



# fastplotlib

*Augmenting our scientific imagination*

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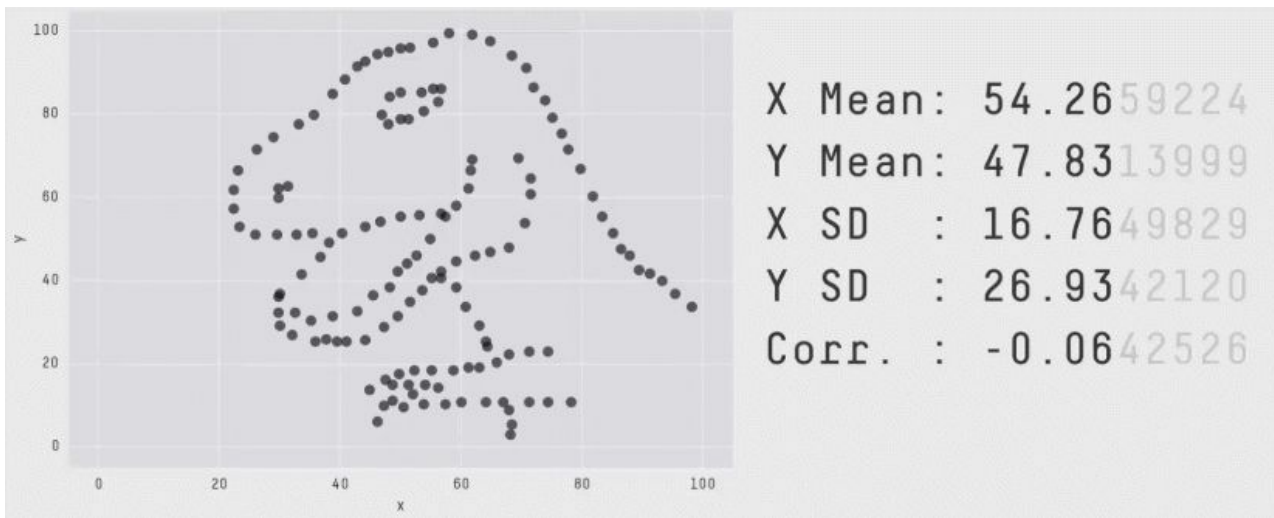


kushalkolar



# It is important to look at your data!

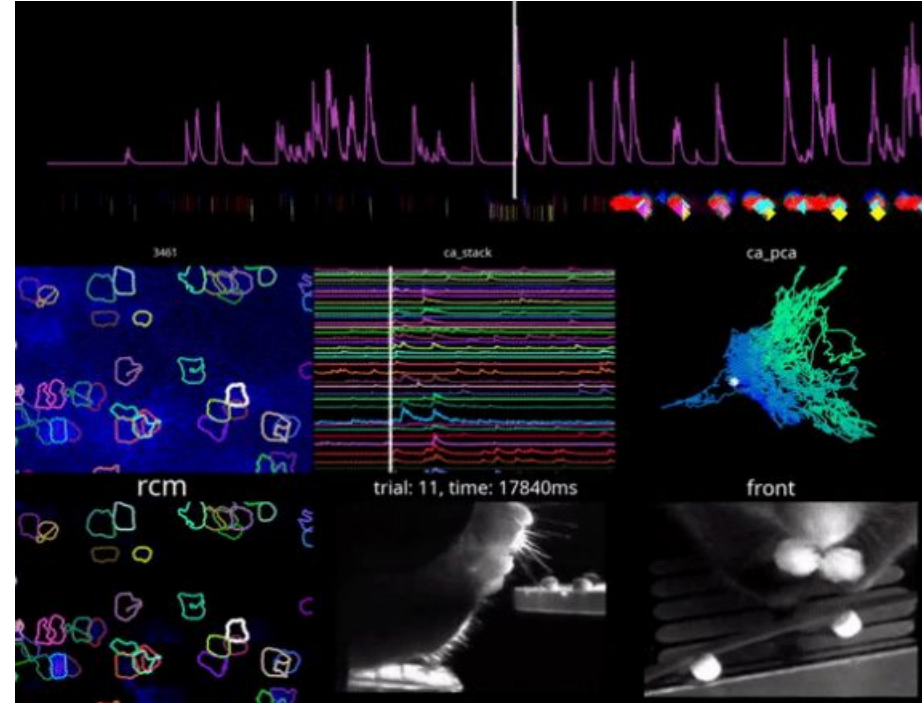
- Statistics are not sufficient
- “All models are wrong, some are useful”
- All algorithms are approximations

