



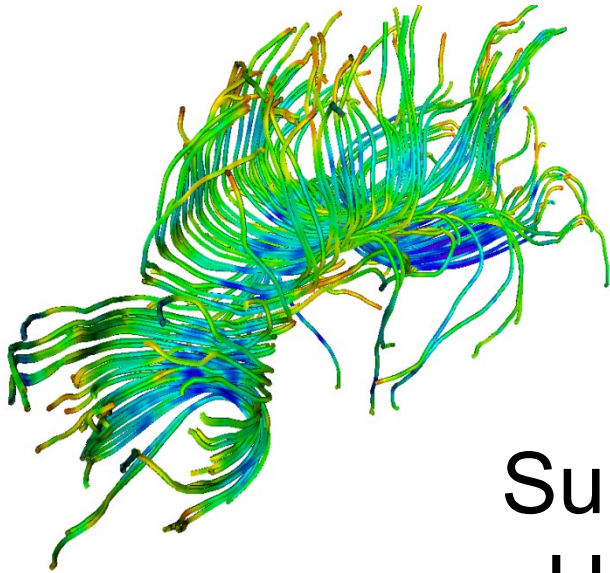
NA-MIC

*National Alliance for Medical Image Computing*

*<http://www.na-mic.org>*

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# Diffusion Tensor Imaging Tutorial



Sonia Pujol, Ph.D.

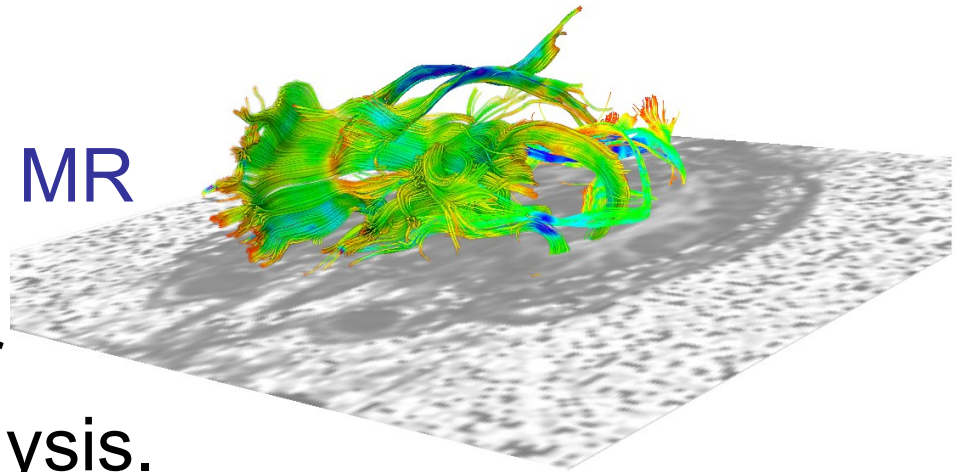
Surgical Planning Laboratory  
Harvard Medical School



# DTI tutorial

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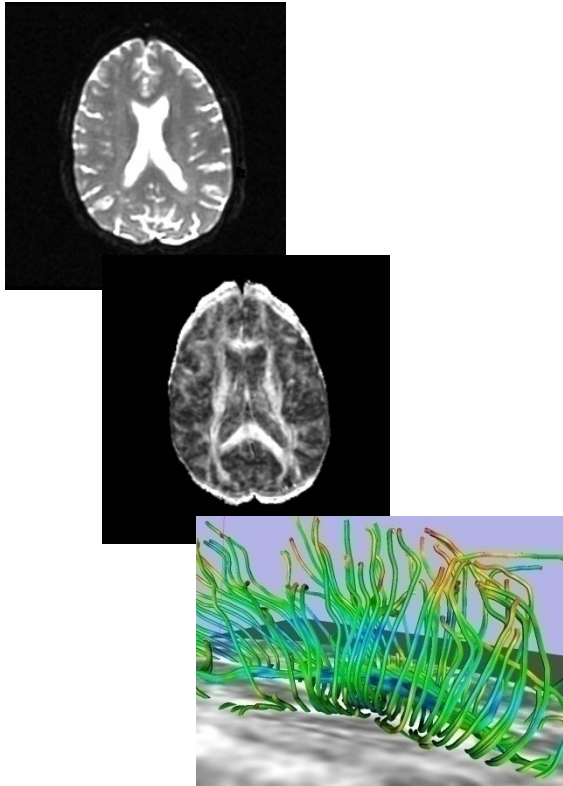
This tutorial is an introduction to the advanced **Diffusion MR** capabilities of the **Slicer3** software for medical image analysis.





# Outline

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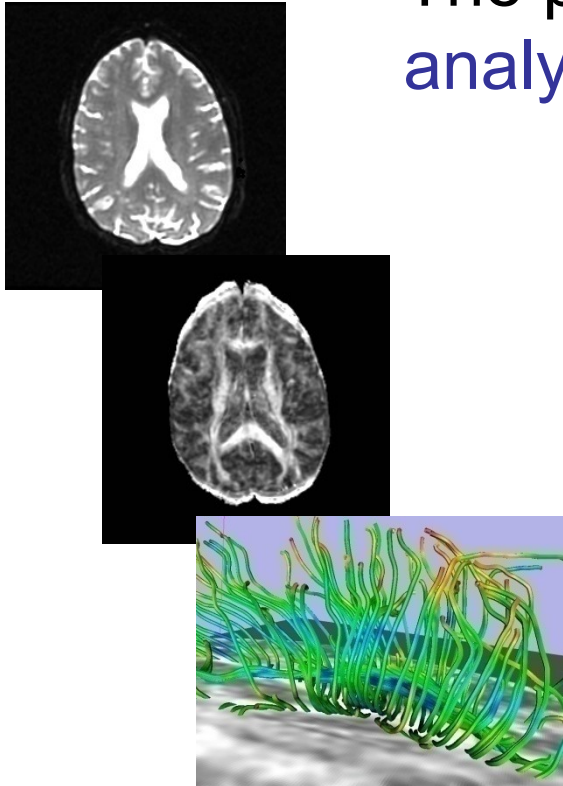


This tutorial guides you through the process of **loading diffusion MR data**, **estimating diffusion tensors**, and performing **tractography** of white matter bundles.



# Outline

The processing pipeline uses 9 image analysis modules of Slicer3.6

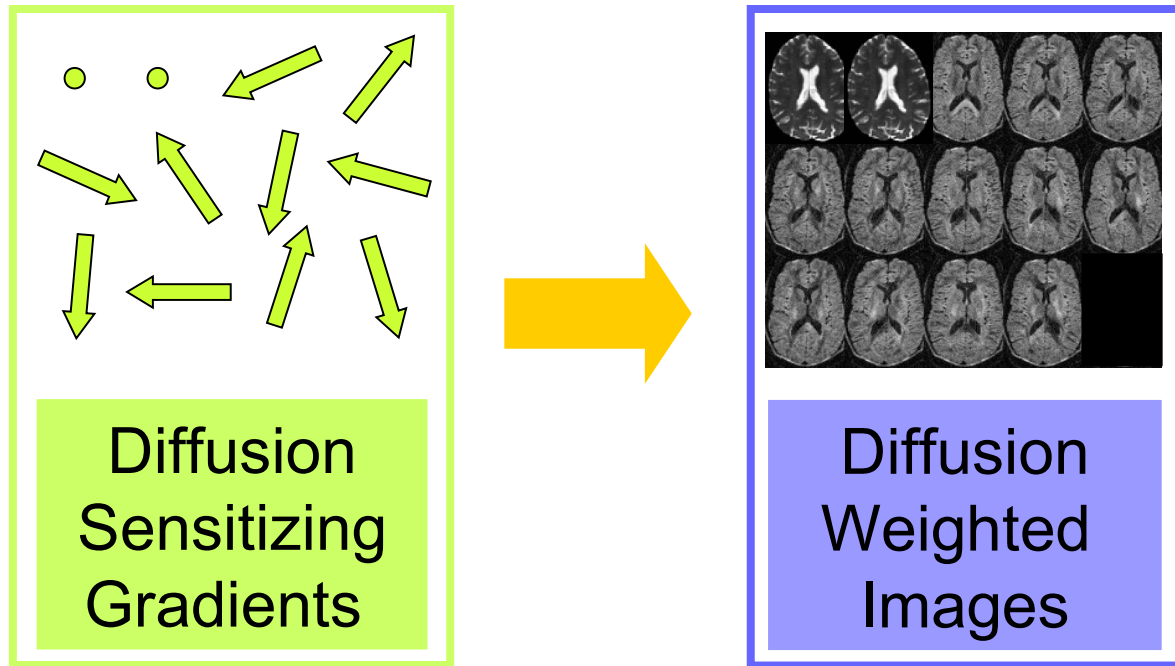


1. Data
2. Volumes
3. Diffusion Tensor Estimation
4. Diffusion Tensor Scalar Measurements
5. Editor
6. LabelMap Seeding
7. Fiber Bundles
8. Fiducials
9. Fiducial Seeding



# Tutorial Dataset

The Diffusion MR tutorial dataset is composed of a **Diffusion Weighted MR scan** of the brain acquired with 12 gradient directions and 2 baseline.





# Tutorial Dataset

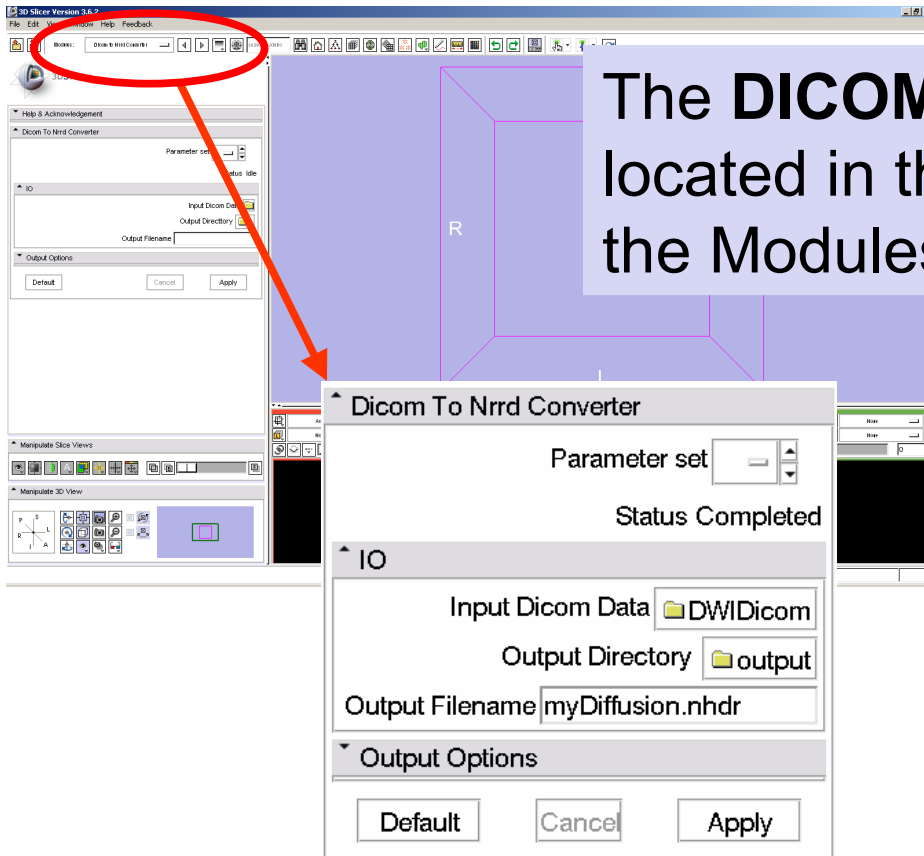
---

The dataset used in this tutorial is in **the Nrrd file format**, which is part of the NA-MIC kit.

To convert your own Dicom data to Nrrd, use the **DicomToNrrdConverter** module in Slicer.



# DicomToNrrd converter



The **DICOMToNrrdConverter** is located in the category 'Converters' in the Modules' menu



# DicomToNrrd converter



3DSlicer

search

Google Custom Search

GO

navigation

- Slicer website
- Wiki Home
- Slicer Downloads
- Training
- Documentation
- Users
- Developers
- FAQ
- Acknowledgements
- Links
- Recent Changes

toolbox

- What links here
- Related changes
- Special pages
- Printable version
- Permanent link

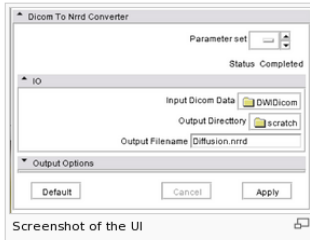
[page](#) [discussion](#) [view source](#) [history](#)

## Modules:DicomToNRRD-3.6

[Return to Slicer 3.6 Documentation](#)

Module Name

DWI Dicom To NRRD



Screenshot of the UI

GENERAL INFORMATION

Module Type & Category

Type: Command line module

Category: Converters

Authors, Collaborators & Contact

- Author: Xiaodong Tao (with contribution from Vince Magnotta and Hans Johnson)

A list of supported DWI formats can be found on the documentation page of the **DicomToNrrdconverter**:

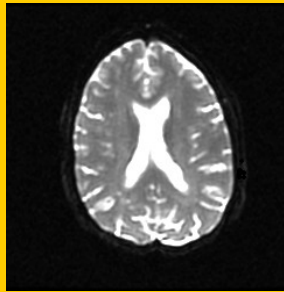
<http://www.slicer.org/slicerWiki/index.php/Modules:DicomToNRRD-3.6>



