

# **Serial Block Face Imaging: Teneo VolumeScope**



# Cell & Tissue biology solutions

# FEI Life Science portfolio

## TEM



Tecnai



Talos



Talos Artica



Titan Halo



Titan Krios

## SEM SDB



Inspect



Quanta



NovaNano



Teneo



Verios



Scios



Helios

## CLEM



CorrSight



iCorr

## Software

Explore. Discover. Resolve.

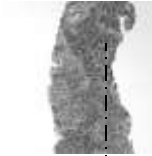
Maps 2

**Amira<sup>®</sup> 6**  
for FEI Systems

Organism  
(~10 mm)



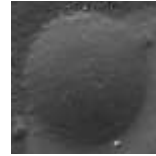
Tissue  
(~1 mm)



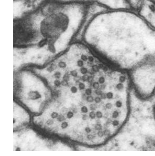
Glomerulus  
(~100 μm)



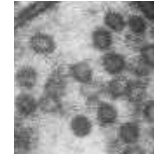
Cell  
(~10 μm)



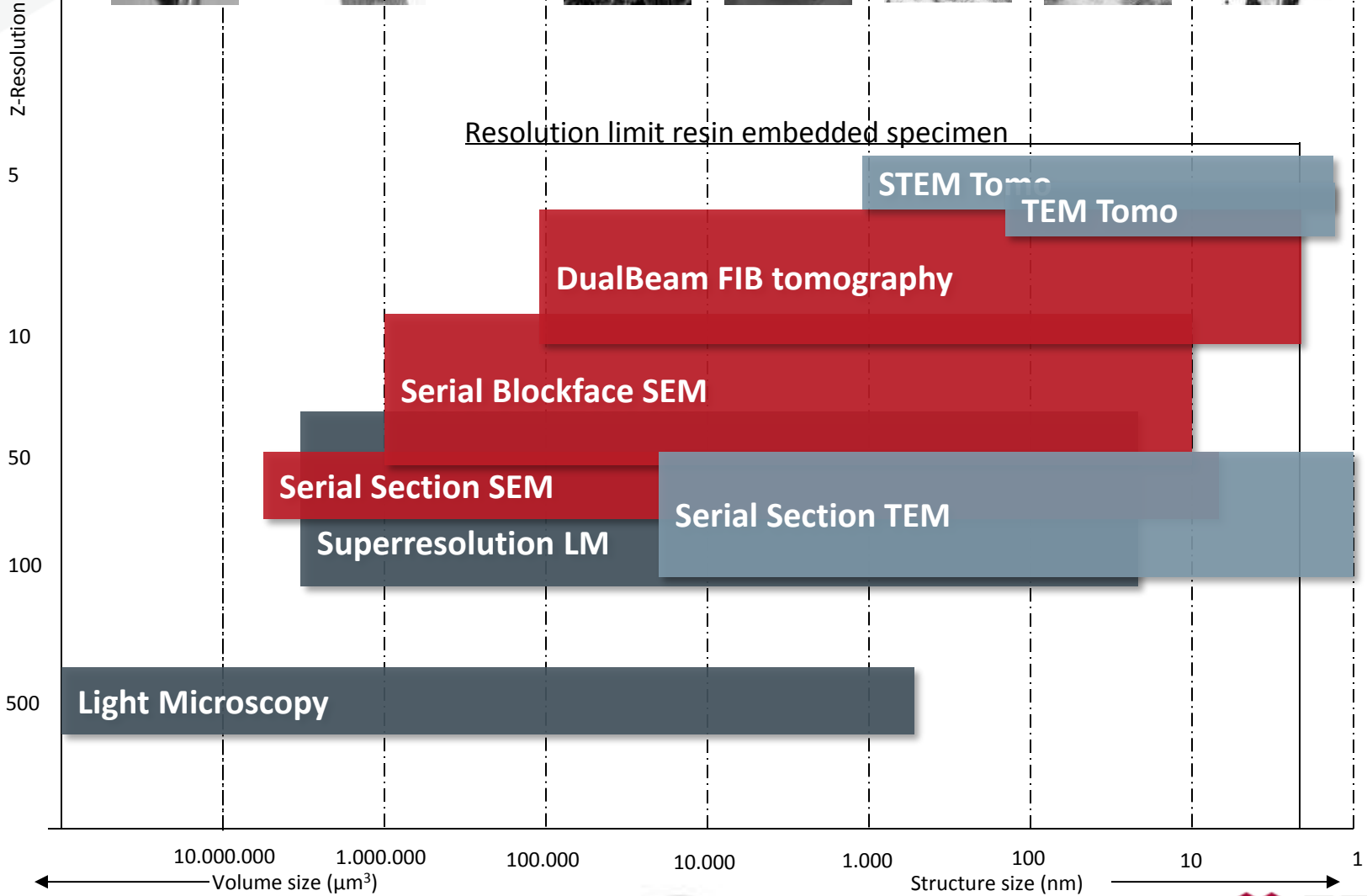
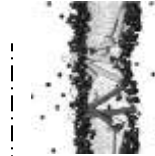
Synapse  
(~500nm)

