

# jupyter<sup>°</sup> Pop-up

@JupyterCon | #JupyterPopUp



# State of Jupyter

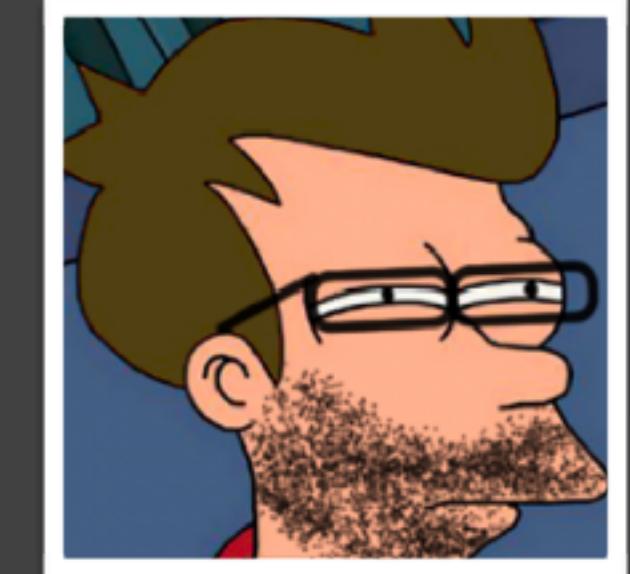
March 21st, 2018

**Matthias Bussonnier**

[bussonniermatthias@gmail.com](mailto:bussonniermatthias@gmail.com)

GitHub: [@carreau](https://github.com/@carreau)

Twitter: [@mbussonn](https://twitter.com/@mbussonn)



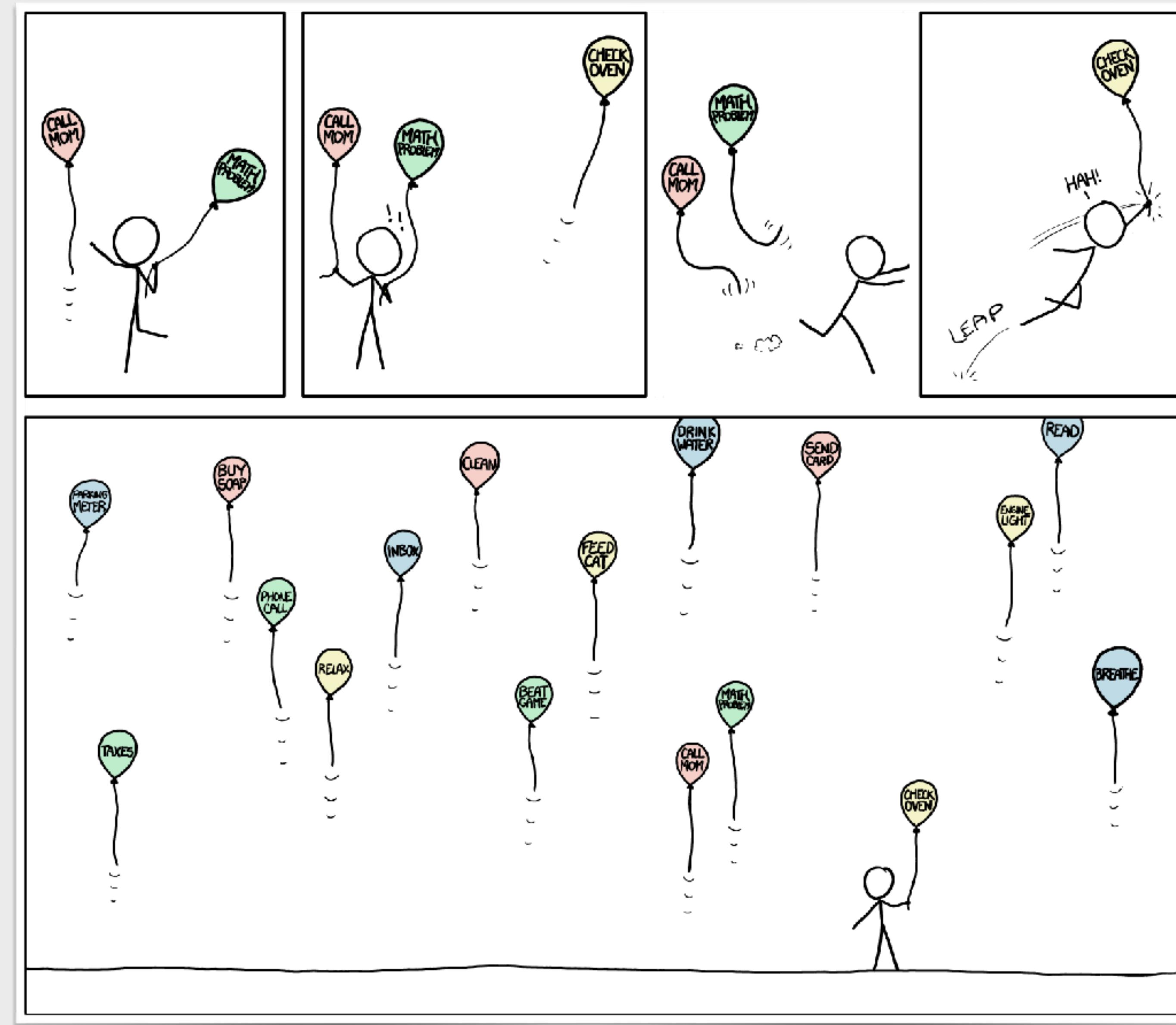


# About Me

# Matthias Bussonnier

Core developer of IPython/Jupyter since 2012,  
Founding and Steering Council member.





Randall Munroe  
(<https://xkcd.com/1106/>)

# IPython – 2001

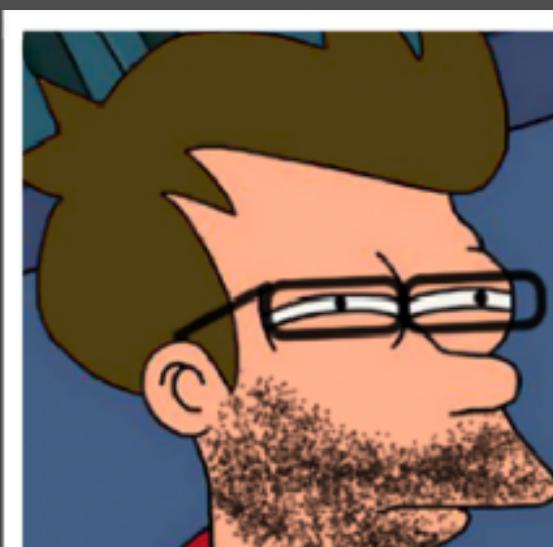
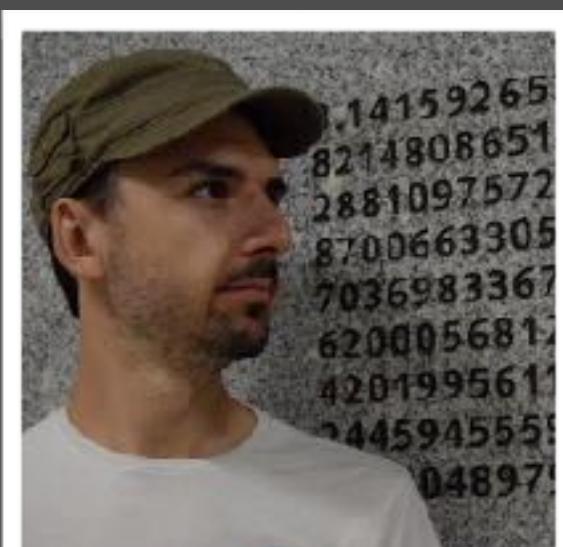


```
IPython
$ ipython
Python 3.6.0
Type 'copyright', 'credits' or 'license' for more information
IPython 6.0.0.dev -- An enhanced Interactive Python. Type '?' for help.

In [1]: from string import hexdigits
....: from random import choice
....:
....: def randhex(length=10):
....:     return '0x'+''.join([choice(hexdigits) for x in range(10)]).l
...:                                         ljust
...:                                         lower
...:                                         lstrip
```



# The Notebook – 2012



Jupyter Welcome to P

This Notebook Server was created by:

**WARNING**  
Don't rely on this server.

Your server is hosted there.

Run some Python code!

To run the code below:

1. Click on the cell to select it.
2. Press SHIFT+ENTER

A full tutorial for using the Jupyter Notebook is available here.

```
In [ ]: #matplotlib inline  
  
import pandas as pd  
import numpy as np  
import matplotlib
```

**Exploring the Lorenz System**

In this Notebook we explore the [Lorenz system](#) of differential equations:

$$\dot{x} = \sigma(y - x)$$
$$\dot{y} = \rho x - y - xz$$
$$\dot{z} = -\beta z + xy$$

This is one of the classic systems in non-linear differential equations. It exhibits a range of complex behaviors as the parameters ( $\sigma$ ,  $\beta$ ,  $\rho$ ) are varied, including what are known as *chaotic solutions*. The system was originally developed as a simplified mathematical model for atmospheric convection in 1963.

```
In [7]: interact(Lorenz, N=fixed(10), angle=(0.,360.),  
sigma=(0.0,50.0),beta=(0.,5),rho=(0.0,50.0))
```

