ITKWidgets

Interactive widgets to visualize images, point sets, and 3D geometry on the web.

Matt McCormick @ Kitware

March 2nd, 2023

Software Development Panel: Web Visualization Frameworks

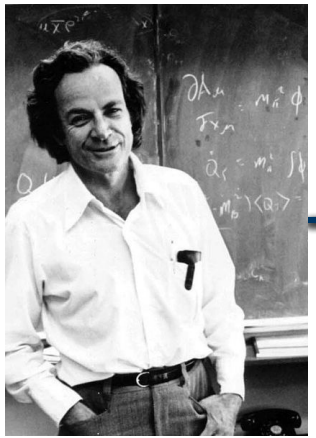
Scientific Computing and Imaging Institute, University of Utah

Thank You

- Scientific Computing and Imaging Institute
  University of Utah

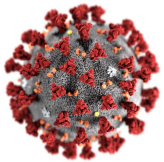
- National Institute of General Medical Sciences of the National Institutes of Health: R24 GM136986

Where are our research components located?



1

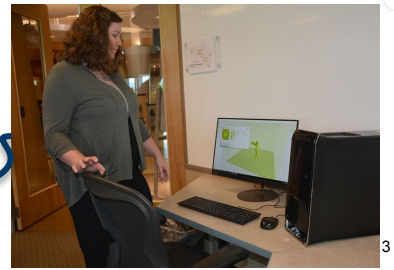
Researcher



2

Image Acquisition System

6



3

Laboratory Workstation

5

Cloud Computing Cluster

4

High Performance Computing Cluster

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1 Source: [illegible] richard-feynman.jpg

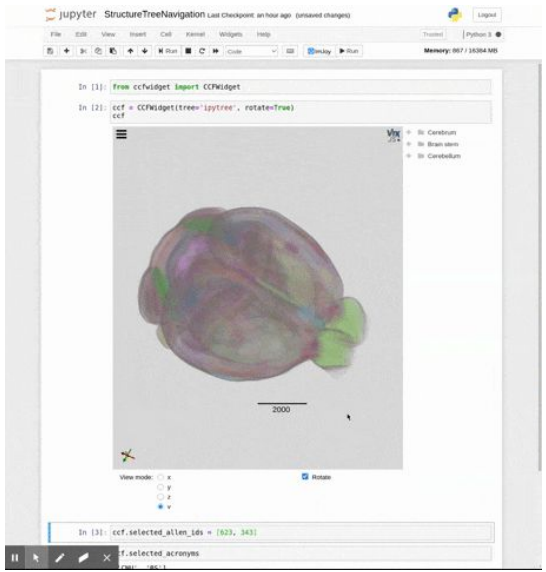
2 Source: https://commons.wikimedia.org/wiki/File:CT_Scanner_Malizia.jpg

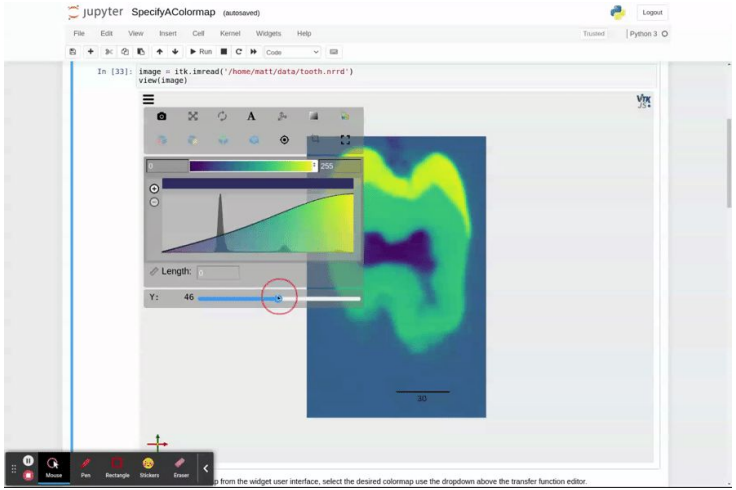
3 Source: http://www.wpafb.af.mil/News/Article-Display/Article/930177/maker-hub-turns-researchers-into-builders/

