

## Preliminary Program – Subject to Change – Last updated 7/17/23

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**Tuesday, July 18**

### **PRE CONFERENCE TRIP**

#### **Three Canyons, Two Days, One Awesome Trip!**

Led by Zack Lemann, Audubon Butterfly Garden and Insectarium; Clayton Leopold, Moody Garden

Join Zack Lemann and Clayton Leopold in Florida Canyon at a work station managed by the University of Arizona. This small but beautiful canyon rests between Madera and Box Canyons. Participants will gather at the field station by noon for lunch on the 18th and then have the opportunity to explore Florida Canyon or Madera Canyon on Day 1 of this overnight trip. That evening, black lighting in Box Canyon will amaze on most any night during the desert monsoon season. Day 2 will include breakfast and then more exploration before we depart for Tucson around lunch time. The habitat here hosts an incredible number of fantastic arthropods and other amazing species.

This experience includes one night of lodging and three meals (lunch, dinner & breakfast). Transportation to the field station is not included but carpools and timing will be arranged with participants once booked. *Bedding and towels are not provided.* Beds will have a basic flat sheet on top of the mattress. Kitchens are fully equipped with a stove, fridge, microwave, pots and pans, dishes, utensils. Space is limited to 24 participants, and responsible collecting is allowed. Open to conference participants 18 years of age or older.

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**Wednesday, July 19**

**1:30 PM - 5:30 PM Registration Presidio Desk**

### **EVENING EVENTS**

**5:30 PM - 9:00 PM**

**Welcome, Keynote Presentation, and Reception and Dinner Presidio III,IV,V**

**Invertebrates In Captivity: How and Why it Happened**

**Michael Weissmann, Kallima Consultants, Inc**

How the conference came to be, in the words of Steve Prchal as published in the Conference Proceedings from 1993, read (and perhaps embellished a bit)

**IECC 2023 Keynote Speaker - Dr. Paul Marek, Virginia Tech University**

Dr. Marek is an associate professor of systematics at Virginia Tech and a global expert on millipedes, probably best known for his work on bioluminescent millipedes in North America and for the recent discovery in Australia of the first millipede species described to actually possess a thousand legs (1,306, to be precise)!

When he is not teaching, doing research, searching for glow-in-the-dark millipedes or counting their legs, Dr. Marek is a member of the Entomological Society of America, The Virginia Entomological Society and the Centre International de Myriapodologie.

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**Thursday, July 20**

**5:30 AM - 6:30 AM Registration, Presidio Desk**

**8:00 AM - 4:00 PM Registration, Presidio III,IV,V**

**8:00 AM - 4:00 PM Silent Auction, Presidio I, II**

**FIELD TRIPS** - Pre-registration required. All field trips will meet at Presidio Registration Desk. To help keep the cost of the field trips down and to be sympathetic to those that do not feel comfortable riding in closed vehicles with large groups of people we will be asking for volunteers to help with carpools for the field trips. All field trips will be supplied with light snacks and water. Please bring a refillable water bottle, best to start with it filled!

**6:00 AM – Noon**

**Peppersauce Canyon Day Hike**

Led by Emma Califf, Arizona-Sonora Desert Museum

Join Arizona-Sonora Desert Museum keeper Emma Califf for an exploratory day hike in Peppersauce Canyon. This stunning region of the Santa Catalina Mountains is home to a high diversity of invertebrate, reptile, and amphibian life. July is the perfect time of year to see rainbow and lubber grasshoppers, as well as many different species of praying mantises, jumping spiders, stick insects, and more. Wear closed-toe shoes, and be sure to bring plenty of water. Space is limited to 15 participants, and this is a no collecting field trip.

**7:00 AM – Noon**

**Behind the Scenes at the Arizona – Sonora Desert Museum**

Led by Tom Weaver, Arizona -Sonora Desert Museum

Come see behind the scenes at the Arizona-Sonora Desert Museum with Curator of Herpetology, Ichthyology, and Invertebrate Zoology Tom Weaver. Get a look at our diverse collection of snakes, amphibians, inverts, and more. After a 30-45 min tour of the collection, take advantage of free admission to the general Museum grounds for conference-goers! Space is limited to 15 participants, and this is a no collecting field trip.

**MORNING WORKSHOPS**

**9:00 AM – Noon, Agave Ballroom**

**What the frass!? Composting with Invertebrates: Opportunities for Raising Feeders, Sustainable Implementation, and Educational Programming**

Led by Giangelo Leos, Food Exploration & Discovery (Food ED)

Invertebrates are some of the most important decomposers, soil shredders, and composters of the world. In this hands-on workshop we will address how diverse invertebrates can reduce food waste at your institution or organization and create usable frass and compost, develop community engagement, raise feeders, and build exciting educational programming connected to sustainability, environmental justice, and opportunities in new waste management laws.

