

44th
International Herpetological
Symposium



June 8-11, 2022
Atlanta

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.

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Ctenosaura pectinata

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Banana Iguanas (*Ctenosaura pectinata*) are large lizards native to hot, dry habitats such as dry forests and deserts in Mexico and Central America where they regularly experience ambient basking temperatures of over 104° F. In our large Iguana Habitat here in the mild climate, we found it difficult to attain the high basking temperatures these animals desired. Although these animals were active and appeared healthy for over 12 years here, we did not have any success breeding them until adding a Zoo Med Infrared Heat Projector above one of their basking sites. The animals seemed to prefer this heat and spent an increased amount of time relaxing under these heating elements, then finally laid a beautiful clutch of eggs that hatched successfully 77 days later. After many years of trying different strategies to encourage reproduction, we are pleased to finally introduce the offspring of our Banana Iguanas!

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This year, 2022, marks the 44 th anniversary of the International Herpetological Symposium. The first annual symposium on Captive Propagation and Husbandry of Reptiles and Amphibians was held in July 1976, at Hood College in Fredrick, Maryland. The International Herpetological Symposium (IHS) evolved from this meeting. The primary purpose 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 and propagation of amphibians and reptiles. Each year the IHS is held in a different location hosted by a zoological, herpetological, or herpetocultural institution. This year, IHS is proud to partner with Zoo Atlanta and the Amphibian Foundation in Georgia who remain dedicated to the preservation of reptiles and amphibians and their ecosystems.

Unlike most herpetological societies or associations, IHS does not have a voting membership, but an electoral body. That body consists of the volunteer members of the Board of Directors, the Advisory Council, and chairs of various committees. Zoologists, herpetologists, and private herpetoculturists are all involved in organizing the annual symposia. These meetings and programs are largely supported by the generosity of our donors and sponsors, to whom we are eternally grateful. If YOU would like to get involved in IHS, please speak to any officer.

This is a special meeting for the IHS as it is the organization's first time in Georgia. When I became the President-elect in 2017, an immediate goal of mine was to host an IHS in Atlanta. The city is rich in culture and natural areas, with wonderful gardens, great food, and a FANTASTIC zoological park. Officers began planning on this meeting in early 2019 so this IHS Atlanta meeting is three years in the making. Like most other organizations, IHS was heavily impacted by the Covid-19 pandemic, and we had to postpone our scheduled 2020 Atlanta meeting for public health reasons. I am so grateful to finally be here and would like to thank our local hosts Robert Hill and Dr. Joseph Mendelson with Zoo Atlanta, and Mark and Crystal Mandica with the Amphibian Foundation for all their assistance with putting on this dynamic conference. I would also like to thank the fantastic symposia speakers joining us this year as well as our primary sponsors, Timberline and ZooMed Industries - IHS would not be where we are today without you. Please support all of our sponsors whenever you are able.

Over the years, an increasing number of people with varied interests in herpetology have attended IHS meetings, and this curious mix has allowed IHS to develop its "unique" flavor. Although IHS is often visualized as an organization with an interesting blend of academia and herpetoculture, the types of people who attend the meetings far exceed those bounds. Progressive programs such as the Junior Herpetologist Award and Collegiate Speed Session have also opened the doors to the next generation of reptile and amphibian enthusiasts and conservationists.

The 44th meeting marks my fifth full year as President of this wonderful organization. Due to the pandemic, my tenure was extended for a third term by the Executive Committee. I am extremely grateful to be here, working alongside some of the most generous and dedicated folks in this field. I gave my first public presentation at an IHS in my early 20's (quite a long time ago!); I recall feeling nervous, but the welcoming IHS board and attendees made it easy. At that same meeting, I met a soon-to-become employer and mentor who played a significant role in both my career and life. You never know what opportunities may present themselves at an IHS meeting. I am honored to have the opportunity to work with such a multi-talented and highly dedicated group of volunteers as we continue to move forward. To our old friends, we thank you for your continued support, and for those who are joining us for the first time, we welcome YOU and look forward to seeing you at these annual gatherings for many years to come.

Welcome to Atlanta!

Jennifer Stabile

President
International Herpetological Symposium

SCHEDULE

Wednesday, June 8

7:00pm-10:00pm IHS Ice Breaker and Registration

*** Join us for a complimentary social event at our host hotel. Snacks and drinks available!**

Thursday, June 9

9:00am-9:10am OPENING REMARKS: IHS President, Jennifer L. Stabile

**9:10am-10:10am KEYNOTE SPEAKER: Joseph R. Mendelson III, Ph.D.
Director of Research, Zoo Atlanta & Adjunct Professor Georgia Institute of
Technology - "Snakes, Sand, and Robots"**

**10:15am-10:45am Mark Mandica, M.S., Director, Amphibian Foundation -
"Conservation Status Update of the Frosted Flatwoods Salamander"**

10:45am-11:00am COFFEE BREAK (complimentary)

**11:00am-11:30am Neil Ford, Ph.D., Professor Emeritis, University of Texas Tyler -
"Journeys of a Field Biologist"**

**11:35am-12:05pm Rowland K. Griffin, Curator of Reptiles, Zoológico La Aurora -
"Conservation of the Guatemala Beaded Lizard: An International Collaboration"**

**12:10pm-12:25pm Kristina Chyn, Ph.D., Postdoctoral Research Associate, Texas
A&M University - "Amphibian and Reptile Exclusion Fence Controlled Trial
Efficacies and Roadkill Surveys"**

12:25pm-1:40pm LUNCH (on your own)

**1:40pm-2:00pm Clinton S. Doak, Assistant Curator, Turtle Survival Center, Turtle
Survival Alliance - "Conserving the Complex"**

2:05pm- 2:35pm Chelsea Thomas, Amphibian Program Coordinator, Atlanta Botanical Gardens - "Striped Newt Repatriation Project Participation at the Atlanta Botanical Garden"

2:40pm-3:10pm Todd Pierson, Ph.D., Assistant Professor of Biology, Kennesaw State University - "Next-generation natural history: genetic tools for studying salamander ecology"

3:15pm-3:45pm Ruth Marcec-Greaves DVM PhD, Executive Officer, Honduras Amphibian Rescue and Conservation Center - "Let's get topical! (A minimally invasive method for using hormones to induce breeding in small amphibian species)"

3:45pm-4:00pm COFFEE BREAK (complimentary)

4:00pm-4:30pm Cindy Steinle, Board Member, Chicago Herpetological Society; Founder, Small Scale Reptile Rescue - "The good, bad and ugly, Tales of 25 years in reptile rescue"

4:35pm-4:55pm Ben Stegenga, Research Assistant, Longleaf Savannas Initiative, The Orienne Society

5:00pm-5:30pm Roger Carter, Treasurer, Hoosier Herpetological Society - "Searching for Hidden Herps"

5:35pm-6:05pm Cynthia Blankenship, Cloud Forest Animal Care Coordinator, Zoo Miami - "Fungus Among Us: A Case Series on the Management of Ophidiomycosis at Zoo Miami"

7:30pm-9:00pm LIVE CheloniaCast with hosts Jason Carter, Michael Skibsted, Jack Thompson, and Ken Wang



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Friday, June 10

9:00am-9:40am Christopher Jenkins, Ph.D., CEO, Orianna Society - "Emperor of the Forest"

9:45am-10:20am Kent A. Vliet, Ph.D., University of Florida - "Changes in our understanding of the diversity of extant Crocodylia"

10:20am-10:35am COFFEE BREAK (complimentary)

10:35am-11:05am Dustin Smith, Curator of Herpetology, North Carolina Zoo - "Conservation of the Virgin Islands Boa: Past, Present, and Future"

11:10am- 11:40am Justyne Lobello, President and Founder, Georgia Reptile Society, Director of Marketing, VivTech Products - "The Shift in Captive Herpetoculture"

11:45am- 12:15pm Robert Mendyk, Curator of Herpetology, Audubon Zoo - "Multi-generational Reproductive Management of the Shingleback Skink (*Tiliqua rugosa*) at Audubon Zoo"

12:15pm- 1:20pm LUNCH (on your own)

1:20pm- 1:35pm Casey Perkins, Conservation Research Technician, Amphibian Foundation - "Urban Ecology Research at the Amphibian Foundation"

