



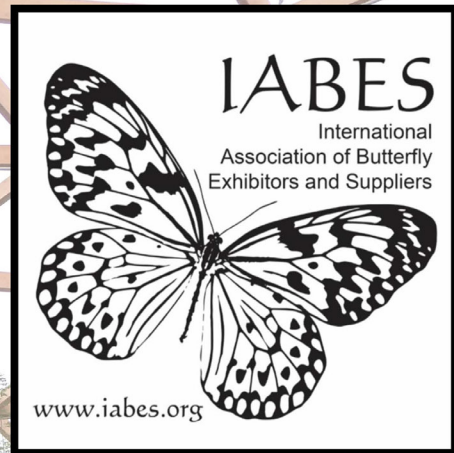
IECC 2016
TUCSON
AZ, 85704
TITAG.ORG

INVERTEBRATES IN EDUCATION & CONSERVATION CONFERENCE

TUCSON, AZ • JULY 26 - 30, 2016

Hosted and Organized by the Association of Zoos and Aquariums'
Terrestrial Invertebrates Taxon Advisory Group (TITAG)

Protecting wild butterflies
and their habitats by
promoting butterfly
exhibits and their
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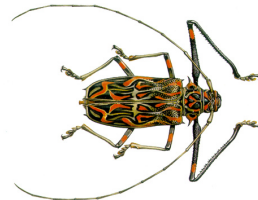
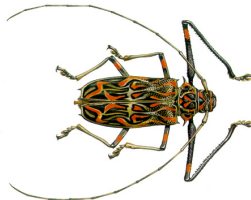
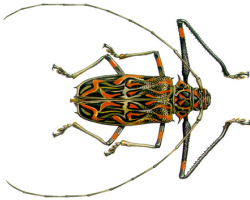
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Tucson, Arizona

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Welcome to our friends from IABES it nice to have you all here with us in Tucson this year!



Thank you for the many years of support, camaraderie, fun, ideas, the beautiful sunsets, and monsoons if we are lucky.

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IECC 2016
TUCSON
AZ, 85704
TITAG.ORG

2016 INVERTEBRATES IN EDUCATION AND CONSERVATION CONFERENCE™ July 26 – July 30, 2016

Hosted by the Association of Zoos and Aquariums' Terrestrial
Invertebrate Taxon Advisory Group (TITAG)

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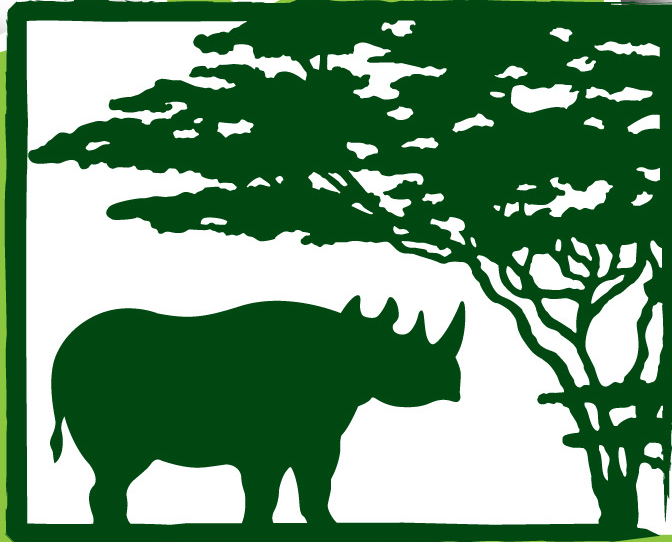
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EXHIBIT HOURS

Exhibition Area -
Thursday, July 28 7am - 4pm
Friday, July 29 7am - 4pm
Saturday, July 30 7am - 1pm

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SCHEDULE OVERVIEW

TUESDAY, JULY 26

8:00am - 12:00pm	IABES Meeting	Presidio I
1:00pm - 4:00pm	Registration	Presidio Foyer
1:30pm - 4:30pm	TITAG Meeting	Presidio I

WEDNESDAY, JULY 27

6:30am - 8:30am	Registration	Presidio Foyer
1:30pm - 5:30pm	Registration	Presidio Foyer

Field Trips: Pre-registration required

7:00 am - 4:00pm	Field Trip: Tiger Safari – Palo Verde	
7:10am - 4:00pm	Field Trip: Butterfly Wonderland –Palo Verde	
7:20am - 4:00pm	Field Trip: BUG TOURS Episode 24 - The Desert Awakens – Palo Verde	
7:30am - 4:00pm	Field Trip: Waterfalls and Water Bugs –Palo Verde	
7:45am - 1:45pm	Field Trip: Pass the Peppersauce, Please! – Palo Verde	
5:30pm - 9:00pm	Keynote Event	Presidio II, III
5:30pm	Keynote Event: Cocktails	
6:00pm	Keynote Event: Speaker Presentation – Dr. Karen Oberhauser, University of Minnesota	
7:30pm	Keynote Event: Dinner served	Presidio II, III

THURSDAY, JULY 28

7:00am - 4:00pm	Silent Auction	Presidio I, IV
7:00am - 4:00pm	Registration & Exhibits	Presidio I, IV
	<i>(Registration may close during paper sessions and lunch)</i>	
8:00am	Welcome and Announcements	Presidio II, III
8:10am - 9:30 am	Paper Session: From the Field	
9:30am - 9:50am	Break – Please visit the Exhibit Hall	
9:50am - 10:50am	Paper Session: Bugs in the Machine – Tech Talks	
10:50am - 11:30am	Special Presentation: Social Media Tips and Tricks	
11:30am - 1:30pm	Lunch (provided)	Presidio V

1:30pm - 4:30pm	Workshop: Desert Ants: Collecting and Managed Care, Part 1 – Laboratory Techniques	Palo Verde I
1:30pm - 4:30pm	Workshop: Let's Teach You How to Teach	Mesquite
1:30pm - 4:30pm	Workshop: Make Your Own Habitat for Invertebrates!	Palo Verde II
1:30pm – 10:00pm	Field Trip: Border Bugs 2016 – The Monsoon Gods Have Spoken	Presidio V
7:00pm	Insect Trivia & Game Night	Hospitality Suite

FRIDAY, JULY 29

7:00am - 4:00pm	Silent Auction	Presidio I, IV
7:00am - 4:00pm	Registration & Exhibits <i>(Registration may close during paper sessions and lunch)</i>	Presidio I, IV
8:00am	Welcome & Announcements	Presidio II, III
8:10am - 10:10am	Paper Session: Life Support: Invertebrate Husbandry and Natural History	
10:10am - 10:30am	Break – please visit the Exhibit Hall	
10:30am - 12:30pm	Special Husbandry Session	Presidio II, III
12:30pm - 1:30pm	Lunch (provided)	Presidio V
1:30pm - 4:30pm	Workshop: Desert Ants: Collecting and Managed Care, Part II: Field Observations	Palo Verde I
1:30pm - 4:30pm	Workshop: Natural Born Botanists: Insects and Their Hosts	Palo Verde II
1:30pm - 2:30pm	Roundtable: Topics in Butterfly House Management	Presidio II, III
2:45pm - 4:45pm	Roundtable: Education Special Roundtable	Presidio II, III
7:00pm - 11:00 pm	Event: Evening Blacklighting Adventure	Biosphere 2

SATURDAY, JULY 30

7:00am - 1:00pm	Silent Auction	Presidio I, IV
7:00am - 1:00pm	Registration & Exhibits <i>(Registrations may close during paper sessions and lunch)</i>	Presidio I, IV
8:00am	Welcome & Announcements	Presidio II, III
8:10am - 9:30am	Paper Session: Sustaining Flight: Butterfly House Nutrition and Tradition	
9:30am - 9:50am	Break - Please visit the Exhibit Hall	
9:50am - 11:10am	Paper Session: Better Together: Engagement & Collaboration	
11:10am - 11:30pm	Break - Please visit the Exhibit Hall	
11:30am - 12:15pm	Special Presentation – USDA Updates	Presidio II, III
12:15pm - 1:30pm	Lunch (on your own)	
1:30pm - 4:00pm	Workshop: Bug Appetit!	Presidio V
1:30pm - 4:30pm	Workshop: Art and the Single Bug	Mesquite
1:30pm - 3:00pm	Roundtable: Pollinators Unite!	Palo Verde
6:00pm - 10:00pm	Banquet: Final silent auction bids, Cash Bar & Banquet	Presidio

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.

