

Summer Student Start-up for Pulsars and Transients

1. Contact Info:

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2. Introductory and Reference Material:

Start here¹: <http://astro.cornell.edu/~shami/psrintro/>

As a starting plan, read the Nobel Prize lectures in (1), (2) for historical flavor and work through (5) or (4) for a background understanding of radio pulsars.

3. Python:

Make sure you have access to a working Python installation. If you're using a laptop of your own, it is much better not to fiddle with your operating system Python version, since you risk breaking things. Instead, we recommend that you install and update the Anaconda Python distribution.

Start here: <https://www.anaconda.com/distribution/> (or search for Anaconda Python).

Please install the Python 3.x version (current) rather than the Python 2.x version.

Then install the following packages, at least, if they aren't already there by default:

- IPython;
- NumPy, Matplotlib, AstroPy, SciPy.

If you haven't worked with Python before, please open a terminal window, launch IPython, and use one of the various online tutorials to come up to speed on the basics.

- Try: <https://www.learnpython.org/> (Basics, and NumPy arrays)
- Or try: <https://docs.python.org/3.7/tutorial/>

- If you haven't used Matplotlib before, try this tutorial too:

Pyplot: https://matplotlib.org/users/pyplot_tutorial.html

- For a flavor of advanced Astronomy-specific capabilities, take a look at:

<https://python4astronomers.github.io/intro/quick-tour.html>

- Finally, here is a gist by Danny Price that brings it all together:

<https://gist.github.com/telegraphic/790df2b9dc94dcb690053fe563687282>

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¹All links are clickable in the PDF version.

4. **Advanced exercises:** please ask for help if needed.

- **Detection of the carrier signal from the Voyager spacecraft:**

This uses data from the Green Bank Telescope that were acquired as part of the Breakthrough Listen (SETI) project:

IPython Notebook: <https://github.com/UCBerkeleySETI/breakthrough/blob/master/GBT/voyager/voyager.ipynb>

You can get the required filterbank module at the same place: <https://github.com/UCBerkeleySETI/breakthrough/tree/master/GBT/voyager>

There is also a PDF description file included.

You can run the notebook as a Jupyter notebook. It will produce some plots.

Getting this to work is a bit of a challenge so if you accomplish it, congratulations.

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