We will cover building different composting bins for diverse worms, isopods, flies, and soil inverts like springtails, mites, and microbial life that fit your composting and food waste needs both large and small. Participants will receive plans for building bins, expanded resources for bin management, and a chance to take home luggage-approved composting items/small composting bins.

**9:00 AM – Noon, Palo Verde**

**Bugs for All: Building Diverse, Inclusive and Equitable work Environments and Programming**

Led by Karen Verderame and Jacquie Genovesi, University of Pennsylvania School of Veterinary Medicine and Academy of Natural Sciences of Drexel University

It is up to us to make STEM spaces welcoming for all. Our identity, knowledge, communication style and interactions with others are shaped through our lived experiences. Participants will gain insight into the complex systems of oppression and how they influence identity, power and status and learn how to identify their own implicit biases. We will explore resources and techniques on how to affect change and bring diversity, equity, inclusion and accessibility into our work and programming. After building this foundational knowledge we will work together to build examples of inclusive and accessible programming to engage diverse audiences.

**12:30 PM - 1:30 PM - COMPLIMENTARY lunch provided for conference participants, Presidio III,IV,V**

**PAPER SESSION**

**1:30 PM – 3:10 PM Primarily Pollinators, Presidio III,IV,V**

**1:30 PM Welcome and Announcements**

**1:40 PM – 2:00 PM Souls Under the Highway: Establishing Pollinator Habitat in an Historic Cemetery**

Faith B. Kuehn, State of Delaware

During construction of Interstate 95 in the 1960s, a 20ft. embankment was built over a county potters field and the adjacent wetland destroyed. The cemetery and wetland were forgotten, turning into an overgrown dump. Delaware Naturalists and historians recently cleared the trash and invasive plants, installed a State historic marker, and are establishing pollinator habitat borders. The cemetery location adjacent to a major Greenway trail offers opportunities to educate the public about the area's history and the vital importance of native plants and ecological landscaping. Pollinator landscaping will connect the past to the present and future.

**2:00 PM- 2:20 PM Virgin Queen Behaviour and Controlled Mating in the Stingless Bee *Tetragonula carbonaria* (Meliponini)**

Francisco Garcia Bulle Bueno, Butterfly Pavilion

Improving knowledge of virgin queen behaviour and mating biology in stingless bees is an important step towards artificial selection programs for managed colonies and conservation. We assess whether young queens of the Australian stingless bee *Tetragonula carbonaria* can be mated under constrained conditions. Queen behaviour followed a typical pattern with three phases: a period of high activity and wing-flapping on top of the brood, attempts to leave the colony for the nuptial flight, and oviposition. Together, these trials indicate that controlled matings with *T. carbonaria* are possible but suggest that queens may need to actively accept mating for successful mating.

**2:20 PM – 2:40 PM Expanding the use of Photo-identification Technology to Include Tiny, Flighted, and Ephemeral Species**

Jenny Shrum, On Sacred Ground

Photo-identification is widely used to determine population sizes and behavior in mid-to-large-size creatures, yet this technology is grossly under-utilized in rare insect research. Like many endangered species, recovery of the island marble butterfly has been stymied by insufficient information about its dispersal, longevity, and even population size in response to various management strategies. Advances in digital camera technology, accelerating database processing, improved artificial intelligence software, and the ease at which these are accessed has made it possible to use mere photos to answer critical conservation questions about this species. With careful consideration of habitat, it may be possible to engage the public in this research improving awareness and cost efficiencies.

**2:40 PM – 3:00 PM Budburst: Investigating How Our Pollinators are Navigating a Changing Climate**

Erin Mills, Houston Botanic Garden

We all know that our climate is changing, but one thing we are not sure of is how it is impacting our native plants, and the pollinators that rely on them. Enter Budburst, a community science project that allows you record important observations and submit data with your phone. Erin Mills, Education Manager for the Houston Botanic Garden will introduce you to the project and discuss possible applications for your organization.

**3:00 PM – 3:10 PM Epigenetic Effect on Larval Melanin and Pattern Determining Genes for Lepidopteran Host *Danaus plexippus* (short)**

Ainsley Basham, University of South Florida

Epigenetic variation is crucial for populations when considering environmental factors; how they affect phenotypic plasticity and local adaptations which can lead to speciation. This study analyzes larvae of *Danaus plexippus* to determine if temperature-dependent phenotypes are an inheritable trait or caused by epigenetic changes. If found an epigenetic change, research will identify if DNA methylation occurs during embryo or larval development. Our aim is to provide a better understanding of development, genetic change, evolution and adaptations in butterflies as their environment changes.

