

**Ceramic Petrographers in the Americas:
Promoting the advancement and application of petrography in archaeology**
Chair: Andrea Torvinen

A marked resurgence in the use of petrography to answer archaeological questions has resulted in the formation of Ceramic Petrographers in the Americas (CPA), a group that seeks to promote, discuss, and develop ceramic petrography in archaeology. While CPA members physically reside in the Americas, our research spans the globe both temporally and geographically as illustrated by the posters to be presented. The goal of this session is to provide a venue for the discussion and advancement of ceramic petrography and other characterization techniques among petrographers of all skill levels. In this session, ceramic petrography is used in a variety of archaeological cases to investigate social processes (i.e., cultural continuity, identity, migration, and mortuary behavior) by drawing on both qualitative and quantitative data related to raw material selection, ceramic technology, and provenance, as well as highlight additional sourcing techniques (e.g., SEM, EDX, XRF, and INAA) and tools (i.e., digital image analysis, ethnographic interviews, and experimental archaeology) currently used by petrographers.

Ceramic Petrographers in the Americas: An Introduction to our Mission and Goals
Yukiko Tonoike (Yale University) and Andrea Torvinen (Arizona State University)

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

Defining petrographic fabrics among regional wares at La Quemada, Zacatecas, Mexico
Andrea Torvinen (Arizona State University)

Situated in the Malpaso Valley of Zacatecas, Mexico, the site of La Quemada was one of a series of polities that developed along the northern frontier of Mesoamerica during the Epiclassic period (A.D. 500-900). Widely distributed ceramic wares suggest interaction among northern frontier polities, but it remains unknown whether they are the product of widely recognized social categories (i.e., shared style) or direct, face-to-face interaction among individuals (i.e., shared composition). Answering this question requires distinguishing between local and nonlocal pottery found at La Quemada. Despite geologic homogeneity observed across the northern frontier region due to an extensive ignimbrite province, previous characterization studies involving La Quemada pottery types have observed compositional variability among sherds and clays sampled from the Malpaso Valley. This poster builds upon these studies to define the set of ceramic fabrics observed in the La Quemada assemblage using a three-tier approach: (1) qualitative sorting and description of petrographic fabrics; (2) quantitative point counting of a

proportional subsample of petrographic fabrics to test their mutual exclusivity; and (3) analysis of elemental data acquired from the clay matrix of point counted sherds and a set of briquettes made from natural Malpaso clays to establish local or nonlocal provenance.

At a Crossroads: 300 years of Pottery Production and Exchange at Goat Spring Pueblo, NM

Suzanne Eckert (Arizona State Museum) and Deborah Huntley (Tetra Tech)

The Goat Spring Archaeology Project explores late Pueblo period (A.D. 1300 - 1680) cultural continuity and transformation in south-central New Mexico. Goat Spring Pueblo was occupied periodically: initially during a period of demographic reorganization and expansion of regional networks in the 1300s, again during the early Spanish Colonial period, and possibly during the Pueblo Revolt of 1680. This highland village was strategically located along the trail connecting Western Pueblo and Rio Abajo villages. Petrographic analysis of decorated and undecorated sherds from Goat Spring Pueblo sheds light on local identities, ritual practices, and participation in regional networks.

Pottery Production at the Dillard Site: an early Basketmaker III Community Center in the Central Mesa Verde Region

Kari Schleher (Crow Canyon Archaeological Center), Emma Britton (University of California, Santa Cruz), Donna M. Glowacki (University of Notre Dame), and Robin Lyle (Crow Canyon Archaeological Center)

The Dillard site (5MT10647)-the earliest community center identified in the Mesa Verde region-may contain among the oldest examples of multi-household pottery production during the Basketmaker III period. A thorough understanding of how pottery was produced and obtained at this early large pithouse village, which is centered on a great kiva, provides important insights on village organization and interpersonal relationships. In this poster, we explore compositional variation in pottery production using three data sets to evaluate variation in materials used in pottery production: binocular and petrographic qualitative analyses of temper, refiring, and neutron activation analysis of paste. These lines of evidence allow us to identify spatial patterns in the distribution of pottery and its potential compositional differences among the pithouses at the Dillard site in order to address the organization of production, as well as the extent of influence the Dillard site may have had on the broader surrounding community through pottery production and exchange. Methodologically, we also compare the correspondence of compositional groups to refire color groups in order to determine the potential use of the refiring technique as an inexpensive compositional method for future projects in the area.

