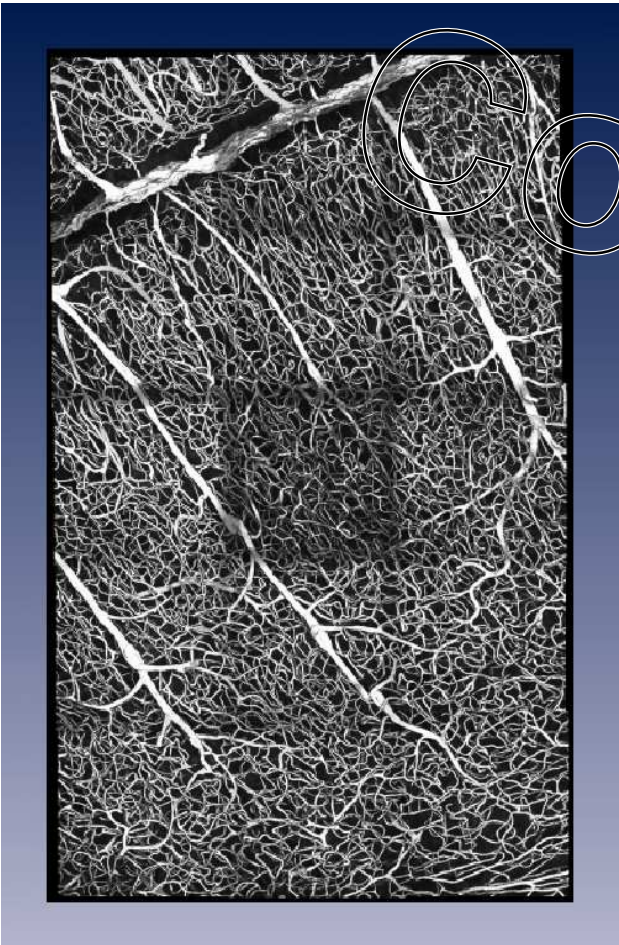


Display and handling of large 3D images



Steffen Prohaska

(Indeed, Zuse Institute Berlin/ZIB)

prohaska@zib.de

Indeed
Visual Concepts



**Towards a Research Network
on Imaging and Biomechanics
of the Brain Microcirculation
(Toulouse, 18-19 November 2002)**

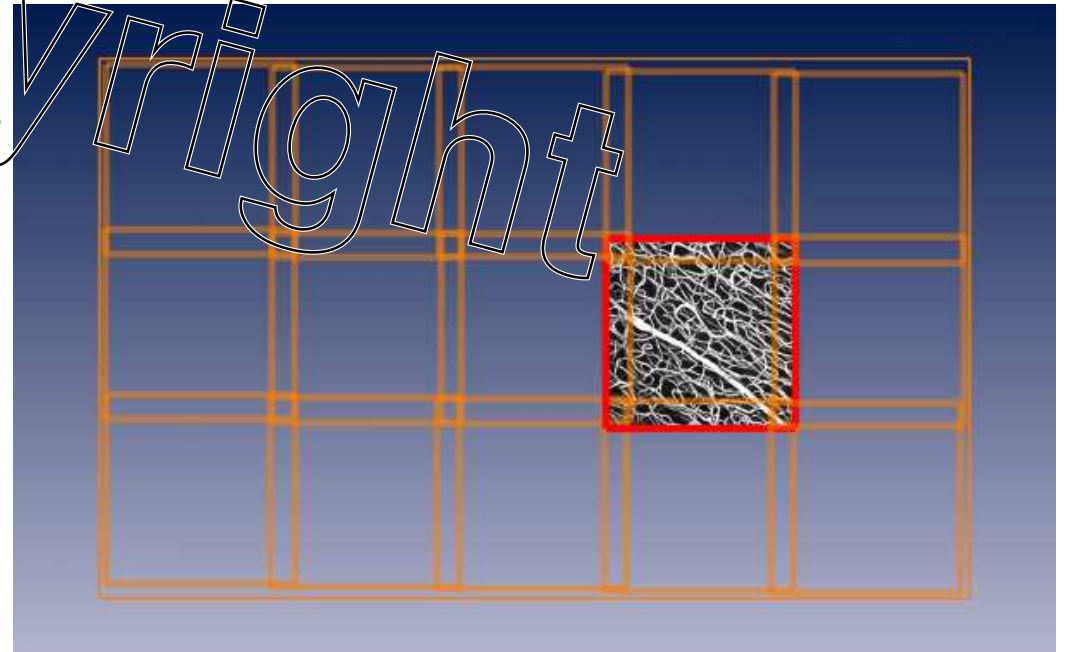
Outline



- Blockwise image acquisition
 - **Display of image data**
 - **Alignment, merging**
 - Segmentation
 - Thinning, conversion to lines w/ thickness
 - **Check, correction of network**
 - Assessment of network
- Copyright*

