

Evolutionary Developmental Biology: “Evo-Devo”

Tuesdays, 10:00AM – Noon; room **1201**, BRB II/III; **First Meeting Sept 13th**

This semester’s topic: We recently celebrated Darwin’s 200th birthday, and the 150th anniversary of his greatest work, “On the Origin of Species”. This foundation, built also by Alfred Russell Wallace, has grown astoundingly. It is very clear that *Evolutionary Theory* is a comprehensive explanation for all the facts amassed from paleontology, systematics and biology. In this light, it is stunning to realize that almost 50% of the population (in America) believe that a “god created human beings pretty much in their present form within the last 10,000 years”¹. We cannot tackle all the issues raised by such survey results. However, as *Developmental Biologists*, we can apply what we know of how organisms and organs develop to the larger issue of how *Evolution* has and is occurring. This will be our focus this semester.

There has been an explosion in identifying the regulatory circuits used by embryos to construct their body plan, tissues and organ systems. The *Developmental Biology* of various “model” systems, including worm, fly, fish, chick, frog and mouse, has revealed amazing examples of conservation in the strategies used during development. But it is the **variation** within those strategies that is presumed to be the driving force for evolution (Darwin’s “...*descent with modification*...”). Specifically, natural (or mutational) variation that exists in populations, and that variation is selected upon, leading to “survival of the fittest”.

Some socio-political commentators assert that there is no evidence for evolution. Over this semester we will delve into just this: ***what is the evidence that changes in gene function and/or regulation are responsible for variation in form and among species today?*** To accomplish this goal, each week we will learn some of the developmental biology for a particular organ, or organism, and then see how that knowledge might help explain how that structure or body form changes through Evolution. Among our goals for this semester: we shall have answers for our family and friends the next time the dinner-table conversation touches on evolutionary theory. The specific syllabus will follow soon.

Class format: CAMB 620 is not a survey course in *Developmental Biology*. Rather, we pick an overarching theme for the semester (see above), enabling us to define issues central to that theme, and explore attempts to uncover solutions using different model systems. Primary research papers are assigned for discussion, and all students are expected to contribute thoughtfully and energetically to the discussion each week. ***Active participation contributes 2/3rd of your grade.*** Each class is **2 hours**, with the last **20 minutes** reserved to provide background for the next week’s topic.

During the last 1/3 of the course, **groups of students** will choose the specific sub-topics (and the papers), based on areas or issues they found appealing during the first part of the course. Each group will be responsible for presenting the background and guiding a week’s discussion, and that ***performance will account for the last 1/3rd of your grade.***

Prerequisite: A solid foundation in cell and molecular biology. There is no developmental biology prerequisite, but you may need to familiarize yourself with certain “developmental” concepts, as needed².

¹ Roper Center for Public Opinion Research, data set USPSRA2007-NW05.

² Treatments of these are found in: **Developmental Biology** 8th (& earlier) editions., by Scott F. Gilbert, Sinauer Assoc.