**3:10-3:30 PM BREAK**

## **ROUNDTABLES**

### **3:30 PM – 5:00 PM, Agave Ballroom**

#### **Butterfly Conservation**

Facilitated by Dr. Jaret Daniels, Florida Museum of Natural History; Erin Sullivan, Woodland Park Zoo and Paige Howorth, San Diego Zoo

This is a great opportunity to convene with other organizations actively working toward the recovery of imperiled butterflies and share common challenges and solutions.

### **3:30 PM – 5:00 PM, Palo Verde**

#### **Tarantula Breeding Summit**

Facilitated by Jessie Sutherland, Point Defiance Zoo & Aquarium

Who doesn't love baby tarantulas? At this roundtable we will discuss all the tips, techniques, tricks, and arcane magic that it takes to produce a lovely clutter of spiderlings. We will be focusing on documenting methodology for *Aphonopelma*, *Brachypelma*, *Grammostola*, and *Poecilotheria* – but bring all your input from other genera as well! Join us to discuss nutrition, pairings, enclosure set up for hopeful mothers, seasonal timing and manipulation, environmental parameters, and what to expect when you're expecting (tarantulas).

## **EVENING EVENT**

### **7:00 PM - 10:00 PM, Meet at Presidio Desk**

#### **Black Lighting the Night Away - Catalina State Park (Flycatcher picnic site)**

Black lights, sheets and mercury vapor lights will be set up at Catalina State Park to enjoy the insect life as it flies in. Please note that this event is organized at no cost to conference participants. This means that there will be no meal provided, and participants are encouraged to eat before attending. Restrooms are available at the site. Car caravans will be organized via a sign-up sheet in the exhibit hall and will depart from the resort at 7 pm.

Map of the area [CATA Park Map 2022 01.pdf \(usedirect.com\)](#)

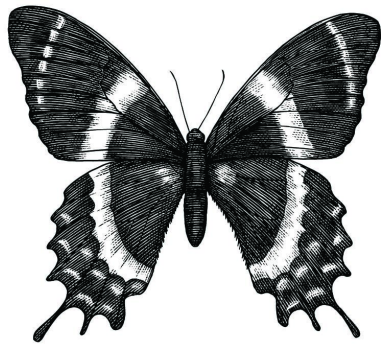
In case of inclement weather, please check in at the lobby of the hotel to see if the event was canceled or moved.

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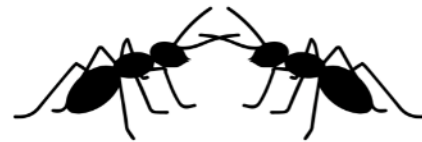


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**Friday, July 21**

**8:00 AM - 4:00 PM Silent Auction Presidio I,II**

**8:00 AM - 4:00 PM Registration , Presidio III,IV,V**

Registration may close during paper sessions and lunch

**FIELD TRIPS** - Pre-registration required. All field trips will meet at Presidio Registration Desk. To help keep the cost of the field trips down and to be sympathetic to those that do not feel comfortable riding in closed vehicles with large groups of people we will be asking for volunteers to help with carpools for the field trips. All field trips will be supplied with light snacks and water. Please bring a refillable water bottle, best to start with it filled!

**6:00 AM – Noon**

**Saguaro National Park**

Led by Lucas Hetherington, Saguaro National Park

Take a trip to Saguaro National Park, where we will be granted access to a secluded area of the Rincon Mountains where perennial waters fill tinajas and support a wide variety of wild creatures in a very unique habitat. Make sure to bring close toed shoes and sun protection in addition to lots of snacks and water for this canyon adventure. After exploring the canyon we will visit the Visitor Center and drive around the Cactus Forest Loop of Saguaro NP (time permitting). Space is limited to 13 participants, and this is a no collecting field trip

**6:15 AM - Noon**

**Exploring Mt. Lemmon**

Led by Courtney Christie -Arizona-Sonora Desert Museum

Explore Mt. Lemmon with Arizona-Sonora Desert Museum keeper Courtney Christie during a leisurely to moderate day hike, where the mountain air is a bit cooler than the hot desert below. There are several options for where we might go— TBD based on weather conditions leading up to the trip. This trip would largely consist of branching out and meandering after a short hiking distance of a mile or less. There are trails in these areas so further exploration is an option for individuals, but you don't have to venture far

to experience the biodiversity in the area. Potential locations include Mt. Bigelow, Gordon Hirobayashi, or Molino Basin. Mt. Bigelow is higher elevation (8,000 ft)— amongst the pine trees there are hillsides of plants that attract butterflies, beetles and Hymenoptera alike. The latter two locations are mid-elevation (~4,500 ft) with a stream that is active during the rainy seasons. There's potential to see various invertebrates, in addition to vertebrates such as lizards, mud turtles, amphibians and snakes. This trip will likely be a single location, but there is potential for flexibility depending on invert activity. Please wear closed-toed shoes, bring plenty of water, and a snack, as it's at least a one hour drive each way from the conference. Space is limited to 15 participants and this is a no collecting field trip.

