ANTH 641: Digital Archaeology and Data Reuse

University of Wisconsin-Milwaukee
Dr. Kevin Garstki kgarstki@uwm.edu

Monday and Wednesday, 3:45 – 5:00pm
Place: Sabin Hall 240
Office Hours: TBD

Course Description:

Archaeology has always been open to borrowing techniques, technology, and knowledge from other disciplines, and archaeologists have long made use of outside digital technologies. Despite the widespread use of digital databases and geographic information systems for over 30 years, the last decade has witnessed a significant increase in the different types of digital technologies being utilized at all levels of archaeological research. The influx of new hardware and software, and the various applications and platforms now available, have made it difficult for many to "keep up" with emerging trends in archaeology. As social science disciplines increasingly move towards reliance on digital datasets for recording, research, accessibility, and archiving, it is now incumbent upon developing scholars to be familiar with the ways in which digital data can used, and how they are impacting research practices. This course will provide students with a space to develop their digital literacy in archaeological contexts. We will use a combination of lecture, discussions, and computer work to engage students in ways to create, manage, combine, and reuse archaeological data, while also confronting emerging issues in the field related to the increased use of digital technologies: data accuracy, data ethics, ownership, open data, public engagement, 'big data.' There are no expectations of a coding or data analysis background, but since activities will be taking place on a computer, a basic level of digital literacy will be assumed. Students will not be expected to emerge from this course with a complete knowledge of how to perform complex analyses on digital datasets – rather, this course will instill an underlying framework for how to think about archaeology and the data that archaeologists produce. It will foster an understanding of the principles that are beginning to guide archaeological research in the 21st century.

Student Learning Outcomes:

Following the completion of this course, students will:

- Be able to access and collect data from open sources.
- Know the basics of data management and curation.
- Have knowledge of the methods for utilizing, visualizing, and performing analyses on digital data.
- Be able to knowledgeably assess published digital archaeological datasets.
- Know the different techniques for capturing 3D data and disseminating those data.
- Be familiar with the broad discussions in archaeology surrounding the use of digital technologies and be able to engage productively in them.

Statement of Course Transparency:

This course is funded by a source outside of the University of Wisconsin-Milwaukee. The course is funded by the Alexandria Archive Institute (AAI), a 501(c)(3) non-profit organization (EIN: 9102146202). AAI has received an Infrastructure and Capacity-Building Challenge Grant from the National Endowment for the Humanities which provides funding for the AAI's activities for ten years, until December of 2028. A key aim of the program is to develop data literacy among students and other practitioners of archaeology. To this end, a portion of the AAI's annual budget is earmarked for developing a Data Literacy Program, which will include a variety of approaches, such as workshops, full courses, and fellowships. This course is a part of this program, working to develop principles of archaeological data literacy and reuse.

Readings:
The Open Digital Archaeology Textbook by Shawn Graham, Neha Gupta, Jolene Smith, Andreas Angourakis, Andrew Reinhard, Kate Ellenberger, Zack Batist, Joel Rivard, Ben Marwick, Michael Carter, Beth Compton, Rob Blades, Cristina Wood, & Gary Nobles *(Listed on Syllabus schedule as "ODAT").*This textbook is available at no cost by clinking the above link or the link provided in our Canvas site.

Additional required reading will be posted as PDFs or links in Canvas. The full citations of each reading are listed below in the "Course Schedule" section of this syllabus.

Undergraduate Course Requirements:

Participation	35%
Digital Assignments	10%
Leading Discussion	10%
Blog Posts	20%
Final Project -Web Interface	25%

Graduate Course Requirements:

Participation	25%
Digital Assignments	10%
Leading Discussion	10%
Blog Posts	20%
Pinal Project – Data Reanalysis	35%

Grading Scale:

A	100-94%	C+	79.5-77%
A-	93.5-90%	C	76.5-73%
B+	89.5-87%	C-	72.5-70%
B	86.5-83%	D+	69.5-67%
B-	82.5-80%	D	66.5-60%
		F	59% -

Graduate Student Requirements: Graduate students are responsible for additional assignments that will require further work outside of class, including preparing discussion questions for each in-class discussion and writing a discussion paper when leading discussion. Additionally, the final project undertaken by graduate students will require significant external research and time to complete. These additional responsibilities are outlined in the sections below.

