A PROPOSAL TO THE OHIO UNIVERSITY RESEARCH COUNCIL

TITLE OF PROJECT:  _Paleoanthropological Investigations of the Middle Pleistocene Site of Isimila, Tanzania_  

NAME OF APPLICANT:  _Sabrina C. Curran; Paul E. Patton_  

STATUS:  _X_ Asst. Prof.  _ _ Assoc. Prof.  _ _ Prof.  _ _ Administrator  

DEPARTMENT:  _Sociology & Anthropology_  

CAMPUSS ADDRESS:  _Bentley Annex 162_  

E-MAIL ADDRESS:  _currans@ohio.edu; pattonp@ohio.edu_  

RE-SUBMISSION:  ___ YES (Original Submission Date ______)  

X  NO  

BUDGET:  Total Request  ___$8000.00___ (May not exceed $8,000)  

IRB AND IACUC APPROVAL:  
To ensure that the University is in compliance with all federal regulations, complete the checklist below. Note: your proposal can be approved prior to IRB or IACUC approval, but funding will be withheld until notification of approval or exemption.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Office of Research Compliance</th>
<th>Policy #</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>Human Subjects in Research (including surveys, interviews, educational interventions):</td>
<td>19.052</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Institutional Review Board (IRB) Approval #:</td>
<td>19.049</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expiration Date:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Animal Species:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Institutional Animal Care &amp; Use Committee (IACUC) Approval #:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expiration Date:</td>
<td></td>
</tr>
</tbody>
</table>

SIGNATURES:

<table>
<thead>
<tr>
<th>Applicant's Signature</th>
<th>Applicant's Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Signature</td>
</tr>
<tr>
<td>Sabrina Curran</td>
<td></td>
</tr>
<tr>
<td>Dept/School</td>
<td>Unit</td>
</tr>
<tr>
<td>Sociology/Anthropology</td>
<td>Sociology/Anthropology</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
</tr>
<tr>
<td>2-7-2015</td>
<td>1-27-2016</td>
</tr>
</tbody>
</table>

Chair/Director's Signature

<table>
<thead>
<tr>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Mattley</td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>Date</td>
</tr>
<tr>
<td>Sociology/Anthropology</td>
<td>2-7-11</td>
</tr>
</tbody>
</table>

Dean's Signature

<table>
<thead>
<tr>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian E. McCarthy</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>Date</td>
</tr>
<tr>
<td>CAS</td>
<td>27-JAN-2016</td>
</tr>
</tbody>
</table>
Optional:
If selected for funding, I give permission to the Office of the Vice President for Research and Creative Activity to use my proposal as an example during training and workshop exercises.

Signature: ___________________________ Date: 27 Jan 2020

Signature: ___________________________ Date: 27 Jan 2020
Ohio University Research Council Proposal Checklist

Applicants must complete and sign the checklist. The checklist should be included as the second page of the application (following the cover page).

☑ Cover Page
☑ Checklist
☑ Abstract*
☐ Introduction (for resubmissions only)*
☐ New Project Description (for established applicants only)*
☑ Discussion
☑ Glossary/Definition of Terms* (not required)
☑ Bibliography (not required)
☑ Biographical information (applicant(s) and key personnel)
☑ Other Support (applicant(s) and key personnel)
☑ Budget and Justification
☑ Appended Materials
☑ Recommended Reviewers
☑ Electronic copy of proposal

use OUC form
use OUC form
1 double-spaced page
1 double-spaced page
1 double-spaced page
10 double-spaced pages
2 double-spaced pages
3 pages
3 pages per person
1 page per person
no limit specified
10 pages; no more than 10 minutes of footage
5 required
Single Acrobat file, containing entire proposal and required signatures

* These sections should be written in language understandable by an informed layperson to assist the committee in its review. Established applicants (i.e.) are faculty members who have tenure and have been at the university at least three years or administrators who have been at the university at least five years.

**Please note: The committee has the right to return without review any proposals that do not conform to these format requirements.**

Applicant signature:

Applicant signature:
Abstract: Paleoanthropological sites offer important evidence of the evolutionary origins of our species. Isimila, in central Tanzania, is one such site that may provide especially important insight into our evolutionary past. The site has been dated to a time period (270,000 – 60,000 years ago) in which Homo heidelbergensis, a poorly understood human ancestor, has its last appearances in the fossil record, and when the earliest members of our own species, Homo sapiens, first appear. While this time period is well represented in Eurasia, African records of this critical time are far fewer. Thus, Isimila is positioned to become very important to our understandings about the beginnings of humanity. Despite its potential significance, no work has been conducted at the site since the late 1960’s and early 1970’s, and the site is in critical danger due to erosion and vandalism. Previous surveys and excavations yielded numerous stone tool artifacts and fossilized mammalian bones, some of which showed signs of butchery. We propose to travel to the site of Isimila to explore its current state of preservation and begin new surveys and excavations using modern techniques. Specifically, we aim to redate the site, clarify the manner in which the fossils and artifacts came to be assembled, and reconstruct what the environment would have been like at the time our human ancestors were living at Isimila.

