

Data Visualization With Python Using Jupyter Notebooks

Jeff Sale

SDSC Learning Design Technologist
XSEDE ECSS Visualization Consultant
XSEDE Workforce Development

<https://tinyurl.com/201912-dvp>

Code of Conduct

XSEDE has an external code of conduct for XSEDE sponsored events which represents XSEDE's commitment to providing an inclusive and harassment-free environment in all interactions regardless of gender, sexual orientation, disability, physical appearance, race, or religion. The code of conduct extends to all XSEDE-sponsored events, services, and interactions.

Code of Conduct: <https://www.xsede.org/codeofconduct>

Contact:

- Event organizer: Jeff Sale, Presenter, (esale@ucsd.edu)
- XSEDE ombudspersons:
 - Linda Akli, Southeastern Universities Research Association (akli@sura.org)
 - Lizanne Destefano, Georgia Tech (lizanne.destefano@ceismc.gatech.edu)
 - Ken Hackworth, Pittsburgh Supercomputing Center (hackworth@psc.edu)
 - Bryan Snead, Texas Advanced Computing Center (jbsnead@tacc.utexas.edu)

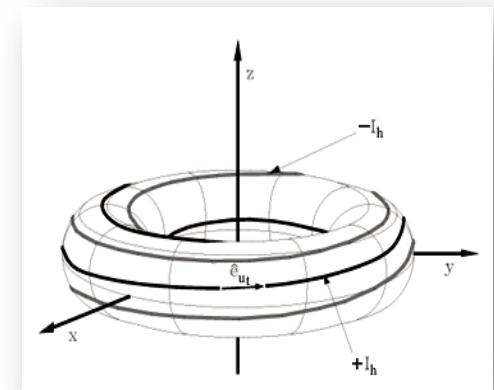
Please Mark Your Attendance on the XUP

- I normally do this manually during a webinar but can't do it this time because I'm presenting.

THANKS!!

About Me

- Born in Canada (Naturalized last year.
Woohoo I can vote!!)
- B.S., Applied Physics
 - Emphasis: Condensed Matter (“Solid State Physics”)
 - San Diego State University
 - Mesa Community College
- M.A. Degree
 - Learning Design and Technology
 - MOOCs
- SDSC Learning Design Technologist
- XSEDE ECSS and Workforce Development



Motivation...



The John Muir Trail





Acknowledgements

- Chris Myers*, Senior Research Associate, [Center for Advanced Computing](#), Adjunct Professor, Dept. of Physics, Cornell University
- Susan Mehringer*, Associate Director, Consulting, Cornell University Center for Advanced Computing, & XSEDE L3 for Training, WBS 2.1.2
- Kate Starbird, Associate Professor, Human Centered Design & Eng., U. of Washington
- Jen Zeimke, Associate Professor, Political Science, John Carroll Univ.
- Mary Thomas and Bob Sinkovits, SDSC User Training



***Data Science With Python Tutorial**
Cornell Virtual Workshop, <https://cvw.cac.cornell.edu/>

The Jupyter Project

“Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.”

<https://jupyter.org/>



The Jupyter Menagerie



Notebook Widgets

iPython



IRuby



IJulia



An IJulia Preview

This notebook is a preview demo of Julia: a [Julia-language](#) backend combined with the [IPython](#) interactive environment. This combination allows you to interact with the Julia language using IPython's powerful graphical [notebook](#), which combines code, formatted text, math, and multimedia in a single document.



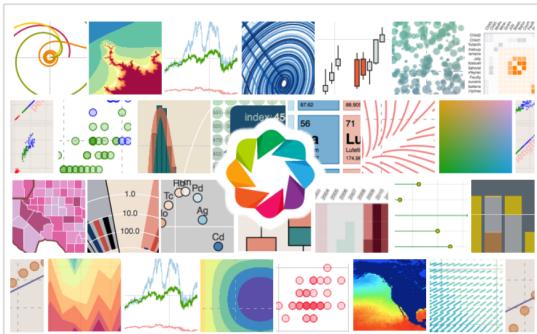
• Note: this is a preview, because it relies on pre-release bleeding-edge versions of Julia, IPython, and several Julia packages, as explained on the [Julia github page](#), and functionality is evolving rapidly. We hope to have a more polished release soon.

