

46th
International Herpetological
Symposium



June 19-22, 2024
Knoxville, Tennessee

About the International Herpetological Symposium

The first Symposium on Captive Propagation and Husbandry of Reptiles and Amphibians was held in June of 1976 at Hood College in Fredrick, MD. The International Herpetological Symposium (IHS) evolved from this meeting. The mission of the IHS is to provide a forum for the dissemination of information and results of such research pertaining to the natural history, conservation biology and captive management/propagation of amphibians and reptiles.

Each year the IHS is held in a different location and is hosted by a zoological, herpetological or herpetocultural institution.

The purpose of the IHS is twofold:

To provide a yearly symposium for the dissemination of information and research pertaining to the natural history, conservation biology, captive management and propagation of amphibians and reptiles

To build a community open to all individuals who are interested in reptiles and amphibians and provide a platform that fosters the exchange of ideas and information

Unlike most herpetological societies and associations, IHS does not have a voting membership. We are governed instead by an Electoral Body that consists of the members of the Board of Directors, Advisory Council, Publication Editors and chairs of various committees. These individuals are selected from all areas of the herpetology and herpetocultural worlds. Zoologists, herpetologists and private herpetoculturists are together involved in the planning and organizing of each annual symposium.

IHS OFFICERS

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Immediate Past President (2023-2024)

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Vice President (2012)

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Treasurer and Grant Program Chair (2014)

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Secretary/ Edu. Coord. (2018)

Justin Elden, Saint Louis Zoo, Government Dr.,
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IHS COMMITTEE MEMBERS

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Dear Friends -

It is my great honor and privilege to welcome you all to the 46th annual gathering of the International Herpetological Symposium (IHS). Since its inception in 1976, the IHS has stood as a cornerstone within the herpetological and herpetocultural community, serving as a one-of-a-kind venue where enthusiasts, researchers, and conservationists from across the globe converge as colleagues. Reflecting on nearly five decades of shared knowledge and collaboration, it's truly remarkable to witness the evolution of our community and field of study. During that inaugural meeting, discussions on reptile egg incubation techniques, light cycles for inducing mating, and leopard gecko breeding (*Eublepharis macularius*) were considered revolutionary. Fast forward to today, and we continue to uphold that tradition of cutting edge discourse, with a diverse array of voices, perspectives, and expertise contributing to our collective dialogue. Whether you are a hobbyist looking to advance your keeping skills or a seasoned academic here to share a fantastic body of work, IHS is for you. We are glad you have joined us.

This year, we continue to build on that legacy with a focus on conservation, education, and the responsible care of amphibians and reptiles through some extraordinary presentations, starting with our keynote speaker, Dr. Graham Reynolds, distinguished herpetologist, author, and National Geographic explorer. Propagation has always been a cornerstone of IHS, and this year, we have created a dedicated day of talks on this topic, which we call the *Advancing Herpetoculture Sessions*, featuring some of the top names in herpetoculture today. We've also brought back poster sessions to allow an easy entry point for more voices to be heard and studies to be seen, as well as a continued dedication to our *Collegiate Sessions* and *Junior Herper Program*— continuing our commitment to fostering and uplifting the future generation.

Looking ahead, I can only imagine what the future holds for IHS, but no future would be possible without our major sponsors, so I want to acknowledge our generous contributors. Timberline Industries, Zoo Med, Rodent Pro, Reptile Industries and the Knoxville Zoo— thank you for your generosity and support... You make this possible, and it means the world to us.

Stepping into the role of President, I'm humbled by the legacy of those who've paved the way for the IHS's success over the years, and honored to be a part of our future together with our incredible board of directors. I vividly recall arriving at my inaugural IHS experience in San Antonio, 22 years old, pulling up to the hotel in my mud and bug-covered car (except for the windshield, which was fastidiously attended to for road cruising purposes), frantically checking my shirt for any remaining chip crumbs, scrambling to hide the piles of energy drink and Slim Jim trash under the seat, overthinking every possible hello about to happen, and honestly a little intimidated— I couldn't shake the initial pangs of imposter syndrome. Looking out my car window, I could see the faces of names I'd only ever read about. What have I done? I don't belong here, I thought. Yet, as the meeting unfolded and I connected with fellow attendees, I quickly went from feeling lost to knowing I was exactly where I would want to be year after year. For any newcomers or aspiring herpetologists grappling with similar feelings and doubts, let me assure you— you're in the right place. Here, the authors and authorities you've long admired are more than just figures on a page—they're prospective friends and future collaborators. So, to all of our newcomers, welcome, and to our long-time IHS family, let's continue to be that group we've always been- one that embraces a sense of community unlike any other.

Myke Clarkson
IHS President

SCHEDULE

JUNE 19

WEDNESDAY

Icebreaker 5:00 pm - 8:00 pm (with vendor set-up during day)

JUNE 20

THURSDAY

9:10 am: Opening of the IHS Conference: Remarks IHS President Myke Clarkson

9:30 am - 10:30 am: Keynote Speaker: Graham Reynolds, Ph.D, University of North Carolina "Boas of the West Indies: Ecology and Evolution of Enigmatic Island Snakes"

10:30 am - 10:45 am: Break

10:45 am - 11:15 am: Sam Perrett, Herp HQ "The Perfect Imperfect"

11:15 am - 11:45 am: Rachel Boehm, St. Louis Zoo "Care and Reproduction of *Protothrops* species at the Saint Louis Zoo"

11:45 am - 12:00 pm: Madeline R. Mann, Department of Biological Sciences Eastern Kentucky University "How a Salamander Gets its Spots: Predation Risk as a Carryover Effect on Aposematic Coloration in *Ambystoma maculatum*"

12:00 pm - 1:30 pm: LUNCH

1:30 pm - 2:00 pm: Jack Bugaj, St. Louis Zoo "Care of Ecuadorian Amphibians at the Saint Louis Zoo"

2:00 pm - 2:40 pm: Matt Gray Ph.D, University of Tennessee Institute of Agriculture, "A Healthier Trade for U.S. Pet Amphibians"

2:40 pm - 3:10 pm: Roger Carter, Hoosier Herp Society "Knives, Swords, and Herpetological Art"

3:10 pm - 3:20 pm: Break

3:20 pm - 4:00 pm: Kristen Wiley, Kentucky Reptile Zoo "Antivenom Issues During the Pandemic"

**4:00 pm - 4:30 pm: R. Davis Gunnin, Don Sundquist Center of Excellence in Paleontology
"Appalachian Alligators and Giant Salamanders: Herpetofauna of the Five-Million-Year-
Old Gray Fossil Site"**

4:30 pm - 4:50 pm: Daniel Cabrera "Herping the Yucatan Peninsula"