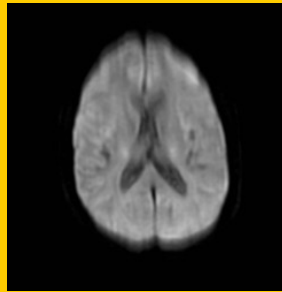


# DTI Processing Pipeline

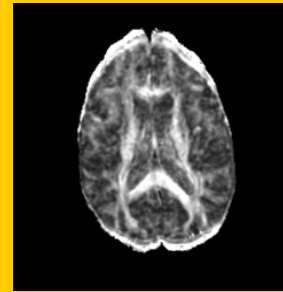
---



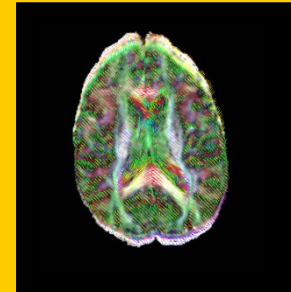
DWI  
Acquisition



Tensor  
Calculation



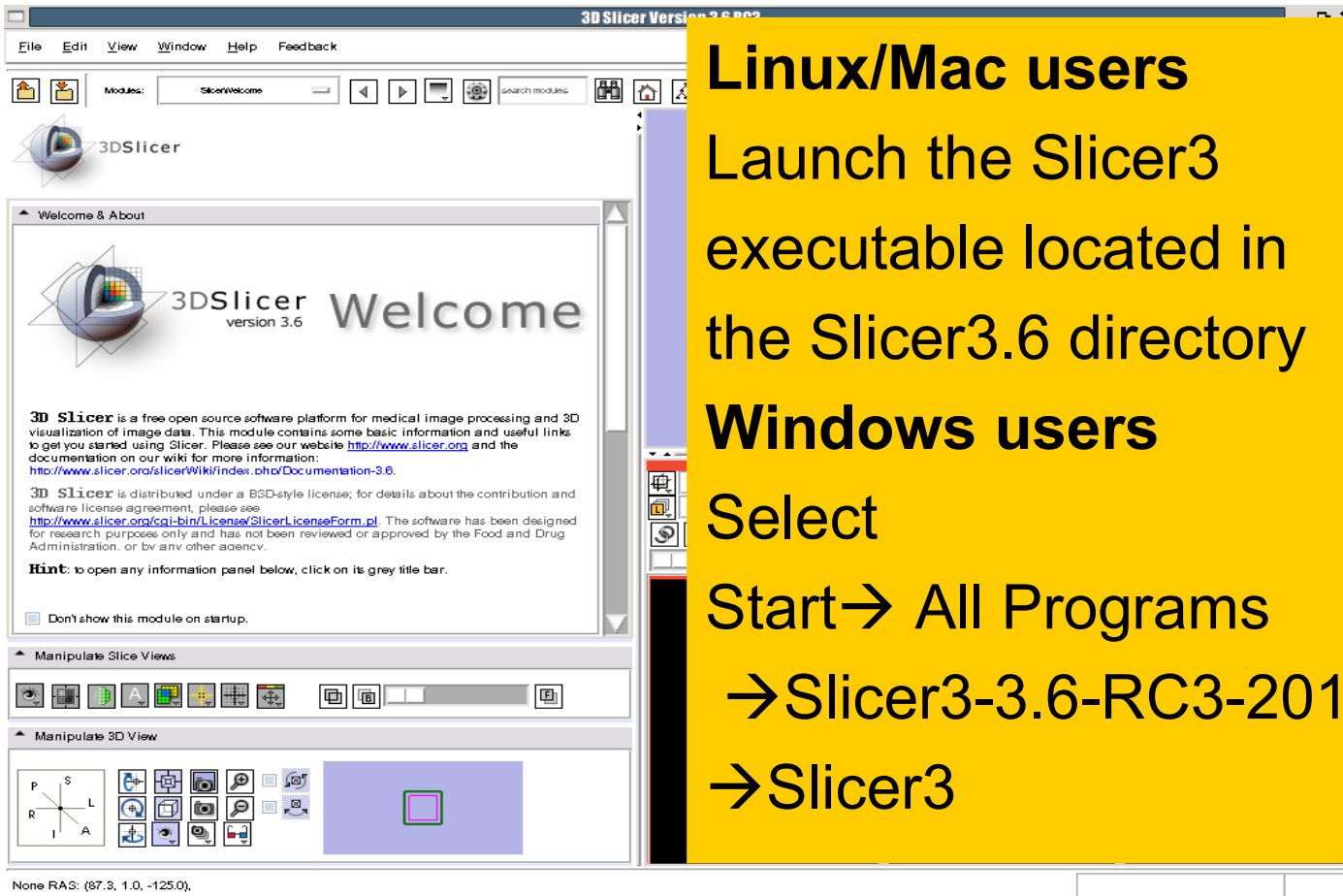
Scalar  
Maps



3D  
Visualization



# Start Slicer3



**Linux/Mac users**

Launch the Slicer3 executable located in the Slicer3.6 directory

**Windows users**

Select

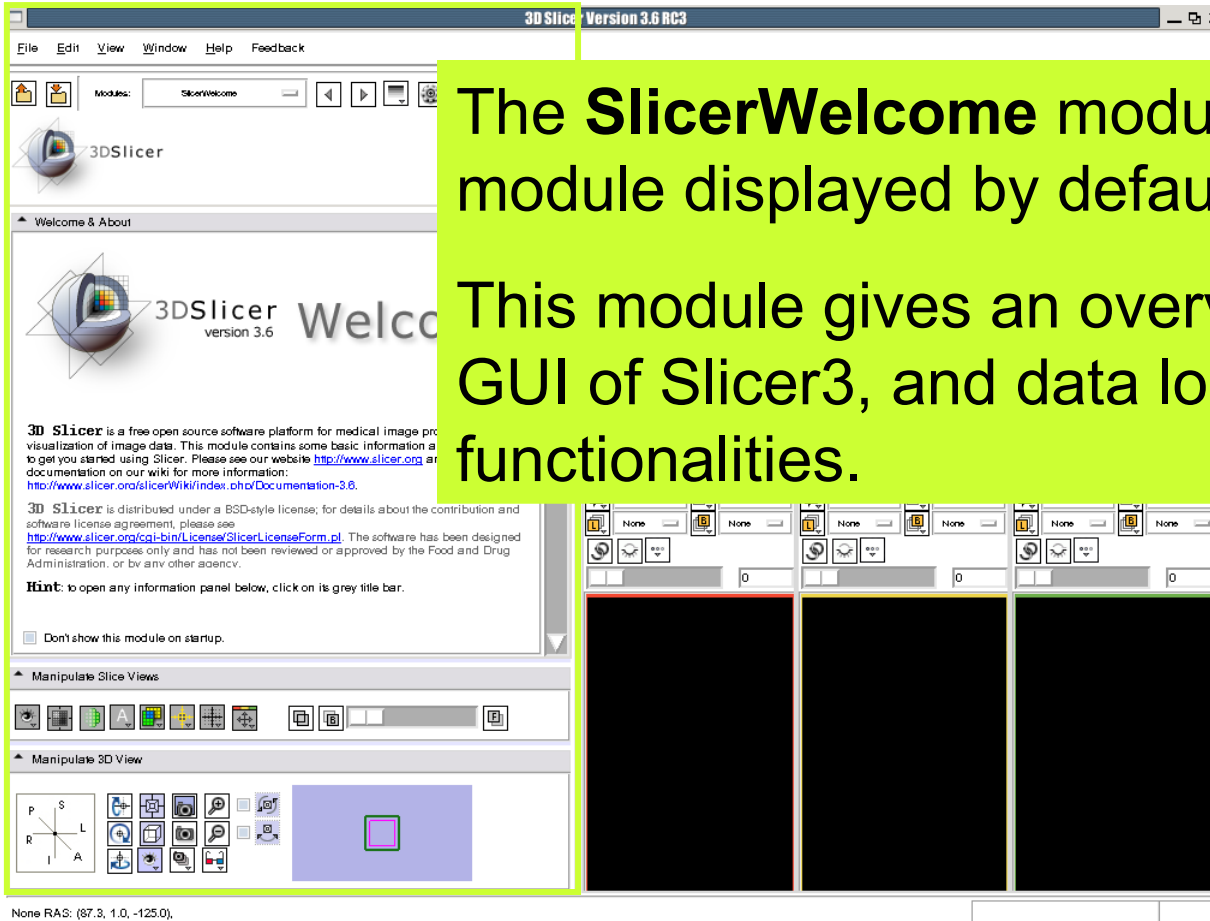
Start → All Programs

→ Slicer3-3.6-RC3-2010-06-04

→ Slicer3



# Slicer Welcome



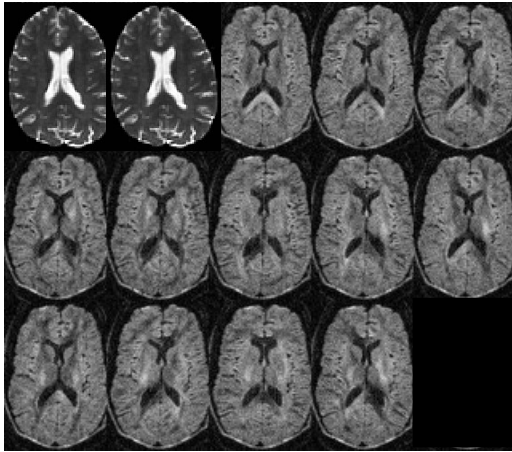
The **SlicerWelcome** module is the module displayed by default.

This module gives an overview of the GUI of Slicer3, and data loading & saving functionalities.



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## Part 1:

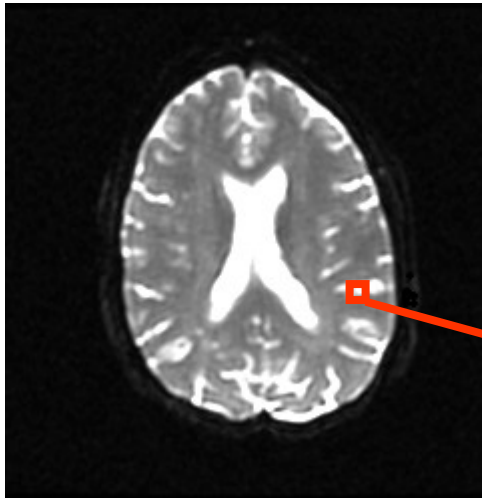


# Diffusion data loading and tensor estimation



# Diffusion Tensor

Stejskal-Tanner



$$S_i = S_0 e^{-b \hat{g}_i^T \underline{D} \hat{g}_i}$$

$$\underline{\mathbf{D}} = \begin{bmatrix} D_{xx} & D_{xy} & D_{xz} \\ D_{yx} & D_{yy} & D_{yz} \\ D_{zx} & D_{zy} & D_{zz} \end{bmatrix}$$



# Loading the DWI Volume

3D Slicer Version 3.6 RC3

File Edit View Window Help Feed

Modules: SlicerWelcome

3DSlicer

Welcome & About

3DSlicer version 3.6 Welcome

3D Slicer is a free open source software platform for medical image processing and 3D visualization of image data. This module contains some basic information and useful links to get you started using Slicer. Please see our website <http://www.slicer.org> and the documentation on our wiki for more information: <http://www.slicer.org/slicerWiki/index.php/Documentation-3.6>.

3D Slicer is distributed under a BSD-style license; for details about the contribution and software license agreement, please see <http://www.slicer.org/cgi-bin/License/SlicerLicenseForm.pl>. The software has been designed for research purposes only and has not been reviewed or approved by the Food and Drug Administration, or by any other agency.

**Hint:** to open any information panel below, click on its grey title bar.

Don't show this module on startup.

Manipulate Slice Views

Manipulate 3D View

None RAS: (87.3, 1.0, -125.0)

Select File → Add Volume from the File menu



# Loading the DWI Volume

The screenshot shows the 3D Slicer interface with the 'Add Volume' dialog box open. The file list contains the following items:

Name	Size	Modified
dwiDataset.nhdr	2 KB	Wed Sep 2
dwiDataset.raw	31,909 KB	Tue Aug 7

The 'Volume Name' field is circled in red and contains the text 'dwiDataset'. A red arrow points to the 'dwiDataset.nhdr' file in the list.

**Browse to the location of the Diffusion tutorial dataset directory and select the file dwiDataset.nhdr**

**Click on **Apply** to load the volume**



# Loading the DWI Volume

**Left click on the menu **Modules** and select **All Modules** to display the list of over **100 modules** available for image analysis and 3D visualization. Select the **Volumes** module**

dwiDataset RAS: (-236.5, -79.8, 29.8), Bg: Slice not shown,





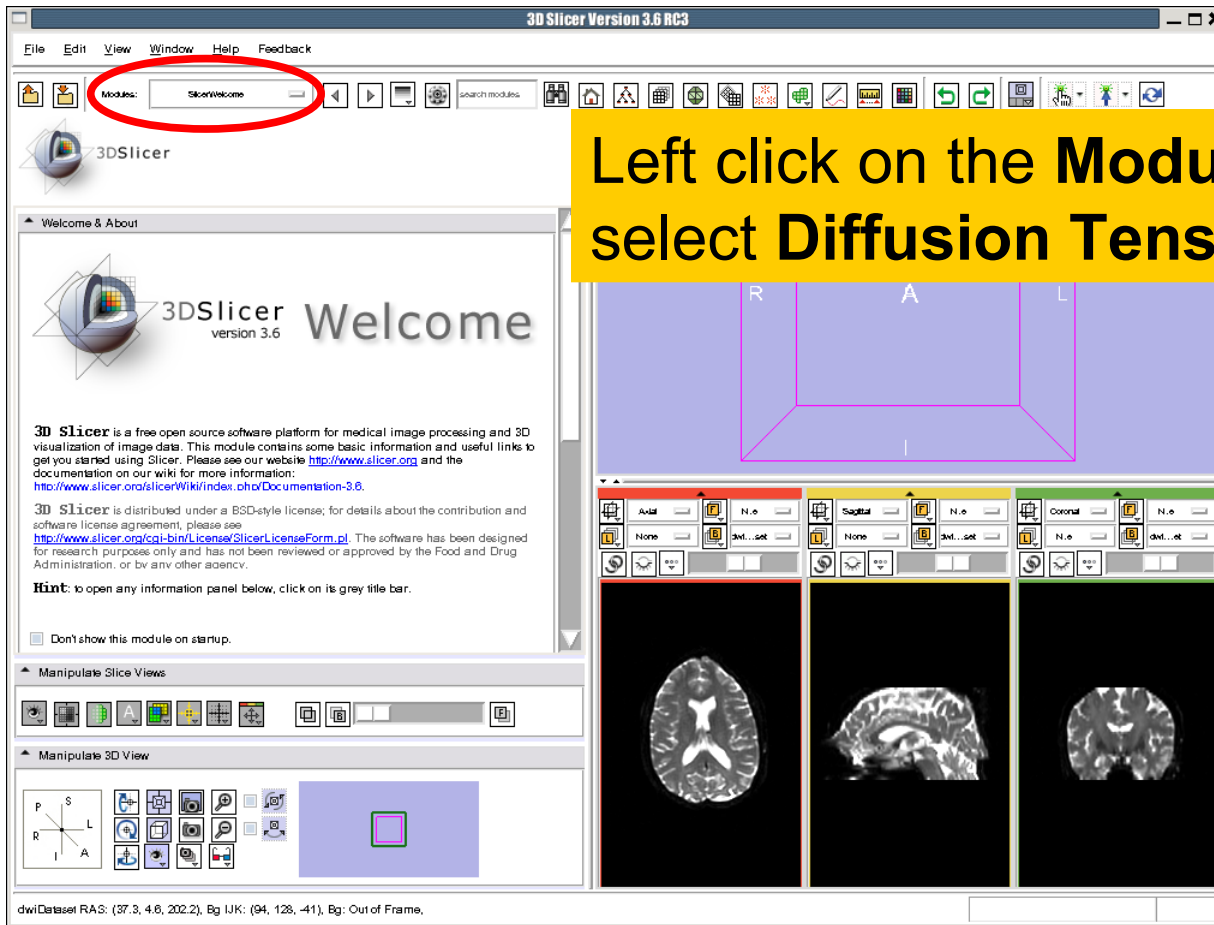
# Loading the DWI Volume

The screenshot shows the 3D Slicer software interface. On the left, the Volume panel is visible, showing the 'Active Volume' set to 'dwiDataset'. Below this, the 'Display' section includes a 'DWM Component' slider, a 'Lookup Table' dropdown set to 'Grey', and an 'Interpolate' checkbox. The 'Window Level Editor Presets' section shows 'CT-abdomen', 'CT-brain', and 'CT-lung'. The 'Volume Window Level Presets' section has 'Window/Level' set to 'Manual' with values 3712.8 and 0.5, and a 'Threshold' set to 'Off' with values 0 and 14618. On the right, the 2D Slice Viewer displays three anatomical views: Axial, Sagittal, and Coronal. Each view shows a slice of the DWI volume. The Axial view has a background of 'dwiDataset' and a slice position of 19. The Sagittal view has a background of 'dwiDataset' and a slice position of 128. The Coronal view has a background of 'dwiDataset' and a slice position of 129. A yellow callout box with a red arrow points to the 'Active Volume' dropdown in the Volume panel, containing the text: 'Select the Active Volume **dwiDataset** and adjust the Window/Level Parameters'. A red arrow also points to the 'Window/Level' dropdown in the Volume panel.

Slicer displays the anatomical views of the baseline volume of the diffusion dataset in the 2D Slice Viewer.



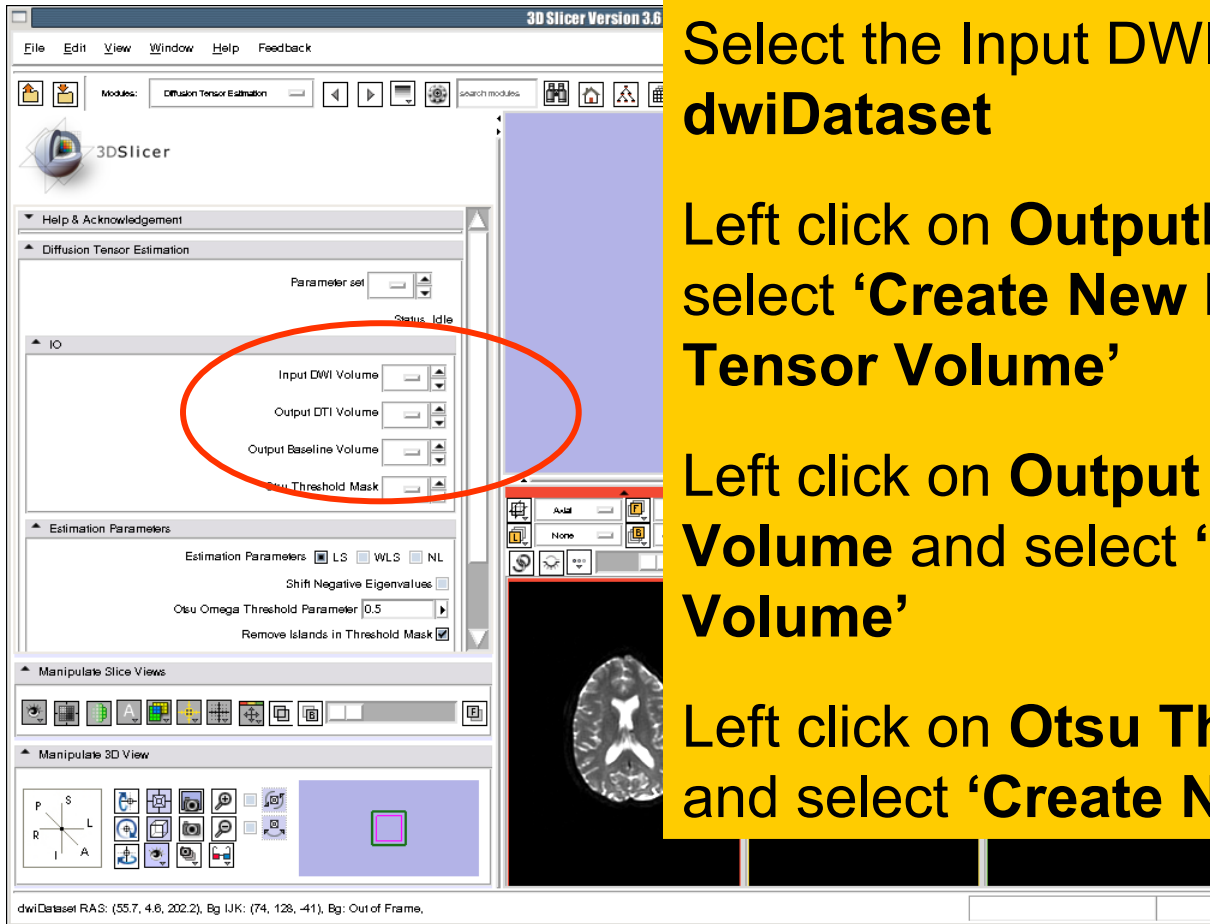
# Tensor Estimation



Left click on the **Modules** menu and select **Diffusion Tensor Estimation**.



# Tensor Estimation



Select the Input DWI Volume  
**dwiDataset**

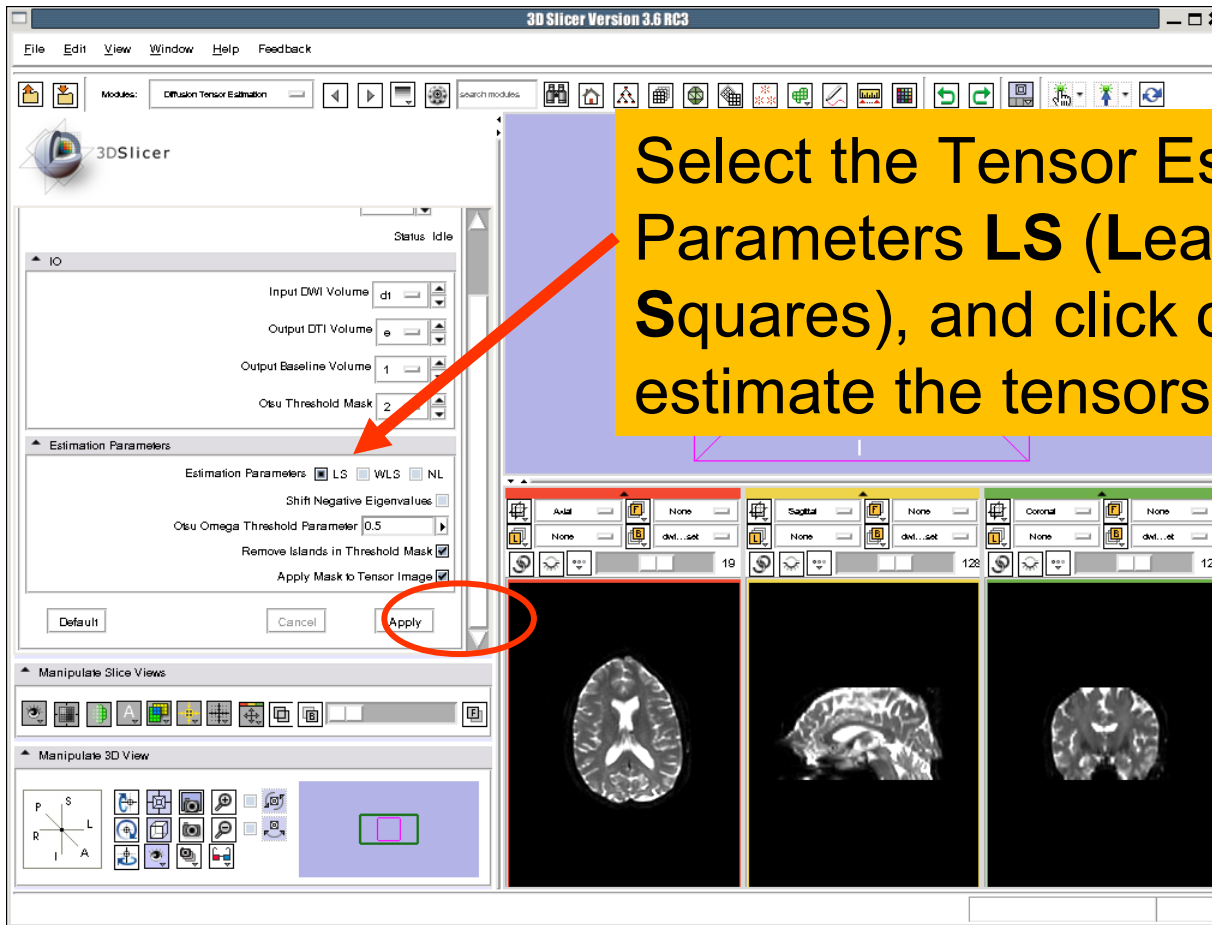
Left click on **OutputDTIVolume** and  
select '**Create New Diffusion  
Tensor Volume**'

Left click on **Output Baseline  
Volume** and select '**Create New  
Volume**'

Left click on **Otsu Threshold Mask**  
and select '**Create New Volume**'



# Tensor Estimation





# Tensor Estimation

**Left click on **Output Baseline Volume** to display the list of volumes that have been computed by Slicer**

The screenshot shows the 3D Slicer interface with the Diffusion Tensor Estimation module active. The IO section lists the following volumes: Input DVI Volume (dt), Output DTI Volume (e), Output Baseline Volume (e), and Otsu Threshold Mask (k). The Estimation Parameters section shows LS selected, VLS and NL unselected, Shift Negative Eigenvalues unselected, Otsu Omega Threshold Parameter set to 0.5, Remove Islands in Threshold Mask checked, and Apply Mask to Tensor Image checked. The 3D view shows a brain slice with a red arrow pointing to the 'Output Baseline Volume' in the volume list, which is highlighted in red.

