Modeling Project (due April 16th, 2021)

Learning Objectives:

In this project you will learn how to run an existing agent-based model, extend it/modify it to address a specific biological question, and run simulations that generate predictions you can draw conclusions from that can help you answer the question.

Activity:

Find a partner. Working with your partner, use and extend an ABM of wound healing (provided by Dr. Peirce-Cottler)to generate novel insight on a biological question of your choosing that is relevant to wound healing.

Extend the existing model formulation in order to answer a question you come up with about the biology of wound healing. For example, if you are curious about macrophage phenotype switching, you might select option 2 in order to explore what factors play a role in that:

1. Run a sensitivity analysis on one or two key parameters and show how the model is sensitive (or not) to them
2. Add an agent (& behaviors) to the model to predict something new that it currently doesn't predict
3. Add a rule(s) to the model and show how it changes the outcome with respect to one or two key parameters
4. Program the model to predict a new output(s) that it doesn't currently keep track of

Formulate a hypothesis for what will happen to the system once you implement your perturbation/analysis. Implement this perturbation and analysis and describe your results. Does it agree with your hypothesis? Why or why not?

Once you have implemented your change to the model, present your results as a BMES style abstract with a figure or two that describes your results. Choose your formatting, but the following sections should be touched upon:

- Introduction
- Methods
- Results
- Conclusions/future directions
- References

Specifications:

You will meet specifications for this project if you:

- Explicitly formulate a question based on the biology of the system and test that question using one of the options listed above.
- You write up your results in a BMES style abstract, including each of the sections listed above.

- You provide at least one figure (adhering to best practices in visualization) that helps illustrate your results.
- You provide quantitative statements about the results, backed by the appropriate statistical tests.
- You upload any original code to Github
    - Link: https://classroom.github.com/g/AvxcFxIy
- You follow the general specifications