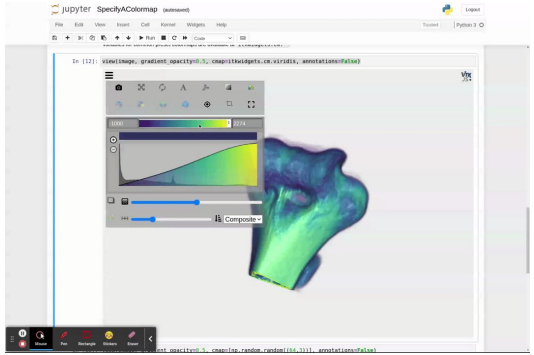
https://commons.wikimedia.org/wiki/File:U.S._Department_of_Energy_-_Science_-_119_008_006_(29842821730).jpg

What is itkwidgets? (https://itkwidgets.readthedocs.io/)

Interactive widgets to visualize images, point sets, and 3D geometry on the web.







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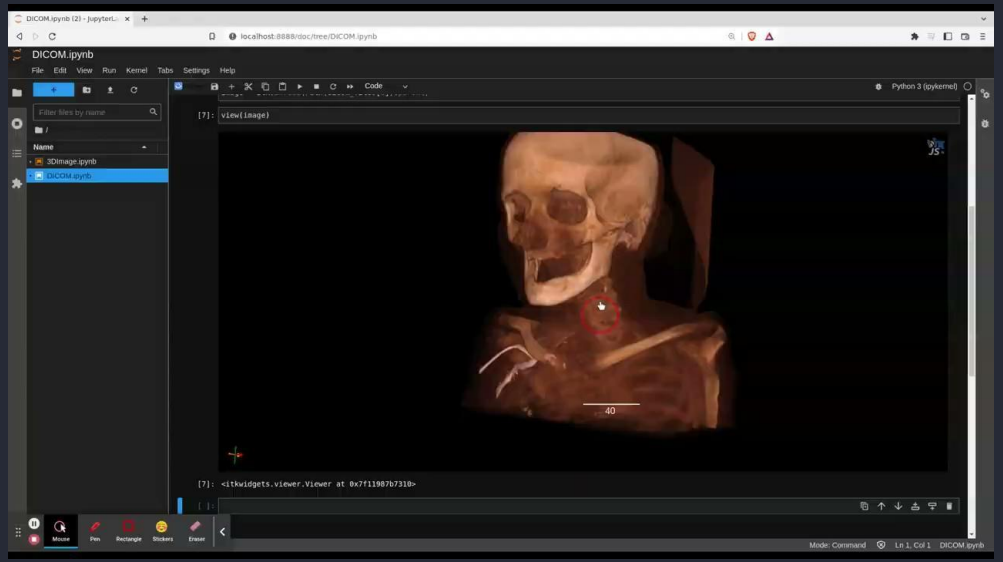
Cinematic Volume Rendering Integrated with your AI Research and Applications



- Runs in Jupyter, JupyterLab, JupyterLite, Google CoLab, AWS Sagemaker, and Python standalone (WIP)
- Works with MONAI, PyTorch, TensorFlow, etc.
- Advanced cinematic volume rendering of medical data
- Integrated overlay of AI results
- Open and reproducible