**1:40pm- 3:00pm Junior Herpetologist and Next-Gen Herpetologist Session
- Introduction by Russ Gurley, Junior and Next-Gen Herpetologist Coordinator**

- Jack Knowlton (12-15 age group runner up) "You'll Find Me Between Cancer and Capricorn"

- Katie Karl (19-22 Next Gen winner) - "Parasites of Peruvian Anurans and Conservation through Art"

- Thomas Clem (Amphibian Foundation School - Homeschool; Age 14) - "Atlanta's Ectotherms"

5:00pm-10:00pm IHS Dinner and Tour at ZOO ATLANTA

Admission to Zoo Atlanta and Dinner included in registration

Saturday, June 11

9:00am-9:45am Elliott Jacobson, DVM, Ph.D., Professor Emeritus of Zoological Medicine, University of Florida - "Medical Management of Large Collections of Reptiles"

9:50am-10:35am Daniel Parker, Sunshine Serpents - "Diamondback Terrapins in Florida"

10:35am-10:50am COFFEE BREAK (complimentary)

10:50am-11:20am Alex Shepack, Postdoctoral Researcher Dept of Biology, University of Notre Dame - "Back from the brink: Amphibian population recoveries following epidemic declines"

11:25am-12:10pm Stacey Leonatti Wilkinson, DVM, DABVP (Reptile and Amphibian), Avian and Exotic Animal Hospital of Georgia - "Veterinary Medical Care of Reptiles and Amphibians"

12:15pm-12:30pm Udita Bansal, PhD Student, Washington University in St. Louis - "Vegan or not: diet influences latitudinal gradients in life-history traits, but not reproductive output, in lizards"

12:30pm-1:40pm LUNCH (on your own)

1:40pm-2:50pm Collegiate Speed Session

- Introduction by Justin Elden, Collegiate Speed Session Coordinator

- Elizabeth Haseltine, Georgia State University - "Diel activity and location patterns of zoo-housed juvenile Amazon Basin Emerald Tree Boas"

- Maisy D. Englund, Georgia State University - "Beaded lizards olfaction discrimination in a radial arm maze"

- Sophia Babish & Anais Paterno, Georgia Institute of Technology - "Cognition in helodermatid lizards in the context of a radial-arm maze"

- Hannah Strudwick, Georgia Institute of Technology - "Effects of Rotating Novel and Non-natural Enrichment on Captive Snake Species at Zoo Atlanta"

- Stephen Falick, Sul Ross University - "Studying the Desert: The College Experience in a Herpers Mecca"

2:55pm- 3:15pm Samantha Dillon, Wildlife Technician & Charlie Abeles, Wildlife Biologist, The Longleaf Alliance - “Recovery of the Reticulated Flatwoods Salamander on Escribano Point Wildlife Management Area, FL”

3:15pm- 3:30pm COFFEE BREAK (complimentary)

3:30pm-4:00pm Holly S. Carter, Secretary, Hoosier Herpetological Society - “An overview of Indigos and Cribos”

4:05pm- 4:15pm Bryan D. Hudson, Ph.D. Student, Clemson University - “The real house-kings of Atlanta: harnessing community science data to reveal rapid urbanization effects on cryptic wildlife”

4:20pm- 4:45pm Tim Cole, Austin Reptile Services - “The Viral Viper of Central Texas: how the first live specimen of *Crotalus ornatus* from Travis County, Texas became a social media sensation in 2019”

******* BANQUET *******

6:00pm-11:00pm Beer at 6:00pm, Dinner served at 6:30pm

**7:00pm-8:00pm * BANQUET SPEAKER: WHIT GIBBONS *
Professor Emeritus, University of Georgia**

**“What Does a Retired Herpetologist Do?
Mysteries about Reptiles and Amphibians”**

8:00pm-11:00pm AWARDS and CLOSING REMARKS: Jennifer L. Stabile

LIVE AUCTION



BANQUET SPEAKER: WHIT GIBBONS

Professor Emeritus, University of Georgia

“What Does a Retired Herpetologist Do? Mysteries about Reptiles and Amphibians”



Whit Gibbons is a herpetologist who is Professor Emeritus of Ecology, University of Georgia, and former Head of the Environmental Outreach and Education program at the Savannah River Ecology Laboratory (SREL). He received degrees in biology from the University of Alabama (B.S.-1961; M.S.-1963) and in zoology from Michigan State University (Ph.D. – 1967).

Whit Gibbons is author or editor of 25 books on herpetology and ecology and has published more than 250 articles in scientific journals. He has had commentaries on National Public Radio (Living on Earth, Science Friday, and others), and published more than 1,000 popular articles on ecology in magazines and newspapers, including a weekly environmental column originally distributed by the New York Times Regional Newspaper Group. His encyclopedia articles have appeared in World Book, Compton's, and for 25 years included the annual summary of Zoology for the Encyclopedia Britannica Book of the Year. In 1993 he wrote “Reptile and Amphibian Study,” the merit badge booklet for the Boy Scouts of America.

Whit is a frequent speaker at meetings, both civic and scientific, and gives talks each year to college and pre-college school groups. Many of the talks use live animals, particularly reptiles and amphibians, in discussions of ecological research and environmental awareness. He also leads herpetological field trips at a private wildlife reserve (Salleyland) in South Carolina.

KEYNOTE SPEAKER: Joseph R. Mendelson III, Ph.D.,
Director of Research, Zoo Atlanta &
Adjunct Professor Georgia Institute of Technology

“Snakes, Sand, and Robots”



Joe Mendelson, with *Lithobates sierramadrensis* (Ranidae),
in Oaxaca, Mexico. Photo by D. Frost.

Dr. Joseph R. Mendelson III has been studying amphibians and reptiles for more than 30 years, concentrating mostly on Mexico and Central America. Most of his work has involved evolutionary studies and taxonomy including the description of more than 40 new species. Other studies have included ecology, behavior, biomechanics, and morphology.

Joe is very active in basic research and development conservation programs and policies related to global amphibian extinctions.

He is Director of Research at Zoo Atlanta and Adjunct Associate Professor of Biology at Georgia Tech University, where he teaches regularly. He also is Past-President of the Society for the Study of Amphibians and Reptiles.

Joe has published more than 100 technical papers in peer-reviewed journals such as *Science*, *Biology Letters*, *Proceedings of the National Academy of Sciences*, and *Journal of Herpetology*.

ABSTRACTS

Recovery of the Reticulated Flatwoods Salamander on Escribano Point Wildlife Management Area, FL

Timothy C. Abeles ¹, Samantha M. Dillon ¹

¹The Longleaf Alliance
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The Reticulated Flatwoods Salamander (*Ambystoma bishopi*), a federally endangered species, has been reduced to a few isolated sites and two known areas with multiple occupied breeding sites in the Florida Panhandle - Eglin Air Force Base and more recently, Escribano Point Wildlife Management Area (EPWMA). The Department of Defense Readiness and Environmental Protection Integration (REPI) Program, along with the National Fish and Wildlife Foundation (NFWF), funded a five-year large-scale recovery effort on EPWMA. Project objectives are executed by a team consisting of a Wildlife Biologist, two wildlife technicians, and a seasonal restoration crew. Recovery methods include habitat restoration through prescribed burns, manual removal of vegetation followed by chemical treatments, headstarting of larval salamanders in mesocosms, and monitoring through larval sampling and collection of genetic data to determine population structure and success of headstarting efforts. The project relies heavily on partnership collaboration through the Gulf Coastal Plains Ecosystem Partnership (GCPEP). Partners share information, recovery successes, and collaborate to meet habitat restoration goals in order to accelerate the recovery of the species. Currently, we are in year 4 of 5 of the project. Continued habitat restoration and monitoring efforts are needed to ensure the success of flatwoods salamanders within this landscape.

