

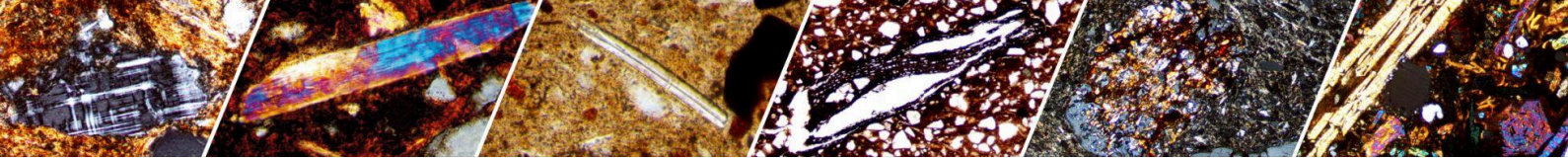
# SCIENTIFIC ANALYSIS ON POTTERY FINDS FROM AFRICA

*Challenges and Perspectives for  
Petrographic and Geo-Chemical Studies*

International Virtual Workshop  
6th to 7th June 2024

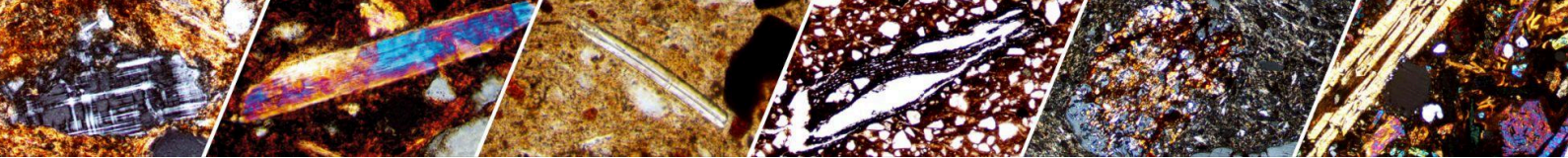
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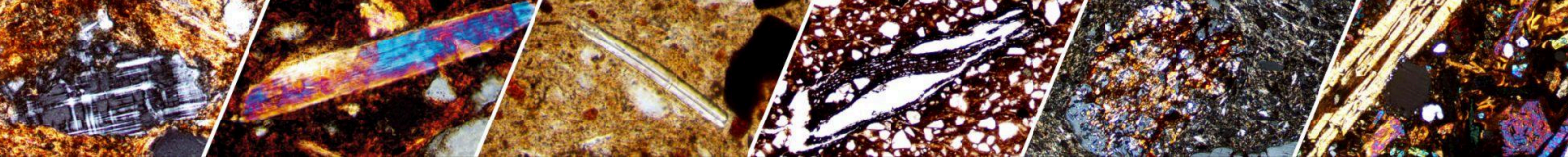




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# Thursday June 6th, 2024

## Session 1

### 09:10-09:30 Magda Mahmoud Ibrahim

Ptolemaic perfume vases from the new discovered Cemeteries in Alexandria, Egypt

Egyptian Ministry of Tourism and Antiquities, [mahmoudmagda396@gmail.com](mailto:mahmoudmagda396@gmail.com)

Unguentaria or Perfume vases are the most common pottery vessels found in Cemeteries in Alexandria, probably because perfume was used in funerary rites, or perhaps the deceased used these vessels during his life and then they were buried with him. Two Cemeteries were discovered recently by the Egyptian Ministry of Antiquities: The Cemetery of El-Haddad and the Cemetery of El-Abd, they are located about 300 meter and 900 meter east of the Cemetery of El-Shatby, which was discovered by Evaristo Breccia between the year 1904 and 1910. The Cemetery of El-Haddad dates back to between the 2nd half of the 3rd century to the late 2nd/ early 1st century BC. However, the newly discovered areas of the Cemetery of El-Abd (Excavation seasons from the year 2017 to 2019) dates back to the 2nd half/late 2nd century BC to the 3rd century AD. Large numbers of these vessels with different types were found in loculi and in the fill of the Cemeteries, reasonable number of which was found in specific archaeological layers, or in three phases dates to: the 2nd half of the 3rd to mid-2nd century BC; The 2nd half of the 2nd to early 1st century BC; The late 2nd to late 1st century BC. The majority of these vessels, recorded from the two Cemeteries, were in local fabrics, and they are mainly imitations of the Greek models in the Hellenistic period.

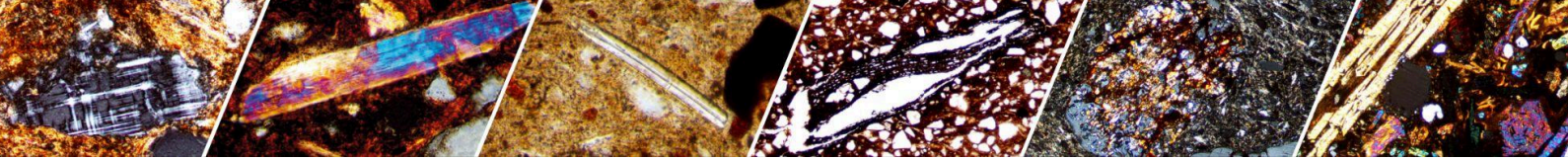
### 09:30-09:50 Cameron Gokee

A Petrographic Approach to Paste Recipes along the Lower Falémé River, Senegal (AD 500-1900)

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Ethnoarchaeological studies of pottery production in West Africa have worked to clarify how technical choices for clay procurement and processing (paste recipes) emerge from the interplay of available resources, embodied habits, social identities, and cultural tastes at multiple scales. The archaeological application of these insights, however, ultimately depends on our ability to link compositional variability in ceramic assemblages to the technical choices of past potters. In this paper, I evaluate the potential for petrographic analysis to discriminate among potters' clay sources and identify their subtractive (sieving) and additive (tempering) processing techniques. Specifically, I present an analysis of petro-fabric groups defined for 60 ceramic sherds from ceramic Late Stone Age (< AD 500), Iron Age (AD 500-1500), and Atlantic Era (AD 1500-1900) sites along the Falémé River in eastern Senegal. Long-term changes in these petro-fabric groups demonstrate that cultural preferences for grog and organic temper began to inform local paste recipes beginning in the





Iron Age. Based on analogy to ethnographic examples across West Africa, these changes likely attest to processes of migration and shifting patterns of political economic interaction along the Falémé River over the past two millennia. I conclude with lingering questions and ongoing challenges for archaeological petrography in this corner of West Africa.

