

COMMITTEE ON DIVERSITY



UNDERGRADUATE RESEARCH SYMPOSIUM

AAPA 85TH ANNUAL MEETING

6-8 PM, WEDNESDAY APRIL 13TH, 2016

(5:00 PM – POSTER SETUP, 5:30 PM – PARTICIPANT CEREMONY)

GRADUATE MENTORS

Colin Brand	University of Oregon
Noah Dunham	Ohio State University
Christina Fojas	University of Tennessee
Lauren Funkhouser	University of Alabama
Carmen Hové ♦	University of California, Santa Barbara
Mareike Janiak	Rutgers University
Jessica Joganic	Washington University of St Louis
Erin Kane	Ohio State University
Elaine Kozma ♦	City University of New York
Myra Laird	New York University
Steven Lautzenheiser ♦	University of Washington
Ignacio Lazagabaster	National Museum of Natural Sciences, Madrid
Diana Messer	Mercyhurst University
Christina Nicholas	University of Iowa
Rachel Perash ♦	Confederated Tribes of the Colville Reservation
Elle Powell	Johns Hopkins
Kristen Ramirez ♦	City University of New York
Michala Schaye	University of Florida
Ben Thompson	Mercyhurst University
Allysha Winburn	University of Florida
Kena Worsham	Mercyhurst University

Organized by Cara Wall-Scheffler

Program by Marcie Myers

♦ Previous USR participant now serving as graduate student abstract reviewer

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Poster Titles and Authors

1. **An assessment on the classification of transitional hominins.** *OLIVIA D.L. BURLEY and GEOFFREY P. THOMAS.
2. **Paleoarchaeology of East Turkana: Comparison of faunal and isotope data to understand ancient ecosystems.** *AMY PETERSON, AMELIA VILLASENOR, and DAVID BRAUN.
3. **§A re-evaluation of the Health Index of Southern Brazil shellmound populations.** *MADELYN GREEN, MARK HUBBE and WALTER A. NEVES.
4. **Testing meat consumption using osteological markers and isotopic evidence during the Middle Period (AD 500-900) in the Atacama oases, Chile.** *CAMERON BEASON, FRANCISCA SANTANA, MAURICIO URIBE, MARK HUBBE, SERGIO FLORES, and ANAHÍ MATURANA.
5. **§Stable isotopic evidence for diet and nutritional stress in a potentially cannibalized human skeletal sample from Ana Manuku, Mangaia, Cook Islands.** *MARIA BARCA, RHONDA L. QUINN and SUSAN C. ANTÓN.
6. **Stable nitrogen isotopic evidence for health and physiology in 19th century Peoria, Illinois.** *RUTH L. DORTON, RHONDA L. QUINN and ANNE L. GRAUER.
7. **§Nutritional change following social change in Illyria (modern Albania).** *CODEE J PFLEIDERER and BRITNEY KYLE.
8. **§Children's health and social changes in ancient Albania.** *MARIA J WARNE and BRITNEY KYLE.
9. **§Change in nonspecific disease through time in Durres, Albania.** *MELISSA T CHOWNING and BRITNEY KYLE.
10. **Polio in ancient Nubian skeletal remains.** *MEGHAN ROSE, KATIE WHITMORE and MICHELE BUZON.
11. **Life and death in Roman Crete: An osteobiography of skeleton 4 Tomb A from Ierapetra, Crete, Greece.** *CHELSEY SCHROCK.
12. **Cradled in the grave: An osteobiography of a New Kingdom mother and fetus excavated from the archaeological site of Tombos, Sudan.** *LILY ANNE ANDERSON and MICHELE BUZON.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Poster Titles and Authors

13. **Is osteoarthritis a consequence of evolution? A finite element analysis of the anatomical geometry in the mouse knee.** *MICHAEL RUIZ and RONALD JUNE.
14. **§Coalition frequencies in the feet of modern Thai.** *LAURA A WINTERS, SCOTT E. BURNETT, D. TROY CASE, SITTIPORN RUENGDIT and PASUK MAHAKKANUKRAUH.
15. **New approaches to measuring diffuse idiopathic skeletal hyperostosis.** *MEGAN F. VELTRI, *JORDAN R. LEWMAN and DANIEL J. WESCOTT.
16. **The effects of obesity and diabetes on diffuse idiopathic skeletal hyperostosis.** *JORDAN R. LEWMAN and *MEGAN F. VELTRI.
17. **Depression in the calvarium: A differential diagnosis.** *LINDSAY KIEFER.
18. **§Examining the variation of orbital shape in modern human populations using 3D geometric morphometrics.** *MELISSA G TORQUATO and MAJA ŠEŠELJ.
19. **A preliminary study on human craniofacial morphology variation among subsistence groups in hyper-arid climates.** *KATHARINE G.J. RYAN, SUSAN C. ANTÓN and MARISA E. MACIAS.
20. **A brave new post-NAGPRA world: A model for ethical repatriation and reburial.** *ASHLEY GLENESK, *SARAH DRESSER, *ANGELIQUE MAGDALENO , MARCEL YOUNG and CINDI ALVITRE.
21. **Bones don't lie: Historical and forensic comparisons of Wellesley College's human skeletal anatomy teaching collection.** *ISABEL STARR and *AUDREY CHOI.
22. **Mapping the St. Lawrence County Poorhouse cemetery in Canton, NY.** *EMILY LIEBELT, *MELANIE SWICK, MINDY PITRE, ALEXANDER STEWART and CARL PIERCE.
23. **Insights into life on the frontier: A study of the Hill Street Burials (1880-1920), Riverton, Wyoming.** *ASHLEY DAFOE.
24. **Nonspecific infection of Windover subadults.** *KAITLYN LIENBY and GEOFFREY THOMAS.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Poster Titles and Authors

25. **Windover: Analyzing dental attrition in a Florida archaic hunter-gatherer population.** *CASEY JOHNSON and GEOFFREY THOMAS.
26. **Analysis of dental health in a Late Woodland population from Myrick Park, La Crosse, Wisconsin.** *MEGHAN CAMPBELL CAVES, LESLIE LEA WILLIAMS and WILLIAM GREEN.
27. **Adaptations of the hallual metatarsal in hominin bipedalism.** *SARAH G. MCCRACKEN.
28. **§Biology trumps mechanics: Bone adaptation to exercise correlates more closely to bone marrow stem cell responsivity than peak forces.** *JASPER RUBIN-SIGLER, GABRIEL M. PAGNOTTI and IAN J. WALLACE.
29. **Paleoanthropology in motion: Using X-rays to study subsurface foot motion during human footprint formation.** *DAVID A. PERRY, KEVIN G. HATALA and STEPHEN M. GATESY.
30. **Predicting biacetabular breadth from bitrochanteric or bicristale breadth in human males and females.** *AVIVA KATZ and PATRICIA KRAMER.
31. **Testing gender-based differential mobility with stable oxygen and carbon isotopes in 19th century Peoria, Illinois.** *ANGELA ASHMAN, *RUTH L. DORTON, RHONDA L. QUINN and ANNE L. GRAUER.
32. **Ancient DNA from Mayan tooth offerings at Yakalche, Belize.** *SAMANTHA M. ARCHER, RICK W. A. SMITH, ALAN H. GOODMAN and DEBORAH A. BOLNICK.
33. **Tibia measurements in sex determination in ancient Cretan populations.** *PRINCESS AURORA WILSON.
34. **Cold acclimation among residents of the Chicago Metro Area: Changes in brown adipose tissue thermogenesis, energy expenditure and vasoconstriction.** *MADISON BONDY, *DANIA ATALLAH, STEPHANIE LEVY and WILLIAM LEONARD.
35. **The ecology of anemia: Anemia prevalence and risk in adult indigenous women in Argentina.** *LAURA GOULD GOETZ and CLAUDIA VALEGGIA.
36. **Daily energy requirements for human populations.** *LAUREN CHRISTOPHER and HERMAN PONTZER.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Poster Titles and Authors

37. **Are you what you eat? Investigating dietary acculturation among East Asian international college students in the United States.** *CHIA-PING CHIN and WILLIAM LEONARD.
38. **Anthropogenic effects on *Procyon lotor*: Detecting a secular trend.** *CARLY M. PATE, ANDREA R. ELLER and FRANCES J. WHITE.
39. **§The relationship of estradiol to paternal care behavior in wild-living red-bellied lemurs (*Eulemur rubriventer*).** *JULIANA COSTANZO, ANDREA BADEN and STACEY TECOT.
40. **§To care or not to care? Paternal and alloparental care in free-ranging male Coquerel's sifaka (*Propithecus coquereli*).** *LINDSEY MEADOR.
41. **§A study of habituation in *Eulemur flavifrons*.** *KATHERINE MEIER.
42. **Anti-predator behaviors in four species of nocturnal prosimian at the Duke Lemur Center.** *CODY J MOSER.
43. **Sex differences in tool use during termite gathering among chimpanzees (*Pan troglodytes troglodytes*) of the Goulougo Triangle, Republic of Congo.** *ERIC ELLISON, STEPHANIE MUSGRAVE, DAVID MORGAN and CRICKETTE SANZ.
44. **Cortisol trajectory from weaning to dispersal in chimpanzees.** *DAVID WOOD, REBECCA STUMPF, C. IRUMBA, SUMMER SANFORD, A. FORD and ALEXANDRA LYNN.
45. **§Effects of visitor group size on the number of abnormal behaviors in captive bonobos (*Pan paniscus*) housed in outdoor and indoor zoo exhibits.** *JESSICA BOLTE and MONICA WAKEFIELD.
46. **Social instability in a captive bachelor group of Western Lowland Gorillas (*Gorilla gorilla gorilla*) following the death of the dominant silverback.** *KYLEN GARTLAND, MONICA MCDONALD, CRICKETTE SANZ and SIMONE GODWIN.
47. **Geographic variation in gibbon diets.** *AVERY K. TWITCHELL-HEYNE and HERMAN PONTZER.
48. **A cross-species comparison of distance travelled in four New World primates.** *REBECCA LAVICTOIRE.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Poster Titles and Authors

49. **A comparative study of the glenohumeral joint in New World monkeys.** *RACHEL PROVAZZA.
50. **Correlations to the rituals of feeding: An instantaneous behavioral sample of the *Alouatta Palliate*.** *TANNER MARTIN.
51. **§The penalty for brawling: Patterns of healed skeletal trauma in free-ranging *Saimiri sciureus*.** *RISA LUTHER, *CECILIA MAYER and SCOTT S. LEGGE.
52. **§How tough is the grey-cheeked mangabey: Patterns of trauma in *Lophocebus albigena*.** *CECILIA MAYER, *RISA LUTHER and SCOTT S. LEGGE.
53. **Exploring the energetic costs of infant care in wild forest baboons.** *ALYSSA M. MOLLOY, EMMA C. CANCELLIERE, CALEY A. JOHNSON, and JESSICA M. ROTHMAN.
54. **Cost of maternal care: Infant-carrying effects on feeding and foraging strategies in forest monkeys (*Cercopithecus ascanius*).** *NATALIA T. GRUBE, EMMA C. CANCELLIERE, CALEY A. JOHNSON and JESSICA M. ROTHMAN.
55. **Revisiting primate masticatory scaling relationships.** *SARAH M. CUMPSTON and CLAIRE E. TERHUNE.
56. **Rib curvature, thoracic shape and locomotor adaptation in anthropoid primates.** *ANNIE WALLACH, EMILY R. MIDDLETON and CAROL V. WARD.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

Cradled in the grave: An osteobiography of a New Kingdom mother and fetus excavated from the archaeological site of Tombos, Sudan. LILY ANNE ANDERSON and MICHELE BUZON. Purdue University.

Background: In 2013, the burial of a woman and third trimester fetus positioned in her pelvis were excavated from the archaeological site of Tombos, located in northern Sudan. The individual was interred in a small funerary chapel/pyramid tomb, dating to the Ramesside period during the New Kingdom (~1300 BC). **Methods:** All bones from the woman and fetus were inventoried, measured, and observed for pathological conditions. Age was determined for both individuals and sex was estimated for the adult. **Results:** The adult was determined to be female, approximately 27-35 years in age. The fetus is estimated to be 3rd trimester. Few other examples of this type of burial are found in the archaeological record of this region. **Conclusion:** Clear obstetric death is a rarity in the archaeological record, and every case holds unique glimpse into the biology and culture of pregnancy. This study presents the osteobiography of one such individual who appears to have been buried with jewelry artifacts in a well-designed and prosperous tomb.

Ancient DNA from Mayan tooth offerings at Yakalche, Belize. SAMANTHA M. ARCHER, RICK W. A. SMITH, ALAN H. GOODMAN and DEBORAH A. BOLNICK. University of Texas at Austin.