**4:50 pm - 5:10 pm: Brady McGowan "Accessing Amazonia: A Field Report From a First
Timer in the Peruvian Amazon"**

4:50 pm- 5:00 pm: Closing Remarks: IHS President Myke Clarkson

JUNE 21

FRIDAY

ADVANCING HERPETOCULTURE SESSIONS

9:10 am: Opening Remarks IHS President Myke Clarkson

**9:15 am - 9:45 am: Jim Harrison & Kristen Wiley, Kentucky Reptile Zoo "Captive
Husbandry of the Cascavel, *Crotalus d. terrificus*"**

**9:45 am - 10:15 am: Wayne Hill, National Reptile Breeders Expo "Breeding the Nile
Softshell"**

**10:15 am - 10:45 am: Zac Loughman, West Liberty University and Colubrid and Colubroid
Radio "Naturalistic Keeping Strategies for North American Hognose Snakes"**

10:45 am - 11:00 am: Break

**11:00 am - 11:30 am: Roy Blodget, Wellspring Herpetoculture and Project
Herpetoculture "The Husbandry of Monkey-Tailed Lizards"**

**11:30 am - 12:00 pm: Zach Brinks, Josh's Frogs "Frog On!: An Ethical Approach to
Supplying a Growing Demand for Captive-bred Amphibians"**

12:00 pm - 1:00 pm: LUNCH

**1:00 pm - 1:30 pm: Chris Montross, Darkhorse Herpetoculture "Hidden Beauty:
Natural History and Husbandry of Mangrove Salt Marsh Snakes (*Nerodia clarkii*
compressicauda)"**

**1:30 pm - 2:00 pm: Billy Sveen, "Captive Equivalence as the Minimal Welfare Standard for
Captivity Managed Herpetofauna"**

**2:00 pm - 2:30 pm: Ryan Dumas, "Coming Unhinged with Hingebacks - Captive
Husbandry and Natural History of Home's Hingeback Tortoises (*Kinixys homeana*)"**

2:30 pm - 2:40 pm: Closing Remarks: IHS President Myke Clarkson

KNOXVILLE ZOO TOUR & DINNER 3:00 pm - 7:00 pm

JUNE 22

SATURDAY

9:10 am: Opening Remarks IHS President Myke Clarkson

9:30 am - 10:30 am: Vicky Poole, Fort Worth Zoo “Successful Gharial Breeding at The Fort Worth Zoo”

10:30 am - 11:00 am: Michael Ogle, Zoo Knoxville “Breeding Programs”

11:00 am- 11:15 am: Break

11:15 am - 11:45 am: Bob Ashley, Chiricahua Desert Museum “Rattlesnakes of the Sky Islands and the Origins of the Chiricahua Desert Museum”

11:15 am - 12:00 pm: Junior Herpetologist Winners: Russ Gurley

12-15 Age Group

Winner: Savannah Senopole - New Albany, Indiana “*Pseudocerastes urarachnoides* “Spider-tailed Horned Viper”

19-22 (NextGen Herpetologist)

Winner: Taryn Cornell - San Diego State University “Monitoring Mojave Desert Tortoises”

Winner: Claudia Goss - Oklahoma State University “Horned & True Toads: An Overview of Texas Horned Lizard Population Monitoring & North American Toad Diversification”

12:00 pm - 12:30 pm: Myles Masterson, Virginia Tech “Exploring the Herpetofauna of Southeast Asia”

12:30 pm- 1:30 pm: LUNCH



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1:30 pm - 2:00 pm: Dane Conley, “Estimating the Impact of Snake Fungal Disease Across a Southeastern Geographic Gradient”

2:00 pm- 2:45 pm: Collegiate Speed Session: Justin Elden

Tyler Schwisow - West Liberty University “Thermal Covariates Associated with Plains Hognose Snake (*Heterodon nasicus*) Activity”

Brianne Light - West Liberty University “Beyond the Bask: How Thermal Preferences Affect Growth, Behavior, and Stress Levels in *Hydrodynastes gigas*”

Casey Cannon - West Liberty University “Courtship and Social Interactions in Captive Malayan Gharial (*Tomistoma schlegelii*)”

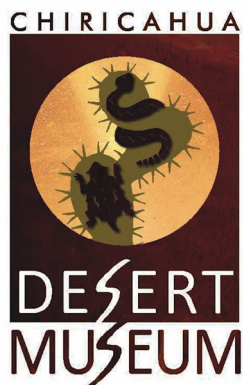
2:45 pm - 3:00 pm: Break

3:00 pm - 3:30 pm: Brad Lock, Oklahoma City Zoo “Report on a Long-term Conservation in Guatemala for Two of the Most Endangered Species in the World, *Heloderma charlesbogerti* and *Abronia campbelli*; 20 Years and Counting”

3:30 pm - 3:50 pm: Devin Edmonds, Association Mitsinjo, Andasibe, Madagascar “Discovering the Life History Traits of Poorly Known Frog Species Through a Captive Breeding Program in Madagascar”

3:50 pm - 4:00 pm: Closing Remarks IHS President Myke Clarkson

Banquet Speaker- Dr. Bruce Means “Islands in the Sky: The Herpetological Wonders of South America’s Tepuis”



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Dr. Bruce Means is President Emeritus of the Coastal Plains Institute and Land Conservancy, a nonprofit organization he and others founded in 1984 that is dedicated to conserving the rich biodiversity — and elevating public awareness and appreciation



— of the vast Coastal Plain of the southeastern United States. He is an Adjunct Professor of Biological Science at Florida State University where he has taught courses on the ecology of upland, wetland, and coastal environments of the southeastern U. S. and courses on vertebrate biology, ichthyology, mammalogy, herpetology, general biology, tropical ecology, and conservation biology.

His research includes a wide variety of topics ranging from ecosystems of the southeastern United States to fire ecology, the natural history of South American tepuis, biogeography, conservation, endangered species, and the evolution and natural history of amphibians and reptiles. He has published more than 310 scientific articles, technical reports, and popular articles on his research in *National Wildlife*, *International Wildlife*, *Natural History*, *BBC Wildlife*, *National Geographic*, *Fauna*, *South American Explorer*, and other magazines. His books include several on the ecology of Florida and *Stalking the Plumed Serpent and Other Adventures in Herpetology*, as well as the forthcoming *Basecamp in the Tropics: My Adventures Discovering Biodiversity in South America*.

Basecamp is the field guide from Bruce's most iconic expeditions, most notably the trip to Guyana's tepui's with climber Alex Honnold that became the *National Geographic* documentary, "The Last Tepui."

From 1998 to the present, he and his research have been featured in documentary films for National Geographic Television (*King Rattler*; *Quest for the Rainbow Serpent*; *Into the Lost World*; *Saving the King of Snakes*; *Diamondback Survivors*, etc.), BBC Television, and PBS. Bruce Means lives in Tallahassee and relishes his time in the woodlands, swamps, and bogs of the Florida Panhandle — and making expeditions into the vast wilderness of northeastern South America.

