Friday and Saturday
November 18-19
Julius Glickman Conference Center
University of Texas at Austin

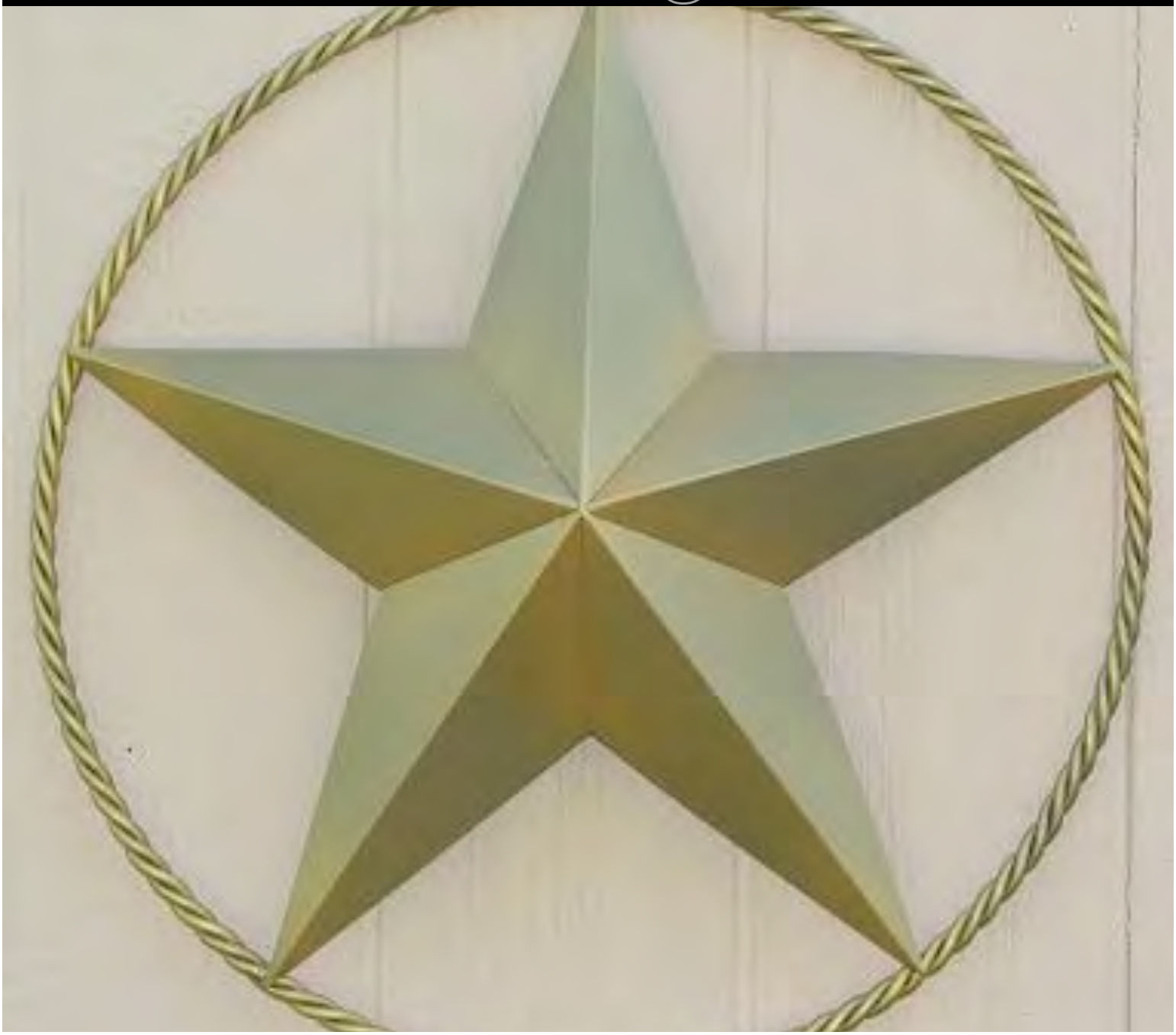
Primate Behavior
Socioecology

Forensics
Human Variation

Paleoanthropology
Paleoprimatology

TABA Texas Association of Biological Anthropologists

Annual Meeting 2016



SCHEDULE OF EVENTS

Friday, November 18, 2016

5:00-6:00 Registration (Glickman Conference Center, First Floor of the CLA)

6:00-7:00 Keynote Address: John Kappelman, Department of Anthropology, University of Texas at Austin, *When Lucy came down from the trees.*

7:00-8:00 Opening Reception

Saturday, November 19, 2016

8:45 - 9:15 Registration (Glickman Conference Center, First Floor of the CLA)

9:15-10:15 Podium Presentations (Session I)

10:15-10:30 Coffee Break

10:30-11:30 Podium Presentations (Session II)

11:30-1:30 Lunch Break

1:30-2:30 Business Meeting and Election of Officers

2:30-3:30 Podium Presentations (Session III)

3:30-3:45 Coffee Break

3:45-4:45 Podium Presentations (Session IV)

4:45-5:00 Coffee Break

5:00-6:00 Poster Presentations

6:00 Social Gathering (Sholz Garten, 1607 San Jacinto Blvd)

KEYNOTE ADDRESS

Friday, November 18, 2016
6:00 PM

WHEN LUCY CAME DOWN FROM THE TREES

JOHN KAPPELMAN, Department of Anthropology, University of Texas at Austin

The Pliocene fossil "Lucy" was discovered in the Afar region of Ethiopia in 1974 and is among the oldest and most complete fossil hominin skeletons. Although her skeleton is marked by typical postmortem damage, there is a subset of perimortem breaks that appear to document high-energy bone-to-bone compressive fractures at several of the major joints. We propose that the most likely cause of these fractures, and of her death, was a "vertical deceleration event," or impact following a fall from considerable height. Lucy has been at the center of a vigorous debate about the role, if any, that arboreal locomotion played in early human evolution. It is therefore ironic that her death can likely be attributed to injuries resulting from a fall, probably out of a tall tree, thus offering unusual evidence for the presence of arborealism in this species.

John Kappelman is a Professor in the Departments of Anthropology and Geological Sciences at University of Texas at Austin. His interests include the evolutionary history of primates and especially hominoid and hominin origins and evolution, with a research focus in paleoecology, functional morphology, sedimentology and stratigraphy, paleomagnetism, and computer imaging. He has conducted fieldwork across Africa and Asia, with current projects on the Middle Stone Age of northwestern Ethiopia, Oligo-Miocene monkeys and hominoids of West Turkana, Kenya, and the geological history of the Ethiopian Plateau. Kappelman and his team have developed several websites including *eSkeletons.org*, *eFossils.org*, *eAnthro.org*, and *eLucy.org*, and will launch a human osteology and forensics online course, *eForensics.info*, in 2017. He directs the team studying the hires CT scans of the 3.2 million year old fossil "Lucy." Kappelman's degrees include a B.S. in Geology and Geophysics from Yale University, and an A.M. in Anthropology and a Ph.D. in Anthropology and Earth and Planetary Sciences, both from Harvard University. Kappelman is an avid bowhunter, and he (mostly) enjoys rebuilding old Land-Rovers.

More information on Dr. John Kappelman's work, including the full text from which this excerpt was taken, can be found at: https://liberalarts.utexas.edu/anthropology/faculty/jwk5664.

PODIUM TALKS
Saturday, November 19, 2016

SESSION I

9:15 **Developmental and biomechanical perspectives on vertebral intraspecific variation in hominoids.** LIZA SHAPIRO, ADDISON KEMP.

9:30 **Climate and the modern human nose: Reassessing the adaptive role of nasal projection.** SCOTT MADDUX, LAUREN BUTARIC, ROBERT FRANCISCUS.

9:45 **Healed Rib Fractures: A Micro-anatomical Assessment.** KATE HALL.

10:00 **A comparison of measurements in analog and digital dissection.** JUSTIN LEVI, PATRICK LEWIS, ADAM HARTSTONE-ROSE.

