#HYMATHON2024

A 24 hour virtual symposium
from the International Society of Hymenopterists

5 – 6 December 2024

#Hymathon2024

International Society of Hymenopterists virtual symposium

Organising Committee:

Natalie Dale-Skey, Jessica Awad, Erinn Fagan-Jeffries,
Manuela Sann, Cristina Vasilița, Miles Zhang, Zoltán László

- All start times in the program are given **in UTC exclusively**
- The schedule can also be accessed via a public Google calendar (see next page)
- Talks titles (with the name of the presenter only and social media handles when available) are listed in the schedule - these link to the abstracts with full authorship; abstracts can also be accessed directly from the bookmarks panel
- All photos in this program are the winning entries of last year's art competition

Jump to:

Cover photo: "*Pteromalus cassotis*" - Photograph by Sloan Tomlinson
Pteromalus cassotis adults emerging from the pupa of *Danaus plexippus*. Shot with Canon 5DS using the MP-E 65 lens. Image composited as the adults continued to emerge. Shot in my studio in Hatfield, Massachusetts, United States of America from specimen found in the wild here

The program can also be accessed via a public Google calendar (click on "Agenda" or choose "Schedule" in the top right corner to have a list view of the talks); all times should appear in GMT and be converted to your own time-zone if you add the calendar to your own:
https://calendar.google.com/calendar/u/0?cid=N2Y3ZWVjODczZDhhYzE2MmNlMjAxMGRlYjUxOTAyNzU1YzllYThmMzU1N2M0NzFiZDQ3NDU4NDY2YzU2ZWNhMkBncm91cC5jYWxlbmRhci5nb29nbGUuY29t

#Hymathon2024 - schedule

SESSION 1, chaired by Jessica Awad

17:00 **Introductory remarks**

17:05 **KEYNOTE: A Passion for Parasitoids – 45 Years of Chasing Eucharitid Wasps**
Presenter: John Heraty

17:45 **Break 1 Session 1**

17:55 **Parasitoid Wasps Avoid Sick Caterpillars: A Key Insight for Better Pest Control**
Presenter: Enakshi Ghosh - Social media handle: @enakshighosh15

18:10 **"To (*Nosema*) Immunity and Bee-yond!" Uncovering the molecular secrets of survivor and managed honeybee immunity in response to *Nosema ceranae***
Presenter: Emilia Burnham - Social media handle: @mimibee822

18:25 **130 myo wasps and the evolution of the telescopic ovipositor**
Presenter: Cristina Vasilita - Social media handle: '@nuga_vasilita

18:40 **Unpicking the taxonomic and ecological determinants of host range and specificity in *Aleiodes* parasitoid wasps**
Presenter: Iona Cunningham-Eurich - Social media handle: @ionace.bluesky.social

18:55 **Taxonomic problem of the Neotropic genera *Tropidopsilus* and *Masnerolyta*.**
Presenter: Ryoji Kawai - Social media handle: '@satis369086151

19:00 **HYMENOPTERA SHOWDOWN Session 1**

19:10 **Break 2 Session 1**

19:20 **Braconid parasitoids of the *Hydrangea* leaftier moth: a backyard natural history mystery**
Presenter: James Whitfield

19:35 **The great grapplers: Investigating the mechanisms powering the unique Dryinidae pincer**
Presenter: Carly Tribull - Social media handle: '@cmtribull

19:50 **The taxonomy of *Stelis foederalis* Smith (Hymenoptera: Megachilidae): it's not just black and white**
Presenter: Cory Sheffield

20:05 **Taxonomic Revision of the *Perilampus carolinensis* Species Complex (Hymenoptera: Chalcidoidea: Perilampidae), and the Description of Five New Species.**
Presenter: Jeong Jae Yoo

20:10 **The first genome-scale phylogeny of the Trigonalidae (Apocrita: Trigonaloidea): preliminary results**
Presenter: Zachary Griebenow

20:15 **Soil Dwellers: What's Crawling and Buzzing Below**
Presenter: Brittany Kohler - Social media handle: IG: (@BugswithBritt)

20:20 **Wrap-up**

20:25 **Hymathon Quiz and Great Hymenoptera Scavenger Hunt**

SESSION 2, chaired by Miles Zhang

00:00 **Introductory remarks**

00:05 **KEYNOTE: The evolutionary history of bees in time and space**
Presenter: Eduardo Almeida

00:45 **Break 1 Session 2**

00:55 **A taxonomic study of the genus *Gastrancistrus* (Hymenoptera: Pirenidae) parasitizing gall midges (Diptera: Cecidomyiidae) in Japan**
Presenter: Kishin Inoue

01:10 **Investigating the biodiversity and systematics of Australian rogadine parasitoid wasps using DNA barcoding and phylogenomics (Hymenoptera, Braconidae, Rogadinae)**
Presenter: Mollie-Rosae Slater-Baker - Social media handle: '@molliersb

01:25 **Phylogeny and classification of the ant subfamily Dolichoderinae**
Presenter: Ziv Lieberman

01:40 **Critical review of one of the oldest faunistic data sets of its kind – Bees and stinging wasps in Schäffer's "Icones" (1766–1779)**
Presenter: Robert Zimmermann

01:55 **Differences in Early Egg Cell Formation and Specification Between the Social Paper (*Polistes*) and the Model Fruit Fly**
Presenter: Laura Miller

02:00 **HYMENOPTERA SHOWDOWN Session 2**

02:05 **Break 2 Session 2**

02:15 **Morphometric analysis of sawfly chromosomes of the genera *Tenthredo* Linnaeus, 1758 and *Athalia* Leach, 1817 (Hymenoptera, Tenthredinidae, Athaliidae)**
Presenter: Vladimir Gokhman

02:30 **British Columbia's Community Bumble Bee Project**
Presenter: Jennifer Heron

02:45 **Revising the Genus *Apanteles* (Hymenoptera: Braconidae) in Australia**
Presenter: Erinn Fagan-Jeffries

03:00 **The honey bee stinger: From high-speed filming to 3D printing**
Presenter: Fiorella Ramirez Esquivel - Social media handle: '@FiorellaEnto

03:15 **Biodiversity of oak gall-associated *Torymus***

Presenter: Jackie Chitty

03:20 **Wrap-up**

03:25 **Hymathon Quiz and Breakout rooms**

SESSION 3, chaired by Zoltán László

06:00 **Introductory remarks**

06:05 **Puzzling taxonomy, ongoing speciation, and social parasitism: The case of the Nearctic pyramid ants**
Presenter: Jill Oberski - Social media handle: @jilloberski.bsky.social

06:20 **Developing a framework to progress the historically intractable Australian *Psyllaephagus* fauna, problematic but important parasitoids of lerp-forming psyllids.**
Presenter: Alana McClelland

06:35 **Right phylogeny, wrong time: geographic barriers, host recognition barrier, and local adaptation shaped a pseudocospeciation between conifers and wasps**
Presenter: Xiaoxiao Chen

06:50 **The identity of *Telenomus remus* Nixon (Scelionidae) a cosmopolitan egg parasitoid of *Spodoptera* species**
Presenter: Andrew Polaszek

07:05 **Three intriguing species of Eupelmidae from South Africa: guessing on their biology and taxonomy**
Presenter: Lucian Fusu

07:20 **HYMENOPTERA SHOWDOWN: Session 3**

07:25 **Break 1 Session 3**

07:35 **Evolution of prey type and life history traits in the Crabronidae (Apoidea)**
Presenter: Idris Adams - Social media handle: @IdrisAdamsBio

07:40 **Think Pink! The Taxonomy and Systematics of Gall-inducing Tanaostigmatidae**
Presenter: Tareva-chine Atkin-Zaldivar

07:45 **Morphological adaptation between *Juniperus* seeds and *Megastigmus sabinae* (Chalcidoidea: Megastigmidae)**
Presenter: Chunxu Chen

07:50 **Can you hear how old a bee is?: the sound of morphological senescence**
Presenter: Alixandra Prybyla

07:55 **KEYNOTE: The trouble with parasitoids? Pattern and process in the global evolution of oak gall phenotypes**
Presenter: Graham Stone

08:35 **Break 2 Session 3**

08:45 **International Society of Hymenopterists 2024 business meeting**

09:45 **Wrap-up**

SESSION 4, chaired by Cristina Vasilița and Manuela Sann

13:00 **Introductory remarks**

13:05 **KEYNOTE: Evolving perspectives in Hymenoptera systematics**
Presenter: Tamara Spasojevic

13:45 **Break 1 Session 4**

13:55 **Itchy feet but whose? The little fire ant *Wasmannia auropunctata* in Cyprus**
Presenter: Jakovos Demetriou - Social media handle: '@JakovosD

14:10 **One Name, Many Faces: Exploring the Diversity of *Aphanogmus* Thomson, 1858 (Hymenoptera: Ceraphronidae) with Emphasis on the Caucasus Region**
Presenter: Tobias Salden

14:25 **Artificial Intelligence for species identification in parasitoid wasps: a case study on Scelionidae**
Presenter: Ecaterina Pirvu - Social media handle: '@ecaterina_pirvu

14:40 **Molecular and morphological systematics of *Sycophila* (Hymenoptera: Eurytomidae) associated with *Ficus* (Moraceae)**
Presenter: Atiyeh Naghizadeh

14:55 **Unique courtship display of small *Eupelmus muellneri* (Hymenoptera: Eupelmidae)**
Presenter: Matvey Nikelshparg

15:00 **HYMENOPTERA SHOWDOWN: Session 4**

15:05 **Break 2 Session 4**

15:15 **Fantastic Beasts and How to Save Them: Mowing Strategies for Microhymenoptera**
Presenter: Maura Haas-Renninger - Social media handle: '@MauraRenninger

15:30 **Latitudinal diversity gradients in Darwin wasps unraveled by global-scale DNA barcoding data**
Presenter: Bernardo Santos

15:45 **Preliminary information of the findings of fossil Aphidiinae (Hymenoptera, Braconidae) from Danish amber**
Presenter: Maryna Kaliuzhna - Social media handle: https://twitter.com/marinka_kma

16:00 **Distribution and prevalence of *Diplolepis* (Hymenoptera, Diplolepididae) induced galls on wild roses in Romania: insights from a three-year survey**
Presenter: Zoltan Laszlo - Social media handle: '@_LaszloZoltan_

16:15 **Mapping nocturnal wasps**
Presenter: Gavin Broad - Social media handle: '@BroadGavin

16:20 **Recurrent genomic dynamics and parallel evolution of secondary phytophagy in Hymenoptera**
Presenter: Ronja Reinisch

16:25 **Wrap-up including prize announcements**

16:45 **Hymathon Quiz**

ABSTRACTS

SESSION 1, chaired by Jessica Awad

17:00 Introductory remarks

17:05 KEYNOTE: A Passion for Parasitoids – 45 Years of Chasing Eucharitid Wasps

Presenter: John Heraty

John Heraty is a Professor of Entomology at the University of California, Riverside. After an undergraduate degree at the University of Guelph, he worked for 10 years in biological control, during which he completed a part-time Master's degree on, of course, the ant- parasitic Eucharitidae. He then did a PhD with Jim Woolley at Texas A&M, postdoc'd in Ottawa and then the Smithsonian and USDA-SEL lab in Washington DC, and moved to UCR in 1995. His research focus has always been on the ant-parasitic Eucharitidae, which has led him to collect in over 30 countries around the world to discover new specimens and new behaviors and host associations. With the help of many students and individuals, his career has ranged from simple hennigian phylogenetics to novel phylogenomics. Many of the big questions have been answered and many species have been described, but many of both still remain to be addressed and 45 years is still not enough.

