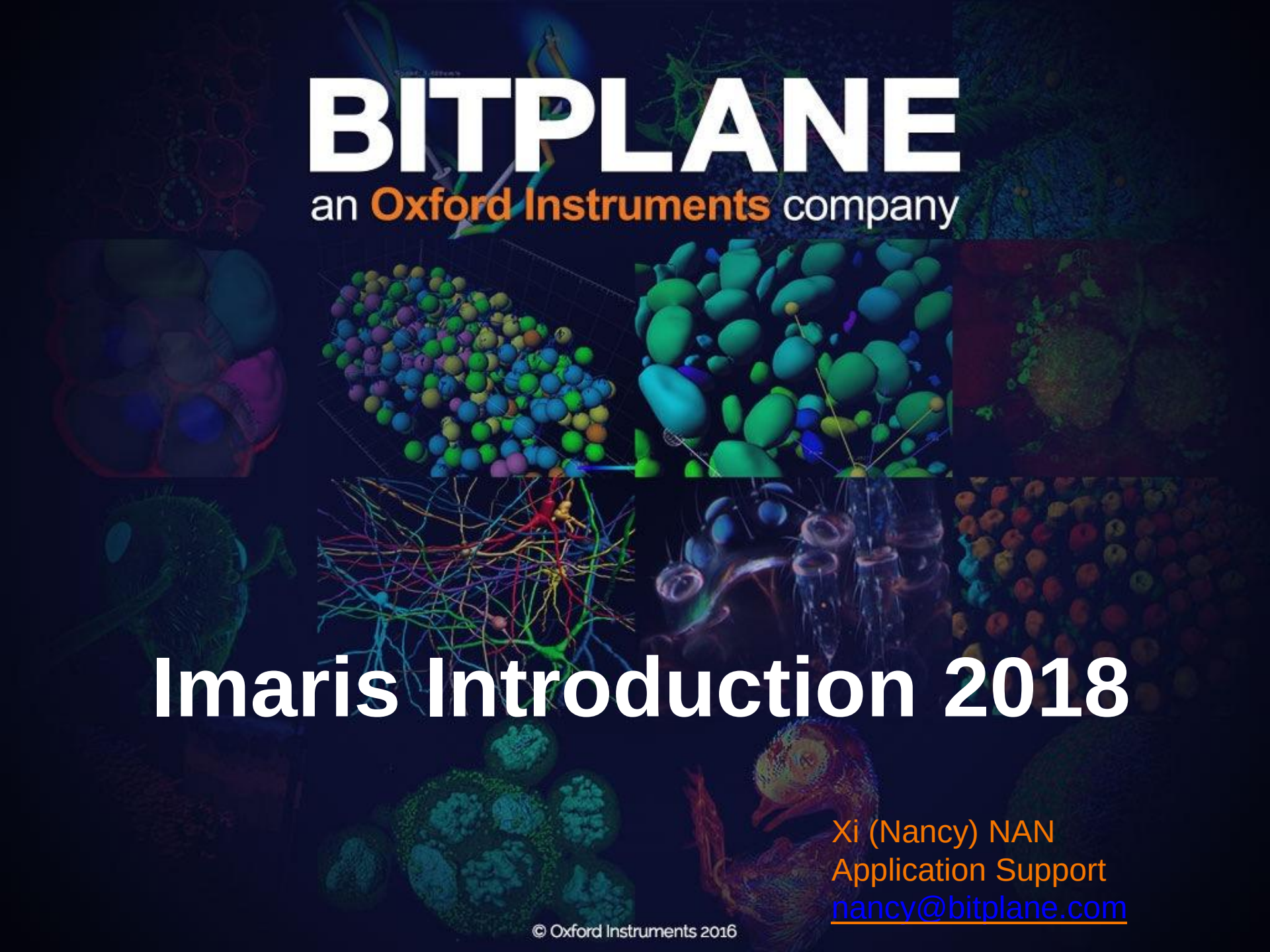


# Imaris Introduction 2018

Xi (Nancy) NAN
Application Support
nancy@bitplane.com

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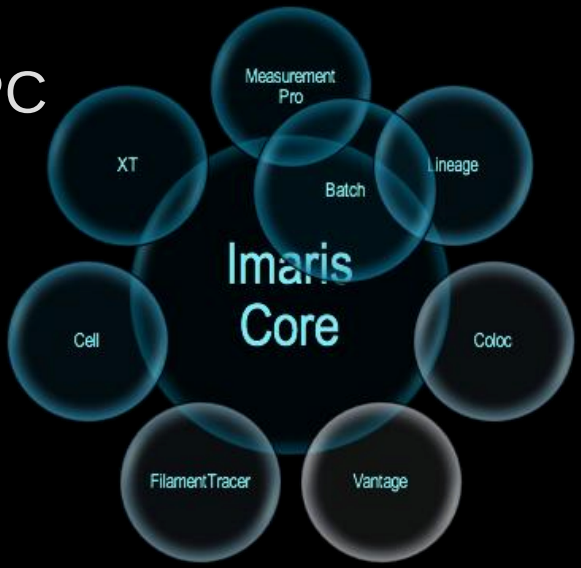
# What is Imaris

- Software for visualization, segmentation, analysis and interpretation of multi-channel 3D and 4D datasets.
- Runs on 64-bit version of both Mac and PC
- Modular based application allows customization of Imaris capabilities.
- Supports all Confocal file formats

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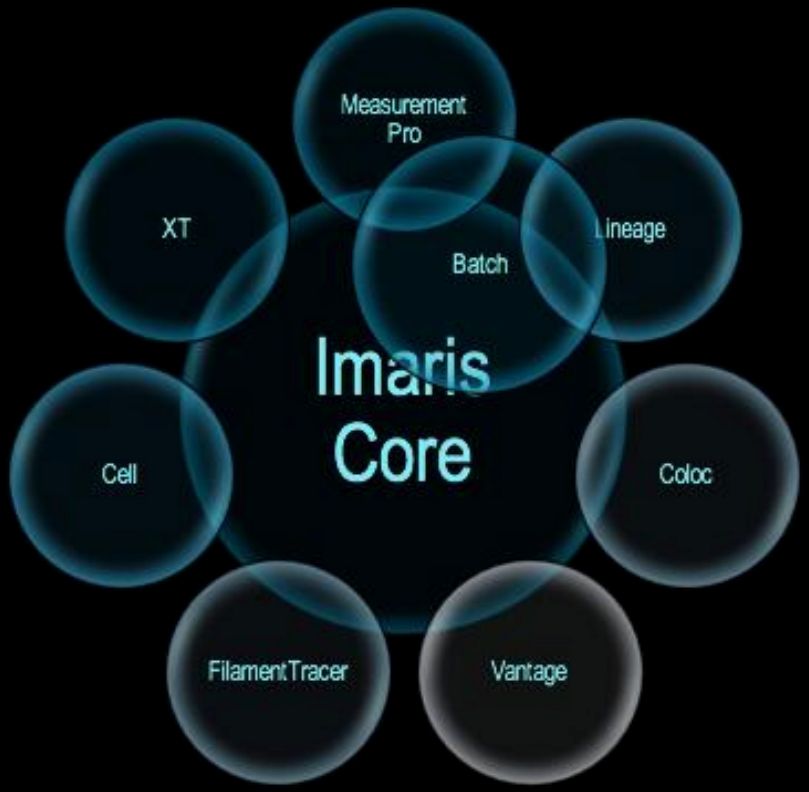
# What is Imaris

- **Module based**
  - Imaris
  - Imaris MeasurementPro
  - Imaris Cell
  - Imaris Lineage
  - Imaris Vantage
  - Imaris Coloc
  - Imaris FilamentTracer
  - Imaris XT
  - Imaris Batch

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# Agenda

- **Arena View - Data Management**
- **Application - Segmentation Tools**
  - Spots/Surfaces/Cells rendering
  - Filaments rendering
  - Cell/Object Tracking
  - Colocalization Analysis
    