ABOUT COLLECTING

It is your 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**.

If you choose to collect, please make responsible arrangements to transport your live animals. *Please practice responsible collecting procedures* and follow collecting restrictions in designated areas. Collecting is at the discretion of any trip leader based on prevailing conditions.

BEING A GOOD NEIGHBOR

The conference continues to grow and with success comes additional concerns. Your contribution to the Conference is significant and your cooperation makes the event go smoothly.

- **Please wear your conference name tag throughout the weekend.**
- 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.

BEING A GOOD NEIGHBOR

(continued)

- If you see people engaged in disrespectful collecting, please notify a leader, conference organizer, or interrupt the behavior yourself. If someone needs information about a collecting practice, please provide the information.
- Dogs are not allowed at any conference event.

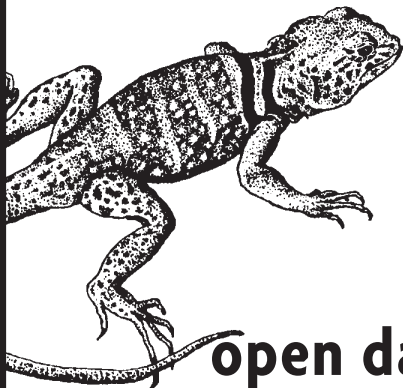
HOSPITALITY SUITE

Stumble across a nuptial flight of ants in the field and feel like sharing? Join us in the Hospitality Suite for a beverage, snacks and a friendly ear. The Hospitality Suite's location will be announced at the conference and will be open the following hours:

- Wednesday, July 27 – 9:00pm - 11:00pm
- Thursday, July 28 – 7:00pm - 11:00pm
- Friday, July 29 – 9:00pm - 11:00pm

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TUESDAY, JULY 26

8:00am - 12:00pm **IABES Meeting** - Palo Verde
1:00pm - 4:00pm **Registration** - Presidio Foyer
1:30pm - 4:30pm **TITAG Meeting** - Palo Verde

WEDNESDAY, JULY 27

The breakfast location (Sundance) opens at 6:30 AM and offers a la carte items as well as a breakfast buffet. The “grab and go” area (which features Starbucks) opens at 6:00 AM and offers breakfast sandwiches, bagels, and pastries. Field trips are for registered participants only and depart promptly at their scheduled times from the Palo Verde Room. *Please wear name tags!*

6:30am - 8:30am — **Registration** - Presidio Foyer
1:30pm - 5:30pm — **Registration** - Presidio Foyer
9:00pm - 11:00pm — **Hospitality Suite**

FIELD TRIPS (*All Wednesday field trips depart from Palo Verde*)

7:00am - 4:00pm – Palo Verde

Tiger Safari (12 participants)

Led by Doug Taron, Chicago Academy of Sciences

Willcox Playa, about 1.5 hours from our hotel, is one of the world’s tiger beetle hotspots. Over 20 species have been recorded there, including numerous endemics. There will be ample opportunity for collecting and photography at several good viewing spots in the area. In addition to tiger beetles, expect good grasshopper diversity, tarantula hawks, and lots of other cool stuff. Prepare for hot, dry conditions, as this is an old lakebed with salt pannes and no shade. If there is time we will stop at French Joe Canyon, home of big bugs, as we return to Tucson. Responsible collecting allowed. Conference vans to be provided.

7:10am - 4:00pm – Palo Verde

Butterfly Wonderland (24 participants)

Presented by IABES

Led by Michael Buckman, Callaway Garden

Butterfly Wonderland is the largest indoor butterfly pavilion in America and provides a magnificent, lush rainforest atrium where thousands of butterflies from around the world fly freely. The experience also includes a 3D theater experience, the Butterfly Emergence Gallery, honey bees, desert nature exhibits, a stingray touch tank, and more. Max Shure, Assistant Curator, will be guiding us through the facility and offering a rare, behind-the-scenes look at the operation of this state-of-the-art butterfly

exhibit. Butterfly Wonderland is located in Scottsdale, just two hours from the hotel. Conference vans to be provided.

7:20am - 4:00pm – Palo Verde

BUGTOURS, Episode 24 – The Desert Awakens (24 participants)

Led by Zack Lemann, Audubon Institution

A short time ago in a habitat not too far away... The Entomologists' Alliance had been visiting a remote region of southeast Arizona for years. As the summers rains came, they ventured into canyons and scrublands to find that the arthropod fauna had blossomed. Seeking a continuation of their success, they sent a team of intrepid explorers back in 2016 to examine cacti, turn rocks, and swing nets. Come collect and observe all that this amazing land has to offer on a day long field trip. In addition to gathering fascinating information and (we hope) terrific invertebrates for your exhibits, you will also have a chance to create philosophical quotes like these: This net is the tool of the entomologist. Not as clumsy or random as trying to catch butterflies by hand; and elegant device from a more civilized age. I find your lack of bugs disturbing [only to be used if it's been too dry]. Remember: a Bugi (or gal) can feel the monsoons flowing through the Sonoran landscape. Responsible collecting allowed. Conference vans to be provided.

7:30am - 4:00pm – Palo Verde

Waterfalls and Water Bugs (12 participants)

Led by Shane "Bugz" Burchfield, Bugs of America

We will be exploring the Catalina Mountains by foot in this exploration focusing on but not limited to waterfalls and water bugs. The hiking will be moderate to difficult and weather permitting. An extra pair of shoes and clothing or bathing suit is recommended. This field trip will give all who attend an opportunity to experience many aspects of the local mountain range, riparian area and wildlife. Feel free to bring your camera, but not your nets; collecting is not permitted on this field trip. Conference vans to be provided.



Audubon Butterfly Garden
and Insectarium
A Facility of Audubon Nature Institute



BUGS of AMERICA



COSTA RICA
ENTOMOLOGICAL
SUPPLY

7:45am - 1:45pm – Palo Verde

Pass the Peppersauce, Please! (24 participants)

Led by Howard Byrne, Arizona-Sonora Desert Museum

Peppersauce Canyon in the Santa Catalina Mountain range is a great place to escape the warmer reaches of the lower desert during the day. It's nestled in at around 4,700 feet in elevation, and even boasts a nearby cave! This ephemeral riparian area is lined by Sycamore, Walnut and Ash trees. The surrounding hills are 'peppered' with oaks, grasses and yucca. Arthropod species are as varied as other more southerly sky islands, and it's even a notable birding location. It's a beautiful spot for a half-day field trip, and we'll be back to the resort by early afternoon. This will be a new and different area, so come along and check it out! Responsible collecting allowed. Conference vans to be provided.

EVENING KEYNOTE ADDRESS

Presidio II, III

5:30pm – Cocktails

6:00pm – Keynote Address

7:30pm – Dinner

Dr. Karen Oberhauser is a Professor in the Dept. of Fisheries, Wildlife and Conservation Biology at the University of Minnesota, where she and her students conduct research on several aspects of monarch butterfly ecology. Her research depends on traditional lab and field techniques, as well as the contributions of a variety of audiences through citizen science; this research has resulted in over 100 scientific publications.



Her strong interest in promoting a citizenry with a high degree of scientific and environmental literacy led to the development of a science education program that involves courses for teachers, and opportunities for youth to engage in research and share their findings with broad audiences. In 1996, she and graduate student Michelle Prysby started a nationwide Citizen Science project called the Monarch Larva Monitoring Project, which continues to engage hundreds of volunteers throughout North America. Karen is passionate about the conservation of the world's biodiversity, and believes that the connections her projects promote between monarchs, humans, and the natural world promote meaningful conservation action. She is the chair of the Monarch Joint Joint Venture, and a founding officer of the Monarch Butterfly Fund. In 2013, Karen received a White House Champion of Change award for her work with Citizen Science.

Dr. Oberhauser will be sharing some of her findings and expertise with us in her keynote presentation, *Dwindling numbers for an iconic insect: A conservation biologist ponders moving beyond the documentation of declines.*

Monarch butterfly populations have been declining over the last 20 years. Because insect numbers are notoriously difficult to assess, and because they often show large year to year fluctuations, simply documenting this decline has been a challenge. It is now important to move beyond simple documentation and toward responding to the challenge posed by monarch conservation, specifically, and insect conservation in general. Monarchs are negatively impacted by many human activities, and various scientists and monarch advocates have implicated habitat degradation and loss, pesticide use, climate change, vehicular collisions, invasive species, and pathogen spread in their dwindling numbers.

