

ANTH 045

How Our Environment Has Shaped Us

Fall 2020

Tuesdays and Thursdays

Asynchronous (Tuesdays) and Synchronous (Thursdays 3-4.20pm EST)



Dr Jennifer Bates

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Office Hours: Mondays 9-10am; Fridays 9-10am, or by appointment (email).

Office: Zoom!

Description: How Our Environment Has Shaped Us.

Seminar open to First Years, Juniors and Seniors.

From our earliest ancestors to the recent warming of our planet, the history and future of humans is fundamentally influenced by our relationship with the world around us. This intimate connection makes it a necessity for us to understand how humans have used, adapted to, altered and are in turn affected by our environment. How has climate change affected the development of human society? How have people adapted to their environments in the past and how have they shaped these

environments in turn? What does it mean to develop “sustainable” approaches to our environments over the short and long term? Environmental archaeology is the study of these questions. By the end of this course you will have the tools to interpret human-environment interactions in the past and the present, and suggest ways we can change our thinking and actions in the future.

Schedule:

Classes are predominantly seminar discussion based, though some will have a hands-on or practical element to them. This will involve applying the things learned through discussion through practicals done at home (e.g.: soil and seed analysis), analysing a dataset online,, or object sessions with the Penn Museum online collections (e.g.: exploring artifacts relating the human adaptation to different environments).

We’re going to use a mix of asynchronous and synchronous materials.

On Tuesdays will we have a series of asynchronous lectures and videos so that you can engage with the debates relating to the reading materials in your own time at the start of the week.

For the Thursday sessions we will alternate each week between asynchronous practicals and synchronous seminars on zoom.

The practicals are designed so that you can carry them out in your own home setting.

The synchronous Zoom meetings will be scheduled class time (Thursdays, 3pm-4.20pm Philadelphia time), and will reflect on the readings for the week. These sessions will be recorded so that those who cannot attend will be able to review them later.

If you cannot attend the Zoom meeting, we have an alternative option to create a more synchronous discussion across different time zones or in your own time. We will use a Canvas plug in, Piazza. This creates a typed thread conversation where we can set up a discussion about the papers that doesn’t require us to be on the app at the same moment, but we can still debate and discuss over the end of the week time period (Thursday through Sunday).

You will all therefore get a chance to talk about papers, engage in the debates and interact with both the instructor and each other, as well as take part in practicals and discover how these hot topics have a deep history to them.

The week therefore breaks down into:

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Instructor (alt. weeks)	Asynchronous video/lecture uploaded			Asynchronous practical materials uploaded			
Student	View videos/lectures and read papers according to own schedule			Engage with practicals according to own schedule			
Instructor (alt. weeks)	Asynchronous video/lecture uploaded				Zoom meeting 3pm EST	Respond to Piazza threads according to student schedule	

					AND Start Piazza threads	
Student	View videos/lectures and read papers according to own schedule				Zoom meeting 3pm EST OR Respond to Piazza threads	Respond to Piazza threads if choosing asynchronous according to own schedule

Learning outcomes:

Through taking this course you will be able to:

- 1) Describe the natural and cultural mechanisms driving environmental and climatic change
- 2) Critically evaluate the effects of climatic and environmental change on technology, social organisation and politics
- 3) Be able to discuss how humans have affected the climate and environment.
- 4) Identify and describe the processes of environment and landscape formation and change
- 5) Develop your critical thinking and writing skills

Course Text Books:

There are two key text books for this course (see below). You do NOT have to purchase these for yourself, the relevant chapters for the course have been scanned and uploaded to Canvas.

- Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge.
- Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London.

Other readings from articles, specialist books and webpages will be used in the seminars to build our discussions around. These will all be uploaded as PDFs or weblinks to the Canvas page.

An additional reading list of interesting and relevant material has been attached to the back of this syllabus should you wish for a starting place to explore the topic more widely. For extra suggestions pop by my office during my office hours!

Canvas and Piazza:

The Canvas course page and Piazza plug in on our Canvas site will be the main tool for checking on announcements, view set weekly readings, view assignments, and post and respond to questions. Please make sure you have set yourself as receiving announcements for the course page and make sure you check it regularly for important information like rooms changes etc.

This syllabus may be periodically updated throughout the semester (using the Announcement Page). You must read the required readings before the class meeting. You should be prepared to discuss each of the required readings for all classes. I strongly suggest taking detailed notes while doing the readings. These notes will be useful for in-class discussions and for preparing your papers.

Graded Coursework:

The breakdown of course assessment is as follows:

- **Attendance and participation (10%)**

Participation and engagement is through the viewing of the lectures, engaging with the readings, and being involved in the synchronous meetings, be that through attending the Zoom sessions or through responding via the Piazza threads. Participation is weighted 10% of the final grade.

- **3 Assignments (30% each)**

The three written assignments will develop over the course of the semester to form a final Environmental Site Report.

This assignment requires you to produce a paper about an archaeological site or region similar to reports developed for example by the Environmental Protection Agency, a key government body that produces reports relating to historical and archaeological resource protection, or published site reports from research projects. In the first couple of weeks we will look at these type of reports and discuss how they are developed.

The goal of producing these papers is for you to engage with how our heritage is produced, consumed and protected. This is both archaeological, historical and environmental. When choosing which site to explore, think about issues that interest and affect you, for example it may be a site you have visited, or one you would like to visit. Alternatively you could look at the news – is there a site that is being discussed or is under threat? Think then about how producing a deep time historical study of the environmental and archaeological setting of this site may help in the protection of this site and/or providing information on it to the stakeholders (interested people). This may be a diverse group, from local people to international policy makers.

The three assignments are structured as follows:

Assignment 1 (Due start of Week 6) – c.1000 words

Introduction to the site. In this paper you will outline the background of the project – locate the site in its context, both regional and archaeological, and why work is/should/has been done at it. Why are we looking into it? Is it under threat? Is it of local/national/international significant? Are there specific research questions that you want to address through exploring it?

Assignment 2 (Due Start of Week 11) – c.1000 words

The Paleoenvironmental Setting. What did the environment at your site look like in the past? How has this been reconstructed? What methods did archaeologists use to get this information? In this paper you will explore how the past environmental setting of the site has been developed in research, and provide a more detailed exploration of the data currently available to us. You can provide information from further afield than your own site – look at other comparable excavations or studies, how does your site fit into these?

Assignment 3 (Due Start of Week 16) – c.1000 words

The Future. Building on the previous two papers – what is going to happen next at your site? What are the gaps in the studies already done? From your research agenda in the first paper, is there a particular aspect of environmental archaeology that still needs to be addressed? If the site is under threat, what can or should be done? And how does the site help us think about future environmental challenges? Finally – how are you going to disseminate this information? What channels are you going to use (e.g.: a policy whitepaper, a published academic paper, a newspaper report, social media, a local/national/international event, develop a museum)? Remember to think about the stakeholders, the nature of your site, and which of these kinds of information channels is appropriate for these.

