

# Python for Geoscientists

Welcome!

The learning curve for Python can be a little steep at first. This (short) document is designed to get you underway with some tools that are likely to be unfamiliar.

This course as a whole is designed to put you on path to Python enlightenment (no joke, it's a thing).

Let's get started.

(Help, I'm doing this at home on my own)

Great! There are some things you will need to install first though.

1. The [Anaconda Python](#) distribution (this includes Python, its most popular packages, as well as Jupyter notebooks).
2. A text editor – my favourite is [Notepad++](#).

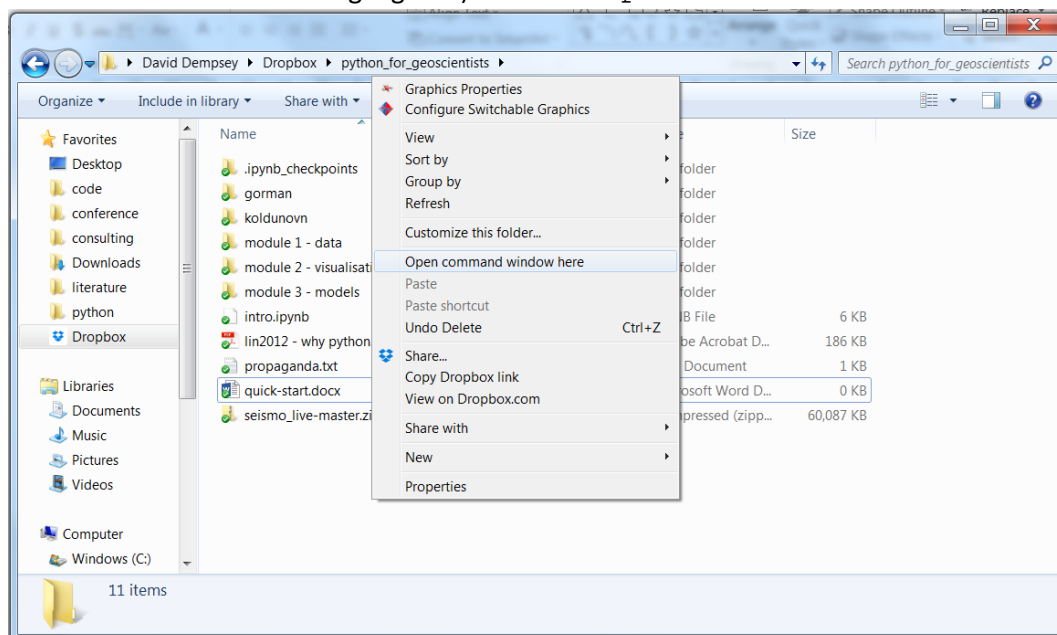
## The Jupyter Notebook

There are two ways to interact with Python that we shall consider:

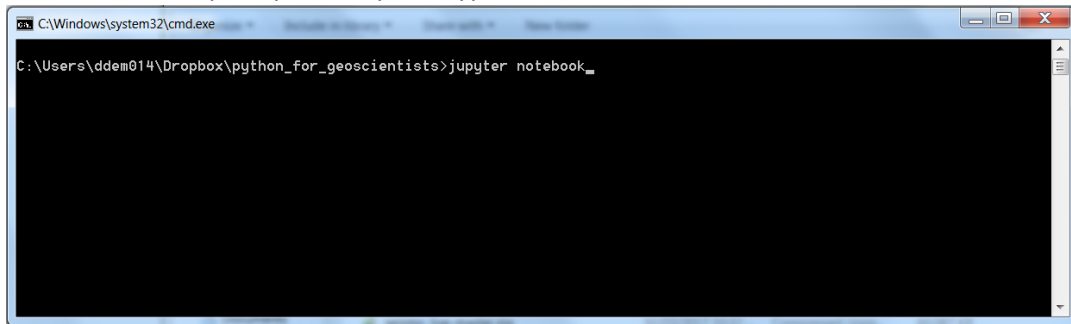
1. The Jupyter Notebook: a kid-friendly introduction that hides much of the technical stuff behind the scenes.
2. Python scripts run in at the command line: the R18 version – maximum power, maximum responsibility.

