

The point of the case study and course project is to allow student groups to explore the area of the computational life sciences covered in our course that most interests them. The course project should therefore be a challenging and an enjoyable undertaking. The project has two components:

- Case study presentation
- Project paper

You are strongly encouraged to choose to work in a group. IF YOU ARE FROM A ENGINEERING, PHYSICS, OR MATH BACKGROUND OR MAJOR, YOU ARE ENCOURAGED TO GROUP WITH SOMEONE FROM BIOLOGY, AND VICE-VERSA. THIS HAS GIVEN VERY NICE SYNERGY IN THE PAST!

#### GUIDELINES FOR CASE STUDY PRESENTATION:

- **Identify EITHER**
  - A paper from the research literature OR
  - A topic in current research by yourself or your research group
- ...on which to base your course project (see list of suggestions and more info on website).
- For the case study, each individual or group will give a brief in-class presentation of a paper that applies the modeling and computational techniques we have learned in the course. If you are doing a project related to your current research, find the closest existing paper that applies mathematical modeling to your topic. These studies will then be developed into course projects.
- For your case study presentation,
  - Prepare about 5 slides (powerpoint, or other software), including: (1) intro to topic, (2) mathematical or computational model used in paper, (3) conclusions / insight from this model. If there are many different conclusions, summarize or pick one or a few key conclusions. (4) Sketch of your plans for asking your own question based on the model.
  - Prepare and **practice** a presentation of the main ideas. One group member, or several / all, can give the presentation – it doesn't matter, but of course all will contribute to its preparation. **YOUR PRESENTATION MUST FIT IN SIX MINUTES. TWO ADDITIONAL MINUTES WILL BE ALLOCATED FOR QUESTIONS.** Time yourself as you practice – it is difficult to give a summary of anything in a few minutes! But this is exactly what happens in spotlight sessions of many research conferences.

## GUIDELINES FOR NEXT STEPS / COURSE PROJECT:

- Write MATLAB code that implements one of the central models in the paper (or the central model, if there is only one). Reproduce one or several of the associated figures in the paper, or at the very least some of the model results behind one of these figures. (See guidelines below.)
- Identify an interesting new question that can be asked about the model and topic of the paper.
- Extend or modify the MATLAB code to answer this question.

## GUIDELINES FOR PREPARATION OF YOUR PROJECT PAPER:

**NOTE: The paper is due as posted on the website.**

- Prepare a paper describing your findings. **This paper should have the following sections.**
  - Introduction. Discuss the biological problem that is solved in the paper.
  - Detailed description of model equations, including definitions in of all variables, written in prose as text.
  - Reproduction of results in paper – figures, captions, text discussion.
  - Novel results – figures, captions, text discussion.
  - Conclusion – text
  - Appendix – code.

You MUST have all sections to receive full credit.

- In the introduction and / or discussion, cite at least one OTHER article (beyond the one you are focussing on) that are on a related theme, and comment on how the article you based your work on and / or your results fit in.
- Please attach the article you based your project on to the back of your paper.
- Figures should appear throughout as part of the main text, as you go along, and should be high-quality – large enough, with large enough text, clear line types, all symbols and axes defined, and well-written captions. The appendix should include all MATLAB code used to reproduce figures in the paper and to extend them to answer your research question.
- As a guideline, if you are a one-person group your paper should include at LEAST six pages of double-spaced text (excluding all figures and equations), to accomplish the above. More material is expected for larger groups.

## GUIDELINES FOR PROJECT PRESENTATION

- Prepare about 5-7 slides (powerpoint, or other software), including: (1) intro to topic and review of the work done by original authors, (2) the novel question you asked, (3) your results, and (4) your conclusions, interpretations, and (optional) interesting directions for further work.
- Prepare and **practice** a presentation of the main ideas. One group member, or several / all, can give the presentation – it doesn't matter, but of course all will contribute to its preparation. **YOUR PRESENTATION MUST FIT IN SIX MINUTES. TWO ADDITIONAL MINUTES WILL BE ALLOCATED FOR QUESTIONS.**