Lectures
All lectures will be held from 10:30 am-12:00 pm on Mondays and Thursdays in BH 212. When Monday is a holiday lectures will be on Tuesday.

Discussions
Discussion sections are a required part of the course. Three sections are assigned on Wednesdays.

Review Sessions
The TAs will hold weekly review sessions in S201 on Wednesday evenings with food provided. They will highlight key concepts from the previous week, clarify lecture material, and answer questions.

Problem Solving Workshop
The problem sets to be discussed in class are designed to help you practice the type of thinking and analysis you want to develop as an experimental scientist (and the thinking we will be testing you on in your final exam). All the discussions will be using the whiteboard. You will be divided into four groups. Each group will be assigned one problem. You are expected to meet amongst your group a few days beforehand to discuss the problem and formulate the solutions that you will describe during the in class workshop.
Research Proposal

Formatting: Use Arial font, at least 11 point, and 1” margins on all sides. Place titles and any subheadings in bold. The body of the proposal should be at most 2 pages. Figures and references can be included in a third page.

Topic: In preparation for the final exam, students are asked to write a one to two page research proposal (references and figures can be relegated to a third page) on a BioReg-related topic that should be well-focused and based on a clear, testable hypothesis. The proposal should NOT be based on a previous research project of yours (i.e. senior thesis project, postgraduate research project, rotation project). The written proposal is an important document, because you have to properly synthesize information, organize your thoughts, and think through things systematically to write a good proposal. You have opportunity to modify the proposal you present at the exam, especially after feedback from faculty members on your written proposal. But poorly written proposals often correlate with poor performances on the exam, because they usually reflect sloppy reading and thinking. So take them seriously.

Scope: As a general guideline, the proposal should cover a body of work that a team of two scientists could complete in 2-3 years; that is, you can propose more than one line of experimentation, and an experiment, if successful, can be followed up with additional experiments. It is important that you be able to explain, what is known in the field, what key questions you wish to ask, how your system and experimental design will address those questions, and what you can and cannot conclude from the possible results of your experiments.

Design: You can assume that you will be able to generate commonly made reagents (e.g. antibodies, tagged constructs, and conditional mutants), but you should know how they will be generated and confirmed to be valid reagents. Experiments should be feasible (talk to people working in your proposed system to help you judge what is feasible), but do not get stuck on trying to design bulletproof experiments that are guaranteed to be conclusive since they don’t exist. All experimental systems have their strengths and weaknesses; we would like to know whether you understand what those strengths and weaknesses are and how they influence your interpretation of your results. Also, some experiments may be more informative if you obtain one set of results rather than another; be able to explain why that is the case, and whether there are follow up experiments you can do, especially for the less informative results.

Aims: As this is not a grant proposal, you can relax (not fully eliminate) the proscription against making specific aims dependent on one another that was drilled into you during your fellowship preparation last fall. Occasionally a key question must be addressed first before determining which of two very distinct directions to pursue. If you think one outcome is more likely to occur than others, and can defend that reasoning, we will tolerate having some specific aims dependent on this outcome in your written proposal;
be prepared in the actual exam, however, to be asked what you would do if the other outcome is observed.

**The Exam**
The final will be a one-hour oral exam, given by two faculty members. The format is much like a qualifying exam, with questions pertaining to a research proposal (~2/3 of the exam) followed by questions concerning general course material. The ability to reason through problems and experimental approaches will be emphasized. You will have 5 minutes at the beginning of the exam to present the essence of your research proposal (the key questions, experimental strategies, and potential conclusions) before the questions begin. You can write things up on the board ahead of time to assist your presentation. You should not expect to be able to answer every question that is asked of you, as part of our job is to figure out the limits of your knowledge then move on to other topics. However, if you can’t directly answer a question, it would be useful if you could propose experimental approaches that might help answer the question. At the end of your exam, you will be asked to exit the room promptly so the faculty examiners have time to discuss your performance among themselves and prepare for the next exam. The faculty want everyone to pass so please start your preparations well in advance (see timeline in Schedule) and take advantage of the faculty in finding a topic and hammering out your proposal.

Exams will be given over four days. An exam schedule will be posted below on this web page by end of the day on Thursday, March 12. If you notify Geeta, we will try to accommodate those who need to go earlier in the final exam week, but there are no guarantees and it depends in part on the reason. Thus, we strongly urge you to keep your schedule clear on all exam days. Students have found that the process of preparing for these exams gives them valuable experience for their oral qualifying exam

**Practice:** In short, the final exam is testing whether you are capable of engaging in an informed, creative, and critical scientific conversation. You will be carrying out many such scientific conversations throughout your scientific career well after you have passed your bioreg exam, so we encourage you to practice this every day by talking to your lab mates, classmates, lunch partners, intramural teammates, etc. (basically every opportunity that you have) about your science and theirs.

**Timeline & Deadlines:** Students are encouraged to run possible ideas for proposals (and early drafts) past the faculty as the course proceeds and not to wait until the last minute. We recommend that you start researching topics and questions for proposals by late January and write a rough draft by Feb 16th. The rough draft is optional. Those of you who submit a rough draft by Feb 16th will get feedback on it.