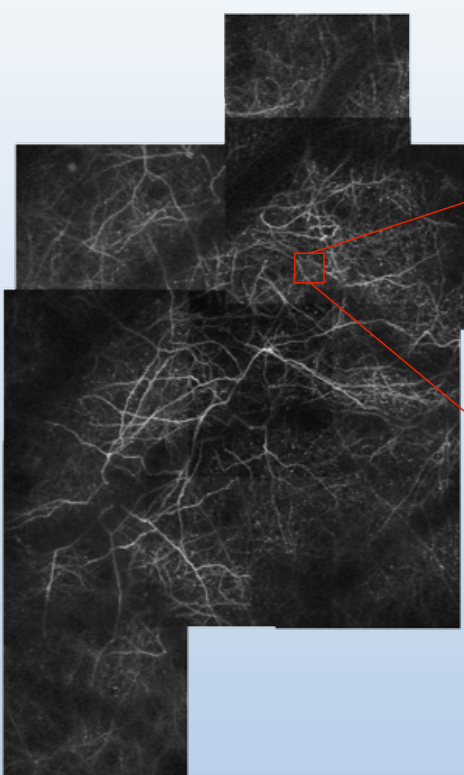
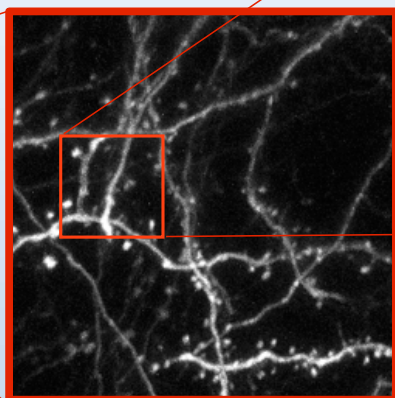


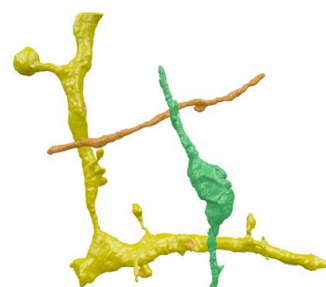
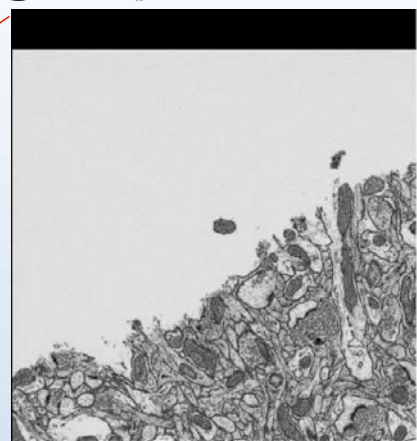
Multi-Scale Brain Imagery



Fluorescent neurons in vivo in the adult mouse brain.



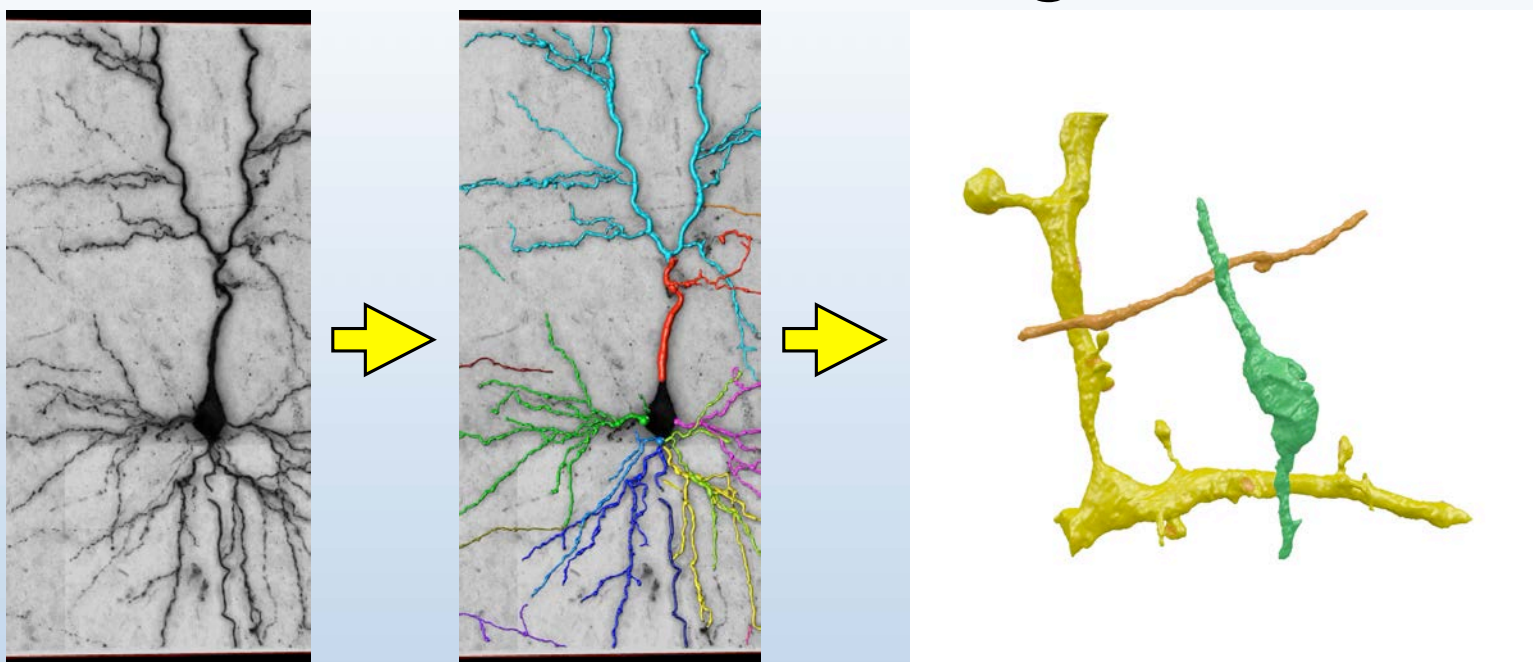
Imaged through a cranial window using a 2-photon microscope.



