



Dynamic Brain Circuits
in Health and Disease + **Advanced Research Computing**



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Getting to know the crowd

- How many people have used Python before?
- How many people are comfortable with NumPy, Matplotlib, Scipy?
- How many have used Jupyter before?
- How many have used Jupyter as tool for publication?

Features

- Customizable
 - Create a variety of different environments
 - Supports multiple kernels: Different Python versions, R, Julia
 - Supports different User interfaces: Notebook, Lab, RStudio
- Shared Filesystem for Quick Collaboration
- Get access to more powerful computational resources
- Work from anywhere on any device
- Plus everything you get from Notebook/Lab, including:
 - Text Editor
 - Command Line Interface
 - Notebook goodies: Include Media, LaTeX, Markdown

Our Deployment

- Deployed on Alder
- Each user gets 4 CPUs, 16 GB RAM
- Scratch Space with 500 TB storage (PS, this is **not** backup space!)
- Built on top of slurm job scheduler
- Request resources when you begin a session
- Software: Includes Numpy, Scipy, Matplotlib, Pandas.
 - Pip install
 - List can be queried with pip list

Setting a new password

- Open up a terminal
- `$ ssh <username>@alder.arc.ubc.ca`
- `$ passwd`
- Your temporary password is Please use a secure
password.
- Log on to `jupyter.alder.arc.ubc.ca` and use your username and new password

Just like a Notebook!

The screenshot shows the 'Files' tab of the Jupyter interface. At the top left is the 'jupyter' logo. Below it are tabs for 'Files', 'Running', and 'Clusters'. A grey box labeled 'Select Items' has an arrow pointing to the file list. The file list contains a folder named 'Images' (with a grey box labeled 'Folders' pointing to it) and two notebook files: 'Matplotlib.ipynb' and 'SyntheticDroppedFrames.ipynb'. At the top right, there are 'Quit' and 'Logout' buttons. Below them are 'Upload' and 'New' buttons. A grey box labeled 'Upload files from local machine' has an arrow pointing to the 'Upload' button. A dropdown menu is open from the 'New' button, showing options: 'Notebook: Python 3' and 'Other: Text File, Folder, Terminal'. A grey box labeled 'Open a variety of interfaces' has an arrow pointing to the 'Other' section of the dropdown menu.

The screenshot shows the 'Running' tab of the Jupyter interface. At the top left is the 'jupyter' logo. Below it are tabs for 'Files', 'Running', and 'Clusters'. The main heading is 'Currently running Jupyter processes'. There are two sections: 'Terminals' and 'Notebooks'. The 'Terminals' section shows a terminal window with the prompt '>_ terminals/1' and a 'Shutdown' button. The 'Notebooks' section shows a notebook titled 'lab/JupyterHubDemo/Untitled.ipynb' running on 'Python 3', with a 'Shutdown' button and the text 'seconds ago'. A grey box labeled 'See and control what's running' has an arrow pointing to the 'Shutdown' button in the 'Terminals' section.

Demo

- A brief demo of the interface
- Copying data onto the JupyterHub
- Running an example notebook

Profiling Resource Usage

Multiple resources available online like

<https://www.pluralsight.com/blog/tutorials/how-to-profile-memory-usage-in-python>

Use batch spawner to graph num cpus vs time (real and core hours, as needed) to find the minimum or most reasonable resource requirements. Pure python/threaded python will not benefit from multiple CPUs. Libraries like numpy, scipy, multiprocessing python will.

Open Session

- Run your own code!