For more information:
https://itkwidgets.readthdocs.io

Open in Colab

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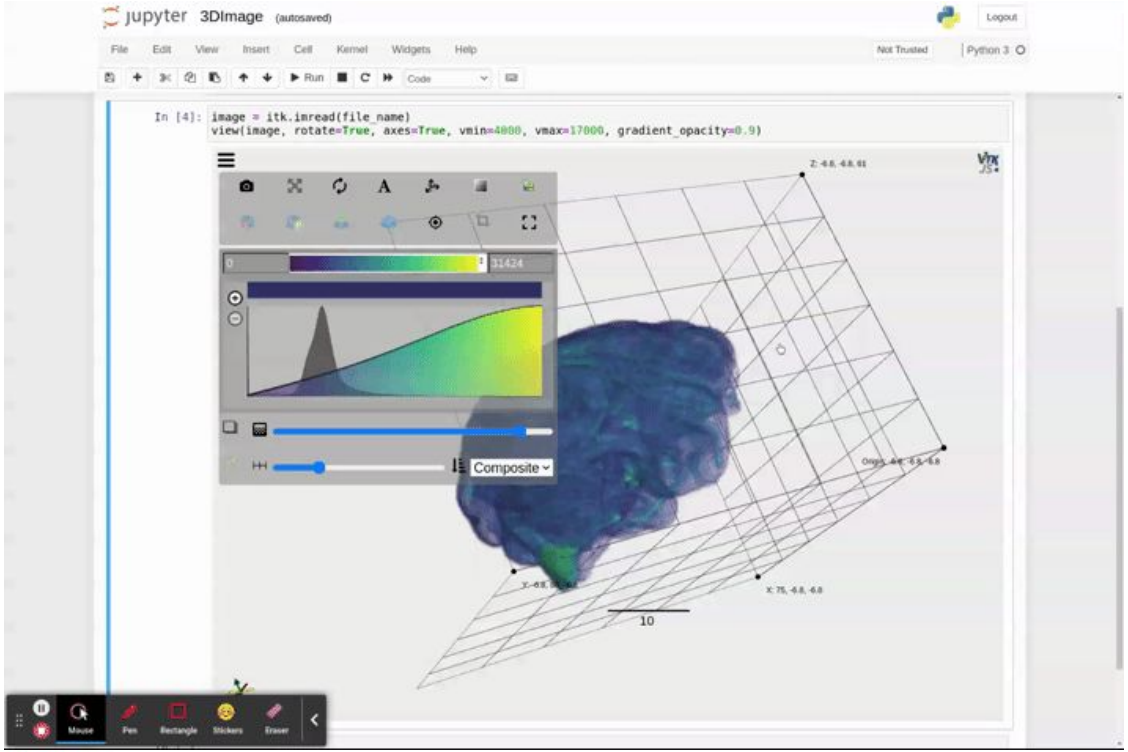
2D and 3D images



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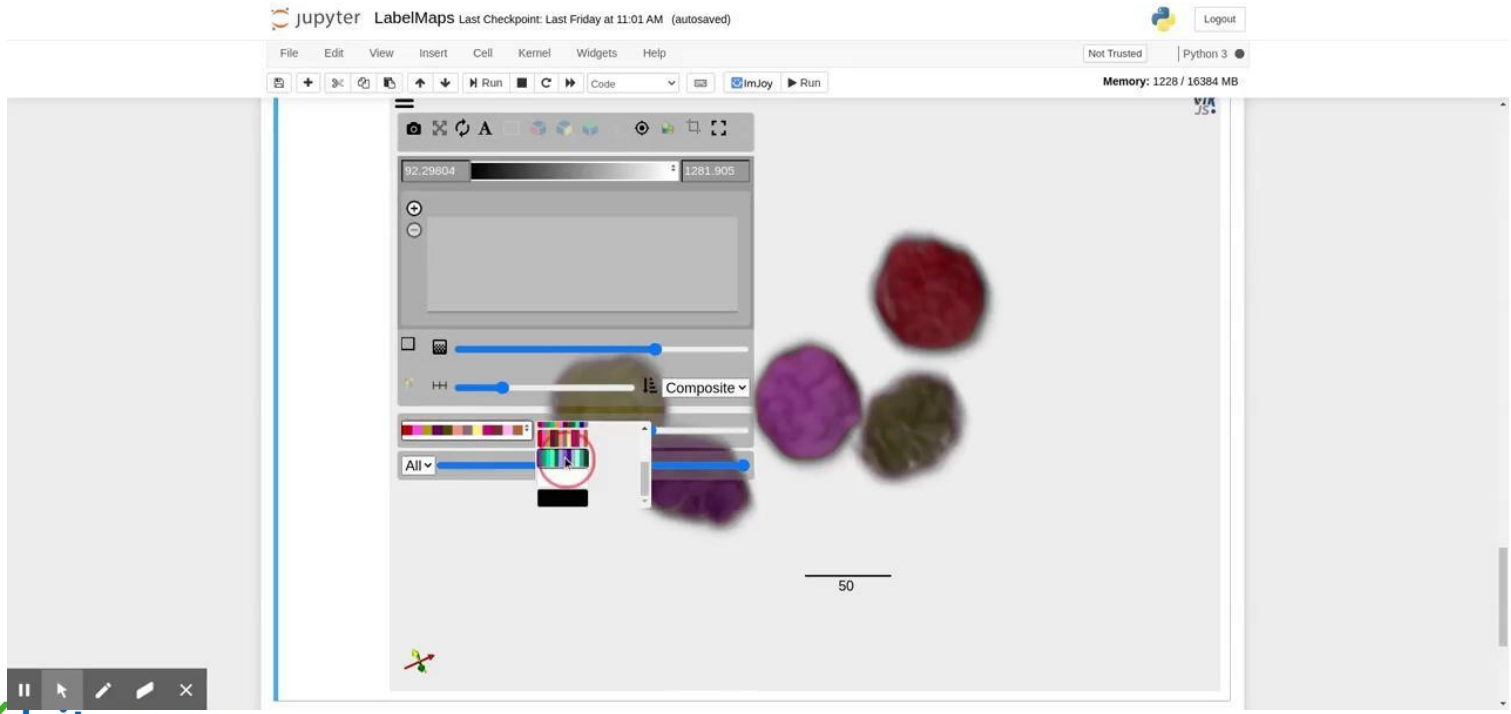
Label images



