MOBILIZING *the* PAST *for a* DIGITAL FUTURE

The Potential of Digital Archaeology

Edited by

Erin Walcek Averett
Jody Michael Gordon
Derek B. Counts

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Preface & Acknowledgments

This volume stems from the workshop, "Mobilizing the Past for a Digital Future: the Future of Digital Archaeology," funded by a National Endowment for the Humanities Digital Humanities Start-Up grant (#HD-51851-14), which took place 27-28 February 2015 at Wentworth Institute of Technology in Boston (http://uwm.edu/mobilizing-the-past/). The workshop, organized by this volume's editors, was largely spurred by our own attempts with developing a digital archaeological workflow using mobile tablet computers on the Athienou Archaeological Project (http://aap.toumazou.org; Gordon *et al.*, Ch. 1.4) and our concern for what the future of a mobile and digital archaeology might be. Our initial experiments were exciting, challenging, and rewarding; yet, we were also frustrated by the lack of intra-disciplinary discourse between projects utilizing digital approaches to facilitate archaeological data recording and processing.

Based on our experiences, we decided to initiate a dialogue that could inform our own work and be of use to other projects struggling with similar challenges. Hence, the "Mobilizing the Past" workshop concept was born and a range of digital archaeologists, working in private and academic settings in both Old World and New World archaeology, were invited to participate. In addition, a livestream of the workshop allowed the active participation on Twitter from over 21 countires, including 31 US states (@MobileArc15, #MobileArc).[1]

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[1] For commentary produced by the social media followers for this event, see: https://twitter.com/electricarchaeo/status/571866193667047424, http://shawngraham.github.io/exercise/mobilearcday1wordcloud.html, https://twitter.com/electricarchaeo/status/571867092091338752, http://www.diachronicdesign.com/blog/2015/02/28/15-mobilizing-the-past-for-the-digital-future-conference-day-1-roundup/.

Although the workshop was initially aimed at processes of archaeological data recording in the field, it soon became clear that these practices were entangled with larger digital archaeological systems and even socio-economic and ethical concerns. Thus, the final workshop's discursive purview expanded beyond the use of mobile devices in the field to embrace a range of issues currently affecting digital archaeology, which we define as the use of computerized, and especially internet-compatible and portable, tools and systems aimed at facilitating the documentation and interpretation of material culture as well as its publication and dissemination. In total, the workshop included 21 presentations organized into five sessions (see program, http://mobilizingthepast.mukurtu.net/digital-heritage/mobilizing-past-conference-program), including a keynote lecture by John Wallrodt on the state of the field, "Why paperless?: Digital Technology and Archaeology," and a plenary lecture by Bernard Frischer, "The Ara Pacis and Montecitorio Obelisk of Augustus: A Simpirical Investigation," which explored how digital data can be transformed into virtual archaeological landscapes.

The session themes were specifically devised to explore how archaeological data was digitally collected, processed, and analyzed as it moved from the trench to the lab to the digital repository. The first session, "App/Database Development and Use for Mobile Computing in Archaeology," included papers primarily focused on software for field recording and spatial visualization. The second session, "Mobile Computing in the Field," assembled a range of presenters whose projects had actively utilized mobile computing devices (such as Apple iPads) for archaeological data recording and was concerned with shedding light on their utility within a range of fieldwork situations. The third session, "Systems for Archaeological Data Management," offered presentations on several types of archaeological workflows that marshal born-digital data from the field to publication, including fully bespoken paperless systems, do-it-yourself ("DIY") paperless systems, and hybrid digital-paper systems. The fourth and final session, "Pedagogy, Data Curation, and Reflection," mainly dealt with teaching digital methodologies and the use of digital repositories and linked open data to enhance field research. This session's final paper, William Caraher's "Toward a Slow Archaeology," however, noted digital archaeology's successes in terms of

time and money saved and the collection of more data, but also called for a more measured consideration of the significant changes that these technologies are having on how archaeologists engage with and interpret archaeological materials.

The workshop's overarching goal was to bring together leading practitioners of digital archaeology in order to discuss the use, creation, and implementation of mobile and digital, or so-called "paperless," archaeological data recording systems. Originally, we hoped to come up with a range of best practices for mobile computing in the field – a manual of sorts – that could be used by newer projects interested in experimenting with digital methods, or even by established projects hoping to revise their digital workflows in order to increase their efficiency or, alternatively, reflect on their utility and ethical implications. Yet, what the workshop ultimately proved is that there are many ways to "do" digital archaeology, and that archaeology as a discipline is engaged in a process of discovering what digital archaeology should (and, perhaps, should not) be as we progress towards a future where all archaeologists, whether they like it or not, must engage with what Steven Ellis has called the "digital filter."

So, (un)fortunately, this volume is not a "how-to" manual. In the end, there seems to be no uniform way to "mobilize the past." Instead, this volume reprises the workshop's presentations—now revised and enriched based on the meeting's debates as well as the editorial and peer review processes—in order to provide archaeologists with an extremely rich, diverse, and reflexive overview of the process of defining what digital archaeology is and what it can and should perhaps be. It also provides two erudite response papers that together form a didactic manifesto aimed at outlining a possible future for digital archaeology that is critical, diverse, data-rich, efficient, open, and most importantly, ethical. If this volume, which we offer both expeditiously and freely, helps make this ethos a reality, we foresee a bright future for mobilizing the past.

* * *

No multifaceted academic endeavor like *Mobilizing the Past* can be realized without the support of a range of institutions and individ-

research and for allowing us to integrate mobile devices and digital workflows in the field.

The workshop itself benefitted from the help of Kathryn Grossman (Massachusetts Institute of Technology) and Tate Paulette (Brown University) for on-site registration and much more. Special thanks goes to Daniel Coslett (University of Washington) for graphic design work for both the workshop materials and this volume. We would also like to thank Scott Moore (Indiana University of Pennsylvania) for managing our workshop social media presence and his support throughout this project from workshop to publication.

This publication was a pleasure to edit, thanks in no small part to Bill Caraher (Director and Publisher, The Digital Press at the University of North Dakota), who provided us with an outstanding collaborative publishing experience. We would also like to thank Jennifer Sacher (Managing Editor, INSTAP Academic Press) for her conscientious copyediting and Brandon Olson for his careful reading of the final proofs. Moreover, we sincerely appreciate the efforts of this volume's anonymous reviewers, who provided detailed, thought-provoking, and timely feedback on the papers; their insights greatly improved this publication. We are also grateful to Michael Ashley and his team at the Center for Digital Archaeology for their help setting up the accompanying Mobilizing the Past Mukurtu site and Kristin M. Woodward of the University of Wisconsin-Milwaukee Libraries for assistance with publishing and archiving this project through UWM Digital Commons. In addition, we are grateful to the volume's two respondents, Morag Kersel (DePaul University) and Adam Rabinowitz (University of Texas at Austin), who generated erudite responses to the chapters in the volume. Last but not least, we owe our gratitude to all of the presenters who attended the workshop in Boston, our audience from the Boston area, and our colleagues on Twitter (and most notably, Shawn Graham of Carlton University for his word clouds) who keenly "tuned in" via the workshop's livestream. Finally, we extend our warmest thanks to the contributors of this volume for their excellent and timely chapters. This volume, of course, would not have been possible without such excellent papers.

