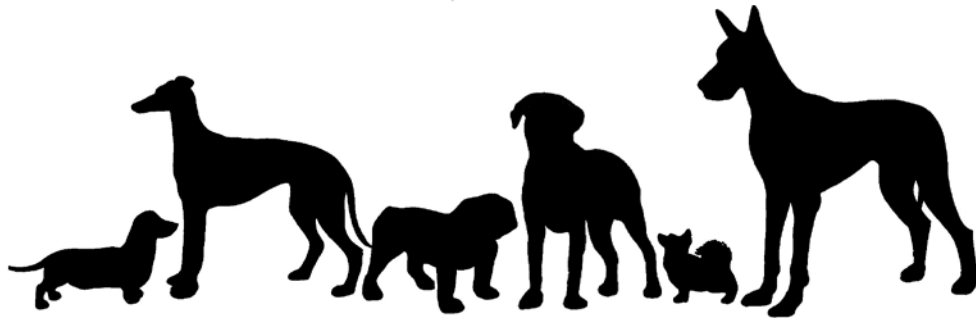


# TEXAS SOCIETY OF MAMMALOLOGISTS



**PROGRAM, ABSTRACTS, AND NEWSLETTER**

**36<sup>th</sup> Annual Meeting**

**16–18 February 2018**

**Texas Tech University Center at Junction**

**#TSM2018**



# Texas Society of Mammalogists

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Cover illustration of a Gray Wolf (*Canis lupus*) and domestic dogs by Krysta Demere.

**Texas Society of Mammalogists  
36<sup>th</sup> Annual Meeting  
16–18 February 2018**

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## **MENU 2018**

### **Friday:**

#### **6:00 pm DINNER**

Chicken fried steak, roasted mashed potatoes, cream gravy, broccoli, salad bar, rolls and chocolate pie

### **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

### **Saturday:**

#### **12:15 pm LUNCH**

Baked pork chops, green beans, scalloped potatoes, salad bar, wheat rolls, brownies

#### **3:00 pm Break**

Coffee, tea, water, cookies, trail mix, fruit

### **Saturday:**

#### **5:30 pm DINNER**

Brisket, sausage, potato salad, coleslaw, beans, bread, cobbler

### **Sunday:**

#### **7:30 am BREAKFAST**

Scrambled eggs, bacon, hash browns, scones, English muffins, assorted cereals and fruit

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## **TSM Members – Test your mammal knowledge and participate in our Annual Mammal Challenge!**

The challenge begins Friday evening at 6 pm and continues through Saturday, ending at lunch time. Winners (one faculty member and one student) are announced during the banquet and receive prizes, as well as the privilege of creating the mammal challenge for the next annual meeting!

The 2017 Mammal Challenge winners, and this year's Challenge coordinators, were Loren Ammerman (faculty, Angelo State University) and Jack Francis (student, Texas Tech University).

## 2018 Program Schedule

### Friday, 16 February

3:00–7:30pm	Registration	Dining Hall
4:30–6:00pm	Meeting of the Executive Committee	Packard Building
6:00pm	Dinner (serving line open 6:00–6:30pm)	Dining Hall
7:00pm	Announcements/Welcome Address TSM President John Hanson	Dining Hall
7:30–9:30pm	Poster Presentations	Dining Hall

### Saturday, 17 February

7:00am	Breakfast and Registration (serving line open 7:00–7:30am)	Dining Hall
8:00am	Introduction and Announcements TSM President John Hanson	Dining Hall

### PAPER SESSION 1 – Dining Hall

(Presenters' names are underlined)

**Chair: David Ray, Texas Tech University**

*Papers 1–9 are to be considered for the TSM Award.*

- 8:05 Paper 1 – **DIGESTIVE EFFICIENCY AND GUT-MICROBIOME DYNAMICS THROUGHOUT REPRODUCTION IN THE MEXICAN FREE-TAILED BAT, *TADARIDA BRASILIENSIS*** Oscar Sandate<sup>1</sup>, Matthew Fox<sup>1</sup>, Gregory Knox<sup>1</sup>, Marilyn Mathew<sup>1</sup>, Craig Tipton<sup>1</sup>, Caleb Phillips<sup>1,2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Museum of Texas Tech University
- 8:20 Paper 2 – **A NON-ANDEAN AREA OF DIFFERENTIATION AND NEW PERSPECTIVES ON THE DIVERSIFICATION OF *AKODON* (RODENTIA: SIGMODONTINAE) BASED ON HISTORICAL BIOGEOGRAPHY** Daniela Arenas-Viveros<sup>1</sup>, Ulyses F.J. Pardiñas<sup>2</sup>, Adriana Rico-Cernohorska<sup>3</sup>, J. Pablo Jayat<sup>4</sup>, and Jorge Salazar-Bravo<sup>1</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Centro Nacional Patagónico, Argentina. <sup>3</sup>Instituto de Ecología, Universidad

Mayor de San Andres, La Paz, Bolivia, <sup>4</sup>Instituto de Ambiente de Montaña y Regiones Áridas, Universidad Nacional de Chilecito, La Rioja, Argentina

- 8:35 Paper 3 – **A POPULATION GENETICIST’S DELIGHT: USING MOLECULAR MARKERS TO ASSESS CONTACT ZONES AND BOUNDARY LINES OF CRYPTIC SPECIES (*GEOMYS*) IN OKLAHOMA** Cristina N. Coffman and Michelle L. Haynie. Department of Biology, University of Central Oklahoma
- 8:50 Paper 4 – **ASSESSING LEVELS OF DNA DEGRADATION IN FROZEN TISSUES ARCHIVED IN A NATURAL HISTORY COLLECTION** Taylor J. Soniat<sup>1</sup>, Caleb D. Phillips<sup>1,2</sup>, Kathy MacDonald<sup>2</sup>, Jeremy Wilkinson<sup>3</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biology, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Texas Tech University, <sup>3</sup>RTL Genomics, Lubbock, Texas
- 9:05 Paper 5 – **GENETIC EVIDENCE FOR MULTIPLE CRYPTIC SPECIES WITHIN *PEROMYSCUS MANICULATUS*** James Q. Francis<sup>1</sup>, Caleb D Phillips<sup>1,2</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Museum of Texas Tech University
- 9:20 Paper 6 – **ALTERNATIVE RNA SPLICING OF A GAMETE RECOGNITION PROTEIN, ZONADHESIN, MAY PROMOTE NEW FUNCTIONAL ADAPTATION IN MAMMALIAN REPRODUCTION** Emma K. Roberts<sup>1</sup>, Daniel M. Hardy<sup>2</sup>, and Robert D. Bradley<sup>1,3</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, <sup>3</sup>Natural Science Research Laboratory, Museum of Texas Tech University
- 9:35 **15 Minute Break**

## **PAPER SESSION 2 – Dining Hall**

**Chair: Brian Chapman, Sam Houston State University**

- 9:50 Paper 7 – **COULD A FAILURE IN A POST-MATING ISOLATION PROTEIN ALLOW HYBRIDIZATION IN SPECIES OF DEER IN TEXAS?** Emily A. Wright<sup>1</sup>, Emma K. Roberts<sup>1</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biology, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Museum of Texas Tech University
- 10:05 Paper 8 – **GENETIC VARIATION IN SUBSPECIES OF THE EASTERN SPOTTED SKUNK (*SPILOGALE PUTORIUS*) WITH EMPHASIS ON THE PLAINS SPOTTED SKUNK (*S. P. INTERRUPTA*)** Alexandra A. Shaffer<sup>1</sup>, Robert C. Dowler<sup>1</sup>, J. Clint Perkins<sup>1</sup>, Adam W. Ferguson<sup>2</sup>, Molly M. McDonough<sup>2</sup>, and Loren K. Ammerman<sup>1</sup>, <sup>1</sup>Department of Biology, Angelo State University, <sup>2</sup>Field Museum of Natural History, Chicago, IL

- 10:20 Paper 9 – **THE PREVALENCE OF *TRYPANOSOMA CRUZI* IN MEXICAN FREE-TAILED BATS (*TADARIDA BRASILIENSIS*) AT THREE MATERNITY ROOSTS IN OKLAHOMA** Matthew D. Nichols, Wendy S Monterroso, and Wayne D. Lord, Department of Biology, University of Central Oklahoma

*Papers 10–16 are to be considered for the William B. Davis Award.*

- 10:35 Paper 10 – **MONITORING SITE FIDELITY AND SEASONAL ACTIVITY OF MEXICAN LONG-NOSED BATS AT EMORY CAVE USING PIT TAGS** Roxanne D. Pourshoushtari<sup>1</sup>, Erin R. Adams<sup>2</sup> and Loren K. Ammerman<sup>1</sup>, <sup>1</sup>Department of Biology, Angelo State University, <sup>2</sup>U.S. Fish and Wildlife Service, Upper Mississippi River National Wildlife & Fish Refuge

- 10:50 Paper 11 – **CHANGE AND FRAGMENTATION OF WOODY COVER IN THE LOWER RIO GRANDE VALLEY FROM 1984-2050: CURRENT TRENDS AND FUTURE IMPLICATIONS AFFECT OCELOT RECOVERY** Jason V. Lombardi, Michael E. Tewes, and Humberto L. Perotto-Baldivieso, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville

- 11:05 Paper 12 – **POPULATION STATUS, TRENDS, AND DISTRIBUTION OF MULE DEER (*ODOCOILEUS HEMIONUS*) IN OKLAHOMA** Sarah C. Vrla, Brandon K. McDonald, and Chris J. Butler, Biology Department, University of Central Oklahoma

- 11:20 Paper 13 – **ABIOTIC AND BIOTIC HABITAT CHARACTERISTICS AFFECT THE CURRENT DISTRIBUTION AND ABUNDANCE OF A RARE KANGAROO RAT** John D. Stuhler<sup>1</sup>, Michaela K. Halsey<sup>1,2</sup>, David A. Ray<sup>2</sup>, Robert D. Bradley<sup>2,3</sup>, R. Neal Platt<sup>2</sup>, and Richard D. Stevens<sup>1,3</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Texas Tech University, <sup>3</sup>Museum of Texas Tech University

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

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

### **PAPER SESSION 3 – Dining Hall**

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

- 1:45 Paper 14 – **ENVIRONMENTAL CORRELATES OF PHYLOGENETIC STRUCTURE OF BAT COMMUNITIES ACROSS MEXICO** Jenna R. Grimshaw<sup>1</sup> and Christopher L. Higgins<sup>2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Tarleton State University

2:00 Paper 15 – **DIETARY VARIATION DURING REPRODUCTION IN SEBA’S SHORT-TAILED FRUIT BAT** Erin E. Bohlender<sup>1</sup>, Jairo Pérez-Torres<sup>2</sup>, Natalia A. Borray-Escalante<sup>2</sup>, and Richard D. Stevens<sup>1, 3</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biology, Laboratorio de Ecología Funcional, Unidad de Ecología y Sistemática (UNESIS), Pontificia Universidad Javeriana, Bogotá, Colombia, <sup>3</sup>Museum of Texas Tech University

2:15 Paper 16 – **ENVIRONMENTAL FACTORS AFFECTING MESOPREDATOR OCCUPANCY IN AN URBAN AREA ON THE SOUTHERN HIGH PLAINS OF TEXAS** Christopher R. Carter<sup>1</sup>, Warren C. Conway<sup>1</sup>, Mark C. Wallace<sup>1</sup>, Robert D. Bradley<sup>2</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Texas Tech University

*Paper 17 is to be considered for the Bobby Baker Award.*

2:30 Paper 17 – **ASSESSING MULTIPLE PATERNITY IN EASTERN RED BATS, LASIURUS BOREALIS, WITH MICROSATELLITE LOCI** Brittney A. Jones<sup>1</sup>, Morgan P. Holt<sup>1</sup>, Samuel J. Harrison<sup>2</sup>, Loren K. Ammerman<sup>2</sup>, Dana N. Lee<sup>1</sup>, <sup>1</sup>Department of Agriculture, Biology, and Health Sciences, Cameron University, <sup>2</sup>Department of Biology, Angelo State University

*Paper 18 is to be considered for the Rollin H. Baker Award.*

2:45 Paper 18 – **THE RELATIONSHIP OF SMALL MAMMALS AND THE COMMUNITY STRUCTURE OF INVERTEBRATES AND VEGETATION IN A BLACKLAND PRAIRE RESTORATION SITE** Michael Moran and Jessica Healy, Austin College

3:00 **15 Minute Break**

3:15pm	<b>Business Meeting</b>	Packard Building
	All members, including students, please attend!	

5:30–9:00pm	<b>Annual Banquet and Auction</b>	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:

***Citizen Science, Pet Dogs, and the Complex Genomics of Behavior***  
**Dr. Elinor Karlsson**  
**Broad Institute**

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

9:00pm–?      Socializing and Dancing      Dining Hall

**Sunday, 18 February**

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

## Oral Presentation Abstracts

### Paper 1

#### **DIGESTIVE EFFICIENCY AND GUT-MICROBIOME DYNAMICS THROUGHOUT REPRODUCTION IN THE MEXICAN FREE-TAILED BAT, *TADARIDA***

***BRASILIENSIS*** Oscar Sandate<sup>1</sup>, Matthew Fox<sup>1</sup>, Gregory Knox<sup>1</sup>, Marilyn Mathew<sup>1</sup>, Craig Tipton<sup>1</sup>, Caleb Phillips<sup>1,2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Museum of Texas Tech University ([oscar.sandate@ttu.edu](mailto:oscar.sandate@ttu.edu))

The gut-microbiome contains almost three-quarters of all microorganisms in the body and is an essential contributor to many bodily processes such as metabolism, nutrient extraction and storage and even immunological modulation. Given such attributes, it is expected that gut-microbiomes are consequential to host health, and may be particularly important during periods when host energetic demands are increased. The mammalian reproductive period is an energetically expensive time in a female's life with lactation usually considered the most energetically costly. Bats being volant already have unusually high energetic demands, yet have digestive tracts that are short relative to similarly sized rodents, presumably as an adaptation to minimize weight. Pregnant bats also support large fetuses relative to their body size, thus further increasing energy requirements. These metabolic attributes indicate that digestive efficiency should be crucial to the reproduction and overall survival of bats. In this study we focus on *Tadarida brasiliensis* sampled across several months and use 16s rDNA gene and mitochondrial COI sequencing to quantify microbiome community and dietary composition, respectively, and use qPCR to assess bacterial load. Bomb calorimetry of feces is being used to assess digestive efficiency, which we are considering our phenotype of interest. Through this work we will develop a model to explain how measured variables interact and explain observed variation in digestive efficiency.

### Paper 2

#### **A NON-ANDEAN AREA OF DIFFERENTIATION AND NEW PERSPECTIVES ON THE DIVERSIFICATION OF *AKODON* (RODENTIA: SIGMODONTINAE) BASED ON HISTORICAL BIOGEOGRAPHY**

Daniela Arenas-Viveros<sup>1</sup>, Ulyses F.J. Pardiñas<sup>2</sup>, Adriana Rico-Cernohorska,<sup>3</sup> J. Pablo Jayat<sup>4</sup>, and Jorge Salazar-Bravo<sup>1</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Centro Nacional Patagónico, Argentina. <sup>3</sup>Instituto de Ecología, Universidad Mayor de San Andres, La Paz, Bolivia, <sup>4</sup>Instituto de Ambiente de Montaña y Regiones Áridas, Universidad Nacional de Chilecito, La Rioja, Argentina ([daniela.arenasviveros@ttu.edu](mailto:daniela.arenasviveros@ttu.edu))

The effects of past geological and climatic events in the distribution and diversification of South American taxa have been extensively studied. The genus *Akodon* is among the most speciose groups of South American cricetid rodents and constitutes an ideal clade to study mechanisms and patterns of diversification from a macroevolutionary perspective. In the present study, phylogenetic relationships were coupled with current geographic distributions of species to estimate the relative frequency of different modes of speciation and reconstruct the historical biogeography of *Akodon*. None of the analyses showed clear evidence for any particular mode of speciation. However, some general trends (albeit not significant) indicated that sympatric speciation can be considered uncommon for the group, while parapatric speciation seems to be

more common. Initial divergence within *Akodon* occurred c.a. 3.4 Mya during the Mid-Late Pliocene. During the Pleistocene, lineages diverged at different epochs up until the last split 0.26 Mya. We propose an area of differentiation for the genus in the lowlands of the current biogeographic Chaco region (i.e., southeastern Bolivia, northern Argentina, and western Paraguay). From there, diverging lineages dispersed either north along the eastern slope of the Andes, or to the east towards the lowlands of central South America and the eastern Atlantic Forest and Cerrado biomes. The conditions that influenced the speciation events of *Akodon* are as diverse as the group itself. Its exceptional richness in Andean habitats can be explained by both intrinsic and extrinsic factors, while its diversity in the eastern region is likely related to vegetation shifts and the capacity of *Akodon* ancestors to disperse with their habitats or adapt to new environments.