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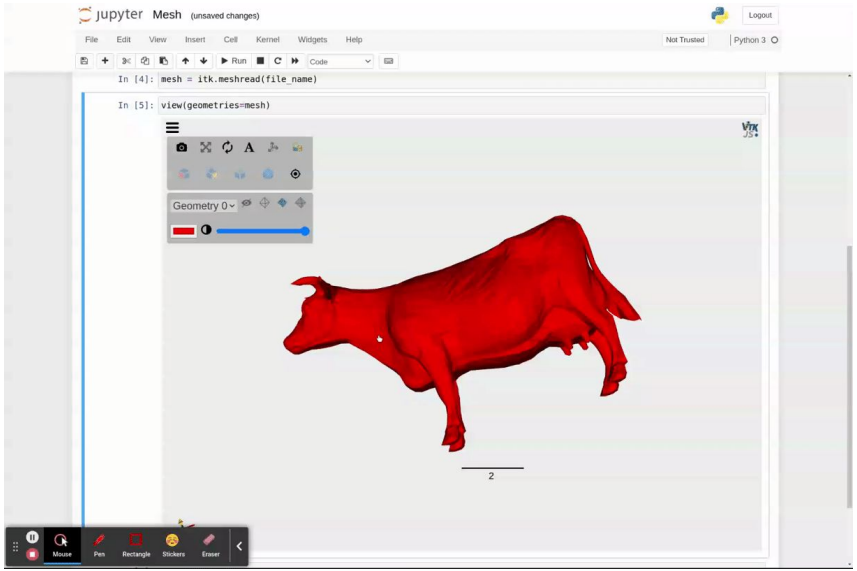
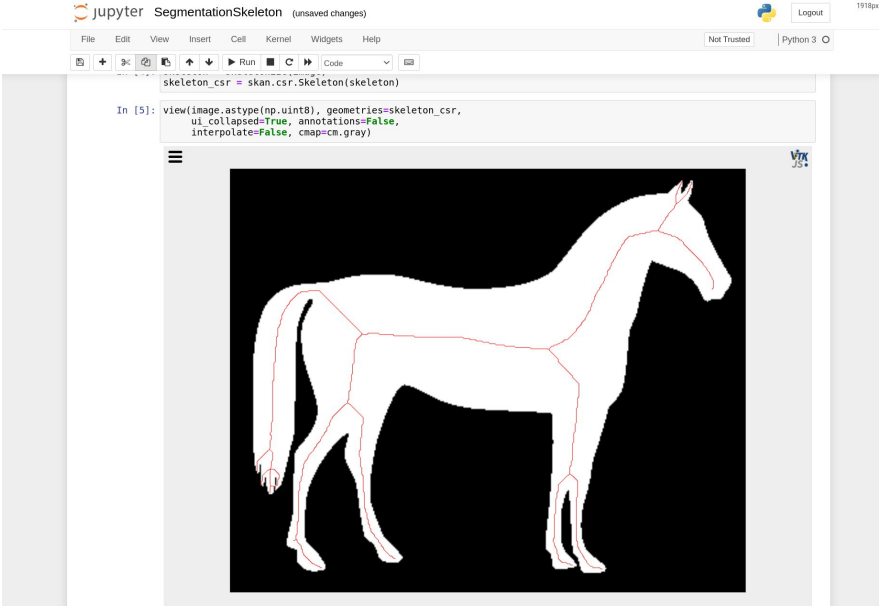
Meshes, geometry





