Bioarchaeologists’ Northeast Regional Dialogue

8th Annual Conference

Saturday, October 13, 2018

Rowan University, Glassboro, NJ
The Bioarchaeologists’ Northeast Regional Dialogue (BNRD) Conference was established in 2010 to initiate dialogue among bioarchaeologists in the Northeast United States and to provide a semi-formal venue in which students and faculty can present current research in subfields of biological anthropology including, but not limited to, human osteology, paleopathology, dental anthropology, paleodemography, forensic anthropology, and bone taphonomy.

The 2018 conference is hosted by Dr. Maria Rosado and Rowan University in co-sponsorship with the College of Humanities and Social Sciences; Dr. Nawal Ammar, Dean; and the Department of Sociology and Anthropology.

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*If you are interested in joining the 2019 Conference Committee or Faculty Advisory Committee, please let one of the organizers know, or email bnrd.conf@gmail.com.
Rowan University is located in the southern New Jersey town of Glassboro, 18 miles southeast of Philadelphia. The campus is easily reached from the N.J. Turnpike, the Atlantic City Expressway, or any of the Delaware River Bridges.

The Welcome Gate is located at 1 Memorial Circle, Glassboro, NJ 08028. All conference attendees will enter the Welcome Gate (yellow star on map) from Rt.322, stay to the left and report to the gatehouse and Rowan Security for parking directions.

The conference will be held in the Chamberlain Student Center (red star on map). Signs will direct attendees to the venue inside.

**Wi-Fi Information:**
To access the Rowan University visitor wireless network, select “Rowan Visitor Wireless” from the list of available wireless networks on your laptop or mobile device. Accept the terms of use in the window that pops up, and then click “Connect.” If a window doesn’t automatically pop up, open a browser, navigate to rowan.edu and follow the same steps. See the link below for additional support: https://support.rowan.edu/sp?id=kb_article&sys_id=cec0bfdbdb49e280c262fbec0f961949
2018 Conference Schedule

Welcome Reception and Check-In ____________________________ 8:00-8:50

Opening Remarks __________________________________________ 8:50-9:00

**Podium Session 1** ______________________________________ 9:00-10:00
*Bioarchaeologies of Identity*

**Podium Session 2** ______________________________________ 10:00-10:45
*It’s all in Your Head: Re-assessing Ancestry*

Morning Break ____________________________________________ 10:45-11:00

**Podium Session 3** ______________________________________ 11:00-12:00
*Aches and Pains: Skeletal and Dental Pathology*

Lunch and Power Hour Networking ____________________________ 12:00-1:15

**Keynote Lecture** ____________________________ 1:15-2:15
*Research and Responsibility: Lessons Learned from Backhoes, Baptists, and Bentham*

**Podium Session 4** ______________________________________ 2:15-3:00
*New Approaches to Projectile Trauma Analysis*

**Undergraduate Poster Session** ____________________________ 3:00-3:30

Afternoon Break and Poster Viewing ____________________________ 3:30-3:45

**Podium Session 5** ______________________________________ 3:45-4:45
*Interdisciplinary Approaches to Skeletal Remains and Conservation*

Closing Remarks ____________________________________________ 4:45-5:00
The study of human remains has never been without controversy. Religious objections to the dissection, handling, and storage of human remains forced early medical research into a black market economy. Research by physical anthropologists into the morphological differences amongst people groups reinforced racial stereotypes and bigotry. The excavation, retention, and display of sacred objects and human remains by archaeologists led to legal action, most notably the Native American Graves Protection and Repatriation Act (NAGPRA).

Archaeologists today shouldered the sins of our professional past. Rather than ignore archaeology’s complicated and problematic pedigree, we should confront it head-on, address our predecessors’ failings, and strive to construct a future archaeology that includes civic engagement, public outreach, and mindfulness towards the ethical implications of our work and our obligations to the dead.

About our Keynote Speaker

Kimberlee Sue Moran, MSc, RPA, is an Associate Teaching Professor & Director of Forensics at Rutgers University-Camden. She holds an undergraduate degree in Classical and Near Eastern archaeology from Bryn Mawr College and a Masters of Science in forensic archaeological science from the Institute of Archaeology at University College London. She has been a forensic consultant and educator since 2002. Her archaeological research includes ancient fingerprints, artificial cranial deformation, and the Whispering Woods site in Salem, NJ.

Kimberlee has worked on a number of forensic cases in a range of capacities. She has also provided forensic services to legal professionals in the UK and most recently has run training workshops for local law enforcement. She helped to launch the JDI Centre for the Forensic Sciences in 2010 and has run an educational organization, Forensic Outreach, since 2004. Her forensic research includes taphonomic studies, fingerprint development and enhancement, post-mortem toxicology, and the interface of forensic archaeology and crime scene investigation. Kimberlee serves on the Crime Scene Investigation sub-committee of the NIST-led Organization of Scientific Area Committees (OSAC).