SESSION II

10:30 **Microbiome Succession within Bone Marrow during Human Decomposition.** NICHOLE RUBLE, PATRICK LEWIS, AARON LYNNE**.**

10:45 **After the Iceberg: How anthropology can improve interdisciplinary discourse on climate change and counter denialism.** PATRICK LEWIS, KEN HENDRICKSON.

11:00 **Analysis of skeletal part proportions of mammalian microvertebrates taken by barn owls (Tyto alba) in southern Africa.** TIMOTHY CAMPBELL, ZACHARY PIERCE, FRANK SENEGAS, PATRICK LEWIS.

11:15 **An Eocene Primate Frontal from the Devil's Graveyard Formation, Texas.** CHRIS KIRK, AMY ATWATER, CHRIS CAMPISANO, SEBASTIAN EGBERTS, INGRID LUNDEEN.

11:30 Lunch

2:30 Business Meeting

SESSION III

2:30 **Comparative Analysis of Male Reproductive Strategies in Genus Propithecus.** REBECCA J. LEWIS, MATTHEW BANKS, MITCHELL IRWIN, TONI LYN MORELLI, ERIK PATEL, JOSIA RAZAFINDRAMANANA, ANDREW ZAMORA, PATRICIA WRIGHT.

2:45 **The role of forest expansion and contraction in species diversification among galagos (Primates: Galagidae).** LUCA POZZI.

3:00 **A molecular assessment of variation in primate entomophagy among closely related omnivorous guenons (*Cercopithecus ascanius*, *C. mitis*) inhabiting Kibale National Park, Uganda.** MARTHA LYKE, ANTHONY DI FIORE, NOAH FIERER, ANNE MADDEN, JOANNA LAMBERT.

3:15 **Range expansion and observations of tool use by blond capuchins, *Sapajus flavius* (Schreber, 1774), in the Caatinga biome of Brazil.** AMELY MARTINS, MONICA VALENÇA-MONTENEGRO, MARCOS FIALHO, PLAUTINO LAROQUE, ANTHONY DI FIORE.

SESSION IV

3:45 **Mating, paternity, and reproductive skew in wild white-bellied spider monkeys (Ateles belzebuth).** ANTHONY DI FIORE, ANDRÉS LINK.

4:00 **Who forages where? Predictors of within-group spatial position in wild vervet monkeys.** MARYJKA BLASZCZYK, ANTHONY DI FIORE.

4:15 **Influences of sunrise and morning light on behavior of five sympatric New World primates (Alouatta, Ateles, Callicebus, Lagothrix, Pithecia).** MAX SNODDERLY, KELSEY ELLIS, ANDRÉS LINK, EDUARDO FERNANDEZ-DUQUE, SARA ALVAREZ, LAURA ABONDANO, ANTHONY DI FIORE.

POSTER PRESENTATIONS

1. Children's Health in Archaic Texas: A Paleopathological Analysis of Juvenile Remains. LAUREN GEORGIANA KOUTLIAS.

2. Madagascar's lemur endangerment crisis; vulnerability for seed-dispersal services and consequences for carbon storage. ANECIA GENTLES, ELLA MATSUDA, ONJA RAZAFINDRATSIMA, AMY DUNHAM.

3. The passive mate guarding hypothesis and monomorphism in mammals. RACHEL VOYT.

4. Where do primatologists work?: Understanding the scope of primate studies. ALLISON MCNAMARA, MICHELLE BEZANSON.

5. 3D Morphometrics of the cercopithecoid distal humerus: implications for the reconstruction of paleohabitats. EMMA KRISTINA CURTIS.

6. Meta-Analysis of Geometric Morphometrics in Anthropology. KERSTEN BERGSTROM, ROBERT Z. (ZAC) SELDEN JR.

7. Using Microfauna to Reconstruct a Pleistocene Cave Site in Botswana. ZACHARY W. PIERCE, TIMOTHY L. CAMPBELL, PATRICK J. LEWIS.

8. All About That Acid: The Effects of Soil pH on the Diagenesis of Non-Human Bone. ROBYN KRAMER

9. An Application of Geospatial Software to the Analysis of Commingled Human Remains. SAMANTHA MJ MITCHELL , KATE MW HALL , PATRICK J. LEWIS.

10. An application of structure from motion to document the decomposition of hacking wounds. CONNOR D. CARLTON, SAMANTHA MITCHELL, PATRICK J. LEWIS.

11. The Use of the Pelvic Microbiome for PMI Estimatio. LAUREN RUDIE, MEREDITH MANN.

12. Bacterial Succession in Bone Marrow as a Potential Tool for Estimating Postmortem Interval. CHRISTIANA TISARA FAKHRI, LAURA SPOONIRE, NICHOLE RUBLE.

13. Measuring bacterial communities in the humerus to estimate PMI. SARAH ELIZABETH BIVENS, ERIC DAVID, MARY NICHOLE RUBLE.

14. Using Bacterial Communities From Human Femora To Determine Post Mortem Interval. STEPHANIE ANNE BAKER, SARAI N. MESA, MARY N. RUBLE.

15. Operation Identification: An effort towards identiying migrant remains from South Texas. COURTNEY C. SIEGERT, TIMOTHY P GOCHA, KATE SPRADLEY, CHLOE P MCDANELD.

ABSTRACTS (In order of presentation)

Developmental and biomechanical perspectives on vertebral intraspecific variation in hominoids.

LIZA J SHAPIRO[1], ADDISON D KEMP[1]. [1]Anthropology, University of Texas at Austin.

Recent analyses of intraspecific variation in regional numbers of vertebrae in primates and other mammals have provided valuable insights on the evolution of the spine from developmental and adaptational perspectives. However, intraspecific variation in morphology across regions of the column has received little attention. Here we used a modified Levene's test and ANOVA to compare intraspecific variation in seven morphological features across lower thoracic, lumbar and proximal sacral vertebrae, in hominoids and *Chlorocebus aethiops* (n=228). We predicted that for any given species/morphological variable, 1) there will be greater intraspecific variation in homeotic transition areas than non-transitional areas, and 2) due to biomechanical constraints, the lumbosacral transition will exhibit less intraspecific variation than the thoracolumbar transition. We also predicted that at a given vertebral level, taxa characterized by agility, vertebral flexibility and/or biomechanically demanding locomotion (*Homo*, *Hylobates*, *Chlorocebus*) will exhibit reduced intraspecific variation compared to slower, less agile taxa with stiffer spines (*Pan*, *Gorilla*, *Pongo*). Contrary to predictions, we found few significant differences in intraspecific variation across regional levels. As predicted, for most measures, variability within Gorilla and Pongo significantly exceeded that of *Homo* and *Hylobates*. Contrary to predictions, Pan grouped with *Homo* and *Hylobates*, and *Chlorocebus* exhibited variation intermediate between *Homo*/*Hylobates*/*Pan* and *Pongo*/*Gorilla*. The distinction in variability between *Pan* and *Gorilla* contrasts with their similarity in vertebral formula variation, possibly reflecting an adaptational constraint related to Pan's more agile locomotion. Future research on an expanded phylogenetic sample holds promise for further understanding of the evolution of the primate spine.

Climate and the modern human nose: Reassessing the adaptive role of nasal projection.

SCOTT D. MADDUX[1], LAUREN N. BUTARIC[2], ROBERT G. FRANCISCUS[3]. [1]Center for Anatomical Sciences, University of North Texas Health Science Center; [2]Department of Anatomy, Des Moines University; [3]Department of Anthropology, University of Iowa.

