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Welcome

Hello everyone! Welcome to our fifth edition of Lasiurus! Time flies and my five years on the Board of Directors is coming to an end in 2019, so this will likely be my last year as editor of the NASBR newsletter. Thanks to all of you who have been willing to contribute stories over the years and have put up with my pestering emails and frantic requests for pictures and other items. While I will be leaving the Board of Directors, I will still be an active member and look forward to reading future issues of Lasiurus!

In this issue, we will provide some more details about the plans for our 50th anniversary celebration in Tempe, Arizona (October 2020), which includes an anniversary volume of research articles that can be traced back to the early meetings and the roots of our society. We also have a story about a large-scale effort among Mexican bat biologists to build a comprehensive call library for the insectivorous bats of Mexico. Finally, one of our Program Directors, Luis Viquez, will explain some of what happens in the background when figuring out the extensive logistics of a NASBR meeting - from hotel prices to why the conference ends up on Halloween sometimes, this is definitely an important read! Other highlights from this issue include bios on the 2018 conference awardees, information about our upcoming conference in Kalamazoo, as well as a call for board member nominations and a host for the 2022 NASBR conference. Have a great summer, and remember to take lots of pictures!

Summer 2019

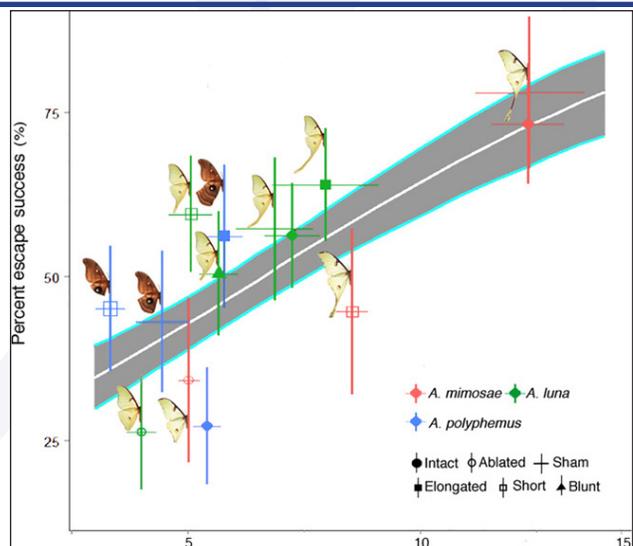
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In Focus

~ Erin Gillam
 Board Member and Editor of Lasiurus

When we think of prey trying to dupe their predators with sensory illusions, the first examples that likely come to mind are the eye spots present on many butterflies, which are thought to mimic the eyes of large, predatory birds and startle smaller birds as they attack the insect. A visual illusion is logical for birds, as these animals rely heavily on vision to assess their environment. But what about bats, who detect their world primarily through an acoustic channel? Can bats be duped by prey through an acoustic sensory illusion? This question is the focus of the paper by Juliette Rubin and others recently published in Science Advances. In this study, Rubin and colleagues examine the hindwing lobes and tails of some saturniid silk moths, which spin during flight and have previously been shown to draw bat attacks towards the less critical tail area. Rubin and colleagues quantified the hindwing structure of over 50 species across the four saturniid subfamilies (two of which contain hindwing lobes/tails and two of which do not) and mapped these onto a newly constructed phylogeny. From this analysis, they identified four different types of hindwing shapes that have evolved independently on multiple occasions and appear to be adaptive in nature. To follow up on this analysis, Rubin and Colleagues conducted an experimental laboratory test to determine if certain hindwing shapes are associated with higher predator escape rates. Using three different saturniid species, tail/hindwing length was experimentally lengthened (cont'd page 2)



(cont'd from page 1)

or shortened, after which moths were allowed to fly along a tether in the presence of a big brown bat. Results showed that moths with longer hindwing lobes and tails more successfully evaded a bat attack (see Figure). Overall, these exciting findings demonstrate one more trick that some moths have up their sleeves in the bat-moth arms race - specialized wings and tails that create an echoic diversion to attacking bats.

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~ Erin Gillam

NASBR Stories

NASBR's 50th Anniversary

Our 2020 meeting in Tempe, Arizona, will mark the 50th anniversary of the North America Society for Bat Research. We will be celebrating this historic milestone with several events including special guests who were instrumental in getting NASBR established. It all started in 1970 with a 2-day Symposium on Bat Research in the Southwest that was organized by Roy Horst and held at the University of Arizona in Tucson with 120 attendees and 26 presentations. Last year in Puerto Vallarta, we had 312 attendees with 187 oral and poster presentations, including dedicated student sessions. We have definitely grown from an informal gathering of like-minded chiroptologists to one of the most prominent scholarly societies dedicated to the research and conservation of bats.

It is fitting for our landmark half-century gathering to promote bat research that we go back to the Grand Canyon state. Ted Fleming, 1999 recipient of NASBR's Gerrit S. Miller Jr. award in recognition of outstanding contribution and service to the study of bats, is the keynote speaker. Our first and long-serving program director Roy Horst is preparing a poster highlighting the history of the Society. We will also be inviting other distinguished guests to give presentations on their perspective of NASBR and the progress in the study of bats over the last 5 decades.

Another initiative to coincide with the Tempe meeting is a book titled "50 Years of Bat Research: Foundations and New Frontiers", which will be published by Springer and available for purchase during registration in 2020 at a 55% discount (\$50). As most of you are aware from our website and emails, this will be an edited volume of review papers that were proposed by the membership and other collaborators. We have accepted 24 contributions from 72 authors representing 9 different countries. Topics cover the full breadth of study in fields as diverse as ecology, behaviour, taxonomy, systematics, physiology, parasitology, methodology, and history of bat research.