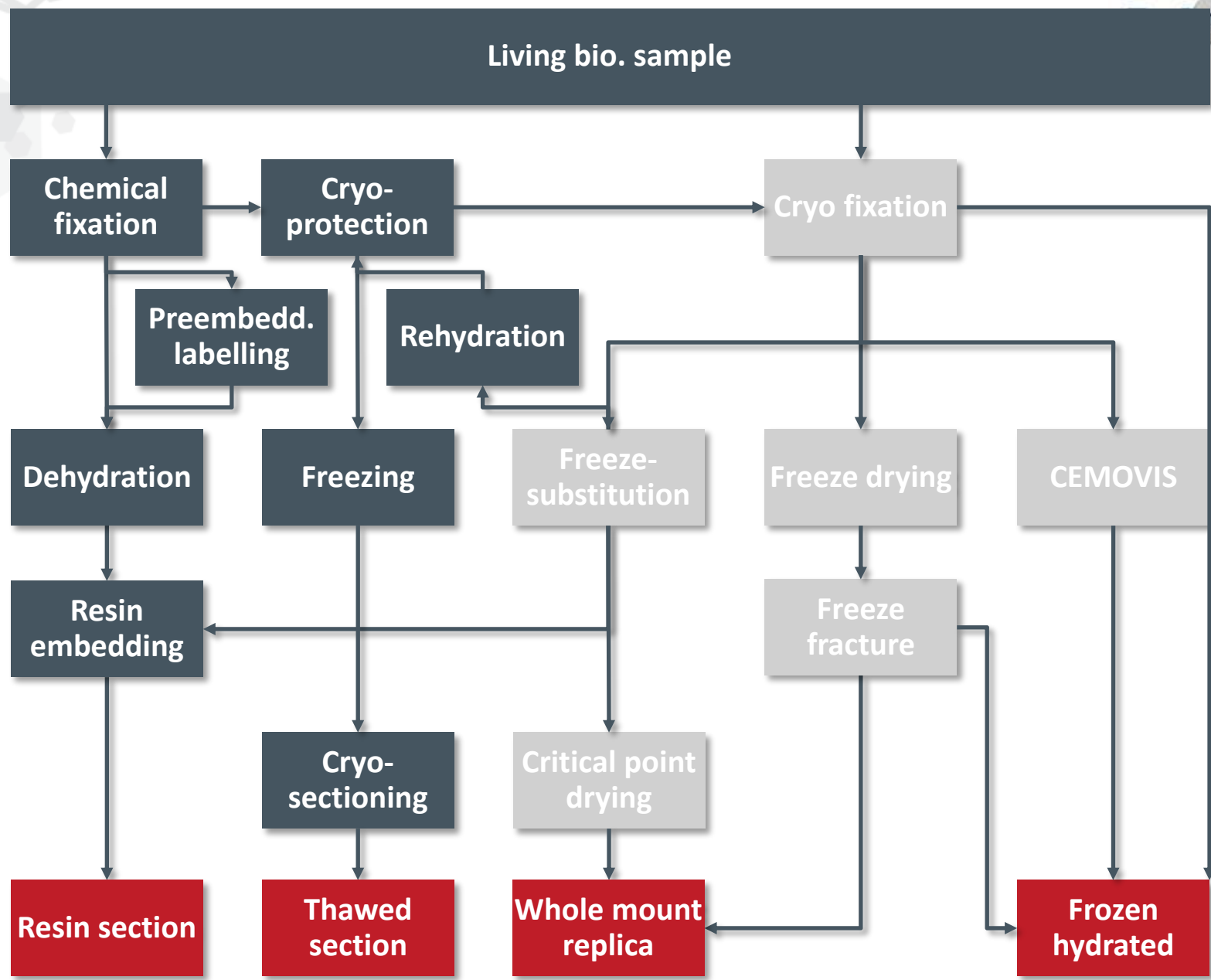


Vesicle  
(~30nm)



Lipid bi-layer  
(4.3nm)





Adapted from slide of Bruno Humbel, UNIL Lausanne

# Serial Block Face Imaging

- *In-situ* ultramicrotome for automated sectioning and imaging of the freshly cut block face
- Walk-away acquisition of large volumes (100s of  $\mu\text{m}^3$ )
