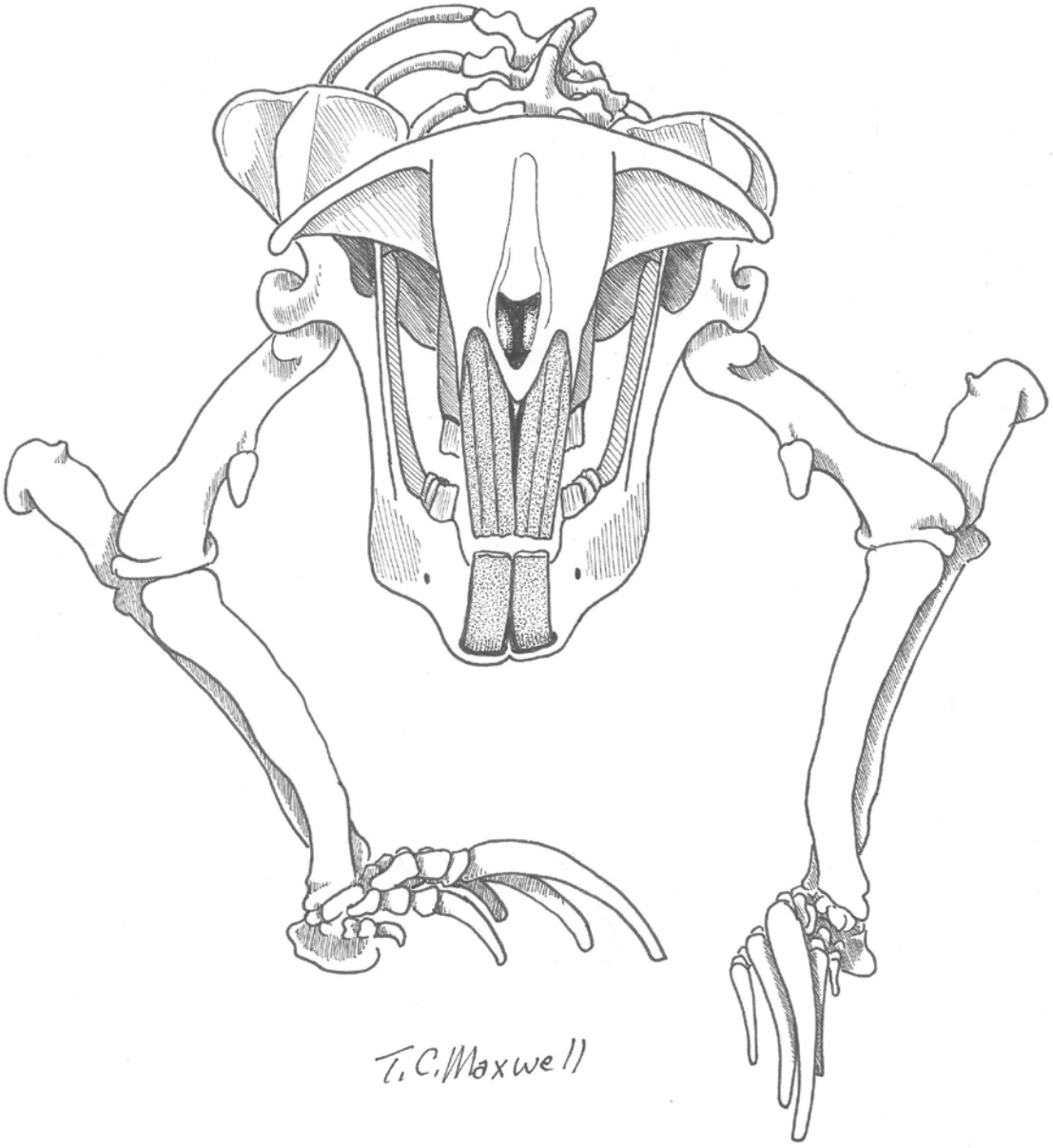
# TEXAS SOCIETY OF MAMMALOGISTS




## PROGRAM, ABSTRACTS, AND NEWSLETTER

34th Annual Meeting

12-14 February 2016

**Texas Tech University Center at Junction**

**#TSM2016**

# Texas Society of Mammalogists

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**Cover illustration of a gopher skeleton, by Terry Maxwell.**

# Texas Society of Mammalogists
# 34th Annual Meeting
# 12-14 February 2016

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## 2016 Program Schedule

**Friday, 12 February**

| | | |
|---|---|---|
| 3:00–7:30pm | Registration | Dining Hall |
| 6:00pm | Dinner (serving line open 6:00–6:30pm) | Dining Hall |
| 7:00pm | Announcements/Welcome Address<br>TSM President Monte Thies | Dining Hall |
| 7:30pm | Poster Presentations | Dining Hall |
| 8:30pm | Meeting of the Executive Committee | Packard Building |

**Saturday, 13 February**

| | | |
|---|---|---|
| 7:00am | Breakfast and Registration (serving line open 7:00-7:30am) | Dining Hall |
| 8:00am | Introduction and Announcements<br>TSM President Monte Thies | Dining Hall |

### PAPER SESSION – Dining Hall

(Presenters' names are underlined)

**Chair: Richard Stevens, Texas Tech University**

*Papers 1 – 11 are to be considered for the TSM Award.*

8:05 Paper 1 – **LANDSCAPE EFFECTS ON GENEFLOW OF PORCUPINES (*ERETHIZON DORSATUM*) ALONG TWO TEXAS PANHANDLE RIVER DRAINAGES** Erica D. Thomas and Rocky Ward[1], Department of Life Earth and Environmental Sciences, West Texas A&M University.

8:20 Paper 2 – **RECENT POPULATION EXPANSION IN *CALOMYS TENER* (RODENTIA: SIGMODONTINAE)** Narayan P. Kandel[1], Ulyses F. J. Pardiñas[2], Raul González-Ittig[3], Pablo Teta[5], Cibele R. Bonvicino[5,6] , and J. Salazar-Bravo[1], [1] Department of Biological Science, Texas Tech University, [2] Unidad de Investigación Diversidad, Sistemática y Evolución, Centro Nacional Patagónico, Argentina, [3] Instituto de Diversidad y Ecología Animal (CONICET-UNC), Argentina; Universidad Nacional de Córdoba, Argentina, [4] División Mastozoología, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Argentina, [5]Instituto Oswaldo Cruz, Rio de Janeiro, Brazil, [6] Instituto Nacional de Câncer, Rio de Janeiro, Brazil.

8:35 Paper 3 – **THE UTILITY OF ZONADHESIN IN EXAMINING A POTENTIAL REPRODUCTIVE ISOLATION MECHANISM IN RODENTS** Emma K. Roberts[1], Daniel M. Hardy[2], and Robert D. Bradley[1,3], [1]Department of Biological Sciences, Texas Tech University, [2]Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, [3]Natural Science Research Laboratory, Museum of Texas Tech University.

8:50 Paper 4 – **DIVERSITY OF MAJOR HISTOCOMPATIBILITY COMPLEX ALLELES WITHIN TEXAS OCELOT POPULATIONS** John P. Leonard[1], Michael E. Tewes[1], Randall W. DeYoung[1], Jan E. Janecka[2], Tyler A. Campbell[3], and Arturo Caso[1], [1]Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, [2] Bayer School of Natural and Environmental Sciences, Duquesne University, [3] East Foundation.

9:05 Paper 5 – **TIMING OF DIVERSIFICATION FOR NEOTROPICAL CRICETID RODENTS ACROSS ISTHMUS OF TEHUANTEPEC** Nicté Ordóñez-Garza[1], and Robert D. Bradley[1,2], Department of Biological Sciences, Texas Tech University, [2]Museum of Texas Tech University

9:20 Paper 6 – **ADDRESSING THE ADAPTIVE RADIATION IN *PEROMYSCUS* USING TRANSCRIPTOME DATA** Laramie L. Lindsey, Roy N. Platt, Caleb D. Phillips and Robert D. Bradley, Department of Biological Sciences, Texas Tech University.

9:35 **15 Minute Break**

**Chair: Chris Higgins, Tarleton State University**

9:50 Paper 7 – **TRANSPOSABLE ELEMENT ANNOTATION USING *DE NOVO* BASE REPEAT IDENTIFICATION** Laura Blanco-Berdugo, Roy N. Platt II, and David Ray, Department of Biological Science, Texas Tech University.

10:05 Paper 8 – **EXPLORING LINE RETROTRANSPOSON ACTIVITY IN SCIURIDS USING A NOVEL PHYLOGENOMIC METHOD** Sarah Mangum, Neal Platt, and David Ray, Department of Biological Sciences, Texas Tech University.

10:20 Paper 9 – **ASSESSING THE UTILITY OF MICROSATELLITE MARKERS IN IDENTIFYING *GEOMYS* SPECIES IN CENTRAL OKLAHOMA AND THE OKLAHOMA PANHANDLE** Cristina Coffman and Michelle L. Haynie, Department of Biology, University of Central Oklahoma.

10:35 Paper 10 – **A PHYLOGENETIC ANALYSIS OF FIFTEEN RODENT MITOCHONDRIAL GENOMES** Kevin A.M. Sullivan, Roy N. Platt, Robert D. Bradley, and David A. Ray, Department of Biology, Texas Tech University.

10:50 Paper 11 – **CHRONOBIOLOGY OF SYMPATRIC OCELOT AND BOBCAT (CARNIVORA: FELIDAE) IN SOUTH TEXAS** Justin P. Wied[1], Michael E. Tewes[1], John P. Leonard[1], Shelby Carter[1], Lauren D. Balderas[1], Arturo Caso[1], and Tyler A. Campbell[2], [1] Feline Research Program, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, [2] East Foundation.

*Papers 12 – 19 are to be considered for the William B. Davis Award.*

11:05 Paper 12 – **FEMALE MATING BEHAVIORS PREDICTED FROM ANATOMY IN DOLPHINS AND PORPOISES** Dara N. Orbach[1], William Keener[2], Angela Ziltener[3,4], Jessica Hillhouse[1] , and Bernd Würsig[1], [1]Department of Marine Biology, Texas A&M University at Galveston, [2]Golden Gate Cetacean Research, [3]Dolphin Watch Alliance, [4] Anthropological Institute and Museum, University of Zurich.

11:20 Paper 13 – **BIODIVERSITY OF THE SMALL MAMMALS IN TWO DIFFERENT HABITATS WITHIN THE DALQUEST DESERT RESEARCH STATION** Robert W. Stewart and Ray E. Willis, Department of Biology, Midwestern State University.

12:15 **Lunch** (serving line open 12:15–12:45pm)

1:15 **Group Photo** behind the Packard Building

**PAPER SESSION – Dining Hall**

**Chair: John Hanson, RTL Genomics, Lubbock**

1:45 Paper 14 – **DETANGLING EDGE EFFECTS: SMALL MAMMAL ABUNDANCE NOT DRIVEN BY LIANA PRESENCE IN A PANAMANIAN FOREST** Michaela K. Halsey[1,*], Thomas D. Lambert[1], Scott A. Mangan[2], Stefan A. Schnitzer[3], [1]Department of Biology, Frostburg State University, Frostburg, MD, [2]Department of Biology, Washington University in St. Louis, St. Louis, MO, [3]Department of Biological Sciences, Marquette University, Milwaukee, WI. *Present address: Department of Biological Sciences, Texas Tech University.

2:00 Paper 15 – **MERCURY CONTAMINATION IN BATS FROM THE CENTRAL UNITED STATES** Jennifer M. Korstian[1], Matthew M. Chumchal[1], Amanda M. Hale[1], [1]Biology Department, Texas Christian University.

2:15 Paper 16 – **SPATIAL NETWORK APPROACHES TO CHARACTERIZE METACOMMUNITY STRUCTURE OF NEOTROPICAL BATS IN COLOMBIA** Cristina Ríos-Blanco[1] and Richard D. Stevens[1,2], [1] Department of Natural Resource Management, Texas Tech University, [2] Museum of Texas Tech University.

2:30 Paper 17 – **INVESTIGATING VAGINAL CYTOLOGY AND PROGESTERONE METABOLITES OF SEBA'S SHORT-TAILED FRUIT BAT (*CAROLLIA PERSPICILLATA*) DURING REPRODUCTION** Erin E. Stukenholtz[1], Beverly S.

Chilton[2], Lisa A. Smith[3], Jairo Pérez-Torres[4], and Richard D. Stevens[1, 5], [1]Department of Natural Resources Management, Texas Tech University, [2]Department of Cell Biology and Biochemistry, Texas Tech University Health and Science, [3] Department of Pathology, Texas Tech University Health and Science, [4]Department of Biology, Unidad de Ecologia y Sistematica, Pontificia Universidad Javeriana, Bogota, Colombia, [5]Museum of Texas Tech University, Texas Tech University.

2:45 Paper 18 – **A MOLECULAR DIET ANALYSIS OF *PARASTRELLUS HESPERUS***. Krysta D. Demere and Loren K. Ammerman, Biology Department, Angelo State University.

3:00 Paper 19 – **IDENTIFYING AND CHARACTERIZING ROOSTS OF *LASIURUS EGA* AND *LASIURUS INTERMEDIUS*** P. Citlally Jimenez, Benjamin R. Skipper, and Loren K. Ammerman, Department of Biology, Angelo State University.

*Paper 20 is to be considered for the Bobby Baker Award.*

3:15 Paper 20 – **BAT INVASIONS OF THE HAWAIIAN ISLANDS** Ashlyn Holbert[1], John W. Bickham[2], and Amy B. Baird[1], [1]Department of Natural Sciences, University of Houston – Downtown, [2]Battelle Memorial Institute.

3:30 **15 Minute Break**

3:45pm **Business Meeting** Packard Building
All members, including students, please attend!

5:30–9:00pm **Annual Banquet and Auction** Dining Hall

*5:30–6:30* Dinner (serving line open 5:30–6:00pm)

*5:30* Silent Auction opens for bidding

*6:30–7:00* Award Presentations

*7:00–8:00* Guest Speaker Address:

# *Not Enough Skeletons*

## Dr. Christopher Bell

**University of Texas-Austin Jackson School of Geology**

*8:00–9:00* Live Auction
Silent Auction ends 10 minutes after Live Auction

9:00pm–? Socializing and Dancing Dining Hall

**Sunday, 14 February**

7:30am Breakfast (serving line open 7:30–8:00am) Dining Hall

## MENU

**Friday:**

**6:00 pm DINNER**
Baked pork chops (with BBQ sauce on side), fried okra, scalloped potatoes, salad bar, wheat dinner rolls, peach cobbler

**Saturday:**

**7:00 am BREAKFAST**
Breakfast tacos, hash browns, cinnamon rolls, assorted cereal and fruit

**9:35 am Coffee Break**
Coffee, tea, water, scones, muffins, granola bars, fruit

**12:15 LUNCH**
Empanadas, chicken crispitos, refried beans, Spanish rice, salad bar, tortillas, brownies

**3:30 Break**
Coffee, sodas, water, cookies, trail mix, fruit, cheese & crackers

**5:30 pm DINNER**
Chicken fried steak, roasted mashed potatoes, cream gravy, broccoli, salad bar, rolls, chocolate pie

**Sunday:**

**7:30 am BREAKFAST**
Scrambled eggs, breakfast ham, hash browns, scones, English muffins, assorted cereals and fruit

## Oral Presentation Abstracts

Paper 1

**LANDSCAPE EFFECTS ON GENEFLOW OF PORCUPINES (*ERETHIZON DORSATUM*) ALONG TWO TEXAS PANHANDLE RIVER DRAINAGES** Erica D. Thomas and Rocky Ward[1], Department of Life Earth and Environmental Sciences, West Texas A&M University. (edthomas1@buffs.wtamu.edu)

North American porcupines (*Erethizon dorsatum*) in the Great Plains region of North America are relatively unstudied. Information specific to this geographic area will aid in management and to the overall understanding of the porcupine in Texas. The objective of this study is to determine how landscape influences genetic subdivision and gene flow of porcupines along the Canadian River and Red River drainages in the Texas panhandle. Male versus female movements along these drainages is a point of interest within this study. The identification of spatial genetic patterns requires the collection of genetic data from many individuals whose exact geographical location is known. At present, 86 individual (1 male and 85 female) tissue samples (quill, muscle, and/or fecal material) have been collected from both live-trapped animals and vehicular mortalities. Genomic DNA was extracted using the DNeasy® Blood & Tissue Kit: Spin-Column Protocol and PCR amplified with 19 microsatellite loci. We utilized individual-based analyses to estimate population structure and gene flow within each river drainage and to determine the degree to which porcupines inhabiting the two drainages are genetically isolated.

Paper 2

**RECENT POPULATION EXPANSION IN *CALOMYS TENER* (RODENTIA: SIGMODONTINAE)** Narayan P. Kandel[1], Ulyses F. J. Pardiñas[2], Raul González-Ittig[3], Pablo Teta[5], Cibele R. Bonvicino[5,6], and J. Salazar-Bravo[1], [1] Department of Biological Science, Texas Tech University, [2] Unidad de Investigación Diversidad, Sistemática y Evolución, Centro Nacional Patagónico, Argentina, [3] Instituto de Diversidad y Ecología Animal (CONICET-UNC), Argentina; Universidad Nacional de Córdoba, Argentina, [4] División Mastozoología, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Argentina, [5]Instituto Oswaldo Cruz, Rio de Janeiro, Brazil, [6] Instituto Nacional de Câncer, Rio de Janeiro, Brazil. (narayan.kandel@ttu.edu)

*Calomys tener* ranges broadly in the planalto of central Brazil and eastern Bolivia and has recently been reported from Paraguay, Argentina, and southeastern Brazil. It is unknown whether or not the species is expanding into new regions, maybe as a result of the expansion of the agricultural frontier, or if these new records correspond to geographic locations not previously sampled. In this study, we obtained sequence data for 30 samples of *Calomys tener* from different geographical localities from throughout the currently known distribution of the species to test for the signature of recent population expansion. We found a high diversity of haplotypes, which in combination with summary statistics, results of AMOVA, mismatch distribution, and BSP, support the hypothesis of a recent and/or ongoing population expansion in *C. tener*. Since, it is known that this species serves as a reservoir of the pathogenic Araraquara Hantavirus in Brazil, there is a possibility that the virus may be dispersing to new areas and into other countries of South America.

Paper 3

**THE UTILITY OF ZONADHESIN IN EXAMINING A POTENTIAL REPRODUCTIVE ISOLATION MECHANISM IN RODENTS** Emma K. Roberts[1], Daniel M. Hardy[2], and Robert D. Bradley[1,3], [1]Department of Biological Sciences, Texas Tech University, [2]Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, [3]Natural Science Research Laboratory, Museum of Texas Tech University. (emma.k.roberts@ttu.edu)

Species-specificity in mammals is crucial to maintain reproductive isolation boundaries and prevent interbreeding and dilution of the gene pool. It has been hypothesized that gamete recognition (sperm/egg compatibility) is one of the first steps in establishing post-mating isolating mechanisms. Gamete recognition is a known prezygotic isolation mechanism in certain invertebrates, but its significance in vertebrates, such as mammals, is not well established. One of the proteins crucial in this process is referred to as zonadhesin (ZAN), a rapidly evolving, sperm protein that mediates species-specific adhesion to the egg's zona pellucida. It has been suggested that the evolution of ZAN correlates with reproductive isolation in mammals and is an adaptive gene found only in certain internally fertilizing mammals. In addition, it has been concluded that intra-species differences are known to exist in human and pig ZAN and might be under strong selective pressures, and thus, evolution of those alternative transcripts of the gene might contribute to the process of speciation. Therefore, by examining the protein-coding sequence of ZAN between and within species, both closely and distantly related, we can determine the level of variability and conservation of the gene and further establish if the subsequent protein is acting as a reproductive isolation barrier. To address this question, we examined genetic variability in multiple species of *Peromyscus* in order to assess the extent of sequence variation across a 400 bp region of the gene. Currently, we are sequencing 4 species of *Peromyscus* to establish baseline variation of ZAN.