Participation: Students will be required to attend and participate in all aspects of the course. This includes having the reading done prior to class, participating in class discussions, working on in-class activities, and being on time to class. On days when you are not the discussion leader, **graduate students** are responsible for posting **at least 3 discussion questions** to the weekly Canvas discussion board by **midnight the Sunday before class**.

Digital Assignments: Part of the semester will be spent in the Sabin 240 computer lab, working on exercises that are designed to teach different aspects of digital literacy and data reuse in archaeology. Some of these exercises will be conducted in a computational environment that uses Jupyter Notebooks through an online browser, while some will be designed to work with specific archaeology-based online datasets, applications, and tools. All of these tools are available at no cost to the student, as open-source programs or licenses that exist already through the university. Students will be able to utilize open computer lab hours to complete outstanding computer work. Furthermore, the majority of applications used for assignments can be accessed through any browser, allowing students to complete assignments from their own computers if necessary. These experiential learning activities are meant to teach you specific skills or frameworks to bring to your outside research.

Discussion Leader: Each student will be responsible for leading discussion once through the semester. **Graduate students** will post a **two-page discussion paper** along with **five** discussion questions to that week's Canvas discussion board **at least 48 hours** before the class meeting. The paper and questions can

cover any of the readings from that week specifically or can be broader conceptual questions relating to the larger topic. **Undergraduate discussion leaders** will post **five** discussion questions to the discussion board **at least 48 hours** before the class meeting.

Blog Posts: Some major underlying themes in "digital archaeology" are openness (in scientific terms) and transparency. To foster good practices when doing digital archaeology part of your work will be writing up and sharing your digital work through blog posts. These short (approximately 600 word) entries will include links to your work, descriptions of what you did, and a brief contextualization of the exercise within broad theoretical discussions occurring in class.

Final Project: As you develop your digital skills and become familiar with the theories behind their use in archaeology, you will be working towards a final project that displays your comprehension of these skills with real archaeological data. **Graduate students** will find and make use of two datasets – one from Open Context and one from another open-access platform – and perform a basic (re)analysis of some aspect of the data to come to a meaningful interpretation. This project is meant to demonstrate the student's grasp of principles of digital archaeological data use: collection, curation, and reuse. Students will outline their project in a final blog post (approximately 2500 words) discussing what they have done, sharing their conclusions, visualizations, and/or code. **Undergraduate students** will use an open archaeological dataset of their choosing to design a public-facing web interface to display the data and convey information (e.g., in the form of a story map). This project will build on skills developed through the exercises in class, as well as discussions about digital public archaeology. The student will accompany the development of the interface with a final post in their blog (approximately 1500 words) in which they will describe their reasoning for displaying the data in that way and a brief discussion about their methods in the context of broad trends in digital archaeology.

Workload:

For this three-credit course, undergraduate students should expect to dedicate 147.5 total hours, while graduate students should expect to dedicate 195 hours. This breakdown of expected time commitments is an approximation and students are assessed by performance, not hours put into the classwork.

Undergraduate	Graduate
Class time = 37.5 hours	Class time = 37.5 hours
Reading and discussion prep = 60 hours	Reading and discussion prep = 80 hours
Assignments and blog = 35 hours	Assignments and blog = 35 hours
Final Project = 15 hours	Final Project = 42.5 hours
Total = 147.5	Total = 195

Late Work:

All assignments will receive a 5% deduction each day the assignment is turned in past the posted due date. Exceptions may be made by the instructor in outstanding circumstances, and if the students contacts me about an excusable absence at least one day prior to the assignment due date.

Course Schedule

Activities and Readings are subject to change based on the progression of the class

Week 1: Introduction to the class

Jan. 22

In-class: Introduction to the course

Week 2: Data in Archaeology: What are they and how do we use them?

Jan. 27 & 29

Readings: ODAT: Getting Started, Welcome, Chapter 1

In-class: Computer-based activity

Topics: Basic use of Git, Jupyter Notebooks

Week 3: Data in Archaeology: What are they and how do we use them?

Feb. 3 & 5

Readings: Tringham, R. & M. Ashley. 2015. "Becoming Archaeological." *Journal of Contemporary Archaeology* 2(1): 29-41.