## **MORNING WORKSHOPS**

**9:00 AM – Noon, Agave Ballroom**

**Macro Photography for Everyone, Everywhere, at Every Budget**

Led by Sebastian Echeverri, Freelance

Finally seeing an invertebrate at their own tiny scale is a dream come true but actually taking pictures of very small animals might seem like a daunting and expensive venture. Don't worry! In this workshop, you will learn how to take excellent photos of all the tiny life around you, no matter your budget or previous experience. We will explore all the key equipment, camera settings, and animal handling skills you need for great shots. We'll also discuss how to use your new skills in your research, social media, education/outreach programs, and more. Just bring any device capable of taking photos!

**9:00 AM – Noon, Palo Verde**

**Scared but not Scarred: Calming the Spider-Phobic Layperson**

Led by Anne B. Johnson, Henderson County Public Schools, Retired

No doubt many of you have had nervous people ask the identity of a spider they have in their house, garden or elsewhere in their lives. Arachnophobia leads to the destruction of spiders and other insects essential to a healthy ecosystem and often the overuse of toxic chemicals. This workshop will demonstrate the use of layperson friendly identification techniques through games such as Password, To Tell the Truth, What's My Line, etc. This foundation will allow instructors to tailor their own presentations for either classrooms or community outreach.

## **ROUNDTABLES**

**10:30 AM – Noon, Mesquite**

**Creating a System for Institutional Animal Sharing**

Facilitated by Tanya Minott, Thanksgiving Point

Captive breeding of many invertebrate species is a necessary activity within invertebrate-centric collections. It's becoming increasingly difficult to source unrelated individuals of several taxa, like

mantids and orthopterans, and other commonly exhibited species may benefit from a regularly scheduled bug swap among institutions. Thanksgiving Point would like to facilitate a discussion to create systems that will increase communication between US facilities with the goal of sharing animals for healthy breeding opportunities and will initiate any agreed upon first steps. Those with stud book or other collection management experience are particularly welcome, as are members of both AZA and non-AZA institutions.

**10:30 AM – Noon, Presidio III,IV,V**

**Beetle Larvae Rearing and Substrate**

Facilitated by Julie La Turner, Houston Zoo

We still get interested parties asking about our fermented flake soil and larvae, and know other institutions are experimenting as well! We would like to invite interested parties to a discussion on what species they are interested in breeding, what types of substrates are being used, methodology of making substrates, what is working or not working, and any troubleshooting, questions or brainstorming that is desired.

**12:30 PM -1:30 PM COMPLIMENTARY lunch provided for conference participants, Presidio III,IV,V**

**PAPER SESSION**

**1:30 PM – 3:20 PM Reaching Out, Presidio III,IV,V**

**1:30 PM Welcome and Announcements**

**1:40 PM – 2:00 PM WeBeeScientists: Partnering for Place-Based Biodiversity Curriculum**

Catherine Bartlett, Arizona-Sonora Desert Museum

The Arizona-Sonora Desert Museum and Flowing Wells Unified School District are co-designing and implementing place-based STEM units for elementary grades. The lessons incorporate local phenomena, research from Museum scientists, and biodiversity data to enhance student engagement and support teachers teaching science. This session will explore authentic collaboration, benefits to formal and informal educators, barriers to overcome, and student outcomes.

**2:00 PM – 2:20 PM Invertebrate Inspired Innovations**

Dominique Thomas, Academy of Natural Sciences

Khyla Carter and Ilianny Perez, Women in Natural Sciences Program

Engineering WINS(EngWINS), also known as Engaging Women in Engineering, is an NSF-funded project entering its 4th year of introducing young women to how engineers use the engineering design process to create solutions to challenges that we experience in our natural world. One of the most prominent

components of EngWINS is an introduction to the design process of Biomimicry, also known as nature-inspired innovation. EngWINS provides an introduction to live invertebrates and then explores how these organisms inspire scientists to develop some of the world's most innovative and impactful tools and resources. EngWINS design, build and present their own biomimicry inspired prototypes.

**2:20 PM – 2:40 PM Accessibility Considerations in Live Insect Displays at Small and Mid-size Institutions**

Miles Maxcer, Jennifer Schlauch, Trapjaw Science Communications; University of Florida Department of Entomology and Nematology, Gainesville; University of California, Irvine

As exhibitors of live invertebrates, we focus on telling stories about underappreciated organisms and the roles they play in our lives and in the natural world. During the exhibit design process, it is also important to consider using methods that increase accessibility to ensure our messaging can effectively reach a wide audience. We discuss feasible methods to ensure exhibits and events can be accessed by people with disabilities, and ways that Trapjaw Science Communications is innovating in the space of live insect exhibits to increase accessibility and provide cost-effective, scale-appropriate options for small and medium-sized institutions.