Most recently, Kimberlee has been a collaborator on the Arch Street Project, an analysis of historic skeletal remains from a salvage archaeology project at the site of the First Baptist Church of Philadelphia's burial ground. She is an active member of the Society for American Archaeology, the American Academy of Forensic Sciences, the Association for Women in Forensic Science, and Forensic Archaeology Recovery.
Conference Program

Welcome Reception and Registration  8:00-8:50
Opening Remarks  8:50-9:00

Podium Session 1  9:00-10:00
Bioarchaeologies of Identity

Perceptions of Disability and Impairment in Medieval Iceland: A Case Study from Western Iceland (1200-1563 CE)
Sarah E. Hoffman, Jonathan M. White, and Trevor Totman
University at Buffalo, The State University of New York

Perceptions of disability and impairment in Medieval Iceland are often linked to specific character traits within historical literature. Recognition of what we would today consider a disabling condition varies greatly from source to source making it difficult to determine the perceived nature of disability in medieval Icelandic society. Haffjarðarey is a small island off the coast of Western Iceland on the southern coast of the Snæfellsnes Peninsula, north of Borgarnes. A regionally popular Catholic church and cemetery were built on the island some time before the year 1200 CE and remained in use until 1563 CE when the site was abandoned. Excavations throughout the early 20th century have revealed one of the largest cemeteries from this period.

This paper presents an interdisciplinary approach to the case study of a young adult female (18-24 years old) with skeletal features consistent with a clinical diagnosis of Facio-Auriculo-Vertebral Sequence (FAVs). FAVs is a highly variable spectrum of craniofacial and skeletal asymmetries with accompanying organ, central nervous system, and/or sensory defects. This paper considers paleopathological, literary, and archaeological evidence in a discussion of perceived and physical disability in the medieval North Atlantic.

Social, Cultural, and Biological Coming of Age in Hungarian Transylvania
Danielle Julien\textsuperscript{1}, Alexandra Lee\textsuperscript{2}, and Abagail Schofield\textsuperscript{3}
\textsuperscript{1}Binghamton University, \textsuperscript{2}Boston University, \textsuperscript{3}Rhodes College

The dichotomy between biological and social age affects the ways in which puberty is interpreted in bioarchaeological contexts. In medieval Europe, puberty marks the transition towards an adult identity where physical characteristics are represented through cultural factors, such as, rituals and clothing. This transition also varies between men and women, their place within social hierarchy, and can affect the types of rituals and practices that make up their adult identities. Puberty affects the development of an individual's skeleton, in addition to the individual's role within their community. Numerous factors including biological sex, environment, and nutrition affect the timing and length of puberty. Establishing skeletal markers indicative of individuals leaving childhood and entering adulthood allows bioarchaeologists to assess accurate age, infer population health, and generate informed
sociocultural identities. Creating an estimated time frame for puberty in an adolescent population will help bioarchaeologists better assess social and biological age relationships. In addition, by understanding the relationship between puberty and age estimation, both sex estimation and age estimations in juvenile populations can be improved. Recently developed osteological indicators of puberty were applied to eight individuals from medieval cemetery in the Székely community of Patakfalva. The results demonstrated that there were two individuals in pre-puberty, three in puberty, and three in post-puberty. Additionally, this sample suggest that puberty is estimated to begin at twelve years of age and end at sixteen. Integrating a holistic understanding of the phases of puberty will provide contextualized bioarchaeological evidence into the historical records for Medieval Transylvania.

**Perinatal Mortuary Practices: The Treatment and Identity of Perinates from West-Central Tennessee**

Tracy K. Betsinger1, Michaelyn Harle2, Maria Ostendorf Smith3

1 *SUNY Oneonta*, 2 *Tennessee Valley Authority*, 3 *Illinois State University*

The burial and mortuary treatment of perinates (aged 6 months in utero – 1 month postnatal) is an important area of research when trying to reconstruct the lives of these youngest individuals. While perinates may be excluded from some communal cemeteries, their inclusion and treatment may reflect their social role and identity, as mortuary practices can indicate how the community viewed them. By comparing perinatal burial features to that of infants (0-1 year) and young children (1-4 years), we can gain insight into whether perinates had an identity comparable to that of older infants and children.

Subadult remains from several sites, including Williams (1HY1), Thompson Village (7HY5), and Link (HS6) were examined for multiple mortuary features (location, orientation, funerary objects, body position). These sites, located in the west-central Tennessee region of Kentucky Lake Reservoir, date to the Late Mississippian period (CE 1300-1600). Results of this analysis are presented and compared with results from similar studies of perinatal remains from Late Mississippian period sites in East Tennessee.

**Scattered Bones, Connected Landscapes**

Jason Rasmussen

*University at Buffalo, The State University of New York*

The archaeology of Mesolithic hunter-gatherer populations in Western Europe has a long history with the retrieval of human remains which have been purposefully deposited in the past. Often these remains are in the form of single elements or isolated fragments which have been modified by human activity. Scholarly research on these elements/fragments often revolves around issues of violence vs excarnation as the origin of the cut-marks and fragmentation. While these issues are important, the issue of their placement in a certain location which was visited repeatedly over generation when new elements/fragments were added must not be overlooked. In Western Europe, this period is also when we start to see the origins of formal cemeteries in Ireland and Denmark.

In this paper, I would like to explore how the sites where isolated human remains/fragments were placed by Mesolithic hunter-gatherer populations helped to create a connection with the landscape. This connection would have been crucial in the development of
social memory and Identity for these populations at a pivotal time when the landscape itself was in flux due to sea-level rise from the Holocene transition. This paper would be confined to sites and remains from the British Isles for the sake of brevity, but I am confident that other collections and sites during this time period could have experienced similar issues as they coped with cultural and climatic changes.

