



# JupyterLab: The Evolution of the Jupyter Notebook

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# The Jupyter Notebook



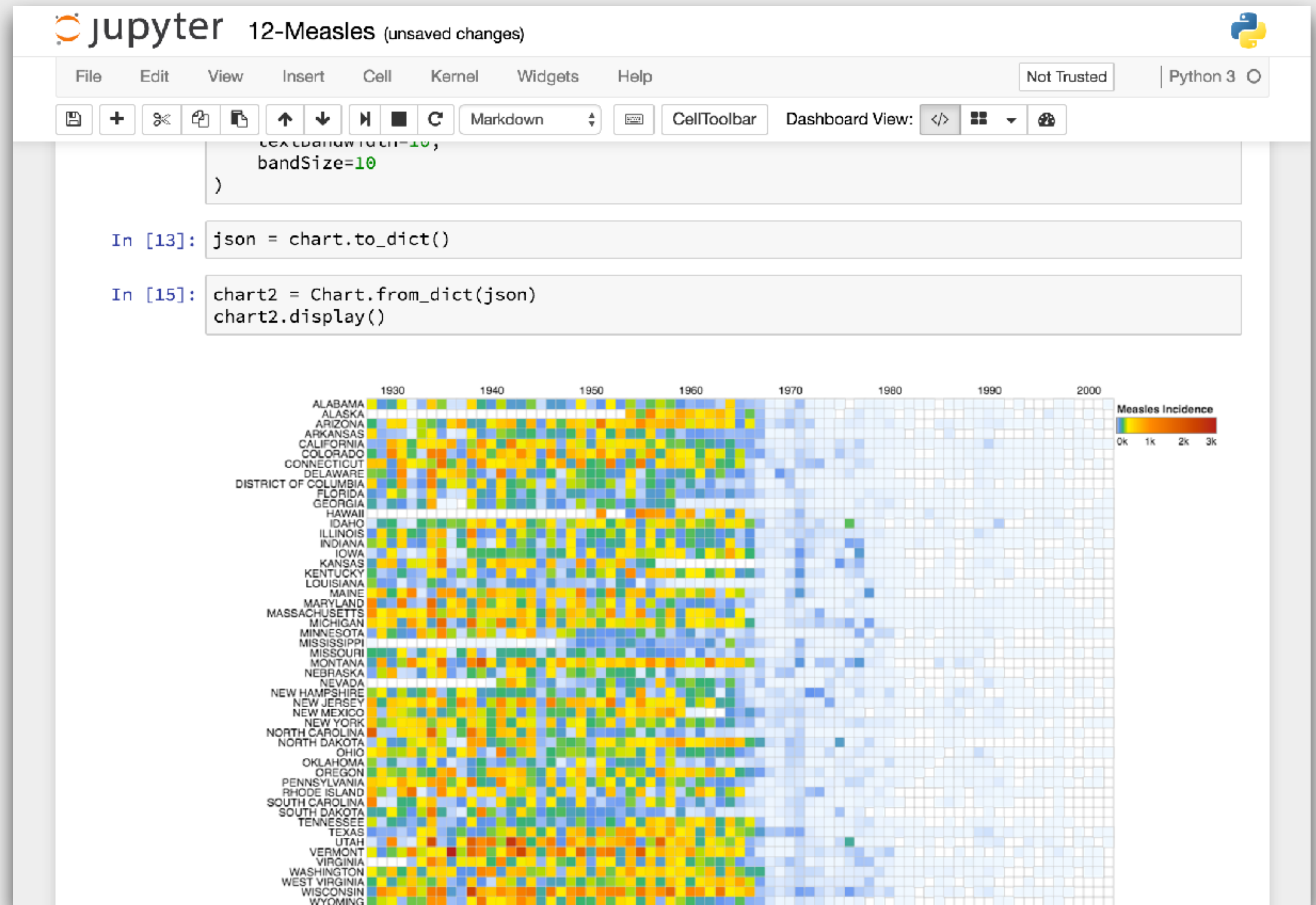
# Jupyter Notebook



## 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)

# Jupyter Notebook



A Jupyter Notebook document with a visualization of measles data.

