ARCH XXXX

INTRODUCTION TO ARCHAEOBOTANY

2020

Syllabus

Schedule: TBC, Room TBC

A course with Dr Jennifer Bates, Postdoctoral Researcher

Jennifer's Office Hours: Monday's 2-4pm
Office: TBC
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Course Description:

Archaeobotany, the study of the use of plants by people in the past, examines archaeological plant remains. It is an inherently interdisciplinary sub-field of archaeology that integrates botany, ecology and social theory to explore a broad range of topics. This course will introduce both the debates in archaeobotany, from the discussion surround 'domestication' to the use of archaeobotanical remains in reconstructing 'diet' and 'food', and integrate these debates in practical lab-based classes. Whilst primarily focused on macrobotanical identification, seminars will explore the integration of multiproxy approaches and lab sessions introducing the identification of phytoliths, starch, spherulites and pollen will ensure hands-on experience with the diversity of materials that archaeobotanists interact with.

The practical classes will introduce you not only to archaeobotanical identifications, but also to current and emerging trends in archaeobotanical research. You will be introduced to the lab equipment, microscopy and digital imaging tools that are shaping the field, and discuss in seminars how these are changing the way archaeobotany is carried out today. Please note that as this is a practical lab based

class as well as a seminar course you are expected to invest time beyond class hours to carry out lab work. You are expected to spend a minimum of 2-3 hours additional to the lab practical hours a week working on your identification key and final project.

Learning Outcomes:
Through taking this course you will:

1. Understand and be prepared to assist in archaeobotanical sampling in the field and in the lab
2. Be able to discuss and debate historical and current trends in archaeobotanical research an understand the social and archaeological relevance of this work
3. Critically assess published research and reports for research design, choice of methods, data presentation and interpretive decisions
4. Correctly use a range of lab equipment including microscopy and digital imaging tools
5. Design and execute a research project
6. Prepare research results/data for sharing with academic/non-academic audiences

Class Structure:
Classes will be run twice a week, involving a Tuesday seminar and Thursday lab practical. Core readings relating to the weekly theme and readings and handouts for the lab practical will be uploaded to Canvas or (in the case of books for self-selected readings) held at the Library (see below).

Course Texts:
There is no single key text for this course, but there are a wide range of readings listed in the course syllabus. You do **NOT** have to purchase these for yourself, the relevant articles/chapters for the course have been scanned and uploaded to Canvas, or in the case of books which you should be reading selectively from have been held at the Library for use in the library.

While there is no single key reading for this course, there are a range of useful texts for reference listed below. Again, you do NOT have to purchase this, and these have either been uploaded to Canvas or reserved for use in the Library for this course.

As well as the readings for the lectures, there is a vast literature available out there. A bibliography of additional literature is included in this syllabus. This is extensive but by no means all inclusive, and for extra suggestions pop by my office hours.

Recommended introductory reading for course:

Hastorf, C .and Popper V. (Eds) 1989. *Current Paleoethnobotany*. University of Chicago Press.

Jacomet, S., 2006. *Identification of Cereal Remains from Archaeological Sites*, 2nd ed. IPAS, Basel.

Nesbitt, M., 2006. *Identification Guide for Near Eastern Grass Seeds*. Institute of Archaeology, University College London, London.

Marston, J., d'Alpoim Guedes, J., and Warinner, C. (Eds). 2014. *Method and Theory in Paleoethnobotany*.
University of Colorado Press.

Pearsall, D. 2015. *Paleoethnobotany*: A Handbook of Procedures. Left Coast Press: Walnut Creek.

Canvas:
The Canvas course page 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.

A Note on Reading and Note-Taking:
Your success in this course will depend in no small part upon completing the assigned readings for the lectures thoroughly and on time, as well as attending the lectures and completing the assignments. Readings for the basis for the course lectures and class discussions, as well as the written assignments (detailed below). Read the papers, make notes and discussion will flow.

Referencing and Resources:
The preferred referencing style is **Harvard**, which is the most common style used in Archaeology and Anthropology. These consist of in text citation (author, date, page numbers) followed by a detailed citation of the publication in the bibliography.

You are also reminded that using libraries is **essential**. Key readings are listed in the syllabus and will be made available online, but it is also important you expand your reading into other works and scholars. A useful tip is to use the bibliographies of the provided readings but be aware of the dates of publications.

