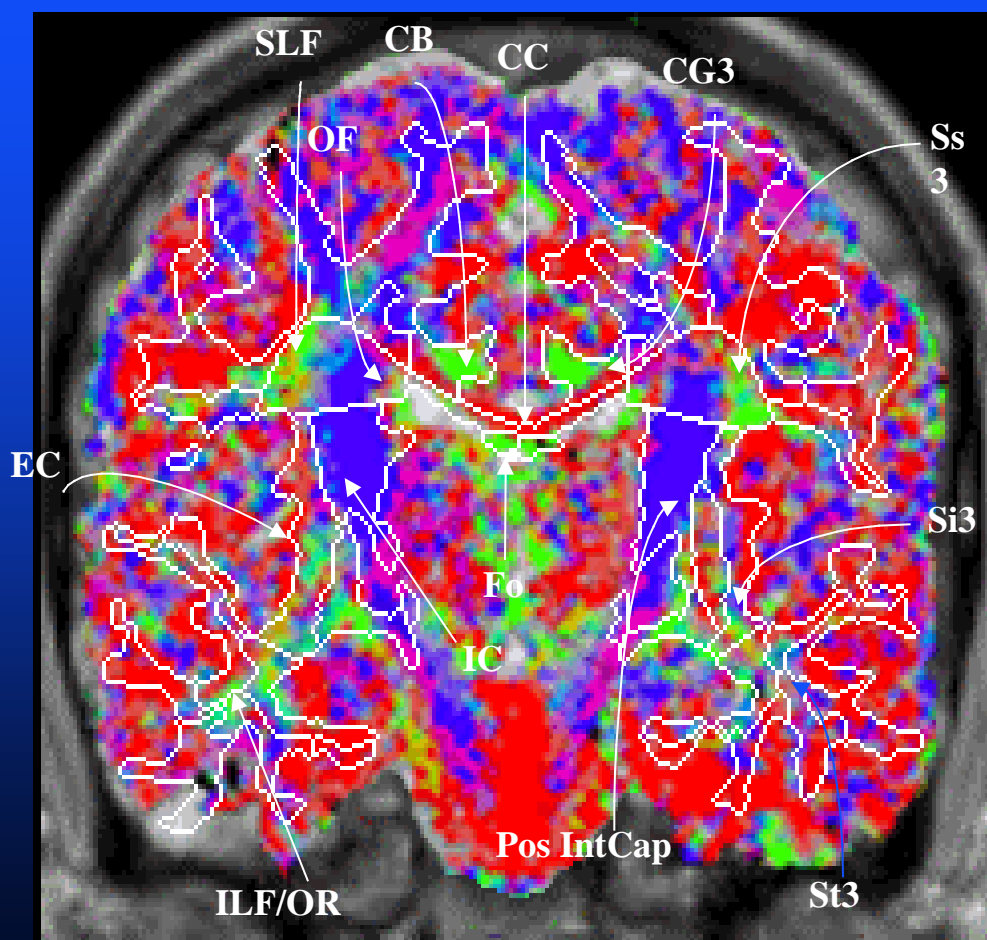


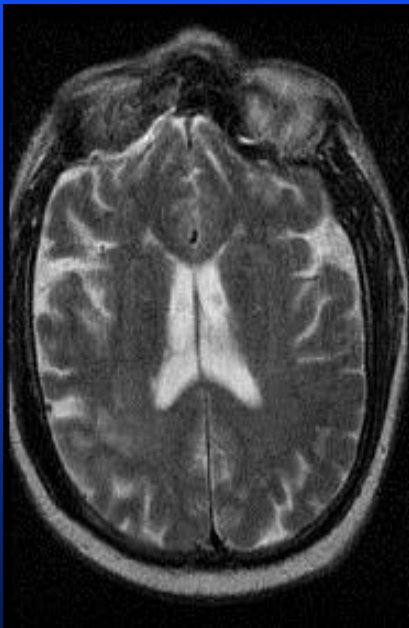
Diffusion Imaging and White Matter Parcellation



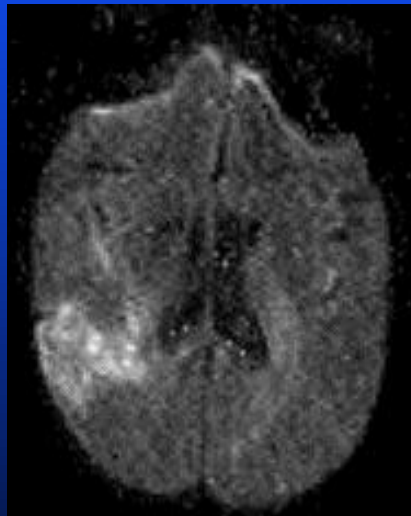
Diffusion Tensor Imaging: Examples of Pathology

- Stroke: Case 1
- Stroke: Cases 2 & 3, compared

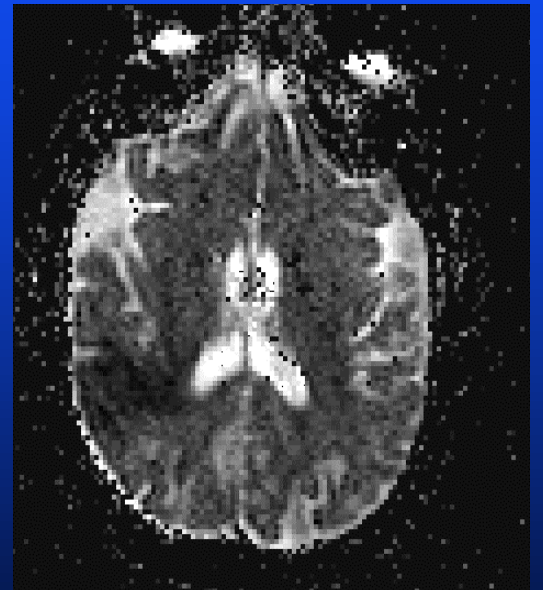
Conventional MRI and DWI in acute stroke