#### Paper 3

##### **A POPULATION GENETICIST'S DELIGHT: USING MOLECULAR MARKERS TO ASSESS CONTACT ZONES AND BOUNDARY LINES OF CRYPTIC SPECIES**

**(GEOMYS) IN OKLAHOMA** Cristina N. Coffman and Michelle L. Haynie. Department of Biology, University of Central Oklahoma ([ccoffman5@uco.edu](mailto:ccoffman5@uco.edu))

Cryptic species are classified as those that cannot be readily identified based on morphology. Pocket gophers of the genus *Geomys* are cryptic species and, because of this, taxonomy within the genus can be challenging and boundary lines between species are difficult to determine. Previous research utilized cranial measurements to classify species and proposed a boundary between *G. bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher) in Central Oklahoma that runs north and south along the I-35 highway. A contact zone between the two species was confirmed in Norman, Oklahoma. Recent research has suggested a third species, *G. jugossicularis*, occurs in the Oklahoma panhandle. The goals of this research were to utilize genetic marker to reevaluate distribution boundaries of *G. bursarius* and *G. breviceps* in central Oklahoma, as well as determine the range of *G. jugossicularis* in the Oklahoma panhandle. Genetic data also was used to assess the possibility of hybridization in contact zones throughout central Oklahoma. Nine microsatellite markers were used to identify unique genetic clusters from specimens collected in central Oklahoma and the panhandle. The genetic data obtained from these specimens were compared to samples collected from within the well-defined ranges of the two species (western Oklahoma – *G. bursarius*; southeastern Oklahoma – *G. breviceps*) to ensure correct genetic identification and to account for the possibility of hybridization. Admixture between clusters suggests the possibility of hybridization between *G. bursarius* and *G. breviceps* throughout central Oklahoma. Mitochondrial cytochrome b sequences and restriction enzyme data confirmed that *G. jugossicularis* occurs in the Oklahoma panhandle and is restricted to the three panhandle counties.

#### Paper 4

**ASSESSING LEVELS OF DNA DEGRADATION IN FROZEN TISSUES ARCHIVED IN A NATURAL HISTORY COLLECTION** Taylor J. Soniat<sup>1</sup>, Caleb D. Phillips<sup>1,2</sup>, Kathy MacDonald<sup>2</sup>, Jeremy Wilkinson<sup>3</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biology, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Texas Tech University, <sup>3</sup>RTL Genomics, Lubbock, Texas ([taylor.soniat@ttu.edu](mailto:taylor.soniat@ttu.edu))

Frozen tissue samples housed in natural history collections have many uses in the field of biology; including ecology, virology, taxonomy, and evolution. The recent increase in genomic level sequencing has generated an ever-increasing interest in using properly archived tissue samples. Therefore, it is imperative that frozen tissue collections are preserved and maintained in perpetuity. In order to accomplish this, tissue samples should be maintained in an environment that is sufficiently cold as to prevent damage to the tissue and DNA. Historically, -20°C and -80°C was used for most frozen tissue collections. However, many institutions are starting to implement a liquid nitrogen freezing system, which is able to maintain samples at -196°C. To assess whether tissues are being properly stored, tissues covering a range of 30 years, as well as multiple storage mediums were examined. Tissues will be transported to a private robotics research laboratory where DNA was extracted, and analyzed on a Fragment Analyzer. Data were returned in the form of excel files. Each tissue sample had a listing of the density of respective base pair lengths. An Analysis of Variance (ANOVA) was performed on the data, as well as a Principal Components Analysis (PCA), to see if there is a significant difference in DNA quality throughout the time frame, as well as between storage temperatures, and tissue types.

#### Paper 5

**GENETIC EVIDENCE FOR MULTIPLE CRYPTIC SPECIES WITHIN *PEROMYSCUS MANICULATUS*** James Q. Francis<sup>1</sup>, Caleb D Phillips<sup>1,2</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup> Natural Science Research Laboratory, Museum of Texas Tech University ([jq.franis@ttu.edu](mailto:jq.franis@ttu.edu))

*Peromyscus maniculatus* is one of the most commonly encountered small mammal species in North America, adapted to a wide variety of habitats. Previous studies have noted that high degrees of genetic variation exist across multiple populations, contributing to taxonomic uncertainties. A wide-spread phylogenetic study that examines multiple populations across a broad scale environment is necessary to interpret the extent of this genetic variation. To accomplish this, parsimony and likelihood analyses of the mitochondrial gene cytochrome-*b* were performed to determine the phylogenetic relationship of this species across the entire known geographic range of *P. maniculatus*. Additional samples of closely related taxa were included to assay taxonomic validity and phylogenetic relationship to *P. maniculatus*. Genetic distance and BEAST analyses of these samples also were conducted to better understand relationships across populations and time since divergence parameters. The data suggest that multiple cryptic species may be present within *P. maniculatus*. The putative species are discussed and their geographic distributions are suggested based on samples used for this study, as well names based on the principal of taxonomic priority. Four distinct clades were generated in this study. The first contained samples from southern California and the name *P. gambelli* is the most appropriate name available. The second clade contained samples from central and western North America and *P. sonorensis* has priority for this clade. The third clade contained samples from the east coast will retain the *P. maniculatus* name. The fourth clade contained samples from Mexico and the name *P. labecula* is the most appropriate name available.

#### Paper 6

**ALTERNATIVE RNA SPLICING OF A GAMETE RECOGNITION PROTEIN, ZONADHESIN, MAY PROMOTE NEW FUNCTIONAL ADAPTATION IN**

**MAMMALIAN REPRODUCTION** Emma K. Roberts<sup>1</sup>, Daniel M. Hardy<sup>2</sup>, and Robert D. Bradley<sup>1,3</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, <sup>3</sup>Natural Science Research Laboratory, Museum of Texas Tech University ([emma.k.roberts@ttu.edu](mailto:emma.k.roberts@ttu.edu))

The birth of new genes with novel functions serves as a major contributor to adaptive evolutionary innovation. It has been shown that novel genes commonly arise from messenger RNAs of ancestral genes, protein-coding genes metamorphosing into new RNA genes, and RNA genes composed from scratch. Alternative splicing during mRNA processing may lead to neogenesis, the process of gene birth, and promote potentially functional adaptations, especially if expressed in the gametes. We characterized the molecular evolution of zonadhesin (ZAN), a large, mosaic protein in the sperm acrosome that mediates species-specific adhesion to the egg's zona pellucida. The 7-16 kb ZAN mRNA encodes multiple domain types, including tandem von Willebrand type-D domains that comprise polypeptides with species-specific zona pellucida-binding activity. Intra-species differences in the gene are under strong selective pressures and may be undergoing alternative RNA splicing which contribute to speciation. In marine invertebrates, rapid molecular evolution of egg recognition proteins in the sperm acrosome confers species specificity to fertilization and promotes post-mating and pre-zygotic reproductive isolation. Herein, we examine the same molecular process in mammals and evaluate alternative mRNA transcripts present in 21 species and 9 suborders of mammals. Further, ZAN protein sequence divergence, together with domain duplications unique to some species of rodents, produced dramatic species differences in the sizes of mature ZAN polypeptides in spermatozoa. Phylogenetic analyses indicate that the alternative transcripts are present in all mammal species examined to date. However, domain duplications appear to be restricted to the suborder Myomorpha in Rodentia, possibly indicating molecular mechanisms involved in the duplication events were initiated following the divergence of the Myomorpha from the other rodent suborders. Alternative splicing during ZAN mRNA processing and extensive domain expansions in some taxa may contribute to potentially functional adaptations for reproductive isolation.

Paper 7

**COULD A FAILURE IN A POST-MATING ISOLATION PROTEIN ALLOW HYBRIDIZATION IN SPECIES OF DEER IN TEXAS?** Emily A. Wright<sup>1</sup>, Emma K. Roberts<sup>1</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biology, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Museum of Texas Tech University ([emily.a.wright@ttu.edu](mailto:emily.a.wright@ttu.edu))

White-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) occur naturally in Texas. Because these two species are sympatrically distributed across much of West Texas and breeding seasons overlap, hybridization is thought to commonly occur between white-tailed and mule deer in the Trans-Pecos region and along the edges of the Llano Estacado. Given that relatively high levels of hybridization occur and it is known that viable F<sub>1</sub> offspring may be produced, perhaps the molecular mechanism that serves as a post-mating isolation barrier fails, allowing the two species to mate. One of these putative genes is zonadhesin (ZAN), a multi-domain, transmembrane, sperm protein that is crucial in species-specific binding of the spermatozoa with the zona pellucida of the egg during fertilization. ZAN is the only mammalian protein which shows species specificity across multiple taxa. ZAN may be useful in

hybridization research because it is thought to be a candidate gene for species specificity; thereby acting as a potential post-mating isolation mechanism for keeping two species from interbreeding. If the ZAN pathway fails and no longer serves as a barrier for reproductive isolation, then the sperm cell of one species is able to recognize the egg cell of the other species, allowing fertilization to occur and thus, producing hybrids naturally. The focus of this study is to understand the mechanism that allows hybridization between white-tailed and mule deer. ZAN sequences will be analyzed for differences (nucleotide and amino acids) between hybridizing taxa. Furthermore, ZAN sequences of parental and hybrid individuals will be generated to study the level of divergence to determine if the presumptive failure of ZAN allows introgression to occur. Additional molecular markers will be utilized to develop a complex genotype, which will then be used to determine the directionality of introgression between the two deer species.

#### Paper 8

**GENETIC VARIATION IN SUBSPECIES OF THE EASTERN SPOTTED SKUNK (*SPILOGALE PUTORIUS*) WITH EMPHASIS ON THE PLAINS SPOTTED SKUNK (*S. P. INTERRUPTA*)** Alexandra A. Shaffer<sup>1</sup>, Robert C. Dowler<sup>1</sup>, J. Clint Perkins<sup>1</sup>, Adam W. Ferguson<sup>2</sup>, Molly M. McDonough<sup>2</sup>, and Loren K. Ammerman<sup>1</sup>, <sup>1</sup>Department of Biology, Angelo State University, <sup>2</sup> Field Museum of Natural History, Chicago, IL ([ashaffer3@angelo.edu](mailto:ashaffer3@angelo.edu))

We present results of an assessment on the genetic variability of the eastern spotted skunk (*Spilogale putorius*), with a particular emphasis on the potentially endangered plains spotted skunk (*Spilogale putorius interrupta*), throughout the range of the species. Tissue samples from a variety of sources (including field surveys, state agencies, and museum tissue collections) allowed a detailed assessment of the genetic variability in *S. putorius* using both microsatellite markers and cytochrome-*b* gene sequences. Our analysis of 119 specimens established that genetic patterns were consistent with the currently accepted taxonomy of the 3 recognized subspecies: *S. p. putorius*, *S. p. ambarvalis*, and *S. p. interrupta*. The differentiation between *S. p. putorius* and *S. p. ambarvalis* was less pronounced ( $F_{ST} = 0.178$ ; cytochrome *b* sequence divergence = 1.2%) than between these subspecies and the plains spotted skunk (average  $F_{ST} = 0.278$ ; cytochrome *b* sequence divergence = 2.9%). Overall, genetic variability (observed heterozygosity = 0.474, allelic richness = 6.64) in the plains spotted skunk was lower than that seen in common carnivores (striped skunks, raccoons), but slightly higher than some endangered carnivores (black-footed ferret). The heterozygosity levels more closely resemble the levels found within the island spotted skunk (*S. gracilis amphiala*) from the Channel Islands of California and other vertebrates that have a “threatened” conservation status.

#### Paper 9

**THE PREVALENCE OF *TRYPANOSOMA CRUZI* IN MEXICAN FREE-TAILED BATS (*TADARIDA BRASILIENSIS*) AT THREE MATERNITY ROOSTS IN OKLAHOMA** Matthew D. Nichols, Wendy S Monterroso, and Wayne D. Lord, Department of Biology, University of Central Oklahoma ([mnichols7@uco.edu](mailto:mnichols7@uco.edu))

*Trypanosoma cruzi* is a vector-borne protozoan parasite that infects 8 million individuals in Central and South America and is the etiological agent of Chagas disease. Mexican free-tailed bats (*Tadarida brasiliensis*) migrate from Central and South America to North America each spring to give birth and rear their young in maternity roosts. Approximately 361 Mexican free-

tailed bats were sampled for *T. cruzi* at three maternity roosts in Oklahoma. We collected wing punches from the uropatagium and plagiopatagium and stored them in ATL lysis buffer. DNA was extracted using the DNeasy Blood and Tissue Kit (Qiagen) and *T. cruzi* DNA was amplified using the primer set TCZ1/TCZ2. Samples were subjected to gel electrophoresis and amplified DNA was observed using the ChemiDoc-It 2 Imager. One juvenile Mexican free-tailed bat was positive for *T. cruzi* resulting in a prevalence of 0.27% of the 361 sampled bats. Low prevalence in the sampled population may be due to the roosts being located on the northern boundary of the historic vector range, low vector population at the roosts, or low parasitemia. The positive sample was shipped to Eton Biosciences for sequencing. Future research will focus on establishing vector prevalence at the maternity roosts.

#### Paper 10

**MONITORING SITE FIDELITY AND SEASONAL ACTIVITY OF MEXICAN LONG-NOSED BATS AT EMORY CAVE USING PIT TAGS** Roxanne D. Pourshoushtari<sup>1</sup>, Erin R. Adams<sup>2</sup> and Loren K. Ammerman<sup>1</sup>, <sup>1</sup>Department of Biology, Angelo State University, <sup>2</sup>U.S. Fish and Wildlife Service, Upper Mississippi River National Wildlife & Fish Refuge ([rpourshoushtari@angelo.edu](mailto:rpourshoushtari@angelo.edu))

*Leptonycteris nivalis* (Mexican long-nosed bat) is an endangered nectarivore of conservation concern. In an effort to understand how *L. nivalis* use Emory Cave in Big Bend National Park, Texas during migration, bats were captured and PIT tagged in the summer months of 2014, 2015, and 2017. PIT tags were detected using an antennae cable hung in a serpentine configuration over the cave entrance. Across all four years, the earliest date of detection was 1 May and the latest was 1 September, with highest activity in late-June to mid-July. Out of 206 PIT tags, 81.6% were detected in at least 1 year over the course of the study and, of bats tagged in 2014 and 2015, 11.5% were detected yearly since tagging. Individuals were in the roost area an average of 26.4 days (excluding individuals only detected a single day in a season), with the maximum time spent in the area by an individual being 43 days. Roost abandonment does not seem to be an issue, as bats have continued returning year after year, despite installment of the PIT tag system. The percentage of tagged juvenile males that were detected within a season was higher than tagged females, but very few males returned to the cave the following year. Similarly, juveniles had a greater percentage of detections overall than adults, but juveniles were less likely to be detected outside of capture year. The differences in detection rates could indicate an effect of sex and age on site fidelity or differing survival rates. Continued monitoring of this species in Emory Cave using this PIT tag system will improve our knowledge of the Mexican long-nosed bat's population dynamics.

#### Paper 11

**CHANGE AND FRAGMENTATION OF WOODY COVER IN THE LOWER RIO GRANDE VALLEY FROM 1984-2050: CURRENT TRENDS AND FUTURE IMPLICATIONS AFFECT OCELOT RECOVERY** Jason V. Lombardi, Michael E. Tewes, and Humberto L. Perotto-Baldivieso, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville ([Lombardijv@gmail.com](mailto:Lombardijv@gmail.com))

The Lower Rio Grande Valley of southern Texas has become one of the fastest urbanizing regions in the United States over the last 25 years. Coupled with a rapidly expanding urban area,

this region is noted by productive agriculture and rangeland, while still retaining a distinction as a rich biodiverse region in Texas. Since the early twentieth century, conversion of woody cover for agricultural uses and human development has become one of the main drivers of the decline of ocelots *Leopardus pardalis* in the Lower Rio Grande Valley. In the mid-1980's, researchers reported only 5% of native woody cover remained in the Lower Rio Grande Valley but no region-wide assessment had been conducted since then. We classified LANDSAT imagery from 1984-2016 to quantify different rates of land cover change and used housing density scenarios to project woody cover change until 2050 based on five landscape metrics. Woody cover increased from 13.7% to 15.9% since 1984; however mean patch area decreased while edge density, patch density, and Euclidean distance to nearest patch increased indicating fragmentation near the Rio Grande River. Rangeland and intensive cropland conversion were the leading causes of change in woody cover, which can be attributed to rapidly expanding urban areas. By 2050, urban cover types will represent the greatest percentage (39.9%) of landscape cover and we project a loss of at least 1.5% of woody cover and 4% of rangeland and agriculture cover types. These results provide important information for predicting future woody cover fragmentation to focus efforts for connectivity of ocelot populations.

Paper 12

**POPULATION STATUS, TRENDS, AND DISTRIBUTION OF MULE DEER**

**(*ODOCOILEUS HEMIONUS*) IN OKLAHOMA** Sarah C. Vrla, Brandon K. McDonald, and Chris J. Butler, Biology Department, University of Central Oklahoma ([svrla@uco.edu](mailto:svrla@uco.edu))

The distribution and population status of mule deer (*Odocoileus hemionus*) is well documented in most areas except in Oklahoma where published records are few. We conducted an analysis of harvest records collected by the Oklahoma Department of Wildlife Conservation to update the distribution and abundance of mule deer in the state. Abundance of mule deer harvests consistently followed a northwest to southeast gradient, with the highest abundance occurring in the Oklahoma panhandle. Our results suggest stable populations, especially in the panhandle.

