8th Annual GSA Research Symposium

Graduate Students in Anthropology
Department of Anthropology | Michigan State University

February 16, 2024
McDonel C103
Zoom: https://msu.zoom.us/j/96978785672
Password: GSA2024

Symposium Schedule

10:00 *Light Refreshments*

10:25 *Opening Remarks from GSA e-board*

10:30 Stacey Camp
10:45 Emily Jenkins

11:00 *Break*

11:15 Andrea Louie
11:30 Savannah Holcombe
11:45 Aubree Marshall

12:00 *Lunch*

1:00 Victoria Schwarz
1:15 Alexis VanBaarle
1:30 Joseph Hefner

1:45 *Break*

2:00 Holly Long
2:15 Carolyn Isaac
2:30 Kevin Cabrera

2:45 *Break*

3:00 Carolyn Isaac
3:15 Emma Zblewski
3:30 Rhian Dunn

3:45 *Closing Remarks from GSA e-board*

GSA Symposium Abstracts

*Indicates presenting author

10:30 Stacey Camp*, Ben Akey, Levi Webb, Hannah Magnus
Hidden in Plain Sight! The Discovery of MSU's First Observatory

The discovery of Michigan State University's (MSU) first observatory dating to the 1880s recently made international news, featured in the New York Times, the Washington Post, USA Today, The Guardian, People Magazine, Smithsonian Magazine, Space, and Popular Science. While it is exciting to see archaeological discoveries make it into the popular press, perhaps the more significant story is that the observatory would likely not have been found without years of community-building and communication across one of the largest research universities in the world. Our talk will focus on the discovery of the observatory and how our campus and off-campus partnerships were fundamental to its discovery.

Keywords: archaeology, historical archaeology, observatory, collaboration

10:45 Emily Jenkins*
Creating American Students: State Power, Linguistic Violence, and Bilingual Education

Public-school classrooms in the United States are spaces of collective memory building that utilize a white, middle-class ethos to create community and establish an American identity. This is heavily influenced by the presence of civics curricula that work to shape ideas about American exceptionalism and the archetype of "the American." The linguistic identities of bilingual students are at odds with the dominant narrative of American education, and therefore these students feel pressure to either assimilate and forgo their cultural heritage or develop an identity in opposition to dominant narratives. This presentation provides a historical context of bilingual education in the United States while considering the various ways through which the state exerts its power in American classrooms.

Keywords: bilingual education, state violence, language and power

11:15 Andrea Louie*
Rethinking the Model Minority Myth

Scholars in Asian American Studies have worked to dispel the model minority myth--the idea that Asian Americans are well behaved, high-performing, and hardworking which leads to their success in education and in the workplace. However, some scholars continue to be interested in understanding why Asian Americans appear to be outperforming their non-Asian American peers, looking to "success frames" (Lee and Zhou 2015), an "Asian American Playbook" (Chin 2020), or other explanations for Asian American academic success. My relationship with the model minority myth and its effects is complicated, as my maternal grandmother's story was used to help create the

myth in the 1950s (Wu 2014). Toy Len Goon was selected as U.S. Mother of the Year in 1952 during the Cold War. Using interviews with my own generation conducted as part of my book project, I discuss their complex relationship with the myth in relation to the family legacy and to the myth as it has evolved over their lifetimes. In this presentation, I focus on my response to feedback asking that I consider how my interviews reflect themes discussed in sociological studies examining second generation post-1965 immigrants and their approaches to education and experiences in the workplace. I discuss the importance of historical context in thinking about immigrant generations—the second generation of my family grew up in the 1930s and 40s and went to college in the 1940s and 50s. I also consider disciplinary differences in how interview data are presented and analyzed in written work.

Keywords: Model Minority Myth, generation, "Asian American playbook", interviews, disciplinary differences

11:30 Savannah Holcombe*
Geometric Morphometrics for Sex Estimation of the Scapula

This project explores sexual differences in scapular morphology through linear measurements (LM) and geometric morphometric (GM) methods. Traditional LMs assess size while GM methods primarily assess shape. Our two hypotheses are one, that the human scapula expresses sexual dimorphism in both size and shape, and two, given shape differences exist this bone will produce higher correct classification rates when assessed for sex using GM rather than using LMs. Three-dimensional data were obtained from the William M. Bass Collection (n=106); linear data were obtained from the Forensic Anthropological Databank (n=1,252).