ABSTRACTS

Rattlesnakes of the Sky Islands/The Chiricahua Desert Museum

Bob Ashley

Chiricahua Desert Museum

www.chiricahuadesertmuseum.com

This talk will be a photo journey through the many beautiful rattlesnakes, reptiles and landscapes that helped make the decision to move out the middle of nowhere NM/AZ and create a natural history museum. The journey will begin with images going back almost 30 years from the many trips out here to the beginning stages of building the Chiricahua Desert Museum, Geronimo Event Center and the new Library of Herpetology and its collections and breeding programs for many of the montane rattlesnakes, tortoises and other reptiles we breed at the museum.

The Care and Reproduction of *Protobothrops* Species at the Saint Louis Zoo

Rachel Boehm

Saint Louis Zoo Herpetology Department, 1 Government Drive, St. Louis, MO 63110

The Saint Louis Zoo is committed to the conservation of endangered species and the environments in which they live and this extends to ex-situ care of rare and endangered species. The genus *Protobothrops* consists of fifteen extant species of pit viper originating from across southeastern Asia. The Saint Louis Zoo's Department of Herpetology has invested in the captive care of six species of *Protobothrops* (*P. tokarensis*, *P. elegans*, *P. cornutus*, *P. mangshanensis*, *P. mucrosquamatus*, and *P. jerdonii xanthomelas*) and has successfully reproduced and reared three of these species recently: *P. tokarensis*, *P. elegans*, and *P. cornutus*. Here we will discuss husbandry procedures, reproduction, and the captive raising of *Protobothrops*. By sharing our methodologies and insights, we hope to contribute to the advancement of the captive management of pit vipers as we continue to learn more about these species.

Abstract: Frog On!: An Ethical Approach to Supplying a Growing Demand for Captive-bred Amphibians

Zach Brinks

In this oral presentation, Zach Brinks of Josh's Frogs (VP of Live Operations, 17 years running) will discuss the challenges and opportunities around ethically supplying amphibians for the exotic animal trade. Strategies will include partnering with others to produce animals in the country of origin, large scale captive breeding operations to produce a wide range of amphibian species for the domestic US market, as well as the development and implementation of conservation grants and partnerships that directly link the keeping of amphibians as pets to their survival in the wild. He will also discuss what he sees as the future of ethical amphibian keeping and what can be done to move forward in a sustainable manner.

Ex-Situ Conservation Programs of the Saint Louis Zoo's Herpetology and Aquatics Department

Jack Bugaj^{1*}, Justin M. Elden^{1,2}

***Presenting Author**

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The Saint Louis Zoo's Herpetology and Aquatics team has a long-vested interest in ex-situ conservation and its implications on wildlife preservation. Recently we have made strides in ensuring we make great impact for species of conservation concern in our zoo based Herpetarium. Examples include Ecuadorian Amphibians, which are under serious threat. Our WildCare Institute Center for Ecuadorian Amphibian Conservation has been working to conserve these rare species since 2006. We successfully reproduce some of these animals at our Zoo, recently including the Critically Endangered Rio Pescado Stub-foot Toad (*Atelopus balius*), the threatened Diablito Poison Frog (*Oophaga sylvatica*), and others. Conversely, Antillean Boas face different kinds of threats. We work with a variety of species with an emphasis on the Virgin Island Boa (*Chilabothrus granti*) as part of the Virgin Island Boa Recovery Program and eventual head-start program. A more recent undertaking is our initial work with Endangered Cave species. A starting point is reproduction of the Groundwater Isopod (*Caecidotea brevicauda*) as a proof of concept and food source for our potential work with endangered subterranean fish and salamander species. During this presentation we will explain our captive husbandry, developed reproductive strategies, and natural histories for these fascinating Endangered species at the Saint Louis Zoo.

Herping the Yucatan Peninsula

Daniel Cabrera

Autonomous University of Yucatan

The Yucatan Peninsula is located in the extreme southeast of the Mexican Republic. Between 18° and 21°30' north latitude. It is made up of the Mexican states of Campeche, Quintana Roo and Yucatán. The herpetofaunistic diversity is represented for 145 species of amphibians and reptiles, which includes 22 species of anurans, three of salamanders, two crocodylians, 102 squamates and 16 turtles. Some of the problems that most affect these groups in the Yucatan Peninsula are the modification of the habitat due to a growing phenomenon of urbanization. Roads play an important role in territorial interconnectivity, but they are also a negative factor in mortality due to being run over. Pollution, climate change, illegal species trade or the introduction of exotic species are factors that also influence in the process of descension of these groups. Although the Yucatan Peninsula has been very well studied, new records have recently been made of species with natural distribution, as well as exotic species that give us a better perspective of the distribution of these species in the territory.



Estimating the Impact of Snake Fungal Disease Across a Southeastern Geographic Gradient

Dane A. Conley¹, Gaele Blanvillain¹, John Kleopfer², Kate Langwig¹, Emily Gray³,
Jayme Waldron³, Michael Brennan⁴, Christian Jeitner⁵, Patrick Burritt⁵, Kim Laidig⁵,
John Bunnell⁵, Ben Stegenga⁶, Kameron Burgess⁷, Joseph Hoyt¹

¹ Department of Biological Sciences, Virginia Tech, Blacksburg, VA 24060; ² Virginia Department of
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Authority, Jekyll Island, GA 31527; ⁵ Pinelands Commission, Pemberton Township, NJ 08068;
⁶ Orianna Society, Tiger, GA 30576, ⁷ Longleaf Alliance, Milton, FL 32570

Conservation of herpetofauna remains a significant challenge due to the myriad of threats wildlife face in the Anthropocene. These include habitat loss, climate change, overutilization, and infectious disease. Snake fungal disease (SFD), is caused by the fungal pathogen *Ophidiomyces ophidiicola*, which is widespread across North America and poses a threat to multiple species of snakes. Substantial infections have been documented across the United States and in some cases resulting in mortality, and even population declines. Differences in infection severity among species may play a key role in the dynamics of this disease, however, limited research has been conducted on variation among species. To examine species level and geographic variation in infection severity, we sampled 1100 wild snakes from 44 species at 14 sites across the Southeastern and Mid-Atlantic regions of the United States. We found strong spatial and intra-species variation from data collected over three years. We found that *Farancia*, *Crotalus*, *Pituophis*, and *Nerodia* species had high prevalence and severity when compared to other species across the Eastern United States.

During the sampling period we also documented an unusual mortality event of rainbow snakes, *Farancia erytrogramma*, in North Carolina and Virginia, which included over 40 individuals. These snakes were found dead in habitat, tested positive for *Ophidiomyces ophidiicola* via qPCR, and were confirmed through histopathology to have died from SFD. These results show that snake fungal disease may be a persisting threat to snake communities and that continued monitoring of the most impacted species is crucial for their conservation.