The editorial team includes Burton Lim, Brock Fenton, Mark Brigham, Allen Kurta, Shahroukh Mistry, Erin Gillam, Amy Russell, and Jorge Ortega. This book will compile a unique collection of chapters that cover the initial developments of key areas of study presented at NASBR meetings and the growth of these fields of research over the years. We have encouraged contributions to include a wide arrange of authors from early to mid and late career researchers. All of these review papers will conclude with a prospectus on future directions in their field of study in bat biology.

We are still open to suggestions for other ideas of celebrating our 50th anniversary. So please let any Board member know your thoughts on invited guests or special events that can be done in Tempe for 2020. Looking forward to a good turnout for what will be a great party!

~ Burton Lim, Chair of the NASBR Board of Directors



Photo from Tempe Mission Palms Hotel

An Echolocation Call Library for the Insectivorous Bats of Mexico

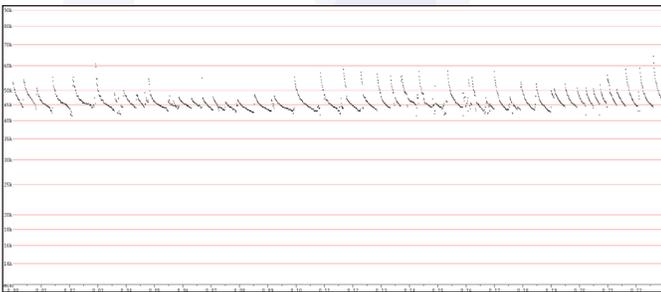
A group of bat researchers with the Mexican Society of Mammalogists (AMMAC) recently concluded a project entitled "Ensemble of reference of the acoustic library for the Mexican insectivorous bats". The main objectives of this project were to: 1) to develop a standardized recording protocol for recording bat echolocation calls to be used as a part of a reference library for species acoustic ID; 2) to create the first reference library for bat echolocation calls in Mexico, a megadiverse country and one of the richest in regards to bat species diversity; and 3) to generate a free online platform to upload and share any bat acoustic data worldwide.

Bat experts were summoned to a national workshop to discuss and develop the standardized recording protocol based on their expertise with different species and habitats. Afterwards, several workshops across the country were organized to train people in bat sampling techniques, echolocation call recording methods, and sound analysis. Field work was planned to gather a wide range of intra- and inter-specific call variation of the insectivorous bats distributed across Mexico, and to represent the great environmental heterogeneity in the country. The online platform consisted of a graphical interface that allows

authenticated users to associate metadata and media files (sound and images) to field observations. The resulting data structure is stored locally as a SQLite database for offline persistence and can be inserted into a centralized non-relational Mongo database located at the National Commission for the Use and Knowledge of Biodiversity (CONABIO).

Researchers collected 2,302 echolocation call sequences of 1,640 individuals belonging to 67 insectivorous bat species (50% of the species found in the country) from seven families (90% of the families found in the country). Echolocation calls were collected at 183 field sites in 27 states (out of 32) in Mexico. A total of 173 people from 30 academic institutions participated along the process of the project. This development provides the first public bat acoustic library collected in a systematic way to enhance data quality for use in species acoustic ID. Results are being used to investigate patterns and drivers of variation in the echolocation calls of these Mexican species. The platform, along with all the hosted data, will be freely accessible and can be strengthened over time to increase and extend to the calls of representative species from any country.

~ *Cristina MacSwiney Gonzalez*



From the Program Director's Desk The Road to Kalamazoo

San Antonio, Knoxville and Puerto Vallarta... if you were throwing darts randomly at a map of North America, they would be pretty lucky to hit any of those 3 places. Nevertheless, those three cities hosted our societies' most recent annual meetings. How did we end up at these locations? Well, to answer this question we must go back and remember how our meetings are planned and organized. Every year, we solicit bids and a few brave members come forward that are willing to welcome our society to their hometowns or a great beachside location (thank you Rebecca, Gary and Emma, and Jorge!). The first quality of these brave members is their commitment to see their bids go from draft to reality. From the moment we draw a proposal together (Program Directors [PDs], Local Host(s) [LHs], and the hotels) until we hand out the first name tag, over three years pass. It is often hard to look that far into the future, but the fact that the decision to hold a meeting is taken so far in advance is one of the biggest factors that limits the pool of potential local hosts.

For example, we are currently negotiating the contract with

hotels in Winnipeg for the meeting in 2021. The development and negotiation of hotel contracts are the first challenges that PDs, LHs and the Board of Directors (BoD) face. Negotiating with hotels requires that we estimate the number of people that will attend a meeting scheduled in the future. What factors are taken into account to do this? We weigh historical data from past meetings, the location of the meeting (meetings held outside the US are often attended by fewer state and federal employees), and if there are any other big bat meetings being held the same year (i.e. IBRC).

After we have estimated the number of attendees who are likely to attend the meeting, we need to find a place that can accommodate a group our size. The biggest restriction we have is that our meeting requires a lot of space. At any given meeting, we require enough space for A) 2 concurrent sessions that can be joined for the plenary; B) a lockable room to accommodate the vendors and exhibitors; C) a room for the poster sessions; D) a room for the morning and afternoon breaks; E) a room for breakfasts; F) a separate room (when possible) for the diversity breakfast; and G) at least two rooms for the pre-conference workshops, BoD meeting, IUCN meeting, and teacher's workshop. Whatever way you slice it, we need a lot of space for a medium-sized conference.