In total your report will add up to between 3000 to 4000 words (4000 words is a maximum limit) when each of the three papers is added together. Through writing these reports you will develop your writing skills, your research design skills and your critical reasoning skills.

Formatting: 1.5 spacing, 12 point, Times New Roman font, 1 inch margin. Please add as many illustrations as are necessary to make your point.

We will discuss referencing style in class.

Attendance Policy:

It is expected that students will attend all classes (except religious holidays). Absences must be reported by filing a Course Absence Report on Courses In Touch. Attendance and classroom participation will account for 10% of your final grade (see above with regards to what that entails).

UPenn supports the principles of freedom of expression for both faculty and students, and the rights for faculty to teach and students to learn. In order to maintain these rights classroom conditions should not impede the learning process. A disruptive classroom will not be tolerated. Online classrooms are similar to real classrooms – civil behaviour is important, and you should consider giving space to those who want to be heard, and allowing reasoned debate to develop. Please do not read magazines, mess about on Facebook, make obnoxious remarks or engage in other rude activities, even though you are online. Sanctions for activities deemed to impinge upon faculty and student rights can be found here: <https://catalog.upenn.edu/pennbook/#policiesbytopictext> <https://catalog.upenn.edu/pennbook/code-of-student-conduct/>

Assistance:

Please ask questions in class, by email, or in my office hours. I am more than happy to discuss anything with you that will help you to succeed in this class, and if you have a question then doubtless others are also thinking the same thing too. So please, the most important policy in this class is that if you don't know something or have a question, ask!

Student and Employee Accessibility Services

Please inform me (after class or during my office hours) if you require some modification of any of these course procedures. For more information contact Office of Student Disabilities Services (SDS) at 215-573-9235 or vpul-lrcmail@pobox.upenn.edu

Academic Integrity:

All students at UPenn must abide by the copyright policies standards in the UPenn Code of Academic Integrity: <https://catalog.upenn.edu/pennbook/code-of-academic-integrity/> Penalties for violating these can be severe, so please familiarize yourselves with them.

Plagiarism is a serious offence and penalties can include a warning, reprimand or grade adjustment, although further penalties at the Dean's discretion can also be applied. A simple guideline is never plagiarize. More information can be found here in the academic code: <https://catalog.upenn.edu/pennbook/code-of-academic-integrity/>

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Course Structure

(Tentative and subject to change dependent on circumstances)

September 1st: Course Introduction: archaeology and the environment **Asynchronous**

September 3rd: Thinking about environment change, mechanisms and human (inter)actions
Synchronous (Zoom/Piazza)

September 8th: Garbology and the science of interference **Asynchronous**

September 10th: Environmental Reports **Practical (Piazza)**

September 15th: Measuring time and determining chronology **Asynchronous**

September 17th: Mass spectrometers, dendrochronology and dating **Synchronous (Zoom/Piazza)**

September 22nd: Sedimentology **Asynchronous**

September 24th: Geoarchaeology and soil identification **Practical (Piazza)**

September 29th: Landscapes, landforms and processes for change **Asynchronous**

October 1st: Site formation processes **Synchronous (Zoom/Piazza)**

October 6th: Paleoenvironmental Reconstruction I – archaeobotany at the macrobotanical level
Asynchronous

October 8th: What we can see with the naked eye: seeds, charcoal and other larger vegetal matter
Practical (Piazza)

October 13th: Paleoenvironmental Reconstruction II – archaeobotany at the microbotanical level
Asynchronous

October 15th: Life under the microscope: phytoliths, pollen and starch **Synchronous (Zoom/Piazza)**

October 20th: Paleoenvironmental reconstruction III – zooarchaeology **Asynchronous**

October 22nd: Animals in the environment: using bones as paleoenvironmental tools **Practical (Piazza)**

October 27th: Paleoenvironmental Reconstruction IV – localised isotopic approaches **Asynchronous**

October 29th: Isotopes on hair **Synchronous (Zoom/Piazza)**

November 3rd: Paleoenvironmental Reconstruction V – global isotopic approaches **Asynchronous**

November 5th: Museum object online session **Practical (Piazza)**

November 10th: Hunter-gathers and Agriculture, the impacts of changing lifestyles **Asynchronous**

November 12th: The LC6K project **Synchronous (Zoom/Piazza)**

November 17th: Ancient Ecology of Individual People **Asynchronous**

November 19th: Analysing a body in detail, looking at Otzi **Practical (Piazza)**

November 24th: Life in the big city, the develop of urban environments **Asynchronous**

November 26th: **Thanksgiving Break (no class)**

December 1st: Analysing the campus and its environmental and archaeological footprint **Asynchronous**

December 3rd: Environmental Change, climate change and their impact **Synchronous (Zoom/Piazza)**

December 8th: How do environments shape humans and humans shape their environments? Debate.
Synchronous (Zoom/Piazza)

December 10th: Project discussion time (**Scheduled trouble shooting/discussion**)

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FALL SYLLABUS

(Tentative and subject to change)

September 1st: Course Introduction: archaeology and the environment

Asynchronous

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Preface and Chapter 1.**

Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London. **Chapter 1.**

September 3rd: Thinking about environment change, mechanisms and human (inter)actions

Synchronous (Zoom/Piazza)

Dillehay, T.D., Kolata A.L. 2004. Long-Term Human Response to Uncertain Environmental Conditions in the Andes. *Proceedings of the National Academy of Sciences of the United States of America* 101(12): 4325–4330.

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 3 & 4.**

Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London. **Chapter 3.**

September 8th: Garbology and the science of inference

Asynchronous

Reitz, E.J., Shackley, M.L. 2012. *Environmental Archaeology*. Springer, London. Pp.1-39

Shillito, L.-M., Matthews, W., Almond, M.J., Bull, I.D., 2011. The microstratigraphy of middens: capturing daily routine in rubbish at Neolithic Çatalhöyük, Turkey. *Antiquity* 85, 1024–1038. <https://doi.org/10.1017/S0003598X00068460>

Smith, D.N., 2013. Defining an indicator package to allow identification of ‘cesspits’ in the archaeological record. *Journal of Archaeological Science* 40, 526–543. <https://doi.org/10.1016/j.jas.2012.06.014>

Sullivan, A.P., 1978. Inference and Evidence in Archaeology: A Discussion of the Conceptual Problems. *Advances in Archaeological Method and Theory*, 1: 183–222.

Wilson, D.C., 1994. Identification and Assessment of Secondary Refuse Aggregates. *Journal of Archaeological Method and Theory* 1, 41–68.

