



NA-MIC

National Alliance for Medical Image Computing

<http://na-mic.org>

Diffusion Tensor Imaging tutorial



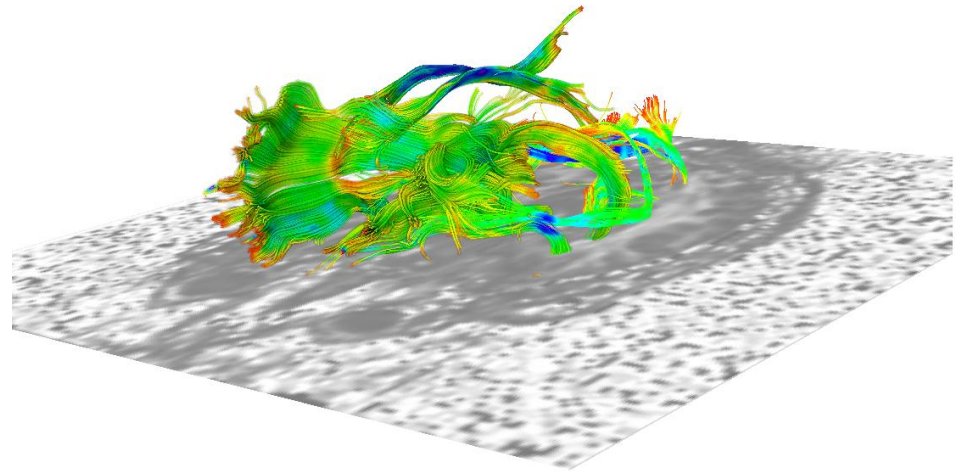
Sonia Pujol, PhD

Surgical Planning Laboratory
Harvard University



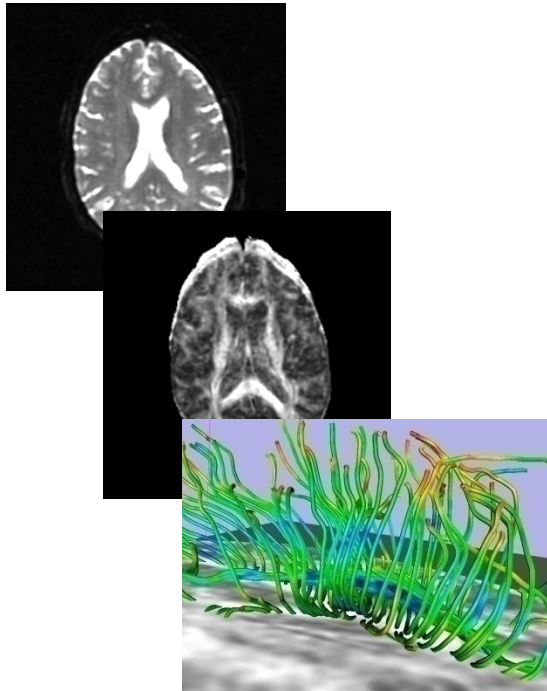
DTI tutorial

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





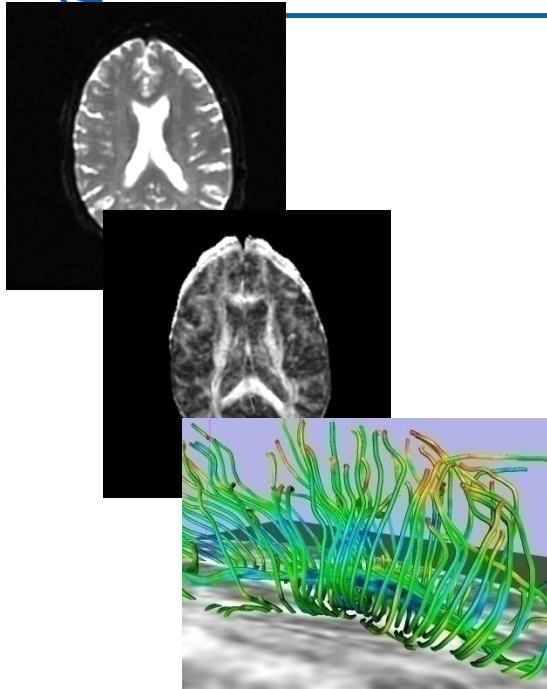
Outline



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



Outline



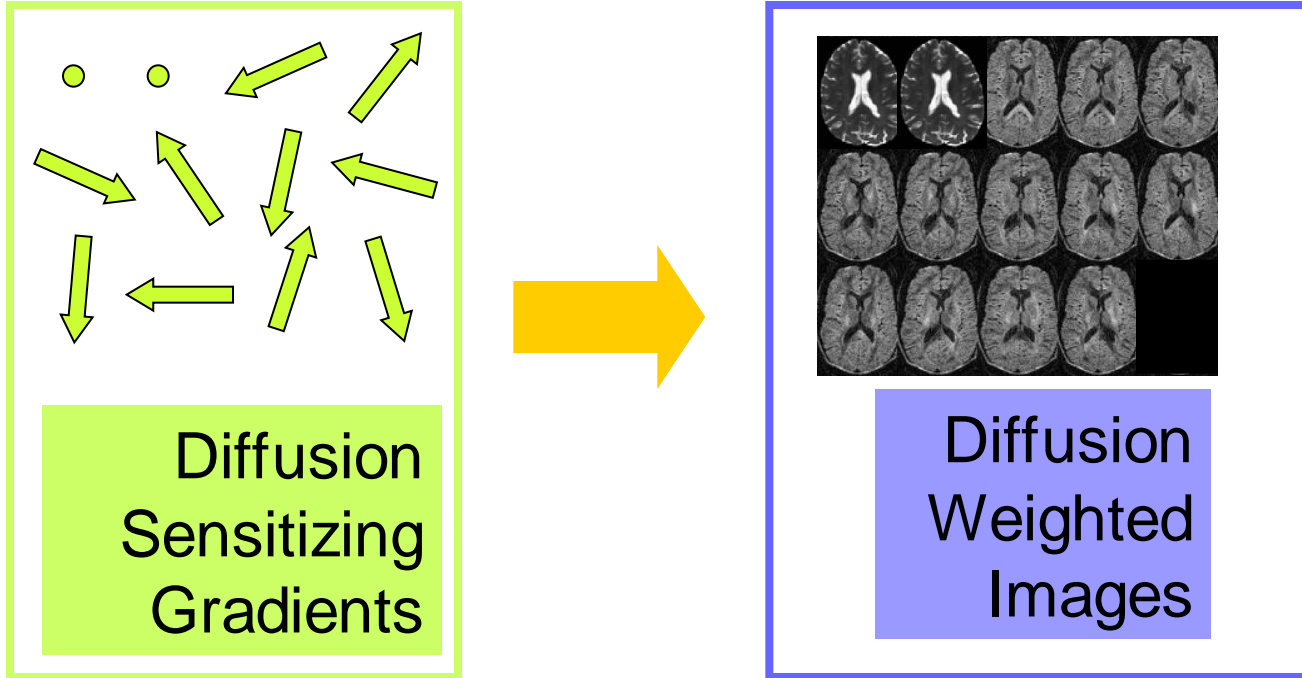
The processing pipeline uses **9 image analysis modules** of Slicer3.6

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



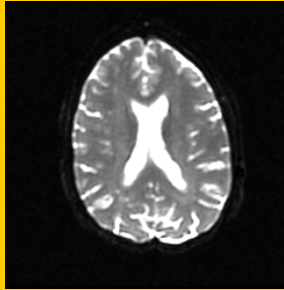
Tutorial Dataset

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

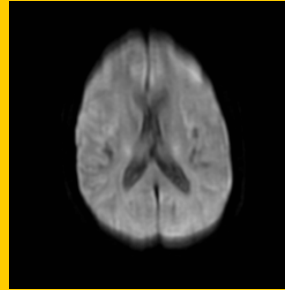




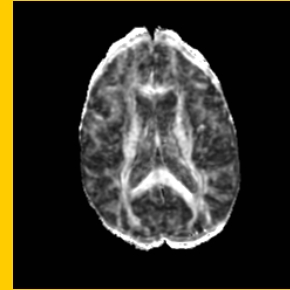
DTI Processing Pipeline



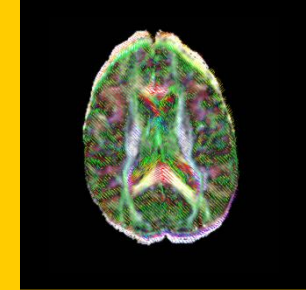
DWI
Acquisition



Tensor
Calculation



Scalar
Maps



3D
Visualization



Start Slicer3

Linux/Mac users

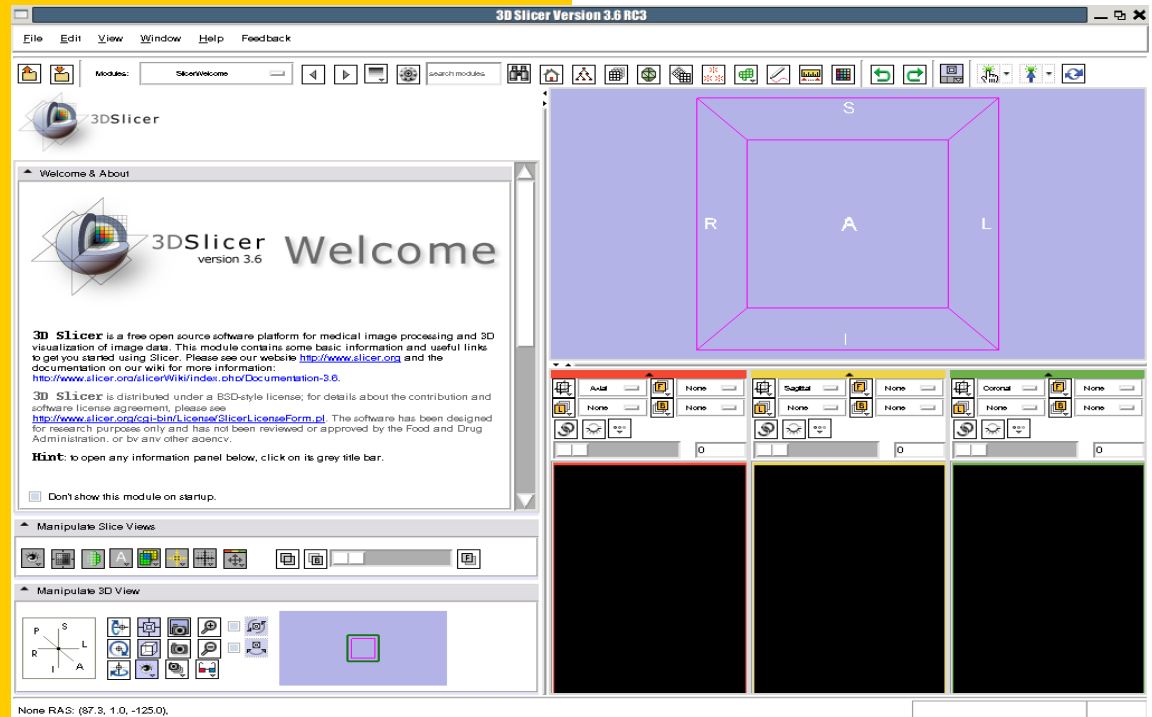
Launch the Slicer3 executable located in the Slicer3.6 directory