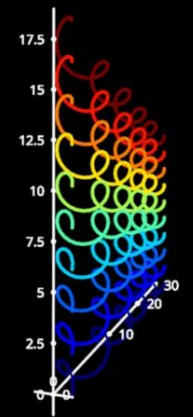
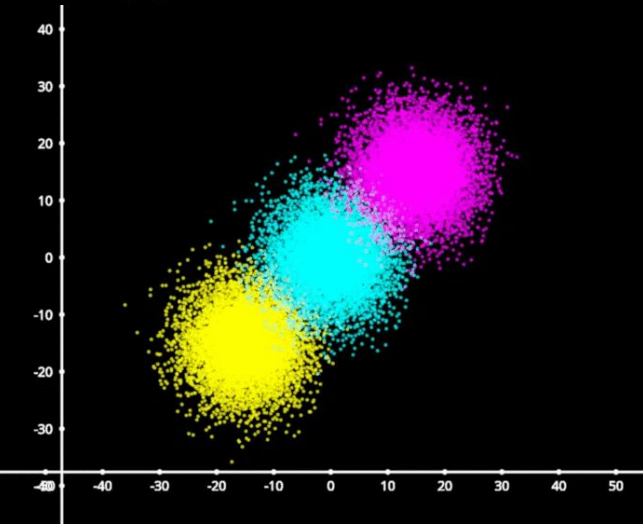
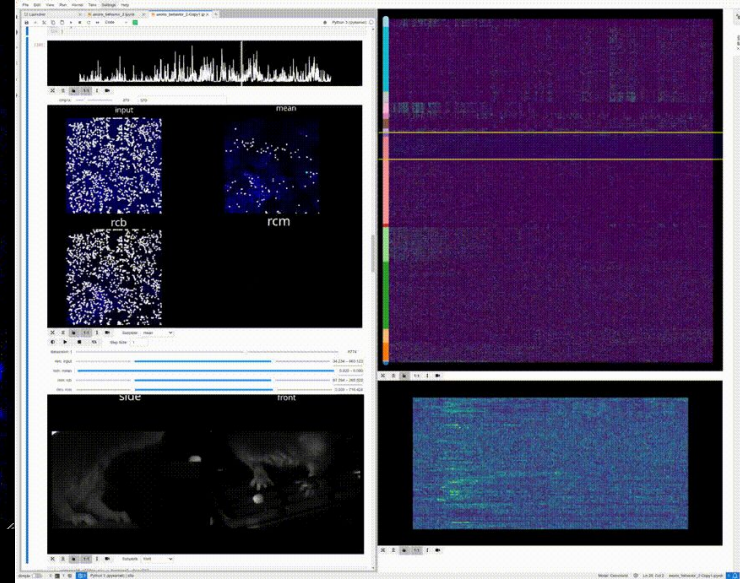
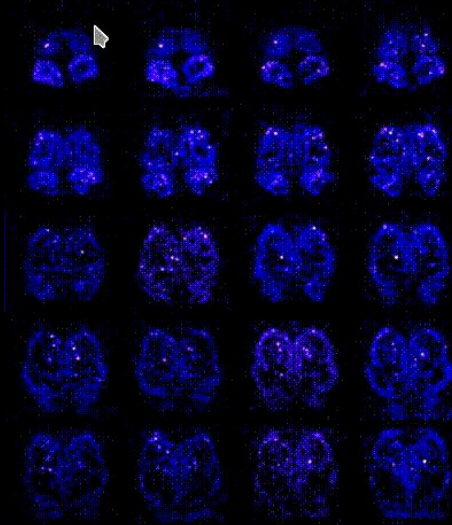
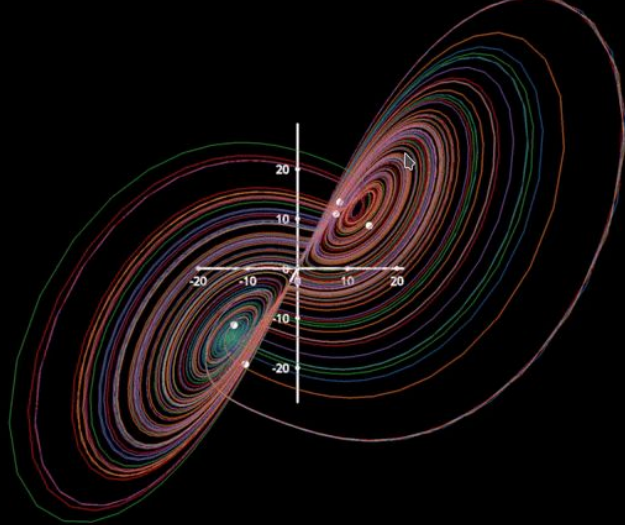