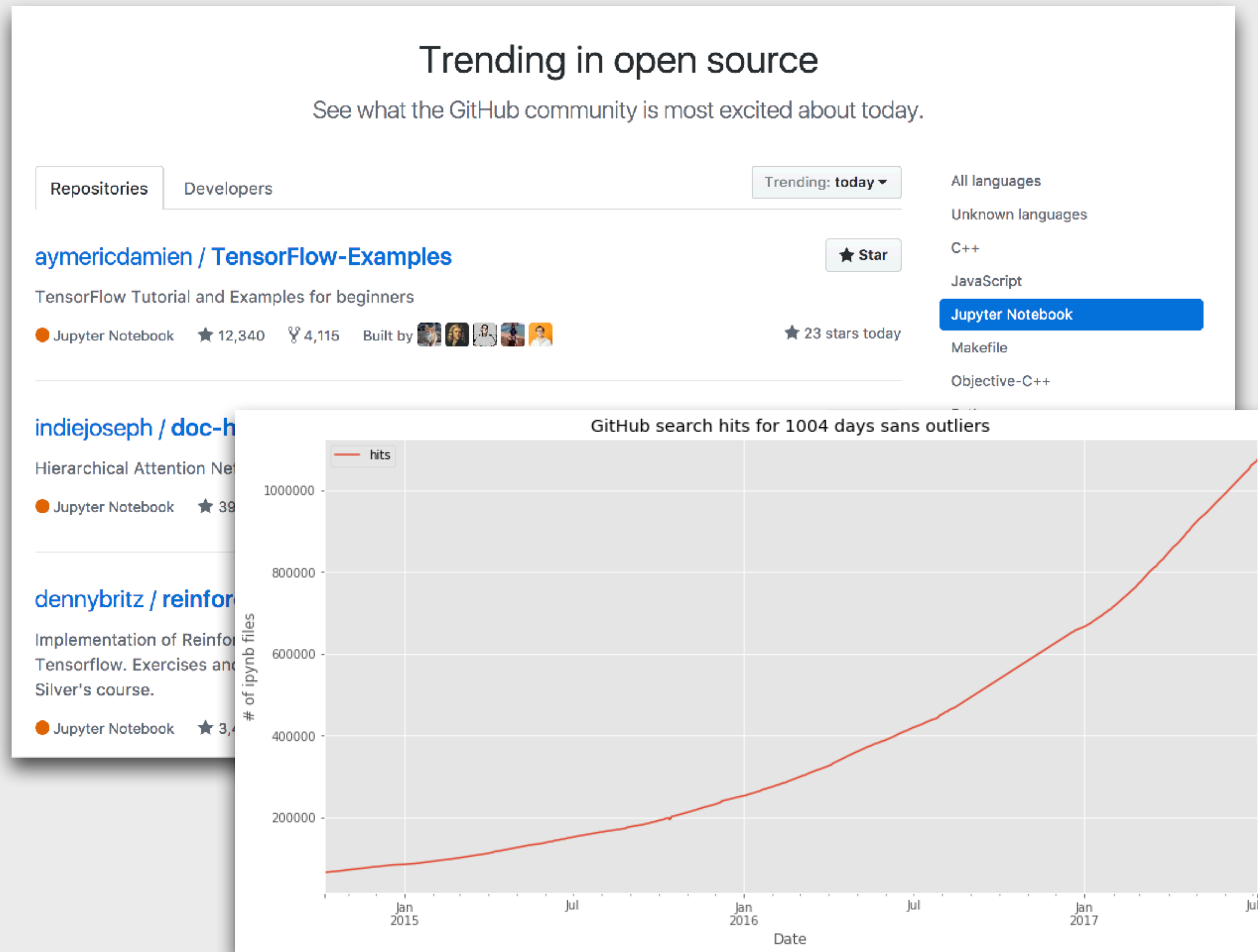
# Project Jupyter: Where are we today?



>6M Users



# Over 1M Notebooks on GitHub



<https://github.com/trending/jupyter-notebook>



# Enabling Reproducible Science





## LIGO Open Science Center

LIGO is operated by California Institute of Technology and Massachusetts Institute of Technology and supported by the U.S. National Science Foundation.

**Getting Started**

- Tutorials
- Data
  - Events**
  - Bulk Data
- Timelines
- My Sources
- Software
- GPS ↔ UTC
- About LIGO
- Data Analysis Projects
- Acknowledgement

## Welcome to the LIGO Open Science Center

About LIGO  
Get Started with LIGO data  
Join the E-mail list for updates  
For general information on LIGO, please visit [ligo.org](https://ligo.org)  
If you have LSC credentials, you may go to the [development site](#)

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### More discoveries from LIGO!

**Data Releases from two events and a candidate event**

*released 2016 June 15:*  
[Event of December 26, GW151226: Chirp mass 9](#)

*released 2016 June 15:*  
[Candidate event of October 12, LVT151012: Chirp mass 15](#)

*released 2016 Feb 11:*  
[Event of September 14, GW150914: Chirp mass 30](#)

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The [LIGO Laboratory's Data Management Plan](#) describes the scope and timing of LIGO data releases.