Windows users

Select

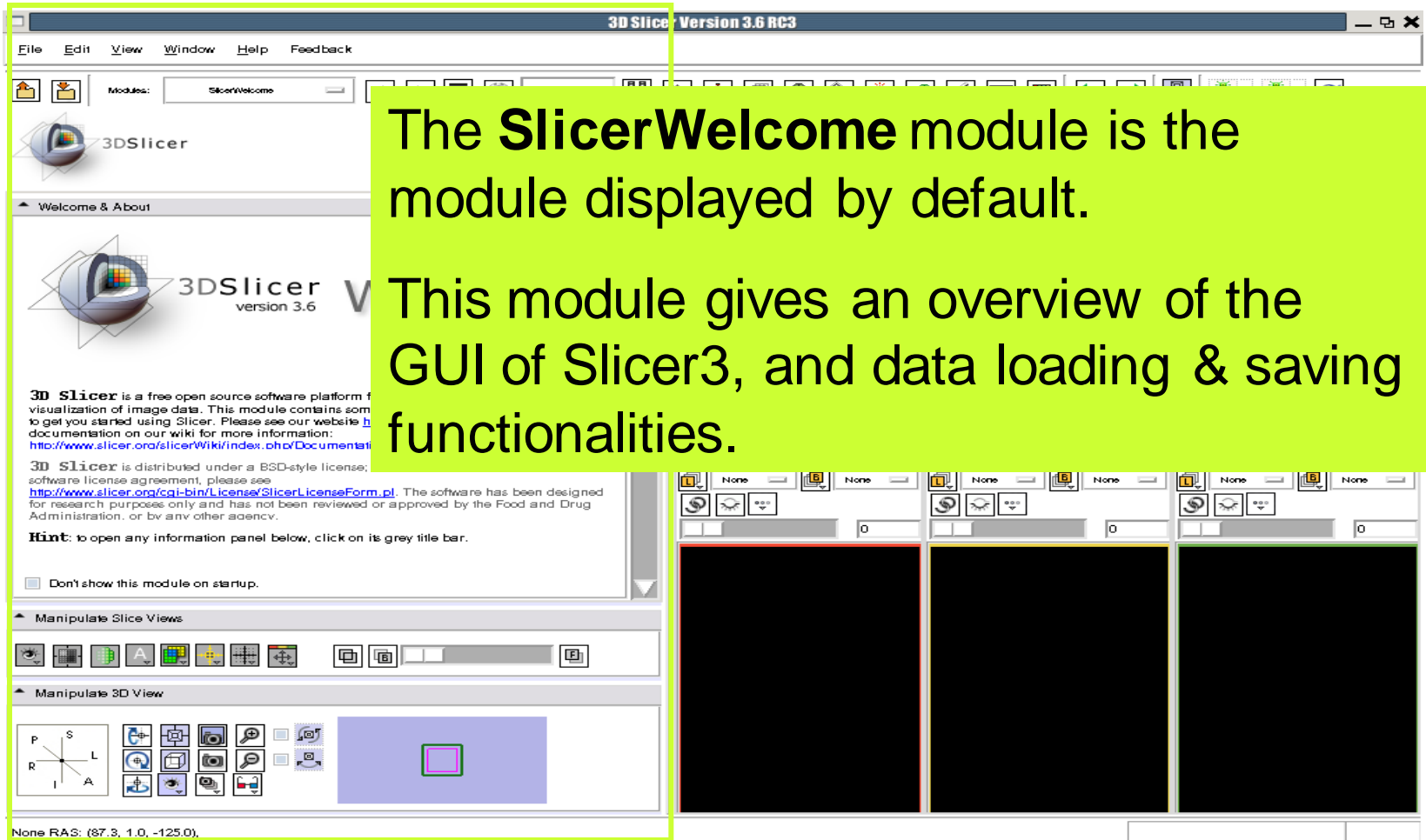
Start → All Programs

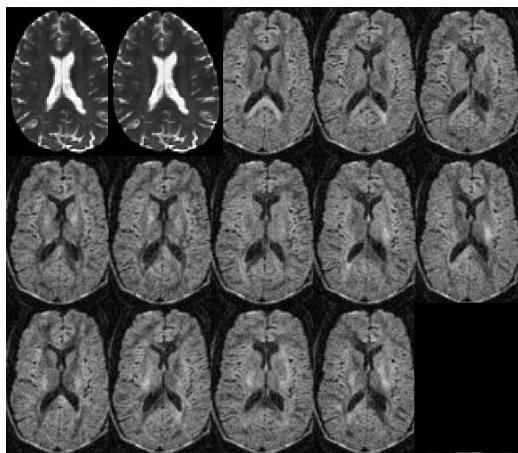
→ Slicer3-3.6-2010-08-23 → Slicer3





Slicer Welcome



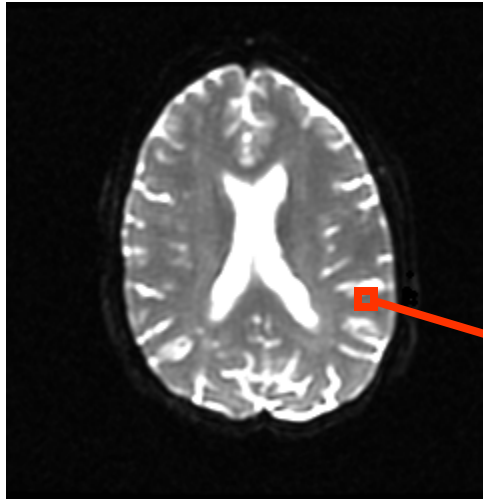


Part 1:

Diffusion data loading and tensor estimation



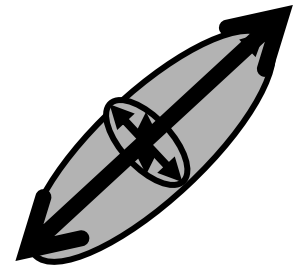
Diffusion Tensor



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

(Stejskal and Tanner 1965, Basser 1994)

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





Tensor Calculation

Calculate the **main directions of diffusivity** and corresponding **diffusion values** in each voxel

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

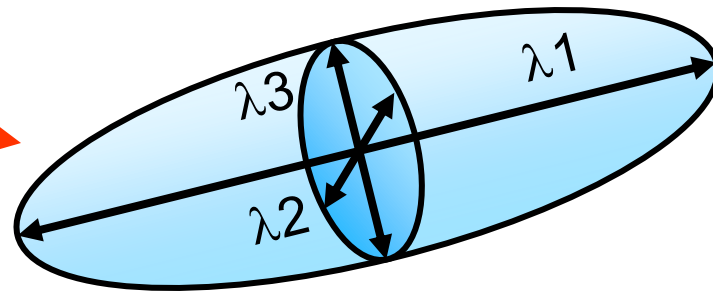
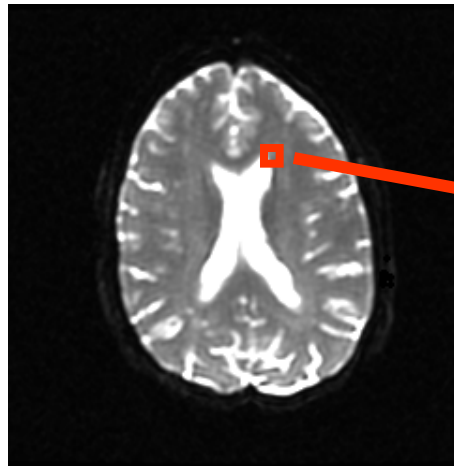


$\lambda_1, \lambda_2, \lambda_3$



Physical Interpretation

The diffusion tensor \underline{D} in the voxel (I,J,K) can be visualized as an ellipsoidal isoprobability surface in which the principal axes correspond to the eigenvectors.





Loading the DWI volume

3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

3DSlicer

Welcome & About

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/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

