Iannone, Gyles (Trent University)
[136] *Merit Making at Ancient Bagan, Myanmar: A Consideration of Socioreligious Entanglements and the Rise and Fall of a Classical Southeast Asian State*
Much of the recent discourse surrounding the collapse of archaic states is centered on the impacts of ecoside or climate change. Driven by natural scientists and increasingly sophisticated data generation and analysis methods, such environmentally-based approaches to collapse have tended to gloss over the myriad cultural factors also involved in such severe transformations, thus inhibiting our ability to fully grasp the complexities of the collapse process in the various case studies currently under archaeological scrutiny. This presentation underscores the importance of including considerations of both religion and ritual in our interpretations of sociopolitical collapse, using insights from the rise and fall of Bagan, Myanmar's "classical period" capital. The focus of the discussion will be on the roles that Buddhist merit making played in Bagan's development and denouement, with specific attention to the various ecological, economic, social, and political entanglements that resulted from ideologically charged donations to temples and monasteries.
[214] *Discussant*

Iannone, Gyles [214] see Baron, Natalie

Ibarra, Emilio and Laura Ortíz-Tenorio
[53] *Los microrrestos botánicos (polen) en ofrendas y rellenos constructivos del área de Tlaltecuhtli*
Dentro de la gran cantidad de material arqueológico recuperado en la Séptima Temporada del Proyecto Templo Mayor se encuentran los microrrestos botánicos, elementos que al reflejar la flora regional nos permiten inferir sobre las actividades de tipo rituales y sagradas realizadas en torno a Tlaltecuhtli al pie del Templo Mayor. Esto cobra importancia si recordamos que para el pueblo Mexica, las plantas jugaban un papel importante en su cosmovisión, relacionándose no sólo con elementos como la guerra, la fertilidad, el sol, sino también en varios casos, se asociaban con deidades específicas, como en el caso de Tláloc y el yauhtli. Para determinar qué tipo de plantas eran utilizadas y el por qué de su presencia, se realizó el análisis del polen, siendo de relevancia su presencia tanto en las ofrendas como en los rellenos, puesto que estos últimos, al informarnos sobre la flora común en la época prehispánica, nos permite establecer un margen de comparación para detectar elementos atípicos y exóticos en las ofrendas.

Ibarra, Emilio [174] see Ortíz, Laura

Ibarra, Thania (Universidad de las Américas Puebla) and Aurelio López Corral (Centro INAH-Tlaxcala)
[7] *Thread Production in Late Postclassic Tepeticpac, Tlaxcala: A Technological and Experimental Study of Archaeological Spindle Whorls*
Textile production was one of the most valuable social and economic activities in prehispanic Mesoamerica. In this study, we inquire into thread production in the site of Tepeticpac, Tlaxcala, one of the main altepemeh of Late Postclassic Tlaxcallan, using a technological, ethnoarchaeological and experimental analysis. In particular, we evaluate key attributes of archaeological spindle whorls in the spinning process, including weight, shape and moment of inertia. With the collaboration of three craftswomen (zapotec and otomí), we performed an experimental study of thread production using replicas of archaeological spindle whorls and different types of fibers. Preliminary results show that although there is a certain correlation between the size of the spindle whorl and the quality of thread produced, it is the ability of the craftswoman and the spinning technique that determines its final quality.

Ibarra López, Marcelo (Centro INAH Michoacán)
[12] *Use and Symbolism of Copper Axes in Tarascan Society during the Late Postclassic Period in Modern-Day Michoacán, Mexico*
The cultural core of the Tarascan society settled in the region of what is now Michoacán, western Mexico. For the Tarascans, gathering firewood was a sacred activity, and the maintenance of a never-ending fire within their temples or "cues" was an essential part of their religion. This sacred element was an offering for their most venerated god, Curicaueri. Collecting wood was an activity so sacred that even the tools used to retrieve it were transformed into consecrated objects sharing the same taboos as the sacred firewood itself. This work is about how copper axes became depositories of status in Tarascan society. Through an analysis of the specific use of the ax, the individuals who used them, and the different raw materials used for manufacture, I will analyze how each factor contributed to the significance of copper axes and shaped their role within Tarascan society and their vision of the world.

Ibarra López, Miguel Alberto (Centro INAH Michoacán)
[12] *A Paleopathological Analysis of Skeletal Remains Uncovered in La Cueva de los Hacheros, Turicato, Michoacán*
This poster deals with the study of skeletal remains belonging to eighteen individuals deposited within La Cueva de los Hacheros, a site located in the municipality of Turicato, Michoacán. Unfortunately, as a result of looting by landowners, the site has an altered context. Despite that fact, a salvage excavation and a comprehensive analysis of the remains yielded valuable data for interpreting the site and learning more about the individuals buried within. The skeletal analysis made it possible to recognize various pathologies including antemortem trauma, diseases, and developmental anomalies, some of which were represented in various individuals. This investigation also provided us with sufficient data to register the total number of individuals and differentiate them by age and sex. This investigation will provide a better understanding of those whose final resting place was at La Cueva de los Hacheros and the diseases that afflicted them.

Ibarrola, Mary Elizabeth (University of Florida)
[74] *Resistance and Intersectionality in Maroon Archaeology*
We define Maroons by their overt resistance; theirs was one of the most extreme forms of anti-slavery opposition in the Americas and for many scholars is representative of the human desire to be free. However, defining Maroons by the act of marronage is isolating and limits attempts to study cultural continuities and ethnogenesis among the wider African Diaspora. This paper will look at the potential for, and advantages of, an intersectional maroon archaeology. Through the lens of marronage in Florida, and comparative analysis of three Florida sites—a slave cabin at Bulow Plantation in east-central Florida, an urban slave site at 71 Park Place in St. Augustine, and the Maroon settlement of Peliklikaha in central Florida, all of which date from the late Second Spanish Period—the paper will address the ability of intersectionality to both challenge our understanding of marronage and to build more complex comparisons of Maroon, slave, and free black societies in the colonial world.

Ichikawa, Akira
[236] *A Revised Chronology of the Southeastern Maya Area: an Evaluation of New and Existing Radiocarbon Dates from the Preclassic to Postclassic period*

The establishment and refinement of chronology is a critical issue in archaeological practice worldwide. In the archaeology of the southern Maya area, Inomata et al. (2014) have currently proposed a new revised chronology for Kaminaljuyu, Guatemala, especially for the Preclassic period, using several calibrated radiocarbon dates and Bayesian statistics. They also highlight a new interpretation of the social process in southern Maya area. However, the dataset for the southeastern Maya area, especially that located in the western part of present-day El Salvador, has not been updated since the 1970s and 1980s. This paper shows the latest updated radiocarbon dates for the southeastern Maya area. These include more than 100 dates collected from Chalchuapa, which is a key site in the region, and other sites by applying Bayesian statistics to further better the chronology. Based on this data, I present an enhanced local chronology from the Middle Preclassic to the Late Postclassic period. Furthermore, although it requires minor revisions, I support the validity of the chronology proposed by Inomata et al.

Iles, Louise (University of Sheffield)
[161] *The Spread of Iron Metallurgy: The African Continent*
Theories of the origin(s) of iron production and the spread of ferrous technology have provoked many decades of lively and enduring debate. The notion that iron production developed in one core location—from where knowledge of it spread—has been challenged by claims of early, independent inventions of iron production in Africa, India and China. However, it has proved problematic to verify the timing and contexts of these multi-origin hypotheses without placing undue emphasis on isolated radiocarbon dates. This research reopens the discussion of the origins and spread of iron production using summed probability distributions of published radiocarbon dates as a proxy for technological activity. It aims to investigate the broad-scale dynamics of the spread of iron metallurgy through the whole of the Old World, exploring some of the socioeconomic factors that influenced the movement of knowledge, and considering the impact of iron production on the environments where it flourished. The research began in 2016 with the collection of published radiocarbon dates from Africa, and this presentation introduces and considers the results of the initial analysis of the African dataset.

Ingalls, Victoria (University of Texas at San Antonio)
[369] *A Place for the Living, A Place for the Dead: Social Memory at the Ancient Maya Hinterland Community of San Lorenzo, Belize*
Public structures across the Maya lowlands functioned as materializations of ideology, memory, and identity. However, documentation of public ritual structures is typically limited to formal ceremonial centers. Little is known about public spaces within hinterland communities. Excavations at the site of San Lorenzo offer insight into the use and transformation of ritual space within a hinterland community. Recent excavations of a public structure group have uncovered multiple construction phases beginning in the Preclassic and culminating in the Terminal Classic. The Preclassic phase of these structures is a round platform resting on a tamped marl surface. Due to its size and form, comparative data suggests that this platform may have functioned as a space for public ritual. Excavations have further uncovered seven interred individuals within the patio space of the Late Classic construction phases. Thus, by the Late and Terminal Classic periods, this site became a burial ground. The transformation in use and the continual reconstruction of ritual space over centuries suggests that this site served as a space of social remembrance and identity on the landscape of the San Lorenzo community.

Inomata, Takeshi (University of Arizona)
[217] *Maya Palaces at Aguateca and Ceibal, Guatemala*
Royal palaces at the medium-sized centers of Aguateca and Ceibal appear to represent a basic template for the spatial and functional configurations of Maya palaces. They exhibit simple square forms resembling smaller residential groups of lower status, indicating their primary function as residential complexes of the royal families. Administrative and ceremonial functions were likely merged with domestic ones. These palaces also provide information on the degree of spatial mobility. While the Maya were generally attached to fixed residential localities, they allowed a certain level of residential mobility. The royal palaces of these dynasties moved through their history, depending on administrative and strategic needs and the idiosyncrasies of individual rulers.
[337] *Discussant*

Inomata, Takeshi [81] see Ortiz, Jose Raul

Inskip, Sarah (University of Cambridge)
[31] *Being Male in al-Andalus: A Comparative Osteobiographical Approach to Reconstructing Islamic Identities in Medieval Spain*
In AD 711 the influx of Arabs and Berbers into Iberia culminated in the formation of the only Islamic state in medieval Western Europe. The uptake of new religious ideology and cultural practices by the inhabitants, which when applied in their unique sociohistorical context, resulted in an Iberian Islamic identity. While much research has explored variation in the lives of women, including debates on their freedom of movement and activity, less is postulated about the lives of men and what it meant to be Muslim and male in al-Andalus. Fortunately, due to the reflective relationship that exists between the body and society, the analysis of human skeletal and funerary remains offers an opportunity to address this lacuna. An osteobiographical approach, which explores both cumulative and individual life histories, can inform about shifts in male practices and lifeways when data are compared between groups. Furthermore, as the practice of certain behaviors is key in identity (re)construction, interpretation of these changes in the relevant social, political and historical context informs about important factors affecting the lives of men in Iberia. This is demonstrated through an analysis of markers of activity, disease, stature and burial rites from Medieval Écija and Coracho, Spain.

Iott, Molly [155] see Reese, Kelsey

Iovita, Radu (New York University), Johannes Pfleging (ETH-Zürich) and Jonas Buchli (ETH-Zürich)
[40] *Evaluating the Effect of Force and Duration on Lithic Use Wear Using a Force- and Impedance-Controlled Robot*
Use-wear analysis relies on the strength of the analogy between microscopic wear patterns produced in laboratory experiments and those present on archaeological tools. Unfortunately, the physical processes that control the production of these patterns, both in the lab and in the past, are subject to complex interactions. One approach to reducing this complexity is to isolate factors (duration, material properties, or dynamics) that influence wear patterns and try to identify their contribution. An important issue concerns the possibility that wear on tools thought to have been used for a long time may in fact reflect use with a higher force, as both factors should, in theory, affect wear (e.g., Key et al. 2014, JAMT). We present results from experiments using a KUKA LWR-iiwa force- and impedance-controlled robot to scrape beech plates. The input data for controlling the robot (force, torque, velocity, position) were obtained from a dynamically monitored scraping experiment performed by humans (Pfleging et al. 2015, PLoS One). Because of the high level of control, we are able to systematically vary the duration and force and investigate their effect on the wear patterns, which are quantified via 3D surface metrological methods using a focus-variation instrument from Alicona.
[40] *Chair*

Iovita, Radu [169] see Smith, Geoff M.

Iriarte-Chiapusso, Maria José [165] see Bradtmöller, Marcel

Isaksson, Sven [35] see Junno, Aripekka

Iseminger, Bill (Cahokia Mounds)
[283] *Chair*

Isern, Neus [38] see Fort, Joaquim

Islas Orozco, Mirsa (Mirsa Islas Orozco)
[292] *Historical Archaeology in Downtown Mexico City: The Case of "La Casa del Mayorazgo de Nava Chávez"*
The historical center of Mexico City is a canvas of superimposed maps in which we can perceive history through the streets and architectural diversity. In this territory the Mexica Empire was settled as well as the colonial city. Later, this area was essential for the independence conflict and revolution. Nowadays is the political and cultural center of Mexico. The historic heart of the city has been the setting of outstanding incidental discoveries, of great significance for Mexican archaeology. The latest major finding was the monolith of the Earth Goddess, Tlaltecuhtli, discovered on October 2, 2016, inside the Mayorazgo of Nava Chávez, premises popularly known as "La Casa de las Ajaracas." Although this site was the scenario of an intensive religious and ritual activity during prehispanic times, it has been continuously occupied for five centuries, since the Conquest. The aim of this paper is to present the history of this place and their inhabitants, as well as the results of the analysis of colonial ceramic materials recovered during the excavations of the seventh field season of the Templo Mayor Project.

Issavi, Justine (Stanford University)
[73] *Trash Talk: (Re)evaluating External Spaces at Çatalhöyük, Turkey*
The Neolithic tell site of Çatalhöyük is composed of clusters of structures interspersed with open or external areas that contain extensive deposits of midden, as well as evidence for several other activities. James Mellaart (1967) initially identified these areas as courtyards while the current project has variously evaluated these spaces through frameworks of discard, food, and sharing practices. A general understanding of external spaces at Çatalhöyük sees them transformed from relatively informal and communal spaces into spaces that were used by individual houses or households as they became more autonomous and insulated, mirroring a wider social transformation noted elsewhere in the Near Eastern Neolithic. External spaces at Çatalhöyük, however, tend to be varied and complex and analyses often rely on comparisons between broad spatiotemporal categories. A multipronged approach including archaeological excavation, archival research, and spatial and statistical analyses has been deployed to provide a deeper understanding of these dynamic spaces and their long-term development. This paper will provide a brief synthesis of previous results, as well as present preliminary insights from recent research and the excavation of a large external space at Çatalhöyük in order to reevaluate external spaces as integrated parts of the Neolithic social and architectural landscape.
[73] *Chair*

Ito, Nobuyuki [236] see Fukaya, Misaki

Iverson, Shannon (Rice University)
[395] *Resignification as a Way In and a Way Out: Power and the Colonial Religious Experience in Tula, Hidalgo*
Archaeological assemblages from two early colonial religious sites at Tula, Hidalgo, are nearly indistinguishable from precolumbian assemblages at the same sites. These findings indicate that colonial changes in material culture were much more gradual than we expected, and driven to a surprising degree by Indigenous traditions and aesthetic prerogatives. These data led us to reconsider various models of social change that would adequately account for the observations of material culture at Spanish religious sites. Clearly, we know from documentary sources that the so-called colonial encounter was not an equal exchange of ideas. However, models of top-down power alone could not account for the data in Tula. Conversely, models that posited cultural continuity—an Indigenous "core" with a Spanish colonial "veneer"—seemed inadequate to account for genuine Indigenous relationships with the Church. This paper explores the legacies and problems of several models, including acculturation and syncretism, before positing Judith Butler's concept of resignification as an appropriate model of colonial power and religious change.

Ives, John W. (University of Alberta)
[339] *Seeking Congruency: Search Images, Archaeological Records, and Apachean Origins*
Apachean prehistory presents a significant conundrum: remarkably resilient and pragmatic people, Athapaskan speakers consistently adopted many elements of the ceremonial life and material culture of their neighbors, making for profound archaeological challenges. How do we truly know when an archaeological record was created by Proto-Apachean ancestors? The best response to this challenge is to draw upon the independent strengths of anthropological, linguistic and genetic studies to develop a series of "search images" pertinent to various stages of Apachean migration from Subarctic Canada to the American Southwest. These fields have provided clear targets we should anticipate in Apachean prehistory. The founding Apachean population was small, and undoubtedly grew through fissioning of small populations creating further founder effects. Yet, Proto-Apachean populations did not remain small: many people (especially women from neighboring societies) joined nascent Apache and Navajo groups. With new data emerging from Promontory Culture, Franktown Cave and Dismal River sites, specific search images can be evaluated against the rich perishable, demographic, and isotopic data as well as evidence of societal interactions now available, in the context of high-precision chronologies. This paper will offer a synthesis of the status of archaeological research into Apachean prehistory arising from the symposium contributions.
[226] *Discussant*
[339] *Chair*

Ives, John W. [339] see Billinger, Michael

Iwanami, Ren [330] see Hirasawa, Yu

Izeta, Andres (IDACOR-CONICET, Universidad Nacional de Córdoba, Argentina) and Roxana Cattáneo (IDACOR-CONICET, Universidad Nacional de Córdoba)
[227] *Networking: Digital Archaeology Repositories in Argentina*
The digitization of primary data in social sciences and humanities, including archaeology, has been a central issue in the management of science in Argentina by federal agencies, public universities and private foundations. About this topic, Argentina´s National Research Council (CONICET) created the Interactive Platform for Social Science Research, an interdisciplinary space, that over six years has generated protocols related to digitization and ways to share these results under the concept of open science. In this framework, a program focused on archaeology (Digital Archaeology Program—PAD) became an instance of theoretical reflexivity on the digital turn in the discipline and the socials sciences and the humanities. Based on that experience we present some results from the PAD digital repository, which integrates archaeological collections, databases, gray literature, and publications. We will discuss relevant topics such as repository laws and digitalization criteria in Argentina, limitation of software and hardware, methodological issues and the training of human resources.

Jackley, Julia, Dana Lepofsky (Simon Fraser University), Nancy J. Turner (University of Victoria) and Jennifer Carpenter (Heiltsuk Integrated Resource Management Department)
[77] *Mountain Top to Ocean Floor: The Eco-Cultural History of Hauyat*
The Mountain Top to Ocean Floor Project is a collaborative undertaking by the Heiltsuk First Nation, Simon Fraser University, and the University of Victoria that seeks to document and explore the unique cultural and ecological history of Hauyat, a landscape in Heiltsuk traditional territory on the Central Coast of British Columbia. Over millennia, Hauyat has been transformed by a complex web of relationships among people, plants, animals and ecosystems. The rich and deep history of this place is known through Heiltsuk oral history and is also reflected in the number and diversity of archaeological sites and eco-cultural features. Ranging from the lower intertidal to the subalpine, the landscape has been modified to include clam gardens, fish traps, root gardens, berry patches, orchards, settlements, rock art, and defensive sites. These features are suggestive of long-term resource management systems that likely worked together to provide food, materials, and medicines for past communities.

Jackson, Gary [28] see Smith, Claire

Jackson, Sarah (University of Cincinnati), Linda A. Brown (George Washington University) and Brett A. Houk (Texas Tech University)
[83] *The Emic, the Etic, and the Electronic: Digital Documentation in Northwestern Belize*
Twenty-five years of archaeological research in northwestern Belize have yielded a robust regional database, allowing a rich and diverse picture of ancient Maya life to emerge. As part of this research, multiple projects have recently adopted innovative digital technologies using new methods to record and envision ancient sites in novel ways. This paper presents some of the ways in which researchers have engaged with digital technologies that allow for the collection of new types of data, as well as renewed engagement with traditional archaeological data, with the overall goal of highlighting the array of methods used in this region and how they might be translatable to other Maya sites. In particular, our paper focuses on digital approaches used by the Say Kah and Chan Chich Archaeological Projects. Both projects use tablet-based paperless recording systems to streamline data collection. At Say Kah, the relational database is unique as it provides interpretive transformations by recording artifacts and features according to two cultural perspectives: archaeological and Classic Maya. The project at Chan Chich employs drones to map vast cleared areas and includes Structure from Motion documentation of excavations as a standard recording practice.

Jacobi, Keith [185] see Dye, David

Jaffe, Yitzchak (New York University ISAW)
[36] *Between Control and Influence: Early Globalization Processes in Bronze Age China*
The traditional narrative of the Zhou expansion (1046–771 BCE, roughly 800 before the formation of the first Chinese empire in 221 BCE), has been to view it as a military enlargement and conquest and as leading, consequently, to the establishment of a polity controlling a large territorial state. To date, most studies have viewed the finding of Zhou artifacts in a given region as indicating Zhou political control over that area or even that actual Zhou people inhabited the region. This paper argues that the Zhou expansion must be investigated in a contextual manner to evaluate the regional-specific cases of cultural exchange and the process through which it created new forms of localized social identities. Globalization offers a model that focuses less on an all-powerful center dominating a periphery. Instead, it is the natural process by which the creation of new forms of connectivity, entanglements and cultural practices emerge from supra local interaction. This approach not only gets away from problematic models that identify material culture with specific ethnic groups, but also renounces power dynamics that conflate control with material assemblages.

Jafri, Nazim (Aligarh Muslim University, Aligarh India)
[167] *Cultural Change in Funerary Practices from Harappan to Post-Harappan Phases in Protohistoric India*
Various archaeological sites in the Indian subcontinent namely, Harappa, Kalibangan, Surkotada, Lothal, Daimabad, Bhagwanpura, Navadatoli and Nevasa have been identified as settlements dated to roughly 3000 to 1000 BC. These archaeological sites present evidences of urn burials, which have generally been overlooked in favor of extended burials and cremations, not unlike contemporary funerary practices. In this paper, I examine the distribution pattern of burials and cremations at the above sites, to shed light on cultural changes with respect to funerary practices in protohistoric India. The results suggest a dramatic cultural change in the practice of burials from the north Indian sites to the cremations on the sites in central and Eastern India. This suggests the Harappan Civilization was confined to the northern Indian continent, and its extension toward central and southern India was Post-Harappan expansion with remarkable cultural or religious change.

Jaimes Vences, Gustavo (Doctorado en Estudios Mesoamericanos. Universidad Nacional Autónoma de México)
[145] *Caracterización química (MEB-EDS) y cristalográfica (DRX) de cerámica local del sitio arqueológico Santa Cruz Atizapán*
En el sitio arqueológico de Santa Cruz Atizapán (con ocupación desde el Clásico tardío ca. 500–650 dc hasta el Epiclásico ca. 650–900 dc), han sido detectadas macroscópicamente una serie de pastas, que por sus atributos de textura, compacidad e inclusiones, fueron agrupadas en nueve conjuntos (Inclusiones café, blancas, naranjas, de varios colores, pseudo anaranjado delgado, fina, intermedia, burda y con mica). Lo anterior refleja una diversidad en los posibles centros de producción cerámica que abastecían de vasijas a Santa Cruz Atizapán durante la época prehispánica. Con el objetivo de corroborar dicho planteamiento, se obtuvo la composición química de esos conjuntos mediante Microscopía Electrónica de Barrido con

Espectroscopía por Dispersión de Energía (MEB-EDS), además se adquirieron diversas imágenes de la estructura microscópica de la pasta. Así mismo, para complementar la caracterización, se empleó la Difracción de Rayos X (DRX), lo cual permitió identificar las fases cristalinas de las arcillas usadas para la elaboración del utillaje cerámico. Los resultados preliminares permitieron la identificación de diatomeas en arcillas pertenecientes, en su mayoría, al Epiclásico, así como en aquellos correspondientes al Pseudo Anaranjado Delgado. Por su parte, las predominantes del Clásico (inclusiones café, naranjas, de varios colores) no las presentan.
[145] *Chair*

Jakob, Tina, Joe W. Walser III (University of Iceland and the National Museum), Donatella Usai (Centro Studi Sudanesi e Sub-Sahariani, Trevio, Ita) and Sandro Salvatori (Centro Studi Sudanesi e Sub-Sahariani, Trevio, Ita)
[219] *A View from the Periphery: Bioarchaeology and Funerary Archaeology at Al Khiday, Central Sudan*
Archaeological sites south of Khartoum are much scarcer compared to those further to the north and this presentation aims to report on a multi-phase cemetery that is situated at the periphery of our archaeological knowledge. At present, burials dating to three chronological periods have been recovered at Al Khiday. The site is located on the left bank of the White Nile, approximately 20 km south of Omdurman (Khartoum). Forty-two individuals are dated to the Classic/Late Meroitic period (end of the first millennium BCE/beginning of the first millennium CE), while 25 early Neolithic burials date to the mid-fifth millennium BCE. Bioarchaeological parameters (age and sex distribution) are analyzed in conjunction with funerary rites (body placement, orientation and grave goods) and compared to Neolithic and Meroitic cemeteries in Nubia to evaluate whether the Al Khiday populations adhered to the same burial customs as those further north. Furthermore, the oldest burials, dated to the pre-Mesolithic period (>12.700–11.100 BCE), by using a combination of stratigraphic observations, mineral deposition and stable isotope analyses are the most exceptional. Most of the 94 individuals are buried in an extended, prone position, attesting to a unique funerary rite that is unparalleled on such a large scale.

Jalbert, Catherine (Memorial University of Newfoundland/Moore Archeological Consulting, Inc.)
[258] *Archaeology and the Social Sciences and Humanities Research Council (SSHRC): A Gendered Analysis of Federal Funding in Canada, Fiscal Years 1994–2014*
Research conducted over the past twenty years on gender politics in archaeology have addressed both how the past is investigated, and has examined the presence of equity issues in the archaeological workplace. It has been suggested that multiple barriers exist for women's advancement, however, funding for archaeological research has received little attention in the literature. Although studies in the United States and Australia have highlighted the presence of funding disparities between women and men, the situation in Canada is less understood. Specifically, I will present analyzed data from SSHRC's Standard Research Grant and Insight Grant programs to examine if similar disparities are seen in Canada. Results from SSHRC show that although women and men had similar success rates, submissions from women were less than half that of men, and women listed as principal investigator received less funding on average. These results will then be compared to extant data from the United States and Australia. Providing contextualization in this way will aid in determining if global trends in gender disparities in archaeological funding are present and why they might be occurring.

Jamaldin, Sophia [140] see Reaux, Derek

James, Emma [191] see Hawkins, Hannah

James, Nathaniel (Washington State University)
[177] *Revisiting Harappa: A Reevaluation of Macrobotanical Evidence*
Harappa is a key site in understanding of the plant-human relationships that defined the increasing urbanization and eventual regionalization of the Indus Valley from 3300–1700 cal. BC. This paper presents a reevaluation of macrobotanical evidence excavated at Harappa from 1990–2000. It charts how the archaeobotanical record reflects changing social organization at the site.

Jamieson, Elaine (University of Reading)
[168] *Wizards, Dragons, and Giants: Creating Motte Castles in an English Landscape*
Medieval motte castles are large flat-topped earth and stone mounds, often coupled with an enclosure or bailey, and represent a characteristic component of the British landscape. Mottes often dominate their immediate surroundings, with many remaining visually impressive monuments to this day. Although their creation often involved substantial landscape change, it is becoming increasingly clear that continuity could also be maintained. Many mottes were placed at points in the landscape with preexisting ritual significance, as seen through the adaptation of extant Saxon town defenses, the reuse of Iron-Age hillforts, and the reappropriation of prehistoric mounds. The transformation of such sites would have reshaped peoples' perception of place, serving not only to create continuities with the past, but also to facilitate a reordering of the broader social and symbolic world. A ritual dimension may also have been ascribed to the creation of the motte castle, with levels of significance attached to the processes surrounding its construction. This paper will draw on results from the Leverhulme Trust funded project Extending Histories: From Medieval Mottes to Prehistoric Round Mounds, which is investigating the archaeology and history of monumental mounds in the English landscape.

Jamieson, Ross W.
[270] *Tokens of Oppression: Coinage at a Nineteenth-Century Galapagos Sugar Plantation*
In the 1870s Manuel J. Cobos founded the El Progreso plantation agricultural operation on the Island of San Cristóbal in the Galapagos. It is known that he used "scrip," or company-issued cash, to force workers to only spend their wages at the company store. Archaeological recovery of hard rubber tokens from several plantation contexts brings up many questions of economics and labor relations surrounding this remote location that was also tied to the global economy through steam power, commodity agriculture, and ideas of modernity.
[270] *Chair*

Jamieson, Ross W. [270] see Astudillo, Fernando J.

Jamsranjav, Baiyarsaikhan [114] see Barton, Loukas

Janetski, Joel (Brigham Young University)

[339] *The Promontory Phase in the Eastern Great Basin*
Julian Steward found a distinctive culture in the uppermost levels of several caves on the north shore of the Great Salt Lake and labeled it Promontory after the low range of mountains containing the caves. Based on stratigraphy, material diagnostics and findings elsewhere along the Wasatch Front, he placed the Promontory culture subsequent to the Puebloan (Fremont) and prior to the Shoshone presence. Steward recognized the possibility that these recent cave occupants were Athapaskan speakers related to Canadian peoples to the north, a suggestion reinforced by recent research. Initial radiocarbon dating of Promontory moccasins suggested the Promontory culture was contemporary with late Fremont, and recent dating of perishables from the cave have reinforced that temporal placement. Non-perishable Promontory culture diagnostics include Desert Side-notched arrow points and low-fired, calcite tempered ceramics, objects also found in abundance at open sites along the Wasatch Front. All sites with these signature artifacts, including the caves, are referred to as representing the Promontory Phase in the eastern Great Basin; however, Promontory open sites postdate the bulk of cave Promontory dates on average by 200 years or more. This paper explores why open site dates were occupied later than those from the caves.

Jansen, Amelia (University of Tennessee, Knoxville/ SEAC), Martin Walker (University of Tennessee, Knoxville), Heather Woods (University of Tennessee, Knoxville), Alexander Craib (University of Wyoming) and Anita Lehew (University of South Carolina)
[92] *Woodland Period Occupations along the Savannah River: An Update of the Late Prehistoric Investigations at the Topper Site (38AL23), Allendale, South Carolina*
The Topper Site (38AL23) is a multicomponent prehistoric site located along the eastern bank of the Savannah River in South Carolina. The focus of ongoing University of Tennessee, Knoxville excavations at the Topper Site are the extensive Woodland and Mississippian occupations that have until recently gone unexamined. To date, two block excavations and a dispersed 1 × 1 m unit survey have been completed to better define these later occupations. Excavations have also resulted in the mapping, excavation, and processing of 357 features representing possible pits, post-holes, and other signs of past human activity. Utilizing the open-source software QGIS, site-level distributional analyses of recovered materials and features, and regional-level comparisons have shed new light on the peoples inhabiting and utilizing the Savannah River and surrounding areas. This paper presents a synthesis of these analyses as well as highlights the unique artifacts and features that have been excavated and will discuss the future directions of the project.

Janssens, Rindert [356] see Bogemans, Frieda

Jansson, Anna (University of Arizona)
[344] *Before and After Mazama at the Billy Big Spring Site: Landscape Evolution during Altithermal Times and Reoccupation after the Eruption*
How did the ash fall from the Mount Mazama eruption (7682–7584 cal. yr BP [Egan et al. 2015]) affect the people on the Northwestern Plains who experienced it? Data from 24GL304 (the Billy Big Spring Site) in north-central Montana is used to investigate this question. Excavations conducted in 1952, 1954, 1971 by Thomas Kehoe and in 2016 by our team all found extensive Middle and Late Plains Archaic deposits, but in 2016 we discovered a ~10 cm thick layer of ash from this eruption. This poster addresses four research questions through the lens of geomorphology and soil science: (1) How did the landscape evolve before and after the Mazama ash fall? (2) How did the paleoenvironment evolve after the eruption? (3) How does this landscape setting correspond to what archaeologists know about the Altithermal (9400–6000 cal. yr BP [Barnosky 1989]) on the Northwestern Plains? (4) How long did it take for people to reoccupy this site after it was covered with Mazama ash, and what did this occupation look like? Archaeologists have long hypothesized about the impacts of the Altithermal on the Northwestern Plains, and I hope to contribute to this discussion with data from these recent excavations.

Jansson, Anna [344] see Thompson, Ashleigh

Janusek, John [230] see Bowen, Corey

Janz, Lisa (Trent University)
[99] *Expanding Frontier and Building the Sphere in the Western Deserts*
During the early and middle Holocene the deserts of Mongolia and northern China were characterized by arid grasslands and numerous lakes and wetlands. Specialized wetland exploitation defined land use during this period, but more detailed data on subsistence is not clear. The prevalent use of microlithic technology and the lack of architectural structures underscores the presumption that these groups were highly mobile hunter-gatherers, but increasing evidence reveals that pastoralism spread widely across the steppes of Northeast Asia during the third millennium BC. There has been no clear discussion of how desert groups were impacted by these changes. Here I examined the extent of climatic amelioration and present evidence to suggest that inhabitants of the western deserts were numerous and influential, and that they played a substantial role in the spread of pastoralist technologies—such as herding and bronze—into and across China.

Janzen, Anneke (Cotsen Institute of Archaeology, UCLA), Patrick Roberts (Max Planck Institute for the Science of Human Hist) and Nicole Boivin (Max Planck Institute for the Science of Human Hist)
[284] *Using Stable Isotopes to Explore Ancient Wildebeest Mobility in the Context of Pastoral Expansion*
The spread of pastoralism through Kenya may have been slowed by novel disease challenges presented to livestock by wild taxa. In particular, wildebeest-derived malignant catarrhal fever (WD-MCF), which is extremely fatal to cattle, would have been encountered by pastoralists for the first time as they moved south of the Lake Turkana Basin into the native range of East African wildebeest (Connochaetes taurinus). Today, migratory wildebeest have well-known annual migration patterns. However, while they are currently not found north of Kenya's Loita or Athi-Kapiti Plains, nor did early explorers describe them there, archaeological sites document their presence as far north as Lake Baringo until the second millennium BP. Pastoral extirpation of wildebeest populations from the prime grazing areas of the Central Rift Valley is one likely cause of their shifting biogeography over time. Stable isotope analysis is a powerful tool to examine ancient patterns of wildebeest distribution and mobility in the context of pastoral expansion. Through sequential sampling of wildebeest molars from Rift Valley archaeological sites spanning the mid to late Holocene for carbon, oxygen, and strontium isotope analysis, a history of their annual migration cycles as herders and their livestock spread throughout their native range may be documented.

Jaramillo, Luis (Profesor Asociado Departamento de Antropología)
[106] *Los Muiscas de la Sabana de Bogotá: Muchos cacicazgos? Patrones de asentamiento, demografía y organización política en la parte baja de la cuenca del río Teusacá.*

Investigaciones recientes en la cuenca baja del río Teusacá -la zona del valle de Sopó-, han proporcionado información regional que permite revisitar con nuevos datos, el tema siempre interesante de cuál era el grado de complejidad de los muiscas -y cuál su patrón general de asentamiento-, al ser ésta considerada como una–sino la más compleja- de las sociedades encontradas por los españoles alrededor de 1540 en el actual territorio de Colombia. A pesar de que ésta perspectiva ha sido respaldada y defendida por diversos estudiosos, este punto de vista deriva y se soporta casi que enteramente en las fuentes etnohistóricas y documentos coloniales tempranos. Pero en el valle de Sopó, sin embargo, ha sido posible conjugar y cotejar información arqueológica sobre los asentamientos en una escala regional con datos etnohistóricos sobre demografía y organización política, lo que permite argumentar que aunque siendo complejo el escenario, la estructura básica organizacional correspondía a pequeñas comunidades con altos grados de independencia, siendo este un escenario que contrasta con la idea de un control central y de gran alcance por parte de unos pocos centros de poder, como Bacatá en el extremo sur de la sabana.

Jarquin, Ana M. (Ana M. Jarquin Pacheco) and Enrique Martinez (Enrique Martinez Vargas)
[217] *El Palacio Norte de la Ciudadela, Conjunto 1D, Teotihuacán*
Los trabajos de investigación arqueológica en el Palacio Norte de La Ciudadela de Teotihuacán permitieron establecer que dicho recinto fue construido en relación a la consolidación del poder estatal y su autoridad además de su legitimación. Lo anterior en la búsqueda del reconocimiento de la población hacía los funcionarios que representaban un sistema económico, politico, y religioso, como un todo, basado en instituciones estructuradas de manera tal que, regían todos los aspectos de la vida de los habitantes de la antigua urbe. La ciudadela durante un lapso considerable de tiempo fue sede del sistema político, económico, y religioso de Teotihuacán. Bajo los escombros del último momento ocupacional del recinto, asociado al momento del llamado colapso Teotihuacáno, se localizaron evidencias que llevaron a proponer la planeación del lugar en base a principios de carácter político, mítico-religiosos y astronómicos. El análisis de los vestigios materiales, permitió sustentar la hipótesis de un conjunto arquitectónico, que posteriormente constituiría el modelo de los recintos ceremoniales importantes en varios asentamientos destacados, lugar de habitación de personajes importantes, posiblemente parte del sistema político que regía la estructura política, económica, y religiosa oficial Teotihuacána.

Jarriel, Katherine (Cornell University)
[132] *Modeling Maritime Travel in the Bronze Age Cyclades (Greece)*
In this paper, I model maritime connections in the central Cyclades (Greece) to better understand small world network interactions during the Early Bronze Age (ca. 3100–2000 BCE). Using Geographic Information Systems (GIS), I create a cost raster of local and seasonal wind and wave patterns in the Aegean. Based on this, I generate an anisotropic model of the time it takes to sail outward from various settlements. When compared with ethnographic and archaeological evidence about travel times for habitual interaction, I predict which Early Cycladic communities would have interacted with one another on a regular basis. This allows for a more complete understanding of the intensity and frequency of Early Cycladic intercommunity relations. By relying on travel times rather than absolute distance, this model offers an understanding of community interactions based on meaningful scales of human movement and social time.

Jastremski, Nicole [232] see Van Voorhis, Laura

Jay, Bethany [122] see Randall, Lindsay

Jazwa, Christopher (Pennsylvania State University), Douglas J. Kennett (Pennsylvania State University) and Bruce Winterhalder (University of California, Davis)
[383] *Territoriality among Coastal Villages on California's Northern Channel Islands*
The location of archaeological settlement sites is influenced not only by the distribution of ecological resources, but also cultural factors including conflict between neighboring populations. The ideal free distribution is a human behavioral ecology model that has been used to understand the establishment and persistence of settlement sites in the archaeological record. On California's northern Channel Islands, the number and location of settlement sites expands over time until the Medieval Climatic Anomaly (1150–600 cal BP), consistent with the predictions of the ideal free distribution. Afterward, total population on the islands continued to increase, but the number of major settlement sites decreased. We argue that this pattern, which is consistent with the ideal despotic distribution model variant, is related in part to territoriality and conflict. Rather than focusing settlement on all the best ecological locations, there are buffer zones between villages that were unoccupied. This includes the depopulation of sites that were occupied early and persistently throughout the Holocene. Many of the occupied sites are in defensible locations with large viewsheds. This study provides a useful case study for understanding the relationship between ecological and social factors in settlement distributions, illustrating the explanatory value of balancing general models and specific cases.

Jefferies, Richard (Dick Jefferies)
[61] *Discussant*

Jefferies, Richard [87] see Stumpf, Tyler

Jelinek, Lauren (Bureau of Reclamation)
[255] *Moderator*

Jenkins, Chris and Lance Lundquist
[351] *Beyond "Document and Destroy" Mitigation: Fill In the Blank*
The National Historic Preservation Act requires federal agencies to consider the effects of their actions on historic properties. In contrast to many other federal agencies, the Army Corps of Engineers, Regulatory Branch does not initiate undertakings on its own behalf. Rather, it is tasked with verifying permit applications from other agencies and the public. The Regulatory Branch is neither a proponent nor opponent of the permitted action. As a neutral party, one of the more challenging aspects of the Section 106 process is developing meaningful mitigation to resolve adverse. However before the consultation process reaches this point, the efforts to avoid and minimize the effects on historic properties plays an important role, contributing to and limiting the options to resolve the adverse effects. Examining permitting actions by the Seattle District Regulatory Branch, this paper presents efforts taken to avoid and minimize adverse effects and how these influenced the efforts to find and craft mitigation to resolve the adverse effects. A major challenge is balancing the conflicting agendas and requests of the consulting parties. The process to consider the consulting party's opinions and the efforts to identify and develop the mitigation measures and their efficacy is presented.

Jenkins, Chris [351] see Lundquist, Lance

Jenkins, Dennis (Museum of Nat. & Cult. Hist., University of Oregon)
[226] *Western Stemmed Occupations of the Northern Great Basin*
Recent research into the chronology and character of Western Stemmed Tradition occupations at the Paisley and Connley Caves provides new insight into the settlement-subsistence patterns and social organization of the period >13,000 to 9000 cal. BP. Human populations may have been larger, more social, and territorially constrained than previously envisioned. Long distance movement of obsidian artifacts across the landscape probably reflect brief population agglomerations (festivals) scheduled to coincide seasonally with peak periods of biologic productivity (late summer–early fall). Pronghorn and rabbit drives, in particular, in and around grasslands surrounding lowland lakes and marshes offered the perfect opportunity to meet potential mates, trade, gamble, exchange gossip, and keep abreast of social developments.

Jenkins, Emma (Bournemouth University), Sarah Elliott (Council for British Research in the Levant), Samantha Allcock (University of Plymouth), Carol Palmer (Council for British Research in the Levant) and John Grattan (Aberystwyth University)
[274] *Using Geochemistry, Phytoliths, and Ethnographic Analogy to Interpret Neolithic Settlements in Southwest Asia*
Our understanding of Neolithic sites in southwest Asia is often impeded by the lack of preservation of biological evidence. As a result, they often consist of a series of structures, the construction and function of which, remains elusive. In order to address this problem we conducted a study which used phytoliths and geochemistry from an ethnographic site in Jordan, Al Ma'tan, to determine if certain building construction techniques and anthropogenic activities leave specific phytolith and elemental signatures. We sampled a range of context categories and our results found that certain categories, for example fire installations and animal penning areas, do have distinct phytolith and elemental concentrations. Other categories, however, were less distinguishable; mainly those constructed using the same local clay sources, for example the makeup of hearths, plastered features, and wall plasters.

Jenks, Kelly (New Mexico State University)
[375] *Prehistoric Rock Art and Historic "Graffiti": Petroglyphs at a Multicomponent Site in Eastern New Mexico*
Recent field investigations at Los Ojitos, a multicomponent site in the Middle Pecos River Valley, have focused on refining the site chronology and documenting the land-use practices of Hispanic homesteaders who settled this area in the late nineteenth century. Like earlier visitors to this site, the Hispanic settlers were attracted to the clean water provided by several little springs ("ojitos") that empty into the river. Survey of one of these spring-fed drainages identified at least 45 petroglyphs—many concentrated in a shady alcove—that range from prehistoric horned serpent figures and undated abstract designs to historical-period carvings of names, anthropomorphs, and possible gaming boards. This paper presents the results of this survey and reflects on the different ways archaeologists have approached and investigated prehistoric and historical-period rock art in this area.
[255] *Discussant*

Jennings, Justin (Royal Ontario Museum)
[147] *Discussant*

Jennings, Richard [32] see Petchey, Fiona

Jensen, Anne (Bryn Mawr College)
[2] *Walakpa as Case Study: Rescuing Heritage and Data from a Vanishing Site*
Walakpa is an iconic Arctic site with spectacular preservation, due to frozen conditions. Although many believe it to have been fully excavated, Stanford was only able to reach a third of the way to sterile soil due to permafrost, so earlier occupations of the site remain unstudied. Long considered stable, Walakpa began eroding rapidly in 2013. A single recent storm removed over 30 m of cultural stratigraphy along a 100+ m front. Need for rapid response prompted a large volunteer effort in 2016, with support from the landowner (an Alaska Native village corporation) and the municipality, as well as many individuals. I will briefly describe the data recovered. Walakpa is only one of many such significant sites in the north, all under threat from climate change. Using Walakpa as an example, I will discuss the implications for our ability to contribute to the expansion of scientific knowledge of the past, and discuss how choices we make in the next few years will impact our science for the foreseeable future.
[224] *Discussant*
[144] *Chair*

Jensen, Anne [144] see Sayle, Kerry

Jensen, Craig (Aquinas College) and Mark Golitko (University of Notre Dame)
[196] *Ceramics Provenience: Chemical Analysis of Ceramics and Clays in Eastern Hungary via LA-ICP-MS*
This project explores the provenience of ceramics found at the Bronze Age Békés 103 cemetery. By answering the question of where these ceramics came from, it is possible to hypothesize which Bronze Age communities used the cemetery. To do this, clays were collected throughout Eastern Hungary for chemical analysis. Clay is often found along river banks, but many modern rivers may have been polluted. Instead, paleo-meanders of modern rivers were chosen as collection sites; these were identified using QGIS. This revealed the chemical variability found throughout the region. Then, by comparing the chemical composition of the clays to that of the Békés 103 ceramics, the farthest possible extent of cemetery usage was determined. Preliminary analysis of the clays was performed using XRF. Both the ceramics and the clays were analyzed by LA-ICP-MS.

Jensen, Jill (National Trails Intermountain Region–NPS)
[255] *Discussant*

Jeremiah, Kristen (Public Archaeology Laboratory, Inc. [PAL])
[16] *Campfire Stories: Defining Features at the Susquetonscut Brook Site 11 in Eastern Connecticut*
The Susquetonscut Brook Site 11 (SB-11) is a Native American campsite occupied primarily during the Archaic Period and again briefly in the Woodland Period. Data recovery excavations conducted by The Public Archaeology Laboratory, Inc. (PAL) in the summer of 2015 resulted in the recovery of

thousands of artifacts and the exposure of 14 cultural features, including post-molds, pit features, fire hearths, and a roasting platform. Feature definition was attained through a variety of analyses, including behavioral studies in regard to resource processing, as evidenced by stone tool morphology and use-wear patterns; lithic tool manufacturing and maintenance, as evidenced by lithic debitage characteristics; refuse patterning, as evidenced by spatial relationships between thermally altered rocks, charcoal, lithic artifacts, and faunal remains; and specialized studies consisting of protein residue, 14C, and phytolith analyses. The results of archaeological investigations provided a better understanding of Native American Archaic period habitation in the Yantic River Drainage basin of eastern Connecticut.

Jerrems, William
[375] *Petroglyphs As Time Markers for Pleistocene Occupation of the Great Basin*
The association of cupules and pit and groove petroglyphs is possibly the oldest form of “rock art” in the Americas as evidenced in the northern Great Basin. Recant methods of dating petroglyphs, made possible by unusual paleoclimatic circumstances, have resulted in what may be the identification of the ‘North America’s oldest petroglyphs.” Three sites located on the shores of ancient Pleistocene Lakes, two at Lake Lahontan in northern Nevada and one at Long Lake in southern Oregon, have given evidence of this style of petroglyph’s great antiquity. At Winnemucca Lake in the far northwestern sub-basin of the Lake Lahontan system, absolute dating was possible on a tufa dome of calcium carbonate deposited by variable lake levels of the Younger Dryas. In all three cases the pit and groove/cupule petroglyph style is present on the shores of Pleistocene pluvial lakes that are now dry lakebeds.

Jeske, Robert (University of Wisconsin Milwaukee)
[102] *Strangers in a Strange Land: The Lake Koshkonong Oneota Locality in Context*
The distribution of Oneota sites in Wisconsin has long been recognized as clustered within distinct areas referred to as Localities. At least seven localities are now generally accepted by Oneota researchers in Wisconsin; several others appear to exist in northern Illinois. However, recent research at the Lake Koshkonong locality shows that it stands as a distinctive outlier among all of the other localities. It is unique in terms of landscape patterns, subsistence strategies, distance from other localities, and interregional and/or interlocality economic and political relationships. A demonstration of this distinctiveness, and an explanation for it, are offered.
[102] *Chair*

Jew, Nicholas P. (University of Oregon), Taylor Dodrill (University of Oregon) and Scott M. Fitzpatrick (University of Oregon)
[223] *Stable Oxygen Isotope δ18O Analysis of Crocus Clam (*Tridacna crocea*) from Palau, Micronesia: Evaluating a Proxy for Sea-Surface Temperature Reconstruction*
For thousands of years and on a global scale, shellfish have been a key resource for peoples living in island and coastal environments. Not only were they critical food resources, but can act as records of paleoenvironmental conditions. In this study, we evaluated whether the crocus clam (Tridacna crocea) could satisfactorily record ambient water temperature via the incorporation of oxygen isotope ratios into the calcium carbonate matrix during shell growth. Modern Tridacna crocea were collected from intertidal zones near the prehistoric (ca. 3000–0 BP) site of Chelechol ra Orrak in the northern Rock Islands of Palau and compared with samples from the archaeological assemblage. The shells were sampled for stable oxygen isotope analysis, fractionation equations applied, and temperatures compared to modern reported nearshore temperatures to determine the efficacy of T. crocea’s temperature recording. X-ray diffraction was also used to determine the shell’s biomineralogical composition, necessary for selecting the appropriate water temperature conversion equation. Results demonstrate that this species is an accurate proxy for estimating ambient sea-surface temperatures (SST), particularly long-term changes due to its slower growth rate.

Jew, Nicholas P. [46] see Dodrill, Taylor

Ji, Ping [116] see Chen, Quanjia

Jiang, Shangwu [115] see Zhao, Yongsheng

Jiao, Tianlong [229] see Bestel, Sheahan

Jigen, Tang [117] see Xiaohong, Ye

Jiménez Álvarez, Socorro [5] see Fernandez Souza, Lilia

Jiminez Cano, Nayeli [44] see Bryant, Jeff

Jin, Guiyun, XianJun Fan (Hunan Provincial Institute of Cultural Relics and) and GuoKe Chen (Gansu Provincial Institute of Cultural Relics and)
[26] *Agriculture Development in the Bronze Age Hexi Corridor-Archaeobtanic Evidence from Xichengyi Site*
The combination of crops and weeds found in the site reflects a typical rainfed agriculture dominated by foxtail millet and broomcorn millet. Under the external cultural influences, wheat and barley started to be cultivated. Since late Machang culture and, through the agricultural development during the “Transitional type” period, were widely cultivated during the period of Siba culture, when marijuna appeared in the crop assemblages. The integrated study of archaeobotanical and zooarchaeological remains, and isotope analysis indicate a subsistence strategy dominated by dry farming during Siba culture in Xichengyi site. Meanwhile, husbandry accounted for certain percentage, with occasional hunting and gathering.

Jin, Heling [33] see Miao, Yunfa

Jin, Yingxi (Institute of Archaeology, Chinese Academy of Social Sciences)
[24] *Research on Neolithic Settlements in the Guanglu Island and the Liaodong Peninsula, China*

The Liaodong Peninsula was a hub that documented interactions across distinctive Neolithic cultures in northeastern China and the northern Korean Peninsula. The Neolithic sites in Liaodong were neighbors with the Liao River (Liaohe) culture to its north; located across the Yellow Sea from the Huanghe culture; and were adjacent to the Chulmun Neolithic culture in Korea across the Yalu River. Thus Liaodong is a key region to understanding cultural interactions throughout the Neolithic period in Northeast Asia. The Institute of Archaeology of the Chinese Academy of Social Sciences has conducted fieldworks in several Neolithic shell midden sites in the Guanglu Island in Liaodong for the last decade. This study focuses on changes in settlement patterns in the Guanglu Island and coastal sites in Liaodong.

Jing, Zhichun [72] see Chen, Hui

Jirsa, Courtney (George Washington University), Tamara Dogandžic (Department of Human Evolution, Max Planck Institut), Kathryn L. Ranhorn (George Washington University) and David R. Braun (George Washington University)
[153] *Assessing Edge Damage in MSA Lithic Assemblages: Experimental Proxies for the Analysis of Use and Postdepositional Damage*
Given the low frequency of retouched stone tools in many Middle Stone Age (MSA) assemblages, the analysis of edge damage on unretouched artifacts offers a promising depth of insight into tool-use behavior. Taphonomic process such as trampling, however, can also cause edge damage on lithic artifacts. As part of the investigation of GaJj17, an MSA site in the Koobi Fora region (Kenya), we conducted an experiment designed to investigate differences between edge damage resulting from use and that resulting from postdepositional damage. Damage was inflected on the edges of a series of ignimbrite flakes in a variety of experimental contexts (e.g., butchery, trampling). These experiments mimicked processes that may inflect damage on tool edges. We assessed the relationship between edge angle and the intensity and continuity of edge damage in these experimentally damaged artifacts. A qualitative assessment of the intensity and continuity of edge damage was used to distinguish use from postdepositional damage. These criteria were applied to in situ and surface collections from GaJj17. These analyses sought to test whether the archaeological assemblages exhibit patterns of damage more similar to experimental use or trampling. This research was sponsored by the National Science Foundation IRES Program (OISE-1358178 and 1358200).

Jochim, Michael (Univ of California–Santa Barbara)
[332] *Functional and Organizational Variation among Late Mesolithic Sites in Southwestern Germany*
Because sites of the Late Mesolithic are relatively rare in southern Germany, and are mostly represented by caves, three open-air sites of this period provide unique insights into this period. Two of the sites are located on a lakeshore and the third is in a river valley. All three possess excellent preservation of organic materials that facilitate analysis. The contents and spatial organization of these sites will be examined in the context of their functional role and their implications for understanding the lifeways of the last hunter-gathers in the region.

Jochim, Michael [90] see Harris, Susan

Johal, Mannat (University of Chicago)
[167] *"The South" as Object of Knowledge between Archaeology and History*
With a focus on writing about the medieval period in southern India, this paper will interrogate how south India came to be defined as an object of knowledge, and thus, a space for representation. Narratives on the south Indian past, from the writing of the Dravidian proof in early nineteenth-century Madras to Nilakanta Sastri's iconic History of South India in the year of India's independence, have engendered polyvalent inheritances for current historiographical projects. In unpacking these inheritances, this paper is interested in the mechanics of the constitution of historical facts. While the history of medieval south India has typically drawn from textual sources, both literary and epigraphical, archaeology makes different promises of retrieval and representation. Yet, archaeologists too must contend with inheritances of method and narrative, often rooted in the particularities of the object of knowledge. Taking a cue from the attentiveness of deconstruction toward the processes of historiography, archivisation and the representation of knowledge, this paper interrogates the relationship between evidence and narrative. It is especially interested in the impetus for new evidence, and the role of newly generated facts in plugging perceived gaps in our knowledge of "the south."

Johal, Mannat [325] see Lycett, Mark

Johansen, Peter (McGill University) and Andrew Bauer (Stanford University)
[167] *Settlement, Socio-environmental Practice and the Long Durée of Landscape Production in South India: A Regional View from Maski, Raichur District, Karnataka*
For five seasons, the Maski Archaeological Research Project has been collecting new multi-period archaeological and environmental data on changing patterns in settlement, agricultural, pastoral and metallurgical land-use practices from a 64km2 study area surrounding the large multi-period site at Maski. Our research documents significant temporal changes in the size, configuration, density and location of settlements, as well as those among a myriad of other sites (e.g., pastoral camps, field stations, iron working facilities, rock art complexes, water retention features, and mortuary sites), and 'off-site' artifact distributions dating to between the South Indian Neolithic and Medieval Periods (3000 BCE–1600 CE). Occupational histories of geo-environmental contexts (e.g., inselberg slopes and terraces, pediment slopes, peneplain and river terraces) point to shifts in social and environmental practices that transformed a range of soils, water and mineral sources into social and economic resources. We discuss how, through the deployment of strategies and technologies of control (social and environmental), opportunities and inequalities of access to these resources were constructed and contested across an ever-changing political landscape. In doing so we argue for a regionally unique social and environmental history in which ecological vectors of social difference contributed to the production of a temporally dynamic political landscape.