Basic Julia interaction

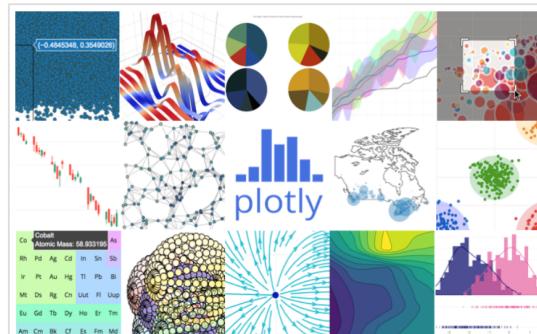
Data Visualization with Lightning



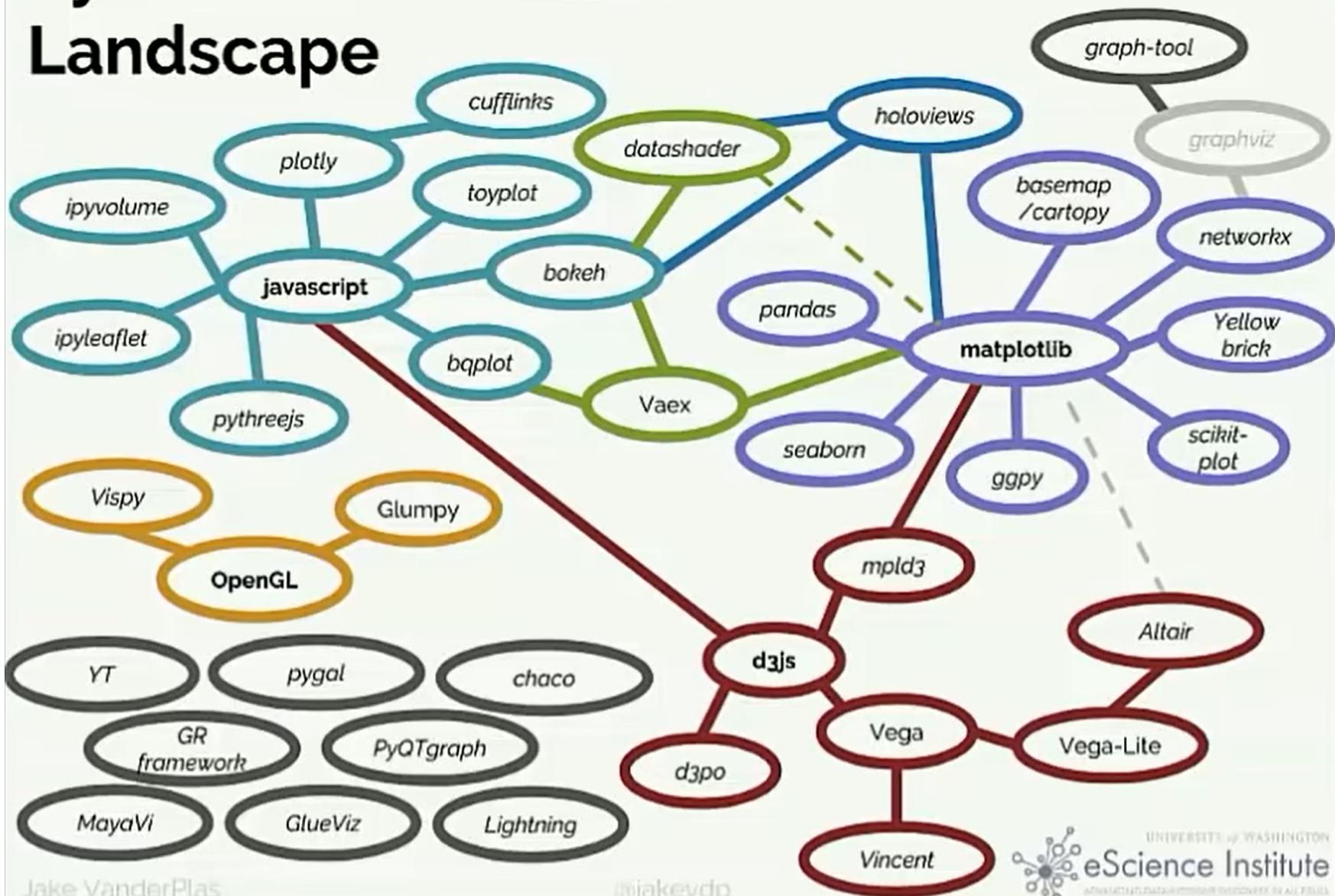
Interactive data visualization with Bokeh