17:45 Break 1 Session 1

17:55 Parasitoid Wasps Avoid Sick Caterpillars: A Key Insight for Better Pest Control

Presenter: Enakshi Ghosh - Social media handle: @enakshighosh15

Enakshi Ghosh (Agricultural Biology, Colorado State University, Fort Collins, United States of America)

Host selection behaviour plays a pivotal role in determining the success of parasitoids, especially in environments where host quality varies. In heterogeneous environments, parasitoids frequently encounter hosts that are infected.

We conducted experiments to ascertain whether the ecto-parasitoid *Bracon brevicornis* can differentiate between healthy caterpillars and those infected with *Bacillus thuringiensis* (Bt) and examined the implications of this host selection behaviour.

In an olfactometer choice assay, *B. brevicornis* avoided Bt-infected *Spodoptera litura* hosts. In a no-choice assay, the female parasitoid displayed a lower paralysis rate on infected hosts, indicating a strong selection behaviour. Furthermore, we explored the impact of infection duration by exposing female wasps to larvae infected for 24, 48 and 72 h with Bt. Both choice and no-choice assays demonstrated that female *B. brevicornis* refrains from ovipositing on infected larvae, regardless of the infection duration.

Direct exposure to Bt through consumption did not affect the fitness of the tested parasitoid wasp. However, post-24-h Bt infection, host larvae showed an increased total hemocyte density, particularly high phagocytic cell numbers, and enhanced melanization, rendering the host larva unsuitable for parasitoid development.

Taken together, our study underscores that parasitoids exhibit robust host selection behaviour by actively avoiding infected hosts. This insight is valuable for devising new pest control strategies in agriculture that safeguard beneficial parasitoids.

18:10 **"To (*Nosema*) Immunity and Bee-yond!" Uncovering the molecular secrets of survivor and managed honeybee immunity in response to *Nosema ceranae***

Presenter: Emilia Burnham - Social media handle: @mimibee822

Emilia Burnham (Department of Entomology, University of California: Riverside, United States of America); Boris Baer (Department of Entomology, University of California: Riverside, United States of America); Kerry Mauck (Department of Entomology, University of California: Riverside, United States of America); Naoki Yamanaka (Department of Entomology, University of California: Riverside, United States of America)

Nosema ceranae is a fungal spore parasite that affects honeybees and causes various symptoms, including diarrhea, fatigue, and even death. There are two genotypes of honeybees: managed, which are typically kept by commercial and hobbyist beekeepers, and survivor, which live without management in nature. It has been found that survivor bees are able to tolerate pathogens such as *N. ceranae* better than managed bees. The life cycle of *N. ceranae* germinates within the bee's midgut, which requires them to be alive. What happens when these spores are dead? Could they be used like a vaccine to help the honeybees defend against an infection before it actually occurs? There are three specific immune indicators that I am measuring: Vitellogenin, a lipoglycoprotein that is formed in the fat body and has immunological effects. Juvenile hormone, which controls what the honeybee's task is at that time in its life, such as being a nurse or forager, and chitinase, an enzyme that breaks down chitin and also has been shown to be able to kill other species of *Nosema* and will be using this to help confirm the results of the other two hormone levels. In my research, I am investigating the immunocompetence of *N. ceranae* in survivor and managed honeybees after feeding them live and dead spores by measuring the quantities of vitellogenin, chitinase, and juvenile hormone in their hemolymph and confirming infection by measuring the spore counts in their midguts.

18:25 **130 myo wasps and the evolution of the telescopic ovipositor**

Presenter: Cristina Vasilita - Social media handle: '@nuga_vasilita

Cristina Vasiliță (Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; Stuttgart State Museum of Natural History, Stuttgart, Germany; University of Hohenheim, Stuttgart, Germany); Quentin Martinez (Stuttgart State Museum of Natural History, Stuttgart, Germany); Thomas van de Kamp (Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany); Brendon Boudinot (Senckenberg Research Institute and Natural History Museum, Frankfurt am Main, Germany); Dany Azar (Lebanese University, Jdeidet, Lebanon); Ovidiu Popovici (University „Alexandru Ioan Cuza" in Iași, Iași, Romania); Lars Krogmann (Stuttgart State Museum of Natural History, Stuttgart, Germany; University of Hohenheim, Stuttgart, Germany)

Fossils are critical for understanding the history of life on Earth, the development of ecosystems, and the processes that have shaped our planet over billions of years. Amber inclusions are a tremendous source of information, as they often allow clear visibility for small details providing a unique opportunity to peek into past biodiversity. Lebanese amber dates back ~130 million years to the Early Cretaceous and contains the oldest insect specimens as amber inclusions. As most of extant Hymenoptera diversity originated in the Cretaceous and continued long into the Paleogene, Lebanese amber specimens grant an exclusive preview at the status quo during the early megaradiation of parasitoid wasps.

The key innovation considered to have served as catalyst for diversification in Platygastroidea is the evolution of the telescopic ovipositor. The telescopic mechanism provides increased flexibility and control, enabling the wasp to reach hidden or protected sites where its eggs will be safe and have access to hosts for larval development. In this study we examine and describe a new group of Platygastroid wasps from five extremely well preserved specimens in Lebanese amber. The advancement of 3D imaging techniques based on uCT scanning makes it possible to examine even the most minute morphological characters in fossil inclusions, granting precise phylogenetic placement and in-depth analysis of key morphological innovations. Thus, we combine state-of-the art 3D imaging with a thorough morphological analysis integrated in a Platygastroidea-wide phylogeny to investigate the phenotypic evolution and the strategies that have shaped the origins of diversity in this group.

18:40 **Unpicking the taxonomic and ecological determinants of host range and specificity in *Aleiodes* parasitoid wasps**

Presenter: Iona Cunningham-Eurich - Social media handle: @ionace.bluesky.social

Iona Cunningham-Eurich (Natural History Museum and University College London, London, United Kingdom), Seirian Sumner (University College London, London, United Kingdom), Gavin Broad (Natural History Museum, London, United Kingdom)

Understanding the mechanisms that shape host range and host specificity in parasitoid wasps has never been more important, especially given that current environmental change is impacting how organisms interact with their resources. Parasitoid wasps possess a wide diversity of behaviours and life history traits, making them excellent study systems for ecological and evolutionary questions. Additionally, although they provide essential ecosystem services through regulation of insect and arachnid populations and are vital agents of biocontrol, they remain understudied compared to other taxa. Host range and specificity are fundamental properties of these wasps as their ability to find suitable hosts has important implications for healthy populations. However, the factors influencing host range and degree of specialism in parasitoid wasps remains poorly understood, despite consequences for biocontrol and ecosystem regulation. Here, we present a case study attempting to understand the evolution of host range and host specificity in *Aleiodes* (Hymenoptera: Braconidae), a species-rich genus which targets Lepidoptera known to vary in its degree of host specialism across species. We assess the influences of host taxonomy, ecology and life-history traits on the formation of *Aleiodes* host ranges and host specificty to gain understanding of their searching environments. We find that *Aleiodes* spp. host range is largely driven by host taxonomy, but that other host traits may also play influential roles. This study has important potential implications for understanding how parasitoid wasps may adapt to environmental change in the future, but for understanding the high levels of ecological and behavioural diversity observed across the Hymenoptera.

18:55 **Taxonomic problem of the Neotropic genera *Tropidopsilus* and *Masnerolyta*.**

Presenter: Ryoji Kawai - Social media handle: '@satis369086151

Ryoji Kawai (Entomological Laboratory, faculty of Agriculture, Kyushu University, Fukuoka, Japan); Vasilisa Chemyreva (Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia; A.A. Borissiak Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya, Moscow, Russia)

The *Tropidopsilus* Kieffer, 1908 is the neotropical monotypic genus with the type species *Tropidopsilus laticeps* Kieffer, 1909. This species was described based on a single female from Brazil. The morphological definition of the genus was reviewed in Quadros & Brandão (2017) based on seven morphospecies from Brazil, but no additional species of this genus have been described since, Kieffer's original description of the type specimen of the genus. Another

neotropical genus - *Masnerolyta* Buhl, 1997, with the type species *Masnerolyta ruber* Buhl, 1997 was described based on a single female from Argentina. According to the diagnosis of *Tropidopsilus* given by Quadros & Brandão (2017), *Masnerolyta* is morphologi-cally closely related to *Tropidopsilus* and these two genera differ in two characters: the development of the spinose projection on the metascutellum; the features of the fore wing ve-nation. We examined many specimens of the family Diapriidae deposited at Meijo University and discovered an undescribed species that turned out to be very close to *M. ruber*. By comparing the morphology of the undescribed species with the morphology of the type specimen of *M. ruber*, six undescribed species of *Tropidopsilus* from Mexico and Brazil and considering the morphological variation and diversity within the close genera of the subfamily Belytinae, we concluded that the type species of the genus *Masnerolyta* should be placed in the genus *Tropidopsilus*. and that the generic name *Masnerolyta* Buhl, 1997 is a junior synonym of *Tropidopsilus* Kieffer, 1908.

