nature, Ottawa, ON, CANADA*

Timekeeper: **Mark Metz**, *USDA Systematic Entomology Laboratory, National Museum of Natural History, Washington, DC, USA*

8:15–8:27 am          Rancho La Brea Insects: Recent Methodological Advances  
Enable Diverse Lines of Research of the Most Extensive  
Quaternary Insect Collection

**Anna Holden** (1,2,3), John Southon (4), Kipling Will (5),  
Matthew Kirby (6), Rolf Aalbu (7) & Molly Markey (8)

*(1) American Museum of Natural History, New York City, NY, USA; (2) La Brea Tar Pits and Museum, Los Angeles, CA, USA; (3) Natural History Museum of Los Angeles County, Los Angeles, CA, USA; (4) UC Irvine, Irvine, CA, USA; (5) University of California, Berkeley, CA, USA; (6) California State, Fullerton, Fullerton, CA, USA; (7) California Academy of Sciences, San Francisco, CA, USA; (8) AIR Worldwide, Boston, MA, USA*

While the Rancho La Brea Tar Pits (RLB) constitutes the richest Ice Age locality and famous for its vast collection of large extinct mammals and birds, its insect collection is even more extensive yet has remained understudied. A persistent problem with stratigraphic correlation at this site is that asphalt flows are characteristically intermittent and discontinuous, which can result in the mixing fossils of significantly different ages. New methods of AMS radiocarbon dating of insect chitin in combination with georeferenced-based climate extraction methods circumvent this lack of stratigraphy and increasing the significance of RLB insects as paleoenvironmental indicators by enabling placement of insects' climate restrictions along a chronology for the first time. Another likely deterrent to researchers relates to the preservation of specimens which are often disarticulated and asphalt-impregnated. Reinforced elements of the exoskeleton such as legs, elytra, head capsules, etc., preserve but often separate as softer, connective tissue degrades. Asphalt, even after preparation solvents, also often obstructs pigmentation and patterning more frequently evident in other Quaternary insect fossils. While the aforementioned challenges to identification are legitimate and have earned RLB insects a reputation for being harder to identify, there is so much material to examine that presents obvious characters such as complex surface sculpture, pigmentation, scales, setae, and iridescence that are often not present with other preservation methods and enables species-level identification in some cases. Evidence from recent radiocarbon dating demonstrate that these fossils represent the

period of transition from Late Ice Age to modern times, making this collection of higher utility to paleontologists and neontologists than previously recognized for studying biogeography, endemism, systematics, and ecological change in the face of impacts of human interference such as urban development, agriculture, and climate change.

8:27–8:39 am          Blathering on About Nothing: Absence Data in Entomology

**Michael L. Ferro**

*Clemson University Arthropod Collection, Clemson Univ., Clemson, SC, USA*

The concepts of presence and absence are not symmetrical and presence is clearly dominate. Absence can only exist in the presence of presence, and when presence is present, absence must follow, except when presence is 100%, in which case absence is no longer present. While rarely explicitly acknowledged, absence data is widely used in studies in conservation, ecology, invasive biology, and agriculture. A brief discussion of the kinds and extent of absence data and various possible and useful usages will be given.

8:39–8:51 am          Combining natural history collections and large-scale image analysis for a novel taxonomy of ground beetles (Lebiinae: Carabidae)

**Beulah Garner, Laurence Livermore, Ben Price, Louise Allan & Alfried Vogler**

*Natural History Museum, Cromwell Road, London, England, UK*

Accessing label data from entomology pinned collections is a challenge. The NHM Lebiinae collection is currently not organised in a modern taxonomic classification and thereby inaccessible for modern research. Recuration will organise species into the current subtribe classification allowing for a visual overview of morphological traits which can test or support the current subtribe classification. This project on the evolution and systematics of the subfamily Lebiinae Bonelli, 1810, a large group of predatory ground beetles with ca. 5000 described species, will use novel digitisation techniques to mobilise label data and provide information on biogeography, phenology and on host associations, to map on the phylogeny. Our traditional digitisation requires that labels are removed from the specimens before being imaged which presents a bottleneck to rapid digitisation. By using angled imaging ALICE (Automated label imaging capture) and prioritizing the primary metadata, there is the potential to speed up digitisation, while reducing specimen handling and the associated damage that can occur. ALICE captures six images, four of the labels and two of the specimen. While the labels are legible, part of the text is excluded by the pin and other labels. As a result a software solution to extract and merge each view of each label promises to facilitate full legibility of each label, either by transcription OCR software.

8:51–9:03 am          An Update on the Kenelm W. Philip Collection: Digitization through LepNet

**Kathryn M. Daly & Derek S. Sikes**

*University of Alaska Museum, Fairbanks, AK, USA*

In 1966, Dr. Kenelm W. Philip began to document Lepidoptera spanning Alaska, western Canada and eastern Russia. He created the Alaska Lepidoptera Survey (ALS) to document species diversity by providing collecting gear to over 600 volunteers. He amassed a collection of over 111,800 specimens from this region and an additional 16,140 specimens from elsewhere. His collection was moved to the University of Alaska Museum in Fairbanks, Alaska, following Dr. Philip's death in March 2014. Curation efforts are ongoing through LepNet, a multi-institution, National Science Foundation-funded, collaborative project focused on digitization of Lepidoptera specimen label data and images. This talk will include a brief history of the ALS and a curation progress update on the Kenelm W. Philip Lepidoptera Collection.

9:03–9:15 am            Mississippi Entomological Museum — Activities and Acquisitions in recent years

**Ryan J. Whitehouse**, Terence L. Schiefer & Richard L. Brown  
*Mississippi Entomological Museum, Mississippi State University, Mississippi State, MS, USA*

The Mississippi Entomological Museum at Mississippi State University contains more than one million specimens, with strengths of the collection including microlepidoptera, ants, grasshoppers, and wood boring beetles. The insect collections of University of Mississippi and University of Louisiana, Monroe as well as some significant private collections recently have been acquired. The annual Cross Expedition, now in its 34th year, has added material from West Texas, Florida panhandle, Carolina Sandhills, and other locations. Annual trips to SE Arizona have increased holdings of southwestern taxa, and surveys throughout the Southeast have added many ants and grasshoppers. The Museum continues to serve as an APHIS regional identification center to screen samples from eight states for exotic species, and these have supplied many wood boring beetles for the collection.

