

TEXAS SOCIETY OF MAMMALOLOGISTS



PROGRAM, ABSTRACTS, AND NEWSLETTER
40th Annual Meeting
18-20 February 2022
Virtual Meeting

#TSM2022



Texas Society of Mammalogists

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Cover illustration: Spotted Skunk by Krysta Demere.

**Texas Society of Mammalogists
40th Annual Meeting
18–20 February 2022**

Table of Contents

Meeting Links	2
Program and Abstracts	
Program Schedule	3–8
Oral Presentation Abstracts	9–17
Poster Presentation Abstracts	18–22
2022 Member’s Business Meeting Agenda	23
Treasurer’s Report for Calendar Year 2021	24
Newsletter	
2022 Guest Speaker	26
Patron Membership Announcement	26
News & Announcements	27–29
In Memoriam	29–30
Research and Graduate Programs of TSM Members	31–57
Minutes of the 2021 Business Meeting	58–61

Texas Society of Mammalogists Goes Virtual! Again!

With the continuing COVID 19 pandemic and the need to limit the opportunities for virus transmission, the officers and executive committee once again determined that a face-to-face meeting would not be in the best interests of our membership. A virtual meeting would facilitate the exchange of research findings and allow students to interact with mammalogists from all over Texas while maintaining appropriate distancing protocols to stem the spread of the virus. This year's meeting will not be the TSM experience we all know and love. However, we can still gather virtually and further the mission and goals of the Texas Society of Mammalogists.

We will rely on our website and the Zoom video conferencing tool to facilitate our 2022 TSM meeting. Student presenters have been asked to record their presentations and upload them to the web. During the appropriate session, we will play these recorded talks for meeting attendees and the student presenter will then be able to field questions submitted by the audience. For oral presentations, students will record a 12 minute video and have 3 minutes to respond to questions. For poster presentations, students will record a 3 minute video and have 7 minutes to respond to questions. Posters will be available for viewing beginning Wednesday (16 February 2022) at the following link:

<https://www.texasmammalogy.org/2022-posters>

All registered attendees will receive an invitation from Zoom to attend a “webinar” for Friday evening, a “webinar” for Saturday morning, a “meeting” for the Member’s Business Meeting, and a “meeting” for the awards ceremony and Banquet Speaker. Links for each of these events can be found below:

Poster Session (Friday evening)

<https://us02web.zoom.us/j/88212702899?pwd=b2FqWDdEM2UrOU5DakZTQkdFOXpQUT09>

Paper Sessions (Saturday 8:00 am – 3:00 pm)

<https://us02web.zoom.us/j/81510560772>

Member’s General Business Meeting, Awards Ceremony,
and Guest Speaker (Saturday afternoon)

<https://us02web.zoom.us/j/85017777297?pwd=dkthenc4QXlQZDgzbFQ3Z0tIUUVVsUT09>

For informal gathering and visiting, we have set up a “chat” space. You can access this chat area using the following link:

<https://us02web.zoom.us/j/7193226919>

2022 Program Schedule

Friday, 18 February

4:30–6:00 pm Meeting of the Executive Committee

7:00 pm Announcements/Welcome Address
TSM President Dana Lee

POSTER SESSION

Moderator: Joel G. Brant, McMurry University

(Presenters' names are underlined)

Poster 1 is to be considered for the Clyde Jones Graduate Award.

7:10 Poster 1 – **OBSERVATIONS ON THE GENETIC HEALTH OF BOBCAT (*LYNX RUFUS*) POPULATIONS IN OKLAHOMA** Timothy McSweeney and Michelle Haynie, Department of Biology, University of Central Oklahoma

Poster 2 is to be considered for the Clyde Jones Undergraduate Award.

7:20 Poster 2 – **POPULATION STRUCTURE OF BOWHEAD WHALES USING MTDNA SEQUENCES** Emily F. Fritsche and Amy Baird, Department of Biology, University of Houston-Downtown

Posters 3-4 are to be considered for the Vernon Bailey Graduate Award.

7:30 Poster 3 – **A SURVEY OF PARASITES OF SPOTTED SKUNKS (*SPILOGALE* SP.) FOUND THROUGHOUT THEIR RANGE** Madeline N. Arszulowicz, Robert C. Dowler, and Nicholas J. Negovetich, Department of Biology, Angelo State University

7:40 Poster 4 – **CARNIVORE COMMUNITY INTERACTIONS IN A BRUSH MANAGED LANDSCAPE** A.B. Branney, T.J. Yamashita, J. V. Lombardi, M. J. Cherry, and M.E. Tewes, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville

Posters 5-10 are to be considered for the Vernon Bailey Undergraduate Award.

7:50 Poster 5 – **OBSERVING THE EFFECT OF LUNAR LIGHT ON NOCTURNAL RODENTS IN A MIXED-GRASS PLAINS REGION** Madison E. Baugh and Victoria L. Jackson, Department of Biology, University of Central Oklahoma

8:00 **15 Minute Break**

- 8:15 Poster 6 – **USING COMPUTED TOMOGRAPHY TO ASSESS COPULATORY FIT IN ORCAS (*ORCINUS ORCA*)** Madeleine Deel and Dara N. Orbach, Department of Life Sciences, Texas A&M University- Corpus Christi
- 8:25 Poster 7 – **STEROID HORMONES IN THREE BALEEN PLATES FROM THE SAME INDIVIDUAL** Makayla Guinn, D.D. Crain, F. Mansouri, B. Otulana, J. Patterson, R. Sabin, S. Usenko, and S.J. Trumble, Department of Biology, Baylor University
- 8:35 Poster 8 – **FREE-ROAMING DOG (*CANIS LUPUS FAMILIARIS*) POPULATION AND GASTROINTESTINAL PARASITE DIVERSITY IN TULUM, MEXICO** Michael A. Lyons, Rumaan Malhotra, and Cody Thompson, Department of Ecology & Evolutionary Biology and Museum of Zoology, University of Michigan
- 8:45 Poster 9 – **TEMPORAL CHANGES IN MAMMALIAN CARNIVORE DISTRIBUTION IN THE TEXAS BLACKLAND PRAIRIES** Adam Myers, Kaitlyn Malone, Abbigal Maeng, and Jessica E. Healy, Department of Biology, Austin College
- 8:55 Poster 10 – **RESULTS OF THE ACOUSTIC SURVEY OF BAT POPULATIONS WITHIN THE WICHITA MOUNTAINS WILDLIFE REFUGE** R. J. Trent, Matthew Van Sant, and Dana N. Lee, Department of Biology, Cameron University

Saturday, 19 February

8:00 am Introduction and Announcements
TSM President Dana Lee

PAPER SESSION 1

Moderator: Michelle Haynie, University of Central Oklahoma

Papers 1–10 are to be considered for the William B. Davis Award.

- 8:05 Paper 1 – **SEASONAL OCCUPANCY OF THE BAT COMMUNITY IN FORT LEATON STATE HISTORIC SITE IN PRESIDIO TEXAS** Katie Fitzgerald and Loren Ammerman, Department of Biology, Angelo State University
- 8:20 Paper 2 – **PREDICTIVE OCCURRENCE MODELS FOR BAT SPECIES IN TEXAS** Natalie Hamilton, Department of Rangeland, Wildlife, and Fishery Management, Texas A&M University
- 8:35 Paper 3 – **THE EFFICACY OF ACOUSTIC LURES ON BATS IN THE CHIHUAHUA DESERT** Rebecca Harris and Loren K. Ammerman, Department of Biology, Angelo State University
- 8:50 Paper 4 – **MOVEMENT AND BEHAVIORAL PATTERNS OF COMMON BOTTLENOSE DOLPHINS (*TURSIOPS TRUNCATUS*) IN A DYNAMIC TEXAS SHIP CHANNEL** Eliza M. M. Mills and Dara N. Orbach, Department of Life Sciences, Texas A&M University-Corpus Christi
- 9:05 Paper 5 – **EFFECTS OF SEASONALITY AND BAIT TYPE ON CAPTURE EFFICACY AND SEX RATIO OF PLAINS SPOTTED SKUNKS** J. Clint Perkins¹, Kamren P. Jefferson², Matthew H. Hamilton², Robert C. Dowler², and Richard D. Stevens^{1,3} ¹Department of Natural Resources Management, Texas Tech University, ²Department of Biology, Angelo State University, ³Natural Science Research Laboratory of the Museum of Texas Tech University
- 9:20 **15 Minute Break**

PAPER SESSION 2

Moderator: Stephanie Martinez-Brewer, Texas A&M Natural Resources Institute

- 9:35 Paper 6 – **NOVEL BIOMIMETIC ARTIFICIAL VAGINA USE TO IMPROVE EJACULATE QUALITY** Jacqueline Rich¹, Jonathan Cowart², and Dara Orbach¹, ¹Department of Life Sciences, Texas A&M University-Corpus Christi, ²Department of Aquatic Animal Health, University of Florida

- 10:05 Paper 7 – **USING HIDDEN MARKOV MODELS TO IDENTIFY BEHAVIORAL STATES OF OCELOTS, BOBCATS, AND COYOTES** Maksim Sergeyev¹, Joseph D. Holbrook², Jason V. Lombardi¹, Michael E. Tewes¹, and Tyler A. Campbell³, ¹Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ²Haub School of the Environment and Natural Resources, University of Wyoming, ³East Foundation
- 10:05 Paper 8 – **COMPARISON OF PASSIVE DETECTION METHODS FOR DETERMINING OCCUPANCY OF COYOTES (*CANIS LATRANS*) IN RANGELAND IN SOUTH-CENTRAL OKLAHOMA** Kenneth E. Shimer¹, Vicki L. Jackson¹, Stephen L. Webb², Mike D. Proctor³, ¹Department of Biology, University of Central Oklahoma, ²Natural Resource Institute, Texas A&M University, ³The Noble Foundation
- 10:20 Paper 9 – **CHIROPTERAN COMMUNITY COMPOSITION AND STRUCTURE OF THE DAVIS MOUNTAIN PRESERVE, JEFF DAVIS COUNTY, TEXAS** William V. Thompson, Loren K. Ammerman, Robert C. Dowler, Nicholas J. Negovetich, Department of Biology, Angelo State University
- 11:05 Paper 10 – **INFLUENCE OF FINE-SCALE LANDSCAPE AND VEGETATION STRUCTURE ON BOBCAT USE OF HIGHWAY WILDLIFE CROSSINGS IN CAMERON COUNTY, TEXAS** Thomas J. Yamashita¹, Humberto L. Perotto-Baldivieso¹, Zachary M. Wardle¹, Richard J. Kline², Michael E. Tewes¹, John H. Young Jr.³, and Jason V. Lombardi¹, ¹Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ²School of Earth, Environmental, and Marine Sciences, University of Texas Rio Grande Valley, ³Environmental Affairs Division, Texas Department of Transportation

10:50 **15 Minute Break**

PAPER SESSION 3

Moderator: Joel G. Brant, McMurry University

Papers 11–13 are to be considered for the Rollin Baker Award.

- 11:05 Paper 11 – **COPULATORY FIT IN SOUTHERN SEA OTTERS (*ENHYDRA LUTRIS NEREI*)** Audra Clute and Dara N. Orbach, Department of Life Sciences, Texas A&M University-Corpus Christi
- 11:20 Paper 12 – **MAMMALS OF THE TAPICHALACA RESERVE, ECUADOR** Jonathan Jasper¹, Thomas E. Lee, Jr.¹, Nicolas Tinoco², M. Alejandra Camacho², Santiago F. Burneo², ¹Department of Biology, Abilene Christian University, ²Sección Mastozoología - Museo de Zoología, Pontificia Universidad Católica del Ecuador

- 11:35 Paper 13 – **SPATIAL DISPERSION AND ORIENTATION IN BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) GROUPS** Caitlynn Partin¹, Eric Angel Ramos², Marcelo O. Magnasco², Diana Reiss³, Dara, N. Orbach¹, ¹ Department of Life Sciences, Texas A&M University-Corpus Christi, ² The Rockefeller University, ³ Hunter College, City University of New York

Papers 14-15 are to be considered for the Bobby Baker Award.

- 11:50 Paper 14 – **EVALUATION OF THE RELATIONSHIP BETWEEN A HIGH-FAT DIET AND GUT MICROBIOME HEALTH IN THIRTEEN LINED GROUND SQUIRRELS (*ICTIDOMYS TRIDECIMLINEATUS*)** Emma Solis and Jessica Healy-La Price, Department of Biology, Austin College

12:05 **Lunch**

PAPER SESSION 4

Moderator: Jessica Healy-La Price, Austin College

- 1:30 Paper 15 – **PHYLOGENETICS OF CYAMID “WHALE LICE” HARVESTED FROM BOWHEAD WHALES (*BALAENA MYSTICETUS*) AND GRAY WHALES (*ESCHRICHTIUS ROBUSTUS*)** Michelle Lokkesmoe¹, Raphaela Stimmelmayer², and Amy Baird¹, ¹Department of Biology, University of Houston-Downtown, ²North Slope Borough, Department of Wildlife Management

Papers 16–17 are to be considered for the TSM Award.

- 1:45 Paper 16 – **POPULATION GENETIC STRUCTURE AND DIVERSITY AMONG FRAGMENTED POPULATIONS OF THE LLANO POCKET GOPHER (*GEOMYS TEXENSIS*)** Julia A. Nitschmann and Russell S. Pfau, Department of Biology, Tarleton State University
- 2:00 Paper 17 – **REDEFINING THE FAMILY ABROCOMIDAE (RODENTIA: OCTODONTOIDEA) AND THE CONTEXT OF THE ENDANGERED *ABROCOMA BOLIVIENSIS*** Daniela Arenas Viveros and Jorge Salazar-Bravo, Biological Sciences Department, Texas Tech University

Paper 18 is to be considered for the Robert Packard Award.

- 2:15 Paper 18 – **THE EFFECT OF 60 YEARS OF TRANSLOCATIONS ON POPULATIONS OF TEXAS DESERT BIGHORN SHEEP** Emily A. Wright¹, Rachael C. Wiedmeier¹, Emma K. Roberts², Froylán Hernández³, Warren C. Conway⁴, and Robert D. Bradley^{1,5}, ¹Department of Biological Sciences, Texas Tech University, ²Climate Science Center, Texas Tech University, ³Texas Parks and Wildlife Department, ⁴Department of Natural Resources Management, Texas Tech University, ⁵Natural Science Research Laboratory, Museum of Texas Tech University

2:30 **30 Minute Break**

3:00 pm

Members Business Meeting

All members, including students, please attend!

4:45 pm

Awards Presentations

5:00–6:00 pm

Guest Speaker Address:

Perspectives on Almost Five Decades of Courses in Mammalogy

Dr. Robert C. Dowler
Angelo State University

Oral Presentation Abstracts

Papers 1–10 are to be considered for the William B. Davis Award.

Paper 1

SEASONAL OCCUPANCY OF THE BAT COMMUNITY IN FORT LEATON STATE HISTORIC SITE IN PRESIDIO TEXAS Katie Fitzgerald and Loren Ammerman, Department of Biology, Angelo State University (kfitzgerald3@angelo.edu)

Buildings have been documented as important roosting sites for bats. In North America, half of all the bat species have been reported to select buildings to roost in for part of the year, which has posed a conflict for humans. *Myotis velifer* is one of the largest myotis species and can be found throughout the southwestern United States, Mexico, and parts of Central America. Despite their widespread distribution, *Myotis velifer* has received little dietary attention and lacks surveys throughout much of the state. To determine occurrence, abundance, and seasonal changes in diet, we surveyed a known roosting colony at Fort Leaton State Historic Site in Presidio, Texas from March through October for two consecutive nights in each month using harp traps and mist nets. Dietary analysis using a molecular approach is in progress. We captured four different species, *Tadarida brasiliensis*, *Antrozous pallidus*, *Myotis velifer*, and *Myotis yumanensis*, totaling 885 individuals. March and April had the highest capture rate, while October had the lowest. *Tadarida brasiliensis* was the most abundant species, followed by *Myotis velifer* and *Myotis yumanensis*. *Myotis velifer* juveniles were present between June and July. Our results suggest that the fort is an essential roosting location for different bat species, especially during reproductive months.