- Less knife artifacts on block face
- **But:**
  - Limited axial resolution (sectioning thickness, practical limit around 25 nm)
  - Lateral resolution limits set by image acquisition times

# Teneo VS™

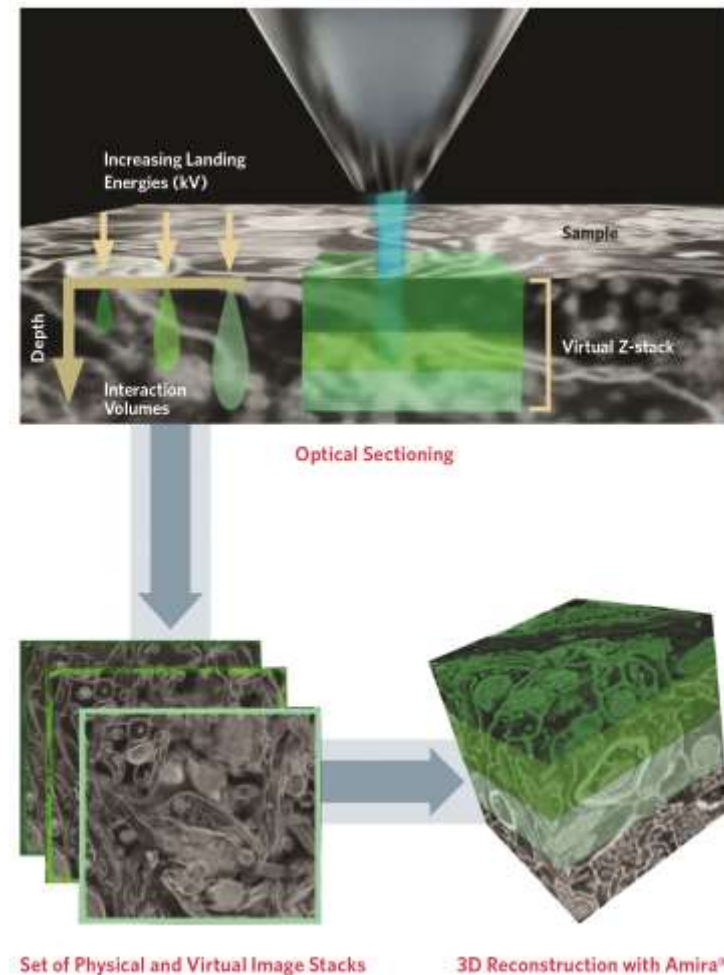


Explore. Discover. Resolve.