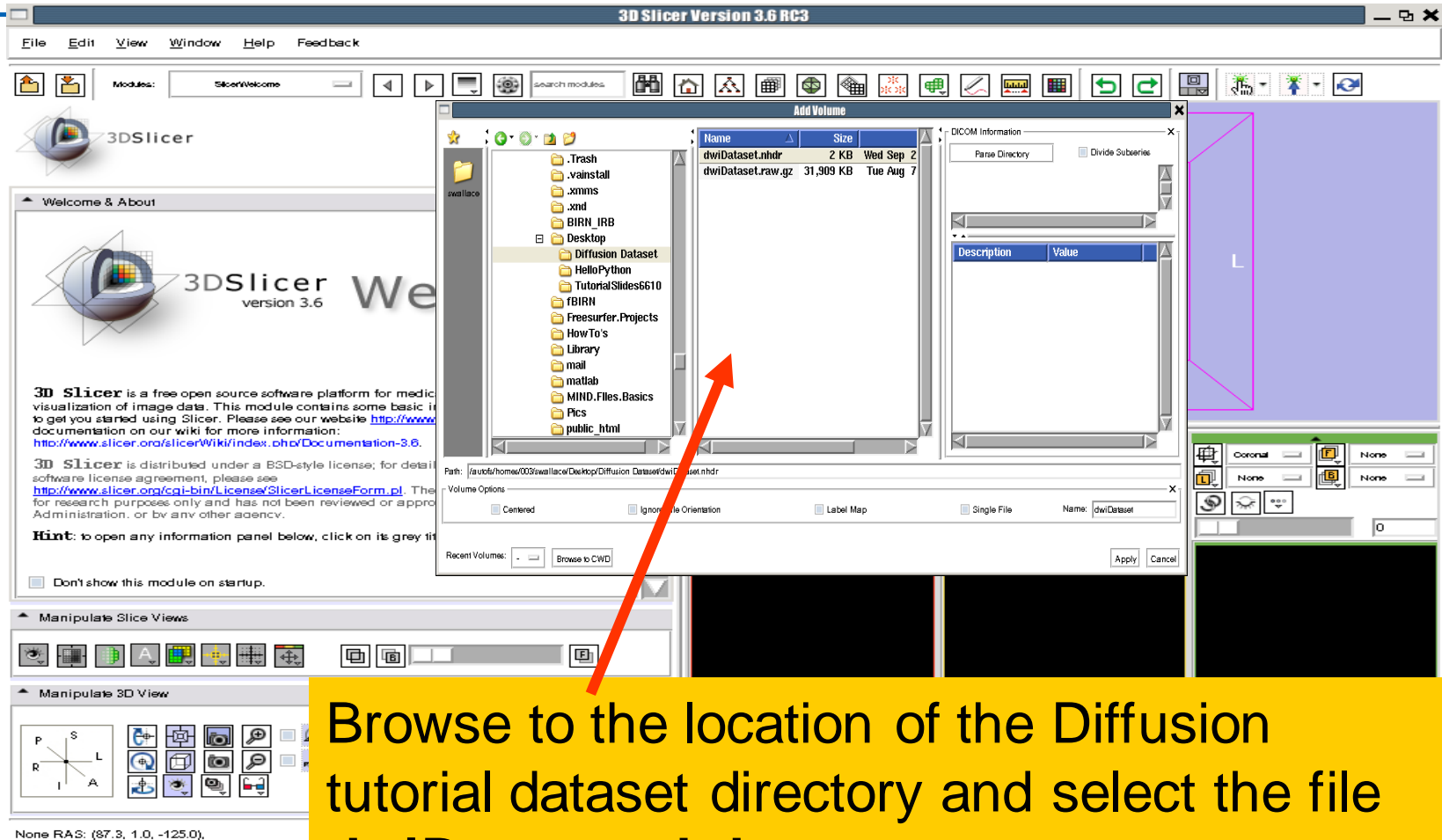
Manipulate 3D View

None RAS: (87.3, 1.0, -125.0).

Select File → Add Volume from the File menu



Loading the DWI volume



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

3D Slicer Version 3.6

File Edit View Window Help Feedback

3D Slicer Welcome
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/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.

Overview

Basic & Extended Modules

Loading Scenes & Data

Manipulate Slice Views

Manipulate 3D View

S
R A L

Left click on the menu **Modules and select **All Modules** to display the list of **95 modules** available for image analysis and 3D visualization.**

Select the module **Volumes**



Loading the DWI volume

Select the Active Volume **dwiDataset** and adjust the Window/Level Parameters

Window Level: Manual | 3712.8 | 0.5
Threshold: Off | 0 | 14618

Volume Window Level Presets: CT-abdomen CT-brain CT-lung

Volume Name: dwiDataset
Image Origin: From File
Image Orientation: From File
Label Map: Single File
 Keep all Apply Previous Next

Active Volume: dwiDataset

DWI Component: 0
Lookup Table: Grey
 Interpolate

Window Level Editor Presets: [Icons]

Volume Window Level Presets: [Dropdown]

Manipulate Slice Views: [Icons]

Manipulate 3D View: [Icons]

Axial: None | None | None
Sagittal: None | None | None
Coronal: None | None | None

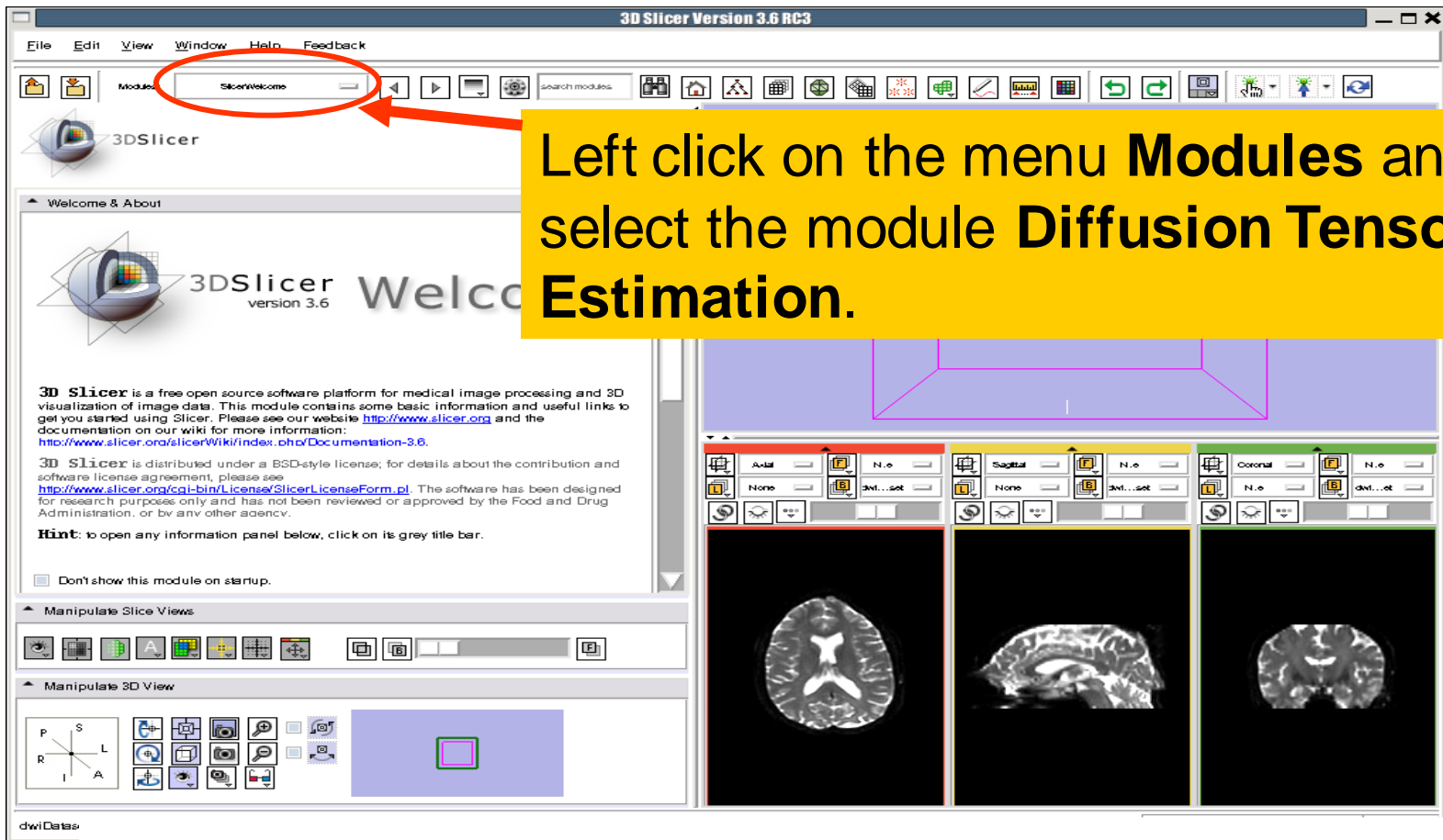
Bg: dwiDataset
None
None
Axial
Sp: 3mm
Bg: Out of Frame, R: 173.5, A: 106.6, S: 23.8

Bg: dwiDataset
None
None
Coronal
Sp: 0.938mm
Bg: Out of Frame, R: 147.1, A: 4.6, S: -114.8

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

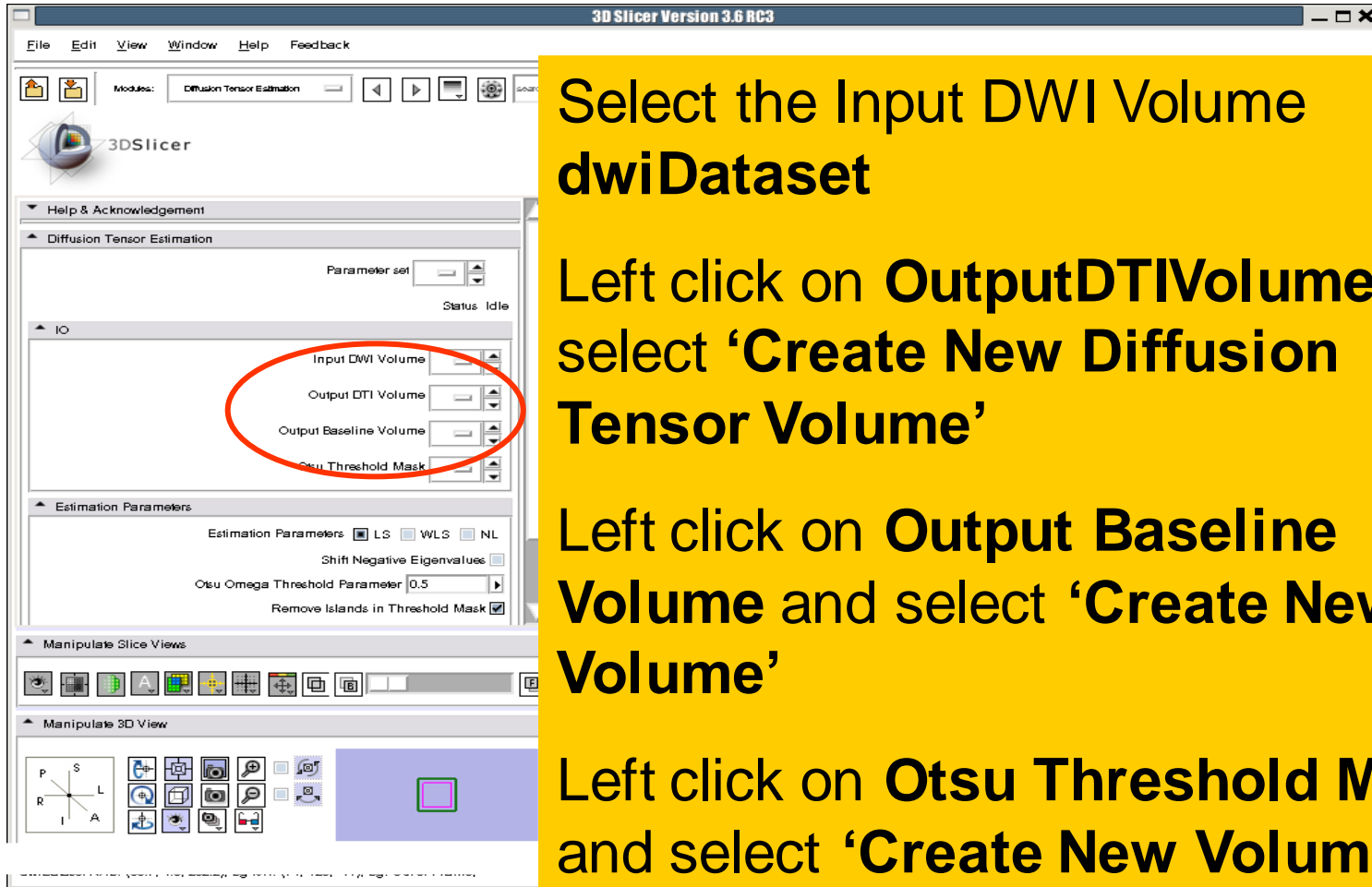


Tensor Estimation





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

Select the Tensor Estimation Algorithm **LS** (Least Squares), and click on **Apply** to estimate the tensors.



