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Fieldwork in an Increasingly Variable Climate: The Kites in Context Project 2023 Field Season

Austin Chad Hill [1], Yorke M. Rowan [2], Ali Atallah Al-Hajj[3,4], Jennifer Feng[1], Joseph Harris[2], Blair Heidkamp[5], Morag M. Kersel [6], Megan Nishida[7], and Amelie Schmücker[8]

[1]University of Pennsylvania, Philadelphia, USA; [2]University of Chicago, Chicago, USA; [3]Jordanian Department of Antiquities, Amman, Jordan; [4]University of Jordan, Amman, Jordan; [5]University of Texas at Austin, Austin, USA; [6]DePaul University, Chicago, USA; [7]University of Notre Dame, South Bend, USA; [8]Christian-Albrecht University of Kiel, Kiel, Germany

ABSTRACT

Archaeologists commonly include climatic data in their analyses of living in the past, but rarely do current weather conditions achieve mention in our professional considerations. The Kites in Context Project (KiC) focuses on a multi-scalar investigation of desert kites in the eastern badia region of Jordan. During the Neolithic (7000–5000 B.C.) period, people began building large animal traps, known as desert kites, across a wide swath of southwestern Asia. This multi-year project is designed to provide novel insights into the chronology and function of these animal traps through an intensive study incorporating remote sensing with boots-on-the-ground excavation and survey. The 2023 season began like any other—a combination of aerial survey using drones, walking the landscape in a pedestrian survey, and excavation under sunny skies. During our 2023 field season in Jordan, we experienced dramatic, atypical weather, likely driven by climate change. In this photo essay, we present images from this surprising rain and flooding event in the Black Desert of eastern Jordan that caused us to consider on a more personal level the challenges that may have faced the hunters and herders who constructed the kites and who managed the water thousands of years ago.

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Figure 1. The forlorn tent, post-flooding event (image by A. C. Hill).

CONTACT Austin C. Hill chadhill@sas.upenn.edu Department of Anthropology Penn Museum, Rm. 325 3260 South Street Philadelphia, PA 19104-6398.
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Kites in the Context of Climate Change

The increasing variability and intensity of extreme weather events resulting from climate change is negatively affecting people around the world (Horton et al. 2015; Zhang et al. 2022). In August 2023, the media was saturated with accounts of the extraordinary flooding in the Black Rock Desert of Nevada after a late season summer storm left thousands caked in mud and stranded at the Burning Man event (Associated Press 2023). Rarely a day goes by without a news report of unprecedented rain, flooding, fires, or drought. In no way comparable to the loss of lives, homes, and communities during epic flooding events in places like Europe, Libya, and Southeast Asia, current weather emergencies threaten not only contemporary life but also the record of our shared past (Hermann and Stephens 2023). Climate events also affect archaeological sites and fieldwork projects. Increasingly common are news reports of recent archaeological discoveries, the result of melting glaciers and ice patches (Ötzi is perhaps the most famous example) or as lake levels recede, revealing sites like Ohalo II, a 23,000-year-old Upper Palaeolithic/Epipalaeolithic campsite on the shore of the Sea of Galilee (Nadel et al. 2012). The scale, complexity, and variation in impact of climate events on archaeological resources presents a massive challenge for assessment, prioritization, and mitigation, resulting in ongoing discussions of best practices (Hollesen 2022). The second season of the National Science Foundation-supported Kites in Context archaeological survey and excavation project, co-directed by Yorke Rowan and Chad Hill, provides a compelling example of the impact of weather extremes as they become increasingly common.

During the summer of 2023, the 9-person (Figure 2) Kites in Context crew was in the field for a second season in the already particularly challenging environment of the Black Desert of eastern Jordan, an arid to hyper-arid area of ancient lava flows. Kites in Context is a study of early adaptations to marginal environments. During the Neolithic (7000–5000 B.C.) period, people began building large animal traps, known as desert kites, across a wide swath of southwestern Asia (Crassard et al. 2015; Hammer and Lauricella 2017; Helms and Betts 1987).