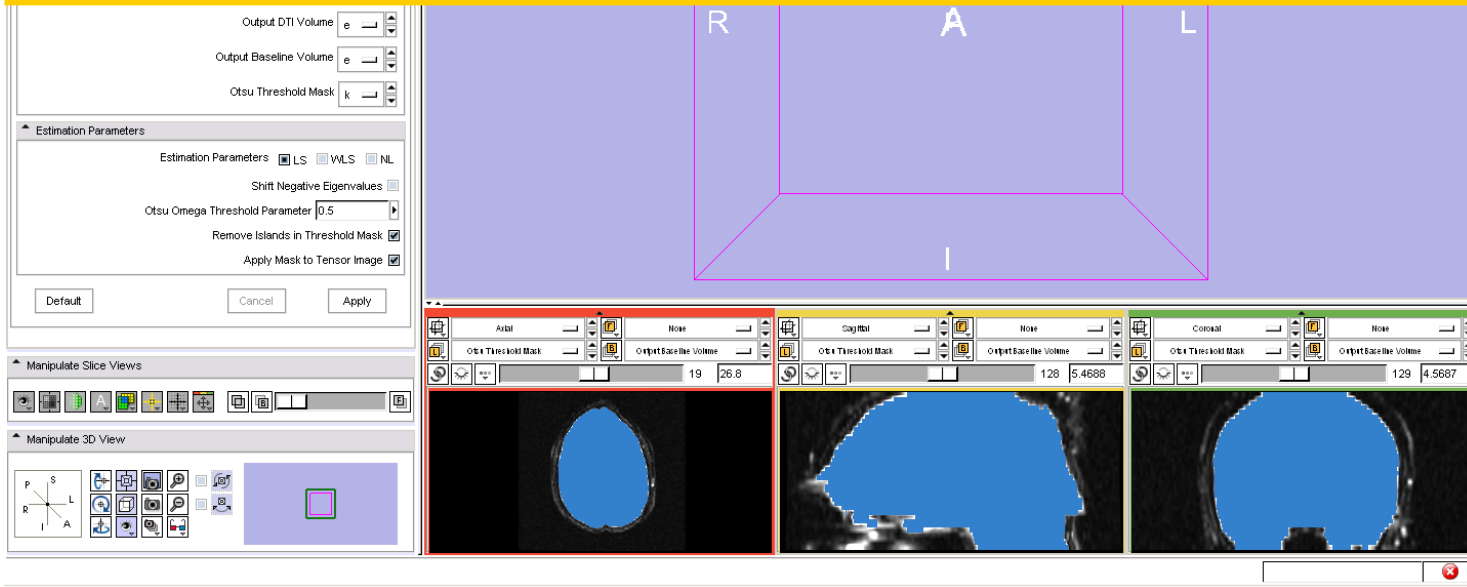


# Tensor Estimation

**Output DTI Volume** is the volume of estimated tensors

**Output Baseline Volume** is the Baseline volume

**Output Threshold Mask** is the tensor mask (blue)





# Tensor Estimation

3D Slicer Version 3.6

File Edit View Window Help Feedback

Mode: Diffusion Tensor Estimation

3DSlicer

Help & Acknowledgement

Diffusion Tensor Estimation

IO

Input DWI Volume: dt

Output DTI Volume: e

Output Baseline Volume: e

Otsu Threshold Mask: k

Estimation Parameters

Estimation Parameters:  LS  VLS  NL

Shift Negative Eigenvalues:

Otsu Omega Threshold Parameter: 0.5

Remove Islands in Threshold Mask:

Apply Mask to Tensor Image:

Default Cancel Apply

Manipulate Slice Views

Manipulate 3D View

Output Threshold Mask

Click on the link icon, left click on **Output Threshold Mask** and select **None**

R A L

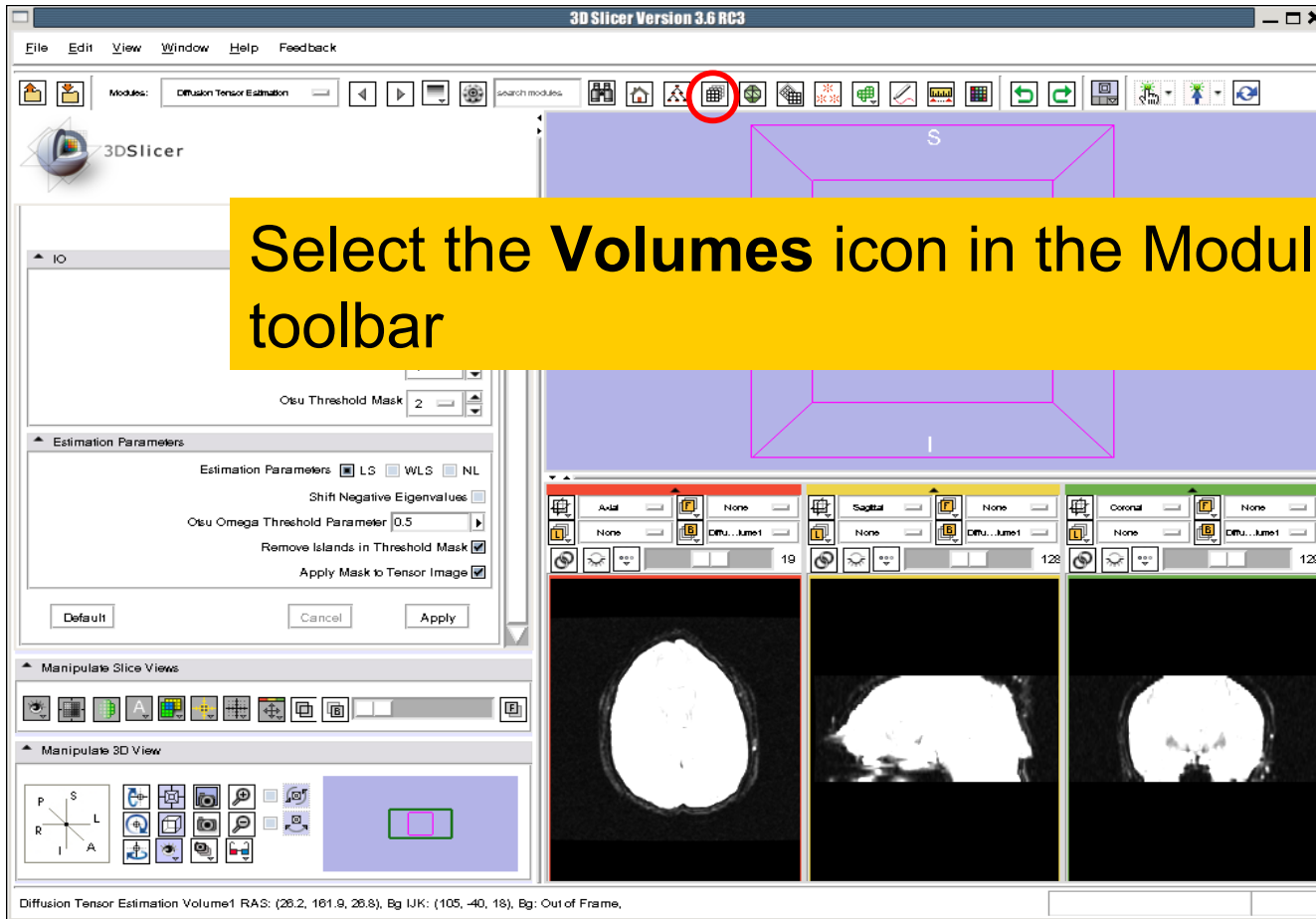
19 26.8

126 5.4688

129 4.5687



# Tensor Estimation







# Tensor Estimation

**Set the Active Volume to Output Baseline Volume and click on the tab Display**

3D Slicer Version 3.6

File Edit View Window Help Feedback

3DSlicer

Help & Acknowledgements

Load

Select Volume File

Volume Name: Output Baseline Volume

Image Origin: From File

Image Orientation: From File

Label Map  Single File

Keep all Apply Previous Next

Active Volume: Output Baseline Volume

Display

Diffusion Editor

Info

Manipulate Slice Views

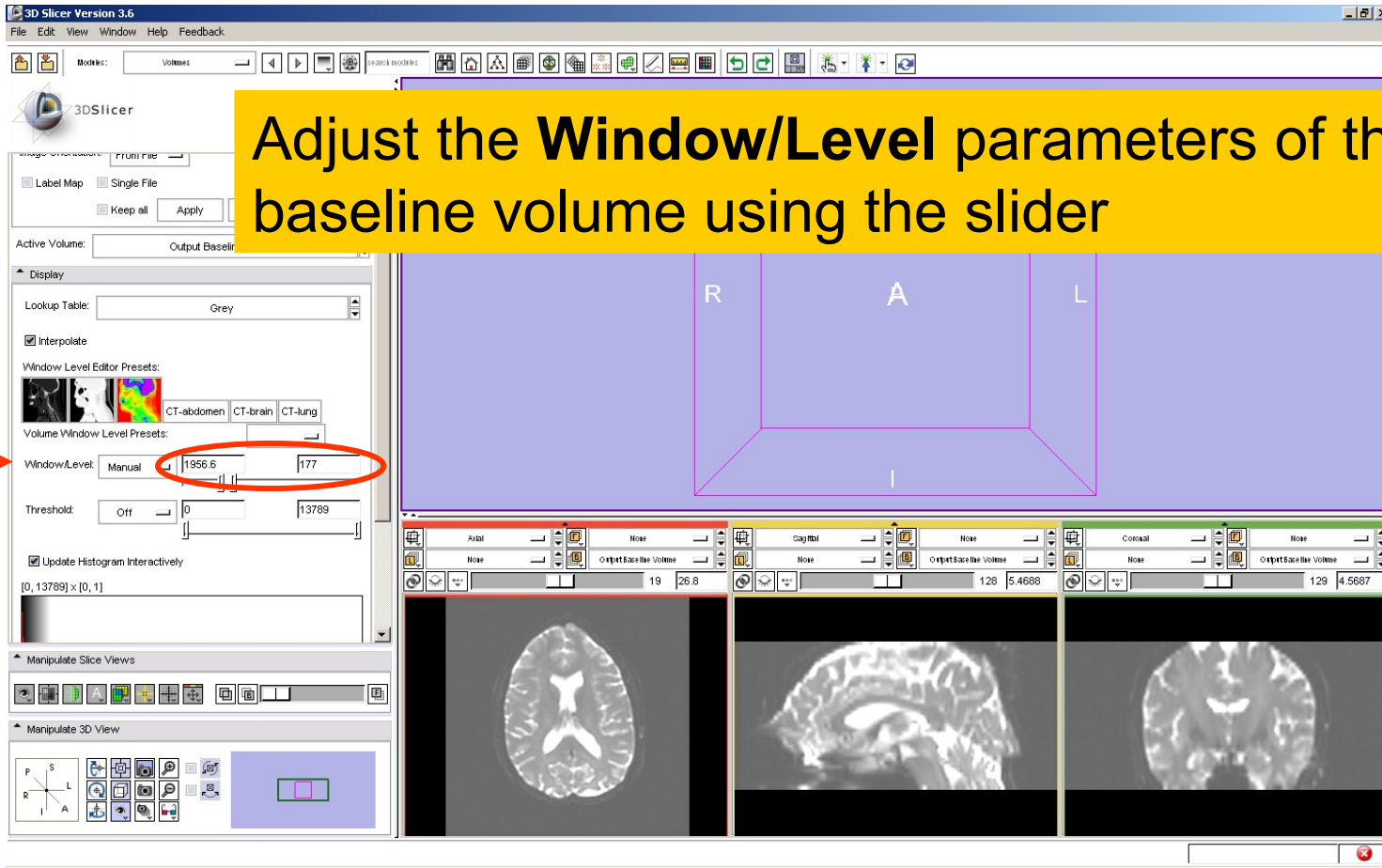
Manipulate 3D View

Output Baseline Volume RAS: (-156.1, -115.0, 32.8), Bg: Slice not shown



# Tensor Estimation

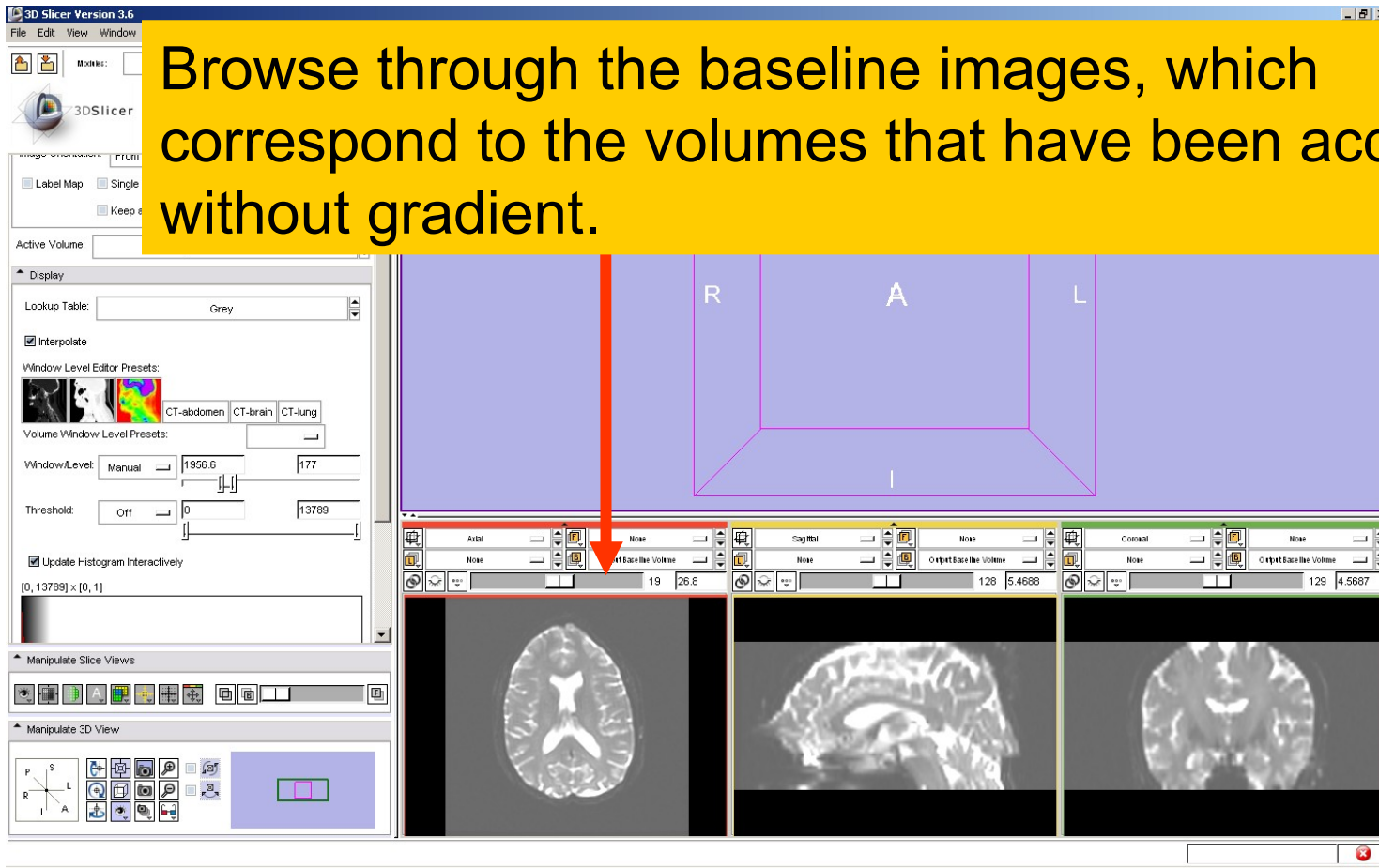
Adjust the **Window/Level** parameters of the baseline volume using the slider

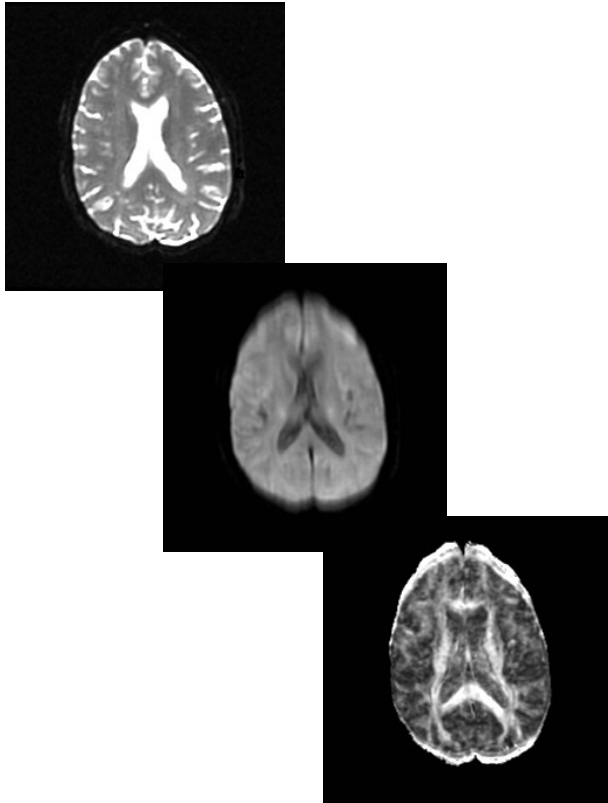




# Tensor Estimation

Browse through the baseline images, which correspond to the volumes that have been acquired without gradient.