Johansson, Lindsay (University of Colorado, Boulder)
[339] *People and Animals on the Move: Insights from the Promontory Caves on Proto-Apachaean Faunal Use and Hunting Practices*
The faunal assemblages recovered from the Promontory Caves by Julian Steward, and more recently by John Ives and Joel Janetski, suggest that the subsistence practices, hunting patterns, and mobility strategies of those using the caves ca. AD 1100 to 1300 differed greatly from those of later peoples who used similar ceramics in the same region. While there are many potential explanations for these differences, this paper uses faunal data to argue that large game hunting, together with the mobility patterns of the animals hunted and transport decisions made by hunters living in the Promontory caves, may have adversely affected large game populations in the area and, as a result, prompted some proto-Apachean individuals to leave the Great Salt Lake region when large game populations became less reliable. Because of the heavy dietary focus individuals living in the Promontory Caves placed on large game, it is possible that when these individuals left the area, they followed migrating game, eventually ending up in new places such as the Dismal River region.

Johnston, Christine (Western Washington University)
[240] *Reinventing by the Wheel: Ceramic Networks and New Approaches to the Study of Political Economies*
This paper explores the value of network analysis as a method for the quantitative assessment of trade systems with the aim of profiling the structural nature of their associated political institutions. This study will focus on trade in the Eastern Mediterranean during the Late Bronze Age (ca. 1700 to 1200 BCE), and includes a network analysis of Cypriot and Mycenaean pottery circulated throughout Egypt, Cyprus, and the Levant. The analysis of ceramic distribution networks demonstrates a high degree of variability in consumption and import distribution systems across the regions of study. Network centralization and density measures indicate diverging mechanisms for import circulation, which coincide with the contrasting political institutions extant in this period. The networks of ceramic trade in Egypt and the Levant will be contrasted to examine the correlation between network measures and the surmised political structures in these two regions during this period. Results of this analysis will demonstrate the efficacy of network methods for the examination of political economy and traded materials.
[240] *Chair*

Johnson, Eric (Harvard University)
[261] *Measuring Household Wealth Using Mound Accumulation Rates in Skagafjörður, North Iceland*
Characterizing inter-household inequalities has long been a fundamental task of archaeology, but a fine-tuned measure of household wealth is often troubled by the inability to account for time or demographics in the archaeological record. This project tests the ways that Iceland, settled by Norse populations between AD 870 and 930, provides a temporally-sensitive mode of measuring household wealth through average rates of midden and architectural accumulations while also providing a context for studying the emergence of inequality in a previously uninhabited landscape. In 2014, a deep-coring survey of 11 occupational sites was conducted in the region of Langholt in Skagafjörður, Northern Iceland to supplement shallow-coring data previously collected by the Skagafjörður Archaeological Settlement Survey (SASS). With the aid of tephrachronology, volumetric estimates of cultural accumulations were generated in ArcGIS using site boundaries at AD 1104 as the aerial extent of cultural volumes. Site occupation duration before AD 1104 was then used to calculate average Viking Age accumulation rates. I argue that average accumulation rates can be used as a proxy for household wealth over time. Results confirm a strong relationship between accumulation rates and occupation duration of sites, suggesting that settlement order impacted inter-household inequalities over the longue durée.

Johnson, Erlend (Tulane), Ellen Bell (UC Stanislaus) and Marcello A. Canuto (Tulane)
[71] *Tracing the Emergence of Maya Lordship at Secondary Centers of the Copan Polity: An Examination of Residential Differentiation and Access at Centers in the Cucuyagua and El Paraiso Valleys*
In this paper we contend that Copan fundamentally transformed the political structures and social institutions of centers in outlying areas as it expanded and integrated these regions. Evidence from our areas of study, the Cucuyagua and El Paraiso valleys, suggest that these regions had long lived autocthonous populations prior to Copan's expansion into these regions in the Late Classic period. Using evidence from other non-Maya sites in Western and Central Honduras we contend that while varied political systems in these valleys lacked the same degree of social and political hierarchy typical of Maya culture. By examining how Late Classic period site layouts and residential patterns changed over time, we will evaluate to what degree Maya style political hierarchy was adopted in each valley. The data suggest that integration within the Copan polity an adoption of Lowland Maya style political relations led to significant structural changes that allowed local rulers to accrue greater wealth and prestige than had previously been possible. At the same time the degree to which these changes occurred varied from center to center, which may point to differing mechanisms and processes by which these institutions were introduced.

Johnson, Jack (Burke Museum, Univ. of Washington)
[51] *Chronometry at Bear Creek, a ~12,000-Year-Old Site in Western Washington*
Extant deposits at the Bear Creek site are highly compositionally variable, including fibrous peat, fluvial sands, volcanic tephra, and diatomaceous earth, reflecting a series of significant Holocene changes to the local environment. Multiple methods were used to directly date each of these sediments, including radiocarbon dating, single-grain IRSL dating of feldspar, OSL dating of fine-grained quartz, and tephra dating. Results from independent chronometric methods were then integrated with Bayesian analysis performed in OxCal 4.2 to allow statistical assessment of the stratigraphic compatibility of individual dates, to identify significant outliers, and to generate a comprehensive site chronology. Results show a high degree of success; individual dates were generally stratigraphically compatible, with excellent statistical agreement between independent chronometric methods. Results therefore firmly establish the antiquity of the early Bear Creek cultural component at ~12,000 years old and provide a detailed depositional history spanning roughly 9,000 years of local environmental change.

Johnson, James (University of Copenhagen) and Timothy Taylor (University of Vienna)
[76] *The Emergence of the Bel'sk Settlement Complex: Landscape, Population Histories, and Social Structure*
During the Pontic Iron Age, ca. 700–300 BCE, large fortified settlement complexes that encompass areas between 100 ha and 5,000 ha emerged along the forest-steppe and steppe boundary in Ukraine. At Bel'sk, the largest settlement complex of its kind with three separate settlements were linked by a fortification wall spanning 33 km, delineating a massive urban internal space from its hinterlands. Despite one hundred years of periodic archaeological investigation, much about the Bel'sk settlement complex remains an enigma, including its role in Pontic interregional or more localized socioeconomic dynamics. A collaborative Ukrainian-American-Austrian team, funded by the National Geographic Society, began new work at Bel'sk focusing on the analysis of remotely sensed imagery that allow us to explore population levels for each settlement, the construction of the fortifications, and the agropastoral land needed to support the settlement complex. Isotopic analyses of human and animal remains recovered from the cemeteries located at Bel'sk and beyond were also conducted to investigate the degree of mobility in human and animal populations present. In this paper, we discuss the important socioeconomic role of settlement complexes like Bel'sk in the movement of people and livestock in and out of the Pontic forest-steppe/steppe regions.

Johnson, Jay (University of Mississippi) and John Connaway (Mississippi Department of Archives and History)
[163] *Pochteca from Cahokia, an Evaluation of the Implications of Mississippian Period Contact between the American Bottoms and the Northern Yazoo Basin in Mississippi*
Drawing primarily on data from the Carson Mound Group located in the Mississippi River floodplain of northwestern Mississippi, this paper considers the timing, duration, and nature of the substantial evidence for what appears to have been direct contact between the polity that centered on Cahokia and the people who built the mounds at Carson. Distinctive northern traits include raw material, lithic technology, projectile point styles, ceramics, and architecture. These traits appear for a very short span of time during the founding of Carson which is one of the earliest Mississippian Period sites in the northern Yazoo Basin. There is the suggestion that Cahokia played a role in the transformation of Woodland into Mississippian in this part of the Southeast.

Johnson, Katharine (Earth Resources Technology, Inc.) and Guido Pezzarossi (Syracuse University)
[218] *Assessing Defensibility: Geospatial Analyses of Preclassic to Colonial Highland Maya Settlement Patterns*
Postclassic Maya settlement patterns have long been explained in terms of the increasing defensibility in the transition from Classic period settlement patterns. Drawing on arguments for the increased militancy and conflict that characterized the Maya region in the wake of the Classic "collapse," this narrative has endured despite minimal cross-context, large scale assessment. This paper presents the results of a large-scale, in-progress diachronic geospatial analysis of Maya settlement patterns, defensibility and agrosuitability from Preclassic to Colonial periods. Working from Edwin Shook's site survey data, we employ geospatial and statistical approaches to determine defensibility and its intersection with historic land use practices in order to provide cross-comparable and quantifiable data on changing site defensibility across multiple time periods and in different regions. While our results address and nuance defensibility and violence narratives, we also provide insight into the variable historical trajectories, experiences and motivations of diverse Maya communities reflected in heterogeneous settlement patterns.

Johnson, Kelsey, Heather McKillop (Louisiana State University) and Bretton Somers (Gulf South Research Corporation)
[281] *Postclassic Obsidian Trade at Arvin's Landing, Belize: A pXRF Analysis*
Arvin's Landing is a Postclassic (AD 900–1500) settlement located on Joe Taylor Creek near Punta Gorda in southern Belize. The abundance of obsidian in the artifact assemblage at Arvin's Landing indicates trade from the Maya highland sources of obsidian. During the Classic period (AD 300–900), obsidian was transported along the coast and by inland routes to the Maya in the lowlands. There was a shift from a dominance on El Chayal obsidian in the Classic to Ixtepeque obsidian in the Postclassic. During the 2016 Underwater Maya lab season in Belize, we used a Bruker portable XRF machine to assay obsidian from Arvin's Landing in order to evaluate its role in trade. With the abandonment of inland cities in southern Belize at the end of the Classic period, the nearest Postclassic community to Arvin's Landing was the trading port on Wild Cane Cay, some 20 km north along the coast. Certainly there are similarities in obsidian source use between the two communities. In this paper we describe the site of Arvin's Landing, present obsidian source data for the site, and evaluate its role in Postclassic trade with Wild Cane Cay and beyond.

Johnson, Kent (SHESC/Arizona State University)
[245] *Multiethnic Colonial Communities and Endogamy: Evaluating the Dual Diaspora Model of Moquegua Tiwanaku Social Organization*
The Moquegua Valley Tiwanaku colonial enclave was comprised of two Tiwanaku-affiliated populations: camelid agropastoralists who used Omo-style ceramics and maize agricultural specialists associated with Chen Chen-style ceramics. Despite living in close proximity, Chen Chen- and Omo-style communities maintained distinct social and cultural boundaries for several centuries. Goldstein's dual diaspora model suggests that Omo- and Chen Chen-style Tiwanaku colonists represent two separate but interconnected ethnic diasporas, comparable to maximal ayllus, whose members maintained affiliations with their ancestral homelands. Goldstein suggests that members of Chen Chen- and Omo-style maximal ayllu communities also maintained separate ethnic identities in part through endogamous marriage practices. This study evaluates the biological implications of the dual diaspora model. Biodistance and exploratory data analyses of basicranial and temporal bone landmarks are used to evaluate patterns of gene flow among samples of human skeletal remains from five archaeological sites in the middle Moquegua Valley, Peru. Overall, results suggest that maximal ayllu affiliation influenced gene flow within the Moquegua Tiwanaku colonies, but Omo- and Chen Chen-style communities were not strictly endogamous. While normative marriage practices favored maximal ayllu endogamy, there were exceptions to this general pattern. These exceptions were likely structured by myriad factors, including family-based social organization.

Johnson, Leslie Main [77] see Armstrong, Chelsey Geralda

Johnson, Marie (Brigham Young University)
[247] *If It Were Your Grandma: A Tribal Perspective on NAGPRA in Utah*
In 1990, the Native American Graves Protection and Repatriation Act (NAGPRA) was passed. The passing of NAGPRA was a huge step forward for indigenous rights; the law allowed tribes to decide the ultimate outcome of Native American burials found in any context on federal or tribal land. In Utah, there are also state laws that require similar standards of protection on private land. That being said, the repatriation process can be long and painful for many tribe members who are concerned with the welfare of their ancestors. Oftentimes, tribe members must fight the interests of archaeologists to demand the respect that they feel their ancestors deserve. Through evidence gained from interviews with tribe members in Utah, I will show the perspective of the tribes on grave repatriation and NAGPRA associated practices. I will then present possible solutions for the problems raised by tribe members. Hopefully, this paper can help to create a culture of mutual respect and understanding between archaeologists and tribe members.

Johnson, Matthew (Central Washington University)
[343] *Faunal Analysis of Two Columbia River House Feature Sites: Hole-in-the-Wall-Canyon (45KT12) and French Rapids (45KT13)*
As part of ongoing thesis work, a taxonomic and taphonomic faunal analysis was completed for the zooarchaeological collections (n ≈ 5,000) of two house feature sites, Hole-in-the-Wall Canyon (45KT12) and French Rapids (45KT13). Both sites are located near Vantage, Washington, within the inundated area of the Wanapum Reservoir, and date ca. 2400–200 BP. Originally excavated as part of large scale archaeological salvage work prior to dam construction in the summers of 1961–1962, the fauna was never analyzed. The study area represents a significant spatial gap in analysis and reporting of faunal data along the Columbia River. While fauna from house feature sites has been reported for areas to the north and south along the Columbia River, as well as for sites along the Snake River, almost no significant quantifiable faunal data has been reported for the Columbia between its confluence with the Wenatchee River (river mile 468) and Snake River (river mile 325). Preliminary identifications include deer, sheep, rabbit, dog, muskrat, sucker, salmon, minnow, and mussel, and further analysis is underway. The thesis will report on differences and similarities between the analyzed faunal collections and other reported house feature faunal assemblages along the Snake and Columbia Rivers.

Johnson, Meghan (Archaeological Investigations Northwest, Inc.) and Marci Monaco (Archaeological Investigations Northwest, Inc.)
[91] *Dittman Cache Replication*
Experimental replication of the fourteen bifacial blanks recovered from the Dittman cache, site (35MA375) located near Salem, Oregon, provided information that will help answer numerous technological questions as research on the site continues. This study attempts to determine if the bifaces were prepared at the Dittman site or transported there in their current state of reduction. Our primary goal is to demonstrate what debitage would be present if the bifaces were manufactured at the site. Two sets of fourteen bifaces were produced in a controlled setting. One set by an experienced flintknapper and one set by two novice flintknappers. The individual reductions were timed, collected, and analyzed. Debitage was separated by size, type of termination and whether the platform was present, absent, or crushed. The replicated bifaces were compared to the cache bifaces and the debitage was analyzed by reduction stage. The experimental data can be used to determine if the bifaces were produced at the Dittman site. The data

can also be used to answer questions regarding the reduction strategy, technological approach, implications of obsidian quality selected, possible skill level of the flintknapper, and to determine if the cache was intended for local use or trade.

Johnson, Nadia (Penn State) and Kenneth G. Hirth (Penn State)
[13] *Altica and the Role of Middlemen in Formative Obsidian Exchange*
Altica's location, in the Patlachique Range 10 km away from the Otumba obsidian source, suggests a potentially significant role in the distribution of Otumba obsidian. Altica may have served as an important middleman and processing site in Formative obsidian exchange, but a greater understanding of the nature of these exchange relationships is required to define this role. This paper combines geochemical sourcing and technological data from obsidian from nine Early and Middle Formative sites, including Altica, in order to reconstruct the movement of obsidian in this period. The intent of this study is to identify the sources and consumption sites, as well as the physical form in which obsidian was transported—in rough cores, macroblades, or finished products. In doing so, the paper will assess role that intermediary sites like Altica could have played in the processing and distribution of obsidian into downstream sites.

Johnson, Victoria P. (NYU)
[305] *Chair*

Jolie, Edward [373] see Webster, Laurie

Jolivette, Stephanie (Statistical Research, Inc.), Ross Smith (University of Oregon) and Shelby Anderson (Portland State University)
[47] *Subsistence and Seasonality during the Thule Phase (ca. 1000 BP to Contact Era) at Point Spencer, Alaska*
Intensification of marine resource use is well documented over the last 1,000 years in northern Alaska, but the role of other resources in the subsistence economy is poorly understood. In order to better understand the full range of subsistence activities, and to reconstruct season of site occupation, we undertook analysis of faunal materials from several Thule Phase sites located on Point Spencer, Alaska. The subsistence remains from a large site near the tip of the peninsula (TEL-8) were found to be dominated by sea mammals, primarily ringed seals (Pusa hispida), with bird remains dominated by eiders (Somateria spp.) and other seaducks and mergansers. By contrast, least auklets (Aethia pusilla) dominated the bird fauna of the other sites along the peninsula, and fewer sea mammal remains were identified. These sites also contain large quantities of fish bone, in contrast to TEL-8 site where fish bones were extremely rare. The variety in faunal remains suggest that this region was an important subsistence gathering location across multiple seasons and that local diet was relatively diverse. These results contribute new data to a limited but growing body of research on diet and subsistence activities in Arctic hunter-gatherer groups over the last 1,000 years.

Jones, Ashley (Raba Kistner Environmental)
[109] *Moderator*

Jones, Emily Lena (University of New Mexico)
[251] *Testing for Environmental Rebound: Untangling a Multicausal Event*
"Environmental rebound" has been proposed by a large number of researchers to explain the disjuncture between the reports of American environments by early Spanish explorers and the long-term human impacts evidenced in the archaeological record of North, Central, and South America. However, by definition environmental rebound may be caused by multiple factors: changes in human population numbers, settlement patterns, resource acquisition and/or land use may all have contributed to a rebound of environmental conditions to historically observed levels. The presence of these multiple potential causes as well as their intertwined nature makes it difficult to definitively demonstrate rebound in the archaeological record. In this paper, I review the literature (archaeological and other) on environmental rebound associated with the Columbian Exchange; explore the different ways scholars have tested for rebound; and assess the potential of different avenues for moving forward in understanding rebound events.
[165] *Chair*

Jones, Eric (Wake Forest University), Maya Krause (Wake Forest University) and Caroline Watson (Wake Forest University)
[79] *Lithic Material Use in the Upper Yadkin River Valley and Its Implications for Southeastern Late Woodland Exchange Networks*
Mississippian and Piedmont Village Tradition (PVT) communities contemporaneously occupied the North Carolina and Virginia Piedmont and adjacent areas from AD 1100–1600. Discussions of trade and exchange, however, tend to focus on Mississippian political economies. Previous work at PVT sites has identified nonlocal lithic materials, some moving between Mississippian and PVT areas, suggesting a regional network that included both cultures. Our work focuses on the fourteenth-century Redtail site (31Yd173), a small, dispersed PVT settlement in the upper Yadkin River Valley. We compare total proportions of local to nonlocal materials between Redtail and other sites in the valley to examine variations in material use over time and space. We also examine the context, spatial arrangement, and material type of different tools to understand how access to particular materials influenced their use at this site. This work provides new information on PVT exchange behavior, which is critical to understanding the complete scope and structure of Southeastern regional trade networks. The influence of Tom and Charlotte's approach to research, teaching, and mentoring is apparent throughout every aspect of this project, from the analytical methods to the collaborative approach that values undergraduate students as legitimate scholars.

Jones, George (Hamilton College)
[79] *Discussant*

Jones, Ian (University of California–San Diego), Mohammad Najjar (JoScapes) and Thomas E. Levy (University of California–San Diego)
[297] *Economic Strategies of Provincial Elites in Ayyubid Southern Jordan*
The late twelfth and thirteenth centuries AD in the southern Levant are a period of increasing political centralization, ending the political instability caused by the fragmentation of the 'Abbasid Empire in the tenth century AD. While the eleventh and early twelfth centuries are marked by near-constant shifts in political sovereignty, by the thirteenth century control was contested only between the Ayyubid rulers of Cairo and Damascus. A third center—Karak, in central Jordan—was, however, able to achieve political autonomy, if only briefly, during the thirteenth century, largely through maintaining economic autonomy. The elites of Cairo and Damascus recognized and attempted to disrupt this economic autonomy, but with only limited success. This paper presents evidence from recent archaeological research at one of the "nodes" of this economic strategy, the copper ore resource district of Faynan, in southern Jordan, where copper production saw a brief revival during the twelfth and thirteenth centuries AD. This strategy of maintaining political

autonomy is also compared to other strategies that have been archaeologically and historically observed in the Levant both earlier and later in the Islamic periods.

Jones, Jacob [49] see Duelks, Jonathan

Jones, Jennifer (University of Minnesota Duluth)
[151] *Population Aggregation at the Early Bronze Age Settlement of al-Lajjun, Kerak Plateau, Jordan*
The University of Minnesota Duluth Project is working at al-Lajjun to understand the initial period of population aggregation in the southern Levant. At this time, settlements of 5,000–10,000 people, some with fortification walls, developed. The economic and political organization of these larger groups of people, whether hierarchical or heterarchical, competitive or cooperative, embedded in or separate from kin groups is under debate. Our research seeks to add to this discussion by detailing the intrasite location of craft production and the distribution of architectural features at one such third millennium site. Al-Lajjun is unburied by later settlement so the visibility of artifacts and architectural features offer a valuable space within which to experiment with intensive site survey and GIS mapping techniques. During our initial season, we identified two areas inside the fortification wall with concentrations of lithic debitage and established the feasibility of extensive artifact mapping. In our second season, we mapped and recorded at least 100 domestic and nondomestic architectural features visible on the surface of the site. Next steps include excavation to understand the function and sequence of occupation of the various structures and additional intensive survey to map the distribution of craft production across the site.

Jones, Jennifer (University of Cantabria), Ana B. Marín Arroyo (University of Cantabria) and Michael P. Richards (Simon Fraser)
[165] *Bioarchaeologocal Approaches to Reconstructing Upper Paleolithic Environments in the Cantabrian Region, Northern Spain*
The Cantabrian Region of Northern Spain was an important refugium during the harsh conditions of the Last Glacial Maximum, when ice sheets covered much of Northern Europe and populations were pushed further south. Late Upper populations in the Cantabrian region thrived at this time, and there is an increase in the density of archaeological sites is seen, in addition to cultural changes such as the creation of rich cave art assemblages. Understanding the climatic and environmental conditions experienced by humans and animals in the region is key to understanding the region's importance during the Upper Paleolithic. Specifically, what the environment like was on both an individual site level and regional level is crucial in understanding the conditions experienced by the humans living during the Upper Paleolithic. The use of δ13C and δ15N stable isotope analysis of animal bone collagen from hunted ungulates, in combination with more traditional environmental proxies can produce detailed paleoclimatic reconstructions directly linked to the moments when these sites were being occupied. Results show that environmental and paleoclimatic changes were occurring in the region at this time, impacting on the behavior of Upper Paleolithic humans and animals, observable on an individual site level and regional level.

Jones, John G. (Archaeological Consulting Services) and Nicholas Dunning (University of Cincinnati)
[337] *Archaeobotanical Realities at Yaxnohkah: A Pollen Grain of Truth on Preclassic Land Use*
Examination of sediments from several reservoirs at the Preclassic site of Yaxnohkah Campeche, Mexico reveals less than stellar pollen preservation, but still useful botanical data. Thus far, pollen grains show varying degrees of degradation, requiring the use of exacting extraction methods. Cultigens and economic taxa are abundant in the samples demonstrating that we are sampling in the right place, but cyclic wetting and drying has resulted in the loss of fragile taxa, skewing the botanical record. Pollen data can still be obtained, but requires careful analysis and interpretation to identify past activities at this large, important site. Upcoming excavations will focus on the collection of sediments from additional reservoirs and wetlands rich in clay, where oxidation has been less damaging.

Jones, Terry (Cal Poly San Luis Obispo) and Al Schwitalla (Millennia Archaeological Consulting)
[286] *Cooperation and Violence in Prehistoric California: A Brief Interregional Evaluation*
Intergroup cooperation in prehistoric California has traditionally been evaluated via the relative intensity of exchange—tracked archaeologically with shell beads and obsidian. Transported great distances (most commonly via down-the-line exchange) trade items in abundance imply amiable intergroup relations, if not actual cooperation. Violence, on the other hand, as represented in the ethnographic and bioarchaeological records, is generally assumed to represent hostile interactions between individuals and groups. Models that consider these alternative interactive options generally assume that times of non-violence most likely coincided with increased intergroup economic cooperation (e.g., trade). In some instances intensity of violence indeed correlates with paleoenvironmental variability, specifically with upturns in violence during intervals of climatically-induced resource scarcity. Here we evaluate diachronic patterns in both trade and violence from several regions of California and find surprisingly that trade and some forms of violence did not necessarily alternate, but rather, at some times, co-varied, peaking simultaneously, and then declining.

Jones, Thomas (Archaeological Consulting Services)
[255] *Discussant*

Jones, Terrah (UCLA Cotsen Institute of Archaeology), Rachel Moy (UCLA Cotsen Institute of Archaeology) and Hans Barnard (UCLA Cotsen Institute of Archaeology)
[309] *Storage, Cooking, and Transport: A Preliminary Residue Analysis of Ceramics from Mai Adrasha*
This paper outlines the preliminary investigation of a collection of diagnostic and undiagnostic ceramics recovered from the site of Mai Adrasha, located in the Shire region of Ethiopia. Mai Adrasha is one of the largest and arguably most significant early town sites west of Aksum dating to the Pre-Aksumite to Early Aksumite periods (twelfth century BCE–second century CE) located in the Western Tigray. The site consists of a cemetery and a domestic area characterized by a collection of stone walls and ceramic and lithic assemblages. Study of this site will yield important information on the early prehistoric period and uncover insights into the social, economic, and political organization of the Aksumite polity and what preceded it. Our goal here is to present the initial results of a series of ceramic residue analyses conducted on a small sample of ceramics excavated by the UCLA Shire Project's 2015 field season. Each ceramic sherd was analyzed using gas-chromatography/mass spectroscopy (GC/MS) at UCLA. These results will help address questions concerning the production, consumption, and use life of ceramic vessels at Mai Adrasha, and will hopefully shed some light on Mai Adrasha's standing in the broader cultural landscape of Northern Ethiopia.

Jordan, Amy (University of Washington)
[36] *"Make little use of pots": A Review of Earthenware Assemblages from Three Nutmeg Plantations on the Banda Islands, Maluku Province, Indonesia*

In his 1544 voyage to Maluku, Galvao noted that residents “make little use of pots.” Despite their purported “little use,” earthenware is ubiquitous in Metal Age Malukan sites, but few detailed studies of these assemblages have been presented in the literature. In this paper, I reviewed the ceramic assemblages from multicomponent sites in the Banda Islands, Maluku Province, Indonesia. The Banda Islands were the world’s sole source of nutmeg prior to the seventeenth century and was a center of early experimentations in European colonialism while concurrently being a node in a regional Asian trade network. The time periods of assemblages range from Neolithic to early twentieth century. The characteristics of tempers and designs of ceramics suggest differential access to the long distance trade network based around the Banda Sea and may be associated with changing social patterns associated with the global spice trading.

Jordan, Jillian M. (University of New Mexico)
[162] *Late Classic Ceramic Production and Communities of Practice at Uxbenka, Belize*
Archaeological approaches to ancient Maya communities often assume that spatially distinct architectural groups are tantamount to social groups, but proximity is likely not the only salient organizing principle. Members of prehistoric communities, like modern ones, defined the community in which they belong based on who they choose to interact with, which often lies at the intersection of kin, status, gender, ethic, economic, and spatial affiliations. Employing a communities of practice theoretical framework, this paper examines the ceramic manufacturing process from resource acquisition to final production decoration using macroscopic and petrographic data. At least three households, located in three spatially distinct neighborhoods, likely participated in ceramic production during the Late Classic Period (AD 600–800). I analyze both low visibility (shared knowledge at the personal level) and high visibility (shared knowledge at a broad scale) on utilitarian ceramic vessels recovered from these households to understand the degree and nature of information exchange through an examination of the spatial distribution of the attributes among households and neighborhoods at Uxbenka. These data are used to evaluate spatial conceptions of intracommunity social boundaries and argues for a more interaction-based approach.

Jordan, Peter (Arctic Centre, University of Groningen, Netherlands)
[35] *Life beyond Circumpolar Cosmologies: New Themes in the Archaeology of Arctic Human-Animal Relations*
In Arctic Archaeology, human-animal relations have traditionally been studied in terms of ecology, optimality and adaptation; more recently, there has been growing interest in understanding how spiritual obligations affected treatment of circumpolar animals and their physical remains. Although these symbolic perspectives were initially useful, many tended to draw on ethnography, especially when using the concept of a single overarching ‘Circumpolar Cosmology; unfortunately, this can reduce prehistoric human-animal interactions into the same endless cycle of respectful hunting, reciprocal release of animating essences, and their eventual regeneration into new forms of life. This paper undertakes a critical reflection on the current state of Arctic human-animal studies, and concludes that we need to move beyond thinking in terms of fixed cosmologies, and engage more fully with the unique potentials of the long-term Arctic archaeological record. In fact, rather than a single timeless cosmology, these sequences provide abundant evidence for profound variability and endless transformation in the ways in which humans related to northern animals; at the same, time new scientific methods are transforming the depth, quality and diversity of information about these shifting relations, as well as their social and ecological contexts. Suggestions for future research priorities are presented in the conclusion.
[330] *Discussant*

Jordan, Peter [35] see Junno, Aripekka

Jorgensen, Mads [347] see Cheong, Kong

Jorgeson, Ian (Southern Methodist University)
[287] *Quantifying the Relationship between Geography and Social Networks*
Social Network Analysis (SNA) has become an important tool for archaeologists. However, unlike other social scientists who work with living populations, archaeologists do not have direct access to the social networks of ancient peoples. Instead, they rely on material culture to infer the presence, strength, and properties of social networks in the past. A standard approach is to compare assemblages of an artifact class among a group of sites, and quantify the similarity of those assemblages pairwise as a proxy for social networks. Pairs of sites with high similarity scores are inferred to be more strongly networked. For many artifact classes, the assumed link between assemblage similarity and strength of social network is well supported. However, this assumption is potentially problematic when assemblage similarity is based on geochemical sourcing of artifacts. In these cases, the distances between sites and the sources of the raw materials may do a better job of explaining patterns in assemblages among sites. This research develops a method for quantifying geographical similarity of sites to raw material sources using least-cost path analysis within a GIS framework, establishing a baseline of expected assemblage similarity given local geography, which can then be compared to the results of SNA.

Joseph Folan, William [349] see Domínguez, María del

Joslin, Terry [300] see Perry, Jennifer

Joyce, Arthur (University of Colorado at Boulder)
[82] *Landscape and Dietary Change in Formative Period Coastal Oaxaca*
This paper presents the results of an isotopic study of human dietary change during the Formative period (2000 BCE–300 CE) in the lower Río Verde Valley of Oaxaca. Approximately 60 individuals were sampled for δ13C and δ15N using both teeth and long bones. The study examines trends in the consumption of maize and marine/estuarine resources relative to regional environmental change. Interdisciplinary research along the drainage system indicates that environmental change in the lower Verde was triggered by anthropogenic landscape change in the highlands. Geomorphological research in the Nochixtlán Valley in the Verde’s upper drainage basin provides evidence for anthropogenic erosion due to land clearance for agriculture beginning in the Early Formative period. Paleoenvironmental research in the lower valley shows that the erosion in the highlands altered the drainage system, which led to an expansion of the agriculturally productive floodplain. Sediment discharged into the Pacific Ocean also contributed to the formation of bay barriers and back barrier estuaries. The expansion of the floodplain and the formation of the estuaries created highly productive habitats that may have contributed to population growth and dietary change. The isotopic study evaluates how human diet was affected by the changes in lowland environments.
[82] *Chair*

Joyce, Arthur [82] see Urcid, Javier

Joyce, Rosemary (University California Berkeley)
[357] *Death and the Origin of Enduring Social Relations*
Knowledge of Formative Period Mesoamerican archaeological sites often comes from narrow windows into buried sites. One feature has been a partial exception to this rule: burials. Groups of Formative Period burials, often accompanied by objects, have been recovered in many parts of Mesoamerica. Using models of mortuary treatment that saw burials as reflecting individual identity, burials provided one of the first ways researchers could examine the emergence of stratification within these settlements. Yet such analyses were open to critiques of the assumption that burial treatment was a simple reflection of social status and identity. In previous research on published burials from Tlatilco, I showed that clusters of burials there were products of social action by people associated with specific residential groups or neighborhoods within the settlement. I was able to demonstrate within-village variation not rising to the level of emergence of firmly delimited social strata but illuminating how stratification emerged, with intergroup distinction, age-related uniformity, and gendered trends evident in women's burials. This paper considers in detail the burial assemblages of males not previously analyzed, refining models that might be applicable more broadly in other Formative villages in the process of creating distinctions in wealth, status, and authority.
[178] *Discussant*

Juárez-Martin, Ana Itzel [119] see Bustos-Ríos, Diana

Judd, Veronica [335] see Craig, Douglas

Juengst, Sara L. (UNC Charlotte), Manuel Mamani (Universidad Nacional de San Agustin de Arequipa) and Karissa Deiter (Vanderbilt University)
[75] *Stress and Daily Life in an Andean Reducción Town: Preliminary Osteological Analyses of Juvenile Burials in a Church Sacristy*
Juvenile mortality and morbidity is a sensitive marker of overall group health, as juvenile individuals are more susceptible to circulating endemic diseases and nutritional stress. Thus, reconstructing relative frailty of the juvenile population at Mawchu Llacta provides important data about daily life at this colonial site, in a relatively understudied transitional period of Peruvian history. In this paper, we present the results of preliminary skeletal analyses of burials excavated from the sacristy at Mawchu Llacta. These burials included 21 individuals whose ages ranged between birth/infancy and eight years old. While preservation of the remains varied depending on depth of the burial, dentition and some cranial and long bone remains were well-preserved enough to allow for macroscopic, paleopathological analyses. We particularly focused on recording indicators of nutritional and/or immune stress (such as periosteal reactions, porotic hyperostosis, cribra orbitalia, and linear enamel hypoplasia) as a way to investigate overall frailty of the burial sample. Here, we present initial results and interpretations of this skeletal analysis, and suggest future projects that will help us more fully understand routine risk and stress experienced by people living at Mawchu Llacta.

Juengst, Sara L. [75] see Deiter, Karissa

Julig, Patrick (Laurentian University)
[216] *Traditional Wooden Structures on an Ancient Quartzite Quarry Site, Manitoulin Island, Canada*
Ancient quarry extraction locations on elevated bedrock outcrops continue to be used in the modern era for traditional activities such as constructing bent wooden sweat lodges and wooden shelters for fasting and meditation, which are built and maintained in modern times, over at least several decades. Other special "powerful" locations such as a cave in a Bar River Formation quartzite adjacent bluff are visited and used for spiritual activities by local First Nations members. As part of the sacred cultural landscape these topographically elevated quarry locations also appear to be "maintained," as broken glass from hilltop parties has been removed to clean the area. The continued traditional use for fasting and meditation may restrict other interpretive activities at such quarry workshop sites, as walking paths and visits by tourists are not too compatible with traditional activities such as fasting.

Júliússon, Árni Daniel [77] see Hicks, Megan

Jun, Ben [17] see Finkelstein, Aviva

Junge, Justin [257] see Anderson, Shelby

Junker, Laura (University of Illinois Chicago)
[41] *Battlefield Archaeology in Ancient Europe and Southeast Asia: The Challenge of Remote Histories and Personification of War Events*
Archaeological studies of 'warfare' in their cultural settings have multiplied over time and include analyses of fortifications, military equipment, warrior paraphernalia, and human skeletal trauma, usually spanning broad time scales and including diverse archaeological contexts (e.g., town walls, weapons production workshops, cemeteries) that are often remote from the actual locales where warfare is carried out. In contrast, 'battlefield' archaeology focuses on relatively temporally compact events occurring within actual fighting spaces and on the personal 'minutia' of battle experiences and outcomes for individual participants and factions. In the case of recent wars, a sizeable and diverse historical record and oral histories, more visible and better preserved sites, and a wider array of forensic science options have produced good results in not only identifying combatants, but also inferring the various factors (mechanical, environmental, and human decision-making) involved in war casualties. However, differing temporal scales, degrees of historical reference, and preservation of archaeological remains challenge battlefield archaeologists dealing with premodern war events. To illustrate the difficulties of reconstructing battlefield events in the distant past and investigating their impact on regional political and social landscapes, several case studies from Bronze Age and Iron Age Europe and pre-sixteenth century Southeast Asia are analyzed.

Junno, Aripekka (University of Groningen), Hirofumi Kato (Center for Ainu and Indigenous Studies, Hokkaido U), Sven Isaksson (Archaeological Research Laboratory, Department) and Peter Jordan (Arctic Centre, University of Groningen, PO Box 716)
[35] *Exploring Human-Animal Relations among the Okhotsk Culture in Northern Japan*

This paper investigates long-term human-animal interactions among Okhotsk cultures in Hokkaido, northern Japan. The Okhotsk Culture were maritime foragers and traders who expanded out from the Amur into Hokkaido and Sakhalin Island from about AD 600, with many of their distinctive traits and practices such as elaborate bear ceremonialism and other hunting rituals persisting into the historic Ainu cultures. Our ongoing research aims to understand the origins, spatiotemporal variability and long-term change in how communities living along the north coast of Hokkaido were 'bringing home animals' and subjecting particular terrestrial and aquatic species to specific processing and consumption practices. To trace the origins of some of these traditions, our study examines cultures that predate the Okhotsk, for instance the Late Jomon period. We are applying organic residue analysis of food processing technologies such as tools and pottery containers to elucidate how different marine and terrestrial animals were treated, for example, according to a common set of procedures or in terms of more specific beliefs for each species.

Jurgens, Christopher [126] see Hanselka, Kevin

Kabata, Shigeru [353] see Murakami, Tatsuya

Kaeding, Adam
[280] *Colonial Negotiation in the Frontier Province of Beneficios Altos*
The frontier location of the Spanish colonial province of Beneficios Altos, Yucatán provides a unique case study for investigation into the lives and strategies of colonial Maya individuals and communities. Given their proximity to a notoriously porous southern border and the documented record of significant numbers of people who escaped colonial authority by crossing that border, those communities and individuals living within the boundaries of Beneficios Altos can largely be considered to have remained by choice. A process of colonial negotiation carried out primarily through daily, mundane interactions between agents representing and/or opposing the interests of the Spanish Empire established the foundation by which residents of Beneficios Altos communities (both Maya and non-Maya) maintained and created distinct cultural and ethnic identities. This paper details the process of colonial negotiation and draws upon archaeological and documentary data to demonstrate examples of its effect on the Beneficios Altos population and landscape during the colonial and early national periods.

Kahn, Jennifer (College of William and Mary)
[278] *Houses of Power: Community Houses and Specialized Houses as Markers of Social Complexity in the Precontact Society Island Chiefdoms*
World-wide, communal houses and specialized houses represent hallmarks of social complexity. In precontact Society Island chiefdoms, social complexity was materially marked by architectural differences between elite and commoner residences. Yet perhaps more pronounced are architectural differences and varied spatial patterning between residential houses, communal houses, and specialized houses. This paper provides a spatio-temporal analysis of communal and specialized houses on the Ma'ohi landscape. Communal houses, notably fare manahini (elite meeting houses), fare 'arioi (houses for the fertility sect), and fare ia manaha (houses for storing ritual items) differ from everyday residences in their large size, elaboration, and spatial proximity to ritual sites. Specialized house sites, including those for craft activities and those to house ritual practitioners, sometimes mimic residential houses in their size and architecture, yet have different suites of activities associated with site occupation. Tacking back and forth from the microscale to a landscape approach highlights how communal and specialized houses not only materially marked socioeconomic rank, but created landscapes of power, or landscapes of inclusion and exclusion based on one's rank and bounded status. In this way, communal houses and specialized houses serve as important hallmarks of increasing social complexity in the late prehistoric Society Island chiefdoms.
[19] *Discussant*

Kalaska, Maciej [316] see Druc, Isabelle

Kalawe, Keonelehua [43] see Rossen, Jack

Kalayci, Tuna (Institute for Mediterranean Studies, FORTH)
[57] *A Satellite Remote Sensing Model for the Ancient Traffic in Upper Mesopotamia*
Roads reflect motivations and needs behind many relations of past societies; they imposed spatial order on agricultural production, enabled transportation of bulk-goods, and mediated hegemonic power. Considered not only as the container of action, but also the action itself, the road has much more to say on the ancient movement praxis. This study focuses on Bronze Age roads (hollow ways) in Upper Mesopotamia. At this space-time, the movement embedded within production economies contributed to the formation of hollow ways. In pursuit of this phenomenon, the study constructs a typology of roads based on the volume of ancient traffic. Therefore, the aim is not only to document locations of hollow ways–the container, but to build a model for the movement—the action. It is hypothesized that variations in the ancient traffic differentially changed soil physical characteristics (soil compaction/moisture) so that past variation in traffic is still detectable on satellite data. In particular, CORONA is deployed for a remote sensing based archaeological survey of hollow ways. Next, Near-Infrared and Short-wavelength Infrared portions of the spectrum are exploited to generate proxy variables (vegetation/moisture indices). Finally, these proxy variables are used to model variations in ancient traffic on hollow ways.

Kalayci, Tuna [282] see Sarris, Apostolos

Kalisher, Rachel [252] see Fu, Janling

Kamenov, George [144] see Fitzhugh, Ben

Kamp-Whittaker, April (Arizona State University)
[315] *Moderator*
[111] *Discussant*

Kaner, Simon (University of East Anglia)
[25] *Discussant*

Kaner, Simon [396] see Nixon, Sam

Kang, Chang-Hwa
[24] *Early Historic Overseas Exchanges in Tamra, Jeju*
Overseas exchanges are a key interest in Jeju archaeology as several sites there document intricate networks in early historical periods. The term “Tamra” is first appeared in the “Samguk Sagi” (History of the Three Kingdom, 1145), and is widely believed to refer to political entities in Jeju. In archaeology, “Tamra” often refers to the period from c. 200 BC to AD 1105, and if further divided into three phases. The Tamra Formation period (200 BC–AD 200) marks a population increase and increasing social distinction among settlements. The Early Tamra period (AD 200–500), contemporaneous with the Three Kingdom period in mainland Korea, documents the integration of regional cultures, as manifested in the wide spread of the Gwakjiri-style material culture. The Late Tamra period (AD 500–1105) is recorded in early historical texts as a small state. Throughout the Tamra period, several sites show imported materials, including both utilitarian and prestigious goods. For example, the Formation period sites yield jade rings and Han Dynasty coins, while the Early Tamra sites reveal the Chinese celadon. The shift in trading patterns during the Tamra period reflects changes in social dynamics across the seas and rising social complexity in Jeju.

Kanik, Nadine (University of Winnipeg Department of Geography), Yadira Chinique de Armas (University of Winnipeg Department of Anthropology), Mirjana Roksandic (University of Winnipeg Department of Anthropology) and Bill M. Buhay (University of Winnipeg Department of Geography)
[69] *Determining local marine reservoir effect ΔR correction factors for Cuba*
The atmosphere constantly produces radiocarbon, 14C, which dissolves in the oceans as carbon dioxide. Theoretically, radiocarbon concentrations are equilibrated between the atmosphere, hydrosphere, and biosphere. However, in some regions old seawater at the bottom of the oceans returns significantly older radiocarbon dates as water sinks down the water column, causing the isotopic decay of 14C to increase with depth. This creates a delay of ~200–500 years for the atmospheric carbon to be completely distributed through the ocean’s water column, producing the Marine Reservoir Effect (MRE). This results in different radiocarbon content between terrestrial and marine organisms. In a local context, coastline shape, ocean bottom topography, currents, trade winds, and local climate, control the upwelling and mixing of deep and surface water. Radiocarbon dates obtained from biogenic calcite and aragonite precipitated from these mixed waters reflects a unique regional age variance, known as its ΔR value. Therefore, in areas of upwelling, marine carbonates are 14C deficient and return radiocarbon dates that may be significantly older or younger than terrestrially dated materials of the same age. This study examines the local MRE and the associated ΔR correction factors for Cuba and discusses the implications of these for some Cuban archaeological sites.

Kansa, Eric (Open Context/UC Berkeley)
[227] *Big, Slow, and Linked: Toward Distributed and Scalable Data Practices in Archaeology*
This paper highlights the social challenges of bringing “Big Data” to archaeology. In the political economy of universities, corporations, and governments, Big Data enjoys a special status because it tends to require and reinforce institutional and information centralization. We often imagine that the research and analytic opportunities promised by Big Data are a function of the economies of scale offered by the centralized aggregation of fungible datasets. However, many forms of archaeological data are small but complicated, collected under very different conditions and sampling protocols. Moreover, archaeology has many different institutional stakeholders that create and manage data, making centralized aggregation more difficult. Because of these complications, this papers advocates a “Slow Data,” incrementalist, approach to building Big Data. As illustrated by Open Context and other Linked Open Data providers, larger datasets can be assembled from data contributions scattered across the Web. While Linked Open Data (especially when combined with text-mining) offers paths for data aggregation, bringing together diverse data still involves potentially contestable judgement calls that require specialized knowledge, thought, and labor investments. Therefore, archaeological Big Data needs community-wide commitments to practice more open and more reproducible research.
[149] *Moderator*
[66] *Discussant*

Kansa, Eric [18] see DeMuth, R. Carl

Kansa, Sarah Whitcher (AAI/Open Context), Shawn Graham (Carleton University) and Eric Kansa (Open Context/UC Berkeley)
[18] *WTF Do API, JSON, CSV, and LOD Mean? Instruction and Professional Development in Digital Archaeology*
Digital data play increasingly prominent roles in archaeological research. At the same time, the Web has become the key medium for professional and public communication including the transmission of research data. The “Web of Data” represents a fundamental paradigm change. Increasingly, data are no longer packaged in discrete files (spreadsheets, database files) for download. Instead, many datasets come from dynamic information services (APIs, or Application Program Interfaces) and link with other data on the Web using Linked Open Data (LOD). While these services have the potential to transform our ability to visualize and understand data, many people are still struggling to move beyond basic use of spreadsheets. We present case studies from the 2015–2016 Michigan State University Institute for Digital Archaeology (#MUSDAI) and the 2016 Open Context & Carleton University Prize for Archaeological Visualization to highlight how self-expression and building can promote data literacy and better professional practice.
[149] *Moderator*

Kantner, John (University of North Florida)
[147] *Discussant*

Kaplan, Jed (University of Lausanne)
[325] *Anthropogenic Land Cover Change over the Last 6,000 Years: How Can We Use Archaeology to Inform Global Models?*
Did humans affect global climate before the Industrial Era? While this question is hotly debated, the coevolution of humans and the natural environment since the last Ice Age had an undisputed role in influencing the development and present state of terrestrial ecosystems, many of which are highly valued today as economic, cultural, and ecological resources. Yet we still have a very incomplete picture of human-environment interactions over the last 21,000 years, both spatially and temporally. In order to address this problem, I am working as part of the PAGES LandCover6k/LandUse6k group to synthesize the archaeological record of demographic, technological, and economic development in the preindustrial world. These data are combined with a dynamic global model of land cover and human-environment interactions to quantify the magnitude and timing of global anthropogenic land cover change in the late Pleistocene and preindustrial Holocene. This integrated model is driven with paleoclimate from GCM scenarios and simulates global

land cover and human land use change, fire, soil erosion, and emissions of CO_2 and methane (CH_4). My results highlight the importance of the long histories of both climate change and human demographic, economic, and technological history on the development of continental-scale landscapes.
[268] *Discussant*

Kaplan, Jed [38] see Kay, Andrea

Kaplan, Jessica
[222] *Obsidian in the Wari Empire: Sourcing Material from the Capital Using pXRF*
This paper examines the procurement and consumption of obsidian within the Wari capital (AD 600–1000) in the Ayacucho highlands of Peru. During the Middle Horizon, the Wari Empire expanded and controlled much of the Peruvian Andes, largely through the import, export and regulation of critical resources extracted from subject territories and populations. This project hypothesizes that obsidian may have operated as one such critical resource for imperial control and seeks to examine this hypothesis at the imperial capital of Huari. As part of ongoing dissertation research, analysis was conducted on obsidian collections of varying contexts deriving from the site of Huari, using X-ray fluorescence to determine the source location for each of the samples to explore varying temporal and spatial patterns of consumption of obsidian by imperial populations as well as the relationships between the capital and the hinterland regions from which the obsidian was extracted.

Kaplan, Molly
[14] *A Student's Perspective on the Unidentified Persons Project, San Bernardino, California*
Beginning in 2006 as a response to California Senate Bill 297, the Unidentified Persons Project is the first statewide attempt to apply modern DNA analysis to cold cases in San Bernardino County. In 2014 the project became an accredited field school through the Institute of Field Research and proceeded to have two consecutive field seasons in the summers of 2014 and 2015. This paper will present a student's perspective on the most-recent 2015 field season and will discuss both the rewards and challenges of the project. While providing a breakdown of the classroom, field, and laboratory components of the field school, this paper will also discuss the broader themes that emerged throughout the season, including the dynamics between students, professors, and law enforcement, and the realities of pursuing careers in forensic archaeology and anthropology. Overall, the Unidentified Persons Project is a profound initiative that gives back to the community and provides an incredible learning opportunity for its students. The field-school structure of the project should continue to be studied and treated as a model for other counties in California and other states looking to inspire similar initiatives nationwide.

Kaplan, Susan
[224] *What to Do about Avayalik Island 1: A Remote Central Place in the Paleoeskimo World*
In 1978 archaeologists partially excavated a frozen Middle Dorset Paleoeskimo midden on Avayalik Island, a far outer island at the tip of Labrador, Canada's uninhabited northern coast. They recovered hundreds of organic artifacts unlike any found in Labrador's other Middle Dorset sites, which contain only lithic tools. Faunal remains suggested a North Atlantic quite different from that of the present day. In 2016 Kaplan returned to Avayalik and documented the ongoing destruction of the site. Frozen deposits are thawing, compromising organics remains and destabilizing the terrace on which the site is located. Additional structures were identified, some slumping down the terrace's eroding faces. The 2016 visit also revealed that this remote place was a vibrant central place in the Dorset world. How should we respond to the deterioration of a site whose significance is not yet understood, given the major logistical and financial challenges of accessing the island and given that archaeometric techniques now are available to analyze it in ways not possible in 1978? How should northern archaeologists, funding agencies, and permitting bodies respond to site endangerment that stands to compromise our ability to ever understand the cultural and environmental history of the region?

Kardulias, Drosos N. [90] see Torpy, James

Kardulias, Paul Nick (College of Wooster) and Drosos N. Kardulias (Wooster High School)
[234] *Fluid Ethnoarchaeology: A Study of British-Era Water Fountains in Athienou, Cyprus*
The Athienou Archaeological Project (AAP) has conducted excavation and survey work in Cyprus since 1990. Ethnoarchaeological and ethnographic research have accompanied the other field investigations to create a holistic examination of the community situated at the southern end of the Mesaoria, a fertile agricultural plain in the central part of the island. The semiarid summer climate makes access to water a major concern of the residents of Athienou. A number of public fountains scattered throughout the town are a remnant of the British colonial presence in the twentieth century. In the summer of 2016, an AAP team recorded all of the extant fountains. Most of the water stations occur on a heritage corridor along which the municipality, with assistance from the national government, has restored a number of traditional structures. The fountains and the buildings together reflect an effort to preserve elements of past village life that are rapidly disappearing. In addition, the fountains are a modern example of the age-old effort to provide sufficient water in the region; in the Malloura Valley south of Athienou, this aspect is reflected in a qanat system of underground channels cut through bedrock to provide water for people, livestock, and irrigation of crops.

Karges, Dylan [377] see Peacock, Evan

Kassabaum, Megan (University of Pennsylvania) and Ashley Peles (University of North Carolina-Chapel Hill)
[385] *Unusual Elements, Special Contexts: Bear Ceremonialism in Context at Feltus, Jefferson County, Mississippi*
During the Coles Creek period (AD 700–1200), people constructed three earthen mounds at the Feltus site in Jefferson County, Mississippi. Before, during, and after the construction of these earthworks, Feltus was a location for ritual gatherings characterized by communal feasts and ritual post activities. Archaeological investigations at Feltus produced not only a large amount of bear bone, but a range of skeletal elements that are unusual at prehistoric sites. The nature of these remains and their association with ritual gatherings makes clear that bears were particularly important to the people who gathered at Feltus. Throughout Eurasia and North America, preagriculturalists saw bears as people, albeit different-from-human people, who possessed the spiritual power to link the human and spirit worlds. Importantly for our interpretations of the Feltus data, bears are commonly seen as kin, as healers, and especially as food providers. The material remains of large feasting events including bear remains, pipe smoking, and the setting of large standing posts align remarkably well with traditional bear ceremonies. These findings not only help us to understand the origins and meaning of the activities taking place at Feltus, but also expand our understanding of the geographic and temporal extent of bear ceremonialism.

Kaszab-Olschewski, Tuende [282] see Wilke, Detlef

Kate, Emily (Pennsylvania State University)
[120] *A Preliminary Study of Epiclassic Diet at Cerro Magoni in Tula, Mexico, Using Stable Isotope Analysis and AMS Radiocarbon Dating*
In this paper, we present preliminary paleodietary data and radiocarbon dates for 12 burials recovered from Cerro Magoni, an Epiclassic (ca. AD 600–900) hilltop settlement in Tula, Mexico. Stable carbon (δ13C) and nitrogen (δ15N) analyses of bone collagen were used to assess the diet of individuals buried near the summit of the settlement. The production of bone collagen requires essential amino acids derived from protein, therefore stable carbon analyses reflect the origins of dietary protein, particularly C3, C4, and CAM (crassulacean acid metabolism) plants. Additionally, stable nitrogen values reflect trophic position in biological systems and can be used to differentiate between marine and terrestrial food sources. Finally, AMS radiocarbon dates of the burials will also be presented. These dietary data and radiocarbon dates will be further contextualized through a comparative discussion of our current understanding of food production and consumption in the Tula region during the Epiclassic and Early Postclassic (ca. AD 900–1200) periods. To our knowledge, this analysis is the first isotopic reconstruction of diet in the immediate Tula area and will provide the basis for future research regarding diet, migration, and identity in the Tula Valley during the Epiclassic period.
[120] *Chair*

Kater, Thiago [327] see Watling, Jennifer

Kato, Hirofumi (Hokkaido University), Ekatelina Lipnina (Irkutsk state University), Kunio Yoshida (University of Tokyo), Takao Sato (Keno University) and Dmitrii Lokhov (Irkutsk state University)
[332] *The Paleolithic Site Mal'ta in Eastern Siberia: New Discoveries and New Situation*
Mal'ta is located in southern part of Eastern Siberia, near Baikal. This site has been known as unique Paleolithic settlement, including a double human burial of two children, 30 human figurines carved from ivory, and 15 dwelling clusters. While the original interpretation of Mal'ta was that of a single cultural layer, recent investigations have identified over 10 cultural layers, dated between the OIS 3 to OIS 2 stage. Since 2010, we have continued the Russian-Japanese joint research for confirming the site formation process and high-precision AMS dating on Mal'ta site. In this paper, we would like to make a report on current results of new AMS dating and new situation from new excavation in Mal'ta site.

