

## HEB 1320

**Term:** Fall 2016

**Course Instructors:** Manuel Dominguez-Rodrigo

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**Meeting Time:** Tuesday, Thursday 10:00am - 11:29am

**Meeting Location:** [Peabody Museum 52H](#) (HEB Meeting Room)

**Course Description:** How did the earliest humans spend their days? What traces of their activities can we hope to uncover after 2.5 million years or more? Using comparative primate ecology as a framework, this course delves into how we interpret the material remains discarded by early humans at specific African locales. It emphasizes a behavioral approach (with a strong archaeological component) to understanding the emergence and evolution of humanity during the Early Pleistocene. Ultimately, it converges with evidence from physical anthropology to define "human" both from a physical and behavioral point of view.

Click here to download the course syllabus: [HEB 1320 SYLLABUS - Fall 2016.pdf](#)

## SYLLABUS

HEB 1320: Stones, Bones, and the Evolution of Human Behavior

Manuel Dominguez-Rodrigo, Visiting Professor in Human Evolutionary Biology

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**Goal and course requirements:** This course is intended to complement LS2 (Life Sciences: Evolutionary Human Physiology and Anatomy) by expanding behavioral knowledge from the biomechanical study of skeletons to the study of the material record that primates (and more specifically, humans) create through their adaptive behavior. This course intends to bring a behavioral approach of the archaeology of human origins to the biological anthropologist in order to understand how human behavior appeared and evolved during the Early Pleistocene.

**Course Format:** The main format of this course is lecture with critical discussion of selected readings and the evidence presented in these readings. Students are expected to come prepared to discuss each week's readings. Reading discussion will be carried out every Thursday. Students will be assessed (using SAT/UNSAT grading system) based on their preparation for and participation in each class meeting (10% of final assessment), as well as on one piece of written work: one (10-15 pp) research paper on a selected topic (30%). In the final week of class, students will present and discuss the main findings of their paper with their classmates (10%). The remaining of the grade (50%) will be divided into two tests (mid-term and final).

**Attendance Policy:** This class requires attendance and active participation; you cannot participate if you are not present. A substantial part of the information discussed is novel and cannot be fully comprehended by using just published references. Each class absence will be noted and the participation component of your grade may be lowered one full letter for each two unexcused absences.

**Late submissions:** Late papers will be marked down one full letter grade for each 24h period they are late, beginning at class time on the due date.

**Policy on Academic Integrity:** This course follows the Academic Integrity policy as outlined in the student handbook (<http://handbook.fas.harvard.edu/book/academic-integrity>). Please review carefully the policies on collaboration and plagiarism. Collaboration on written assignments is not permitted without written permission from the instructor. Plagiarism in written work will be taken extremely seriously; students are expected to be familiar with the Harvard Guide to Using Sources. Papers should be created for and submitted to only this course. If a student wishes to submit the same or similar work to more than one course during the same term, prior written permission of all instructors involved must be obtained.

**Academic Accommodations:** Any student needing academic adjustments or accommodations is requested to present their letter from the Accessible Education Office (AEO) and speak with the professor by the end of the second week of the term. Failure to do so may result in the Course Head's inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

### Schedule of the topics covered in this class

Each section corresponds on average to one week (two classes)

## 1. Defining "human" behavior: the comparative analogical approach.

This section is founded on the ethnographic study of human behaviors in modern foragers that leave a material inprint. It focuses mostly on subsistence and adaptation. It also draws on comparing these behaviors with modern non-human primates. The goal is to understand which features are shared between modern humans and other primates (where differences may be expressed in degrees) and which features are qualitatively unique of modern humans.

Readings:

Domínguez-Rodrigo, M. 2012. Toward a scientific-realistic theory on the origin of human behavior. In (Domínguez-Rodrigo, M., ed.) *Stone tools and fossil bones. Debates in the archaeology of human origins*, Cambridge University Press, Cambridge, pp. 11-46.

Wood, B., Marlowe, F. 2013. Household and kin provisioning by Hadza men. *Hum Nat* (2013) 24:280–317

Burkart, J.M., Fehr, E., Efferson, C., van Schaik, C.P. 2007. Other-regarding preferences in a non-human primate: Common marmosets provision food altruistically. PNAS 104(50): 19762-19766.

## 2. Central-place behaviors in primates

Most of our understanding on early human behavior comes from the study of archaeological sites, some of which were created through central-place behaviors by early humans. Central-place behaviors are diverse and not unique to humans: they vary from central-place sleeping places or central-place foraging spots to central-place ranging places. This section studies central-place behaviors in primates and shows a specifically human type of central-place behavior linked to social organization and food consumption: central-place provisioning.