It is likely that the construction of these more permanent networks of traps (Figures 3–4) allowed humans to expand into the modern-day Black Desert in larger numbers than had been previously sustainable (Rollefson, Rowan, and Wasse 2014). Elsewhere in the region, excavation of similar structures date to the Late Neolithic (ca. 6800–5400 CAL B.C.), leading the archaeologists to conclude that small communities of herder-hunters were spending substantial parts of the year in what is now desert (Rollefson, Rowan, and Wasse 2014; Rowan et al. 2015, 2017). Chains of these connected kites extend from Syria through Jordan, constituting Neolithic infrastructure (Hill and Rowan in press). By mapping, excavating, and dating the kites and related structures, we are gaining insights into the people who lived and managed the resources in this region. Kites in Context is hoping to add to our understanding of the structures and the lifeways of Neolithic peoples.

Our small crew (see Figure 2), composed of the two project directors, a Jordanian Department of Antiquities colleague and representative, five graduate students, and the pedestrian surveyor, left Amman on May 19 for a month of desert living with only a generator for battery charging, minimal cell phone reception (only available after hiking to high places), camping, cooking out, no running water, relentless flies, and the most amazing night skies (Figure 5).

Like any archaeological field project, establishing a base camp for research requires some logistical planning. In eastern Jordan, there is one asphalt road leading from the west across the desert to Baghdad. Our field area is approximately 25 km to the south of this road, along the eastern edge of the basalt flows from which the Black Desert derives its name. In order to bring equipment and supplies 250 km from Amman, we hire a transport truck. This truck, unable to negotiate the rough, narrow track of basalt, deposits the load on a playa (an area of dried, flat desert) at the edge of the basalt. Our team then loads everything onto our two 4-wheel drive trucks, making multiple trips to our camp and field site.

In 2023, our field site was near what the local Bedouin call the Roman Pool (Figure 6). The kites, buildings, and petroglyphs that surround the pools attest to the continued interest this landscape feature has held for millennia. Although clear of rocks, camping in the pool or near it seemed unwise, even in the summer, so we chose an upland area away from the *wadi* (Arabic for "dry riverbed") channel about a kilometer away, where many older Bedouin camps and animal corrals are located. We took our cue on where to camp from the many repeated users of this landscape (Figure 7).

The season started out like the previous one—a combination of aerial survey using drones, walking the landscape in a pedestrian survey, and excavation under sunny skies. But then, at the end of our first week, during the last few days of May, we encountered our first extreme out-of-season weather event. It started with a sandstorm (Figure 8) on the afternoon of May 27, which led to a thunder and lightning storm with 48 hours of rain (Figure 9). This culminated in an impressive and overwhelming flooding event.

This rare (local Bedouin told us that they had not seen rain like this since the early 1980s) event filled 22% of the water storage capacity across Jordan over a 24 hour period.

By the end of May, annual rainfall for 2023 surpassed the previous year by 160%, and flash flooding across the country resulted in the tragic death of a child in Aqaba (Omari 2023). Like most people in Jordan, our archaeological field project was unprepared for such a rare deluge at this time of year (Figures 10–16). The flash flood that followed the large quantity of rain trapped us for several days because the tracks in and out of the site remained impassable. The flood also forced us to move equipment and supplies to higher ground.

Three days passed before we could return to the site to continue excavations and survey, and an additional two days before we could get out to the main road to continue our drone survey and restock water and supplies. It was fascinating and unprecedented to experience the effects of changing and extreme weather in this environment and to confront our own ability to cope with difficult and changing conditions (Figure 17). The situation offered us the opportunity to experience, firsthand, conditions faced by the hunters who constructed the kites and who managed the water thousands of years ago (Figure 18).

Typically, our interaction with the desert focuses on the need for reliable potable water, shade from the afternoon sun, and struggling against windy conditions that may include sandstorms. This season provided the opportunity to consider bodily experience through the wind and rain that we were ill equipped to handle. Certainly, our vehicles, generator, and ample supply of food and water is unlike the experience of a Neolithic individual, yet this episode underscored another harsh condition prehistoric people faced while hunting and caring for their flocks, a bodily experience valuable for this reminder (Ingold 2000). Although we often think and write about climate, the "… absence of weather from anthropological accounts of human ways of being and knowing is little short of extraordinary" (Ingold 2010, S132). The substantial, sturdy Neolithic structures recently recorded in the Black Desert attest to the adaptive constructions these hunter-herders built to endure similar weather.

