

Methods In Evolutionary Paleobiology 206-13831 – 2 credits

Dr. Sigal Abramovich

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.

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 Ediacaran and Cambrian fauna: A Case Study for Evolutionary innovations (Conway, 2000; Butterfield, 2007, Knoll, 1999 and 1995 (online), James W. Valentine, 1995(online)

Bibliography

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 changing 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. Harvard 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

Course Requirements

Prerequisites: Introduction to Paleontology
2 hr lecture