Paper 13

**ABIOTIC AND BIOTIC HABITAT CHARACTERISTICS AFFECT THE CURRENT DISTRIBUTION AND ABUNDANCE OF A RARE KANGAROO RAT**

John D. Stuhler<sup>1</sup>, Michaela K. Halsey<sup>1,2</sup>, David A. Ray<sup>2</sup>, Robert D. Bradley<sup>2,3</sup>, R. Neal Platt<sup>2</sup>, and Richard D. Stevens<sup>1,3</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Texas Tech University, <sup>3</sup>Museum of Texas Tech University ([john.stuhler@ttu.edu](mailto:john.stuhler@ttu.edu))

A primary goal of ecology aims to understand which factors influence distribution and abundance of species. Rare species, by definition, have sparse or restricted spatial distributions generally governed by habitat availability. As such, understanding distribution and abundance of rare species requires a comprehensive knowledge of both their dependence on local habitat features and interspecific interactions (i.e., positive and negative species associations). We sampled vegetation and soil characteristics and surveyed the rodent community at 35 sites across the historical range of the Texas kangaroo rat (*Dipodomys elator*), a rare and potentially threatened species in north-central Texas, to identify biotic and abiotic characteristics potentially limiting its distribution and abundance. Soil type (i.e., clay-loam) and the aboveground biomass



of vegetation were important determinants of *D. elator* occurrence across its distribution. Moreover, *D. elator* occurred most frequently with *Chaetodipus hispidus*, another heteromyid species with similar habitat preferences. Results from our work should improve understanding of factors contributing to the rarity of this kangaroo rat species and its vulnerability to habitat change and help inform conservation and management strategies for rare species.

#### Paper 14

##### **ENVIRONMENTAL CORRELATES OF PHYLOGENETIC STRUCTURE OF BAT COMMUNITIES ACROSS MEXICO** Jenna R. Grimshaw<sup>1</sup> and Christopher L.

Higgins<sup>2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Tarleton State University ([jenna.grimshaw@ttu.edu](mailto:jenna.grimshaw@ttu.edu))

Contemporary examination of community structure requires analyzing multiple dimensions of biodiversity to provide a more holistic understanding of the ecological and historical factors involved in the formation and maintenance of local communities. We used empirical data on bat communities across Mexico to investigate patterns of taxonomic and phylogenetic diversities. More specifically, we 1) characterized phylogenetic structure using multiple measures of diversity and identified environmental factors that serve as potential drivers of the underlying structure, 2) determined whether any bat community showed evidence of phylogenetic overdispersion or underdispersion and characterized how taxonomic structure differed among overdispersed, randomly dispersed, and underdispersed sites, and 3) examined the relationship between phylogenetic diversity and size of the regional species pool. We used 3 indices of phylogenetic diversity (Faith's index [FI], mean nearest neighbor distance [MNND], and mean pairwise distance [MPD]) to quantify patterns of evolutionary relatedness in bat communities across Mexico. To determine whether a particular community was overdispersed, randomly dispersed, or underdispersed, we used randomization procedures with latitudinal and longitudinal constraints to define the regional species pool for each bat community. We used regression trees to investigate which climatic factors explained variation for each measure of phylogenetic diversity. Precipitation and longitude were correlated with FI, temperature was correlated with MNND, and temperature along with latitude and longitude were correlated with MPD. We found that just over one-half of the communities were underdispersed, just under one-half were randomly dispersed, and only 1 was overdispersed. Each measure of phylogenetic diversity was differently affected by the size of the regional species pool.

#### Paper 15

##### **DIETARY VARIATION DURING REPRODUCTION IN SEBA'S SHORT-TAILED**

**FRUIT BAT** Erin E. Bohlender<sup>1</sup>, Jairo Pérez-Torres<sup>2</sup>, Natalia A. Borray-Escalante<sup>2</sup>, and Richard D. Stevens<sup>1,3</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biology, Laboratorio de Ecología Funcional, Unidad de Ecología y Sistemática (UNESIS), Pontificia Universidad Javeriana, Bogotá, Colombia, <sup>3</sup>Museum of Texas Tech University ([erin.stukenholtz@ttu.edu](mailto:erin.stukenholtz@ttu.edu))

Energy and nutrient availability are important determinants of fetal and offspring development. Given high energy and nutrient expenditure during pregnancy and lactation, foraging strategies and choices of specific food items are critical for survival of both mother and offspring. We

analyzed dietary variation and consumption of nitrogen-rich and calcium-rich foods during different developmental stages in Seba's short-tailed fruit bat (*Carollia perspicillata*). Dietary analysis was carried out on fecal samples from males and non-pregnant, early pregnant, late pregnant, and lactating females at Macaregua Cave in Santander, Colombia. Diets were similar among males, non-pregnant females, and pregnant females, but lactating females exhibited statistically distinguishable diets. Males and pregnant females displayed a generalist diet, eating a wide variety of items, whereas non-pregnant and lactating females had narrower diets. Nitrogen-rich items, such as *Piper* (Piperales: Piperaceae; pepper plants) and insects were not prevalent in the diet of pregnant bats, whereas spiked pepper exceeded expected frequencies in the diets of lactating bats. Calcium-rich *Ficus* (Rosales: Moraceae; figs) was rarely found in the diets of lactating or pregnant bats. Increased calcium requirements associated with lactation may therefore be satisfied through other avenues.

#### Paper 16

**ENVIRONMENTAL FACTORS AFFECTING MESOPREDATOR OCCUPANCY IN AN URBAN AREA ON THE SOUTHERN HIGH PLAINS OF TEXAS** Christopher R. Carter<sup>1</sup>, Warren C. Conway<sup>1</sup>, Mark C. Wallace<sup>1</sup>, Robert D. Bradley<sup>2</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Department of Biological Sciences, Texas Tech University ([christopher.carter@ttu.edu](mailto:christopher.carter@ttu.edu))

Urban landscapes provide valuable habitat to several mesocarnivores, however, few studies have identified which environmental features in these environments influence mesocarnivores presence and occupancy within urban areas. We used game cameras dispersed throughout the city limits of Lubbock, Texas to characterize occupancy of coyote (*Canis latrans*), domestic cat (*Felis catus*), domestic dog (*Canis familiaris*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), and Virginia opossum (*Didelphis virginiana*). We delineated 16 1-km<sup>2</sup> cells throughout the study area and used program PRESENCE to estimate occupancy and evaluate the influence of environmental covariates (grasslands, croplands, and densities of development using coverages from the National Land Cover Data (NLCD) on focal species occupancy. We detected too few observations (<10) of raccoons and red foxes for formal analyses. However, preliminary analyses suggest that cat (the most frequently observed species) occupancy increased as grassland decreased ( $\beta = -156.5$ ), gray fox occupancy increased as both grasslands ( $\beta = -37.2$ ) and crops ( $\beta = -19.1$ ) decreased, whereas coyotes occupancy increased as grasslands increased ( $\beta = 12$ ). Virginia opossum occupancy increased with both low (impervious surfaces occupy < 20% of the area;  $\beta = 68.4$ ) and medium development (impervious surfaces occupy 20-49% of the area;  $\beta = 119.3$ ), whereas dogs were not correlated with any land cover characteristics despite a 47% naïve occupancy. For all analyses, elevated AIC values (> 6), suggested that the selected environmental characteristics defined by NLCD did not provide strong model weights, and other factors may be more important drivers for these species occurrence. Further analysis will include other local scale habitat features and socioeconomic factors to improve model performance.

#### Paper 17

**ASSESSING MULTIPLE PATERNITY IN EASTERN RED BATS, *LASIURUS BOREALIS*, WITH MICROSATELLITE LOCI** Brittney A. Jones<sup>1</sup>, Morgan P. Holt<sup>1</sup>, Samuel J. Harrison<sup>2</sup>, Loren K. Ammerman<sup>2</sup>, Dana N. Lee<sup>1</sup>, <sup>1</sup>Department of Agriculture, Biology, and

Health Sciences, Cameron University, <sup>2</sup>Department of Biology, Angelo State University  
([brittney.jones@cameron.edu](mailto:brittney.jones@cameron.edu))

Most species of bats give birth to only one pup each year, although Eastern red bats can produce one to five pups per litter. In this species, it has been found that offspring within a litter can be at different stages of development, suggesting multiple paternity. This hypothesis was tested using DNA fingerprinting; however, the sample size was limited, and more precise methods are now available to retest this hypothesis. We amplified eight autosomal microsatellites and one X-linked microsatellite from eight parent/offspring groups and an additional eight individuals for a total of 53 bats. These bats were submitted to the Oklahoma State Department of Health and Texas Department of State Health Services for rabies testing and consisted of both pregnant females and mothers with pups. Multiple paternity was assessed using maximum-likelihood methods and X-linked locus exclusion. Preliminary results from the maximum-likelihood approach showed that six of eight parent/offspring groups consisted of half siblings, and X-linked locus exclusion suggested multiple paternity in seven of the eight parent/offspring groups. Multiple paternity might be an adaptive strategy to allow for increased genetic variation, which would be beneficial to a species threatened by population declines from wind turbines.

Paper 18

**THE RELATIONSHIP OF SMALL MAMMALS AND THE COMMUNITY  
STRUCTURE OF INVERTEBRATES AND VEGETATION IN A BLACKLAND  
PRAIRE RESTORATION SITE** [Michael Moran](mailto:mmoran14@austincollege.edu) and Jessica Healy, Austin College  
([mmoran14@austincollege.edu](mailto:mmoran14@austincollege.edu))

To evaluate the restoration efforts and determine the health of the ecosystem, many restoration projects target small mammal populations because they heavily depend on the diverse species composition of the ground flora. The effects of small mammal predation on the community structure of invertebrates and vegetation have been studied in grassland ecosystems. These studies found that small mammal excluded plots resulted in higher numbers of invertebrates as well as greater numbers of established plants inside exclosures than in control plots. The aim of this study was to test and compare these effects in a blackland prairie restoration ecosystem in North Texas. Small mammal exclusion plots were set up in three different field types with Sherman live traps and pitfall traps to assess the community composition of these animals. Additionally, vegetation surveys were conducted to observe any differences between controls and exclosures in each field type. Data collected in 2013 was compared to the results of the 2017 study to track the effects of the exclusions over time. The results of the 2017 study exemplify that the exclosures are not completely effective in keeping small mammals out, and will need to be reinforced for future studies. Like the 2013 study, this study found no difference in total invertebrates in the absence of small mammals. Plant community composition varied between controls and exclosures, but overall there was not a significantly greater number of established plants inside exclosures. This evidence has important implications for the use of small mammal exclusions in ecological monitoring.

## POSTERS AT-A-GLANCE

1 – ABUNDANCE, ACTIVITY PATTERNS AND INTERACTIONS AMONG FELIDS, CATTLE, NILGAI, FERAL HOG AND JAVELINA

Shelby Carter

2 – THE EFFECTS OF A MAJOR FLOODING EVENT ON A LARGE URBAN POPULATION OF FREE-TAILED BATS (*TADARIDA BRASILIENSIS*)

Timothy McSweeney

3 – FIRST RECORD OF *PROECHIMYS PATTONI* (RODENTIA: ECHIMYIDAE) IN BOLIVIA

Pamela Sánchez-Vendizú

4 – EXPLORING THE DISTRIBUTION OF *PEROMYSCUS MANICULATUS* IN SOUTH TEXAS

Leila Siciliano-Martina

5 – MACRO- AND MICRO-HABITAT EFFECTS OF OCELOT OCCUPANCY

Jason V. Lombardi

6 – SOIL ASSOCIATIONS OF FOUR RODENT SPECIES ACROSS THE HISTORICAL DISTRIBUTION OF THE TEXAS KANGAROO RAT (*DIPODOMYS ELATOR*)

S. Chase Brothers

7 – AGE-RELATED PHYSICAL ACTIVITY PERFORMANCE IN RAPAMYCIN DOSED MARMOSETS IN AN OPEN FIELD TEST

Megan Flores and Matthew Lopez

8 – DETOURED REACH: TESTING A COGNITIVE TASK IN AGING MARMOSETS (*CALLITHRIX JACCHUS*)

Khira Warford

9 – OKA'YANAHLI NATURE PRESERVE BASELINE MAMMAL SURVEY

Wendy S. Monterroso

10 – TESTING FOR SEXUAL DIMORPHISM WITHIN THE WHITE-LINED BROAD-NOSED BAT (*PLATYRRHINUS LINEATUS*)

Ashlyn N. Kildow

11 – SURVEY OF SMALL MAMMALS AND MESOCARNIVORES AT CAMP BOWIE TRAINING FACILITY, BROWN COUNTY, TEXAS

Rachel M. Leucht, Samantha R. Velasquez, and Krystal M. Goedde

12 - MAMMALS OF TEXAS MODELING: IN SEARCH OF LOST POPULATIONS

Bernardo Traversari

13 – PHYLOGEOGRAPHIC ASSESSMENT OF THE HEERMANN'S KANGAROO RAT  
(*DIPDOMYS HEERMANNI*)

Bridgett B. Downs

14 – PHYLOGENY OF ARENAVIRUSES (ARENAVIRIDAE) ASSOCIATED WITH NORTH  
AMERICAN WOODRAT SPECIES, *NEOTOMA*

Laramie L. Lindsey

15 – STATUS, DISTRIBUTION, MORPHOLOGY AND GENETICS OF *SIGMODON  
FULVIVENTER DALQUESTI* IN THE CHIHUAHUAN DESERT ECOREGION

Preston J. McDonald

16 – DNA TRANSPOSON ACTIVITY AND MUTATION RATES IN *MYOTIS* GENES

Nicole S. Paulat

17 – HOW MANY SPECIES OF MAMMALS ARE THERE?

Connor J. Burgin

18 – INVESTIGATION OF THE PHYLOGEOGRAPHIC STRUCTURE OF THE  
SUBSPECIES OF NORTHERN YELLOW BATS (*DASYPTERUS INTERMEDIUS*) BY  
MOLECULAR ANALYSIS

Sydney K. Decker

19 – CHARACTERIZATION OF AN X-LINKED MICROSATELLITE IN EASTERN RED  
BATS (*LASIURUS BOREALIS*) TO DETERMINE GENETIC VARIABILITY AMONG  
OFFSPRING

Morgan P. Holt

20 – A GENETIC ASSESSEMENT OF POCKET GOPHERS OF THE GENUS *GEOMYS*  
(RODENTIA: GEOMYIDAE) IN TEXAS

Mariah N. Mills

21 – ASSESSING THE GENETIC DIVERSIFICATION OF BATS IN THE GENUS  
*MONOPHYLLUS*

Irene Vasquez

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

Destiny Wadewitz and Hannah Seah

## Poster Presentation Abstracts

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

### Poster 1

**ABUNDANCE, ACTIVITY PATTERNS AND INTERACTIONS AMONG FELIDS, CATTLE, NILGAI, FERAL HOG AND JAVELINA** Shelby B. Carter<sup>1</sup>, Michael E. Tewes<sup>1</sup>, Jason V. Lombardi<sup>1</sup> and Tyler A. Campbell<sup>2</sup>, <sup>1</sup>Caesar Kleberg Wildlife Research Institute, Texas A&M University - Kingsville, <sup>2</sup>East Foundation ([shelbycarter511@hotmail.com](mailto:shelbycarter511@hotmail.com))

In southern Texas, ocelots *Leopardus pardalis*, occur in two small breeding populations on private and public lands in Willacy and Cameron counties. The East Foundation's El Sauz Ranch, Willacy County has the largest known population of ocelots in the United States. Research on ocelot interactions with other carnivores and prey species have been previously studied across their geographic range; however, interactions with cattle and large game species on private lands have not been studied. The purpose of this study is to use a six year photographic data set (2011-2017) to identify differences in abundance, activity patterns and interactions among ocelots, bobcats *Lynx rufus*, cattle *Bos taurus*, nilgai *Boselaphus tragocamelus*, feral hogs *Sus scrofa*, and javelina *Pecari tajacu*. We are particularly interested in the use of trails and dense thornshrub as it relates to occurrence by each of the target species. Preliminary results indicate feral hog and javelina share a high degree of activity overlap and used secluded and isolated areas which is similar to behavior observed by ocelots. Occurrence of nilgai does not influence ocelot occurrence or activity. Information derived from this study will assist management of cattle, game species, bobcat and ocelot as well as understand coexistence patterns among the focal species. Furthermore, these results will benefit future ocelot recovery and conservation on private lands in southern Texas.

### Poster 2

**THE EFFECTS OF A MAJOR FLOODING EVENT ON A LARGE URBAN POPULATION OF FREE-TAILED BATS (*TADARIDA BRASILIENSIS*)** Timothy McSweeney and Daniel M. Brooks, Houston Museum of Natural Science, Department of Vertebrate Zoology ([timmcsweny@gmail.com](mailto:timmcsweny@gmail.com))

Severe floods can significantly alter wildlife and habitats through the destruction of native plant life, decimation of animal populations, and disruption of food chains from both the volume of water, as well as any debris and chemicals in the water. Bat populations that live in urban areas, especially colonies that roost under bridges or overpasses, may be at a greater risk from floods due to their proximity to water, and a significant flood can damage a colony by drowning a population or forcing it to disperse. A significant flood can permanently destroy an active bat colony, or at the very least reduce the size of the population. Houston (Harris Co., Texas) is home to a sizeable colony of free-tailed bats (*Tadarida brasiliensis*) living under the Waugh Bridge. Until recently the colony could be seen exiting the bridge roost every evening from spring through fall, as well as periods of winter. The roost site has access to fresh water and provides a consistent temperature. However, the situation may have changed after the recent Hurricane Harvey and associated flooding. The purpose of this note is to document observations of the colony and behavior of the resident bats after Hurricane Harvey events. The most obvious

deleterious effect of the flood was finding several deceased bats (population decrease). Noted behavioral changes post-flood include ‘false exodus’ from the bridge, smaller group emergences, and later time of emergence from the roost. Factors attributing to these behavioral changes are discussed, and genetic analyses are underway to determine if these observations are driven by behavioral differences that characterize different subspecies (*T. b. mexicana* vs *T. b. cyanocephala*).