In this presentation, I'll describe the amazing biology of migratory monarch populations, and the work of citizens and scientists in documenting monarch numbers at all stages of their migratory cycle. I'll then discuss threats to monarchs, and potential responses to these threats. Because conservation biology must be, at its essence, a science of hope, my focus is on positive changes as well as on the challenges posed by declining monarch numbers.

THURSDAY, JULY 28

7:00am - 4:00pm — Silent Auction - Presidio I, IV

7:00am - 4:00pm — Registration & Exhibits - Presidio I, IV

8:00am — Welcome & Announcements - Presidio II, III

8:10am - 11:30am — Paper Sessions - Presidio II, III

PLEASE NOTE: Paper sessions start promptly at the time specified in the program. Name tags must be worn for admittance into the Paper Sessions. While formal talks are in session, please keep noise level in the exhibit area low. To reduce disruptions and interruption, please keep entering and exiting the paper sessions to a minimum.

FROM THE FIELD

(Moderator: Lou Perrotti, Roger Williams Park Zoo)

8:10am - 8:30am

How Honeybees Are helping Elephant Conservation in Kenya

Joseph Soltis - Disney's Animal Kingdom

Honeybee pollination and honey production may enhance positive attitudes towards bees, but their stings may do the opposite. Nevertheless, this stinging capacity is helping conserve elephants. Elephants commonly raid the crops of farmers, resulting in sometimes deadly conflict. Researchers at Disney's Animal Kingdom and Save the Elephants conducted experiments showing that elephants (*Africana loxodonta*) are afraid of bees (*Apis mellifera*). Since then, local farmers in Kenya have been surrounding crops with "beehive fences" that scare the elephants away. Beekeeping practices may enhance bee-hive fences, and the "elephants and bees" story may enhance bee conservation by casting them as conservation heroes.

8:30am - 8:50am

Changes in Butterfly Community Composition Driven by Shifting Phenologies

Zak Gezon, Anne Savage and Jaret Daniels - Disney's Animal Kingdom

Climate change has caused numerous ecological changes, including species range shifts and altered phenology. Because species show individualistic responses, climate change is causing mismatches between pairs of interacting species in space and time. Most ecological communities, however, are comprised of numerous similar species within trophic levels, but the effects of climate change on such species assemblages have received less attention. The goal of this study was to test the degree to which butterfly communities and temporal co-occurrence change over long periods of time. Using a long-term citizen science dataset, we analyzed temporal co-occurrence of butterflies in Central Florida. Our results indicate that climate change could cause immediate restructuring of insect communities with potential consequences for competition for resources and trophic interactions.

8:50am – 9:10am

A Teen's Perspective: Using Butterfly Farms and Exhibits to Engage Teens in Critical Environmental Issues Such as Climate Change

Jacqueline and Katie Genovesi - The Academy of Natural Sciences

Wondering how you can get teens more involved in your institutions' conservation education? What types of programs engage teens in critical environmental issues? This presentation will

talk about a new pilot program between the El Bosque Nuevo farm and the Academy of Natural Sciences butterfly exhibit. Through a special national award from the UL Corporation, 17 high school girls visited El Bosque Nuevo and other habitats in Costa Rica to learn about the impacts of climate change. One student will share her experience from the program. What worked, what didn't and what you really need to do to involve teens.

9:10am – 9:30am

Propagation and Repatriation of the Regal Fritillary Butterfly

Tim Becker - ZooAmerica North American Wildlife Park

Beginning in 2011, ZooAmerica entered into a partnership with Fort Indiantown Gap Military

WORK AS PLAY



Raymond A. Mendez
Principal
P.O. Box 16485
Portal, AZ 85632
520-558-2412
workasplay@vtc.net

Museum & Zoo Exhibit Design and Development

- At Work As Play, our goal is to create spaces that are playful, engaging and enlightening.
- Our specialties include mentoring guests to change behaviors and attitudes (if necessary) related to issues of concern brought up in an exhibit experience. We also build environments that are flexible for both storytelling and changing current events.
- WAP's experience in design and construction for museums, zoos, movies, television, advertising, theater and theme parks gives the firm a rather unique perspective on what the public enjoys as well as the skills to make your concepts become realities.
- And did we mention? WE LOVE BUGS!



Reservation to rear Regal Fritillary butterflies (*Speyeria idalia*) for repatriation into suitable habitat within Pennsylvania. Fort Indiantown Gap is home to the last remaining population of this once common species east of Indiana. This presentation will be a summary of what the project has accomplished thus far.

9:30am - 9:50am — **Break** - Please visit the Exhibit Hall

9:50am - 10:50am — **Paper Session** - Presidio II, III

BUGS IN THE MACHINE – TECH TALKS

(Moderator: Nathan Brockman, Reiman Gardens, Iowa State University)

9:50am – 10:10am

Insect Education Through YouTube

Patricia Nichols - Insectopia

Insectopia is a small business based in Lansing, Michigan. Our mission is to share our passion for insects with the public. We posted our first YouTube video in January of 2016. In our first two months, our videos were viewed in 35 states and 30 countries around the world. Insects intrigue people and there is a need for insect education. People should understand that not all insects are “creepy crawlies” and that they can be fascinating animals. We hope to share some of our tips and tricks that we have learned during our time in video creation.

10:10am - 10:20am

Using Photographic Guides & Charts to Integrate ‘Non-Invertebrate’ Keepers into an Invertebrate House

Amber Zelmer - Houston Zoo

When The Houston Zoo opened the doors to our new ‘Bug House’ in May of 2014 the keepers were vastly outnumbered by the new additions. Many keepers in our area, myself included, had limited experience caring for invertebrates on this scale. User-friendly labeling systems, photographic identification guides and detailed ‘How To’ exhibit protocols are just some of the tools that we developed for our Bug House. This paper will share some of the organizational techniques that we employed to help get all of our Bug Team Members on the same page and provide tips for others to do the same.

10:20am – 10:40am

It’s All Geek to Me: Translating Names of Insectarium Arthropods

Prof. J. Phineas Michaelson (a.k.a. Mike Weissmann) - U.S. Biological & Geological Survey of the Territories
Kids today! Why don’t they know the basics of Greek and Latin? Either they don’t pay attention in class, or in many cases schools just don’t teach these classic languages of science anymore. For those who are Latin and Greek-challenged, noted (fictional) Victorian entomologist and explorer, Prof. J. Phineas Michaelson, will present English translations of the scientific names that have been given to some of the popular common arthropods available for public exhibits. This paper will explore how species get their names, as well as a brief look at some of the naturalists that named them.

10:40am – 10:50am

Creating Buzz at the Houston Zoo Bug House with Time Lapse

David Suttinger - Houston Zoo

In December of 2015, the Houston Zoo public relations team was looking for an opportunity to purchase equipment for time lapse videography. This paper will discuss how the Children’s Zoo bug team approached the public relations department with two species for a collaborative project. I will discuss how the public relations department was able to capture hours of work from ants cutting leaves and beetles burying a mouse and compress it in a few minutes of action. Social media is a great tool to get the public’s attention, and sometimes the creepier it is the more likes you will get.

10:50am – 11:30am -- Special Presentation

Social Media Tips & Tricks

Gwen Pearson - Purdue University

In addition to all your other duties, you also have to manage social media accounts and a website. How can you work smarter and not harder? How do you measure the impact of your activities, to know if it’s worth your time? Be a better nerd with metrics and automation. If desired, bring a computer or cell phone to this discussion and follow along!

11:30am – 1:30pm — Lunch (provided) – Presidio V

WORKSHOP

1:30pm – 4:30pm - Palo Verde I

Desert Ants: Collecting and Managed Care, Part 1: Laboratory Techniques

Randy Morgan - Cincinnati Zoo and Botanical Garden; Paige Howorth - San Diego Zoo

The first part of this comprehensive workshop concerns how to set up and maintain ant colonies and/or freshly collected queens for long-term maintenance. Materials to build artificial nests and contain ants will be discussed, as well as general techniques for the care of captive ant colonies. Participants will work directly with nest construction materials and collaborate to create laboratory ant habitats.