At this point, it is important that we explain that a conference of our size is not the most profitable for hotels. Hotels are used to big conferences (think of ESA or TWS) and they know how to cater to them appropriately. The problem is our meeting is not normal in the sense that the society only covers the conferences expenses and not hotel rooms. Other meetings, for example pharmaceutical meetings, are extremely profitable for the hotels. For these meetings, the company organizing the meeting pays for everything directly. This is not our model. If we were to charge a full fee, we would need to include the hotel room and all the meals in the registration fee. The registration fee for the Puerto Vallarta meeting would have been over \$1000 USD for regular registration and \$800 USD for students.

Organizing the meeting using an all-inclusive model would give us more leverage with hotels to negotiate better prices, but would significantly increase the registration costs and consequently, reduce the size of our membership. By not including the hotel rooms in the registration cost, we can keep the prices for all registrants down, and allow registrants to economize on room accommodations. Our model aims to minimize the cost for regular and student members, while maximizing extracurricular activities, workshops and exhibitor options. The post-meeting survey from the Puerto Vallarta meeting indicated nearly 50% of the membership used, in part, personal funds to attend the meeting. Our goal every year is to keep the registration fee as low as possible without compromising the normal functioning of the meeting. As our

Puerto Vallarta 2018

membership continues to grow, finding the ideal location and price is getting increasingly harder.

With our current model, the only bargaining chips we have when negotiating with hotels are the food and beverage (F & B) budget and room block. In order to get the meeting space free of charge, we negotiate the minimum revenue that they will receive from our meeting. On average, hotels require (and enforce by contract) that our F&B consumption should be \$50-70K USD and that between 400-600 hotel nights are booked by attendees during our meeting time. This is a typical contract requirement that the BoD is legally responsible to cover. Although cancellation policies vary from hotel to hotel, we are responsible for guaranteeing this revenue to the hotel, regardless of the success of the meeting. To help ensure the success of a meeting, and that they continue, we need NASBR members to stay at the designated NASBR meeting hotel. We do have an emergency fund that will help us cope with the cancellation of a meeting due to a natural disaster or any other major event; but this fund will not be sufficient if we keep dipping into it every other meeting.

Typically, F&B is not a problem. We usually consume enough between breakfast, breaks, and poster sessions to cover this amount. The biggest problem for our meetings is meeting the room block. Last year we barely made it over the threshold established within our contract with the Westin. We understand that in a tourist venue like Puerto Vallarta it was easy to find alternative lodging and vacation rentals with lower prices than the Westin. However, if this trend continues, we may have to introduce changes to our meeting model that could affect both the price and the time of year that the meeting occurs (see box 1).

Since our membership keeps growing, the number of hotels in a given city that have the amount of meeting space we require is quite limited. For example, for Winnipeg, there were only three hotels big enough to accommodate our group. Because of the hotel size limitation, we sometimes end up in high-end establishments because these hotels are the only ones in the area that can accommodate us. In other words, the big meeting space that we need comes with a price tag.

Over the past 50 years, our society has visited over 40 different cities distributed in 5 different countries (Canada, US, Puerto Rico, Mexico and Costa Rica). Every year, the PDs and LHs start planning a new meeting that will bring our society to another location. This process requires hundreds of emails and sometimes weekly conference calls; however, all the hours that the PDs and LHs put into the planning suddenly feel weightless when the Welcome Social begins and we can see old friends again and greet them as we get ready to launch a 3-day marathon of bat science. We wanted to share with the membership some details of how we organize and price

our meetings so that the next time you are registering for the meeting you can be sure that we got your back!

~The PD Team (Gary, Shahroukh, Riley, Luis, and Emma)

Local Host Report



As every year, the North American Society for Bat Research held its annual symposium in 2018 in Puerto Vallarta, Jalisco, Mexico, at the Westin Resort & Spa Hotel, from October 24th to October 27th. We started with our field trips on Tuesday 23th: Military Macaws Conservation Program, Botanical Garden and Tequila Distillery, Bird Sanctuary and Wildlife Reserve, and Sea Turtle Cap were among the pre-planned excursions took by many attendees to the meeting. Local host Jorge Ortega had a very helpful advisory by Program Directors Luis Viquez, Emma Willcox, Riley Bernard, Shahroukh Mistry and Gary Kwiecinski. We had a complete attendance of 312 registered academic persons. We had representation, mainly from Mexico, Canada and USA; but also attendees from El Salvador, Costa Rica, Israel, Finland, Brazil, and many other countries. We used an abundant and local species, *Artibeus jamaicensis*, to be in our logo (designed by Mariella Jiménez), this creation included indigenous Wixarika symbols.

There were six Student Honors Sessions that included 51 talks from undergraduate and graduate students. We had 12 concurrent sessions, including 80 oral papers. Two poster sessions were included in the program: 21 student posters and 35 regular members presented during both days. Some of these concurrent sessions were species-specific (i. e. *Leptonycteris yerbabuenae*), or topic-specific (i.e. migration, ecology, etc.). Registration volunteers included Rafael Juárez, Diana Moreno, Dillan Hoyt, Melissa Rodríguez, Lorena Miranda, Daniela Caffaggi, Begoña Iñárritu, Daniel Ramos, Marisol Martínez, Edgar Gutiérrez. Aldo Espinoza, Citlali Mendoza, José Luis Martínez, Mercedes Morelos, and Marcos Reyes.