Monitoring the Mojave Desert Tortoise

Taryn Cornell

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The Mojave Desert Tortoise (*Gopherus agassizii*) is an endangered species on the decline in the Western US. USFWS and partners have been monitoring their populations across multiple conservation areas around Las Vegas, NV for nearly two decades. This longitudinal data set is crucial for identifying trends in population density and occupancy for their recovery.

Taryn Cornell is an early career biologist who has most recently worked with the Mojave Desert Tortoise on various projects. During her undergraduate, she conducted an independent project characterizing species richness and distribution of anurans along an elevational gradient in Costa Rica. In the near future, she aims to pursue graduate research with an emphasis on conservation biology and herpetofauna.

**Discovering the Life History Traits of Poorly Known Frog Species
Through a Captive Breeding Program in Madagascar**

**Devin Edmonds^{1,2,3*}
Justin Claude Rakotoarisoa¹
Sebastian Wolf¹**

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Amphibians are facing an extinction crisis, and ex situ programs are increasingly being used as a tool for their conservation. However, conservation efforts are often limited because we do not understand the ecological, behavioral, and life history traits of many amphibian species. We established a conservation breeding facility in Andasibe, Madagascar and collected data on the ecology and reproductive biology of 11 poorly known frog species. Terrestrial breeding species and microhylids with non-feeding tadpoles laid the fewest eggs yet completed metamorphosis rapidly. Conversely, species that bred in or above water laid larger clutches and took longer to develop. Natural seasonal temperature variation in the facility aligned with breeding patterns for most but not all frog species. Using a captive population, we confirmed *Gephyromantis mitsinjo* lays eggs on land with tadpoles developing terrestrially within jelly, a behavior previously theorized but which until now remained unobserved. Such observations show how captive breeding programs can be used to gain valuable data on the life history traits of species that are otherwise challenging to observe in nature.

Project authorization and collection permits were received from Madagascar's Ministère de l'Environnement et du Développement Durable, numbers 145/MEF/SG/DGF/DVRN/SGFF and 30-12/MEF/SG/DGF/DVRN/SGFF.

You are Invited!



2024 TTPG Conference on the Captive Care & Breeding of Turtles and Tortoises



Wednesday, November 20 (Field Trip)

Thursday, November 21 9:00 am to 5:00 pm * Presentations

Friday, November 22 9:00 am to 2:00 pm * Presentations and lunch banquet

*** Annual meeting of the Galapagos Tortoise Alliance and the Kinixys Working Group**

Mesa Centennial Hall * Mesa, ARIZONA USA

www.ttpg.org for information

Horned & True Toads: An Overview of Texas Horned Lizard Population Monitoring & North American Toad Diversification

Claudia Goss

Oklahoma State University

crgoss01@gmail.com

This will be an overview of a Texas Horned Lizard population monitoring project I worked on as an undergraduate at University of Oklahoma and I will give a brief synopsis of my current graduate research exploring North American toad morphology, hybridization, and toxin diversification.

Healthy Trade Institute – A Vision for a Healthier Herpetofaunal Trade

Matthew Gray^{1,2}, Danielle Galvin^{1,2}, Ashley Brinkman^{1,3}, Mark George^{1,4}, and Debra Miller^{1,2,5}

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² School of Natural Resources, University of Tennessee, Knoxville, TN

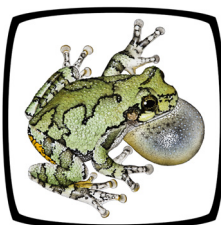
³ Pet Advocacy Network, Washington D.C.

⁴ Reptiles by Mack, Xenia, OH

⁵ College of Veterinary Medicine, University of Tennessee, Knoxville, TN

Previous surveys indicate that U.S. businesses and pet owners are in support of an industry-led healthy trade certification program for pet amphibians. In June 2022, we began discussions with over 20 industry stakeholders and experts to develop a voluntary program that would certify U.S. businesses as healthy trade partners. Member businesses participate in online training, incorporate biosecurity practices that promote healthy animals, test a subset resident, for-sale, and newly acquired amphibians for target pathogens (chytrid fungi, ranavirus), and quarantine animals if a positive detection occurs. For market incentive, testing amphibians in shipments between certified businesses is not required. Testing is done using nonlethal swab samples and performed by approved laboratories that demonstrate proficiency in diagnostic assays for the target pathogens. In 2024, the non-profit Healthy Trade Institute Inc. (HTI) was created to launch and coordinate this program. The HTI is recruiting diagnostic laboratories to lead pathogen testing and will be opening membership in 2024 to businesses that sell amphibians. Membership fees are tiered based on annual sale revenues and range between \$100 – \$5000 per year. Member businesses are authorized to use the HTI certification logo to increase market value of their sellable amphibians. The HTI certification program is the first of its kind – a partnership among industry, academia, and a non-profit to empower businesses to champion healthy trade practices that enhance the wellbeing of pets and wildlife.

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**SOCIETY FOR THE STUDY OF
AMPHIBIANS AND REPTILES**

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**Appalachian Alligators and Giant Salamanders:
Herpetofauna of the Five-Million-Year-Old Gray Fossil Site, Tennessee, USA**

R. Davis Gunnin¹, Blaine W. Schubert^{1,2}

¹ Don Sundquist Center of Excellence in Paleontology, Johnson City, TN.

² Department of Geosciences, East Tennessee State University, Johnson City, TN.

Located in the Valley-and-Ridge of eastern Tennessee, the Gray Fossil Site (GFS) preserves an extraordinary record of Appalachian herpetofauna prior to the climatic upheavals of the Pleistocene Ice Age. Estimated to be 4.9 – 4.5 million years old, GFS is one of only a few similarly aged localities east of the Mississippi River and the only such locality in the southern Appalachian Mountains. Excavations since its accidental discovery in 2000 have uncovered a rich herpetofaunal community, including many new taxa, and has revealed unexpected biogeographic and evolutionary trends in the southeastern United States. Frogs, salamanders, and squamates are some of the most common vertebrate fossils at the site. Turtles are also well represented, often as nearly complete shells. Enigmatic taxa including a potential new species of Alligator and a poorly known helodermatid are minor but important components of the fauna. The Alligator is smaller than the living *A. mississippiensis* and histological analysis may indicate a different growth strategy. GFS is particularly notable for its plethodontid community – the oldest in eastern North America and most taxonomically diverse fossil assemblage globally. The plethodontid community appears largely modern in composition, but a new large desmognathan has been discovered here and underscores the southern Appalachians as an important arena of plethodontid evolution. This unique temporospatial locale provides a crucial window into evolutionary and biogeographic trends of herpetofauna, not just in the southern Appalachians – a globally recognized biodiversity hotspot – but in eastern North America as a whole.

Venom VS Cancer: Excitement or Disappointment?