Kato, Hirofumi [35] see Junno, Aripekka

Katz, Jared (University of California, Riverside)
[347] *Creating and Curating a 3D Dataset: Establishing Categories for Ancient Maya Musical Instruments Using 3D Scans*
The Maya Music Project is dedicated to documenting ancient Maya musical instruments throughout the Maya area. Over the past year and a half the project has been documenting instruments housed in both archaeological laboratories and museums in Guatemala, Belize, and the United States in order to better understand the types of musical instruments that were played by the ancient Maya. At the time of writing this abstract, the project has worked with over 250 musical instruments, and has made 3D models of 98 of those instruments. In the fall of 2016, the project will be making 3D models of the instruments housed in the Museum of Fine Arts, Boston and the instruments housed in the Peabody Museum's collection at Harvard University. By performing typological analyses on these artifacts, interesting trends of stylistic attributes begin to emerge that were present throughout the Maya area. The project also played, recorded, and 3D printed playable replicas of many instruments, and has proven that the Maya had a sophisticated understanding of pitch. This talk will discuss trends of stylistic attributes, the sounds that the instruments can produce, and the role that 3D technology can play in this type of analysis.

Katzenberg, Mary A. (University of Calgary)
[237] *New AMS Dates for Paquimé, Northern Chihuahua, Mexico*
In an effort to resolve some long standing questions about the chronology of the site of Paquimé, accelerator radiocarbon dates were obtained from bone collagen of 77 burials. Bone samples were obtained as part of a larger project to explore life history and diet at the site. We address three questions: the temporal relationship between the Viejo period (Convento site) and Medio period (Paquimé), whether or not the "non-interred" individuals from the Medio phase at Paquimé date to the later occupation (the proposed Diablo phase suggested by Charles DiPeso), and the likely closing date of Paquimé. Making use of Baysian modeling, our results indicate likely overlap between Convento and Paquimé, deposition of non-interred specimens throughout the Medio period rather than only toward the end, and a closing date for the site between 1423–1460 AD. We gratefully acknowledge funding through an Insight Grant from SSHRC and permission to study and obtain samples from The National Institute of Anthropology and History (INAH), Mexico and from the Centro Cultural Paquimé in Casas Grandes, Mauricio Salgado, Director.
[30] *Discussant*

Katzenberg, Mary A. [30] see Kwok, Cynthia

Kaufman, Brett (University of Science and Technology Beijing)
[279] *Discussant*

Kaufman, Brett [240] see Braekmans, Dennis

Kay, Andrea (University of Lausanne) and Jed Kaplan (University of Lausanne)
[38] *Modeling Human-Environment Interaction in Sub-Saharan Africa: Archaeological Data, Ecological Questions*
The African Iron Age transition is characterized by a shift from nomadic hunting and gathering societies to food-production, ferrous metallurgy, and centralized states and empires across most of the continent. Because of the magnitude and persistence of the change, understanding the African Iron Age is critical for assessing the present state and potential future of Africa's ecosystems. Because the transition occurred episodically and at different times in different regions, and because large parts of Africa are poorly studied archaeologically, unambiguous evidence for human influence on the environment is lacking in large parts of the continent. Thus, in order to better understand the process, pattern and impact of anthropogenic activities on the environment over the African Iron Age, we are developing a continental-scale quantitative model of human-environment interactions. This model is informed by archaeological data synthesis and information on the physical environment. Here I present a new series of maps of the distribution of livelihood systems in Iron Age Africa that are used to drive our quantitative model. The maps represent a synthesis of archaeological, archaeobotanical,

linguistic, and ethno-historical data. While large data gaps still exist, my maps demonstrate the potential of using archaeological information for large-scale modeling.

Kay, Andrea [325] see Kaplan, Jed

Kay, Marvin (University of Arkansas), Justin Dubois (Department of Anthropology, University of Arkansas) and Devin Pettigrew (Department of Anthropology, University of Colorado)
[264] *Wear Traces from Some Experimental Chipped Stone Extractive Tools*
Experimental replicas of chipped stone sickle blades and both arrowheads and atlatl darts are used to evaluate (1) stages of sickle gloss formation as affected by moisture content of harvested wild grasses and domesticated rye cereal grains, and (2) armature impact and penetration wear traces. Herbaceous plant moisture content was calculated along with the total time of harvesting by wooden sickles mounted with stone prismatic blades. High speed digital photography recorded projectile flight paths and details of shaft rotation on impact and penetration of a domestic hog carcass. Other chipped stone knives were then used to skin and butcher the hog. The respective results show plant moisture content affects sickle gloss formation, and armature rotation on carcass impact and penetration is equally apparent in the microscopic wear traces. Pig blood residues and contrastive skinning/butchery wear is apparent too. These results have broad application to both New and Old World archaeology.

Kaya, Deniz (University of Notre Dame), Ian Kuijt (University of Notre Dame) and Meredith S. Chesson (University of Notre Dame)
[142] *Ritual Feasting and Its Social Implications: Analysis of the Ritual Pits at Dana-Bunar 2- Lyubimets, Bulgaria, during the Late Neolithic (5400–5000 BC).*

Keach, Levi (Desert Research Institute)
[107] *Howdy Podner! The Strange Story of Soda Bottles on a Cold War Battlefield in Southern Nevada*
In 2016, Desert Research Institute archaeologists identified 26NY15768, an artifact scatter consisting primarily of Vegas Vic brand root beer bottles dating to 1953. 26NY15768 is located in Frenchman Flat on the Nevada National Security Site, known as the Nevada Proving Grounds at the time of deposition. The Nevada National Security Site, under various names, has served as the United States' continental nuclear test site since it was withdrawn from the Las Vegas Bombing and Gunnery Range at the close of 1950. The location of this site is intriguing given the date. During 1953, two nuclear tests occurred on Frenchman Flat associated with Operation UPSHOT-KNOTHOLE. I describe the site and consider possible explanations for its existence. Evidence for and against each explanation is drawn from historical documents and topographic analysis.
[107] *Chair*

Kealhofer, Lisa, Peter Grave (University of New England, Armidale, NSW Australia) and Ben Marsh (Bucknell University)
[27] *Changes on the Land: Gordion in the First Millennium BCE*
Throughout the first mill BCE, the inhabitants of Gordion engaged with multiple changes in political power and agricultural strategies, within a diverse landscape with shifting climate regimes. Over most of this period, the city, its industries, and its hinterland population thrived. Using multiple lines of evidence, both material and environmental, this paper explores what we know about changes in the organization of different production spheres at Gordion in order to understand how changing political and economic strategies intertwined with this diverse, dynamic, and unpredictable environment.

Kealhofer, Lisa [271] see Stark, Miriam

Kealy, Shimona [180] see O'Connor, Sue

Kearns, Catherine (University of Chicago)
[242] *On Some Classical Roots of the Anthropocene: Where Does Mediterranean Archaeology Belong?*
In the long run-up to deciding the Anthropocene's scientific status there have been few archaeological voices, as many have noted, revealing the proposed epoch's narrow periodization of human-environment relationships. None seem to be more absent than classical archaeologists, an omission which reflects not only disciplinary cleavages but also tacit conceits about the classical world as paradoxically generative of and divorced from modern geopolitics and human-nature interfaces. From the early arguments of George Perkins Marsh about humanity's ancient, unintended environmental degradation, to the trending fascination with climatic disasters in old world societies, however, past Mediterranean contexts have been foundational yet ambivalent sources in modernity's attempts to understand global anthropogenic change. At stake in efforts both to codify or to critically "provincialize" this anticipated era are thus important biases toward specific historical and material records. It is worth considering the Anthropocene's (and its challengers') oblique engagements with classical antiquity, given that so much of the rhetoric derives from the nature/culture discourse rooted in western Europe (and America). This paper ponders the Anthropocene's imaginaries of nature and the human past that look askance at Mediterranean (pre)histories and archaeological evidence, and thus chiefly asks what an ancient Mediterranean critique of the epoch might offer.

Keddie, Grant [46] see Stewart, Kathlyn

Keefe, Earl [282] see Parker, Christopher

Keegan, William (Florida Museum of Natural History)
[32] *On the Edge of the New World: Colonizing the Bahamas*
The Bahama archipelago is the last place colonized in the New World, and the first encountered by Europeans. Previous efforts to explain the arrival of humans followed the stepping-stone model of expansion that began in the Orinoco River drainage of lowland Venezuela. Communities island-hopped through the Lesser Antilles, expanded into the Greater Antilles, and continued their northward migration through the southern Bahamas after crossing the last open water gap between Hispaniola and the Turks and Caicos Islands. We now know that none of this is true. The Bahamas are not visible from any of the surrounding land areas, most of which were first occupied from 10,000 (Florida) to 4,000 (Greater Antilles) years before the Bahamas (circa AD 700). In 1995, Berman and Gnivecki made the case that the central Bahamas were the first colonized by colonists that came from Cuba. This was not further explored because there was equal or better evidence that the southern Bahamas were colonized earlier from Hispaniola. Part of the issue is

how archaeologists envision island colonization. This paper takes a fresh look at the processes of island colonization with specific reference to the Bahama archipelago.

Keegan, William [284] see LeFebvre, Michelle

Keehnen, Floris (Faculty of Archaeology, Leiden University)
[395] *Treating "Trifles": The Indigenous Adoption of European Material Goods in Early Colonial Hispaniola (1492–1550)*
This paper discusses the cultural implications of European materials recovered from early colonial indigenous spaces on the island of Hispaniola. The exchange of exotic valuables was vital for the emergent relationships between European colonists and indigenous peoples during the late fifteenth- and early sixteenth-century Caribbean. As the colonial presence became more pressing and intercultural dynamics more complex, formerly distinct material worlds increasingly entangled. Archaeologists have long given minimal attention to these material correlates of indigenous colonial transition. Nevertheless, more than fifty years of archaeological work in Hispaniola has revealed a select number of indigenous sites yielding such foreign artifacts, or objects with European influence, occasionally appearing in reworked, repurposed, or copied forms. Among these are glass beads, metal items, and glazed ceramics, found in a variety of contexts and ranging from singular finds to direct associations to indigenous valuables. This paper presents an overview of these findings in order to explore indigenous agencies in the ways of handling these objects related to the differential impacts of colonial power on the island. As such, this paper aims to advance our understanding of the materiality of things in these encounters and the transformations they brought about in indigenous material culture repertoires.
[395] *Chair*

Keenan Early, Erin
[181] *Applying ZooMS to Gault Site Faunal Material: Identifying the Unidentifiable and the Case for Database Expansion*
The Gault site is a well-known Clovis-age occupation site in Texas, with further evidence of pre-Clovis activity. In addition to an abundance of lithic artifacts, the site has yielded thousands of faunal remains. Unfortunately, the taphonomic processes to which these bones have been subjected have resulted in the vast majority of them being morphologically unidentifiable beyond small, medium, and large mammal. This greatly restricts researchers' abilities to understand the human-environmental relationships at this site. However, the application of the peptide mass fingerprinting technique ZooMS promises to allow for the reconsideration of these otherwise limited materials by opening the door to biomolecular identification to the genus or species level. Recent initial analysis of Gault faunal material from two areas of excavation has yielded results indicating that collagen preservation in some samples is sufficient to allow for ZooMS identification. These results demonstrate the need for the expansion of the reference database to include more North, Central, and South American species. Such an expansion would enable the reconsideration of otherwise severely restrictive faunal assemblages, and allow us to increase understanding of the earliest American's lifeways.

Keenan Early, Erin [345] see Lassen, Robert

Keeney, Joseph (National Park Service; University of Alaska Fairbanks) and Robert C. Bowman (Northern Land Use Research Alaska; University of A)
[257] *Testing Potential Archaeological Applications for Surficial Magnetic Susceptibility Probes in Shallow Depositional Environments: A Study from Agiak Lake in Alaska's Brooks Range*
Magnetic susceptibility (MS) is the measure of a material's potential to hold a magnetic field, the variation of which can indicate anthropogenic forces acting upon a substrate. In Alaska, diachronic MS analyses have been useful when investigating environmental change and anthropogenic variation through time in deeply-stratified subarctic interior sites. Synchronic MS approaches, on the other hand, use surficial MS probe mapping to analyze contemporaneous variation across space and can reveal shallow-buried cultural areas and features. Despite successful reports from European studies, synchronic MS approaches are virtually absent in the North American literature, especially from Alaska. This pilot study investigated surficial MS probing's potential as an efficient and less-destructive means for identifying past human activity areas and features within shallow depositional contexts such as those typical of Arctic Alaska. We selected Agiak Lake in Alaska's central Brooks Range for its expansive and well-documented mid-Holocene tent ring complexes and shallow depositional environment. Through the process of MS mapping and multiple means of verification, we were able to confirm anthropogenic signals related to the known features, identify multiple undocumented features within and away from visually-identifiable ones, and examine a potential method for assessing culturally-significant relationships between intrasite features.

Keen-Zebert, Amanda [191] see Pober, Rachel

Kehoe, Alice (Independent)
[393] *Following the Data for Long-Distance Travels*
Part of the postcolonial movement is recognition of long-distance trade and other interactions in the Americas. As late as mid-twentieth century, anthropology textbooks dichotomized the world between "progressive, dynamic" Western civilizations and "primitive peoples" alleged to remain isolated in small villages. Unilineal cultural evolution constructed by Enlightenment didacts and continued in Western "rise of civilization" histories and textbooks such as Johnson and Earle's *Evolution of Human Societies* (2nd edition 2000) is closely connected to the Doctrine of Discovery (1493) legitimating European conquests and domination in the Americas. Ethnographic, ethnohistorical, and archaeological data, and indigenous histories, abundantly evidence cross-continental and sea travel routes in the Americas from paleoamerican times continuing to and after European contacts. Many railroad and highway routes today follow precolumbian routes. Plotting routes such as the Santa Fe Trail, and the distribution of linguas francas such as Mobilian Jargon can lead archaeologists to recognize precontact connections. Connections should also be premised for water routes—ethnohistorian Helen Tanner advised, "Look to the rivers!" and to their junctions with seas. This paper represents the "historical turn" taken by a growing number of American archaeologists thinking out of the box of customary American history reflecting Manifest Destiny ideology.
[311] *Discussant*

Kehua, Zhou
[333] *New Archaeological Discoveries in Sichuan Zhou Kehua: Sichuan Provincial Institute of Cultural Relics and Archaeology*
Recent years have seen a large number of archaeological discoveries in Sichuan; especially during the construction of the Xiangjiaba Hydropower Station in Yibin, Southern Sichuan, which led to four years of excavation covering an area of over 6,000 m^2. These excavations brought to light a large number of remains from the late Neolithic, Shang, Zhou, Qin, and Han periods, greatly advancing our understanding of local cultural developments. The present paper will introduce some of these recent discoveries, focusing on four main questions: 1) how these discoveries help fill the gaps in our

understanding of the local cultural sequence; 2) how they elucidate the connection between the Three Gorges region and the Chengdu Plain during prehistoric times; 3) how the evidence pertains to the Shu expansion toward the south; and 4) how they enrich the amount of archaeological material available for the Han period.

Kelker, Nancy
[310] *Forgery and the Precolumbian Art Market*
Why forgery? “Because,” as Willie Sutton once said, referring to why he robbed banks, “that’s where the money is.” Forgery is a common problem in the art market with works by contemporary living artists as well as “old masters” having been and, continuing to be, faked. Some segments of the market, specifically precolumbian antiquities, are worse than others in the sheer number of forged and faked works being offered for sale in upscale galleries, online, and by independent, direct-to-the-collector dealers. The history of precolumbian art forgery is a long one beginning with the Spanish Conquest and steadily gaining in momentum after 1821. This paper will look at how the art market, historically and in modern times, drives the manufacture of forgeries, and at some of the modern producers and purveyors of these false works.

Keller, Hannah [152] see Sender, Rachel

Kelley, Alice
[224] *Discussant*

Kelley, Eric (University of Washington), Ben Marwick (University of Wollongong and University of Washing), Son Pham (Institute of Archaeology, Hanoi, Vietnam), Hoàng Diệp (University of Social Sciences and Humanities, Viet) and LamMy Dzung (University of Social Sciences and Humanities, Viet)
[113] *Geometric Morphometry versus Traditional Stone Artifact Typology in the Hoabinhian of Northern Vietnam*
Hoabinhian typologies dominate stone artifact analysis in discussions of late Pleistocene archaeology in mainland Southeast Asia. Although, the objective reality of the types in this system has been questioned, there has been little empirical work to test the usefulness of the commonly used types as discrete entities. We collect 3D scan models of 110 artifacts from Mau A, a recently excavated site in northern Vietnam, where the Hoabinhian was first described. We derive semi-landmarks along outlines in three planes for each artifact, and use Principal Component Analysis and k-means analysis on elliptical Fourier analysis coefficients to explore patterns in morphological clusters. We identify which outline is most informative for traditional types, and demonstrate that substantial morphological overlap is present between the traditional types. Our results reveal where continuities and discontinuities exist between the traditional types, and highlight the importance of recording measurements of continuous variables when collecting data from stone artifact assemblages.

Kelley, Jane H. [237] see Katzenberg, Mary A.

Kellner, Corina
[147] *Discussant*

Kelly, Bridget (Indiana University)
[137] *Linguistic Archaeology of the Sierra Sur, Oaxaca*
In this paper the potential for productive relationships between linguistics and archaeology is discussed in the context of the Sierra Sur region of Oaxaca, Mexico. The material remains of most traded goods decompose too swiftly to be studied hundreds of years after their circulation in trade networks. However, the vocabulary that describes these goods has the potential to survive in contemporary languages. Thus, comprehensive study of linguistic data can support historical and archaeological theories on the migrations of people, goods, and values. As a test case, research was conducted using the traditional comparative linguistic method and phylogenetic relations mapping software to trace phonetic changes in the Southern Zapotec spoken across five towns in the Sierra Sur. By comparing words for the trade items cited in previous archaeological studies of the region to Swadesh words (words which are considered to be borrowed less frequently), the towns could be tied to trade routes outside the Sierra Sur, connecting the Valley of Oaxaca to the Southern Coast. This paper will discuss how these findings relate to and pave the way for archaeological studies on the trade and migration of this understudied region.

Kelly, John (Public Archaeology Laboratory, Inc.)
[16] *A Pleasant Eighteenth-Century Surprise: The Postcontact Component of the SB 11 Site in Franklin, Connecticut*
In the summer of 2015, the Public Archaeology Laboratory, Inc. (PAL) conducted data recovery excavations at Susquetonscut Brook Pre-Contact Site 11 (SB 11), a multicomponent site in Franklin, Connecticut. Prior archaeological investigations had produced a high density of precontact artifacts, but very few artifacts that would have suggested a sizeable postcontact occupation. However, the data recovery yielded 1,798 postcontact artifacts, revealing a substantial postcontact component to the site. Diagnostic artifacts indicate that the postcontact component at SB 11 is early to mid-eighteenth-century, although the postcontact occupation may have begun in the late seventeenth century. This paper presents an assessment of the postcontact assemblage from SB 11 and explores how the site fits in the context of early eighteenth-century settlement in the New London and Norwich area of southeastern Connecticut. This research also seeks to investigate how the material culture at SB 11 might offer insight into the recognition of postcontact sites that do not have extant foundations or other surface features.

Kelly, John (Washington University) and James Brown (Northwestern University)
[283] *Redefining Cahokia: City of the Cosmos*
By the early nineteenth century the group of mounds we now recognize as Cahokia mounds was called the Cantine mound, with Monks Mound referred to as the “Great Cahokia” mound. Actual boundaries for the site were not established until the 1950s. For the inhabitants, the site was probably without bounds and our definition of Cahokia is to a large extent fulfills our society needs that relate to legal aspects of ownership and historical significance. The natural landscape is a palimpsest of features related to its creation by the Mississippi river and its tributaries. At this point Cahokia is composed of at least 110 earthen mounds and other visible architecture and modification of the natural landscape within an area of about 13 km^2 that has been altered to varying degrees over a period of over centuries. As Eastern North America’s initial urban center, this presentation focuses on the nature of its definition from a landscape perspective and as an American Indian cosmogram and in the end the manner in which it has changed as it defies our attempts to define this unique place we now call Cahokia.

Kelly, Kenneth (University of South Carolina)
[370] *Seeking Out Slavery in Colonial Saint Domingue (Haiti)*
Saint Domingue was the most important European colony of the Caribbean region, producing vast amounts of wealth through the labor of enslaved Africans and their descendants. It was also the setting of the only large scale slave revolt that succeeded in overturning the slavery system. In spite of this importance to Atlantic studies, African Diaspora studies, and historical archaeology, very little substantive research has been conducted on sites associated with the dwelling places of the enslaved laborers. In summer of 2016, I traveled to Haiti and surveyed nearly 30 plantation sites to determine if the slave villages could be identified, and their potential for contributing toward developing comparisons with other slave-based colonies of the French colonial world. This paper presents the results of that research.
[64] *Discussant*

Kelly, Robert L. (University of Wyoming)
[227] *The Challenges and Prospects of Developing Radiocarbon "Big Data" for the Study of Prehistoric Demography*
The use of large radiocarbon datasets has the potential to transform archaeology and its place in the social and natural sciences in the coming decades. Radiocarbon "big data" enhances the unique contribution of archaeology to reconstruct human demography over vast spans of time. This move toward big data is confronted by some central challenges in archaeological method and theory, such as the use of legacy data of disparate quality and working over broad spatial and temporal scales. For some, these challenges pose insurmountable barriers to the use of radiocarbon big data. We disagree: radiocarbon big data can be used with appropriate kinds of questions, ones that concern processes working at broad temporal and spatial scales. This presentation discusses our ongoing work to develop a radiocarbon database for the United States, focusing on the problems of data collection and potential for using these data to ask questions regarding long-term human demographic change, human-environment interactions, and cultural dynamics.
[227] *Chair*

Kelly, Robert L. [81] see Robinson, Erick

Kelterbaum, Daniel [221] see Schlotzhauer, Udo

Kelvin, Laura [172] see Hodgetts, Lisa

Kemp, Brian M. [86] see Hofman, Courtney

Kendall, Heather [50] see Buff, Lindsay

Kenna, Lachlan [40] see Mackay, Alex

Kennedy, Chris J. [134] see Tripcevich, Nicholas

Kennedy, Ryan (Indiana University), Guido Pazzarossi (Syracuse University) and Tamar Brendzel
[159] *The Fish of Fort Morris: A GIS-Based Study of Human-Environment Interaction during the American Revolutionary War*
Situated at the mouth of the Medway River in coastal Georgia, Fort Morris provided protection for the bustling port city of Sunbury. During the Revolutionary War the fort was first controlled by American forces and later by the British, and while the fort's history is well-known in local lore archaeological analyses are shedding new light on everyday life at the site. This paper draws on the identification of fish bones to provide an inventory of the fish taxa consumed by soldiers at the fort on both sides of the conflict. Because soldiers often collected fish while on patrol or in their spare time, the taxa present can provide substantial clues to reconstructing movement and food collection in the past. We present GIS-based analyses that link the identified fish taxa and their respective biological and environmental needs to bodies of fresh, brackish, and marine water in the vicinity of the fort. We combine these data with least cost path and viewshed analyses to understand soldier movement near Fort Morris during a time of war. Ultimately, we demonstrate how something as simple as fish bones from the garbage of Revolutionary War soldiers can directly reconstruct their physical movements through past landscape.

Kennedy, Sarah (University of Pittsburgh)
[331] *Chair*

Kennedy-Richardson, Karimah [334] see Martinez, Desiree

Kennett, Douglas J. (Penn State) and Brendan Culleton (Penn State)
[9] *Studying Past Human-Environment Interactions with High-Precision AMS 14C at Penn State*
The newly established PSU AMS Radiocarbon (14C) Facility provides high-precision measurements of 14C content in a wide range of carbon-bearing materials. Our primary mission is the study of human-environment interactions in the past and present with the goal of working with archaeologists in the context of inter-disciplinary environmental research. The facility operates a NEC 1.5 SDH 500kV Tandem Pelletron accelerator optimized for relatively small samples, requiring only 700µg of graphitized carbon, with a potential lower limit of 15µg C, with routine precision of 20–25 14C years for samples less than 10,000 years old. We provide expertise in sample collection, research design, Bayesian chronology building, and the chemical preparation of archaeological samples with special expertise in the purification of bone collagen. We highlight recent projects in Alaska and the Maya Region.
[162] *Discussant*

Kennett, Douglas J. [8] see Buckley, Gina

Kenoyer, Jonathan (University of Wisconsin)
[177] *Plant-Based Textiles and Basketry at Harappa, Pakistan (3700–1900 BCE)*
Excavations at the site of Harappa undertaken by the Harappa Archaeological Research Project between 1986 and 2010 have recovered a wide variety of artifacts relating to plant based textiles and basketry from between 3700 to 1900 BCE. This paper will present the results of the analysis of archaeological evidence and experimental studies used to develop more accurate interpretations of the nature of early plant based fibers and basketry. Woven textile impressed terracotta beads and spindle whorls provide evidence for spinning and weaving from the very earliest occupations at the site during the Ravi Phase (3700–2800 BCE). Spindle whorls as well as coiled and woven basket impressions in the soil have been recovered from the Kot Diji Phase (2800–2600 BCE). During the urban Harappa Phase (2600–1900 BC) charred fibers, pseudomorphs preserved on copper and silver, as well as impressions of textiles in clay and faience provide evidence for wide range of textiles and fibers. Fabric impressions on pottery and actual fibers preserved in clay are also found in the Late Harappan Phase (1900–1300 BC). When combined with the paleoethnobotanical record from the site, these data provide a unique perspective on the development and changing nature of textile production at Harappa.

Kerchusky, Sarah (University of California, Santa Barbara)
[170] *INAA of Loro Ceramics from Zorropata, a Middle Horizon Las Trancas Habitation Site in Nasca, Peru*
Early in the Middle Horizon (c. AD 650–1000), the Wari Empire expanded from its Ayacucho homeland and established at least three colonies (Pacheco, Pataraya, and Inkawasi) in the Southern Nasca Region (SNR) on the South Coast of Peru. Concomitant with the Wari presence local settlement patterns underwent dramatic reorganization. Large portions of the population shifted from the Nasca and Taruga Valleys south to the Las Trancas Valley—away from and perhaps in contention with the Wari. A new polychrome fineware ceramic style, Loro, was developed and constituted a significant stylistic departure from Early Intermediate Period (EIP) (c. AD 0–650) Nasca ceramics. Unlike the polychrome finewares from previous periods, Loro pottery was thicker, heavier, rougher, less colorful, and less polished. This paper discusses archaeological data including Loro and EIP ceramics, lithics, architecture and mapping data, and surface artifacts recovered during the 2014 excavations at the site of Zoropata in the Las Trancas Valley, Nasca, Peru. Zorropata was identified as a relatively large (c. 30,000 m^2) domestic site with possible ceremonial function occupied during the EIP and early Middle Horizon. These data enable further investigation into the changes Nasca culture underwent from the later EIP to the early Middle Horizon.

Kersel, Morag (DePaul University)
[141] *Good Collectors of Archaeological Artifacts from the Holy Land?*
In an ideal world there would be no looting, selling, or collecting of archaeological artifacts. But, given the centuries old lure of material from the Middle East, it is unrealistic and naïve to think that there will be a cessation of collecting. This desire for Holy Land antiquities has resulted in a bifurcated community of consumption: those willing to purchase undocumented artifacts, and Good Collectors, the discerning individuals and institutions who ask questions about archaeological find spots, export licenses, object biographies, and owner histories. Ideally, Good Collectors will return material to countries of origin if it is discovered to have been stolen or illegally exported. They will only buy suspect material as a last resort when items are under threat, thereby acting as safe havens for the benefit of society. Using research into the acquisition of Holy Land artifacts, this paper will argue that there is such a thing as a Good Collector, and that archaeologists need to collaborate, engage, include, and work with collectors in order to improve our understanding of the trade in legal and illegal antiquities.

Kerwin, Ruby (Arizona State University) and Sarah Klassen (Arizona State University)
[113] *Developing Typologies of Temple Features of Angkor, Cambodia.*
Over 1,400 temples have been identified surrounding Angkor, the capital of the medieval Khmer Empire (ninth–fifteenth centuries CE) in present-day Cambodia. Some of these temples contain inscriptions and are easily dated, though many temples are lacking inscriptions and the associated chronological information. In this poster, we inventory and develop typologies for four types of temple features: pedestals, lintels, colonettes, and door frames. We use these diagnostic features to identify relationships of potential chronological significance between temples. Finally, we use geographic information system analyses of these patterns to determine the spatial distribution of temples and their associated diagnostic features, gaining broad insights into the chronological development of Angkor.

Kessler, Nicholas (University of Arizona)
[368] *Remotely Sensed Seasonal and Interannual Variability of Vegetation and Temperature Indices from Ancestral Pueblo Fields in the Lower Rio Chama Basin, New Mexico, USA*
An analysis of multispectral satellite imagery in the lower Rio Chama basin, in northern New Mexico, reveal that seasonal patterns of vegetation cover (NDVI) are significantly altered by Prehispanic agricultural features surrounding ancestral Tewa pueblos. Interannual variability of NDVI on previously cultivated upland surfaces is similar to a model derived from terrain attributes of minimally-modified watersheds. However, in relict agricultural fields late-summer and autumn NDVI tends to be higher, and temperatures somewhat warmer, than expected. Though there is some uncertainty, this effect appears sensitive to seasonal patterns of precipitation. These observations are important for better understanding the function of prehispanic agricultural features in the upper Rio Grande, the use of which is undocumented historically. This knowledge has implications for contextualizing the Tewa ritual and agricultural works cycle, models of the resilience of late Classic communities in the Upper Rio Grande to environmental perturbation, and the long-term ecological legacies of past anthropogenic environmental modification.

Keyser, James (Oregon Archaeological Society)
[175] *Cheval Bonnet: A Crow Calling Card in Blackfeet Country*
Cheval Bonnet is a small petroglyph site on Cut Bank Creek, just east of the Blackfeet Indian Reservation that shows a Crow Indian coup counting scene and three other horses, two of which can be identified as the products of Crow artists by their form and the stylized war bonnet worn by each animal. Located in a hidden canyon adjacent to a major stream crossing, the site represents a “calling card” similar to other biographic images drawn both as petroglyphs and arborglyphs during the late Historic period.

Khaing, Kyaw [333] see Marwick, Ben

Khamis Ali, Abdallah [307] see Alders, Wolfgang

Khanjian, Herant [78] see Ma, Xiao

Khartanovich, Valeriy I. [330] see White, J. Alyssa

Kiazyk, Hillary (Western University and Sustainable Archaeology)
[258] *Archaeology, Accessibility, and 3D Imaging*
The recent incorporation of 3D imaging into the field of archaeology has opened many doors with regard to accessibility of archaeological materials. While this promotes research by inviting a much broader research discussion, it also poses questions of ownership of materials. This poster will explore new ways that archaeologists, descendant communities and people of the general public are now interacting with archaeological materials as well as some of the challenges, benefits and problems associated with these platforms. This poster will examine the effects of 3D scanning and printing, 3D social media platforms such as Sketchfab and legal implications of this wide availability of cultural history on the field. It will also explore the ways in which this technology is being used and could be used in the future to make archaeology more accessible.

Kidder, Barry (University of Kentucky), Scott Hutson (University of Kentucky), Jacob Welch (Yale University), Daniel Vallejo-Cáliz (University of Kentucky) and Shannon Plank (University of Kentucky)
[329] *From Household to Polity: (Dis)integration along the Ucí-Cansahcab Causeway in the Northern Maya Lowlands*
Over the past decade, the Ucí-Cansahcab Regional Integration Project (UCRIP) has utilized multiples scales of analysis, from broad household excavations to large swathes of lidar collection, to examine the social processes of community (dis)integration of a polity in the northern Maya Lowlands. This polity, headed by Ucí, was integrated by an 18 km long intersite causeway system by the Terminal Preclassic and connected the emerging regional capital with three secondary sites. Extensive test pitting from monumental and household contexts at Ucí and other sites, both on and off the causeway, allow for comparing economic practices and household identities during this political shift. Recent excavations from Ucí clarify the chronology of the regional capital and indicate an apex during the Terminal Preclassic as well as a relatively robust “Protoclassic” ceramic presence, such as experimental forms and decorative embellishments. The presence of a structure with iconography indicating rulership and a high quality of life of the households at the secondary site of Ucanha underscores the successful integration of this region during this period. However, by the first few centuries into the Early Classic Ucanha experiences a decline, although Ucí does not, thereby showing integration and disintegration are variable even at the regional scale.

Kidder, Tristram (Washington University)
[110] *Discussant*

Kidder, Tristram [325] see Qin, Zhen

Kidwell, Jasmine (Eastern New Mexico University)
[345] *Modeling Channel Morphology at the Clovis-Type Site, Blackwater Draw, New Mexico*
Blackwater Locality No. 1 (the Clovis-type site) served as a catchment for spring-fed streams during the late Last Glacial Maximum (~19,150–12,900 cal yr BP), providing a water source for the Paleoindian occupants of the Southern High Plains. During episodes of high effective moisture, water flowed out of the basin via an outlet channel into Blackwater Draw proper. Coinciding with the changing climate of the early Younger Dryas (~12,900–11,500 cal yr BP), the flowing waters of the outlet channel were obstructed, impounding the waters of a shallow lake. This study uses the distribution of well-defined stratigraphic boundaries to create a series of surface models corresponding to the Clovis, Folsom, and Late Paleoindian occupations at the site. Stratigraphic data and sediment samples were collected from systematic hand augering of the outlet channel. Where the surface models indicate pronounced changes in the channel, sediment samples were more intensively analyzed to identify their origin and depositional environment. The models, coupled with sedimentary data, shed light on the processes responsible for ponding of the lake and provide snapshots of the changing morphology of the outlet channel, ultimately contributing to a richer understanding of the changing landscape during this critical time in prehistory.
[6] *Discussant*

Kieffer, C. L. (Museum of Indian Arts and Culture, University of New Mexico) and Jack Baker (University of New Mexico, Anthropology)
[8] *Statistically Comparing Demographic Distributions of Mortuary Assemblages*
This analysis includes data from 50 archaeological mortuary assemblages variously attributed to sacrifice, warfare, and standard mortality processes. The research compares two sites, both attributed to sacrifice, to those produced by the two alternative processes of warfare and standard mortality and explores the question of whether these assemblages may be differentiated from them based on the age distribution of deaths. The analysis incorporates a novel feature in that preservation bias is directly modeled using monte carlo experiments. The results suggest that the two sacrifice assemblages (Midnight Terror Cave, Belize, and Chichén Itzá, Mexico) do not differ significantly from a small-scale horticularalist reference model of mortality proposed by Gurven and Kaplan (2007), but do differ significantly from other sites in the sample in the proportion of the assemblage comprised of 6 to 10 year olds at the site of Midnight Terror Cave. This finding is in line with ethnohistoric and ethnographic accounts that indicate children were often selected for sacrifice to the Maya rain gods in caves and cenotes.
[66] *Discussant*

Kielhofer, Jennifer (University of Arizona)
[279] *A Soil-Stratigraphic Record of Landscape Evolution and Human-Environment Interaction at the Yangguanzhai Archaeological Site, North-Central China*
This paper presents the results of soil-stratigraphic investigations and stable isotope analysis at Yangguanzhai, a Middle Neolithic site (~5500 cal. years BP) in the Wei River Valley of north-central China. At Yanguanzhai, there is a well-preserved sequence of alternating sediment and buried soils, indicative of multiple fluctuations in landscape stability. Human occupations are associated with three buried soils: the two lower soil horizons contain Middle Neolithic (~6000–5500 cal. yrs. BP) artifacts and features, while the upper horizon contains Han Dynasty artifacts (~2500 cal. yrs. BP). Unweathered sediment between these buried soils may signal heightened flooding and floodplain deposition during the Late Holocene. Stable isotope analysis on bulk soil and sediment carbonates offers insight on Middle Neolithic paleovegetation and paleoclimatic conditions. δ13Ccc values range from –4.76 to –7.83‰, reflecting a higher proportion of C3 biomass within a mixed C3/C4 ecosystem. Agricultural cultivation of millet during the Neolithic may be responsible for the C4 signal. δ18Occ values range from –8.13 and –9.48‰, suggesting strong summer monsoonal conditions. Based on these analyses, Middle Neolithic groups at Yangguanzhai experienced warm summer temperatures, strong monsoonal rainfall, and seasonal climatic variation. However, human activities (agriculture) may have influenced pedogenesis and the isotopic signature of carbonates.
[6] *Discussant*

Kielhofer, Jennifer [279] see Fox, Mathew

Kiesow, Danielle (Indiana University of Pennsylvania)
[17] *Reservation Archaeology in an NPS Setting: Native-White Relations and Land Use on the Grand Portage Reservation, 1854–1930*
Grand Portage National Monument (GRPO) is located within the Grand Portage Reservation in Northern Minnesota and is primarily concerned with interpreting the events and impacts of the fur trade in the eighteenth century. In an effort to increase Grand Portage Ojibwe representation and in compliance of Section 110, GRPO conducted archaeological excavations in the summer of 2016 of the historic yard of a Bureau of Indian Affairs (BIA) building to explore land use and plant use throughout time and to better identify the occupation of the building. The Grand Portage BIA Complex excavation is one if the first efforts in Grand Portage to learn more about the history of the Reservation and history of BIA occupation on a local and regional scale. Preliminary results of the study discuss the artifact assemblage from the yard and house waste found in the four excavated units, the soils in and around the site, phytolith analysis taken from soil samples in the units and outside the site, and historic documentation from BIA employees. Additional consideration is given to the differences in soils and artifact assemblages from the Grand Portage BIA Complex site and 21CK12, located within the vicinity, that highlight differences in socioeconomic lifestyles.

Kikiloi, Kekuewa [302] see Graves, Michael W.

Kilgore, Gertrude (Texas Tech University), Brooke Bonorden (Texas Historical Commission) and Brett A. Houk (Texas Tech University)
[280] *Machetes, Metates, and Majolica: San Pedro Maya Involvement in the Colonial Economy at Kaxil Uinic Village, Belize*
Following the outbreak of the Caste War in the Yucatán (1847–1901), a group of San Pedro Maya established the village of Kaxil Uinic in northwestern Belize (formerly British Honduras). In the wake of the Battle of San Pedro between British and Maya forces in 1867, the Lieutenant Governor of British Honduras issued a decree to delegitimize San Pedro Maya claims to land, undermining their subsistence economy and forcing them into wage labor for the logging and chicle industries. O. Nigel Bolland (2003:111) characterizes the period during which Kaxil Uinic was inhabited (ca. 1880–1931) as the consolidation of British jurisdiction over the Maya and their incorporation into the colonial social structure. A critical analysis of archaeological and archival data gathered over two field seasons reveals that the inhabitants of Kaxil Uinic selectively participated in the colonial economy according to their needs. Strategic interaction with logging firms, the chicle industry, and the colonial administration allowed the residents to maintain some social, political, and economic autonomy through the supplemental use of imported goods and cash alongside locally made tools and vessels. Data from Kaxil Uinic demonstrates this amalgamation of indigenous and European technologies, where residents navigated the ever-changing cultural landscape of British Honduras.

Killebrew, Ann E. [151] see Skinner, Jane

Killick, David (University of Arizona) and Frances Hayashida (University of New Mexico)
[164] *Lung-Powered Copper Smelting on the Pampa De Chaparri, Lambayeque Department, Peru*
We report here the archaeometallurgical analysis of residues associated with two banks of four lung-powered copper smelting furnaces at site 256AO1, discovered during Hayashida's full-coverage survey of the Pampa de Chaparri in 2008. Calibrated radiocarbon dates place the operation of the furnaces in the Middle Sican period, ca. 1000–1200 cal AD. The furnaces are similar in size and shape to those excavated by Shimada and Epstein at Cerro Huaringa, which is only 15 km away; the smelting process that we reconstruct differs in some significant respects. At Cerro Huaringa, copper prills were trapped in a pasty slag, which was crushed on giant grindstones (batanes) to recover the metal. At 256AO1, fluid slags separated cleanly from copper, and there are no batanes. The ore smelted was weathered chalcopyrite (CuFeS2) and furnace atmospheres were evidently very reducing, as at least some of the copper was contaminated with metallic iron. This was removed by refining the metal on shallow ceramic plates, about 20 cm in diameter, under a more oxidizing atmosphere. The copper metal contains 1–5% arsenic, but we are unable to determine whether arsenic minerals were part of the copper ore, or whether they were deliberately added.

Kilpatrick, James (University of Toronto)
[191] *Weber Fractions, Standardization, and Variation in Artifact Form*
Scholars have debated the relevance of variation and standardization in artifact assemblages since the nineteenth century. Variation in artifact assemblages is used for developing typologies and examining temporal changes in artifact form. Standardization in artifact shape is an important indicator of the cognition of early humans, socioeconomic organization, and the emergence of craft specialization. Research into the causal factors of variation includes testing humans' sensory perceptions, biomechanical studies of our motor skills, and experimental replication. These studies suggest there is a physiological threshold beyond which humans are unable to perceive size differences below 3%. The current proposal is based on an experiment that quantified humans' ability to perceive minute size differences in three-dimensional (3D) objects without the aid of an external scale. A hand ax and a Levallois core were laser scanned and 3D printed as a size-scaled series decreasing by 1%. Size ratio tests were administered to 30 participants using the printed models. The experiment demonstrated that humans' ability to perceive size variation decreases rapidly below 3% volumetric difference between objects. The results suggest that humans' inability to accurately detect minute size differences may explain some of the variation in artifact form introduced into the archaeological record.

Kim, Alexander (Harvard University, Dept. of Anthropology), Alexander Kozintsev (Peter the Great Museum of Anthropology and Ethnogr), Nadin Rohland (Dept. of Genetics, Harvard Medical School), Swapan Mallick (Dept. of Genetics, Harvard Medical School) and David Reich (Dept. of Genetics, Harvard Medical School; Howard)
[92] *The Ones Who Stayed Behind? Genome-Wide Affinities of Okunev Remains from Bronze Age South Siberia and the Enduring Dialogue of Ancient DNA and Physical Anthropology*
Genome-wide ancient DNA data from Upper Paleolithic Siberians and deep time series in Europe challenge many traditional models of relationships between Native Americans, West Eurasians, and East Asians—commonplace units in physical anthropology—by recasting them as fusions of prehistoric ancestry streams that may unexpectedly cross-cut or fracture these categories. We evaluate new and published genome-wide data from remains attributed to Okunev—an archaeological culture of the Middle Yenisei and eastern steppe in southern Siberia (latter third–first half second millennium BC), famous for slab graves, massive stelae, and fantastic zoomorphic and anthropomorphic petroglyphs—to test an unusual physical anthropological hypothesis. Russian anthropologists have argued Okunev remains to exhibit pronounced affinity to Native Americans, surpassing that of other ancient groups from the region as well as recent Siberians and Central Asians. Kozintsev et al. (1999), in the most systematic investigation, suggested Okunev people to derive much of their ancestry from late-persisting "collateral relatives" of Native Americans who remained in Eurasia. We

evaluate this proposal in special light of the “Ancient North Eurasian” concept (sensu Lazaridis 2014) and offer considerations on the future of skeletal morphology in framing and motivating investigations of human population history.

Kim, Ha Beom (University of Oregon) and Gyoung-Ah Lee (University of Oregon)
[325] *Preliminary Spatial Analysis of the Middle Mumun Culture’s Land-Use Pattern in Southcentral Region of Korea*
This study investigates the land-use pattern of the Middle Mumun culture (c. 29/2800–2400 cal. BP) in south-central region of Korea from a spatial analytic perspective. By employing inter-settlement visibility analysis and geographical variable comparisons, this study explores social and environmental contexts affecting cultural decisions of the Middle Mumun people for their settlement locations. Through our analysis, we find that relationships across the Middle Mumun settlements may have emerged gradually over time through interactions among neighboring groups, and that the locations of these settlements reflect landscape preferences of the Middle Mumun people. We suggest a long-term bottom-up processes of emerging social unity as an important concept to better understand the complex context of Middle Mumun settlement choices.

Kim, Ha Beom [24] see Bone, Christopher

Kim, Nam (University of Wisconsin-Madison)
[20] *The Co Loa Settlement: Biography of an Anomalous Place*
In the archaeological study of ancient large-scale settlements, there is considerable debate regarding definitional criteria for categories of “city” and “urban.” New field studies from different world areas have enriched our understanding of the variability of past settlement configurations along dimensions of utility, meaning, space, scale, and demography. In northern Vietnam, the remains of monumental constructions of the prehistoric settlement of Co Loa still stand today. Dating to the first millennium BCE and encompassing some 600 hectares in size, this settlement was unprecedented in Southeast Asia. Recent field investigations have provided new insights for this large-scale and relatively anomalous settlement, one exhibiting signs of highly centralized political power and a dispersed, low-density form of ancient large-scale settlement. This paper offers an overview of the settlement, illustrating several local-historical and regional trends in order to provide a context for the early story of Co Loa and its occurrence. The case offers a glimpse into alternative pathways for trajectories of settlement development, both in Southeast Asia and worldwide.
[76] *Discussant*
[20] *Chair*

Kim, Nanny (Heidelberg University)
[333] *Mapping Mining Remains in the Borderlands of Southwest China*
About 43 very important silver mines and some six copper mines are known to have been worked between the early fifteenth and the mid-nineteenth century across the Far Southwest of China and in the borderlands beyond. Written sources on mining in the Ming and Qing periods are so scarce that in some cases we identified sites before eventually finding their historical names. Under ideal research conditions, this paper would present archaeological surveys on these sites. In the real world of greatly improved transportation and quickly changing landscapes, we attempt to cover as many of the sites as possible in very preliminary fieldwork surveys. In these, we try to collect spatial information on slag dumps, settlements, and temple sites, presenting finds and an approach that uses geographic information systems for analyzing spatial data. The mapping of settlements, mining areas, slag dumps, and transport networks provides a tool for integrating various data for a comparative grading of mining sites, and for gaining insights into past societies.

Kimball, Larry (Appalachian State University)
[264] *The Recognition of Hafting Traces on Native American Stone Tools*
As Keeley (1982) pointed out some time ago, the recognition of microwear traces due to hafting is an important source of information not only about how stone tools were prepared for use, but how their differential discard affects the recognition of site structure and site function. This is because the economy of different hafting arrangements and the act of “retooling” is different for hafted versus unhafted tools. In an effort to consider the variable range of hafting traces among Native American lithic technologies, a sample of over 2300 tools from Paleoamerican through Historic Cherokee industries from 40 sites in eastern North America is discussed to provide a better understand of the patterning of hafting traces. In rank order, general tool groups exhibit a variable but expected pattern of percentage of hafting traces: arrowpoints (86%), bladelets (76%), end scrapers (74%), Paleoamerican points (70%), blades (66%), Archaic and Woodland points (57%), utilized flakes (57%), retouched flakes (52%), flake tools (30–50%), drills (46%), bipolar flakes (22%), and bipolar cores or pieces esquillees (0%). It is argued that such microwear data from archaeological specimens is a useful first step to address the question of hafting, but also to guide future experimentation.

Kime, Sherry [394] see Guilfoyle, David

King, Adam [5] see Powis, Terry

King, Charlotte (University of Otago), Siân Halcrow (Department of Anatomy, University of Otago), Andrew Millard (Department of Archaeology, Durham University), Anne Marie Sohler-Snoddy (Department of Anatomy, University of Otago) and Vivien Standen (Departamento de Antropología, Universidad de Tarap)
[30] *Children of the Atacama Desert: The Complex Interactions between Breastfeeding, Weaning and Environmental Stress in One of the World’s Harshest Environments.*
Infant feeding practices and the weaning process have important implications for early life health and mortality patterns. In particular, the concept of weaning stress is often invoked as an explanation for increased infant or child mortality and morbidity. In this paper we evaluate the concept of weaning stress and the bioarchaeological methods used to interpret its presence. We highlight the intimate connection between stress and the weaning process in our own research in the northern Atacama Desert, northern Chile, by combining paleopathological and incremental isotopic methods. We use a case study from the Formative Period (1400 BC–500 AD) to illustrate the interaction between breastfeeding, weaning, physiological stress and metabolic disease. This highlights the importance of taking a multifaceted approach to weaning studies, and the contribution that this type of approach can make to understanding early life histories within past natural and social environments.

King, Eleanor (Howard University), Michael Brennan (Ocean Exploration Trust), Beverly Chiarulli (emeritus, Indiana University of Pennsylvania), Christine Taylor (Maax Na Archaeology Project) and Darcie Flanigan (Maax Na Archaeology Project)
[83] *Putting the Pieces Together: Maax Na in Its Regional Context*

Twenty years of research at the large prehispanic Maya site of Maax Na in northwestern Belize have yielded insights not only into site organization and function, but also into its role in the Three Rivers Region. Ongoing investigations of a marketplace and of local caves indicate that Maax Na, while probably not the political capital that its neighbor La Milpa was, nonetheless had a distinct and important regional function as a religious and marketing center. Investigation of water management and agricultural areas further illuminate its role and add to the range of practices documented for the region. To complement this site-centric research, we have also pursued broader inquiries that link Maax Na with other communities. These include investigations into the small, agriculturally specialized site of Bolsa Verde, midway between Maax Na and Dos Hombres, and chemical sourcing of limestone monuments at Maax Na and other sites, to understand patterns of procurement and distribution. The picture emerging from this research is of a complex region, where sites of all sizes played distinctive and interconnected roles. It challenges common models of Maya polities, where one large site dominates in every aspect, and invites us to consider alternative views of regional dynamics.

King, Stacie (Indiana University), Shanti Morell-Hart (McMaster University) and Elizabeth Konwest (Indiana University)
[137] *Sacred Worlds and Pragmatic Science in the Aftermath of Conquest: The Hidden Caves of Cerro del Convento*
In the sixteenth century, Dominican priests attempted to eradicate various non-Catholic ritual practices in Nejapa. Native peoples apparently regularly visited Cerro del Convento, a Sierra Sur landmark, to perform rituals and leave offerings. In the late 1500s, priests from the Dominican doctrina in Nexapa visited Cerro del Convento to destroy and burn all evidence of “idolatry.” Between 2009 and 2013, members of the Proyecto Arqueológico Nejapa Tavela surveyed and excavated at Cerro del Convento to document the occupation and use of the site. Our work shows that the rockshelters associated with Cerro del Convento were visited as early as the Late Formative (500 BC). The mesa top served as a residential and ceremonial center during the Classic and Postclassic period, a time of increased conflict and military incursion. During the Late Postclassic and Early Colonial periods, the caves and rockshelters became pilgrimage destinations and were used for storing of agricultural products. We argue that the Dominican efforts to eradicate idolatry may have had a more pernicious function of exposing hidden reserves of foodstuffs. Cerro del Convento remained an important regional landmark precisely because it met both the sacred and pragmatic needs of indigenous peoples during the turbulent years of conquest.

King, Adam (SC Institute of Archaeology and Anthropology), Terry Powis (Kennesaw State University), Kong Cheong (American University) and Nilesh Gaikwad (University of California at Davis)
[173] *Absorbed Residue Evidence of Datura Use in Mississippian Contexts*
We recently identified residues indicative of the preparation of Datura in ceramic and shell vessels dating to the Mississippian period (900–1600 CE) of the southeastern United States in the collections of the Gilcrease Museum. Datura is a genus of flowering plants whose seeds and flowers contain tropane alkaloids that produce hallucinogenic effects when consumed by people. The use of Datura for a variety of medicinal ritual practices is well established among Native Americans today and in the recent past. The only other evidence for its use in North American prehistory comes from the recovery of charred seeds, a rare occurrence in the archaeological record. Absorbed residues present an opportunity to learn more about Datura use in the past and connect recent medicine traditions. In this paper we will use archaeological and iconographic information to explore ancient contexts of use and possible transmission as part of cultic institutions.

King, Jason (Center for American Archeology) and Jane E. Buikstra (Arizona State University)
[241] *Sculpting, Renewal, and Perdurance of Illinois Hopewell Mounds*
Investigations of Illinois Valley Middle Woodland (Hopewell, ca 50 cal BC–cal AD 400) mound structure have traditionally emphasized the organization and composition of initial, or primary, features that anchor these monuments. Particular attention has been placed upon the distinctive ramp and tomb complex that centers initial ritual activity at mound sites and its connection to mortuary activity, cosmology, and creation. In contrast, archaeologists have typically underappreciated subsequent building episodes that transform tumuli into massive monuments. Often referred to simply as “capping layers” because they obstruct access to central features, these earthen additions transform and sculpt the external structure of mounds in meaningful ways that reconfigure Middle Woodland people’s landscape through repetitive performances that reinforced received and transmitted wisdom. In this paper, we focus on the communal and regenerative nature of mound sculpting, particularly the reconfiguration of structures that shift activity and attention away from mortuary contexts and creation narratives to practices that emphasize renewal and perdurance throughout the Middle Woodland period and beyond.
[241] *Chair*

King, Julia
[315] *Discussant*

Kintigh, Keith (Arizona State University), Katherine Spielmann (Arizona State University), K. Selçuk Candan (Arizona State University), Adam Brin (Arizona State University) and James DeVos (Arizona State University)
[227] *Data Integration in the Service of Synthetic Research*
Addressing archaeology’s most compelling substantive challenges requires synthetic research that exploits the large and rapidly expanding corpus of systematically collected archaeological data. That, in turn, demands an integration procedure that preserves the semantics of the data when combining datasets collected by multiple investigators who employ different systematics in their recording. To that end, we have developed a general procedure that we call query-directed, on-the-fly data integration that is deployed within the tDAR (the Digital Archaeological Record) digital repository. The integration procedure employs ontologies that are mapped to the original datasets. Integration of the ontology-based dataset representations is done at the time the query is executed, based on the specific content of the query. In this way, the original data recording is preserved and data are aggregated only to the extent necessary to obtain semantic comparability. Our presentation draws examples from the largest application to date: an effort by a research community of southwest United States faunal analysts. Using 24 ontologies developed to cover a broad range of observed faunal variables, we can now integrate faunal data from 37 projects investigating the late prehistoric northern Southwest, including more than 378,000 individually recorded specimens.

