

R-Club Presentation

Python for Research

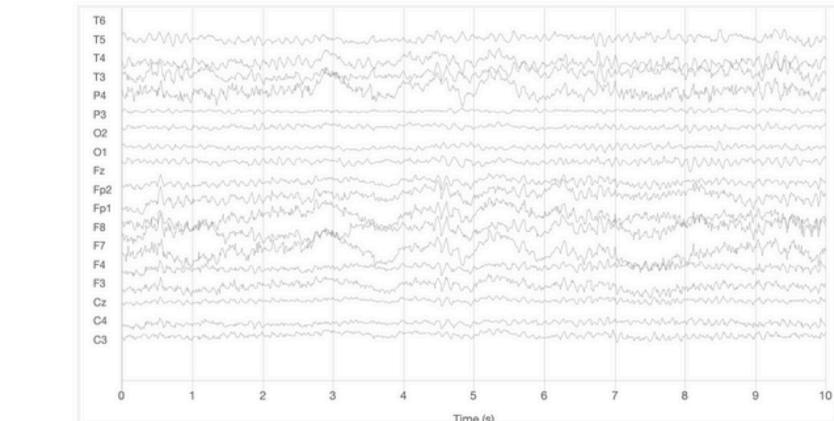
Nathaniel Nyema

What I Use Python For

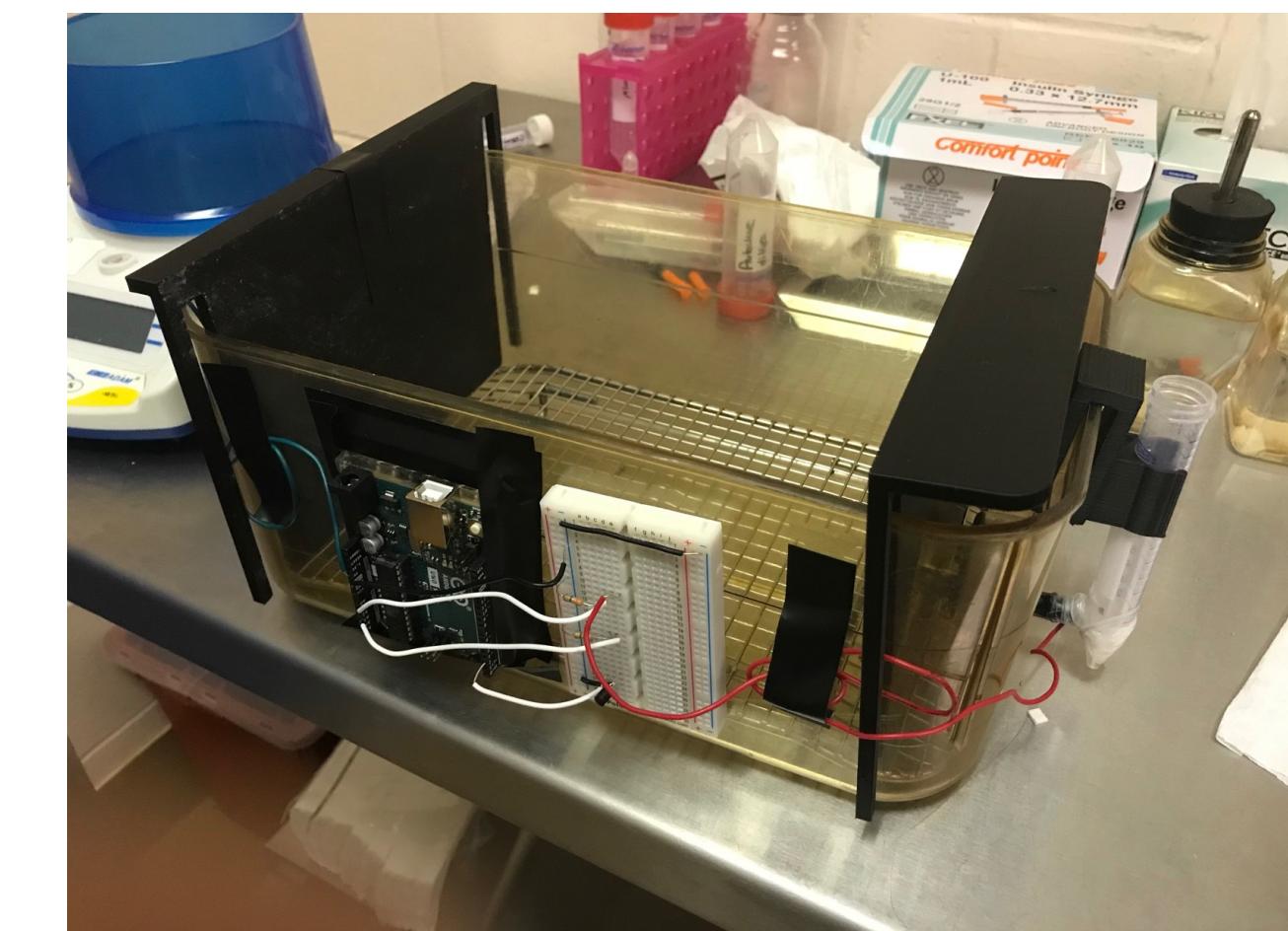
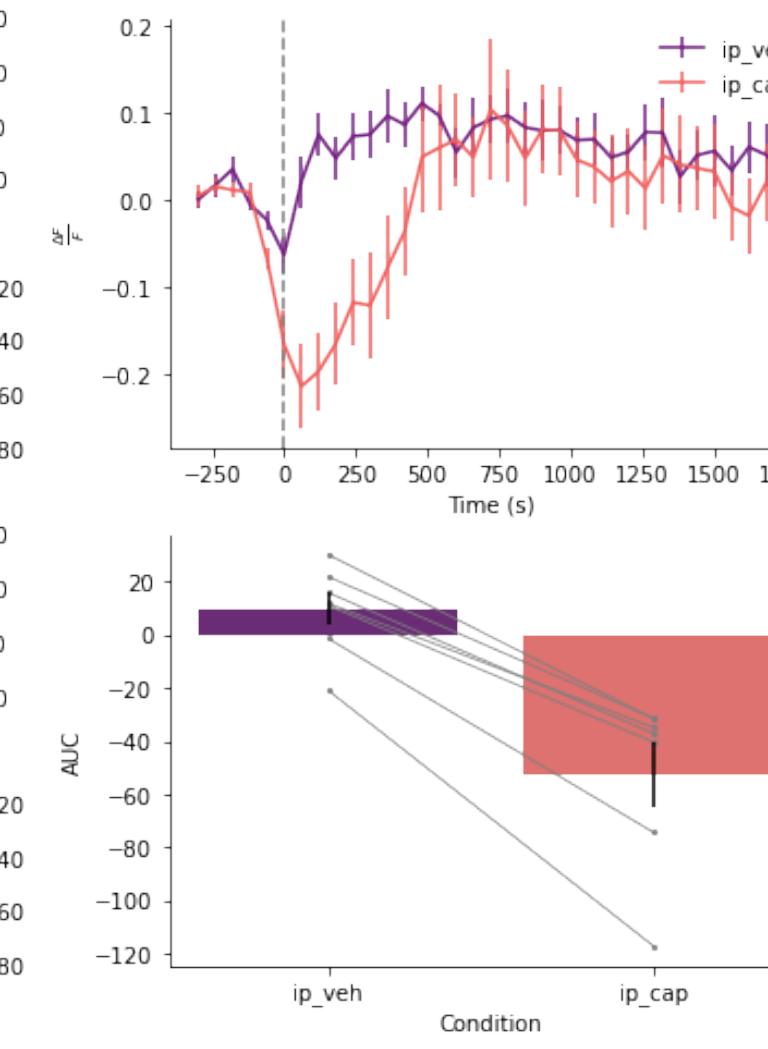
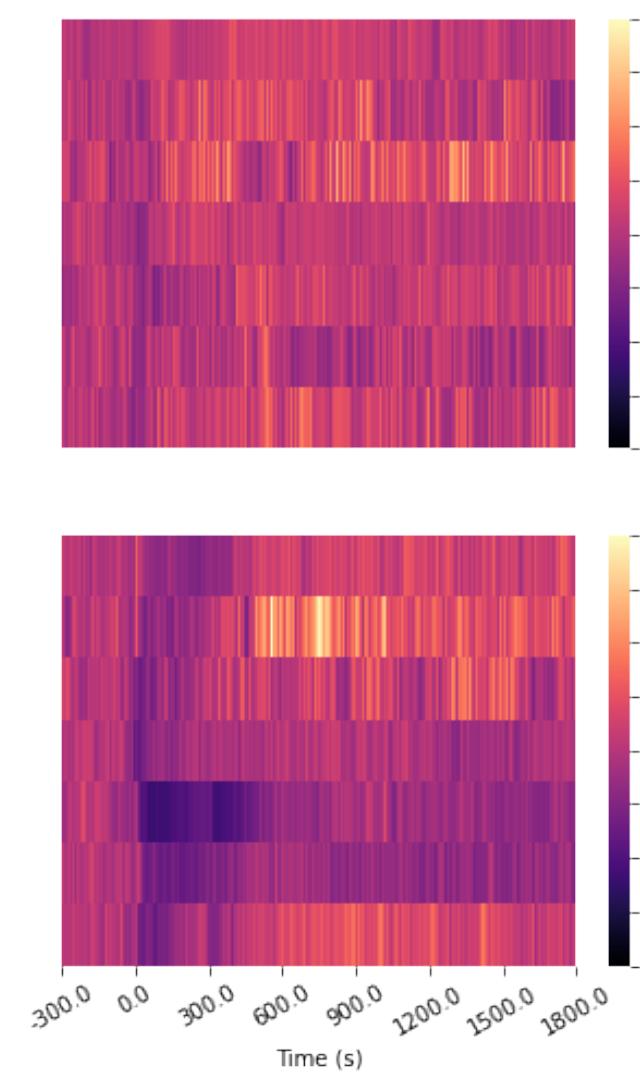
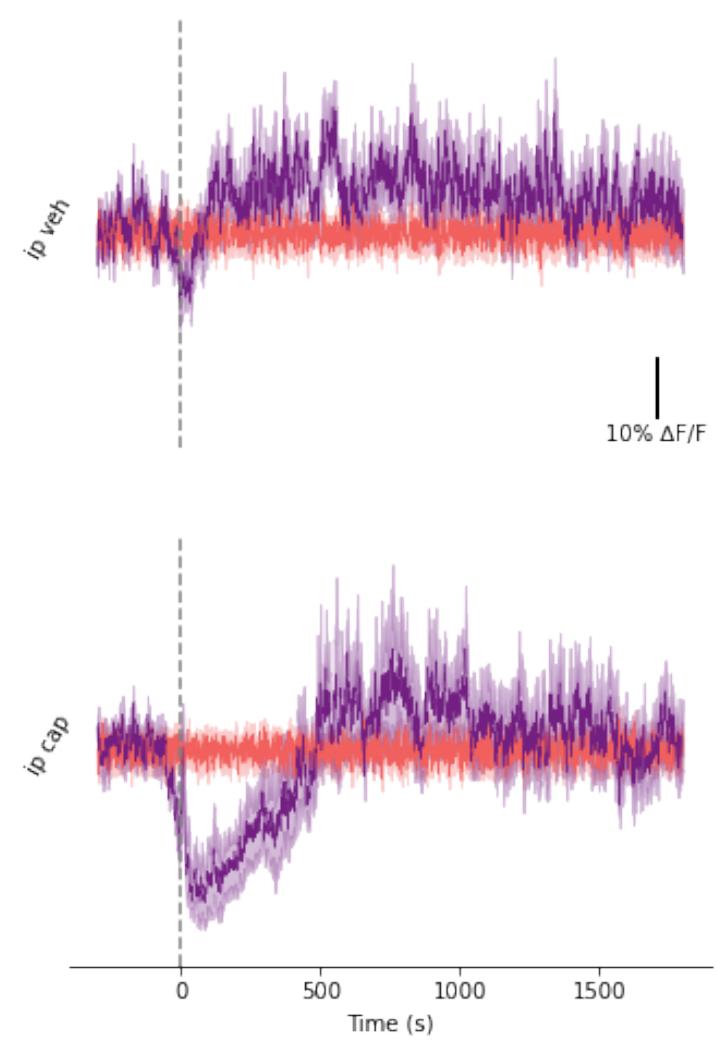
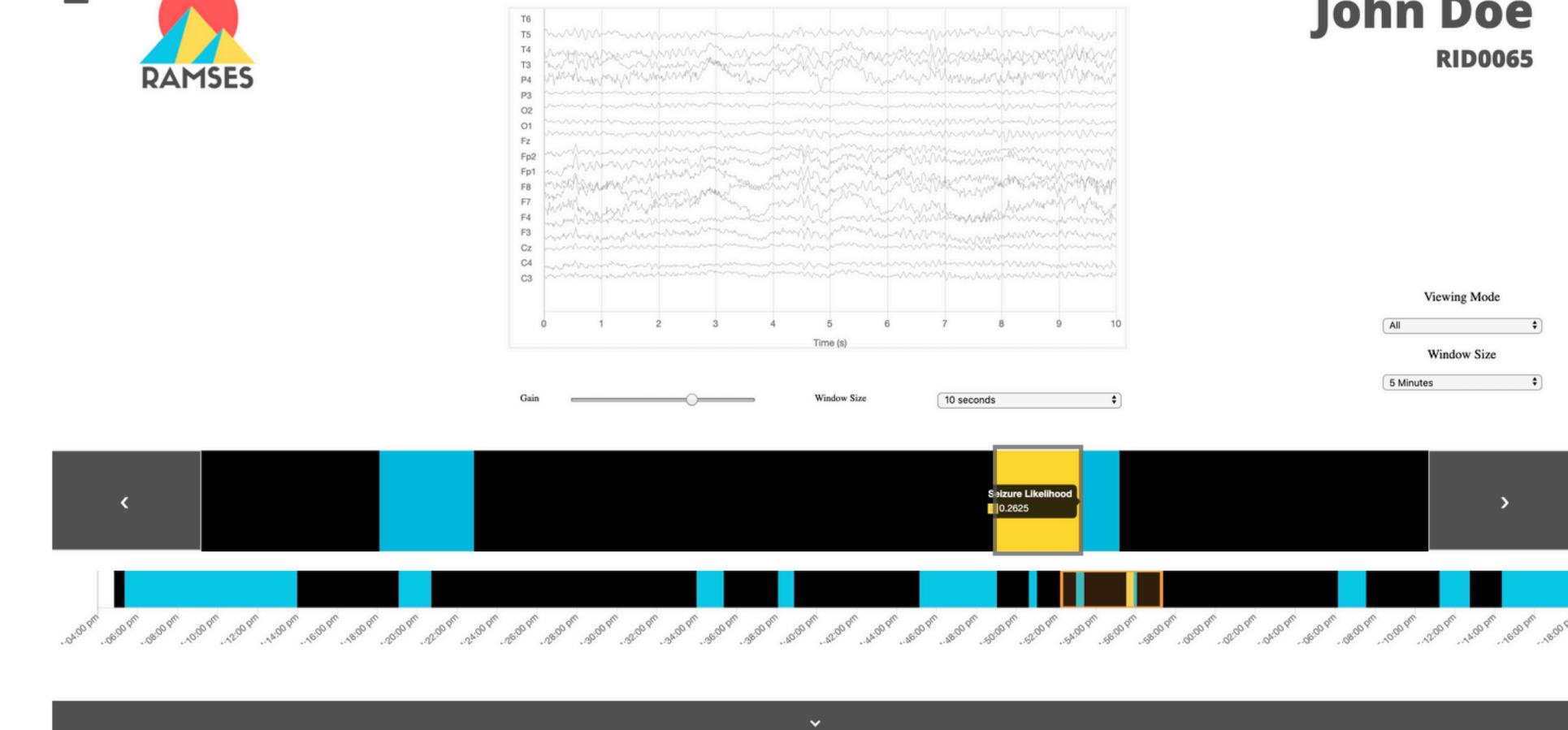
```
(photometry) Nathaniels-MacBook-Air:photometry-scripts nathanielyema$ python analysis_pipeline_cli.py
=====
Would you like to 1. load and add to an existing analysis or 2. start a new analysis? [1/2]: 1
