

Material Past in a Digital World

ANTH/CLST/HIST 1303-401

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Summary

Current information technologies improve our ability to document, study, and present artifacts and spaces from the past in novel ways, but what does it mean to deal with material evidence in a virtual context? In this class, students will explore the ways in which archaeologists collect, process, and share digital data from objects through lectures, discussion, and hands-on activities. As we learn about acquiring, managing and sharing digital data, we will discuss how sophisticated digital methods have changed the study of the past, how online tools have facilitated public participation, and how virtualization of objects and spaces allow people to experience the past in new ways. We will also confront the logistical and ethical consequences of these new technologies and data in security, accessibility, and representation. Finally, we will touch on technology's role in the preservation of the past in today's turbulent world. No prior technical experience is required, but we hope students will share an enthusiasm for the past.

Class Experience

We will meet twice a week, with one meeting for a lecture by the instructor or a guest lecturer and the other meeting for discussion, working on class exercises, or other activities. Most of the class meetings will be in the designated classroom, but in other cases we may meet in CAAM or another location to take advantage of the resources that the museum offers. Readings will be provided digitally by the instructor via Canvas, Box, or links which can be accessed through the Penn library online interface.

A note on hardware and software: This is a course in digital techniques in archaeology. Therefore, we will be relying heavily upon some digital tools. Course material assumes you have an adequate personal computer and a smartphone or a digital camera. We will use some specialized software for our projects (e.g. [RealityCapture](#), [ImageJ](#), [CloudCompare](#)). You may be comfortable installing and using some of this software on your personal laptop, and others will be browser-based which should eliminate any barriers for use. There will be some cases, however, where your computer is not capable or appropriate for the work that you want to do. In that case you must schedule time for you to use the computers in the CAAM-Digital Lab.

Evaluation

Periodic Exercises (40%)

Approximately four exercises will provide students with an opportunity to practice skills in creating, managing, and presenting digital object data for archaeology. Each one will include the development of a digital product (database, model, etc.) and a short written segment. These will be done partly together during a class period and will be completed by the students outside of class time. Some exercises may draw upon some external web-based platforms.

Late assignments will be marked down 10% for every calendar day after the due date.

Course Project (35%)

Students are asked to complete a 'digital object biography' in which they use a digital method to record an archaeological object, space, or landscape and use the data to highlight important aspects of the subject and connect it to a larger social theme. Students are invited to choose an object related to one of several themes that will be presented during the first few weeks of the course.

- Sitio Conte: Create 3D models from artifacts associated with a burial excavated as part of the 1940s Cocoli Expedition.
- Rajasthan Ethnoarchaeological Ceramic Collection: Create 3D models or digital interpretation of objects from a CAAM study collection.
- Upper Egypt Gallery: Document some of the standing sculptures in the Upper Egypt Gallery before the gallery is renovated.
- Faunal Remains Reference Collections: Create an online reference collection of CAAM zooarchaeological remains.

Students may also propose their own object and project for digitization.

Object selection is due February 28th. A project plan by April 4th. A project plan includes a description of the workflow and expected product. Students will give a 10 minute presentation on the project topic at the end semester and submit a written summary (5 pages max) describing the project procedures, outcomes, and significance.

Midterm Exam (15%)

An in-class 'midterm' exam will consist of short answers and short essay questions.

Attendance and in-class contributions (10%)

Your interest and enthusiasm is important and appreciated.

Academic Integrity

This course will follow Penn's guidelines on Plagiarism. If detected, the use of AI to generate text for assignments will be treated as plagiarism. Guidance for avoiding plagiarism can be found here: <https://guides.library.upenn.edu/citationpractices/plagiarism>

Schedule:

A working schedule is below. See the calendar for reading lists which will be updated no fewer than two weeks before the due date. The instructor reserves the right to adjust the calendar to take advantage of new opportunities.

Week	Module	Date	Tuesday	Thursday
1	Introduction	1/12	X	Archaeology at Penn, Penn Museum, CAAM, digital archaeology, Introduction to the course, syllabus, review of Canvas organization for this course
2	Archaeology	1/ 17	Lecture: Introduction to Archaeology Read: Renfrew, Colin. 2015. Archaeology Essentials : Theories, Methods, Practice. Third edition. London: Thames & Hudson. Read sections: Introduction (p 8-13), 2. What is left? (p 38-48), 3. Where? (p62-105).	Lecture: Digital Archaeology Read: Nobles, 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. n.d. The Open Digital Archaeology Textbook. https://o-date.github.io/draft/book/so-what-is-digital-archaeology.html . Read Chapter: 1.1 So, What is Digital Archaeology? Emphasize subsections 1.1.1 1, 1.1.2, and 1.1.5.

