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PERSONAL STATEMENT

introduction

I am an archaeologist interested in human behavior, technology and ecology. My approach to these themes is motivated by models and methods from the evolutionary sciences which I seek to adapt to better understand the human past. My passion as a scholar is to apply evolutionary approaches to address questions of technological variation and ecological adaptation, cultural change and cultural transmission ranging from the deep past to recent times. Unlike many archaeologists motivated by evolutionary theory, I am fascinated by the challenges of primary data collection, and my fieldwork in mainland Southeast Asia and Australia supplies the empirical content of my research. Fundamental to these activities is my deep concern for the social relevance and disciplinary integrity for archaeology. What sets my work apart from others is this combination of evolutionary theory applied to primary data collected in Southeast Asia in collaborative arrangements that prioritize training and capacity building.

In what follows, I will describe my research trajectory since arriving at the University of Washington in 2008 and explain how the characteristics that distinguish my research – namely, its use of evolutionary approaches and its focus on archaeological problems of Southeast Asia – contribute to my teaching and service.

research trajectory

I began my research career investigating questions about Australian Aboriginal hunter-gatherer adaptation during the Late Pleistocene and Holocene periods (Marwick 2002a, 2002b, 2005c, 2009, Hughes et al. 2011, Sullivan et al. 2012, Brockwell et al. 2013). Motivated by the success of combining stone artefact and geoarchaeological analyses in overcoming problems of a sparse archaeological record, I took up the challenge of investigating prehistoric human-environment relations in tropical Southeast Asia, where the archaeological record is notoriously sparse for hunter-gatherers (Marwick 2008). Directly emerging from my dissertation research have been three related projects.

1. I constructed a local palaeoclimate proxy from oxygen isotope values obtained from shell fish recovered from the same archaeological deposit as the stone artefacts (Marwick and Gagan 2011). This oxygen isotope curve provides the first evidence of a major change in conditions from the Pleistocene to the

Holocene, consistent with evidence from similar records in China. We noted the absence of a signal of the Younger Dryas (YD) in our data, a key climatic event linked to the emergence of agriculture in many parts of the world. We used this evidence to argue that agriculture in Southeast Asia most likely originated in China where there is a strong YD signal.

2. As a core member of the Middle Mekong Archaeology Project (MMAP) I excavated two rockshelters in the uplands of northern Laos to further investigate the question of how hunter-gatherers became farmers in mainland Southeast Asia. We predicted that if agriculture moved into Southeast Asia from China, we might find strong early signals in Laos, due to the ease of movement facilitated by the Mekong. The archaeological results, noted in our *Antiquity* article ([White et al 2009](#)), proved to be of limited relevance to my core interest in hunter-gatherers because the excavations recovered extensively bioturbated and only very recent (Iron Age) deposits.
3. I made a novel modification to standard behavioural ecological models ([Marwick 2013](#)). I began this analysis with the application of three standard behavioural ecological models but found that when testing the predictions of the models with archaeological data, the three models did not give a consistent indication of the main variables influencing stone artefact assemblage production. Taking inspiration from Sewall Wright's idea of multiple optima in evolutionary biology, I revised the standard models to incorporate multiple behavioral optima and found a consistent fit with my data.

With my early work focused on inland and upland settings, I became curious about human adaptation in tropical coastal and island environments. Specifically, I was driven to evaluate the usefulness of my model for people with marine adaptations and to use the model as a tool to understand transitions to agriculture in regions where past sea level changes – which others have argued was a driving factor in the domestication process – had a profound effect on the landscape. Two current projects directly relate to this question.

1. While a Luce/ACLS post-doctoral fellow during 2010-11, I initiated a project with Thai collaborators to explore hunter-gatherer adaptations in coastal environments through survey, excavation in southern Thailand. Together with my Thai colleagues and US graduate students, I have been active presenting the results of our analysis at professional meetings and have one scholarly paper published ([Conrad et al. 2013](#)). So far our data show a clear signal of

subsistence behaviours focused on fresh-water resources during the late Pleistocene and early Holocene shifting to mangrove swamp resources during the later Holocene as sea levels rose. This is a much earlier shift than previously documented, challenging earlier work that recorded this dietary shift – often linked to the transition to agriculture – much later in the Holocene.