#### Poster 3

**FIRST RECORD OF *PROECHIMYS PATTONI* (RODENTIA: ECHIMYIDAE) IN BOLIVIA** Pamela Sánchez-Vendizú<sup>1</sup>, Jorge Salazar-Bravo<sup>2</sup>, and Joseph Cook<sup>3</sup>, <sup>1</sup>Departamento de Maztozoología del Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, <sup>2</sup>Department of Biological Sciences, Texas Tech University, <sup>3</sup>Division of Mammals, Museum of Southwestern Biology ([p.sanchez.vendiz@gmail.com](mailto:p.sanchez.vendiz@gmail.com))

Five species of *Proechimys* are recognized in Bolivia: *P. brevicauda*, *P. gardneri*, *P. longicaudatus*, *P. simonsi*, and *P. steerei*. However, based on our morphological and molecular analysis we found that the species *P. pattoni* is also inhabiting the lowland forest of Bolivia, locality Santa Rosa, department of Pando. This register represents the first record of *P. pattoni* in Bolivia and extends its distribution range in 315 km southeastern at 180 m of elevation since the actual distribution of *P. pattoni* is reported only in western Brazil and east and southern Peru. The karyotype of *P. pattoni* from Bolivia is also the same that specimens from Río Jurua, 2n=40/FN=56. The genetic difference between all individuals of *P. pattoni* sequenced is 1.6%. Moreover, in Bolivia *P. pattoni* is sympatric with *P. simonsi* from which is easily recognized because *pattoni* is smaller than *simonsi* and present six fleshy plantar pats whereas *simonsi* have only five. Also, the southernmost record of *P. gardneri* (another small-bodied species) is in the locality San Juan de Nuevo Mundo, department of Pando, and is about at only 230 km north of the new record of *P. pattoni*. Therefore, both species *P. pattoni* and *P. gardneri* could be in sympatry in northeast Bolivia and because of their great similarity in morphology could be being misidentified. Future studies should focus on a careful revision of small-bodied of *Proechimys* from northeastern Bolivia to clarify the distribution of *pattoni* and *gardneri*.

#### Poster 4

**EXPLORING THE DISTRIBUTION OF *PEROMYSCUS MANICULATUS* IN SOUTH TEXAS** Leila Siciliano-Martina<sup>1</sup>, Ira Greenbaum<sup>2</sup>, Mary Casillas<sup>3</sup>, A. Michelle Lawing<sup>1,4</sup>, Jessica Light<sup>1,5</sup>, <sup>1</sup>Ecology & Evolutionary Biology Program, Texas A&M University, <sup>2</sup>Department of Biology, Texas A&M University, <sup>3</sup>Department of Biochemistry and Biophysics, Texas A&M University, <sup>4</sup>Department of Ecosystem Sciences and Management, Texas A&M University, <sup>5</sup>Department of Wildlife & Fisheries Sciences, Texas A&M University ([sicilia77@tamu.edu](mailto:sicilia77@tamu.edu))

*Peromyscus maniculatus* is sympatric with *P. leucopus* throughout nearly all of the latter's range. In Texas, *P. leucopus* is known from almost every county. Although *P. maniculatus* is thought to occur across the entire state, records of *P. maniculatus* from the southern parts of Texas are spotty, often based on few specimens. Differentiating these two species in the field can be difficult; thus, the Texas distribution of *P. maniculatus*, especially in the southern parts of the state, is uncertain. Using museum specimens and 2D geometric morphometric techniques, we

used a cranial landmark scheme to distinguish between the species across the southernmost distribution of *P. maniculatus* in Texas. To set a morphometric baseline, several specimens included in the analysis were genetically identified *P. maniculatus* and *P. leucopus*. Principal component and linear discriminant function analyses indicated that the genetically identified *P. maniculatus* clustered separately (with some overlap) from specimens of *P. leucopus* with 95% confidence. The majority of south Texas specimens previously identified as *P. maniculatus* clustered within the morphospace of the genetically identified *P. leucopus* specimens, indicating that these specimens were likely misidentified. These findings suggest that the southernmost range of *P. maniculatus* in Texas is more limited than previously thought.

*Poster 5 is not competing for an award.*

Poster 5

**MACRO- AND MICRO-HABITAT EFFECTS OF OCELOT OCCUPANCY** Jason V. Lombardi<sup>1</sup>, Michael E. Tewes<sup>1</sup>, Humberto L. Perotto-Baldivieso<sup>1</sup>, Jose M. Mata<sup>1</sup>, Daniel Kunz<sup>2</sup>, Shelby Carter<sup>1</sup> and Tyler A. Campbell<sup>3</sup>, <sup>1</sup>Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, <sup>2</sup>Texas Parks and Wildlife Department, <sup>3</sup>East Foundation ([lombardijv@gmail.com](mailto:lombardijv@gmail.com))

The ocelot, *Leopardus pardalis*, is an endangered subtropical felid found in two small populations in the Lower Rio Grande Valley of Texas. Degradation and loss of habitat is one of the principal drivers of a loss of ocelot genetic diversity in the region. From 2011-2017, we conducted remote camera surveys on 28 sites within the East Foundation's El Sauz Ranch, Willacy County, TX. Preliminary results indicated a seasonal trend in detection between hot and cool months and initial occupancy was positively influenced by increasing linear distance to roads and woody patch density. Localized colonization was negatively influenced by sandy clay loam soils, but positively influenced by increasing woody patch density. Local extinction was influenced by decreasing woody patch density and negatively impacted by fine sandy soils. These data indicate that probability of initial occupancy of ocelots was greatest at least 1 km from roads, which has impacts on mitigating road crossings for ocelots. As woody patch density decreases, there will be less preferred dense vegetation for ocelots to colonize and differences in soil types should be factored into future habitat preservation and restoration efforts. This research provides information into habitat components most likely to influence ocelot occupancy, which is essential for future ocelot recovery and habitat restoration in the Lower Rio Grande Valley.

*The following posters (6–12) are to be considered for the Vernon Bailey Undergraduate Award.*

Poster 6

**SOIL ASSOCIATIONS OF FOUR RODENT SPECIES ACROSS THE HISTORICAL DISTRIBUTION OF THE TEXAS KANGAROO RAT (*DIPDOMYS ELATOR*)**  
S. Chase Brothers, John D. Stuhler, and Richard D. Stevens, Department of Natural Resources Management, Texas Tech University ([chase.brothers@ttu.edu](mailto:chase.brothers@ttu.edu))

One of the primary goals of ecology is to understand patterns in distribution and abundance of organisms. For example, identifying habitat features that influence distribution and abundance of rare species can help inform conservation plans. We surveyed rodent communities and collected



soil samples from 35 sites across the historical range of the Texas kangaroo rat (*Dipodomys elator*), a rare species that is today found in five counties in north-central Texas. Using particle size analysis to quantify the amount of sand, silt, and clay in each soil sample, we examined relationships between soil characteristics and distribution and abundance of four rodent species (*Chaetodipus hispidus*, *D. elator*, *D. ordii*, and *Sigmodon hispidus*). We found *D. elator* at sites with soils containing more clay and silt, whereas *D. ordii* was found exclusively in sandy soils. Moreover, *C. hispidus* and *S. hispidus* appeared in a much wider range of soil types and overlapped with each other and both *Dipodomys* species. This suggests that soil is a possible contributor to niche partitioning between the *Dipodomys* species in this region. Furthermore, these results indicate that the distribution of *D. elator* may be limited in part by soil characteristics across its range. Results from this work should help improve our understanding of factors contributing to the rarity of the Texas kangaroo rat as well as help identify locations to prioritize for habitat management.

#### Poster 7

**AGE-RELATED PHYSICAL ACTIVITY PERFORMANCE IN RAPAMYCIN DOSED MARMOSETS IN AN OPEN FIELD TEST** Megan Flores<sup>1</sup>, Matthew Lopez<sup>1</sup>, Adam Salmon<sup>2</sup>, Corinna Ross<sup>1,2</sup>, <sup>1</sup>Department of Science and Mathematics, Texas A&M University - San Antonio, <sup>2</sup>Barshop Institute for Longevity and Aging Studies, University of Texas Health San Antonio ([Mflor013@jaguar.tamu.edu](mailto:Mflor013@jaguar.tamu.edu), [mattlopez1204@gmail.com](mailto:mattlopez1204@gmail.com))

Frailty and sarcopenia are risks associated with functional decline of aging. Longevity research is now focused on extending health span for individuals, the period of time that aging adults are free of chronic diseases such as these. A possible intervention that may increase health span is the drug rapamycin which has been found to significantly increase life span in mice. In order to determine whether rapamycin may increase health, locomotion and balance are being examined in marmosets (*Callithrix jacchus*), a New World primate. Marmosets are a good model for aging studies due to their short average lifespan of four to six years. To test whether rapamycin protects aging marmosets from functional decline in locomotion and balance, we examined ambulation of the marmosets in an open field. Twenty marmosets have been receiving daily doses of oral rapamycin in a yogurt vehicle for over one year. The open field apparatus measured six foot by six foot, gridded by one foot marks, enclosed along the exterior with a two-foot barrier. Marmosets were trained to transfer into a cylinder from their cage and then into a ferret ball. For the trial the ferret ball was placed into the open field and data collection included location within the field each 20 seconds, and number of grid line crossings collected instantaneously. In the preliminary two minute trials marmosets regardless of age and rapamycin status varied between very active and inactive. In the lengthened four minute trials half of the marmosets doubled in line crossing, as well as varying in position and balance inside the ball itself. Trials continue to increase in time to the full 10 minute trials in which speed, balance, and distance traveled will be analyzed from video recordings.

#### Poster 8

**DETOURED REACH: TESTING A COGNITIVE TASK IN AGING MARMOSETS (CALLITHRIX JACCHUS)** Khira Warford<sup>1</sup>, Adam Salmon<sup>2</sup>, Corinna Ross<sup>1,2</sup>, <sup>1</sup>Department of Science and Mathematics, Texas A&M University- San Antonio, <sup>2</sup>Barshop Institute of Longevity and Aging Studies, University of Texas Health San Antonio ([khiras.warford@jaguar.tamu.edu](mailto:khiras.warford@jaguar.tamu.edu))

Functional decline associated with aging is the primary risk factor associated with dementia and many neurodegenerative diseases. In recent years research has focused on defining and attempting to expand health span of humans by prolonging the portion of their lifespan which is free of chronic disease. One potential intervention for health span is the FDA approved drug rapamycin that was discovered as a biological product of bacteria located on Easter Island. It has shown to be an effective immunosuppressant in humans and successfully increases longevity in mice. However, before beginning age-related testing in healthy human adults, marmosets (*Callithrix jacchus*), serve as a valuable transitional step from mice to humans. Marmosets are small nonhuman primates that are easy to handle, don't carry zoonotic disease, and are relatively short lived (approximately 6-10 years). Marmosets at the Barshop Institute are dosed daily with oral rapamycin in a yogurt vehicle. One method of testing rapamycin's efficacy on health span measures is by creating tasks that test the cognitive ability associated with executive function. Executive function is associated with impulsivity, decision making and planning. The detoured reach task tests the marmosets' ability to reach for a marshmallow and successfully retrieve it from a 5-sided clear cube that is randomly shifted to move the opening. Currently nineteen marmosets are being tested with sessions that consist of 20 trials with a maximum of 30 seconds to complete each attempt. An animal that successfully completes 18 out of 20 trials in less than or equal to 6 seconds reaches criterion. We hypothesize that the marmosets receiving daily doses of rapamycin will maintain executive cognitive function better than control animals. Preliminary results show that there may be sex specific responses and that rapamycin may aid in prolonging the healthspan of marmosets.

Poster 9

**OKA'YANAHLI NATURE PRESERVE BASELINE MAMMAL SURVEY** Wendy S. Monterroso and Victoria Jackson, Department of Biology, University of Central Oklahoma ([wmonterroso1@uco.edu](mailto:wmonterroso1@uco.edu))

Oka'Yanahli Preserve is a 3598-acre area located in the Blue River Watershed. Habitats on this area include limestone prairies interspersed with oak mottes and some bottomland hardwoods along the river. Located close to The Nature Conservancy's Pontotoc Ridge Preserve, this relatively new preserve is currently being surveyed for mammals. Since August 2016 we have surveyed various areas within the preserve with diverse habitats. We have set on average of 200-300 Sherman live traps for two nights and two days each month when weather was permitting. So far, we have determined that the highest percentage of trapped individuals have been *Sigmodon hispidus* (34%), *Peromyscus maniculatus* (34%), and *Reithrodontomys fulvescens* (17%). The remaining percentage is comprised of specimens that were difficult to identify or specimens that were caught only once such as *Chaetodipus hispidus*, *Cryptotis parva*, and *Microtus pinetorum*. Small and medium tomahawks have been utilized as well to trap mammals in areas along ponds and uninhabited sheds. *Procyon lotor*, *Didelphis virginiana*, and *Neotoma floridana* have been successfully trapped using this method. The goal of this survey is to establish baseline knowledge of the abundance and species richness of mammals as it is imperative to gain an understanding of how mammals react to different management strategies. Long-term monitoring efforts can be compared to this baseline inventory. In addition, knowing which species inhabit the area may alert property managers to species of conservation concern. This project will continue until Fall of 2018. We hope to expand our

research to include a mark-recapture study to determine not only species richness but also population densities.

Poster 10

**TESTING FOR SEXUAL DIMORPHISM WITHIN THE WHITE-LINED BROAD-NOSED BAT (*PLATYRRHINUS LINEATUS*)**

Ashlyn N. Kildow<sup>1\*</sup>, John D. Stuhler<sup>1</sup>, and Richard D. Stevens<sup>1,2</sup>, <sup>1</sup>Department of Natural Resources Management, Texas Tech University, <sup>2</sup>Museum of Texas Tech University ([ashlyn.kildow@ttu.edu](mailto:ashlyn.kildow@ttu.edu))

Examining sexual dimorphism is important for understanding selective pressures that influence behavior or fitness of a species in a given environment. For example, the presence of sexual dimorphism may indicate differences in breeding preferences, diets, or energy expenditures within a species. In bats, sexual dimorphism has been reported for many species, where females are consistently larger than males. We evaluated whether sexual dimorphism exists in the white-lined broad-nosed bat (*Platyrrhinus lineatus*), a species endemic to South America. We examined sixteen skull measurements (i.e., eight cranial, six dental, and two mandibular) and 14 external measurements for 94 adult bats collected from two sites in eastern Paraguay (Reserva Natural del Bosque Mbaracayú and Yaguareté Forests). Measurements were made to the nearest 0.01 mm using digital calipers. Because sexual dimorphism typically manifests as external characters in bats, we predict that females will be significantly larger than males, although preliminary analyses indicate no overall significant difference in skull morphology between the two sexes. If sexual dimorphism is present within *P. lineatus* for external characters, it could suggest that natural selection is driving intersexual differences due to sexual selection, intraspecific competition, or differential costs of parental care.

Poster 11

**SURVEY OF SMALL MAMMALS AND MESOCARNIVORES AT CAMP BOWIE TRAINING FACILITY, BROWN COUNTY, TEXAS**

Rachel M. Leucht, Samantha R. Velasquez, Krystal M. Goedde, and Joel G. Brant, Department of Biological Sciences, McMurry University ([leucht.rachel@mcm.edu](mailto:leucht.rachel@mcm.edu))

The Camp Bowie Training Facility regularly conducts military exercises that potentially affect wildlife populations. The ultimate objective of our survey is to propose management recommendations to address any potential impacts of military activity on mammal populations. We documented the presence of small mammal and mesocarnivore species and the distribution of these species relative to elevation. Camp Bowie was broadly divided into 3 elevation zones: highland, slope, and lowland. Trapping arrays were established in each elevation zone to estimate density of rodent populations. Transect trap lines of 50 Shermans were deployed opportunistically to supplement presence/absence detection of small mammals. Tomahawk live traps were deployed opportunistically to sample mesocarnivores. Sampling was conducted from August 2017 to January 2018. A total of 49 individuals, representing 6 species, were caught in small mammal traps over 3570 trapnights. We collected 22 *Sigmodon hispidus*, 6 *Peromyscus attwateri*, 5 *Baiomys taylori*, 4 *Reithrodontomys fulvescens*, 4 *Neotoma micropus*, 4 *Peromyscus laceianus*, and 1 *Chaetodipus hispidus*. We collected 3 *Procyon lotor*, 1 *Mephitis mephitis*, and 1 *Didelphis virginianus* in tomahawk traps. Voucher specimens were collected and deposited into the McMurry University Mammal Collection (McM). Tissue samples were also collected for

future genetic and parasitic analysis. These results represent only preliminary data in a two-year research project. Sufficient information has not yet been collected to allow statistical analysis. However, the sampling areas included in our study, as well as the trapping arrays designed to estimate density, differ from previous surveys. More data will be forthcoming as the project progresses.