Interactive plots with Plotly



Python's Visualization Landscape



Courtesy: Jake VanderPlas The Python Visualization Landscape PyCon 2017, https://www.youtube.com/watch?time_continue=134&v=eVET9IYgbao&feature=emb_logo

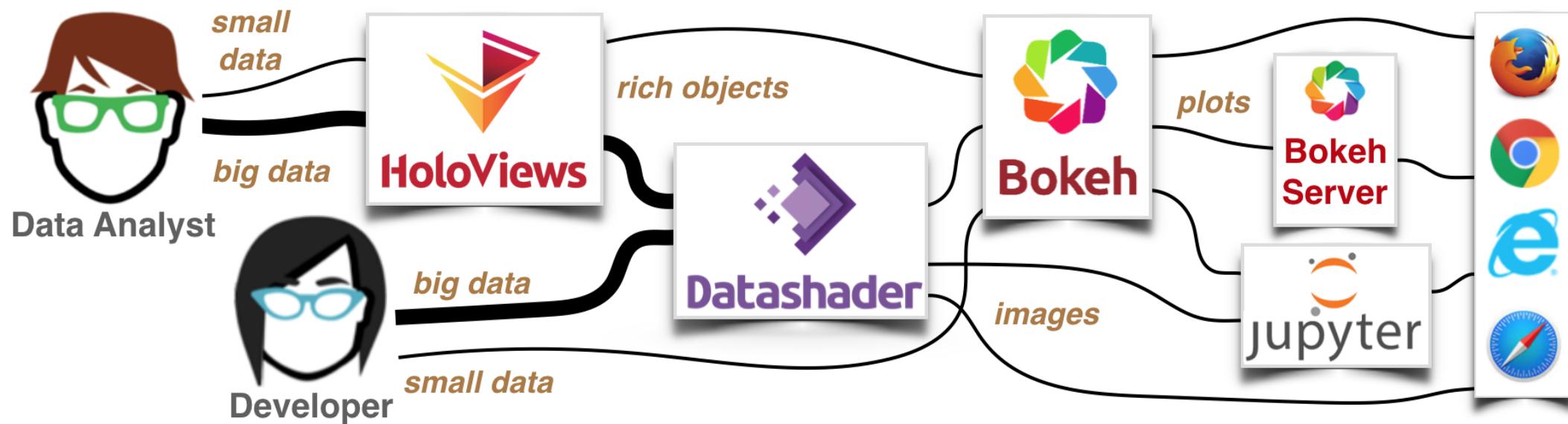
Bokeh

“Bokeh is an interactive visualization library for modern web browsers. It serves as a web-based front end to matplotlib using JavaScript behind the scenes to run in a browser”.

