

## Cellular Bioengineering Project 4 – Due 5/1/2014

Your task for the fourth project is to generate a research proposal that uses one of the techniques or approaches we've been discussing. Spend some time researching the area you would like to focus on (by finding and reading a handful of papers) and develop a question or hypothesis (it can be quite simple, but it should be novel). Then you will propose a plan of study to ask your question (which can involve experimental and/or modeling approaches) and write this up in the form of a grant proposal.

### *Timeline*

- Choose a topic and submit it in writing by ~ 4/14/14
- Draft due 4/24/14
- Final report due 5/1/14\*

### *Guidelines and Deliverables*

- The work you propose must in some way make use of the mathematical and/or experimental models we have been discussing in class.
- You are welcome to work alone or in groups of 2 for this project.
- Your final proposal should be no more than 4 pages and should include the following:
  - executive summary
    - somewhat like an abstract, but also the first thing a reviewer would see first and form their first impression
    - should have a few sentences reflecting each of the following sections
    - including 1-4 specific aims
  - background and significance
    - this section should motivate the work by telling the reviewer why they care and presents the work done previously done in the area
    - ideally the reviewer finishes this section and thinks, wow! What an important area of research!
  - experimental proposal
    - succinctly lays out the experiments that will be done
    - includes enough information on methods that will be used to convince the reader you know what you are doing
    - also describes any validation of the setup of these methods
    - includes appropriate controls
    - might include an experimental grid
    - provides expected results/outcome (**faux graphs are encouraged, be semi-quantitative if possible**)
    - the goal is to explain experiments and to convince the reviewer you could gather the experimental/modeling tools to do this work (i.e. if you are working with cells, you should briefly describe where they come from and reference isolation techniques, but you don't need to describe the culture media in detail)

- references – it is important that you completely reference all of the information in your report that is not your own.
- Formatting should be IEEE 2 column formatting
- Your report should demonstrate
  - Your ability to perform literature research
  - your understanding of your topic and it's relevance
  - your ability to break down a complex problem into smaller pieces
  - application of what you have learned about cells
  - your ability to generate research ideas from the literature
  - your ability to design experiments to test your ideas
  - your ability to quantitatively and qualitatively analyze (potential) results

\*A 20%/day grade decrease will be applied late papers. Requests for extensions will be generously considered if they are made in a timely manner.