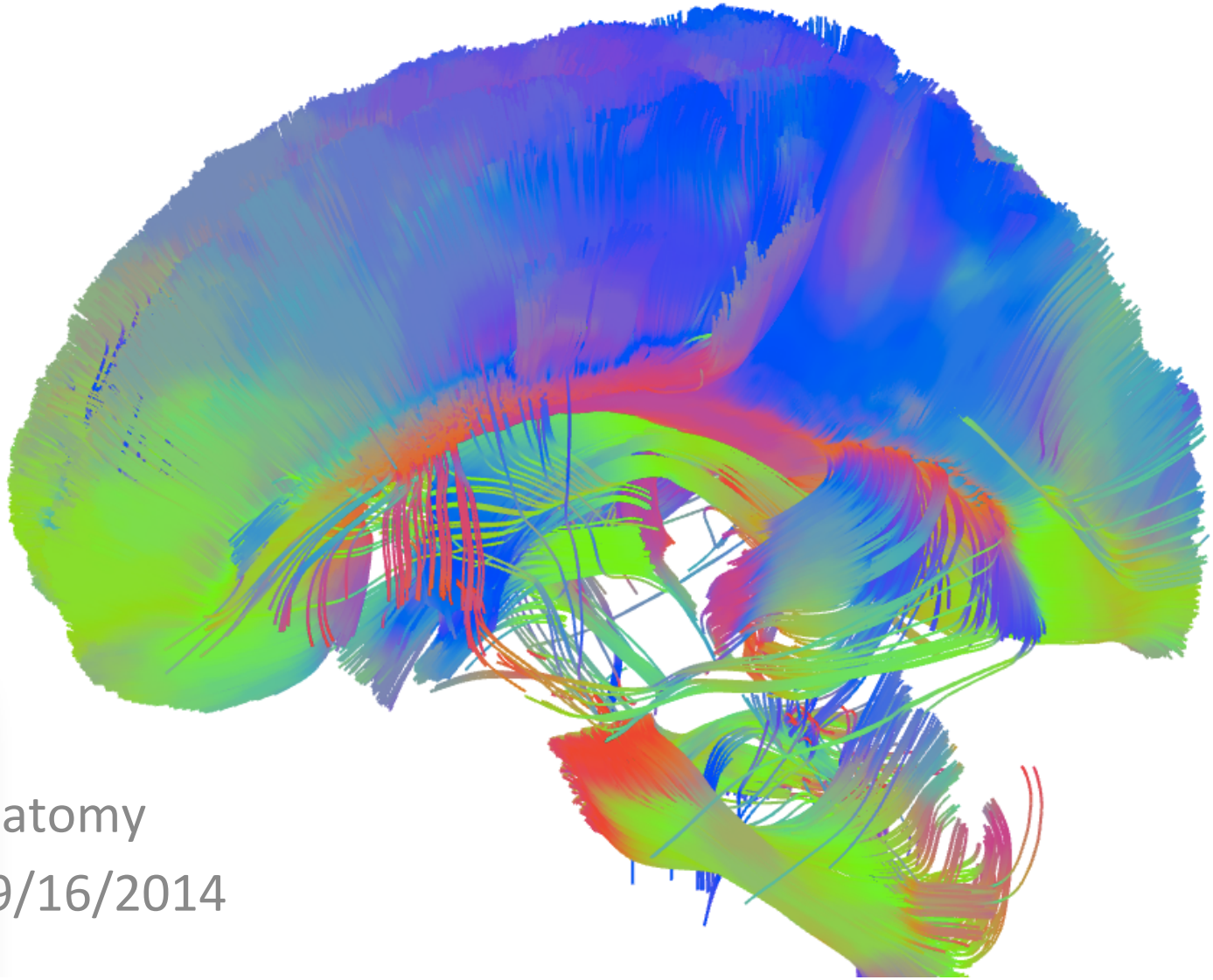
# Applied Tractography – Part 3



Virtual Neuroanatomy

Lecture Date: 09/16/2014

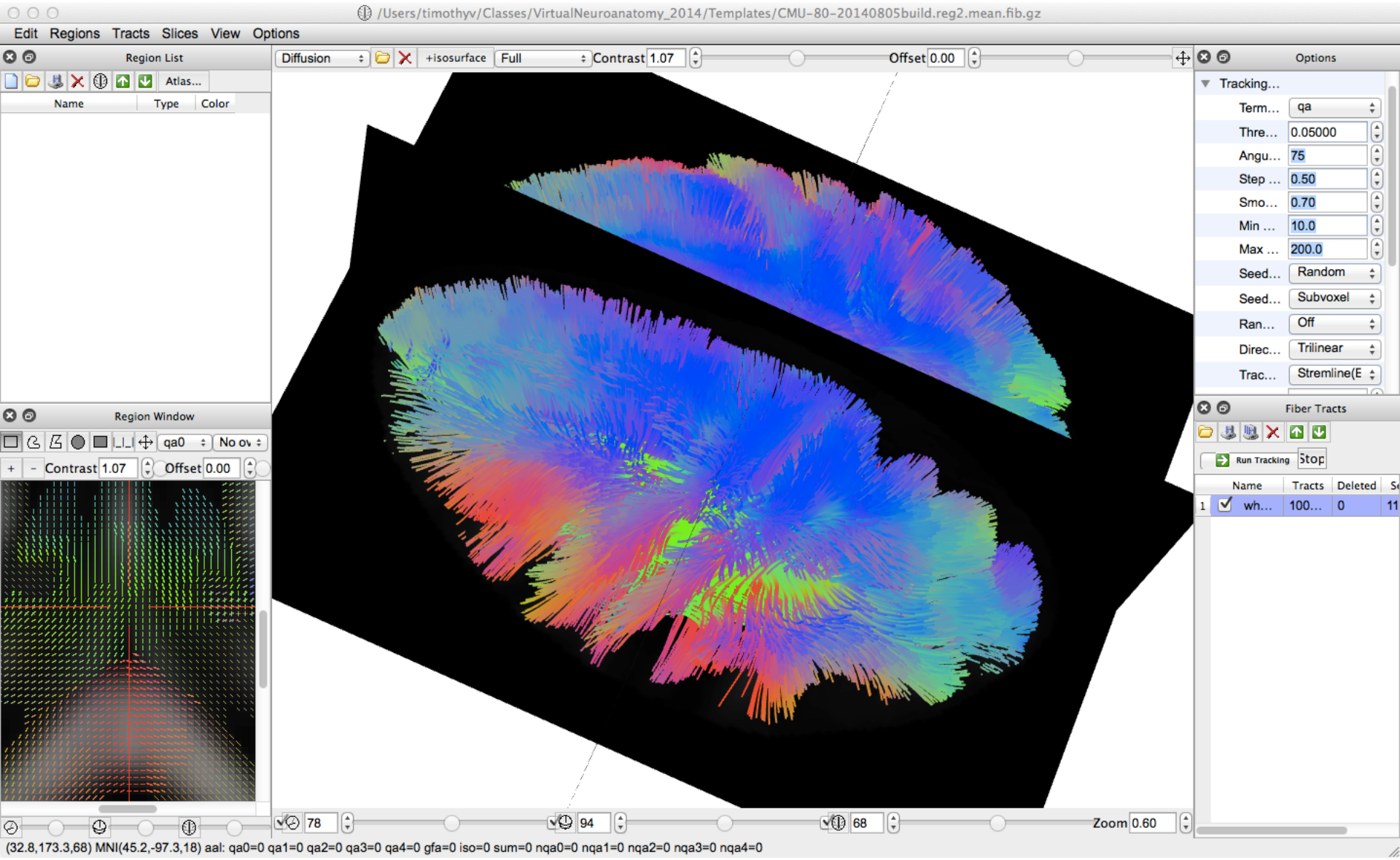
# Goals

A. Explore approaches to whole-brain tractography.
B. Understand rendering & visualization options.

# Whole-brain tractography

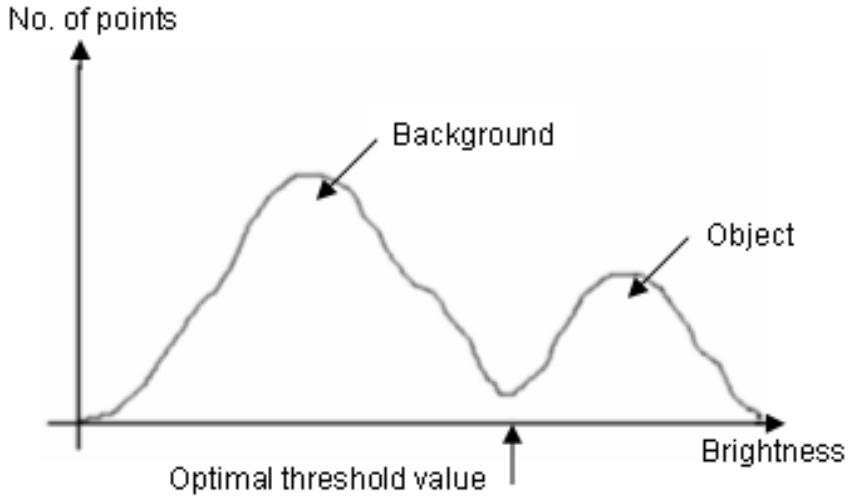
Rather than select for a group of streamlines that pass through a certain region of interest, look at as many possible connections as you can.

# Whole-brain tractography



# Otsu's method

A computer vision method for finding a clear separation between two distributio of values (in our case, gray vs. white matter). - Nobuyuki Otsu (1979). "A threshold selection method from gray-level histograms". IEEE Trans. Sys., Man., Cyber. 9 (1): 62–66.