Over the course of three weeks, we will first familiarize ourselves with the materials previously collected. We will then spend two weeks at the site of Isimila conducting archaeological surveys and excavations, collecting measurements on specimens, and sampling materials for dating and environmental reconstruction. Our final few days will be spent in the museum curating new materials that we collected. The data gathered in this pilot study will be presented at national conferences, preliminary publications, and form the basis for subsequent grant proposals (National Science Foundation and National Geographic).
DISCUSSION

**Specific Aims**

This proposal is a request for funding to travel to the site of Isimila and explore its current state of preservation while conducting archaeological surveys and excavations. The project will 1) document archaeological strata and collect samples for redating the stratigraphic levels (Sands 1-5) previously reported at Isimila, 2) elucidate the taphonomic histories of the deposits containing evidence of paleoanthropological materials, and 3) reconstruct the paleoenvironment of the aforementioned strata in order to provide the context in which the Isimila hominins lived. Within the context of a refined chronology, we will investigate change in environmental conditions in the Isimila korongo (river valley) through time (Potts, 1998; Bobé and Behrensmeyer, 2004). While there is a proposed butchery site associated with Acheulean tools in Sands 5 of Isimila (Cole and Kleindienst 1974), the taphonomic and depositional histories of the site are largely unknown. We will examine both the curated and *in situ* faunal materials and stone tools in order to ascertain the primary accumulator(s) of these deposits. Once the depositional context of these accumulations are understood, we aim to reconstruct the paleoenvironment for Isimila using a multi-proxy method, including the following analyses: mesowear, hypsodonty, and ecomorphology. These analyses will assist in reconstructing the dietary and locomotor adaptations of the fauna.

**Significance**

The Isimila site is located in an erosional landscape subject to water and wind processes that are potentially destroying important archaeological materials. Furthermore, destruction by livestock grazing, tourism, and human vandalism threatens the integrity of the site. The site has
been described as “urgently” in need of conservation and preservation to mitigate the loss by these forces (Rao and Temu, 2015). Past research at this location is extremely limited, and no new data have been reported from the site since the early 1970’s.

The site spans an underrepresented and poorly understood time period (see Table 2 in Appended Materials) in paleoanthropology (Rightmire 2009, 2013). Abundant Acheulean tools, typically associated with *Homo erectus*, are known to scatter the landscape at Isimila. Further, the site contains strata that span the period during which the enigmatic *Homo heidelbergensis* disappears and *Homo sapiens* first appears in the paleoanthropological record. Fossils of humans from this period are extremely rare. Thus work at Isimila could provide crucial information about the environments in which our ancestors evolved and possibly offer major contributions to the reconstruction of human origins.

In light of the existing lithic assemblage, chronology, and relatively-modern fauna recovered from the Isimila site, a redating of the deposits using modern techniques is warranted. The existing dates for the site are inconsistent with the last known occurrence of *Homo erectus* in Africa.

**Previous Work**

**Previous Excavations**

The Isimila river valley is located in the Iringa Plateau of the central Tanzanian highlands. The region was first surveyed by F. C. Howell in 1954 with subsequent excavations of the site from 1957 to 1959 by Howell, Cole and Kleindienst (1962). Additional surveys and excavations were conducted by Hansen and Keller (1971) from 1967 to 1969. Archaeological remains recovered from the valley are associated with the Early Stone Age eastern African
Acheulian tradition (Clark and Kleindienst 1974; Cole and Kleindienst 1974). No extensive field work has been conducted at the site since the late 1960’s, however a second site, Isimila 2, was identified in 2008 and yielded further Acheulian artifacts (Willoughby 2012:106). Recent assessment of Isimila for the purpose of heritage preservation and management documented high rates of erosion and movement of artifacts, destruction of materials due to animal grazing, and loss by human vandalism (Rao and Temu 2015).

**Chronology and Geology at Isimila Korongo**

The Isimila Formation is composed of two members: Lisalamagasi and Lukingi. The Lisamagasi member is located below the modern soil colluvium. this member is mottled with both iron and manganese and is divided into two archaeological strata, Sands 1 and Sands 2, with a thin (1 meter thick) layer of Sands 3 cutting into the bottom of the member. Materials recovered from Sands 1 correlate with aggregates and Late Acheulian tools from sites in Kalambo Falls, Karandusi, and Olorgesailie, placing deposition sometime before 60,000 BP (Hansen and Keller 1971: 1207). The Lisalamagasi member has been described as “Transition Beds” with a total thickness of approximately 8 meters. The Lukingi member is located approximately 11 meters below the modern soil colluvium and is composed of clay and sandy-clay sediments with occasional sandstone inclusions; the Lukingi member is divided into archaeological strata Sands 3-5. Below this member is a deposit of paleosols and a sandstone bedrock.