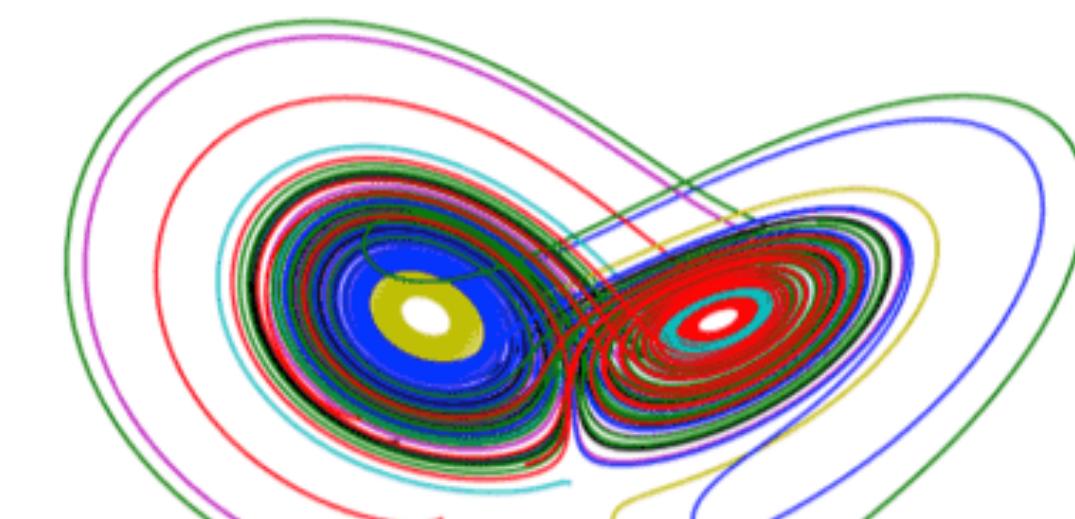
angle: 308.2

max\_time: 12

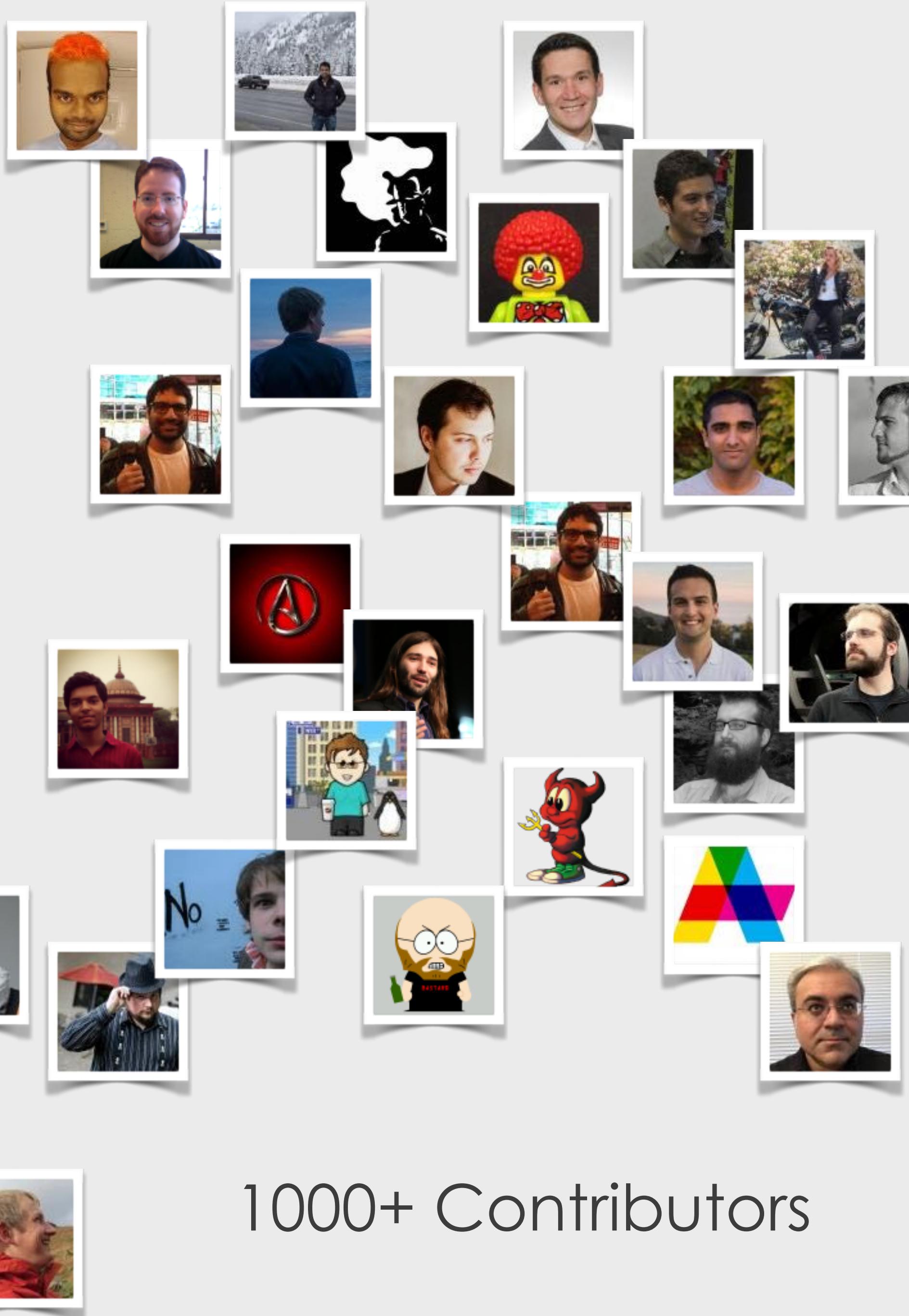
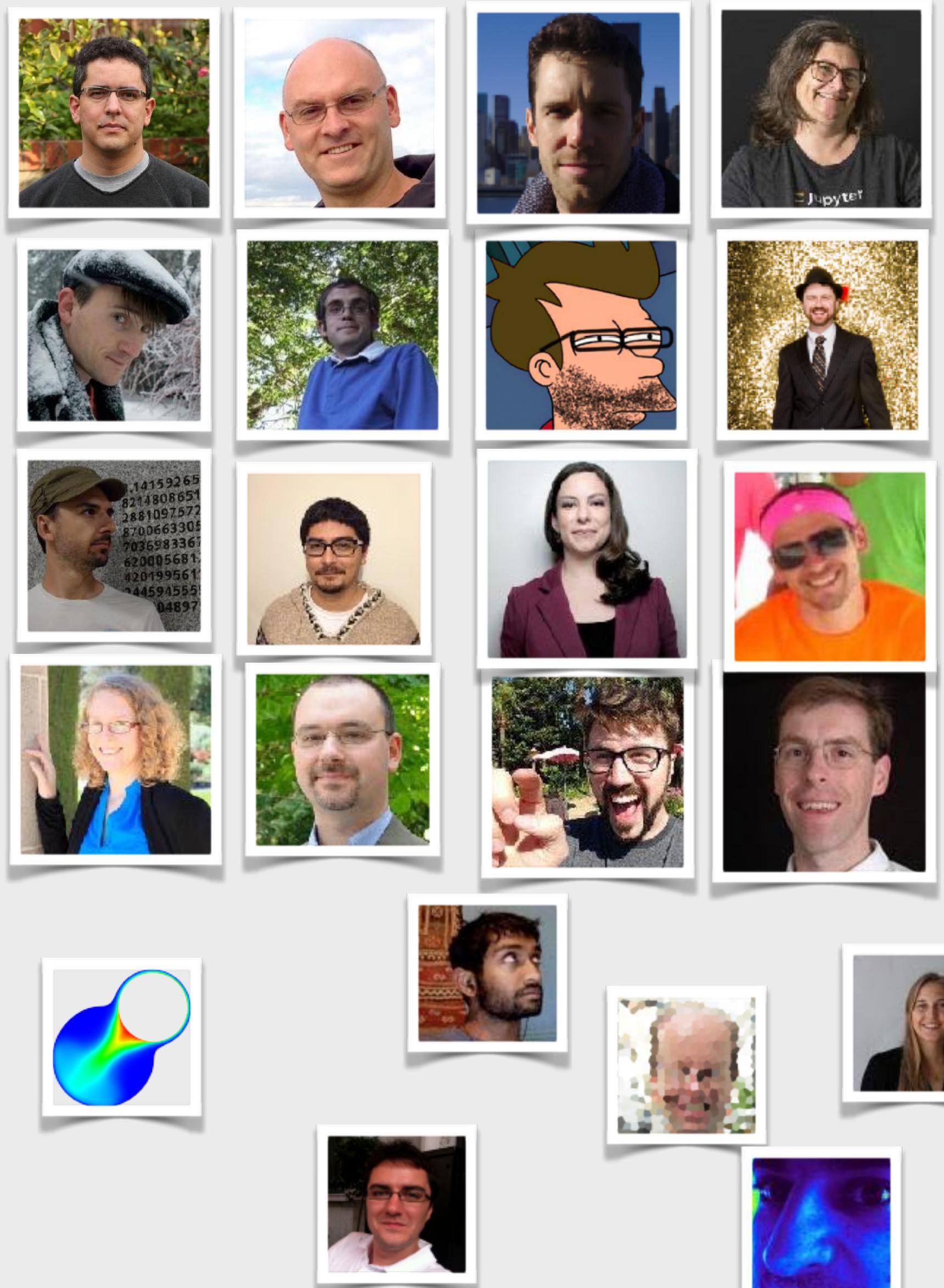
$\sigma$ : 10

$\beta$ : 2.6

$\rho$ : 28



# Jupyter – 2014



1000+ Contributors





Berkeley  
UNIVERSITY OF CALIFORNIA

GORDON AND BETTY  
**MOORE**  
FOUNDATION

Bloomberg

QuantStack  
Scientific Computing

NETFLIX

 QUANSIGHT

Alfred P. Sloan  
FOUNDATION

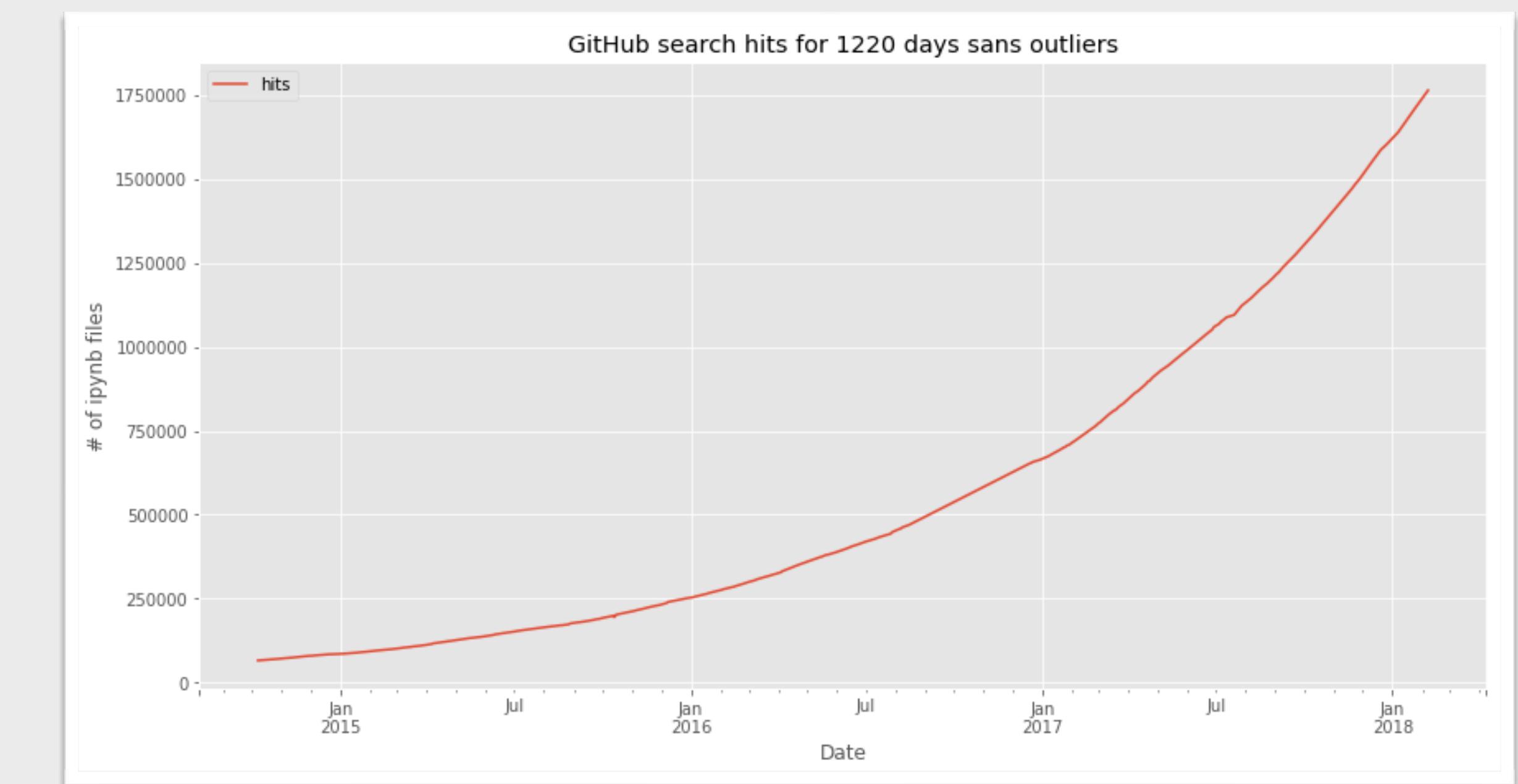
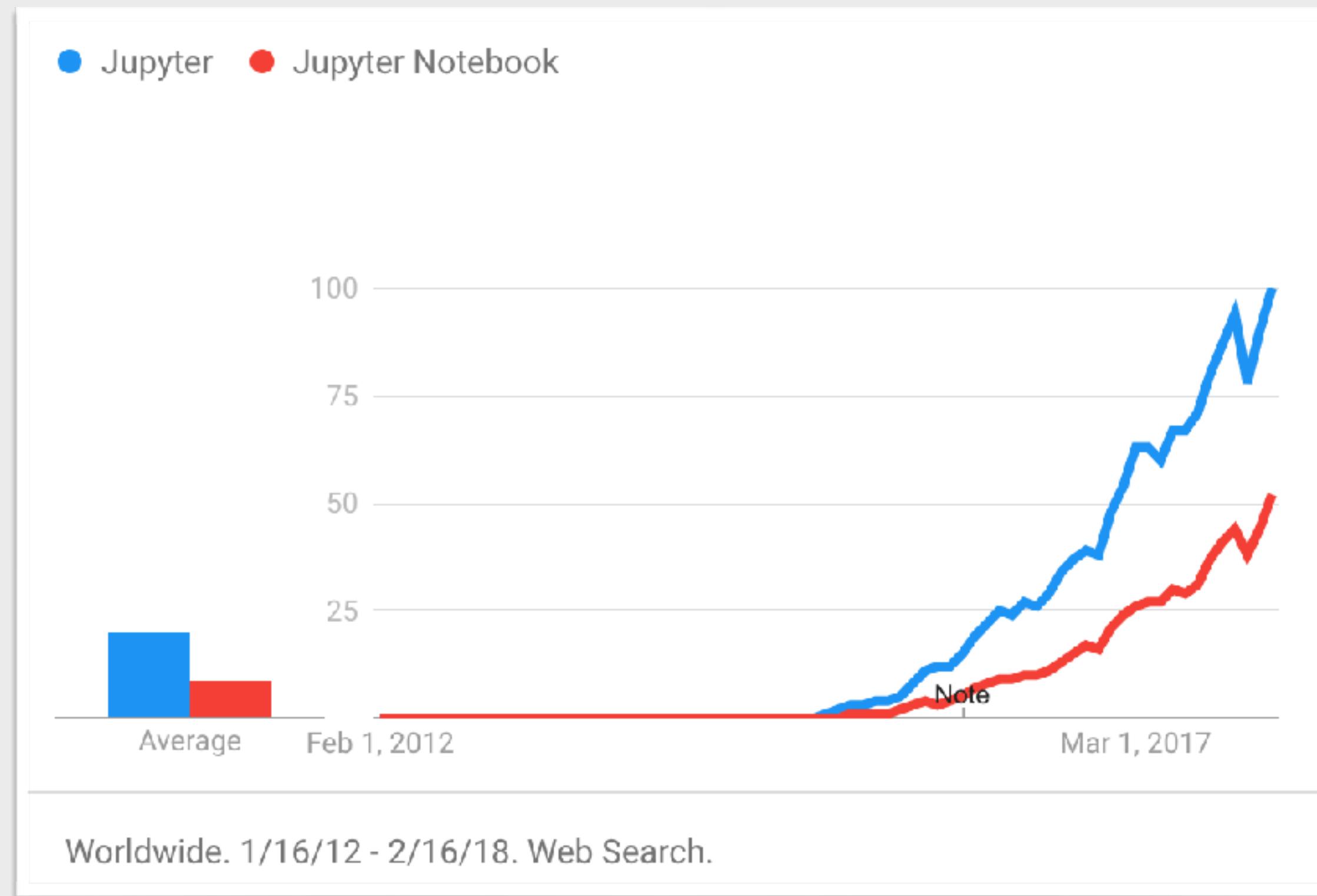
O'REILLY®