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**Jupyter notebook**  
See the new tutorial on signal processing with LIGO data, as a Jupyter (iPython) notebook.  
[Tutorial on Binary Black Hole Signals in LIGO Open Data](#)

<https://losc.ligo.org/about/>



# Live Code on Binder

## LIGO Binder



Turn a GitHub repo into a collection of interactive notebooks

Have a repository full of Jupyter notebooks? With Binder, open those notebooks in an executable environment, making your code immediately reproducible by anyone, anywhere.

### Build and Launch a Repository

GitHub repo or URL

Git branch, tag, or commit

Path to a notebook file (Optional)

Launch

Waiting

Already built!

Launching

Build logs

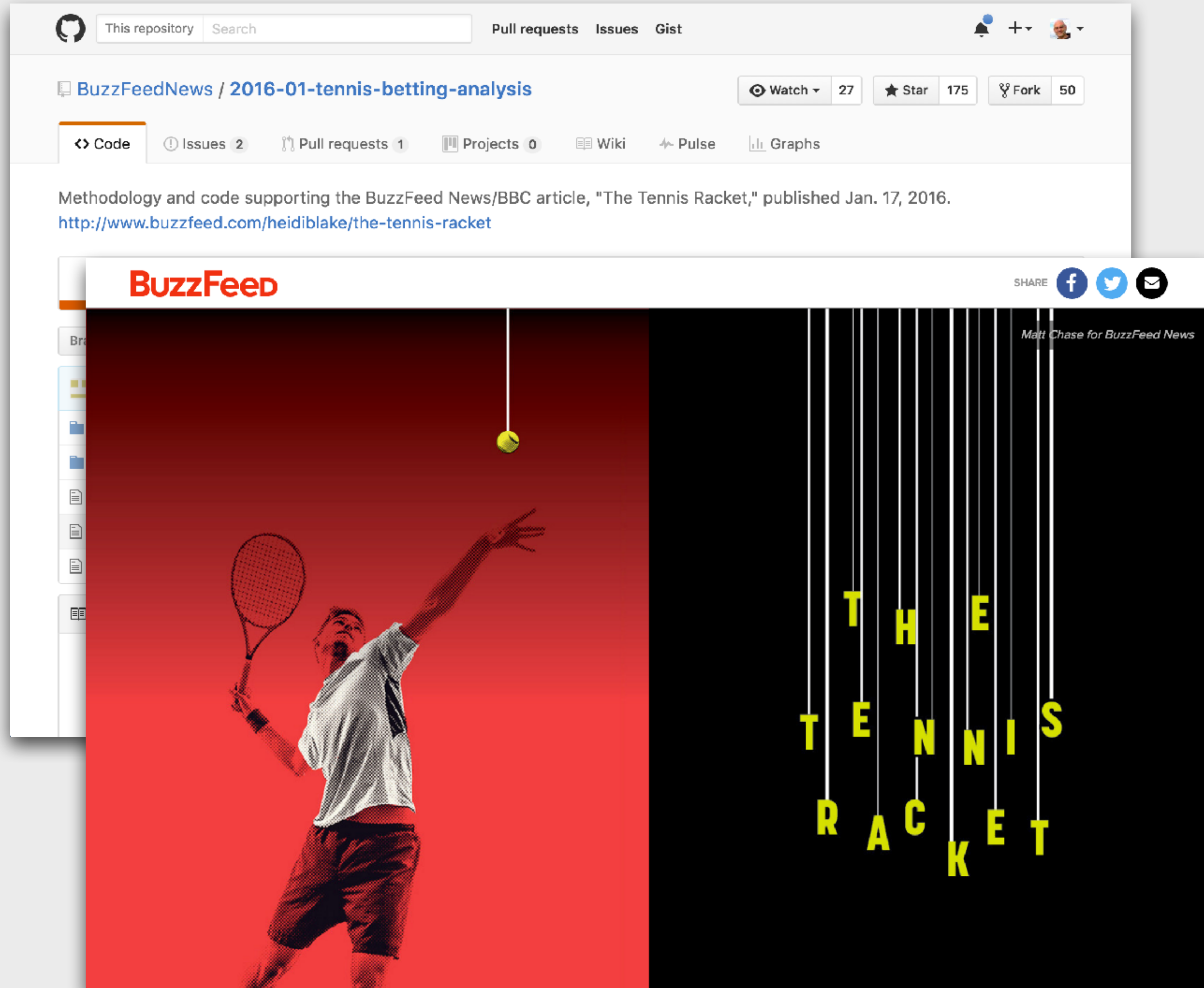
show

<https://losc.ligo.org/tutorials/>

<https://beta.mybinder.org/v2/gh/minrk/ligo-binder/master?filepath=index.ipynb>



# Enabling Open Data Journalism



# Authoring Interactive Books

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## Data visualization with Seaborn

Seaborn provides an API on top of matplotlib, which uses sane plot and color defaults and simple functions for common statistical plot types.