As this list of collaborators demonstrates, the discipline of archaeology and its digital future remains a vital area of interest for people who value the past's ability to inform the present, and who

recognize our ethical responsibility to consider technology's role in contemporary society. For our part, we hope that the experiences and issues presented in this volume help to shape new intra-disciplinary and critical ways of mobilizing the past so that human knowledge can continue to develop ethically at the intersection of archaeology and technology.

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October 1, 2016
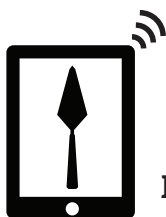
How To Use This Book

The Digital Press at the University of North Dakota is a collaborative press and *Mobilizing the Past for a Digital Future* is an open, collaborative project. The synergistic nature of this project manifests itself in the two links that appear in a box at the end of every chapter.

The first link directs the reader to a site dedicated to the book, which is powered and hosted by the Center for Digital Archaeology's (CoDA) Mukurtu.net. The Murkutu application was designed to help indigenous communities share and manage their cultural heritage, but we have adapted it to share the digital heritage produced at the "Mobilizing the Past" workshop and during the course of making this book. Michael Ashley, the Director of Technology at CoDA, participated in the "Mobilizing the Past" workshop and facilitated our collaboration. The Mukurtu.net site (https://mobilizingthepast.mukurtu.net) has space dedicated to every chapter that includes a PDF of the chapter, a video of the paper presented at the workshop, and any supplemental material supplied by the authors. The QR code in the box directs readers to the same space and is designed to streamline the digital integration of the paper book.

The second link in the box provides open access to the individual chapter archived within University of Wisconsin-Milwaukee's installation of Digital Commons, where the entire volume can also be downloaded. Kristin M. Woodward (UWM Libraries) facilitated the creation of these pages and ensured that the book and individual chapters included proper metadata.

Our hope is that these collaborations, in addition to the open license under which this book is published, expose the book to a wider audience and provide a platform that ensures the continued availability of the digital complements and supplements to the text. Partnerships with CoDA and the University of Wisconsin-Milwaukee reflect the collaborative spirit of The Digital Press, this project, and digital archaeology in general.

Abbreviations

AAI	Alexandria Archive Institute
AAP	Athienou Archaeological Project
ABS	acrylonitrile butadiene styrene (plastic)
ADS	Archaeological Data Service
Alt-Acs	Alternative Academics
API	application programming interface
ARA	archaeological resource assessment
ARC	Australian Research Council
ARIS	adaptive resolution imaging sonar
ASV	autonomous surface vehicle
BLM	Bureau of Land Management
BLOB	Binary Large Object
BOR	Bureau of Reclamation
BYOD	bring your own device
CAD	computer-aided design
CDL	California Digital Library
CHDK	Canon Hack Development Kit
cm	centimeter/s
CMOS	complementary metal-oxide semiconductor
CoDA	Center for Digital Archaeology
COLLADA	COLLAborative Design Activity
CRM	cultural resource management
CSS	Cascading Style Sheet
CSV	comma separated values
DBMS	desktop database management system
DEM	digital elevation model
DINAA	Digital Index of North American Archaeology
DIY	do-it-yourself
DoD	Department of Defense
DVL	doppler velocity log
EAV	entity-attribute-value
EDM	electronic distance measurement
EU	excavation unit/s
FAIMS	Federated Archaeological Information Management System
fMRI	functional magnetic resonance imaging
GIS	geographical information system
GCP	ground control point
GNSS	global navigation satellite system
GPR	ground-penetrating radar

GUI	graphic user interface
ha	hectare/s
hr	hour/s
Hz	Hertz
HDSM	high-density survey and measurement
ICE	Image Composite Editor (Microsoft)
iOS	iPhone operating system
INS	inertial motion sensor
IPinCH	Intellectual Property in Cultural Heritage
IT	information technology
KAP	Kaymakçı Archaeological Project
KARS	Keos Archaeological Regional Survey
km	kilometer/s
LABUST	Laboratory for Underwater Systems and Technologies (University of Zagreb)
LAN	local area network
LIEF	Linkage Infrastructure Equipment and Facilities
LOD	linked open data
LTE	Long-Term Evolution
m	meter/s
masl	meters above sea level
MEMSAP	Malawi Earlier-Middle Stone Age Project
MOA	memoranda of agreement
MOOC	Massive Online Open Course
NGWSP	Navajo-Gallup Water Supply Project
NeCTAR	National eResearch Collaboration Tools and Resources
NEH	National Endowment for the Humanities
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
NSF	National Science Foundation
OCR	optical character reader
OS	operating system
PA	programmatic agreement
PAP	pole aerial photography
PARP:PS	Pompeii Archaeological Research Project: Porta Stabia
PATA	Proyecto Arqueológico Tuti Antiguo
PBMP	Pompeii Bibliography and Mapping Project
PDA	personal digital assistant

PIARA	Proyecto de Investigación Arqueológico Regional Ancash
PKAP	Pyla-Koutsopetra Archaeological Project
Pladypos	PLAtform for DYnamic POSitioning
PLoS	Public Library of Science
PQP	Pompeii Quadriporticus Project
PZAC	Proyecto Arqueológico Zaña Colonial
QA	quality assurance
QC	quality control
QR	quick response
REVEAL	Reconstruction and Exploratory Visualization: Engineering meets ArchaeoLogy
ROS	robot operating system
ROV	remotely operated vehicle
RRN	Reciprocal Research Network
RSS	Rich Site Summary
RTK	real-time kinetic global navigation satellite system
SfM	structure from motion
SHPO	State Historic Preservation Office
SKAP	Say Kah Archaeological Project
SLAM	simultaneous localization and mapping
SMU	square meter unit/s
SU	stratigraphic unit/s
SVP	Sangro Valley Project
TCP	traditional cultural properties
tDAR	the Digital Archaeological Record
UAV	unmanned aerial vehicle
UNASAM	National University of Ancash, Santiago Antúnez de Mayolo
UQ	University of Queensland
USACE	U.S. Army Corp of Engineers
USBL	ultra-short baseline
USFS	U.S. Forest Service
USV	unmanned surface vehicle
UTM	universal transverse mercator
XML	Extensible Markup Language

4.2.
Click Here to Save the Past

Eric C. Kansa

This paper takes a critical look at how the branding, promotion and financing of digital solutions and services impacts archaeology. Digital data obviously has much promise: it can help us engage with wider communities, explore new research questions, and create and preserve a vastly enriched body of archaeological documentation. Digital data also has a certain glamour, gained in large part through its associations with the burgeoning tech industry. At conferences, digital initiatives are often marketed like tech startups as solutions to make archaeology faster, more efficient, and cutting-edge. The look and feel of archaeological websites owes a great deal to styles and user interface designs coming from the commercial Web. Overall, the quickly growing field of "digital archaeology" brings freshness and excitement to archaeology.