19:00 **HYMENOPTERA SHOWDOWN Session 1**

Platygastroidea, represented by Elijah Tamalas and Jessica Awad

Mymaridae, represented by Catherine Hébert

Non *Baeus* cute and brachypterous parasitoids, represented by Robert Kresslein

19:10 **Break 2 Session 1**

19:20 **Braconid parasitoids of the *Hydrangea* leaftier moth: a backyard natural history mystery**

Presenter: James Whitfield

James B. Whitfield (University of Illinois, Urbana, United States of America); Jose L. Fernandez-Triana (Canadian National Collection of Insects, Ottawa, Canada)

The *Hydrangea* leaftier moth, *Olethreutes ferriferana*, is a common minor garden pest of ornamental *Hydrangea*s in eastern North America, also occurring on wild native *Hydrangea*s. Studies by W. V. Baldig in the 1930s in the Urbana, Illinois area revealed two species of parasitoids, one of them a braconid, attacking caterpillars of the leaftier. Roughly 80 years later, the presenter of this talk sampled these caterpillars in the same area over several years and also found two species of parasitoids, both braconids but neither of them the same as Balduf found, and neither previously recorded from this host. The system is described and we speculate on why the situation today might be different.

19:35 **The great grapplers: Investigating the mechanisms powering the unique Dryinidae pincer**

Presenter: Carly Tribull - Social media handle: '@cmtribull

Carly Tribull (Farmingdale State College, Farmingdale, United States of America); Brendon Elias Boudinot (Senckenberg Institut & Naturmuseumg, Frankfurt, Germany); Thomas van de Kamp (Karlsruhe Institute of Technology, Baden-Wurttemberg, Germany)

Dryinidae, a family of parasitoid wasps within the Aculeata, are unique among the Hymenoptera for their chela - articulating pincers formed from a highly derived fifth tarsal segment and claw. Most dryinid females have chela, although there is variation in their mobility and ability to constrain prey. However, the internal anatomy of Dryinidae has rarely been examined and there are no detailed studies of the musculature or biomechanics of the chela and associated structures in the prothoracic segments. For the purposes of our study, we used synchrotron radiation micro-computed tomography (SR-µ-CT), scanning electron microscopy (SEM), and confocal laser

scanning microscopy (CLSM), to reconstruct the prothoracic anatomy of 4 species, representing a morphological sequence from achelate to chelate, and from having a short to long pronotum. Based on our results, we define the anatomy of the chela and propose a model for the mechanics of the modified tarsus.

19:50 The taxonomy of *Stelis foederalis* Smith (Hymenoptera: Megachilidae): it's not just black and white

Presenter: Cory Sheffield

Cory Sheffield (Royal Saskatchewan Museum, Saskatchewan, Canada)

Members of the cuckoo bee genus *Stelis* (subgenus *Stelis*) usually have body integument that is entirely black, or more commonly black with pale maculations on the metasoma, and occasionally on the mesosoma and head. However, unlike Palearctic members of the subgenus, many of the North American species have the integument metallic blue or green, these also with or without pale maculations. While examining specimens of *Stelis* s. str. from coastal British Columbia, Canada, it was noticed that some of the female specimens had a medial spine on the apex of sternum 6, a diagnostic feature of the widespread *S. foederalis* Smith, 1854 and *S. nitida* Cresson, 1878, both species with black bodies and with pale maculations. However, the specimens from British Columbia had metallic blue-green bodies. To resolve the taxonomy of these specimens as part of a larger taxonomic study of this genus in Canada, morphological examination of type materials and molecular analysis was undertaken, and the results are presented. In addition, a brief review of other North American bee taxa with both metallic and non-metallic forms is presented.

20:05 Taxonomic Revision of the *Perilampus carolinensis* Species Complex (Hymenoptera: Chalcidoidea: Perilampidae), and the Description of Five New Species.

Presenter: Jeong Jae Yoo

Jeong Jae Yoo (Royal Ontario Museum and University of Toronto, Toronto, Canada); D. Christopher Darling (Royal Ontario Museum and University of Toronto, Toronto, Canada)

This study recognizes seven species in the *Perilampus carolinensis* species complex, primarily Neotropical species within the *Perilampus hyalinus* species group, by combining morphology and two genes (COI and ITS2). Five new species are described.

20:10 The first genome-scale phylogeny of the Trigonalidae (Apocrita: Trigonaloidea): preliminary results

Presenter: Zachary Griebenow

Zachary Griebenow (Colorado State University, Fort Collins, United States of America); Vilas Brown (Colorado State University, Fort Collins, United States of America); Stephanie Eskew (Colorado State University, Fort Collins, United States of America); Marek Borowiec (Colorado State University, Fort Collins, United States of America)

The vanishingly rare family Trigonalidae (Apocrita: Trigonaloidea) constitute the largest radiation of hyperparasitoids in the Hymenoptera and are infamous for their convoluted ontogeny. Trigonalid morphology is oddly diverse relative to their low species-richness and also highly labile, obscuring intuition of their phylogeny from phenotype alone. Until now, there have been no comprehensive efforts to resolve trigonalid phylogeny or taxonomy with molecular data. We here briefly present a preliminary hypothesis of the phylogeny of the Trigonalidae, inferred from ultra-conserved elements (UCEs), considerably advancing our understanding of these enigmatic hymenopterans.

20:15 Soil Dwellers: What's Crawling and Buzzing Below

Presenter: Brittany Kohler - Social media handle: IG: (@BugswithBritt)

Brittany L. Kohler (University of California, Davis, United States of America)

Preliminary results of a novel systematic survey method for subterranean ants are presented, acquired from a premiere study of the subterranean arthropod fauna of Stebbins Cold Canyon, a site belonging to the Natural Reserve System (NRS) and located in the inner Coast Ranges of northern California. This study is novel in that few subterranean ant surveys have been conducted in the Nearctic region, and none have been produced using California's valuable NRS, in the globally recognized biodiversity hotspot that is the California Floristic Province.

20:20 Wrap-up

20:25 Hymathon Quiz and Great Hymenoptera Scavenger Hunt

“Wasp games” – Photograph by Devon Henderson

When I first saw a picture of *Cameronella*, I couldn't believe how bizarre it looked! Known as the "dart-tailed wasp", I naturally had to illustrate this in action. Pictured is a species of *Pepsis* playing a game of darts with said *Cameronella*. (No wasps were hurt in the making of this drawing). The materials that I used were fine-liner pens and alcohol-based markers.

SESSION 2, chaired by Miles Zhang

00:00 **Introductory remarks**

00:05 **KEYNOTE: The evolutionary history of bees in time and space**

Presenter: Eduardo Almeida

Eduardo Almeida completed his undergraduate and Master's degrees at Universidade Federal de Minas Gerais, Brazil, with Dr. Fernando Silveira and his PhD with Dr. Bryan Danforth at Cornell University, Ithaca, working on bee systematics and biogeography. With a keen interest in general comparative phylogenetic questions, particularly aimed at understanding bee diversity across space and time, he established his own lab in the Department of Biology at the Universidade de São Paulo in Ribeirão Preto, Brazil, in 2011. He is an Associate Professor and Curator of Entomology in the same department.

00:45 **Break 1 Session 2**

00:55 **A taxonomic study of the genus *Gastrancistrus* (Hymenoptera: Pirenidae) parasitizing gall midges (Diptera: Cecidomyiidae) in Japan**

Presenter: Kishin Inoue

Kishin Inoue (School of Interdisciplinary Science and Innovation, Kyushu University, Fukuoka, Japan); Kazunori Matsuo (Faculty of Social and Cultural Studies, Kyushu University, Fukuoka, Japan)

The genus *Gastrancistrus* (Hymenoptera: Pirenidae) contains at least 153 species worldwide. Among them, three species, *G. fuscicornis*, *G. sugitama*, and *G. hakonensis*, have been recorded from Japan. During our survey, we reared six *Gastrancistrus* species from six different sorts of galls that were induced by Cecidomyiidae (Diptera) in Japan. The present study tried to identify these *Gastrancistrus* species.

The galls were collected from various localities in Japan. The reared parasitoids were kept in the 99% ethanol. Dried specimens were made by the methods described by Matsuo (2020). Voucher specimens were kept in the collections of the Biosystematics Laboratory, Faculty of Social and Cultural Studies, Kyushu University, Fukuoka, Japan. Morphological examination revealed that every *Gastrancistrus* species, *Gastrancistrus* sp. 1 to sp. 6 were undescribed. Also, we found new candidates of morphological characters that newly can be used for the identification of this genus. In this presentation, we introduce diagnostic characters of undescribed species and morphological characters which were newly focused by us.

01:10 **Investigating the biodiversity and systematics of Australian rogadine parasitoid wasps using DNA barcoding and phylogenomics (Hymenoptera, Braconidae, Rogadinae)**

Presenter: Mollie-Rosae Slater-Baker - Social media handle: '@molliersb

Mollie Slater-Baker (The University of Adelaide, Adelaide, Australia); Michelle Guzik (The University of Adelaide, Adelaide, Australia), Juanita Rodriguez (Australian National Insect Collection CSIRO National Research Collections Australia, Canberra, Australia); Erinn Fagan-Jeffries (The University of Adelaide & South Australian Museum, Adelaide, Australia)

Rogadinae is a subfamily of parasitoid wasps belonging to the megadiverse family Braconidae. Rogadines are commonly known as ‘mummy wasps’, where members of the subfamily share the unique trait of mummifying their caterpillar hosts as the larvae develop. These wasps are found

throughout Australia, however only a fraction of their estimated diversity is formally documented. A particularly poorly studied tribe, the Betylobraconini, was found to belong to Rogadinae within the last decade following molecular work. Betylobraconini is endemic to Australia and surrounding regions, however the biology of all members of the tribe remains completely unknown, and their likely hosts can only be speculated based on morphology and the habits of related taxa. This project employs a combination of DNA barcoding for rapid assessment of rogadine diversity, along with a short read whole genome sequencing approach to extract Ultraconserved Elements and mitochondrial genomes from both fresh and museum specimens. Molecular methods are used alongside efficient morphological examination to document and explore the diversity of the Australian Rogadinae, and provide a foundational taxonomic and systematics framework for further work. With a focus on members of the Betylobraconini, the project also aims to provide a better understanding of the evolutionary history and biology of this poorly understood group. Here, initial results on the distribution and diversity of Australian Rogadinae based on DNA barcodes are presented, along with plans and outlooks for further study.