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# Part 2:

# Scalar

# Measurements

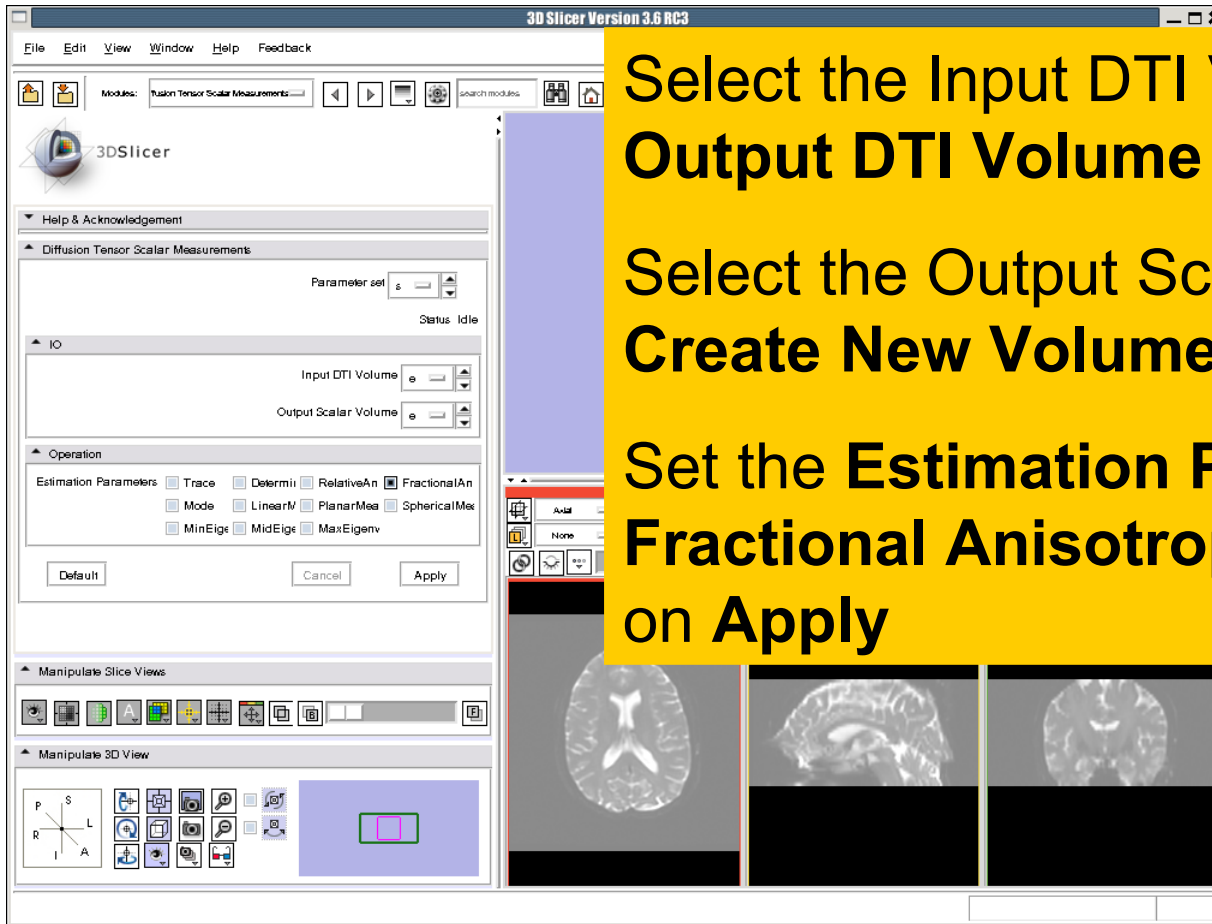


# Scalar Measurements

Select the category **Diffusion** → **Utilities** from the list of modules, and left click on the **Diffusion Tensor Scalar Measurements** module.



# Scalar Measurements



Select the Input DTI Volume  
Output DTI Volume

Select the Output Scalar Volume  
Create New Volume

Set the **Estimation Parameters to Fractional Anisotropy**, and click on **Apply**



# Fractional Anisotropy Volume

3D Slicer Version 3.6

File Edit View Window Help Feedback

MODELS: Nucleus Tensor of Gradient Measurements

3DSlicer

Help & Acknowledgement

Diffusion Tensor Scalar Measurements

IO

Input DTI Volume e

Output Scalar Volume e

Operation

Estimation Parameters  Trace  Determinant  Rekt  Fractional/  
 Mode  LinearMeas  Plan  SphericalM  
 MinEigenva  MidEigenva  Max  MaxEigenv  
 MaxEigenvs  MaxEigenv  RAll  RAllMaxEig  
 RAllMaxEig  D11  D22  D33  
 ParallelDiff  Perpendicu

Default Cancel Apply

Manipulate Slice Views

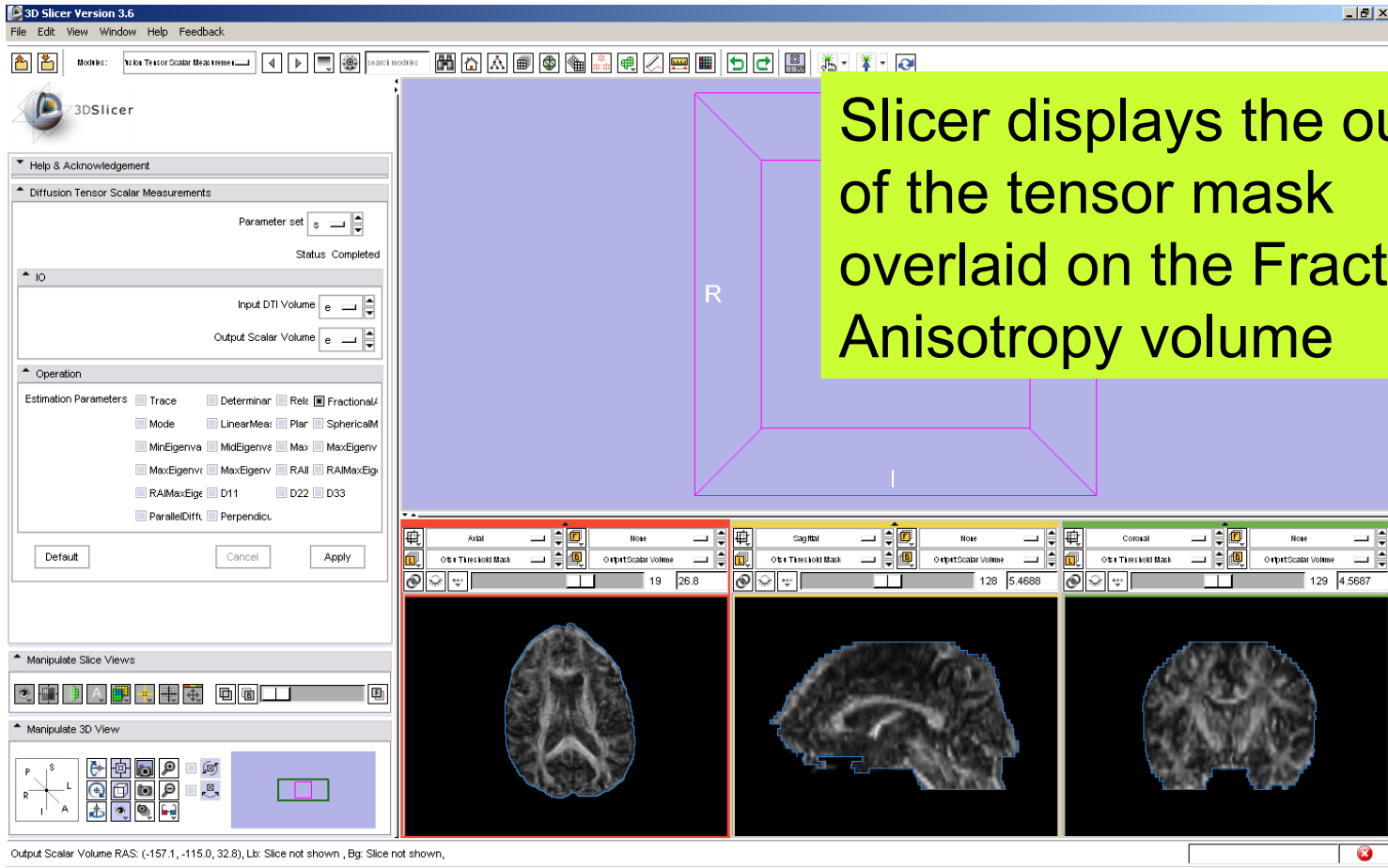
Manipulate 3D View

Output Scalar Volume RAS: (85.8, 124.1, 26.8), Bg IJK: (42, 0, 18), Lb: 0 Black, Bg: 0.0

Left click on the **Slicer Viewer Menu** icon, and select **Show label volume outlines**



# Fractional Anisotropy Volume







# Fractional Anisotropy Volume

3D Slicer Version 3.6

File Edit View Window Help Feedback

Mode: Yuka Tensor of Scalar Measurements

3DSlicer

Help & Acknowledgement

Diffusion Tensor Scalar Measurements

Parameter set: s

Status: Completed

IO

Input DTI Volume: e

Output Scalar Volume: e

Operation

Estimation Parameters:  Trace  Determinant  Rekt  Fractional/  
 Mode  LinearMeas  Plan  SphericalM  
 MinEigenvs  MidEigenvs  Max  MaxEigenv  
 MaxEigenvs  MaxEigenv  RAI  RAIMaxEig  
 RAIMaxEig  D11  D22  D33  
 ParallelDiff  Perpendic

Default Cancel Apply

Manipulate Slice Views

Manipulate 3D View

Output Scalar Volume RAS: (-16.3, 19.2, 26.8), Bg MJK (151, 112, 18), Lb: 1 jake, Bg: 0.3

Start 3D Slicer Version 3.6 DiffusionMRTutorial\_Slic... 11:13 AM

Move the mouse over the Fractional Anisotropy map to explore the FA values which range from 0 to 1, and are displayed in the bottom corner of the active (Bg) window.



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**Part 3:**

**Region of  
Interest Based  
Tractography**



# LabelMap Generation

The screenshot shows the 3D Slicer Version 3.6 interface. The 'Modules' menu is open, and 'Editor' is selected. The 'Master Volume' dropdown is set to 'Output Scalar Volume'. The main 3D view shows a brain slice with a purple bounding box. The bottom panel shows three viewports: Axial, Sagittal, and Coronal, each displaying a brain slice with a blue outline.

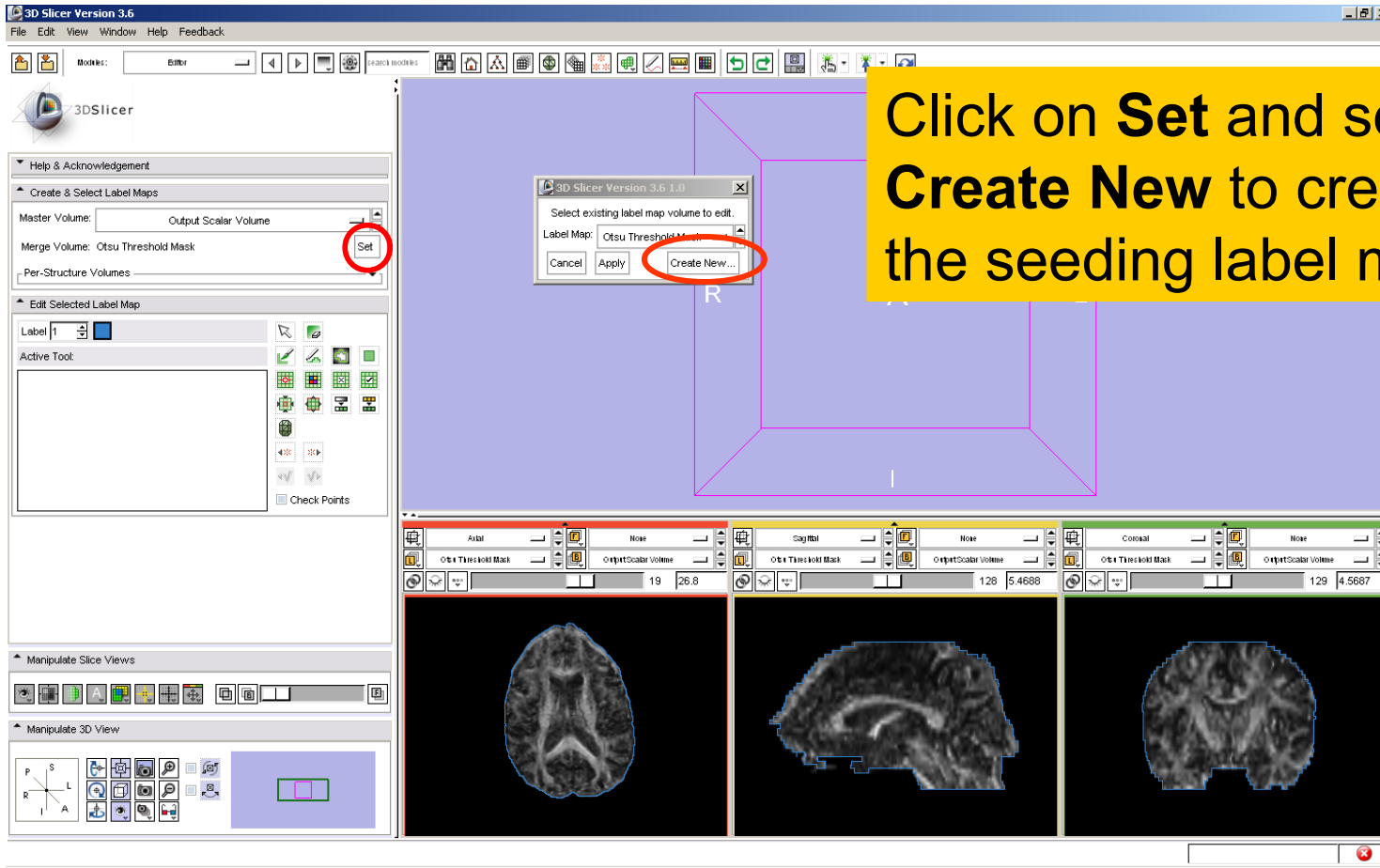
Select the **Editor** module in the modules menu.

Set the **Master Volume** to **Output Scalar Volume**

Output Scalar Volume RAS: (89.6, 148.7, 23.8), Bg IJK: (38, -26, 19), Lb: Out of Frame, Bg: Out of Frame,



# LabelMap Generation





# LabelMap Generation

3D Slicer Version 3.6

File Edit View Window Help Feedback

3D Slicer

3D Slicer Version 3.6 1.0

Create a merge label map for selected master volume Output Scalar Volume.  
New volume will be Output Scalar Volume-label.  
Select the color table node will be used for segmentation labels.

Color Table: Labels

Cancel Apply

Set

Master Volume: Output Scalar Volume

Merge Volume: Otsu Threshold Mask

Discrete

- Labels
- ColorRainbow
- Grey
- Iron
- Rainbow
- Ocean
- Desert
- InvertedGrey
- ReverseRainbow
- fMRI
- fMRIPA
- Random
- UserDefined
- Red
- Green
- Blue
- Yellow
- Cyan
- Magenta
- Warm1
- Warm2
- Warm3
- Cool1
- Cool2
- Cool3
- RandomIntegers

Manipulate 3D View

Output Scalar Volume RAS: (-135.3, -115.0, 29.8), Lb: Slice not shown , Bg: Slice not shown,

Start 3D Slicer Version 3.6 DiffusionMRITutorial\_Slic... StLouis2010 NA-MIC - Adobe Reader iTunes 11:28 AM

Left click on the **Color Table** dropdown box and select **Discrete** → **Labels**.

Click **Apply**.



# LabelMap Generation

3D Slicer Version 3.6

File Edit View Window Help Feedback

3DSlicer

Help & Acknowledgement

Create & Select Label Maps

Master Volume: Output Scalar Volume

Merge Volume: Output Scalar Volume-label

Per-Structure Volumes

Edit Selected Label Map

Label 1

Active Tool:

Check Points

Manipulate Slice Views

Manipulate 3D View

Output Scalar Volume RAS: (96.2, 126.0, 23.8), Bg IJK: (31, -2, 19), Lb: Out of Frame, Bg: Out of Frame.