9:15–9:27 am            Progress update: Growing and modernizing the Clemson University Arthropod Collection

**Anthony M. Deczynski**, Michael S. Caterino & Michael L. Ferro  
*Clemson University Arthropod Collection, Clemson Univ., Clemson, SC, USA*

Thanks to a team effort involving faculty curators, a new full-time collection manager, graduate assistants, and a small army of undergraduate and high school students, the Clemson University Arthropod Collection (CUAC) has made significant growth and improvements over the past three years. The collection has expanded to nearly double the former floor space, and the pinned and alcohol collections have been renovated with new cabinets, drawers, unit trays, and vials. Digitization is underway for both old and new materials. In collaboration with Notes from Nature ~1,400 alcohol specimens have been digitized. We have also overhauled and expanded outreach programs including creating new educational displays. Current fieldwork to under-collected areas such as the Carolina sandhills and coastal plain are expanding our holdings. We are now fully accessible to researchers and would like to encourage taxonomists to request loans for research and identification or to visit the collection in person. If you are interested please contact Collection Manager Dr. Mike Ferro at [mferro@clemson.edu](mailto:mferro@clemson.edu).

9:27–9:39 am Backbone Taxonomies, Data Aggregation, and Early Career Systematists: Something's got to give

**M. Andrew Johnston & Nico Franz**

*Hasbrouck Insect Collection, Arizona State University, Tempe, AZ, USA*

Backbone taxonomies synthesized from multiple sources are used by all major biodiversity data aggregators. By design, these backbones impose a top-down filter for clustering and retrieving aggregated specimen data, and thus for deriving inferences about taxon distributions. However, current implementations of backbone taxonomies are closed systems that do not directly accommodate or encourage individual contributor input. This is particularly problematic in cases of conflicting perspectives considered to be valid simultaneously by different regional treatments, or when newly published revisions no longer align with the backbone view. We can expect such cases to remain frequent in insects for the foreseeable future, due to their still under-explored diversity at the species level and often unnatural classification at higher levels. The backbone design approach contributes in an important way to the relative lack of trust in aggregated biodiversity data, because there is little availability or reward for early-career systematists to become involved with such systems. We illustrate these challenges with examples from ongoing thesis research on darkling beetles (Coleoptera: Tenebrionidae), focusing on how newly identified specimen data are transformed through the aggregation process to no longer make biological sense. We suggest that more open, conflicting-embracing designs for aggregated biodiversity data are a solution for bringing early-career systematists back into the synthesis process, and for increasing trust in the synthesis products.

9:40–10:00 am Coffee Break

### **MEMBER SYMPOSIUM 1: Natural History Discoveries and their Impact on Collecting and Collections Data**

Organizer/Moderator: **Sydney Brannoch**, *Case Western University, Cleveland, OH, USA; The Cleveland Museum of Natural History, Cleveland, OH, USA*

Timekeeper: **Christine Johnson**, *American Museum of Natural History, New York, NY, USA*

This symposium will focus on specific natural history observations that have been made across a diversity of insect taxa and how those observations impact the field collection, curation, and data collection of those taxa.

10:00–10:15 am Praying mantis oothecae, maternal care, and parasitoids: best practices for enhancing natural history observations

**Sydney Brannoch (1,2)**

*(1) Case Western University, Cleveland, OH, USA; (2) The Cleveland Museum of Natural History, Cleveland, OH, USA*

Mantodea, comprised of approximately 2500 species, feature a remarkable assortment of cryptic characteristics ranging from camouflaged coloration to special resemblance, the morphological assumption of the characteristics of an inedible object. These cryptic traits can also be observed in the oothecae (egg cases) that females produce. Interestingly, some species are known to exhibit maternal care, wherein they guard their deposited egg case against parasitoids. Here, I will discuss techniques for collecting praying mantises and their oothecae in the field, along with best practices for associating oothecae with depositing females, emergent nymphs, and emergent parasitoids, so as to enhance curation and data collection. I will touch on the importance of associating field collected praying mantises with the ecological niche from which they were collected and what to do when a horsehair worm emerges from freshly euthanized specimens in your kill jar.

10:15–10:30 am      Co-option of sexual structures as novel anti-bat defenses among males of certain tiger moths (Lepidoptera: Erebiidae: Arctiinae)

**Nicolas J. Dowdy** (1) & W. E. Conner (2)

(1) *Purdue University, West Lafayette, IN, USA;* (2) *Wake Forest University, Winston-Salem, NC, USA*

While conducting field work along the eastern slopes of the Ecuadorian Andes, we discovered two novel anti-bat defenses employed by the tiger moths *Eucereon zizana* and *Homoeocera trizona*. These new defenses are derived from two different male structures, which both normally function in sexual courtship. Males of *E. zizana* were found to evert their tube-like, pheromone-disseminating structures (“coremata”) in response to bat echolocation and restraint. Males of *H. trizona* were found to release deciduous, filamentous scales (“floculent”) in response to physical restraint when captured by free-flying bats, allowing them to successfully escape their would-be predator. The bodies and sexual structures of both species were found to contain host-plant derived defensive chemical compounds and the male pheromone hydroxydanoidal, suggesting these structures may serve dual-roles in both survival and reproduction. The discovery and investigation of these novel anti-predator behaviors required the integration of traditional data collection methodologies with more technologically advanced tools including ultrasonic acoustic equipment, high-speed infrared videography, and chemical analyses.

10:30–10:45 am      Did fecal-based defenses and domiciles drive diversification in leaf beetles? Chrysomelidae: Cassidinae, Criocerinae, Cryptocephalinae, Galerucinae, Lamprosomatinae)

**Caroline S. Chaboo**

*University of Nebraska State Museum, Univ. of Nebraska, Lincoln, NE, USA*

Chrysomelidae (leaf beetles) comprises ~40000 recognized species and is regarded as a “top five” most diverse beetle lineage. The primary hypotheses developed to explain that diversity are the ancient age, herbivory (with chemical adaptation), and the rise of angiosperms. However, the great unevenness in the diversity of leaf beetle subfamilies begs for additional explanations. This paper focuses on an unusual behavior of fecal-based constructions that appears as a significant macroevolution pattern in Chrysomelidae, appearing in in five subfamilies—Cassidinae, Criocerinae, Cryptocephalinae, Galerucinae

and Lamprosomatinae. A literature review is conducted to compare the life stages involved, their constructions (architecture and materials), and function as barriers, defenses, and domiciles. The morphological, ecological, and macroevolutionary implications of fecal-based constructions on the evolution of Chrysomelidae are analyzed using recent phylogenetic hypotheses.

10:45–11:00 am      Termite natural history: what we know about lower termites behaviour and life history

**Jessica L. Ware & Megan M. Wilson**

*Department of Biology, Rutgers University, Newark, NJ, USA*

Termites, Isoptera, are ubiquitous subjects of pest management studies. Their ecology is often studied in terms of their social behaviour, but less attention has been paid to their natural history. Termite colonies vary widely in size and structure, features which may be linked to their evolutionary history. Here, we present notes on the natural history of a subset of non-Neoisopteran termites, from the New and Old World, in the context of the evolution of the lower termites.