Geographically-patterned variation in external nasal projection is commonly cited as evidence for climatic adaption in modern humans. Specifically, humans living in colder and/or drier environments are generally argued to exhibit nasal bones characterized by both greater anterior protrusion and nasal bridge elevation. However, the majority of studies investigating nasal projection have employed European samples as primary representatives of "cold-dry" environments—despite the existence of populations inhabiting even colder/drier environments in Asia and the New World. Here, we reassess nasal projection within climatic contexts employing a geographically broad sample of modern human crania (n = 837), including sub-samples of Asian and New World populations from mid-to-high northern latitudes. Using six standard measures of nasal bone protrusion and elevation in conjunction with climatic variables (temperature, absolute humidity, relative humidity, precipitation) from the CRU-TS3 database, we demonstrate that

measures of nasal bone protrusion and bridge elevation are actually poorly correlated with climate across modern humans. Instead, exceedingly projecting external noses appear primarily restricted to populations from Europe, North Africa, and Western Asia. Indeed, randomization tests (10,000 permutations) reveal that these geographically adjacent populations exhibit significantly more projecting noses than those from northern Asia (all p-values < 0.003) or the Arctic Circle (all p-values < 0.004). Further, contrary to previous predicative models, these Asian and New World populations from cold-dry environments generally exhibit levels of nasal projection similar to populations from tropical areas. These results clearly suggest that external nasal projection is not a universal adaption to cold and/or dry climates among modern humans. Still, such a finding does not necessarily eliminate a potential climate-mediated adaptive function for nasal projection. Rather, an exceedingly projecting nose may represent a specific adaptive approach that evolved in some, but not all, human populations inhabiting cold and/or dry climates.

Healed Rib Fractures: A Micro-anatomical Assessment.

KATE MW HALL[1].[1]Sociology Anthropology and Social Work, Texas Tech University

This study presents an assessment of micro-anatomical features specific to healed rib fractures. Twenty-nine fractured and healed ribs from 17 individuals with known demographics and medical histories are examined. Rib fractures are placed into three categories based on the size of the callus relative to normal rib circumference. Large fractures are defined by a ratio of 1.47-1.24, medium fractures by 1.22-1.16, and small fractures by 1.15-1.02. Three thin sections are prepared for each rib according to standard histological procedures. These sections are obtained from the unfractured bone 5cm from the callus, the edge of the callus, and the midpoint of the callus. Histological variables include: cortical area, cortical thickness, woven area, primary area, and secondary area. A standard light microscope and Pax-it! Image system are employed to assess the variables. Ratios of primary and woven bone to secondary bone are created to assess the degree of remodeling in each thin sections. Data are compared across thin sections in the same rib and across the three categories of fractures. Results indicate that fractures have a greater ratio of newly formed woven bone to secondary bone. However, fractures do not necessarily have greater cortical thickness than normal bone. Fractures tend to be highly trabecularized and sections of the original cortical bone may be located amid woven or trabecular bone. Importantly, there is no consistent pattern of micro-anatomical features across the three fracture groups. Fractures are re-organized based on microanatomical features to examine the relationship between fracture microanatomy, gross anatomy, and demographic information. Findings suggest that an assessment of healed fractures requires an understanding of the time between the injury and the death of the individuals. Gross morphology alone is not an adequate means for classifying post-traumatic interval.

A comparison of measurements in analog and digital dissection.

JUSTIN LEVY[1], PATRICK J. LEWIS[1], ADAM HARTSTONE-ROSE[2] .[1]Department of Biological Sciences, Sam Houston State University; [2]Department of Cell Biology and Anatomy, University of South Carolina School of Medicine

The use of iodine staining in computed tomography (CT) has increased greatly in recent years, revolutionizing the study of in situ soft tissues in three dimensions. The advent of this approach requires more research to compare measurements from CT and traditional dissection methods. To this end, the

head of a common marmoset, Callithrix jacchus, was stained in 2.5% Lugol's solution for 37 days, with fresh solution supplied after 20 days, and studied digitally. Prior to and following staining, the head was CT scanned, then physically dissected. Amira was used to digitally segment and isolate a variety of soft tissue structures, comprising all four major tissue types: connective, epithelial, muscle, and nervous. Over 50 measurements were recorded to evaluate the difference between the digital and traditional dissections using percent error and regression. We found that this technique is generally reliable and an improvement for exceedingly small tissues that are difficult to measure traditionally. One important observation is that staining regimes vary depending on the tissues targeted for optimal evaluation. Thus, while our specimen was optimized for myology, the glands were not stained as clearly and staining the deepest parts of the brain requires an amount of iodine that oversaturates muscle visibility. This process could be widely beneficial when traditional destructive dissection is not possible. It allows for three dimensional views of structures that are not otherwise visible due to size and/or morphology, however, study of multiple types of tissues requires serial scanning after variable staining regimes.

Microbiome Succession within Bone Marrow during Human Decomposition.

NICHOLE RUBLE[1], PATRICK LEWIS[1], AARON LYNNE[1]. [1]Department of Biological Sciences, Sam Houston State University.

Decomposition is a dynamic process driven by biotic and abiotic factors. Scavenging, weather, and climate, for example, can all impact decomposition rates. Recent studies utilize metagenomics, particularly the succession of bacterial communities, to estimate postmortem interval (PMI), but these methods too are subject to difficult to control variables. The interior of marrow-containing bones, however, is relatively protected from many of these variables, and while soft tissues may last for only weeks or days, many bones persist for months or years. Here we outline a novel methodology for sampling the microbiome of decomposing cadavers and summarize our preliminary results. We placed bodies at the Southeast Texas Applied Forensic Science (STAFS) facility at Sam Houston State and sampled them for 4 months. We sampled the femur, humerus, and ilium of three human cadavers (2 male and 1 female) using bone marrow biopsy needles. Left bones were sampled every 2 days and right ones every 10, as a control for contamination. We submitted all these samples for sequencing of the 16S rRNA gene to identify bacterial communities. Several challenges were encountered, such as difficulty sealing sampled bones, preventing insect contamination of the marrow cavities, and scavenger activity. Preliminary results, however, suggest that this method may be useful in estimating PMI with fewer external variables and for longer periods. As we take the data from 2016 and refine our methodology, we anticipate that information from marrow-containing bones can be used to better estimate the postmortem interval PMI and provide a useful tool for forensic investigators.

After the Iceberg: How anthropology can improve interdisciplinary discourse on climate change and counter denialism.

PATRICK LEWIS[1], KEN HENDRICKSON[2]. [1]Department of Biological Sciences, Sam Houston State University; [2]Department of History, Sam Houston State University.

Decomposition is a dynamic process driven by biotic and abiotic factors. Scavenging, weather, and climate, for example, can all impact decomposition rates. Recent studies utilize metagenomics, particularly the succession of bacterial communities, to estimate postmortem interval (PMI), but these methods too are subject to difficult to control variables. The interior of marrow-containing bones, however, is relatively protected from many of these variables, and while soft tissues may last for only weeks or days, many bones persist for months or years. Here we outline a novel methodology for sampling the microbiome of decomposing cadavers and summarize our preliminary results. We placed bodies at the Southeast Texas Applied Forensic Science (STAFS) facility at Sam Houston State and sampled them for 4 months. We sampled the femur, humerus, and ilium of three human cadavers (2 male and 1 female) using bone marrow biopsy needles. Left bones were sampled every 2 days and right ones every 10, as a control for contamination. We submitted all these samples for sequencing of the 16S rRNA gene to identify bacterial communities. Several challenges were encountered, such as difficulty sealing sampled bones, preventing insect contamination of the marrow cavities, and scavenger activity. Preliminary results, however, suggest that this method may be useful in estimating PMI with fewer external variables and for longer periods. As we take the data from 2016 and refine our methodology, we anticipate that information from marrow-containing bones can be used to better estimate the postmortem interval PMI and provide a useful tool for forensic investigators.

Analysis of skeletal part proportions of mammalian microvertebrates taken by barn owls (*Tyto alba*) in southern Africa.

TIMOTHY L. CAMPBELL[1], ZACHARY W. PIERCE[2], FRANK SENEGAS[3], PATRICK J. LEWIS[2] . [1]Anthropology, Texas A&M University; [2]Biological Sciences, Sam Houston State University;[3]Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements, Université Pierre et Marie Curie.