As part of our fieldwork, we collect a wide variety of visual documentation. This photographic essay presents images of the short-term effects of this remarkable weather event that we experienced. In addition to standard digital photographic recording, we encourage participants on the project to chronicle their experiences and to share those photographs with the project as part of our digital record. In addition to drone photographs for mapping, we take a range of aerial oblique images to help provide novel visualizations of the landscape (see Figures 18–19). Finally, we shoot a significant quantity of analogue film photography utilizing a range of vintage cameras, both because some of us enjoy the challenge of shooting film but also because black and white and analogue photography provides a more visceral way of recording our work in the field. Film photography forces the photographer to be a little slower and more thoughtful about what they are recording. This essay comprises photographs taken by several people and utilizing a range of equipment that, taken together, provide a powerful example of presenting what fieldwork looks like in extraordinary conditions.

Unfortunately, due to unabated climate change, fieldwork challenges like this are going to become increasingly common. We put this photographic essay together to share visually what the impact of extreme weather events can look like and to consider the unavoidable and ongoing effects of climate change (Figure 20). We need to think about how to plan for and respond to extreme weather in the contexts of our fieldwork. The weather we experienced during the 2023 Kites in Context season was stunning (and at times, terrifying) but thanks to an excellent team and the kindness of strangers, we survived, even thrived, and we did some good archaeology.

Figure 2. The Kites in Context Crew: Brady Bunch edition. L–R top row: Jennifer Feng, Blair Heidkamp, Joseph Harris; middle row: Austin (Chad) Hill, Yorke Rowan, Morag Kersel; bottom row: Megan Nishida, Ali Atallah Al-Hajj, and Amelie Schmücker. Polaroid Images taken by Chad Hill. Megan Nishida took the picture of Chad Hill.

Figure 3. Desert kites, named for their shape when viewed from the air, are Neolithic animal traps with tails used for channeling gazelle into the center area where hunters lie in wait or gazelle are forced into the cells (image by A. C. Hill).

Figure 4. Project co-director, Yorke Rowan, photographs an excavated kite cell (used for trapping animals or for hiding hunters) (image by J. Harris).

Figure 5. Amelie Schmücker of the Christian-Albrecht University of Kiel and the Black Desert night sky (image by A. C. Hill).