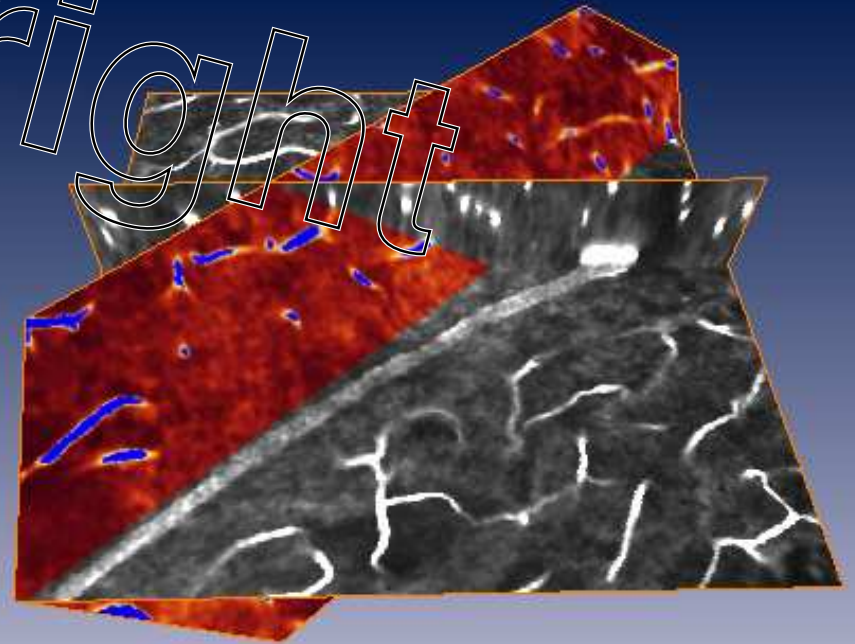
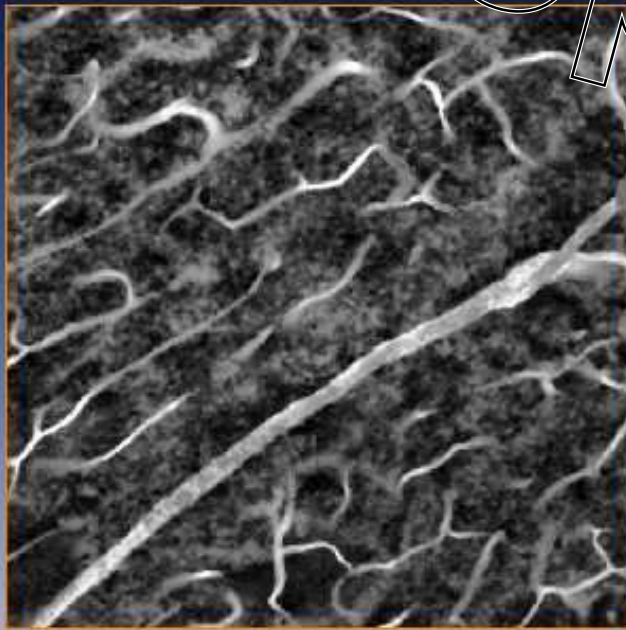
Image Acquisition

- Blockwise with overlap
- Depth limited by confocal microscope
- Xy-plane virtually unlimited
- Blockwise preprocessing
 - Filtering
 - Z-drop correction



