

BISP 194. Ecological and Evolutionary Genomics. This course will focus on a subset of central topics in the areas of ecological and evolutionary genomics: (1) DNA Barcoding, (2) Codon Usage Bias (CUB), (3) Metagenomics, (4) Ecotoxicology, (5) Gene Family Evolution, and (6) Evolution of Genome Size. We will explore how advances in genomic technologies have enhanced our ability to ask ecological and evolutionary questions. A subset of the class will be assigned a given topic and specific papers to read and present to the rest of the class for discussion.

Class meetings: Wednesday, 10AM-11:30 pm; York 3010

Professor Dr. Therese Markow, Section of Cellular and Developmental Biology, Muir 2115 tmarkow@ucsd.edu

Office Hours Tuesdays, 4:00 – 5:00 pm.

Note: When sending emails sent to Dr. Markow, include BISP194 in the subject line and your full name in the body of the email.

All course information is posted on the TED site for the class. The class website will provide all course information • Syllabus • Research articles and relevant reviews (as PDF files) • Schedule of the assigned presentations • Evaluation forms for presentations • Tips on “How to read a paper” • Tips on “How to prepare a presentation”

You will be responsible for printing all research articles posted on the website.

Textbooks. No text is required, but it is suggested that you utilize **PubMed** <http://www.ncbi.nlm.nih.gov/sites/entrez>.to identify additional related research articles to assist in your scholarly presentations.

Prerequisites BICD100 (Genetics), BIBC102 (Metabolic Biochemistry) or permission of instructor.

Course Summary Each week, a group of students will present the assigned primary literature papers on one of the topics listed above. Each group will be responsible for providing a basic introduction of that week’s topic and to lead class discussion on the specific aims and significance of the primary data and the paper. Every student will be required to write 3 reviews of the assigned articles (other than the ones their own group is presenting) AND 1 summary of a seminar presented on the UCSD, SIO or Salk Campus. Reviews of assigned articles will be due at the beginning of the class. In addition, all students will write constructive peer evaluations of the presentations to be turned in at the end of each class. The goal of the course is to not only learn about the topics encompassed in the fields of ecological and evolutionary genomics, but also to

learn to read, critically evaluate and present primary data from research articles.

Grading Grades will be based on performance with these requirements: **(1) Presentations:** Oral group presentation assigned research articles. **(2) Written Reviews:** One-page critiques of 3 articles AND 1 outside seminar. **(3) Participation:** Involvement in all weekly discussions of research articles. **(4) Evaluations:** Written evaluations done in class of all weekly presentations. **(5) Final Exam.**

Evaluations will include the quality of student written work and oral presentations, as well as the level of preparedness and participation in all class discussions.

(1) Presentations: Presentations, including the overview of the topic and the particular papers assigned, should take no more than 50 minutes, so that we can have discussion and questions. Each member of the group should be prepared to answer questions and engage in discussion of the presentation. In order to thoroughly prepare and clearly deliver your presentation, you should start early. The provided review articles for each topic can help introduce your subject, you also may need to read additional publications to assist your understanding and presentation of each paper. It is your job to help the class gain a clear understanding of the conceptual context, purpose, approaches taken and significance of each paper. A good understanding of the experimental methods employed is essential for a critical reading of any paper. So be certain that you look up and become familiar with any terminology you encounter that is unfamiliar to you so you can explain it to the group. In order to lead the group discussion, be prepared to take the class step-by-step through the rationale, approach and results in each paper. This often requires well-considered choices as to those figures and concepts central to the paper and included in your PowerPoint.

Preparation of Presentations. The student presenters for a given group should exchange contact information and arrange multiple meetings to prepare your presentations. I suggest that each group meet multiple times before your presentation. These papers are complicated, and the level of background and experience within the class vary. Nevertheless, by working together, the group should achieve a common level of understanding of the research performed.

Format of the presentations and their content. Each group of presenters should prepare PowerPoint slides to deliver their presentations. You can use the board as well. Dr. Markow's computer will be available or you can hook-up your own computer to the projector. The members of the group should divide up the parts of the presentation, but all should be prepared to answer questions from the class as well as comment on the paper. Regardless of which computer is used, the group's entire presentation should be on one computer. Students

planning to use Dr. Markow's computer should be sure their presentation is in a MAC compatible format and brought to class on a memory stick

In general, each group presentation on a given paper should include the following information: (A) Background and Introduction that tells what the authors are trying to show and how it fits with the overarching questions in the field of the paper. (B) Methods: What tools did the authors use address the problem? (C) Discussion of Data/Results: Describe the specific experiments, how the techniques were used and what controls were employed that are important for the interpretation of the data. (D) Summary: What was the basic result and do you feel the authors provided convincing support of their conclusions? Did you have any questions or reservations about the data? Figures should be divided between members of the group. What should be the next steps or ways to follow up the study?

Format of the Presentations:

(2) Written reviews: You are expected to read EVERY paper before coming to class. In addition, you are required to write 1-page *maximum* critical reviews for three of the assigned research articles (not of the paper that you present) and one seminar. You will turn in your summaries at the beginning of class on the day that paper is to be discussed. The write-up should include a brief summary of the authors' work, an analysis of the results, and an evaluation of how the authors support their claims. Although each individual should turn in their own write-up, I encourage you to discuss the articles together. Do not leave all three reviews for the end of the quarter.

(3) Participation: Read EVERY paper before coming to class and be prepared to discuss it. Participation during discussions will be a major factor in assigning final grades. I will assumed that each student has read carefully, and is conversant with the contents of, each of the papers assigned for a given week. This includes the background information contained in the assigned reviews. I may call on anyone at anytime during the class to comment on a particular paper, so be prepared! Furthermore, I expected each student to regularly make spontaneous contributions to the discussion.

(4) Evaluations: Following each presentation, you will fill out a peer Evaluation Form (available online) with *constructive* comments on the group's presentation of the background material and data in each paper. Additionally, you will have a chance to observe and comment on presentation styles of the presenters. Excerpts of the most insightful and instructive comments will be provided to the group and also will serve in evaluating students for their final grades

(5) Final Exam: The Final Exam will be a take-home.