Poster 12

**MAMMALS OF TEXAS MODELING: IN SEARCH OF LOST POPULATIONS** Bernardo Traversari and David Ribble, Department of Biology, Trinity University ([btravers@trinity.edu](mailto:btravers@trinity.edu))

Over the past two decades, there has been a rapid increase in the number of statistical spatial tools available to ecologists to create and understand the geographic distributions of species. At the same time, enthusiasm from citizen-scientists has resulted in expanding depositories of species locations such as found at iNaturalist.org and the Texas Parks and Wildlife Texas Nature Trackers program. The objective of this study was to combine the predictive power of species distribution modeling with the growing database of mammal occurrences from citizen-scientists to empower and motivate the discovery of new mammal locations of species of concern in Texas. To accomplish this 10 mammal species of concern were selected and every known occurrence collected through digitized natural history collections (e.g. VertNet.org) and citizen science sources were compiled. A traditional SDM model (MAXENT) was then applied to highlight Texas counties where a species has never been recorded but should be present based on the distribution and habitat requirements of the species. Maps of these findings will be presented along with strategies to inform and motivate the citizen-scientist community throughout Texas.

*The following posters (13–16) are to be considered for the Clyde Jones Graduate Award.*

Poster 13

**PHYLOGEOGRAPHIC ASSESSMENT OF THE HEERMANN'S KANGAROO RAT (*DIPODOMYS HEERMANNI*)** Bridgett B. Downs and Jessica E. Light, Department of Wildlife and Fisheries Sciences, Texas A&M University ([bdowns@tamu.edu](mailto:bdowns@tamu.edu))

Heermann's kangaroo rats (*Dipodomys heermanni*; Rodentia: Heteromyidae) are endemic to California and primarily found in the dry, gravelly grassland and open chaparral habitats of the San Joaquin Valley. Current taxonomy (based on morphology and habitat use) recognizes nine subspecies within this kangaroo rat species. Current management practices of *D. heermanni* are based on these historical classifications; however, these classifications may not accurately reflect unique lineages in need of conservation. This study aims to assess the phylogeography of *D. heermanni* across its geographic range. In doing so, we will gain insight into the diversification of *D. heermanni*, determine what, if any, barriers to gene flow exist among unique lineages, revise subspecific taxonomy (if necessary), create predictive models for the geographic ranges of each unique evolutionary unit, and make recommendations for conservation and management. We present a mitochondrial dataset, including an analysis of over 45 ancient museum specimens representing a total of nine subspecies distributed across the range of *D. heermanni*. Our analysis indicates that recognition of all nine subspecies is likely unwarranted. Future work will include a geometric morphometric analysis of the cranium of

adult *D. heermanni* museum specimens (representing all subspecies and paying close attention to the characters used in the original descriptions of subspecies).

Poster 14

**PHYLOGENY OF ARENAVIRUSES (ARENAVIRIDAE) ASSOCIATED WITH NORTH AMERICAN WOODRAT SPECIES, *NEOTOMA*** Laramie L. Lindsey<sup>1</sup>, Maria N. B. Cajimat<sup>2</sup>, Mary Louise Milazzo<sup>3</sup>, Robert D. Bradley<sup>1,4</sup>, and Charles F. Fulhorst<sup>2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Microbiology and Immunology Graduate Program, Graduate School of Biomedical Sciences, University of Texas Medical Branch, Galveston, <sup>3</sup>Department of Pathology, University of Texas Medical Branch, Galveston, <sup>4</sup>Natural Science Research Laboratory, Museum of Texas Tech University ([laramie.lindsey@ttu.edu](mailto:laramie.lindsey@ttu.edu))

The genus Arenavirus is comprised of Old World species (lymphocytic choriomeningitis-Lassa serocomplex) and New World species (Tacaribe serocomplex). Members of the Cricetid family of rodents are the main hosts of many Tacaribe serocomplex viruses. Furthermore, many Tacaribe viruses have been described with *Neotoma* species as their principal hosts. In fact, 9 arenaviruses have been described in North America and all are affiliated with the genus, *Neotoma*. For instance, the *Whitewater Arroyo virus* (WWAV) was isolated from *Neotoma albigula*, and *Neotoma micropus* from southern Texas was described as the principal host for the *Catarina virus* (CTNV). Previously, the S segment of the arenavirus isolated from several samples of *Neotoma* were sequenced and a phylogenetic tree was generated to depict the evolutionary relationships of arenaviruses in North America. For this study, we sequenced the cytochrome-b gene from each *Neotoma* host sample that was used in the arenavirus study for species identification. A phylogenetic tree was generated to depict the relationships of *Neotoma* species included in the study. Next, we compared the two phylogenetic trees generated and developed a map of localities of the *Neotoma* species to determine if geography and phylogenetic relationships play a role in the evolution of arenaviruses found in the genus *Neotoma*.

Poster 15

**STATUS, DISTRIBUTION, MORPHOLOGY AND GENETICS OF *SIGMODON FULVIVENTER DALQUESTI* IN THE CHIHUAHUAN DESERT ECOREGION** Preston J. McDonald and Caleb D. Phillips, Department of Biological Sciences, Texas Tech University ([preston.mcdonald@ttu.edu](mailto:preston.mcdonald@ttu.edu))

The tawny-bellied cotton rat, *Sigmodon fulviventer dalquesti*, is a Texas endemic subspecies reported only from a single sampling near Fort Davis in 1991 (Stangl 1992a). The current population, distribution and evolutionary origin of *S. f. dalquesti* is enigmatic (Schmidly et al. 2016). The Texas Parks and Wildlife Department's Texas Conservation Action Plan designates *S. f. dalquesti* as critically imperiled within the state. Additionally, the relationship between *S. f. dalquesti* and other *S. fulviventer* subspecies in Mexico, Arizona, and New Mexico is not well understood. The current state of knowledge of *S. f. dalquesti* systematics consists of morphological distinction from *S. f. minimus* (New Mexican form) (Stangl 1992b), and a finding of mitochondrial cytochrome *b* divergence between *S. f. dalquesti* and *S. f. fulviventer* (Mexican form) roughly equivalent to 100,000 years of divergence (Peppers et al. 2002). To inform an

accurate conservation assessment, a more complete understanding of *S. f. dalquesti* biology is required. We will conduct morphological and molecular phylogenetic analyses of the recognized *S. fulviventer* subspecies using existing specimens available in museum collections, as well as specimens obtained in planned field work. We will assess the population and distribution of *S. f. dalquesti* in the Chihuahuan Desert Ecoregion by Sherman Trap sampling transects in areas of the original detection in addition to other localities. Lastly, we will use niche modeling to predict *S. f. dalquesti* distribution. These efforts will improve our understanding of *S. f. dalquesti* biology, and inform future conservation management decisions.

Poster 16

**DNA TRANSPOSON ACTIVITY AND MUTATION RATES IN *MYOTIS* GENES** Nicole S. Paulat, David A. Ray, and Jennifer Korstian, Department of Biological Sciences, Texas Tech University ([nicole.paulat@ttu.edu](mailto:nicole.paulat@ttu.edu))

Transposable elements (TEs) are DNA sequences that mobilize through copy-and-paste or cut-and-paste mechanisms, expanding within a host genome. *Myotis* is one genus within vespertilionid bats which has experienced an unorthodox TE history. For example, their genomes are unique among mammals in containing many active DNA transposons, which continue to shape their genomic landscapes. Recent data suggests that, in addition to the indel mutations normally associated with TE activity, these genetic elements may also contribute to higher mutation rates via DNA repair mechanisms. DNA transposons preferentially insert near genes, and so transposon activity may be correlated with mutation rate increases in regulatory regions and coding sequences. An analysis of transposon polymorphisms in ten *Myotis* species will reveal the extent of mutations in nearby genes that are associated with DNA repair after transposon insertions and excisions. These increased mutation rates could correlate to differences in orthologous genes between closely related *Myotis* species and contribute to our understanding of this exceptionally diverse clade.

*The following posters (17–22) are to be considered for the Clyde Jones Undergraduate Award.*

Poster 17

**HOW MANY SPECIES OF MAMMALS ARE THERE?** Connor J. Burgin<sup>1</sup>, Jocelyn P. Colella<sup>2</sup>, Nathan S. Upham<sup>3</sup> and Philip Kahn<sup>4</sup>, <sup>1</sup>Department of Biological Sciences, Boise State University, <sup>2</sup>Department of Biology and Museum of Southwestern Biology, University of New Mexico, <sup>3</sup>Department of Ecology and Evolutionary Biology, Yale University, <sup>4</sup>Museum of Vertebrate Zoology, University of California ([connorburgin@u.boisestate.edu](mailto:connorburgin@u.boisestate.edu))

Accurate taxonomy is central to the study of biological diversity, as it provides the needed evolutionary framework for taxon sampling and interpreting results. While the number of recognized species in the class Mammalia has increased through time, tabulation of those increases has relied on the sporadic release of revisionary compendia like the Mammal Species of the World (MSW) series. Here, we present the Mammal Diversity Database (MDD), a digital, publicly accessible, and updateable list of all mammalian species, now available online: <https://mammaldiversity.org>. The MDD will continue to be updated as manuscripts describing new species and higher taxonomic changes are released. Starting from the baseline of the 3rd edition

of MSW (MSW3), we performed a review of taxonomic changes published since 2004 and digitally linked species names to their original descriptions and subsequent revisionary articles in an interactive, hierarchical database. We found 6,496 species of currently recognized mammals (98 recently extinct, 6,398 extant), compared to 5,416 in MSW3 (75 extinct, 5,341 extant)—an increase of 1,080 species in about 13 years, including 11 new species considered extinct within the last 500 years. We tabulate 1,251 new species recognitions, at least 171 unions, and multiple major, higher-level changes, including an additional 88 genera (1,314 now, compared to 1,226 in MSW3) and 14 newly recognized families (167 compared to 153). Analyses of the description of new species through time and across biogeographic regions show a long-term global rate of ~25 species recognized per year, with the Neotropics as the overall most species-dense biogeographic region for mammals, followed closely by the Afrotropics. The MDD provides the mammalogical community with an updateable online database of taxonomic changes, joining digital efforts already established for amphibians (AmphibiaWeb), birds (e.g., Avibase, IOC World Bird List, HBW Alive), non-avian reptiles (The Reptile Database), and fish (e.g., FishBase).

Poster 18

**INVESTIGATION OF THE PHYLOGEOGRAPHIC STRUCTURE OF THE SUBSPECIES OF NORTHERN YELLOW BATS (*DASYPTERUS INTERMEDIUS*) BY MOLECULAR ANALYSIS** Sydney K. Decker and Loren K. Ammerman, Department of Biology, Angelo State University ([sdecker4@angelo.edu](mailto:sdecker4@angelo.edu))

Northern yellow bats, *Dasypterus intermedius*, occur in North and Central America, ranging from Honduras to South Carolina along the coast of the Gulf of Mexico. Two subspecies are currently recognized: *D. intermedius intermedius*, found from Honduras to south Texas, and *D. intermedius floridanus*, which ranges from southern Texas eastward to Florida and South Carolina. In this phylogeographic study, over 40 tissue samples were processed for DNA extraction and the amplification of the cytochrome b gene, with 21 sequences successfully attained. Samples were chosen from across the known geographic range, with particular attention paid to samples from south Texas, where the two subspecies' ranges overlap in order to test the hypothesis that molecular data will correspond geographically with the morphologically defined subspecies. Two well-supported lineages were recovered based on a maximum likelihood phylogenetic analysis that did not correspond to the proposed geographic separation. A distance value of 0.119 between the two lineages of *D. intermedius*, as well as the relationship to the endemic Cuban species *D. insularis*, suggest that the taxonomy be re-evaluated according to the genetic species concept to reflect the level of divergence found. More molecular data, especially from the nuclear genome, as well as morphological measurements for applicable individuals are needed to further corroborate the results.

Poster 19

**CHARACTERIZATION OF AN X-LINKED MICROSATELLITE IN EASTERN RED BATS (*LASIURUS BOREALIS*) TO DETERMINE GENETIC VARIABILITY AMONG OFFSPRING** Morgan P. Holt<sup>1</sup>, Brittney A. Jones<sup>1</sup>, Loren K. Ammerman<sup>2</sup> and Dana N. Lee<sup>1</sup>, <sup>1</sup>Department of Agriculture, Biology, and Health Sciences, Cameron University, <sup>2</sup>Department of Biology, Angelo State University ([morgan.holt@cameron.edu](mailto:morgan.holt@cameron.edu))

Eastern red bats (*Lasiurus borealis*) are one of a few bat species known for carrying more than one offspring at a time with the potential of having different fathers. Before a study testing the hypothesis of multiple paternity can be completed, we characterized an X-linked microsatellite (Paur\_03), previously identified in brown long-eared bats (*Plecotus auritus*), in 53 Eastern red bats. These individuals consisted of nine mother/offspring groups and two sibling groups that were collected for rabies testing by the Oklahoma State Department of Health and Texas Department of State Health Services. It was found that this locus is in Hardy-Weinberg Equilibrium and does not have null alleles or heterozygote deficiencies. Additionally, there were eight alleles, observed and expected heterozygosity was 0.792 and 0.765, respectively, and the polymorphic information content (PIC) was high (0.718). Heterozygosity and allelic richness of this locus was higher in Eastern red bats than in brown long-eared bats suggesting this microsatellite could be used in a future study testing red bat paternity.

Poster 20

**A GENETIC ASSESSEMENT OF POCKET GOPHERS OF THE GENUS *GEOMYS* (RODENTIA: GEOMYIDAE) IN TEXAS** Mariah N. Mills<sup>1</sup>, Taylor J. Soniat<sup>1</sup>, Michaela Halsey<sup>1</sup>, Richard D. Stevens<sup>1,2</sup>, David A. Ray<sup>1</sup>, and Robert D. Bradley<sup>1,2</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Natural Science Research Laboratory, Texas Tech University ([mariah.mills@ttu.edu](mailto:mariah.mills@ttu.edu))

Pocket Gophers (genus *Geomys*) occur throughout North America and nine species have been described from Texas (*G. arenarius*, *G. attwateri*, *G. breviceps*, *G. bursarius*, *G. jugossicularis*, *G. knoxjonesi*, *G. personatus*, *G. streckeri*, and *G. texensis*). Pocket gophers, specifically *Geomys*, are morphologically ambiguous, leading to taxonomic uncertainty. Additionally, the number of species within the genus has been debated among biologists. Identification to the subspecific level is difficult because most species of *Geomys* are morphologically cryptic. In order to assess the validity of subspecies, genetic testing is required. Twenty-five samples were collected from type localities across Texas. DNA was extracted from liver tissue, and the mitochondrial gene, cytochrome-*b* (*Cytb*) (1,143 bp) was amplified using PCR. Sequences were aligned with previously sequenced *Geomys* samples, and *Cratogeomys castanops* was used as an outgroup. A Neighbor-Joining Tree was constructed using the program PAUP\*. Furthermore, a Bayesian analysis was performed as well as maximum likelihood to construct a robust tree depicting the phylogenetic relationships within the genus *Geomys*.

Poster 21

**ASSESSING THE GENETIC DIVERSIFICATION OF BATS IN THE GENUS *MONOPHYLLUS*** Irene Vasquez<sup>1</sup>, Laramie L. Lindsey<sup>1</sup>, Julie A. Parlos<sup>2</sup>, Robert J. Baker<sup>1,3</sup>, Robert D. Bradley<sup>1,3</sup>, and Hugh H. Genoways<sup>4</sup>, <sup>1</sup>Department of Biological Sciences, Texas Tech University, <sup>2</sup>Department of Biological Sciences, TTU Biology at Waco, <sup>3</sup>Natural Science Research Laboratory, Museum of Texas Tech University, <sup>4</sup>University of Nebraska State Museum ([irene.vasquez@ttu.edu](mailto:irene.vasquez@ttu.edu))

The genus *Monophyllus*, the Antillean long-tongued bats, is distributed throughout the Greater Antilles and Lesser Antilles in the Caribbean. *Monophyllus* is comprised of two species, *M. plethodon* and *M. redmani*. *M. plethodon* resides in the Lesser Antilles islands and several subspecies have been recognized (*M. p. frater*<sup>†</sup>, *M. p. luciae*, and *M. p. plethodon*). *M. redmani*



occurs in the Greater Antilles islands with several subspecies described (*M. r. clinedaphus*, *M. r. portoricensis*, and *M. r. redmani*). Based on prior knowledge (morphological data and preliminary molecular data), we hypothesize that *Monophyllus* consists of several species and that the currently recognized *M. redmani* can be split into more than one species based on the genetic species concept. The hypothesis was tested by evaluating molecular data generated from the mitochondrial cytochrome-*b* gene (1,140 bp). The species, *Glossophaga soricina*, was used as an outgroup. Thirty-nine samples were collected from almost all subspecies of both *M. plethodon* and *M. redmani*. Tissues were obtained through the NSRL (Natural Science Research Laboratory) at Texas Tech University. Preliminary results show that *M. plethodon* and *M. redmani* are different species with K2P values at 10.9%, and the occurrence of genetically divergent clades may suggest multiple taxa represent *M. redmani*. Further analyses will include samples of *M. redmani* from more islands in the Greater Antilles.