Huggett, J. 2012 "Lost in information? Ways of knowing and modes of representation in e-archaeology" *World Archaeology* 44(4): 538-552,

Kansa, E. and S. Kansa 2013 "We all know that a 14 is a sheep: data publication and professionalism in archaeological communication." *Journal of Eastern Mediterranean Archaeology and Heritage Studies* 1(1): 88-97.

Bevan, A. 2015 "The Data Deluge." *Antiquity* 89: 1473-1484

Wylie, A. 2017 "How Archaeological Evidence Bites Back: Strategies for Putting Old Data to Work in New Ways." *Science, Technology, & Human Values*, 42(2):203-225

In-class: Discussion

Topics: Not all data are made the same; difficulty in using other people's data; potential for data reuse; FAIR data principles

Week 4: Data Management

Feb. 10 & 12

Readings: ODAT Chapter 2.1-2.4

In-class: Computer-based activity

Topics: Data preservation, curation, cleaning

Due: Blog Post 1

Week 5: Where is our digital data coming from? Born-digital data and legacy data

Feb. 17 & 19

Readings: Faniel, I.M., Austin, A., Kansa, E., Kansa, S.W., France, P., Jacobs, J., Boytner, R. and Yakel, E., 2018. "Beyond the Archive: Bridging Data Creation and Reuse in Archaeology." *Advances in Archaeological Practice*, 6(2): 105-116.

Wallrodt, J. 2016 "Why Paperless: Technology and Changes in Archaeological Practice, 1996-2016." *Mobilizing the Past for a Digital Future*, pp. 33-50.

Caraher, W. 2016 "Slow Archaeology: Technology, Efficiency, and Archaeological Work" *Mobilizing the Past for a Digital Future*, pp. 421-442.

Leighton, M. 2015 "Excavation Methodologies and labour as epistemic concerns in the practice of archaeology. Comparing examples from British and Andean archaeology." Archaeological Dialogues 22(1): 65-88.

Atici, L. et al. 2013 "Other People's Data: A Demonstration of the Imperative of Publishing Primary Data*." Journal of Archaeological Method and Theory* 20: 663-681.

In-class: Discussion

Topics: The impact of digital-data collection in the field; the problems with using legacy archaeological data

Week 6: Data Reuse: Data collection

Feb. 24 & 26
Readings: ODAT Chapter 2.5-2.7
In-class: Computer-based activity
Topics: Scraping, APIs, digital repositories
Due: Blog Post 2

Week 7: Avoiding the Data Graveyard – what happens to our data after they're published?

Mar. 2 & 4
Readings: Opitz, R. 2018 "Publishing Archaeological Excavations at the Digital Turn." *Journal of Field Archaeology* 43, S68-S82.
Richards, J. 2015 "Ahead of the Curve: Adventures in e-publishing in Internet Archaeology" *Archäologische Informationen* 38: 63-71.
Kansa, E. 2016 "Click here to save the past." *Mobilizing the Past for a Digital Future*, pp. 443-472
Jeffrey, S. 2012 "A new Digital Dark Age? Collaborative web tools, social media and long-term preservation" *World Archaeology* 44(4): 553–570
Beck, A. and C. Neylon. 2012 "A vision for open archaeology" *World Archaeology* 44(4): 479–497.
In-class: Discussion
Topics: Digital dissemination and publication of archaeological data; open data

Week 8: Data Reuse: Data (re)analyses

Mar. 9 & 11
Readings: ODAT: Chapter 3.1-3.3
In-class: Computer-based activity
Topics: Organizing your data; basics of archaeological statistics in R
Due: Blog Post 3

Spring Recess: March 15-22

Week 9: Data Re-use: Data (re)analyses

Mar. 23 & 25
Readings: Elliott, T., S. Heath, and J. Muccigrosso 2014. "Prologue and Introduction." In *Current Practice in Linked Open Data for the Ancient World*. http://dlib.nyu.edu/awdl/isaw/isaw-papers/7/elliott-heath-muccigrosso/
In-class: Computer-based activity
Topics: Data visualization; Linked Open Data
Due: Blog Post 4

Week 10: Spatial data and Web-mapping

Mar. 30 & Apr. 1
Readings: ODAT Chapter 3.5
In-class: Computer-based activity
Topics: Story-telling with geographic data; Geospatial data for the public
Due: Blog Post 5

Week 11: 3D Data Capture and Use

Apr. 6 & 8

Readings: Sapirstein, P. and S. Murray. 2017 "Establishing Best Practices for Photogrammetric Recording During Archaeological Fieldwork." *Journal of Field Archaeology* 42(2): 337-350.

