Advanced Analysis in TEM

05/01/2020

Week 2

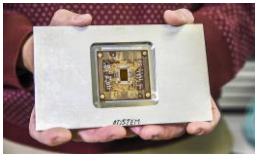
Analysis of High-Resolution STEM images

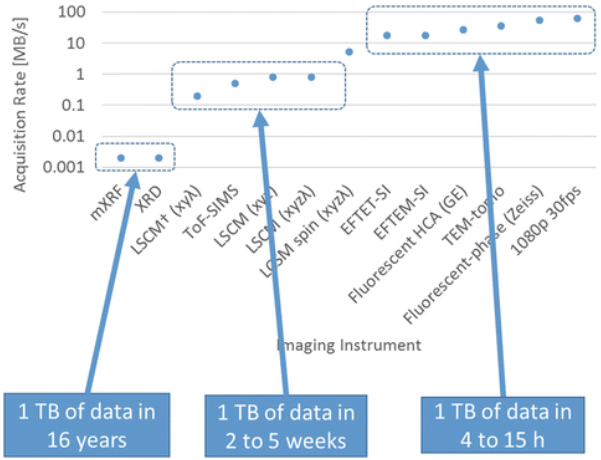
- **Extracting Quantitative information**

  - Understand read/write in hdf type
  - Improve plotting skills
  - How to write a report from Python Notebooks

Read/write in hd5 files

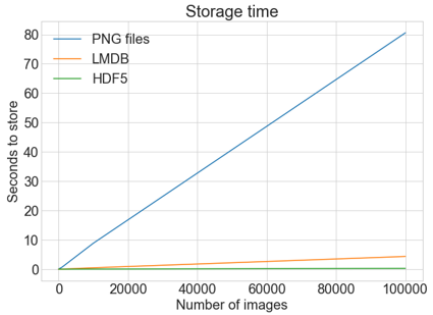
Motivation





~4 Tb/min

~4 Tb/h



Organization, flexibility, interoperability

Python libraries for Data Visualization

Matplotlib

Interactive environment across platforms

Seaborn

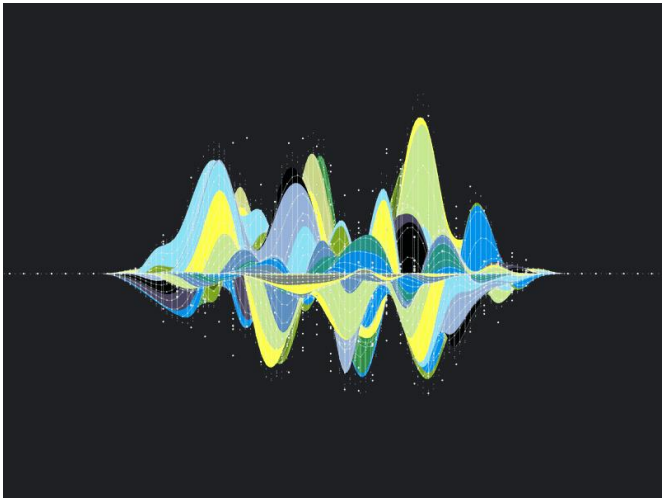
Built on matplotlib,

Plotly (https://plotly.com/python/)

- Provides options for full interactivity

Other libraries:

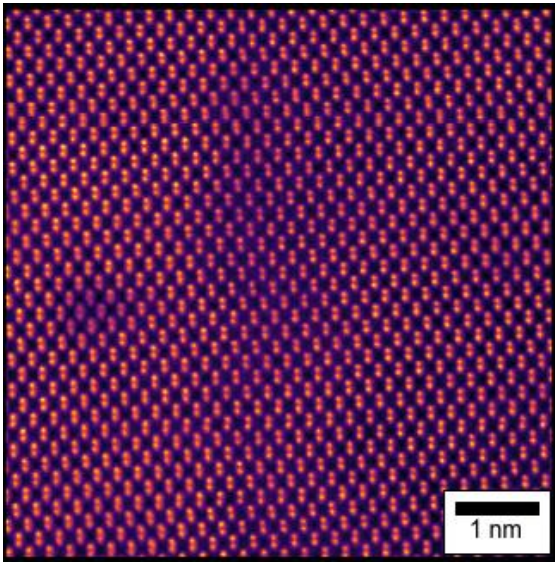
ggplot (http://ggplot.yhathq.com/)
Altair (https://altair-viz.github.io/)

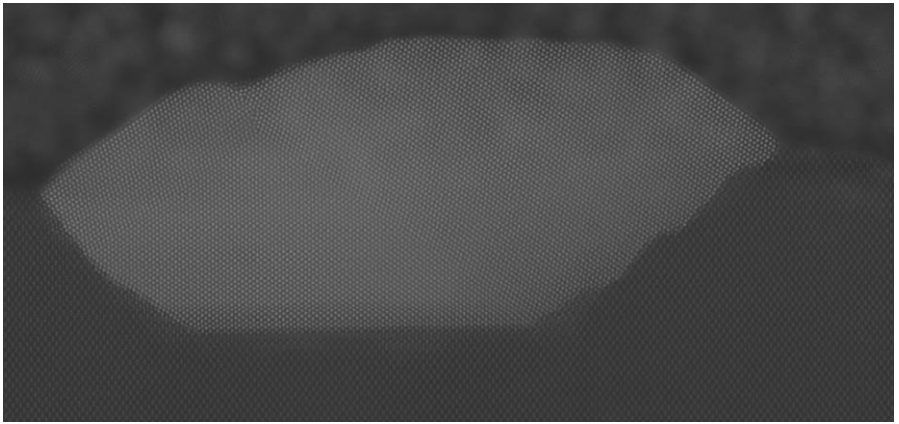


Created with plotly

The beauty of data visualization:
https://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

Quantification of High-Resolution STEM images





Nice images…but what do they mean??

R. dos Reis et al Appl. Phys. Lett. 102, 081905 (2013); https://doi.org/10.1063/1.4793651
B. Jany et al Micron 130, 102800 (2020); https://doi.org/10.1016/j.micron.2019.102800

Time to code!