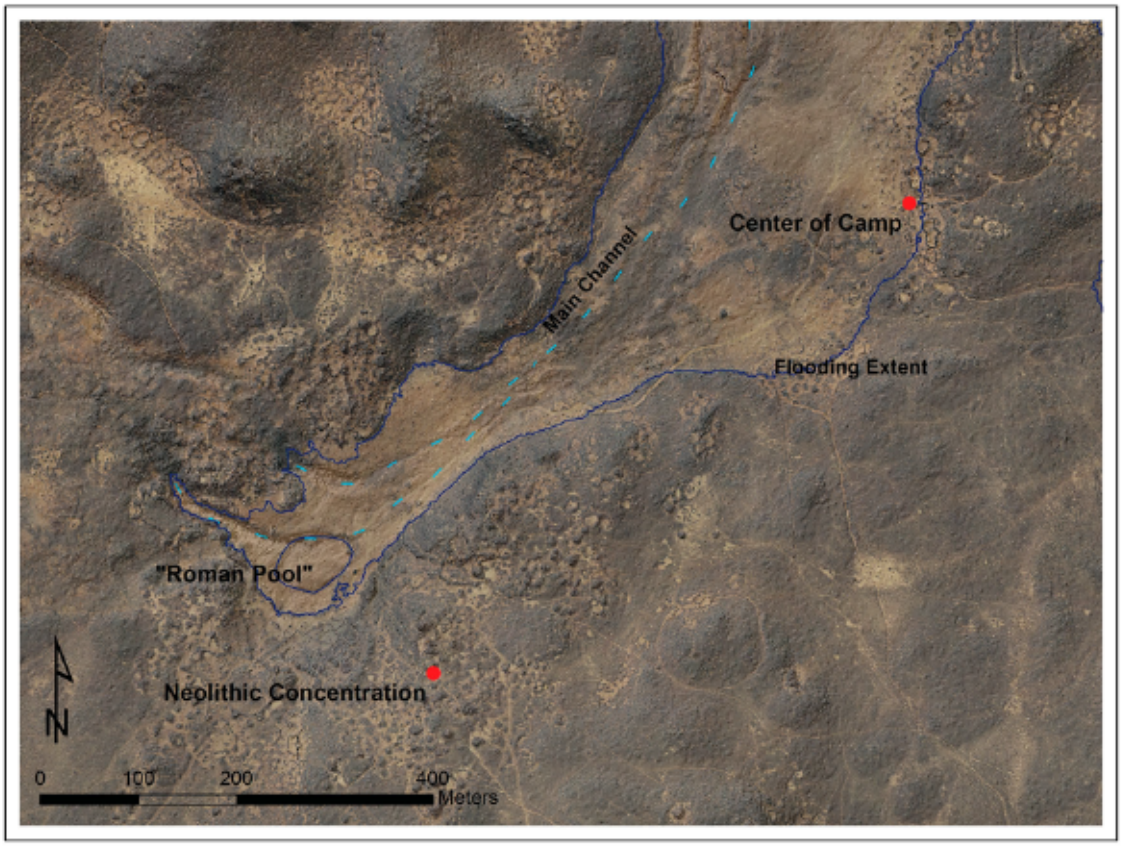

Figure 6. This map shows the location of our archaeological site, the "Roman Pool," and our campsite within the local wadi. Also marked is the extent of the flooding beyond the main drainage channel. The natural pool in the center of our research area, which the local Bedouin refer to as the "Roman Pool," was dry by the time we arrived in early June 2022, as shown in this drone-derived imagery from that season (orthophotograph by A. C. Hill).

Figure 7. When we arrived in mid-May 2023, there was a little water in the natural pool (known to locals as the Roman Pool) at the site, and a local shepherd was using it to water their sheep (image by M. M. Kersel).

Figure 8. On the afternoon of May 27, a sandstorm blew in, typical for the desert in May/June, but this storm continued for hours (image by B. Heidkamp).

Figure 9. The rain continued for 48 hours, interspersed with lightning storms that lit up the night sky. This image, which looks like it could be sunset, was taken after midnight and is actually sheet lightning (image by A. C. Hill).