We are grateful to all the conference Sponsors - Pettersson Elektronik, Holohil Systems, Wildlife Acoustics, Titley Scientific, ESI, Lotek Wireless, HSL, Bat Conservation International, Cascahuin Distillery, Arizona Game & Fish, Conventions and Visitors Bureau of Puerto Vallarta, and CONANP. Student awards were financed by: AVINET, Lube Foundation, Bat Conservation International, Basically Bats, Bat Research News, Speleobooks, Titles, and Center for Bat Research, Outreach, and Conservation.

Teacher Workshop Report

The 23rd annual NASBR Teacher Workshop was held in Puerto Vallarta, Mexico. The Teacher Workshop began in 1995 as the Society's outreach into the local community. The goal of the workshop is to provide educators in each year's host city with information and activities about bats and conservation. Presenters at each Teacher Workshop come from scientists and educators attending the scientific meeting who generously volunteer their time to present topics including: basic bat biology, information on local bats, and interactive activities that can be shared with students of all ages.

The Spanish-language Teacher Workshop in Puerto Vallarta was organized by Laura Navarro, who has worked on educating the public about bats for over 20 years and currently works for Bioconciencia A. C. and Programa para la Conservación de los Murciélagos de México (PCMM). Laura has written many children's books about bats, including Marcelo, the Bat and Don Sabino, the City Bat, and she generously donated many of her outreach materials to workshop participants. Local students Begoña Iñarritu and Andrea Valdés presented their research to attendees, who also were able to examine bat skins and resin skulls of several bat species, provided by the Santana Lab.

The NASBR Education and Outreach Committee is very grateful to Laura for her fantastic talents and contributions to this year's Teacher Workshop. We hope to use her talents again, especially when NASBR is hosted in Spanish-speaking communities.

The 2018 Teacher Workshop reached 13 local teachers and educators, mostly from government agencies. Whereas attendees of the scientific portion of NASBR are always welcome to attend any or all of the Teacher Workshop, this year's Teacher Workshop being conducted in Spanish limited participation to mostly Spanish-speaking attendees. To better provide members of NASBR with opportunities to discuss education and to share classroom resources, we plan to add a pre-conference education and outreach workshop to the 2019 meeting.

We greatly thank the following sponsors for donating funds and materials to the Teacher Workshop: Bioconciencia A. C., Programa para la Conservación de los Murciélagos de México (PCMM), Bat Conservation International, and the Santana Lab.

~Veronica Brown

Awards

Villa Award

Aline Mendez-Rodriguez

Phylogenetic Relationships and Genetic Introgression between *Pteronotus fulvus* and *Pteronotus gymnotus* (Chiroptera: Mormoopidae)

The Bernardo Villa Award is one of the most significant honors received by a Mexican student during the annual meeting of the NASBR society. The award honors the academic trajectory of Dr. Bernardo Villa, the first chiropterologist of Mexico, who had a major worldwide impact with his bat studies. In 2018, we opened the post at the beginning of the year, announcing the contest in different platforms (social networks, electronic pages, bulletins, etc.). We received ten contestants from undergraduate and graduate levels, and coming from different parts of Mexico. We selected three judges from Latin America and the USA to review all proposals and select the top project to be awarded with the Bernardo Villa Award.

In 2019, the award went to Aline Mendez, an undergraduate student from the Universidad Autónoma Metropolitana-Iztapalapa, supervised by Dr. Ricardo López Wilchis. In Aline's words "My research is focused on natural hybridization between two species

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of bats, *Pteronotus fulvus* and *Pteronotus gymnonotus*. Genetic analyses of mitochondrial and nuclear DNA indicate the presence of historical and contemporary hybridization between the two species in the region of overlap in southern Mexico and Central America. The direction of the gene flow between species is asymmetric, possibly facilitated by the colonization of *P. gymnonotus* to Mexico and Central America". Aline was very happy and grateful to have received the Bernardo Villa award and the support of the association, which allowed her to attend and share her research during the 48th Annual North American Symposium on Bat Research in Puerto Vallarta, Jalisco, Mexico. "It was an opportunity where I was able to meet many admirable bat researchers. This award motivates me to continue studying these amazing animals", says Aline.

~ Jorge Ortega Reyes



Student Awards

Avinet Award

Sara C. Lucero-Verdugo

Phylogenetic Signal in Skull Shapes of Stenodermatine Bats. The main goal of my project was to analyze if the variation in skull shape of 10 genera across the Stenodermatinae subfamily had a phylogenetic component, using modularity and geometric morphometrics techniques. The results showed that cranial modules have a phylogenetic signal while the mandibular modules do not. This implies that only cranial modules have phylogenetic information in the species studied, and these characters could be used in the future in phylogenetic analysis of the subfamily Stenodermatinae. Winning this award gave me more motivation to continue studying this amazing group of bats. I will use the prize as part of the resources designated for a continuation of these results in my master's degree project where I will do a phylogenetic analysis of Stenodermatine bats.



Basically Bats, Wildlife Conservation Society Award

Melissa R. Ingala

Frugivory in Phyllostomids is Associated with Microbiome Functional Specialization. As part of my dissertation research, I am investigating how the gut microbiome contributes to dietary diversity in Neotropical bats. Bats that eat mostly low-quality food items, such as fruit, must acquire essential nutrients like proteins, fats, and vitamins from other sources. One avenue by which vertebrates can acquire nutrients not directly available in their food is through microbial metabolism in the gut. At NASBR, I presented a poster on a study testing the hypothesis that fruit-eating bats have bacterial gut microbiomes functionally enriched for fat, protein, and vitamin synthesis compared to insectivorous bats. Interestingly, we found that Stenodermatine microbiomes were enriched for functions related to fatty acid metabolism, peptide biosynthesis, starch and sucrose metabolism, and vitamin B6 biosynthesis, while insectivorous bat microbiomes were enriched for protein digestion and absorption. In the future, I will be expanding this study by testing whether dietary complexity is related to the degree of gut microbiome functional specialization in a community of bats. I was honored to receive the Basically Bats award for my work, and plan to use the money to fund upcoming fieldwork in Peru and Belize.