Kintigh, Keith [129] see Strawhacker, Colleen

Kinzig, Ann [129] see Strawhacker, Colleen

Kirakosian, Katie V. (Kaplan University)
[340] *On Manitou and Consanguineal Respect between Human and Animal Societies in Southern New England*

By definition, hunter-gatherer societies rely upon few, if any, domesticated animals. Domestication is counter to many hunter-gatherer worldviews, where human and nonhuman animals are seen as sharing a literal biological connection. From here, in essence, domestication is akin to slavery. Examples from the ethnohistoric and archaeological records will be used to illustrate how local Native groups in southern New England treated wild and domestic animals and animal remains in culturally prescribed ways, which pushes against the notion that animals should be placed in such a dichotomy in this context. Counter to the idea that humans are “rulers” over the animal kingdom, the Woodland Indian concept of manitou shows how animals, in fact, also controlled humans in very real ways.
[363] *Moderator*
[239] *Discussant*

Kirch, Patrick (Univ. California Berkeley)
[380] *Fishponds and Aquaculture in the Ancient Hawaiian Political Economy*
The political economy of ancient Hawai’i, prior to European contact in 1778–1779, has often been characterized as based primarily on a “staple economy” with highly intensified forms of both irrigated and dryland agriculture. Less appreciated is the role of intensive aquaculture of two species (milkfish and mullet) using several kinds of often extensive fishponds. This paper explores the role and significance of such aquaculture in the late precontact Hawaiian political economy, drawing especially upon extensive archaeological and ethnohistoric data from the island of Moloka’i. It is argued that on Moloka’i, fishponds rivaled pondfield irrigation in their ability to provide the elite ruling class with a dependable source of surplus.
[32] *Discussant*

Kirk, Scott
[346] *The Study of Castles throughout Europe: Limitations of Multiregional Studies*
For much of Europe, castles represent a point of cultural heritage and national pride. Yet, even though the study of castles has long been of interest to scholars, few researchers have moved beyond intraregional analyses to examine interregional trends in the manifestation of these monuments. Traditional archaeological investigations examining cross-cultural differences have been hampered primarily by language barriers and differences in how researchers approach questions pertaining to the encastellation of medieval Europe. The rising use of satellite data and GIS software in archaeological research might represent one such way to get around these barriers. This paper will focus on the potential benefits of large-scale, geospatial investigations of castles, provide an example of an analytical framework from which appropriate research questions can be asked, and examine three disparate regions—Sicily, Bohemia, and Scotland—to look at the geospatial similarities and differences between castles in each of them. It will then conclude with a look at some of the difficulties in taking such a multiregional approach in terms of computational space needed, differences between datasets between regions, and the problem of using present landscapes as a proxy for medieval ones.
[346] *Chair*

Kirkwood, Damian (University of Wyoming)
[142] *Butchering Practices at the Vore Buffalo Jump (48CK302): Investigating Organization with the Nearest Neighbor Test*
Spatial recognition of organization at mass kill sites is often commented on in the literature but is rarely systematically investigated. The goal of this paper is to investigate social organization of butchery with the nearest neighbor test. The lack of these sorts of methods in the literature is primarily due to the ever-changing methods of archaeological excavation and limited ability to easily analyze provenience data. In the literature, observations of organization and spatial patterning have relied on site maps of excavation blocks and in-field observations. In this paper, statistical methods are applied to a mass kill site of Bison bison from the Vore Buffalo Jump (48CK302) to investigate the organization of butchery. Using a nearest neighbor test, pairwise bootstrapping tests, and a chi-square analysis, this study finds that these methods can give insight into dense stratified bone beds and locate patterns more confidently.

Kiss, Viktória [196] see Szigeti, Anna

Kissel, Marc (University of Notre Dame) and Agustin Fuentes (University of Notre Dame)
[191] *Semiosis in the Pleistocene Scene*
One of the distinctive aspects of human behavior is the ability to think symbolically. However, the ability to track this capacity archaeologically is complicated by debates on what makes an object symbolic. Rather than initially asking if materials are symbols/symbolic, we offer that it may be better to ask if and how they are signs. A more nuanced view of “symbol” in the archaeological record, combined with aspects of Peircean semiotics, can help to bridge the gap between the material record of the past and current interpretive assessments. We argue that using the Peircean distinction between qualisigns, sinsigns, and legisigns provides support for this endeavor. The glimmers of early symbolic behavior (the sporadic occurrences of objects with embedded social meanings in the early/middle Pleistocene) can best be seen as sinsigns, “one-off” occurrences, whereas sites that show long-term presence of such materials are demonstrating the presence of legisigns, the codification of ideas. To illustrate this approach we apply these ideas to three classes of artifacts (ochre, engraved objects, and ornamentations), showing how this system can address issues of relevance to archaeologists who often fetishize the symbolic and think that is what makes us human. Communication, and meaning, are more than symbolic.
[269] *Discussant*

Kitchel, Nathaniel (University of Wyoming)
[216] *The Use and Travels of Red Munsungun Chert: The Early Social Significance of a Northern New England Quarry*
Red Munsungun chert from northern Maine has long been recognized as an important lithic raw material during the fluted point period of New England. Building upon this observation, recent lithic sourcing efforts using visual and XRF geochemical techniques, have demonstrated that this material is virtually ubiquitous in fluted point sites from the region. This same study also shows that red Munsungun chert is transported over longer distances than other raw materials commonly used at this time. Such patterns of use suggest that red Munsungun chert was more highly prized than other toolstone sources commonly used by the earliest peoples of this region. Such differences indicate that this toolstone, and consequently the quarry location from which it was obtained, held social significance for these first groups beyond simple utilitarian applications. These patterns demonstrate that these early populations were already highly knowledgeable of their environment having embedded landscape features, including the quarry location of red Munsungun chert, within webs of social meaning.

Kitchell, Lindsey (Indiana University) and Alex E. Badillo (Indiana University)
[137] *The Sierra Sur in 3D: Benefits of Photogrammetry and 3D Printing for Archaeological Research in Remote Regions*
Researchers working in the Sierra Sur region of Oaxaca, Mexico are often documenting sites that have not yet been studied by western scholars. 3D modeling (via photogrammetry) and 3D printing is a quick and low cost way we can begin sharing this new information with other scholars and the

public, while simultaneously enhancing the documentation of archaeological landscapes and artifacts. In the 2016 field season of Proyecto Arqueológico de Quiechapa (PAQuie), we pilot tested the use of low cost photogrammetry and 3D printing at several scales of analysis. In this paper, I will present the benefits of adding photogrammetry and 3D printing to field research. In particular, I will discuss using (1) UAV (drone) photography to create 3D models of sites and landscapes, (2) still photos to create 3D models of artifacts, rock carvings, and landscape features, and (3) the merits of having 3D prints of those models. These methods are particularly conducive to fast and easy sharing of information; facilitating collaboration and communication between scholars working in this region and beyond.

Klassen, Sarah (Arizona State University), Jonathan Weed (Massachusetts Institute of Technology) and Damian Evans (École française d'Extrême-Orient)
[333] *Untangling the Urban Morphology of Medieval Angkor, Cambodia*
One of the largest puzzles for archaeologists at Angkor is untangling the extremely complex chronological development of the site. The region was host to hundreds of years of urban occupation arising out of a long tradition of habitation through the Bronze and Iron Age. Decades of archaeological investigations have established relational frameworks through which it is now possible to do more precise dating. Recent lidar investigations and the associated mapping and ground truthing have documented over 1,400 temples and 8,000 reservoirs. In this paper, we group temples with associated reservoirs based on alignments, proximity, and known historical relationships. We then combine several disparate datasets into a relational database and use a mathematical model to understand chronological and spatial relationships. The resulting maps reveal the urban development of Angkor and highlight spatial patterns of anthropological interest. We argue that having a more sophisticated understanding of the development of Angkor can assist in asking more robust questions of the archaeological site.

Klassen, Sarah [23] see Russell, Will

Klaus, Haagen D. [233] see Schaefer, Benjamin

Klehm, Carla (Washington University—St. Louis)
[379] *Material Elaboration and Monumentality: Mortuary Beads, Pastoralists, and Social Innovation in Northwest Kenya*
Megalithic architecture appeared suddenly in northwest Kenya 5,000 years ago in tandem with the earliest pastoralists in the region. As Lake Turkana's levels dropped, these people built "pillar sites"—massive feats of labor and coordination that represent one of the earliest instances of monumentality in Africa—in a brief explosion of material and architectural elaboration. The burials associated with these pillar sites are highly ornamented, with thousands of beads made from stone, bone, and ostrich eggshell that would have been brilliantly colored when worn. This paper takes a first look at sourcing, minerology, and the context of these bead assemblages, excavated by the Later Prehistory of West Turkana Project, as an entry into understanding the radical reconceptualization of self and society that took place. During this era of climate instability and economic innovation, people felt compelled to procure a wide variety of minerals, gather them together, and place them with their dead, suggesting novel approaches to the ways they understood the worlds of the living and the afterlife. These beads in turn provide insight at the level of individual perception into how people grappled with social changes and, potentially, differentiation in early complex societies.

Klein, Cecelia
[80] *Blindfolds and the Eternal Return in Late Postclassic Central Mexico*
Scholars have invariably interpreted the blindfolds worn by certain figures in Aztec painted manuscripts as a sign of—in their words—"transgression," "sin," and "punishment." This talk challenges the simplicity and inherent Eurocentrism of that reading. It is true that the Aztecs perceived a person's mistakes to plunge him into darkness and chaos, and that blindfolds, at one level, symbolized that disorder. The cause of a moral error, however, was embodied by certain objects and substances that also contained the power to cure the damage caused—and thus to restore order and wholeness to the social fabric. For the Aztecs the blindfold enabled this reversal. It did so, I argue, because, by blocking vision and light, it symbolically returned the wearer to the primordial darkness of the earliest years of the Creation when, sources tell us, "it had always been night." Blindfolds allowed their wearer to tap into the creative energy of this darkness, thereby undoing the damage caused. This new understanding of blindfolds as having ambivalent meaning for the Aztecs therefore resonates with Mircea Eliade's concept of the "Eternal Return," in which people the world over symbolically return to the distant past in order to restart the present.

Klemmer, Amy (University of Wisconsin–Milwaukee)
[232] *Preliminary Faunal Analysis at the Coastal Site of Rio Chico, Ecuador (OMJPLP-170)*
The Rio Chico site is situated on the central coast of Ecuador, a region that is heavily influenced by climatic events such as El Niño Southern Oscillation (ENSO). Rio Chico was occupied almost continuously for 5,000 years (ca. 3500 BCE to 1532 CE), and therefore provides an opportunity to study coastal resource usage over a long temporal span. This poster presents a preliminary zooarchaeological analysis of the relative abundance of fish and other classes of fauna at the site. A sample of faunal remains from the Florida Atlantic University field school excavations conducted in 1997, 1998, 1999 and 2003 is identified to the class level and serves as the basis of this analysis. This analysis provides a foundation for further research to ascertain if there was relative stability or change in resource usage at Rio Chico over time. Prehistoric data analyses from coastal regions impacted by catastrophic weather patterns related to ENSO are relevant to the modern-day management and sustainability of coastal fisheries. A better understanding of resource usage at sites such as Rio Chico can provide important knowledge of the ways in which humans living in coastal regions may have responded to environmental instability over time.

Klimowicz, Janis [140] see Haynes, Gary

Klokler, Daniela (Universidade Federal de Sergipe—UFS) and Todd Pitezel (Arizona State Museum/University of Arizona)
[84] *From Southern Brazil and Northwest Mexico: Swimming across Landscapes with the Fishes*
Prehistoric societies included multidimensional natural, economic, social, political, and ritual landscapes. In this paper we briefly describe landscapes from the southwestern coast of Brazil during the Archaic period and from the Casas Grandes Medio period (AD 1200–1450) in northwest Chihuahua, Mexico. More specifically, we address ritual landscapes from shell mounds to hilltops. These components of landscapes are highlighted in honor of research conducted by Paul Fish and Suzanne Fish that inspired our work.

Kloulechad, Errolflynn [394] see Ngirmang, Sunny

Knaf, Alice [133] see Ostapkowicz, Joanna

Knecht, Rick [144] see Hillerdal, Charlotta

Knell, Edward (California State University, Fullerton)
[184] *Terminal Pleistocene-Early Holocene Occupation Span and Technological Provisioning Strategies at Pluvial Lake Mojave, California*
This paper represents a first attempt to reconstruct the occupation span of Terminal Pleistocene–Early Holocene foragers around pluvial Lake Mojave, Mojave Desert, California. Models suggest and research indicates that foragers were more sedentary and made shorter moves around large, productive resource patches (large lakes, marshes), but made more frequent and longer distance moves when resource patches were small and/or widely scattered. Lake Mojave at its Pleistocene maximum was 300 km^2 and reasonably considered a large resource patch; whether foragers used it this way is unknown, though. To address this, I consider (following the lead of other researchers) whether the lithic technology at Lake Mojave fits a provisioning place or provisioning individual strategy. The provisioning place strategy is expected when occupation span is long and the provisioning individual strategy when the occupation span is short. Given Lake Mojave's large size and expected patch productivity, the provisioning place strategy is anticipated. Several variables will be used to differentiate between these strategies: toolstone selection and proximity, tool kit structure (degree of curation) and diversity, and artifact replacement patterns. Data to address these issues come from analyses of the extant Campbell and Brainerd collections, and my ongoing research along the shorelines of Lake Mojave.
[184] *Chair*

Knight, Charles (University of Vermont)
[42] *Quantifying Obsidian Extraction at the Zaragoza-Oyameles Source Area of Puebla, Mexico and What This Means for Understanding Ancient Mesoamerican Economies*
Typically overlooked in economic models of commodity production, distribution and consumption in Mesoamerica, is some discussion on the initial procurement of the materials that form the basis of the ancient economies we study. Significant cultural issues, such as labor coordination, territoriality, group identity, knowledge transmission and wealth, which are all wrapped up in a dynamic political and ideological milieu, are at play in the discrete geographical loci where material procurement occurs. Focusing on the procurement of obsidian at the Zaragoza-Oyameles source area in eastern Puebla, Mexico, I present quantitative data on the extent of raw material extraction and, where possible, the type and degree of early stage tool production at the source. Results of detailed topographic mapping of these extraction loci, and the analysis of intensive collections made from their surface, provide a fundamental baseline of data for all subsequent discussions on the role of obsidian in ancient Mesoamerican economies.
[42] *Chair*

Knight, Terry [366] see Hammer, Ben

Knight, Vernon J., Jr. [365] see Smith, Karen

Knipper, Corina [90] see Harris, Susan

Knisley, Matthew (University of Chicago)
[242] *Deep Time versus Archaeological Time: Disentangling Stratigraphy, Periodization, and Historical Narrative*
The earth sciences have periodically contributed to shifts in archaeologists' theoretical and methodological approaches to space and time ("deep" time and sociocultural evolution, stratigraphic laws and contextual interpretation). The Anthropocene seems to herald another such shift, but the category/concept remains controversial given its bridging, by design, of science and politics. This paper argues that archaeologists can clarify our discipline's engagement with these debates by comparing archaeological and geological periodization. An assessment of differing approaches to sedimentary layers reveals conflicting disciplinary logics concerning evidence and historical narrative. These differences extend beyond scaling individual disciplines "up" or "down" through space and time, or how to incorporate nontraditional lines of evidence into the existing interpretive frameworks of particular disciplines. This paper points to a number of conceptual matters that must be addressed as part of a possible disciplinary reordering in response to the challenges of global warming and other environmental crises.

Knodell, Alex
[118] *A Paradigm Shift in Regional Archaeology?*
The pace and scale of technological change in field- and lab-based applications in remote sensing, spatial sciences, and digital media (to name only a few) have fundamentally transformed archaeological research design and practice, especially on a regional level. But have these technological advances changed the discipline in ways that might constitute a paradigm shift? Have they resulted in new disciplinary priorities? Or do they simply represent newer, faster ways to pursue agendas not so different than before? This paper examines positive and negative examples of what may constitute a paradigm shift in regional archaeology and what implications that may have. The first case concerns remote sensing and spatial technologies. The second has to do with digital media. A critical examination from the perspective of scientific revolutions suggests that new priorities have emerged in direct response to certain technological opportunities, especially since the 1990s. It is more difficult to assess our current state in the twenty-first century—although seemingly characterized by exponential growth in everything "digital," few would argue that in every case this represents some unqualified good. A further challenge is that disciplinary change tends to be apparent mostly in hindsight. Nevertheless, such field-shaping developments call for careful scrutiny.

Knoll, Michelle
[363] *Discussant*

Knudsen, Pauline [144] see Walls, Matthew

Knudson, Kelly [8] see Pacheco-Fores, Sofia

Knüsel, Christopher (UMR 5199, PACEA, Université de Bordeaux, France)
[31] *"Where Individuals Are Nameless and Unknown": Osteobiography Reveals the "Big Man," the Ritualist, the Heiress, and the Priest*
In 1957, Christopher Hawkes (of the ladder of inference renown) wrote: "the most scientific and therefore the best, because the purest, kind of archaeology is the prehistoric kind, where individuals are nameless and unknown, and so cannot disturb our studies by throwing any of their proud and angry dust in our eyes" (quoted in Christopher Evans, Historicism, Chronology and Straw Men: Situating Hawkes' "Ladder of Inference," *Antiquity* 72[276]:398–404). Because the social identity of the deceased cannot be identified from human remains without analysis, osteobiography, the bioarchaeological reconstruction of the lives and deaths of individuals from the past, is essential. This is as true for historic as for prehistoric people, not only for those "without history," but even those named individuals who are said to be "historical." This contribution introduces a Bronze Age "Big Man," an Iron Age ritualist, a medieval aristocratic heiress, and an Archbishop of Canterbury (and martyr), a mix of the historic and prehistoric, all nameless without analysis and none throwing much dust in our eyes.

Ko, Jada [116] see Brunson, Katherine

Ko, Jae Won (Jeju Cultural Heritage Institute)
[24] *Peopling of Jeju in the Late Pleistocene and Early Holocene*
Paleolithic sties in Jeju Island have been found in the Quaternary sediment layers that are related to volcanic activities. Accordingly, research has been closely related to the geological investigation on sediment formation and volcanic activities. This presentation focuses on two Paleolithic sites, Oeododong along the north coast and Sangsugae cave along the south coast. The Oedodong site contains choppers and is dated to 32,000 BP; the Sangsugae cave site represents the Terminal Pleistocene, which dates to 25,000 BP. This study investigates the relationship between the Terminal Pleistocene Paleolithic culture and the Early Holocene Neolithic culture, known as the Gosanri culture.

Kobayashi, Masaru
[211] *Archaeology of Salmon Ceremony in the Japan Sea Coastal Regions: A Comparative Study with the Northwest Coast of North America*
As in the Northwest Coast of North America, salmon may have played a critical role for the development of subsistence and political economies as well as ritual systems during prehistoric and historic northern Japan. This paper explores the Jomon salmon ceremony in the Japan Sea coastal regions based on the analyses of the (1) ecology of salmon, (2) rock arts (petroglyphs), (3) salmon remains and their archaeological contexts, (4) zoomorphic stone figurines (clubs), and (5) ethnohistory (folklore) of salmon rituals and their spatial distribution. All of the evidence from the analyses suggests that ecological conditions of salmon have a significant effect on Jomon salmon ceremony in the Japan Sea coastal regions.
[148] *Discussant*

Kober, Brent [335] see Craig, Douglas

Kocer, Jacqueline
[59] *Why Fake it? Counterfeits, Emulation, and Mimicry: Symbolic and Practical Motives for the Imitation of Crafts*
I examine the behavior of emulation wherein an artisan reproduces a craft on a less valuable or precious material to mimic a desired symbolic prestige good. I present cross-cultural examples of artisans making copies of a craft using different materials. Under what circumstances do people create counterfeit objects? Examples from the Gallina area (AD 1100–1300) of the American Southwest are discussed. The Gallina occupied an area on the periphery of a more socially complex polity (Chaco), and they appear to have lacked access to the prestige goods that they were counterfeiting. I further discuss symbols of prestige and how they might be used by the emulating group.
[59] *Chair*

Koenig, Charles W. (Texas State University–San Marcos, Texas)
[126] *Low Impact, High Resolution: Unraveling and Learning from 10,000 Years of Hunter-Gatherer Use of Eagle Cave*
On the northeast fringe of the Chihuahuan Desert, one of the largest rockshelters in the Lower Pecos Canyonlands, Eagle Cave, preserves an extraordinary record of hunter-gatherer life spanning more than 10,000 years. Ongoing investigations by the Ancient Southwest Texas Project of Texas State University beginning winter of 2015 have re-excavated a 4 m deep trench through the center of this massive rockshelter in order to document and sample complex stratigraphy and to stabilize and backfill archaeological units left open in 1963. Spanning 13 field months, we have used continuous Structure from Motion 3D mapping as our primary documentation method while employing microstratigraphic excavation techniques and rigorous multidisciplinary sampling led by geoarchaeology to explore Archaic and Late Prehistoric features such as shallow pits, earth oven beds, and latrines. We have also sampled Paleoindian deposits containing surface hearths, butchered bison bone, decomposing fiber beds, and mammoth remains. This presentation summarizes our methodological approach and field interpretations and highlights the site restoration effort as well as ongoing analyses from the 2015–2017 Eagle Cave investigations.
[126] *Chair*

Koenig, Charles W. [21] see Black, Stephen L.

Koerner, Shannon (Colorado State University, CEMML), Bretton Giles (Colorado State University, CEMML) and Eric Skov (Colorado State University, CEMML)
[344] *Landscape Preference and Precontact Site Location Modeling in the Central Plains, USA*
The Cultural Resource program at Fort Riley provides an ideal setting for developing and testing models for precontact settlement within the Flint Hills region of the Central Plains. Precontact populations utilized the patchy environmental resources available within the Flint Hills by means of specialized activity locations in varying topographic zones. Many of these small sites have been identified through extensive pedestrian surveys of the Fort Riley Installation. These survey data have been used to test existing site location models in addition to providing more information about the different resource exploitation strategies of precontact peoples in the region. This broad view of the survey data has both refined and developed new research questions about landscape use within Fort Riley, particularly in regard to the National Register of Historic Places (NRHP) evaluation process.

Koerner, Shannon [376] see Giles, Bretton

Koetje, Todd (Western Washington University)
[90] *Neanderthals, Denisovians, and Modern Humans: What Material Culture Differences Can We See During Their Overlap?*
The time frame from 50–30 kya contains evidence for at least three distinct human populations spread across northern and western Eurasia. These groups faced serious environmental challenges, and seem to have existed in widely spread, small populations with perhaps very similar basic cultural adaptations. As indicated by shared genes, these groups were evidently in contact. How are these populations represented in material culture? To what extent can we begin to see typological and technological patterns in material culture that might distinguish them? Preliminary comparisons suggest only very subtle distinctions. Is this the Bordes-Binford debate's revenge?

Kohler, Tim (WSU/SFI/CCAC)
[38] *Discussant*

Kohler, Tim [38] see Crabtree, Stefani

Kohut, Betsy [5] see Bey, George J.

Kohut, Lauren (Tougaloo College)
[37] *Thinking Outside the Map: Alternative Approaches to Data Visualization*
One of the more promising applications of Geographic Information Systems (GIS) in archaeology is the potential to incorporate aspects of human perception and experience of the landscape. Visibility analysis has been applied extensively to archaeological contexts, and models of movement, acoustics and other sensory experiences have recently received greater consideration. But despite the promise of moving beyond measurements of geographic space, most applications of experiential modeling continue to rely on standard cartographic tools for representing and analyzing relationships between archaeological phenomena. In this paper, I explore how digital technologies offer alternative (i.e., non-map-based) visualization techniques can be used to better represent and support analysis of human-scale spatial relationships. As a case study, I use regional survey of Late Intermediate Period (1000–1450 CE) hilltop fortifications from south-central highland Andes. Specifically, I examine alternative visualization techniques for modeling intersite relationships in terms of visual perception and travel time—rather than geographic distance. This case study contributes to broader discussions of the potential for digital technology to transform both how we represent and analyze archaeological data.

Kolb, Michael (Metropolitan State University of Denver)
[346] *Discussant*

Kolen, Jan (Leiden University)
[158] *The First Cultural Landscapes of Europe—and Before . . .*
Cultural landscapes appear relatively late in the human history. In Europe, between c. 40–20,000 BP, people for the first time seem to have transformed (parts of) their environment intentionally on a significant spatial scale in order to make places and areas "fit" for future activities. Already between 40,000 and 30,000 BP, prominent natural formations and hidden places were marked with signs and symbols to enable distant communication. From c. 25,000 BP onward, on-site constructions, such as dwelling structures, were deliberately "built" to facilitate livelihood. By 20,000 BP, hunter-gatherers probably used fire as a landscaping tool as well. The timing of these developments makes clear that the emergence of cultural landscapes does not simply coincide with the appearance of anatomically modern humans in Europe. This paper briefly discusses the evidence for the thesis that the cultural landscape is a late development. However, it also criticizes the idea that the earliest cultural landscapes can be understood properly from conventional geographical perspectives. Thirdly, the paper explores what could have characterized human niche construction in the millennia before c. 40,000 BP. How did Late Pleistocene hunter-gatherers organize their living space if not by means of cultural landscapes in a more or less classical sense?
[158] *Discussant*
[158] *Chair*

Kollias, George (Northern Arizona University, Belize Valley Archaeological Reconnaissance Project) and Jaime Awe (Northern Arizona University, Belize Valley Archaeo)
[101] *Investigating the Maya Polity at Lower Barton Creek, Cayo, Belize*
Over fifty years of settlement research in the Belize River Valley has made the region one of the most intensively investigated areas of the Maya Lowlands. Recent lidar research by the Belize Valley Archaeological Reconnaissance Project identified the previously unknown center of Lower Barton Creek in the southern extent of the Belize Valley, filling in a major gap in our understanding of settlement histories. In this paper, we present the results of settlement survey based on spatial analysis of lidar data and the results of excavations in the Lower Barton Creek site core. The goal of this research was to contextualize the site's occupation within the ancient sociopolitical dynamics of the Belize River Valley. High-resolution AMS 14C dating and ceramic analysis indicate that Lower Barton Creek was settled by the Middle Preclassic Period (~700–300 AD cal), and quickly grew into a large regional center. A hiatus in activity at the site occurs after AD 300, coinciding with an extended drought documented in regional paleoclimate records. Ceramic evidences indicates that the site core recovers after AD 700 and continues to develop until its abandonment in the Terminal Classic Period around AD 900.

Kollmann, Dana D.
[14] *"An Arson, a Wig, and a Murder": The Search for Particia Calloway*
Patricia Calloway was reported missing from Henderson, Kentucky, on March 3, 1993. She was last seen in the company of her brother-in-law, Gene Calloway. On October 17, 2012, arrest warrants were executed for Gene and his wife Debra for the felony counts of homicide, kidnapping, tampering with evidence, and retaliation against a participant in a legal process. Debra was convicted, but Gene died while awaiting trial. Prior to his death, Gene prepared a crudely drawn map of the body disposal location. This map was recovered from an ammunition box that had been buried outside for an unknown period of time. In May 2015, forensic archaeological resources were pooled in the effort to interpret the map and thoroughly investigate the presumed location of interment.

Kolpan, Katharine (University of Florida)
[245] *If the Dead Could Return: The Politics of World War II–Era Human Remains in Eastern Europe*
Although World War II hostilities ended in 1945, still today the graves and remains of both combatants and civilians continue to be unearthed, especially in Eastern Europe. These discoveries of graves become entwined with the dynamic physical and geopolitical landscapes, whereby the post-human remains take on new, contested identities. Their unique identifications to name or nationality are sublimated, as their collective national or ethnic identities become prioritized. Combatants tentatively identified as German are typically interred near where they fell, in foreign lands, as a gesture of reconciliation. However, the Second World War exacerbated ethnic hostilities in the former Yugoslavia. There the uncertain identification of World War II combatants allows bioarchaeological materials to take on new meaning as they become representations of continuing feelings of loss and animosity that have been manipulated for contemporary ideological purposes. The indexicality of these enduring remains keeps the memories of the war salient in current political agendas, such that the past is not really past.
[245] *Chair*

Konstantinov, Aleksander V. [332] see Terry, Karisa

Konwest, Elizabeth [137] see King, Stacie

Kooiman, Susan (Michigan State University)
[21] *Cooking and Cuisine: Culinary Clues and Contexts in the Archaeological Record*
Identifying specific foods exploited and consumed by people from past societies is important, but decisions concerning nutrition and social identity can only be fully understood through the study of food preparation techniques and recipe development and traditions. Cooking and cuisine embody the intersection of the biological and the cultural. Their centrality in both everyday and ritual life makes them ideal thoroughfares into the exploration of adaptive, social, political, and ideological tenets and behaviors of past societies. For this reason, ancient cooking techniques and the social and cultural aspects of food choice have become topics of increasing interest. There are multiple evidences through which to access past diet and cooking, including macrobotanical and faunal remains, food processing technologies, chemical and microscopic food residues found on cooking technologies, experimental replication and ethnographic analogy. Each method yields unique and complementary data about past diet and food processing. This diversity holds the potential for collaborative efforts across multiple independent methods resulting in more complete social and cultural interpretations of past cooking habits and food selection.
[21] *Chair*

Kooiman, Susan [21] see Arthur, John

Koons, Michele (Denver Museum of Nature & Science)
[382] *Climate Change and Moche Politics: A View from the Northern Chicama Valley, Peru*
In this paper I will discuss the different lines of evidence pertaining to detecting El Niño and La Niña events at the site of Licapa II and surrounding Northern Chicama Valley. Flood deposits, dune encroachments episodes, malacological data, canal destruction and rebuilding events, and radiocarbon evidence are used as proxies to help understand the intensity and timing of ENSO events. I compare evidence from Licapa II to other sites inside and outside the Chicama Valley to highlight the localized impact of ENSO events. The local nature of destruction from such events has repercussions for the way that political relationships functioned at the sub-valley, valley, and intervalley level.
[2] *Chair*

Koons, Michele [303] see Trautwein, Emily

Koontz, Rex (University of Houston)
[119] *H. B. Nicholson and the Gulf Coast*
While known primarily as an Aztec specialist, H. B. Nicholson was instrumental in beginning a dialogue on regional iconographies. A key example of this dialogue was his work on deity complexes. Building on his mastery of the ethnohistorical data, Nicholson's work on deity complexes attempted to locate particular deity groups with certain regions. This essay looks at Nicholson's hypotheses on Gulf Coast iconography and how those hypotheses have helped shape the regional iconographies now being constructed.

Koontz, Rex [179] see Turner, Andrew D.

Kopperl, Robert (Willamette Cultural Resources Associates)
[51] *Bear Creek (45KI839) Data Recovery Investigation and the Paleoarchaic Settlement of the South Salish Sea during the Late Pleistocene-Holocene Transition*
The Bear Creek site (45KI839) in Washington State's central Puget lowland is among the earliest lithic artifact-bearing, professionally excavated archaeological sites on the Pacific coast between Haida Gwaii and the Santa Barbara Channel. Data recovery excavations in 2013 provided an unprecedented view of Native American settlement in a rapidly changing coastal lowland setting during the Late Pleistocene-Holocene (LPH) transition. We summarize the results of these excavations and attendant analyses and address some broader implications of the research to date, including the settlement of the earliest peoples in western North America, patterns of land use in the Pacific Northwest's dynamic post-glacial environment, and rethinking regional culture-historical sequences. The Bear Creek LPH component contains a lithic assemblage akin to the Western Stemmed Tradition in the interior although it also shows elements of continuity with later regional technological traditions. The lithic assemblage and other contextual data meet expectations derived from models of WST settlement of the interior Pacific Northwest which originated from a Pacific coastal migration.
[51] *Chair*

Kosiba, Steve (University of Minnesota)
[29] *Does Technology Hinder or Assist Storytelling? A Critical Theory Approach to Archaeological Representation and Relational Data*
Advances in archaeological science are throwing new light on old concerns about representations of the past. Methods such as GIS allow archaeologists systematically to analyze multiple variables at once and rapidly to view data from various vantage points. Critics argue that such methods lose sight of

the experiential aspects of history—the cultural differences that influenced how different people participated in social life and told stories about their past. This paper argues that this critique creates a false dichotomy between categories for archaeological explanation and practices that structure social experiences. In particular, the paper draws on critical theory and the philosophy of action to demonstrate how objective renderings of archaeological data can be consistent with subjective, experiential practices of storytelling. Stories are told by emphasizing situated relationships among people, materials, and spaces. New technology, with its capacity to create truly relational ontologies, can enhance archaeologists' abilities to tell stories in ways that mirror cultural understandings, reveal essential cultural differences, and represent complex ecologies. As an example, the paper presents photogrammetry and GIS research from the heartland of the Incas, to tell a story of how forcibly resettled workers created a political community and challenged an empire by building their houses.
[272] *Discussant*

Kosiba, Steve [331] see Hunter, Raymond

Koster, Jeremy M. [156] see Cooper, Catherine G.

Kostrzewa, Agata (Bournemouth University)
[235] *Will Your Childhood Years Kill You Earlier? A Study Exploring the Relationship Between Height, Stress, and Age at Death*
Could shorter legs mean premature death? Stature is a highly complex trait which seems to be influenced by many different factors. To name a few, genetics, social status, through to environment, diet, or health issues. However, it has been observed for some time that taller people live longer. For the purpose of current research, data from 10 multi-period sites were collected. The main focus of project is to explore the correlations between height and age-at-death. Additional to this, as it is broadly suggested that environmental factors have significant impact on body height, this research seeks to explore whether individuals that experienced stress during childhood or adolescence are more likely to be shorter and die younger? As an indicator of childhood stress, linear enamel hypoplasia was analyzed. The next question considered, are shorter people more likely to show stress markers developed in adult life? Therefore, cribra orbitalia was analyzed. All possible associations were explored, taking into account sex and origin of the individuals. Does childhood stress result in shorter body height, and is stature indeed connected to the age at death?

Kosyk, Katrina (McGill University)
[347] *Communities of Practice and Sound-Related Archaeological Collections*
This paper explores an alternative method for examining ephemeral aspects of material culture, such as sound, in the production processes of ceramic precolumbian aerophone construction. In a case study of a museum collection from the G-752Rj site in Greater Nicoya, I demonstrate that it is possible to identify groups of producers and evidence of knowledge transfer between persons that may reflect communities of practice. This research has the potential for examining regional trade and migration of sound related concepts as well as building upon our conceptions of everyday practices of past peoples.

Kotar, Kathryn (McGill University) and James M. Savelle (McGill University)
[190] *Preliminary Results of New Excavations on Jens Munk Island, Foxe Basin, Arctic Canada*
Paleo-Inuit groups settled and inhabited the Canadian Arctic from 2800 BC until the arrival of Thule Inuit groups approximately 1200 AD. Previous archaeological research indicated that Paleo-Inuit populations were particularly large and stable in a "core area" comprising Foxe Basin, Nunavut, and adjacent regions. The diverse and supposedly stable resources of this area allowed people to continuously inhabit the region for almost 3,000 years, including a supposedly smooth transition from the early (Pre-Dorset) to late (Dorset) phases of the Paleo-Inuit Period. The core area model persists in Arctic archaeology, despite recent critiques and a paucity of primary data. In summer 2016, we began new excavations at Kapuivik on Jens Munk Island to shed light on this argued continuity. The field season was part of Savelle's ongoing research project regarding the core area model, which began in 2002. Our investigations targeted dwelling features from transitional levels (i.e., late Pre-Dorset and early Dorset) to document change between the two periods; that is, whether it was in situ development or a replacement population that spurred a cultural shift. This paper will present our initial results, with a particular emphasis on the recovered faunal remains.
[190] *Chair*

Kotegawa, Hirokazu (Museo de Córdoba, Ver.)
[3] *Trono olmeca de Estero Rabón*
En el sitio arqueológico Estero Rabón, se encontró un fragmento superior de trono olmeca en 1996. Actualmente está resguardado en el pueblo que asienta encima del sitio pero también se había olvidado en la comunidad académica. A través del Proyecto Arqueológico Estero Rabón, este trono fue analizado detalladamente para reconstruir la imagen total de él, ya que actualmente se ha perdido parte inferior del trono. En el inicio de este estudio se pensó que tenía una imagen parecida al trono de otro sitio olmeca Loma del Zapote porque la parte superior de ambos tronos tienen imagen similar. Además, en el corpus de las esculturas olmecas se encuentran varios pares de esculturas similares. Sin embargo, aunque es un resultado preliminar, hemos considerado que es un trono olmeca extra ordinario y único en el corpus de esculturas olmecas. Además de que el trono de Estero Rabón tiene una forma particular, cuando se observan tronos de distintas regiones y tiempos en Mesoamérica, se encuentran varios ejemplos similares a este trono olmeca. En este trabajo se examinará esta similitud de la forma de los tronos mesoamericano para comprender la relación interregional y la tradición continua en Mesoamérica.

Kotsoglou, Anastasia (Cornell University) and Andrew Crocker (Cornell University)
[11] *Applied Digital Technologies and GIS Spatial Statistics at Tzak Naab, Northwestern Belize*
The ceremonial center of Tzak Naab, located in the northern hinterlands of the major Maya city of La Milpa, displays many idiosyncratic and unique elements in its built environment that speak to the relationship of the site with the natural landscapes it inhabits. The site core is constructed on three large tiers which overlook the Dumbbell Bajo, a large seasonally inundated wetland. Within this area, aspects of (in)visibility are employed to control movement through—and perception of—space. We investigate these issues using various digital and GIS technologies in order to show how different platforms may be understood at scalar levels ranging from the local to the regional. We also consider the feasibility of Real Time Kinematic mapping in Central America and the ways in which underutilized mapping techniques may be combined with spatio-statistical testing that combines recent and legacy data.

Kotsoglou, Anastasia [179] see Heller, Eric

Koutlias, Lauren
[345] *Children's Health in Archaic Texas: A Paleopathological Analysis of Juvenile Remains*
While many dissertations, theses, and publications have repeatedly touted the relatively low number of juvenile burials at Texas mortuary sites, this research project serves to reconsider their importance in the archaeological record. The Archaic Period mortuary sites of Ernest Witte and Morhiss on the Western Gulf Coastal Plains of Texas have an abundance of juvenile skeletons on which to conduct an analysis. Juvenile bones are especially susceptible to extrasomatic stress where adult bones may not be affected. By studying the remains of these children from a paleopathological perspective, a connection can be made to diet, lifestyle, and overall community health. This study aims to prove that a consideration of juvenile presence and contributions in past societies is important to reconstructing and understanding the past.

Kovac, Milan [131] see Lieskovsky, Tibor

Kovacevich, Brigitte (University of Central Florida), Duncan Cook (Australian Catholic University), Michael Callaghan (University of Central Florida) and Dawn Crawford (Southern Methodist University)
[323] *The Complement of Geochemical Soil Data to Artifact Patterns in the Study of Craft Production: A Case Study from Cancuen, Guatemala*
This paper will discuss the various activities that took place on the exterior stone patio floor of the M6-12 domestic structure at Cancuen, Guatemala, and compare it to previously published findings of the M10-4 and M10-7 structures. These structures typically have a low investment in construction and appear to be nonelite in status, characterized by earthen mounds surrounded by limestone flagstone floors and perishable superstructures. These surfaces often appear to be communal activity areas where multicrafting took place. These activities included large-scale lithic production, including jade and pyrite, subsistence activities, and other types of craft production, some of which are highly visible. Geochemical ICP-MS analysis of soils can help to present a clearer and more holistic picture of the spatial patterning of these activities and the nature of economic structures that may not be readily visible to the naked eye.

Kovacik, Peter [174] see Scott Cummings, Linda

Kowalewski, Stephen (University of Georgia)
[84] *Community, Territory, and Polity in Postclassic Highland Oaxaca*
In late prehispanic Oaxaca, Mexico, the community was a territorial polity cross-culturally comparable to the city-state. Sixteenth-century native and Spanish sources describe aspects of these communities. Full-coverage archaeological surveys have mapped dozens of cases, providing information on size and internal structure not available in the documents. This study compiled evidence regarding population, territory size, boundary marking, internal complexity, political status, languages, hydrology, and agricultural practices for some 60 communities that have both full-coverage archaeological survey and documentary data. Communities (city-states) usually had less than 10,000 inhabitants; the largest had 100,000. Larger city-states were also the capitals of greater states made up of subordinate communities. Territories were small—usually less than 100 km^2. All had shrines or temples, many of which were located at the edges of the territory. Polities were simultaneously urban (over half the population living in large towns or cities) and had strong rural development. Communities had this same form regardless of language or predominant agricultural practice. Larger cities and the capitals of greater states were located in larger valleys. They had key positions in the Mesoamerican world-system. The similarity in form despite environmental differences echoes conclusions about Hohokam communities made by Paul and Suzanne Fish.

Koziarski, Ralph (AECOM)
[385] *Did Bears Make the Fur Trade Possible? Seasonal Resource Scheduling during Wisconsin's Early and Middle Historic Periods*
Data have been found to suggest increased consumption of bear meat at Eastern Wisconsin sites during the seventeenth and eighteenth centuries. While bear remains are rare at these sites, they occur at generally higher densities than at Late Prehistoric Late Woodland and Oneota sites in the same region. Ethnohistoric evidence, supported by zooarchaeological data from the eighteenth century Meskwaki Grand Village (Bell Site) indicate that ritualized disposal behaviors may have impacted the archaeological visibility of bears, even after they became a more common dietary component. The increased consumption of bears appears to be related to changes in settlement and subsistence patterns associated with the influx of resettled peoples, their fur-trading related scheduling needs, climate change, and possible shifts in belief systems related to the great cultural stresses of the period.

Kozintsev, Alexander [92] see Kim, Alexander

Kradin, Nikolay (Russian Academy of Sciences)
[25] *The Northern Hinterland of Mongolian Empire: Urban Centers of Transbaikalia*
In Yuan shih chronicle Hasar, the brother of Chinggis Khan, is described as having the territory of the Argun River and nearby steppe. In the new Yuan empire, after change of the capital from the Onon–Herlen to the Orkhon valley, Eastern Mongolia and Transbaikalia were transformed from heartland into hinterland. Because of previous betrayals by his family Chinggis granted Hasar only four thousand yurts. Also, a city was built in what is today the Hailar/Hulumbur area of Inner Mongolia. This site, known as Khirkhira town or the Kondui palace was excavated by S. Kiselev in 1957–1959. After 2000, Russian scholars continued the studies of Mongolian urbanization in this area. This presentation will discuss results of those new archaeological discoveries. The excavations of three sites were studied; and it was different types of sites. Khirkhira was a real urban center and royal residence. Kondui was an imperial palace with servicing settlements, and Alestui an out-of-town palace.

Krahtopoulou, Athanasia [250] see Garcia, Arnau

Kramer, Andrew [40] see Eren, Metin

Krantz, Sarah (Barnard College, Columbia University)
[192] *Reevaluating Rock Art Panels in Northern New Mexico*
This paper examines what might be called the "palimpsest panel" rock art tradition of the northern Rio Grande region of New Mexico. Palimpsest panels are rock faces with petroglyphs that have accrued in a layered fashion through time. Prior research into such panels has typically focused on questions of chronology, each layer representing a distinct culture-historical era of iconographic production or a chapter in a linear chronology. Here, however, I

move away from the traditional chronological approach, in order to examine the iconographic data present in the form of representation itself, the so-called palimpsest. The way that meaning develops through the act of layering is a process by which the icons interact and modify one another. Such an approach reveals not only the rich, information-laden periods between discrete chronological chapters but also demonstrates that palimpsests are far more than the sum of their parts.

Krasinski, Kathryn (Adelphi University), Brian Wygal (Adelphi University), Charles Holmes (University of Alaska Fairbanks) and Barbara Crass (University of Wisconsin-Oshkosh)
[387] *The Holzman Site: Faunal Remains from a Late Pleistocene Occupation in the Tanana Valley, Alaska*
The earliest archaeological sites in eastern Beringia occur at the gateway of the ice free corridor in interior Alaska. The Holzman site was discovered in 2015 along Shaw Creek in the Tanana Valley and dates to the late Pleistocene. Bison and caribou remains as well as mammoth ivory in the lowest components of the site demonstrate the importance of big game hunting during the colonization of Beringia and the interaction of humans with mammoths during the last phase of their extinction in interior Alaska. Abundant gastroliths suggest birds were also processed at the site. Zooarchaeological analysis, bone hearths, and associated lithics indicate definitive use of the materials by the earliest Alaskans.
[387] *Chair*

Krasinski, Kathryn [194] see Wells, Joanna

Kraszewska, Anna [389] see Ciesla, Magda

Krause, Rüdiger [76] see Heeb, Bernhard

Krause, Johannes (Max Planck Institute—SHH), Verena Schuenemann (Institute for Archaeological Sciences, Universi), Alexander Peltzer (Department for Archaeogenetics, Max Planck Inst), Wolfgang Haap (Department for Archaeogenetics, Max Planck Inst) and Stephan Schiffels (Department for Archaeogenetics, Max Planck Inst)
[203] *Ancient Egyptian Mummy Genomes Suggest an Increase of Sub-Saharan African Ancestry in Post-Roman Periods*
Egypt, located on the isthmus of Africa, is an ideal region to study historical population dynamics due to its geographic location and documented interactions with ancient civilizations in Africa, Asia, and Europe. Particularly, in the first millennium BCE Egypt endured foreign domination leading to growing numbers of foreigners living within its borders possibly contributing genetically to the local population. Here we mtDNA and nuclear DNA from mummified humans recovered from Middle Egypt that span around 1,300 years of ancient Egyptian history from the Third Intermediate to the Roman Period. Our analyses reveal that ancient Egyptians shared more Near Eastern ancestry than present-day Egyptians, who received additional Sub-Saharan admixture in more recent times. This analysis establishes ancient Egyptian mummies as a genetic source to study ancient human history and offers the perspective of deciphering Egypt's past at a genome-wide level.

Krause, Samantha (University of Texas at Austin), Timothy Beach (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin), Thomas Harold Guderjan (University of Texas at Tyler) and Colin Doyle (University of Texas at Austin)
[243] *New Frontiers in Wetland Archaeology: Mapping Maya Agricultural Systems with Lidar*
Lidar has exponentially increased our knowledge of ancient agricultural systems and land use, especially within the Maya world. This paper explores a new lidar dataset for the Maya Lowlands in Northwestern Belize where archaeological and geoarchaeological teams have studied ditched and raised field systems for over 25 years. Through surveys and excavations, researchers in Northwestern Belize have shed light upon the importance of Maya wetland agriculture, but questions of spatial scale still remain. We are currently using increasingly advanced remote sensing techniques to better understand how intensive and expansive modification of lowland wet environments was within this region. This new dataset demonstrates the complexity of ancient Maya wetland agriculture in regard to spatial distribution as well as regional hydrology and topography. This imagery, considered alongside previous remote sensing data and both aerial and pedestrian survey, provides a robust dataset by which we can quantitatively consider the extent of wetland agriculture throughout in Northwestern Belize and throughout the Maya world. Further, this dataset provides insight into natural and anthropogenic wetlands in Belize, and provides a baseline for ongoing and future research for archaeology within tropical wetland systems.

Kretzler, Ian (University of Washington)
[17] *Locating Stories of Survivance within the Colonial Archive: Crafting New Accounts of Grand Ronde History*
Archival material plays an important role in historical archaeological research. This is particularly true in studies of Native American communities of the recent past since the colonial archive comprises a sizable portion of available historical sources. Yet the archive must not be treated as a storehouse of information alone, as it constitutes both state perceptions of Native lifeways and modes of knowledge production through which colonial projects were realized. When approached as sites of critical inquiry the archive's inconsistencies, omissions, and contingencies may be used to better understand the ways Native communities subverted, accommodated, and lived through European and American colonialisms. This paper explores how community-based historical and archaeological research with the Confederated Tribes of Grand Ronde Tribal Historic Preservation Office lends new insight into the history of the Grand Ronde Reservation from its establishment in the mid-1850s through the early twentieth century. Reading government reports, maps, and correspondences against ethnographic information, community knowledge, and archaeological data displaces assimilationist narratives within dominant accounts of tribal history, replacing them with stories that foreground community survivance. This work refashions the colonial tools that created and maintained the Grand Ronde Reservation into sources of capacity building and decolonization.

Krier, Jon (Oregon State University)
[47] *Looking for Fish of the Right Age: Using GIS in Conjunction with Salmon Genetics to Identify Key Submerged Drainages*
Geospatial analysis of Beringian bathymetric data provides powerful tools for formulating predictive modeling of submerged sites of Pleistocene age. With the acceptance of Pre-Clovis archaeological sites in the Americas (Jenkins et al. 2012), attention has shifted to alternative models of the peopling of the Americas. A Coastal Migration hypothesis has been proposed by Erlandson et al. (2013, 2015), however any evidence of such a route is now submerged. Ice free areas along the Pacific margin of North America would have provided refugia for early peoples. Inspired in part by Haida traditional histories, this analysis is attempting to identify streams that could have supported anadromous fish species, like salmon. In addition to being an attractive resource in their own right, anadromous species provide marine derived nutrients to a variety of terrestrial taxa. More broadly, incorporation of genetic data and contemporary population studies provides insight into the effects of climate change on economically important species. This study provides preliminary results of hydrologic analysis as well as recommendations for future inquiry.

Krigbaum, John [144] see Fitzhugh, Ben

Krigbaum, John (University of Florida), Christina M. Giovas (University of Queensland) and Scott M. Fitzpatrick (University of Oregon)
[156] *Agouti Commensalism? An Open Question in the Prehistoric Lesser Antilles, West Indies*
Light isotope data for bone collagen, bone apatite, and tooth enamel apatite have been collected for prehistoric agouti (Dasyprocta sp.) recovered from secure archaeological contexts on Carriacou (Sabazan and Grand Bay) and Nevis (Coconut Walk) in the Lesser Antilles, West Indies. Stable carbon isotope ratios of individual specimens exhibit a wide range of values for both bone collagen (–20.0‰ to –11.5‰; avg = –17.8‰) and bone apatite (–13.6 to –6.5‰), with apatite-collagen spacing also quite varied (3.6‰ to 9.9‰; avg = 7.0‰). Corresponding nitrogen isotope ratios from these samples also exhibit heterogeneous values (6.2‰ to 11.7‰; avg = 8.0‰). The frugivorous feeding habits of agouti suggest they should exhibit a more consistent dietary pattern; however, results underscore marked dietary variation and suggest a degree of commensalism for some, but not all, individuals sampled from Carriacou and Nevis. Results are consistent with two models for human–agouti interaction: 1) mixed hunting of wild animals with captive management of others; and 2) garden hunting of agouti drawn to human agricultural fields. We explore the archaeological and ecological implications of both models.
[284] *Chair*

Kristan-Graham, Cynthia (Auburn University)
[119] *Family Trees and Feathered Serpents at Chichén Itzá: Expanding H. B. Nicholson's Understanding of Kukulcan*
While H. B. Nicholson's magnum opus about Topiltzin Quetzalcoatl concentrates on ethnohistory, he acknowledges that some imagery at Chichén Itzá may highlight the feathered serpent's role as patron. I propose other readings for Kukulcan ("Feathered Serpent" in Yucatecan Maya) at Early Postclassic Chichén Itzá. Linguistic and ethnographic evidence indicates that the feathered serpent symbolizes lineage and ancestry and that rattlesnake physiognomy intersects with fertility. These readings intersect with Nicholson's interest in language and Topiltzin Quetzalcoatl's genealogy, and with Chichén Itzá's visual culture wherein painting and sculpture highlight lineage.
[179] *Discussant*
[179] *Chair*

Kristiansen, Kristian
[324] *Discussant*

Kristensen, Tood [91] see Morin, Jesse

Kristoffersen, Elna Siv (University of Stavanger)
[35] *The Northern Way: Conceptualization of Nonhuman Animals in the Animal Art of Fifth–Sixth-Century Norway*
The presentation takes up a northern way of expression opposed to a southern one—namely the stylistic depiction and focus on animals and mixed animal/human designs prevailing in the Nordic Barbaric area opposed to a focus on the naturalistic ideal of the human body throughout the classical world. The complexity and continuity of this Nordic art form indicates that it was structurally incorporated in an overarching principle that reflects social and cosmic order. The mixed animal-human designs create species that cross-cut traditional categories and enforce reflections on such relationships. On such a basis certain motifs within the Animal Art open up to a pre-Christian understanding of the potential for interchangeability between not only animals and humans—but also objects, where a basic transformative logic is evident. It is, however, a question whether the hybridity in the representations, in their bringing together of different elements and the overcoming of boundaries, might be taken as an expression of a relationship in real life without opposition or distinction. And whether investment of creativity in their representation might be taken as an indication of the essentiality of these designs in respect of ideas of a transcending relationship between animals and humans.

Kristy, Gwendolyn (University of Chicago), Kate Frank (University of Chicago) and Emily Hammer (University of Chicago)
[151] *The Impacts of Urbanization on Archaeological Site Preservation in Afghanistan*
Urbanization is a significant force affecting the preservation of archaeological sites across the globe. Even in war-torn countries such as Afghanistan, urbanization dramatically outpaces looting and other forms of site destruction that have been highly visible in the media. We present data on how urbanization has affected archaeological site preservation across Afghanistan. Using the city of Herat as an example, we present a method for predicting how urban growth will affect archaeological sites in the coming decades. This method draws on historical aerial and satellite imagery, historical maps and gazetteers, modern urban planning data, and predictive modeling within a GIS.

Kromberg, Beau [91] see Burns, Samuel

Kroot, Matthew (Santa Clara University)
[54] *Back to Basics: Analyzing Knapped Stone Recovered During Survey in Southeastern Senegal*
Archaeological ethics require all sites identified on survey to be reported and described in such a manner as to allow for the archaeological community to understand their research potential. This can present a challenge in regions without a significant body of previous research to aid in the interpretation of finds. The Bandafassi Regional Archaeological Project in southeastern Senegal faces just such a situation. A research question driven survey strategy, directed at the archaeological record of the Atlantic Era and using current methods for regional analysis, has produced a wealth of knapped stone finds from preceramic periods, which cannot be easily interpreted and reported in any useful manner. This is due to a lack of established detailed local culture-history chronologies for preceramic periods, utilizing technological and morphological typologies for knapped stone artifacts. This paper explores how methods of analysis borrowed from other well-researched regions have and have not been successful in generating interpretations. In many ways, this process has required a return to some of the earliest and most basic methods in archaeology, as well as an alteration of research strategies in order to meet the basic recording and, therefore, interpretive requirements of regional survey.
[54] *Chair*

Krug, Andrew (University of Missouri), Andrew Fernandez (University of Missouri), Brenton Willhite (University of Missouri), Christine VanPool (University of Missouri) and Clayton Blodgett (University of Missouri)
[237] *From Plain Wares to Polychromes: A Geospatial Evaluation of Ceramics in the Casas Grandes Region*

The past 25 years have seen a significant increase in archaeological fieldwork in the Casas Grandes region of Chihuahua, Mexico. Among significant issues in Casas Grandes archaeology is the relationship between sites close to Paquimé and those in its borderlands. Investigations into ceramic distributions across the landscape have the potential to provide a greater understanding of the relationship between sites and their relationship to Paquimé. In this study, we reexamine Carpenter's (2002) influential map of ceramic types distribution by examining ceramic assemblages (e.g., Casas Grandes Polychromes, Salado Polychromes, and El Paso Polychrome) at various sites (e.g., Brand's surface collections, Janos joint project surface collection, and excavated wares from Galleana, Villa Ahumada, and 76 Draw) within the region. These data are analyzed via ArcGIS, which contains analytical applications that can be used to address the mechanisms behind geospatial variation. Ultimately, we find that a few ceramic type "zones" need to be reconsidered and likely remapped.