**09:50-10:10 Anne Mayor<sup>1\*</sup> & Nadia Cantin<sup>2</sup>**

**Raw material procurement strategies in Eastern Senegal:  
Environmental or cultural constraints?**

<sup>1</sup>University of Geneva

<sup>2</sup>Université Bordeaux Montaigne, Institute of Archaeomaterials Research

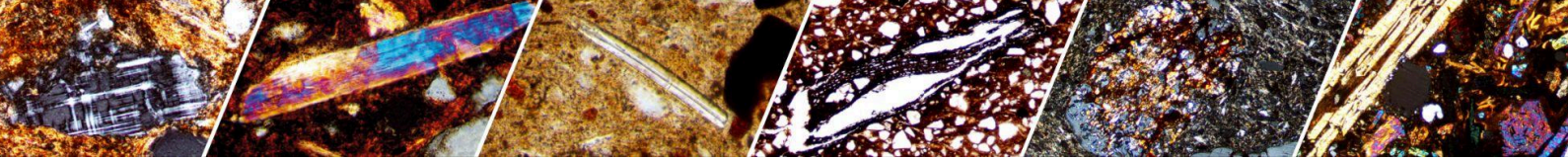
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The choice of raw materials and the preparation ‘recipes’ of pastes to make pottery is often difficult to address archaeologically. Observations made in different ethnographic contexts, as well as physicochemical analyses, contribute to identifying the respective effects of environmental and cultural constraints in technological choices made by artisans and to creating reference repositories useful for the interpretation of archaeological assemblages.

In the framework of the research project “Human settlement and paleoenvironment in Africa” at the University of Geneva, which has focused since 2012 on Eastern Senegal, Anne Mayor’s archaeological research on ceramic traditions in the Falémé Valley has demonstrated that there was a high level of uniformity in paste recipes and shaping techniques despite the diversity in the cultural groups (Mandinka, Fulani, Jakhinke and Soninke) and the clay materials used, identified in the laboratory in Bordeaux by Nadia Cantin (Cantin & Mayor, 2018).

This situation contrasts with the neighboring region of Bassari-Bedik Country, explored in 2016, where the choices of raw materials, paste preparation and shaping techniques differ considerably. This region, classified as a UNESCO World Heritage Site and termed a Cultural Landscape, is formed by the foothills of the Fouta Djallon massif and was a mountain refuge for populations fleeing slavery and Islamization. This example, comprising different cultural groups and environments, will serve as the basis for a discussion of raw material procurement strategies and their processing, using a dual approach in the field and laboratory to better ascertain the choices made by potters.





## Session 2

**10:40-11:00 Giulia D'Ercole<sup>1\*</sup>, Julia Budka<sup>1</sup> & Elena A. A. Garcea<sup>2</sup>**

**More than one way to perform archaeometric analyses on pottery. Case studies from Prehistoric and Bronze Age Sudan**

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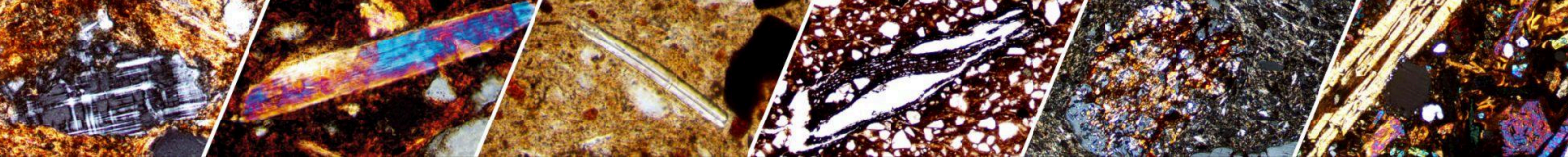
Sudanese archaeology boasts a long-lasting tradition in the field of pottery technology and archaeometric studies of ceramics, having had scholars of the caliber of Hans-Åke Nordström, one of its pioneers. Starting with the early 1970s, numerous petrographic and geo-chemical studies have been carried out in Sudanese Mesolithic and Neolithic ceramic assemblages by several International and Sudanese scholars. More or less contemporaneously, the Vienna system, the backbone of Egyptian ceramic studies, was designed by D. Arnold, M. Bietak, J. Bourriau, H.-Å. Nordström and others, representing a breakthrough in the classification of Egyptian ceramics based on physical and technological properties.

Current archaeometric approaches on both prehistoric and historical Sudanese pottery commonly integrate a wide range of organic (i.e., ORA) and inorganic (e.g., POM, XRF, iNAA) analyses, with the purpose of reconstructing the chaîne opératoire of the ceramic assemblages, local traditions, and ceramic ecologies, meaning with this term the interplay between the natural and anthropocentric sphere.

The present paper aims to compare different archaeometric projects on different key contexts of Sudanese archaeology, with case studies ranging chronologically from the Mesolithic and Neolithic to the Bronze Age, and geographically from Northern to Central Sudan. In particular, we aim at demonstrating that varying sampling strategies, analytical techniques, archaeological challenges, and research objectives must necessarily be calibrated on the basis of the specific ceramic assemblage, site chronology, as well as the topographical and cultural landscape.







**11:00-11:20 Patrick Quinn<sup>1</sup>, Hannah Page<sup>2</sup>, Isabelle Vella Gregory<sup>3</sup>  
& Michael Brass<sup>1</sup>**

Ceramic manufacturing traditions and sources from the multi-period cemetery of Jebel Moya, Sudan: Newly published and additional scientific findings

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The multi-period cemetery of Jebel Moya, Sudan, has over 5000 years of occupation and use. Located far below the Nile's Sixth Cataract, Jebel Moya is in an area that remains archaeologically under-explored. Excavations show activity to be largely mortuary, though other types of activity, including those of a domestic nature, have recently come to light. A programme of ceramic studies has to date clarified the chronological sequence, shown a range of tools and motor actions in use over millennia and elucidated the community of practice of pot making. Our recently published petrographic and geochemical study focused primarily on sherds dating to the first millennium BC. Additional on-going analyses are tackling older material to provide a more complete picture of the compositional diversity, raw material sources and technology of ceramics from the mid-6th millennium to the late 1st millennium BC. Building on previous work, we are integrating thin section petrography with geochemical data obtained via portable XRF and SEM-EDS. The initial studies showed that the bulk of the 1st millennium sherds were made using materials from the area, with some notable exceptions. Despite the presence of several distinct compositional groups reflecting the use of separate clay sources, there was no direct correlation with the stylistic characteristics of the sherds. Current studies will determine if this applies to earlier material and help further elucidate the relationship between raw material, style and composition. We will also discuss the nature of pottery traditions vis-a-vis the compositional lens, focusing on how these need to be seen within the broader context of life at Jebel Moya.