Paper 4

**DIVERSITY OF MAJOR HISTOCOMPATIBILITY COMPLEX ALLELES WITHIN TEXAS OCELOT POPULATIONS** John P. Leonard[1], Michael E. Tewes[1], Randall W. DeYoung[1], Jan E. Janecka[2], Tyler A. Campbell[3], and Arturo Caso[1], [1]Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, [2] Bayer School of Natural and Environmental Sciences, Duquesne University, [3] East Foundation. (john.leonard@students.tamuk.edu)

The ocelot, *Leopardus pardalis,* is an endangered felid whose range in the United States is restricted to 2 isolated breeding populations in southern Texas, both having experienced recent declines in genetic variation. Previous studies of ocelots have used neutral markers, which provide only a surrogate for adaptive variation. To better assess the genetic health of these populations and advise future translocation efforts, an examination of functional genetic variation is also necessary. The major histocompatibility complex (MHC) is a genomic region that codes for antigen-presenting molecules that play an integral role in the immune response. High allelic diversity at MHC loci confers disease resistance to animal populations by allowing a wide range of antigens to be presented to the immune system. Our goals were to compare changes in MHC allele frequencies over time between ocelot populations in Texas and Mexico, test for the presence of selection on MHC alleles, and determine if alleles have been lost over time due to inbreeding and genetic drift. We amplified exon 2 of the MHC DRB locus for 53

ocelots from both Texas populations and from Tamaulipas, Mexico, and obtained nucleotide sequences using the Illumina platform. We identified 16 alleles, 6 of which had not been previously described in ocelots. Antigen-binding sites showed high dN/dS ratios, indicating a high posterior probability of positive selection. We found between 1 and 3 private alleles per population, suggesting that translocations between populations might be necessary to maintain MHC variation within Texas ocelot populations.

Paper 5

**TIMING OF DIVERSIFICATION FOR NEOTROPICAL CRICETID RODENTS ACROSS ISTHMUS OF TEHUANTEPEC** Nicté Ordóñez-Garza[1], and Robert D. Bradley[1,2], Department of Biological Sciences, Texas Tech University, [2]Museum of Texas Tech University. (nicte.ordonez-garza@ttu.edu)

Mesoamerica has a complex geologic and climatic history resulting in a varied topography over a relatively small geographic area. This scenario provides an opportunity for the evolution of a diverse vertebrate fauna, including several endemic mammals. Several studies of vertebrates in this region, indicated that taxa distributed across the Isthmus of Tehuantepec (IT) evolved into different taxonomic units due to the disjunction of the mountain systems in Mesoamerica. Recent studies described the geological development of the region, however, the impacts of these historical events on the diversification of montane mammals remains uncertain. To understand the origin of the montane cricetid rodents distributed in the highlands of Mesoamerica, this study incorporated phylogenetic analyses of DNA sequences from the mitochondrial cytochrome-*b* (*Cyt*b) gene. Phylogenetic analyses were then used to test the hypothesis of simultaneous intraspecific divergence of populations from 10 species whose distributions span the montane forests of Mesoamerica. Divergence times estimated between populations located NW and SE of IT indicated that isolation occurred mostly during the Pleistocene. The analyses provided evidence that temporal and a geographical patterns of divergence are not shared among multiple co-distributed rodent taxa in Mesoamerica. The resulting independent chronologies indicated that the IT did not form an effective vicariance barrier for the diversification of cricetid species distributed across Mesoamerica; instead it appears that climatic changes during the last 2 million years may be responsible for the diversification patterns.

Paper 6

**ADDRESSING THE ADAPTIVE RADIATION IN *PEROMYSCUS* USING TRANSCRIPTOME DATA** Laramie L. Lindsey, Roy N. Platt, Caleb D. Phillips and Robert D. Bradley, Department of Biological Sciences, Texas Tech University. (laramie.lindsey@ttu.edu)

Adaptive radiations are described by the origin of multiple new species over a short period of time. These new species are often cryptic, with little or no morphological variation and often display low levels of sequence divergence as measured by comparison of mitochondrial and nuclear genes. The genus *Peromyscus* represents such a scenario with approximately 70+ species arising in the last 5-6my. Over the years, evolutionary biologists and systematists have attempted to resolve species boundaries of *Peromyscus* through morphological and genetic analyses. However, the proposed evolutionary tree still contains unresolved relationships within Peromyscine subclades, reflecting the rapidly radiating characteristic of *Peromyscus*. Advances

in sequencing through-put and computational biology have provided biologists the opportunity to utilize more comprehensive datasets including genomic, transcriptomic, and whole exome approaches. Based on karyotypic convergence, we hypothesize that a suite of genes was repeatedly selected during the rapid radiation that resulted in the numerous species of *Peromyscus*. The rapid divergence of *Peromyscus* suggests a role for selection of genes involved in reproductive isolation in the evolution of extant lineages. For this study, liver and testes transcriptomes of four taxa within *Peromyscus* were analyzed. To identify genes with putative testes-specific functions, transcriptomes were compared to determine if genes or suites of genes exhibited differential expression levels in testes versus liver transcriptomes. Preliminary results suggest that all testes transcriptomes for the four species expressed higher levels of similar genes when compared to liver transcriptomes. Further analyses of these data will determine what genes are differentially expressed among testes samples to identify which genes are subjected to directional selection in independent *Peromyscus* lineages.

Paper 7

**TRANSPOSABLE ELEMENT ANNOTATION USING *DE NOVO* BASE REPEAT IDENTIFICATION** Laura Blanco-Berdugo, Roy N. Platt II, and David Ray, Department of Biological Science, Texas Tech University. (laura.blanco-berdugo@ttu.edu)

Transposable elements (TEs) are genetic elements that have the ability to replicate and relocate themselves around the host genome. The number of reference genomes has increased at a faster rate than the effort to annotate transposable elements from non-model species, methods of identification of these elements vary significantly from project to project, increasing the variation in TE annotation when less than optimal methods are used. It was found that across a variety of taxa, it becomes more difficult to identify TEs based only on homology as the phylogenetic distance between the queried genome and the reference genome increased. We annotated the repeats using both homology alone, as it is usually done with new genome analyses, and a combination of homology and the *de novo* methods as well as an additional manual curation step. The used of this methods showed a substantial number of new TE subfamilies in genomes that were previously characterized, recognized a higher proportion of the genome as repetitive, and decreased the average genetic distance within TE families, implying recent TE accumulation. Lastly, the findings were confirmed via analysis of the postman butterfly (*Heliconius Melpomene).* These observations imply that complete TE annotation relies on a combination of homology and *de novo* base repeat identification, manual curation and classification and that relying on simple, homology-based methods is insufficient to accurately describe the TE landscape of newly sequenced genome.

Paper 8

**EXPLORING LINE RETROTRANSPOSON ACTIVITY IN SCIURIDS USING A NOVEL PHYLOGENOMIC METHOD** Sarah Mangum, Neal Platt, and David Ray, Department of Biological Sciences, Texas Tech University. (sarah.mangum@ttu.edu)

Transposable elements (TEs) are selfish genetic elements capable of mobilizing in a genome. In most mammals, TEs occupy more than half of the genome. LINEs and SINEs are often the dominant active TE in mammalian genomes. Previous bioinformatic analyses identified reduced activity from the LINE-1 (L1) lineage in the genome of the thirteen-lined ground squirrel,

*Ictidomys tridecemlineatus* (formerly known as *Spermophilus tridecemlineatus*). According to the analyses, the reduction in L1 activity began 19-25 million years ago and all signs of activity ceased ~ 5 million years ago. LINE extinction events are rare in mammals with only four identified occurrences thus far. If verified, over one hundred sciurid species may have evolved under reduced or extinct L1 loads, an observation that would significantly alter our understanding of mammalian genomics. This study utilizes a high-throughput sequencing technique to investigate *Ictidomys* L1 extinction in the context of the broader sciurid phylogeny. Using degenerate L1 primers, ~450bp fragments from ORF2, reverse transcriptase, were amplified and sequenced for fourteen representative taxa. From the millions of resulting reads, L1 activity across and beyond the sciurid phylogeny was quantified using various distance and phylogenetic methods. Initial findings suggest that the L1 extinction in *I. tridecemlineatus* may not have been as extreme as previously thought.

Paper 9

**ASSESSING THE UTILITY OF MICROSATELLITE MARKERS IN IDENTIFYING *GEOMYS* SPECIES IN CENTRAL OKLAHOMA AND THE OKLAHOMA PANHANDLE** Cristina Coffman and Michelle L. Haynie, Department of Biology, University of Central Oklahoma. (ccoffman5@uco.edu)

The goal of this project is to utilize genetic markers to address questions concerning the distribution of members of the genus *Geomys* (pocket gophers) found in Oklahoma. Specifically, what are the distribution boundaries of *G. bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher) in Central Oklahoma and does *G. jugossicularis* occur in the Oklahoma panhandle? A boundary between *G. bursarius* and *G. breviceps* in central Oklahoma was proposed based on morphological data of cranial measurements. Additionally, a contact zone between the 2 species was identified in Norman, Oklahoma. Recent research has suggested that a third species, *G. jugossicularis*, occurs in the Oklahoma panhandle. Genetic data will be used to reassess both the proposed boundary line and the known contact zone, as well as to confirm the identity of samples collected in the panhandle. We used 9 microsatellite markers to analyze specimens from central Oklahoma and the panhandle to assess the utility of these markers to identify unique genetic clusters. Genetic data obtained from specimens collected in central Oklahoma and the panhandle will be compared to samples collected from within the well-defined ranges of the 2 species (western Oklahoma excluding the panhandle – *G. bursarius*; southeastern Oklahoma –*G. breviceps*) to ensure correct genetic identification and to account for the possibility of hybridization between the 2 species. Preliminary data has identified 3 distinct clusters of pocket gophers found in Oklahoma, 2 in central Oklahoma and a 3$^{rd}$ in the panhandle. Admixture between the 2 clusters in central Oklahoma suggests the possibility of hybridization between *G. bursarius* and *G. breviceps* in this region. Future research will include further evaluation of the microsatellite data as well as analyzing mitochondrial and Y chromosome sequences.

Paper 10

**A PHYLOGENETIC ANALYSIS OF FIFTEEN RODENT MITOCHONDRIAL GENOMES** Kevin A.M. Sullivan, Roy N. Platt, Robert D. Bradley, and David A. Ray, Department of Biology, Texas Tech University. (kev.am.sullivan@gmail.com)

Mitochondrial markers have been an important data source in the study of *Peromyscus* phylogenetics. All current phylogenies are all based in part, on mitochondrial data. The question of, "What is *Peromyscus*?" remains in an open topic of discussion, as there are three contrasting hypotheses for the genus' phylogeny. Current phylogenies lack support at nodes reflecting critical points in the *Peromyscus* radiation. The addition of more sequence data may be capable of providing resolution where other markers have failed. Here, we present fifteen rodent mitochondrial genomes, all of which exhibit archetypal gene composition and synteny. In addition to providing valued molecular data, they allow us to undergo a phylogenetic analysis of the genus with the largest data source to date. Bayesian and maximum likelihood trees, along with a *cytb* tree to compare with previous phylogenies, were generated utilizing a GTR + I + G model.

Paper 11

**CHRONOBIOLOGY OF SYMPATRIC OCELOT AND BOBCAT (CARNIVORA: FELIDAE) IN SOUTH TEXAS** Justin P. Wied[1], Michael E. Tewes[1], John P. Leonard[1], Shelby Carter[1], Lauren D. Balderas[1], Arturo Caso[1], and Tyler A. Campbell[2], [1] Feline Research Program, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, [2] East Foundation. (justin.wied@students.tamuk.edu)

The composition of an ecological guild depends on individual species separating into niches based on habitat, diet, and activity patterns. Ocelot (*Leopardus pardalis*) and bobcat (*Lynx rufus*) are sympatric in their distribution in the Rio Grande Valley of southern Texas. Studies on activity patterns have not been undertaken on either felid in this location. From 2011-2015, remote cameras were placed on the East Wildlife Foundation El Sauz Ranch. Photographs from these cameras indicate date and time of capture, and they are sorted by identifying individuals using unique spot and coat patterns. Our objective is to describe the effect of environmental cues on activity patterns of the two felids. Additionally, we will determine overlap of activity between species and the activity of ocelot and bobcat in relation to time of day, lunar phase, and percent moon illumination. This information can be used to understand how these two species temporally compete for resources through time.

Paper 12

**FEMALE MATING BEHAVIORS PREDICTED FROM ANATOMY IN DOLPHINS AND PORPOISES** Dara N. Orbach[1], William Keener[2], Angela Ziltener[3,4], Jessica Hillhouse[1] , and Bernd Würsig[1], [1]Department of Marine Biology, Texas A&M University at Galveston, [2]Golden Gate Cetacean Research, [3]Dolphin Watch Alliance, [4] Anthropological Institute and Museum, University of Zurich. (orbachd@tamug.edu)

There are few places in the world where whales, dolphins, and porpoises can be observed regularly mating under natural conditions. In the absence of direct observations, male reproductive anatomy is often used to infer male mating tactics while female mating tactics remain poorly understood. We address the knowledge gap and predict female investments in pre-copulatory mating behaviors using reproductive morphology measurements. An inverse relationship was predicted between relative testes size/vaginal complexity and female mating behavior repertoire size and intensity. Our model was empirically tested using video recordings of mating bottlenose dolphins (*Tursiops aduncus*) in the Red Sea, Egypt, dusky dolphins

(*Lagenorhynchus obscurus*) off Kaikoura, New Zealand, and harbor porpoises (*Phocoena phocoena*) in San Francisco Bay, USA. Males engage in contest, scramble, and sperm competition, respectively, in these species. Consistent with comparative anatomy predictions, female harbor porpoises had the smallest mating behavior repertoire size ($N_{groups}$= 22, $N_{behavior\ types}$ = 4). Female dusky dolphins ($N_{groups}$= 49) and bottlenose dolphins ($N_{groups}$ = 18) had the same repertoire size ($N_{behavior\ types}$ = 6) despite predictions that bottlenose dolphins would display more types of behaviors. While female harbor porpoises and dusky dolphins displayed more high than low intensity behaviors, female bottlenose dolphins displayed more low intensity behaviors. Female bottlenose dolphins may be more passive than predicted during mating chases because of potential high costs of received injury in the context of male contest competition. Sexual coercion by males may constrain females in mate choice, and other subtle techniques may be used to influence paternity. The range and intensity of females' mating behaviors could also reflect maturity/experience, co-vary with male range and intensity of mating behaviors, or change with group size. We demonstrate that anatomical data can advance the knowledge of female mating tactics in toothed whales, with broad taxonomic applications.

Paper 13

**BIODIVERSITY OF THE SMALL MAMMALS IN TWO DIFFERENT HABITATS WITHIN THE DALQUEST DESERT RESEARCH STATION** Robert W. Stewart and Ray E. Willis, Department of Biology, Midwestern State University. (rws0080@gmail.com)

The Dalquest Desert Research Station is a 1214-hectare property belonging to Midwestern State University. The property is situated in the heart of Trans-Pecos Texas and encompasses a unique set of Chihuahuan desert environmental characteristics. The western third of the property is typical of the Bandera Mesa with rolling hills, arroyos, and rocky outcrops all covered with *Larrea tridentate*, *Prosopis glandulosa*, *Acacia* spp., *Fouquieria splendens*, *Agave lechuguilla*, *Yucca* spp., and Cactaceae among other vegetation. The western two thirds of the property drop off into a system of canyons that provide a diverse and unique set of environments. These include thick *Salix* spp., *Prosopis glandulosa*, and *Acacia* spp. thickets, vernal pools and riparian waterways, year-round springs, heavy river stone gravel, and sandy creosote bush flats. These environments provide a rich and varied set of food and shelter for rodents over the entire property. Sherman live traps are being used to conduct a baseline presence-absence survey in conjunction with a biodiversity comparison of the rodents in the canyon habitat and mesa habitat. A total of 4230 trap nights were conducted between June 2013 and June 2015. Ten species have been sight identified, or captured and identified, with noticeable differences of community diversity between the two designated habitats. A small sample of the *Perognathus* is being genetically tested to determine the possible presence of both *P. flavus* and *P. merriami*.

Paper 14

**DETANGLING EDGE EFFECTS: SMALL MAMMAL ABUNDANCE NOT DRIVEN BY LIANA PRESENCE IN A PANAMANIAN FOREST** Michaela K. Halsey[1,*], Thomas D. Lambert[1], Scott A. Mangan[2], Stefan A. Schnitzer[3], [1]Department of Biology, Frostburg State University, Frostburg, MD, [2]Department of Biology, Washington University in St. Louis, St. Louis, MO, [3]Department of Biological Sciences, Marquette University, Milwaukee, WI. *Present address: Department of Biological Sciences, Texas Tech University. (michaela.k.halsey@gmail.com)

Small mammal abundance has been shown to correlate positively with liana abundance in tropical forests. Lianas provide three main resources for small mammals: as conduits for traveling through the forest, as cover structures along the ground and in gaps, and as a food resource. When hyperabundant, small mammals can suppress tree recruitment, thus negatively impacting forest regeneration. Here we examined whether the established relationship between small mammal abundance and lianas is causal or merely correlative. On Gigante Peninsula, part of the Barro Colorado Nature Monument in Central Panama, 16 liana plots were established in 2010. In March 2011, lianas were cut and left to decay in 8 randomly selected plots. We live-trapped 345 individuals from 10 different species across six censuses in these plots. To determine the effects of the liana removal, we conducted a profile analysis on each of the three most abundant species: *Proechimys semispinosus*, *Marmosa robinsoni,* and *Didelphis marsupialis.* Initially, captures of terrestrial small mammals in liana removal plots were lower than captures in control plots, but as dead lianas fell from trees, terrestrial small mammal abundance in removal plots became greater than in control plots. Captures of arboreal and scansorial species did not decline in liana removal plots as anticipated. Arboreal species (ex. *Marmosa*) may not be as dependent on lianas to move through the forest, and scansorial species (ex. *Didelphis*) simply may have not responded to the removal. We concluded that lianas are not the primary driver of small mammal increases in disturbed tropical habitat. However, liana presence adds structural complexity to a forest, thereby attracting terrestrial small mammals. Even so, this increase in small mammals could lead to the suppression of forest regeneration and the subsequent loss of biodiversity in the tropics.

Paper 15

**MERCURY CONTAMINATION IN BATS FROM THE CENTRAL UNITED STATES**

Jennifer M. Korstian[1], Matthew M. Chumchal[1], Amanda M. Hale[1], [1]Biology Department, Texas Christian University. (j.korstian@ttu.edu)

Mercury (Hg) is a highly toxic metal that has detrimental effects on wildlife; however, most studies on Hg accumulation have focused on aquatic food chains. We surveyed Hg concentration in ten species of insectivorous bats and found contamination in all species. Hg contamination varied by species and by age; generally, the lowest concentrations were found in highly migratory species and juveniles. We examined samples from Minnesota and Texas and despite the >1200 km between sites, we found little evidence supporting regional variation in Hg concentration between these locations. Mercury concentrations observed in most of the bats were well below levels known to cause lethal effects; however, the non-lethal effects of lower concentrations of Hg in birds and mammals have not been well studied. Additional research is needed to understand the impact of the levels of Hg observed in the present study and how it may interact with other threats to negatively influence bat survival. Given the ubiquitous nature of Hg in the environment and the results of the present study, we hypothesize that all bats have the potential to become contaminated with Hg and that the impact of Hg contamination in terrestrial vertebrates warrants further study.

Paper 16

**SPATIAL NETWORK APPROACHES TO CHARACTERIZE METACOMMUNITY STRUCTURE OF NEOTROPICAL BATS IN COLOMBIA** Cristina Ríos-Blanco[1] and

Richard D. Stevens[1,2], [1] Department of Natural Resource Management, Texas Tech University, [2] Museum of Texas Tech University. (cristina.rios-blanco@ttu.edu)

How species assemble into communities depends on environmental factors, biotic interactions and species dispersal abilities. The recently developed metacommunity paradigm explicitly incorporates dispersal into community analyses and suggests that movement of individuals among sites is an important determinant of spatial variation in species composition at regional scales. Typically, spatial proximity is used as a proxy for dispersal; however, such measures do not provide estimates of variability of species dispersal abilities. As a result, traditional approaches have provided limited understanding of how dispersal influences metacommunity structure. A network approach may be better to assess dispersal and its implications to metacommunity patterns. In a metacommunity network, nodes represent sites, and links represent a measure of the strength of dispersal among sites. A common characteristic of metacommunities is that they often times are composed of compartments (i.e. sites with similar species composition and distinct from other groups of sites). If compartments are real, they will correspond to modules (i.e., group of sites with more connections among themselves than with other sites) in a network framework. We examined modular network structure and evaluated whether these modules correspond to elevation or land cover characteristics. We used a network framework to evaluate spatial variation in species composition of a metacommunity from the Colombian Coffee-growing ecoregion. We used georeferenced records from museum specimens and land cover data within the region to determine environmental characteristics of sites. We assessed modularity with an agglomerative hierarchical clustering analysis and results were related to each site elevation and land cover attributes of each site. Determining how these communities are clustered and which environmental characteristic most corresponds to clusters will help to elucidate the mechanistic determinants governing metacommunity assembly, such as dispersal potential, physiological constraints, or habitat selection.