The Lukingi member has yielded extensive artifacts and faunal remains from throughout the river valley. Excavations in the 1960’s yielded evidence of a ‘butchery site,’ where Acheulean tools were recovered in association with the remains of a hippopotamus (*Hippopotamus amphibius*) in Sands 5 (Cole and Kleindienst 1974:350). No modern
chronometric dating methods have been utilized to date the Isimala sediments, however, a single uranium series date from a bone recovered from Sands 4 yielded a date of 260,000 (+70,000/–40,000) BP (Howell et al. 1972) consistent with the time range of Homo heidelbergensis.

The Isimila Formation was originally interpreted as a lacustrine deposit by Pickering (1957). However, reanalysis by Hansen and Keller (1971) supports a reinterpretation of the sediments as fluvial and resulting from braided or anastomosed streams moving regularly through lateral accretion across the canyon floor. The presence of slickensides and crack fillings suggests multiple flowing channels that underwent periodic (probably seasonal) inundations followed by periods of drying and desiccation. Following seasonal rains and flooding, seasons of increased vegetation cover would have encouraged occupation by herbivores. Typical of these environments, grasses probably dominated the disturbed lowlands along the river’s edge with shrubby vegetation and trees growing in patches along better drained riverine terraces. Early hominins would have taken advantage of these environments seasonally, resulting in the archaeological record that has been described from Isimila. The faunal assemblage is consistent with this environmental reconstruction.

**Faunal Assemblage**

Fossil mammals reported (Coryndon et al., 1972) from Isimila include an elephant, rhinoceros, zebra, hippopotamus, two species of pigs, five species of bovids (antelopes and their relatives), and a rabbit (Table 1 in Appended Materials). While modern African elephants (Loxodonta Africana) are mostly browsers, the species from Isimila (Paleoloxodon (Elephas) recki) was a grazer (Cerling et al., 1999; Lister, 2013), suggesting that the area surrounding Isimila was grasslands. This hypothesis is supported by the presence of several other (probable) grazing species in the faunal assemblage (see Table 1 in Appended Materials). However, several
species from Isimila are associated with more closed habitats, such as a tooth from a small bovid (reported as either a duiker or a dik-dik), a larger bovine, and a mixed-feeding pig, *Kolpochoerus cf. olduvaiensis* (Levin et al., 2015). Based on these preliminary faunal equivalencies (to modern fauna), the environment of Isimila was likely to have been relatively open in character, with more closed regions around water sources.

Given this preliminary reconstruction, it is surprising that no carnivores or primates have been recovered from Isimila, for they are frequent occupants of closed-covered habitats near bodies of water. It is possible that this is a taphonomic and/or preservational artifact. However, the bovid taxa that have been found span the body size range of most of the expected primates and carnivores, thus, size-based bias does not appear to be a factor. Until the specific depositional and taphonomic factors of Isimila’s accumulation are known, these apparent species paucities cannot be addressed. Since hominins and carnivores are often found in low frequencies in paleoanthropological sites it is also possible that they have not yet been recovered due to limited previous excavations.

**Applicants’ Previous Experience**

Dr. Sabrina Curran has 17 years of experience working on paleoanthropological sites in Africa. Having worked in South Africa, Kenya and Ethiopia, she has experience working with a wide variety of paleoecological and taphonomic methods. Most recently, Dr. Curran spent two field seasons (2013-2014) at Woranso-Mille, Ethiopia, a 3.8 to 3.6 million year old *Australopithecus* site. She also directs a Pleistocene-age paleontological survey project in central Romania which is comparable in age to the earliest dispersal of *Homo erectus* in Eurasia (1.85 million years old at Dmanisi, Georgia).
Dr. Paul E. Patton is the director of the Ohio University Archaeological Field School and is currently excavating a Pleistocene to Early Holocene habitation site in eastern North America. His expertise lies in archaeological, stratigraphic, and archaeobotanical analyses. Patton’s research focuses on the reconstruction of ancient environments using archaeological, dietary and ecological methods. He has over ten years of experience in archaeological survey and excavation in a variety of depositional contexts.

**Methods**

We propose to conduct a taphonomic investigation of both the curated (museum) material from Isimila as well as any *in situ* faunal remains. Fossil bone housed in the National Museum of Tanzania will be examined to reassess their taxonomic affiliation and make updates to specimens as necessary. We will also calculate the number of identified specimens present (NISP) and create skeletal element profiles, which are useful in attempting to identify specific biotic accumulators, such as leopards or hyenas (Brain, 1987). We will specifically focus on bone breakage patterns (Villa & Mahieu, 1991) and bone surface modification, which inform us about what processes acted on the skeletal remains at/near the time of death and after. Specifically, we will look for cut-marks and hammerstone notches from stone tools, tooth marks, pits, and notches from carnivores and rodents, root/fungus etching, insect damage, digestive corrosion, peeling from breakage, signs of pathology, and a number of depositional/diagenetic changes to the bone, such as discoloration and sediment splitting. Together these changes to the bone will allow us to create a profile of which species and/or abiotic accumulators (such as water transportation) influences the formation of the assemblages at Isimila.