Please enter the path to an exported analysis file: /Users/nathanielyema/Downloads/analysis_adm227_ala220_adm480_adm487_adm380_adm440.npy
recomputing...
successful

Choose one of the following tasks:
1. plot 490 and 405
2. plot just the 490
3. add data to this analysis
4. save this analysis
5. find the peak Δf/f (min/max) for individual mice
6. find the peak Δf/f (min/max) for individual mice at the location of the peak in the mean signal
7. find the average value over a specified portion of data
8. find the area under the curve for a specified portion of data
9. bin and plot the data
10. remove a mouse from this analysis
11. retrieve an excluded mouse from this analysis
12. update the parameters of this analysis
13. export normalized 490 data to .mat
14. plot the trace for an individual mouse
15. exit

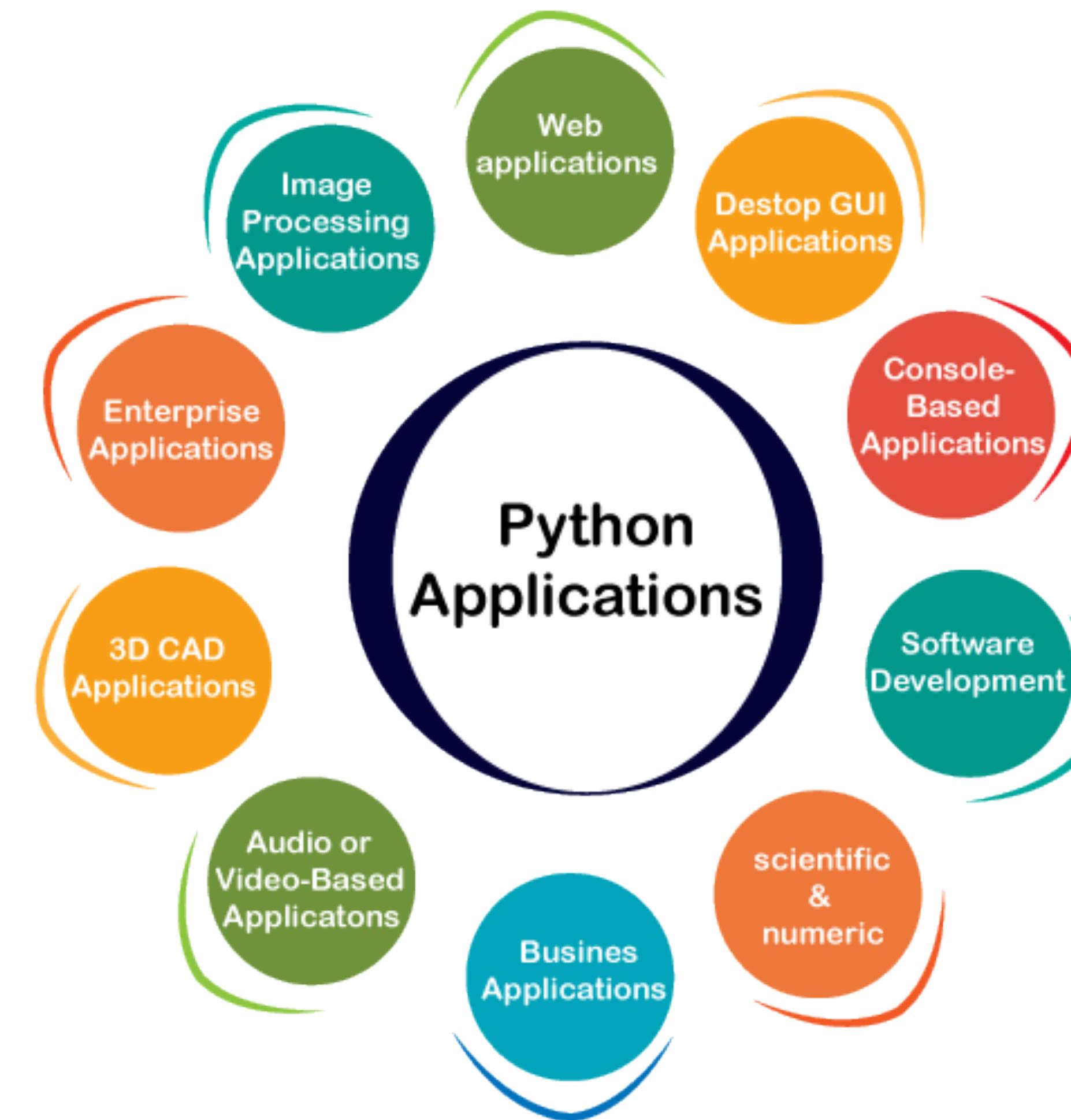
(input the number of the desired task): 1
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Choose one of the following tasks:
1. plot 490 and 405
2. plot just the 490
3. add data to this analysis
```