Podium Session 2
10:00-10:45
It’s all in Your Head: Re-assessing Ancestry

Analyzing Ancestry: Craniometric Variation in Two Contemporary Caribbean Populations
Michelle Herrera
Boston University School of Medicine

Skeletal ancestry estimation is conducted through comparative means, and a lack of population-specific skeletal data can lead to misclassifications. This is especially true for individuals of Latin American descent. Generally, each country in Latin America can trace their ancestry to three parental groups: Indigenous, European, and African. However, grouping them together, as has been the practice in forensic and biological anthropology, ignores the levels of contribution from each parental group, which is dependent on the histories of each country. Craniometric analysis uses landmarks on the crania that represent the craniofacial complexity, providing a good separation of groups statistically. This study explores ancestry in the Dominican Republic and Haiti, who share the island of Hispaniola, using the island’s history and Computed Tomography (CT) scans of 190 crania to determine similarities and differences between the two groups. The CT scans were uploaded into RadiAnt DICOM Viewer 4.2.1, a 3-D viewing software, allowing the manipulation of the crania in order to reach the landmarks. The use of CT scans instead of dry bones for craniometric analysis is usually done for populations that do not have skeletal collections readily available for analysis like the Dominican Republic. It is hypothesized that both groups will reflect their genetic makeup craniometrically. Haitian mtDNA is 98.2% sub-Saharan African with a European contribution of only 1.8%. Dominican mtDNA is 61% African, 22% Taino, and 22% European.

Exploring secular change in nonmetric trait frequencies associated with ancestry estimation in European American individuals
Grace S. Kilroy and Sean D. Tallman
Boston University School of Medicine

Population variation significantly impacts the biological profile; and therefore, continued research is necessary to further understand the changes occurring within and between populations. In particular, secular change has been documented in several studies focused on cranial and postcranial morphometrics and postcranial nonmetric traits; however, very few studies address the possibility of temporal changes in cranial nonmetric traits utilized in ancestry estimation. This study examines whether secular change affects the expression of 23 cranial and mandibular nonmetric traits; with the age, sex, and birth year of each individual documented for data analysis. Historic reference data was collected for European American
individuals from the Hamann-Todd Skeletal Collection in Cleveland, OH; data on modern individuals was collected from the William M. Bass Donated Skeletal Collection at the University of Tennessee, Knoxville. The individuals were divided into birth-year cohorts as follows: Hamann-Todd Skeletal Collection: 1824-1849, 1850-1874, 1875-1899, and 1900-1924; William M. Bass Donated Skeletal Collection: 1900-1924, 1925-1949, and 1950-1987. This presentation will discuss the results of statistical analyses employed to examine secular change in the expression of nonmetric traits. Changes in the frequency distributions of expressed traits will be evaluated based on year of birth, age, and sex. The authors expect that this study will demonstrate statistically significant secular change has occurred in the expression of cranial and mandibular nonmetric traits. Methods for determining nonmetric trait expression have only recently begun to be standardized in forensic anthropology; thus, the goal of this research is to determine if nonmetric traits are impacted by temporal trends.

**Nonmetric Cranial Trait Expression in Pre-contact Southwest Native Americans and Modern Asians**

Megan Atkinson  
*Boston University School of Medicine*

Traditionally, pre-contact Native Americans have served as a biological reference for identifying modern Asian individuals when performing ancestry assessments in forensic settings due to their distantly shared genetic history. This is largely a result of the lack of Asian population-specific methods, which can further be attributed to the overall lack of ancestral variation within skeletal collections across North America. The assumption that pre-contact Native Americans can serve as sufficient representatives for modern Asian individuals remains predominately untested as no direct comparison study between the two populations has been Conducted.

The present study explores whether pre-contact Native Americans serve as an accurate biological reference for identifying modern Asian individuals. Specifically, nonmetric cranial trait expression data for pre-contact Southwest Native Americans is recorded and compared within a statistical framework to the nonmetric cranial trait data gathered on modern Asians (Thai and Japanese) by Tallman (2016). The results indicate that the Native American and Asian populations exhibit significant differences in their nonmetric cranial trait expressions. Differences in cranial trait expression are likely a result of distinct population histories, and these disparities are large enough to ascertain that pre-contact Native Americans should not serve as a biological reference for modern Asian populations when performing ancestry estimations in forensic or bioarchaeological settings. Ultimately, the present study indicates that Native American and Asian populations are not skeletally homogenous. As such, it highlights the increasing need for the development of population-specific biological profile methods for Asian populations.

**Morning Break**  
*10:45-11:00*
Osteoarthritis and Osteophytosis in the Vertebral Column in Two Prehistoric Populations in the Semi-Arid North of Chile
Kimberly Raymond and Danielle Julien
Binghamton University

