GRADUATE SEMINAR IN BIOLOGY:

Critical Examination of Experiment Design and Analysis

Course: BIOL 857  2015 Spring
Mondays, 3:00-5:00 p.m.
Wilson 310

Instructor: Keith Sockman: kws@unc.edu
Office Hrs: after class, by appt.
Wilson 237

Website

You can access the course website through Sakai.

Synopsis

The scientific literature is rife with experiment designs that do not test the stated hypotheses. In addition, the frequent misunderstanding and misuse of basic statistical approaches often leaves a trail of flawed conclusions in the literature. Yet, well designed and analyzed experiments are generally feasible. After we review some concepts central to experiment design and analysis, students will lead discussions on the design and analysis of their own, upcoming experiments or of experiments in published literature they select with instructor guidance. We intend to discuss a wide range of topics possibly including, but not limited to, studies of behavior, ecological field plot experiments, and gene expression profiling. This seminar is not a statistics course and will involve relatively little math. Rather, it focuses on understanding appropriate experiment design and broad analytical approaches and concepts. We will examine literature from a diversity of biological disciplines, much from the students' own choosing.

Organization and Format

Students will lead discussions on the design and analysis of their own, upcoming experiments or on recent literature they choose with instructor guidance. They will also participate in the critical examination of the experiments and literature they and other students present. Two weeks prior to each of their pre-determined (during our first meeting) dates on which they lead discussion, each student will e-mail the instructor the details of a proposed experiment/analysis
or paper from the recent primary literature on any topic in biology that he or she wishes to lead. The instructor will correspond with the student regarding the suitability of the experiment or paper, sometimes requiring the student to come up with an alternative. By one week prior to leading the discussion, the student must have been given approval by the instructor and post the reading on the course Sakai website, making it available for all students in the course and the instructor to read. By 24 hours prior to discussing the experiment/analysis or paper, each non-leading student will post comments or questions about the reading on the website discussion forum. These postings need not be extensive but, in a short paragraph, should be original and reflect a careful reading of the experiment/analysis or paper. These comments may facilitate discussion. When leading the discussion, visual aids such as handouts or projected slides (e.g., Powerpoint) will likely be useful in guiding us through the study being discussed.

**Grading**

You will be graded based on your class presentations, in which you lead discussions, and on your participation in others' presentations, including your weekly postings on the reading (see above).

**Prerequisites**

Some experience with statistical analyses. This would most likely come from a formal course on biostatistics but a comparable working knowledge of basic statistical analysis is suitable.

**Tentative Schedule**

Week 1: No Meeting  
Week 2, January 12th: Orientation, seminar overview and settle on some presentation dates  
Week 3: MLK Day  
Week 4: Instructor-led discussion on central concepts in experiment design and analysis  
Week 5: Student-led discussion  
Week 6: Student-led discussion  
Week 7: Student-led discussion  
Week 8: Student-led discussion  
Week 9: Student-led discussion  
Week 10: Spring Break  
Week 11: Student-led discussion  
Week 12: Student-led discussion  
Week 13: Student-led discussion  
Week 14: Student-led discussion  
Week 15: Student-led discussion  
Week 16: Instructor-led discussion