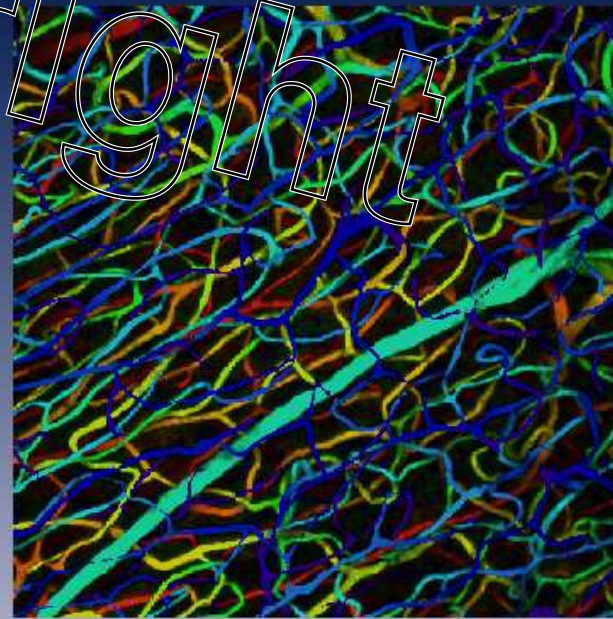
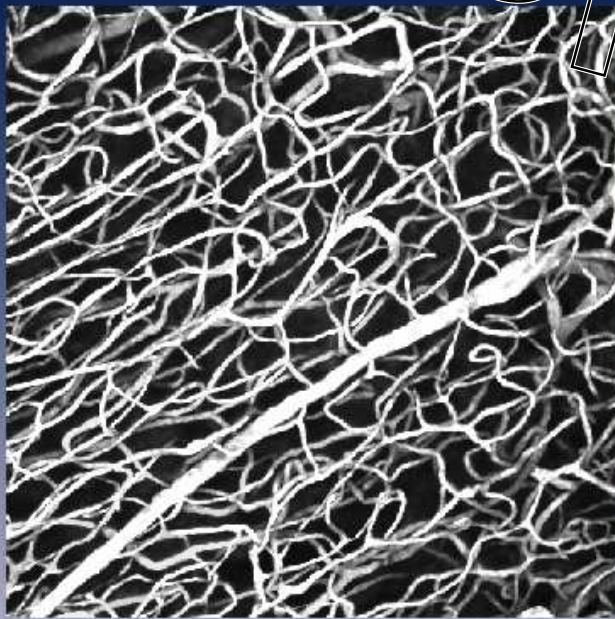
Slicing

- Orthogonal, oblique
- Color mapping



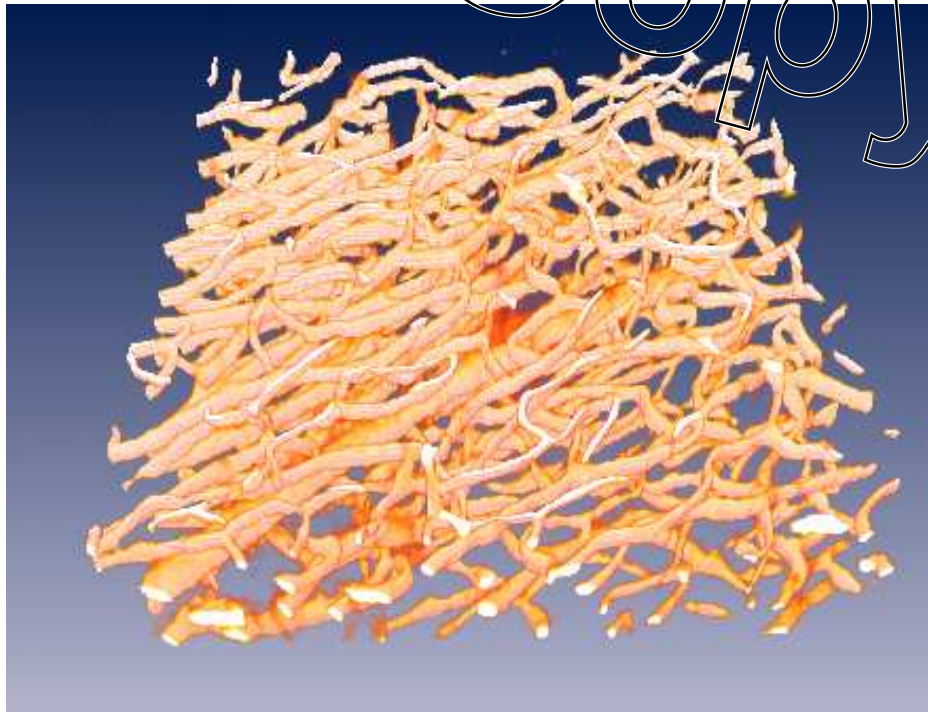
Projection View

- Maximum intensity projection (MIP)
- Color encodes 3D information (depth)



