

**INDIVIDUAL ABSTRACTS OF THE SAA 83RD ANNUAL MEETING**

paleoecological data patterning. Examination of congruence, or lack thereof, between these lines of evidence can thus render past human ecological impacts more easily visible.

**Tabata, Yukitsugu (Waseda University)**

**[175]** *Techno-morphological Approach to the Stoneware Production in Angkor*

This paper will discuss several aspects of premodern stoneware industry in Cambodia. Based on the results of recent excavation of the stoneware kilns in Angkor area, traits of the kiln structure, fuel strategy, forming techniques, glazing, and loading method of the Khmer stoneware will be discussed.

Tabata, Yukitsugu [175] see Chhay, Rachna

**Tabatabaeian, Shadab**

**[73]** *Eyes in the Dark: Explaining the Universal Ritual Function of Dark Zones via Eye-tracking Technology*

A plethora of ethnographic and archaeological evidence indicates a cross-cultural association of dark zones of caves with supernatural phenomena. In various geographic locations and time periods, human beings have been frequenting dark zones for ritual purposes. Regarding the unsuitable living conditions of dark zones, the following question arises: what drives humans to choose such places for practicing rituals? The answer to this question lies in the way human beings interact with dark cave environments. In this paper, I suggest that experiencing sensory deprivation, in particular lack of vision in dark zones, precipitates the enhancement of abstract and magical thinking. To verify this hypothesis, I employed the methods of cognitive scientists—namely, experimental research. I conducted an experiment using eye-tracking glasses to record participants' eye-movement trajectories in darkness. The results indicated that eye-movement patterns during darkness resemble that of activities involving abstract and primary process thinking (aka magical thinking). Consequently, darkness provokes and facilitates magical thinking. Thus, I suggest that in addition to social and cultural incentives, darkness, as an environmental cue, sets the stage for human beings to associate dark zones of caves with supernatural powers and therefore choose to practice rituals in such locations.

**Tache, Karine (CUNY Queens College) and Roland Tremblay (Ethnoscop Inc.)**

**[77]** *A Taste for Fish among the Saint Lawrence Iroquoians of the Montreal Region*

Iroquoian groups inhabiting the Saint Lawrence valley in the 15th and early 16th centuries were agriculturalists who complemented their diet with a variety of wild plant and animal foods. The relative importance of different food sources and their methods of preparation, however, likely varied from one community to another. To further document subsistence practices and foodways at the Iroquoian site of Dawson in Montreal, organic residue analysis was carried out on foodcrust and absorbed ceramic samples representing twenty-nine distinct containers recently excavated. Molecular characterization of lipids by gas chromatography-mass spectrometry (GCMS) show the presence of aquatic products in a great majority of samples. These data attest to the importance of freshwater fish for Iroquoians of the Montreal region and represent direct evidence of their frequent processing in ceramic containers, either alone or mixed with other ingredients. By combining these results with single compound isotope analysis (GC-c-IRMS) and the analysis of starch and phytolith microfossils, we hope to obtain a more complete picture of the range of foods prepared in pottery at the Dawson site, and ultimately shed new lights into food choices and culinary practices among the Saint Lawrence Iroquoians.

Tache, Karine [225] see Lamothe, Francis

**Tafari, Aurelien (University of South Florida), Andrea Vianello (University of South Florida), Robert H. Tykot (University of South Florida) and Emanuela Gualdi (University of Ferrara)**

**[23]** *Reconstructing Individual Life Histories in Early Medieval Italy through Serial Analysis and Compositional Analysis of Bones and Teeth*

This contribution aims at gaining on the life history of individuals buried in northeastern Italy between the fifth and the seventh centuries AD. Elemental analysis of human and animal remains provides data on the evolution of diet and mobility at a time of significant social changes. Our research strategy, based on a preliminary histological study on teeth and bones and on serial sampling, gives us the opportunity to observe these variations at the level of the individual. Thus, this research provides us with some new insights on the consequences of the fall of the Roman Empire by revealing the living conditions of the inhabitants of the Po Valley during the formative period of the Langobard, Venetian and Byzantine Empires of Italy.

Taft, Mara [138] see Benden, Danielle

**Taivalkoski, Ariel (University at Buffalo)**

**[16]** *Technological Choice and Human-Animal Relationships: A Bird's Eye View*

New theoretical attitudes in zooarchaeology have begun exploring the social dimensions of human-animal relationships. As representative of both human-environment and human-material interactions, the dynamics between people and animals go well beyond household economics. This paper presents preliminary results of the analysis of avian remains from the Aleutian Islands as part of a study characterizing the complex relationship between the Unangan people and birds as it changes over time. Here, technological choice is used as a method for parsing out the many contingencies, economic, social, cultural and environmental, that constituted the interactions between Unangan and birds. This approach melds materiality with the classic economic and ecological approaches in order to employ a more comprehensive perspective on the subject-hood, if not subjectivity, that birds and animals retained in Unangan culture.

**Takahashi, Akatsuki**

**[78]** *Underwater Cultural Heritage Protection and Management in Pacific Island States*

The waters of the Pacific Ocean contains a wealth of Underwater Cultural Heritage (UCH) encompassing the history of humanity from the Stone Age to the Atomic Age and witnessing climate change. This paper presents a summary of the outcomes of the UCH Programme in Pacific Small Island Developing States (SIDS). Notable progress includes the reference to the UNESCO Convention on the Protection of the UCH in SAMOA Pathway outcome document (2014), national and regional capacity building workshops, and Chuuk Lagoon Ocean Emergency Response—Safeguarding UCH, Addressing Environmental Hazards—Project (2017). Updates on the other UNESCO Conventions such as the Convention concerning the Protection of the World Cultural and Natural Heritage and the Convention for the Safeguarding of the Intangible Cultural Heritage (ICH) are also provided in order to illustrate the concept of Heritage of Humanity and explore linkages among tangible, intangible and natural heritage safeguarding. The paper concludes by discussing the prospective of the Marine Archaeology from the Pacific SIDS perspective, which aims to engage the people in the Pacific in UCH protection with an integrated and community-based approach not only for scientific research cooperation but also for achieving the Sustainable Development Goals (SDGs), reconciliation and peace.

Talaverano, Arlen [154] see Zimmer-Dauphinee, James

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**Tamura, Ellie (Trent University)**

**[49]** *The Two Pillars of the Kingdom of Bagan, Myanmar: How Royalty and Religion Shaped the Settlement Patterns of an Empire*  
Bagan was the political, economic, and cultural centre of Myanmar during the country's Classical Period (c. 800–1400 CE). This immense empire operated primarily on two institutions: the crown and the sangha (Buddhist monkhood). Kutho (merit) was arguably one of the most important Buddhist doctrines in Bagan as it was believed to guarantee better social status upon reincarnation. Kutho, for the elite, was most commonly obtained by contributing large donations to the sangha. These donations took the form of labourers, tax-free lands, or precious materials that were used for the construction of temples and monasteries, of which thousands continue to survive today. The construction of these buildings would have displaced a sizeable amount of the commoner population whilst also establishing new settlements. Despite the extensive archaeological potential in this region, no settlement studies have been conducted in Myanmar. Through inscriptions, murals, and ground survey along with the application of entanglement theory, this study will determine how the crown and the sangha worked together influencing the settlement patterns of the commoner population. This study will bring insight into a relatively new area of research in a region that is only beginning to open for archaeological work.

Tan, Boun Suy [175] see Stark, Miriam

**Tanasi, Davide (University of South Florida), Ilenia Gradante (Polo Museale della Campania) and Stephan Hassam (University of South Florida)**

**[130]** *From Field to Screen: Best Practices for Digital Recording and Global Sharing of Catacombs from Late Roman Sicily*  
Ten years after the seminal research on the digital recording of the monumental complex of The Catacombs of Saint Domitilla at Rome, undertaken by the Österreichische Akademie der Wissenschaften, the virtualization and the dissemination of 3d models of Late Roman catacombs is still a challenging research topic. While the catacombs of Rome are consistently considered for cutting edge digital archaeology projects, the underground cemeteries of Late Roman Sicily, the second in importance to those of Rome, struggles to get the digital visibility they deserve. Against this scenario, between 2013 and 2015 an Italian-American research project was undertaken at the Catacombs of St. Lucy at Siracusa. The research, including archaeological fieldwork, focuses on some very problematic parts of Region C. During the excavation, an array of 3D digital techniques was used for the daily recording of the archaeological units, but also to create high-resolution virtual replicas of certain districts of the catacombs and certain classes of materials, such as frescoes and marble architectural elements that could otherwise only be studied in the dark environment of the catacombs. The USF Digital Collections, a well-established multimedia repository of USF Libraries, has been chosen as global dissemination media.

**Tankersley, Kenneth (University of Cincinnati)**

**[292]** *Surviving Climate Change*  
During the past decade, the University of Cincinnati has offered a summer archaeological field school, which focuses on periods of rapid and profound global climatic change. Students undertake detailed excavation profile descriptions, collect samples for AMS radiocarbon and OSL dating, botanical, faunal, soil, and geochemical analyses to develop an accurate chronology and paleoenvironmental framework of the depositional history for archaeological sites, which date to the Younger Dryas and Little Ice Age. From an evolutionary perspective, these are significant periods of change, which force people to economically adapt, downsize, or migrate. Data collected during these field schools have been published in co-authored articles in the journals *Nature*, *PNAS*, *Quaternary Research*, and *American Antiquity*.

**Tappan, Katie K., Kelsey A. Gruntrad, G. Tucker Austin, Samantha N. Butler and Chrissina C. Burke**

**[187]** *Rabbits, Pronghorn, Oh Deer! Oh My! A Preliminary Analysis of Subsistence Strategies at Wupatki National Monument, Northern Arizona*  
Wupatki National Monument is a Puebloan site located in the Sinagua region of Northern Arizona, featuring an array of wildlife available to past populations for subsistence and technological purposes. Analyzing faunal remains from Colorado Plateau sites is an important part of developing a holistic understanding of the lifeways of agricultural communities in the Southwest. This poster focuses on the zooarchaeological analysis of materials from Wupatki National Monument housed at the Museum of Northern Arizona. By determining taxa present, minimum number of individuals, animal portions utilized, cultural modifications such as butchering, pot polish, and bone tool manufacture, and natural taphonomic signatures, we provide a thorough understanding of animal use through time at the site. We further examine the Garden-Hunting hypothesis and discuss the relative frequencies of Artiodactyls and Lagomorphs in the community's diet. Our research highlights the importance of zooarchaeology to understanding animal presence at the site and provides discussion on subsistence strategies as it relates to animal resource use in an arid environment.

Tappan, Katie K. [7] see Wisner, Gavin

Tappen, Martha [41] see Coil, Reed

**Tapper, Bryn**

**[180]** *Petroglyphs on the Periphery: Rock Art in the Canadian Maritimes*  
Ongoing investigation of the Algonquian rock art of the Canadian Maritimes reveals that while some sites, such as Kejimikujik Lake, are well documented as a result of longstanding conservation strategies, these and other petroglyph sites have yet to be adequately and comprehensively framed within their archaeological, ethnohistorical and ethnographic contexts. Combining a landscape archaeology approach with theoretical positions emerging from the 'ontological turn' in archaeology, my research seeks to investigate the petroglyphs at various interrelated scales—from motif, to panel, to site, to landscape setting—in order to better understand the different functional and ideological levels at which these phenomena operated. Formal approaches using computational photography, principally Highlight Reflectance Transformation Imaging and photogrammetry, are employed to revisit known sites, test earlier interpretations, and to document new sites. Additionally, ethnohistories and ethnographies sought through collaboration with Mi'kmaq and Wolastoqiyik First Nations are used to articulate indigenous narratives alongside archaeological understandings of the petroglyphs. These complimentary approaches seek to inform how indigenous concepts of landscape, the environs of the rock art site, the material conditions of the rock surfaces, as well as the content and composition of the images engraved, combine to make socially significant places in the landscape.

Taschek, Jennifer [258] see Reents-Budet, Dorie

**Taylor, Geoffrey (UC Berkeley)**

**[300]** *Foodways and Urban Living: A Macrobotanical Analysis of Huari Homes*  
Knowledge of Wari plant use has progressed significantly with analyses from sites such as Conchopata and Cerro Baul, but there has yet to be any investigation into Wari plant foodways at the capital city of Huari. This paper will investigate the botanical remains from flotation samples recovered throughout the 2017 excavations of Patipampa, a domestic sector of the site occupied during the Middle Horizon (AD 500–1000). For years, it has been assumed that the emergence of the Wari state in Ayacucho was fueled in part by maize agriculture. Preliminary results of the macrobotanical analysis will reveal what food crops people living at the site of Huari were actually consuming within their homes, and to what extent people were either using maize as a staple crop or maintaining a diverse diet. The assemblages of weed seeds and crop parts will also give insight into Wari agricultural

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practices and the organization of labor inside and outside of the house. Furthermore, using Geographic Information Systems (GIS), the densities and distributions of plant remains will be studied within a variety of architectural spaces to understand how cooking and preparation may have been organized within the urban landscape of Huari.

[300] *Chair*

**Taylor, R.**

[315] *Moderator*

[315] *Discussant*

**Taylor, Samantha (Indiana University of Pennsylvania)**

[22] *Looking Through Dirty Dishes: The Preliminary Results of a Ceramic Analysis at Pandenarium (36ME253)*

In recent years, African Diaspora archaeology has become one of the most impactful means by which archaeologists supplement our current understanding of the past. Not only does this subfield have the potential to benefit descendant and local communities, but it also enables professionals to fill in the blank gaps left by the systematic disenfranchisement and intentional illiteracy of an entire group of people. One site with the potential to enhance our understanding of the African Diaspora is Pandenarium (36ME253) a freed African American settlement in western Pennsylvania. Current research at Pandenarium focuses on a comparative ceramic analysis with nearby European American sites, other freed African American sites, and slave quarters at plantation sites. The goal of this is to determine the socio-economic status of individuals living at Pandenarium, along with preferred food preparation methods and participation in local and regional markets. The preliminary results of the analysis featured in this paper are a foundation for future comparative studies featuring Pandenarium and will aid in the recognition of Pandenarium as a dynamic African Diaspora site deserving of further archaeological attention.

**Taylor, Sarah (University of South Florida) and Robert H. Tychot (University of South Florida)**

[270] *The Dietary Importance of Maize and Aquatic Resources during the Regional Development Period at El Dornajo, Southwest Ecuador*

Earlier studies of subsistence at the site of El Dornajo in southwestern Ecuador examined faunal, macro- and macro-botanical remains. These studies indicated that residents consumed large quantities of shellfish and marine fish during both the Formative and Regional Development periods (2800 BC—700 AD), with a marked decrease and differential access based on socioeconomic status in the later period. It has been hypothesized that site residents increased their reliance on domesticated plant foods, especially maize, in order to compensate for decreased consumption of marine foods. While no physical evidence for maize has been found, there exists a chance for bias based on poor preservation and sampling.

In order to better address dietary practices at the site and test the maize hypothesis, stable isotope and elemental analysis of 16 elite and non-elite individuals from the Regional Development period were conducted. Bone collagen carbon and nitrogen, and bone apatite and tooth enamel carbon and oxygen isotope ratios were determined, along with calcium, strontium, and barium elemental values. The isotopic results reinforce previous conclusions concerning diet at El Dornajo, including the lack of evidence for maize. We, therefore, conclude that any increased reliance on plant foods focused on other indigenous plant resources.

Taylor, Sean [34] see Bissett, Thaddeus

**Taylor, William (Max Planck Institute—SHH), Tumurbaatar Tuvshinjargal (National Museum of Mongolia), Jamsranjav Bayarsaikhan (National Museum of Mongolia) and Julia Clark (American Center for Mongolian Studies)**

[304] *Zooarchaeology by Mass Spectrometry (ZooMS) and the Emergence of Nomadic Herding in Eastern Central Asia*

Identifying the timing and nature of the emergence of pastoral societies in eastern Central Asia is hampered by many key logistical challenges, including the scarcity of early nomadic habitation sites and the small and fragmented nature of related archaeofaunal assemblages. This study presents faunal identifications of animal bones from two recently discovered Bronze Age habitation sites in northern and western Mongolia using ZooMS (Zooarchaeology by Mass Spectrometry)- a technique that uses mass spectrometry to make taxonomic classifications based on peptide sequences from bone collagen. Results provide a window into diet and husbandry practices in the eastern Eurasian Steppe during the critical transition from hunting to herding societies, and indicate that ZooMS is a powerful tool for the investigation of early pastoral economies.

Teeter, Wendy [306] see Kennedy Richardson, Karimah

Tepania, Haumata [13] see Cramb, Sara Lynn

Téreygeol, Florian [23] see Géraud, Manon

**Terlep, Michael L.**

[27] *Cup and Channel Petroglyphs and Ancestral Puebloan Migration*

The age, origin, and function of the enigmatic cup and channel petroglyphs of the Arizona Strip have fascinated archaeologists for decades. The petroglyphs size, up to 2 m long, as well as, placement on horizontal surfaces at prominent locations, contributes to the intrigue of the glyphs. Previous hypotheses for the age and function of the petroglyphs include prehistoric navigational markers to water sources, solstice markers, historic tar burners, and ceremonial water channels. Hundreds of cup and channel petroglyphs are reported within a narrow 100 mile radius within southwest Utah and northwest Arizona. Little known evidence beyond this spatially confined distribution exists. The recent documentation of cup and channel petroglyphs at Homo'ovi, Woodruff Butte, and Awat'ovi in eastern Arizona expands this distribution and contributes new insight into temporal, spatial, and stylistic variation of cup and channel petroglyphs. This presentation offers inference into the newly documented glyphs' connection to the Arizona Strip Region. The data suggest cup and channel petroglyphs are signs of Virgin Puebloan migration to the Hopi Mesas.

Terlep, Michael L. [27] see Tsouras, Theodore

Terrell, John Edward [83] see Golitko, Mark

**Terry, Richard E. (Brigham Young University), Jeffrey Blomster (George Washington University) and Daniel A. Bair**

[288] *Geochemical Analysis of the Soils and Floors of Ancient Activity Areas at the Site of Etlatongo, Oaxaca, Mexico*

Soil and floor samples from the ancient activity areas of Etlatongo were sampled and concentrations of extractable P and chelate extractable heavy metals. The relative concentrations of these elements have been shown to delineate areas of food preparation, consumption, and waste disposal. Increased heavy metal concentrations are indicative of the use of paints and pigments or the working of mineral ores. Low levels of these elements are usually present at sleeping areas and at high traffic pathways.

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**Terry, Samantha (Florida State University)****[102]** *A Reexamination of the Faunal Assemblage at Bird Hammock (8Wa30)*

The Bird Hammock site (8Wa30) located in Wakulla County, Florida, is a multicomponent site representing Late Swift Creek and Weeden Island occupations. The site consists of two burial mounds as well as two accompanying middens each representing one phase of occupation. Bense completed excavations in 1968 that provided a preliminary description of faunal material at the site but it was not until Nanfro's (2004) excavations that a more thorough analysis was completed. My research reexamines the faunal assemblages represented in the northern midden, the Weeden island component, as a means of modeling the subsistence patterns of peoples in Florida's Gulf Coastal Zone. I will also consider the consequences of screening biases in past analysis to determine if other species may be underrepresented in the assemblage.

**Terstriep, Jeff (CyberGIS—University of Illinois)****[279]** *Discussant*

Teten'kin, Aleksei [177] see Henry, Aureade

**Texis, Ariel (Proyecto Arqueológico Tlalancaleca, Puebla), Shigeru Kabata (Proyecto Arqueológico Tlalancaleca, Puebla) and Tatsuya Murakami (Proyecto Arqueológico Tlalancaleca, Puebla)****[262]** *Tlalancaleca: Ceramics and Interregional Interactions in Formative Central Mexico*

Using ceramics as a proxy for social contact, we discuss a long history of interregional interactions of Tlalancaleca with other areas during the Formative Period. We have observed some clear changes of ceramic assemblages in the transitions between the Middle, Late, and Terminal Formative (or between the Texoloc, Tezoquipan, and Late Tezoquipan phases). While we do not imply that the presence or absence of certain ceramic traditions serves as direct indicators for political control, it is likely that Tlalancaleca formed part of important interaction spheres along with other areas such as the Morelos region, the Tehuacan Valley, the Basin of Mexico, and more lately with the Valley of Teotihuacan. Some ceramics resembling those from the Patlachique-Tzacualli tradition at Teotihuacan, which were formerly seen as foreign and brought after the abandonment of Tlalancaleca around 100 A.D., have been obtained from secure contexts in recent excavations of monumental architecture at Tlalancaleca. This suggests that the manufacture of similar ceramic traditions (with different raw materials) was widely shared among different social groups in Central Mexico just before the expansion of the Teotihuacan state.

**Thacker, Paul (Wake Forest University)****[41]** *Emic Knapping Perspectives and the Analytical Concept of Raw Material Similarity: Building a Contextualized Theory of Lithic Raw Material Selection*

Existing frameworks for analyzing lithic raw material economies insufficiently characterize the complex interface of reduction strategies with local raw material variability. This presentation contextualizes assemblage technological organization from the Middle and Upper Paleolithic of Portugal with occurrence frequencies and size variability in local raw material cobbles. The new analytical concept of similarity differentiates Middle Paleolithic quartz preference within a pattern of overall raw material equivalency from two radically-different and synergistic chaînes opératoire structuring EUP assemblages. At the site of Espadanal, chert and quartz were utilized for different functions and as blanks for fashioning different tool forms, demonstrating that prehistoric knappers considered them dissimilar raw materials. Focusing on evidence for prehistoric decision-making facilitates a robust theoretical framework of raw material economy that integrates both the structural and the contextual.

**[41]** *Chair*

Thakar, Heather [59] see Hirth, Kenneth

**Tharalson, Kirsten (University of Iowa) and Leland C. Bement (University of Oklahoma)****[155]** *Late Archaic Southern Plains Bison Kills: Accumulated Analysis Results at the Certain Site, Western Oklahoma*

The Certain site is a 2000-year-old Late Archaic bison kill site consisting of multiple arroyo localities in western Oklahoma. Analysis of the site's excavated faunal assemblage identified an MNI of several hundred bison, although an MNI around 1000 is expected for the entire site. At least nine distinct kill events are represented at Certain, including multiple seasonalities, though largely targeting calf/cow herds. We present the culmination of our analysis to date, including seasonality, herd demographics, and butchering patterns. These results are viewed from a regional perspective.

Thayn, Jonathan [116] see Erickson, Clark

**Thibodeau, Alyson (Dickinson College), Allison Curley (Dickinson College), Emily Kaplan (Smithsonian National Museum of the American Indian) and Ellen Howe (Metropolitan Museum of Art)****[139]** *Lead Isotopes as Chronological Markers for Colonial Period Ritual Drinking Vessels in the Andes*

Ritual drinking vessels called qeros have been produced in the Andes for millennia. In the colonial period, Andean artists produced wooden qeros, many of which were decorated using a polychrome inlay technique. Almost all extant polychromed wooden qeros attributed to the colonial period derive from museum and private collections and lack provenience and precise means of dating. Here, we investigate the chronology and production of qeros by characterizing lead white pigment (lead hydroxycarbonate or lead carbonate, introduced to the Andes by the Spanish) used in the decoration of these vessels. We analyzed the Pb isotopic composition of lead white pigments taken from 21 colonial period qeros that currently reside in the collections of the National Museum of the American Indian-Smithsonian Institution, the American Museum of Natural History, the Brooklyn Museum of Art, and in private collections. The results indicate that, during the early colonial period Andean artists initially used lead white pigment manufactured from Spanish ores. In contrast, later period qeros were decorated with lead white pigment that was likely synthesized from local ore sources. Based on these results, we suggest the isotopic composition of lead white pigment may function as a chronological marker for colonial period qeros.

**[152]** *Discussant***Thomas, Ben (Archaeological Institute of America)****[233]** *Discussant***Thomas, David (American Museum of Nat History)****[137]** *Discussant*

Thomas, David [154] see Edwards, Alexandra

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**Thomas, Jayne-Leigh (Indiana University), Larry Zimmerman (Indiana University Purdue University Indianapolis), Felipe Estudillo Colon (Institute of American Indian Arts), Jeffrey Bendremer (College of New Rochelle) and Jennifer Meta Robinson (Indiana University)**  
**[222]** *Learning by Example: Exploring the Importance of Case Studies in Learning NAGPRA*

Although the Native American Graves Protection and Repatriation Act (NAGPRA) has existed for over a generation, educators and professionals continue to discuss the best ways to prepare learners for the complex and contextually specific process of repatriation. Every consultation and every repatriation differs, even when the same tribes and institutions are involved. Because of this, learners can benefit from seeing multiple examples of how NAGPRA is implemented and how different stakeholders effect and are affected by the process. As part of the National Science Foundation funded Learning NAGPRA Project, researchers asked students in Anthropology and Museum Studies programs to suggest helpful resources. The results of this online survey showed that learners are eager for examples beyond the Ancient One (Kennewick Man) repatriation case, but a working group aimed at collecting and creating case studies experienced several challenges in preparing new material for public access. This presentation overviews why and what types of NAGPRA case studies are beneficial and the challenges and outcomes of creating educational materials on sensitive, complex issues.

**Thompson, Amy (University of New Mexico), Jillian Jordan (University of New Mexico) and Keith M. Prufer (University of New Mexico)**  
**[82]** *Household Distributions and Social Organization of the Ancient Maya in Southern Belize*

This paper examines processes of low-density urban development through geospatial analyses of households at two Classic Period (AD 250–800) Maya communities, Uxbenká and Ix Kuku'il. Located in the southern foothills of the Maya Mountains, Toledo District, Belize, these centers were situated in similar landscapes yet exhibited distinctly different household distributions. Wherein Uxbenká had geospatially discrete districts and neighborhoods while Ix Kuku'il's houses were more evenly distributed across the landscape with little evidence of social clustering. We compare several methods in a discussion of how archaeologists can model past human behaviors across a regional landscape based on both geospatial and chronological data in conjunction with material goods. Furthermore, we statistically analyze the influence of several social and ecological resources on the settlement patterns at Uxbenká and Ix Kuku'il. The results of these analyses suggest that the variations in household distributions reflect shifts in human decision-making dynamics during transitions of sociopolitical integration from autonomous, self-governing social units to top-down centralized authority influencing settlement locations.

**Thompson, Charmaine**  
**[281]** *Discussant*

**Thompson, Jessica (Emory University), Andrew Zipkin (University of Illinois at Urbana-Champaign), David Wright (Seoul National University), Stanley Ambrose (University of Illinois at Urbana-Champaign) and Flora Schilt (University of Tuebingen)**

**[198]** *Out with a Whimper or a Bang? Hunter-Gatherer Response to the End of the African Humid Period in Northern Malawi*

The modern climate of the southernmost African Rift Valley is characterized by a single warm-wet season, which receives almost all annual precipitation. The other six months are arid, and surface water is confined to major river and lake features. In the northern basin of Lake Malawi, at the southern extent of the modern ITCZ, core records show a rapid increase in water surface temperatures peaking at ~5.5 ka, followed by a major expansion of grasslands. This coincides with the end of the African Humid Period (AHP) further north, but it is unknown what impact this change had on parts of the landscape away from the Lake. The Kasitu and Luwelezi Rivers in the Mzimba District of northern Malawi offer perennial water in the incised Kasitu Valley, with paleosols and terrace sequences that show past changes in precipitation regimes. We report new results from three rock shelter sites from the Valley, which contain archaeological and paleoenvironmental archives of precipitation, vegetation, and human response to resource availability before and after the AHP. We pair these results with data from a new Sr isoscape, to further resolve how hunter-gatherer mobility and social relationships were impacted by resource distributions, prey availability, and precipitation.

Thompson, Victor [35] see Lulewicz, Isabelle

**Thornton, Erin (Washington State University), Richard Hansen (FARES Foundation/Mirador Basin Project) and Edgar Suyuc-Ley (FARES Foundation/Mirador Basin Project)**

**[18]** *Ancient Maya Diet, Environment, Animal Use and Exchange at El Mirador: The Zooarchaeological Evidence*

The site of El Mirador (Petén, Guatemala) is among the largest Preclassic settlements in the Maya lowlands. The site has attracted attention due to its size and antiquity, but also for its location within a region containing few permanent or perennial water sources. This study summarizes current zooarchaeological evidence from the site to assess past diet, habitat use, environment, and exchange. Comparative analysis demonstrates that the inhabitants of El Mirador conformed to certain widespread Preclassic dietary and animal use traditions. However, other animal use patterns are unique to the site, including on-site rearing of domestic turkeys, which was not conducted on a similar scale elsewhere in the Maya lowlands until the Postclassic (post-AD 1000). Inter-site comparisons of Preclassic animal use also reveal greater reliance on terrestrial fauna at El Mirador despite the presence of extensive wetland habitats near the site. Although a large portion of the El Mirador faunal remains date to the Late Preclassic (350 BC-AD 150), remains associated with a Late/Terminal Classic (AD 600–900) re-settlement provides an additional opportunity to address diachronic variation in animal use, and how the local environment changed or recovered after nearly 500 years of human abandonment.

Thornton, Erin [7] see Phillips, Lori

**Throgmorton, Kellam J. (Binghamton University)**

**[269]** *Early Chacoan Communities of the San Juan Basin*

In the late summer of 2017, I conducted dissertation research at two Chacoan communities: Morris 40, on the Ute Mountain Ute Reservation, and Padilla Well, in Chaco Culture National Historic Park. I was assisted by a team comprised of Binghamton University graduate students and independent researchers from New Mexico and Colorado. We used remote sensing, geophysical survey, and material culture analysis to map and document these two communities. We evaluated the idea that migration from aggregated villages in the Northern San Juan region of Southwest Colorado contributed significantly to the development of Early Bonito Phase (AD 840–1020) Chacoan communities in the San Juan Basin of New Mexico. The broader goals of the project were to evaluate variability in political organization during the initial development of a complex political entity (Chacoan society) in order to understand how these kinds of social formations arise.

**Thulman, David (George Washington University)**

**[120]** *Florida's Fluted Paleoindian Points: A Reassessment of the Typology*

Paleoindian points from Florida are different from the rest of the Southeast. Instrument-assisted fluting was never adopted, and Florida produced some apparently post-Clovis forms that are unlike any elsewhere. Several attempts have been made to sort out the myriad forms. This attempt uses landmark-based geometric morphometrics to more objectively distinguish fluted point forms.

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**Thurber, Hali (University of Arkansas) and Justin Uehlein (American University)****[39]** *Mapping Transience: An Archaeology of Hobo Movement and Placemaking*

GIS has become a powerful tool for visualizing cultural activity over time and space. We have found that it is invaluable in the archaeological study of movement and transient labor. In this paper, we aim to demonstrate how the use of geospatial technology in conjunction with the material record can offer a glimpse into the daily movements of transient laborers along Mid-Atlantic railway networks and industrial centers in the late 19th century through the Great Depression. Specifically, we suggest that the spatial relationships that emerge at an historic hobo jungle located just outside Delta, PA are not simply manifestations of economic or social hardship. Rather, we view transient worker movement and labor patterns as an essential aspect of early 20th century capitalism from which a unique form of resistance emerged. The distribution of artifacts within the site (revealing patterns of behavior by occupants coming and going from the camp over time), and the modeling of the physical location of the camp in proximity to the railroad, slate quarry, creek, and town center, are necessarily conjoined spatial and temporal units, which reveal a social structure dialectically entangled with the nearby town and broader regional economy.

**[235]** *Discussant*

Thurber, Hali [68] see Vining, Benjamin

**Thurston, T. L. (SUNY Buffalo)****[220]** *Andra tider, andra seder: Shifting Taskscapes of Gender, Age and Class in Early Sweden*

Anecdotal evidence for rural gender and age-based divisions of labor are known for Medieval and Post-Medieval Sweden, and a handful of historians have discussed their implications in terms of the 'slices of time' they represent. Other more continuous geographic and archaeological data address the status of agricultural populations through increased or diminished affordances, economic opportunities, taxation and laws, as well as climate change and demographic transitions. How were these varying conditions experienced as changing gender- and lifecycle-based taskscapes, as landscapes of shifting labor and organization, and as substrata for the emergent ideas of modernity regarding life, work, and leisure? While these transformations can be followed among lowland cereal farmers, they are perhaps most starkly highlighted within upland communities in marginal contexts where older traditions, adjusted skills, and novel practices were constantly and simultaneously in play.

Thurston, T. L. [144] see Whalen, Kathryn

**Tibbits, Tawny (Broward College)****[256]** *Sourcing Stones: pXRF Use at Pacbitun*

The Maya site of Pacbitun in Belize has produced large amounts of granite ground stone tools, debitage, and debris. Determining provenance is integral to reconstructing the chaîne opératoire of ground stone tool production at the site. Portable X-Ray fluorescence (pXRF) is becoming widely used in the field for quick and accurate geochemical assessments. Most prior archaeological work has focused on fine-grained materials, rather than coarse-grained rocks like granite. This project used geologic reference materials to assess the accuracy and validity of pXRF on coarse-grained rocks such as granite. It was determined that by using multiple data points per granite sample it is possible to generate an average composition that is statistically indistinguishable from traditional powdered samples. This method was used to compare the chemical signature of granite artifacts from Pacbitun to collected granite outcrop samples from throughout the Maya Mountains. The results of this project indicate that Mountain Pine Ridge is the likely source pluton for the granite being utilized at Pacbitun.

Tibesasa, Ruth [198] see Jones, Mica

**Tidwell, Wade (The University of Alabama)****[302]** *Artifact Ubiquity as an Index of Ancient Maya Socioeconomic Variability at Actuncan, Belize*

The Actuncan Archaeological Project has conducted ten field seasons of research at this ancient lowland Maya site in Belize, Central America and inventoried all artifact classes including ceramics, lithics, marine shell, jade, daub, etc. from excavation contexts. One of my research goals was to consolidate this information into a relational Access database so that project members could more easily analyze artifacts across contexts and time periods. The database allowed me to construct archaeological indices for documenting the ubiquity of artifact classes as a measure of socioeconomic variability across households or civic spaces. To achieve this goal, I explore which index is the most valid or useful, including the ratio of artifact classes potentially controlled by elites such as groundstone, jade and marine shell to the most commonly occurring ones (ceramics or lithics) or to excavation volume. Once these indices are created, I can identify structures or spaces that have disproportionately high or low ratios of materials and hypothesize how these areas were utilized by elite and common members of the society.

**Tiesler, Vera (Universidad Autónoma de Yucatán)****[177]** *Embodying the Sun. Pyrotechniques as Part of Human Sacrifice in Ancient Mesoamerica*

In Mesoamerica, sacrificial ceremonies for the sake of religious merit-making tended to bridge polarities between action and symbols. Some of the ritual practices were mediated by mythical narratives surrounding domestic hearths, divine fire, and the sun itself. Among ancient Mesoamericans with their hierophagic cosmic understanding, the fiery protagonists to which sacrifices were destined to were deemed necessary complements of all life and had to be fed. This talk combines graphic and textual information with new findings of heat-exposed skeletal remains from Central and Eastern Mesoamerica to discuss different choreographies of sacrificial fire consumption of human bodies and their associated meanings in religion and political transaction.

Tiesler, Vera [330] see Rodriguez, Monica

**Tiffany, Joseph and Shirley J. Schermer (Office of the State Archaeologist of Iowa)****[166]** *The Glenwood Phase Settlement System Revisited*

One of Larry Zimmerman's lasting contributions to archaeology is his research on the Central Plains tradition Glenwood culture in southwest Iowa. New site seriations, AMS radiocarbon dating, and site modeling utilizing GIS, all address fundamental assumptions derived from Zimmerman's research in the 1970s. The current model proposes a short-term occupation consisting primarily of dispersed farmsteads and possibly two or three unfortified house clusters in the Glenwood locality. Site location is resource driven; resource stress in the locality led to its abandonment.

**Todd, Lawrence (GRSLE) and Kyle Wright (Shoshone National Forest)****[106]** *Structured Wilderness: Managing 19th and Early 20th Century Heritage Resources, Shoshone National Forest, Wyoming*

As the first National Forest that abuts Yellowstone Park, the Shoshone National Forest, northwestern Wyoming has a rich and diverse history of changing use and management. Over the last several years several projects that highlight this history have been conducted by the Shoshone and several partners. Two projects at Anderson Lodge (constructed ~1890) and Simpson Lake Lodge (1926) represent stabilization efforts at cabins representing both administrative and private uses of the back county before the Wilderness designation. The third project, the Gallaher Survey party

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tree, documents the efforts of an 1893 team mapping the east and southern boundaries of the Yellowstone Forest Reserve. Efforts at these unusual Wilderness properties face numerous logistical and management difficulties, but the enthusiastic support of local, regional, and national partners clearly demonstrates the importance that the public places on these types of sites and highlights the need to a more richly nuanced perspective on evidences of human presence in our Nation's Wildernesses.

Todd, Lawrence [106] see Wright, Kyle

Tokanai, Fuyuki [18] see Tsukamoto, Kenichiro

### **Tokovinine, Alexandre (The University of Alabama)**

[109] *Giving Back: Debt in Classic Maya Narratives*

This paper considers textual and visual evidence of debt among Classic Maya nobles. It begins with an overview of lexical data and summarizes specific references to payment and accounting. The argument proceeds to some less obvious contexts such as 'just-so' myths, which reveal a notion of primordial transactions and gifts to be repaid in perpetuity. Finally, the paper considers the movement of inscribed objects. The argument is that giving those essentially inalienable possessions marked unredeemable obligations, which, nonetheless, could be transferred further down the social ladder along with the inscribed items.

Tokovinine, Alexandre [33] see Beliaev, Dmitri

### **Tomaskova, Silvia (UNC Chapel Hill) and Muzi Msimanga (Independent consultant, Johannesburg, South Africa)**

[180] *Different Methods for Different Strokes: Petroglyphs in the Northern Cape, South Africa*

Our 2017 fieldwork in the Northern Cape, South Africa presented us with a dilemma: how do methods of rock art research aimed at studying image making help us understand petroglyphs that may not be "images". The site Wildebeest Kuil near Kimberley, Northern Cape has two discrete areas of engravings: an area covered with distinct images of animals, humans, "geometric patterns" (80% of engravings), and a second adjacent area covered with peckings and stone modifications that do not easily translate into images (90% of engravings). The presentation addresses (and interrogates) archaeological methods as guiding principles that may have to be broadened or adjusted in the face of different kinds of data.

[220] *Discussant*

### **Tomka, Steve (Raba Kistner Environmental Inc.,)**

[275] *From "Nation" to "Indio" and "Español": Transitions in Indigenous Culture in the Missions of San Antonio*

The Spanish colonial advance into Texas during the late 17th century resulted in the establishment of several missions to house members of dozens of indigenous groups and a handful of presidios to protect the missions from raiding bands of Comanches and Apaches. The Padres that were in charge of the missions enforced systematic policies and procedures to affect change in the identity of the resident indigenous nations. The policies and procedures specifically targeted religious beliefs, language, dress, and daily practice to re-shape the identity of the neophytes. To a large extent, elements of the indigenous material culture were not targeted for change. Descriptions of the behavior, appearance, and language-use of indigenous groups living in the missions depict a de-emphasis on one's own group identity in favor of the demographically dominant indigenous groups in each mission. Over time, indigenous leaders and children come to undertake the most rapid change to the Spanish cultural norms. The material culture reflects few of these rapid and dramatic changes in the identity of the mission Indians. This paper explores these processes of identity change, their reflection in the written record, and how and why some aspects of material culture remained a signature of Indigenous identity.

### **Tonoike, Yukiko (Yale University) and Andrea Torvinen (Arizona State University)**

[95] *Ceramic Petrographers in the Americas: An Introduction to Our Mission and Goals*

Founded in June 2017, the mission of the Ceramic Petrographers in the Americas (CPA) group is the promotion, discussion, and development of ceramic petrography in archaeology. Of principal interest is providing resources for those interested in employing ceramic petrography for their research and those who would like to pursue this method as a specialty. The group consists of archaeologists residing in the Americas who use optical petrography and other characterization techniques to infer the geological provenance of pottery and to study ceramic technology all around the world. This poster describes how the CPA formed, our goals, and information on how to connect with us and other petrographers based in the Americas.

### **Toohey, Jason (University of Wyoming)**

[207] *Diverging Patterns of Community Organization in the Late Intermediate Period Cajamarca Region of Northern Peru*

The organizational concept of ayllu has been central to many discussions of community generation and organization in the Andes, but the blanket application of ayllu is also problematic. In the Cajamarca region of northern Peru, the beginning of the Late Intermediate Period (A.D. 1000—A.D. 1450) saw a demographic shift, with many settlements forming or relocating to higher elevation defensible and occasionally fortified positions indicating possible increases in competition and conflict between local groups. This shift in the location of some communities might also reflect increasing economic specialization between farming and herding communities, as has been seen in some other Andean zones at this time. Recent research at the communities of Callacpuma and Yanaorco in Cajamarca is beginning to shed light on possible organizational differences between higher and lower elevation communities. Variability in spatial patterning, foodways, and ceramic production and use points to diverging patterns of organization among local Cajamarca communities at this time. I will argue for the development of community at the large scale, speaking to possibly increasing inter-settlement interaction and interdependency even in the face of increased local tensions during the LIP.

Toohey, Jason [240] see Stagg, Sarah

Torpy, James [274] see Kardulias, Paul Nick

### **Torquato, Melissa**

[103] *Why Do We Farm?: Risk Assessment of the Foraging Farming Transition in North America*

The evolution of the genus *Homo* is characterized by the emergence of numerous biological and cultural traits including bipedalism, encephalization, and language. A more recent adaptation led humans to transition from a foraging subsistence strategy to one based on farming. This is significant because foraging persisted for approximately 95% of human existence until farming emerged about 12,000 years ago. For nearly a century, anthropologists have studied the foraging-farming transition and proposed several hypotheses to explain its occurrence. Naturally, current research has prioritized ultimate explanations emphasizing long-term causality with limited research focusing on proximate explanations representing immediate causal mechanisms. This study evaluates the potential of "foraging risk" to have functioned as a proximate mechanism facilitating the transition to agriculture using a small sample within the North American Eastern Agriculture Complex, where independent domestication of numerous plants

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occurred during the Late Archaic period (4500–4000 BP). This study uses species distribution models, archaeological diet data, and paleoenvironmental proxies to reconstruct the paleoenvironment, assess the availability of prehistoric resources, and compare expected and observed diets. Results of this research lead to a better understanding of the effect of foraging risk on the independent development of and ultimate foraging-farming transition in North America.

**Torrence, Robin (Australian Museum)**

[137] *Chair*

**Torrens, Shannon**

[156] *Moving Earth at Poverty Point: Investigating “Perforators” as Specialized Basket Making Tools*

Studying the development of technological specialization in cultural groups has been an interest of archaeologists for many years because specialization lends itself to the development of specialized labor. Technological specialization was a necessary factor in the building of the mounds and ridges at the late Archaic site at Poverty Point. Yet most of the research done to this point has been focused on the symbolic significance of the mounds and ridges, leaving our understanding of the development of the infrastructure necessary to create these structures surprisingly blank, even though 1.2 million cubic meters of soil must have been moved from other locations in some sort of containers. Imprints of baskets found in the excavations of Mound B indicate that baskets were the containers used. Little is known about how or where these baskets were made; I argue that the numerous perforators found at Poverty Point could have been used to create the massive quantity of baskets required to create the mounds. In this research, I explore the question of whether the perforators of Poverty Point were used in the production of basketry.

Torres, Jimena [34] see Flores-Fernandez, Carola

**Torres, Josh (National Park Service)**

[202] *The Old Stone House Revisited*

The Old Stone House was built in 1765, making it the oldest standing building in Washington, DC. The house has been used throughout its history as a residence or residence/shop. This presentation provides an overview of archeological research conducted at the site and the results of recent investigations. This paper also addresses how historical narratives are produced and consumed and the role of archaeology in public heritage.