September 10th: Environmental Reports

Practical (Piazza)

Gibb, J.G., 1997. Necessary but insufficient: Plantation archaeology reports and community action. *Hist Arch* 31, 51–64. <https://doi.org/10.1007/BF03374230>

Hodder, I., 1989. Writing archaeology: site reports in context. *Antiquity* 63, 268–274. <https://doi.org/10.1017/S0003598X00075980>

Kenward, H., 2009. Northern Regional Review of Environmental Archaeology INVERTEBRATES IN ARCHAEOLOGY IN THE NORTH OF ENGLAND. English Heritage.

<https://www.york.ac.uk/inst/chumpal/EAU-reps/eaureps-web.htm> [explore some of these – there are a VAST number, find a subject that looks interesting and dive in]

<https://www.crowcanyon.org/access-our-research/site-reports-databases>

September 15th: Measuring time and determining chronology

Asynchronous

Bailey, G. 2007. Time perspectives, palimpsests and the archaeology of time. *Journal of Anthropological Archaeology*, 26, 198-223.

Bronk Ramsey, C., Higham, T., Leach, P., 2004. Towards High-Precision AMS: progress and limitations. *Radiocarbon* 46, 17–24.

Clift, P.D., Carter, A., Giosan, L., Durcan, J.A., Duller, G.A.T., Macklin, M.G., Alizai, A., Tabrez, A.R., Danish, M., VanLaningham, S., Fuller, D.Q., 2012. U-Pb Zircon Dating Evidence for a Pleistocene Sarasvati River and Capture of the Yamuna River. *Geology* 40, 211–214.

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 5.**

Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London. **Chapter 4.**

Sealy, J., Yates, R., 1994. The chronology of the introduction of pastoralism to the Cape, South Africa. *Antiquity* 68, 58–67. <https://doi.org/10.1017/S0003598X00046196>

September 17th: Mass spectrometers, dendrochronology and dating

Synchronous (Zoom/Piazza)

Dee, M.W., Wengrow, D., Shortland, A.J., Stevenson, A., Brock, F., Bronk Ramsey, C., 2016. Radiocarbon Dating of Early Egyptian Pot Residues. Vienna 2 - Ancient Egyptian Ceramics in the 21st Century 14-18 May 2016 Vienna, Austria.

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 6.**

Fiedel, S.J., 1999. Older Than We Thought: Implications of Corrected Dates for Paleoindians. *American Antiquity* 64, 95–115.

Gebrekirostos, A., Bräuning, A., Sass-Klassen, U., Mbow, C., 2014. Opportunities and applications of dendrochronology in Africa. *Current Opinion in Environmental Sustainability* 6, 48–53. <https://doi.org/10.1016/j.cosust.2013.10.011>

Nowak, M., Hoyo, M.M.-D., Mueller-Bieniek, A., Lityńska-Zajac, M., Kotynia, K., 2017. Benefits and weaknesses of radiocarbon dating of plant material as reflected by Neolithic archaeological sites from Poland, Slovakia and Hungary. *Geochronometria* 44, 188–201. <https://doi.org/10.1515/geochr-2015-0066>

September 22nd: Sedimentology

Asynchronous

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 11.**

Dusar, B., Verstraeten, G., Notebaert, B., Bakker, J., 2011. Holocene environmental change and its impact on sediment dynamics in the Eastern Mediterranean. *Earth-Science Reviews* 108, 137–157. <https://doi.org/10.1016/j.earscirev.2011.06.006>

England, A., Eastwood, W.J., Roberts, N., Turner, R., Haldon, J.F., 2008. Historical Landscape Change in Cappadocia (central Turkey): a paleoecological investigation of annually laminated sediments from Nar Lake. *The Holocene* 18, 1229–1245.

French, C.A.I., 2003. *Geoarchaeology in action: studies in soil micromorphology and landscape evolution*. Routledge, London. Pp.1-80

Surdez, M., Beck, J., Sakellariou, D., Vogel, H., Birchler Emery, P., Koutsoumba, D., Anselmetti, F.S., 2018. Flooding a landscape: impact of Holocene transgression on coastal sedimentology and underwater archaeology in Kiladha Bay (Greece). *Swiss J Geosci* 111, 573–588. <https://doi.org/10.1007/s00015-018-0309-4>

September 24th: Geoarchaeology and soil identification

Practical (Piazza)

Friesem, D.E., Karkanias, P., Tsartsidou, G., Shahack-Gross, R., 2014. Sedimentary processes involved in mud brick degradation in temperate environments: a micromorphological approach in an ethnoarchaeological context in northern Greece. *Journal of Archaeological Science* 41, 556–567. <https://doi.org/10.1016/j.jas.2013.09.017>

Reitz, E.J., Shackley, M.L. 2012. *Environmental Archaeology*. Springer, London. Pp.125-159.

Wilson, C.A., Davidson, D.A., Cresser, M.S., 2009. An evaluation of the site specificity of soil elemental signatures for identifying and interpreting former functional areas. *Journal of Archaeological Science* 36, 2327–2334. <https://doi.org/10.1016/j.jas.2009.06.022>

September 29th: Landscapes, landforms and processes for change

Asynchronous

Acabado, S., 2012. The Ifugao agricultural landscapes: Agro-cultural complexes and the intensification debate. *Journal of Southeast Asian Studies* 43, 500–522.

Bamforth, D.B., Becker, M., Hudson, J., 2005. Intrasite Spatial Analysis, Ethnoarchaeology, and Paleoindian Land-Use on the Great Plains: The Allen Site. *American Antiquity* 70, 561–580. <https://doi.org/10.2307/40035314>

Casana, J., 2008. Mediterranean valleys revisited: Linking soil erosion, land use and climate variability in the Northern Levant. *Geomorphology* 101, 429–442. <https://doi.org/10.1016/j.geomorph.2007.04.031>

Hooke, R.LeB. 2000. On the history of humans as geomorphic agents. *Geology*, 28, 843-846.

Kaniewski, D., Paulissen, E., De Laet, V., Dossche, K., Waelkens, M., 2007. A high resolution Late Holocene landscape ecological history inferred from an intramontane basin in the Western Taurus Mountains, Turkey. *Quaternary Science Reviews* 26, 2201–2218.

October 1st: Site formation processes

Synchronous (Zoom/Piazza)

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 12**.

Friesem, D., Boaretto, E., Eliyahu-Behar, A., Shahack-Gross, R., 2011. Degradation of mud brick houses in an arid environment: a geoarchaeological model. *Journal of Archaeological Science* 38, 1135–1147. <https://doi.org/10.1016/j.jas.2010.12.011>

Graf, K.E., Gore, A.K., Melton, J.A., Marks, T., DiPietro, L., Goebel, T., Waters, M.R., Rhode, D., 2020. Recent excavations at Owl Ridge, interior Alaska: Site stratigraphy, chronology, and site formation and implications for late Pleistocene archaeology and peopling of eastern Beringia. *Geoarchaeology* 35, 3–26. <https://doi.org/10.1002/gea.21754>

Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London. **Chapter 5**.