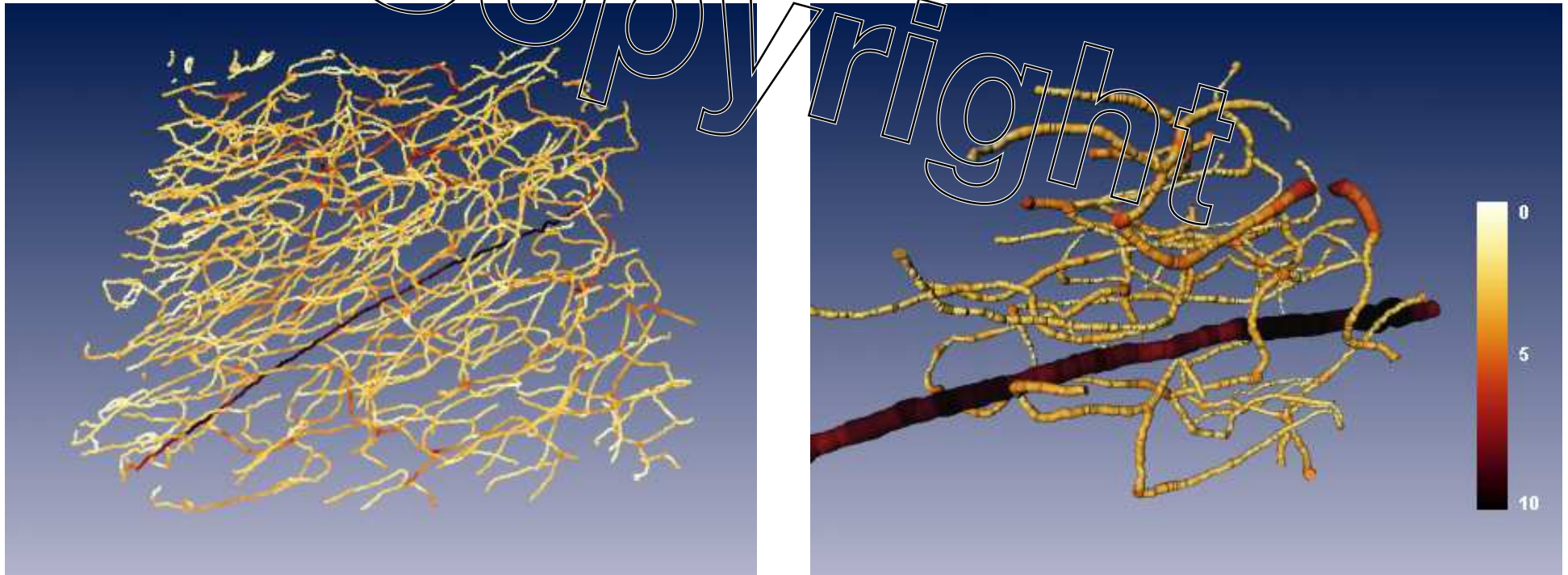
Volume Rendering, Isosurface

- Fully three dimensional
- No preprocessing needed