CAL POLY  
SAN LUIS OBISPO

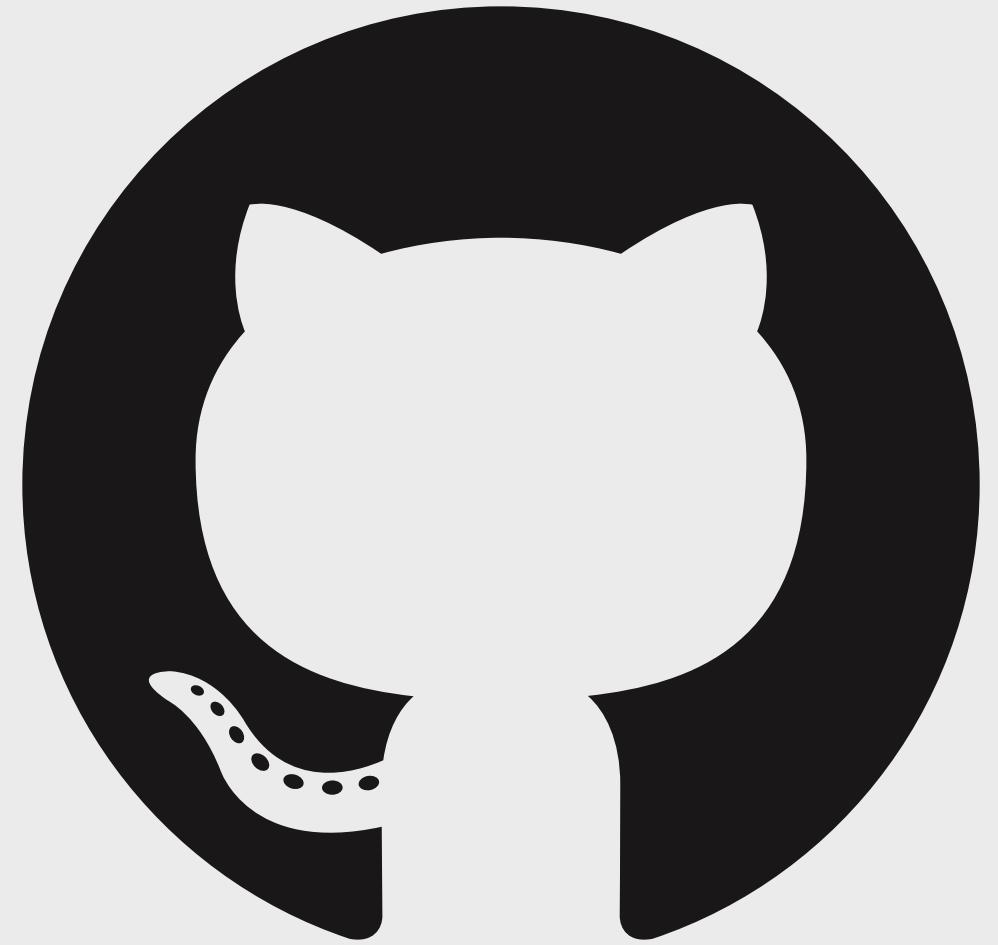
THE LEONA M. AND HARRY B.  
**HELMSEY**  
CHARITABLE TRUST

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# A few Numbers



<https://github.com/parente/nbestimate>

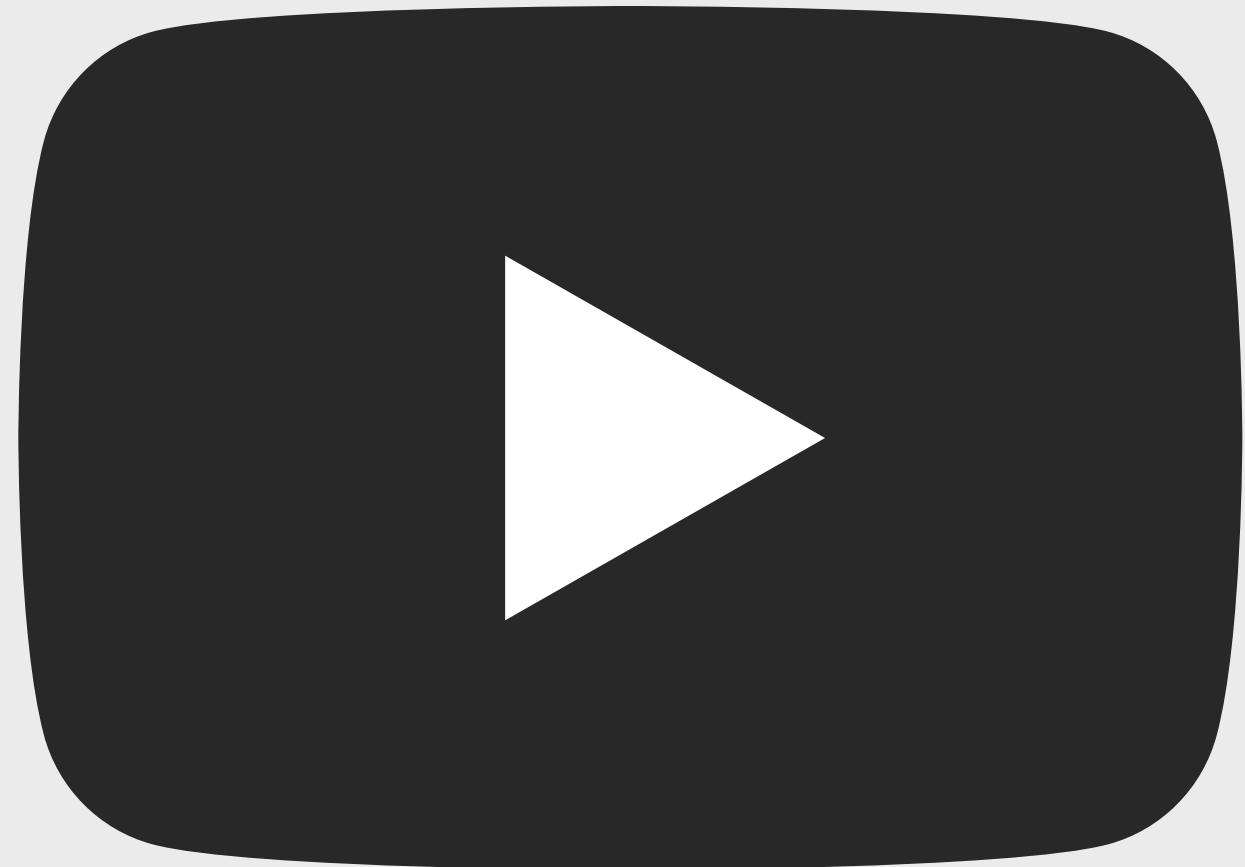


150+ repositories across multiple organisations  
(IPython, Jupyter, JupyterHub, JupyterLab, ...)  
at 2 release/year that's 1 release per day

1000+ Contributors

8+ Millions Users,  
(with conservative estimates)

Worldwide ~21M developers – North America ~4.4M  
VS Code ~2.6 M Active Users  
GitHub 24M Users



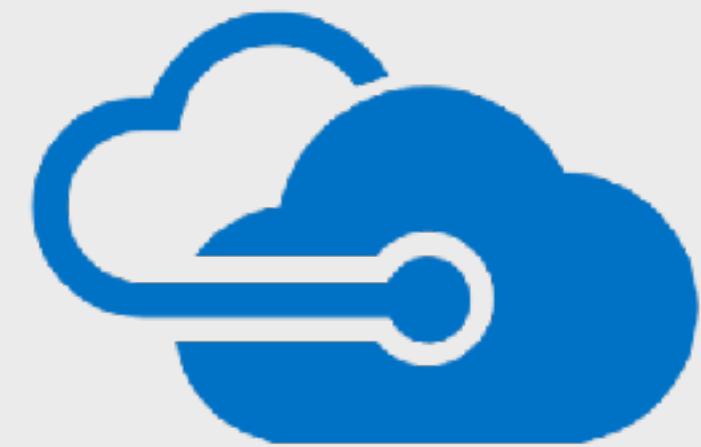
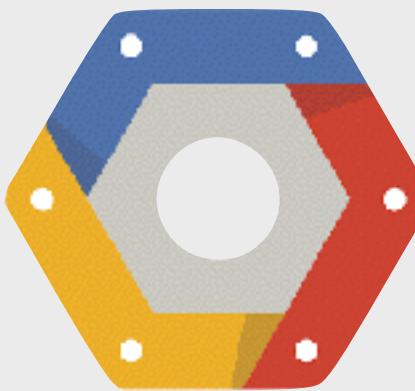
[youtube.com/c/ipython](https://youtube.com/c/ipython)