Shahack-Gross, R., 2017. Archaeological formation theory and geoarchaeology: State-of-the-art in 2016. *Journal of Archaeological Science* 79, 36–43. <https://doi.org/10.1016/j.jas.2017.01.004>

October 6th: Paleoenvironmental Reconstruction I – archaeobotany at the macrobotanical level

Asynchronous

Arranz-Otaegui, A., Gonzalez Carretero, L., Ramsey, M.N., Fuller, D.Q., Richter, T., 2018. Archaeobotanical evidence reveals the origins of bread 14,400 years ago in northeastern Jordan. *Proc Natl Acad Sci USA* 115, 7925–7930. <https://doi.org/10.1073/pnas.1801071115> Castillo, C.C., Higham, C.F.W., Miller, K., Chang, N., Douka, K., Higham, T.F.G., Fuller, D.Q., 2018. Social responses to climate change in Iron Age north-east Thailand: new archaeobotanical evidence. *Antiquity* 92, 1274–1291. <https://doi.org/10.15184/aqy.2018.198>

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 13**.

Pearsall, D.M., 1989. *Paleoethnobotany: a handbook of procedures*. Academic Press, San Diego. Pp.1-10.

White, C.E., Miller, N.F., 2018. The Archaeobotany of Grape and Wine in Hittite Anatolia. *Die Welt des Orients* 48, 209–224.

October 8th: What we can see with the naked eye: seeds, charcoal and other larger vegetal matter
Practical (Piazza)

Asouti, E., Austin, P., 2005. Reconstructing Woodland Vegetation and its Exploitation by Past Societies, based on the Analysis and Interpretation of Archaeological Wood Charcoal Macro-Remains. *Environmental Archaeology* 10, 1–18.

Miller, N.F., 1988. *Ratios in Paleoethnobotanical Analysis*, in: Hastorf, C.A., Popper, V.S. (Eds.), *Current Paleoethnobotany: Analytical Methods and Cultural Interpretations of Archaeological Plant Remains*. Chicago University Press, Chicago, pp. 72–85.

White, C.E., Shelton, C.P., 2015. *Recovering Macrobotanical Remains: Current Methods and Techniques*, in: Marston, J.M., d’Alpoim Guedes, J., Warinner, C. (Eds.), *Method and Theory in Paleoethnobotany*. University Press of Colorado, pp. 95–114.
<https://doi.org/10.5876/9781607323167.c006>

October 13th: Paleoenvironmental Reconstruction II – archaeobotany at the microbotanical level
Asynchronous

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 14.**

Farooqui, A., Gaur, A.S., Prasad, V., 2013. Climate, vegetation and ecology during Harappan period: excavations at Kanjetar and Kaj, mid-Saurashtra coast, Gujarat. *Journal of Archaeological Science* 40, 2631–2647. <https://doi.org/10.1016/j.jas.2013.02.005>

Madella, M., García-Granero, J.J., Out, W.A., Ryan, P., Usai, D., 2014. Microbotanical Evidence of Domestic Cereals in Africa 7000 Years Ago. *PLoS ONE* 9, e110177.

Phadtare, N.R., 2000. Sharp Decrease in Summer Monsoon Strength 4000–3500 cal yr B.P. in the Central Higher Himalaya of India Based on Pollen Evidence from Alpine Peat. *Quaternary Research* 53, 122–129. <https://doi.org/10.1006/qres.1999.2108>

Shillito, L.-M., 2011. Taphonomic observations of wheat phytoliths from Neolithic Çatalhöyük, Turkey, and the use of conjoined phytolith size as an indicator of water availability. *Archaeometry* 53, 631–641. <https://doi.org/10.1111/j.1475-4754.2010.00582.x>

Twiss, P.C., 1992. *Predicted World Distribution of C3 and C4 Grass Phytoliths*, in: Rapp, G., Mulholland, S.C. (Eds.), *Phytolith Systematics, Emerging Issues*. Plenum Press, New York, pp. 113–128.

October 15th: Life under the microscope: phytoliths, pollen and starch
Synchronous (Zoom/Piazza)

Collins, M.J., Copeland, L., 2011. Ancient starch: Cooked or just old? *Proc. Natl. Acad. Sci. U.S.A.* 108, E145, author reply E146. <https://doi.org/10.1073/pnas.1103241108>

Halbritter, H., Ulrich, S., Grímsson, F., Weber, M., Zetter, R., Hesse, M., Buchner, R., Svojtka, M., Frosch-Radivo, A., 2018. *Illustrated Pollen Terminology*. Springer International Publishing, Cham. <https://doi.org/10.1007/978-3-319-71365-6>

Madella, M., Lancelotti, C., 2012. Taphonomy and phytoliths: A user manual. *Quaternary International* 275, 76–83. <https://doi.org/10.1016/j.quaint.2011.09.008>

Piperno, D.R., 2006. *Phytoliths*. AltaMira Press, Oxford. Pp.23-80.

October 20th: Paleoenvironmental reconstruction III – zooarchaeology

Asynchronous

Chase, B., 2014. On the pastoral economies of Harappan Gujarat: faunal analyses at Shikarpur in context. *Heritage: Journal of Multidisciplinary Studies in Archaeology* 2, 1–22.

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 15 & 16.**

Benecke, N., Hansen, S., Nowacki, D., Reingruber, A., Ritchie, K., Wunderlich, J., 2013. Pietrele in the Lower Danube region: integrating archaeological, faunal and environmental investigations. *Doc. Praeh.* 40, 175–193. <https://doi.org/10.4312/dp.40.14>

Reitz, E.J., Newson, L.A., Scudder, S.J., 2008. *Case Studies in Environmental Archaeology*, 2nd Edition. Plenum Press, London. **Chapter 21.**

Yeomans, L., Richter, T., Martin, L., 2017. Environment, seasonality and hunting strategies as influences on Natufian food procurement: The faunal remains from Shubayqa 1. *Levant* 49, 85–104. <https://doi.org/10.1080/00758914.2017.1368820>

October 22nd: Animals in the environment: using bones as paleoenvironmental tools

Practical (Piazza)

Albarella, U., 2017. *Zooarchaeology in the twenty-first century*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199686476.013.56> - also check out the glossary of terms: <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199686476.001.0001/oxfordhb-9780199686476-miscMatter-12>

Carter, R.J., 1998. Reassessment of Seasonality at the Early Mesolithic Site of Star Carr, Yorkshire Based on Radiographs of Mandibular Tooth Development in Red Deer (*Cervus elaphus*). *Journal of Archaeological Science* 25, 851–856.