T2
FSE

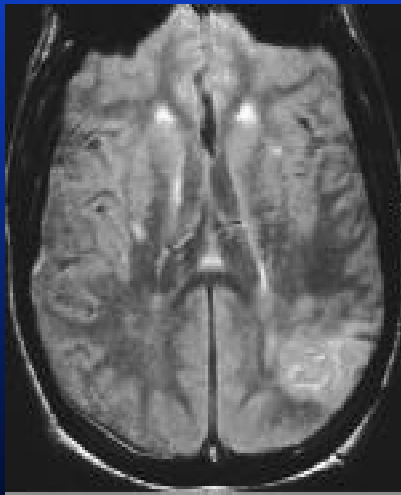
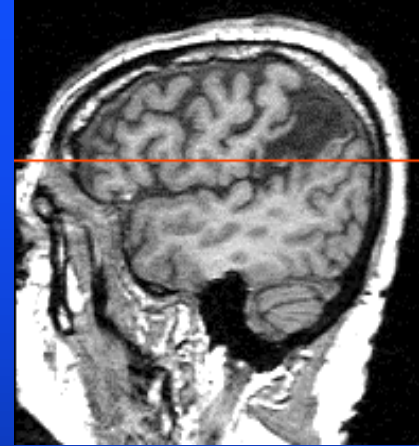
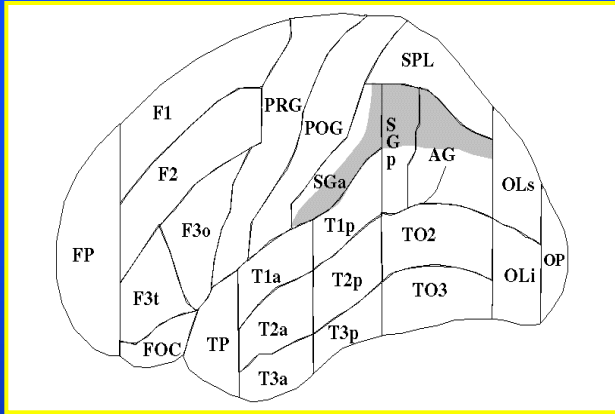


DWI



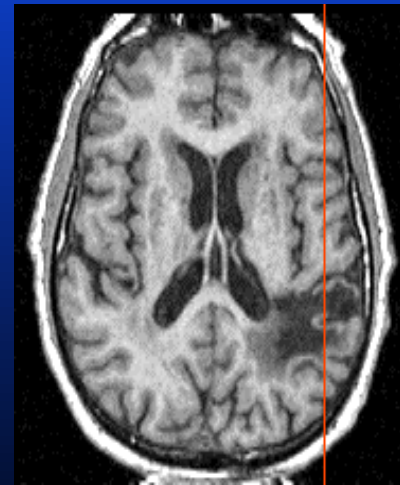
ADC

Stroke Patient - Anatomic Lesion



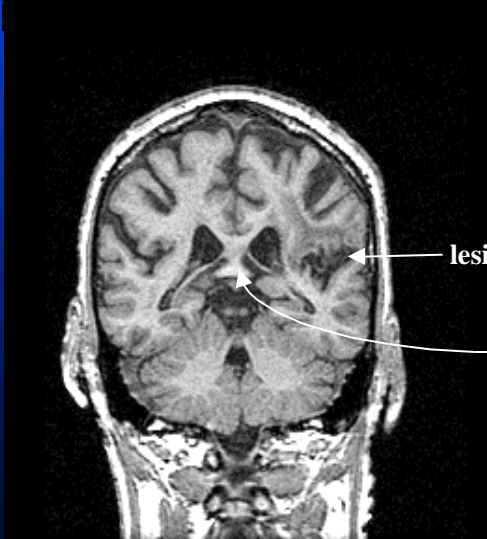
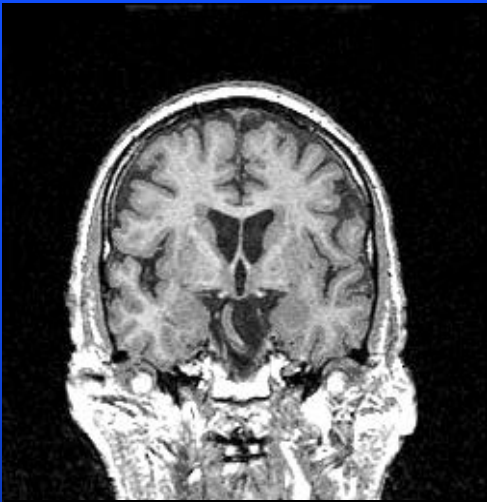
Right

Left



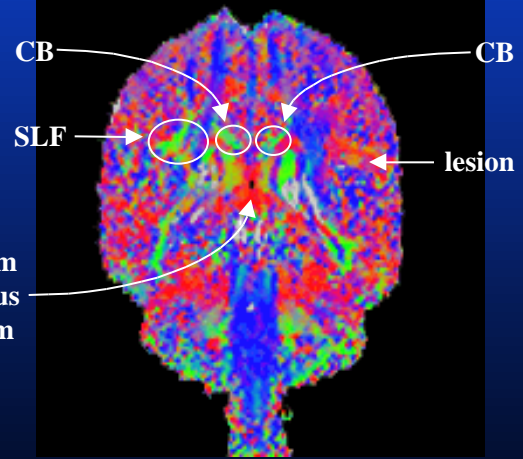
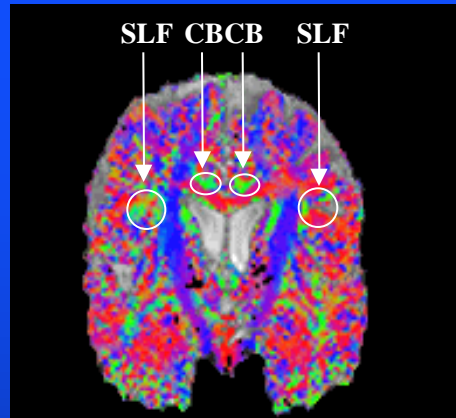
Right