**Left click on the Label Map Selection, and select the Output Scalar Volume-label label map**



# LabelMap Generation

3D Slicer Version 3.6

File Edit View Window Help Feedback

Models: Editor

3DSlicer

Help & Acknowledgement

Create & Select Label Maps

Master Volume: Output Scalar Volume

Merge Volume: Output Scalar Volume-label

Per-Structure Volumes

Edit Selected Label Map

Label 2

Active Tool: Paint

Paint Over:

Threshold Painting:

Threshold: 0 1

Radius: 23

Smudge:

Check Points

Manipulate Slice Views

Manipulate 3D View

Don't show label volume outlines

Left click on the Slicer Viewer Menu icon, and select **Don't Show label volume outlines**

Fit to window

Rotate to Volume Plane

Adjust label map opacity

Don't show label volume outlines

Show reformat widget

Compositing

Slice spacing mode

Lightbox view

Adjust display

tear off control panel

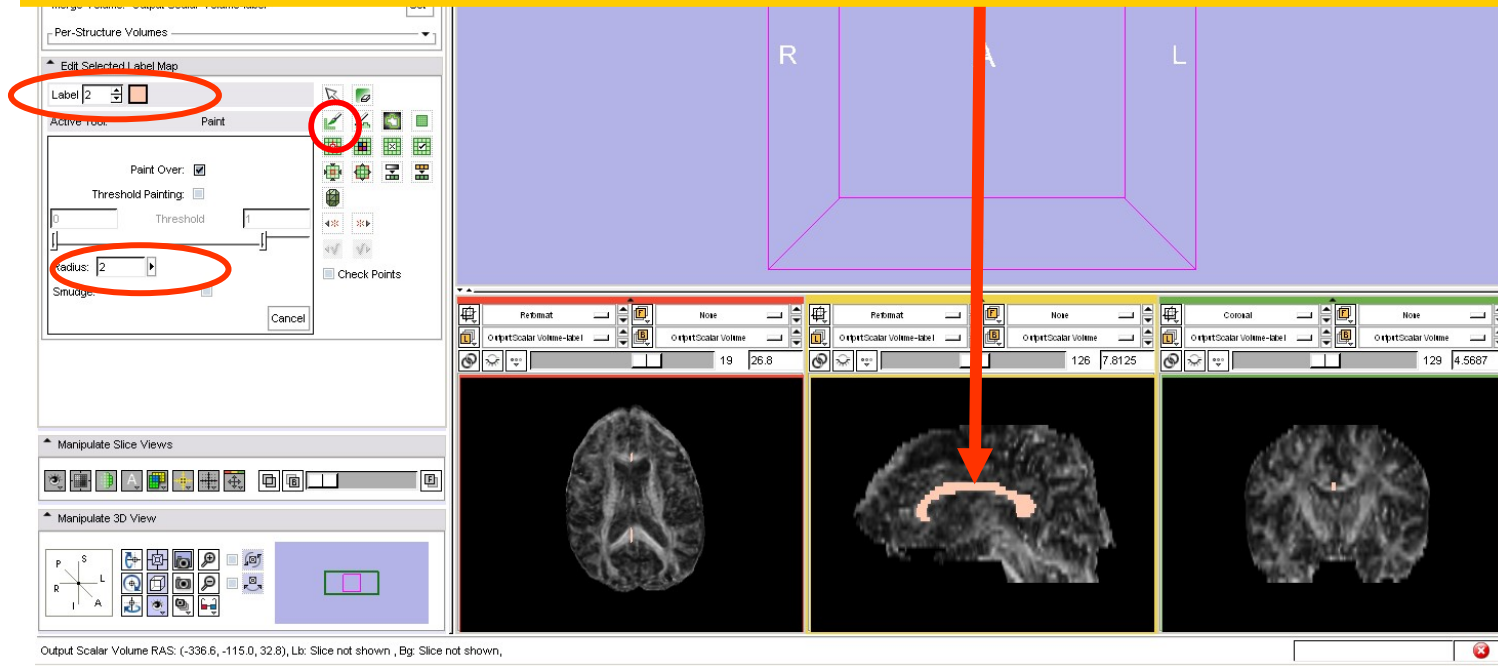
close

Don't show label volume outlines



# LabelMap Generation

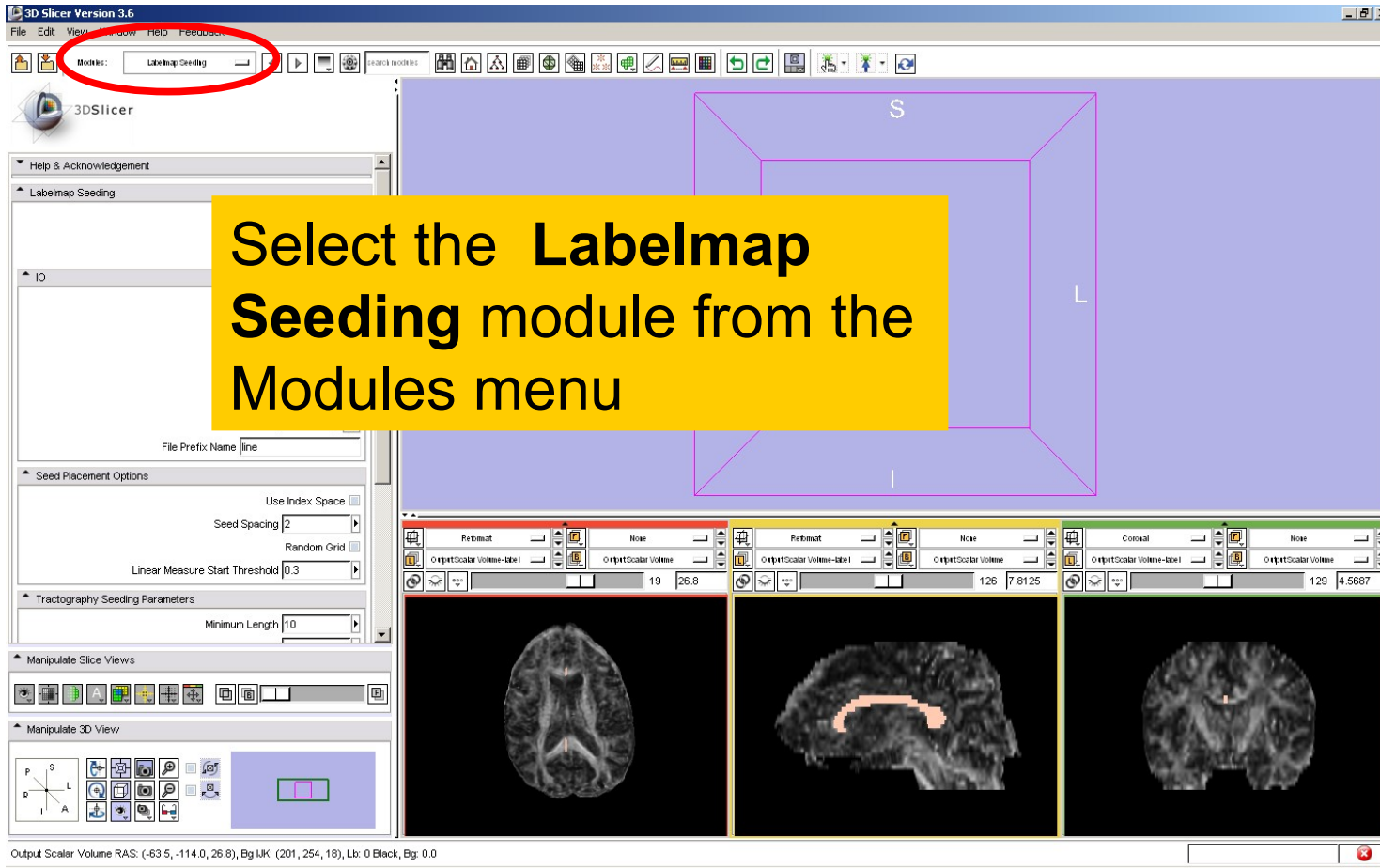
Select the label 2 (pink), click on the **Paint** icon, set the radius to **2** and draw a region of interest within the corpus callosum in the sagittal view on a set of 2 or 3 slices







# LabelMap Seeding





# LabelMap Seeding

**Select the Input DTI volume  
'Output DTI Volume'**

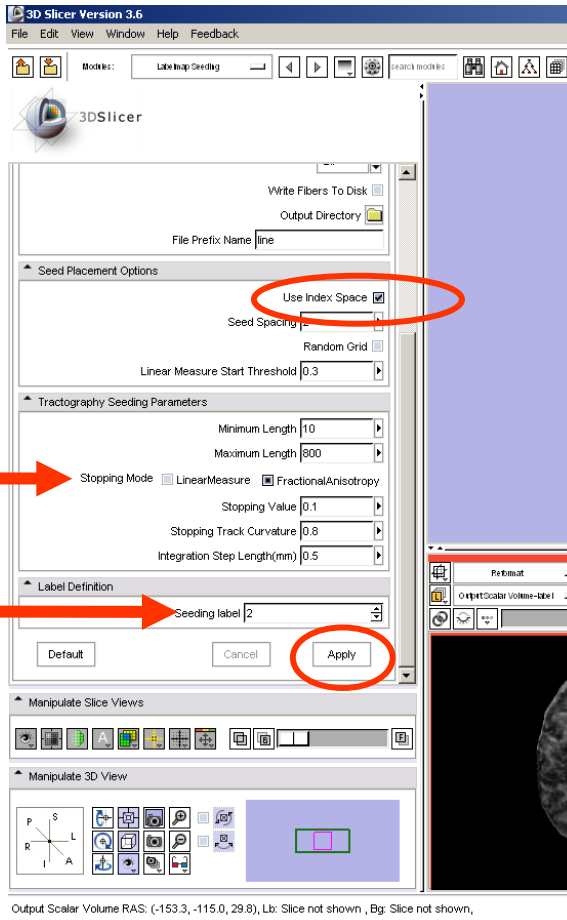
**Select the Input Label Map  
'Output Scalar Volume-label'**

**Select Output Fiber Bundle  
'Create New Fiber Bundle'**

3D Slicer Version 3.6  
File Edit View Window Help Feedback  
Module: Labelmap Seeding  
Parameter set: g  
Status: Idle  
IO  
Input DTI Volume: e  
Input Label Map: OI  
Output Fiber bundle: LI  
Write Fibers To Disk  
Output Directory  
File Prefix Name: line  
Seed Placement Options  
Use Index Space  
Seed Spacing: 2  
Random Grid  
Linear Measure Start Threshold: 0.3  
Tractography Seeding Parameters  
Minimum Length: 10  
Manipulate Slice Views  
Manipulate 3D View  
Output Scalar Volume RAS: (165.2, 223.3, 20.8), Lb: Slice not shown, Bg: Slice not shown



# LabelMap Seeding



In the Seed Placement Options tab, select **Use Index Space**.

In the Tractography Seeding Parameters tab, select the **Stopping Mode Fractional Anisotropy**, and use the default parameters for the Minimum Length, Maximum Length, Stopping Value, Stopping Track Curvature and Integration Step Length.

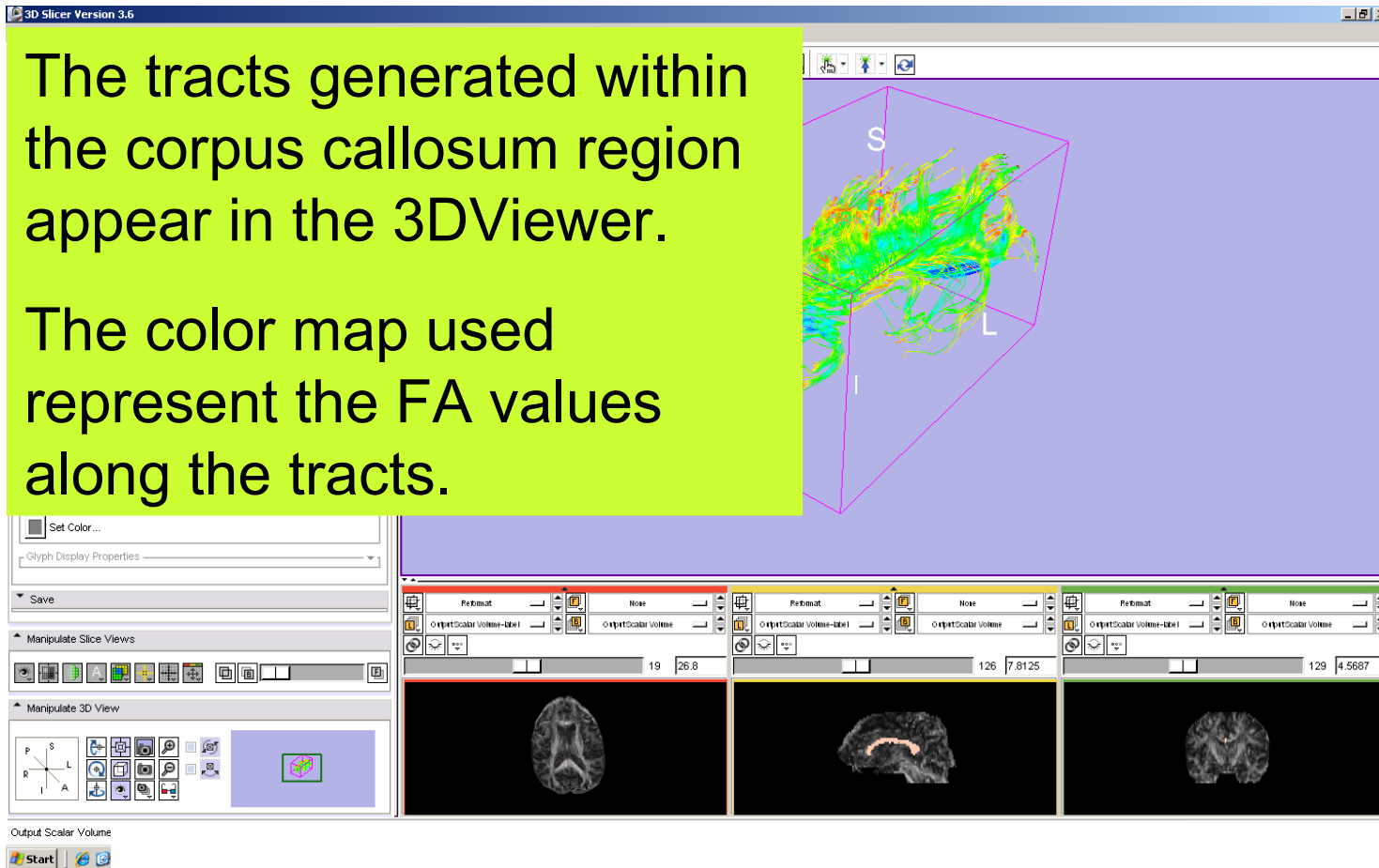
In the Label Definition tab, set 'Seeding label' to label 2, and click on **Apply**



# LabelMap Seeding

The tracts generated within the corpus callosum region appear in the 3DViewer.

The color map used represent the FA values along the tracts.





# LabelMap Seeding

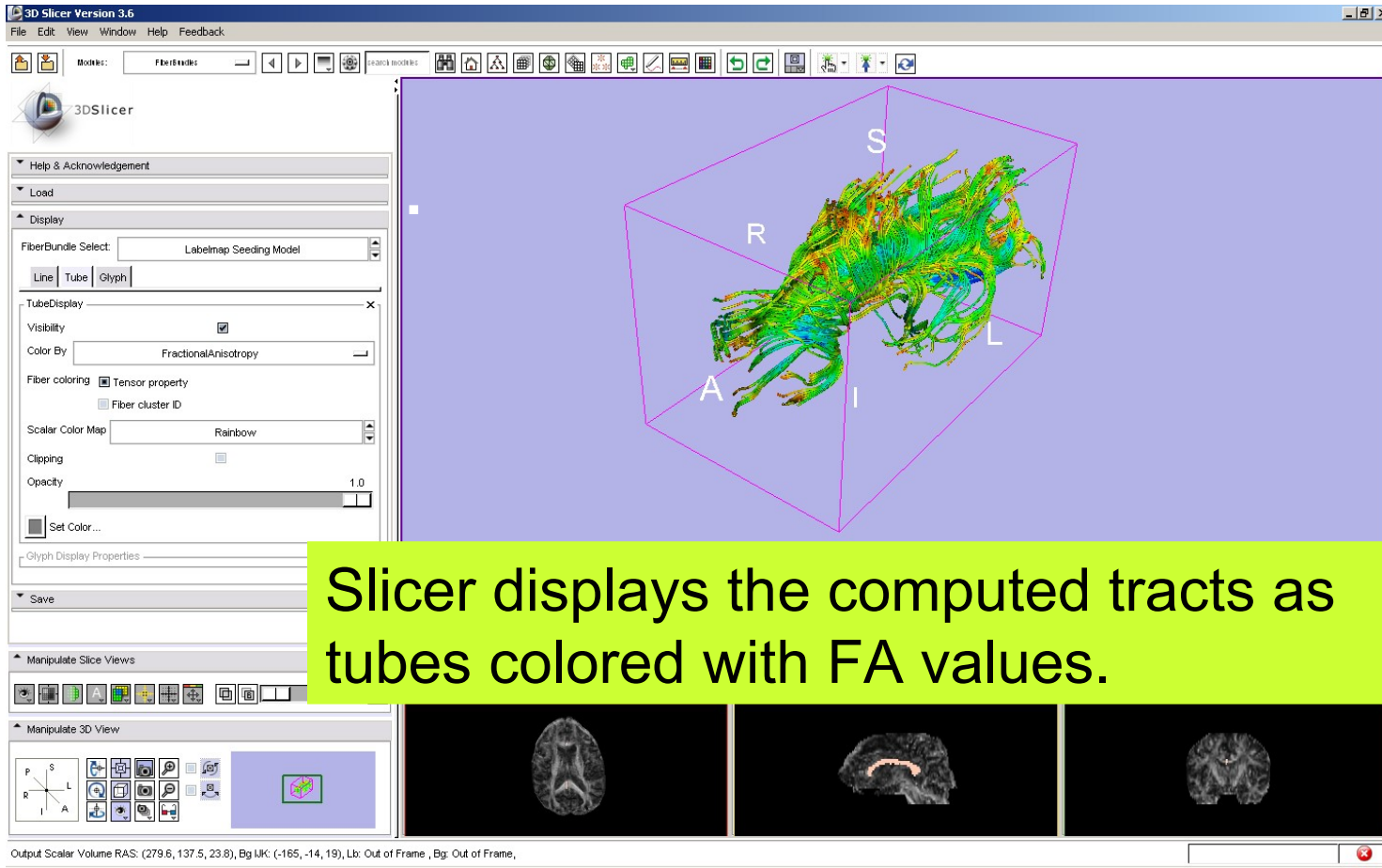
The screenshot shows the 3D Slicer software interface. The 'FiberBundles' module is selected in the top toolbar. In the 'Display' panel, the 'Tube' tab is selected. The 'TubeDisplay' sub-panel has the 'Visibility' checkbox checked. The main 3D view shows a brain with green and blue fiber bundles. The bottom of the interface shows three orthogonal slice views (axial, sagittal, and coronal) and a status bar with coordinates.

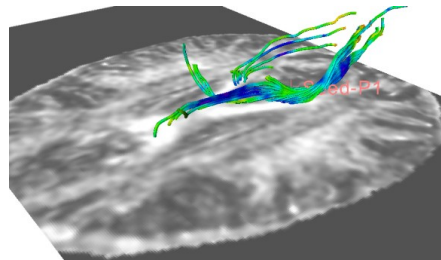
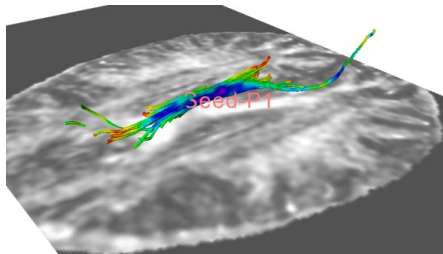
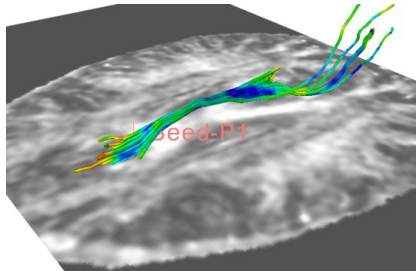
Select the **FiberBundles** module, and click on the tab **Tube** in the Display panel

Check the visibility box to display the tubes.