Paper 2

PREDICTIVE OCCURRENCE MODELS FOR BAT SPECIES IN TEXAS Natalie Hamilton, Department of Rangeland, Wildlife, and Fishery Management, Texas A&M University (nhamilton@tamu.edu)

Effective conservation and management practices depend on knowledge of species' distributions and habitat preferences. When compared to other vertebrate groups, bat ecology and distributions remain less well-known. Therefore, predicting habitat suitability is a critical first step in bat conservation. The goal of our study was to map the potential distribution of bat species in Texas and determine environmental variables that best predict a species' presence. We utilized occurrence data from the Global Biodiversity Information Facility (GBIF) to create presence-only Maximum Entropy (MaxEnt) species distribution models for bats in Texas. We trimmed data to include only species with more than ten occurrences. We also tested environmental variables for correlation, which left us with ten environmental predictors. The generated models did not predict that any region of Texas was most suitable for bat species, but all models predicted a lack of suitable habitat in the Texas panhandle. The environmental variable that best predicted the most species was annual precipitation, which discriminated between presence and absence of eight species. Our models show elevation was the most important variable in predicting the occurrence of seven of our study species. Distance from water and isothermality both predicted the occurrence of three different species. The remaining species were best predicted by distance from water and annual temperature range. Knowledge on important environmental factors and the maps resulting from our models provide an important foundation for future studies of bat species in Texas by providing information on potential conservation actions or areas appropriate for surveys and/or protection.

Paper 3

THE EFFICACY OF ACOUSTIC LURES ON BATS IN THE CHIHUAHUAN DESERT Rebecca Harris and Loren K. Ammerman, Department of Biology, Angelo State University (rharris41@angelo.edu)

Declining bat populations increase the need to obtain more accurate surveys to understand changes in abundance. Traditional methods that have been used include mist-netting, roost surveys, and acoustic monitoring but each method has advantages and disadvantages. Variations of broadcast calls have been used to increase the capture rate of many taxa including birds, reptiles, and mammals. Previous mist-netting surveys in the US have increased bat capture rates with the implementation of an acoustic lure but the mechanism by which this occurs is not yet understood. These studies have been conducted in areas with low species diversity. We chose to utilize an acoustic lure in the Chihuahuan Desert of Texas where 22 species of bats are documented to occur. Bat calls were passively recorded with the use of a Pettersson D500 detector from March to July 2021 where bats were known to be actively foraging. After analyzing the calls using Sonobat 4, several echolocation calls were selected to be broadcast at timed intervals using a Binary Acoustics Technology AT-100 lure. On each of 12 sampling nights in August and September we simultaneously documented bat captures at a control net and at a net with the lure deployed. Four AudioMoth detectors also were used to detect acoustic activity at both the lure net and the control net. Overall, more *Antrozous pallidus* were captured in nets using lures than in control nets and a total of 3,829 bat calls were detected with 2,259 at the lure net and 1,570 at the control net. Our preliminary results suggest that the acoustic lure increased bat activity based on acoustic monitoring and increased the capture rate of *Antrozous*. Further testing on the best acoustic lure to use for this bat community is needed in order to establish its utility as a survey tool.

Paper 4

MOVEMENT AND BEHAVIORAL PATTERNS OF COMMON BOTTLENOSE DOLPHINS (*TURSIOPS TRUNCATUS*) IN A DYNAMIC TEXAS SHIP CHANNEL Eliza M. M. Mills and Dara N. Orbach, Department of Life Sciences, Texas A&M University-Corpus Christi (emills1@islander.tamucc.edu)

While humans continue to use and transform marine habitats, understanding the impacts of anthropogenic activities on animals is important for conservation and management practices in coastal areas. As infrastructure and oil exportation has undergone major growth in Port Aransas and Port Corpus Christi, Texas in the past 40 years, significant interactions between dolphins and vessels could address the urgency of protecting marine mammals in areas with high vessel activity. Previous studies show increased diving intervals and avoidance behavior by dolphins with vessel presence. The movements, distributions, behaviors, and vessel interactions of free-ranging common bottlenose dolphins (*Tursiops truncatus*) are currently being investigated (2021 – 2022) using a digital theodolite from elevated land-based stations at the convergence area of the Corpus Christi Ship Channel (CCSC), the Lydia Ann Channel, and the Aransas Channel in Port Aransas, Texas. Behavior [travel, forage, mill, rest, social, and bow-ride] and vessels [small, medium, large] were analyzed. The distance of each dolphin position to closest bathymetric line and habitat features [seawall, sandy/muddy substrate, seagrass] were calculated in ArcGIS Pro. Dolphin behavior and movement [reorientation rate, swimming speed, linearity] were analyzed in response to vessel activity. Foraging appears to occur along channel seawalls and near the Port Aransas ferry crossing [medium], indicating that dolphins may utilize physical structures and the mixing of water currents created by vessel activity to capture prey. Dolphins were also observed orienting against current flow with no positional change in movement, suggesting that tides play an important role in this population's movement and behavior. Bow-riding occurred on the majority of tankers and bulk cargo carriers [large], indicating that dolphins utilize the movement of larger vessels for travel and social behaviors. Knowledge of dolphin habitat use in the CCSC-Port Aransas area could be vital in determining important locations of behavior in order to better preserve critical environments.

Paper 5

EFFECTS OF SEASONALITY AND BAIT TYPE ON CAPTURE EFFICACY AND SEX RATIO OF PLAINS SPOTTED SKUNKS

J. Clint Perkins¹, Kamren P. Jefferson², Matthew H. Hamilton², Robert C. Dowler², and Richard D. Stevens^{1,3}, ¹Department of Natural Resources Management, Texas Tech University, ²Department of Biology, Angelo State University, ³Natural Science Research Laboratory of the Museum of Texas Tech University (J.clint.perkins@ttu.edu)

Improper or inefficient survey designs are commonly cited as underlying issues contributing to failure to detect rare or understudied species. Researchers primarily rely on information obtained when species were widely distributed and abundant to inform research design. Recently, interest in *Spilogale putorius* (Eastern Spotted Skunk) has piqued due to declining populations and an uncertain conservation status. To address knowledge gaps on the effects of seasonality, bait choice, and survey design on capture efficacy and sex ratio, we surveyed *Spilogale putorius interrupta* (Plains Spotted Skunk) in the Katy Prairie region of Texas with 2 survey designs. Our systematic survey design provided 2 bait types, a 5-day survey length, and a grid array of traps, while our casual live-trapping surveys had 1 bait type with varied survey length and trap array. From February 2019 through August 2020, we captured 29 unique Plains Spotted Skunks 49 times. Analysis of systematic survey data indicates that seasonality and bait type did not affect capture success. Additionally, surveys conducted in the summer resulted in similar overall capture rates but higher female capture rates when compared to other seasons. Our finding of similar capture rates among seasons contrasts with previous reports that suggest reduced capture efficacy of spotted skunks during the summer. These results improve the current knowledge of techniques for capturing spotted skunks and offer more efficient means for researchers to assess populations.

Paper 6

NOVEL BIOMIMETIC ARTIFICIAL VAGINA USE TO IMPROVE EJACULATE QUALITY

Jacqueline Rich¹, Jonathan Cowart², and Dara Orbach¹, ¹Department of Life Sciences, Texas A&M University-Corpus Christi, ²Department of Aquatic Animal Health, University of Florida (jrich4@islander.tamucc.edu)

The success of assisted reproductive technologies (ART) such as artificial insemination has been highly variable in mammalian breeding programs. Artificial vaginas (AVs) have historically been utilized for the collection of high-quality ejaculates to improve ART success. In recent years, AV modifications such as the addition of warmed bladders and imitation cervix have further improved the quantity and quality of ejaculate collected. However, innovative AV designs have yet to be created for cetaceans, which include critically endangered species that exhibit limited artificial insemination success. Additionally, an AV design that closely reflects the morphology and biomechanical properties of the female reproductive tract has yet to be developed for any species. Recent research on common bottlenose dolphin (*Tursiops truncatus*) genitalia has revealed the coevolution of genital shape between the sexes, suggesting a probable influence of the unique morphology of the vaginal lumen in mechanical stimulation of the penis during semen collection. Additional studies have characterized the biomaterial properties of female reproductive tract tissues and developed a technique to model the shape of the vaginal lumen, allowing for the creation of a common bottlenose dolphin biomimetic artificial vagina (BAV). The proposed study is the first to utilize post-mortem females to create a BAV that mimics the shape and elasticity of the female reproductive tract to improve ejaculate quality at the time of collection. Adult male common bottlenose dolphins housed at aquaria around Florida will be trained to ejaculate into a BAV and the sperm morphology, kinematics, and integrity of ejaculates will be analyzed using histological techniques and computer-assisted sperm analysis (CASA) software. BAVs are predicated to produce higher quality ejaculates compared to manual stimulation techniques. The proposed study aims to develop a novel ejaculate collection technique that can be widely applied to conservation of terrestrial and marine endangered species and the livestock breeding industry.

Paper 7

USING HIDDEN MARKOV MODELS TO IDENTIFY BEHAVIORAL STATES OF OCELOTS, BOBCATS, AND COYOTES

Maksim Sergeyev¹, Joseph D. Holbrook², Jason V. Lombardi¹, Michael E. Tewes¹, and Tyler A. Campbell³, ¹Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, ²Haub School of the Environment and Natural Resources, University of Wyoming, ³East Foundation (ecomaksimsergeyev@gmail.com)

Describing the behavior of carnivores is essential to understanding their ecology. However, it is difficult to obtain accurate field data on behavior of carnivores. Advances in monitoring technology have provided the ability to obtain reliable, high-frequency data on wildlife. From these data, behavioral states can be approximated by analyzing angle and distance between locations. We monitored 12 ocelots (*Leopardus pardalis*), 19 bobcats (*Lynx rufus*), and 5 coyotes (*Canis latrans*) on the East Foundation's El Sauz Ranch and the Yturria Ranch in South Texas, USA, that were fitted with a GPS collar that collected locations every 30 minutes. We characterized behavioral states using hidden Markov models. We assumed low turning angles and longer step lengths to represent patrolling territory, larger turning angles with shorter distances between successive points would represent hunting behavior, and low angles and minimal movement would indicate periods of rest. We predicted 1) each species exhibits three behavioral states: resting, hunting and territory patrolling, 2) ocelots moved further (i.e. territory patrolling) in open areas and rested in dense cover 3) bobcats and coyotes would remain in more open areas than ocelots. We found that ocelots remained closer to heavy cover when resting and foraging and used open areas more when patrolling territory. Bobcats and coyotes remained closer to open areas when foraging and patrolling and overall used open areas at a greater extent. We observed differences in timing of behaviors within and across species. Identifying behavior in the field improves our understanding of the ecology of these species and can target conservation efforts to manage habitat for various behaviors.

Paper 8

COMPARISON OF PASSIVE DETECTION METHODS FOR DETERMINING OCCUPANCY OF COYOTES (*CANIS LATRANS*) IN RANGELAND IN SOUTH-CENTRAL OKLAHOMA

Kenneth E. Shimer¹, Vicki L. Jackson¹, Stephen L. Webb², Mike D. Proctor³, ¹Department of Biology, University of Central Oklahoma, ²Natural Resource Institute, Texas A&M University, ³The Noble Foundation (kshimer@uco.edu)

Passive monitoring devices have had a long-standing influence on how wildlife surveys are conducted, given their low labor investment and cost. The primary and most used example of this is triggered camera traps, particularly in terrestrial mammal surveys. However, autonomous recording units (ARUs) have been growing in popularity for sound-producing terrestrial species. ARUs allow for a broader detection range and are historically used in surveying marine and air-borne species such as birds and bats. This increase in utilization raised the question of how successful these monitors are compared to the more traditional camera trap in terrestrial environments. To address this question, we compared 29 paired sets of un-baited passive detection devices (1 camera trap, 1 ARU per site) for detection of coyotes (*Canis latrans*), a highly vocal species, within two rangeland sites owned by the Noble Foundation in south-central Oklahoma. We used occupancy models to compare detection binary histories of each method in order determine detection success. Our preliminary finding suggests that ARUs offer a higher-level detection of coyotes in comparison to camera traps. This study recommends that using or supplementing ARUs within survey protocols increases the potential detection of elusive sound-producing species.

Paper 9

CHIROPTERAN COMMUNITY COMPOSITION AND STRUCTURE OF THE DAVIS MOUNTAIN PRESERVE, JEFF DAVIS COUNTY, TEXAS

William V. Thompson, Loren K. Ammerman, Robert C. Dowler, Nicholas J. Negovetich, Department of Biology, Angelo State University (wthompson7@angelo.edu)

Habitat loss, alteration, and climate change are three of the leading causes of decline in biodiversity. The effects of these changes are likely to be pronounced in mesic, montane communities due to the limited dispersal potential and specialized habitat requirements of resident taxa. The threat posed by climate change and habitat alteration to biotic communities highlights the necessity for increased monitoring and conservation activities, particularly in habitats at greater risk like the mesic, montane communities of the Davis Mountains. Due to the crucial ecosystem services provided and their power as bioindicators, bats rank highly on the list of species that wildlife scientists should be monitoring. The mesic, montane habitats of the Davis Mountains are an understudied area of west Texas that could be categorized as sky island communities and that are also home to a diversity of bat species. In this analysis, we compared sex ratios, species presence, and abundances of bat species captured at the Davis Mountain Preserve between two historic surveys in 2001 and 2005 to contemporary survey data collected in the summer of 2021. Chi-squared and permutational MANOVA statistical tests were used to compare the survey data. We found differences in species presence, abundance, and sex ratios among the surveys. Our findings support published literature regarding elevational sexual segregation. Further, through synthesis of capture and specimen records, we have compiled a comprehensive list of species that are likely present at the Davis Mountain Preserve. Our analysis did not determine a causal factor for the community shifts detected but does explore the potential effects of habitat alterations occurring at the preserve – i.e. wildfire and juniper removal – on the bat community. This analysis serves as the first attempt to document long-term bat community dynamics for the region and acts as a baseline for comparison for future monitoring activities.

Paper 10

INFLUENCE OF FINE-SCALE LANDSCAPE AND VEGETATION STRUCTURE ON BOBCAT USE OF HIGHWAY WILDLIFE CROSSINGS IN CAMERON COUNTY, TEXAS

Thomas J. Yamashita¹, Humberto L. Perotto-Baldivieso¹, Zachary M. Wardle¹, Richard J. Kline², Michael E. Tewes¹, John H. Young Jr.³, and Jason V. Lombardi¹, ¹Caesar Kleberg Wildlife Research Institute, Texas A&M University – Kingsville, ²School of Earth, Environmental, and Marine Sciences, University of Texas Rio Grande Valley, ³Environmental Affairs Division, Texas Department of Transportation (thomas.yamashita@students.tamuk.edu)

Globally, wildlife crossing structures (WCS) are constructed to help improve connectivity of wildlife populations and help reduce wildlife-road mortality. The use of WCSs may be affected by structural characteristics of crossings, human disturbance, and the 3D structure of vegetation in the surrounding landscape. We computed seven metrics of horizontal woody cover structure (percent land cover, patch density, edge density, mean patch area, largest patch index, aggregation index, and Euclidean nearest neighbor distance) from a classified 1-m resolution aerial image in 1-km buffers around 14 wildlife crossing structures in Cameron County and 14 random locations in nearby habitat. We estimated vegetation density at five different heights above the ground from classified light detection and ranging (LiDAR) point clouds within each crossing and random buffer. We then used permutational multivariate analysis of variance to compare the vegetation structure around wildlife crossings to the surrounding landscape. To assess how landscape structure affects wildlife crossing use, we used camera traps to identify bobcat (*Lynx rufus*) presence at each WCS location. We used a generalized linear mixed model to assess how bobcat detections were related to landscape structure and internal vegetation structure. We expect that landscape structure at WCSs will not differ from the surrounding landscape and bobcat use of WCSs will increase with larger, more connected patches that have higher vegetation density. This study will help determine the effectiveness of WCSs by demonstrating the important landscape and vegetation characteristics that influence use.

Papers 11–13 are to be considered for the Rollin Baker Award.