Developers meetings are recorded and available online

# Education



# Jupyter in education



Azure Notebook

GRYD



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- NBGrader
- Multiple Extensions



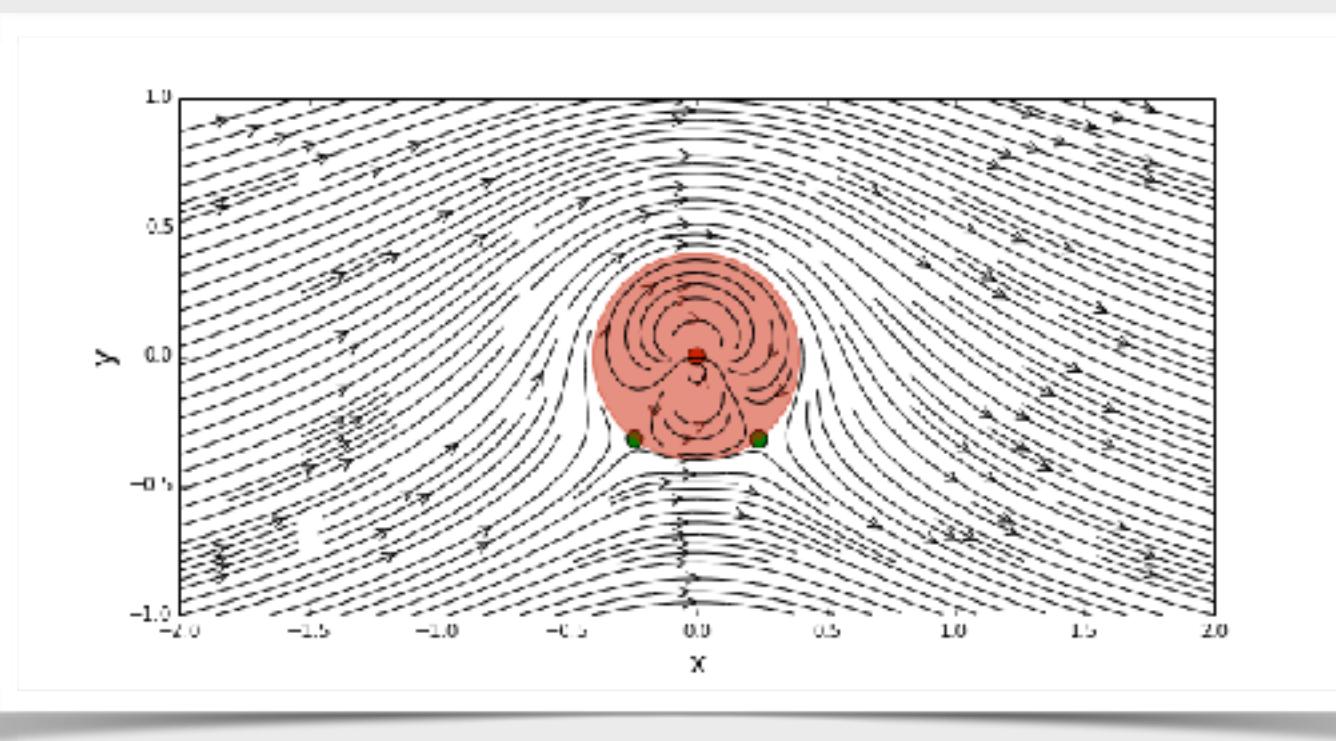


DataHub  
[datahub.berkeley.edu](http://datahub.berkeley.edu)

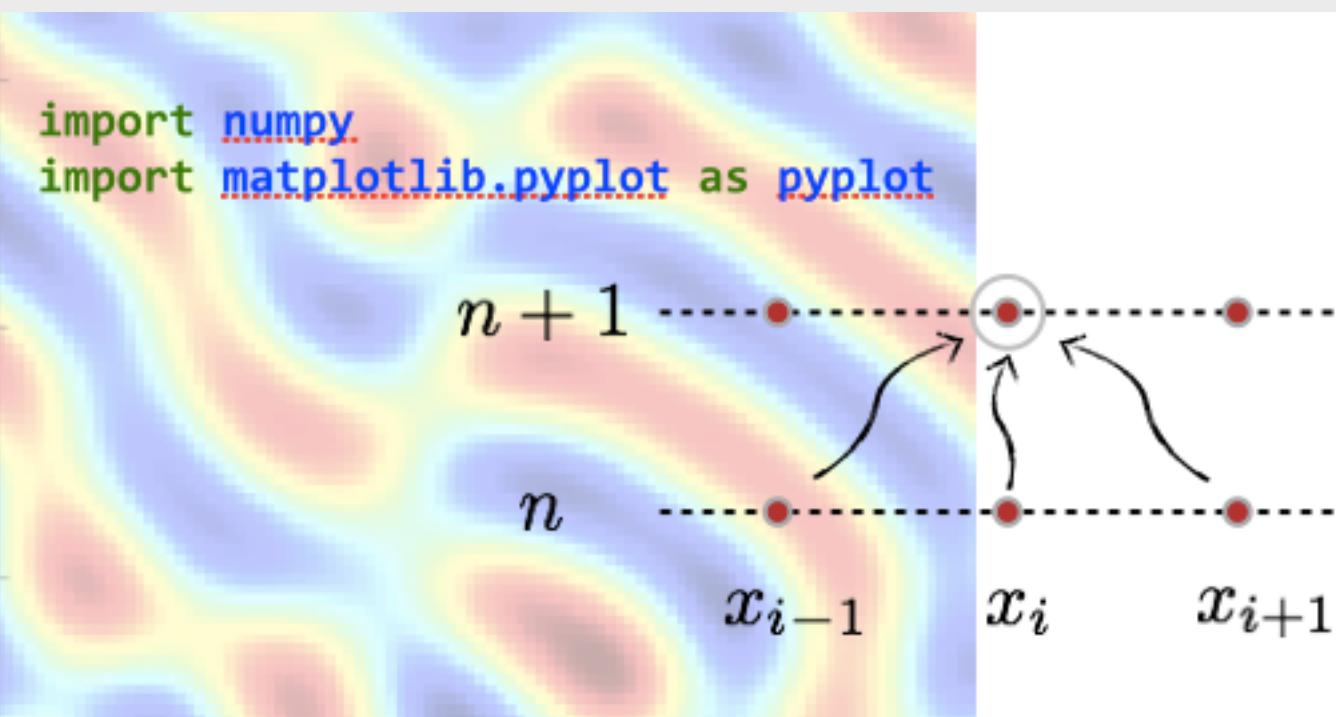
2 500+ Students



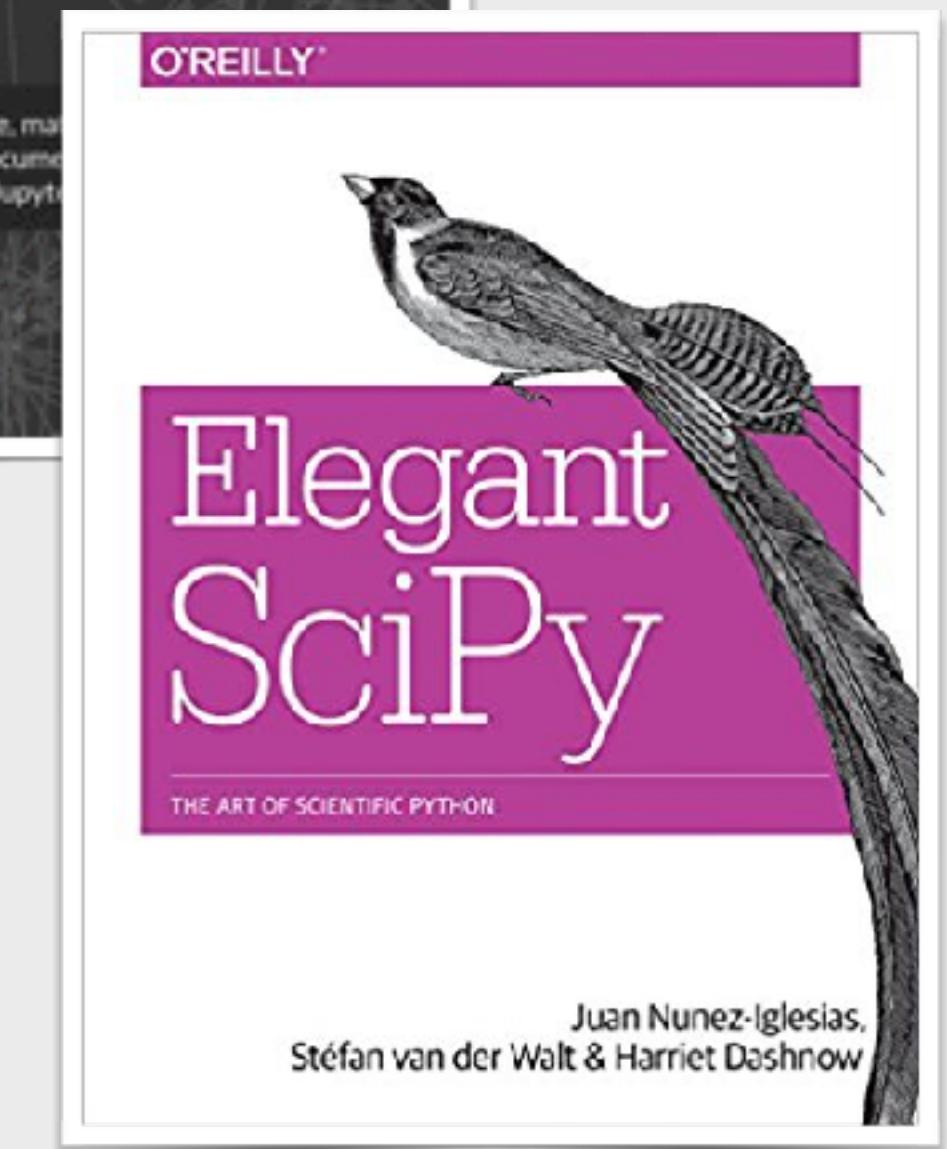
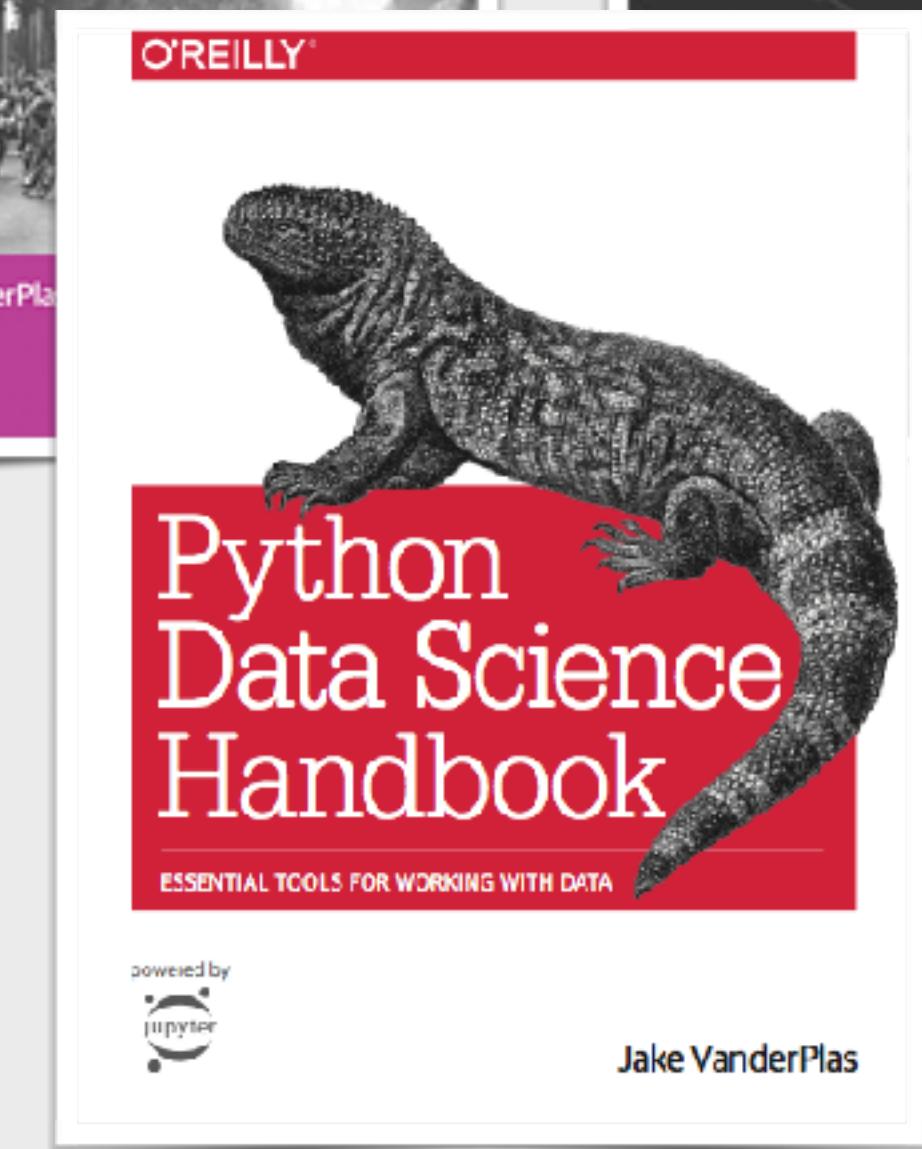
<http://www.ds100.org/>