**2:40 PM – 3:00 PM Murals**

Wayne Wehling, Retired USDA APHIS

Love them or list them, murals have emerged on the scene in the past several decades. Murals with arthropods, butterflies in particular, are showing up all over the place. Are they useful for promoting invertebrate education, entomological or environmental education? Are they useful to promote or highlight your exhibit/facility? I feel that anything that reminds us about arthropods, puts arthropods in our face, is a first step. Butterflies bring a positive response to everyone, but do they get us thinking about nature? Let's talk about our experiences.

**3:00 PM -3:10 PM Investigating Empathy and Welfare Knowledge from an Invert Facet (Short)**

Karen Verderame, Penn Vet Shelter Medicine and Community Engagement

Like many programs offered in informal science institutions like zoos and museums, humane education programs delivered through schools and animal shelters aim to teach respect, empathy and compassion through animal-related learning activities. Penn Vet Shelter Medicine and Community Engagement is conducting a study to test the reliability of two new scales developed to measure student knowledge regarding animal welfare and empathy towards animals, as well as to investigate the impact of humane education programs on student knowledge and empathy towards animals. After review of the scales and goals, we would like to invite discussion, interest, and potential collaborations with fellow institutions to utilize the scales in current program offerings and explore how the scales may be modified and implemented in future investigations with invertebrates and measuring attitudinal changes towards invertebrates.

**3:10 PM -3:30 PM BREAK**

## PAPER SESSION

### **3:30 PM- 6:00 PM AZA and Invertebrates: Reimagining the Mold, Presidio III,IV,V**

#### **3:30 PM – 3:50 PM Managing a Zoological Invertebrate Collection**

Winton Ray, Cincinnati Zoo & Botanical Garden

To manage a zoological collection of live terrestrial invertebrates requires the understanding and maintenance of an assortment of protocols, guidelines, policies and permits. This presentation will walk IECC attendees through the most important of them.

#### **3:50 PM – 4:00 PM AZA Animal Programs Reimagined**

Erin Sullivan, Woodland Park Zoo

In 2019 AZA approved a strategic plan to reimagine the current way the organization manages its animal species. This is in response to a sustainability crisis. In addition the one size fits all was not working for many programs. All Species Survival Plans (SSP's) have now been reviewed, let's see what the future looks like.

#### **4:00 PM – 4:20 PM Over 30 years of snails: Conservation of an extinct in the wild snail species (*Partula nodosa*)**

Kayla Garcia, Saint Louis Zoo

*Partula* snails (family Partulidae) feature prominently in groundbreaking research on island species radiation. Once numbering over a hundred species, one third of these were declared extinct by the late 20th century due to introduced predators. Zoos and universities made a last ditch attempt to save what was left and after 30 years, the first snails were finally returned home to French Polynesia. COVID-19 halted this important work, but reintroductions resumed in 2023. This paper will recount the latest reintroduction efforts, discuss a new method for post release surveying utilizing UV fluorescent paint, and describe next steps in the international conservation efforts for these special snails.

#### **4:20 PM – 4:30 PM North American Monarch SAFE (Saving Animals From Extinction): The Genesis of the First Insect SAFE Program**

Paige Howorth, San Diego Zoo

The SAFE North American monarch's program goal is to take action for monarch conservation, inspire increased action throughout their communities through public education and engagement, and promote reduction of the threats to monarch butterflies with specific conservation outcomes.

#### **4:30 PM – 4:50 PM Ahead of Its Time: Opportunities for Growth in SWARM (Safety Web for Arthropod Reproduction and Management)**

Jessie Sutherland, Pt. Defiance Zoo and Aquarium

Analysis of the TITAG Regional Collection Plan illuminated that the invertebrate collections in most zoos relied on many of the same species. Some of these species are not currently being bred in captivity while other species were being maintained at only one or two zoos, making them vulnerable to extinction in our collections. With this in mind, TITAG developed the Safety Web for Arthropod Reproduction and Management (SWARM) project. The primary goal of SWARM is to promote the maintenance of sustainable populations for invertebrate programs and exhibition while reducing the risk of key populations disappearing from collections without warning.

**4:50 PM-6:00 PM TITAG Meeting - All welcome!**

We will be discussing the papers in this session and covering other TITAG agenda items such as Welfare, Invertebrates used in education programs, etc.

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**5:15 PM- 10:00 PM**

**Afternoon at Sycamore Canyon**

Led by Jim Melli, San Diego Natural History Museum

Lots of interesting creatures are lured into activity by the cooling temperatures and lower light of the late afternoon and evening. Critters not seen anywhere else in the US can be found here and the spectacular mountain landscape makes for awesome photography. We will follow Ruby Road into Sycamore Canyon. Once we get there, we can hang out and poke around and see what's out and hidden. If we're up for it, we can fire up a Bioquip black light and see who flies in. Let's have our food packed and ready so there is more time to explore Nature. Moderate hiking is involved in the trip so make sure to wear appropriate footwear. Space is limited to 15 participants and this is a no collecting field trip.