Paper 11

COPULATORY FIT IN SOUTHERN SEA OTTERS (*ENHYDRA LUTRIS NEREI*) Audra Clute and Dara N. Orbach, Department of Life Sciences, Texas A&M University-Corpus Christi (aclute@islander.tamucc.edu)

Reproductive systems have been vastly studied to better understand reproductive behaviors and fitness. Studies of copulatory fit, which provide insights into functional morphology and mechanisms of copulation, have been largely limited to insects. Copulatory fit of southern sea otters (*Enhydra lutris nereis*) was analyzed to find the optimal anatomical positioning between the sexes. Frozen-thawed post-mortem penises were inflated with melted Vaseline to simulate erection and vaginal lumen endocasts were made using silicone. Genital were digitized using a 3D scanner and penis models were overlain onto vaginal endocast models and rotated in 90° angle intervals to determine which orientation would provide the best fit between the sexes. There was extensive genital contact and the best fit when in a dorsal-ventral copulatory position. Field observations of natural copulations among southern sea otters affirm the anatomical predictions. Understanding copulatory fit has resounding impacts for husbandry programs invested in breeding animals.

Paper 12

MAMMALS OF THE TAPICHALACA RESERVE, ECUADOR Jonathan Jasper¹, Thomas E. Lee, Jr.¹, Nicolas Tinoco², M. Alejandra Camacho², Santiago F. Burneo², ¹Department of Biology, Abilene Christian University, ²Sección Mastozoología - Museo de Zoología, Pontificia Universidad Católica del Ecuador (jgj16a@acu.edu)

This mammal survey is part of an ongoing project to observe the mammalian diversity and frequency in the Andes mountains of Ecuador. This 2021 study took place within the Tapichalaca Reserve, in the Zamora-Chinchipe Province of Southern Ecuador. This reserve is in the Eastern Mountain Cloud Forests, and was established for conservation of the Jocotoco Antpitta (*Grallaria ridgelyi*). This survey was confined to cloud forest habitat around 2522 meters in elevation, and used Sherman traps, tomahawk traps, mist nets, and game cameras. Nineteen mammal species were documented in this survey, including: *Marmosops caucae*, *Didelphis pernigra*, *Caenolestes convelatus*, *Caenolestes condorensis*, *Anoura peruana*, *Myotis* sp., *Sturnira bidens*, *Sturnia erythromos*, *Cuniculus tazanowskii*, *Coendou rufescens*, *Sciurus granatensis*, *Oreoryzomys balneator*, *Akodon aerosus*, *Thomasomys aureus*, *Thomasomys caudivarius*, *Thomasomys taczanowskii*, *Nephleomys albigularis*, *Leopardus tigrinus*, and *Nasuella olivacea*. Cytochrome-b analysis of collected specimens was conducted to confirm identifications. Species frequency on game camera sightings was also analyzed.

Paper 13

SPATIAL DISPERSION AND ORIENTATION IN BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) GROUPS Caitlynn Partin¹, Eric Angel Ramos², Marcelo O. Magnasco², Diana Reiss³, Dara, N. Orbach¹, ¹ Department of Life Sciences, Texas A&M University-Corpus Christi, ² The Rockefeller University, ³ Hunter College, City University of New York (cpartin@islander.tamucc.edu)

Past studies have shown that spatial dispersion in common bottlenose dolphins (*Tursiops truncatus*) is dependent on water depth and food availability. It is unclear how dispersion and orientation in groups are altered by other factors, like group size, substrate type, and behavioral state. We used videos collected by aerial drone of free-ranging bottlenose dolphins in Turneffe Atoll, Belize to identify factors potentially influencing dispersion and orientation. The videos were analyzed to assess the relationship between group size (3–15), substrate (boundary, seagrass, or mixed), behavioral state (forage, social, rest, and travel) on group orientation (line abreast, parallel, scattered, facing inward), and spatial dispersion (distances). Orientation and dispersion were measured in ImageJ. Group size, substrate, and behavior were

significantly related to the spatial dispersion of a group. Dolphins swam parallel and proximate to each other during travel or when in boundary substrates. Dolphins were often scattered and in small group sizes during socializing or when in swimming over seagrass, suggesting that close proximity and undirected movement are important for social bonding. During foraging in small groups and swimming over mixed substrates, groups were dispersed with a scattered orientation, suggesting that feeding may be a predominantly solitary activity in this population. Knowledge of how dolphin group cohesiveness varies with abiotic and biotic factors in Turneffe Atoll, Belize, could help to identify areas of conservation need and factors driving habitat preferences. The novel application of drones to assess dolphin behavior provides a non-invasive way to learn about free-swimming populations.

Papers 14-15 are to be considered for the Bobby Baker Award.

Paper 14

EVALUATION OF THE RELATIONSHIP BETWEEN A HIGH-FAT DIET AND GUT MICROBIOME HEALTH IN THIRTEEN LINED GROUND SQUIRRELS (*ICTIDOMYS TRIDECEMPLINEATUS*) Emma Solis and Jessica Healy-La Price, Department of Biology, Austin College (esolis18@austincollege.edu)

Hibernating species typically undergo extreme cycles of fat accumulation and loss throughout the year as they maintain their normal circannual rhythm of euthermia and torpor. With feeding patterns changing drastically during the year, there have been several papers detailing subsequent seasonal differences in gut microbiota structure and diversity according to a standard hibernation cycle. However, little research has been done to evaluate if other factors such as dietary fat content or natural vs. lab diets have any direct effects on the gut health and microbial community of hibernating species. Using behavioral (food intake), morphological (body mass and composition), and molecular (qPCR) techniques this project evaluates the physiological effects of a high-fat diet on the thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*) to observe potential differences that emerge as wild-caught animals are transitioned to a lab diet.

Paper 15

PHYLOGENETICS OF CYAMID “WHALE LICE” HARVESTED FROM BOWHEAD WHALES (*BALAENA MYSTICETUS*) AND GRAY WHALES (*ESCHRICHTIUS ROBUSTUS*) Michelle Lokkesmoe¹, Raphaela Stimmelmayer², and Amy Baird¹, ¹Department of Biology, University of Houston-Downtown, ²North Slope Borough, Department of Wildlife Management (lokkesmoemichelle@gmail.com)

Whale lice (Amphipoda: *Cyamus*) are ectoparasites common on many species of cetaceans. They have no free-swimming stage, therefore transmission occurs only between contact of whales. Prior to our study, bowhead whales, *Balaena mysticetus*, were thought to only carry *Cyamus ceti*. Gray whales (*Echrichtius robustus*) were known to be parasitized by at least 3 species (*C. scammoni*, *C. kessleri*, and *C. ceti*). We sequenced mtDNA from a collection of bowhead and gray whale lice from Northern Alaska. Our results showed that bowhead lice fall into 3 distinct clades: *C. scammoni* (previously known only from gray whales); *C. ceti* (also shared with gray whales); and an undescribed lineage that is unique to bowhead lice. These results suggest more physical interaction between gray and bowhead whales than has been reported in the past.

Papers 16-17 are to be considered for the TSM Award.

Paper 16

POPULATION GENETIC STRUCTURE AND DIVERSITY AMONG FRAGMENTED POPULATIONS OF THE LLANO POCKET GOPHER (*GEOMYS TEXENSIS*)

Julia A. Nitschmann and Russell S. Pfau, Department of Biology, Tarleton State University
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The Llano pocket gopher (*Geomys texensis*) is a Texas endemic divided into two subspecies (*G. t. texensis* and *G. t. bakeri*) separated by a distance of 60 miles. Both subspecies exist as apparently fragmented populations of different sizes due to *G. texensis* requiring soil with a high sand content to construct their burrows. Some populations inhabit areas as small as two square miles. This provides an excellent opportunity to investigate the effects of genetic drift due to population fragmentation. Our objectives were (1) identification of new populations and range extensions, (2) determining the pattern and extent of genetic divergence among populations, and (3) assessing the levels of genetic diversity within each population. Samples were collected from several populations representative of the entire species' distribution. Nuclear and mitochondrial genetic data sets were generated. Nuclear data was produced by Amplified Fragment Length Polymorphism analysis. Mitochondrial data was generated by PCR and sequencing of the COIII gene. Population structure was assessed using principal coordinate analysis (PCoA) and STRUCTURE 2.3.4. A phylogenetic tree was created from mitochondrial sequences. Nuclear genetic diversity was estimated by calculating expected heterozygosity and proportion of polymorphic loci. For mitochondrial data, genetic diversity was estimated by haplotype and nucleotide diversity. Preliminary data will be presented.

Paper 17

REDEFINING THE FAMILY ABROCOMIDAE (RODENTIA: OCTODONTOIDEA) AND THE CONTEXT OF THE ENDANGERED *ABROCOMA BOLIVIENSIS* Daniela Arenas Viveros and

Jorge Salazar-Bravo, Biological Sciences Department, Texas Tech University
(daniela.arenasviveros@ttu.edu)

The family Abrocomidae belongs to a lineage of South American rodents that have inhabited the continent since the Eocene (i.e., Caviomorphs). Members of this family are well adapted to inhabit rocky environments along the central Andes and include no less than seven extinct and two extant genera: *Abrocoma* and *Cuscomys*. One species, *A. boliviensis*, is endemic to Bolivia and considered Critically Endangered by the IUCN. With the procurement of unique samples, we reconstructed the phylogenetic relationships of the family, with a special emphasis on *Abrocoma boliviensis*. Results from the analysis of mitochondrial and nuclear markers support a close phylogenetic relationship between *A. boliviensis*, *A. cinerea* and *Cuscomys* spp. with *A. bennetti* as the sister taxa to all three. These results call for a taxonomic rearrangement within the family. In addition, mitochondrial data from 11 individuals of *A. boliviensis* revealed high levels of genetic distance when compared with other closely related taxa. Possible explanations for these results include: 1) *A. boliviensis* is a species complex and further taxonomic revision is required, 2) sex-biased dispersal is promoting divergence within the mitochondrial genome, or 3) *A. boliviensis* might require further partitions into subspecies. Preliminary results seem to point to hypothesis 2 as the most likely scenario. Because *A. boliviensis* is both endemic and endangered, understanding how its genetic diversity is apportioned will better inform any potential conservation efforts.

Paper 18 is to be considered for the Robert Packard Award.

Paper 18

THE EFFECT OF 60 YEARS OF TRANSLOCATIONS ON POPULATIONS OF TEXAS

DESERT BIGHORN SHEEP Emily A. Wright¹, Rachael C. Wiedmeier¹, Emma K. Roberts², Froylán Hernández³, Warren C. Conway⁴, and Robert D. Bradley^{1,5}, ¹Department of Biological Sciences, Texas Tech University, ²Climate Science Center, Texas Tech University, ³Texas Parks and Wildlife Department, ⁴Department of Natural Resources Management, Texas Tech University, ⁵Natural Science Research Laboratory, Museum of Texas Tech University (emily.a.wright@ttu.edu)

In Texas, desert bighorn sheep (DBS, *Ovis canadensis*) historically occupied 16 mountain ranges in the Trans-Pecos Region. Described as *O. c. texianus* in 1912, this subspecies of DBS was extirpated in the 1950s due to overharvesting, competition, and diseases. Historical restocking efforts have depended on translocating individuals of *O. c. nelsoni* and *O. c. mexicana* from Nevada, Utah, and Arizona, and Mexico and from in-state locations. These efforts reestablished populations from <14 individuals in 1959 to >1,500 individuals across 11 mountain ranges by 2020. The effects of these inter- and intrastate translocations on the genetic and genomic composition of contemporary populations are unknown. Mitochondrial markers (Cytochrome *b*, *Cytb*; Displacement loop, D-loop) and double digest restriction site-associated DNA sequencing (ddRADSeq) was used to determine the subspecific status of known pre-extirpated individuals and population structure, genetic variation, and connectivity in contemporary populations, respectively. To date, the *Cytb* gene has been successfully sequenced from 11 of 23 pre-1960 bone samples, indicating that pre-extirpated DBS represent a ‘desert-like’ subspecies (*O. c. mexicana*, *O. c. nelsoni*, and *O. c. texiana*) rather than the Rocky Mountain subspecies (*O. c. canadensis*). From preliminary analyses using ddRADSeq data, DBS west of 104° (Sierra Diablo, Beach, Baylor, and Van Horn Mountains) are similar in the nuclear genome to populations in Arizona whereas DBS east of 104° (Elephant Mountain, Black Gap, Dove, and Bassey Mountains) are similar to populations in Nevada. Consequently, reintroduction efforts from multiple out-of-state sources were successful with evidence of detectable contributions to the nuclear genome.

Poster Presentation Abstracts

Poster 1 is to be considered for the Clyde Jones Graduate Award.

Poster 1

OBSERVATIONS ON THE GENETIC HEALTH OF BOBCAT (*LYNX RUFUS*) POPULATIONS IN OKLAHOMA Timothy McSweeney and Dr. Michelle Haynie, Department of Biology, University of Central Oklahoma (tmcsweny@uco.edu)

The bobcat (*Lynx rufus*) is a significant meso-carnivore and an important game species within the state of Oklahoma. The bobcat is regularly harvested, with thousands of bobcats being legally hunted every season. To date there have been limited studies on the genetic makeup and health of the species within the state. Collecting and analyzing genetic data from specimens collected across the state will provide information on the current health of the species, as well provide insight on the possible effect the removal of bobcats may have on the total population in the state. To assess the genetic health of bobcats in Oklahoma, 222 individuals will be genotyped for 10 microsatellite loci to establish a baseline of genetic diversity. To date, genotypes have been generated for 172 individuals. Future research will focus on comparing genetic diversity measures between hunting seasons.

Poster 2 is to be considered for the Clyde Jones Undergraduate Award.

Poster 2

POPULATION STRUCTURE OF BOWHEAD WHALES USING MTDNA SEQUENCES Emily F. Fritsche and Dr. Amy Baird, Department of Biology, University of Houston-Downtown (fritscheel@gator.uhd.edu)

The Bowhead whale is one of 16 baleen whale species and lives mostly in the Arctic and subarctic waters. This species is of high cultural significance to Arctic tribes, which hunt these whales as part of their subsistence. In our ongoing study, we examine the population genetics of the Bowhead whales through mitochondrial DNA (mtDNA) sequences. This work is part of a long-term study monitoring genetic diversity and population structure to inform the International Whaling Commission's management and conservation decisions for this species. We have sequenced 3 mtDNA genes from bowhead samples that were donated by Alaska Native whalers over the course of the past several decades. We conducted standard population genetic analyses to look for evidence of potential population sub-structuring, to examine the distinction of the Bering-Chukchi-Beaufort (BCB) Seas Stock (which is hunted by Alaska Natives) from surrounding stocks, and characterize the haplotypes present in the population. Results so far indicate that the BCB stock is well differentiated from the Okhotsk Sea stock, but less so from the Eastern Canadian Western Greenland stock. No evidence of sub-structuring of the BCB stock was seen.

Posters 3-4 are to be considered for the Vernon Bailey Graduate Award.

Poster 3

A SURVEY OF PARASITES OF SPOTTED SKUNKS (*SPILOGALE* SP.) FOUND THROUGHOUT THEIR RANGE Madeline N. Arszulowicz, Robert C. Dowler, and Nicholas J. Negovetich, Department of Biology, Angelo State University (marszulowicz@angelo.edu)

To date, few studies exist on the extent of the parasitic fauna found on and within spotted skunks (*Spilogale* sp.). Most research has focused either on skunks from a portion of their range, or on a specific parasite group, creating a bias towards heterogeneous sampling efforts and incomplete sampling. As such, the goal of this project is to report on the parasite community of spotted skunks collected across their ranges. Skunks collected thus far represent eight states and were obtained from vehicle-killed animals,

mortalities from previous research projects, donations from natural history collections, and legally harvested animals by fur trappers. We have performed forty-eight total necropsies on spotted skunks, seven of which were western spotted skunks (*S. gracilis*) and forty-one eastern spotted skunks (*S. putorius*). Endoparasites (acanthocephalans, cestodes, and nematodes) have been found in thirty-five hosts and ectoparasites (fleas, lice, mites, and ticks) were found on fifteen hosts. Additional ectoparasites were obtained from a radio collar project in Harris County. Identification of the collected parasites is ongoing.