We modeled these data separately to quantify levels of sexual dimorphism in size (LM) and shape (GM) variability. Linear measurements correctly identified 93% of the sample; the GM method could only correctly identify ~70% of the sample when following the GM protocol for scapular landmark collection outlined in Uhl et Al. 2007. However, GM data produced correct classification rates of over 93% when checked for correlation of centroid size. These results indicate that both size and shape drive differences between female and male shoulder girdle morphology, though the primary contributor is sexual size dimorphism (SSD). Size-free and/or allometric differences were also noted within this sample but with a much smaller impact on morphology. The human scapula produces high accuracy rates for sex estimation regardless of whether LMs or GMs are utilized.

Keywords: Forensic anthropology; geometric morphometrics; sexual dimorphism; skeletal sex estimation

11:45 Aubree Marshall*, Rylee LaLonde, Gabriel Wrobel
Update from the Field: The 2023 Field Season at Marco Gonzalez, Belize

The Marco Gonzalez Archaeological Program (MGAP) ran for the first time in the summer of 2023 after years of delay caused by the COVID-19 pandemic. The field school ran for four weeks and consisted of students from Michigan as well as Belize. This season focused on two structures, Structure 14 and Structure 18, focusing on pre-existing research questions from previous excavations. This season incorporated the use of photogrammetry and 3D modeling as a documentation method. This talk will focus on the findings from Structure 14, including evidence for extensive trade and exchange networks at the site, industrial-scale salt-processing, Maya Dark Earths, and a cache of what resembled grave goods without an associated individual.

Keywords: ancient Maya, archaeology, field school

1:00   Victoria Schwarz*, Emily Milton
Update from the Field: A Visual Quest into the Central Peruvian Highlands

Archaeological survey in the central Peruvian Andes began in the mid-1960s but was halted in the 1980s due to political unrest. Investigation of the Early Holocene highland sites resumed in the 2000s, however, there are still areas that have yet to be systematically surveyed. Digitization of the preexisting field survey data is a means to improve the efficiency and accuracy of new archaeological investigations in central Peru. This method can help us understand landscape change and use over time, as well as identify new zones that have not yet been surveyed. Before the start of the 2023 field season, a GIS digitization of all the available field survey data in the Junín region of the central Peruvian Andes was completed and locations were identified for field reconnaissance survey. The goal of this initial field survey was to explore the potential for archaeological sites in the locations identified from the GIS digitization. This presentation transcends traditional formats, offering a dynamic experience that goes beyond data points. Through a blend of video footage and photographs, we aim to transport the audience up into the heart of the Andes.

Keywords: Andean archaeology, geoarchaeology, field survey, GIS digitization

1:15   Alexis VanBaarle*
Using Outline Analysis to Assess Saw Mark Kerf Floor Shape Morphology

In cases of dismemberment, forensic anthropologists assess bony cut surfaces and estimate saw class characteristics, which can aid in investigative and legal proceedings. Previous research indicates that saw class characteristics such as tooth shape, saw set, and power can be deduced from the kerf floor shape. However, these studies are based on subjective visual categorizations with limited statistical assessments. This study aimed to use elliptical Fourier analysis to quantitatively assess the relationship between kerf shape and saw class characteristics.

      Incomplete kerf profiles (n=113) from 19 anatomically gifted, macerated human limbs were created using 19 saws. Kerf profiles were captured with a stereomicroscope and a closed outline was created. The outline images were subjected to elliptical Fourier and principal component analysis. M/ANOVAs were performed on resultant PCs to assess effects of saw set, power, and tooth shape on kerf shape. Cross-validated stepwise discriminant function analyses (DFA) were performed to evaluate classification accuracy.

      There was no significant difference between entrance and exit morphology (p=0.31). Significant results were obtained for all saw class characteristics. DFA classified tooth shape with 88.0% accuracy. Flat and U-shaped kerfs were associated with rip saws while W-shaped kerfs were indicative of crosscut saws. DFA classified saw power with 89.5% accuracy. On average, mechanical saws produced kerfs with larger widths compared to hand saws. Classification of saw set, however, was poor with only 59.4% correct overall. These quantitative analyses of kerf shape generally support anecdotal relationships established in the literature and the utility of kerf shape in forensic analyses.

Keywords: forensic anthropology, sharp force trauma, dismemberment

1:30   Joseph Hefner*
Exploring Mutual and Exclusive Biological Information in Cranial Metric and Morphological Variables