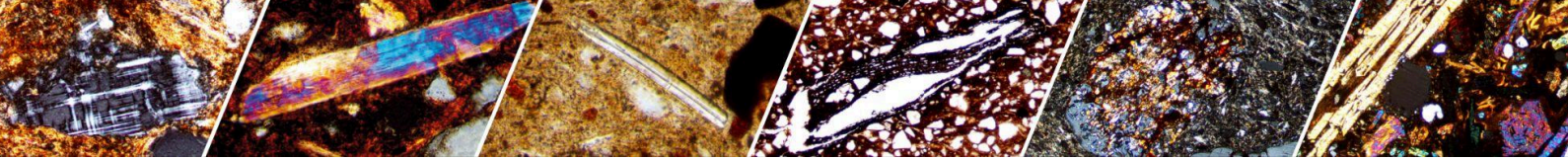
**11:20-11:40 Wafa Hussein**

Manufacturing process of late prehistory (Neolithic) ceramic of Central Sudan and modern pottery tradition in the Nuba Mountains (Sudan): A comparative study

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Ethnographic and experimental archaeological studies have provided much information about early methods of pottery production in archaeology. Therefore, this article attempts to establish a link between the studies of Neolithic pottery in Central Sudan dated 5000-3000 BC and modern traditional pottery industries in the Nuba Mountains by using the concept of *chaîne opératoire*, a term that means the reconstruction of all the technical processes of the pottery industry (collecting the raw material, preparing the clay, forming, surface treatment,





decoration, firing and using the final product) through studies of the micro-traces of ancient pottery.

The present study aims to obtain more information about the manufacturing process of Neolithic pottery in Central Sudan by linking it with the study of ethno-archaeology of pottery industries in the Nuba Mountains conducted in 2020. The comparison between the micro-traces of Neolithic pottery and modern pottery production provides a clear picture of the evolution of the technical manufacturing process in the late prehistoric period in Central Sudan.

The results show several common elements of the pottery manufacturing process between late prehistoric and modern communities in the Nuba Mountains. The methods of collecting clay, preparing it, and firing it in kilns traditionally used in the Nuba Mountains may shed light on whether these methods were also used in the Neolithic era in Central Sudan. In terms of ceramic forming and surface treatment techniques, both Mesolithic and Neolithic societies used the manual method of coiling by pinching and molding techniques, which are still used in the Nuba Mountains.

## Session 3

### 13:00-13:20 **Abdelgabar Ibrahim Amam Hanaa**

#### Characteristics and diagnostic features of the Islamic Pottery in the Sudan case study “Sennar, Suakin and Wad Nemery”

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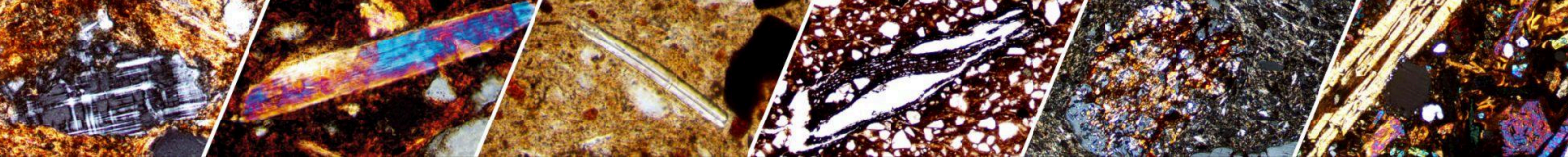
The study examines Islamic period pottery in Sudan, specifically at the sites of Sennar, Suakin, and Wad Nemery. Its objectives are to identify the features of Islamic pottery and explore the trade relations during that era. The research employs descriptive, analytical, comparative, and sample collection methodologies through archaeological surveys. Laboratory and chemical analyses, utilizing techniques such as XRD, XRF, and Petrography Analysis, are also used.

The study reveals several findings. It suggests that potters during the Islamic period in Sudan held a lower social status compared to earlier historical periods, possibly influenced by political instability affecting pottery production and quality. Nonetheless, decorative patterns from both earlier periods and the Islamic era persisted. The study also highlights the significance of trade and pilgrimage routes, as evidenced by imported pottery sherds and glazes. The pottery discovered at the sites is characterized by simple decorations like straight and crossed lines, with decorative patterns showing similarities to those found in South and West Africa. Chemical and petrographic analysis confirm the use of locally sourced clay with impurities for pottery production.

The study recommends further research, particularly in establishing a historical and chronological sequence of Islamic period pottery in Sudan. It also suggests focusing on the analytical aspects of pottery, including its components and technologies. Analytical methods such as XRD, XRF, and Petrography Analysis are recommended for future investigations.







Overall, the study provides valuable insights into the characteristics of Islamic pottery in Sudan and the associated trading relationships, shedding light on its cultural and historical significance.

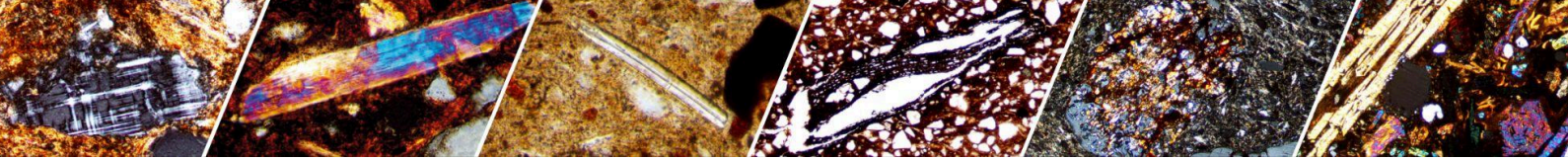
**13:20-13:40 Amanuel Abraha**

**Archaeometric Analysis of Ancient Ceramics in the Northern Ethiopia: Challenges and Prospects**

Archaeology and Heritage Management, Adigrat University, Ethiopia,  
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Northern Ethiopia was one of the busiest sea routes of the ancient world which has long been an important corridor of cultural contact and trade. Archaeological investigations that have been conducted in this region indicate that it has rich material cultures that date back since the pre-Aksumite (ca.1650 BC-400 BC) period. Ceramic objects are the most frequently discovered artifacts in all of the sites in the region. However, the previous archaeological ceramic studies in the region have been entirely focused on examining their physical attributes (surface decorations, colors, forms, and hardness etc). As a result, a range of archaeological questions such as their manufacturing techniques and processes, their provenance, and the local and regional interactions are not yet addressed through the applications of modern scientific methods. Particularly, though archaeometric examination and characterization of pottery artefacts is very crucial to uncover valuable information about the production techniques, raw materials used, trade networks, and cultural interactions of past societies in the region, such methods are not yet employed due to various challenges. One of the primary challenges faced in the archaeometric analysis of ancient ceramics in northern Ethiopia is lack of access to advanced analytical tools. In this region, there is not a single archaeometric laboratory facility where professionals of the field can conduct such studies. The other significant challenge is lack of budget and specialized trained expertise. However, the ongoing advancements in scientific instrumentation and analytical techniques across the world, the presences of rich but least investigated ceramic potentials in northern Ethiopia and the emerging collaborations between the local archaeologists of this region with renowned researchers of the field across the world have promising prospects for future archaeometric analysis of ceramics and fill the required archaeological knowledge gaps in the region.