Poster 4

CARNIVORE COMMUNITY INTERACTIONS IN A BRUSH MANAGED LANDSCAPE

A.B. Branney, T.J. Yamashita, J. V. Lombardi, M. J. Cherry, and M.E. Tewes, Caesar Kleberg Wildlife Research Institute, Texas A&M University–Kingsville, Kingsville, Texas
(aidan.branney@students.tamuk.edu)

Carnivore community interactions are driven by predation, competition, and vegetation structure on the landscape. Habitat management strategies can alter resource availability and carnivore distribution on the landscape. South Texas rangelands are heavily managed for brush plant communities through clearing and brush sculpting. This has proven beneficial to native economically valued prey species (e.g., upland game birds and ungulates). However, brush management impacts on native carnivores such as bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and raccoons (*Procyon lotor*) remain understudied. Since March 2021 we have conducted camera surveys (54 cameras) on the Hixon Ranch, La Salle County, Texas to examine spatial and temporal interactions of these three carnivore species in brush managed management areas. We conducted a preliminary diel overlap activity analysis, indicating that bobcats and coyotes do not exhibit significantly different circadian rhythms ($w=0.70$, $p > 0.05$), but raccoon differed from both carnivores ($w=0.34$, $p < 0.05$, $w= 0.29$, $p < 0.05$). Future analyses include multispecies occupancy modeling to examine behavioral interactions and find environmental drivers of carnivore co-occurrence in the landscape. These analyses will help further the understanding of carnivore community ecology in these managed areas.

Posters 5-10 are to be considered for the Vernon Bailey Undergraduate Award.

Poster 5

OBSERVING THE EFFECT OF LUNAR LIGHT ON NOCTURNAL RODENTS IN A MIXED-GRASS PLAINS REGION Madison E. Baugh and Dr. Victoria L. Jackson, Department of Biology, University of Central Oklahoma (mbaugh1@uco.edu)

The overall predation risk, foraging techniques, and habitat preferences of nocturnal rodents can be altered by the brightness of a particular moon phase. We will measure the variation in lunar emissions and observe the consequential changes in nocturnal rodent behavior using camera traps. There is little recent literature to support the notion that moonlight directly affects the nocturnal activities of rodents. We will be the first to use camera trapping as a mode of data collection for nocturnal rodent activity in a mixed-grass plains region. Our study will contribute to two prominent databases: eMammal Snapshot USA and the UCO Natural History Museum. Capturing evidence of nocturnal strategies such as predator avoidance, foraging, and habitat preferences will be a key component of the project. We will also record any daytime activity. Each camera trap will record the percent lunar emission. Rodent activity will be recorded via motion-activated RECONYX camera traps that will take a series of 5 pictures when triggered. Each camera trap will be deployed and baited with peanut butter oats monthly to capture 6 months of lunar cycles and rodent behavior. We expect that if there is an increase in the percent emission of lunar light, then there will be a decrease in the nocturnal activities of rodents.

Poster 6

USING COMPUTED TOMOGRAPHY TO ASSESS COPULATORY FIT IN ORCAS (*ORCINUS ORCA*) Madeleine Deel and Dara N. Orbach, Department of Life Sciences, Texas A&M University-Corpus Christi (mdeel@islander.tamucc.edu)

Computed tomography (CT) imaging has been frequently used for clinical diagnostics in the health care system. However, novel application of CT scans may improve the understanding of body positioning during intromission of animals that have not been observed copulating in the wild. The excised and inflated penis of a post-mortem sexually mature male orca (*Orcinus orca*) was placed into the vagina of a conspecific and dice CT scanned to assess copulatory fit. Tissue types were segmented to produce a 3D reconstruction of the genitalia in simulated copulation. Relative volumes of tissue types were measured and landmarks were identified where tissues were in contact between the sexes. A tight fit was found between the penis and vagina when positioned in ventral-ventral orientation. Identification of this copulatory positioning can provide insights for artificial insemination advancement that may improve fertility rates in endangered species.

Poster 7

STEROID HORMONES IN THREE BALEEN PLATES FROM THE SAME INDIVIDUAL Makayla Guinn, D. D. Crain, F. Mansouri, B. Otulana, J. Patterson, R. Sabin, S. Usenko, and S.J. Trumble, Department of Biology, Baylor University (makaylaguinn18@gmail.com)

Baleen whales are exceptional models of the interactions occurring within and among species in the marine environment, and serve as valuable tools for measuring stress and reproductive biomarkers in marine mammals. Numerous factors including large size, aquatic lifestyle and wide-ranging migration make these whales difficult to study and thus relatively underutilized in longitudinal studies. However, new methods have recently been developed that utilize accreted tissues to reconstruct longitudinal hormone data. Baleen, in particular, has been found to archive up to several years of hormone data and is being largely explored in cetacean research due to its ease of collection from deceased animals. One area under investigated is the consistency of hormone data between baleen plates collected from the right and left side of the mouth. In this study, we show corticosterone and progesterone data collected from three different blue whale baleen plates of the same individual were not significantly different. We know from previous studies that this concept holds true for hormone analysis in both right and left whale earplugs, but until now was unknown for baleen. Measured Z-scores across all three plates for corticosterone and progesterone yielded (ANOVA, $F = 0.025$, $p > 0.05$) and (ANOVA, $F = 0.004$, $p > 0.05$), respectively. Our results indicate hormone and possibly other analyses including stable isotope analysis will not depend on specific baleen plates sampled. The use of accreted tissues for hormone analysis from baleen whales have been increasing and this study provides evidence of consistent hormone archival within baleen plates, regardless of sampling location within the mouth of the whale, as well as providing indirect evidence of consistent excretion into such tissues over time. Additional studies are warranted to determine if this pattern of consistency is found among other baleen whale species.

Poster 8

FREE-ROAMING DOG (*CANIS LUPUS FAMILIARIS*) POPULATION AND GASTROINTESTINAL PARASITE DIVERSITY IN TULUM, MEXICO Michael A. Lyons, Rumaan Malhotra, and Cody Thompson, Department of Ecology & Evolutionary Biology and Museum of Zoology, University of Michigan (lyonsma@umich.edu)

In many areas around the world, free-roaming dogs (*Canis lupus familiaris*) play large ecological roles that impact wildlife and people. Free-roaming dogs can impact wildlife in a variety of ways, including predation, competition, hybridization, and disease transmission. The latter also poses a major threat to humans. To better understand the threat of domestic dogs to wildlife and people and add to the growing literature on free-roaming dog ecology, a study was conducted to estimate the dog population in Tulum,

Mexico. A modified mark-recapture technique was used to obtain dog population estimates along six different transects dividing the city. Population estimates ranged from 19.75 dogs in one transect to 101.841 dogs in another, with 150 total dogs identified throughout the study and an estimated minimum population density of 48.57 dogs/km². Fecal samples were also opportunistically collected for parasite identification through fecal flotation analysis using the McMaster technique. Out of 25 samples collected, 19 tested positive for gastrointestinal parasites with the most common species found being *Ancylostoma caninum*, followed by *Toxocara canis*, *Dipylidium caninum*, and *Cystoisospora* spp. Parasite loads ranged from 50 to 10,700 ova per gram of feces. The large population of free-roaming dogs and the prevalence of three zoonotic parasites highlight the importance of understanding free-roaming dog ecology and educating the public on the health risks free-roaming dogs pose.

Poster 9

TEMPORAL CHANGES IN MAMMALIAN CARNIVORE DISTRIBUTION IN THE TEXAS BLACKLAND PRAIRIES Adam Myers, Kaitlyn Malone, Abbigal Maeng, and Jessica E. Healy, Department of Biology, Austin College (amyers19@austincollege.edu)

Zoogeography is the study of where animals live and why. As the climate changes, species ranges change, and therefore it is important to consider how and why those range shifts occur. Our project focuses on the comparison of the current range, diversity, and population of mammalian carnivores in the Blackland prairie with the historical diversity, ranges, and populations of those species. We developed a historic data set (prior to 1970) of carnivore species presence in Texas by County by reviewing previous primary literature as well as tag data from Austin College's museum collection. A modern dataset, using County-level mammalian carnivore sightings from 1970 onward, was developed primarily using sightings from the citizen science database iNaturalist, supplemented by camera trapping at Austin College's Sneed Prairie restoration site in Grayson County, TX. We detected a total of 19 mammalian carnivore species across our modern and historic Blackland prairie data sets, with 4 mammalian carnivore species detected by camera trapping at Austin College's Sneed prairie, in addition to 6 other non-carnivore mammal species. Four species present in the historic dataset (*Mustela frenata*, *Canis rufus*, *Leopardus parda*, and *Panthera onca*) were not detected in our modern dataset. In addition, population estimates of larger carnivore species (such as *Puma concolor* and *Ursus americanus*) in the modern dataset were below what would be considered historical levels. These results suggest that 1) smaller or more cryptic mammalian carnivore species are likely to be overlooked by citizen science efforts like iNaturalist, which tend to overcount mesocarnivores in urban areas and undercount those in rural areas, and 2) that prairie restoration sites are in themselves inadequate to restore carnivore diversity to pre-modern levels.

Poster 10

RESULTS OF THE ACOUSTIC SURVEY OF BAT POPULATIONS WITHIN THE WICHITA MOUNTAINS WILDLIFE REFUGE R. J. Trent, Matthew Van Sant, and Dana N. Lee, Department of Biology, Cameron University (rt194457@cameron.edu)

The Wichita Mountains Wildlife Refuge (WMWR) is comprised of 59,020 acres of federally protected land and was established in an effort to protect threatened wildlife species and their habitats. It is estimated that the WMWR is home to approximately 50 species of mammals but exactly which species of bats are present is not well known. Therefore, our objective was to establish a more complete record of the diversity of bats present within the refuge. In this study, we utilized ultrasonic recording devices to non-invasively survey six locations within WMWR from April – November 2021. We left each recording device at the same location for the entire sampling period in an effort to determine species richness at each site. Every two weeks we retrieved the SD chips from each recorder to check for recordings. Noise files were removed and the remaining recordings were analyzed utilizing Sonobat software. Batch summary reports included likelihood of presence values for each species. If the likelihood of presence was >0.9 we accepted the identified species as present within the site. We performed manual verification of individual classifications if the species had a likelihood of presence < 0.9. We report the detection of

Myotis velifer, *Nycticeius humeralis*, *Lasiurus borealis*, *Lasiurus cinereus*, *Eptesicus fuscus*, *Lasionycteris noctivagans*, *Tadarida brasiliensis*, *Antrozous pallidus*, *Corynorhinus townsendii*, and *Nyctinomops macrotis*. We detected each of these species at all six of the locations; however, species richness patterns at two of the locations do appear to be impacted significantly by weather pattern changes throughout the sampling period. Next steps in this study should include mist net surveys to capture and more confidently document the presence of each species within WMWR. This will also enable us to record more detailed information including population sizes and to monitor for the presence of White-Nose Syndrome.

**Texas Society of Mammalogists
40th Annual Members Business Meeting
19 February 2022**

AGENDA

1. Call to Order
2. Approval of the minutes of the 2021 Member's Business Meeting
3. Officer Reports
 - a. Secretary-Treasurer, Tom Lee
 - b. Permanent Secretary, Joel Brant
 - c. Editor, Michelle Haynie
4. Committee Reports
 - a. Report of Honorary Membership Committee, Phil Sudman
 - b. Report of Financial Advisory Committee, Phil Sudman
 - c. Report of the Student Honoraria Committee, Ray Willis
 - d. Report of the *ad hoc* Informatics Committee, Michelle Haynie
 - e. Report of the *ad hoc* Conduct Committee, Jessica Light
 - f. Report of the *ad hoc* Auction Committee, Krysta Demere
5. Officer Elections
 - a. President-Elect
 - b. Secretary-Treasurer
6. Old Business
7. New Business
 - a. Code of Conduct from American Society of Mammalogists wording
 - b. Ombudspersons volunteers
 - c. Selection of site for 2023 Annual Meeting
 - d. Introduction of new TPWD mammalogist Dana Karelus
8. Closing Remarks of TSM President, Dana Lee
9. Adjourn

Texas Society of Mammalogists
Treasurer's Report for 1 January to 31 December 2021
Submitted by Thomas E. Lee, Jr., Secretary-Treasurer

Income and expenses of TSM for the 2021 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 \$2,169.48. Total income in 2021 was \$9,521.54 and total expenses were \$6,785.21. TSM total assets at the end of 2021 were \$137,619.06. The value of the investment fund increased \$9,819.64.

Checking Account Balance as of 1 January 2021	\$2,169.48
Investment Account (Morgan Stanley) balance 1 January 2021	\$122,893.61
Total TSM assets as of 1 January 2021	\$125,063.09

2021 Income

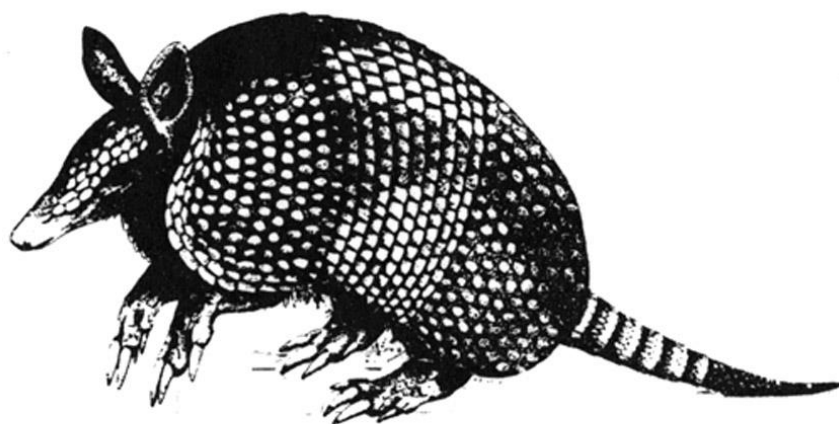
2021 Annual Meeting income (registration, meals and lodging fees)	
Student Registration	\$250.00
Late Registration	\$596.54
Non-Student Registration	\$880.00
Meals	\$0.00
Lodging	\$0.00
Linens	\$0.00
2021 Membership dues	\$990.00
2021 Patron Memberships	\$1,260.00
2021 Contributions (any over \$1,000)	\$85.00
2021 Annual Meeting activities	\$0.00
T-shirts (106 ordered)	\$960.00
Auction Income	\$0.00
Entertainment (deposit refund)	\$0.00
Meeting photos	\$0.00
Transfer from Morgan Stanley account	\$4,500.00
Total income	\$9,521.54

2021 Expenses

2021 Annual Meeting Expenses to TTU Center	\$0.00
Entertainment – DJ & Bartender	\$0.00
Refreshments/Beverages	\$0.00
Program copy charges (ASU print shop)	\$0.00
Computer, software, Zoom Webinar	\$1,400.00
Office supplies	\$0.00
Supplies, Honorary Awards	\$0.00
PO Box	\$192.00
Student Awards	\$3,700.00
T-shirts (106 ordered, 42 free)	\$812.70
Fuel to pick-up t-shirts (round trip Abilene to San Angelo)	\$27.97
Speaker Travel Reimbursement	\$0.00
Shipping	\$433.71
Transfer fee, Morgan Stanley	\$0.00
2021 Stripes fees (registration)	\$218.83
Total expenses	\$6,785.21

Checking Account Balance 31 December 2021	\$4,905.81
Investment Account (Morgan Stanley) balance 31 December 2021	\$132,713.25
Total TSM assets as of 31 December 2021	\$137,619.06

Texas Society of Mammalogists



**Newsletter
2022
The 40th Annual Meeting**

2022 Guest Speaker



Our banquet speaker will be Dr. Robert C. Dowler, Tippet Professor of Biology and Curator of Mammals at Angelo State University. Dr. Dowler has had a long career mentoring over 38 graduate students with research interests in systematics, ecology, and conservation of mammals. He has conducted field studies in much of Mexico, the Galapagos Islands, Guyana, Indonesia, and Australia, as well as throughout much of the United States. His research has included pocket gophers, distributional studies of Texas mammals, and the endemic rodents of the Galapagos Islands. In the recent past, research by him and his students has focused on the biology of skunks of the southwestern U. S., including current studies of the ecology and conservation biology of the plains spotted skunk, currently under consideration for listing under the Endangered Species Act.

Patron Membership

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

News & Announcements

Introduction the New Texas Parks and Wildlife Department State Mammalogist



Dana Karelus comes to TPWD most recently from the Natural Resources Institute at TAMU, where she worked as a Research Scientist. She also worked for over 2 years at the Borderlands Research Institute in Alpine as a postdoctoral researcher studying black bears, mountain lions, kit foxes, and other mesocarnivores. Her Ph.D. comes from the University of Florida, where she researched space use, movements, and habitat selection of Florida black bears in an anthropogenically fragmented area recently recolonized by bears.