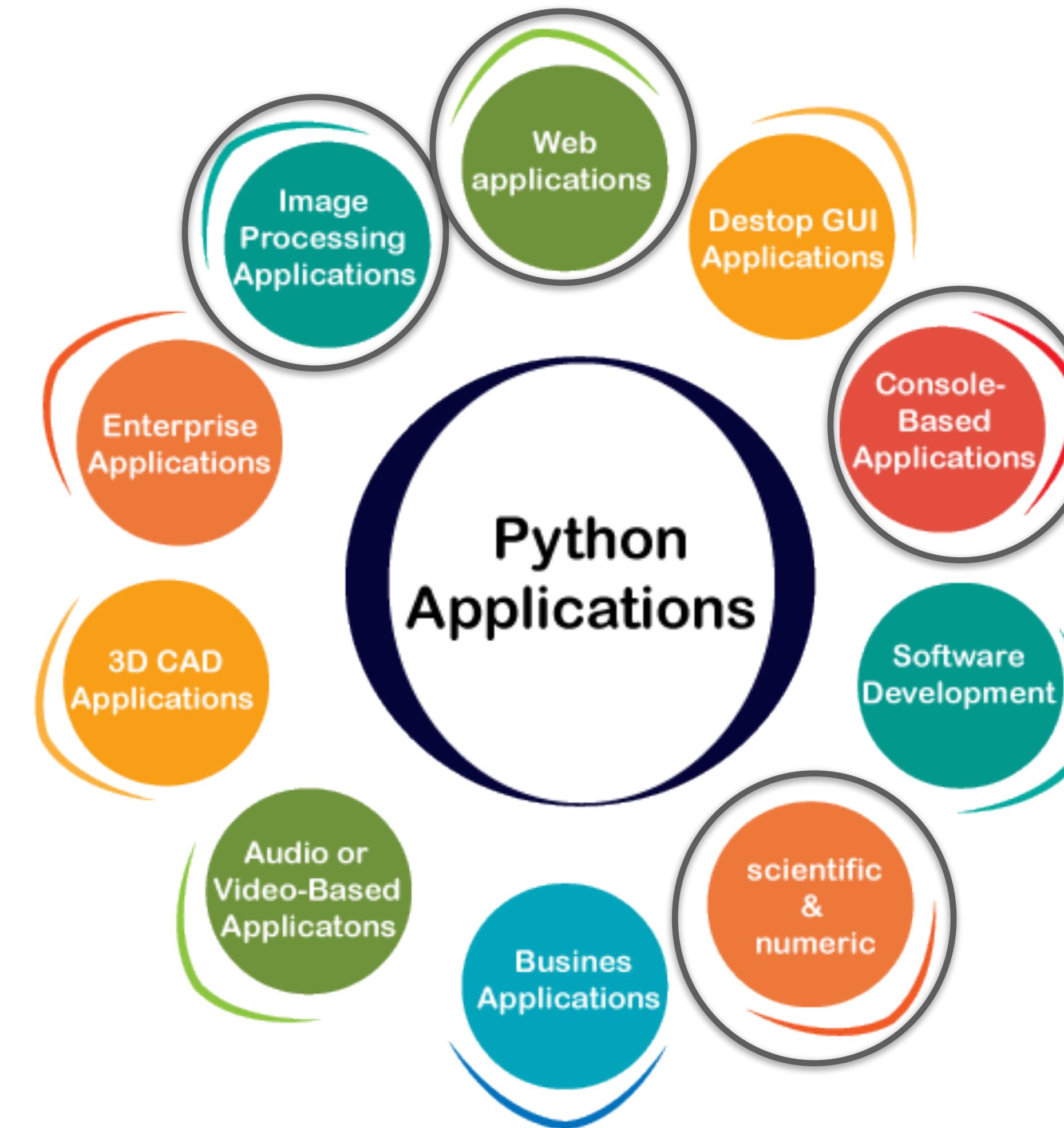
John Doe
RID0065



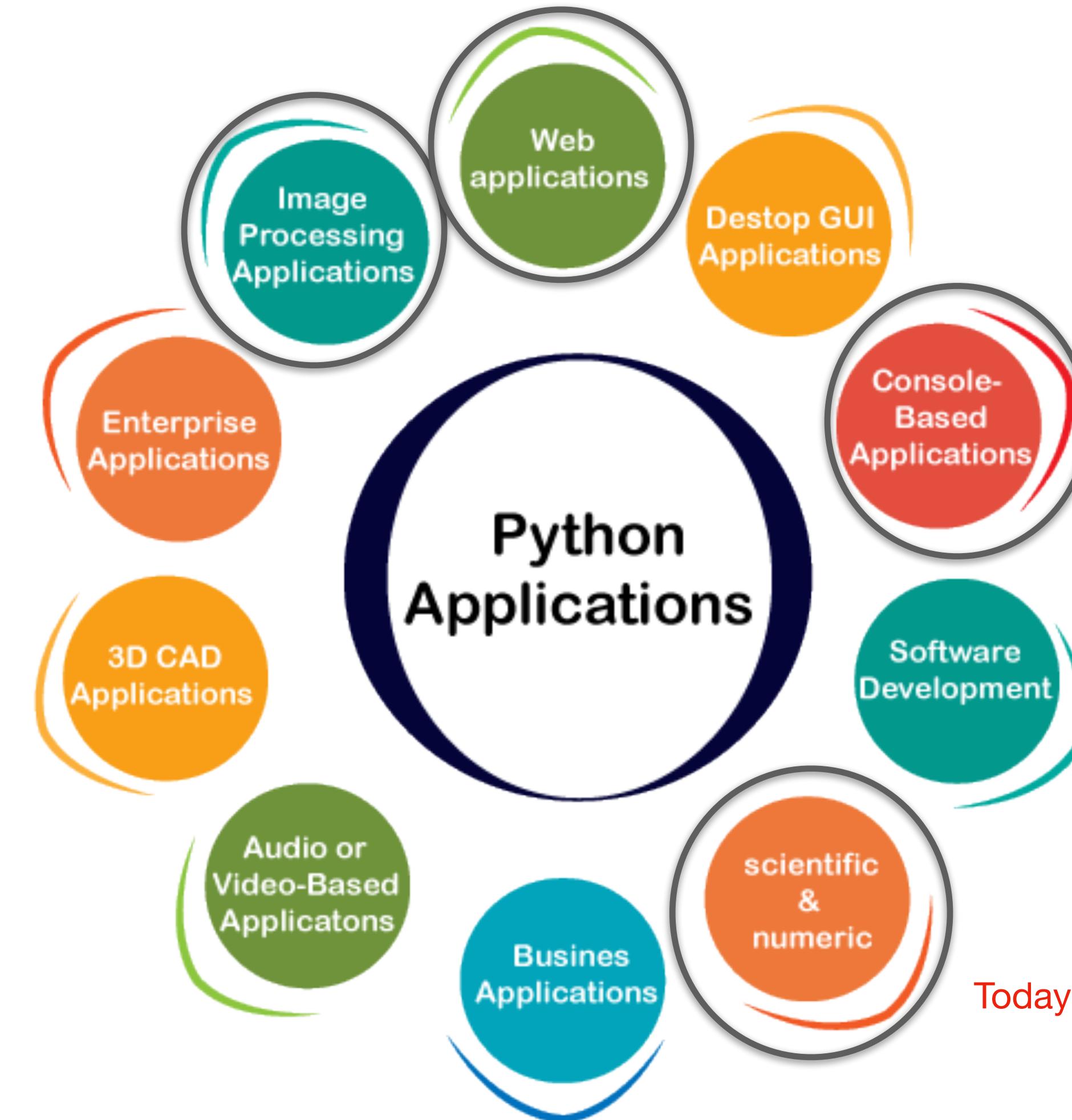
Python as a General-Purpose Programming Language



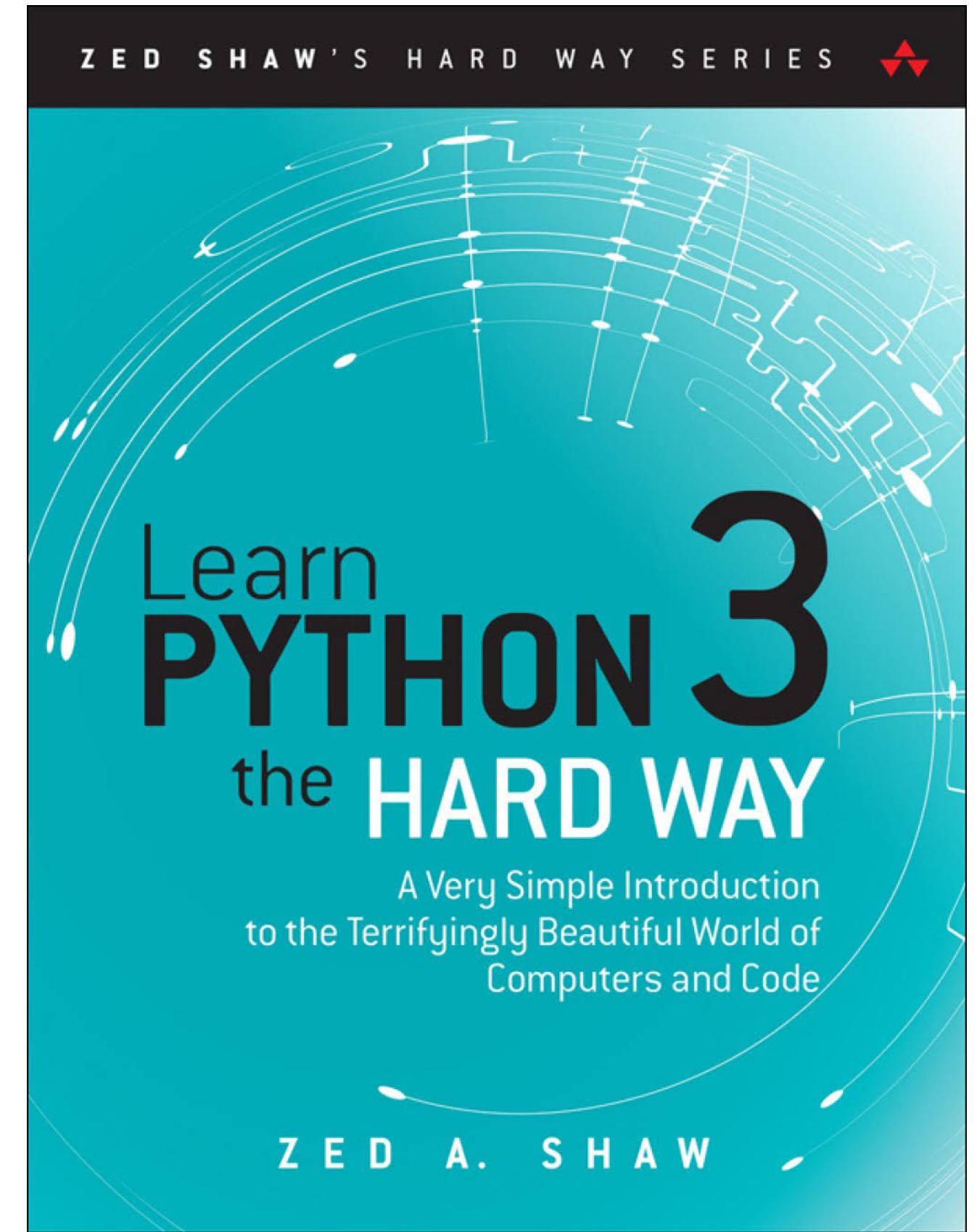
Python as a General-Purpose Programming Language



Python as a General-Purpose Programming Language



How I learned Python



Some resources I've discovered more recently

- Software Carpentry - [Programming with Python](#) (beginner)
- [Scipy Lecture Notes](#) (intermediate)
- [Python Data Science Handbook](#) (advanced)
- [Neuromatch](#)