By Jake VanderPlas, May 7, 2015

### Embracing Jupyter Notebooks at O'Reilly

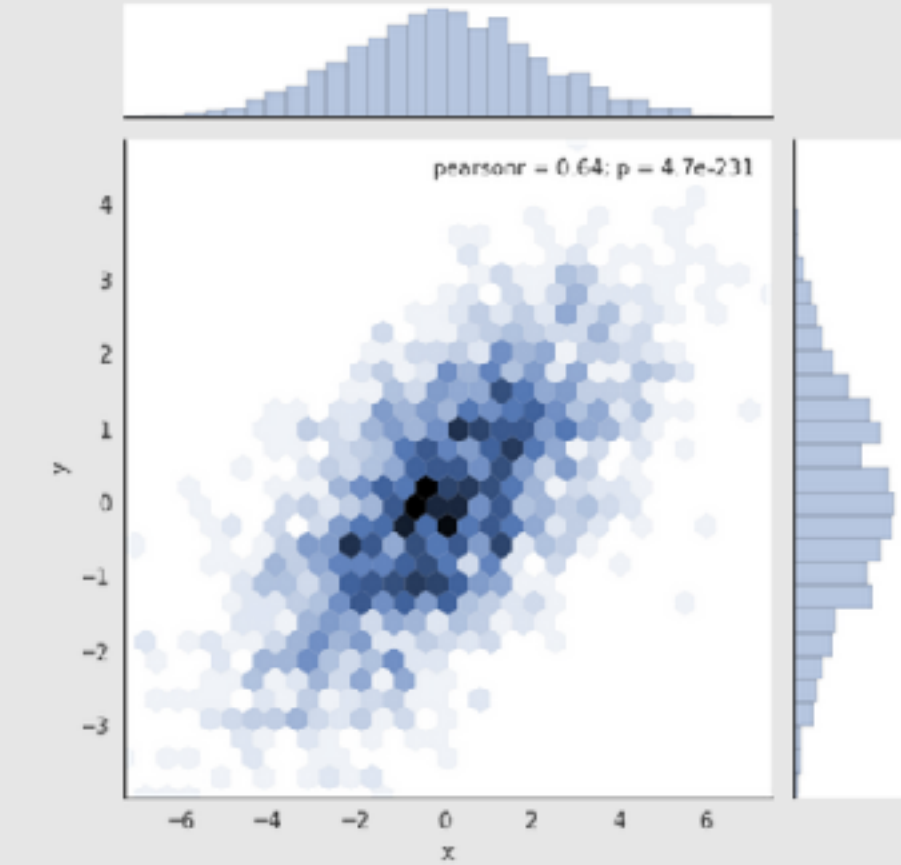
O'Reilly Media is using our Atlas platform to make Jupyter Notebooks a first class authoring environment for our publishing program.

By Andrew Odehahn, May 7, 2015

#### Embracing Jupyter Notebooks at O'Reilly

O'Reilly Media is thrilled to announce that we're making IPython Notebooks a first-class authoring environment for our publishing program, on par with Word or our Atlas platform. As part of our move to embrace the platform, we're also experimenting on [beta.oreilly.com](https://beta.oreilly.com) with new ways for readers to experience this content, like these examples:

- Data visualization with Seaborn
- Introduction to Support Vector Machines
- Simple Line Plots with Matplotlib
- Three-dimensional Plotting in Matplotlib
- An illustrated introduction to the t-SNE algorithm



```
with sns.axes_style('white'):  
    sns.jointplot("x", "y", data, kind='hex')
```