**5:30 PM -9:30 PM**

**Douglas Springs Night Hike**

Led by Emma Califf and Courtney Christie, Arizona Sonora Desert Museum

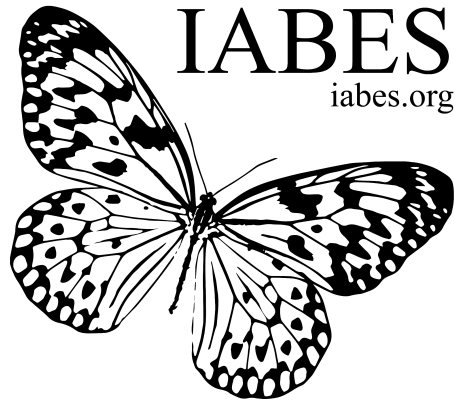
You've seen the Sonoran Desert during the heat of summer, but have you seen it come to life at night? Join Arizona-Sonora Desert Museum keepers Emma Califf and Courtney Christie for a leisurely night hike and discover the new world that comes alive under the stars. Nestled in the foothills of the Rincon Mountains, just up the street from Saguaro National Park East, Douglas Springs contains a high diversity of flora and fauna. When the sun goes down and the temperature drops (a little), we have a chance to see (not collect) a wide variety of native invertebrates, including but not limited to tarantulas, sun spiders, and scorpions, in addition to the extraordinary local herpetofauna, like Gila monsters, rattlesnakes, and toads. Wear closed-toe shoes, bring plenty of water, and bring a headlamp or flashlight if you have one. (We will supply extras). Space is limited to 10 participants and this is a no collecting field trip.

**7:00 PM – 9:00 PM INSECT TRIVIA, MOVIE AND GAME NIGHT, Presidio III,IV,V**

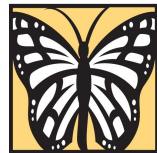
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**Saturday, July 22**

**8:00 AM - 4:00 PM Silent Auction**

**8:00 AM - 4:00 PM Registration - Registration may close during paper sessions and lunch. Presidio III,IV,V**

**PAPER SESSION**

**8:00 AM - 11:10 AM Invertebrate conservation and Research, Presidio III,IV,V**

**8:00 AM Announcements**

**8:10 AM - 8:30 AM So You Want to Start an Invertebrate Conservation Program? What you Need to Consider**

Mitch Magdich, Toledo Zoo & Aquarium



As with any conservation program, there are a number of points to consider before diving head first into a full-fledged invertebrate conservation initiative. This presentation will explore those points you've already considered and several you likely have not considered. In addition, you will be presented with a road map that explores several avenues to be actively involved and make valuable contributions to invertebrate conservation regardless of expertise, funding, staffing or other perceived limitations.

**8:30 AM – 8:40 AM Impacts of Artificial Light on the Mortality and Growth Rates of Tanzanian Tailless Whip Scorpions (*Damon diadema*) (short)**

Kelsey Stone, Thanksgiving Point's Butterfly Biosphere

This study explores the impact of artificial light on the mortality and growth rates of Tanzanian Tailless whip scorpions (*Damon diadema*), a species naturally found in low light environments. Little is known about how artificial light affects invertebrates in captivity, so we established two sets of control and test groups to explore the implications of development under exposure to ambient lab lights compared to a zero-light setting. Average body size, molting frequency, and deaths were recorded to gain an understanding of how this aspect of our animal care influences their health and physiology.

**8:40 AM – 9:00 AM The Lord Howe Island Stick Insect - Establishing a Legend from Down Under in the U.S.**

Paige Howorth, San Diego Zoo

Presumed extinct for more than 70 years, the Lord Howe Island stick insect *Dryococelus australis* became the most famous insect in the world when a tiny population was rediscovered in the wild in 2001. What followed was an impressive effort by the Melbourne Zoo to bring this animal back from the brink, and to later engage international partners. As one of only two partners currently maintaining assurance colonies outside of Australia, this presentation will detail the challenges and successes in the 11-year journey to a sustainable population at the San Diego Zoo.

**9:10 AM – 9:20 AM My Experience Raising *Strategus aloues* on Different Diets (short)**

Michael Chao, Student

This year I conducted my first scientific entomology experiment. The project's purpose was to analyze whether a variety of food supplements would influence the growth of *Strategus aloues* larvae. Adult *Strategus aloues* were captured during last year's IEEC conference, and bred to produce larva. The larva were then fed three types of protein - dog food, fish pellets, and mycelium. I will present my data, findings and recommendations for future experiments.