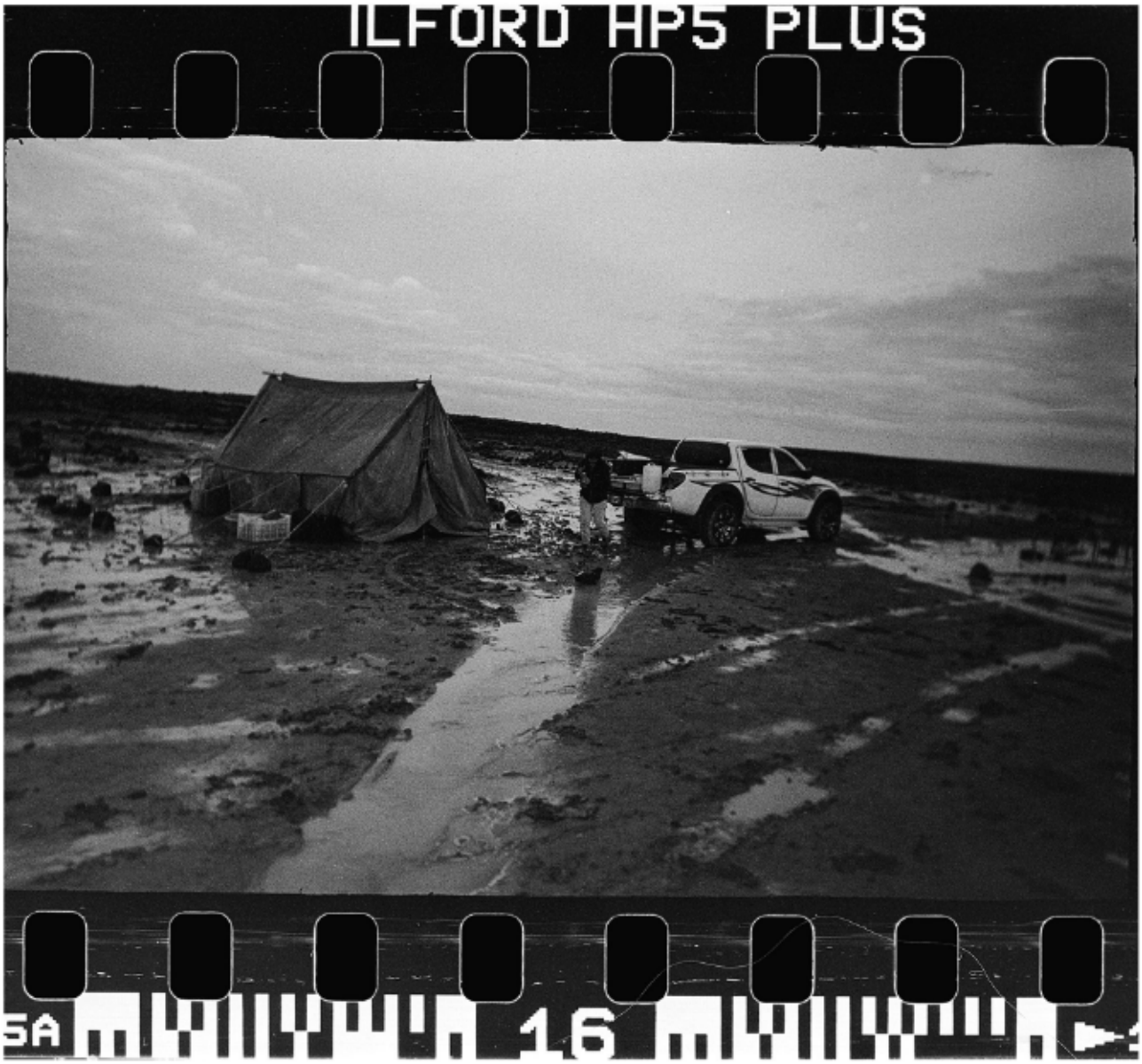

Figure 10. In the early hours of May 28, the rain began. We retreated to our A-frame army tent, where we store our food and have a small office space, to wait out the unusual rain while doing crossword puzzles together. The rain continued, on and off, for 48 hours, leading to significant quantities of water sitting on the surface, which made walking around the landscape difficult. The trucks were in danger of being mired in mud (image by A. C. Hill).

Figure 11. The ground quickly became saturated, and the floor of the army tent became a muddy mess. Here, Blair Heidkamp prepares a hot meal, despite the difficulties (image by A. C. Hill).

Figure 12. On the first day of rain, local Bedouin friends (Omar Al-Ghayath and Omar Al-Masaeed), who have helped our project in the past, brought a tent and some supplies. Their amazing kindness provided us with a drier space where we could all sit out the rain. They also brought *shawarma*, fries, and cokes for everyone, a welcome treat during the deluge (image by A. C. Hill).