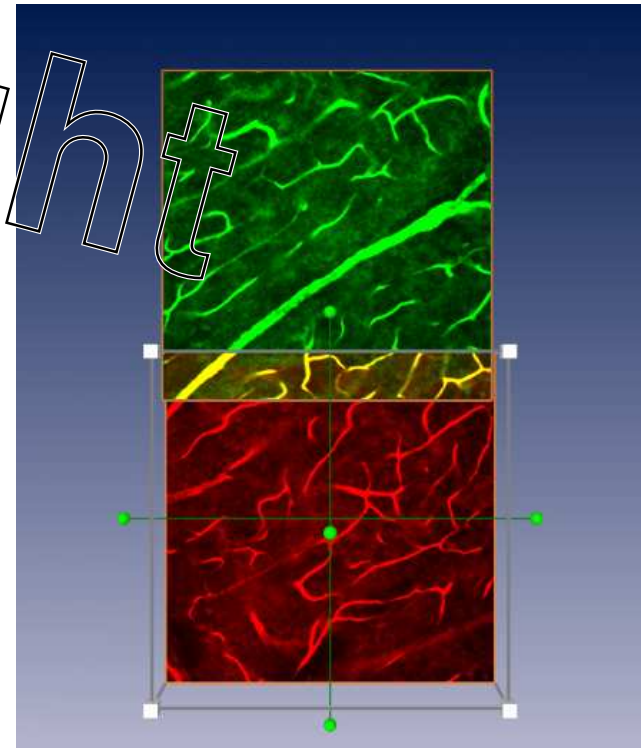
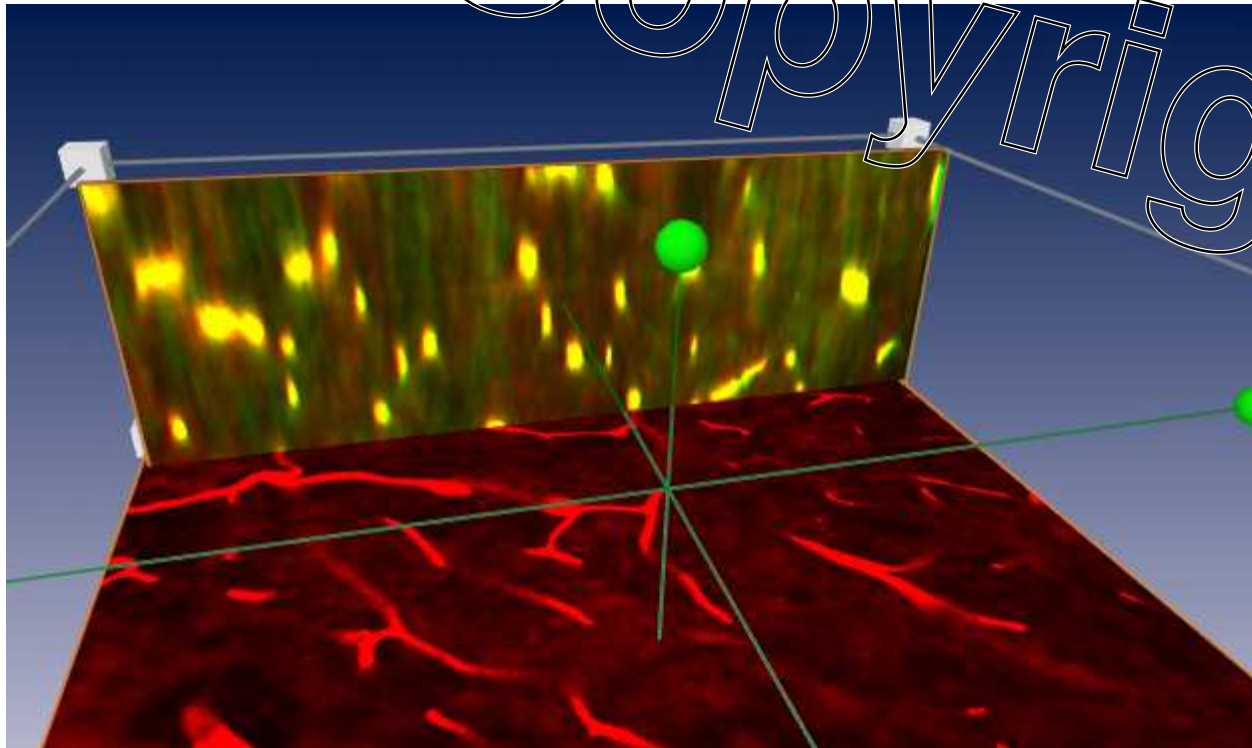
Feature Extraction