Poster 22

#### **DEVELOPMENT OF NEW NUCLEAR MARKERS FOR PHYLOGENY**

#### **RECONSTRUCTION IN *THOMASOMYS* (RODENTIA: CRICETIDAE) Destiny**

Wadewitz, Hannah Seah, Joshua M. Brokaw, Thomas E. Lee, Department of Biology, Abilene Christian University ([djw15a@acu.edu](mailto:djw15a@acu.edu))

*Thomasomys* is a genus of mouse-like 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 evolutionary adaptations in 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 tested and redesigned primers in order to obtain sequences exon 6 of the gene coding for the dentin matrix (*DMPI*), first exon of the interphotoreceptor retinoid binding protein (*IRBP*), second intron of alcohol dehydrogenase gene 1 (*Adh*), seventh intron of b-fibrinogen gene (*bfbg*), and second intron of preproinsulin 1 (*Ins*). Early results suggest that these markers are less variable than previously used mitochondrial markers and the nuclear recombination activating gene 1 (*RAG1*) but could contain significant amounts of phylogenetically informative characters. Although increased phylogenetic resolution has been minimal, when combined, these nuclear genes can provide independent evidence supporting mitochondrially based hypotheses.

**Texas Society of Mammalogists  
36<sup>th</sup> Annual Business Meeting  
Texas Tech University Center at Junction  
17 February 2018**

**AGENDA**

1. Approval of the Minutes of the 2017 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, Richard Stevens
  - 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 2019 Annual Meeting
  - b. Other New Business
8. Closing Remarks of TSM President, John Hanson
9. Adjourn

**Texas Society of Mammalogists**  
**AMENDED Treasurer's Report for 1 January to 31 December 2017**  
**Submitted by Marcia (Marcy) A. Revelez, Secretary-Treasurer and approved by**  
**the Executive Committee on 8 February 2019**

Income and expenses of TSM for the 2017 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 \$3,768.66. Total income in 2017 was \$15,364.00 and total expenses were \$13,732.46. No funds were transferred to Morgan Stanley in 2017. TSM total assets at the end of 2017 were \$111,730.24. The checking account balance at the end of 2017 was \$5,400.20. The value of the investment fund for 2017 increased by \$12,554.03. A total of \$574.39 was paid to Morgan Stanley in fees for the year.

		<b>ADJUSTED</b>
Checking Account Balance as of 31 December 2016	\$3,768.66	\$3,768.66
Investment Account (Morgan Stanley) balance 1 January 2017	\$93,776.01	\$93,776.01
<b>Total TSM assets as of 1 January 2017</b>	<b>\$97,544.67</b>	<b>\$97,544.67</b>
<b>2017 Income</b>		
2017 Annual Meeting income (registration, meals and lodging fees)	\$8,858.00	\$9,171.00
Membership Dues	\$258.00	\$258.00
T-shirts (83 sold, 48 free, 5 unsold)	\$830.00	\$830.00
Auction Income (live \$3460, silent \$834)	\$4,294.00	\$4,294.00
Contributions	\$143.20	\$459.00
Patron memberships	\$350.00	\$350.00
Meeting photos	\$2.00	\$2.00
Total income	\$14,735.20	\$15,364.00
<b>2017 Expenses</b>		
2017 Annual Meeting Expenses to TTU Center	\$7,724.00	\$7,724.00
Entertainment - DJ in 2017 (\$600 total, \$300 balance paid)	\$300.00	\$300.00
Refreshments/Beverages	\$667.76	0.00
Program copy charges (ASU print shop)	\$241.93	\$241.93
Nametags	\$0.00	\$0.00
Computer, software	\$251.87	\$251.87
Office supplies	\$60.98	\$60.98
PO Box	\$167.00	\$167.00
Student Awards	\$3,699.00	\$3,699.00
T-shirt charges (Gandy Ink) 136	\$995.00	\$995.00
Speaker Travel Reimbursement (\$102.83)		
honorarium	\$0.00	\$0.00
airfare	\$0.00	\$0.00
car rental/gas	\$0.00	\$0.00
parking	\$0.00	\$0.00
hotel	\$102.83	\$102.83
GKG fees for domain and hosting renewal	\$88.45	\$88.45
Shipping	\$6.70	\$6.70
PayPal fees	\$94.70	\$94.70
Total expenses	\$14,400.22	\$13,732.46
Checking Account Balance 31 December 2017	\$4,662.66	\$5,400.20
Investment Account (Morgan Stanley) balance 31 December 2017	\$108,148.98	\$106,330.04
<b>Total TSM assets as of 31 December 2017</b>	<b>\$112,811.64</b>	<b>\$111,730.24</b>



# **Texas Society of Mammalogists**



**Newsletter**

**2018**

**The 36<sup>th</sup> Annual Meeting**



# 2018 Banquet Speaker

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Our banquet speaker will be Dr. Elinor Karlsson of the Broad Institute. She is the director of the Vertebrate Genomics Group. Her research incorporates citizen science and genomics.



## Patron Membership

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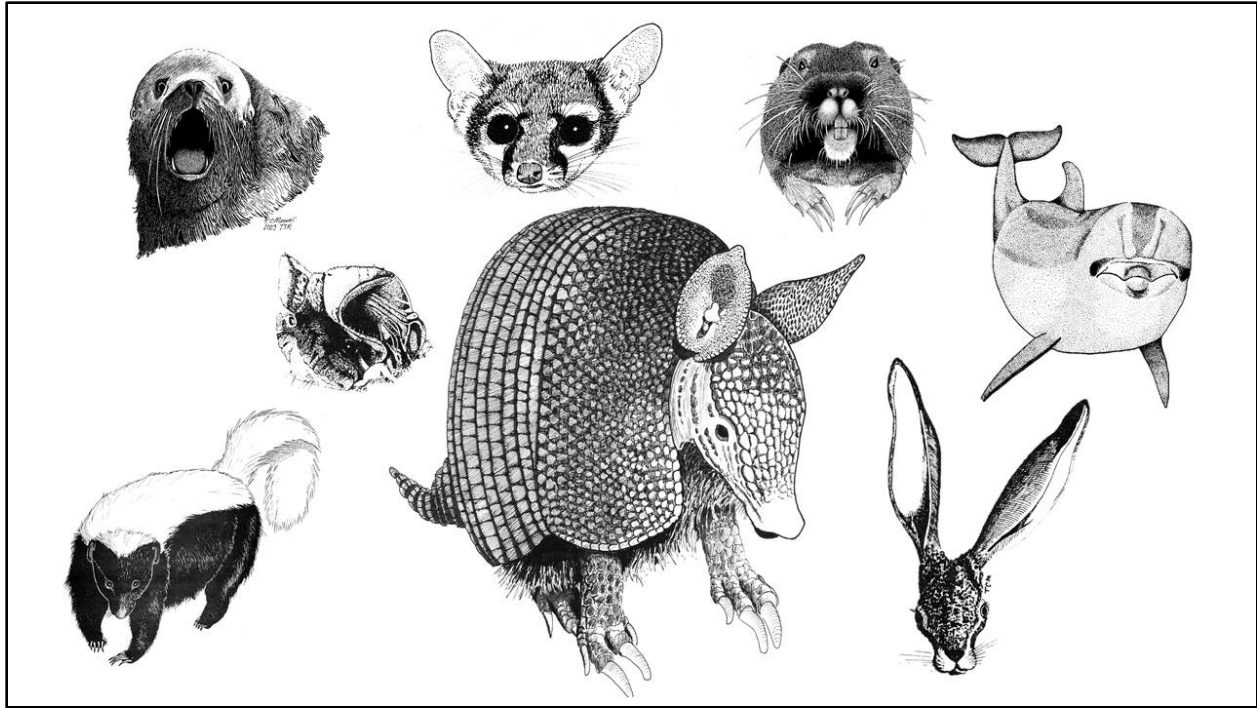
Members are encouraged to consider becoming Patrons of the Society by donating \$100 (or more) to support the Society's student paper awards. A list of Patron members is published on the website and in the program. Regular Patron membership is achieved with a donation of \$100. Members who exceed \$100 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.

## On the Passing of a Dear Friend, and the Passing on of a Tradition

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### **TSM mourns loss of Terry Maxwell**

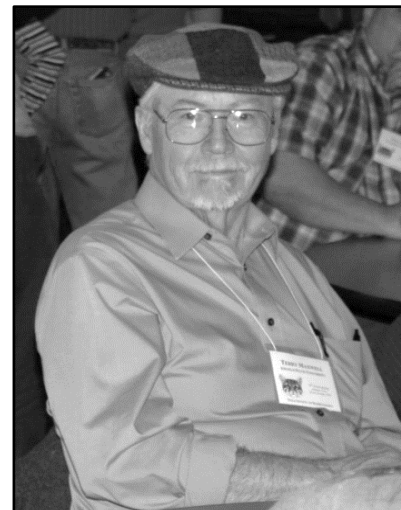
TSM members were all saddened by the sudden passing in April of 2017 of Dr. Terry C. Maxwell, most popularly known within the Texas Society of Mammalogists for sharing his amazing artistic talent. Terry had been a member of the society since 1990. He was named an Honorary Member in 2006 and he served as President in 2010–2011. Since 1995, Terry had created the original artwork, based on the subject of the banquet speaker's presentation, that was used on the meeting's program cover and later the t-shirts and name badges. When the annual fundraising auction of the society was established in 2003, Terry began donating his original art to the cause. Always the highlight of the auction, his artwork brought in an average of \$400–\$600 per year for the TSM endowment to support student awards.



*A sampling of Terry's TSM art.*

Dr. Maxwell, Distinguished Biology Professor Emeritus, retired from Angelo State University in 2015. Over the course of his 38-year career, he contributed to the growth of the Angelo State Natural History Collections, the field of ornithology, and the natural history of the Concho Valley. But he is most fondly remembered for his teaching, mentoring, and personal interactions with students. He was loved, and we will miss him. For more information about Terry, you can request a copy of the 2017 Newsletter of the Angelo State Natural History Collections.

With Terry's loss, the Texas Society of Mammalogists was faced with finding a new artist. The goal was to find someone that would maintain the integrity of the society while honoring the tradition of Terry's legacy. The society did not have to look far, and we are so pleased to announce our new artist – Ms. Krysta Demere.



*Dr. Terry Maxwell, wearing one of his signature flatcaps, at the TSM meeting in 2010.*

## About Krysta

Four generations of family ranching in West Texas has made Krysta Demere about as Texan as you can be. Her time spent at Angelo State University, however, made her a proud Texan who aspires to be a mammalogist, naturalist, and an artist. Although she displayed interest in art from an early age, Krysta's time studying bats and various other mammals across the western United State sparked an attentiveness to the illustrations of mammals. Flaming that spark, Krysta had the opportunity to study under and learn

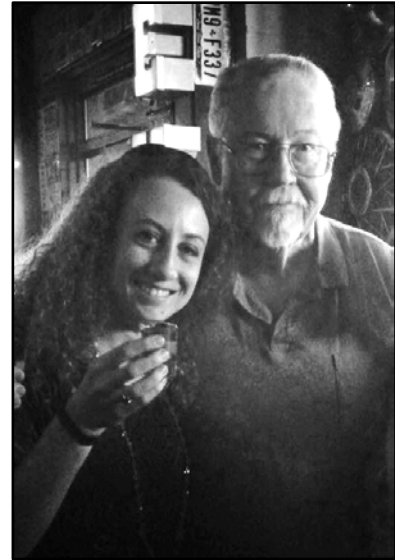


from the exceptional naturalist and illustrator, Dr. Terry C. Maxwell. Upon graduating with an M.S. in Biology under the guidance of Dr. Loren K. Ammerman in 2016, Krysta left the San Angelo area and took a position with Texas A&M Natural Resource Institute, College Station, as a Research Associate. Since starting at the institute, Krysta has cooperated on projects such as the Statewide Assessment of Bats Over-wintering in Texas and the Ecological Monitoring of Military Lands for the United States Air Force. It was during this post grad-school “honeymoon phase” that she picked up brush and pen to begin exploring art more fully.

### **What it means to follow in Terry’s footsteps, in Krysta’s words:**

*“Demere. Are you one of those crazy Demeres from Water Valley?” – Terry Maxwell*

Since roll call on the first day of Dr. Maxwell’s Zoology class, and him famously picking on the local kid, I always felt that Dr. Maxwell was just as much a friend as he was a professor. A San Angelo native himself, Dr. Maxwell had spent many an hour on our family land, and I thoroughly enjoyed chatting with him about not only the natural history of the Concho Valley, but of the natural history of my family’s ranch. As I started drawing, I would send Dr. Maxwell emails of my artwork and excitedly wait for his supportive reaction. The biggest honor in serving as the artist for the Texas Society of Mammalogist is having the opportunity to carry on the exceptional work of Dr. Maxwell and knowing he would send his familiar response, “This is great. Carry on the good work.”



*Krysta celebrating the completion of her Master’s thesis with Terry by honoring his tradition – a tequila shot.*



*As she started drawing, Krysta would send Terry emails of her artwork and excitedly wait for his supportive reaction.*

# News & Announcements

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## Endowment in Memory of Dr. Terry Maxwell

An endowment to support the Angelo State Natural History Collections has been renamed in memory of Dr. Terry Maxwell, long-time attendee and honorary member of TSM. An anonymous donor has agreed to match funds up to \$7500 through March, 2018 in order to reach our long-term goal of \$100,000. Donations to the Terry Maxwell Endowment in Natural History can be made online at [www.angelo.edu/e-giving](http://www.angelo.edu/e-giving) or by contacting the ASU Office of Development at 325-942-2116 or [development@angelo.edu](mailto:development@angelo.edu).

## Still Wanted! Observations and Specimens of Spotted Skunks!



*Robert Dowler*—My graduate students and I continue to collect 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 specimens are found, regardless of condition, and frozen, we could possibly use these for endoparasite analyses. Thanks and see you in Junction. For questions or to send information: Robert Dowler-325/486-6639 or Hannah Jones - 325/226-9222; [robert.dowler@angelo.edu](mailto:robert.dowler@angelo.edu)

## Notice to All Authors of TTU Occasional Papers and Special Publications

The NSRL is in the process of reducing their inventory of printed Occasional Papers and Special Publications, for the entire series dating back to 1972. Demand for hard copies has declined over the years, and storage space in the NSRL is at a premium. All recent issues are available online as PDFs, and the goal is to make all volumes available in PDF format via the NSRL website over the course of the next year or so. A limited number of hard copies will be retained, but excess inventory will be culled through several methods, including donations, sales to book dealers, and, as a last resort, recycling.

**If you have published in the Occasional Papers or Special Publications series and you wish to receive hard copies of your publications from this excess inventory**, please contact Lisa Bradley at [lisa.bradley@ttu.edu](mailto:lisa.bradley@ttu.edu), by 1 May 2018, with the volume numbers and quantity of each that you desire. Depending on the quantity requested, authors may be asked to cover the cost of shipping.

This decision was not made lightly, and the NSRL appreciates your understanding of the situation. The NSRL is confident that the printed copies available in numerous libraries, and the online presence of the PDF files, will not have a negative effect on the availability and distribution of your publications.

# Abilene Christian University

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



## Tom Lee

Phone: 325-370-4442

Email: leet@acu.edu

### Research Interests, Projects, and Grants:

My research is on the mammals of Ecuador. I have been a part of nine mammal collecting trips to Ecuador including the Galapagos Islands. Most of my trips have focused on the Andes from 2,000 to 3,500 meters. From these research trips to Ecuador we have published many survey accounts and discovered three new species of mammal. Many members of the Texas Society of Mammalogists have collaborated with me and my students of these projects. The trips are funded by internal ACU Math/Science grants to faculty and students. Hannah Seah and Destiny Wadewitz will present

the results of our phylogenetic analysis of *Thomasomys* at the 2018 meeting. These data were obtained by working with Santiago Burneo, Josh Brokaw and John Hanson.

# Angelo State University

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



## Loren K. Ammerman

Phone: 325-486-6643

Email: loren.ammerman@angelo.edu

Web page: [www.angelo.edu/content/profiles/75-loren-k-ammerman](http://www.angelo.edu/content/profiles/75-loren-k-ammerman)

### 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.

I am currently funded for the projects “Binational Conservation of an Endangered Pollinator: Research, Protection, and Recovery for the Mexican Long-nosed Bat” (TPWD Section 6 funding via contract with Bat Conservation International) and “Genetic Analysis of Multiple Paternity in Red Bats” (ASU Faculty Research Enhancement Program grant in collaboration with Dana Lee at Cameron University).