Paper 17

**INVESTIGATING VAGINAL CYTOLOGY AND PROGESTERONE METABOLITES OF SEBA'S SHORT-TAILED FRUIT BAT (*CAROLLIA PERSPICILLATA*) DURING REPRODUCTION** Erin E. Stukenholtz[1], Beverly S. Chilton[2], Lisa A. Smith[3], Jairo Pérez-Torres[4], and Richard D. Stevens[1, 5], [1]Department of Natural Resources Management, Texas Tech University, [2]Department of Cell Biology and Biochemistry, Texas Tech University Health and Science, [3] Department of Pathology, Texas Tech University Health and Science, [4]Department of Biology, Unidad de Ecologia y Sistematica, Pontificia Universidad Javeriana, Bogota, Colombia, [5]Museum of Texas Tech University, Texas Tech University. (erin.stukenholtz@ttu.edu)

An important aspect of conserving wildlife is understanding reproductive characteristics of species. Analyzing reproductive hormones gives a researcher insight into how environmental stressors and triggers (temperature, rainfall, food abundance, and photoperiodism) influence reproductive patterns. Yet, due to high price and difficulties obtaining and preserving biological samples, reproductive endocrinology remains poorly studied in most species. This study is one of the first to diagnose different reproductive stages in Seba's short-tailed fruit bats (*Carollia perspicillata*). We recorded changes in vaginal cytology and progesterone concentrations during estrus, metestrus, incipient pregnancy, gestation, onset of parturition, and lactation. We collected 400 vaginal smears and 300 fecal samples, and examined 70 females for the presence of a fetus

or embryo throughout the reproductive season. Cell counts (superficial, intermediate, and parabasal cells) were made using vaginal smears stained with a hematoxylin procedure. Progesterone levels were analyzed from fecal samples using an ELISA immunoassay kit, and correlated with fetus size. The predicted outcomes for this study are: (1) vaginal cells of females in metestrus and pregnancy will be dominated by intermediate cells, but females in metestrus will have a high percentage of superficial cells compared to parabasal cells, and vice versa for pregnant females, (2) superficial cells will increase close to parturition due to an increase in the estrogen to progesterone ratio, and (3) progesterone will increase throughout gestation until parturition. By diagnosing different stages, we increase our understanding of the intricacies of bat reproduction, in a group of mammals that is greatly under researched in terms of vaginal cytology and reproductive endocrinology.

Paper 18

**A MOLECULAR DIET ANALYSIS OF *PARASTRELLUS HESPERUS***. Krysta D. Demere and Loren K. Ammerman, Biology Department, Angelo State University. (kdemere2@angelo.edu)

The documented diet of *Parastrellus hesperus* is largely based on a single conventional identification effort that identifies eight orders and twenty-three families of prey items including caddis flies, stoneflies, moths, small beetles and flies. Using recent molecular methods to screen fecal pellets, there is the potential to expand our knowledge of the diet of this species. Therefore, the objective of this study was to determine the diet of *P. hesperus* using molecular analysis methods. We captured bats from May 2015 through July 2015 over nine nights in Big Bend National Park for a total 68 net hours. Guano pellets from 149 parastrelles (49 reproductive adult females, one non-reproductive adult female, 47 non-reproductive adult males, 33 juvenile females, and 19 juvenile males) were collected. Fecal samples from 22 individuals were selected for initial analysis and DNA was extracted using the QIAamp DNA Stool Mini Kit. A fragment of the cytochrome c oxidase gene (COI) was sequenced using an Illumina MiSeq platform from the DNA extracted from the fecal pellets of each individual. Preliminary results identified 123 unique COI sequences of prey species from two phyla, three classes, eleven orders, and sixty-eight families of arthropods. Among these sequences, seven orders, and fifty-seven families are newly identified prey species. Additional samples will be processed to evaluate potential ontogenetic dietary shifts as well as shifts in consumption during various reproductive conditions.

Paper 19

**IDENTIFYING AND CHARACTERIZING ROOSTS OF *LASIURUS EGA* AND *LASIURUS INTERMEDIUS*** P. Citlally Jimenez, Benjamin R. Skipper, and Loren K. Ammerman, Department of Biology, Angelo State University. (pjimenez1@angelo.edu)

Roosting habits of several North American lasiurines (*Lasiurus seminolus*, *L. borealis*, and *L. cinereus*) have been well studied, but those of *L. ega* and *L. intermedius* are poorly known. Previous research has shown *L. ega* to roost in the dead fronds of native palms [*Sabal texana* (*mexicana*)], and non-native palms (e.g., *Washingtonia robusta*). Roost use by *L. intermedius* is thought to be similar to *L. ega* with the addition of Spanish moss (*Tillandsia* spp.) as a roosting substrate. Quantitative assessments of roosting substrates, however, are lacking. Our objective

was to identify and quantitatively characterize the roost palms of *L. ega* and *L. intermedius* at Sabal Palm Sanctuary in Brownsville, Texas. Through radio-telemetry from May – November of 2015, we located a total of 20 *Sabal texana* roost palms used by 9 yellow bats (6 *L. ega* tracked to 16 roosts, and 3 *L. intermedius* tracked to 6 roosts). Two roosts were occupied by both species but on different dates. On average, *L. ega* individuals were tracked for 3.3 days (range 1-5), and *L. intermedius* were tracked for an average of 3.5 days (range 1-4). The number of different roosts used by each bat ranged from 1 to 5 (average of 2.75). We found no difference between roost characteristics of *L. ega* and *L. intermedius*, therefore characteristics were combined in subsequent analyses. Comparison of characteristics of roost palms (n=20) and randomly selected palms showed that yellow bats were found in sabal palms that were more cluttered, had a thicker frond skirt, and were narrower in width than randomly selected sabal palms. Most roost palms (n=20) were located within 25m from a netting site or a water source. Our results will aid in managing existing and future palm stands to provide roosting habitat for these yellow bats.

Paper 20

**BAT INVASIONS OF THE HAWAIIAN ISLANDS** Ashlyn Holbert[1], John W. Bickham[2], and Amy B. Baird[1], [1]Department of Natural Sciences, University of Houston – Downtown, [2]Battelle Memorial Institute. (ashlynholbert@angelo.edu)

The only native land mammals on the Hawaiian Islands are two species of hoary bats in the tribe Lasiurini (*Aeorestes cinereus* and *A. semotus*). Their unique ability to invade and successfully colonize the Hawaiian Islands makes them an integral part of the Hawaiian fauna. In order to properly conserve these species, it is important to have a solid understanding of their relationships and evolutionary history, including determining when they arrived on the Islands. Two recently published studies used different methods and genetic markers to estimate the timing of colonization of the Hawaiian Islands, and disagreed in their estimates by two orders of magnitude. Here, we aim to resolve the discrepancy between these studies by increasing the molecular data available. We studied the phylogenetic relationships of bats in the tribe Lasiurini using mitochondrial and nuclear genes to determine the time at which the Hawaiian Islands were colonized. We sequenced CHY, RAG2 (nuclear) and COI (mitochondrial) genes and compared the data to previously published mitochondrial and Y-chromosome markers. We added samples from the islands of Hawaii and Maui, as well as samples of *A. cinereus* from North America, and additional representatives of red (genus *Lasiurus*) and yellow (genus *Dasypterus*) bats for comparison.

## POSTERS AT-A-GLANCE

1 - PREDICTING THE CONTEMPORARY DISTRIBUTION OF A RARE KANGAROO RAT (*DIPODOMYS ELATOR*) USING HISTORICAL OCCURRENCE DATA AND PRESENT-DAY HABITAT SURVEYS
John Stuhler

2 - ASSESSING THE FEASIBILITY OF USING NABAT MONITORING PROTOCOL TO CHARACTERIZE BAT ASSEMBLAGES ACROSS TEXAS
Jenna R. Jensen

3 - DIVERSITY OF THE ORDER CHIROPTERA AND THEIR ECTOPARASITES WITHIN THE DALQUEST DESERT RESEARCH STATION (PRESIDIO AND BREWSTER CO., TEXAS)
Matthew R. Fox

4 - ENDOPARASITE COMPARISONS AMONG TEXAS POCKET GOPHER SPECIES (GENUS *GEOMYS*)
Kaitlynn M. LeBrasseur

5 - MATING INTERACTIONS OF INDO-PACIFIC BOTTLENOSE DOLPHINS (*TURSIOPS ADUNCUS*)
Jessica Hillhouse

6 - MAMMAL BIODIVERSITY SURVEY OF ROLLING N LLP PROPERITES, RUNNELS COUNTY, TEXAS
Darby R. Thornton

7 - AN ANALYSIS OF THE EFFECTS OF BIOMETEOROLOGY ON RED WOLF (*CANIS RUFUS*) AND GREY WOLF (*CANIS LUPUS*) SCENT-MARKING BEHAVIOR
Hannah M. Jones

8 - RELATIONSHIPS BETWEEN SMALL MAMMAL ASSEMBLAGES AND LAND MANAGEMENT IN THE SOUTHEASTERN ROLLING PLAINS
Reece C. Wells and Daisy Gomez

9 - ABUNDANCE AND OCCUPANCY PATTERNS OF OCELOT AND BOBCAT IN SOUTH TEXAS
Shelby B. Carter

10 - EXECUTIVE FUNCTION ASSESSMENT USING AN APPARATUS DESIGNED TO EXAMINE VISUAL AND MOTOR COORDINATION IN COMMON MARMOSETS (*CALLITHRIX JACCHUS*)
Alexander Greig

11 - FETAL GROWTH IN LEAN AND OBESE MARMOSET DAMS
Jessica Adams

12 - PHYLOGENETICS OF *PEROMYSCUS MANICULATUS* BASED ON THE MITOCHONDRIAL GENE CYTOCHROME-*B*
James Q. Francis

13 - GENOMIC STRUCTURAL VARIATION WITHIN THE GENUS *MYOTIS*
Austin B. Osmanski

14 - POPULATION GENETICS OF DESERT POCKET GOPHERS, *GEOMYS ARENARIUS*, IN TEXAS AND NEW MEXICO
Hunter Glisson-Warner

15 - POPULATION GENETICS OF THE STATE THREATENED TEXAS KANGAROO RAT, *DIPODOMYS ELATOR*, USING MODERN AND HISTORICAL SPECIMENS
Elizabeth K. Gilliland

16 - GENETIC IDENTIFICATION OF GOPHERS IN THE OKLAHOMA PANHANDLE USING THE MITOCHONDRIAL CYTOCHROME-B GENE
Kori Owens

17 - USING GENOMICS AND BIOINFORMATICS TO DETERMINE THE ORIGIN AND PHYLOGENETIC SIGNIFICANCE OF THE ZONADHESIN GENE IN RODENTIA
Whitney N. Watson

18 - DEVELOPMENT OF NUCLEAR MARKERS FOR PHYLOGENY RECONSTRUCTION IN *THOMASOMYS* (RODENTIA: CRICETIDAE)
Maya J. Feller

19 - PHYLOGENY OF RODENT GENUS *THOMASOMYS* (RODENTIA: CRICETIDAE) BASED ON MITOCHONDRIAL MARKERS
Nathan M. Dougherty

20 - STATUS AND PHYLOGENY OF A BOLIVIAN ENDEMIC MAMMAL OF CRITICAL CONSERVATION IMPORTANCE
Susan Sherali

21 - OCCURRENCE OF *EPTESIPOX VIRUS* IN BIG BROWN BATS (*EPTESICUS FUSCUS*)
Craig D. Tipton

22 - PHYLOGENY OF BATS OF GENUS *MONOPHYLLUS*: A STUDY OF GENETIC AND MORPHOLOGICAL DIVERGENCE BASED ON MITOCHONDRIAL CYTOCHROME-*B* GENE
Marilyn Mathew

## Poster Presentation Abstracts

*The following posters (1-4) are to be considered for the Vernon Bailey Graduate Award.*

Poster 1

**PREDICTING THE CONTEMPORARY DISTRIBUTION OF A RARE KANGAROO RAT (*DIPODOMYS ELATOR*) USING HISTORICAL OCCURRENCE DATA AND PRESENT-DAY HABITAT SURVEYS** John Stuhler[1], David Ray[2], Robert Bradley[2,3], Neal Platt[2], Cristina Rios-Blanco[1], Carlos Garcia[1], and Richard Stevens[1,3], [1]Department of Natural Resources Management, Texas Tech University, [2]Department of Biological Sciences, Texas Tech University, [3]Museum of Texas Tech University. (john.stuhler@ttu.edu)

One of the central goals of ecology is to identify factors that affect the distribution and abundance of species. Obtaining this fundamental information for rare taxa, however, is often difficult and represents a hurdle for identifying effective conservation and management strategies. The Texas kangaroo rat (*Dipodomys elator*) is a rare and potentially threatened species that has historically occurred in Texas within 10 counties in the north-central portion of the state. Because of its small geographic distribution and potential population decline this species is currently under consideration for heightened conservation efforts. We used historical occurrence records to develop a niche model to predict the present-day distribution of this species, followed by road surveys and line-transect trapping along roads and in native habitats within the historic range of *D. elator*. Results from the niche model highlighted the importance of a number of variables related to climate, land cover, and soil type. Based on these variables, the model indicated two areas of high probability of occurrence around Hardeman and Wichita Counties. In the field, we surveyed 414 sites across ten counties and captured 30 *D. elator* individuals from Cottle, Hardeman, and Wichita Counties, as well as 1129 individuals from 13 additional species. Results from this work should improve our mechanistic understanding of factors contributing to the apparent rarity of this kangaroo rat species with implications for improving conservation and management strategies for threatened and endangered species.

Poster 2

**ASSESSING THE FEASIBILITY OF USING NABAT MONITORING PROTOCOL TO CHARACTERIZE BAT ASSEMBLAGES ACROSS TEXAS** Jenna R. Jensen and Christopher L. Higgins, Department of Biological Sciences, Tarleton State University. (jenna.jensen@go.tarleton.edu)

Bats are the second most diverse group of mammals following rodents. They are important bioindicators of climate change and habitat loss for they show taxonomic stability, are widely distributed around the globe, and are sensitive to human-induced changes in ecosystems. Bats also play an important role in agriculture as they consume large quantities of nocturnal insects, including those species considered crop pests. However, white-nose syndrome (WNS) is an emergent disease affecting hibernating bats throughout the eastern portions of the United States and Canada killing over 6 million individuals. WNS was first detected in New York in 2006, but it now has been confirmed as far south and west as Arkansas. If WNS makes its way to the southwestern regions of North America, it could have devastating effects on bat diversity. However, assessing broad-scale patterns of bat diversity is difficult given the variety of sampling

schemes utilized to characterize bat assemblages. To this end, efforts have been made to establish standardize sampling techniques across North America (NABat monitoring protocol) so that meaningful comparisons can be made. However, few studies have used this sampling scheme. Hence, the primary objective of this study is to assess the effectiveness of using NABat protocol to monitor bat populations in Texas. This past summer I used a combination of mist nets and a harp trap to capture bats; I also used acoustic monitors to document the presence of bats observed but not captured. Overall, I captured four species with a total abundance of 78 individuals with cave myotis (*Myotis velifer)* and the eastern red bat (*Lasiurus borealis*) being the most abundant species. Acoustic data is still being analyzed. I will complete my second field season in the summer of 2016.

Poster 3

**DIVERSITY OF THE ORDER CHIROPTERA AND THEIR ECTOPARASITES WITHIN THE DALQUEST DESERT RESEARCH STATION (PRESIDIO AND BREWSTER CO., TEXAS).** Matthew R. Fox and Ray E. Willis, Department of Biology, Midwestern State University. (matthew.fox.0906@students.mwsu.edu)

The Dalquest Desert Research Station contains 3000 acres straddling Brewster and Presidio counties of southwest Texas in the northern Chihuahuan Desert. It is adjacent to the northeastern boundary of Big Bend Ranch State Park and within the geographic area known as the Trans-Pecos. The research station is comprised of two physiographic regions. The western edge is typical Chihuahuan Desert scrubland with intermittent arroyos dominated primarily by creosote bush and lechuguilla. The eastern two-thirds of the property is a large canyon system containing one natural spring and several temporary seeps forming in response to subterrestrial water being forced to the surface by impermeable strata. More than twenty species of Chiroptera are resident or migratory to the Trans-Pecos, more than any other Texas geographical biome, making it the ideal location for the study of bats in Texas. Mist netting for bats has been conducted at least one night per month from March 2014 to January 2016. Netting has resulted in the capture of eight bat species belonging to the Vespertilionidae and Molossidae families. In addition to a taxonomic survey, bat ectoparasites have been collected in order to record ectoparasite abundance, diversity, and species specificity. Initial field inspections of captured bats have yielded a mosaic of ectoparasitic arthropods. The acarine family Spinturnicidae and nycteribiid family of Diptera have been found in strong association with some Dalquest bats. Future research and further identification of ectoparasitic species will potentially reveal ecological associations of DDRS bats and their parasites.

Poster 4

**ENDOPARASITE COMPARISONS AMONG TEXAS POCKET GOPHER SPECIES (GENUS *GEOMYS*)** Kaitlynn M. LeBrasseur and Robert C. Dowler, Department of Biology, Angelo State University. (klebrasseur@angelo.edu)

Pocket gopher species in Texas and their external parasites, such as chewing lice, have been well-studied. There is, however, a gap in the research over pocket gophers and their internal parasites, including nematodes, in Texas. In this study, three species of pocket gophers, *Geomys texensis*, *Geomys attwateri*, and *Geomys bursarius*, from their respective ranges in Texas are being examined for endoparasites. Stomachs, large intestines, small intestines and cecae are

removed and systematically examined under a stereoscopic dissection microscope. Preliminary results show nematode parasites in the genus *Physaloptera* occur in the stomachs of *Geomys texensis* and *Geomys attwateri*. Based on the examination of *Geomys attwateri* and *Geomys texensis* to date, the two species appear to experience differential infection rates by *Physaloptera sp.* Additionally, cestodes have been found in the cecae of pocket gophers infected with *Physaloptera*, but not in uninfected gophers. More work and a larger sample size will be needed in order to determine whether infection rates truly differ and if infection by *Physaloptera sp*. is correlated with cestode infection. We also hope to confirm the species of both nematodes and cestodes found. Plans for future work on pocket gophers and their nematode parasites include molecular analysis in order to determine whether the different Texas pocket gopher species and their nematode parasites have coevolved in a manner similar to pocket gophers and their ectoparasites.

*The following posters (5-11) are to be considered for the Vernon Bailey Undergraduate Award.*

Poster 5

**MATING INTERACTIONS OF INDO-PACIFIC BOTTLENOSE DOLPHINS (*TURSIOPS ADUNCUS*)** Jessica Hillhouse[1], Dara N. Orbach[1], Angela Ziltener[2,3], and Bernd Würsig[1]. [1]Department of Marine Biology, Texas A&M University at Galveston, [2]Dolphin Watch Alliance, [3]Anthropological Institute and Museum, University of Zurich. (jessicahillhouse@hotmail.com)

Mating tactics have been studied more in male than female dolphins. In some populations of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*), males are aggressive and females may have limited control of mates. If females exercise active mate choice, we predicted their responses to male behaviors would differ from chance expectations. Fourteen underwater video recordings were analyzed of mating-affiliated sequences off the coast of Hurghada, Egypt. The videos were transcribed in Transana, and individual behaviors were summed from an ethogram containing nineteen behaviors. A log likelihood test was used to determine if females responded differently to particular male behaviors. Behaviors were pooled into four categories for females and six categories for males. Female behavioral responses to preceding male behaviors varied from chance expectations ($G2=72.13$, $d.f.=15$, and $p<0.01$). Furthermore, each female behavior was preceded more than expected by a different male behavior. However, female behaviors did not vary from chance following male copulation attempts. Female behaviors appear to be influenced by preceding male behaviors, suggesting females are capable of active discrimination among males. Variable female responses immediately following copulation attempts could indicate high costs associated with resistance. Recordings of mating behaviors of free- swimming dolphins can broaden our understanding of female mate choice.