01:25 Phylogeny and classification of the ant subfamily Dolichoderinae

Presenter: Ziv Lieberman

Ziv E. Lieberman (University of California, Davis, Davis, United States of America); Jill Oberski (Senckenberg Museum and Research Institute, Frankfurt am Main, Germany); Brendon E. Boudinot (Senckenberg Museum and Research Institute, Frankfurt am Main, Germany)

The Dolichoderinae is among the 'big four' subfamilies where most ant species diversity is concentrated. Despite being ubiquitous, and often conspicuous and important ecologically and economically, the highly derived dolichoderines have seen relatively little systematic interest. This inertia is partially attributable to the trends of morphological homogeneity and widespread homoplasy, with extreme departures in form in a few lineages, along with the lack of contemporary molecular-genetic data. However, evolutionary patterns like strikingly uneven species diversity, heterobathmy, and recent rapid radiations merit further investigation.

Our research brings dolichoderine systematics into the modern era by re-investigating relationships under UCE-based phylogenomic inference and a variety of modeling approaches. We confirm some formerly educed clades, but infer a variety of new relationships at the genus, genus group, and tribal levels, including the placement of certain previously intractable lineages. Our phylogenetic inferences facilitate reinterpretation of morphology and reclassification at various ranks. We also broadly reinterpret and revise the rich fossil record of Dolichoderinae, as part of chronogram construction and historical biogeographical analysis.

01:40 Critical review of one of the oldest faunistic data sets of its kind – Bees and stinging wasps in Schäffer's "Icones" (1766–1779)

Presenter: Robert Zimmermann

Robert Zimmermann (University of Regensburg, Regensburg, Germany)

The current threat to biodiversity requires detailed assessments of regional faunas to plan and conduct informed nature conservation measures. To understand faunal change, and insect decline, and to assess the endangerment of species historical faunistic data is as important as recent data. This study is a contribution to a better understanding of the bee and aculeate wasp fauna of the Regensburg area by investigating historical data. The extraordinary old local-faunistic dataset by Jacob Christian Schäffer, the “Icones” (1766–1779) was exhaustively studied. All 3,000 published illustrations were manually scanned for bees and stinging wasps. Of 166 illustrations of

Hymenoptera: Aculeata (excl. Formicidae), 57 could be identified to a total of 33 distinct species. Several remarkable species records could be found in this historical dataset: Bombus pomorum (Panzer, 1805) [(almost) extinct from Bavaria], *Megachile parietina* (Geoffroy, 1785) [extinct from Bavaria], *Systropha planidens* Giraud, 1861 [extinct from Bavaria], *Batozonellus lacerticida* (Pallas, 1771) [extinct from Germany], *Scolia hirta* Schrank, 1781 [extinct from Bavaria], *Scolia sexmaculata* Mueller, 1766 [not known from the wider area], *Oxybelus lineatus* (Fabricius, 1787) [extinct from Bavaria], and *Sceliphron destillatorium* (Illiger, 1807) [not known from Bavaria]. Together with an extensive assessment of the species occuring in the Regensburg area today, this work provides the first comprehensive list of bee and aculeate wasp species in the region since 1840. Studying other taxa in the Icones with the methods used here promises further interesting results.

01:55 **Differences in Early Egg Cell Formation and Specification Between the Social Paper (*Polistes*) and the Model Fruit Fly**

Presenter: Laura Miller

Laura Miller (Drexel University, Philadelphia, United States of America); Ella McVerry (Drexel University, Philadelphia, United States of America); Kari Lenhart (Drexel University, Philadelphia, United States of America); Sean O'Donnell (Drexel University, Philadelphia, United States of America)

The fruit fly, *Drosophila melanogaster*, is a model organism to study the cellular characteristics of oogenesis, which is the formation and maturation of an egg cell. There are three main types of oogenesis, and the fruit fly exhibits meroistic oogenesis, in which the egg cell goes through multiple rounds of division to produce nurse cells which remain connected through actin filaments. These nurse cells do not mature into eggs and are there to support the growth of the oocyte. Insects in Hymenoptera, also have this type of oogenesis. Despite having similar processes of oogenesis, the ovaries of species can vary extensively to accommodate the needs of that species. Honeybee queens have large ovaries to facilitate the continuous production of thousands of offspring. The primitively eusocial paper wasps, *Polistes exclamans*, have queens that maintain smaller ovaries due to their small colony sizes. I used immunostaining techniques in this project to visualize cellular structures important for oogenesis in *D. melanogaster* and *P. exclamans*. In the early stages of oogenesis, I found variations in multiple areas involving egg cell specification and germ cell organization. This project will provide insight into how cellular processes in oogenesis differ between insects despite having a similar type of oogenesis. Also, how earlier processes in oogenesis may adapt with eusociality.

02:00 **HYMENOPTERA SHOWDOWN Session 2**

Cynipoidea, represented by Jackie Chitty

02:05 **Break 2 Session 2**

02:15 **Morphometric analysis of sawfly chromosomes of the genera *Tenthredo* Linnaeus, 1758 and *Athalia* Leach, 1817 (Hymenoptera, Tenthredinidae, Athaliidae)**

Presenter: Vladimir Gokhman

Vladimir Gokhman (Haifa, Israel)

Morphometric analysis of chromosomes of twelve sawfly species of the family Tenthredinidae and Athaliidae, namely, *Tenthredo arcuata* Forster, 1771, *T. campestris* Linnaeus, 1758, *T. mesomela* Linnaeus, 1758, *T. omissa* (Förster, 1844), *T. velox* Fabricius, 1798, *T. vespa* Retzius, 1783 (in all these species n = 10), *T. amoena* Gravenhorst, 1807 and *T. brevicornis* (Konow, 1886)

(n = 18 in both), as well as of *£%Athalia* bicolor$& Serville, 1823, *A. circularis* (Klug, 1815) (in both n = 6), *A. scutellariae* Cameron, 1880 (n = 7) and *A. rosae* (Linnaeus, 1758) (n = 8) is performed. Karyotype differences between species with the same chromosome numbers are revealed. Possible implications of chromosome morphometry for the sawfly taxonomy and phylogeny are discussed.

02:30 British Columbia's Community Bumble Bee Project

Presenter: Jennifer Heron

Jennifer Heron (British Columbia Ministry of Water, Land and Resource Stewardship, Surrey, Canada); Cory S. Sheffield (Royal Saskatchewan Museum, Regina, Canada)

There are approximately 37 bumble bee species in British Columbia, Canada, and most are wide-ranging and live in a variety of habitats across the vast provincial landscape. Data on bumble bee species population trends is lacking, making it difficult to monitor trends and assess a species conservation status. At present, five of the province's species have been assessed as Endangered, Threatened or Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and at least three additional species are potentially at risk. This presentation summarizes a project that aims to establish long term (> 10 years) bumble bee monitoring routes throughout the province, and concurrently build a community of trained volunteers who, once or twice within the summer months, would survey one or two of these routes within the areas they live and work. Survey routes include some of the same routes monitored as part of the North American Breeding Bird Survey program, as well as new routes; and routes travel through all the provinces ecozones. Ultimately, the data collected over the ten-year assessment timeframe will be used to determine long-term trends in bumble bee distribution and abundance, update conservation status assessments and range maps, and allow for targeted threat mitigation, for the province's bumble bees. The summer of 2024 was the fourth year of the project (started in 2021), challenges and successes to date will be briefly summarized.

02:45 Revising the Genus *Apanteles* (Hymenoptera: Braconidae) in Australia

Presenter: Erinn Fagan-Jeffries

Erinn Fagan-Jeffries (University of Adelaide, Adelaide, Australia); Mollie-Rosae Slater-Baker (University of Adelaide, Adelaide, Australia); Olivia Portmann (University of Adelaide, Adelaide, Australia); Katherine Oestmann (University of Adelaide, Adelaide, Australia); Tiahni Bament (University of Adelaide, Adelaide, Australia); Jose Fernandez-Triana (Canadian National Collection of Insects, Ottawa, Canada)

Apanteles is a genus of parasitoid wasps in the subfamily Microgastrinae and was previously known from only nine species within Australia. With specimens commonly collected in bulk sampling techniques like Malaise traps, and sometimes reared from their lepidopteran hosts, the genus has been crying out for a modern taxonomic revision for many years. Whilst progress on documenting the Microgastrinae has been increasing in both speed and quality over the last decade, *Apanteles* is a particularly challenging group even within the morphologically-conserved Microgastrinae – it intensely embodies the 'they're all tiny and black and look the same' mentality that has caused many of Australia's hyperdiverse insects to languish in museum collections undescribed. This highly collaborative project attempted an accelerated taxonomic approach to document *Apanteles* in Australia, using cytochrome c oxidase subunit I (COI) and Wingless (Wg) DNA barcodes from over 400 Australian *Apanteles* specimens from bulk samples, citizen science and recent field work. Using molecular species delimitation in combination with reduced morphological diagnoses, we confirmed at least 48 distinct molecular lineages in Australia, and 34 new species were formally described. In this presentation we'll discuss some of the collaborations

that made the project possible, and lament how ‘accelerated taxonomy’ is sometimes a relative term.

03:00 The honey bee stinger: From high-speed filming to 3D printing

Presenter: Fiorella Ramirez Esquivel - Social media handle: '@FiorellaEnto

Fiorella Ramirez Esquivel (UNSW, Canberra, Australia); Sridhar Ravi (UNSW, Canberra, Australia)

The honey bee stinger has the unique ability to separate from the bee body and continue to sting autonomously. Not only is this a remarkable anti-predator defence but it also facilitates direct observation of the stinger in action, unobstructed by the abdomen. The stinger’s piercing parts, the lancets, move in a reciprocating motion, propagating the stinger deeper into tissue. At the same time, the motion of the lancets pump venom by displacing the attached valvilli. These act as collapsible pistons, and also move in a reciprocating fashion. Once detached from the body the stinger has no way to replenish its energy stores and motion rapidly decays. Stinging concludes at approximately 30 seconds to 2 minutes post detachment.

In our study we observe the honey bee stinger using a combination of high-speed filming, SEM and microCT. We use these observations to describe the anatomy and kinematics of the stinger and attempt to reproduce its pumping and piercing behaviours using 3D printed, working models. Our work represents a deep dive into the insertion kinematics and fluid dynamics of the bee stinger.