[202] *Chair*

Torres Castro, Martín [116] see Watling, Jennifer

Torres Hochstetter, Francisco [101] see Sullivan, Kelsey

**Torres Morales, Genesis, Celeste Gagnon and Gabriel Prieto**

[270] *Violence among the Gallinazo: New Insights from Pampa la Cruz, Moche Valley*

The Moche of the North Coast of Peru, are well known for their ritualized culture of violence. Warriors, prisoners, weapon bundles, and sacrifice are commonly depicted in a variety of Moche media, and archaeological evidence from urban centers suggests such acts were practiced. What is not known is if the Early Intermediate Period ancestors of the Moche also engaged in such acts of violence. Pre-Moche, Gallinazo phase urban sites were often located in defensible settings and some show evidence of fortification. However, until now the archaeological record of the Moche Valley has not yielded bioarchaeological evidence of Gallinazo violence. We present the case of a multiple burial recovered from the rural fishing village of Pampa La Cruz, Huanchaco (50 BC/AD100-AD 500). The remains recovered show evidence of severe trauma. These individuals provide us with insight into the practices of violence during this time and allow us to explore the role that violence may have played both in Gallinazo society and in the rise of Moche hegemony.

Torres-Cubillas, Luz Alicia [131] see Martínez-Tagüña, Natalia

**Torvinen, Andrea (Arizona State University)**

[95] *Defining Petrographic Fabrics among Regional Wares at La Quemada, Zacatecas, Mexico*

Situated in the Malpaso Valley of Zacatecas, Mexico, the site of La Quemada was one of a series of polities that developed along the northern frontier of Mesoamerica during the Epiclassic period (A.D. 500–900). Widely distributed ceramic wares suggest interaction among northern frontier polities, but it remains unknown whether they are the product of widely recognized social categories (i.e., shared style) or direct, face-to-face interaction among individuals (i.e., shared composition). Answering this question requires distinguishing between local and nonlocal pottery found at La Quemada.

Despite geologic homogeneity observed across the northern frontier region due to an extensive ignimbrite province, previous characterization studies involving La Quemada pottery types have observed compositional variability among sherds and clays sampled from the Malpaso Valley. This poster builds upon these studies to define the set of ceramic fabrics observed in the La Quemada assemblage using a three-tier approach: (1) qualitative sorting and description of petrographic fabrics; (2) quantitative point counting of a proportional subsample of petrographic fabrics to test their mutual exclusivity; and (3) analysis of elemental data acquired from the clay matrix of point counted sherds and a set of briquettes made from natural Malpaso clays to establish local or nonlocal provenance.

[95] *Chair*

Torvinen, Andrea [95] see Tonoike, Yukiko

**Tostevin, Gilbert (University of Minnesota), Luke Premo (Washington State University, Pullman, Washington) and William Wimsatt (University of Chicago)**

[227] *Using Agent-Based Modeling to Study Constraints on the Social Learning of Lithic Technology*

Social learning is universally believed to be critical to the hominin adaptation. Yet when this becomes evident in our oldest cultural proxy, lithic artifacts, is hotly debated. Much of the variation in how archaeologists study this question is caused by differing assumptions related to the constraints on the performance, and thus the learning, of the flintknapping process. This paper explores the consequences of the physical constraints within lithic technology on its cultural transmission, using a spatially-explicit agent-based model. Building off of our previous work (PLoSOne 2016), we examine the incomplete social learning of the technological knowledge to produce curated lithic tool kits. We measure the number of learning events produced under the different constraints within flintknapping that reside at the heart of this debate. These constraints include where the learning occurred on the taskscape, the significance of the cognitive difference between strategic knowledge and tactical know-how, the degree of equifinality of products from different sequences, the generative entrenchment between products and sequences, and the size of the parameter space of lithic technology. Using

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the developmental utility of our model, we discuss ways to improve both experimental and artifactual studies designed to test for social learning during the Stone Age.

Tovar Saldana, Walter [18] see Cortes-Rincon, Marisol

Townsend, Russell [101] see Yerka, Stephen

**Toyne, Jennifer Marla (University of Central Florida)**

**[216]** *Victims or Venerated? A Bioarchaeological Examination of Gendered Ritual Violence and Social Identity of the Possible Aqlla at Túcume, Peru*

Human sacrifices are frequently referred to as 'victims' of ritual violence, which presupposes that the sacrificed had no control over their fate or were unjustly harmed. Many examples of human sacrifice have been identified recently across the north coast of Peru involving a range of time periods and bodily treatment to suggest that there was incredible variation in practice, including in the identity of those sacrificed. Both males and females have been identified as sacrifices, but rarely are both found within the same sacrifice tradition suggesting that gender identity often played a role. This paper explores the various human sacrificial contexts at Túcume (1000–1532 CE) specifically focusing on the 19 young females from Huaca Larga who were inferred as an Inca Aqlla; supposedly killed to accompany the principal ruler at his death. While no direct perimortem trauma is evident, they do conform to mortuary treatments of human offerings. The osteological analysis of pathological stress markers suggests that these women did not necessarily lead lives of honored status, but suffered cranial trauma, dental disease, and episodic stress during childhood. Even if they came from lower social strata, their 'death' may have elevated their status, regardless of if they had a choice.

Toyne, Jennifer Marla [7] see Michell, Samantha

**Trabanino, Felipe**

**[323]** *Starch Evidence of Nixtamalization in the Maya Region from Dental Calculus*

Human dental calculus or tooth tartar is used in the reconstruction of ancient diet and plant consumption. In the Mayan region of Guatemala, archaeological starch granules were identified as corn. But this corn were nixtamalized or not? This paper presents the initial results of analysing several changes in the starch structure in the different processes of nixtamalization (dry, fermented, ground, nixtamalized, boiled).

**[76]** *Discussant*

Trabanino, Felipe [306] see Hannigan, Elizabeth

**Trabert, Sarah (University of Oklahoma), Stephen M. Perkins (Oklahoma State University), Richard R. Drass (Oklahoma Archaeological Survey (Retired)) and Susan Vehik (University of Oklahoma (Retired))**

**[268]** *New Investigations of the Deer Creek Site, an Early Eighteenth Century Ancestral Wichita Village*

Deer Creek (34KA3) is one of few known fortified villages on the Southern Plains and was occupied during a critical point in Wichita tribal history. While researchers have been interested in this site for almost one hundred years, it was only two years ago that archaeologists were allowed to formally excavate the site. Following removal of dense brush cover in 2014, archaeologists with the University of Oklahoma, Oklahoma State University, Oklahoma Archaeological Survey, and the Oklahoma Anthropological Society conducted limited excavations at the site in 2016 and 2017. This poster presents preliminary results from this project which included the excavation of an interior fortification ditch, two trash mounds, and two storage/trash pits. Some highlights of our work include the recovery of articulated horse remains, a lithics cache, a number of French trade goods, quantities of bison and turtle bones, and paleofeces.

**Tracey, Rachel (Queen's University Belfast)**

**[296]** *Interpreting 'Irishness' in the Archaeological Record: A Northern Ireland Perspective*

The northern Irish town of Carrickfergus, in the seventeenth century, was a thriving settlement; home to a mixed population of English and Scottish settlers, in addition to a local Gaelic-Irish population. As such, the excavated material evidence is particularly suited to considerations of how we interpret, and eventually ascribe, identity in the archaeological record. Cultural identity, and expressions of such identity—be that Irishness, Britishness, or Ulster Scottishness—lie at the heart of existing sectarian divides and political histories in Northern Ireland, stemming from contested interpretations of British expansion into Ireland in the late sixteenth/early seventeenth century. A selection of artefacts from Carrickfergus will be presented to discuss the identification of 'Irishness' in material assemblages and our understanding of Irish society in the early modern period, particularly in relation to the role of choice in the use and adoption of material culture, and in terms of cross-class, cross-ethnicity material hybridity.

Tranberg, Annemari [9] see Lipkin, Sanna

**Traslaviña, Abel, James Zimmer-Dauphinee and Steven A. Wernke**

**[68]** *Historical Photogrammetry: Bringing a New Dimension to Historic Landscape Reconstruction*

Archaeologists always strive to use every available source of information when conducting research, and historic imagery and aerial photography are nothing new to the field. However, new technical developments are bringing another dimension to these old sources of information. Many historic aerial photos were taken in a series of densely overlapping photos to minimize the effects of lens distortion for use in surveillance, cartography, or other purposes where accuracy in measurement was important. While useful, the resulting photos also create stereoscopic sets that are ideal for analysis using photogrammetric methods. These techniques allow researchers to generate three-dimensional reconstructions of the landscape as it existed when the photos were taken. The resulting models can then be compared to models generated from modern imagery to examine landscape dynamics on a regional or local scale at extraordinarily high resolutions. Very small changes to the landscape, and to individual archaeological sites can be mapped, measured and analyzed. In some cases, it is even possible to explore sites that have ceased to exist today.

This article presents selected case studies from North and South America demonstrating some of the unique capabilities of this innovative approach to quickly and efficiently address archaeological questions.

Travassos, Daiana [213] see Iriarte, Jose

**Trein, Debora (University of Washington) and Thomas Hart (Franklin and Marshall College)**

**[37]** *Not Your Backyard Garden: Terraces in the Shadow of La Milpa's Temples*

Terrace construction for agriculture was integral to the survival and growth of ancient Maya centers in the Lowland Neotropics. Terraces supplied communities with food for consumption and trade, materials for construction and goods production, and plants of medicinal and ritual significance.

Research into ancient Maya agricultural practices has been largely situated in wetlands contexts, known to be sites of extensive landscape modification for agricultural purposes. Nevertheless, terraces are also identified as being integrated into the architectural arrangement of the cores of large urban

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centers throughout the Maya Lowlands. This paper discusses one such set of terraces, built and maintained adjacent to the public monumental core of Classic-period La Milpa, the third largest ancient Maya urban center in Belize. Excavations conducted on this system of terraces, positioned in the shadow of the three largest monumental temples at La Milpa, uncovered a series of modestly constructed retaining walls spanning the crest and shoulders of a 7 m-high limestone outcrop. This presentation examines some of the preliminary results from these excavations, and provides a discussion of the methods that will be used to identify the types of plants that were cultivated on these urban terraces, emphasizing macro-botanical, phytolith, and starch analyses.

**Tremain, Cara (Langara College)**

**[139]** *Taking Ancient Maya Vases off their Pedestals: A Case Study in Optical Microscopy and Ultra Violet Light Examination*  
Ancient Maya polychrome vases, especially those that are decorated with elaborately painted scenes, fill the display cases and collection drawers of museums and galleries around the world. Unfortunately, the majority of these are unprovenanced and many also lack clear provenance. Furthermore, modern restorations and/ or falsifications further muddy our understanding and blur the line between authentic and inauthentic. In order to learn more about these ceramics, and help to restore some of their life histories, detailed visual inspection and tactile examination is necessary. Situating such research within conservation departments is wholly appropriate because it allows for the application of specialized, non-invasive, equipment such as optical microscopy and ultra violet light. This paper discusses research undertaken by the author while a Smithsonian Pre-Doctoral Fellow at the National Museum of the American Indian, where more than 25 ancient Maya ceramics were investigated at the Cultural Resources Centre conservation department.

Tremblay, Roland [77] see Tache, Karine

**Triadan, Daniela (University of Arizona) and Takeshi Inomata (University of Arizona)**

**[80]** *The Roots of Urbanization: Early Middle Preclassic Transformations to a Sedentary Lifestyle at Ceibal, Guatemala*  
Our research at the Maya site of Ceibal, Guatemala, has led to new insights into processes involved in the transition of mobile hunting and horticultural populations to a more sedentary lifestyle and emergent social inequalities. Like in other areas of the world, the first architectural constructions at Ceibal, were public-ritual configurations, built communally by a still mobile population around 950 BC. Sedentism developed gradually and may have first involved people with higher social status and who may have been involved with carrying out public ritual performances. These early ritual constructions, often called an E-Group assemblage, set the stage for the first settlements and the accelerating urbanization of Maya settlements in the Preclassic.

Triadan, Daniela [147] see Inomata, Takeshi

**Tricarico, Anthony (University of South Florida)**

**[208]** *Chair*

Tricarico, Anthony [208] see Waters, Christopher

**Trigg, Heather (Univ Massachusetts Boston)**

**[104]** *Space and Architecture at LA 20,000, a 17th Century Spanish Ranch*  
Domestic space both reflects the social order and contributes to its construction. In early colonial New Mexico, houses and other architecture created arenas in which social interactions among Spanish colonizers and indigenous peoples played out and ethnogenesis took place. Moreover Spanish economic production was household based, occurring primarily at rural ranches and mission compounds; consequently, the built environment at households also framed economic activity. Here, we explore the architecture at LA 20,000, a 17th-century Spanish ranch located southwest of Santa Fe. LA 20,000 was the home of colonizers and their workers and slaves, and produced basic subsistence goods. In this poster we reconstruct the physical layout of the ranch, exploring the creation of the architecture, the buildings' functions, and remodeling and destruction episodes. Archaeological investigations of this site have identified a series of corrals, a large multi-room domestic structure, a large barn, and other buildings. Artifacts and environmental samples complete the picture of economic activities taking place at the site. As the social context of cross-cultural interactions on a micro-scale, the physical context of this site was an important location for the exchange of information among Spanish colonizers and indigenous peoples.

**[259]** *Discussant*

**[104]** *Chair*

Trigg, Heather [104] see Huerta, Danielle

**Trimble, Michael (U.S. Army Corps of Engineers)**

**[326]** *Introduction to the USACE Veterans Curation Program*

For the last 100 years, the U.S. Army Corps of Engineers (USACE) has been accumulating archeological materials that require, by laws and regulations, adequate care that ensures continued preservation. USACE administers one of the largest archaeological collections in the country. However, these materials are in less than optimal condition. Overseas contingency operations have increased the number of veterans that lack the essential skills for the current job market. The Veterans Curation Program (VCP) was created to address these two needs with a single and effective solution. The VCP invests in service members by providing competitive pay and technical training to bolster existing skillsets. At VCP laboratories, the irreplaceable archaeological assets administered by USACE are repackaged and recorded using the most current techniques to ensure the safekeeping of our nation's cultural resources for future generations. To date, over 400 veterans have benefited from the program, of which 90% have either obtained employment or matriculated to colleges, universities, or certificate programs following program completion. With the passage of Public Law 114–189 in 2016, the VCP was codified, ensuring the program can continue to hire, train, and employ veterans and members of the Armed Forces while assisting in the curation efforts of USACE.

**[326]** *Chair*

**Tringham, Ruth (Univ of California-Berkeley)**

**[172]** *Discussant*

Tringham, Ruth [309] see Danis, Ann

**Trinidad-Rivera, Gelenia (University of Puerto Rico—Rio Piedras Campus)**

**[57]** *Altering the Walls of Domesticity: Late 19th Century Modifications to Households in San Juan, Puerto Rico*

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Urban archaeology can help us understand the evolution of specific habitational spaces and shed light to investigations related to domestic life and issues related to daily life necessities. This paper will trace the modifications completed to buildings within the walled city of San Juan in the late 19th century. A selection of structures was made based primarily on the permit requests and blueprints submitted to the local government which can be consulted at the Archivo General de Puerto Rico. Each case was supplemented with information taken from a variety of sources that include maps, photographs, census data and ownership records to develop a virtual map. Taking into consideration that space is an important component in the process of daily life choices, and the development of a domestic environment, this study will provide a connection between the people who occupied these buildings in the past and today.

Trinkl, Elisabeth [118] see Rieke-Zapp, Dirk

### **Triozi, Nicholas**

**[35]** *Competing with the Crown: Early Spanish Mission Settlement Decisions in a Human Behavioral Ecology Model*

Models developed from principles in human behavioral ecology have long benefited archaeological research. Drawing on natural features in the modern landscape, locations of prehistoric settlements can be evaluated in terms of calculable suitability. Such models also have predictive potential, as they can rank loci in terms of any combination of environmental conditions appropriate to the archaeological context being investigated. Where available, careful examination of ethnohistoric and cartographic documentation have pointed to parsimonious locations validated by excavation. When this documentation is unavailable, surface collections or remote sensing will afford some surveyed areas a second look. Such has been the case for the archaeology of many 16th- and 17th-century Spanish missions in the Southeast U.S. This paper considers environmental conditions and cultural landscapes encountered by Spanish missionaries, confirmed mission loci, and the royal directives for new mission towns as criteria for a testable, predictive model of early Spanish mission settlement locations. Using the ideal despotic distribution as a scaffold, criteria in this model are affected by the competition between royal ordinances and the "realities" of the natural and social landscape experienced by 16th-century Spaniards as they navigated the Atlantic coast of La Florida.

**[35]** *Chair*

Tripp, Jennifer [219] see Stevens, Rhiannon

### **Tritsch, Michael (The Johns Hopkins University)**

**[32]** *Banqueting with Tutankhamun: A Case Study in Determining the Function and Meaning of an Unprovenanced Artifact*

A striking example of the sophistication of the vitreous materials industry at the time it was produced, a faience bead depicting Tutankhamun drinking from a white lotus chalice possesses tremendous symbolic meaning that reflects the mores of the ancient Egyptian culture of the time. Although a published piece from the Eton College Collection, this is the first time extensive research has been performed on this unprovenanced artifact bought on the antiquities market in the late 1800s. Production of the bead occurred at the end of the Amarna Period during the reign of Tutankhamun and the return to orthodoxy of Egyptian culture. A comprehensive physical analysis of the bead confirmed its material composition as faience and indicated the process utilized in its production. Through the in-depth analysis of the components of the image, the iconography established it as a potent fertility symbol representative of royal regeneration. Then, based on the findings, the original appearance of the bead and its associated collar has been reconstructed, followed by a suggestion of its function in Egyptian society. The method of analyzing this complex artifact undertaken herein allows for the interpretation of an unprovenanced find in determining its meaning, use, and cultural significance.

### **Trivedi, Mudit (University of Chicago, Graduate student)**

**[56]** *The Archaeology of Religious Conversion: Virtue and Tradition in the Indor Valley, North India*

This paper presents the results of an extended project directed at an archaeological investigation of religious conversion to Islam in South Asia. The project combined extensive regional survey, excavations and architectural documentation focused upon the site and valley of Indor, located in the region of Mewat on the borders of Rajasthan, North India.

The medieval residents of Mewat were stereotyped in contemporary imperial chronicles as primitive rebels, living in a forested hilly backwater, beyond the pale of civilized politics. After conversion to Islam in the fourteenth century CE, one group amongst them came to be known as the Khanzada lineage. The Khanzada founded Indor, a fortified city as monumental as any other in the region, and over the next five centuries, a salient attachment to place and a distinctive material repertoire were intrinsic to the Khanzada tradition.

This paper presents a contextualization of the site, its rapid emergence and the variable decline of its urbane capacities over 5 demonstrable phases of settlement in the Indor valley. Through analysis of the unprecedentedly rich assemblages of monumental sepulchral architecture and ornaments from Indor, it argues for the salience of the categories of tradition and virtue for the archaeology of religion.

### **Troccoli, Ruth (D.C. City Archaeologist) and Josh Silver (Lead Planner for Strategic Initiatives and Partner)**

**[251]** *A New Frontier: Archaeology and Heritage Management Meet Urban Planning and Creative Placemaking*

Heritage Placemaking is a thing—embrace it! Learn from our mistakes. The DC Office of Planning received a grant from the Kresge Foundation to engage in creative placemaking by artist/curators with the goal of activating underused public spaces. The DC Archaeology Program saw this as an opportunity to engage in a novel form of public outreach funded by someone else. Despite best intentions, false starts, permitting issues, need for cultural sensitivity, and last-minute directives, the archaeology- and heritage-themed intervention "If YOU Lived Here" was a smashing success. Incorporating African American archaeology and history of the post-Civil War Barry Farm Freedman community, the artist/curator came up with a moving public art installation, and pushed us out of our comfort zone into a new and scary realm with its own vocabulary, processes, metrics, and requirements. Our partners included the Smithsonian's Anacostia Community Museum and the NPS.

Troncoso, Andrés [74] see Méndez, César

### **Troskosky, Christopher (University at Buffalo), Erika Ruhl (University at Buffalo), Sarah E. Hoffman (University at Buffalo), Torill Christine Lindström (University of Bergen) and Ezra Zubrow (University at Buffalo)**

**[34]** *A Small Rock Holding Back the Waves*

Islands are both understudied and spatially constrained, with often turbulent colonial histories. This paper reconsiders the conceptual basis of intra- and inter-island relationships in the context of archaeology. We argue that islands need not be isolated as geographic, ecologic or cultural entities and have not been so during the proto-historic and prehistoric periods. Using 21st century equilibrium theory and gateway theory we suggest that islands may be

in some contexts central places. We conclude that if one views the complex and dynamic interconnections of settler and indigenous identity through the lenses of locality, steady state sustainability, heterogeneity, gradualism, and interdependence, that a supply side analysis indicates that there are strong forces which influence the colonialism of islands towards vertical relationships of the trade dynamic if not the processes of production

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themselves. Examples are provided from the Northern Latitudes including the islands as Osterøy and Radøy in Norway along with analogous examples from Aland and Lofoten and the Kiril and Aleutian island chains.

### Troufflard, Joanna (University of Florida)

#### [116] *Understanding the Tapajó Socio-political System through the Study of Landscapes and Material Culture*

The socio-political organization of the Tapajó people living in the Lower Amazon region during late precolonial times has been studied through two main sources: contact chronicles and archaeological data coming from the Santarém site located at the mouth of the Tapajós River. Based on these sources, researchers have formulated three models to explain the socio-political organization of the Tapajó. However, recent surveys and excavations conducted in the upland Belterra plateau provide new data on ceremonial and domestic contexts and call for a re-evaluation of these models of social complexity. My project compares landscapes and material culture of riverine and upland settlements in order to challenge previous models of social complexity and formulate a new model that looks at the Tapajó occupation at a broader regional scale. Based on results of the upland Cedro site ceramic analysis and the comparison between riverine and upland sites, I argue that the Santarém and Cedro sites were organized as primary and secondary centers and maintained a heterarchical relationship during the late precolonial period.

Trousedale, William B. [3] see Allen, Mitch

### Troutman, Michele (Binghamton University)

#### [41] *Spatial Distribution of Stone Tools at Peyre Blanque*

Ancient people's organization of their social space can inform us about the kinds of activities that take place on a site. However, before making any cultural interpretations, the site's stratigraphic and formation processes need to be considered. The goal of this research is to examine how lithic tools are spatially arranged at Peyre Blanque to gain a better understanding of the site organization and how stratigraphic processes may have affected the artifacts. Peyre Blanque is an open-air camp related to an early phase in the Middle Magdalenian—roughly between 18,000 BP and 20,000 BP—located in southern France, north of Fabas, Ariège (Lacombe et al. 2012). Most artifacts are plot-pointed using a total station, so their horizontal and vertical location is known. Information about the stone tools, including their spatial location, classification "type" (such as a burin or scraper for example), maximum width, maximum length, weight, and contextual notes of nearby objects and features (such as roots and burrows) were examined. The artifacts are mapped in ArcGIS and some statistical analyses were used. There are several clusters of tools that show a differentiation of space at Peyre Blanque that appear to be more cultural than post-depositional in nature.

### Truhan, Rebekah (University of Iowa)

#### [239] *The Grateful Dead: A GIS Approach to Determining the Correlation between Habitation Sites and Burial Sites in the Woodland Period in Iowa*

A powerful function of GIS is to look at spatial distributions of different components of settlement systems. During the Woodland Period, there appears to have been fundamental changes in economic and social organization, during the transition from hunting and gathering to substantial dependence on maize agriculture. Increasing dependence on maize agriculture appears to be correlated with increases in population and number of sites in the Late Woodland. What is less clear is the relationship between the number of burial mounds and the decreasing prominence of elite burials. While there has been an abundant amount of research conducted in locating mounds and burial sites using Geographic Information Systems (GIS) technology, there has been very little research done in looking at the correlation between burial sites and habitation sites in the Midwest region of North America. This project focuses on the Woodland period in the state of Iowa, which lasted from 500 B.C. to 1000 A.D., and will look at how the spatial distribution of these sites changes from the Early, Middle, and Late Woodland periods. This will be done by using the program Arc GIS, and the 1412 distinct habitation and burial sites in Iowa.

Truhan, Rebekah [89] see Stroth, Luke

Tsartsidou, Georgia [298] see McNamee, Calla

Tsosie, Lenora [138] see McBrinn, Maxine

### Tsouras, Theodore (Logan Simpson), William Bryce (Logan Simpson) and Michael L. Terlep (Logan Simpson)

#### [27] *Becoming Virgin in Jenny Clay: An Analysis of Settlement Evolution and Kayenta Intrusion in Southern Utah*

Based on recent pedestrian survey of approximately 1,500 acres of BLM-managed land in the Grand Staircase-Escalante National Monument of southern Utah, this paper examines new evidence from 129 archaeological sites that demonstrates a deep settlement history as well as both expected and unexpected changes resulting from the so called "Kayenta Intrusion" of the Pueblo II period. The Jenny Clay study area is located in a broad alluvial valley surrounded by the Vermillion Cliffs, and contains several key resources that likely contributed to significant prehistoric settlement. Deep alluvium overlaid with thin to substantial aeolian sediments provided a range of opportunities for dry-farming agriculturalists; naturally occurring and often high quality petrified wood is readily available throughout the study area; water is available from perennial springs; and the study area is part of a deer migration corridor. While evidence of prehistoric use ranges from the late Paleoindian through to early Pueblo III periods, the primary settlement of the study area consists of substantial Virgin Anasazi occupation during the Pueblo II period. Through examination of architecture, ceramics, and site layout, this paper examines how the predominately Virgin Anasazi pattern is punctuated and potentially negotiated by migrants from the Kayenta region to the south.

### Tsukamoto, Kenichiro (Department of Anthropology, University of California, Riverside), Fuyuki Tokanai (The Center for Accelerator Mass Spectrometry, Yama) and Toru Moriya (The Center for Accelerator Mass Spectrometry, Yama)

#### [18] *Building a High-Resolution Chronology: A Case from the Maya Archaeological Site of El Palmar, Mexico*

This paper aims to refine the Maya chronology during the Classic period (A.D. 250–950) through the development of Bayesian models. In so doing, we combined radiocarbon dates with stratigraphic information, ceramic data, burials, and calendric dates from stone monuments. At the Center for Accelerator Mass Spectrometry of Yamagata University, we ran 78 radiocarbon samples recovered from the Guzmán Group, an outlying group located 1.3km north of El Palmar in southeastern Campeche, Mexico. To establish the ceramic sequence of the Guzmán Group, we used the type:variety-mode system that enables us to detect subtle changes in their forms and technologies. Furthermore, we reinforced the ceramic analyses through petrographic microscope. While the results of radiocarbon samples date from the Preclassic to the Terminal Classic period, this paper focuses on the second half of the Classic period (A.D. 600–950), a time of political turbulence in which the inhabitants of the Guzmán Group became involved.

Tsukamoto, Kenichiro [37] see Cerezo-Román, Jessica

### Tsurumi, Eisei (The University of Tokyo), Cesar Sara (Pontificia Universidad Católica del Perú) and Yuichi Matsumoto (Yamagata University)

#### [178] *Settlement Pattern Study on the Early Occupations in the Upper Huallaga Basin, Northern Peru*

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The excavations at Kotosh by Japanese team during the 1960s demonstrated that in the Upper Huallaga Basin there are many archaeological sites corresponding to the time of the early development of Andean Civilization. One of the most important contributions of these studies is a fine-grained regional chronology from the Late Preceramic Period to the end of Early Horizon. The subsequent investigations in Cajamarca region of northern highland since the 1970s successfully elucidate diachronic process of early socio-economic transformations. This led us to re-examine the early cultural sequence the Upper Huallaga Basin after a half century from the excavations at Kotosh by incorporating new data set obtained from our most recent excavations there in 2016.

Tsurumi, Eisei [64] see Sara, Cesar

**Tucker, Carrie, Jeffrey B. Glover (Georgia State University) and Dominique Rissolo (University of California, San Diego)**

**[330]** *A Tale of Two Ports: A Preliminary Assessment of Ceramic and Artifactual Assemblages from Conil and Vista Alegre*  
Coastal communities in the Maya Lowlands played a myriad of roles in the ebb and flow of political, economic, and social formations over the past 3000 years, yet these roles have remained along the periphery of Maya studies. Though ever present, Maya coastal sites were atypical—perhaps even idiosyncratic—in terms of how they were imagined and lived-in by the Maya. Critical to our understanding of these coastal settlements is the material culture traded and utilized by the occupants of these sites. In this paper we present our preliminary analysis of the ceramic and artifactual assemblages collected at the neighboring ancient Maya port sites of Vista Alegre and Conil during the 2016 and 2017 field seasons. Research at both sites included survey work and surface collection, off-structure test excavations, and architectural excavations. Aside from the strikingly high concentration and deeper deposits of material culture at Vista Alegre in comparison to Conil, these excavations have provided a better understanding of both sites' chronologies and their relations with other parts of the Maya and Mesoamerican world.

Tuki, Mario [101] see Sullivan, Kelsey

Tuller, Hugh [282] see Elgerud, Lucia

Tun Lynn, Saw [56] see Iannone, Gyles

**Tune, Jesse (Department of Anthropology, Fort Lewis College)**

**[120]** *Assessing Biface Reduction and the Ideal Use-Life of Fluted Bifaces*  
Various methods have been developed to assess the use-life of Paleoindian bifaces by focusing on morphological attributes. Comparative studies have often proven difficult in part because of the diverse nature of Paleoindian biface technologies in North America. While morphological ratios such as length-to-width vary considerably throughout biface use-lives, technological ratios related to fluting and lateral grinding typically remain more constant. In turn, technological variables may be more meaningful, and have the potential to inform us about decision making processes related to lithic technologies, i.e. when bifaces were discarded versus refurbished. The study sample analyzed here was selected to minimize external factors that could influence biface manufacture, such as raw material availability and package size. Fluted Clovis and Cumberland bifaces from the Lower Tennessee River Valley were selected because of the abundance of toolstone that is readily accessible throughout the region. Technological ratios and biface conditions were used to develop a general model for the ideal use-life of fluted Clovis and Cumberland bifaces.

**[120]** *Chair*

Tune, Jesse [182] see Miller, D. Shane

Tung, Tiffany A. [270] see Smith, Emily

Turchin, Peter [105] see Johnson, Amber

**Turley, Cameron (The Graduate Center, CUNY)**

**[196]** *Centering Alluitsoq: The Potential for an Indigenous Archaeology in Greenland*  
Postcolonial and Indigenous archaeologies have changed the theoretical, methodological, and political landscapes of our discipline's engagement with regions and peoples once conceptualized as peripheral to the European core. However, some regions, and the subjects that move within them, still occupy the conceptual margins. This paper considers the position of archaeological praxes in Greenland, a constituent of the Kingdom of Denmark, and the late arrival of the postcolonial critique to Greenlandic archaeology. A new research project at Alluitsoq, formerly the German Moravian mission of Lichtenau, is taking up the agenda of the postcolonial critique and the movement toward an Indigenous archaeology. Using Alluitsoq as a case study, this paper discusses the implementation of theoretical and methodological strategies to center new subjects in a region dominated by Euro- and Paleo-focused studies. The author and a Greenlandic scholar are working together to collect oral histories from the now-dispersed descendant population of Alluitsoq to bring the community to the interpretive table. It is our hope that collaborative efforts in project design, fieldwork, and interpretation will all contribute to a decolonized archaeological practice in Greenland and produce usable narratives of the past for and by Greenlanders, who today struggle with the question of complete independence.

Turley, Cameron [34] see Madsen, Christian K.

**Turnbow, Christopher (New Mexico Gas Company) and Robert Forrester**

**[91]** *The XSX Ranch Site: Excavations of a Late Classic Mimbres to Early Post Classic Pueblo in the Upper Gila Forks, New Mexico*  
The XSX Ranch site (LA 50702) is a multicomponent occupation located on the East Fork of the Gila River in Grant County, New Mexico. Between 1980 and 1992, Robert E. Forrester, a chemist from Texas, excavated 10 pithouses, 32 pueblo rooms in five roomblocks, and 91 burials at the site. In his little-known excavation reports, Forrester suggested the site was a Classic Mimbres occupation reoccupied by a Reserve/Tularosa population; however, in a review of his data, the site may best be interpreted as a medium-sized transitional late Classic Mimbres to Early Post Classic pueblo. This poster examines the site's architectural remains, mortuary patterns, and related funerary ceramics in comparison to other excavated Classic Mimbres occupations in the Forks region and using those data, suggests other sites that may have been occupied in the Gila Forks between circa AD 1130 and 1200.

**Turner, Andrew D. (Yale University)**

**[209]** *Weapons of the Sun: Centipedes and Fire Serpents in the Art and Symbolism of Ancient Mesoamerica*  
In a myth that provided a charter for Mexica domination of Central Mexico, the deity Huitzilopochtli defeated his foes with a spear-thrower in the form of a fire serpent, or Xiuhcoatl. While Huitzilopochtli was a being unique to the Mexica, the Xiuhcoatl is generally considered to derive from an earlier entity referred to as the Teotihuacan War Serpent. Although the influence of Teotihuacan symbolism on later cultures of Central Mexico is undeniable, the portrayal of solar deities with supernatural zoomorphic weapons is more readily apparent in art of the Late Classic Maya Lowlands. Classic Maya solar

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deities and rulers often wield lances in the form of skeletal centipedes with protruding tongues made of flint. This paper explores the relationship between supernatural centipedes and fire serpents and argues that Maya conceptions of solar weaponry contributed to the development of the bellicose sun gods of Late Postclassic Central Mexico.

Turner, Andrew D. [264] see Guernsey, Julia

**Turner, Grace (The Antiquities, Monuments & Museum Corporation)**

**[337b] *The Struggle to Maintain an African Cultural Identity: The Case of the Bahamas***

Once the British Parliament abolished the trans-Atlantic trade in African captives the Bahamas became a primary locale for the re-settlement of these persons. Between 1811 and 1860 some 6,000 liberated Africans, as they were called, were re-settled in the Bahamas. These Africans served apprenticeship periods of six to sixteen years, at the end of which they were to be free. Archival documents and archaeological evidence suggest that these indentured Africans were able to maintain a stronger African cultural identity as they settled into their new lives in these tiny islands in the Americas. However, an 18th century black cemetery in Nassau indicates that, long before this population of 'unacculturated' Africans were being settled in the Bahamas, earlier communities such as this one were devising means for allowing members of their communities to express and maintain their African cultural identity. These examples provide insight on the processes through which African peoples in the Americas managed to adjust to new lives in new environments.

**Turner, Michelle (Binghamton University)**

**[27] *The Politics of Mud, Masonry and Landscape at the Aztec North Great House***

The Aztec North great house is a monumental Chaco-era building at Aztec Ruins National Monument, in northern New Mexico. Its size, its shape and its dramatic hilltop siting all echo construction norms for other great houses at Chaco Canyon and its outliers, but excavation revealed a surprising set of architectural features. In addition to a fairly typical great house artifact assemblage, we found Chaco-style wall foundations and masonry veneers, but non-Chacoan adobe wall cores. Drawing on ideas of social landscape and the materiality of mud and masonry construction, this paper explores the cultural and sociopolitical meaning of these architectural choices. Building with both adobe and stone implies a different organization of labor than a masonry structure, and perhaps participation by a wider subset of the community. Moreover, the adobe and its extravagant use of water differentiate this building from other Chaco-era structures. How might questions of labor and construction choices illuminate our understanding of political forces? Within the context of Aztec Ruins as a riverside community in an arid region, this paper considers the phenomenology of stone and mud construction, explores ideas of home and tradition, and connects the site to a greater social and political landscape.

**[27] Chair**

**Turney, Kathryn (University of Oklahoma)**

**[42] *Land and the Social Consequences of Land Loss: Navajo Oral History, Ethnoarchaeology, and Spatial Analysis at Wupatki National Monument, Arizona***

There is a contentious history between Navajo families living in the Wupatki Basin, ranchers, and the National Park Service. The creation of the monument in 1924 gradually displaced indigenous residents from ancestral homelands leading to loss of territory and connection to family. Here I focus on change in Euroamerican demands for land and federal management policies, as well as Navajo kinship, family dynamics, and oral history as told by descendants of the first Navajo settlers in the Wupatki Basin.

Using spatial analysis of settlements to discern Wupatki Navajo land use patterns before and after the establishment of the monument, I demonstrate the historic and ongoing importance of land and the social consequences of land loss for Navajo people. My findings are that the intersection of external pressures and internal factors led to disruption of traditional lifeways, values, and family, as well as loss of connection to culture.

Tuvshinjargal, Tumurbaatar [304] see Taylor, William

**Twiss, Katheryn (Stony Brook University), Melina Seabrook (Stony Brook University) and Michael Charles (Oxford University)**

**[71] *Plant and Animal Remains from Old Babylonian Ur***

Archaeologists have been examining the great cities of ancient southern Mesopotamia for well over a century now, but as yet we have limited understanding of their subsistence economies. For decades researchers more or less ignored the wealth of faunal and botanical remains in and around ancient Mesopotamian architecture. Over the course of the twentieth century researchers began to recover animal bones and teeth, but as few digs dry-screened or floated their soils the resulting assemblages could not reveal the realities of ancient animal and plant management and exploitation. We present on fully screened and floated deposits from Old Babylonian (first half of the second millennium BCE) levels at the famed site of Ur. We compare and contrast remains from household middens inside the ancient city. We summarize plant and animal taxonomic proportions as well as animal skeletal element distributions and taphonomic characteristics. We provide a brief overview of the revealed Old Babylonian economy and discuss the extent of economic differentiation at Ur.

**Two Bears, Davina (Dartmouth College Charles Eastman Fellow)**

**[337c] *Discussant***

**Tykot, Robert H. (U. of South Florida) and Andrea Vianello (U. of South Florida)**

**[77] *Prehistoric Obsidian Use in Southern Italy: Primary Acquisition and Down-the-Line Exchange in Calabria, Basilicata, and Campania***

Obsidian was a significant component of daily life in southern Italy during the Neolithic period (ca. 6000–3000 BC). Intensive surveys by Ammerman and colleagues in the 1970s identified a widespread presence of Neolithic obsidian in Calabria, generally thought to have come from the island of Lipari, mostly on the basis of its being the closest, along with general visual characteristics. While it was also thought possible to have small amounts of obsidian from the further away tiny island of Palmarola, only Lipari obsidian was present in the ~50 artifacts chemically analyzed.

Since then, extensive geological study of Lipari and the other Mediterranean obsidian sources has been conducted, while in the last ten years thousands of obsidian artifacts have been tested using non-destructive, portable X-ray fluorescence (pXRF) spectrometers. Specifically, about 2400 obsidian artifacts from the regions of Calabria, Basilicata, and Campania were analyzed from 2014–2017. The results fully support Lipari as the major resource, but obsidian from Palmarola, Pantelleria, and from multiple Sardinia subsources have also been identified in the region. The location and type of archaeological artifacts has been incorporated into our interpretation of the social dynamics of production and exchange during the Italian Neolithic revealing a vibrant exchange network.

**[112] *Discussant***

Tykot, Robert H. [23] see Tafani, Aurelien

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Uchida, Junko [24] see Mizoguchi, Koji

Uehlein, Justin [39] see Thurber, Hali

**Ugalde, Paula (School of Anthropology, University of Arizona), Calogero Santoro (Universidad de Tarapaca (IAI)) and Eugenia M. Gayo (Universidad de Concepcion & (CR)2)**

**[200] *Weathering of Surficial Lithic Assemblages in the Hyperarid Core of the Atacama Desert, Chile***

Surficial archaeological sites are widespread in arid environments. However, due to the difficulties in numerically dating them, they are usually considered as coarse indicators of past behaviors. Here, we explore the use of lithic weathering to develop local relative chronologies, and to better incorporate these assemblages into archaeological research. We test whether the most weathered artifacts should be considered the oldest; an assumption that has informally served to compare assemblages. Through macroscopic analyses, we compared seven surficial mid-to-late Holocene lithic assemblages from different micro-environments of the Atacama Desert, northern Chile. By recording changes in polish, texture, shine and color, we established that weathering varied significantly between two main locations: interfluvial and canyon sites. Lithics from interfluvial sites showed a dark coating and were moderately to highly weathered, whereas canyon lithics were mildly weathered and uncoated. This means that even within the hyperarid core of the Atacama, lithics of roughly the same age, are differentially weathered. We conclude that wind is the main weathering agent, mostly affecting artifacts deposited on inactive terraces or interfluvial sites, where they remain persistently at the surface. Consequently, we stress the importance of considering taphonomic, geomorphologic and archaeological factors together when trying to establish relative chronologies.

Ugan, Andrew [44] see Morales, Jessica

**Ullah, Isaac (San Diego State University), Yesenia Garcia (San Diego State University), Paula Kay Lazrus (St. John's University), Nicholas Ames (University of Notre Dame) and Meredith S. Chesson (University of Notre Dame)**

**[54] *Historic Water Management Infrastructure in the San Pasquale Valley, Calabria, Italy***

Over the last several field seasons, the Bova Marina Archaeological Project has been documenting the timing of construction and the physical characteristics of the original water management infrastructure as well as documenting the changes in the natural and social systems of the San Pasquale Valley in Calabria, Italy. The Valley was recolonized in the 19th and early 20th centuries for both large scale bergamot plantations and by peasant farmers. With large scale population exodus from the Valley in the post-war period, much of this infrastructure is now also falling into disrepair, and the frequency and severity of damage from flash flood hazards is increasing. We have documented these processes through geoarchaeological and archaeological survey, interviews with the few remaining landowners in the region, and archival research. This poster showcases what we have learned about the social and natural processes at play in this community with regards to water management, and discusses the extent of damage that is now occurring each rainy season.

**[161] *Discussant***

**[258] *Chair***

Ullah, Isaac [54] see Chesson, Meredith S.

**Ulloa Hung, Jorge (Postdoctoral Researcher ERC Synergy-NEXUS 1492)**

**[123] *Cultural Diversity and Transculturation in the Pre-Columbian Indigenous Universe of Northern Hispaniola***

The island of Hispaniola has been considered an initial place by the formation of creole cultures in the Caribbean and the Americas. This consideration has been founded on the study of the socio-economic dynamics and cultural transformation generated by the European colonial irruption, especially the creation of first Spanish colonial settlement on the island. At the same time, generate an excessive dependency of archaeological data of ethnohistorical sources, and formalized a reductionist interpretation and a historical division in the study of the creolization process. This point of view has ignored essential aspects of cultural diversity, socio-cultural interactions, and the transculturation among indigenous communities since pre-Columbian times.

This presentation addresses, from archeological data and historical criticism, cultural plurality and transculturation among indigenous communities that inhabited northern Hispaniola prior to the European colonial invasion. It also evaluates its possible impacts on the emergence of a Creole culture in that region.

Ulloa Hung, Jorge [275] see Hofman, Corinne L.

Ummenhofer, Caroline [213] see Buckley, Brendan

Unger, Jiri [118] see Kvetina, Petr

**Upton, Andrew (Michigan State University)**

**[26] *Conflict, Migration, and the Transformation of Network Interrelationships in Mississippian West-Central Illinois: A Multilayer Social Network Analysis***

Prior scholarship on intercultural contacts emphasizes interaction spheres, hybridization, technological transfer, or models of exchange as measures for constructing borders and defining societal membership. This presentation assesses how network relationships among complex and smaller-scale societies structured, and were restructured by, migration. Network models of social interaction and social identification are examined both prior to and following a migration process in a uniquely bellicose frontier region. In particular, the presentation addresses the role of ceramic industry in the transformation of communal scale interaction and identification networks across the middle to late Mississippian transition in the Late Prehistoric central Illinois River valley (ca. A.D. 1200–1450). Network models are analyzed to better understand how a circa 1300 A.D. in-migration of an Oneota tribal group restructured social relationships in a Mississippian chiefly environment and how communities of agents negotiated multicultural cohabitation in a region fraught with violence. A database of stylistic decorations elucidates categorical identification networks. Technological characterization data related to vessel form reveals interaction network models. Taken together, these networks create a multiple relations, or multilayer, network that is interrogated to demonstrate the role of network interrelationships as indicators of how both indigenous societies and migrant peoples approach intercultural social and economic relations.

**Upton, Samantha**

**[188] *Archaeology on the Half Shell: Preliminary Analysis of Shellfish Consumption at Coan Hall (44NB11), Virginia***

Coan Hall is the site of the first English settlement on the Northern Neck of Virginia, established by John Mottrom, an English merchant-planter, around 1640. Mottrom resided there with his family, servants, and slaves until his death in 1655. His descendants occupied the house until the early 18th century. It was situated on the banks of the Coan River, a brackish tributary of the Potomac River that empties into the Chesapeake Bay.

Representative samples of shellfish, predominantly those of eastern oyster (*Crassostrea virginica*), will be analyzed from primary contexts at Coan Hall

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that represent three temporal periods: 1640s-1660s, 1670s-1680s, and 1710s-1720s. These periods correlate with phases of household occupation and with the demolition and filling of a large basement beneath the dwelling with domestic refuse from the nearby early 18th-century house that replaced Coan Hall.