To get your first Jupyter Notebook started, follow the steps below.

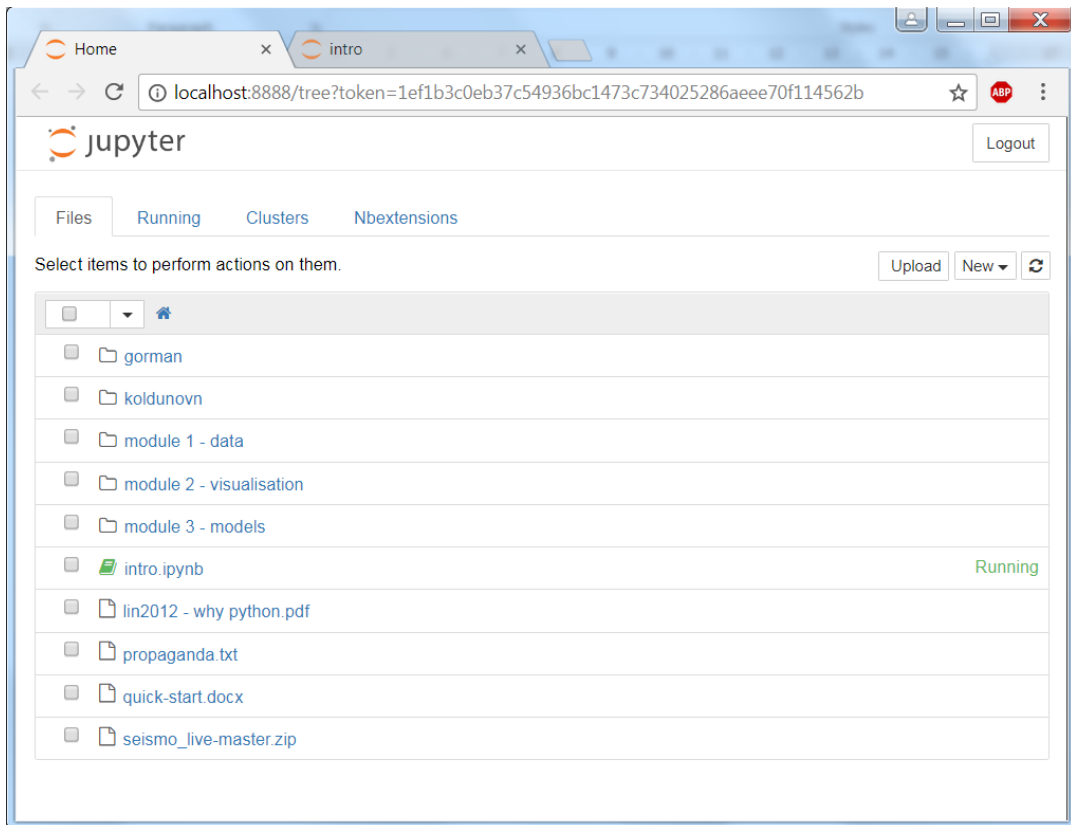
1. **Shift+Right Click** in the *empty space* inside the `python_for_geoscientists` directory (make sure no files or folders are highlighted) and select `Open command window here`.