Background: Previous bioarchaeological studies of Mayan sites have suggested that human sacrifice played an important role in religious ritual, and have hypothesized that males may have had higher status in such rituals. To gain further understanding of the gendered and social correlates of Mayan sacrificial practices, we extracted ancient DNA (aDNA) from a tooth cache excavated from Yakalche, a small satellite site of Altun Ha located in modern-day Belize, with the main purpose of determining the sex of individuals whose teeth were found in this sacrificial context. **Methods:** In this project, we attempted to extract aDNA from a sample of 10 teeth using a non-destructive silica extraction. We sequenced a portion of the first hypervariable region (HVR1) of the mitochondrial DNA (mtDNA) and identified diagnostic mutations to determine mtDNA haplotypes and haplogroups (sets of maternally-inherited DNA sequences that are closely related). Haplogroups were determined via MitoTool using PhyloTree, build 16. We then compared each aDNA sequence to previously obtained modern and ancient mtDNA

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

sequences in the published literature and GenBank (using the Basic Local Alignment Search Tool). Finally, we assayed a length dimorphism of the amelogenin gene to determine the presence of X and Y chromosomes in each sample. **Results:** This study has yielded some of the first ancient mtDNA sequences from the Maya region. So far, we have determined the haplogroups and haplotypes of a subset of samples. Our results are consistent with the sequences found among Native Americans prior to colonial contact, as well as with the genetic diversity of the contemporary Yucatan peninsula. **Conclusion:** Our results contribute to what is known about the genetic diversity of the Maya in pre-contact times. This study also helps clarify the gender and biosocial context of sacrifice in the ancient Yucatan.

Funded by a Kuhn Intellectual Entrepreneurship Scholarship (\$1,000).

Testing gender-based differential mobility with stable oxygen and carbon isotopes in 19th century Peoria, Illinois. ANGELA ASHMAN, RUTH L. DORTON, RHONDA L. QUINN and ANNE L. GRAUER. Seton Hall University.

Background: The 19th century witnessed large-scale demographic change with the western expansion into new territories across the US. From 1840

to 1860 year, population in Peoria, Illinois swelled from 11,858 to 17,227, much of which can be credited to immigration. The attributed reason for overall increase of immigration to Peoria was the prospering industries largely due to its location on the Illinois River. Men and women may have had different reasons for migrating including marital and employment decisions. Based on census data, between 1855 and 1864, the number of women in Peoria differentially grew from 1,368 to 4,644 as compared to that of men 1,177 to 4,266. **Methods:** In this study we explore place of origin and differential mobility between males and females with stable oxygen and carbon isotopic analysis of bone hydroxyapatite and first, second and third molar enamel samples from a mid-19th C. burial sample of adults (13 females and 8 males) from Peoria. **Results:** Our results indicate that females show comparable mean values but significantly larger ranges as compared to males in both isotopes. The female $\delta^{18}\text{O}$ range exceeded 4‰ and included potentially nonlocal values; the male $\delta^{18}\text{O}$ range was less than 2‰ and demonstrated only local values. Female $\delta^{13}\text{C}$ values yielded a range of over 8‰ compared to the male $\delta^{13}\text{C}$ range of less than 3‰. **Conclusion:** We discuss potential reasons for these $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values including diet, water intake, physiology, cultural practices

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

and local environmental factors. We gauge if differential mobility is a plausible interpretation considering age-at-death and burial context and discuss the potential reasons for gender-based mobility at this time and place in US history.

Funding provided to RLQ by the National Science Foundation (NSF BCS-1455274).

Stable isotopic evidence for diet and nutritional stress in a potentially cannibalized human skeletal sample from Ana Manuku, Mangaia, Cook Islands. MARIA BARCA, RHONDA L. QUINN and SUSAN C. ANTÓN. Seton Hall University.

Background: Ana Manuku, a prehistoric rockshelter on Mangaia (Cook Islands), has been interpreted as a ritualistic site that potentially shows evidence for cannibalistic practices. Two excavated earthen ovens at the site contained over 1800 NISP of human bone representing 26% of the faunal assemblage. Of these, 39 NISP yielded cutmarks. Previously reported dietary isotopic evidence from human skeletal material recovered from the earthen ovens (n= 23 adults) was initially interpreted to represent a potentially cannibalistic diet through isotopic modeling (IsoSource). This interpretation was bolstered by archaeological evidence for dietary resource depletion. **Methods:** Here we

significantly enlarged the isotopic datasets from the zooarchaeological assemblage (n= 65) and increased the human skeletal sample to include subadults (n= 10) and additional adults (n = 32, total 55). We compared our data to those of all published contemporaneous samples from Pacific Islands and modeled diet with IsoSource and a concentration-dependent isotopic model (IsoConc). **Results:** Individuals from Ana Manuku show significantly higher $\delta^{15}\text{N}$ values relative to other Pacific Islanders and low $\delta^{13}\text{C}$ values. We found that subadult samples show systematic variation in $\delta^{15}\text{N}$ values indicating breastfeeding and weaning. The IsoConc models indicate dietary contributions from pelagic fishes and terrestrial endemic species, not cannibalism per se. We also assert that the elevated $\delta^{15}\text{N}$ values may be a consequence of nutritional stress. **Conclusion:** We cannot rule out that these potentially cannibalized individuals also practiced nutritive cannibalism during life. All three of these factors—endemic dietary resources, nutritional stress and cannibalism—may have acted in concert to produce the dietary isotopic results.

Funding provided to RLQ by the National Science Foundation (NSF BCS-1455274) and the Seton Hall University Research Council.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Testing meat consumption using osteological markers and isotopic evidence during the Middle Period (AD 500-900) in the Atacama oases, Chile. CAMERON BEASON, FRANCISCA SANTANA, MAURICIO URIBE, MARK HUBBE, SERGIO FLORES, and ANAHÍ MATURANA. Ohio State University.

Background: This study compares dental pathologies and isotopic evidence from skeletal series from the Middle Period of the Atacama oasis, Chile. These comparisons were performed to test if meat consumption played a role in the prevalence of oral pathologies. **Methods:** Association between caries prevalence and stable carbon and nitrogen isotopes was tested using linear regressions. **Results:** Our results show there was a significant correlation between caries and carbon isotopes ($r = -0.415$; $p=0.011$) among all individuals as well as among females ($r = -0.596$; $p=0.003$). Wear incidence showed significant correlation with Nitrogen values, for all individuals ($r=0.48$, $p=0.028$) and for females ($r=0.76$, $p=0.003$). **Conclusion:** This research allows us to better understand the dietary effects on the teeth of individuals during the Middle Period in the Atacama Oasis. We can observe that differential access to C4 plants plays a bigger role in determining caries

prevalence than meat consumption among this skeletal series.

Effects of visitor group size on the number of abnormal behaviors in captive bonobos (*Pan paniscus*) housed in outdoor and indoor zoo exhibits. JESSICA BOLTE and MONICA WAKEFIELD. Northern Kentucky University.

Background: In zoo environments animals have closer contact and more interaction with humans than in the wild, which may cause the animals to experience higher levels of stress and abnormal behaviors can be displayed in a response to high stress. Most animals studied are negatively affected by constant interaction with visitors, but some species, like captive bonobos (*Pan paniscus*), instigate interactions indicating that these may be positive. **Methods:** I completed instantaneous group scans and focal scans to determine if the number of abnormal behaviors changed when the bonobos were in an exhibit indoors (where interactions occur frequently) or outdoors (where interactions do not occur often) at The Cincinnati Zoo in 58 hours of observations. **Results:** Mann-Whitney tests determined that there was no significant difference in the number of abnormal behaviors exhibited at either exhibit ($Z=-0.205$, $p=0.837$). A Spearman's rank correlation

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

test determined that there was no significant correlation in the number of abnormal behaviors observed with varying numbers of visitors ($\rho=0.03$, $N=167$, $p=0.699$). These results did not support the hypotheses, but suggest that visitor interactions do not cause higher levels of stress in *P. paniscus*. **Conclusion:** In many zoo animal exhibits, it is best for zookeepers and exhibit designers to inhibit interactions between guests and the animals. Based on the results of this study, it may be better for *P. paniscus* welfare if healthy interactions are not inhibited.

The project was funded by Northern Kentucky University's Research Foundation Summer Undergraduate Research Fellowship.

Cold acclimation among residents of the Chicago Metro Area: Changes in brown adipose tissue thermogenesis, energy expenditure and vasoconstriction. MADISON BONDY, DANIA ATALLAH, STEPHANIE LEVY and WILLIAM LEONARD. Northwestern University.

Background: Previous work in describing human adaptation to cold stress suggests that repeated cold exposure may recruit brown adipose tissue and promote non-shivering thermogenesis, increasing heat production and minimizing its loss. This study focuses on the relationship

between energy expenditure, brown adipose tissue thermogenesis and FGF21's, a hormone shown to have favorable metabolic effects, levels during cold stress. **Methods:** In this study, we conducted a 40 minute cold challenge on 27 residents of the Chicago Metro Area for four consecutive days. Brown Adipose Tissue thermogenesis was measured using infrared thermal imaging and energy expenditure was quantified using indirect calorimetry. Skin temperatures on the arm and trunk were measured using iButtons. Anthropometric measurements and blood biomarkers of metabolic health were collected as well. **Results:** The results of this study describe the complex combination of energetic and endocrine changes that occur in reaction to repeated mild cold exposure. **Conclusion:** This research is relevant to the field of anthropology because it provides insight into how people physiologically adapt to their environments.

Funded by NSF BCS-1455804 and Northwestern University.

An assessment on the classification of transitional hominins. OLIVIA D.L. BURLEY and GEOFFREY P. THOMAS. Florida State University.

Background: The beginnings of humans and the world around them has been a fascination as long as they have been

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

able to conceptualize change and natural processes. This very fascination in *Becoming Human* is why the study of the genera *Australopithecus* and *Homo* has become so integral to our history. To ask, "when did we truly become human?" is to expose a rift in the paleoanthropological community concerning the placement of transition species (*naledi*, *sediba*, *georgicus*, *habilis*, and *rudolfensis*) and the definition of the genera. **Methods:** Using primarily craniometrics, non-metrics, as well as post-cranial aspects such as limb-length and locomotor patterns, relationships throughout this transition can be estimated. Information was gathered from various published sources that included standard measurements to build a comprehensive table of traits to compare species. **Results:** With the data currently accessible, a confident assessment of the division between the two genera is mostly speculative. That being said, with the data collected, I have begun to create a spectrum of trait change within the transition species. As all of my measurements have been taken from other sources, all results are interpreted and inferred. **Conclusion:** Focus on this type of research can begin to allow for a more comprehensive method of classifying species that do not blatantly conform to the current standards set for each genus. A chronological spectrum of trait change

can also aid in a timeline of change between the genera.

Analysis of dental health in a Late Woodland population from Myrick Park, La Crosse, Wisconsin. MEGHAN CAMPBELL CAVES, LESLIE LEA WILLIAMS and WILLIAM GREEN. Beloit College.

Background: North American archaeologists often characterize the Late Woodland as a transitional period between Middle Woodland cultures with economies based on hunting and low-level food production and Mississippian cultures based on agriculture. Despite the importance of the Late Woodland transition, little published literature exists on the health of Late Woodland populations in Wisconsin. This project investigates Late Woodland health by examining dental disease in a population from the Myrick Park mounds in La Crosse, Wisconsin. The Myrick Park remains have a MNI of 25 and are largely comingled and fragmentary with poor preservation. **Methods:** Because dental health provides valuable insights into diet and associated cultural practices, we examined the Myrick Park teeth for the presence or absence of carious lesions. We recorded data for each tooth and the surface affected. Based on data from Late Woodland sites in the Ohio Valley, we hypothesized that 15-25

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

percent of the observable teeth in the Myrick Park remains would exhibit carious lesions. **Results:** The Myrick Park dental inventory yielded 46 observable permanent teeth; no deciduous teeth were present. Only three of the observable teeth (6.5 percent) exhibited carious lesions. Of the carious lesions recorded (n=5), one was interproximal, three were occlusal, and one was on the root (below the CEJ). **Conclusion:** The Myrick Park dental data fall well below the hypothesized prevalence of carious lesions for Late Woodland populations. This difference in prevalence indicates exploitation of cariogenic foods may have been less important to northern Midwestern Late Woodland populations than to their cultural counterparts in Ohio.

This research was funded by the Mouat and Whiteford Endowed Research Fund and the Professional and Program Development Committee at Beloit College.

Are you what you eat? Investigating dietary acculturation among East Asian international college students in the United States. CHIA-PING CHIN and WILLIAM LEONARD. Northwestern University.

Background: Dietary acculturation is a natural experience of immigrant populations. This study looked at dietary change and health status of East Asian international college students.