Cognition in Helodermatid Lizards in the Context of a Radial-arm Maze

Sopia Babish & Anais Paterno

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Visual and Tactile Discrimination in helodermatid lizards in the context of a radial-arm maze
Sophia Babish, Anais Paterno, Maisy D. Englund, Elizabeth L. Haseltine, & Joseph R. Mendelson

Continuing our efforts to assess cognitive and sensory abilities in helodermatid lizards, here we will present our planned studies using a radial-arm maze. In Experiment 3 (Visual Discrimination) arm openings will be colored either red or blue with a unique and different pattern. Subjects will be assigned to one of these colors/patterns for the duration of the experiment. At the start of each trial, the subjects will be placed in the start box and allowed to move around the maze until they enter one of the arms and move to the end. Only the tunnel associated with the lizard's assigned color will be considered correct and allow it to consume the reward. Experiment 4 (Tactile Discrimination) will use a similar design, but using assigned textures rather than colors. These experiments will provide a comparative basis for the evaluation of the evolution of cognition in lizards.

Vegan or Not: Diet Influences Latitudinal Gradients in Life-history Traits, but not Reproductive Output, in Lizards

U. Bansal ^{1,2,3}, M. Thaker ¹

¹ Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India

² Washington University in St. Louis, St. Louis, MO, USA

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Latitudinal gradients in life-history traits are apparent in many taxa and are expected to be strong for ectotherms that have temperature-driven constraints on performance and fitness. The strength of these gradients, however, should also be affected by diet because diet type influences accessibility to nutrition and assimilation efficiency. We studied how diet affects latitudinal gradients in lifetime reproductive output and underlying life-history traits in ectotherms. We used empirical and phylogenetically imputed data to analyse the interactive effects of latitude and diet on life-history traits and lifetime reproductive output of lizards.

Lifetime reproductive output doesn't significantly differ in lizards across diet types. Diet type, however, influences latitudinal patterns of individual life-history traits. Carnivores shift towards "slower-paced" life-histories at higher latitudes, whereas herbivores either display "faster-paced" life-histories or no change. We suggest that nutritional challenges of herbivory, compounded by thermal constraints at higher latitudes, may explain differences in life-history of herbivorous ectotherms. Intermediate patterns for omnivores highlight how flexibility in diet can buffer environmental challenges at higher latitudes. Our results indicate that lizards with different diet types display various trends in their life-histories across latitudes, which eventually balance out to result in similar reproductive outputs throughout their lifetime, with little benefits to carnivory. international community of individuals and organizations concerned with the survival of the species. The motto for Hicatee conservation in Belize continues to unite efforts, which is important because our work is far from finished - The Hicatee is disappearing, but together we can save it!

Fungus Among Us: A Case Series on the Management of Ophidiomycosis at Zoo Miami

Cynthia Blankenship

This presentation will cover the series of events from the initial discovery of Snake Fungal Disease (*Ophidiomyces ophidiicola*) in Zoo Miami's reptile collection up to present time, as well as looking ahead towards the future. In addition to overviewing each case in this series, we will take a look back at the course of action taken to address this disease head on. Topics such as quarantine, treatment, disinfection protocol, and addressing risk with regard to naturalistic exhibits will be covered with an open floor for discussion.

An Overview of Indigos & Cribos

Holly Carter

Hoosier Herpetological Society
drymarchonzz@hotmail.com

Many years ago, I was introduced to my first Indigo snake. I have maintained and bred several Indigos and Cribo Snakes over the years and continue to think this species is very special. I hope to highlight this family of Drymarchon to new people as well as bring up new information to other herpers.

Searching for Hidden Herps

Roger Carter

Hoosier Herpetological Society
drymarchonzz@hotmail.com

This presentation will show me using an inspection camera to safely search for reptiles and, occasionally, amphibians that are hiding in hollow logs or rocky crevices. Many years ago, we used to use flashlights, or a mirror to direct sunlight into hollow logs, to see what might be hiding there and I decided that I wanted a better way to search hiding places. My inspection camera can take pictures and videos. I also am setting up broken pieces of hollow logs to create what I call “Natural Hide Boxes” as hiding places for reptiles and amphibians.

Amphibian and Reptile Exclusion Fence Controlled Trial Efficacies and Roadkill Surveys

Kristina Chyn*, James L. Tracy, Lee Fitzgerald, Robert Coulson

Robust, spatially explicit approaches accounting for ecological drivers are needed to identify environmental correlates of roadkill and set conservation priorities, especially for herpetofauna, which are one of the most impacted vertebrate taxa on roads. We are conducting a multifaceted study that examines the efficacy of reptile and amphibian road exclusion fencing in both controlled field environments and in the field. Roadkill surveys along Texas highways were conducted for one season prior to the installation of exclusion fencing, as well as one season after installation. Additionally, we are creating predictive models of herpetofaunal roadkill across the state of Texas for species of interest. We also used roadkill data collected on project surveys, along with community science roadkill records, to predict roadkill probability across Texas. We focus on endangered and threaten species within Texas and guilds and regional predictive roadkill models. The models produce immediately practical predictions of roadkill risk for management, mitigation, and planning. This project also emphasizes the importance of systematic and volunteer collection of roadkill data, which contributes to both informing conservation action and engaging the public in wildlife education. Importantly, this methodology is not limited to Texas and has been applied in other regions with sufficient roadkill and environmental data and is scalable across taxa to address the ecological question of interest.

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The Eastern Blacktail Rattlesnake (*Crotalus ornatus*) Social Media Post That Went Viral
with Positive Influence Both with the Public and Research

Tim Cole, Director

Rattlesnake Preservation Trust
Georgetown, Texas
timcole@austinreptileservice.net

Found on June 3, 2019 in Travis County TX. As far as we know, this was the first live specimen found in Travis County. I posted photos with accompanied story on the “Texas Field Herpers” group and the post went viral with the media asking for interviews about this snake. Public response was very favorable with valid sightings coming in from areas not recorded for the species.

Conserving the *Cuora galbinifrons* Complex

Clinton S. Doak

Assistant Curator
Turtle Survival Center, Cross, SC
cdoak@turtlesurvival.org

The *Cuora galbinifrons* complex is comprised of three separate species, *Cuora galbinifrons*, *C. bourreti*, and *C. picturata*. All of which were initially described as *C. galbinifrons* ssp. Due to their restricted ranges in Southeast Asia and their bright coloration, these chelonians have been highly sought after for the pet and food trade. Immense pressures have been placed on their survival throughout their range due to human interference. All three species in the *galbinifrons* complex have been elevated to Critically Endangered as well as an elevation in status to CITES Appendix I for *C. bourreti* and *C. picturata* and Appendix II for *C. galbinifrons*. The Turtle Survival Alliance (TSA) has made this complex, and all *Cuora*, a priority species for our Turtle Survival Center (TSC). Where we strive to produce a genetically diverse group of F1 populations for all three species. This has been done through fine tuning of husbandry and breeding success, participating in SSP and studbooks, and helping design enclosure and husbandry parameters for others seeking to work with these critically endangered chelonians. TSA and its partners are continuing to work hard on our commitment to Zero Turtle Extinctions.



You are Invited!



2022 TTPG Conference on the Captive Care & Breeding of Turtles and Tortoises

Wednesday, November 16 (Field Trip to Phoenix Zoo)

Thursday, November 17 9:00 am to 5:00 pm

Friday, November 18 9:00 am to 2:00 pm

Mesa Centennial Hall * Mesa, ARIZONA USA

www.ttpg.org for information.

Beaded Lizard Olfaction Discrimination in a Radial Arm Maze

Maisy Bowdon-Englund

Georgia State University
Mbowden.englund@gmail.com

Maisy D. Englund, Elizabeth L. Haseltine, Jim Weed, and Joseph R. Mendelson

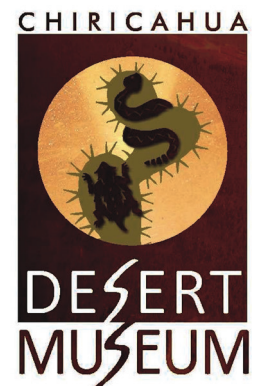
Non-avian reptiles include a large range of species that are extremely diverse in behavior and ecology, yet cognitive research has historically been dominated by the study of mammals and birds. For example, essentially nothing is known regarding the cognitive abilities of Guatemalan beaded lizards (*Heloderma charlesbogerti*), one of the most endangered lizards in the world. The present study utilizes an 8-arm radial arm maze to assess the cognition, behavior, memory, and sensory modality of five Guatemalan beaded lizards. In Experiment 1, each arm was baited with a single food reward, and each lizard received 30 minutes per trial to navigate the maze and attempt to maximize their food rewards. Preliminary data analyses demonstrate large individual variation, but minimal evidence of learning or improved efficiency across 12 testing trials. Experiment 2 will investigate lizards' olfaction discrimination and summation abilities by presenting a two-arm choice task, where each arm will be baited with differing amounts of food rewards. Data collection for Experiment 2 is ongoing. Future studies will explore lizards' visual discrimination and memory. These experiments will provide a comparative basis for the evaluation of the evolution of cognition in lizards.

