PALEONTOLOGY
GEOLOGY 320
MWF 9-9:50; Lab Wednesday 1:30-4:30

Karla Parsons-Hubbard
Office Hours: Friday 1:30-3:00; Thursday 11:00-12:00
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Web Address: www.oberlin.edu/faculty/kmhubbar
Textbook: *Bringing Fossils to Life* 2nd Ed., Prothero
Required book: *On the Origin of Species*, Charles Darwin, 1st edition

Course Requirements:
3 exams during semester 18-18-18%
1 research paper & presentation 15%
Class participation and field trip participation 6%

LAB [25%] ($10 lab fee)
Weekly lab assignments
Weekly lab quizzes

The field of Paleontology is the study of fossils and the history of life. It is an historical science with applications to evolutionary theory, the origin of life, systematics, and paleoecology. Fossils are also key tools in the study of the earth over time. In this course we will cover invertebrate biology/paleontology in lab and concentrate on more theoretical aspects of evolution, ecology, and applications of paleontology in lecture. Readings are from your textbook (Prothero) plus articles on reserve. Reserve readings are available on Blackboard [BB].

2009 is a special year for the study of Evolution. It is the 200th anniversary of the birth of Charles Darwin and the 150th anniversary of the publication of "On the Origin of Species." In honor of Darwin's year, we will be reading the "Origin" in its entirety and you will prepare a presentation and an extended essay on an assigned aspect of the book due in the last week of classes. You should either purchase a copy of the first edition (a facsimile, of course) or you can access it on-line through ebooks (you can find the link on OBIS). Abridged versions will be troublesome, so try to find a first edition. For each set of chapter readings you will have some questions posted on Blackboard to guide our discussion on Fridays. Please be sure to refer to the questions as you read the assignments.

Your course grade will be based on three equally weighted exams distributed throughout the semester. Exams are not cumulative per se, but do build on earlier material. Wednesday of each week will begin with a morning lecture introducing the Phylum of animal that will be the subject of the laboratory in the afternoon. Labs are to be worked on in small, informal groups and preferably completed within the three hour time slot. There will be eight weekly lab quizzes; one for each phylum discussed. Quizzes are to be taken on your own and will be available for you starting Friday afternoon. Each quiz must be handed in to my mailbox prior to lab the following week (i.e., 1:30 on Wednesday). Seven of the eight quiz grades will be tallied for your lab quiz score (you can drop your lowest grade or skip one quiz).

We will have two field trips. A one day trip to look at Devonian fossils near Marblehead OH and a weekend trip to visit the famous fossil beds of southern Indiana. Please take note of the dates and plan your schedule around these trips.

Day	Date	Topic	Readings
M	Feb. 2	Intro to Paleo/fossils	
W	Feb. 4	Taphonomy	Pro ch. 1
	LAB	Taphonomy, Sampling the database	
F	Feb. 6	Variation in organisms	Pro ch. 2
M	Feb. 9	Growth and Form	Gould: Size-Shape [BB]
W	Feb. 11	Bacteria & Protists	Pro ch. 11
	LAB	Bacteria & Protists	
F	Feb. 13	Discussion: Darwin (domestication & variation)	Darwin, chs. 1&2
M	Feb. 16	Variation, Populations, & species	Dog's Life [BB]
W	Feb. 18	Porifera	Pro ch. 12; 215-222
	LAB	Porifera – origin of Metazoa	
F	Feb. 20	Discussion: Darwin (natural selection)	Darwin, chs. 3&4
M	Feb. 23	Systematics & taxonomy	Gould: zebra [BB]
W	Feb. 25	Cladistic analysis	Pro ch. 4
	LAB	Cladistics	
F	Feb. 27	Discussion: Darwin (variation)	Darwin ch. 5 & 6
M	Mar. 2	**EXAM 1 (through cladistics)**	
W	Mar. 4	Cnidaria	Pro ch. 12; 223-229
	LAB	Cnidaria	
F	Mar. 6	Evolution since Darwin	Darwin, chs 7 & 8
M	Mar. 9	Role of Extinction in Evolution	Pro chs. 5 & 6
W	Mar. 11	Lophophorata	
	LAB	Lophophorata	
F	Mar. 13	Discussion: Darwin (The Geologic Record)	Darwin chs. 9 & 10
M	Mar. 16	Macroevolution: Patterns in the fossil record	
W	Mar. 18	Arthropods	Pro ch. 14
	LAB	Arthropoda	
F	Mar. 20	Discussion: Darwin (geographical patterns)	Darwin chs. 11 & 12
BREAK			
M	Mar. 30	Functional Morphology	Pro ch. 7
W	April 1	Mollusca -Gastropods	Pro ch. 15
	LAB	Mollusca-Gastropoda	
F	April 3	Final Origin discussion: Assign papers	Darwin chs. 13 & 14
		Sunday Field Trip - Marblehead	