**13:40-14:00 Selina Han<sup>1</sup>, Patrick Quinn<sup>1</sup>, Tania Tribe<sup>2</sup>, Jacke Phillips<sup>2</sup>, Laurence Smith<sup>3</sup>, Mesfin Getachew<sup>4</sup>**  
Ceramic Production and Distribution during a Period of  
Dynastic Change at Medieval Lalibela, Ethiopia

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The Solomonik-Zagwe Encounters Project (SolZag) seeks to further our knowledge of the Amhara populations that took control of the Lalibela region of Ethiopia in the late 13th century, focussing on the people themselves and their culture. One aim of the project is to produce a typology of medieval ceramics in the area and compare it with material recovered from other Ethiopian sites. As part of this aspect of the study, a sample of the sherds is being studied by thin-section petrography and by a bulk fabric analysis using pXRF and ICP-MS or ICP-AES. This study aims to establish the amount of variation in fabric composition within and between sites; establish whether there is variation in fabric composition geographically and over time, which could be associated with the cultural changes from the Zagwe to Amharic dominance and to establish whether it is possible to source the archaeological pottery, to see whether there changes in production associated with the move from Zagwe to Amharic influence. In terms of methodology, the study intends to determine whether thin-section analysis alone is sufficient to differentiate between archaeological ceramics and extant clay sources within the region or whether the combination of thin-section analysis and chemical analysis is needed to differentiate between the pottery and the clay sources in the region. The paper will present the results of the different methods of analysis and give preliminary interpretation of groupings obtained and conclusions as to the most effective methodology.

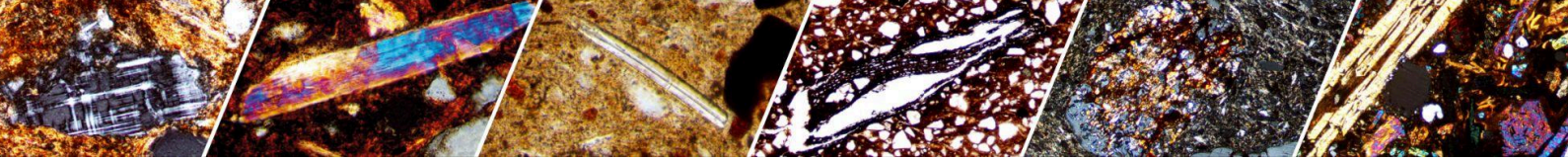
## Session 4

**14:30-14:50 Daniel Kumah**  
Volcanic Ash-Tempered Pottery: Recent Recovery of  
Pottery Tradition from Begho, Ghana.

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Ceramic samples with volcanic ash were recovered from Begho in the Bono Region of Ghana for the first time in archaeological studies. Begho was an ancient and historic market town, which traded with Jenne in Mali during the Trans-Saharan trade. The archaeological excavations between 1970 and 1979 revealed the following quarters: Dwabirim, a market center; Dwinfour, an artisan quarter; Brong, a royal quarter; and Kramo, a Mande Muslim quarter. These sites were organized along economic, political, and sociocultural ties.





For a decade, the excavation uncovered numerous artefacts. Research on Begho's analysis is limited apart from the last pottery analysis conducted in 1972. It remains a mystery why Begho's pottery have not been interrogated and archaeological reports have not been published since 1979. It is against this background Begho was revisited in order to reassess the site and conduct analysis of the local pottery.

The analysis of the recent excavations revealed nine pottery traditions. A Volcanic ash-tempered pottery tradition was identified. The petrographic studies revealed that a fine-grained matrix contained coarse-grained clasts. The coarse clasts are mainly mafic and quartz. The presence of mafic clasts indicates that mafic rock materials such as volcanic and/or volcanoclastic rocks were used to produce pots. In the Bono area such mafic rocks are abundant.

This preliminary research argues that it is critical to use petrography to study pottery production in Ghana and West Africa.

### **14:50-15:10 Dela Kuma<sup>1</sup> & Brandi L. MacDonald<sup>2</sup>**

#### **Diversity in Consumption: Local Pottery Economies in 19th & 20th Century Amedeka, Southeastern Ghana**

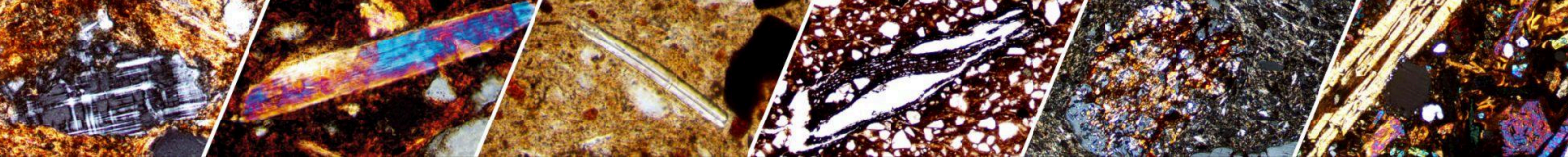
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Historical archaeologists working in southeastern Ghana rarely use archaeometric techniques, particularly Neutron Activation Analysis (NAA), to identify pottery provenance and consumption patterns. In this paper, we present the results of a combined typological analysis, ethnographic data, and NAA of local earthenware from the mid-19th century site of Amedeka in southeastern Ghana. The goal of this study was to examine geochemical variation within the Amedeka assemblage to determine if distinctive compositional groups could be identified and linked to possible areas of production and to understand patterns of consumption. In addition, we compared the data to previously characterized pottery from elsewhere in Ghana to determine possible inter-regional pottery trade networks. In total, 47 samples from Amedeka were analyzed at the University of Missouri Research Reactor (MURR). Three distinct compositional groups (G1, G2, G3) were identified. At least two of the groups reflect a local but more dispersed pottery production within the southeastern region. Comparison to the reference groups from Banda, west-central Ghana, suggests that the majority of the Amedeka G2 samples have high compositional similarities with the Banda samples (Stahl G-K2). Overall, the data suggests that Amedeka consumers acquired pottery from local producers but also expanded their sphere as far as west-central Ghana.