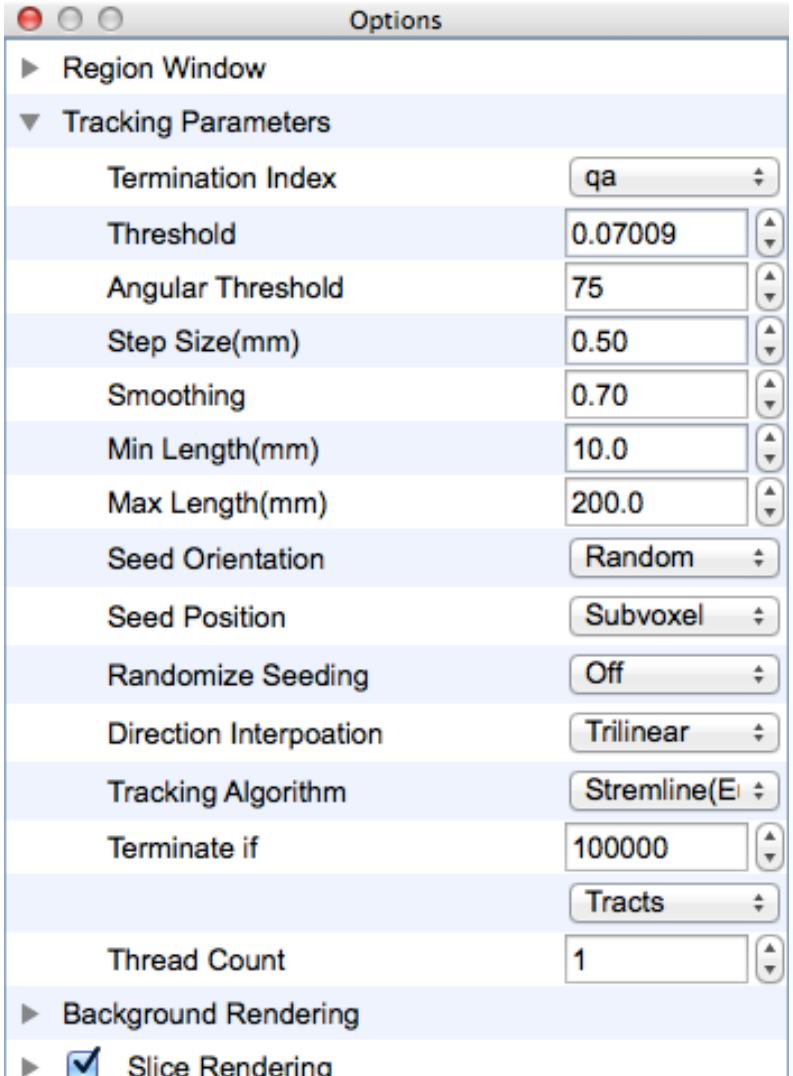



Original

Binary after Otsu's thresholding

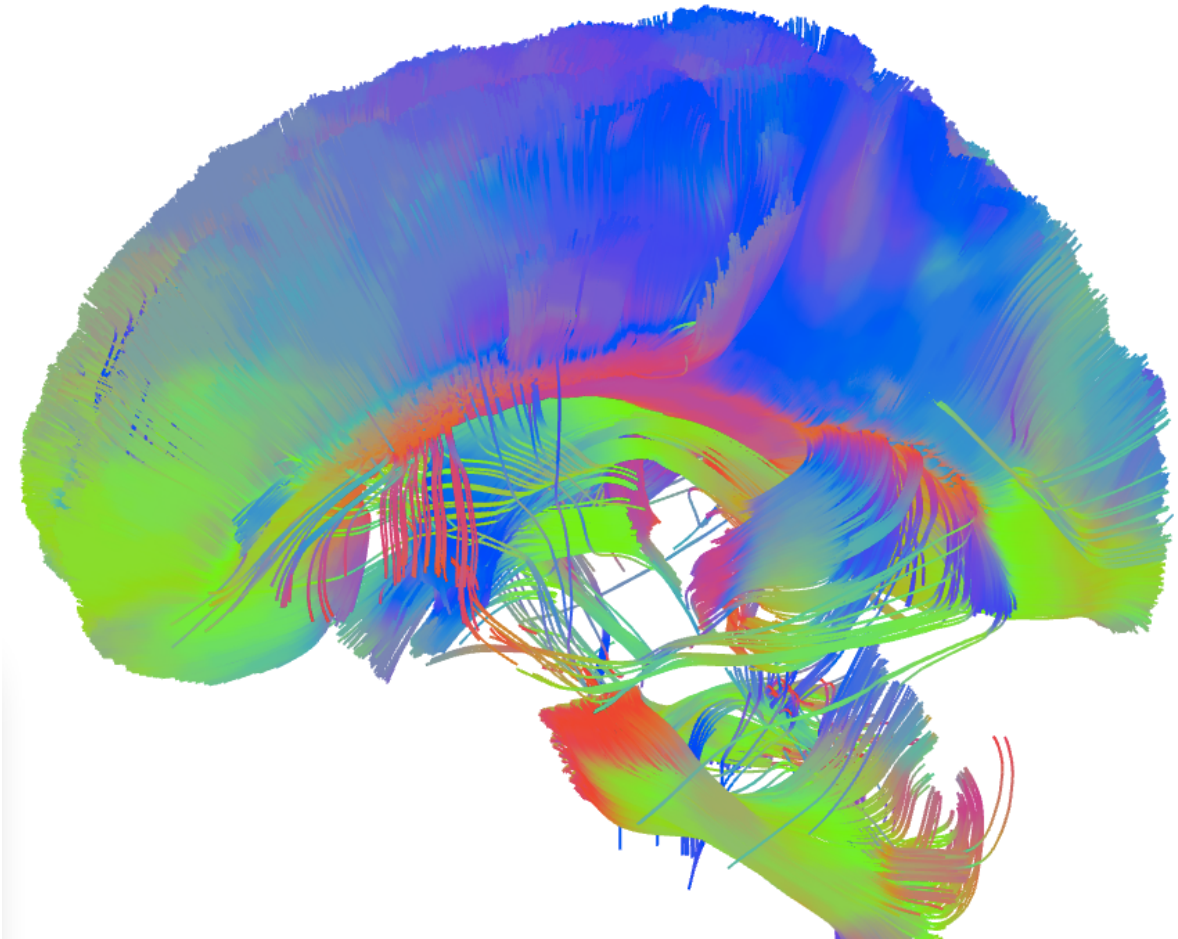
# Otsu's method

Default = 0.6 * Otsu's threshold

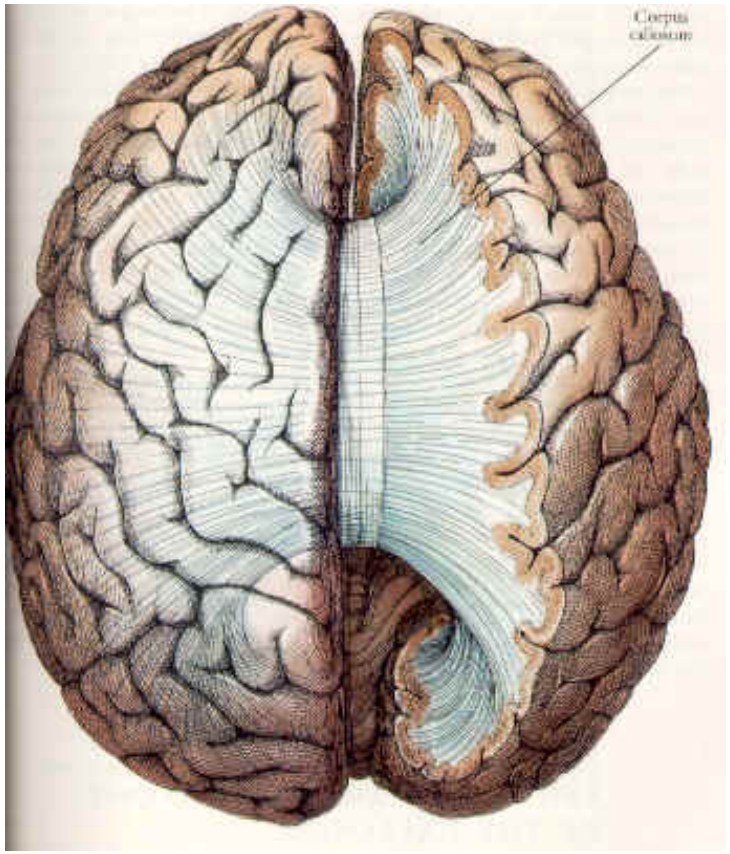


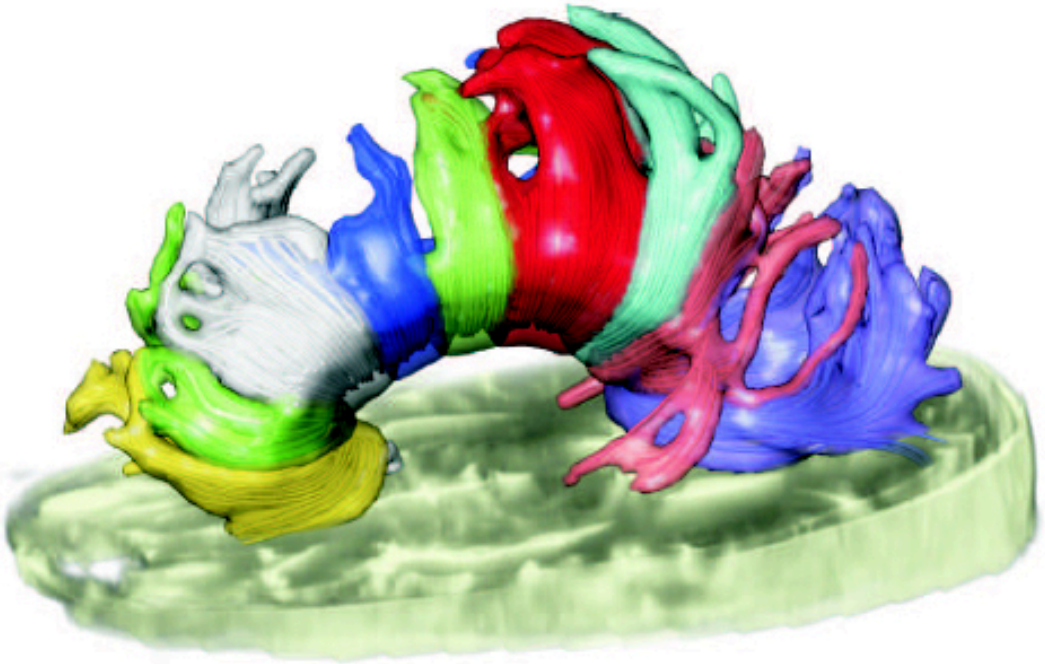
# “Dissection” hotkeys

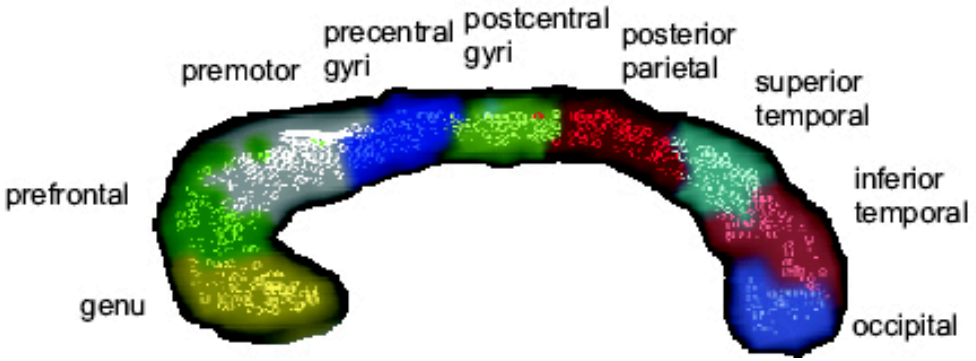
| Parameter | Function |
|---|---|
| **Cut** | Command+D (OSX) or Crtl+D (Windows) |