<https://docs.bokeh.org/en/latest/index.html>



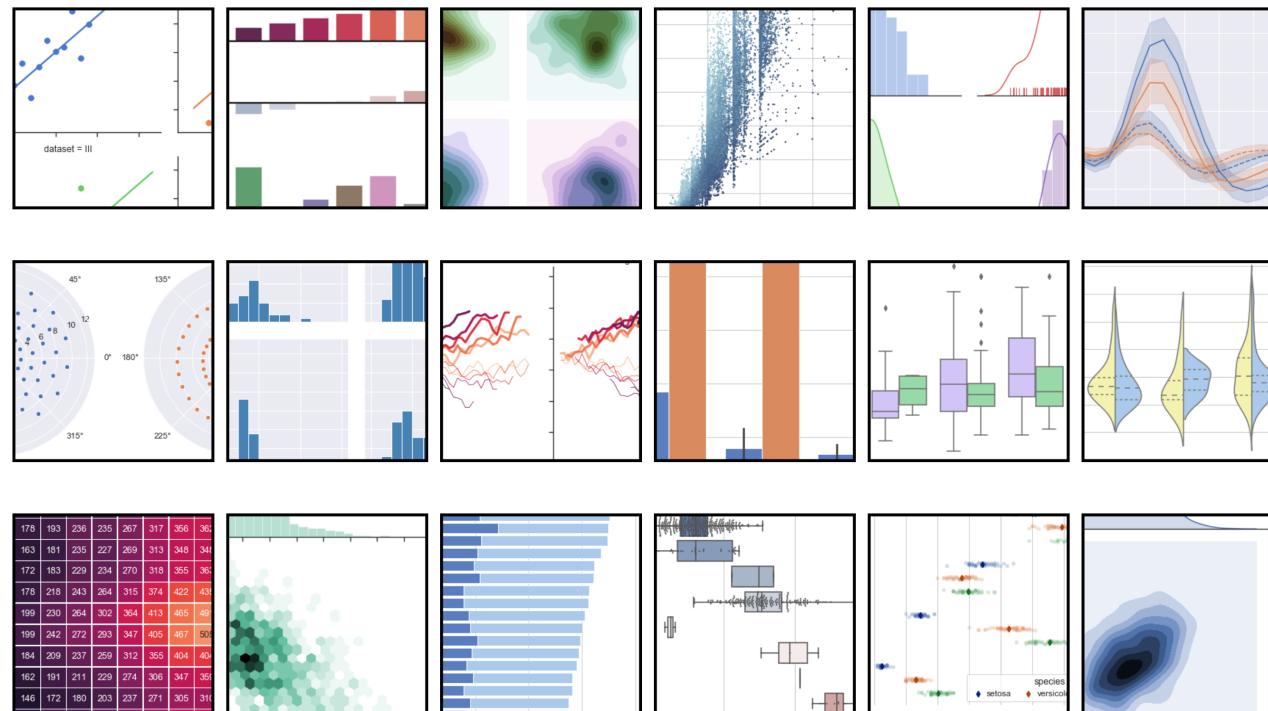
HoloViz



Seaborn

Seaborn is a Python data visualization library based on [matplotlib](#). It provides a high-level interface for drawing attractive and informative statistical graphics.

<https://seaborn.pydata.org/>



Ways to Access Jupyter on XSEDE Systems

- TACC Visualization Portal
 - <https://vis.tacc.utexas.edu/>
- SDSC Comet
 - https://education.sdsc.edu/training/interactive/dpc_python_2019/
- PSC Bridges
 - <https://www.psc.edu/user-resources/software/jupyter>

A Brief Head's Up

- Possibly simpler material than you expected
- Not really a Jupyter Notebook tutorial
- I'm a “Stack Overflow” Programmer
- *“See One, Do One, Teach One”*
 - (Teaching Hospital Surgery Mantra)
- PEARC 2018 Hyperglyph Tutorial
- XSEDE Viz Workshop – Murphy Meets the TACC Viz Portal
- Skip visualization lessons

*Let's just
jump into
it!*