03:15 Biodiversity of oak gall-associated *Torymus*

Presenter: Jackie Chitty

Jackie Chitty (Rowan University, Glassboro, United States of America); Andrew Forbes (University of Iowa, Iowa City, United States of America)

Here, we examine parasitoids in genus *Torymus*, important parasites of oak gall wasps across the globe. We combine both DNA barcodes and morphological characters to develop putative species limits for these parasites.Genetic work has not been performed in any significant way and would answer a lot of questions that pose barriers to future taxonomy research on this genus. High amounts of intraspecific variation can be found in this genus, ovipositor lengths and coloration appear to vary drastically within a single species. Genetic sequencing could elucidate which morphological traits correlate best with genetic differences, allowing the establishment of new species that better stand up to scrutiny. In addition to improving the quality of new descriptions of species it may also help improve the quality of old descriptions of species. Numerous species in the genus have host ranges in the double digits, and oligophagy has been shown to be rare in parasitoids in past genetic studies (often representing cryptic species instead). Because of this genetic work may show that many already established species in the genus might not represent natural species.

03:20 Wrap-up

03:25 Hymathon Quiz and Breakout rooms

SESSION 3, chaired by Zoltán László

06:00 **Introductory remarks**

06:05 **Puzzling taxonomy, ongoing speciation, and social parasitism: The case of the Nearctic pyramid ants**

Presenter: Jill Oberski - Social media handle: @jilloberski.bsky.social

Jill T. Oberski (Senckenberg Natural History Museum and Research Institute, Frankfurt, Germany)

Ants of the genus *Dorymyrmex* Mayr 1866, the "pyramid ants" or "cone ants," are widespread and frequently encountered in dry landscapes throughout North, Central, and South America and the Caribbean. Their conspicuous crater nests and propensity for tending hemipterans make them easy to detect, and socially parasitic species have evolved several times within the genus, but their puzzling taxonomy has long hindered research efforts. Recent work shows that the rapid Nearctic radiation is young and still actively speciating, often with two or more species in sympatry—a rich setting for the evolution of species interactions and social parasitism. To shed light on *Dorymyrmex* taxonomy and this fascinating system, I took an integrative approach that combines phylogenomics with classical morphological methods. I sequenced partial genomes of *Dorymyrmex* spanning the Nearctic region by targeting ultra-conserved elements (UCEs), inferred ML and Bayesian phylogenies, estimated divergence dates, and reconstructed hypothesized ancestral areas. Additionally, I generated a morphometric dataset of 24 measurements and 22 indices for 150 specimens, totaling 6,854 individual observations. The results indicate the presence of at least 27 *Dorymyrmex* species in North America, more than doubling the currently valid 13. Here, I present an overview of the Nearctic radiation and discuss how historical biogeographic changes have likely shaped 1) the coevolution of species within the genus and 2) the development of social parasitism both within and outside the bounds of Emery's rule. In sum, this work helps illuminate pyramid ant taxonomy as well as several origins of parasitism among North American ants.

06:20 **Developing a framework to progress the historically intractable Australian *Psyllaephagus* fauna, problematic but important parasitoids of lerp-forming psyllids.**

Presenter: Alana McClelland

Alana McClelland (University of Adelaide, Adelaide, Australia); Erinn Fagan-Jeffries (University of Adelaide, Adelaide, Australia); Michelle Guzik (University of Adelaide, Adelaide, Australia); Miles Zhang (University of Edinburgh, Edinburgh, United Kingdom); Andy Austin (University of Adelaide, Adelaide, Australia); Steve Cooper (University of Adelaide, Adelaide, Australia); Juanita Rodriguez (CSIRO, Canberra, Australia)

The current taxonomic framework for describing new species of *Psyllaephagus* in Australia is largely intractable, mainly due to damaged or missing types and, as such, the genus has been neglected for almost 40 years. An absence of robust taxonomic and molecular data, and often erroneous associations records among *Psyllaephagus* and their hosts has halted progress on this important group of parasitoids. We present the first molecular phylogeny and species delimitation of the fauna reared for this study, which goes some way to disentangling the taxonomy of the genus in Australia.

06:35 Right phylogeny, wrong time: geographic barriers, host recognition barrier, and local adaptation shaped a pseudocospeciation between conifers and wasps

Presenter: Xiaoxiao Chen

Xiaoxiao Chen (Sichuan University, Chengdu, China); Jingge Kuang (Sichuan University, Chengdu, China); Miles Zhang (University of Edinburgh, Edinburgh, United Kingdom); Yi Wang (Sichuan University, Chengdu, China); Jialiang Li (Sichuan University, Chengdu, China); Wenqian Hu (Sichuan University, Chengdu, China); Senlin Yang (Sichuan University, Chengdu, China); Wentao Wang (Sichuan University, Chengdu, China); Tao Li (Sichuan University, Chengdu, China); Kangshan Mao (Sichuan University, Chengdu, China)

A key issue in host-symbiont evolution lies in understanding their speciation history. High phylogenetic congruence between hosts and symbionts can arise from cospeciation or host-shift speciation, but the factors driving such patterns at the population level remain poorly explored.

Here, we conducted a population genomic and phenotypic survey of the herbivorous wasp *Megastigmus* daduheensis (Chalcidoidea, Megastigmidae), which feeds on seeds of Cupressus chengiana （Cupressaceae）, revealed three genetically and phenotypically distinct lineages. These lineages correspond to their host and are distributed across three river valleys in the eastern Qinghai-Tibet Plateau. Phylogenetic congruence between the three wasp lineages and eleven cypress populations, coupled with a strong correlation in genetic distances, supports the cospeciation hypothesis. However, the wasp's lineage divergence, dated to the early Holocene, is much more recent than that of its host.

Geographic barriers have restricted gene flow, promoting lineage differentiation. Local adaptation of wasps, likely linked to phenotypic traits, olfactory cues, and host-specific volatile compounds that preferentially attract wasps from the same valley (as confirmed by behavioral tests), may have further driven incipient speciation during the Holocene.

These findings highlight the rapid evolution of genomic and phenotypic differentiation and host recognition barriers in *Megastigmus* wasps. They also suggest that cophylogenetic patterns can arise surprisingly quickly through pseudocospeciation.

06:50 The identity of *Telenomus remus* Nixon (Scelionidae) a cosmopolitan egg parasitoid of *Spodoptera* species

Presenter: Andrew Polaszek

Andrew Polaszek (Natural History Museum, London, United Kingdom); Weetek Tay (CSIRO, Canberra, Australia)

The egg parasitoid *Telenomus remus* Nixon is the most widely-reported species attacking eggs of *Spodoptera* spp., many of which are major crop pests, especially of cereals. The relatively recent increase in the distribution and impact of *Spodoptera frugiperda* - Fall Armyworm or FAW - has led to much increased interest in its parasitoids, especially *T. remus*. A long-standing question regarding possible synonymy of *T. nawai* (Japan), *T. spodopterae* (Indonesia: Java) and *T. remus* (Malaysia) has been answered by collections in all 3 type localities and comparisons of mitogenomes.

07:05 **Three intriguing species of Eupelmidae from South Africa: guessing on their biology and taxonomy**

Presenter: Lucian Fusu

Lucian Fusu (University „Alexandru Ioan Cuza", Iași, Romania); Simon van Noort (Iziko Museums of South Africa and University of Cape Town, Cape Town, South Africa); Jean-Yves Rasplus (CBGP, INRAE, CIRAD, IRD, Montpellier SupAgro, University of Montpellier, Montpellier, France)

Three new species of Eusandalinae (Chalcidoidea: Eupelmidae) were discovered in South Africa. They are included in *Exosandalum* which should be resurrected from synonymy under *Eusandalum*. We choose this taxonomic solution instead of considering them derived species within *Eusandalum* because in an unpublished collaborative study using ultraconserved elements (UCE) of Eupelmidae they form a group which is reciprocally monophyletic to other members of Eusandalum included in the analysis. The divergence between the two clades is similar to that between Heydeniidae and Calosotinae for example, or between any other two genera of the subfamily Eusandalinae. Two of the new species are brachypterous, this being the first known species with short-winged females within the subfamily. They have peculiar morphological adaptations that suggest a subterranean or nocturnal lifestyle and enhanced jumping abilities.

07:20 **HYMENOPTERA SHOWDOWN: Session 3**

Eucharitidae, represented by Natalie Dale-Skey

Dolichoderinae: The Odorous Ants, represented by Jill Oberski

07:25 **Break 1 Session 3**

07:35 **Evolution of prey type and life history traits in the Crabronidae (Apoidea)**

Presenter: Idris Adams - Social media handle: @IdrisAdamsBio

Idris Adams (UCL, London, United Kingdom)

The Crabronidae family of apoid wasps is highly diverse, comprising nearly 10,000 species globally. Between subfamilies and genera there are varying levels of prey specificity, with some species acting as highly specific predators of one prey type, while others are generalists. Despite their importance as apex predators and pest controllers in their ecosystems, literature on the Crabronidae is largely limited to either natural history studies documenting their nesting behaviours and life histories, or taxonomic revisions, with little analysis of the proximate causes of these behaviours. Using a novel database of wasp-prey records extracted from the scientific literature, and applying phylogenetic methods such as ancestral state reconstruction, I aim to shed light on the drivers of variation in predator-prey interactions in this group. Additionally, I will consider how prey specificity in this family has evolved in relation to life history traits including nesting type and provisioning behaviours, with potential insights into the evolution of sociality and behavioural flexibility in the apoid wasps.

07:40 Think Pink! The Taxonomy and Systematics of Gall-inducing Tanaostigmatidae

Presenter: Tareva-chine Atkin-Zaldivar

Tareva-chine Atkin-Zaldivar (The University of Adelaide, Adelaide, Australia); Erinn Fagan-Jeffries (The University of Adelaide, Adelaide, Australia; South Australian Museum, Adelaide, Australia); Yuanmeng Miles Zhang (University of Edinburgh, Edinburgh, United Kingdom); Alana McClelland (The University of Adelaide, Adelaide, Australia); Ken Walker (Museums Victora, Melbourne, Australia)

Amongst the parasitoid lifestyle of most of the superfamily Chalcidoidea (order Hymenoptera), whole families have developed phytophagous and gall-inducing life strategies. Many of these families are only described when the galls they create become pests in the agricultural industry overseas, meaning that within Australia many of these groups are largely undiscovered. One of these groups is the family Tanaostigmatidae; only 11 species are currently described in Australia though estimates suggest that the true diversity is much larger. One species has already been known for years by citizen scientists through the bright pink, fluffy galls it makes, yet it has not been formally described. This presentation will share the initial results of a PhD project on the taxonomy of chalcids that form galls on native Australian flora, by introducing a new species of gall-forming wasp on Bossiaea (Fabaceae).