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# Imaris 8 – Arena

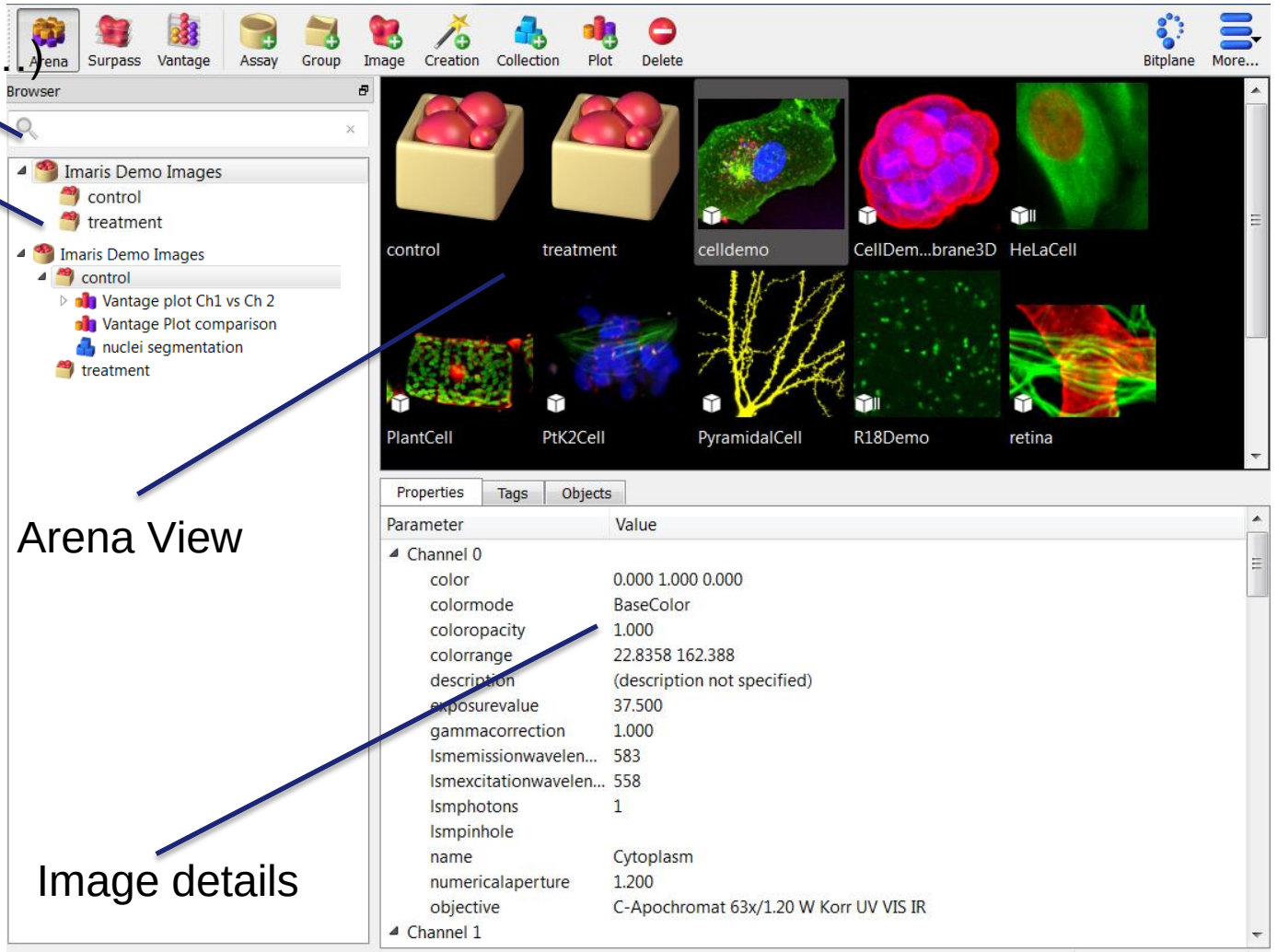
Search field (files, tags…)

Arena tree

provides direct access to all the components of your experimental data including creation parameters, Vantage plots and (batch) results

displays contents of the current tree location or any search results

displays object's properties, tags and surpass objects




Arena View

Image details

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# Directly Read More than 40 Microscopy File Types

- Andor: Multi-Tiff (Series) (*.tiff, *.tif)
- Andor: iQ ImageDisk (*.kinetic)
- Applied Precision DeltaVision (*.r3d, *.d3d, *.dv)
- Biorad MRC 1024, 600 Series (*.pic)
- Biovision: Ivision (*.ipm)
- Biovision / Scanalytics: IP Lab (series) (*.ipl)
- Bitplane: Imaris 2.7, Imaris 3, and Imaris 5.5 (*.ims)
- Bitplane: Imaris Scene File (*.imx)
- BMP (adjustable file series) (*.bmp)
- Gatan Digital Micrograph (*.dm3)
- Hamamatsu/Compix SimplePCI (*.cxd)
- IMOD binary file (*.imod, *.mod), object scene file
- IMOD MRC file (*.mrc, *.st, *.rec)
- 3i Slidebook (*.sld)
- Leica Image Format LIF (*.lif)
- Leica Vista LCS (*.tif, *.tiff, *.lei, *.raw)
- Leica Series (*.tif, *.tiff, *.inf, *info)
- Leica TCS-NT (*.tif, *.tiff)
- Molecular Devices: Metamorph Stack (*.stk)
- Molecular Devices: Metamorph ND (*.tif, *.nd)
- Micro-Manager Image 5D (*.tif *.tiff *.txt)
- Nikon ICS – “Huygens compatible” (*.ics, *.ids)
- Nikon Elements ND2 (*.ND2)

- Olympus Cell^R 1.1 (*.tif, *.tiff)
- Olympus FluoView (*.tif, *.tiff)TIFF
- Olympus OIB (*.oib)
- Olympus OIF (*.oif)
- Olympus VSI (*.vsi)
- Open Microscopy Environment Tiff (*.tiff, *.tif)
- Open Microscopy Environment XML (*.ome)
- Perkin Elmer: Ultraview (*.tim, *.zpo)
- Perkin Elmer: Volocity / OpenLab LIFF (*.liff)
- Perkin Elmer: Volocity / OpenLab RAW (*.raw)
- Prairie Technologies (*.xml, *.cfg, *.tif)
- Quick PALM (.quickpalm, .tif)
- TIFF (adjustable file series) (*.tiff)
- TILL Photonics: TILLvisION (*.rbinf)
- Zeiss Axiovision (*.zvi)
- Zeiss LSM410, LSM310 (*.tif, *.tiff)
- Zeiss LSM510, LSM 710 (*.lsm)
- Zeiss CZI (Zen) (*.czi)

ANDOR
ZEISS Leica
OLYMPUS Nikon
Molecular Devices
3i Intelligent Imaging Innovations
BIO-RAD
OME
HAMAMATSU PHOTON IS OUR BUSINESS
applied precision A GE Healthcare Company
TILL Photonics an FEI Company
gatan
BioVision Technologies Digital Imaging Solutions...
PerkinElmer For the Better
PRAIRIE TECHNOLOGIES, INC.

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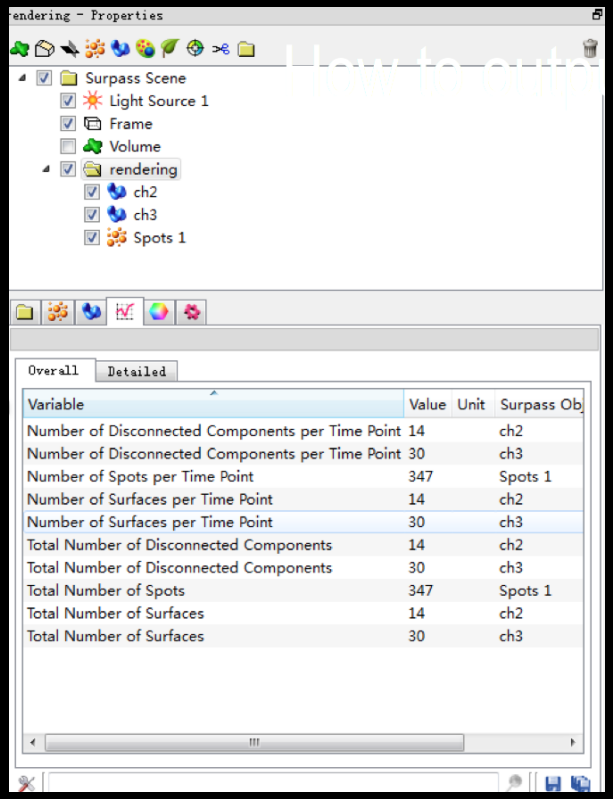
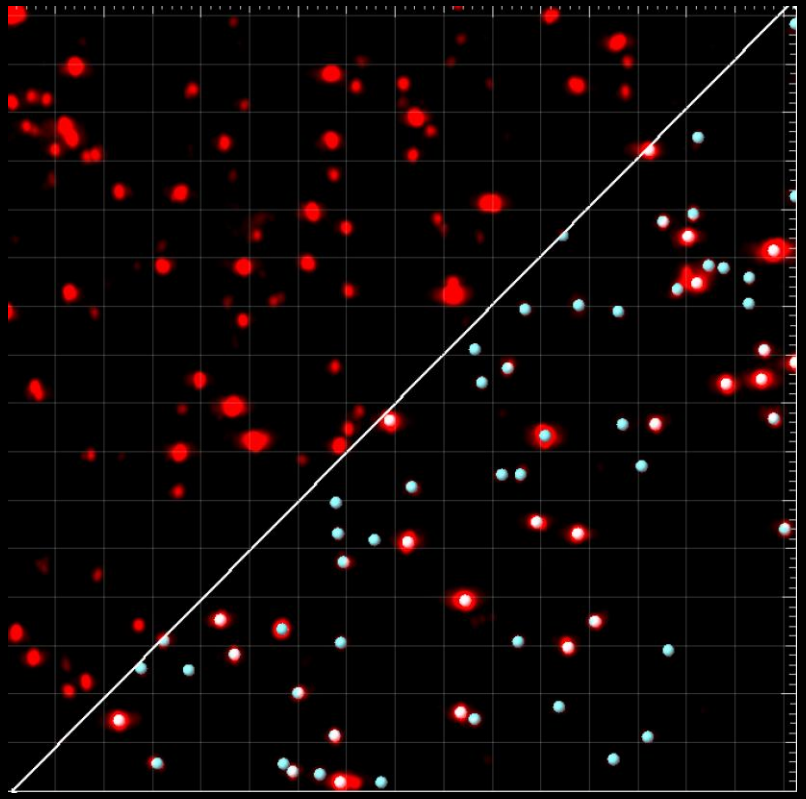
# What we do in Imaris

- What is segmentation and why we do this?