Krug, Andrew [155] see Willhite, Brenton

Krummel, Jordan [210] see McCall, Grant

Krus, Anthony (Scottish Universities Environmental Research Centre)
[81] *Gathering Shells and Time: A Bayesian Approach to Shell Mound Formation in Southwest Florida*
Archaeologists have longed grappled with how to effectively date shell mound deposits in Florida. Interpreting radiocarbon dates from shell samples has been a dominant method; however, these interpretations have not fully assessed the possibility that radiocarbon samples might not truly date their corresponding archaeological context. For example, recent research on Mound Key demonstrates that shell from middens was likely used to construct shell mounds, therefore the redeposition of old shells further complicates interpretation of the radiocarbon data. In this paper we critically evaluate the existing radiocarbon samples for shell deposits at two sites (Mound House and Big Mound Key) located on Florida's southwest coast and use a Bayesian approach to create site chronologies informed by stratigraphic contexts and feature formation processes. The selection of radiocarbon samples at these sites was not taken with a Bayesian approach in mind; however, the available data lends itself nicely to Bayesian modeling. The results address previous conclusions about the timing and span of activity and the suitability of certain shellfish species for radiocarbon dating. Together, the models for these sites and Mound Key provide regional insight into the timing and tempo of shell mound activity in southwest Florida.
[254] *Discussant*
[81] *Chair*

Krus, Anthony [144] see Sayle, Kerry

Kruse-Peeples, Melissa (Arizona State University)
[129] *Landscape Legacies in Central Arizona: Archaeologists and Ecologists Working Together*
Archaeologists have long used environmental data to reconstruct the past. Recently, environmental scientists have come to realize the value of incorporating archaeological viewpoints in understanding modern ecological systems. It has been shown that human activities, even those that are relatively non-intensive, have the potential to result in long-lasting ecological transformations. Cross-disciplinary alliances between archaeologists and environmental scientists are necessary if we are to truly understand the modern and future trajectory of ecological systems. One outstanding example of such an alliance is the Legacies on the Landscape Project spearheaded by Katherine Spielmann. Working together, not just borrowing from other disciplines, a collaborative team of archaeologists, soil scientists, and plant ecologists developed innovative research designs to study the Perry Mesa landscape in Central Arizona and document the long-term ecological transformations. In this paper I will provide an overview of the collaborative process of this project and review the document the ecosystem changes brought about by the thirteenth- and fourteenth-century occupation by sedentary agriculturalists. Conclusions will focus on the ways in which the collaborative alliance has helped to advance the fields of archaeology and ecology.

Kubicek, Richard (University of Wisconsin-Milwaukee) and Patricia Richards (University of Wisconsin-Milwaukee)
[341] *$1.87 Each, Four Feet Long and Over; $0.87 Each, Less than Four Feet: A Spatial Analysis of Coffin Type and Coffin Hardware from the Milwaukee County Poor Farm Cemetery.*
Excavations at the Milwaukee County Poor Farm Cemetery (MCPFC) in Wauwatosa, Wisconsin, in 1991 and 1992 recovered 1,649 individuals associated with Milwaukee County's practice from the mid-1800s through 1974 of providing burial for institutional residents, unidentified or unclaimed individuals sent from the Coroner's Office, and community poor. In 2013, Historic Resource Management Services of the University of Wisconsin-Milwaukee recovered an additional 632 individual coffin burials representing over 800 individuals. Richards (1997) proposed a land use timeline for the portion of the cemetery excavated in 1991 and 1992. This poster presents the consolidated data from all excavated graves to date. In particular, we focus on associating the distribution of coffin hardware and coffin type with other classes of material culture in order to interpret spatial patterning and refine the land use history of the Milwaukee County Poor Farm Cemetery.

Kuehn, Steven R. (Illinois State Archaeological Survey)
[127] *The Changing Role of the Domestic Dog: New Evidence from the American Bottom Region of Illinois*
Recent archaeological investigations in the American Bottom have resulted in the identification of several hundred individual dog remains from Late Woodland (AD 650–900), Terminal Late Woodland (AD 900–1050), and Mississippian (AD 1050–1400) components. Ongoing research, including coprolite and isotopic analyses, as well as traditional osteological and pathological studies, is providing important new insight on the diet, treatment, and changing roles of domestic dogs in prehistoric Native American communities. The data obtained thus far indicate notable shifts in dog roles between the Late Woodland, Terminal Late Woodland, and Mississippian periods. Although dogs served in multiple capacities during all three periods, the strongest evidence for ceremonial use and ritual feasting occurs during the Late Woodland and Mississippian periods. In contrast, dogs were used extensively as transport animals during the Terminal Late Woodland period. With this expanding database, it is now possible to begin addressing more detailed, in-depth research questions regarding human-canine relationships in the American Bottom, with broader implications for dog studies across the continent.

Kuehn, Steven R. [61] see Smith, Beverley

Kuester, Falko [29] see Meyer, Dominique

Kuffner, Kim [263] see Heizer, Melanie

Kuhn, Steven (University of Arizona) and Mary Stiner (University of Arizona)
[286] *A Road to Forager Cooperation*
Humans have a unique capacity among primates for cooperation. Recent foragers routinely cooperate in economic activities, and a range of social mechanisms help maintain that cooperation. We argue on the basis of hunting practices and weapon systems that some of these social mechanisms emerged comparatively late in hominin evolutionary history. Large game hunting by Early and Middle Pleistocene hominins involved simple, short range weapons and depended on participation of multiple individuals. The interests of participants were closely aligned in these contexts. Nearly everyone was present at the kill, making cooperation and sharing easy to monitor and maintain. The appearance of long-distance projectile weapons in the Late Pleistocene enabled one or a few individuals to take large, elusive game more efficiently. This freed some individuals to pursue other economic activities, providing a broader and more flexible economic base for the group. However, greater autonomy also created more opportunities for deception and unbalanced reciprocity. When individuals have greater latitude to act as free agents, various social mechanisms can help to ensure honesty and equity. The intense leveling mechanisms documented among egalitarian hunter-gatherers likely evolved in response to the tensions which arose from greater independence in foraging.
[338] *Discussant*

Kuijt, Ian (University of Notre Dame)
[278] *Micro-History and Macro-Evolution: Material Geographies of Multifamily Neolithic Households*
The Near Eastern foraging to farming transition was characterized by the emergence of more powerful nuclear family and multifamily households. It remains unclear, however, how this longer-term evolutionary transition was connected to small-scale daily household decision-making. Focusing on the archaeology sites of Tell Halula and Çatalhöyük, I explore archaeological evidence for the development of Neolithic multifamily households, and how they may have been connected to seasonal collective labor, and were maintained through collective burial practices that focused on linage houses. I argue that small-scale decision making related to Neolithic household food storage and population growth created the context for the long-term evolutionary development of entrenched intra-household differentiation, and the development of multifamily households living in multiple residential buildings. Although difficult to address, the short-term control of household ritual practices may have served as a means for the development of more powerful, and larger, inter-generational households.
[207] *Discussant*
[207] *Chair*

Kuijt, Ian [141] see Shakour, Katherine

Kulaga, Nicole (National Park Service)
[89] *A Study of Lithic Debitage from Talepop (CA-LAN-229) at Santa Monica Mountains National Recreation Area, California*
CA-LAN-229 is a prehistoric archaeological site and an ethnohistoric Chumash village, Talepop, in the interior Santa Monica Mountains in southern California with evidence of human occupation stretching nearly 9,000 years. There are both chronometric and ethnographic lines of evidence which indicate a punctuated occupation from 5000 BC up until the 1800s. The longevity of the occupation of the site provides a rare opportunity to study and test chronologies. The site is also distinctive because of its location within the interior of the mountains. Most other large mainland sites with village occupations in the region are located on the coast or in major valleys. Recent and past excavations of CA-LAN-229 recovered many lithic artifacts, most of which, unsurprisingly, are debitage. While chronologies for shell beads and groundstone have been researched for this region of California, much less emphasis has been placed on lithic artifacts, especially lithic debitage. Debitage analysis can provide insight to a site's function, organization, favored materials, and trade. This research will analyze the debitage of CA-LAN-229 in order to gain a better understanding of the human behaviors taking place there, how they may have changed through time, and how these behaviors may be different from their coastal neighbors.

Kulick, Rachel (University of Toronto)
[354] *Urban Micromorphology at Bronze Age Palaikastro, Crete: Evidence of Transitions*
Sequences at Bronze Age Cretan settlement sites are defined by destructive events, natural or anthropogenic, that capture cultural material in a particular time and space. The traditional approach of studying urban archaeological contexts based on these snapshots of material culture is not completely suitable for analyzing transitional phases that occur between these events. However, detailed micromorphological examination of the sediments present in these transitional stratigraphic sequences can fill the gaps in understanding how and when sites transition from one phase to another. Being able to identify the temporal and spatial relationship and exact nature of these transitional periods of destruction, abandonment, or other processes is essential in forming these interpretations, and approaches focusing on these transitions have not been systematically practiced at Bronze Age Cretan sites to date. This paper will discuss the results from the soil thin section analyses conducted during the 2013–2015 Palace and Landscape at Palaikastro (PALAP) excavations and will elucidate the anthropogenic activities, processes of site formation, and broader landscape transformation in these transitional periods.
[354] *Chair*

Kulisheck, Jeremy (Cibola National Forest and Grasslands), Sandra Arazi-Coambs (Cibola National Forest and Grasslands), Jess Gisler (Cibola National Forest and Grasslands), Kathi Turner (Cibola National Forest and Grasslands) and Christina Sinkovec (Army Corps of Engineers, Albuquerque District)
[301] *An Agricultural Landscape on the Northern Mimbres Frontier, South-Central New Mexico, USA*
The Cañada Alamosa is the northernmost frontier of the ancestral Pueblo Mimbres people of the U.S. Southwest. Intensive survey of a side canyon has defined a distinct agricultural landscape composed of small pueblos, farmsteads, field houses, shrines, and other features. Occupation was centered around alluvial fans located on the first terrace above the drainage, fed by runoff from upper terraces, rather than the floodwaters of the drainage bottom itself. While the Cañada Alamosa has significant later Tularosa and Mesa Verde occupations, use of this agricultural landscape is confined to the Classic Mimbres phase, AD 1000–1130. This agricultural landscape reveals both spatial and temporal diversity in farming practices in the eastern Mimbres area, with implications for the understanding of social and economic changes in this part of the region during the later years of ancestral Pueblo occupation.

Kullen, Douglas (Burns & McDonnell)
[376] *Identifying Hide-Processing Activity Areas at Hunters Home*
Testing and data recovery at the Hunters Home site (11Wi398) in Naperville, Will County, Illinois, recovered nearly 60 formal end scrapers. Microwear analysis determined that more than 80% of them exhibited traces of use wear, and, of those, nearly 90% showed evidence of hide working. Spatial

relationships between hide scrapers, burnishing stones, ochre crayons, and refitted fire-cracked rocks were examined to define discrete, hearth-centered, hide working activity areas within the site.

Kumar, Ajit [167] see Vasantha, Rajesh

Kupriyanova, Elena [323] see Hanks, Bryan

Kurnick, Sarah (University of Colorado Boulder)
[204] *Navigating Social Memories and Reshaping Built Environments: An Analysis of Postclassic Reoccupation in the Yucatán Peninsula*
Societal regenerations are common events in world history. Be they in ancient times, the recent past, or the present, such regenerations are instructive and encourage reflection on several critical issues. How, for example, do those exercising political authority negotiate traumatic social memories? And how, if at all, are preexisting built environments modified? To addresses these and other questions, I examine the regeneration of communities and the reestablishment of political authority in the northern Maya lowlands during the Postclassic period. In this presentation, I analyze the built environments at a series of coastal and inland sites in the eastern Yucatán Peninsula, and suggest patterns in Postclassic reoccupation and Postclassic treatment of the Classic period past. In doing so, I emphasize the importance of place, the past, and the built environment to the operation of political authority, as well as the usefulness of archaeology in understanding ancient, historical, and contemporary events.

Kusimba, Chapurukha
[136] *Contextualizing Ritual and Collapse in Eastern and Southern African Chiefdoms and States*
The role of ritual in the rise of complex societies is well understood in many regions of the world. In contrast, the roles ritual may have played in state collapse, regeneration, and resilience remains inadequately theorized in archaeological studies of the political dynamics of complex societies. This paper will evaluate the role of ritual in the emergence, resilience, and collapse of chiefly and state societies in Eastern and Southeastern Africa. Social and symbolic factors especially the role of ritual and ritual experts, who included master smiths, rain makers, healers, soothsayers, and shamans has remained sorely understudied in the archaeology of state formation in Africa. This paper will examine evidence of the role of ritual in the context of an emerging theoretical perspective in archaeology of the collapse of the state in Africa. I argue that understanding how ritual knowledge and expertise was nurtured, used, abused, and discarded in the service of the state is critical to unveiling how power was negotiated between communities, among various disparate stakeholders, both during the precolonial, colonial, and postcolonial Africa to address overlapping forms of social, political, economic, and technological interactions.

Kuwanwisiwma, Leigh (Hopi Cultural Preservation Office)
[34] *Hopi Migration Traditions: A Fulfillment of the Spiritual Covenant*
For thousands of years, the Hopi clans have traversed both the South and North American continents. Today, this presence is evidenced by the thousands of Hopi/Puebloan archaeological ruins. As well, esoteric ceremonies of today are ancient ceremonies and reinforce a living connection to our cultural history and religion. This great migration period of Hopi people was in fulfillment of a spiritual covenant between clans and our spiritual deity and guardian called Ma'sawu. Ma'sawu is the guardian and caretaker of this fourth world. So to earn the honor of living with him, clans submitted to this covenant to place our cultural footprints on both continents. If clans completed journeys to the four cardinal directions, then they were instructed to wait and eventually be led to their final spiritual home, the Hopi mesas in northern Arizona. This fulfillment of the covenant would grant the Hopi people a title of universal stewards. Today these footprints are represented by ancient Hopi ruins, landscapes, burials, pottery sherds, petroglyphs, and trails.

Kuzminsky, Susan C. (Universidad Católica del Norte, Chile, University of California, Santa Cruz)
[143] *Assessing the Population History of the Atacama Desert using 3D Geometric Morphometric Methods*
Many scholarly debates in South American archaeology have centered on the discovery and cranial morphology of the earliest inhabitants known as Paleoamericans that predate 8000 years BP. Although it was initially hypothesized that cranial differences between Paleoamericans and later populations may reflect distinct biological populations or migration patterns that occurred after the initial colonization of South America, recent genetic data show biological continuity throughout the Holocene in western South America. Given that the current archaeological evidence suggests an early and rapid Pacific coastal migration occurred during the colonization of the Americas, and that several early archaeological sites are located along the coast and in the highlands of Chile, our study focused on a skeletal series from the Atacama Desert where several Paleoamerican skeletons have been excavated. Using 3D scanning and geometric morphometric methods, we examined morphological variation among the Paleoamericans and other prehistoric populations of the Atacama Desert covering a 9,000-year temporal sequence. Our results show biological continuity among several groups within our skeletal series from this region, suggesting that gene flow and complex trade networks contributed to the evolutionary adaptations and population history of the Atacama Desert throughout the Holocene.
[143] *Chair*

Kuzminsky, Susan C. [143] see Poulson, Simon

Kvetina, Petr (Institute of Archaeology Prague, Czech Republic) and Jiri Unger (Institute of Archaeology Prague, Czech Republic)
[189] *Digital On-Site Presentation of the Invisible Past*
The aim of the paper is to demonstrate the possibility of broad spectrum of digital methods for presentation of archaeological sites. This approach is extremely valuable in locations where there is neither any preserved construction, nor any relic of the original appearance of the past structures and landscape. Such sites usually meet with indifference both from the public and from institutions involved in preservation of historical monuments. The possibility of creating virtual and augmented reality proved to be a potential tool to grasp the invisible and to describe the disappeared. On the examples of several Central European sites spanning from the Early Neolithic to Medieval times we show a potentially powerful tool for digital heritage management. Several technological platforms can be interconnected to provide a classical static approach of exhibiting artifacts (in the form of open library of 3D scans), which however may be expanded with dynamic level including augmented and virtual reality, videos and other interacting features. The acquired digital records can also serve as open access sources for research and educational purposes at all academic levels.

Kwak, Seungki (University of Oregon)
[24] *Ancient Residues Indicate Prehistoric Subsistence and Culinary Practices in the Korean Peninsula during the Middle Holocene*

This study attempts to understand ancient human subsistence using isotope analysis on the organic residues extracted from the archaeological potsherds collected from prehistoric coastal shell midden sites in the southern part of the Korean peninsula. In Korean archaeology, shell middens are useful for isotope analysis because they provide suitable condition in terms of organic preservation. To date, the subsistence of these prehistoric coastal and island dwellers remains poorly known. However, this may be addressed through the study of ceramic containers, which were often used for culinary practices, by extracting organic residues of the foodstuffs that remain on the interior wall or inside of the clay matrix. Carbon isotope analysis on those residues provides an opportunity to understand ancient human subsistence strategies in the region.

Kwan, Daniel (University of Toronto)
[78] *A Thin Section Petrographic Study of Early to Late Shangshan Ceramics from Zhejiang, China*
Ceramics from the early Holocene Shangshan Culture, in Zhejiang Province, China, have been subjected to thin section petrographic analysis in order to characterize clay groups, view production patterns, and aid in the development of a complete understanding of the Shangshan technological tradition. Analysis has revealed a pattern in the local production of ceramic vessels likely related to the transformations in cooking methods and dietary patterns that coincided with new evidence for the beginnings of rice domestication in central China.

Kwan, Daniel [33] see Yasui, Emma

Kwok, Cynthia, Sandra Garvie-Lok (Department of Anthropology, University of Alberta) and Mary A. Katzenberg (Department of Anthropology & Archaeology, University)
[30] *Exploring Sex-Based Variation in Infant Feeding Practices in Byzantine Greece Using Stable Isotope Analysis of Dentin Serial Sections*
This paper explores whether sex-based differences in infant feeding practices existed at the early Byzantine Greek site of Nemea (fifth-sixth c.). Dentin serial sections were obtained from the permanent first molar and first premolar from 31 adults (11 males, 8 females, 12 unidentified) and analyzed for stable carbon and nitrogen isotopes. The isotopic data demonstrated that most individuals were breastfed and fully weaned at a mean age of 2.6 with a range of 1.8 to 3.6 years. Sex-based differences were not observed as boys and girls on average were fully weaned at 2.5 (1.9 to 3.3 years) and 2.4 (1.9 to 3.6 years) years, respectively, contrary to the patriarchal structure of Byzantine society. These results are discussed in the context of Byzantine society through the use of written sources. Compared to traditional analyses using subadult bone collagen, dentin serial sections can capture nuances within infant feeding practices and the value of this latter method is highlighted.

Ladefoged, Thegn (University of Auckland) and Benjamin Davies (University of Auckland)
[38] *Emergent Landscapes: Simulating the Distribution of Residential Features in a Hawaiian Dryland Agricultural System*
Cultivation in the Leeward Kohala Field System (Hawai'i Island) required sufficient rainfall for crops to flourish. Periodic droughts restricted production to upper elevations where orographic rainfall was higher and more dependable, likely influencing the labor needs and settlement patterns of resident populations. We employ a series of spatially-explicit agent based models incorporating cultural conceptions of kapu (sacred) and noa (profane) in conjunction with environmental parameters and individual decision-making. The models explore how the ecodynamics of land use and postdepositional processes within this highly productive rain-fed agricultural system combined to pattern the distribution of archaeological features we observe in the present. We propose that the constriction and expansion of cultivation in response to variation in seasonal and annual rainfall produced a palimpsest landscape of periodically abandoned and reused residential features and temporary structures.

Ladrón de Guevara, Sara [3] see Bernard, Henri

Ladrón de Guevara, Sara [10] see Budar, Lourdes

Laffey, Ann (University of Florida)
[173] *Big Plans for Small Pots: Development of an Organic Residue Analysis Protocol for Ancient Wari Miniature Wares*
Excavations from the Monqachayaq sector of the site of Huari uncovered an impressive burial that contained over 300 miniature vessels. The vessels were offered by a people known as the Wari (c. AD 600–1100), an ancient culture thought to be responsible for one of the Andes first great empires. Even more remarkable, the vessels retained the desiccated remains of their contents. The anthropological insight that can be gained has direct implications for a better understanding of Wari practices and continuity of ritual behavior in the Andes in general. If it can be verified that the vessels contain a fermented beverage known as chicha it will speak to a long-held tradition in the Andes of offering the drink to dead ancestors. Furthermore, if compounds associated with hallucinogenic plants can be identified, it will add new elements of understanding to Wari ritual practice. This paper follows the development of an organic residue analysis protocol that will be used to delineate the content of the miniature vessels. It begins with macro and micro archaeobotanical analyses and leads into chemical analyses, which include bulk stable isotope analysis, gas chromatography-mass spectrometry, compound specific stable isotope analysis, and high performance liquid chromatography.
[173] *Chair*

Laffoon, Jason [133] see Leppard, Thomas

Lagle, Susan (University of California, Davis)
[169] *Integrating Faunal and Lithic Evidence from Quina Mousterian Contexts in Southwestern France to Investigate Neanderthal Subsistence Strategies and Mobility*
The interpretation of Middle Paleolithic archaeological assemblages has been the subject of spirited debates among researchers of Neanderthal behavior for over half a century. While these debates have classically centered on analyses of lithic assemblages (e.g., the “Bordes-Binford debate”), it is important to recognize the value of incorporating the associated faunal records in our approach to these questions. Differences in lithic assemblages may be affected by factors like mobility, which may in turn be influenced by subsistence strategies. Changes in prey resource type and availability during differing climate periods could impact how Neanderthals navigated their landscape, affecting both hunting and prey processing practices as well as tool-making decisions. Future research into Neanderthal behavior could benefit from a more holistic approach in which foraging theory is applied to the faunal record and then aligned with studies of lithic attributes relating to mobility. An application of this approach will be discussed in terms of Quina Mousterian archaeological (faunal and lithic) assemblages in southwestern France.

Lahaye, Christelle [90] see Feathers, James

Lake, Mark (University College London)
[38] *What We Choose to Model and How We Think the World Works*
In 1972 David Clarke argued that “models are pieces of machinery that relate observations to theoretical ideas.” That “machinery” does not have to be computational, or even quantitative, but with the resurgence of interest in simulation, the adoption of methods from evolutionary biology and the development of more sophisticated spatial statistics, it is increasingly both. Many of the papers in this session are case studies that explore exactly the issue of how effectively we can use models to connect observation and theory—essentially a question of epistemology, or how we get to know about the world. But of course even the most rigorous and effective use of explicit models to connect observations and ideas can only answer the questions we actually ask, so this paper compliments others by reviewing the sorts of models that we offer up against reality, in other words, what aspects of the world interest us and what kinds of relationships do we typically posit between them. Drawing on published examples, I will sketch key debates surrounding description versus explanation, individuals and aggregates, and cause and effect.

Lakevold, Courtney (University of Alberta; Government of Alberta) and Jennifer Hallson (University of Alberta)
[339] *Population Size and Structure in the AD Thirteenth-Century Occupation of Promontory Cave 1*
The extraordinary preservation and narrow time frame (AD 1240–1290) for the occupation of Promontory Cave 1 on Great Salt Lake allow for unusual insights into the population and demography of its Promontory Culture inhabitants. We use two methods to determine population size. First, with accurate data on the habitable space in Cave 1, we calculate space needs per person from ethnographic accounts of Western North American hunter-gatherer groups in order to estimate likely group size. Second, artifact densities are calculated and projected into the entire cave volume using mathematical and GIS methods. The number of moccasins will be the focus because of the sound ethnographic knowledge of their use and discard rates. We apply accumulation equations to these projection results to determine population size, taking into account the duration and time of the occupation of the cave. These two methods will be compared and discussed to provide a likely size for the population inhabiting Promontory Cave 1.

Lakevold, Courtney [91] see Morin, Jesse

Lam, WengCheong (Chinese University of Hong Kong Department of Anthropology)
[58] *Archaeology of Iron in the Lingnan Region and the Imperial Strategy of the Han Dynasty in its Southern Peripheries*
Although the imperial strategy of the Han Empire in its southern peripheries attracts significant scholarly interests, how to synthesize the issue of ethnic integration and imperial expansion within the study of material culture is still widely under-addressed. Especially, how the Han’s control over the movement and distribution of iron—a strategical resource for agricultural and military conquest—is almost overlooked in the literature. This presentation presents the latest statistical studies on the assemblage of iron objects from burial contexts in the Lingnan region to identify relations between the procurement and burying of iron and the ethnicity as well as rank of tomb owners. Through a comparison with the distributional pattern of iron objects found in Han tombs in the Yungui plateau after the Han conquest, this study also attempted to depict the distribution of iron materials on a macro-regional scale in order to articulate the underlying political strategies reflected by the strategic material.
[58] *Chair*

Lamb, Céline (University of Kentucky)
[101] *Constructing Rural Complexity: Intra-household Relations of Community and Inequality at Chunhuayum, Yucatán, Mexico*
The concept of rural complexity acknowledges that social, political, and economic complexity is not limited to large urban centers (Iannone and Connell 2003; Schwartz and Falconer 1994). Like urbanites, hinterland residents are involved in diverse and shifting interactions through which they form, maintain, and reinvent relations of commonality and social differentiation. Chunhuayum, a small settlement located in the Northern Lowlands and occupied from the Late Preclassic through the Late Classic, presents an excellent case study to address ancient Maya complexity from a hinterland perspective and at the microscales (household and communities) of human interaction, due to its separation from larger centers, its lack of monumental architecture, and its internal heterogeneity. Using recently collected data concerning settlement patterns, domestic architecture and household assemblages, I infer: 1) the degree to which households were integrated into a cohesive community, 2) local inequalities, and 3) the material and social practices that may have expressed, (re)produced, and structured understandings of commonality and distinction over time. Reframing discussions of complexity to focus on the micro-levels of human interaction within a lower-order rural settlement, this research contributes to a more inclusive and nuanced understanding of ancient Maya social complexity.

Lambert, John [342] see Hill, Matthew G.

Lambert, Spencer (Brigham Young University), Robert Bischoff (Brigham Young University) and Joseph Bryce (Brigham Young University)
[181] *Feathered Fauna: A Look at Bird Usage among the Fremont*
Bird use among the Fremont is a topic that has been under studied in recent times by archaeologists. We seek to address this lack of current information regarding how birds were used by the Fremont. Although birds likely only played a secondary role in the subsistence economy when compared to large mammals, birds were clearly a supplemental food source. In addition to being a food source, wing and leg elements of large birds were sometimes modified and used as a bone resource for constructing cultural artifacts such as beads and whistles. Indeed, birds likely played an important role in both subsistence and social activities in Fremont society. There has also been research arguing for the existence of a Fremont bird cult. Newly obtained bird bone data from sites in Utah Valley have bird bones found in a variety of contexts. We will compare new bird bone data to other Fremont sites excavated in the past several decades, to present a more recent analysis about bird use among the Fremont.

Lambert, Stephanie (Brigham Young University), Elizabeth Whisenhunt (Brigham Young University) and Spencer Lambert (Brigham Young University)
[367] *Fremont Abandonment Practices: A Case Study of Ventilation Tunnels at Wolf Village*
Ventilation tunnels were commonly used by the Fremont to circulate air within their subsurface buildings. However, there is evidence that ventilation tunnels at Wolf Village, a Fremont site south of Utah Lake, were used for more than circulating air. Our research will explore possible ritual abandonment practices of the Fremont by analyzing the six ventilation tunnels and their associated artifacts uncovered at Wolf Village. Evidence of ritual abandonment practices can include finding articulated animal bones and high value artifacts, such as figurines and trade items, purposefully placed in the ventilation tunnel just prior to disuse. We will compare our findings from Wolf Village to ventilation tunnels at other Fremont sites. By studying ventilation tunnels and the items found in them, we can gain greater insight into possible abandonment practices and expand our knowledge of the Fremont culture.

Lamnidis, Thiseas [143] see Posth, Cosimo

Lamoureux St-Hilaire, Maxime (Tulane University), Marcello A. Canuto (Tulane University), Tomás Barrientos (Universidad del Valle de Guatemala) and Clarissa Cagnato (Université Paris 1-Panthéon Sorbonne)
[274] *Detecting the Functions of Patios in a Classic Maya Regal Palace at La Corona, Guatemala.*
Classic Maya regal palaces were political institutions with many functions, ranging from domestic and ceremonial to administrative. This paper presents the results of the multifaceted study of three adjoining patios of the palace at the Classic Maya Center of La Corona, Guatemala. Research suggests that these patios, dating to final phases of occupation in the Late Classic (eighth and ninth centuries AD), were open spaces dedicated to activities relating to the preparation of food, the manufacture of artifacts, as well as the storage and discard of both perishable and durable goods. This study exhaustively sampled these spaces to study the composition of their stucco floors, associated micro- and macro-artifacts assemblages, and macrobotanical remains. The results of the artifactual, flotation, and ICP-MS analyses of the sampled patios indicate the ancient functions of those spaces to a scale much finer than traditional archaeological methods could. This study will use these data to consider the economic and logistical roles of the members of Classic Maya palaces in order to better understand the pragmatics associated with the exercise of power in ancient Maya society.

Lancelotti, Carla (Universitat Pompeu Fabra)
[274] *Modeling Anthropic Activity Markers: A Multidisciplinary Approach to the Study of Plant-Related Domestic Activities*
The concept of Anthropic Activity Markers as ethnography-derived models to interpret archaeological activities has seen a remarkable development in recent years. In this talk we present the results of MoMArq (Modelización de Marcadores de Actividades Antrópicas: de lo etnográfico a o arqueológico), a multidisciplinary project that combined cross-cultural studies with analyses of phytoliths, starch, multi-element geochemistry and spot-tests to analyze domestic plant-related activities in the past. The main focus of the project is on arid and semiarid areas. Starting from the Standard Cross-Cultural Sample (SCCS), we build and coded a small database that includes, alongside environmental data, ethnoarchaeological information (e.g., features that can be identified in archaeological record). We then used these data to create models of distribution of the above-mentioned proxies. Ethnography-inspired models were validated through ethnoarchaeological studies and applied to a domestic space in classical Greek Olynthos. This approach allows for a better identification of how people used domestic spaces in the past for plant-related activities, specifically food processing and consumption.
[274] *Chair*

Landa-Jaime, Victor [236] see Gomez-Gastelum, Luis

Landau, Kristin (Northwestern University)
[71] *The Consequences of State Collapse: Evidence from the San Lucas Neighborhood during the Terminal Classic*
Understanding the growth and dissolution of state entities has long been a topic of anthropological inquiry. More recently, archaeologists are promulgating dynamic and careful conceptions of how leaders acquire power, and whether and why surrounding residents may support them. By turning our attention to the political economic relationship between Maya rulers and the local population, we can identify successful and failed attempts to maintain states. In this paper, I combine political anthropology with urban studies and practice theory to illustrate how the intermediate scale of neighborhoods can be useful for assessing state dynamics. I focus on the neighborhood of San Lucas during the Terminal Coner ceramic subphase (ca. AD 820–900) to examine the transition between the death of the last major ruler and the full onset of the Postclassic. Multiple lines of evidence from four architectural groups indicate that San Lucas residents enacted different living strategies in response to the dissolution of central government. For example, households established in the Preclassic continued to support small families, while higher status living arrangements were quickly abandoned. Such data offer a more nuanced picture of who emigrated from Copán and when, allowing us to infer the aftereffects of state collapse on residing populations.

Landry, Shannon (Alpine Archaeological Consultants, Inc.)
[368] *Red or Green? Examining the Reliability of Macaw Postcranial Identification*
Archaeologists consider macaws highly valuable trade items which served an important economic and ritual role in the prehistoric Southwest. Costly to acquire, brightly colored, and difficult to keep, macaws are often an exciting indicator of social complexity. There is a consensus that the bright red Scarlet Macaw was used and traded with greater frequency than the emerald green Military Macaw in the American Southwest. Yet variation in size and morphological similarity of Ara sp. postcrania make species level identification of macaws exceedingly unreliable, making past identifications based on postcranial elements problematic. Aside from small-scale, though valuable, lines of inquiry on the topic (e.g., Bullock 2007), this problem remains understated. This poster explores the potential impacts of past, present, and future macaw postcranial identification and interpretation; offers suggestions for modern faunal analysts; and considers the methodological barriers that have led to this point.

Lane, Brian (University of Oregon)
[302] *Defining Territories: Exploratory Analysis in Polynesia*
Territory boundaries can often be difficult to identify archaeologically despite their importance in understanding the larger population process of competition between groups in the past. This analysis tests our ability to define archaeological territories on islands based on geospatial relationships between resources and fortifications. Territories are the result of historical processes of competition between groups. Testing of this method is conducted for the island of Rapa, Austral Islands, French Polynesia. The island is an ideal location due to the importance of competition and territoriality in our understanding of the island's prehistory and the circumscribed nature of islands.

Lane, Brian [180] see DiNapoli, Robert J.

Lane, Kevin (CONICET—Instituto de Arqueologia) and Jennifer Grant (CONICET—INAPL)
[238] *Pastoralisms of the Andes: A Southern and Central Andean Perspective*
In this paper we contrast and compare the development of pastoralism at two opposite yet complimentary geographical locations with a focus on pastoralist impact on the environment. In Argentina we present the evolution and development of pastoralism (c. 3300–400 BP) in the arid highlands of Antofagasta de la Sierra, as societies negotiated the shift from hunter-gathering to a more mixed, but increasingly, pastoralist economy culminating in late complex agropastoralist adaptations. Similarly in the central Andes, we consider the enduring landscape modifications and transhumance patterns of complex agropastoralists located in Ica highlands (2100–400 BP) and their relationship with agricultural communities. In so doing, this presentation

argues for the concept of the many, different and varied types of pastoralism present in the Andes; ranging from an early transhumant hunter-gatherer-horticultural pastoralism to a tethered, fully integrated agropastoralist model for the latter period. Adopting a political ecology approach we consider how human agency and an expanding pastoralist frontier have impacted on and developed landscapes. We thus consider changes and shifts in the landscape of resource areas, settlement location and concomitant herding patterns as well as human-induced alterations in pasturage. Finally we focus on the wider implications of pastoralism in the development of Andean society.

Lane, Rachael (University of Sydney)
[76] *Apples and Oranges? Positioning Regional Archaeology in a Global Perspective*
This paper focuses on issues and methodological approaches to the comparison of archaeological sites, scaling from a regional to a global perspective, with a specific focus on settlement archaeology. The key issue appears to be the logical difficulty of contextualizing regional culture historical data within theories of global settlement patterns. A secondary problematic issue related to the one aforementioned is in the comparison of datasets with highly variable integrity at both these scales, which adds to the difficulty of building viable comparative methodologies. Furthermore, the constraints on archaeologists conducting comparative research, arising from the non-standardization of data and practice within a globalized world are far from trivial. That said, the fact that archaeology is practiced differently all over the world resonates with Bruce Trigger's argument that archaeological theory and method generated in different social and national contexts is a more viable pathway toward understanding the past than is the formulation of a single coherent empirical archaeological theory, or the kind of general theory that David Clarke advocated in the 1970s. This paper also attempts to utilize the tension between Trigger and Clarke to investigate issues impacting global comparative research in archaeology now and in the future.

Lang, Jianfeng [287] see Wang, Qingzhu

Langdon, Steve
[380] *Tlingit "Streamscaping" as Landesque Capital Formation*
The Tlingit heen sati ("stream master") was responsible for establishing and maintaining respectful relations with salmon as a trustee for his clan. The portfolio of obligations included both pragmatic duties controlling access and harvests and ritual responsibilities, such as greeting the arrival of salmon each year with welcoming ceremonies, practices anchored to the Salmon Boy mythic charter that identified the fundamental similarity of humans to salmon as persons. Another dimension of Tlingit interaction with salmon was the modification of in-stream features that was intended to accomplish different purposes through a variety of forms. The term "landesque capital" is a conceptual frame formulated to characterize landscape modifications among agriculturalists but is here utilized to examine the range of in-stream modifications developed by Tlingit through which to interact with salmon. It will be suggested that a particular form of landesque capital formation was motivated by Tlingit understanding of the "ish," a deep pool of slowly moving water in a stream, as a location of special importance to salmon as persons and beings. The long term consequences of in-stream modifications to create other features similar to the "ish" will be highlighted, particularly as related to increasing and regularizing salmon productivity.

Lange, Hans [144] see Darwent, John

Langley, Michelle (Australian National University), Sue O'Connor (Australian National University) and Jane Balme (University of Western Australia)
[173] *Organic Artifacts and Organic Residues in Island Southeast Asia and Australia: Seeking Intangible Behaviors in the Deep Past*
Exploring intangible behaviors—such as the decoration of oneself, or the manufacture of clothing or baskets—in the deep past is often beyond the reach of archaeologists. The microscopic examination of use wear and residues, however, allows researchers to gain significant insights into such 'invisible' behaviors. Organic artifacts recently excavated from sites located in both northern Australia and Timor-Leste (Island Southeast Asia) were microscopically examined for use wear and residues, and resulted in the identification of early decorative traditions in each region. Shells artifacts from the sites of Jerimalai, Lene Hara, and Matju Kuru 1 and 2 in Timor-Leste represented the earliest shell beads in Southeast Asia and the earliest shell appliqués in Island Southeast Asia, while bone artifacts from Carpenter's Gap 1 and Riwi, Kimberleys, Australia, resulted in the identification of the earliest example of a personal ornament on the Australian continent. Such research demonstrates the power of use wear and residue research for examining some of the most remarkable aspects of early human communities.

Langlie, BrieAnna (Loyola University Chicago)
[285] *Engineering an Ecosystem of Resistance: Late Intermediate Period Farming in the South-Central Andes (AD 1100–1450)*
In the fifteenth century, the Inca built the largest precolonial empire in the western hemisphere. In southern Peru near Lake Titicaca, an ethnic group known as the Colla violently resisted conquest by the Inca for several years. Because of their military prowess, the Inca named one quarter of their empire, Collasuyo, after this group. The Colla's ability to resist Inca subjugation was facilitated by their decentralized economy evident in their construction and management of a new agricultural ecosystem. At the Colla hillfort Ayawiri, archaeological data indicate that the construction of terraces and the production of agricultural products were managed by kin groups. The terraces surrounding Ayawiri are irregular in form indicating no centralized authority oversaw construction. Furthermore, there is no irrigation system that would have required cooperation among farmers to manage the flow of water. This farming system provided households with economic autonomy that was resistant to incorporation into stable political forms, including the Inca Empire. The Colla were only integrated into the empire after they relocated from their hilltop communities atop terraced fields to valley-bottom towns. My case study provides key insights into the ways autonomous farming communities engineer ecosystems that can defy statecraft and resist integration into empires.

Langlitz, Meredith Anderson (Archaeological Institute of America)
[291] *Moderator*

Langlitz, Meredith Anderson [234] see Perez-Juez, Amalia

Lanoë, François (University of Arizona), Joshua Reuther (University of Alaska Fairbanks Museum of the North) and Charles Holmes (University of Alaska Fairbanks)
[47] *Mobility and Resource Exploitation during the Late Glacial in the Shaw Creek Flats (Eastern Beringia)*
The colonization of Beringia during the Late Glacial period (about 14,500–11,700 cal. BP) represents the first permanent settlement of the subarctic and provided a pathway to the colonization of North America. The Shaw Creek Flats and nearby middle Tanana river, in central Alaska, constitute the

densest area of identified Late Glacial sites; these are generally characterized by low-density occupations and diverse technological complexes. Recent research suggests some of these sites were specialized, short-lived locations dedicated to a single or few activities. Based on the spatial association of artifacts and faunal remains, the site of Swan Point CZ4b is interpreted as a workshop related to the production of composite tools, and the site of Keystone Dune is interpreted as a camp related to hunting activities. Specialized sites can be seen as logistical forays oriented toward the exploitation of specific resources within a larger economic landscape. Logistical sites, along with other, more residential sites, provide insight as to the strategies of landscape use employed by Beringian people in the Shaw Creek Flats.

Lapeña, Queeny (University of California, Los Angeles) and Stephen Acabado (University of California, Los Angeles)
[198] *Resistance through Ritual Feasts: The Role of Domesticated Pigs (Philippine* Sus scrofa*) in Ifugao's Fight against Spanish Colonialism*
Successful resistance against a colonizing power involves effective martial organization and a complex polity. Due to violence and diseases, established polities in the Americas and the Philippines were devastated following Spanish conquest. Nevertheless, several groups have been documented as actively resisting conquest by establishing settlements in remote mountainous settlements. In the Philippines, scholars have suggested that Spanish conquest of the Magat Valley urged the Ifugao to strategically resettle in the Cordillera Mountains between AD 1600 and 1700. Shortly after, they adopted wet-rice agriculture and built extensive rice terraces. The subsistence shift was accompanied by an increase in the consumption of domesticated pigs, a pattern that we argue is associated with increased ritual feasting. The agricultural movement, hence, established a ranked society that awarded political power to individuals skilled in mobilizing the community. This paper argues that the ritual consumption of domesticated pigs in feasts was entangled in the maintenance of the ranked social order that emerged from Ifugao's resistance against Spanish conquest. In the Philippines and elsewhere in the globe, local interpolity conflict is linked with the expansion of ritual feasting. This investigation presents a case where feasts politically and economically consolidated previously dispersed Ifugao communities.

Lapham, Heather (University of North Carolina—Chapel Hill)
[385] *Black Bear Use through Time in the Southern Appalachians*
Historic accounts of Fort San Juan, a Spanish garrison built near the native village of Joara in the late 1560s in western North Carolina, inform us that chiefs from neighboring towns brought "meat and maize" to the soldiers on various occasions. Based on the high proportion of bear in the fort faunal assemblage, it seems likely that the foods gifted to the Spaniards included bear meat. A recent zooarchaeological study suggests that native peoples provisioned the soldiers with some prime bear meat and meat dishes in a prepared or partially prepared state. Thinking about possible sources of these provisioned meats, we review the archaeological record of black bears (Ursus americanus) in the southern Appalachian Mountains and adjacent Piedmont region of Virginia and North Carolina from the fifth through the seventeenth century to better understand Native American bear procurement and use. Differences among the sites in geographic location, occupation period, disposal methods, and other variables suggest changing patterns of bear use through time. We explore reasons for these patterns, and present a brief contextual study of bear remains from several sites to more clearly define the role of bear in ritual, mortuary practices, and subsistence within these communities.
[385] *Chair*

Lapp, Jennifer E.
[370] *Why Pacific Nicaragua Should Not Be Considered Mesoamerican during Prehistory*
During precolumbian times, it is well-known that the societies of Mesoamerica developed monumental architecture with a high level of complexity. During this same period, much if not all of lower Central America never achieved higher complexity other than that of chiefdom level. Honduras is the one major exception. While the societies of Nicaragua had similar gods and ceramics much of this can be explained through other means. The gods that were similar were "lesser" gods and not the main gods that the Mesoamerican groups held central to their beliefs. The ceramics utilized had some similar motifs, but were unique in their own right. This can be seen by the many studies that are coming out in the more recent years. The burials and settlement sizes were significantly different. It is believed that the settlers of Nicaragua during prehistory were a mixture of Mesoamerican and South American heritage. The various sites of Nicaragua illustrate the fact that precolumbian Nicaragua should be considered a group of its own.

Lara Barajas, Israel (INAH) and Fiorella Fenoglio (INAH)
[183] *Aspectos bioarqueológicos de los grupos prehispánicos del semidesierto queretano durante el Epiclásico*
El hallazgo y recuperación de los restos de un bulto mortuorio que contenía el esqueleto de un individuo masculino permitió, dadas sus características, plantear la hipótesis de que se trataba de un cazador recolector que habitó en esta zona antes de la llegada de los grupos sedentarios a la región; para confirmar dicha hipótesis se realizaron diferentes fechamientos a los materiales arqueológicos de éste y otros contextos hallados en la zona. En esta ponencia se dará a conocer los resultados del estudio bioarqueológico, de la datación y trataremos esbozar las implicaciones socioculturales que estos resultados tienen para la comprensión de las sociedades que habitaron la región.

Lara Barajas, Israel [183] see Fenoglio, Fiorella

Larkin, Karin (University of Colorado at Colorado Springs) and Michelle Slaughter (Avalon Archaeology)
[193] *Health Mecca of the West: The Archaeology of a Tuberculosis Sanatorium*
Eighty years ago, Cragmor Sanatorium in Colorado Springs was a celebrated asylum for wealthy tuberculars and one of the premier facilities in the West. The history of the sanatorium is colorful and perhaps legendary. It includes housing movie stars, Mafioso and millionaires in the 1920s to 1930s and later Navajo patients in the 1950s. Once it became part of the University of Colorado system in 1965, much of the original history was subsumed under the growing campus. This project seeks to recover some of the ephemeral features of the sanatorium that could help us put the history in context and better understand the fanciful stories that surround the sanatorium through the material culture. As part of a survey and inventory of the cultural resources of UCCS funded by the Colorado State Historic Fund, we identified, recorded and tested several features and sites associated with the original functioning of the sanatorium. Although this project is in the beginning phases, we illuminate institutional practices and failures as well as suggest alternative healing strategies employed by physicians and patients.

Larmore, Sean P. (ERO Resources Corp.) and Kevin P. Gilmore (HDR)
[339] *On the Road to Becoming Apache: The Western Dismal River Culture at the Plains/Foothills Margin*
Discovery of new sites as well as the reanalysis of museum collections over the last 15 years has renewed focus on the Western Dismal River (WDR) culture, which we hypothesize represents the ancestral Apachean occupation of the western margin of the Great Plains and into the foothills and high country of the Rocky Mountains, AD 1300–1650. Once thought to represent the initial entry of ancestral Apache in the region during the initial Na-Dene diaspora from the north, this culture is now recognized as transitional between the Promontory Culture at Franktown Cave (AD 1180–1280), which represents the initial ancestral Apache entry into the area, and the later Eastern Dismal River culture (AD 1650–1725) of the Central Plains. A decrease

in regional population possibly related to climate change could have provided an advantage to WDR people who were adapted to marginal upland environments. The technology and material sources represented in WDR material culture reflects both familiarity with their environment born of long tenure and reciprocal trade relationships resulting in the exchange of raw material and ideas with groups in the Southwest and Great Plains. This intermediary role between the Plains and the Southwest represents the early stages in historical Apache ethnogenesis.

Larsen, Frederik [144] see Walls, Matthew

Larson, Griffin [11] see Stanyard, Zachary

Lash, Ryan (Northwestern University)
[157] *Pilgrims and Pebbles: The Taskscape of Veneration on Inishark, County Galway*
This paper explores how a relational approach centered on the concept of taskscape could reinvigorate analyses of how pilgrimages create, sustain, or transform human-environment relations. Medieval and modern traditions of pilgrimage in Ireland are renowned for their engagement with 'natural' places and objects, such as mountains, springs, and stones. Some take this focus as evidence of an animistic pre-Christian heritage, but few have questioned how such practices structured peoples' ideas and interactions with the environment in Christian centuries. Eight years of research on the island of Inishark, County Galway has brought to light an early medieval pilgrimage landscape in which many shrine monuments acted as the foci of veneration and the deposition of water-rolled pebbles, including both decorated and undecorated pieces. Interweaving archaeological, textual, and folkloric evidence, I investigate the gathering, curation, and embodied interaction with pebbles in the context of contemporary processional rituals and cosmology. Considering the taskscape of human and nonhuman actions that brought pebbles to shrines suggests how the experience of pilgrimage afforded ideas of divine creation, reinforced notions of sacred hierarchy, and sustained monastic agricultural regimes.

Lassen, Robert (Gault Project at Texas State University) and Erin Keenan Early (Gault Project at Texas State University)
[345] *Radiocarbon Dating at the Gault Site: A Case Study in Collaboration between AMS and ZooMS to Analyze Promising Faunal Samples*
The Gault site is a lithic procurement site and campsite in Central Texas with components ranging from earlier than Clovis to the Late Prehistoric. For the most part, absolute dating at Gault has relied on optically stimulated luminescence (OSL), which has a high standard error. AMS dating on sparse charcoal samples has been conducted as well, but with mixed results. In particular, the charcoal from the Clovis and lower strata failed to yield viable radiocarbon dates. While faunal preservation tends to be poor, the degree of preservation varies from sample to sample. Recent research by Harvey et al. (2016) indicates that ZooMS (zooarchaeology by mass spectrometry) can be used to screen bones for suitability for radiocarbon dating. By considering a combination of m/z range and minimum number of peaks, the peptide mass fingerprinting technique is purported to determine whether collagen preservation is sufficient for AMS dating. This project therefore seeks to assess the viability of this new screening methodology in different taphonomic conditions than those of Harvey et al., with the ultimate hope of gaining valuable collagen-based dates for the earliest components of the Gault site.

Latham, Katherine (University of Alberta)
[127] *Working Like Dogs: A Systematic Evaluation of Spinal Pathologies As Indicators of Dog Transport in the Archaeological Record*
The use of dogs to pull or carry loads is well documented in the recent and historic past, but the origins of these working relationships are not well understood. Although it is likely that humans utilized dogs for transport activities in the prehistoric period, there is no clear archaeological evidence of dog transport until the historic era. Some archaeologists have suggested that pulling or carrying loads leaves unique signatures of stress on the skeletons of dogs. The use of skeletal indicators for identifying archaeological dogs is problematic because none of the indicators proposed have been systematically evaluated in known transport dogs or in dogs and other canids not engaged in transport activities. Without such data it is unclear if it is appropriate to attribute these skeletal abnormalities to specific occupational etiologies. This paper presents results from a large scale study of modern dogs and wolves that evaluates the occurrence of two spinal pathologies previously used as indicators of dog transport. These pathological lesions are spondylosis deformans and bent or twisted spinous processes. The goal of this study is to test the reliability of these pathologies as indicators of dog's involvement in transportation, including burden carrying and sled pulling.

Latimer, Bruce [338] see Hershkovitz, Israel
Latimer, Bruce [338] see Sarig, Rachel

Latinis, Kyle [333] see Ea, Darith

Latorre, Claudio [134] see Gayo, Eugenia M.

Lattanzi, Gregory (New Jersey State Museum)
[4] *Getting to the Source: Copper Characterization, Prehistory, and the Question of Interpretation*
One cannot truly "source" the raw material of an artifact back to its geologic origin. One can chemically characterize an artifact's raw material to a degree, to make an interpretation as to its likeliest point of origin. As we are dealing with a completely heterogeneous material—copper—archaeologists can only best guess the likely geologic source for the cultural artifacts they are testing. The chemical differentiation of distinct geologic deposits of native copper has been well established, but the same cannot be said for artifacts made from copper. Archaeologists involved in chemical characterization studies use different protocols, laboratories, machines, and different standards. Specific elements and isotopes are purposefully chosen for our analyses, and the results are then subjected to rigorous statistical analyses. The data are then presented in such a way that the archaeologist interprets them as highly likely to have originated from a specific geologic source. This presentation discusses the basic assumptions of chemical characterization, how as archaeologists we must be careful in our interpretations of the data, and how there should be some common protocol for the future of prehistoric copper studies.

Lattanzi, Gregory [4] see Hill, Mark

Lau, Hannah (UCLA)

[244] *Experimentations in Social Complexity: The Halaf Period and Evidence from Domuztepe*
The Late Neolithic Halaf period (c. 6100–5200 cal. BCE) is one of critical importance for understanding the emergence of social complexity in the Ancient Near East. During this period, people in Northern Mesopotamia were beginning to experiment with altering the scale at which their social, economic, and political networks were structured. By examining gradual shifts in the scale of cooperation within groups, we can identify changes in social interaction and organization. I demonstrate this using evidence of Halaf peoples' agropastoral production systems and of large-scale feasts at the Halaf site from the site of Domuztepe (ca. 6000–5450 cal. BCE) in southern Turkey. Evidence of cooperation and emergent inequality at Domuztepe correlates with evidence from the broader Halaf region of cooperation and coordination in raw material procurement, craft production, and accounting practices. Together these data indicate that at Domuztepe, and perhaps at other population centers during the Halaf period, people began to experiment with new forms of social integration and organization.
[244] *Chair*

Laue, Cheyenne (University of Montana)
[38] *Environmental Variation and Technological Change: Results of an Agent-Based Simulation*
Computer modeling is an increasingly important aspect of evolutionary anthropology and archaeology. Computer models of change in cultural and technological forms are often highly revelatory of the ways in which large-scale evolutionary patterns arise from the local interactions between individuals. As such, the results of these models may have broad implications, both within the anthropological sciences and without. This paper details simulation results from an agent-based model of cultural evolution that focuses on the processes of technological innovation and diffusion. In particular, the model discussed here examines the emergence of different technological strategies in the context of spatial structuring and environmental variation. Drawing from both population genetics and cultural evolutionary theory, this model is oriented around previous work on evolutionary dynamics and parameters such as cultural selection and drift, and population size and density. Model results are discussed in the context of current archaeological understandings of the relationship between technological complexity, specialization, and environmental change.

Lauer, Adam (University of Hawaii at Manoa), Stephen Acabado (University of California, Los Angeles), Chin-hsin Liu (California State University Northridge) and John Krigbaum (University of Florida)
[198] *Health and Nutritional Stress in Pericolonial Ifugao, Philippines*
The Ifugao of the highland Philippines responded to Spanish colonial incursions in adjacent lowland towns in the early 1600s by consolidating their political, social, and economic resources. This period saw the introduction of wet-rice agriculture and subsequent expansion of irrigated terraced agriculture in the region. These social and economic changes suggest an increased reliance on rice and a decreased dependence on a broad-spectrum diet. It is hypothesized that changes in diet and larger population density would be reflected in deteriorating health of the population. For this study 23 fetal to early juvenile (24 months) skeletons and teeth as well as the fragmentary teeth and skeletons of six adults recovered from the Old Kiyyangan Village site were analyzed for health and diet data, including a subset analyzed for light stable isotopes. Adult are generally healthy. Fetal and subadult health indicate maternal nutritional stress during gestation as well as nutritional stress and the possibility of trauma in the first years of life. These patterns are stable through time, from before the Spanish colonial incursion through the abandonment of the village. Light stable isotope analyses also find that the diet remained relatively steady throughout the time period of intensifying wet rice production.
[198] *Chair*

Lauer, Adam [284] see Liu, Chin-hsin

Laughlin, Tyler (Texas A&M University) and Anna Dean (Texas A&M University)
[341] *Analysis of a Late Archaic Hearth Feature at the Debra L. Friedkin Site in Central Texas*
The Debra L. Friedkin Site (41BL1239) near Salado, Texas, is the oldest known, continually occupied site in North America. While the previous focus of excavations and analyses at the Friedkin Site has been on Paleoindian strata, this site also has extensive early and late Archaic components, and recent excavations in 2015 and 2016 uncovered a 3 m × 5 m series of five overlapping hearth features in the late Archaic strata (14C 4000–1250 BP). Projectile points, tools and organic materials such as bone and charcoal were recovered in and around these features, creating an assemblage from which multiple dates can be derived. Through a spatial analysis of projectile points and radiocarbon dating, this complex hearth feature provides the opportunity to better understand not only the site formation processes of the Friedkin site, but also the occupational chronology of the late Archaic Period of central Texas.

Laurila, Erick [301] see Terlep, Michael **L.**

Laurin, Gina [191] see Milligan, Jennifer

Lausanne, Alexandra (University of Victoria), Daryl Fedje (University of Victoria), Quentin Mackie (University of Victoria) and Ian Walker (Arizona State University)
[49] *A Multi-Method Approach to Prospecting Stranded Paleo-Coastal Sites on Quadra Island, British Columbia*
Despite increasing support for the first peopling of North America via a coastal route, only a limited number of postglacial (Late Pleistocene–Early Holocene) archaeological sites have been identified on the Northwest Coast. This research aims to identify high potential locations for evidence of the Early Period archaeological record (pre-10,000 cal BP) on Quadra Island, BC. Quadra Island has experienced dramatic sea level regression over the past 14,000 years following the Last Glacial Maximum. These (now inland) paleo-shorelines represent key areas for archaeological prospecting. Through a multi-method approach using sea level history, LIDAR and GIS modeling techniques, prospection for stranded paleo-coastal sites can be greatly improved. LIDAR and GIS modeling are up-and-coming technologies in Northwest Coast archaeology. Using the local sea level history with LIDAR allows detailed "bare-earth" visualizations to be created and reveals hidden archaeological and paleo-coastal features. These features, such as inland paleo-shorelines, can be remotely targeted from beneath the rainforest canopy for archaeological foot survey. Through integration of these technologies into a multi-method prospection approach, time and effort during fieldwork can be maximized, and archaeological site identification can be increased.