2. My recent work on Sulawesi, Indonesia was motivated by the question of whether my multiple optima model can be generalized to include tropical hunter-gatherer adaptations in island settings. As co-PI with six collaborators on a project funded by the Australian Research Council (ARC), I conducted six excavations on Sulawesi during 2012-13. Two of these yielded archaeological sequences spanning the Late Pleistocene to recent times, providing data relevant to evaluating my model. We have presented some preliminary data at conferences and the detailed analyses are currently in progress.

To better understand these questions of human adaptation and the specific historical trajectories leading up to major events such as the transition to agriculture, I have found it necessary to broaden my inquiry to investigate the longer term evolutionary processes of humans in Southeast Asia and Australia. My *Quaternary International* article surveys the available evidence for hominin colonization of Southeast Asia and details three models that fit the data ([Marwick 2009b](#)). My current work is engaged in testing these models with three current projects which are my focus for the near future.

1. I am a co-PI with five colleagues on an ARC-funded project to investigate modern human origins and early behavioural complexity in Australia and Southeast Asia. The aim of this project is to collect and compare a large sample of early materials from three locations across Southeast Asia to Australia to more reliably date the appearance of modern humans and document the emergence of cultural diversity. In 2012 we excavated at Malakanunja II in northern Australia, one of Australia's oldest sites, in 2014 we will excavate at Jerimalai in East Timor, and in 2015 we will return to Thailand. I have been leading the geoarchaeological analysis and contributing to the lithic analysis of the Malakanunja II excavation.
2. I am a co-PI with three colleagues on a Leakey Foundation grant to excavate archaeological deposits in Sumatra. We aim to investigate human colonization and adaptation relating to the Toba eruption 74 thousand years ago (fieldwork in Sumatra is scheduled for 2014).

3. I am a co-PI with 13 colleagues on an ARC-funded project investigating hominin colonisation from India to Australia, with my specific responsibility being Myanmar and Thailand (fieldwork in Myanmar is scheduled for 2015).

Whilst engaged in these deep time questions, I developed an interest in the potential of evolutionary archaeology to provide insights into more recent historical and political processes. Specifically, I have been pursuing attribute-based phylogenies and morphometric analyses of bronze Buddha statues from Laos and Thailand to better understand the flow of influence between different production centers. I have published some results of the phylogenetic analysis ([Marwick 2012](#)) and am currently working on the morphometric analysis.

Concurrent with my field and laboratory work I have been examining questions of archaeological engagement and practice. I have been specifically concerned with popular culture, the public in the field, local collaborators, and other professional archaeologists.

1. I have defined how popular culture engages with archaeology in a study of blockbuster films ([Marwick 2009](#)). I demonstrated how archaeological themes can be decoded from films that present a long-term narrative of the human experience but have no obvious archaeology content.
2. As a Luce/ACLS fellow I developed a model of collaborative archaeology that has influenced my subsequent work ([Marwick et al. 2013](#)). Specifically, I argued that community engagement can occur in three forms: syntactic (highly technical), semantic (generation of meanings) and pragmatic (resulting in practical intervention), and I list when and how each form might be best deployed
3. While working with MMAP I organised extensive training of local archaeologists and museum workers ([Marwick et al. 2009](#)). I have continued with this practice in subsequent fieldwork.
4. I have developed computational methods for identifying controversy and topic trends in scholarly literature ([Marwick 2013](#)) and used these tools to analyse how anthropologists use online communication ([Marwick 2013](#))
5. I practice and promote principles of open science and reproducibility by using workflows and permissive licenses to enable sharing and reuse of [data](#) and [code](#) produced by my research projects. I also contribute to a variety of open science projects, mostly as a member of the [rOpenSci](#) developer community.

teaching

I teach classes at every level of the undergraduate and graduate program and the common foundation of these classes is engagement through active learning methods. Engagement has several dimensions in my teaching, not only of students with course content, but also of archaeology with the public, of theory with evidence, and of knowledge with practical application.