Owls are predators of small animal communities and are useful in studying them as they preserve parts of prey consumed in the form of regurgitated pellets. Analyses of pellet contents have long contributed valuable information on modern microfaunal community composition. Additionally, the contribution of owls to the fossil record is also well documented with the fossilized remains of prey commonly used to reconstruct paleoenvironments. In many studies prey craniodental remains feature prominently in analyses, while postcrania are generally not considered. As studies have noted inter and intraspecific variation among owls in prey skeletal part proportions recovered, sole reliance on craniodental remains may underestimate the true number of prey taken, thus influencing analyses relying on count data. Here we present results on the skeletal part proportions of mammalian microvertebrates recovered from six barn owl roosts: three from Namibia, two from South Africa, and one from Botswana. Individual skull (mandibles and maxillae), appendicular long bone (femora, tibiofibulae, humeri and radii), and girdle elements (scapulae and os coxae) were sided, identified to order, and used to calculate minimum number of individuals (MNIs) per skeletal region. Results show that for most roosts, MNIs calculated using the appendicular elements are higher than those calculated using skull elements, with the tibiofibula being the most common postcranial element found. Counts of girdle elements produced the lowest MNIs, while the highest were calculated using all elements combined. Supporting previous studies, these results further highlight the need for including postcrania in any analyses dependent on accurate prey count data.

An Eocene Primate Frontal from the Devil's Graveyard Formation, Texas.

CHRIS KIRK[1], AMY ATWATER[1], CHRIS CAMPISANO[2], SEBASTIAN EGBERTS[3], INGRID LUNDEEN[1]. [1]Anthropology, University of Texas at Austin; [2]School of Human Evolution and Social Change, Arizona State University; [3]Bio-Medical Sciences, Philadelphia College of Osteopathic Medicine.

Paleontological research in the Tornillo Basin of Texas since 2005 has yielded a large sample of Middle Eocene vertebrate fossils, including dento-gnathic material of at least 5 primate genera. Here we describe a new primate partial cranial specimen from the middle member of the Devil's Graveyard Formation (Uintan). The new primate specimen consists of undistorted left and right frontal bones. Lack of an associated dentition precludes attribution of the specimen to a known genus. Nevertheless, the new specimen shares a suite of derived characteristics with the holotype of *Rooneyia viejaensis* – a Duchesnean species known only from the Sierra Vieja, Texas. Probable synapomorphies of the two Texas specimens include partial fusion of the metopic suture, orbital fossae that are deeply recessed under the anterior cranial fossa, a small postorbital flange on the lateral process of the frontal, and a large foramen on the posterosuperior aspect of the postorbital flange. This combination of features is unique to the two Texas specimens among North American Eocene primates that are known from cranial material. Despite these similarities, the new Devil's Graveyard frontal differs from *Rooneyia* in exhibiting rounded and everted orbital margins, pronounced temporal lines, a larger olfactory bulb endocast, and a frontal lobe endocast that is less dorsally expanded. The new Devil's Graveyard frontal is therefore probably not *Rooneyia*, but may represent a closely related taxon. Furthermore, neither *Rooneyia* nor the new Devil's Graveyard frontal has contact between the alisphenoid and the postorbital flange. In this respect the two Texas specimens differ from tarsiers and anthropoids, which exhibit more extensive postorbital septae comprised of flanges from the frontal, zygomatic, and alisphenoid. This lack of alisphenoid expansion, combined with the persistently primitive morphology of the middle ear and nasal cavity in *Rooneyia*, suggests that neither Texas specimen belongs to the haplorhine crown group.

Comparative Analysis of Male Reproductive Strategies in Genus *Propithecus*.

REBECCA J. LEWIS[1], MATTHEW BANKS[2], MITCHELL IRWIN[3], TONI LYN MORELLI[4], ERIK PATEL[5], JOSIA RAZAFINDRAMANANA[6], ANDREW ZAMORA[7], PATRICIA WRIGHT[7]. [1]Anthropology, UT-Austin; [2]Department of Biology, Temple University ; [3]Department of Anthropology, Northern Illinois University; [4]DOI Northeast Climate Science Center, USGS; [5]Lemur Conservation Foundation; [6]Ecole Normale Supérieure , Université d'Antananarivo ;[7]Department of Anthropology, Stony Brook University ;

Propithecus is a species-rich genus that has been extensively studied. Nevertheless, small group sizes and slow life histories have resulted in small sample sizes limiting statistical power. By pooling demographic, ecological, morphological, and behavioral data and utilizing variation within the genus, we examined male reproductive strategies across nine *Propithecus* species. All *Propithecus* live in small cohesive groups (2-14 individuals) with 1-3 adults of each sex in variable sex ratios. Species vary in the presence/prevalence of multimale groups, but this variability is unrelated to population density. Males in multimale groups generally sleep huddled together rather than with females but their relationships range from tolerance to multi-year alliances. Males disperse singly or in parallel, sometimes forming temporary all-male bands. Male dispersal events can be associated with infanticide. Intrasexual hierarchies, intense

aggression, and competition for breeding position suggest males contest for mates. Agility, scent-marking, and alternative reproductive tactics also play key roles in mate competition, though the importance of male chest staining varies. Because testes size, paternity data, and mating observations indicate females occasionally mate polyandrously, some sperm competition may also occur. Notably, "female dominance" is ubiquitous and constrains male abilities to coerce females. In sum, male-male competition takes several forms, and male strategies in *Propithecus* are strongly influenced by small group size, home range size, and female power because these factors affect mate availability and monopolizability.

The role of forest expansion and contraction in species diversification among galagos (Primates: Galagidae).

LUCA POZZI[1] . [1]Anthropology, UT San Antonio.

The repeated cycles of forest contraction and expansion have been suggested as a major driver of vertebrate diversification in sub-Saharan Africa. Members of the family Galagidae are relatively small nocturnal primates inhabiting various environments across most sub-Saharan Africa, from rainforests to dry savannas. Their widespread distribution and relatively old origins make them a good model to study the impact of forest transgression-regression on primate diversification. The aim of this study is to reconstruct the biogeographical history of the Galagidae in the context of major climatic and geological events in sub-Saharan Africa. I assembled a supermatrix including 53 nuclear loci and three mitochondrial markers for 94% of the galagid species currently recognized. Bayesian and maximum likelihood methods were used to infer phylogenetic relationships and times of divergence within the family. Ancestral ranges were estimated using several methods, including BioGeoBEARS and RASP. Biogeographical analyses strongly indicated central African origins just after the Eocene-Oligocene boundary (~33 Ma) and subsequent expansion to the east in the Early-Mid Miocene. Galagid evolution and diversification was affected by three major series of events: (1) the global cooling and forest contraction in the Early Oligocene, (2) the forest expansion and the uplift of the African rifts in the Miocene, and (3) the aridification and extension of open woodlands and savanna in the Late Miocene and Plio-Pleistocene. Ancestral galagids were probably forest-adapted primates; adaptations to arid environments are of recent origin, as a consequence of the expansion of open woodlands and savannas that took place in the Plio-Pleistocene. These results further indicate the critical role of climatic changes as drivers of mammal diversity in sub-Saharan Africa during the Cenozoic.

A molecular assessment of variation in primate entomophagy among closely related omnivorous guenons (*Cercopithecus ascanius, C. mitis*) inhabiting Kibale National Park, Uganda.

MARTHA M LYKE[1], ANTHONY DI FIORE[2], NOAH FIERER[3], ANNE A MADDEN[4], JOANNA E LAMBERT[5]. [1]Anthropology, University of Texas at San Antonio; [2]Anthropology, University of Texas at Austin; [3]Ecology and Evolutionary Biology, University of Colorado Boulder; [4]Applied Ecology, North Carolina State University; [5]Anthropology, University of Colorado Boulder.