While I welcome the increasing limelight cast in areas that align with my particular research interests, I worry about the institutional context that currently surrounds digital data's growing prominence. In Kathleen Fitzpatrick's study of the dysfunctions of scholarly monographs as the sole route to tenure and promotion in many areas of the humanities (2011: esp. 47–49), she notes how scholars rarely focus critical reflection on the institutions and tacit rules that govern their own professions. Just as we need critical focus on why scholars fail to engage with new media, we also need critical reflection on how new media become part of our profession. If digital archaeology is to really fulfill its promise and widen participation and opportunities for exploring the past, we urgently need more reflection on the forces that shape the branding, management, and financing of digital data in archaeology.
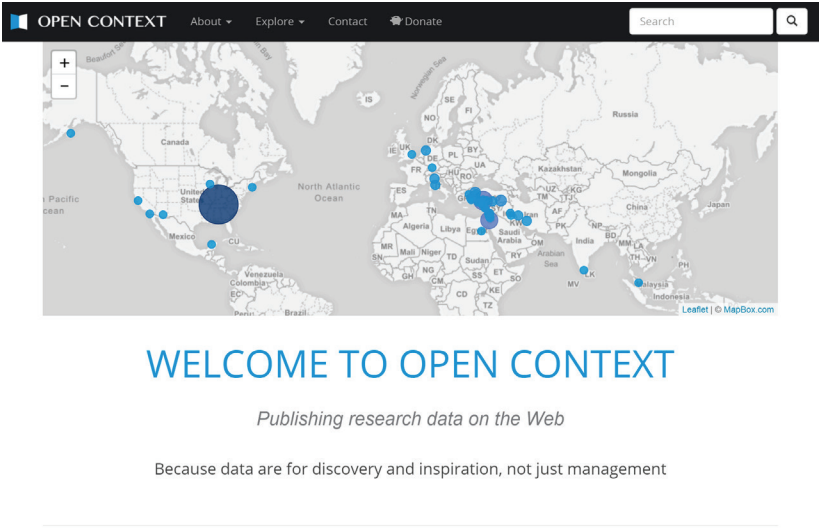
Figure 1: Open Context home page.

Since reflection in digital archaeology is in short supply, rather than focus specifically on my work with Open Context (http://opencontext.org), a data publishing service for archaeology, this essay will explore some of the institutional challenges faced by Open Context in particular and digital archaeology more generally. The perspectives offered here stem from my experience over 12 years as a dedicated "digital archaeologist," founding and running a nonprofit endeavor to promote the dissemination and preservation of archaeological field data. Open Context is now referenced by the National Science Foundation (NSF) and the National Endowment for the Humanities (NEH) for data management for archaeology and the digital humanities. Its approach of "data sharing as publishing" emphasizes collaboration with dedicated editorial and information specialists to make data more intelligible and usable. Open Context publishes a wide variety of archaeological data, ranging from survey data to excavation documentation, artifact descriptions, chemical analyses, and detailed descriptions of bones and other biological remains found in archaeological contexts.

The range, scale, and diversity of these data require expertise in data modeling and a commitment to continual development and iterative problem solving. Open Context (FIG. 1) has undergone several upgrades, the most recent in the spring of 2015, in order to keep pace with technology changes and to leverage best practices in data stewardship. With data preservation through the University of California's California Digital Library (CDL), Open Context now publishes more than 1.2 million archaeological records from projects worldwide.[1] This is on a scale comparable to that of a major museum (for instance, the online collection of the Metropolitan Museum of New York makes some 407,000 records available). Open Context has made this remarkable achievement on a much more limited budget than the online collections of major museums. Grant funding from the William and Flora Hewlett Foundation, the NEH, the Alfred P. Sloan Foundation, NSF, and others has gone a long way largely because of the Alexandria

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[1] Open Context now also benefits from mirror hosting and backups offered by the German Archaeological Institute (DAI; see: http://opencontext.dainst.org). We are now beginning to do software development in collaboration with the DAI.

Archive Institute's (AAI, the legally recognized corporation behind the Open Context publishing service) status as an independent non-profit organization with an overhead much, much lower than large research institutions. The AAI and Open Context have also benefited from the growth of the Web and the "ecosystem" of projects and individuals in similar roles who are undertaking innovative work outside of traditional academic roles. At the same time, our vantage point outside of the tenure track offers us a different perspective on the academy and its evolution. Those perspectives inform this essay.

Branding and Sustainability in Digital Archaeology

As a relatively new area of specialization, digital archaeology has emerged during a time of tremendous change in the academy. While we see technological transformations unfolding that make digital archaeology possible, we also see profound and often disturbing restructuring of wider economic and political institutions that impact university funding and governance. Simply put, "neoliberalism"—a loosely associated bag of ideologies that emphasize fiscal austerity and relentless competition, market transactions, and certain management techniques centered on metrics and surveillance—now permeates academic institutions (Feller 2008; Kansa 2014a, 2014b).

With the notable exception of Wikipedia, commercial players dominate much of our interaction with World Wide Web. Most, if not all, digital archaeology projects must interface with the commercial Web, commercial software, and other commercial platforms. Search engine optimization, marketing of digital archaeology projects on social media, and the embrace of GitHub for software (and sometimes data) version control all illustrate cross-cutting ties with the commercial tech sector. Much of the interface design, look and feel, and other aspects interactivity take their cue from the commercial tech sector. Many digital archaeology websites have familiar commercial social media icons to facilitate tweets and links to social-media sites platforms such as Facebook. Similarly, many of the "best practices" of digital archaeology, including project management methodologies (agile, iterative), user-centered design, and systems architectures (e.g., cloud computing, RESTful web service design) come directly from approaches developed in commercial settings. And at the same time, many digital archaeology projects are actually built by people working

on short-term academic computing contracts that may cycle between the academic and commercial sector (these individuals are often called "Alt-Acs" or Alternative Academics; see Posner 2013; Kansa and Kansa 2015). As such, Alt-Acs, typically working on short-term "soft money," would be prudent to look toward the commercial sector if the grant money does not continue to flow; fluency in methodologies and skills demanded in the tech sector can offer Alt-Acs more employment options outside academia. All of these factors come together to make the practice and outcomes of digital archaeology seem similar to those of (low budget) commercial start-ups.

These factors make the character of digital-centered outputs very different from conventional academic outputs. Branding for conventional research, be they books or articles, works very differently than digital scholarship. The dominant branding factor for conventional research outputs centers on the publisher: certain publishers carry cachet and prestige, and that branding confers prestige to their authors. While branding matters, the connection between a conventional scholarly work and an individual scholar is more personal and direct. Books and articles are largely "marketed" on a researcher's curriculum vitae, clearly identified as a researcher's individual accomplishments.

The myopic focus of academic reward systems to reward individual accomplishments over collaborative endeavors has seen wide critique among digital humanists (Fitzpatrick 2011). Despite these critiques, digital projects usually still fall outside of normal academic recognition and reward systems. They mainly count for tenure in promotion only indirectly, either as a success in competitive granting, or as the subject of a conventional publication that sees recognition and reward. For Alt-Acs that fall outside of the tenure track, recognition comes from involvement with the project itself. As an alternative to conventional paths toward recognition, many digital archaeological projects establish their own unique brands. As is the case with commercial startups, digital humanities brands are expressed with domain names, logos, color palettes, font choices, and the like.

The issue of branding goes far beyond the mere fact that domain names and hosting are inexpensive. Rather, the ubiquity of branding in digital archaeology reflects its peculiar role in the larger discipline. Although some digital projects aim to disseminate results of a specific project, many attempt to develop and market tools or services. Thus,

many digital projects, though requiring their own research and development, aim to facilitate the research or outreach of others. Unlike conventional archaeological scholarship, where impact is usually measured through citation, digital projects tend compete for adoption by wider communities. Branding recognition works toward that goal.