M	Apr 6	Ecological concepts	
W	Apr 8	Molluscs – Bivalves & Cephalopods	Pro ch. 15
	LAB	Molluscs – Bivalves & Cephalopods	
F	Apr 10	Discussion: The Cambrian Explosion. Replaying the tape of life	Gould ch. 1 Morris chs. 1 & 8
M	Apr 13	**EXAM II (through April 6)**	
W	Apr 15	Echinodermata	Pro ch. 16
	LAB	Echinodermata	
F	Apr 17	Paleoecology I	Pro ch. 8
M	Apr 20	Paleoecology II	
W	Apr 22	Biostratigraphy I	Pro ch. 10
	LAB	Graptolites & Conodonts & Trace fossils	Pro ch. 18
F	Apr 24	Biostratigraphy II	
		WEEKEND FIELDTRIP TO INDIANA	
M	Apr 27	Discussion "Seafood Through Time"	Bambach [BB]
W	Apr 29	Biogeography	
	LAB	Study session for lab exam	
F	May 1	Biogeography II	Vermeij [BB] Marshall [BB]
M	May 4	Presentations	
W	May 6	Presentations	
	LAB	**Final Lab Exam**	
F	May 8	Presentations; Papers due by midnight	

FINAL EXAM: Thursday May 14th, 9am

HONOR CODE: You are expected to abide by the Oberlin College Honor Code. Exams will be closed book and note. I expect that lab exercises will be openly discussed between you and your classmates. Lab quizzes are closed note and book. You may not consult references while taking lab quizzes. If you do not understand the concept of plagiarism with respect to writing your paper, please see me, or a writing tutor.

REFERENCE LIST:

Bambach, Richard K., 1993. Seafood through time: changes in biomass, energetics, and productivity in the marine ecosystem, Paleobiology, v. 19, p. 372-397.

Conway-Morris, Simon, 1998. The Crucible of Creation: The Burgess Shale and the Rise of Animals, Oxford University Press.

Gould, Stephen Jay, 1977. Size and Shape, in Ever Since Darwin, New York, Norton & Co., p. 171-178.

Gould, Stephen Jay, 1983. What, If Anything, Is a Zebra? In Hen's Teeth and Horse's Toes, New York, Norton & Co., p. 355-365.

Gould, Stephen Jay, 1993. A Dog's Life in Galton's Polyhedron, in Eight Little Piggies, New York, Norton & Co., p. 382-395.

Gould, Stephen Jay, 1989. Wonderful Life: The Burgess Shale and the Nature of History, W.W. Norton & Co., New York.

Lauder, George V., 1995. On the inference of function from structure, in Functional Morphology in Vertebrate Paleontology, J.J. Thomason editor, Cambridge University Press, p. 1-18.

Vermeij, Geerat, 1991. When Biotas Meet, The Anatomy of a biotic interchange, Science, v.253 (5024), 1991.