One Stop Shop for Sequencing, Analysis, and Consulting needs!



Who we are: In business since 2011, RTL Genomics is a trusted partner CRO and long-term NGS provider, with extensive experience in various sequence-based technologies and specializing in Illumina applications such as microbiome and environmental DNA profiling.

Started and run largely by alumni from Texas Tech University, we take pride in the quality of our services and strive to deliver results at competitive rates and exceptional turn-around times, without sacrificing quality. Today, samples are processed by a lab that has the experience of completing nearly 7,000 orders of various sample types and order sizes, from 1 sample to over 2,000 samples. Part of our continued success comes from our Bioinformatic and Biostatistical support groups, which implement quality control, maintain analytical pipelines, and can be contracted for publication-quality analysis. To that end, we have completed more than 500 unique analysis requests - which have contributed to academic, government, and industry research efforts including presentations, publications, and even marketing claim development.

What's new? Many members of this society are already familiar with our name and a few even mentored members of our team in various stages of their careers (even mentored the mentors!). Effective on January 1st 2021, RTL Genomics was acquired and welcomed into the larger MicroGenDx family. MicroGenDx, also a provider of NGS services, has a successful track record in translating sequence-guided diagnostics to the clinical realm and direct to consumers. Together, MicroGenDx and RTL have processed over 1.5 million molecular assays. With this acquisition, RTL Genomics has gained an expanded support structure including a wider staff and infrastructure to support our customers. We are growing yet again, so be on the lookout for expanded services soon!

Why choose RTL? As a full-service provider, we are ready to assist in every facet of a project, from early planning to laboratory technical support, analysis and downstream interpretation. In the age of ever-increasing data, we recognize that a major unmet need involves the experience and resources to analyze sequencing data and interpret complex findings. As such, we offer free

consultation meetings to discuss your projects and how we might contribute to your goals. For advanced needs, we can provide support for analysis and even interpretation where needed. Additionally, RTL Genomics maintains full data accessibility for a minimum of 2 years after sequencing, in a hope to preserve a backup of customer data if ever needed again as a backup or for experimental goals envisioned at a later date.

Types of services offered:

- Illumina sequencing applications
 - o E.g., 16S rRNA, COI, ITS
- Troubleshooting for difficult samples
- PMA Viability Assays (limited)
- Quantitative PCR
 - o E.g., Bacterial abundance
- Some bioinformatics included for most sequencing orders
- Custom bioinformatics and biostatistics services
- Data visualization
- Manuscript support

Contact us! Reach out to us at info@rtlgenomics.com to get started and enquire about specific pricing, or feel free to message Craig with questions directly at craig.tipton@rtlgenomics.com. You can visit our website at <https://rtlgenomics.com/> to learn more.

Students Wanted!

We would like to encourage students to become more actively involved in the society. One of the ways you can do this is to join a committee. Below are the committees that are open for participation. If you are interested in joining a committee, please let us know while you are at the meeting. You also can email TXmammals@gmail.com with the name of the committee(s) you would like to join. We will pass your name along to the committee chair and they will be in touch with you. In addition to committee work, we are looking for volunteers to assist at the meeting every year (e.g., help with registration, etc.). If you are willing to assist at the meeting, please email TXmammals@gmail.com and indicate when you would be available to help and what you would like to do.

Conservation Committee

The role of this Committee is to monitor governmental and other activities that relate to conservation of mammals in Texas; advise officers and membership of the Texas Society of Mammalogists on issues of concern; and respond to the issues via formal resolutions. This Committee is intended to serve as a clearinghouse for information on all aspects of conservation of Texas mammals and to maintain the capacity to respond promptly and effectively in crises.

Ad hoc Auction Committee

The role of this Committee is to request and collect donations, set up and help conduct the live and silent auctions at the meeting, and help collect payments at the end of the auctions. Even though we are virtual this year, you can still join the committee and help with preparations for our next in-person meeting.

Ad hoc Government Liaison Committee

The role of this Committee is to facilitate interactions between the Texas Parks and Wildlife Department and TSM regarding issues that might affect mammalian conservation and research in Texas. It is similar to the Conservation Committee but is aimed specifically at communicating with TPWD.

Ad hoc Informatics Committee

The role of this Committee is to update and maintain the web and social media presence of the society. TSM currently has Facebook and Twitter accounts.

Website Updates

We continue to work on updating the society website and are seeking requests for information you would like to see included on the site. Please send your suggestions and requests to Michelle Haynie (mhaynie@uco.edu; Editor).

In Memoriam

Brian R. Chapman, Ph.D. (1946-2021): Dr. Brian R. Chapman passed away of 5 June 2021. Brian was born in Corpus Christi, Texas. He obtained his B.S. from Texas A&M University-Kingsville in 1967, his M.S. from Texas Tech University in 1970 under the direction of Robert L. Packard, and his Ph.D. from Texas Tech in 1973 under the direction of John E. George. Brian was on the faculty of the Department of Biology at Texas A&M University-Corpus Christi (formerly known as Corpus Christi State University) from 1973 to 1990. He also was Acting Chairperson of the Division of Science from 1973 to 1978 and Chairperson of the Division of Graduate Studies, College of Science and Technology, from 1981 to 1990. Brian served for one year (1990-1991) as Research Zoologist and Visiting Professor in the Department of Zoology at the University of Oklahoma, then served as Professor of Wildlife Management in the School of Forest Resources at the University of Georgia (1991-2000). He was Dean of the College of Arts and Sciences and Professor of Zoology at Sam Houston State University from 2000 to 2005. In 2005, Brian became Provost and Vice President for Academic Affairs at West Texas A&M University. He returned to Sam Houston State University in 2013 as a Senior Research Scientist and Scholar and served as a research mentor prior to his retirement in 2018. Brian's research interests included vertebrate ecology and management of endangered species with emphasis on birds, bats, and rare or protected species, animal distributions, and habitat use. He authored numerous peer-reviewed publications as well as several books, and directed both M.S. and Ph.D. students. Chapman was a founding member of The Waterbird Society and a Fellow in the Texas Academy of Science. He served as President of the Southwestern Association of Naturalists from 1987 to 1989 and the Texas Society of Mammalogists from 1988 to 1989. During his presidency, the society voted to appoint a member as a liaison with Texas Parks and Wildlife (leading to the establishment of the Government Liaison Committee in 1991), and a second student paper award (the TSM Award) was established. Chapman was in attendance at both the 1979 and 1981 organizational meetings of the Texas Society of Mammalogists. He served on several TSM committees and brought numerous students to participate in the meeting over the years.

Brenda E. Rodgers, Ph.D. (1960-2021): Dr. Brenda Rodgers passed away on 5 August 2021, at the age of 61. Born in Carthage, Texas, Brenda graduated with a B.S. in Biology from the University of Houston in 1996, an M.S., under the direction of Dr. Michael W. Haiduk, from Lamar University in 1999, and a Ph.D. in Biological Sciences, under the direction of Dr. Robert J. Baker, from Texas Tech University in 2002. Her dissertation topic investigated the effects of Chernobyl's radiation on the genetics of rodents living in the highly contaminated zones near the reactor. As a post-doctoral researcher (directed by Drs. Ronald Chesser and Carleton Phillips) at Texas Tech University (2002-2003), Brenda and her colleagues received a \$1.9 million grant from the Department of Energy to continue her research on genetic impacts of radiation on mammals at Chernobyl. Dr. Rodgers also traveled to Guyana with the Smithsonian Institute to assess the genetics of tropical rainforest bats. In 2003, she was hired by West Texas A&M University as an Assistant Professor, and in 2008 she was promoted to Associate Professor. In 2005, Brenda was part of a US-led team that helped to initiate re-training of former weapons-scientists in Iraq, thus beginning her work in science-diplomacy. From 2006 to 2013, she was contracted by the U.S. Department of State to work with Iraqi nuclear scientists and to serve as a United States Delegate to the International Atomic Energy Agency in Vienna, Austria, and at venues in Croatia, Italy, Jordan, Cyprus, Switzerland, and Turkey. In 2009, Brenda returned to Texas Tech University as a faculty member, where she continued and expanded her science-diplomacy work in Iraq and with the International Atomic Energy Agency of the United Nations, receiving about \$4.2 million in support. Brenda was recognized for her excellence in teaching through various awards at Texas Tech University, and her research efforts resulted in numerous publications in national and international peer-reviewed scientific journals. In 2021, when husband Ron Chesser retired from Texas Tech University, Brenda and Ron moved to Crystal Beach, Texas (near Houston) and Brenda switched her teaching load to online courses. Brenda was a member of TSM for several years, first as a student at Lamar University and Texas Tech University, and later as a faculty mentor. She became a Patron member of TSM in 2004. Her graduate students won the Clyde Jones Award for their presentations at TSM in 2004 (Kristen Holmes, West Texas A&M) and 2009 (Eric Howell, Texas Tech).

Abilene Christian University

Department of Biology, 1600 Campus Court, Abilene, TX 79699



Tom Lee

Phone: 325-370-4442

Email: leet@acu.edu

Research Interests, Projects, and Grants:

In 2020, I received the inaugural Clark Stevens endowed professorship. Research this last summer was paid for by the funds from the Clark Stevens professorship. In the summer of 2021 I used the Clark Stevens funds to conduct field research in southern Ecuador.

I cannot forget that I was very honored and grateful to receive the Texas Society of Mammalogists honorary membership award for 2020. My thanks to the Society for this great recognition.

Undergraduate Students and Their Research:

- My students and I are finishing another study on the mammals of the Andes of Ecuador. Jonathan Jasper, Nicholas Tinoco, and I worked at almost 8,000 feet in southern Ecuador on the last project. Jonathan Jasper will present on the findings from last summer's research trip.
- My students Brianna Douglas, Megan Howard, and Colton Jakubik conducted a camera trapping survey at Abilene State Park. This project was part of the emammal (snapshot) Smithsonian nationwide camera-trapping program.
- I finished up a number of projects this year including: A mammalian species account on *Mazama rufina* with Jonathan Jasper; and Small mammals of Otonga, Ecuador with former students Grayson Allred and Nicholas Tinoco.

Additional Information:

The Abilene Christian University Natural History Collection catalog has been updated and the frozen tissue collection is easy to access. The collection is now part of the ARCTOS data base.

Angelo State University

Department of Biology, 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

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, to investigate genetic diversity, and to understand diet. I also am interested in distribution, community structure, and the ecology of bats, especially in Texas. Most recently I have been using thermal imaging and PIT tag systems to monitor seasonal roost use and colony size fluctuation of *Leptonycteris nivalis* in Big Bend National Park (funded by Bat Conservation International). See my ResearchGate profile <https://www.researchgate.net/profile/Loren-Ammerman> for recent publications.

Current Graduate Students and Their Research:

- **Alex Buckel** – MS thesis student, Interaction of bats and simulated water surfaces in a desert habitat, Dec 2020-present
- **Katie Fitzgerald** – MS thesis student, Seasonal variation in diet of cave bats (*Myotis velifer*) in Texas using a molecular approach, August 2020-present
- **Rebecca Harris** – MS thesis student, The effect of acoustic lures on the capture rates of bats in the Chihuahuan Desert, August 2020-present
- **Will McCoy** – MS thesis student, Phylogenetic position of *Sauromys* and *Platymops* within Molossidae, August 2021- present
- **Will Thompson** – MS thesis student, Characterization of Long-legged Myotis (*Myotis volans*) roost trees identified using a novel audio telemetry method, August 2020-present

Current Undergraduate Students and Their Research:

- **Zoey Stormes** – Genetic markers for species of *Sylvilagus* in west Texas (ASU Undergraduate Research Scholar, Spring 2020-present)
- **Katie Holland** – Detection and genetic analysis of Mastadenoviruses in *Myotis velifer* (Undergraduate Research Scholar, Spring 2020-present)

Additional Information: The Angelo State Natural History Collection has over 20,000 mammal specimens and over 29,000 tissue specimens. The collection is searchable at <http://www.angelo.edu/dept/asnhc/collections.php> and on VertNet and GBIF. Contact Loren Ammerman or Robert Dowler if you have any questions about the collection.

I am looking for fecal samples from pallid bats (*Antrozous pallidus*) from across their distribution. I can provide sample vials and more details if interested. I will be accepting samples until June 2022.



Robert C. Dowler

Phone: 325-486-6639

Email: 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 are continuing to work on determining aspects of the spatial ecology of the plains spotted skunk (*Spilogale putorius interrupta*) in Texas. We are continuing work on other aspects of the ecology of eastern spotted skunks, including their ecto- and endoparasites. I also 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 and as voucher specimens for the Angelo State Natural History Collections. I am also interested in the conservation biology and systematics of Galapagos rodents, collaborating with Marcia Revelez, Research Associate at Texas Tech University, and Cody Edwards at George Mason University.

Graduate Students and Their Research:

- J. Clint Perkins, former M.S. student is now a Ph.D. student at Texas Tech University working on the spatial ecology of populations of plains spotted skunks at the Katy Prairie. I am co-advisor with Dr. Richard Stevens at TTU.
- Kamren Jefferson finished her M.S. thesis research on den site selection of the plains spotted skunk at our study site on the Katy Prairie near Houston, Texas.
- Matthew H. Hamilton is working on his M.S. in Biology working on spatial ecology of striped skunks where they co-occur with plains spotted skunks on the Katy Prairie near Houston.
- Rebecca Scott is working on her M.S. thesis on resurveying sites at Davis Mountains Preserve for terrestrial mammal species.
- Madeline Arszulowics is finishing her M.S. thesis on the parasites of spotted skunks, genus *Spilogale*.

Undergraduate Students and Their Research:

- Rodrigo Andrade Luna is conducting a study of the nose pad of hog-nosed skunks using scanning electron microscopy.

Austin College

900 N. Grand Ave., Sherman, TX 75090



Jessica Healy-La Price

Phone: 903-813-2338

Email: 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. A current project involves measuring hibernation patterns in wild thirteen-lined ground squirrels across a latitudinal gradient from Texas to Canada. 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:

- Kaitlyn Malone, Adam Myers, Abby Maeng – Small mammal survey of Sneed Prairie Restoration
- Emma Solis, Emily Davis, Carolina Coreas – Effects of high fat diet on gut microbiome in thirteen-lined ground squirrels

Cameron University

Lawton, OK 73505



Dana N. Lee

Phone: 580-591-8009

Email: 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. Undergraduate students in my lab are currently working to determine the bat species present in the Wichita Mountains Wildlife Refuge using mist netting and acoustic survey techniques as well as determining the genetic diversity in the refuge's population of elk.

Centenary College of Louisiana

2911 Centenary Blvd., Shreveport, LA 71104



Scott Chirhart

Phone: 318-869-5209

Email: schirhar@centenary.edu

Research Interests, Projects, and Grants:

Evolutionary Biology, including: Evolutionary/Population Genetics, Vertebrate Speciation and Systematics, Molecular Variation

Blackhawk Genomics/Institute for Biodiversity Research and Genomics

Charlestown, IN



John Delton Hanson

Phone: 806-549-4669

Email: j.delton.hanson@gmail.com

My current role as clinical laboratory director and consultant has consumed most of my bandwidth during the COVID-19 pandemic. However, I am working on establishing a small research institute focusing on biodiversity education. One of the goals of the institute is to help create opportunities for more students to experience field work and new environments through US based and study abroad field type courses. I recently moved to exurb of Louisville in southern Indiana and am slowly learning the mammalogical and ecological communities here.

Houston Museum of Natural Science

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



Dan Brooks

Phone: 713-639-4776

Fax: 713-639-4767

Email: dbrooks@hmns.org

Web page URL: www.hmns.org/exhibits/curators

Research Interests, Projects, and Grants:

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, SubSaharan Africa, and more recently Southeast Asia.

Current mammalogy projects I'm involved in include:

- Collaborative research on deforestation in South America's Chaco biome was recently published: <https://doi.org/10.1007/s10980-021-01291-x>.
- We have recently launched a website for the Houston Urban Wildlife Project (HUWP), featuring a section on urban mammal projects in Houston (www.hmns.org/huwp).
- Former department intern Tim McSweeney has wrapped up various projects at a large urban *Tadarida* colony (predation by Night herons [published] and movements during extreme weather events [in press]), and has moved on to greener pastures, wrapping up his thesis work under Michelle Haynie at UCO.
- Other urban mammalogy projects here in Houston deal with Ringtail biology (in review).