The Anaconda Distribution and Jupyter Notebooks

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 JupyterLab 3.3.2 An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture. Launch	 Notebook 6.4.8 Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis. Launch	 Qt Console 5.3.0 PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more. Launch	 Spyder 4.1.4 Scientific Python Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features Launch	 VS Code 1.67.0 Streamlined code editor with support for development operations like debugging, task running and version control. Launch
 Glueviz 1.0.0 Multidimensional data visualization across files. Explore relationships within and among related datasets. Install	 Orange 3 3.26.0 Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox. Install	 RStudio 1.1.456 A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks. Install		

data_viz_demo_rclub - Jupyter | Welcome To Colaboratory - Colab | +

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▼ Data science

With Colab you can harness the full power of popular Python libraries to analyze and visualize data. The code cell below uses **numpy** to generate some random data, and uses **matplotlib** to visualize it. To edit the code, just click the cell and start editing.

```
import numpy as np
from matplotlib import pyplot as plt

ys = 200 + np.random.randn(100)
x = [x for x in range(len(ys))]

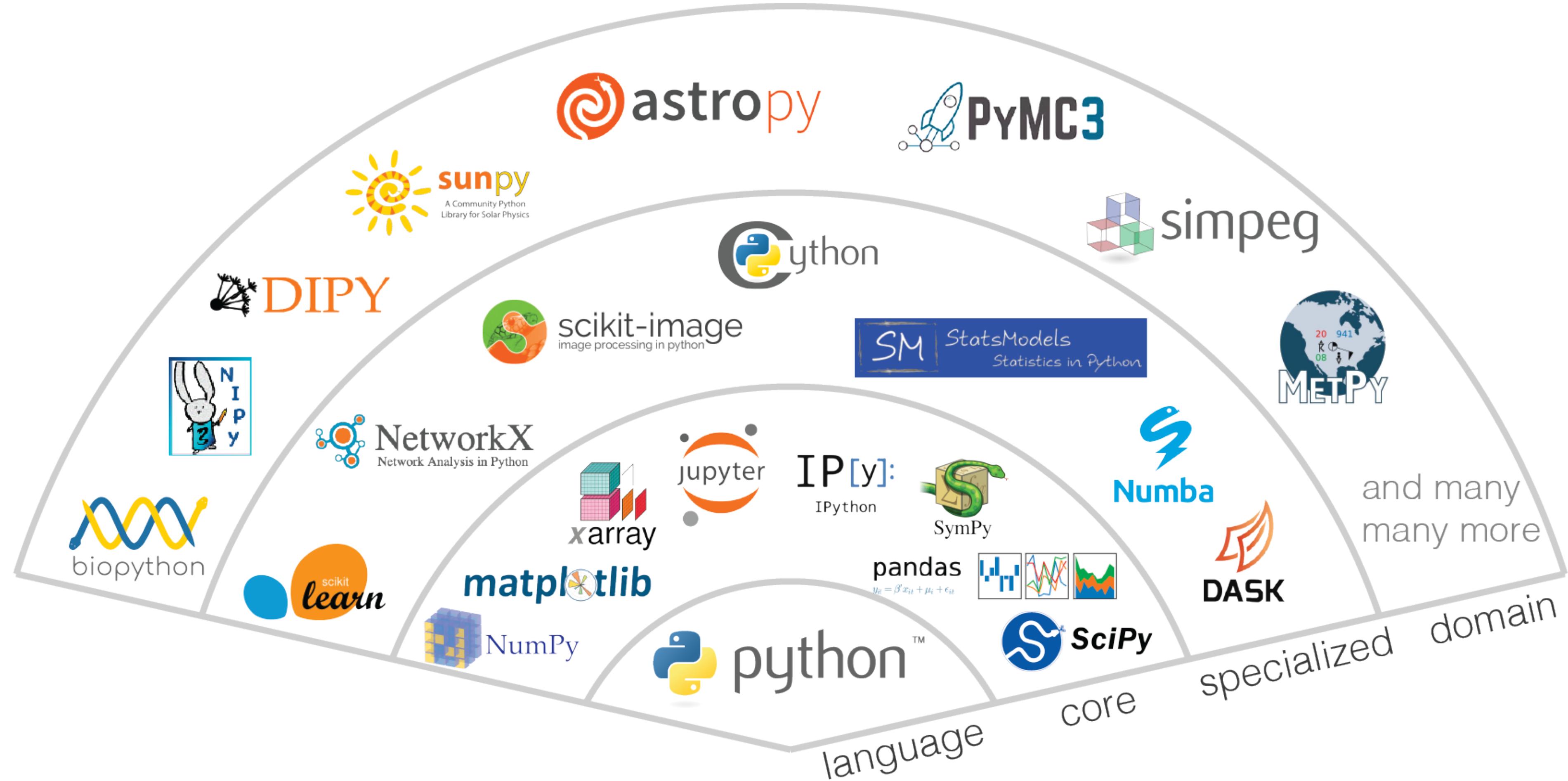
plt.plot(x, ys, '-')
plt.fill_between(x, ys, 195, where=(ys > 195), facecolor='g', alpha=0.6)

plt.title("Sample Visualization")
plt.show()
```