Studying the Desert: The College Experience in a Herper's Mecca

Stephen Falick

Sul Ross University
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The Trans Pecos region of Texas has been a favorite destination for herpers for the last several decades. With a diversity of herpetofauna that includes over forty species of snakes and several unique species of lizards, turtles and amphibians the region offers something for every herper. As a kid growing up in Houston the idea of seeing Trans-Pecos rat snakes, rock rattlesnakes and bright red coachwhips filled my mind with a desire to travel to this region, but above all else I had a need to see a gray banded kingsnake in the wild. The thought I could one day live there seemed almost impossible, but then I learned about Sul Ross State University, a small college in Alpine, Texas. Located in a wide valley on the southern end of the Davis Mountains it is situated in the middle of the Trans Pecos region allowing me to spend the summer monsoon season searching for the species that I once thought I would never get a chance to see.



Journeys of a Field Biologist: Adventures with Snakes and Other Critters

Neil B. Ford

Professor Emeritus,
Department of Biology
University of Texas at Tyler
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I have spent over 50 years of my life studying snakes. This talk covers stories compiled during coVid lockdown in a book about trips taken throughout the world collecting and studying those animals. The story begins with my learning in a course at the University of Kansas to take field notes and ends with my stories of presenting the results at scientific meetings in South Africa and Australia. It encompasses catching snakes within the U.S. from Ohio and South Carolina to Texas and California and stories of international trips from working in the garter snake dens in Manitoba to catching anacondas in the Llanos of Venezuela. Also trips working on an endangered snake in Antigua and abundant species of snakes in Trinidad. I cover trips to 17 locations around the world. Some trips were exciting like those in Haiti to others that were very laid back like catching smooth snakes in ancient archeological sites in Sweden or travelling in the west studying garter snakes for a book on that group of snakes. Writing the book also stimulated me to digitally scan slides I had taken on the trips and I picked some of the best to show in this talk.

Diel Activity and Location Patterns of Zoo-housed Juvenile Amazon Basin Emerald Tree Boas

Elizabeth Haseltine

Georgia State University
Ehaseltine1@student.gsu.edu

Diel activity and location patterns of zoo-housed juvenile Amazon Basin Emerald Tree Boas
Elizabeth L. Haseltine, Jadya Sethna, Sophia Babish, & Joseph R. Mendelson III

The Amazon Basin Emerald Tree Boa (*Corallus batesii*) is a boid snake native to the Amazon basin. Due to a taxonomic shift in 2009 when *C. batesii* was declared a distinct species from *Corallus caninus*, research on the basic biology and behavior of *C. batesii* and other *Corallus* spp. has become muddled. This study contributes to clarifying the biology of *C. batesii* by analyzing the temporal, foraging, and spatial behavior of six juveniles in a captive setting at Zoo Atlanta. Video recordings were collected over the course of two feeding cycles and behavioral data were coded for a total of 156 hours for each snake, with an equal distribution of nighttime and daylight hours. Spatial data were collected after individuals transitioned from movement into stationary behaviors. Results show that hunting and movement behaviors were primarily nocturnal while resting behaviors were diurnal. Qualitatively, site fidelity was observed in individual snakes with respect to both hunting and resting behaviors. Implications of *C. batesii* foraging style will be discussed. This study has provided great insight into the behavior of *C. batesii* that will complement the traditional observations in the wild, owing to increased visibility offered in a captive setting.

Conservation of the Guatemala Beaded Lizard:
An International Collaboration

Rowland K. Griffin, Curator of Reptiles, Zoológico La Aurora
Robert Hill, Associate Curator of Herpetology, Zoo Atlanta

The critically endangered Guatemalan beaded lizard (*Heloderma charlesbogerti*) is endemic to the Motagua Valley of Guatemala. The species is at risk mainly from drastic reduction in natural habitat and current estimates put the adult population at around 500 individuals. As part of the Guatemalan National Conservation Strategy for the species Zoo Atlanta and Zoológico La Aurora are developing a collaboration with the goal of reproducing *H. charlesbogerti* in captivity for release of the offspring into the *Heloderma* Natural Reserve in Zacapa. In this talk we will discuss the history of the population in Atlanta along with our current and future plans in Guatemala.

The Real House-kings of Atlanta: Harnessing Community Science Data to
Reveal Rapid Urbanization Effects on Cryptic Wildlife

Bryan D. Hudson^{1*}, Samantha Kennett², and Kyle Barrett¹

¹Clemson University; ²Kennesaw State University
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Projections of rapid global urbanization indicate an increase in both direct and indirect human-wildlife conflict. Point sources of direct conflict include injury to humans and wildlife from vehicle collisions, novel routes of disease transmission (e.g., zoonotic diseases increasing from concentrated human-wildlife populations), and the interactions between free-ranging domestic animals and wildlife. Indirect conflict may exert delayed yet costly effects on wildlife populations. Examples of this include the loss of functional connectivity via infrastructure development, the susceptibility of isolated wildlife populations to disease due to density dependent relationships, and a shift in resource selection from novel interactions with changing abiotic and biotic variables. As the need for urban planning parallels the growth potential surrounding major cities, the public desire to maximize recreational greenspace should be considered concurrently with the needs of wildlife when designing future development. We launched Urban Kings: A Citizen Science Project in 2018 to unravel the effects of urbanization in metro Atlanta, Georgia on populations of the Eastern Kingsnake (EKS) *Lampropeltis getula*. Specifically, we sought to experiment with the utility of relying on community reports to amass the data necessary to evaluate patterns of resource selection, disease dynamics, population genomics, and movement models. While our initial objectives did not include an analysis of the human perspective on being a citizen scientist, our project to date has exceeded the data requirements for most models in similar studies using cryptic reptiles as study organisms. We plan to use this information to develop a risk map by combining multiple data layers which can be applied under future development scenarios and/ or current conditions across the range of our target organism. We suggest future urban wildlife projects targeting cryptic wildlife can be successful when certain measures are taken to engage local communities in research objectives.

Medical Management of Large Collection of Reptiles

Elliott Jacobson, DVM, Ph.D.

Professor Emeritus of
Zoological Medicine, University of Florida

Captive reptiles are being bred in increasingly greater numbers. Reptiles are also commonly displayed in most zoological collections, although the density in most of these facilities has probably remained somewhat constant

over the last few decades. The exceptions are those institutions having conservation programs involving captive breeding of reptiles that will be released to the wild. The nature of aquatic species and the systems in which they are kept, adds to the problem of controlling outbreaks and spread of certain pathogens. A number of infectious diseases have surfaced, resulting from keeping reptiles under crowded conditions commonly seen in production operations. What is unique about reptile production is the mixing of species from different parts of the globe. Managing large collections of reptiles is dependent upon a sound preventative medicine program. The proper quarantining of newly acquired reptiles is the single most important step in preventing or limiting the spread of pathogens in a collection.

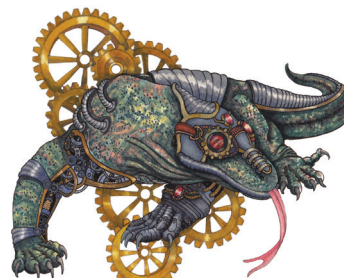
Animals in a collection that die should be submitted for a thorough postmortem evaluation. This is essential. Unfortunately, until the age of polymerase chain reaction (PCR), many misidentifications of microbes have occurred. Knowing the biological characteristics of a pathogen is extremely helpful in limiting its spread. Along with the ease of transportation of reptiles around the world, is the transport of pathogens that accompany their host. This has resulted in what has been called “pathogen pollution”.