In addition, online resources like JStor and WebofKnowledge for finding articles, academia.edu and researchgate are important repositories of scholarly research. Students are encouraged to use these sites to broaden their reading and familiarize themselves with looking up scholars and their research.

I will be uploading **a pdf entitled 'Useful Resources' on Canvas**. Please look at it as this has a guide to referencing styles, bibliography building and places you can go to look for articles, books and chapters.

Course Requirements and Expectations:
Over 16 weeks, you will spend 3 hours per week in class (48 hours total). Required reading is expected to take up approximately 5 hours per week (65 hours total). In addition, research and writing for the final assessment is estimated at total of approximately 30 hours over the course of the term.

Assessment:
The breakdown of course assessment is as follows:
- Attendance and participation (10%)
- Lab notebook (20%)
- Archaeobotanical 'key' (20%)
- Final Project (50%)

Lab Notebook
You must purchase a suitable A4 lab notebook and graph paper for the course. Your lab notebook is a critical document and this coursework is designed to get you into the habit of keeping good notes of all lab practices. The lab notebook should consist of handouts, notes on the nature of the practical, observations of the materials, annotated drawings (essential) of modern reference materials as well as archaeological samples, and descriptions of actions taken. It should also contain a record of all actions taken in relation to project work. Your lab book should be left in the classroom on Friday evening for feedback over the weekend by the instructor. Photocopies can be left in place of the original if work over the weekend is to be permitted.

Archaeobotanical 'key'
This assessment is deigned to integrate observations about modern reference material and archaeological samples. Archaeologically relevant keys are rare – the majority of keys are related to

modern botanical reference material and feature characteristics that may not survive the myriad taphonomic pathways present at archaeological sites. You will pick a family/genus (e.g.: Asteraceae or *Brassica*) and describe the general features of taxa for a specific region (e.g.: South Asia, East Coast USA), and develop an archaeologically relevant key for charred remains.

Final Project
The bulk of your grade will be placed on the production of a report on the archaeobotanical remains you have analysed throughout the course of the semester. This semester material will be provided from the sites of Sheri Khan Teraki, Taraki Qila and Acre in Pakistan (Neolithic -Bronze Age). If you have another collection that you would like to analyse, please arrange to meet to discuss with the instructor. You will write up a report which details how the seeds were identified and analysed, summarize basic patterns and present a quantified interpretation of the data. This should be followed by an interpretation of the data following a line of question of your own choosing (e.g.: crop processing analysis, agricultural intensification, domestication, dietary reconstruction, non-staple plant exploitation, foodways etc.). This should be 7-10 pages of double-spaced text for undergraduates. Graduate student reports should be roughly 15 double spaced pages in length. This does not include supporting tables, figures and references. You MUST cite at least 7 references with regards to this project.

Referencing, Resources and Recommended Textbooks:
The preferred referencing style is **Harvard**, which is the most common style used in Archaeology and Anthropology. These consist of in text citation (author, date, page numbers) followed by a detailed citation of the publication in the bibliography.

You are also reminded that using libraries is **essential**. Key readings are listed in the syllabus and will be made available online, but it is also important you expand your reading into other works and scholars. A useful tip is to use the bibliographies of the provided readings and to build from there.

In addition, online resources like JStor and WebofKnowledge for finding articles, academia.edu and researchgate are important repositories of scholarly research. Students are encouraged to use these sites to broaden their reading and familiarize themselves with looking up scholars and their research.

I will be uploading **a pdf entitled 'Useful Resources' on Canvas**. Please look at it as this has a guide to referencing styles, bibliography building and places you can go to look for articles, books and chapters.

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 have a disability or other condition that might require some modification of any of these course procedures. For more information contact Student Diversity and Accessibility Office.

Classroom Policies:
Attendance is mandatory. Tardiness can cause disruptions, please keep it to a minimum, and in the lab sessions it will not be allowed due to the safety procedures.

Turning in late assignments without due reason will not be accepted. You know the due date of your assignments in advance, plan accordingly. If you are worried about handing in an assignment late for a particular reason, talk with me in advance by email, after class or in my office hours, accommodations can and will be made (I am more than happy to do so for due reason). You can hand in a hard copy of

an assignment or send a hard copy with another student if you wish (for example if your computer breaks down but you cannot attend a lecture). You can turn assignments in early should you wish.