Tensor Estimation

The screenshot shows the 3D Slicer Version 3.6 interface. The main window displays a 3D view of a brain slice with a yellow callout box overlaid. The callout box contains the text: "Left click on **Output Baseline Volume** to display the list of volumes that have been computed by Slicer".

The left sidebar contains the **Diffusion Tensor Estimation** panel. The **IO** section shows the following settings:

- Input DVI Volume: dt
- Output DTI Volume: e
- Output Baseline Volume: e
- Otsu Threshold Mask: k

The **Estimation Parameters** section shows the following settings:

- Estimation Parameters: LS WLS NL
- Shift Negative Eigenvalues:
- Otsu Omega Threshold Parameter: 0.5
- Remove Islands in Threshold Mask:
- Apply Mask to Tensor Image:

The bottom of the interface shows three slice views: **Axial**, **Sagittal**, and **Coronal**. Each view displays the **Output Baseline Volume** as a blue region within the brain slice.



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

Module: Diffuska Tensor Estimation

3DSlicer

Help & Acknowledgement

Diffusion Tensor Estimation

IO

Input DVM Volume dt

Output DTI Volume e

Output Baseline Volume e

Otsu Threshold Mask k

Estimation Parameters

Estimation Parameters LS VMLS 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

Otsu Threshold Mask

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

None

Output Baseline Volume 19 26.8

None

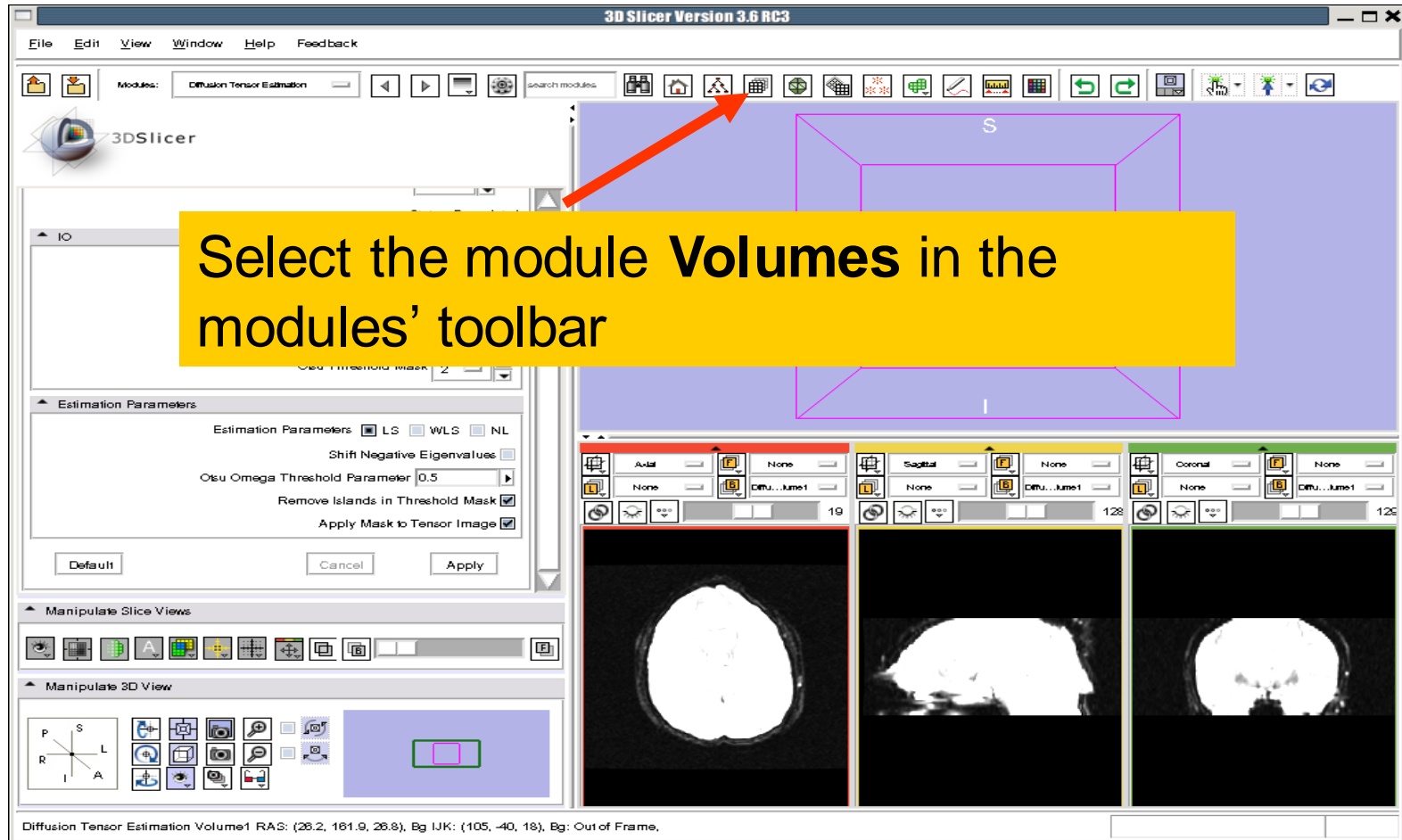
Output Baseline Volume 128 5.4688

None

Output Baseline Volume 129 4.5687



Tensor Estimation





Tensor Estimation

Select the **Active Volume** 'Output Baseline Volume' and click on the tab **Display**

3D Slicer Version 3.6

File Edit View Window Help Feedback

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

Axial None Output Baseline Volume 19 26.8

Sagittal None Output Baseline Volume 128 5.4688

Coronal None Output Baseline Volume 129 4.5687

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



Tensor Estimation

3D Slicer Version 3.6

File Edit View Window Help Feedback

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

Active Volume: Output Baseline Volume

Display

Lookup Table: Grey

Interpolate

Window Level Editor Presets: CT-women CT-brain CT-lung

Volume Window Level Presets:

Window/Level: Manual 1956.6 177

Threshold: Off 0 13789

Update Histogram Interactively

[0, 13789] x [0, 1]

Manipulate Slice Views

Manipulate 3D View

R A L

I

Axial None Sagittal None Coronal None

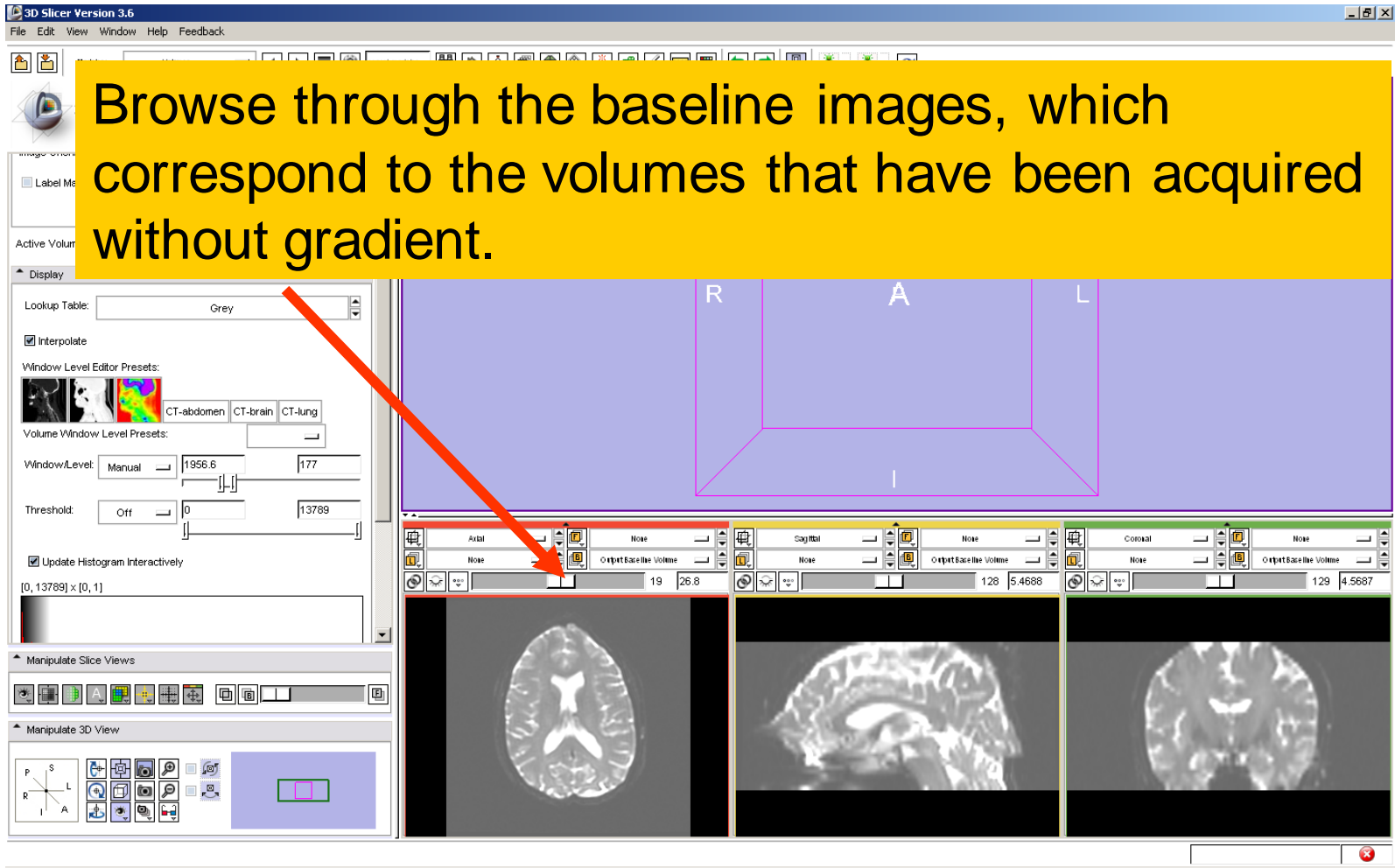
None Output Baseline Volume None Output Baseline Volume None Output Baseline Volume

