

The Science of Cats

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Meeting Time: Wednesdays 2:30-5:00, MCZ G022

Week 1 (Sept. 7). Introduction and Cat Anatomy

Introduction to the course and laboratory session in the Mammalogy Department of the Museum of Comparative Zoology where we will study the anatomy of cats and compare the housecat to its wild relatives, small and large.

Week 2 (Sept. 14). The Secret Lives of Cats

We will discuss research investigating the outdoor activities of housecats. In addition, we will plan short-term projects in which students place kitty-cams on their own pets back home for a week.

Assignments:

View BBC documentary *The Secret Life of the Cat: What Do Our Feline Companions Get up to?*

<http://www.bbc.com/news/science-environment-22567526>

<https://vimeo.com/108062526>

View University of Georgia KittyCam Project webpage:

<http://www.kittycams.uga.edu/research.html>

Read:

Loyd, K.T., Hernandez, S.M., Abernathy, K.J., Shock, B.C., Marshall, G.J., 2013. Risk behaviours exhibited by free-roaming cats in a suburban US town. *Veterinary Record*, 10.1136/vr.101222

Week 3 (Sept. 21). The Origin of Housecats—Archaeology

We will read zooarchaeological papers documenting the first evidence of cats in association with humans and will visit a zooarchaeology lab at Harvard to learn first-hand how such research is conducted.

Read:

Chapters 1-3 of John Bradshaw. 2013. *Cat Sense*. Basic Books: New York.

Hu, Y., et al. 2014. Earliest evidence for commensal processes of cat domestication. *Proceedings of the National Academy of Sciences of the United States of America* 106: 9971-9978.

A press release reporting on this paper: Vigne et al. 2016. Earliest “Domestic” Cats in China Identified

as Leopard Cat (*Prionailurus bengalensis*). *PLoS One* 11(1): e0147295.
doi:10.1371/journal.pone.0147295 <http://www2.cnrs.fr/en/2691.htm>

Zeder, M.A. 2011. Pathways to animal domestication. In A. Damania and P. Gepts., Eds., *Harlan II: Biodiversity in Agriculture: Domestication, Evolution and Sustainability*. University of California Press: Berkeley. Pp. 227–259.

Week 4 (Sept. 28). The Diversity of Cats

This week will focus on the varieties of cat breeds and discuss how artificial selection works and how particular breeds were developed.

Read:

A. Levy. 2013. Living Room Leopards. *New Yorker*, May 6, 2013

Learn cat breeds and read how two new breeds were developed:

<http://www.tica.org/cat-breeds>

https://en.wikipedia.org/wiki/Munchkin_cat

https://en.wikipedia.org/wiki/Savannah_cat

Weekend Field Trip: New England Cat Show

Week 5 (Oct. 5). The Origin of Housecats—Molecular Genetics

We will read studies on cat genetics that have inferred when and where cats were domesticated and how genetically altered they are from their wild ancestors.

Reading assignment:

Driscoll, C., J.C. Clutton-Brock, A.C. Kitchener and S.J. O'Brien. 2009. The taming of cats. *Scientific American* June, 2009, pp. 68–75.

Kurushima, J. D., S. Ikram, J. Knudsen, E. Bleiberg, R.A. Grahn and L.A. Lyons. 2012. Cats of the pharaohs: genetic comparison of Egyptian cat mummies to their feline contemporaries. *Journal of Archaeological Science* 39: 3217-3223.

Montague, M. J., et al. 2014. Comparative analysis of the domestic cat genome reveals genetic signatures underlying feline biology and domestication. *Proceedings of the National Academy of Sciences of the United States of America* 111: 17230–17235.

Week 6 (Oct. 12). Sequence Your Own Cat!

We will get the results of the cat DNA sequencing back and will discuss what they mean.

Reading assignment:

Lyons, L.A. 2015. DNA mutations of the cat: the good, the bad and the ugly. *Journal of Feline Medicine and Surgery* 17: 203–219.

Week 7 (Oct. 19). Cat Behavior

Why do cats behave as they do? To what extent is their behavior a legacy of their evolutionary past, and to what extent does it represent adaptation to living among humans?