Bat Conservation International Award

Nicole A. S.-Y. Dorville

Are *Eptesicus fuscus* resistant to, or tolerant of, *Pseudogymnoascus destructans*. My research explores whether the big brown bat, *Eptesicus fuscus*, is resistant or tolerant to *Pseudogymnoascus destructans* (Pd), the fungal pathogen that causes White-Nose Syndrome. Interestingly, two WNS-impacted species (*Myotis lucifugus* and *E. fuscus*) both hibernate in conditions favoring Pd growth, sometimes even in the same hibernaculum. *M. lucifugus* is one of the species heavily affected by WNS, while *E. fuscus* is one of the species able to maintain relatively stable populations despite infection. Through a replicated inoculation-challenge experiment, our disease metrics results so far support the hypothesis that *E. fuscus* is physiologically resistant to WNS. During the 48th meeting, I was incredibly honored to receive the Bat Conservation International Award for my presentation on this. I plan to use the award to fund part of my expenses to the 18th International Bat Research Conference in Thailand where I plan to present a more completed version of my work. My plan for then is also to network with more bat researchers to help me narrow down where/whom I would like to pursue a PhD (with) in disease ecology as I would like to work in Asia, closer to home.



Bat Research News Award

Angelica Menchaca

From Morphology to Genes: Adaptations to Migration in Tequila Bats. I study how migration alters the genetic and morphological architecture of bats. My latest project explored how changes in wing morphology and the expression of particular genes affect the migratory behaviour of tequila bats (*Leptonycteris yerbabuena*). My results show that the wings of migratory bats have adapted to endure long-distance flight and that brain-related genes allow them to navigate, explore and build memories to deal with the challenges posed by migration. This research is the first to associate circadian clock genes to migratory behaviour in bats and opened the door to further exploration of migration from a genomic viewpoint. This award allowed me to pay for my travel expenses to attend NASBR 2018.



Karl F. Koopman Award

Kathryn E. Stanca

Anatomical Diversification of the Bat Calcar. My primary research interests are mammalian evolution and skeletal biology, so I have naturally been drawn to the remarkable skeletons of bats. My dissertation research seeks to understand the anatomy, evolution, development, and function of the calcar, a novel skeletal structure found in bat ankles. This project was inspired by my first NASBR meeting, and members of the NASBR community have been essential in helping me learn more about this unique part of the bat skeleton. I have examined many specimens collected by Dr. Koopman as a part of this project, and I am honored to receive this award. I will use the award funds to cover student fees as I finish my dissertation.



Luis F. Bacardi Bat Conservation Award

Giorgia G. Auteri

Good Genes or Good Luck? Little Brown Bat Shows Signs of Evolutionary Adaptation to White-nose Syndrome. My dissertation focuses on discerning the migratory patterns of bats in East Central Nebraska. We have deployed a grid of acousBats in temperate North America have experienced severe population declines due to white-nose syndrome (WNS), which is caused by an introduced pathogen that kills bats during winter hibernation. I explored if surviving *Myotis lucifugus* in northern Michigan, USA, were genetically resistant to the disease, by comparing the genetics of disease-survivors versus non-survivors. I detected adaptive divergence at three genes with functional links to hibernation physiology and echolocation, suggesting that selective pressures are acting on mechanisms for regulating hibernation and foraging. However, adapting to something isn't the same as being well adapted, and I also found evidence of a genetic bottleneck among the surviving bats. I plan to continue exploring the potential for evolutionary rescue in bats effected by WNS. I am honored and thankful to receive this award, which is encouraging as I proceed with my doctoral research. The award funds were used to purchase winter field equipment—I will no longer have to wear borrowed waders that were way too big!



Speleobooks Award

Trinity N. Smith

Elucidating Patterns of Bat Species Occupancy Across a Disturbed Landscape in California's Central Valley.



For my master's research, I am identifying landscape patterns of bat species distribution in California's Central Valley. With the support of California Fish and Wildlife, I monitored 275 acoustic sites in the spring of 2016 and 2017. At NASBR, I presented preliminary results that suggested that western red bat land use is positively impacted by natural and cultivated tree crops, and negatively impacted by high severity drought. This research provides insight into how western red bats are distributed in areas with high agricultural production and suggests that bats in the Central Valley use anthropogenic habitats as well. My experience at NASBR was highly rewarding and provided the opportunity to collaborate with researchers. I am honored to receive this award from Speleobooks and will use the funds to support future conference travel as I discover how the other species of bats in California respond to human land use.

Titely Scientific Award

Aya Goldshtein

Foraging Strategy of the Nectar Feeding Lesser Long-nosed bat. Every spring, dozens to thousands of pregnant females of the lesser long-nosed bat (*Leptonycteris yerbabuenae*) arrive at a maternal cave in the Sonoran Desert of Mexico after a long migration of more than 1000 km from central Mexico. I study the foraging behavior of these bats during the lactation period, when they rely on the nectar, pollen and fruits of the Saguaro cacti (*Carnegiea gigantea*) as their main food source. I found that the bats conduct long commute flights every night, flying up to 103 km (one way) from the cave to the foraging site. They concentrate their feeding in a specific area inside the foraging site, feeding from the same cacti throughout the night and during consecutive nights, visiting certain cacti more often than the others. I am very grateful for receiving the Titely scientific award and I will use these funds to cover my research expenses in the upcoming field season.