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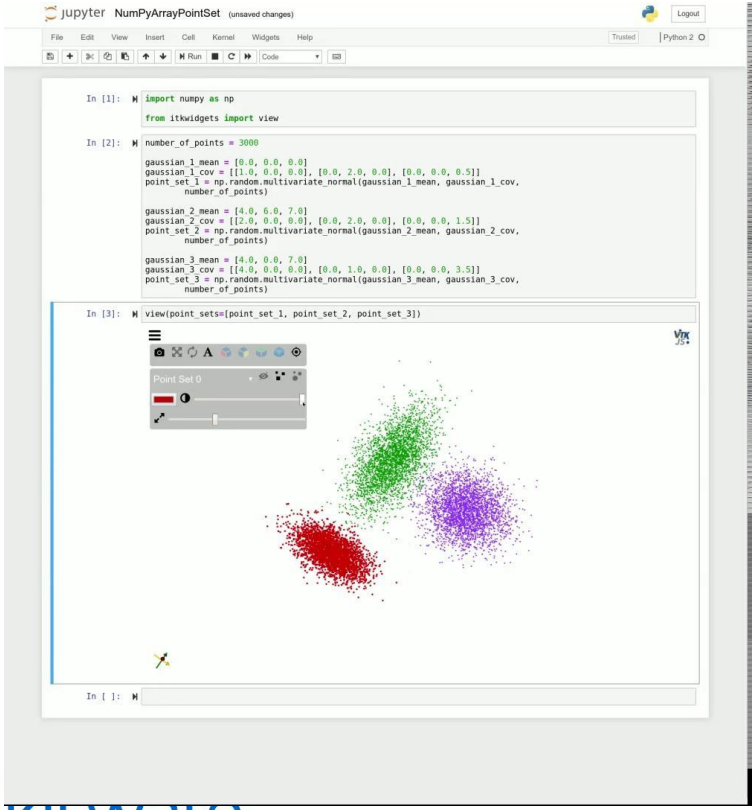
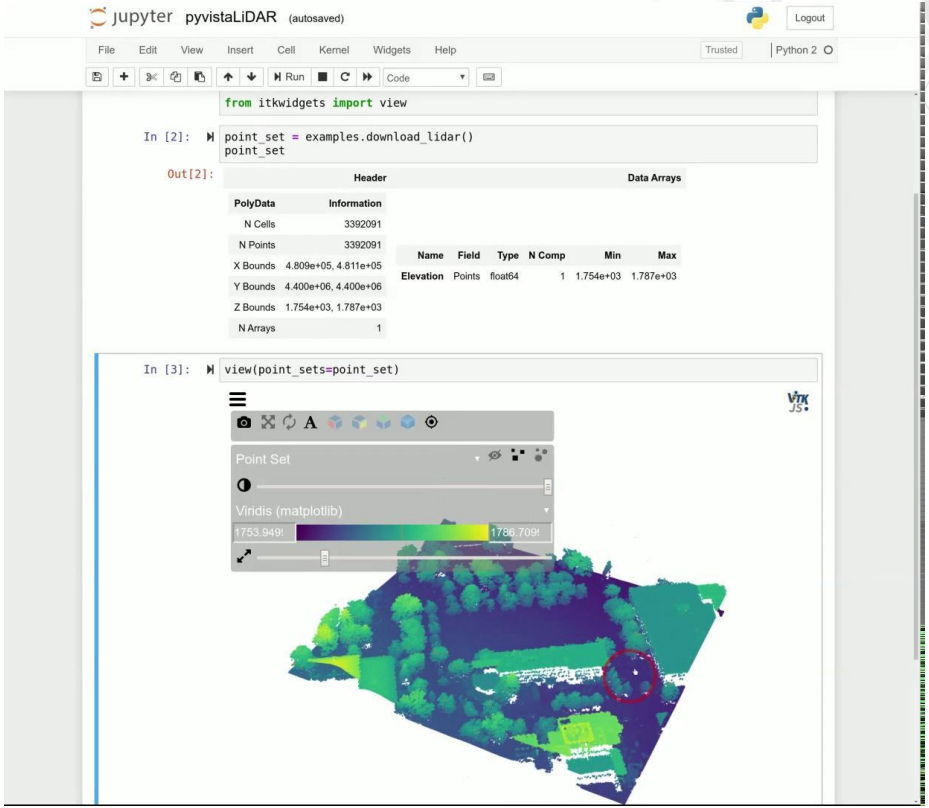
Point sets