Poster 6

**MAMMAL BIODIVERSITY SURVEY OF ROLLING N LLP PROPERITES, RUNNELS COUNTY, TEXAS** Darby R. Thornton, Anthony W. Kocher, Hannah M. Jones, and Wendi K. Wolfram. Biology Department, Hardin-Simmons University. (darby.r.thornton@hsutx.edu)

Biodiversity studies examine the varying populations of living organisms within an area and the interactions between these organisms. Studies such as these, provide important information

regarding relationships between the organisms and their ecosystem which are in turn valuable tools in the development of effective land management strategies. The Runnels County, Texas study area consists of 363 acres of ranchland owned and operated by Rolling N LLP Properties and is a prime location due to the convergence of three different ecosystems in this region, the Rolling Plains, the Cross Timbers, and the Edwards Plateau. Information confirming mammal species in this area is limited, therefore, all findings will be submitted to the Rolling N LLP Properties Grassland Initiative as well as the Texas Parks and Wildlife – Texas Natural Diversity Database for documentation. Preliminary surveys were conducted for a full year from spring 2015 to spring 2016. These surveys were concentrated on the mammal species in the area observed through the use of box traps, camera traps, and visual observations. Several mammals have been identified to include Canis, Suidae, Cervidae, Felidae, and Muridae.

Poster 7

**AN ANALYSIS OF THE EFFECTS OF BIOMETEOROLOGY ON RED WOLF (*CANIS RUFUS*) AND GREY WOLF (*CANIS LUPUS*) SCENT-MARKING BEHAVIOR** Hannah M. Jones and Wendi K Wolfram, Biology Dept., Hardin-Simmons University. (hannah.jones@hsutx.edu)

Abiotic conditions can modify chemosensory signals used in animal communication and can therefore, impact species' behavior. Analysis of these biometeorological factors aid field biologists in studying the effects of environmental conditions such as time of day, lunar phase, temperature and barometric pressure and their influence on animal behavior. Studies have been conducted analyzing the impact of environmental conditions on the activity level of grey wolves (*Canis lupus*), and a previous study has been conducted analyzing their impact on the endangered red wolves (*Canis rufus*). Abiotic conditions in both the presence and absence of chemicals previously identified to initiate scent-marking behavior in canids were analyzed to determine the impact on wolf behavior. The purpose of this study was to examine the impact of time of day and lunar phase on the scent-marking behavior of both red wolves and grey wolves to determine the optimal conditions for scent-marking individually and comparatively. Results reveal an overlap in the preferred scent-marking conditions of both species. These overlaps include the midday time range of 10am-3pm and the waxing gibbous and full moon lunar phases. Because biometeorology is a key component in the scent-marking decisions of both grey wolves and red wolves, gaining a further understanding of the impact of abiotic conditions on environmental preference can help field biologists with implementing the best plans for population management.

Poster 8

**RELATIONSHIPS BETWEEN SMALL MAMMAL ASSEMBLAGES AND LAND MANAGEMENT IN THE SOUTHEASTERN ROLLING PLAINS** Reece C. Wells[1], Daisy Gomez[2], Leneka T. Hagins[1], Catherine C. Longest[1], Nathan R. Neill[2], S. James Nix[2], Jamie E. Thompson[2], Thomas E. Lee, Jr.[2], Joshua M. Brokaw[2], [1]Department of Agricultural and Environmental Sciences, Abilene Christian University, [2]Department of Biology, Abilene Christian University. (rcw12a@acu.edu)

Prairie restoration is an increasingly important facet of land management in central Texas. In order to understand the ecological impacts of changes in land use, complex relationships between

abiotic and biotic variables must be described. In this study we investigate relationships between soils, vegetation, and small mammal populations under four different management histories in the southeastern Rolling Plains. Surveys were conducted on four adjacent range sites with the following management histories: 1) unrestored oldfield with discontinued cultivation, no grazing, no vegetation management, 2) kleingrass/pricklypear/mesquite pasture with introduced forage, intensive grazing, minimal vegetation management, 3) mesquite shrubland with native vegetation, unrestrained grazing, no vegetation management, and 4) restored prairie: reintroduced native tall grasses, no grazing, shrub mitigation management. Sampling was conducted during spring, summer, and fall from a 50 x 50 m grid positioned in the interior of each site. Soils were sampled for chemical and physical properties from the corners and center of each grid; vascular plant species composition was sampled using 9 meter-square quadrats from the edges and center of each grid; and the small mammal assemblage was measured using a 5 x 10 grid of Sherman live traps. Small mammal assemblages differed substantially across treatments and seasons. Lowest mammal quantity and diversity occurred in the unrestored oldfield. Mammal assemblages at other sites varied seasonally, with greatest overall diversity occurring in the restored prairie.

Poster 9

**ABUNDANCE AND OCCUPANCY PATTERNS OF OCELOT AND BOBCAT IN SOUTH TEXAS**

Shelby B. Carter[1], Michael E. Tewes[1], Justin P. Wied[1], Lauren D. Balderas[1], John P. Leonard[1], Arturo Caso[1], and Tyler A. Campbell[2], [1]Feline Research Program, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, [2]East Foundation, San Antonio, TX. (shelbycarter511@hotmail.com)

Ocelot (*Leopardus pardalis*) and bobcat (*Lynx rufus*) populations overlap in South Texas. Both felids are solitary species. Information on their coexistence and potential competition is important to the conservation of the federally endangered ocelot. This study evaluates the abundance and occupancy of these felids on the East El Sauz and Yturria San Francisco Ranches in Willacy and Kenedy counties, Texas. Five years of data have identified an ocelot population of 26 individuals, with some traveling between and inhabiting East El Sauz and Yturria ranches. Although Yturria Ranch has been studied for a longer period of time, the past 5 years will be the focus of analysis. The Yturria Ranch has a smaller population of 13 individuals. Results from this study will improve the understanding of ecological relationships between species and potential interguild competition.

Poster 10

**EXECUTIVE FUNCTION ASSESSMENT USING AN APPARATUS DESIGNED TO EXAMINE VISUAL AND MOTOR COORDINATION IN COMMON MARMOSETS (*CALLITHRIX JACCHUS*)**

Alexander Greig[1], Suzette Tardif[2,3] and Corinna Ross[1,2,3], [1]Texas A&M University San Antonio, [2]Barshop Institute for Longevity and Aging Studies, University of Texas Health Science Center San Antonio, [3]Southwest National Research Primate Center, Texas Biomedical Research Institute, San Antonio TX. (AlexanderN.greig@jaguar.tamu.edu)

The common marmoset (*Callithrix jacchus*) has been targeted to become the standard in nonhuman primate aging models, as they are considered “old” at 8 years, have a maximum life span of 16.5 years, and exhibit many aging-related pathologies often seen in humans[1]. Conveyor

belt tasks have been used to assess visual-motor coordination in marmosets, gaining popularity in behavioral pharmacological and Parkinson's research[2]. However, to date no such tasks have been implemented with marmosets to assess executive function, the ability to select actions or thoughts in relation to internal goals. We sought to develop a technique that would provide researchers with a tool to quantify executive function in nonhuman primates, especially in aging and dementia studies, where decline in executive function is predicted to be prevalent[3]. We found a significant time by age effect on treat choice ($F=3.408$, $p=0.039$) (Fig 3), all individuals were more likely to choose the marshmallow by the last trial in a session over the decoy. Older animals were slower to switch than the young, making this a valid assessment of executive function and decision making in nonhuman primates, and an easily trainable highly rewarding task for the animals, making it particularly useful in continuing aging research in marmosets.

Poster 11

**FETAL GROWTH IN LEAN AND OBESE MARMOSET DAMS** Jessica Adams[1], Suzette Tardif[2], Corinna Ross[1], [1]Texas A&M University San Antonio**,** [2]Southwest National Primate Research Center, Texas Biomedical Research. (adams_jessica12@yahoo.com)

Marmosets (*Callithrix jacchus*) have been found to exhibit spontaneous and diet-induced obesity in captive settings. The fast maturity rates, low risk of zoonotic disease, high fertility, and short lifespan makes marmosets a great model for studying the development of obesity. Infants that are defined as obese at maturity (12 months of age) demonstrate a split growth trajectory from lean animals as early as thirty days of age. This study focused on evaluating the fetal growth pattern of infants born to dams described as lean or obese prior to pregnancy. We predicted that obese dams would produce larger infants with a faster rate of prenatal growth than lean dams. A GE Logiqbook ultrasound machine was used to determine biparietal diameter (BPD), abdomen circumference (ABC), abdomen area (ABA), and crown rump length (CRL) of each infant throughout the 145 day gestation at roughly 60d, 90d, and 120d. It was found that the head and total body length growth patterns of the fetuses did not differ in relation to the obese status of the dam (BPD: $F(1,142)=.000, p=.99$; CRL: $F(1,163)=.06, p=.81$). However, it was found that lean dams produced infants with larger abdominal circumference and area (ABC: $F(1,74)=11.625, p=0.001$; ABA: $F(1,74)=13.154, p=0.001$). These data suggest that certain growth measures such as head growth are tightly controlled with little individual variation, but maternal environment may have significant effects on prenatal abdominal growth.

*The following posters (12-13) are to be considered for the Clyde Jones Graduate Award.*

Poster 12

**PHYLOGENETICS OF *PEROMYSCUS MANICULATUS* BASED ON THE MITOCHONDRIAL GENE CYTOCHROME-*B*** James Q. Francis[1], Caleb D. Phillips[1,2], and Robert D. Bradley[1,2], [1]Department of Biological Sciences, Texas Tech University, [2]Natural Science Research Laboratory, Museum of Texas Tech University. (jq.francis@ttu.edu)

*Peromyscus maniculatus* is an abundant mammal species occupying a wide variety of habitats in North America, with close to 60 recognized subspecies. Despite the common occurrence of this species, and the numerous described subspecies, few wide spread phylogenetic studies have been conducted across multiple populations. In order to investigate the relationship between

populations of this species, a Bayesian and RAxML analysis of the mitochondrial gene cytochrome-*b* (Cyt*b*) were preformed. The goal of these analyses was to obtain information concerning the genetic relationship of this species across the entire known geographic range. In all, 430 Cyt*b* sequences of *P. maniculatus,* collected from specimens throughout North America, were used in this study. The genetic variation in Cyt*b* sequences will be used to provide insight into the phylogeographic similarities and differences of *P. maniculatus* throughout the species' range. Our preliminary results indicate three strongly distinct clades of *P. maniculatus* were formed, each clade representing populations in specific geographic areas. The topology of these clades indicates that the genetic variation within *P. maniculatus* can, in part, be defined by the geographic distribution of the species. In particular, there appears a West Coast clade that extends from Southern California into Baja and northwestern Mexico; a central US clade that includes the plains states, northern California into Canada, and east to the western side of the Appalachians; and an East Coast clade. Further subdivisions may reveal themselves with additional data.

Poster 13
**GENOMIC STRUCTURAL VARIATION WITHIN THE GENUS *MYOTIS*** Austin B. Osmanski, Cibele Caiao, Roy N. Platt, and David A. Ray, Department of Biology, Texas Tech University. (austin.osmanski@ttu.edu)

Species of the bat genus *Myotis* have identical karyotypes, no large scale interspecific chromosome rearrangements and are assumed to be structurally conserved at the genomic level. We sequenced genomes of eight species of North American *Myotis*: *M. yumanensis*, *M. vivesi*, *M. velifer*, *M. occultus*, *M. ciliolabrum*, *M. austroriparius*, *M. californicus*, and *M. septentrionalis* in an effort to quantify genome-wide structural variation with single nucleotide resolution. Genomes were sequenced to an average of 14x coverage. Individual sequence reads were aligned to the *M. lucifigus* draft genome using the Burrows-Wheeler Aligner. Structural variants were identified in the 8 newly sequenced genomes relative to *M. lucifugus* using Delly and further analyzed using Integrative Genomics Viewer and BEDtools. In total, 705,117 structural variants were found: 121,495 deletions; 26,295 duplications; 22,747 inversions; 234,579 translocations. Through preliminary analyses some of the identified structural variation was likely a result of transposable element activity. Our findings demonstrate the utility of combining low coverage sequencing and reference guided assembly to identify small scale structural variation not visible at the gross chromosomal level. These results show that the small scale structural variation in *Myotis* may be more prevalent than karyotyping methods imply.

*The following posters (14-22) are to be considered for the Clyde Jones Undergraduate Award.*

Poster 14
**POPULATION GENETICS OF DESERT POCKET GOPHERS, *GEOMYS ARENARIUS*, IN TEXAS AND NEW MEXICO** Hunter Glisson-Warner, Ashley Kozora, Phillip Sudman, and Russell Pfau, Department of Biological Sciences, Tarleton State University. (hunter.glissonwarner@go.tarleton.edu)

*Geomys arenarius,* commonly known as the desert pocket gopher, prefers loose or sandy soils for burrowing and occurs in portions of west Texas, New Mexico and the Chihuahua desert of

Mexico. Two subspecies are currently recognized: *G. a. arenarius* to the south and *G. a. brevirostris* to the north. Inhospitable habitat likely prevents gene flow among populations of *G. arenarius*. Our objective was to determine the degree to which populations of *G. arenarius* are separately evolving lineages, and thus, whether or not they should be recognized as separate species. DNA was extracted from tissues of individuals from multiple populations. A polymerase chain reaction was used to amplify the ND2 gene of the mitochondrial DNA, and DNA sequences were obtained. These sequences were used to create phylogenetic trees. We compared patterns of genetic divergence in the mitochondrial DNA with nuclear DNA (amplified fragment length polymorphisms). Significant genetic divergence exists between subspecies, and gene flow appears to be restricted among some populations within subspecies. Because multiple characteristics identify the subspecies as separately evolving lineages, they could be considered for elevation to the species level. Understanding the uniqueness of these lineages and populations and their potential recognition as distinct species could lead to improved conservation.

Poster 15

**POPULATION GENETICS OF THE STATE THREATENED TEXAS KANGAROO RAT, *DIPODOMYS ELATOR*, USING MODERN AND HISTORICAL SPECIMENS**

Elizabeth K. Gilliland and Russell S. Pfau, Department of Biology, Tarleton State University. (elizabeth.gilliland@go.tarleton.edu)

The Texas kangaroo rat (*Dipodomys elator*) is listed as a threatened species because of its scarcity and small geographic range. Historically, *D. elator* is known to have occurred in 11 counties in Texas and 2 in Oklahoma; however, recent surveys have documented them in only 5 Texas counties: Archer, Childress, Hardeman, Motley, and Wichita. Assuming that this reflects a population decline, it is likely due to degradation of their natural habitat which includes arid shrublands mixed with short grasses. In order to aid conservation efforts, we sought to determine the extent to which populations differed geographically and temporally in terms of genetic diversity and divergence. Specifically, we assessed the genetic diversity of historical museum specimens collected in 1969 and more recently captured individuals (1986 and 2005) from two locations. We sequenced a portion of the mtDNA control region and the cytochrome oxidase I gene and observed a striking lack of mitochondrial DNA diversity within the species as a whole. PCR primers for amplifying microsatellite loci were designed from sequence data generated using massively parallel DNA sequencing. We will present preliminary results from 8 microsatellite loci.

Poster 16

**GENETIC IDENTIFICATION OF GOPHERS IN THE OKLAHOMA PANHANDLE USING THE MITOCHONDRIAL CYTOCHROME-B GENE**

Kori Owens, Cristina Coffman, and Michelle L. Haynie, Department of Biology, University of Central Oklahoma. (kowens7@uco.edu)

The aim of this project is to utilize the mitochondrial cytochrome-*b* (*Cytb*) gene to determine the genetic identity of gophers in the Oklahoma panhandle. Recent studies have suggested that *Geomys jugossicularis* is present in the Oklahoma panhandle, but this has yet to be confirmed. Our specific goals are to determine: 1.) if G. jugossicularis does occur in the panhandle and 2.) the extent of its range if it is present. Eighteen samples from Cimarron and Beaver Counties have

been collected or obtained from museums and complete or partial *Cytb* sequences have been generated for all 18 samples. Preliminary data indicates that samples from Cimarron County may represent *G. jugossicularis*. Future research will include collecting samples from Texas County and obtaining complete *Cytb* sequences for all samples.

Poster 17

**USING GENOMICS AND BIOINFORMATICS TO DETERMINE THE ORIGIN AND PHYLOGENETIC SIGNIFICANCE OF THE ZONADHESIN GENE IN RODENTIA**

Emma K. Roberts[1], Whitney N. Watson[1], Daniel M. Hardy[2], and Robert D. Bradley[1,3], [1]Department of Biological Sciences, Texas Tech University, [2]Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, [3]Natural Sciences Research Laboratory, Museum of Texas Tech University. (whitney.watson@ttu.edu)

Zonadhesin (ZAN) is a multi-domain protein that is utilized in the binding of the egg's zona pellucida layer (ZP) to the spermatozoa. It has been suggested that this process may function in a species-specific fashion and thereby regulate hybridization between closely related species. However, to date, ZAN's role in species-specific interaction is poorly understood and viability of hybrid offspring between species is largely unknown. ZAN's structural domains have been studied in several domesticated mammalian taxa, but unfortunately wild rodent systems have been under-utilized in reproductive isolation studies. Rodents are an ideal group of taxa for examining the reproductive role of ZAN, as rodents are r-selected and have the ability to evolve rapidly compared to other mammalian orders. This thereby generates a system where the genome evolves at a quicker rate due to short gestation times and a rapid population turnover. Currently, we are comparing conserved and variable regions of ZAN in representative species from five suborders of Rodentia to examine differential variability in the gene and determine if regions of this gene are phylogenetically informative in this group of mammals. Protein-coding DNA of ZAN will be obtained from genetic databases for representatives from each suborder. Sequences from domains of interest will be aligned and scored for statistical accuracy using various software programs. In addition, several phylogenetic analyses will be performed to infer if ZAN is successful in resolving sub-ordinal relationships throughout Rodentia. Levels of sequence differentiation will be used to assess the rate of molecular evolution and possible codon and nucleotide biases in this gene among this taxonomic group. Further, research on ZAN and other gamete fusion proteins enhances our understanding of the mammalian reproductive system, provides extensive knowledge into the processes of mammalian fertilization and allow for greater understanding of the processes of speciation and evolution.

Poster 18

**DEVELOPMENT OF NUCLEAR MARKERS FOR PHYLOGENY RECONSTRUCTION IN *THOMASOMYS* (RODENTIA: CRICETIDAE)**

Maya J. Feller, Amberly N. Grothe, Paulina Sanchez, Thomas E. Lee, Jr., and Joshua M. Brokaw, Department of Biology, Abilene Christian University. (mjf12b@acu.edu)

*Thomasomys* is a genus of 30–40 rodent species distributed primarily in northwestern South America. Previous investigations based on mitochondrial genes have provided well resolved nodes at the species level. In contrast, most deep nodes needed for reconstructing the geographic and ecological history of *Thomasomys* had short branches and low bootstrap values, suggesting a

rapid radiation early in the diversification of *Thomasomys*. In order to further test these phylogenetic hypotheses, we have designed new primers and obtained sequences from the nuclear *RAG1* (Recombination activating gene 1) and *AP5* (intron 2 from the acid phosphatase type V gene) regions. Early results suggest that these markers are less variable than previously used mitochondrial markers but contain significant amounts of phylogenetically informative characters. Although increased phylogenitic resolution has been minimal, these nuclear genes have provided independent support for our mitochondrially based hypotheses.