Exploring the Interaction of Culture and Technology in the Acoma Culture Province

David Hill (Metropolitan State University of Denver)

The Acoma Culture Province is the geographic expanse of the ancestral homeland of the Pueblo of Acoma documented for adjudication through the Indian Claims Commission and through

archaeological research. Pottery made during both the prehistoric and historic periods found within the Acoma Culture Province was made using crushed potsherds as an addition to the pottery clay. The practice of adding crushed potsherds represents a cultural choice for Acoma potters, a choice that has considerable time-depth. Pottery containing crushed pot sherds appears around A.D. 900 in decorated and undecorated utilitarian vessels, a practice that continues today. The continued use of crushed pottery sherds as a component of Acoma ceramic technology represents an example of a conservative technology.

Petrography, Production, and Provenance of Ceramics from La Blanca, Guatemala

John Lawrence (CSU, Northridge), Cathy Costin (CSU, Northridge), Kathleen Marsaglia (CSU, Northridge), Michael Love (CSU, Northridge), and Hector Neff (CSU, Long Beach)

The Middle Preclassic (900-600 BCE) was a critical time of political and social centralization in the Guatemalan lowlands. Of particular interest is La Blanca, one of the first polities to rise and show signs of regional influence and potential urbanization. To reconstruct everyday life I am using excavated ceramic refuse to observe dynamics surrounding three households. This, in turn, elucidates elements of La Blanca's political economy associated with the manufacturing and production of ceramics. To observe this I am adapting Dickinson's methods of mapping interaction spheres using petrography to a household level. Reviews of local geologic sources and 90 sherds have been collected. Petrographic examination of sherds has shown three distinct compositional groups: Mineralic, Volcanic, and Vitric. From these groups, representative samples have been selected and point counted using the Gazzi-Dickinson method. To correlate sherd samples to potential sources, three modern sands were sampled and seven Paleo sands from the Missouri University Research Reactor were provided. These samples were analyzed using the same methods as the sherds. Preliminary results indicate a local geologic provenance for raw materials and varied clay sources and manufacturing techniques among households. This suggests that each household was producing their own ceramics and trading amongst themselves.

Recipe for Daub? A Comparative Petrographic Study of a Common Construction Component in the Maya Area

Anabel Ford (UCSB), Linda Howie (HD Analytical Solutions), and Josh Inga (UCSB)

Daub is characterized as a mixture of a plastic substance, like natural clay or plaster, and an organic, fibrous binder, which is applied and smoothed against a stick or wood structure to construct a wall. This building strategy is used extensively throughout the world, past and present, yet studies have tended to focus exclusively on identification of component ingredients, rather than compositional and provenance characteristics that offer insights related to resource procurement patterns, variability in daub compositions across time and space, and what contiguous and divergent compositions suggest about development and traditions of construction practices. In this study, we present the results of a comparative petrographic analysis of clay artifacts commonly identified as 'daub' from Late Classic Maya residential buildings situated in three different environmental zones around the site of El Pilar, Belize. We identify and compare the compositional components of artifacts from valley, foothill, and ridgeland environments and consider their compositional and provenance characteristics in light of formal definitions of daub

as a building material, daub recipes, and the nature and significance of variability in these artifacts across the landscape.

Mineralogy Without Minerals: A Proposed Methodology for Reconstructing the Original Compositions of Highly Altered Ceramic Bodies Using Thin Section Petrography

Linda Howie (HD Analytical Solutions), Jillian Jordan (University of New Mexico), Heather McKillop (Louisiana State University)

The rock and mineral fragments present in archaeological pottery, whether naturally occurring in the clay component or intentionally added as a temper, often serve as the primary geologic basis for provenance ascription in petrographic analysis. In certain contexts, however, the original compositional characteristics of pottery have been highly altered through technological or postdepositional processes. In these situations, accurate characterization and sourcing of original raw material ingredients must be based on a wider range of microscopic attributes than the rock and mineral assemblage alone. This is especially the case when diagnostic aplastic components have been completely removed.

We present two case studies of Late Classic Maya pottery from archaeological sites in Belize in which the original mineralogy of the raw material ingredients and paste recipes were reconstructed in the complete absence of actual rock and mineral fragments. We discuss the factors contributing to the removal of these essential fabric components, which are different in each case, and their identification. We propose a methodology for the reconstruction and description of the original compositions of highly altered ceramic bodies using a descriptive systems approach that integrates an appropriately broad range of microstructural and textural criteria, which are oftentimes otherwise ignored.