White-nose Syndrome Award

Briana N. Anderson

Development of Fibroblast Cultures for North American Bat Species: A Novel Method for Studying White-nose Syndrome.



White-nose syndrome ranges in severity among species of North American bats; certain species experience mass mortality while populations of other species have remained stable. I hypothesized that a difference in immune response to infection might explain this. To test my hypothesis, I studied four bat species at the cellular level. I established fibroblast cell cultures for each species using wing tissue samples, infected the cells with the fungus, and utilized RNA-sequencing data to study differential expression of immune genes. While this method of studying bats is rather novel, I believe it is valuable in that it allows various research questions to be explored with a small tissue sample rather than bringing bats into the laboratory. It was an incredibly humbling experience to win this award in the presence of so many admirable students. It heightened my confidence that this area of research should be explored further in the bat community. With the funds, I plan to attend more conferences in 2019.

Kalamazoo 2019

Kalamazoo: October 23 - 26, 2019

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The 49th Annual North American Symposium on Bat Research will be held in Kalamazoo, Michigan, USA on 23-26 October 2019 at the Radisson Plaza Hotel. While staying at the Radisson, you will be within walking distance of numerous local restaurants, breweries and bars, shops, and more including the Kalamazoo Mall, the country's first outdoor pedestrian walking mall. Just minutes from the vibrant downtown, you will find expansive nature trails and sandy shores, as well as world class attractions and museums. There are several pre-conference tours, including a trip to the Field Museum of Natural History in Chicago, a trip to a dune-covered park on the western shore of Lake Michigan, and a tour of local breweries in Kalamazoo. We will also offer pre-conference workshops on bat photography and on strategies for engaging in effective public outreach. We will have a bowling tournament to support the Spallanzani Fund Raiser.



City of Kalamazoo

Important Dates

Aug. 9	Early Registration Deadline & Abstracts due
Sep. 16	Last day to get conference rates at the hotel
Sep. 23	Last day to order t-shirts
Sep. 23	Program and Abstracts available online
Sep. 25	Last day to sign up for Tours & Bowling
Oct. 19	Last day to order banquet tickets

The Venue: Radisson Plaza Hotel

The 49th Annual Symposium on Bat Research will be held at the Radisson Plaza Hotel, Kalamazoo. The Radisson Plaza Hotel is located within easy walking distance of downtown restaurants and attractions like Bell's Brewery and the Kalamazoo State Theatre.

The elegant rooms each have a television, Wi-Fi connection, work desk, and coffee maker. Upgraded suites offer separate living rooms, kitchenettes, sleeper sofas, murphy beds, and whirlpools. Room service is available from 6AM to midnight daily. Additional amenities include an indoor pool and hot tub, a fitness center, and a full-service salon and spa. The average minimum and maximum October temperatures in Kalamazoo are 45/60 °F (7/15 °C).

Room Rate: \$139+tax (single/double); \$149+tax (triple); \$159+tax (quadruple). The tax rate is 11%, giving a total cost of \$154.29 (single/double); \$165.39 (triple); \$176.49 (quadruple) per night. This rate is available from Tuesday 22 October to Saturday 26 October. Check-in time is 4:00PM and the check-out time is 12:00PM.

Make a reservation: Call +1 (800) 333-3333 or +1 (269) 343-3333 (use code NASBR), or reserve your room online with the same code (use the More Search Options button to enter the NASBR code). Room reservations may be cancelled without penalty before 4PM one day prior to the date of arrival.

Parking: Self-parking is available in an attached parking ramp for \$10 per night.

Getting to the hotel: The Kalamazoo/Battle Creek International Airport (AZO) is approximately 5 miles from the conference hotel. The Radisson provides a free shuttle service by appointment to and from the airport from 6AM to 11:30PM. Call +1 (269) 343-3333 to reserve a space, or contact the hotel using the airport courtesy phone at baggage claim.

Taxi, Uber, and Lyft car services are available in Kalamazoo. Depending on your time of arrival, a trip from AZO to the conference hotel should cost around \$10-\$15.

Local Attractions

Drink locally brewed beer: Lucky for beer lovers, downtown Kalamazoo is home to many breweries! Check out this brewery map for directions and more info on the six walkable downtown breweries, as well as the seven other breweries in Kalamazoo County.

Shop on the mall: The historic Kalamazoo Mall, the first outdoor pedestrian mall in the United States, features revitalized art deco buildings and specialty shops.

Go to a museum: Kalamazoo's museums and area attractions embrace nature, history, education, and art to ignite your imagination. Add the Kalamazoo Nature Center, the Kalamazoo Institute of Arts, and Heritage Guitar Inc. to your list of downtown attractions.

Eat the food: To get a real sense of the flavor of Kalamazoo, you need to sample the food! The number of diverse cuisines just in the downtown radius is pretty impressive. You'll find ev-

everything from German and tapas, to BBQ and sushi.

Grand Rapids: Just north of Kalamazoo is Grand Rapids, also known as Beer City, USA! The city is home to an excellent variety of farm-to-table restaurants, beautiful art and scenery at Frederik Meijer Gardens & Sculpture Park, and the remarkable exhibits at the Grand Rapids Art Museum.