### Current Graduate Students and Their Research:

- Virginia Jaquish – MS thesis student, *Agave* flower visitation by pallid bats, *Antrozous pallidus*, September 2017-present

- Katie Kuzdak – MS thesis student, Effects of drought conditions on the diets of insectivorous bat species: a molecular diet study, graduated December 2017
- Roxy Pourshoushtari - MS thesis student, Activity of Mexican long-nosed bats in Big Bend National Park, and, Population genetics of endangered Mexican long-nosed bats (*Leptonycteris nivalis*) using microsatellite markers, January 2017-present
- Alexandra Shaffer – MS thesis student, Gene flow in the Eastern Spotted Skunk (*Spilogale putorius*) in Texas based on microsatellite markers, co-advised with Bob Dowler, graduated August 2017

#### Current Undergraduate Students and Their Research:

- Sydney Decker – Defining lineages of the Northern Yellow Bat (*Dasypterus intermedius*) based on mitochondrial cytochrome b (Undergraduate Research Scholar, Fall 2015-present)
- Sam Harrison – Population genetics of *Dasypterus (Lasiurus) ega* (Southern Yellow Bat) (Undergraduate Research Scholar, Spring 2017-present)

#### Additional Information:

The Angelo State Natural History Collection has over 18,500 mammal specimens and over 20,000 tissue specimens. The collection is searchable at <https://www.angelo.edu/dept/biology/asnhc/> and on VertNet and GBIF. Contact Loren Ammerman or Robert Dowler if you have any questions about the collection. Also, I will be offering a Maymester field course called “Natural History of Bats” during May 2018 through Angelo State University. Contact me if you would like to learn more about participating in this course.



#### **Robert C. Dowler**

Phone: 325-486-6639

Email: [robert.dowler@angelo.edu](mailto:robert.dowler@angelo.edu)

Web page: <http://www.angelo.edu/content/profiles/293-robert-dowler>

#### Research Interests, Projects, and Grants:

My graduate students and I have completed field work to determine the status of the Plains Spotted Skunk (*Spilogale putorius interrupta*) in Texas. With Loren Ammerman, we are assessing genetic variability in *S putorius* across the range of the species. We are continuing work on the ecology of eastern spotted skunks, including their endoparasites. **I am interested in all specimen records in Texas for any spotted skunks, as well as any sightings, photographs, or tissue samples with locality data. In particular we are trying to gather whole animals for endoparasite studies.** I am also interested in the conservation biology and systematics of Galapagos rodents, collaborating with Cody Edwards at George Mason University.

#### Graduate Students and Their Research:

- J. Clint Perkins completed his M.S. research on conservation status of the plains spotted skunk in Texas.
- Alexandra A. Shaffer completed her M.S. research on genetic variability of the eastern spotted skunk (co-chaired with Loren K. Ammerman).
- Kaitlynn LeBrasseur completed her M.S. research on a comparison of pocket gopher endoparasites among *Geomys texensis*, *G. attwateri*, *G. bursarius*, and *G. personatus*.
- Hannah Jones is conducting M.S. studies on the endoparasites of the eastern spotted skunk.

#### Undergraduate Students and Their Research:

- Matthew Hamilton is comparing anatomical features of Galapagos rodents in the genus *Nesoryzomys*.
- Angela Rollins is conducting research to compare activity patterns of mesocarnivores based on camera trap images.

## Austin College

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900 N. Grand Ave., Sherman, TX 75090



### **Jessica Healy-La Price**

Phone: 903-813-2338

Email: [jhealy@austincollege.edu](mailto:jhealy@austincollege.edu)

#### Research Interests, Projects, and Grants:

My primary area of study is the physiological ecology of ground squirrels that hibernate. Using both laboratory and field populations of thirteen-lined ground squirrels, I investigate interactions between hormones that control food intake and reproduction. I also have an ongoing long-term project examining the effects of small mammal exclosures on a prairie restoration site.

#### Undergraduate Students and Their Research:

- Michael Moran (Effects of small mammal exclosure on prairie restoration)
- Liberte Manirakiza, Monica Martinez, Lisha Jacob, Mindalena Adams (Sex hormones and food intake in thirteen-lined ground squirrels)

## Cameron University

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Lawton, OK 73505



### **Dana N. Lee**

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Email: [dalee@cameron.edu](mailto:dalee@cameron.edu)

#### 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 detect species of viruses found in Texas and Oklahoma bats. Joel Brant (McMurry University) and I are working on producing a molecular phylogeny for subspecies of the Eastern Mole, and Loren Ammerman (Angelo State University) and I are investigating the possible multiple paternity in Eastern Red Bats.



# Columbus State University

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Department of Biology, Columbus State University, Columbus, GA



## John Delton Hanson

Phone: 806-549-4669

Email: [hanson\\_john1@columbusstate.edu](mailto:hanson_john1@columbusstate.edu)

### Research Interests, Projects, and Grants:

My research currently working on the systematics of various neotropical rodent groups. In addition, I am in the process of establishing some long term ecological projects looking at mammalian communities in areas being restored to long-leaf pine habitat.

# Houston Museum of Natural Science

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



## Dan Brooks

Phone: 713-639-4776

Email: [dbrooks@hmns.org](mailto:dbrooks@hmns.org)

Web page URL: [www.hmns.org/exhibits/curators](http://www.hmns.org/exhibits/curators)

### Research Interests, Projects, and Grants:

Last February the Paraguayan government organized a Conservation Assessment and Management Plan (CAMP) for the endangered Chacoan Peccary (*Catagonus wagneri*). Brooks did some of the pioneer work for this species during 1989-90; it was really great to see all the interest that has accrued in this species over the last three decades. The meeting led to collaborating with colleagues in Paraguay, Argentina and Bolivia on a population management publication, along with an Action Plan.

Last summer we added several addition specimens and a couple of new displays to the Frenshley/Graham Hall of African Wildlife Conservation. The displays include: 1) a W. African wetland featuring a bull Elephant, and 2) a kiosk on evolution and describing new species using as the model, several new species of African House Bats (*Scotophilus*) recently described John Bickham and myself.

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.)
- Predation on *Tadarida* by raptors (with K. Conlan)
- Conservation plan for Chacoan Peccary (*Catagonus wagneri*; with M. Altricher, et al.)
- Distribution of the Black-tailed Marmoset (*Mico melanurus*) in Paraguay (with A. Yanosky, et al.)

#### 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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Department of Biology, McMurry University, Abilene, TX 79697



### **Joel G. Brant**

Phone: 325-793-3875

Email: brant.joel@mcm.edu

#### 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); and a survey of mammals at Camp Bowie Training Center in Brown County, Texas.

# Midwestern State University

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



## **Ray E. Willis**

Director of the Dalquest Desert Research Station; Vertebrate Biologist

Phone: 940-397-4408

Email: ray.willis@mwsu.edu

### 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.

### Students and Their Research:

I currently have three graduate students working on various vertebrate morphology and phylogenetic research projects. I have two grants active until 2019 working on mammals and reptiles on the Texas National Guard bases located in Paris and Bastrop, Texas. I anticipate having room for at least three more students who would be interested in working on these grants or at the Dalquest Desert Research Station.

# Purdue University

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West Lafayette, IN



## **J. Andrew DeWoody**

Phone: 765-496-6109

Email: dewoody@purdue.edu

Web page: <https://web.ics.purdue.edu/~dewoody/DeWoody/wordpress/>

### Research Interests, Projects, and Grants:

Evolutionary genetics and genomics; molecular ecology and evolution; natural history; conservation biology; wildlife and fisheries management. My lab group uses genomic and other approaches to study otherwise cryptic aspects of biology. Our work has been funded by a variety of state, regional, and federal agencies including the Indiana Department of Transportation/Joint Transportation Research

Program, the Great Lakes Fishery Trust, the National Birds of Prey Trust, the USDA, the USFWS, the Bureau of Land Management, and the National Geographic Society. Most of our long-term funding has come from the National Science Foundation.



### Graduate Students and Their Research:

My graduate students and postdocs work on a variety of questions in ecology and evolution, including important conservation issues related to threatened and endangered species (e.g., golden eagle demography and gray whale population structure).

### Undergraduate Students and Their Research:

My undergraduates are all mentored by graduate students or postdocs. Most start as “assistants”, but the best students develop their own research projects.

### Additional Information:

I am always looking for bright, motivated students so please contact me if you are interested in an immersive experience at a top-notch graduate school. See my webpage for more details.

## Tarleton State University

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



### **Christopher L. Higgins**

Phone: 254-968-9019

Email: [higgins@tarleton.edu](mailto:higgins@tarleton.edu)

Web page: [faculty.tarleton.edu/higgins/](http://faculty.tarleton.edu/higgins/)

### Research Interests, Projects, and Grants:

Most of my research focuses on how local factors combine with regional processes to determine the distribution and abundance of organisms. It combines experimental and observational approaches, and often uses computer simulations to determine whether empirical observations deviate from null expectations.

The Higgins Research Lab just completed a three year survey of mammals at Palo Pinto Mountains State Park (TPWD Contract No. 455307) and is now surveying bats at Camp Bowie and Camp Swift military training facilities (TMD Contract No. 17-2014-ENV). In addition, we are monitoring changes in small mammal assemblages at Timberlake Biological Field Station as part of Tarleton’s Research Experiences for Undergraduates (REU) program (NSF Contract No. 1658984).

### Graduate Students and Their Research:

- Vanessa Hays – Effects of turbidity on shoaling behavior in two stream-dwelling cyprinids: the importance of visual and olfactory cues
- Jarrett Vincik – Bat survey at Camp Bowie and Camp Swift military training facilities
- Leah Woolam – Distribution and abundance of state threatened freshwater mussels along the middle Colorado River and its tributaries
- Austin Kaulfus – Effects of parasites on the reproductive ecology of freshwater mussels in the middle Colorado River

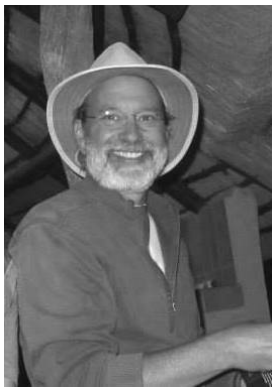
### Undergraduate Students and Their Research:

- Madison Gover – Survey of bats at Camp Bowie

- Elexus Hargis – Survey of bats at Camp Swift

Additional Information:

The REU Site award to Tarleton State University, located in Stephenville, TX, will support the training of 10 undergraduate students from 2-year colleges or 4-year universities with limited research opportunities for 10 weeks during the summers of 2018 - 2020. Research will be conducted both on the main campus and at Timberlake Biological Field Station, located south of Goldthwaite in Mills County, TX. The scientific focus is on environmentally related issues associated with converting a working cattle ranch into a long-term biological field station. Ranching was once a widespread and profitable business with little environmental focus. However, increasing emphasis on sustainable land and water use has helped reshape how cattle ranchers manage their resources to maximize their gain while minimizing their impact on surrounding ecological systems.



**Philip D. Sudman**

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Web page URL: [faculty.tarleton.edu/sudman/](http://faculty.tarleton.edu/sudman/)

Research Interests, Projects, and Grants:

I continue to have a keen interest in pocket gopher genetics/phylogenetics/population genetics. Although I have 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. My most recent graduate student projects included 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).



**Russell S. Pfau**

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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, fish, and plants and am collaborating on a bumblebee project. Ongoing projects include:

- 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 several pocket gopher species in the genus *Geomys*
- Characterization of the hybrid zone between eastern and western lineages of the cotton rat (*Sigmodon hispidus*) in Arkansas, Oklahoma, and Texas

- Population genetics of the invasive mud crab, *Rhithropanopeus harrisii*
- Species status of two bumblebees in Texas (in collaboration with Jessica Beckham and Jeff Johnson (University of North Texas))

I have recently completed research for a TPWD Section 6 grant entitled “Assessment of genetic diversity of the state threatened Texas kangaroo rat, *Dipodomys elator*, using museum specimens”.

Undergraduate and Graduate Students and Their Research:

- Kimberly Norris – Defeating nuclear mitochondrial inserts (NUMTs) in gophers (*Geomys*)
- Alberto Luciano and Juana Marin – Population genetics of gophers (*Geomys*) along the Colorado river of Texas
- Jason Villaret-Dean – Geographic patterns of morphometric variation of shrews (*Blarina hylophaga* and *B. brevicauda*) in the southern Great Plains
- Seth Hamby (Master’s student) – Population genetics of the Texas endemic plant, *Dalea reverchonii*

## Texas A&M Natural Resource Institute

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Texas A&M Natural Resource Institute, Texas A&M University, College Station, TX 77843

### Krysta D. Demere

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Research Interests, Projects, and Grants:

My current research focus revolves around the ecological monitoring of military lands and conducting baseline biological surveys to ensure compliance with environmental policies. Additionally, in collaboration with Texas Parks and Wildlife, my team and I surveyed bat hibernacula across Texas during the 2016-2017 winter season and documented the first known occurrence of *Pseudogymnoasucus destructans* (the fungus responsible for the development of white-nose syndrome in bats) in the state. Personal areas of interest for me are largely concerned with community structure, ecology, the natural history of bats and other non-game species.

# Texas A&M University-College Station

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Department of Wildlife and Fisheries Sciences Texas Cooperative Wildlife Collection Texas A&M,  
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## **Jessica Light**

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### 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 funded by the National Science Foundation (to investigate the population genetics of an expanding population of chewing lice), CONACYT (to assess the role of the Mexican Plateau as a center for diversification), Texas EcoLabs (to explore biology of Nelson's pocket mouse and pocket gophers and their lice), TPWD (to explore the distribution of the Nelson's pocket mouse in Texas), and Texas A&M University.

### Graduate Students and Their Research:

- Adrian Castellanos is a fifth year Ph.D. student. For his dissertation research, he is undertaking a comparative phylogeographic study across Central America, concentrating his investigation on the variegated squirrel and the gray four-eyed opossum.
- Bridgett Downs is a second year M.S. student. For her master's research, Bridgett is examining the phylogeography of the Heermann's kangaroo rat, *Dipodomys heermanni*.
- Whitney Preisser is a fifth year Ph.D. student. Whitney is examining how parasite diversity (specifically parasites of cricetid rodents) varies across latitude.
- Leila Sicilliano-Martina is a second year Ph.D. student (co-advised with Dr. Michelle Lawing). Leila is interested in exploring evolutionary changes in morphology in captive and domesticated animals.

### Undergraduate Students and Their Research:

- Over the last year, I've had approximately 10 undergraduate students in the lab working on a variety of projects. Three continues are continuing their work even though they recently graduated. Austin Lester is exploring the distribution of porcupines in Texas and across North America, AnMarie Ulery is trying to better understand the distribution of molecular NUMTs in mammals, and Ben Anderson is exploring parasite latitudinal gradients and using molecular techniques to help identify Mexican rodents.

### Additional Information:

The mammal division in the Biodiversity Research and Teaching Collection currently has over 65,000 specimens. 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.

# Texas A&M University-San Antonio

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## **Corinna Ross**

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### Research Interests, Projects, and Grants:

I am a primatologist and physiologist that focuses on New World primates in the subfamily Callitrichinae. Specifically I am interested in developmental programming, reproductive physiology and aging. In order to evaluate these questions in marmosets I use ultrasound techniques to follow pregnancies, behavioral analyses to examine infant care behaviors, feeding, locomotion and social interactions, as well as molecular tools to assess gene activity.

I am currently funded by two grants from the National Institute of Health the first is to investigate reproductive health of females over multiple generations and the second explores mechanisms of aging and cognitive decline. I work collaboratively with a number of investigators from the Southwest National Primate Research Center and the University of Texas Health Science Center San Antonio.

### Undergraduate Students and Their Research:

- Jennifer Adams is evaluating the effects of rapamycin on cognitive aging.
- Alexander Greig evaluated the development of a new tool to assess cognitive function and the effects of aging on learning in marmosets
- Jessica Adams evaluated the effect of a dam's obesity on the prenatal growth of infants.
- Christa Leach & Raquel Alonso have been examining the effects of aging on sleep patterns in marmosets.
- Lisa Skinner in collaboration with Dr. Suzette Tardif at the Southwest National Primate Research Center evaluated the effect of background white noise on marmoset response to colony disturbance during husbandry care.

# Texas State University

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## 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. 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. Besides pathogen ecology my lab also addresses questions related to the impacts of anthropogenic activities on wildlife and also on the ecology of mammals species of conservation concern.

Currently I have three projects that are supported by grants. The first one is funded by Texas Parks and Wildlife and is centered on ascertaining the small scale spatial ecology of Texas Kangaroo Rats, a species of conservation concern. The second project, also funded by TPWD is about the wildlife impacts of wind energy at a facility in South Texas with the goal of devising strategies to reduce this impact. This project is a central portion of the dissertation of my current PhD student, Sara Weaver. Finally, our third funded project (by US Forest Service) is centered in a stable isotope analysis of the diet of Brazilian free tailed bats.

### Current Graduate Students and Their Research:

- Sara Weaver (PhD) - Sara joined my lab in the fall of 2015 and she is 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.
- Colton Novack (MS) – Colton is working on a stable isotope study aimed towards ascertaining the dietary profile of Brazilian free tailed bats.
- Rosa Ramirez (MS) – Rosa is studying the exposure rates of different small and medium mammal species to bites from soft ticks (*Ornithodoros turicata*) using camera traps.
- Michaela Bowsby (MS). Michaela is working on testing the efficiency of natural repellents on nymphal stages of soft ticks.
- Emily Javan (MS) – Emily is a mathematician highly interested in ecological systems. Her thesis work is about metacommunity structure of small mammals on mountains worldwide.