The Use of White Engobe in the Formative Ceramics in Ojo de Agua Spring from San Antonio La Isla, Toluca Valley, Mexico

Francisco J. Sanchez-Tornero (

In the present research analyzed by Scanning Electron Microscopy (SEM) and Energy-Dispersive X-ray (EDX) the Formative (ca. 1500BC-200BC) ceramics with white engobe, located in Ojo de Agua spring from San Antonio La Isla, Toluca Valley, with the objective of identifying the first manifestations of the use of white engobe and/or dye in a comparative framework and its cultural significance for the lacustrine societies in the studied regions. Micrometric images and chemical data identify fossil diatom structures in the engobe, indicating that it is the raw material used for the elaboration of the white engobe applied to the Formative ceramics in the Alto Lerma basin and the southern basin from Mexico.

The chemical-elemental results suggest that the use of the diatom fossil as a dye material was a chromatic tradition rooted in Alto Lerma and in the south of the basin of Mexico, which prevailed in riverside communities for millennia. The similarities and specific variations, recorded in archaeometric information, allow the recognition of the relationship between

different human groups, the technique and/or the techniques used, serving as a basis for knowing the cultural legacy that identifies a population group.

Tecnología cerámica, análisis petrográfico y técnicas arqueométricas en cerámicas policromas de las fronteras de Quebrada de Humahuaca, Jujuy, Argentina

Veronica J. Acevedo (Universidad de Buenos Aires)

Los materiales cerámicos arqueológicos policromos denominados “vírgulas o comas” tienen una amplia pero desigual distribución espacial y son hallados en cantidades limitadas en sitios arqueológicos de las regiones de Puna norte, central y Quebrada de Humahuaca, Jujuy, Noroeste de la República Argentina. Estas regiones mantienen límites ambientales y geográficos fronterizos. En el pasado los habitantes de ambas zonas sostenían una fluida comunicación, manteniendo formas identitarias diferentes entre el “Ser Quebradeño” y el “Ser Puneño”. Estas vasijas han transitado las dos regiones desde el 900 d.C. hasta el postcontacto con el español. Lo que nos ha conducido a reflexionar sobre la circulación de piezas cerámicas entre fronteras con importante uso y consumo ceremonial.

En este trabajo se presentan los resultados del análisis de caracterización petrográfica y pigmentaria de fragmentos de vasijas de sitios de la región de Puna y de Quebrada de Humahuaca, Jujuy. La aplicación combinada de técnicas arqueométricas con las cuales se estudiaron los materiales permitió reconocer las dinámicas fronterizas dadas en el pasado entre poblaciones de las regiones mencionadas. Las técnicas analíticas usadas fueron: análisis sobre cortes delgados, microscopía óptica, microestratigrafías, espectroscopia Raman, DRX, entre otras.

Mortuary Spaces as Social Power: Ceramic Exchange and Burial Practice at Safford Mound (8PI3)

C. Trevor Duke (Florida Museum of Natural History), Neill J. Wallis (Florida Museum of Natural History), and Ann S. Cordell (Florida Museum of Natural History)

Mortuary spaces often served as gathering points for disparate communities in the pre-Columbian past. The deep temporal associations of many burial mounds across the southeastern United States linked living societies to the ancestral landscape, thus creating a sense of social memory that penetrated both quotidian and ritualized social practice. Safford Mound (8PI3), a burial mound located near modern Tarpon Springs, Florida, embodies some of these characteristics. In this study, we qualitatively describe thin sections, and also present a gross paste characterization and technological analysis of ceramic vessels from the Safford assemblage. Although the excavations were poorly recorded, the sheer size and completeness of this assemblage provides us types of information usually unattainable through standard recovery methods. We use these data to investigate the ways in which vessel exchange and provenance at Safford represents both change and continuity in mortuary practice during the Woodland (1000 BC-AD 1000) and Mississippian Periods (AD 1000-1500). The results of these analyses ultimately suggest that Safford Mound maintained its social power during a period of immense

sociopolitical realignment and reorganization. We view this pattern as indicative of the embeddedness of mortuary ritual within social life in the Gulf Coastal Plain.