I do not provide copies of the powerpoint presentations, as you will get more out of these classes by attending, taking good notes and interacting with the discussions. Handouts will however be given in the lab sessions as these will form part of the lab notes books. Take careful notes in all lectures and lab sessions and feel free to ask me to pause and go over a point if you need me to, I encourage it!

Interacting with Your Professor:

The best way to get in touch with me is in person, either just after class (before is not so good as I will be in preparation mode and you won't necessarily have my undivided attention) or in office hours. Email (jenbates@sas.upenn.edu) is also a good way to get hold of me. Do not rely on Canvas chat, as I don't have time to login everyday and check it. Also, while many other lecturers may prefer a formal title for interactions, I prefer to be addressed as 'Jennifer'.

Email Policy:

Please email me all questions etc. in one go, rather than bombard me with hundreds of emails in one day. You will receive a far quicker and more eloquent response. If the subject matter is something more complex, requiring more than a single email reply, come and find me in office hours and we will discuss it in more detail.

I will try to reply to emails within 24 hours, but give me at least 48 hours before sending me a follow up (weekdays – weekends you will NOT get a reply). If it is Urgent, add this in the subject line and I will follow up urgently.

Classroom Civility:

Stanford 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. Please do not allow cell phones to ring, read magazines, mess about on Facebook, make obnoxious remarks or engage in other rude activities. Sanctions for activities deemed to impinge upon faculty and student rights can be found here:

Academic Dishonesty:

All students must abide by the copyright policies standards outlined here:. 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:

WEEKLY SCHEDULE

Full references can be found in the bibliography at the end of this syllabus.

Week 1
Seminar 1: Introduction
Lab 1: Using reference collections and herbaria

Readings:
Levetin et al. (2012)
Marston et al. (2014)
Pearsall, Deborah M. (2015) [Chapter 1]

Week 2
Seminar 2: The development and future of the field
Lab 2: Botanical keys and Linnaean classification

Readings:
Larson et al. (2014)
Lee et al. (2011)
Minnis (2001)

Week 3
Seminar 3: Preservation, Sampling and Biases
Lab 3: Tissues and Charring Experiments

Readings:
Boardman and Jones (1990)
Bradbaart and Bergen (2005)
Lee (2012)
Stevens (2014)

Week 4
Seminar 4: Fuel
Lab 4: Sorting and Wood Charcoal

Readings:
Asouti and Austin (2005)
Lancelotti (2019)
Smith et al. (2018)

Week 5
Seminar 5: Domestication
Lab 5: Cereals – wheat, barley and rice

Readings:
Arranz-Otagui et al. (2016)
Kraft et al. (2014)

Smith (2006)

Willcox (2004)

Week 6
Seminar 6: Agriculture
Lab 6: Cereals – millets and maize

Readings:
Kingwell-Banham et al. (2019)
Petrie and Bates (2017)
Smith (2014a)
Ziiumbo-Villareal (2012)

Week 7
Seminar 7: Crop processing
Lab 7: Cereal - chaff

Readings:
Fuller et al. (2014)
Fuller and Harvey (2006)
Harvey and Fuller (2005)
Hillman (1981)

Week 8
Seminar 8: Foodways
Lab 8: Pulses

Readings:
Atalay and Hastorf (2006)
Kim (2015)
Smith (2006)
Wollstonecroft et al. (2012)

Week 9
Seminar 9: Beyond staples
Lab 9: Oilseeds and Fruits

Readings:
Bates (2019)
Crawford (2009)
Johns (1990)
Wang et al. (2016)

Week 10
No lectures – spring break

Week 11
Seminar 10: Consumer/producer debates
Lab 10: "Weeds" Part I

Readings:

Van der Veen (1991)
Mattingly (1997)
Stevens (2003)

Week 12
Seminar 11: Ethnographic analogy
Lab 11: "Weeds" Part II

Readings:
Bogaard et al. (2001)
Hosoya (2011)
Louderback et al. (2013)
Willcox (2012)

Week 13
Seminar 12: Integrating datasets
Lab 12: Microbotany I – phytoliths and starch

Readings:
Henry (2009)
Garcia-Granero et al. (2015)
Logan (2016)
Mercader et al. (2018)
Styring et al. (2017)

Week 14
Seminar 13: Environmental reconstruction
Lab 13: Microbotany II – spherulites and pollen

Readings:
Boivin et al. (2016)
Marston (2011)
Pearsall and Hastorf (2011)

Week 15
Seminar 14: Quantification and presentation of data
Lab 14: Research time

Readings:
Marston (2014)
Smith (2014)
Van Derwarker et al. (2014)

Week 16
Seminar/Lab 15: research time

References

Arranz-Otagui, A. S. Colledge, L. Zapata, L. C. Teira-Mayolini, and J. J. Ibáñez 2016 Regional diversity on the timing for the initial appearance of cereal cultivation and domestication in southwest Asia. *PNAS* 113(49): 14001-14006.