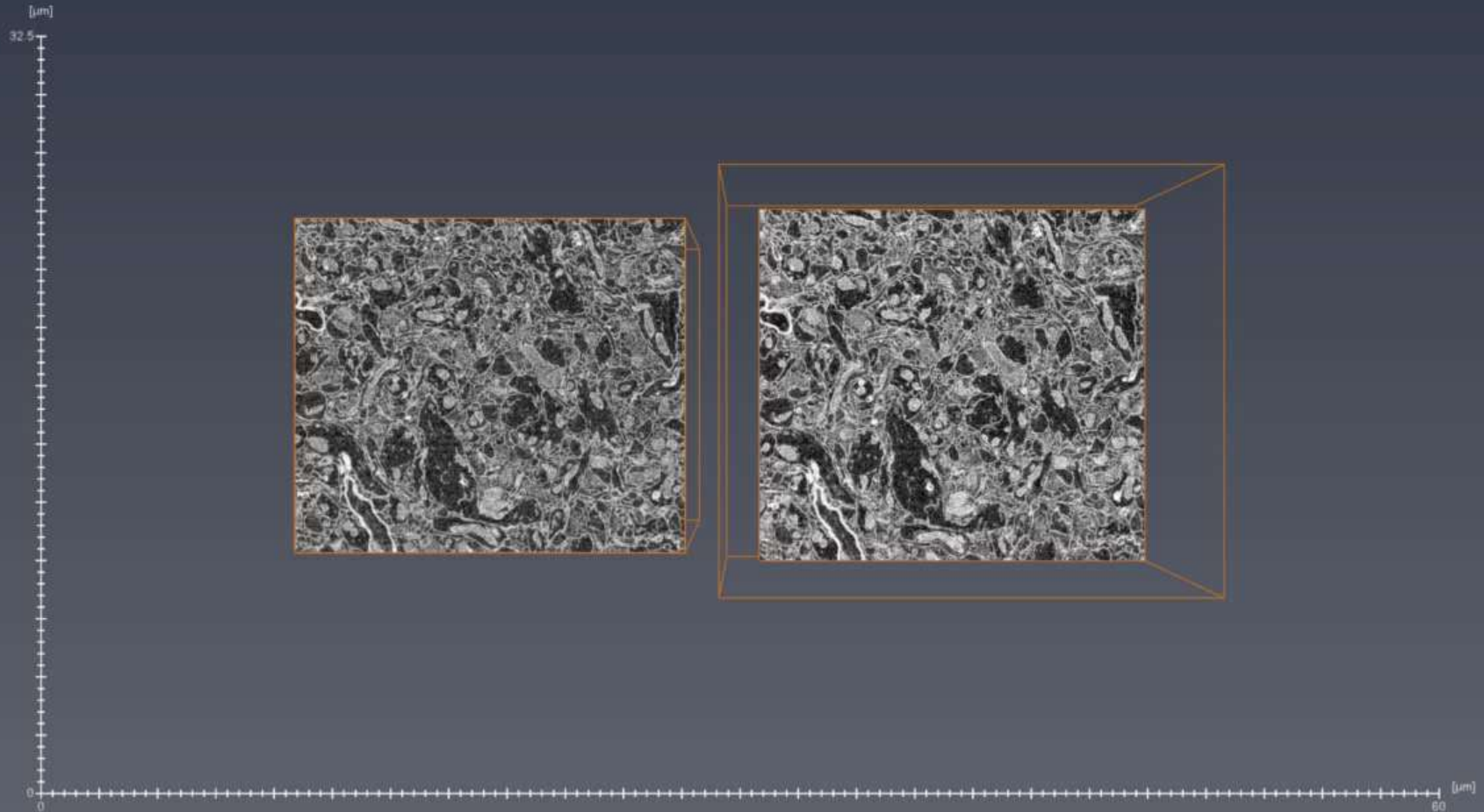
# Isotropic data – Multi-energy deconvolution

- Acquire an image series with increasing energy  
⇒ increasing interaction volume!
- Blind deconvolution to create virtual z-stack
- 70 nm depth info @  $\geq 10$  nm isotropic resolution!