James R. Harrison, Kristen Wiley

kyreptilezoo@kyreptilezoo.org

Kentucky Reptile Zoo is involved in providing venom for a potential drug for non-small cell lung cancer that is in development in Europe. The species being used for this project is *Crotalus durissus terrificus*. These animals were originally acquired over a decade ago, and this colony has been maintained at KRZ ever since. The nature of venom production presents unique challenges to maintenance of a colony of snakes. Husbandry, breeding and veterinary concerns will be discussed, as well as the difficulty of dealing with an unknown outcome.

Breeding Nile Softshell Turtles, *Trionyx triunguis*

Wayne Hill

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Trionyx triunguis, the Nile Softshell Turtle, has an extensive range in Africa and the Mediterranean. Over a ten year period, seven Nile Softshell Turtles of various sizes and ages were imported to the United States and introduced to my breeding facility in Winter Haven, Florida. This presentation will address the challenges and solutions that resulted in successful captive breeding of these beautiful turtles over the last two years.

Report on a Long-term Conservation in Guatemala for Two of the Most Endangered Species in the World, *Heloderma charlesbogerti* and *Abronia campbelli*; 20 Years and Counting

Brad Lock, Monica Torres, Thomas Schrei

This presentation will focus on two long-term, holistic conservation programs for two of the most endangered reptile species in the world: The Guatemalan beaded lizard (*Heloderma charlesbogerti*) and Campbell's alligator lizard (*Abronia campbelli*). Topics will span almost 20 years of an in-situ program that has evolved from "just trying to find if the species still existed" to a range-wide program centered on habitat preservation for each species. With this in mind, the presentation will highlight each species, habitat restoration and preservation efforts and results to date, community involvement successes, conservation education as an all-important piece of any conservation program and critical social initiatives that serve to engage and create local and governmental partners crucial to the long-term success of these programs.

Thermal Covariates Associated with Plains Hognose Snakes (*Heterodon nasicus*) Activity

Tyler Schwisow, Zackary Graham, Zachary Loughman

West Liberty University
tschwisow@westliberty.edu

Members of the Series Reptilia, a taxon of ectothermic vertebrates, rely on their environment and its factors to function. Because of this, these individuals are more likely to follow a set activity pattern based on environmental factors, increasing the predictability of where they will be found under given conditions. Those interested in finding reptiles in their natural habitat, whether professionally or as a hobby, would be aided by knowledge of a species' preferences for habitat and environmental factors. The Plains Hognose snake (*Heterodon nasicus*), a semi-fossorial snake in the family Dipsadidae, is a species of snake that is common in the pet trade but wild populations in parts of its range have been decreasing. These snakes are located in the mid-western portion of the United States and are known to be highly secretive and difficult to find because of their fossorial behavior. Using data collected from a localized region, a statistical analysis of environmental conditions can be run to determine favorable environmental factors that will increase the probability of locating members of this species for field surveys and population analysis. Additionally, the herpetoculture industry could greatly benefit from this information, making it significantly easier to accurately represent the environmental conditions that an individual would experience in the wild. As global temperatures rise the thermal profile of the landscape will shift, potentially causing *H. nasicus* to either shift its behavior or temperature preferences.



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**How a Salamander Gets its Spots: Predation Risk as a Carryover Effect
on Aposematic Coloration in *Ambystoma maculatum* (A Proposal)**

Madeline R. Mann¹ and Cy L. Mott¹

¹ Eastern Kentucky University

Early experience in many species can induce the expression of traits that subsequently influence fitness later in life, a phenomenon known as carryover effects (COEs). Some COEs influence phenotype expression in both early and late life stages, which then influence expression of additional secondary traits developed in later stages, called indirect COEs. Previous research has highlighted indirect COEs of food availability on body condition and aposematic coloration in amphibians, but little is known of how predation risk experienced during larval stages affects later stage coloration. I hypothesized increased predation risk in larval stages will decrease larval body condition, subsequent juvenile body condition, and lead to reduced secondary defensive coloration. To better understand the interplay between larval predation risk, growth and development, and subsequent aposematic coloration as a potential indirect COE in larval amphibians, this research is in the process of monitoring a suite of growth, development, and color variables among larval Spotted salamanders (*Ambystoma maculatum*) under a predator present/absent mesocosm design. The proposed research will determine if larval adaptive responses to predation risk (decrease in foraging and body condition) lead to maladaptive juvenile defensive coloration and later implications of fitness.

Exploring the Herpetofauna of Southeast Asia

Myles Masterson

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Virginia Beach, Virginia

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Southeast Asia is a paradise for any naturalist. Tropical latitudes, combined with intense geographical relief, set the stage for incredible biodiversity. For many reasons, naturalists are drawn to this region for an opportunity to see some of the most fascinating herpetofauna in the wild. In our journey, we set out to observe and photograph as many species of herpetofauna and marine life as we can while backpacking our way through five Southeast Asian countries. With a one way ticket to Thailand booked and a clear schedule ahead, we set out on a journey many naturalists dream of.

To donate to the Junior Herpetologist and NextGen Herper programs and the IHS Grants Program, contact Vicky Poole at vpoole@fortworthzoo.org.

Accessing Amazonia: A Field Report from a First-timer in the Peruvian Amazon

Dane Conley
Brady McGowan

Naturalist
Hbmcgowan36@gmail.com

The Peruvian Amazon attracts a healthy number of naturalists and wildlife photographers every year due to its famed biodiversity and general ease of access. The 2024 MT Amazon Peru Expedition explored several miles of forest in two different areas of the Loreto region of Peru. We documented 104 species of herpetofauna between Madre Selva Biological Station and Santa Cruz Forest Reserve, as well as dozens of species of birds, mammals, invertebrates, and fish. While not strictly a research expedition, significant data was collected for conservation purposes within the confines of both Project Amazonas-owned sites. Illegal logging and poaching is still prevalent, even in protected areas, and monitoring is being done at both sites to prevent future loss of unique fauna and habitat. These tours are designed to benefit both clients and the locals, providing hectares of protected primary forest for tourists to enjoy as well as income opportunities and humanitarian aid for remote local communities. Project Amazonas demonstrates an ideal model for responsible ecotourism in remote areas that benefits all parties involved, while also providing a lenient outlet for wildlife photographers, naturalists, and those that simply want to experience a no-frills Amazon adventure.

*Data and photo contributions from Matt Cage, Mike Pingleton, Kara Ericson, Lucas Dunn, Justin Elden, and Dane Conley.

Successful Gharial Breeding at The Fort Worth Zoo

Vicky A. Poole

Associate Curator of Ectotherms
Fort Worth Zoo

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After decades-long effort, The Fort Worth Zoo (FWZ) successfully hatched five critically endangered Indian Gharials (*Gavialis gangeticus*) in 2023. Gharials are a keystone species for freshwater river systems and are considered the most ecologically distinct and globally endangered crocodylian due to pollution and habitat alteration, including sand collection, river damming, and water extraction among other factors (Griffith, et al, 2023).