Cruz-Uribe, K., 1988. The use and meaning of species diversity and richness in archaeological faunas. *Journal of Archaeological Science* 15, 179–196. [https://doi.org/10.1016/0305-4403\(88\)90006-4](https://doi.org/10.1016/0305-4403(88)90006-4)

Pringle, H., 1998. Reading the Signs of Ancient Animal Domestication. *Science* 282, 1448–1448.

October 27th: Paleoenvironmental Reconstruction IV – localised isotopic approaches

Asynchronous

Dixit, Y., Hodell, D.A., Petrie, C.A., 2014. Abrupt weakening of the summer monsoon in northwest India 4100 yr ago. *Geology* 42, 339–342.

Fiorentino, G., Ferrio, J.P., Bogaard, A., Araus, J.L., Riehl, S., 2015. Stable isotopes in archaeobotanical research. *Vegetation History and Archaeobotany* 24, 215–227.

Hedman, K., Hargrave, E., Ambrose, S.H., 2002. Late Mississippian diet in the American Bottom: Stable isotope analyses of bone collagen and apatite. *Mid-Continental Journal of Archaeology* 27, 237–271.

Iacumin, P., Bocherens, H., Chaix, L., Mاريوth, A., 1998. Stable Carbon and Nitrogen Isotopes as Dietary Indicators of Ancient Nubian Populations (Northern Sudan). *Journal of Archaeological Science* 25, 293–301. <https://doi.org/10.1006/jasc.1997.0206>

Sealy, J.C., van der Merwe, N.J., Thorp, J.A.L., Lanham, J.L., 1987. Nitrogen isotopic ecology in southern Africa: Implications for environmental and dietary tracing. *Geochimica et Cosmochimica Acta* 51, 2707–2717.

October 29th: Isotopes on hair

Synchronous (Zoom/Piazza)

Cadwallader, L., Beresford-Jones, D.G., Whaley, O.Q., O’Connell, T.C., 2012. The Signs of Maize? A Reconsideration of What $\delta^{13}\text{C}$ Values Say about Paleodiet in the Andean Region. *Human Ecology* 40, 487–509.

O’Connell, T.C., Hedges, R.E.M., 1999. Investigations into the effect of diet on modern human hair isotopic values. *American Journal of Physical Anthropology* 108, 409–425.

Roberts, P., Fernandes, R., Craig, O.E., Larsen, T., Lucquin, A., Swift, J., Zech, J., 2018. Calling all archaeologists: guidelines for terminology, methodology, data handling, and reporting when undertaking and reviewing stable isotope applications in archaeology. *Rapid Commun Mass Spectrom* 32, 361–372. <https://doi.org/10.1002/rcm.8044>

Szpak, P., Metcalfe, J.Z., Macdonald, R.A., 2017. Best practices for calibrating and reporting stable isotope measurements in archaeology. *Journal of Archaeological Science: Reports* 13, 609–616. <https://doi.org/10.1016/j.jasrep.2017.05.007>

November 3rd: Paleoenvironmental Reconstruction V – global isotopic approaches

Asynchronous

Dincauze, D.F., 2001. *Environmental Archaeology, principles and practice*. Cambridge University Press, Cambridge. **Chapter 8**.

Giesche, A., Staubwasser, M., Petrie, C.A., Hodell, D.A., 2019. Indian winter and summer monsoon strength over the 4.2 ka BP event in foraminifer isotope records from the Indus River delta in the Arabian Sea. *Clim. Past* 15, 73–90. <https://doi.org/10.5194/cp-15-73-2019>

Leng, M.J., Lewis, J.P., 2016. Oxygen isotopes in Molluscan shell: Applications in environmental archaeology. *Environmental Archaeology* 21, 295–306. <https://doi.org/10.1179/1749631414Y.0000000048>

Madella, M., Fuller, D.Q., 2006. Paleocology and the Harappan Civilisation of South Asia: a reconsideration. *Quaternary Science Reviews* 25, 1283–1301.

Park, J., 2017. Solar and tropical ocean forcing of late-Holocene climate change in coastal East Asia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 469, 74–83. <https://doi.org/10.1016/j.palaeo.2017.01.005>

Prendergast, A.L., Stevens, R.E., O'Connell, T.C., Hill, E.A., Hunt, C.O., Barker, G.W., 2016. A late Pleistocene refugium in Mediterranean North Africa? Paleoenvironmental reconstruction from stable isotope analyses of land snail shells (Haua Fteah, Libya). *Quaternary Science Reviews* 139, 94–109. <https://doi.org/10.1016/j.quascirev.2016.02.014>

November 5th: Museum object online session

Practical (Discussions Thread)

Dudley, S., 2012. *Materiality Matters: experiencing the displayed object* (No. 8), Working Papers in Museum Studies. University of Michigan, Michigan.

November 10th: Hunter-gathers and Agriculture, the impacts of changing lifestyles

Asynchronous

Balbo, A.L., Rubio-Campillo, X., Rondelli, B., Ramírez, M., Lancelotti, C., Torrano, A., Salpeteur, M., Lipovetzky, N., Reyes-García, V., Montañola, C., Madella, M., 2014. Agent-Based Simulation of Holocene Monsoon Precipitation Patterns and Hunter-Gatherer Population Dynamics in Semi-arid Environments. *Journal of Archaeological Method and Theory* 21, 426–446. <https://doi.org/10.1007/s10816-014-9203-1>

Bleed, P., Matsui, A., 2010. Why Didn't Agriculture Develop in Japan? A Consideration of Jomon Ecological Style, Niche Construction, and the Origins of Domestication. *J Archaeol Method Theory* 17, 356–370. <https://doi.org/10.1007/s10816-010-9094-8>

Denham, T., 2005. Envisaging early agriculture in the Highlands of New Guinea: landscapes, plants and practices. *World Archaeology* 37, 290–306. <https://doi.org/10.1080/00438240500095447>

Fuller, D.Q., Stevens, C.J., 2019. Between domestication and civilization: the role of agriculture and arboriculture in the emergence of the first urban societies. *Veget Hist Archaeobot* 28, 263–282. <https://doi.org/10.1007/s00334-019-00727-4>

Janusek, J.W., Kolata, A.L., 2004. Top-Down or Bottom-Up: rural settlement and raised field agriculture in the Lake Titicaca Basin, Bolivia. *Journal of Anthropological Archaeology* 23, 404–430.

Richerson, P. J., Boyd, R., & Bettinger, R. L. (2001). Was agriculture impossible during the Pleistocene but mandatory during the Holocene? A climate change hypothesis. *American Antiquity*, 66(3), 387-411.