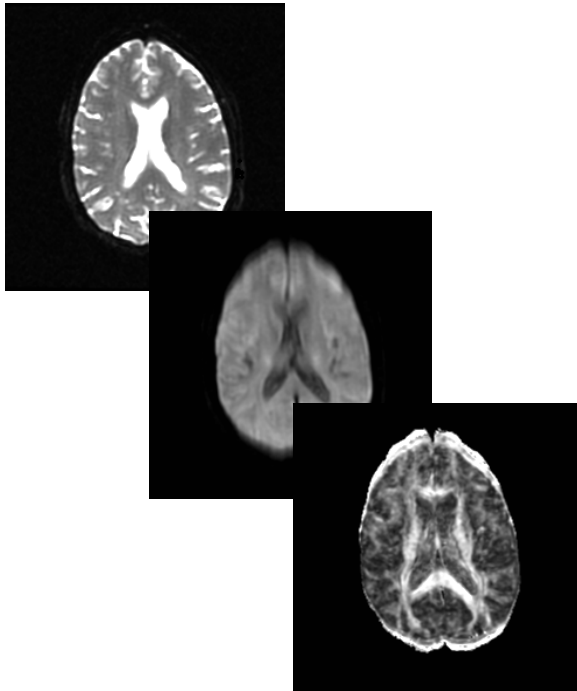
19 26.8 128 5.4688 129 4.5687



Tensor Estimation

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





Part2:

Scalar Measurements

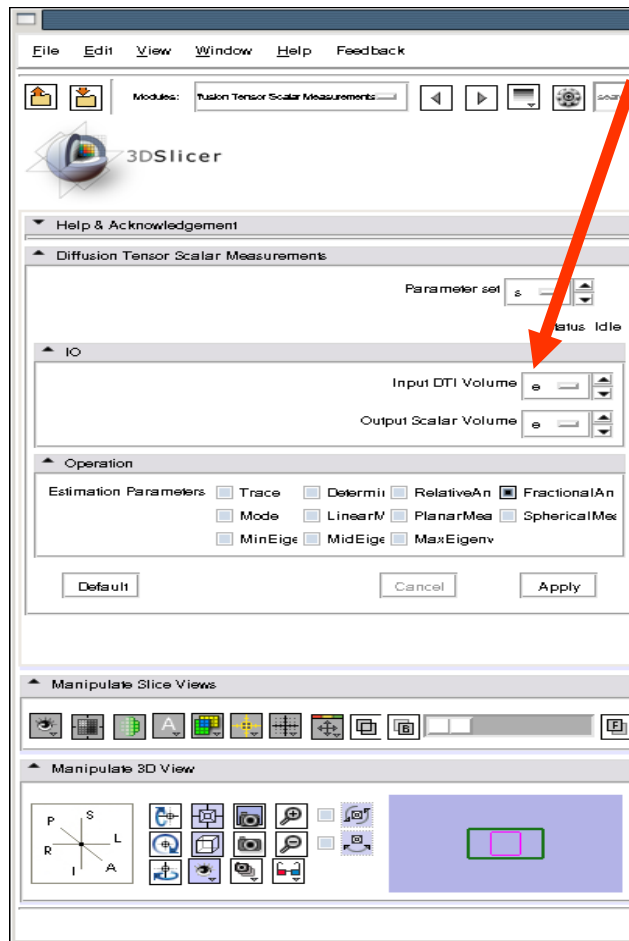


Scalar Measurements

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



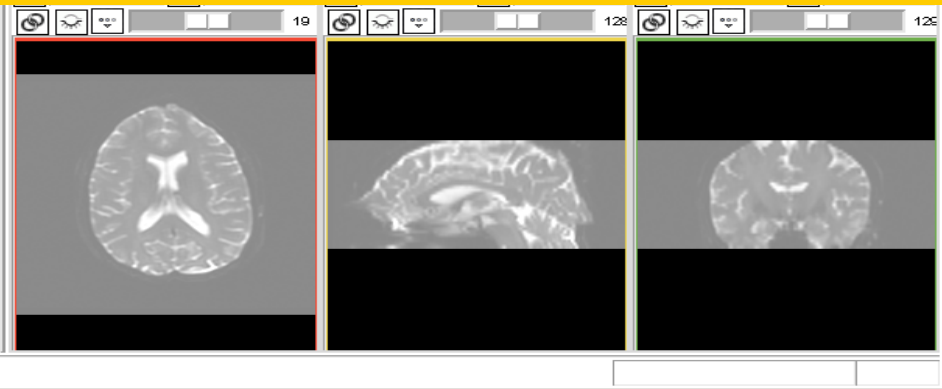
Scalar Measurements



Select the Input DTI Volume **Output DTI Volume**

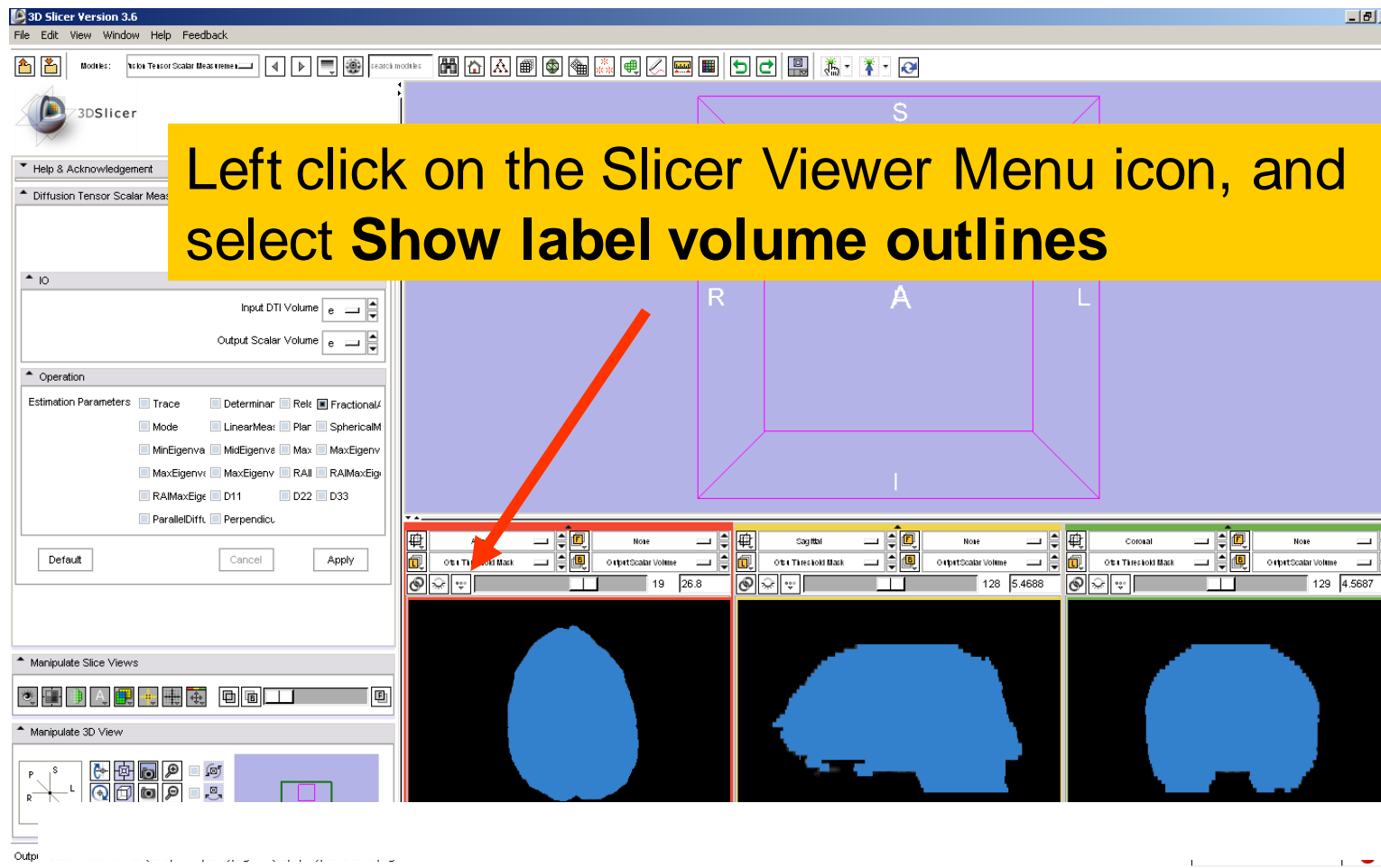
Select the Output Scalar Volume **'Create New Volume'**