## AeroPython



## Numerical Mooc



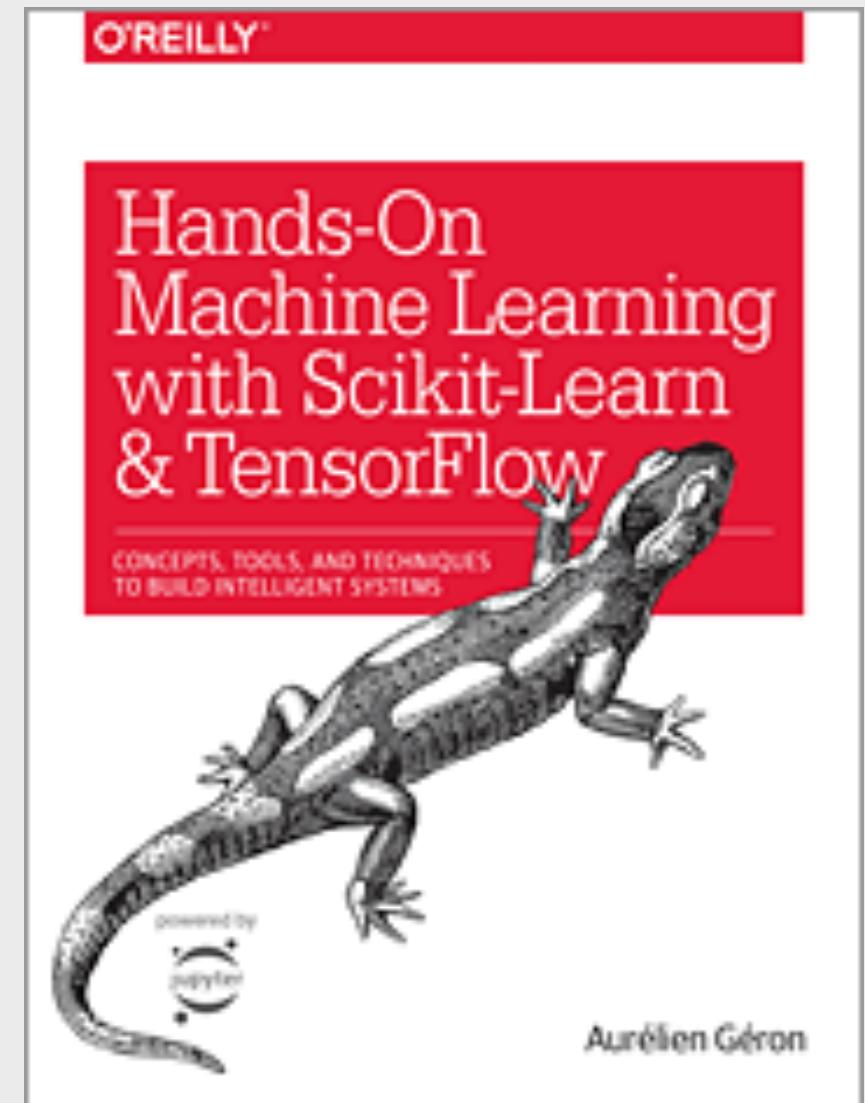
Jupyter Notebook is and will be the new platform for Data Science

# Education Mailing List



jupyter-education@googlegroups.com

# Jupyter ❤ Machine Learning/AI



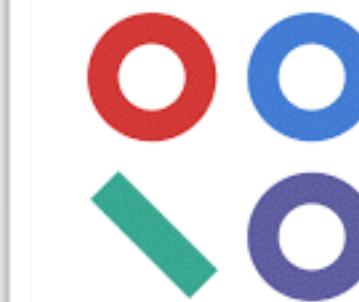
# kaggle

K Keras

TensorFlow



Amazon SageMaker



R-Brain



Google Colaboratory

GRYD



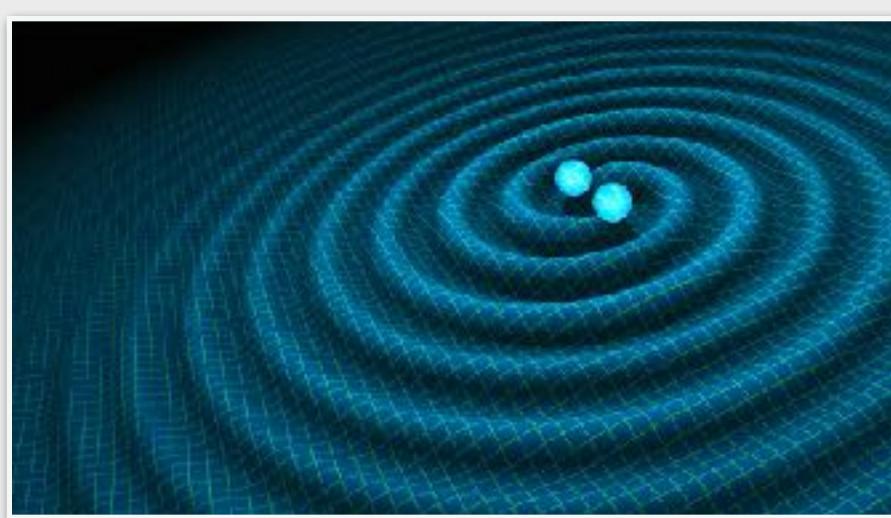
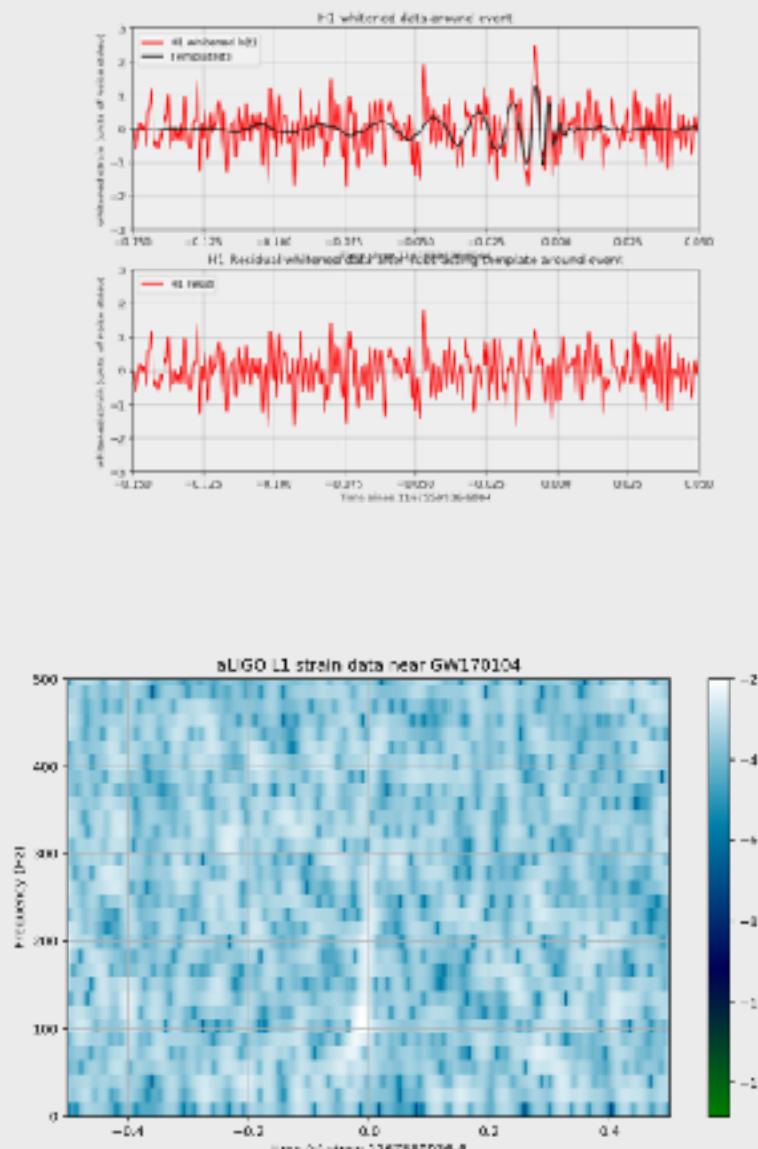
...

