

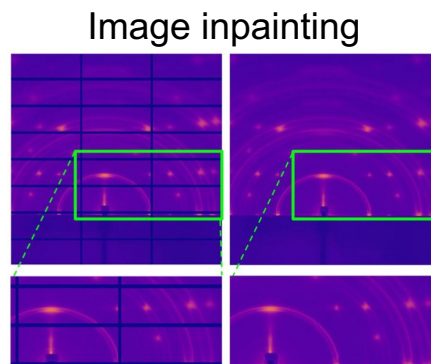
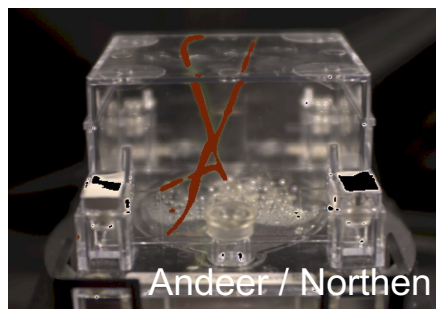
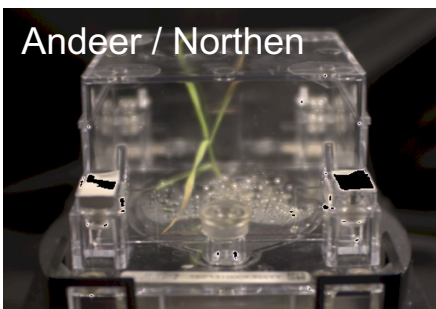
Deep Learning for Scientific Image Analysis - Overview

Handling imaging data is a core task in biosciences.
Extracting patterns from data can be laborious.
Common stumble blocks: **3D dimensional**, Spectral data,
Large volumes

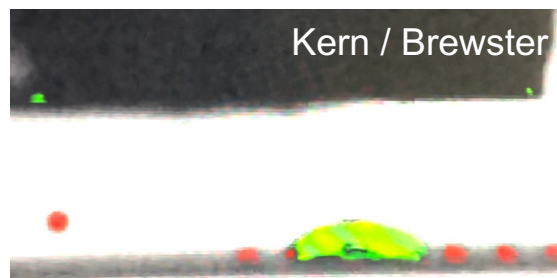
With these challenges in mind, we developed the **DLSIA**
package: **Deep Learning for Scientific Image Analysis**.

Key feature: Ensembles of Random Networks – *require less
training data than conventional architectures*

Segmenting hyperspectral imaging data



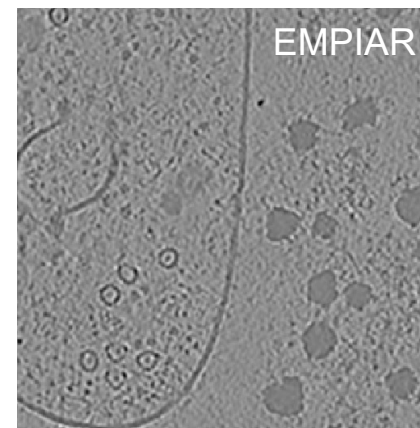
Segmenting 2D video data
SFX sample delivery



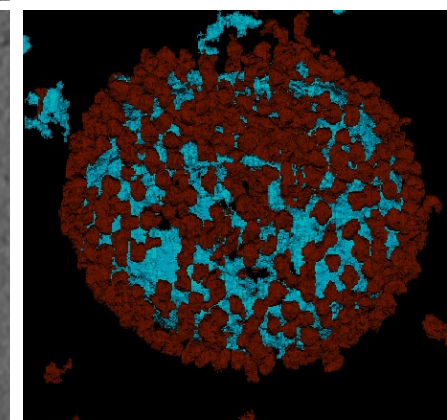
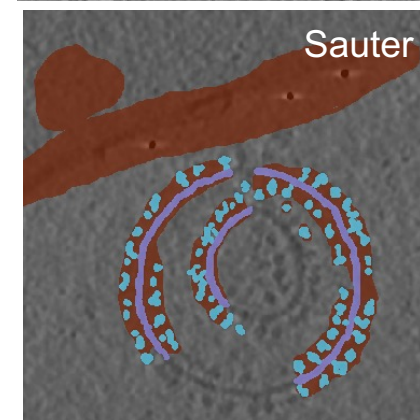
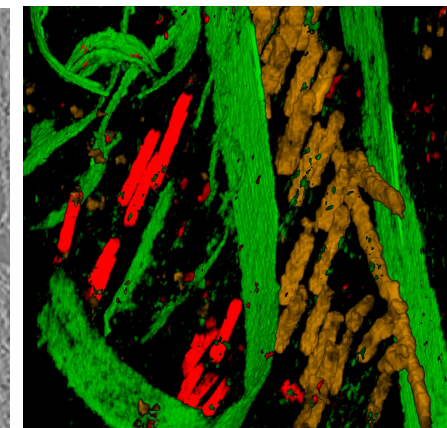
Segmenting 3D Cryo ET data