The need to brand digital projects in large measure reflects an institutional context shaped by neoliberalism. Digital projects largely have short-term grant financing. Generating positive buzz and recognition can improve chances for future grants. Similarly, in order to sustain digital projects (see below), many projects have adopted some sort of fee-for-service model; for that of the Digital Archaeological Record (tDAR) see Kintigh and Altschul 2010, but this is applicable to Open Context also). Paying for useful services harkens back to both the market orientation and instrumentalism that help to define neoliberalism. Knowledge production has to be measurable, and ideally have practical outcomes that can be monetized. The project focus of digital archaeology similarly emphasizes instrumentalism. Most work aims to conceptualize, and if funded, build easily marketed "deliverables." Practitioners loudly trumpet accomplishments, collaborations, new features, and new funding via social media, in a way calculated to enhance recognition for a project's brand and eventually drive sales.

Making and marketing practical tools and services is not inherently bad or damaging to archaeology. After all, we absolutely should celebrate the creation of good tools and services that help archaeologists achieve research, public outreach, and other goals more effectively. However, I note the issue of branding to highlight a key concern—namely, is digital archaeology to be scholarship in its own right, or is it to be a niche area for (semi)commercial services? At what point do marketing and branding imperatives become self-serving goals unto themselves? How does marketing buzz impact the way we understand and evaluate the scholarship encoded in digital archeology?

The current framing of "sustainability" centers around organizational and project continuity made possible by clever business models that market some sort of service for fees. Ideas about what sustainability means and how we should attain it draws very heavily from neoliberalism. Grants can be seen as a type of no-interest venture capital loan. They get projects going, but then it is up to the project to maintain itself. Success means a project (and its associated institution)

has enough continued income to grow via non-grant sources of support.

The clearest example of this vision of sustainability is the online journal repository, JSTOR. JSTOR started with grant funding from the Andrew W. Mellon Foundation in 1995 and first launched its online services in 1997. In subsequent years, JSTOR's developers founded Ithaka, a nonprofit corporation to sustain and manage JSTOR. In many ways, JSTOR represents a singular success. It offers invaluable services to the scholarly community (that can afford institutional subscriptions) and now does so without depending on grant-based financing. In 2004, Donald Waters, a Mellon Foundation program officer, discussed how JSTOR came to be such a dominant player in digital scholarship, stating that "designing resources to take advantage of the economies of scale inherent in the digital environment is critical to sustainability" (Waters 2004). He also lamented the jumbled fragmentation of scholarly resources developed by many small and one-off projects (Waters 2004).

Is this vision of sustainability always desirable? One danger may be the encouragement of monopolies or oligarchies where "sustainability" is not just a means to an end (some sort of public service), but an end unto itself. Dominating a market and crowding out rivals is surely sustainable. Effectively, because JSTOR is so dominant, commands so much scholarly attention, and has contractual agreements with so many publishers and libraries,[2] it would be very difficult for others to build alternative discovery services, indexes, and interfaces to the content now delivered by JSTOR. One can imagine feminist or African American scholars developing special discovery, presentation, and text analysis tools as alternative ways of understanding and exploring the content now in JSTOR. But I cannot see how such alternative JSTOR-like platforms could now be financed, launched, and sustained. Thus, while JSTOR offers excellent services, these services come with opportunity costs.

I need to be clear that JSTOR does not deserve to be considered a villain in the world of scholarly communications. The (near) monopoly power of some commercial actors, especially Elseveir and

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[2] On this issue, see http://www.theawl.com/2011/08/
was-aaron-swartz-stealing.

Figure 2: Example of an individual sherd, a URI-identified resource in Open Context.

Proquest, does far more to stifle new (and lower cost) alternatives.[3] Rather, I focus on JSTOR because it started as a grant-funded effort. It succeeded in dominating an important niche and pioneered a model for other grant funded projects to emulate, and that is the center of my concern. Another Mellon Foundation funded effort, Digital Antiquity, is working with its tDAR (the Digital Archaeological Record) repository to offer key and absolutely necessary digital preservation services for US-based archaeology. Like similar large-scale, long-term projects, Digital Antiquity must develop a sustainable business model for its services. In doing so, it has some parallels as well as some important differences with JSTOR. First, while JSTOR relies on institutional subscription-for-access income,[4] Digital Antiquity has largely adopted "open data" policies (see below) and charges for deposit (like Open Context). Although tDAR imposes some access restrictions because of the sensitive nature of some of its data, it is otherwise very open with the content it archives. Nevertheless, a proven method to gain sustainability would be to work toward the scale and institutional positioning achieved by JSTOR, a strategy outlined by Waters (2004):

> There is as yet on the horizon no real substitute for the vision, discipline, and commitment needed to build digital collections at a scale and level of generality that will attract a broad audience of users and have such an impact on scholarship that their disappearance is not an option.

JSTOR succeeded in amassing a collection so large and comprehensive that one cannot be an effective researcher in many fields without JSTOR access. Similarly, if Digital Antiquity succeeds in developing a comprehensive archive of American archaeology, it will be in a powerful position to become a similarly essential resource for the discipline.

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[3] Thanks to Amanda French for highlighting the need to keep perspective with respect to JSTOR; see her comments: https://github.com/ekansa-pubs/ekansa-pubs.github.io/issues/23

[4] As pointed out by Ben Marwick (https://github.com/ekansa-pubs/ekansa-pubs.github.io/issues/25), JSTOR is an excellent source of open (or at least free-of-charge) data for text mining and other analyses. However, JSTOR has not embraced open-access distribution of articles and mainly maintains fee-for-access services.
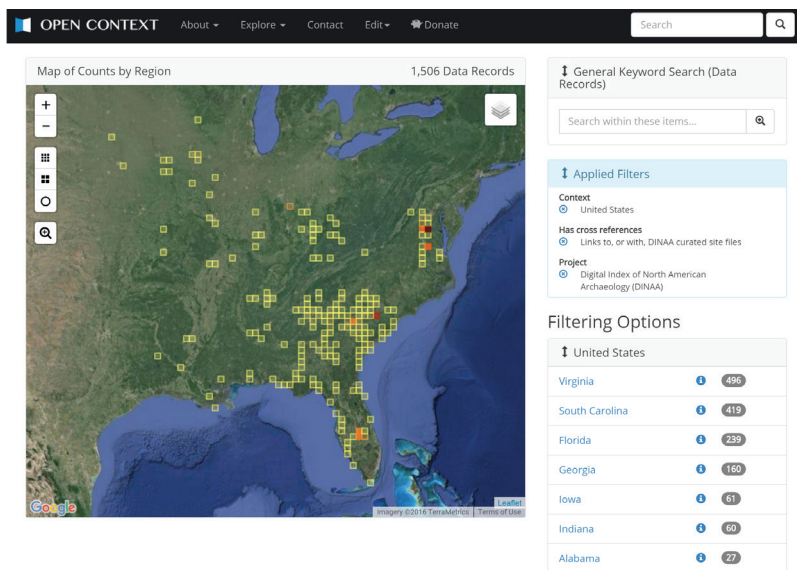
Figure 3: Map of Sites in the Digital Index of North American Archaeology (DINAA) that cross-reference with tDAR and other online collections.
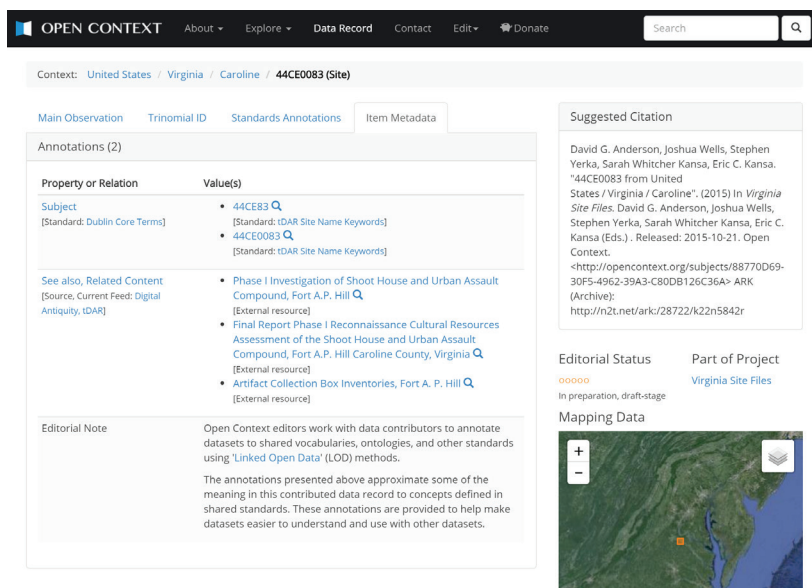
Figure 4: Example DINAA site-record cross-referencing tDAR and displaying tDAR archived reports via an API request.