Methods: This research used both qualitative and quantitative methods including participant-observation, interviews, dietary assessment, and anthropometry. **Results:** The results demonstrated that rates of obesity were low in the sample and dietary energy intakes were remarkably similar to those of the US population. The interviews suggest that perceptions of Western views of diet and body type influence food consumption patterns and health. **Conclusion:** This research is relevant to anthropology because it provides insights into how social and cultural experiences shape individuals' food consumption patterns and health status.

Research was funded in part by an Undergraduate Research Grant from Northwestern University.

Change in nonspecific disease through time in Durres, Albania. MELISSA T CHOWNING and BRITNEY KYLE. University of Northern Colorado.

Background: This study addresses changing levels of skeletal stress in a population from Durres, Albania during periods of Greek and Roman occupation. **Methods:** We test the hypothesis that levels of nonspecific stress, evidenced by cribra orbitalia, porotic hyperostosis, and linear enamel hypoplasia, increased through time. To test this hypothesis, 116 skeletons from

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Durres, Albania were observed for evidence of cribra orbitalia, porotic hyperostosis, and linear enamel hypoplasia using standard data collection protocols. The skeletons were observed from the Greek to the Late Roman periods. **Results:** Skeletal stress increased from the Greek to the Late Roman period (40% to 45.8% for cribra orbitalia (n=39), 27.8% to 28.6% for porotic hyperostosis (n=46), and 57.1% to 74.4% for linear enamel hypoplasia (n=57)). However, none of these differences were statistically significant. **Conclusion:** My research contributes to the body of knowledge in a discipline because it adds data to a question many researchers are trying to answer, how do populations in the transition of colonization react culturally and in this case physically? We can model how populations handle all of these new stressors and compare them to other samples from close to the site or from around the world to see if trends appear, or if a difference in environment makes an the impact of the colonization. More modernly, we can look at areas today or recently that have had an influx in population or a new ruling party and predict what will occur in the terms of health and overall stress.

Funded by an undergraduate research stipend for the trip to the AAPA conference.

Daily energy requirements for human populations. LAUREN CHRISTOPHER and HERMAN PONTZER. CUNY-Hunter College.

Background: Previous studies indicate that body size (particularly fat free mass) and age affect total energy expenditure, TEE (kcal/d), but the effects of habitual physical activity and climate are not well understood. Climate has been shown to affect basal metabolic rates, BMR (kcal/d), but the effects of latitude and elevation on TEE are unstudied. **Methods:** Here, we assembled a global dataset of TEE for 255 cohorts, using data from 188 doubly labeled water studies from 1986 – 2015. We used multiple regression to test for effects of habitual physical activity (assessed via human development index (HDI)) and climate (latitude and elevation), controlling for anthropometric variables (including body mass, sex, and age). **Results:** None of our models indicated a significant effect of habitual activity or lifestyle on TEE. However, several models did indicate a significant effect ($p<0.05$) of latitude and elevation, as well as a latitude-elevation interaction. **Conclusion:** Results are consistent with previous work showing no effect of habitual physical activity on size-controlled measures of TEE. The effect of climate warrants further investigation, and should be considered

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

in futures estimates of TEE in human populations.

The relationship of estradiol to paternal care behavior in wild-living red-bellied lemurs (*Eulemur rubriventer*). JULIANA COSTANZO, ANDREA BADEN and STACEY TECOT. University of Arizona.

Background: Allomaternal care is especially prevalent among primate species when compared with other mammals, suggesting that there was strong selection for this care strategy during our evolutionary history. Research on the hormonal correlates of paternal care in particular has been largely limited to cooperative breeders, where allomaternal care is obligate and highly derived. In the majority of primates however, allomaternal care is facultative; there is much individual variation. The investigation of potential hormone-behavior relationships associated with paternal care in species with facultative paternal care will help determine the role hormones play in the widespread evolution of allomaternal care. **Methods:** Behavioral data were collected on six groups of wild-living red-bellied lemurs in Ranomafana National Park from 2013 to 2015. Each group consisted of an adult pair and their offspring. Weekly fecal samples were collected from known individuals, desiccated, and shipped to the Lab for

the Evolutionary Endocrinology of Primates to be extracted and analyzed for levels of estradiol. Males were categorized as helpers (n=3) or non-helpers (n=3) based on infant carry behavior, and estradiol was assayed using a commercial enzyme immunoassay kit. Samples from three periods were analyzed: pre-partum (four weeks prior to birth), postpartum (four weeks following birth), and carry (four weeks from the first observation of allomaternal carrying). The average number of days after birth that paternal carrying was observed was used to define the carry period for non-helper males. **Results:** A one-tailed t-test determined there was no significant difference between helpers and non-helpers in percent change of estradiol levels across periods (prepartum to carry $t(4) = -0.542$, $p = 0.309$; postpartum to carry $t(4) = 0.984$, $p = 0.191$). These preliminary data suggest estradiol changes are not a driver of individual variation in paternal behavior, however estradiol may still play a role in preparing males for fatherhood within this species. **Conclusion:** Examining factors underlying individual variation in paternal care provides a basis on which to determine how infant care behavior may be influenced by hormones. Additionally, it provides new context in which to understand the evolution of allomaternal care more broadly.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Funding provided by The LSB Leakey Foundation, the AAPA Professional Development Grant, The Rowe/Wright Primate Fund, Hunter College, the University of Arizona, the Thomas A. Bogard Bequest Scholarship, and the Lab for the Evolutionary Endocrinology of Primates.

Revisiting primate masticatory scaling relationships. SARAH M. CUMPSTON and CLAIRE E. TERHUNE. University of Arkansas.

Background: Previous work on the masticatory apparatus has demonstrated unique scaling patterns in the temporomandibular joint (TMJ) and mandible of both platyrrhines and cercopithecoids that can be linked to dietary behaviors. Folivory and ingestion of large, tough fruits in cercopithecoids has been demonstrated to be positively correlated with their deeper mandibles and wider condyles. However, these adaptations are not shared by folivorous platyrrhines, suggesting a phylogenetic component to the observed variation. **Methods:** In this study, we analyze a broad sample of anthropoids primates to determine the role of phylogeny and sexual dimorphism in masticatory scaling. We employ phylogenetic reduced major axis regression, analyzing males and females separately, and we scale variables describing the condyle and

corpus against mandible length and body mass. **Results:** Results indicate that all regressions are strongly influenced by phylogeny, and many are consistent with a Brownian motion model. Condylar variables (width, length, area) were found to scale with positive allometry relative to body mass in both sexes, though scaling patterns of these variables relative to mandible length differed between males and females. This contrasts with previous work that found these measurements scaled with isometry, and suggests important differences in masticatory scaling among sexes. **Conclusion:** These results demonstrate the usefulness of including female specimens and controlling for phylogeny in analyses of primate mandibular scaling relationships, and can further contribute to inferences of dietary behavior and adaptation in extinct primates.

Insights into life on the frontier: A study of the Hill Street Burials (1880-1920), Riverton, Wyoming. ASHLEY DAFOE. University of Wyoming.

Background: Several burials (N=3) were recovered west of the town of Riverton, Wyoming in 1985 during utility and road construction. This particular area was an inclusion of the Wind River Reservation and although pioneers were settling here, it was not officially open to homesteading until

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

1906. **Methods:** Coffin hardware and clothing place these burials to approximately 1880-1920. Preliminary osteological analyses determined that the burials were of two males and one female and all were of European ancestry. Following standard osteological protocols and accepted methodologies, we conducted an integrated investigation of the remains and then analyzed the mortuary, osteological, dental, and stable isotope data alongside historical documentation. **Results:** The injuries, pathologies, and other gathered data collected from these individuals was used to determine whether or not these individuals were some of the first homesteaders to the area and how frontier life affected their skeletal health and diets. **Conclusion:** This poster describes the results of these analyses and contextualizes the lives and deaths of these individuals in the history of the settlement of the American West during the late 19th and early 20th Centuries.

Stable nitrogen isotopic evidence for health and physiology in 19th century Peoria, Illinois. RUTH L. DORTON, RHONDA L. QUINN and ANNE L. GRAUER. Seton Hall University.

Background: Stable isotopic analyses are typically used to reconstruct diet; however recent approaches have expanded the application to indicate aspects of physiology and health.

Nitrogen isotopes ($\delta^{15}\text{N}$), specifically, have been shown to vary with nutritional stress and pregnancy. **Methods:** Here we explore the relationships between $\delta^{15}\text{N}$ values and age, biosex and pathological markers in a human skeletal sample from 19th C. Peoria, IL. We compared eighteen adult individuals (13 females, 5 males) that differentially demonstrated evidence for trauma, osteoarthritis, periosteal reaction, dental caries, and enamel hypoplasia. **Results:** None of the individuals sampled here were found without one or more pathology. We found no statistical difference between male and female $\delta^{15}\text{N}$ values; however females, especially of child-bearing ages achieved higher $\delta^{15}\text{N}$ values. No relationship was found between $\delta^{15}\text{N}$ values and evidence of trauma or osteoarthritis. We did find that individuals with enamel hypoplasia (4/18) and those with periosteal reactions (6/18) yielded significantly higher $\delta^{15}\text{N}$ values. **Conclusion:** We review current evidence from individuals with known health and physiologies to measured $\delta^{15}\text{N}$ values and discuss the implications for studies such as this one in a bioarchaeological setting.

Funding provided to RLQ by the National Science Foundation (NSF BCS-1455274).

Sex differences in tool use during termite gathering among chimpanzees

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

(*Pan troglodytes troglodytes*) of the Goulougo Triangle, Republic of Congo. ERIC ELLISON, STEPHANIE MUSGRAVE, DAVID MORGAN and CRICKETTE SANZ. Washington University in St. Louis.

Background: Sex differences in tool use are hypothesized to have existed in the common ancestor of humans and chimpanzees and played a role in the evolution of complex technology in hominins. Dietary quality is considered a limiting factor of female reproduction in chimpanzees, and enhanced access to high quality foods through the use of tools has the potential to increase fitness. Female bias in tool use has been documented among certain East and West African chimpanzee populations, but it remains to be determined whether sex differences occur within the complex tool repertoires of chimpanzees in Central Africa. **Methods:** To address this issue, we video recorded 88 hours of chimpanzee visitation to termite nests in Republic of Congo over a four year period. Sexually mature individuals were identified and videos scored to examine potential sex differences in termite gathering. **Results:** We observed 52 females and 53 males visiting termite nests, and of these individuals 46 females and 40 males engaged in tool use. Average time spent using tools per day was similar between females (2.82 ± 2.77 min) and males

(2.34 ± 2.26 min), but females visited tool-using localities more frequently on average (11.31 days, range=1, 64) than males (6.96 days, range=1, 39). A higher proportion of females used perforating tool sets than males (29% versus 21%), whereas more males used puncturing tool sets than females (32% versus 27%). However, females showed higher frequencies and durations of tool set use. **Conclusion:** We are currently examining whether sex differences occur in other foraging contexts in this population.

Funding from the National Geographic Society, Max Planck Society, and the Columbus Zoo.

Social instability in a captive bachelor group of Western Lowland Gorillas (*Gorilla gorilla gorilla*) following the death of the dominant silverback. KYLEN GARTLAND, MONICA MCDONALD, CRICKETTE SANZ and SIMONE GODWIN. Washington University in St. Louis.

Background: With the aim of maximizing social opportunities within the constraints of captive environments, most western lowland gorillas (*Gorilla gorilla gorilla*) are housed in either family or bachelor groups. It has been hypothesized that escalating tensions among maturing males may be a factor in the ephemeral nature of bachelor groups in the wild, which suggests that

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

successful management of captive all-male groups will require careful monitoring of social dynamics. **Methods:** In this study, we examined how the death of the dominant silverback affected activity patterns and social interactions within the bachelor gorilla group at the Saint Louis Zoo. We collected a total of 80 hours of behavioral data using fifteen-minute focal observations with thirty-second instantaneous scans on the five gorillas in this group. **Results:** Overall activity budgets of surviving group members remained consistent after the loss of the dominant male. However, we documented a dramatic shift in social behaviors. General affiliation within the group decreased and there was near cessation of social play. Although frequency of non-contact aggression remained relatively stable within the group (2.83 vs. 2.28 events/hr), there was evidence of hierarchical restructuring. One subordinate male showed an increase of 293% in non-contact aggression, while the other two mature males showed decreases of 28.9% and 100%. **Conclusion:** We conclude that dominance hierarchies of bachelor groups may be somewhat inherently unstable, and therefore particularly susceptible to disruption from changes in group composition. We advocate behavioral monitoring, since instabilities are likely to become

increasingly common within the aging demographic of captive populations.

