(METHODS) IN EVOLUTIONARY PALEOBIOLOGY
206-1-3831

Fig. 703.
Archaeopteryx lithographica H. v. Meyer. Nach dem Berliner Skelet aus dem Lithographischen Schiefer von Eichstätt. 1/2 nat. Gr. *cl* Cavicula, *co* Coracoid, *h* Humerus, *r* Radius, *u* Ulna, *c* Carpus.

/http://www.daily-tangents.com/Aves/Archaeop

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COURSE SYLLABUS

Course goals- The course aims to provide coverage of both core principles of evolutionary paleobiology as well as investigating key topics. Specifically, the course will focus on the importance and contribution of the fossil record to the field of evolution. In addition, students will learn to review, and discuss the research literature in this field.

Attendance Policy- Student must attend in 3/4 of the classes.

Course format and ground rules- Following introductory lectures, the course will be carried out as a "journal club": On each session, a group of one or two students will be in charge (i.e. leaders) of one of the weekly discussions. A primary paper will be assigned to each discussion. *All students are required to read the primary paper in advance and to be prepared to participate in the discussions.* The leader of the weekly session must begin the discussion with a brief presentation providing background on the topic and may also choose a second, related paper (after consulting SA). Presentation will *always* be followed by a group discussion. The discussions will allow to review the implications and importance of each topic and to raise features that are unclear. Handouts must be submitted to the class, at the beginning of the session. The handout should contain a summary of key points and results, graphs or figures from other papers relevant to discussion, a list of related references, and provocative questions or statements to prompt discussion.

Grading: There is no formal exam. Grading will be determined based on the presentation (80%) and participation in group discussions (20%).

Course topics:

1. Macroevolution vs. Microevolution: concept and definitions (Erwin, 2000, Grantham, 2007, Stephen Jay Gould, 1995, online, Ernst Mayer, 2001)
2. External and internal forces of evolution: (Jablonski, 2002)
3. Species and Speciation. Models: Punctuated Equilibrium vs. Phyletic gradualism (Eldredge and Gould, 1972, Mayer, 2001)
4. Saltationism and the "hopeful monster" (Richard Goldschmidt): Evo Devo, Homeotic Genes (Gould, 1980, Dietrich, 2000, Davidson and Erwin, 2006)
5. Species sorting and species selection (Stanley, 1975; Gould, 1980; Vrba and Gould, 1986; Gliniski, 1986; Crespi, 2001; Leiberman and Vrba, 2005)
6. Heterochrony disparity and evolution: (MacNamara, 2005)
7. Systematics and evolution. (Adrain et al., 2001, Levington, 2001, Chapter 5 Prothero, 2007)
8. Marine diversity through the Phanerozoic (Smith, 2007)
9. The role of mass extinctions events in evolution (Eds, Raup and Jablonski, 1986, David M. Raup, 1995, online, Jablonski, 2001)
10. The Ediarcran and Cambrian fauna: A Case Study for Evolutionary innovations (Conway, 2000; Butterfield, 2007, Knoll, 1999 and 1995 (online), James W. Valentine, 1995(online)

Textbooks:

1. Adrain, J.M., D.G. Edecombe, and B.S. Leiberman. 2001. Fossils, Phylogeny and Forms. Kluwer Academic, New York.
2. Ron Amundson. 2007. The changin Role of the Embryo in Evolutionary thoughts. Roots of the evo-Devo. Cambridge studies in Philosophy and Biology
3. Benton. M. J., 2000. When life nearly died. Thames and Hudson
4. Carroll. S.B. 2005. Endless Forms Most Beautiful: The New Science of Evo Devo and the Making of the Animal Kingdom, W.W. Norton, New York.
5. Carroll. S.B. 2009. The Making of the Fittest.
6. Gould. S J. 2002. The structure of Evolutionary Theory. Belknap Harvard
7. Gould.. S. J. 1977. Ontogeny and Phylogeny. Belknap Harvard online text: http://www.sjgarchive.org/library/ontogeny.html
8. Hall B.K, and Olson W.M. 2003. Keyword and concepts in Evolutionary Development biology. Harward University Press
9. Jablonski, D., D. H. Erwin, and J. H. Lipps, .1996. Evolutionary Paleobiology. The University of Chicago Press. , Chicago.
10. Kemp. T.S. 1999. Fossils and Evolution. Oxford University press
11. Levinton, J.S. 2001. Genetic, Paleontology and Macroevolution. 2nd ed. Cambridge University Press.

12. Mayer, E., 1989. Towards a New Philosophy of Biology.
13. Mayer E., 2001. What Evolution is. Basic books
14. Müller G. B. and Newman, Stuart A. 2002. Origination of Organismal Form Beyond the Gene in Developmental and Evolutionary Biology.
15. Prothero. D. R. 2007. Evolution. What the fossils Say and why it matters. Colombia University Press.
16. Ross. R.M., and W.D. Allmon. 1990. Causes of evolution: A Paleontological Perspective. The University of Chicago Press. , Chicago.
17. Wallace A. 1997. The Origin of Animal Body Plans. A study in Evolutionary Developmental Biology
18. Walter M. Fitch and Francisco J. Ayala. 1995. Tempo and Mode in Evolution: Genetics and Paleontology 50 Years After Simpson (1995). National Academy of Sciences. This book is available online. http://www.nap.edu/catalog.php?record_id=4910#toc

Websites:

19. http://www.stephenjaygould.org/library/gould_hopeful-monsters.html