

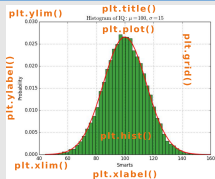
# Exploring complex systems using computational tools

## Matplotlib Cheat Sheet

### Matplotlib

Matplotlib ([matplotlib.org](http://matplotlib.org)) is a Python 2D plotting library which produces publication quality figures in a variety of hard-copy formats and interactive environments across platforms.

### Workflow



Steps to create a plot using matplotlib:

- 1 Import libraries
- 2 Prepare data
- 3 Create plot
- 4 Customize plot
- 5 Show / Save plot

### 1 Import libraries

```
>>> import numpy as np
>>> import matplotlib.mlab as mlab
>>> import matplotlib.pyplot as plt
```

### 2 Prepare data

```
>>> mu, sigma = 100, 15
>>> x = mu + sigma*np.random.randn(10000)
```

### 3 Create plot

```
>>> n, bins, patches = plt.hist(x,
                               50, normed=1, facecolor='
                               green', alpha=0.75)
>>> y = mlab.normpdf(bins, mu
                     sigma)
>>> l = plt.plot(bins, y 'r-',
                 linewidth=2)
```

### 4 Customize plot

```
>>> plt.xlabel('Smarts')
>>> plt.ylabel('Probability')
>>> plt.title(r'$\mathrm{Histogram}$
              of IQ:} \mu=100, \sigma=15$'
              )
>>> plt.xlim(40,160)
>>> plt.ylim(0,0.03)
>>> plt.grid(True)
```

### 5 Show / Save plot

```
>>> plt.savefig('histogram.png')
>>> plt.show()
```