Sapirstein, P. 2018 "A High-precision photogrammetric recording system for small artifacts." *Journal of Cultural Heritage* 31: 33-45.

ODAT: Chapter 4.2-4.5

In-class: Structure from Motion activity

Topics: Basics of computational photogrammetry image capture and processing

Due: Blog Post 6

Week 12: Use of 3D models

Apr. 13 & 15

Readings: Jeffrey, S. 2015 "Challenging heritage visualisation: beauty, aura and democratisation." *Open Archaeology* 1: 144-152.

Rabinowitz, A. 2015 "The work of archaeology in the age of digital surrogacy." *Visions of Substances: 3D Imaging in Mediterranean Archaeology,* pp. 27-42.

Eve, S. 2018 "Losing our Senses, an Exploration of 3D Object Scanning." *Open Archaeology* 4:114-122.

Hermon, S. and F. Niccolucci. 2018. "Digital Authenticity and the London Charter." In *Authenticity and Cultural Heritage in the Age of 3D Digital Reproductions.* 37-48.

Garstki, K. 2017. "Virtual Representation: the Production of 3D Digital Artifacts." *Journal of Archaeological Method and Theory* 24:726–750.

In-class: Discussion

Topics: Fidelity, accuracy, and authenticity of archaeological 3D models; dissemination of 3D models

Week 13: Digital Public and Community Archaeology

Apr. 20 & 22

Activity: Browse Digital Pubic Archaeology projects.

Readings: ODAT Chapters 3.4, 3.7, 3.8

Richardson, L. 2013 "A digital public archaeology?" *Papers from the Institute of Archaeology* 23(1).

Beale, G. and N. Beale. 2015 "Community-Driven Approaches to Open Source Archaeological Imaging." *Open Archaeology* 1: 44-63.

Bollwerk, E. 2015. "Co-Creation's Role in Digital Public Archaeology" *Advances in Archaeological Practice* 3(3): 223-234.

Sayre, M. 2016 "Digital Archaeology in the Rural Andes: Problems and Prospects." *Mobilizing the Past for a Digital Future,* pp. 181-199.

In-class: Discussion and activity

Topics: How digital technologies aid in interactions between archaeologists and the public

Due: Blog Post 7

Week 14: Ethics and digital archaeology

Apr. 27 & 29

Readings: ODAT Chapter 5

Khunti, R. 2017 "The Problem with Printing Palmyra: Exploring the Ethics of Using 3D Printing Technology to Reconstruct Heritage." *Studies in Digital Heritage* 2(1): 1-11.

Richardson, L-J. 2018 "Ethical Challenges in Digital Public Archaeology*." Journal of Computer Applications in Archaeology* 1(1): 64-73.

Clarke, M. 2015 "The Digital Dilemma: Preservation and the Digital Archaeological Record" *Advances in Archaeological Practice* 3(4): 313-330

Cook, K. 2019 "EmboDIYing Disruption: Queer, Feminist and Inclusive Digital Archaeologies" *European Journal of Archaeology* 22(3): 398-414.
Perry, S. 2018 "Why Are Heritage Interpreters Voiceless at the Trowel's Edge? A Pleas for Rewriting the Archaeological Workflow" Advances in Archaeological Practice 6(3) 212-227.
In-class: Discussion
Topics: Can we use digital technologies to aid in an ethical future for archaeology? CARE data principles

Week 15: 'Big data'

May 4 & 6
Readings: Levi, A. "Humanities 'big data': myths, challenges, and lessons." *Big Data,* 2013 IEEE International Conference.
Gattiglia, G. 2015 "Think big about data: archaeology and the Big Data challenge." *Archäologische Informationen* 38: 113-124.
VanValkenburgh, P. and J. A. Dufton. 2020. "Big Archaeology: Horizons and Blindspots" *Journal of Field Archaeology* 45(51): S1-S7.
Huggett, J. 2020 "Is Big Digital Data Different? Towards a New Archaeological Paradigm" *Journal of Field Archaeology* 45(51): S8-S17.
In-class: Discussion
Topics: Are archaeological data "big data?"

Final Projects due May 11th at 11:59pm.

There is no final exam.