WORKSHOP

1:30pm – 4:30pm - Mesquite

Let’s Teach You How to Teach

Kelsey Johnson - National Park Service

Educational programming is changing at a rapid pace across the nation with various ground-breaking initiatives. Inclusion and knowledge of these trends strengthens any educational institutions

TITAG SILENT AUCTION

Each year, TITAG organizes the silent auction at the IECC. The proceeds go towards the TITAG Small Grants Program and the Steve Prchal Scholarship Fund. We appreciate every contribution to these important programs.

programming, thus, attracting visitors and improving overall visitor experiences. Participants will learn theories such as learning styles, the basics of common core, 5E inquiry-based education techniques and how to write curriculum -based lessons plans. Participants will also have the opportunity to develop their own lesson plans, including hands-on curriculum-based activities, with one-on-one instruction and group discussion.

WORKSHOP

1:30pm – 4:30pm - Palo Verde II

Make Your Own Habitat for Invertebrates!

Nicky Williams & Tony Ruiz - Reynolds Advanced Materials

This workshop will include an assessment of easy-to-use 2-part liquid silicone rubbers, liquid plastics and self-hardening epoxy putties all of which can be used to fabricate new, or enhance existing invertebrate habitats. Techniques for processing materials properly and efficiently will be covered to help you effectively create naturalistic environments with an authentic appearance. Session will include demonstrations by presenters as well as practical hands-on experience.

FIELD TRIP

1:30pm – 10:00pm – Presidio V

Border Bugs 2016 - The Monsoon Gods Have Spoken

Jim Melli - San Diego Museum of Natural History

We will explore the beautiful Pajarito Wilderness just north of the border. The proximity to the border and variety of habitats ranging from Madrean woodlands, desert grasslands, streams, ponds, and rocky hillsides bristling with ocotillo and agave insure that something groovy will show up. After nightfall we can hang out at a mercury vapor blacklight and see what comes in. Last year we saw giant killer centipedes and other cool bugs, including aquatics. Among the herps that we saw were short-horned lizards, black-headed and hook-nose snakes. What will we find in 2016?

7:00pm – Insect Trivia & Game Night (details to be announced) - Hospitality Suite

7:00pm - 11:00pm — Hospitality Suite



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FRIDAY, JULY 29

7:00am - 4:00pm — Silent Auction - Presidio I, IV

7:00am - 4:00pm — Registration & Exhibits - Presidio I, IV

8:00am — Welcome, Announcements - Presidio II, III

8:10am- 10:10am — Paper Sessions - Presidio II, III

LIFE SUPPORT: INVERTEBRATE HUSBANDRY AND NATURAL HISTORY

(Moderator: Randy Morgan, Cincinnati Zoo and Botanical Garden)

8:10am – 8:30am

Increase Fecundity and Larval Growth Rate of African Fruit Chafer (*Pachnoda sinuata flaviventris*) in a Novel, Fermented Substrate

Tad Yankoski - Sophia M. Sachs Butterfly House

The African fruit chafer beetle, *Pachnoda sinuata flaviventris*, is a great display animal for insect zoos and butterfly houses. Beetles breed and readily lay eggs in a wood mulch/compost substrate mixture, and though the larvae seem to thrive in these conditions, overall colony growth is slow. This paper will show that by changing the preparation method for the substrate you can increase the larval growth rate, and adult fecundity of the beetle, producing more adults beetles in a shorter time than traditional husbandry methods.

8:30am – 8:40am

Troubleshooting *Exstatosoma tiaratum* Population Decline

Devin Krafska - Henry Doorly Zoo and Aquarium

In the spring of 2015, we noticed a dramatic decline of our *Exstatosoma tiaratum* population. Thinking it was a husbandry issue we set up several new enclosures to account for more or less humidity and moisture. After seeing no increase in population, we consulted with other institutions and veterinary staff. We explored further husbandry protocols and medical treatments. In this paper we will explore the histology and various treatments used to boost the ailing population.

8:40am – 9:00am

There's a *Notocyphus* On My Back!

Howard Byrne - Arizona-Sonora Desert Museum

The Pepsis wasps get most of the attention as the premier parasitoids of Theraphosid spiders. Their size, colors and fascinating reproductive cycle capture the attention of nearly everyone who's seen or heard of them. The Arizona Spider Wasp, (*Notocyphus dorsalis arizonicus*) is a Pompilid that also utilizes tarantulas for reproduction, but goes about it a little differently...

9:00am – 9:20am

Captive Rearing Study of *Thermonectus marmoratus*

Tim O'Sullivan - St. Louis Zoo

This presentation will review the methods and results of a research study done at the St. Louis Zoo to reproduce *Thermonectus marmoratus* in a systematic manner in order to produce the most successful

and consistent results. It will also review the findings from a husbandry survey for the *T. marmoratus* sent out last year.

9:20am – 9:40am

Observing an Observation Hive

Lauren Bloomenthal and Katie Malmberg - Pacific Center
Pacific Science Center's observation beehive has stood in the same location since 1998. Over the years we made changes to its structure that improved our ability to access and care for it. We also changed our expectations for the bees, making more effort to understand and meet their behavioral needs in the space, and in our changing environment outside the hive. As we refine our management practices for the observation hive, we have seen bees overcome old challenges and encounter new ones. Each success we see means happier visitors and better educational opportunities. But there is still plenty to learn.

9:40am – 9:50am

The Light Side of Darklings: Pupation and Ecdysis of Pinacate Beetles, *Eleodes* spp.

Mike Cash - Woodland Park Zoo
Darkling Beetles, *Eleodes* spp., are terrestrial, long lived, oblong bodied insects found within the Western and Southern United States. These beetles make a great display animal as they are active and communal. Adult beetles fare well in captivity, however, we understand less about caring for and pupating their larvae. Zoos and Universities have mixed success rearing with minimal information on rearing conditions that lead to the greatest success. The goal of this paper is to show a process in which beetles are raised and the conditions needed for each life stage through multiple generations.

9:50am – 10:10am

Life History and Managed Care of the Coconut Crab, *Birgus latro*

Kelli Walker - San Diego Zoo
As the world's largest terrestrial arthropod, the coconut crab is both coveted and rare in collections. During the winter of 2013, the San Diego Zoo acquired one specimen from a neighboring institution. In alignment with our animal welfare priorities at San Diego Zoo Global, we began to develop a program of enrichment and animal care that has



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resulted in the successful management of this novel species. Husbandry and enrichment techniques will be covered in this paper, as well as an overview of the coconut crab's natural history and celebrity status.

10:10am – 10:30am — Break

Please visit the Exhibit Hall

SPECIAL HUSBANDRY SESSION

10:30am - 12:30pm — Presidio II, III

The Special Husbandry Session is organized to promote the discussion of husbandry in our industry, and to expand on the topics presented in the preceding paper session.

TOPICS: Beetles, honey bee observation hive management, phasmid pathology, coconut crabs.

12:30pm - 1:30pm — Lunch (provided)

- Presidio V

WORKSHOP

1:30pm – 4:30pm - Palo Verde I

Desert Ants: Collecting and Managed Care, Part II: Field Observations

Randy Morgan - Cincinnati Zoo & Botanical Garden; Paige Howorth - San Diego Zoo

The second session of this two-part workshop will involve visiting nearby southern Arizona habitats in search of desert ants. The ecology and natural history of these ants will be covered, as well as methods to collect, observe, and transport colonies or individuals.

WORKSHOP

1:30pm – 4:30pm - Palo Verde II

Natural Born Botanists: Insects and Their Hosts

John Watts - Texas Discovery Gardens; Nancy Greig - Cockrell Butterfly Center

The best entomologists know their plants! Most herbivorous insects are dependent on one or a few species of closely related plants. We will help you learn to identify some of the most important plants



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from an insect's point of view, using hands on techniques (observations in the "field" at the Tucson Botanical Garden where we will have access to a wide variety of plants). We'll bring some specimens back to the hotel for closer observation/dissection (bring a hand lens if you have one).

ROUNDTABLE

1:30pm - 2:30pm — Presidio II, III

Topics in Butterfly House Management - Presented by IABES

Lauren Williamson, IABES

Are you concerned with butterfly conservation or how it is portrayed in our industry? What types of education and interpretation would you like to see more in exhibits? Do you have a favorite nectar or host plant? These are just some of the potential topics we will cover in the roundtable. We welcome all butterfly houses and similar institutions as well as breeders, suppliers and anyone else who has an interest!