Select the Operation **Fractional Anisotropy**, and click on **Apply**



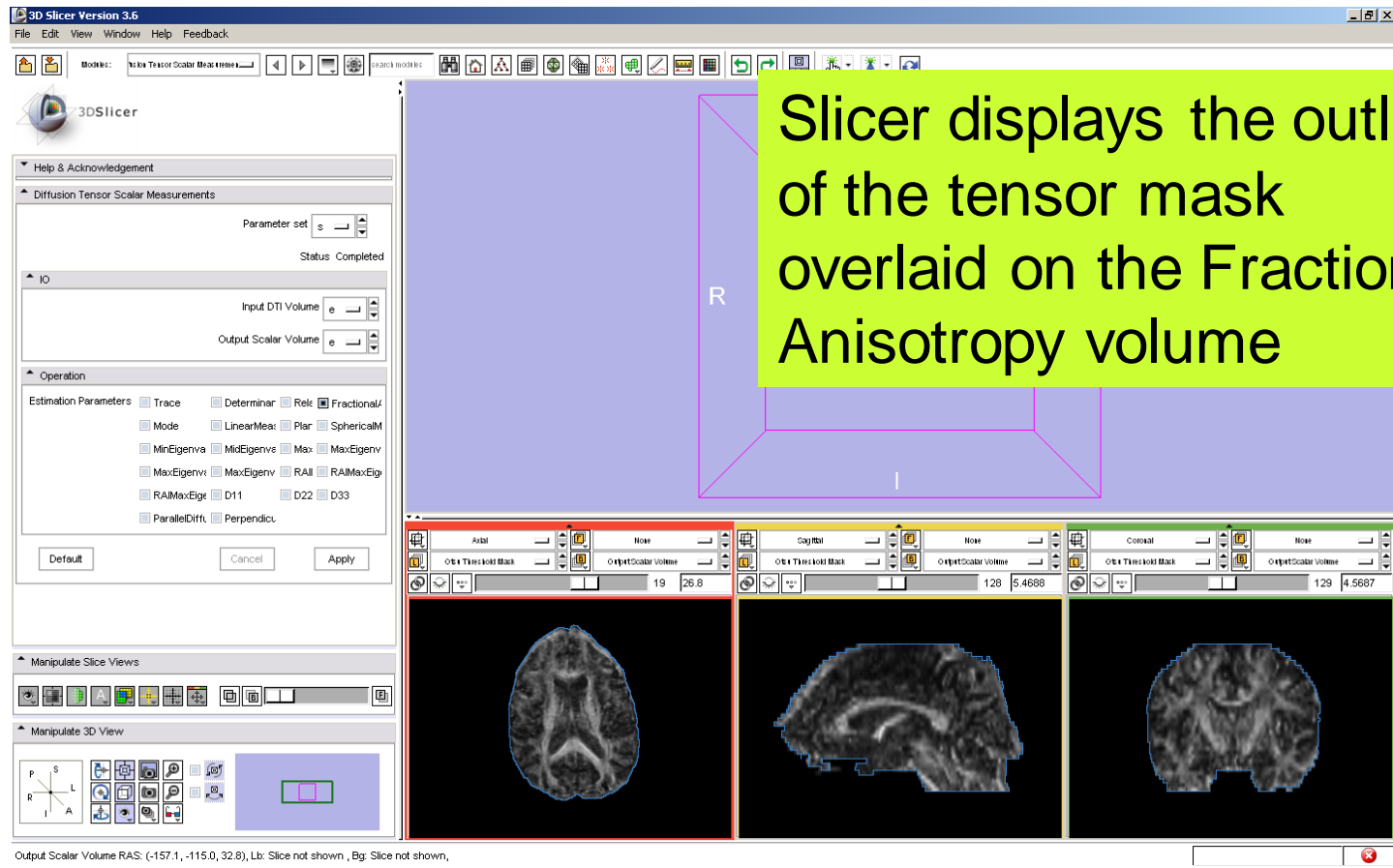


Fractional Anisotropy Volume



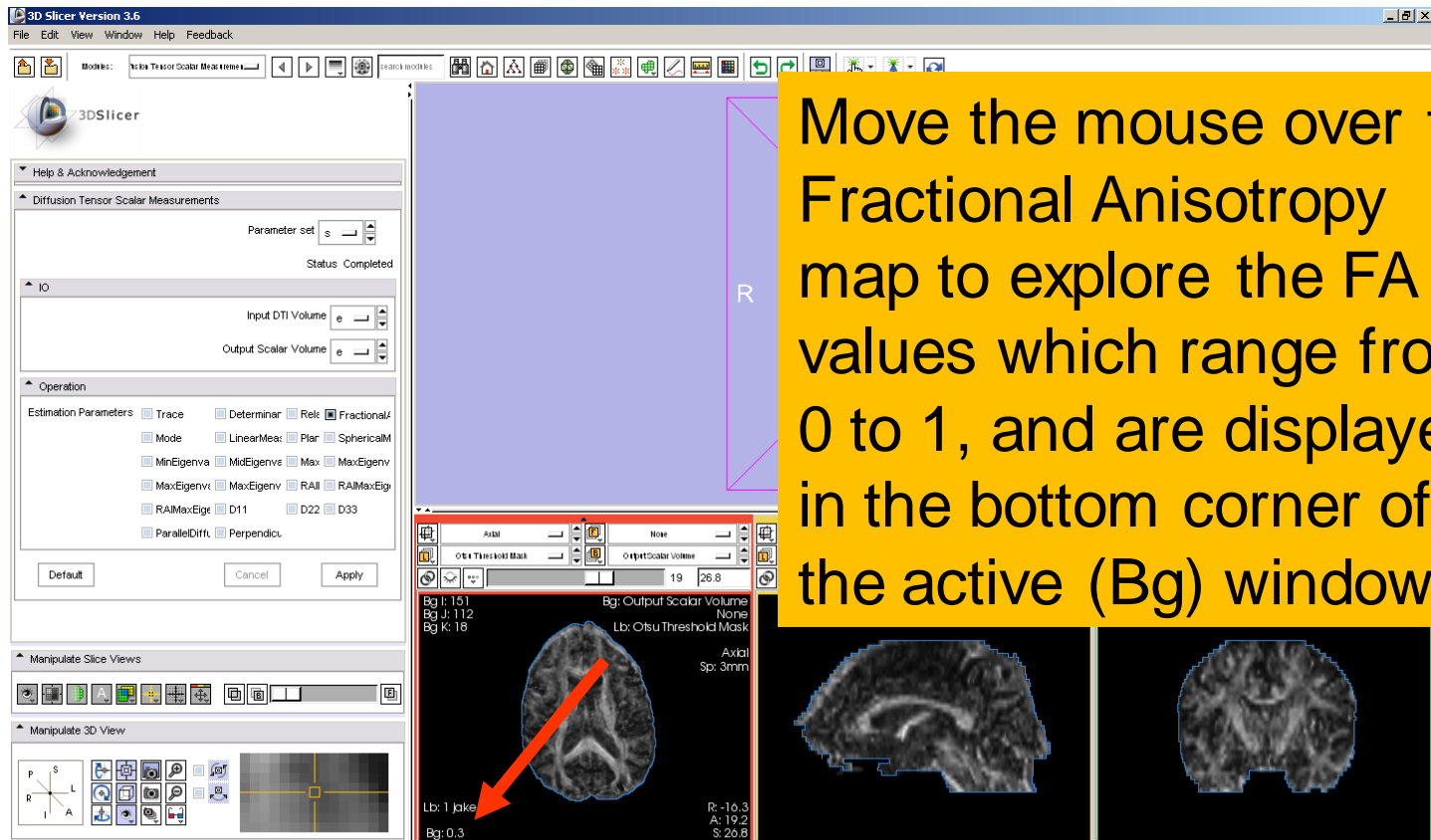


Fractional Anisotropy Volume





Fractional Anisotropy Volume





Part 3:

Region of Interest based Tractography





LabelMap Generation

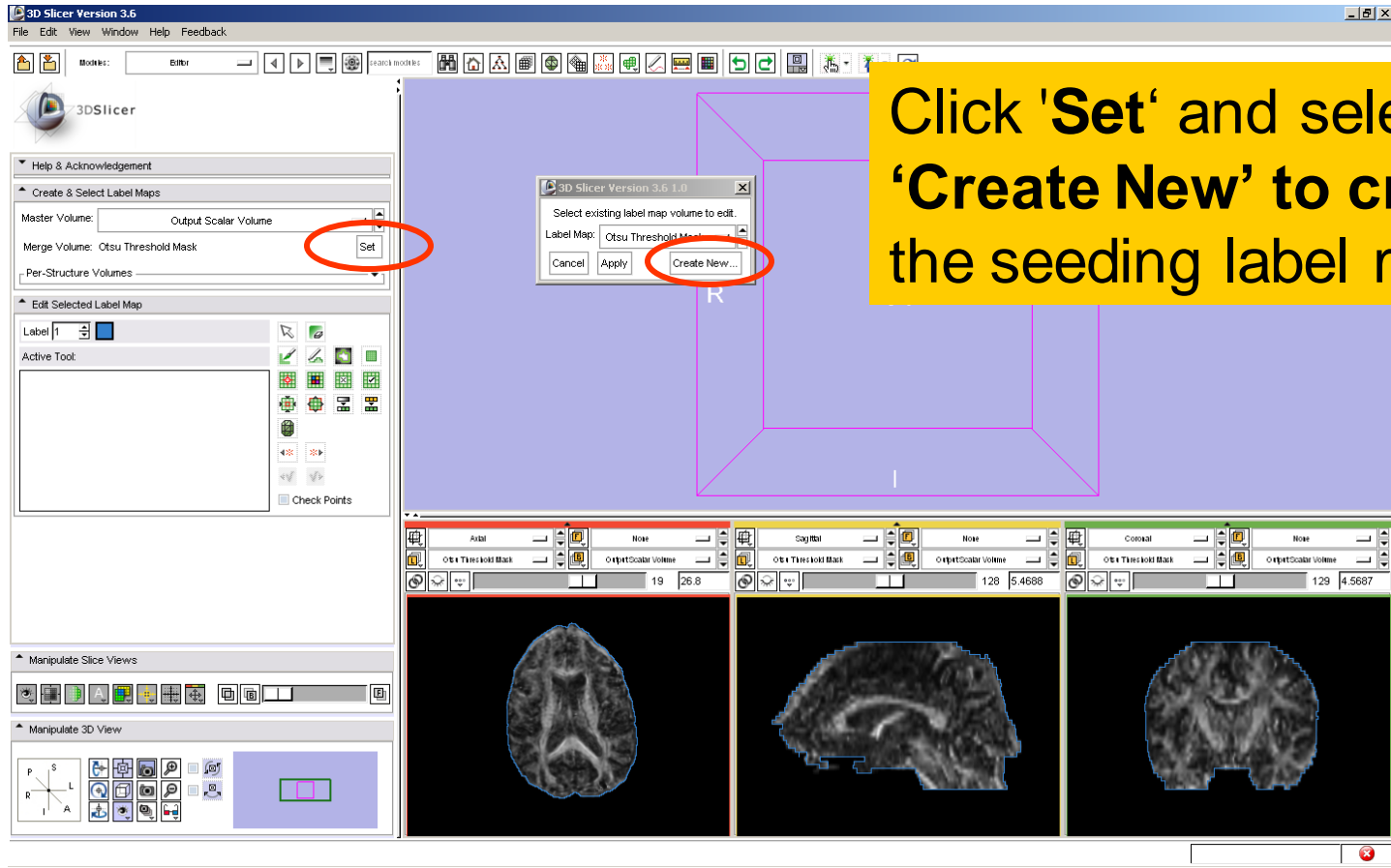
Select the module **Editor** in the modules menu.