The relationship between skeletal phenotypic variability and genetic variation is the theoretical foundation upon which anthropological understandings of population structure (including population affinity and biodistance), familial associations, migration patterns, and macro- and micro-scale evolutionary trends are built. Craniometric data have been applied in biological anthropology for these purposes, and specifically of estimating group membership, for over 100 years, and for much longer when not considering statistical modeling (Hefner et al. 2016). A sizeable body of biological anthropology research suggests that—through both direct and indirect evidence—craniometric variables are a reliable proxy for neutral genetic information, resulting in a high level of confidence regarding their concordance and utility (e.g., Algee-Hewitt, 2016; Betti, Balloux, Amos, Hanihara, & Manica, 2009; Harvati & Weaver, 2006; Howells, 1973; Manica, Amos, Balloux, & Hanihara, 2007; Perez, Bernal, & Gonzalez, 2007; Pinhasi & von Cramon-Taubadel, 2009; Rathmann et al., 2023; Relethford, 2004; Relethford, 1994,

p. 201; Roseman, 2004; Roseman & Weaver, 2007; von Cramon-Taubadel, 2009, 2014). While early studies using craniometric data focused on race and typology, current studies continuously incorporate new modes of multivariate analyses and focus on genetic variation, population relationships, and secular change.

Keywords: Forensic Anthropology, genetic variation, craniometric, macromorphoscopic

2:00   Holly Long*
Preliminary Study of Funerary Patterns at the site of CuzCuz – Huarmey Valley, Peru

The archaeological study of funerary practices can provide information about cultural traditions, belief systems, social inequalities, and ethnicity. The excavation conducted at a pre-Hispanic cemetery at the site of CuzCuz offers the opportunity to observe the funerary practices conducted by Andean groups during the Late Intermediate Period (1000-1400 A.D.). In the Huarmey Valley, this cultural period emerged after the collapse of the Wari state and it is associated with the production of local pottery style. While most of the information recovered from CuzCuz came from the LIP occupation, there is a Middle Horizon occupation where polychrome ceramic fragments, textiles, and other artifacts were recovered. The study of funerary patterns and the changes in material culture offers the opportunity to observe/understand the social transition from the Middle Horizon to the Late Intermediate Period.

Keywords: bioarchaeology, Huarmey Valley, LIP, Middle Horizon, funerary practices

2:15   Carolyn Isaac*, Clara Devota, Alexis VanBaarle, Redwan Sony, Arun Ross
Deep Learning Models for Fracture Detection and Segmentation in Bone Histology

As digital pathology has successfully implemented artificial intelligence (AI) to enhance diagnostic accuracy, the capability of AI for the estimation of posttraumatic survival time (PTST) should be explored. This project is the first step in employing such models for PTST estimation by developing deep learning approaches for the detection and segmentation of fracture margins in photomicrographs. The study sample comprised 120 photomicrographs of fractured cranial bone annotated with a bounding box to demarcate the fractured area. These were divided into training (N=94) and testing (N=26) samples. A Faster-RCNN model was used for automatic fracture detection and Segment Anything Model (SAM) was used for segmentation. After training, the Faster-RCNN model was able to correctly detect the fracture bounding boxes with mean average precision (mAP) of 84.61% at intersection over union (IoU) threshold of 40%. To generate the precise contour of the fracture, the predicted bounding boxes from the Faster-RCNN model were used as input prompts in the generic SAM model. SAM model accomplished precise localization of the fracture in 7 of the 26 samples. These results highlight the challenges of histological fracture PTST research broadly. The limited sample size makes it difficult to divide the sample for training and testing while maintaining an adequate training sample representative of the variety of fracture morphologies. Moreover, variations in

bone samples due to the size, shape, composition, age of the individual, and type of injury further make the task challenging.

Keywords: forensic, posttraumatic survival time (PTST), fracture age estimation, histomorphology

2:30 Kevin Cabrera*
Preliminary Case Study on An Osteobiography of Tomb Op.42, Ent.5 from Copan, Honduras

This research constructs an osteobiological narrative of two females and a male from Copan, Honduras, who were placed together within a Late Classic Period (600-822 A.D.) tomb in the residential group Salamar (8L-10) Op. 42. Utilizing mortuary and isotopic data, this case study emphasizes aspects of personhood reflective of perceived sex, gender, and identity within the culturally diverse Copan society. Aspects of personhood, including gender roles, are embodied on the skeleton, enabling researchers to identify life history events and reconstruct daily practices. An osteobiographical approach best explores the personal journey of each individual by providing a highly specific context reflecting individual social and environmental experiences. This case study examines the lives of these three individuals, hypothesizing how they became entangled in death and how these stories fit into Copan society as a whole.

