MCDB 172/272 Biological Dynamics Winter 2023 Final Assignment Instructions

DUE DATE: March 23rd, 2023

The idea behind this assignment is to give you a chance to use your newfound Quantitative and Computational Biology skills to ask and answer a scientifically relevant question.

Your final assignment should have the following sections:

- Title
- Author(s)
- Abstract – (150 words) A very short summary of what you did and found and why you did it.
- Introduction – (500-700 words) Introduce the main ideas, give background on the problem, and discuss why your experiment is significant. Identify the BIG QUESTION.
- Methods & Results – (600-1200 words) Show the details of you model, equations, parameters, lattice, results. Justify why you made certain decision. Explain what the outcomes of your experiments are and include figures with captions. Add an additional computational experiment here for every member of your group. (If you have a large group exceeding the word limit is ok, but not necessary (good scientific communication is concise))
- Discussion – (500-700 words) Provide analytical depth to your results. What do your results mean? How do they relate to other results in the field? How might they inform treatment or intervention measures, what further modifications could be made to your model, where should the scientific community go from here? What are some of the limitations to your study? Future directions?
- Works Cited – no limit.
- Supplemental Code – Provide a well-commented python notebook that can generate every figure in your main article.

You will submit *3 documents*. (1) The scientific article you chose as a PDF, (2) your own experimental main text from Title to Works Cited as a PDF, (3) your supplemental code file as a .ipynb. Please submit one assignment per group. Name the file using your last name(s)_MainText and last name(s)_SupplementalCode.ipynb.

Start by choosing a scientific article that implements a computational or mathematical model of a biological system. Please be sure to let me know what your selection is so that I can help you assess your choice.

Next, use this paper as a springboard into the biological question of interest by, first, implementing the original model and demonstrating the main result from that model that was shown in the paper and, second, performing a biologically justified computational experiment that the authors of your article did not yet do. Please include one additional, independent experiment for each member of your group (e.g. if you have 3 people in your group then perform 3 experiments). Report on the results of your experiment in the “Results” section of your assignment and be sure to include figures demonstrating that you have implemented the model and your computational experiment.

Good luck and have fun!