- Complicated algorithms
- Fast rendering, data analysis



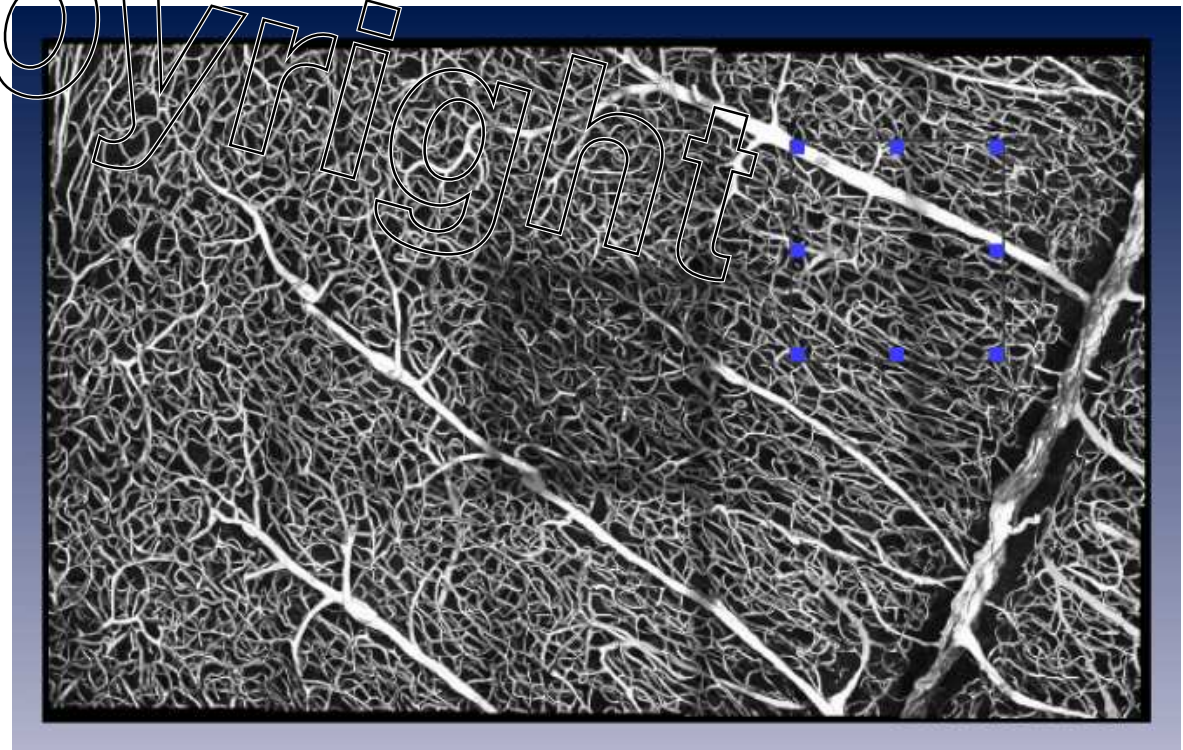
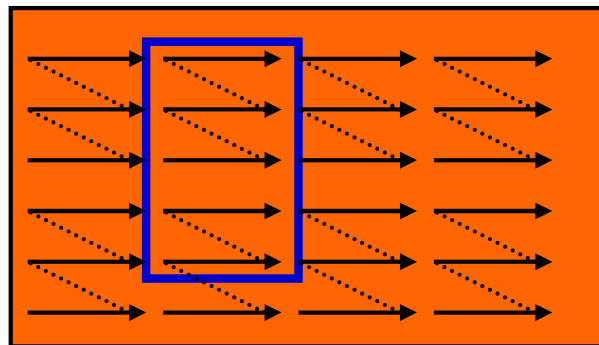
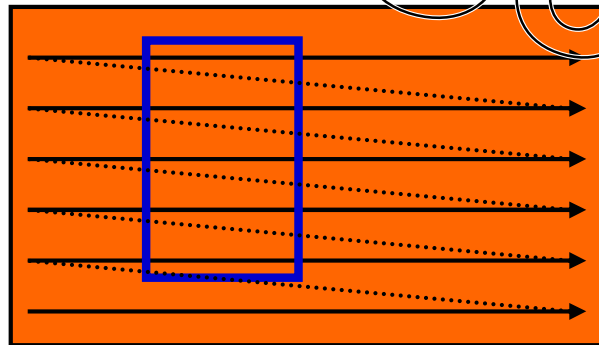
Alignment of Blocks