Asouti, E., and P. Austin. 2005. Reconstructing woodland vegetation and its relation to human societies, based on the analysis and interpretation of archaeological wood charcoal macro-remains. Environmental Archaeology 10: 1-18

Atalay, S. and Hastorf, C. 2006. Food, meals and daily activities: The habitus of food practices at Neolithic Çatalhöyük. American Antiquity 71(2):283-319.

Bates, J. 2019. Oilseeds, Fruits, and Fibrs. *Jornal of Archaeological Science, reports.*

Boardman, Sheila and Glynis Jones (1990) "Experiments on the Effects of Charring on Cereal Plant Components," Journal of Archaeological Science 1990, 17: 1–11.

Bradbaart, Freek and Pim F. van Bergen (2005) "Digital imaging analysis of size and shape of wheat and pea upon heating under anoxic conditions as a function of the temperature," Vegetation History and Archaeobotany (2005) 14:67–75.

Bogaard, A., G. Jones, M. Charles and J. G. Hodgson. 2001. On the Archaeobotanical Inference of Crop Sowing Time using the FIBS Method. Journal of Archaeological Science 28(11):1171-1183.

Boivin, N. L., M. A. Zeder, D. Q. Fuller, A. Crowther, et al. 2016 Ecological consequences of human niche construction: examining long-term anthropogenic shaping of global species distributions. *PNAS* 113(23): 6388-96.

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Carreterob, Monica N. Ramseyc, Dorian Q. Fuller, and Tobias Richter (2018) "Archaeobotanical evidence reveals the origins of bread 14,400 years ago in northeastern Jordan," PNAS 115(31): 7925–7930.

Charles, M.P. (1984) "Introductory Remarks on the Cereals," Bulletin on Sumerian Agriculture 1: 17–31.

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Curet, L. A., and W. J. Pestle 2010 Identifying high-status foods in the archaeological record. *Journal of Anthropological Archaeology* 29: 413-431.

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Fuller, D.Q., Harvey, E.L., 2006. The archaeobotany of Indian pulses: identification, processing and evidence for cultivation. Environmental Archaeology 11, 219–246.

Fuller, D.Q., Stevens, C.J., McClatchie, M., 2014. Routine Activities, Tertiary Refuse and Labour Organisation: social inferences from everyday archaeobotany, in: Madella, M., Lancelotti, C., Savard, M. (Eds.), Ancient Plants and People, Contemporary Trends in Archaeology. University of Arizona Press, Tuscon, pp. 174–217.

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Hedrick, U. P. (1919) Sturtevent's Notes on Edible Plants. Albany: J. B. Lyon Company.

Henry, Amanda G., Holly F. Hudson, Dolores R. Piperno (2009) "Changes in starch grain morphologies from cooking," Journal of Archaeological Science 36: 915–922.

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Ge, W., L. Liu, X. Chen, and Z. Hin. 2011. Can noodles be made from millet? An experimental investigation of noddle manufacture together with starch grain analyses. *Archaeometry* 53(1): 194-204.

Gong, Y. Y. Yang, D. Ferguson, D. Tao et al. 2011 Investigation of ancient noodles, cakes, and millet at the Subeixi site, Xinjiang, China. Journal of Archaeological Science 38: 470-479.

González Carretero, Lara, Michèle Wollstonecroft, Dorian Q. Fuller (2017) "A methodological approach to the study of archaeological cereal meals: a case study at Çatalhöyük East (Turkey)," Vegetation History and Archaeobotany 26: 415–432.

Grieve, M. (1971) A Modern Herbal; the Medicinal,Culinary, Cosmetic and Economic Properties, Cultivation and Folk-lore of Herbs, Grasses, Fungi, Shrubs, and Trees with all their Modern Scientific Uses. New York: Dover Publications

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Lee, G.-A., G. W. Crawford, L. Liu, and X. Chen 2007 Plants and people from the early Neolithic to Shang periods in North China. *PNAS* 104(3):1087-92.

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