



JupyterLab:

# The Evolution of the Jupyter Notebook

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# The Jupyter Notebook



# Jupyter Notebook



A Jupyter Notebook document with a visualization of measles data.



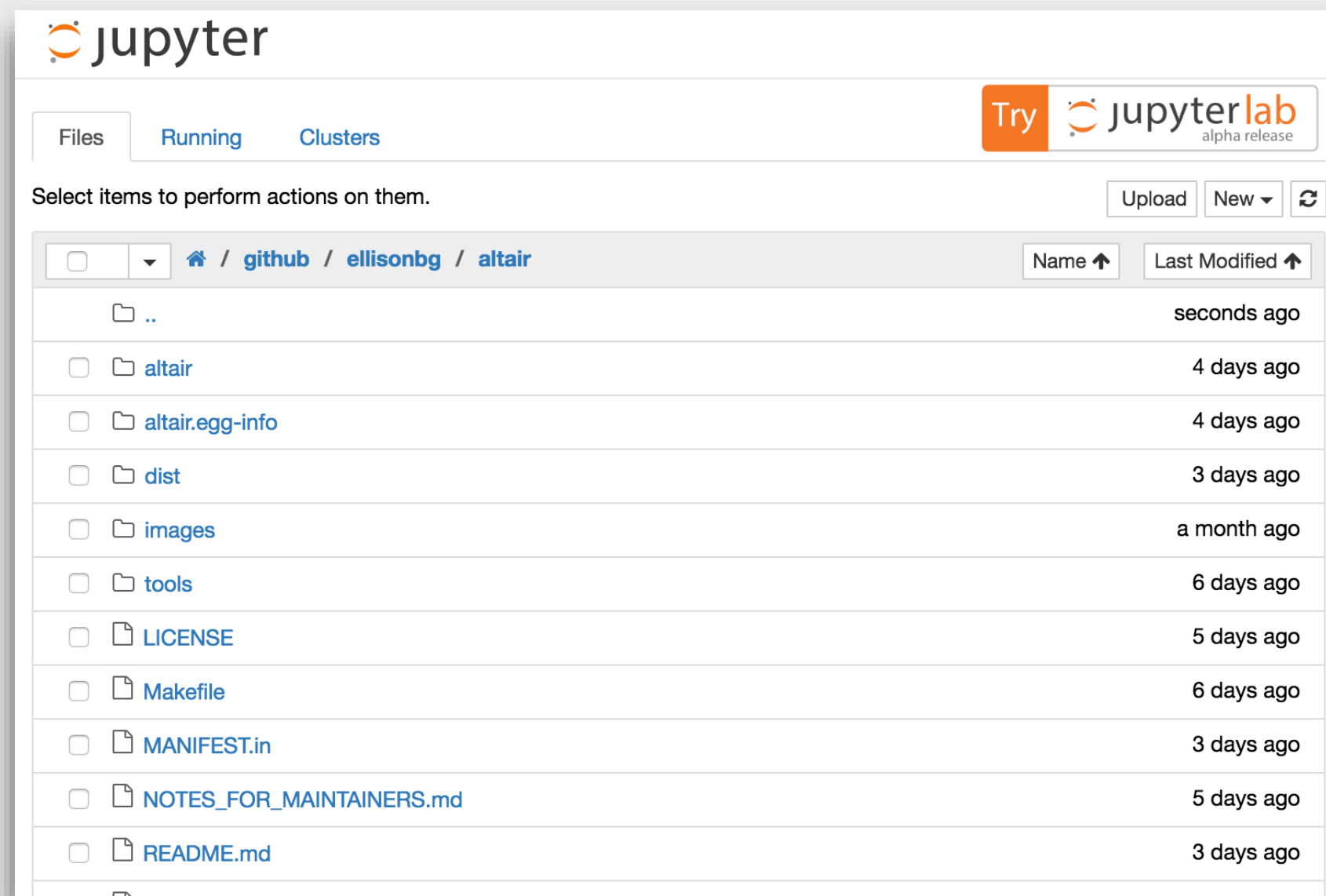
# Jupyter Notebook

## Interactive, Exploratory, Reproducible

- **Interactive**, browser-based computing environment
- **Exploratory** data science, ML, visualization, analysis, stats
- **Reproducible** document format:
  - Code
  - Narrative text (markdown)
  - Equations (LaTeX)
  - Images, visualizations
- Over 50 programming languages
- Everything open-source (BSD license)