Entomophagy, or insectivory, is a significant though largely unexplored component of human and nonhuman primate diets. While few primate species are obligate insectivores, many are omnivores that

habitually consume insects. Here, we use next-generation sequencing to identify insects from fecal DNA to assess variation in insectivory by sympatric guenons inhabiting Kibale National Park. We test the hypothesis that variation in entomophagy facilitates niche differentiation and coexistence among closely related species with high dietary overlap. We collected 233 fecal samples (July – December, 2015) from redtail (*Cercopithecus ascanius*; n=118) and blue monkeys (*C. mitis*; n=115) and used high-throughput sequencing with tagged markers to identify arthropod taxa. Of 233 samples, arthropod DNA was detected in 223 (redtails n=117, 99%; blues n=106, 92%). A total of 68 arthropod families (15 orders) were identified. Redtails consumed insects from 54 families in 11 orders, of which 12 families (21.8%) were absent from blue monkey samples. Blue monkeys consumed insects from 56 families in 11 orders, of which 14 families (24.6%) were absent from redtail samples. For both species, >97% of taxa consumed comprised four orders (Araneae, Diptera, Hymenoptera, Lepidoptera). However, the relative abundances of these four orders present in the samples were significantly different between the two primate groups ($p<0.05$). Additionally, blue monkeys consumed a greater diversity of arthropod taxa than redtail monkeys ($p<0.05$). These results indicate that while overlap exists in the insect portion of their diets, 20-25% of taxa consumed are unique to each group and there is variation in the relative proportions of overlapping taxa consumed. Our findings suggest that variation in entomophagy can be an important mechanism in decreasing niche overlap and facilitating coexistence among closely related species that occupy the same feeding guild.

Range expansion and observations of tool use by blond capuchins, *Sapajus flavius* (Schreber, 1774), in the Caatinga biome of Brazil.

AMELY B. MARTINS[1], MÔNICA M. VALENÇA-MONTENEGRO[2], MARCOS DE S. FIALHO[2], PLAUTINO DE O. LAROQUE[2], ANTHONY DI FIORE[1]. [1]Anthropology, University of Texas at Austin; [2]ICMBio.

Sapajus flavius, the blond capuchin, is an endangered primate endemic to Brazil. Early studies indicated that its range was restricted to the coastal Atlantic Forest, extending from Rio Grande do Norte to the left bank of the São Francisco River in Alagoas, and with the western extent of the species' range coinciding with the current limits of the Atlantic Forest. Only one report existed of *S. flavius* perhaps being found outside of this range. Between December 2012 and November 2013, we conducted four survey expeditions to look for *Sapajus* in the Caatinga biome. We observed wild *Sapajus* at five different localities, and at three of these we captured 4 individuals and collected morphometric data. In three sites, we also observed evidence of tool use. The morphological traits of the individuals captured and the phenotypes of animals observed in the field strongly indicates broad presence of blond capuchins in the dry Caatinga. The significant expansion of *S. flavius*' range into Caatinga at both its northern and southern limits supports the reassessment of the species as "Endangered" rather than "Critically Endangered". Given that the Caatinga biome is also home to a different species of capuchin, S. libidinosus, our results raise questions about potential hybridization between these two primates in the regions where they occur in sympatry and highlight the need for genetic studies of their phylogenetic relationships.

Mating, paternity, and reproductive skew in wild white-bellied spider monkeys (*Ateles belzebuth*). ANTHONY DI FIORE[1], ANDRÉS LINK[2]. [1]Department of Anthropology, University of Texas at Austin; [2]2Laboratory of Ecology of Tropical Forests and Primatology (LEBTYP), Universidad de Los Andes.

Spider monkeys live in large social groups containing multiple adult males and females. During a 10-year study of one group of wild white-bellied spider monkeys (*Ateles belzebuth*) in Amazonian Ecuador, we collected data on sexual behavior from 12 adult males and 16 adult females who were present in the group for at least part of the study. We also used fecal DNA to genotype group members at a panel of 12 microsatellite marker loci and evaluated parentage for 10 immatures present at the start of the study and for another 20 offspring born subsequently. While direct observations of mating were rare, all individuals who were seen to mate more than once did so with more multiple partners. Offspring were sired by a total of 7 different males. With one exception, no two offspring shared the same dam and sire, and in every year when multiple offspring were born, at least two males sired offspring. The two most successful males, both present since the onset of the study, each sired ~25% of the total offspring, one over a 10-year period, the other over a 4-year period. Given the lack of clear dominance relationships among male spider monkeys, female choice likely plays an important role in influencing male reproductive success.

Who forages where? Predictors of within-group spatial position in wild vervet monkeys. MARYJKA BLASZCZYK[1], ANTHONY DI FIORE[1]. [1]Anthropology, University of Texas at Austin

The within-group spatial position of a foraging individual is associated with trade-offs in terms of locating food resources versus minimizing predation risk. Central spatial positions in a group are theoretically associated with a lower predation risk, while peripheral positions – as well as positions towards the front of a group in moving groups – are associated with an increased risk of predation. Central positions are also associated with higher levels of food competition. We used generalized linear mixed effects models to assess the degree to which individual variation in boldness, reactivity, sociability, and dominance rank, as well as sex and age class, predicted whether individuals foraged in peripheral vs. central positions and at the front of groups in vervet monkeys, *Chlorocebus pygerythrus*, at Soetdoring Nature Reserve, South Africa. Dominant individuals were more likely to forage at the front of a group and in central positions, and boldness predicted foraging on the periphery among adults. Furthermore, in mixed models individual identity explained a significant proportion of the variance in spatial behavior, showing that individuals are relatively consistent in their choice of within-group position. This last finding suggests that within-group position during social foraging may be considered a type of "social niche" in vervet groups.

Influences of sunrise and morning light on behavior of five sympatric New World primates (*Alouatta, Ateles*, *Callicebus*, *Lagothrix*, *Pithecia*). MAX SNODDERLY[1], KELSEY ELLIS[2], ANDRÉS LINK[3], EDUARDO FERNANDEZ-DUQUE[4], SARA ALVAREZ[5], LAURA ABONDANO[2], ANTHONY DI FIORE[2] . [1]Neuroscience, University of Texas at Austin; [2]Anthopology, University of Texas at Austin; [3]Departamento de Ciencias Biológicas y Administración, Universidad de Los Andes; [4]Anthropology, Yale University; [5]Wildlife, Universidad Regional Amazónica IKIAM

Among New World primates, the diversity of visual phenotypes raises questions about the ecological adaptations that coexist in a given habitat. Little is known about temporal differences among sympatric species in foraging and activity patterns. Using light spectra measured during the transition from darkness to daylight, and behavioral data collected during ongoing studies, we analyzed the timing of first vocalizations, first movement from the sleeping tree, and first foraging in relation to ambient light for five sympatric primates at the Tiputini Biodiversity Station in Amazonian Ecuador. Across taxa, we found little activity occurring before the onset of nautical twilight (~48 min before sunrise). Observers on the ground frequently thought that monkeys began their morning activity in darkness, but separate measures of the quantum flux between 400 and 700 nm (the visible spectrum) showed that only 1-2% of the light at canopy level reaches the ground; thus the light available to the animals is orders of magnitude higher. Day-to-day variation in cloud cover had large effects on available light, producing a 1.6 log unit range in quantum flux at sunrise. First vocalizations of *Alouatta* and *Callicebus* often occurred before sunrise, while those of *Ateles* and *Lagothrix* were usually later. Nevertheless, first feeding bouts of *Callicebus* were well after sunrise (median 1.5 hours) and significantly later than those of either *Ateles* or *Lagothrix* ($p<.02$). Differences such as these could expose the different taxa to different light conditions that might favor different visual phenotypes. We are genotyping animals from these sympatric species to determine how the visual genotypes are related to these behavioral patterns and the ecology of the monkeys.

Children's Health in Archaic Texas: A Paleopathological Analysis of Juvenile Remains. LAUREN GEORGIANA KOUTLIAS[1]. [1]Department of Anthropology, University of Texas at Austin.

While many dissertations, theses, and publications have repeatedly mentioned the relatively low number of juvenile burials at Texas mortuary sites, this thesis serves to reconsider the importance of juveniles in the archaeological record. The Archaic Period mortuary sites of Ernest Witte and Morhiss on the Western Gulf Coastal Plains of Texas provide an adequate number of juvenile skeletons on which to conduct osteological analyses. By studying the remains of these children from a paleopathological perspective, a connection can be made to diet overall community health (Hard and Katzenburg et al 2011). Results indicate that the higher rate of pathologies at Morhiss compared to Ernest Witte may be attributed to the earlier adoption of plants in the diet of the Morhiss population and later by the Ernest Witte population. Other results indicate that many children struggled during the weaning period. This study stresses that a consideration of juvenile presence and health in past societies is important to reconstructing and understanding the past.