**15:10-15:30 Juan-Marco Puerta-Schardt<sup>1\*</sup> & Sonja Magnavita<sup>1</sup>**  
**Tracing connections – Archaeometric provenance analyses of West African pottery**

<sup>1</sup>Goethe University Frankfurt, Institut für Archäologische Wissenschaften

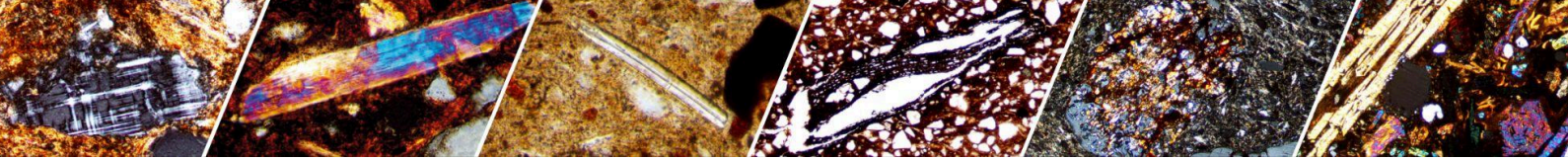
\*Corresponding author: [Puerta-Schardt@em.uni-frankfurt.de](mailto:Puerta-Schardt@em.uni-frankfurt.de)

Portable X-ray Fluorescence (p-XRF) is an established tool for provenance analyses of archaeological ceramics based on their chemical composition. While successfully applied in some investigations in West Africa, these studies have primarily focused on smaller regional contexts. Our study aims to, for the first time, utilize this method for provenance investigation on a supra-regional scale to trace connections across large distances.

To achieve this, we non-destructively measure the geochemical composition of sherds from diverse collections and compare them using statistical methods. By utilizing a sufficiently large quantity of locally identified ceramics, a pseudo-reference group for the regional geochemical signature can be established, enabling differentiation between individual regions. We have already achieved this for various regions in Niger and neighboring countries. For instance, the southern Air Mountains can be clearly distinguished from the Lake Chad region, and even the areas east and west of the lake exhibit differences in the geochemistry of locally produced ceramics.

The regional signatures identified can aid in attributing imported ceramics identified through p-XRF and typological attributes to their potential regions of origin. Therefore, our work not only provides a crucial foundation for geochemically supported provenance analysis in West Africa but also contributes to a deeper understanding of the historical and archaeological network in West Africa and beyond, as documented by historical sources and archaeometric studies of other artifact categories.





Thursday June 7th, 2024

## Session 5

### 09:00-09:20 Elizabeth Adeyemo

Paste Preparation and The Organization of Ceramic Production in Igbo Ukwu (7th - 13th Century CE) Southeastern Nigeria

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Macroscopic analyses of archaeological ceramics are foundational in understanding traits distributions within an assemblage. Since the features of ceramics recovered from archaeological excavations are impacted by their manufacturing process, usage, and post-depositional history, macroscopic analyses are insufficient to investigate paste variation in ceramic production. The investigation of ceramic paste types and their distribution can advance the reconstruction of craft production processes and the political economy of ancient societies. Thus, this paper investigates the patterns of paste exploitation in Igbo Ukwu (9th -12th Century CE) ceramic assemblage as part of a broader project that aims to reconstruct the organization of the ceramic industry and how the regional socioeconomic and political shifts are reflected within the material remains. Using a combination of archival studies toolkit, Portable X-Ray Fluorescence (pXRF) and petrography, this paper investigates utilization of raw materials, and the organization of the ceramic industry in Igbo Ukwu (9th-12th century CE), Southeastern Nigeria. Further, this paper explores ideas of craft specialization in the ancient Igbo Ukwu polity by exploring the processes of ceramic production along with the resources and technology required to produce the famed ceramics recovered from the site.

### 09:20-09:40 R. Lawal<sup>1</sup> & R. Yusuf<sup>1\*</sup>

Pottery finds around the Zaria Area: Information from Scientific analyses

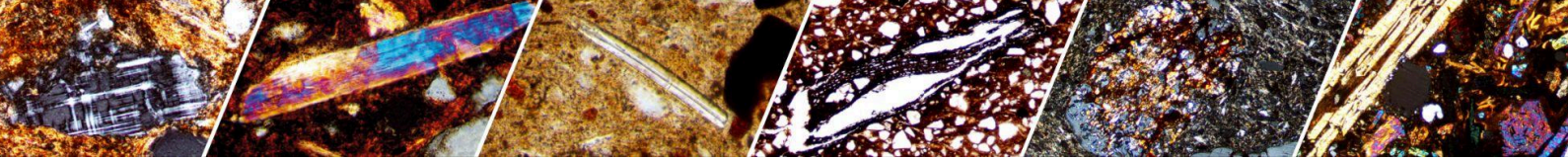
<sup>1</sup>Department of Archaeology and Heritage Studies, Ahmadu Bello University, Zaria

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This is a preliminary report of the scientific analyses conducted on 22 samples of potsherds and vessels around the Zaria Area as part of a PhD research and a long-time project on Northeastern Zazzau area. Ethnographic and Archaeological research in the area has revealed the existence of pottery making traditions that have spanned for several centuries.

Thin sectioning, X-ray Diffractometer (XRD) and X-ray Fluorescence (XRF), were carried out on the samples of potsherds from Rukochi, Kargi, Turunku and Maiyashin Tukwane to further investigate provenance and pottery technology processes. The results of the thin sectioning showed that the potsherds contain quartz, feldspar, granite, mylonite,





microcline, orthoclase and laterite. These are associated with igneous rock, metamorphic and plutonic rocks which are rocks found in the area. The XRD results also showed different mineral composition in different degrees (quartz, illite, orthoclase and granite). The result from the XRF was used for cluster analysis, highlighting the degree of association of the samples in term of chemical content.

In conclusion, the results indicate a very high level of silicon ( $\text{SiO}_2$ ) both in the potsherds and clay materials. The rock types identified are categories of igneous/volcanic origins which were associated with the geology of the area, affirming that the source of the clay use in making the pots though different were obtained within the area.

