Philosophy/S&TS 6890 Seminar in Philosophy of Biology
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Prerequisites: Officially none. This seminar is for undergraduates/graduate students interested in biology and philosophy. Some background in one of these fields will be necessary.

Preliminary reading list: http://courses.cit.cornell.edu/jdv55/teaching/systematics/

Course work: One research paper in two drafts. Initial draft due 2/3 of the way through the seminar. Final draft in response to comments due last meeting of seminar.

Topics (this material is from the flyer that you may have already read):

Species. Biologists have defended different metaphysical conceptions of species (natural kinds, individuals, classes, …) and very many different conceptions of how they're defined (for overview see [1]). Some have suggested "pluralism": different definitions for different purposes (e.g., [2]). Others defend "eliminativism": there is no distinct species level among taxa (e.g. [3]). What are the strengths and weaknesses of the arguments for and against these positions?

Higher taxa. Many early 20th century biologists accepted "evolutionary systematics": higher taxa are broadly explanatory categories defined in terms of both respects of biological similarity and commonality of ancestry. Most now accept "cladism": higher taxa are monophyletic—they consist of a single species together with all of its descendant species. Their only explanatory role is to reflect facts about phylogeny. Others (pheneticists and "pattern cladists") deny even this explanatory role: higher taxa are just information retrieval devices. [more details: [1].] Some recent proposals (e.g., [4]) are intermediate between the first two. What are the strengths and weaknesses of these positions? How do they relate to the species problem? For cladists, what conception of species is best for defining monophyly? How should eliminativists about species understand monophyly? Will the new intermediate proposals work?

Homology. The homology-analogy distinction predates evolutionary theory, but today the accepted distinction is really an evolutionary one: similar structures in two different species are homologous if they arose from a common evolutionary origin; they're analogous otherwise. The discovery of extremely well-conserved gene complexes and developmental pathways has lead to the proposal that when a highly conserved developmental module is manifested in distinct lineages, but not in their common ancestor we have the phenomenon of *broad-sense homology* (see [5]). Broad sense homologues can arise in different lineages; strict sense homologues cannot. How should we individuate (count) lineages? Are they defined by their initial species? If so, how are conceptions of homology related to the species problem? What's the difference in explanatory role between *strict* and *broad sense* homology? What can eliminativists say about this distinction?

Organisms. As in the case of species, there is a wide range of conceptions of what counts as an organism with biological disciplines such as systematics, ecology, and developmental biology apparently focusing on quite different aspects of biological reality which can often come apart. The 'organism problem' is far less discussed, though arguably, more fundamental to biological theory than is the species problem. Is there a good definition of 'organism'? Is the category 'organism' a natural kind or perhaps a cluster concept? Should we be pluralists about it? Or eliminativists?

[1] Kearney, Maureen. 2007. "Philosophy and Phylogenetics: Historical and Current Connections." in David Hull and Michael Ruse, eds. The Cambridge Companion to the Philosophy of Biology. New York: Cambridge University Press. [2] Kitcher, Philip. 1984. "Species." Philosophy of Science 51: 308-333. [3] Ereshefsky, Marc. 1999. "Species and the Linnaean hierarchy." in R. Wilson, ed. Species: New Interdisciplinary Essays. Cambridge: MIT Press. [4] Rieppel, 2005c. "Monophyly, paraphyly and natural kinds." Biology and Philosophy 20: 465-487. [5] West-Eberhard, Mary J. 2003. Developmental Plasticity and Evolution. Oxford: Oxford University Press.