# Comparison SBF-SEM vs SBF-SEM+MED-SEM



Amira

Physical slices + optical slices: z-resolution = **10nm**

Physical slices only: z-resolution = **50nm**

# SBF/VolumeScope workflow

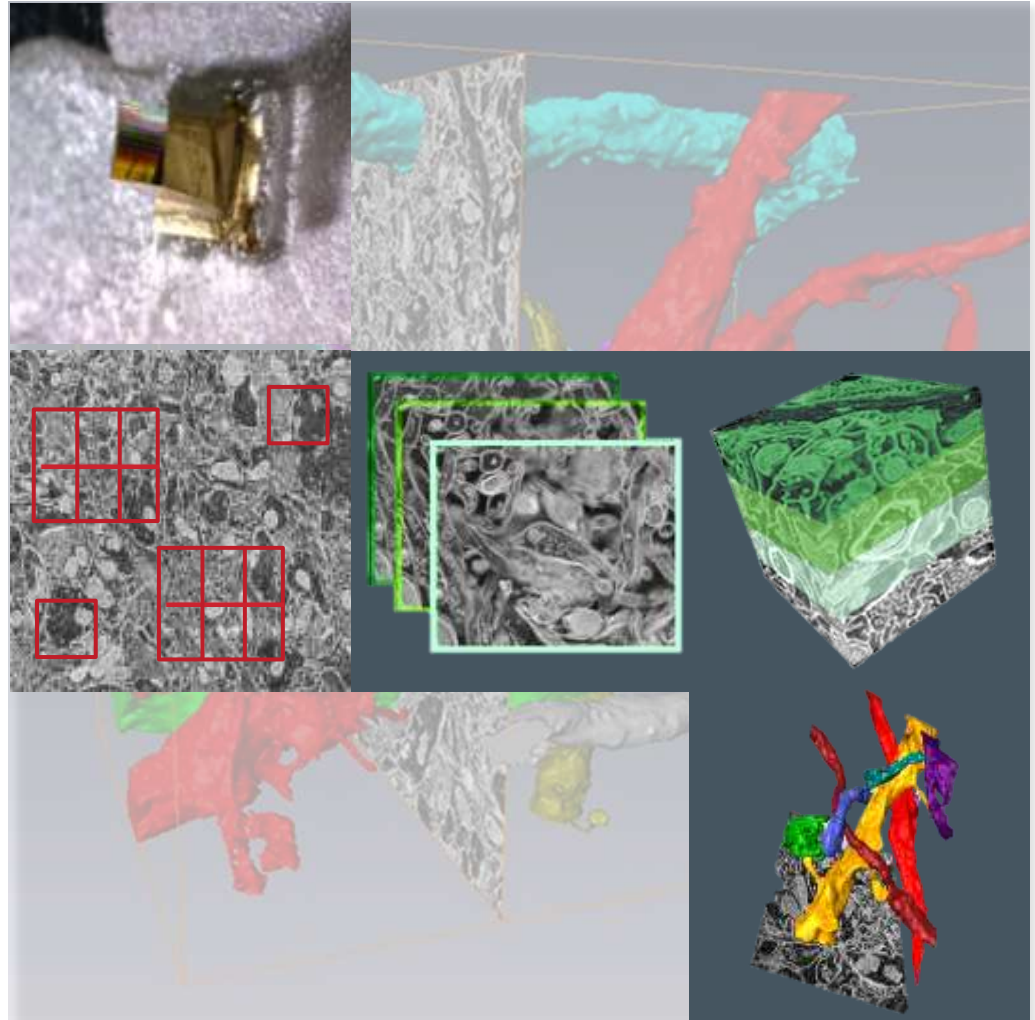
Resin embedded sample  
(trimming, mounting)