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 two committees I serve on, both 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:

This is my annual default statement: The primary driver of the Houston Museum of Natural Science is Education, including outreach. We educate every 4th and 7th grader in the 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!

Times of Covid: The museum is still afloat, and is slowly renormalizing!

McMurry University

Department of Biology, 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); assessing the ecological impacts of wind farms on bat diversity (with Tom Lee); and various mammal, herp, and bird projects associated with Firebase Libby, a property owned by McMurry University located in Callahan County, Texas.

Midwestern State University

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



Ray E. Willis

Phone: 940-397-4408

Email: ray.willis@msutexas.edu

Research Interests, Projects, and Grants:

I am the curator of the Dalquest Vertebrate Collection. 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.

I am in the last year of a two-year grant surveying the mammals of Camp Swift National Guard base located in Mineral Wells, TX, as well as a grant surveying the mammals of Camp Swift in Bastrop, TX. I am also in the final year of a \$473,000 NSF grant which is being utilized to purchase mammal cabinets, -80°C freezers, computers, and digitization of the mammal collection at Midwestern State University.

Students and Their Research:

I currently have five graduate students working on various vertebrate morphology and phylogenetic research projects. I have funding for all current projects and anticipate having room for at least three more students who would be interested in vertebrate research.

Purdue University

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. Our research occurs at the intersection of ecology, evolution, and genetics. Ongoing or recent projects have centered on fishes, herps, birds, and a variety of mammals including marsupials,

rodents, and cetaceans.

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., gray whale population structure). Students matriculate through either the Biology program or a Wildlife program.

Undergraduate Students and Their Research:

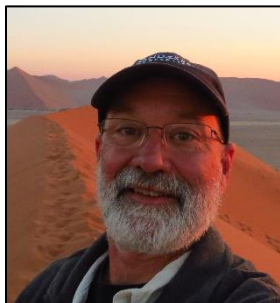
My undergraduates are all mentored by graduate students or postdocs. Most start as “assistants”, but the best students develop their own research projects.

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

Department of Biological Sciences, Stephenville, TX 76402



Philip D. Sudman

Phone: 254-968-9154

Email: sudman@tarleton.edu

Web page URL: faculty.tarleton.edu/sudman/

Research Interests, Projects, and Grants:

I continue to have a keen interest in pocket gopher genetics/phylogenetics/population genetics as well as general mammal historical biogeography. Although I am still teaching and doing limited research, the bulk of my time these days revolves around the development of a 780 acre ranch along the Colorado River south of Goldthwaite in Mills County into the Timberlake Biological Field Station (<https://www.tarleton.edu/timberlakeranch/index.html>). If anyone is interested in bring classes for a day, a weekend, or longer, please contact me. Facilities are limited to a classroom building, bathhouse, a small cabin, and a large pavilion – bunkhouses are in the planning stages so for now most groups rely on tents. Unfortunately, mammal diversity in this part of central Texas is rather limited, but birding, herping, and aquatic opportunities are fantastic!

Graduate Students and Their Research:

- Madison Gover – Effects of the presence of American Bison (*Bison bison*) and Black-tailed Prairie Dogs (*Cynomys ludovicianus*) on small mammal diversity at Caprock Canyons State Park



Russell S. Pfau

Phone: 254-968-9761

Email: pfau@tarleton.edu

Web page: faculty.tarleton.edu/pfau/

Research Interests, Projects, and Grants:

My main research focus is population and evolutionary genetics—often with a focus on conservation biology. Small mammals have been the primary subject of my research, but I have broadened my taxonomic coverage to include crustaceans, fish, plants, frogs, and insects. Ongoing projects include:

- Distribution of shrews (*Blarina*) in the southern Great Plains region using mtDNA sequencing (for identification) and morphometric analysis to examine geographical patterns of variation
- Population genetics and soil-type correlations of several pocket gopher species in the genus *Geomys*
- Mitochondrial genomics of the mammalian suborder Castorimorpha
- Species status of two bumblebees in Texas (in collaboration with Jessica Beckham and Jeff Johnson)

- Phylogenetics and species discovery among the Texas anemones (windflowers)
- Population genetics of the Texas endemic plant, *Dalea reverchonii*.
- Conservation genetics of the crawfish frog (State Wildlife Grant, TPWD) in collaboration with Toby Hibbitts, Texas A&M—College Station.

Undergraduate and Graduate Students and Their Research:

- Julia Nitschmann – fine-scale population genetics of the pocket gopher *Geomys texensis*
- Nicole Armitage – identification of a contact zone between the pocket gophers *Geomys breviceps* and *G. bursarius*

Recent Graduates

- Two of my former students who presented their research at TSM within the past two years have graduated from Tarleton State University. Haley Greenia is employed at the Baylor College of Medicine Human Genome Sequencing Center. Shady Kuster is pursuing her PhD at Colorado State University studying mito-nuclear co-evolution.

Texas A&M Natural Resources Institute

1919 Oakwell Farms Parkway, Suite 100, San Antonio, Texas 78218



Stephanie Martinez-Brewer

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Research Interests, Projects, and Grants:

I am a policy associate for Texas A&M Natural Resources Institute. I currently support the conservation of nationwide declining, threatened, and endangered species by working with the U.S. Fish and Wildlife Service (Service), as well as state and federal partners, to write Species Status Assessments (SSAs) and other Endangered Species Act (ESA)

documents such as five-year reviews, and aiding in species range and habitat mapping. As of last year (2021), I've been a member of the plains spotted skunk (*Spilogale interrupta*) SSA core team. I also have previous experience with DoD Natural Resources programs for Texas military lands in environmental monitoring efforts that aid in the mitigation of negative urban-wildlife interactions, particularly those that pose as aircraft strike hazard risks on Air Force installations.

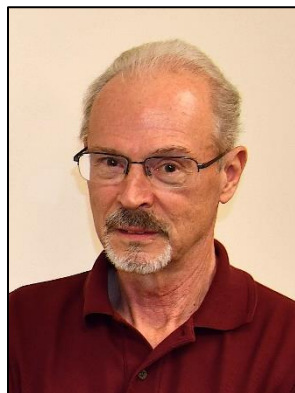
I received a Bachelor of Science in biology from Abilene Christian University in 2013, and a Master of Science in biology from Angelo State University in 2015. During my education, I worked almost exclusively with Mexican free-tailed bat urban populations. I am currently a member of the Texas Society of Mammalogists, Texas Chapter of the Wildlife Society, and the North American Society for Bat Research.

My research interests include urban mammal ecology, and how human development influences behavior and species adaptation. I recently completed a project focused on urban Rio Grande ground squirrels (*Ictidomys parvidens*) occurring in west Texas. I am currently recovering from a

severe invasive MRSA infection that resulted in numerous surgeries, and at this time, I dedicate my work efforts in GIS-centered projects for the Service. Outside of work, I enjoy the outdoors by birdwatching, hiking, and half marathon training.

Texas A&M University-College Station

Department of Ecology and Conservation Biology, Biodiversity Research and Teaching Collections, Texas A&M University, College Station, TX 77843



Thomas E. Lacher, Jr.

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Research Interests, Projects, and Grants:

Ecology and conservation of macaw species in Peru; livestock, Mammalian biodiversity, and local communities in Huascarán National Park in Peru; Transboundary conservation of bats and agaves in the Texas and northern Mexico; Acoustic biology of nectar-feeding bats in northern Mexico; Models of white-nose transmission in bats in Texas and Mexico; Payment for ecosystem services and mammalian conservation on a landscape matrix in Costa Rica; Spatial ecology of sloths in Costa Rica; Fragmentation and mammalian biodiversity in Costa Rica; Population and community ecology of bats in the southern Brazilian Atlantic Forest; Cacao plantations and marmoset ecology in the Brazilian Atlantic Forest; Climate change and land-use impacts on amphibians in Colombia; Assessment and monitoring of globally threatened species.

Graduate Students and Their Research:

- Jessica Gilbert, Ph.D. The impacts and dynamics of the socio-ecological system of livestock grazing on biodiversity in the Huascarán Biosphere Reserve. Major Advisor.
- Jordan Rogan, Ph.D. Biodiversity Thresholds and Functional Traits as Determinants of the Resilience of Mammals in Fragmented Landscapes of Costa Rica. Major advisor.
- Alaya Keane, M.S. Impacts of intensity of cacao agroforestry on primate communities in the Brazilian Atlantic Forest. Major Advisor.

Undergraduate Students and Their Research:

- Carson Hood: Assisting with the Small Mammal Specialist Group Extinction risk assessment and Texas Threatened species for Re:wild.
- Sidney Sanchez: Assisting with the Small Mammal Specialist Group Extinction risk assessment

Additional Information:

- Member of the IUCN Red List Committee (Planning Committee for the Red List Process)
- Co-Chair IUCN Small Mammal Specialist Group

- Member, IUCN Climate Change Specialist Group
- Associate Conservation Scientist, Re:wild, Austin, Texas
- Co-Editor, Volumes 6 and 7, Handbook of the Mammals of the World and Volumes 1 and 2 of the Illustrated Checklist of the Mammals of the World



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 (Thematic Collections Network to digitize external parasites of terrestrial vertebrates and a mid-career grant to study *Peromyscus* systematics) and Texas EcoLabs (to explore associations between pocket gophers and their lice).

Graduate Students and Their Research:

- Rhianon Belcher is a second-year Ph.D. interested in lemur evolution.
- Stephen Fowler is a second-year non-thesis Master's student interested in ecological processes and the effects mammals have on those processes.
- Natalie Hamilton is a third-year Ph.D. student studying the population genetics, relatedness, and social connectivity of Townsend's big-eared bats across the western United States. She also is working on several *Peromyscus* systematics projects.
- Delaine Kelley is a second-year non-thesis Master's student interested in conservation, biodiversity, and the effects of climate change on endangered species.
- Ali Lira is a first-year Ph.D. student interested in Neotropical bat flies, bats, and host-parasite coevolution.

Undergraduate Students and Their Research:

- Katelyn Sanchez is a third-year student interested in conservation biology. She's currently working on several *Peromyscus* related projects in the Light lab.

Technicians and Their Research:

- Danielle Dillard is investigating interactions between the giant kangaroo rat and a trombiculid mite. She also is interested in porcupine range expansions and several other projects ongoing in the Light lab.
- Shelby Fischer is an organizational guru, working on the NSF-funded Terrestrial Parasite Tracker to organize and catalog ectoparasite collections.

Additional Information:

The mammal division in the Biodiversity Research and Teaching Collections (<http://brtc.tamu.edu>) currently has over 67,000 specimens. Our data are available online through VertNet, iDigBio, and GBIF.

Texas A&M University-Corpus Christi

Department Life Sciences, Texas A&M University- Corpus Christi, Corpus Christi, TX 78412



Dara Orbach

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Research Interests and Projects:

My research interests are the functional anatomy and behavioral ecology of marine mammals. My functional anatomy research focuses on reproductive morphology and explores potential evolutionary drivers of diverse genital forms and coevolution between the sexes. My behavioral ecology research assesses mating patterns, decision-making processes, and population biology. Current graduate lab

members are doing land-based observations and boat-based surveys to explore the abundance, movement patterns, site fidelity, and health of bottlenose dolphins exposed to extensive anthropogenic disturbances in Coastal Bend, TX, or doing sperm analysis to help conserve dolphins through advancements in assisted reproductive technology.

Graduate Students and Their Research:

- Samantha Huron, M.S. student. Population biology of dolphins relative to anthropogenic disturbances in Coastal Bend, TX
- Eliza Mills, M.S. student. Movement and behavioral patterns of common bottlenose dolphins (*Tursiops truncatus*) in a dynamic Texas ship channel
- Jackie Rich, Ph.D. student. Novel biomimetic artificial vagina use to improve ejaculate quality in dolphins
- Makayla Guinn, M.S. student. Modelling the effects of a desalination plant on common bottlenose dolphin (*Tursiops truncatus*) health and stress

Undergraduate Students and Their Research:

- Two honor's students (Emily Cano, Alison Wilson) and one LSAMP student (Austin Wilson) are currently conducting research using bottlenose dolphin photo-identification
- One honor's student (Caitlynn Partin) is currently researching bottlenose dolphin grouping patterns using UAV footage
- One honor's student (Audra Clute) is currently researching sea otter genital morphology
- One honor's student (Madeleine Deel) is currently researching killer whale genital morphology

Additional Information:

- I joined Texas A&M University-Corpus Christi in 2019
- I have supervised over 130 undergraduate students from groups historically underrepresented in STEM disciplines and serve as a faculty mentor to four professional organizations.

Texas A&M University-Kingsville

Feline Research Program, Caesar Kleberg Wildlife Research Institute



Michael Tewes

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Web page: <https://www.ckwri.tamuk.edu/research-programs/feline-research-program>

Research Interests, Projects, and Grants:

Small cats – ocelot, bobcat, jaguarundi, margay, clouded leopard, Asiatic golden cat, leopard cat, marbled cat; not-so-small: cougar and jaguar

Graduate Students and Their Research:

- Amanda Veals: Ph.D. student; examining resource selection and landscape connectivity of the ocelot in South Texas with the aim to help the Texas Department of Transportation plan for wildlife crossing structures to mitigate vehicle collisions for this endangered species
- Jason Lombardi: Ph.D. student; Factors of Ocelot Occupancy in South Texas (Collaborative Effort with East Foundation); Ocelot-Road Monitoring Project on FM 1847 in Cameron County, TX (Collaborative Effort with TXDOT)



Jane Anderson

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Website: www.ecojane.org

Research Interests, Projects, and Grants:

I specialize in applied, interdisciplinary ecology, typically focused on: terrestrial mammal ecology and management, invasive species management, and human dimensions of natural resource conservation. I am currently studying invasive rose-ringed parakeets on the island of Kauai, Hawaii.

Texas Parks and Wildlife Department

District 1 Diversity Biologist, Alpine, TX 79830



Krysta D. Demere

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Research Interests, Projects, and Grants:

As a Diversity Biologist for Texas Parks and Wildlife, I supervise non-game research projects, provide technical guidance to private landowners regarding management and effective conservation actions for rare and threatened species, conduct outreach programs for landowners and the public, and conduct surveys for nongame species across the ~25 million acres that encompass the 16 counties of the Trans-Pecos Wildlife District. My efforts within the discipline of mammalogy for the past year have primarily focused on compiling a comprehensive database for historical and recent black bear observations, establishing a genetic tissue collection for black bear samples retrieved within west Texas, monitoring overwintering western bat species for the presence of Pd and potential development of white-nose syndrome, and investigating disease outbreaks in local lagomorphs. I have had the honor of serving as the official artist for TSM since 2018 and look forward to representing the society each year.

Texas Tech University

Department of Biological Sciences, and Natural Science Research Laboratory, 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; determining the genetic basis for adaptation in *Peromyscus*; examination of hybrid zones between genetically distinct taxa; understanding 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; various wildlife diseases such as chronic waste disease in deer, 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 and adaptation in *Peromyscus*
- Effects of zonadhesin gene in speciation of mammals
- Hybridization between white-tailed and mule deer
- Detection methods of Chronic Wasting Disease in cervids
- Genetics of transplanted populations of bighorn sheep in Texas with Warren Conway and Caleb Phillips
- Phylogenetic relationships of Neotomine and Reithrodontomyine rodents
- Systematic and genome studies of the genus *Geomys* and *Thomomys* with Richard Stevens and David Ray
- Ecology of hanta- and arenaviruses in the southwestern US and Mexico
- Revision of *Texas Natural History: A Century of Change* with D. J. Schmidly and L. C. Bradley
- Morphology, landscape genomics, and effective population size of the Palo Duro Mouse, *Peromyscus truei comanche*
- NSF funded project to A Partnership to Facilitate Scientific Inquiry into the Vast Functional Trait Diversity of Phyllostomid Bats (Richard Stevens – project PI)

Graduate Students and Their Research:

- Emily A. Wright (PhD candidate) is in her 5th year. Her research project utilizes genomic methods (SNPs) to characterize population structure and connectivity, genetic variation, and management schemes for Desert Bighorn Sheep in Texas.
- Joanna Bateman (PhD candidate) is in her 4th year and is using genomic methods to determine speciation and evolutionary processes in heteromyid rodents.
- Macy Krishnamoorthy (PhD candidate) is in her 4th year and is chaired by Dr. Richard Stevens. Macy is examining bat feeding and pollination impacts on baobab tress, and other bat questions.