07:45 Morphological adaptation between *Juniperus* seeds and *Megastigmus sabinae* (Chalcidoidea: Megastigmidae)

Presenter: Chunxu Chen

Chunxu Chen (Sichuan University, Chengdu, China); Miles Zhang (University of Edinburgh, Edinburgh, United Kingdom); Kangshan Mao (Sichuan University, Chengdu, China)

Conifers make up about one third of global forests but are threatened by seed parasitoid wasp species. Many of these oligophagous wasps belong to the genus *Megastigmus*, yet little is nown about their interaction relationship. In this study, We plan to explore the interaction between the two from the perspective of population genomics.

07:50 Can you hear how old a bee is?: the sound of morphological senescence

Presenter: Alixandra Prybyla

Alixandra Prybyla (University of Edinburgh, Edinburgh, United Kingdom); Ava Nelson (University of Edinburgh, Edinburgh, United Kingdom); Graham Stone (University of Edinburgh, Edinburgh, United Kingdom); Jonathan Silvertown (University of Edinburgh, Edinburgh, United Kingdom)

Non-lethal ageing techniques in bees are largely imprecise and not generalisable across localities and taxa (see: hair discoloration, behavioural assessments, &c.). Several studies have indicated that the accumulation of wing wear (e.g., damage in a bee's wings) is correlated with time, and, therefore, age. While recording foraging flight audio for a different project, the presenting researchers noticed that the quality of sound in targeted specimens (*Bombus pratorum* males) was audibly different between worn and unworn individuals. This led to a season-long (i.e., beginning of March to end of May) capture-recapture study of the univoltine hairy-footed flower bee (*Anthophora plumipes*) in the Royal Botanic Gardens Edinburgh (RBGE). Male and female individuals were baselined upon their initial emergence (or first sighting), and then repeatedly over the course of the season. Target specimens were recorded using a specialised parabolic microphone, captured, cooled to torpor, marked with a coloured and numbered disc for identification purposes, measured, and photographed for a more granular assessment of wing wear back in the lab. Individuals were then manually warmed and released. In ImageJ, employing the landmarking system often used in Geometric Morphometrics, wing photos were measured

and analysed. This data is currently being measured against acoustic features extracted from the flight bioacoustics recorded prior to each wing being photographed. Initial results have yielded unique insights into the nonlinear nature of wing wear accumulation, with more insights to come!

07:55 KEYNOTE: The trouble with parasitoids? Pattern and process in the global evolution of oak gall phenotypes

Presenter: Graham Stone

Graham Stone is Professor of Ecology at the Institute of Ecology and Evolution at Edinburgh University. His research focuses on insect-plant interactions, particularly pollination and the evolution, adaptive significance and development of insect-induced galls. This talk will look at how we can test the idea that selection imposed by parasitoids may have driven the evolution of the striking trait diversity seen in galls induced by cynipid wasps on oaks and other Fagaceae.

08:35 Break 2 Session 3

08:45 International Society of Hymenopterists 2024 business meeting

09:45 Wrap-up

"Squared in" – Photograph by Shweta Mukundan

Potter wasps and mud daubers find the darkest corners to build nests-like the corners of windows which are protected from rain and direct sunlight. In the image you can see me in an acrobatic pose carefully extracting the mud nest stuck to the wall at Indian Institute of Science, Bengaluru. The picture was shot on Canon EOS 750D on 16.03.2023

SESSION 4, chaired by Cristina Vasilița and Manuela Sann

13:00 Introductory remarks

13:05 KEYNOTE: Evolving perspectives in Hymenoptera systematics

Presenter: Tamara Spasojevic

Tamara Spasojevic completed her undergraduate studies in General Biology at the University of Belgrade and her master`s studies at the University of Bern in Switzerland. She began her research on Hymenoptera during her PhD under the supervision of Dr. Seraina Klopfstein, focusing on the incredibly diverse Darwin wasps. Following her PhD, Tamara held postdoctoral positions at the Smithsonian National Museum of Natural History and Natural History Museum in Basel. She then assumed a role of Curator of Hymenoptera at the Natural History Museum in Vienna. Since her PhD, Tamara has been working on establishing a time scale of evolution of Darwin wasps, integrating fossils, morphology, and molecular data, while employing both empirical and simulation-based approaches. Her latest projects look at mass extinction events and their impact on the evolutionary dynamics of Darwin wasps. Simultaneously, she has been exploring hostrelated evolutionary patterns in polysphinctine spider parasitoids using phylogenomic methods to uncover the complexities of their fascinating relationships.

13:45 Break 1 Session 4

13:55 Itchy feet but whose? The little fire ant *Wasmannia auropunctata* in Cyprus

Presenter: Jakovos Demetriou - Social media handle: '@JakovosD

Jakovos Demetriou (National and Kapodistrian University of Athens, Athens, Greece; Laboratory of Vector Ecology and Applied Entomology, Joint Services Health Unit Cyprus, Akrotiri, Cyprus; Enalia Physis Environmental Research Centre, Nicosia, Cyprus)

Native to South America, the little fire ant *Wasmannia auropunctata* has spread around the globe with the ever-increasing translocation of people and goods. Beyond its native range it has earned its position amongst the world's worst 100 invasive alien species due to its severe impacts on native biodiversity. It also has socio-economic impacts including negative effects on human and animal health. In July 2022, *W. auropunctata* was included in the EU list of Invasive Alien Species of Union Concern mandating Member States to establish monitoring schemes, possible eradication measures, and ways to mitigate its harmful impacts. In the Mediterranean, the little fire ant has been detected outdoors in Israel, Spain, France, and the island of Cyprus, where it was first detected in 2022, inhabiting urban habitats including parks, gardens, and plant nurseries. Since then, knowledge of its distribution, pathways of introduction and spread as well as its impacts, have been increasing, including recent reports of stinging and presence both in agricultural sites and protected areas. Nevertheless, so far we only have sparse, anecdotal records of occurrence without any robust quantitative accounts on its prevalence in local habitats. Hence, more research is necessary to provide such quantitative data that are indispensable for the evaluation of its impacts on native biodiversity, agriculture, the economy, and human well-being. In light of recent developments such data could help guide monitoring and management efforts as well as inform national policy on invasive alien species.

14:10 One Name, Many Faces: Exploring the Diversity of *Aphanogmus* Thomson, 1858 (Hymenoptera: Ceraphronidae) with Emphasis on the Caucasus Region

Presenter: Tobias Salden

Tobias Salden (Leibniz Institute for the Analysis of Biodiversity Change, ZFMK, Museum Koenig, Bonn, Germany); George Japoshvili (Institute of Entomology, Agricultural University of Georgia, Tbilisi, Georgia); István Mikó (University of New Hampshire Collection of Insects and other Arthropods, Durham, United States of America); Ralph S. Peters (Leibniz Institute for the Analysis of Biodiversity Change, ZFMK, Museum Koenig, Bonn, Germany)

The currently described species diversity of parasitoid wasps does not reflect their actual diversity. Our research on the grotesquely underexplored Ceraphronoidea conducted in biodiversity hotspots of the central-eastern Afromontane regions (Kenya, Tanzania) and the Caucasus (Armenia, Georgia) supports this hypothesis. We have identified 88 new species, more than doubling the known Ceraphronoidea species in the Afrotropics. Additionally, we initiated the first dedicated efforts to study Ceraphronoidea from the Caucasus, a region with only five unverified species records for the superfamily. Our findings reveal significant diversity within both Ceraphronidae and Megaspilidae, identifying approximately 160 species, many of which are likely new to science. Exemplarily, we demonstrate our revised integrative biodiversity discovery approach in the description of new species groups and several new species of the most species-rich genus of Ceraphronidae in the Palaearctic, *Aphanogmus* Thomson, 1858. Our results underscore the necessity and feasibility of studying the largely overlooked parasitoid wasp fauna in biodiversity hotspots. We aim to stimulate further exploration of small-bodied and megadiverse insect groups by providing taxonomic knowledge essential for biodiversity conservation, evolutionary studies, and understanding ecological networks.

14:25 Artificial Intelligence for species identification in parasitoid wasps: a case study on Scelionidae

Presenter: Ecaterina Pirvu - Social media handle: '@ecaterina_pirvu

Cristina Vasilița (Stuttgart State Museum of Natural History, Stuttgart, Germany); Ecaterina Pîrvu (Stuttgart State Museum of Natural History, Stuttgart, Germany; University „Alexandru Ioan Cuza", Iași, Romania); Christian Pylatiuk (Karlsruhe Institute of Technology, Karlsruhe, Germany); Lorenz Wührl (Karlsruhe Institute of Technology, Karlsruhe, Germany); Hossein Shirali (Karlsruhe Institute of Technology, Karlsruhe, Germany); Ovidiu Popovici (University „Alexandru Ioan Cuza", Iași, Romania); Lars Krogmann (Stuttgart State Museum of Natural History, Stuttgart, Germany; University of Hohenheim, Stuttgart, Germany)

Artificial Intelligence (AI) has potential for automated species identification, based on image recognition algorithms. Dark Taxa lack descriptions and identification keys due to their small sizes, high species diversity, complicated biology and limited taxonomic expertise. Convolutional Neural Networks (CNNs) are trained to identify species using insect images of morphologically identified specimens and could greatly advance biodiversity research in dark taxa. The small sized insects are photographed using the Entomoscope, a stacking imaging device developed by the Robotics Team (IAI) at the Karlsruhe Institute of Technology (KIT). It allows taking pictures of extremely small insects, while being portable, user friendly and relatively cheap, as most of its parts are 3D-printed, as well as being suitable for a wide range of insect sizes as it comes with a set of interchangeable lenses. We present a study case of using AI for species identification on the family Scelionidae based on barcode vouchers from the German Barcode of Life III: Dark Taxa Project, at the Stuttgart State Museum of Natural History. The GBOL III: Dark Taxa voucher collection of Scelionidae was morphologically identified by taxonomists, as well as checked against reference libraries, therefore is reliable for use in training of the AI. Additionally, scelionid

wasps are a great candidate as a mega-diverse group of insects, with high relevance in biodiversity research, presenting a wide range of hosts, applicability in pest control and agricultural and economical importance.