Tours

Trip to Field Museum of Natural History

Date: Tuesday, October 22, leave hotel at 8AM and return by 8PM

Cost: \$70 per person

Limit: 28 people

Take a day-trip to visit the Field Museum of Natural History in Chicago! Permanent exhibits include the Evolving Planet, Restoring the Earth, the Lions of Tsavo, Mammals of Asia, and the Regenstein Halls of the Pacific. Don't miss Sue the T-Rex in the Stanley Field Hall! Bruce Patterson will lead a special behind-the-scenes tour of the mammal collections. Transportation is by chartered bus leaving the conference hotel at 8AM and returning to the hotel by 8PM.

Includes: complementary admission by donation of the Field Museum of Natural History and transportation. Lunch is on your own in the museum cafe or a nearby restaurant.



Photo from the Field Museum of Natural History

Trip to Saugatuck Dunes State Park

Date: Wednesday, October 23, 8AM-3PM

Cost: \$40 per person

Limit: 14 people

From Kalamazoo, we will drive 1-hour northwest to Saugatuck Dunes State Park on the shore of Lake Michigan. The South Trail stretches 5.2 miles through a secluded strip of the Lake Michigan shoreline. The terrain of the trail varies from steep slopes to rolling dune hills, making it a moderately difficult journey for hikers. Visitors will encounter deep dune forests as well as picturesque views of Lake Michigan. Of the trails that compose the trail systems in Saugatuck Dunes State Park, this

Announcements

is the most secluded and wooded hike. The group will make a lunch stop at a local restaurant on the return trip.

Includes: transportation, guided hike



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Workshops

Bat-themed Outreach Techniques

Date: Wednesday, October 23, 9AM-12PM

Cost: \$10

Limit: 30 people

Location: The Fields Room

NASBR annually hosts a Teacher Workshop to engage with teachers in the local community. This year we will offer a pre-symposium workshop for meeting participants who are interested in bat outreach ideas. The workshop will be led by the NASBR Teacher's Workshop Coordinator, Veronica Brown, and will include community outreach ideas for both the general public and school groups, including some hands-on activities. Veronica will also discuss using bat walks as a tool to engage with local communities and using social media as an outreach opportunity.

Photographing Bats

Date: Wednesday, October 23, 2PM-4PM

Cost: \$25

Limit: 50 people

Location: The Oaks Room

Brock Fenton, Merlin Tuttle, Beth Clare, and Price Sewell will host an afternoon bat photography workshop. During the workshop they will introduce the basics of bat photography, take an in depth look at some specific photographs of bats and how they were taken, and answer questions from participants, both those submitted beforehand and those posed during the session. Participants can send their questions to Brock Fenton in advance of the workshop (bfenton@uwo.ca).

Announcements

Scholarships / Grants

Call for Updates from Regional Bat Working Groups

We would like to start including annual updates from regional bat working groups. So if you are interested in sharing a brief (~300 words or less) blurb about great research, outreach, or anything fantastic happening in your working group, please contact the News Letter Lead.

Upcoming Conferences

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50th North American Symposium on Bat Research

October 28-31, 2020

Tempe, AZ

Local Host: Angie McIntire, Arizona Game and Fish Department & Marianne Moore, Arizona State University

Venue: Mission Palms, Tempe

<http://www.nasbr.org>

New England Bat Working Group Meeting

Date TBD

<http://www.nebwg.org/meetings.html>

Midwestern Bat Working Group Meeting

Date and Location TBD

<http://mwbwg.org/>

Southeastern Bat Diversity Network Meeting

Date and Location TBD

<http://sbdn.org/>

Western Bat Working Group Meeting

Date TBD

<http://wbwg.org/2019-biennial-workshop-and-meeting/>

18th International Bat Research Conference

July 28 - August 2, 2019

Phuket, Thailand

15th European Bat Research Symposium

August 3-7, 2020

Turku, Finland

<http://ebrs2020.fi>

51st North American Symposium on Bat Research

October TBD, 2020

Winnipeg, Manitoba, CAN

Local Host: Craig Willis, University of Winnipeg

<http://www.nasbr.org>

Bat Conservation International Scholarship

This scholarship of up to \$3,000 funds research aimed at bat conservation.

<http://www.batcon.org/our-work/initiatives/award-grants-scholarships>

Bat Conservation and Management

Small Grant Program

Up to \$5,000 in products and software to encourage important but under-supported conservation and/or research projects

<http://www.batmanagement.com/GrantProgram/grantprogram.html>

Holohil Grant Program

Scientific Product Grant

Offers Holohil transmitters at a reduced (or no) cost to research projects.

<http://www.holohil.com/grant-program>

Southeastern Bat Diversity Network Student Travel Award

Up to \$500 to attend NASBR

<http://www.wildlifeacoustics.com/grant>

Western Bat Working Group: Bob Berry Fund

This scholarship provides various technology to assist in research (transmitters, detectors, etc.).

<http://wbwg.org/>

Western Bat Working Group: Dixie Pierson Memorial Fund

This scholarship consists of two \$500 awards every other year to defray travel costs to the WBWG meeting.

<http://wbwg.org/>

Wildlife Acoustics

Scientific Product Grant

Up to \$5,000 in products (some exclusions apply) each quarter
Quarterly deadlines (Feb 15, May 15, Aug 15, Nov 15)

<http://www.wildlifeacoustics.com/grant>

American Society of Mammalogists Grants in Aid of Research

ASM provides various funding opportunities available to members.

<http://www.mammalsociety.org/grants>

AMNH Theodore Roosevelt Memorial Grants

Seed research grants are available for field-based research, as well as to use the AMNH collections.