Hard, Robert J., and M. Anne Katzenberg. 2011 Stable Isotope Study of Hunter-Gatherer-Fisher Diet, Mobility, And Intensification on the Texas Gulf Coastal Plain. *American Antiquity* **76**.4: 709–751.

Madagascar's lemur endangerment crisis; vulnerability for seed-dispersal services and consequences for carbon storage.

ANECIA GENTLES[1], ELLA MATSUDA[1], ONJA RAZAFINDRATSIMA[2], AMY DUNHAM[1]. [1]Department of BioSciences, Rice University; [2]Organismal and Evolutionary Biology, Harvard University.

Lemur-mediated seed dispersal is an essential part of Malagasy forest ecosystems, but the primates are becoming increasingly threatened by habitat loss, hunting, and a variety of other anthropogenic factors. Few studies have examined the impacts of primate biodiversity on forest biomass loss and the vulnerability of seed dispersal services. It is predicted that seed disperser decline may have a negative impact on carbon storage or tree biomass in the forest system. In this study, we examined the relationship of aboveground biomass with seed, fruit, and tree size, and dispersal mode within Ranomafana National Park, Madagascar. We also studied the species richness and the threat levels of seed dispersers across Madagascar. We found that lemur-dispersed tree species tend to have a greater biomass. However, seed-dispersing lemur populations are unevenly distributed across the island and are highly threatened. These results highlight the importance of primate conservation to protect the biodiversity of all species within forest communities and the potential consequences for the carbon capture ability of the forests as a whole.

The passive mate guarding hypothesis and monomorphism in mammals.

RACHEL VOYT[1]. [1]Anthropology, University of Texas at Austin

Most mammals exhibit some degree of male-biased size dimorphism, where males are at least 10% larger than females in 45% of species. This bias is generally assumed to result from mating strategies involving intense male contest competition for mates, which results in selection for increased male body size. Contest competition may occur via active mate guarding, where post-copulatory males actively defend their mating partners against other males. However, males can also mate guard passively through the use of copulatory plugs, where semen solidifies and molds to the female vaginal canal after ejaculation. Selection for passive mate guarding strategies thus alleviates selection for increased male body size, and has been proposed as a possible explanation for sexual monomorphism in mammals ("the passive mate guarding hypothesis"). Passive mate guarding is expected when females have short sexual receptivity lengths (e.g. less than 4 days) and when females mate with multiple males. Additionally, species with dispersed social systems may also be expected to exhibit passive mate guarding, given that males may not be present to defend mating partners. These combined factors may thus provide a basis for monomorphism, but so far their relationship has only been investigated in primates. The aim of this review is to investigate the potential application of the passive mate guarding hypothesis in additional mammalian taxa and provide a synthesized hypothesis and predictions for monomorphism in all mammals.

Where do primatologists work?: Understanding the scope of primate studies.

ALLISON MCNAMARA[1], MICHELLE BEZANSON[2]. [1]Anthropology, University of Texas at Austin; [2]Anthropology, Santa Clara University.

In this poster, we review the kind of work primatologists are doing and where this work is being conducted. The purpose of this research is to understand the scope of primatological research. Are anthropologists studying a variety of species in a variety of anthromes (Ellis and Ramankutty, 2008), or is research biased based on study type, location, and species? We searched each issue of American Journal of Primatology, International Journal of Primatology, and Primates from 2011-2015 for a total of 1,273 articles, and recorded the type of research conducted (field, captive, review, museum, database). We found that 761 publications consisted of field work and 343 were lab/captive studies. We made maps using ArcGIS to show the concentration of research at particular sites and to identify anthromes. Results show that field researchers are heavily concentrated at a handful of sites, all of which are national parks, indicating that studies are being focused on protected anthromes, rather than urban, rural, or fragmented forests. Captive studies are heavily focused in the United States, a few sites in Europe, and one lab in Kyoto. This is not to say that unique sites are not explored and smaller sites are completely ignored, however, a bias can be seen to certain sites. When studying primates, access is crucial, and access to the most published captive sites may be limited, as well as access to species not held at these popular locations. Our results indicate that unprotected habitat and therefore species are not as prevalent in our literature as protected sites. This may be an issue of interest, access, or both. In lieu of this data, primatologists can be cognizant of what sites and species have been "under" studied and are underrepresented in the literature.

3D Morphometrics of the cercopithecoid distal humerus: implications for the reconstruction of paleohabitats.

EMMA KRISTINA CURTIS[1]. [1]Anthropology, University of Texas at Austin.

The reconstruction of paleohabitats is a necessary precursor to understanding the environmental pressures that drove hominin evolution. However, the relative scarcity of hominins in the fossil record, as compared to other mammals, makes direct inference difficult. The ecomorphology of cercopithecoids can serve as a valuable indicator of paleohabitat composition given their behavioral diversity and greater relative abundance in Plio-Pleistocene fossil assemblages. The morphology of the distal humerus is functionally informative regarding the extent to which the elbow is adapted for certain types of motion and can indicate the degree of terrestriality versus arboreality of a species. This study utilizes geometric morphometric analyses to visualize three-dimensional shape variation of the distal humerus among terrestrial (n=59), semi-terrestrial (n=93), and arboreal (n=155) cercopithecoids. Humeral shape is digitized using 18 landmarks and analyzed in conjunction with quantitative behavioral data. Linear regression and discriminant function analyses of Procrustes-adjusted coordinates are used to determine the accuracy with which individuals can be placed along a terrestrial◊arboreal spectrum based on the morphology of this joint surface. Results show a significant correlation between distal humeral shape and percentage of terrestriality, $p<0.0001$. Discriminant models reveal 87.3% accuracy (75.2% jackknifed) in reclassifying individuals by group. A second discriminant analysis based on quantitative behavioral data proved 86.5% accurate (66.3% jackknifed) in predicting the % terrestriality of an individual within a 10% range. Overall, this study demonstrates the potential for more precise determination of differential

substrate utilization within fossil communities. These proportions can later serve as proxies for predicting substrate availability at the community level and be matched with those of existing habitats, ultimately providing modern analogues for the structure and vegetative composition of paleohabitats.

Meta-Analysis of Geometric Morphometrics in Anthropology.

KERSTEN BERGSTROM[1], ROBERT Z. (ZAC) SELDEN JR.[2]. [1]Anthropology, Texas A&M University; [2]Center for Regional Heritage Research, Stephen F. Austin State University

Through the use of publications and their cited references harvested from Scopus, we generated an interactive directed bipartite citation network for geometric morphometric applications in anthropology using Gephi 0.9.1. The network was subsequently filtered to include only those nodes with a degree of two or higher. InDegree and OutDegree were used to identify and illustrate publications and references central to each of the communities identified in the study. Using the citation network as an epistemological tool, practitioners can identify schools of thought or practice, references with the highest overall authority, references central to each school of thought or practice, and the within-field publications that are cited most. Practitioners may then view and actively explore the progression of those publications, and the references that they cited, in graphical form.

Using Microfauna to Reconstruct a Pleistocene Cave Site in Botswana.

Zachary W. PIERCE[1], TIMOTHY L. CAMPBELL[2], PATRICK J. LEWIS[1]. [1]Department of Biological Sciences, Sam Houston State University; [2]Anthropology, Texas A&M University.

