**Model Documentation:** Biophysical Modelling of Neuronal Phenotypes of the Right Atrial Ganglionic Plexus from Single Neuron Transcriptomics

**Context of use:** Simulation of single compartment neuron electrical activity in the RAGP.

**Instructions for running the models:**

Detailed instructions for running the model in NetPyNE and on the O2S2PARC platform are as follows:

**I. NetPyNE implementation**

1. Open a new Terminal window
2. Make a new directory into which to clone the repository
3. Clone GitHub repository and checkout to tag-*v2*

**git clone https://github.com/suny-downstate-medical-center/ragp.git**

1. Install NEURON and NetPyNE:

**pip3 install NEURON / pip install NEURON**

**pip3 install netpyne / pip3 install netpyne**

1. Compile *mod* files:

**nrnivmodl mod**

1. On successful compilation, x86\_64 folder is created
2. In order to run a single simulation, execute the following command:

**nrniv -python init.py**

1. In order to run a batch simulation, MPI installation is mandatory:

**mpiexec --oversubscribe -np 32 nrniv -python -mpi batch.py**

* 1. Once the simulations are complete, run *scAnalysis.py*

**ipython -i scAnalysis.py**

* 1. Create *\_allData.json* file by running the function

**readBatchData(dataFolder, batchLabel, paramFile = 'params.csv')**

* 1. Load the *\_allData.json* file by running the function

**readAllData(jsonfilename)**

* 1. Analyse the data in *\_allData.json* using the functions in *scAnalysis.py*

1. In order to run sobol sampling on the parameter space, execute *sobol.py*, following which a csv file (default name: *params.csv*) is generated that will contain the parameter values
2. In order to plot the binarized transcriptomics data, execute

**ipython Tdata\_plots.py**

**II. O2S2PARC implementation:**

1. Login to[**https://osparc.io/**](https://osparc.io/)
2. Use the *Jupyter Octave+Python Math* service from the Dashboard
3. Clone the repository from GitHub: **https://github.com/suny-downstate-medical-center/ragp.git**
4. Launch *Terminal*
5. Type the following commands on the Terminal
   1. **cd work/ragp**
   2. **pip install --quiet NEURON**
   3. **pip install --quiet netpyne**
6. Resume the steps from ***I.5.***