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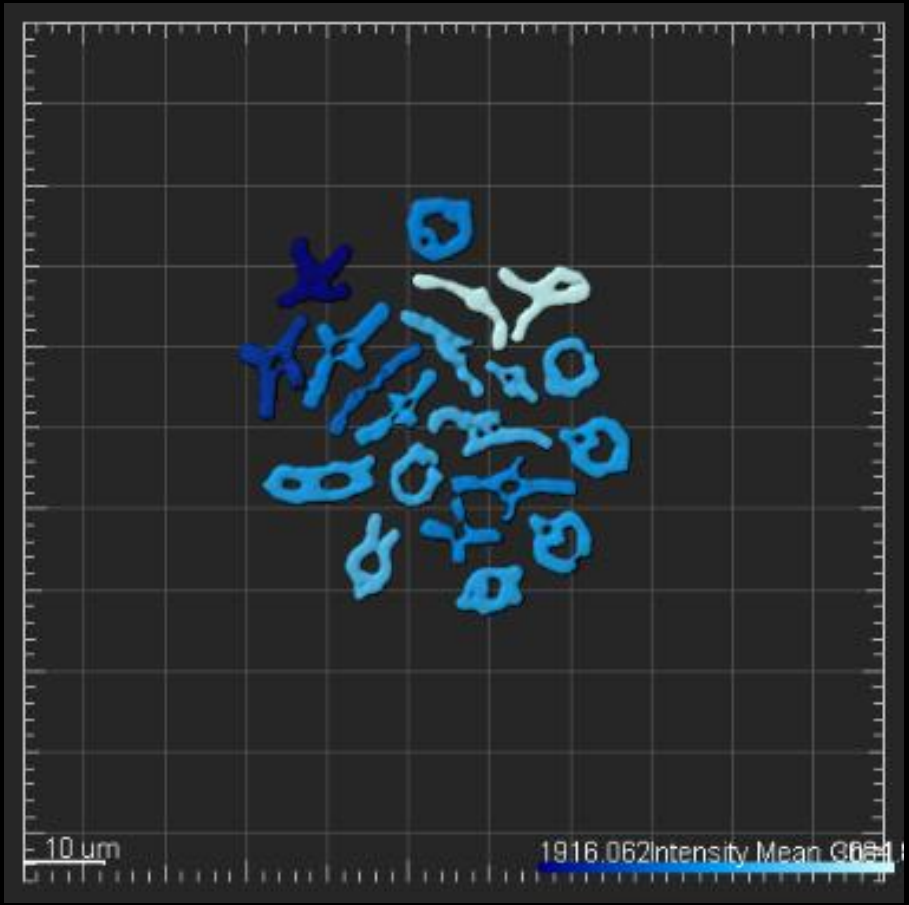
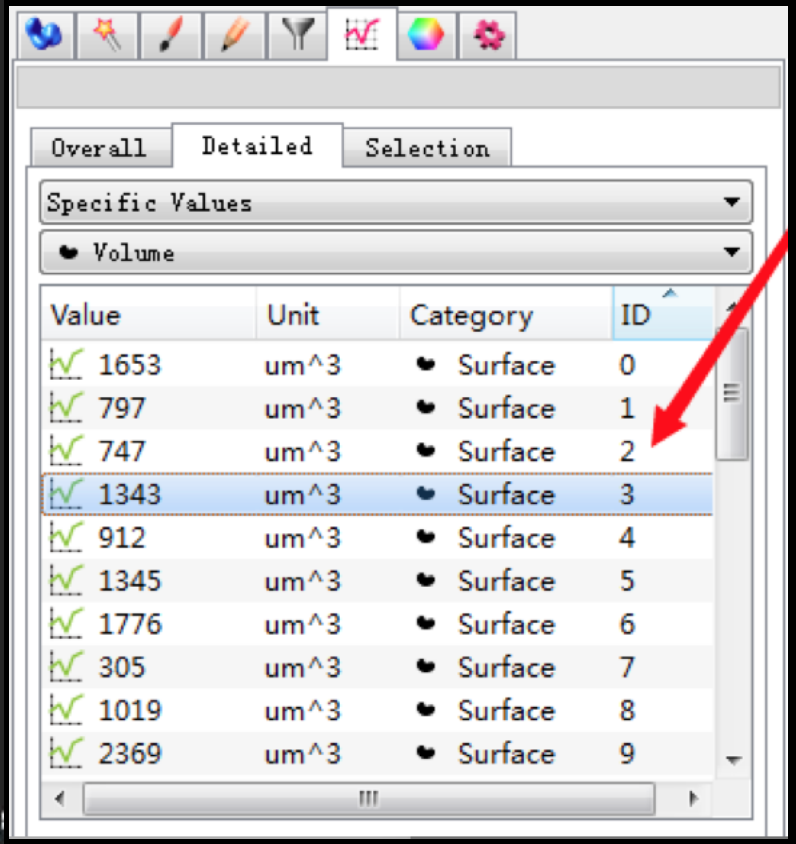
# What we do in Imaris

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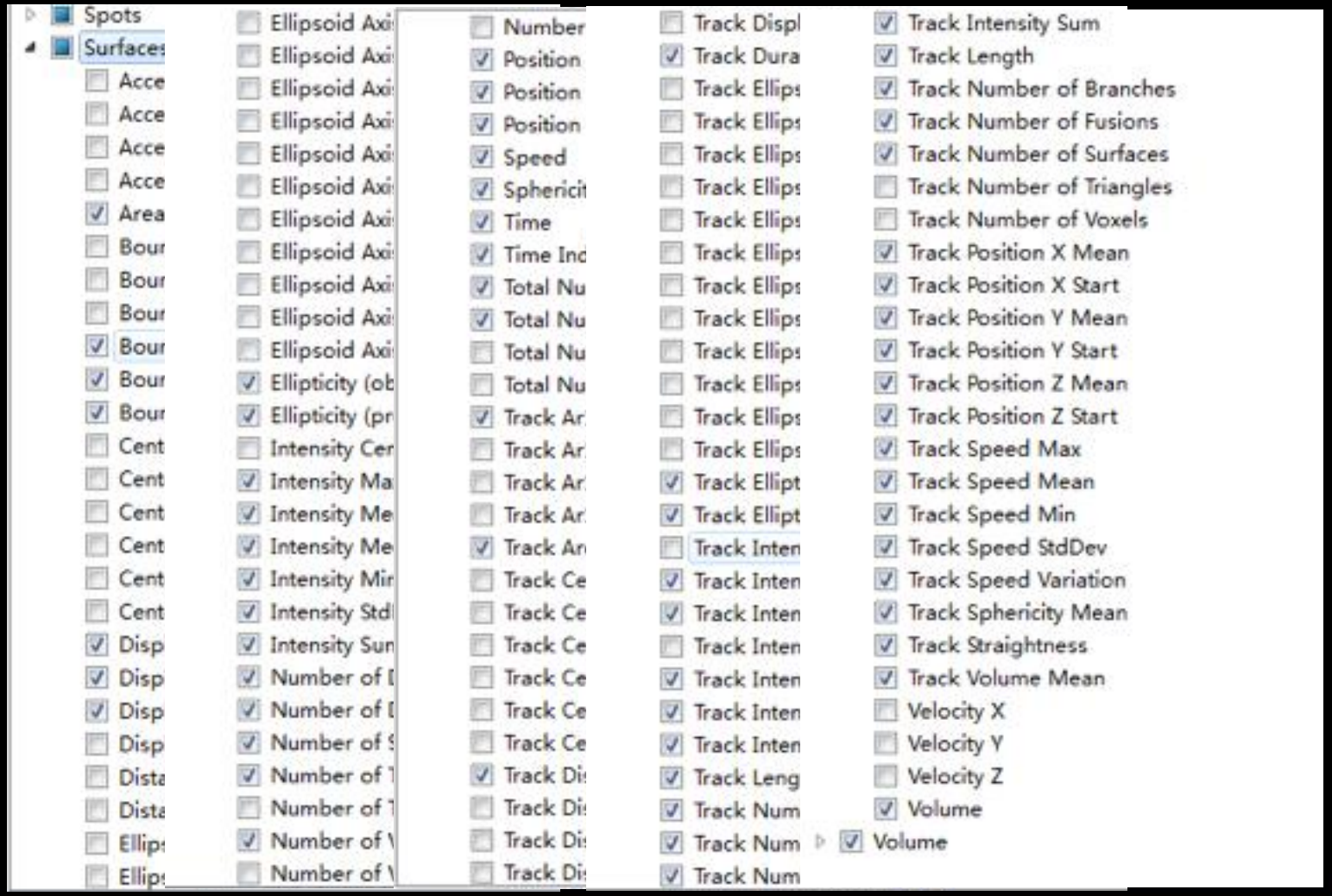
# What we do in Imaris