2. In the command prompt that opens, type `jupyter notebook` and hit **Enter**.



3. An interface will automatically open in your web-browser. Click on `intro.ipynb` to open the first notebook.



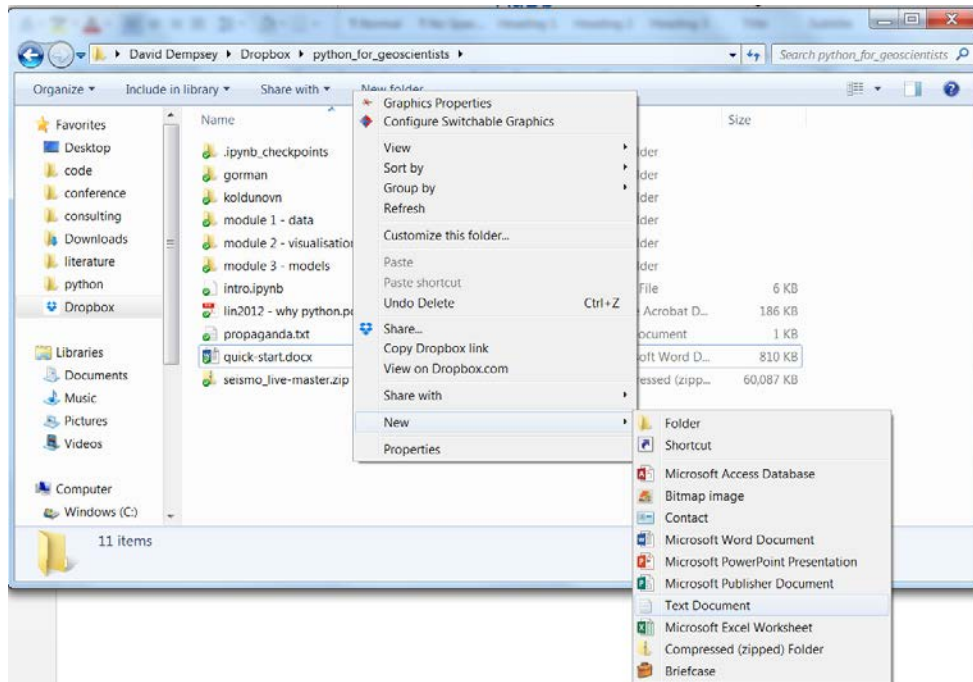
4. That's it! Now follow the instructions in the notebook.

## Creating and running a Python script from the command line

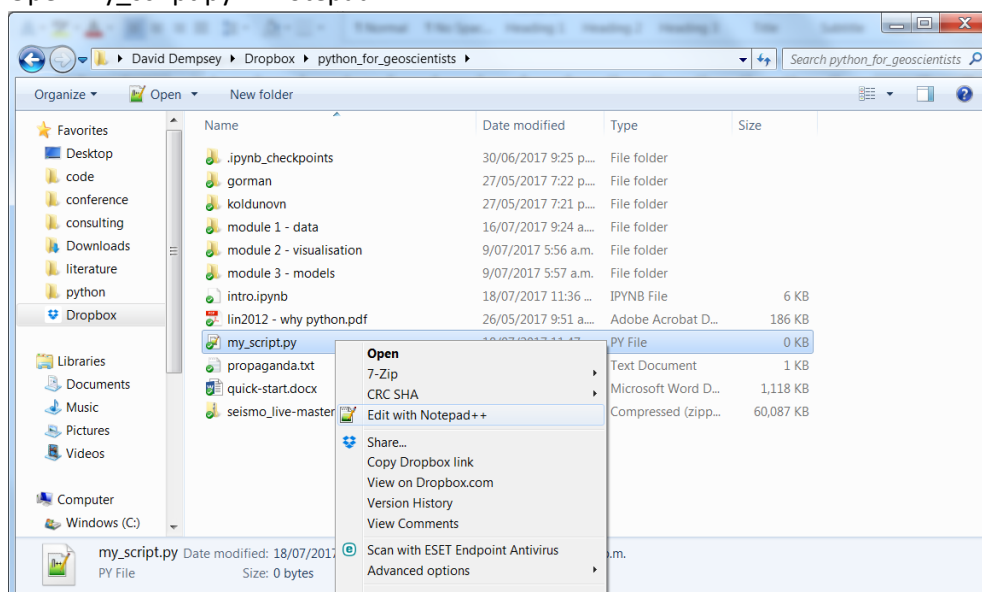
This is the way most people will use Python – small programs or scripts (a series of commands) executed to achieve a particular task.