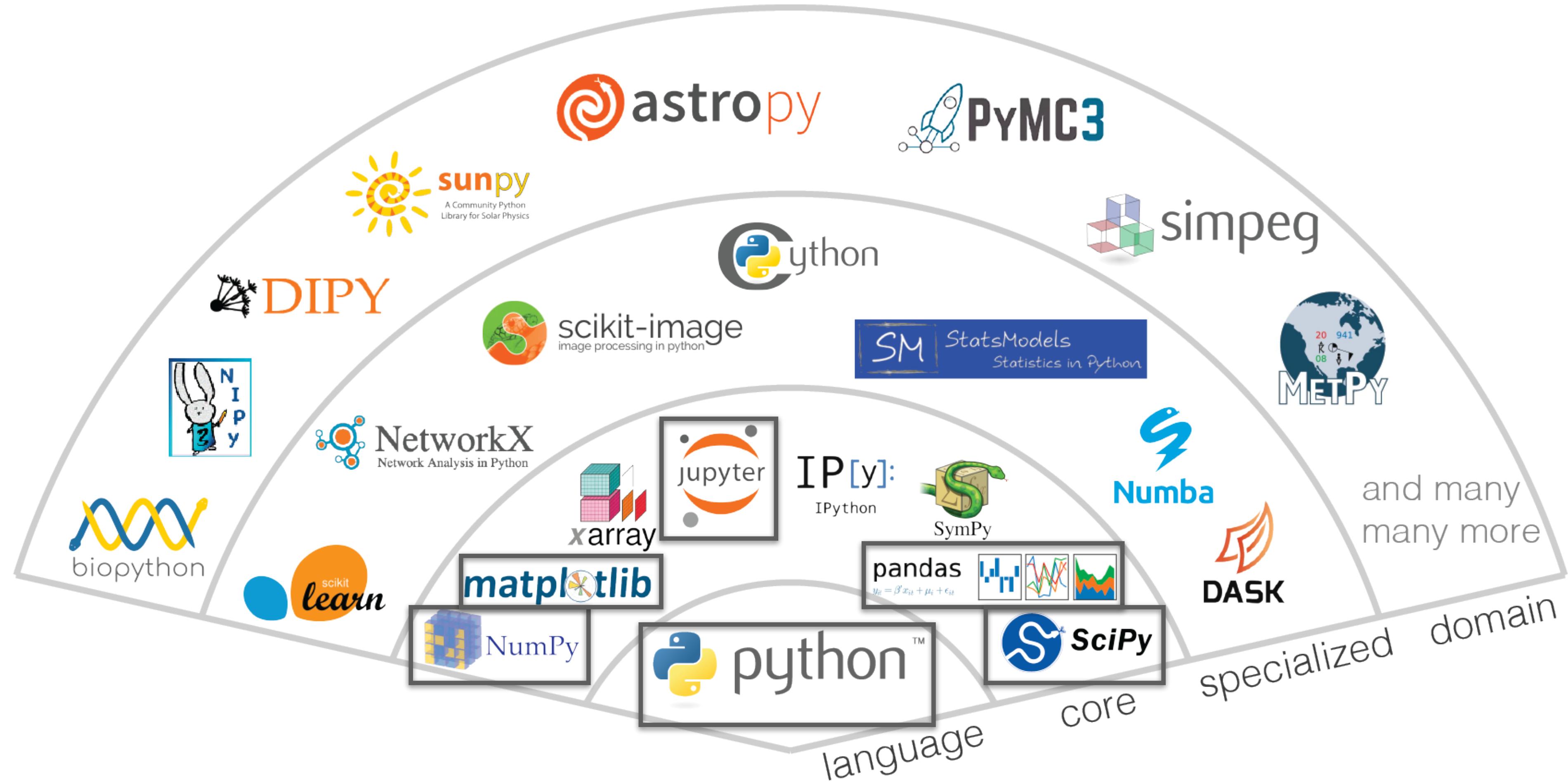
Sample Visualization

You can import your own data into Colab notebooks from your Google Drive account, including from spreadsheets, as well as from Github and many other sources. To learn more about importing data, and how Colab can be used for data science, see the links below under [Working with Data](#).

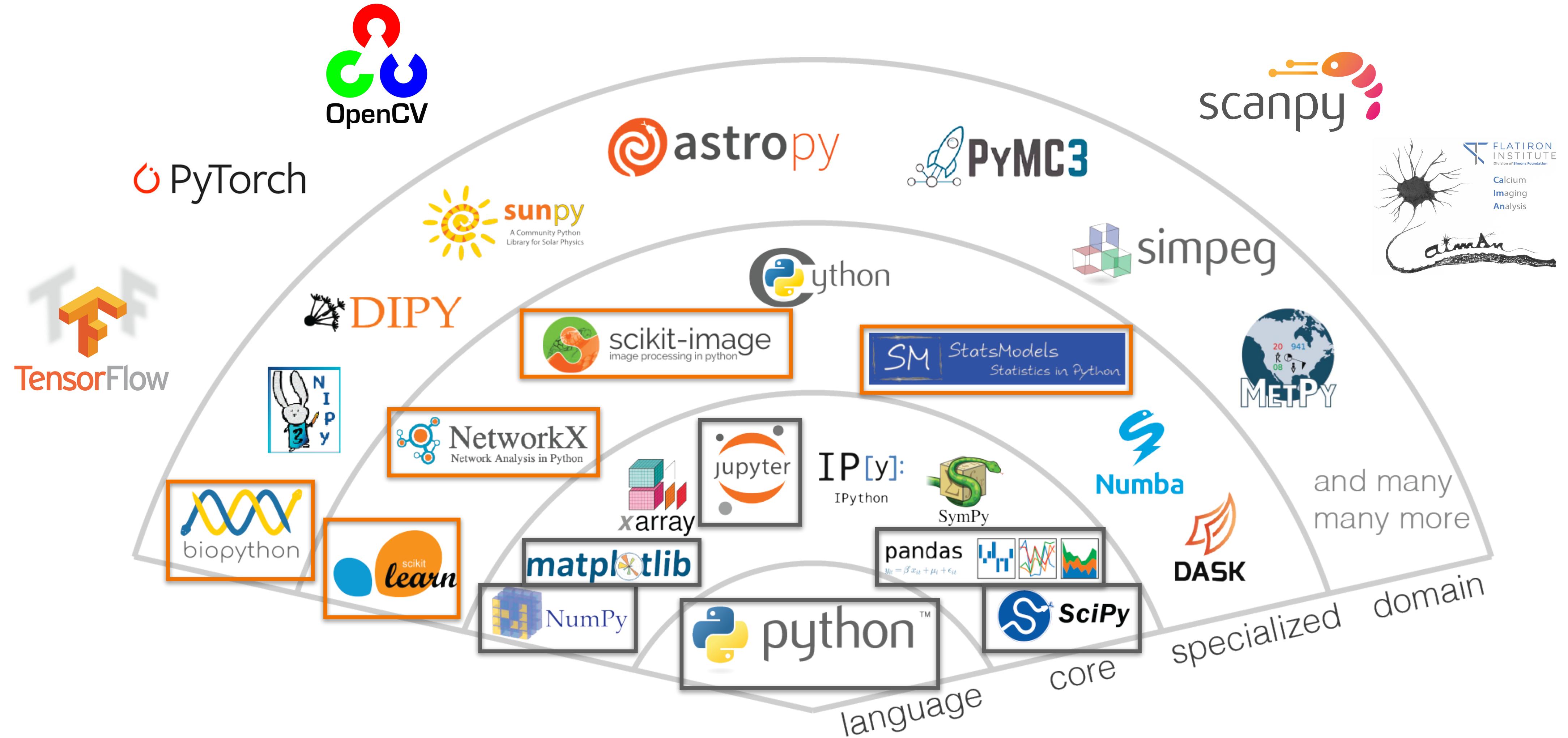
The Python Scientific Computing Ecosystem