# LabelMap Seeding



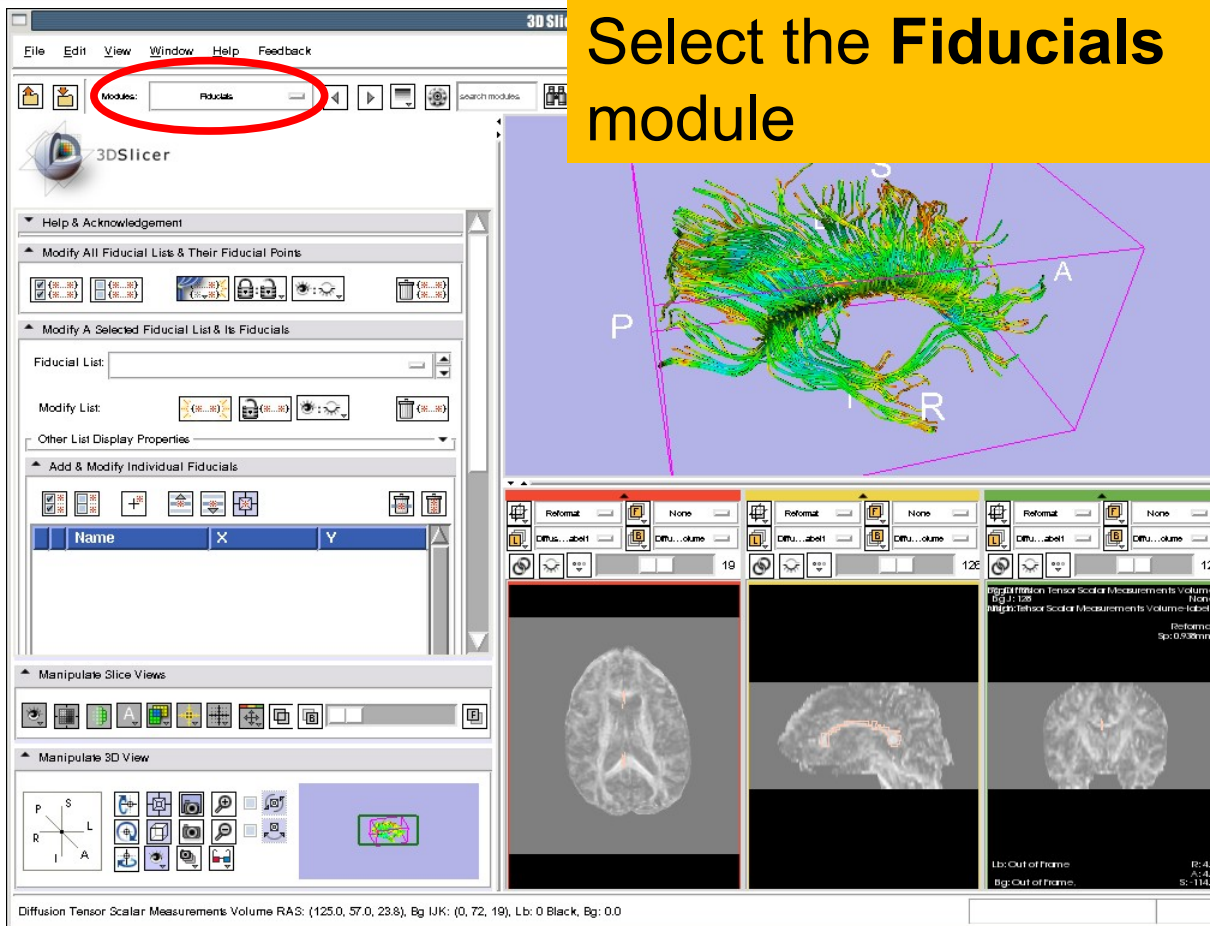


# Part 4: Tractography on-the-fly



# Fiducial Seeding

Select the **Fiducials** module







# Fiducial Seeding

**Set Fiducial List to Create New Fiducial List**

The screenshot displays the 3DSlicer software interface. The 'Fiducials' module is active. A red arrow points to the 'Fiducial List' dropdown menu in the 'Modify A Selected Fiducial List & Its Fiducials' section. The main 3D view shows a brain with a green and blue fiber-like structure and a purple wireframe box with axes labeled S, A, P, I, R. Below the 3D view are three slice views (axial, sagittal, coronal) and a status bar at the bottom.



# Fiducial Seeding

3D Slicer Version 3.6

File Edit View Window Help Feedback

MODES: Fiducial

3DSlicer

Help & Acknowledgement

Modify All Fiducial Lists & Their Fiducial Points

Modify A Selected Fiducial List & Its Fiducials

Fiducial List:  Fiducial List:  Fiducial List:

Modify List:

Other List Display Properties

Add & Modify Individual Fiducials

Name	X	Y	Z
------	---	---	---

Distance:

Manipulate Slice Views

Manipulate 3D View

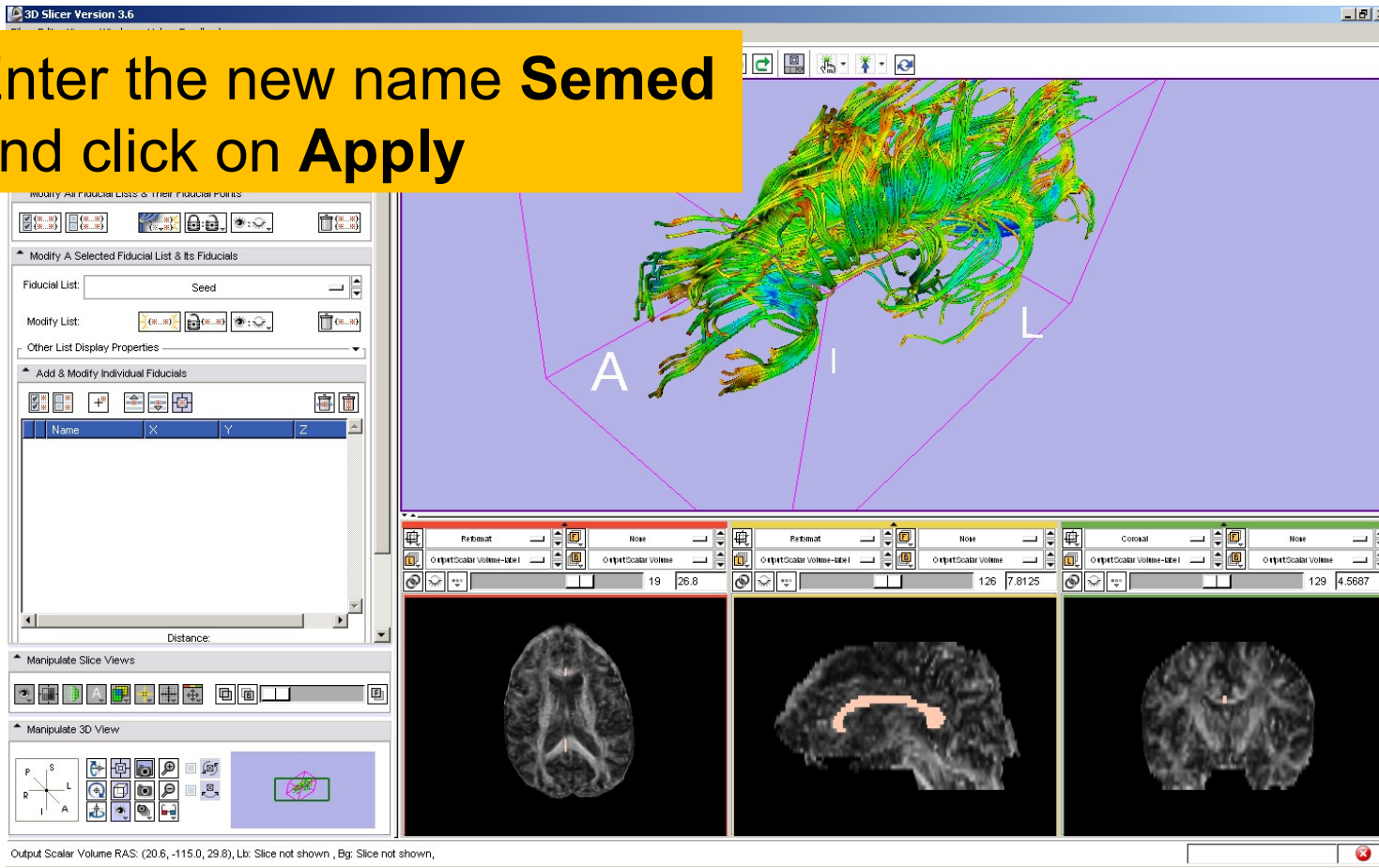
Output Scalar Volume RAS: (20.6, -115.0, 29.8), Lr: Slice not shown, Bg: Slice not shown

**Left click on Fiducial List and select Rename**



# Fiducial Seeding

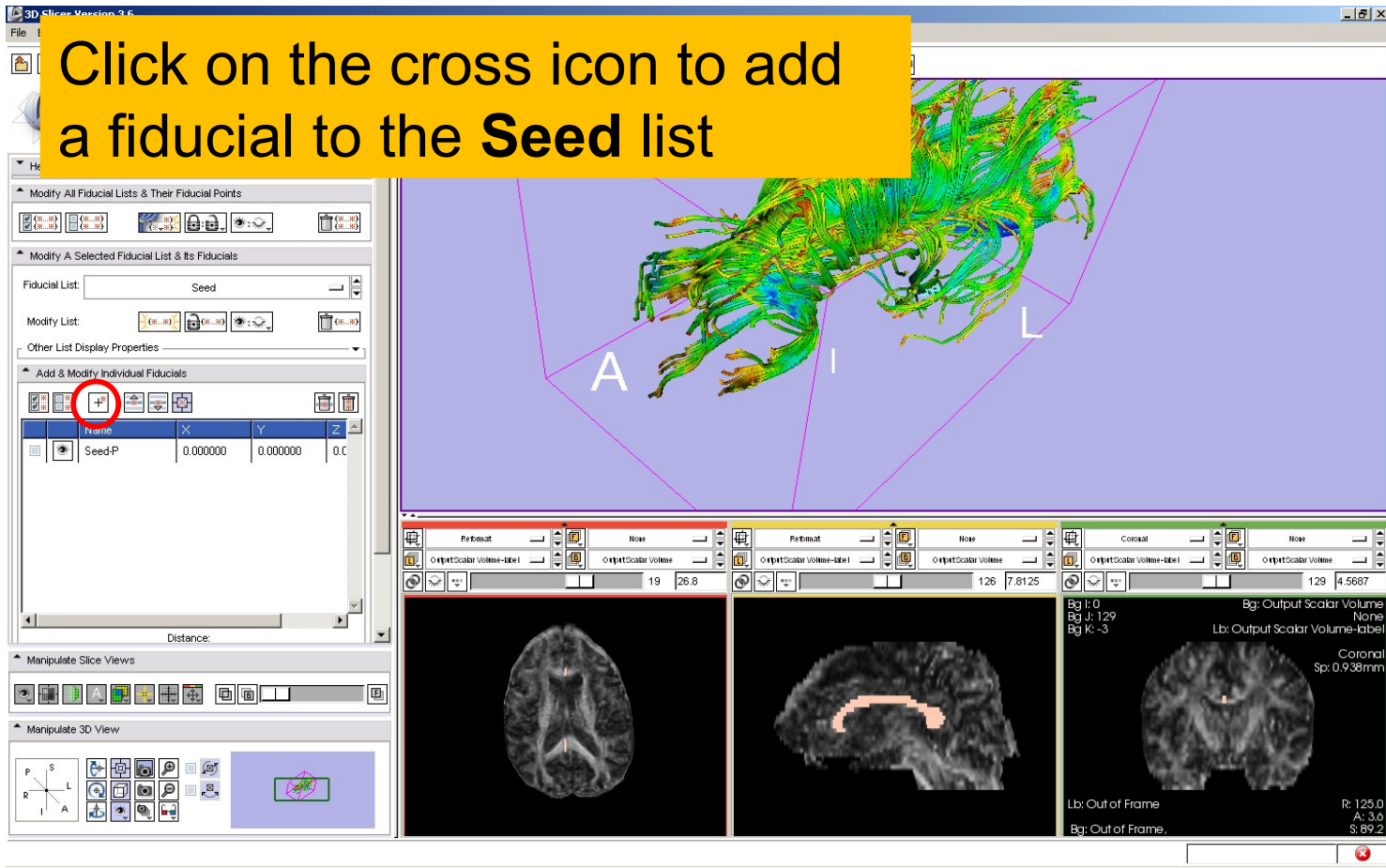
Enter the new name **Semed** and click on **Apply**





# Fiducial Seeding

Click on the cross icon to add a fiducial to the **Seed** list





# Fiducial Seeding

The fiducial **Seed-P** appears in the 3D Viewer

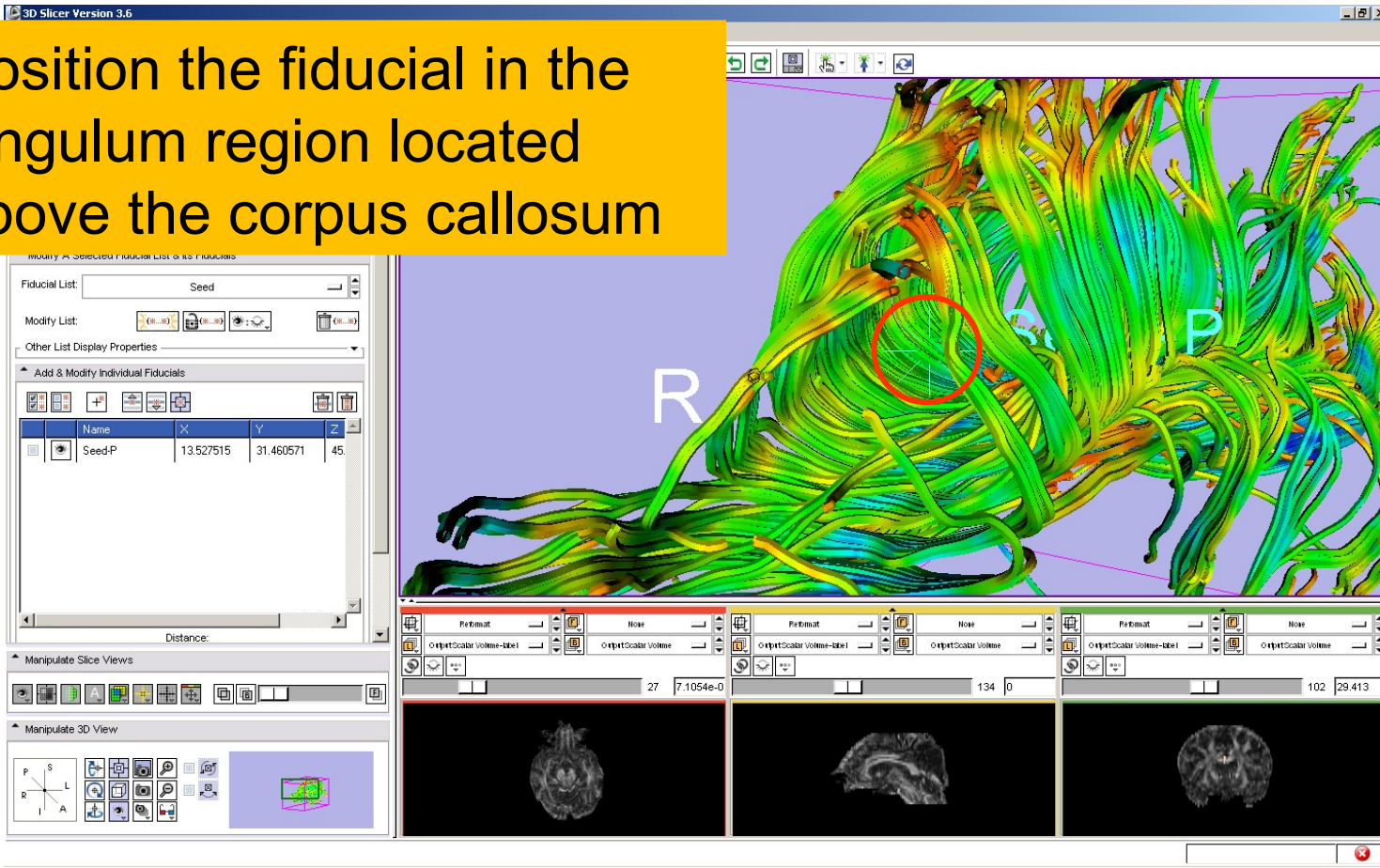
Name	X	Y	Z
Seed-P	0.000000	0.000000	0.0

Output Scalar Volume RAS: (-84.3, 233.7, 23.6), Bg IJK: (223, -117, 19), Lb: Out of Frame, Bg: Out of Frame



# Fiducial Seeding

Position the fiducial in the cingulum region located above the corpus callosum





# Fiducial Seeding

**Check the box to select the 'Seed-P' fiducial: we will use this fiducial to drive the tractography**

The screenshot shows a software interface with a 3D view of brain white matter tracts. A pink 'P' with a red arrow points to a specific tract, labeled 'Seed-P'. On the left, a panel titled 'Add & Modify Individual Fiducials' contains a table with a checked box next to 'Seed-P'. Below the table are sections for 'Manipulate Slice Views' and 'Manipulate 3D View'. At the bottom, there are three 2D slice views and a status bar with coordinates: 'Output Scalar Volume RAS: (232.8, -115.0, 3.0), Lr: Slice not shown, Bg: Slice not shown'.

Name	X	Y	Z
Seed-P	13.527515	31.460571	45.

Once selected, the fiducial Seed-P is displayed in pink letters in the 3D viewer.