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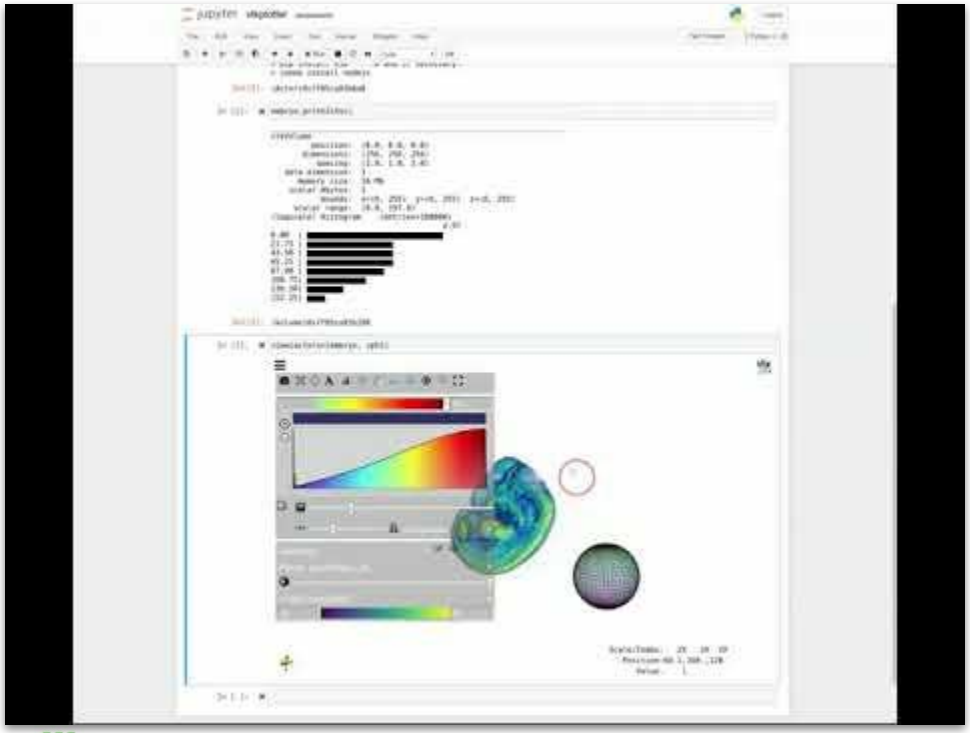
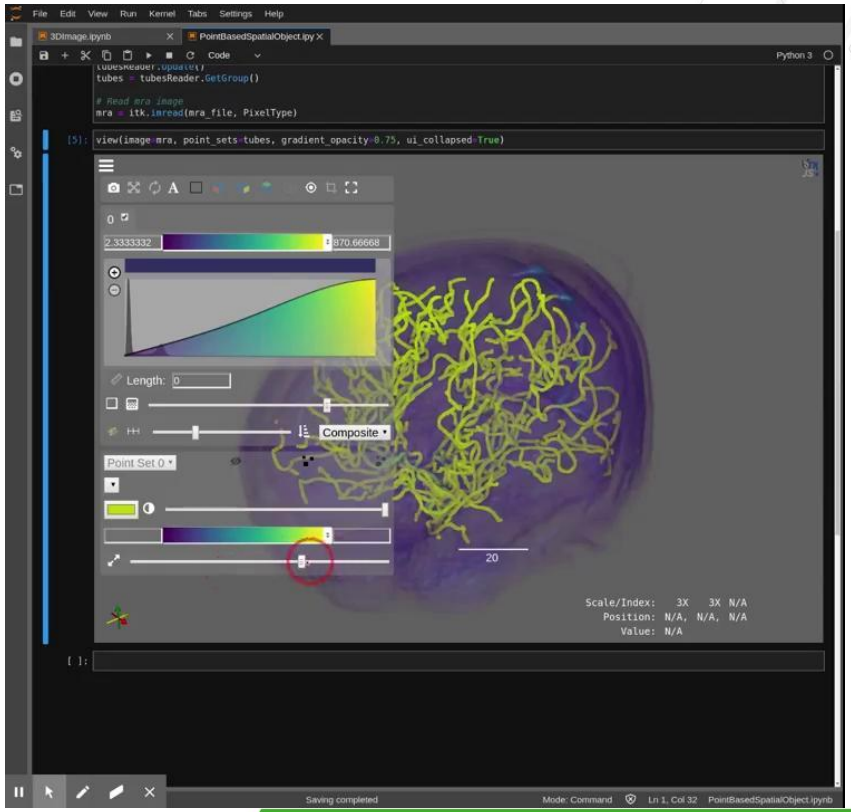
Combine data





