Team Charter for Neuro Group

## Group members:

Samantha Sun 1st year PhD student (sunh20@uw.edu)

Kelsey Luu 3rd year undergraduate student (kelseytl@uw.edu) (Th)

Grace Jun 3rd year undergraduate student (gracejun@uw.edu) (Th)

Meriam Lahrichi 3rd year undergraduate student (meriaml@uw.edu) (W)

Jackson Chin 4th year undergraduate student (jch1n@uw.edu) (W)

# Team Goals

Our overall goal is to deliver a completed model of a neural ODE system, consisting of a small-scale single-neuron model and a network-level model. We also plan to complete a written report summarizing the motivation, methods, results, and conclusions of our project.

Week 1 goals: Complete background section, complete Aim 1, and start on Aim 2.

* The background section will be split up into two sections, addressing scientific need and computational methods. The work will be evenly split amongst group members, and we plan to finish a draft of the background by Friday, May 17th and turn it in on Monday, May 20th.
* To complete Aim 1, two students will work on getting the initial ODE working and fit the parameters to pre-existing data using parameter estimation. They will then explore and create different types of stimulation inputs for the neuron model. After completing the ODE model, bifurcation analysis code should be written at this point and generated for the single neuron model.
* To start on Aim 2, two students will compile the results of a literature search to determine the network properties of neuron groups and write a template code or function that creates a simple network in preparation for integrating it with the neural ODE model. This group will also work with the Aim 1 group on stimulation inputs and figure out how to stimulate a small group of neurons in the network.

Week 2 goals: Complete methods section, work on Aim 2

* A draft of the methods section will be completed by Friday, May 24th and turned in on Monday May 27th.
* We will integrate the neural ODE into the network model and investigate the behavior of the network, including:
  + Overall activity (summed activity)
  + Generating multiple networks and comparing activities (mean + variance)
  + Generating networks of different sizes and comparing
  + Varying the number of neurons stimulated in the network and comparing
* We will also compare our results to literature results

Week 3 goals: Complete results section, verification/validation analysis

* A draft of the results section will be completed by Friday, May 31st and turned in on Monday June 3rd.
* Bifurcation analysis will be performed at the network scale, with varying parameters such as the equation parameters, network size, and neurons stimulated.
* For verification, we will perform steady-state analysis and explore other verification methods as appropriate
* For validation, we will compare our findings to literature results and other validation methods as appropriate

Week 4: Revise final project document, prepare presentation, buffer time for previous weeks

* A draft of the oral presentation will be completed by Friday, June 7th
* A draft of the final written project will be completed by Friday, June 7th
* Complete any other remaining tasks from the previous weeks

# Decision Making

Small decisions about parameter use and implementation will be made by individual students and later explained to the entire group. Decisions regarding the project direction and other major items will be made as a group using majority vote. We all agree to remain civil and provide constructive feedback for any and all decisions made for this project.

# Accountability

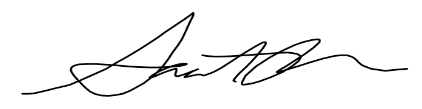
We expect all group members to attend all class sessions and their respective lab session, and if a group member cannot make it to a class, they will communicate their absence through our group chat. Two students are in the Wednesday lab section, and two are in the Thursday lab section. Samantha will be attending parts of both sections. As our project is starting and towards its end, we plan to all meet during the Thursday lab section as needed. Other meeting times will be established via group chat.

To ensure quality work, there will be two teams of two students who will work together to complete complementary parts of the project. Everyone will contribute to working on written portions, and each team is responsible for their respective parts in the written work. Documentation of work will be located on GitHub and our shared Google Drive.

# Communication

Our group will primarily communicate via group Facebook messenger. Due to the multiple interacting parts of this project, we will also be sure to provide informative descriptions of what changes we made to the code every time a member updates the code. Additional meetings will be decided as needed. Files will be shared via GitHub and Google Drive.

# Signatures



Samantha Sun \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Kelsey Luu \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Grace Jun \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Meriam Lahrichi \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Jackson Chin \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_