A brave new post-NAGPRA world: A model for ethical repatriation and reburial. ASHLEY GLENESK, SARAH DRESSER, ANGELOUQUE MAGDALENO, MARCEL YOUNG and CINDI ALVITRE. California State University, Long Beach.

Background: Lan-270 is a collection from a salvage archaeology site in Long Beach, Ca, excavated in 1953. The collection has sat in storage for nearly sixty years at CSULB, has since been repatriated under NAGPRA and is currently awaiting reburial. **Methods:** We catalogued the remains in order to bring the collection up to curatorial standards. Our methods included macroanalysis of the artifacts and osteological analysis of the ancestral remains. With express permission from the Tongva community we utilized photogrammetry as a recording method, creating 3D constructions of the artifacts. **Results:** Our research included the cataloguing of 4,141 artifacts and other objects, including shell, lithic materials, pottery fragments, tortoise shell, antlers, and Tongva ancestral remains. We used osteological analysis with the skeletal remains, confirming burials in the excavation notes and determining pathologies. **Conclusion:** Our data showed that the

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

general health, particularly dental wear and disease, is consistent with similar Los Angeles basin Native American groups.

Funded by a small ASI grant to pay for Agisoft Photoscan Software for 3D imaging.

The ecology of anemia: Anemia prevalence and risk in adult indigenous women in Argentina.

LAURA GOULD GOETZ and CLAUDIA VALEGGIA. Yale University.

Background: The Toba of Namqom are an indigenous community native to the Gran Chaco region of northern Argentina. Traditionally semi-nomadic hunter-foragers, citizens of Namqom now live in a peri-urban barrio outside the city of Formosa. Settling resulted in a nutritional transition from a high-protein, high-fiber diet to a high-energy, low-nutrient diet consisting primarily of fried dough, white bread, and noodles.

Methods: The objective of this study was to assess the relationship between prevalence and risk of anemia and place of birth, current diet, and reproductive history. We measured the capillary hemoglobin (Hb) levels of 153 adult women in Namqom. Each participant was also given two interviews characterizing reproductive history and a 24-hour food recall. **Results:** The average Hb level was 12.6 g/dL (range = 5.8 to 15.7 g/dL). We found 28% of

participants were anemic and 31% were borderline anemic. Iron food consumption and vitamin C consumption had a statistically significant impact on anemia risk. Place of birth (rural vs peri-urban), can be considered a proxy for early diet and suggest developmental programming effects lifelong anemia risk. Women born in a rural setting were less likely to be classified as being anemic. We did not find parity, age at first pregnancy, menstrual status, or lactation status to be statistically significant predictors of anemia. **Conclusion:** These results are relevant from a public health standpoint, since current diet may be altered, while reproductive history may be more difficult to modify. This supports the necessity for nutritional interventions and nutritional education in these vulnerable communities to alleviate anemia.

This research was funded by the Yale College Fellowships for Research in Health Studies, the Yale GHI: Field Experience Award, the CIPE Spanish and Latin American Fellowship and an NSF-REU grant associated with award BCS-0952264.

A re-evaluation of the Health Index of Southern Brazil shellmound populations. MADELYN GREEN, MARK HUBBE and WALTER A. NEVES. Ohio State University.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Background: Brazilian shellmounds show clear traces of habitation practices, including feasting, accumulation of material waste, and human burials. As such, the human remains recovered from these sites are an important source of information on health and overall lifestyle of these Mid-Holocene populations, and as such were included in the comparative analyses of the Western Hemisphere World Health project. Using the Health Index, which considers the prevalence of seven health and lifestyle skeletal markers, the Brazilian shellmounds show the highest index value in the entire continent. However, this result is based on collections that lacked postcranial remains, and therefore they may be misrepresenting the relative health of these local populations. **Methods:** The Health Index was calculated for a shellmound sample of 22 complete skeletons recovered from the site Porto do Rio Vermelho 02 (Santa Catarina, Brazil). Using the skeletal remains analysis methods outlined by Steckel and Rose (2002), a quantitative percentage was measured to evaluate the overall quality of health for this particular shellmound population. **Results:** The Health Index for the complete skeletons is 65.6%, which is lower than the average reported for American series in the project (72.6%) and considerably lower

than the index reported for the incomplete shellmound series (91.8%). The difference is due to a large prevalence of infectious disease and low stature observed in the postcranial skeleton, which characterize shellmounds groups in general. Therefore, while a useful comparative statistic, caution should be used when applying the Health Index to incomplete skeletal series. **Conclusion:** Archaeological sites, such as shellmounds in Southern Brazil, yield material culture of past populations. Human remains, in the form of osteological material, and the analysis of the recovered remains allow for archeologists to focus on the biological aspect of past peoples. By analyzing the recovered remains from archaeological sites, inferences can be made about the overall nutrition, health, and lifestyle of prehistoric populations.

Cost of maternal care: Infant-carrying effects on feeding and foraging strategies in forest monkeys (*Cercopithecus ascanius*). NATALIA T. GRUBE, EMMA C. CANCELLIERE, CALEY A. JOHNSON and JESSICA M. ROTHMAN. CUNY-Hunter College.

Background: Infant carrying is a necessary behavior that has evolved to ensure infant survival. Though this behavior is beneficial it may also be costly, specifically to mothers. We

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

conducted an experiment exploring the maternal costs of infant carrying in arboreal forest monkeys (*Cercopithecus ascanius*). **Methods:** The study was conducted in Kibale National Park, from June and July of 2014 and 2015. We collected 24 hours of behavioral data on individual females (n=26) using 10 minute rotating focal samples. **Results:** Red-tail mothers consumed food more often when they were distanced from their infant than when the infant was clinging. Mothers also spent more time traveling than any other activity ($x^2=46.240$, $p<0.0001$). **Conclusion:** Our preliminary results suggest that infant carrying is costly in terms of time, and to compensate, red-tail mothers will increase their feeding time while distanced from their infant. Our study sheds light into the activity budgets of female primates and the constraints they face due to infant rearing.

Windover: Analyzing dental attrition in a Florida Archaic Hunter-Gatherer population. CASEY JOHNSON and GEOFFREY THOMAS. Florida State University.

Background: The Windover population is a group of skeletal remains thought to be upwards of 8,000 years old that were unearthed in the 80s in Titusville, Florida. I examine the dental wear or attrition and look for patterns that could be from gender, gender roles, or

possibly teeth as tool use. **Methods:** I examined the mandibles and maxilla of the population that is housed at Florida State University. I took photographs of each specimen for cataloguing. I then used dental charts to sketch the wear from the teeth onto a physical paper for analyzing at a later time. I took the sketches and photos and rated each tooth based on the Scott system for dental wear scoring. I also broke each molar into four quadrants, scored each individually, and gave the molar an overall score. I have currently used simple T-tests to determine if there are significant differences in the wear scores. **Results:** I have found that in almost all individuals observed, the right and left second molar of the mandible (M2), had one quadrant (Q2) that was worn significantly less than the surrounding quadrants. After using statistical analysis, I received p-values of .0006, .00004, and .0009. These scores were retrieved by comparing the Q2 against the rest of the quadrants, Q1, Q3, and Q4. On the Maxilla, there was not a similar pattern, but the quadrants of each molar exhibited a down, up, down, up pattern of wear. This being, the wear of Q2 would be as high as Q4, but both would be much higher than Q1 and Q3. I have ran statistical analysis on the Maxilla only to determine if the Q3 was significantly worn less than the surrounding quadrants. I found that when comparing Q3 to the rest of the

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

quadrants I was able to reject my null at $p < .05$. More statistical analysis will be conducted in the future to account for other variables such as sex and age. **Conclusion:** The Windover group is one of the largest collections of completely intact skeletons with a high amount of specimens in the country. Little has been studied on the population, any new knowledge can be used to paint a picture about the lifestyle of Florida Archaic Hunter-Gatherers. This research could also allow for better comparison with not just Florida groups but other Archaic hunter-gatherer groups in the country.

Funded by a travel grant through the Student Council for Undergraduate Research.

Predicting biacetabular breadth from bitrochanteric or bicristale breadth in human males and females. AVIVA KATZ and PATRICIA KRAMER. University of Washington.

Background: Sexual dimorphism in biacetabular breadth in modern humans is believed to have developed in response to selective pressures for both a short lever arm from the body center of gravity to the acetabulum and a relatively large birth canal. Biacetabular breadth is difficult to measure in living people without invasive imaging and while proxy measurements such as bitrochanteric and bicristale breadth

have been used, it is unknown how well these measurements can predict biacetabular breadth. **Methods:** 154 AP radiographs from 61 females and 93 males (aged 18-65 years) were collected from a radiograph database and multiple linear regression was used to assess the ability of bitrochanteric or bicristale breadth to predict biacetabular breadth. **Results:** Biacetabular breadth is predicted by bitrochanteric breadth in both males (r -squared=0.48) and females (r -squared=0.63). Including the effect of both bitrochanteric and bicristale breadth improved the predictive ability in females (r -squared=0.70) but not in males. From these results, we conclude that bitrochanteric and bicristale breadth predict biacetabular breadth in both males and females. **Conclusion:** Knowing the bitrochanteric and bicristale breadth, we are able to predict the biacetabular breadth without invasive imaging and warrants further research into explaining the >30% variability in modern humans.

Depression in the calvarium: A differential diagnosis. LINDSAY KIEFER. University of Wyoming.

Background: The skeletal remains of a 45-55 year old adult male were examined as part of a research investigation of skeletal health, disease, demography, and lifestyle among

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

communities from the Rimac Valley, Peru. This individual possesses a large depression on the occipital above the highest nuchal line and below lambda along the midline. **Methods:** The depression is approximately 27mm by 32mm and round, but not perfectly symmetrical. The edges are smooth and rounded without sharply defined margins. The interior of the defect has coalescing porosity and a slight wrinkle or irregularity at its base. Several conditions were evaluated, including but not limited to dermoid cyst, dermoid sinus, epidermoid cyst, eosinophilic granuloma, blunt force trauma, trephination, and tuberculosis. Pathognomonic characteristics for each were assessed macroscopically and radiographically. **Results:** Trephination, tuberculosis, and epidermoid cyst were excluded because few or none of the pathognomonic characteristics were present on the cranium or postcranium (primarily tuberculosis). The depression exhibits several pathognomonic conditions of a dermoid cyst and sinus: located along the occipital midline, does not affect the inner table, a smooth rounded depression, and a possible irregular opening or sinus. The depression may also represent an eosinophilic granuloma due to its solitary nature. The depression could also have resulted from blunt force trauma that has healed: it forms a conical crater and has edges that are

continuous with surrounding bone. I conclude that the depression is probably a dermoid cyst or sinus, but the possibility of blunt force trauma or eosinophilic granuloma cannot be ruled out. **Conclusion:** Much of the literature, both clinical and paleopathological, state that a dermoid cyst or sinus is more likely to occur along the occipital midline; however, current paleopathological evidence shows this defect occurring more regularly at the bregma. The impact of this study could provide one of the first pieces of paleopathological evidence to represent current clinical findings of a dermoid cyst or sinus occurring along the occipital midline.

A cross-species comparison of distance travelled in four New World primates.
REBECCA LAVICTOIRE. Oklahoma City University.

Background: There are four species of primate found on the Osa Peninsula in Costa Rica. This research focused on the distances traveled by these primates. Travel is important for conservation purposes, as well as its evolutionary implications. **Methods:** I tracked the distance travelled overtime using a GPS. **Results:** The results indicated that *S. oerstedii* travelled the most of the four species. Their pattern of travel was less consistent than the other species. These results could indicate that size and diet

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

play an important role in determining a primate's home range, and the amount of energy they will allocate to daily travel. **Conclusion:** It is important to understand the potential evolutionary trade-offs due to greater or lesser need for travel. This can be achieved by comparing species in the same habitat.

The effects of obesity and diabetes on diffuse idiopathic skeletal hyperostosis. JORDAN R. LEWMAN and MEGAN F. VELTRI. Texas State University.

Background: Although diffuse idiopathic skeletal hyperostosis (DISH) has been well described in literature, very little is known about its etiology. Various hypotheses have been put forth regarding the cause of DISH, the most popular being obesity and diabetes, however little research has been conducted to test these relationships. The goal of this study was to examine the relationship between DISH prevalence with obesity and diabetes. **Methods:** The Texas State donated skeletal collection was used as a sample population for this project due to a seemingly high prevalence of DISH in the collection. Using biographic information from donor files and biometric data taken from the remains, an assortment of statistics (including chi², Welch's t-tests, and ANOVA) were run to assess prevalence of obesity and

diabetes in individuals with and without DISH. Biographic information included height and weight for BMI calculations and diabetes status. DISH severity was taken as total volume of spinal expression, measured as total length, width, and thickness of the ossified ligaments. **Results:** No statistically significant differences were found between the BMI spread of individuals with or without DISH [$F(2,250)=2.75, p=0.066$], however a Welch's two-tailed t-test showed significant difference between normal-weight ($M=74645.67, Var=8.79E+08$) and obese ($M=216884.4, Var=1.43E+10$) individuals with DISH; $t(10)=2.23, p=0.004$. The prevalence of DISH did not differ significantly between individuals with or without diabetes. **Conclusion:** This research provides insight into a well known, yet highly misunderstood skeletal pathology. It is hoped that this insight may help guide further research on the subject.

