

Assignment 2: Build and analyze your own model

Due: **Friday, February 19, 2021**

In assignment 1, you implemented someone else's model. Here, your goal is to create your own model, and analyze it using any of the techniques we've learned in this class. Critical first steps are to 1) identify your question and 2) put together a flow diagram. I encourage you to sketch this out and send it to me for feedback, anytime. **Important: keep things simple!**

Once you've put together your flow diagram, use the tools from this class to code up and examine model behaviour. You'll want to explore as many parameter combinations as possible, making figures as you go, to help you visualize model behaviour. If you find that the model behaves in biologically non-plausible ways, you may want to revise your assumptions - and document these revisions, as this can be good fodder for discussion - these initial mis-steps can help provide biological insight - e.g., why did the model that initially seemed reasonable not make sense?). Once you've got things working and things seem to make sense, do your best to summarize your findings in as few and as simple figures as possible.

Your submitted assignment you should include:

- Background: Set up the question and justify the need for a model (e.g., what is the model helping you understand that you cannot just figure out without it?).
- Methods: describe the model itself, including all key equations. Make sure to describe all parameters. Feel free to include the flow diagram, if helpful.
- Results: At least 2 but no more than 4 tables or figures (a multi-panel table/figure counts as just one). Each table/figure should help the reader understand an aspect of the model that is not deducible entirely from the other tables/figures. E.g., you should ask yourself "what message am I showing with this figure?"
- Discussion: Summarize results and conclusions. Does the model output make sense? Did you answer your initial question?
- R script, so that I can run the model on my own machine. I don't need to be able to re-create your figures, but I want to be able to run the model, in some capacity (so that I could make my own figures, if I wanted to. This is what you'd typically post online as a supplement for your paper. No RStudio projects please!
- I don't have any strict guidelines for length, but let's aim to keep the text at ≤ 5 pages, double-spaced (not counting references or figures).

Assignment and R script to be uploaded to Canvas.

Rubric

1. Background and motivation [**5 points**]
2. Model description [**5 points**]
3. Quality of analysis [**15 points**]
4. Conclusions, and links back to original question [**5 points**]
5. Quality of your R code [**5 points**]
Annotated, readable, and “general” organization.