Poster 19

**PHYLOGENY OF RODENT GENUS *THOMASOMYS* (RODENTIA: CRICETIDAE) BASED ON MITOCHONDRIAL MARKERS** Nathan M. Dougherty[1], John Iragena[1], Jeremy M. Aymard[1], J. Delton Hanson[2], Joshua M. Brokaw[1], Thomas E. Lee, Jr.[1], [1]Department of Biology, Abilene Christian University, [2]Research and Testing Laboratories, Lubbock, Texas. (nmd13a@acu.edu)

*Thomasomys* is a genus of 30 – 40 rodent species distributed primarily in northwestern South America. Previous taxonomic efforts in classifying species within *Thomasomys* have utilized mitochondrial DNA sequences to reconstruct a species-level phylogeny. This study incorporates recently sampled taxa into the ongoing assessment of phylogenic relationships and previous taxon descriptions. New samples from the species *T. baeops*, *T. cinnameus*, *T. ucucha*, and *T. vulcani* were collected in the summer of 2014 from the Carchi Province, Ecuador. Phylogenetic analyses were based on sequences obtained from the cytochrome b (Cytb) and cytochrome c oxidase 1 (CO1) genes . We extracted DNA from liver tissue and performed PCR using the previously the published primers p484 and p485 for Cytb and BatL5310 and R6036R for CO1. PCR products were direct sequenced and then edited and aligned using Sequencher 5.2.4 and SE-AL v2.0. Maximum likelihood (ML) searches were performed using RAxML to determine the best tree and bootstrap support for clades. Congruent phylogenetic results from Cytb and CO1 suggest that 1) recent collections from Ecuador represent new distribution records for *T. taczanowskii*, 2) new DNA sequences suggest that *T. ucucha* is closely related to *T. silvestris* and that *T. vulcani* is closely related to *T. fumeus*, and 3) more thorough sampling of *T. cinnameus* suggests that specimens may represent two sister species.

Poster 20

**STATUS AND PHYLOGENY OF A BOLIVIAN ENDEMIC MAMMAL OF CRITICAL CONSERVATION IMPORTANCE** Susan Sherali[1], Randall Rittman[2], Teresa Tarifa[3], Marisol Hidalgo[4] and Jorge Salazar-Bravo [1], [1]Department of Biological Sciences, Texas Tech University, [2]School of Medicine, Texas Tech Health Sciences Center, [3]Colección Boliviana de Fauna, La Paz – Bolivia. Current address: Orma J. Smith Museum of Natural History, The College of Idaho, [4] Museo de Historia Natural Alcide d'Orbigny, Área de Mastozoología, Cochabamba – Bolivia. (susan.sherali@ttu.edu)

The Bolivian Chinchilla Rat, *Abrocoma boliviensis*, is an endemic species ranked 21st among the 100 most critically endangered mammals of the world (i.e., Evolutionarily Distinct and Globally Endangered, EDGE species). It is thought to live in burrows and have a vegetarian diet, although almost nothing is known of the biology of the species, because until recently, it was known from an area less than 100km$^2$ and 3 specimens collected over a span of 90+ years. In

fact, even its status as a member of the genus *Abrocoma* is in question. Joint efforts by our institutions and other Bolivian colleagues, have allowed us to secure a handful of samples from new localities outside the recognized range of distribution of the species. With the goal of ascertaining the phylogenetic position of *Abrocoma boliviensis* we obtained and sequenced two mitochondrial and a nuclear marker for several individuals of the species; in addition, we sequenced the entire mitochondrial genome (>16kb) of one representative individual. The combined analyses of these data, in the context of the Caviomorpha, suggest that the Bolivian Chinchilla rat is a distinct member of the genus *Abrocoma*. In addition, our fossil-calibrated tree suggests that the evolution of the genus was heavily influenced by the rise of the Andes, a pattern also suggested for other caviomorphs.

Poster 21

**OCCURRENCE OF *EPTESIPOX VIRUS* IN BIG BROWN BATS (*EPTESICUS FUSCUS*)**

Craig D. Tipton and Loren K. Ammerman, Department of Biology, Angelo State University. (ctipton4@angelo.edu)

The recently described pathogen, *Eptesipox virus*, was first reported in 2013 based on 6 grounded adult Big Brown bats (*Eptesicus fuscus*) that had been taken to a wildlife rehabilitation center in Washington state. These individuals suffered from obvious joint swelling and were subsequently euthanized after failed treatments. The novel virus was characterized as a member of the poxvirus group by researchers associated with the Centers for Disease Control which led to a real-time PCR protocol being developed for detecting the virus. Although *Eptesipox* is not thought to be pathogenic to humans, it does represent a poorly understood threat to North American bat populations. The purpose of this study was to gain a better understanding of the occurrence and distribution of this virus, which could potentially encompass the full known range of the Big Brown bat. We acquired tissue samples from *Eptesicus fuscus* submitted to the Texas Department of State Health Services and supplemented with tissues archived in the Angelo State Natural History Collection. After screening 36 samples, preliminary results report that the samples are negative for *Eptesipox* based on real time PCR when run concurrently with a positive control. This work could suggest that these infections are localized to the Northwestern part of the *Eptesicus fuscus* range, but additional testing with more samples would be needed to develop a stronger argument. Continuing work will aim to acquire additional specimens and expand the study to encompass closely related vespertilionid species.

Poster 22

**PHYLOGENY OF BATS OF GENUS *MONOPHYLLUS*: A STUDY OF GENETIC AND MORPHOLOGICAL DIVERGENCE BASED ON MITOCHONDRIAL CYTOCHROME-*B* GENE**

Marilyn Mathew[1], Dayana P. Bolzan[2], Julie A. Parlos[1], Robert J. Baker[1], [1]Department of Biological Sciences, Texas Tech University, [2]Doutoranda do Programa de Pós-Graduação em Biodiversidade e Biologia Evolutiva, Universidade Federal do Rio de Janeiro, Brazil (marilyn.mathew@ttu.edu)

The genus *Monophyllus* is distributed throughout the Caribbean Islands. Two species of *Monophyllus* are recognized, *M. redmani* and *M. plethodon*, and are sympatric in Puerto Rico. Two hypotheses were formed, first that *M. plethodon* has multiple species and second that there is more than one species of *M. redmani*; both hypotheses were based by evaluating

morphological differences and application of the Morphological Species Concept. Molecular data, generated from the mitochondrial cytochrome-*b* gene, were used to test if genetic differentiation was congruent with morphological variation. Genetic distance between *M. redmani* and *M. plethodon* is approximately 11%. Considering the Genetic Species Concept, analysis of cytochrome-b does not support the hypothesis of more than one species of *M. plethodon* (genetic distance < 5%). The experimental data generated from analysis of *M. redmani* suggests that there could be an undescribed species on the island of Puerto Rico (genetic distance > 5%). Genetic distance values of the cytochrome-*b* gene are compatible with standards used to determine taxonomic status in mammals. Multiple species concepts exist, and not all can be applied. However, application of multiple species concepts provide more confidence in conclusions drawn from the data. Based on available data, there is no indication for the existence of more than three species in the genus *Monophyllus*. Further research to analyze the cytochrome-*b* gene, by completing sequencing, is being conducted. In addition, we plan to sequence a nuclear gene which could determine if gene flow is occurring among the two groups classified as *M. redmani*.

**Texas Society of Mammalogists**
**34th Annual Business Meeting**
**Texas Tech University Center**
**13 February 2016**

## AGENDA

1. Approval of the Minutes of the 2015 Business Meeting
2. Report of Secretary-Treasurer, Marcy Revelez
3. Report of Permanent Secretary, Lisa Bradley
4. Report of Editor, Russell Pfau
5. Reports of Committees
    a. Committee for Honorary Members, Phil Sudman
    b. Committee for Student Honoraria, Amy Baird
    c. Financial Advisory Committee, Phil Sudman
    d. Committee on Conservation, Mike Tewes
    e. *ad hoc* Auction Committee, Marie Tipps
6. Election of President-Elect
7. New Business
    a. Selection of site for 2017 Annual Meeting
    b. Other New Business
8. Closing Remarks of TSM President, Monte Thies
9. Adjourn

# Treasurer's Report for Calendar Year 2015
## Submitted by Marcy Revelez, Secretary-Treasurer

Income and expenses of TSM for the 2015 calendar year are shown below. Our checking account is with Bank and Trust. Our investments are handled by Morgan Stanley. The checking account balance as of the first of the year was $4,551.84. Total income in 2015 was $17,143.31 and total expenses were $16,466.80. The checking account had $5,228.35 at the end of 2015. No funds were transferred to Morgan Stanley in 2015. TSM total assets at the end of 2015 were $91,107.60. The value of the investment fund for 2015 decreased by $977.56. A total of $968.76 was paid to Morgan Stanley in fees for the year.

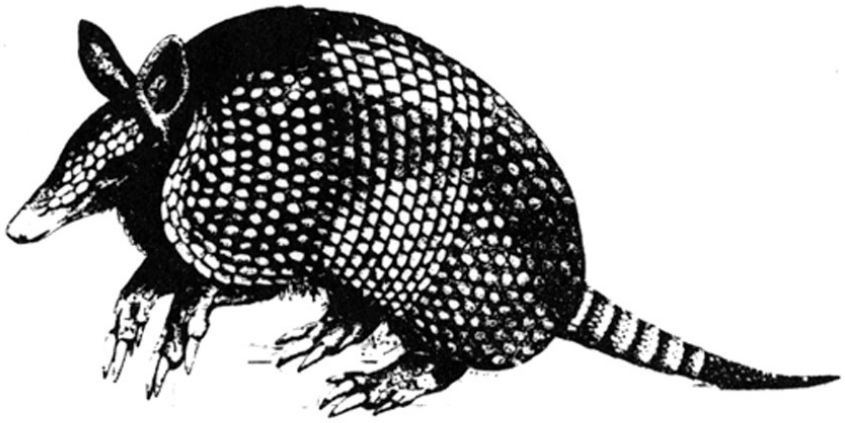
| | |
|---|---|
| Checking Account Balance as of 25 December 2014 | $4,551.84 |
| Investment Account (Morgan Stanley) balance 1 January 2015 | $86,856.81 |
| **Total TSM assets as of 1 January 2015** | **$91,408.65** |

| **2015 Income** | |
|---|---|
| 2015 Annual Meeting income (registration, meals and lodging fees) | $9,972.00 |
| Membership Dues | $306.00 |
| T-shirts (53 shirts to presenters for free) | $770.00 |
| Auction Income | $5,350.50 |
| Contributions | $300.88 |
| Patron memberships | $434.93 |
| Meeting photos | $9.00 |
| Total income | $17,143.31 |

| **2015 Expenses** | |
|---|---|
| 2015 Annual Meeting Expenses to TTU Center | $9,316.00 |
| Entertainment - DJ in 2015 ($600 total, $300 balance paid) | $300.00 |
| Refreshments/Beverages | $453.77 |
| Program copy charges (ASU print shop) | $287.70 |
| Nametags | $151.53 |
| Office supplies | $25.98 |
| Student Awards | $3,300.00 |
| T-shirt charges (Gandy Ink) 130 | $950.00 |
| Deposit for DJ in 2015 ($300 deposit, $300 owed in 2016) | $300.00 |
| Speaker Travel Reimbursement ($1,220.92) | |
| honorarium | $500.00 |
| airfare | $287.20 |
| car rental/gas | $316.66 |
| parking | $117.06 |
| GKG fees for domain and hosting renewal | $58.39 |
| PayPal fees | $102.51 |
| Total expenses | $16,466.80 |

| | |
|---|---|
| Checking Account Balance 25 December 2015 | $5,228.35 |
| Investment Account (Morgan Stanley) balance 31 December 2015 | $85,879.25 |
| **Total TSM assets as of 31 December 2015** | **$91,107.60** |

# Texas Society of Mammalogists



## Newsletter

## 2016

## The 34th Annual Meeting

# 2016 Banquet Speaker

Our banquet speaker will be Dr. Christopher Bell from the University of Texas-Austin Jackson School of Geology. The title of his presentation will be "Not Enough Skeletons". Dr. Bell's research centers on understanding the complex dynamics of vertebrate faunal communities during the Quaternary Period.

# Patron Membership

Members are encouraged to consider becoming Patrons of the Society by donating $100 (or more) to support the Society's student paper awards. A list of Patron members is published on the website and in the program. Regular Patron membership is achieved with a donation of $100. Members who exceed $100 in donations to the Society's student awards fund will receive a certificate recognizing their total donation level as follows: $125, Ocelot Level; $250, Bobcat Level; $500, Puma Level; $1000, Jaguar Level. Members can upgrade at any time, and all donations are cumulative. There is no time limit or minimum contribution requirement as a member works toward the next level. Donation levels are confidential.

# News & Announcements

**WANTED! OBSERVATIONS AND SPECIMENS OF SPOTTED SKUNKS!**

*Robert Dowler*–My graduate students and I are actively collecting data on spotted skunks in Texas and would be most appreciative if you could notify us of any specimens you encounter—observations, road-killed individuals, trail camera photos, obscure museum specimens, or recent additions to collections that might not be on databases. We would especially like TSM members to keep an eye out for road-killed animals that could be salvaged between now and the February meeting. If any tissue could be salvaged, regardless of condition, and frozen, we could possibly use this for our genetic analyses. Of course if the animal is in good shape, we would urge you to try to find a way to salvage the whole animal. Thanks and see you in Junction. For questions or to send information: Robert Dowler-325/486-6639 or Alexandra Shaffer-714/351-8201; robert.dowler@angelo.edu

# Feature Article

**Bracken Cave – A Look Back to the '70s**

Chester O. Martin
Research Wildlife Biologist (Retired), 113 Estelle Drive, Vicksburg, MS 3918

The significance of Bracken Cave as a maternity cave for Brazilian free-tailed bats (*Tadarida brasiliensis*) has long been known to bat enthusiasts. The cave, located 27 km northeast of San Antonio, Comal Co., Texas, was historically estimated to support approximately 20 million bats, and is the largest known colony of the species (Davis et al. 1962, Tuttle 1994). Guano harvested from the cave provided ingredients for gun powder during the Civil War, and was an important source of natural fertilizer in the late 1980s/early 1990s, with 80-85 tons harvested annually (Tuttle 1994). Also, recent studies have documented the importance of free-tailed bats as pest-control agents (McCracken and Gustin 1987, McCracken and Westbrook 2002, Lee and McCracken 2005, Cleveland et. al. 2006, Kunz et. al. 2011). Tuttle (1994) estimated that a single night of feeding by Bracken cave bats could potentially exceed 250 tons of insects.

In 1992 Bat Conservation International (BCI), under the direction of Merlin Tuttle, purchased Bracken Cave and 697 acres of adjacent land to protect the colony and secure it from the rapidly expanding suburbs of San Antonio. The protected area then became a living laboratory for numerous studies of free-tailed bat ecology, social life, reproduction, and food habits. Access to the cave was originally limited to BCI members by appointment only, but in 2012 a program was initiated by BCI, in conjunction with Natural Bridge Caverns, to open the cave for regulated tours to increase the awareness of bat conservation to the public. Indeed, everything was going well for the bats in their summer home. However, several years ago this monumental success story was suddenly in jeopardy.

In 2012 a private development company began advertising plans to build 3,500 homes in the property immediately south of the cave. This development would have placed approximately 10,000 people in the flight path of Bracken's bats. Fortunately, the potential devastation of this situation so alarmed conservationists and local citizens that a united effort, spearheaded by BCI and The Nature Conservancy with support from both public and private sources, stopped the project and secured 3,500 acres of adjacent land. The Nature Conservancy will manage this area and create hiking trails across a 5,000-acre swath of land that now protects the cave. So it appears that the bats of Bracken will continue to live on – at least for the time being.

**Bracken Cave in the 1970s.**

Now I want to take you back to the 1970s, long-before BCI acquired Bracken Cave when it was in private ownership, and tell you my story. Dr. Donald Clark, then with the U.S. Fish and wildlife Service Patuxent Research Center, was conducting a series of studies on pesticide residues in bats and needed someone in the area to collect material from Bracken Cave. At the time I was in graduate school at Texas A&M University; I was a Masters candidate under Dr. David Schmidly and was busy writing my thesis. Dr. Clark contacted me to see if I would be interested in making a couple of trips to the cave to do some field work for his project. I needed a relief from writing and so agreed. He said the task would basically consist of visiting the cave while young bats were present to collect a sample representing both sexes and various age groups. For comparative purposes, he also needed specimens that appeared ill or had fallen to the floor of the cave. I would then label and pack my samples in dry ice and ship them to Patuxent in special containers. I figured I could handle that with ease, and welcomed a little extra financial support from the Service.

**The Inaugural Visit**

My first task was to contact the land owner and make an appointment. I did so and was on my way to Bracken Cave on June 13, 1973. The site was a bit more difficult to find in those days. I exited IH-35 approximately 10 miles south of New Braunfels and drove 5.7 miles to Bracken on Farm Road 1337. I met the cave owner, Mr. Oliver Marbach, at his residence and sat with him a while. In those days the only way you were going to get permission to see the cave was to drink a couple of Shiner beers with Mr. Marbach and convince him that you were reputable and weren't going to be a threat to the cave or other ranch property. That done, I was on my way to Bracken Cave, which was approximately 4.6 miles by road to the first gate, then 2.1 miles from the gate to the cave.

I arrived at the cave site about 1:30 p.m. and made camp on high ground near the entrance. It was very hot (ca. 102◦ F) and humid following three days of rain, and the ground near the cave entrance was moist. I donned my primitive spelunking apparel and descended the incline into the cave at 3:30 p.m. The cave temperature was approximately 98◦F and there was a strong smell of ammonia. Free-tailed bats were packed everywhere except for an area about 15-30 ft. from the entrance; they were hanging throughout the ceiling and walls and all along the ledges. I was astonished at the sheer numbers. I attached the flash to my camera and began taking photos. However, this caused some turmoil, especially the close-up shots, and many bats began flying. There were no bats on the floor of the cave except for a mating pair that dropped to the floor, disconnected, then resumed flight. I examined as much of the cave as possible without going too deeply toward the rear because I was alone and the guano was slippery. I then began netting bats from ledges using a butterfly net. I collected 19 females and one male, which I bagged and later stored in dry ice. I took several more photos and returned my campsite.

Much activity was noticed within the cave at 8:25 p.m.; it was almost dusk but there was still plenty of available light. At 8:31 p.m. a red-tailed hawk (*Buteo jamaicensis*) arrived on the scene and began circling at the cave's entrance. At 8:32 p.m. bats began leaving the cave in swarms, made several large circles outside the cave, and flew toward the South-Southeast in huge cloud-like clusters. The stream of bats was steady and continuous – seemed almost mechanical. Bats were still swarming at sunset (8:55 p.m.). It was the first time I had experienced this phenomenon and it was truly impressive. At 9:45 p.m. all bats were out of the cave except for a few stragglers. There was a full moon and it was very bright; the temperature was 75◦F at 1:30 a.m.

I was awakened at 7:15 a.m. on June 14 by bats returning to the cave. They seemed to be returning in groups at seemingly regular intervals. As they approached the cave, they appeared to make one descending swoop together into the entrance. The morning was overcast with a heavy foggy haze; although it was not raining there was a continuous light mist. Bats continued returning until 9:50 a.m., at which time the haze began to break and it became clear and suddenly miserably hot. As bats entered the cave I collected three additional females and two males.

Events were similar on the evening of the 14th. Bats were becoming restless at 8:10 p.m. and began flying just inside the cave entrance at 8:35 p.m. At 8:40 p.m. they began to fly immediately outside of the cave entrance, then at 8:42 p.m. they were swarming and circling outside the cave and flew south-southeast in a continuous cloud. Again, a red-tailed hawk appeared minutes later. All bats were gone from the cave by 10:00 p.m. and I entered hoping to find some young bats: none were present. Later examination of specimens revealed that three of four females collected were in the later stages of pregnancy and had one embryo each. I began breaking camp on the morning of the 15th and returned to College Station. The specimens were shipped to Patuxent as soon as I returned.

**The Summer Trip**

My next visit to Bracken was on July 7, 1973. I was sure to find young bats this time. I had become concerned about making the trip by myself, so had enlisted the help of Robert Patten, who was working on a dissertation on skunks at the time. I figured that anyone doing a skunk study could handle the discomfort of Bracken cave. We arrived at Mr. Marbach's residence about noon and again engaged in

the obligatory conversation and beverage consumption. After all, this was his first time to meet Bob. We were running late so we hastened to the cave area and made camp. We entered the cave at 2:30 p.m. Young bats seemed to be everywhere and were especially clustered on ledges near the entrance. Parturition had apparently just taken place and was still occurring; none of the juvenile bats appeared more than a week old and part of the umbilical card was still present on many. The young bats were in clusters numbering from about 20 to 50 with one to three females attending. There were very few young bats on the cave's floor but we managed to collect 10 specimens. We then collected several young bats and post-lactating females from ledges. We could find no adult males near the entrance.