This work is funded in part through instrumentation funded by the National Science Foundation under Grant NSF:MRI 1338044.

Mapping the St. Lawrence County Poorhouse cemetery in Canton, NY. EMILY LIEBELT, MELANIE SWICK, MINDY PITRE, ALEXANDER STEWART and CARL PIERCE. St. Lawrence University.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Background: The St. Lawrence County Poorhouse cemetery in Canton, New York contains the remains of over 600 individuals dating to the late 19th to early 20th centuries. Individuals buried within the cemetery were considered poor, indigent, insane, or feeble minded. More than 40 feet of the cemetery have eroded away by the Grasse River and bone has been exposed on several occasions. **Methods:** With only 111 tombstones remaining and over 480 unmarked graves, geophysical techniques were necessary to map the site. In this study we used ground penetrating radar (GPR) to survey the 5000 square meter cemetery site. Grave-like anomalies were georeferenced using GPS (global positioning system) and marked in the field. **Results:** While we were unable to distinguish between individual graves, we were able to create a map using Arc GIS to show the location of possible graves. The results of this study are currently being used by DSLC to relocate through archaeological salvage several of the graves found along the river's edge. **Conclusion:** This survey, in combination with historical research, is shedding light on a long-forgotten part of St. Lawrence County's past and is offering a glimpse at what life was like in early 19th–20th century poorhouses in upstate New York.

Nonspecific infection of Windover subadults. KAITLYN LISEBY and GEOFFREY THOMAS. Florida State University.

Background: The causes of non-specific infections, periostitis or osteomyelitis, in pre-historic human skeletal populations is not widely understood, especially in subadults. The long bones of the subadult skeletons of the 8,000-year-old hunter-gatherer Native American population of Windover, Florida demonstrate high levels of nonspecific infection; no study thus far has been conducted to understand why. **Methods:** All of the subadult skeletons containing long bones from the Windover skeletal population, 39 in total, were assigned nonspecific infection severity rankings for each long bone the skeleton contained. Each long bone was given a severity ranking ranging from 0-3, with 0 representing no infection of the bone and 3 representing the most severe level of infection of the bone. Each bone was given an absence (0) or presence (1) ranking on the proximal, medial, and distal thirds of the long bone. Finally, all of the subadult skeletons containing crania were observed to determine the absence or presence of cribra orbitalia. **Results:** 18 of the 39 subadults showed non-specific infection of the long bones. It was concluded that the non-specific infection in the subadults was linked to

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

chronic anemia. 13 of the 18 infected subadults were found to have cribra orbitalia, an indicator of chronic anemia. Of the 5 infected subadults not shown to have cribra orbitalia, 2 were missing their crania. **Conclusion:** Chronic anemia is shown to reduce the strength of the immune system creating the conclusion that the Windover subadults suffered from anemia that resulted in the ease of contraction of infection. These hunter-gatherer subadults may have had a range of metabolic deficiencies including anemia contributing to their overall weaker immune system. The Windover population may be a model for the cause of nonspecific infection in other prehistoric hunter-gatherer populations' subadults.

The penalty for brawling: Patterns of healed skeletal trauma in free-ranging *Saimiri sciureus*. RISA LUTHER, CECILIA MAYER and SCOTT S. LEGGE. Macalester College.

Background: This study aims to connect observational, qualitative data from the published literature of *S. sciureus*' behavior and social organization to survived trauma evidenced in skeletal remains. **Methods:** To understand survivable traumatic injuries sustained by New World Monkeys, macroscopic skeletal analysis was conducted on one species (*Saimiri sciureus*) collected in the

mid-1900s in Brazil. The remains are a part of the Tappen Collection housed in the Department of Anthropology at the University of Minnesota (UMN). Sixty disarticulated adult skeletons of *S. sciureus* are examined for frequency of trauma by sex. **Results:** Overall, trauma is seen in 1.60% of the sample (n=5947), including 1.18% of female bones (n=2970) and 2.02% of male bones (n=2977). The highest frequencies of trauma are seen in scapulae (17.39%, n=46) and femora (4.76%, n=42) in females and in radii (3.93%, n=51) and fibulae (4.44%, n=45) in males. Analysis shows that among *S. sciureus* there is a statistically significant difference in overall trauma load and trauma in caudal vertebrae, phalanges and metatarsals between the sexes with adult males sustaining significantly more trauma than adult females in each case. **Conclusion:** The results of this research may be connected to behavioral observations of intra-species aggression among male monkeys, such as brawling pile-ups and other types of learned aggression and play behaviors.

This project was funded by Macalester College: Educating Sustainability Ambassadors Summer Research Grant for Collaborative Summer Research.

Correlations to the rituals of feeding: An instantaneous behavioral sample

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

of the *Alouatta Palliate*. TANNER MARTIN. University of West Georgia.

Background: During fieldwork on the Osa peninsula, a high frequency of howler monkey calls was noted daily around 4:30 AM. Such consistency lead to a correlation between the call frequencies and feeding frequencies of the mantled howler. **Methods:** For this pilot study, instantaneous behavioral sampling was utilized over a period of six days in order to document the feeding frequencies of mantled howler monkeys, *Alouatta palliate*, on the Osa peninsula, Costa Rica. This form of behavioral sampling would require me to measure mantled howler feeding frequencies at one minute intervals. **Results:** Through the use of instantaneous behavioral sampling, a potential overlap in the home ranges between various primate troops inhabiting this semi-dry temperate rainforest was noticed. This could indicate greater competition for food within a species. After a six day period of collecting feeding frequency data, Costa Rican mantled howler monkeys were recorded feeding a total of 30.2% of the time and not feeding a total of 69.8% of the time; however, the data collected in this pilot study shows that Costa Rican mantled howler monkeys feed more consistently during the morning compared to the afternoon. If these feeding patterns were confirmed

through further analysis, one might correlate the early morning to lower predator pressures, making food more easily available. **Conclusion:** Conducting research on primate feeding frequencies is important because it can also aid in estimating local demographic conditions such as home range, population size, and population density. Moreover, documenting these feeding rituals can lead to a more concrete understanding of primate social hierarchy and territoriality.

How tough is the grey-cheeked mangabey: Patterns of trauma in *Lophocebus albigena*. CECILIA MAYER, RISA LUTHER and SCOTT S. LEGGE. Macalester College.

Background: This topic discusses the frequencies of trauma in a skeletal collection of grey-cheeked mangabeys with reference to previous research on the species regarding diet, social behavior, and environment. **Methods:** Research methods include data collection through macroscopic and microscopic analysis of the skeletal collection. Data analysis was done through statistical tests. **Results:** Data analysis showed that males have more trauma than females in ribs, metatarsals, and phalanges. Males also have more trauma overall than females when all bones are combined. There was

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

no statistically significant difference between trauma in individuals by sex.

Conclusion: This research is relevant to the field of physical anthropology in that it discusses non-human primate osteology and behavior.

Funded by Educating Sustainability Ambassadors Collaborative Summer Research Grant at Macalester College.

Adaptations of the hallucal metatarsal in hominin bipedalism. SARAH G. MCCRACKEN. University of Tennessee Knoxville.

Background: Skeletal adaptations for primate bipedalism in the lower limbs include, but are not limited to, a decrease in the bicondylar angle of the femur, decreased fibular robusticity, and increased robusticity of the calcaneus. Arguably one of the most marked differences in primate long bones of the lower limbs occurs in the hallux, which is opposable in quadruped primates, but not in human bipeds. **Methods:** For this study I examine and synthesize the relevant literature highlighting the differences in the function and morphology of the hallucal metatarsal in primate quadrupeds (*Pan troglodytes*) and hominin bipeds (*Homo sapiens*, *H. neanderthalis*, and *Australopithecus afarensis*). I examine trends for diaphyseal morphological adaptation in the transition to bipedalism, as well as

possible implications for bone flexibility or lack thereof due to the differences in diaphyseal thickness and distribution in *Pan troglodytes* and *Homo sapiens*, as well as models for lower limb movement and the weight bearing capacity of the hallucal metatarsal. Finally, I examine overall adaptive and evolutionary trends in the structure and function of the hallucal metatarsal that may have aided in the transition to bipedalism.

Results: The bipedal hominins discussed share overall trends in hallucal orientation and shape. The biped hallux is more robust, less flexible, and lies closer to the midline than the quadruped hallux, which retains grasping capabilities, making the first metatarsal rather more like the first metacarpal of humans. The chimpanzee hallux also differs, not only in rugosity and position, but also in the movement of the hallux within the foot. During bipedal walking, while the human hallux is configured with weight distribution dorsoplantarly, the chimpanzee hallux is configured with the weight along the medial-lateral plane. As such, the chimpanzee hallux displays differing configurations of cortical bone along the shaft of the hallux. **Conclusion:** Differences in the morphology and cortical structure of the first metatarsal between primate quadrupeds and bipeds are important factors in the transition to bipedal locomotion. Understanding the

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

similarities in structure and orientation of the hallux in fossil hominids and modern humans, and comparing this structure to quadrupedal primates allows us to better understand the evolution of Hominin bipedalism.

To care or not to care? Paternal and alloparental care in free-ranging male Coquerel's sifaka (*Propithecus coquereli*). LINDSEY MEADOR. Northern Kentucky University.

Background: My study focuses on paternal and alloparental infant care in Coquerel's sifaka. Specifically looking at how genetic relatedness to an infant may bias time invested into the infant
Methods: I used instantaneous focal follows where I collected the behavior and distance to the infant of focal male (n=2) at one minute intervals, and ad libitum data on aggression (noting the giver and receiver), and play and grooming, where I noted who began and ended the social interaction
Results: I found differences between the males in time spent in infant care behaviors (grooming and play) and differences in the males' overall distance to the infant (Mann-Whitney test: $Z=29865$, $p<0.0001$, $n=610$). However, Hinde's indices indicated that both males were actively maintaining social relationships with the infant. **Conclusion:** The study of primatology contributes to the field of

biological anthropology as we can learn more about humans as a species by studying our own primate relatives. By studying infant care in males, we may be better able to understand this behavior in humans.

A study of habituation in *Eulemur flavifrons*. KATHERINE MEIER. Macalester College.

Background: Behavioral observations and data were recorded over the course of three weeks detailing the change in reaction to researcher presence among a group of wild blue-eyed black lemurs in northern Madagascar. **Methods:** Over the course of 17 days, the lemur group's behavior was recorded using an ethogram. We applied the Point Center Quarter method to the trees used for rest and feeding by the lemurs and the GPS coordinates of those trees were recorded in order to map and analyze the home range and ranging behavior of our group. **Results:** We saw a clear change in the behavior of the group of *flavifrons* from the start to the finish of our study. They were clearly more tolerant of our presence by the end, with the majority of behavioral responses shifting from avoidance, display and curiosity to curiosity and ignore. In addition, we found that their home range directly overlapped with that of a second group of *E. flavifrons*. **Conclusion:** Non-human primates who

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

have had little or negative contact with humans are often flighty and timid. Behaviors forced by human presence such as avoidance, display or flight, make research and observation difficult or impossible. Non-human primate behavioral studies are essential to anthropological understanding especially as the physical proximity of humans and other primates grows. The conservation status of this species is critical and any research furthering our understanding of its behavior, ability to adapt, and environment is invaluable.

Exploring the energetic costs of infant care in wild forest baboons. ALYSSA M. MOLLOY, EMMA C. CANCELLIERE, CALEY A. JOHNSON, and JESSICA M. ROTHMAN. CUNY-Hunter College.