11:00–11:15 am      Diptera associated with Neotropical Zingiberales phytotelmata

**Barbara Hayford (1) & Caroline Chaboo (2)**

*(1) Department of Life Sciences, Wayne State College, Wayne, NE, USA; (2) University of Nebraska State Museum, University of Nebraska, Lincoln, NE, USA*

Diptera are common in phytotelmata (plant-held water pools), but most studies have focused on Culicidae (mosquitoes) in bromeliads hosts. As part of an ongoing inventory of poorly known arthropod communities in Zingiberales phytotelmata (bract and leaf-roll pools), the Diptera fauna was studied from 178 samples collected in Peru (2011 -2012) and in Costa Rica (2015). Seven families of aquatic Nematocera and 3 families of undetermined aquatic Brachycera were collected. Chironomidae were the numerically dominant family followed by Syrphidae and then Culicidae. Psychodidae, Stratiomyidae, and Tipulidae. A literature review of Diptera in Zingiberales was conducted to compare findings. Culicidae are most commonly recorded from Zingiberales followed by Syrphidae and Ceratopogonidae. The preponderance of culicids reports reflects surveys focused on mosquito control in which other, non-target Diptera are not recorded. Focused surveys on other families of Diptera such as Syrphidae have increased known diversity from phytotelmata, while taxonomic studies have documented new and endemic species of aquatic Diptera such as *Culicoides heliconiae* Fox and Hoffman 1944 (Ceratopogonidae) and *Phytotelmatocladus delarosai* Epler 2010 (Chironomidae). These findings indicate the value of Diptera surveys in Zingiberales phytotelmata to better estimate Diptera diversity in tropical and subtropical habitats, to uncover unique endemic species, and to unravel their life cycle dynamics.

11:15–11:30 am      Beetle buddies: parasitic, phoretic, and inquiline beetles associated with mammals

**Ainsley Seago**

*New South Wales Department of Primary Industries, New South Wales,  
AUSTRALIA*

Fleas and lice may be the best known insect parasites of mammals, but beetles are in the game as well. From facultative nest inhabitants to wingless, eyeless true parasites, mammal symbiosis has evolved many times within Coleoptera. This talk explores their diversity, evolution, and the best collecting methods for mammal-associated beetles.

11:30–11:45 am      Field rearing, injury labels and other techniques to increase natural history value of field collection

**Dominic Evangelista**

*Muséum national d'Histoire naturelle, Institut de Systématique, Evolution, Biodiversité, Paris, FRANCE*

When collecting specimens we often ignore details like the type of plant the insect was found on or the time of the day the sample was collected. However by focusing on nontraditional types of collection data we could expand our understanding of some understudied biological traits. For example, autotomy is not documented among cockroaches but this could be an artifact of collectors not noting injuries upon collection. As another example, time of collection and strata (height) information could hint at mating habits and ecological interactions. In a final example specific to cockroaches, egg case laying novelties are thought of as important events in the evolution of Blattodea. Yet, observing egg laying in the field is extremely unlikely unless the organisms are kept alive. I will discuss my experiences of collecting cockroaches in the field, and how improvements to collection methods and labeling can assist with building extremely informative natural history database.

11:45 am–12:40 pm      Next-generation natural history: From collecting to chemoecology in the vampire moths and their fruit-piercing relatives

**Jennifer Zaspel (1) & Julia Snyder (2)**

*(1) Milwaukee Public Museum, Milwaukee, WI, USA; (2) National Museum of Natural History, Smithsonian Institution, Washington, DC, USA*

Calpinae, commonly known as the piercing moths, are a cosmopolitan lineage comprised of approximately 200 species worldwide. This enigmatic subfamily contains species that are both obligatory fruit piercers of agricultural importance, and facultative mammalian blood feeders as adults. The origins of blood feeding, and the potential for these moths to serve as vectors of human or animal disease, are unknown. Although calpines can be found on most continents, blood-feeding species are predominantly found in subtropical and tropical climates in Asia. A global field program focused on collecting these and other moths for systematics research has been established over the past decade. Key observations from collections-based field work involving this system have provided a platform for interdisciplinary research in functional morphology, chemical ecology, and behavior. These and other projects have resulted in numerous successful long-term collaborations, novel methodologies, extensive student training opportunities, and new discoveries.

12:00–1:30 pm      Lunch

## **CONTRIBUTED TALKS SESSION 2**

**Moderator:** **Dominic Evangelista**, *Muséum national d'Histoire naturelle, Institut de Systématique, Evolution, Biodiversité, Paris, FRANCE*

**Timekeeper:** **Olivia Boyd**, *Oregon State University, Corvallis, OR, USA*

1:30–1:42 pm      Publishing a Symbiota specimen-based checklist (version) with the Biodiversity Data Journal

**Nico M. Franz** (1), Edward E. Gilbert (1), Thomas H. Atkinson (2) & Viktor Senderov (3)

*(1) School of Life Sciences, Arizona State University, Tempe, AZ, USA; (2) University of Texas Insect Collection, Lake Austin Center, Austin, TX, USA; (3) Pensoft Publishers, Sofia, Bulgaria & Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, BULGARIA*

We review the components and workflow for creating a specimen-based checklist with the Symbiota software platform [1], and publishing a version of this checklist with the Pensoft Biodiversity Data Journal [2]. The primary example is the early-stage "Curculionoidea of Sonora" checklist [3]. The presentation will illustrate proposed checklist integration solutions for a diversity of records originating from the legacy literature, externally recorded vouchers [4], and specimens from various source collections [5]. An updated Symbiota module that configures checklist data in Darwin Core Archive format for ingestion into Pensoft's ARPHA Writing Tool will be presented. Some aspects related to publishing incremental or differential checklist versions are also discussed.

[1] <https://doi.org/10.3897/BDJ.2.e1114>

[2] <https://bdj.pensoft.net/>

[3] <http://tinyurl.com/curcu-sonora>

[4] <http://www.barkbeetles.info>

[5] <http://symbiota4.acis.ufl.edu/scan/portal/>

1:42–1:54 pm      Introducing the entomological collections in the Natural History Museum Aarhus, Denmark

**Thomas J. Simonsen**, Christina Vedel-Schmidt & Kent Olsen  
*Natural History Museum Aarhus, Wilhelm Meyers Allé 10, DK-8000 Aarhus C, DENMARK*

To many entomologists 'collections-based entomological research' and 'Denmark' equals the Natural History Museum of Denmark (ZMUC) in Copenhagen. While ZMUC with its more than 10 million specimens and long tradition or outstanding research indeed is the major natural history museum in Denmark, it is not the only one. The Natural History Museum Aarhus (NHMA) was founded in 1911, and is an independent, self-governing institution supported by the Ministry of Culture and Sports, and the city-council of Aarhus (the second largest Danish city). While NHMA's collections are considerably smaller than those of ZMUC,

the entomological collections still contain several million specimens dating back more than a century, with strong focus on Scandinavia and Greenland. As such the museum is an extremely valuable, but underutilised resource for especially faunistic and biodiversity studies focused on northern Europe and Greenland. In this talk we will give an overview of the Museum's collections, history and current activities, as well as outlining prospects and challenges for the future.