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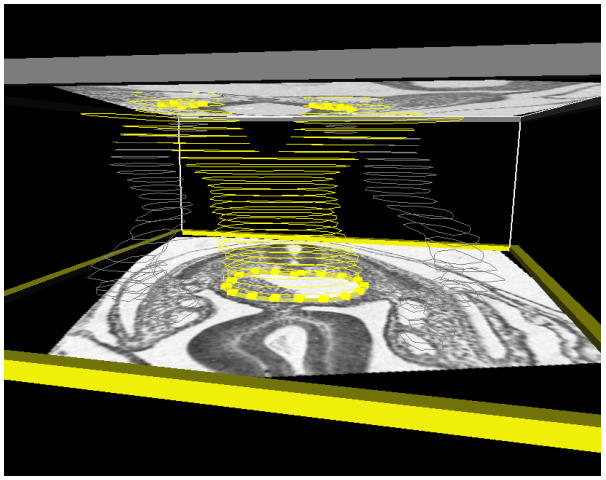
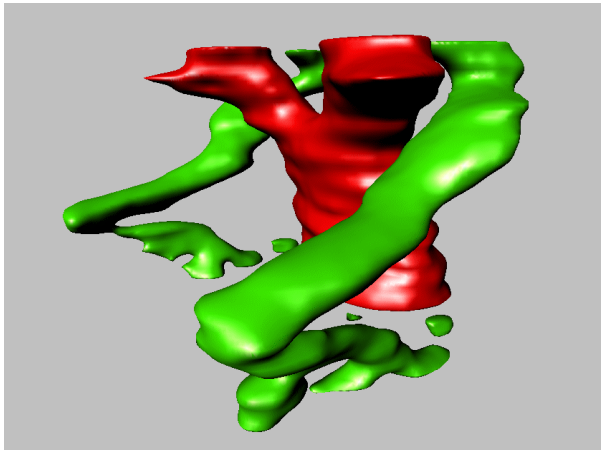
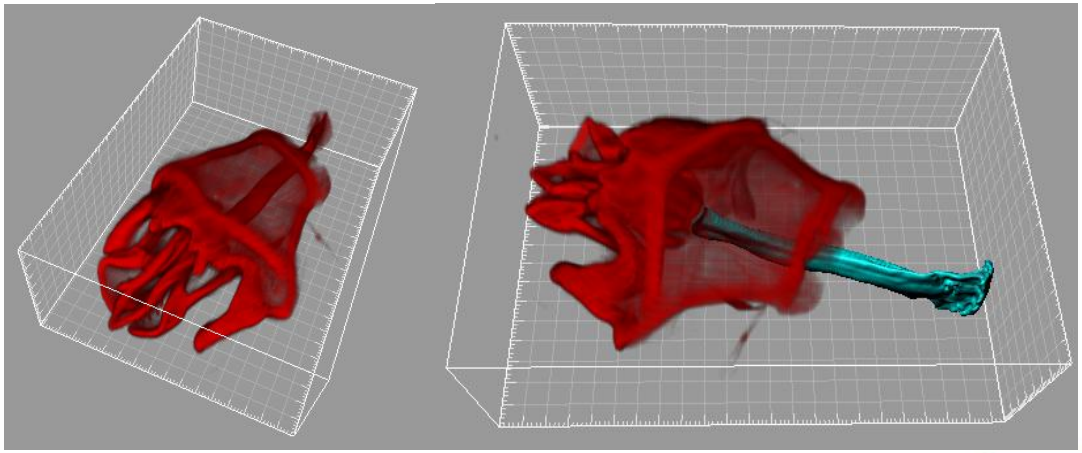
# Creating Surface manually via Contour tracing



Visualization & Measurement of structures which cannot be easily segmented from background or neighboring structures

Draw 3D Regions of Interest to get Statistics for those regions or for masking part of one or more channels





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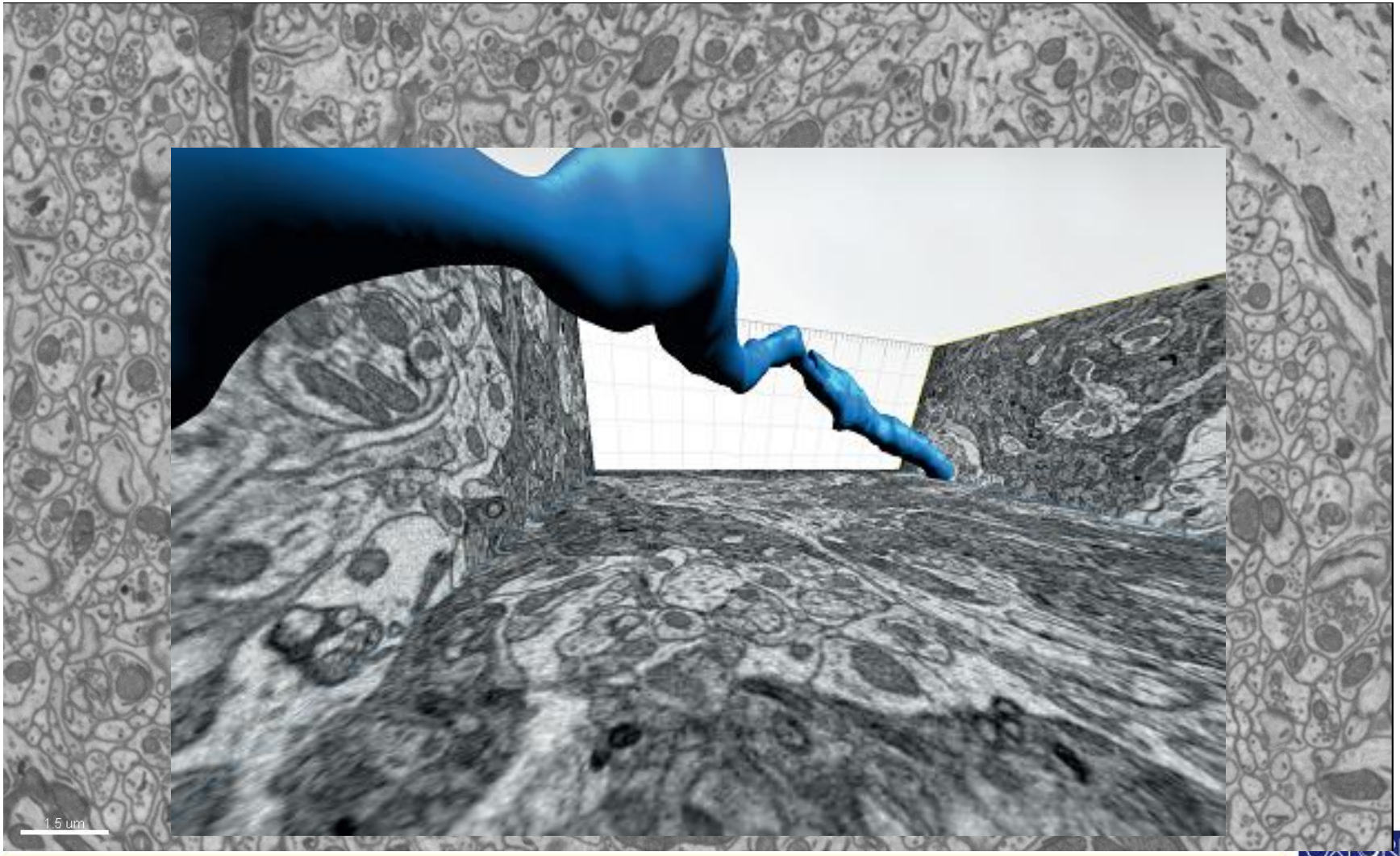
# Creating Surface manually via Contour tracing

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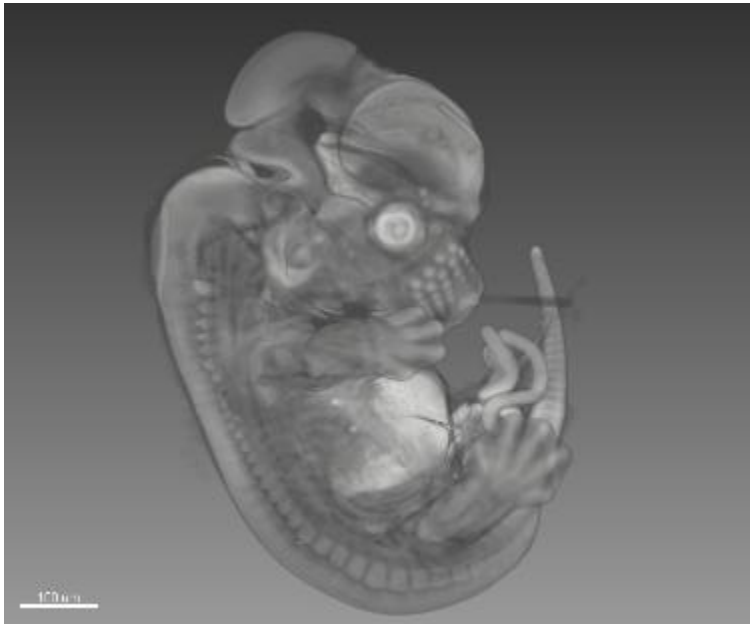
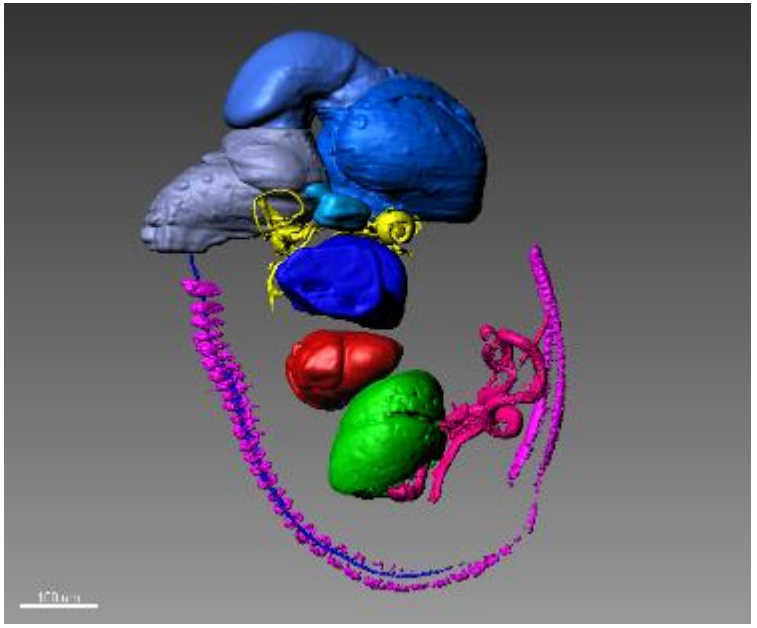
# Creating Surface manually via Contour tracing