Readings:

Sept, J., 1992. Was there no place like home? a perspective on early hominid archaeological sites from the mapping of chimpanzee nests. *Curr. Anthropol.* 33, 187-207.

Hernandez-Aguilar. 2009. Chimpanzee nest distribution and site reuse in a dry habitat: implications for early hominin ranging. *Journal of Human Evolution* 57: 350–364

### 3. The archaeology of chimpanzees.

This section analyses a part of the chimpanzee behavioral repertoire that generates a material record. It shows activity loci where organic tools are used and discarded and activity loci where more durable materials (e.g., stone tools) are also accumulated. This section presents an analysis on how we can understand chimpanzee behavior and cognition through the study of these sites.

Readings:

Haslam et al. Primate Archaeology. Nature 460: 339-344.

Carvalho, S., Cunha, E., Sousa, C., Matsuzawa, T. 2008. ChaÄ±nes operatoires and resource-exploitation strategies in chimpanzee (*Pan troglodytes*) nut cracking  
*Journal of Human Evolution* 55: 148-163

Pickering, T., Domínguez-Rodrigo. 2012. Can we use chimpanzee behavior to model early hominin hunting? In (Domínguez-Rodrigo, M., ed.) *Stone tools and fossil bones. Debates in the archaeology of human origins*, Cambridge University Press, Cambridge, pp. 174-200.

#### 4. Introducing the earliest archaeological record.

Here the earliest sites discovered in East Africa will be presented, including purported earliest archaeological manifestations (such as Lomekwi or Dikika). This section offers an opportunity to present site formation processes and taphonomic understanding on how these sites were created by hominin and

non-hominin agencies. The diversity of early site types is presented.

#### Readings:

Semaw et al. 2003. 2.6-Million-year-old stone tools and associated bones from OGS-6 and OGS-7, Gona, Afar, Ethiopia. *Journal of Human Evolution* 45: 169–177

Harmand, S. et al. 2015. 3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya. *Nature* 521: 310-316.

Domínguez-Rodrigo, M., Alcalá, L. 2016. 3.3-million-year-old stone tools and butchery traces? more evidence needed. *Paleoanthropology* 46-53.

### **5. Behavioral models to interpret Oldowan sites (I): from 1900 to 1990.**

A historical review is presented of the various models for interpreting hominin Oldowan sites, spanning from Leakey's "living floor" model, to Isaac's "home-base" and "central-place foraging" model, including Binford's "marginal scavenger", Schick's "accidental occupation" and Potts' "stone-cache" models. Through each of these models it will be shown how taphonomy developed to contrast each of these models empirically with the archaeological record.

#### Readings:

Rose L, Marshall F. 1996. Meat eating, hominid sociality, and home bases revisited. *Curr Anthropol* 37: 307–338.

Plummer, T., 2004. Flaked Stones and Old Bones: Biological and Cultural Evolution at the Dawn of Technology. *Yearbook of Physical Anthropology* 47:118–164

### **6. Behavioral models to interpret Oldowan sites (I): from 1990 until today.**

During this period, interpretations from the behavior of Oldowan hominins were expanded from the Olduvai and Koobi Fora sites to other areas, including Gona and Kanjera. This higher diversity of sites produced more behavioral interpretations, such as Blumenshine et al.'s "refuge" model or Ferraro's "obligate carnivore" model. These models required an understanding of the off-site archaeology and this prompted the emergence of landscape archaeology projects. Some of the most relevant projects will be shown and the knowledge that we gained from them to understand the in-site behavior of hominins. A special focus on the Olduvai Bed I record will be presented.

#### Readings:

Domínguez-Rodrigo, M. 2014. The Oldowan: Early Hominins and the Beginning of Human Culture. *Oxford Encyclopedia of African Archaeology*. Oxford university Press, Oxford, pp.

Uribe-larrea, D. et al. 2014. Geo-archaeological and geometrically corrected reconstruction of the 1.84 Ma FLK Zinj paleolandscape at Olduvai Gorge, Tanzania. *Quaternary International* 322-323: 7-31

Ferraro JV, Plummer TW, Pobiner BL, Oliver JS, Bishop LC, et al. 2013. Earliest Archaeological Evidence of Persistent Hominin Carnivory. *PLoS ONE* 8(4): e62174. doi:10.1371/journal.pone.0062174

### **7. Neo-taphonomic work and its application to the Oldowan record: how we understand what early humans did.**

This section shows a summary of more than three decades of actualistic work on carnivores and humans and how its archaeological application produces knowledge on early human behavior. This shows the potential information contained in archaeofaunal assemblages. This section shows what Oldowan hominins did at anthropogenic sites and what they did in carnivore-made sites and palimpsests.

