Congratulations on completing the ‘foundations’ half of the course! By now, lectures, recitations, and problem sets should have given you the algorithmic, machine learning, and biological breadth to tackle many diverse problems in computational biology. While the lectures will continue to expose you to recent advances and current research directions, the recitations and problem sets for the second half of the course are dedicated to your final project, including project brainstorming, project feedback, and project write-up and presentation advice.

(a) Project brainstorming and feedback: The first part of any research project is coming up with a good innovative, concrete, and feasible idea. There is no single recipe for getting a good idea for a project, and our best ideas frequently come in unexpected ways. You may already have an idea of what you would like to pursue, and may have already found a team to execute it with. But if you’re still brainstorming, there are several resources available:

• During lectures, we have already discussed several research directions that can be pursued as final projects. Going back through your notes can give you more ideas.
• A brief look at the calendar of remaining lectures can also give you ideas about current research directions, and the lecture notes from last year (linked from the class website) can give you more details on most of these, that can help you build your own research projects.
• The problem sets that you have completed provide possible initial working starting points for projects that extend the algorithms and programs you have already written in new research directions.
• And of course, browsing recent publications in Nature, Science, PLoS Biology, Genome Research, Nucleic Acids Research, PNAS, PLoS Computational Biology, the Journal of Computational Biology, PubMed, Google Scholar, is a great way to get ideas of recent research ideas, datasets, results, that you can expand upon for your project.

In addition, we have scheduled the following sessions to give you feedback on your ideas:

• Friday 10/30 at 12-1pm: In recitation. Project feedback and discussion.
• Friday 10/30 at 2-3:30pm: MIT Stata Center Gates Tower 7th floor (right outside elevators). Postdocs and graduate students from the MIT Computational Biology group (combio.mit.edu) will answer questions, discuss projects, give advice and feedback.
• Monday 11/2 at 9am-10:30am. MIT Stata Center Gates Tower 8th floor reading room (G882). Prof. Kellis will have open office hours to give you additional feedback on your draft project proposals.

(b) Writing a research proposal. (Problem set 5a)
Due: Wednesday 11/4 at 8pm (please note 2-day extension from original schedule)
Propose your final project in the form of an NIH research proposal, following the NIH guidelines and advice. You should include sections on dataset availability, techniques to be used, relevant lectures, design and methods, and timeline. You should also append a brief CV or biosketch (without noting your GPA or other information you do not want to share with other students in the course, as these will be circulated!). You should also note available resources both computational and personal, such as who you will go to for advice,
whether you have found a specific mentor who will guide you and provide feedback. Students working in groups should include a collaboration plan, roles of individual investigators, and the specific coordination activities to ensure success of the group.

Follow NIH new guidelines:
http://enhancing-peer-review.nih.gov/docs/application_changes.pdf

Strict page limit: 6 pages.

(c) Reviewing Peer Proposals (Problem Set 5b)
Due: Monday 11/9 at 8pm (as originally planned)
Write critiques of three submitted proposals, propose specific suggestions and changes, summarize the proposed work, its strengths and weaknesses, the appropriateness of the investigator’s background in achieving it. While reviewers will know the identity of proposal authors, reviews will be kept anonymous.

Follow NIH enhanced review criteria here:

You should obviously continue working towards your project throughout all stages of the review process, extending your ideas, gathering data, background information, algorithmic and machine learning techniques and tools that you can use, and additional biological background, and beginning the implementation of your ideas. You can incorporate feedback as you go, but preliminary work will be crucial in your revised proposal to provide a rebuttal to reviewers.

(d) Writing a revised final proposal and preliminary results. (Problem set 5c)
Due: Monday 11/16 at 8pm.
Provide revised aims, based on feedback, and adjusted scope based on length of the term, and adjusted timeline. You should address the perceived weaknesses by correcting them when possible, perceived points of failure by providing additional background that will ensure success, and also present your continued progress and additional results since writing the initial proposal, to ensure feasibility despite reviewer’s criticisms. In some cases, you may need to change your proposal altogether, and provide a new plan, but we hope this will be rare.

(e) Writing your results in a scientific paper format (Problem set 6).
Due: Monday 12/7 at 8pm.
Additional details will be provided in a future handout.

(f) Final Project Presentations
Thursday 12/10 at 11am-12:30pm and 3:30-5pm.
Give a 10 minute presentation on your project to the class. Sign up on the course wiki at http://6047.wikispaces.com/FinalPresentations. Additional details will be provided in a future handout.