Optical projection tomography "Haeckaliens"





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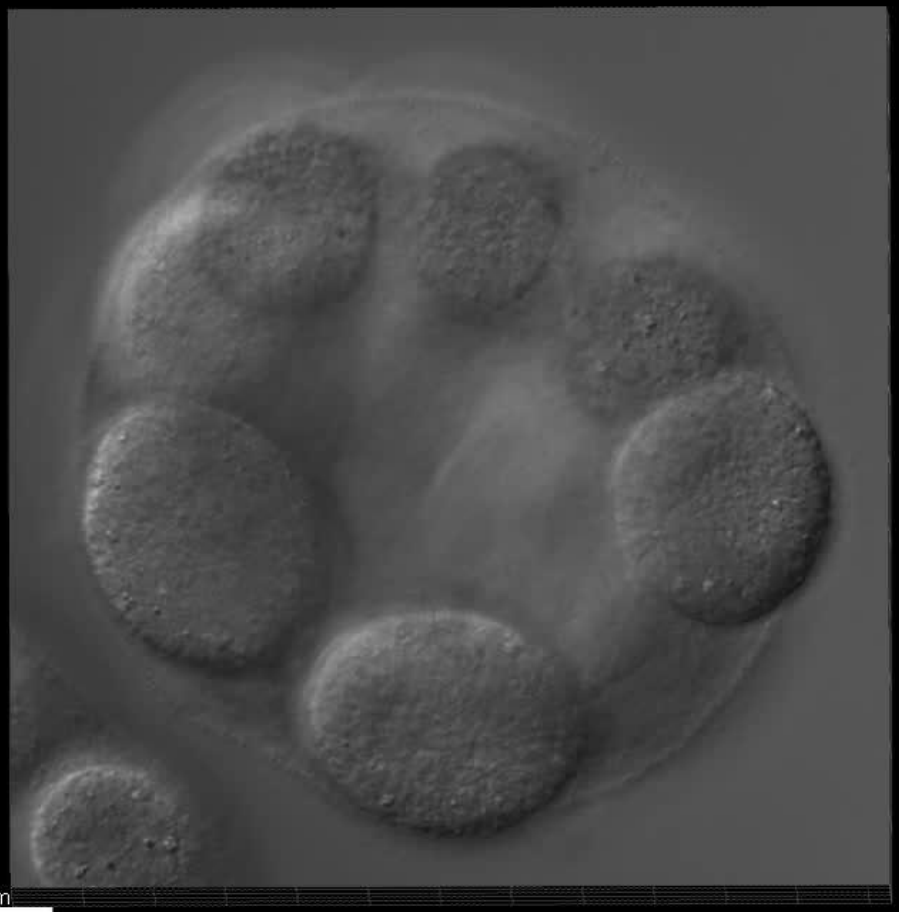
# Cell/Object Detection




- Qualitatively and Quantitatively examine micro relationships that exists between cells and between the cell and its subcellular components
- Analysis is done in 2D, 3D and 4D
- Calculate Statistical parameters such:
  - Distance to membrane
  - Distance to nucleus
  - Number of vesicles per cell
  - Nucleus to Cytoplasm volume ratio
  - Relative Tracking of subcellular objects

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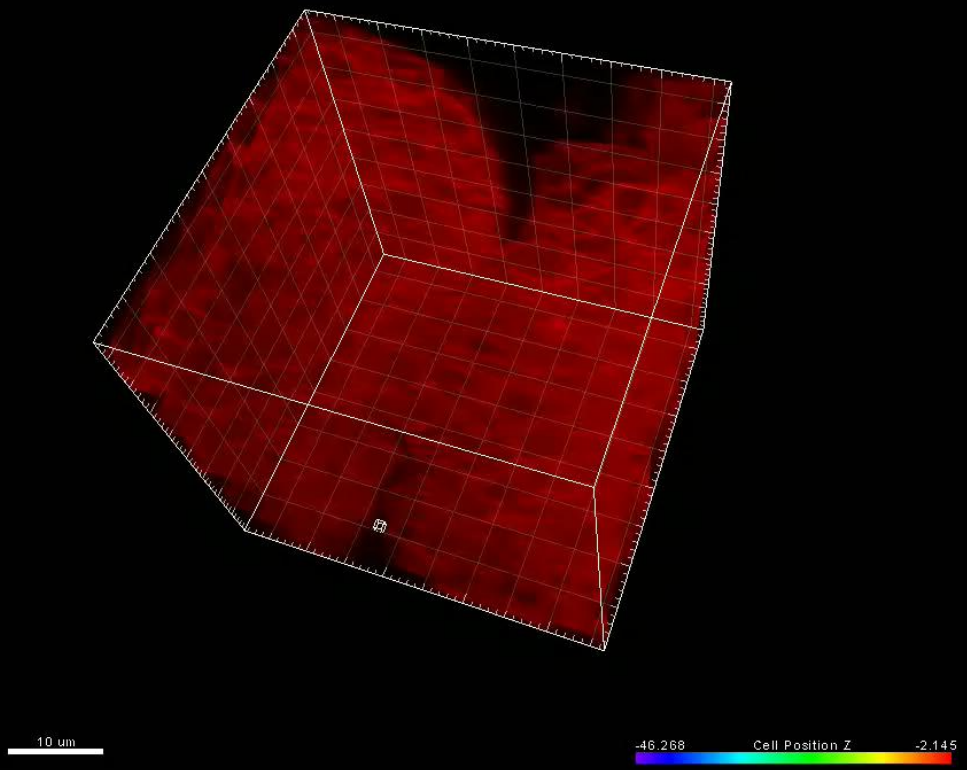
# Cell/Membrane Detection




Qualitatively and Quantitatively examine micro relationships that exists between cells and between the cell and its subcellular components
Analysis is done in 2D, 3D and 4D

Calculate Statistical parameters such:

- Distance to membrane
- Distance to nucleus
- Number of vesicles per cell
- Nucleus to Cytoplasm volume ratio
- Relative Tracking of subcellular objects

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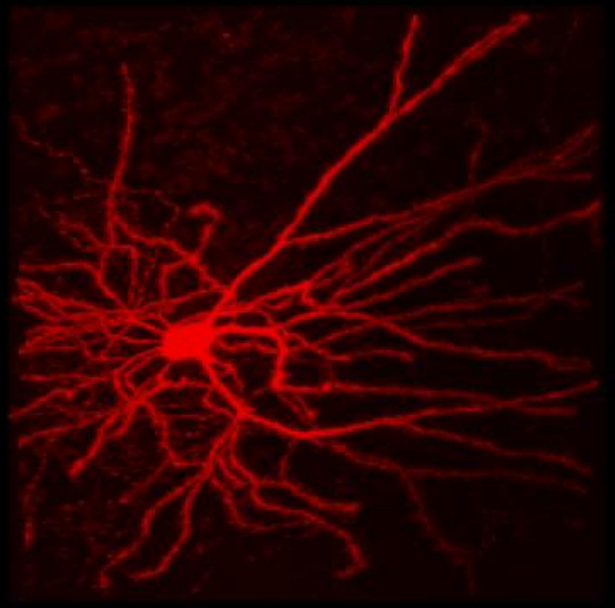
# Filament/Neuron Detection