Using archaeological field techniques, we will survey the site of Isimila using a total station to produce detailed maps and datasets for later analysis using geographic systems (i.e.
arcGIS). All in situ fossilized faunal remains and stone tools will be point provenienced and depositional environments will be recorded. In situ fossilized remains will be examined for the modifications described above in addition to several other field observations, such as their position relative to other bones, their orientation, and their surrounding matrix type. These data help illuminate how the bones came to rest where they did (including if they were moved by river waters, floods, or were discarded as part of a meal—either for carnivores or hominins). All lithic debitage and stone tools that are found in situ will be collected and accessioned. Further analysis of the existing sediments and stratigraphic profiles will contribute to our current understanding of the geological processes that took place at Isimila.

To reconstruct the environmental conditions at Isimila during hominin occupation we will employ a multi-proxy approach that includes ecomorphology of the bovids, ungulate dental wear patterns (mesowear), and community analysis of the entire faunal assemblage. Using methods previously established for cervids (Curran, 2012; 2015), bovid limb bones will be analyzed to reconstruct the paleohabitat in the vicinity of the sites. Using a Microscribe digitizer and a 3D laser scanner, three-dimensional coordinates on post-cranial elements will be collected. Standard geometric morphometric methods with phylogenetic corrections (Barr, 2015) will be used to compare each specimen to a database of extant bovids. Using these data, specimens will be assigned to a habitat type by discriminant function analysis. For mesowear analysis, the macroscopic morphology of ungulate (mesowear) will be evaluated in order to assess their diet. By examining molar cusp height and sharpness, grazers, mixed feeders, and browsers will be differentiated from one another (Fortelius and Solounias, 2000), which, when done for the entire assemblage, indicates the types of vegetation at each site. Once all specimens are identified to taxon, trophic and locomotor adaptations will be assigned to each species based on a
combination of published reports and ecomorphological analyses. Percentages of locomotor and trophic adaptations will be calculated for each site and compared to published data on recent communities to find the most similar ecological context for each assemblage (following Reed, 1997). Correspondence analysis adjusted for taphonomic biasing (after Kovarovic et al., 2013) will be used to calculate similarity between Isimila and other penecontemporaneous African sites using published data.
Glossary


Bovid: The mammalian family that includes antelopes, sheep, goat, and cattle and the ancestors.

Cervid: The mammalian family that includes deer, moose, and elk and their ancestors.

Correspondence analysis: A multivariate method that plots both specimens and variables in a reduced number of dimensions and allows for the visualization of possible data clusters.

Debitage: Pieces of stone produced as a by-product of constructing stone tools.

Diagenetic: relating to the chemical and physical changes during the process of fossilization

Discriminant function analysis: A multivariate method that allows for classification of unknown specimens into pre-selected categories.

Geometric morphometrics: A method of shape analysis that used 3D coordinate data instead of linear measurements.

Hominin: bipedal ancestors of *Homo sapiens* and including *Homo sapiens*

*Homo erectus*: The first hominin with modern body proportions, living between 1.9 million to 50,000 (?) years ago

*Homo heidelbergensis*: transitional species between *Homo erectus* and *Homo neanderthalensis* and *Homo sapiens* without specific morphological characteristics that persist throughout the entirety of its chronological existence

In situ: Found in the place it was originally deposited.
**Locomotor:** The manner in which an organism moves through its environment.

**Post-cranial:** The portion of the skeleton that does not include the head.

**Slickensides:** in soil sciences, this refers to the surface of the cracks produced in soils under which the clays endure a high proportion of swelling.

**Stratigraphy:** the analysis and order of sediment layers in archaeology and geology; study of strata offer evidence of the environment at the time of deposition.

**Taphonomic:** relating to taphonomy.

**Taphonomy:** study of the processes that affect organic materials from the time of death to the time of curation.

**Trophic:** Relating to an organism’s feeding and diet.

**Ungulate:** Hooved mammals.
Bibliography


SABRINA CURRAN  
Curriculum Vitae  
January 2016

Department of Sociology and Anthropology  
Ohio University  
124 Bentley Annex  
curran@s.ohio.edu  
tel: 740.597.1532  
Athens, OH 45701

EDUCATION
2009  Ph.D., Anthropology, University of Minnesota, MN
2001  B.A. Magna Cum Laude, Anthropology, Arizona State University, AZ

EMPLOYMENT
2015-present  Assistant Professor, Department of Sociology and Anthropology, Ohio University.
2014-2015  Visiting Assistant Professor, Department of Sociology and Anthropology, Ohio University.
2009-2012  Lecturer and Assistant Researcher, Department of Anthropology, University of California, Santa Barbara.

PUBLICATIONS
2016  Patton, P. E. and Curran, S. Late Archaic Period Plant Domestication in the Northern Ohio Valley: Archaeobotonical Remains from the County Home Site (33AT40), Southern Ohio. In revision for Mid-Continental Journal of Archaeology.