Quantitative analyses will demonstrate whether there are measurable differences in the shellfish remains between contexts. We will establish whether shellfish were exploited from single versus multiple habitats and whether shellfish deposits represent single versus multiple harvesting episodes. This research will demonstrate the importance of shellfish to the diets of early settlers and explore the relationship between early colonists and the landscape of the Chesapeake Bay.

[90] *Chair*

Ure, Scott [68] see Searcy, Michael

#### Uribe, Mauricio

[257] *Incas, locales y otras identidades: Dinámicas materiales en el norte de Chile en tiempos del Tawantinsuyo*

Los estudios arqueológicos en Chile plantearon la ausencia de una conquista incaica propiamente tal en esta parte del Desierto de Atacama, puesto que sus poblaciones se hallaban insertas dentro de sistemas de complementariedad ecológica preincaicos, cuyas cabeceras o "señoríos" se encontraban en el altiplano del lago Titicaca. Y las que, una vez anexadas al Tawantinsuyo, implicaron un dominio casi automático de las restantes entidades ubicadas en lugares más alejados como las del norte chileno, situándolas en una condición periférica e incluso al margen del control cusqueño. Lo anterior ha redundado en plantearse la expansión y/o formación del Tawantinsuyo de manera dicotómica como una dinámica de presencia o ausencia, de incas y locales, centro o periferia, hegemonía o territorialidad, especialmente determinada por indicadores cerámicos y arquitectónicos. Esta situación, nos parece que invisibiliza la complejidad y heterogeneidad de los procesos expansivos e imperiales, sobre todo en sus dinámicas étnicas, identitarias y de clase, entendidas hoy como múltiples, ambiguas e incluso de resistencia. Gracias a los avances en la arqueología chilena, aprovechamos el marco de este simposio para discutir estas categorías desde el mismo análisis cerámico y arquitectónico a partir de distintos casos del Norte Grande, avanzando en la comprensión del fenómeno panandino.

Uribe, Mauricio [100] see Santoro, Calogero

Uriquizú, Mónica [163] see Scherer, Andrew

#### Urquhart, Kyle

[169] *Ireta: An Ethnohistoric and Archaeological Model of P'urépecha Urban Polities*

New archaeological research at the site of Angamuco, Michoacán, Mexico demonstrates unequivocally that the P'urépecha (Tarascans) had cities that before the formation of the Late Postclassic empire. This paper will reexamine the ethnohistoric and ethnographic evidence for the organizational structure of P'urépecha urban polities in light of the new archaeological evidence. The evidence presented here suggests a form of political organization superficially similar to the altepetl model of Nahua (Aztec) urban polities with nested political subdivisions that included both rural and urban areas. The descriptions presented in ethnohistoric documents are similar to archaeological patterns at Angamuco dating to at least the Early Postclassic. This indicates that many of the complex social institutions embedded within urban polities predate the formation of the Late Postclassic empire.

#### Urton, Gary (Harvard University)

[132] *The Tension between Standardization and Regionalism in Cord-Keeping in Tawantinsuyu*

Studies of the extant corpus of some 1,000 khipus from different regions around the former territory of the Inka Empire—Tawantinsuyu—show evidence of contradictory forces at work in terms of the forms and degree of standardization of recording structures and techniques. While, on one hand, there are marked differences in certain features of khipus from one region to the next throughout the empire, there are, on the other hand, notable similarities in other features. This paper examines the similarities and differences in khipus from archives around the empire—from the far north of Peru to northern Chile—to address the question of how cord-keeping represented a field of cultural and administrative practices that served state interests in the surveillance and control of subject populations in Tawantinsuyu.

#### Uruñuela, Gabriela (Universidad de las Américas Puebla), Patricia Plunket (Universidad de las Américas Puebla) and Héctor Aguilar (Universidad de las Américas Puebla)

[262] *"La del estribo": The Formative Funerary Goblets from Tetimpa, Puebla, Mexico*

A Mexican slang expression, "la del estribo" (one for the stirrup) refers to the extra glass before departing, the one that you take to continue your path. In many cultures, social drinking reinforces the collective fabric: to seal an accord, to pledge peace, or to celebrate the start or the end of an event. As death is the most crucial instance that both signals closure and new beginnings, today, as in the past, funerals often include libations. In the village of Tetimpa, some beverage was fitting for the last journey, since several of over a hundred burials have goblets. Their content is unknown, but as each house had, besides ollas for water, amphorae similar to those later used in Cholula for pulque, it might have been this or another fermented brew. Here we explore two aspects of the goblets: a) Do they show a modal distribution reflecting a unit of measurement?; and b) Is the volume of liquid they represent related to the deceased's importance as estimated by the mortuary expenditure (e.g., kind of deposit, specific location, "value" of the other offerings) or with the family's prominence as judged by residential investment (e.g., acreage, building dimensions and construction quality)?

#### Urwin, Chris (Monash University)

[114] *Excavating and Interpreting Ancestral Action—Stories from the Subsurface of Orokolo Bay, Papua New Guinea*

Orokolo Bay is a rapidly changing geomorphic and cultural landscape in which the ancestral past is constantly being interpreted and negotiated. This paper examines the importance of subsurface archaeological and geomorphological features for the various communities of Orokolo Bay as they maintain and re-construct cosmological and migration narratives. Everyday activities of gardening and digging at antecedent village locations bring

Orokolo Bay locals into regular engagement with buried ceramics (deposited during the ancestral 'hiri' trade) and thin strata of 'black sand' (iron sand). These deposits—both dating to within the past 700 years—provide material evidence for various spatio-temporal interpretations of the ancestor's actions and the structure of ancestral settlements. I conclude by examining how Orokolo understandings of their tangible past might interact with my own archaeological methods and results, and with proposed iron-sand mining on the south coast of Papua New Guinea.

[114] *Chair*

#### Usman, Aribidesi (Arizona State University)

[337b] *A Report of 2017 Archaeological Investigation at Okete-Kakini Palace Precinct, Idah, Niger-Benue Confluence, Nigeria*

This paper will report the 2017 excavation at Okete-Kakini site near the king's (Attah) palace in Idah. Okete-Kakini was the residential area of Attah's eunuchs (amonoji), one of the two major palace officials who carried out various functions for the Attah. The aim of the investigation is to identify the

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activities of the palatine elites through an examination of their material culture found in archaeological excavations. It is thought that the members of the palatine groups, like the formal elites, used their settlements and their day-to-day consumption to exhibit their status. The overall goal of the research was to have a better understanding of the social, political, and economic organization of Igalá and the intrasite distribution of materials.

**Uzzle, Stephen (Cochise Community College) and Karen Schollmeyer (Archaeology Southwest)**

**[91]** *Insights into the Salado Phenomenon from the Gila River Farm Site*

During the 2016–2017 Upper Gila Preservation Archaeology Field School, test excavations focused on the Gila River Farm Site [LA39315], located near Cliff, New Mexico. These excavations allow us to gain new insights into the Cliff phase (AD 1300–1450) in the upper Gila region. Despite evidence of looting and other disturbance, artifacts and data recovered here allow us to better understand several aspects of the Salado occupation of the site, including architectural styles, room function, resource procurement strategies, production and consumption, and possible trade and migration patterns. Comparisons of these patterns with other excavated sites in the Upper Gila area (including Dinwiddie and Ormand Village) carry interesting implications for understanding variability among Salado sites and the interactions of fourteenth-century site residents with contemporaneous groups.

**Vacca, Kirsten (University of California, Berkeley) and Lisa Maher (University of California, Berkeley)**

**[295]** *Exploring the Interpretative Roles of Microarchaeology, Ethnohistory and Ethnoarchaeology for Structuring Daily Life in Pre-contact Hawaiian Houses*

Ethnoarchaeology provides a useful tool for understanding material patterns in the archaeological record. However, caution must be exercised in the application of this method to avoid projecting data onto times and places that are no longer represented by contemporary practices. In this paper, the authors argue that ethnoarchaeology is most useful for projects that focus on the *longue durée* when used in conjunction with a combination of micro and macro archaeological methods. Specifically, the use of microartifacts and micromorphology in conjunction with analysis of excavated artifacts allow one to piece together site formation processes and material patterns that relate to specific activities. A case study utilizing Hawaiian house sites exemplifies this approach. The case study presented here analyzes data from 16th century house complexes, a time when daily practices were developing in ways not reflected in the (later) ethnohistories. However, this paper illustrates that utilizing complimentary micro and macro artifact analytical methods allows for a reconstruction of daily practices by comparing the data with the ethnohistorically-derived predictive models. The model for integration of ethnohistory is followed by a model for ethnoarchaeological work in Hawai'i that will further elucidate how repeated daily activities leave traces on the built landscape.

**Vadala, Jeffrey (Five College Consortium—Hampshire College)**

**[320]** *Discussant*

**Vail, Gabrielle (UNC-Chapel Hill)**

**[209]** *Cultural Legacies of the Classic Maya: The Postclassic Northern Maya Lowlands and Beyond*

Analysis of the iconography, hieroglyphic captions, and calendrical component of the Postclassic Maya codices, believed to derive from the Northern Maya Lowlands, provides important information about their possible antecedents. Portions of the Dresden Codex, for example, suggest clear links to the mural program painted on the interior of the Los Sabios structure from the site of Xultun, Guatemala, which includes a section with detailed calculations of a lunar cycle and another that may depict a yearbearer ceremony. Similarly, the Paris Codex includes calendrical tables that can be dated to the Classic period on the basis of astronomical referents, with hieroglyphic captions that likewise reflect this earlier time period. On the other hand, the Madrid Codex, likely produced in the eastern portion of the Northern Maya Lowlands, evidences broader networks of interchange, spanning the highlands of Puebla, Tlaxcala, and the central Mexican plateau. Commonalities include the structure of almanacs (including the *in extenso* and *Formée Cross formats*) and an emphasis on the 52-year Calendar Round with its quadripartite division of time and space.

Valamoti, Soutana-Maria [298] see Ntinou, Maria

**Valcárcel Rojas, Roberto (Faculty of Archaeology, Leiden University)**

**[123]** *Colonial Cuba: From Indian to Creole*

The construction of the Indian as a colonial category was one of the first resources of domination implemented by the Spaniards in the Antilles. The term with its social, economic and cultural implications served to homogenize and differentiate populations, to eliminate identities of origin and to build a destiny of subordination and disappearance. In Cuba this category was transformed over the last five centuries and adjusted to various historical circumstances. The historical and archaeological data of the Island indicate that the Indians did not maintain a passive attitude against the colonial power. They confronted or learned to interact with him and sought mechanisms of survival. Although *mestizaje* and *acriollamiento* have been seen as processes of ethnic and cultural neutralization of the Indian, and as part of the causes of their disappearance, they were also channels for their integration into the colonial world and have a determining role in the current survival of their legacy.

Valcárcel Rojas, Roberto [275] see Hofman, Corinne L.

Valde-Nowak, Pawel [29] see Brunswig, Robert

**Valdes, Alejandro (INAH Michoacán) and Lissandra González**

**[55]** *El Arte Rupestre en el Paisaje de la Tierra Caliente Michoacana*

La llamada Tierra Caliente, se ubica al sur del estado de Michoacán y abarca una extensa región que estuvo continuamente habitada desde hace miles de años. A pesar de las condiciones climáticas donde llegan a registrarse algunas de las temperaturas más altas del país, es una tierra llena de recursos naturales y fértiles tierras dentro de un paisaje de valles y sierras que han sido aprovechadas por los grupos humanos. Las fuertes condiciones y contrastes de la Tierra Caliente han llevado a desarrollar una forma de vida y expresiones culturales muy particulares. Dentro de esas expresiones culturales, se encuentran las manifestaciones gráfico-rupestres, donde las personas han dejado constancia de su morar en este espacio, siempre en estrecha relación con los elementos del paisaje. El objetivo del presente trabajo se centra en el uso de técnicas Fotogramétricas y de Sistemas de Información Geográficas, para llevarnos a una interpretación integral de los motivos representados, las distribuciones espaciales entre ellos, su interacción con el entorno natural y las intenciones de las personas que los grabaron.

**Valdez, Fred (University of Texas At Austin)**

**[142]** *Homogeneity, Diversity, and Complexity between Hinterland Communities of NW Belize*

The "hinterland" communities of northwest Belize are among the most diverse and complex across the Maya lowlands. The Rio Bravo Management and Conservation area of NW Belize serves as the region of interest with more than 25 seasons of Maya archaeological research. Utilizing survey and mapping strategies, material culture analyses, and theoretical concerns, the Programme for Belize Archaeological Project (PFBAP) defines new ways of looking at and interpreting ancient Maya interactions for the region. The social-political-economic reconstructions for prehistoric Maya relationships

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between communities of varying size and complexity are based on data and functional concerns of polity survival(s). It is with the considerations of complex relationships within and between communities that issues of production, identity, and equality are placed and defined.

[243] *Discussant*

[243] *Chair*

Valdez, Fred [173] see Krause, Samantha

**Valdez, Francisco (IRD / France—Ecuador)**

[178] *Mayo Chinchipe-Marañón Complex, the Unexpected Spirits of the Ceja*

The fringes of the eastern Andean slopes that conform Ecuador's Ceja de Montaña are a steep transitional zone between the cordillera highlands and the Amazonian lowlands, where altitude varies from 1800 to ca. 400 masl. The ceja is covered by a dense humid tropical forest that has been traditionally seen as unfit for the development of social complexity. In spite of the apparent adverse ecological conditions this region became an important cultural area around 5000 years ago. A precocious ceremonial center has been discovered recently in the area of the headwaters of the Mayo Chinchipe hydraulic drainage. The site, called Santa Ana—La Florida, shows a complicated stone architectural layout, where two opposing platform mounds mark the extremes of a sunken circular plaza. One of the platforms held a circular structure that has been interpreted as a temple. Under this platform several elite tombs were found. The funerary paraphernalia shows the importance of the regional interactions that connected the Pacific coast the Andean highlands and the Amazonian lowlands. The iconography depicted in the stone and ceramic vessels suggest a strong ideological structure that led and managed the population on a regional scale ideological

**Valdez, Lidio (MacEwan University)**

[132] *The Inca State and the Valley of Acari, Peru*

The south coast of Peru was one of the regions conquered relatively early by the expanding Inca state. Following its incorporation, a series of Inca administrative centers were established, all linked by a branch of the Inca road. Tambo Viejo was established in the Acari Valley. The south coast was, in general, incorporated peacefully into the imperial system; the administrative control exercised by the Inca state was likely to have been exerted through local authorities. However, Inca control was brief and probably lasted no more than fifty years. As a result, the residents of valleys such as Acari experienced little change in their daily life. The architecture of Tambo Viejo and the associated ceramics do not exhibit strong external influence, but rather a low impact of Inca traditions. Though material items display only minor changes, Inca ideology is more apparent in the manner in which the layout of the center was planned. Tambo Viejo, although built with architecture in the local tradition, was conceived following the standardized Inca structural pattern that included a large rectangular plaza and an enormous mound that very likely served as an ushnu.

**Valdez, Velma (Tribal Historic Preservation Officer), Angela Neller (Curator, Wanapum Heritage Center) and Lourdes Henebry-DeLeon (NAGPRA Program Director)**

[253] *Tribal Agency and Federal Hegemony: NAGPRA in Action*

Our knowledge and traditions tell us that the Ancient One is our Ancestor. We have requested repatriation for nearly twenty years only to be blocked at every turn. The final judgment made at the United States Court of Appeals for the 9th Circuit placed the Claimant Tribes in the status of "interested party" in the minds of the federal agency. This is the hegemonic framework the tribes found themselves in when the US Army of Engineers made the official determination that the Ancient One is Native American and is subject to the processes and procedures outlined in the NAGPRA. The Claimant Tribes took a proactive approach by putting forth a Request for the Disposition of the Ancient One and conducting a supporting cultural affiliation study. The court's decision continued to influence the Corps' application, or misapplication, of the preponderance of evidence standard holding the tribes to a higher legal standard than is required by law and creating an uneven playing field.

Valenzuela Contreras, Paula [101] see Sullivan, Kelsey

**Valenzuela-Toro, Ana (Dept. of Ecology and Evolutionary Biology, University of California Santa Cruz) and Meghan K. Yap-Chiongco (Department of Ecology and Evolutionary Biology, Un)**

[187] *Pinniped Taphonomy: Observations from a Northern Elephant Seal Breeding Colony Provide New Insights into the Taphonomic Processes on Pinnipeds*

Actualistic studies on vertebrate taphonomy have been focused on terrestrial mammals, and little is known about the taphonomic processes affecting marine mammals. Pinnipeds (seals, sea lions, fur seals) exhibit an extensive fossil and archaeological record, the interpretation of which is often impeded by the lack of research on their taphonomic processes. We present the preliminary results of a taphonomic study performed in a modern breeding colony of Northern elephant seal (NES; *Mirounga angustirostris*) located at Año Nuevo State Park, San Mateo County, California. Direct observations along linear transects were performed, and more than 350 isolated bones and 30 pinniped carcasses in variable states of decomposition, were recorded. Remains of rodents, birds, and fishes were also noted. Most of the remains were of NES pups, followed by adult and subadult California sea lions (*Zalophus californianus*). The study documented the predominance of disarticulated limb bones and the existence of geographic gradients in the bone distributions. Overall, these results underline the need for new and more exhaustive studies incorporating knowledge of the functional anatomy and natural history of the species, to elucidate the taphonomic processes involved in modern, archaeological, and fossil assemblages containing pinnipeds.

Vallebuena, Miguel [97] see Waller, Kyle

**Vallejo-Caliz, Daniel (University of Kentucky, Lexington) and Scott Hutson (University of Kentucky)**

[173] *Regional Integration during the Late Preclassic in Uci, Yucatán*

Regional integration as materialized by the connections created through sacbeob can widely transform political, economic and social institutions in the participant communities. Perceiving the process through dichotomies such as center-periphery or paramount-subordinate clouds the agency of the multiple stakeholders involved in the matter. Active manipulation of social systems by intermediate elites and the commoner population seems to have had a great influence on the general process of integration. During the complex negotiations between the various sectors involved it seems likely that the activities carried out through the sacbeob (e.g., processions, exchange of products) would have greatly mitigated the frictions which would have been created. Studies at the communities connected by the Uci-Cansahcab sacbeob, in the NW plains of the Yucatan, are geared towards exploring these negotiations by considering multiple social sectors. Looking more closely at Uci as the proposed center for the micro-region during the Late Preclassic, we can assess the benefits and hindrances of regional integration. By using the concept of "disjuncture" we are able to contemplate the nature of the connections which linked the communities and how they varied within the region.

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**Van Alst, Emily (Indiana University)**

**[268]** *Into the West(ern Plains): Results of the 2017 Bighorn Archaeology Field School, Park and Fremont Counties, Wyoming*

This presentation highlights several aspects of archaeological research and training undertaken by the Indiana University Bighorn Archaeology field school in its thirteenth year. Areas of study include documentation of Native residential campsites (stone circles) at the Heart Mountain Nature Conservancy; research at the Heart Mountain WWII Japanese American Confinement Site; photogrammetry of stone architecture (stone circles and cairns) and rock art around the Bighorn Basin; comparative rock art research at Legend Rock, Ten Sleep Nature Preserve, and the Oregon Basin; and post-fire inventory and site monitoring in the Washakie Wilderness of the Shoshone National Forest. Staff and students also engage with the public through traditional means and social media. Using different methodologies, Bighorn Archaeology's overarching research goals remain focused on exploring historical and social landscapes of the Greater Yellowstone Ecosystem and to communicate our results to professional audiences and the public. Through additional readings on the region's history and culture, we teach students to understand the West from multiple perspectives and to apply them to their personal interactions and experiences. Discussion of unfamiliar concepts communicated through familiar channels allows students more quickly to grasp complexities of the West and to think about them critically, especially in rural conservative American communities.

**[61]** *Discussant*

**Van Alstyne, Benjamin (UNLV)**

**[269]** *Developing an Immersive Experience of the Past*

As archaeologists, we are looking for ways to engage the public and help them learn about the past and human diversity. Using photogrammetry, photospheres, and digital 3D modelling, this project creates an immersive experience through Virtual Reality (VR) for the public to learn about the Ancestral Puebloan people. This poster demonstrates an interactive public outreach effort that can be replicated by universities and museums, with limited budgets, to convey their research. It is a straightforward endeavor of utilizing the proliferation of accessible smartphones, the increasingly popular and affordable VR technology (i.e., \$15 google cardboard), and social media. Therefore, archaeologists can utilize this technology to provide information to a broader audience.

**Van Der Leeuw, Sander (SHESC)**

**[213]** *Sustainability: The Next 100 Years*

This paper argues that much sustainability research, which sees the challenge as an environmental one rather than as a societal one, misses the fact that the societal changes that are occurring are so fundamental, as part of the Information and Communication Technology (ICT) revolution, that our societies will be unrecognizable before the impact of the environmental changes hits our world most heavily, in the second half of the current century. The paper will argue that developing a societal perspective on socio-environmental sustainability is essential to come to grips with our future. The Maya area is an interesting one to do this for, as its society is undergoing accelerated societal changes as part of globalization and development.

**[1]** *Discussant*

**Van Dommelen, Peter (Brown University) and Alfonso Stiglitz (Museo civico di San Vero Milis)**

**[14]** *The S'Urachi Project: Cultural Encounters and Everyday Life around a Nuraghe in Phoenician and Punic Sardinia*

Nuraghi, the famous dry-stone walled towers of Sardinia, are usually just regarded as prehistoric monuments of the Bronze Age. They continued to be inhabited long after, however, and were transformed into often substantial settlements of later periods. Nuraghi are key sites for the investigation of the colonial encounters and cultural interactions between local Sardinians, Phoenician traders and Punic settlers, because they are the only places that were continuously inhabited before and during the colonial presence of Phoenicians and Carthaginians in Sardinia.

Nuraghe S'Urachi is situated in the Upper Campidano and Gulf of Oristano regions of west central Sardinia. Standing halfway between the Monti Ferru to the north and the Cabras salt marshes to the south, S'Urachi is located in a resource-rich landscape at just 15 miles away from the Phoenician colonial settlement of Tharros. Numerous imports and local adaptations testify to a long history of cultural and colonial entanglements.

In this poster, key results of the past five years of excavation at S'Urachi, are presented, showing first of all the continuity of occupation throughout the first millennium BCE, and the extent and depth of cultural interactions at the site between Phoenicians and Iron Age 'Nuragic' Sardinians.

**[117]** *Discussant*

**Van Dyke, Ruth (Binghamton University)**

**[218]** *In Homage to Homol'ovi: Architecture and Ceremony in Chaco Canyon*

As Adams significantly argued, there are clear relationships between the configuration of public Pueblo spaces and the nature of Pueblo ceremonialism. In this paper, I build on Adams' work to explore the relationships among architecture, public spaces, and ceremony at Chaco Canyon. Architectural spaces may be seen not only as functional containers for human activities, but also as resonant participants in affective human experiences. The visual and acoustic properties of public architecture in Chaco may assist us in understanding the Chacoan ceremonial experience from the vantage point of the human body. These insights can help support or refute particular models for Chacoan social and political organization through time.

**Van Etten, Heidi**

**[74]** *Reinvestigating the Chronostratigraphy of the Early Paleoindian Components of Hell Gap, Locality 1*

Hell Gap in eastern Wyoming contains the most complete Paleoindian cultural sequence in North America, providing insight into long-term landscape use and available resources exploited by early Americans. A well-developed chronology allows for clearer and more accurate comparisons of both cultural information and geologic data. Although Hell Gap is well studied and has provided archaeologists a wealth of information regarding the Paleoindian period, questions remain regarding the timing of events and geomorphology due to discrepancies with 14C dates and a complex stratigraphy. Some cultural components and sedimentary units remain undated. Discrepancies in the chronological record of Hell Gap may be better understood by improving the dating resolution using techniques not reliant on charcoal or cultural material such as that provided by OSL Dating. OSL samples were recently collected from Hell Gap, thus rendering a greater understanding of the timing of sediment deposition in relation to cultural sequences at the site.

Van Gelder, Leslie [118] see Huang, Cindy Hsin-ye

**Van Gijn, Annelou (Leiden University)**

**[137]** *Back to Basics: Next Generation Experimental Archaeology*

Experimental archaeology plays a critical role in the development of new ideas and techniques within the discipline, for example, within studies of artifact manufacture and use, butchery practices, taphonomy, etc. Despite a difference in the nature of 'controls,' out-of-the-lab experiments play a crucial role in scientific archaeology because they often shed new and different light on a range of complex issues, as demonstrated by recent house building experiments conducted with the assistance of local communities. These experiments illustrate the advantages of reaching outside the circle of

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professional (lab-based) archaeologists and removing the barrier between re-enactors and craftspeople, on the one hand, and professional archaeologists, on the other. A critical limitation for many experiments, a lack of expertise in specialised tasks such as wood working, knapping, or thatching, can be overcome by involving experts outside academia. Not only are these experiments highly fruitful for scientific research, because they reveal and document lifeways foreign to the modern world, they are enjoyable and enable academics to get out of the ivory tower and reach out to a broader public.

**Van Hagen, Logan (Department of Anthropology, University of Georgia), Douglas Dvoracek (University of Georgia), Laurie Reitsema (University) and Carol Colaninno-Meeks (Southern Illinois University Edwardsville)**

**[188]** *Sulfur Isotope Ratios of Terrestrial and Coastal Fauna on the Southeastern Coast: A Step toward Resolving Equifinality in Human Paleodiet Reconstructions*

Sulfur isotope ratios in human bone collagen are used in paleodiet reconstructions to distinguish between marine- and terrestrial-based diets, because sulfur isotope ratios in marine organisms are typically higher. However, natural phenomena such as sea spray, rain, and flooding can deposit sea water sulfates on land that are bioavailable to plants and terrestrial animals. Comparing sulfur from archaeological deer and fish-eating raccoons from sites both in close proximity to the coast and further inland, this study examines whether sulfur isotope ratios have the potential to discern between marine and terrestrial foods in past human diets on the southeastern coast.

**Van Keuren, Scott (University of Vermont)**

**[287]** *How Long Did It Take to Paint Ancestral Pueblo Pottery?*

One of the basic goals of ceramic analysis is to reconstruct the manufacturing process. The sequence of production may be easy to infer but the duration of each step is elusive. For instance, archaeologists have yet to devise a method for estimating how long potters spent painting vessels. In the American Southwest, Ancestral Pueblo potters seem to have invested considerable time in these pursuits. Drawing on ethnoarchaeological scholarship, Pueblo ethnographies, and experimental archaeology, I present a new method that estimates minimum painting duration based on the organization and structure of brushstrokes. The latter mark discrete movements of the ancient potter's hand as s/he crafted, step-by-step, the overall design layout. Using examples from the Ancestral Pueblo world, I discuss what these estimates of painting time tell us about the social dimensions of ceramic production.

**Van Oyen, Astrid (Cornell University)**

**[181]** *Storage and Empire: Choreographies of Time and Matter at Rome's Harbours*

The capacity for storing surplus has been a key parameter in the hierarchical rankings of socio-political evolution, with empire at the apex. With its large-scale ports and massive warehouses, the Roman empire easily fits this bill. Models of socio-political evolution, however, not only build on top-down templates of power, but also adopt a view of things (i.e. stored goods) as passive resources. But in the light of recent material culture theory, storage becomes a more complex mediation of time and matter than the 'surplus model' could fathom, with power emerging from localized mediations of assemblages of humans and things, although with historical implications that were no less far-reaching.

This paper empirically traces the temporal and material choreographies of storage practices at Ostia and Portus, the main ports of the city of Rome. It investigates how things' trajectories through these ports and their warehouses articulated control and calculability, and it traces the resulting landscape of power. In so doing, it challenges old readings of an opposition between state control and private interests at these centres, and instead proposes a kaleidoscopic model of power, rooted in the material and metaphorical assemblage of the family.

Van Pelt, Paul [32] see Walsh, Carl

**Van Thienen, Vince**

**[95]** *Rethinking Migration and Mobility in the Late Roman West with Ceramic Petrography*

For some time the study of migration with ceramics was considered unreliable or unuseful after the ethnic discourse applied by cultural historians. The idea of 'pots=people' was heavily criticized, and rightly so: for similarities in style can result from mobility in people, goods and ideas. Yet, discarding the ceramic evidence altogether is not the solution. With a proper understanding of the limitations and issues, and ideally supplemented with other datasets, the distribution of ceramics and ceramic technology can be very useful in studying migration and even distinguishing between different kinds of mobility. This poster aims to demonstrate the use of ceramic petrography to investigate migration and mobility in the Late Roman West. By identifying fabrics of traditional house-made pottery from Roman Gaul (local) and several Germanic territories outside the Roman Empire (non-local), the results demonstrate continued traditions, the arrival of new immigrants with 'foreign' traditions and new or redefined ceramic productions. On the one hand, these new techniques are the result of technological changes due to restrictions and changes in natural resources, and on the other hand can be linked to choices resulted from the merging of various cultural and ethnic groups.

**Van Vlack, Hannah (San Jose State University, California), Jamie A. Civitello (Bandelier National Monument, National Park Service), Rory P. Gauthier (Bandelier National Monument, National Park Service) and Robert Powers (University of New Mexico, Anthropology Department)**

**[269]** *Ancestral Pueblo Agriculture on the Pajarito Plateau: A Geoscience Investigation of Field Terraces in the Northern Mountains of New Mexico*

In honor of Robert Powers, Bandelier National Monument (BNM) presents research on his final project investigating agricultural potential in the arid highlands of the American Southwest. Powers' research was conducted on behalf of the University of New Mexico's anthropology doctoral program for archaeology. The Park is well-known for its ancestral Pueblo archaeological sites and the unique, natural ecotones throughout the Eastern Jemez Mountains. The region is topographically dynamic; the landscape is shaped by tuff and talus deposits formed from early Quaternary volcanic eruptions, carved by ancient watersheds into a mesa plateau now punctuated by an intricate canyon system. The Pajarito Plateau refers to the mesa tops, where the ancestral Pueblo agricultural terraces are situated and laced among the pinyon and juniper woodland. The peopling of the Pajarito Plateau has been well-studied; however, the emergence of agricultural practice and stability in this arid region is relatively unexplored. The terrace contexts Powers' sampled likely date between the Classic and Coalition periods (Pueblo III and IV; AD 1150–1400). Conclusively, this project evaluates the information potential of legacy collections and interagency collaboration in the application of archaeological science for resource management.

Van Vlack, Kathleen [305] see Yaquinto, Jessica

**Van Wormer, Heather (Grand Valley State University)**

**[205]** *Memory and Materiality at Mary's City of David*

Mary's City of David is a millenarian commune in Michigan, founded in 1903 and re-organized in 1930. As with all intentional communities, material culture (i.e., architecture, clothing, landscapes) serves as an active medium to both reflect and reinforce social ideals, and community members are keenly aware of the symbolic meanings represented. At their peak, the Benton Harbor colony sent out preachers to spread the word, bands to spread the music, and baseball teams to spread the game. These journeys are marked in various ways in the colony landscape and architecture. Additionally, social and collective memories serve to reinforce their beliefs. Individuals that are no longer living or events that happened long ago are commonly

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remembered—often triggered by material objects, landscapes, plantings, or specific places at the colony. This serves to not only reinforce social and religious ideology in the present, but is also a theological promise for the future. In this paper I explore these material expressions of “home” and “community” in both the past and present colony and their central place in promoting and reinforcing community through social memory.

Vance, Samuel [238] see Baxter, Carey

VanDam, Seth [268] see Newman, Tiffany

**Vander Heiden, Robert (University of Wisconsin- Milwaukee)**

**[296]** *Glass Bottles at the McHugh Site: Patent Medicines, Frontier Health, and 19th Century Popular Culture*

Patent medicine bottles offer a window into the popular culture of 19th Century America and highlight the ways in which otherwise isolated populations were connected into broader social and economic networks. Settlers on the Wisconsin frontier in the mid-to-late 19th century had limited access to formal health care. Physicians who did provide services to remote populations were often poorly trained and had a limited understanding of the causes of many diseases. Thus, self-medication and alternative forms of health care became an attractive option for many frontier occupants. As a result of rapid industrialization during this period, many groups of immigrants were forced to abandon their ancestral ethnic identities and assimilate to a more homogeneous capitalistic American culture. This paper illustrates how patent medicine bottles recovered from the McHugh site provide an indication of how the McHugh family responded to the need for health care under the harsh conditions of frontier life in northeastern Wisconsin during the mid-to-late 19th century. Moreover, this analysis shows how broadly changing social conditions as well as the emergence of American popular culture may have shaped how the McHughs conceptualized ideas of sickness and disease.

**Vander Linden, Marc (University of Cambridge)**

**[144]** *“British”, “Irish” and “Continentalist”: Practising Comparative in the Later Prehistory of North-Western Europe*

Projecting back notions of “British”, “Irish” or “European” back into prehistory does not go without problems as, explicitly or not, these concepts are closely associated with the rise of nation-states, and still echoed in yesterday’s and today’s turbulent politics. And yet, even advocating a simple geographic meaning for these terms does not prevent any problems, as it raises theoretical and methodological issues regarding the choice of location and scale of case-studies to be analysed. In the case of North-Western Europe, these problems are even more challenging given the insular character of several areas: does the Channel for instance work as a connecting fluid or as a water barrier? Are periods of cross-Channel interactions associated with increased connectivity within islands and the nearby continent?

In order to provide first elements of answer to these many questions, two distinct Later European case-studies will be explored; firstly, the early 4th mill. cal BC and, secondly, the introduction of animal and plant domesticates, and the late 3rd mill BC and the Bell Beaker Phenomenon. In both instance, long-standing debates have argued the contemporary association of extensive cross-Channel contacts, whilst recent aDNA studies have stressed the role of human migrations.

**Vanderslice, Allison (San Francisco Planning Department)**

**[179]** *Discussant*

**VanDerwarker, Amber (UCSB)**

**[310]** *Farming, Warfare, Drought, and Soil Fertility in the Mississippian Central Illinois River Valley: Carbon and Nitrogen Isotopes on Maize Kernels from Five Sites Spanning Two Centuries*

We report on carbon and nitrogen isotope results from a total of 60 maize kernels from five sequentially-occupied sites in the Central Illinois River Valley that span the Mississippian period (AD 1100–1300). The sites span: (1) the onset of and intensification of warfare in the region; and (2) a long period of drought that eventually gave way to wetter conditions during the last 50 years of the sequence. C13 and N15 isotope values from these maize kernels provide independent support for the cessation of drought conditions during the final occupation, but also provide evidence for deteriorating soil fertility associated with intensive infield production.

**[150]** *Discussant*

**[310]** *Chair*

**Vandiver, Pamela (Materials Science and Engrg., University of Arizona)**

**[246]** *Discussant*

**Vandrei, Charles**

**[148]** *Discussant*

**Vangstad, Hilde (Researcher)**

**[78]** *Man and Machine—New Methods for Excavation, Documentation and Reconstruction of 29 Medieval and Renaissance Boat Wrecks from Oslo Harbour, Norway*

Since 2003, the Norwegian Maritime Museum has had several extensive excavations in the area of Bjørvika in the harbour of Oslo as a measure to document archaeological remains before being removed or covered during the rapid urban development of the area. This paper will discuss two of the major sites that have yielded 29 well-preserved boat wrecks and large areas of previously unknown harbour constructions of timber. Boats and constructions date to the 16th and early 17th century and varies from small boats of around five meters length to 20 meters long ships. All but one are built in the Nordic clinker technique.

The museum made the decision early to retrieve all boats and document every boat part with a digital 3D Faro-arm. We have chosen to use a combination of digital and traditional methods of documentation including cardboard models of the boats using 3D prints. In the process of building replicas of the boats, we have experienced the subjective contribution and practical knowledge of the older generation of boat archaeologists and skilled boat builders to be of great value to complement the “objective” digital methods.

VanPool, Christine [154] see Noneman, Heidi

**Vargas, Amilcar (University of Barcelona) and Álvaro Brizuela Absalón (Universidad Veracruzana)**

**[42]** *REAP in El Tajin: Looking towards Social Participation in a World Heritage Site*

The Pre-Hispanic city of El Tajin (Mexico) was inscribed on the UNESCO World Heritage List in 1992. Late on in the same decade UNESCO encouraged State Parties to foster “informed awareness on the part of the population... whose active participation [in conservation]... is essential”. Using the Rapid Ethnographic Assessment Procedures method (REAP) on fieldwork in Mexico, this paper aims to contrast global and local policies to improve participation of local communities generally and in particular of indigenous peoples in El Tajin. The inscription as Intangible Heritage in 2009 and 2012 of two cultural expressions of nearby Tajin village has added complexities to social participation that will also be discussed.

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**Vargas Ruiz, Juan (Universidad Externado de Colombia)****[75]** *Prehispanic Warfare, Leadership and Demography in the Llanos of the Orinoco, Northern South America*

Although for northern South America it has been proposed that warfare was an important mechanism that elites used to promote their authority and the institutionalization of their leadership during precolonial times, the evaluation of the available evidence is still not systematic. This presentation offers a comparative discussion about warfare in the Llanos of the Orinoco. The archaeological evidence suggests that warfare in the Llanos played a differential role in the historical and evolutionary sequences of the complex societies in the Llanos. In contrast to the Barinas (Venezuela) complex societies, in the Casanare (Colombia) region warfare was not a main factor that affected the emergence of central leadership or its consolidation at least during the first stages of the occupational sequence. The archaeological evidence recovered during the regional survey conducted in the Barinas and Casanare regions supports the ethnohistorical accounts of the varying extents of centralized power and the varying strategies used by emerging elites according to the capabilities and the possibilities at the disposal of aspiring rulers in different times and places.

**[75]** *Chair*

Varien, Mark [226] see Coffey, Grant

**Varillas, Rosa Maria (Proyecto Arqueológico Cerro de Oro) and Francesca Fernandini (Pontificia Universidad Católica del Perú)****[211]** *Wari Textiles for the Everyday and the Afterlife*

Some pre-Hispanic textiles were complex masterpieces made with labor-intensive techniques and high quality raw materials. Nevertheless, the vast majority of textiles, those used by the population at large, were plain, simple and without any decoration. This study will present a comparative analysis between a sample of plain weaves obtained from domestic contexts and a sample of high quality textiles excavated in an elaborated Wari tomb, all of them registered at the pre-Hispanic settlement of Cerro de Oro. This comparison will explore parameters to evaluate their quality and aesthetics as well as the cultural practices involved in their production. These lines of investigation will be incorporated within broader questions regarding the presence of Wari elements in the coast, and particularly within the site of Cerro de Oro.

**Varlan, Abigail (The College of Wooster) and Olivia Navaro-Farr****[242]** *Trade Winds: A Study of Roman Ceramic Trade in the Balearic Islands*

The Balearic Islands, located off the coast of Spain, were occupied by the Romans beginning in 123 B.C.E. Under Roman occupation, the islands saw the development of Roman-style infrastructure and architecture in place of the pre-existing megalithic style of groups such as the Talayotic people. Sanisera and Pollentia are examples of Roman cities developed to facilitate trade and support the military needs of the empire. While excavations of the Balearic Islands have provided a wealth of data, this information is often underrepresented in Classical scholarship. An emphasis in Classical scholarship on documentary sources over the archaeological record results in the marginalizing of places like the Balearics, whose archaeological records are far more robust than Classical texts convey. We argue a comprehensive contextual analysis of ceramics from these sites not only underscores the importance of the islands in Roman trade, but contributes substantially to a more holistic understanding of the Classical Roman political economy.

Varney, R. A. [74] see Scott Cummings, Linda

**Varney, Tamara, Treena Swanston (2Department of Anthropology, Economics and Politic), Ian Coulthard (Canadian Light Source), A. Reginald Murphy (National Parks Antigua) and David M. L. Cooper (1Department of Anatomy and Cell Biology, Universit)****[208]** *Unravelling the Social Determinants of Lead Exposure in 19th Century British Royal Navy Stationed in Antigua, W.I.*

An exploration into various aspects of lead exposure in the British Royal Navy stationed in 19th Century Antigua, West Indies has contributed to some unexpected insights. This research was facilitated by study of human remains mitigated from a Naval Hospital cemetery in response to modern development. The interred at the site were lower ranking naval personnel including enslaved individuals. Other work on lead exposure in the region focused on enslaved plantation laborers revealed high levels of the toxic metal in skeletal elements which was attributed to exposure in sugar processing. The work presented here focuses on enslaved African laborers in a military context. The patterns of lead exposure for this group are compared and contrasted with those of both the regular naval personnel and enslaved Africans in a plantation context. Similarities and differences seen in the lead burden of the bony remains between these three groups that were connected to the sugar industry in different capacities highlight into the variability in lived experiences of enslaved Africans in the colonial Caribbean.

**Vasquez, Josefina (Universidad San Francisco de Quito)****[132]** *Puruwá Polity under Inka Rule in Colta, Chimborazo Province (Ecuador)*

The Inka incorporated the territory of today's Ecuador to the Tawantinsuyu around 1420. This conquest is well documented from South to North by recording the expansion of monumental features such as pukaras, tambos, bridges, terraces, collkas, wakas, patios and plazas, built in traditional Inka style. The political transformation of northern Andes landscape by the Inka was very profound in the Loja and Azuay provinces of southern Ecuador. While it was a milder transformative factor around Quito and other northern suyus. In the Chimborazo province, the Puruwá territory at the time of Inka expansion was transformed into an agricultural production area, as witnessed by the constructions of dozens of monumental terraces associated to nucleated houses that seem to be erected using Inka techniques. Both terrestrial and aerial survey data has been used to reconstruct the history of occupations of Colta region within the Chimborazo province to track changes in landscape that correspond to these sociopolitical events, as well as to natural catastrophes that modeled Puruwá patterns of economy before, during, and after Inka rule.

Vasquez, Victor [7] see Michell, Samantha

**Vaughn, Kevin (UCLA), Christina Conlee (Texas State University), Sarah Kerchusky (UCSB) and Verity Whalen****[165]** *Household Spaces in Nasca: A Comparison through Time*

In this paper we evaluate household spaces in the Nasca region through time. We consider household structures in domestic contexts from the Formative, the Early and Late Nasca epochs, the Middle Horizon and the Late Intermediate Period. We look at the changes that took place in the use of residential space and consider how broader regional changes in sociopolitical structure, economy and religious ideology may have contributed to the changing nature of local dwellings.

Vavisoa, Voahirana [114] see Douglass, Kristina

**Vavrsek, Jessica (The University at Albany)****[301]** *St. Lawrence Iroquoian Pottery Motifs and Dog Isotopes as Indicators of Population Movement in Jefferson County, NY*

Pottery motifs are known to change across time, space, and group affiliation, and are something that can be observed archaeologically. Rim sherds recovered from archaeological sites in and around Jefferson County, NY, are observed in an attempt to better understand the occupation by the St.

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Lawrence Iroquoians. Each of the observed sherds displays some form of decorative motif that can potentially inform researchers about when and where it came from. It is hypothesized that these sherds can determine whether individual motif components are indicative of location and/or time. In addition, I am also looking at carbon, nitrogen, oxygen, and strontium isotopes from domestic dog remains as compared to white-tailed deer remains recovered from the same site to see whether domesticated dogs can be used as proxies for humans when considering movement patterns in a small area. The combination of these two data sets will strengthen any results from either individual data set and provide a more comprehensive interpretation of movement patterns in Jefferson County during the Late Woodland Period.

**Vawser, Anne (National Park Service)**

[276] Moderator

Vega, Enrique [175] see Hendrickson, Mitch

Vehik, Susan [268] see Trabert, Sarah

Vela González, Claudia Marie [142] see Eberl, Markus

**Velarde, María Inés and Pamela Castro de la Mata (Museo de Arte de Lima)**[141] *Producción metalúrgica en la Costa Sur: de Paracas a Nasca*

Las sociedades de Paracas y Nasca que habitaban el actual territorio de Ica, desarrollaron una tradición metalúrgica con características locales particulares dentro de los Andes Centrales. Los orígenes de la producción metalúrgica en esta zona se relacionan con la presencia de Chavín durante el Horizonte Temprano, y se caracteriza por el predominante uso de oro laminado y trabajado en formas y diseños simples. Esta tradición metalúrgica se mantuvo durante varios siglos en el sur, casi a espaldas del auge tecnológico que ocurría en el norte, donde existía una proliferación en técnicas, formas y estilos de producción de diferentes minerales y metales.