Past research has studied osteoarthritis and osteophytosis in hunter-gatherer and agricultural societies; these studies have generally focused on postcranial elements such as the knee, hip, shoulder girdle, and elbow joints (Ortner 2003:547-549). However, few studies have been done on the vertebral column in relation to these diseases. For this study, prehistoric individuals from the Archaic and Diaguita cultures, which occupied the semi-arid north of Chile, were examined. Using methods originally presented by Stewart (1958), Chapman (1973), and Ubelaker (1999), data were collected on the location and severity of osteoarthritis and osteophytosis in both males and females above the age of 16. These data were collected from 27 Archaic and 22 Diaguita individuals. Of the vertebrae present in the Archaic population 37% of the cervical, 59% of the thoracic, and 63% of the lumbar vertebrae were affected by osteoarthritis. In addition, osteophytosis affected 26% of the cervical, 37% of the thoracic, and 56% of the lumbar vertebrae. In the Diaguita, osteoarthritis affected 91% of the present cervical, 77% of the present thoracic, and 77% of the present lumbar vertebrae. Osteophytosis affected 73% of the cervical, 59% of the thoracic, and 59% of the lumbar vertebrae. These data show that not only did both populations have vertebral degeneration, but the severity and location of this degeneration varied between the hunter-gatherers and the agriculturalist societies. The results of this study support that the change to an agricultural lifestyle had a negative impact on the vertebral columns of the individuals. By comparing individuals from different prehistoric populations, bioarchaeologists can better understand degenerative diseases, their influence on vertebrae, and the different ways osteoarthritis and osteophytosis affect males and females.

The Effects of Orthopedic Pathologies on the Prevalence of Hip Osteoarthritis
Aubrie Sanchez and Sean Tallman
Boston University School of Medicine

Osteoarthritis (OA) is a degenerative joint disease estimated to be the fourth leading cause of disability (Zampetti et al. 2016), with over 2.5 million individuals in the U.S. living with total hip arthroplasties (Kremers et al. 2015). Of those individuals, 70% attribute OA as the cause (AJRR 2016). However, the majority of anthropological OA research excludes pathological individuals, therefore little is known about how prostheses and pathologies impact OA. This project adds to the research surrounding OA by investigating its relationship with age, disease and prostheses. The proximal femora of 179 individuals (25-95 years old), from the Edmonds Orthopedic Pathology Collection at the National Museum of Health and Medicine from the Armed Forces Institute of Pathology were analyzed. The degree of OA was scored using Jurmain’s (1990) method, which employs an ordinal four-point scale to categorize the changes as none/slight, moderate, severe, and ankylosis. Osteoarthritic hip changes are hypothesized to be positively correlated with age and presence of a prosthesis. It is also
hypothesized that systemic diseases, such as cancer, will increase the likelihood of OA in an individual. The multifactorial etiology of OA suggests that different populations may exhibit different patterns of OA. Preliminary results from this study show that there is a statistically significant relationship (p<0.000) between degree of OA, recorded disease and evidence of previous injury or prostheses. Further results will help researchers better understand the etiology and contemporary risk factors of OA, as well as contribute data to OA research on an underrepresented sample.

**Exploring Sex Differences in Dental Health in a Pre-Inka Andean Community**

Sierra Cotrona and Matthew C. Velasco

1Cornell University

Bioarchaeological analyses of pre-Inka crania in the Colca Valley (southern Peru) have provided remarkable insights into biological variation and social structure in the region. Contributing to this dataset, Proyecto Collaguas Antiguos recently collected detailed dental pathological data for 140 adult individuals dating to the Late Intermediate Period (LIP, A.D. 1150-1450). While the etiology of dental health is complex and shaped by genetic, hormonal, and age-related factors, the examination of dental caries can shed light on aspects of social structure related to dietary behavior, occupation, and gendered norms of consumption. Shifts in subsistence strategy through time may also be reflected in dental health.

In this study, it is hypothesized that increased agricultural intensification and social stratification during the LIP may have resulted in declining dental health, overall, and differences between males and females, in particular. While females generally exhibit higher rates of caries across global samples, male-dominated feasting in the Andes, involving the consumption of cariogenic maize beer, may have mitigated this trend. In fact, prior stable isotopic analysis suggests males consumed higher proportions of carbon-enriched foods, such as maize, during the first half of the LIP. However, preliminary analysis of caries data shows statistically similar crude prevalence rates among males (46%, N = 44) and females (54%, N = 51) throughout time. These patterns will be further explored using true prevalence rates of caries and abscesses, adjusted for age and antemortem tooth loss, to improve our understanding of dental health in the region before the rise of the Inka Empire.

**An assessment of mandibular asymmetry in relation to tooth loss, dental hardware and periodontal disease**

Haley Lankau1, Nasser Malit2, Jessica Sanger1, Elizabeth DiGangi1

1Binghamton University, 2SUNY Potsdam

The integrity of the mandibular corpus matrix is constantly impacted by extrinsic forces. Periodontal disease, a term encompassing a wide variety of pathological conditions involving the teeth and gums is one such example of external force. The presence of disease may lead to mandibular asymmetry by subjecting the alveolar bone to disequilibrium if pain persists and bone cell production and distribution is incongruent. The specimens being used in this study present subgingival calculus, impacted molars, exostosis, and various other serious conditions. Dental implants such as screw implants, and dental hardware such as bridges as seen in the collection, can also change the distribution of weight within the jaw. This research explores the
presence of asymmetry in mandibular remains donated by an anatomical supply company for a forensic study of skeletal trauma at Binghamton University.

The assessment of asymmetry is done by bilateral measurements of corpus height and thickness, as well as the degree of root exposure at various regions. The height and thickness dimensions of the left and the right sides will be compared. The presence of periodontal disease as well as all dental work is accomplished by gross observation. In addition, the presence or absence of teeth is assessed to relate with corpus dimensions and other signs of disease. We hypothesize that considerable mandibular asymmetry will be found within the individuals with advanced periodontal disease and significant dental work.

