**PART 1 – BMTK Tutorials**

The Brain Modeling Toolkit (<https://github.com/alleninstitute/bmtk>) (<https://alleninstitute.github.io/bmtk/>) has become an essential tool in developing many of the lab’s models. The assignment is to complete a series of guides and **turn in the resulting project files**, walking you through the basics of how BMTK works. The guides can be found here: <https://github.com/tjbanks/bmtk-howto>

Python is a prerequisite to using BMTK. If you are not familiar with python I encourage you to review <https://www.learnpython.org/> and search for additional python learning resources. Libraries such as Numpy, Pandas and Matplotlib may also be used, if you encounter a function definition you don’t understand documentation is usually available online via google.

Several of you may have completed some of these tutorials previously. Use this time to review your previous work and take special consideration toward how BMTK projects are laid out.

Here are a few quick notes to reference while working through these guides.

**01-Installing\_BMTK**

Runs through steps of installing BMTK on your Windows-based machine, and is not applicable to Linux. If you’re **not** using the NeuroVM (<https://tylerbanks.net/projects/neurovm/>) the steps for installation will be similar (install neuron/anaconda/bmtk) but a little more difficult.

If you’re using the NeuroVM, BMTK and Anaconda will already be installed. Simply run pip install --upgrade bmtk and you’re done!

**02-Single\_cell\_Hoc\_BMTK**

Go through the steps of creating your first BMTK network. The instructions have been updated recently to accommodate recent changes to the BTMK API. If you run into issues initializing your network you may be running an incorrect version of BMTK. Upgrade according to the troubleshooting section below.

**03-Networked\_Hoc\_BMTK**

Build a simple network based on your single cell code from the last tutorial.

**10-Simple\_Data\_Manipulation, 11-Advanced\_BMTK, 99-Additional\_BMTK\_info**

Nothing needs to be done with these documents. Thoroughly review and **remember that these resources are available to you when conducting research with later projects**.

**Troubleshooting**

Ensure you’re running the latest version of BMTK (installation in tutorial 01)

If you’re encountering errors with files not found, **ensure that you’re using backslashes for paths in .json files, instead of “\\”.** I tried correcting all of these in the instructions but may have missed a few. Let me know if you find one!

Updates to come as issues arise.

**PART 2 – Hippocampus Code**

Review the code provided for the Hippocampus model. (<https://missouri.box.com/s/fmso3zzfwu3388i13lh8r5eiezi9hjj0>) From the **GuntuBanks-bmtk folder** in the provided zip - Use your new BMTK skills to understand and navigate the code. Pay special attention to the following files:

build\_network.py

synapses.py

run\_bionet.py

biophys\_components/hoc\_templates/Template.hoc

biophys\_components/synaptic\_models/ # Json files define the properties to be used for each synapse (read by synapses.py)

**Document their purpose and attempt to run the code similar to the tutorials.**

(Remember to compile the mod files biophys\_components/mechanisms/modfiles/)

**Windows**: mknrndll in that folder then copy the resulting .dll file to the parent (mechanisms directory)

**Linux**: Run nrnivmodl from the mechanisms directory