There was heavy rainfall from approximately 5:30 -7:30 p.m., and thereafter a slight drizzle until 8:00 p.m. We noted activity in the cave as early as 6:00 p.m. and heavy activity about 8:00 p.m., with bats circling inside the cave. At 8:20 p.m. the first bat exited the cave and flew north. No other bats left the cave until 8:31 p.m. at which time they began circling outside of the cave entrance and swarmed to the South-Southeast. At the farthest distance of visibility the funnel of bats appeared to separate into swarms, one flying to the east and the other to the west. At 8:35 p.m. we noticed a family of raccoons (*Procyon lotor*), an adult and four half-grown young, in the corner of the cave near the entrance. They were busy feeding on young bats that were being pulled from the ledges. The night was overcast and no moon was visible. At 9:00 p.m. there was still a drizzle and the night was cool with a slight chill. We observed more bats leaving the cave at 10:20 p.m. We then left the area and drove roads looking for skunks.

We returned to the cave at 2:00 a.m. and observed bats returning in a massive continuous swarm. It was impossible to determine which direction they were coming from. Large numbers were still returning at 2:30 a.m., after which we could no longer keep our eyes open. However, we were awakened at 3:00 a.m. by heavy rain which continued for several hours. We were also awakened at 8:00 a.m. by bats returning to the cave. They continued to arrive either individually or in small numbers until 10:20 a.m. We departed Bracken Cave at 11:00 a.m. with 10 young bats from the floor, 15 young bats from the ledges, and 12 post-lactating females form the ceiling.

**The Winter Trip**

I headed to Bracken on Feb 9 in the company of Rick Roberts. The primary purpose of this trip was to investigate a cluster of bats reportedly hibernating in a raised dome near the rear of the cave. Mr. Marbach had moved to Converse, Texas, and we had a difficult time finding his house, so we didn't arrive at the cave site until 2:00 p.m. We then made our way into the cave and attempted to investigate its farthest retreats. Although I had been told that around 1,000 bats were roosting in the cave the previous weekend, we only detected a handful of bats in a dome leading to an abandoned mine shaft above. We attempted to capture specimens with an extended butterfly net but were unsuccessful. Thus, we were unable to identify them to species. However, they appeared to by small myotid bats and were likely cave myotis (*Myotis velifer*) based on the known winter distribution and occurrence of this species hibernating in central Texas caves (Schmidly 1991). Evening temperatures were in the low 30◦Fs, so we decided to return home that evening rather than camp. The only thing that we learned definitively from this trip was that FM 1337 to Bracken Cave had been changed to FM2552.

**The Wrap Up**

My farewell trip to Bracken Cave was on April 5, 1974. I was accompanied by George Baumgardner and Kirby Brown. My primary reason for making the trip was to collect an adequate number of male bats to include in the pesticide analysis. I also planned to collect a supply of dermestid beetles needed for cleaning skeletal material in the wildlife collection (at the request of Dr. Schmidly). As suspected, the bat population in the cave was low compared with summer months. Bats began swarming from the cave about 7:15 p.m., made several large counterclockwise circles outside the entrance, and funneled toward the east. There was still plenty of sunlight and no wind or cloud cover. Occasionally groups of bats would seem to free-fall from the farthest reaches of the ceiling and join the

swirling bats. The swarms began to thin out at 7:40 p.m., and by 7:55 p.m. there were no bats leaving the cave. Bats began returning to the cave around 8:00 p.m., but swarms were not nearly as large as those leaving the cave earlier.

At 8:30 a.m. on April 6 we entered the cave to attempt collecting bats by scraping them from the walls using butterfly nets. Again, we needed males because we were able to collect few males on previous trips. Thus, we had to net bats individually and examine them to determine sex. It took nearly two hours to collect 20 males, which amounted to less than 1% of the specimens examined. I then collected two cups-full of dermestid beetles, which I cleverly deposited in my fatigue jacket. The final part of this story was that when I arrived home, I followed usual protocol and immediately dumped all my field clothes in the washing machine. Upon completing the wash my wife opened the washer door to find an inch layer of beetles floating on the surface. She was most unhappy, as was Dr. Schmidly.

**Reflection**

From a scientific perspective my Bracken trips were a success. Dr. Clark included me as a co-author in his paper on organochlorine insecticide residues in Bracken Cave free-tailed bats (Clark et al. 1975). These data were then presented along with numerous other studies of pesticide contamination conducted in various regions (Clark 1981). However, my days and nights at Bracken have become even more meaningful in a broader sense. Since those days in the 1970s, the significance of Bracken Cave as a maternity sight for the largest population of Brazilian free-tailed bats has received world-wide acclaim. The purchase of the cave and adjacent property by BCI ranks as a major achievement for bat conservation. This has allowed a multitude of studies to be conducted that have verified the importance of the cave to both the bats and to humans directly or indirectly affected by the ability of bats to consume massive numbers of insects (Cleveland et al. 2006, Kunz et al. 2011)). And recently, with the purchase and protection of additional lands to curtail the threat of suburban development near the cave, the need for protecting the site has become even more aware to the general public. I look back on my old days at Bracken and realize how fortunate I was for this small piece of Bracken history in the 1970s to be part of my own life's journey.

**Literature**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# Abilene Christian University

Abilene Christian University, 1600 Campus Court, Abilene, TX 79699


## Tom Lee

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Research Interests, Projects, and Grants:
I have continued to conduct research the mammals of Ecuador (with Santiago Burneo and Ale Camancho). For the mammals of Ecuador we are planning a trip to Loja in the High Andes of Southern Ecuador. Furthermore, I am working with Josh Brokaw on the phylogenetics of the Ecuadorian genus *Thomasomys*. Two of my former students (Grayson Allred and Stephanie Martinez) are have finished their master's degrees at Angelo State University and Stephan Roussos has finished his Ph.D. at Texas Tech University. Stephanie Martinez is working as the collections manager at the ACUNHC. My former student Rachel Ritchie is working with Karen McBee at Oklahoma State on her master's. I am continuing to working with John Hanson and Miguel Pinto on additional research on Ecuadorian mammals. John Hanson and I published a paper on a new species (*Neusticomys vossi*). Hopefully there will be at least one more new species named this coming year from Ecuador.

# Angelo State University

Department of Biology, Angelo State University, San Angelo, TX 76909


## Loren K. Ammerman

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Research Interests, Projects, and Grants:
I am interested in bats and other mammals. I work with students to use molecular data to reconstruct evolutionary relationships of organisms and to investigate species boundaries. I also am interested in community structure and the ecology of bats, especially in Big Bend National Park and the Lower Canyons of the Rio Grande.

Current Graduate Students and Their Research:

- **Erin Adams** – Seasonal and nightly activity of Mexican long-nosed bats (*Leptonycteris nivalis*) in Big Bend National Park (completed MS thesis Fall 2015)
- **Grayson Allred** – Bat activity at Devil's River State Natural Area, Big Satan Unit (MS thesis student co-advised with Bob Dowler, Fall 2013-present)

- **Krysta Demere** – Diet of the Canyon Bat, *Parastrellus hesperus*, determined using molecular methods (MS thesis student, Fall 2014-present)
- **Citlally Jimenez** – Characterization of roost sites of the Southern Yellow Bat (*Lasiurus ega*) in southern Texas (MS thesis student, Fall 2014-present)
- **Katie Kuzdak** – (MS thesis student, project to be determined)
- **Stephanie Martinez** – Seasonal fluctuations in urban roost use by Brazilian free-tailed bats (*Tadarida brasiliensis*) in a highway overpass, San Angelo, Texas (completed MS thesis Fall 2015, co-advised with Bob Dowler)
- **Alexandra Shaffer** – Gene flow in the Eastern Spotted Skunk (*Spilogale putorius*) in Texas based on microsatellite markers (MS thesis student co-advised with Bob Dowler, Fall 2015-present)

Current Undergraduate Students and Their Research:

- **Craig Tipton** – Prevalence of Eptesipox virus in bats submitted to Department of State Health Services (Undergraduate Research Scholar, Fall 2015-Spring 2016)
- **Sydney Decker** – Defining lineages of the Northern Yellow Bat (*Lasiurus intermedius*) based on mitochondrial cytochrome b (Undergraduate Research Scholar, Fall 2015-Spring 2016)

Additional Information:
The Angelo State Natural History Collection has almost 18,000 mammal specimens and 20,000 tissue specimens. The collection is searchable at https://www.angelo.edu/dept/biology/asnhc/. Contact Loren Ammerman or Robert Dowler if you have any questions about the collection.

I will be offering a field course (Bio4403/5403:Natural History of Bats) at Angelo State University starting on May 16 and ending June 1 (Maymester 2016). The course involves a 6-day field experience in Big Bend National Park. The course objective is to study the ecology and evolution of the order Chiroptera with emphasis on unique adaptations related to the life history strategies and echolocation of North American bats. The course is limited to 15 participants. If you are interested in enrolling, please talk with me at the meeting or email me at loren.ammerman@angelo.edu.

## Robert C. Dowler

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Research Interests, Projects, and Grants:
I have begun field work to determine the status of the Plains Spotted Skunk (*Spilogale putorius interrupta*) in Texas, as well as examine the genetic variability across the species range**. I would be interested in all specimen records in Texas for any spotted skunks, as well as any sightings, photographs, or tissue samples with locality data.** I am also interested in the conservation biology and systematics of Galapagos rodents, collaborating with and with Cody Edwards at George Mason University.

This summer I will be co-leading (with Dr. Michael Dixon) a study abroad course on tropical biology and ecotourism to Costa Rica and Nicaragua.

Graduate Students and Their Research:

- Clint Morgan completed his M.S. research on microhabitat selection by *Peromyscus laceianus* as part of research on the mammals of the Devils River State Natural Area- Big Satan unit.

- Grayson Allred (co-chaired with Loren Ammerman) is finishing an acoustic monitoring survey of bats at the Devils River State Natural Area-Big Satan unit.
- Zachary Ellsworth is collecting data on season reproductive patterns of the hog-nosed skunk-*Conepatus leuconotus.*
- Malorri Hughes is finalizing her thesis research on the prevalence of the nematode parasite (*Skrjabingylus*) in skunks.
- Stephanie Martinez (co-chaired with Loren Ammerman) completed her M.S. research on roost use of free-tailed bats (*Tadarida brasiliensis*) at a bridge colony in San Angelo, Texas.
- Kaitlynn LeBrasseur is continuing graduate work on on pocket gopher endoparasites.
- Clint Perkins is a new graduate student working on the determining the status of eastern spotted skunks in Texas. He will be surveying in ten counties using live traps, game cameras and track plates.
- Alexandra Shaffer is a new graduate student also working on the eastern spotted skunk project and, in addition to assisting with field surveys, will focus on microsatellite variability and gene flow among populations of spotted skunks.


**Marcia A. Revelez**
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Research Interests, Projects, and Grants:
Collection Management, Integrated Pest Management, Best Practices in Museums, Museum Safety.

# Baylor University


Dept. of Biology, One Bear Place #97388, Baylor University, Waco, TX 76798-7388



**Kenneth T. Wilkins**
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Research Interests, Projects, and Grants:
Our projects generally relate to ecology and distribution of small mammals (primarily, rodents and bats) at the population and community levels in natural and urban settings.

Graduate Students and Their Research:

The BU mammalogy lab graduated two doctoral students in December 2014: *Anica Debelica-Lee*'s dissertation is entitled "Community Structure, Ecomorphology, Resource Partitioning, Diet: Implications for Conservation of a Forest-Dwelling Bat Community." Anica continues to teach part-time at St. Edwards University in Austin.

*Han Li* wrote a dissertation entitled "Urban Bats: Distribution, Roost Selection, and Foraging Site Selection." He is now a research associate with the NABat Transect Protocol project, based out of the University of North Carolina at Greensboro.

Additional Information:

Publications:

- H. Li & K.T. Wilkins. 2015. Selection of building roosts by Mexican free-tailed bats (*Tadarida brasiliensis*) in an urban area. *Acta Chiropterologica,* 17(2):321-330.
- N.S. Green & K.T. Wilkins. 2015. Habitat associations of the rodent community in a Grand Prairie preserve. *The Southwestern Naturalist,* 59:349-355. http://dx.doi.org/10.1894/TAL-61.1

Recent graduates:

- Nick Green, a 2012 doctoral graduate, works as an ecologist for the Columbia Environmental Research Center, U.S. Geological Survey, Columbia, Missouri.

# California Baptist University

California Baptist University, Riverside, CA 92504


## Art Cleveland

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Projects and Grants:

I am currently completing a book review for the JM. The book, *China's Mammal Diversity and Geographic Distribution*, was published in 2015. My role as Vice President University Advancement resulted in a $10 Million gift in January 2016. Additional major gifts are in process for various projects.

Additional Information:

Last year I chaired a session and presented a paper at an international conference in China. My presentation dealt with environmental implications of a bioremediation device on which I had earlier received a patent. Vicki and I are weighing several options for later this year that may return us to Texas.

# Houston Museum of Natural Science

Houston Museum of Natural Science, Dept. of Vertebrate Zoology, 5555 Herman Park Dr, Houston, Tx 77030-1799

## Dan Brooks

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Research Interests, Projects, and Grants:

Last year was very busy with the opening of three new Permanent Exhibits for the Division of Vertebrate Zoology:

- Glassell Hall of Tropical Marine Life
- Vintage Texas Wildlife Dioramas
- The newly ground-up revamped Farish Hall of Texas Wildlife
- Frensley/Graham Hall of African Wildlife Conservation continues to edutain visitors

Although I do quite a bit of work with birds, research interests in mammalogy span a variety of topics including community and behavioral ecology, biogeography and taxonomy, harvest patterns, natural history and conservation. I am particularly interested in Neotropical species in lowland regions east of the South American Andes (especially the Peruvian Amazon, Paraguayan Chaco and eastern Bolivia). Additional regions of coverage include Texas, Middle America, Africa and the Philippines.

Current mammalogy projects I'm involved in include:

- Cougar (*Puma concolor* Jardine) recolonization of east Texas (with J. Gonzalez, et al.)
- Documentation of a population of albino raccoons in SE Tx (with A. Castellanos)
- Predation on *Tadarida* by raptors (with K. Conlan)

Graduate Students and Their Research:

Working at a museum, I don't have my own grad students but currently serve as an external committee member for several students. In terms of Mammalogy, there are currently three committees I serve on, all Ph.D. candidates:

- Juan Carlos Diaz (Rice Univ.) – Tracking the origins and source of genetic variation in the gene *Vkorc1*
- Kim Dingess (Indiana Univ.) – Vocal communication of the Dusky Titi Monkey (*Callicebus donacophilus*)

Additional Information:

The primary driver of the Houston Museum of Natural Science is Education, including outreach. We educate every 4th and 7th grader in Houston Independent School District annually (approx. 700,000 students/yr), have nearly 2.5 million individuals come through the doors per annum, and are the 4th highest attended museum in the country; surpassed only by Smithsonian, AMNH and the MOMA, we are the highest attended US museum west of the Mississippi. Every year I tour college-level classes through

our collections and permanent wildlife exhibit halls. If you have any interest in coming for a visit just touch base directly!

# McMurry University

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## Joel G. Brant

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Research Interests, Projects, and Grants:
My research interests are primarily concerned with the natural history of mammals, particularly in Texas and the Chihuahuan Desert. My current research program focuses on the natural history & ecology of mammals in the Southern Rolling Plains, northern Edwards Plateau, and northeastern Chihuahuan Desert. My current projects include a survey of the mammals of the Southern Rolling Plains, specifically Taylor County & surrounding areas (with Tom Lee); an examination of the ecological distribution and population genetics of *Scalopus aquaticus* in Texas (with Dana Lee); assessing the ecological impacts of wind farms on bat diversity (with Tom Lee); & a survey of the geographic distribution of *Geomys bursarius* on the Southern Rolling Plains.


## Dana N. Lee

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Research Interests, Projects, and Grants:
I primarily study bats and am interested in all aspects of their ecology, genetics, and evolutionary relationships. Although, I use molecular biology tools to study the genetic variation of other wildlife populations. My undergraduate students are using PCR to possibly detect species of coronaviruses found in Texas bats, and Joel Brant and I are working on producing a molecular phylogeny for subspecies of the Eastern Mole.

# Midwestern State University

Assistant Professor of Biology, College of Science and Mathematics, 3410 Taft Blvd, Wichita Falls, TX 76308

**Ray E. Willis**
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Research Interests, Projects, and Grants:
My current research is conducted at the Dalquest Research Station located on the northeastern border of Big Bend Ranch State Park. I have initiated ongoing herpetological and mammal surveys of Dalquest with monthly trips throughout the year, along with extended summer opportunities. We have a newly constructed research station that opened in the summer of 2015 and can hold up to 20 researchers comfortably. Feel free to contact me if you would like to visit or perform some research at our facilities.

We are also performing a small mammal survey of the Fort Wolters Training Center located in Mineral Wells, TX through January 2017.

Students and Their Research:
I currently have seven graduate students working on various vertebrate morphology and phylogenetic research projects. Five grad students are scheduled to graduate in 2016. I have funding for all current projects and anticipate having room for at least three more students who would be interested in desert vertebrate research.

# Sam Houston State University

Department of Biological Sciences, Sam Houston State University, Huntsville, TX 77341

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Research Interests, Projects, and Grants:
Current research interests are twofold. My primary area of interest deals with detailed skeletal (primarily cranial) analyses of several vertebrate groups (mostly small mammals and reptiles) using micro-CT and 3D scanning and modeling techniques. We are currently expanding on the CT methods used in standard CT studies to include differential (iodine) staining of soft tissue anatomy to conduct innervation pathway and bite force comparisons among taxa. Second is completion of a project we started in 2008 with efforts to characterize the small mammal

species assemblage found at the Koanaka Hills, Ngamamiland Province, Botswana. That project carried through two field seasons in Botswana, with research elements focusing on identification of species present and how skeletal elements may be identified in owl pellet remains from a modern and paleontological perspective.

Current Graduate Students and Their Research:
Corey Green: An examination of environmental mercury contamination associate with artisanal gold mining in Zimbabwe.

Additional Information:
I have just completed revision of the 4th edition of "A Key to The Skulls of North American Mammals", which is being published through Kendall/Hunt and scheduled for release in early 2016.

# Tarleton State University

Department of Biological Sciences, Tarleton State University, Stephenville, TX 76402

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Research Interests, Projects, and Grants:
My main research focus is population and evolutionary genetics. Small mammals are the primary subject of my research; but I have mentored students working with crabs and fish. I have several ongoing projects in addition to those of my current students, including:

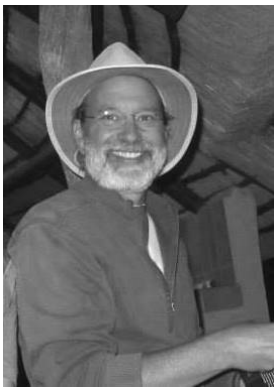
- Population genetics of *Dipodomys elator* (the state threatened Texas kangaroo rat) using DNA extracted from museum specimens to address spatial and temporal patterns of population structure.
- Distribution of shrews (*Blarina*) in the southern Great Plains using mtDNA sequencing (for identification) and morphometric analysis to examine geographical patterns of variation
- Population genetics of the pocket gopher (*Geomys breviceps*) across its geographic distribution in collaboration with Sam Kieschnick, Phil Sudman (Tarleton), and Jessica Light (Texas A&M).
- Characterization of the hybrid zone between eastern and western lineages of the cotton rat (*Sigmodon hispidus*) in Arkansas, Oklahoma, and Texas (using nuclear, mtDNA, and Y-chromosome markers).
- Development of microsatellite markers for the invasive mud crab, *Rhithropanopeus harrisii*

I am currently working under a TPWD Section 6 grant entitled "Assessment of genetic diversity of the state threatened Texas kangaroo rat, *Dipodomys elator*, using museum specimens".

