

HBIO 406
THEORY AND METHODS IN HUMAN EVOLUTIONARY BIOLOGY
4 Units

The goal of this course is to obtain knowledge of the theories behind our current understanding of human evolution. The course focuses on paleoanthropology, and the use of molecular evidence from fossils and living human beings. This is in order to throw light on the evolution of hominins, the origin of *Homo sapiens*, and the subsequent evolution of human populations, with particular focus on the methods used in these studies.

We will go through the fossil hominins in detail, discussing the techniques used for obtaining and preparing fossils, as well as the formal description of new fossil forms. We will also study readings based on the DNA extraction from fossil materials and from living human beings. We will investigate how morphological and molecular data are used to produce phylogenetic trees, thus presenting hypotheses of human relationships and origins.

Another major goal of the course is to teach students how to write academic papers, and to present their findings to their peers. These are skills that are useful to any career, particularly in academics. The time requirements for this course will be substantial because students will be reading and presenting on the class readings, and also will engage in producing a major research paper and a oral presentation. A heavy emphasis will be placed on daily class attendance, participation in discussions, and the student's efforts to make written and oral works interesting and clear.

The class meets on Thursdays from 4-6:50 in Hancock (AHF) B10 seminar room. The course format is a mixture of lecture and both instructor and student-led discussions based on readings.

Required textbook:

Reconstructing Human Origins, A Modern Synthesis, by Glenn C. Conroy and Herman Pontzer (3rd ed.)

Additional readings (peer-reviewed research papers) will be posted each week.

General Information:

A heavy emphasis is placed on the student's ability to write an original review paper based on literature discussed in class, as well as on additional papers that are related to the topic being discussed. Each topic is subject to approval, and must be cleared with Dr. Sigurdson. The paper should be 5-7 pages long, and should primarily be based on original research papers on a subject that is related to topics discussed. The paper can give reference to academic books, but should also contain references to at least five peer reviewed papers. The paper will be presented by the individual student towards the end of the class.

Grading:

20% - Class participation/Preparedness

20% - Class Presentations

20% - Quizzes/ Assignments

40% - Paper

LECTURES

Week 1

Jan 14: Introduction: Evolution, paleanthropolgy, genes and anatomy. Paleontological methodology. Finding fossil.

Week 2

Jan 21: Paleoclimate, and dating fossils (absolute and relative dating). The origin of mammals.

Week 3

Jan 28: Early primates, primate diversification and anatomy. **Quiz.**

Week 4

Feb 4: The origin of apes. Fossil ape diversity. Phylogenetics and cladistics, the use of phylogenetic software.

Week 5

Feb 11: **Phylogenetic assignment due.** Early hominin evidence. Anatomical correlates to bipedalism. Functional anatomy and bipedal locomotion.

Week 6

Feb 18: Australopithecine diversity. Early branching of the hominin tree. Dating australopithecine hominins.

Week 7

Feb 25: The genus *Homo*. Why the large brain? Dating the earliest tools. **Quiz**

Week 8

Mar 3: Diversification of *Homo*. Early spread from Africa. Analyzing the spread of tool cultures (industries).

Week 9

Mar 10: Archaic *Homo sapiens*, *Homo heidelbergensis*. The origin of neandertals. Fossils and genes illuminate neandertals and denisovans.

Week 10

Mar 17: Spring Recess- No class

Week 11

Mar 24: Fossil and genetic evidence of late archaic humans. *Homo floresiensis*. Writing academic papers, **approval of topics**

Week 12

Mar 31: The origin of anatomically modern humans. Fossils and genes. The origin of modern culture and language.

Week 13

Apr 7: The spread of anatomically modern humans. The mitochondrial Eve. **Quiz**

Week 14

Apr 14: From paleoanthropology to archaeology. Neolithic culture and the origins of agricultural lifestyle. Archaeology of early civilizations. Genetics of modern human populations.

Week 15

Apr 21: Student presentations of papers.

Week 16

Apr 28: **Final Quiz. Paper Due**

Academic Accommodations:

•Any student requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (the instructor) as early in the semester as possible. DSP is located in Student Union (STU) 301 and is open 8:30-5:00pm Monday – Friday. The phone number for DSP is 213) 740-0776.

Academic Integrity:

•Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the University. Since dishonesty in any form harms the individual, other students and the University, academic integrity policies will be strictly enforced. I expect you will familiarize yourself with the Academic Integrity guidelines found in the current SCampus.

Academic Integrity Violations:

•Academic dishonesty/misconduct (plagiarism, cheating, unauthorized collaboration, etc.) will not be tolerated. All academic integrity violations will result in a grade sanction and will be reported to the Office for Student Judicial Affairs. It is your responsibility to “reasonably” protect your own work from the plagiarism of others.

•If plagiarism is detected on a group project, all members of the group will be held responsible.

•You are expected to be familiar with the Academic Integrity guidelines found in the current SCampus (student guidebook). An electronic version is available at <http://usc.edu/scampus>.