1:54–2:06 pm      Next Gen LED light collecting: A sustainable system

**Gavin J. Svenson**

*Cleveland Museum of Natural History, Cleveland, OH, USA*

Three years ago I presented a new LED light trap system covering 360-395nm in the UV spectrum for attracting insects at night. This system was designed for a 12V battery, but at 36 watts it pulled enough power from the battery to reduce practical use for long-term passive trapping systems. Here I present a unit that can be customized for 5-20 watt output and spectral tuning based on use requirements. This system has been designed to be an ideal replacement for a 15 watt fluorescent black light mounted on bucket traps. A 10 watt unit running on a 12V 20AH motorcycle battery with a photo-switch and a 20 watt solar charger could run indefinitely depending on 6 peak solar charging hours during the day. However, used in combination with replicate units, a user can cover additional spectra, increase light at a collecting sheet, or connect them in serial along a trap line. Units are water resistant with all electronics sealed within a 3D printed diffuser.

2:06–2:18 pm      Musings on metrics: Measuring representation and development of insect collections

**Max Barclay (1) & Vladimir Blagoderov (2)**

*(1) Natural History Museum, London, England, UK; (2) National Museums Scotland, Edinburgh, Scotland, UK*

Most metrics applied to museum collections focus on how the specimens are housed and preserved, how accessible they are, etc. We have been experimenting with different metrics, of primary concern to most entomologists: how representative an insect collection is, and how its rate of comprehensiveness changes over time, for example relative to global taxonomic knowledge. These metrics may be useful for comparing the 'health' of different collections and sub-collections, and recognising the factors that lead to successful collections development.

2:18–2:30 pm      Entomological sampling on and around Camp Lemonnier, Djibouti, Horn of Africa

**Warren E. Steiner, Jr.**

*National Museum of Natural History, Smithsonian Institution, Washington, DC, USA*

Insects and other arthropods were included in a bioinventory conducted by the Smithsonian Institution at Camp Lemonnier, Djibouti, Africa on two expeditions, May 2014 and February 2016. This project was funded jointly through the U.S. Navy (Natural

Resources Program) and the Smithsonian Institution (Global Genome Initiative). Inventory lists contribute to the Navy's Natural Resource Management Plan (NRMP), Bird Aircraft Strike Hazard (BASH) program, and support health protection awareness for deployed personnel through vector and potential pest surveillance. Specimens preserved included many taxa not previously represented in North American museum collections and genetic repositories.

2:30–2:42 pm            Guatemala's digital footprint: A snapshot of online specimen data with a focus on recent efforts at the SEMC

**Zack Falin**

*Division of Entomology, KU Biodiversity Institute, University of Kansas, Lawrence, KS, USA*

I discuss current efforts at documenting the local insect fauna with my hosts during several recent expeditions to Guatemala. While often logistically challenging for foreigners, responsible collecting is encouraged and aided by Guatemalan colleagues and a considerable amount of recent work has taken place. However, after preparing and digitizing the results of my own expeditions I found only 71,000 specimen records available via the Global Biodiversity Information Facility (GBIF) for Guatemala. Two providers, the SEMC and AntWeb, were responsible for 60% of the total available records while the next largest provider contributed just over 6%. Clearly, despite notable historic and recent efforts at surveying the country's insect diversity comparatively few data are currently online. I offer a snapshot overview of what is available via GBIF as well as a more in-depth examination of the results of recent work done on Guatemalan insects at the SEMC. Apart from their immediate scientific value, these data can be used to identify potential collaborators, inform future survey efforts, and help build in-country support and expertise.

2:45–3:05 pm            Coffee Break

**MEMBER SYMPOSIUM 2: Tales from the Field: Volume 2**

Organizers/Moderators: **Derek A. Woller**, *Rangeland Grasshopper and Mormon Cricket Management Team, USDA, APHIS, PPQ, CPHST - Phoenix Lab, Phoenix, AZ, USA*; & **Michael L. Ferro**, *Clemson University Arthropod Collection, Clemson Univ., Clemson, SC, USA*

During the 2015 Entomological Collections Network (ECN) meeting, Max Barclay's talk contained many interesting ideas, one of which was particularly captivating: he mentioned that scientists tend to be reserved when talking about the fun and enjoyment they have at work because how dare they enjoy their job! On the other hand, depending on one's perspective, it might be said that mounting 10,000 specimens isn't all that fun. And, for that matter, neither is reviewing papers, databasing, cracking the whip on student workers, etc. BUT, if you're like us, spending some time out in the field makes it all worthwhile! Who hasn't had that moment out in nature where they found an incredible insect, had a near-death experience, encountered memorable locals, or even just brought back leaf litter that contained amazing things never-before-seen? We bet EVERY one of you has at least one of these tales and we're hoping you can share it with us eventually. For now, though, sit back, listen, and enjoy the entertaining tales from the field told by those who have dared to enjoy

their jobs (maybe a little too much in some cases). In case you're curious, presentation abstracts have been withheld to enhance your listening experience because spoilers are no fun. NOTE: Talk times vary in duration and on purpose.

3:05–3:17 pm Pirates, Quicksand, Floods and Civil War: the McHughlidae  
2005 Expedition to the Snake Farm

**Floyd W. Shockley**

*National Museum of Natural History, Smithsonian Institution, Washington, DC, USA*

3:17–3:27 pm Tales from Tiputini

**Olivia F. Boyd**

*Dept. of Integrative Biology, Oregon State University, Corvallis, OR, USA*

3:27–3:47 pm Top Ten Field Sites

**Robert S. Anderson**

*Canadian Museum of Nature, Ottawa, ON, CANADA*

3:47–4:02 pm Greatest hits of rock(excavat)ing bees

**Michael C. Orr**

*USDA-ARS Bee Biology & Systematics Lab, Utah State Univ., Logan, UT, USA*

4:02–4:17 pm Bottom of the Food Chain

**Karen W. Wright**

*Texas A&M University, College Station, TX, USA*

4:17–4:25 pm But wait! It gets worse.