Para determinar continuidades y cambios a lo largo del tiempo, se vienen estudiando patrones de uso, estilístico o tecnológico de ambos desarrollos culturales Paracas-Nasca durante el período de transición entre ambos y en adelante. Las excavaciones científicas y la revisión de colecciones de museos, algunas con procedencia, incluyendo las inéditas piezas de metal de Rubini y Soldi procedentes de la Hacienda Ocucaje, los objetos metálicos recuperados por Tello en Wari Kayan y los hallazgos metálicos de los valles de Nasca y Palpa.

**Velasquez, Adrienne**[42] *Treasure within the Fortress: Opportunities for Partnership in DoD Archaeology*

Some of the least known and best preserved archaeological resources in North America exist within the confines of federal property in the Department of Defense (DoD). The US military acquired large land holdings for the purposes of military training in the early nineteenth century, prior to suburban sprawl in the Northeast. The Army and subsequently the Air Force in a snapshot encapsulated whole communities that evolved in place since colonial times. Those archaeological resources, held in public trust by the federal agency, are protected under the National Historic Preservation Act from potential adverse effects of military activities and the DoD has cultural resource management programs that do so. Though a vast resource for American archaeology, few of those resources are known outside the federal agency. In this paper, I present two examples of untapped archaeological resources from Air Force installations in the eastern United States, the efforts to identify and hold those resources in trust, as well as the potential for collaboration in exploration of those resources beyond the DoD.

Velásquez, Antolín [142] see Barrios, Edy

Vellanoweth, Rene [225] see Lopez, Escee

Venegas, Joaquin [173] see Hernandez, Hector

**Veness, Megan (Fairfax County Park Authority)**[251] *Rocks and a Box: Data Recovery of a Rural Domestic Complex*

Patriot Park North, located in the western side of Fairfax County, is a 67-acre park in which the Fairfax County Park Authority is planning to construct a baseball complex. Fairfax County Park Authority Archaeology and Collections Branch (ACB) conducted a comprehensive Phase I and II survey in Summer 2016, and began Phase III excavation in Fall 2016. An area in the northeastern section of project area contained artifacts from the late third quarter of the eighteenth century. A large feature, Feature 5, a 25 foot by 9 foot cellar, contained artifacts ranging from black glazed earthenware to green shell-edged pearlware and brass buttons. Other artifacts and features in the vicinity are suggestive of associated outbuildings. With further testing and continued analysis of the artifacts recovered, archaeologists can reconstruct the areas of use within the structure, and shed more light on the inhabitants of Fairfax County in the eighteenth century.

**Venter, Marcie (Murray State University), Sean Carr (Independent Researcher) and Shayna Lindquist (University of Kentucky)**

[285] *A Comparison of XRF and Visual Sourcing Methods in the Identification of Guadalupe Victoria Obsidian at Matacanela, Sierra de los Tuxtles*  
Several Pre-Classic assemblages in the Mesoamerican Gulf lowlands are characterized by obsidian from the Guadalupe Victoria source. Tools produced are characterized by flake-core reduction strategies. The combined visual characteristics of the source material and technology employed are important chronological indicators. But, general similarities in the appearance of the raw material and factors such as variable thickness create the potential for overlap with other sources, such as Pico de Orizaba, though the latter tends to have fewer inclusions, making it more suitable for the production of prismatic blades than Guadalupe Victoria obsidian. Thus, the presence of clear-to-light-gray material in flake form is typically assigned to the Guadalupe Victoria source, whereas clear-to-light-gray material in blade form is often attributed to Pico de Orizaba. The presence of clear-to-light gray material in flake form throughout the occupational sequence of Pre-Classic and Classic period Matacanela challenged existing ideas about the efficacy of visual designation. As a result, we used pXRF to examine the entire assemblage of visually sourced Guadalupe Victoria material from excavated contexts to evaluate our accuracy in predicting source material. We present these findings, and offer suggestions for refinements of the analysis of materials and interaction patterns in the southern Gulf lowlands.

Vento, F. J. [35] see Adovasio, J. M.

**Ventresca Miller, Alicia (Max Planck Institute for the Science of Human History)**

[310] *Evidence for Close Management of Sheep in Ancient Central Asia: Foddering Techniques and Transhumance in the Final Bronze Age*  
Ancient animal management strategies have important implications for debates on modern pastoral landscape use in Eurasia. As livestock production intensifies in semi-arid regions there is a need to identify the diverse set of strategies employed by pastoralists. Sequential carbon ( $\delta^{13}C$ ) and

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oxygen ( $\delta^{18}\text{O}$ ) isotope analysis of teeth from domesticated sheep at Bronze Age sites in Kazakhstan exhibit varied isotopic sequences. Sheep from Kent exhibit an inverse relationship where low  $\delta^{18}\text{O}$  values coincide with high  $\delta^{13}\text{C}$  values indicating that they ingested  $^{13}\text{C}$ -enriched graze during the winter season. This pattern is consistent with the foddering of caprines during the winter months when they are living in sheltered valleys near the site. In contrast, sheep from Turgen exhibit diverse isotopic sequences indicating variation in husbandry practices and landscape use. This is expected, as the site is located in a mountainous landscape with access to high elevation summer pastures, forested areas, and the semi-arid steppe. The patterns evident at Turgen suggest that in the early period transhumance was practiced, while in later periods sheep were foddered throughout the year.

Ventura Santos, Roberto [69] see Pugliese, Francisco

**Verdugo, Cristina (University of California, Santa Cruz)**

[134] *Cenote Xtoloc: Paying Attention to the Ignored Cenote*

A truism was established very early in Maya studies that the Cenote of Sacrifice at Chichen Itza had a religious function while the nearby Cenote Xtoloc was the source for domestic drinking water. Part of the attraction of this idea was no doubt its close paralleling of the popular Western dichotomy, sacred vs. profane. The problem with truisms, statements so obviously true that they say nothing new or interesting, is that they direct attention elsewhere. This is probably why the Temple of Xtoloc was never placed on the Carnegie map of Chichen Itza even though Ann Axtell Morris excavated there in the 1920s. When a truism is not true the impact can be disastrous for our understanding of the subject.

The Gran Aquifero Maya undertook a reexamination of the area surrounding the cenote as part of its assessment of all water sources at the site. The project found architectural enhancements that included stairways leading from sacbe to the water and constructed masonry platforms formalized this space. In addition, three caves in the northwest wall of the cenote were documented and mapped.

[134] *Chair*

Verdugo, Cristina [134] see Saldana, Melanie

Vermillion, Alexander [190] see Daugherty, Sean

**Vernon, Kenneth (University of Utah Department of Anthropology), Kate Magargal (University of Utah Department of Anthropology), D. Craig Young (Far Western), David Zeanah (Sacramento State University Department of Anthropology) and Brian Coddington (University of Utah Department of Anthropology)**

[92] *Prearchaic Land Use in Grass Valley, NV: A Novel Statistical Implementation of Optimal Distribution Models*

Despite decades of work, debate persists regarding the nature and extent of Prearchaic land use patterns in the North American Great Basin. While some archaeologists argue that Prearchaic hunter-gatherers favored a broad diet and, therefore, relied on a generalist land use strategy, others insist that they favored a narrow diet, thus relying instead on a specialist land use strategy. To help resolve these debates, here we ask the simple question: what environmental parameters drive variation in Prearchaic settlement decisions? To answer this question, we undertake a modelling exercise that evaluates Prearchaic settlement locations in Grass Valley, NV relative to measures of habitat suitability informed by Ideal Free Distribution and implemented using a Maximum Entropy approach to species distribution modeling. The results of this case study provide a quantitative measure of factors that structured land use decisions in the Great Basin prior to 9000 BP.

Viana, Sibeli [2] see Silva, Rosicler

**Vianello, Andrea (University of South Florida) and Robert H. Tykot (University of South Florida)**

[88] *Mobility in North-eastern Italy between the Late Roman and Byzantine Periods*

The upheaval caused by the fall of the Roman Empire brought armies and new settlers in Italy in chaotic ways, producing significant changes to the socio-economic and political organization of the Empire. Material evidence has been irresolute in determining the actual significance of migratory movements due to the fast adoption of foreign customs to attain social power in the new political landscape. An interdisciplinary research using strontium isotope analyses on Late Roman and Byzantine individuals buried in southern Veneto and Emilia-Romagna in Italy is investigating mobility and migration directly. At a time when Italy seems a gateway to chaotic migratory fluxes, the research has the dual importance to investigate a past transition that is directly responsible for medieval and modern Europe, and understand mechanisms that might affect the perception of migratory movements. The preliminary results to be presented will attempt to quantify migration in a highly contested area and compare those values with the perception resulting from the study of material culture. This study compares isotopic data from bones against the perception detectable in historical sources and material culture, focusing on multiple funerary contexts within a small region.

Vianello, Andrea [23] see Tafani, Aurelien

Vicenzi, Edward [77] see Foecke, Kimberly

**Victor, Bart (Vanderbilt University), Arthur Demarest (Vanderbilt University) and Chloé Andrieu (Le Centre National de la Recherche Scientifique)**

[121] *Changing Patterns of Production and Exchange in "Borderland" Economies: The Case of the Classic Maya Civilization*

Following the trajectory of the work of Rita Wright, recent research has focused on production, producers, and exchange in a "borderland" zone, the "frontier" between Classic Maya lowland city-states and less complex, but more diverse, polities of the resource-rich highlands to the south. These "borderland" studies led to insights concerning exchange, production, and the roles of elite managers and non-elite "labor". Archaeologists and economists examined the material culture of dozens of sites to assess changing borderland partnership networks. This evidence revealed innovations in management and production strategies. Those innovations led rapidly to spectacular wealth, yet growing inequality, in a new economic system, while more conservative central lowland Maya states to the north were declining.

As in Wright's approach, this material culture history of these "borderlands" provided a foundation for application of social and economic theory including Innovation Network theories and Network Failure theories from economics. This research is directed upward to examine the "big picture" of changing state economic structure and "downward" to identify the agents and forms of agency involved. This work confirms Wright's conviction that borderlands production and its agents and material products provide keys to understanding ancient economic systems and the people that acted within them.

Vicze, Magdolna [245] see Earle, Timothy

Vidal-Guzman, Cuauhtemoc [288] see Salazar Chavez, Victor Emmanuel

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**Vidal-Montero, Estefanía (Department of Anthropology, University of Chicago), Itací Correa (Universidad Alberto Hurtado, Chile), Liz Vilches, Francisco Gallardo (CIIR-Universidad Católica de Chile) and Mauricio Uribe (Universidad de Chile)**

[141] *Technologies of Clay: Pottery, Architecture, and the Transformation of Mud in the Atacama Desert (South-Central Andes)*

In the Atacama Desert, pottery is one of the main technological changes of the Formative Period (ca. 2700 BP). The initial industry (LCA type) is characterized by a stylistic homogeneity coupled with a wide geographical distribution. Compositional analyses, however, have shown a significant regularity in pastes, suggesting the use of localized sources of raw materials and/or specific production centers—indicative of a well-defined recipe and style. Provenance studies have identified a locus of production in the Guatacondo valley, in the hyper-arid core of the Atacama. In this valley the production and consumption of LCA pottery coincides with the emergence of mud architecture. Both technologies were developed in a geomorphological environment characterized by multiple outcrops of clay, making this material easily accessible.

Using archaeometric methods, we approach both traditions as technological practices that required specific technical gestures, bodily engagements, labor organization, and temporal rhythms, mobilizing a collective that was partially constituted as such through the repeated and enduring transformation of mud. Considering the networks of materials, practices, and spheres of circulation wrought by these technologies, we offer an interpretation of the Formative process that centers on the qualities of clay in order to understand the material trajectories of this social landscape.

Viera, Ricardo [57] see Hernandez-de-Lara, Odlaner

Vigne, Jean-Denis [125] see Cucchi, Thomas

Vilar, Miguel [283] see Alfonso-Durruty, Marta

Vilches, Liz [141] see Vidal-Montero, Estefanía

Villalba, Ricardo [105] see Gil, Adolfo

**Villarreal, Alessandra (University of Texas, San Antonio)**

[37] *Preclassic Maya Ceramic Production and Distribution: Preliminary Petrographic Analysis from the Mopan Valley, Belize*

Understanding the organization of ancient ceramic production and distribution patterns can provide archaeologists a means of exploring past economies. Recent studies have shown that petrographic analysis can be operationalized to detect variability in production recipes, distribution of production groups across a landscape, and even producer-specific material choices. Ceramicists working in the Maya lowlands have demonstrated the benefit of using petrographic analysis in conjunction with other methods including type/variety. Few studies, however, have focused on the Preclassic period to address questions related to early economic organization through ceramic production and distribution. Fewer still have engaged with traditional potters whose knowledge of local clay sources prove invaluable to the broader discussion of ceramic production. This paper presents the preliminary results of a study from the Mopan Valley, Belize, comparing ceramics from domestic and public contexts to clay sources from the greater Xunantunich area. The study incorporates the petrographic analysis of three locally known clay sources and two buried sources discovered during excavation, as well as Middle Preclassic ceramics from both domestic and public contexts. The initial results have important implications for archaeologists' understanding of the organization of production and distribution of early ceramics in this region.

**Vining, Benjamin (University of Arkansas, Fayetteville) and Hali Thurber (University of Arkansas, Fayetteville)**

[68] *Detecting el Niño's Disasters: Remote Sensing of Recent ENSO Events in Northern Peru and Implications for Prehispanic Societies*

Several models have discussed links between warm (el Niño) phases of the el Niño Southern Oscillation (ENSO) and cultural developments on Peru's north coast. In particular, the abandonment of Moche settlements and agricultural systems and periods of social stress in both Moche and Chimu societies have been interpreted through the lens of ENSO disasters. ENSOs during the years 1982–83, 1997–98, and most recently 2016–17 offer the opportunity to better understand the spatial development of el Niño-driven events through remote sensing, and hence to better understand potential implications of ENSO for past and current communities. Here, we use data from the Landsat and Sentinel families of earth observation satellites to describe the extent and severity of these ENSO's impacts on the Chicama and Jequetepeque Valleys (Department of La Libertad, Peru). We estimate the areas that are impacted by mass wasting and sediment entrainment, and describe the recovery time from past events. Comparisons of similar events across individual ENSO years show spatial patterning in the areas that are impacted by various ENSO-driven phenomena. We discuss the implications these findings have in light of archaeological land use, including identifying several vulnerabilities that may have affected prehispanic agriculture and settlement.

**Vis, Benjamin**

[80] *An Inhabitant's Perspective of Material Urban Structure at Chunchucmil*

Maya urban archaeology is progressively addressing how to 'people the past', using data exploration techniques. The Chunchucmil map (Hutson and Magnoni 2017) offers an exemplary spatial data resource. Chunchucmil features here as a testing ground for showcasing the interpretive research advances enabled by Boundary Line Type (BLT) Mapping.

BLT Mapping resulted from establishing a common frame of reference to make radical comparisons between Maya and contemporary urban patterns. The anticipation of the step increase in knowledge about the spatial layout of Maya cities achieved by LiDAR surveys, makes comparative research on Maya urbanism highly relevant. Here I will examine sections of Chunchucmil's built environment to evaluate the interpretive contribution of BLT Mapping analyses to internal comparisons of urban configurations.

The methodology explores an inhabitant's perspective on urban life and development. BLT Mapping conceptualises urban built environments as compositions of materialised boundaries. The boundaries fix focus on the small scale urban morphology of spatial-material properties, which are mapped as socio-spatial characteristics. Topographical information is not used to explain top-down how general patterns came to exist, but to explore how everyday inhabitation of Chunchucmil's urban space is structured by opportunities and experiences afforded by spatial morphology.

**Vitale, Salvatore (University of Pisa), Calla McNamee (Wiener Laboratory for Archaeological Science), Toulia Marketou (Ephorate of Antiquities of Dodecanese), Denitsa Nenova (University College London) and Jerolyn E. Morrison (INSTAP Study Center for East Crete)**

[298] *Changing Landscapes: Settlement Strategies, Cultural Dynamics, and Material Evidence on Kos, Dodecanese, during the Final Neolithic and the Bronze Age*

Landscape as a concept incorporates not simply the geographic and environmental characteristics of an area, but also the cultural and symbolic value vested in places. Understanding the relationship of these factors, which are often closely linked, to past societies remains a challenge in archaeology. In this paper, we attempt to reconstruct the Final Neolithic (FN) through Bronze Age landscape on the island of Kos, Dodecanese, and investigate its cultural meaning to the prehistoric peoples. We combine environmental methodologies, using GIS to examine the relationship of topography, viewsheds, vegetation, and resource distribution to site location, with the analysis of significant changes in the material cultural assemblage. Our

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results identify shifts in occupation patterns from sparse upland settings in the FN and the Early Bronze Age (EBA) 1–2 phases to a nucleated center in the coastal plain beginning in EBA 3. In addition, changes in ceramic repertoire, fabric mixes, and technology, as well as in ceremonial and burial practices, demonstrate a parallel shift in the perception of landscape through time. Cultural contact and a growing participation in wider regional trade networks are considered factors contributing to this changing view and use of the Koan landscape.

Vlcek, David [18] see Ringle, William

Vogel, Melissa [82] see Pacifico, David

### **Vogelsang, Ralf (Institute of Prehistoric Archaeology, University of Cologne)**

**[174]** *The Mountain Exile Hypothesis: How Humans Benefited from African High Altitude Ecosystems in Ethiopia*

Although high-altitude mountain habitats are often regarded as unfavorable for human occupation; on the other hand tropical highlands in Africa are suggested as potential refugia during times of environmental stress. The presentation gives a review of new evidence of human occupation in the tropical highlands of Ethiopia from the Late Pleistocene to the Holocene period. A first correlation of the archaeological data with the climate record suggests a complex interplay between humans and their environment during the last 20 ka. Finally, we speculate about potential land-use patterns on Mount Dendi in the southwestern highlands of Ethiopia.

Volk, Kyle [135] see Ollendorf, Amy

Volta, Beniamino [268] see Leonard, Daniel

von Tersch, Matthew [50] see Admiraal, Marjolein

### **Voorhies, Barbara (University of California, Santa Barbara) and Douglas J. Kennett (Penn State University)**

**[59]** *Archaic Period Lifeways on the South Pacific Coast of Mexico*

Insights concerning human lifeways during the Archaic Period on the South Pacific coast come principally from archaeological investigations in Chiapas and Guerrero. These data are supplemented by coring programs that permit independent reconstructions of human-plant interactions. We present an overview of what we know and what compelling questions remain.

Vorenhout, Michel [135] see Martens, Vibeke Vandrup

### **Vovides, Andrew (Instituto de Ecología, A.C.)**

**[150]** *Discussant*

Vrba, Eric [260] see Isaza, Ilean

Wackett, Josh [326] see Shepherd, Alison

### **Wade, Mariah**

**[229]** *The Penumbra of Castro Archaeology: Evidence and Questions*

The archaeology and socio-cultural practices of Iron Age hilltop fortified settlements (castros) in Northwest Portugal and Galicia present usual and unusual specific problems. From the recognition of the uniqueness of castro cultural practices in the late nineteenth century to the last decades of the twentieth century, castro archaeology has suffered from the inadequate methodologies of earlier excavations, poor temporal controls, a parochial stance toward entertaining unanswered questions, and from the overall absence of burial contexts. These factors have often resulted in broad-stroke analyses that normalize castro cultural practices. This paper will discuss what is actually known about castro practices in littoral Portugal on the basis of recent evidence, and examine issues and evidence the archaeological excavations at the Cividade de Bagunte have uncovered.

**[229]** *Chair*

### **Wagensonner, Klaus**

**[149]** *Discussant*

### **Waggle, Tawnya (Eastern New Mexico University), Laura Hronec (Bureau of Land Management), Jasmine Kidwell (Eastern New Mexico University), Donald Purdon (Eastern New Mexico University) and Jenna Domeischel (Eastern New Mexico University)**

**[222]** *Blackwater Draw: Turning Student Research into Public Outreach*

Blackwater Draw is known world-wide as the type-site for Clovis culture—the first demonstrable evidence of humans hunting mammoths in the New World. However, as a resource of Eastern New Mexico University, Blackwater Draw is also a valuable tool for creating connections between student research and community engagement. Students participate in internships, directed studies, and use the varied components of the site to write their undergraduate capstone papers and graduate theses. Through these original research initiatives students have built a compelling archive of material that is being offered to the community in new and exciting ways. With projects as diverse as teaching trunk programs, re-imagined visual media, and geoarchaeological studies ranging from stream channel to wind tunnel, these students are changing the way that we connect with our community. Their work comprises a large component of the new initiative of Blackwater Draw, an initiative focused on emphasizing to the world outside our professional circles that the study of archaeology is not some arcane and exclusive profession. Rather, archaeology is an inclusive study of what makes us all human, a study that allows us to draw connections between the past and the present.

Wagner, Daniel P. [328] see Goode, Charles

### **Wagner, Dustin (New Mexico State University) and Trevor Lea (New Mexico State University)**

**[106]** *Preliminary Results from Excavations of a Communal Pit Structure in the Gila National Forest*

As part of the recent salvage recovery effort at the South Diamond Creek Pueblo (LA 181765), a small Classic Mimbres pueblo (1000–1150 CE) in the Aldo Leopold Wilderness of the Gila National Forest, excavation was performed on a large pit structure that appears to be associated with an earlier occupation of the area. Sample excavation was performed as part of a field school directed by Dr. Fumiyasu Arakawa of New Mexico State University under. Very few archaeological investigations have been conducted in this area. The data recovered from this structure will contribute to a sparse data set on communal pit structures from this northern edge of the Mimbres boundary. With the work performed in the summer of 2017, numerous artifacts were discovered that will aid in the dating of the pit structure. This poster will provide a glimpse into the excavation and will present preliminary results

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of the excavation effort. Continued work on this site offers a new perspective into the northern Mimbres during the Late Pithouse period (550–1000 CE).

**Wagner, Mark and Ryan Campbell (Southern Illinois University Carbondale)**

**[39]** *Bound to the Western Waters: Searching for Lewis and Clark at Ft. Kaskaskia, Illinois*

Lewis and Clark recruited 11 soldiers from the small US Army outpost of Ft. Kaskaskia (1802–1807), Illinois, in 1803 to join their expedition to explore the American west. This event traditionally has been identified as having occurred at a 1750s French fort of the same name. The 2017 SIU summer field school investigations within the fort walls including the use of LIDAR, GPR, and hand excavations revealed that the fort is primarily a single component French construction dating to the mid-1700s that contains a small number of colonial French artifacts as well as a barracks and bakehouse. No evidence was found that the United States Army later rebuilt and reoccupied the fort in the early 1800s. LIDAR, GPR, and hand investigation of a nearby hilltop known as “Garrison Hill” located an extensive brick scatter intermixed with early 1800s military items that clearly interpreted as representing the remains of the 1802–1807 American Ft. Kaskaskia. This rediscovery of one of the pivotal sites of the Lewis and Clark Expedition not only corrects history but affords an opportunity to recover information on the daily lives and material possessions of American soldiers immediately prior to the start of the Lewis and Clark expedition.

**Wake, Thomas (Cotsen Institute of Archaeology at UCLA), Lana Martin (UCLA Department of Anthropology) and Tomas Mendizabal (Patronato Panama Viejo)**

**[260]** *Settlement, Subsistence, Culture Change and Networking: New Perspectives on Bocas del Toro's Integration with Greater Central America*

Understanding the settlement chronology and degree of interaction and integration of Caribbean western Panama within “Gran Chiriqui” and greater Central America has driven archaeological research in the region since the 1950's. Hernan Colon's accounts of Bocas and adjacent Costa Rica depict a populous region, with vast fields of maize, people traveling about in numerous canoes and wearing more gold objects than ever seen in the New World. Lothrop's 1947 synopsis of the “myth” of the Sigua settlement of Panama/Costa Rica Caribbean coastal plain suggests an enduring influence of Nahua, perhaps even Mexica, speakers moving into the region from the North. Linares' and Ranere's 1980 foundational study of western Panama raised perhaps more questions than it provided answers. Together these works have inspired a new generation of archaeological study in the region, the results of which have radically altered the perception of the area's pre-colonial history. A synthesis of new data more clearly illustrates the time-depth of greater Bocas del Toro's settlement, subsistence system, and interaction with greater Central America.

**Walden, John (University of Pittsburgh)**

**[82]** *Neighborhood Integration in Low Density Cities Which Follow a Divergent ('Outside-In') Urban Trajectory*

One relatively understudied aspect of neighborhood integration in ancient cities relates to the divergent trajectories along which cities form. In some ancient cities, the urban periphery appeared as autonomous communities prior to the development of a center, representing an ‘outside-in’ model of urbanism. Such contexts provide a valuable case study for investigating neighborhood integration into cities, due to a clear comparative temporal threshold (before and after incorporation). This presentation explores how a small community transitioned into a low density urban neighborhood in a larger city, and how the local elites at its apex transformed into intermediate elites in an emergent three tier political system. The Late-Terminal Classic (AD 700–900) Maya polity of Lower Dover, Belize offers potential for examining this issue because the center arose in the midst of several long-established, Middle Preclassic (1000–400 BC) communities. This presentation identifies the ways in which the lives of the inhabitants of the Tutu Uitz Na neighborhood changed during the Late Classic as it transitioned from an autonomous community to become amalgamated into a polity. A focus on the changing wealth, status and behavior of inhabitants permits an understanding of how the neighborhood became incorporated politically, economically, ritually and socially.

**[82]** *Chair*

Walden, John [28] see Levin, Anais

Walden, John [40] see Watkins, Tia B.

**Walder, Heather (Northern Illinois University)**

**[332]** *Phase III Investigations of Three Archaeological Sites at Stillwell Crossing, Fort McCoy, Wisconsin*

In summer of 2017, CEMML archaeologists at Fort McCoy, in Tomah, Wisconsin conducted Phase III investigations of three NRHP-eligible sites 47MO054, 47MO360, and 47MO660 near a tank trail crossing Stillwell Creek. This location was continually re-occupied for the last 3,000 years, by Late Archaic to historic-era Native American (probably Ho-Chunk) communities. Bioturbation, military activities, and other cultural and natural processes easily disturb the sandy soils at Stillwell Crossing, resulting in substantial mixing of the archaeological components, so the Phase III research design tested two questions: 1) How effective is subsurface geophysical prospecting in such contexts? and 2) How do spatial distributions of artifacts reflect both depositional and post-depositional processes at the site? Investigations demonstrated that the effectiveness of geophysical prospecting is limited, especially for identifying ephemeral pre-contact features. Vertical distribution of artifacts showed no distinctly stratified deposits, though horizontal distributions of lithic raw material varied across the three sites. Mineralogical analysis of soil samples, radiocarbon dates, and compositional analysis of a glass trade bead all yielded informative results about the extent and nature of past human activities at Stillwell Crossing. These mitigation efforts, which also included construction of a mock cultural site, enhance the military training facility at Fort McCoy.

**[246]** *Discussant*

**Waldo, Brian (California State University, Los Angeles), Samantha Lorenz (Contested Caves Archaeological Project) and Toni Gonzales (U.C. Santa Barbara)**

**[157]** *Investigating the Spatial Analysis of Chultuneob at Mul Ch'en Witz, Belize*

Mul Ch'en Witz (Hill with Many Caves) was first excavated in the summer of 2017 by the Contested Caves Archaeological Project (CCAP), a subproject of the Three Rivers Archaeological Project (TRAP). The area, located just below the escarpment on which the core architecture of the ancient site of La Milpa, Belize is situated, was chosen for excavation because of the high density of chultunes encountered within a restricted area. The chultunes have similar entrance styles and diameters, and five of the six investigated were located less than ten meters apart and display a strong north-south alignment. This poster will discuss the relation of the Mul Ch'en Witz chultunes to other landscape and architectural features at La Milpa and will advance preliminary inferences of these relationships.

**Wales, Nathan (University of California, Berkeley), Kristen Gremillion (Ohio State University), Bruce D. Smith (Smithsonian Institution National Museum of Natural), Melis Akman (University of California, Berkeley) and Benjamin K. Blackman (University of California, Berkeley)**

**[137]** *The Future of Paleogenomics in Archaeology: Insights from a Multidisciplinary Study on Sunflower Domestication*

Ancient DNA (aDNA) methodologies have rapidly developed over the past three decades, and today these tools provide a powerful means to investigate a wide range of archaeological inquiries, including human evolution, animal and plant domestication, and paleoenvironmental reconstructions. In this talk, I will summarize general approaches in paleogenomics research, focusing on concerns and questions from archaeologists.

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To demonstrate how state-of-the-art paleogenomic techniques can contribute to archaeological research, I will present new research on sunflower domestication that integrates aDNA, radiometric dating, and archaeobotany. Given the speed at which genomic technologies are becoming more cost effective, I will conclude with predictions about the future of paleogenomic research and offer suggestions for how aDNA studies can be integrated into archaeological research programs.

**Walker, Debra (University of Florida), Kathryn Reese-Taylor (University of Calgary), Meaghan Peuramaki-Brown (Athabasca University) and Shawn Morton (Northern Arizona University)**

**[258]** *A Middle Classic Horizon? Tracking Calakmul's Rise in the Ceramics of the Central Karstic Uplands*

Joe Ball's seminal work on the ceramics of Becan, Campeche, Mexico, anchored two generations of research on the ancient Maya. His analysis, for the most part, has stood the test of time, and his recent revisions to it reflect the breadth of his knowledge, and his ability to re-conceptualize a problem in light of subsequent research.

One aspect of his Becan work that has proved elusive to other researchers is the definition of a Middle Classic. Although some have isolated a Middle Classic component similar to Ball's Sabucan Complex, most find the period problematic. The recent identification of Middle Classic Macanxu Group ceramics in stratified residential debris at Yaxnohcah is described here, in the context of an expanding Calakmul polity.

**Walker, John (UCF Department of Anthropology)**

**[333]** *Donald Lathrap, the Tropical Forest, and Hemispheric Archaeology*

Donald Lathrap was a visionary anthropologist and archaeologist. His contributions always reflected the "big picture": an understanding that all pre-Columbian culture history was intertwined, and that these connections went back through time to origins in the lowland tropics, or the Tropical Forest. He practiced an archaeology that gave equal weight to iconography and religious thought, and rim sherds and energetics. The most significant issues for Lathrap's version of American Archaeology, is not an argument over the significance of the Amazon Basin in comparison to the Andes, or as a center for cultural innovation. The legacy of Lathrap is Hemispheric Archaeology, that there are deep cultural-historical connections across the Americas, particularly between the Andes and the Amazon that have explanatory value. The big picture is relevant both for maize farmers in the Mississippi Valley, tuber gardeners in the Pacific Northwest, and raised field builders in the Southwest Amazon. Such hemispheric explanations could be just-so-stories, but correcting for this danger is worth the effort, because as the evidence for earlier developments continues to accumulate, the big picture is getting bigger.

**[80]** *Discussant*

**Walker, Karen (Florida Museum of Natural History), Jennifer Haney (Pennsylvania State University), William Marquardt (Florida Museum of Natural History), Rachael Kangas (Florida Public Archaeology Network) and Sara Ayers-Rigsby (Florida Public Archaeology Network)**

**[135]** *Archaeological Shoreline Monitoring in a Climate-Changing SW Florida: The Case of a Rapidly Eroding, Rare, Late-Archaic Shell Midden at Calusa Island*

There are only a very few Archaic period sites in the Charlotte Harbor/Pine Island Sound region of southwest Florida. One of these, composing a large portion of Calusa Island, is an oyster-shell dominated midden. According to a landowner, since ca. 1973–1974 the site has suffered a horizontal loss of 11 m along parts (if not all) of its 80+meter, eroding archaeological shoreline. Based on a 1944 aerial photograph, it is likely that as much as 28 m has been eroded away. We began a monitoring program at this site in April of 2016, and in July began partnering with the Florida Public Archaeology Network's Southwest and Southeast regional archaeologists to assist and then continue the work. We describe our initial, simple method, its problems, and the improvements made by our FPAN colleagues. Currently, FPAN incorporates Calusa Island's monitoring into its statewide program which is, in large part, staffed by citizen volunteers who visit and re-visit sites in jeopardy and report their observations.

**Walker, Martin (University of Tennessee, Knoxville) and David Anderson (University of Tennessee, Knoxville)**

**[35]** *Examining the Subsistence and Social Landscapes of the Late Precontact Occupations at the Topper Site (38AL23), Allendale, South Carolina*

The Late Woodland to Early Mississippian transition within the Atlantic Coastal Plain is characterized by widespread and dynamic changes from more dispersed and politically decentralized organizational practices into highly centralized, stratified, and complex sociopolitical organization. This period also experiences changes in both hunting technologies and horticultural food production. The timing of the linkages among these developments are not well established locally, something that this project hopes to remedy. Three field seasons directed to the extensive Precontact occupations at the Topper site (38AL23), Allendale, South Carolina, have documented hundreds of features and a rich material record dominated by cross-cord-marked pottery and small triangular arrow points, as well as the widespread presence of maize. What was occurring on the site and when it occurred is the subject of a suite of specialized analyses, which are helping to reshape thinking about late prehistoric occupations in the central Savannah River Valley, and on a site formerly best known for its extensive Paleoindian archaeological record.

Walker, Martin [34] see Bissett, Thaddeus

**Walker, Samantha (McGill University), Kathryn Kotar (McGill University), James Savelle (McGill University) and Arthur Dyke (McGill University)**

**[16]** *Regional Analysis in Perspective: An Epistemological Assessment for Paleo-Inuit Archaeology*

The increasing accessibility of archaeological data from the Canadian Arctic has promoted a recent influx of macro-scale analyses. Drawing insights from our ongoing research project in the Foxe Basin region, we address some challenges regarding the synthesis of archaeological information, especially as it pertains to Paleo-Inuit studies. We discuss the importance of data quality and address issues of variability in occupation density, duration, and seasonality, both at the household and community levels. We propose potential solutions to these challenges. First, a relational bottom-up approach that utilizes multiple social scales of analysis in a fluid and continuous way, moving from household identities to the region-wide synthesis of archaeological activity. Second, the integration of both remote sensing and traditional ground survey technologies provide higher resolutions of analysis for local scales. It is subsequently evident that macro-scale approaches to Paleo-Inuit archaeology require a re-evaluation of both household and community contexts and chronologies prior to regional analysis.

**Walker, William (New Mexico State University) and Axel Nielsen (C.O.N.I.C.E.T., Instituto Nacional de Antropología)**

**[218]** *Prophets of the Ancient Southwest*

How do prophecy and new religious movements impact life histories of artifacts and architecture? Ethnographic evidence indicates that prophets realize their visions, in part, by transforming relationships between people and material objects. They shun, embrace, or reorient technologies, artifacts, and architecture. Not surprisingly, in cultures where spiritual forces already animate artifacts and architecture, such reorganizations can produce dramatic changes in material culture. Much of the revitalization and crisis cult literature has logically focused on the role that colonialism played in creating new religious movements. Prehistoric contexts, however, exhibit a broader range of underexplored contexts such as environmental stress, disease, and war. The ethnographic and historical records of the American Southwest suggest revitalization movements extend far into the past. We

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argue that widespread changes in material culture associated with significant inflection points in southwestern prehistory (circa A.D. 700s, 1000s, and 1300s) document the work of ancient prophets.

Walker Cunningham, Marilyn [261] see Frederick, Jennifer

Wall, Robert [22] see Gollup, Jasmine

**Wallduck, Rosalind (Natural History Museum, London) and Silvia M. Bello (Natural History Museum, London)**

**[89]** *Cut Marks and Decaying Bodies: An Experimental Study*

It has been suggested that cutting into decaying bodies occurred in the past, for instance during the cleaning or dismemberment of corpses during protracted funerary rituals. However it can be difficult to confirm the timings of such interactions, particularly for secondarily deposited bones. An experimental study was therefore conceived to test whether the frequency, location and micro-morphometric characteristics of cut marks might differ on fresh compared to decaying bodies. In order words, whether cut marks can be used to verify the stage of carcass decay. Incisions were regularly made into pig body parts as they decomposed over a period of three months. For metric evaluations of the experimentally produced cut marks, Focus Variation Microscopy was used. The effects of different hand pressures and different tools were also studied. Our results show that micro-morphometric analyses of cut-marks have the potential to enable the timing of cutting to better hypothesized with regards to defleshing and disarticulation practices in the past.

**Waller, Joseph (PAL)**

**[159]** *History on the Edge: Loss of the Ocean State's Past*

Hurricane Sandy impacted Rhode Island's south coast on October 29, 2012. Storm surge and wind-driven waves eroded considerable sections of the shore damaging historical and archaeological sites located at the contact between the land and sea. Emergency response and preservation planning archaeological surveys conducted in response to Hurricane Sandy represent the first large scale, systematic attempts to identify and evaluate vulnerable archaeological sites situated along the Rhode Island coast. These surveys also underscored the long-term threats that rising seas and future tropical storms pose to ancient, as well as, more recent cultural deposits. Continued erosion of the Rhode Island shore imposes current and future financial and logistical challenges to preservationists wishing to preserve the Ocean States' unique maritime history.

**Waller, Kyle (University of Missouri), José Luis Punzo Díaz (Instituto Nacional de Antropología), Ana Morales-Arce (University of Calgary), Meradeth Snow (University of Montana) and Miguel Vallebuena (Laboratorio Nacional de Genómica para la Biodivers)**

**[97]** *Ancient DNA Investigations of Possible Casas Grandes—Chalchihuites Interactions*

Paquimé, the political and religious center of the Casas Grandes culture, demonstrates extensive evidence of Mesoamerican influence, including macaws, architectural characteristics such as ballcourts and platform mounds, and mortuary practices in the form of modified trophy skulls and human sacrifice. The role of Mesoamerican influence on the development and florescence of the Casas Grandes culture remains an important but contentious research question for the late prehistoric Northwest/Southwest. While there is general agreement that some degree of Mesoamerican interaction occurred, the sources of this interaction, and their significance, remain an open question. In this study, we compare mtDNA haplogroup and sequence data from Paquimé to a series of Southwestern and Mesoamerican samples. The results suggest that samples from the Chalchihuites region of Durango, Mexico, are more similar to Paquimé than geographic distance would suggest. We conclude by discussing the potential role of the Chalchihuites culture in the spread of Mesoamerican traits into Chihuahua and the US Southwest.

Waller, Kyle [225] see Krug, Andrew

**Waller-Cotterhill, Charlotte (The University of Sheffield)**

**[87]** *Child Disability and Prostheses in Nineteenth-Century Britain*

Introduction of dedicated paediatric medicine, was an advancement arriving in Britain late compared to its neighbours such as France's 'Enfant Malades' in 1802. Paediatric hospitals were a consequence of physicians' financial aspirations rather than falsely portrayed 'community need' (Lomax, 1998). Their establishment contradicted longstanding attitudes surrounding children as 'incomplete beings...whom it was wasteful to devote attention to' (Porter, 1989). Oddly, amputation saw children harness the same attention as adults, and despite being overused, crudely performed with poor survival rates and aftercare, evidence exists of child amputees surviving into adulthood and of child prostheses. This paper will discuss complicated beliefs surrounding paediatric care in nineteenth-century Britain, concentrating on archaeological evidence of prostheses available for juvenile amputees. It asks why, in a society with poor paediatric care, was amputation and prosthesis provisioned for? What sparked the changes to children's healthcare which saw institutions such as Great Ormond Street Hospital, London, introduced in 1852? Analysis of Victorian prosthetic devices and medical procedures will help demonstrate that whilst children occupied the role of 'society's future', lingering attitudes, contributed to high infant mortality rates, overcrowded workhouses and an enduring class system. However, medical improvements and enlightenment, created an optimism, triggering a re-evaluation in paediatric healthcare.

Wallgrün, Jan Oliver [101] see Huang, Jiawei

**Walling, Stanley (Community College of Philadelphia)**

**[142]** *Late Classic Maya Commoner Myth, Ritual, and Landscape at Chawak But'o'ob, Belize*

Recent research at the ball court complex and other areas of the ancient hinterland community of Chawak But'o'ob in the Rio Bravo Conservation and Management Area in northwestern Belize indicates the existence of a sophisticated interplay of environment and ideology at this agrarian site. The intersection of landscape, hydrology, and architecture here hints at mythological underpinnings of Maya commoner ritual that only partially overlap those in evidence in ancient urban contexts.

**Wallis, Neill (Florida Museum of Natural History), John Krigbaum (University of Florida), George Kamenov (University of Florida) and Michael D. Glascock (University of Missouri Research Reactor)**

**[9]** *Pots and People in Motion in Woodland Period Florida*

Populations across northern Florida during the first millennium CE were highly interconnected as evidenced by shared patterns of mortuary practices, material culture, and settlement patterns. Social networks evidently were predicated on common ritual practices that found purchase in diverse and far-flung communities, especially those associated with "Swift Creek" and "Weeden Island" archaeological cultures. Through time, and with an expanding suite of religious practices and paraphernalia, populations across the region became increasingly aggregated in villages and possibly exhibited differentiated social status. Did Woodland period religious movements fuel village aggregations and incipient social inequality?

We test these apparent correlations through a multifaceted study of nearly a dozen burial mound assemblages from across northern peninsular Florida,

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seeking to infer patterns of human mobility, social interaction and community formation in the context of mortuary rituals. Isotopic analysis of skeletal populations are combined with demographic and life history information from individual secondary interments to model patterns of diet and mobility. Neutron Activation Analysis of pottery, compared with data from clays across the region, is used to source ornate mortuary wares. Results indicate that frequent transport of mortuary pots and possible integration of disparate populations were fundamental to religious expansion and social change.

Wallis, Neill [35] see Lulewicz, Isabelle

**Wallman, Diane (University of South Florida)**

[278] Moderator

[278] Discussant

**Wallrodt, John and Denitsa Nenova (UCL Institute of Archaeology)**

[130] *Beyond Research Design: Digital Resource Management for the Next Generation*

Digital technologies in the field of archaeology have often been promoted as a tool enhancing productivity and efficiency, usually implying that the immediate digital recording of data would allow for the excavation of greater volumes and covering larger areas. Moreover, the strength of Paperless Archaeology comes with the enabling of immediate dissemination of observable data while breaking up the 'sealed' relationship between the raw data and the First Interpreter.

What remains less addressed, however, is the long-term impact of digital recording. Because field projects often last several decades, there is a large gap between the initial methodological outlay and research design on one hand, and the final publication on the other. The true value of such digital resources becomes apparent only with the need of contextualizing and illustrating large volumes of artifacts, architectural or skeletal remains and other types of archaeological data, many years after the initiation of an archaeological project. The authors will use the example of the current Pylos excavations in Greece to emphasize the collection, storage, and dissemination of an avalanche of digital information with an emphasis on the integration of a complex database design, Geographical Information Systems (GIS), photogrammetry and aerial photography.

**Walls, Matthew (University of Calgary)**

[277] Discussant

**Walsh, Carl (Brown University), Justin Yoo (Kings College London) and Paul van Pelt (Independent Researcher)**

[32] *The Current State of Egyptology: An International Survey and Discussion*

This paper suggests that Egyptology has reached a critical juncture in which the opening of the field to other areas, such as anthropology and sociology, is critical in revitalising and safeguarding the future of the discipline. Discourse beyond disciplinary boundaries is becoming increasingly important in academia, due to wider changes in university structures, employment, and funding opportunities. Given the current importance of these issues, the authors wanted to determine how these aspects have impacted the identities, research, and careers of those who are currently entering the discipline. The authors designed and implemented an international survey to gauge the current state of Egyptology from the point of view of PhD students and early career researchers. The aim of this survey was to determine how these individuals perceived the scope and role of Egyptology, its prospects as a discipline, its integration in the humanities and social sciences, and the role of their own research and experience. The survey results are discussed alongside the authors proposal that a more reflexive Egyptology, one that engages critically with other disciplines, is needed to help reinvigorate the field and open new lines of enquiry for future research.

**Walsh, Justin (Chapman University), Alice Gorman (Flinders University) and Erik Linstead (Chapman University)**

[118] *A New Methodology for Archaeological Investigation of Human Activity in Space: The International Space Station Archaeological Project*

Our project is the first major archaeological study of a space habitat: the International Space Station. It is a locus of intercultural interaction at the level of both individuals and states, "a micro-society in a miniworld" (National Academy of Sciences 1972).