There are other parameters which can be passed to `jointplot` for example, we can use a hexagonally-based histogram instead:

done

O'Reilly Atlas authoring platform incorporating live code

<https://www.oreilly.com/ideas/jupyter-at-oreilly>

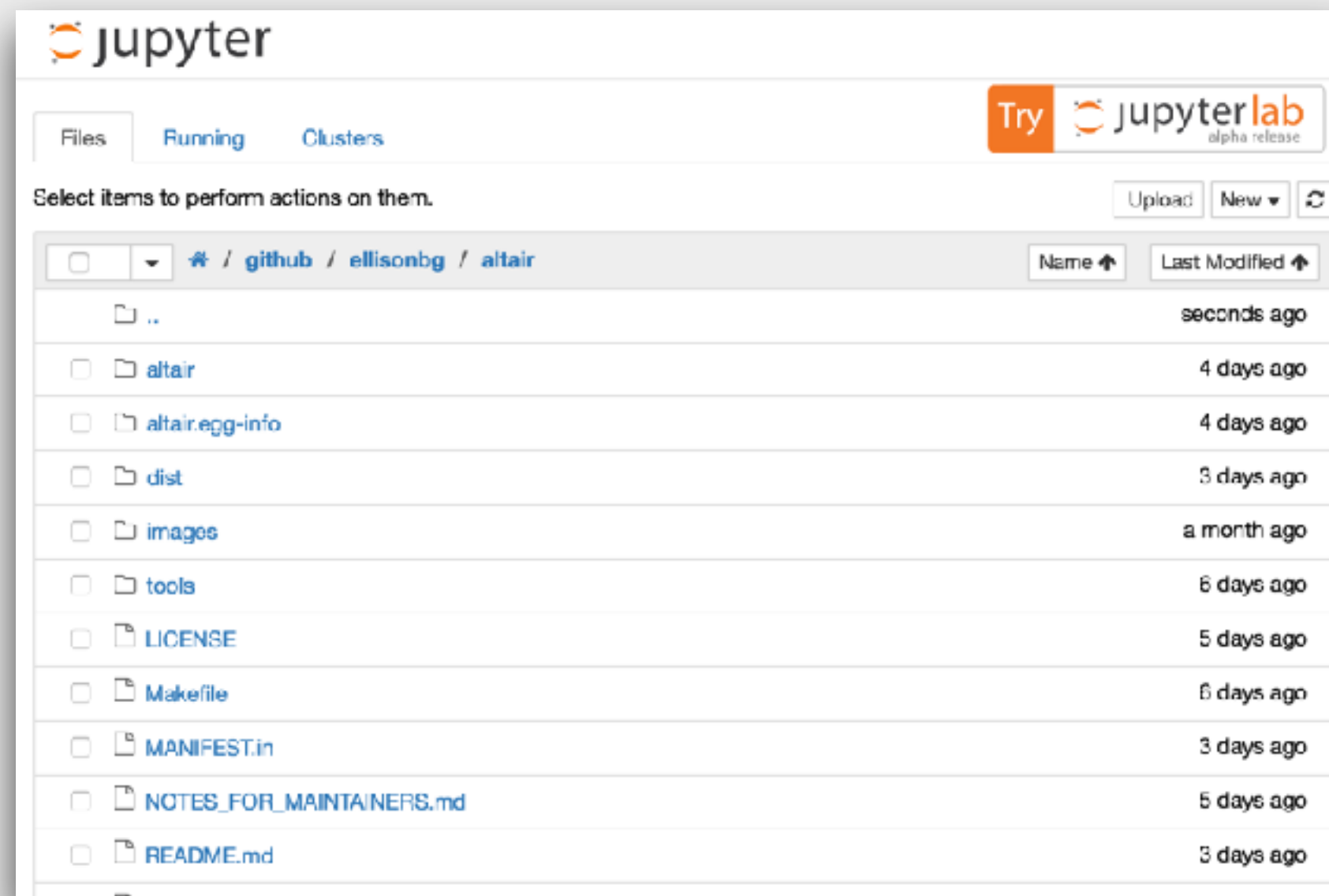


# Building Blocks for Interactive Computing



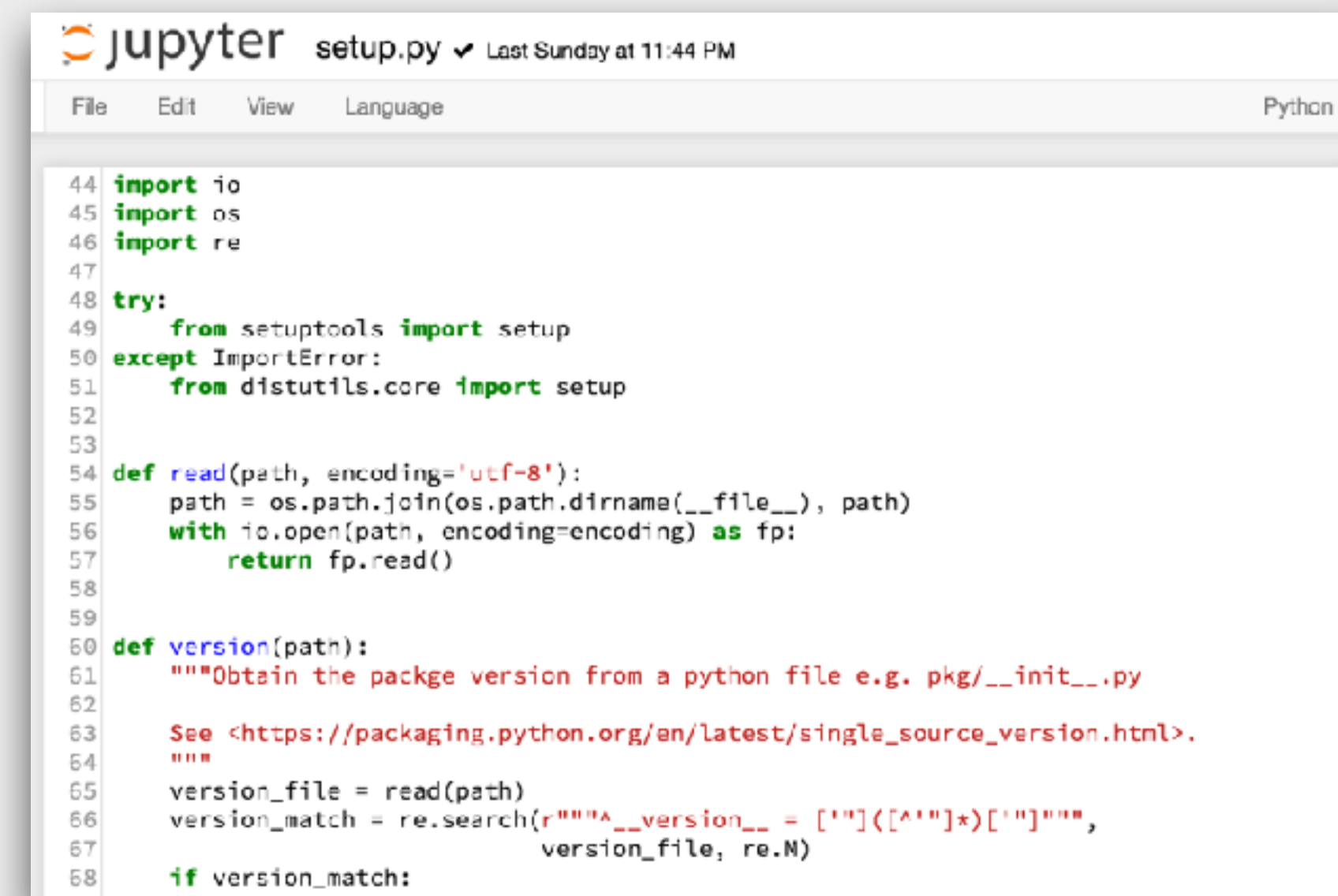


# Classic Jupyter: More Than Just Notebooks



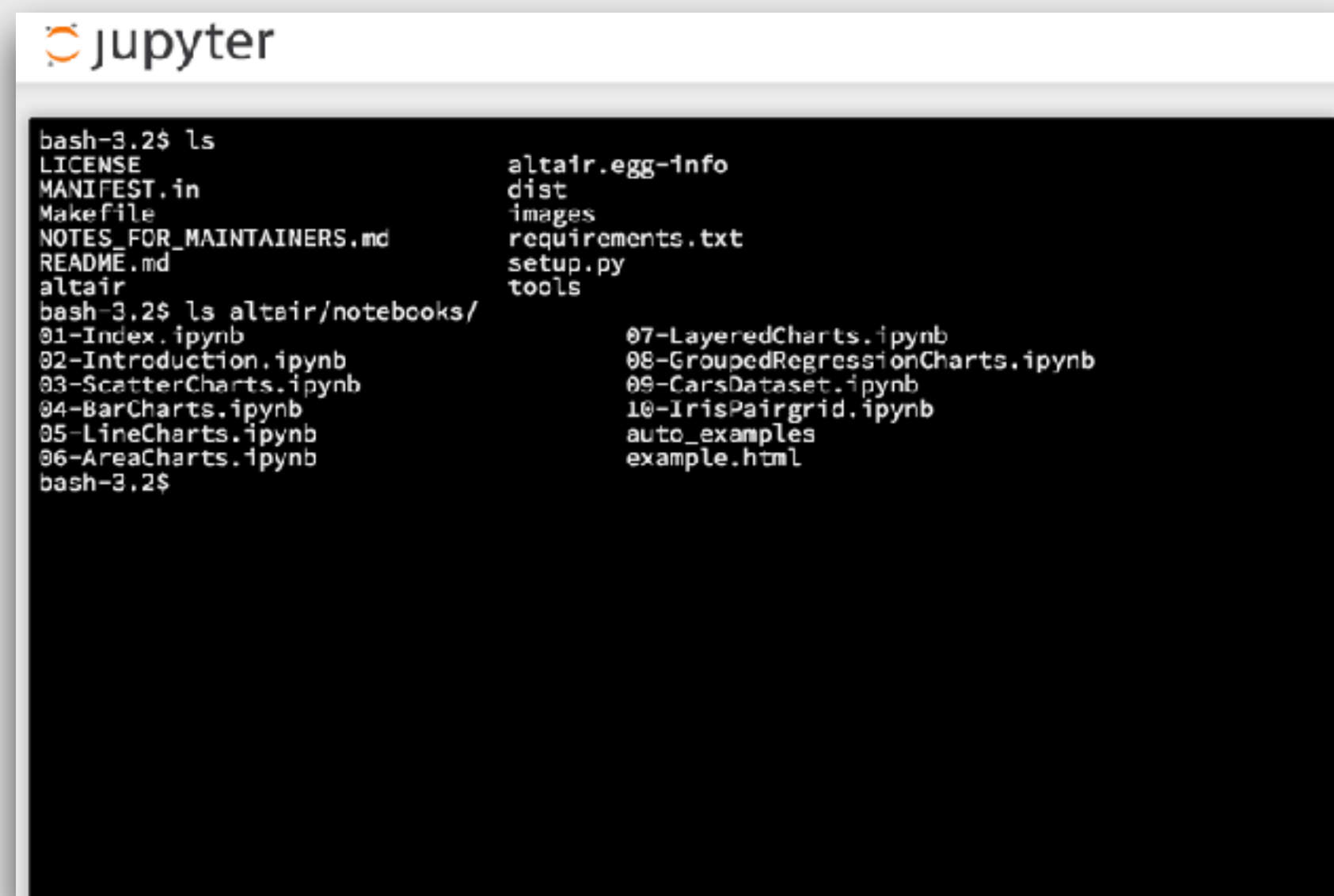
The Jupyter file browser interface shows a directory listing for the path `github / ellisonbg / altair`. The interface includes tabs for `Files`, `Running`, and `Clusters`. A table lists files and directories with columns for `Name` and `Last Modified`. The files listed are:

Name	Last Modified
..	seconds ago
altair	4 days ago
altair.egg-info	4 days ago
dist	5 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 Jupyter code editor interface shows a Python file named `setup.py`. The code is as follows:

```
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__ = ["\']([^\"]*)["\']',
67                               version_file, re.M)
68     if version_match:
```



The Jupyter terminal interface shows a shell prompt `bash-3.2$` and a directory listing of the `altair` directory. The output is as follows:

```
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
07-LayeredCharts.ipynb
08-GroupedRegressionCharts.ipynb
09-CarsDataset.ipynb
10-IrisPairgrid.ipynb
auto_examples
example.html
```



# Building Blocks

File Browser

Notebooks

Terminal

Text Editor

Kernels

Output





What are we hearing from users?



# 2015 UX Survey

## Survey Results

- Mostly daily/weekly users
- Love the notebook workflow and user experience
- Top needs:
  - Integration with version control systems (Git, GitHub)
  - Improved code/text editing
  - Flexible layout and integration between the building blocks
  - Debugger, profiler, variable inspector, etc.