Background: Gestation and lactation are highly costly to female primates, but less is known about the energetic and time costs associated with infant care. We conducted an experiment to explore how infant care affects foraging behavior and feeding efficiency in a population of forest-dwelling olive baboons (*Papio anubis*). We hypothesized that there is an energetic cost to infant care that would affect the mother's ability to forage. We expected to find that the female baboons would forage less often and less efficiently while carrying their infants due to the

energetic costs of the added weight and lactation. **Methods:** This research was conducted in Kibale National Park, Uganda, from June to July of 2014 on a group of 65 forest-dwelling wild olive baboons. At the time of research there were six mother/infant pairs. Data was collected through 10 minute rotating focal samples on mothers with dependent infants. During each focal sample the mother's activity and infant location was recorded. Plant species, plant part, and unit count was also recorded during feeding bouts. **Results:** Contrary to our hypothesis, wilcoxon signed rank tests revealed that mothers did not significantly spend more time feeding with the infant than without the infant ($V=1335.5$, $p=0.2208$). While the infant was on the mother, there was no significant difference whether the infant was ventral or dorsal ($V=643$, $p=0.3925$). But while the infant was away from the mother, the time spent feeding was significantly longer when the infant was two meters or less away than when the infant was three or more meters away ($V=1033.5$, $p<0.001$). There was no significant difference of feeding efficiency between infant locations ($V=905$, $p=0.9442$). In these forest dwelling olive baboons, the energetic costs of infant care do not significantly affect the mother's ability to forage, although there may be an effect of infant distance from the mother on her likelihood to forage. **Conclusion:**

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

Baboons, like early humans, can adapt to a wide range of habitats making them a useful model for early human evolution. In studying the nutritional and energetic requirements of forest-dwelling baboons, we can attempt to understand the underlying factors that led early humans to leave the forest for a savannah habitat.

Funded by Raab Presidential Fellowship.

Anti-predator behaviors in four species of nocturnal prosimian at the Duke Lemur Center. CODY J MOSER. Florida State University.

Background: At least one-third of known extant primate species exhibit nocturnal behavior, yet despite this fact, few projects have explored the interaction between their behaviors and environments. In this project, I build upon the relationship between nocturnal prosimians and their predators through the use of false predator models and playback experiments. **Methods:** Utilizing hawk calls, owl calls, and calls elicited by other predators found in their natural habitats, I attempted to elicit vocal and behavioral responses from the semi-free-ranging lemurs and lorises housed at the Duke Lemur Center in Durham, North Carolina. A model fossa (*Cryptoprocta ferox*) was placed in the enclosure during experiments when fossa vocalizations were played. These

experiments expand upon an original experiment conducted on mouse lemurs in their natural habitat. I was able to increase the sample size from eight mouse lemurs (*Microcebus murinus*) to thirty-three animals across five different species of strepsirrhine including; *Microcebus murinus*, *Cheirogaleus medius*, *Daubentonia madagascariensis*, *Nycticebus pygmaeus*, and *Lemur catta*. These behavioral data were supplemented with ultrasonic recordings and behavioral observations taken of the individuals in their free-range and colony-group enclosures at the Lemur Center. **Results:** Preliminary data show a behavioral trend of crypsis in all nocturnal species tested, while the diurnal *L. catta* exhibits an alternative "fleeing" and vocal trend. **Conclusion:** Further analyses of these data will attempt to elucidate roles of predator evasion and nocturnality contributing to early strepsirrhine evolution and primate diversity.

Funded by the ACC Collaborative Summer Research Award (\$5,000).

Anthropogenic effects on Procyon lotor: Detecting a secular trend. CARLY M. PATE, ANDREA R. ELLER and FRANCES J. WHITE. University of Oregon.

Background: The Common Raccoon (*Procyon lotor*) is an ecologically flexible species of mammal that occupies much

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

of N. American suburban environments. Much like some species of primate, this commensal mammal thrives in human ecologies. Their dietary range, dexterous hands, and extraordinarily plastic phenotype allows them to easily navigate our human landscape. Due to the food availability of human N. American areas, we hypothesize that raccoons will experience increases in body size through time. **Methods:** We compiled body masses over a 70 year period, and we report results on the use of cranial data to predict body size in this species. To document body size in *Procyon lotor*, we include published body masses, museum data (records and new metrics; n=26), whole body measures (n=2), and cranial measures (n=21). Whole body measures were retrieved through museum records associated with crania, or obtained in necropsy. Cranial measures (n=24) were based on published protocols; original cranial data was collected using Mitiyoto calipers. **Results:** We used cranial and external measurements as a proxy for body weight. Of 25 measurements, 36% (n=9) had less than a 20% error (2.47-17.71); four of these measures had an R² above 0.40. Combining data to chart size over time, we plotted the masses by year collected. Our results show a slight negative slope between log-transformed body weight and time, (m=-0.0023, n=51) between 1940 and

2016; we believe this result is influenced by the small sample size. **Conclusion:** *Procyon lotor* provides an interesting model for understanding anthropogenic ecologies, and potentially other areas of population and health studies.

Paleoanthropology in motion: Using X-rays to study subsurface foot motion during human footprint formation. DAVID A. PERRY, KEVIN G. HATALA and STEPHEN M. GATESY. Brown University.

Background: Fossilized tracks provide the only direct records of the locomotion of extinct taxa and thus offer promising means by which to study the evolution of hominin locomotion; yet, the final, preserved morphology of a footprint is the result of nuanced interactions between anatomy, kinematics, and substrate that have proven difficult to measure. Here, we describe the development of new experimentally-based methods that have allowed for the first quantification of subsurface foot motion during human footprint formation. **Methods:** Human subjects were asked to walk along an elevated trackway. At the center of the trackway was an interchangeable segment that consisted of artificial, radiolucent substrate. Substrates with varying degrees of compliance were used within this segment, ranging from rigid carbon

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

fiber to highly deformable mud. Seventy radiopaque beads were attached to the subject's foot and two perpendicular X-ray systems captured X-ray video of the foot-substrate interaction. Using software designed for XROMM (X-ray Reconstruction of Moving Morphology), three-dimensional bead movements across time were tracked and imported into Maya animation software, where they were used to form the basis of a low-resolution polygonal mesh to which a high-resolution photogrammetric model of the foot was bound. The end result was a complete, animated digital reconstruction of the foot's movement through the sediment, as driven by the seventy tracked beads attached to the foot's sole. The animation software then granted us a variety of tools with which to analyze the foot's motions within the substrate and their relationships to the resulting track. **Results:** This presentation is largely focused on the development of new experimental methods designed for this research. Thus, the "results" of this project would be our success in designing and implementing a new methodology that allows for the first quantification of subsurface foot motion during human footprint formation. However, it is worth noting that preliminary results indicate distinct patterns of foot motion and deformation of the plantar surface of the foot across different substrates.

Conclusion: The ultimate aim of this project is to utilize this new method in order to better understand how modern anatomy and walking relates to modern footprint morphology, thereby providing data-derived insight to interpreting fossilized hominin tracks. This, in turn, further progresses the study of the evolution of hominin locomotion.

We thank the National Science Foundation (SMA-1409612, IOS-0840950, DBI-1262156) for funding support.

Paleoarchaeology of East Turkana: Comparison of faunal and isotope data to understand ancient ecosystems.

AMY PETERSON¹, AMELIA VILLASENOR² and DAVID BRAUN².
¹New York University, ²George Washington University.

Background: Studies of fossil hominins sometimes neglect ecological factors that influenced their evolution, namely their environment. In order to increase our understanding of hominin adaptive behaviors, it is vital to understand the environment they occupied. Our research focused on analyzing the paleoecology of the East Turkana region in Kenya, focusing on geological areas that had been historically undersampled for this type of analysis. **Methods:** Our methods involved sampling both faunal remains and paleosols in order to reconstruct faunal

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

community composition and vegetation type (e.g. savannas or woodlands) to recreate the landscape of these areas. Specifically, this study compares spatial variation in paleoecology between sites within the Tulu Bor member (~3.3 Ma) (n=34 taxa, n=33 soil isotopes) and within the Lokochot member (~3.5 Ma) (n=36 taxa, n=47 soil isotopes) of the Koobi Fora Formation, respectively. **Results:** Chi squared tests showed significant variation in faunal composition between areas in the Lokochot member ($p=0.0496$) but not statistically significant variation within the more geographically separate Tulu Bor sites ($p=0.243$). Pairwise comparisons of carbon isotope data showed significant variation within the Tulu Bor sites ($p<0.001$) but not Lokochot sites. We found that, of the areas we sampled from both time periods that yielded fossil hominin remains, most were wooded-grassland environments based on the faunal remains and carbon isotope data. **Conclusion:** This indicates that for the time period we sampled (roughly 3.6-3.22 million years ago), hominins were occupying relatively closed, wooded areas, and may have been exploiting the resources that would come from such environments. Such paleoecological research can give us further clues to the conditions under which fossil hominins evolved a variety of traits, including bipedal locomotion and larger brains.

Nutritional change following social change in Illyria (modern Albania). CODEE J PFLEIDERER and BRITNEY KYLE. University of Northern Colorado.

Background: Analysis of nutritional change in a community with the introduction of new social changes. **Methods:** Methods used were the measurements of dental caries, abscesses, and pre-mortem tooth loss for each individual. These pathologies were then cross referenced with sex, age, and time. **Results:** Data showed us that individuals in Durres (74%) during the Hellenistic period had dental caries and evenly distributed cases of tooth loss and abscessing compared to the late Roman period (47%). Young individuals under the age of 20 tended to have worse dental health. Of the 73 young adults analyzed we found that they averaged more caries (30%) and abscessing (15%) compared to mid-aged and older adults. On the other hand tooth loss seems to be the same between ages. This can signify that younger individuals may have had less access to nutritious foods that leads to disease compared to the entire community **Conclusion:** The relevance of this work is to better help us understand how nutrition changes within a society when exposed to new adaptations such as, colonization, agriculture, and social change. This research also helps us

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

understand how nutrition changes with the addition of urbanization as well.

A comparative study of the glenohumeral joint in New World monkeys. RACHEL PROVAZZA. Dickinson College.

Background: Due to the forelimb-dominated suspensory locomotion of *Ateles*, the glenohumeral joint of this genus should exhibit a rounder and wider humeral head and glenoid fossa in comparison to other monkeys of the Aotidae, Atelidae, Callitrichidae and Cebidae families who take part in more quadrupedal locomotion. Previous research has shown that *Ateles* has a more globular shaped humeral head with larger articular surfaces on the glenoid fossa, suggesting a larger range in motion necessary for forelimb suspension. **Methods:** This study examines the glenohumeral joint of a collection of ten genera of adult monkeys from the Aotidae, Atelidae, Callitrichidae and Cebidae families, native to South and Central America. I carried out two linear measurements of the length and breadth of the humeral head and preformed four linear measurements of the glenoid fossa: total length, breadth of the most caudal half, breadth of the most cranial half and length from the more cranial point to the location of the maximum caudal breadth. Of these six measurements, I

computed four indices: the breadth-length ratio of the humeral head, breadth-length ratio of the glenoid fossa, maximum breadth of the glenoid articular surface and the location of the maximum breadth of the glenoid fossa. I analyzed the data using ANOVAS and Bonferroni post-hoc tests to examine each separate index in addition to the MANOVAS among the four indices. **Results:** The indices show that *Ateles* had a round humeral head and a larger articular surface (ANOVA F-statistic= 16.87, $p < 0.01$). In addition, the glenoid fossa of *Ateles* reflected a wider and more round glenoid fossa compared to a long and ovular glenoid fossa of other genera (ANOVA F-statistic= 23.32, $p < 0.01$). Both the location of the maximum breadth of the glenoid fossa (ANOVA F-statistic= 6.009, $p < 0.01$) as well as the location of the maximum breadth of the articular surface (ANOVA F-statistic=8.883, $p < 0.01$) were cranially situated in *Ateles* whereas the maximum breadth of other genera were more caudally located. **Conclusion:** While previous research had been conducted regarding the effect of locomotion and behavior on the morphology of hominids, little has been researched in the realm of New World Monkeys. In this study, the variation of locomotion between *Ateles*, a genus known for forelimb-dominated suspension, and other genera characterized by arboreal

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

quadrupedalism is evident in the difference in shoulder morphology.

Polio in ancient Nubian skeletal remains. MEGHAN ROSE, KATIE WHITMORE and MICHELE BUZON. Purdue University.

Background: The skeletal remains of the individual being studied come from a site called Tombos located on the third cataract of the Nile in modern day Sudan. This individual was recovered from the western chamber of burial 36 which also included several other individuals, including many children. Coffin and other artefactual remains date the tomb to the mid to late 18th dynasty of the New Kingdom (~1400 BC). **Methods:** The individual was inventoried and assessed visually for pathological conditions. Along with visual assessment, metric traits were taken for all long bones, both clavicles, both scapula, and the cranium. Sex was determined and age was estimated for using the standards of Buikstra and Ubelaker. **Results:** This individual was female based on cranial morphological traits (pelvic traits were not well preserved). She is estimated to be middle-aged. This individual appears to have experienced paralysis in the lower half of her body based on the significant amount of atrophy in the long bones of the legs and pelvis. She also had severe scoliosis in her lower spine, fusion of

two lumbar vertebrae, and signs of arthritis in her vertebrae. Her right humerus, ulna, and radius were similar in length to her left, but the dimensions of the right arm bones were smaller than her left, which was also observed in the pair of scapula. All of these pathological traits are consistent with this individual having had poliomyelitis in childhood, which can result in paralysis and bone deformations such as scoliosis. The slight atrophy in the right arm and scapula can be the result of post-polio syndrome where a lack of use due to new weakness can occur after the fact. Because this individual survived into adulthood, we can assume that she had a caregiver, as she could not have provided well for herself. There are no signs of abuse or nutritional deficiencies on the skeletal remains. **Conclusion:** Having an individual who experiences debilitating deformities, such as we see with this female individual, in a society in which we can no longer study their day to day activities in real time can give us great insight into how people from this society and culture understood and cared for/not cared for individuals with debilitating circumstances. Whether we see signs of abuse in only disabled individuals but not elderly individuals or some combination of circumstances can help us understand how disabled/elderly/deformed individuals were perceived in a society.