Ceramic Petrography of Woodland Period Swift Creek Complicated Stamped pottery in Florida and the lower Southeastern United States

Ann S. Cordell (Florida Museum of Natural History), Neill J. Wallis (Florida Museum of Natural History), and Thomas Pluckhahn (University of South Florida)

Swift Creek Complicated Stamped pottery from the lower Southeastern U.S. is a premier material for the systematic study of Woodland period social interactions. Petrographic analysis of Swift Creek pottery was undertaken as part of a research program that integrated materials analyses of pottery, including Neutron Activation Analysis, digital imaging of paddle stamp designs, technological analysis, and absolute dating, to identify patterns of social interaction. Over 200 samples have been thin sectioned from more than two dozen sites across Florida and Georgia, dating between AD 200 and 800. 91 clay samples from most of the sample regions were included for comparison. Petrographic analysis documented eight gross temper and/or constituent categories and eight matrix or petro-fabric groups (on the basis of presence/relative frequency of mica and siliceous microfossils). Most gross “temper” and petro-fabric categories are well represented in the sampled clays. The results indicate mostly local pottery manufacture within the northern regional site clusters, which encompass large ceremonial centers. Swift Creek pottery at the southern clusters contain an abundance of non local vessels, especially at burial mounds. Integrative results indicate that interactions were geographically extensive, but clearly most intensive along particular corridors.

Clay Resource Variability and Stallings Pottery Provenance along the Savannah and Ogeechee Rivers

Zackary Gilmore (Rollins College) and Kenneth Sassaman (University of Florida)

An understanding of the raw materials available to ancient potters is essential to archaeological considerations of vessel production and provenance. Consequently, the collection and analysis of raw clay samples has become a common component of such studies. This poster presents the results of compositional analyses of clays from along the Savannah and Ogeechee Rivers in Georgia and South Carolina via petrographic point-counting and neutron activation analysis (NAA). These analyses were conducted as part of a larger project focused on reconstructing the ceramic social geography of Late Archaic Stallings societies, makers of North America’s oldest pottery technology. While multiple studies have demonstrated the feasibility of geochemical sourcing in other parts of the American Southeast, this is the first such investigation centered in the Savannah River Valley and the first systematic attempt to determine the provenance of Stallings vessels. Our results show that clear patterned differences in the mineralogy and chemistry of clay resources exist both between Savannah and Ogeechee Rivers and along the length of the Savannah. These data suggest a high potential for not only distinguishing between local and nonlocal vessels but also determining the direction (i.e., upriver versus downriver) of pottery movement.

The Recipes of Disaster in Northern Iroquoia: Integrating Digital Image Analysis into Petrographic Practice

Daniel Ionico (McMaster University)

European contact with Northern Iroquoian communities brought about a series of direct and indirect consequences. These involved European-disease epidemics and a series of migrations that moved people across the landscape as refugees, captives, or conquerors. Ceramic petrography offers a way for archaeologists to understand the impacts such demographic upheavals can have on technological systems. Iroquoian potters often use a recurrent set of rock and sand types that homogenize the paste-type assemblage, yet textural data (inclusion sizes, density, sorting, roundness, and sphericity) from thin sections can be used to explore micro-style changes in pottery production. However, constraints on time and levels of experience are often at odds with point counting procedures and recommended sample sizes for statistically significant studies. In this study, I couple qualitative and semi-quantitative assessments of petrographic samples with a digital textural analysis using the free open accessed program ImageJ (v. 1.51k) and Adobe Photoshop CC 2017. With this collection of techniques, I analyzed samples from two villages in the Neutral Iroquoian Confederacy that represent before and after chronologies for a series of demographic shifts to consider how these experiences altered paste preparation practices.

Applications of Microscopy and Thin Section Petrography in Iroquoian Ceramic Analysis

Sarah Striker (Arizona State University)

Iroquoian ceramic analysts typically focus on decorative style, in part because this approach maximizes the amount of information that can be obtained from an assemblage in a short amount of time. Decorative attributes can be rapidly identified and recorded, and a significant literature links patterns in decorative styles to social, temporal, and cultural trends. Characteristics of ceramic fabrics including clays and tempers are rarely examined, but adding these elements to the standard Iroquoian ceramic analysis would address important unanswered questions about Iroquoian ceramic production.

I present a methodology for the efficient and cost-effective analysis of Iroquoian ceramic fabrics applicable to ceramic pots and pipes. The attributes selected and methods for recording them are developed using insights from petrographic analysis of ceramic thin sections using a polarizing microscope following Whitbread's (1989) methodology. By focusing on characteristics diagnostic of specific technological and provenance related characteristics of ceramic fabrics that are evident using a standard binocular microscope, this methodology is designed to be used and refined in conjunction with selective petrographic analysis. I test my methodology by comparing this method with thin section petrography using ceramics from three ancestral Wendat village sites located near Toronto, Ontario spanning roughly 1400-1550 C.E.

Rethinking migration and mobility in the Late Roman West with ceramic petrography

Vince Van Thienen (Yale University)

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