# Fiducial Seeding

3D Slicer Version 3.6

File Edit View Window Help Feedback

Modules: FiducialSeeding

3DSlicer

Help & Acknowledgement

Tractography Seeding From Fiducial

Parameters Parameters

Select DTI Volume: Output...olume

Select FiducialList or Model: Seed

Output FiberBundleNode: Seed\_FiberTracts

Stopping Mode: Linear Measure

Stopping Value: 0.25

Stopping Track Curvature: 0.7

Integration Step Length (mm): 0.5

Minimum Path Length (mm): 20

Fiducial Seeding Region Size (mm): 5.0

Fiducial Seeding Step Size (mm): 1.5

Manipulate Slice Views

Manipulate 3D View

Output (Scalar Volume-label)

Output (FiberBundle)

Output (FiberBundle)

Lb: Slice not shown

Bg: Slice not shown

R: 105.6  
A: -115.0  
S: 46.6

Lb: 0 Black

Bg: 0.0

R: 125.0  
A: -22.2  
S: 6.0

Set the Output FiberBundleNode to **Create New FiberBundle**

**Important:** this step must be done first

Select the **Fiducial Seeding** module

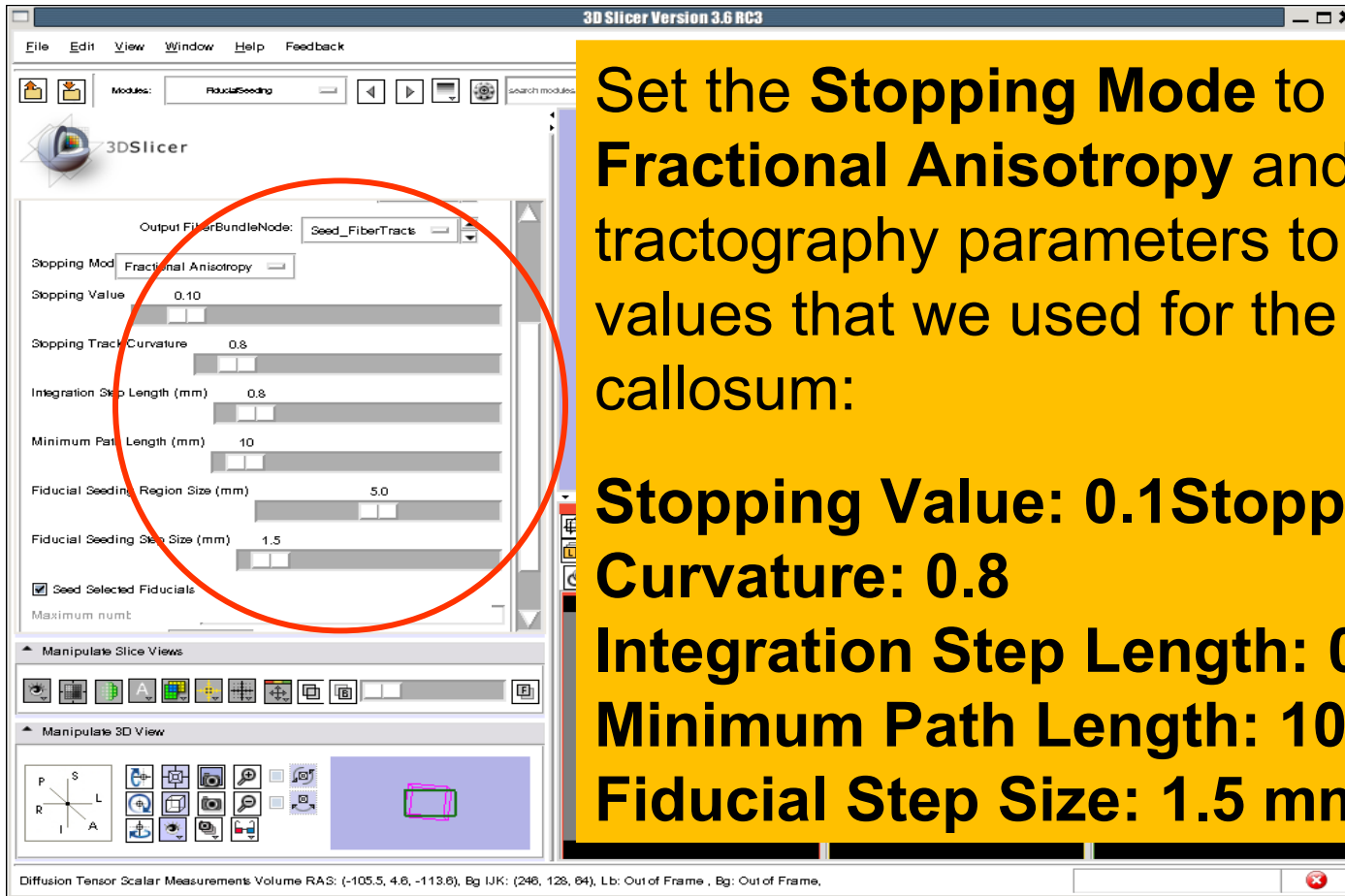
Set the DTI Volume to **Output DTI Volume**

Select the Fiducial List **Seed**





# Fiducial Seeding



Set the **Stopping Mode** to **Fractional Anisotropy** and set the tractography parameters to the values that we used for the corpus callosum:

**Stopping Value: 0.1**  
**Stopping Track Curvature: 0.8**

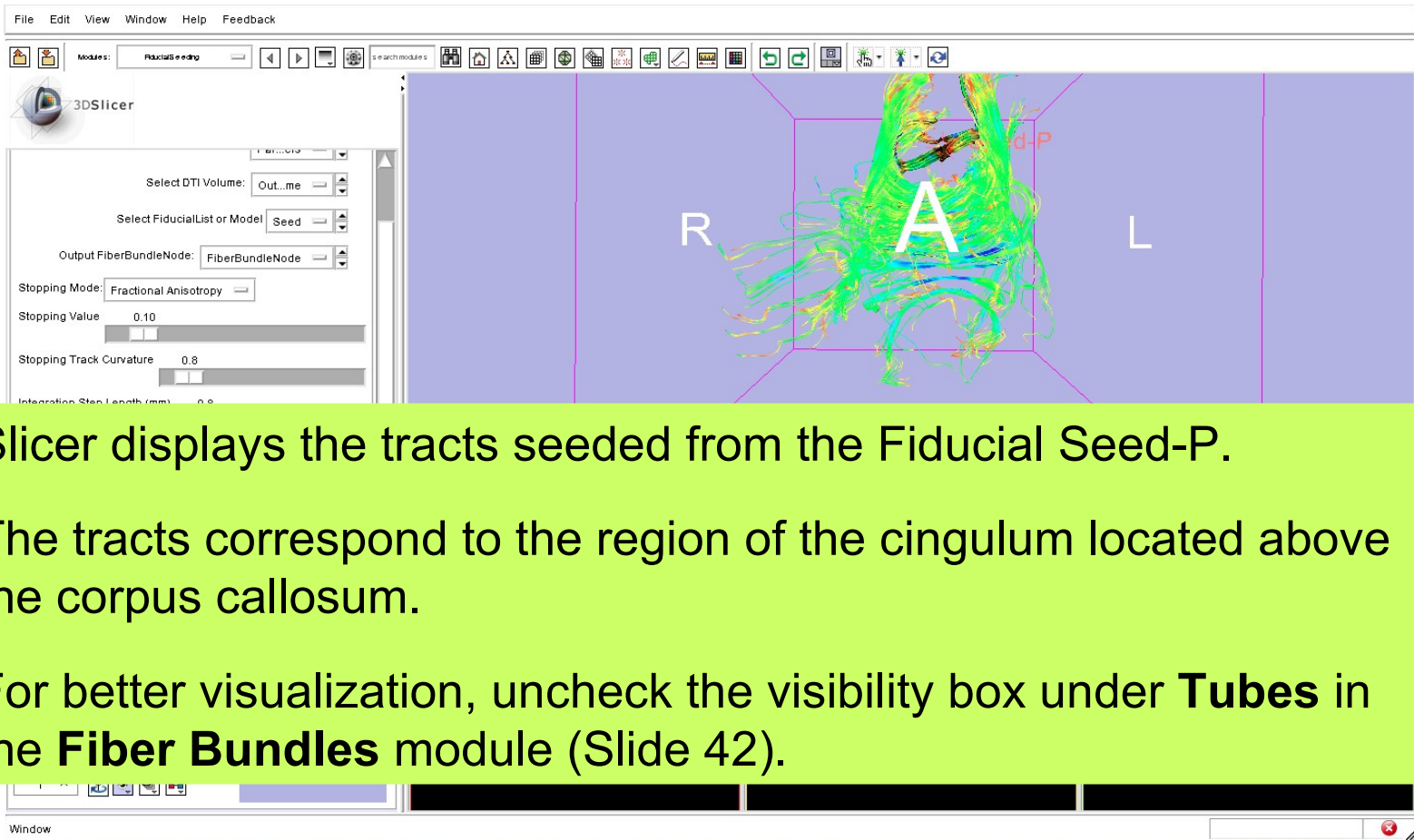
**Integration Step Length: 0.8 mm**

**Minimum Path Length: 10 mm**

**Fiducial Step Size: 1.5 mm**



# Fiducial Seeding



Slicer displays the tracts seeded from the Fiducial Seed-P.

The tracts correspond to the region of the cingulum located above the corpus callosum.

For better visualization, uncheck the visibility box under **Tubes** in the **Fiber Bundles** module (Slide 42).



# Fiducial Seeding

3D Slicer Version 3.6

File Edit View Window Help Feedback

3DSlicer

Help & Acknowledgement

Tractography Seeding From Fiducial

Parameters Parameters

Select DTI Volume: Output...olume

Select FiducialList or Model: Seed

Output FiberBundleNode: Seed\_FiberTracts

Stopping Mode: Fractional Anisotropy

Stopping Value: 0.10

Stopping Track Curvature: 0.8

Integration Step Length (mm): 0.8

Minimum Path Length (mm): 10

Fiducial Seeding Region Size (mm): 5.0

Fiducial Seeding Step Size (mm): 1.5

Manipulate Slice Views

Manipulate 3D View

FiducialSeeding

Move the fiducial **Seed-P** from the left cingulum to the corresponding region in the right cingulum in the coronal slice.

PerEomat Noise PerEomat Noise PerEomat Noise

OutputScalar Volume-label OutputScalar Volume-label OutputScalar Volume-label

Bg I: 400 Bg: Output Scalar Volume

Bg J: -421 None

Bg K: 13 Lb: Output Scalar Volume-label

Reformat Sp: 3mm

Lb: Out of Frame R: -249.7

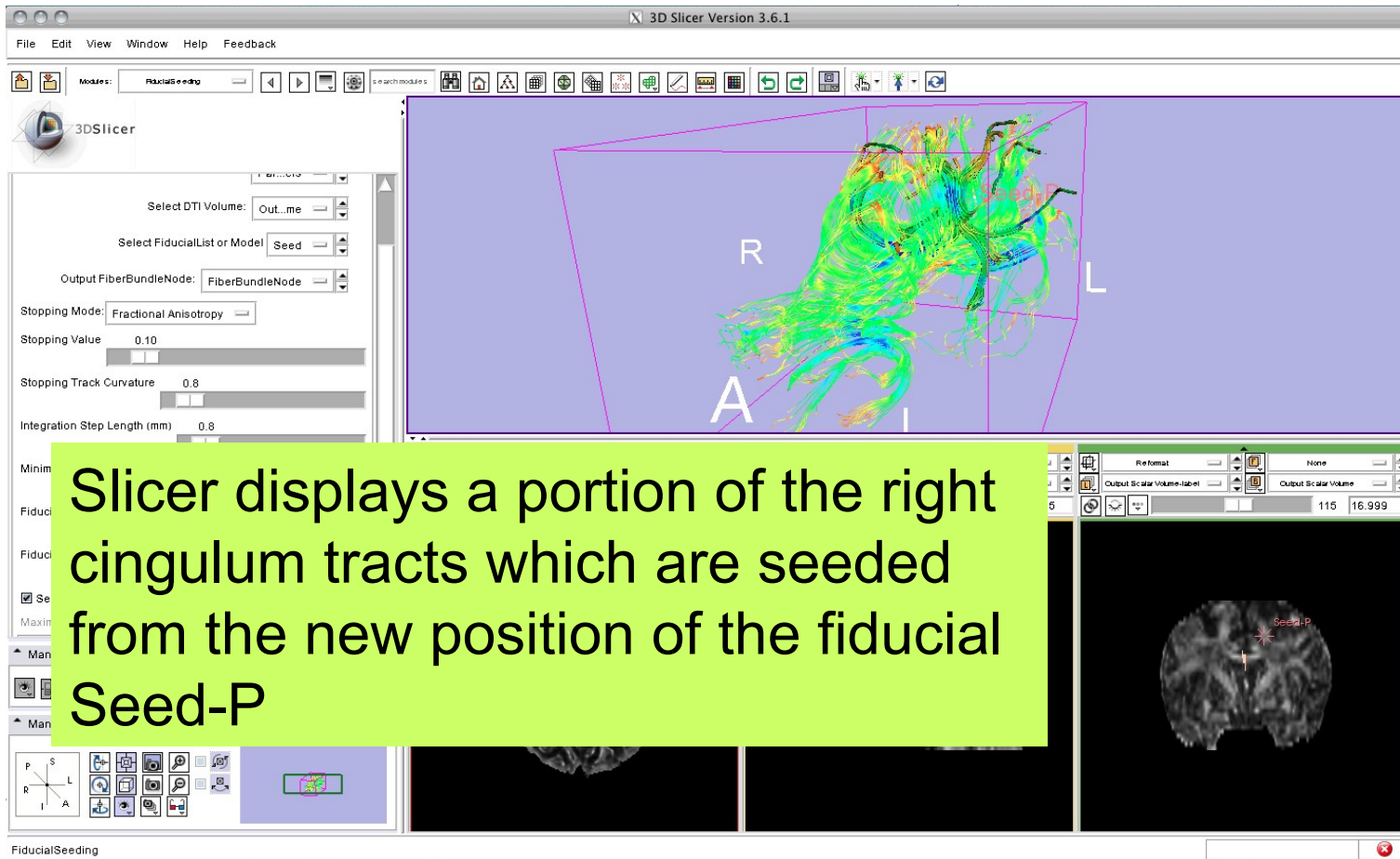
Bg: Out of Frame A: 519.1

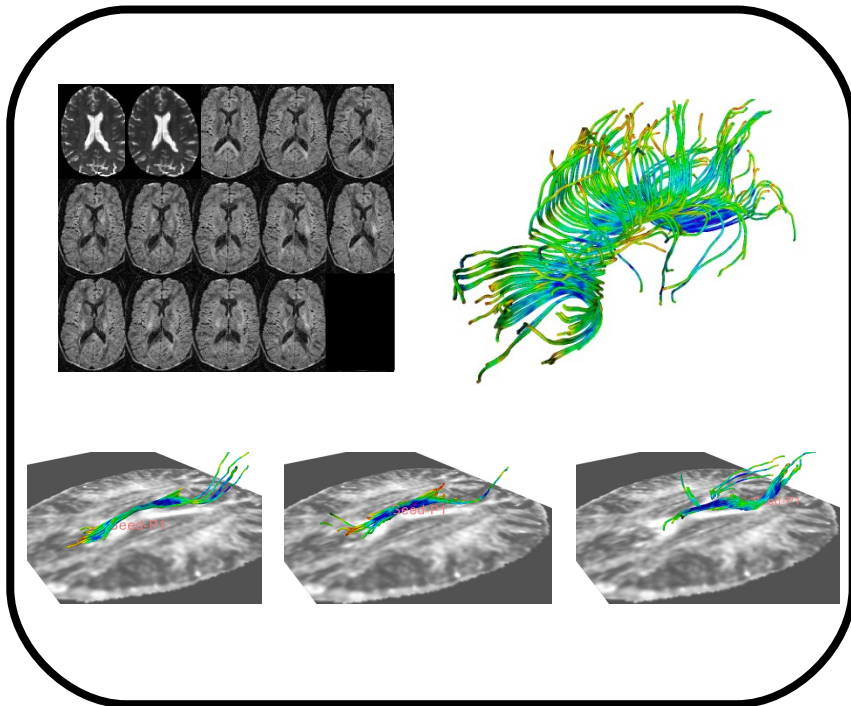
S: 40.6

Seed-P



# Fiducial Seeding





## Part 5:

# Saving a DTI Scene



# DTI Scene

3D Slicer Version 3.6.1

File Edit View Window Help Feedback

Modules: Data

Select the **Data** module

MRML Tree

- Scene
  - View
    - Default Scene Camera
  - dwiDataset
    - Output DTI Volume
    - Output Baseline Volume
    - Otsu Threshold Mask
    - Output Scalar Volume
    - Output Scalar Volume-label
    - Labelmap Seeding Model
    - Seed
    - FiberBundleNode

Display MRMLID's

MRML Node Inspector

Load & Add Scenes Or Individual Datasets

- Load new scene (close current)
- Add a scene (to current)
- Add data or a data directory

Manipulate Slice Views

Manipulate 3D View

Slicer displays the list of volumes and models generated in this tutorial

Data



# Saving a DTI Scene

3D Slicer Version 3.6.1

File Edit View Window Help Feedback

Modules: FiducialSeeding

Select DTI Volume: Out...me

Select FiducialList or Model: Seed

Output FiberBundleNode: FiberBundleNode

Stopping Mode: Fractional Anisotropy

Stopping Value: 0.10

Stopping Track Curvature: 0.8

Integration Step Length (mm): 0.8

Minimum Path Length (mm): 10

Fiducial Seeding Region Size (mm): 5.0

Fiducial Seeding Step Size (mm): 1.5

Seed Selected Fiducials

Maximum number of seeds: 100

Manipulate Slice Views

Manipulate 3D View

**Select File → Save from the main menu**

Reformat None Reformat None Reformat None

Output Scalar Volume-label Output Scalar Volume-label Output Scalar Volume-label

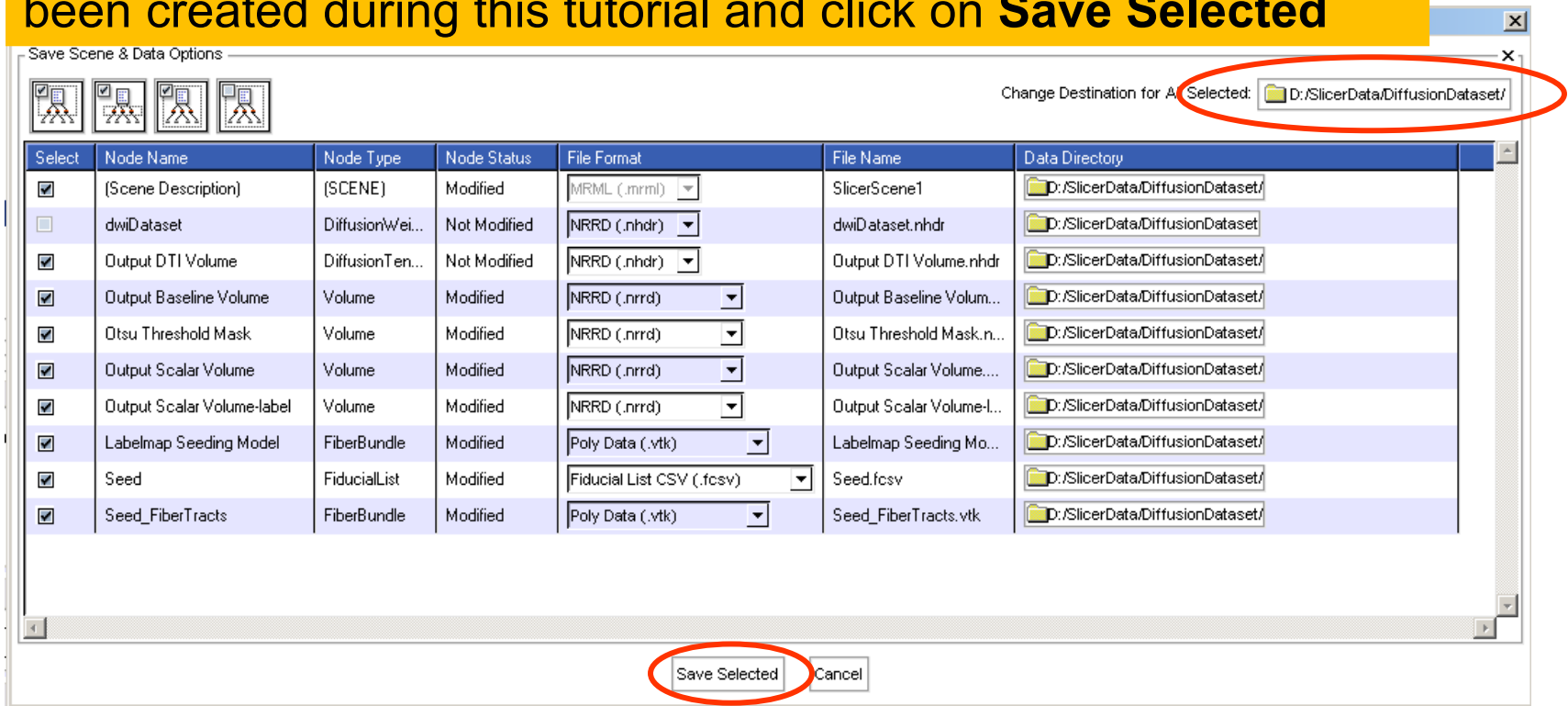
9 55.407 143 -8.2265 115 16.999

FiducialSeeding



# Saving a DTI Scene

Browse to a directory where you would like to save the data. Once you have selected a directory, select all the files that have been created during this tutorial and click on **Save Selected**