CODE OCEAN

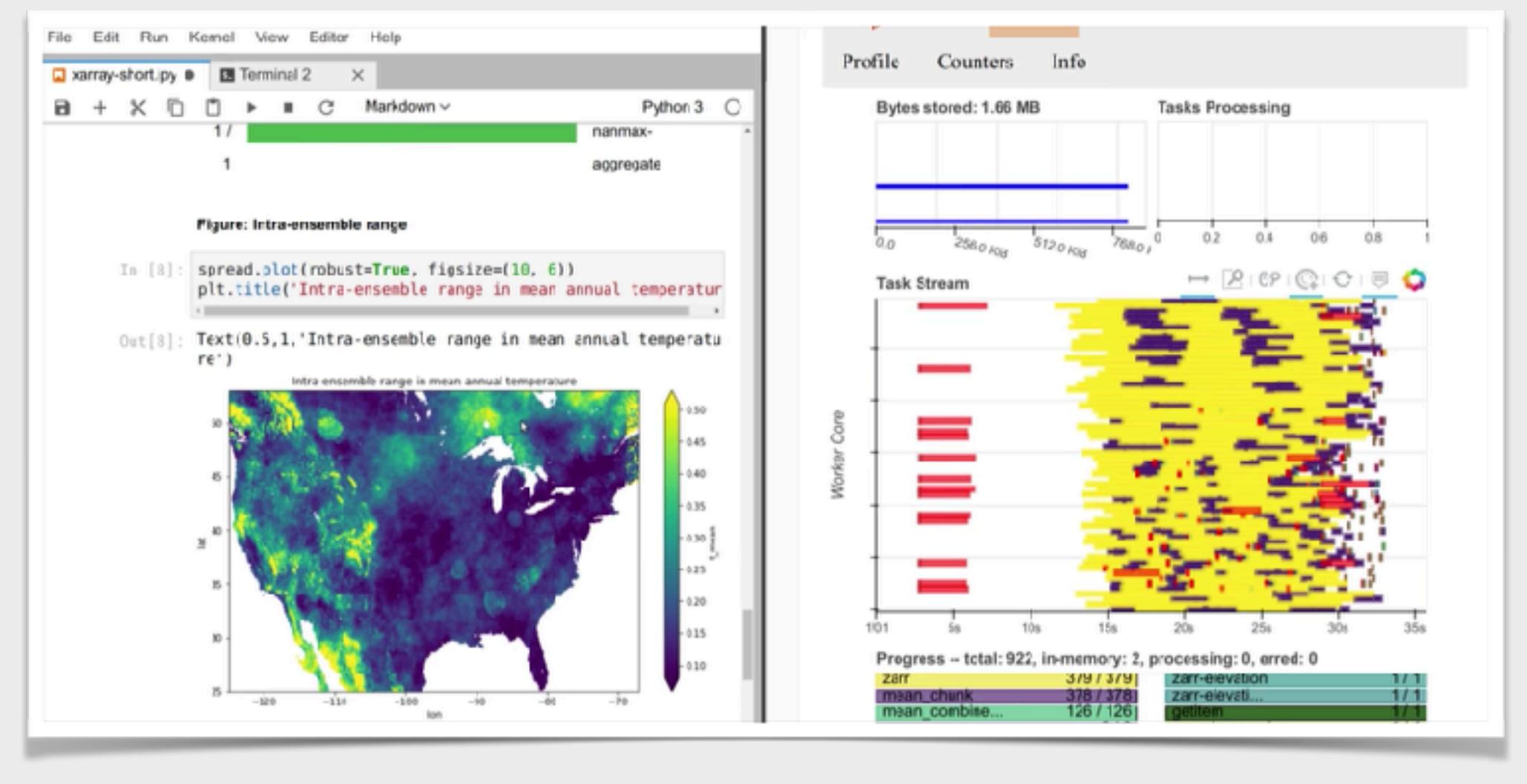
# Jupyter in Science and HPC



# Ligo (Gravitational waves discovery)



# In the cloud Climate Science (Pangeo)



pangeo-data.github.io

# Custom Business Needs



# Knowledge Repo



Feed   Favorites   About   Stats   Write a Post!

## Knowledge Feed

Search for Knowledge

prev <   > next

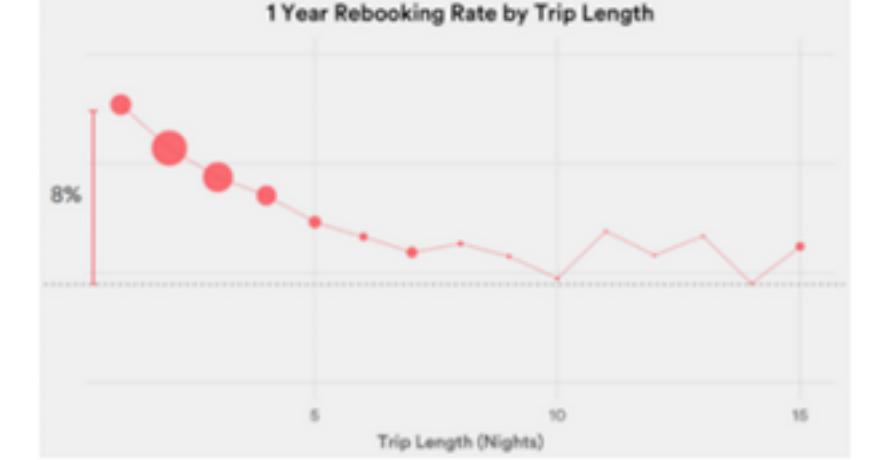
### How Well Does Nps Predict Rebooking?

Author(s) : Lisa Qian  
Date: 2016-02-24  
Tags: #topics/reviews, #other/nps, #other/rebooking, #other/external-blog, #metrics/nps, #topics/rebooking

Data scientists at Airbnb collect and use data to optimize products, identify problem areas, and inform business decisions. For most guests, however, the defining moments of the Airbnb experience happen in the real world when they are traveling to their listing, being greeted by their host, settling into the listing, and exploring the destination. These are the moments that make or break the Airbnb experience, no matter how great we make our website. The purpose of this post is to show how we can use data to understand the quality of the trip experience, and in particular how the Net promoter score adds value.

[Read post](#)

2 comments, 1 like, 0 shares



### New Metric Historically Performed Better On Experiments

Author(s) : Junshuo Liao  
Date: 2016-02-24  
Tags: #topics/experiments, #metrics/blog-post-metric

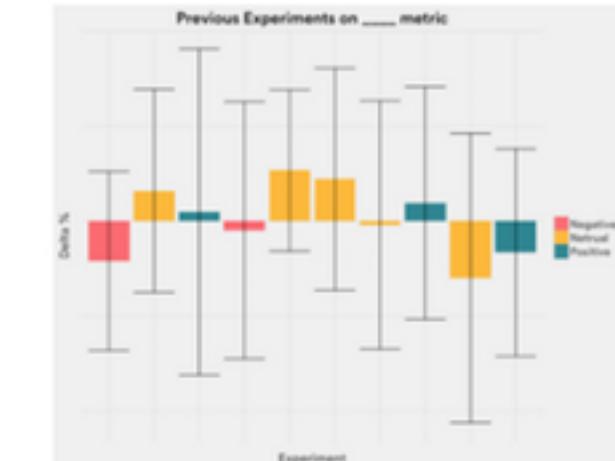
The booking team developed a new metric to measure \_\_\_\_\_. Following **prior research** that showed the metric may be useful for measuring \_\_\_\_\_, we decided to see how previous successful experiments changed the metric. We found that:

- \_\_\_\_ types of experiments consistently showed lift in the metric
- \_\_\_\_ types of experiments did not show consistent effects on the metric.
- We were generally able to get sufficient power for the metric on 80% of the experiments

These results lead us to believe this metric may be a good submetric for judging ancillary benefits of our product changes.

[Read post](#)

2 comments, 0 likes, 0 shares



NodeBook



STITCH FIX

Standard Jupyter Notebook

# Tools Integrations



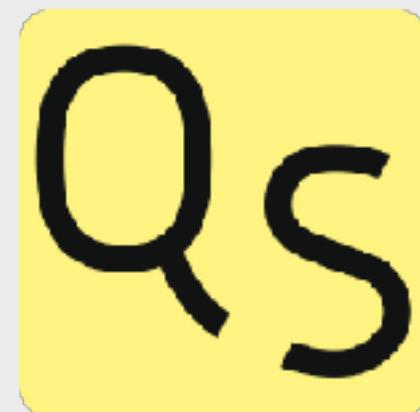
# Tools Integrations

**Kernels:** Python, Julia, R, Haskell, Perl, Fortran, Ruby, Javascript, C/C++, Go, Scala, Elixir... 60+





eUS  
Cling



QuantStack

```
In [3]: #include <string>
#include <fstream>

#include "xtl/xbase64.hpp"
#include "xeus/xjson.hpp"

namespace au
{
    struct audio
    {
        inline audio(const std::string& filename)
        {
            std::ifstream fin(filename);
            m_buffer << fin.rdbuf();
        }

        std::stringstream m_buffer;
    };

    xeus::xjson mime_bundle_repr() const
    {
        auto bundle = xeus::xjson::object();
        bundle["text/html"] = std::string("<audio controls>" + xtl::base64_encode(im->m_buffer.str()));
        return bundle;
    }
}

In [4]: au::audio drums("audio/audio.wav")
drums
```

Out[4]: ▶ 0:00 / 0:02 ⏪ ⏴ ⏵

```
In [1]: #include <string>
#include <fstream>

#include "xtl/xbase64.hpp"
#include "xeus/xjson.hpp"

namespace im
{
    struct image
    {
        inline image(const std::string& filename)
        {
            std::ifstream fin(filename, std::ios::binary);
            m_buffer << fin.rdbuf();
        }

        std::stringstream m_buffer;
    };

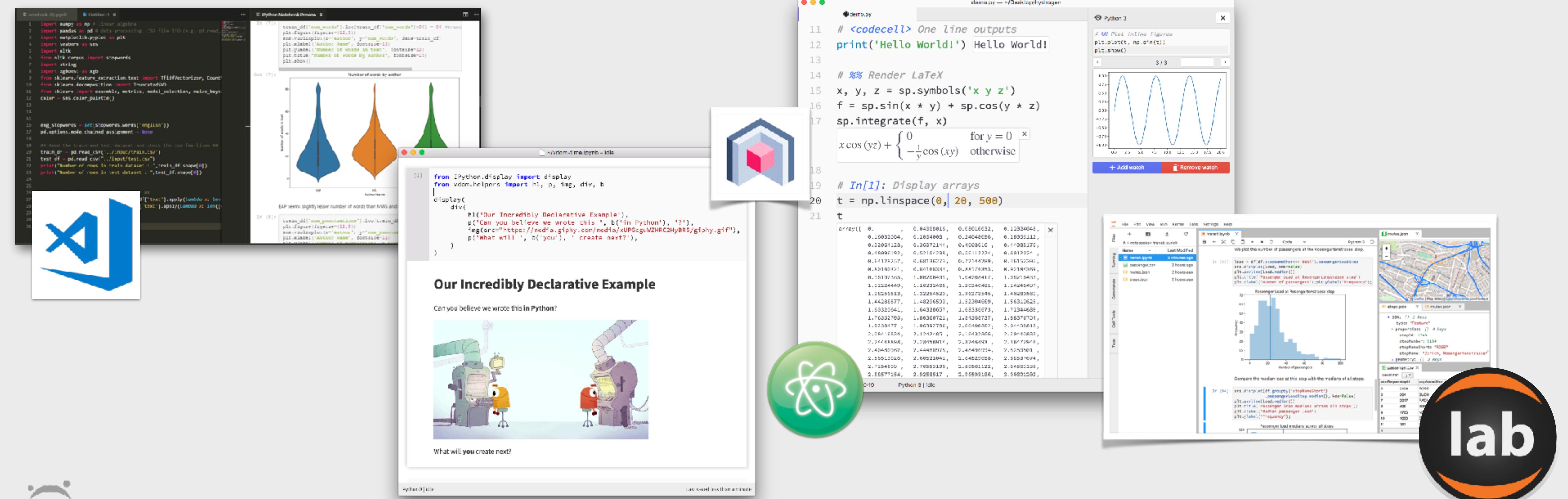
    xeus::xjson mime_bundle_repr(const image* im) const
    {
        auto bundle = xeus::xjson::object();
        bundle["image/png"] = xtl::base64_encode(im->m_buffer.str());
        return bundle;
    }
}

In [2]: im::image marie("images/marie.png");
marie
```

Out[2]:

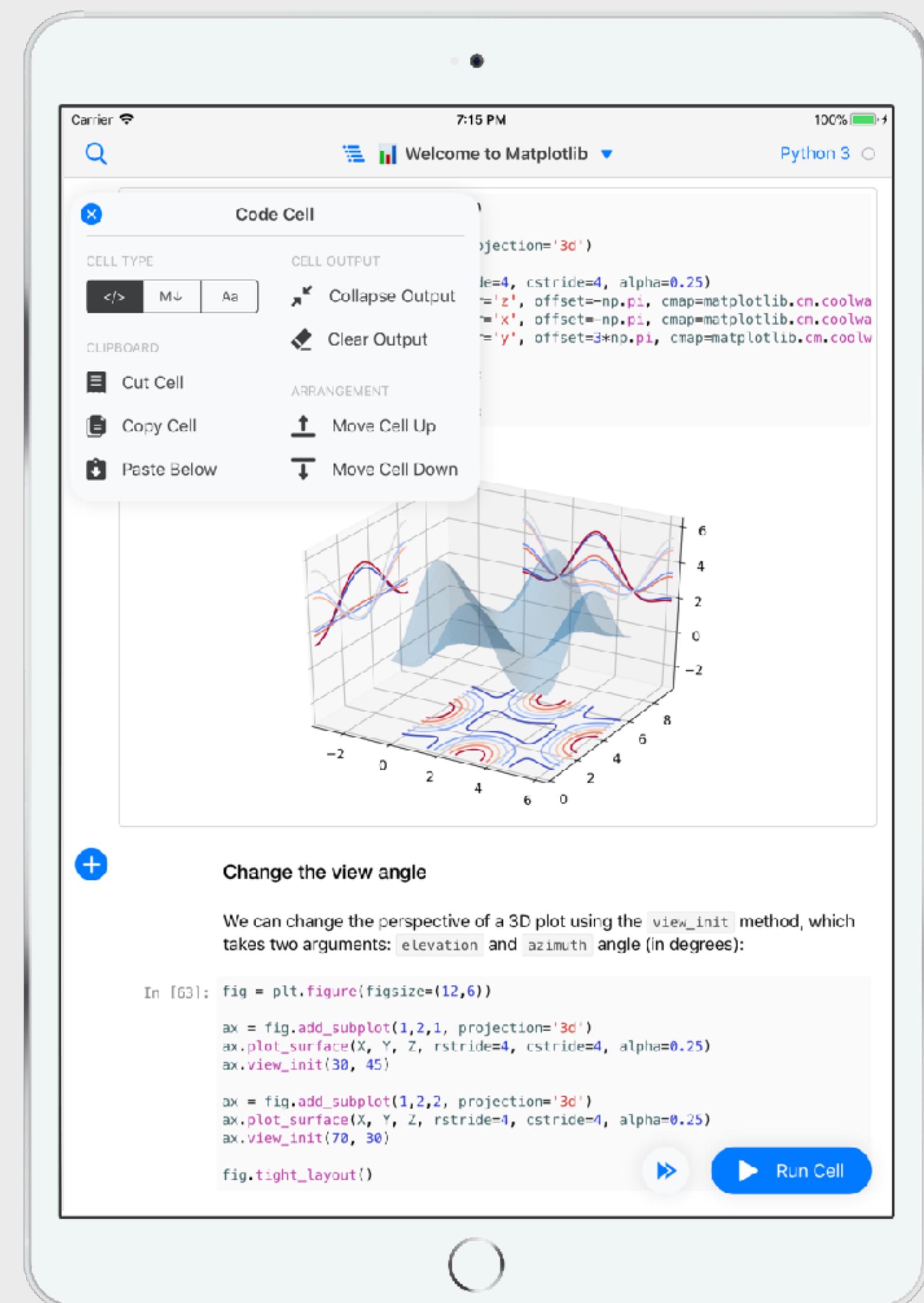
# Tools Integrations

**Frontends:** Notebook, JupyterLab, CLI, Vim, Emacs,  
Visual Studio Code, Atom, Nteract, Juno...





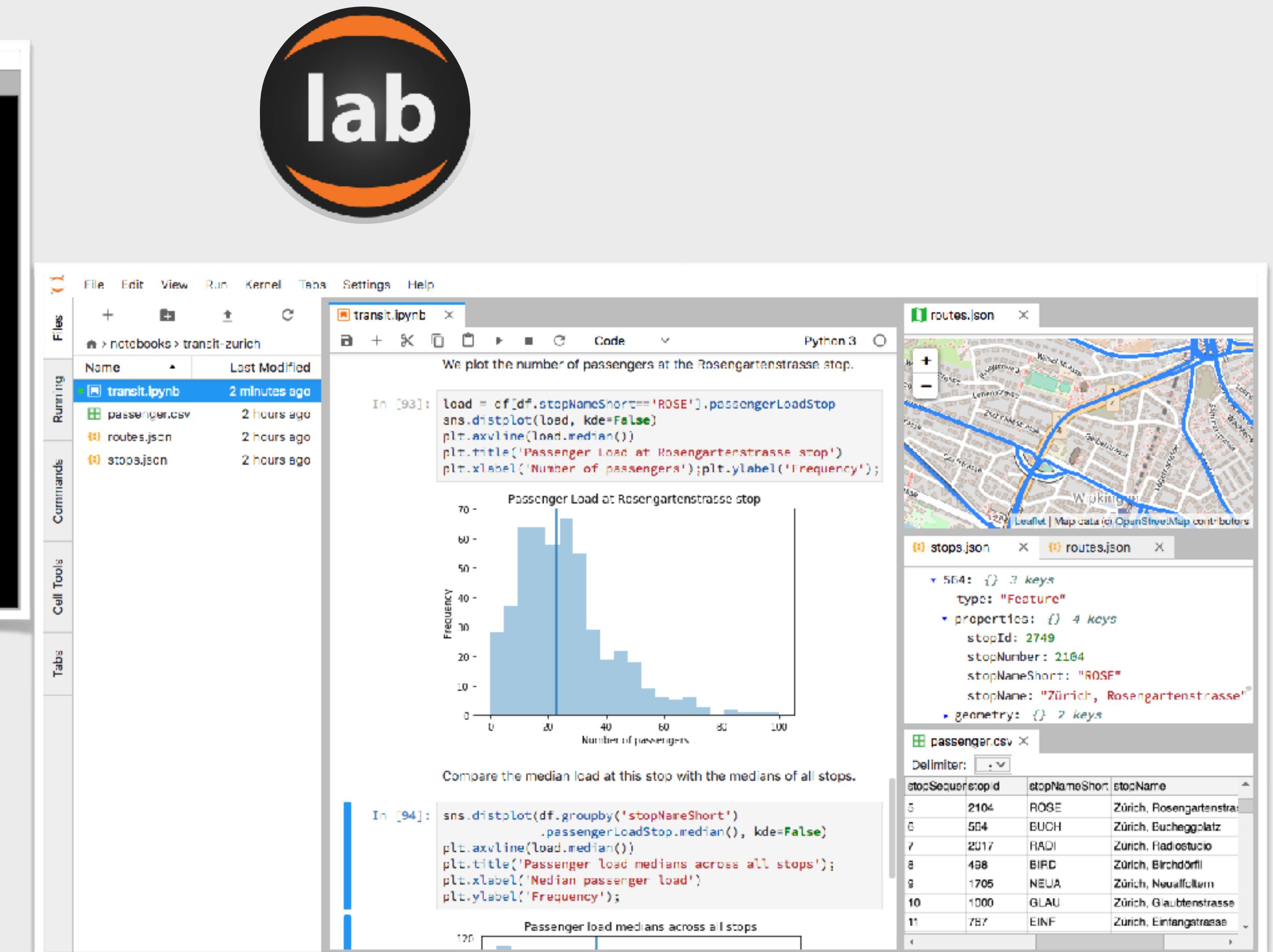
# Juno



<https://juno.sh>

# JupyterLab

A screenshot of the JupyterLab interface. On the left is a file browser showing a list of files and notebooks. In the center is a code editor with a Python 3 notebook containing code for generating a scatter plot. To the right is a terminal window showing the output of the notebook's execution.

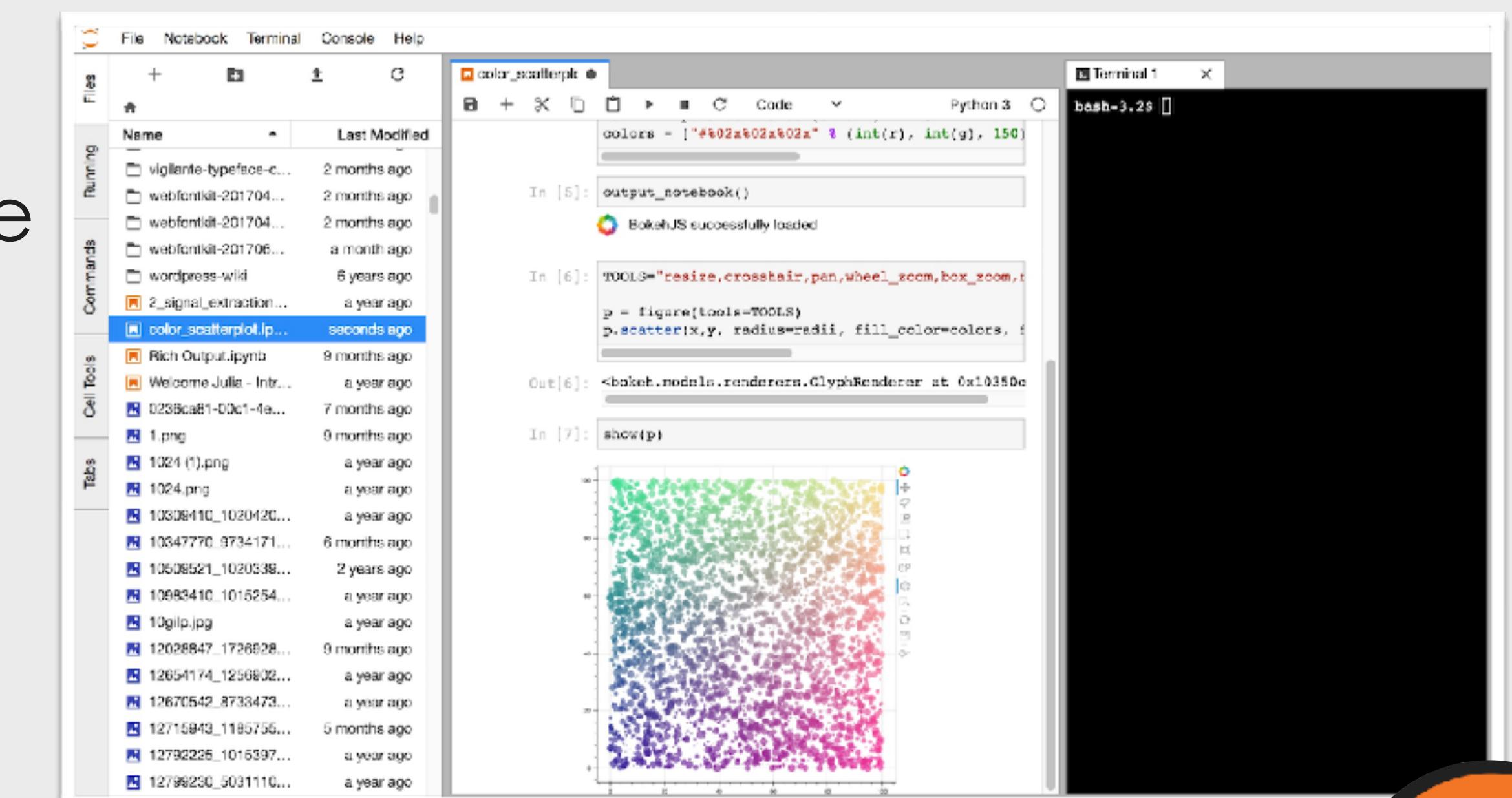
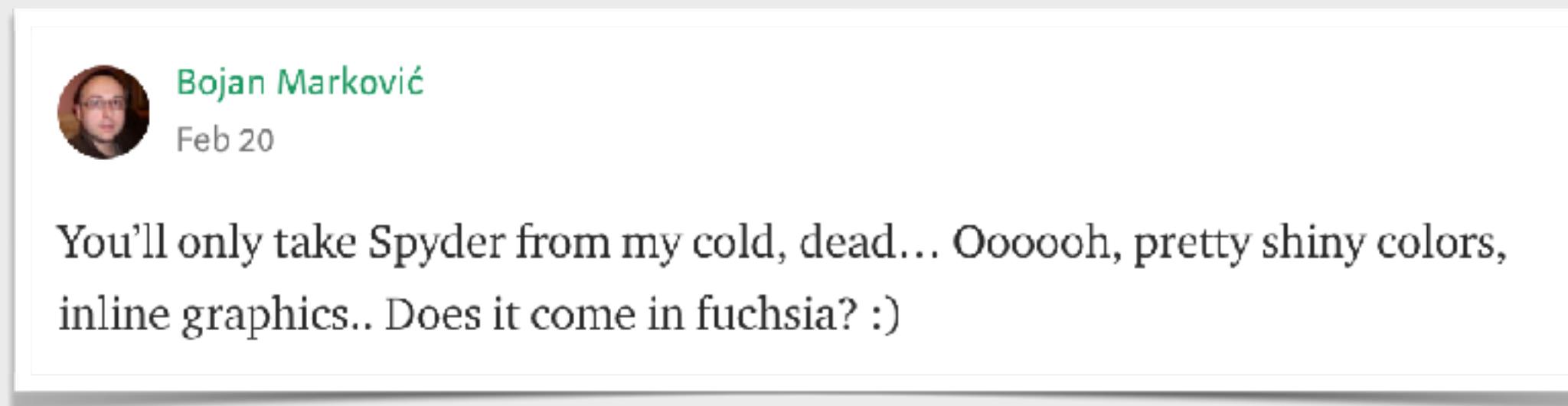