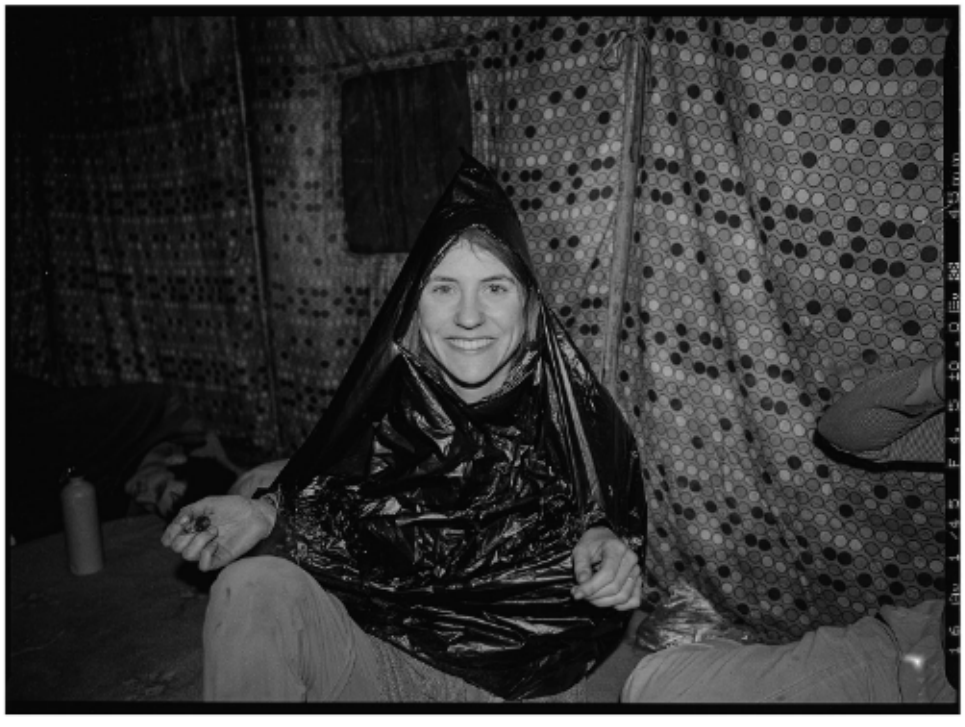

Figure 13. We spent two miserable nights being cold, damp, and awakened by thunder and lightning. Some of the crew slept in the Bedouin tent; some retreated to the trucks, while a few stayed in their tents. Amelie Schmücker crafted a rain parka from a garbage bag to stay dry while moving gear out of the rain (image by A. C. Hill).

Figure 14. Surprised by the amount of water among the petroglyphs in the area above the Roman Pool, Omar Al-Ghayath demonstrates drinking the fresh water from a pool in a boulder that is covered by Neolithic and later petroglyphs (image by Y. M. Rowan).

Figure 15. On the third day, the sun came out. As we explored the post-deluge scene, we could hear the roar of rushing water as rainwater from higher elevations made its way through the landscape to the "Roman Pool" and our campsite (image by A. C. Hill).

Figure 16. By the afternoon of May 29, the rushing water noise increased and the water started to rise, rapidly spreading and filling the entire wadi and our camp (image by A. C. Hill).

Figure 17. The many lives of a storage tent (images by A. C. Hill).

Figure 18. After the water receded enough for us to continue the drone survey, there was still significant water filling up the landscape across the eastern desert. When we visited this mudflat in 2022 (top), the modern water reservoir in the center of the area had just a small amount of water in mid-June. In 2023 (bottom), after the flooding, the water almost covered the top of the reservoir banks and filled the entire adjacent area (images by A. C. Hill).

Figure 19. Ancient "wheel" structures in the foreground and after one week, a landscape still full of water in the distance (image by A. C. Hill).

Figure 20. Flood aftermath (image by A. C. Hill).

Figure 21. Archaeological adventures in the age of climate change in the Black Desert of Jordan.

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Notes on Contributors

Austin Chad Hill (Ph.D. 2011, University of Connecticut) is a Post-doctoral Fellow at the University of Pennsylvania with the Penn Paleoecology Lab. ORCID 0000-0002-8397-8105.

Yorke M. Rowan (Ph.D. 1998, University of Texas at Austin) is Research Professor at the Institute for the Study of Ancient Cultures, University of Chicago. ORCID 0000-0002-6577-1215.

Ali Atallah Al-Hajj (Ph.D. 2020, University of Jordan) is a lecturer in the Department of History, School of Arts, The University of Jordan and publications staff at the Jordanian Department of Antiquities.

Jennifer Feng (M.S. 2023, University of Illinois. Urbana-Champaign) is a graduate student in the Anthropology Department at the University of Pennsylvania.

Joseph Harris (B.A. 2022, University of North Carolina at Chapel Hill) is a graduate student in Near Eastern Languages and Civilizations at the University of Chicago.

Blair Heidkamp (M.A. 2018, University of Cincinnati) is a graduate student in the Department of Anthropology at the University of Texas at Austin.

Morag M. Kersel (Ph.D. 2006, University of Cambridge) is Associate Professor of Anthropology at DePaul University. ORCID 0000-0002-9254-0957.

Megan Nishida (M.Phil. 2018, University of Cambridge) is a graduate student in the Anthropology Department at the University of Notre Dame.

Amelie Schmücker (M.A. 2023, Christian-Albrechts-University, Kiel) is a graduate student in the Institute of Pre- and Protohistoric Archaeology at Christian-Albrechts-University, Kiel.

ORCID

Austin Chad Hill http://orcid.org/0000-0002-8397-8105
Yorke M. Rowan http://orcid.org/0000-0002-6577-1215
Morag M. Kersel http://orcid.org/0000-0002-9254-0957

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