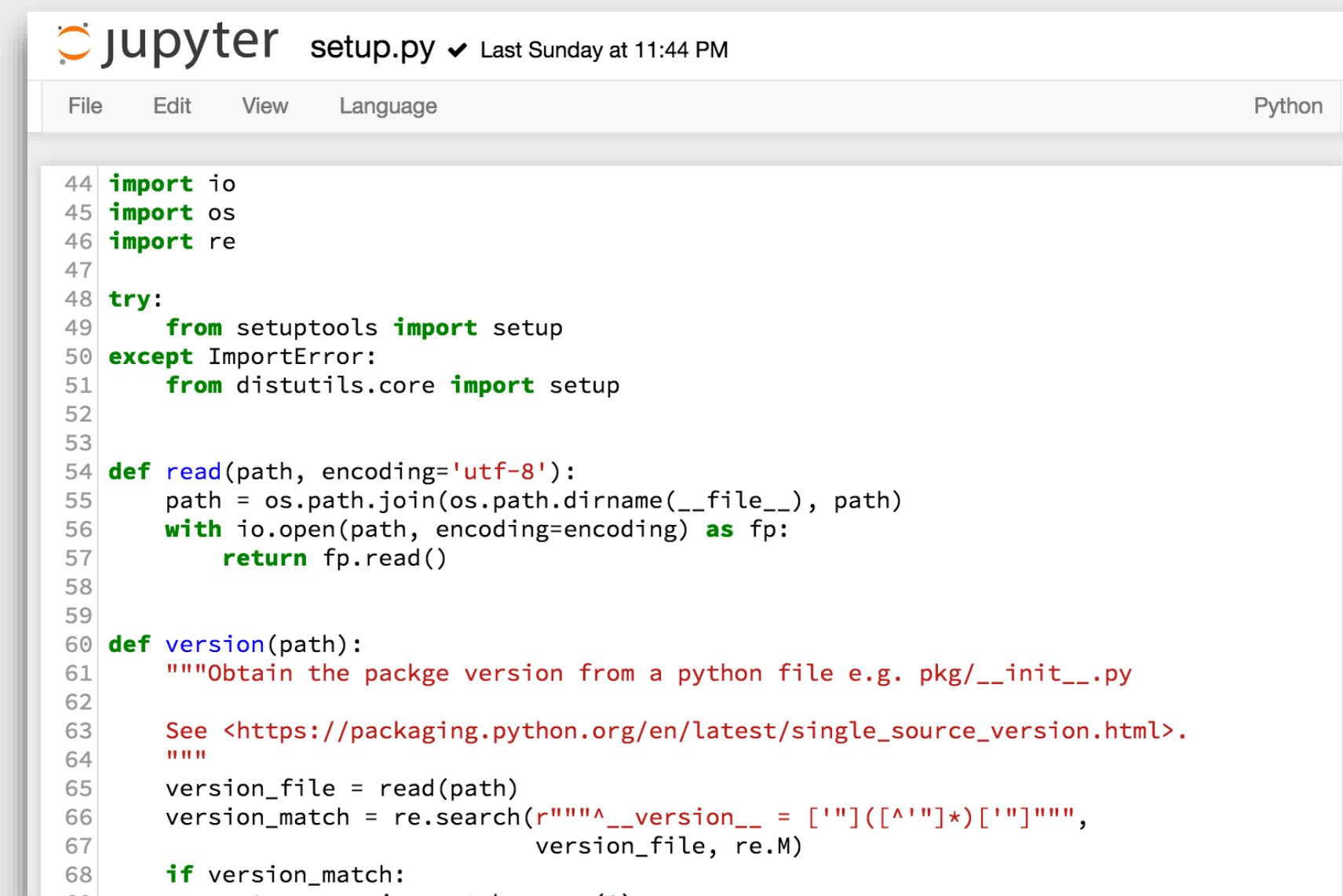


# Classic Jupyter: More Than Just Notebooks



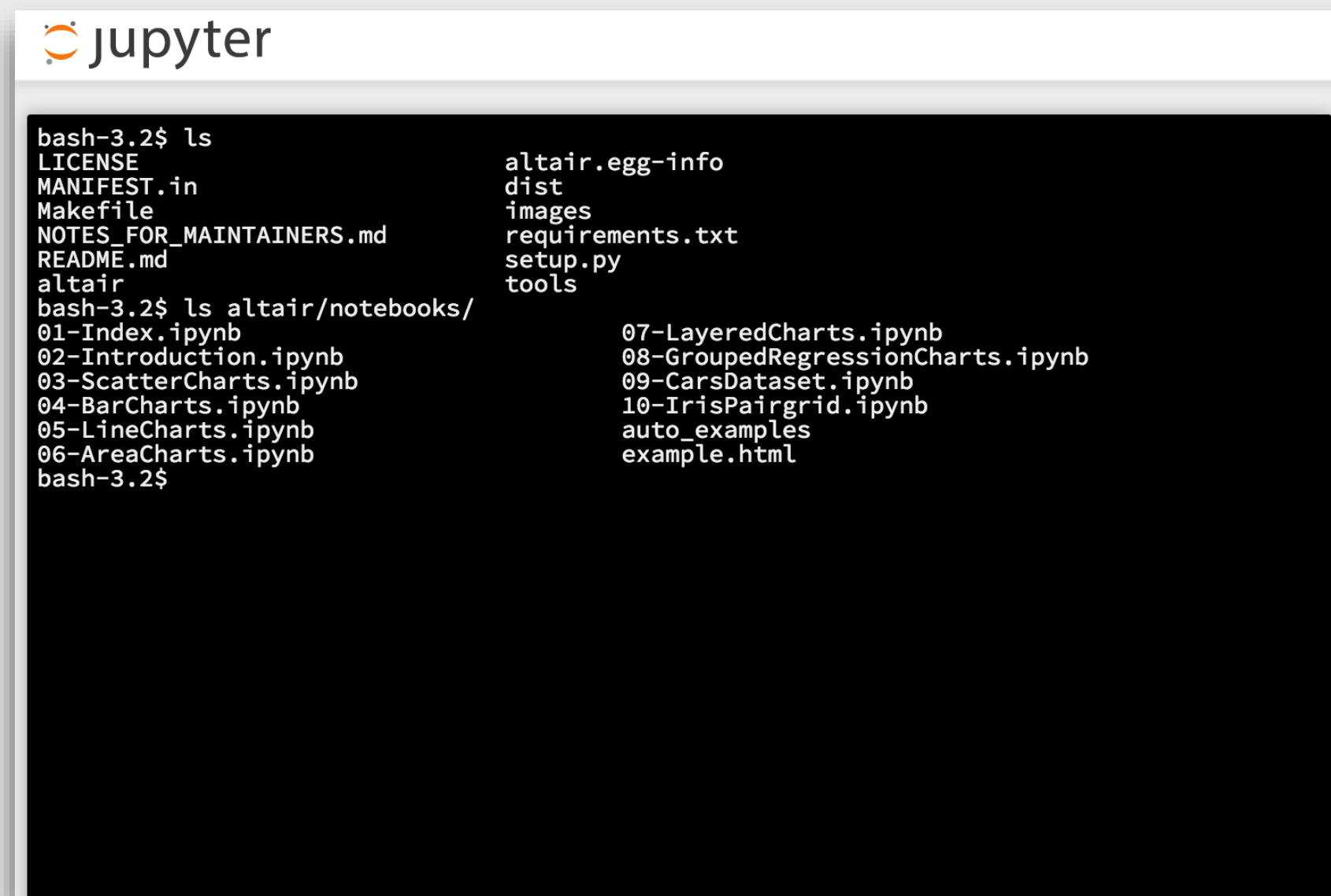
The screenshot shows the JupyterLab file browser interface. At the top, there are tabs for 'Files', 'Running', and 'Clusters'. Below the tabs, there's a navigation breadcrumb: 'github / ellisonbg / altair'. A table lists files and folders with columns for 'Name' and 'Last Modified'. The files listed include 'LICENSE', 'Makefile', 'MANIFEST.in', 'NOTES\_FOR\_MAINTAINERS.md', and 'README.md'. There are also folders like 'altair', 'altair.egg-info', 'dist', 'images', and 'tools'.