# JupyterLab

- Install Side by Side with Classic Notebook

- No Change in File Format, or protocol

- Better Architecture (all extensions are first class)

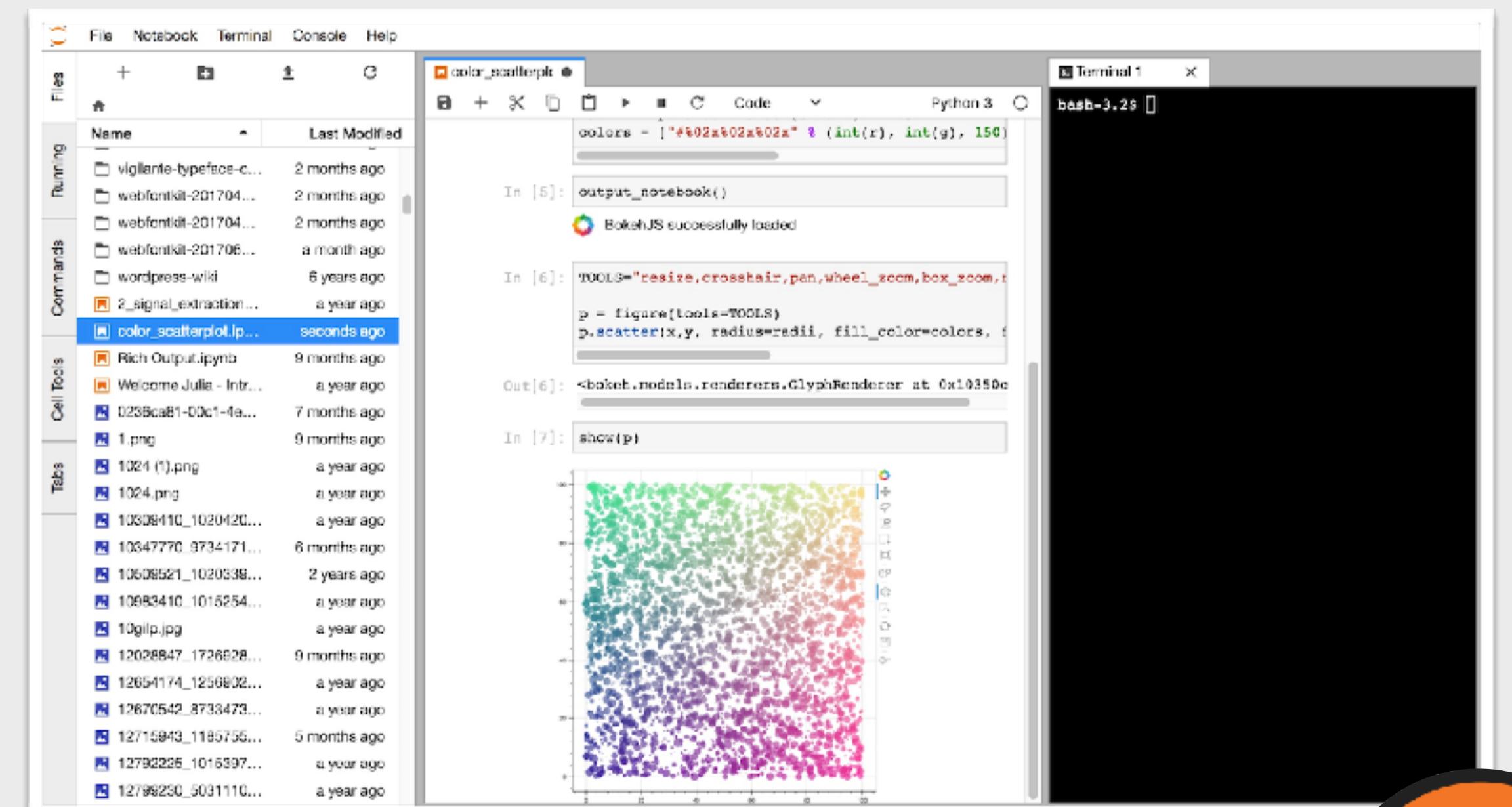


- Classic Notebook will be deprecated at some point



# JupyterLab

- Ready for users
- Ready for Classic Extensions to be ported
- Will have all the new features





# JupyterHub

- Key Infrastructure for Multi-tenant system
- Not limited to Notebook



...

- Key Piece in reproducible research



- Integration into existing environment



# Things to Come



# Real Time Collaboration



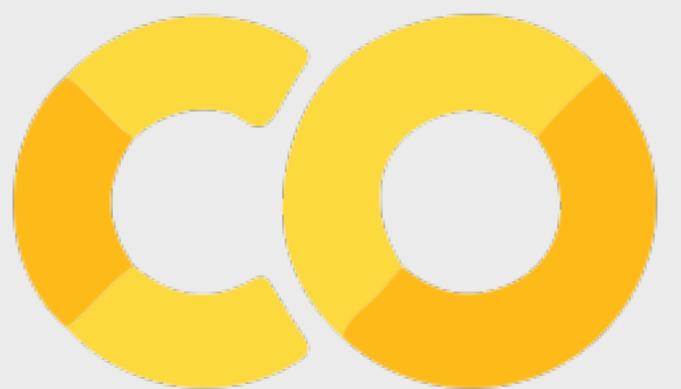
The Good:

It works\* !

The Bad

Google Drive RT API is deprecated

## Services implementing Real-Time



Google Colaboratory



# Road to 1.0



- Scaling horizontally and Vertically
  - 100k+ Users
- Sharing/Integration with RT collaboration
- Binder and Federation
- Auditability (Hippa, GDPR...)



O'REILLY®

# jupytercon

Brought to you by NumFOCUS Foundation and O'Reilly Media Inc.

August 21-24, 2018

New York, NY

[jupytercon.com](http://jupytercon.com)



You



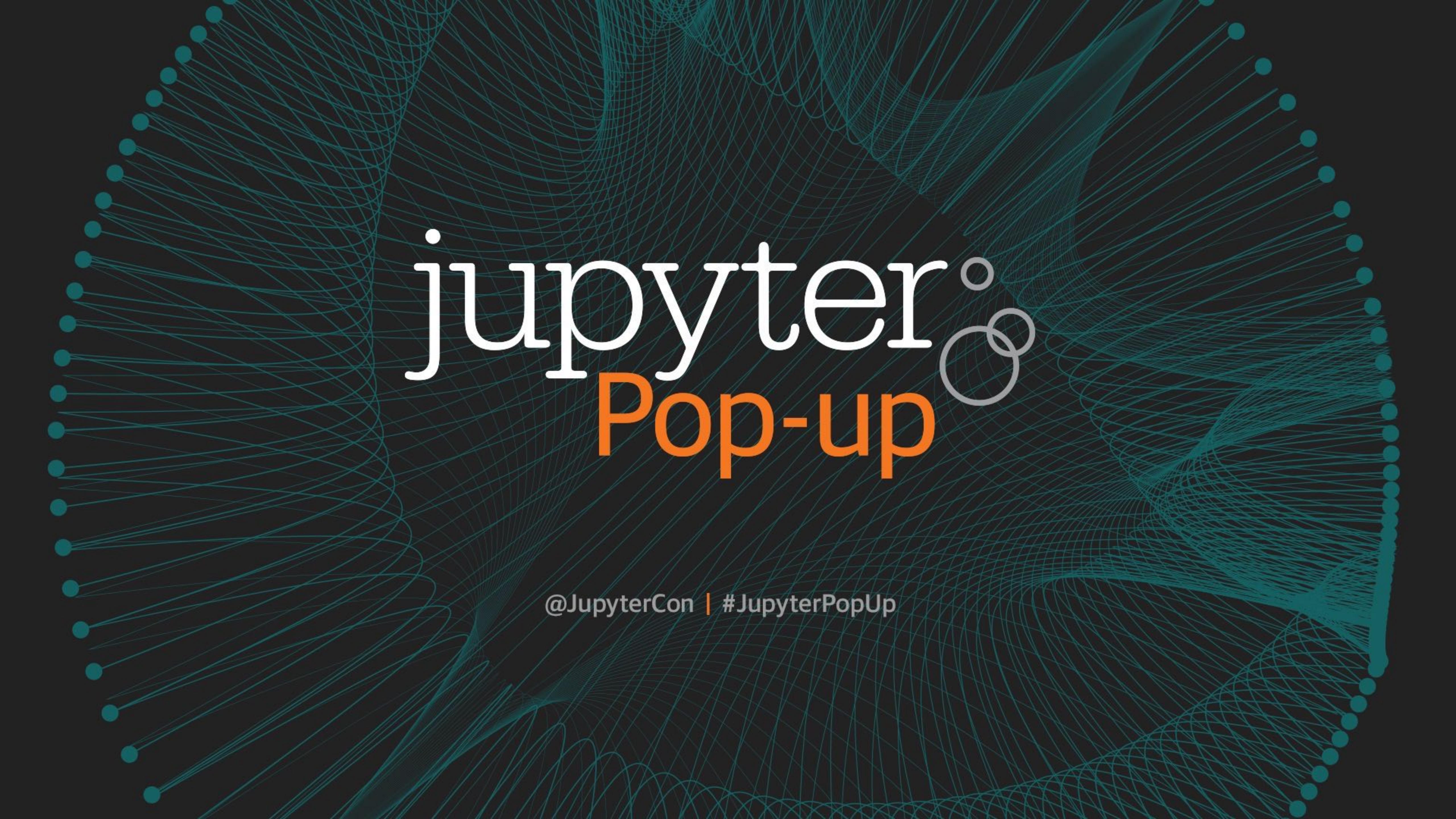
**Give Feedback**

**Participate**

**Showcase**

Thanks





# jupyter<sup>°</sup> Pop-up

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