CONFERENCE PRESENTATIONS & PUBLISHED ABSTRACTS
2015  Paleoenvironmental conditions in early Pleistocene Romania: implications for hominin dispersals (co-authors: Claire Terhune, David Fox, Jenifer Hubbard, Alexandru Petculesscu, Chris Robinson, Marius Robu, Emil Stiuca, Ioan Tantu). Society of Vertebrate Paleontology, 14-17 October, Dallas, TX).
2015  Quantifying Shape: Three-dimensional Morphometric Methods in Paleoecology. Invited speaker to Latest Methods in Reconstructing Cenozoic Terrestrial Environments and Ecological Communities workshop (10-12 September; Cleveland, OH)
2015 Eurasian Paleocommunity Analysis: Habitat Reconstructions of Early Pleistocene Sites (co-author, Samantha Gogol) at Latest Methods in Reconstructing Cenozoic Terrestrial Environments and Ecological Communities workshop (10-12 September; Cleveland, OH).


2011 A very complete Dorcatherium pigotti skeleton from Rusinga Island, Kenya: Implications for taxonomy and functional morphology. Society of Vertebrate Paleontology, Las Vegas, NV.

2011 Open habitats of four Eurasian early Pleistocene sites demonstrated with Cervidae ecomorphology. American Association of Physical Anthropologists, Minneapolis, MN. American Journal of Physical Anthropology 144 (S52): 118.

RESEARCH EXPERIENCE

Field experience (in the past five years):

2013, 2014 | Woranso-Mille Project, Ethiopia
2012, 2014 | Romanian Plio-Pleistocene Paleontological Survey, Olteț Valley, Romania

Institutes visited to conduct research (in the past five years):

2013, 2014 | Cleveland Museum of Natural History, Cleveland, OH, USA
2008, 2014-5 | Institute of Speleology "Emil Racovita", Bucharest, Romania

PROFESSIONAL MEMBERSHIPS

American Association of Physical Anthropologists
Paleoanthropology Society
Society of Vertebrate Paleontology

COURSE TAUGHT

At Ohio University:

Human Evolution (Anth 4730): Fall 2014, 2015
Perspectives in Anthropology (Human Variation) (Anth 3730): Spring 2016
Perspectives in Anthropology (Controversies in Human Evolution) (Anth 3730): Spring 2015
Seminar in Biological Anthropology (Research Methods) (Anth 4942): Spring 2015

At the University of California, Santa Barbara:

Human Variation (Anth 105): Fall 2009-2012
Human Evolution (Anth 121): Winter 2010-2012
Osteology I (Anth 180A): Winter 2010-2012
Osteology II (Special topics) (Anth 180B): Spring 2010-2012
Basic Issues in Physical Anthropology (graduate seminars) (Anth 210)
  Paleoeecology: Spring 2010
  Shape Analysis: Spring 2011
  Taphonomy: Spring 2012

ACADEMIC FUNDING

2014 | Smead Staff Enrichment, Cleveland Museum of Natural History: $400.00
2012-2013 | Non-senate Faculty Professional Development Fund Grant, University of California, Santa Barbara (UCSB): $800.00
2010-2013 | Anthropology Department, UCSB, research funding: $8216.00
VITAE
Paul E. Patton
pattonp@ohio.edu

EDUCATION
Ph.D., 2013, The Ohio State University, Dept. of Anthropology
Dissertation title: *People, Places and Plants: An Appraisal of Technology, Subsistence and Sedentism in the Eastern Woodlands*

M.S.E.S., 2007, Ohio University, Program of Environmental Studies, Environmental Archeology Track
Thesis title: *A New Approach to Hocking Valley Ceramics, Southeastern Ohio*

B.A., 2004, Ohio University, Dept. of Anthropology and Dept. of Classical Civilizations
Thesis title: *The Patricians and the Cult of the Magna Mater*

TEACHING AND ADMINISTRATIVE POSITIONS
January 2015—Present, Assistant Professor, Ohio University, Dept. of Sociology and Anthropology

August 2014—December 2014, Visiting Professor, Ohio University, Dept. of Sociology and Anthropology

August 2012—August 2014, Instructor, Ohio University, Dept. of Sociology and Anthropology

RESEARCH AND FIELD POSITIONS
June 2015, Session Organizer for the Association for the Study of Food and Society Annual Conference, *Food and Culture in the Prehistoric Ohio Valley*. Included three presentations, two by undergraduate researchers Cameron Fortin and Amanda Cumpston, Department of Sociology and Anthropology, Ohio University.

May 2015—August 2015, Field Director, Excavations at Monday Creek Workshop Site (33HO413), as part of the Monday Creek Watershed Archaeological Survey Project, Greendale, Ohio, Dept. of Soc/Anth, Ohio University

May 2014—August 2014, Field Director, Excavations at Monday Creek Workshop Site (33HO413), as part of the Monday Creek Watershed Archaeological Survey Project, Greendale, Ohio, Dept. of Soc/Anth, Ohio University

April 2014—Present, Principal Investigator, Monday Creek Watershed Archaeological Survey Project, in collaboration with Wayne National Forest, Dept of Soc/Anth, Ohio University

2013—Present, Analysis of Archaeobotanical samples from Patton’s Cave, Dept. of Soc/Anth, Ohio University

2013—Present, Co-Principal Investigator, Appalachia Population History Project and Buchtel Cemetery Project, Dept. of Soc/Anth, Ohio University

May 2013—August 2013, Field Director, Excavations at Patton’s Cave, Athens, Ohio, Dept. of Soc/Anth, Ohio University
June 2012—August 2012, Co-Field Director, Excavations at the Patton 3 Site 33-At-1026, The Plains, Ohio, Dept. of Soc/Anth, Ohio University

PUBLICATIONS
Paul E. Patton and Andrew Weiland

Paul Patton and Sabrina Curran

Elliot Abrams and Paul Patton.