Undergraduate Students and Their Research:

- Hunter Glisson-Warner – Population genetics of *Geomys arenarius* (the desert pocket gopher) using mtDNA sequencing
- Elizabeth Gilliland – Population genetics of *Dipodomys elator* (the state threatened Texas kangaroo rat) using microsatellites

- Jessica Heinsohn – Geographic patterns of morphometric variation of shrews (*Blarina hylophaga* and *B. brevicauda*) and genetic identification using mtDNA sequencing



### Philip D. Sudman

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Research Interests, Projects, and Grants:
I continue to have a keen interest in pocket gopher genetics/phylogenetics/ population genetics. I have recently been reassigned and now work primarily out of Tarleton's Fort Worth campus. I hope to continue to mentor graduate students on a limited basis, so if you are interested at all in a project of mutual interest and are seeking a small university atmosphere, please get in touch. Current graduate student projects include a data mining project in collaboration with Fossil Rim Wildlife Center related to cheetah breeding and an avian study involving breeding pen modifications for Attwater's prairie chickens (also associated with Fossil Rim).

# Texas A&M University-College Station

Department of Wildlife and Fisheries Sciences Texas Cooperative Wildlife Collection Texas A&M, College Station, TX 77843

### Jessica Light

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Web page: peoplec.tamu.edu/~jlight2

Research Interests, Projects, and Grants:
I am an evolutionary biologist with a focus on phylogenetic, population genetic, and ecological interactions between parasites and their hosts. To address these broad research interests, I employ a variety of tools such as molecular (multiple genes, population genetic loci, or genomic data) and morphological data from field-collected and museum specimens. My lab is currently founded by the East Foundation (to explore mammal and parasite diversity across East Foundation properties), the National Science Foundation (to investigate the population genetics of an expanding population of chewing lice), and Texas A&M University and CONACYT (to assess the role of the Mexican Plateau as a center for diversification).

Postdoctoral Researchers and Their Research:

- Nina du Toit-Heunis is a recent graduate of Stellenbosch University, South Africa. She is funded by the National Research Foundation of South Africa to undertake phylogenetic and population genetic assessments of sucking lice parasitizing rodents. Nina also is investigating sucking louse morphology and chewing louse population genetics.

Graduate Students and Their Research:

- Adrian Castellanos is a third year Ph.D. student. For his dissertation research, he will undertake a comparative phylogeographic study across Central America, concentrating his investigation on the variegated squirrel. Adrian also has been leading up an extensive study examining the interactions among invasive fire ants, small mammals, ticks, and tick-borne pathogens.
- Aleyda Galán is a third year M.S. student. Aleyda is examining mammal and pathogen biodiversity in south Texas through the East Foundation.
- Whitney Preisser is a third year Ph.D. student. Whitney is interested in examining how parasite diversity (specifically parasites of cricetid rodents) varies across latitude.
- Oona Takano is a third year M.S. student and she is an ornithologist interested in host-parasite coevolution, specifically of birds and their lice. Oona is also undertaking a study examining the population genetics of Townsend's big-eared bats (*Corynorhinus townsendii*) in California.

Undergraduate Students and Their Research:

- Hunter Folmar has been working with Ms. Galán, initially as a volunteer in the mammal collection preparing museum specimens. He has since expanded his repertoire to undertake examinations of ectoparasites and molecular investigations of mammals and pathogens from south Texas. Hunter will continue this research during the Spring 2016 semester.
- Katelyn Lasater has been working with Ms. Preisser to examine parasite diversity across latitudes, specifically looking at blood parasites of cricetid rodents. Katelyn will continue this research during the Spring 2016 semester.
- Preston Mitchell has been working with Ms. Takano, examining avian louse diversity across Africa. Preston will continue this research during the Spring 2016 semester.

Additional Information:
The mammal division in the Biodiversity Research and Teaching Collection (formerly the Texas Cooperative Wildlife Collection) has been very active. We currently have over 63,000 specimens and we are working our way through hundreds of work case specimens and continuing to work on overall organization. We are completely reorganizing the tissue collection and hope to have tissues available for loan later this year. The BRTC Web Page URL is http://brtc.tamu.edu. Our location at Texas A&M also provides opportunity for interactions with other mammalogists in the area, most notably Drs. Ira Greenbaum and Duane Schlitter. Both are supports of the BRTC; thanks Ira and Duane!

# Texas Parks and Wildlife

## Jonah Evans

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Web page: naturetracking.com

Research Interests, Projects, and Grants:
Conservation of nongame and rare mammals in TX.
Currently funded research projects include:

- Texas Bats Winter Roosts Prior to the Arrival of White-Nose Syndrome - TAMU - Michael Morrison

- Pilot-scale Implementation of North American Bat Monitoring Program (NABat) in Texas - SFASU - Chris Comer
- Distribution Of The Texas Kangaroo Rat (*Dipodomys elator*) In Texas - TX State - Randy Simpson
- WNS Treatment and Monitoring Study in TX Panhandle - Bat Conservation International - Katie Gillies

# Texas State University

Department of Biology, 601 University Drive, San Marcos, TX 78666

## Ivan Castro-Arellano

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Research Interests, Projects, and Grants:
I use my background and training as an ecologist to address questions to understand the ecology of zoonotic diseases and invasive species. Since mammals are natural reservoirs for many zoonotic diseases most of my work has been devoted to this taxonomic group, especially rodents and bats. Beyond my interest in disease ecology I also have done research on theoretical aspects of community ecology, specifically on the analysis of assemblage-wide temporal niche overlap and elements of metacommunity structure. I address these questions using a variety of approaches that include modelling, null models, and analyses of both published and empirically data generated at my lab. Although my research interests are wide they are intertwined and my goal is to integrate the study of community level dynamics in mammalian hosts to understand the dynamics of pathogen transmission.

Currently I have three projects that are supported by grants. The first one is our Puerto Rico mongoose project, funded by the Government of Puerto Rico and done in collaboration with a USDA-ARS laboratory. The main objective of this project is to ascertain the potential role of the invasive Small Asian Mongosse in Puerto Rico to sustain and disperse Cattle Fever Tick populations in the island. Our second project, funded by NIH, is about the population genetics dynamics and vector ecology of *Ixodes scapularis* in Texas. Very little is known about the ecology of this important vector in Texas and my lab is working on the potential mammal hosts for this species. This project is done in collaborator with two researchers from Texas A&M University. Finally, our third funded project is about the population status and distribution of the Texas Kangaroo rat, with this project being funded by Texas Parks and Wildlife and in which 4 faculty from Texas State are participating.

Graduate Students and Their Research:
- Matt Milholland (PhD) - Matt's dissertation work is centered around the ecological correlates for hantavirus seroprevalence at different spatial scales.
- Sara Weaver (PhD) - Sara joined my lab in the fall of 2015 and she will be working on the effects wind energy production has on populations of bats and birds at wind farm located in south Texas.

Very little is known about the interaction of wind energy turbines and wildlife in Texas although this state has quite a diverse avian and bat fauna that might be impacted by wind farms.

- Madison Torres (MS) - Madison is doing her graduate work on the home range dynamics of the invasive Small Asian Mongoose (*Herpestes aeropunctatus*) in Puerto Rico. She has done two summers of fieldwork and currently analyzing her data.
- Kathryn Michelle Benavidez (MS) - Michelle is working with the samples derived from fieldwork in Puerto Rico. She is trying to ascertain the potential role of mongooses and commensal rodents as reservoirs of Leptospira, a zoonotic pathogen that
- Jose Martinez (MS) - Jose work is centered on determining the endoparasite loads of the mongosses we have collected in Puerto Rico. He has been finding nematodes and acantocephalan worms, with some being new records for the island. Of special interest is trying to determine if the introduced mammal hosts endoparasites of veterinary or medical importance.
- Gabriela Solis (MS) - Gaby is working in close collaboration with a USDA research lab and will be conducting molecular work on horn flies with a special interest in determining the genetic basis for pesticide resistance in these flies.
- Bradford Westrich (MS) - Brad is currently working on my NIH-funded grant centered about the population genetic dynamics and vector ecology of *Ixodes scapularis*. He recently started the fieldwork in which we are trapping small and meso-mammals in eastern Texas.
- Candice Rodriguez (MS) - Candice has been an undergraduate volunteer at my lab for more than two years and she is starting her MS on spring 2016. She will analyze the food habits of the invasive mongoose in Puerto Rico. She already has done two summers of fieldwork and collected the digestive tracts needed for her work.

# Texas Tech University

Department of Biological Sciences, and Museum of Texas Tech University, Lubbock, TX 79409

**Robert D. Bradley**
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Research Interests, Projects, and Grants:
My research interests include: systematic relationships, molecular evolution, genomics, and natural history of mammals, particularly in the cricetid and geomyoid rodents; examination of hybrid zones between genetically distinct taxa; including isolating mechanisms and the dynamics of genetic introgression; exploring the utility and application of the Genetic Species Concept; examination of the origin and evolution of rodent-borne viruses, especially in the use of rodent phylogenies and genetic structure to predict the transmission and evolution of viruses; modeling predictions associated with epidemiology; and growth and utilization of natural history collections, especially those pertaining to mammals.

Current Projects:

- Systematics of the genus *Peromyscus*
- Use of genomic methods to investigate speciation in *Peromyscus*

- Systematic and phylogenetic studies of *Peromyscus boylii* species group
- Systematic and phylogenetic studies of *Peromyscus maniculatus*
- Endangered species research on *Dipodomys elator* with R. Stevens, D. Ray, and N. Platt
- Phylogenetic relationships of Neotomine and Reithrodontomyine rodents
- Systematic and phylogenetic studies of the genus *Neotoma*
- Systematic and phylogenetic studies of the genus *Geomys*
- Ecology of hanta- and arenaviruses in the southwestern US and Mexico
- Effects of zonadhesin gene in speciation of mammals
- Population genetics and origin of elk in Texas
- Revision of the *Mammals of Texas*

Graduate Students and Their Research:

- Kathy MacDonald (PhD student, Co-chaired with Dr. Richard Strauss) is in her 7th year. Dissertation involves modeling biological and genetic parameters of the *Catarina arenavirus* in *Neotoma micropus*.
- Emma Roberts (PhD student) is in her 5th year. Dissertation involves interaction of egg and sperm fusion proteins in hybridization events.
- Chris Dunn (MS student) is in his 3rd year. Thesis involves determining the origin of the Texas elk herd.
- Laramie Lindsey (PhD student) is in her 2nd year. Dissertation undecided but she currently is examining transcriptomes in various species of *Peromyscus* in order to detect genes associated with speciation process.
- Jack Francis (MS student) is in his 1st year. Jack is being co-chair by Dr. Caleb Phillips and will be using next-gen methods to determine the systematics and taxonomy of *Peromyscus maniculatus*.
- Taylor Soniat (MS student) is in his 1st year. Taylor is getting experience in the lab and will be deciding on a thesis soon.

Graduated Students:

- Megan Corley (now Megan Keith) will graduate in December 2015 with her PhD degree. Dissertation involved determining phylogenetic relationships within the Neotominae. Megan is now a faculty member at South Plains College.
- Nicté Ordóñez-Garza (PhD student) graduated in December 2015. Dissertation involved exploring the biogeographic impact of the Isthmus of Tehuantepec on rodent fauna. Nicte is working at the NSRL and finishing up some research projects with applying for research positions.

Undergraduate Students and Their Research:

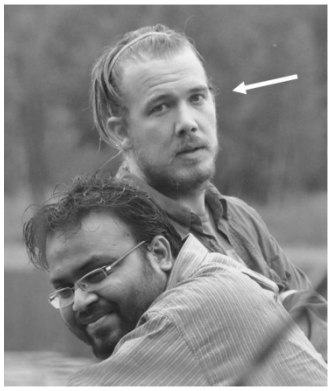
Last year, 11 undergraduate students (Clinton Gabel, James Francis, Marisa Wagley, María Núñez, Gage Rowden, Catarina Pizana, Zach Middleton, Megan Spradley, Amy Voigtel, Kelsey Donckels, and Whitney Watson) were involved in various research projects in the Laboratory.

Additional Information:

My teaching responsibilities include: Mammalogy, Natural History of the Vertebrates, Molecular Systematics and Evolution, Mammalogy for Advanced Students, and Principles of Systematics. In addition, I teach Mammalogy at the Texas Tech University Center at Junction each May (referred to as the Intersession Semester). This is an excellent opportunity to receive credit at the Graduate or Undergraduate level. I also teach "Field Methods" for the Museum of TTU each summer. This three-week course offers an opportunity to garner experience in field biology.

In June 2015, I became Director of the Natural Science Research Laboratory, Museum of Texas Tech University, a position that Dr. Robert Baker held for 40+ years.

In addition, I am editor of the two publication series (*Occasional Papers* and *Special Publications*) at the Natural Sciences Research Laboratory. We are seeking to increase the number of contributions to these two series, so please, send us your manuscripts!



## Caleb D. Phillips

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Research Interests, Projects, and Grants:

The Phillips laboratory studies metagenomic and genomic evolution underlying mammalian adaptations. Owing to the diversity and uniqueness of bats, most of our current projects utilize chiropteran systems.

Our work in metagenomics is geared to understand the relationship between the function and phylogenetic distribution of genes occurring in microbial genomes, the observed microbiome community structure of (and variance among) individual hosts, and host lineage-specific functional differences of metagenomes. By incorporating concepts developed in the fields of evolutionary biology, genomics, phylogenetics, physiology and ecology, this work builds systems-level understanding of organismal function.

Our work in genomics devolves from our interest in understanding how evolution of gene expression explains functional differences across lineages. For example, we are interested in identifying which genes have been recruited (i.e. turned on) in specific tissues of some bat species, but not others, and how these recruitments are adaptive to the different diets of these species. Related, we are developing projects to understand gene expression changes as a physiological response to flight and foraging. A uniting theme of our work is the goal of understanding the diversity of ways in which genomic function evolves to support success in different dietary niches.

Current Projects:

- Community assembly processes and functional evolution of metagenomes
- Functional evolution of salivary glands

Graduate Students and Their Research:

- Howard Huynh (PhD student): Howie's dissertation focuses on systematics, phylogeography, and zoonosis of *Peromyscus* of mainland and island populations in Atlantic Canada.
- Preston McDonald (MS student): Transcriptional responses to active flight in bats: lipid metabolic pathways.
- Oscar Sandate (MS student): Community and functional evolution of mammalian metagenomes.

Additional Information:

My teaching responsibilities include bioinformatics and metagenomics. These courses are offered at graduate and undergraduate levels.


## Richard D. Stevens

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Research Interests, Projects, and Grants:

Currently I have several ongoing projects:

- Mojave Desert metacommunity dynamics—The Mojave Desert exhibits much interyear variability in precipitation and productivity. Productivity inputs affect rodent population density and also the propensity of individuals to disperse to new communities. We are examining how productivity pulses affect the relative contributions of local environmental conditions and regional dispersal to structure of rodent communities in the Mojave National Preserve.
- Patterns of biodiversity of New World bats—Bread and butter of our research program has been to try to better understand patterns of biodiversity of bats in the New World, in particular the Neotropical family Phyllostomidae. Currently we are considering multiple dimensions of biodiversity (i.e., taxonomic, phylogenetic, functional and morphological) to better understand correlations among these dimensions and in particular are to better understand the unique insights (if any) that can come from these different dimensions.
- Conservation of Atlantic Forest bat communities—More bread and butter in the lab has to do with trying to understand patterns of distribution and abundance of bats in Atlantic Forest, especially in light of forest fragmentation, and how this affects the organization of communities. Atlantic Forest is perhaps the most fragmented forest in the World (reduced to about 7% of its original extent) and what remains is a highly distributed network of patches of various sizes and configurations. Unfortunately, Atlantic Forest has become the premier natural laboratory from which to study effects of fragmentation. Historically we have focused our work on Atlantic Forest found in Paraguay, but recently through collaboration with Renata Muylaert and Milton Ribeiro we have begun examining effects of fragmentation on bat community structure across the entire Atlantic forest. More as things develop.
- Distributional update for Texas Kangaroo rats—Through collaboration with Robert Bradley, David Ray and Neal Platt (Biology TTU) we are re-examining the distribution and abundance of Dipodomys elator as well as examining if this species forms a metapopulation within its small geographic range in Texas. We will be intensively sampling about 50 sites within its range for rodents and environmental/habitat characteristics, conducting thousands of miles of nocturnal road surveys and estimating patterns of genetic diversity using both individuals caught in the wild and museum specimens.
- Statewide survey of bats of Louisiana with a focus on roosting ecology of Myotis spp.
- We are in our fourth year of a statewide survey of bats of Louisiana. We have just been awarded additional funding to examine the roosting ecology of Myotis septentrionalis and M. austroriparius in order to build a predictive model to be used in forest management.

Graduate Students and Their Research:

- Garret Langlois— Garret is a fourth year Ph.D. student that conducted fieldwork in Atlantic Forest of Paraguay for a year and a half, studying the behavioral ecology (specifically roost use and selection, social interaction networks, and geospatial configuration) of two bat species. Currently he is characterizing those data for *Artibeus lituratus*, and making comparisons between anthropogenically modified and natural landscapes. He also collected a small data set on *Chrotopterus auritus*, a very large, sexy carnivore that is fairly rare. Garret is interested in using

wildlife behavior to evaluate ecological integrity, and advocates behavior being better integrated to optimize species conservation and management.

- Cristina Rios-Blanco—Cristina started her Ph.D. at TTU in August 2014. She is interested in how bat communities are assembled at regional scales. She is studying Neotropical bat metacommunities along elevational gradients of bats and trying to use elevational contexts to better understand bat metacommunity structure. She will also be developing a network approach to apply to metacommunities to better elucidate biological processes important to metacommunity dynamics.
- John Stuhler—John is a first year Ph.D. student having just finished his M.S. at the University of Wisconsin. He is interested in the ecology/conservation biology of Texas kangaroo rats. He is in the process of working on contemporary and future niche models for the species as well as conducting an intensive study of habitat preferences.
- Michaela Halsey— Michaela is a first semester Ph.D. student who is interested in the population/landscape genetics of the Texas kangaroo rat and aims to shed light on the phylogenetic uncertainty of the species by implementing genomic tools and analyses. Having already worked with small mammals from western Maryland, northern California, and central Panama, and she is eager to study species from the southwest. She is co-advised by David Ray and me.
- Erin Stukenholtz—Erin started her M.S. in June 2014. She is interested in dietary patterns of bats, especially differences between pregnant and nonpregnant (males, females and juveniles) bats in terms of their diets and relating this back to the energetics of pregnancy and lactation. Erin will also develop a less invasive means of determining early pregnancy by examining progesterone levels in feces.
- Carlos Garcia—Carlos is a long-time veteran of the lab having started as an undergrad right after I started at TTU in 2014. He has now graduated and has started a M.S. under David Ray and me. As an undergrad, Carlos contributed greatly to the initial work on *D. elator*. For his masters, he is working on roosting ecology of *Myotis* bats in Louisiana as well as conducting surveillance of white-nose syndrome in the state.

# Trinity University

Department of Biology, One Trinity Place, Trinity University, San Antonio, TX 78212

**David O. Ribble**
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Research Interests, Projects, and Grants:
I am interested in the evolutionary ecology of small mammals, primarily *Peromyscus* and elephant-shrews. My research in recent years has ranged from studies of social organization to mating behavior to thermal ecology. My students and I have been funded through a Math-Biology NSF grant on a project modeling geographic distributions of select *Peromyscus* in North America. I finally stepped down as Chair after 12 years and will be enjoying a 2016 sabbatical starting with 4 months in Monteverde, Costa Rica (February – May).

Undergraduate Students and Their Research:

- Heather Finch and Madeline Petri – Modeling Mammal Distributions in North America.

# University of Central Oklahoma

Department of Biology, Edmond, OK 73034

**Michelle L. Haynie**
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Research Interests, Projects, and Grants:
My research interests lie in population genetics and molecular systematics. Currently, I have students examining genetic diversity in *Mephitis* populations in the central U.S. and *Geomys* populations in Oklahoma. Additionally, I co-advise a student examining genetic diversity in mud turtles.