Conservation Biology of Southeastern ‘Giants’: Snakes of the Longleaf Pine Ecosystem

Christopher L. Jenkins, PhD

Chief Executive Officer
The Orianne Society

The Longleaf Pine Ecosystem spans the Southeastern Coastal Plain from Virginia to Texas and is a biodiversity hotspot. It is also home to the largest native snakes in North America, the Eastern Indigo Snake and the Eastern Diamondback Rattlesnake. However, the longleaf ecosystem has declined to less than three percent of its original range and as a result large carnivores such as Eastern Indigo Snakes and Eastern Diamondback Rattlesnakes have declined. A broad group of partners have come together in an effort to restore the longleaf pine ecosystem and the Orianne Society is playing a critical role in restoring Eastern Indigo Snakes and Eastern Diamondback Rattlesnakes. The ecology of these two species are very different but they do use similar habitats and thus efforts to conserve them can be difficult. We will discuss the ecology of these species and regional efforts to restore the longleaf pine ecosystem and conserve these two iconic snakes of the Southeast.



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Parasites of Peruvian Anurans and Conservation through Art

Katie Karl

kaitlinmkarl@gmail.com

Katie has been attending the International Herpetological Symposium since 2015 and her involvement in the IHS Junior & Next-Gen Herpetologist Program has played a significant role in her pursuit of herpetology. When she learned about the impact of rattlesnake roundups, Katie felt a serious need to do something for herpetological conservation. She had the idea to combine her love for art with her passion for herpetology, and created a painting of timber rattlesnakes which raised \$1200 for rattlesnake conservation. Since donating that first painting, she has raised over \$20,000 for reptile and amphibian conservation through her artwork. This early introduction to various topics in herpetology has led to Katie's pursuit of a degree in Zoology with a focus on herpetology. As a Junior in Zoology at Southern Illinois University-Carbondale, Katie is currently studying the helminth species that infect anurans in the Eastern slopes of the Andes, with a focus on anuran species belonging to the genera *Pristimantis*, *Telmatobius*, and *Hypsiboas*. The objective of this research project is to genetically sequence and identify the helminths occurring in the various host species surveyed and describe the parasites' presence in multiple host species not previously recorded. In addition to the compilation of new genetic data, the results of this research are expected to offer new insights into how parasite load and parasite species diversity in Peruvian anurans varies in relation to climate, geographic location, and habitat. In addition to studying helminth diversity, Katie continues to be involved with herpetological conservation through her artwork.

You Will Find Me Between Cancer and Capricorn

Jack Knowlton

This presentation will focus on Jack's life experiences as an aspiring herpetologist, and his goal to spend his life traveling the tropics researching squamates in their native habitats. The presentation will address how field research is the key to understanding localized behaviors, discovering new species and getting ahead of disease and other environmental threats.

Jack Knowlton is a fifteen-year-old sophomore in high school from Salt Lake City, Utah. He is an aspiring herpetologist with an affinity for snakes. Jack's earliest memories were caching garter snakes at his family's cabin and the deserts of southern Utah. At the age of one, Jack was chasing geckos and iguanas on a trip to Belize. Jack has always been drawn to research and in 2014 won the Utah State Science Fair for his project "Are Geckoes in Their Right Mind?" a study of bilateral stimulation in geckoes. Jack got his first snake when he was six-years-old and has kept 13 different species of reptiles and amphibians. Jack has had opportunities to travel to study amphibians and reptiles in Thailand, Mexico, Costa Rica and Florida. In 2017, Jack saw his first live cobras at the Queen Saovabah Memorial Institute in Bangkok. Seeing these magnificent creatures and meeting the people who spent their lives researching them reaffirmed his herpetology goals. In 2021 Jack spent time with researcher Brian Kubecki at the Costa Rican Amphibian Research Center. During his time there, he became the thirteenth person in the world to see the newly identified worm salamander *Oedipina berlini*, and also had the experience of handling his first venomous snake in the wild, *Micrurus mosquitensis* (Costa Rican Coral Snake). Jack has become a certified scuba diver and is a skilled rock climber-



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skills that he uses to access and study animals wherever he goes. Jack plans to spend his life pursuing his love of herpetology and is committed to traveling the world to research and protect herpetological life.

The Shift in Captive Herpetoculture

Justyne Lobello

**President and Founder, Georgia Reptile Society
Director of Marketing, VivTech Products**

Modern Herpetoculture has seen a shift in the last decade - most notably in the past few years, with new laws, regulations and studies that have shown the way we obtain, study, keep and breed reptiles and amphibians in captivity needs another look - let's go back in time to how things started, and where they are today - and where we could see ourselves in the next several years.

Conservation Status Update for the Frosted Flatwoods Salamander

Mark L Mandica, M.S.

Director, Amphibian Foundation

The flatwoods salamanders have collectively suffered a 90% loss of population since their federal listing in 1999. Both species, the Reticulated and the Frosted Flatwoods Salamanders are now believed to be at imminent risk of extinction in the next 10-20 years. In 2014, the federal Recovery Team of agency professionals, academics, zoo and nonprofit amphibian biologists determined that captive assurance, and subsequent captive propagation would be a necessary component of a successful conservation strategy, if such captive management protocols could be developed and identified. Staff at the Amphibian Foundation began successfully rearing Frosted Flatwoods Salamanders from egg to adult in 2015, and in December 2021, bred the Frosted Flatwoods Salamander for the first time ever in three different breeding groups, suggesting the development of a successful breeding protocol which could now be shared with partner organizations. In 2022, young salamanders will be distributed to skilled partner organizations as part of the newly formed Frosted Flatwoods Salamander Conservation Breeding Working Group.

Keywords. — (Conservation, Salamander, Flatwoods Salamander, Captive Propagation)

Let's Get Topical! (A Minimally Invasive Method for Using Hormones
to Induce Breeding in Small Amphibian Species)

Ruth Marcec-Greaves DVM PhD

Executive Officer

Honduras Amphibian Rescue and Conservation Center (HARCC)

Exogenous hormones are often beneficial to amphibian captive breeding programs through encouraging reproduction in species that have highly specific parameters for natural breeding. The majority of historical amphibian hormone protocols have indicated administration by injection. Many amphibian species are minute, some reaching adult sizes of less than 1 gram, and in such animals the potential of injection becomes dangerous. Topical hormone application has been utilized to successfully stimulate breeding in endangered toads and, more recently, salamanders. The recent trial of application in salamanders was performed in two species: the San Marcos Springs salamander (*Eurycea nana*) and the Texas blind salamander (*Eurycea rathbuni*). *Eurycea nana* showed significant courtship behavior and *E. rathbuni* demonstrated significantly improved production of offspring. These successes, across toad and salamander species, highlight the potential of topical hormone application as a tool for less invasive reproductive enhancement in captive amphibian populations, particularly those of smaller species.

Urban Turtle Community in an Atlanta Nature Preserve

John A. Martin, Tristan M. Clark, S. Casey Perkins*,
Connor D. M. Pogue, Mark L. Mandica, Tobias Landberg

Amphibian Foundation

Urbanization threatens wildlife populations through many mechanisms. Long-lived species with delayed maturity like turtles are at risk of decline due to invasive species, road mortality, subsidized predators, and habitat degradation. We conducted a mark-recapture study for six months in 2020, three months in 2021, and four months in 2022 on a 12 ha metro-Atlanta nature preserve to assess turtle diversity and abundance. Based on problems facing other urban turtle populations, we predicted this community would exhibit male-biased populations and that the invasive Red-eared Slider would be present on the preserve. Over 45 total weeks of study, we made 149 hand captures in >188 search hours and 86 trap captures in 265 trap nights. 150 individual turtles were identified with 85 recaptures. The male:female:juvenile ratio varied dramatically among species: 36:5:3 in Snapping Turtles, 3:16:3 in Pond Sliders, and 33:39:2 in Eastern Musk Turtles. Less abundant species included: Painted Turtles 0:3:3, Box Turtles 1:1:1, a River Cooter 1:0:0, and a Loggerhead Musk Turtle 1:0:0. Eight invasive Red-eared Sliders and three Red-eared/Yellow-bellied Slider intergrades were removed from the population to be used in education and outreach programs. Identifiable sources of mortality included road mortality and territorial male combat. Both species richness and abundance of turtles exceeded our expectations for this small urban park, however the strongly male biased sex ratio of Snapping Turtles suggests significant problems with urbanization that may impact future generations.