#### Readings:

Egeland, C.P. 2012. The use of bone surface modifications to model hominin lifeways during the Oldowan. In (Domínguez-Rodrigo, M., ed.) *Stone tools and fossil bones. Debates in the archaeology of human origins*, Cambridge University Press, Cambridge, pp. 80-114.

DomÍnguez-Rodrigo, M., Bunn, H.T., Yravedra, J. 2014. A critical re-evaluation of bone surface modification models for inferring fossil hominin and carnivore interactions through a multivariate approach: Application to the FLK Zinj archaeofaunal assemblage (Olduvai Gorge, Tanzania). *Quaternary International* 322-323: 32-43.

Parkinson, J., Plummer, T. Harstone-Rose, A., 2015. Characterizing felid tooth marking and gross bone damage patterns using GIS image analysis: An experimental feeding study with large felids. *Journal of Human Evolution* 80: 114-134.

## 8. Reconstructing behavior from the study of the Oldowan stone tools.

This section shows how the analysis of the stone tools and their reduction sequences at Oldowan sites capture hominin behavior from raw material acquisition, to their curation, transport along the landscape, use within and outside sites and final discard. A final approach on cognitive studies is also made. Hominin stone tool use and cognition will be subsequently compared to that of chimpanzees.

Readings:

Toth, N., Schick, K. 2009. The Oldowan: The Tool Making of Early Hominins and Chimpanzees Compared. *Annu. Rev. Anthropol.* 38:289–305

Braun, D. 2012. What does Oldowan technology represent in terms of hominin behavior? In (Domínguez-Rodrigo, M., ed.) *Stone tools and fossil bones. Debates in the archaeology of human origins*, Cambridge University Press, Cambridge, pp. 222-244.

## 9. How was human behavior during the early Acheulian?

The transition from Oldowan to Acheulian involves several important behavioral innovations. These will be presented through the analysis of selected anthropogenic Acheulian sites from Olduvai and Peninj. Some of these behavioral changes involve consumption of a higher diversity of resources, greater degree of curation of stone tools, and bigger sites reflecting bigger group sizes. Information drawn from the study of stone tools and fauna will be used.

Readings:

Domínguez-Rodrigo, M. et al. 2014. On meat eating and human evolution: A taphonomic analysis of BK4b (Upper Bed II, Olduvai Gorge, Tanzania), and its bearing on hominin megafaunal consumption. *Quaternary International* 322-323: 129-152.

Díaz-Martín F., Eren, M. 2012. The early Acheulean in Africa: past paradigms, current ideas and future directions. In (Domínguez-Rodrigo, M., ed.) *Stone tools and fossil bones. Debates in the archaeology of human origins*, Cambridge University Press, Cambridge, pp. 310-358.

## 10. Final reflections: is there a link between behavior and biology?

Here hominins (the study of their anatomy) will be introduced and diverse attempts to link their anatomy to the behavior reconstructed from these early sites will be made. Functional morphology and behavior (as reconstructed from the material record) will be critically analyzed. Students at this point will know what we can say about the potential hominin candidates for explaining the Oldowan and Acheulian records. They will also understand which are the elements that constructed a specifically human behavior. Finally, comparison with later innovations in human evolution will be made.

Readings:

Lieberman, D. Bramble, D., Raichlen, D., Shea, J. 2009. Brains, Brawn, and the Evolution of Human Endurance Running Capabilities. In (Grine, F., Fleagle, J., Leakey, R., eds.) *The First Humans - Origin and Early Evolution of the Genus Homo*. Springer, New York, pp. 77-92

Roach, N., Venkadesan, M., Rainbow, M.J., Lieberman, D. 2013. Elastic energy storage in the shoulder and the evolution of high-speed throwing in Homo. *Nature* 498: 483-487.

**Complementary course reading:**

Domínguez-Rodrigo, M., 2012. Stone tools and fossil bones. Debates in the archaeology of human origins,

Cambridge University Press, Cambridge.

Pickering, T. 2013. Rough and tumble. Aggression, hunting and human evolution. University of California Press.