Left



Right

Left

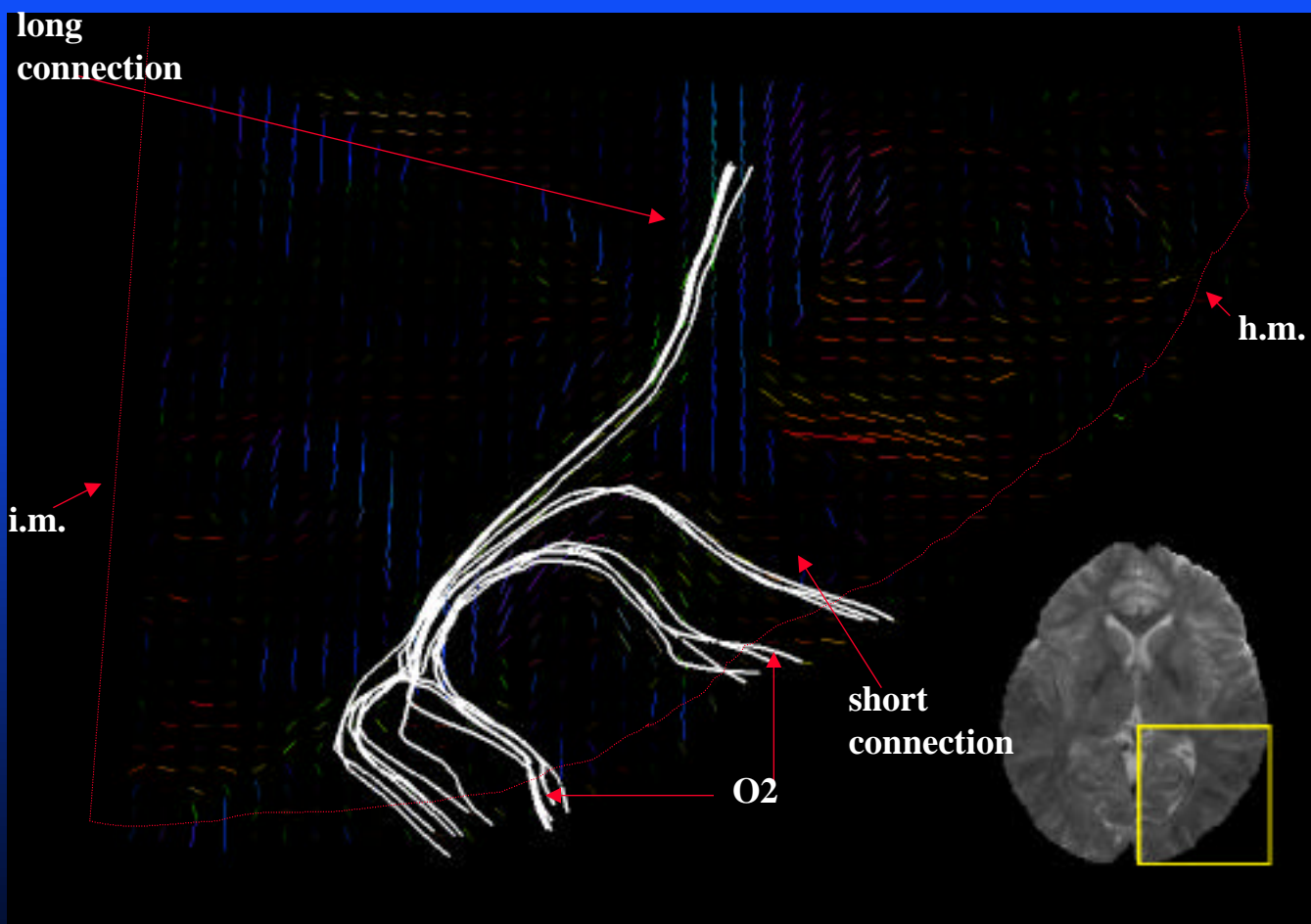


Right

Left

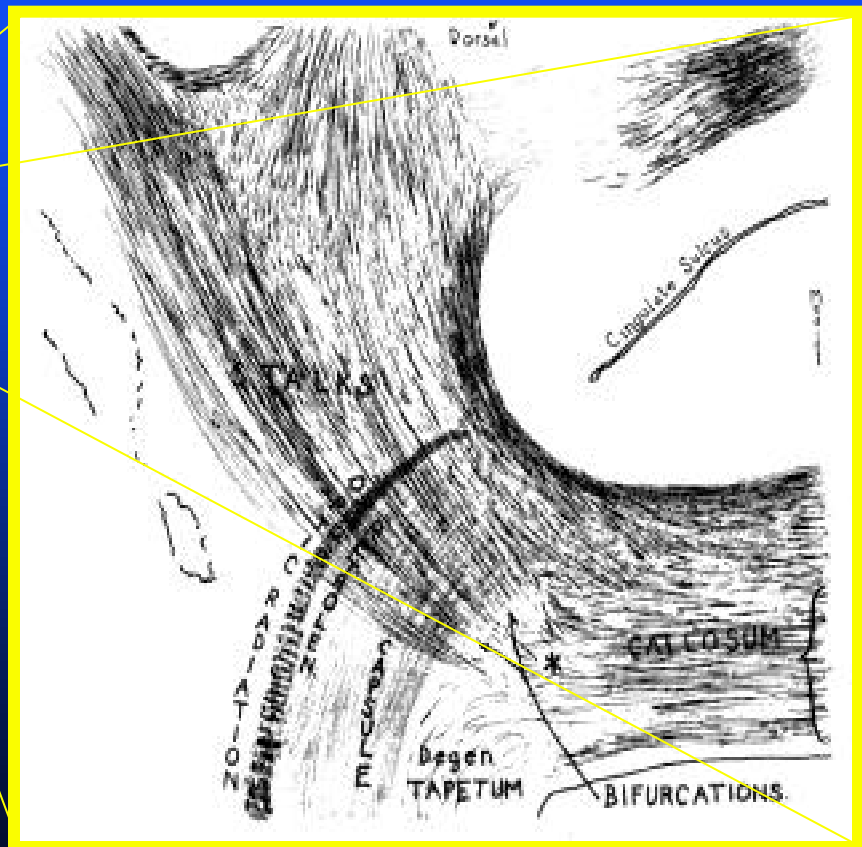
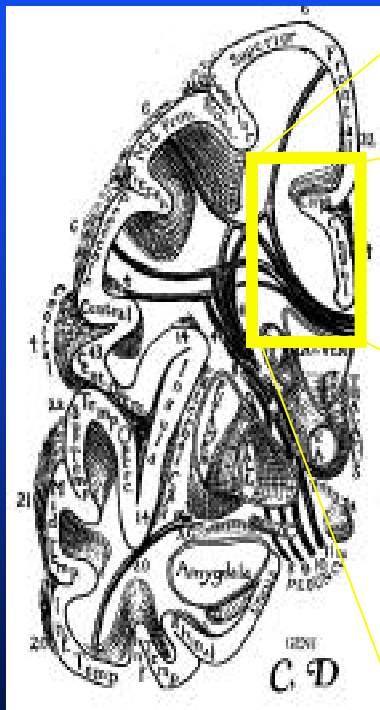
Diffusion Tensor Imaging: Technical Topics

- Tract Tracing
- Diffusion Spectrum Imaging
- Spatial Coverage
- SNR
- Visualization



Wedeen & Tuch

Overview of WM - Microstructure

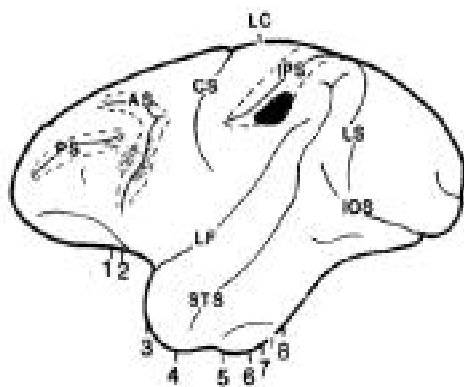


W. Krieg, 1973

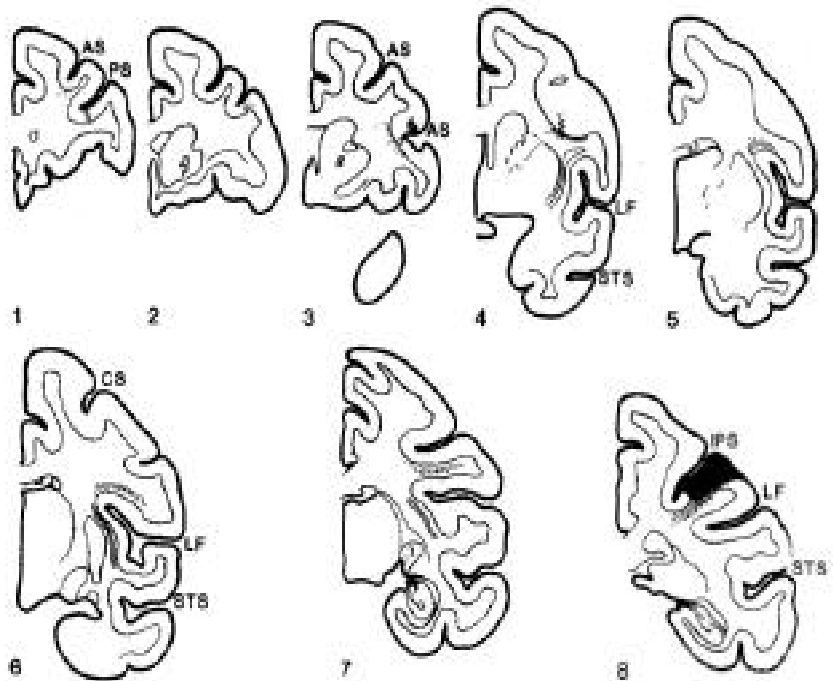
Traditional Methods to Observe White Matter Structure