Waters' emphasis on scale and centrality to explicitly achieve a JSTOR-like "lock-in" has potential drawbacks. Though it probably does lead to the long-term continuity of a given effort, it can also result in the crowding out of other programs, thereby inhibiting exploration of other paths toward innovation and other ways of organizing and representing digital scholarship. For example, Open Context has taken a very different (but complementary) route to managing and disseminating archaeological data than tDAR or other repositories. Open Context publishes digital data as granular Web resources ("one URL per potsherd;" see FIG. 2). This facilitates new opportunities to explore the approaches of Linked Open Data toward networking archaeological information. But it also represents something of a challenge to interface with a digital repository because most repositories (including tDAR) have different expectations about data organization and granularity. Nevertheless, we were able to collaborate with the California Digital Library (CDL) to arrange repository services that could accommodate the granularity of Open Context's resources. The fact that the CDL could tailor repository services to our specific needs allows us to explore different approaches to data curation while meeting preservation responsibilities.

Fortunately, recent collaborations between Digital Antiquity, Open Context, and the Digital Index of North American Archaeology (DINAA) project demonstrate that a JSTOR-like lock-in is not inevitable in digital archaeology. The DINAA project, led by Joshua Wells and David G. Anderson, uses Open Context to publish archaeological site file data curated by state officials with geospatial and other sensitive information redacted (Wells *et al.* 2014). In close collaboration with Adam Brin at Digital Antiquity, we recently cross-referenced the DINAA site file records with certain metadata records in tDAR using Linked Open Data approaches. Open data practice adopted by both Open Context and tDAR (FIGS. 3, 4), as well as technologies such as APIs (application program interfaces) and Linked Open Data that facilitate rich exchanges of data, can promote meaningful collaboration between distributed projects and collections. These same APIs and Linked Open Data methods would similarly allow completely new and independent projects to build upon tDAR and Open Context managed resources in novel ways.

A diversity of perspectives and approaches to digital data should be seen as a "feature" rather than a "bug." Archaeological data

management issues involve significant theoretical, practical, and technological challenges. These intellectual challenges are as rich and deep as any other archaeological research question, necessitating a wide variety of perspectives and experiments. We should not sacrifice community-wide engagement and participation in digital archaeology in order to make one specific program "sustainable," however worthy it may be. Thus, part of our evaluation of digital archaeology projects should focus on how such projects promote and facilitate new and independent approaches. Developing institutional supports that promote the future work of others rather than our own parochial branded interests represents a key challenge for digital archaeology in the 21st century.

Branding Solutionism

Interestingly, branding dynamics in digital archaeology not only reflect the strategies of the creators and developers of digital projects, they also reflect performance strategies of people in wider communities. For example, the laptops of many "digital archaeologists" are often covered with stickers of different brands. One could have a GitHub "octocat" sticker to signal participation in current best practice of software version control (https://github.com), a Mukurtu logo to signal awareness and concern for indigenous rights issues in digital media (http://mukurtu.org), or a Creative Commons logo to signal participation in "open knowledge" (http://creativecommons.org). Though one need not seriously engage with indigenous rights or the political economy of intellectual property to use those logos, the logos can serve a serious purpose. That is, branding and logos in digital archaeology are beginning to play a role in performance, self-fashioning, and identity construction (see Deuze *et al.* 2012). The branding of our apps serves as a signal of our commitment to public engagement, reproducibility, and ethical practice.

This issue of branding and marketing identities within the profession raises a host of questions about how digital archaeology works as scholarship. As noted, the value of conventional scholarship is measured through citation impact. How does this impact work in digital archaeology given the complexities of how brands are marketed and worn in identity construction? The actual substance, development history, technical characteristics, or conceptual foundations of

a specific platform or project can matter less than its importance as a signal of identity. After all, the specifics of any program are often opaque and difficult to discern, especially to a non-expert.

How does marketing-buzz and identity-signaling correlate with recognition of a project as an important element of archaeological practice? I argue that the issue of branding and identity construction relates to Evgeny Morozov's (2014: 5) critique of "solutionism," a technocratic tendency of:

> . . . recasting all complex social situations either as neat problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized—if only the right algorithms are in place!—this quest is likely to have unexpected consequences that could eventually cause more damage than the problems they seek to address.

Solutionism is appealing in a neoliberal academic institution because it suggests that complex and contested problems can be made tractable with the proper technologies and management practices. The initial (and now more tempered) enthusiasm for "Massive Open Online Courses" (MOOCs) to cheaply deliver "educational experiences" that can scale up is illustrative of solutionism in higher education. While it may seem obvious that education is an intensely social and complex process, MOOC proponents were highly effective at selling the idea that learning was a service ripe for cost-cutting disruption through digital media. It turns out that MOOCs are not simple turn-key solutions. MOOCs can, and occasionally do, broaden access to meaningful learning, but it takes more than simple delivery of course materials and interaction over the Web. Making MOOCs work requires institutional commitment and dedication to understand how to make technologies work within complex social contexts of learning (Earl 2014).

Temptations to celebrate simple branded solutions exist in digital archaeology. In the current context of cost-cutting and pressure for high-throughput and easily recognized research outputs, brands can unfortunately signal concern for larger research and engagement goals without necessarily investing meaningful effort. This is akin to "green-washing," a tactic where institutions adopt superficially "green" measures to promote ecological branding, but continue to follow environmentally destructive practices. A recent episode

involving CyArk, a nonprofit organization that uses 3D laser scanning and other techniques to "preserve"[5] cultural heritage monuments, illustrates the challenge of discerning style from substance. CyArk has a beautifully designed web presence, and it branded itself under the banner of "open access."[6] However, in attempting to reuse CyArk data, Isenburg (2013) noted that he was blocked by severe legal restrictions. This prompted accusations of "open washing" (a play on the phrase "green washing"), where some claimed CyArk presented itself as an open-access data provider that highlighted Creative Commons licenses but actually maintained proprietary control over data in far less conspicuous fine-print. CyArk has since clarified what it means by "open access" and explained access and reuse restrictions on the basis of security issues and other sensitivities (see Barton 2014). While such restrictions may be justified, only a careful read and immersion in open-access licensing debates (see Hagedorn *et al.* 2011; Rocks-Macqueen 2013; Costa *et al.* 2014) would let one understand that CyArk is not open access in the sense of the Wikipedia, Public Library of Science (PLOS), tDAR, Open Context, or other efforts. Nevertheless, a Google Search of recent press coverage[7], shows that CyArk still clearly leverages "open access" branding in public promotion.

