

# The Evolution of Our Bodies from 7mya to the present

Instructor: Dr. James T. Watson

Location: Rubel Room (Poetry Center) & Online

Date/Time: Oct. 6, 13, 20, 27; 10:00am-12:00pm

## Course Description

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More than seven million years of evolution led to the dominance of our species over the planet. A long but often scant trail of fossil skeletons tells the tale. But biological evolution is only one part of the equation as behavioral adaptations, or “culture”, both contributed to and accelerated the evolution of our human form.



Today we live trapped in bodies that hold the residues of physical evolution and their limitations, under the intensely rapid transformations of modernity. In this four-part lecture series, you will journey through millions of years of evolution with Dr. Watson to trace the development of our species from the hominin fossils to the modern legacy of lifestyle diseases.

## Instructor Biography

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Dr. Watson is Curator of Bioarchaeology in the Arizona State Museum and Professor in the School of Anthropology at UA. His research examines health and disease in prehistoric populations through their skeletal remains. He is particularly interested in understanding prehistoric human adaptations in arid environments and the role local resources play in the adoption of agriculture and their impact on health. Current projects involve the excavation and analysis of the earliest farmers in the Sonoran Desert and early foragers in the Titicaca Basin of southern Peru.

## Course Schedule

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### 10/06 Evolving species

- a. Evolution: Darwinian, modern, and extended synthesis
- b. Species concept: biological vs. fossil
- c. Paleoanthropology: places, environments, periods, evidence
- d. The fossil record (7mya-10kya): "hope of life" to "the Hobbit"

## Readings/Media

Aiello L, Dean C, Cameron J. (1990). Chapter 1: An Introduction to Classification, Phylogenetic Reconstruction, and the Fossil Record. In: *An Introduction to Human Evolutionary Anatomy*, pp. 1-14. Jordan Hill: Elsevier Science & Technology.

Aiello L, Dean C., Cameron J. (1990). Chapter 5: The Comparative Anatomy of the Hominoid Mandible and Cranium. In: *An Introduction to Human Evolutionary Anatomy*, pp. 54-75. Jordan Hill: Elsevier Science & Technology.

Smithsonian *Human Family Tree* interactive webpage

(<https://humanorigins.si.edu/evidence/human-family-tree>)

Movie (The History Channel): *The Evolution from Ape to Man* (2005).

(<https://www.youtube.com/watch?v=LoGnYmNp2Y0>)

## 10/13 The Shape of Change

- Bipedalism: head to toe
- Manual dexterity: shoulder and hand
- Encephalization: bigger brains
- Gracilization & microdontia: bigger (but less muscular) bodies



## Readings

Bramble DM, Lieberman DL. (2004). Endurance running and the evolution of Homo. *Nature* 432, 345-3.

Falk D. (2016). Evolution of brain and culture: the neurological and cognitive journey from Australopithecus to Albert Einstein. *Journal of Anthropological Sciences* 94, 1-14.

<https://doi.org/10.4436/jass.94027>

Marzke MW, Marzke RF. (2000). Evolution of the human hand: Approaches to acquiring, analyzing, and interpreting the anatomical evidence. *Journal of Anatomy* 197, 121-140.

Spencer MA., Demes B. (1993), Biomechanical analysis of masticatory system configuration in Neandertals and Inuits. *Am. J. Phys. Anthropol.* 91, 1-20.

<https://doi.org/10.1002/ajpa.1330910102>

## 10/20 Biocultural Changes

- Fire and shelter: once burned, twice shy
- Tools: the Paleolithic

c. Culture: language, art, adaptation, and diversification

### Readings

Ambrose SH. (2001). Paleolithic Technology and Human Evolution. *Science* 291 (5509), 1748-1753.

Gowlett JAJ. (2016). The discovery of fire by humans: a long and convoluted process. *Phil. Trans. R. Soc. B* 371, 20150164. <http://doi.org/10.1098/rstb.2015.0164>

Tecumseh Fitch W. (2000). The evolution of speech: A comparative review. *Trends in Cognitive Sciences* 4, 258-267.

### 10/27 Modern Evolutionary Mismatches

- a. The obstetrical dilemma
- b. Ancient pathogens and modern resurgence
- c. Modern metabolic syndrome
- d. Dental crowding



### Readings

Betti L, Manica A. (2018). Human variation in the shape of the birth canal is significant and geographically structured. *Proc. R. Soc. B* 285, 20181807. <https://doi.org/10.1098/rspb.2018.1807>

Enard D, Petrov DA. (2018). Evidence that RNA Viruses Drove Adaptive Introgression between Neanderthals and Modern Humans. *Cell* 175(2), P360-371. <https://doi.org/10.1016/j.cell.2018.08.034>

Pontzer H, Raichlen DA, Wood BM, Mabulla AZP, Racette SB, et al. (2012). Hunter-Gatherer Energetics and Human Obesity. *PLoS ONE* 7(7): e40503. doi:10.1371/journal.pone.0040503