- **Myelin Staining Methods** (usually potassium dichromate as mordant)
 - Hematoxylin-based
 - Osmium-based
 - Silver-based
- **Experimental Methods**
 - **Retrograde Methods**
 - Horseradish peroxidase
 - **Anterograde Methods**
 - Nauta Technique: Marchi Technique: Electron Microscopy
 - Radiolabeled aminoacids
 - Neurotransmitter-related Techniques

Example Anterograde Tracing - SLF

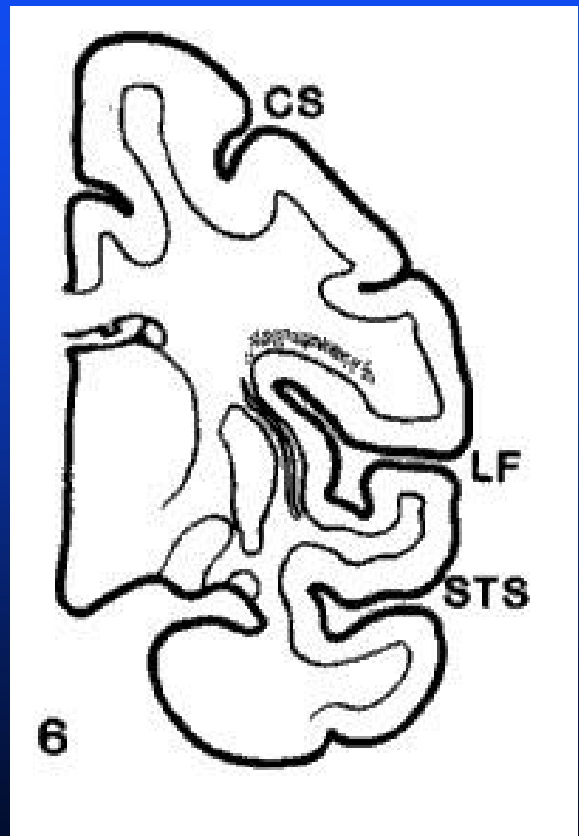
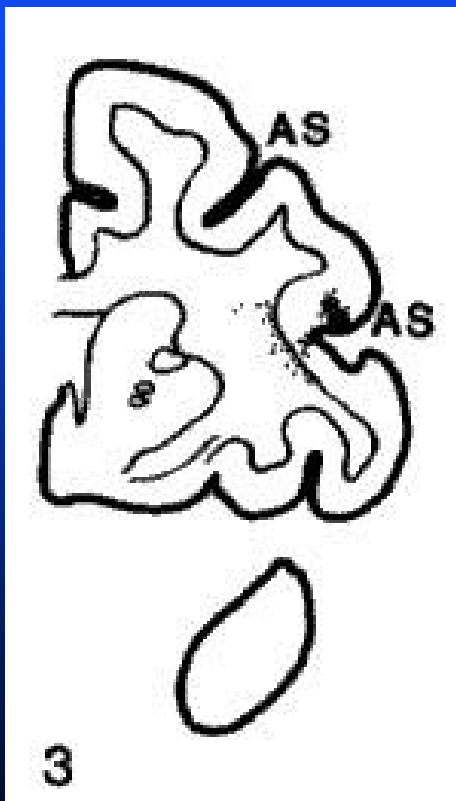