**Brett Ratcliffe**

*University of Nebraska Museum, University of Nebraska, Lincoln, NE, USA*

4:25–4:40 pm Salamat Po, Philippines: Doing fieldwork in the new era for the Philippines

**Katrina L. Menard**

*Sam Noble Museum of Natural History, University of Oklahoma, Norman, OK, USA*

4:40–4:50 pm Fun with Faeces?

**Erica McAlister**

*Natural History Museum, London, England, UK*

4:50–5:05 pm      Drinking kava and searching for pollinators of Degeneriaceae in Fiji

**Richard Brown**

*Mississippi Entomological Museum, Mississippi State University, Mississippi State, MS, USA*

5:05–5:20 pm      Break

5:20–6:15 pm      ECN Business Meeting

6:15–7:30 pm      ECN Mixer and Poster Session  
*Poster Presenters should plan to be near posters for questions.*

7:30–9:00 pm      ECN Annual Banquet (Meeting Room 603/605)

**Sunday, November 5, 2017**  
**Denver Convention Center, Meeting Room 607**

7:00–8:15 am      Registration and Coffee

**CONTRIBUTED TALKS SESSION 3**

Moderator: **Oliver Keller**, *University of Florida, Gainesville, FL, USA*

Timekeeper: **David Furth**, *National Museum of Natural History, Smithsonian Institution, Washington, DC, USA*

8:15–8:27 am      A Portal into the NMNH Snout Moth Larval Collection 130 Years in the Making

**M. Alma Solis**

*USDA Systematic Entomology Laboratory, National Museum of Natural History, Washington, DC, USA*

The Lepidoptera alcohol collection in the National Museum of Natural History (NMNH), Washington, DC is one of the largest and oldest on the planet. Within this large collection the snout moth or Pyraloidea collection has been maintained and curated as an everyday working tool. The development of this collection began in the late 1800's when the Smithsonian Institution was just newly established. This collection has now expanded to over 1200 jars and about 6000 vials with mostly larvae, but including pupae. It also includes adults that are tied to genitalia and wings on microscope slides, and series of other pinned adults and "blown" larvae in the main collection. A database of each vial was completed this past year. It will be placed into EMU so that the collection is accessible to larval biologists worldwide and the data, such as host plant data, can be mined. This database also sheds

light on the 19th and 20th century collaborations between American snout moth larval biologists and those in Europe and Russia when studies on the morphology and identity of snout moth larvae was at its infancy in the United States.

8:27–8:39 am            The Entomological Society of America, Entomological Collections Network, and “SPNHC”

**Daniel K. Young**

*University of Wisconsin-Madison, Madison, WI, USA*

The Entomological Collections Network recently signed a Memorandum of Understanding with The Society for the Preservation of Natural History Collections (SPNHC), joining 20 other collections-based alliances and associations. The newly formalized partnership provides a liaison between ECN and SPNHC. This presentation provides ECN members with an overview of, and introduction to SPNHC, outlining our mutually overlapping missions as well as the organizational structure of SPNHC, membership, publications, and meetings.

8:39–8:51 am            BioQuip Products: A 70 Year Entomological Safari

**Louise Fall, Chris Fall & Ken Fall**

*Bioquip Products, Inc., Rancho Dominguez, CA, USA*

A condensed history of the company’s journey from 1947 to the present, with commentary on the people, events, and products who made the journey possible is presented. Questions about BioQuip will be answered by staff members attending the meeting.

8:51–9:03 am            Evolution of the Entomological Collections Management workshop: Lessons learned, new opportunities, and future directions

**Floyd W. Shockley (1) & Jennifer M. Zaspel (2)**

*(1) National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; (2) Milwaukee Public Museum, Milwaukee, WI, USA*

Several years ago, after a panel discussion at the ECN Annual Meeting, a plan to develop a workshop on entomological collections management was conceived to meet a perceived need by the systematics and collections communities. Originally designed to target new collections managers and advanced students nearing the completion of their terminal degrees and seeking employment working in collections, the workshop has proven itself to be attractive to museum directors, researchers, collections managers, curators, collections support staff and students alike. This talk will summarize the steps that were taken in developing the workshop, discussion of topics and coverage, show how we modified the workshop in year 2 in response to feedback, and where we plan to go with the third (and perhaps final) offering of the program next year unless asked to continue doing it beyond the end of our original 3 year cycle.

9:03–9:15 am            Diversity of living arthropods in North American insectariums

**Steven G. Nichols & Anthony I. Cognato**  
*Michigan State University, East Lansing, MI, USA*

We surveyed the arthropod diversity in North American insectariums and the factors that potentially associate with the diversity. An electronic questionnaire consisting of 27 questions was sent to members of ECN and zoological groups. As of July 2016, we received 56 responses from a potential pool of at least 150 institutes. 177 species were listed as part of insectarium collections. The most common species across the participating institutions included (in order): 1. *Gromphadorhina portentosa* (common hissing cockroach), 2. *Archispirostreptus gigas* (giant African millipede), 3a. *Grammostola rosea* (Chilean rose-hair tarantula) 3b. *Exatosoma tiaratum* (Australian walking stick). No one factor largely associated with diversity in our preliminary data. Overall, “ease of rearing” and “food availability” tied as the most influential factors when considering the species best suited for display followed closely by “time associated with care”. The “ability to collect locally” received the lowest consideration when deciding the composition of live collections. There was an association between attendance and advertising. Insectariums with larger attendance averaged 6 advertising venues, whereas insectariums with smaller attendance averaged of 3.7. The most common advertising venues were social media and institution websites. Potentially, increased advertising may improve the attendance in insectariums. However, these observations were not statistically significant.

9:15–9:27 am            Natural history collections greet the age of genomics: UA Insect Collection’s ancient DNA laboratory

**Wendy Moore & Gene Hall**  
*University of Arizona Insect Collection, University of Arizona, Tucson, AZ, USA*

Advances in next-generation DNA sequencing technology make it possible to obtain quality genomic sequence data from museum specimens, resulting in a resurgence of interest in museum specimens and the unique contributions they can make to molecular-based research. The significant difference between next-gen and older methods is that next-gen methods sequence small fragments of DNA at a time. The small sequences are then assembled into longer sequences on the computer. Since the DNA in dried, pinned museum specimens becomes fragmented over time, it is well suited for next-gen sequencing. However, because they contain low amounts of total DNA, extractions of historical specimens are highly susceptible to contamination. Our new Ancient DNA Laboratory, built within the footprint of the UA Insect Collection, is a designated clean room, outfitted with a laminar flow hood, UV light sterilization, and designed to minimize contamination from non-target DNA. In this talk we will present the design of our lab and the protocols we have adopted from forensic laboratories to ensure long-term protection from contaminants. We will also highlight the tracking, management, and loan policies we have adopted for the Total Genomic DNA from specimens in our collection.