November 12th: The LC6K project

Synchronous (Zoom/Piazza)

Morrison K. et al. (draft paper). Title still to be determined. – we will debate this in preparation paper and apply it to some data in class. The pdf will be sent round before class.

Kandrika, S., Roy, P.S., 2008. Land use land cover classification of Orissa using multi-temporal IRS-P6 awifs data: A decision tree approach. *International Journal of Applied Earth Observation and Geoinformation* 10, 186–193. <https://doi.org/10.1016/j.jag.2007.10.003>

Punia, M., Joshi, P.K., Porwal, M.C., 2011. Decision tree classification of land use land cover for Delhi, India using IRS-P6 AWiFS data. *Expert Systems with Applications* 38, 5577–5583. <https://doi.org/10.1016/j.eswa.2010.10.078>

<http://pastglobalchanges.org/science/wg/landcover6k/intro>

November 17th: Ancient Ecology of Individual People

Asynchronous

Houldcroft, C.J., Rifkin, R.F., Underdown, S.J., 2019. Human biology and ancient DNA: exploring disease, domestication and movement. *Annals of Human Biology* 46, 95–98. <https://doi.org/10.1080/03014460.2019.1629536>

Jones, E.L., 2004. Dietary evenness, prey choice, and human–environment interactions. *Journal of Archaeological Science* 31, 307–317. <https://doi.org/10.1016/j.jas.2003.08.011>

Larsen, C.S., 2002. Bioarchaeology: the lives and lifestyles of past people. *Journal of Archaeological Research* 10(2):119-166.

Warinner, C., Speller, C., Collins, M.J., Lewis, C.M., 2015. Ancient human microbiomes. *Journal of Human Evolution* 79, 125–136.

Yeh, H.-Y., Mao, R., Wang, H., Qi, W., Mitchell, P.D., 2016. Early evidence for travel with infectious diseases along the Silk Road: Intestinal parasites from 2000 year-old personal hygiene sticks in a latrine at Xuanquanzhi Relay Station in China. *Journal of Archaeological Science: Reports* 9, 758–764. <https://doi.org/10.1016/j.jasrep.2016.05.010>

November 19th: Analysing a body in detail, looking at Otzi

Practical (Piazza)

Festi, D., Putzer, A., Oeggl, K., 2014. Mid and late Holocene land-use changes in the Ötztal Alps, territory of the Neolithic Iceman “Ötzi.” *Quaternary International* 353, 17–33. <https://doi.org/10.1016/j.quaint.2013.07.052>

Kutschera, W., Rom, W., 2000. Ötzi, the prehistoric Iceman. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 164–165, 12–22.

Rollo, F., Ubaldi, M., Ermini, L., Marota, I., 2002. Otzi’s last meals: DNA analysis of the intestinal content of the Neolithic glacier mummy from the Alps. *Proceedings of the National Academy of Sciences* 99, 12594–12599.

Zink, A.R., Maixner, F., 2019. The Current Situation of the Tyrolean Iceman. *Gerontology* 65, 699–706. <https://doi.org/10.1159/000501878>

<http://www.iceman.it/en/the-iceman/>

November 24th: Life in the big city, the develop of urban environments

Asynchronous

Chase, A.F., Chase, D.Z., 1998. Scale and Intensity in Classic Period Maya Agriculture: Terracing and Settlement at the “Garden City” of Caracol, Belize. *Culture and Agriculture* 20, 60–77. <https://doi.org/10.1525/cag.1998.20.2-3.60>

Green, A.S., Petrie, C.A., 2018. Landscapes of Urbanization and De-Urbanization: A Large-Scale Approach to Investigating the Indus Civilization’s Settlement Distributions in Northwest India. *Journal of Field Archaeology* 43, 284–299. <https://doi.org/10.1080/00934690.2018.1464332>

Koons, M.L., 2013. *Reexamining Tiwanaku's Urban Renewal through Ground-Penetrating Radar and Excavation: the Results of Three Field Seasons.*, in: Vranich, A., Levine, A.R., Vranich, A., Levine, A.R. (Eds.), *Advances in Titicaca Basin Archaeology-2, Monograph*. Los Angeles, pp. 147–165.

Masi, A., Balossi Restelli, F., Sabato, D., Vignola, C., Sadori, L., 2018. Timber exploitation during the 5th–3rd millennia BCE at Arslantepe (Malatya, Turkey): environmental constraints and cultural choices. *Archaeol Anthropol Sci* 10, 465–483. <https://doi.org/10.1007/s12520-017-0499-0>

November 26th: Thanksgiving Break (no class)

December 1st: Analysing the campus and its environmental and archaeological footprint

Asynchronous

<https://www.sustainability.upenn.edu/>

<https://www.sustainability.upenn.edu/node/648>

<https://www.design.upenn.edu/cebd/work/university-pennsylvania-health-system-carbon-footprint>

<https://www.seas.upenn.edu/energy-and-the-environment/>

December 3rd : Environmental Change, climate change and their impact

Synchronous (Zoom/Piazza)

Crawford, G.W., 1997. *Anthropogenesis in Prehistoric Northeastern Japan*, in: Gremillion, K.J. (Ed.), *People, Plants and Landscapes, Studies in Paleoethnobotany*. University of Alabama Press, Tuscaloosa, pp. 86–103.

Fuller, D.Q., van Etten, J., Manning, K., Castillo, C., Kingwell-Banham, E., Weisskopf, A., Qin, L., Sato, Y.-I., Hijmans, R.J., 2011. The contribution of rice agriculture and livestock pastoralism to prehistoric methane levels: An archaeological assessment. *The Holocene* 21, 743–759. <https://doi.org/10.1177/0959683611398052>

Harriss-White, B., Rodrigo, G., 2013. 'Pudumai' – *Innovation and Institutional Churning In India's Informal Economy: a report from the field*. Paper for the conference on Innovation in India, University of Pennsylvania, November 13-15, 2013 <http://www.southasia.ox.ac.uk/resources-greenhouse-gases-technology-and-jobs-indias-informal-economy-case-rice>

Marston, J.M., 2015. Modelling Resilience and Sustainability in Ancient Agricultural Systems. *Journal of Ethnobiology* 35, 585–605. <https://doi.org/10.2993/etbi-35-03-585-605.1>

Newby, P., Bradley, J., Spiess, A., Shuman, B., Leduc, P., 2005. A Paleoindian response to Younger Dryas climate change. *Quaternary Science Reviews* 24, 141–154. <https://doi.org/10.1016/j.quascirev.2004.04.010>

Petrie, C.A., Singh, R.N., Bates, J., Dixit, Y., French, C.A.I., Hodell, D.A., Jones, P.J., Lancelotti, C., Lynam, F., Neogi, S., Pandey, A.K., Parikh, D., Pawar, V., Redhouse, D.I., Singh, D.P., 2017. Adaptation to Variable Environments, Resilience to Climate Change: Investigating Land, Water and Settlement in Indus Northwest India. *Current Anthropology* 58, 1–30. <https://doi.org/10.1086/690112>

December 8th: How do environments shape humans and humans shape their environments? A debate and summation of the course.