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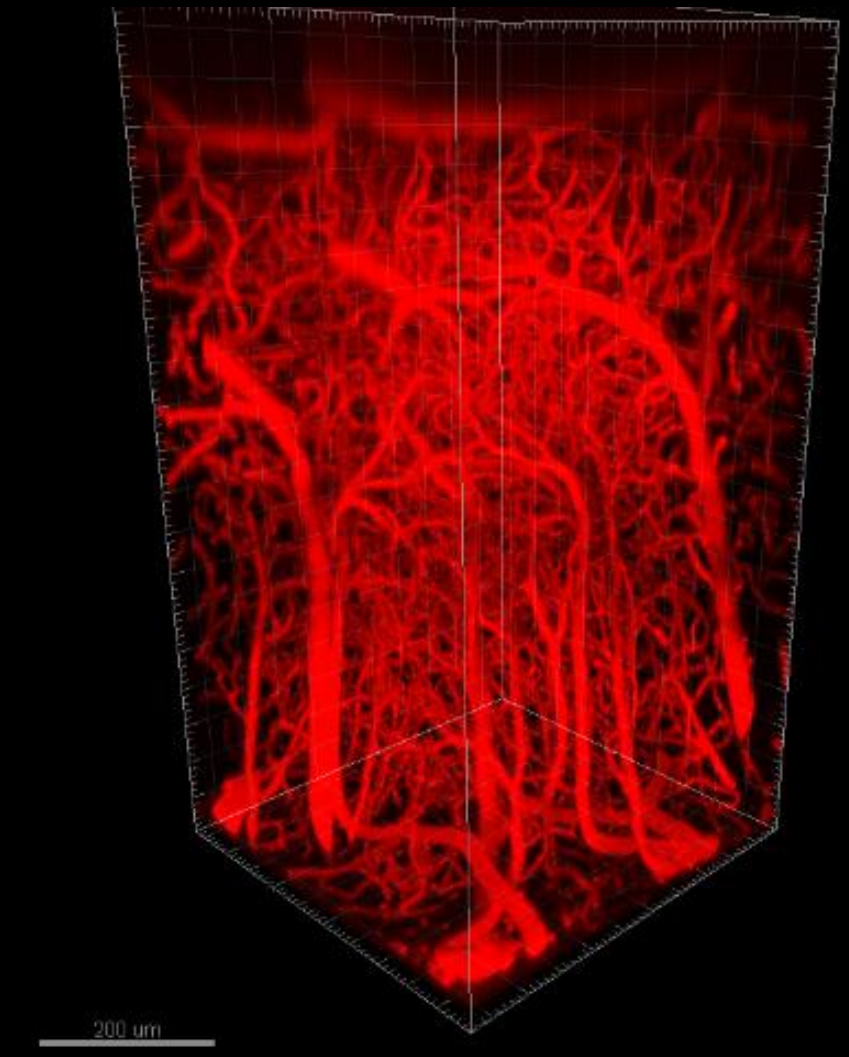
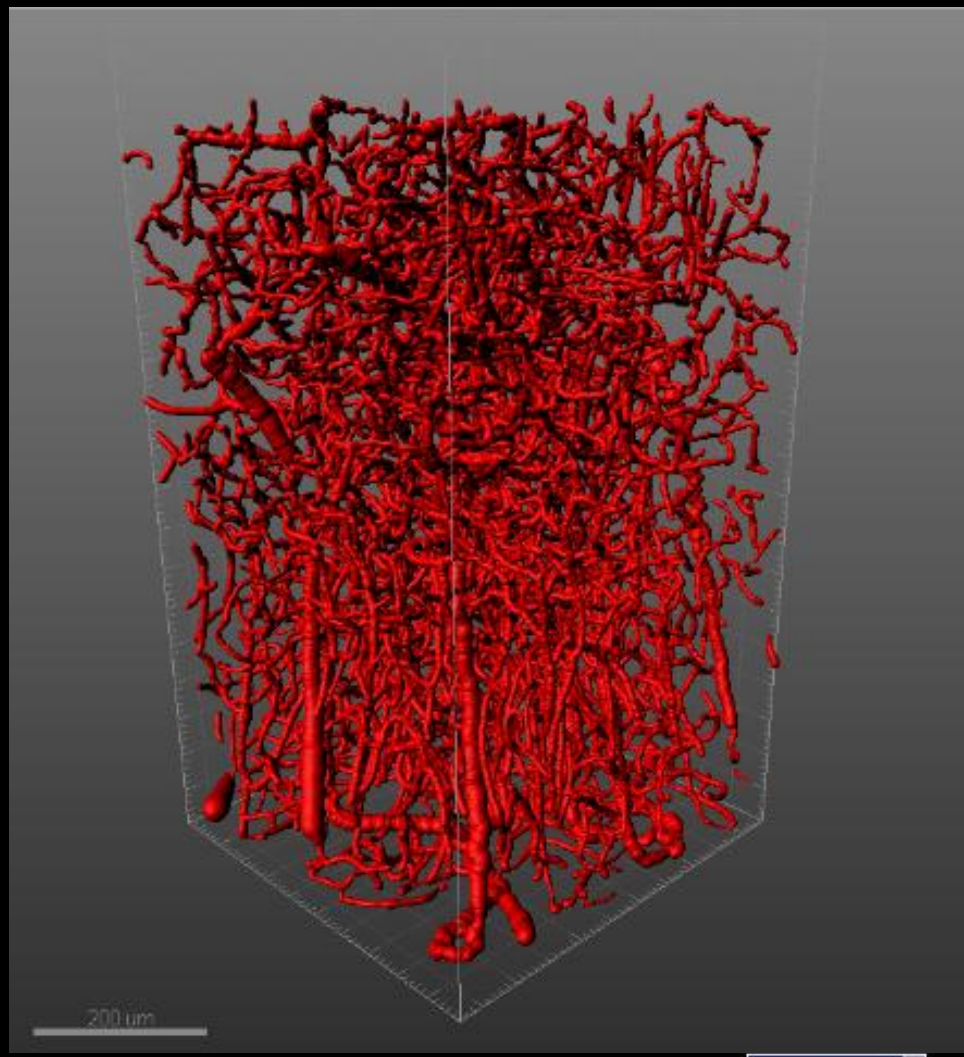
# Filament/Blood Vessels Detection

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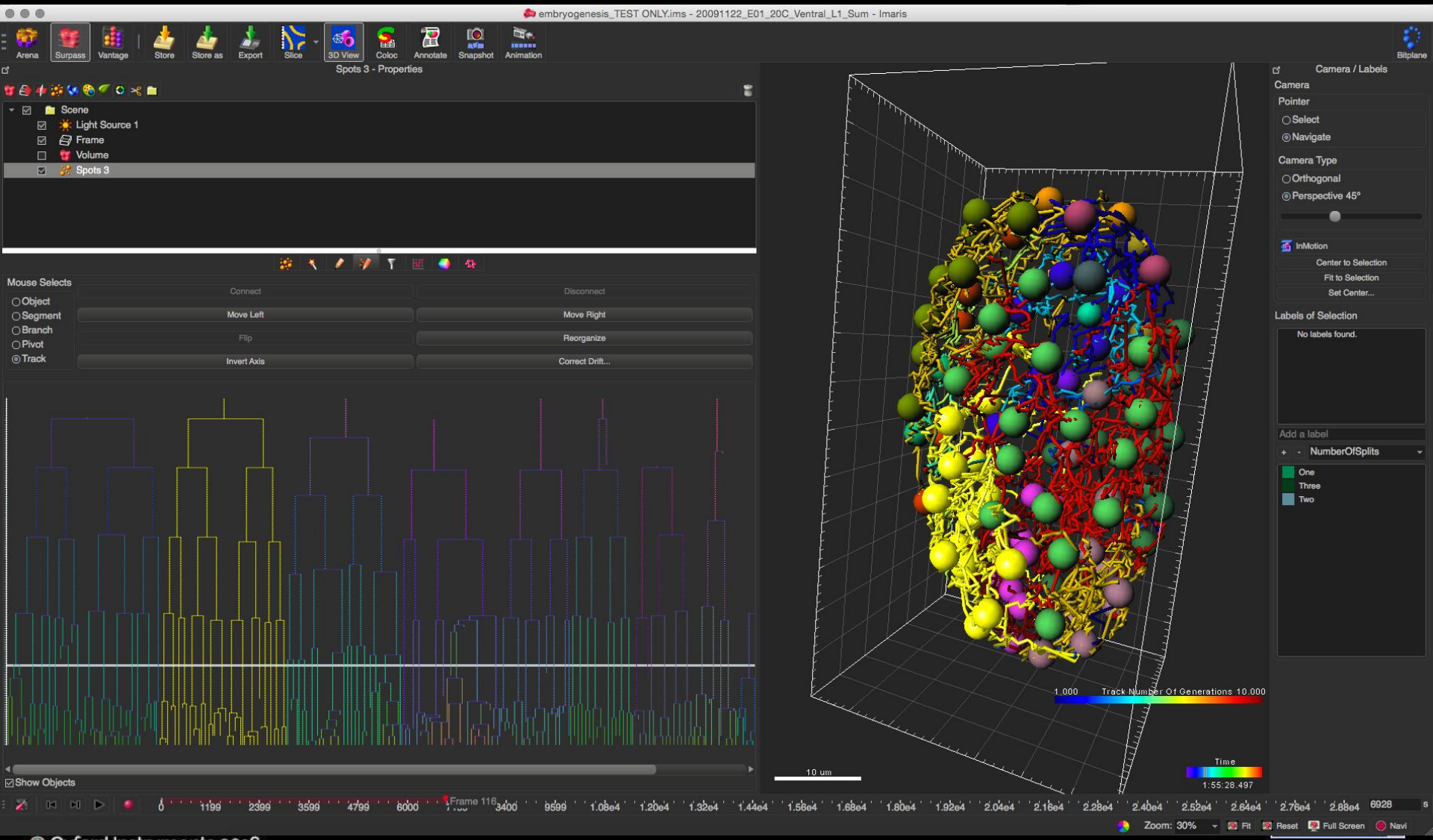
# Imaris TrackLineage - Object Label