Gharials have proven to be incredibly difficult to reproduce under professional care. With only one other AZA live hatching to date at St Augustine Alligator Farm in 2016, the FWZ success is a major milestone for the conservation of this species. Low egg fertility remains an issue, but putting together compatible animals, creating the perfect environment for nesting females, and successful incubation of the eggs are challenges that our Gharial team has worked to overcome. Modifications and manipulations to the management of Gharial at the FWZ including nesting beach management and pool temperature adjustments, along with breeding, incubation, and hatchling-rearing successes and failures will be reviewed to further improve future reproduction efforts at the FWZ and other SSP facilities.

Reference:

Griffith, P., Lang, J. W., Turvey, S. T., & Gumbs, R. (2023). Using functional traits to identify conservation priorities for the world's crocodylians. *Functional Ecology*, 37, 112–124. <https://doi.org/10.1111/1365-2435.14140>

Boas of the West Indies: Ecology and Evolution of Enigmatic Island Snakes

Graham Reynolds PhD

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Imagine yourself arriving on a Caribbean Island with poorly studied boa species. Here are some of the observations you make: some boas are large and feed on whatever they can catch while others seem to specialize, some are small and arboreal, some are restricted to specific habitats, and some appear to have learned to hunt bats. What about remote islands? You visit an island that is not supposed to have snakes and wham- there is an undescribed boa lying there. What does it mean for the evolution of boas more broadly?

In this presentation, I will discuss the current state of our collective knowledge regarding the West Indian boas. I will offer a tour of the diversity of boas on the islands of the Greater Antilles and the Lucayan Archipelago, pausing at each to describe what we know, and what we do not yet know, about the biology of the species that are found there. I will then summarize the origins of this boa fauna, and what major outstanding questions remain. I hope to encourage others to join in the study of this fascinating group of underappreciated snakes.

R. Graham Reynolds PhD is an Associate Professor of Biology and Director of the University Honors Program at the University of North Carolina Asheville. He is an Associate of Herpetology in the Museum of Comparative Zoology, a National Geographic Explorer, and a Fellow of The Explorers Club. He serves as the co-Red List Authority for the IUCN Snake Specialist Group, as well as on IUCN Taxonomy Working Groups for snakes and iguanas. Dr. Reynolds earned a B.A. in Biology from Duke University, a Ph.D. from The University of Tennessee, and was a Postdoctoral Fellow at UMass Boston and Harvard University. His research focuses on endangered species, biodiversity, and vertebrate evolutionary genetics. His research is highly collaborative, and he regularly works with institutions such as the San Diego Zoo Wildlife Alliance, the North Carolina Zoo, Ft. Worth Zoo, the St. Louis Zoo, the US Fish and Wildlife Service, and others. He is a co-author of the books *Boas of the West Indies* (2023), *The Reptiles of Tennessee* (2013), and *The Amphibians of Tennessee* (2011).

Estimating Alligator Body Size Based on Skeletal Remains, with Application to the Gray Fossil Site of Northeastern Tennessee

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Body size is linked to many aspects of an organism's biology, and estimation of size is regularly employed in paleontological studies to better characterize life histories of extinct animals. Several studies have examined correlation of total body length to skeletal measurements in the American alligator (*Alligator mississippiensis*), with some being better predictors of total length than others. Femur length has been found to be tightly correlated with total body length in *A. mississippiensis*, and this relationship has been used to estimate body size of extinct crocodylians. Using the femur, we estimated the body size of Alligator from the Gray Fossil Site (GFS), an early Pliocene sinkhole lake deposit in the southern Appalachians of northeastern Tennessee. Our results suggest that the GFS Alligator is smaller on average than modern *A. mississippiensis*. A relatively smaller size in the GFS Alligator could reflect phyletic size differences between the extant and extinct form, inadequate sampling of the fossil record, or phenotypic plasticity related to environmental conditions and/or food availability. New data shows other limb elements may also be tightly correlated with total body length and useful for body size estimation size in *A. mississippiensis*, which is the focus of ongoing research.

Pandemic Effects on Foreign Antivenom Supply in the United States

Kristen Wiley

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Kentucky Reptile Zoo regularly imports foreign antivenoms for a group of zoos and facilities in the US. During the COVID-19 pandemic, replacing expired or used antivenoms became more challenging. In addition, there were multiple bites to private individuals during 2020, resulting in several zoos in the eastern United States giving up antivenom to treat those bites. This combination of factors led to a period of time in which there was very little of certain antivenoms in the United States.

POSTERS

Cave-associated Amphibians of the Southeastern United States

Matthew L. Niemiller (1), Dante B. Fenolio (2), Michael E. Slay (3), Brian T. Miller (4), Kirk S. Zigler (5), Evin T. Carter (6), K. Denise Kendall Niemiller (1), Eric Cline (1), Brendan T. Cramphorn (1), Katherine E. Dooley (1), Jared P. Higgs (1), Amata Hinkle (1), Joseph Lamb (7), Eric Maxwell (1), Bjorn V. Peterson (1), Kayla Wilson (1)

- (1) The University of Alabama in Huntsville
- (2) San Antonio Zoo
- (3) The Nature Conservancy
- (4) Middle Tennessee State University
- (5) University of the South
- (6) Oak Ridge National Laboratory
- (7) Alabama A & M University

Caves and associated subterranean environments in karst regions are important habitats for many amphibian species of the southeastern United States. Many species use cave habitats on a semi-regular to regular basis for several aspects of their life histories, including reproduction, refuge from harsh environmental conditions on the surface, and hibernation. Here we review salamander and frog diversity in and use of caves and other karst subterranean habitats in the southeastern United States, including Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. We compiled cave occurrence records for salamanders and frogs from the scientific literature, museum accessions, and online repositories (GBIF, iNaturalist). In addition, we included occurrence data from more than 1,100 biosurveys of 700+ caves in the study region from our research over the past 20 years. Over 60 species/subspecies of amphibians are known from caves and other subterranean habitats in the southeastern United States. Six salamanders in the region are considered troglobionts (obligate cave-dwellers): *Eurycea braggi*, *E. nerea*, *E. spelaea*, *E. wallacei*, *Gyrinophilus gulolineatus*, and *G. pallescens*. Although the occurrence of several species can be categorized as accidental, several non-troglobiotic salamanders breed in caves, such as *Eurycea cirrigera*, *E. longicauda*, *E. lucifuga*, *Gyrinophilus porphyriticus*, *Plethodon glutinosus*, *P. ventralis*, and *Pseudotriton ruber*. A growing body of evidence indicates that in addition to the surrounding surface habitats, caves are critical habitats for many species, and, therefore, should be protected for proper amphibian conservation and management.