ROUNDTABLE

2:45pm - 4:45pm — Presidio II, III

Education Special Roundtable

Catherine Bartlett, Arizona-Sonora Desert Museum

An overlap between arthropods and education is inevitable in zoo, museum, and collegiate settings. We all love bugs but spreading the appreciation and conservation message naturally comes with challenges. Participants will engage in discussions and share their own experiences. Don't reinvent the wheel- just learn from others! This two-hour roundtable will have 5 break-out topics led by Jessie Sutherland (Battling Burnout), Kelseyanne Johnson (Advertising Your Program), Gwen Pearson (Fundraising), Karen Verderame (Organizing Insect Events) and Catherine Bartlett (Know Your Audience-and Engage Them). Even the most seasoned outreach educator will come away with fresh ideas from this powerhouse group of arthropod-ophiles!

EVENT

Evening Blacklighting Adventure

7:00pm – 11:00pm — Biosphere 2

32540 S. Biosphere Rd, Oracle, AZ 85739

Blacklights and sheets will be set up at this amazing location 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. Car caravans will be organized via a sign-up sheet in the exhibit hall, and will depart from the resort at 7 pm.

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

9:00pm - 11:00pm — Hospitality Suite

SATURDAY, JULY 30

7:00am - 1:00pm — Silent Auction - Presidio I, IV

7:00am - 1:00pm — Registration & Exhibits - Presidio I, IV

8:00am — Welcome & Announcements - Presidio II, III

8:10am - 11:10am — Paper Sessions - Presidio II, III

SUSTAINING FLIGHT: BUTTERFLY HOUSE NUTRITION AND TRADITION

(Moderator: Michael Buckman, Callaway Gardens)

Presented by IABES

8:10am – 8:30am

Raising Giants

Justin Dunning, Victoria Butterfly Gardens

When it comes to raising a species of moth that does not feed as an adult, proper larval nutrition is essential. This presentation will discuss the Victoria Butterfly Gardens methods of rearing *Attacus atlas* to its fullest potential. Topics will include enclosures, mating, egg management, host plants, larval development, and rearing challenges. This presentation will also discuss the benefits of using multiple species of host plants throughout the different instars and life cycle of *Attacus atlas*.

8:30am – 8:50am

Stepping up and Stepping Down: 22 Years at the Cockrell Butterfly Center

Nancy Greig, Cockrell Butterfly Center, Houston Museum of Natural Science

Covering the “good, the bad and the bugly” of the live butterfly and insect zoo business, this talk is a twenty-two year perspective of the evolution of the Cockrell Butterfly Center, from its opening in summer 1994 until the present. The Center was one of the earliest such exhibits in the USA, and many things have changed in the industry since those early days. Thanks to good staff, helpful colleagues, and some luck, we’re still going strong. Many lessons have been learned!

8:50am – 9:10am

Going Vertical: New Take on Artificial Nectar Feeders

Nathan Brockman, Reiman Gardens, Iowa State University

In butterfly exhibits when the flowering plants can't keep up with the feeding needs of the butterflies, artificial nectar dishes are often used. Feeding stations are typically on a horizontal axis which can be a difficult perspective for visitors to observe feeding behaviors. For years, work has been underway in the Christina Reiman Butterfly Wing to develop a vertical feeder that is easy to use, maintain and fun for visitors to watch. Learn about the end product, what it takes for you to create your own and the process involved with development of this new vertical feeder.

9:10am – 9:30am

The Trials and Tribulations of Horticultural Design in a Butterfly House at a Public Garden

Anita Westphal, Reiman Gardens, Iowa State University

Everyone knows in a glass house full of butterflies, providing enough food for all individuals is a priority. But being part of a public garden where every planted space has a horticultural mission

some of the priorities can be lost in translation. Is it possible to have horticultural diversity but still provide enough nectar for several hundred butterflies? At Reiman Gardens we have landscaped our flight house almost exclusively with herbaceous and woody plants that provide nectar. Along the journey we had met several challenges, some successful, some not. This talk will address some of those challenges.

9:30am – 9:50am — Break - Please visit the Exhibit Hall

9:50am - 11:10am — Paper Session

BETTER TOGETHER: ENGAGEMENT AND COLLABORATION

(Moderator: Jamie Sincage, Disney's Animal Kingdom)

9:50am – 10:10am

Colorado Pollinator Summit 2016: Combining Conservation Efforts Statewide

Sarah Garrett, Butterfly Pavilion

The decline of invertebrate populations in the US, like the monarch butterfly and honey bee, has increased public awareness for the conservation needs of pollinators. A wide variety of groups, both educational and research alike, have begun focusing work on this issue. How do these groups keep from competing with one other for funding or working in parallel without knowing? In Colorado,



Butterfly Pavilion has identified several organizations working on pollinator projects/initiatives and has expanded lines of communication between these groups. Butterfly Pavilion will host a Pollinator Summit in June of 2016 to bring these like-minded organizations together to identify opportunities for information sharing and collaboration. The goal of the Pollinator Summit is to combine efforts so that together we make a larger impact on the conservation of Colorado's pollinators than we could otherwise do alone.

10:10am – 10:30am

Polishing a Presentation: Tips and Tricks for Successful Shows

Catherine Bartlett, Arizona-Sonora Desert Museum

Two rules in showbiz: don't work with kids and don't work with animals. However, in zoobiz, most of us do both! At the same time! While handling tarantulas! And while 8 legged creatures aren't frightening, a room full of kids can be. Come learn some tips and tricks to enhance the guest experience and yours. Attention getters, questioning techniques, stage presence and use of humor will help make animal shows more engaging for your guests, reduce behavioral issues, and increase time on task. All this means an easier and more rewarding experience for you, the presenter! Whether you regularly bring an Insect Zoo to elementary schools or spend time doing the "dog and pony" show for large audiences, a little tailoring of your talk will make your show pop!

10:30am – 10:50am

Scientific Inquiry Activities with Madagascar Hissing Roaches: An Effective Way to Enrich Your Arthropod Education Program

Ron Wagler, University of Texas at El Paso

Madagascar hissing roaches are amazing insects that can enrich arthropod education programs. However, finding fun and effective activities using these roaches can be difficult. This presentation will provide an overview of a series of published peer-reviewed articles that explain Madagascar hissing roach husbandry and scientific inquiry activities utilizing these remarkable arthropods. These enjoyable activities can be easily integrated into your current arthropod education program. Free electronic copies of the articles will be provided to those attending the presentation.

10:50am – 11:10am

Engaging Different "Communities" in Endangered Species Invertebrate Conservation

Bob Merz, St. Louis Zoo

Since 2011, the Saint Louis Zoo, under the direction of the Center for American Burying Beetle Conservation, has been coordinating the reintroduction of the federally endangered American Burying Beetle (*Nicrophorus americanus*) to Missouri. This coordination involves the input, expertise and help of various "communities." Examples include the Conservation Community, the wider Zoo Community, the internal Saint Louis Zoo community and the general community that lives near and around the reintroduction site. At times, the approach to engage these different communities was calculated and metered, and at other times, engagement was serendipitous. Details of these various engagements will be presented along with analysis of transformative change in certain groups.

11:10am – 11:30am — Break - Please visit the Exhibit Hall

11:30am - 12:15pm — SPECIAL PRESENTATION - Presidio II, III

USDA Updates

Wayne Wehling, USDA/APHIS PPQ

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

12:15pm – 1:30am — Lunch (on your own)

WORKSHOP

1:30pm – 4:00pm - Presidio V

Bug Appetit!

Zack Lemann, Audubon Institute

In recent years, interest in entomophagy has increased markedly in the U.S., and many natural history facilities have started single-day or weekend events involving edible insects. This workshop will offer a broad overview of how to go about serving tasting portions of cooked insects at a zoo, museum, or nature center. Participants will get a chance to do some cooking (and eating!) of their own, and the floor will be open for questions, discussion, and definitely trading stories for those who've been down the bug cooking road before. Practical pieces, background information, and good-natured banter included!

WORKSHOP

1:30pm – 4:30pm - Mesquite

Art and the Single Bug

Jim Melli, San Diego Museum of Natural History

Here is your chance to get up close and personal with a groovy bug! In this workshop, participants will

NATURAL HISTORY ORGANIZATIONS

The following local organizations will be offering free admission for the duration of the conference:

- Arizona-Sonora Desert Museum
- Phoenix Zoo
- Reid Park Zoo
- Tucson Botanical Garden
- Butterfly Wonderland
- Desert Botanical Garden

Conference name badges are required for admission.



learn to observe and record their observations as drawings, with the guidance of Jim Melli, exhibit designer and skilled illustrator. Participants do not need to be artists, but would have to look closely at specimens and record details of their subjects as accurately as possible. A small sketchbook, pencil and sharpener, eraser, magnifier, and choice of specimens will be supplied. Come learn the basics of field illustration from one of the best!