Name	Last Modified
..	seconds ago
altair	4 days ago
altair.egg-info	4 days ago
dist	3 days ago
images	a month ago
tools	6 days ago
LICENSE	5 days ago
Makefile	6 days ago
MANIFEST.in	3 days ago
NOTES_FOR_MAINTAINERS.md	5 days ago
README.md	3 days ago



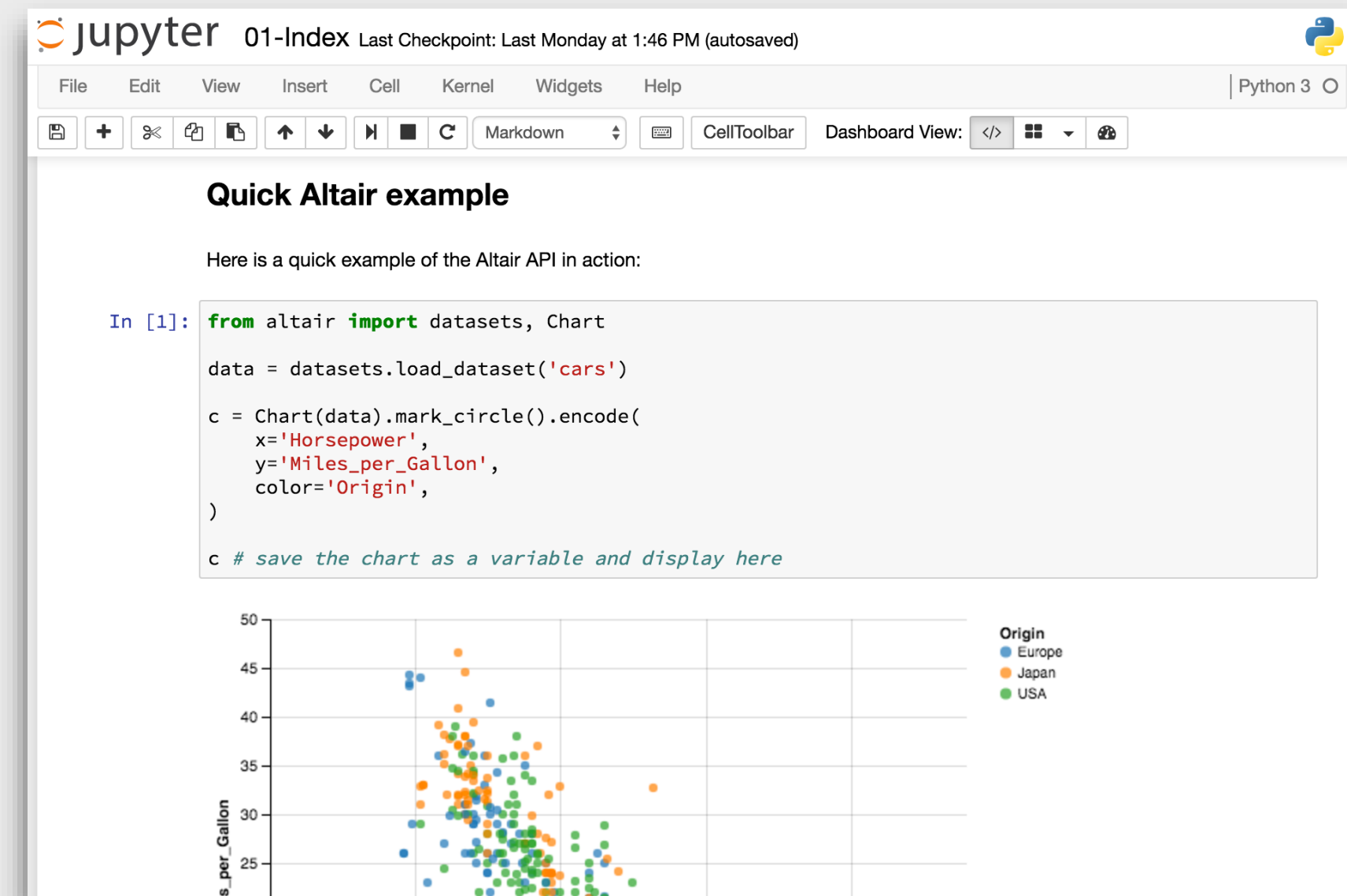
The screenshot shows a JupyterLab code editor with a Python script. The script is a setup.py file for a package named 'altair'. It includes imports for 'io', 'os', and 're', and a 'try' block for 'setup' from 'setuptools'. It also defines a 'read' function to read a file and a 'version' function to extract the package version from a file.

```
44 import io
45 import os
46 import re
47
48 try:
49     from setuptools import setup
50 except ImportError:
51     from distutils.core import setup
52
53
54 def read(path, encoding='utf-8'):
55     path = os.path.join(os.path.dirname(__file__), path)
56     with io.open(path, encoding=encoding) as fp:
57         return fp.read()
58
59
60 def version(path):
61     """Obtain the package version from a python file e.g. pkg/__init__.py
62
63     See <https://packaging.python.org/en/latest/single_source_version.html>.
64     """
65     version_file = read(path)
66     version_match = re.search(r'"""^__version__ = ["']([^\s"]*)["']"""',
67                               version_file, re.M)
68     if version_match:
```