Contact:

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Bjorn V. Peterson – bp0089@uah.edu

Permits:

Alabama Department of Conservation and Natural Resources scientific collection permit nos. 2022096307868680, 2022096308068680, 2023109374868680, and 2023109375668680

Alabama State Parks scientific permit nos. 222207 and 232206

Tennessee Wildlife Resources Agency scientific collection permit nos. 1385 and 5874

Tennessee Department of Environment and Conservation scientific permit no. 2013-026

Southeastern Cave Conservancy research permit no. 1074

**Slow and Steady Decline: Revealing Demographic Patterns
in Two Isolated Ornate Box Turtle (*Terrapene ornata*) Populations**

Devin Edmonds^{1*}

Laura Adamovicz²

Matthew Allender^{2,3}

Andrea Colton¹

Randy Nyboer¹

Michael Dreslik¹

¹ Illinois Natural History Survey, Prairie Research Institute,
University of Illinois Urbana-Champaign, Champaign, IL, USA

² Wildlife Epidemiology Laboratory, University of Illinois, College of Veterinary Medicine,
Urbana, IL, USA

³ Chicago Zoological Society, Brookfield Zoo, Brookfield, IL, USA

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Turtle life history is characterized by delayed sexual maturity and a long lifespan, making populations susceptible to decline following perturbations. Indeed, over half of the world's turtles and tortoises are assessed as threatened with extinction by the IUCN Red List. Despite the need, we lack crucial demographic data for many species and most populations. We are studying two isolated ornate box turtle (*Terrapene ornata*) populations in Illinois to estimate demographic traits including annual survival, fecundity, and population sizes. Using over three decades of capture-mark-recapture data and a stage-based matrix model, we found both populations to be declining under mean estimated vital rates. Sensitivity analyses showed adult survival has the greatest impact on population growth and fecundity the least. Our results highlight the importance of long-term monitoring for informing turtle conservation.

Permits for this project were received from the Illinois Department of Natural Resources, Endangered and Threatened Species Permits no. 5041 and no. 6680.

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**Pathogen Screening of the Tennessee Cave Salamander (*Gyrinophilus palleucus*)
to Guide Conservation and Management in Alabama and Tennessee**

Matthew L. Niemiller, Jared P. Higgs, Bjorn V. Peterson, K. Denise Kendall Niemiller

The University of Alabama in Huntsville

The Tennessee cave salamander, *Gyrinophilus palleucus* McCrady, 1954, is a large, neotenic, groundwater salamander endemic to caves in central Tennessee, northern Alabama, and northwestern Georgia. The species faces multiple potential threats including emergent amphibian diseases. Between Alabama and Tennessee, the species is known from 90 sites across 17 counties. However, current population statuses and trends are largely unknown as the last formal survey efforts occurred 15+ years ago. Herein, we report on pathogen screening results for Ranavirus, *Batrachochytrium dendrobatidis* (Bd), and *B. salamandrivorans* (Bsal) of *G. palleucus* in Alabama and Tennessee as part of a larger conservation assessment effort. We did not observe any obvious signs of active infection or poor health for any salamanders observed and captured. Between April 2022 and February 2024, we collected a total of 14 skin swabs and 57 tail-tip tissue samples from 64 salamanders at 16 sites, including four spring salamanders, *G. porphyriticus*. Additionally, we screened 63 tissue samples collected between 2004 and 2020. One sample from 2007 in Alabama and one from 2023 in Tennessee tested positive for Bd, representing the first two documented cases of Bd in *G. palleucus* and only the second and third records in a groundwater salamander. *G. palleucus* may be less susceptible to Bd and Bsal due to the limited keratinization of larviform adults and larvae, but they could potentially act as disease reservoirs in subterranean habitats. Additional research is warranted to determine potential short- and long-term impacts to populations as well as other subterranean amphibian community associates.

Contact:

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Bjorn V. Peterson – bp0089@uah.edu

Permits:

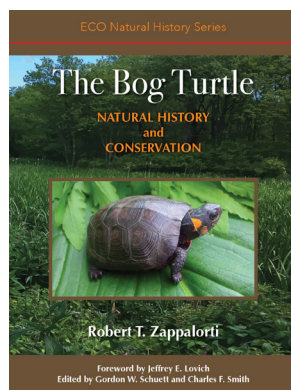
Alabama Department of Conservation and Natural Resources scientific collection permit nos. 2022096307868680, 2022096308068680, 2023109374868680, and 2023109375668680

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Southeastern Cave Conservancy research permit no. 1074



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**Estimating Alligator Body Size Based on Skeletal Remains, with Application
to the Gray Fossil Site of Northeastern Tennessee**

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Joshua X. Samuels, samuelsjx@etsu.edu

Body size is linked to many aspects of an organism's biology, and estimation of size is regularly employed in paleontological studies to better characterize life histories of extinct animals. Several studies have examined correlation of total body length to skeletal measurements in the American alligator (*Alligator mississippiensis*), with some being better predictors of total length than others. Femur length has been found to be tightly correlated with total body length in *A. mississippiensis*, and this relationship has been used to estimate body size of extinct crocodylians. Using the femur, we estimated the body size of Alligator from the Gray Fossil Site (GFS), an early Pliocene sinkhole lake deposit in the southern Appalachians of northeastern Tennessee. Our results suggest that the GFS Alligator is smaller on average than modern *A. mississippiensis*. A relatively smaller size in the GFS Alligator could reflect phyletic size differences between the extant and extinct form, inadequate sampling of the fossil record, or phenotypic plasticity related to environmental conditions and/or food availability. New data shows other limb elements may also be tightly correlated with total body length and useful for body size estimation size in *A. mississippiensis*, which is the focus of ongoing research.

NOTES

INTERNATIONAL HERPETOLOGICAL SYMPOSIUM JUNIOR HERPETOLOGIST AWARD

This program created by Russ Gurley, Todd Goodman, the IHS Board, and a dozen other excited sponsors, is a program for IHS, implemented in 2015. The Junior Herper committee thoroughly examined every application and one winner in each age category was chosen. This winner received an all expenses paid trip to the 2024 International Herpetological Symposium. In the two younger age groups, an all expenses paid trip was given to a parent or chaperone as well. Up to three runners-up in each age category received free registration to the 2024 IHS meeting and \$200 towards travel expenses.

Applicants submitted:

1. A cover letter explaining why the applicant should be chosen as the Junior Herpetologist winner
2. A short essay (500 to 1,000 words) with the topic of Natural History or Conservation or Herpetoculture
3. Two letters of recommendation from a teacher, friend, parent, or someone who knows the applicant well

* Note from Russ:

We had an unusual year this year in regards to the Junior Herpetologists Program. There were very few submissions. I try to figure out why but the complexities of the world these past few years give me little insight. We are thrilled to have Savvy, Taryn, and Claudia, a large entourage of young herpetologists from West Liberty University, and previous Junior Herpetologists applicants join us in Knoxville this year.

We continue to have a very energetic, interesting, sophisticated, and intelligent group of young herpetologists out there, studying, researching, flipping boards and flat rocks, taking care of their reptile pets, and growing into the amazing herpetologists who will replace us all someday. Thank you again this year to my judges and to all who continue to support this program.