- 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.
- Jose Martinez (MS) - Jose work is centered on determining the endoparasite loads of the mongooses 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.
- Candice Rodriguez (MS) - Candice has been an undergraduate volunteer at my lab for more than two years and she is started her MS on 2017. She is analyzing the food habits of the invasive mongoose in Puerto Rico.

# Texas Tech University

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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 Richard Stevens and David Ray
- Phylogenetic relationships of Neotomine and Reithrodontomyine rodents
- Systematic and phylogenetic studies of the genus *Neotoma*
- Systematic studies of the genus *Geomys* and *Thomomys* with Richard Stevens and David Ray
- Ecology of hanta- and arenaviruses in the southwestern US and Mexico
- Effects of zonadhesin gene in speciation of mammals
- Revision of *Texas Natural History: A Century of Change* with D. J. Schmidly and L. C. Bradley



#### Graduate Students and Their Research:

- Emma Roberts (PhD Candidate) is in her 6<sup>th</sup> year. Dissertation involves the interaction of egg and sperm fusion proteins in hybridization events.
- Laramie Lindsey (PhD Candidate) is in her 4<sup>th</sup> year. Laramie is being co-chaired by Dr. Caleb Phillips and her dissertation involves examining transcriptomes and exomes in various species of *Peromyscus* in order to detect genes associated with speciation process.
- Jack Francis (MS student) is in his 3<sup>rd</sup> year. Jack is being co-chaired 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 3<sup>rd</sup> year. Taylor will be examining the quality of DNA obtained from various archival methods at the Museum.
- Emily Wright (MS student) is in her 2<sup>nd</sup> year. Her research project will involve examining the interaction of egg and sperm fusion proteins in hybridization between white-tailed deer and mule deer.
- Heidi Stevens (MA student) is in her 2<sup>nd</sup> year. Her research examines the post-mortem degradation rate of DNA and RNA. Heidi is a Museum Science major so her research projects focuses on our Genetic Resource Collection.

#### Recently Graduated Students:

- Nicté Ordóñez-Garza (PhD, 2016) - "Diversification of cricetid rodents in the montane regions of Mesoamerica: Is the Isthmus of Tehuantepec a vicariant barrier?"
- Juan P. Carrera Estupinan (PhD, 2016) - "Diversity, zoogeography, and community ecology of Bats in the Ecuadorian Andes?". Research Associate, Natural Science Research Laboratory, Texas Tech University.

Both Nicté and Juan have moved to Ecuador (Juan's home) and are interviewing for faculty positions.

#### Undergraduate Students and Their Research:

- Last year, 9 undergraduate students (Marisa Wagley, Sam Stroupe, Mariah Mills, Cassie Poehlein, Irene Vasquez, MacKenzie Sims, Harrison Lobb, Daysi Gonzales, Courtney Evans, 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.
- I am the Director of the Natural Science Research Laboratory, Museum of Texas Tech University.
- In addition, I am editor of the two publication series (*Occasional Papers* and *Special Publications*) at the Natural Sciences Research Laboratory, Museum of Texas Tech University. 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 metagenomes, genomes, craniofacial development as well as some classical and molecular mammalogy. The lab is currently supported by a Texas Parks and Wildlife Department SWG as well as an ongoing genetic consulting contract with Zara Environmental LLC.

### Graduate Students and Their Research:

- Howard Huynh (PhD student): Systematics, phylogeography and zoonosis of *Peromyscus* in Atlantic Canada
- Oscar Sandate (MS student): Microbiomes, diet and energetics of *Tadarida brasiliensis* throughout pregnancy
- Matthew Fox (PhD student): Post-transcriptional regulation of Sonic Hedgehog in craniofacial development
- Craig Tipton (PhD student): Interindividual, temporal, and geographic distribution of chronic wound microbiomes and how they are influenced by host (human) genetics
- Preston McDonald (MS student): Status, Distribution, Morphology and Genetics of *Sigmodon fulviventer dalquesti* in the Chihuahuan Desert Ecoregion (TPWD SWG)

### Additional Information:

My teaching responsibilities include Bioinformatics, Metagenomics and Evolution. 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:

- 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 4 additional grants to examine: 1) Summer roosting ecology of *Myotis septentrionalis* and *M. austroriparius* 2) Summer roosting ecology of *Myotis septentrionalis* and *M. austroriparius*. Winter occupancy and activity of bats in Louisiana and eastern Texas (with Liam McGuire) and 4) Comparative population genetics of imperiled bats of Louisiana (with David Ray).
- Through a collaboration with Robert Bradley, David Ray and Neal Platt we are examining Population Status of Texas Pocket Gophers (*Geomys* and *Thomomys*).

#### Graduate Students and Their Research:

- 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 third year Ph.D. student having completed 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, a third year Ph.D. student, is interested in the influence of the physical landscape on gene flow and population genetic structure in Heteromyid and Geomyid rodents. She plans to demonstrate how such information, analyzed via bioinformatic methods, can guide conservation management and practice. She is co-advised by David Ray and me.
- Erin Stukenholtz—Erin finished her M.S. in August 2016. She conducted her thesis on 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. She also developed a less invasive means of determining early pregnancy by examining vaginal cytology and progesterone levels in feces. She is now working on her Ph.D. focusing on the urban ecology of feral pigeons.
- Carlos Garcia—Carlos has started a M.S. under David Ray and me. For his masters, he is working on studying the roosting ecology of the threatened bat species, *Myotis septentrionalis*, in Louisiana and is interested in studying the diets between *M. septentrionalis* and *M. austroriparius*. He has also conducted a survey throughout the state of Louisiana for white-nose syndrome.
- Jenna Grimshaw — Jenna is a first year Ph.D. student co-advised by David Ray and me. Her current research is to identify patterns in genetic structure for three species of critically-imperiled Louisiana bats: *Myotis austroriparius*, *M. septentrionalis*, and *Eptesicus fuscus*. More specifically,

she aims to determine if each of these three species comprise a single population or multiple genetic subpopulations with little gene flow. She is also interested in the distribution of transposable elements among mammalian genomes from a genomic ecological perspective.

## Trinity University

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### **David O. Ribble**

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#### Research Interests, Projects, and Grants:

I am interested in the evolutionary ecology of small mammals, including *Peromyscus* and elephant-shrews. My research in recent years has ranged from studies of social organization to mating behavior to thermal ecology. I have recently begun leading a course in Costa Rica where we are monitoring the elevational distribution of small mammals on the Pacific Slope from Monteverde to the coast. In January, I began as Associate Vice President of Academic Affairs for Budget and Research.

#### Undergraduate Students and Their Research:

Bernardo Traversari – Mammals of Texas Modelling; In Search of Lost Populations. Bernie conducted a study for TPWD to examine records of 10 mammal species of concern. For each species he collected every known occurrence from digitized natural history collections (e.g. VertNet.org) and citizen science sources. He used a traditional Maximum Entropy Model (MaxEnt) to take existing species records and compare to set of georeferenced environmental and climatic data. He examined American badger (*Taxidea taxus berlandieri*), Eastern spotted skunk (*Spilogale putorius interrupta*), Hog-nosed skunk (*Conepatus leuconotus*), Long-tailed weasel (*Mustela frenata*), Mink (*Neovison vison mink*), Mountain lion (*Puma concolor*), Swamp rabbit (*Sylvilagus aquaticus aquaticus*), Swift fox (*Vulpes velox velox*), Texas antelope squirrel (*Ammospermophilus interpres*), and Western spotted skunk (*Spilogale gracilis*).

# University of Central Oklahoma

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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 *Geomys* and *Peromyscus* populations in Oklahoma. Additionally, I co-advise a student examining genetic diversity in mud turtles. I will be starting a long-term small mammal mark-recapture project at UCO's Selman Living Lab this spring. This project will involve a number of undergraduate and graduate

students at UCO as well as students from other institutions, and will focus on factors that influence changes in small mammal populations and communities over time.

### 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
- Kristy Meyer – Reexamination of a known *Geomys* contact zone in Cleveland Co., Oklahoma
- Sarah Vrla – Genetic identification of *Peromyscus* at the Four Canyons Preserve and assessment of a putative contact zone between *P. maniculatus* and *P. leucopus*

### Undergraduate Students and Their Research:

- Sarah Ranabhat – Assisting Cristina Coffman with her research, senior
- Abigail Moore-Lee – Assisting Sarah Vrla with her research, senior
- Giselle Ibanez - Small mammal mark-recapture for long-term monitoring at the Selman Living Lab, sophomore

### Additional Information:

I am still in the process of writing the “Mammals of Oklahoma” with Bill Caire and Lynda Loucks.

# The University of Texas at Austin

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## **Pamela R. Owen**

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### 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*, published in 2016 by Alpha Wildlife Publications, Sherwood Park, Alberta, Canada.

- Late Cenozoic mammalian faunas: Description of diminutive pronghorn (*Capromeryx*) skeletal material from a Pleistocene-Holocene site in Travis County, co-authored with Phill Shaw (one of my museum volunteers), was published last year in the Texas Journal of Science (Vol 67). We are currently working up a mammalian faunal list for the site.

### Additional Information:

As Associate Director of Texas Memorial Museum, I coordinate and support collections-based natural science education programs for educators, preK-16 learners and the public. 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

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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 lasiurine bats, 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 grant from the North Slope Borough (PI).

#### Undergraduate Students and Their Research:

- Tina Cull – Tina joined the lab in 2017 and is working on population genetics of bowhead whales.
- Sandra Lopez – Sandra recently joined the lab in 2018 and has started a project on phylogenetics of *Chiroderma* in collaboration with Manfredo Turcios of Honduras.

## U.S. Centers for Disease Control and Prevention

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### **Marcia (Marcy) A. Revelez**

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#### Research Interests, Projects, and Grants:

I have over twenty years of experience working in natural history collections, primarily with mammal and genomic collections. I am now the Collections Manager for the CDC Biorepository, which is made up of approximately 6 million specimens from research, surveillance, and emergency response efforts at CDC. My role is to modernize the biorepository, with emphasis on policy and collection stewardship. Research interests revolve around best practices, collections management, data management, and IPM.

I currently mentor 2 fellowships – and current project interests include best practices for the management of biorepositories, and determination of optimal storage temperatures for different sample types. Other projects include: IPM strategies for small collections, and best practices and guidelines for the care and management of small mammal collections.

# Minutes of the 2017 Business Meeting

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**Texas Society of Mammalogists  
General Business Meeting  
Texas Tech University Center, Junction, Texas  
11 February 2017**

The meeting was called to order by President Amy Baird at 3:50 p.m. in the Packard Building of the Texas Tech University Center at Junction. The minutes of the 2016 Annual Business Meeting, as written in the 2017 Program for the Texas Society of Mammalogists (TSM), were approved.

## **Officers' Reports**

**Secretary-Treasurer.** Marcy noted that the Treasurer's report was in the Program. She thanked the membership for donating and purchasing items for the auction, as it is the main source of funds for the student awards of the society. Meeting expenses were slightly more than meeting income in 2016. She noted that a laptop had been purchased for the Society, and investment funds would be used to cover that expense.

President Baird noted that she had forgotten at the Executive Committee meeting on Friday night to have the Committee review and approve the list of new members of the Society. That vote was held and approved.

**Permanent Secretary.** Permanent Secretary Lisa Bradley was not in attendance due to a family illness. Robert Bradley served as Permanent Secretary in her place. Robert noted that Lisa prepares the program for the annual meeting. Robert also reported that Lisa continues to maintain the archives of the society and asked that members send any relevant items for the archives to her. He asked that Committee Reports be turned in to him or forwarded to Lisa for the archives soon after the meeting.

Robert pointed out to the membership that one of the first and founding members of TSM, Dr. Robert Baker, was not in attendance due to poor health. Dr. Schmidly suggested that Robert personally send the Society's best wishes to Dr. Baker. That motion was seconded and approved. Marcy mentioned that she would also provide Dr. Baker with a t-shirt from the meeting.

**Editor.** Newsletter Editor Russell Pfau reported that he had produced the 2017 Newsletter (printed in the back half of the program booklet). The Newsletter contains brief bios and research summaries for most of the mammalogists in the state and he encouraged students to take a look. Russell noted that he would be happy to accept relevant announcements and other materials to be included in the Newsletter. President Baird noted that Russell also manages the website for TSM.

## **Reports of Committees**

Phil Sudman, Chair of the Committee for Honorary Members, noted that the Committee for Honorary Members is composed of the entire Executive Committee. Any member of the Society wishing to suggest someone for Honorary Membership can submit their suggestion to a member of the committee. Phil reported

that there was one nomination this year, and that an announcement would be made at the banquet. That evening, Mike Tewes of Texas A&M-Kingsville was named as an Honorary Member of the Society. He will receive a framed plaque at the 2018 meeting.

President-elect John Hanson, Chair of the Committee for Student Honoraria, announced that he would make his report later that evening at the banquet. After the banquet dinner, Hanson announced the winners of the presentation awards. Each winner received a cash award (\$500 for the Packard Award and \$400 for all others).

The award winners for oral presentations were:

1. Robert L. Packard Award — Jennifer Korstian, Texas Christian University
2. TSM Award — Laramie Lindsey, Texas Tech University
3. William B. Davis Award — John Stuhler, Texas Tech University
5. Bobby Baker Award — Sienna Krueger, Austin College
6. Rollin H. Baker Award — Maya Feller, Abilene Christian University

Poster presentation award winners were:

1. Clyde Jones Award (graduate) — Oscar Sandate, Texas Tech University
2. Vernon Bailey Award (graduate) — Daniel Taylor, Texas A&M University-Kingsville
3. Clyde Jones Award (undergraduate) — Aubree Jones, Texas A&M University
4. Vernon Bailey Award (undergraduate) — Heath Finch, Madeline Petri, and Zachary Wooten, Trinity University

Phil Sudman, Chair of the *ad hoc* Financial Advisory Committee, reported to the membership that the Executive Committee were considering how to best utilize the Society's investment funds, and he welcomed ideas from the membership.

Michael Tewes, Chair of the Committee on Conservation, reported that the Committee had developed a Resolution regarding the plan by President Trump to build a wall at the U.S.-Mexico border. During the discussion of the draft Resolution, a few minor corrections were made. The resolution was approved by the membership.

Marie Tipps, Chair of the *ad hoc* Auction Committee, reported that the 2016 auction raised about \$3,000 in the live auction and about \$1,000 in the silent auction, for a total of \$4,102. Marie thanked Amy Bishop and Carla Ebeling for their assistance with obtaining donations for the auction. Marie also called for additional help and membership on the auction committee.

### **Election of Officers**

President Baird announced that the Executive Committee had nominated two candidates for President-Elect: Richard Stevens (Texas Tech University) and Jessica Light (Texas A&M University). The floor was opened for additional nominations. There were none. Jessica and Richard were invited to give a few words about themselves. A ballot election was held. Richard Stevens was elected to the office of President-Elect.

President Baird announced that the Executive Committee had nominated Marcy Revelez for Secretary-Treasurer. Marcy was re-elected by acclamation.



### **New business**

**Selection of the site for the 2018 TSM meeting.** It was moved and seconded to hold the 2018 TSM meeting at the TTU Center at Junction. Motion passed. The 2018 meeting will be held February 16–18.

### **OTHER NEW BUSINESS.**

President Baird informed the membership that the Executive Committee had discussed the issues of limited available space for talks and meals at the Junction Center due to our growing membership. It was decided by the Executive Committee that the 2018 meeting would have a concurrent session format. Marcy explained that each year, more than 20 oral abstracts are submitted, forcing some students to give posters, instead. And with an increasing number of poster presentations, space and time for viewing and judging the posters has become problematic. She encouraged students to submit oral abstracts in 2018.

Marcy also announced that beginning in 2018, student presenters who submit their registration on time (before the deadline) will have their registration and on-site housing costs covered by the Society. Those who register late will be required to pay their registration in full (along with the \$20 late fee).

President Baird thanked the Society for allowing her to serve as President, and recognized and thanked Marcy, Lisa, Russell and John Hanson for their efforts during the year.

The meeting was adjourned at 4:25 p.m.

Respectfully submitted,

Lisa Bradley  
Permanent Secretary



## 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 (D)  
**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  
**Class of 2017**  
Michael Tewes

## 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  
Brian Chapman  
Ron Chesser  
Scott Chirhart

Arthur G. Cleveland  
Michael Dixon  
Robert C. Dowler  
Cathy Early  
Carla Ebeling  
Herschel Garner  
Jim Goetze  
Ira F. Greenbaum  
Meredith Hamilton  
John Hanson  
Michelle Haynie  
Steve Hoofer  
Mandy Husak  
Michael Husak

Clyde Jones  
Stephen Kasper  
Thomas E. Lee  
Jessica Light  
Robert E. Martin  
Ann Maxwell  
Terry Maxwell  
Kevin McKinney  
Steve McReynolds  
Anne Merchant  
Chris Montag  
Jim Patton  
Russell Pfau  
Caleb Phillips

Carl Phillips  
Brenda Rodgers  
Duke Rogers  
David J. Schmidly  
Stephanie Shelton  
Steve Smith  
Phil Sudman  
Michael Tewes  
Ron Van Den Bussche  
Christopher Walker  
Kenneth T. Wilkins  
Don Wilson  
Bernd Wursig  
Earl Zimmerman