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

Biology trumps mechanics: Bone adaptation to exercise correlates more closely to bone marrow stem cell responsivity than peak forces. JASPER RUBIN-SIGLER¹, GABRIEL M. PAGNOTTI² and IAN J. WALLACE³. ¹Emory University, ²Stony Brook University, ³Harvard University.

Background: Force magnitudes are considered a primary determinant of bone's adaptive response to exercise. Yet, to a degree, the ability of a bone to respond to functional challenges may be regulated by regional variations in the capacity of marrow progenitors to differentiate into bone-forming cells. **Methods/Results:** Here, we examine the relationship between bone adaptation and mesenchymal stem cell (MSC) responsivity in growing mice subject to exercise. First, using a force plate, we show that peak external forces generated by forelimbs during running are approximately 20% ($P<0.001$) higher than hindlimb forces. Second, using micro-CT to quantify humeral and femoral morphology in mice subject to 4 weeks of treadmill running as compared to sedentary controls, the skeletal response to increases in loading is shown to be site-specific but not predicted by peak forces. While exercise failed to augment either cortical or trabecular structure in the humerus, the femoral mid-diaphyses of running mice had 11% ($P<0.001$) larger cortical areas,

17% ($P<0.01$) larger maximum second moments of area, and 16% ($P<0.01$) larger minimum second moments of area. Trabecular bone quantity in the distal femur increased 24% ($P<0.05$) in runners. Finally, fluorescence-activated cell sorting (FACS) was used to show that marrow-derived MSCs from the femur are more responsive to exercise-induced loads than those from the humerus, such that running lowered MSC populations only in the femur (by 34%, $P<0.05$). **Conclusion:** Together, these data suggest that changes in skeletal morphology induced by exercise must consider both the mechanical challenge, as well as the biologically defined ability to respond.

Funded primarily by the LSB Leakey Foundation.

Is osteoarthritis a consequence of evolution? A finite element analysis of the anatomical geometry in the mouse knee. MICHAEL RUIZ and RONALD JUNE. Montana State University.

Background: The modern knee is a unique and recent functional adaptation. We hypothesize that evolution has not had sufficient time to adapt to the new long-term mechanical demands of daily human life. **Methods:** Traditional structural engineering methods provide a useful methodological framework for studies of degenerative joint disease. This study

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

will examine the geometrical properties of the skeletal and cartilaginous elements of the knee joint in a mechanical framework. Finite element analysis will be used to assess the reliability of our geometric components of interest. Under IACUC approval, mice were individually housed and provided with instrumented running wheels for voluntary exercise over a period of six weeks. **Results:** Preliminary results of a student's t test indicate non-significant changes in body mass ($P > 0.05$). Finite element model and analysis (pending). **Conclusion:** Our ability to identify the functional significance of changes in skeletal anatomy in response to short- and long-term deformation is key to understanding the adaptive diversity of our Hominoid ancestors and will improve our understanding of the etiology of degenerative joint disease. Our finished work will provide a useful methodological framework for future analyses to account for how skeletal form relates to function, ecology and evolution.

Funding from the Idea Network of Biomedical Research Excellence (INBRE) and the National Institutes of Health (NIH) Award # P20GM103474.

A preliminary study on human craniofacial morphology variation among subsistence groups in hyper-

arid climates. KATHARINE G.J. RYAN¹, SUSAN C. ANTÓN¹ and MARISA E. MACIAS². ¹New York University, ²American Museum of Natural History.

Background: With the rise of advanced 3D scanning capabilities, there have been several studies in the past few years that have aimed to identify global trends of human craniofacial variation between subsistence groups. Knowing that climate is also a strong mechanism behind craniofacial variation, I provide additional insights into this research by taking these broad trends and testing to see if they hold true under an extreme environmental condition. **Methods:** I chose two archaeological populations, both of which subsisted in hyper-arid climates: Egyptians (agriculturalists) (N=40), and Australian Aboriginals (hunter-gatherers) (N=34). For my preliminary data, I took standard craniometric measurements of the crania and mandibles using spreading calipers, controlled for general size differences with geometric means. For my preliminary analysis, I chose the following trends to test: Upper Facial Height (NPH), Maximum Cranial Breadth (XCB), and the Bigonial Breadth (BGO) are significantly greater in agriculturalists than hunter-gatherers, while Maxillo-Alveolar Breadth (MAXB) is greater in hunter-gatherers. **Results:** T-tests showed NPH ($p=.000$),

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

XCB ($p=.000$), and BGO ($p=.016$) were significantly greater in Egyptians than Australian Aboriginals, supporting our expectations. However, MAXB ($p=.351$) failed to reach significance. This could be because the palate, acting as the floor of the nasal cavity, is responding more strongly to the hyper-arid climate. **Conclusion:** This preliminary analysis has promising implications for the relationship between subsistence and climate in craniofacial variation. This will be followed up with more complex morphology shape analysis using imageJ, as well as an exploratory comparison to an additional subsistence strategy specifically adapted for hyper-arid climates, pastoralism.

This research was made possible by a grant from the Dean's Undergraduate Research Fund from the NYU College of Arts and Science.

Life and death in Roman Crete: An osteobiography of skeleton 4 Tomb A from Ierapetra, Crete, Greece. CHELSEY SCHROCK. Kennesaw State University.

Background: This research was compiled during my time as a research assistant at the INSTAP Center in East Crete. In order to experience the post archaeology process from start to finish, each student was given a skeleton to clean, sort, assemble, and assess. **Methods:** The tomb that held the

remains was cracked open and left the remains exposed to the elements. This left post cranial material very deteriorated and fragmented. After gently cleaning the post cranial material, the dirt encrusted skull was cleaned and a coin was found in mouth. The finding corroborates previous research from that area that shows evidence of a ritual based on demographic characteristics of the deceased. **Results:** The individual from Tomb A in fact was a young female with no pathologies. The most significant finding was the presence of the coin in her mouth. **Conclusion:** This research gives a look at not only this individual's person health, but also possibly the burial practices associated with demographic characteristics.

Bones don't lie: Historical and forensic comparisons of Wellesley College's human skeletal anatomy teaching collection. ISABEL STARR and AUDREY CHOI. Wellesley College.

Background: Our project looks into the accession of the Wellesley College human skeletal anatomy teaching collection through archival and forensic research, using age, sex, and ancestry demographics to understand the composition of the collection in comparison to its contemporaries from the early 20th century. **Methods:** Using Osteoware, a computer software

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

program designed to assist in the documentation of human skeletal remains, we collected metric and non-metric cranial data from the 45 skulls in the collection. We then analyzed this data using FORDISC to assess the age, sex, and ancestry of each individual. **Results:** Statistical analysis of the data in FORDISC shows that the Wellesley College human skeletal anatomy teaching collection is mainly comprised of black and white young adult individuals, most likely of lower socioeconomic status. These results are consistent with the majority of sources of human skeletal material from the late 19th and early 20th centuries. We are also able to cross-compare this data with the records of accession to the Wellesley Zoological Museum in the Wellesley College Archives. **Conclusion:** This research is relevant to anthropology as it sheds further light on the creation and composition of human skeletal anatomy teaching collections in colleges and universities, and provides more information about the anonymous individuals that make up these collections and how they came to be used to teach students about human anatomy.

Funding from Wellesley College Office of the Provost's Research Grant to conduct primary source archival research in the Ward Archives at the University of

Rochester Rare Books and Special Collections Preservation Department.

Examining the variation of orbital shape in modern human populations using 3D geometric morphometrics. MELISSA G TORQUATO and MAJA ŠEŠELJ. Bryn Mawr College.

Background: One of the common traits used to assess ancestry is the variation in shape of the orbital opening. Angular, rounded and rectangular orbits are characteristic of European, Asian, and African populations respectively. **Methods:** In order to study the variation in orbital and facial shape and its relationship to geographic region, I conducted a 3D geometric morphometric analysis with 83 specimens from Europe, Africa, Asia and Australia. Forty-nine standard osteometric landmarks and twenty points around each orbit were recorded in order to study the variation in shape. I performed a Principal Components analysis to assess the variation between the specimens. **Results:** The study determined that Europeans are characterized by angular orbits, Native American and Asian populations are categorized by round orbits, and Australian populations are categorized by rectangular orbits. Other traits were assessed by looking at variation in face shape. Although these traits were present, there was a substantial amount

**AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016**

Abstracts

of overlap between populations demonstrating that orbital shape and other ancestral traits are continuous, not discrete, characteristics. **Conclusion:** The significance of this research is twofold. First, this research had the potential to interrogate the categories of orbital shape while enhancing the methodologies that are used for determining ancestry. Secondly, it provided geometric morphometric evidence that supports that orbital shape is a continuous characteristic.

Travel for conducting research was funded by the Leadership, Innovation, and Liberal Arts Center at Bryn Mawr College.

Geographic variation in gibbon diets.
AVERY K. TWITCHELL-HEYNE¹ and
HERMAN PONTZER². ¹Rice
University, ²CUNY-Hunter College.

Background: Gibbons are among the most endangered primates, yet remain the least studied of the apes. Deforestation has isolated entire species and many populations whose continued survival requires active conservation measures. **Methods:** Understanding the feeding ecology of these apes is essential for developing effective management strategies. Previous analyses of gibbon diets have focused on few species, underrepresented Hoolock and Nomascus genera, and neglected to examine taxonomic diversity in plant

foods. In this study we analyze the relationship between geographic variation and diet composition and diversity in thirteen gibbon species. A review of 34 studies of at least 11 months' duration yielded 58 samples describing the diet of 81 groups and 314 individuals. **Results:** Hylobates was the most represented among samples (n=21), followed by Hoolock (n=20), Symphalangus (n=10), and Nomascus (n=7). Gibbons are primarily frugivorous, spending 24% and 36% of feeding time on figs and non-fig fruits respectively (n=56). Nomascus was the most folivorous. Plant food diversity was not related to gibbon taxon but was inversely related to fig consumption. Rainfall, latitude, altitude, territory size, and forest size differed significantly among genera ($F=3.49-624.8$, $p<0.01$), as did all fruit and leaf consumption ($F=3.96-6.25$, $p<0.01$). Hoolock and Nomascus together experienced the highest altitudes and latitudes, the least rainfall, and the most fragmentation, and demonstrated the greatest variation in diet composition. **Conclusion:** These results illustrate the substantial diversity in feeding ecology among the smaller apes, and their resourcefulness under environmental stress. More research is needed on gibbons in degraded habitats to maximize conservation efforts for these vanishing primates.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

New approaches to measuring diffuse idiopathic skeletal hyperostosis.

MEGAN F. VELTRI¹, JORDAN R. LEWMAN¹ and DANIEL J. WESCOTT².

¹Texas State University-San Marcos,

²Forensic Anthropology Center, Texas State University.

Background: Diffuse Idiopathic Skeletal Hyperostosis (DISH), characterized by the ossification of ligaments in the spine, is a well-known but insufficiently studied skeletal pathology. While overall prevalence of DISH in different populations is well documented, osteometric methods determining its severity are mostly absent in the literature. This study intends to create an appropriate method of measuring DISH in a known skeletal sample to assess the effects of obesity and diabetes on this skeletal pathology. **Methods:** The sample consists of remains from the Texas State University Donated Skeletal Collection. Individuals with DISH (n=14) were selected based on diagnostic pathological characteristics. The spinal levels affected, as well as the length, width, and thickness of the ossified ligaments were measured using sliding calipers and radiographs to quantify maximum volume of vertebral DISH. Vertebral columns were measured four times total, twice by each author. **Results:** Inter- and intra-observer reliability was assessed to determine the validity of the methods

used. Our research shows these elementary techniques exhibit 16% inter-observer error and 6-9% intra-observer error, which may be adequate for use in assessing DISH severity, but must be improved. **Conclusion:** The initial goals of this study were to determine the prevalence of DISH in obese and/or diabetic individuals using measured standards. However, lack of osteometric techniques for DISH required the authors to create measurement standards for use in this study. In conclusion, further research must be performed to develop acceptable techniques for measuring and analyzing DISH in skeletal samples.