Synchronous (Zoom/Piazza)

Balter, M., 2013. Archaeologists Say the “Anthropocene” Is Here--But It Began Long Ago. *Science* 340, 261–262. <https://doi.org/10.1126/science.340.6130.261>

Boivin, N.L., Zeder, M.A., Fuller, D.Q., Crowther, A., Larson, G., Erlandson, J.M., Denham, T., Petraglia, M.D., 2016. Ecological consequences of human niche construction: Examining long-term anthropogenic shaping of global species distributions. *Proc Natl Acad Sci USA* 113, 6388–6396. <https://doi.org/10.1073/pnas.1525200113>

Davies, P., Lawrence, S., 2019. Engineered landscapes of the southern Murray–Darling Basin: Anthropocene archaeology in Australia. *The Anthropocene Review* 6, 179–206. <https://doi.org/10.1177/2053019619872826>

Ellis, E., Maslin, M., Boivin, N., Bauer, A., 2016. Involve social scientists in defining the Anthropocene. *Nature* 540, 192–193. <https://doi.org/10.1038/540192a>

Shaw, J., 2016. Archaeology, climate change and environmental ethics: diachronic perspectives on human:non-human:environment worldviews, activism and care. *World Archaeology* 48, 449–465. <https://doi.org/10.1080/00438243.2016.1326754>

December 10th: Project discussion time

Scheduled trouble shooting/discussion



Additional Readings

- Adams, R.E.W. 2000. Introduction to a Survey of the Native Prehistoric Cultures of Mesoamerica. In Adams R.E.W., MacLeod M. J., ed., 2000. *The Cambridge History of the Native Peoples of the Americas, Volume II: Mesoamerica, Part 1*. Cambridge: Cambridge University Press.
- Ames, K.M., Maschner, H.D.G. 1999. *Peoples of the Northwest Coast: Their Archaeology and Prehistory*. London: Thames & Hudson.
- Angel, L.J. 1984. Health as a Crucial Factor in the Changes from Hunting to Developed Farming in the Eastern Mediterranean. In Cohen M.N., Armelagos G.J., eds. 1984. *Paleopathology at the Origins of Agriculture*. Florida: University Press of Florida.
- Bathurst, R.R., Davide Z., Byock J. 2010. Diatoms as Bioindicators of Site Use: Locating Turf Structures from the Viking Age. *Journal of Archaeological Science* 37(11): 2920–2928.
- Boas, F. 1966. *Kwakiutl Ethnography*. University of Chicago Press.
- Bolt, H.M. 2012. Arsenic: an Ancient Toxicant of Continuous Public Health Impact, from Iceman Ötzi until now. *Archives of Toxicology* 286 (866).
- Branch, N., Canti, M., Clark, P., Turney, C. 2014. *Environmental Archaeology: Theoretical and Practical Approaches*. London: Routledge.
- Butler, V.L. 1993. Natural versus cultural salmonid remains: origin of the Dalles Roadcut bones, Columbia River, Oregon, USA. *Journal of Archaeological Science* 20:1-24.
- Butzer, K.W. 1983. Human Response to Environmental Change in the Perspective of Future, Global Climate. *Quaternary Research* 19(3): 279–292.
- Butzer, K.W., Endfield, G.H.. 2012. Critical Perspectives on Historical Collapse. *Proceedings of the National Academy of Sciences* 109 (10):3628-31.
- Byock, J. 2001. *Viking Age Iceland*. Penguin UK.
- Carson, R. 1962. *Silent Spring*. Boston: A Marine Book.
- Diamond, J. 2005. *Collapse: How Societies Choose to Fail or Succeed*. New York: Viking.
- Diamond, J. 1997. *Guns, Germs, and Steel: The Fate of Human Societies*. New York: Norton.
- Dickson, J.H., Mudie, P.J. 2008. The Life and Death of Kwāday Dän Ts'ınchi, an Ancient Frozen Body from British Columbia: Clues from Remains of Plants and Animals. *The Northern Review* 28:27-50.
- Di Cosmo, N. 1994. Ancient inner Asian nomads: their economic basis and its significance in Chinese history. *The Journal of Asian Studies*, 53:1092-1126.
- Dillehay, T.D., Kolata A.L. 2004. Long-Term Human Response to Uncertain Environmental Conditions in the Andes. *Proceedings of the National Academy of Sciences of the United States of America* 101(12): 4325–4330.
- Dugmore, A.J., McGovern, T.H., Vésteinsson, O., Arneborg, J., Streeter, R., Keller, C. 2012. Cultural Adaptation, Compounding Vulnerabilities and Conjunctions in Norse Greenland. *Proceedings of the National Academy of Sciences* 109 (10):3658-63.
- Dugmore, A.J., Newton, A.J., Larsen, G., Cook, G.T., 2000. Tephrochronology, Environmental Change and the Norse Settlement of Iceland. *Environmental Archaeology* 5(1): 21–34.