<http://www.amnh.org/our-research/richard-gilder-graduate-school/academics-and-research/fellowship-and-grant-opportunities/research-grants-and-student-exchange-fellowships>

The Animal Behavior Society Research Grants

Several grants including Meeting Related Awards, Student Related Awards, Developing Nations Research Grants, Travel Awards, and Career Awards.

<http://www.animalbehaviorsociety.org/web/awards.php>

Announcements

The Society of Systematic Biology

Graduate Student Research Awards assist students in the initiation (first two years) of their systematics projects and in the collection of preliminary data.

<http://www.systbio.org/graduate-student-research-awards.html>

EPA Star and GRO Fellowships

Support for fellowships and professional development opportunities that will help ensure that environmental solutions are based on quality training and sound science.

Information here.

<https://www.epa.gov/research-fellowships>

Sigma Xi Grants in Aid of Research

Grants of up to \$1,000 to students from all areas of the sciences and engineering. Designated funds from the National Academy of Sciences allow for grants of up to \$2,500 for vision related research.

<https://www.sigmaxi.org/programs/grants-in-aid>

New Leaders

This year, we are excited to welcome several new individuals to the NASBR leadership and coordination team! We are also sad to see the dedicated individuals that previously served in these positions stepping down, but we thank them deeply for all of the time and effort they have given to NASBR over the years.

First, the Hellos....

Chair of the Board of Directors:

Dr. Burton Lim

Assistant Curator of Mammalogy
Royal Ontario Museum



Board Member: Leanne Burns
Clemnsen University

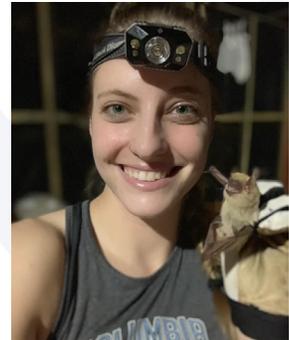


Board Member: Dr. Nate Fuller
Postdoctoral Research Associate
Texas Tech University



Student Board Member: Lexi Brown

Masters Student
Columbia University &
American Museum of
Natural History



And the Goodbyes...

Past Chair of the Board of Directors:

Dr. Al Kurta

Professor of Biology
Eastern Michigan University



Student Board Member:

Kristen Lear

PhD Student
University of Georgia





Summary by calendar year:

	2011	2012	2013	2014	2015	2016	2017
General Fund	\$16,439.71	\$73,573.59	\$72,824.22	\$89,163	\$97,440	\$95,371	\$135,404
Spallanzani Fund	\$12,215.18	\$9,106.44	\$5,502.87	\$9,524	\$9,490	\$10,612	\$9,748
Teacher's workshop	\$5,574.25	\$5,618.89	\$5,660.18	\$6,389	\$6,636	\$5,374	\$4,083
Koopman Fund	\$12,006.64	\$12,682.07	\$12,182.08	\$12,238	\$12,431	\$12,676	\$12,176
Bernardo Villa Fund	\$11,307.73	\$9,086.57	\$7,994.97	\$6,820	\$5,717	\$6,249	\$5,259
TOTAL NASBR FUNDS (Dec 31)	\$57,543.51	\$110,067.46	\$98,661.45	\$124,134	\$131,714	\$130,282	\$166,670

Current balance (as of 10/23/2018) is \$203,744 (funds for paying for the 2018 meeting transferred in, partly expended).

Invitation to Host The 52nd NASBR

2022 NASBR Meeting (West Region)

The North American Society for Bat Research invites bids for hosting the 2022 annual meeting of the society. Eligible states, provinces, and territories are those west of Ontario in Canada, US states west of the Mississippi (see map below). Intention to bid should be communicated to one of the Program Chairs as soon as possible. Program chairs will provide detailed advice on bid preparation. Bids must be submitted by August 1st to the Chair of the NASBR Board of Directors, Burton Lim. Support for locating suitable venues and obtaining hotel bids is available - contact Shahroukh Mistry (mistrysh@butte.edu). Additional information can be found on the website. The NASBR Board of Directors will evaluate bids and successful bids meeting the basic criteria of the society will be placed before the members of the society at the NASBR business meeting in Kalamazoo for a vote of member preference.



- Riley Bernard
Pennsylvania State University
Associate Program Director
- Alyson Brokaw*
Texas A&A University
Student Representative
- Lexi Brown*
Columbia University
Student Representative
- Leanne Burns*
Clemson University
Board Member
- Nate Fuller*
Texas Tech University
Board Member
- Erin Gillam*
North Dakota State University
Secretary, Spallanzani Chair, Auction Chair
- Gary Kwiecinski
University of Scranton
Program Director
- Burton Lim*
Royal Ontario Museum
Board Chair, Finance
- Liam McGuire*
Texas Tech University
Finance Chair, Policy & Public Relations
- Shahroukh Mistry
Butte College
Associate Program Director
- Joy O'Keefe*
Indiana State University
Sponsorship, Awards
- DeeAnn Reeder
Bucknell University
Treasurer
- Jorge Ortega Reyes
Instituto Politécnico Nacional
2018 Local Host
- Maria Sagot*
SUNY Oswego
Nominations Chair, Sponsorships
- Sharlene Santana*
University of Washington
Awards Chair
- Bill Schutt*
Long Island University & AMNH
Sponsorships Chair, Policy & Public Relations
- Luis Viquez
Instituto de Ecología, UNAM, México
Associate Program Director
- Emma Willcox
University of Tennessee
Associate Program Director, 2017 Co-host
- Heather York*
Buena Vista University
Education & Outreach Chair, Awards

* Denotes voting member

Lasiurus Editor
Design

Erin Gillam
Riley Bernard

www.nasbr.org

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