This work is supported by instrumentation funded by the National Science Foundation under Grant NSF:MRI 1338044.

Rib curvature, thoracic shape and locomotor adaptation in anthropoid primates.

ANNIE WALLACH, EMILY R. MIDDLETON and CAROL V. WARD. University of Missouri.

Background: Thoracic shape is hypothesized to reflect locomotor adaptation in primates, with hominoids having broader rib cages associated with a shoulder joint positioned laterally compared with monkeys who have narrower rib cages that position the shoulder joint to face ventrally. Rib curvature should reflect overall thoracic shape and so differ among taxa with

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

varying locomotor repertoires. **Methods:** Using ImageJ, we quantified rib curvature from photographs of all ribs of over 200 anthropoid primate individuals. Curvatures of upper, middle and lower ribs were compared among taxa using analysis of variance with post-hoc adjusted pairwise comparisons. **Results:** Contrary to our predictions, monkeys and apes do not differ appreciably in rib curvature throughout the thorax. Humans and hylobatids, however, were significantly more curved than other taxa in the upper ribs, perhaps reflecting a relatively broader upper thorax. In the lower ribs, humans were more curved than nonhuman primates, but other taxa were equivalent. **Conclusion:** This research suggests that rib curvature itself is not a sensitive indicator of locomotor differences in anthropoid primates. In addition, our results show that taxa may differ throughout the rib cage in curvature that may reflect overall thoracic shape, and that these patterns vary among ribs and across taxa. Other factors such as vertebral form and rib declination may also contribute to rib cage shape. Understanding thoracic shape in primates is important for exploring body form and its relationship with body shape and locomotor adaptation in extant and fossil species.

Funded by NSF BCS 0716244 to CVW.

Children's health and social changes in ancient Albania. MARIA J WARNE and BRITNEY KYLE. University of Northern Colorado.

Background: Durres and Apollonia were initially occupied by local Illyrians, but were later colonized by the Greeks (c. 600 B.C.) and Romans (c. 250 B.C.). **Methods:** Subadult remains were scored for non-specific stress indicators (including cribra orbitalia, porotic hyperostosis, and linear enamel hypoplasia) from 100 individuals from Durres (n=47) and Apollonia (n=53). **Results:** Our results indicate that the majority of subadults (55%) died between ages 0-5 years (68% of subadults from Apollonia and 40% of subadults at Durres died before age five). No clear patterns of change in skeletal stress through time or between the two sites emerged, which supports the null hypothesis. However, prevalence of cribra orbitalia decreased with age (62% of subadults aged 0-5 had cribra orbitalia in contrast to 33% of subadults who survived to 16-20). **Conclusion:** We chose to study subadults because their skeletons are often underrepresented in the archaeological record, but are full of information about how environment and lifestyle affect a population.

Tibia measurements in sex determination in ancient Cretan

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

populations. PRINCESS AURORA WILSON. Kennesaw State University.

Background: The scope of my research involves using tibia circumference measurements to investigate whether they can be used to determine biological sex. **Methods:** Metric measurements were taken utilizing a measuring tape of all tibia specimens. The measurements were collected and then subjected to SAS 9.4 Simple Regression. **Results:** I wanted to create a standard scale which would use tibia measurements to sex individual skeletons. The logistic model showed 87.5% to 93.75% accuracy. **Conclusion:** This research is relevant to anthropology because it explores different sexing techniques which would benefit bioarchaeologists.

Coalition frequencies in the feet of modern Thai. LAURA A WINTERS, SCOTT E. BURNETT, D. TROY CASE, SITTIPORN RUENGDIT and PASUK MAHAKKANUKRAUH. Eckerd College.

Background: Coalitions are congenital malsegmentation anomalies that can result in the abnormal union of tarsals and/or metatarsals by bony or fibrocartilaginous tissue. Population variation in coalition frequencies and sites can provide insights about relationships among human samples and their evolutionary histories. **Methods:** A sample of 355 skeletons

from the Excellence Center in Osteology Research and Training Center at Chiang Mai University in Thailand was analyzed for morphological evidence of tarsal and metatarsal coalitions, with a subset analyzed for pedal symphalangism. The resulting coalition frequencies were compared to those from European, African, Native American and other Asian samples. We hypothesize that coalition patterns in our Thai sample will be most similar to other Asian and Native American samples due to their evolutionary relationships. **Results:** Inter sample differences were tested using a two-tailed Fisher's Exact test ($\alpha = 0.05$). Statistically significant differences in coalition frequencies were found between samples. For example, European samples exhibit a significantly higher proportion of hindfoot coalitions relative to other regions. As predicted, the pedal symphalangism frequency in Thai is not significantly different from Native American and Asian samples, however, the European and African sample frequencies were significantly lower. Based on cuneiform III-metatarsal III coalition (CF3-MT3), Thai frequencies for the distal midfoot, were significantly different from Native Americans, but not European, African, and Asian samples. Interestingly, the only Asian sample with significantly higher frequencies of CF3-MT3 coalition is

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Abstracts

from the Lake Baikal region of Asia, supporting genetic evidence linking the ancestors of Native Americans to this area. **Conclusion:** Coalitions can be informative about the relationship between populations through linking similar coalition sites and frequencies. For example, similar patterns of coalitions between two populations can be used to trace one population to their source population, while in contrast, dissimilar patterns can be informative about how distantly two groups are related.

Some funding for travel to Thailand and the AAPA conference was provided by the Ford Scholars Foundation at Eckerd College.

Cortisol trajectory from weaning to dispersal in chimpanzees. DAVID WOOD, REBECCA STUMPF, C. IRUMBA, SUMMER SANFORD, A. FORD and ALEXANDRA LYNN. University of Illinois.

Background: To avoid incest, female chimpanzees (*Pan troglodytes*) generally leave their natal group during adolescence. The proximate explanations for the occurrence and timing of dispersal remain unclear. One factor, social stress, may catalyze female chimpanzees to leave their kin group to alleviate this stress. **Methods:** Using urine samples from the Kanyawara community of in Kibale National Park Uganda, we will construct a

developmental trajectory of cortisol using ELISA analysis. We will compare this data with the behavioral record of these individuals to determine if a rise in cortisol levels is correlated with the frequency of antagonistic interactions and if these interactions are associated with dispersal timing. **Results:** Preliminary results suggest that there is an early peak in female cortisol concentration around the time of weaning, cortisol concentrations generally decrease post weaning, the confidence interval for this decrease is large, but as more individuals are tested a stronger trend will be revealed. At approximately age 9 urine cortisol levels increase sharply to reach a second peak at about ten years of age, corresponding to age of first maximal swelling. This spike in cortisol level could be from male sexual attention during their first maximal swelling. **Conclusion:** More fine grained analyses of cortisol concentrations and behavior over time may help to identify the proximate causes influencing dispersal timing. This research could offer a proximate explanation for female chimpanzee dispersal which will expand our understanding of chimp life history and endocrine functioning.

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Author Index

Ω denotes IDEAS Scholar. # denotes COD Undergraduate Symposium Travel Award recipient. Poster number shown in brackets []. Abstract page number shown in parentheses (). Email address is for corresponding author.

Anderson, Lily Anne #	[12]	(p7)	ander473@purdue.edu
Archer, Samantha M. #	[32]	(p7)	samanthamarie.archer@gmail.com
Ashman, Angela #	[31]	(p8)	angela.ashman@student.shu.edu
Atallah, Dania	[34]	(p11)	
Barca, Maria	[5]	(p9)	maria.barca@student.shu.edu
Beason, Cameron #	[4]	(p10)	beason.11@osu.edu
Bolte, Jessica	[45]	(p10)	jessica.bolte0422@gmail.com
Bondy, Madison #	[34]	(p11)	mhbondy@gmail.com
Burley, Olivia D.L. #	[1]	(p11)	ODLBURLEY@GMAIL.COM
Caves, Meghan Campbell #	[26]	(p12)	cavesm@beloit.edu
Chin, Chia-Ping #	[37]	(p13)	chiapingchin2016@u.northwestern.edu
Choi, Audrey	[21]	(p40)	
Chowning, Melissa T.	[9]	(p13)	chow8747@bears.unco.edu
Christopher, Lauren #	[36]	(p14)	lchri347@gmail.com
Costanzo, Juliana	[39]	(p15)	julianacostanzo@email.arizona.edu
Cumpston, Sarah M.	[55]	(p16)	smcumpst@uark.edu
Dafoe, Ashley #	[23]	(p16)	adafoe@uwyo.edu
Dorton, Ruth L. #	[6,31]	(p8,p17)	ruth.dorton@student.shu.edu
Dresser, Sarah Ω	[20]	(p19)	
Ellison, Eric #	[43]	(p18)	ellisone@wustl.edu
Gartland, Kylen	[46]	(p18)	kylengartland@wustl.edu

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Author Index

Ω denotes IDEAS Scholar. **#** denotes COD Undergraduate Symposium Travel Award recipient. Poster number shown in brackets []. Abstract page number shown in parentheses (). Email address is for corresponding author.

Glensk, Ashley Ω	[20]	(p19)	aglensk@gmail.com
Goetz, Laura Gould #	[35]	(p20)	laura.goetz@yale.edu
Green, Madelyn	[3]	(p20)	green.1365@osu.edu
Grube, Natalia T. #	[54]	(p21)	nataliagru1@gmail.com
Johnson, Casey #	[25]	(p22)	cj13h@my.fsu.edu
Katz, Aviva #	[30]	(p23)	avivak2@uw.edu
Kiefer, Lindsay #	[17]	(p23)	lnimick1@uwyo.edu
LaVictoire, Rebecca #	[48]	(p24)	becky.lavictoire@gmail.com
Lewman, Jordan R. #	[15,16]	(p25,p43)	jrl114@txstate.edu
Liebelt, Emily	[22]	(p25)	eglieb12@stlawu.edu
Lisenby, Kaitlyn #	[24]	(p26)	lisenbykaitlyn@gmail.com
Luther, Risa	[51,52]	(p27,p28)	rluther@macalester.edu
Magdaleno , Angelique	[20]	(p19)	
Martin, Tanner #	[50]	(p27)	tmarti15@my.westga.edu
Mayer, Cecilia	[51,52]	(p27,p28)	cmayer@macalester.edu
McCracken, Sarah G.	[27]	(p29)	smccrack@vols.utk.edu
Meador, Lindsey	[40]	(p30)	meadorl1@nku.edu
Meier, Katherine G.J.	[41]	(p30)	kmeier@macalester.edu
Molloy, Alyssa M.	[53]	(p31)	alyssa.molloy72@myhunter.cuny.edu
Moser, Cody J. #	[42]	(p32)	cjm13j@my.fsu.edu
Pate, Carly M.	[38]	(p32)	cpate6@uoregon.edu

AAPA COMMITTEE ON DIVERSITY
UNDERGRADUATE RESEARCH SYMPOSIUM
6-8 pm, Wednesday April 13th, 2016

Author Index

Ω denotes IDEAS Scholar. **#** denotes COD Undergraduate Symposium Travel Award recipient. Poster number shown in brackets []. Abstract page number shown in parentheses (). Email address is for corresponding author.

Perry, David A. #	[29]	(p33)	david_perry@brown.edu
Peterson, Amy #	[2]	(p34)	ap3269@nyu.edu
Pfleiderer, Codee J.	[7]	(p35)	pfle1444@bears.unco.edu
Provazza, Rachel #	[49]	(p36)	provazzr@dickinson.edu
Rose, Meghan	[10]	(p37)	rose56@purdue.edu
Rubin-Sigler , Jasper	[28]	(p38)	jman474@gmail.com
Ruiz, Michael Ω	[13]	(p38)	michaelruiz917@gmail.com
Ryan, Katharine #	[19]	(p39)	kgr247@nyu.edu
Schrock, Chelsey #	[11]	(p40)	cschrock13009@gmail.com
Starr, Isabel #	[21]	(p40)	istarr@wellesley.edu
Swick, Melanie	[22]	(p25)	
Torquato, Melissa G.	[18]	(p41)	melissa.torquato@gmail.com
Twitchell-Heyne, Avery K. #	[47]	(p42)	akt2@rice.edu
Veltri, Megan F. #	[15,16]	(p25,p43)	mfv7@txstate.edu
Wallach, Annie	[56]	(p43)	cawm97@mail.missouri.edu
Warne, Maria J.	[8]	(p44)	mariajwarne@gmail.com
Wilson, Princess Aurora #	[33]	(p44)	aurorapwilson1@gmail.com
Winters, Laura A.	[14]	(p45)	lawinter@eckerd.edu
Wood, David	[44]	(p46)	dbwood2@illinois.edu