Acquisition setup

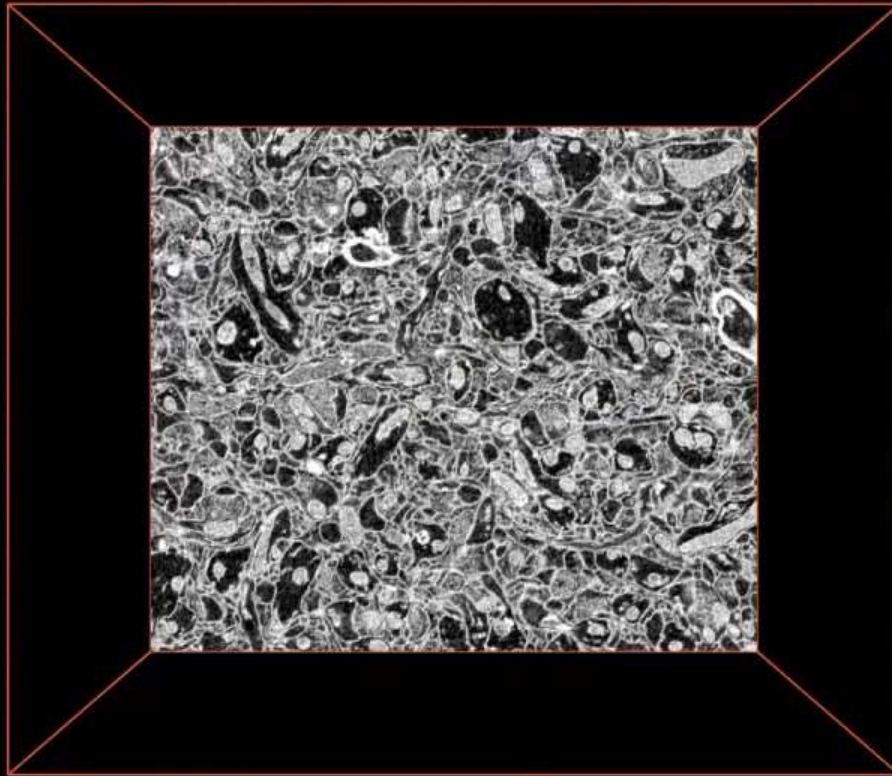
Dataset acquisition  
(in-situ slicing & MEA)

3D volume reconstruction

3D segmentation



# Volume reconstruction of mouse brain



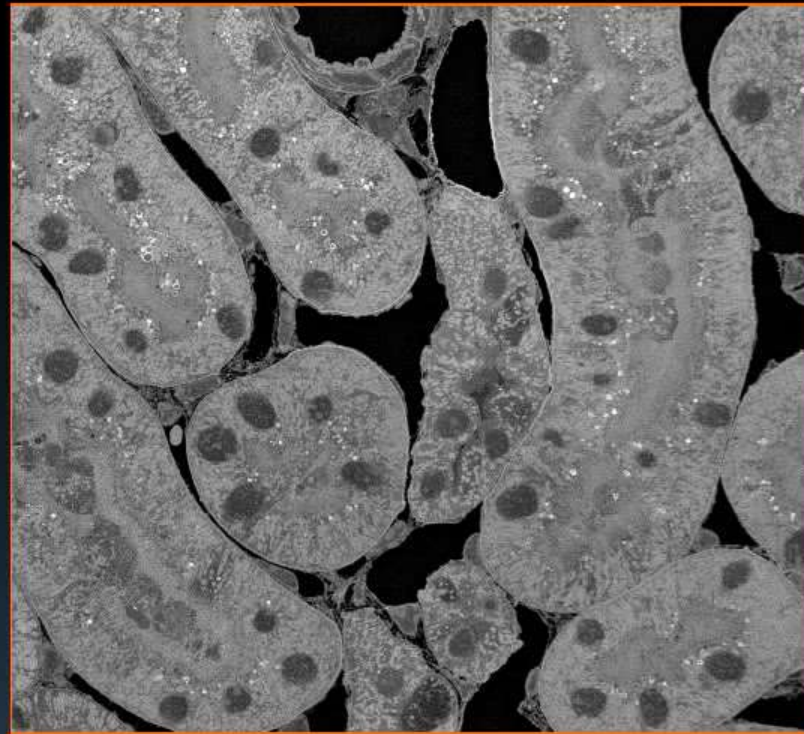
Amira

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TechnoInfo

FEI™

# Volume reconstruction of mouse kidney



100  $\mu\text{m}$