PAPERS IN PREPARATION
Paul Patton, Elliot Abrams, Michael Pistrui, and AnnCorinne Freter
Late Prehistoric Architecture and Domestic Economy at the Patton 3 site, Southeastern, Ohio. Manuscript in progress for Journal of Field Archaeology.

Lauren Johnson and Paul E. Patton
The Spatial Organization and Distribution of Archaeological Materials at Patton’s Cave: A Late Prehistoric Rock Shelter in the Hocking Valley, Southeastern Ohio. In preparation for submission to Pennsylvania Archaeologist.

Cameron Fortin and Paul E. Patton
Food for the Dead: Hopewellian Feasting and Ritual Food Sacrifice at the Armitage Mound, the Wolf Plains Mound Group, Southeastern Ohio. In preparation for submission to Southeastern Archaeologist.

Paul E. Patton and Sabrina Curran.
Textural Analysis of Seed Coat Change with Domestication of Chenopods. Hypotheses regarding the change in texture in seed coats with domestication (to allow for easier germination) exist, but have not been tested. We will quantify the texture of several wild type and seed plants to test for changes with domestication.

Sabrina Curran and Paul E. Patton.
Establishing Surface Texture Quantitative Analysis Methods in Paleoanthropology and Archaeology. We are currently setting up standards and protocols for collecting data on objects as small as seeds and as large as muscle scars on large mammals.

PAPERS PRESENTED AND INVITED PRESENTATIONS
Paul Patton
Paul Patton

Paul Patton

Paul Patton
2014  How the Hopewell Built their World: Middle Woodland Period Landscape Management and Modification in the Ohio Valley. Presented by invitation as part of the Arc of Appalachia Indigenous Legacies Summer Lecture Series at Serpent Mound, Ohio.

Lauren Johnson and Paul Patton
2013  Spatial Organization and Subsistence Implications of Patton’s Cave: A Late Woodland/Late Prehistoric Rockshelter in the Hocking Valley, Southeastern Ohio. Presented at the Midwest Archaeological Conference, Columbus, Ohio.

Paul Patton
2013  The Transition from Foraging to Farming: Evidence from the County Home Site, Hocking Valley, Ohio. Presented at the Midwest Archaeological Conference, Columbus, Ohio.

Elliot Abrams and Paul Patton

Paul Patton, Michael Pistrui and Elliot Abrams
2011  Preliminary Results from the Patton 3 Site (33At1026): An Early Woodland Habitation in the Hocking Valley, Southeastern Ohio. Presented at The Ohio Archaeological Council Spring Membership Meeting, Columbus Ohio.

Paul Patton and Michael Pistrui
2011  Moving Beyond the Question “Were the Hopewell Really Farmers?” A View from the Hocking Valley, Southeastern Ohio. Presented at the Society for Ethnobiology Meeting, Columbus, Ohio.

PROFESSIONAL SERVICE
2014-2015, Food Studies Theme Steering Committee, Ohio University
2015—2017, Membership Chair, Ohio Archaeological Council
2015—2017, Trustee, Ohio Archaeological Council
2014, Conference Attendee for ASFS/AFHVS, Representative of Ohio University, Food Studies Theme
2014, Faculty Contributor, Sense of Place Initiative, Ohio University
2013—2014, Faculty Contributor, Food Studies Initiative, Ohio University
2013—2014, Site Consultant, The Archaeological Conservancy
2011, Volunteer Assistant Organizer, Society of Ethnobiology Annual Meeting, Columbus, Ohio
Other Support

We will be applying for several additional grants for this project. Two internal grants, the International Travel Fund and the Faculty Development Award, will be sought to assist with the cost of airline tickets to Tanzania (for a total of $4,500). We plan to apply for a National Science Foundation grant under the High-Risk Research in Biological Anthropology and Archaeology (HRRBAA) program.
## Budget Worksheet – Isimila Paleoanthropological Survey Expedition