Matejka, Justin, and George Fitzmaurice. *"Same stats, different graphs: generating datasets with varied appearance and identical statistics through simulated annealing."* Proceedings of the 2017 CHI conference on human factors in computing systems. 2017.

# Data visualization can be hard

- Rendering needs to be **fast**
- Non-trivial to represent and visualize high dimensional data
  - Visualization of data from multiple instruments
    - Data from cameras, PMTs, etc. simultaneously: behavior + physiology
- Interactivity
  - APIs in many libraries may be limited or complicated





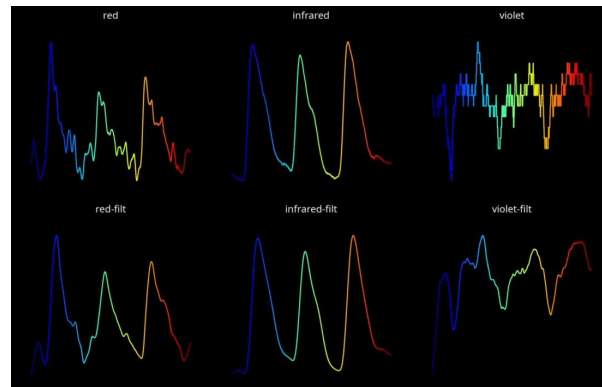


# fastplotlib

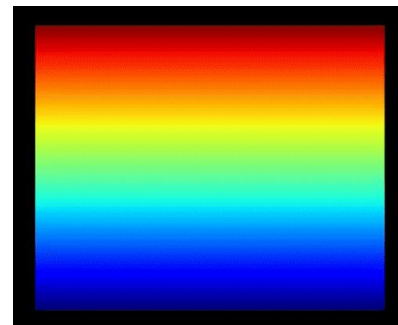
- High-level API for scientific plotting - inspiration from *pyqtgraph* and other libs
  - ❤️ *pyqtgraph*
- Uses the *pygfx* rendering engine
- Very new ~2 years old
- Goals: fast visualization, fast user implementation
  - **Think like numpy arrays!**
  - Minimize cognitive overhead
  - “expressive & elegant API”
- Core developers & leadership:
  - **Kushal Kolar - Flatiron Institute/NYU**
  - **Caitlin Lewis - Duke University**
- Major developers:
  - **Almar Klein - Independent/funded by Flatiron Institute**
  - **Amol Pasarkar -Columbia University**

# What can I do with fastplotlib?

- GPU accelerated visualization
  - Modern integrated graphics is sufficient for many use-cases!
- Rapid prototyping and algorithm design
  - Examples: matrix decompositions, time series exploration
  - Design, develop, evaluate and ship machine learning models
- Exploration and fast rendering of large-scale data
- Create real-time acquisition systems for instruments