9:27–9:39 am            Braconidae of Plummers Island and comparison of the fauna in canopy and understory

**Jennifer Pierce (1,2), Michael Parak (3) & Robert R. Kula (4)**

(1) Hood College, Frederick, MD, USA; (2) National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; (3) Slovak Academy of Sciences, Zvolen, SLOVAKIA; (4) USDA Systematic Entomology Laboratory, National Museum of Natural History, Washington, DC, USA

Plummers Island, located in the Potomac River near Washington DC, is one of the most extensively studied islands in North America. Comprehensive surveys have been conducted for the vascular plants and many insect groups. As of 2008 3,012 insect species had been documented, with species richness highest for Lepidoptera (836 species), Diptera (617 species), Coleoptera (600 species), and Hymenoptera (416 species). Some taxa within each order have been surveyed more intensively than others. For example, hymenopteran diversity is well known for aculeate wasps (274 species), sawflies/woodwasps (91 species), and bees (232 species) on Plummers Island compared with hyperdiverse “microhymenopteran” taxa that consist primarily of parasitoid wasps. Braconidae and Ichneumonidae are the most species rich families of Hymenoptera, but only one species from each is listed from the island currently. To address the gap in knowledge for Braconidae, Plummers Island was sampled continuously from June 2–November 7, 2016 with replicated Malaise traps placed in the canopy and understory. Sampling was designed to simultaneously survey Braconidae and assess whether braconid diversity differs between the island’s forest canopy and understory. Eight hundred and thirty-one specimens of Braconidae were collected and consist of 83 genera in 20 subfamilies. Fifty-three and 72 genera are known from the canopy and understory, respectively. Species identification is ongoing; patterns of diversity between canopy and understory will be analyzed upon completion.

9:40–10:00 am      Coffee Break

### **MEMBER SYMPOSIUM 3: Entomological Collections, Social Media, and YOU**

Organizers/Moderators: **Derek Hennen**, Virginia Tech University, Blacksburg, VA, USA; **Morgan Jackson**, University of Guelph Insect Collection, University of Guelph, Guelph, ON, CANADA; **Crystal Maier**, Field Museum of Natural History, Chicago, IL, USA; and **Christine Johnson**, American Museum of Natural History, New York, NY, USA

Much has been written in praise of broader impacts and the importance of science communication, but what are the best ways for collections to approach social media and science communication? This symposium showcases what has been done to improve the relevance and impact of collections in the age of instant mass communication. You'll hear about innovative methods to improve outreach and education on a variety of platforms, and leave with ideas for implementing them in your own work.

10:00–10:12 am      #DivisionofInsects: The Evolution of Social Media at a Large Insect Collection

**Crystal A. Maier**

*Field Museum of Natural History, Chicago, IL, USA*

Social media efforts began in the Field Museum's Division of Insects, Arachnids and Myriapods in 2011. Nearly all photos either flashy, "oh my" photos produced especially for social media or images which were produced as part of research products. Specimens which were involved in the "Insect of the Week" feature were databased and details on the social media activity was recorded in the event record in the database. A recent switch to Instagram as the main content outlet for the collection has allowed us to pursue a more dynamic and community-involved approach, reaching a much broader audience. We take advantage of the highly visual nature of Instagram to share beautiful images which introduce the fascinating stories of insects in the collection and use hashtags to put specimen images in the feeds of people who may have never engaged with the collection otherwise. We have also put together a social media imaging station to encourage of-the-moment captures by interns and volunteers and encouraged the use of a hashtag, #divisionofinsects, to engage with visitors and tour attendees. Additionally, collaborations with established social media channels, such as the Brain Scoop and the Field Museum's own official accounts have broadened the reach of the collection even further.

10:12–10:24 am      Tips to promoting collections and entomology research on social media

**Bryan Lessard** (1), Ashleigh Whiffin (2) & Andrea Wild (3)  
*(1) Australian National Insect Collection, CSIRO, Canberra, AUSTRALIA; (2) National Museums Scotland, Chambers Street, Edinburgh, Scotland, UK; (3) Communications, National Research Collections Australia, CSIRO, Canberra, Australia.*

Social media has revolutionized the way entomological collections and museums communicate with the general public by disseminating knowledge and information in real time. Social media has the power to promote collection events, research and staff, as well as raise awareness of entomological collections and demonstrate their relevance to the public, industry, policy makers and potential students of entomology. Currently there are limited studies examining the use of social media by entomological collections to engage the general public online. SCOPE is a new framework for promoting museums and entomological collections using social media. The SCOPE framework streamlines strategy development, content choice, refinement of online engagement, choice of social media platform, and evaluation of social media campaign using altmetrics. Case studies from the Australian National Insect Collection, CSIRO and National Museums Scotland following the SCOPE framework are provided so that other museums, entomological collections, staff and students can replicate it to develop and maintain their own social media presence. The benefits of using social media by staff and entomological institutions are also discussed.

10:24–10:36 am      Taking the world behind the scenes with interactive live broadcasting

**Isa Betancourt**  
*Academy of Natural Sciences of Drexel University, Philadelphia, PA, USA*

Over the last couple of years, interactive television broadcasts have risen in popularity and accessibility as a new and influential form of social media. Anyone with internet and a connected camera can tune into broadcasts or host their own show. I started Periscope

broadcasting weekly from the Entomology Department at ANSP in December 2016, and will share how Periscope works and offer tips on how to make entomology engaging to a lay audience through the Periscope platform.

10:36–10:48 am      Snapchatting science from the field and how to keep your audience engaged

**Susan Finkbeiner** (1,2)

*(1) Dept. of Biology, Boston University, Boston, MA, USA; (2) Dept. of Ecology and Evolution, University of Chicago, Chicago, IL, USA*

Social media is rapidly evolving into the way many people share and receive information. In recent years, Snapchat has become a more popular device application that allows users to upload short videos and pictures about their day. As a field entomologist, I find that using Snapchat allows my audience to see in-the-moment and behind-the-scenes activities from daily adventures in the field. Snapchats can range from scenic still shots of the forest, to funny encounters with interesting animals and insects, to a quick peek at what a field biologist eats for lunch in the Amazon jungle. Snapchat can also be used in many ways in the office or lab, whether or not you are a field biologist. The app creates a window into the secret life of an entomologist that may not necessarily be as well communicated through other forms of social media, and here I discuss ways that you can share your science with the world in a unique way using Snapchat.