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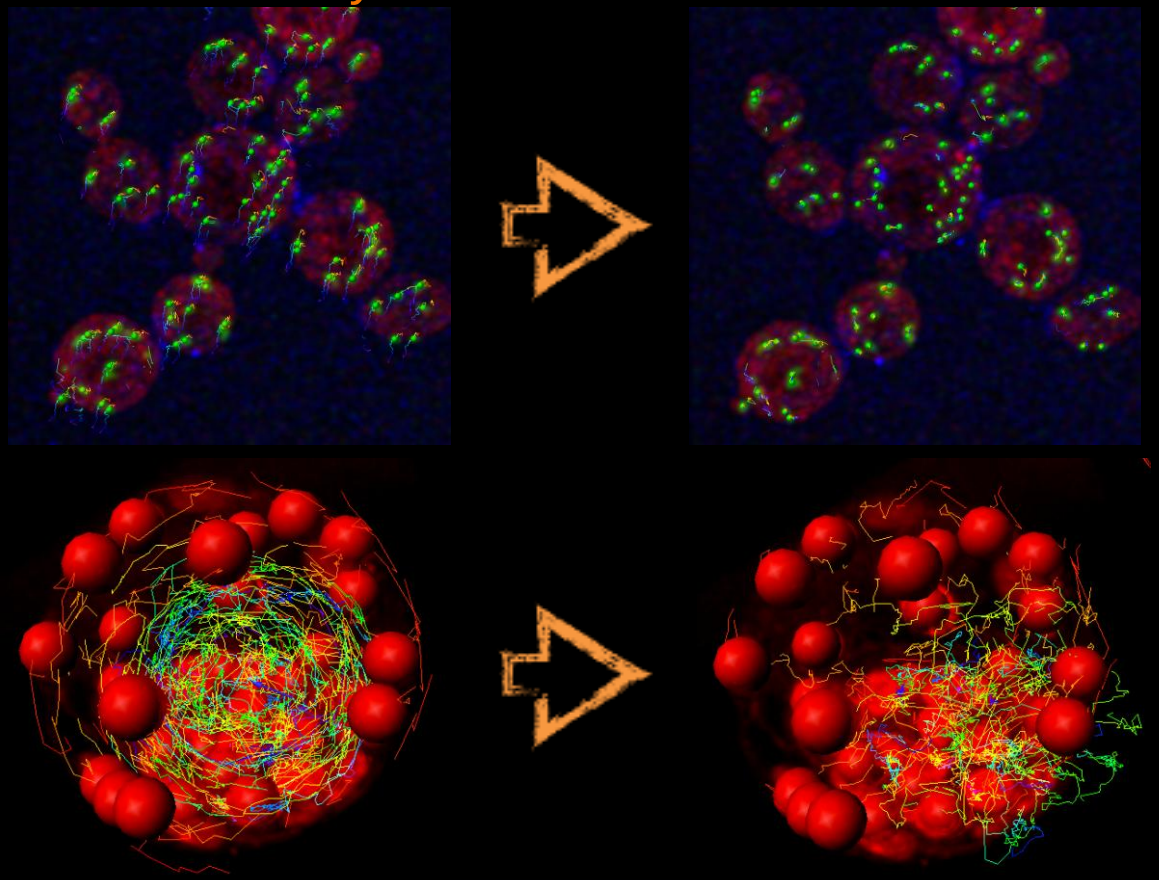
# Reference Frame / Coordinate System

- Correct Drift by RF



- Track Position
- Track Position Reference Frame
- Track Position Start
- Track Position Start Reference Frame
- Track Speed Max
- Track Speed Max Reference Frame
- Track Speed Mean
- Track Speed Mean Reference Frame
- Track Speed Min
- Track Speed Min Reference Frame
- Track Speed StdDev
- Track Speed StdDev Reference Frame
- Track Speed Variation
- Track Speed Variation Reference Frame
- Track Straightness
- Track Straightness Reference Frame
- Track Volume Mean
- Velocity Angle
- Velocity Angle Reference Frame

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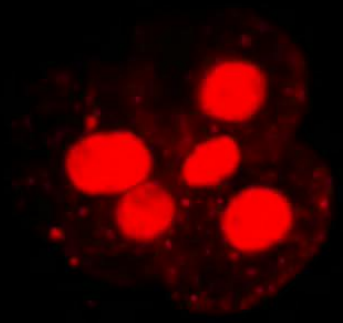
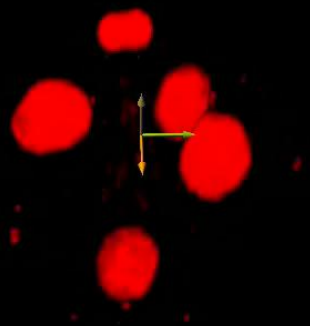
# Reference Frame / Coordinate System

- raw data

rf aligned





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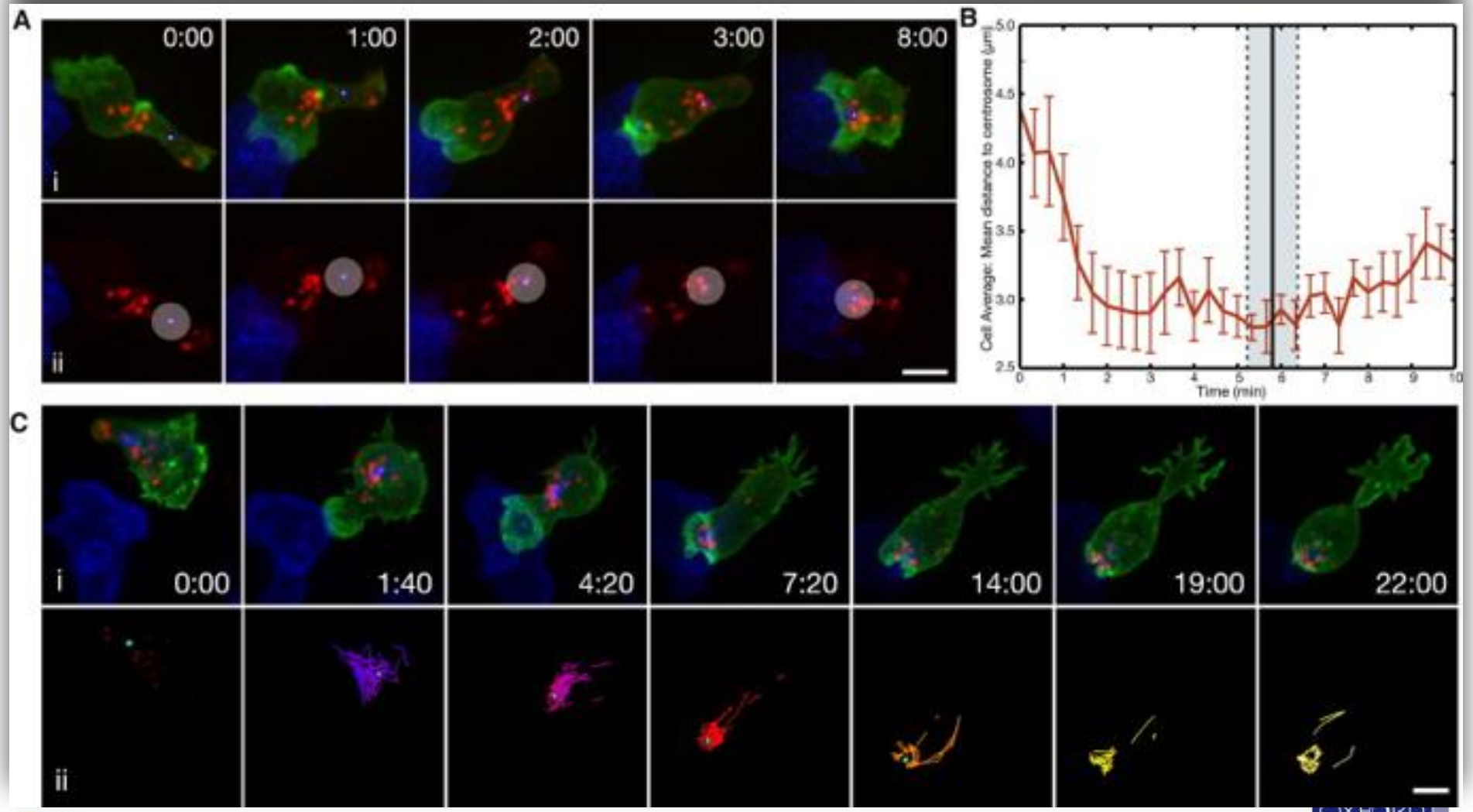
# Killing Cancer - Cytotoxic T-Cells on Patrol

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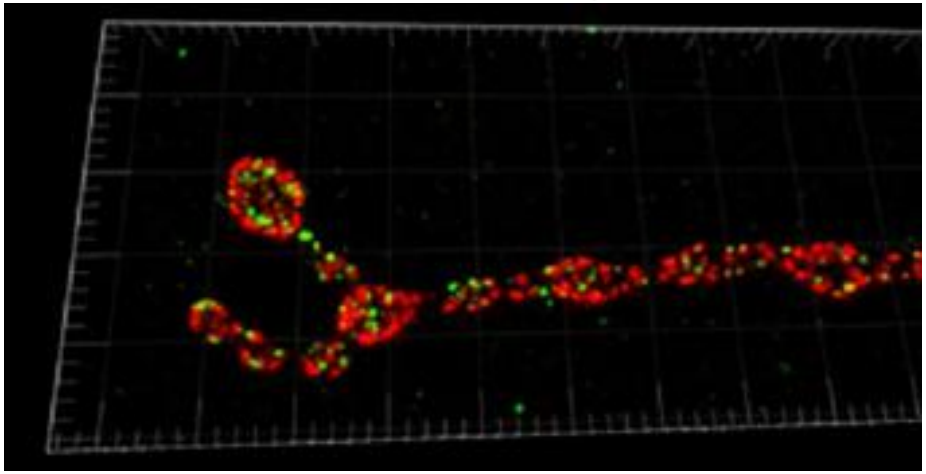
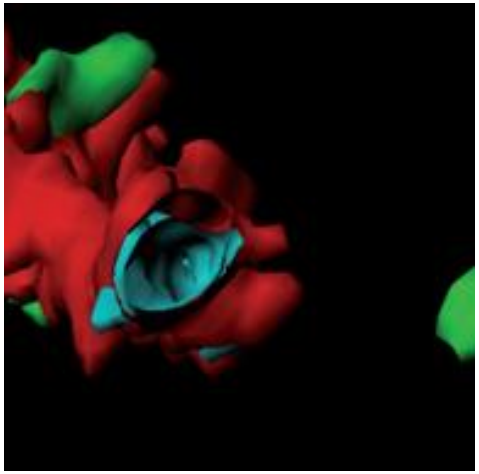
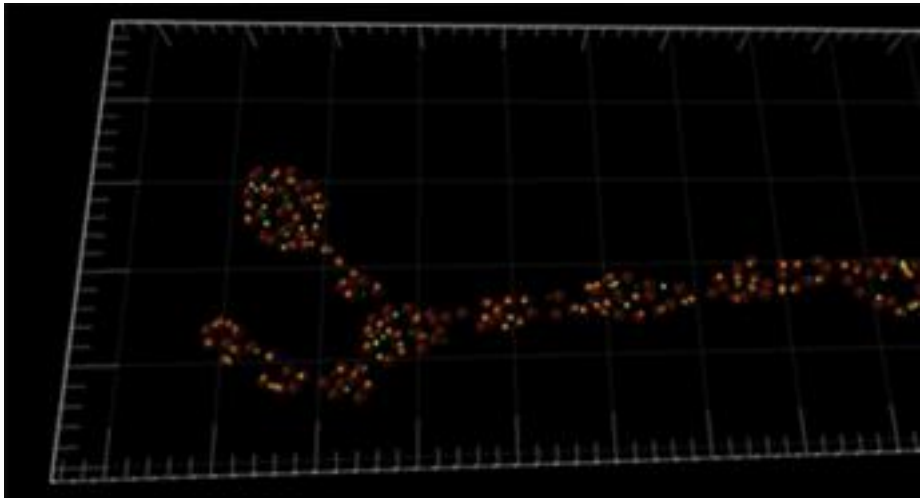
# Two primary kinds of colocalization