<table>
<thead>
<tr>
<th>Headings</th>
<th>Project Total</th>
<th>Amount requested from OURC</th>
<th>Amount requested from other sources</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International (Itemize EACH airfare)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 roundtrip airfares from US to Tanzania</td>
<td>$4,500.00</td>
<td>$</td>
<td>$4,500.00</td>
<td>Necessary for travel into Tanzania, all pricing was based on approximate expenses we obtained from a 2015 field team working in the country of Tanzania.</td>
</tr>
<tr>
<td>2 Tanzanian entry visas @ $100/person</td>
<td>$200.00</td>
<td>$</td>
<td>200.00</td>
<td></td>
</tr>
<tr>
<td>Local Transportation/Travel (vehicle rental, including maintainence and fuel costs, number of days and cost per day)</td>
<td>$1,680.00</td>
<td>$1,680.00</td>
<td>$</td>
<td>Necessary for travel around Tanzania</td>
</tr>
<tr>
<td>4X4 vehicle rental for 14 days @ $120/day</td>
<td>$300.00</td>
<td>$300.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Gasoline for 4x4 vehicle x 14 days</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Bus/taxi fares in Dar es Salaam for airport/equip transport</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal for Travel</strong></td>
<td>$6,880.00</td>
<td>$2,380.00</td>
<td>$4,500.00</td>
<td></td>
</tr>
<tr>
<td><strong>Living Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodging (include number of days and cost per day)</td>
<td>$560.00</td>
<td>$560.00</td>
<td>$</td>
<td>These funds would provide basic needs of food and lodging during the proposed research.</td>
</tr>
<tr>
<td>Lodging pre/postseason logistics Dar, 2 people@$50/day, 4 days</td>
<td>$600.00</td>
<td>$600.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Meals (include number of days and cost per day)</td>
<td>$600.00</td>
<td>$600.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Meals pre/postseason logistics Dar, 2 people@$25/day, 4 days</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal for Living Expenses</strong></td>
<td>$1,960.00</td>
<td>$1,960.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Personnel/Assistants (number of assistants, cost per day, number of days)</strong></td>
<td>$1,400.00</td>
<td>$1,400.00</td>
<td>$</td>
<td>The following personnel are required for field and museum work in Tanzania. They also serve as translators.</td>
</tr>
<tr>
<td>Tanzanian Division Antiquities representative, 14 days@$50/d</td>
<td>$700.00</td>
<td>$700.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>UDar representative, 14 days@$50/day</td>
<td>$700.00</td>
<td>$700.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal for Personnel</strong></td>
<td>$1,400.00</td>
<td>$1,400.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Expendable Supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td>Collecting supplies are necessary for taking samples; many of the samples are delicate and require special care.</td>
</tr>
<tr>
<td>Collecting supplies (tools, sample bags, plaster, consolidant)</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal Expendable Supplies</strong></td>
<td>$250.00</td>
<td>$250.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Fees, Permits, Visas and Other Expenses</strong></td>
<td>$2,000.00</td>
<td>$2,000.00</td>
<td>$</td>
<td>The permits and fees are required for field and museum work in Tanzania.</td>
</tr>
<tr>
<td>Project research fee to the Tanzanian Division of Antiquities</td>
<td>$800.00</td>
<td>$800.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>COSTECH application fees ($50/ea) for 2 persons</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>COSTECH research permit fees ($300/ea) for 2 persons</td>
<td>$600.00</td>
<td>$600.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Shipping fees to Ohio U for fossil preparation and study</td>
<td>$500.00</td>
<td>$500.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal for Fees &amp; Expenses</strong></td>
<td>$2,000.00</td>
<td>$2,000.00</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td>$12,490.00</td>
<td>$7,990.00</td>
<td>$4,500.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Diet/Habitat</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proboscidea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paleoloxodon</em> (formerly <em>Elephas</em>) <em>recki</em></td>
<td>C4 diet; grazer</td>
<td>1,2,3</td>
</tr>
<tr>
<td><strong>Perrisodactyla</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Diceros bicornis</em></td>
<td>grasslands-wooded savannah</td>
<td>1</td>
</tr>
<tr>
<td><em>Equus</em> cf. <em>burchelli</em></td>
<td>grasslands-wooded savannah</td>
<td>1</td>
</tr>
<tr>
<td><strong>Artiodactyla</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hippopotamus amphibius</em></td>
<td>Rivers/Lakes/Swamps (grazers)</td>
<td>1</td>
</tr>
<tr>
<td><em>Afrochoerus</em> sp.</td>
<td>grazer</td>
<td>1,4</td>
</tr>
<tr>
<td><em>Kolpochoerus</em> (formerly <em>Mesochoerus</em>) (cf. <em>olduvaïensis</em>)?</td>
<td>mixed feeder</td>
<td>1,5</td>
</tr>
<tr>
<td><em>Parmularius augusticornis</em></td>
<td>grazer?</td>
<td>1,6</td>
</tr>
<tr>
<td>Bovini indet.</td>
<td>More closed</td>
<td>1</td>
</tr>
<tr>
<td>Antilopini indet.</td>
<td>More open</td>
<td>1</td>
</tr>
<tr>
<td>Alcelaphini indet.</td>
<td>Open</td>
<td>1</td>
</tr>
<tr>
<td>Small bovid (Neotragini/Cephalophini)</td>
<td>Closed- Intermediate</td>
<td>1</td>
</tr>
<tr>
<td><strong>Leporidae</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>?<em>Lepus</em> sp.</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Rodentia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cricetomys gambianus</em></td>
<td>intrusive?</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 2. Middle Pleistocene hominin sites, dates, and associated species and lithic industries from Africa and Israel.