| **Keep** | Command+S (OSX) or Crtl+S (Windows) |



# Today's Tract: The corpus callosum





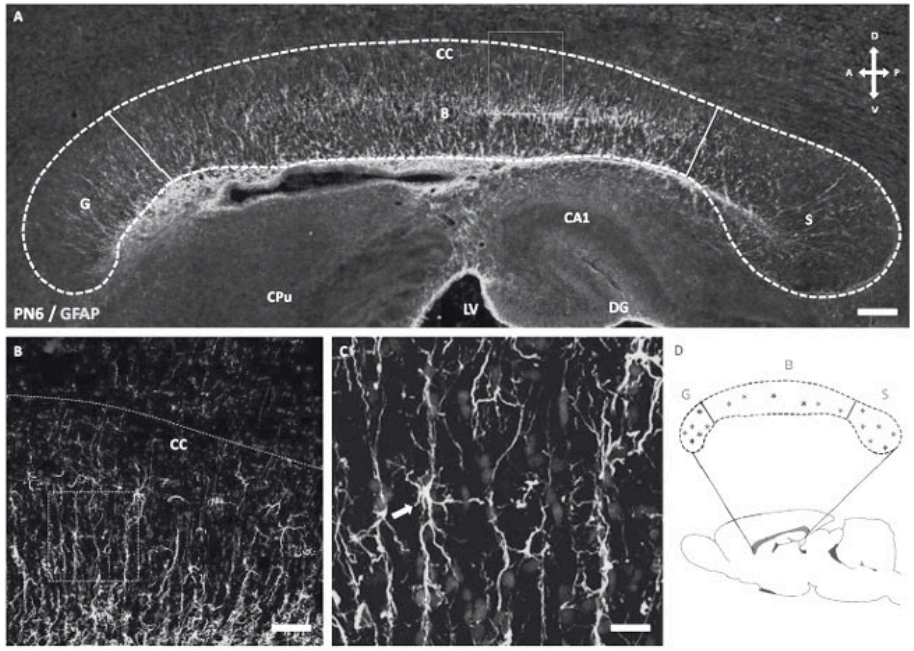
# Today's Tract: The corpus callosum

Three Major Sections:

1. **Genu**: Connects frontal cortices, primarily orbitofrontal cortex, anterior cingulate and dorsal prefrontal.

2. **Middle/Body**: Connects caudal frontal, motor and parietal areas.

3. **Splenium**: Connects occipital striate areas.



# Download the DSI template

- The Human Brain: An Introduction to Its Functional Anatomy. John Nolte. Mosby; 2002.

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**Data sets:** Below includes data sets for various class projects that are freely distributed for educational purpos

- (50d DTI with b=2000 & 257d DSI with bmax = 5000).
- 80 Subject DSI Template (2 5d DSI, b-max = 5000)
- template (270d 3-shell, b-max = 3000)

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**Lectures & Readings:** Note, PDF links are only for course use. They will be removed within 2 weeks of the sc
lecture.

# Tractography Test

How can you capture a complete a picture as possible of the corpus callosum?

- Three major sections
- Most lateral coverage possible
- Least Amount of noise