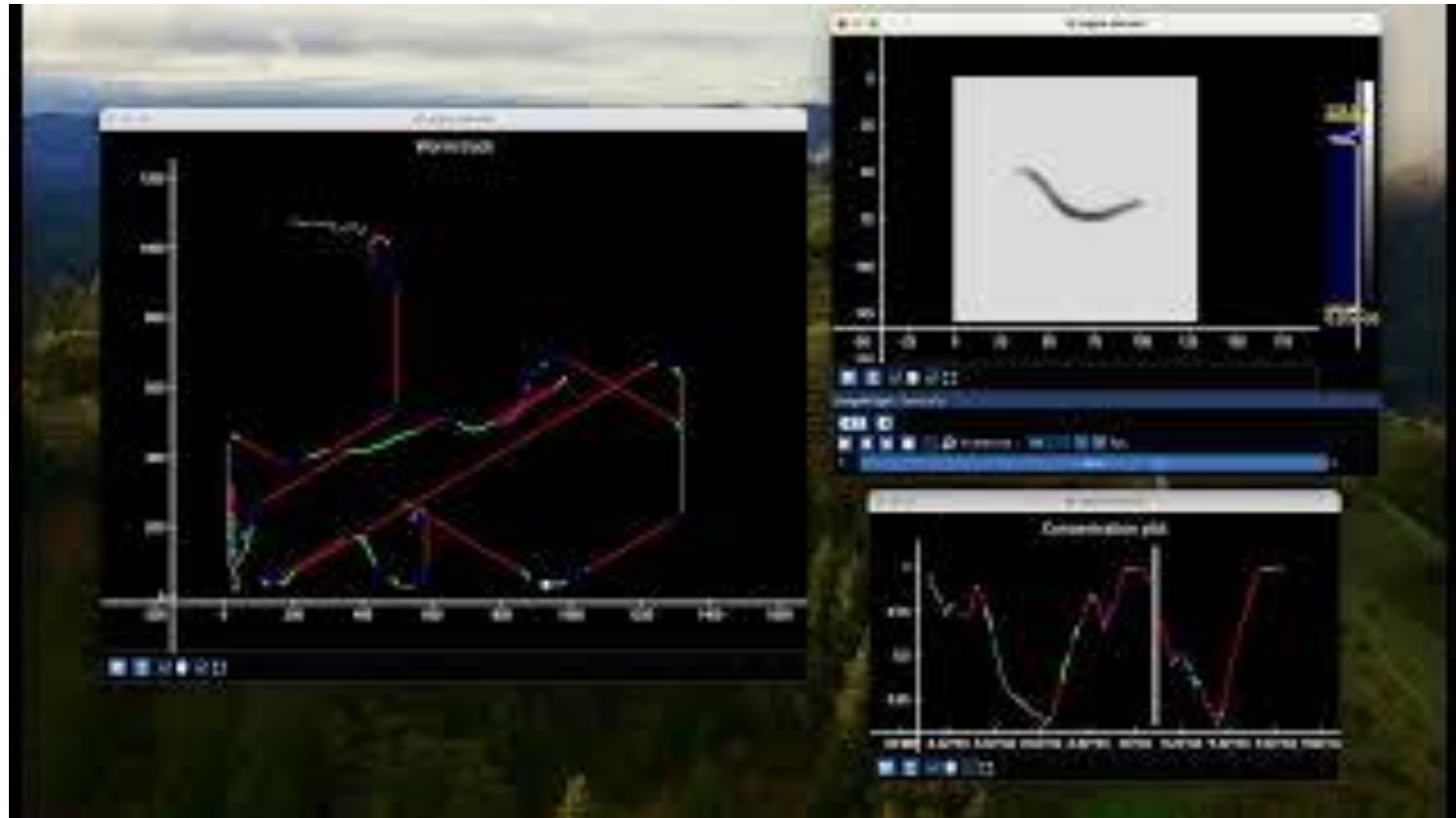


3 million points - fastplotlib  
midrange 2017 GPU

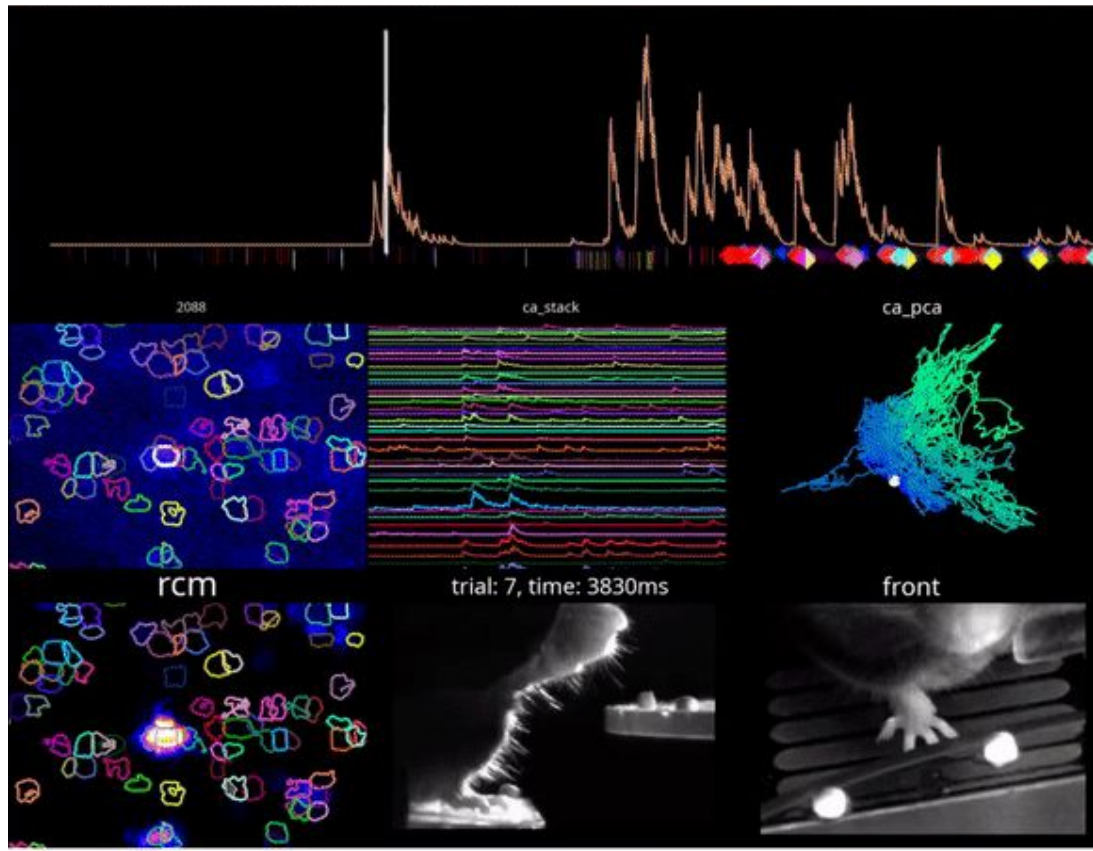




# Curating experimental data - Phil Kidd



# Exploration of large multi-modal experimental datasets





# Documentation & Examples

<https://www.fastplotlib.org/ver/dev/>

Includes a user guide and how-to on getting started using fastplotlib!

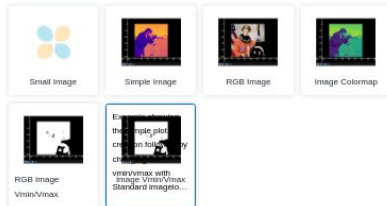
Extensive examples gallery that we are always expanding :D

- 50+ examples so far
- We would love to add more examples for your use-case!

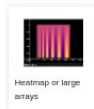
We are also always happy to help you with visualizing your data!!

- Feel free to reach out on our GitHub via an issue or discussion post!
- You can also find Flynn O'Connell, your local fastplotlib expert!
- Please don't ask chatgpt.

## Image Examples



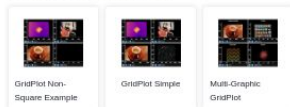
## Heatmap Examples



## ImageWidget Examples



## GridPlot Examples



## Line Examples

