
# Software and Data for Tutorials

**Data:**
The data for each tutorial can be found here:
https://drive.google.com/drive/folders/1Ty2qDF_NoFSi8vpjNMl9DCvjUczA3C0Q?usp=sharing

**Software:**
It is recommended to use a linux laptop or Mac, windows will not work. You will need a version of python installed (e.g. anaconda or miniforge or system default). Below is a list of the software we will be using. You can download and install yourself or for some you can use a docker container (https://www.docker.com/get-started/) with software pre-setup. Although note that Docker may have issues with newer ARM / non-intel macs in which case it is recommended to use the new Mac Containers app https://github.com/apple/container which can be installed via Homebrew as well via

*brew install container*
*brew services start container*

- CASA : the latest versions of CASA for Mac and Linux can be downloaded here https://casa.nrao.edu/casa_obtaining.shtml.
- For Linux:
  - Once downloaded, extract the package into an appropriate folder. E.g., you can use the tar command in the command line / terminal to do this:
    - `tar xvf casa-6.7.5.tar.xz`
    - `Adjusting for the version name`
  - This will make a folder named `casa-6.7.5` or something similar in the directory you extracted in.
  - You can run CASA by running `casa-6.7.5/bin/casa` in your command line.
  - An easier way is to set a bash alias so that you can run CASA by just typing `casa` into the command line (from anywhere!). This can be done using the following code (where you want to replace `(path_to_CASA_folder)` with the CASA folder path (you can find your current path with the command `pwd`). Note that this command will modify your `.bashrc` file in your home directory by adding a line at the end of the file:
    - `echo 'alias casa=(path_to_CASA_folder)/casa-6.7.5/bin/casa' >> ~/.bashrc`
    - For example, if I untarred CASA in my home folder, this command would be
    - `echo 'alias casa=/home/radcliff/casa-6.7.5/bin/casa' >> ~/.bashrc`

    - Test that this alias works by opening a new terminal and type `casa` into it. This should open up CASA and the logger window.
- For Mac:
    - Download the image and click to install (dragging the CASA app to your Applications folder)
    - Within the applications folder, right click and open CASA so that we can override the Apple security safeguard. If this doesn't allow you to open first time, try again. This should finish with a Terminal window opening and the CASA prompt present.
    - Within the CASA prompt type: `!create-symlinks` and follow the prompts.
    - Leave the CASA window open, and go to System Settings → Privacy & Security → Full Disk Access and make CASA, and the Terminal apps have full disk access.
    - Once complete, close CASA and the Terminal app **completely** (i.e. right-click on the Mac dock to quit). Open a new Terminal tab/window and type in `casa`. This should open up CASA and the logger window.
    - You can also install a pared down version of CASA to use within any python environment by
        - `Pip install casatasks casatools cubevis`
        - Then from within a normal python script or environment you can import the needed CASA tasks as follows:
        - `from casatasks import gaincal, mstransform`
        - `cubevis` is required for the imaging task `iclean` which we will use to perform interactive imaging within the tutorial notebooks
            - `Pip install cubevis`
    - Additionally for linux or mac, On first import / run CASA self-downloads and installs a bunch of runtime data and ephemerides which are about ~300 MB in size. It also tries to update these files ~once per day to week, which we don't want it trying to do while on site.
        - Open a CASA terminal and enter
        - *`from casaconfig import data_update`*
        - *`data_update()`*
        - And add the following to ~/.casa/config.py to prevent the auto-download while out of network access:
        - *`measures_auto_update = False`*
        - *`data_auto_update = False`*
        - *`skipnetworkcheck = True`*
- CARTA: https://cartavis.org/#download
- RMTools: https://github.com/CIRADA-Tools/RM-Tools
    - Note that this install forces a potentially older version of numpy and thus it is recommended to be installed in its own virtual environment
- WSclean: https://wsclean.readthedocs.io/en/latest/installation.html
    - There are many Docker containers already available with WSClean
        - There is a fairly recent build here https://gitlab.com/ska-telescope/ssc/ska-ssc-low-scicomm-docker/container_registry/9663117
    - Also on Mac you can use Homebrew
        - *brew tap ska-sa/tap*
        - *brew install wsclean*