The fog of marketing and brand signaling to promote financial sustainability in digital heritage can complicate ethical practice, even for a project like Mukurtu, which is designed to empower communities to manage, share, and preserve their digital cultural heritage within their own ethical, cultural, and social parameters and protocols.[8] Mukurtu (http://mukurtu.net) plays a much needed and

[5] The rationale and efficacy of "scanning as preservation" are debatable but out of scope for this paper. In addition, it is not clear what measures CyArk takes to preserve data beyond file backups; it does not seem to use any recognized digital repository platforms or methods, nor does CyArk seem to partner with digital libraries or archives.

[6] See the Internet Archive preserved webpage from 2012: https://web.archive.org/web/20121011125856/http://archive.cyark.org/about. After the Isenburg 2013 blog post, CyArk clarified its policies on data restrictions, claiming such restrictions are passed on from site owners; see http://www.cyark.org/data-use-policy.

[7] See a Google News search for the keywords: CyArk and "open access": https://www.google.com/search?q=cyark+%22open+access%22&tbm=nws.

[8] See http://mukurtu.org/project/differential-access-for-the-ethical-stewardship-of-cultural-and-digital-heritage-april-28–2015/.

essential complimentary role in this space. Unfortunately, it faces the same pressures and dilemmas felt by other projects. Branding can collapse complex theoretical, policy, and ethical issues into simplistic and caricatured signaling. An extreme example could read, "Facing the complex negotiations and ethical challenges of working with a community subjected to 500 years of colonialism? There's a hosted solution and mobile app for that!"[9] We need avoid the tendency of branding that drifts toward glib solutionism and risks trivializing issues like cultural appropriation. Similarly, the sustainability imperative to monetize digital archaeology can further undermine the point of these efforts. For instance, because digital projects typically lack access to long-term funding, they need to bring in sales. Mukurtu, as a hosted solution, risks perverse incentives to achieve JSTOR-like market dominance over long-term management of sensitive traditional cultural expressions "as a service." While the Murkutu team launched this hosted service in response to the needs of their partners, this approach nevertheless raises difficult issues in governance and liability, especially since it brands itself as a long-term "safe keeping place."[10] The political economy of system architectures and associated business models, including the power and dependency issues arguably inherent with "software as a service," are rarely discussed in digital archives. But these issues are of key importance in the case of Mukurtu given its emphasis on working with communities struggling against colonialism.

Beyond Mukurtu.net, Kimberly Christen has taken steps to continually maintain the open-source code base for MukurtuCMS at the Center for Digital Scholarship at Washington State University. This long-term support can promote more ethically optimal approaches as the code can deployed, modified, and managed *independently* and thus more clearly help empower indigenous communities. But realizing these outcomes requires more generalized technical capabilities

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[9] While drafting this paper, the exact phrase "there's an app for that," appeared in the press relating to a Mukurtu deployment; see https://www.adn.com/article/20151031/looking-preserve-native-culture-theres-app.

[10] The promise of safe-keeping forever comes from the Center for Digital Archaeology (CoDA) hosted service, Mukurtu.net. As is the case with CyArk, I cannot find any clear documentation that specifies digital preservation processes for Mukurtu.net, nor can I find reference to partnerships with digital libraries and repositories.

and skills, the cultivation of which requires larger and longer-term investments made directly to indigenous communities themselves, not necessarily the Mukurtu development team. In some cases, these communities may determine they need to sometimes prioritize systems other than Mukurtu. This is not to say the Mukurtu development team does not deserve financial support. Of course it does. But their livelihoods should be less dependent on pushing a particular suite of software or services. I raise this issue to highlight how scarce funding creates real pressures and tradeoffs. The fight for money carries marketing imperatives to push one's own branded solutions in order to win grants, generate buzz, collect service fees, and keep the servers running. We need to articulate and explore these pressures so as to better understand how to align the interests of Mukurtu and other digital humanities projects with the publics they serve.

Open Context, the (branded!) system I manage, faces similar dilemmas. It seeks to broaden participation to the research process but has to charge for its publishing services, and those charges can exclude less-advantaged researchers (such as independent scholars and graduate students) that lack institutional or grant support. I also face pressures to "oversell" Open Context as "the answer" to hugely challenging semantic, technical, and interoperability imperatives. Of course Open Context cannot solve all of archaeology's information challenges. Mukurtu is obviously a much better platform for community control and expression of their own materials, while tDAR is a good platform for general-purpose data preservation needs. Open Context serves different needs, and it only makes sense as a complimentary part of a much larger landscape. But who will finance the vast diversity of needs and niches in that landscape? Thus, digital archaeology—even when it promotes laudable goals like indigenous rights or responsible digital curation—faces strong commodification pressures. If digital platforms are to improve archaeological practice, they need to be parts of a much larger programs and commitments to quality and ethics. Reaching these more meaningful goals requires more understanding of the trade-offs and costs of grants with short budget cycles and institutions that seem concerned only with cutting costs, generating buzz, and maximizing quantified research efficiencies.

Moving beyond Solutionism

Most discussion of data management presumes and reinforces a normative institutional status quo for the organization and conduct of research. Research data management typically focuses on cost-cutting—"Doing More with Less" (Whyte and Tedds 2011)—by reducing waste (lost data) and increasing efficiencies (interoperability). However, institutionalizing data management only in terms of optimizing the business as usual *status quo* (but now with saving data!) side-steps important challenges. Research data management raises important questions about intellectual property, evaluation, reproducibility, and quality that go far beyond concerns over costs, efficiencies, and measurements of impact. Indeed, as discussed below, treating data as yet another research product needing to be managed and measured undermines both intellectual freedom and the ethical conduct of research.

As noted above, Open Context has adopted a model of "data sharing as publication." In recognition of the complexities of intellectual property, stakeholder engagement, and the semantic and quality challenges inherent in archaeology, we made the explicit choice to explore a model where data editors work in collaboration with data creators to share more meaningful and intelligible data. Open Context's approach has helped researchers share, integrate, and analyze datasets at a large scale, leading to significant research outcomes (Arbuckle *et al.* 2014; Kansa *et al*. 2014).

A key issue with Open Context, however, is that its approach requires human collaborative effort to drive editorial processes. Editing and integrating data require costly staffing and time commitments that do not readily scale, leading some to call it a "boutique data publisher" (see Kratz and Strasser 2014). Conventional publishing finances editorial and other productions costs through subscriptions and sales predicated on commoditizing the intellectual property of the copyright-protected content. But Open Context very deliberately employs open-access and open-data publishing models to avoid commoditizing content. In response to heavy lobbying by the media industry (including large scholarly publishers), Congress (and other legislative bodies outside the the United States) have enacted increasingly far reaching and draconian laws to protect business models that are based on commoditized intellectual property. These laws not only

apply to entertainment, but also to scholarly communications. The recent tragic case of Aaron Swartz, an Internet activist who took his own life after the collapse of plea-bargain negotiations with federal prosecutors, illustrates the legal risks associated with commoditized intellectual property.[11]

The Swartz example shows how a complex thicket of contractual agreements and intellectual property laws enforced by surveillance and the threat of draconian punishment underpin normative academic publishing (Kansa *et al.* 2013). Reform efforts in scholarly communications have largely embraced the banner of "openness." The term "open" has assumed a special kind of valence in relation to digital technologies, especially in networking and communications (see the digital "commons" in Benkler 2006: 60-63). "Open" usually means legal and practical guarantees for inspection, reuse, and adaptation of a piece of content or a technology. Thus, the term "open" stands in opposition to "closed" or "proprietary," which imply legal and other restrictions that require negotiating specific permissions or licenses, usually for a fee, for even limited kinds of access and reuse. The varieties of "open" relevant to researchers include open standards, open formats, open-source software, open-access publications, and open data. Integrating all of these forms of openness together, especially in the context of "transparent" workflows, starts to approach ideals of "open" or "reproducible" science (Lake 2012; Marwick 2014). To some (Stodden 2009), openly exposing the process of research represents an intrinsic good, and an ideal of ethical practice and scientific professionalism.