**9:20 AM – 9:40 AM From Coast to Coast: Comprehensive U.S. At-Risk Butterfly Conservation and Recovery Efforts**

Dr. Jaret C. Daniels, Florida Museum of Natural History

A growing body of evidence supports ongoing defaunation of butterflies in North America. The drivers of loss are complex and often attributed to multiple, interacting factors, several of which may be incompletely understood. In the face of this uncertainty, effective at-risk species recovery efforts require a comprehensive toolkit of diverse options to help stabilize, reestablish, and ultimately increase wild

populations. As part of a comprehensive decadal effort, we focused on some 42 different declining or federally listed butterfly taxa in the United States. We deployed collaborative recovery planning with diverse stakeholder communities using the Open Standards for the Practice of Conservation to strategically develop, manage and evaluate tailored initiatives. These involved a broad mix of approaches including habitat and species restoration, basic research, and public education. We present a detailed overview of these efforts, their impact and the lessons learned.

**9:40 AM – 9:50 AM Effect of Additional Host Plant on the Health of *Extatosoma tiaratum* (short)**

Lynn Fennema, San Diego Zoo

The spiny stick insect, *Extatosoma tiaratum*, is a common insect in managed care, yet there is little scientific information on the effects that diet has on their overall health and welfare. In this study, two groups of *E. tiaratum* were given a diet of either only eucalyptus (their primary host plant) or eucalyptus and tree lucerne. Differences in welfare outcomes between the groups were found, including longevity, number of eggs laid, and the weight of eggs laid. Adding an additional host plant appeared to be overall beneficial to the health of the animals.

**9:50 AM- 11:10 AM - Break out session**

Presenters and attendees have further opportunities to engage with each other and share information about topics presented in session.

**11:10 AM -11:20 AM Break**

**11:20-12:00 PM USDA round table, Presidio III,IV,V**

This discussion will cover updates to USDA/APHIS PPQ policy as well as serve as a question and answer session for permit holders.

**12:00 PM -1:30 PM Lunch on your own**

**PAPER SESSION**

**1:30 PM – 4:30 PM Striving for Sustainability: Invertebrate Health, Welfare and Nutrition, Presidio III,IV,V**

**1:30 PM - 1:50 PM *Eudicella smithii* - Working to Build a Better Substrate**

Nathan Brockman, Reiman Gardens, Iowa State University

*Eudicella smithii*, commonly known as jade headed buffalo beetles, are regularly kept in captive breeding colonies. *Eudicella smithii* prefer leaf-based substrates, specifically oak-leaf based. There are many different ways to produce an oak mulch substrate that flower beetles can be reared on. A study was conducted to determine if the process used to create oak mulch substrate affects the size of captive reared adult flower beetles. This paper will share the process used to create the different mulches and result of these trials.

**1:50 PM – 2:10 PM Beetles: the Prequel to Larvae Production at Houston Zoo**

Julie LaTurner, Houston Zoo

Prequels are a trend in Hollywood, Houston is now bringing them to IECC! We covered rearing of larvae and fermented flake soil in 2022, but we now know there is a lot of interest in how we keep our beetles

to facilitate our larvae load. We'll now share the beginning with our adults. We'll also provide updates on rearing projects over this last year.

**2:10 PM – 2:20 PM Browse Blanching for Long Term Storage (Short)**

Clayton Leopold, Moody Gardens

Quality browse can be difficult to obtain year round and storing fresh is not a long term option. Additionally, browsable plant species and growing seasons vary regionally. This presentation will focus on the materials and methods needed to preserve browse using Blanching; a technique traditionally used for freezing and storing vegetables. This has been adapted to use for common browse plants for phasmids and other leaf eating/cutting insects. With a few simple common implements and planning, one can store enough quality preserved and preferred browse for their insects through a winter season.

**2:20 PM – 2:40 PM Raising the Unknown**

April Pitman, Cincinnati Zoo & Botanical Gardens

As the pandemic was still going on throughout the world, we were hit with our own pandemic, Mantis Madness! In the span of a few months over 40 mantis oothecae were confiscated from the Cincinnati International Airport by the US fish and wildlife service and transferred into our custody. Without knowing which species we were caring for, the challenge became how to successfully raise and identify these mantids. Through trial and error, lots of pictures and research, and more mantis hatchlings than I can count, we were able to identify some of the species and are even continuously rearing some of them today.

**2:40 PM – 2:50 PM Veterinary Procedures on Invertebrates in a Zoo Setting (short)** Kristin

Rodenburg, Omaha's Henry Doorly Zoo and Aquarium Veterinary care is a vital part of animal husbandry, and that holds true even when it comes to the often-overlooked category of invertebrates. Over the past few years, our team has worked alongside the zoo's excellent veterinary staff to assess and treat various medical problems within our collection. This presentation will cover some of the procedures we have performed on groups and individuals and changes we will be making in the future to create a less stressful experience for staff and animals alike.