Keywords: Ancient Maya, Embodiment, Identity

3:00 Carolyn Isaac*, Redwan Sony, Clara Devota, Alexis VanBaarle, Todd Fenton, Joseph Hefner, Arun Ross
Automated Comparative Chest Radiography Using Deep Neural Networks

Forensic anthropologists use comparative radiography methods to link the antemortem record from a tentative identity to the postmortem record of the decedent for a positive identification. However, these often lack quantification, automation, or standardization. To address this, a large dataset of 2,753 anonymized chest radiographs representing 680 individuals were compiled from the NIH Chest X-Ray Database and casefiles from the Michigan State University Forensic Anthropology Laboratory. The dataset was divided into training (N = 1498) and testing (N = 1255) samples and three regions of interest (ROIs) were digitally annotated: 1) thoracic vertebrae one through five; 2) complete vertebral column; and 3) clavicles. Deep learning models were developed using popular Convolutional Neural Networks (CNNs), ResNet, DenseNet, and EfficientNet. A closed-set identification protocol was employed, i.e., for each probe image (single radiograph), a different image corresponding to the same identity was present in the gallery (database). Using a single ROI, DenseNet-169 correctly identified 74.42% of the probes using the T1-T5 region, EfficientNet-B3 correctly identified 73.71% with the complete vertebral column, DenseNet-201 reached 69.72% using only the clavicles, and DenseNet-169 correctly classified 69.72% using the entire chest radiograph. When the scores of multiple ROIs are fused, the true positive identification rate reached 80.00%. In comparison to a

human practitioner, DenseNet-201 can generate ranks on 1,277 radiographs in 17 seconds with 80% accuracy, whereas trained human examiners can compare 1,000 radiographs in 30 to 60 hours with 100% accuracy.

Keywords: comparative medical radiography, positive identification, machine learning

3:15 Emma Zblewski*
Biosocial media and Postural Orthostatic Tachycardia Syndrome (POTS): themes from large, public Facebook and Reddit community discussions

Biosociality is an anthropological concept referring to a social group or identity shared by people with a biological experience in common. Social media platforms facilitate the formation of these communities, allowing people even on disparate continents to connect over shared biological experiences that might be rare in their individual geographic areas. Biosocial communities of Postural Orthostatic Tachycardia Syndrome (POTS) patients are prevalent on a number of social media platforms. Reddit communities gather users to discuss a particular topic, and Facebook provides the Groups function through which users can form a public or "private" community space. We have identified more than 200 Facebook groups, ranging in size from fewer than 10 individuals to more than 58,000, and 10 Reddit communities, ranging in size from fewer than 20 individuals to more than 29,000.

Passive observation of these groups ("lurking") shows that these sites are important opportunities for patients to gather, sharing practical tips for illness management, finding community support, and forging biosocial identities. For this project we analyzed 1 week of Reddit posts from the largest Reddit community focusing on POTS, and 1 week of Facebook posts to the largest public-facing POTS-focused Facebook group. We catalogued data on the broad category of post (e.g., questions about diagnosis, discussing symptoms, questions about medications) as well as report aggregate themes of the content of these posts (i.e., medications patients are discussing, patient barriers to getting diagnosed or adhering to treatment). A preliminary round of coding and analysis was done for the American Autonomic Society's meeting in November 2023. The posts will be re-coded for major themes with the help of undergraduate research assistants. A Cohen's kappa coefficient will eventually be calculated for each theme to estimate inter-rater reliability of the themes.

Keywords: discourse analysis, social media, Postural Orthostatic Tachycardia Syndrome (POTS); medical anthropology

3:30   Rhian Dunn*, Holly Long, Micayla Spiros, Joseph Hefner, Melissa Clarkson

Nonmetric Skeletal Traits: Examination of Existing Classification Schemes and Development of a Graphic Library Depicting Variations

Due to its complex ossification pattern during development, the superior region of the human occipital bone is a frequent site of supernumerary bones, known as interparietal bones. Interparietal bones have been well studied across various disciplines and multiple classification schemes have been developed using simple icon-like graphics to represent categories of interparietal variants. However, disparities across these classification systems reveal the need for a standardized system to facilitate the comparison of interparietal bone variants. We argue that the best approach for standardization is the use of an evidence-based graphical system, a flexible interface that allows the continuous addition of any new morphological variants seen on osteological specimens. As other classification models require the reduction of all morphological variations into a few discrete categories, an evidence-based system provides an avenue for all morphological variation to be represented and facilitates an avenue for the comparison of previously existing systems without their erasure. Following an extensive literature review and the examination of physical specimen, we present a library of 78 evidence-based graphics of interparietal variants for community use. The library provides 5 graphics of different morphologies of the lambdoid suture, 62 graphics of interparietal bones, 6 of ossicles above lambda, 3 of mendosal suture variants, and 2 of intrasutural ossicles. We compare our graphics to those from existing classification schemes and discuss how these graphics will help to facilitate communication and standardize data collection. Lastly, we discuss current work to expand our graphic library to include other cranial nonmetric traits.

Keywords: classification system, cranial nonmetric traits, graphics, visual communication