The Koanaka Hills, located in the Ngamiland District of Botswana, are one of a few fossil-bearing sites geographically intermediate to the productive Plio-Pleistocene fossil localities of eastern and southern Africa. Prior excavations of the internal cave deposits at this site produced a mid-Pleistocene date estimate of ≥ 317,000 + 114,000 years using thermoluminescence, and yielded a new subspecies of baboon, Papio hamadryas botswanae. Due to their spatiotemporal placement, an understanding of paleoenvironmental change at the Koanaka Hills can provide important information on the evolution and biogeographic history of many African lineages. Renewed excavations at this site during the summers of 2007-2009 produced a rich collection of fossil mammalian microfauna. Microfauna are integral to rebuilding past environments as they are particularly sensitive to environmental change. During these excavations many rodent taxa were found including otomyines and Mystromys, none of which are found in the region today. Modern distributions and habitat use by these taxa suggest a wetter, cooler period at the Koanaka Hills during the mid-Pleistocene and a paleohabitat which included the presence of rank vegetation with a greater wooded component than present today. These conditions probably reflect the influence of the nearby Okavango Delta and documents a warming and drying of conditions from the mid-Pleistocene to those seen today in the Koanaka area.

All About That Acid: The Effects of Soil pH on the Diagenesis of Non-Human Bone.

ROBYN KRAMER[1]. [1]Anthropology, Texas State University

Methodology: I examine how the acidity of different soils affects the transfer of soluble and exchangeable ions (Mg2+, K+, P3+, Ca2+, Na+, Fe2+) between bone and its burial environment. Through the comparison of pre- and post-burial ionic concentrations, I have two objectives: (1) to determine if the acidic soils lead to an accelerated rate of soluble ions available for transfer and (2) if the particular tree and its surrounding soil have a significant effect on the soil pH. Soil was collected from the base of isolated Pine, Oak, Redwood and Walnut trees and stored in four separate 5 gallon buckets to prevent contamination by foreign substances. Bone (n=84 rib fragments) used in sample was collected from a wild boar donated for research purposes by the California Department of Fish and Game. Samples were analyzed using the XRF. Each bucket contained twenty-one fragments; 20 rib fragments. Bone and soil samples were collected throughout the study period. Results: I found that Redwood and Walnut soils exchanged ions (Mg2+, K+, P3+ and Fe2+) at similar rates and in similar amounts because the soils maintained their pH levels over time. I conclude that I cannot determine if soil acidity has an effect on decomposition because none of the samples were acidic enough to cause a noticeable difference in ion exchange. However, I cannot reject the null hypothesis that the pH of soil will have no effect on the rate of ionic transfer. This is due to the significant F ratios for Ca2+ and Na2+. Calcium produced the following results, $F(7,16) = 22.438$, $p = .000$, while Na2+ had $F(7,16) = 5.269$, $p = .003$. In conclusion, these values indicate that the type of soil does significantly affect the mean exchange of Ca2+ and Na2+ ions.

An Application of Geospatial Software to the Analysis of Commingled Human Remains.

SAMANTHA MJ MITCHELL [1], KATE MW HALL [1], PATRICK J. LEWIS[2]. [1]Sociology, Anthropology, and Social Work, Texas Tech University; [2]Biological Sciences , Sam Houston State University.

Documenting the spatial distribution of scattered and commingled skeletal elements is an important aspect of forensic anthropology and bioarchaeology. While existing methods of documentation may effectively represent scattered and commingled human skeletal remains, they do not facilitate further spatial analysis that may be useful in reconstructing taphonomic processes. Geographic Information Systems (GIS) have recently been leveraged as a method of inventorying human remains, but their capacity for detailed spatial analysis is underutilized. In the Spring of 2016, graduate students from Texas Tech University explored GIS as a tool for the documentation and analysis of human skeletal remains. The remains of eight individuals–previously deposited at the Southeast Texas Applied Forensic Science facility within a 15m2 area over a four-year period–were mapped in situ with a Total Data Station. Geospatial analyses were then performed in ArcGIS to assess patterns in the spatial distribution of remains. This paper presents a comprehensive method for the efficient mapping of human remains using GIS and details potential uses of geospatial software in the reconstruction of taphonomic events. It further discusses the benefits and shortcomings of a geospatial method of documentation and analysis in forensic anthropology and bioarchaeology.

An application of structure from motion to document the decomposition of hacking wounds. CONNOR D. CARLTON[1], SAMANTHA MITCHELL[2], PATRICK J. LEWIS[1]. [1]Biological Sciences, Sam Houston State University; [2]Sociology, Social Work, and Anthropology, Texas Tech University.

Over the past decade, Structure from Motion (SfM) has increasingly been used as a means of digital preservation and for documenting archaeological excavations, architecture, and cultural material. However, few studies have tapped the potential of using SfM to document and analyze taphonomic processes affecting burials for forensic sciences purposes. This paper utilizes SfM models to elucidate specific post-depositional events that affected a series of three human cadavers deposited at the South East Texas Applied Forensic Science Facility (STAFS). Prior to deposition, a series of cuts were inflicted on each cadaver using a non-serrated machete. Afterwards, remains were deposited and placed within enclosures. For a series of three months a single lens reflex (SLR) camera was used to capture a series of overlapping images at periodic stages in the decomposition process of each cadaver. These images are processed through photogrammetric software that creates a 3D model that can be measured, manipulated, and viewed. This project used photogrammetric and geospatial software to map entomological changes in decomposition and movement of the body from original deposition points. Project results indicate significant movement of metacarpals and metatarsals immediately after deposition and increased entomological activity in areas afflicted by sharp force trauma. Furthermore, this project argues the use of SfM has potential to contribute to decomposition studies for time of death analyses. The results of this study indicate photogrammetry is an efficient, relatively simple, and affordable tool for the documentation of decomposing hacking trauma.

The Use of the Pelvic Microbiome for PMI Estimation. LAUREN RUDIE[1], MEREDITH MANN[1]. [1]Biology, Sam Houston State.

Postmortem interval (PMI), or time since death, is critical for determining cause of death. Current estimation of PMI is derived primarily using bacteria-driven stages of decomposition and entomology. These methods are difficult as they are influenced by external factors including temperature, moisture level, season, and scavenger activity. Likewise, soft tissues generally last only weeks or days. Bones are protected from external environments and persist for weeks or months, extending their potential for estimating PMI. Here we utilized the protected marrow cavity of the pelvis to study bacterial succession throughout all stages of decomposition. Three cadavers were placed at the Southeast Texas Applied Forensic Science (STAFS) facility at Sam Houston State University where samples were taken from the left and right iliac crest over the past four months, using the right side as a control. Samples were collected from all three specimens using medical grade bone marrow biopsy needles. Each sample was labeled according to the day it was taken and the sampled side, then stored in sterile cryotubes and kept refrigerated at -20°C. The microbiota collected were analyzed using deep sequencing of 16S rRNA genes, as this specific gene is common among all bacteria. The presence of marrow after four months suggest that this method could establish a more accurate PMI after extended periods of time. Preliminary results suggest that the microbiome of the pelvis may be an accurate predictor of PMI. This novel study could transform the methodology in which PMI is calculated, allowing for a more accurate estimation.

Bacterial Succession in Bone Marrow as a Potential Tool for Estimating Postmortem Interval. CHRISTIANA TISARA FAKHRI[1], LAURA SPOONIRE[1], NICHOLE RUBLE[1]. [1]Biological Sciences, Sam Houston State University.

Postmortem interval (PMI) is an estimate of time since death that traditionally relies on soft tissues in conjunction with stages of decomposition, insect activity, and bacterial progression. However, PMI estimates reliant on soft tissue remain inexact due to variables such as season, moisture, and climate. Such methods are further limited by relatively quick decay, typically days or weeks, of soft tissues. Comparatively, bone persists for weeks or months. Thus, the environment inside of marrow-containing bones may extend the range of PMI estimation and provide a more controlled environment relevant to PMI. Here we test for variation in the composition and progression of bacterial communities in pelvic, femoral, and humeral bone marrow from three human cadavers (two males, one female). For four months, we sampled left elements every other day and right elements (as a control for introduced contamination) every tenth day. Field research took place at the Southeast Texas Applied Forensic Science (STAFS) facility at Sam Houston State University beginning in May of 2016. We sterilized sampling locations and collection tools in order to limit contamination. Samples were collected using a T-Lok Bone Marrow Biopsy Needle and stored in cryotubes for deep sequencing of the 16S RNA gene using PCR amplification and ilumina protocols at Baylor College of Medicine. Preliminary results suggest that bone marrow biomes are consistent across element and specimen, making this technique potentially useful for determining a more accurate PMI. We expect that this method of PMI estimation will ultimately provide a more accurate tool for forensic sciences.