JUNIOR HERPETOLOGISTS 2024

12-15 Age Group

Winner: Savannah Senopole - New Albany, Indiana

19-22 (NextGen Herpetologist)

Winner: Taryn Cornell - San Diego State University

Winner: Claudia Goss - Oklahoma State University

To donate to the Junior Herpetologist and NextGen Herper programs and the IHS Grants Program, contact Vicky Poole at vpoole@fortworthzoo.org.

The Joseph Laszlo Memorial Award

Many individuals were fortunate to have known the late Joseph Laszlo, long-term Superintendent of the Department of Reptiles at the San Antonio Zoo, San Antonio, Texas, who died on 14 November, 1987. In recognition of his lifelong achievements in and contributions to herpetology, especially in herpetoculture, the International Herpetological Symposium, Inc. has bestowed an annual award in his name. The Joseph Laszlo Memorial award is presented to the speaker at the IHS meeting who has demonstrated that his or her work represents new and exciting views and advances in herpetology. For information on the interesting life of Joseph Laszlo, an obituary was published in *Herpetological Review*, 19, 5-6 (1988).

The following individuals have received the Joseph Laszlo Memorial Award:

- 1991 Seattle, WA - Richard Shine, Ph.D., University of Sydney, Australia
- 1992 St. Louis, MO - Brian A. Kend
- 1993 Miami, FL - Dr. Hans-George Horn, Germany
- 1994 New Orleans, LA - Dante Fenolio/Michael Ready
- 1995 Denver, CO - Ross M. Prazant, D.V.M./Phillipe DeVosjoli
- 1996 San Antonio, TX - David Grow, Oklahoma City Zoo
- 1997 Liberia, Costa Rica - Allen E. Anderson, Norwalk, Iowa
- 1998 Cincinnati, OH - Harry Greene, University of California, Berkeley
- 1999 San Diego, CA - Carlos H. Arevalo Gtez, Guadalajara Zoo
- 2000 New Orleans, LA - Gregory C. Lepera, Jacksonville Zoological Gardens
- 2001 Detroit, MI - Scott J. Stahl, DVM
- 2002 St. Louis, MO - John Brueggen, St. Augustine Alligator Farm, FL
- 2003 Houston, TX - Bill Love, Blue Chameleon Ventures, Alva, FL
- 2004 Daytona Beach, FL - Dr. Stephen P. Mackessy, University of Northern Colorado, CO
- 2005 Phoenix, AZ - Dante Fenolio, University of Miami, Coral Gables, FL
- 2006 San Antonio, TX - Dr. David Lazcano Jr., Universidad Autonoma de Nuevo León, México
- 2007 Toronto, Canada - Ray E. Ashton, Jr., Newberry, FL
- 2008 Nashville, TN - Wayne Hill, Winter Haven, FL
- 2009 - Monterrey, Mexico - cancelled
- 2010 Tucson, AZ - Carl Franklin University of Texas at Arlington, Arlington, TX
- 2011 Fort Worth, TX - Alan Kardon San Antonio Zoo, San Antonio, TX
- 2012 Baltimore, MD - Marie Rush DVM
- 2013 New Orleans, LA - Chawna Schuett, Saint Louis Zoo, St Louis, MO
- 2014 Riverside, CA - Philippe de Vosjoli

- 2015 San Antonio, TX - Collette Adams, Gladys Porter Zoo, Brownsville, TX
- 2016 Saint Louis, MO – Roger Sweeney, Virginia Zoo, Norfolk, VA
- 2017 Rodeo, NM - Robert Mendyk, Jacksonville Zoo, Jacksonville, FL
- 2018 – Houston, TX - Micha Petty, Louisiana Exotic Animal Resource Network, LA
- 2019 - Belize City, Belize - Derek Cossaboon, Denver Zoo, Denver, CO
- 2020 – Cancelled due to COVID-19 Pandemic
- 2021 – Rodeo, NM - Justin Elden, St. Louis Zoo, St. Louis, MO
- 2022 – Atlanta, GA - Rowland Griffin, Ph.D., Parque Zoologico Nacional la Aurora, Guatemala
- 2023 – Chicago, Illinois - Chuck Knapp, Ph.D., The Shedd Aquarium

PORRAS CONSERVATION AWARD

In recognition of lifelong achievements in and contributions to field biology, the International Herpetological Symposium is pleased to bestow the Porrás Conservation Award. This award is presented to a speaker at the IHS annual meeting who has demonstrated that his or her work represents exceptional accomplishments in the field that benefit herpetological conservation.

AWARD RECIPIENTS

- | | |
|--|--|
| <ul style="list-style-type: none"> 2015 San Antonio, TX 2016 St. Louis, MO
Kristina Chyn 2017 Rodeo, NM
Jeffrey Lemm 2018 Houston, TX
María Elena Barragán 2019 Belize City, Belize
BFREE | <ul style="list-style-type: none"> 2020 Postponed due to COVID-19 Pandemic 2021 Rodeo, NM
Jeff Ettling, PhD 2022 Atlanta, GA
Alex Shepack, PhD 2023 Chicago, IL
Sarah Ruane, PhD |
|--|--|

IHS LIFETIME ACHIEVEMENT AWARD

- | | |
|--|--|
| <ul style="list-style-type: none"> Charlie Painter
2014 Dr. David Lazcano
2015 John Tashjian
2016 | <ul style="list-style-type: none"> David Grow
2017 Paul Moler
2018 |
|--|--|



IHS GRANTS

The IHS Grant Committee reviewed (14) COMPLETE APPLICATIONS in 2023, and again the various projects covered an amazingly broad scope in subject species, project type, and multinational localities. The competition was quite close in the selected categories warranting full funding for those winners. Due to the continuing generosity of Grant Fund donors and dedicated fundraising events, the IHS Grant Committee was pleased to award a total of \$1,000 in total to the following

Calvin Vick & Stephen Mackessy (University of Northern Colorado)
Range Wide Venom Characterization of the Arizona Black Rattlesnake (*Crotalus cerberus*)

On behalf of the entire IHS Grant Committee and Executive Board, congratulations to the 2023 grant recipient!

The IHS Grant Fund is made available through the fundraising efforts of our annual Silent Auction and dedicated donations. Over \$30,650 has been provided to worthy projects since 2012. All grant applicants are now required encouraged to present at a future IHS meeting as it offers a great opportunity for young researchers to develop presentation/public speaking skills, and we are always interested in their projects (if travel is difficult for international applicants, we accept a poster presentation of their work in lieu of attending). For more information on the annual IHS Grant Program, which opens January 1 each year, please check out the IHS website: <https://www.iherpsymp.org/ihs-grants>

Finally, my most sincere thanks to the Grant Committee members for their tireless efforts and time in reviewing grants and assisting with fundraising.

Vicky A. Poole

International Herpetological Symposium (IHS) – Treasurer and Grants Committee Coordinator



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