- Automatically based on grey values
- Manual interaction possible



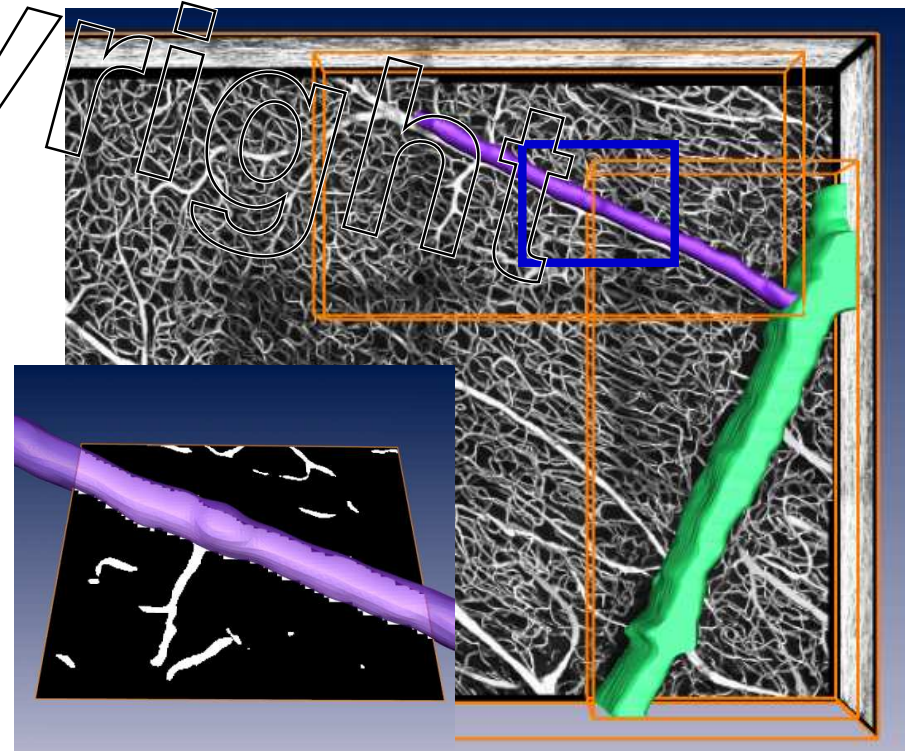
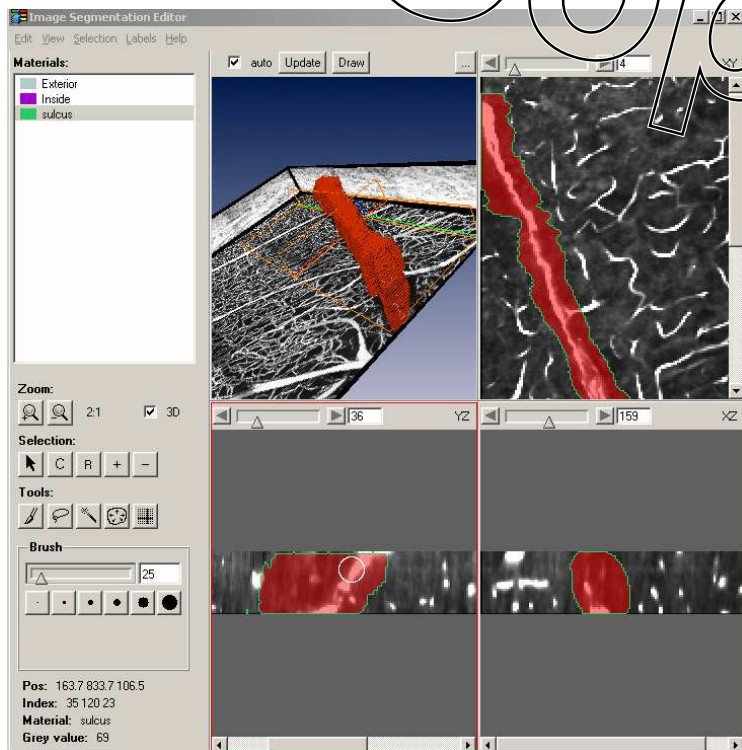
Merging to One Image