CASE 13



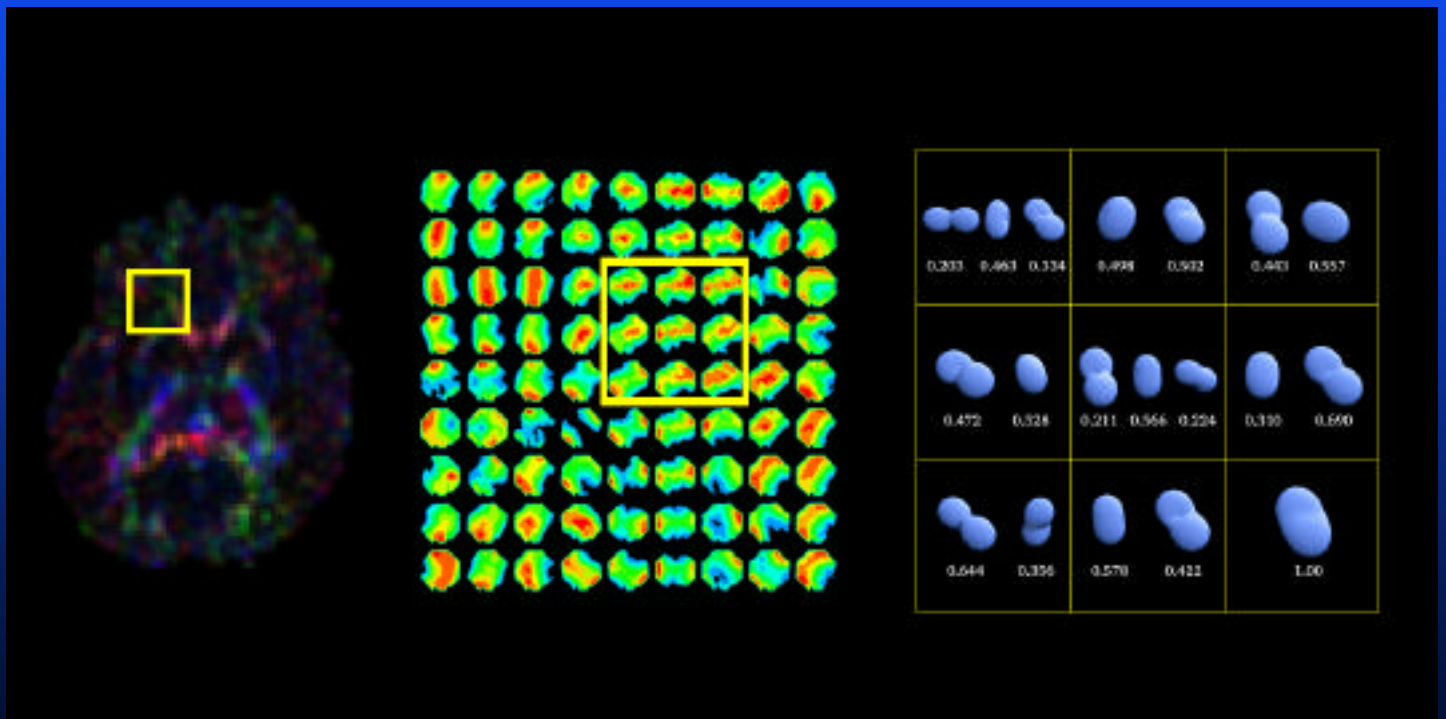
Petrides & Pandya, '84

Example Anterograde Tracing - SLF



Petrides & Pandya, '84

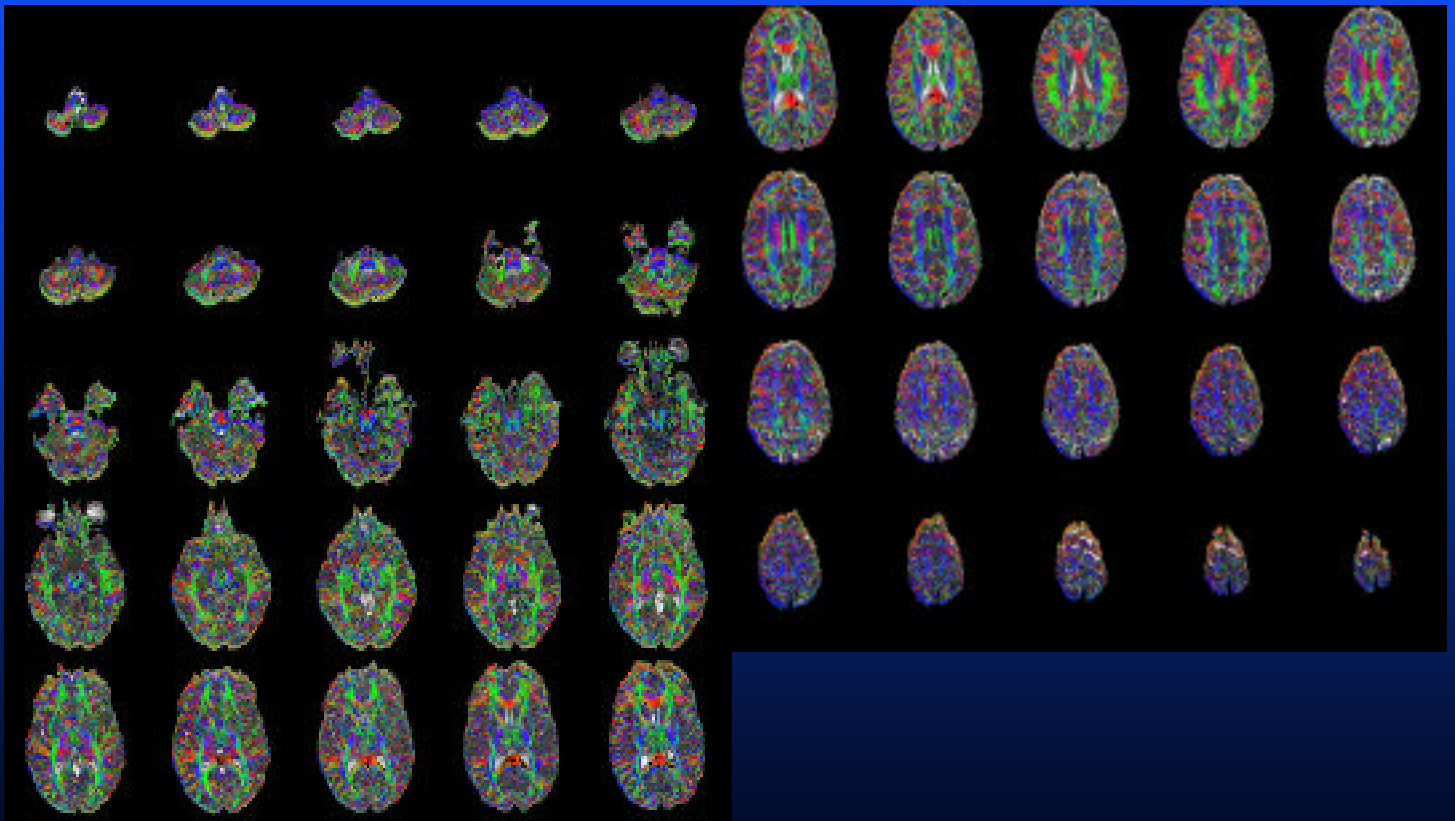
Diffusion Spectrum Imaging (DSI)



Wedeen & Tuch

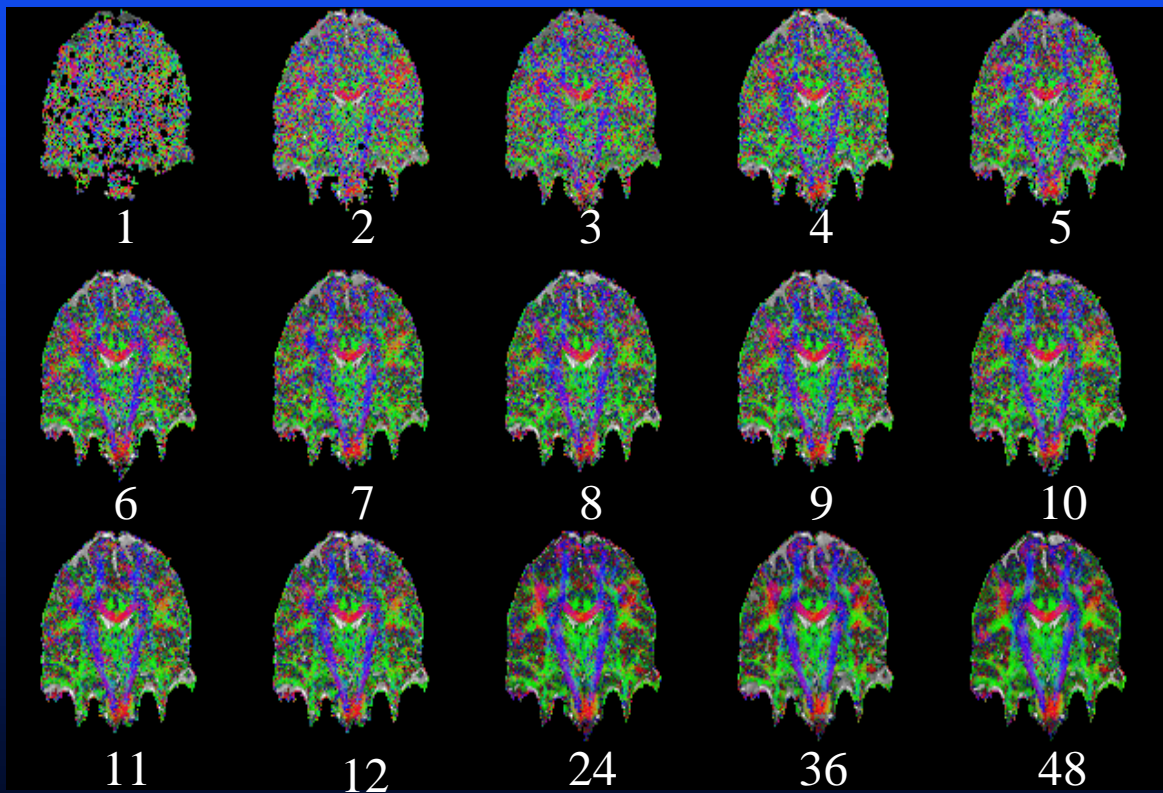
High-Resolution Diffusion Imaging

(1.5 x 1.5 x 3 mm)