Thus, while openness sometimes means access and permissive intellectual property frameworks, in the research context it increasingly means moving the knowledge creation process to more public forums that can, in principle, support wider engagement with more communities (Beale and Beale 2012). As I discuss below, emphasis on the research process, as opposed to neatly packaged outcomes (peer-reviewed papers or even archived datasets), has the potential to help digital archaeology move beyond solutionism.

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[11] Swartz faced between 30 to 50 years of federal prison for alleged mass-downloads of papers from JSTOR. In contrast, he would have faced 20 years of prison for human-trafficking (slavery). See: http://www.propublica. org/article/hacktivism-civil-disobedience-or-cyber-crime

Fungible Data and Its Discontents

Placing more value on the process of knowledge creation can help turn back many of the worst dysfunctions of neoliberalism in today's research institutions. Unfortunately, the language we currently use to discuss digital data suggests that data is mainly a management or preservation problem. After all, two agencies of the United States government, the NSF and the NEH, require data management plans for grant-funded archaeological research. This language can lead some to consider data to be mainly a matter for bureaucratic compliance, not intellectual engagement.

Similarly, many discussions about data management frequently emphasize the central importance of standards. Common information standards help facilitate data discovery, interoperability, and integration. Standards make use of data at large scales efficient. With common standards data can open new research opportunities that require large-scale data analysis. But one may also see the imposition of standards as exactly that: an imposition. Common standards reflect a certain (and potentially contestable) set of perspectives, assumptions, and goals. Requiring the use of certain standards means requiring a certain agenda. Successfully imposing standards that prioritize certain kinds of questions and approaches may open new opportunities for easier, large-scale data analysis, while at the same time curtailing researcher autonomy to organize and describe materials in new ways. Interoperability standards may marginalize "artisanal" or "craft" (Shanks and McGuire 1996) research practices in favor of practices that lead to the "mass-production" of interchangeable, standardized, and fungible outputs (see also Limp 2011: 278). If interoperability and efficiency become our discipline's key concern with respect to data, we should expect pervasive and sometimes unwelcome impacts to the practice of archaeology.

One can make similar arguments about copyright licensing and interoperability. Open-science and open-data advocates note standardized liberal copyright licensing makes interoperability easier. Combining different datasets together represents a fundamental research need in using data. Ambiguous or incompatible licenses and access controls can complicate or preclude this form of reuse. Therefore, open-data advocates typically promote free access and attribution only licensing (i.e., the Creative Commons Attribution

license) or "entanglement-free" public domain dedications (Creative Commons Zero; see Vollmer 2013; Costa *et al*. 2014).

While valuable in many circumstances, open-data licensing does not represent an ethical ideal for all cases. Ten years ago, several colleagues and I highlighted how Creative Commons licenses reflect ethical positions and norms that are not universally applicable, particularly in contexts of colonialism and cultural appropriation (Kansa *et al*. 2005; Kansa 2009). Similarly, Christen's critiques of open access motivated her to develop the Mukurtu platform. Christen considers open access as tending toward arbitrary technocratic colonialism, at least with respect to indigenous rights issues (Christen 2009, 2012). While I strongly agree with the vision of more ethical practice that Christen very articulately describes, I disagree with her characterization of "openness" as a root problem. In my experience,[12] open-data advocacy is not nearly so uniformly ideological and indifferent to social context as Christen suggests. Instead, theoretical and policy debates about "openness" can cross-fertilize debates about cultural appropriation. For instance, our 2005 paper discussed Creative Commons–inspired "some rights reserved" models to meet a wider range of needs for traditional cultural expressions. The paper had a large impact, and, as noted by Allison Fish (2014), Christen and colleagues implemented similar licensing and labeling ideas with their "Local Contexts" project (http://localcontexts.org; see also Anderson and Christen 2013; Christen 2015).[13] In addition, over the past several years, representatives from Open Context and other digital practitioners have debated cultural appropriation issues and policy concerns. We did so with iCommons (a former branch of Creative Commons),[14] the Intellectual Property in

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[12] I obviously have a very different set of experiences and interactions that framed my perspectives here. There are many different issues, communities, and actors involved in this space, and my conversations about ethically situating openness seem to have taken a different tone than what Christen describes in her 2012 publication. So it maybe these different kinds of interactions led to very different conclusions about open advocacy.

[13] Fish recognized the similarities in these approaches; however (not to sound crabby), none of the scholarly papers about "Local Contexts" actually cite Kansa *et al*. 2005, a publication that led to my participation in fruitful meetings, panel discussions, and presentations about these topics with Christen and others.

[14] See, e.g., the blog post and discussion hosted by iCommons: http://web.archive.org/web/20071125100852/http://beta.icommons.org/articles/

Cultural Heritage (IPinCH) project,[15] scholarly debates about "open archaeology" (Kansa 2012; Lake 2012; Morgan and Eve 2012), ethics policies for the American Library Association (ALA, Christen herself participated in this),[16] and policy recommendations for government agencies.[17] Like the ALA, Michigan State University's MATRIX Institute similarly adopts different intellectual property frameworks into the practice of its digital cultural heritage collaborations. While some MATRIX projects adopt open models,[18] depending on context, others adopt stricter safeguards and protections for digital content.[19]

Public debate about mass-surveillance, online privacy, open access, open government, race and gender issues in social media, and more highlight the complexity of current information empowerment issues (Wells 2014: 28). Rather than blindly asserting that all "information must be free" ([sic] Christen 2009, 2012), even (non-anthropologically informed) advocates for openness often protest against ubiquitous data collecting and surveillance by government agencies and corporations. For instance, the Electronic Frontier Foundation seeks less severe copyright restrictions and penalties[20] and greater openness in science[21] and government,[22] while at the same time promoting civil

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finding-common-ground-in-the-digital-commons

[15] See the IPinCH reserch team (http://www.sfu.ca/ipinch/about/ipinch-people/research-team) and also the policy outcomes for Open Context (http://opencontext.org/about/intellectual-property).

[16] See the American Library Associations discussion of "traditional cultural expressions": http://wo.ala.org/tce/faq/.

[17] See Sarah Kansa's (Open Context's Editor) policy recommendations submitted to the White House Office of Science and Technology Policy on proposed frameworks for government-sponsored research data: http://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_083132.pdf#page=20.

[18] See the "Digital Archaeology Institute" ("ethic of openness") led by Ethan Watrall and Lynne Goldstein: http://digitalarchaeology.msu.edu/about/.