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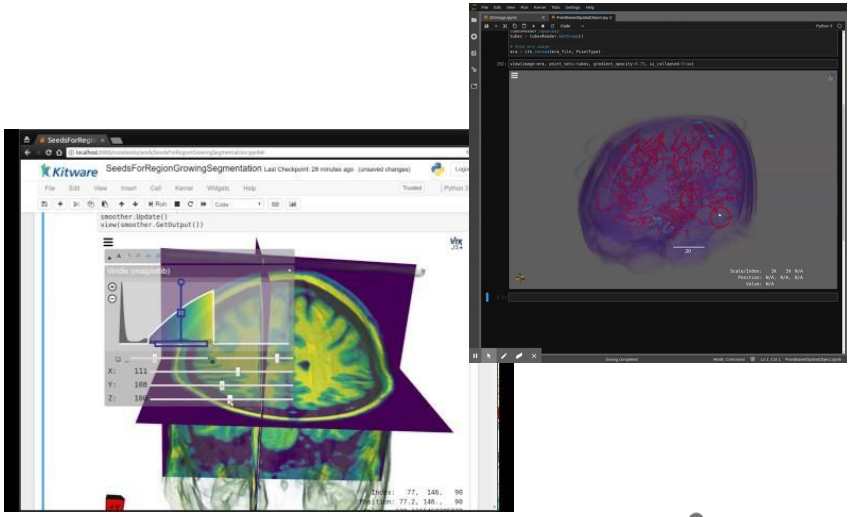
How does it work?