Measuring bacterial communities in the humerus to estimate PMI. SARAH ELIZABETH BIVENS[1], ERIC DAVID[1], MARY NICHOLE RUBLE[1]. [1]Biology, Sam Houston State University.

Current methods of estimating postmortem interval (PMI), an estimate of elapsed time since death, are dependent on external changes in soft tissues, and the sampling of insect and bacterial succession. These traditional methods are unreliable due to several biotic and abiotic factors, such as moisture, temperature and geography. Our research focuses on estimating PMI based on bacterial community composition and succession in marrow-containing bones. Here we hypothesize bacterial communities inside the human humerus will change in a predictable and consistent manner. We began sampling three cadavers (two male and one female) at Southeast Texas Applied Forensic Science (STAFS) facility in Huntsville, Texas in May, 2016. Over four months, the left humerus was sampled every four days and the right humerus every eight days as a control for contamination. We used sterilized T-Lok bone marrow biopsy needles and a sterilized drill to extract marrow samples, and froze samples in a cryotube for shipment to Baylor School of Medicine. Statistical analysis of bacterial communities in each sample were determined using UniFrac; using protocol outlined by the Human Microbiome Project, microbiota will be measured by deep sequencing of the 16S rRNA gene specific to bacteria, as this is a relatively evolutionarily stable and common gene conserved among and specific to bacteria. Preliminary results suggest that bacterial communities inside the humerus change at a predictable rate and are largely consistent across specimens. The results of this research could provide for improved methods of estimating PMI, which will be a valuable tool for forensic scientists and law enforcement.

Using Bacterial Communities From Human Femora To Determine Post Mortem Interval.

STEPHANIE ANNE BAKER[1], SARAI N. MESA[1], MARY N. RUBLE[1]. [1]Biology, Sam Houston State University.

Current methods of estimating postmortem interval (PMI) are based on changes in cadaver decomposition, insect activity and bacteria succession. These methods are subject to various abiotic and biotic factors, such as temperature and humidity. Additionally, soft tissue methods are only useful days to weeks post mortem. Bacteria inside marrow-containing bones, however, are protected from many external variables and persist in the environment for months. This project studies the makeup and succession of bacteria inside the human femur. We sampled bone marrow inside the femora of three cadavers (two male and one female) placed at the Southeast Texas Applied Forensic Science (STAFS) facility in Huntsville, Texas for four months. The left femurs were sampled every other day and the right femurs were sampled every fifth time as a control for introduced contamination. We used a sterilized drill to make a hole in the diaphysis of the femur. A sterilized T-Lok medical grade biopsy needle was then inserted to collect bone marrow, which was then placed into a cryotube. Holes were sealed to prevent contamination. The samples were shipped to Baylor College of Medicine and analyzed using deep sequencing of 16SrNA gene, which is unique to bacteria. Microbial communities were analyzed using UniFrac to identify relationships between microbial communities in each cadaver. Preliminary results indicate the bacterial communities in the femur change consistently and predictably. As such, this is a novel study that can potentially offer a more accurate and persistent method for forensic science when estimating PMI.

Operation Identification: An effort towards identiying migrant remains from South Texas.

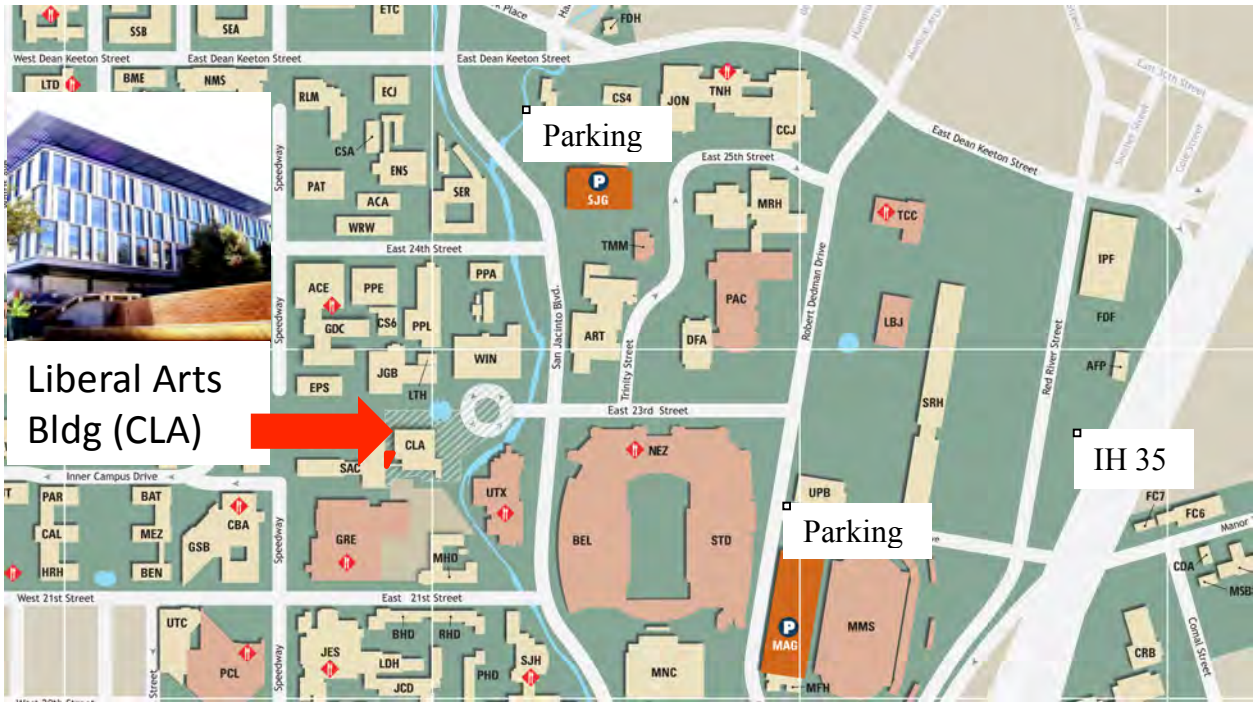
COURTNEY C. SIEGERT[1], TIMOTHY P GOCHA[1], KATE SPRADLEY[1], CHLOE P MCDANELD[1]. [1]Anthropology Department, Texas State University.

Brooks County in South Texas is part of a known migrant corridor used by undocumented border crossers entering Texas through the U.S./Mexico border. Operation Identification (OpID) at Texas State University is a project which aims to facilitate the identification and repatriation of human remains found along or near the South Texas border through scientific analysis and collaboration with governmental and nongovernmental organization. The project utilizes a multifaceted anthropological approach towards identification including traditional osteological, dental, isotopic, genetic, and histological analyses. Additionally, OpID incorporates biocultural lines of evidence not commonly used in biological anthropology such as analyses of missing persons reports for comparison of antemortem and postmortem data, and exmination of personal effects to help establish identification hypotheses. Since 2013, OpID has received a total of 195 sets of human remains or presumed migrants and has helped facilitate in the identification of 18 individuals

CONFERENCE LOCATION & PARKING

The conference will be held on the University of Texas at Austin Main Campus in the Glickman Conference Center, 1st floor of the Liberal Arts Building (CLA). The closest parking garages are the San Jacinto Garage (SJG), located on San Jacinto in between 24th street and Dean Keaton, and the Manor Garage (MAN), located on Robert Deadman Drive, across from the UT football stadium. Additional parking options can be found on the visitor map:

http://www.utexas.edu/parking/maps/visitor/visitor-map.pdf



SOCIAL GATHERING

At 6:00, we will gather at the historic Scholz Garten, where we have reserved space for TABA participants and guests in the Bismarck Room. Scholz Garten is located at 1607 San Jacinto Blvd, in walking distance from UT. Appetizers will be provided, and food and drink are available for purchase.

http://www.scholzgarten.net/