Recently Graduated Students:

- Heidi Stevens completed her MA in Heritage and Museum Sciences in the summer of 2021. Her research examined the post-mortem degradation rate of DNA and RNA in liver and muscle samples collected from *Sigmodon hispidus*. Heidi is now employed as a Research Aide (translation Collections Manager) for the Natural Science Research Laboratory.

Undergraduate Students and Their Research:

- Last year, 15 undergraduate students (Anjali Aaluri, Joseph Bayouth, Alexandra Benson, Zoe Bixler, Aaron Bickerstaff, Trent Campbell, Cheyenne Ivey, Emma Johnston, Katherine Jones, Conner Jordan, Vivienne Lacy, Emma McDonald, Anne Pham, Maddison Reddock, and Mackenzie Talkmitt) were involved in various research projects in the Laboratory.

Postdoctoral Researchers:

- Dr. Emma Roberts (PhD 2020). Emma is now a postdoctoral researcher at the Texas Tech University Climate Center. Emma is wearing many research hats: impact of climate change on mammalian zoonoses, developing new methods for detecting chronic wasting disease, investigating the role of gametic recognition in speciation and hybridization and examining mechanisms behind reproductive isolation and the role they play in mammalian speciation.

Additional Information:

- My teaching responsibilities include: Mammalogy, Natural History of the Vertebrates, You're a Biology Major: So Now What?, Zombie Apocalypses, Rise of the Wuvarillas, and other Current Events in Biology, 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. I would be pleased to address questions about loans, visits, or resources.
- In addition, I am editor of the 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!
- Sometime in the Spring of 2022, *Texas Natural History in the Twenty-first Century*, by David J. Schmidly, Robert D. Bradley, and Lisa C. Bradley will be published by Texas Tech University Press. This book will provide an updated synopsis of Texas natural history. In this version, an effort is made to include information for amphibians, reptiles, and birds as obtained by members of the Bureau of Biological Survey. In addition, the information for mammals has been updated and expanded.
- In the Fall of 2019, the Memorial Volume for the Dr. Robert J. Baker was completed and provides a synthesis of the career of one of the most ardent supporters of TSM. It is available on the NSRL website and is cited as follows: Bradley, Robert D., Hugh H. Genoways, David J. Schmidly, and Lisa C. Bradley. 2019. Overture. Pp. v-ix in *From field to laboratory: A memorial volume in honor of Robert J. Baker* (R. D. Bradley, H. H. Genoways, D. J. Schmidly, and L. C. Bradley, eds.). *Special Publications*, Museum of Texas Tech University 71:xi+1-911.
- In 2019, Dr. Robert Dowler and I were invited to write a summary of North American Mammalogical Research for the Centennial Issue of the *Journal of Mammalogy*. This manuscript (see below) provides useful information for students and faculty who are interested in the history of mammalian research methods. Bradley, Robert D., and Robert C. Dowler. 2019. A century of mammal research: changes in research paradigms and emphases. *Journal of Mammalogy*, Centennial Issue 100:719-732.
- In 2017, David Schmidly led an effort to publish a timeline of important events in North American Mammalogy; this effort resulted in the manuscript (see below) that provides useful information for students (think qualifying exams), faculty, and historians. Schmidly, David J., Robert D. Bradley, Lisa C. Bradley, and Richard D. Stevens. 2017.

A timeline of significant events in the development of North American mammalogy. Special Publications, Museum of Texas Tech University, 66:1-37.



Caleb D. Phillips

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Research Interests, Projects, and Grants:

The Phillips laboratory studies metagenomes, genomes, craniofacial development, as well as some morphology and molecular mammalogy.

The lab is currently supported by a Texas Parks and Wildlife Department SWG, the National Institutes of Health, the National

Science Foundation, and Zara Environmental LLC.

Graduate Students and Their Research:

- 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
- Khalid Omeir (MS student): Microbiome-genome-wide association of bacteria in chronic wounds
- Jacob Ancira (MS student): Structural equation modeling to predict wound healing time based on wound microbial composition
- Hendra Sihaloho (PhD student): Community assembly of microbiomes of forest interior bats of Malaysia

Additional Information:

My teaching responsibilities include Bioinformatics, Metagenomics and Organic Evolution. These courses are offered at both graduate and undergraduate levels. I am also Curator of Genetic Resources at the Natural Science Research Laboratory.



David A. Ray

Department of Biological Sciences

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Research Interests, Projects, and Grants:

I am broadly interested in genome evolution and the utilization of genome-level data to investigate populations and evolutionary trends.

We are involved in several large-scale genome sequencing and analysis projects including bat1k (bat1k.com) and the Broad Institute's 250 mammals project (aka Zoonomia). Much of our work focuses on

the evolution and impact of mammalian transposable elements. Funding for our research comes

from the National Science Foundation (NSF), the United States Department of Agriculture (USDA), Texas Parks and Wildlife, and the Louisiana Department of Wildlife and Fisheries.

Specific projects include:

- The evolution of bat genomes in relation to longevity and aging (with Liliana Davalos).
- Transposable element evolution in mammalian genomes.
- The population genomics of Texas Kangaroo rats (with Robert Bradley and Richard Stevens).
- Population structure and phylogenetics of Texas pocket gophers (with Robert Bradley and Richard Stevens).
- Population genomics of vespertilionids bats in Louisiana (with Richard Stevens).
- The ecology of the genome, investigating equivalencies between transposable elements and ecosystem components.

Graduate Students and Their Research:

- Jenna Grimshaw (PhD student) – Genome ecology, the relationships between transposable elements in the genomic ecosystem. Co-advised by Richard Stevens.
- Michaela Halsey (PhD student) – Population genomics of *Dipodomys elator* and Texas pocket gophers. Co-advised by Richard Stevens.
- Jenny Korstian (PhD student) – Incomplete lineage sorting and phylogenetic analysis using transposable elements in bats and butterflies.
- Diana Moreno-Santillan (Postdoc) – Bat genomics, patterns of selection, and aging phenotypes. Co-advised with Liliana Davalos.
- Austin Osmanski (PhD student) – Genome evolution in mammals and crocodilians. Co-advised by Lou Densmore.
- Nicole Paulat (MS student) – The impact of transposable elements on mutation rates in bats.
- Kevin Sullivan (PhD student) – The relationship between LINE activity and pseudogene evolution in bats and other mammals.
- Sarah Vaca (MS student) – Population genomics and genome evolution of bats in the genus *Carollia*.
- Riley Risinger (MS student) – Genome evolution and transposable elements as they relate to population substructure in mammals.



Richard D. Stevens

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Research Interests, Projects, and Grants:

- Patterns of biodiversity of New World bats.
- Conservation of Atlantic Forest bat communities.
- Metacommunity structure of rodents of the Mojave Desert.
- Dispersal and metapopulation dynamics of Texas Kangaroo rats.

- Comparative population genetics of imperiled bats of Louisiana (with David Ray).
- Population Status of Texas Pocket Gophers (with Robert Bradley, David Ray, and Neal Platt).
- Continued Study of the Plains Spotted Skunk (with Bob Dowler).
- Use of Highway Structures by Bats in the Trans-Pecos and East Texas.

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 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 seventh 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 and is conducting an intensive study of habitat preferences. He is also interested in large-scale diversity patterns in heteromyid rodents.
- Erin Stukenholtz—Erin finished her M.S. in August 2016. She is now working on her Ph.D. focusing on the macroecology and metacommunity structure of urban birds.
- Carlos Garcia—Carlos is a M.S. student 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 fifth year Ph.D. student co-advised by David Ray and me. She earned a M.S. at Tarleton State University studying patterns of phylogenetic diversity of Mexican bats. Her current research is to identify patterns of genetic structure in 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.
- Holly Wilson—Holly is a fourth year Ph.D. student who recently earned her M.S. from Fort Hays State University under Elmer Birney. She is interested in how bats use highway structures as day-roosts in the Trans Pecos of Texas as well as characterizing ecological neighborhoods of pallid bats.
- Clint Perkins—Clint is a fourth year Ph.D. student who recently earned his M.S. from Angelo State University under Bob Dowler. His project revolves around population and spatial ecology of the plains spotted skunk, *Spilogale putorius interrupta*.
- Macy Madden—Macy is a Ph.D. student co-advised by Robert Bradley and me. She is interested in plant-pollinator interactions between baobab trees and *Rousettus aegyptiacus* and *Epomophorus* species in South Africa and Kenya.
- Samantha Garcia—Samantha is a third year M.S. student co-advised with Liam McGuire. She earned her B.S. in Biological Sciences at Texas Tech. She is examining elevation gradients in bats characterized across multiple dimensions of biodiversity.

- Angela Alviz—Angela is a third year Ph.D. student who received her M.S. in Biology from the Pontificia Universidad Javeriana. Angela is interested in Tapir metapopulation dynamics in Colombia.
- Sarah Vrla—Sarah is a third year PhD student co-advised between Dr. David Ray and me. She received a M.S. in Biology at the University of Central Oklahoma under Dr. Michelle Haynie in 2019. She is interested in sensory ecology, particularly the evolution, significance, and function of ultraviolet vision and communication in mammals.
- Emma Sanchez was recruited into the lab to do her M.S. on use of culverts as day roosts by bats in east Texas. She graduated from TTU with her B.S. in 2019 and we are glad to have he back in the lab!
- Michaela Halsey and Brett Andersen graduated with their Ph.D. and M. S. degrees, respectively. Congratulations to both!

Texas Tech University/University of New Mexico

60 Homesteads Rd., Placitas, New Mexico 8704



David J. Schmidly

Retired President and Professor Emeritus

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Research Interests: Natural History, Systematics, and Conservation of Texas Mammals

Projects: I spent the COVID year completing projects that have been underway for several years. With my colleagues, Robert and Lisa Bradley, I completed “Texas Natural History in the 21st Century,”

which chronicles how the mammal fauna changed in the state during the 20th and first two decades of the 21st century, beginning with Vernon Bailey’s 1905 publication, “The Biological Survey of Texas,” which is reprinted (with annotations) in the book. The closing chapters explain the major problems and potential solutions to the conservation challenges facing Texas mammals for the remainder of the 21st century. This book is completed and will be published by the Texas Tech Press and should be available in April of 2022.

My colleagues Frank Yancey, Steve Kasper, and Rick Mannings and I completed a “Field Guide to the Mammals of the Trans-Pecos,” and it has been accepted for publication by the Texas A&M Press sometime in 2022. The book includes color photographs of mammals, detailed distribution maps, keys, and illustrations of mammals drawn by Chester O. Martin.

I worked with Robert Bradley and other colleagues on a paper that will appear in the Journal of Mammalogy in 2022 describing two new species of deer mice of the *Peromyscus boylii* group from Michoacán, Mexico.

My current project involves the publication of a “Taxonomic Catalog for the Recent Terrestrial Vertebrates (Species and Subspecies) Described from Texas.” There are 417 amphibians,

reptiles, birds, and mammals in the catalog that were described exclusively from Texas specimens and with type localities in the state, and 143 of these are mammals. Each catalog entry contains the original scientific name and authority, current name and common name, complete synonymy, nature of the type specimen/s (holotype, syntypes, cotypes, etc.), information about the type locality, topotype and near topotype specimens in museum collections, and information about the describers and collectors of the taxa. The mammal section of the catalog is being developed by me, Robert and Lisa Bradley, Frank Yancey, and Joanna Bateman. There are other authors for the bird and herp catalogs. Rodney Honeycutt has joined with us to write a conclusion section that explains the importance of the compiled materials to the conservation of Texas' wildlife diversity. The catalog will be published as a Special Publication of the Museum at Texas Tech University and should be completed sometime in 2022.

When these projects are finished and published, I will begin thinking about what is next!

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. I now serve as Associate Vice President of Academic Affairs for Budget and Research, so while my own research agenda has diminished, I am enjoying supporting and promoting others at Trinity University.

University of Central Oklahoma

Department of Biology, Center for Wildlife Forensic Science and Conservation Studies,
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Michelle L. Haynie

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Research Interests, Projects, and Grants:

My research focuses on mammalian evolution biology, primarily in population genetics and molecular systematics. I am interested in using genetic markers to address conservation and evolutionary questions, with most of my current research focusing on comparative hybrid zone studies and the identification of cryptic species. I also am interested in genomic drivers of the speciation process and local adaptations.

My current projects include:

- Genetic examination of *Geomys* contact zones in Oklahoma
- Examining the potential spread of *Geomys bursarius* into eastern Oklahoma
- Status and trends of bobcat populations in Oklahoma (with Vicki Jackson, Sue Fairbanks, and Jerrod Davis; funded by ODWC)
- An evaluation of bobcat genetic structure in Oklahoma
- A long-term small mammal mark-recapture survey at UCO's Selman Living Lab to identify factors that impact population and community persistence (with Francisca Mendez-Harclerode, Gloria Caddell, Chad King, and Sean Laverty)

Graduate Students and Their Research:

- Tim McSweeney – Genetic diversity and population structure in Oklahoma bobcats
- Nathan Proudman – Status and trends of bobcat populations in Oklahoma (Nathan is advised by Dr. Sue Fairbanks at OSU, I serve as his laboratory mentor)

Undergraduate Students and Their Research:

- C. Claire Smith – Claire is leading the genetic identification of small mammals at the Selman Living Lab
- Rebekah Frank – Rebekah is assisting with the bobcat projects and will be assisting former student (Sarah Vrla) in obtaining additional data for publication of her thesis project

Additional Information:

- We are nearly finished with the revised edition of the "Mammals of Oklahoma." My coauthors (Bill Caire, Lynda Loucks, Brandi Coyner, and Meredith Hamilton) and I have submitted material to the OU Press for an early review process. We are in the process of responding to the reviewers and compiling the final documents for submission.



Vicki Jackson

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Research Interests, Projects, and Grants:

My research interests include spatial ecology and captive wild animal care.

My current projects and grants include:

- UCO CMS STEM Summer Bridge Program
- July 2017: Current Distribution of Eastern (Plains) Spotted Skunks (*Spilogale putorius interrupta*) in Eastern Oklahoma – Oklahoma Department of Wildlife Conservation.
- Effects of Translocation on black Rat Snakes – Oklahoma City Zoo

Graduate Students and Their Research:

- Mesocarnivore Survey of Southeastern Oklahoma (KaLynn Branham)
- Comparison of Noninvasive Survey Techniques for Coyote (Kenny Shimer)
- Spatial Ecology of Translocated Black Rat Snakes (Alan Jones)

Undergraduate Students and Their Research:

- Use of camera traps to assess impacts on moon illumination on rodent activity at Selman Living Lab, Woodward, OK (Madison Baugh)

University of Michigan

Museum of Zoology, 3600 Varsity Drive, Ann Arbor, Michigan 48109



Cody W. Thompson

Phone: (734) 615-2810

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Web page: codythompson.org

Research Interests, Projects, and Grants:

I consider myself a classically trained mammalogist, and as such, I use knowledge gained from observations made during fieldwork and through the examination of museum collections to answer questions about mammalian diversity. Specifically, my lab focuses on the following four areas: 1) hybrid zones and hybridization, 2) systematics and taxonomy, 3) leveraging technology in museums, and 4) basic natural history. My lab currently is funded by the National Science Foundation (Awards #1701713, #1902105, and #2101909) and the Huron Mountain Wildlife Foundation.

Undergraduate Students and Their Research:

- Shion Otsuka – Exploration of mammal venom glands using contrast-enhanced scanning

- Rhea Rajani – Comparisons of bat wing morphology using 3D data

Other Lab Personnel:

- Ellen Cassidy – Museum Technician
- Ramon Nagesan – CT Lab Manager

Additional Information:

I joined the Mammal Division at the University of Michigan Museum of Zoology (UMMZ) in June 2013. The UMMZ is administered by the Department of Ecology and Evolutionary Biology (EEB). I serve as the UMMZ Mammal Collections Manager and maintain a research appointment in EEB. With these two roles, I am fully involved in all aspects of the UMMZ Mammal Division, and I enjoy the challenge of integrating my experience working in museum collections with my own research program.