ROUNDTABLE

1:30pm – 3:00pm - Palo Verde

Pollinators Unite!

Dr. Joseph Soltis, Dr. Zak Gezon, Jamie Sincage - Disney's Animal Kingdom

This round table is designed to bring anyone that is working on a pollinator project (whether it be bees, bats, beetles or butterflies) or someone looking into starting a pollinator project into one room to share ideas, best practices and just talk pollinators! Participants are encouraged to come ready to brag about their projects whether it be conservation, climate change, interspecies interactions, citizen science or just a cool local pollinator projects (photos are encouraged). Ultimately a spreadsheet compiled with all projects and contacts will be generated as a resource for all participants.

BANQUET

6:00pm - Final Silent Auction Bids

6:00pm - 10:00am — Cash Bar, Banquet & Dancing - Presidio



The logo is a white circle containing the text "IECC 2016" in red, "TUCSON" in black, "AZ, 85704" in black, and "TITAG.ORG" in black. The background of the entire page is a pattern of orange and black stripes, resembling a tiger's stripes.

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Logo & Program Layout:	Ron Skylstad (NORSE Creative)
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NOTE OF APPRECIATION

The organizers are grateful to all presenters, volunteers and attendees that contributed to this wonderful event.

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2016 SCHOLARSHIP RECIPIENTS

Congratulations to Camilla Leurini, Emily Noel and Katie Malmberg, the recipients of the 2016 Steve Prchal Scholarship. Welcome to the conference! We hope this is the first of many in your professional career.



EMILY NOEL



KATIE MALMBERG



CAMILLA LEURINI

REGISTRANTS

A

Hussein Aden

Kipepeo Butterfly Project
PO BOX 58-80208
Gede-Malindi, Kenya, 80208
United States
Phone: +254 720552266
kipepeo@africaonline.co.ke

Jill Andrews

San Diego Zoo
4813 Mansfield Street
San Diego, CA 92116
United States
Phone: 619-405-6135
jilldodi@gmail.com

Julie Anthony

Albuquerque Bugarium
3501 Atrisco Dr NW
Apt 717
Albuquerque, NM 87120
United States
Phone: 706-201-6680
juliebanthony@gmail.com

B

Emma Barney

Beetle Source
314 Monroe Street
Lafayette, LA 70501
United States
Phone: 337-852-9052
steven@beetlesource.com

Steven Barney

Beetle Source
314 Monroe Street
Lafayette, LA 70501
United States
Phone: 337-852-9052
steven@beetlesource.com

Kat Barnum

Oregon Zoo
4001 SW Canyon Rd
Portland, OR 97221
United States
Phone: 503-220-3683
kat.barnum@oregonzoo.org

Catherine Bartlett

Arizona-Sonora Desert Museum
2021 N. Kinney Rd
Tucson, AZ 85743
United States
Phone: 520-883-3004
cbartlett@desertmuseum.org

Cokie Bauder

Audubon Butterfly Garden and
Insectarium
13200 Old Gentilly Rd
New Orleans, LA 70129
United States
Phone: 504-606-4471
cbauder@auduboninstitute.org

Kathy Becker

Susquenita High School
10283 Jonestown Road
Grantville, PA 17028
United States
Phone: 717-512-6416
tkatbecker@comcast.net

Tim Becker

ZooAmerica
100 West Hersheypark Dr
Hershey, PA 17033
United States
Phone: 717-534-3866
tbecker@hersheypa.com

David Berger

Media
4025 50th Ave. S
Seattle, WA 98118
United States
Phone: 206-722-7193
davidberger@hilakers.org

Jonathan Bertolas

Milwaukee Public Museum
3318 N. Newhall St.
Milwaukee, WI 53211
United States
Phone: 414-861-1961
jonbertolas@gmail.com

Lauren Bloomenthal

Pacific Science Center
200 2nd Ave North
Seattle, WA 98109
United States
Phone: 206-443-3626
lbloomenthal@pacsci.org

Samantha Botting

Otago Museum
419 Great King Street
North Dunedin
Dunedin, Otago 9016
New Zealand
Phone: 03 4793261
sam.botting@otagomuseum.nz

Anne Bouchie

Audubon Butterfly Garden and
Insectarium
423 Canal St
New Orleans, LA 70130-1152
United States
Phone: 504-587-2112
abouchie@auduboninstitute.org

Yvonne Bourgeois

Tucson Botanical Gardens
2150 N Alvernon
Tucson, AZ 85712
United States
Phone: 520-235-7259
bfly@tucsonbotanical.org

Jennifer Brannon

Oregon Zoo
4001 SW Canyon Rd
Portland, OR 97221
United States
Phone: 541-993-4421
kat.barnum@oregonzoo.org

Zach Brockman

Reiman Gardens, Iowa State University
1407 University blvd
Ames, IA 50011
United States
Phone: 515-450-0170
mantisnb@iastate.edu

Corrienne Brons

Butterfly WNW
43 Grand Meadow Crescent
Edmonton, AB T6L 1A3
Canada
Phone: 780-462-1839
corriennebrons@gmail.com

Michael Buckman

Callaway Gardens
2156 Turnbury Ln
Auburn, AL 36830
United States
Phone: 706-881-2008
mrhi@mindspring.com

Howard Byrne

Arizona-Sonora Desert Museum
2021 N. Kinney Rd
Tucson, AZ 85743
United States
Phone: 520-883-3057
hbyrne@desertmuseum.org

C**John Cambridge**

Insectarium Institute
1505 S 12th Street
Philadelphia, PA
United States
Phone: 703-472-1175
plana.corporation@gmail.com

Michael Cash

Woodland Park Zoo
5500 Phinney Ave S
Seattle, 98103
United States
Phone: 206-548-2588
michael.cash@zoo.org

Aaron Chambers

Chambers Inc
1727 east 12th Street #1
Tucson, AZ 85719
United States
Phone: 520-991-6642
desertdwellr@hotmail.com

John Chastain

Toledo Zoo
P.O. Box 140130
Toledo, OH 43614
United States
Phone: 419-385-5721
john.chastain@toledozoo.org

Laura Chisholm

Sophia M Sachs Butterfly House
15193 Olive Blvd
Chesterfield, MO 63017
United States
Phone: 636-530-0076 x17
laura.chisholm@mobot.org

Traci Clevenger

Omaha's Henry Doorly Zoo & Aquarium
3701 S. 10th St.
Omaha, NE 68107
United States
Phone: 402-669-6470
traci.clevenger@omahazoo.com

Richard Cowan

LPS LLC
12075 E 45th Ave
Suite 312
Denver, CO 80239
United States
Phone: 303-371-6004
office@LPSimports.com

Royce Cumming

Butterfly Palladium
39467 Metz Rd.
King City, CA 93930
United States
Phone: 831-320-3345
roycecumming@gmail.com

D

Mark Deering

Deering Photography and Consulting
181 20th Ave. NW
Naples, FL 34120
United States
Phone: 314-800-7551
bflyphoto@earthlink.net

Ellen Dickinson

California Science Center
700 Exposition Park Drive
Los Angeles, CA 90037
United States
Phone: 213-744-2888
edickinson@cscmail.org

Justin Dunning

Victoria Butterfly Gardens
1461 Benvenuto Ave
Brentwood Bay, BC V8M 1R3
Canada
Phone: 250-652-3822
this.is.justin@hotmail.com

Dan Dunwoody

Butterfly Dan's
1803 Harbor Road
Kissimmee, FL 34746
United States
Phone: 321-624-3818
butterflydan@aol.com

F

Sylvia Flores James

Rocking J Leather
5445 N. La Canada Dr.
Tucson, AZ 85704
United States
Phone: 520-884-7579
hammertoeat@gmail.com

G

Chad Gaines

Reptile Emporium Acrylic Displays
1280 E. Saddle Way
San Tan Valley, AZ 85143
United States
Phone: 815-209-6015
reacrylicdisplays@gmail.com

Sarah Garrett

Butterfly Pavilion
6252 West 104th Avenue
Westminster, CO 80020
United States
Phone: 720-375-9987
SGarrett@butterflies.org

Jacquie Genovesi

The Academy of Natural Sciences
1900 Benjamin Franklin Parkway
Philadelphia, PA 19103
United States
Phone: 215-299-1048
genovesi@ansp.org