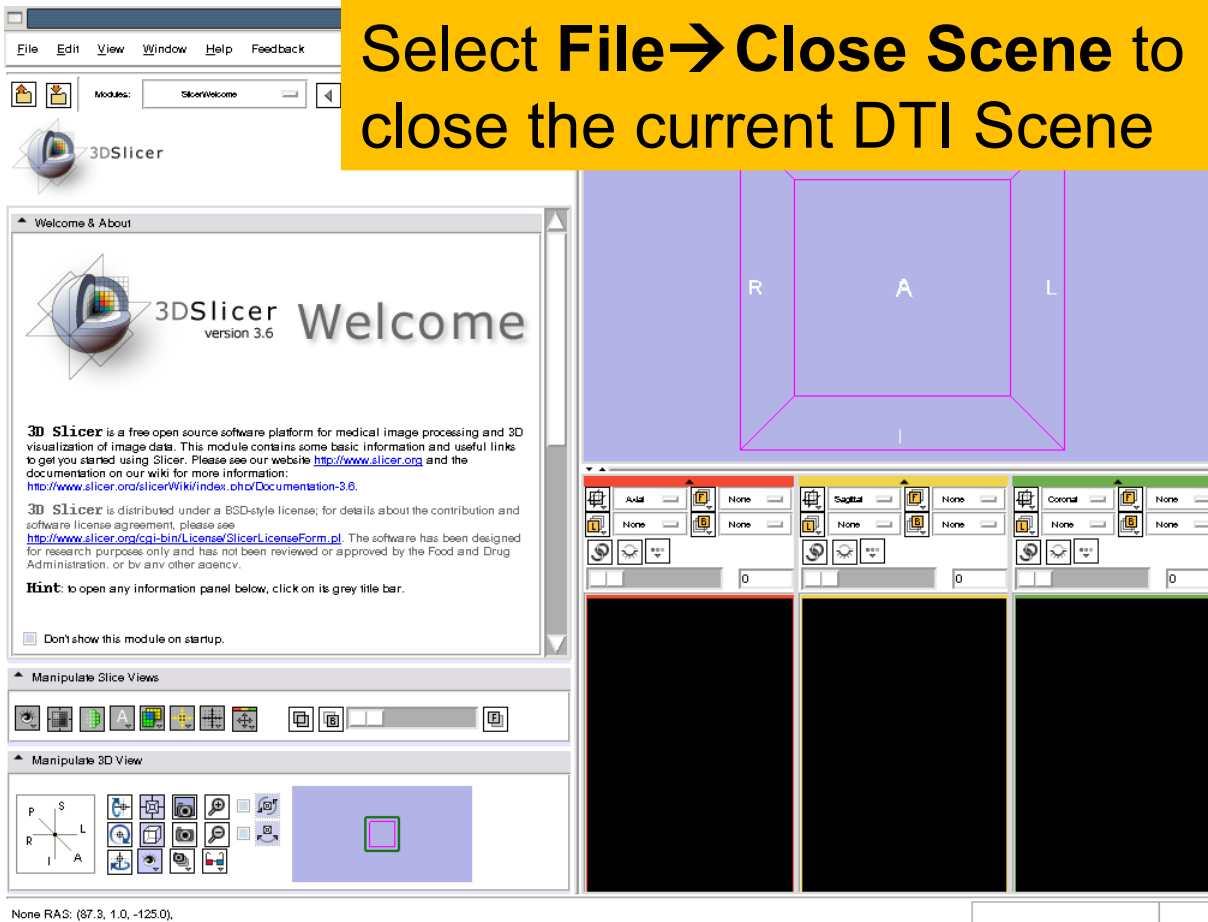






# Saving a DTI Scene

Select **File** → **Close Scene** to close the current DTI Scene





# Loading a DTI Scene

**Select File → Load Scene and browse to the location where you saved the scene SlicerScene1.mrml**

3DSlicer version 3.6

3D Slicer is a free open source software platform for medical image processing and 3D visualization of image data. This module contains some basic information and useful links to get you started using Slicer. Please see our website <http://www.slicer.org> and the documentation on our wiki for more information: <http://www.slicer.org/slicerWiki/index.php/Documentation-3.6>.

3D Slicer is distributed under a BSD-style license; for details about the contribution and software license agreement, please see <http://www.slicer.org/copyright/license/SlicerLicenseForm.pl>. The software has been designed for research purposes only and has not been reviewed or approved by the Food and Drug Administration, or by any other agency.

**Hint:** to open any information panel below, click on its grey title bar.

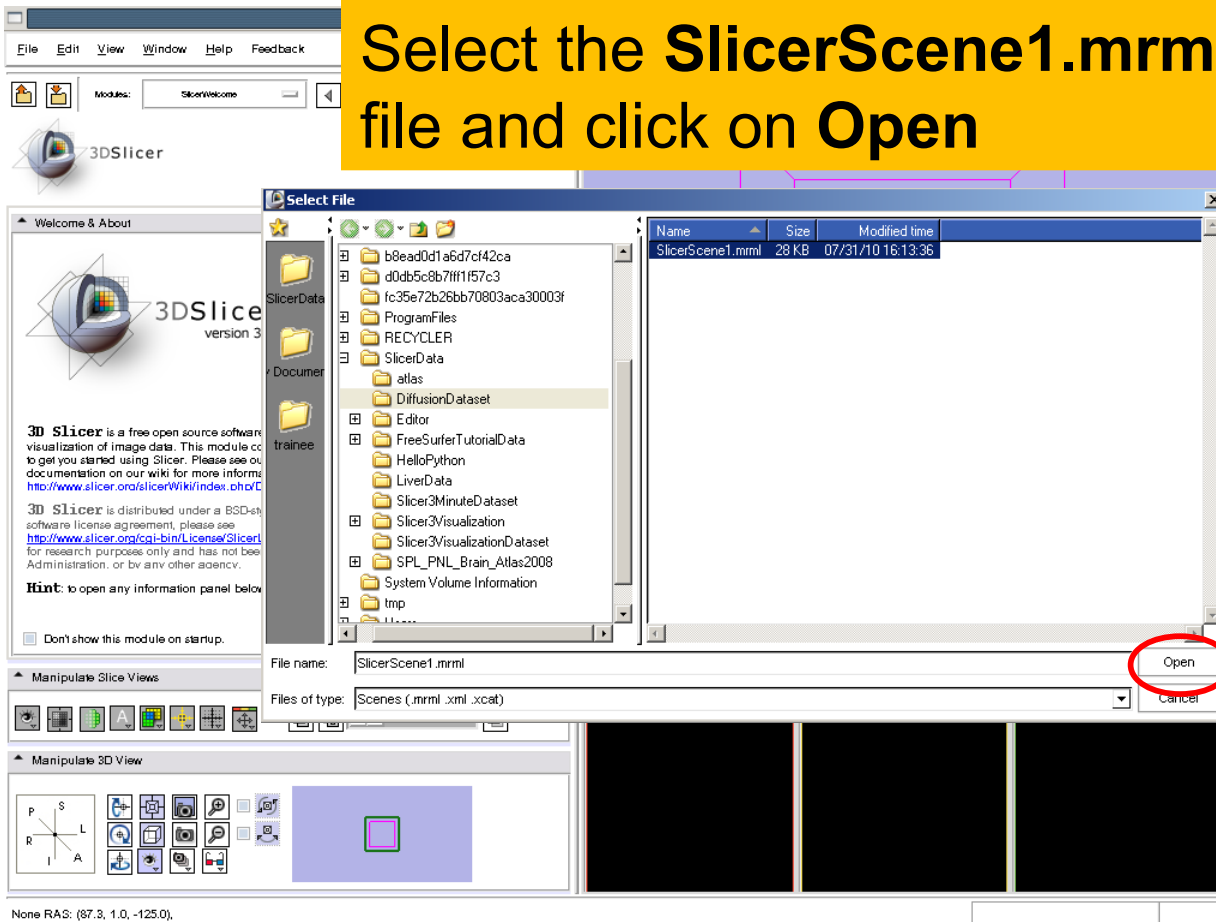
Don't show this module on startup.

None RAS: (87.3, 1.0, -125.0)



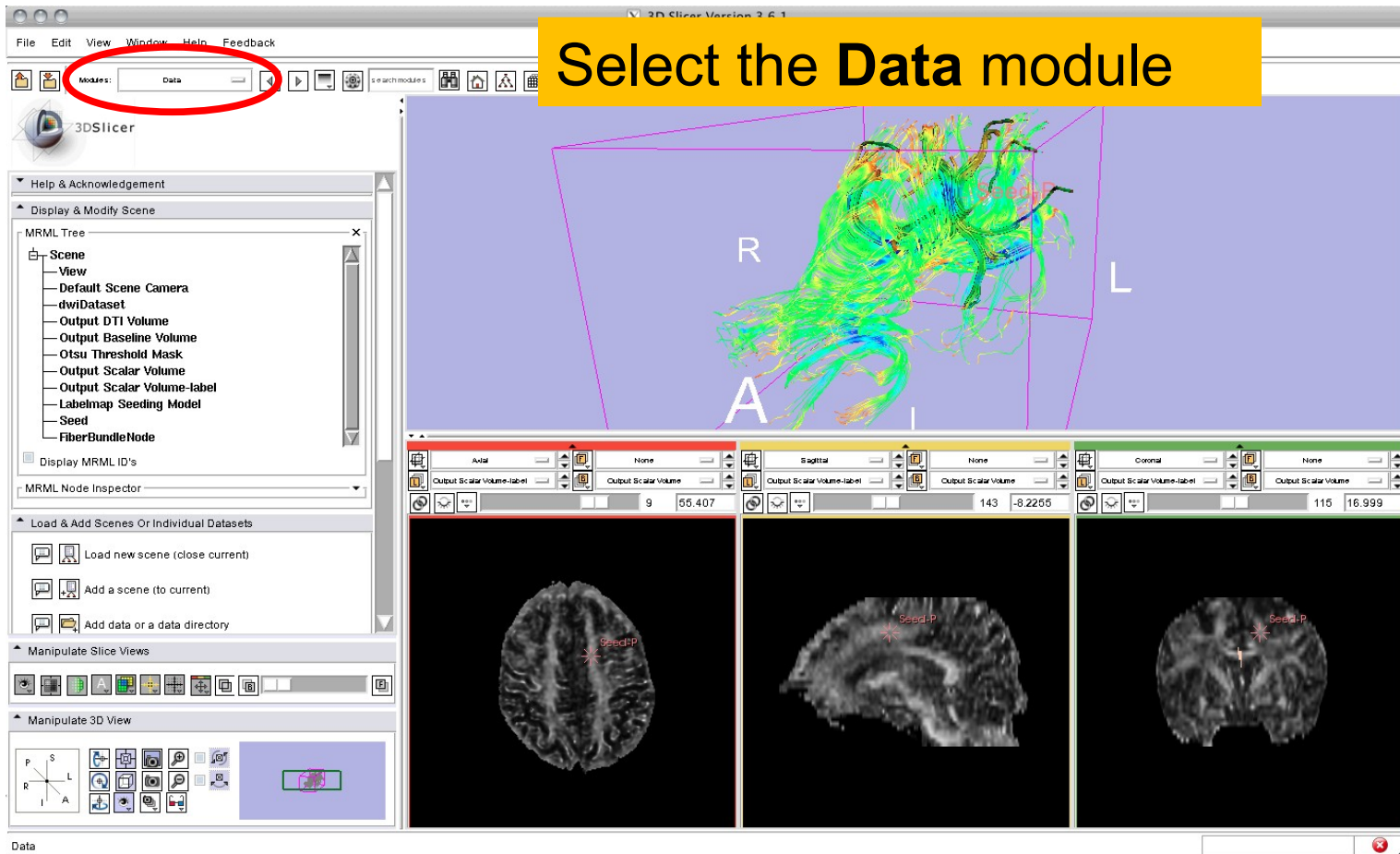
# Loading a DTI Scene

Select the **SlicerScene1.mrml** scene file and click on **Open**





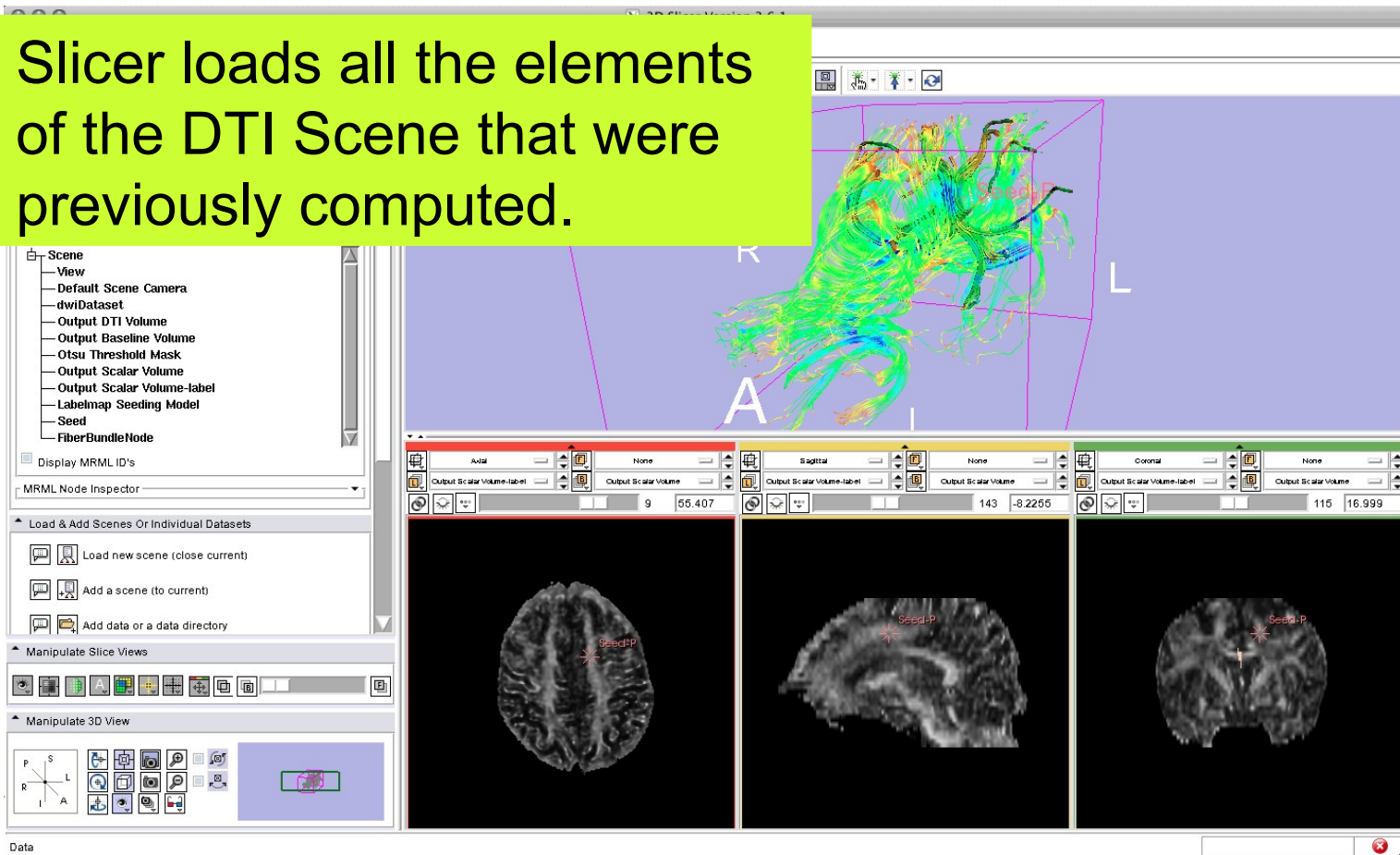
# Loading a DTI Scene





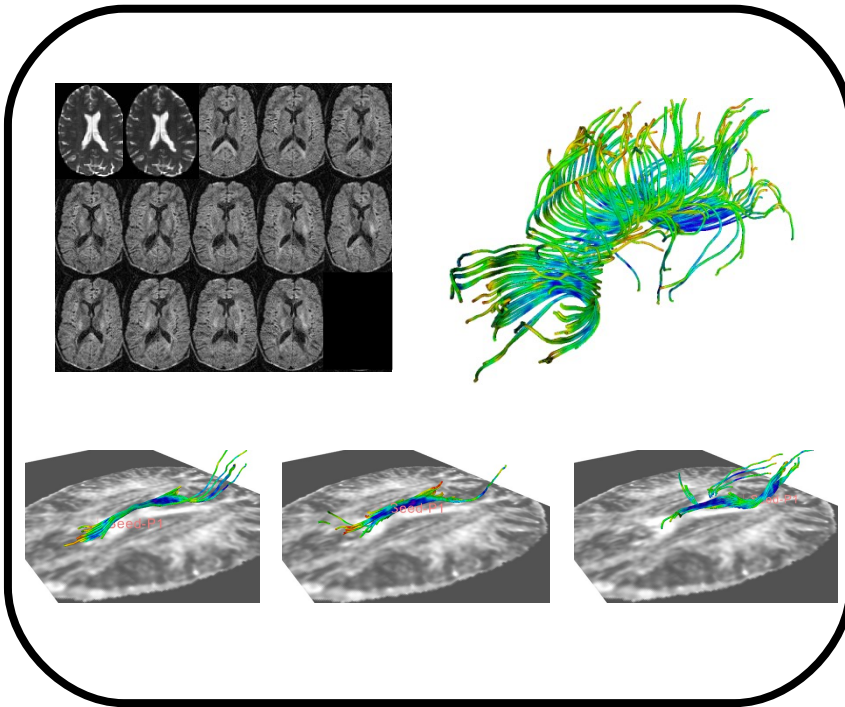
# Loading a DTI Scene

Slicer loads all the elements of the DTI Scene that were previously computed.





# Conclusion



This tutorial guided you through some of the **Diffusion MR** capabilities of the **Slicer3** software for studying the brain white matter pathways.

spujol at bwh.harvard.edu



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