- Dunning, N.P., Beach, T.P., Luzzadder-Beach, S.. 2012. Kax and Kol: Collapse and Resilience in Lowland Maya Civilization. *Proceedings of the National Academy of Sciences* 109 (10):3652-7.
- Eastman, A. 1997. The potential of bird remains for environmental reconstruction *International Journal of Osteoarchaeology* 7: 422-429.
- Erlandson, J.M., 2010. As the World Warms: Rising Seas, Coastal Archaeology, and the Erosion of Maritime History. *Journal of Coastal Conservation* 16(2): 137–142.
- Erlandson, J.M., Rick, T.C., Braje, T.J, Steinberg, A., Vellanoweth, R.L., 2008 Human Impacts on Ancient Shellfish: A 10,000 Year Record from San Miguel Island, California. *Journal of Archaeological Science* 35(8): 2144–2152.
- Fitzhugh, B., Gjesfjeld, E.W., Brown, W.A., Hudson, M.J., Shaw, J.D., 2016. Resilience and the population history of the Kuril Islands, Northwest Pacific: A study in complex human ecodynamics. *Quaternary International* 419, 165–193.
- Fritz, G. 2005, *Paleoethnobotanical Methods and Applications*. In Maschner, H.D.G., Chippindale, C. eds. 2005. *Handbook of Archaeological Methods*. Rowman Altamira. Pp. 773–833.
- Gardner, A., Cochrane, E.E. 2011. *Evolutionary and Interpretive Archaeologies: A Dialogue*. In Cochrane, E.E., Gardner, A., eds. 2011. *Evolutionary and Interpretive Archaeologies: A Dialogue*. Walnut Creek, CA: Left Coast Press.
- Hardesty, D.L. 1977. *Ecological Anthropology*. John Wiley & Sons.
- Jazwa, C.S., Braje, T.J., Erlandson, J.M., Kennett, D.J., 2015 Central Place Foraging and Shellfish Processing on California’s Northern Channel Islands. *Journal of Anthropological Archaeology* 40: 33–47.
- Lear, L. 2002. Introduction. In Carson, R., *Silent Spring*. Boston: A Marine Book.
- Legge, T. 1996. The beginning of caprine domestication in Southwest Asia. In Harris, D.R., ed., 1996. *The Origins and Spread of Agriculture and Pastoralism in Eurasia*. London: UCL Press. Pp. 238-262.
- Lightfoot, K.G., Martinez, A., Schiff, A.M. 1998. Daily practice and material culture in pluralistic social settings: an archaeological study of culture change and persistence from Fort Ross, California. *American Antiquity* 63:199-222.
- Liritzis, I., Singhvi, A.K., Feathers, J.K., et al. 2013. Luminescence Dating of Archaeological Materials. In *Luminescence Dating in Archaeology, Anthropology, and Geoarchaeology* Pp. 25–40. Springer Briefs in Earth System Sciences. Springer International Publishing.
- Marston, J.M., Warinner, C., d’Alpoim Guedes, J. 2014. Paleobotanical Method and Theory in the Twenty-First Century. In Marston, J.M., D’Alpoim Guedes, Warinner, C., eds. 2014. *Method and Theory in Paleobotany*. University Press of Colorado.
- Martin-Benito, D., Pederson, N., McDonald, M., et al. 2014. Dendrochronological Dating of the World Trade Center Ship, Lower Manhattan, New York City. *Tree-Ring Research* 70(2): 65–77.
- McElory, A., Townsend, P.K. 2015. *Medical Anthropology in Ecological Perspective*, Sixth Edition: Westview Press.

- Mighall, T.M. 2003. Geochemical Monitoring of Heavy Metal Pollution and Prehistoric Mining: Evidence from Copa Hill, Cwmystwyth, and Mount Gabriel, County Cork. In Craddock, P., Lang, J., eds. 2003. *Mining and Metal Production Through the Ages*. London: The British Museum Press.
- Moran, E.F. 2006. *People and Nature: An Introduction to Human Ecological Relations*. Blackwell Publishing.
- Moran, E.F. 2007. *Human Adaptability: An Introduction to Ecological Anthropology*. Third edition. Boulder, CO: Westview Press.
- Moss, M.L. 2011. *Northwest Coast: Archaeology as Deep History*. Society for American Archaeology: The SAA Press.
- Pate, D.F., 1994. Bone Chemistry and Paleodiet. *Journal of Archaeological Method and Theory* 1:161-209.
- Price, E.O. 1999. Behavioural development in animals undergoing domestication. *Applied Animal Behaviour Science* 65: 252-271.
- Quilter, J., Stocker, T. 1983. Subsistence Economies and the Origins of Andean Complex Societies. *American Anthropologist* 85 (3):545-62.
- Redman, C.L. 2005. Resilience Theory in Archaeology. *American Anthropologist* 107(1): 70–77.
- Reeder-Myers, L.A., 2015. Cultural Heritage at Risk in the Twenty-First Century: A Vulnerability Assessment of Coastal Archaeological Sites in the United States. *The Journal of Island and Coastal Archaeology* 10(3): 436–445.
- Rick, T.C., Walker, P.L., Willis, L.M., et al. 2008 Dogs, Humans and Island Ecosystems: The Distribution, Antiquity and Ecology of Domestic Dogs (*Canis Familiaris*) on California's Channel Islands, USA. *The Holocene* 18(7): 1077–1087.
- Rosen, A.M. 1997. Environmental Change and Human Adaptational Failure at the End of the Early Bronze Age in the Southern Levant. In Dalfes, H.N., Kukla, G., Weiss, G., eds. 1997. *Third Millennium BC Climate Change and Old World Collapse*. NATO ASI Series; Springer.
- Rosen, A.M. 1995. The Social Response to Environmental Change in Early Bronze Age Canaan. *Journal of Anthropological Archaeology* 14 (1):26–44.
- Schoeninger, M.J. 2010. Diet Reconstruction and Ecology Using Stable Isotope Ratios. In Larsen, C.S., eds. 2010. *A Companion to Biological Anthropology*. Wiley-Blackwell.
- Schurr, M.R., 1998. Using nitrogen-isotopes to study weaning behavior in past populations. *World Archaeology* 30:327-342.
- Serjeantson, D. 1997. Subsistence and symbol: the interpretation of bird remains in archaeology. *International Journal of Osteoarchaeology* 7: 255-259.
- Smith, B., 2001. Low-level food production. *Journal of Archaeological Research* 9:1-43.
- Smith, A., Munro, N.D., 2009. A holistic approach to examining ancient agriculture. *Current Anthropology* 50:925-936.
- Stanish, C. 2003. *Ancient Titicaca: The Evolution of Complex Society in Southern Peru and Northern Bolivia*. Berkeley: University of California.
- Sutton, M.Q., Anderson, E.N. 2014. *Introduction to Cultural Ecology, Third Edition*: Altamira Press.

Townsend, P.K. 2009. *Environmental Anthropology: From Pigs to Policies*, Second Edition. Long Grove, IL: Waveland.

Trigger, B.G. 2006. *A History of Archaeological Thought*, Second Edition: Cambridge University Press.

Van Neer, W., Muniz, A.M.. 1992. Fish Middens: anthropogenic accumulations of fish remains and their bearing of archaeoichthyological analysis. *Journal of Archaeological Science* 18: 579-603.

Walker, P.L., Erlandson, J.M., 1986. Dental Evidence for Prehistoric Dietary Change on the Northern Channel Islands, California. *American Antiquity* 51(2): 375–383.

Weiss, H., Courty, M.A., Wetterstrom, W., Guichard, F., Senior, L., Meadow, R., Curnow, A. 1993. The Genesis and Collapse of Third Millennium North Mesopotamian Civilization. *Science* 261 (5124):995-1004.

Weiss, H. 1986. Introduction: The Origins of Cities in Dry-Farming Syria and Mesopotamia in the Third Millennium B.C. In Weiss, H., ed. 1986. *The Origins of Cities in Dry-Farming Syria and Mesopotamia in the Third Millennium B.C.* Guilford, CT: Four Quarters Publishing Co.