Select the Master Volume as 'Output Scalar Volume'

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

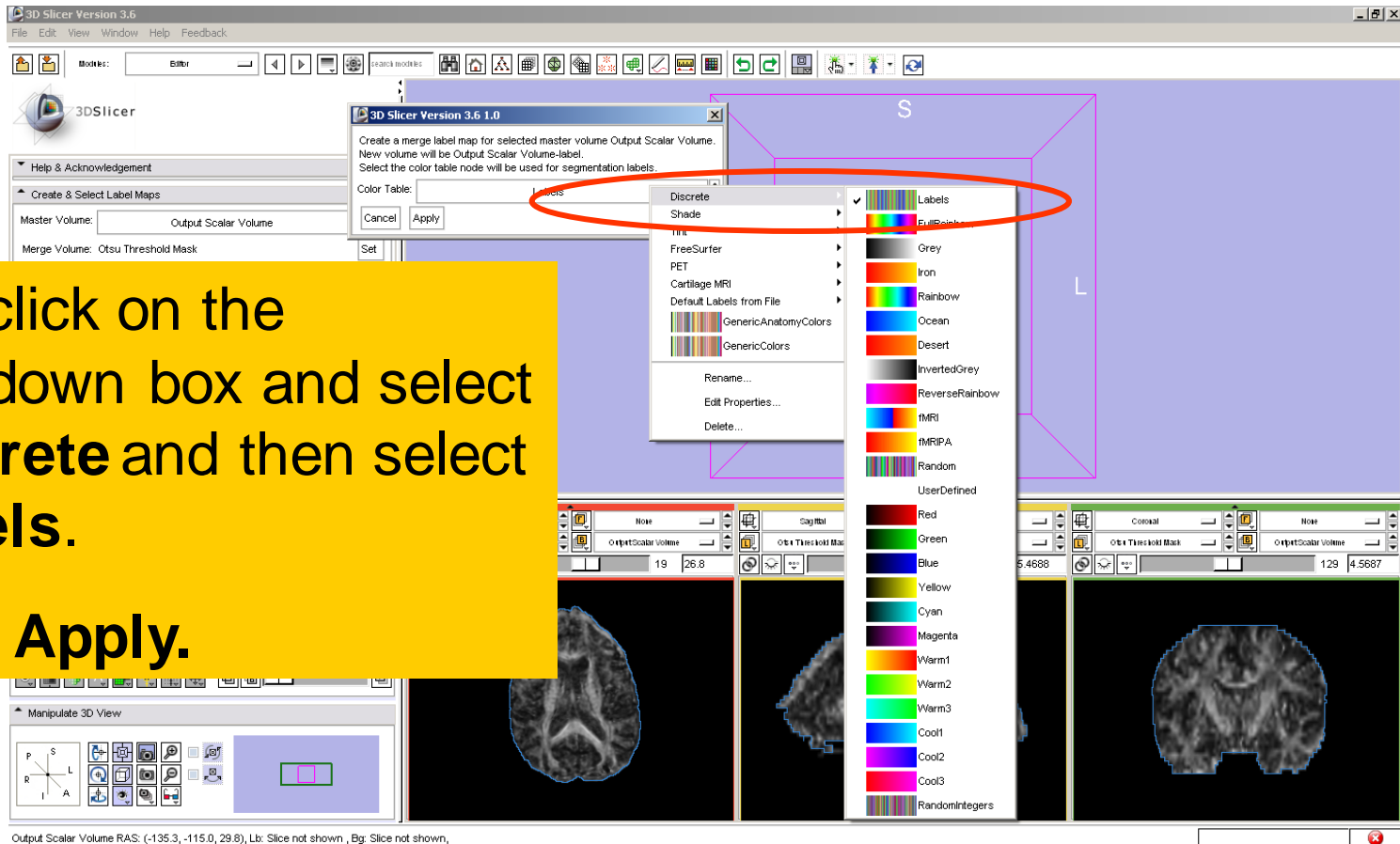


Label Map Generation





LabelMap Generation



Left click on the
dropdown box and select
Discrete and then select
Labels.

Click **Apply**.



LabelMap Generation

Left click on the Slicer Viewer Menu icon, and select the label map **Output Scalar Volume-label**

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



LabelMap Generation

3D Slicer Version 3.6
File Edit View Window Help Feedback

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

3D Slicer Viewer Menu options:

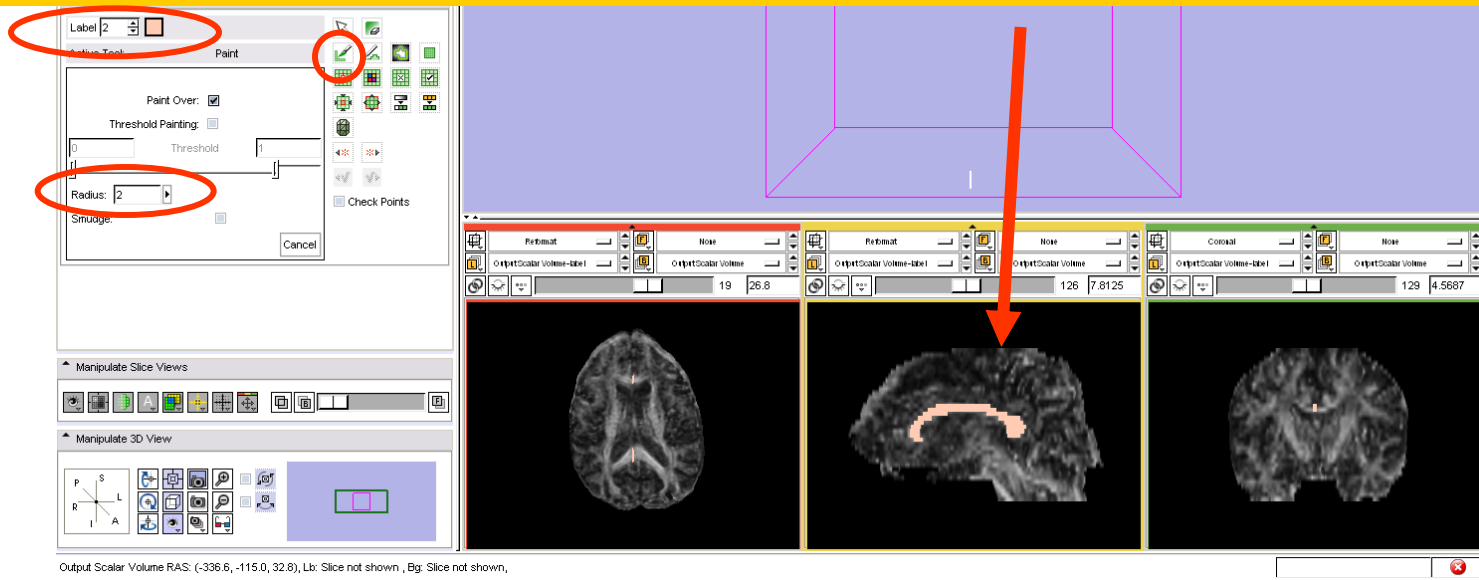
- Fit to window
- Rotate to Volume Plane
- Adjust label map opacity
- Don't show label volume outlines
- Show reformat widget
- Compositing
- Slice spacing mode
- Lightbox view
- Adjust display
- tear off control panel
- close

Don't show label volume outlines



LabelMap Generation

Select the label 2 (pink), click on the icon **Paint** , 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

3D Slicer Version 3.6

File Edit View Window Help Feedback

Labelmap Seeding

Parameter set

Status: Idle

IO

Input DTI Volume

Input Label Map

Output Fiber bundle

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: (-63.5, -114.0, 26.8), Bg UK: (201, 254, 18), Lb: 0 Black, Bg: 0.0

Select the module
Labelmap Seeding
from
the Modules' menu



LabelMap Seeding

3D Slicer Version 3.6
File Edit View Window Help Feedback

3DSlicer

Labelmap Seeding

Parameter set: g

Status: idle

IO

Input DTI Volume: e

Input Label Map: O1

Output Fiber bundle: L1

Write Fibers To Disk:

Output Directory:

File 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

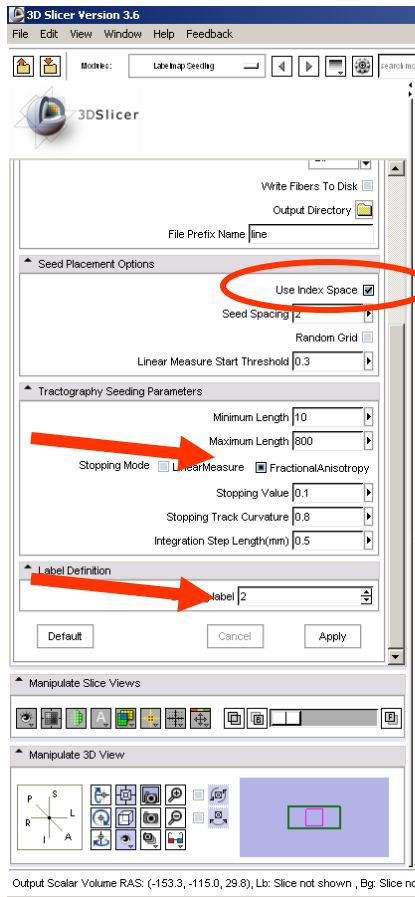
Select the Input DTI volume
'Output DTI Volume'

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

Select Output Fiber Bundle
'Create New Fiber Bundle'



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 and maximum tract length, stopping value, stopping track curvature and integration step length.