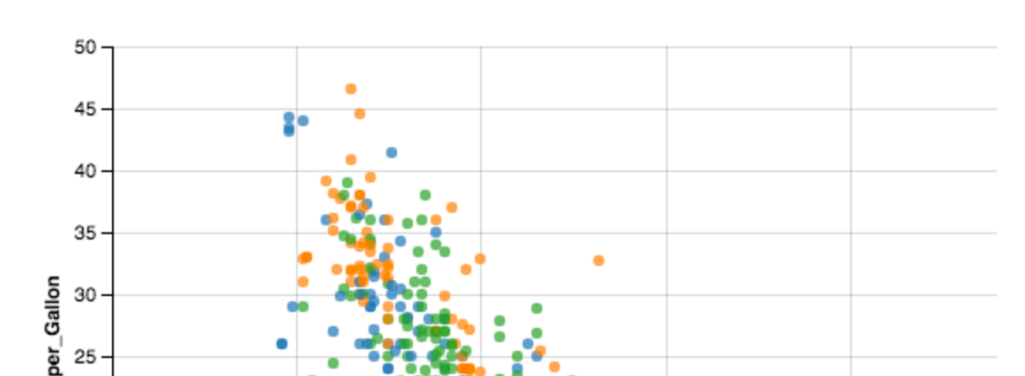
The screenshot shows a JupyterLab terminal window with a shell prompt. The user has run 'ls' and 'ls altair/notebooks/'. The output shows a list of files and folders in the current directory and the 'altair/notebooks/' subdirectory.

```
bash-3.2$ ls
LICENSE
MANIFEST.in
Makefile
NOTES_FOR_MAINTAINERS.md
README.md
altair
altair.egg-info
dist
images
requirements.txt
setup.py
tools
bash-3.2$ ls altair/notebooks/
01-Index.ipynb
02-Introduction.ipynb
03-ScatterCharts.ipynb
04-BarCharts.ipynb
05-LineCharts.ipynb
06-AreaCharts.ipynb
07-LayeredCharts.ipynb
08-GroupedRegressionCharts.ipynb
09-CarsDataset.ipynb
10-IrisPairgrid.ipynb
auto_examples
example.html
bash-3.2$
```



The screenshot shows a JupyterLab notebook titled '01-Index'. It contains a code cell with Python code that uses the Altair API to load a dataset and create a scatter plot. The plot shows 'mpg\_per\_gallon' on the y-axis and 'Origin' on the x-axis, with data points colored by origin (Europe, Japan, USA).

```
In [1]: from altair import datasets, Chart
data = datasets.load_dataset('cars')
c = Chart(data).mark_circle().encode(
    x='Horsepower',
    y='Miles_per_Gallon',
    color='Origin',
)
c # save the chart as a variable and display here
```



The scatter plot displays the relationship between 'Horsepower' (x-axis) and 'Miles\_per\_Gallon' (y-axis) for cars from three different origins: Europe (blue), Japan (orange), and USA (green). The y-axis ranges from 25 to 50, and the x-axis ranges from 25 to 50. The plot shows a general negative correlation between horsepower and miles per gallon, with data points clustered by origin.