14:40 **Molecular and morphological systematics of *Sycophila* (Hymenoptera: Eurytomidae) associated with *Ficus* (Moraceae)**

Presenter: Atiyeh Naghizadeh

Atiyeh Naghizadeh (University of Cape Town, Cape Town, South Africa); Simon van Noort (Iziko Museums of South Africa, Cape Town, South Africa); Charlene Janion-Scheepers (University of Cape Town, Cape Town, South Africa); Hossein Lotfalizadeh (Iranian Research Institute of Plant Protection, Tehran, Iran)

Sycophila Walker (Hymenoptera: Eurytomidae) is the fourth largest genus of Eurytomidae

(Chalcidoidea) and comprises 141 valid species worldwide. While tropical and subtropical species of *Sycophila* are mainly associated with figs and are typically considered true parasitoids or inquilines, their diversity and biology are not well understood, especially in the Afrotropical region. In this study, adult fig wasps collected from 21 different African *Ficus* species were sorted and identified. As a result, four new species of *Sycophila* have been identified based on morphological characterization. The *Ficus* species from which adult fig wasps were collected include *F. abutilifolia*, *F. artocarpoides*, *F. bubu*, *F. burkei*, *F. chirindensis*, *F. conraui*, *F. fischerii*, *F. glumosa*, *F. ingens*, *F. lingua lingua*, *F. louisii*, *F. modesta*, *F. natalensis*, *F. ovata*, *F. petersii*, *F. polita*, *F. sansibarica*, *F. stuhlmannii*, *F. sur*, *F. sycomorus*, and *F. wakefieldii*,.Molecular aspects of the study are yet to be pursued. Potential findings of molecular analyses will be used along with the morphological findings to provide a well-resolved recently studied phylogeny of the genus. By understanding the biology and ecology of *Sycophila* species it may be possible to develop more targeted and effective methods for controlling non-pollinating fig wasps, which can have a significant negative impact on pollination and hence fig propagation.

14:55 **Unique courtship display of small *Eupelmus muellneri* (Hymenoptera: Eupelmidae)**

Presenter: Matvey Nikelshparg

Matvey I. Nikelshparg (Ben-Gurion University of the Negev, Beer-Sheva, Israel; Saratov State University, Saratov, Russia); Vasily V. Anikin (Saratov State University, Saratov, Russia)

Hymenoptera are recognized for their unique courtship behaviors. However, detecting such behavior in small wasps, especially in parasitoid ones presents a significant challenge. We were able to record unique details of the courtship ritual of *Eupelmus muellneri*. We meticulously described the steps of the display and highlighted the differences and similarities between it and the courtships of other species of Hymenoptera order. We found that *E. muellneri* males perform one of the most complex rituals, which includes leg, antennae, and abdomen movements as well as guardianship behavior. The *E. muellneri* female was found to have the response to the courtship of the male, which shows the complexity of this intraspecies interaction. The study of courtship displays can enhance our understanding of insect behavior and the evolutionary importance of courtship complexity in the Eupelmidae family.

15:00 **HYMENOPTERA SHOWDOWN: Session 4**

Ichneumonidae, represented by Gavin Broad

15:05 **Break 2 Session 4**

15:15 Fantastic Beasts and How to Save Them: Mowing Strategies for Microhymenoptera

Presenter: Maura Haas-Renninger - Social media handle: '@MauraRenninger

Maura Haas-Renninger (State Museum of Natural History Stuttgart, Stuttgart, Germany); Justus Weber (Institute of Biology, Chemical Ecology (190t), University of Hohenheim, Stuttgart, Germany); Isabel Felske (Institute of Biology, Chemical Ecology (190t), University of Hohenheim, Stuttgart, Germany); Thomas Kimmich (Arbeitsgruppe für Tierökologie und Planung GmbH, Filderstadt, Germany); Michael Csader (State Museum of Natural History Stuttgart, Stuttgart, Germany); Oliver Betz (Institute of Evolution and Ecology, Evolutionary Biology of Invertebrates, University of Tübingen, Tübingen, Germany); Lars Krogmann (State Museum of Natural History Stuttgart, Stuttgart, Germany); Johannes L. M. Steidle (Institute of Biology, Chemical Ecology (190t), University of Hohenheim, Stuttgart, Germany)

The worldwide decline of insects is a major challenge for humankind, driven largely by intensive farming practices that reduce habitats and food resources and cause direct mortality through pesticides. Mowing grasslands, especially frequently in roadside verges, adds another threat. These verges, covering large areas globally, can serve as habitats and corridors for biodiversity if managed ecologically, such as with arthropod-friendly mowing. Microhymenoptera, diverse and prominent in meadows, play key roles as parasitoids but are overlooked in mowing impact studies. We explored which microhymenoptera families inhabit roadside verges and meadows, assessed their vulnerability to conventional mulching mowers, and identified groups benefiting from arthropod-friendly mowing using the Eco 1200 plus from MULAG and a flushing bar. In our experimental plots, 18 families from six superfamilies (Chalcidoidea, Ceraphronoidea, Diaprioidea, Ichneumonoidea, Platygastroidea, and Proctotrupoidea) were found. Conventional mulching mowing resulted in a significant loss of up to 64% for parasitoid Hymenoptera. Conversely, the Eco 1200 plus reduced impact on Chalcidoidea by saving 38% of individuals compared to the conventional mower. The flushing bar also significantly affected the total number of individuals, with reductions in Chalcidoidea and tendencies in Ichneumonoidea by 30% and 47%, respectively. This study demonstrates the negative impact of conventional mowing on microhymenoptera and shows partial mitigation for Chalcidoidea and Ichneumonoidea through arthropod-friendly mowing. Our findings highlight the necessity of considering microhymenoptera in the context of insect conservation.

15:30 Latitudinal diversity gradients in Darwin wasps unraveled by global-scale DNA barcoding data

Presenter: Bernardo Santos

Bernardo Santos (Museum für Naturkunde, Berlin, Germany); Amrita Srivathsan (Museum für Naturkunde, Berlin, Germany);); Karen Neves (Universidade Federal de Uberlândia, Uberlândia, Brazil); Rudolf Meier (Museum für Naturkunde, Berlin, Germany)

The latitudinal diversity gradient is firmly established for charismatic organisms but virtually untested for the small, hyperdiverse invertebrate taxa that make up most of terrestrial biodiversity. We analyzed species diversity patterns on a global scale based on DNA barcodes for 1.35 million specimens collected in 101 Malaise traps placed at 45 sites in 27 countries. We confirm that over 50% of the species and specimens belong to the top 10 most diverse families, a pattern that held across sites, continents and habitats. Six families showed the expected latitudinal diversity gradient, but four had no significant increase in diversity towards the tropics. The most striking deviation of the pattern were Ichneumonidae parasitoid wasps, which significanly decrease in diversity and relative abundance towards the tropics, regardless of host specialization. In general, the latitudinal diversity gradient is relatively modest for the top 10 families when compared to previous studies based on larger and more well-studied organisms.

Our results highlight the need to tackle the diversity of doninant insect clades, which have been largely neglected thus far, as a priority in order to gain a broad understanding of global ecological patterns.

15:45 Preliminary information of the findings of fossil Aphidiinae (Hymenoptera, Braconidae) from Danish amber

Presenter: Maryna Kaliuzhna - Social media handle: https://twitter.com/marinka_kma

Kaliuzhna M.O. (I.I. Schmalhausen Institute of Zoology of NAS of Ukraine, Kyiv, Ukraine); Perkovsky E.E. (I.I. Schmalhausen Institute of Zoology of NAS of Ukraine, Kyiv, Ukraine, Natural History Museum of Denmark, Copenhagen, Denmark)

Aphidiinae is a worldwide distributed and practically important subfamily of aphid parasitoids within the family Braconidae. Currently, 31 fossil species of 16 genera are known (Ortega-Blanco et al., 2009; Davidian et al. 2021 a, b, 2022, 2023 a, b). The oldest known species *Archephedrus stolamissus* is described from the late Cretaceous (Albian) of Spain (Ortega-Blanco et al., 2009). Most of the fossil Aphidiinae (21 species) were described from the Oligocene (Quilis, 1940; Stary, 1970, 1973). Two species are described from middle Eocene Sakhalinian amber (Davidian et al., 2021 a, b) and 7 species – from late Eocene Baltic amber (Brues, 1933; Stary, 1970; 1973, Davidian et al. 2022, 2023 a, b). Aphidiinae are present in late Eocene Rovno amber (Kaliuzhna, Perkovsky, 2021). Information about the presence of braconids in Danish (Scandinavian) late Eocene amber had been reported by Butcher et al. (2014), Kittel (2015), and Belokobylskij et al. (2024 a, b), however, no data on Aphidiinae were published.

The history of the study of Danish amber is presented in Lyubarsky et al. (2024a) and references herein. The fauna of Danish amber (mostly from the western coast of Jutland), and Rovno amber as well, contains more cryophobic elements (see Archibald et al. 2023) than Baltic amber fauna (Perkovsky 2016, 2017; Kirichenko-Babko and Perkovsky 2023; Belokobylskij et al., 2023, 2024a; Jenkins Shaw et al. 2024; Lyubarsky et al. 2024b, c). Notably, half of Danish amber hymenopteran genera are unknown from Baltic amber, indicating high endemism and suggesting a distinct geographic origin (Larsson, 1978; Belokobylskij et al., 2024b).

We present several findings of Aphidiinae from Danish amber collection deposited in the Natural History Museum of Denmark with notes on their morphology and possible taxonomic status.

16:00 Distribution and prevalence of *Diplolepis* (Hymenoptera, Diplolepididae) induced galls on wild roses in Romania: insights from a three-year survey

Presenter: Zoltan Laszlo - Social media handle: '@_LaszloZoltan_

Zoltán László ('Hungarian Department of Biology and Ecology' and 'Centre 3B', Faculty of Biology and Geology, Babeș-Bolyai University, Cluj-Napoca, Romania); Attila Mátis ('Hungarian Department of Biology and Ecology', Faculty of Biology and Geology, Babeș-Bolyai University, Cluj-Napoca, Romania)

Small indicator communities, such as insect-induced plant galls, offer valuable insights into ecosystem health and habitat specificity. Species Distribution Models (SDMs) are vital tools for understanding and predicting species habitats, especially in the context of biodiversity conservation and ecological forecasting. The primary objective of our long-term fieldwork is to develop SDMs regarding Romania's wild rose species, *Diplolepis* gall inducers, and their parasitoids. These models are expected to provide critical insights into species distribution and gall formation patterns, offering a robust basis for ecological forecasting and conservation planning. Our preliminary results give descriptive parasitological indices for the wild roses and their *Diplolepis* gall inducers from the surveyed regions. Here we present our findings from a

three-year survey of wild roses and associated *Diplolepis* gall-inducing species across seven regions in Romania: Oltenia, Muntenia, Dobrogea, Moldova, Maramureș, Crișana, and Banat. Using a systematic approach, randomly selected bushy sites were surveyed every 50 km along 1.5 km transects, each assessed over a one-hour period. During each survey, wild rose species were identified, and all *Diplolepis* galls present on them were documented. Data analysis focused on calculating the prevalence and incidence of each gall inducer across the recorded rose species. Further surveys across the Carpathian Mountains and along Romania's NW-SE axis will complete this extensive dataset, enabling comprehensive modelling for regional biodiversity assessment and management. These data will contribute to the mapping of the distribution of these communities, providing reliable data for monitoring environmental changes, identifying conservation priorities, and enhancing predictive accuracy for species interactions and ecosystem resilience.