Remoteness and cost are obstacles to employing traditional archaeological techniques in Earth orbit, so we are developing new methodologies. Chief among these is the use of the millions of images generated by space agencies showing life onboard the station. We will classify the associations between objects, spaces, and crewmembers by cataloguing them from the images into a database, indexing them for time using the images' metadata. The enormous number of images makes classification by human researchers time- and cost-prohibitive. We are exploiting recent advances in machine-learning algorithms and crowdsourcing for classification of non-machine-readable data to solve this problem.

Ultimately, we will be able to choose any moment and study the station's development and occupation. We can then map changes in the function of spaces, or the associations of people and objects with particular spaces, over time. Such insights into how crew members adapt to the microgravity environment have never been available before, and have applications for future mission design.

**Walsh, Rory (University of Oregon)**

[246] Moderator

[246] Discussant

**Walter, Doris (independent researcher) and Rebecca Bria (University of Minnesota-Twin Cities)**

[292] *Multiple Ways of Understanding Peru's Changing Climate: Bridging Ethnographic, Archaeological, and Other Scientific Perspectives in Student Learning*

This paper discusses the importance of combining ethnographic, archaeological, and "hard" scientific knowledge when teaching about climate change. Archaeology courses that discuss climate change typically bring together data from the physical sciences, such as from ice or lake cores, with archaeological evidence of social change, such as shifting settlement patterns or food strategies. Though an understanding of these links is critical to scientific literacy and knowledge about the past, we suggest that an ethnographic perspective can deeply enrich student learning by revealing social processes beyond subsistence-based adaptations. Drawing on ethnographic fieldwork conducted in rural communities in Peru, we first review how local people perceive the causes and effects of climate change, including through the lens of religious belief. Second, we draw on archaeological and available ice core evidence from the region that reveal how ancient people adapted to shifting flows of water: an ongoing process that continues today. Ultimately, we suggest that the diverse kinds of knowledge that ethnography, archaeology, and paleoclimatology produce—and the multiple ways of knowing the world that each provides—is essential for students to consider when learning about not only what happened during moments of climate change in the past, but how societies creatively responded.

Walters, Patrick [22] see Gollup, Jasmine

Walthew, Jessica [265] see Carpiaux, Natalie

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**Wandsnider, LuAnn (University of Nebraska)****[241]** *Heritage Enhances Resilience?: The Solomon Butcher History Project of Custer County, Nebraska*

Solomon Butcher was a citizen photographer smitten with what he referred to as the "history project," to photodocument the citizens of Custer County, Nebraska as the frontier receded further west. From 1886–1892, he imaged perhaps one third of the occupants, staging them in front of occupied or recently abandoned sod houses and making them party to his commemoration of a constructed pioneer heritage. When severe droughts hit in the mid-1890s, did this shared pioneer "can-do" heritage sustain Custer County residents? I report on a comparative analysis addressing this question.

**[200]** *Discussant***Wang, Jiajing****[284]** *Making Plant Foods in the Early Neolithic: Microbotanical Evidence from Shangshan Pottery*

The Lower Yangtze Valley of China is renowned for the origin of rice agriculture. Previous research based on archaeobotanical analysis and genetic data indicates that the evolution from wild rice to domestic rice was a continuous process that occurred between 11,000—6,000 BP. The Shangshan culture (11,400 BP—86,00) has revealed the earliest evidence of rice cultivation in the region and abundant pottery vessels. These vessels are diverse in form but their functions still remain unclear. By applying starch analysis on different types of Shangshan pottery, this presentation explores how plant foods were made and their associated social activities. By integrating plants into the social organization of human life, this study aims to develop an explanatory model to better understand the transition to agriculture in the Lower Yangtze.

Wantschik, Magdalena [15] see Crews, Christopher

**Ward, James (University of Central Lancashire) and David Robinson (University of Central Lancashire)****[214]** *Sonic Landscapes, Past and Present: An Archaeoacoustical Study of Pleito*

Located on the Wind Wolves wildlife preserve in South Central California, there are several spectacular rock art sites. Created by the Native Californians who inhabited the landscape, they have been the focus of a number of studies over the years, but none of these studies concentrated on the sound quality of these spaces. The correlation between the placement of rock/cave art, and the acoustic properties of the space in which it is found, is increasingly being studied under the rubric of 'archaeoacoustics'. In this study, we employ both 'standard' and novel approaches to the study of the spectacular painted site called Pleito (CA-KER-77). This paper details the methodology and results of the 'standard' method, which employs a sine sweep and impulse analysis in order to determine the sonic properties of the local landforms in relation to where the art was placed. More importantly, a frequency response analysis of a traditional song performed by a member of the local Tejon Indian illustrates the deep importance of sonic landscapes within contemporary Native society.

Ware, Roselyn [143] see Kistler, Logan

Warinner, Christina [143] see Mann, Allison

**Warmlander, Sebastian (Cotsen Institute of Archaeology, UCLA)****[46]** *Three Case Studies of Andean Metalworking*

The history of South American metalworking still presents a number of unresolved questions, despite decades of archaeological and historical research. This is especially true for the Andean region, where in prehistoric times alloys of copper as well as precious metals were crafted into intricate objects. Here, analytical metallographic techniques such as scanning electron microscopy (SEM), X-ray diffraction (XRD), and infra-red (IR) spectroscopy are used to investigate different aspects of Andean metalworking in three case studies. The first study investigates the technology used to produce gold wire in the pre-Columbian Quimbaya culture (Colombia). The second study concerns Inka period copper and silver production in the Tarapacá valley in northern Chile. The third study characterizes the composition, manufacture, and deterioration of metal embroidery from Chilean and Peruvian church objects dating to the colonial period. The broad geographic and temporal range of these case studies illustrates the diversity of the outstanding research questions of South American archaeometallurgy.

Warnacutt, Camille [39] see Myster, James

**Warren, Matthew (University of Texas at San Antonio)****[257]** *Inka Colonialism without Inkas: Uncovering the Role of Lowland-Affiliated Populations in the Consolidation of the Eastern Andean Frontier*

As the Inkas expanded their imperial hegemony over the valleys of the eastern Andes, their armies fought and then forged political and military alliances with the various cultural groups comprising the Charkas confederacy. While the Spanish chronicles and local ethnohistoric sources attest to these events and to the important role the local indigenous populations played in Inka colonization efforts along the eastern imperial frontier, they are all curiously silent on another important population which inhabited the eastern Andean valleys into the Inka period. Abundant archaeological evidence from the Inka site of Pulquina Arriba and surrounding settlements demonstrates that the earliest settlers of this region had arrived not from the altiplano, but instead from the eastern tropical lowlands. Further, instead of being administered by Inka elites, Pulquina Arriba seems to have been inhabited by a combination of Charkas- and lowland-affiliated peoples. As such, this seems to represent a case in which a historically unacknowledged indigenous population was nevertheless critical to the success of imperial activities and administration in a critical frontier region. At least within the loosely incorporated easternmost Andes, a strategy of "Inka colonialism without Inkas" seems to have represented a viable means of imperial expansion and colonization.

**Waters, Christopher (Syracuse University) and Anthony Tricarico (University of South Florida)****[208]** *Socio-spatiality of an Antigua Plantationscape*

Caribbean Sugar production during the 18th and 19th centuries expanded rapidly, fueled by increasing proletariat consumption across the globe. In response, sugar planters in 18th century Antigua, West Indies, deforested over 90 percent of the landscape, carving the island into proto-industrialized plantations defined by sugarcane monoculture and labored by enslaved Africans. New World plantation organization was once ascribed as a balance between profit and surveillance: simultaneously maximizing control over the landscape and enslaved labor. However, evidence from Antigua questions aspects of these earlier notions. This paper examines the socio-spatiality of the late 18th century Antigua plantationscape. Specifically, this research builds upon the analysis of Bates (2015) in Jamaica and Nevis, conducting a diachronic and synchronic analysis of seven different plantations in Antigua owned by the Codrington family, including Betty's Hope [1655–1944], New Works [before 1710], Cotton Estate [before 1710], Tuitts Estate [before 1750], Rooms Estate [1717–1852], Clare Hall [1814–1848 (at least)], Jennings Estate [1772–1815], and Bolans Estate [1772–1815] to determine whether plantation layout sought to maximize profit or surveillance. Our research shows that Antigua plantations underwent several transformations aimed at profit extraction at the expense of surveillance, reflecting a much more heterogeneous 18th century island landscape.

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**Waters, Michael (Texas A&M University) and Jessi Halligan (Florida State University)**

**[78]** *Page-Ladson and Submerged Late Pleistocene Sites along the Aucilla River, Florida, and Their Importance to First Americans Archaeology*  
Late Pleistocene terrestrial archaeological sites now lie submerged in the karstic river systems of Florida. Nowhere is this more apparent than along the Aucilla River where dozens of inundated prehistoric sites are known. One of the most important sites is Page-Ladson, which has yielded some of the earliest unequivocal evidence for pre-Clovis occupation in North America, dating back to 14,550 cal yr B.P. At that time, sea levels had fallen approximately 100 m and people utilized a pond in the bottom of a sinkhole that was located ca. 250 km inland from the coast. Subsequent sea level rise slowly submerged the site, 4 m of sediment buried the site, and the sinkhole became part of the Aucilla River channel. This scenario was repeated at multiple sites, creating a rich underwater record of archaeological sites dating to the Late Pleistocene in Northwest Florida. These submerged sites are critically important to First American studies because they occur in a secure geological context that can be dated by the radiocarbon method. Further, floral and faunal remains are well preserved at these sites which can provide detailed paleoenvironmental records related to climate change and megafaunal extinctions.

Waters, Michael [8] see Keene, Joshua

**Watkins, Rachel (American University)**

**[107]** *Ethics, Epistemology and Multiple Consciousness: Some Considerations*

This paper centers the ethical epistemology (EE) of the New York African Burial ground—as well as the scholar-activist traditions that informed it—in this important session discussion on ethics. I argue that both are overlooked resources for conceptualizing and operationalizing an ethics of multiple consciousness such as the one that the organizers propose. The intellectual and political work associated with the EE of the New York African Burial Ground Project is discussed along with the specific structural inequalities to which it responds. The recent application of the New York African Burial Ground's ethical epistemology to a case involving real estate development and the desecration of an African American burial site in Washington, DC is also discussed. The historical, social and political factors involved in both the New York African Burial Ground and the local cemetery case lead to 2 important conclusions: 1) developing an ethics of multiple consciousness must involve a critical examination of both our research practices and researchers as social actors; and, 2) the social and contemporary relevance of our research is both an intellectual and moral imperative.

**Watkins, Tia B. (Northern Arizona University) and John Walden (University of Pittsburgh)**

**[40]** *A Comparative Spatial Analysis of Ancient Palaces*

Ancient palatial complexes offer opportunities to understand the actors at the apex of prehistoric polities. With careful and complex design, these structures were built to represent the affluence of those who resided within their confines. While the external façade of a palace represents the defining barrier between the elite and the public, the architectural layouts of ancient palaces reveal multiple levels of exclusivity. The varying levels of privacy in different palaces may relate to the differing roles and functions that palaces fulfilled across the ancient world. In some contexts palaces were simply a grandiose residence for the ruling elite, whereas elsewhere they fulfilled political, religious, administrative, economic and military functions. Furthermore, the accessibility of the inner areas of palaces might reflect the gulf between rulers and subjects, or the overall safety of the elite. We apply a space syntax analysis to several ancient palatial complexes to measure privacy and accessibility. We compare the results to identify patterned variability in the level of restriction between palaces, which might be structured by the presumed function of the palaces (military, economic, religious, residential, and administrative), the broader bases of political power in the society, or the level of societal complexity.

**Watling, Jennifer (University of São Paulo), Myrtle Shock (Federal University of Western Pará), Martín Torres Castro (University of São Paulo) and Eduardo Góes Neves (University of São Paulo)**

**[116]** *From the First to the Last Amazonian Dark Earths: The Longue-Durée of Landscape Management at the Teotônio Site, Upper Madeira River, SW Amazonia*

The Teotônio site, situated on the right bank of the Madeira river near Porto Velho, Rondônia, is a key location for understanding the deep history of human-environment interactions and landscape management in southwest Amazonia. Its archaeological record stretches back to the early-mid Holocene and includes vestiges of 6,000-year old Amazonian Dark Earths (ADE) belonging to the Massangana Phase, hypothesised as marking the beginning of widespread landscape transformations in the Upper Madeira region. From around 3,000 BP, more intense occupations are visible with the arrival of ceramic-producing groups, while the accumulation of darker ADEs packed with ceramics from ca. 1,000 BP may reflect a peak in site occupation during this period. In this paper, we present new data from on-site and off-site archaeobotanical and palaeoecological analyses currently underway at Teotônio and discuss their preliminary implications for subsistence, land use and climate-vegetation dynamics throughout the site's rich history.

**Watrall, Ethan (Michigan State University)**

**[215]** *Towards an Approach to Building Mobile Digital Experiences for Campus Heritage & Archaeology*

The spaces we inhabit and interact with on a daily basis are made up of layers of cultural activity that are, quite literally, built up over time. While museum exhibits, archaeological narratives, and public archaeology programs communicate this heritage, they often don't allow for the kind of interactive, place-based, and individually driven exploration so often craved by the public. In recent years, many archaeological projects, cultural landscapes, and heritage institutions have turned to mobile technology to help address these challenges.

It is within this context that this paper will explore a deeply collaborative effort at Michigan State University that leverages mobile technology to build an interactive and place-based interpretive layer for campus heritage and archaeology. Driven by the work of the Campus Archaeology Program, these efforts have unfolded across a number of years and evolved to meet the ever changing need to present the rich and well-studied heritage and archaeology of MSU's campus.

Ultimately, the goal of this paper is not only to present and discuss the efforts at Michigan State University, but to provide a potential model for other university campuses interested in leveraging mobile technology to produce engaging digital heritage and archaeology experiences.

**[160]** *Discussant*

**Watson, Adam (American Museum of Natural History)**

**[322]** *Discussant*

Watson, James [88] see Krummel, Jordan

**Watson, Jessica (University at Albany)**

**[34]** *Martha's Vineyard Beach Economy: Scavenged Seals and Washed-up Whales at the Frisby Butler Site*

Marine mammals, including whales and seals, were a source of meat, blubber, baleen, and bone to the settlers of Martha's Vineyard from the earliest occupation until the historic period. Numerous species of whales have been observed in New England's shallow waters, including migratory species

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like the North Atlantic Right Whale (*Eubalaena glacialis*) and other marine mammals like the Harbor seal (*Phoca vitulina*). During the 17th and 18th centuries, the Wampanoag on Martha's Vineyard and neighboring islands negotiated drift whale rights with the English, reserving claims to dead whales on sold lands, particularly along the southwestern coast. Stranded whales were also trapped and driven ashore at nearby coasts.

In this paper, the role of drift whales and other beached finds is assessed at the Frisby Butler site, located along the southwestern shore of Martha's Vineyard. Marine mammals account for less than 1% of the total assemblage but represent at least four separate species. How can we explain the diversity of these taxa at a site otherwise focused on deer and inshore fishing? In particular, this research questions whether infrequent whale bones are indicative of scavenging drift whales, offshore hunting, or perhaps dispersed trade practices.

### **Watson, Rachel (Louisiana Division of Archaeology)**

**[231]** *Can You Make Me a Map? Making Louisiana's Cultural Resources Records Accessible*

This paper will outline the processes and decisions that the Louisiana Division of Archaeology made to create an efficient, comprehensive GIS system that could be utilized by both professionals and the citizenry of Louisiana to help promote both progress and preservation. I will discuss how we partnered with La Department of Transportation & Development, La Governor's Office of Homeland Security & Emergency Preparedness, the New Orleans Corp Engineers, and the Federal Emergency Management Agency to fund the project. Furthermore, I will discuss how we handled gaps in data and converting paper files into a digital format. Finally, I will outline future endeavors to raise public awareness of Louisiana's rich cultural history utilizing open access maps, story boards, and applications for smartphones and tablets.

### **Wattenmaker, Patricia (University of Virginia)**

**[170]** *Wealth Building in Early Urban Mesopotamia: Strategies and Ideologies*

Stratified occupational remains at mounded sites of third millennium Mesopotamia afford a temporal perspective on houses and institutions, as well as fluctuations in their resources. This paper draws on such data to evaluate the ways that houses and institutions accrued wealth and enhanced inequalities. Evidence for the production, circulation and storage of food and craft goods in early Mesopotamia informs about the kinds of resources used for wealth building, the processes through which goods took on value, and the role of risk in resource accumulation. Findings provide the basis for assessing the value and limitations of anthropological approaches to monetary economies in understanding resource accumulation and exchange networks in early urban Mesopotamian societies.

Wdowinski, Shimon [116] see Erickson, Clark

### **Weaver, Brendan (Berea College)**

**[271]** *Diachronic and Spatial Perspectives for Exploring the Ethnogenesis of Afro-Andean Populations in Southern Coastal Peru*

Ecclesiastical records suggest that the Ingenio Valley in Nasca's northern Rio Grande Drainage has been defined by a predominantly black population since the early 17th century, most of whom worked as enslaved laborers on the two large Jesuit wine haciendas and a number of smaller secular estates in the valley. In this paper I approximate Afro-Andean ethnogenesis in the coastal valleys of Nasca from multiple temporal and spatial scales, considering both historical documentation and archaeological evidence. A close examination of documentation across the subsequent two centuries opens a window onto the complexities and contradiction of mapping casta categories onto the valley's social geography. Archaeology offers a means to explore slave-dominated spaces on the Jesuit wine estates and the production of an hacienda aesthetic which contentiously incorporated a host of African, European, and Andean signs, revealing of both dissensus and social cohesion among the heterogeneous enslaved and free Afro-Andean hacienda population.

### **Weber, Sadie (Harvard University)**

**[249]** *Pulling Abundance out of Thin Air: The Role of Pastoralism in 1000 BC Peru*

Andean camelid pastoralism—with its origins in the puna of the South-Central Andes—plays a key role in risk management and transformation of low-energy, high-abundance resources. Camelids not only help pastoralists mitigate risk by acting as literal “wealth on the hoof,” but they also maintain cohesion of intergroup relationships across vast distances by facilitating mobility within and among diverse environmental zones. Here, I examine intensified camelid pastoral systems as an adaptation to scarcity in the Andean highlands. I employ a multiproxy analysis including zooarchaeology, microbotany, and stable isotopes to examine the extent to which intensified pastoralism was key in proliferating the widespread cultural phenomena we see in the highlands at approximately 1000BC in the Central Andes. I propose that environmental wealth—or a lack thereof in some areas—at 1000BC prompted an intensification economic and cultural systems that were heavily dependent on pastoralists.

**[249]** *Chair*

Weber, Sadie [6] see Schroll, Andrew

### **Webster, Andrew (University of Maryland)**

**[296]** *Intersectional Irish Identity and the Rise of Globalization*

Archaeologists have long struggled with assigning specific artifacts to particular ethnic identity categories. This paper uses the artifacts of the nineteenth-century rural Irish poor to argue that identity is best considered intersectionally, in which questions of ethnic or national identity are combined with class, gender, religion, and other identity categories. This intersectionality becomes increasingly important for archaeologists to consider with the rise of globalization, in which mass-produced objects originating from production centers both near and far are used to construct identities.

**[296]** *Chair*

### **Webster, Chris (APN—@ArchPodNet)**

**[321]** *Discussant*

### **Webster, David (Penn State University)**

**[258]** *Becan Reconsidered*

Joe Ball's early career centered strongly on Becan, which during the early 1970's figured prominently in many interpretations of Classic Maya society and culture history. The initial Becan research predated our effective understanding of Maya inscriptions, the large-scale conflicts and alliances that affected the southern lowlands, and also the now-widespread data for climate change and the Classic “collapse”. Because of its lack of inscriptions Becan has been unfortunately marginalized or ignored in the later literature on these topics. Reconsideration of its significance on the Maya political and agrarian landscape is long overdue.

**[163]** *Discussant*

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**Webster, Jane (Newcastle University (UK))****[308]** *From Rome to Charleston: A Comparative Perspective on the Archaeology of Forced Migration*

My title is borrowed from a groundbreaking volume of papers published in 1997. Eltis and Richardson's *Routes to Slavery: Direction, Ethnicity and Mortality in the Transatlantic Slave Trade* marked the first flowering of a hugely ambitious project to synthesize archival data on known Transatlantic slave trading voyages from ca. 1500–1900. The resultant database is now widely used by archaeologists in both Africa and the Americas. But there were many other routes to slavery in different times and in other places: not least the many routes which brought millions of enslaved persons to ancient Rome and its provinces in the Classical era. Can archaeological work on forced migration, ethnicity and ethnogenesis in the early modern world really inform research centered on the Roman Republic and Empire? Yes it can, as this paper aims to show. Moreover, diachronic comparison—and the nuanced methodologies which underpin the archaeology of the Diaspora in the Americas—could provide the (far less developed) archaeology of Roman slavery with a new road map for the identification of the unfree, and recovery of their life experiences.

**Webster, Laurie (University of Arizona)****[218]** *Cotton as Commodity in the Prehispanic Southwest*

With its strong symbolic reference to moisture and clouds, cotton has long been considered a precious textile fiber in the Americas. Adopted from Mexico as a tropical crop, it was well-established in the Salt-Gila drainage by 500 A.D., and by 1000–1100 A.D. it was adapted to the wetter microenvironments of the Colorado Plateau. Because cotton could not be grown everywhere, it became a prized element of trade and craft specialization. In this paper I examine the agricultural intensification, commodity production, and exchange of cotton and cotton textiles in the prehispanic Southwest with a focus on the Western Pueblos, including the important Homol'ovi villages.

**Wedemeyer, Rachael, Arthur Joyce (Advisor), Jeffrey Brzezinski (Colleague) and Sarah Barber (Colleague)****[9]** *Fragments of Identity: A Comparative Study of Terminal Formative Figurines from Coastal Oaxaca, MX*

The Terminal Formative period (150BCE-250CE) in Coastal Oaxaca, Mexico was a time of urbanization and increasing political interaction. The Terminal Formative included the emergence of an urban center at the site of Río Viejo, which may have extended political influence over surrounding communities. During this period, on the coast of Oaxaca, ceramic figurines were a ubiquitous medium for expression and identity in political/cultural exchanges. By comparing ceramic figurines from the site of Río Viejo, a primary center, to Cerro de la Virgen, a secondary community, relations between these two communities can be better understood. Through both qualitative and quantitative analyses, including INAA, much can be postulated about the manufacture and use of the ceramic figurines. The figurines from both sites have proven to be diverse in their iconography as well as sharing many other aesthetic similarities. With Terminal Formative figurines here some iconographic trends that seem to exist as categories such as anthropomorphic and zoomorphic, which are expressed by a number of well-preserved artifacts. The ceramic figurines have also proven to be diverse in their use: some are musical instruments, some are able to stand, and others were able to be worn.

**Wegner, Paul (Institute for American Indian Studies)****[203]** *Connecticut's First Fishermen: The LeBeau Fishing Camp*

Located on the Quinebaug River, the LeBeau fishing camp and weir is the oldest known weir in Connecticut. Approximately 8,700 artifacts were recovered from the site, primarily lithic tools made from locally sourced materials such as quartzite. These tools indicate the specific activity of fishing and processing. Diagnostic artifacts recovered from the site indicate that it was utilized by indigenous people over the course of thousands of years, from the Middle Archaic to the Early Woodland.

Among the site's notable features is the presence of the diagonal weir, which is particularly useful compared to the traditional V shaped weir. This pattern allows for trapping activities to take place at lower water levels along the shore, whereas the V pattern concentrates the actions on the deeper, center portions of the waterway.

This presentation will explore not only how the LeBeau site differs from other fishing sites found throughout Southern New England, but also how its artifacts provide a unique window into the past and how Native American people utilized the Quinebaug River as part of their seasonal subsistence strategy. And why these unique features included it to be listed as a State Archaeological Preserve.

Weidele, Daniel [83] see Borck, Lewis

**Weik, Terrance****[271]** *Discussant***Weinberg, Camille (University of Texas at Austin), Jo Osborn (University of Michigan), Rachael Penfil (University of Illinois at Chicago) and Kelita Pérez Cubas (Pontificia Universidad Católica del Perú)****[240]** *New Evidence of Late Intermediate and Inca Occupation at Jahuay, Quebrada de Topará, Peru*

Located at the mouth of the Quebrada Topará on the Peruvian South Coast, Jahuay is a multicomponent site key to understanding the rise and spread of the Topará cultural tradition—and the Paracas decline—during the Early Horizon. Limited systematic archaeological work in the mid-20th century defined Jahuay as the type-site for Topará ceramics, and also reported the existence of tombs on the site's upper terraces that were initially dated to the Late Horizon (AD 1450–1532). However, 2017 investigations revealed the existence of a previously unreported Late Intermediate (AD 1100–1450) and Late Horizon occupation at Jahuay's beachside edge. Although this sector has been severely damaged by both human and environmental forces, we recovered well-preserved material culture, including ceramics, plant remains, marine shell, and animal bone. This poster presents this body of evidence and considers the implications of this newly identified later occupation within the regional settlement pattern for the Peruvian South Coast.

Weinberg, Camille [46] see Osborn, Jo

**Weinstein, Richard (Coastal Environments, Inc.), Amanda Evans (Coastal Environments, Inc.) and Jessica Kowalski (University of Alabama)****[84]** *Investigating Subsided and Drowned Shell Middens in Coastal Louisiana: Research at Sites 16SB47 and 16SB153*

Archaeologists from Coastal Environments, Inc., (CEI) reassessed the National Register eligibility of the Bayou St. Malo site (16SB47) and site 16SB153, located adjacent to one another on the southeastern shore of Lake Borgne in St. Bernard Parish, Louisiana. Previous investigations at the two sites suggested that cultural remains occurred only on the marsh surface adjacent to the lake, primarily as redeposited, wave-washed materials, and that neither site was eligible for inclusion in the National Register of Historic Places. CEI's investigations utilized terrestrial subsurface probing, hand-turned augering, and controlled testing, plus offshore vibracoring and sub-bottom profiling, to identify intact shell mounds and extensive associated areas of subsidized and drowned shell middens. It also was possible to reconstruct the occupation sequence of the two sites, identify the now-subsided and submerged landforms on which the locales initially developed, and to offer a methodology for examining similar sites in similar settings, particularly through an interpretation of the remote-sensing data within the established geologic and geomorphic contexts of the region.

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**Weir, Donald (Commonwealth Cultural Resources Group Inc.)**

[151] *Discussant*

Weise, Jeffrey [106] see Dillingham, Frederic

**Weissbrod, Lior (University of Haifa) and Yaron Dekel (Shamir Research Institute)**

[125] *Insights from Commensal Pathways into Domestication Origins*

Research on the origins of animal domestication has relied heavily on the use of morphometric characteristics of skeletal remains as diagnostic markers for important shape and size changes, which supposedly signaled the beginnings of domestication processes. However, the utility of this approach for pinpointing the timing and geographic and cultural context of initial domestication has been recently questioned. This approach has been undermined by empirical findings from geometric morphometric studies of phenotypic variation in key diagnostic traits in dogs and pigs, DNA research, and theoretical thinking from the perspective of niche construction and the extended synthesis of evolution. These developments call for rethinking of current approaches to documenting early domestication pathways, and suggest a way forward to addressing pressing issues in the how and why human societies began to domesticate animals. A step in this direction is provided by recent work on the house mouse and the context of its initial commensal bond with pre-agricultural hunter-gatherers in the southern Levant. This work offers important insights into early human-animal interactions, which did not yet involve the kind of conscious directed human intervention which was likely to have furnished the triggering mechanism for later changes in skeletal morphometry of animal domesticates.

Weissbrod, Lior [125] see Cucchi, Thomas

Weitzel, Celeste [120] see Flegenheimer, Nora

**Weitzel, Elic (University of Connecticut), Brian Codding (University of Utah), Stephen Carmody (Troy University) and David Zeanah (California State University, Sacramento)**

[5] *Site Clustering Parallels Initial Domestication in Eastern North America*

Dense human settlements often emerge following a shift to agricultural economies, yet researchers still debate the underlying cause of this pattern. One driver may be what is known in ecology as an Allee effect, a positive relationship between population density and per capita utility. Allee effects may emerge with economies of scale such as those created by some forms of intensified food acquisition and production. Thus, in an Allee-like setting, individuals belonging to larger groups enjoy the benefits of greater efficiency and productivity of subsistence, as well as group defense, mating opportunities, cooperative parenting, etc. Here we evaluate this hypothesis by examining the process of initial plant domestication in Eastern North America, where we expect the process of intensification should co-occur with a shift from more dispersed to more clustered settlement patterns as individuals begin to benefit from aggregation. Application of the Clark-Evans Nearest Neighbor Index to dated site locations available from the Canadian Archaeological Radiocarbon Database support our predictions, revealing a shift from dispersed to clustered settlements that coincides with the initial domestication of plants in the region. This result supports the hypothesis that subsistence intensification in Holocene Eastern North America was associated with Allee effects and incipient territoriality.

**Welch, Jacob (Yale University) and Scott Hutson (University of Kentucky)**

[82] *Neighborhoods and the Constitution of Authority*

Archaeologists working on the question of integration of neighborhoods within cities or polities often begin by assuming the existence of centralized authority. Next, they move to consider the relationship between neighborhoods and such authorities. Researchers typically see this relationship as one of domination, independence, or something in between. The case of Chunchucmil, a large Maya site located in northwest Yucatan, Mexico, challenges this common approach to neighborhood integration. At Chunchucmil, neighborhoods are clearly defined but centralized authority is not. Thus, we must set aside the question of neighborhoods being weakly or strongly integrated with centralized authority and instead ask how neighborhoods constitute authority itself. In a densely populated, decentralized city, how can neighborhoods be seen as factions whose competition and cooperation produce authority? This paper explores this question while also discussing everyday processes that hold neighborhoods together, cases in which households could switch ties from one neighborhood to another, and the foundations of inequality within neighborhoods and hierarchy between them.

Welch, Jacob [162] see Kidder, Barry

**Welch, John (Simon Fraser University)**

[289] *Discussant*

**Welch O'Connor, Lauren (University of Massachusetts Boston) and Douglas J. Bolender (University of Massachusetts Boston)**

[167] *Environmental Variation and the Sustainability of Farms: Investigating Effects of Erosion in Northern Iceland*

The initial colonization of Iceland in the late 9th century had a profound impact on the fragile environment of the North Atlantic island. Settlement and the introduction of livestock resulted in widespread erosion and the replacement of woodlands with meadows and heaths. Changes in the environment are assumed to have played a role in determining settlement patterning and subsistence strategies. While marginal highland areas were most seriously affected, resulting in farmstead abandonment, the nature of changes in lowland areas and their impact on the productivity of individual farms is poorly understood. Local patterns of landscape change in Iceland could be highly varied as erosion in one area often resulted in soil accumulation in another. Focusing on the lowland region of Hegranes in northern Iceland, we examine the timing of erosive events in relation to fluctuations in farmstead size during three periods of occupation: pre-1104 A.D., 1104–1300 A.D., and post-1300 A.D. We consider when and where these events occurred and their implications for the viability and productivity of individual farms and households.

Welker, Martin [189] see Zavodny, Emily

**Wellman, Hannah (University of Oregon)**

[10] *Avifaunal Remains from the Palmrose Site (35CT47): Establishing Seasonality and Investigating Endangered Species*

Avifaunal remains have great potential to improve archaeological understanding of the economy and subsistence of peoples who lived in the past, as well as to yield information about local ecology, environmental change, and past bird species distribution. The large assemblage of faunal remains from the three archaeological sites comprising the Seaside Collection from Seaside, OR, contains significant quantities of bird bone. Previous analyses of vertebrate remains (including birds) by Greenspan and Crockford (1992) and Colten (2015) suggested occupation occurred at the site year round. While these studies provide baselines for interpreting seasonality and species representation, approximately half the Palmrose faunal remains from the initial 1970s excavation are unanalyzed. Consequently, zooarchaeological analysis has been performed on a previously unanalyzed subsample (NISP=200) as part of a larger avifaunal project. This project seeks to understand not only patterns of site occupation, but to also gain greater insight on strategic hunting practices (i.e., seasonal and geographic targeting/acquisition of specific avian species). Such information is critical for

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understanding human subsistence behavior and landscape use. This investigation also seeks to provide data on the local historical ecology of two currently endangered bird species in Oregon: the marbled murrelet (*Brachyramphus marmoratus*) and the short-tailed albatross (*Phoebastria albatrus*).

**Wells, E. Christian (University of South Florida), Kara A. Fulton (University of South Florida), David Mixter (Binghamton University) and Borislava Simova (Tulane University)**

**[129]** *The View from the Ground: How Geochemistry Informs Our Understanding of the Regal, Ritual, and Residential Character of Actuncan*  
The archaeological investigation of Actuncan in western Belize included the geochemical analysis of one of the largest and most diverse sets of activity surfaces in the Maya world. Over 1200 soil, sediment, and plaster samples from four major architectural complexes representing regal, ritual, and residential locations were assayed using ICP-MS. The results allow a uniquely "atomic" perspective on the changing use of urban space over roughly 900 years, ca. AD 100–1000. This research identifies feasting, ancestor veneration, and other diacritical performances as key practices that marked exclusivity or inclusivity in the political, religious, and social lives of the city's residents.

**[208]** *Discussant*

**Wells, Joshua J. (Indiana University South Bend)**

**[231]** *Principles of Open Government Archaeology: Lessons from the Digital Index of North American Archaeology (DINAA)*  
American archaeology is conducted under cultural resources protection laws, but how does archaeology meet the challenge of openness? The past decade saw development of the "open government" digital information paradigm for public availability of information that underpins the functions of governance. Open government data provide a base for the interested public to offer expertise in aspects of necessary analyses, and to derive further public value from reuse of government data in novel ways. The open government concept has affected the practice and communication of scientific data in regulatory regimes as far flung as climate science, health science, and archaeology, among many others. In 2007 the "eight principles of open government" were coined by a group of public advocates, followed rapidly by a mosaic of federal, state, and local initiatives. The Digital Index of North American Archaeology (DINAA) is a completely free, big data, open government data project, centered at several public institutions; DINAA embodies open government practices to develop a novel linked-open data network of archaeological site primary data and related records across the internet. Our disciplinary capacity to engage with the principles of open government will be addressed through DINAA interoperability assessments and experiments with open government data.

**[321]** *Moderator*

**[101]** *Chair*

Wells, Joshua J. [53] see Noack Myers, Kelsey

Wemanya, Sylvia [99] see Curley, Angelina

**Wendel, Martha (University of Cincinnati), David L. Lentz (University of Cincinnati), Timothy Beach (University of Texas—Austin) and Sheryl Luzzadder-Beach (University of Texas—Austin)**

**[153]** *Raised Field Agriculture in the Maya Lowlands: Archaeobotanical Remains from Birds of Paradise*  
Up until the late 1990s, researchers believed the Maya were solely reliant on slash and burn agricultural practices. However, discoveries of rectangular canal patterns in the margins of wetlands in the Maya lowlands of Guatemala, Belize, and Mexico shined light on a new agricultural practice: raised wetland fields. One example of wetland fields is found at the site Birds of Paradise (BOP) in the Rio Bravo region of northwestern Belize. The macrobotanicals recovered from the raised fields and canals at BOP are compared to the four stages of occupation as outlined in the Birds of Paradise model on the basis of previous research. Since no previous macrobotanical analysis has been done at BOP, this research will make an important contribution to understanding what the Maya were growing in wetland canals and how the land changed over time with the implementation of agricultural practices.

**Wendrich, Willeke (UCLA)**

**[172]** *At Risk Cultural Heritage and the Power of Communities*  
In the years of willful destruction of cultural heritage as part of an extremist obliteration of the past, there have been several instances in the news of local populations taking stance against these destructive forces. In some cases protection of cultural heritage has become a voice against suppression and the reconstruction of destroyed monuments, e.g. through 3D printing and resurrecting lost parts, an act of defiance. Most destruction of cultural heritage, however, takes place much more quietly, through urbanization, the expansion of agriculture and modern mining. The destruction of unexcavated archaeological sites results in the complete erasure of the social history of large areas of the world. Here too, a close collaboration with communities living around and on top of the archaeology can provide access and protection of important cultural heritage, that cannot be reconstructed through 3D printing, because we simply would not know of its existence and importance.

**[316]** *Moderator*

**[286]** *Discussant*

Wendrich, Willeke [172] see Whitmore, Deidre

**Wendt, Carl (Cal State University—Fullerton), Edgar Huerta (Cal State University—Fullerton), Hector Neff (Cal State University—Long Beach) and Michael D. Glascock (University of Missouri)**

**[285]** *Source Analysis of Obsidian from the Late Olmec Site of Los Soldados*  
Recent compositional analyses of obsidian from Formative Period Mesoamerican sites have been used to trace obsidian to a number of Highland Mexican and Guatemalan sources, and documented shifts in sources through time. In this presentation, we report the results of a study that analyzed 401 obsidian samples excavated from the Middle/Late Formative period habitation site of Los Soldados, located 11 km from the Olmec capital of La Venta. Using three high precision techniques (LA-ICP-MS, XRF, and pXRF) we attempt a reconstruction of obsidian procurement and long-distant trade at Middle Formative/Epi-Olmec Los Soldados. Specifically, 102 small obsidian chips (ave. 1–2 sq cm) were analyzed at IIRMES using LA-ICP-MS and pXRF, and another 299 larger obsidian chips (ave. 2–5 sq cm) were analyzed at MURR using XRF. Results show that the inhabitants of Los Soldados utilized obsidian from both Highland Mexican and Highland Guatemalan outcrops. In addition, results indicate that these three techniques produce comparable results. Finally, our results demonstrate that obsidian color is not a reliable indicator of procurement source, and we argue that color should not be used to infer source.

Wendt, Dan [89] see Sterner, Katherine

**Werkheiser, Marion**

**[236]** *Discussant*

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**Werlein, Amanda (University of Missouri, Columbia), Joan Coltrain (University of Utah), Jeffrey Ferguson (University of Missouri Research Reactor), Virginie Renon (University of Missouri Research Reactor) and Karen Schollmeyer (Archaeology Southwest, Tucson, AZ)**  
**[187]** *Developing Regional Isotopic Baselines to Trace Resource Acquisition Patterns in the Mesa Verde Area of the American Southwest*

The analysis of strontium and oxygen isotopes in archaeological bone is commonly used to trace human mobility and migrations. We are using this isotopic approach to reconstruct changes in human access to large animal resources acquired through trading and hunting in the Mesa Verde area between 750–1280 AD. Current work is focused on determining the isotopic variability of the complex geology surrounding the primary study area. Isotopic analyses have been conducted on non-cultural archaeological rodent bones from surrounding regions, which, due to their limited home ranges, can be used as indicators of the bioavailable strontium isotopic signature of their local environment. Modern plant leaves have been used as a corresponding source for local isotopic signatures and in locations where rodent bones could not be acquired. While focusing on strontium analysis, we also address oxygen isotopic signatures of collected plant materials, faunal bone and local water sources providing additional complementary provenance information. The baselines determined from this work will be used to address the provenance of archaeofaunal bones in Mesa Verde assemblages, including those of rabbits, turkey, and deer.

**Werness-Rude, Maline (Ventura College) and Kaylee Spencer (University of Wisconsin-River Falls)**

**[30]** *A Good Footing: The Importance of Plaza Design in the Northern Maya Lowlands*

Ancient Maya architecture tends to follow predictable patterns. Many structures have a single, clear façade, for instance, conceptualized as a literal face. Northern sites, with their toothy-jawed monster buildings, express this idea with particular directness. Stairways and sculptural adjuncts, like altars and stelae, are integral elements that contribute to the idea of facing, both literally and metaphorically, and, as such, are critical to the visual identity of many Maya sites. With a few notable exceptions, scholarly attention often focuses on isolating and analyzing associated texts and patronage as they relate to dynastic agendas, historical chronologies, or infrastructure supporting elaborate ceremonies. The present work acknowledges the importance, and interrelated nature, of Northern Lowland plaza features like stairs, altars, and three-dimensional sculpture. In doing so, we begin to explore how discrete formatting choices, combined with object selection and placement, impact viewers' spatial experiences. Ultimately our work strongly supports the reading of Maya architecture as a performative framework. While Maya sites have long been understood as loci for ritual and other kinds of activity, the unusual aspects of specifically Northern constructs further demonstrate how such selection privileges certain behaviors in particular locations, coordinated with the functionality of those spaces.

Wernke, Steven A. [65] see Ore Menendez, Gabriela

Wesolowski, Veronica [2] see Bachelet, Caroline

**Wesp, Julie (American University), Chelsi Slotten (American University) and Felipe Gaitan Ammann (Universidad de Los Andes)**

**[14]** *Colonial Funerary Rituals at the Templo San Ignacio in Bogotá, Colombia*

This research analyzes the funerary customs in the sixteenth to nineteenth centuries as recovered through archaeological exploration in the Jesuit church named Templo San Ignacio in downtown Bogotá, Colombia. These skeletal remains illustrate how from the moment the church was constructed in 1610, the deposition of the deceased beneath the floor was an integral part of the occupation of this sacred space on the periphery of the Spanish colonial empire. While we recovered human remains from nearly all areas of the church, there is a meaningful difference in funerary practice, particularly between primary burials that were treated with a layer of lime and secondary burials in wooden or metal boxes of skeletonized remains. Here, we explore how age and sex correlate with differences in the organization, orientation, and method of burial, as well as the kind and amount of associated artifacts. We suggest that the variety of funerary rituals within the church reflects differences in social status or affiliation with the Jesuit order.

Wesp, Julie [66] see Palacios, Horvey

Wesson, Alex [36] see Campbell, Wade

West, Frankie [14] see Fleskes, Raquel

**Wester, Carlos (Carlos Wester La Torre)**

**[216]** *Chornancap: Palacio y Mausoleo de la Gobernante y de la Cultura Lambayeque, Perú*

Las investigaciones en Chotuna Chornancap—Lambayeque—Perú, pusieron a la luz el hallazgo de contextos funerarios de personajes de élite, uno de ellos correspondiente a una “Gobernante y Sacerdotisa” de la fase Tardía de la cultura Lambayeque (XII-XIII d.C.). El fardo funerario de la gobernante/sacerdotisa enterrado con ocho acompañantes, ornamentos de alto rango, poder y autoridad, han permitido documentar una de las más conspicuas autoridades políticas y religiosas de la cultura Lambayeque. La gobernante/sacerdotisa es claramente una mujer importante en Chotuna, pero también parece establecer un amplio dominio en el territorio macro regional, al comprobarse vínculos con otras sociedades complejas (Cajamarca, Chimú, Ecuador). El ajuar de la gobernante/sacerdotisa demuestra un variado, rico y complejo corpus iconográfico, que refleja su autoridad política y religiosa. Este episodio funerario permite plantear mayores argumentos para entender la dinámica del poder y religiosidad en la cultura Lambayeque, y construir un nuevo mapa sobre su territorialidad, así como reflexionar sobre la participación de mujeres en la vida política y religiosa, y reconocer un vértice importante en la organización sociopolítica que es la dualidad en el poder político y religioso así como en la ancestralidad de la sociedades andinas.

**Weyrich, Laura (University of Adelaide), Alan Cooper (University of Adelaide) and Keith Dobney (University of Liverpool)**

**[137]** *Ancient DNA Analysis of Microbes Preserved in Dental Calculus: Challenges and Opportunities*

Sequencing ancient microorganisms using next generation sequencing approaches have truly revolutionized our view of the past. While past paleomicrobiological research was largely restricted to coprolites and sediments, the recent analyses of ancient calcified dental plaque has provided novel insights into ancient human diets, disease, behaviors, and lifestyles. Despite the benefits, obtaining DNA from diverse microbial communities is difficult and is fraught with issues for first time researchers. Site, museum, and laboratory contamination can easily swamp out ancient microorganisms, even in clean facilities and in samples devoid of human DNA contamination. To circumvent future issues, the approaches recently applied to Neandertal dental calculus will be discussed in detail, including sample selection and decontamination, DNA extraction, next generation sequencing library preparation, and downstream bioinformatic analyses. As this application of these techniques is still in its infancy, both the benefits and limitations will be presented, and current problems within the field will be highlighted. Specifically, the potential downfalls of reagent background DNA and cutting-edge methodologies applied in the ancient human DNA research will be discussed in the context of ancient microbial community analysis. Through this discussion, the methodologies applied in paleomicrobiology will continue to be refined and improved for future research.