Lunch and Power Hour Networking 12:00-1:15
Join a table of your interest for this year’s Power Hour Networking Lunch! Engage in a casual conversation on various topics adjacent to bioarchaeology and forensics with each faculty Table Host. Tables will rotate every 15 minutes, so pick your topics and get ready to mingle!

Keynote Lecture
Research and Responsibility: Lessons Learned from Backhoes, Baptists, and Bentham
Kimberlee Sue Moran, MSc, RPA

Podium Session 4
New Approaches to Projectile Trauma Analysis

Bullet Design and Skeletal Trauma: An analysis of Skeletal Remains
Lindsay Petry
Cornell University

Gunshot wounds are the most common cause of homicidal death in the United States, but despite the frequency in which they are encountered by forensic anthropologists, research has failed to keep up with the changes in applied ballistics. This study investigates the role bullet design plays in skeletal trauma patterns. Using swine specimens, the effects of four varying types of projectiles were tested; full metal jacketed, lead semi wad cutter target rounds, jacketed hollow points, and flex tip hollow point bullets. Using standardized conditions and random assignment, the specimens were shot with different projectile designs, defleshed using nondestructive methods, and analyzed for skeletal trauma. The research found that bullet design has a significant impact on the skeletal damage inflicted. Despite the unique trauma pattern left by each design, all wounds consistently presented with at least one of the common characteristics of gun-shot trauma. The hollow point design was found to be the most destructive and irregular, at times showing similar characteristics to sharp force and blunt force trauma. This research demonstrates the importance of continued trauma research in a forensic context and the need for forensic anthropologists to understand bullet design and mechanics.
The Use of a Dermestid Beetle Colony with Cranial Gunshot Wound Trauma: An Exploratory Study

Jessica E. Sanger, Kristen M. Perez, Jane T. Pechera, Shanita Li, Haley L. Lankau, Elizabeth DiGangi.
Binghamton University

During the processing of skeletal remains, harmful chemicals are often utilized, which could alter or damage the bone. The exposure of unsafe elements is especially an issue toward the preservation of skeletal trauma, such as gunshot wound trauma. An assessment of ballistic trauma, specifically of entrance wound dimensions, is often a crucial component toward an interpretation of forensic evidence. This exploratory study utilizes a dermestid beetle colony as a processing method to observe whether a cranial gunshot entrance wound is noticeably modified. By using this alternative approach, we seek to demonstrate that the utilization of dermestid beetles can better preserve gunshot wound trauma, especially the entrance wound. This concept will be assessed by using a sample size of five fleshed human heads (from a larger study) which have been shot once either in the temporal/parietal or frontal region with a revolver at three yards using two types of ammunition. A comparison was conducted of the individual entrance wound dimensions of both the original beetle-processed specimen and CT scanned images taken within an hour of the initial shooting. Using statistical analysis, preliminary results of this application suggest that dermestid beetles do not cause significant damage to the cranial entrance wounds. This outcome implies that dermestid beetles are a safe alternative in the processing of skeletal trauma with no greater than a 2-millimeter difference in overall wound dimensions. Future directions will incorporate other means of analysis to fully assess any significant damage incurred by dermestid beetles upon closer investigation.

Revised Practices for Maintaining a Successful Dermestid Beetle Colony Toward the Processing of Human Remains

Kristen M. Perez, Jessica E. Sanger, Jane T. Pechera, Shanita Li, Haley L. Lankau, Elizabeth DiGangi
Binghamton University

Dermestid beetles (Dermestes maculatus) are small dark insects that feed on soft tissue during the early to late stages of decomposition. As an alternative processing method commonly used in a forensic setting, these beetles assist in the continued preservation of skeletal elements for future research. Additionally, the use of dermestidae has become an expedited method to the traditional processing techniques involving chemicals, which can be time-consuming or harmful to delicate skeletal remains (Fenton et al., 2003). However, the literature regarding best practices for dermestid beetle colony maintenance are oftentimes disjointed in their methods regarding the most advantageous manner to continue a successful colony. With that in mind, the goal of this research is to promote successful and scientifically accurate guidelines for maintaining a dermestid beetle population. This exploratory study was part of an initial assessment which utilized fleshed human heads to examine the differences in gunshot fracture pattern morphology. With a sample of five unembalmed heads, the environmental data of the dermestarium was recorded, alongside other information, in order to determine the most efficient means for the maintained growth of a dermestid beetle colony. Preliminary results suggest that ecological factors, such as the temperature and humidity of a
dermestarium, influence the effectiveness and speed of dermestid beetle processing. Increased activity levels and a rapid growth rate of the observed colony can support the application of improved maintenance procedures when cultivating dermestid beetles. Future directions include the continued development and growth of the colony in varying ecosystems with diverse skeletal remains.

Undergraduate Poster Session 3:00-3:30
*Abstracts listed at end of the program in alphabetical order of first author.