**2:50 PM- 3:10 PM Woodland Park Zoo "Bug World" Refresh**

Maria Buckner, Woodland Park Zoo

Beauty is only skin deep, and so are the changes at Woodland Park Zoo's Bug World. This year we embarked upon a variety of cosmetic changes to the exhibit space, including upgrades to lighting, terrarium interiors, and experimenting with using screens as backgrounds. The new and improved Bug World opened May 2023 - join us on our journey from early planning stages all the way to opening and beyond!

### **3:10 PM – 3:30 PM Our Cocktail for Cockroaches**

Michelle Griesinger, Cincinnati Zoo & Botanical Garden

Cockroaches have long been regarded as disgusting, dirty, and disease ridden, when in reality only about 0.5% of all cockroach species are considered pests. As keepers at The Cincinnati Zoo's World of the Insect, our goal is to represent these insect underdogs in a positive light by highlighting their ecological significance through exceptional husbandry and exhibition. Overlapping generations as well as correct habitat parameters are crucial to keeping cockroach cultures thriving for years on end. Though maintaining these eight species has been a challenging process, we want to pass on their unique husbandry information that has been collectively gathered over the last 45 years.

### **3:30 PM -4:20 PM Breakout session**

Presenters and attendees have further opportunities to engage with each other and share information about topics presented in session.

## **BANQUET**

**6:00 PM – 10:00 PM Final Silent Auction bids, Cash Bar and Banquet, Presidio III,IV,V**

### **TITAG SILENT AUCTION**

Each year, TITAG organizes the silent auction at the IECC. If you can, please bring any invertebrate related item with a value of under \$50 to put on the auction table. If you have something of a higher value you would like to donate please contact Erin in advance ([erin.sullivan@zoo.org](mailto:erin.sullivan@zoo.org)). Bidding will start on Thursday and end Saturday at 4pm with a final bidding war starting at 6pm just before dinner on Saturday evening. The proceeds go towards the TITAG Small Grants Program and the Steve Prchal Scholarship Fund. We appreciate every contribution to these important programs

### **FREE ADMISSION TO LOCAL ATTRACTIONS**

The following organizations have generously agreed to offer free admission to IECC participants, just show you conference ID badge:

[Arizona-Sonora Desert Museum](#), [Butterfly Wonderland](#), [Phoenix Zoo](#), [Reid Park Zoo](#) and [Tucson Botanical Gardens](#)

### **ABOUT COLLECTING**

It is your personal responsibility to comply with state and federal regulations if you plan to collect while in Arizona. If you plan to collect in Mexico, contact USDA well in advance. Bringing live or dead specimens across international borders without proper permits is illegal. You should always carry your conference badge with you as proof that you are part of the conference, as well as your own personal identification.

The conference is moving towards encouraging facilities to maintain sustainable collection in captivity to minimize the impact collecting has on the environment. If you choose to collect, please practice responsible collecting procedures and make proper arrangements to transport your live animals. Keep in mind that collecting is at the discretion of any trip leader based on prevailing conditions (if allowed at all). Please observe the following guidelines:

- When in the field, do not harass snakes or any other species. Remember that collecting vertebrates is strictly controlled and requires permits.
- Please practice respectful collecting etiquette. This includes but is not limited to returning rocks, logs, cow patties, etc. to the position in which you found them; treading lightly when not on established paths; asking permission to collect at other people's black light sheets and taking responsibility for keeping live animals cool when in the field.
- Some collecting sites (Madera Canyon, etc.) are more sensitive than others and may require additional communication with local stakeholders.
- Exploring the resort grounds is highly encouraged, native arthropods should be photographed and not collected.
- If you see people engaged in disrespectful or illegal collecting, please notify a leader or conference organizer, or address the behavior yourself. If someone needs information about a collecting practice, please provide it if possible or direct them to a trip leader.
- Dogs are not allowed at any conference event.

#### **KEEPING COOL**

- Keeping Cool Getting too hot in the desert is no fun and is potentially dangerous. Here are some helpful hints for staying cool and enjoying your time in Southern Arizona
  - Wear loose-fitting, lightweight and light-colored clothing.
  - Drink plenty of fluids before, during, and after heat exposure.
  - Wear a wide-brimmed hat.
  - Wear sunscreen (30 spf or greater recommended).
  - Drink lots of water throughout the day. Beverages with electrolytes may also be helpful. If you experience any symptoms of heat exhaustion, stop any physical activity immediately, let someone know what is happening and find a place to cool down. Symptoms can include: headache, excessive thirst, nausea or vomiting, weakness, faintness, dizziness, confusion, or lethargy.
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