Lavi, Noa [193] see Lew-Levy, Sheina

Lavi, Ron (Manot Cave Project) and Lauren Davis (Ben Gurion University)

[338] *The Stratigraphy of Area E, Manot Cave*
Area E is located close to the upper end of the main talus, at the NW side of the cave. It is built of sediments which originated outside the cave, mainly the local Terra-Rossa soil that was washed into the cave with rainwater, mixed with limestone rocks, some of them originating in the cave itself from decaying and falling roof and wall parts. Two main sedimentary units were observed so far: Unit 1—Colluvium made of soil with limestone rocks in varying sizes. This colluvium contains very little to no archaeological finds at all, and only a small amount of bones of bio-origin, namely hyenas' activity. Unit 2—Colluvium made of soil with limestone rock, usually of small to medium size. This colluvium contains abundant archaeological material. Within Unit 2, at least nine separate archaeological layers were detected, consisting of horizontal accumulations of flint items, splintered bones, bone and antler tools, shells, art objects, and combustion features, namely hearths and ash accumulations. These archaeological accumulations are separated by soil containing very little archaeological material. Some of the accumulations are up to 15 cm thick. Possible human-made stone features were also detected in Area E.

Lavier, Catherine [62] see Horta, Helena

Law, Karly
[360] *Oregon Tribal Historic Preservation Offices: Problems and Challenges of Starting and Maintaining a THPO*
In 1992, amendments were made to the National Historic Preservation Act (NHPA) to include provisions for Indian tribes to assume the responsibilities of the State Historic Preservation Officer (SHPO) on tribal lands, and establish the position of a Tribal Historic Preservation Officer (THPO). THPOs are responsible for conducting a comprehensive survey of tribal historic properties and maintaining an inventory of such properties, preparing and implementing a tribal-wide historic preservation plan, and assisting federal agencies in the NHPA Section 106 review of undertakings on tribal land. There are a total of nine federally recognized tribes in Oregon, of which six having a federally recognized THPO, and two agreeing to participate: the Confederated Tribes of Grand Ronde and the Cow Creek Band of Umpqua Tribe of Indians. The goal of this research is threefold: to understand the challenges that these tribes faced when they first began the process of creating their THPO, to find ways to make starting and operating a THPO less of a challenge, and to understand how they measure success (i.e., budget size, staff size, educational outreach, etc.).
[360] *Chair*

Law Pezzarossi, Heather (Syracuse University)
[159] *Visualizing Nineteenth-Century Nipmuc Landscapes*
The Nipmuc people once lived seasonally mobile lifestyles among the lakes, rivers and hills of what is now Central Massachusetts. Colonial encroachment affected this lifestyle greatly, at first in the form of policed and restricted mobility and pressure from the colonial government to own and farmland in severalty, and then later, in the late eighteenth and early nineteenth centuries, the Nipmuc community was largely dispossessed of their land by surrounding Euro-American farmers. As a result, the nineteenth-century Nipmuc community was widely dispersed across Central Massachusetts, living on land they did not own, renting in the city and on larger farms in the countryside. They tended to move often, rarely leaving much documentary evidence of their dwelling history. These events have contributed to an inadvertent narrative of disappearance and erasure that poorly reflects the continued occupancy of the Nipmuc community on the New England landscape. In this paper, I use GIS as a tool to visualize the New England landscape as an Indigenous community space in the nineteenth century, regardless of its ownership, divisions and transformations at the hands of Euro-American settlers and the difficulties, past and present, inherent in representing Native spaces with Western style maps.

Lawler, Brooks (University of Alaska Fairbanks)
[257] *Preliminary Insights into Prehistoric Toolstone Preference of Two Igneous Materials in the Tanana River Drainage, Interior Alaska*
This project examines prehistoric human mobility and raw material preference for tool manufacture in the Tanana River Drainage, Interior Alaska. A geographic approach is used to investigate the distribution of prehistoric obsidian and rhyolitic artifacts in relation to the sources of these materials. The objective of the investigation is to reveal spatial patterning in the distributions of artifacts made of these two materials, relative to each other and relative to the cost of obtaining these raw materials from their sources on the landscape. My initial hypothesis based in human behavioral ecology and optimal foraging theory, stated if prehistoric hunter-gatherers acted to optimize their energy expenditure they could be expected to favor raw materials with the lowest cost of acquisition. The frequencies of different raw material types are examined for thirty-five sites with artifact assemblages that have identified source groups. Those frequencies are compared with geographic information systems models of travel cost. The results of the analysis suggest that the hypothesis does not represent a complete picture of prehistoric human behavior. A more realistic model of human behavior was hypothesized from additional analyses, such that prehistoric hunter-gatherers may have exploited certain material opportunistically and seasonally.

Lawrence, Dan [118] see Hammer, Emily

Lawrence, Ken (SWCA-Texas State University), Charles Frederick (Consulting Geoarchaeologist), Arlo McKee (University of North Texas), Charles W. Koenig (Texas State University) and Stephen L. Black (Texas State University)
[126] *The Paleoindian-Age Deposits of Eagle Cave: Preliminary Impressions*
One of the fundamental research questions of the Ancient Southwest Texas project was to determine if there was Paleoindian occupation of Eagle Cave. Excavations during the 2016 field season explored the Paleoindian age deposits and revealed tantalizing evidence of human presence at that time. One clear occupation was revealed (discussed in another presentation in detail by Castañeda et al.) but beneath this were several deposits that appear to be decomposed fiber beds which are associated with a low density of artifacts. This presentation discusses the Paleoindian-age sediments and their archaeological implications.

Lawres, Nathan (University of Florida, Department of Anthropology)
[377] *Relationality, Circularity, and Monumentality: Ontological Materializations in the Belle Glade Monumental Landscape*
The Belle Glade monumental landscape exhibits a high level of monumentality, with architectural features ranging from large circular ditches to massive geometric arrays of earthen architecture. However, this unique architecture has seen few archaeological interpretations. Those that have been put forth have largely emphasized economic explanations, many of which have been refuted with the acquisition of new archaeological data. Additionally, recent ecological studies show that the physical landscape itself was much different than previously envisioned. These studies make it apparent that this was an aqueous landscape subject to water flowing across its entirety for nine months of the year. Much like the physical landscape they are a part of, the Belle Glade monuments are also unlike anything else in North America. I argue that in order to comprehend the architecture of this landscape we need to shift our line of thought away from thinking of these features as strictly functional architectural elements and envision them as monuments that embody the alterity of the landscape itself. By engaging the ontological turn of anthropology I will show how the Belle Glade people materialized their ontology in monumental form by embodying the relational elements of their landscape in architectural form.

Layco, Wendy (California State University Los Angeles) and Madeleine Yakal (UCLA)
[355] *Beads Associated with Infant Jar Burials/Supine Child Burials: Evidence of Social Inequality in Early Ifugao Culture*
Beads have been used as social markers in many Southeast Asian cultures. The Ifugao Archaeological Project excavations conducted between 2011 and 2012 recovered beads associated with infant jar burials at Old Kiyyangan Village, an early Ifugao site in the Philippines. Preliminary analysis shows that prestige beads were concentrated in burials located near the center of the village. Case studies from Southeast Asian sites in Thailand and Cambodia show similar distributions of material types and locations, allowing inferences about social ranking. The concentration of nonlocal goods suggests social ranking was in effect during the occupation of Old Kiyyangan Village and, therefore, the precolonial social structure of Ifugao was stratified before European contact.
[355] *Chair*

Laycock, Joseph (Texas State University)
[212] *Discussant*

Lazcano Arce, Carlos (Coordinación de Humanidades-UNAM) and Marianne Sallum (University Sao Paulo, Brazil)
[215] *Work and Specialization in the Epiclassic Period (650–950 CE) at Xochitecatl-Cacaxtla, Tlaxcala*
During the Epiclassic Period (650–950 CE) was the peak of Xochitecatl-Cacaxtla. It became the most important center in the Puebla-Tlaxcala Valley. There were numerous small groups who vied for a place in the landscape after the fall of Teotihuacán in the central highlands. There was a clear hierarchical division, as the society was formed by the elite, priests, and groups of peasants. The artisans were different specialists whose work allowed for the biological and social reproduction of “asentamieto” and whose activities involved the exploitation of various natural resources.

Láznicková-Galetová, Martina [127] see Germonpré, Mietje

Lazrus, Paula Kay (St. John’s University)
[336] *Landholdings and Social Standing: Land Use in the Territory of Bova, Calabria, in the early 1800s*
Spatial analysis of land-use data from Napoleonic era Cadastral records provides a window into the social and economic status of individuals in the town of Bova (Calabria, Italy) during the post-Medieval period. Using GIS to explore the cadastral records and archaeological evidence from field survey conducted by the Bova Marina Archaeological Project, this study explores how economic strategies and social relations in this community located in the foothills of the Aspromonte is reflected in the types of crops grown, their position within the landscape and the number and size of holdings. Access to better drainage, roads and rural housing is addressed as a way of understanding the economic and social dynamics of a community that had been a feud of the Archbishop of Reggio and where the church still had much influence even 20 or more years after the official end of feudalism.

Le Bailly, Matthieu, Nicolas Goepfert (CNRS-Paris 1, UMR 8096 Archéologie des Amériques,), Gabriel Prieto (Proyecto Arqueológico Huanchaco, Universidad Nacio) and John Verano (Tulane University, New Orleans, USA)
[238] *Gastrointestinal Parasites of the Camelids of the Archaeological Site of Huanchaquito (Peru): First Results*
The health status of domestic’s camelids is an original research topic in the past Central Andes. The discovery of more than 200 well-preserved camelids in Huanchaquito in the northern coast of Peru was the opportunity to perform paleoparasitological analyses on 20 samples taken from preserved intestines and faeces recovered during the excavations. Extractions of the parasites using RHM standard protocol raised to the observation in 55% of the samples of several helminth taxa belonging to the orders of Trichocephalida and Echinostomida. In addition, 45% of the studied individuals tested positive to coccidian (protozoa) belonging to the Eimeiriidae family. Size of the oocysts showed important variation probably due to the presence of several species. Four Eimeria sp. species are known today by camelids, among which E. macusaniensis, potentially lethal for llamas. This new data shows the high level of infection of camelids and brings new perspectives on the herd health status, the living conditions of these animals, and the Chimú herding practices.

Lea, Sheridan (Dept. of Anthropology, Vanderbilt University), Natasha P. Vang (Dept. of Anthropology, Vanderbilt University) and Tiffiny A. Tung (Dept. of Anthropology, Vanderbilt University)
[233] *Rural Life during and after the Fall of the Wari Empire: A Stable Isotope Analysis of Childhood Diet and Geographical Origins at the Village of Qasa Pampa, Ayacucho, Peru*
Life in a rural village can be vastly different from life in the metropolis, and when an empire collapses the effects can reach even the smallest village. For Qasa Pampa, an agricultural village that was occupied in Wari (ca. 650–850 CE) and post-Wari (ca. 1000–1200 CE) times and located several kilometers away from the capital of Huari, life for its population may have been quite distinct from their capital counterparts. Stable carbon and oxygen isotope analysis can shed light on the dietary habits and geographic origins of Qasa Pampa inhabitants, respectively, both during and after the collapse of the Wari Empire. From the reconstruction of these dietary habits pre- and post- collapse, we aim to understand the impacts of imperial policies and practices on daily life of a lesser village, and also how that lifestyle was altered after the collapse. Results show that carbon enriched foods, likely maize, were consumed in high quantities during childhood throughout the whole occupation (mean δ13C from tooth enamel = –5.8‰; N = 31 enamel samples). The mean δ18OVPDB = –9.2‰ (s.d. = .9) and the stable oxygen values range from –11.7 to –7.7‰, suggesting that there might be nonlocal individuals interred at Qasa Pampa.

Lea, Trevor [303] see Arakawa, Fumiyasu

Leach, Peter (Department of Anthropology, University of Connecticut) and Brian Robinson (Department of Anthropology, University of Maine)
[186] *Consumer-Grade Drone Mapping and Centimeter-Level Intertidal Geomorphic Changes at the Seabrook Marsh Site, Hampton, New Hampshire*
The Seabrook Marsh site [SBM] in Hampton, New Hampshire is a ca. 3500–4500 BP multicomponent site beneath 1–2 m of salt marsh peat and exposed at a rapidly eroding shoreface. Like most intertidal archaeological sites SBM occupies a dynamic environment. Daily tidal fluctuations slightly modify surficial sediments, but on a monthly, seasonal, or annual scale the magnitude of changes is quite significant. The resulting landscape modifications range from minor erosion and deposition to catastrophic failure of shoreline elements through undercutting and rotational slumping. To quantify ongoing erosion at SBM we used a consumer-grade drone and with three surveys recorded 12 months of intertidal geomorphic changes at 6-month intervals. Photographs were collected at 10 m altitude within 1 hour of low tide. We then used digital photogrammetry software to create

orthophotograph mosaics and digital elevation models [DEMs]. Our data exhibited roughly 8 mm resolution and were sufficient to resolve bootprints and minuscule features in DEMs. Data processing in ArcGIS ensured exceptional spatial congruity between surveys. GIS-based spatial comparisons resolved centimeter-level intertidal sediment dynamics and landscape alterations. These data provided a high-resolution assessment of critical areas at SBM that will be the target of upcoming excavations.

Leach, Peter [262] see Singer, Zachary

Leader, George (University of Pennsylvania), Aylar Abdollahzadeh (University of Pennsylvania), Sam Lin (University of Wollongong) and Harold Dibble (University of Pennsylvania)
[40] *The Effects of Exterior and Lateral Platform Morphology and Raw Material on Flake Size and Shape: Results from New Controlled Experiments*
Previous controlled experiments have illustrated that exterior platform angle and platform depth have a strong influence on the size and shape of a flake. Using specially made cores and a hydraulic knapping machine we present results from two new controlled experiments. The first of these involves altering the exterior and lateral margins of the platform and seeing the effects these changes have on flake mass in relation to platform depth. In the second controlled experiment, glass cores (which were used in all of our previous experiments) are replaced with cores made from basalt, obsidian and flint. In this experiment, the emphasis is on the amount of force required for the removal of flakes from each raw material in relation to platform depth. The results from both experiments have important implications for the prediction of flake size based on these important independent variables.

Leary, Jim (University of Reading)
[168] *Discussant*

Lebovich, Liat (University of North Carolina at Greensboro), Victoria P. Johnson (Department of Anthropology, New York University), Ryan M. Byerly (Far Western Anthropological Research Group), Cynthia M. Fadem (Department of Geology, Earlham College) and Charles P. Egeland (Department of Anthropology, University of North Ca)
[152] *Taphonomy of a Modern Landscape Bone Assemblage in the Ngorongoro Conservation Area, Tanzania*
Bone assemblages from modern landscapes can help address a variety of issues, from the degree to which bone scatters accurately reflect local habitats to what variables condition the deposition, preservation, and spatial distribution of faunal material. In 2015, systematic pedestrian survey recovered ~350 bone specimens within a 200 m × 200 m area of open grassland about 2 km north of Olduvai Gorge in the Ngorongoro Conservation Area (NCA). Weathering profiles suggest an exposure, and thus accumulation, time of many years. Find density is well under one bone specimen per square meter, although spatial analysis reveals significant clumping. The findings from the NCA “background scatter” are used better understand the paleoecology and taphonomy of Olduvai Gorge’s well-known early Pleistocene faunal assemblages.

LeBrell, Emilie (Oakland University) and Geoffrey McCafferty (University of Calgary)
[326] *About Face: A Head-On Examination of Precolumbian Social Identity*
A desire for art to reflect social identity is made apparent through prolific representations of human faces in precolumbian ceramics. The ceramic art of Greater Nicoya and the surrounding regions demonstrates an intrinsic drive to communicate distinct group characteristics and illustrates the importance of individuals’ bodies as instruments of both personal expression and social relationships. Physical expressions of collective identity foster a sense of belonging and satisfy the human desire for order and social organization in everyday life. External decoration and modification, hairstyle, tattooing, jewelry, and garment design are all important elements of both self and group identities. These varieties of ornamentation ultimately convey the importance of physical appearance as a device to communicate distinctive group traits. This paper seeks to decode the complex social messages conveyed by human faces on ceramic vessels and figurines from Greater Nicoya and neighboring areas. By gaining a better understanding of social identity through depictions of human faces in ceramic art, we can begin to understand more of the complex social messages and shared ideals of the enigmatic indigenous groups of Greater Nicoya and its neighboring regions.

Lechleitner, Franziska [162] see Baldini, James

Leclerc, Natasha (Memorial University of Newfoundland)
[223] *Shellfish, Seasonality, and Subsistence in Sechelt Inlet: Understanding Intertidal Resources with High-Resolution Bivalve Sclerochronology*
This paper presents the results of annual growth pattern analysis and geochemical analysis of live-collected and archaeological shells from the Sechelt Inlet, southern British Columbia. Annual growth line analysis of butter clams (Saxidomus gigantea) from three sites in this region revealed an intensive pattern of shellfish collection relative to other large village sites on the Pacific Northwest Coast. This variability suggests there may also be differences in seasonal collection patterns. To understand seasonal harvesting practices we analyzed live-collected and archaeological shells to ensure precise seasonality estimates through high-resolution stable oxygen isotope sclerochronology (combined analysis of growth patterns and stable oxygen isotopes). Salinity values in this region were measured at ~15 PSU during the summer months, lower than other previous calibration studies. This lower salinity regime must be considered when inferring seasonality from geochemical data because of the opposing effects of temperature and salinity on stable oxygen isotope values. We also analyzed live-collected littleneck clams (Protothata staminea) to evaluate if this species can also be used as a reliable indicator of shellfish harvest intensity and seasonality. Combined with faunal data, we develop a nuanced understanding of seasonal subsistence practices in the Sechelt Inlet over 5,900 years.
[223] *Chair*

Leclerc, Mathieu [302] see Reepmeyer, Christian

LeCount, Lisa (University of Alabama)
[21] *Discussant*

LeCount, Lisa [274] see Simova, Borislava

Ledford, Janine (Makah Cultural & Research Center)
[295] *Discussant*

Ledford, Kelly (Florida State University) and Tanya Peres (Florida State University)
[340] *Constructed Spaces and Managed Species: Niche Construction Theory and "Wild" Turkey Management during the Mississippian Period in the Southeastern United States*
Precolumbian peoples of the Southeastern United States systematically altered their environment through forest clearing, gardening, terraforming, and urban planning. The end result of these activities encouraged certain native animals like the wild turkey (Meleagris gallopavo silvestris) to occupy these constructed and managed environments, especially forest-edges and agricultural fields. The sustained daily interactions between species resulted in a special and complex human-turkey relationship. In some areas of the Americas the end result is evidenced as domestication, while in the Southeastern United States, a unique style of free-range turkey management was in place by at least AD 1250. Working from the theoretical basis of niche construction theory, we bring together the ethnographic and ethnohistoric record of Southeastern Native Americans, biological literature on wild turkeys, and morphometric data from a Mississippian Period (ca. AD 1250–1450) archaeological turkey assemblage to present a more nuanced understanding of the cultural engagement of a not-so wild species.

Ledin, Lauren (University of Chicago) and Hongbin Yue (Institute of Archaeology, Chinese Academy of Socia)
[72] *Foundations of Childhood: Bioarchaeology of Subadults at the Late Shang Capital of Yinxu*
Oracle-bone inscriptions and pre-Han texts say little about children, making bioarchaeology the best available method to study childhood during earlier periods. In 2004, extensive excavations were carried out on building foundations in Dasikong Village, a Late Shang (c.1200–1046 BC) lineage neighborhood found on the outskirts of modern-day Anyang, Henan Province, China. This led to a uniquely high recovery of subadult remains as younger subadults are often found in and around foundations. For this paper, the age, biological sex, and mortuary contexts of 49 of the subadult individuals were reassessed to explore whether a child/adult binary and later conceptions of childhood are suitable descriptions of the role of Late Shang subadults. Surprisingly, artifacts traditionally considered adult proxies of power were interred with individuals as young as 10–12, suggesting the age group assumed for adult roles should be expanded to include individuals under 15. Patterns in grave good type and number, mortuary treatment, and skeletal age additionally suggest that the current understanding of a child/adult binary is not an effective way to grasp the social identity of Late Shang subadults. In this paper we propose instead that Late Shang subadults passed through a number of socially recognized stages reified in mortuary treatment.

Ledogar, Sarah (University at Albany–SUNY) and Jessica Watson (University at Albany–SUNY)
[248] *Testing the Effectiveness of 2D Morphometric Data for Identifying Species in Galliformes*
Galliformes, or game birds, are one group of birds commonly utilized by prehistoric people that are particularly difficult to classify beyond family. In addition, bird bone assemblages are often fragmentary and poorly preserved, making avifauna notoriously difficult to identify to species, even by trained specialists. Nonidentified bones lead to a decrease in information available about taxa present at the site, hunting preferences of the site inhabitants, environmental conditions, and other issues commonly studied by archaeologists. In this paper, we examine a series of skeletal morphometric traits in 12 gallinaceous species from North America and Europe to determine the range of shape and size variation among these species using principal component analyses. We also test whether the use of morphometrics can enhance the classification of Galliformes using discriminant function analyses. We ask: How can we differentiate between species with bones alone? Can bone measurements discriminate beyond family to species or genus in Galliformes? How effective are morphometrics for zooarchaeologists?
[248] *Chair*

Lee, Boyoung (University of Oxford), Mark Pollard (University of Oxford, Research Laboratory for Arch) and Holger Kramer (University of Oxford, Department of Physiology, An)
[96] *Proteomics for Silks: Identify and Distinguish* B. mori *and Other Species*
Silk fiber generally known is made from a species called Bombyx mori, which was domesticated about 2,000 years ago in China. This is reared by human and the process is called sericulture. However there are other wild silk species that are not domesticated but still used in textile making. In an archaeological context, the proof of sericulture could be an index of the cultural and technological development of a location: it implies that there was a developed economy to import or produce silk—and in latter case also had the knowledge and technology to do so. To know what it is and where it came from is an integral part of the process. However, so far in textile analysis, identification of different species of silks has not been attempted due to the limitation of knowledge and method. Thus in study, it aims to adopt proteomics technique to identify and distinguish B. mori and other wild silks, even from historical and archaeological samples. The results from peptide identification using LC-MS/MS and MALDI-TOF from 7 different species of silks were promising. This would suggest a solution to the current disputes over early silk findings and the settlement of silk-making industry and technology.

Lee, Christine
[276] *Conservation Recommendations for Human Skeletal Remains Excavated from Desert Oases, Cave Shelters, and Permafrost in China and Mongolia*
Tomb excavations have been documented in East Asia for over 100 years, however the focus has been on artifact collection. The systematic excavation and collection of human skeletal remains is new to this region. This study will outline three cases where there was a demonstrated need for the implementation of conservation techniques. The first case included several naturally mummified skulls from Xinjiang, Province, China. A graduate student had decided to wash the skulls to remove skin and hair. A month later white crystals were seen growing out of the skulls. The second case involved four naturally mummified cave burials from southwestern Mongolia. Once removed from the dry environment, they began to decompose again. The last case was excavated from permafrost in northern Mongolia. After the tombs were opened, it began to rain inside from the melting ice. The skeletons were bagged in plastic and stored in cardboard boxes for a year before the author examined them. When examined all of the bones were coated in white mold. This study will give recommendations for the treatment and storage in these particular cases.

Lee, Gyoung-Ah (University of Oregon)
[24] *Chair*

Lee, Gyoung-Ah [24] see Lee, Hyunsoo

Lee, Hyunsoo (University of Oregon) and Gyoung-Ah Lee (University of Oregon)

[24] *Neolithic Resource Use and Niche Construction on Jeju Island, Korea*
One of the key subjects in island archaeology is how islanders adapted to isolated environments and sustained with local resource. Jeju Island sites reveal Early Holocene Neolithic settlements, dating 2,000 years prior to any of Neolithic sites in the Korean mainland. Accordingly, Jeju Island offers an opportunity to understand any shift in subsistence strategies amid the changing Early Holocene environments. A sudden appearance of arrowheads and grinding slabs in the Early Holocene Jeju has been often interpreted as evidence for an increasing importance of edible flora and terrestrial games. This trend may link to worldwide transition to the broad-spectrum subsistence transition. Such a hypothesis has not been tested due to a lack of archaeobotanical studies in Jeju. Our project will investigate both macroscopic and microscopic plant remains in Neolithic sites on Jeju along the coast and uplands. We aim to compare resource utilization among the Korean mainlanders and Jeju islanders and to develop a model on diverse niche construction in Korean Neolithic period.

Lee, Jinok (University of Texas, Austin)
[33] *Neolithic Human-Landscape Interactions in Eastern China: Preliminary Results from Liangchengzhen*
Cultural trajectory of the Yellow River catchment is characterized as complex and integrated feedback process of environment-landscape-human interactions. Landscape history of the Neolithic site, Liangchengzhen, provides a good example of prehistoric agricultural land use and its impact on local landscape, as well as how the human-landscape process possibly affected rapidly increasing social complexity during the Longshan period and subsequent hiatus in eastern China. Through a combination of geomorphological and microbotanical studies of on- and off-site landscapes of Liangchengzhen, evidence has been identified for local landscape history, including erosion of hill slope soils and redeposited soil layers containing rice phytoliths dating to the middle–late Longshan period. This finding provides evidence for late Neolithic rice farming strategies utilizing natural wetlands and redeposited soils. Sediments from subsequent periods, however, revealed evidence for a massive alluvial build-up, probably indicating a sudden change of regional environmental and alluvial regime. The landscape history of Liangchengzhen can shed light on 1) the agricultural production of late Neolithic China, and 2) the impact of landscape dynamics on prehistoric societies.

Lee, Kristina (Vanderbilt University)
[64] *Discussant*

Lee, Lori (Flagler College)
[74] *Intersectionality and Health Consumerism in Antebellum Virginia*
This presentation explores intersectionality in the context of health consumerism in antebellum central Virginia. Health consumerism incorporates the modern sense of patients' involvement in their own health care decisions and the degree of access enslaved African Americans had to resources that shaped their health and well-being experiences. To emphasize the multilayered nature of health and illness, this analysis engages Margaret Lock and Nancy Scheper-Hughes "three bodies model." The three elements comprising this model consist of 1) the individual body—the physical body and personal experience of the body, including the mind; 2) the social body—the body as it is socially represented in various symbolic and metaphorical forms; and 3) the body politic—regulation, surveillance, and control of bodies (both individual and collective) in reproduction and sexuality, work and leisure, and sickness. This model allows for the assessment of intersectionality across domains of power. Public health is a growing research focus that uses an intersectional approach. I argue that understanding intersectionality in past health approaches is critical for understanding modern public health challenges.

Lee, Rachel (University of Washington)
[278] *Household Change and Social Complexity in Prehistoric Korea*
Household archaeology has made important contributions to the study of large-scale social transformations through the remains of the everyday. This paper examines the role of households, themselves, in the social changes that occurred during the Early and Middle Mumun Pottery Periods (ca. 1500–500 BC) in Korea. During this time, incipient social inequality developed alongside another significant change—households that were previously composed of multiple families became single-family units. Excavations of pithouses are presented from Daepyeong and Pyeonggeo-dong, two Mumun settlements from the Nam River region of southern Korea. I examine household changes at these settlements and their relationship with increasing complexity. In particular, I argue that the breakdown of multifamily households raised the potential for competition in Mumun society, ultimately helping to create a sociopolitical context for inequality to develop at densely populated settlements such as Daepyeong.

Lee-Thorp, Julia [30] see Fernández-Crespo, Teresa

Lefebvre, Karine (CIGA—UNAM)
[322] *Ruptura y Continuidad: El impacto de la conquista tarasca en la región de Acámbaro–Maravatío*
A mitad del siglo XV, el joven reino tarasco llevó a cabo una importante fase de expansión de su territorio. Es en este marco que la región de Acámbaro-Maravatío, ubicado a unos 130 km de laguna de Pátzcuaro (corazón del reino), cayó en mano de los tarascos. Pero la conquista no se persiguió más allá y el sector de Acámbaro se convirtió en una zona de frontera. La dominación tarasca de la región fue breve, apenas unos 80 años. Sin embargo, estas ocho décadas fueron suficientes para que el poder tarasco ejerciera su dominación sobre las poblaciones, el territorio y sus recursos. A partir de la confrontación sistemática de datos arqueológicos e históricos, volveremos en varios cambios y permanencias registrados en la región en distintas esferas (política, económica y cultural) de la sociedad tras la conquista tarasca, tal como la continuidad del patrón de asentamiento, la conservación parcial de la elite local, la importación de artefactos desde el centro del reino, la integración diferenciada de los distintos grupos étnicos que residían ahí. Lo anterior permitirá reflexionar sobre la política de expansión y el nivel de control que los tarascos ejercieron sobre los territorios y las poblaciones sometidas.

LeFebvre, Michelle (University of Florida), Susan deFrance (University of Florida), George Kamenov (University of Florida), William Keegan (University of Florida) and John Krigbaum (University of Florida)
[284] *The Zooarchaeology and Isotopic Ecology of the Bahamian Hutia (*Geocapromys ingrahami*)*
Bahamian hutia (Geocapromys ingrahami) are small sized rodents endemic to the Bahamas. Fossil and subfossil records indicate broad geographic distribution of the rodent across the Bahamas in the past, while today Bahamian hutia naturally occur on one island. Bahamian hutia have received little attention archaeologically resulting in critical gaps in our understanding of both natural and anthropogenic patterns in Bahamian hutia distribution and life history. In conjunction with "traditional" zooarchaeological data (e.g., morphometric ranges, geographic distribution, and archaeological context), multiple isotope proxies from bone collagen, bone apatite, and tooth enamel apatite are presented to address geographical origins, management and dietary ecology of sampled archaeological hutia. For example, with respect to bone collagen, mean d13C (–19.5‰) and d15N (5.9‰) values support a predominantly C3-based dietary regime. Interestingly, one individual exhibits a large D13C apatite-collagen spacing of 11.8‰, which suggests some C4

carbohydrate food source in addition to C3-based protein in its diet. Strontium isotope ratios of second molar tooth enamel for all specimens assayed reflect 87Sr/86Sr of modern seawater, between 0.7091 and 0.7092. The data suggest significant indigenous human influence on Bahamian hutia in the past, providing a historical background for Bahamian hutia ecology and distribution today.

LeFebvre, Michelle [340] see Colten, Roger

Lefrançois-Leduc, Alex [178] see Loewen, Brad

Legare, David (Las Cruces District BLM)
[124] *El Camino Real de Tierra Adentro: Public Perceptions and Management*
Management of the Jornada del Muerto segment of El Camino Real de Tierra Adentro National Historic Trail over the last nine years has provided insights into a wide range of behaviors and perceptions about a physical manifestation of history and its meaning and role in our lives. As with many historic/archaeological sites, there is a mythic El Camino as well as an archaeological/historic El Camino. Trail management is sometimes a question of balancing and enhancing and sometimes a question of dispelling and deterrence. The story of the trail goes deeper in time and lasts longer than the three centuries that are cited as its period of significance. Those perceptions of the trail and the meanings that derive from them color the ways that the Bureau of Land Management and the National Park Service manage and interpret El Camino for various members of the public. This presentation focuses on those perceptions, the public's interpretation of the trail, and the management issues that arise from the interactions among the agencies charged with management and the members of the public for whom it is managed.
[255] *Discussant*

Legg, James [395] see Cobb, Charles

Lehew, Anita [92] see Jansen, Amelia

Lei, Xingshan [213] see Chastain, Matthew

Leidwanger, Justin [240] see Daniels, Megan

Leight, Megan (CUNY Graduate Center) and Christina Halperin (Université de Montréal)
[209] *Classic Maya Textiles and the Crafting of Communities*
One of the striking features of contemporary Maya textiles is that their production techniques and aesthetics can be highly regionalized. These textiles manifest strong village, town, and community identities while simultaneously reproducing other identity formations (e.g., gender, ethnicity). Likewise, Classic period Maya (ca. 300–900 CE) political formations were highly regionalized with multiple, shifting centers of gravity. Nonetheless, relatively little is known about the variability of Classic period textiles across the Maya Lowlands and whether textiles were caught up in the political fissions and regionalisms identified in hieroglyphic texts. This paper explores several Classic period Maya textile and garment traditions that have been previously overlooked in the literature. We suggest that unlike other crafting communities, those surrounding textiles often defied the boundaries of petty politics.

Leitermann, Garrett (New Mexico State University)
[390] *The Applicability of Laser-Induced Breakdown Spectroscopy (LIBS): A Case Study of Sourcing Ceramics in the Northern Mimbres Area*
The use of Neutron Activation Analysis (NAA) has been the primary technique for ceramic sourcing studies within archaeology for the last several decades. Laser-Induced Breakdown Spectroscopy (LIBS) is an atomic emission spectroscopy technique that provides archaeologists with a time and cost effective alternative to NAA. LIBS has been used by the author on a large sample of corrugated sherds originating from two Classic Mimbres sites within the Gila National Forest of New Mexico in an attempt to explain the presence of a high volume of distinctively non-Mimbres corrugated wares within the region. More precisely, the author will attempt to use LIBS to test if the significant presence of nonlocal corrugated wares is indicative of high levels of cultural interaction or trade with other cultural groups or if their presence is the result of the adoption or copying of technological and stylistic techniques by local producers. The applicability of LIBS for ceramic sourcing studies will be demonstrated by the results of the author's research.

Lekson, Stephen (University of Colorado)
[393] *Big (Pre)History in North America: A View from the Southwest*
While there are hopeful signs of change, for most of the last half century American anthropological archaeology has been highly skeptical or openly hostile to continental-scale dynamics, particularly north of Mexico. Why was that? This paper briefly explores the history of our discipline, contrasts it to Europe and Latin America, and remarks on emerging, more realistic frames-of-reference for the prehistory of Native agricultural societies in North America. Examples begin with old chestnuts in the Southwest and Mississippi Valley, and move out: from sea to shining sea, and from north and south as far as corn was grown. Summarily, of course.
[373] *Discussant*

Lemke, Ashley (University of Texas at Arlington) and John O'Shea (University of Michigan)
[286] *Cooperation or Competition? The Underwater Archaeology of Communal Hunting Structures*
Forager cooperation can be difficult to detect in archaeological contexts. One approach is to focus on built structures, such as drive lanes or fishing weirs, which required the participation of multiple persons. Yet such features are ephemeral and vulnerable to disturbance and destruction. One way to circumvent these challenges is to target areas with excellent preservation, such as underwater contexts. For example, the cold, fresh water of the Great Lakes preserved 9,000-year-old stone built hunting structures. Due to their submerged setting, these features are virtually intact, and their social and environmental contexts can be investigated on a regional scale. Structures range from simple hunting blinds to complex drive lanes; and their formal attributes including placement on the landscape can be used to infer group size, composition, and seasonality. Yet while communal hunting is often held as a classic example of forager cooperation, permanent built structures raise issues of ownership, property, and territoriality which are at odds with ideals of egalitarian hunter-gatherers. Therefore, the use of such structures by early Holocene foragers may reflect both cooperative and competitive behaviors. We present results from research under Lake Huron on communal hunting structures to comment on the nature of forager cooperation.

LeMoine, Genevieve (Bowdoin College)
[35] *Weasels, Seals, Bears: Late Dorset Miniature Carvings as Indicators of Individual Hunter/Prey Relationships*
Miniature carvings recovered from Paleo-Inuit Dorset culture sites (2800–700 BP) across the Canadian Arctic and northwestern Greenland offer tantalizing glimpses of human-animal relations of this prehistoric group. Recently scholars such as Matt Betts and Mari Hardenberg have begun a productive line of inquiry drawing on representational ecology to contextualize and enrich understanding of the social nature of these relationships and the symbolic role of the carvings of polar bears in particular among the Dorset. Their studies, and most others, consider a broad range of carvings from sites across the north. This paper builds on such work but focuses on subset of carvings: those found tightly grouped in situ, which can be interpreted as having belonged to a single individual at a particular point in time. These "caches" of amulets lend themselves to a consideration of the specific, individual, relationships between hunters and the animals they preyed on, needed protection from, or relied on as helpers, and from there, a better understanding of specific practices of Dorset hunters. Carving caches from Iita, Greenland, and the Arvik and Tasiarulik sites on Little Cornwallis Island, Canada will be the focus.

LeMoine, Genevieve [144] see Darwent, John

Lemonnier, Eva [131] see Nondédéo, Philippe

Lenci, Eric, Jr. [92] see Monroe, Cara

Lengyel, Imre [235] see Edinborough, Marija

Lenoir, Michel [169] see Steele, Teresa

Lenssen-Erz, Tilman (African Archaeology, University of Cologne), Brigitte Mathiak (Data Center for the Humanities, University of Colo), Eymard Faeder (African Archaeology, University of Cologne), Maya von Czerniewicz (African Archaeology, University of Cologne) and Joana Wilmeroth (Dept. for Computing in Arts and Humanities, Univer)
[210] *Scenic Narratives of Humans and Animals in Namibian Rock Art*
In prehistoric rock art the notion of "scene" always played an important role but a clear and widely accepted definition of scene does not exist and little was written about what constitutes a scene. If informing context lacks, Gestalt features are often taken to identify what can be considered a meaningful scene. If we consider a scene as displaying a social animated configuration, then the Gestalt laws alone are an insufficient tool. Particularly in scenes including humans and animals interaction should be considered as well. Here we present a formal approach that provides a rigid framework for the definition of scenic coherence encompassing Gestalt and interaction. This approach allows quantification across the large corpus of Brandberg rock art and it shows that just 2.4% of all scenes show "encounters" of humans and animals. Only once in 117 encounters the animal is clearly in a dominant role. Our data suggest that combining humans and animals in scenes (not in juxtaposition) may be a narrative of hierarchical agency. For the future we aim to grasp the structures of scenic narratives through cooperation with computer science, exploring whether algorithm based data mining enables us to identify underlying rules of scene formation.

Lentz, David L. (University of Cincinnati), Nicholas Dunning (University of Cincinnati) and Vernon Scarborough (University of Cincinnati)
[285] *Resilience and Regime Shift at the Ancient Maya City of Tikal*
Over the time span of nearly a millennium, the ancient Maya polity of Tikal went through periods of growth, reorganization and adaptive cycles of various connected scales. Recent data show that following the reorganization of the Late Preclassic period, Tikal experienced an extended period of technological innovation and population growth that stretched the carrying capacity of the available landscape. A hydraulic system was constructed that provided water for the community during the dry seasons: a powerful development in an area without a permanent water source. Agriculture was intensified using a combination of root crop agriculture, irrigated fields, arboriculture, household gardens, short fallow cropping systems and bajo margin cultivation. The net product of these diverse production activities undoubtedly helped to underwrite an enormous amassing of economic and political capital during the Late Classic period. Ultimately, in the mid-ninth century AD, expansive growth combined with multiple system disturbances led to a collapse of the city's social structure followed by abandonment of the site. The application of resilience theory as a conceptual framework has been useful in helping to interpret the complex web of the underlying social and ecological domains that contributed to Tikal's demise.

Lentz, Kari
[188] *Irish Independence in the Crapper? Irish Republican Army Buttons in San Francisco*
This paper examines two Irish Republican Army buttons discovered in a privy associated with a late nineteenth-century household in San Francisco in order to elucidate how Irish immigrants became Irish Americans on the West Coast. Archaeologists and historians have studied the Irish Diaspora, this they have largely focused on the Northeast. While the Irish Republican Army is familiar to contemporary audiences, many people are unaware of the organization's nineteenth-century roots in the United States. The brass military fasteners derive from the uniform of an IRA solider who participated in Canadian Raids waged by the Fenian Brotherhood in the1860 and 70s. The physical journey of the garment from the Northeast to California engendered the object with import. This paper will attempt to answer the questions of who owned this item and why was it discarded by analyzing the remainder of the collection with insight from historical documents. In addition, this paper will examine assemblages from other Irish households in the neighborhood to better understand how Irish ethnicity identity is expressed through material culture.

Lentz, Kari [75] see Downey, Jordan

Leon, Claudia [368] see Sanchez Miranda, Guadalupe

Leon Romero, Claudia
[349] *Ancient Cacao Groves in Yucatán: A Palynological Approach*

Cacao had a transcendental role in the life of prehistoric people of Mesoamerica, becoming part of their economic, ideological and social system. Due to the morphological and environmental characteristics necessary for the growth of cacao tree, the main producers were concentrated in places like southern Mexico and Central America. However, written sources of the first colonizers in Yucatán disclose that the indigenous nobility of that time had at their disposal cacao orchards in different hollows called rejolladas or ts'ats. Pollen and radiocarbon analyses were made from sediment cores at ts'ats Xkakhuil from the eastern Yucatán. The presence of Theobroma cacao pollen confirms the use of these species, at least from the Post Classic period, when Mayapán was the controller of trade in the north of the peninsula. But the vast iconography of cacao at Chichén Itzá reflected the ideal environment of cultivation of this plant, and the occupation of some rejolladas and ts'ats during the heyday of this city could trace the beginning of this practice centuries before.

Leonard, Alison (University of York), Steve Ashby (University of York) and Dries Tys (Vrije University, Brussels)
[282] *The North Sea and the "Long" Viking Age: Connections and Communication*
This talk presents the results of a northern European collaborative pilot study on the compilation and analysis of internationally-derived datasets of metal-detected material culture. Drawing on nascent heritage initiatives across northern Europe designed to protect and record our at-risk portable material culture, the project seeks to develop and trial a methodology for the synthesis and analysis of metal-detected datasets from England, Denmark, Belgium, and the Netherlands, resulting in the first international synthesis of this material. The project focuses on the North Sea littoral in the Iron Age/Early Medieval period leading up to and throughout the "Viking Age" (c. AD 700–1100)—a period characterized by extensive long-distance networks of trade, migration, and communication. In addition to piloting cross-border data synthesis, the project will analyse the distributions and long-distance routes of movement of artifacts and people, thus shedding light on the interconnectedness of the "Long Viking Age" in the North Sea. The results will be of interest to those making use of metal-detected data regardless of period specialization, particularly with reference to strategies for the effective integration of these diverse and problematic datasets.
[282] *Chair*

Leonard, Jennifer [101] see Marinkovich, Erik

Leoso, Edith (Bad River Tribal Historic Preservation Officer)
[295] *Discussant*

Lepofsky, Dana [47] see Neudorf, Christina

Lepofsky, Dana [77] see Greening, Spencer

Leppard, Thomas (University of Cambridge) and Jason Laffoon (Leiden University)
[133] *Patterns and Outliers in Prehistoric Island Mobility: Comparing the Strontium Data*
During the colonization of islands in the Pacific and Caribbean by agropastoral communities, a variety of proxies (e.g., material, genetic, zoogeographic) indicate substantial interisland and intercommunity contact. It has been suggested that this contact represents an adaptive response to intrinsic demographic fragility during the initial phases of island colonization, and that this connectivity imperative faded in the aftermath of initial dispersal as overall population density increased. Here we evaluate this model by synthesizing and comparing increasingly available 87Sr/86Sr data from funerary populations in the Pacific and Caribbean. Highlighting possible limitations in a comparatively small body of data (not least statistical limitations relating to small sample sizes and problems pertaining to geochemical characterization), we nonetheless tentatively suggest broad patterns, as well as outliers, as regards post-juvenile mobility in both areas. We relate these patterns to recurring types of sociodemographic organization in early agropastoral island communities (especially in terms of general trends in interisland mobility over time), and discuss the broader implications for understanding how island environments imposed—or did not impose—constraints on the organization of communities cross-culturally.

Leppard, Thomas [32] see O'Connor, John

Leroy, Stephanie [323] see Hendrickson, Mitch

Lesage, Louis [30] see Pfeiffer, Susan

Leslie, David (University of Connecticut) and Kevin McBride (University of Connecticut)
[223] *Warm or Cold Season of Capture? Oyster Middens from Block Island, Rhode Island*
Previous research on Block Island, Rhode Island, indicates that during the Woodland Period, the island was likely occupied year-round and maritime resources accounted for a significant portion of peoples' diets. Native American sites on the island include semipermanent villages near the Great Salt Pond and fishing, temporary seasonal, and task specific camps away from villages. Season of occupation for these sites is important to frame our understanding of a developing maritime economy. Several oyster middens (Crassostrea virginica), associated with Woodland Period sites were identified on Block Island during a Phase I and II survey of the coastline, conducted to document and salvage archaeological sites exposed and disturbed by Hurricane Sandy. Archaeological oyster shells were powdered at the terminal growth band and analyzed for stable isotope values (δ18O). To determine season of capture, archaeological δ18O values were contrasted with modern oyster shell δ18O values, collected from three separate locations on Block Island; these were sampled incrementally from the terminal growth band along the hinge to estimate modern seasonal shell growth. A number of the archaeological sites also contained faunal remains indicative of season of capture (Atlantic Sturgeon and Grey and Harbor Seals) providing a check for shell-derived season of capture estimates.

Leslie, David [199] see Sportman, Sarah P.

Letelier Cosmelli, Javiera [246] see Nuevo Delaunay, Amalia

Letham, Bryn (University of British Columbia)
[176] *A Tale of Two Villages: Exploring the Role of Villages with Massive Shell Accumulations as Anthropogenic Coastline Modifications in Prince Rupert Harbour*
3D mapping, percussion coring, and radiocarbon dating are used to explore the geoarchaeology and chronology of two villages composed of massive shell deposits in the Prince Rupert Harbour. We map out accumulation and development of these sites through time and demonstrate that they are major anthropogenic coastline modifications, which, with dozens of other large villages in the area, form a substantial built environment. As well as providing well-drained terraformed terraces on which to build houses and conduct village life, these locations buffered against foreshore erosion and relative sea level change, thereby increasing resilience of communities and establishing enduring places that were occupied for millennia. However, radiocarbon analyses of the two villages show that each formed differently. One was occupied nearly continuously for the last 6,000 years with expansions and contractions and periods of punctuated shell accumulation, while the other was occupied 2500–1500 BP, was constructed rapidly, and maintained its original occupied area through time. We argue that though we can generate hypotheses about how these constructions functioned to shape the Harbour's cultures, the two cases' different chronologies and developmental histories indicate that there are also specific histories behind these mounds' accumulations, which require other lines of evidence to unpack.
[176] *Chair*

Letham, Bryn [49] see Duelks, Jonathan

Leuvano, Nolan [300] see Dodd, Lynn

Leventhal, Alan [30] see Gardner, Karen

Leventhal, Richard (University of Pennsylvania)
[280] *The Maya: Historic Archaeology and Archaeology of Historic Periods*
The study of the ancient Maya has become complicated over the past 30 years. As the ancient Maya writing has been deciphered, these texts provide an historical record of parts of the ancient social and political systems. This development has moved the study of the Maya past into the realm of historic archaeology. In addition, the study of the colonial period in the Maya area has focused upon Spanish and indigenous texts to understand this historic period but additionally to create analogical models of Maya systems that could be used to understand the nature of the ancient Maya world. Even ethnological studies of modern Maya people and communities have become a focal point for the study of the prehistoric Maya. Such an approach within the academic world has positioned the Maya of today as a model for understanding the past. The secondary nature of the living Maya is echoed in the modern representation of the Yucatán as a place of sand and ruins—not part of the living twenty-first century. This paper will examine the nature of historic archaeology and the archaeology of the historic past and heritage of the Maya in the Yucatán and throughout the lowlands.
[280] *Chair*

Levi, Laura (University of Texas at San Antonio), Christian Sheumaker (University of Texas at San Antonio) and Sarah Boudreaux (University of Texas at San Antonio)
[83] *Wayfinding: Paths, Pathway Markers, and Navigational Monuments at Wari Camp and Beyond*
Social life never proceeds in the absence of a spatial dimension that defines, brackets, segregates, alters or otherwise organizes interaction. The power to organize space emerges historically from the sweep of institutional arrangements across society and operates along many different dimensions and scales, at once establishing boundaries all the while insidiously permeating them. This historical process—this "social production of space"—is what we refer to as landscape. Landscape has been a foundational concept for research at the Programme for Belize site of Wari Camp for almost 15 years. We have explored how the spaces of social life there facilitated control by political leaders over a diverse array of people and landforms, and how people through their various institutional affiliations devised a multiplicity of provisioning strategies. Yet only recently have we begun to detect the manner in which people and things moved within and among these spaces. Our paper celebrating the 25th anniversary of research at Programme for Belize tackles this particular dimension of place-making. We focus on the identification of paths, pathway markers and navigational monuments because their distributional patterning provides unexpected insights into both community and regional landscapes.

Levin, Maureece (Stanford University) and Floyd Silbanuz
[229] *Fire Up the Uhmw: Deciphering Botanical Residues from Earth Ovens in Pohnpei, Federated States of Micronesia*
In Pohnpei, Micronesia, the uhmw, or earth oven, is one important way of preparing food. These ovens are typically located in cookhouses next to residential sites. Pohnpeians use heated stones on the ground to cook food and cover items with large leaves while cooking. It is clear that uhmw are a long-standing Pohnpeian tradition, as multiple examples have been found in the archaeological record. In this paper, we ask what botanical residues from uhmw can tell us about the prehistory and history of Pohnpeian culinary practices. We analyze microbotanical remains (phytoliths, raphides) and macrobotanical remains from umhw features on Temwen Island, Pohnpei. We also integrate analysis of the cookhouse structures. Finally, we discuss Pohnpeian umhw in larger Pacific context, including the social importance of earth ovens throughout the region, highlighting the importance of the study of botanical residues in understanding past culinary practices.

Levine, Abigail (University of California, Los Angeles)
[391] *Not Quite One and the Same: Repetition and Rule in the Inka Provinces*
The use of molds for pottery manufacture is an integral part of the ceramic tradition of the North Coast of Peru, dating to at least as early as AD 100. Analysis of mold-made Chimu-Inka monkey effigy vessels excavated from mortuary contexts at the sites of Farfan and Tucume suggest that Late Horizon fineware production occurred in local workshops rather than in a centralized facility—a pattern consistent with other studies of Inka pottery production from around the Central Andes. The use and repetition of the monkey icon in these contexts—facilitated through the use of molds—is especially significant. The use of monkey icons has a long history in the region, dating to the Formative Period, and is common in the Late Intermediate Period mortuary assemblages. Although Inka presence on the coast resulted in the abandonment of certain motifs, the monkey effigy vessel persists throughout the Late Horizon. Importantly, while the use of distinct sets of monkey molds indicates production in disparate facilities, general similarities in form and style nonetheless speak to larger scale artistic canons and principles. Adherence to these selected local traditions was likely a critical facet of state-sanctioned or ritually significant contexts in areas colonized by the Inka.

Levine, Marc (University of Oklahoma)
[135] *Mixtec Goldworking: New Evidence for Lost-Wax Casting from Late Postclassic Tututepec, Oaxaca*

Gold jewelry and ornaments produced in Late Postclassic Oaxaca were among the finest ever made in Mesoamerica. Yet the paucity of archaeological evidence for metallurgical production in Oaxaca has frustrated efforts to better understand these spectacular objects and their role in Postclassic society. This paper presents the results of an analysis of 42 ceramic molds from the Late Postclassic (1100–1522 CE) Mixtec Capital of Tututepec. I argue that the molds were utilized to cast internal cores, which played a pivotal role in the overall process of lost-wax casting. No other molds of this type have ever been reported from Mesoamerica. The presence of casting core molds, in conjunction with ancillary household evidence for metallurgical production, suggests that Tututepec was an important metalworking center. Finally, I discuss how metallurgical production and gold jewelry may have figured in Tututepec's political, social, and economic spheres.

Levine, Mary Ann (Franklin and Marshall College)
[188] *Moravian Travels through the "Spirit's Nest": Archaeology of Colonialism at Madame Montour's Otstonwakin*
In 1741, Moravians, a sect of German pietists established a settlement in Pennsylvania which became the principal religious and administrative center for the Moravian Church in North America. Moravian missionaries soon traveled to nearby Native American communities including Otstonwakin, an eighteenth-century multinational village along the West Branch of the Susquehanna River. Madame Montour served as a frontier diplomat and go-between at Otstonwakin and hosted a succession of visitors into her home including several Moravian missionaries. Moravians sought to have Otstonwakin become an important part of the mission structure in the region and describe it as the "spirit's nest," a place where evil spirits were thought to be present. This paper examines eighteenth century colonial encounters through the maps, diaries, and travel accounts left by Moravians who sought to proselytize to Native Americans at Otstonwakin.
[311] *Moderator*
[311] *Discussant*

Levstik, Linda [97] see Henderson, A. Gwynn

Levy, Janet (UNC at Charlotte)
[109] *Discussant*

Levy, Thomas E. (University of California, San Diego) and Neil G. Smith (King Abdullah University of Science and Technology)
[29] *Cyber-Archaeology, Scientific Storytelling, and the GIS Nexus*
Since 1999, UC San Diego Levantine Archaeology Laboratory excavations have been "paperless" with the aim of developing digital data acquisition, curation, and 2D and 3D dissemination tools for archaeological and cultural heritage data. GIS provides the nexus for our data flow because all archaeological data collected in the field has a geospatial footprint. The X, Y and Z coordinates of the archaeological data provides the organizational and visualization principle of the archaeological endeavor. Our real-time GIS data recording software, ArchField, provides the main data-recording tool during the excavation process. Tablet based Open-Dig, records the metadata concerning the contextual aspects of the excavated material culture; and ArchaeoSTOR serves as a web-based geospatial database that pulls together a wide range of digital data in different formats from lidar, airborne photography, terrestrial and marine geophysics, Structure from Motion (SfM) and more. This data-flow provides the perfect tool kit for objective scientific storytelling, in our case, for the contentious field of Biblical Archaeology. To more effectively tell these stories, 'Big' cultural heritage data is moved over high-speed fiber optic networks and ultimately displayed in personal VR displays and total immersive 3D CAVE environments so that more people can experience the stories.

Levy, Thomas E. [297] see Jones, Ian

Lew, Rachael [230] see Carpio, Margaret

Lewandowski, David (Logan Simpson) and Theodore Tsouras (Logan Simpson)
[155] *Testing Methods for Ceramic Dating on Northern Black Mesa*
The presence and proportions of well-dated ceramic wares and types are used to date the occupation of sites across the Southwest, often to general periods or phases that exceed a site's likely occupation span. Various methods have previously been used to refine the dating of archaeological sites using ceramic artifacts. Recently, Logan Simpson conducted a Class III cultural resources survey of Peabody Western Coal Company's leased lands on northern Black Mesa, Arizona. This study uses ceramic types and wares to date the occupation of sites recorded during the survey. The study tests the effectiveness of various methods, including mean-ceramic dating techniques, for dating the surface ceramic assemblages at sites on northern Black Mesa. The ceramic dates are compared with absolute dates obtained during excavations conducted by the Black Mesa Archaeological Project and used to examine chronology and settlement patterns across the surveyed mine areas.