# Building Blocks

**File Browser**

**Notebooks**

**Terminal**

**Text Editor**

**Kernels**

**Output**

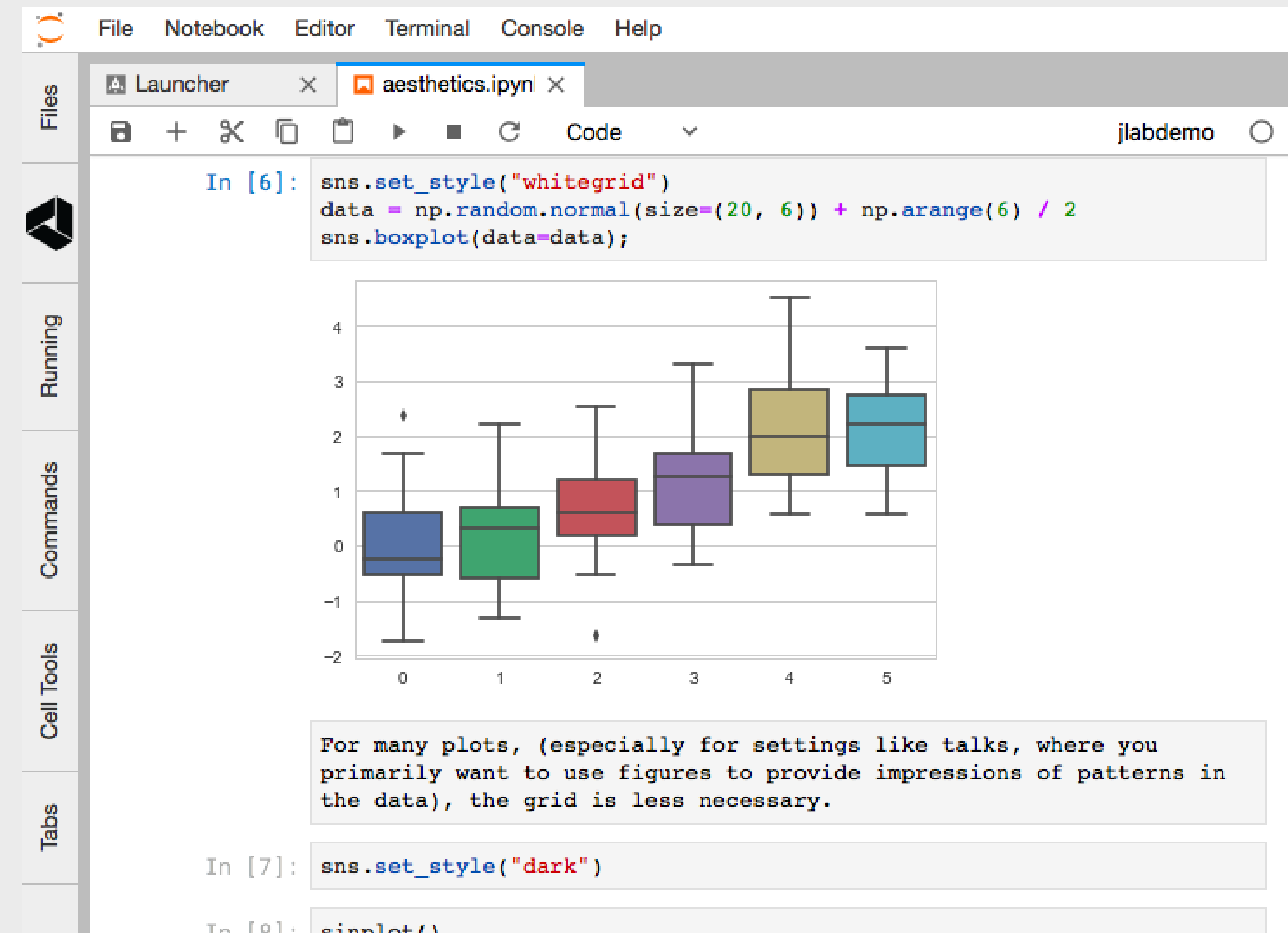


# Introducing JupyterLab



# JupyterLab: Integrated Experience

- Work with the building blocks in a flexible and integrated manner
- Modern JavaScript development: npm-based packaging, Typescript, phosphor.js
- Clean model/view separation
- Well separated public/private APIs
- Fully extensible by third parties
- High performance
- Design!