Read: Chapters 4-8 of John Bradshaw. 2013. *Cat Sense*. Basic Books: New York.

Week 8 (Oct. 26). Cats in Popular Culture

Discussion of cats around us. We'll prepare for the international cat video festival and discuss various cat memes—Grumpy Cat, anyone?—and events. Discuss how to celebrate National Cat Day, Saturday, October 29th.

Assignment:

Read:

Lewis-Kraus, G. 2012. In Search of the Heart of the Online Cat-Industrial Complex. *Wired* http://www.wired.com/2012/08/ff_cats/

Monson, A., 2015. The internet is a cat video library.

<https://newrepublic.com/article/122551/internet-cat-video-library>

Read about Cooper, the cat photographer:

<http://www.photographercat.com/>

Come prepared to discuss your favorite cat videos

Field Trip, Thursday evening, Oct. 27: International Cat Film Festival, Berklee Performance Center.

Week 9 (Nov. 2). What about Dogs?

What does research on dog domestication tell us about cats? Have dogs and cats travelled the same evolutionary path, or has their domestication been very different?

Read:

Hare, B., and V. Woods. 2013. *The Genius of Dogs: How Dogs Are Smarter than You Think*. Chapters 1-6, 11

Week 10 (Nov. 9). Cats' Effect on Nature

How do cats affect natural ecosystem? To the extent that they are a problem, what can be done? Should they be outlawed as some in Australia are proposing?

Read:

Loyd, K.T., Hernandez, S.M., Carroll, J.P., Abernathy, K.J., Marshall, G.J. 2013. Quantifying free-roaming domestic cat predation using animal-borne video cameras. *Biological Conservation* 160: 183-189.

Loss, S.R., T. Will, and P.P. Marra. 2015. The impact of free-ranging domestic cats on wildlife of the United States. *Nature Communications* 4:1396 | DOI: 10.1038

<https://strangebehaviors.wordpress.com/2015/08/14/csi-and-a-poison-pill-for-cats-that-kill/>

Article and comments in *The Economist* on Australian plan to eliminate feral cats: <http://www.economist.com/news/asia/21688436-save-numbat-and-other-native-mammals-australia-culls-cats-felicitous-felicide>

<http://www.economist.com/news/asia/21688436-save-numbat-and-other-native-mammals-australia-culls-cats-felicitous-felicide/comments?page=1>

Week 11 (Nov. 16). Cats through the Ages

We will consider the role of cats through human history. On a field trip to the Fogg Museum, we will examine feline-related material.

Faure, E. and A. Kitchener. 2009. An archaeological and historical review of the relationships between felids and people. *Anthrozoos* 22: 221-238.

Linseele V., W. Van Neer and S. Hendrick. 2007. Evidence for early cat taming in Egypt. *Journal of Archaeological Science* 34: 2081-2090.

Week 12 (Nov. 30). Cats and People

Why do people love their cats? Have cats evolved to bond with humans? Have humans evolved to bond with cats?

Course wrap-up.

Student reports on video and DNA analyses.

M. Nagasawa et al. 2015. Oxytocin-gaze positive loop and the coevolution of human-dog bonds. *Science* 348: 333-336.

Field Trip: Coffee at *Le Chat Noir Cat Café*

Assignments

Each student will turn in a 10-page paper or a 10-minute iMovie on a subject of their choice related to topics raised in the class. Projects must be approved in advance and will be due the last day of reading period.

In addition, students will form into groups to analyze behavioral or video data and will report on their findings on the last day of class.

Academic Integrity and Honor Code

"Members of the Harvard College community commit themselves to producing academic work of integrity – that is, work that adheres to the scholarly and intellectual standards of accurate attribution of sources, appropriate collection and use of data, and transparent acknowledgement of the contribution of others to their ideas, discoveries, interpretations, and conclusions. Cheating on exams or problem sets, plagiarizing or misrepresenting the ideas or language of someone else as one's own, falsifying data, or any other instance of academic dishonesty violates the standards of our community, as well as the standards of the wider world of learning and affairs."