Lewandowski, David [301] see Tsouras, Theodore

Lewarch, Dennis (Suquamish Tribe)
[7] *Calibrating Variation in Domestic Midden Assemblages among Aztec Period Households in Western Morelos*
Archaeologists and geographers calibrate the flow of commodities among households and settlements to infer patterns of production, consumption, economic function, and social class. Michael Smith and his colleagues developed sophisticated measurements of wealth and social class using residential architecture attributes and domestic artifact assemblage diversity from excavations at three Aztec Period sites in Morelos. Here, data from over 4,000 surface collection units in eight Aztec Period sites in the Coatlan del Rio Valley, Western Morelos, are partitioned into over 300 domestic middens. Collections are from plowed fields without direct surface evidence of house foundations, and were generated by occupants from a variety of household sizes, ranging from single, isolated houses to patio complexes with as many as five or six structures. I use 38 ceramic vessel classes, 15 stone tool classes, spindle whorls, and figurines to measure the flow of ceramics and lithics among households, identify artifact suites that likely correlate with economic functions, and infer stone tool and textile production localities. I compare patterns in the Coatlan data to those discussed by Smith and others at the excavated sites of Capilco, Cuexcomate, and Yautepec to expand their interpretations regarding Aztec Period social and economic organization in Morelos.
[108] *Discussant*

Lewis, Brandon (Santa Monica College) and Hugh Robichaux
[83] *Revealing La Milpa: Integrating Residential Data from the Core and Periphery*
The Programme for Belize Archaeological Project represents a regional research program aimed at elucidating the nature of Maya political, social, and economic integration within the northeastern Petén. Toward this end, extensive research is being undertaken at the primary center of La Milpa. Research conducted by the authors has been motivated by numerous objectives. Of specific interest is understanding the role of La Milpa within the changing political landscape of the region. In addition, our research examines the degree to which social status affects both economic and ideological activities at the courtyard level. To address these questions, we draw upon a large corpus of residential data collected over the past 25 years. We integrate an intensive analysis of elite lineages within the La Milpa core with an extensive examination of residential space throughout the periphery. Contrary to original interpretations, our results suggest that La Milpa was home to an entrenched elite class as early as the Late Preclassic. Consequently, we propose a revised model of political growth and power. Furthermore, we revisit population estimates for La Milpa and examine the extent to which status affected differential economic and ideological activities across the social hierarchy.

Lewis, Cecil [86] see Hofman, Courtney

Lewis, Michael D. (University of Utah), Joan Coltrain (University of Utah) and R. E. Burrillo (University of Utah)
[290] *Regional Variability in Stable Isotope Food-Web Baselines and Sex-Based Differences in Diet: An Example from Early Agriculturists in Southeastern Utah*
This paper provides an isotope-ecology context for Cedar Mesa, Utah, by presenting isotope data on over 400 modern botanical and archaeo-faunal specimens from the area. While carbon data fit with regional expectations, nitrogen isotope ratios throughout the Cedar Mesa food-web show depletion in 15N relative to other ecosystems in the intermountain west—consistent with nitrogen inputs from cyptobiotic soil crusts. In light of this localized isotope baseline, we reassess previously published isotope studies of Basketmaker II (BMII) burials by comparing modeled whole-diet isotope ratios with the feasible diet polygon (e.g., convex hull) defined by local resources. Implications for translating sex-based differences in BMII bone chemistry into engendered subsistence strategies are also discussed.
[290] *Chair*

Lew-Levy, Sheina (University of Cambridge), Rachel Reckin (University of Cambridge), Noa Lavi (University of Haifa), Jurgi Cristóbal-Azkarate (University of Cambridge) and Kate Ellis-Davies (University of Cambridge/Nottingham Trent University)
[193] *How Do Hunter-Gatherer Children Learn to Make Material Culture? a Meta-Ethnographic Review*
This poster aims to extrapolate forager-wide trends in how, when, and from whom hunter-gatherer children learn to produce material culture. We use a meta-ethnographic approach, which allows for the systematic extraction, synthesis, and comparison of quantitative and qualitative publications. We extracted a total of eleven publications from psychology, cultural anthropology, and ethnoarchaeology, including studies on the Baka, Aka, San, Kaytetye, Gidra, Penan, Batek, Khanty, Cree and Sioux. Our findings suggest that, cross-culturally, forager children learn to make simple tools effectively by middle childhood, but continue to learn and perfect the skills of complex, multicomponent tool manufacture well into adulthood. From infancy, adults make models of tools like bows, arrows, and digging sticks to give children, from which they are expected during early and middle childhood to reverse engineer their own small tools. During middle childhood, the playgroup is especially important, creating miniature camps complete with hearths and dwellings. As they enter later childhood and adolescence, children begin to receive their first direct instruction on the production of complex material culture like basketry, sledges, or skis. These findings suggest that children create and contribute to material culture in vital ways that archaeologists often fail to consider.

Li, Jean [18] see Carter, Michael

Li, Jiawei (School of Life Science, Jilin University), Ye Zhang (School of Life Science, Jilin University), Xiyan Wu (School of Life Science, Jilin University), Yongbin Zhao (College of Life Science, Jilin Normal University) and Hui Zhou (School of Life Science, Jilin University)
[115] *Ancient DNA of a Nomadic Population Provides Evidence of the Genetic Structure of the Royal Ancient Mongols*
The genetic diversity of the ancient Mongols, especially the Gold family of Genghis Khan remains unclear. Gangga site was a nomadic site dated to the eighth to tenth centuries AD in the HulunBuir grassland, northeast China. This site belonged to the Shiwei population, believed to be the direct ancestors of the ancient Mongols. Nine graves at the Gangga site were excavated with log coffins, which were considered the characteristic burial custom of the royal ancient Mongols, included the Gold family of Genghis Khan. This suggests the Gangga people had a close relationship with the royal ancient Mongols. In this study, mitochondrial and Y-chromosome aDNA were extracted to analyze the genetic structure of the Shiwei population at the Gangga site. Haplogroups D, F, C, B, G, N9a were typed in the mtDNA. Haplogroup C-M130 was detected in Y-chromosome aDNA. Gangga people exhibited a high frequency of Haplogroup C-F3918 (belonging to C3*), indicating it may be the main Y-haplogroup in the Shiwei population. In addition, all Gangga males buried in log coffins exhibited C-F3918 suggesting that C-F3918 might be the characteristic Y-chromosome haplogroup of the royal ancient Mongols.

Li, Min (UCLA)
[95] *Taming the Flood: Religious Response to Climatic Crisis and the Cult of the Great Yu in Early China*
This paper deals with changes in religious practices during a period when ‘Nature’ is least stable in early China. It focuses on the rapid spread of new ritual practices and emergence of new ritual networks during the Longshan period (ca. 2300–1800 BCE) as evidence for religious responses to the extraordinary climatic crisis of the late third millennium BCE. It explores the diverse manifestations of the ecological crisis in geomorphological evidence and their implications for a changing perception of ‘Nature’ in the Longshan society. The choices of sacred places and ritual forms used for prehistoric ritual engagements with the violent forces of nature reveal that the legacy of the Longshan religious tradition had significant contribution to the emergence of the cult of the Great Yu in early China.

Li, Shuicheng
[26] *At the Margin of a World System: Cultural Histories between the Eurasian Steppe and Northwest China*
After 4000 BC, prehistoric populations in southern Kazakhstan and the western side of the Urals in Central Asia began to migrate toward southwestern Siberia. At the same time, Yangshao culture began to spread, and the scale of their expansion toward the northwest was the greatest. The causes are likely multifold. Firstly, the emergence of agriculture in Holocene leaded to the increases in population pressure. Secondly, the arrival of the Copper Age increased the demand for metals such as copper and gold. The latter may also have been a significant cause for the appearance of new metallurgy exchange spheres to the west of the Urals. These large-scale population migrations had a long lasting impact on the prehistoric cultures of southwestern Siberia and Xinjiang. The exchanges between the painted pottery-agriculture of the east and the pressure stamped pottery, animal husbandry of the

north stimulated the formation of early East-West interaction pathway. This was an important pathway for cultural and trade exchanges between the East and the West. Here, I will name it the proto-Silk Road. This wide road greatly initiated the complexity of prehistoric societies in China, and laid down the earliest foundations for what is known as the Silk Road today.

Li, XinWei (Institute of Archaeology, CASS) and Jorge Ramos
[71] *Reconstructions of 8N-11 and Reforms of Late Classic Copan*
8N-11 is a sub-royal elite residential compound located at the end of the eastern causeway (sac be) in the densely settled Las Sepulturas zone about 850 m from the Copan Main Group. Monumental architecture, carving style and representations of figures with royal attributes demonstrate the high status that residents of the 8N-11 enjoyed in Copan society. In collaboration with the Honduran Institute of Anthropology and History and the Anthropology Department of Harvard University, Project IACASS (Institute of Archaeology, of Chinese Academy of Social Sciences), started field work at the group in 2015, aiming a comprehensive culture history of the people who lived here. Construction sequence (four phases) documented to date shows the social, economic and ideological evolution of the group in consonance with the development of the royal family in the city core, especially during the reigns of 11–16 dynasts. Themes restricted to the royal court were conveyed early in architectural sculpture at 8N-11.

Li, Xiuzhen (Emperor Qin Shihuang's Mausoleum Site Museum), Marcos Martinón-Torres (UCL Institute of Archaeology, London, UK), Andrew Bevan (UCL Institute of Archaeology, London, UK) and Thilo Rehren (UCL Institute of Archaeology, London, UK)
[58] *Casting Metals for the Qin First Emperor and His Underground Empire*
Among the most spectacular finds at the Mausoleum of China's First Emperor (259–210 BC) are the Terracotta Army built to protect him in the afterlife, and the two sets bronze chariots designed and buried to facilitate his travel in his underground empire. Thousands of terracotta warriors are equipped with casting bronze weapons, including swords, lances, halberds, spears, crossbows, and arrows, and the quantity and quality of bronze weaponry provide an extremely rare opportunity to investigate patterns of standardization and labor organization of bronze production within such a context. In addition, the bronze chariots comprise 4,000 parts assembled together, including numerous cast gold and silver ornaments that offer information about knowledge of transfer, technological changes, and cultural identity, particularly when compared to the forging, filigree, and granulation used to produce early Qin gold objects (techniques assumed to derive from Western influences). The casting technique employed here seems more consistent with an indigenous tradition manifest in cast weapons and ritual bronzes produced for centuries in the central plains of China. This presentation will show the research results from combining compositional, microscopic, statistical, and spatial analysis, to investigate the human behavior, imperial logistics, and cultural interaction behind the metal production for the Qin First Emperor and his afterlife.
[58] *Chair*

Li, Yinghua (Dr.), Side Hao (Provincial Museum of Hainan Island), Wanbo Huang (Institute of Vertebrate Paleontology and Paleoanth), Hubert Forestier (Muséum National d'Histoire Naturelle, UMR 7194 CNR) and Yuduan Zhou (School of History, Wuhan University)
[78] *A New Variability of Cobble-Tool Industry Associated with a Bone Tool Technology from the Luobi Cave, South China (Ca.11–10 Ka): A Comparative Perspective from Southeast Asia*
The characterization of Paleolithic culture in South China and their relationship with mainland Southeast Asia remains ill-defined and unclearly known. The lithic industry of South China has been characterized as simple "cobble-tool" industry persisting from early Pleistocene to Holocene and the most representative industry of Southeast Asia was also marked by pebble-tool techno-complex termed Hoabinhian during late Pleistocene-early Holocene. The possible cultural link of the two regions was proposed by some scholars but the technological characteristics and variability within the two industries was elusive. In this research we conducted technological analysis on a "cobble-tool" industry associated with a bone tool technology from the Luobi Cave, Hainan Island, dated to ca. 11–10 ka and compared it with a well-studied typical Hoabinhian site of Laang Spean in Cambodia. The major difference of two has rejected the Luobi Cave as a potential Hoabinhian site, indicating a high originality and a new variability in the tool kit of modern human groups during late Pleistocene-early Holocene transition in South China and Southeast Asia. This study represents the first step toward deciphering the cultural variability in this region from a technological view and suggests that behavioral modernity and cultural variability should be evaluated in regional and subregional scale.

Li, Yiping (Research Center for Chinese Frontier Archaeology, Jilin University)
[113] *Social Difference between Songze Culture and Liangzhu Culture as Reflected on Jade Artifacts*
The Liangzhu Culture (3300–2000 BC) and the Songze Culture (4000–3300 BC) are two Neolithic cultures in the lower Yangtze River Delta in China. The two cultures are quite similar in many aspects especially those reflected on ceramics. This research intends to study the difference of social hierarchy between two cultures through an analysis of jades collected from over 20 archaeological sites in the Lake Tai region. By doing so, it is argued that jades in the Songze Culture are precious materials and are seen as symbols of wealth; and in the Liangzhu Culture, jades become sacred and are more exclusively accessible to the ruling class.

Li, Yue (School of Cultural Heritage, Northwest University), Yue You (School of History, Capital Normal University), Yiting Liu (Department of Archaeology, Graduate School of Chi), Nuo Xu (Xi'an Museum) and Jianxin Wang (School of Cultural Heritage, Northwest University)
[116] *Abnormalities of Horse Vertebrae from Xigou Site and Shirenzigou Site in Xinjiang*
This research examines seven horse skeletons unearthed from the burials and sacrificial pits of the late Warring States Period to the early Western Han Dynasty at the Shirenzigou and Xigou sites in Xinjiang. Vertebrae were observed for lesions such as hyperostosis, asymmetry, spinal fusion, horizontal fractures on epiphyses, and dorsal inter-pressing or joining of the vertebrae. Because the abnormalities are similar to those identified as the result of horseback riding in archaeological research outside China, as well as in veterinary medicine and osteology, their presence here is highly suggestive of human use for riding. This is consistent with saddles found in other sites and petroglyphs near the Shirenzigou and Xigou sites that show riding scenes, providing additional clues for the appearance of horseback riding during the late Warring States and early Western Han in Xinjiang.

Lian, Huiru, Dorian Q. Fuller and Yijie Zhuang
[78] *A Glimpse of Rice Exploitation at Mojiaoshan Site, Liangzhu Culture: Archaeobotany and Rice Charring Experiment*
Located at the Lower Yangtze River, China, Mojiaoshan Site is a "palace" and center of Liangzhu Culture. On the edge of the Mojiaoshan platform, a waste accumulation of rice (H11) was found in recent years. Based on the archaeobotanic remains from this accumulation, this paper tries to preliminarily discuss the rice exploitation at Mojiaoshan Site. By conducting a charring experiment aiming to distinguish the rice broken before charring from rice broken after charring, the research tried to identify rice-processing stages in the charred materials. The result shows that most rice recovered from Mojiaoshan site was rice charred with husk (Oryza sativa Subsp. Japonica Temperate japonica group [syn. Sinica]) and Liangzhu people were likely to adopt an early harvesting strategy to optimize the yield of rice. Also, rice in Mojiaoshan site was threshed, winnowed, sieved and stored under a clean state. The exploitation of rice provides a solid foundation for the development of Liangzhu culture and also reflects the highly complexity of Liangzhu Culture.

Lian, Olav [47] see Neudorf, Christina

Liang, Zhonghe [113] see Wolin, Daniela

Liebmann, Matt (Harvard University)
[34] *Movement Encased in Stone: Revealing Ancestral Jemez Migration through Obsidian Source Provenience*
Based on the results of collaborative research performed in conjunction with the Pueblo of Jemez, this paper uses a pXRF study of 2222 obsidian artifacts from 29 Ancestral Puebloan villages in northern New Mexico to provide insights into Jemez movement between AD 1175–1700. The results reveal clear evidence of migration between these villages and the Valles Caldera. These movements steadily increased in intensity throughout the precolonial period. This pattern was disrupted by Spanish colonialism in the seventeenth century, only to be reestablished following the famous Pueblo Revolt of 1680. This paper explores the complex factors underlying these shifting patterns of obsidian procurement, and concludes that they were apparently linked to larger intertribal hostilities and alliances during the tumultuous first century of colonization in the Pueblo world.

Liebmann, Matt [34] see Tosa, Paul

Liesinger, Brian [394] see Smith, J. Gregory

Lieskovsky, Tibor (Faculty of Civil Engineering, Slovak University of Technology in Bratislava), Milan Kovac (Department of Religious Studies, Faculty of Philo) and Tomas Drapela
[131] *Usability of Lidar Data for Archaeological Survey in the Uaxactun Area, North Petén, Guatemala*
The paper deals with validation and quality estimation of spatial data acquired in the focus area of the project “Proyecto arquelogico regional—Uaxactun” as a part of a LIDAR project supported by the PACUNAM. The project has two high-quality 3D models of the Preclassical city of Uaxactun and the site of Dos Torres acquired by detailed topographical survey of the focus area at its disposal. The DEMs serve as basis for the evaluation of spatial accuracy of the lidar DSM and an etalon for calibration of filtration methods. To evaluate the ability of lidar data to identify archaeological structures, we will use data acquired by pedestrian survey realized in the course of the project in seasons 2009–2016 and also data from previous surveys (Acevedo 2012; Puleston 1983). The result will be a definition of the abilities and limitations of current LIDAR data in the focus area.

Lieverse, Angela (University of Saskatchewan), Samantha Purchase-Manchester (University of Saskatchewan), Andrzej Weber (University of Alberta) and Vladimir Ivanovich Bazaliiskii (Irkutsk State University)
[330] *A Novel Examination of Infection among Middle Holocene Hunter-Fisher-Gatherers of the Cis-Baikal, Siberia*
This research uses novel methods to investigate infection—specifically sinusitis, otitis, and mastoiditis—and better understand physiological stress and lifeways among middle Holocene hunter-fisher-gatherers from Siberia’s Cis-Baikal region. Two hundred and fifty individuals from three cemeteries are examined, together representing two distinct biocultural periods (Early Neolithic [EN], 8000–7000/6800 BP, and Late Neolithic–Early Bronze Age [LN–EBA], 6000/5800–3400 BP) and two micro-regions (South Baikal and the Angara River Valley). An endoscope was used to document sinusitis and otitis, and a handheld digital X-ray system was used for mastoiditis. Sinusitis was present in over two-thirds of observed individuals (70.6%), while otitis and mastoiditis (considered together) were found to be nearly ubiquitous (99.4%). The frequency of sinusitis decreased significantly from the EN to the LN–EBA, being consistent with the results of previous research on physiological stress. On the other hand, it did not appear to reflect differences in occupational phases (for the cemetery of Shamanka II, only), sex, or age at death. These new approaches to examining infection have expanded our understanding of past hunter-fisher-gatherer lifeways in the middle Holocene Cis-Baikal and have opened the door for their use at other sites.

Lim, Sangtaek (Pusan National University)
[24] *Beyond Activity Areas, Beyond Burial Spaces: Islands as a Monumental Place for Coastal Foragers*
Coastal foragers of southern Korean Chulmun period had actively exploited marine resources from the initial phase (6000~4500 BCE), and they also have a complex network with groups of Japanese Kyushu Island from that times. Researchers usually have thought that islands served as economic patches for coastal foragers with large numbers of shell mounds. However, based on several burial sites recently excavated at some islands like gadeok, Yeondae, Yokji, we now need to reconsider islands as being just resource patches. We have to shift our view of islands fundamentally—not just as a materialistic “space” for resource exploitation or burials but as an empirical “places” for rituals, memories, living activities and so on for foragers. In doing so, islands acquired meaning of “spaceness” of their own, which can be connected with monumental characteristics of islands. Islands are monumental places for coastal foragers of Korean Chulmun period and economic, ritual practices, including resource exploitation and burial making, all of which enhanced the “spaceness” of islands.

Lima, Helena [327] see Schmidt, Morgan

Limp, W. Fredrick (University of Arkansas)
[149] *Discussant*

Lin, Kuei-chen (Institute of History and Philology, Academia Sinica)
[213] *Standardization in Pottery Production of the Jinsha Site, Chengdu Plain, China*
In earlier studies, scholars have focused on the measurement of vessels’ dimensions to assess the degree of standardization. It should be noted however that not all dimensions are culturally salient or equally important. Moreover, when manufacturing processes can be decomposed into multiple stages, cultural idiosyncrasies that have been shaped through either institutionalized or unconscious ways might affect and be sought in any of these stages. This has called for analyses on ceramics by using different scientific strategies. Through testing the dimensional measurements and mineral compositions of several vessel types that were popular in the Jinsha site (ca. 1200–650 BC), it appears that their degrees of standardization, though vary with both loci and phases, are generally greater than vessels found in other sites at the outskirts. The spatial pattern of the pottery kilns unearthed in this early urban center, Jinsha, might be a key to the formation of consensus. I suggest that the production scale should lie in between households

and workshops, in which kilns were close but meanwhile were spaced by buildings or other features such that they can be loosely bonded. Such manner of production organization might also reveal the pattern plural social groups co-resided in Jinsha.

Lin, Sam (University of Wollongong), Shannon P. McPherron (Max Planck Institute for Evolutionary Anthropology), Luke Premo (Washington State University) and Claudio Tennie (University of Birmingham)
[38] *Modeling the Effects of Knapper Decision-Making and Social Learning on Flake Assemblage Variability*
Paleolithic archaeologists are keen to infer the means by which flintknapping knowledge was acquired and transmitted among past toolmakers from lithic assemblages. The inferences generated from recent studies, which tackle this issue with a variety of analytical approaches, are often fraught with equifinality because the same range of lithic variability can be explained by multiple learning scenarios. To help address this issue, we examine the extent to which different knapper decision-making processes result in recognizably different lithic assemblages. Our agent-based model simulates the formation of a flake assemblage over a range of knapping options, with each option marked by variable parameters of flake size, utility, and failure risk. The decision-making process for choosing the desired knapping option at each time step is set to resemble that expected under either emulation (copying the final form) or imitation (copying the production steps). Results indicate that an imitative decision-making process can achieve higher rates of successful flake production than an emulative process when the assessment error of the available knapping options is large. The findings help connect emergent properties of a lithic assemblage to different forms of knapper decision-making, with implications for inferring past social learning mechanisms from the stone artifact record.

Lin, Sam [40] see Leader, George

Lin, Yi-Ling, Yuling He (Institute of Archaeology, Chinese Academy of Socia), Zezhen Pan (Department of Energy, Environmental & Chemical Eng) and Daniel Giammar (Department of Energy, Environmental & Chemical Eng)
[72] *Trace Metals in Soils as Indicators of Past Human Activities at Hanwangdu East, Anyang, China*
Through chemical analyses of soils, bones, and organic residues, archaeologists can identify anthropogenic impacts on environment at archaeological sites. In this research, we are interested in understanding if and how bronze production had impact on the environment during Bronze Age China. Soil samples from Hanwangdu East, a Middle Shang period site at Anyang, were analyzed by using inductively coupled plasma mass spectrometry (ICP-MS). The purpose of this project is to 1) evaluate if ICP-MS is a proper method to analysis soil samples regarding of soil-metal concentration; 2) compare soil samples from different contexts, such as ash pits, water wells, canals, and house structures, of the same time period, and samples from features of different time period to identify anthropogenic influence on soil-metal concentration related to bronze production. We expect to see different geochemical signals in the soil depending on the various contexts of this site. We hope to gain a better understanding of the anthropogenic and natural soil properties at Anyang, especially during the Middle Shang period.

Lindeman, Michael (Desert Archaeology) and Henry Wallace
[335] *Ancestral Ties during a Period of Social Upheaval: An Example from the Early Classic Period in the Tucson Basin*
The transition to the early Classic Period (ca. AD 1100–1300) in the Tucson Basin has its roots in the disintegration of long-lived Preclassic Period (ca. AD 500–1100) villages in the eleventh century. The break-up of these villages engendered a variety of responses among the constituent social groups including the use of ancestral ties to place, real or constructed, to stake claims to land. Early Classic period settlement at the site of AA:12:46 begins during the fluid period immediately following the breakup of the Preclassic villages. During the twelfth century a corporate group made up of three households settled at the site. The choice of location was not random with the households building within the confines of a plaza of a short-lived village abandoned 400 years before. The new inhabitants made an overt display of their connection to ancestors and place. We suggest that this was important amid the social tensions of the twelfth century to establish rights to the adjacent floodplain farmlands and the water needed to irrigate their crops. While AA:12:46 is a good example of this process in the Hohokam region, other instances of Classic Period construction in Preclassic plazas are considered here.

Lindo, John [176] see Malhi, Ripan

Lindquist, Shayna (University of Kentucky)
[320] *Intraregional Variation in the Obsidian Industry of the Eastern Lower Papaloapan Basin of Mexico*
The Tres Zapotes regional systematic survey, conducted from 2014–2016, yielded an obsidian assemblage spanning across the Formative and into a Postclassic occupation. Furthermore, similarities and differences in technology and sources utilized were observed within the RRATZ assemblage, facilitating an examination into the intraregional variation in obsidian artifact production and use. In addition, one unusual artifact type was recovered that may reflect specialized scraping activities and that were perhaps lowland-centric. The scraper artifact possibly models a highland type that is generally attributed to maguey processing; however, the maguey plant is rare in the lowlands and the typology differs considerably in other respects as well, suggesting the scraper may have been used for processing another material, such as ixtle. This paper thus will provide a preliminary analysis of variation in the RRATZ obsidian assemblage and further investigate the potential of a lowland-centric scraper artifact within the regional polity.

Lindsay, Audrey [126] see Roberts, Victoria

Lindsay, David (Society for American Archaeology)
[206] *Discussant*

Lindsay, Ian (Purdue University)
[147] *Discussant*

Lindstroem, Gunvor (German Archaeological Institute)
[221] *Torbulok: A Sanctuary in the Hellenistic Far East*
A sanctuary of the Hellenistic period was recently discovered at the village of Torbulok in southwest Tajikistan. Its discovery was based on a random find of a large limestone vessel, identified as a perirrhanterion—a vessel for Greek purification rituals. The excavations, started in 2013 by a German-Tajik team, gave insights into the structure of the sanctuary and confirmed the dating to the third and second century BC, as Bactria was part of the Hellenistic

world. The unearthed installations and objects show the performed rituals were inspired not only by Greek customs—as the purification ritual—but also by local traditions, with a high importance of water and ashes. The site seems to have functioned as a pilgrim sanctuary, associated to an ancient settlement at distance of ca. 30 km.

Lindstrøm, Torill Christine [90] see Ruhl, Erika

Linford, Samantha (University of Colorado Boulder)
[390] *Ceramic Sociology Revisited: Ceramic Design Analysis in the Sand Canyon Locality*
Tracing complicated social links such as kinship through the material record has fallen in and out of favor in anthropological discourse. The ceramic sociologists of the 1960s and 1970s (Hill 1966; Longacre 1970) focused on tracking kinship through spatial patterning of ceramic designs among Pueblo sites in the American Southwest. The concept of ceramic sociology sparked many critiques within archaeology (Allen and Richardson 1971). These critiques were tied to a need for better understanding of formation processes, proper and accurate classifications of ceramic designs and the degree to which social organization such as, kinship can be identified. The issues raised by the ceramic sociologists are important and deserve a solution, or at the very least a conversation. Kinship studies in anthropology have reemerged allowing this research to address the critiques previously leveled at ceramic sociologists. Analyzing style data from ceramics at the Sand Canyon locality in southwest Colorado, the issue of proper and accurate classifications of ceramic design are revisited in the application of the conceptual metaphor theory. Formation processes and kinship construction are addressed through ethnographic and linguistic studies providing a reworked commentary on material culture patterns correlated to kinship relations.

Ling, Johan and Per Cornell (Department of Historical Studies: University of Go)
[28] *Rock Art, Warfare, and Long-Distance Trade*
For most of the twentieth century the Bronze Age rock art in Southern Scandinavia has been seen as a manifestation of an agrarian “cultic” ideology in the landscape. In this context the dominant ship image and the armed humans have been perceived as abstract religious icons, not as active symbols relating to real praxis in the landscape. While violence and war related social and ritual traits indeed are common features in the Scandinavian rock art from the Bronze Age and the violence on the rocks is uncanny. It is, beyond any doubt, a dimension of rock art that we cannot deny or be blind to. The rock art appears at the same time as Scandinavian societies became engaged in long distance trade of metal and local warriors would have increasingly played an important role. Elite households investment in the maritime forces of production, ships and warriors, was therefore a crucial feature for engagement in this kind of action. This would have favored the rise of maritime polities in Scandinavia. In this paper, I argue for the notion that the praxis of carving ships onto the stone could have served to manifest the agency of the maritime warriors.

Lingle, Ashley (Cardiff University)
[73] *Reflexive Conservation Research at Çatalhöyük*
Çatalhöyük, like many earthen sites, is a complex exercise in preservation. Since it was first excavated in the 1960s there have been efforts to preserve the archaeological substrate. A significant part of this program was the application of aqueous polymer systems applied as a consolidant to the plaster and mud brick surfaces. This practice of attempting to strength walls by polymerization was reviewed by means of laboratory testing in the 1990s, and continued to some extent unchallenged for the following 20 years. In recent years, however, it became necessary to revise the suitability of this polymer system. As the aims for stabilization shifted from temporary to long-term display, and site monitoring improved, specific deterioration patterns emerged which correlated with failure of the polymer rather than deterioration of the archaeological substrate. This dilemma provided an interesting opportunity to review the practice, and challenge the adequacy of a methodology that is not unique to Çatalhöyük. To achieve this Fourier Transform Infrared microspectroscopy was coupled with a holistic study of the environment at the site. As a result, a new interpretation of the performance of polymer systems within the archaeological substrate allows for a more informed conservation practice in the future.

Linn, Meredith (Barnard College)
[74] *“Irish Fever”: How the Intersection of Ethnicity, Class, and Typhus Fever Created an Epidemic of Prejudice in Nineteenth-Century NYC*
During the height of the Great Hunger in Ireland in the late 1840s, epidemic typhus fever infected thousands aboard emigrant ships destined for New York City. Suddenly, a disease that had long been known as “jail-fever” or “ship-fever” became the “Irish fever.” It was no longer associated with a place, but with a people. This paper will explain why (for many Americans) the intersection between typhus fever and the bodies of rural Irish laborers created a new disease, one they used to naturalize and expand previous ideas of Irish racial difference. It will use the archaeological record to interpret how immigrants attempted to heal themselves and to destabilize stereotypical caricatures of “Pat” and “Bridget.” In doing so, this study will employ intersectionality theory beyond its original emphasis on the intersection between gender and other identities (although gender has important roles in this study too). It aims to draw greater attention to the importance of both the social construction of medical knowledge and particular illness status in the lives of immigrants and in the development of racial and ethnic categories.

Lints, Andrew [319] see Boyd, Matthew

Lints, Andrew D. (University of Alberta) and John W. Ives (University of Alberta)
[339] *Art in the Time of Promontory Cave: Enhancement of Rock Art Figures Using DStretch*
While the Promontory caves are well-known for their preservation of perishable cultural materials, the red-ochre pictographs inside Promontory Cave 1 have attracted less attention. The conditions within the cave provided a ‘safe haven’ for organic artifacts, but the pictographs themselves have varying degrees of visibility, from quite good to poor. Archaeologists have relied solely upon descriptions made by Julian Steward during his 1930s work. Advancements in digital imagery and rock art software, such as DStretch, provide the opportunity to greatly enhance these images, providing new insights. Not only were digital analyses successful in providing fuller images of these ancient paintings, but previously indecipherable design elements were clarified, revealing classic late Fremont forms. In addition to the enhancements of previously identified rock art, we report new rock art paintings located in the vicinity of the Promontory caves. We compare these restored Promontory Point images with examples from Grotto Canyon in southwestern Alberta, where identical images document contact between the late Fremont world and a region Apachean ancestors could be expected to have inhabited.

Lipe, William (Washington State University), Laura Ellyson (Washington State University), Kyle Bocinsky (Crow Canyon Archaeological Center), Robin Lyle (Crow Canyon Archaeological Center) and R. G. Matson (University of British Columbia)
[142] *Costly Gobbling: Raising Turkeys in the Central Mesa Verde Area*

In the Central Mesa Verde (CMV) area of the Southwest, turkey bones increased markedly relative to those of artiodactyls in sites of the late AD 1100s and 1200s. We present an exploratory model of the proportional contribution of turkeys, artiodactyls, and small mammals to the animal protein component of the diet. Assuming a demand of 5 to 10 g of animal protein/person/day, we estimate that more than half that demand was met by turkeys in the mid-1200s. Both turkeys and humans relied heavily on maize; raising a “food turkey” would have annually required a third as much maize as would an adult human. Depending on turkeys for animal protein may have created a “rigidity trap.” High population and aggregation led to wild game depletion. Continued population growth promoted more dependence on turkeys, requiring even more reliance on maize (and fresh water sources) in a CMV subsistence economy based on dry farming. The Northern Rio Grande (NRG) received substantial migrations from the CMV in the late 1200s. Although turkeys became more important in the NRG after AD 1250, our model indicates artiodactyls continued to supply the majority of animal protein there.

Lipe, William [142] see Matson, R.G.

Lipnina, Ekatelina [332] see Kato, Hirofumi

Lipo, Carl (Binghamton University), Robert J. DiNapoli (University of Oregon), Alex Morrison (International Archaeological Research Institute) and Terry Hunt (University of Oregon)
[302] *Spatial Association between Rapa Nui (Easter Island) Ahu and Freshwater Sources*
The famous ahu and moai monuments of Rapa Nui (Easter Island, Chile) are features associated with multiple relatively small-scale communities distributed around the island. These communities are marked archaeologically by repeated sets of domestic architectural classes surrounding ceremonial features (i.e., ahu and moai) that potentially served to functionally integrate local populations. Described in this fashion, this settlement pattern offers the potential to explain the substantial investments in monuments using a multilevel and signaling based evolutionary framework. Such an explanation, however, requires the identification of the set of resources over which individuals compete as well as share. Here, we suggest that freshwater may have played a critical role in the formation and functioning on prehistoric Rapa Nui communities. We demonstrate this potential by examining the varying spatial association of a number of archaeological features with the location of freshwater. We argue that freshwater resources were a key factor leading to the structure of prehistoric communities and the unprecedented level of cultural elaboration on this tiny and remote island.

Lipo, Carl [300] see McElhoes, Jennifer

Lippert, Dorothy (National Museum of Natural History)
[63] *Moderator*

Lira-Lopez, Yamile
[236] *Cerámica mayólica en un sitio posclásico del Valle intermontano de Maltrata, Veracruz*
El valle de Maltrata, enclavado en la Sierra Madre Oriental, al centro-oeste del estado de Veracruz, ha tenido una remota y continua ocupación humana, que data desde la época prehispánica hasta nuestros días. Este valle es importante por formar parte de una de las principales rutas de comunicación y comercio entre la Costa del Golfo y el Altiplano Central, con evidencias olmecas, zapotecas, Teotihuacánas, cholultecas, aztecas. El asentamiento del periodo Posclásico, ocupó principalmente la parte central del valle, donde se encontró gran cantidad de fragmentos de cerámica mayólica, colonial y prehispánica. Se identificaron diversos tipos de cerámica mayólica de los siglos XVI–XIX en el recorrido sistemático de superficie. Aquí veremos cómo se distribuyó la población hispana con base en la cerámica mayólica, profundizando en la relación hispana-indígena en los años después de la conquista y, durante la época Colonial, desde la arqueología histórica. El trabajo es relevante pues no hay estudios sobre cerámica mayólica en la región de las grandes montañas del centro de Veracruz. Los materiales recuperados por el proyecto “Arqueología del valle de Maltrata, Veracruz” (Instituto de Antropología, Universidad Veracruzana e Instituto de Investigaciones Antropológicas-UNAM) continúan aportando valiosa información para la reconstrucción de la historia prehispánica y poshispana.

Litschi, Melissa (Southern Illinois University, Carbondale) and Alexia Moretti (University of Paris-Sorbonne, Paris IV)
[233] *Remote-Sensing Prospection of Recuay Architecture in the Jancu Region, Callejón de Huaylas, Peru*
The Recuay tomb of Jancu has contributed significantly to our understanding of Recuay mortuary practices and ancestral veneration. This subterranean tomb, which housed the remains of several elite individuals and finely crafted offerings, is typically discussed in isolation from its broader context. To date, no formal archaeological research has been conducted in the surrounding region, but recent preliminary surveys by the authors revealed numerous Recuay and Post-Recuay residential and funerary structures. Due to the relative inaccessibility of the region, remote-sensing technology offers a feasible alternative to pedestrian surveys as a method to characterize the distribution of prehispanic architecture in the area. As a preliminary step in elucidating the sociopolitical context of the Jancu elite tomb, this study aims 1) to identify extant architecture near Jancu, and 2) to test the utility of widely accessible remote sensing options (low-resolution aerial photographs, Google Earth imagery, and Landsat IV satellite imagery) in an alpine environment. The results of this study will be tested during planned fieldwork in summer 2017, contributing both to refining the interpretations of mortuary practices and its ties to territoriality and ancestral veneration during the Recuay occupation of Jancu and to improving methodologies for archaeological survey in remote alpine environments.

Litteral, Matthew (University of South Florida)
[318] *More Than a Pair of Hands: The Education and Rights of Local Field-Workers*
The archaeologist abroad must be held responsible for the fair treatment of his/her locally sourced workers. Fair treatment should go beyond providing a pay check comparable to standards in the United States. Archaeologists should feel ethically obligated to provide a wealth of knowledge to local field-workers. There remains much inconsistency in adherence to SAA principles of ethics. Particularly principles 2 and 4, as they relate to the accountability to local peoples and comment to public education. In recent years, archaeology has made great strides in the realm of community outreach. Nevertheless, the rights and education of local field-workers are still frequently overlooked. Educating locally sourced workers is often far from being the top priority of the archaeologist abroad. What is uncovered through fieldwork is, first and foremost, the heritage of the community. Ensuring that the community is informed should be a primary goal of archaeologists, not only due to ethical concerns, but because the local population is an invaluable resource. In this paper, I present data on the prevalence of proposed local education components in U.S.-funded archaeology projects abroad. I then propose methods which may be employed for effectively informing locally sourced workers.

Liu, Chin-hsin (California State University Northridge), Adam Lauer (International Archaeological Research Institute, I), Stephen Acabado (Department of Anthropology, University of California), Katherine E. Quitmyer (Department of Anthropology, University of Florida) and John Krigbaum (Department of Anthropology, University of Florida)
[284] *Faunal Management and Human-Landscape Interactions at Ifugao, Luzon, Philippines*
One major contribution of the Ifugao Archaeological Project in the northern Philippines (Luzon) is associating the origins of the Ifugao wet-rice terrace complex with local resistance against Spanish colonial expansion. With the establishment of wet-rice agriculture in the highlands by the early seventeenth century, it is anticipated that the acquisition and management of fauna would have been modified to adapt to new strategies of crop production. In this context, it is hypothesized that changes in faunal diet over time would serve as a proxy to landscape change and animal management. For this study, identified faunal remains representing four taxa (43 teeth and 29 bones) recovered from Old Kiyyangan Village are analyzed for light stable isotopes. Bone samples processed to data demonstrate good collagen yields and interesting patterns that reflect anthropogenic input. For example, carbon isotope ratios for Sus are very heterogeneous (in contrast to sampled bovines and deer), a pattern that supports the expectation that some individuals were opportunistic and/or refuse feeders most likely associated with human habitation. Isotopic data for sampled fauna are presented and discussed in light of the occupation of Old Kiyyangan Village, and animal management in the context of Spanish colonial impact and local resistance.

Liu, Chung Yu (Department of Anthropology, National Taiwan University)
[208] *Settlement Configuration and Social Structure: Applying Spatial Comparative Analysis in Old-Kucapungane*
This article aims to examine the differences of social structure revealed 1) by the interpretations of the archaeological record through spatial analysis and, and 2) by the data obtained through ethnographic research, both for same ethnic group. Applications of spatial technologies in archaeology began in the early 1980s. Although these GIS-based technologies brought about new research perspectives, their ‘effectiveness’ and ‘correctness’ needs more in-depth investigations. Using Old-Kucapungane as a case study, this research compares the social structure reconstructed through space syntax, and the social structure observed from ethnography. Old-Kucapungane is an abandoned slate house settlement in Taiwan. The Kucapungane people lived in the settlement for the past 600–700 years. However, they were forced to move out 50 years ago due to government policies. Nonetheless, since they abandoned Old-Kucapungane relatively recently, a small amount of the current population still has memories of how living in the settlement was. This inevitably makes Old-Kucapungane a perfect example for a comparative study between archaeology and ethnography. The results of this research will highlight how comparative studies benefit from both perspectives. It not only provides new insights for archaeological interpretations, but also demonstrates the potential of how the Old-Kucapungane landscape was transformed in the past century.

Liu, Guoxiang [26] see Cui, Jianfeng

Liu, Xinyi (Department of Anthropology, Washington University in St. Louis)
[388] *The Use of Chenopodium Plants in China*
This article reviews the use of Chenopodium plants in Chinese archaeobotanical record. We will draw attention to two regions particularly, Northeast and Southwest China. We will consider the use of Chenopodium food in the context of origins of agriculture in China.
[26] *Discussant*

Liu, Yu, Jigen Tang (Professor) and Jianyu Liu (Dr.)
[72] *Pursuing the Mineral Sources of Yinxu Bronze Objects (13th–11th BC): Study on the Lead Ingots from Anyang, China*
The bronze objects played a more significant role in the formation of Chinese ancient civilization than any other early civilizations, especially in late Shang and Western Zhou dynasty (13th–11th BC). So far more than 2,000 bronze vessels and thousands of other type bronze objects were excavated from Yinxu, the capital of late Shang dynasty (13th–11th BC), located in Anyang, Henan province. The discussion of the mineral sources of Yinxu bronze objects last a long time because of rare ingots found in Anyang. Recently 300 pieces of lead ingots excavated from Anyang provide some new clues to solve the problem. Through Metalloscope observation, SEM-EDS and ICP-MS analysis of 12 ingot samples, the composition, microstructure, trace elements, and lead isotope data were analyzed. The results show that the ingots are not pure lead but lead-copper alloy. The lead Isotope data belongs to “ordinary common lead,” and is very close to those data from bronze objects or slags of the 4th phase of Yinxu period, which implies that the bronzes mineral source were probably from the same lead ore at that time, and the “highly radioactive lead” data probably indicates not the lead ore but the copper ore, such as Tongkuangyu in Zhongtiaoshan zone.

Livesay, Alison (University of Oklahoma)
[192] *Exploring Mimbres Social Memory through Burials and Architecture*
Social memory has become a topic of increasing investigation in the field of archaeology. While social memory in archaeology can often be very theoretical and abstract, it can also be very tangible and concrete in its archaeological manifestations. In this poster, I illustrate various social memory practices with specific emphasis on the reference process, strengths of associations, and intimacy past peoples had with their history as observed in architecture and burials in the Mimbres region of southwestern New Mexico. I look diachronically at the superposition of structures over earlier structures, when and where intrusive burials placed into areas of earlier occupation occur, and how different room blocks, corporate groups and site participants might have interpreted the past and referenced it for the present and perceived future. This approach observes the physical links that architectural superposition has with the past, and how Mimbres groups interacted with their deceased ancestors and places formerly occupied by the now dead. Through this lens, we gain a unique perspective concerning how a group’s perceptions and performances of the past are played out on the Mimbres landscape and over time. This research contributes to the discussion of both group and “place” formation, maintenance, and “abandonment.”

Livingood, Patrick (University of Oklahoma)
[197] *Leadership Specialization among the Caddo and Their Neighbors of the Southeast*
One of the remarkable aspects about the Hasinai Caddo is the nature of their specialized leadership roles. This paper is going to take a comparative approach using ethnohistoric documents to examine the differences between the Caddo and their neighbors with regard to the types of specialized roles that exist, the types of divisions and circumscriptions on authority that exist for leaders, and the level of formality or informality in leadership function. The goal of the paper is to highlight what is and is not especially unique about the Hasinai Caddo.
[197] *Chair*

Ljungkvist, John (Uppsala University)
[15] *Centuries of Warrior Boat Graves: The Valsgärde Burial Ground*

The Valsgärde burial ground is one of key sites for the Viking phenomenon project. This burial site was used for more than 1,000 years. It is the best preserved and the only “entirely” excavated boat grave site in Sweden. Here we can follow the changing burial rites and interactions with the world during the first millennia AD. Valsgärde has been seen as a place where an unbroken series of male elite individuals were buried for nearly eight centuries. However, detailed studies of all burials, both inhumation and cremations, reveal that use and role of the site has underwent major changes. The composition of burials stretch from a wide variety of status, gender and age variation in the seventh century, to only rich female and male burials of the ninth/tenth century, to exclusively rich male burials during the major Christianization phase in the eleventh century. This place evidently became important to maintain an elite community’s presence and history in the landscape, in this case primarily warriors buried in chambers and boats. In some phases are burials disappearing, but they eventually reappear and thus are the history the site and the warriors ancestry maintained.

Llobera, Marcos
[158] *Not Landscape: Landscape Archaeology as Bricolage*
The late 1980s and 1990s saw an explosion of landscape studies in archaeology. The notion of landscape was herald as a “usefully ambiguous concept” (Gosden and Head 1994) that was to be applied everywhere only to be later scrutinized and criticized. The emergent interest in landscapes helped archaeologists expand their understanding of the widely diverse range of relationships people maintain with their surroundings, and precipitated a renewed interest in the study of landscapes at a more intimate and experiential scale. It did little, however, to clarify the links, the middle range, that allow archaeologists to connect material evidences with sought out narratives. The following paper is meant as a work in progress where I try to uncover the essential components that make up an archaeological approach to the study of landscape. The orientation I proffer calls for an approach that is analytical in spirit, and that most likely resembles an act of bricolage. It does not seek out the pursue of the next theoretical concept but instead concerns itself with what characterizes a landscape archaeology study.
[37] *Discussant*
[118] *Chair*

Llobera, Marcos [118] see Hunt, David

Lo, Eric [29] see Meyer, Dominique

Lobo, Agustin [57] see Conesa, Francesc C.

Lobo, Jose
[277] *Settlement Scaling: Simple Equation, Familiar Variables, Rich Story*
The basic mathematical statement of settlement scaling involves a very simple equation (a “power law function”) and variables long used in anthropology and archaeology to study the effects of demography on social processes. One could interpret the settlement scaling framework as another instance of the allometric relationship found very widely in the biological realm. But what may be more important is the fact that the framework actually incorporates a lot of accumulated insights from anthropology while leaving out concepts from economics and evolutionary biology that are ill suited to studying premodern human societies. This talk will review the assumptions behind the choice of equation and variables and highlight the concepts behind and implications of settlement scaling theory’s mathematical framework.

Locascio, William (Florida Gulf Coast University) and Matthew Colvin (University of Georgia)
[377] *Prehistoric Tree Island Use in the Northern Everglades: New Evidence from the Late Archaic*
A season of test excavations at a late archaic tree island site in south Florida has produced several interesting, if broad, patterns in the practices of prehistoric peoples living within this landscape. Stratigraphic evidence further supported by AMS dating reveal use of the tree island spanning nearly 1,000 years of periodic long-term human occupation. Evidence attests to a certain “social fabric” at the settlement, suggesting its identity as a memorable place on the landscape, a quality contrary to what might be expected of existing models of tree island use in the prehistoric Everglades.

Locke, Brandon (Michigan State University) and Brian Geyer (Michigan State University)
[18] *LEADR at MSU: A Lab Approach to Digital Cultural Heritage in the Classroom*
Founded in August 2014, LEADR is both a physical space and a curriculum development initiative established as a collaboration between the Departments of History and Anthropology, and Matrix at Michigan State University. Fully equipped with large screens for group work, computers, cameras, 3D printers and scanners, microcomputing equipment, and other technology, LEADR is well equipped to facilitate innovative digital cultural heritage instruction and project development. The decentralized learning space facilitates collaboration and openness, and encourages experimentation and play. Sessions in LEADR create opportunities for students to take the content and methods that they have read and discussed in the classroom and apply them in hands-on experiences where they can build, experiment, and play, and then reflect on their experiences. Sessions focus on the critical use of digital sources, tools, technology, and digital storytelling, often with at least one visit aimed solely at “flipped classroom” style guided work time. These courses are intended to prepare students with the digital skills relevant to careers in the contexts of archaeology, graduate school, and as citizens in the digital age. This session will address LEADR’s approach to curriculum development and course objectives, including successes and failures over the last two years.

Locker, Angelina (University of Texas at Austin) and Stacy Drake (University of Texas at Austin)
[83] *Exploring Migration and Kinship of the Ancient Maya through Isotopes and aDNA in NW Belize*
As a uniquely sustained archaeological research program that has annually excavated in the Rio Bravo Conservation and Management Area for 25 years, the Programme for Belize Archaeological Project (PfBAP) offers a wealth of knowledge for bioarchaeological research. This paper examines ancient Maya burials from northwestern Belize, spanning the Late Preclassic (250 BCE–250 CE) to the Terminal Classic (850–950 CE). Detailed here are stable isotope, ancient DNA, and osteological analyses from a small subset of individuals from the sites of Dos Hombres, Medicinal Trail, and Sak Chen. These data provide information regarding the migration, kinship, and health of the ancient Maya from northwestern Belize. The interplay between sustainability and population and demographic changes over time are postulated given the presented data and analysis.

Lockhart, Jami [87] see Hammerstedt, Scott

Locock, Andrew [91] see Morin, Jesse

Lodge, Spencer (Desert National Wildlife Refuge)
[142] *Fire on the Mountain: Roasting Pits in the Sheep Range on the Desert National Wildlife Refuge*
Within the Sheep Range in southern Nevada, I identified more than 200 roasting pit features with Google Earth, and subsequently recorded 193 of them. A color change that turns local dolomite and limestone white following exposure to high temperatures during use in an earth oven allowed these features to standout in aerial imagery. Following documentation of these features, roasting pit distribution was analyzed according to midden size and vegetative community throughout the Range to identify patterns of use. Additional statistical analysis was performed to test the usefulness of aerial identification in zones with dense tree cover (Pinyon/Juniper). Finally, experimental work with limestone and dolomite from the Sheep Range was conducted to determine the temperature at which these materials change color. X-ray diffraction was used as well on tested rocks to identify material type and elemental makeup.

Loebel, Thomas (Illinois State Archaeological Survey)
[264] *Use Wear and Assemblage Composition: The Role of Endscrapers in Paleoindian Technological Organization*
Historically, microwear studies have focused around resolving issues centered on tool form and function. However, microwear also offers the opportunity to investigate site level activities surrounding “soft” technology, particularly in situations where organic preservation is poor or absent. In addition, when combined with a holistic approach to assemblage composition, microwear can provide larger insights into the organization of technology and larger patterns of adaptation. In this paper I discuss the results of microwear analysis of over 300 endscrapers from six early Paleoindian sites spanning the Eastern Woodlands, the results of which illuminates our understanding of early Paleoindian adaptations across time, space, and gender.

Loebel, Thomas [342] see Hill, Matthew G.

Loehman, Rachel [224] see Steffen, Anastasia

Loendorf, Chris (Gila River Indian Community)
[335] *Classic Period Settlement Patterns along the Middle Gila River*
This paper summarizes archaeological data that show a substantial decrease in population occurred between the Sedentary (ca. 950–1150 AD) and Classic Periods (ca. 1150–1500) along the middle Gila River in the Phoenix Basin. This decrease coincides with well documented increases along the lower Salt River. Extensive data suggest this pattern subsequently reversed in the Historic period, when people were again concentrated along the middle Gila, and the lower Salt River was extensively depopulated. The Salt and Gila Rivers have substantial differences in the topography and elevation of their drainage basins, which create divergent discharge regimes. Holocene climatic data suggest that conditions for irrigation along the Salt and Gila Rivers varied through time, and this variation may in part account for the differences in settlement patterns. These shifts in settlement patterns also affected ideological, economic, and political relationships within the region.

Loendorf, Chris [273] see Rodrigues, Teresa

Loendorf, Lawrence (Retired, Albuquerque, NM)
[175] *Tobacco-Related Imagery in Montana and Wyoming*
Pictographs and a few petroglyphs of tobacco plants, tobacco gardens and tobacco headdresses are found at a dozen sites across Montana and Wyoming. Very similar images painted on Crow Indian Tobacco Society pipe bags, moccasins and other clothing strongly suggest the pictographs and petroglyphs were made by the Crow. High concentrations of tobacco pollen at one site suggest it was the location of a tobacco garden.

Loewen, Brad (Université de Montréal), Christian Bélanger (Université de Montréal), Marie-Claude Brien (Arkéos inc.), Charles Dagneau (Parks Canada) and Alex Lefrançois-Leduc (Université de Montréal)
[178] *A Social Perspective on Wood Remains: Rural Colonization and Urban Growth in the Saint Lawrence Valley, 1600–1900 AD*
Dendrochronology is widely used as a dating tool in archaeology. In North America, the wood record is especially associated with colonial dynamics when farmlands were cleared, rural buildings were erected and young cities drew upon timber resources from expanding hinterlands. In the Saint Lawrence Valley, colonization began in the early seventeenth century and developed in waves, as prime agricultural lands were saturated and became launching pads for secondary colonization into marginal regions and industrializing cities. Some wood species were valued commodities whose sale injected cash into rural economies, while other species went conserved for local construction and still others became firewood. Colonists with greater socioeconomic power had access to more valued species, as compared to ordinary farmers and entrepreneurs. Such social dynamics are shown by a broad-based dendrochronology program at the Université de Montréal, led by the Groupe de Recherche en Dendrochronologie Historique (GRDH). Since 2002, more than 80 sites have been studied from the Saint Lawrence estuary to eastern Ontario, providing more than 800 samples. This paper describes a dendro-archaeological approach that considers wood species, felling dates, and tree provenance within their archaeological context, and focuses on socio-environmental relations as revealed by the study of archaeological wood.

Lofaro, Ellen (University of Tennessee), George Kamenov (Department of Geological Sciences, University of F), Jorge Luis Soto Maguino (Dirección Desconcentrada de Cultura de Ayacucho, A) and John Krigbaum (Department of Anthropology, University of Florida)
[331] *Identity, Residential Mobility, and Anthropogenic Lead in Early Colonial Huamanga (Ayacucho), Peru*
La Iglesia de la Compañía de Jesús de Huamanga, the earliest Jesuit church in modern-day Ayacucho, Peru, was built in AD 1605 near the main plaza. Famous for its baroque art, this standing church is in need of extensive renovations. In a partial restoration in 2008, an archaeological excavation uncovered human and faunal remains underneath the church floor proper, and underneath the floors of associated chapels. Upon examination, only indigenous individuals appear to be buried underneath the church floors; significantly, few individuals show signs of stress or disease. Likewise, ethnohistorical documents show indigenous Peruvians using the Spanish legal system, church service and labor agreements to evade forced labor at the mines of Huancavelica and Potosi, among others. Analyses of strontium isotopes reveal that one-third of the individuals were not born locally, correlating with census records documenting rural migration into the city. Lead isotope results are narrow and lead concentrations are high, indicating the presence of anthropogenic lead, potentially resulting from pollution caused by extensive mining during the period. These data argue that indigenous people actively shaped their lives through migration and used Spanish religious and legal systems to avoid the harshest occupations, thus moving beyond the stereotypical Black Legend trope.

Loftin, Samuel [366] see Copeland, Sandi

Loftis, Kat and Robert J. Speakman (CAIS, University of Georgia)
[86] *Analysis of XAD as a Pretreatment Method for Radiocarbon Dating Bone*
The presence of exogenous organic carbon is a major concern when radiocarbon dating bone. A particular source of error and frustration in the field of radiocarbon dating has been the analysis of bone that has undergone humification. Humification occurs during burial and results from a combination of two distinct processes: Maillard reactions involving indigenous organic carbon, and the complexation of collagen with soil humic substances. Soil humic substances—composed of fulvic acids, humic acids and humins—are hydrophilic, predominately aromatic, heterogeneous complexes that originate from the polymerization of plant and animal biomolecules. As such, the ages of humic substances reflect the numerous and composite geochemical reactions that lead to their formation. The radiocarbon date of humified bone, then, reflects the age of the bone as well as the exogenous humic carbon. Pretreatment methods, such as XAD solid-phase extraction and single-amino acid radiocarbon dating, have been developed to eliminate contaminant carbon and provide a purified collagen sample for dating. Here we present results from our study in which collagen was reacted with a soil humic standard and the effectiveness of chemical purification of the collagen using XAD resin was assessed.