July  
2018

# JupyterLab Today

- <https://github.com/jupyterlab>
- ~3 years worth of development
- ~100 contributors, ~60 components
- ~2,500 releases (npm+python)
- Over 12,000 commits
- Currently Beta



# Roadmap

## JupyterLab Beta: Use It Today

`conda install -c conda-forge jupyterlab`  
or `pip install jupyterlab`

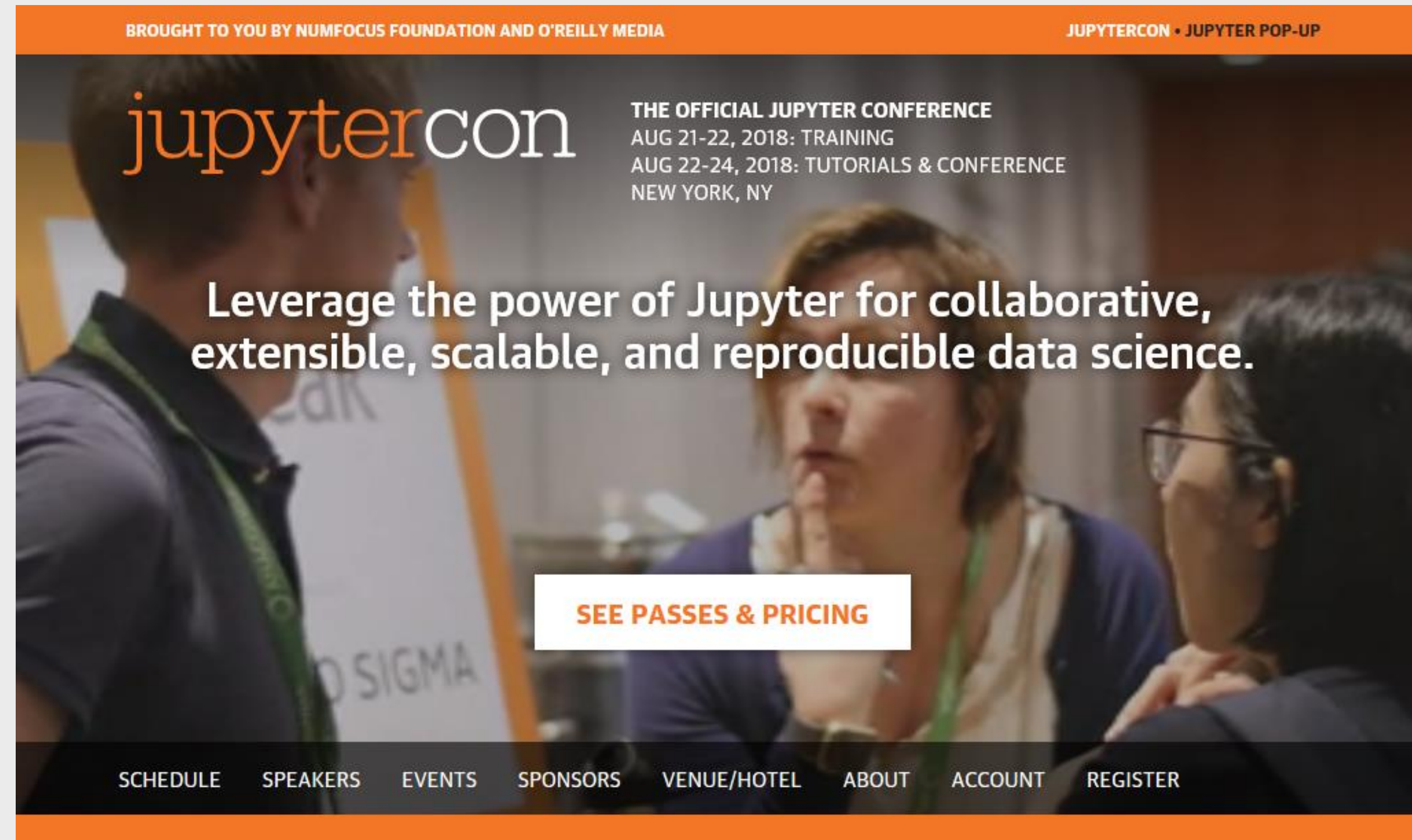
- Beta released in January, Beta 3 coming in July
  - For all users
  - For adventurous extension developers
- 1.0 this year
  - For all users, extension developers
- Eventually:
  - Classic notebook will be retired



Live Demos!



# JupyterCon, Aug 21-25, New York



Thank You!

`jupyter-research-facilities@googlegroups.com`

`conda install -c conda-forge jupyterlab`  
or `pip install jupyterlab`