<table>
<thead>
<tr>
<th>Site</th>
<th>Country</th>
<th>Dates</th>
<th>Species</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elandsfontein</td>
<td>South Africa</td>
<td>1.0Ma- 600Ka</td>
<td><em>H. erectus</em></td>
<td>Acheulean</td>
</tr>
<tr>
<td>Kabwe/Broken Hill</td>
<td>Zambia</td>
<td>similar to</td>
<td><em>H. heidelbergensis</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elandsfontein &amp; Bodo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bodo, Awash</td>
<td>Ethiopia</td>
<td>600 Ka</td>
<td><em>H. heidelbergensis</em></td>
<td></td>
</tr>
<tr>
<td>Salé</td>
<td>Morocco</td>
<td>455-389 Ka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake Ndutu</td>
<td>Tanzania</td>
<td>400-250 Ka</td>
<td><em>H. heidelbergensis</em></td>
<td>Achulean</td>
</tr>
<tr>
<td>Ileret</td>
<td>Kenya</td>
<td>270 Ka</td>
<td><em>H. heidelbergensis</em></td>
<td></td>
</tr>
<tr>
<td>Florisbad</td>
<td>South Africa</td>
<td>260 Ka</td>
<td></td>
<td>MSA</td>
</tr>
<tr>
<td>Isimila</td>
<td>Tanzania</td>
<td><strong>270-60 Ka</strong></td>
<td><strong>UNKNOWN</strong></td>
<td>Achulean</td>
</tr>
<tr>
<td>Omo 2</td>
<td>Ethiopia</td>
<td>older than Omo 1</td>
<td><em>H. heidelbergensis</em></td>
<td></td>
</tr>
<tr>
<td>Omo 1</td>
<td>Ethiopia</td>
<td>195 Ka</td>
<td><em>H. sapiens</em></td>
<td>Levallois (MSA)</td>
</tr>
<tr>
<td>Jebel Irhoud</td>
<td>Morocco</td>
<td>160 Ka</td>
<td><em>H. sapiens</em></td>
<td>Achulean,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Levallois</td>
</tr>
<tr>
<td>Herto, Middle Awash</td>
<td>Ethiopia</td>
<td>160-154 Ka</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
<tr>
<td>Singa</td>
<td>Sudan</td>
<td>&gt;133 Ka</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
<tr>
<td>Lake Eyasi</td>
<td>Tanzania</td>
<td>&gt;130 Ka</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
<tr>
<td>Laetoli, Ngaloba Beds</td>
<td>Tanzania</td>
<td>120 Ka</td>
<td><em>H. sapiens</em></td>
<td>MSA</td>
</tr>
<tr>
<td>Aduma, Middle Awash</td>
<td>Ethiopia</td>
<td>105-79 Ka</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
<tr>
<td>Skhul</td>
<td>Israel</td>
<td>&gt;100-90 Ka</td>
<td><em>H. sapiens</em></td>
<td>Mousterian</td>
</tr>
<tr>
<td>Qafzeh</td>
<td>Israel</td>
<td>&gt;100-90 Ka</td>
<td><em>H. sapiens</em></td>
<td>Mousterian</td>
</tr>
<tr>
<td>Klasies River</td>
<td>South Africa</td>
<td>same as Qafzeh</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
<tr>
<td>Dar es Soltane</td>
<td>Morocco</td>
<td>90 Ka</td>
<td><em>H. sapiens</em></td>
<td></td>
</tr>
</tbody>
</table>
Recommended Reviewers

Anna K. Behrensmeyer
Smithsonian Institution
Title: Curator of Vertebrate Paleontology
E-mail Address: behrensa@si.edu
Phone: 202-633-1307
Fax: 202-786-2832
Mailing Address: Smithsonian Institution
PO Box 37012, MRC 121
Washington, DC 20013-7012

Kieran P. McNulty
University of Minnesota
Title: Associate Professor of Anthropology
E-mail Address: kmcnulty@umn.edu
Phone: 612-625-0058
Mailing Address: Anthropology
383 HHH Center
301 19th Ave S.

Briana Pobiner
The George Washington University
Title: Associate Research Professor
E-mail address: pobinerb@si.edu
Phone: 202-633-1985
Fax: 202-994-6097
Mailing Address: Department of Anthropology
2110 G St., NW
Washington, DC 20052

Kaye Reed
Arizona State University
Title: President's Professor
E-mail Address: kaye.reed@asu.edu
Phone: 480-727-6583
Mailing Address: Institute of Human Origins
   Box 85287-4101
   Tempe, AZ 85287-4101

David Strait
Washington University
Title: Professor of Anthropology
E-mail Address: dstrait@wustl.edu
Phone: 314-935-7898
Mailing Address: Campus Box 1114
   One Brookings Drive
   St. Louis, MO 63130-4899