16:15 Mapping nocturnal wasps

Presenter: Gavin Broad - Social media handle: '@BroadGavin

Gavin Broad (Natural History Museum, London, United Kingdom)

Baseline distribution and ecological data are vital for exploring change in wasp populations over time. However, it can take quite a while to generate the data, decades in this case. I will briefly explain how I am gathering data on nocturnal ichneumonoids in the UK and what I hope to do with the data.

16:20 Recurrent genomic dynamics and parallel evolution of secondary phytophagy in Hymenoptera

Presenter: Ronja Reinisch

Ronja Reinisch (University of Hohenheim, Stuttgart, Germany); Johannes L.M. Steidle (University of Hohenheim, Stuttgart, Germany); Jürgen Gadau (University of Muenster, Muenster, Germany); Mark Lammers (University of Muenster, Muenster, Germany); Manuela Sann (Natural History Museum of Bern, Bern, Switzerland)

The phytophagous lifestyle is a key innovation in insects and has evolved in only one third of all insect orders. The evolution of phytophagy likely involves fundamental behavioural and morphological changes accompanied by chemosensory and metabolic adaptations. To date, the genomic basis and genetic innovations related to evolutionary dietary shifts are poorly understood. Here we focus on two monophyletic groups within the Hymenoptera, Aculeata and Chalcidoidea, that secondarily developed larval phytophagy independently several times. To shed light on evolutionary processes that shaped the diversity of nutritional adaptations in Hymenoptera we address the following main research questions: (1) Is parallel evolution at the phenotypic level reflected by parallel genome evolution? And (2) did similar genomic innovations appear when independent lineages realized convergent dietary transitions? Here I want to give first insights into newly sequenced genomes of representative phytophagous aculeates. These genomes will be the basis of further analyses that will be of interest to scientists in the fields of functional genomics, systematic biology and protein function analysis of insects.

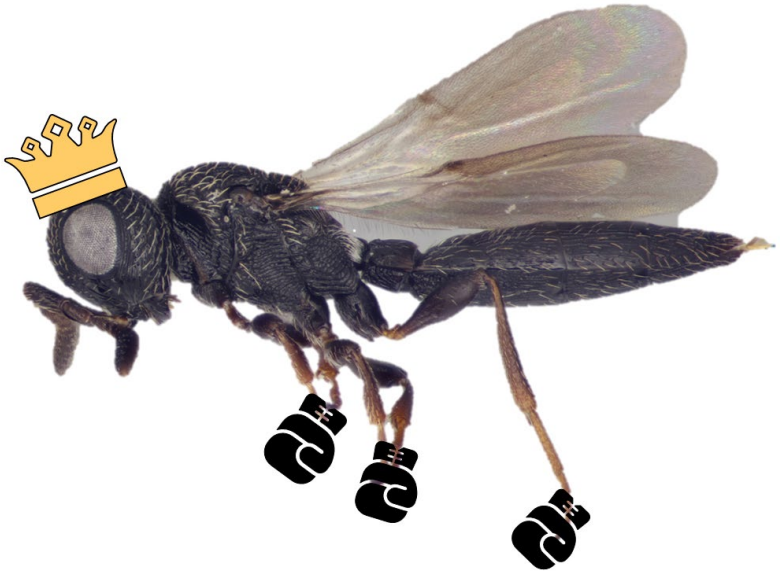
16:25 Wrap-up including prize announcements

16:45 Hymathon Quiz

HYMENOPTERA SHOWDOWN

Refereed in 2024 by Erinn Fagan-Jeffries

Introduced in 2023, the showdown is a lighthearted opportunity for all ISH members to argue why their taxon of choice is the best (or at least the best loved…) in three minutes and three slides - backing up that assertion with a mix of fun, cool and *(possibly un)*scientific facts.



Last year's winners, the Platygastroidea, will be defending their title – and six other groups have risen to the challenge:

SESSION 1, Thursday 5 December from 19:00 UTC:

- **Platygastroidea**, represented by Elijah Tamalas and Jessica Awad
- **Mymaridae**, represented by Catherine Hébert
- **Non *Baeus* cute and brachypterous parasitoids**, represented by Robert Kresslein

SESSION 2, Friday December from 02:00 UTC:

- **Cynipoidea**, represented by Jackie Chitty

SESSION 3, Friday December from 07:20 UTC:

- **Eucharitidae**, represented by Natalie Dale-Skey
- **Dolichoderinae: The Odorous Ants**, represented by Jill Oberski

SESSION 4, Friday December from 15:00 UTC:

- **Ichneumonidae**, represented by Gavin Broad

Who will be crowned this year's winner? YOU DECIDE! All Showdown presentations will be available for you to vote at https://www.hymenopterists.org/hymenoptera-showdown-2024/ throughout Hymathon.

ART COMPETITION

Run by Cristina Vasilița

Images entered in the five categories below will be available for voting throughout Hymathon at https://www.hymenopterists.org/hymathon-art-competition-2024/

Photography – Specimen: Specimen images of Hymenoptera.

Photography – Live Hymenoptera: Live Hymenoptera images photographed in the field or in the indoor studio.

Photography – Hymenopterists in action: Field work pictures, humorous or intriguing pictures of hymenopterists at work.

Illustration – Scientific illustrations: Detailed and accurate drawings that represent the morphology and anatomy of Hymenoptera. These illustrations should be designed to provide a clear understanding of the species, highlighting specific features that may be of scientific interest, and can be used in research papers, taxonomic keys, or educational materials.

Illustration – Fun & Artsy Hymenoptera/Hymenopterists: Creative and imaginative artworks that showcase Hymenoptera or Hymenopterists in a playful, artistic, or unconventional manner. These can be abstract interpretations, cartoons, or any other artistic renditions that bring out the fun and whimsical side of Hymenoptera and their researchers.

"Professional hymenopterists and the acquired taste of inhaling moths" – Photograph by Alexandra Viertler

We went to Zambia for collecting Darwin wasps (Ichneumonidae) for 2 weeks. The place we stayed was next to Lake Tanganyika, and while checking our light traps we were swarmed by thousands of tiny moths. They flew everywhere: your mouth, nose, eyes and even ears. Some of us were rather unbothered, while others got creative as not to inhale too many moths. (On the images from left to right: Alexandra Viertler, Rita Gonzalez Dominguez, Tamara Spasojevic, Noah Meier).

Hymathon Social Events

Organised by Erinn Fagan-Jeffries

Join us for the Hymathon Social events!

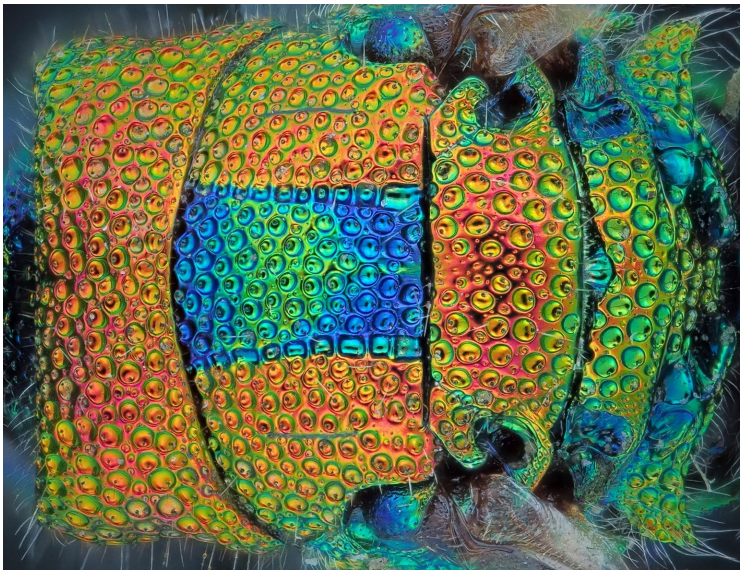
Session 1:
Join us for part one of the Hymathon quiz! Held over Kahoot, the quiz will span all three social time slots – who will reign champion at the end of Hymathon?
After the quiz, in this social session there will also be a 'Great Hymenoptera Scavenger Hunt' – what does that mean? Come along and find out!

Session 2:
In session two, we'll use break-out rooms themed by taxonomic group and some clear instructions to help people get to know each other. Which person in your break-out room has collected Hymenoptera on the most continents? Who has attended the most ISH meetings? Who has the best hymenopteran-themed coffee cup? Join in to get to know your fellow hymenopterists and share some stories of your adventures. We'll also do another round of the Hymathon quiz! Make sure to use the same username as in the first rounds, to tally your points.

Session 3:
There will be no social in Session 3 – instead attend the ISH business meeting!

Session 4:
In session 4, we'll play the final round of the Hymathon quiz and announce the winners!

Head to https://www.hymenopterists.org/hymathon-2024-socials/
to check for updated information and instructions



"*Chrysis blanchardi*" – Photograph by Paolo Rosa

Chrysis blanchardi Lucas, 1849, female, Spain. Photo camera: Camera Olympus E-M1 Mark II with the Olympus Zuiko 60mm F:2.8 macro and a Mitutoyo plan achromatic LWD 5x, stacked with the software Helicon Focus (ver. 7.6).

CODE OF CONDUCT

The International Society of Hymenopterists aims to encourage scientific research and to promote the diffusion of scientific knowledge concerning Hymenoptera.

The Society aims to be inclusive to the largest number of contributors, with the most varied and diverse backgrounds possible. As such, we are committed to providing a friendly, safe, and welcoming environment for all, regardless of gender, sexual orientation, ability, ethnicity, socioeconomic status, and religion.

We expect all participants at ISH functions to abide by our Code of Conduct policy (see https://www.hymenopterists.org/ish_code_of_conduct_2019/), and in particular to exercise consideration and respect and refrain from demeaning, discriminatory, or harassing behavior and speech

https://www.hymenopterists.org/

Journal of Hymenoptera Research