Keywords. — (Conservation, Wetland, Sex Ratio, Road Density, Impervious Surfaces)

Turtle or Fish?

Joe Mendelson

Dr. Joseph R. Mendelson III has been studying amphibians and reptiles for more than 30 years, concentrating mostly on Mexico and Central America. Most of his work has involved evolutionary studies and taxonomy, including the description of more than 40 new species. Other studies have included ecology, behavior, biomechanics, and morphology

Joe is very active in basic research and development conservation programs and policies related to global amphibian extinctions. He is Director of Research at Zoo Atlanta and Adjunct Associate Professor of Biology at Georgia Tech University, where he teaches regularly. He also is Past-President of the Society for the Study of Amphibians and Reptiles.

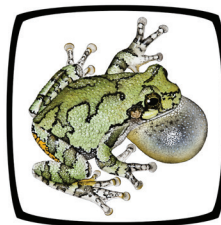
Joe has published more than 100 technical papers in peer-reviewed journals such as Science, Biology Letters, Proceedings of the National Academy of Sciences, and Journal of Herpetology. for Research and Environmental Education (BFREE) completed construction of the Hicatee Conservation and Research Center at BFREE in 2013. Breeding ponds were designed and constructed to permit the manipulation of numerous environmental variables. Since 2014, adult turtles (45) have been aquired from confiscations, rehabs, and wild stock. Succesful nesting has taken place each year, with a total of 321 eggs deposited to date, reflecting 29 nests, with high rates of fertility and hatching. Cative husbandry protocols and best management practices have been put into place, including pond design, water management, prefered nesting sites, diet and feeding, and rearing of juveniles. Information gathered includes: clutch sizes, nesting season, egg incubation, diet preferences, growth rates of juveniles and adults including onset of sexual maturity.

Multi-generational Reproductive Management of the Shingleback Skink (*Tiliqua rugosa*) at Audubon Zoo

Robert Mendyk

Curator of Herpetology, Audubon Zoo

The iconic shingleback skink (*Tiliqua rugosa*) has been maintained in zoos and private collections since the mid-19 th Century and has been considered by many authorities to be easy to care for in captivity. Yet, despite such a long history in human care, captive reproduction has been infrequent and inconsistent in collections outside of its native Australia, especially in zoological parks. This talk describes in detail the husbandry and successful reproductive management of *T. rugosa* at Audubon Zoo over the past decade and through multiple generations, challenges associated with its management, and prospects for the species in zoological collections.



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A Proposal for the Captive Breeding of Diamondback Terrapins (*Malaclemys terrapin*) in Florida

Daniel Parker

(USARK FL, DRMP, Sunshine Serpents)

People all over the world like to keep Diamondback terrapins (*Malaclemys terrapin*) as pets. The high demand for terrapins in Asia, especially China, has driven illegal wild collection to dangerous and potentially unsustainable levels. The remarkable recovery of the American alligator through farming efforts has proven that captive breeding of reptiles is effective in reducing poaching by supplying the market with captive-produced products. Despite receiving proposals for a captive breeding program from turtle breeders as well as top Florida terrapin biologists in the past, FWC has not implemented their suggestions into policy.



Ornate diamondback terrapin in Hernando County, FL. Photo by Daniel Parker.

Threats to wild Diamondback terrapins include habitat destruction, crab traps, road mortality, predation, and poaching. Florida's turtle breeders can help address at least one of those threats. USARK FL supports a program allowing for captive breeding of terrapins and the sale of captive bred offspring. The result would be the availability of a captive bred alternative to poached wild caught animals in the market. Florida turtle breeders are some of the best in the world and would have the ability to produce many thousands of captive bred terrapins within a few years if allowed to do so. This program should be regulated to ensure that any turtles sold can be verified as captive bred offspring and that adult breeder animals are not replaced with wild caught animals.

Next-generation Natural History: Genetic Tools for Studying Salamander Ecology

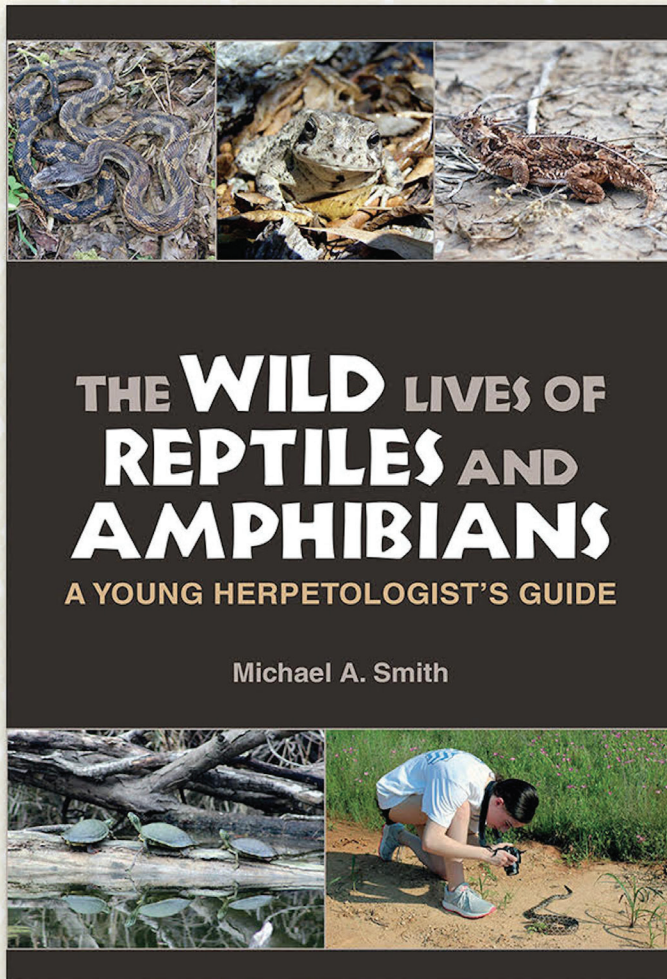
Todd W. Pierson

Assistant Professor
Department of Ecology, Evolution, and Organismal Biology
Kennesaw State University, Kennesaw, GA
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For decades, some herpetologists have lamented the “molecular revolution”, perceiving its focus to be in tension with classic, field-based natural history. The reality is that the proliferation of cheap and accessible genomic technologies provides field biologists with an ever-expanding toolkit for answering the same whole-organism questions we've always asked. Where do organisms live, and with whom? What do they eat, and what eats them? Here, I describe the opportunities for using modern genomic technologies to complement field-based research and study the basic natural history of amphibians and reptiles. This presentation highlights a series of case studies from our research on Appalachian salamanders—including the use of environmental DNA to map the distribution of rare species, the study of salamander diets from non-invasive samples, the genetic identification of salamander predators from chance encounters in the field—and identifies opportunities for future research to improve our understanding of salamander ecology.

Alex Shepack

The enigmatic decline of amphibians across the globe in the last 50 years, and the growing fear about Earth's sixth mass extinction, has captivated the conservation community. The spread of *Batrachochytrium dendrobatidis* and the subsequent wave of declines and extinctions as a result of the epidemic has been well publicized and studied. These declines caused a clear loss of amphibian biodiversity and many species were feared extinct. Despite the clear impacts of Bd on global amphibian communities, particularly those from Neotropical riparian habitats, there have been increasing reports of population and species recovery. I will review global trends in population recovery of amphibian species and focus on several case studies of rebounding and remnant populations. Some, like the rufous-eyed stream frog (*Duellmanohyla rufiocularis*), declined precipitously in portions of its range following the arrival of Bd in Costa Rica, but have apparently begun to recover despite the continued presence of Bd. I used population genetics and mark-recapture to evaluate the historic and current trends of a population of



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D. rufiocularis on the Caribbean slope of Costa Rica, and make predictions about future trends. While community monitoring and haphazard has occurred throughout the last 30 years, new technologies like next-gen sequencing may be able to fill in gaps about historic bottlenecks and the longer-term relationship with *Bd.* Marrying field data with ex-situ conservation programs may provide the best-case scenario for long-term conservation and potential reintroduction of a number of threatened amphibian species. Through this talk I'll discuss current strategies and the potential for future collaborations in the herpetological community.