FIB stack and reconstructed neurites.

Courtesy of G. Knott

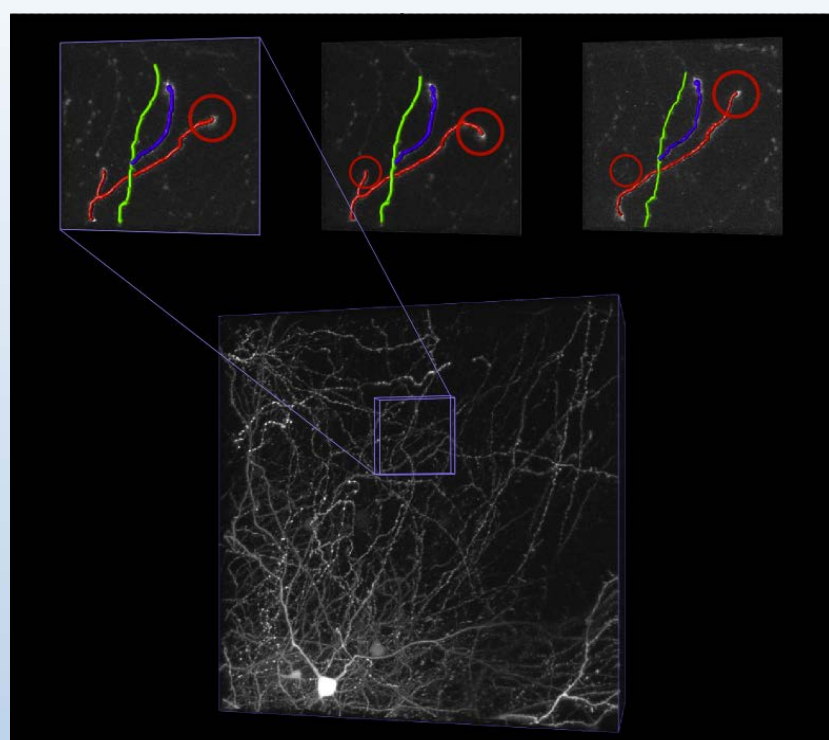
Brain Modeling



Processing steps:

1. Delineation in LM imagery at micrometer resolution.
2. Segmentation in EM imagery at nanometer resolution.
3. Registering them into a single model.

Evolving Structures

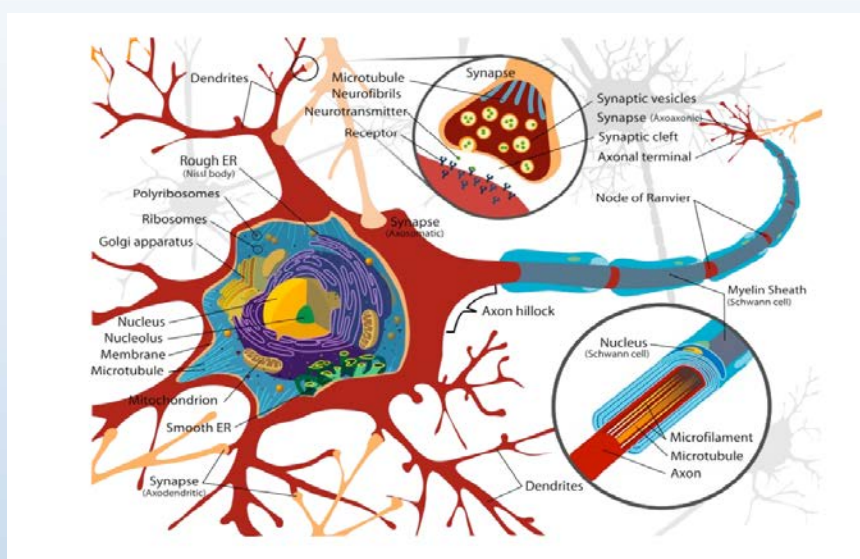


Courtesy of A. Holtmaat

- Three Two-photon image stacks taken a week apart in-vivo.
- Simultaneous reconstruction in all three stacks.

—> Automated change detection + More robust delineation.

Very Big Data



- A human brain contains approximately 100 billion neurons and 100 trillion synapses.

- It would take 1000 Exabytes to store an uncompressed digitization at 5nm resolution.

- Tracing linear structures in LM imagery
 - Segmenting organelles in EM imagery
 - Matching them across scales
 - Introducing the time dimension
- > An integrated representation of neurons and their internal structures.