Afternoon Break and Poster Viewing 3:30-3:45

Podium Session 5 3:45-4:45
Interdisciplinary Approaches to Skeletal Remains and Conservation

Multidisciplinary Analyses in Bioarchaeology: The First Baptist Church of Philadelphia Burial Ground 1700-1860
Jared S. Beatrice¹, Kimberlee Moran², and George Leader¹,³
¹The College of New Jersey, ²Rutgers University-Camden, ³University of Pennsylvania
In November of 2016 human remains were exposed by construction at 218 Arch Street in Philadelphia. Subsequent archival research revealed this was the location of the First Baptist Church of Philadelphia's cemetery from the years 1702 until 1860 at which time it was believed to have been moved. Nearly 500 burials were excavated in 2017 and analysis is underway that incorporates approaches from archaeology, biological anthropology, history, genetics, chemistry, and the environmental sciences. One of the major aims of the project is to investigate the lives and health status of the citizens during this significant period in the nation’s history. This paper introduces the project and presents preliminary observations on the human skeletal remains and associated material culture. Emphasizing the integration of osteological and archaeological datasets, we discuss emerging patterns suggestive of a community in which early-life stress was exceedingly common. We also present brief osteobiographical accounts illustrating individual experiences with childhood illness and possible treatment, skeletal trauma, and postmortem examination.

Metagenomic interpretation of a burial from the First Baptist Church of Philadelphia
Aubrey Otis and Kimberlee Sue Moran
Rutgers University-Camden
Two sets of skeletal remains from the First Baptist Church of Philadelphia’s cemetery, assigned the identifier “G-9”, were chosen for this study. These remains were excavated during the salvage phase of the project meaning that they were historically some of the more recent burials. A biological profile was constructed which included determining age at death, stature,
sex, and ancestry. Upon initial investigation, one of the remains is that of an elderly woman and the other is of a juvenile. There were no obvious signs of pathology or injuries. In an attempt to determine a possible cause of death, a metagenomic study of the soil surrounding G-9 was conducted. This study sequenced the DNA of any bacteria and fungi living in the soil immediately adjacent to the remains. This presentation will discuss the results of the metagenomics analysis, the information attained, and its impact on the interpretation of the G-9 remains.

**Mortuary Analysis of the DOCS Oneida Skeletal Collection from Rome, NY**

Jessica L. Campbell  
*University at Albany-State University of New York*

This research is an investigation into the demography and deposition of the inmates from the Oneida County Asylum and Poorhouse from Rome, NY, currently curated at the New York State Museum. In 1988, a salvage excavation recovered ~80 individuals, with interments dating to ~1880s. Detailed information regarding these remains is obscured from various influences on the cemetery, including its use by both county and state agencies, its evolving purpose from poorhouse to asylum, its likely expansion and relocation with new land acquisitions, and the lack of retention of interment records to coordinate burials with individual records. The purpose of this research is to investigate first, whether the curated remains are representative of the cemetery that was used by both county and state, and if it is representative, second, whether there was a difference in burial treatments and locations, and whether further segregation can be detected between sexes and ages. Demographic data were collected, and burial location and treatment data were recorded from excavation reports. A correspondence analysis was completed to evaluate spatial relationships of variables. Results indicate the burial recovery area might be separated on an east-west axis, which could indicate a transitional period for the interment trends. However, there was no identifiable segregation of interments by biological or cultural data, excepting females, however the low representation of females in the designated recovery area presents bias. This research will provide necessary information for further research on this collection and guide researchers tasked with determining contexts and relationships among remains from historical institutions.

**The conversation in conservation: why it matters that we discuss and share the latest efforts in skeletal conservation protocols at the Museo Arqueologico de La Serena, Chile**

Maria A. Rosado¹, Oscar Silva², and Marcela Urizar³  
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The Museo Arqueologico de La Serena, Chile holds osteological collections of the Late Archaic (ca. 3000 YBP) and formative periods (Molle, 2300-1200 YBP, Animas, ca. 1100-1000 YBP, and Diaguita, 1.000 – 500 YBP) of Chile’s semiarid north. The collections represent a wide geographical range of archaeological sites that include human and animal skeletal remains. Their mostly intact state of preservation permits comprehensive osteological and paleopathological analyses, and the development of enhanced conservation protocols to protect the remains for on-going studies. The conservation also permits the analysis and identification of paleopathologies and cultural behavior affecting bone such as trauma,
intentional cranial and dental alteration, and markers of occupational stress. Without the conservation, these analyses would not be possible in their detail and rigor. The type and degree of preservation of the human remains is representative of several taphonomic factors, including the burials, how the body(ies) were placed, environmental conditions of the semiarid north, soil pH, and artifacts placed within the burials. The conservation protocols created are of continued benefit and needed in Chile’s semiarid north because: (a) of ongoing excavations which yield more skeletal remains of different time periods; and (b) they facilitate a more complete reconstruction of life patterns and cultural adaptation, largely unknown for the populations represented. This work describes the preservation conditions, conservation protocols, and storage protocols of the skeletal remains in the deposit of the Museo Arqueologico de La Serena and aims to share the latest conservation techniques for the most ethical, protective, and effective treatments.

Closing Remarks

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Undergraduate Poster Session Abstracts

*Abstracts listed in alphabetical order of first author.