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**Whalen, Kathryn (University at Buffalo) and T. L. Thurston (University at Buffalo)****[144]** *"Milk sweet and sower, bread in cakes": United and Divided Foodways in Post-Medieval Northern Ireland*

Post-Medieval ethnic identities in the British Isles display similarities and differences. Across the landscape of Northern Ireland, where indigenous people were subject to English, Scottish, and Welsh colonization, a sharing of material culture is evident across all groups. For example, English fine earthenwares, locally produced coarse earthenwares and locally made tobacco pipes are equally distributed, regardless of property owners' ethnicity. This suggests that a culturally blended presentation had been adopted for the performative aspects of the foodway. However, a more varied pattern of consumption is revealed by landscape-scale geochemical survey, largely reflecting disposal of food waste: colonial and indigenous signatures differ, perhaps in line with Early Modern English textual reports on local diet. Comparing these two datasets yields a more nuanced understanding of identity: tea drinking and other English traditions were adopted throughout the Empire, while food itself continued to vary through time.

**[148]** *Discussant*

Whalen, Kathryn [22] see Snyder, Daniel

**Wheeler, Kathleen (IAC, LLC)****[317]** *Discussant***Wheeler, Sandra (University of Central Florida), Lana Williams (University of Central Florida) and Tosha Dupras (University of Central Florida)****[87]** *Entering the "Valley of Death": Isotopic Evidence of Vulnerable Survivors at Roman Period Kellis, Egypt*

Breast-fed infants living in communities with adequate food access experience particularly high health risks during complementary feeding between ages 6 to 36 months. The most vulnerable of these die in this period, characterized as the "valley of death," which represents a biocultural reality. The majority of those who survive are "vulnerable survivors." The Kellis 2 cemetery sample (Dakhleh Oasis, Egypt, AD 50–450) provides a unique opportunity to analyze effects of biocultural disruptions occurring during this critical period of physiological adjustment. Maternal, fetal, and infant (N=210)  $^{13}\text{C}$  and  $^{15}\text{N}$  profiles were produced from hair, dentin collagen, and bone collagen to evaluate adverse biological factors simultaneously present during weaning and illness. Results indicate there are three situations where feeding practices and health interact: first, the mother's ability to meet nutritional demands of infants during prolonged breastfeeding; second, undernutrition due to a health insult when the child is losing passive immunity; third, children being weaned on foods lacking protein quality and content when they may already be undernourished. This strongly suggests risks of malnutrition start shortly after birth, and vulnerable survivors who escape the valley of death at this age may be even more susceptible and predisposed to environmental stressors than previously considered.

**Whelan, Carly (California State University, Chico)****[38]** *Obsidian Trade vs. Direct Acquisition: A View from Central California*

Geochemical sourcing of lithic artifacts has proven to be a useful analytical tool for the studies of trade and mobility in the archaeological record. However, it is difficult to distinguish lithic material acquired through exchange from material acquired directly from the source. Economic models of lithic reduction suggest that material procured for the purpose of exchange may be treated differently than material procured for personal consumption. I compare obsidian source profiles and lithic reduction strategies from several dozen sites in central California that span the entire Holocene record of occupation. I find that residential mobility was likely high during the early Holocene, when it appears that obsidian procurement was embedded into the foraging round. Obsidian was probably procured logistically during the middle Holocene when residential mobility decreased. While opportunistic obsidian trade likely occurred throughout the sequence, it appears that regularized exchange via far-flung trade networks did not begin until after 1,100 cal B.P., when residential mobility reaches its lowest point. This contrasts with previous studies, which have concluded that obsidian trade peaked in the region prior to this period.

**Whelton, Helen (University of Bristol), Lisa-Marie Shillito (Newcastle University) and Ian Bull (University of Bristol)****[126]** *Investigating the Nature and Timing of the Earliest Human Occupation of North America Using a Lipid Biomarker Approach*

Coprolites contain a suite of lipid biomolecules and are an invaluable source of palaeobiological and palaeoecological information. The identification of faecal matter through the presence of highly-specific lipid biomarkers (5 $\beta$ -stanols and bile acids) has been used to identify and characterise faecal input from a range of different sources. Differentiation of these faecal markers is enabled through the diet, digestion and metabolism of the source animal. Lipid analysis of coprolites has also been used to identify dietary biomarkers, providing information regarding available plant resources. The question of how, when and why people first settled the Americas is a subject of intense debate. Evidence of human occupation in North America obtained through DNA analysis of coprolites from the Paisley Caves, south-central Oregon, has dated the earliest occupation to 14,300B.P., one thousand years earlier than previous evidence suggests. Here, a lipid biomarker approach will be applied to sediment and coprolite samples from the Paisley Caves with the aim of identifying the timing of the earliest occupation of North America by characterising the origin of coprolites found in well-stratified archaeological deposits. Biomarker analysis will also be applied to investigate diet which will enhance our understanding of the relationship between early humans and their environment.

Whisenhunt, John [91] see Whisenhunt, Mary

**Whisenhunt, Mary (University of Texas at San Antonio), Kristin Corl (University of Texas at San Antonio), John Whisenhunt, Robert Hard (University of Texas at San Antonio) and John Roney (Colinas Cultural Resource Consulting)****[91]** *Archaeological Survey in Southeastern Arizona: Partnering with Landowners and Local Informants*

Southeastern Arizona's upper Gila River Valley is an understudied area once heavily occupied by prehistoric people from the Early Agriculture to Salado periods. Over time, many important archaeological sites in the Duncan-York Valley, particularly those of large, aggregated communities, were extensively looted or destroyed due to agricultural and construction leveling. To document and, ideally, preserve the remains of these vulnerable sites, we have emphasized establishing relationships of trust with valley residents. In working with valley landowners and local informants, we have identified and recorded 43 sites over the past four years. In 2017, working with a single local informant, we identified 10 previously unrecorded sites in the Duncan-Virden Valley, including two from the Mimbres Classic period, five from the Salado period, and one with both Mimbres Classic and Salado components. An additional three large sites in New Mexico were found. Most of the aggregated sites include multiple components, attesting to the attractiveness of the upper Gila River Valley locale from a resource perspective, and its long-term resilience to environmental perturbation. The valley's archaeology remains highly vulnerable to human disturbance, heightening the need for strong local partnerships to secure and preserve the sites that make up this remarkable occupational pattern.

**Whitaker, Jason****[37]** *Hinterland Domestic Economies: A Summary of Recent Investigations at the San Lorenzo Settlement Cluster*

This paper summarizes recent archaeological investigations at the San Lorenzo settlement cluster in the Mopan River Valley of Western Belize. Current research at this ancient hinterland settlement is concerned with better understanding household economic organization and integration during

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the Late and Terminal Classic (A.D. 670–890) occupations of this site.

Households are fundamental units of economic organization in both past and present societies. The examination of ancient household remains enables archaeologists to better understand micro-scale economic activities, and to situate those activities within larger societal contexts. Investigations at San Lorenzo focus on the areas associated with four structure groups. In accord with previous research at this site, analyses of collected data from these groups show similarities in terms of basic domestic activities. Ongoing analysis of lithic macroartifacts indicates differences among households in terms of reliance on local raw materials. The ancient residents of SL-21 and SL-22 produced informal tools with locally available chert. Conversely, lithic debitage collected from structure group SL-25 indicates importation of raw materials from outside the San Lorenzo settlement cluster.

**White, Andrew**

**[127]** *Patterns of Artifact Variability and Changes in the Social Networks of Paleoindian and Early Archaic Hunter-Gatherers in the Eastern Woodlands: A Critical Appraisal and Call for a Reboot*

Inferences about the social networks of Paleoindian and Early Archaic hunter-gatherer societies in the Eastern Woodlands are generally underlain by the assumption that there are simple, logical relationships between (1) patterns of social interaction within and between those societies and (2) patterns of variability in their material culture. Formalized bifacial projectile points are certainly the residues of systems of social interaction, and therefore have the potential to tell us something about social networks. The idea that relationships between artifact variability and social networks are simple, however, can be challenged on both theoretical and empirical grounds: complex systems science and ethnographic data strongly suggest that patterns of person-level interaction do not directly correspond to patterns of material culture visible at archaeological scales. A model-based approach can be used to better understand how changes in human-level behaviors “map up” to changes in both the system-level characteristics of social networks and the patterns of artifact variability that we can describe using archaeological data. Such an approach will allow us to more confidently interpret changes in patterns of artifact variability in terms of changes in the characteristics and spatial continuity/discontinuity of social networks during the Pleistocene-Holocene transition in the Eastern Woodlands.

**[160]** *Discussant*

**White, Jonathan**

**[25]** *Disability and Accommodation in the Eastern Mediterranean: Case Studies from New Kingdom Egypt and Classical Greece*

Although the archaeology of marginalized groups has been increasingly discussed in recent scholarship, people with disabilities remain largely unstudied. Recent works on this topic have paved the way for a dedicated examination of people with disabilities in the archaeological record. This paper reviews published material to critically examine physical evidence for disability and accommodation in New Kingdom Egypt and Classical Greece, both areas and periods with rich material culture, extensive architecture, a wealth of bioarchaeological samples, and comparative records. These areas are therefore a useful starting point for an in-depth cross-cultural study of people with disabilities in the ancient world. Mummies and other remains that display pathologies diagnostic of disabilities in life, artifacts and material culture made to accommodate individuals with disabilities, and even artistic depictions offer the beginnings of understanding what life was like for people with disabilities on the banks of the Nile and amongst the cities of Greece. In addition to material culture, an architectural analysis of public buildings reveals the difficulties people with mobility issues might have faced when trying to access landmarks such as the temple of Amun or the Athenian Acropolis.

**White, Joyce (Univ of Pennsylvania Museum), Michael Griffiths (William Patterson University), Cyler N. Conrad (University of New Mexico) and Kathleen Johnson (University of California Irvine)**

**[307]** *Climate Change and the Middle Holocene “missing millennia” in the Southeast Asian Archaeological Record*

Archaeological research in mainland Southeast Asia is a relatively recent endeavor, but as the region’s culture history has become more fully known, a gap in evidence called the “missing millennia” has emerged. The gap falls during the middle Holocene c. 6000–4000 BP when few sites have dated deposits. Yet from evidence dating before and after those millennia, important changes must have occurred, including changes in settlement systems, lithics and ceramic technologies, the appearance of cereal agriculture, and new burial practices. Recent palaeoclimate research under the auspices of the Middle Mekong Archaeological Project in northern Laos is providing possible clues related to the gap in archaeological evidence. Four new speleothem records document an abrupt trend of weakened monsoons beginning at approximately 5–4.5- ka initiating the onset of a mega-drought that peaked at approximately 4.0 ka. The drought climax near the “4.2 ka event” is when other parts of Eurasia and Africa experienced sharp climate shifts and associated human dislocations and societal adjustments. This paper reviews the emerging evidence and proposes an initial interpretation of societal responses to this significant period of climate change

White, Tommi [89] see MacDonald, Brandi Lee

**Whitehead, Mike, Matt Bjorkman (Indiana University of Pennsylvania) and Ben Ford (Indiana University of Pennsylvania)**

**[334]** *Recent Archaeology at Fort Necessity National Battlefield: A Cooperative Approach to Cultural Resource Management*

A series of archaeological projects have recently been conducted at Fort Necessity National Battlefield through a Cooperative Agreement between the National Park Service and Indiana University of Pennsylvania. These projects have incorporated geophysical survey, metal detection, systematic shovel testing, and test unit excavation, as well as artifact curation and reporting. Through this partnership, the National Park Service has received an avenue for cost-effective cultural resource management, and has gained new data and new insights for managing and interpreting Fort Necessity and other historic sites located at the park. In return, Indiana University of Pennsylvania has been able to provide new opportunities for its undergraduate and graduate archaeology students to acquire practical field and lab experience beyond the standard field school setting. Indiana University of Pennsylvania has also benefitted by increasing the visibility of its archaeology programs through conference presentations, report publications, and public outreach, and has fostered a relationship with the National Park Service that is conducive for future student research projects at Fort Necessity National Battlefield. This paper summarizes the archaeology projects performed through this Cooperative Agreement, and describes the benefits, opportunities, and challenges presented by this partnership between a Federal agency and State University.

**Whitehead, William (SWCA Environmental Consultants)**

**[68]** *Using Drones for Exploring the Links between Vegetation and Traditional Archaeological Survey: An Example from Arizona*

The use of drone based photogrammetry is now well established in archaeology for surface modeling and mapping of archaeological sites. The Arizona Department of Emergency and Military Affairs (AZDEMA) is sponsoring a number of long-term projects on their properties. One project will be using traditional drone photogrammetry to create high resolution maps to assess plant communities, plant health, and canopy structure as a way of exploring links between vegetation and other survey methods. A pedestrian survey, geophysical survey, and biological survey will be combined to show the interconnections between these frequently used techniques and the newer techniques of drone photography for surface modeling and vegetation modeling. With sub-centimeter accuracy, surface modeling along with canopy modeling is able to find subtle features on the landscape that are normally missed during pedestrian survey. Emergent photosynthetic populations, canopy variation, and biological dead zones can also be used to establish high probability anomaly areas that can be further investigated with traditional testing techniques. The results of the 2017–2018 field seasons will be summarized and the best practices for using these techniques will be presented. In areas with deeply buried features or in areas with few artifacts these techniques seem to be the most promising.

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**Whiteman, Erik (USFS—Payette National Forest) and Morgan Zedalis (USFS—Payette National Forest)****[106]** *Can You Hear Me Now?—The History of a Telephone Booth in the Frank Church-River of No Return Wilderness*

The Frank Church—River of No Return Wilderness is an area that allows its visitors to experience solitude in the nation's largest wilderness in the lower 48. Often unrealized, is that historically, this rugged landscape had quite an extensive communication network while it was managed as the Idaho Primitive Area. One related historic feature managed by the Payette National Forest is the Coyote Springs Telephone Booth. Telephone communications were developed in the area from the late 1920's through to the 1930's. During this time, telephones were installed, often at major trail junctions, on a tree. However, at this location the smoke chasers built a booth. The telephones were used by rangers, fire fighters, and others to contact dispatch on matters regarding daily administrative operations, fire activity, and emergencies. Such a system facilitated the development and management of the Idaho Primitive Area and the Wilderness on the Payette National Forest. Without the phone systems, managing the area would have been a different experience altogether, with firefighting operations being greatly impacted. This poster will present the results of field monitoring and archival research concerning the telephone booth.

**Whitley, David (ASM Affiliates, Inc.) and Tony Quach (ASM Affiliates, Inc.)****[180]** *In-Situ pXRF Analysis of Episodic Pictograph Production*

Yokuts ethnography indicates that pictograph sites passed from father to son to grandson within shamanic lineages, suggesting episodic painting at these locations. This practice is archaeologically supported by motif superimpositions and minor stylistic differences at sites. An in-situ pXRF study of red motifs was conducted at site CA-TUL-2871, Springville, CA, in the hopes of analytically distinguishing painting episodes, based on the assumption that chemically dissimilar pigments may have been used that are otherwise visually indistinguishable. Six hypothesized painting episodes were identified based on motif type and panel position. pXRF measurements were taken on 8 motifs and 3 rock surfaces. Multivariate statistical analyses showed no significant differences in the hypothesized groupings and, in 2 cases, between motifs and unpainted rock, suggesting that variations in paint thickness, weathering and rock coatings affected the elemental measurements. An experimental study was then conducted to evaluate the effect of paint thickness, confirming its significance in measured results. Though pXRF remains a useful tool for examining in-situ geochemical variability, numerous variables must be controlled if it is to be applied to distinguish pictograph painting episodes or determining elemental composition.

**Whitley, Thomas (Sonoma State University), Michael Konzak (Anthropological Studies Center, Sonoma State Univ), Bryan Mischke (Anthropological Studies Center, Sonoma State Univ), Robert Watson (Anthropological Studies Center, Sonoma State Univ) and Paul Engel (National Park Service)****[221]** *20,000 Years under the Sea: Dynamically Visualizing the Past and Future of Shorelines, Ecosystems, and Climate Change at Point Reyes, California*

Geospatial analysts are now capable of developing increasingly accurate models of past and future 'shorelines' and the predicted impacts they might have on archaeological sites or cultural landscapes. But GIS alone cannot realistically simulate hydrodynamic effects, terrain displacements, or changes in vegetation communities, water bodies, and atmospheres. Funded by the NCPTT, this study combines GIS analysis of LiDAR terrain and bathymetric models with the photorealistic 3D modeling capabilities of Terragen 4.1 (a scenery generator used in the film industry) to produce visualizations and animations of the past 18,000 years, and future 2000 years, of landscape evolution at Point Reyes, California. The objective is to not just measure the potential impacts of climate change on known cultural resources, but to develop a simulation of how geomorphological effects have changed the terrain itself, while climatic variables have dramatically altered ecosystems. These visuals and animations are situated at low earth orbit, oblique aerial, and ground level perspectives. The results are presented in digital immersive environments as well as analogue 3D printed models for visitors to experience at the Point Reyes National Seashore. The ultimate objective is to expand these techniques to the rest of the California, and potentially other parts of the world.

**[320]** *Discussant***Whitlock, Allison (New York University)****[144]** *Medieval Agricultural Practices in the "Champion" Region*

During the early medieval state formation process, England's political organization transformed from localized tribal groups to large and consolidated kingdoms. Farmers at early medieval settlements experienced a related increase in agricultural production demands, and they introduced improved agricultural technology such as replacing the light ard with the heavier moldboard plow. The midlands counties (commonly referred to as the core of the "Central Province" or "Champion" region) are often credited as the source of early medieval agricultural innovation.

Macrobotanical indicators of crop production practices are underutilized in medieval rural settlement studies. Archaeobotanists working in the British Iron Age have developed directly relevant models of identifying the crop processing phase, the lighter ard plow from the heavier moldboard plow, and environmental stress indicators due to intensification. I will present the preliminary analysis of macrobotanical samples from the medieval manor site at Harpswell, Lincolnshire. I will apply the archaeobotanical models to these samples and additional samples reported in other Lincolnshire "Central Province" settlements to identify agricultural changes and question the applicability of "Champion" to this region.

**Whitlock, Bethany (Brown University), Kevin Lane, Charles French, David Beresford-Jones and Oliver Huaman Oros****[224]** *Identifying Strategies of Integration and Cooperation during the Late Intermediate Period (AD 1000–1480) at Sangayaico, South-Central Andes, Peru*

The Late Intermediate Period (LIP) in the highlands of the Central Peruvian Andes was characterized by a marked intensification in economic specialization. In contrast to the preceding periods, in which mixed agro-pastoral groups appear to have dominated highland Peru, many LIP populations seem to have adopted increasingly specialized pastoral or agricultural strategies. This increased economic specialization would likely have fostered inter-group cooperation, as subsistence generally required the products of both herding and agriculture. In tandem with this, the LIP also saw the development of new forms and scales of ritual, as groups sought to extend their geographic reach and influence.

Drawing on excavation data and analysis of micromorphological samples from Sangayaico, in the Upper Ica drainage of the south-central Peruvian Andes, we examine how one LIP community established and maintained bonds of cooperation in a time of major political and economic transitions. Initial excavation data—such as the plaza dated to the LIP—suggests that ritual activity at Sangayaico increased in scale and intensity during this period. Micromorphological analysis of these ritual contexts has helped to illuminate how these features were constructed and used, thus furthering our understanding of how communities used ritual to mediate community relations.

**Whitmore, Deidre and Willeke Wendrich (Cotsen Institute of Archaeology at UCLA)****[172]** *DIG: Digital Information Gateway to Sustainable Reuse*

Archaeological data are a form of at-risk cultural heritage, because they are the only record of an excavation. As a research community that deals with often irreplaceable datasets and continuing threats to records and sources, archaeologists regularly reuse data, despite these datasets frequently being locked in printed tables and appendices. DIG, the Digital Information Gateway from the Cotsen Institute of Archaeology Press, aims to facilitate

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reuse by publishing research data within the context of monographs and in sharable formats with the information needed to understand and reuse these data. Creating a sustainable workflow is imperative to DIG. The team has developed a handful of tools to assist with the collection and review of metadata and documentation while authors are engaged with the Press in preparing their manuscript. Additionally, this project builds on the community's increasing interest to preserve datasets (i.e. tDAR, ADS) in an effort to incorporate emerging preservation practices into the evolving scholarly publication framework. All data published on DIG are deposited in repositories. The platform's architecture is designed to support interoperability with existing repositories while modular metadata schemata and Linked Open Data standards provide the flexibility to adapt to new technologies and changes in the research community.

**Whitridge, Peter (Memorial University of Newfoundland)**

**[220]** *Arctic Heterotopias: Qariyit as Queer Spaces in Precontact Inuit Communities*

Gender and landscape have each proved to be such powerful archaeological tropes that thinking them together seems sure to yield interesting results. In the precontact Inuit world, gender and related dimensions of embodiment were key axes of spatial practice and place-based identification. Women's and men's activities were differently distributed across the landscape—in general, women occupying and managing domestic and near-community spaces, and men employing watercraft and dogs to operate within a wider landscape—but these varied and evolved over the lifecourse along with gendered identities themselves. Angakkuit (shamans) extended this range in every direction, to encompass ethereal and submarine realms and ambiguously queer human and nonhuman identities. The qariyit (ceremonial structures) that were the principal sites of their community performances and the points of departure for otherworldly travels constituted the heterotopic non-centers of large winter villages.

**Whittington, Stephen (National Mining Hall of Fame & Museum)**

**[11]** *Mapping and Spatial Analysis of an Ancient Mixtec Capital in Oaxaca*

Chiyo Cahnu, a Mixtec mountaintop capital, is unusual in relation to the archaeology of Oaxaca. Mapping one square kilometer of the capital using powerful GPS devices between 2013 and 2017 revealed about 370 building sites, almost 2,400 agricultural and residential terraces, and ancient roads constructed on the steep slopes of Cerro Amole. The building sites range in complexity from single rooms to compounds with temples and dozens of rooms surrounding patios. The ball court is 45 meters long, making it one of the largest structures of its kind in Oaxaca. The capital is depicted on the famous Mapa de Teozacoalco, a document painted by a Mixtec artist and explained by a Spanish colonial administrator around 1580. Interpretation of images on the Mapa and in related pre-Hispanic and early colonial codices suggests that the principal occupation of the capital occurred over a period of only 236 years (AD 1085–1321) during the Postclassic period. Chiyo Cahnu is remarkable in the Mixtec area because it is larger than normal for Postclassic settlements and because it was inhabited for such a short length of time. The capital has implications for understanding the amount of construction a population can accomplish rapidly and its possible impetus.

**Wholey, Heather (West Chester University)**

**[328]** *Population in the Middle Atlantic Archaic: The Middle Atlantic Transect Approach*

Middle Atlantic archaeology is unique due the tremendous ecological and cultural diversity present within a relatively small, compressed region. The ecological transect model has been widely applied in regional archaeological research for the past thirty years. It is essentially a landscape approach that traverses several major physiographic provinces to encompass the range a discrete and interconnected cultural activities across a broad region. This work employs the transect model to explore how factors such as settlement preference, mobility, social organization, resources, and subsistence practices influence group size and population throughout the Archaic period. This appears to be a tale of population resilience through responsiveness to changing external and internal circumstances that has fostered the growth of cultural diversity across the region.

**Wichlacz, Caitlin (Arizona State University)**

**[287]** *An Efficient and Reliable Mechanism: The Human Experience of Hohokam Ceramic Exchange during the Middle Sacaton Period (A.D. 1000–1070)*

The human labor involved in physically carrying goods across the landscape underpins all artifact provenance studies in the prehispanic American Southwest, yet this labor is all too often left unacknowledged and unconsidered, even as detailed and sometimes remarkable patterns of artifact production and distribution are brought to light. This is especially true for the Phoenix Basin Hohokam, where ceramic provenance studies have revolutionized archaeologists' abilities to understand the organization of pottery production and distribution, but the human labor involved in ceramic transport has been mostly only implied or obliquely referenced.

In this paper, I employ an Archaeology of the Human Experience (AHE) framework to explore the labor involved in ceramic exchange among the Phoenix Basin Hohokam during the middle Sacaton period (ca. A.D. 1000–1070), when the volume and extent of this exchange were at their peak. Through a case study from the site of Las Colinas, I focus on situating and investigating the labor of ceramic exchange as a condition of life for the middle Sacaton period Hohokam, considering how this labor was part of and affected broader social contexts, and exploring bodily, social, and temporal aspects of the experience of ceramic transport, drawing upon archaeological and ethnographic examples.

**[287]** *Chair*

Wichlacz, Caitlin [267] see Abbott, David

Widga, Chris [212] see Perri, Angela

**Widmayer, Elise (University of Exeter)**

**[223]** *An Experimental Approach to Understanding Paleoindian Bipolar Lithic Artifacts*

Bipolar lithic artifacts can be challenging for researchers to understand in the archaeological record. Although these artifacts were first noted in North American literature half a century ago, archaeologists continue to debate over terminology and considerations of morphological and functional distinctions of bipolar objects. This experimental approach aims to shed light on these disparities whilst re-examining morphological and functional characteristics attributed to manufacture and use-wear. Recent experimental work with the Mockhorn Island Clovis assemblage, by the Smithsonian Institution Paleoindian/Paleoecology Program, served as a model for this study. This poster presents the results of manufacturing, feasibility, and use-wear experiments on quartzite beach pebbles split through bipolar reduction.

**Wieckowski, Wieslaw (University of Warsaw)**

**[211]** *Embodied Empire: Life and Death of Wari Elites from Castillo de Huarmey*

The discovery of an undisturbed burial context at Castillo de Huarmey, bringing to light remains of Wari immediate elite members, finally embodied long discussed highest social levels of Wari Imperial elites. Until that time they characteristic was derived almost exclusively from indirect sources, mainly material remains of high quality material culture and architecture. Now, there is a chance to get a glimpse on their actual life stories, occupation, and to see their faces. Analysis of the burial context proves also there was an important change in the perception of female role in the society that occurred sometime during the Middle Horizon. Reconstructing lives and mortuary rites on basis of Castillo de Huarmey is also an important addition to the

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discussion about the Wari presence not only on the North Coast of Peru, but also to the interpretation of Wari expansion, and forming of the Empire. To see its multidimensional aspect, a comparison with other Wari provinces is necessary.

### **Wiersema, Juliet (University of Texas, San Antonio)**

**[275]** *Far from the Crown: Currents of Opportunism along the Dagua River during the Late Spanish Colonial Period (Nueva Granada)*

Throughout the late Spanish colonial period, the Dagua River in Colombia's Cauca Valley was a multi-cultural backwater. Its shores were inhabited by mestizos, mulattos, slaves, and free slaves, with a minority of Indians and Spaniards. While this area was mined for gold and offered one of few routes to the Pacific from Colombia's interior, the Dagua River region was largely cut off from global trade and colonial currents due to its geographical remoteness. 50 days distant from Cartagena and 14 from the nearest town, Cali, it was just beyond the reach of Spanish colonial authorities. For the Dagua's largely self-governing and self-sustaining inhabitants, including African slaves, topographical challenges such as steep cordilleras, dense tropical jungles, and torrential rivers gave rise to social, cultural, and economic opportunities. Spaniards, who theoretically were in control as hacendados, merchants, and miners, depended on forasteros—French doctors, Italian notaries, and African slaves. African slaves in the Dagua region came to wield great power and autonomy, controlling terrestrial and river commerce, effectively fighting royal aguardiente and tobacco monopolies, buying their freedom, and building free slave communities. Their descendants would inhabit this area into the early twentieth century. Methods are art historical, historical, cartographic, and ethnographic.

### **Wiewel, Adam and Rebecca Wiewel (Arkansas Tech University)**

**[5]** *Remote Sensing Investigations of the Arzberger Site (39HU6)*

Arzberger is a fifteenth- or sixteenth-century fortified Plains Village site located near present-day Pierre, South Dakota. Although it is an important example of an Initial Coalescent settlement in the Middle Missouri subarea of the Plains, its most intensive study occurred in 1939 when the village was accurately mapped and test excavations were made of four lodges and the fortification. This early work identified a surprisingly low number of houses for such a large settlement. In recent decades, quarrying activities have destroyed substantial portions of the settlement, despite its 1964 designation as a National Historic Landmark. To better understand the site's content and assess its current condition, archeologists from the Midwest Archeological Center (National Park Service) recently deployed a six channel SENSYS MAGNETO MX V3 gradiometer system. Besides the magnetic data, the unit's integrated GPS yields accurate topographic information. When combined with historical aerial photographs, these datasets provide a clear view of the remaining portion of the village's fortification, its many lodges, and probable storage pits. We will discuss these significant findings as well as review several benefits and difficulties of surveying with the SENSYS gradiometer system.

### **Wiewel, Rebecca (Arkansas Tech University)**

**[94]** *Making Active Learning Practical*

This poster presents the outcomes of my efforts to make active learning activities an integral component of undergraduate courses in archaeology. For the past three years I have taken my Southeastern Archaeology course from a typical lecture-based class to a more active learning environment that includes hands-on lab activities, participation in fieldwork, field trips to archaeological sites, and service learning opportunities at our campus museum and local research station of the Arkansas Archeological Survey. Beyond assessing learning outcomes, I discuss practical challenges and lessons learned from implementing these measures with limited resources at a mid-sized teaching institution in which I am the sole archaeologist.

Wiewel, Rebecca [5] see Wiewel, Adam

### **Wilcox, Daniel (The College of Wooster) and Paul Nick Kardulias (The College of Wooster)**

**[225]** *Trade and Production of Steatite Vessels in New England*

This research examines the trade and production of steatite vessels during the Archaic Period in New England. The study focuses specifically on a quarry Located in Barkhamsted, Connecticut where recent excavation has supplemented prior investigations from 1949 to 1951. The material from this site is located at Yale's Peabody Museum and the archaeology lab at Central Connecticut State University. We also examine the artifact assemblages from other sites in Connecticut and Massachusetts. Along with the archaeological assemblages, this work looks at the geology and geography of Connecticut, to obtain a better understanding of how the environment provided the key resources that inhabitants exploited. Finally in order to examine the trade of vessels and utensils this research examines the geochemistry of steatite through XRF analysis to determine the sources of artifacts within New England. Using models proposed by Renfrew and Binford we propose an exchange system between areas in New England with and without a local source of steatite. The Study provides an examination of Archaic lifestyle along the Atlantic seaboard, with elements of both local and interregional interaction.

### **Wilcox, Timothy (Stanford University)**

**[272]** *Gobernador Polychrome as a Material Expression of Survivance*

The production of Gobernador Polychrome Pottery by the Navajo people, is entangled in many social and material negotiations of survivance. Its production in the Dinétah Region of New Mexico, during the late Seventeenth and early Eighteenth century place it in a time of Native resistance to Spanish colonization in Northern New Mexico. This resistance, in the form of a pan-Indian uprising, the Pueblo Revolt of 1680, sets the stage in which the production of Gobernador Polychrome emerged and ceased. This event, along with other contexts of colonization, influenced the practices of the Navajo people in this period. While western science has painted the Navajo as recent immigrants to the SW, indigenous understandings of place and identity contradict this view. For instance, an Indigenous braided model of interrelatedness does not fit with the theoretical bases of genetic and linguistic evidence, which favor dendritic models. Contemporary Indigenous communities have been forced to internalize concepts such as blood quantum and accept western style governments that promote difference and competition for resources. This case study highlights the emergence and rejection of practices that define contemporary Navajo culture and remind us of a time when cooperation accomplished common goals.

### **Wildenstein, Roxanne (McMaster University), Aubrey Cannon (McMaster University) and David Burley (Simon Fraser University)**

**[189]** *Utilization of Fish Resources at the Hupoate Site on Tongatapu, Kingdom of Tonga*

Analysis of archaeological fish remains from the Hupoate site, on Tongatapu in the Pacific Island Kingdom of Tonga, identified 18 different families. Significant change in relative abundance was evident in Lethrinidae (emperors) and Acanthuridae (surgeonfish, unicornfish), two families common as food fish in Tonga. Frequencies of the families were compared between the early settlement period (~2850–2900 cal BP) and the subsequent Plainware/Aceramic period. Larger-bodied Lethrinidae, which are common in both periods, show a decline in relative abundance, while smaller-bodied Acanthuridae show a corresponding increase in abundance. Although this pattern might be viewed as evidence for resource depression, potentially linked to intensive fishing of Lethrinidae, bone measurements show no decrease in the size of Lethrinidae over time. A number of factors can account for the change in taxonomic abundance. While the relative abundance patterns may be a result of change in reef productivity caused by increased pressure on Lethrinidae, they could also indicate a shift in fishing techniques, or intensification of fishing involving the addition of a wider range of species to the food inventory.

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**Wiley, Kevin (New York University) and Joseph Schuldenrein (Geoarcheology Research Associates)****[39]** *Riverside 2: Urban Archaeology, Landscape Reconstruction, and Public Engagement*

The Riverside 2 site, situated along the original shoreline of the island of Manhattan, presents a unique opportunity for landscape reconstruction within an urban archaeological context. Drawing upon geoarchaeological borings, excavation units, and historical sources, we created a 3D GIS model of the site highlighting its role in the development and transformation of the emerging neighborhood of the Upper West Side in the 19th century. The results of these research efforts have recently been put on view in a permanent gallery housed within the development project whose construction precipitated the archaeological excavation.

**Wilkie, Laurie (University of California Berkeley)****[278]** *Discussant***Wilkinson, Darryl (University of Cambridge)****[181]** *Not Becoming Inka: Anarchism as a Set of Human-Thing Relationships*

Power depends on certain modes of relation between people and things; a fact archaeologists have recognized for some time. Thus there can be no states or rulers without monuments, elite regalia, official iconographies and the like—although traditionally it is only the human component that has been seen as the active element in this equation. More recently, archaeologists have sought to reconsider humans not as the users of things, but as their partners and co-participants in the social. In this paper I draw on such approaches to rethink anarchism as a particular mode of human-thing relations, rather than as an ideological stance or political philosophy. As a case study, I will examine a set of village communities of the Andean Late Intermediate Period (c.1000–1450) who resided on the heavily forested eastern piedmont to the northwest of Cuzco. Drawing on two seasons of excavation data, I will show how these settlements were founded by people who were attempting to flee the Inka Empire and all it represented. The rise of the Inka Empire entailed complex new forms of human-thing relations, and for the ancient anarchists presented in this paper, not becoming Inka was a process of actively rejecting those relationships.

Wilkinson, Keith [177] see Brittingham, Alexander

Will, Manuel [124] see Conard, Nicholas

**Willey, P. (Chico State)****[179]** *Stature of Adult Human Remains from Point San Jose*

Stature provides insights into the lives and wellbeing of individuals and populations. In living groups, stature is employed to evaluate differences associated with time (secular trend), geographic distribution, sexual dimorphism, socioeconomic differences, and from other living conditions. Poor living situations hinder growth and yield shortened statures; advantageous conditions enhance growth and result in greater heights. Similar influences are inferred for past populations and the skeletal samples that represent them, including human remains from a pit at Point San Jose (PSJ), San Francisco. Employing all possible PSJ adult stature estimations in this analysis, they average 64.3 inches. The PSJ statures display a bimodal distribution, with peaks at 62 inches and 66 inches. That bimodality may result from a number of causes: small sample size, over-representation of a few individuals, ancestral differences, or sexual dimorphism. When compared with worldwide adult statures, the PSJ material display average stature. On the other hand, compared to a 19th century U.S. military sample, most members from PSJ stand shorter than that group by an average of 3.5 inches. This result suggests that the PSJ individuals faced impoverishment, deprivations and other challenges during their growth period.

**[179]** *Chair*

Willey, P. [179] see Sgheiza, Valerie

**Willhite, Brenton (University of Missouri)****[267]** *Understanding the Emergence and Spread of Chupadero Black-on-white Ceramics through Network Analysis*

It has been hypothesized that social ties between the Salinas Pueblo Province and the Jornada Mogollon sparked cultural change in both regions. In this study, I use Social Network Analysis to characterize these interactions from A.D. 900 to 1450 via the spread of Chupadero Black-on-white pottery. Integral to the study of social interaction and the emergence of Chupadero Black-on-white ceramics is the nature of the pithouse-to-pueblo transition in each region. Prior to the emergence of pueblo architecture, populations in Salinas lived in pithouses and used predominantly brownware ceramics. The gradual shift to above-ground architecture in the area coincided with a marked increase in the abundances of Chupadero Black-on-white. Similarly, while the shift out of pithouses occurred sporadically in the Jornada Mogollon world, those sites that eventually shifted to above-ground architecture frequently display higher quantities of Chupadero Black-on-white. By creating ties between archaeological sites based on ceramics and architecture, Social Network Analysis produces networks of hypothesized interaction between sites in a large portion of the Mogollon culture area.

William, Justine Tuatai [13] see Cramb, Sara Lynn

**Williams, James (Renmin University of China)****[75]** *Communities, Violence and Fortification: A Study of Longshan Landscapes*

The Late Neolithic period in Central China, known as the Longshan period, has long been associated with violence and warfare. There have been several theories as to what are the catalysts for this period of increased violence. This paper will review the evidence of warfare and violence during this period. Using disparate spatial data this paper will investigate the implications of warfare and violence on the settlement patterning of the Central Plains of China. Through this investigation we can directly test several of the theories which have been proposed for the region. It has been long understood that warfare and violence can shape a regional landscape this paper offers methods into investigating specific motivations and catalysts for warfare. In doing so it also provides new insights into how warfare may have affected changes in the settlement patterning during the Late Neolithic in Central China.

**Williams, Justin (Wheelock College) and Richard M. Niquette (University of Kansas)****[186]** *From Clovis to Dalton: Key Differences in Hafted Biface Resharpener*

In order to further understand Paleoindian lithic technological organization, we examined blade and haft elements of Clovis, Gainey, and Dalton hafted bifaces. Samples inspected were from across the Midwest, the Southeast, and the Northeast. Due to the rarity of these hafted bifaces, images of individual bifaces were used to take traditional linear measurements on the hafted bifaces in this study. Results indicate key differences in retouch and resharpener patterns throughout the Paleoindian period, likely due to factors such as variability in raw material resources, prey choice, and technological requirements. The findings of this study have large-scale implications for pan-regional studies of Paleoindian hafted bifaces.

Williams, Lana [87] see Wheeler, Sandra

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**Williams, Patrick Ryan (Chicago Field Museum) and John Janusek (Vanderbilt University)****[181]** *Wari Huamani, Tiwanaku Apu, and the Political Work of Things*

In this paper, we focus on the relationships between landscape places viewed as ancestors to Andean communities and things that further political agendas in imperial contexts. We explore how objects and people work together to create or deconstruct political power in Wari and Tiwanaku societies. In particular, we focus on objects, including ceremonial ceramics and lithic monuments, as examples of things that participate in building power relationships with local communities. We argue that distinctive agencies exist within objects in Wari and Tiwanaku contexts, despite the contemporaneity and shared iconography of the Middle Horizon states. Part of this distinction lies in the way in which Wari political power emanates from relationships between sacred places, objects, and humans in divergent ways from the ways Tiwanaku relationships between these entities are constituted. Our work draws on examples of archaeological data from Wari and Tiwanaku provincial centers like Cerro Baul and Khonko Wankane, as well as investigations in the monumental core of Tiwanaku to assess the political work of things in the highland Andes' first imperial formations between 600 and 1000 CE.

**[211]** *Chair***Williams, Veronica (CONICET- UBA)****[207]** *Farmers and Herders in the High Quebradas of the Valle Calchaquí Medio (Salta, Argentine) between the 11th and Early 17th Century*

For Northwestern Argentina (NWA) the period between AD 1000 and 1400 represented a state of political fragmentation, conflict situations, and the emergence of hierarchies materialized in the presence of defensive settlements, iconography, war paraphernalia, and evidence of trauma on human remains. Climatic change that occurred in the Andes starting in the 13th century is one of the main causes of this regional disruption. The archaeological data from the high quebradas (ravines) of the Valle Calchaquí Medio, in the present-day Province of Salta, NWA between the 11th and 17th century, allows us to hypothesize about a continuity in the occupation of this area. This occupation, presented a continuum of social logic and practices from earlier Prehispanic periods linked to subsistence strategies and social reproduction, such as seasonal and altitudinal management by farmers and herders.

Williams Sr., Paul [250] see Skinner, Dougless

**Williams-Beck, Lorraine (Universidad Autonoma de Campeche)****[28]** *Ballcourts, Towers, and Urbanism in the Chenes Region, Campeche*

In the geographic heartlands of the Yucatan Peninsula, academic literature describes the Chenes region as an "archaeological province" with a particular regional cultural character, in which sculpted monuments with glyphs or ballcourts are scarce components in urban systems, and even less frequent in most monumental cores. To date only three ballcourts had been recorded. After field seasons in 2016 and 2017 I confirm another example in Tabasqueño, the only site also to exhibit a free-standing tower adjacent to the ballcourt. This paper discusses ballcourt position and orientation within the four monumental core layouts, and how all four peers share urban design schemes that include structures, sculptures, mural painting, and other elements. I also will discuss what ballcourt presence means within this regional context. Two working hypotheses are proposed: a) one of a functional nature that deals with isolated tower structures found in three additional sites, and b) a combined structural symbolic premise guiding geographic location: ballcourts and the ballcourt—tower complex play significant roles in ancient urbanism that create foundations for an emic perception of culture area.

**Willis, Kelsey, Destiny Crider (Anthropology Department, Luther College) and Clifford Brown (Anthropology Department, Florida Atlantic University)****[263]** *Ceramic Evidence of Normal and Anomalous Diffusion from Mesoamerica into Northwest Nicaragua*

The ceramic record of Pacific Nicaragua can be interpreted as showing evidence of migration in the form of both normal and anomalous diffusion. Normal diffusion is seen in the Department of Chinandega through the ceramics of the early facet of the Late Preclassic Cosigüina complex, which derive from the Providencia Sphere. This ceramic sphere originates from the southern highlands of Guatemala and western El Salvador and now extends at least to northwest Nicaragua. The evidence of superdiffusion lies with a type known as Delirio Red-on-white, which is found at scattered sites in Mexico, Guatemala, El Salvador, Honduras, and Nicaragua. We argue that its patchy and discontinuous distribution is evidence for superdiffusion because, as we show through design analysis and comparison of forms and pastes, Delirio is related to Coyotlatelctlo types from Late Classic Central Mexico. We suggest that Delirio and associated types may serve as a marker for the historically attested Chorotega migrations to Nicaragua, Chiapas, and nearby areas.

Willis, Mark [324] see Brown, David

**Willis, Staci****[290]** *Pollen in Nautical Archaeology*

The inclusion of pollen analysis into the excavations of shipwreck sites has improved our understanding of the cargoes these vessels carried, the timing of the wrecking event, and, in some cases, the processes of ship construction. Vaughn Bryant spearheaded many of these advances in the palynology of nautical archaeology through his mentorship of nautical archaeologists at Texas A&M, of which, the author here is one. This paper will highlight the important steps Bryant and his students have taken to promote the use of pollen analysis in nautical archaeology, including a case study of the author's research on Roman-era sewn boats of the upper Adriatic Sea.

**Willis, William (University of Nevada Las Vegas)****[164]** *Reexamining Environmental Stress in Settlement Transitions: Implications for Understanding Settlement Patterns and Socio-environmental Response on the Shivwits Plateau*

Where people choose to settle can be thought of in part as a behavioral response to the ecological constraints placed on a society's ability to meet its needs through interacting with its environment. While humans are indeed not always completely rational actors, their endeavors require either basic raw materials or environmental conditions that, when absent, either force them to seek out other regions for exploitation or adapt to new conditions. Because of this, archaeologists have long been interested in the human response to the environment, particularly in areas of elevated risk. This research seeks to address the variability in Virgin Branch Puebloan settlement patterns on the Shivwits Plateau though time as a response to socio-environmental stress. Environmental data, ceramic seriation, habitation site variation and locations, and paleo-climatic reconstruction are used to spatially examine land use patterns over time. Additionally, this paper reports on assemblage patterns that are suggestive of identifying a core production area for Shivwits Ware ceramics, and discusses the future of current research undertakings on the southern portion of the Shivwits Plateau.

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**Wills, Chip (University of New Mexico)****[283]** *Settlement Re-occupation at Chaco Canyon: Evidence for Migration and Serial Plurality*

Places where people invest significant human capital and resources in architecture and landscape engineering may nevertheless be abandoned in response to environmental or social factors. Those places might eventually be re-occupied by the original builders, or in some cases, appropriated by others. During migrations, abandoned or largely abandoned places may become destinations for people on the move. Chaco Canyon, New Mexico, has archaeological evidence for episodes of abandonment or termination, followed by re-occupation, linked to migration processes. It is possible that there was greater cultural diversity during periods of re-occupation, suggesting mixing of populations from different sources.