Manual labeling ~15 to 30 minutes
Training: ~ 1 hour / network (RTX3090)

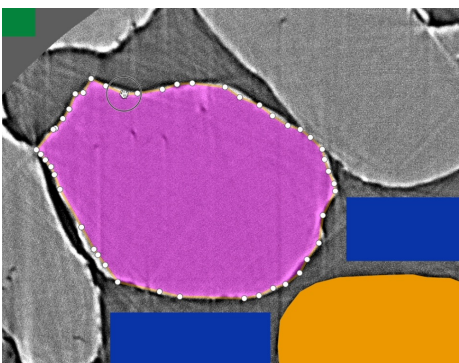
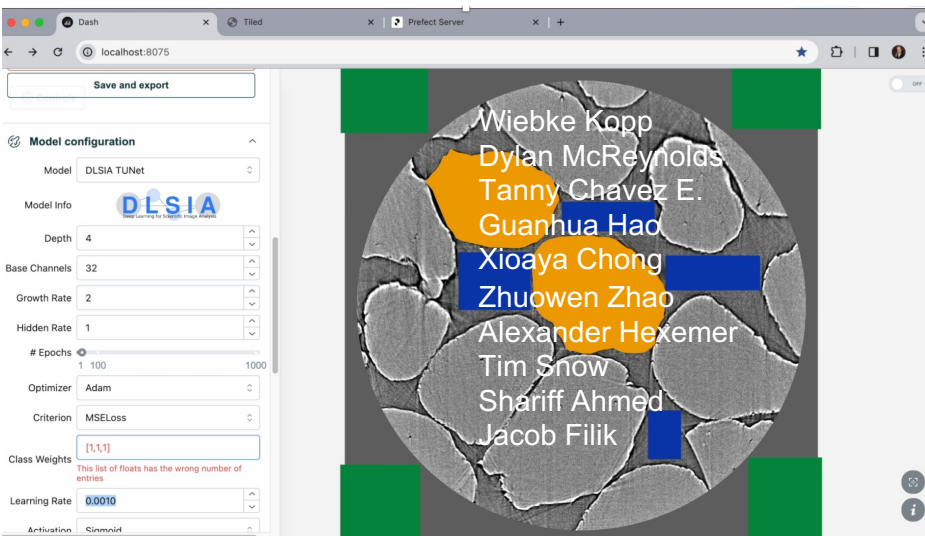
Minimal labeling



3D Segmentation



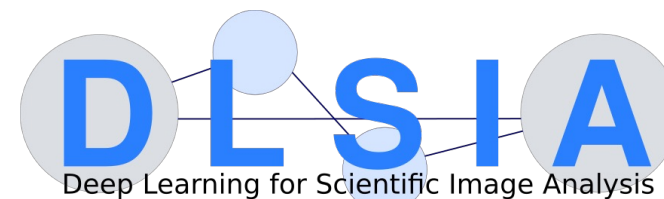
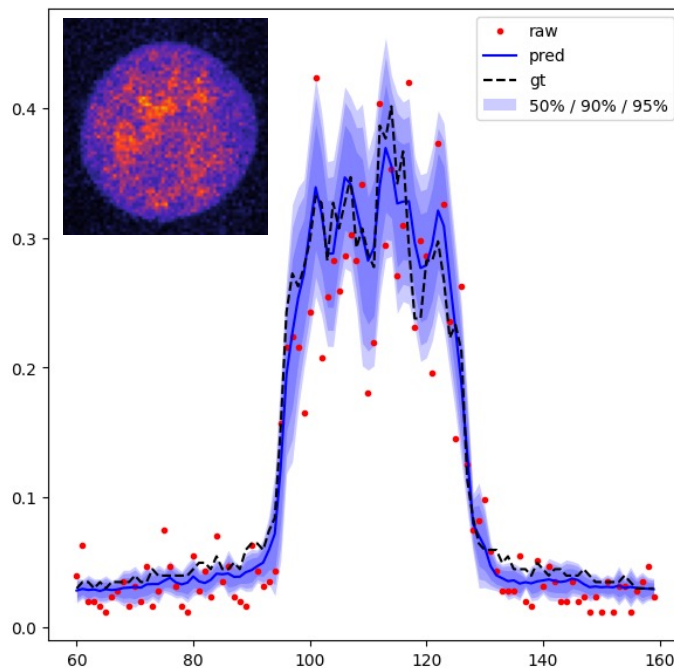
Web-based GUI for annotation, training and inference.



Trustable Machine Learning

When we run machine learning prediction jobs, we often do not get reliability estimates of the output

In DLSIA, we leverage conformal prediction machinery with ensemble methods to get calibrated error estimates. Conformal prediction provides high-quality confidence intervals under minimal assumptions.



`pip install dlsia`
<http://dlsia.readthedocs.io>