- Blending in overlapping regions
- Specialized block storage scheme on disk



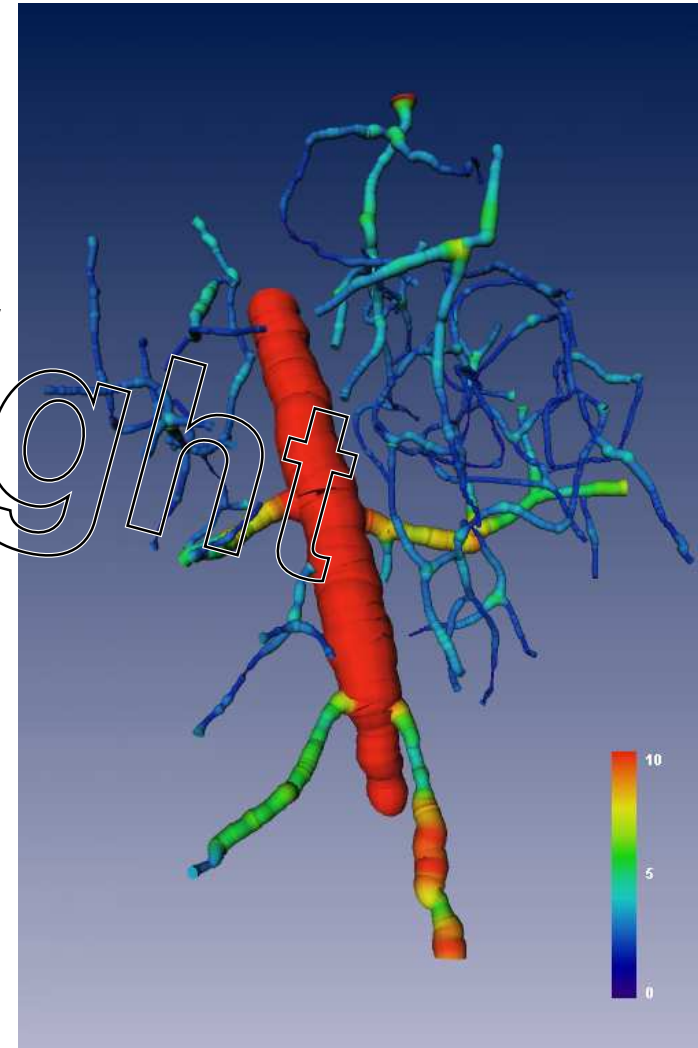
Segmentation

- Simple thresholding
- Postprocessing manual corrections



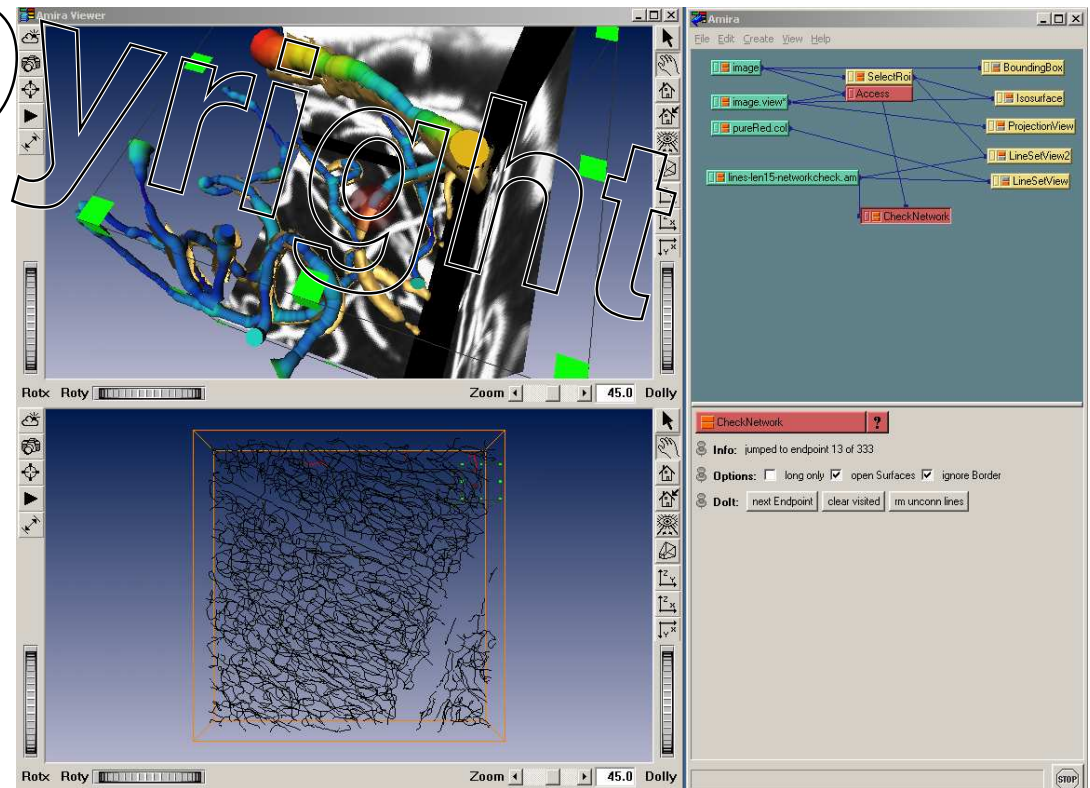
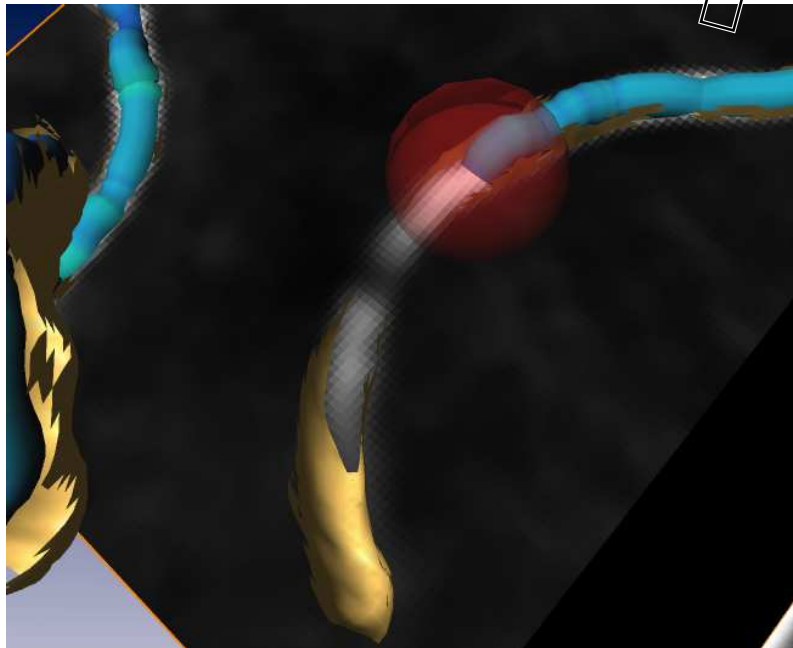
Extraction of Central Lines

- Voxel based
- Distance map
- Thinning
 - Remove boundary voxels
 - Preserve topology
- Tracing of lines



Checking the Network

- Display original image data and resulting network at the same time



Summary



- Visualization methods
 - Slicing
 - Projection view
 - Volume rendering
 - Isosurface
 - Feature extraction
 - Merge to one large image stored on disk
 - Forget about blockwise acquisition, work on arbitrary blocks
 - Intergrate everything and use as needed
- Copyright*

Discussion

Thank you for your attention.