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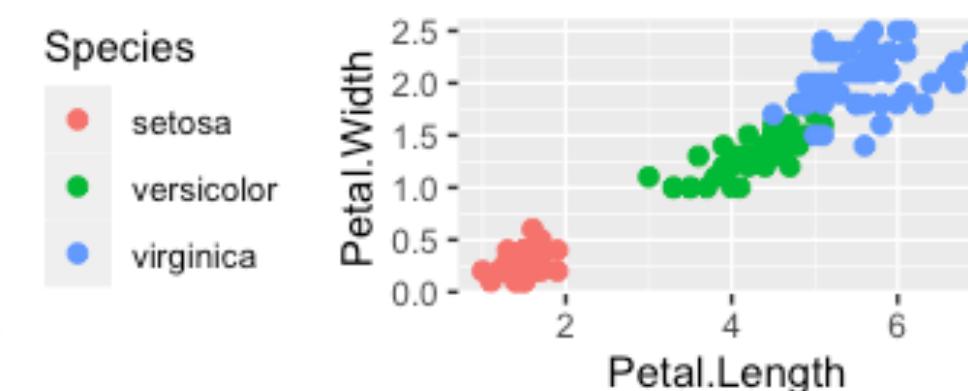
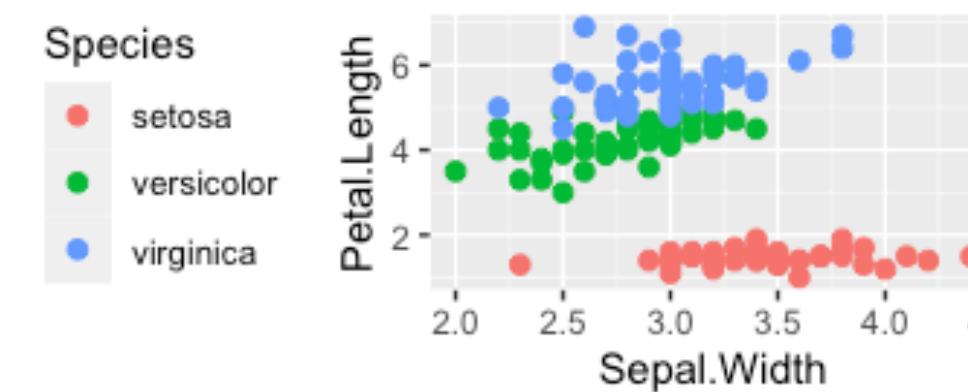
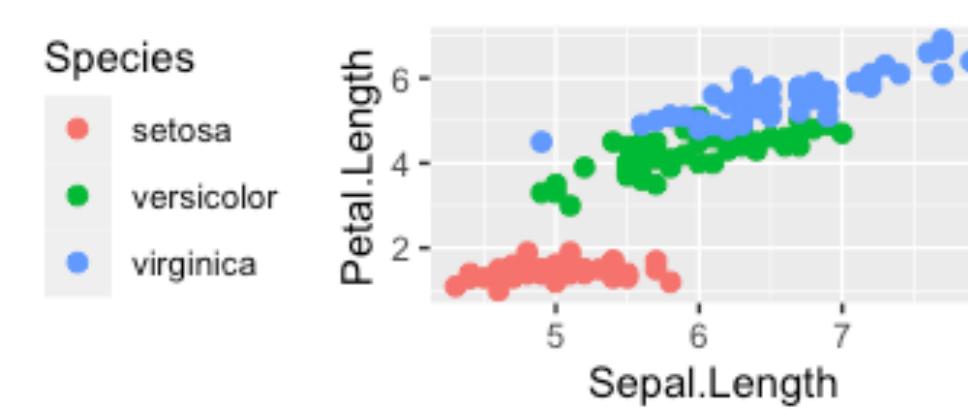
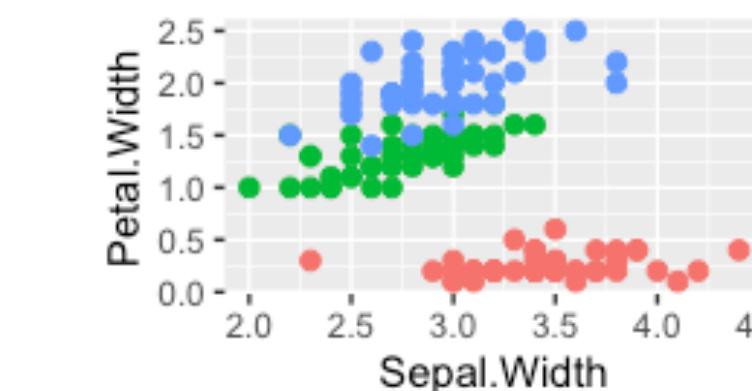
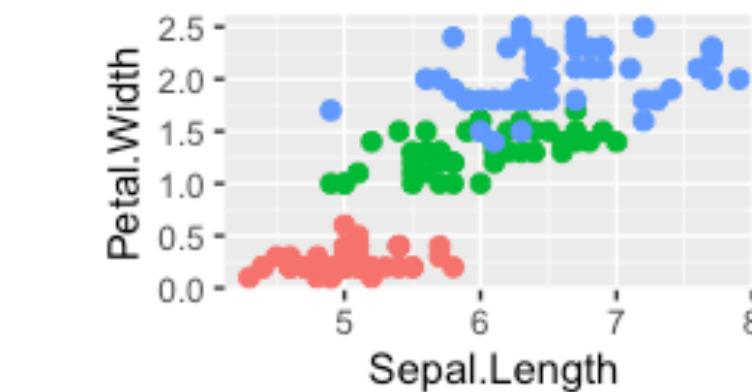
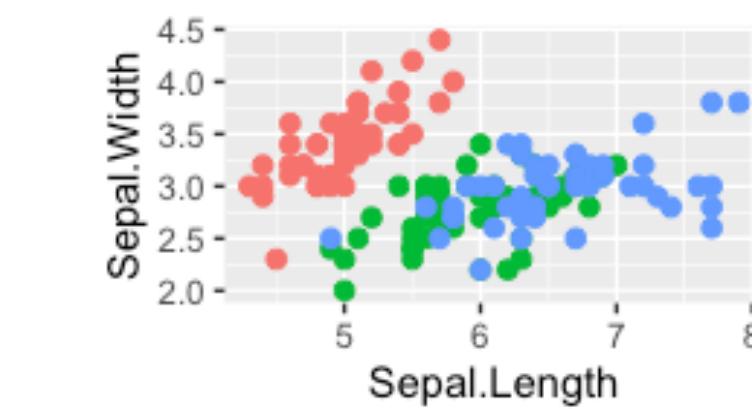


Data Visualization

Looking at the Iris dataset in R

```
```{r}
library(ggplot2)
library(gridExtra)

combos <- combn(colnames(iris)[1:4], 2)
p = list()
for (i in 1:dim(combos)[2]){
 p[[i]] <- ggplot(iris, aes_string(x=combos[1,i], y=combos[2,i], color="Species")) + geom_point(size=2)
}
do.call(grid.arrange,p)
````
```



Let's try the same thing in Python!