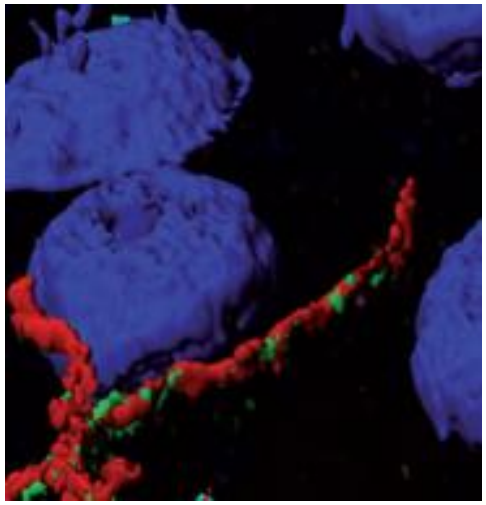
Neuron 66, 724–738, June 10, 2010, DOI 10.1016/j.neuron.2010.05.020

Mensa L, Crespo G, Gastinger M, et al. Hepatology, 2011 (53), pp 1436 - 1445









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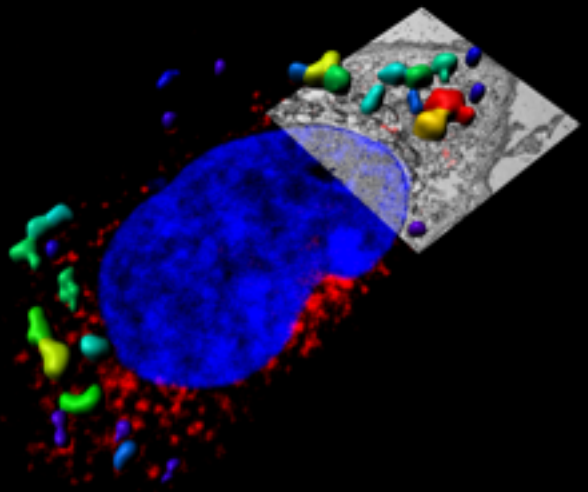
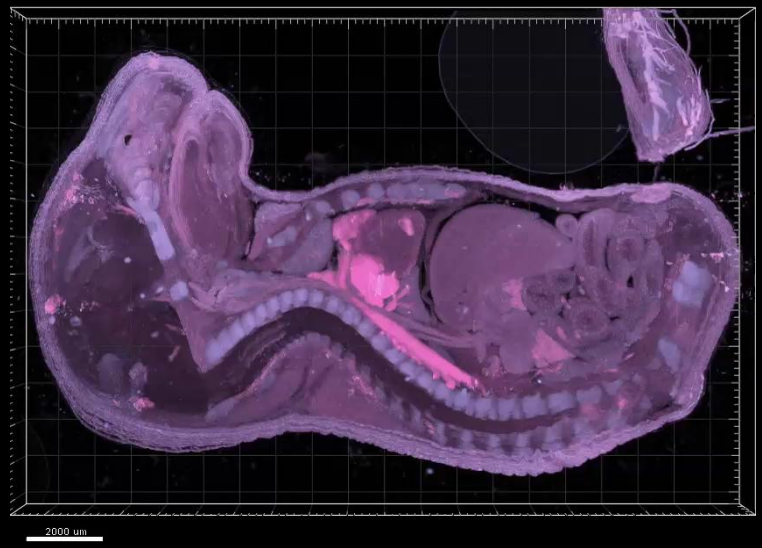
# Simultaneous Visualization of Multiple Images

- Correlative Microscopy
  - Confocal &:
    - EM
    - TIRF
    - DIC, Phase, etc.



- High-mag/Low-mag Overlay
  - Staging
  - Tissue identification

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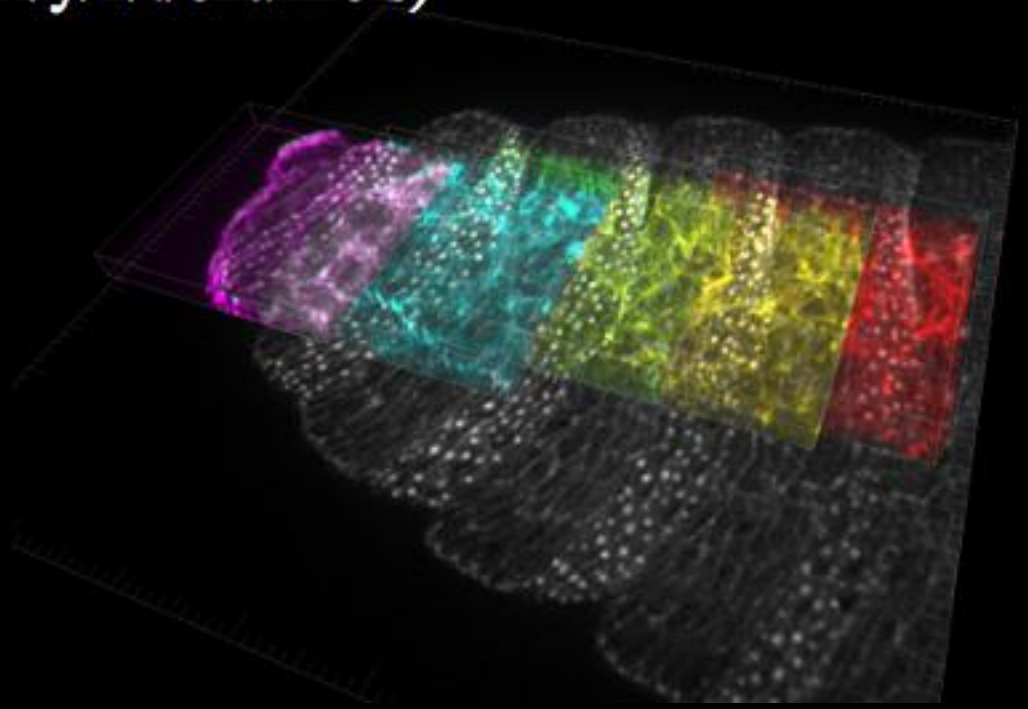
# Simultaneous Visualization of Multiple Images

- Flexibility
  - Overlay many images
  - Of differing dimensions (x/y/z/t/channels)
  - Of differing resolutions



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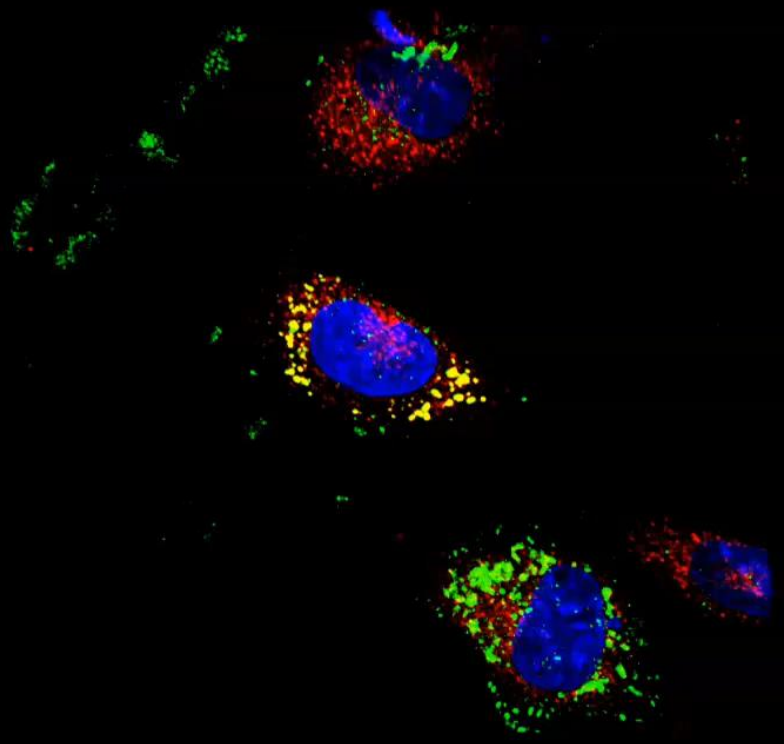
# Simultaneous Visualization of Multiple Images

Physical sectior

•Working distan

•Antibody cost

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# Any Questions?

Thank you !

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