### **09:40-10:00 Abubakar Abdulqadir Muhammad**

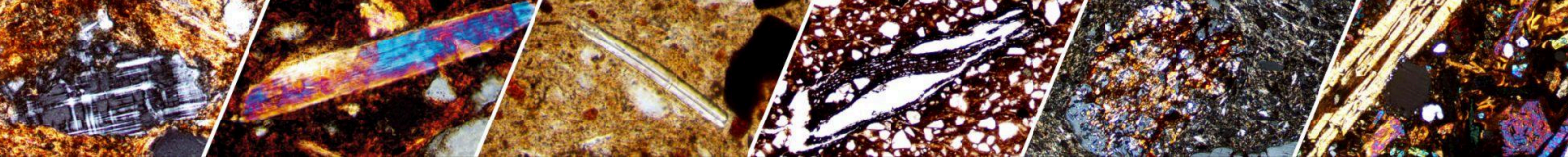
#### **Ceramic Petrography: A Microscopic and Compositional Analyses of Nupe Pottery from the Old Tafyan Mound Site, Central Nigeria**

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[muhammadabubakar@abu.edu.ng](mailto:muhammadabubakar@abu.edu.ng)

The art of pottery making is a common technological feature among the several ethnic groups inhabiting the Central Nigerian area. Although pottery forms an integral part of everyday life and is produced in large amounts in the region, its microscopic and compositional characteristics remain largely un-investigated by archaeologists. This is especially true for Nupe pottery which is notable for its unique production processes and exquisite decorations. The current paper, therefore, through the combination of archaeological, ethnographic, and scientific laboratory techniques of thin section and XRF examines the fabric composition of Nupe pottery. In line with these methods, selected sherds retrieved through archaeological survey and excavation were analysed and information obtained corroborated with ethnographic parallels. As a result, the preliminary findings suggest that Nupe pottery compositional attributes are largely influenced by factors such as the clay parent material type, the formation conditions of the clays, the deposition environment, tempering to improve plasticity, and a host of chemical reactions occurring during firing. The paper thus concludes that the archaeological study of pottery fabric compositions holds a lot of potential for understanding past natural environments and production processes.







## Session 6

### 10:30-10:50 Epossi Ntah Zoila Luz - Kroll

#### Mineralogical Study of tuyères from Pongsolo (Lekie, Centre Cameroon)

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Pongsolo is situated in the Lekie division of centre Cameroon. Archaeological studies attest the production of iron in this site between 15th to 16th centuries AD (Essomba, 1988 et 1992a et b). Tuyères are technical ceramics used as pipes/ tubes in the furnace during the metallurgical process. Eight fragments of tuyères from Pongsolo have been analysed by X-ray diffraction and polarized optical microscope in order to determine their mineralogy and deduce their firing temperature and heat resistance. These tuyères are divided into two groups according to the colour of their external surfaces. Samples from group 1 (05) are reddish with some black parts whereas samples from group 2 (03) are black and covered by a slag layer. X-ray diffraction showed that all the samples contained muscovite, quartz and feldspar (microcline/oligoclase and albite). However, kaolinite and hematite are also observed in one sample from group 1. Polarized optical microscope showed the abundance of the muscovite flakes in all the ceramics except for one sample from group 2. Quartz and K-feldspar are the main non-plastic inclusions present in all the samples. Kaolinite indicates a firing temperature less than 650°C whereas the preserved muscovite flakes indicate a firing temperature between 650-800°C. However, the matrix of the sample from group 2 without muscovite flakes showed a presence of vitrification, indicating a firing temperature above 900°C. This variation of temperature could be explained by a re-firing or by the exposure of some parts of tuyères to higher temperatures during the metallurgical process.

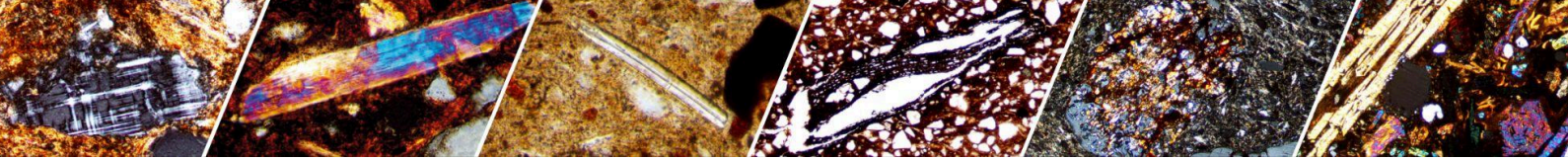
#### Literature

Essomba Jean Marie, 1988. Trois ans de recherches archéologiques au Sud-Cameroun. Bilan et perspectives (1984-1987). Yaoundé, Université de Yaoundé/Multig

1992a Archéologie du Sud-Cameroun. Notes préliminaires de recherches au site de Nkometou (Mfomakap). Dans : J.-M. Essomba (dir. publ.), L'archéologie au Cameroun (Colloque de Yaoundé, janvier 1986). Paris, Karthala, p. 228-245.

1992b. Civilisation du fer et sociétés en Afrique centrale. Paris, L'Harmattan, 699 p.





**10:50-11:10 Dirk Seidensticker<sup>1\*</sup>, Wannas Hubau<sup>2</sup>**

**On/Off the Rivers: Strategies for Clay Sourcing and Preparation in the Congo Basin**

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<sup>2</sup>Ghent University, Department of Environment, Coupure links 653, 9000, Ghent, Belgium

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Ceramics constitute the most prominent find category encountered by archaeologists in Central Africa and form the basis of various regional chrono-historical frameworks. Like with many material remains, they inherit multistage object biographies, as they were produced, distributed, used for some time and only then deposited in the context they have been found. This circumstance requires that the local, intermediate or trans-local nature of ceramics found at any given site during archaeological and paleo-environmental research has to be examined. The Congo Basin is of special importance as archaeological sites are, in consequence of particular surveying strategies, nearly completely situated along the main rivers. This paper presents, for the first time, petrographic and geochemical data to deduce the 'provenance' of pottery from the Congo Basin. The study is based on two case studies: the first case study is comprised of sites along the rivers Sangha and Likwala-aux-Herbes in the western Congo Basin. While clay procurement strategies on the middle Sangha river change drastically, potters' communities show consistent clay sourcing strategies along the Likwala-aux-Herbes. The second case study incorporates finds from the Luilaka river in the southern Inner Congo Basin. Here, recently discovered pottery from pedo-anthracological trenches, on the terra firme next to the Luilaka river, shows apparent difference compared to the previously documented ceramics of the area. Both case studies inform on the exclusive reliance of potters' communities either of terrestrial clays, occasionally tempered, or riverine clays that were used without tempering. The latter type is only superficially known in sub-Saharan Africa.