Here, I will take you through the steps of creating and running a script from scratch.

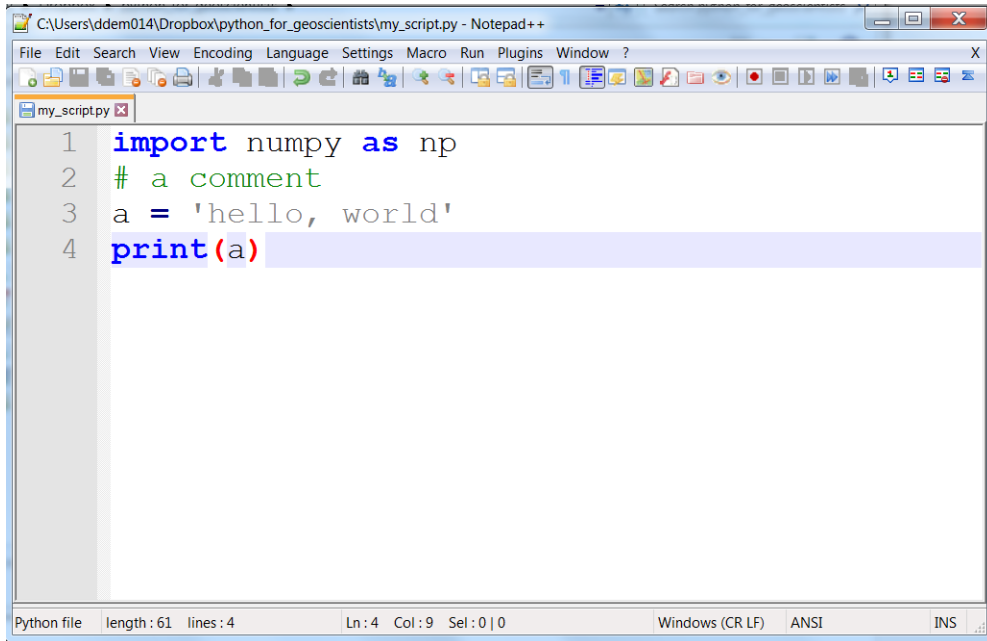
1. Create an empty text file by **Right Clicking** in a folder and selecting **New > Text Document**.



2. Rename the document `my_script.py` (note the `.py` extension at the end, this indicates the text file is a Python script).
3. Open `my_script.py` in Notepad++.