Conservation of the Virgin Islands Boa (*Chilabothrus granti*): Past, Present, and Future

Dustin Smith

Curator of Herpetology
North Carolina Zoo

The Virgin Islands Boa (*Chilabothrus granti*) is an Endangered species found along the Puerto Rican bank from Eastern Puerto Rico to the British Virgin Islands. While there was once a successful conservation program that brought the species numbers back from a critical low, the population is experiencing a significant decline once again. This has spurred our efforts to conduct further research and re-invigorate a collaborative conservation effort to see its recovery. The breeding program is getting kickstarted once more with founder populations at the North Carolina Zoo, Fort Worth Zoo, and St Louis Zoo. Our recent population surveys in Puerto Rico and the US Virgin Islands have shown stability in some areas, while completely disappearing from islands they once flourished. However, we are also optimistically surveying new islands to be used for future releases and translocations. Although these efforts are still in their infancy (and especially hampered by COVID), we are excited to share some preliminary results, as well as future conservation and research strategies to help with the recovery of the Virgin Islands Boa.

Assessing the Current Distribution of the Suwannee Alligator Snapping Turtle (*Macrochelys suwanniensis*) in Georgia

Benjamin S. Stegenga^{1*}, Dirk J. Stevenson², Houston C. Chandler¹, Christopher L. Jenkins¹
¹The Orianne Society; ²Altamaha Environmental Consulting
[bstegenga@oriannesociety.org]

The Suwannee Alligator Snapping Turtle (*Macrochelys suwanniensis*) was recently described as a distinct species from the Alligator Snapping Turtle (*Macrochelys temminckii*), based on morphological and genetic characteristics. This updated taxonomy revealed a major lack of distribution data for *M. suwanniensis* in Georgia, as the majority of *Macrochelys* records in the state were of *M. temminckii*. The USFWS is also considering listing *M. suwanniensis* as Threatened under the Endangered Species Act, so understanding the distribution of *M. suwanniensis* is vital for informing future conservation. We compiled museum records, literature, and personal communications and discovered only 20 observations in the state prior to 2016. In 2016, we began surveying for *M. suwanniensis* throughout the Suwannee River drainage in Georgia, by setting baited hoop traps in river mainstems, tributary creeks, and oxbow lakes. Our efforts focused largely on areas with no previous survey effort or locations that would constitute range extensions. From 2016 to 2021 we documented an additional 66 turtles, including the first records for 10 counties and the only recent records for Georgia's upper Suwannee drainage and Okefenokee Swamp. These new observations give us a better understanding of the current distribution of *M. suwanniensis* and help us pinpoint remaining strongholds and the most at-risk populations.

Cindy Steinle

Board Member, Chicago Herpetological Society; Founder, Small Scale Reptile Rescue

As the popularity of reptiles as pets has grown, so has the need for rescue. Small Scale Reptile Reptile has been in operation for 28 years offering support to pet owners, law enforcement and shelters, Cindy shares a selection of unique stories of the world of reptile rescue, navigating the world of animal rights and humane ethics while dealing with local and federal regulations.

Effects of Rotating Novel and Non-natural Enrichment
on Captive Snake Species at Zoo Atlanta

Hannah Strudwick

Georgia Institute of Technology
Hannah.strudwick@gmail.com

Effects of novel and changing enrichment, while well documented and proven to be paramount to welfare in captive mammal and avian species, remain unclear for captive reptiles. We subjected 4 snakes at Zoo Atlanta (2 arboreal *Morelia carinata*, 2 semi-arboreal *Boa constrictor*) to a rotating schedule of four novel enrichment items, each with varying nature and usability to the snake, and documented instances and frequencies of different behaviors over the course of 16 weeks using motion detection cameras and an ethogram. We believe, based on previous observations, that the introduction of novel and changing enrichment, regardless of usability or nature, will have a non-significant effect on overall snake behavior. At the time of this abstract's submission, the experiment is ongoing, however preliminary observations do indicate some changes in behavior upon introduction of novel enrichment. This is yet to be proven significant, and further quantitative results will be elucidated at the experiment's conclusion. Monitoring behavioral changes is crucial to the welfare of captive animals, and quantifying the effects of enrichment on behavior may prove vital in developing future care plans and management techniques for captive snake species.

Striped Newt Repatriation Project Participation at the Atlanta Botanical Garden

Chelsea Thomas

Amphibian Program Coordinator, Atlanta Botanical Garden
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This year the Atlanta Botanical Garden began breeding *Notophthalmus perstriatus* as part of the Striped Newt Repatriation Project, a multi-partner collaborative effort led by the Coastal Plains Institute aiming to restore extirpated populations of the imperiled Striped newt in the Apalachicola National Forest, FL. We are the sixth breeding institution to partner with this project. While some of the other partners have had great success breeding this species on plastic plants in relatively sterile conditions, we are providing a highly bioactive environment with several species of live plants, rotting leaves, peat moss and limestone, all helping to mimic water conditions found in the wild. We also offer the widest variety of feeder species and weekly adjustments to lighting to mimic seasonal cues. This talk will introduce ABG's husbandry methods and discuss the challenges and early successes these methods have produced.

Changes in our Understanding of the Diversity of Extant Crocodylia

Kent A. Vliet , Ph.D.

University of Florida,
kvliet@ufl.edu

How many extant species of Crocodylia are there? Most modern accounts state there are 21-23 living species, plus several recognized subspecies. Numerous molecular studies of populations across the zoogeographic range of crocodylians within the past two decades have revealed several previously unrecognized taxa, in addition to solidifying our recognition of other previously described taxa. Several of these discoveries have been made in Africa. Crocodiles in West Africa, previously classified as *Crocodylus niloticus*, have been demonstrated to represent the newly recognized West African crocodile, *C. suchus*. Dwarf crocodiles (genus *Osteolaemus*), once thought to be one species with two recognized subspecies, are now classified as three species (one yet unnamed). African slender-snouted crocodile, previously considered the monotypic genus *Mecistops*, have recently been split into two species, *M. cataphractus* and *M. leptorhynchus*. In Papua New Guinea, freshwater crocodiles south of the Central Highlands are recognized as *Crocodylus halli*, distinct from *C. novaeguineae* found north of the Highlands.

In the New World, analyses across the expansive range of the American crocodile, *Crocodylus acutus*, reveal geographically distinct taxa as well as extensive areas of hybridization.

Geographic variation across the ranges of South American caimans will be discussed.

Veterinary Medical Care of Reptiles and Amphibians

Stacey Leonatti Wilkinson, DVM, DABVP (Reptile and Amphibian)

Avian and Exotic Animal Hospital of Georgia

Veterinary medical care of reptiles and amphibians has advanced dramatically in the last thirty years or more. Care is now provided at the same level as for dogs, cats, and other domestic and exotic pets. There are more veterinarians than ever that are capable of providing excellent care to reptile and amphibian patients, though it is important to find a vet that is comfortable with the unique medical care and needs of these species. This presentation will cover numerous areas related to the veterinary care of herpetological patients including: what to look for in a veterinarian and how we learn about ongoing advancements; history taking and physical examination of patients; explanation of diagnostic testing and sample collection; description of clinical techniques such as injections, medications, surgery, and anesthesia; along with some sample cases and common medical conditions as time allows. After this presentation, the attendee should have a more thorough understanding of what we as veterinarians are able to do for our reptile and amphibian patients and how researchers and pet owners can contribute to the medical care of their animals.