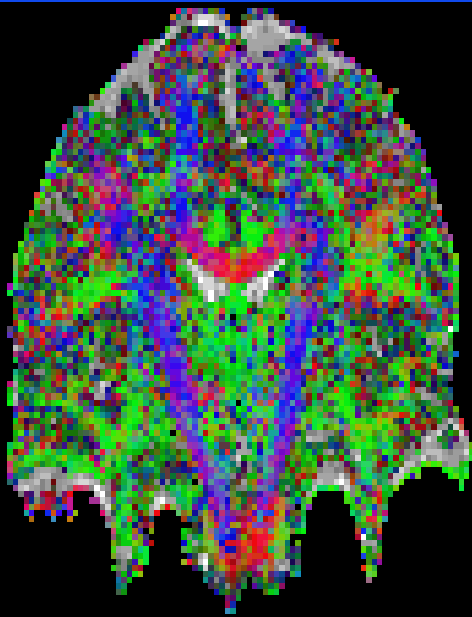
Diffusion Tensor Imaging

Effect of Averaging

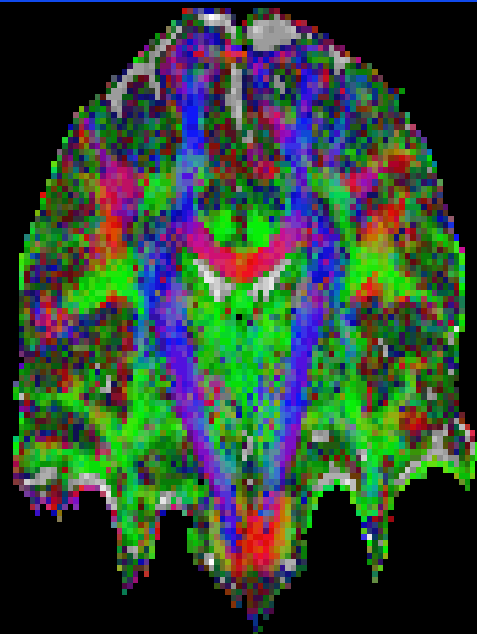


Diffusion Tensor Imaging

Resolution = 1.5 x 1.5 x 3 mm

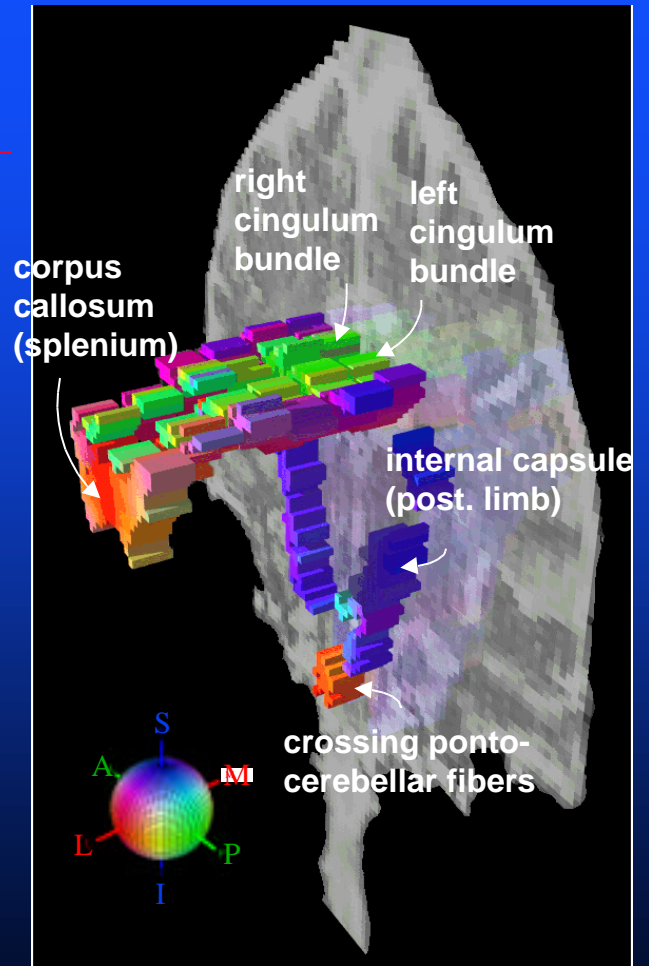
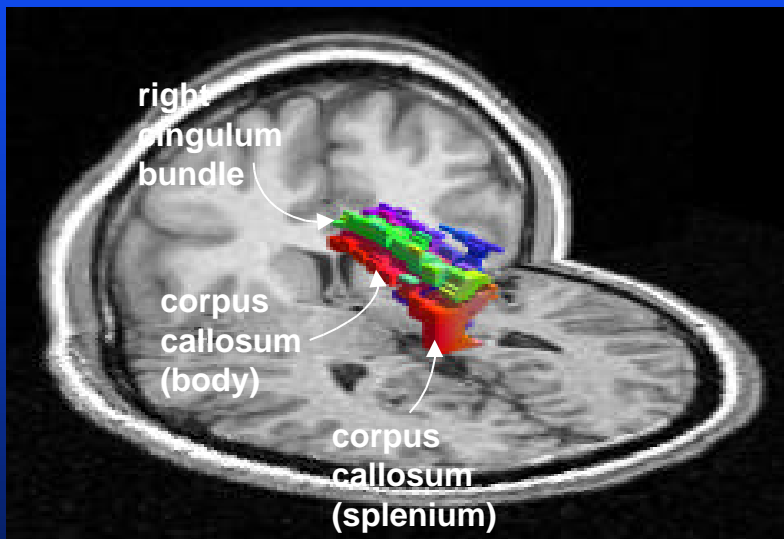