Lohse, Jon (Coastal Environments, Inc.), Derek Hamilton (SUERC), Takeshi Inomata (University of Arizona) and Hector Neff (California State University, Long Beach)
[81] *Fire and Ash: Formative Period Environmental Chronologies in Eastern Mesoamerica*
Recent dating work has led to revision of regional political chronologies in the Guatemala Highlands. In particular, key Middle and Late Formative phases now date as much as 300 years later than previously believed. This reanalysis brings these phases in line with significant environmental conditions stemming from volcanism and drought. In this paper, we present new high-precision chronologies for these environmental records, and compare these records against regional political chronologies in order to suggest how cultural developments may have been influenced by these factors.

Lokhov, Dmitrii [332] see Kato, Hirofumi

Lombardo, Umberto (Universitat Pompeu Fabra)
[325] *Estimating the Precolumbian Population of Southwestern Amazonia.*
Estimates of population density in precolumbian Amazonia have been based on calculations of the carrying capacity of the environment, generally classified as varzea, terra firme, and savannah. These estimates, however, have been criticized because they overlook the fact that 1) the Amazonia environment is far more diverse in terms of soils, vegetation, and climate than this simplistic classification, and 2) precolumbians increased, both intentionally and unintentionally, the productivity of the land through raised field agriculture and terra preta. Moreover, at the time when these estimates of precolumbian population size were formulated, most of the current archaeological data about Amazonia was unavailable. Here, we estimate the population density of the Monumental Mounds Region (MMR), in the Bolivian Amazon, based on archaeological evidence and ethnographic analogies. We calculate a minimum population size based on the amount of work needed to build all the earthworks present in the MMR and a maximum population size based on the use that modern indigenous groups make of natural resources. In particular, we focus on the use of wood: comparing archaeological data, ethnographic evidence, and forest primary production.

Lonaker, Sydney (Arizona State University), Julie Hoggarth (Baylor University) and Jaime Awe (Northern Arizona University)
[236] *Methods for Intensive Data Collection on Terminal Deposits in the Belize River Valley, Belize*
Terminal deposits, defined here as dense midden-like assemblages that contain nonelite and elite paraphernalia (i.e., utilitarian and decorated ceramic vessels, faunal remains, obsidian blades, ground stone tools, and human remains) have been discovered at sites across central and northern Belize. Despite the research on these features, there is little consensus on what type of activities these deposits represent. In the past, archaeologists have labelled these deposits as de facto refuse, primary or transposed middens, problematic deposits, termination rituals, garbage associated with feasting events, evidence for rapid abandonment, and post-abandonment rituals. Systemically testing these hypotheses is difficult, as research projects excavate these deposits using a range of methods. This makes direct comparisons across regions challenging. In an effort to better understand the composition, deposition, function, and spatial patterns of these terminal deposits, the Belize Valley Archaeological Reconnaissance Project (BVAR) developed standardized documentation and excavation protocols for excavating the deposits. This presentation describes the methods used in these excavations, including photogrammetry, mapping, and intensive recording of dateable organic material and polychrome ceramics. We propose these new approaches for creating comparable datasets across regions.

Long, Elizabeth (Texas State University, Anthropology Department, Graduate Student)
[390] *Saenger Pottery Works: Preliminary Report: Unlocking a Town's History through their Pottery*
This investigation of historical ceramics is conducted on a collection that dates from 1886 to 1915. Saenger Pottery Works was in operation from ca.1885 through ca. 1915. The size, form, and function variability of the ceramics inform about production techniques used and what forms are preferred over others. The sherds previously collected are currently dated based on makers' marks, stylistic attributes, and the period of kiln operation. However, issues with the dating method need resolution due to occupation by multiple groups and the inability to use proper dating techniques. The issues in provenience and provenance are discussed because the pottery, while attributable to the site, do not have records of excavation. Background research is a joint effort with the president of the town Historical Society. One result was the discovery of an African American cemetery, which appears on maps from 1836 until 1983. Additionally, a darker history is revealing itself with the discovery of a long-forgotten disturbing criminal with familial ties to current residents. The investigation seeks to find the historical significance Elmendorf has in the development of San Antonio and the State of Texas. Research is currently on going, and an excavation of the Saenger site is under development.

Longie, Erich [394] see O'Boyle, Robert

Longstaffe, Fred [8] see Moreiras Reynaga, Diana

Loomis, Sarah [9] see Hartford, Alexis

Lopez, Carlos (Universidad Tecnológica de Pereira, Colombia) and Martha Cano
[226] *The Earliest Occupation of Colombia: Balance and Perspectives at the Beginning of the Twenty-First Century*
In First Americans research in Colombia, the last three decades of the twentieth century were significant in terms of enthusiasm and motivation. Studies carried out by scholars such as Ruth Gruhn and Alan Bryan in Venezuela and other places were fundamental references for Colombian teams and encouraged advances in Pleistocene archaeology. Gonzalo Correal, Thomas Van der Hammen and Gerardo Reichel-Dolmatoff, among others, followed widely their contributions. Following Colombian generations of archaeologists discovered in the 1990s, new sites were discovered and new interpretations of site contexts were considered according to theoretical and methodological issues of the era. However, the balance in production and publications lacks continuity in the beginning of the twenty-first century; there are few accomplishments despite a growing number of opportunities for developing studies. Overall, there has been a general increase in research on the first occupants of the Sub-Andean mountains, with interesting findings related to processes of initial horticulture in central and southwest Colombia. But this trend has declined over the last decade. This presentation memorializes and acknowledges pioneers such as Ruth Gruhn, and promotes new opportunities for the future research of the amazing search of the first South Americans.

Lopez, Cira Martinez, Cira Martínez López (Instituto Nacional de Antropología e Historia) and Robert Markens (Universidad Nacional Autónoma de México)
[9] *La greca escalonada como símbolo del poder político en Oaxaca prehispánico*
Debido a que la greca escalonada es uno de los motivos más perdurables y ampliamente difundidos en el tiempo y espacio mesoamericano, su significado ha despertado desde hace tiempo el interés de varias generaciones de estudiosos. Por su forma geométrica y abstracta, el signo se presta a una gran diversidad de interpretaciones. Esta presentación tiene la finalidad de acercarse al significado de la greca escalonada en objetos del arte e inmuebles en Oaxaca prehispánico mediante un análisis de documentos coloniales y creencias de los pueblos tradicionales que quedan vigentes.

López, Francisco [337] see Balcarcel, AnaBeatriz

Lopez, John (Skidmore College)
[179] *Tenochtitlan: A Cultural History of Water*
Located today in Chicago's Newberry Library, the 1524 Nuremberg Map, representing the prehispanic city of Tenochtitlan on the eve of its conquest to Hernán Cortés, is an ink-and-watercolor image on paper, measuring 47.30 × 30.16 cm. Produced by an anonymous author in an unknown workshop in the German city of Nuremberg, it first appeared in the Latin edition of Cortés' Second Letter to the Spanish monarch Charles V. It is the earliest printed map of a New World city and although it is a highly Europeanized image of the Aztec capital, the map is believed to have been based on a now-lost drawing made by the hand of an indigenous author. A fish-eye perspective, valued for depicting large geographic areas such as cities, it provides the viewer with a 360-degree view of the precolumbian city and its surrounding aquatic environs. Much has been written about the Tenochtitlan's religious and political history, but water as a methodological lens to scrutinize the city's social and cultural history has received considerable less attention. Through study of historical images, this paper explicates the undergirding currents of water to Tenochtitlan's attitudes toward its public sphere.

López, María Laura (CONICET-FCNyM, Universidad Nacional de La Plata) and María Teresa Planella (Sociedad Chilena de Arqueología)
[388] *Chenopod Data in Two Countries of South America: Advances in Knowledge about the Use of Chenopodium in Argentina and Chile from Early Holocene (9000–11,000 BP) to Historical Times (250 BP)*
Argentina and Chile are the most austral American countries where Chenopodium species are recovered in several archaeological contexts. In both countries from the north to central and south, various issues are addressed from these findings such as hunter-gatherers subsistence strategies and chenopod grain morphological changes. Multi-proxy methods are used based on pollen, macro and micro botanical remains analyses, and isotopic data. However scarce botanical evidence has carried an uneven depth studies about the ancient presence of chenopod species, in particular quinoa grains, in the different regions. The objective of this contribution is to present the complete evidence about the presence and consumption of Chenopodium in Argentina and Chile remarking on new data. Advances in research have allowed knowing the manipulation of wild chenopod since early times and probably the development of different practices related to protection, transplantation, selection, and processing techniques. In this way the adoption of domesticated chenopod could have been easier among the first farmer and horticultural societies that lived far from the domestication centers. New issues are raised to be solved with future research, following the aim to get better insights into this pseudo cereal and preserve its cultivation in both countries.

Lopez Bravo, Roberto (Universidad de Ciencias y Artes de Chiapas) and Elizabeth H. Paris (University of Calgary)
[218] *The Jovel Valley of Highland Chiapas from the Classic Period to the Postclassic Period*
In contrast to the sociopolitical instability and depopulation observed at many sites in the Southern Maya Lowlands during the Classic to Postclassic transition, Highland Chiapas was characterized by stability and demographic expansion, as suggested by our excavations in the Jovel Valley, where small cities and towns maintained their roles as political and economic centers throughout this period. In this paper, we examine patterns of continuity and change evidenced by recent excavations at the cross-valley monumental centers of Moxviquil and CV-38 (San Pedro y San Pablo). Founded near the beginning of the Late Classic period, these centers experienced a period of prosperity during the Early Postclassic, marked by the expansion of residential settlement into new areas. The occupation of domestic spaces for multiple generations is reflected in numerous building phases and renovations to residential terraces and houses. Both sites are characterized by distinctive architectural building styles that combine adobe and masonry techniques, including an adobe ball court at CV-38, and the use of adobe brick foundation walls and puddled adobe floors in outlying residential areas. We also observe a significant transformation in burial practices during this period, from rectangular masonry tombs to communal graves in mortuary caves.

Lopez Bravo, Roberto [322] see Meanwell, Jennifer

López Corral, Aurelio (Instituto Nacional de Antropología e Historia), A. Gabriel Vicencio (Universidad de las Américas, Puebla), Bianca L. Gentil (Penn State University) and Nora A. Pérez Castellanos (Instituto Nacional de Antropología e Historia, CNC)
[215] *The Geopolitical Implications of Sub-flow Variation within the Zaragoza-Oyameles Obsidian Source*
Chemical analysis of obsidian is a useful proxy for studying the control of obsidian goods exchange and the presence of prehispanic geopolitical boundaries. Recent studies on obsidian sourcing show that during the Late Postclassic period (AD 1250–1519), regional altepemeh imported obsidian from several sources within highland Mesoamerica. Analysis of data suggests that no single political entity fully controlled the distribution of obsidian goods from a particular source, suggesting that perhaps a single obsidian source was geopolitically exploited by several rival altepemeh. In order to

examine this issue, we used pXRF analysis to analyze variation in sub-flow chemical signatures of 20 locations within the Zaragoza-Oyameles source area (located in Puebla, Mexico). Results were then compared to chemical signatures of archaeological obsidian artifacts from Late Postclassic sites of the Puebla-Tlaxcala region. Here, we present our preliminary results with special reference to the economic relationship between competing rival political entities.

López Corral, Aurelio [7] see Ibarra, Thania

López Corral, Aurelio [322] see Xiuhtecutli, Nezahualcoyotl

López Hernández, Karina [225] see Chávez Balderas, Ximena M.

López Luján, Leonardo (Museo del Templo Mayor, INAH)
[225] *Starfish in the Offerings of the Great Temple of Tenochtitlan*
Recent excavations carried out by the Templo Mayor Project in Tenochtitlan's sacred precinct uncovered a significant number of calcium carbonate plates, which, in spite of their advanced degree of deterioration, can be identified as consisting of the endoskeletons of sea stars. These organisms belong to the Asteroidea (from the Greek aster: "star" and eidos: "in the shape of") class, most of which exhibit radial symmetry and have thin, discernibly pentagonal bodies. Sea stars inhabit marine environments in nearly all longitudes and latitudes. Among the excavated plates, five species have been identified thus far: Astropecten duplicatus from the Atlantic, and Pentaceraster cumingi, Nidorelia armata, Luidia cf. superba, and Astropecten regalis from the Pacific. These remains were found in seven caches (Offerings 124, 126, 136, 137, 141, 163, and 166) deposited in the Templo Mayor, all of them corresponding to Phase VI (1486–1502 CE).
[225] *Chair*

López Luján, Leonardo [225] see Favila, Mario

Lopez Mestas Camberos, Martha Lorenza
[23] *Las piedras verdes en el Centro de Jalisco*
Los objetos trabajados en una extensa variedad de piedras verdes fueron altamente apreciados por las culturas mesoamericanas desde tiempos tempranos. Lo anterior aplica para el Occidente de México, en donde su uso se encuentra ligado a las actividades económicas, rituales y políticas realizadas por las elites, desde el Formativo medio, documentado en sitios de los complejos Capacha, El Opeño y Pantano, y generalizado a partir del Formativo tardío entre los grupos pertenecientes a la tradición de tumbas de tiro, momento en el que parece generalizarse un estilo propio de la región. A partir del Clásico tardío, es decir, a partir de la manifestación de una nueva tradición cultural conocida como complejo El Grillo, el trabajo y las redes de intercambio de las piedras verdes sufrieron cambios notorios, que parecen ser reflejo de las transformaciones mayores que se presentan en esta región. Este trabajo versará sobre los usos sociales de las piedras verdes y sus cambios desde el Formativo temprano al Epiclásico.

López Rivera, Alma Gabriela [120] see Carr, Sean

López Sánchez, Pablo Daniel [328] see Silis García, Omar

Lopez Varela, Sandra (UNAM)
[178] *Technologies and the State: Analyzing the Impact of Economic Growth through Archaeological Science*
Mexico's government attempts to eradicate poverty through infrastructure building and welfare policies have changed the social dimension of griddle and basket making at Cuentepec, in the State of Morelos Mexico. For generations, the house embodied the knowledge of making griddles and baskets, evoking people to remember fragments of the social practices of distant pasts and collectively lived histories. The act of remembrance is compromised with the building of welfare landscapes. Memory is intimately linked with the landscape, as it creates a sense of place that legitimizes the many identities and social worlds that have existed through time. In this hybrid landscape of welfare and memory, we characterized the technology of griddle making and approached the spatial and chemical analysis of residues left by the cycle of activities that interweave domestic tasks with production for more than a decade. In addition, we introduced a social impact assessment to our study to corroborate our findings. Results from these investigations provide a framework for evaluating the potential of applying archaeological science to analyze the impact of economic growth to the preservation of ancient technologies.

Lopiparo, Jeanne (Rhodes College)
[80] *Night and the Underworld in the Classic Period Ulúa Valley, Honduras*
As the sun set and the light dimmed in the Classic Period Ulúa Valley, Honduras, the nighttime sky and a soundscape of nocturnal animals emerged. The transition between day and night was marked not only by the shifting sensory experience of the nightscape but also by the passage of the sun through the underworld, as the realm of death and the ancestors came alive. The night was inhabited and animated by liminal animals and ancestors that moved between the world of the living and the dead. The prevalence of representations of animals that are nocturnal, crepuscular, and/or associated with the underworld in the corpus of figural artifacts, and especially those associated with life-cycle rituals, suggests that the nighttime was crucial to everyday life, death, and renewal. Their animal (and sometimes zoo-anthropomorphic hybrid) bodies were frequently whistles, which would have animated a soundscape that accompanied transition-marking events. Solar and life-cycle rituals on the monumental scale featured large figural censers that heralded the passage between life and death, which—at night—became a two-way journey between the earthly world and the underworld.

Lorca, Rodrigo [231] see Rivera, Francisco

Lorenz, Samantha [11] see Saldana, Melanie

Lorenzi, Varenka [354] see White, AJ

Lorenzo, Francisco [62] see Silva, Rosicler

Lorey, Andrew (University of Cambridge)
[374] *Toward a Unified "Heritage Ecology": Developing a Systems-Based Approach to Research in Archaeology and Heritage*
Archaeologists and researchers in heritage-based disciplines frequently study the complex interactions between human societies and natural environments. All too often, however, research proceeds from the premise that natural patterns, stressors and events promote direct cultural changes or adaptations on the part of human societies. Instead of perpetuating this linear and causal understanding of the relationships between nature and culture, this paper develops a new, holistic framework that encourages researchers to understand cultural and natural elements as part of a broader network of multidirectional associations and connections. In order to break down this false opposition between nature and culture, the paper expands upon previous definitions of "heritage ecology" and provides a new conceptual model that facilitates the analysis of agentive and multidirectional interactions between natural and cultural forces and actors. Dividing this model into three types of components—fabrics, elements and actors—the paper then applies a "heritage ecosystem" approach to a case study in the Pacific island nation of Vanuatu. The paper concludes by offering suggestions as to how researchers may employ the framework within other research settings.

Lorusso, Michael [301] see Schleher, Kari

Losey, Robert (University of Alberta)
[340] *Living with Reindeer in Arctic Siberia: The View from Arctic Yamal, Russia*
Reindeer are an essential part of daily life and special events across a broad stretch of northern Eurasia, but their long-term history with people has remained elusive. Ethnographers have characterized reindeer as living in "intermittent co-existence" with humans, or as "semi-domesticates," "pastoral herd animals," and even "slaves." Archaeology has struggled to characterize human-reindeer relationships, with even the geographical origins of modern domesticated deer remaining unclear. The Yamal Peninsula of Arctic Siberia has a remarkable record of human interaction with reindeer, including habitation sites with abundant deer remains, harness equipment dating back 2,000 years, and a rich iconography in which these animals are commonly depicted. This paper presents our ongoing efforts to integrate these sources of information to produce an enriched understanding of human-reindeer engagement in the Siberian north. Described in the presentation will be preliminary results of zooarchaeological analyses of the region's faunal assemblages, and experimental work with replicas of the reindeer harness equipment from several sites in Yamal. These technical studies are discussed using a theoretical perspective that envisions domestication as an ongoing, multidirectional, and multispecies process that involves changes in genotypes and phenotypes, but that also involves sociality, shared labor, and numerous crafts.
[228] *Discussant*

Losey, Robert [35] see Fleming, Lacey

Losier, Catherine (Memorial University)
[93] *Discussant*

Loubser, Johannes (Stratum Unlimited, LLC)
[175] *Recording and Interpreting Mississippian Rock Imagery at Painted Bluff, Alabama*
As part an overall effort by the Tennessee Valley Authority to conserve, manage, and present Middle Mississippian era pictographs and petroglyphs to a visiting public, Stratum Unlimited recorded 101 motifs from 47 panels at Painted Bluff, a steep south-facing limestone cliff overlooking the Tennessee River in northeastern Alabama. Results from the recording include an assessment of pictograph and petroglyph techniques, types and numbers of motifs, stratigraphic overlap and sequencing of techniques, and identification and interpretation of certain motifs.

Loughlin, Michael L. (University of Kentucky)
[320] *Classic Period Architectural Variation and Interregional Interaction: A View from the Tres Zapotes Hinterland*
During the Protoclassic (AD 1–300) and Early Classic (AD 300–600) periods, the Eastern Lower Papaloapan Basin (ELPB) experienced an important reorganization. The political influence of the large center at Tres Zapotes began to wane and a series of new centers were established across an increasingly independent, but fragmented political landscape. Eschewing the architectural cannons of the Tres Zapotes polity, these new centers are characterized by diverse configurations revealed by pedestrian survey and lidar mapping, many of which feature monumental platforms and/or "Standard Plan" layouts, architectural forms more common in Central and South-Central Veracruz. I argue that the use of these nonlocal styles reflects a reorientation of interregional interaction in the ELPB toward the large polities in Central Veracruz, such as Cerro de las Mesas. These interactions are further evidenced by the appearance of Mixtequilla style ceramics in the ELPB during the Early Classic period.
[320] *Chair*

Loughlin, Michael L. [320] see Pool, Christopher A.

Loughmiller-Cardinal, Jennifer [287] see Cardinal, J. Scott

Loughmiller-Cardinal, Jennifer (University at Albany, New York)
[392] *They Are What They Eat: A Need to Know More about Diet through Residues, Hieroglyphic Texts, and Images of the Classic Mayas*
Among the various sources of information about what foodstuffs comprised the Classic Mayan diet, we lack resolution on daily, domestic, and the various ritual and event foodstuffs. Beyond the archaeologically recovered macrofossil and faunal data, the identifications of drugs and ritual foodstuffs are less well established. Speculative and presumed behaviors that surround these goods tend to bias methods of analysis toward known substances and preconceived interpretations, thereby potentially obscuring empirical data on actual behavior. In the case of the "chocolate vases," the residues did not match our assumptions. Are there other assumptions we have made that maybe leading us astray? There are a number of other residues and

contexts to which we should be paying special attention, and we need more appropriate methods of acquiring residues from limited-preservation soils and contexts.

Louys, Julien [180] see O'Connor, Sue

Lovata, Troy (University of New Mexico)
[192] *Manito Trail Arborglyphs: Expressions of Place and Conceptions of Wilderness in Historic Graffiti from New Mexico, Colorado, and Wyoming*
Chicana/o scholars Levi Romero and Vanessa Fonseca define the Manito Trail as a late nineteenth- through mid-twentieth-century diaspora of New Mexicans traveling to work across the state of Wyoming. Manitos labored in herding, ranching, farming, mining, and lumber extraction, as well as in-town jobs. Some returned to New Mexico annually while others made Wyoming their permanent residence; yet most never fully lost contact with their homeland. Although Wyoming has a small Hispanic population whose presence hasn't always been recognized by the public at large, there is a rich archive of literature, poetry, and music related to the Manito Trail. This presentation outlines an ongoing project recording the material culture of the Manito Trail—in the form of arborglyphs or historic graffiti left on aspen trees by sheep herders and other laborers in Rocky Mountain forests. Arborglyphs are found at both ends of the Manito Trail—in northern New Mexico and adjacent areas of Colorado as well as Wyoming. They are material evidence of the culture history of the region as well as a conduit to understanding people's conceptions of the wilderness, mountains, and forests in which they labored.

Love, Michael [391] see Guernsey, Julia

Lovis, William [21] see Albert, Rebecca

Low, Marika (University of Wollongong) and Alex Mackay (University of Wollongong)
[54] *The Organization of Hornfels Blade Production during the Early Later Stone Age (ELSA) in the Eastern Cederberg, Western Cape, South Africa*
The Early Later Stone Age (ELSA) represents the onset of sustained microlithic technology in southern Africa. The ELSA is, however, poorly defined with respect to its technological characteristics and organization. In this paper we identify key features of the ELSA at Putslaagte 8 (PL8) rockshelter in the south-west of southern Africa, dating ~25–22 ka. The assemblage features relatively expedient production of hornfels blades using natural ridges of cobbles from the nearby Doring River. A second, distinct component is the reduction of quartz-bipolar cores to very small sizes. We then examine evidence from the open-air site Uitspankraal 7 (UPK7) on the Doring River, which contains a similar hornfels blade production system to PL8. Differences between the PL8 and UPK7 assemblages suggest an organizational system involving the staged production, use and discard of artifacts in different landscape settings. Hornfels blades appear to have been produced at the river and transported into the surrounding landscape, with limited transportation of cores. Quartz-bipolar systems, in contrast, appear to have involved local acquisition, reduction and discard of non-riverine rocks. Intriguingly little evidence of quartz-bipolar was found in the open-air sample, raising the possibility that different ELSA technological components were organized in distinct patterns at the landscape-scale.

Lowe, Lynneth (Centro de Estudios Mayas, UNAM)
[292] *Génesis del Museo Yucateco durante el Segundo Imperio (1863–1867)*
El presbítero Crescencio Carrillo y Ancona fue un destacado intelectual yucateco y precursor del estudio científico de la arqueología maya, que culminó sus esfuerzos con la inauguración del Museo Yucateco en 1871 en base a sus propias colecciones. El análisis de diversos documentos de archivo ha hecho posible conocer los antecedentes de tal institución durante el Segundo Imperio mexicano. El emperador Maximiliano mostró un notable interés por la historia y las culturas indígenas, al igual que la emperatriz Carlota, quien realizó una visita a Yucatán en 1865, acompañada por el padre Carrillo, apreciando la importancia de conservar los sitios arqueológicos, así como de fundar un museo local. Como resultado de ello, en 1866 el Comisario Imperial de Yucatán decreta la creación del museo e instala una Junta de Arqueología y Artes que establecería los lineamientos para su formación a partir de la donación de piezas "tales como vasos o trastos, figurillas, ídolos, estatuas, piedras esculpidas o grabadas, cascabeles, planchuelas de metal, armas, instrumentos, adornos, ornamentos, libros, pieles pintadas o mapas," además de proteger y registrar el patrimonio material. La caída del Imperio al año siguiente frena la realización del proyecto, que tiempo después se concretaría con apoyo del gobierno federal.

Lowman, Shannon, Nicola Sharratt (Georgia State University) and Bethany L. Turner (Georgia State University)
[233] *Social Transition at Tumilaca la Chimba: A Bioarchaeological Analysis of Terminal Middle Horizon and Late Intermediate Period Mortuary Contexts*
The centuries following Tiwanaku state decline circa AD 1000 were characterized by political fragmentation and social flux. In the Moquegua Valley, Peru, the first 250 years following the state's demise are referred to as the terminal Middle Horizon (AD 1000–1250), a period during which considerable cultural continuity with Tiwanaku is evident despite political collapse. The following Late Intermediate Period (LIP) (AD 1250–1450) is marked by major changes in material culture, domestic architecture, and ceremonial practices as the valley likely underwent a process of population replacement. Drawing on skeletal data from one site (Tumilaca la Chimba) with both terminal Middle Horizon and LIP occupations, this poster examines stress and health across this turbulent transition. An osteological analysis of 20 individuals from the terminal Middle Horizon cemeteries and 23 individuals from the LIP period cemetery reveals significant differences in age and sex distributions and in differences in dental and skeletal pathologies between the two periods. These results provide insights into nutritional stress and disease exposure between these two occupations and underscore the importance of a bioarchaeological perspective in understanding the impacts of major social and political transition in the Andes.

Lowry, Justin [326] see Paling, Jason

Lowry, McKenzie
[124] *Seismic Mitigation for Collections at the J. Paul Getty Museum through Mountmaking*
As recent earthquakes in Oklahoma and Virginia have shown, even regions generally thought to be far from seismic zones are never truly immune to their effects. The development over the last 30 years of seismic mount systems that safely capture objects in 360 degrees can offer solutions relevant to collections in a diversity of environments. Focus on this goal for the past few decades has led to a realization that more can be done to protect collections in advance of threats, leading to the evolution of mountmaking as a form of preventative conservation. This paper will examine how modern

mountmaking can mitigate destructive forces for collections on display. Examples of earthquake damage to collections will be examined and discussed in conjunction with modern preventative techniques, both simple and complex.

Loyola, Rodrigo, Isabel Cartagena (Facultad de Ciencias Sociales, Departamento de Ant) and Lautaro Núñez (Instituto de Arqueología y Antropología, San Pedro)
[134] *Tecnología lítica y movilidad durante el poblamiento temprano del Desierto de Atacama Meridional (Chile)*
Actualmente se reconoce que los grupos humanos que colonizaron el Desierto Meridional de Atacama (22–25°S) desde la transición Pleistoceno tardío-Holoceno temprano (12.6–10.2 ka AP) accedían a la amplia diversidad de ambientes disponibles en este árido paisaje. Desde los oasis de borde de salar, los paleohumedales y quebradas de la precordillera, hasta los paleolagos de la alta puna, estos espacios fueron articulados a través de circuitos de movilidad estacional. Por otro lado, la colonización de esta parte del desierto también fue un proceso biogeográfico estructurado en el tiempo. A medida que se dispersaban por el territorio, los grupos de cazadores-recolectores seleccionaron, incorporaron y se adaptaron paulatinamente a los nuevos ambientes. El registro lítico -estrechamente vinculado a la dimensión espacial de los grupos humanos- nos brinda una entrada excepcional para evaluar los cambios ocurridos durante este proceso. A través de la comparación de conjuntos líticos de contextos tempranos, planteamos que la variabilidad de los sistemas técnicos y los cambios en las estrategias de movilidad responden a un proceso continuo de aprendizaje, en el cuál los grupos acumularon información del entorno y desarrollaron un conocimiento acabado del paisaje.

Lozada Mendieta, Natalia (MPhil Student/PhD candidate UCL-Institute of Archaeology)
[327] *Ceramic Variability and Social Interaction in the Middle Orinoco: On Multiethnic Communities and Ceramic Traditions in the Late Occupation Period (500–1500 AD)*
The Átures Rapids in the Middle Orinoco region are mentioned in the historical sources as a key trading center linking the Western Llanos of the Orinoco and the Guyana, where people, goods and ideas were exchanged. A recent study in Picure Island, located in the rapids, present a variety of ceramic temper wares, beads and quartz crystals associated in stratigraphically excavated contexts. The ceramic sherds recovered in Picure are closely related to other archaeological sites in the Middle Orinoco. Besides the presence of common ceramic traditions and complexes, it confirms a dual temper ware assemblage for the late occupation composed by the Arauquinoid and Valloid ceramic traditions. Both traditions exhibit distinctive temper wares and stylistic traits that under the normative approach have been related with different cultural groups. Nonetheless, both have been associated with Carib speaking parties and in certain contexts appear to share decorative motifs, usually explained as a product of contact and diffusion. From a communities of practice perspective, the characterization of technical traditions through macroscopical and microscopical analysis of ceramic sherds from Picure intends to contribute novel insights to the discussion of how to understand ceramic variability in a multiethnic interaction context in prehispanic times.

Lozano, Sergi [165] see Fernandez-Lopez de Pablo, Javier

Lozano, Stephanie (University of California, Riverside)
[298] *Teotihuacán Influence in the Maya Area as Documented by Archaeological Fieldwork and Museum Collections*
There is extensive evidence of the exchange that occurred between Teotihuacán and the Maya area and new evidence has continued to surface in recent archaeological literature and in museum collections. This paper has several main objectives, first to revisit the history of research and analysis of iconographic symbols and epigraphy within the Maya area that notes a Teotihuacán influence. Secondly, to point out that the Maya obtained Central Mexican symbols and writing not merely for their exoticness but rather for what they represented as powerful instruments used within sacred ritual activity at Teotihuacán. Finally, this investigation offers new perspectives found within museum collections on cultural and ideological exchange between Teotihuacán and the Maya.

Lozano Bravo, Hilda (UNAM, Estudios Mesoamericanos.)
[353] *Life on Floors: The Archaeometry of Teotihuacán's Living Surfaces*
Archaeometric studies promote interdisciplinarity. Therefore, through this framework we can analyze other materials which facilitate the understanding of the society which created, modified, and used them. To sum up, with this methodology we seek to comprehend the characteristics of the materials used to build the city of Teotihuacán. Currently, there are archaeomagnetic studies underway which intend to discover the Sun Pyramid Square's chronology of occupation. Furthermore, we are also conducting physical analyses that aim to understand the floor structure; some of these include optical microscopy, SEM, XRF, FTIR, Raman, and Pixe. Moreover, these analyses are being complemented by the identification of the floor's mineralogical composition through soil micromorphology. In fact, we were able to identify similarities and differences between the materials used in the manufacture of floors. That is to say, that this discovery may indicate that preferences toward certain raw materials could be related to the technological advances that were achieved over time in Teotihuacán. Finally, we propose that these studies suggest that the same surfaces which were used in prehispanic times are themselves an archaeological material that must be taken into account to reconstruct the history of this place.

Lu, Baorong [78] see Pan, Yan

Luan, Fengshi [76] see Underhill, Anne P.

Lubinski, Patrick (Central Washington University) and Thomas Hale (Central Washington University)
[191] *Identifying and Siding the Stylohyoid Bone for North American Artiodactyls*
The stylohyoid is the largest bone in the hyoid complex surrounding the throat in artiodactyls. There is little published information to allow its identification to species or anatomical side. Our study examined comparative stylohoid bones in order to provide criteria for taxonomic identification, using more than 350 animals representing 13 species present in the continental United States. Based on osteometrics and discrete features, the bone can be distinguished to species for most of these through an iterative set of comparisons, but with variable degrees of confidence. For example, a bone could be sorted into the small artiodactyl group based on maximum length with 99% success (n = 304), and a pronghorn specifically based on its S-shaped dorsal aspect with 99% success (n = 223). Other species, like small bovids and deer, are harder to separate with confidence, but fair results are obtained with some measures (e.g., deer species can be separated using anterior end width with 72% success in a sample of 76). Our study also extracted stylohyoids in place in order to provide criteria for siding, using 29 carcasses representing 8 species, and found it can be readily sided based on a marked concavity on the lateral side.

Lucas, Virginia (University of Nevada, Las Vegas), Claira Ralston (University of Nevada, Las Vegas), Anna Osterholtz (Mississippi State University), Andre Gonciar (Archaeotek Canada) and Angelica Balos (Ministry of Culture, Hunedoara County, Romania)
[294] *Sacrifice or Feasting: Fauna Interpretations of the First Iron Age Romanian Commingled Assemblages at Măgura Uroiului*
The Magura Uroiului rock formation, located at the confluence of the Mures and Strei Valleys, is a natural, dominating fortress on the landscape. This rock formation has been utilized by groups including, the Hallstatt, Celtic, and Late Iron Age Dacian. The focus of this presentation is the First Iron Age mortuary monument located at the base of the rock face. This monument yielded both human and animal remains, with primary and secondary burial practices of the human remains occurring. The monument was excavated over seven field seasons and both wild and domesticated animals were present. Following the analysis of the faunal remains, evidence of feasting and sacrifice were observed. The presence of these activities as well as burial objects present within the mortuary monument suggests increasing social stratification among this population group.

Lucero, Gustavo [91] see Castro, Silvina

Lucero, Lisa (University of Illinois at Urbana-Champaign)
[20] *Discussant*

Lucet, Genevieve (IIE-UNAM)
[217] *Spatial Roles in Cacaxtla: A Delineation from the Study of Its Architecture*
The archaeological site of Cacaxtla, in the central highlands of Mexico, had its heyday during the Mesoamerican Epiclassic period. Its architectural characteristics define it as a place for residential and government activities, in contrast with the neighboring hill Xochitecatl, where constructions typify ritual purposes. Excavations were not accompanied by scientific studies of materials for the understanding of functions of rooms, porches, and courtyards that make up the site. Therefore, it is necessary to resort to other sources of information derived from the analysis of structural, spatial, and formal features of these buildings in order to obtain hypotheses about their spatial roles. The observable diversification of built spaces corresponds to different design solutions applied in order to meet different needs. By defining and describing these features, we will distinguish some aspects of these needs and try to derive possible spatial roles. To perform this analysis, we will review the spatial composition of the site, the formal characteristics of rooms and courtyards, connections, and visual communication between the constructions and with the environment, the different formal solutions of the facades, the presence of hearths and altars and, of course, the spectacular murals as essential elements of meaningful characterization of the architecture.

Lueth, Friedrich [224] see Heilen, Michael

Luin, Camilo [298] see Beliaev, Dmitri

Lujan Dávila, Milton [358] see Praet, Estelle

Lukas, Dominik (Department of Anthropology, Stanford University) and Claudia Engel (Department of Anthropology, Stanford University)
[73] *Changing Technologies, Changing Practices: The Transformation of the Çatalhöyük Research Database*
Since its beginnings, the Çatalhöyük project has stood out as an early adopter of latest innovations in information technology and digital recording solutions. Consequently, a considerable effort went into keeping the technology infrastructure on site up to date, incorporating new developments, and ensuring compatibility of applications. A core component of the Çatalhöyük technology infrastructure is a central database which hosts textual and numeric records of the excavation. Excavation and Specialist teams enter data through highly customized desktop interfaces. As the teams' research goals, interpretations, and practices evolve, the database developer generates the code to implement changing requirements in the interfaces—usually during the excavation season in a very short turnaround time. Over the course of the project each of these digital humanist developers has left traces not only in the featureset and functionality of the system, but also in the source code of the application itself. In this paper we will analyze this code with qualitative and Natural Language Processing methods. We will try to unravel how technological advances and ever evolving archaeological research practices are mirrored in the history of the Çatalhöyük central database code.

Lulewicz, Isabelle (University of Georgia), Victor Thompson (University of Georgia) and Thomas Pluckhahn (University of South Florida)
[286] *Shell Mound Architecture and Cooperative Mass Oyster Collection on the Central Gulf Coast of Florida, USA*
Coastal fisher-gather-hunters often have a deep connection among their ritual practices, economic systems, and the built environment. Emerging trends and traditions of cooperation within forager communities can have lasting impacts on group social organization and can be instrumental in the development of early villages. The Crystal River region of the Gulf Coast of Florida, USA provides an interesting locale to explore the intersection between shell mound architecture and cooperative mass capture of estuarine resources. To so do, we combine our recent research on the temporality of village life and monument construction, habitat exploitation practices, and ethnographic example in order to model the emergence of cooperative systems in the context of these larger traditions (e.g., monument construction). The results from our recent research provide insight into patterns of behavior that are suggestive of habitual cooperation at multiple temporal and spatial scales.

Lulewicz, Jacob (University of Georgia)
[197] *Sociopolitical Networks and the Transformation of Southern Appalachian Societies, AD 700–1400*
This paper investigates how processes of societal transformation, including the emergence of sociopolitical hierarchies and socioeconomic inequalities, are shaped by the scale and structure of social networks. Across Southern Appalachia, during more than seven centuries of population growth and sociopolitical change, two distinct regional political traditions emerged in what are today northern Georgia and eastern Tennessee. Employing data on social signaling practices as materialized in ceramic traditions and ritual paraphernalia, this study compares changes to network topologies across the two regions to contextualize differences in long-term sociopolitical development. Using formal network analytical methods, this paper tracks the historical development of network structures to evaluate the emergence, and underlying organization, of two distinct sociopolitical traditions.

Lulewicz, Jacob [163] see Thompson, Victor

Luna Erreguerena, Pilar [140] see Chatters, James

Lundquist, Lance and Chris Jenkins
[351] *Section 106 Mitigation in Memorandum of Agreements: A View from the Corps*
What constitutes acceptable Section 106 mitigation to resolve adverse effects under the National Historic Preservation Act? Stipulations in a Section 106 Memorandum of Agreement (MOA) need to be enforceable, with sufficient specificity and accountability for an Agency to monitor compliance. Are there limits to what is possible in Stipulations in Section 106 MOAs? This paper uses examples from the U.S. Army Corps of Engineers' Regulatory Program-permitted projects to explore the concept and application of mitigation in Section 106 MOAs.

Lundquist, Lance [351] see Jenkins, Chris

Luo, Wugan [33] see Gilstrap, William

Luo, Yunbing (Hubei Provincial Institute of Cultural Relics and Archaeology, Wuhan, China)
[116] *New Observations on Antlers from Chu Tombs*
Lacquered artifacts unearthed from Chu state tombs represent the highest achievements of the lacquer industry in the Eastern-Zhou period (770–221 BC). Antlers form an important part of several typical Lacquered wood-wares unearthed from large and medium-sized Chu Tombs. Antler-wares mainly belong to three categories: 1) tomb-protecting beast (with two or four antlers inserted on the head), 2) lacquered wooden flying birds with tiger-shaped bases (with two antlers inserted on the bird waist), and 3) lacquered wooden crouching deer (with two antlers inserted). The antlers are identified mainly as sika deer, followed by David's deer. Tombs with sika deer antlers were medium-sized tombs. David's deer antlers were only found in large-sized tombs. The presence of David's deer antler artifacts, especially adult antlers with many branches, may be related to the high social status of the tomb owners. The lacquered wooden-wares may have used real antlers because the Chu people esteemed deer. They thought antler was a symbol of strength and could be used to protect the tomb and keep evil out. Antlers may have also been a symbol of the wind that could guide the soul. I think these meanings may be connected with the natural phenomena of antlers annually shedding and regenerating.

Lupo, Karen [85] see Bakke, Gwen

Luque-Talaván, Miguel (Universidad Complutense de Madrid)
[36] *The Innovations that Traveled to the Philippines: An Approach to the Biological Conquest of the Islands (Sixteenth–Eighteenth Centuries Centuries)*
Every process of discovery, conquest and colonization, regardless of its magnitude and historical implications, entails a transformation in those societies in which it takes place. The Philippines, as it had already happened to other parts of the world before, was no exception. The conquest of the Philippines Islands by the Spanish Monarchy supposed the transformation of a very important part of the indigenous population of the islands. In this occasion we studied the biological conquest of the islands and the impact between its inhabitants and its ecosystem. Analyzing those exogenous elements that, traveling on board of the Manila Galeon, contributed to the island´s life. That´s exactly what we call ecological impact of the conquest, derive of the introduction of new proceeding farming from Spain or from the Spanish American possessions, as well as agriculturalist and cattle raising new technics. The other subject of our study is the demographic impact that conquest and colonization processes had on the indigenous population. Not only because of the diseases transmitted to them, but also because of the forced movements of population; as well as the European and African migration and its consequent miscegenation or mestizaje with the American indigenous population.

Luzzadder-Beach, Sheryl [83] see Beach, Timothy

Luzzadder-Beach, Sheryl (Department of Geography and the Environment, University of Texas at Austin), Timothy Beach (Department of Geography and the Environment, Uni), Nicholas Dunning (Department of Geography, University of Cincinnati), Vernon Scarborough (Department of Anthropology, University of Cincinna) and Fred Valdez (Department of Anthropology, University of Texas at)
[83] *A Quarter-Century of Exploring the Three Rivers Watersheds in Belize*
The Programme for Belize Archaeological Project is situated in the heart of the Three Rivers Watersheds, drained by the Rio Bravo, Booth's River, and Rio Azul/Blue Creek in northwestern Belize. These three river systems, along with groundwater, springs, and wetlands, nurture what is today the tropical rainforest refuge of the Rio Bravo Conservation Management Area, active farming communities, and long ago sustained multiple ancient Maya communities such as La Milpa, Dos Hombres, Chawak But'o'ob, Maax Na, Blue Creek, Grey Fox, and others. Comparatively little is known about tropical river systems in Central America. The Three Rivers have been an ideal laboratory in which to study the availability and quality of water for ancient Maya communities, the hydrologic advantages and challenges faced in the past, and to understand the sustainability of these resources for today's inhabitants. This paper traces ancient Maya water use research undertaken over the last quarter century, and offers insights gained from multiple environmental methods and proxies, including water chemistry, sediment chemistry, geoarchaeology, and remote sensing studies including a 2016 lidar survey.

Lv, Liangbo [58] see Lam, WengCheong

Lycett, Mark (University of Chicago), Andrew Bauer (Stanford University), Mannat Johal (University of Chicago) and Marco Madella (Universitat Pompeu Fabra, Barcelona, Spain)
[325] *Six Thousand Years of South Asia: Implications for Climate Modeling.*
We review the archaeological evidence for land use patterning in South Asia over the past 6,000 years as part of a larger effort of the PAGES-supported Landcover6k and LandUse6k project to reconstruct global land use and land cover datasets for the purpose of improving models of anthropogenic land cover change used by climate scientists. Here, we use archaeological and paleoecological data from our study areas to trace land use shifts from the Southern Neolithic through the Middle or Precolonial Period and discuss their relationship to anthropogenic land cover change. Our data demonstrate an intensification and expansion of agricultural and pastoral land use during this period. We suggest that this pattern characterizes many regions of South Asia that these changes significantly altered both land cover and other environmental conditions during the mid to late Holocene.

Lyle, Robin (Crow Canyon Archaeological Center)
[142] *Two Episodes of Ritual Turkey and Dog Burials in Southwestern Colorado: A Case Study*
Many instances of turkey and dog burials have been documented in the prehistoric American Southwest. Some are simple burials or discarded remains but some examples bear characteristics of deliberate sacrifice, arrangement and elaborate ritual interment. Excavations directed by D. M. Dove from 2008 through 2012 in Early Pueblo II period contexts at the large Champagne Spring site in Dolores County, Colorado, revealed two unprecedented examples of this latter type. On or near the floors of two pit structures were complete skeletal remains of multiple turkeys, dogs and other animal remains systematically arranged and covered with sandstone slabs and rich cultural deposits. Orientation and association of the various skeletons clearly suggests symbolic meaning in each episode, as does the sheer number of otherwise healthy individuals including; day old turkey poults, puppies, a crow, cottontail rabbit, rattlesnake and several aged turkey hens with healed fractures. These two different episodes of elaborate, ritual burial occurred within a few meters of each other and a human generation apart but they both demonstrate significant, deliberate community scale sacrifice.

Lyle, Robin [142] see Lipe, William

Lyman, R. (University of Missouri Co)
[79] *Discussant*

Lynch, Sally (McMaster University)
[272] *The Role of Social Memory in Everyday Bodily Practices of Pottery Production and Consumption during the Late Moche Period (AD 500–800) on the North Coast of Peru*
Often the term “social memory” conjures up ideas of grand commemoration events such as statues, museums, large-scale construction and other public displays to remember the collective past. We must not forget, however, the seemingly mundane daily practices that help to create, maintain, and change society while simultaneously forming social identities. This study looks at the Late Moche period (AD 500–800) on the North Coast of Peru. It was a time of immense social, religious, and political change caused in part by environmental upheavals and foreign Highland influence. I propose to examine the role that bodily practices, in particular, pottery production and food consumption, have to play in the maintenance of a social past as well as future, particularly during periods of social unrest that characterized the Late Moche Period. The ceremonial center of Huaca Colorada in the Jequetepeque Valley provides ample evidence for both mundane daily practices, as well as more overtly commemorative and symbolic events of architectural reconstruction. This study will examine their intersection, as well as evidence of continuity and change in pottery production and food consumption that highlights the role of daily practices in the formation of social memory during the Late Moche period.

Lyon, Jerry (Tierra Right of Way Services, Ltd.) and Jeffrey Jones (Tierra Right of Way Services, Ltd.)
[105] *Cemeteries, Settlement Development, and Becoming Hohokam in the Northern Tucson Basin*
The transition from hunting and gathering to increased reliance on farming and the subsequent development of distinct regional cultural traditions represent critical processes in the prehistory of southern Arizona. Previous research at the site of Valencia Vieja in the southern Tucson Basin suggests the development of a distinct Hohokam cultural identity began during the Tortolita phase (Red Ware horizon) when significant population aggregation could be maintained and supported with dependable irrigation agriculture. As exemplified at Valencia Vieja, such population aggregation was expressed in a distinctive plaza-oriented spatial structure. Moreover, ideological and mortuary ritual patterns, agricultural strategies, and settlement hierarchies originating in the Tortolita phase appear to foreshadow subsequent Hohokam developments. Recent excavations at Early Ceramic period sites (Dairy, Richter, and Lonetree-Redtail-Coachline) within a 4-mile reach of the Santa Cruz River in the northern Tucson Basin provide additional information on sedentism and the emergence of a distinct, local Hohokam tradition. This paper addresses Hohokam origins in the Tucson Basin by examining site structure, occupational histories, and settlement development at three important Early Ceramic localities, two of which were anchored to large, enduring cemeteries.
[105] *Chair*

Lyons, Diane (University of Calgary)
[161] *Transferring Technological Styles: An Ethnoarchaeological Study of Marginalized Pottery Production in Tigray, Northern Highland Ethiopia*
The transfer of pottery making skills and knowledge is well studied in Africa using the chaîne opératoire methodology. Chaîne opératoire is understood as a social practice in which technological choices are guided by social choices that potters learn as members of a potter community. The complement of technological choices of this group of potters creates a unique technological style. Africanists use technological styles to study the history of potter communities through time and space. But what happens if the learning network is transferred to other people? This paper presents results from a regional study of pottery production in northern Tigray. Contemporary pottery production is an economic strategy of very poor women, who are socially marginalized for practicing a despised craft. However, historians argue that blacksmithing and pottery making in the northern highlands were monopolized by a Jewish subgroup called the Beta Israel, who formed an endogamous caste. Most Beta Israel were evacuated to Israel during and at the end of Ethiopia’s civil war (1974–1991). Our study found a more complex social picture of pottery production than historians allow, and contributes to our understanding of the variability in the transfer of technological styles between diverse communities.
[314] *Discussant*
[161] *Chair*

Lyons, Kevin (Kalispel Tribe of Indians)
[350] *Problematic Pixels: Prehistoric Residential Floor Recognition in the Pend Oreille Valley*
Public archaeology, as constructed in the United States, is heavily invested in the efficient use of tax and rate payer moneys to identify archaeological sites. The form of that investment, typically, results in a well certified and experienced archaeological practitioner walking the land and/or systematically probing soils. Although well established, this approach is not without its conspicuous errors and project crushing missteps. With the recent proliferation of remote sensing datasets (e.g., lidar) and targeted use of additional methods, can site search failures be reduced and site discovery increase? If systematically applied upon a landscape scale, can such an approach improve needed efficiencies for both commercial and research oriented archaeology? The Kalispel Tribe shares its results of multi-modal search efforts for residential encampments and related phenomena on and adjacent to its reservation.

Lyons, Natasha (Ursus Heritage Consulting) and Anna Marie Prentiss (University of Montana)
[50] *Exploring the Status of a Roasting Feature Complex along the Mid-Fraser Canyon, Bridge River Site, British Columbia*

Roasting features were developed by First Peoples throughout North America to prepare and preserve food for winter storage during the mid to late Holocene. On the Interior Plateaus of British Columbia, Washington, and Oregon, these complexes are found at upland root harvesting sites and, to a lesser extent, in association with winter villages. This poster focuses on the interpretation of a dense complex of roasting features within a housepit at the Bridge River site, located on the Mid-Fraser Canyon of British Columbia, and dated to ca. 1200–1300 cal. BP. We explore the results of recent excavations within Housepit 54, and examine the size, shape, and structure of these pits in comparison to other complexes on the Canadian Plateau. We analyse the plant macroremains, determining what edible species were being processed, what vegetative matter was used in the cooking process, and what size and species of fuels were being used to cook these resources. These paleoethnobotanical analyses inform us about harvesting, subsistence, and preservation practices of ancient St'át'imc residents at this long-lived village complex, and the nature of their relationships with the landscape they lived in and to neighboring Interior Salish communities.
[172] *Chair*

Lyons, Natasha [172] see Supernant, Kisha

Lyons, Patrick (Arizona State Museum), Don Burgess (Arizona State Museum), Marilyn Marshall (Arizona State Museum) and Jaye Smith (Arizona State Museum)
[390] *Maverick Mountain Phase Ceramics from Point of Pines Pueblo: A Preliminary Report*
Emil Haury's 1958 synthesis of the Pueblo III–Pueblo IV period (AD 1265–1450) archaeology of Point of Pines Pueblo, in east-central Arizona, is the American Southwest's classic case study in how to reliably infer ancient migrations. Field school excavations conducted between 1946 and 1960 uncovered compelling evidence of immigrants from the Kayenta region of far northeastern Arizona and southeastern Utah. However, because the excavations at Point of Pines Pueblo have never been fully reported, the site's ceramic assemblage is not nearly as well understood as it should be. Since 2012, a team at the Arizona State Museum (University of Arizona) has been studying the pottery from Point of Pines Pueblo in order to shed new light on the immigrant occupation. In this paper, we report on the analysis of dozens of previously uncatalogued reconstructible vessels from key contexts at the site. These objects provide insight into interaction between Kayenta immigrants and those who harbored them as well as architectural changes at the pueblo. They also represent critical data for understanding formation process at the site and refining its chronology. Important from a regional perspective, many of these vessels illuminate the development of Pinedale Style.
[390] *Chair*

Lytle, Whitney (University of Texas at San Antonio)
[187] *Transformations within an Ancestor Shrine: New Discoveries from Group D—Xunantunich, Belize*
The concept of transformation is expressed by innumerable cultures and has been explored by archaeologists across the globe. The ritual act is often represented in Maya iconography as rulers and religious practitioners exhibiting their power through the ability to change into their animal uays. However, like individuals, spaces can undergo a process of ritual transformation. This paper examines the subject of transformation and how it is demonstrated through imagery and space within a Classic period Maya ancestor shrine at the elite residential unit of Group D, Xunantunich. I will discuss preliminary analyses of crypts discovered during the 2016 field season coupled with findings from the 2012–2015 investigations and how they represent various manifestations of the transformation theme. First, the re-signification of the shrine from its original function within the Late Preclassic can be seen as an act of transformation. Second, various secondary burials and at least one primary individual were discovered within a crypt containing grave goods which I suggest were meant to transform the burial space into the watery underworld. Lastly, a more traditional representation of this ritual ability is expressed iconographically on two carved shell gorgets found in association with a buried individual.

Lytle, Whitney [43] see Vara, Rachel

Lyu, Peng (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing), Katherine Brunson (Brown University), Jing Yuan (Institute of Archaeology, CASS, China) and Zhipeng Li (Institute of Archaeology, CASS, China)
[116] *Zooarchaeological and Genetic Evidence for the Origins of Domestic Cattle in Ancient China*
This paper reviews current evidence for the origins of domestic cattle in China. We describe two possible scenarios: 1) domestic cattle were domesticated indigenously in East Asia from the wild aurochs (Bos primigenius), and 2) domestic cattle were domesticated elsewhere and then introduced to China. We conclude that the current zooarchaeological and genetic evidence does not support indigenous domestication within China, although it is possible that people experimented with managing wild aurochs in ways that did not lead to complete domestication. Most evidence indicates that domestic taurine cattle (Bos taurus) were introduced to China during the third millennium BC, and were related to cattle populations first domesticated in the Near East. Zebu cattle (Bos indicus) entered China sometime between 2000–200 BC, but much less is known about this species. The role of cattle as ritual and wealth animals seems to have been critical to their initial introduction.

Lyu, Shaowu (College of Life Sciences, Jilin University), Chunxue Wang (Research Center of Chinese Frontier Archaeology), Quanchao Zhang (Research Center of Chinese Frontier Archaeology), Lixin Wang (Research Center of Chinese Frontier Archaeology) and Ningning Liang (Research Center of Chinese Frontier Archaeology)
[116] *Identification of Adhesive on Bone-Handled Microblades from the Houtaomuga Site in Northeast China*
With the emergence and development of composite tools in the Upper Paleolithic, adhesives became one of the most widely used materials by early human societies. Of particular interest is to know which animal/plant species were being exploited for glue manufacturing. The Houtaomuga site, located in northeast China, provides favorable materials for the identification of organic residues; and a few bone-handled microblades were collected from this site. In this study, we scraped micro adhesive samples from bone-handled microblades and carried out FTIR and proteomics analysis to determine the protein components and precise origins. The identified signatures from tandem mass spectra of doubly protonated tryptic peptides match most closely to known horse collagen markers, suggesting the adhesive was an animal glue made from horse parts. These results reveal the diverse utilizations of horses at the site, which provided not only meat and hides, but also parts for manufacturing adhesive.