Wills, Wirt [115] see Hamilton, Marian

**Wilson, David (University of Connecticut) and Kevin McBride (University of Connecticut)****[294]** *Analysis of Sturgeon Fishing Encampments from Block Island, Rhode Island*

Several archaeological deposits along the shores of Block Island, RI were exposed by the destructive wave action of Hurricane Sandy in 2012. Once exposed, these deposits were threatened by continual coastal erosion and excavated by the Mashantucket Pequot Museum and Research Center as part of the 2013 Hurricane Sandy Disaster Relief Grant (P13AF00176); several of the excavated sites contained significant faunal assemblages. Faunal analyses of these sites included relative abundance and Number of Identifiable Specimens, as well as comparisons with previously excavated inland sites. Based on these analyses, two of the coastal sites identified were likely used primarily as sturgeon fishing camps during the Woodland and Contact periods. Selected ethnographic reports and historical accounts support these conclusions, yet alternate explanations for the sites' context are also explored and discussed.

**Wilson, Jeremy (Indiana University-Purdue University, Indianapolis)****[166]** *"First, Be Humble": Reflections on Larry Zimmerman's Impact on IUPUI and Indianapolis*

Arriving in 2004, Larry Zimmerman made an immediate impact on our department, university, and the surrounding community, serving as one of the first public scholars of civic engagement at Indiana University-Purdue University, Indianapolis. In this talk we reflect on his influence on our research programs and students, the fostering of collaborations with the community and local organizations, and the establishment of our institution's Native American Studies Program. Over 14 years, Larry consistently emphasized an ethos of mutual respect in principle and practice, while also remaining dedicated to the scientific investigation of the distant and more recent past. We conclude by reviewing Larry's contributions to the archaeology of homelessness and this marginalized population in Indianapolis, contending that our discipline, as long recognized by Larry, has yet to seize its full potential as advocates for the disenfranchised, influencers of social policy, and practitioners working towards a brighter future.

**[166]** *Chair*

Wilson, Michael [89] see Bebbler, Michelle

**Wilson, Nathan (Universidad Nacional Autónoma de México (UNAM))****[285]** *Obsidian Importation and Use at Teotepec, Veracruz, Mexico: Situating Site-Level Lithic Activities within a Regional Context*

In this paper, I present new data on lithic production, consumption, and importation from the site of Teotepec, a large pre-Hispanic settlement located in the Sierra de los Tuxtlas region of Veracruz, Mexico. Like much of the Mexican Gulf Coast, the Prehispanic inhabitants of the Sierra de los Tuxtlas relied on non-local obsidian for most of their lithic needs. Using the results of recently completed technological and visual source analyses, I identify differences in production and consumption behavior across the site and over time to situate these behaviors within regional and interregional contexts. The combination of regional-scale data from previous projects and site-level data (both from surface collection and excavated contexts) derived from the Proyecto Arqueológico Teotepec (PAT) allow for the assessment of importation and use of obsidian at the site and to gauge Teotepec's participation in larger regional processes.

**[285]** *Chair*

Wimsatt, William [227] see Tostevin, Gilbert

**Winemiller, Terance (Auburn University at Montgomery) and Virginia Ochoa-Winemiller (New Jersey City University)****[40]** *The Imitation Game: Hybridization of Styles and Trade Goods in Ancient Eastern Honduras*

This paper discusses the spatial, typological, and stylistic analyses of obsidian and ceramic artifacts recovered from El Chichicaste and Dos Quebradas, two prehistoric sites in the department of Olancho, Eastern Honduras. Using geographic information systems and 3D laser scanning technology, analyses revealed the extent of trade relationships that these two ancient communities maintained with sites in Mesoamerica and their southern neighbors in Central America. We argue that integration of foreign trade goods and ceramic stylistic decoration into local lifeways at these two eastern Honduran sites shaped subsequent hybrid cultures that included ideologically perceived status symbols from nearby communities and at the same time infused them with local interpretation and uniqueness.

**Wingfield, Laura (Contract Curator, Art of the Americas, Nasher Museum of Art at Duke University)****[263]** *A Tale of Two Cities: Quelepa, El Salvador and Guayabo de Turrialba, Costa Rica*

The art and structures of the ancient Central American sites of Quelepa in El Salvador and Guayabo de Turrialba in Costa Rica both suggest influence from afar by the late first millennium CE. Quelepa was restructured from what was likely a Lenca foundation to reflect possibly invasive Veracruz tastes, yet some Lenca elements were retained. Did both Lenca and Veracruz immigrants live together peacefully? What can art and architecture tell us of this possible merger, an instance of multiculturalism? Farther south in the highlands of Caribbean Costa Rica, the site of Guayabo de Turrialba was sculpted in the image of Colombian cities farther to the south or possibly vice versa. Yet Guayabo art retains traits of what is likely deep-seated ancient Huetar culture in this region, newly blended with Tairona styles. What can a comparison of these two sites reveal of mobility and multiculturalism in pre-Hispanic Central America?

**Winter, Marcus (Centro INAH Oaxaca) and Teresa Alarcón (Centro INAH Oaxaca)****[59]** *Preceramic Occupations in the Valley of Oaxaca and the Southern Isthmus*

Surveys and excavations during the past 12 years in the Valley of Oaxaca and the southern Isthmus of Tehuantepec provide new data on lithic assemblages and settlement distributions in these Oaxaca regions and facilitate comparison with contemporaneous sites in central and southern Mexico.

**[288]** *Discussant*

Winter, Marcus [248] see Levine, Marc

Winthrop, Robert [247] see Hritz, Carrie

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Wise, Dan [46] see Sagripanti, Jose-Luis

**Wise, S. Andrew**

**[266] *Game On: Ceramic Discoidals from the Lamar Site***

Ceramic discoidals represent a commonplace but often overlooked artifact found at many Mississippian sites. Generally, these important cultural objects are classified by archaeologists as gaming pieces. This assumption is based on European descriptions of Native American games. However, uncertainty remains regarding the function and significance of this class of artifact with no conclusive evidence that discoidals were used exclusively for games. Additionally, comparing ceramic discoidals with stone discoidals, chunky stones, or similar artifacts is problematic. An analysis of artifacts from the Lamar site near Macon, Georgia uncovered a large number of ceramic discoidals. Excavated in the 1930s, a study of discoidals from this collection provides information regarding their distribution and variety. This research contributes to our understanding of daily life during the Lamar period as well as discoidals from Mississippian contexts. Furthermore, it is important to understand how these ceramic discoidals correspond with historic descriptions of Native American game pieces. By assessing the physical properties of discoidals from the Lamar site, this study sheds light on a neglected class of artifacts.

**Wisner, Meredith (University of Iowa)**

**[43] *Pocket Gophers as Food? The Zooarchaeological Investigation of an Unusual Woodland Period Assemblage***

The Rainbow site (13PM91) is a multi-component Middle to Late Woodland period site situated within the tallgrass prairie of northwest Iowa. Excavated in the late 1970's, the site remains an important example due to its well excavated and substantial faunal collection. The current study focuses on the reanalysis of a concentration of pocket gopher (*Geomys bursarius*) remains found within the Early-Late Woodland horizon C (AD 550–620). The surprising number and spatial concentration of pocket gopher specimens suggests that humans were responsible for their accumulation. Individual pocket gophers may have had little to offer nutritionally, however, collectively their predictable habits, visibility on the landscape, and fat content may have made them a valuable supplement during lean winter months.

**Wisner, Gavin (Northern Arizona University), Katie K. Tappan (Northern Arizona University), Aimee I. Alvarado (Northern Arizona University) and Chrissina C. Burke (Northern Arizona University)**

**[7] *The Zooarchaeology of Problematic Deposits: Ancient Maya Use of Fauna in Ritual Contexts at Group B, Xunantunich***

Zooarchaeological data provides details on the social processes related to ritual artifact deposits in the Maya area. This poster provides the results of faunal analysis on materials collected during the 2016 and 2017 Belize Valley Archaeological Reconnaissance project excavations of Group B at the site of Xunantunich. Our excavations focused on structures B1, B2, and B4, where multiple, and often layered, deposits of artifacts were located outside of the structures. Data collected includes, skeletal elements recovered, taxa present, cultural signatures such as butchery, bone tool manufacture, and bone implements or personal adornments, and natural taphonomic signatures. These data and our analyses contextualize these deposits by providing information as to whether they are middens, domestic occurrences, or rituals. We conclude by comparing the Group B deposits with similar deposits excavated in the Belize Valley at the sites of Baking Pot and Lower Dover to identify whether similar patterns are present.

Wisner, Gavin [147] see Burke, Chrissina C.

**Wistuk, Bronson (Binghamton University)**

**[300] *A Preliminary Analysis of Flaked Stone Tools at Patipampa***

The 2017 fieldwork at Huari, arguably the largest pre-contact city in South America, yielded in excess of 1800 lithic artifacts—excluding microliths found via soil floatation. These artifacts include whole bifaces, unifaces, tool fragments, and debitage. This analysis focuses on the morphologically distinct tool types excavated, such as bifacial points with lanceolate bodies, fluted points, and drills. These tool types offer insight into daily life at Patipampa and the city of Huari, potentially indicative of areas of manufacture. In one season, the frequency of flaked stone implements exceeds that found in excavating Conchopata, another Wari city in the Ayacucho Basin. Statistical and spatial analyses are used in visualizing potential significances of specific tool types.

Witschey, Walter [159] see Farrell, Mary

**Witt, David (NYS Department of Environmental Conservation)**

**[148] Moderator**

**[148] Discussant**

Witt, David [40] see Goodwin, Graham

**Witt, Kelsey (School of Natural Sciences, University of California-Merced), Laurent Frantz (The Palaeogenomics & Bio-Archaeology Research Netw), Greger Larson (The Palaeogenomics & Bio-Archaeology Research Netw), Angela Perri (Department of Archaeology, Durham University) and Ripan Malhi (Department of Anthropology, University of Illinois)**

**[212] *Genome Sequencing of Ancient Dogs in the Americas to Understand Their Demographic History***

Several ancient DNA studies have been conducted on dogs in the Americas, yet all have focused on the mitochondrial genome. In this study, we sequenced 79 complete mitochondrial genomes (mitogenomes) and seven nuclear genomes of ancient dogs from more than twenty archaeological sites, ranging in age from 10,000 to 800 years before present (ybp) to gain insight into the population history of dogs in the Americas. We compared the ancient dogs' mitogenomes and nuclear genomes to those of modern dogs and wolves, and modeled demographic changes in the population over time. We found that all pre-contact dogs share a common ancestor roughly 15,000 ybp, and diverged from a closely-related Siberian dog population 1,000 years prior. Pre-contact dogs also show a closer affinity to modern dogs than to Eurasian or American wolves, further supporting the hypothesis that dogs migrated to the Americas with humans. Only a small number of American and East Asian dogs share mitochondrial haplotypes with the pre-contact dogs, suggesting that the majority of pre-contact dog diversity was lost as a result of European contact and the arrival of European breeds to the Americas.

Wittig, Jon [224] see Krueger, Erica

Woehlke, Stefan [202] see Sonderman, Robert

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**Woelkers, Lauren (East Tennessee State University) and Jay Franklin (East Tennessee State University)**

[127] *First Foragers on the Upper Cumberland Plateau of Tennessee: Transitional Late Pleistocene and Early Holocene Lithic Technology at Rock Creek Mortar Shelter (40Pt209)*

We analyze lithic flaking debris from transitional terminal Pleistocene and early Holocene layers at Rock Creek Mortar Shelter, a multicomponent site on the Upper Cumberland Plateau (UCP), Pickett County, Tennessee. Blades, blade-like flakes, and two blade core fragments are among the lithics recovered from these contexts. Because these transitional-looking assemblages were recovered from early Holocene contexts, we believe they potentially represent groups of early Archaic peoples who were separated from other groups that also practiced blade technology, possibly before they reached the UCP. The transitional nature of the assemblages suggests that blade technology gradually went away as people became increasingly familiar with the local environment, and therefore raw material sources. We further believe that these were family foraging groups that were seasonally occupying these shelters. Thus far, lithic technological analyses reveal that older or more experienced members of the groups were teaching less experienced people stone tool production. Additionally, we seek to determine if the flake debris analysis reveals significant differences from later Holocene contexts on the UCP.

Woelkers, Lauren [41] see Franklin, Jay

**Woldekiros, Helina (Washington University in Saint Louis)**

[242] *Human and Animal Foodways on the Afar Salt Route, North Ethiopia*

Caravans form an important component of ancient trade routes world-wide. They were lifelines to settlements and connected diverse landscapes. They also encouraged complex transport networks. Our understanding of ancient ways of life along these trade routes is, however, hampered by an incomplete picture of the participants or caravaners themselves. This study uses quantitative and qualitative data from ethnoarchaeological and archaeological research on the Afar salt caravan route in northern Ethiopia to recreate human and animal foodways on the route. The Afar trade route transverses the North Ethiopian highlands during the Aksumite period (400 BCE-900 CE) and the Afar desert. Today pack-based caravans transport c. 70,000 tons of salt annually. Archaeological data indicate that people at caravan campsites consumed more plant than animal based diets. Sheep, goats, and cattle were used to supplement caravan diets but were only found at logistical support settlement sites such as border towns. Caravan campsites were dominated by plant remains such as wheat and barley, grains used for making bread. The chaff of these plants, on the other hand, was used as animal feed. Fired bread making stones were also found at the site of Ona Adi Agway in Agula.

**Wolff, Alice**

[197] *Where Are the Brewers? Feasting and Operational Chains in Anglo-Saxon England*

The importance of alcohol in the landscape of feasting has been well documented across cultures, and early medieval Europe is no exception. The mead-hall in Anglo-Saxon Britain functioned as a location where social bonds were strengthened both vertically and horizontally; Vikings in Iceland relied on barley beer to demonstrate the power and generosity of chieftains. Production of alcohol in the large quantities required for feasting necessitates some degree of specialization, but to what degree did this specialization take on a ritual significance for the individuals involved? This paper investigates the role of brewing as part of the ritualized landscape of feasting in early medieval Europe, focusing particularly on Anglo-Saxon Britain, and considers the intersection of individual (or community) ritual practice with the use of public technology.

**Wolff, Barbara**

[300] *Post-Fire Incisions on Wari Pottery*

Whole ceramic vessels and sherds incised after firing are known from Middle Horizon sites in the Wari heartland and periphery, associated with offering, burial and ceramic production contexts. Incisions include a wide variety of forms and have been interpreted as graffiti, makers or owners marks, and score marks to control breakage. The presence and forms of post-fired incisions were recorded during inventory of all ceramics excavated at Huari by the Huari Urban Prehistory Program in 2017. Their motifs, vessels and contexts are described and compared with finds from Conchopata in Wari's Ayacucho heartland, Tenehaha in Arequipa, and other published examples. Significant attributes and a typology to facilitate further study are proposed.

**Wolff, Christopher (University at Albany) and Donald Holly (Eastern Illinois University)**

[34] *Colonizing the Edge: The Maritime Archaic Settlement and Occupation of Eastern Newfoundland*

This paper presents evidence from a new Maritime Archaic habitation site located on the island of Newfoundland, Canada. Unlike the adjacent mainland of Labrador, very few Archaic habitation sites are known from the island, which makes this work critical to understanding Archaic settlement and social organization across the broader region. Excavations have produced hundreds of lithic artifacts and geomorphological data suggesting that a variety of subsistence and domestic activities occurred at the site. A suite of AMS dates also indicates that the site was occupied during the pioneering phase of Archaic settlement on the island and revisited for several centuries. In this paper, we discuss the artifact assemblage, spatial organization, and chronology of the Archaic occupation of Stock Cove and situate it within the broader context of the colonization and settlement of far eastern North America.

[277] *Discussant*

Wolff, Christopher [50] see Garbellano, John Michael

**Wolfhagen, Jesse (Stony Brook University)**

[103] *Zooarchaeological Survivorship Models Using Ordered Logistic Regression*

Archaeologists investigate past hunting and herding strategies using models of animal survivorship derived from long bone fusion and/or mandibular tooth wear patterns. As biological and behavioral variation makes estimating precise biological ages problematic, researchers typically assign "age stages" that describe ranked age groups. Ordered logistic regression models take advantage of the information in these rankings to estimate and analyze patterns in ranked/ordered data based on other variables. This poster describes fitting ordered logistic regression models to zooarchaeological survivorship data using Bayesian inference (via Stan) to (a) estimate uncertainty in survivorship estimates due to sample size and (b) compare survivorship between different sites and sub-assemblages within sites. The model is also able to incorporate uncertain stage assignments using aoristic analysis; as most zooarchaeological assemblages contain specimens that cannot be assigned to a single "age stage". The ability to use uncertain stages allows aoristic survivorship analyses to combine patterns of long bone fusion and mandibular tooth wear data, despite their variable specificity. The models shown here can be adapted to any archaeological situation that uses ordered or ranked variables.

[103] *Chair*

Wolfhagen, Jesse [103] see Rapes, John

Wollstonecroft, Michele [86] see Garay-Vazquez, Jose

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**Womack, Andrew (McGill University), Peter Coutros (Yale University) and Mamadou Cissé (Chef de la Mission Culturelle de Kangaba)**

**[210]** *Initial Results from Magnetometer Survey at the Sacred Site of Dakajalan, Mali*

In the spring of 2017 geophysical remote sensing surveys were conducted across three locations at and around the Dakajalan sacred site, Commune Rurale de Sanankoroba, Mali in order to detect anomalies associated with archaeological features. This site has been described in oral tradition as the location where the battle that preceded the formation of the Mali Empire took place, and also where the village that acted as the first capital of the newly formed empire was located. Surface survey of various locales, including the proposed military camp, battlefield, sacred overlook, iron smelting sites, and surrounding areas was carried out. Then, small-scale magnetometry surveys were undertaken at the most promising locations. Results of these surveys not only provide information on potential archaeological features in some areas, but also reveal the benefits and difficulties of using this survey technique on the laterite-rich soils of southwestern Mali.

**[246]** *Discussant*

Woo, Eun Jin [56] see Kim, Yong Jun

**Woo, Katherine (The University of Sydney)**

**[20]** *Shifting Palaeoeconomies at the Rockshelter Site Madjedbebe, Australia*

The East Alligator River Region has undergone considerable environmental change throughout the Pleistocene and Holocene, with changing sea levels dramatically altering the ecosystems of this region. Current archaeological models for this area indicate that people adapted their economic activities to successfully exploit these shifting environments. Throughout these changes molluscs have played an important role in the economic activities of these groups and often comprise large portions of the regional assemblages, but they have not been subject to in-depth studies. Detailed analyses of midden material from Madjedbebe, a rockshelter site, will develop a more comprehensive understanding of the changing economic role of molluscs. Additionally, this project will use the known biological and ecological information available for these organisms as environmental proxies, in combination with existing data, to reconstruct the past environments at this site and to examine and build on current models of long-term human behaviour and use of coastal resources. These detailed analyses of the molluscan material provides new lines of evidence enabling re-examination of pre-existing models for the region.

Wood, J. Scott [267] see Abbott, David

Woodard, Brady [135] see Ollendorf, Amy

**Woodfill, Brent (Georgia State University)**

**[264]** *Sacred Places as Battlefields: The Role of the Ritual Landscape in Struggles for Conquest and Resistance in the Northern Transversal*

The Northern Transversal Region in central Guatemala is one of the most fertile regions of the Maya world in addition to being a key strategic point in the past and present. The rivers flowing out of the highlands provide fertile, volcanic soil in addition to natural communication routes. As a result, it has been subject to multiple waves of colonization over the past two millennia, from Classic period Tikal and Calakmul to contemporary narcotraffickers and transnational corporations. In this paper, I will summarize the ebb and flow of foreign powers and local autonomy in the region as seen through the caves, mountains, and archaeological sites that are a fundamental source of local identity and play an active role in the lives of the Maya who live around them in the past and present. As a result, they serve as microcosms of the entire region, and by understanding the history of conquest and independence of the sacred landscape one can understand the history of the region itself.

Woodfill, Brent [37] see Burgos Morakawa, Walter

**Woods, Alexander (Colorado State University)**

**[232]** *Discussant*

Woods, Heather [90] see Baumann, Timothy

Woodson, M. Kyle [72] see Darling, J Andrew

Woolfson Touma, Olga del Pilar [46] see Solorzano Venegas, Maria Soledad

**Woollett, James (Université Laval—Centre d'études nordiques), Céline Dupont-Hébert (Université Laval—Centre d'études nordiques), Paul Adderley (Centre for Environment, Heritage and Policy, Unive), Guðrun Alda Gísladóttir (Fornleifastofnun Íslands, Iceland) and Natasha Roy (Université Laval—Centre d'études nordiques)**

**[167]** *The Variable Resilience of Large and Small Holdings on the Svalbard Estate, NE Iceland: A Multidisciplinary Study of Farm Abandonments circa AD 1300*

Recent studies have identified an important reorganization of the Svalbarð estate, north-east Iceland around AD 1300. The initial coastal-focused settlement of the region was followed by the founding of new farms in the deep interior. Most were not sustained and some farm sites on the coast were also reduced. Initially, the magnate's farm of Svalbarð had a herding economy supplemented by fishing while Hjälmarsvík, its coastal neighbor, exploited a diversity of marine resources. Around AD 1300 Svalbarð became the chief consumer of the region's marine resources and Hjälmarsvík become a more specialized sheep-herding farm resembling other small farms. While this switch occurred during a period in which wool production was on the increase in Iceland, it also corresponds to a phase of climatic cooling. New geoarchaeological and remote sensing data provide a means of resolving the roles of these trends on the Svalbarð estate. These local-scale data enable us to assess inter-site variation in growing season and other landscape productivities and hence to model past landscape productivities, in reference to paleoclimate records and satellite data. In this paper, « predicted » productive potential and vulnerabilities of these farms are compared to archaeological records of occupation, land use and resiliency.

Woollett, James [16] see Frasier, Brenna

**Worman, F. Scott (Missouri State University)**

**[94]** *Risk and Failure in the Classroom: Exploration, Scholarship, and Active Learning*

For at least the past decade, college campuses have been inundated with buzzwords like active learning, flipped classroom, metacognition, and learning-centered teaching. While these concepts and the related pedagogical techniques can be highly successful there are many barriers to effective implementation, particularly in large introductory-level classes. Two of the most significant barriers are enculturation of both students and instructors to expect certain forms of classroom interaction and the content rich nature of most introductory courses. These barriers make experimentation with active learning seem particularly risky for both students and instructors. I discuss general approaches to overcoming these obstacles, including modeling the exploratory nature of scholarship and encouraging student-led inquiry that builds knowledge of basic content. In addition, I provide

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examples of four specific techniques I use that encourage active learning: in-class activities, debates, group presentations, and targeted written assignments. I evaluate the costs of each in terms of both class time and instructor effort, and discuss their benefits in relation to student learning outcomes. While I created these activities for my college classes, I have used variations successfully in several settings and with students as young as first grade.

**Worthey, Kayla (University of Arizona)**

**[304]** *Stable Isotope Analysis Applied to the Reconstruction of Paleoenvironment and Landscape Use during the Middle and Early Upper Paleolithic at Üçağızlı I and II, South-Central Turkey*

Stable isotope analysis of  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  in herbivore tooth enamel from the archaeological sites of Üçağızlı I and II in south-central Turkey is used to explore human responses to environmental change during MIS 3 in the eastern Mediterranean. Although changes through time in local ambient moisture are associated with changes in the local animal communities, they generally do not correlate with proxies for site occupation intensity, and thus do not indicate depopulation or shorter site stays during times of aridity. The Ahmarian occupation at Üçağızlı I, however, is identified as an anomalous interval due to its high levels of environmental moisture, intense site occupations, prey animal representation, and unique exploitation strategies for lithic raw materials indicating a change from residential to logistical mobility. The reorganization of mobility strategies during the Ahmarian may relate to a local expansion of forested habitats.

Worthey, Kayla [155] see Sánchez-Morales, Ismael

**Wren, Colin (University of Colorado—Colorado Springs)**

**[219]** *Landscape Connectivity, Habitat Suitability and Cultural Transmission during the Last Glacial Maximum in Western Europe*

During the Last Glacial Maximum the population of Western Europe contracted its range as the climate became less hospitable and more unpredictable. Mobility decisions must have been a key part of human adaptation during this time but are notoriously difficult to extract from archaeological data. Agent-based modelling offers one way to explore human mobility heuristically, producing test implications that can be tested using the archaeological record. We use a model of habitat suitability derived from archaeological site distributions, paleo-climate simulation data and environmental predictors to derive a GIS landscape (Burke et al. 2017). We then use an agent-based model to explore how this heterogeneous landscape affected patterns of inter-regional mobility and cultural transmission. We look at the impact of different mobility strategies, mobility radius, and the dynamics of cultural transmission to better understand the social context of the LGM's archaeological record.

**[234]** *Moderator*

**[219]** *Chair*

**Wright, Aaron (Archaeology Southwest), John Jones (Archaeological Consulting Services, Ltd.), Todd Bostwick (Verde Valley Archaeology Center) and Arleyn Simon (Arizona State University)**

**[91]** *Hohokam Dry Farming along the South Mountains Bajada, South-Central Arizona*

Hohokam communities who resided alongside the perennial rivers in south-central Arizona are renowned for the massive canals they engineered and operated, representing some of the largest preindustrial irrigation systems in the world. In light of such achievement, dry farming technologies and practices remain a lesser known component of the Hohokam agricultural landscape. This paper takes a close look at recent fieldwork around the South Mountains, an upland setting at the confluence of the Salt and Gila Rivers. Surface survey has identified a range of dry farming features and associated plant processing facilities along the northeast and southwest bajadas. Pollen and phytolith analyses of soils from several of the farming features identified maize and agave as cultivars. They also suggest Hohokam agriculturalists used these facilities to encourage certain economically important wild plants. Macrobotanical analysis of material from associated roasting pits implies some of the agave was processed and possibly consumed on-site, a ritualized practice carried on by historic and modern-day O'odham communities. Diagnostic artifacts associated with the farming features and recovered from within the cooking facilities indicate Hohokam agriculturalists in the Phoenix Basin were dry farming agave, and potentially maize, by AD 950, and possibly as early as AD 750.

**Wright, Alice (Appalachian State University) and Colin Quinn (Hamilton College)**

**[196]** *Confronting Myths of Isolation in Pre-Columbian Appalachia*

In recent decades, ethnographers, historians, and historical archaeologists have refuted popular myths about southern Appalachia that characterize the region as an isolated geographic periphery and, by extension, a cultural backwater. However, these perceptions continue to color interpretations of Appalachia's deeper past, despite the region's long tradition of rigorous archaeological research. Some scholars have suggested that pre-Columbian Appalachia has remained peripheral in archaeological discourse because it comprised the geographic edge of different cultural expressions (e.g., Mississippian, Morrow Mountain) or interaction spheres. In this paper, we argue that Appalachia's recurring position as a cultural boundary renders it uniquely suited for studying pre-Columbian interaction and connectivity. Drawing on spatial and contextual data from the New River headwaters of northwestern North Carolina, we attempt to reframe the southern Appalachians as socially and symbolically central to Woodland period events and histories, and we propose new lines of archaeological research to further interrogate erroneous impressions of the region's inaccessibility, isolation, and cultural inertia.

**Wright, David (Seoul National University)**

**[161]** *Archaeology in the Age of the Anthropocene: How I Learned to Stop Worrying and Love the Bomb*

The 2016 decision by the Working Group on the Anthropocene of the International Commission on Stratigraphy (ICS) to designate an Epoch based on a Global boundary Stratotype Section and Point (GSSP) fixed at AD1950 is significant for managing global ecological systems moving forward. There is no serious scientific debate on whether humans have impacted the global ecology, but regardless of the ICS decision to anchor the so-called "Golden Spike" to the advent of the nuclear age, humans are known to have profoundly altered landscapes at deep timescales. Three examples are presented from the African continent: the Middle Stone Age (Pleistocene) of northern Malawi, the Neolithic (early Holocene) of the Sahara and Iron Age (late Holocene) of northern Cameroon in which the concepts of boundaries and potential impacts of human activity are challenged. Human impacts on ecological systems are qualitatively analogous to other keystone species, but quantifiably larger based on our control of fire and other forms of coppicing as landscape management tools. Although coppicing may not meet the GSSP standard, its accumulated global effect on landscape species composition has altered earth's environmental matrix as significantly as nuclear weapons.

**[161]** *Chair*

**Wright, Kevin (The University of Alabama) and Elliot H. Blair (The University of Alabama)**

**[154]** *Using XRF Analysis on Historic Choctaw Ceramics from Chickasawhay Creek, Kemper County, MS*

In partnership with Tennessee Valley Archaeological Research (TVAR), this poster presents the results of an x-ray fluorescence spectrometry (XRF) analysis of ceramics recovered from historic Choctaw (Late 17th—Early 19th century) contexts at sites (22KE630 and 22KE718) located along Chickasawhay Creek, Kemper County, MS. In the fall of 2017, a sample of ceramic sherds was selected for chemical sourcing at the University of Alabama. XRF was used to non-destructively identify ceramic compositional groups from the sample. In this poster, we discuss our methodology and

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present preliminary interpretations of how these chemical profiles demonstrate changing choices in clay exploitation based on differences in vessel form, function, and chronology.

**Wright, Kyle (USDA Forest Service—Shoshone National Forest, Wyoming) and Lawrence Todd (Research Associate, Draper Museum of Natural History)**

**[106]** *Bounding Uncertainty and Ignorance: Archaeology and Human Paleoecology in Washakie Wilderness, Shoshone National Forest, Wyoming*  
In the early 21st Century, the Washakie Wilderness, which encompasses roughly 2850 km<sup>2</sup> of the Greater Yellowstone Ecosystem, was a virtual blank spot on the map of prehistoric archaeology with only three sites reported and no systematic inventories having been completed. By 2017 cooperative investigation between the Shoshone National Forest and Greybull River Sustainable Landscape Ecology (GRSLE) has completed 16 field seasons in the Washakie and documented 388 previously unknown prehistoric sites in nearly 1700 ha block inventory areas. The GRSLE project focuses on artifact-based documentation and has recorded locational and descriptive data on over 120,000 pieces of chipped stone as our base dataset. Artifacts range in age from Paleoindian through Protohistoric and are found as both small scatters and extensive occupation sites. With only about 0.6% of the Wilderness having been systematically examined, we are just beginning to glimpse the range of variation in artifact locations, attributes, and regional assemblage properties. In addition to a small sample size, recent climate driven changes including large wildland fires and melting alpine ice patches add to our interpretive uncertainty in reconstructing prehistoric use of the Washakie other than to say it was neither marginal nor subject to limited short-term human use.

Wright, Patti [9] see Pierce, Daniel

**Wright, Sterling (University of Oklahoma), Cara Monroe (Laboratories of Molecular Anthropology and Microbi), Mary Furlong (James Madison's Montpelier), James Reeves (James Madison's Montpelier) and Courtney Hoffman (Laboratories of Molecular Anthropology and Microbi)**

**[14]** *Collaborating with Descendant Communities to Explore the Biological Heritage of Enslaved People at James Madison's Montpelier through Ancient DNA Analysis*

Over the past 30 years, historical archaeologists have studied the sites and material remains of enslaved people from across the American South. Recently, archaeologists have actively worked with descendants in this research, including excavation and archaeological interpretation. However, little has been done to build the connection between biological and historical heritages of enslaved people and their descendants. In this study, we utilized ancient DNA methodology to contextualize the maternal ancestry of three teeth that were discovered at James Madison's Montpelier. The teeth were recovered from non-burial contexts associated with enslaved people living and working at Montpelier during the 18th and 19th centuries. Before DNA extraction, the teeth were 3-D scanned and printed to preserve their morphology in digital form. The genetic analysis of the tooth remains not only expands the breadth of knowledge about slavery in the US, but also provides an opportunity for archaeologists and a community of descendants from Montpelier to collaborate in a new way. Therefore, this study illustrates how the knowledge from a genetic study can be of value to both the academic and public settings.

**Wrobel, Gabriel (Michigan State University)**

**[101]** *The Maya Cranial Photogrammetry Project*

The Maya Cranial Photogrammetry Project aims to create a large digital repository for the purpose of comparative shape analyses to test hypotheses relating to ethnic and political distinctions among ancient Maya groups. The shape of skeletons reflects a combination of genetic and environmental influences on development and thus comparison of skeletal variability provides an important means to reconstruct microevolutionary processes. In particular, because of its complex morphology the skull has been the focus of evolutionary biology studies, including those focused on humans. Most often in anthropological contexts, size and shape variables are quantified and compared as part of biodistance studies, relying on the basic assumption that people sharing similar morphological features share a common ancestry when compared to groups with fewer shared features. My study utilizes metric and non-metric data collected digitally from 3D photogrammetry models of crania and mandibles to perform biodistance analyses, which will allow me to map the genetic relationship between geographically-bounded and culturally distinct subgroups within Mesoamerica. Observers will have the opportunity to explore and manipulate the 3D models on a computer and will also be exposed to various visualization options for comparing shape variations.

Wu, Xiaohong [177] see Patania, Ilaria

**Wu, Xiaotong (University of Science and Technology of China), Xingxiang Zhang (University of Science and Technology of China), Zhengyao Jin (University of Science and Technology of China), Rowan Flad (Harvard University) and Xinming Xue (Shanxi Provincial Institute of Archaeology)**

**[45]** *Long-Distance Human Migration in Late Neolithic China: Isotopic Evidence from Qingliangsi Cemetery*

Around 2200BC, Qingliangsi is a large settlement to the north of the Yellow River with wealth accumulation and social stratification. The location of the site close to rich salt resources made the location a draw for emergent elites during the late Neolithic. Among the most significant lines of evidence of emergent stratification are remains of human sacrifice found in the Qingliangsi cemetery. Our carbon, oxygen, and strontium isotope analyses of human remains excavated from Qingliangsi show that some of the elites and the sacrificed juveniles during Longshan period may have come from regions near the Yangtze and Huai Rivers. Our results delineate the complex demography in Qingliangsi and reveal population movement over long distances driven by salt resources. The unusually rich salt resources in North China may have played a vital catalytic role in this evolution. Around 2200BC, Qingliangsi is a large settlement to the north of the Yellow River with wealth accumulation and social stratification. The location of the site close to rich salt resources made the location a draw for emergent elites during the late Neolithic. Among the most significant lines of evidence of emergent stratification are remains of human sacrifice found in the Qingliangsi cemetery. Our carbon, oxygen, and strontium isotope analyses of human remains excavated from Qingliangsi show that some of the elites and the sacrificed juveniles during Longshan period may have come from regions near the Yangtze and Huai Rivers. Our results delineate the complex demography in Qingliangsi and reveal population movement over long distances driven by salt resources. The unusually rich salt resources in North China may have played a vital catalytic role in this evolution.

**Wurst, LouAnn (Michigan Technological University) and Stephen Mrozowski (University of Massachusetts Boston)**

**[247]** *Historical Archaeology of Capitalism and Climate Change*

Much of the climate change literature focuses on whether it is an empirically verifiable process or how individual's behavior can ameliorate the impacts. Our common approach abstracts the environment, economy, society, and individuals as external relations that posit the cause and effects of global warming as categorically separate from endemic global poverty, starvation, and income disparities. Instead, we argue that discussions need to bring together all the social and natural aspects that people tend to abstract as separate; to see capitalism as an internally related dynamic totality. The unforeseen consequences of an ever-expanding economy built on the accumulation of wealth is that one of its "products" is the concentration of toxic gases that have contributed to global climate change. Historical archaeology provides a powerful set of vantage points from which to critically examine

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the history of capitalism in motion and case studies that can help people understand that climate change is both an internal and necessary to the laws of capitalist motion.

**Wyatt, Andrew (Middle Tennessee State University)**

[254] *In the Garden: Studies in the American Neotropics*

Gardens are spaces where households grow plants for food, medicine, and beauty. They provide subsistence as well as economic benefits. However, gardens are more than just economically functional. Gardens are also spaces where families interact and children are socialized, gender and status are negotiated, and ancestral memories are maintained. Archaeologically, soil chemistry, archaeobotany, and spatial analysis have enabled us to identify the locations of gardens, but addressing more anthropologically oriented questions is necessary to situate these important spaces within the household.

This presentation will discuss the history of garden studies in the American Neotropics, how archaeologists have refined their methods in identification and analysis, and how they have attempted to address more theoretical and anthropological questions. I will then present both ethnographic and archaeological data from the Precolumbian Maya site of Chan in Belize, the contemporary Lacandon Maya community of Lake Mensabak in Chiapas, Mexico, and several Precolumbian sites in Gurupá and Caxiuana, Brazil to demonstrate how we can move beyond questions of identification to discussions of meaning.

[254] *Chair*

Wygall, Brian [50] see Krasinski, Kathryn

**Wyllie, Cherra**

[128] *Discussant*

[128] *Chair*

Wynne-Jones, Stephanie [170] see Fleisher, Jeffrey

Xiaowei, Zhao [24] see Yingyuan, Xu

**Xiuhtecutili, Nezahualcoyotl (Tulane University), Daniel Pierce (University of Missouri) and Michael D. Glascock (University of Missouri)**

[31] *Tlaxcallan Pottery Manufacture and Restricted Networks*

The debate whether pottery sherds equal people or just their ideas has been ongoing since the days of pioneers such as Ford and Spaulding. The advent of new technologies has given a new wind to old debates in which the questions surrounding pottery styles are examined more closely to determine their origin. Compositional analysis has been especially helpful in shedding new light on the relations between artifacts and people. Compositional analysis carried out on Postclassic Tlaxcallan pottery from surface collections is compared with visual identification carried out in the initial technical analysis of the assemblage. While that initial analysis identified varied points of origin for stylistically foreign pottery, compositional analysis eliminates the probability that these styles were imported from faraway places, and increases the likelihood that their production was more localized, possibly tapping clay sources within Tlaxcallan itself or nearby sources. This possibility supports the idea that Tlaxcallan's access to foreign goods was limited as Aztec power increased, but also that there seems to have been a demand for these foreign objects that was met with entrepreneurial ingenuity by Pochteca merchants.

[194] *Moderator*

**Xu, Jian (Sun Yat-sen University)**

[336] *Formation of Early State in Highland Southwest China: Rethinking Yelang Culture*

Recent archaeological discoveries in Guizhou, China have moved some scholars to describe and argue for the material existence of a legendary state, Yelang; roughly contemporary with Chinese powers from the late Eastern Zhou to the early Western Han dynasty. Except for precious objects reserved for high ranking people, traditionally-identified indicators of early urban civilizations are largely absent in Guizhou. If the appearance of luxury objects and their applications in well-regulated contexts connote the existence of a state or proto-state, that dramatically differs from states or proto-states in either Central China or in the written accounts of Yelang. This presentation aims to define the archaeological appearance of an early Bronze-age state in the highlands, based on information collected from several sites in Guizhou.

Xu, Yiting [284] see Soleski, Anna Marie

Xue, Xinming [45] see Wu, Xiaotong

**Yacubic, Matthew (Bureau of Land Management)**

[38] *Rails and Trails: Archaeology of the Central Pacific Railroad along the Humboldt River*

The Humboldt River was a significant transportation route used for the movement of information, goods, and people from prehistoric through modern times. Continual use of the river as a transportation node is due to its west-southwest direction, which provides one of the few natural corridors across the Great Basin. Because of the relatively flat topography, the Central Pacific Railroad Company, motivated by the ideals of nationalism and capitalism, built their line along the Humboldt River corridor. Documenting the location and condition of the Central Pacific Railroad (CPRR) is critical to preserving and protecting this historically significant resource. However, the CPRR, including its associated features and artifacts, is more than a historic scar on the landscape; it is a clue to the social, economic, and political conditions of the late nineteenth century. Many of these historic situations can be examined from an archaeological perspective through landscape analysis. As one of the last large-scale construction projects completed by manual labor in the United States, archaeological studies of the Central Pacific also provides details on the lives of groups marginalized by history, including the Chinese laborers who worked on the line.

**Yaeger, Jason (University of Texas at San Antonio) and M. Kathryn Brown (University of Texas at San Antonio)**

[258] *Archaeology, History, and Ancient Political Dynamics of the Mopan River Valley*

One hallmark of Joseph Ball's research has been integration of archaeological data and ethnohistorical and historical data, put to the service of addressing larger anthropological questions. In this paper, we present new data to examine one research question studied by Joseph Ball and Jennifer Taschek: Classic Maya political dynamics in the Mopan Valley of western Belize. This valley was home to five large centers, spaced 1 to 5 km apart: Las Ruinas de Arenal, Early Xunantunich, Classic Xunantunich, Actuncan, and Buenavista del Cayo. Ball and Taschek conducted extensive fieldwork at Buenavista and Arenal, and they proposed a model of the valley's political structure as comprising a single polity with functionally distinct settlements. Following in their footsteps, we have conducted research at all of the sites listed above. We present new archaeological and epigraphic that allow for a more nuanced model of the valley's political organization. We also examine how the ideological basis of political authority and the relationships between the region and outside kingdoms both changed significantly over time.

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Yaeger, Jason [129] see Brown, M. Kathryn

**Yakal, Madeleine (University of California, Los Angeles)**

**[225]** *Origins and Movement of Tradeware Ceramics in the Bicol River, Philippines: Applying pXRF Technology to Trade and Interaction Research*  
The presence of tradeware ceramics (stoneware and porcelain) in the Philippines indicates interaction and exchange with foreign traders. Of particular interest is the spread of Ming (1368–1644) porcelain, which overlapped with the Spanish colonization of the Philippines. Ming ceramics are abundant in the archaeological record of the Philippines, spanning pre- and post-contact periods. These ceramics even became one of the major trade items during the Spanish Philippines. To establish the movement of these goods in the Bicol Region and adjacent Southern Tagalog Region, I utilize portable X-ray fluorescence to analyze tradeware ceramics from sites adjacent to the Bicol River. Elemental analysis of tradeware ceramics excavated at various Philippine sites, as well as collections obtained from salvage archaeology, may provide insights into where these ceramics were made, who was trading them, and the nature of their movement across the archipelago. For comparison, I also analyze tradeware ceramics from archaeological sites in nearby Southern Tagalog Region. Through this analysis, I expect that the elemental composition of Ming porcelain in the Philippines will provide a glimpse of the exchange relationships between the sites investigated. Furthermore, these markers of culture contact are important to understanding the role of exotic, nonlocal goods in Philippine society.

**Yamamoto, Atsushi**

**[178]** *Emergence of Sociopolitical Complexity in Northern Peru: A Diachronic Perspective from the Huancabamba Valley*

This paper focuses on the emergence and diachronic development of sociopolitical complexity in northern Peru during the Initial Period and Early Horizon using new excavation and settlement pattern data from the site of Inгатambo in the Huancabamba Valley. I argue that significant changes in sociopolitical complexity occur alongside shifts and intensification in interregional interaction.

During the Pomahuaca phase (BC. 1200–800); ceremonial centers with platform architecture appear suddenly throughout the valley alongside the expansion of roads and long distant interaction networks. By the subsequent Inгатambo phase (800–550 B.C.), the number of ceremonial centers in the valley decreased despite the florescence of monumentality at the site of Inгатambo and the increase presence of foreign pottery and other exotic materials. This data suggests that the long term development of sociopolitical complexity within the Huancabamba Valley was strongly linked to its interregional relationships and that Inгатambo, as a result of its strategic location, would eventually grow into a major node for both inter-regional and intra-regional interaction.

**Yaman, Irfan (AKSARAY UNIVERSITY), Cevdet Merih Ereк (GAZI UNIVERSITY), Iraz Asli Yaman (AKSARAY UNIVERSITY) and Alper Basiran (PETA AERIAL ANALYSIS)**

**[41]** *A New Excavation In Southeast Turkey: Kece Cave*

Kece Cave is located in Kahramanmaraş—Elbistan Province in Turkey. The first excavation was carried out in 2015 and since that year, it has been continued by excavation team that includes different university experts. According to preliminary reports, first excavations were realized on terraces in front of the cave and inside. Preliminary findings have been remarkable. Although during the last season excavation, most amazing findings than before were obtained in the terrace excavation area and around of the cave. Especially, chipped stone tools concerning with the Paleolithic Age were found by archaeologists. Meanwhile, the area was settled from Early Bronze Age to Roman period. The area and the cave has exhibited significant archaeological reference point with these characteristics.