12 Averages

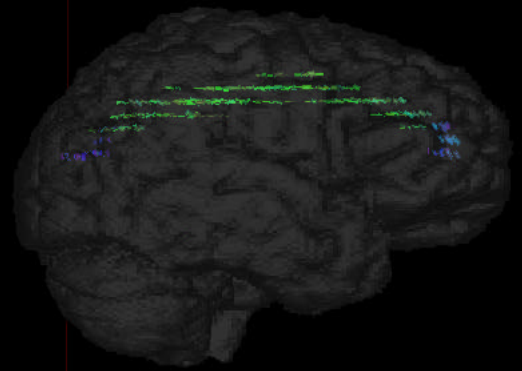
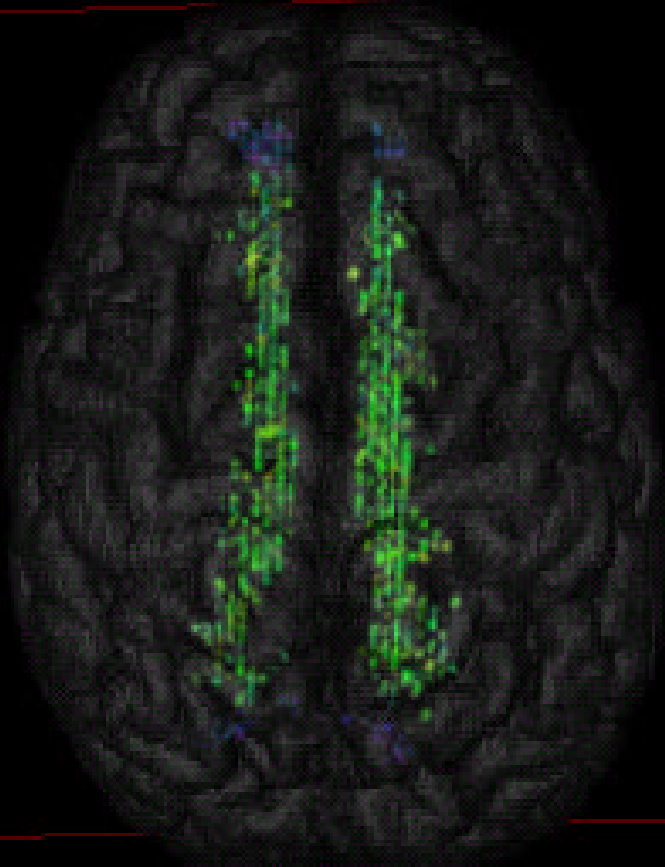