10:48–10:52 am      Passing the Torch - Looking for new social media team members

**ECN Social Media Team**

*The Internet. Email: [ECNsocialmedia@gmail.com](mailto:ECNsocialmedia@gmail.com)*

The Social Media Team representing the Entomological Collections Network online works to increase awareness and understanding of the importance of entomology collections, and acts as a clearinghouse of information and opportunities relevant to the collections community. We'll provide an update on what we've been up to on the Network's associated social media accounts, and details a few of the successes we've had, and finally detail how you can help us make a difference online.

10:52–11:04 am      #YourDailyWeevil - a story of modest but gratifying social media success

**Salvatore Anzaldo & Nico Franz**

*Hasbrouck Insect Collection, Arizona State University, Tempe, AZ, USA*

#YourDailyWeevil is a Twitter hashtag introduced in 2014 and used consistently since to share high-quality specimen habitus images of so far more than 600 weevil species (July, 2017). The majority of images show North American and New World tropical specimens, often gifted to ASU via the exceptional Charles W. O'Brien weevil collection. Each tweet has a link to the corresponding "Symbiota Collections of Arthropods Network" (SCAN) portal (<http://symbiota4.acis.ufl.edu/scan/portal/>), where the Darwin Core-compliant occurrence

records are published. This practice connects the tweets with a primary biodiversity data environment. We provide anecdotal information on the modest but often gratifying success of this hashtag, as one example of increasing collection visibility. Mostly though, this will be about looking (in many instances, again) at gorgeous weevils.

11:04–11:16 am      Crowdsourcing for solutions: Using social media to decipher indecipherable insect labels

**Sydney Brannoch (1,2)**

*(1) Case Western University, Cleveland, OH, USA; (2) The Cleveland Museum of Natural History, Cleveland, OH, USA*

After spending too much time trying to solve indecipherable and incomprehensible label data on insect specimens, and watching others in my lab struggle similarly, twitter handle @Entotranslator was born. This twitter account seeks to harness the power of social media and citizen science to crowdsource the deciphering of difficult insect labels. Social media users from around the world have put their heads together to untangle illegible handwriting or faded lettering, determine localities outdated by geographical renaming, translate terms written in other languages, and identify collectors.

11:16–11:28 am      Museums as Information Resources: the Utility of Social Media

**Doug Yanega**

*Entomology Research Museum, University of California-Riverside, Riverside, CA, USA*

Not only is it true that some of the tasks of "traditional" museums engage in can be enhanced and facilitated through social media, but it is also true that social media opens new opportunities for expanding the kinds of services museums can perform, to everyone's benefit. I give examples of both categories, and encourage museum workers to explore these possibilities.

11:28–11:40 am      Shaping Stories From Your Collection, or "Waiter, there's a fly in my feed"

**Erin Chapman**

*American Museum of Natural History, New York, NY, USA*

For every one of the specimens that sits on collection shelves, there's a story. But with a dizzying array of ever-changing digital platforms, how and where do you begin your "Once upon a time..."? Over the past three years, the American Museum of Natural History's Shelf Life series has surfaced stories from within the Museum's collections, and engaged the general public with videos, social media, and in-person events. Each episode is contextualized with deep support on the Museum's website and various social media platforms—a veritable ecosystem of in-depth articles, archival images, and other content unpacking the collections. This presentation will share some of the lessons learned about how to identify and tell stories from within research collections, and what resources are available to produce and amplify your own media.

11:40 am–12:00 pm Open Floor Q&A Session (All Presenters)

An opportunity for ECN members to discuss strategies, pitfalls, and ask questions of our presenters about all things social media, science communication, and how each intersects with entomological collections.

12:00–12:05 pm ECN Annual Meeting Concluding Remarks

3:00–6:00 pm Behind-the-Scenes Tour of the Denver Museum of Nature and Science (pre-payment for bus ticket required) – led by Frank Krell [2 trips: 3:00-4:30, 4:30-6:00]

## CONTRIBUTED POSTERS

Poster sessions run throughout the meeting from 7:30 a.m. on Saturday, November 4 through 12:00 p.m. on Sunday, November 5. Poster presenters should stand with their posters during the mixer on Saturday evening to answer questions. Posters must be removed no later than 1:00 p.m. on Sunday afternoon.

POSTER 1 A paleoenvironmental and taphonomic study of Late Pleistocene southern California based on a unique fossil insect assemblage from the Rancho La Brea Tar Pits

**Anna R. Holden** (1,2,3) & John R. Southon (4)

*(1) American Museum of Natural History, New York City, NY, USA; (2) Natural History Museum of Los Angeles County, Los Angeles, CA, USA; (3) La Brea Tar Pits and Museum, Los Angeles, CA, USA; (4) Dept. of Earth System Science, Univ. of California-Irvine, Irvine, CA, USA*

An assemblage of near pristine Late Pleistocene insects, the result of a rapid entrapment event and taphonomic anomaly, greatly expand the diversity of insects identified from the Rancho La Brea Tar Pits (RLB) with 80 novel identifications, which subsequently enhance the paleoenvironmental reconstruction of the region. A Western Camel, *Camelops hesternus* Leidy, skull, rib, associated insect and plant material were excavated in a tabular deposit; the material had been trapped and sealed off, thus unaffected by typical fluid movement within asphalt deposits. The condition of specimens with minimal or no apparent asphalt impregnation, numerous aquatic species, and silty sediment in and around the deposit indicate material collected along stream or river margins rapidly accumulated during a flood or overbank event. Accelerator mass spectrometry (AMS) dating of bone collagen, plant, and insect specimens resulted in consistent dates of ~44k cal yr BP, consequently enabling the use of insects, otherwise too small for radiocarbon dating, for paleoenvironmental inferences. The material examined corroborates ecological patterns from other RLB identifications; a significant amount warm/hot, semi-arid/arid, highly

seasonal Mediterranean Csa-b occurring, or, widely distributed insects, as well as a lack of counter-species from mesic, cooler, canopied or forested habitats.

POSTER 2                      Managing Collection Objects in TaxonWorks for Institutional, Lab, and Individual Use

**D.A. Dmitriev, R.E. DeWalt & M. Yoder**  
*Illinois Natural History Survey, Champaign, IL, USA*

TaxonWorks (<http://taxonworks.org>) is an integrated web-based workbench for taxonomists and biodiversity scientists with long term development support thanks to an endowment from the Species File Group. While its scope is much broader than collections metadata curation, it treats specimens as the foundation for recording a wide range of biodiversity data. We highlight aspects of TaxonWorks that are particularly relevant to the ECN, focusing on the integrated features particular to managing collections. These include built in nomenclatural handling for specimen determinations, a built in GIS layer that persists user defined georeferences of any shape (including GEOLocate queries), customizable data attributes for collecting events and collection objects, batch loading of DWCA specimen data, a workflow for image-based specimen digitization that includes specimen label OCR, export to Darwin Core Archive format, loan management and a wide range of query and export interfaces. Important to the long-term success of the project is the effort that has been put in to simplifying the ability to evolve TaxonWorks as new requirements and ideas arise. This includes strong emphasis on developing a community of collaborators who can contribute directly to the development of the platform. We demonstrate use via exemplar projects in their early stages of development: the INHS Insect Collection, the Frost Museum, Species Files (Orthoptera SF, Plecoptera SF, and others), 3i Auchenorrhyncha Database, LepIndex, the Universal Chalcidoidea Database, and others.