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INTERNATIONAL HERPETOLOGICAL SYMPOSIUM JUNIOR HERPETOLOGIST AWARD

This program created by Russ Gurley, Todd Goodman, and 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 2022 International Herpetological Symposium. In the two younger age groups, an all expenses paid trip was given to a parent or chaperone as well. Three runners-up in each age category received free registration to the 2022 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 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. I was so encouraged and excited to read these essays and applications and I hope the Junior Herper program continues for IHS long into the future. Thank you to my judges for your hard work and to all who supported this program in 2020.**

JUNIOR HERPETOLOGISTS 2022

12-15 Age Group

Vincent McKinney (Bluford, IL) - winner
Ashton Smith (High Ride, MO) - runner up
Jack Knowlton (Salt Lake City, UT) - runner up
Jarret Dietzler (Muskego, WI) - runner up

16-18 Age Group

Karin Ebey (Los Alamos, NM) - winner
Sarah Brabec (Novi, MI) - runner up
Megan Robinson (Monona, WI) - runner up
Hana Leonard (Rougemont, NC) - runner up

NEXTGEN HERPETOLOGISTS 2022

Katie Karl (Springfield, IL) - winner
Calvin Vick (Benton, AR) - runner up
Paul Coyne (Chatham, NJ) - runner up

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
- 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 – Postponed due to COVID-19 Pandemic
2021 – Rodeo, New Mexico - Justin Elden, St. Louis Zoo, St. Louis, MO

PORRAS CONSERVATION AWARD

In recognition of lifelong achievements in and contributions to field biology, the International Herpetological Symposium is pleased to bestow the Porras 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

2015 - San Antonio, TX
Robin Moore, PhD

2016 - St. Louis, MO
Jeff Etting, PhD

2017 - Rodeo, NM
Jeffrey Lemm

2018 – Houston, TX
María Elena Barragán

2019 - Belize City, Belize
BFREE

2020 - Postponed due to COVID-19 Pandemic

2021 - Rodeo, NM
Kristina Chyn

The Charles W. Painter
Grant in
Herpetology



<http://www.chiricahuadesertmuseum.com/charles-w-painter-grant>





IHS GRANTS

The IHS Grant Committee reviewed (30) COMPLETE APPLICATIONS in 2021, 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 three selected categories warranting full-funding for those winners rather than splitting available funds between four categories. Due to the continuing generosity of Grant Fund donors and dedicated fundraising events, the IHS Grant Committee was pleased to award a total of \$2,250 in total to the following winning projects in 2021:

NATURAL HISTORY - María José Navarrete-Méndez and Rebecca Tarvin Ph.D. (University of California Berkeley) “The Origin and Evolution of Tetrodotoxin Acquisition in Harlequin Frogs (*Atelopus*, Bufonidae) from the Northern Andes”

CONSERVATION BIOLOGY - Caitlin Aitken (University of the West of England Bristol, United Kingdom) “Using eDNA surveying as a novel method of assessing population distribution of the *Ambystoma mexicanum* in Mexico City’s wetland, Xochimilco”

EDUCATION - H.T. Lalremsanga (Mizoram University, India) “Educating young minds for snakebite management and conservation of snakes in Mizoram, India”

On behalf of the entire IHS Grant Committee and Executive Board, congratulations to the 2021 grant recipients!

The IHS Grant Fund is made available through the fundraising efforts of our annual Silent Auction and dedicated donations. Over \$26,600 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: <http://www.internationalherpetologicalsymposium.com/ihs-grant/>

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

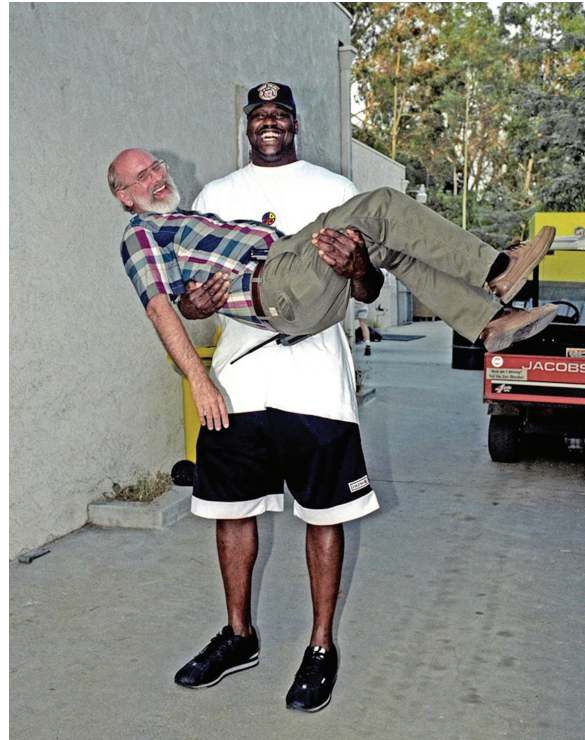
International Herpetological Symposium (IHS) – Treasurer and Grants Committee Coordinator

In Memory of Mike Dee

We pause to mourn the passing of zoo conservationist, Michael Joseph Dee, who lost his battle with cancer in 2017.

With a childhood passion for the snakes, lizards, and turtles of Southern California, teenaged Mike started as an entry-level zookeeper, and following two-years of conscripted US Army service was honorably discharged in 1970 to return to his waiting zoo job. Gradually rising through the ranks to become the General Curator during his record Los Angeles Zoo tenure, he worked tirelessly to improve conditions of zoo animals by giving them more space and superior enrichment in order to encourage better health, longer lives and natural behaviors, leading to numerous innovations which would revitalize the former Griffith Park Zoo into the world-famous LA Zoo.

Easily recognizable by his colorful, trademark Hawaiian shirts, Dee was an approachable leader and tremendous role model for every up-and-coming wildlife professional. Ian Recchio, the zoo's current Curator of Herpetology said "Mike constantly reminded us that our precious animals were irreplaceable, and that caring for them was our God-given purpose. He set a wonderful example and he always led from the front." Mike's sweeping zoological knowledge, and infinite generosity made him an extremely popular figure among his zoo and conservation peers, and some of LA's more well-known citizens such as Betty White and Shaquille O'Neal were honored to have Mike as their friend!



Dee was an outspoken and dedicated champion for the important work of zoos, animal welfare, and conservation. In addition to the conservation of tapirs, big horn sheep, California condors, he was instrumental in getting the early international conservation efforts for the critically endangered Sumatran rhino off the ground, which laid the foundation for today's successful conservation breeding program. As befits a man who strove to save animals from extinction his entire life, Dee has been honored with two wildlife conservation grants that will ensure his living legacy endures: The Michael Dee Conservation Grant, sponsored by Herpetological Conservation International (HCI); and The Michael Dee Mountain Tapir Conservation Grant, sponsored by the IUCN/SSC Tapir Specialist Group in partnership with Houston Zoo.

Now take as inspiration that this globally-renowned, zoological authority was largely self-educated. After graduating from high school, Dee dedicated himself to a lifetime of personal study, worked hands-on with a vast array of species, and read every zoological book he could lay his hands on. His vast and continually changing library of many tens of thousands of volumes filled two homes and four separate storage units, and was posthumously made available by his loving wife, Donna, to many zoo and conservation programs, including IHS. What a legacy!

IHS thanks Donna Dee for her generous donation of books from Mike's personal collection for the IHS Grant Program which will be auctioned off during the 2022 symposium. This donation honors the memory of Mike while supporting our future herpetologists.

Aloha, Mike!

New Book Release by

Dr. Neil Ford

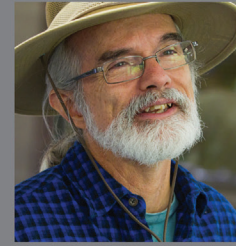
JOURNEYS OF A FIELD BIOLOGIST

ADVENTURES WITH
SNAKES & OTHER CRITTERS

A lifelong passion for snakes has taken biologist Neil Ford to many places around the world, searching for serpents of all shapes and sizes. Everybody loves a snake story, and Ford has a wonderful collection of them – with fascinating tales of fieldwork in remote places with exotic snakes, diverse colleagues and colorful local characters.

—Rick Shine

Professor of Biological Sciences, Macquarie University, and Professor Emeritus, The University of Sydney



Dr. Neil Ford, a professor emeritus at The University of Texas at Tyler, earned his Ph.D. in zoology from Miami University, Oxford, Ohio, and has studied snakes for over 50 years. His primary interest is in life history trade-offs, including factors that affect the number and size of offspring. He has written over 70 peer-reviewed scientific papers, 16 articles and 11 book chapters on that research. He also coauthored the book, “The Garter Snakes, Evolution and Ecology,” which detailed the taxonomy, behavior and ecology of the 30 species that make up this successful group of snakes.



Look for *Journeys of a Field Biologist* at uttyler.edu/press.

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