[19] See an example collection with "all rights reserved" copyright: http://aodl.org/islamicpluralism/.

[20] See, e.g., https://www.eff.org/wp/collateral-damages-why-congress-needs-fix-copyright-laws-civil-penalties, and especially: https://www.eff.org/issues/tpp.

[21] See, e.g., https://www.eff.org/document/student-activism-open-access.

[22] See, e.g., https://www.eff.org/deeplinks/2009/03/foia.

liberties protections through public use of strong cryptography[23] and communication networks free from corporate or government surveillance.[24] If one recognizes the central importance of power relations in information management, one can support both open data *and* privacy safeguards and other protections, depending on the context.

I agree with Christen (2012) that openness is not some sort of inevitable end-stage of technological progress (see also Kansa 2009). Rather, openness reflects choices motivated by ideologies, ethics, practicalities, and other factors, especially in how people navigate identity and power relations. If openness is to make meaningful positive contributions to the practice of archaeology, it needs to be situated within engaged research processes. Informed by anthropology and recent scholarship on privacy (e.g., Nissenbaum 2004), we should expect privacy, security, and cultural mores about information to vary across different historical and cultural contexts and social situations (Chander and Sunder 2004; Kansa *et al*. 2005; Hollowell and Nicholas 2008). Deep understanding of culture, history, and social context (not to mention a willingness to listen, learn, and take "no" for an answer) are required to negotiate issues about what information needs to be considered private, sensitive, sacred, or damaging if released, and even what information may need to be shared with urgency through certain channels.

Building these deep understandings necessarily requires the kinds of wider engagement and partnerships promoted by "community archaeology." This is the approach, explicitly advocated in Open Context's intellectual property policies.[25] These quiet and behind-the-scenes approaches also underlie the core value of Mukurtu's collaborative work. The same holds true for the decades-long partnerships developed between MATRIX and heritage institutions in West Africa, or the years invested in partnership between First Nation communities and museums with the Reciprocal Research Network (https://www.rrncommunity.org/). While exemplary, such deep and long-term investments in engagement are the exceptions and not the norms. Most researchers, including archaeologists, face tremendous pressures to "publish or perish" via venues that have business

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[23] See, e.g., https://www.eff.org/encrypt-the-web

[24] See, e.g., https://www.eff.org/wp/
who-has-your-back-2014-protecting-your-data-government-requests.

[25] See http://opencontext.org/about/intellectual-property.

models explicitly centered on commercial appropriation. Open-data and open-science advocacy still lies at the margins of scientific practice and research norms. By far, most money and effort invested in scholarly communications flows into channels of commercial appropriation (conventional journals) rather than open-data systems or non-commercial archives with privacy safeguards.[26] In a context of cut-throat job competition, many archaeologists feel they cannot invest the great effort needed to make their research processes more open for wider engagement.

Thus, rather than seeing the main threats to ethical research practice in open-access or open-data advocacy (Christen 2012), I see pervasive academic Taylorism[27] as a far greater concern. The bureaucracies that govern research largely see value only in productivity and impact. Academic institutions ignore or even punish effort invested in more thoughtful and ethical practice when only a few types of research outcomes "count" in job performance metrics. Indeed, use of metrics to evaluate scholarship is simple and easy to administer, since it requires no deep insight in the context and process behind that scholarship. These neoliberal practices are corrosive to ethics, *regardless whether the outcomes are open or closed*. The thought and effort required for meaningful and ethical data curation is largely invisible and unrewarded by most research institutions. Thus, we should avoid caricatures where different digital humanities brands signal false dichotomies in prioritizing either open data or the self-determination rights of local and indigenous communities. Instead, we need institutions that encourage more thoughtful and ethical day-to-day practices

[26] The five largest University of California campuses spend together more than $90 million annually on commercial acquisitions and subscriptions in 2013–2014 (see http://arlstatistics.org/analytics). In contrast, during the same period the CDL allocated only about $3.5 million on digital repository services of the type supporting open access, open data, and protected research data; see http://www.cdlib.org/about/docs/CDLAnnualReport_2013_2014.pdf.

[27] "Taylorism" derives from Frederick Taylor, a pioneering business management theorist and developer of "Scientific Managment", a set of practices to improve worker and factory productivity through strict performance metrics and stream-lining of routine tasks. Many see digital technologies as a powerful means to implement Taylorist practices, see: http://www.economist.com/news/business/21664190-modern-version-scientific-management-threatens-dehumanise-workplace-digital

so that researchers have the time and intellectual freedom to navigate complex realities and trade-offs.[28]

Open data and reproducible research advocacy has raised important questions about relationships between commercial appropriation, academic reward systems, and research conduct (Kansa 2014a, 2014b). Rather than celebrating "big data" of a type and scale valued and (factory) farmed largely through corporate and government surveillance, we should highlight the value of small and properly contextualized data. Our community needs institutional supports that offer more space for thoughtful digital curation, or "slow data." The most important value of research data does not center on its scale, efficient collection, or even efficient interoperability. Rather, a slow data approach can highlight how data collection, management, and dissemination practices need to be considered integral to the larger ethical and professional conduct of research.

Conclusions

The idea of "slow data" introduced above owes much to Bill Caraher's notion of "slow archaeology" (Caraher 2013; Ch. 4.1). Slow archaeology captures the notion that we as a professional community should emphasize excellence in the research process, including taking time for thoughtful consideration, not simply high-throughput and efficient production of tangible research outcomes. Slow data is basically the digitized aspects of slow archaeology.

In the case of Open Context, we emphasize that making sense of aggregated data requires dedicated professionalism and thoughtful effort (Kansa *et al*. 2014). Minimal efforts to comply with grant data-management requirements by depositing messy and undocumented spreadsheets into a repository may not be sufficient to enable future reuse. Since such data curation is integral to the process of research, we need more policy emphasis on recognizing and rewarding the research process as a whole (see also Dallas 2015; Huggett 2015). The continued domination of fast-paced "publish or

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[28] Christen (2012) argues for exactly such culturally aware mindfulness. Again, my main focus of disagreement centers not on her vision for better ethical practice (where I absolutely agree); instead, I have a different diagnosis of the root problems in that I think neoliberal institutions and reward systems cause far more harm than advocacy for research "openness."

perish" expectations will perpetuate perverse incentives to badly curate data and to ignore the ethical context of those data.

Slow archaeology can help us articulate more humane and insightful approaches to the "datafication" of archaeology. Simply adding digital technologies, platforms, and services to a disciplinary context of zero-sum competition and dwindling short-term finances will not promote ethical practice or more nuanced understandings of the past. Digital archaeology currently has a growing array of branded projects, many struggling with short-term financing, and all desperately competing for attention and market share. In the name of economies of scale and narrowly defined notions of sustainability, this could drive centralization and lock-in, making it much harder for new ideas and approaches to see experimentation.

It does not have to be like this. We can and should advocate for institutional and financial mechanisms that are more long term and offer more opportunity for reflection. Our memory institutions, namely libraries and museums, may offer some of the best organizational templates to sustain more reflective digital efforts. Though they too are now also struggling with fiscal austerity and neoliberalism, in many cases such organizations have provided invaluable public services for decades. Many of us participate in digital archaeology because we were dissatisfied with the *status quo* of conventional archaeology. Now that our area of practice has finally achieved some recognition, it is time to work toward a better institutional foundation to sustain our efforts in a manner that promotes and does not subvert our ethics and goals.

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