Built on:



Supports:

DASK

TensorFlow

PYTORCH

NumPy

OpenCV

VTK

ITK

ITK wasm

VTK .JS

ImJoy

Zarr

kitware

jupyter

jupyterlite

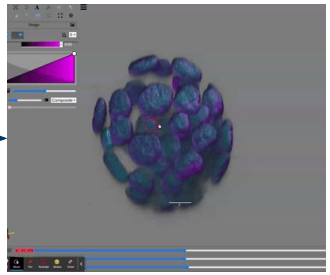
voilà

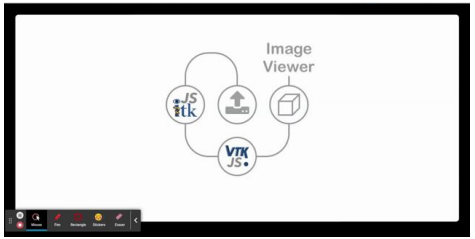
colab

Amazon SageMaker

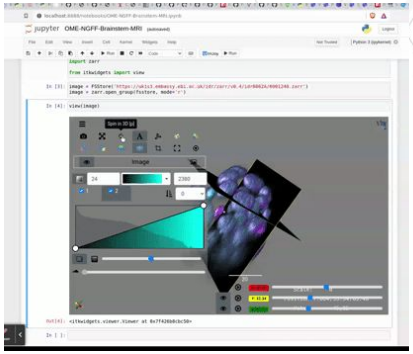
Client-side: Use directly or generate with WebAssembly

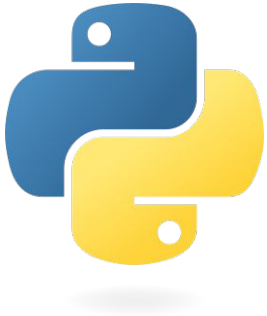
Zarr

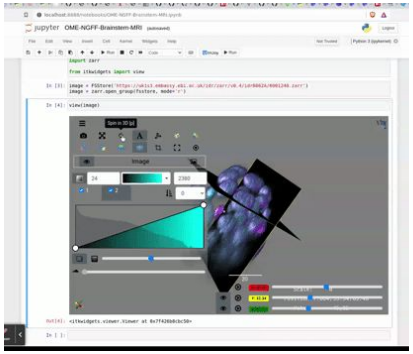




Server-side: Use directly or generate with Python

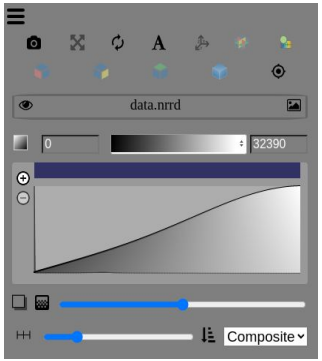


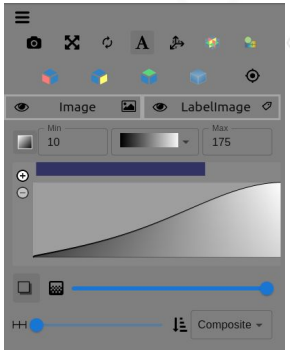


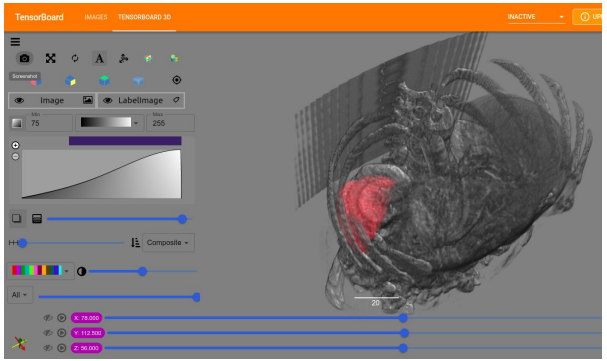


A meta-viewer component for custom research applications (alpha)

- Customizable frontends
  - Vanilla HTML, Vue, React, etc.
  - Complete custom UI or only relevant features from examples
- Customizable renderers (WIP)
  - Editor overlays
  - Server side, e.g. 3D Slicer







Open source

- https://github.com/InsightSoftwareConsortium/itkwidgets
- https://github.com/InsightSoftwareConsortium/itk-wasm
- https://github.com/Kitware/itk-vtk-viewer
- https://github.com/Kitware/vtk-js

Reproduce these slides!

- Brainstem serverless
- Brainstem Jupyter
- Load local images

Questions?

Matt McCormick

Thank You

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