3	Archaeological Collections	1/ 24	<p>Lecture: Archaeological Science & Tour of CAAM Introduction to Rajasthan Ceramics</p> <p>Read: Badillo, Alex E., and Marc N. Levine. 2021. "Why Digital Archaeology? A Case Study from Monte Albán, Oaxaca." The SAA Archaeological Record, January. https://mydigitalpublication.com/publication/?i=722989&article_id=4123580&view=articleBrowser.</p> <p>Cobb, Peter "CAAM's Virtual Lab" Expedition Magazine 59.2 (2017): n. pag. Expedition Magazine. Penn Museum, 2017 http://www.penn.museum/sites/expedition/?p=25546</p>	<p>Lecture: Digital Archaeological Collections</p> <p>Read: Nobles, 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. n.d. 2.4 Arranging and Storing Data for the Long Haul (Databases!) The Open Digital Archaeology Textbook. Accessed January 21, 2021. https://o-date.github.io/draft/book/arranging-and-storing-data-for-the-long-haul-databases.html.</p> <p>Clarke, Mary. 2015. "The Digital Dilemma: Preservation and the Digital Archaeological Record." Advances in Archaeological Practice 3 (4): 313–30. https://doi.org/10.7183/2326-3768.3.4.313.</p>
4	Imaging and Sensors	1/31	<p>Lecture: Sensors</p> <p>Read: TBD</p> <p>Additional Resource: https://historicengland.org.uk/images-books/publications/multi-light-imaging-heritage-applications/</p>	<p>Workalong: Exercise 2: Multispectral Imaging</p> <p>Lecture: Imaging Read: Dritsa, Vasiliki, Noemi Orazi, Yuan Yao, Stefano Paoloni, Maria Kouli, and Stefano Sfarra. 2022. "Thermographic Imaging in Cultural Heritage: A Short Review." Sensors 22 (23): 9076. https://doi.org/10.3390/s22239076.</p>
5	Imaging and Sensors	2/7	<p>Guest Lecture: Presentation of Sitio Conte materials</p> <p>Read: TBD</p>	<p>Lecture: Sensors and Spaces</p> <p>Read: Objects and Imaging Badillo, Alex E., and Marc N. Levine. 2021. "Why Digital Archaeology? A Case Study from Monte Albán, Oaxaca." The SAA Archaeological Record, January. https://mydigitalpublication.com/publication/?i=722989&article_id=4123580&view=articleBrowser.</p>

6	Photogrammetry	2/14	<p>Guest Lecture: Tessa de Alarcon, Project Conservator, Penn Museum: Digital Methods in Conservation.</p> <p>Read: TBD</p>	<p>Workalong: Exercise 3 Photogrammetry</p> <p>https://historicengland.org.uk/images-books/publications/photogrammetric-applications-for-cultural-heritage/</p>
7	Photogrammetry	2/21	<p>Tour of Egyptian Gallery with Conservation</p> <p>Read: Sapirstein, Philip, and Sarah Murray. 2017. "Establishing Best Practices for Photogrammetric Recording During Archaeological Fieldwork." <i>Journal of Field Archaeology</i> 42 (4): 337–50. https://doi.org/10.1080/00934690.2017.1338513.</p>	<p>Lecture: Photogrammetry Applications</p> <p>Explore the Smithsonian's 3D website https://3d.si.edu/ and watch at least the "Overview" video. Look at how they display the models, how you as the user can interact with them, and think about their goals and objectives in undertaking this project.</p>
8	Manipulating 3D data	2/28	<p>Read: "Virtual Hampson Museum." n.d. Accessed March 15, 2021. https://hampson.cast.uark.edu/. Selden, Robert Z., Timothy K. Perttula, and Michael J. O'Brien. 2014. "Advances in Documentation, Digital Curation, Virtual Exhibition, and a Test of 3D Geometric Morphometrics: A Case Study of the Vanderpool Vessels from the Ancestral Caddo Territory." <i>Advances in Archaeological Practice</i> 2 (2): 64–79. https://doi.org/10.7183/2326-3768.2.2.64.</p>	<p>Read: Seales, William Brent, Clifford Seth Parker, Michael Segal, Emanuel Tov, Pnina Shor, and Yosef Porath. 2016. "From Damage to Discovery via Virtual Unwrapping: Reading the Scroll from En-Gedi." <i>Science Advances</i> 2 (9): e1601247. https://doi.org/10.1126/sciadv.1601247.</p>
Spring Break			X	X
9		3/14	<p>Read: Petersson, Bodil, and Carolina Larsson. 2018. "Archaeology and Archaeological Information in the Digital Society." In <i>From Storing to Storytelling – Archaeological Museums and Digitisation</i>, edited by Isto Huvila, 36. Routledge. https://doi.org/10.4324/9781315225272-5.</p>	<p>Read: Unger, Jiri, Christiane Hemker, Christoph Lobinger, and Marik Jan. 2020. "VirtualArch: Making Archaeological Heritage Visible." <i>Internet Archaeology</i> 54. https://doi.org/10.11141/ia.54.2.</p>

10		3/21	Workalong Exercise 4 Read: Cooper, Catriona. 2019. "You Can Handle It: 3D Printing for Museums." <i>Advances in Archaeological Practice</i> 7 (4): 443–47. https://doi.org/10.1017/aap.2019.39	Fisher Fine Arts Artec Demonstrations. Read: Ellenberger, Kate. 2017. "Virtual and Augmented Reality in Public Archaeology Teaching." <i>Advances in Archaeological Practice</i> 5 (3): 305–9. https://doi.org/10.1017/aap.2017.20 Eve, Stuart. 2018. "Losing Our Senses, an Exploration of 3D Object Scanning." <i>Open Archaeology</i> 4 (1): 114–22. https://doi.org/10.1515/opar-2018-0007
11		3/8	Read: http://onlinedigeditions.com/publication/?m=16146&i=392992&p=26&ver=html5	Debate! Content Review
12		4/4	In Class Midterm	Scanning and processing sessions
13		4/11	Scanning and processing sessions	Scanning and processing sessions
14		4/18	Scanning and processing sessions	Project Presentations
15		4/25	Project Presentations	X