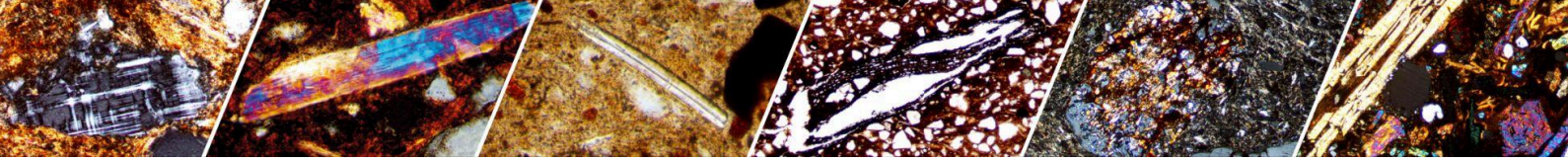
**11:10-11:30 Hannah B. Page**

**Locating Hidden Meaning within Stylistically Homogeneous African Ceramics: A Study from Ntuusi, Western Uganda**

University of Pisa, [hannah.page@cfs.unipi.it](mailto:hannah.page@cfs.unipi.it)

This paper will present the results of technological and compositional analysis undertaken on a large assemblage of early 2nd millennium CE rouletted ceramics from the grasslands region of Mawogola in western Uganda. The large site of Ntuusi and its hinterland currently provides the earliest dated evidence of the region's later ubiquitous rouletted pottery, but due to the perceived simplicity and uniformity in ceramic decorative style, this important archaeological resource has mostly been overlooked. This study utilised portable energy-dispersive x-ray fluorescence and thin section petrography to reconstruct ceramic technology and provenance, and, in combination with well-contextualised archaeological data, was able to shed light on a poorly understood period of significant social and economic





change in the region. The technological results reveal that a strong, local, household ceramic tradition existed in Mawogola during this time, while the compositional data demonstrates the use and movement of ceramics particularly in non-domestic specialised settings that contributed to the development of new, important social and political structures.

The paper will highlight the vast possibilities of using this type of analysis for interpreting a key period in African prehistory. Fundamentally, it is hoped that a greater understanding of the changing way of life at Ntuusi will provide vital comparative information for examining social and political changes taking place more broadly across the continent during the early 2nd millennium CE.

## Session 7

**13:00-13:20 Elizabeth R. Hicks**

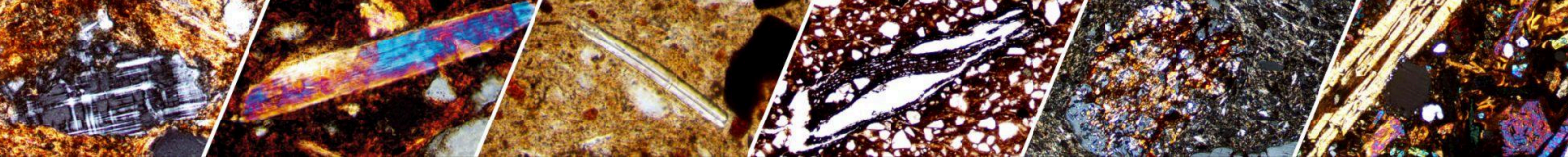
**Integrating Ceramic Petrography and X-Radiography to Investigate Networks of Consumption at the Site of Unguja Ukuu**

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This paper will outline how ceramic petrography and x-radiography have been integrated within this project to investigate the structure and social composition of the groups of potters supplying the archaeological site of Unguja Ukuu in the Zanzibar Archipelago. The majority of ceramics excavated from the site have been classified as Early Tana Tradition (ETT)/Triangular Incised Ware (TIW) pottery. This pottery tradition is considered ubiquitous along the Swahili Coast (from Somalia to Mozambique) between the 7th-10th centuries CE. Typologies for ETT/TIW often rely on the shape of the pot, the colour of the fired clay, and the style of the decoration to categorise these vessels and interpret their function. This study attempts to test whether ETT/TIW is a homogenous industry at Unguja Ukuu; to achieve this goal it was necessary to create an appropriate methodology, capable of identifying variations within the production of this ware across time. Imported courseware sherds from the earliest phases at Unguja Ukuu have also been analysed using ceramic petrography and x-radiography. Hence, this paper will emphasise the importance of producing systematic descriptions for petrographic fabrics: to develop our understanding of Indian Ocean trade and exchange. Pottery excavated from the region has either been labelled as circulating within an 'imported,' or 'local' sphere. Contrary to this approach, the research presented in this paper aims to integrate the analysis of pottery manufactured at Unguja Ukuu and the pottery manufactured beyond the Zanzibar Archipelago, in order to understand local, regional and trans-regional networks of consumption.







### 13:20-13:40 Sabrina Stempfle

#### Bantu arrival in southern Africa. Definition and chaîne opératoire of the Matola pottery

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The Bantu-Expansion was originally a linguistic concept to describe the connection between today's Bantu languages. As the model has been adopted by other disciplines, it is now associated with a spread of a new way of life with (semi-)permanent settlements, agriculture, herding, metalworking and pottery from central to southern Africa within 2.000 years. For the reconstruction of migration routes, archaeological research is focusing on stylistic pottery typologies. Although ethnographic studies showed that different steps and techniques of the chaîne opératoire underlie different distribution patterns, a comprehensive examination of the material is rarely undertaken. The oldest known pottery in southern Africa was found in southern Mozambique and was defined as Matola pottery with a differentiation in two phases. However, this differentiation is not always considered and recent researches are challenging the Bantu model due to new dating results, which are dating Matola pottery a few hundred years earlier. The classification of the Matola pottery into the stylistic typologies of eastern and southern Africa and its role as a possible point of contact is also of great importance, but still leaves some questions.

In our research project we are reanalyzing depot and newly discovered finds from Mozambique and Eswatini to evaluate the definition and development within the Matola pottery as well as to complement an archaeometric approach by using residue analysis, X-ray fluorescence analysis and polarizing microscope. The aim is to reconstruct the chaîne opératoire and to document the diversity in raw material, techniques and usage within the stylistic defined pottery unit.