48 Averages

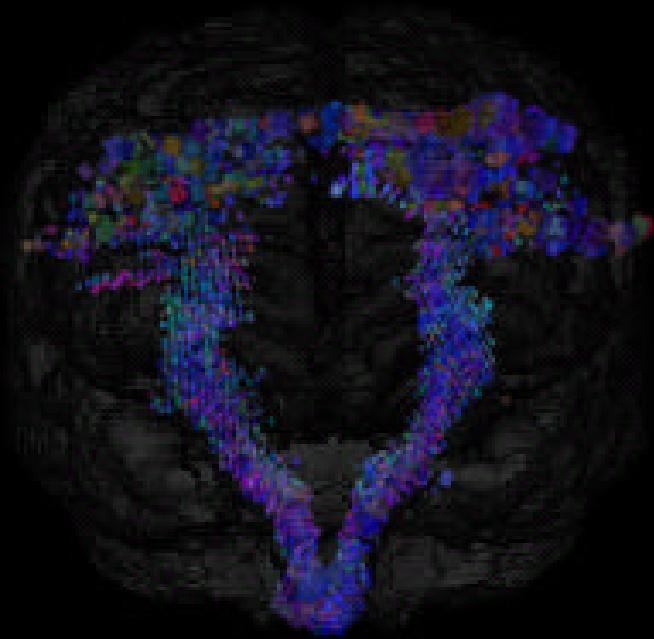
3D Visualization



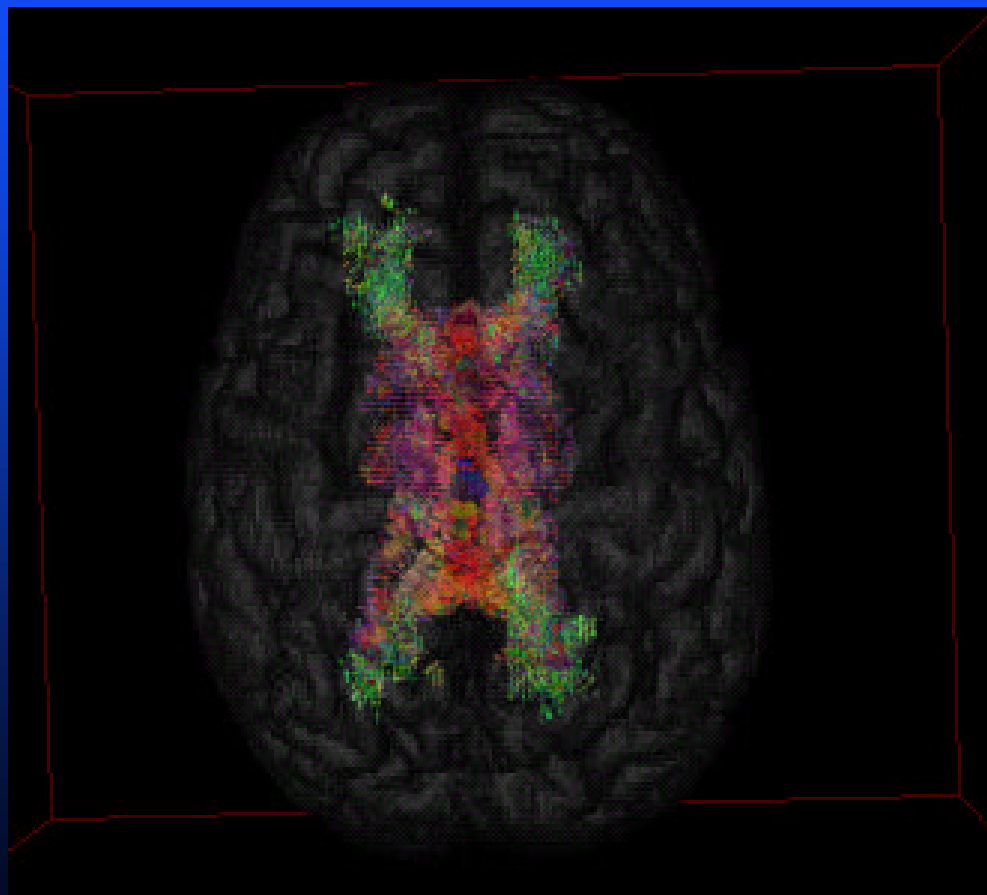
Cingulum Bundle

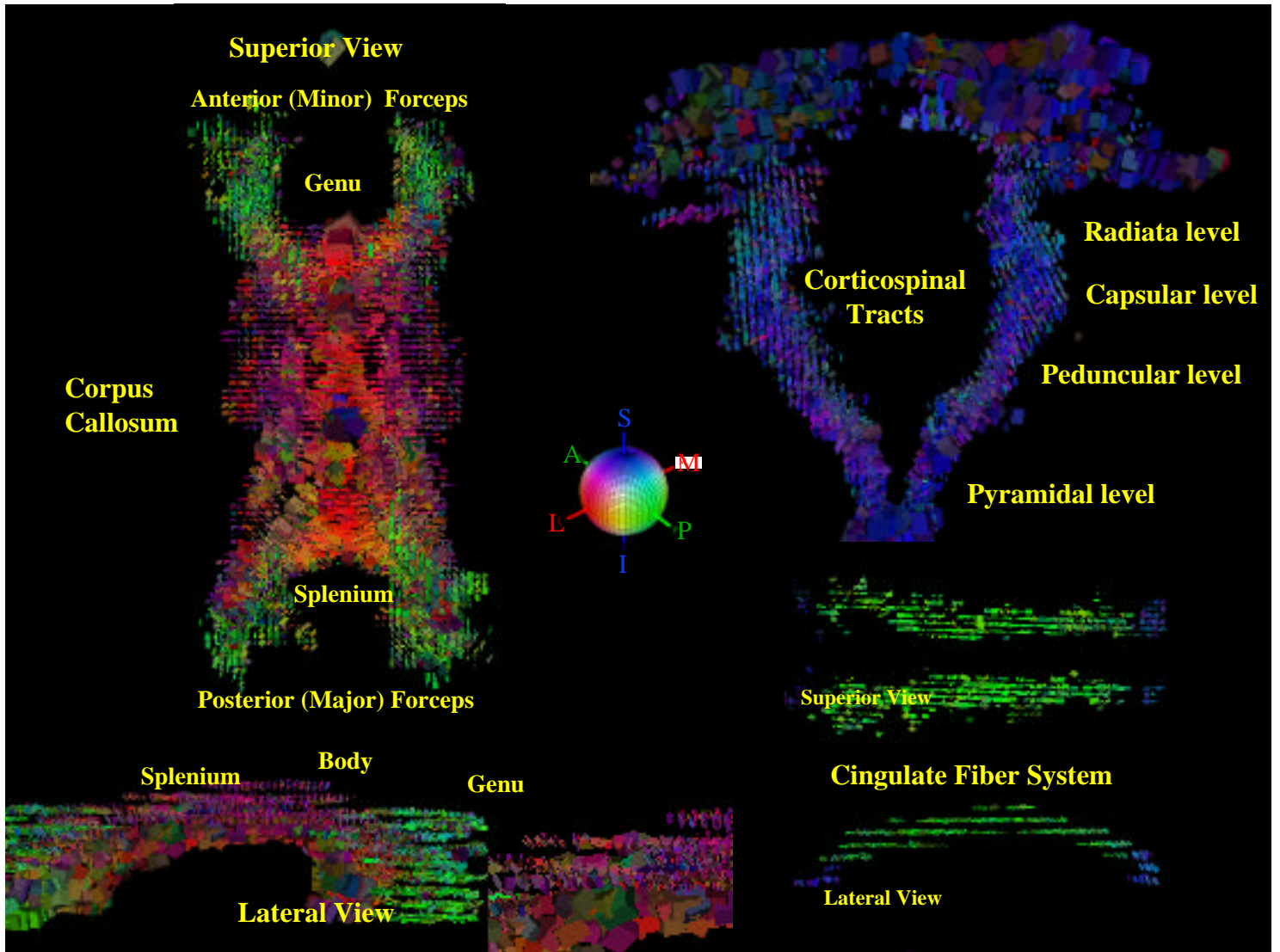


**Cortical Spinal Tract/
Internal Capsule**



Corpus Callosum

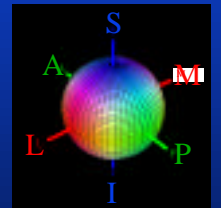
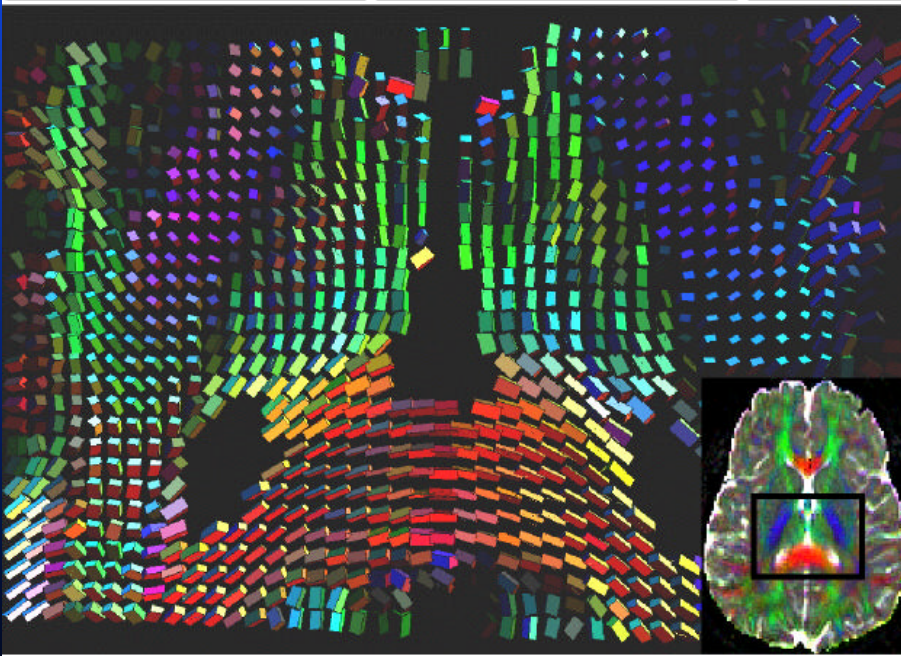
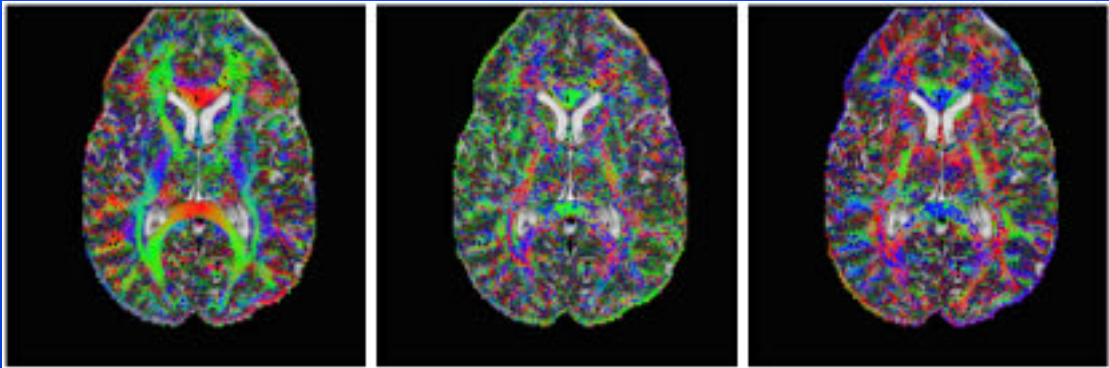




E1

E2

E3



Box-
Plot



How The Brain Works