Katie Genovesi

Student
1900 Benjamin Franklin Parkway
Philadelphia, PA 19103
United States
Phone: 609-737-1736
kathryngenovesi@hvrdsd.org

Zak Gezon

Walt Disney Company
PO Box 10000
Lake Buena Vista, FL 32830
United States
Phone: 407-938-2432
zak.gezon@disney.com

Craig Goldstein

633 Vine Avenue
Highland Park, IL 60035
United States
Phone: 847-926-7039
craig.i.goldstein@gmail.com

Gregg Goodman

USDA APHIS PPQ
4700 River Road
Unit 133
Riverdale, MD 20737
United States
Phone: 301-851-2074
gregg.b.goodman@aphis.usda.gov

Nancy Greig

Cockrell Butterfly Center, Houston
Museum of Natural Science
5555 Hermann Park Drive
Houston, TX 77030
United States
Phone: 713-639-4742
ngreig@hmns.org

H**Alexander Harman**

3493 Veterans Pass
Dodgeville, WI 53533
United States
Phone: 608-930-2220
alexjh@charter.net

Uli Hartmond

Museum of Life and Science
433 W Murray Ave
Durham, NC 27704
United States
Phone: 919-220-5429x363
ulih@ncls.org

Jack Henderson

San Miguel High School
6601 S. San Fernando Road
Tucson, AZ 85756-6644
United States
Phone: 559-779-4555
brojackh@gmail.com

Kurtis Herperger

Victoria Butterfly Gardens
P.O Box, 190 1461 Benvenuto Ave
Brentwood Bay, BC V8M 1R3
Canada
Phone: 250-652-3822 ext 108
kurtis@butterflygardens.com

Kiffnie Holt

KSU Insect Zoo
123 West Waters Hall
Kansas State University
Manhattan, KS 66506
United States
Phone: 785-532-6110
kiffnie@ksu.edu

Kim Hoskins

6243 Babcock
San Antonio, TX 78240
United States
Phone: 210-696-3780
bat2bugz@peoplepc.com

Paige Howorth

San Diego Zoo
Department of Entomology
2920 Zoo Drive
San Diego, CA 92101
United States
Phone: 619-557-3983
phoworth@sandiegozoo.org

Mike Hyrkas

St Paul Public Schools
7950 Hillside Trl S
Cottage Grove, MN 55016
United States
Phone: 612-432-2774
kaptainwinky13@yahoo.com

J**Allison Johnson**

University of Georgia Department of
Entomology
120 Cedar St 413 BioSci Bldg
Athens, GA 30602
United States
Phone: 706-542-1238
ajohns14@uga.edu

Kelsey Johnson

National Park Service
319 2nd Avenue South
Seattle, WA 98104
United States
Phone: 360-871-1988
kelsey_johnson@nps.gov

K**Brent Karner**

BioQuip Products
2321 Gladwick Street
Rancho Dominguez, CA 90220
United States
Phone: 310-667-8800
brent@bioquip.com

Richard Kelson

Butterfly Habitat, Six Flags
29 Tiffin Ct.
Clayton, CA 94517
United States
Phone: 707-556-5270
rkelson@sftp.com

Susan Koenig

Windsor Research Centre
Windsor District
Sherwood Content P.O., Trelawny
Jamaica
Phone: 1-876-997-3832
windsor@cwjamaica.com

Devin Krafka

Omaha's Henry Doorly Zoo & Aquarium
3701 S. 10th St.
Omaha, NE 68107
United States
Phone: 402-669-6470
devin.krafka@omahazoo.com

L**Jennifer Lanphear**

Oregon Zoo
1080 NW 123rd Ave, Apt 32
Portland, OR 97229
United States
Phone: 9713882309
jen.lanphear@gmail.com

Mark Laska

The Butterfly Transformation
2251 San Diego Ave
A218
San Diego, CA 92110
United States
Phone: 917-365-5756
mark@thebutterflytransformation.com

Pat Latas

Invertebrate Veterinarian
7223 E Camino Valle Verde
Tucson, AZ 85715
United States
Phone: 520-979-2748
pjlatasdvm@gmail.com

Remy Lazare

Audubon Butterfly Garden and
Insectarium
423 Canal St
New Orleans, LA 70130-1152
United States
Phone: 504-587-2110
rlazare@auduboninstitute.org

Zack Lemann

Audubon Butterfly and Insectarium
423 Canal St.
New Orleans, LA 70130
United States
Phone: 504-587-2109
zlemann@auduboninstitute.org

David Lennette

Nectandra Institute
1325 Court Street
Alameda, CA 94501
United States
Phone: 510-521-7053
dlennette@nectandra.org

Evelyne Lennette

Nectandra Institute
1325 Court Street
Alameda, CA 94501
United States
Phone: 510-521-7053
elennette@nectandra.org

Camilla Leurini

Butterfly Conservatory
+506 84318520
Rome
Italy
Phone: +50684318520
camils86@msn.com

M**Mitch Magdich**

The Toledo Zoo
P.O. Box 140130
Toledo, OH 43614
United States
Phone: 419-385-5721
mitch.edu@toledozoo.org

Katie Malmberg

Pacific Science Center
9215 Greenwood Ave N
Seattle
WA, WA 98103
United States
Phone: 206-443-3626
kmalmberg@pacsci.org

Lindsey McBride

Thanksgiving Point Institute
3003 Thanksgiving Way
Lehi, UT 84043
United States
Phone: 801-768-7480
lmcbride@thanksgivingpoint.org

Jim Melli

San Diego Natural History Museum
1788 El Prado
San Diego, 92101
United States
Phone: 619-255-0242
jmelli@sdnhm.org

Ray Mendez

Work As Play
PO Box 16485
Portal, AZ 85632
United States
Phone: 520-558-2412
workasplay@vtc.net

Bob Merz

Saint Louis Zoo
1 Government Drive
Forest Park
Saint Louis, MO 63110
United States
Phone: 314-646-4804
Merz@stlzoo.org

Erin Mills

Cockrell Butterfly Center
5555 Hermann Park Drive
Houston, TX 77030
United States
Phone: 713-639-4752
emills@hmns.org

Rianna Modi

Insectarium Institute
8 Ironwood Drive
Morris Plains, NJ 07950
United States
Phone: 973-309-4946
rianna.modi@gmail.com

Lea Morgan

Museum Of Science
1 Science Park
Boston, MA 02114
United States
lmorgan@mos.org

Randy Morgan

Cincinnati Zoo & Botanical Garden
1754 Cornelius Lane
Okeana, OH 45053
United States
Phone: 513-484-9697
randy.morgan@cincinnati-zoo.org

Lorena Muro

California Science Center
700 Exposition Park Dr.
Los Angeles, CA 90037
United States
Phone: 213-744-2530
lmuro@cscmail.org

N**Nate Nelson**

Sedgwick County Zoo
5555 Zoo Boulevard
Wichita, KS 67212
United States
Phone: 316-266-8265
nnelson@scz.org

Patricia Nichols

Insectopia LLC.
542 Baker St.
Lansing, MI 48910
United States
Phone: 734-552-5142
Trisha@insectopia.com

Steven Nichols

Michigan State University
10480 Wesch Rd
Brooklyn, MI 49230
United States
Phone: 317-456-2847
nicho381@msu.edu

Emily Noel

Toronto Zoo
5753 Langmaid Road
Hampton, ON L0B1J0
Canada
Phone: 9057255038
emilyhv.noel@gmail.com

O

Karen Oberhauser

University of Minnesota
135 Skok Hall
2003 Upper Buford Circle
St. Paul, MN 55108
United States
oberh001@umn.edu

Jacob Olander

Heliconius Butterfly Works
985 Island Club Square
Vero Beach, FL 32963
United States
Phone: 3801212
jolander@ecodecision.com.ec

Tim O'Sullivan

Saint Louis Zoo
1 Government Drive
Forest Park
Saint Louis, MO 63110
United States
Phone: 314-646-4830
osullivan@stlzoo.org

P

Gwen Pearson

Purdue University
901 W State St
Smith Hall, Dept. of Entomology
West Lafayette, IN 47907
United States
Phone: 517-410-7166
gpearso@purdue.edu

Louis Perrotti

Rhode Island Zoological Society
1000 Elmwood Avenue
Roger Williams Park Zoo
Providence, RI 02907
United States
Phone: 4019413910
krosemarino@rwpzoo.org

Julie Peterson

Twin Cities Reptiles
7950 Hillside Trl S
Cottage Grove, MN 55016
United States
Phone: 651-432-2774
julie_p_87@hotmail.com