Graduate Students and Their Research:

- Laura Kimmel – Phylogeography of Sonoran Mud Turtles in a fragmented landscape; co-advised with Dr. Paul Stone
- Cristina Coffman – Genetic examination of *Geomys* contact zones in central Oklahoma and a putative cryptic species in the Oklahoma panhandle (using microsatellites and mitochondrial DNA)
- Kristy Meyer – Reexamination of a known *Geomys* contact zone in Cleveland Co., Oklahoma (using Y chromosome and nuclear markers)

Undergraduate Students and Their Research:

- Sharonda Carson – Genetic variation in striped skunk (*Mephitis mephitis*) populations in the central United States; senior
- Rebecca Dimanche – Genetic examination of *Geomys* contact zones in central Oklahoma (Y chromosome markers); senior
- Kori Owens – Genetic examination of *Geomys* contact zones in central Oklahoma (mitochondrial DNA markers); senior
- Sabrina Bermudez – Evaluation of microsatellite markers for use in a phylogeographic study of Sonoran mud turtles (*Kinosternon sonoriense*); sophomore

Additional Information:
I am still in the process of writing the "Mammals of Oklahoma" with Bill Caire and Lynda Loucks. Any information you have regarding Oklahoma mammals would be greatly appreciated.

# University of Mary Hardin-Baylor

Department of Biology, University of Mary Hardin-Baylor, Belton, TX 76513

**Cathleen N. Early**
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Research Interests, Projects, and Grants:
Biology research interest: terrestrial ecology of vertebrates. Pedagogy research: improving spatial organization in lab setting to improve the learning environment and developing engaging hands-on activities for difficult concepts. I am also the faculty sponsor of the Mu Eta Beta chapter of Beta Beta Beta.

Additional Information:

- Started at UMHB in 2004, was promoted to Professor of Biology in 2015.
- University service: Undergraduate representative for the College of Sciences on our academic assessment team. At-large member of Faculty Council 2015-2016.
- Professional service: Collegiate Academy Counselor for Texas Academy of Science 2015-2016.

# The University of Texas at Austin

Texas Natural Science Center, 2400 Trinity St. Austin, TX 78705

**Pamela R. Owen**
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Web page: www.TexasMemorialMuseum.org

Research Interests, Projects, and Grants:

- Evolutionary history of American badgers (Taxidiinae). I am the author of *Evolution of American Badgers*, a chapter in *Badgers: Systematics, Biology, Conservation and Research Techniques*. The book is in press, publication scheduled for March 2016 by Alpha Wildlife Research & Management, Sherwood Park, Alberta, Canada.
- Late Cenozoic mammalian faunas: Description of antilocaprid (*Capromeryx*) skeletal material from a Pleistocene-Holocene site in Travis County, co-authored with Phill Shaw (one of my museum volunteers), is complete and accepted by *Texas Journal of Science*.

Additional Information:
I continue to serve as Associate Editor for *Mammalian Species* (fossil record section) and serve on the Public Education Committee of the American Society of Mammalogists. I provide annual training in

mammalogy for six chapters (Balcones Canyonlands, Capital Area, Good Water, Guadalupe County, Hays County, and Lost Pines) of Texas Master Naturalists.

# University of Houston—Downtown

Department of Natural Sciences, 1 Main Street, Houston, TX 77002


## Amy Baird

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Research Interests, Projects, and Grants:
My research interests include molecular phylogenetics, phylogeography, and speciation of mammals. Current projects include genetic studies of local populations of pocket gophers; molecular phylogenetics of *Lasiurus*, including phylogeography of the Hawaiian Hoary bat; and molecular genetics of bowhead whales (grant funded through the North Slope Borough). I've also been working on herps with a phylogeographic study of *Rhinoclemmys* (with John Carr). I am partially funded by a Department of Education Minority Science and Engineering Improvement Program (co-PI) and a grant from the North Slope Borough (PI).

Undergraduate Students and Their Research:

- Ashlyn Holbert – Ashlyn joined the lab in 2015 and has worked on several projects including phylogeography of Hawaiian hoary bats and population genetics of bowhead whales.
- Chris Bailey – Chris joined the lab in 2016 and is interested in wildlife biology.
- Holly Harper – Holly joined the lab in 2016 and is working on phylogenetics of gophers.

# Minutes of the 2015 Business Meeting

The meeting was called to order by President Scott Chirhart at 3:50 p.m. in the Packard Building of the Texas Tech University Center at Junction. The minutes of the 2014 Annual Business Meeting, as written in the 2015 annual meeting Program for the Texas Society of Mammalogists (TSM), were approved.

**Officers' Reports**

Secretary-Treasurer Loren K. Ammerman announced that there were 153 people registered for the meeting this year (a record attendance), representing 39 institutions from 7 states and 2 countries. Ammerman also reported that 47 new members paid dues this year, and the new members were approved by the Executive Committee.

Ammerman reported income and expenses for the 2014 calendar year as printed in the 2015 meeting program. In 2014, total income was $16,041.16 and total expenses were $14,394.90. Ammerman reported that $10,000 of the checking account funds were transferred to the Morgan Stanley investment fund in March of 2014, the investment fund earned $5,377.58, and $916.19 were paid in fees, resulting in a balance of $86,856.81 in the Morgan Stanley fund. The checking account ended the year with a balance of $4,551.84. Thus, total assets of the society at the end of 2014 were $91,408.65.

Ammerman announced that this was the close of her 10$^{th}$ and final year to serve as Secretary-Treasurer. She recognized and thanked the many students who helped her with registration, the poster session, and other logistics for the meeting. President Scott Chirhart and the membership recognized Loren for her service to the Society with a round of applause and standing ovation.

Permanent Secretary Lisa Bradley reported that she continues to maintain the archives of the society at Texas Tech to document the history of the society (copies in both her office and the Southwest Collection). She takes photos of all presenters, award winners, and otherwise documents the meeting with photographs. She also announced that she keeps track of all official correspondence of the society and all Committee Reports should be forwarded or Cc'd to her for the permanent archives. She thanked the committee chairs who had turned in their reports to her. She also reported that she files the annual tax statement of the Society to the IRS each year.

Editor Russell Pfau explained that his duties are to maintain the website of the Society and to produce the annual Newsletter that is printed in the back of the program. As a service to students, the Newsletter contains an overview of the research programs of the faculty members of the Society. He announced that he had recently updated the layout and navigation of the website, and that it is now "mobile-friendly".

**Reports of Committees**

Phil Sudman, Chair of the Committee for Honorary Members, announced that he would make his report at the banquet. Sudman reminded the members that nominations for Honorary Membership should be forwarded to him or to any member of the Executive Committee. At the banquet, Sudman announced that the Executive Committee had elected Rodney Honeycutt of Pepperdine University as Honorary Member of the Society. Rodney will receive his framed Honorary Membership declaration at the 2016 TSM meeting.

Michael Tewes, Chair of the Committee on Conservation, reported that he had consulted with Jonah Evans, state mammologist for Texas Parks and Wildlife Department, to determine conservation issues and species of concern in Texas. Preliminary concerns were white-nosed syndrome and its potential to reach Texas and affect bat populations, and the population status of the Texas kangaroo rat (*Dipodomys elator*), plains spotted skunk (*Spilogale putorius interrupta*), ocelot (*Leopardus pardalis*), and Limpia Creek pocket gopher (*Thomomys umbrinus texensis*).

Jonah Evans was invited to expand upon Tewes' report. Jonah mentioned that several other species were of concern, including kit foxes (*Vulpes macrotis*). He also announced that he would appreciate being informed of any "red flags" that members noticed in the course of their research concerning species that are possibly in decline.

Mike Tewes also announced that the meetings of the European Congress of Mammals would be in Stockholm Sweden, 16-22 August 2015. He encouraged faculty and students to consider attending.

David Schmidly commented that he and Robert Bradley were currently preparing a new edition of *The Mammals of Texas*. He mentioned that the new edition would include taxonomic updates, as well as new information on population status for each species. He invited members to contact him or Bradley with any relevant information.

Bob Dowler spoke about his work to determine the status of the plains spotted skunk. He asked that members contact him with reports of road kills, etc.

President-elect Monte Thies, Chair of the Committee for Student Honoraria, announced that he would make his report later that evening at the banquet. After the banquet dinner, Thies announced the winners of the presentation awards. Each winner received a cash award ($500 for the Packard Award and $400 for all others). (See New Business, below, regarding the designation of two new poster award categories.)

The award winners for oral presentations were:

1. Rollin H. Baker Award — **Rachel Ritchie** (Abilene Christian University)
2. TSM Award — **Emma Roberts** (Texas Tech University)
3. William B. Davis Award — **Erin Mattson** (Texas A&M University at Galveston)
4. Bobby Baker Award – not awarded; there were no candidates in this category
5. Robert L. Packard Award — **Dara Orbach** (Texas A&M University at Galveston)

Poster presentation award winners were:

1. Clyde Jones Award (graduate) — **Christopher Dunn** (Texas Tech University)
2. Vernon Bailey Award (graduate) — **Clint Morgan** (Angelo State University)
3. Clyde Jones Award (undergraduate) — **Alesha Rimmelin** (University of Houston - Downtown)
4. Vernon Bailey Award (undergraduate) — **Mitchell Crittenden** (McMurry University)

Mike Tewes, Chair of the *ad hoc* Government Relations Committee, announced that Jonah Evans had formed an informal Mammal Advisory Group, which includes several members of the Society. Tewes announced that he and other members had provided comments on numerous species.

Marcy Revelez, Chair of the *ad hoc* Auction Committee, thanked the committee members and others for donating and/or soliciting contributions, setting up, and conducting the silent and live auctions. She reported auction income from 2014 of $4,600. She especially thanked Joel Brant and Marie Tipps, Ann and Terry Maxwell, and others. She confirmed that cash, checks, and credit card payments would be accepted at the auction.

Phil Sudman, Chair of the *ad hoc* Financial Advisory Committee, updated the membership regarding the investment fund of the society. The investment fund has done well, as reported by the Secretary-Treasurer. The Committee recommended that the Society continue with the current arrangements with Darla Cannon (financial advisor) and the Morgan Stanley fund. The committee also recommended that the Permanent Secretary continue to file the Society's annual tax return with the IRS, as long as the Society's assets and average income allow filing of the simple 990-N form. The committee noted that increasing the value of student awards above $600 would require the submission of 1099-MISC forms to the award winners and to the IRS, as well as filing the full 990 tax return; this change would necessitate the hiring of a CPA.

Russell Pfau, Chair of the *ad hoc* Financial Allocation Committee, reported that the charge of this committee was to brainstorm ideas for how to best use the investment funds of the society. The top two items that the committee suggested to the Executive Committee was to pay for the travel costs for the banquet speaker each year (in addition to the current Honorarium of $500). The Executive Committee approved this idea. The second idea was to offer student research grants, but the Executive Committee decided not to pursue this option at this time. Other ideas were reducing the meeting expenses for students and increasing the amount of the student awards. The membership is encouraged to contact the Executive Committee with any additional suggestions.

**Election of Officers**

President Chirhart announced that the Executive Committee had nominated three candidates for President-Elect: Cathy Early of University of Mary Hardin-Baylor, Amy Baird of University of Houston Downtown, and Jessica Light of Texas A&M University. Jessica Light declined the nomination due to her "baby obligation". The floor was opened for additional nominations. There were none. President Chirhart asked Amy Baird to introduce herself to the membership and provide some background information. President Chirhart and Joel Brant provided the membership with information about nominee Cathy Early (who was not in attendance). A ballot election was held. Amy Baird won the vote to become President-Elect.

President Chirhart announced that the Executive Committee wished to nominate Marcy Revelez of Angelo State University for Secretary-Treasurer. The floor was opened for additional nominations. There were none. Revelez was approved by acclamation.

President Chirhart announced that the Executive Committee wished to nominate Lisa Bradley of Texas Tech University for Permanent Secretary. The floor was opened for additional nominations. There were none. Bradley was approved by acclamation.

**New business.**

**Elevation of the *ad hoc* Financial Advisory Committee to a standing committee.**

The *ad hoc* Governance Committee of Ira Greenbaum (Chair), Robert Baker, and David Schmidly presented a proposed amendment to the by-laws of the Society to elevate the Financial Advisory Committee from an *ad hoc* committee to a standing committee. The amendment outlined the duties and responsibilities of the Financial Advisory Committee and a plan for rotating membership on the committee. The proposed amendment to the by-laws, below, was approved.

> Financial Advisory Committee – The role of this Committee is to (a) act as the liaison between the financial advising firm and the society and (b) advise the officers and membership of the Texas Society of Mammalogists on financial issues that affect the society. This Committee is to be constituted of a Chairperson and a minimum of two additional members. The Chairperson and committee members will be selected by the President and approved by a two-thirds majority of the voting members of the Executive Committee. At least one member of the committee shall be a member of The Executive Committee. Term of appointment shall be three years with staggered replacement of one member each year; members are eligible for reappointment. The Committee shall submit a written report to the President and Secretary-Treasurer no later than January 15th annually.

The ad hoc committee recommended that, for initial establishment, the staggered replacement of members be initiated in Year 4 of existence of the committee.

**Proposed amendment to the by-laws to add two new poster award categories.**

President Chirhart announced that the Executive Committee was proposing two new award categories. Given the increasing number of poster presentations at the TSM meetings, the Committee proposed that the Clyde Jones and Vernon Bailey awards for poster presentations should have separate "graduate" and "undergraduate" divisions. The proposed amendment to the by-laws, below, was approved.

> Clyde Jones Awards – The Clyde Jones Awards are presented for the best poster presentations given by one graduate student and one undergraduate student in mammalian molecular biology, evolution, and systematics. Eligibility is open to any student who has not previously received the award at the respective academic level.
>
> The initial Clyde Jones Award was established in 2004 in honor of Clyde Jones, who is currently Horn Professor Emeritus at Texas Tech University. Jones has been an active member of TSM since its inception in 1983 and was President of the Society in 1987-88.
>
> Vernon Bailey Awards – The Vernon Bailey Awards are presented for the best poster presentations given by one graduate student and one undergraduate student in classical mammalogy at the organismal level. Eligibility is open to any student who has not previously received the award at the respective academic level.
>
> The initial Vernon Bailey Award was established in 2004 in honor of Vernon Bailey (1864-1942), Chief Field Naturalist and Senior Biologist for the Department of Agriculture's Bureau of Biological Survey from 1897 to 1933. Bailey conducted the first and most complete biological survey of Texas, from 1889 to 1905.

**Selection of the site for the 2016 TSM meeting**

It was moved and seconded to hold the 2016 TSM meeting at the TTU Center at Junction. Motion passed. The 2016 meeting will be held February 12-14, if the TTU Center is available. There was some discussion about the size of the meeting this year and its impact on the organization of the meeting (i.e., holding the presentations in the Dining Hall rather than the Packard Building). The alternatives discussed for addressing this issue in the future included, 1) holding the meetings at a larger conference center, rather than the TTU Center at Junction, or 2) having concurrent sessions in two rooms of Packard. The membership was encouraged to bring their ideas and input to Marcy Revelez.

**Other new business.**

President Chirhart opened the floor for discussion of any additional new business. There was none.

President Chirhart closed the meeting by thanking the officers, committee chairs, and committee members for their help, especially Loren Ammerman, Joel Brant, and Monte Thies.

The meeting was adjourned at 4:30 p.m.

Respectfully submitted,
Lisa Bradley
Permanent Secretary

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Newsletter Editor: Russell Pfau

# STUDENT AWARDS

***These awards are made possible by the generous donations of the Society's members and by fundraising activities.***

Robert L Packard Award – The Robert L. Packard Award is presented for the Best Overall oral presentation. Eligibility is open to any student who has not previously received this award. This award currently includes an honorarium of $500.

The Robert L. Packard Award was first awarded in 1985 for the best student presentation. In 1990, when the TSM Award was established, the Packard Award was designated for the best presentation in classical mammalogy. Since 1998, the Packard Award has been designated for the Best Overall oral presentation. The award was named in honor of Robert L. Packard (1928-1979), the founder of the Texas Society of Mammalogists.

TSM Award – The TSM Award is presented for the best oral presentation in mammalian molecular biology, evolution, and systematics by a graduate student. Eligibility is open to any graduate student who has not previously received this award. This award currently includes an honorarium of $400.

The TSM Award was established in 1990.

William B. Davis Award – The William B. Davis Award is presented for the best oral presentation in classical mammalogy at the organismal level by a graduate student. Eligibility is open to any graduate student who has not previously received this award. This award currently includes an honorarium of $400.

The William B. Davis Award was established in 1998 in honor of William B. Davis (1902-1995), a leading mammalogist in Texas and the first Head of the Department of Wildlife and Fisheries Sciences at Texas A&M University. Davis authored or co-authored five editions of *The Mammals of Texas* (1947, 1960, 1966, 1974, 1994).

Bobby Baker Award –The Bobby Baker Award is presented for the best oral presentation in mammalian molecular biology, evolution and systematics by an undergraduate student. Eligibility is open to any undergraduate student who has not previously received this award. This award currently includes an honorarium of $400.

The Bobby Baker Award was established in 2013 in honor of Bobby Baker (1986-2012), who was an active and award-winning undergraduate member of the Texas Society of Mammalogists.

Rollin H. Baker Award – The Rollin H. Baker Award is presented for the best oral presentation in classical mammalogy at the organismal level by an undergraduate student. Eligibility is open to any undergraduate student who has not previously received this award. This award currently includes an honorarium of $400.

The Rollin H. Baker Award was established in 2002 in honor of Rollin H. Baker (1916-2007), president of the Society in 1984-85 and an active member of TSM from 1984 until his death in 2007.

Clyde Jones Awards – The Clyde Jones Awards are presented for the best poster presentations by one graduate student and one undergraduate student in mammalian molecular biology, evolution, and systematics. Eligibility is open to any student who has not previously received the award at the respective academic level.

The initial Clyde Jones Award was established in 2004 in honor of Clyde Jones (1935-2015), Horn Professor of Biological Sciences at Texas Tech University. Jones was an active member of TSM since its inception in 1983 until his death in 2015, and was President of the Society in 1987-88.

Vernon Bailey Awards – The Vernon Bailey Awards are presented for the best poster presentations by one graduate student and one undergraduate student in classical mammalogy at the organismal level. Eligibility is open to any student who has not previously received the award at the respective academic level.

The initial Vernon Bailey Award was established in 2004 in honor of Vernon Bailey (1864-1942), Chief Field Naturalist and Senior Biologist for the Department of Agriculture's Bureau of Biological Survey (1897-1933). Bailey conducted the first and most complete biological survey of Texas, from 1889 to 1905.

# TEXAS SOCIETY OF MAMMALOGISTS

## Honorary Members

***Class of 1985***
W. Frank Blair (D)
Walter W. Dalquest (D)
William B. Davis (D)
Robert L. Packard (D)

***Class of 1986***
Rollin H. Baker (D)

***Class of 1991***
Howard McCarley (D)

***Class of 1992***
J Knox Jones, Jr. (D)

***Class of 1995***
Clyde Jones (D)

***Class of 1997***
Robert J. Baker

***Class of 1998***
James Scudday (D)
Herschel Garner

***Class of 1999***
David J. Schmidly

***Class of 2002***
Art Harris

***Class of 2003***
Arthur G. Cleveland

***Class of 2004***
Ira F. Greenbaum
Robert E. Martin

***Class of 2006***
Ann Maxwell
Terry Maxwell

***Class of 2007***
Guy Cameron
Earl Zimmerman

***Class of 2008***
John Bickham

***Class of 2010***
Robert Dowler

***Class of 2011***
Ron Pine

***Class of 2013***
Fred Stangl

***Class of 2015***
Rodney Honeycutt

## Patron Members

Jo Actkinson
Loren K. Ammerman
Amy Baird
Robert Baker
Rollin Baker (D)
John Bickham
Lisa Bradley
Robert Bradley
Joel Brant
Guy Cameron
Darin Carroll
Ron Chesser
Scott Chirhart
Arthur G. Cleveland
Michael Dixon
Robert C. Dowler
Cathy Early
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Meredith Hamilton
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Michael Husak
Clyde Jones
Stephen Kasper
Thomas E. Lee
Jessica Light
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Kevin McKinney
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Anne Merchant
Chris Montag
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Stephanie Shelton
Steve Smith
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Don Wilson
Bernd Wursig
Earl Zimmerman