Python – figures workshop

# Prior to the workshop:

* Install Python 3.7 or 3.8
* Install an IDE (PyCharm [preferred], Visual Studio or Spyder)

# Workshop steps

## Part 1: Setup

1. Create a new project called ‘report-qcer-figures-workshop’
2. Set up virtualenv
3. Command: `pip install pypaper`
4. Command: `python -m pypaper.init\_project`
5. Command: `python manage.py init qf`
6. Get everyone to file ‘fw\_scripts/research/fig\_playground/figure\_eg\_1\_basic\_plot.py’ into same location in their own project.
7. Run script and note that packages are missing and use:
   1. `pip install <package-name>` or
   2. Command: `pip install -r requirements.txt`
8. Share link to medium post about folder setup in README folder

## Part 1: Basics

In figure\_eg\_1\_basic\_plot.py

1. Add a legend and axis labels
2. change the font
3. Add multiple lines with different colours
4. Add text to the figure `subplot.text(2, 3, ‘some text’)`
5. save the figure

## Part 2: Deal with data

1. copy the file ‘fw\_scripts/build\_databases/generate\_basic\_raw\_data.py’
   1. Explain the use of \_\_file\_\_ to get name
   2. Explain kwargs in `np.savetxt`
   3. Explain `ap.MODULE\_DATA\_PATH`
2. copy the file ‘fw\_scripts/research/duration\_study/figure\_raw\_data\_w\_pandas.py’
   1. Explain the thresholding and supports titles
3. copy the file ‘fw\_scripts/research/duration\_study/figure\_raw\_data\_w\_numpy.py’
4. compare ‘figure\_raw\_data\_w\_numpy.py’ to ‘figure\_fit\_raw\_data\_w\_numpy.py’
   1. Show the polyfit command
   2. Show how to add equation to figure
   3. Explain the string formatting
5. Fig\_paper\_v0
   1. Show how to set xlimits
   2. Show how to write function to set them automatically
6. Figure\_paper\_v1
   1. Show problem with legend
   2. Show how engformat revamp\_legend removes this
   3. Show how to look at functions in PyCharm (crtl + click)
7. Figure\_paper\_v2
   1. Show how to add axvspan
   2. Show how to add custom legend patch
8. Figure\_paper\_v3
   1. Add axis labels and tight\_layout
   2. Explain GridSpec is an option
9. Figure\_paper\_v4 – explain why it is in ‘outputs’ folder
   1. Change font
   2. Use engformat xy
   3. Add the save and show options
   4. Explain the figure size and settings.py file
   5. Explain the additional latex insert option
10. Figure\_paper\_v5
    1. Show how to add multiple subplots, sharex option
    2. Explain bwplot
11. In terminal run `pip freeze -> requirements\_20200915.txt`

Extras:

* Zorder
* Grid lines
* Change markers