Jeffry Petracca

Long Island Aquarium
431 East Main Street
Riverhead, NY 11901
United States
Phone: 631-291-1493
jp594@cornell.edu

Celeste Poorte

Houston Museum of Natural Science
5555 Hermann Park Dr
Houston, TX 77030
United States
Phone: 512-632-6633
cpoorte@hmns.org

Mandy Pritchard

Cincinnati Zoo & Botanical Garden
3400 Vine Street
Cincinnati, OH 45220
United States
Phone: 513-559-8348
Mandy.pritchard@cincinnati-zoo.org

R

Winton Ray

Cincinnati Zoo & Botanical Garden
3400 Vine Street Cincinnati
Cincinnati, OH 45220
United States
winton.ray@cincinnati-zoo.org

Barbara Reger

Retired Teacher
4616 S. State Rd. 9
Greenfield, IN 46140
United States
Phone: 317-467-0855
barbarareger@sbcglobal.net

Jay Reger

Retired
4616 S. State Rd. 9
Greenfield, IN 46140
United States
Phone: 317-467-0855
barbarareger@sbcglobal.net

Ernesto Rodriguez

Mariposario del Bosque Nuevo
4k nort of Rio Orosi
La Cruz
Santa Cecilia, La Cruz, Guanacaste 510
Costa Rica
Phone: 506-8824-2682
lasbrisas@racsa.co.cr

S

Andrea Schepmann

Cincinnati Parks Krohn Conservatory
1501 Eden Park Drive
Cincinnati, OH 45202
United States
Phone: 513-421-5707
andrea.schepmann@cincinnati-oh.gov

Patrick Schlemmer

San Francisco Insect Zoo
1 Zoo Road
San Francisco, CA 94132
United States
Phone: 415-225-3830
PatrickS@sfzoo.org

David Schloss

1900 Benjamin Franklin Parkway
Philadelphia, PA 19103
United States
Phone: 2156010857
kcv28@drexel.edu

Fred Sherberger

3305 David Road
Atlanta, GA 30341
United States
Phone: 678-644-3169
f.sherberger@gmail.com

Craig Sherwood

The Strong - Dancing Wings Butterfly
Garden
One Manhattan Square Dr.
Rochester, NY 14607
United States
Phone: 585-410-6372
csherwood@thestrong.org

Sergio Siles

Costa Rica Entomological Supply
Guacima
Alajuela
Costa Rica
Phone: 506-243-80-400
Sergio@butterflyfarm.co.cr

Jamie Sincage

Disney's Animal Kingdom
PO Box 10,000
Lake Buena Vista, FL 32830
United States
Phone: 407-938-2173
jamie.sincage@disney.com

Brittney Smith

The Butterfly Palace
4106 West Hwy 76
Branson, MO 65616
United States
Phone: 417-332-2231
brittney@thebutterflypalace.com

Joseph Soltis

Disney's Animal Kingdom
1200 North Savannah East
Lake Buena Vista, FL 34761
United States
Phone: 321-230-5517
Joseph.Soltis@disney.com

Annie Spikes

NC Museum of Life and Science
433 Murray Ave
Durham, NC 27704
United States
Phone: 806-445-2721
annies@ncmls.org

Dave Stone

University Laboratory High School
1212 W. Springfield Avenue
Urbana, IL 61801
United States
Phone: 217-333-2870
sdenham@illinois.edu

Scott Stricof

The Butterfly Transformation
2 Falcon Woods Court
10506
United States
Phone: 917-842-9065
scott@thebutterflytransformation.com

Celia Stuart

BioQuip Products
2321 Gladwick St
Rancho Dominguez, CA 90220
United States
Phone: 310-667-8800
celia@bioquip.com

Erin Sullivan

Woodland Park Zoo
601 N 59th Street
Seattle, WA 98103
United States
Phone: 206-548-2512
erin.sullivan@zoo.org

Jessica Sutherland

Point Defiance Zoo and Aquarium
5400 North Pearl Street
Tacoma, WA 98407
United States
Phone: 253-404-3670
jessie.sutherland@pdza.org

David Suttinger

Houston Zoo
1513 Cambridge
Houston, TX 77030
United States
Phone: 713-533-6812
dsuttinger@houstonzoo.org

T

Doug Taron

Chicago Academy of Sciences
2430 North Cannon Dr.
Chicago, IL 60614
United States
Phone: 847-695-4568
dtaron@naturemuseum.org

Andalyne Tofflemire

Cambridge Butterfly Conservatory
2500 Kossuth Rd
Cambridge, ON N3H4R7
Canada
Phone: 519-653-1234x110
naturalist@cambridgebutterfly.com

Richard Tofflemire

RHT Enterprises
12 White Street
Guelph, ON N1E 6B3
Canada
Phone: 226-820-0519
naturalist@cambridgebutterfly.com

Matt Trujillo

The Butterfly Palace
4106 W Hwy 76
United States
Branson, MO 65616
United States
Phone: 417-332-2231
brittney@thebutterflypalace.com

V

Kenneth Valverde-Martinez

Woodland Park Zoo
149 159th Place SE
Bellevue, WA 98008
United States
Phone: 425-518-8340
Kenneth17x@gmail.com

Karen Verderame

Academy of Natural Sciences of Drexel
University
1900 Benjamin Franklin Parkway
Philadelphia, PA 19103
United States
Phone: 215-601-0857
kcv28@drexel.edu

W

Ron Wagler

The University of Texas at El Paso
500 West University Avenue
Education Building 601
El Paso, TX 79968
United States
Phone: 915-747-5000
rrwagler2@utep.edu

Kelli Walker

San Diego Zoo
2920 Zoo Drive
Department of Entomology
San Diego, CA 92101
United States
Phone: 619-231-1515
kwalker@sandiegozoo.org

John Watts

Texas Discovery Gardens
3601 Martin Luther King Jr Blvd
Dallas, TX 75210
United States
Phone: 214-428-7476 X220
jwatts@texasdiscoverygardens.org

Wayne Wehling

USDA APHIS PPQ
4700 River Road
Riverdale, MD 20737
United States
Phone: 301-851-2336
wayne.f.wehling@aphis.usda.gov

Michael Weissmann

Kallima Consultants, Inc.
PO Box 33084
Northglenn, CO 80233
United States
Phone: 720-872-6262
AskArtie@aol.com

Anita Westphal

Reiman Gardens, Iowa State University
1407 University Boulevard
Ames, IA 50011
United States
Phone: 515-294-9145
anitaw@iastate.edu

Michael Whitson

Las Vegas Boutique Zoo
7716 Genzer Dr.
Las Vegas, NV 89145
United States
Phone: 702-722-4648
magicdocmw@yahoo.com

Rachel Williams

Kallima Consultants, Inc.
3729 East 135th Drive
Thornton, CO 80241
United States
Phone: 303-913-8631
ewilli7669@aol.com

Lauren Williamson

IABES
5908 C ST
Little Rock, AR 72205-3320
United States
Phone: 979-220-3742
info@iabes.org

Mike Wrubel

Wildlife Conservation Society-Bronx Zoo
2300 Southern Boulevard
Bronx, NY 10460
United States
Phone: 718-220-5047
mwrubel@wcs.org

Y**Tad Yankoski**

The Butterfly House
15193 Olive Blvd
Chesterfield, MO 63017
United States
Phone: 636-530-0076 X16
tad.yankoski@mobot.org

Z**Amber Zelmer**

Houston Zoo
1513 Cambridge
Houston, TX 77030
United States
Phone: 713-533-6812
azelmer@houstonzoo.org

NOTES



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MISSION

The Terrestrial Invertebrate Taxon Advisory Group (TITAG) was established in 1990, under the auspices of the Association of Zoos and Aquariums (AZA), to address the pressing need for attention to this important group of animals within member institutions. TITAG provides support and guidance for the conservation and managed care of invertebrates in educational facilities.

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TITAG maintains Species Survival Programs (SSP) for the following invertebrates:

- Partula Snail, *Partula nodosa*
- Mexican Red-kneed Tarantula, *Brachypelma smithi*
- American Burying Beetle, *Nicrophorus americanus*

TITAG facilitates the Safety Web for Arthropod Reproduction and Management (SWARM) program for the following invertebrate species:

- Emperor Scorpion, *Pandinus imperator*
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- Peruvian Fire Sticks, *Oreophoetes peruana*
- Giant African Millipede, *Archispirostreptus gigas*
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