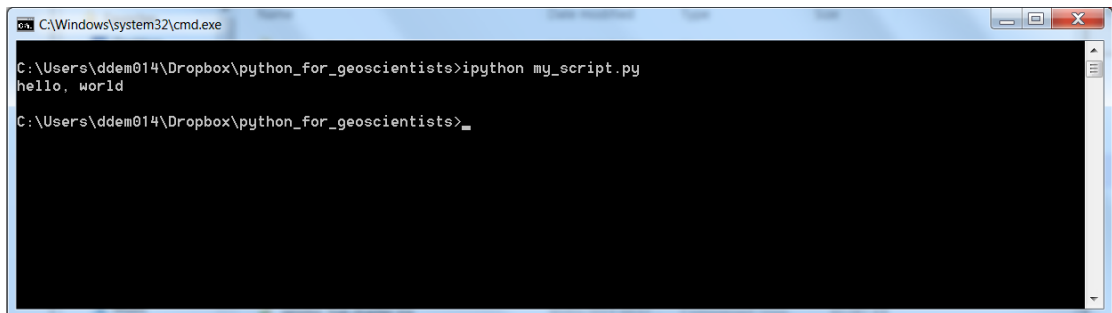


4. Type some basic Python commands into the script and save it (**Ctrl+s**).



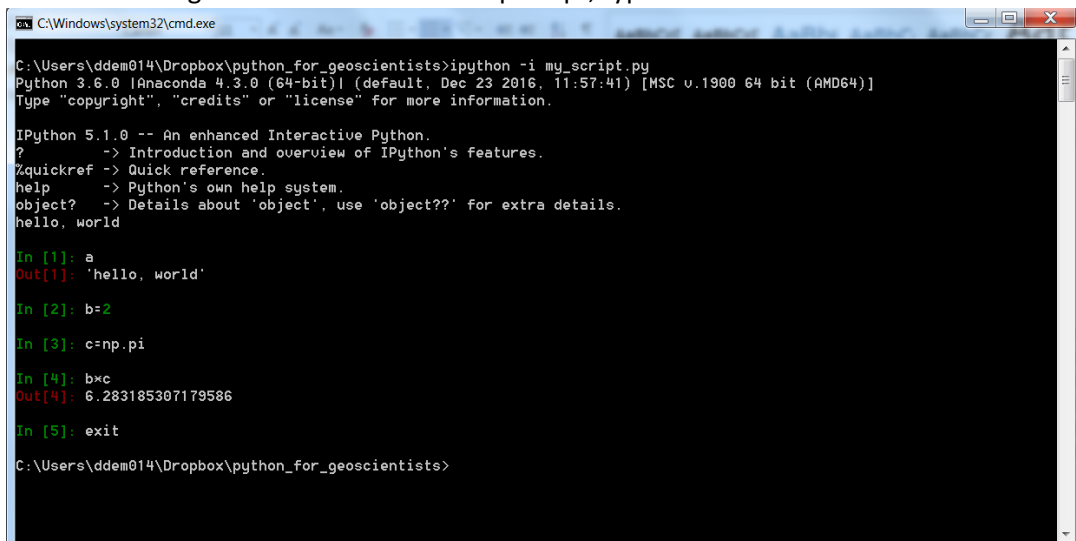
```
C:\Users\ddem014\Dropbox\python_for_geoscientists\my_script.py - Notepad++
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
my_script.py
1 import numpy as np
2 # a comment
3 a = 'hello, world'
4 print(a)
Python file length: 61 lines: 4 Ln: 4 Col: 9 Sel: 0 | 0 Windows (CR LF) ANSI INS
```

5. Open a command prompt in the same folder as `my_script.py` is located (follow Step 1 in opening Jupyter Notebooks above).
6. Type `ipython my_script.py` and hit **Enter**. The Python script will execute and print a short statement to the screen.



```
C:\Windows\system32\cmd.exe
C:\Users\ddem014\Dropbox\python_for_geoscientists>ipython my_script.py
hello, world
C:\Users\ddem014\Dropbox\python_for_geoscientists>
```

7. Alternatively, type `ipython -i my_script.py` and hit **Enter**. As above, this will execute the Python script, but then will finish by leaving you sitting inside a Python terminal. You can now check the values of variables created, or experiment with other Python commands. To get back to the command prompt, type `exit` and hit **Enter**.



```
C:\Windows\system32\cmd.exe
C:\Users\ddem014\Dropbox\python_for_geoscientists>ipython -i my_script.py
Python 3.6.0 |Anaconda 4.3.0 (64-bit)| (default, Dec 23 2016, 11:57:41) [MSC v.1900 64 bit (AMD64)]
Type "copyright", "credits" or "license()" for more information.

IPython 5.1.0 -- An enhanced Interactive Python.
? -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help -> Python's own help system.
object? -> Details about 'object', use 'object??' for extra details.
hello, world

In [1]: a
Out[1]: 'hello, world'

In [2]: b=2

In [3]: c=np.pi

In [4]: b*c
Out[4]: 6.283185307179586

In [5]: exit
C:\Users\ddem014\Dropbox\python_for_geoscientists>
```