Yaman, Iraz Asli [41] see Yaman, Irfan

Yanicki, Gabriel [120] see Ives, John W.

**Yao, Alice (University of Chicago)**

**[181]** *How to Dig a Drinking Well: Watery Politics on China's Han Frontier*

Water plays an undeniable role in the constitution of politics and society, presenting an elemental force to be controlled for the expansion of agrarian economies. The political life line linked with water is perhaps nowhere better illustrated than with the Han Empire whose massive canalization and irrigation works were necessary to facilitate state expansion into deserts and tropics. The archaeological focus on water and agrarian infrastructure has however overlooked other capacities of water, for instance, as a potable substance in the production of life. Because an anthropocentric viewpoint begins with water as a matter of control, water appears as an object existing independently of the wider physical phenomenon. However, if archaeologists are to approach imperial projects as involving new ways of perceiving difference, this paper argues that water presents a contentious form at the intersection of frontier ecologies. Shifting away from infrastructures of water, this paper explores how water forms distinctive assemblages in colonial households beginning with the building of drinking wells in a newly established frontier. Where and how deep and wide to the shape of a well confronted Han settlers with water's tangibility, an encounter which enmeshed people with water's less controllable presence in soils and plants.

Yap-Chiongco, Meghan K. [187] see Valenzuela-Toro, Ana

Yaquinto, Brian [226] see Reese, Kelsey

**Yaquinto, Brian (Bureau of Land Management)**

**[261]** *Using the Past to Inform the Future: Employing Empirical Data to Guide Future Land Management Decisions*

This presentation will explore the opportunity to increase scientific driven data into the National Historic Preservation Act (NHPA) Section 106 compliance process particularly relating to Bureau of Land Management (BLM) undertakings. The absence of empirical data available to the BLM to analyze how different activities' development and/or management affect archaeological sites can result in unfounded assumptions and unnecessary complications during project planning and implementation. Using cases studies from BLM Colorado among other states, this presentation will provide the basis for highlighting the need for additional cultural resource impact studies as well as the advantage of a more scientific approach in federal cultural resource management. Federal agencies, such as the BLM, would greatly benefit from additional resource studies that promote a science driven approach to the Section 106 process. This empirical focus will lead to greater transparency and would overall foster better relations within the BLM, and with State Historic Preservation Officers (SHPO), local governments, communities, tribes, and other stakeholders.

**Yaquinto, Jessica (Living Heritage Anthropology)**

**[305]** *Tribal Connections to the Monticello Field Office*

The BLM Utah Monticello Field Office (MFO) selected Living Heritage Anthropology (LHA) to document tribes' connections to and ethnographic resources within their field office. The MFO is located in southeastern Utah and includes much of the greater Cedar Mesa area. In order to achieve this goal, LHA is currently conducting an ethnographic literature review of tribal perspectives of and connections to the MFO. As part of this process, with the field office, LHA has been initiating conversations with 32 tribes likely to have traditional connections to the area, as well contacting institutions and

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researchers about pre-existing resources within their collections. This talk will highlight initial project findings and tribal perspectives on southeastern Utah.

[233] *Discussant*

**Yates, Donna (Scottish Centre for Crime and Justice Research, University of Glasgow)**

[108] *Discussant*

**Yelacic, David (Terracon Consultants, Inc.), Charles Frederick (The University of Texas at Austin) and Jon Lohse (Coastal Environments, Inc.)**

[59] *Formation and Context of Sitio Chivacabe, Western Highland Guatemala*

Located in the Highlands of western Guatemala, Chivacabe is a Pleistocene-age bone bed and Archaic-age archaeological site. In 2009 the site was subjected to intensive geoarchaeological investigation with the goals of identifying the relationship between the faunal and archaeological remains through developing an understanding of their context. Three allostratigraphic units were identified: The oldest unit, which contains the bone bed, consists of colluvially reworked tephra bracketed by radiocarbon dates of 15,700 and 12,920 years BP (Cal. 2-sigma). The middle unit, marked by a prominent Btkb horizon, minimally dates to 10,190 years BP and likely contains the archaeological materials. The youngest unit truncates the underlying middle unit and represents relatively recent or Late Holocene erosion and deposition. Overarching conclusions from the 2009 geoarchaeological investigations include confirmation of the faunal remains in reworked tephra and dissociation of the bone bed and archaeological materials.

Yellen, John [227] see Brooks, Alison

Yépez, Willy [335] see Bautista, Stefanie

**Yerka, Stephen (University of Tennessee) and Russell Townsend (Eastern Band of Cherokee Indians, THPO)**

[101] *Big Picture, Little Picture: Reconstructing Rock Art and Context in Both the Virtual and Physical Word*

This presentation explores the ways in which 3D reconstruction can succeed as an innovative platform for both archaeological study and public engagement using a case study from the Hiwassee River watershed, North Carolina. The project, initiated by the Tribal Historic Preservation Office (THPO), Eastern Band of Cherokee Indians (EBCI), involves an effort to repair a vandalized petroglyph panel. The rock art panel is a complex composition of incised, interwoven petroglyphs from which a 1.5 m section was removed and carried off-site. The removed section was recently returned to the EBCI, and it was decided that an effort should be made to restore the panel to its original location. Photogrammetric 3D reconstruction was selected as the best method to non-invasively model repair efforts, and also provided a unique opportunity to study the petroglyph forms, and provide the basis for an interactive experience for members of the EBCI community.

Rock art sites and panels make a natural pairing with 3D reconstruction for archaeology, because the study of rock art requires visual and spatial analyses. Additionally, the visually striking, and often enigmatic, nature of rock art generates much public interest—making it an excellent vehicle for public archaeology and interactive virtual reality projects.

[276] *Discussant*

Yerka, Stephen [53] see Noack Myers, Kelsey

**Yerkes, Richard (Ohio State University)**

[245] *Chair*

Yerkes, Richard [245] see Gyucha, Attila

**Yeshurun, Reuven (University of Haifa)**

[124] *Contextual Taphonomy in Zooarchaeology: From Refuse Behavior to Site-Occupation Intensity in Levantine Epipaleolithic Camps*

In zooarchaeology, Contextual Taphonomy means the integration of the stratigraphic and contextual data with zooarchaeological and taphonomic data, to clarify the 'life history' of a faunal sub-assemblage in a given context. The approach uses animal remains to explain variability among site features by looking into the differential taphonomic histories of the bones, most importantly in the post-discard stage. Archaeofaunal remains are normally ubiquitous in foragers' camps and their histories are readily deciphered, potentially making them excellent indicators of site-formation processes, refuse behavior and activity areas and, by extension, of site type and occupation intensity. A contextual taphonomy approach was recently applied to Late Epipaleolithic (Natufian) animal remains in Mount Carmel, Israel (ca. 15,000–11,700 cal. BP) in order to discern the formation and function of architectural contexts of these semi-sedentary foragers. At the Natufian basecamp of el-Wad Terrace, the contextual taphonomy approach identified fluctuations in site-occupation intensity through the 3,500-year-long Natufian sequence of the site. It also showed that a sequence of structures was used for everyday living activities, probably at the household level. Conversely, at the Natufian cemetery site of Raqefet Cave, the animal remains reflected short and punctuated periods of human activity, corresponding with a specialized burial site.

Yildirim, Tayfun [71] see Dardeniz Arıkan, Gonca

**Yingyuan, Xu (University of Science and Technology of China), Zhao Xiaowei (Xuzhou Museum in China), Li Zongmin (Xuzhou Museum in China) and Jin Zhengyao (University of Science and Technology of China)**

[24] *Research on Materials and Manufacturing Process Used for the Imperial Inlaid Jade Lacquered Wooden Coffin from the Royal Mausoleum No.2 of the Vassal King of Jiangdu State of the Western Han Dynasty in China*

The paper focuses on the characterization of material from fragmented pieces of the imperial lacquered wooden coffin excavated in Xuji County, Jiangsu Province, whose owner was the empress of Jiangdu State in Western Han Dynasty. The samples were analyzed by scientific techniques including optical and electron microscopy, XRD, FT-IR and GS-MS. The lacquer film outside consists of a seven-layer structure, which includes (from the top): a red pigmented layer, two lacquer finish layers, three ground layers and a canvas foundation layer. The red motifs on the surface are painted by cinnabar. The lacquer finish layers are made of urushi and amorphous. The three layers of ground are feldspars, hydroxyapatite and feldspars mixed with urushi respectively and there is a layer of organics between every two of them. The foundation layer is identified as a plain weave fabric made of bast fibres. Our study revealed the manufacturing process of Chinese traditional lacquering of Vassal King in Western Han Dynasty.

**Yoffee, Norman (U Michigan)**

[131] *Discussant*

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Yoneda, Minoru [24] see Owlett, Tricia

Yoo, Justin [32] see Walsh, Carl

Yoon, Elias [46] see Sagripanti, Jose-Luis

**Yoon, David (American Numismatic Society)**

**[54]** *Long-Distance Trade in Late Antique Italy: Evidence from the Bova Marina Archaeological Project*

It is well known that the state plays a major role in generating and structuring economic flows in complex societies. What happens, though, when a state's ability to do this is severely reduced? One example to consider is the Roman/Byzantine state in Late Antiquity. Using survey evidence from the Bova Marina Archaeological Project, changes in the presence of long-distance imports in the ceramic assemblage show a drastic shrinkage of the scope of trade, while other economic changes were less dramatic or more gradual.

Young, D. Craig [92] see Vernon, Kenneth

**Young, Eric (OSD DPAA)**

**[62]** *Discussant*

**Young, Kenneth (University of Texas at Austin)**

**[178]** *Ecology and Human Habitation of Andean Forests*

People have altered the naturally forested areas of the tropical Andes for natural resources and as places for settlements. The forests collectively represent a global biodiversity hotspot, with many unique species. Environmental gradients are abrupt, with dramatic changes in temperature regimes with altitude, but also with switches in humidity from dry to pluvial depending on exposure to prevailing winds. The steep environmental gradients create dispersal barriers to plants and animals, resulting in highly restricted distributions. Along the >3000 m altitudinal gradient, there are zones where cooling air can form persistent fogs, leading to cloud forests that have moisture-dependent species and low stature trees, which nevertheless provide important ecosystem services. The relatively cool temperatures and steep slopes at higher elevations often discourage human colonization, but some sites include archaeological sites, suggesting that current land use may not be prescriptive of the past. Nonexclusive factors may include past climate change, enclaves with drier microenvironments, transhumance, and use of multiple ecological zones. Given a long history of Andean landscapes with people, it is important to put conservation and sustainability goals into a larger context, including data on the timing and locations of settlements, and conceptual models of human influences on Andean forests.

**Young, Lisa (University of Michigan)**

**[218]** *Continuing Collaborations at Homol'ovi: A View from the Corn Roasting Pit*

For over a century, Homol'ovi has been a place where Hopi people and archaeologists interacted and learned from each other. The creation of the Homolovi State Park and the Homol'ovi Research Project provided opportunities for collaboration. In this paper, we reflect on these changing interactions and their impact. A corn roasting pit that was built a decade ago provides important insights into ways to maintain relationships after the fieldwork component of research projects has ended.

**[160]** *Discussant*

**[218]** *Chair*

**Young, Michelle (Yale University)**

**[141]** *From Near and Far: Application of Archaeometric Techniques to Characterize Regional and Long-Distance Interaction at the Formative Period Center of Atalla, Peru*

This paper investigates the role of interregional interaction in the development of social complexity in the Central Andes during the Late Initial (c.1100–800 BC) and Early Horizon (c.800–200 BC) periods at the archaeological site of Atalla, a regional ceremonial center located in highlands of Huancavelica, Peru. Methodologically, this research integrates radiocarbon dating with stylistic, technical, and geochemical analyses of a range of materials to examine exchange and interaction on multiple scales. Formal and technical analyses of ceramic styles are compared with petrographic analyses of these ceramics, allowing the investigation to distinguish imported wares from local imitations of foreign styles. NAA and XRF analyses of obsidian flakes and tools reveal regional patterns of obsidian exchange and acquisition. The use of pXRF to verify the composition of decorative pigments illuminates temporal and spatial patterns associated with the exploitation, processing and exportation of cinnabar. The results from these combined analyses will present a more holistic understanding of regional networks and long-distance trade than the sourcing of a single material could offer. This study aims to characterize interactions with foreign communities and to explore the relationship between these interactions and the emergence of social complexity at the site of Atalla.

**[177]** *Chair*

**Young-Wolfe, Halona (State University of New York at Binghamton)**

**[300]** *Architectural Style and Urban Organization at the Patipampa Sector of Huari*

Defining spatial organization was a key research question for the excavations at the Patipampa sector of the Middle Horizon (AD 500–1000) site of Huari in the Ayacucho valley of Peru. In the 2017 excavations we used methods designed to expose the upper portions of walls, in order to define architectural spaces and clarify organization of the sector. Some architectural spaces were excavated more completely, fully exposing walls and architectural features.

Our excavations revealed distinct architectural styles defined by differences in scale, construction materials, and construction techniques. Analysis shows clear linkages and relationships between structures with distinct architectural styles that are maintained across time. Differences in construction materials and techniques are frequently understood to indicate distinctions in the use and purpose of buildings, and differences in who could use those buildings. Our findings at Huari challenge these assumptions, showing that finely constructed buildings and spaces with distinct architectural features were at times integrated with more quotidian architecture.

This paper will define the architectural styles at Patipampa, demonstrate how buildings with distinct architectural styles are related to one another, and explore what these findings can tell us about the everyday life of the early urban inhabitants of Huari.

**[300]** *Chair*

Yousif, Eisa [145] see Dunning Thierstein, Cynthia

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**Yu, Pei-Lin (Boise State University) and Marcy Rockman (National Park Service)**

**[247]** *The State of the Art in Stating Risk: Assessment of Climate Vulnerability Assessments for National Park Service Archaeology and Cultural Heritage Resources*

Across America, the National Park Service has conducted an array of vulnerability assessments for climate change impacts for cultural heritage resources, including archaeology, historic structures, cultural landscapes, and others. A project is currently underway to analyze these assessments. This process is designed to improve the practice of vulnerability assessments as well as scientific understanding of cultural resources vulnerability to climate change. In this paper we share preliminary results for an analysis of 12 vulnerability assessments and recommendations based on those results. Time for discussion will be included.

Yu, Pei-Lin [48] see Lee, Craig

Yue, Tiffany [266] see Coker, Adam

**Zaia, Sara (Harvard University) and Katherine Rose (Harvard University)**

**[225]** *Connecting the Dead: A Comparison of Pre-dynastic Nubian and Egyptian Cemeteries*

In the early 20th century, seminal Egyptologist George Reisner excavated a series of predynastic cemeteries west of the Giza plateau and farther south in modern day Sudan. While some objects from specific cemeteries were published in original manuscripts, the majority of artifacts currently housed in Harvard University's Peabody Museum remain unstudied. Through a combination of ceramic analyses, including petrography and stylistic analysis, we situate these assemblages within a discussion of intra and inter-cemetery patterns during the predynastic period. We present a study of contextualized ceramic material from selected cemeteries, such as Keneh, Sheikh Farag and Kerma, to elucidate the relationships between Egyptian and Nubian funerary material culture during the predynastic period. We aim to identify indications of connectivity, movement of goods, and transmission of technology between pre-dynastic Egypt and Nubia. We situate this comparison within a discussion of the known mortuary characteristics, practices, and organization of Nubian and Egyptian cemeteries. We aim to underline possible channels of trade of goods and the social and cultural meaning of the exchanged objects. Our objective is to contribute to the study of interconnection and relationship between Egypt and Nubia more broadly, through the study of the ceramic material from a funerary context.

**Zaneri, Taylor (New York University)**

**[40]** *Producing the City-State: GIS Modeling of Rural Land Use in Medieval Tuscany*

From 900 to 1300 AD, Italy underwent sweeping cultural changes—the rise of market economies, increased trade and commerce, and new forms of governance. Typically, the elite are cast as the drivers of these shifts, yet it was rural labor that produced the goods (particularly foodstuffs) traded in the cities, collected in the form of rent and taxes, and transformed into capital. This paper examines the impact of rural landscape strategies during the development of the medieval city-state of Lucca. Historically Lucchese rural producers had greater autonomy compared to their counterparts elsewhere in medieval Europe when it came to land choices and production. Using environmental models constructed in GIS, I examine rural settlement location in relation to land suitability for three major cultivars consumed in urban Lucca: vines, olives, and wheat. From 900 to 1300 AD, the period of city-state formation, I explore if and how rural settlement shifted to areas better or less suited to these crops, analyzing if rural producers changed their landscape occupation to engage with urban markets. In summary, I investigate the impact of the periphery on the center, by asking how rural landscape use impacted and interacted with urban transformations.

Zaragoza, Gabriella [105] see Hard, Robert

**Zaragoza, Diana (INAH)**

**[33]** *Un acercamiento al pensamiento simbólico de los Huastecos, siglos XV y XVI*

Definir una región tan antigua y compleja como la Huasteca, implica conocer las características de los grupos humanos que la habitaron; en ella existen diversas manifestaciones culturales a través del tiempo; en esta ocasión presento un primer acercamiento al mundo simbólico que encontramos durante el período Posclásico.

Inicié el estudio utilizando cuatro indicadores arqueológicos: Vasijas de cerámica, Concha labrada, Pintura Mural y Escultura. Lo primero que hice fue reconocer los símbolos que se encontraban en ellos y decidí iniciar con 24 representaciones que agrupé de acuerdo con su frecuencia, para así ir abordando la investigación sobre estos testimonios; empezando un catálogo que da una idea de los elementos que concibieron.

De esta manera emprendo un primer acercamiento hacia la interpretación de representaciones simbólicas en los indicadores, pretendiendo acercarme a sus significados a través de la identificación iconográfica de los símbolos considerados.

Con las referencias bibliográficas de esta región y para otras partes del México Antiguo, he intentado reconocer algunos de los símbolos plasmados, con el fin de poder adentrarme en el pensamiento simbólico de la Huasteca prehispánica.

Zarco Navarro, Jesús [55] see Gastelum-Strozzi, Alfonso

**Zavodny, Emily (Penn State University), Martin Welker (Penn State University) and Sarah McClure (Penn State University)**

**[189]** *A Pawsitively Interesting Prehistory of Dogs: New Stable Isotope and Morphometric Analyses from Croatia*

Though dogs are recognized as important points of comparison for archaeologists seeking to reconstruct prehistoric human diet and lifestyles (e.g., canine surrogacy approach), less attention has focused on understanding the cultural and ecological significance of dogs themselves in these same contexts. We report new morphometric and stable isotope results from prehistoric (Neolithic-Iron Age) sites from Croatia that represent different cultural and environmental contexts that potentially impacted the importance and/or functions of dogs in local communities. We also synthesize other data reported from sites throughout southeastern Europe to highlight regional differences in dog morphology and the relationships between dogs, humans, and the environment over time.

**Zawadzka, Dagmara (Université du Québec à Montréal (UQAM))**

**[331]** *Rock Art Out of Its Element? Exhibiting Places in Museums*

Unlike most material culture, rock art is firmly embedded in its place. This particular circumstance has shaped its research, as well as its reception among the general public. While famous sites, such as Lascaux, are well known and recognised despite difficulty in accessing them, other sites, especially those in Canada, are still relatively unknown. This paper will briefly address how rock art has been consumed and presented to the general public within Canada. Next, I will address how this heritage can be brought to millions through the medium of a virtual exhibit. I will then discuss the project of a virtual exhibit that has been undertaken by the Musée de la civilisation and Université du Québec à Montréal and I will focus on the advantages and challenges that new technologies can create in how rock art is presented, preserved and ultimately understood.

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**Zborover, Danny (Institute for Field Research), Veronica Pacheco (UCLA), John M. D. Pohl (UCLA/CSULA) and Darren Longman (UCLA)**

**[264]** *Alligators, Serpents, Pirates, and a Wedding: Ritualized Political Landscapes of the Oaxacan Pacific Coast, Mexico*

Straddling maritime, lowlands, and highland environments, the neighboring Chontal and Huave ethnic groups occupy one of the most diverse landscapes in southern Mexico. For over five centuries this resource-rich territory served as a junction for Indigenous and European colonial encounters, where interethnic and intercontinental political alliances and conflicts came forcefully into play. In addition to leaving material remains scattered throughout the landscape, this political history was encoded in ritualized performances still practiced today in these coastal communities, as well as in their oral traditions and territorial-narratives. Our interdisciplinary research project in the region demonstrates that mountains, caves, lagoons, and the ocean itself served as portals for both animal and human agents, moving and operating in between the physical and spiritual realms. In turn, these animated palimpsests serve as mnemonic devices to recount and reshape social relations and ancestral memory.

**Zeanah, David (California State University, Sacramento)**

**[92]** *Understanding Prearchaic Mobility and Settlement Patterns: The Role of Theory, Models, and Ethnographic Analogies*

Most evidence suggests that Prearchaic hunter-gatherers were highly mobile, and equipped with a hunting oriented lithic technology that lacked milling equipment. Nonetheless, they acquired a broad spectrum of prey and tended to camp near wetlands rich in small game and plant resources.

Archaeologists have questioned to what degree this evidence reflects an adaptation that fundamentally differed from ethnographically observed patterns in the Great Basin, as well as whether it was shaped primarily by social and political, rather than subsistence needs. We argue that the Prearchaic cannot be understood by direct analogy with ethnographic Great Basin foragers because they lived in climatic circumstances and at population densities utterly unlike those of recent times. An alternative theoretical approach informed by behavioral ecology and validated with data on global variability in hunter-gatherer mobility can yield testable expectations. Such an approach should be founded on the expectation that both social and economic incentives play critical and non-contradictory roles in structuring the settlement patterns and mobility strategies of low population density hunter-gatherers.

**[92]** *Chair*

Zeanah, David [5] see Weitzel, Elic

Zedalis, Morgan [106] see Whiteman, Erik

**Zedeño, Maria Nieves (University of Arizona), Francois Lanoe (University of Arizona), Anna Jansson (University of Arizona), Danielle Soza (University of Arizona) and Ashleigh Thompson (University of Arizona)**

**[153]** *Ancient Landscapes of the Rocky Mountain Front: A View from the Billy Big Springs Site, MT*

The northern Rocky Mountain Front contains critical information regarding human exploration and colonization of the continent. Yet, reconstructed paleo-landscapes in the region extending from southern Alberta to northern Montana have focused almost exclusively on the Pleistocene-Holocene transition. Billy Big Springs, a multi-component site located just east of East Glacier Park, provides new data on long-term natural (as old as 21,000 cal. BP) and cultural (post 14,000 to 700 cal. BP) landscape evolution, which is significant for modeling possible migratory routes, refugia, and settlement preference for Paleoindian, Archaic, and early Late Precontact populations in the region.

**[289]** *Discussant*

**Zegarra, Edward (Binghamton University)**

**[17]** *Partnerships for Patrimony: Developing a Methodology for Creating Sustainable Archaeological Site Preservation in the Central Highlands of Peru*

The growing popularity and lucrative potential of heritage tourism has made sustainability a growing concern for archaeologists, site managers, politicians, local communities, and other stakeholders including transnational individuals. However, heritage management professionals in often employ the term 'sustainable' synonymously with 'collaborative' rather than as a coherent methodology or strategic approach aimed at preserving heritage sites and landscapes. The thinness of the literature on sustainable archaeological site management may pertain to the difficulty heritage managers have in articulating frameworks as advocated for in the prevailing decolonization and indigenous theory underpinning heritage-based sustainability efforts. Throughout Latin America, this problem is further complicated by a distinct historical-colonial legacy that preserved the 'local' as well as the 'indigenous' and promulgated a criollo, or mestizo, identity as the unifying national figure of public imagination.

This paper presents original ethnographic, archaeological, pedagogical, and economic research on the outcomes of English-based theory on Spanish-speaking contexts, ethnographic research into local identities regarding pre-Hispanic archaeology, challenges to democratizing an authorized heritage discourse, and projected outlooks as they pertain to the site of Huari and the neighboring town of Pacaycasa in the Ayacucho region of Peru in the Central Andes.

**[17]** *Chair*

**Zeidler, James (Colorado State University)**

**[295]** *Deep Histories and Persistent Places: Repetitive Mound-Building and Mimesis in the Jama Valley Landscape, Coastal Ecuador*

This paper explores the notions of 'material memory' and human agency in deep time as expressed in the repetitive reconstruction of earthen platform mounds over some three millennia in the Jama Valley of coastal Manabí Province, Ecuador. Empirical evidence of repetitive mound-building is presented over a long stratigraphic record extending from approximately 2030 BCE to about 1260 CE, and special emphasis is given to the site of San Isidro, a major civic-ceremonial site and 'persistent place' located in the central Jama Valley. This long archaeological sequence is punctuated by evidence of three separate volcanic disasters and subsequent hiatus periods of valley abandonment. Repetitive rebuilding of monumental architecture was carried out by peoples of different cultural traditions that colonized the valley several hundred years after each natural disaster, represented by the Formative Period Terminal Valdivia and Chorrera cultures, followed by the long Jama-Coaque tradition. Finally, consideration is given to Dušan Borić's (2002) argument (following Gell 1998) that such repetition and citation of past monumental material culture, as well as its mimetic representation as miniaturized art forms, have apotropaic or protective properties that benefit society at large, or social groups and individual agents within that society.

**[332]** *Discussant*

**Zeitlin, Nicholas (University of Massachusetts, Boston)**

**[167]** *Iron Production at Marginal Settlements in Northern Iceland*

The environment of Iceland was rapidly and severely affected by the Norse Settlement, in particular by deforestation. In Iceland's changing environment the production of iron, an essential material, became limited not by access to iron ore but by availability of wood to make charcoal fuel. The large-scale production of iron may be one of the primary processes that led to deforestation in Iceland due to the large need for charcoal. Investigations at Stekkjarborg on the farm of Keldudalur in Hegrans, Northern Iceland discovered the remnants of a small-scale iron smelting site

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dating to post-1104, well after deforestation. The smelting site represents a specific small-scale production activity being conducted in a marginal area for domestic use. The scale of the activity suggests independent production and usage while the evidence of limited activities suggests an interconnected production network. This paper will examine how such a site managed key natural resources for production activities in marginal ecological and economic contexts.

**Zelenetskaya Young, Tatiana (Temple University)**

**[30]** *Architecture as an Expression of Maya Political Organization in the Cochuah Region, Quintana Roo during the Early Terminal Classic: The Perspective from Non-primary Sites*

Political leaders among the ancient Maya were actors performing for an audience with the intent to receive the people's support to govern. These actors often used specific architecture as stages for their performances; therefore, this architecture serves as a source of information on various aspects of political organization. Architecture embodies political symbolism and has the potential to communicate type of political institution. This paper examines the distribution of architecture that embodies the apparatus of rulership in twenty sites in the Cochuah Region occupied during the Early Terminal Classic or Florescence Phase (A.D. 750–900). The data are compared to the different expectations derived from three political models that vary in the degree of centralization of rulership present. I argue that some types of political organizations would be only visible through the examination of secondary sites and their satellites.

Zender, Marc [337] see Stuart, David

**Zeng, Lingyi (Yale University)**

**[177]** *SEM-EDS Analysis of Ceramics from the Mongol Empire*

I will use scanning electron microscope with an energy dispersive X-ray spectrometer (SEM-EDS) to investigate both elemental compositions and mineral microstructures of ceramics from the Mongol Empire. I will analyze and compare sherds from multiple contexts, including ceramic production centers, burials and residential areas to acquire qualitative and quantitative data on porcelain bodies, glazes, and pigments with the SEM-EDS technique. A high degree of similarities in chemical compositions and mineral structures of samples from different areas would suggest a single or very few production centers. I also expect official wares and civilian wares were made with different sources and recipes of raw materials, which will be indicated by comparing the compositions of sherds using SEM-EDS. My research will not only focus on how objects were produced, consumed and exchanged, but also attempt to understand the underlying sociopolitical factors that affected these processes over time and space.

**[177]** *Chair*

**Zhang, Chengrui (Harvard University) and Rowan Flad (Harvard University)**

**[177]** *A Song Dynasty Roof Tile Kiln at Qijiaping: Gender and Pyrotechnology in Medieval China*

During the 2016 and 2017 excavations at the site of Qijiaping, Guanghe, Gansu, China, the Tao River Archaeological Project excavated a large intact kiln that turned out to be a Song Dynasty roof tile kiln. The kiln is well preserved, and the first of its kind reported in an archaeological excavation in this region. Inside the flues of the kiln were many objects, deliberately disposed of, presumably at the moment when the kiln was put out of commission. Among these objects is a stone phallus in the central flue, potentially reflecting a gendered process of manufacturing associated with this kiln or its decommissioning. This paper aims to explore the role of gender in ceramic production and its association with pyrotechnology in medieval China within a broad social context.

**Zhang, Li (Zhengzhou University)**

**[24]** *The Landscape of China's Participation in the Bronze Age Eurasian Network*

In the last decade, much has been learned about the network of interactions in Bronze Age Eurasia, and the importance of the steppe pastoralists in the creation of this network. However, the mechanisms that enabled societies in ancient China (both those bordering on and distant from the steppe) to participate in the Bronze Age Eurasian arena are still poorly understood. Based on the latest archaeological discoveries in China, this article focuses on the participation of four regions of ancient China: the Ejin River Transfer Zone (ERTZ); the western Hexi corridor; central Inner Mongolia; and the middle Yellow River valley. The article analyzes all significant innovations, materials, and technologies transmitted via the Eurasian network and adopted in ancient China, with an emphasis on metallurgy and the variations in the mechanism of its adoption across different societies during the Bronze Age. Through analysis and comparison, this paper argues that the participation of different societies of ancient China in the Bronze Age Eurasian network can best be understood in the local and regional contexts, which were deeply embedded in their natural and cultural landscapes, rather than as the result of the pull from the steppe pastoralists alone.

Zhang, Xingxiang [45] see Wu, Xiaotong

**Zhang, Zhengwei (Department of Anthropology, Washington University in St. Louis)**

**[336]** *The Making of Agro-pastoral Landscape of the Tibetan Plateau: A Zooarchaeological Perspective*

The vertical ingredient of the Tibetan Plateau plays a unique role in making of the highland agro-pastoral landscape. We divide the Tibetan Plateau into three eco-altitudinal zones: areas below 3,000 m.a.s.l.; areas between 3,000 and 4,200 m.a.s.l.; and areas above 4,200 m.a.s.l. Today, pastoralists and farmers utilize different faunal and floral taxa in the three zones, partly as risk aversion strategies. In this paper, I review the zooarchaeological evidence dated between 6,000 and 1,000 BP from the Tibetan Plateau to explore the chronology of the expansion of animal husbandry to the highland plateau.

By the late second millennium BC, herd animals such as horse, goat, and cattle began to appear in regions below 3000 m.a.s.l. It is not until the first millennium AD, herding animals expanded to regions above 4,200 m.a.s.l.

**Zhao, Chao**

**[45]** *Chair*

**Zhao, Yu-chao (University of Michigan Museum of Anthropological Archaeology) and Brian Stewart (University of Michigan Museum of Anthropological A)**

**[174]** *Tracing Late Quaternary Highland-Dryland Social Connectivity in Southern Africa with Ostrich Eggshell Bead Strontium Values: Preliminary Results*

Humans have frequented southern Africa's highest reaches—Lesotho's Maloti-Drakensberg Mountains—for ≥90,000 years. As with many high mountain systems worldwide, the Maloti-Drakensberg cast a rainshadow over closely neighboring arid lowlands (the eastern Karoo Desert). Based on previous archaeological and paleoenvironmental work in highland Lesotho, researchers have posited that source populations for human dispersals into the mountain zone often originated in the Karoo, particularly during phases of enhanced regional aridity or climatic instability. Lesotho's mid/high-

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altitude temperate grasslands may have been attractive to lowland desert foragers because they offer topographical resource diversity and stable supplies of key resources. Such dynamics would have necessitated the existence and maintenance of strong cultural linkages between these ecologically contrasting macro-regions. To begin testing these hypotheses, we are conducting strontium isotope analyses of ostrich eggshell beads recovered from Sehonghong, a highland Lesotho rock shelter with a record of human occupation stretching from the late Holocene to early Marine Isotope Stage 3, and constructing terrestrial strontium isoscapes in both regions. This paper presents our preliminary results, which demonstrate the existence and persistence of highland-dryland exchange networks and hold implications for tracing the development of social strategies for long-term survival in the southern African interior.

**Zheng, Yunfei and Haibin Gu (Hunan Provincial Institute of Cultural Relics and)**

**[284]** *Archaeological Evidence of Multiple Domestication of Rice*

The first domestication of rice in the Yangtze river valley in China is recently informed by genetic, archaeological, palaeoenvironmental, and archaeobotanical data. Archaeological sites where rice remains between 10000 and 4000 BP have been unearthed are concentrated in the middle and the lower Yangtze valley, a distance of over 1000 km apart. This study focuses on the morphological and histological features of spikelet bases of rice between 8300 and 4800 BP found in the Liyang Plain of the middle Yangtze valley, comparing them with those found in the archaeological sites of the lower Yangtze valley in Zhejiang province. The results showed that there was a clear and complete domestication process in the Liyang Plain, with the domesticated ratios higher than those of the lower Yangtze Valley in the same times. The results indicated that there were separate domestication processes for rice in the middle and lower Yangtze River, even though rice inhabiting the two areas were the same species of the *Oryza* genus. The study suggests that there might have been multiple domestication processes of the same crop in similar ecological niches in the early Holocene.

Zhengyao, Jin [24] see Yingyuan, Xu

Zhouyong, Sun [24] see Owlett, Tricia

Zhuang, Yijie [161] see Kidder, Tristram

Ziesemer, Kirsten [143] see Mann, Allison

**Zimmer-Dauphinee, James (Department of Anthropology & Spatial Analysis Research Lab Vanderbilt University), Arlen Talaverano (PATA Research Project), Kevin Jara (PATA Research Project) and Steven A. Wernke (Department of Anthropology & Spatial Analysis Rese)**

**[154]** *pXRF in the Colca Valley: Experimenting with a Nondestructive Chemical Discrimination of Ceramic Fragments*

The choice of clay and pigment sources for ceramic production in the Andes has the potential to convey complex information about the resilience and persistence of Inca social structure in the Colca Valley throughout the imposition of Spanish imperialism. Prior to the Spanish invasion, ceramics in the Colca Valley were likely primarily produced by a handful of specialized communities which would have widely distributed their products. It is therefore expected that there would be a standardization of clay sources and production methods producing ceramics with similarly standardized chemical signatures. It has been hypothesized that during the Spanish conquest of Colca Valley the resulting political and social transformations disrupted these patterns of production and distribution, resulting in the use of more diverse and perhaps more local clay sources and production techniques. This disruption was therefore expected to result in ceramics with similarly less standardized chemical signatures. Finally, it is an outstanding question whether the traditional patterns of ceramic production and distribution were re-established following the imposition of colonial rule, or new patterns were developed. This study hopes to test each these dynamics through the nondestructive analysis of ceramics excavated from Machu Llaeta using a Bruker Tracer Vi handheld pXRF unit.

Zimmer-Dauphinee, James [68] see Traslaviña, Abel

**Zimmerer, Karl (Pennsylvania State University)**

**[249]** *Discussant*

**Zimmerman, Larry (IUPUI/Eiteljorg Museum)**

**[60]** *Discussant*

Zimmerman, Larry [222] see Thomas, Jayne-Leigh

**Zimmermann, Mario (Washington State University)**

**[76]** *Examining the Bread-Basket Model: Puuc Intra and Inter-site Diversity in Plant Foods*

The Puuc mountains in the northwestern Maya lowlands have proven themselves to be double-faced in regard to pre-Columbian human settlement. On one side, the valleys exhibit the region's most fertile soils. On the other hand, rainfall is scarce and access to the underground water table is comparatively difficult. Nonetheless, authors such as Smyth (1991) have long suggested that the Puuc represented some of the bread-basket for the wider northwestern lowlands. As part of a broader study, in this paper I will present microbotanical data gathered from food consumption areas corresponding to different buildings located at the sites of Kabah, Sayil, and Oxkintok. Starch grain analyses are particularly helpful when evaluating the dietary contributions of carbohydrate-rich staple foods. Among the pre-Columbian Maya this list includes, of course, maize and beans. However, in the past different tubers as well as tree crops have been proposed as supplementary staples or famine foods.

**[76]** *Chair*

Zimpel, Carlos [69] see Pugliese, Francisco

**Zinn, Katharina (University of Wales Trinity Saint David)**

**[309]** *Did You Sleep Well?—The Body, the Senses and the Ancient Egyptian Headrest*

This paper explores the possibility to extract information about sensory experiences inherent in the material culture of ancient Egypt which are often overlooked due to the difficulty to track them in the material. By implementing new intellectual frameworks like New Materialism and the consequent application of methodologies from archaeology and anthropology we gain insight in the actions of ancient bodies. Taking inspiration from Latour's actants (2005), Barad's agential realism (2007) and Bennett's thing power (2010)—relating the potential of agency to materials and objects in human lives—the study discusses the physical relationship of material objects and the human body. With the additional help of experimental and experiential archaeology as well the focus on hitherto neglected objects we not only can bring the objects but also senses in the past to life.

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This is explored using unpublished headrests from Cyfarthfa Castle Museum by looking on the intersection of bodies with the material that also could be interpreted as inter-material communication. Impressions of fabric on their wooden surface are presumably the imprint of bedding intended to ensure comfortable sleep telling us about the sensual experience using these artefacts. The contact between skin and rough wood needed to be alleviated.

Zinsious, Brandon [221] see Gomes, Ana

**Zipkin, Andrew (University of Illinois at Urbana-Champaign), Stanley Ambrose (University of Illinois at Urbana-Champaign), Gideon Bartov (University of Illinois at Urbana-Champaign), Alexander Taylor (University of Illinois at Urbana-Champaign) and Mercy Gakii (National Museums of Kenya)**

**[140]** *Ethno-archaeometry of Ochre Mineral Pigment Extraction, Transport, and Use in the Kenya Rift Valley*

Ochre occurs in African archaeological sites from the later Middle Pleistocene to the ethnographic present. Ochre is used worldwide for symbolic and functional purposes, and is often considered to be evidence for symbolic behavior by cognitively modern Paleolithic humans. Geochemical provenience analysis, complemented by ethnographic studies of ochre source exploitation, transport, and use, can elucidate whether culturally mediated source exploitation differs significantly from a least-cost energetics (closest source) model of source use. In 2015–2017 we sampled 53 ochre deposits in the Kenya Rift Valley, guided by Maasai, Samburu, and Dorobo informants. The strontium isotope ratio (87/86 Sr) and elemental composition of these sources were characterized using Electron Probe MicroAnalysis and Inductively Coupled Plasma-Mass Spectrometry. Our results show that the Provenience Postulate is upheld at the regional scale by 87/86 Sr ratios and at the local scale by elemental composition, facilitating sourcing of cultural ochre. Analysis of ochre recovered from the Elmenteitan Neolithic cremation burial site of Njoro River Cave shows that the pigment is derived from two sources 110 and 150 km to the south, despite the availability of high quality ochre at deposits 20–35 km away and nearby the main sources of obsidian artifacts found at this site.

Zipkin, Andrew [198] see Ambrose, Stanley

**Zoega, Gudny**

**[167]** *The Inequalities of Households—Cemetery Management and Social Change in Early Medieval Iceland*

In AD 1000 Icelanders adopted Christianity in an apparently swift and embracing fashion. The new tradition was implemented by discrete households that built private churches and cemeteries on their farms. These cemeteries were in use until the beginning of the 12th century and interred were all individuals of the household, men and women, the old and the young, householders and servants. The establishment, management, and abandonment sequences of these cemeteries reflect the religious, social, and political transformations that took place at both societal and household levels during the 11th century. A number of these cemeteries have been excavated in Skagafljörður, North Iceland in recent years. This paper examines the resulting funerary and osteological data for evidence of social hierarchies and changes in household structure during the time of their use. The osteological data points to a population subjected to marginal environmental constraints, but the funerary data indicates a people well versed in contemporary European traditions. The internal cemetery management, such as the positioning of burials and the selective removal of individuals from graves, is suggestive of internal social divisions that may infer social inequalities at the wider societal level.

Zongmin, Li [24] see Yingyuan, Xu

**Zori, Colleen**

**[100]** *Mining, Extractive Metallurgy and Imperialism in the Inka Empire*

The Inka empire directed significant resources and labor towards the extraction of metals from the provinces. Using the examples of Porco (silver), Viña del Cerro (copper) and the Tarapacá Valley (copper and silver), this poster explores Inka strategies for obtaining metallurgical wealth. These case studies show that, as suggested by ethnohistoric sources, large-scale silver extraction was directly overseen by the state. In contrast to models of more indirect state involvement typically proposed for copper production, these case studies demonstrate that the Inka actively invested in expanding production of this metal, despite the fact that it was not destined for use in the imperial heartland. I propose several ways that the production of silver and copper—both the sequence of activities and interactions implicated in its manufacture and the metals themselves—enmeshed local people in the relationships of hierarchy, obligation, and reciprocity that constituted them as subjects of the Inka empire.

Zori, Colleen [86] see Zori, Davide

**Zori, Davide (Baylor University), Colleen Zori (Baylor University), Veronica Ikeshoji-Orlati (Vanderbilt University) and Deirdre Fulton (Baylor University)**

**[86]** *Eating and Drinking in the Medieval Castle of San Giuliano (Province of Lazio, Italy)*

The medieval Italian settlement pattern was transformed from the 8th—12th centuries as people moved to inhabit defensible hilltops. The precise timing and reasons for this historical process, known as *incastellamento*, are not well understood. We initiated the San Giuliano Archaeological Research Project to provide high-resolution archaeological data for understanding this phenomenon. Two seasons of survey and excavation atop the San Giuliano plateau have identified walls and structures comprising a fortified castle dating to the *incastellamento* period. In this paper, we present preliminary analyses of the food consumption practices evidenced in and around a large hall in use approximately AD 900–1200 in the center of the castle zone. Ceramic and glassware analyses provide insight into the medieval inhabitants' food consumption activities. The vessel analyses are complemented by an investigation of the faunal remains obtained from two specific contexts: 1) refuse from wall support trenches excavated into bedrock; and 2) a large subterranean feature used as a granary before serving as a place of refuse disposal. These data shed light on the economy and feasting practices of the medieval people within a typical small Italian castle in an area of Lazio where the process of *incastellamento* has been understudied.

**Zovar, Jennifer (Whatcom Community College)**

**[313]** *Steering through North American Archaeology: Reflections on the Effectiveness of an Open Textbook Steering Committee*

As an open educational resource, this textbook has been designed to incorporate the perspectives and expertise of a variety of different scholars and stakeholders from across North America. Early in the process, a 'steering committee' was established to try and ensure balanced coverage, maintain a relatively consistent voice, and iron out any difficulties that may arise. The steering committee has also been responsible for some of the small but important details like hunting down copyrights, identifying reviewers, and initial editing. This paper evaluates the effectiveness of the steering committee at this point, considering our successes, our disappointments, and our future challenges. We share our experiences in the hope that this discussion will be useful to others who are currently engaged in (or thinking about introducing) a similar project and in order to contribute to a larger conversation about the usefulness of open educational resources in archaeology.

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**Zralka, Jaroslaw (Institute of Archaeology, Jagiellonian University) and Bernard Hermes (The Nakum Archaeological Project, Guatemala)**  
**[252]** *Monumental Architecture of Yaxha and Nakum (Northeastern Guatemala) during the Middle and Late Preclassic Periods*

Yaxha and Nakum are two important Maya centers located in northeastern part of Guatemala. Recent research carried out by different projects at both sites indicate that during the Preclassic period Yaxha and Nakum rose to power and became important polities that had many examples of monumental architecture such as E-Groups, triadic complexes, ballcourts, causeways and other constructions. The scale of monumental architecture documented at Yaxha indicates that it was one of the largest Late Preclassic cities in the Southern Maya Lowlands which must have dominated politically and economically over other neighboring centers. Nakum—although smaller in its monumentality—showed examples of various public constructions from the same epoch, some of which were embellished with beautifully rendered stucco friezes. The aim of this paper is to show the evolution of monumental architecture in both sites from its beginning in the early Middle Preclassic until the Terminal Preclassic or Protoclassic period when many Maya centers—including a large polity of El Mirador—collapsed. We will also address the subject of political organization in the Yaxha region during the Preclassic times.

Zubrow, Ezra [34] see Troskosky, Christopher

Zwyns, Nicolas [41] see Gillam, J. Christopher