# Introducing JupyterLab (almost beta)

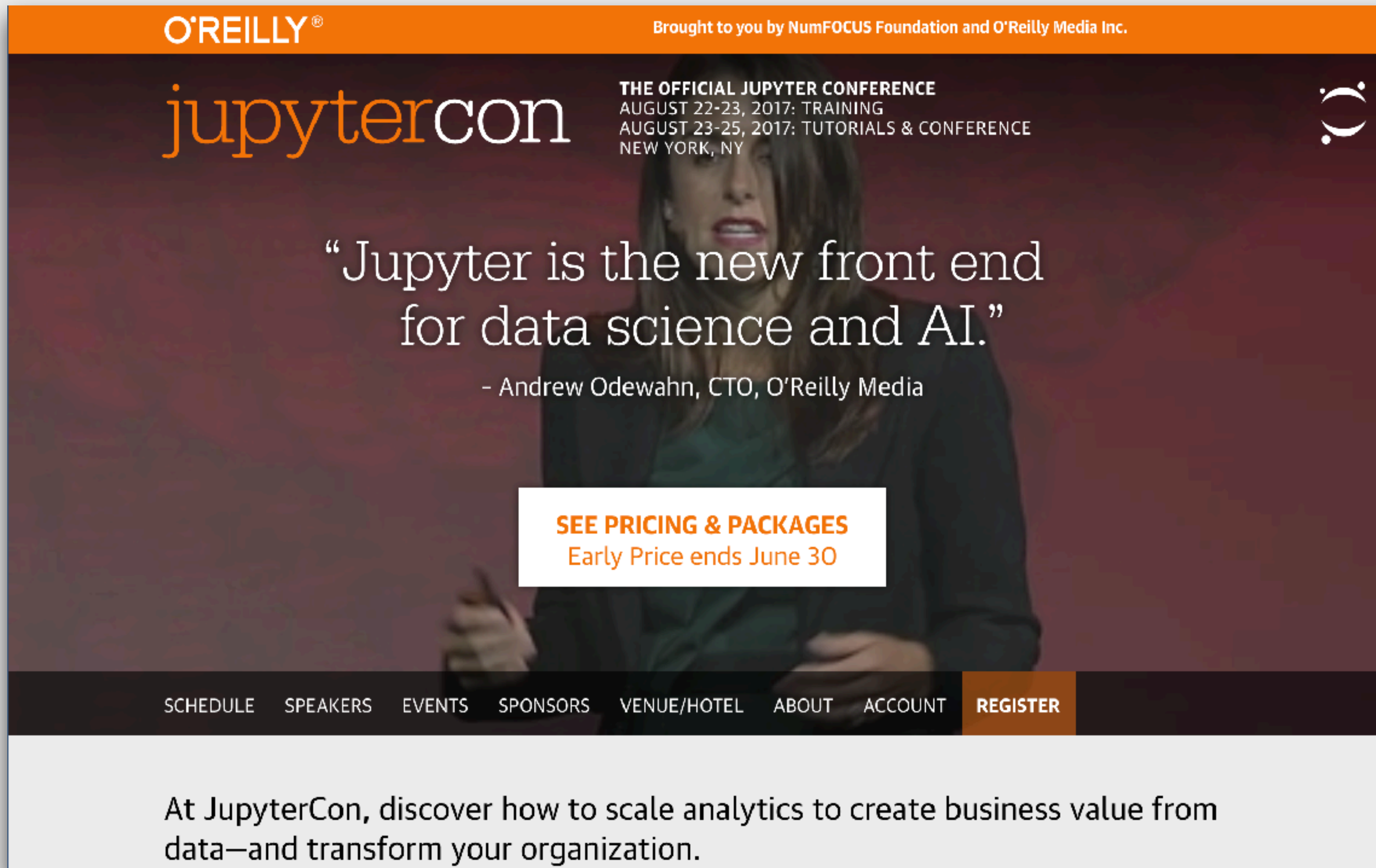


Live Demos!



# JupyterCon, August 2017, NYC

<https://conferences.oreilly.com/jupyter/jup-ny>

The image shows a screenshot of the JupyterCon 2017 website. At the top, there is an orange banner with the O'Reilly logo on the left and the text "Brought to you by NumFOCUS Foundation and O'Reilly Media Inc." on the right. Below this, the main header area features the "jupytercon" logo in orange and white, followed by the text "THE OFFICIAL JUPYTER CONFERENCE" and the dates "AUGUST 22-23, 2017: TRAINING" and "AUGUST 23-25, 2017: TUTORIALS & CONFERENCE" in white. A quote in white text reads: "Jupyter is the new front end for data science and AI." attributed to "- Andrew Odewahn, CTO, O'Reilly Media". A white button with orange text says "SEE PRICING & PACKAGES" and "Early Price ends June 30". The bottom navigation bar is dark with white links: SCHEDULE, SPEAKERS, EVENTS, SPONSORS, VENUE/HOTEL, ABOUT, ACCOUNT, and REGISTER (which is highlighted in orange). At the very bottom, a white box contains the text: "At JupyterCon, discover how to scale analytics to create business value from data—and transform your organization." The background of the main section is a dark red with a faint image of a woman speaking.

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jupytercon

THE OFFICIAL JUPYTER CONFERENCE  
AUGUST 22-23, 2017: TRAINING  
AUGUST 23-25, 2017: TUTORIALS & CONFERENCE  
NEW YORK, NY

“Jupyter is the new front end  
for data science and AI.”  
- Andrew Odewahn, CTO, O'Reilly Media

**SEE PRICING & PACKAGES**  
Early Price ends June 30

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