**SYLLABUS**

**BIOL 659.001: Seminar in Evolutionary Biology: Connecting Micro- and Macroevolution**

**Spring 2019**

**Course goals:**

This course is aimed at Biology graduate students. Each week, students will present and discuss recent scientific papers broadly covering phylogenetics, speciation genomics, adaptation, and new topics in ecology/evolution. We will focus on data-rich empirical papers from major scientific journals, but students may also choose to cover classic papers in evolutionary biology. We may also devote some classes to reading and commenting on manuscripts in preparation for publication or new statistical methods and bioinformatics approaches that may be relevant to students’ research, depending on interest.

**Credit hours:**

1 lecture hour per week

**Meeting times:**

Wed 3:30 – 4:30pm

**Room:**

Genome Sciences Building 2101

**Instructors:**

*Dr. Chris Martin*

Phone: 919-962-4841; Email: chmartin@unc.edu; Office: GSB 2256;

Office hours: W 1-2 or by appointment

Dr. Martin has been studying questions in evolution and ecology since he was an undergraduate. In grad school he developed two new integrative case studies for studying speciation and adaptation genomics: adaptive radiations of Caribbean pupfishes and Cameroon crater lake cichlids. His work at UNC focuses on further study of the evolution, ecology, genomics, functional morphology, and quantitative genetics of these fascinating examples of evolution-in-action.

**Readings:**

There is no required textbook. Readings each week will be posted to Sakai.

**Grading:**

Students will be graded on their general participation, engagement, and discussion of the papers covered each week (30%). Next, each student or groups of students will choose a specific paper to lead discussion on and will be graded for their general preparedness and presentation effort (30%). Finally, students will present a written outline and discussion of their chosen paper for discussion or an active research manuscript they are working on relevant to the class topics (40%).

Class discussion/participation: 30%

Selected paper presentation: 30%

Final paper: 40%

**Final exam period:**

The final paper will act in lieu of a final exam.

**Homework:**

Students are expected to read each paper thoroughly and come prepared to class.

**Course Policies:**

Assignments turned in late, but before the key posted, will incur a 25% penalty on the final grade. Homework turned in after the key is posted, but before the final exam, will incur a 50% penalty on the final grade.

**Honor code:**

Students are encouraged to work together on discussing papers, but must submit an independent write-up of their final paper.

**Note:**

The instructor reserves the right to make changes to this syllabus.

**Schedule:**

Week 1 – Introductions/welcome/ice-breakers.

Discussion of genomic islands of speciation focusing on Cruikshank and Hahn 2014 and Turner et al. 2005, classics in evolutionary genomics.

Choose papers/topics for the rest of the semester.

Possible examples:

**1.** Kreitman’83 [Nucleotide polymorphism at the alcohol dehydrogenase locus of Drosophila melanogaster.](http://www.ncbi.nlm.nih.gov/pubmed/6410283) see also this [post](http://caseybergman.wordpress.com/2013/08/04/on-the-30th-anniversary-of-dna-sequencing-in-population-genetics/) by Casey Bergman on 30th anniversary of paper.

**2.** Price 1970 [Selection and Covariance](http://www.nature.com/nature/journal/v227/n5257/pdf/227520a0.pdf) & Queller 1992 [Quantitative Genetics, Inclusive Fitness, and Group Selection](http://www.jstor.org/stable/2462497).

**3.** Mayr ’47 [Ecological factors in speciation](http://www.zoology.ubc.ca/~purcell/mayr%201947%20evolution%20-%20ecological%20factors%20in%20speciation.pdf).

**4.** Kettlewell 1955 [SELECTION EXPERIMENTS ON INDUSTRIAL
MELANISM IN THE LEPIDOPTERA](http://ocean.otr.usm.edu/~w777157/Kettlewell%201955.pdf) accompanied by Majerus 2009 [Industrial Melanism in the Peppered Moth, Biston betularia: An Excellent Teaching Example of Darwinian Evolution in Action](http://link.springer.com/article/10.1007/s12052-008-0107-y).

**5.** excerpts from Waddington’s “The strategy of the genes” 1957 on the [epigenetic landscape](https://gcbias.files.wordpress.com/2014/11/waddington_excerpt_one1.pdf) & [genetic assimilation](https://gcbias.files.wordpress.com/2014/11/waddington_excerpt_two.pdf)

**6.** Excerpt of Clausen, Keck, & Hiesey 1940 [Experimental studies on the nature of species. I. Effects of varied environments on western North American plants.](https://gcbias.files.wordpress.com/2014/11/clausen_keck_hiesey_1940_xii.pdf)& their [“Concept of Species Based on Experiment”](http://www.jstor.org/stable/2436717) 1939.

**7.** On the origins of reinforcement,Dobzhansky 1940 [Speciation as a Stage in Evolutionary Divergence](http://www.jstor.org/discover/10.2307/2457524?uid=3739560&uid=2129&uid=2&uid=70&uid=4&uid=3739256&sid=21104569973831) paired with Noor’s [Reinforcement and other consequences of sympatry](http://www.nature.com/hdy/journal/v83/n5/full/6886320a.html). 1999

**8.** Felsenstein 1985 [Phylogenies and the Comparative Method](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCkQFjAB&url=http%3A%2F%2Fwww.indiana.edu%2F~kettlab%2FA501%2FFelsenstein1985.pdf&ei=r694VK2EKsyvogShnYCADQ&usg=AFQjCNGksAeTm7aPYEhObdEDwqSeRinIjA&sig2=IV7mPXJKvG2mMikveS0rzA&bvm=bv.80642063,d.cGU) paired with Pennell’s [Models and meanings in comparative biology](http://mwpennell.github.io/pdfs/pennell-sysbio-2014.pdf) book review.

**9.** Charlesworth, Lande, & Slatkin 1982 [A Neo-Darwinian Commentary on Macroevolution](http://www.jstor.org/discover/10.2307/2408095?uid=3739560&uid=2129&uid=2&uid=70&uid=4&uid=3739256&sid=21104682783701).

**10.** Dobzhansky ’47 [Adaptive Changes Induced by Natural Selection in Wild Populations of Drosophila](http://www.jstor.org/discover/10.2307/2405399?uid=3739560&uid=2&uid=4&uid=3739256&sid=21104806248541) paired with Grant & Grant 2002 [Unpredictable Evolution in a 30-Year Study of Darwin’s Finches](http://www.sciencemag.org/content/296/5568/707).

11. Felsenstein's "*Skepticism towards Santa Rosalia*, or why are there so few kinds of animals?" 1981. <http://www.jstor.org/stable/2407946?origin=crossref&seq=1#page_scan_tab_contents>

Weeks 2-14 - Discussion of chosen paper(s) each week.

*Final Exam period: Final paper.*

 *Papers due at the time of the final exam*