The University of Texas at Austin

Texas Memorial Museum, 2400 Trinity St. Stop D1500, Austin, TX 78712



Pamela R. Owen

Phone: 512-232-5511

Email: p.owen@austin.utexas.edu

Web page: www.TexasMemorialMuseum.org

Research Interests, Projects, and Grants:

- Evolutionary history of American badgers (Taxidiinae).
- Late Cenozoic mammalian faunas: I continue work on late Pleistocene mammal remains from the Slaughter Creek Site in southeastern Travis County. There are some intriguing taxa from this site, including: antilocaprids *Capromeryx* and *Antilocapra*, a llama-like camelid, wolves (*Canis dirus* and *C. lupus*), and a machairodont felid. Other taxa identified include *Bison*, *Odocoileus*, *Equus*, *Procyon lotor*, and *Canis latrans*.

Additional Information:

As Associate Director of Texas Memorial Museum, I coordinate and support collections-based natural science programs for educators, preK-16 learners, and the public. The museum makes available several mammal-focused loaner kits to local educators. 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 several chapters (Balcones Canyonlands, Capital Area, Good Water, Hays County, Lindheimer, and Lost Pines) of Texas Master Naturalists.

University of Houston—Downtown

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



Amy Baird

Phone: 713-222-5301

Email: BairdA@uhd.edu

Web page: <https://bairdlab.wordpress.com/>

Research Interests, Projects, and Grants:

My research interests include molecular phylogenetics, phylogeography, and speciation of mammals. Current projects include molecular phylogenetics of lasiurine bats, including phylogeography of the Hawaiian Hoary bat; population genetics of bowhead whales (grant funded through the North Slope Borough); and molecular phylogenetics of Central American shrews. I am partially funded by a grant from the North Slope Borough (PI) and an Organized Research and Creative Activities grant through UHD (PI).

Undergraduate Students and Their Research:

- Michelle Lokkesmoe – Michelle is working on sequencing DNA from bowhead whale lice and kidney worms to study coevolution between the parasites and their hosts
- Emily Fritsche – Emily is conducting mtDNA sequencing as part of a long-term study on population genetics of bowhead whales

U.S. Centers for Disease Control and Prevention

CDC Biorepository, Atlanta, GA 30345



Marcia (Marcy) A. Revelez

Phone: 404-498-1665

Email: mrevelez@cdc.gov

Web page URL: <https://www.cdc.gov/csels/dls/cdc-biorepository.html>

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 Lead and Collections Manager for the CDC Biorepository, which is made up of approximately 6.6 million specimens from research, surveillance, and emergency response efforts at CDC, including the COVID-19 response. 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 am part of a new endeavor to create a preparedness repository for CDC, to facilitate public health response to emergency outbreaks in the U.S.

Additional Information:

Member, Federal Interagency Working Group of Scientific Collections (IWGSC); member, Enviro-Bio Group for International Society of Biological and Environmental Repositories; member, Biobanking standards for International Organization for Standardization (ISO); member, workgroup National Plan for digitization of biodiversity collections (Network Integrated Biocollections Alliance (NIBA)), Biodiversity Collections Network (BCoN); member, Diversity and Equity Committee, Society for the Preservation of Natural History Collections (SPNHC); member, Systematics Committee, American Society of Mammalogists (ASM)

Fellows and Their Research:

- Taylor Soniat, Collections Specialist - Taylor is examining optimal storage conditions and sample viability at the CDC Biorepository
- Elizanette Lopez, Biorepository Fellow – Elizanette is examining sample management as it applies to the CDC Biorepository
- James Austin, Biorepository Fellow – Jamie is also examining sample management and best practices as it applies to sample disposition at the CDC Biorepository
- George Xiang, Communications Specialist – George is examining ways to improve communications and project management as it relates to sample management at CDC

**Texas Society of Mammalogists
Members' Business Meeting
Remote Meeting
13 February 2021**

The meeting was called to order by President Cathleen Early at 2:35 pm via Zoom remote meeting software. The minutes of the 2020 Members' Business Meeting, as written in the 2021 Program for the Texas Society of Mammalogists (TSM), were approved.

Officers' Reports

Secretary-Treasurer. Secretary-Treasurer Tom Lee reviewed the Treasurer's Report for 2020. The report is unfinished and Tom will be working with several members to complete the report after the meeting. We will not vote on this report today. The beginning balance was \$4,806.64 in the checking account and \$116,467.63 in the investment account, for total assets of \$121,274.27 to begin 2020. At the end of 2020, the balances were \$2,242.00 in checking and \$122,893.61 in the investment account, with total assets of \$125,135.61. In the itemized breakdown of the Treasurer's Report, Tom described how there was some uncertainty in the amounts provided on both the income and expenses columns. Tom will work with several folks to correct these values and the membership can vote on this report at a later date. Tom then provided an update on the investment account. In March 2020 the account took a sizable hit due to COVID, dropping below \$100K, before rebounding to ~\$125K by the end of the year. As of 9:00 am yesterday the investment account was at \$126,730.03 (now the account exceeds \$127K). Morgan Stanley has done well for us. Tom showed a breakdown of the invest allocations by sector and mentioned that TSM, based on the advice of the Financial Advisory Committee, had moved our investments out of fossil fuels.

Permanent Secretary. Permanent Secretary Joel Brant briefly described the role of the position as the historian of the society. Normally he would be the one taking photographs to document the meeting, and maintaining the archives of the society at the TTU Southwest Collection. With this being a virtual meeting, we have been recording the Zoom meetings and he will archive those videos. Precautions regarding COVID dissuaded Joel from traveling to Lubbock to obtain the physical files from Lisa Bradley (previous Permanent Secretary) or depositing items into our archives at the Southwest Collection. However, they are in good hands and Joel will coordinate with Lisa when the COVID crisis has abated. He also reported that as of 12 February, 103 members had paid their dues for the year. The membership included 55 students and represented 13 states and 37 institutions. Joel praised the membership for turning out for the remote meeting even in a pandemic. We welcomed 28 new members this year. We hosted 26 presentations at this remote meeting, 11 posters last night and 15 talks this morning. Joel congratulated all the presenters for their high quality presentations and their willingness to embrace the "new" technology of Zoom presentations and recording their presentations beforehand. Robert Martin asked about digitizing historic photos and potentially making them available on the website.

Editor. Newsletter Editor Michelle Haynie reported that she prepares the Newsletter of the Society and maintains the website of the Society. She asked that those with research programs please contact her each year to update (or maintain) their profiles in the Newsletter. She also said that any announcements or news that members feel would be appropriate to post to the website or print in the Newsletter should be sent to her. The Executive Committee voted to add an *In Memoriam* section to the newsletter so that request will go out with the call for papers & newsletter request.

Reports of Committees

Phil Sudman, Chair of the Honorary Membership Committee, reported that no nominations for Honorary Membership had submitted this year. Phil encouraged the membership to nominate folks for this award. Phil also mentioned that he has the certificates for last year's Honorary Membership recipients and will be presenting them when next we meet in person.

Phil Sudman, Chair of the Financial Advisory Committee, reported that the investment account began the year with ~\$114K and ended the year with ~\$122K. This included a \$5,000 transfer to the checking account so actual gain in the account was about 7.7%. As of the close of business yesterday the investment account was at \$127,280. Phil emphasized that the use of the investment account earns to fund the student awards and to keep the meeting affordable is a good thing and was the original intent of establishing an investment account. TSM is all about supporting our students. Morgan Stanley has been good to us and the society is in a good financial position should we need funds for anything.

Dana Lee, Chair of the Student Honoraria Committee, announced that she would be giving her report at 3:30 pm today (just before the guest speaker address). Dana commented that we had 14 judges who evaluated 11 posters last night and 15 talks this morning.

Amanda Veals (standing in for Michael Tewes, Chair) delivered the report from the Conservation Committee. Amanda discussed a proposed workshop for the society to be held next year on Friday (either before or after the posters). The topic of the workshop will be the conservation status of Texas mammals. This workshop was developed in part from the work David Schmidly, Robert Bradley, and Lisa Bradley did in preparation for their upcoming book *Texas Natural History in the 21st Century* to be released sometime in April 2021. This workshop would discuss the serious conservation threats to mammals in our state and develop potential actions that could be taken. The workshop would incorporate TPWD officials (and potentially other conservation agencies) as well as TSM members. This workshop is still in the planning stages and Amanda asked for comments or feedback. President Early commented that the Executive Committee decided to move its 2022 meeting from Friday afternoon to earlier in the month to make room for the workshop to be held Friday at 4:00 pm, just before supper and the poster session. The membership was generally supportive of hosting this workshop.

Krysta Demere, Chair of the *ad hoc* Auction Committee, reviewed the auction report from 2020. The auction generated an income of \$5,100 from 88 auction items. Over 30 businesses and individuals generously provided the auction items. Krysta expressed her thanks to Katie Kuzdack and Stephanie Martinez for their help in managing the auction. She also thanks Robert Bradley, Joel Brant, and Scott Chirhart for making the live auction as rowdy as possible. Because of the online format for this year's meeting, there was not a lot done for the auction (as there would not be one).

Michelle Haynie, Chair of the *ad hoc* Informatics Committee, reported that her committee is in charge of the TSM website and social media accounts. She asked that members send her any information that they would like to see included. Michelle thanked Stephanie Martinez for being active on the TSM Twitter account and Marcy Revelez for managing the TSM Facebook account. She also thanked John Hanson for help with the website and the abstract and registration forms as well as handling the technology for administering a remote meeting. Michelle mentioned that the committee has discussed establishing a job board on the website to highlight employment opportunities for our students. Michelle noted that the committee was concerned with keeping that job board up-to-date and decided against rolling that out. Instead, Michelle has been emailing the membership directly with any job opportunities that come up.

Jessica Light, Chair of the *ad hoc* Conduct Committee, explained that the committee's role is to develop an official Code of Conduct. However, COVID has derailed that effort. The committee will continue to

work on developing the Code of Conduct during the upcoming year. As an intermediate step, the Executive Committee voted last night to adopt a Statement of Inclusion (see below) and to place this statement before the membership for their approval. There was general editorial discussions on who the statement applies to (i.e. members, volunteers, and others). A question arose regarding enforcement and/or acknowledgement of the statement for future meetings. Several members asked questions about the Code of Conduct and Jessica reiterated that the committee was committed to developing the code over the next year and that several of the suggestions would be incorporated into that discussion. A motion was made to include the Statement of Inclusion on the website and registration for next year. Motion was approved.

The Texas Society of Mammalogists (TSM) prohibits discrimination, harassment, and bullying against any member because of ancestry, color, national origin, marital status, veteran status, gender identity or expression, sexual orientation, race, ethnicity, religion, age, disability, political affiliation, or any other characteristic protected by law. The TSM expects its members, volunteers, and other constituents, when and wherever they are conducting TSM business or participating in TSM events or activities, to maintain an environment free of discrimination, harassment, bullying, or retaliation.

Discrimination is defined as treating individuals differently – either preferentially or with adverse impact – because they have similar characteristics or because they are from specific groups, unless differential treatment is reasonable, essential, and directly related to conducting TSM business or when serving as an official representative of the TSM.

Election of Officers

President Early announced that the Executive Committee had nominated Ray Willis (Midwestern State University) for the office of President-elect. The floor was opened for additional nominations. No additional nominations were put forward so Ray was elected by acclamation.

New Business

It was moved and seconded to hold the 2022 TSM meeting at the TTU Center at Junction. Motion passed. The 2022 meeting will be held February 18-20. Several members requested a hybrid or digital option for the meeting. The officers agreed to look into hybrid options for next year.

Phil Sudman mentioned the passing of Dr. Frank Judd as a stimulus for including an *In Memoriam* section in the newsletter. Phil then read a resolution that Robert Martin had proposed to recognize the passing of Frank Judd (see below). Phil then moved to approve the resolution. Motion passed.

RESOLUTION Texas Society of Mammalogists February 13, 2021

WHEREAS, Dr. Frank Wayne Judd, as a Charter Member of the Texas Society of Mammalogists, was a key member of the four-person committee that drafted the initial Constitution of the society in 1981, and

WHEREAS, he was a master's student of Dr. Robert W. Packard, who first envisioned the need for an organization in Texas for people interested in the study of mammals, and

WHEREAS, Dr. Judd published many early papers on Texas mammals and had a distinguished career as a professor at the University of Texas in Edinburg, and

WHEREAS, he had 140 research publications, including three books, and received many honors from professional societies for his eclectic research interests, and

WHEREAS, Frank was intensely devoted to his wife Jane, their two daughters and four grandchildren, and to his many friends and colleagues who delighted in receiving one of his personal letters filled with sardonic wit that could leave one laughing out loud,

THEREFORE BE IT RESOLVED, that members of the Texas Society of Mammalogists extend our profound condolences to Jane, and their children and grandchildren, at its 39th Annual Meeting (Virtual).

President Early opened the floor for other new business. Art Cleveland thanked everyone for their work in hosting this remote meeting. Art also reminded everyone about the virtual 100th meeting of the American Society of Mammalogists. Robert Martin also expressed his appreciation for the way the virtual meeting was managed, especially for hearing impaired members. Robert Dowler expressed appreciation for the moderators and how they handled the new virtual format.

President Cathy Early thanked John Hanson for his work helping her create captions for each of the presentations. She also shared some of the more humorous mistranscriptions by the software they were using to generate captions. President Early thanked everyone for the opportunity to serve the society and expressed hope that she would be the only pandemic president for the society. Cathy reminded the members to stick around for the awards ceremony and the Guest Speaker address to follow.

The Members' Business Meeting was recessed at 3:39 pm.

The Members' Business Meeting was reconvened at 3:40 pm.

Dana Lee, Chair of the Student Honoraria Committee, announced the winners of the presentation awards. Each winner received a cash award (\$500 for the Packard Award and \$400 for all others). Since this was a remote meeting and the award winners would not be able to hear the applause when their names are announced, Dana encouraged everyone to use the reaction buttons included with Zoom to show appreciation for each award winner. Certificates and checks will be mailed to the winners after the meeting. Dana thanked all the presenters for bearing with the technology and presenting in this new format.

Oral presentation award winners were:

1. Robert L. Packard Award — Kamren Jefferson, Angelo State University
2. TSM Award — Emily Wright, Texas Tech University
3. William B. Davis Award — Alexandra Avrin, University of Illinois
4. Bobby Baker Award — Zoey Stormes, Angelo State University
5. Rollin H. Baker Award — Brianna Hurst, Texas A&M University-Corpus Christi

Poster presentation award winners were:

1. Clyde Jones Award (graduate) — Joanna Bateman, Texas Tech University
2. Vernon Bailey Award (graduate) — Kenneth Shimer, University of Central Oklahoma
3. Clyde Jones Award (undergraduate) — Rhea Rajani, University of Michigan
4. Vernon Bailey Award (undergraduate) — Jonathan Jasper, Abilene Christian University

The Members' Business Meeting was adjourned at 3:50 pm.

Respectfully submitted,
Joel G. Brant
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 (D)
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
Class of 2018
Lisa Bradley
Robert Bradley
Class of 2019
Loren Ammerman
Phil Sudman
Class of 2020
Thomas E. Lee
Marcia Revelez

Patron Members

Jo Actkinson
Loren K. Ammerman
Amy Baird
Robert Baker (D)
Rollin Baker (D)
John Bickham
Lisa Bradley
Robert Bradley
Joel G. Brant
Dan Brooks
Guy Cameron
Darin Carroll
Brian Chapman (D)
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 (D)

Stephen Kasper
Thomas E. Lee
Jessica Light
Robert E. Martin
Ann Maxwell
Terry Maxwell (D)
Kevin McKinney
Steve McReynolds
Anne Merchant
Chris Montag
Jim Patton
Clint Perkins
Russell Pfau
Caleb Phillips
Carl Phillips

Brenda Rodgers (D)
Duke Rogers
Kent Rylander
David J. Schmidly
Stephanie Shelton
Steve Smith
Phil Sudman
Michael Tewes
Ron Van Den Bussche
Christopher Walker
Kenneth T. Wilkins
Don Wilson
Ray Willis
Bernd Wursig
Earl Zimmerman