

Syllabus for PHIL*6740
Philosophy of Biology
Fall, 2010
Tuesday 7:00 – 9:50 pm
MACK room 236

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Hours: Thursday. 10-12 (or by app.)

Description

This course will involve a critical exploration of central concepts, theories and methods in the biological sciences. Topics to be discussed include the units of selection debate, adaptationism, macroevolution, the prospects and limits of gene centrism, the relationship between evolution and development, the social reception of evolutionary ideas, and cultural evolution.

Grading:

Weekly presentations/ participation: 40%
Final paper: 60%

Outline

1. The Gene centered view of evolution

Background: Sex and Death, Chapter 3, “The gene’s eye view of evolution” & Chapter 4, “The organism strikes back” (p 55-93).

1. E. Sober & R. Lewontin (1982), “Artifact, cause and genic selection”, *Philosophy of Science*, 49: 157-180.
2. K. Sterelny and P. Kitcher (1988), “The return of the gene”, *Journal of Philosophy*, 85: 339-361.

2. Multi-level selection theory (and its critics) Part 1.

Background: E. Sober and D.S. Wilson (1998), *Unto Others*, Chapter 1, “Altruism as a biological concept”, (17-54).

1. S. Okasha (2004), “The averaging fallacy” and the levels of selection.” *Biology and Philosophy* 19(2): 167-184.
2. R.A. Wilson, (2004) “Test cases, resolvability, and group selection: a critical examination of the myxoma case” *Phil Science* 71(3): 380.

3. Multi-level selection theory (and its critics) Part 2.

Background: W.D. Hamilton (1975), “The innate social aptitudes of man: An approach from evolutionary genetics”. Robin Fox (ed.) *ASA Studies 4: Biosocial Anthropology*, p. 135-53.

1. Marek Cohn (2008), “The needs of the many”, *Nature*, 456(20): 296-299.
2. Nowack et al. (2010), “The evolution of eusociality”, *Nature*, 456(26): 1057-1062.

4. Adaptationism - Part 1, what are the issues?

Background: Sex and Death, Chapter 10, "Adaptation, perfection, function" (p. 215-252).

1. Dawkins, R. (1983/ 1998), "Universal Darwinism". M. Hull & M. Ruse (ed.s) *The Philosophy of Biology*, Oxford University Press: NY. (15-37).
2. Gould, S.J. & Vrba, E. (19982/ 1998), "Exaptation – A missing term in the science of form". M. Hull & M. Ruse (ed.s) *The Philosophy of Biology*, Oxford University Press: NY.(52-71).

5. Adaptationism -Part 2, The "Spandrels" debates.

Background: Gould, S. J. and Lewontin, R. (1979): 'The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme' *Proceedings of the Royal Society of London*, 205, pp. 581-98

1. Van Valen (2009) "How ubiquitous is adaptation? A critique of the epiphenomenist program." *Biology and Philosophy*, 24: 267-280.
2. John Beatty & Eric Cyr Desjardins (2009) "Natural selection and history", *Biology and Philosophy*, 24: 231-46.
3. Forber, P. (2009), "Spandrels and a pervasive problem of evidence" . *Biology and Philosophy*, 24: 247-66.

6. In what sense do genes determine traits?

Background:

1. Kitcher, P. (2001). *Battling the undead: How (and how not) to resist genetic determinism*
2. Griffiths, P.E. (200*), *The fearless vampire conservator: Philipo Kitcher and genetic determinism*".

7. What are species?

Background: Sex and Death, Chapter 9, "Are species real?" (p. 180-214).

1. Ereshefsky, M. (19**), "Species, Taxonomy and Systematics". In
2. Coyne & Orr (19**) "A catalogue and critique of species concepts".

7. Are micro and macro evolution governed by the same processes?

Background: Arthur, W. (2003), "Micro-, Macro- and Mega Evolution. In B. Hall & W. Olsen (eds)) *Keywords and Concepts in Developmental Biology*, Cambridge Press: 243-260.

1. M. Deitrich (2010), "Microevolution and macroevolution are governed by the same process", in Ayala & Arp (eds) *Contemporary Debates in Philosophy of Biology*. Blackwell: UK (169-180)
2. D.H. Erwin (2010), "Microevolution and macroevolution are NOT governed by the same process", in Ayala & Arp (eds) *Contemporary Debates in Philosophy of Biology*. Blackwell: UK (180-193)

8. Is there progress or directionality in evolution?

Background: *Sex and Death*, Chapter 12, "Life on earth: The big picture" (280-310).

1. R. Dawkins (1992), "Progress", In Keller and Lloyd, *Keywords in Evolutionary Biology*.
2. S.J. Gould (1994), "The history of life on the earth", *Scientific American*, Oct: 85-91.

Other topics /options:

1. Fitness and tautology: is natural selection theory a tautology? Is it possible to define "fitness" in a non circular way?
2. Evo Devo- Does developmental biology pose a challenge to evolutionary theory?
3. What is Biodiversity? Is the concept of biodiversity a useful construct for science or conservation?
4. Cultural evolution. (memetics and other theories).
5. Reductionism (of biology to chemistry)
6. Biological essentialism: Do species have essences and are their natural kinds in biology

E. Sober, (1980), "Evolution, population thinking and essentialism", *Philosophy of Science*, 47: 350-383.

P. Griffiths (1999) "Squaring the circle: Natural kinds with historical essences", In *Species, New interdisciplinary essays*, edited by R. A. Wilson. (p. 209-228).