### 13:40-14:00 Alberto Dorado Alejos<sup>1</sup>, Faye Lander<sup>2,3</sup> & Paloma de la Peña<sup>1,3,4\*</sup>

#### First technological approach to the Later Stone Age pottery assemblage from the Marshall site (Rossouw, Eastern Cape, South Africa)

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<sup>2</sup>Origins-Centre University of the Witwatersrand, South Africa

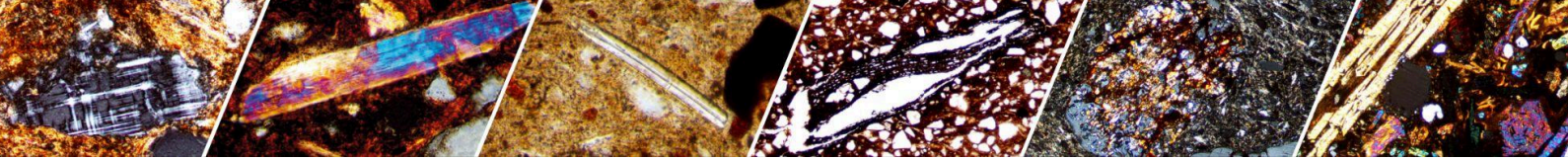
<sup>3</sup>McDonald Archaeological Research Institute, University of Cambridge, United Kingdom

<sup>4</sup>Evolutionary Studies Institute, University of the Witwatersrand, South Africa

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Marshall rock shelter is a recently documented archaeological site in the Stormberg (South Africa). Since 2020, three excavation campaigns have documented a Middle, Later, and historical long chrono-stratigraphical sequence with a rich assemblage of lithics, bone, beads, botanical remains, and ceramics. Here we present the preliminary results of the ceramic analyses. The study aims to determine the technological strategies for the manufacture of the ceramics. To this end, we have focused on the identification of the





macro-traces located on the internal and external surface of the sherds, to know the treatment of the vessels as well as the firing atmospheres in which they were used in their manufacture. Moreover, we have proceeded to carry out a characterisation of the fabrics through thin-section petrography, considering the organisation and morphology of the coarse and fine fractions and voids. Finally, a microstructural analysis was carried out to determine possible thermal transformations of the clay due to exposure to high temperatures. All of this has provided us with information about the origin of the raw materials, their treatment, the technical expertise of the potters in the modeling process, and the firing strategies.

## Session 8

### 14:30-14:50 **Senzeni Khumalo**

#### Ethnoarchaeological Investigation of Pottery Production among the Sotho in southern Africa

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This paper presents an ethnoarchaeological investigation into pottery production among the Sotho, a Bantu-speaking ethnic group in Southern Africa. Applying the ethnoarchaeological theory the paper compared the archaeological potsherds of the Sotho from the Waterberg in the Limpopo Province and ethnographically investigated pottery produced by modern Sotho in Mawane and Majiya, Gwanda South, Zimbabwe. The paper study sought to redress the social meaning of ceramics as different types of pots are made by different communities, investigating cultural continuity/discontinuity amongst the Sotho. Ethnoarchaeology involves studying contemporary societies to gain insights into past human behaviour and material culture. By examining the techniques, tools, and social aspects of pottery production among the Sotho, this research aims to shed light on the prehistoric pottery-making practices of the region. The study utilizes a combination of ethnographic interviews, participant observation, and archaeological comparisons to develop a comprehensive understanding of Sotho pottery production methods and their archaeological implications.

### 14:50-15:10 **Kent D. Fowler<sup>1\*</sup>, Mostafa Fayek<sup>2</sup> & Leonard O. van Schalkwyk<sup>3</sup>**

#### The human element: How potters complicate sourcing archaeological ceramics

<sup>1</sup>Department of Anthropology, The University of Manitoba, Canada

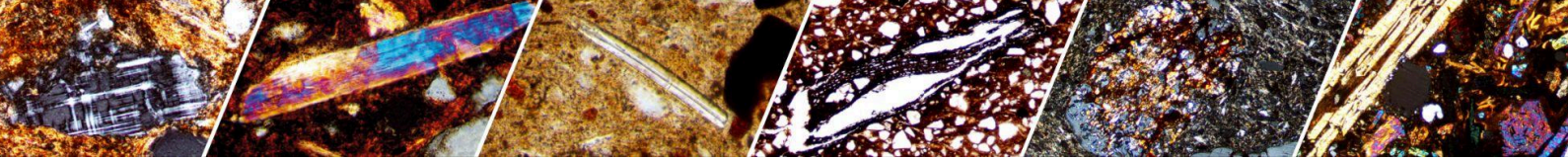
<sup>2</sup>Department of Earth Sciences, The University of Manitoba, Canada

<sup>3</sup>eThembeni Cultural Heritage, South Africa

\*Corresponding author: [Kent.Fowler@umanitoba.ca](mailto:Kent.Fowler@umanitoba.ca)

Chemical composition studies investigate spatial patterns of resource use with the goal of inferring the location and organisation of production. This is accomplished by characterising the chemical variation in pottery (compositional space), and matching the chemistry of





objects with those of raw materials across a landscape (geographic space). It has long been known that the natural variability in clays, the resources chosen by potters, and the techniques used in manufacturing all affect the chemical composition of finished pottery objects. In this study, we review the effects that procurement strategies and processing techniques have on the chemical composition of vessels made by present-day Zulu and Swazi potters in southeastern Africa relative to the raw materials they use in manufacturing them. The effects of different procurement strategies and processing methods range from negligible (there is a close geochemical match to resources) to profound (making it exceedingly difficult to discern the geological origin of raw materials). This ethnographic model guided the study of pottery from the 19th century Zulu Kingdom. Clay mixing and the kinds of grinding stones used by past potters further complicated attributing some compositional groups to geological and geographic spaces. We propose how the rare earth element composition of clays and finished objects can provide a means of resolving the association of these compositional groups to locally available resources.

### 15:10-15:30 **Julia Becher<sup>1,2,3\*</sup> & Emma Loftus<sup>4</sup>**

#### Another piece to the puzzle: evaluating the potential for combining inorganic and organic approaches to ceramics

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<sup>2</sup>Université Côte d'Azur, CNRS, CEPAM, France

<sup>3</sup>Department of Pre- and Protohistory, Archaeometry Research Group, Eberhard Karls University Tübingen, Germany

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Organic Residue Analysis (ORA) is a well-established method and has been routinely used for over four decades to characterise lipid residues trapped within the porous fabric of ceramic vessels, providing valuable insights into the consumption and preparation of a wide range of plant and animal resources, vessel function (e.g. cooking, storage), the movement of goods, repair and sealing of vessels. Though commonly undertaken elsewhere, lipid analyses have rarely been applied to sub-Saharan African material (< 30 studies). This is despite such studies having demonstrated the feasibility and value of this methodology for Neolithic, Pastoralist, hunter-gatherer and Early Farming Communities contexts in Africa. Here, we present a short review on previous studies and consider the promise of this method for African archaeology. We contrast this with discussion of common challenges encountered while analysing farming pots from South Africa, including preservation conditions, contamination and lack of comparative data (e.g. botanical and faunal evidence). Although pottery is the most common and diagnostic artefact category in most parts of Africa, little is known about the relationship between vessel features, such as shape, decoration or manufacture, and vessel function as the majority of ceramic research has focused on typology and ethnoarchaeological interpretations. We thus hope to open up a discussion on future directions for combining inorganic and organic analytical approaches and to encourage collaborations between subfields, such as ORA and petrology.