Burning Beyond Color: Bone Calcination in Bronze Age Cremations from Hungary
Heleinna Abigail Cruz¹, Réka Péter², Jaime Ullinger¹, and Julia Giblin¹
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Societal inequalities caused by trade and movement may have been apparent in Bronze Age Hungary. Békés 103, a Bronze Age cemetery site in Southeastern Hungary, has provided useful information in the form of 78 human burials, the majority of which are cremations. This study focuses on the bone color analysis of 18 of the cremations. Munsell Soil Color Charts were used to objectively score the color of bone fragments, which may be able to indicate the temperature of the funeral pyre. Calcination percentages of bones from subadults and adults were compared. Subadults were found to be more calcined than adults. This difference in calcination may indicate discrepancies between mortuary practices between subadults and adults in the Békés 103 cemetery.
**Distribution of Cranial and Postcranial Elements in Bronze Age Cremation Urns from Southeastern Hungary**

Erika B. Danella¹, Kylie Williamson², Jaime Ullinger¹, Julia Giblin¹, and László Paja³

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Central Europe during the Bronze Age exemplifies an increase in social complexity and inequality. The site of Békés 103 in the Köros region of Hungary contains a Bronze Age cemetery in which the majority of burials are urn cremations. Despite the challenges posed by studying cremated human remains, they still provide a wealth of information regarding mortuary practices. The characterization of these practices could provide evidence for potential social stratification. This study aims to characterize the spatial distribution of anatomical regions within the urn by measuring cranial and postcranial weight throughout the urn’s microstratigraphic levels. Pearson correlation and regression analysis demonstrate significant positive correlations between cranial and postcranial weight in four burials (n = 25). However, this trend is not consistently observed sequentially throughout the levels. Instead of concentrating the cranial elements at the top or bottom of the urn, the cranial and postcranial elements were scattered throughout. Therefore, our results suggest that there was not a systematic arrangement of cranial and postcranial elements, and there was not a lot of heterogeneity in this practice. However, potential evidence for social inequality may still exist outside of funerary practices.

**Effects of Freezing and Removal of Viscera on the Rate of Decomposition in Rats**

Gabrielle DiEmma¹, Tobias Landberg¹, Kimberlee S. Moran², and Karen S. Scott¹

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We investigate the effect of using frozen specimens and the effect of removal of viscera on the rate of decomposition of 12 male Harlan Sprague-Dawley rats in outdoor enclosures. We hypothesized that the previously frozen rats would initially progress through the stages of decomposition slower than the fresh because the freezing temperatures would kill off the microbes living on the surface and in the gut (the thanatombiome which contributes to the process of decomposition). Dissection and removal of viscera and exposing greater surface area for fly oviposition was predicted to increase the rate of decomposition in comparison to the uncut rats. Total body score (TBS) over time, according to Megyesi (2005), showed no significant freezing effects despite the observation that the frozen rats appeared to progress through the initial stages of decomposition slightly faster than the fresh rats before converging again. As expected, there was a significant, time-dependent effect of dissection on the rate of decomposition. The dissected rats (both frozen and fresh) decomposed faster than the uncut rats during the first week and remained slightly ahead even after convergence (repeated measures two-way ANOVA, Time*Dissection treatment interaction; p=0.0001). Using the hourly temperature records from data loggers, we tested the Megyesi (2005), Myburgh (2013), and Moffatt (2016) equations for calculating accumulated degree days (ADDs) from TBS. We found that all three methods resulted in extreme overestimations. Therefore, while rat models may provide observational insight in decomposition studies, they do not appear to be accurate ADD estimators.
**Closing the Gap: Examining Sex Differences in Oral Health**

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Sexual differences in oral health have been postulated to have developed around the same time as the development of agriculture. It has been found that women have higher rates of oral pathologies, which has been linked to biological, environmental and/or sociocultural effects. It has been documented in the archeological record that there are differences between men and women that vary across cultures and geographic areas throughout time. To evaluate a modern industrialized group, dentition was studied from a select sample of White males and females from the Robert J. Terry Anatomical Skeletal Collection ranging between 20-87 years old and had teeth remaining. The results assess whether or not this industrialized society group of people from North America follows the expected trend of women having greater oral health problems than men.

The overall results show a slightly higher rate of pathological conditions in women around the age range of pregnancies (20-35 years). However, the selection for White females in the collection limited the sample size and not enough data was collected to be statistically significant. Statistically significant differences in pathological conditions between men and women are found around age 60 and above - most likely associated with post-menopausal hormone changes in the women. These differences were not as significant as what has been recorded in past populations. Along with other literature which studied more modern people, the trend in decreased disparity in oral health between men and women may be attributed to environmental and sociocultural influences than only biological effects.

**The Fiery Mystery: Burning Patterns of Adult vs Juvenile Bones**

Arianna Gagliardi and Jaime Ullinger

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Cremation practices of Middle Bronze Age Hungary (ca. 2000 BCE) are under investigation by the BAKOTA research project. Juvenile human remains found in the cremation cemetery at Békés 103 in southeastern Hungary were found to be more calcined than the adult remains. This research project experimentally burned juvenile and adult animal bones to learn how bones from these individuals might burn differently in order to compare them to those cremated in Hungary. Lamb and sheep fleshed legs were burned in a fire pit together with beech and birch wood. We weighed and photographed the bones before and after each burning. Juvenile and adult bones were kept separate in the fire pit and we measured the temperature of the fire every 10 minutes in Fahrenheit and Celsius. After the fire had died, the bones were removed. We analyzed the different colors, breaking patterns, and burning patterns between the two types of bones. They were analyzed for primary and secondary colors using Munsell soil color charts. Results suggest that there was no statistically significant difference between adult bones and juvenile bones. This indicates that Early Bronze Age mortuary practices must have had a different cremation practice for their young to make their bones more calcined. However, we will also increase our sample size and continue experimentation to see if this pattern is consistent. Finally, some of the bones will be chosen at random to be double burned in a separate burning to see what happens when bones are burned multiple times.
Dental paleopathology of an adult female of the El Molle culture, Chile’s semiarid north
Renzo Goicochea, Kristine Kortonick, and Megan Zalinka
Rowan University