100-level In 'Archaeology in Film' we investigate representations of archaeology in popular films, culminating in the students (150-250 students per quarter) making their own films (satisfying the university's Individual and Society requirement, and many students also satisfy their writing requirement with this class). I have embraced the unique challenges of engaging students with the large lecture format, and enjoyed positive results using clickers, online activities, in-class group work and in-class low-stakes writing assignments.

200-level Students in my laboratory methods classes (2-10 students per quarter) work side-by-side with me on hands-on data collection from sediments and stone artefacts from my research projects, often presenting their results at the UW undergraduate research symposium or at international professional conferences. I have also taught two five-week field schools at this level (Australia, Thailand).

300-level I teach two regional survey classes (Australian Archaeology, Mainland Southeast Asian Archaeology) in a seminar style that engages students directly with primary research by having students analyse and remix data from scholarly journal articles.

400-level My main effort at this level is my geoarchaeology lab and seminar classes, where students learn skills that are vital for success in a career in archaeological science. These classes combine instruction in widely used earth sciences lab methods with collection of original data, data analysis and visualization, and writing a report that demands intellectual engagement with current research problems in archaeology. As the supervisor of the UW Geoarchaeology Lab (a facility open to all students in the program) I also work closely with small numbers of students on 400-level lab research projects (2-5 per quarter). We routinely use facilities held by other campus units in these research projects, notably a particle size analyser in Earth and Space Sciences that I co-purchased.

graduate-level At the graduate level I lead a seminar class on archaeology and explanation that explores connections between scientific explanation as un-

derstood by philosophers of science and archaeological explanation. To gain insights the students collaborate using a combination of close reading and 'distant reading' or quantitative analysis of large amounts of text (using my [JSTORr software](#)). I currently advise XX students at UW and two elsewhere, chair committees for XX and have examined XX students PhD theses.

I am enthusiastic about encouraging graduate and senior undergraduate students to adopt principles of reproducibility that I have found to be beneficial in my own research. To this end I require students to record their work in open lab notebooks, to use software tools that are open source (ie. R rather than SPSS), to collect and store data in open formats (ie. plain text rather than Excel), and to use scripted workflows (ie. literate computing rather than pointing-and-clicking). While the specific tools change slightly over time, familiarizing students with the principles of reproducibility is valuable because requiring students to clearly document their research encourages them to think more clearly about what they are doing and reinforces what they are learning. Documenting the research process in a way that others can easily inspect also fosters a strong appreciation for research accountability and integrity early in the student's career.

service

Within the archaeology program I have served as annual terms as the curriculum coordinator, seminar coordinator, comprehensive exam coordinator and the coordinator of the Archaeological Sciences Option for undergraduates. As supervisor of the Geoarchaeology Lab I also maintain USDA permits enabling importation and storage of foreign specimens, and ensure the lab satisfies health and safety requirements. My key contributions to the Anthropology Department have been as the honors program coordinator (including reforms to promote faculty engagement with student research), the web site coordinator, and as a member of the the sub-faculty appointments committee. I led the transition to a new departmental webpage, and implemented a cloud-based system to simplify collaborative coordination of teaching scheduling within the department and the secure communication of the schedule to students.

Within the UW I have contributed to the Center for Teaching and Learning (eg. seminars and workshops on large class engagement), the Burke Museum (eg. public talks), and the Centre for Southeast Asian Studies (eg. grant writing). Beyond the UW I have served as co-editor of the *Journal of Indo-Pacific Archaeology* (with Peter Lape), on the editorial board of the *Journal of World Prehistory*, as a peer reviewer for several international journals and book publishers (2-3 manuscripts per year), and funding agencies (1 grant reviewed per year).