POSTER 3                      From rejection to collection! A new entomology collection at the University of California Santa Barbara Museum of Natural History takes the university by swarm

**Rachel Behm & Katja C. Seltmann**  
*Cheadle Center for Biodiversity and Ecological Restoration, University of California-Santa Barbara, Santa Barbara, CA, USA*

The UC Santa Barbara Natural History Museum (UCSB) at the Cheadle Center for Biodiversity and Ecological Restoration has formed an insect collection from about 10K historical specimens that were found in a basement on the UCSB campus and a little funding. Since its discovery, the UCSB collection has grown rapidly through Coastal California arthropod survey efforts, donated student collections, and faculty research projects. These surveys, conducted by the Cheadle Center for conservation monitoring, are hugely valuable as the coastal regions of Santa Barbara and Ventura County are critically endangered habitats, with over 95% of these areas lost to human disturbance. Our effort is making new insect data available from these areas, which are presently under-represented in collecting and digitizing efforts. Also, the creation of a collection has inspired new interest in entomology on the campus. Undergraduate and graduate students are learning basic entomology in newly formed classes and workshops, students are using the collection as a reference, and the inclusion of arthropods in faculty projects is on the rise.

POSTER 4                      From soup to systematics: Residue sample sorting accelerates taxonomic and phylogenetic research on Dipsocoromorpha (Hemiptera)

**Sarah Frankenberg** (1), Alexander Knyshov (1), Rochelle Hoey (1), Stephanie Leon (1,2) & Christiane Weirauch (1)  
(1) Department of Entomology, University of California, Riverside, CA, USA;  
(2) Archbold Biological Station, Venus, FL, USA

Dipsocoromorpha (Hemiptera: Heteroptera), the minute litter bugs, are rare in curated parts of natural history collections due to their small size, cryptic habits, and the small number of specialists working on the group. This neglect is unfortunate, since the true biodiversity of Dipsocoromorpha has remained unknown and because the group has the potential to serve as a model for research into the evolution of elytra, male-specific glands, and complex genitalic structures. As part of a US NSF-funded taxonomic revisionary project on this clade, we took advantage of the thousands of residue samples (mostly leaf litter extraction, Malaise traps, and yellow pan traps) in museums around the world that have remained unsorted for minute litter bugs. During the past four years, our team has retrieved 23,252 ethanol-preserved specimens from bulk samples, 9,515 of which belong to the target group for taxonomic revisions, the Schizopteridae, or jumping ground bugs. The project has databased 25,395 ethanol and point-mounted specimens loaned from various institutions and habitus imaged >800 specimens, with data being available via the Heteroptera Species Pages <http://research.amnh.org/pbi/heteropterasespeciespage/>. The five so far published taxonomic revisions derived from this material documented 59 new species. We have discovered at least seven undescribed genera, and we estimate that an additional 520 undescribed species will be treated as part of taxonomic revisions that are in progress. Our understanding of the biodiversity of Dipsocoromorpha is clearly on an upward trajectory, despite a bias towards the Neotropical region, where the assembled collections are strongest. Although much of the residue-derived material is plagued by suboptimal preservation thus making DNA extractions and molecular phylogenetics difficult, we have generated a molecular dataset of 178 taxa with comprehensive taxonomic and geographic sampling. We are in the process of coding a complementary morphological dataset and combined analyses that will for the first time provide an evolutionary framework for this fascinating clade of understudied insects and inform a revised classification.

POSTER 5                      Pests in the Collection: What is normal?

Andrew R. Deans, **Emily L. Sandall** & Michael Skvarla  
*Frost Entomological Museum, Penn State University, University Park, PA, USA*

In order to sustain collections, attention must be made to their storage conditions. While each museum's strategy for detecting pests is unique, guidelines in interpreting and managing the insects (both living and dead) must be made to effectively treat any threats to collections. We report on our findings from (almost) a year's worth of sampling in our museum and ask the ECN community: What is normal? When does a curator take action?

POSTER 6                      A brief guide to hand lenses

**Michael Skvarla**

*Frost Entomological Museum, Penn State University, University Park, PA, USA*

Small arthropods can be difficult to identify with the unaided eye. A hand lens, also called a loupe, is therefore an important tool for naturalists, entomologists and biologists, horticulturalists, scouts, and others who wish to make correct arthropod identifications and informed decisions in the field. However, choosing a hand lens can be an intimidating prospect to those unfamiliar with the associated terminology. The goal of this poster is to inform readers about hand lenses so they confidently chose the tool that best suits their needs.

POSTER 7

**Founding of the Broward College Insect Collection (BCIC):**  
Goals, focus, timelines and strategies to inspire undergraduate research at an urban minority serving institution

**David Serrano, Jennifer Bishop, Elizabeth Lavelly & Branden Davis**

*Broward College, Davie, FL, USA*

With the success of Broward College's (BC) Environmental Science Bachelors program (launched in 2014) has come an increasing surge of undergraduate students interested in research opportunities. However, the inherent obstacle is that all faculty are on 100% teaching appointments resulting in extremely limited student research opportunities. Principles of Entomology (taught at BC) and Insect Classification (taught at our partnering institution the University of Florida) core curriculum courses have led to a substantial entomological interest in students which has led to substantial justification to establish a teaching and research insect collection at the college. The newly created collection allows students both space and opportunities to embark in research projects that would otherwise been unobtainable. Students (listed co-authors) have already been incorporated into the founding of the collection giving them pivotal roles in establishing the functionality and structure of the collection and building the frameworks for future research projects. The focus of the collection will be south Florida with an emphasis on the greater Everglades ecosystem. Research goals will include projects in diversity surveys, taxonomy, and ecological monitoring of south Florida ecosystems. In addition to fostering undergraduate research in our own program, we will also be working with BC's IT Bachelor's program to build a searchable and accessible database open to potential collaborators interested in the collection materials. The collection will be a repository for specimens collected by BC faculty and students during course work and research projects; from collaborators at neighboring academic and governmental institutions; and private citizens.