What can dental paleopathologies reveal about the disease experience and subsistence practices of past human populations? Dental paleopathology can facilitate the identification of specific and non-specific conditions through the analysis of caries, abscesses, and infections of the maxilla and mandible; understanding of the relationship among different disease processes of the oral cavity; and interpretation, in conjunction with skeletal evidence of paleopathologies and bone chemistry, the types of foods past populations consumed. In addition, an analysis of the type and degree of dental wear can also provide evidence for the relationship among wear, infection, and the use of teeth as tools. This work reports on the results of the dental paleopathology analysis of the skeletal remains representing a female over 50 years of age (197-Esq. 8), site Pirita, culture El Molle (2300-1200 YBP) of Chile’s semiarid north. The individual presents dental wear of the molars affecting the enamel and dentine, periapical abscesses of the maxilla, caries of the maxillary molars, and an infection process affecting almost entirely the hard palate. According to Sumer et al. (2008), infections of the hard palate, resulting from an abscess, typically represent the directed drainage of an infection of pulpal or periodontal origin. This analysis, therefore, explores the relationship between the observed caries and abscesses, and the infection affecting the hard palate, and attempts to infer what kinds of food(s) this individual may have consumed.

How “Handy” Can It Be? The Use of Metacarpals in Sex Determination
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The purpose of this study is to assess whether sex can be determined based on measurements collected from the metacarpals. While sex determination from the pelvis is most reliable, the os coxae are not always observable. As a result, it is essential that other methods of sex determination be developed. A number of previous studies have assessed the use of metacarpals, yielding promising results.

Data was collected from the St. Bride’s Lower Cemetery in London, dating to the 17th-19th centuries and including individuals of mostly low socioeconomic status. The metacarpals of 99 adult individuals were measured (i.e., maximum length, midshaft diameter, head height and width, base height and width). Only those individuals who had been confidently assessed as male or female from the pelvis and cranium were included.

The equations of Case and Ross (2007), Khanpetch et al. (2012), Sheuer and Elkington (1993), and Stojanowski (1999) were used to determine sex for this sample. The Stojanowski equation for the left fourth metacarpal was found to be most reliable, correctly identifying 81% of males and 91% of females. The least reliable was the equation of Khanpetch et al., which did not correctly identify any females, although 100% of males were correctly identified. Overall, most of the equations performed better for males than for females, suggesting that more refinement of established equations may be needed. Furthermore, these results indicate that established equations may not always perform well for other samples, especially if they originate from different communities.
A Pain in the Back? Sacralization of a Sixth Lumbar Vertebra
Juliet Morin, Tiffani Bettinger, Deb Bruce, and Tracy K. Betsinger
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The presence of a supernumerary L6 vertebra and sacralization of the lowest lumbar vertebra are both uncommon spinal anomalies individually; the co-occurrence of these conditions is rare. Clinically, there is no agreement on whether an individual with a sacralized lumbar vertebra experiences any associated pain or discomfort. In fact, in many cases, individuals are not aware they have the condition. The case study presented here is of an adult male of Native American ancestry, aged 19-22 years. The remains were part of a small collection recently discovered in a local museum that had likely been stored since the 1970s. As a result, minimal provenience information is currently available, although archaeologists believe they are prehistoric remains related to the Oneida Indian Nation. Prior to repatriation, these remains were subjected to a nondestructive bioarchaeological analysis. The individual presented with an L6 that was sacralized. No associated degenerative joint disease, bony changes, or inflammation were found on the sacrum or lumbar vertebrae. There were no other skeletal anomalies on the remains, and the individual did not have evidence of infectious disease, trauma, stress markers, or dietary deficiencies. Based on this, it is suggested that the sacralized L6 caused minimal or no discomfort for this individual.

Bioarchaeological assessment of stress and activity in a pilot sample from the historic First Baptist Church Cemetery of Philadelphia (ca. 1700-1860)
Amanda R. Pegher, Victoria V. Solomon, Alyssa M. Webster, Kiira H. Jeffers, Genevieve F. Duran, William A. Russo, and Jared S. Beatrice
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Following the accidental discovery of human skeletal remains at a construction site at 218 Arch Street in Philadelphia, approximately 500 burials were excavated from the historic First Baptist Church cemetery in 2017. The church was formed in 1707 and the burial ground was used until 1859, at which time it was supposed to have been moved. The skeletal sample represents some of the earliest Philadelphians and provides important new insight into lifeways and health in colonial and post-colonial America. Preliminary results of several integrated research projects being conducted on the sample have begun to shed light on patterns of activity and traumatic injury, oral health, and early-life stress among the recovered individuals.

This presentation examines three main research questions using a pilot sample of eleven adults and eleven juveniles. First, the prevalence of musculoskeletal stress markers and their relationship with osteoarthritis in males and females of different age categories may illustrate how gender roles influenced type and level of activity. Second, an assessment of the prevalence of skeletal trauma may suggest that both accidental injury and interpersonal violence were infrequent. Finally, evidence for delays in skeletal maturation in the juvenile subsample and indicators of stress, disease, and diet in the permanent dentition of adults may suggest a relationship between childhood stress and adult health. These indicators may also provide a glimpse into the overall health status of the community during this time.