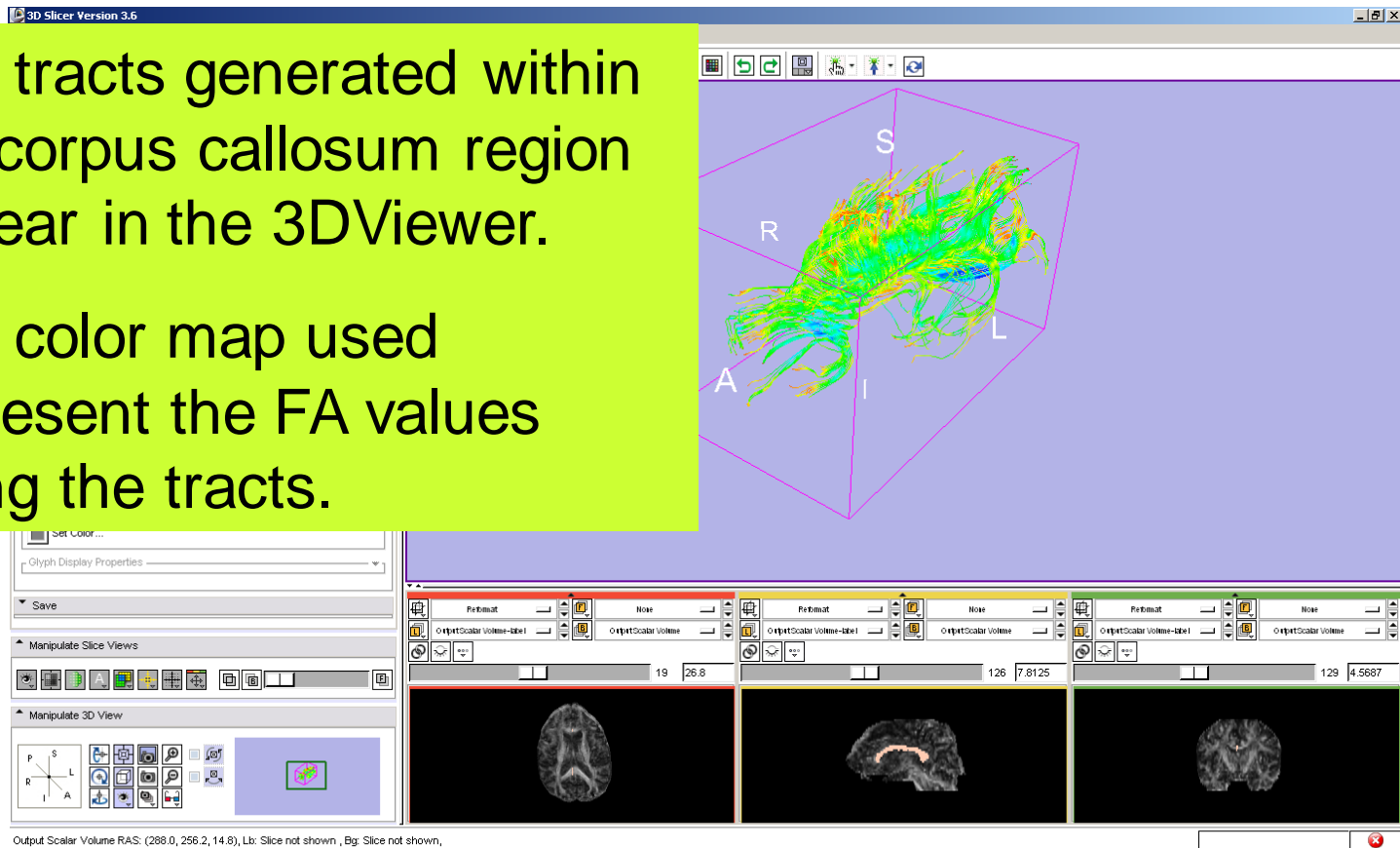
In the Label Definition tab, set 'Seeding label' to label 2, and click on **Apply**



LabelMap Seeding

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

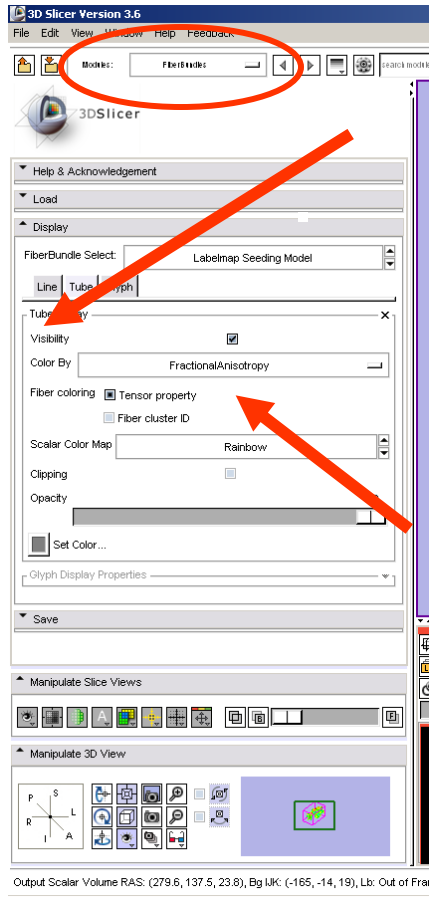
The color map used represent the FA values along the tracts.





LabelMap Seeding

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

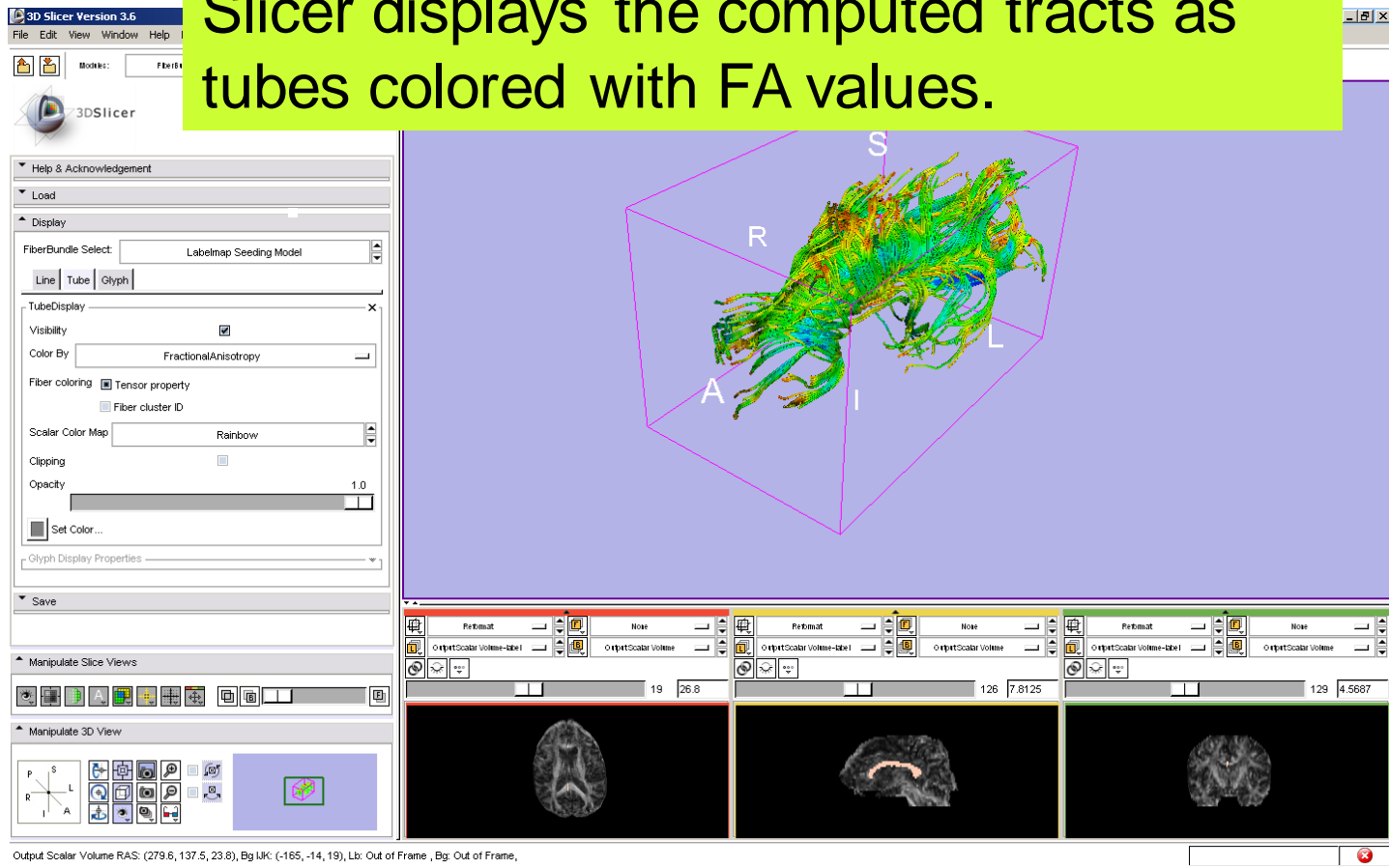


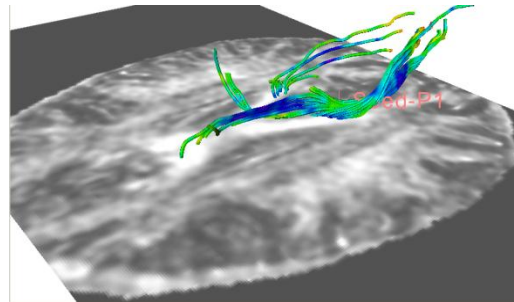
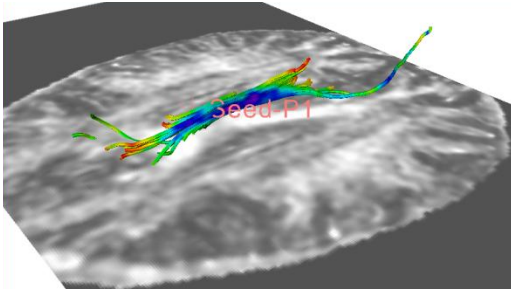
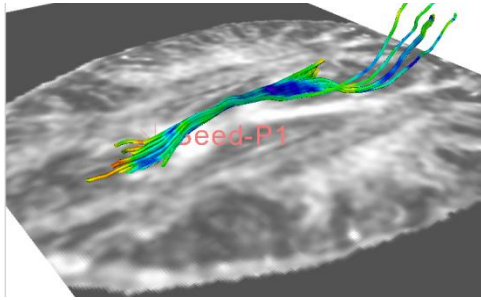
Check the visibility box to display the tubes.



LabelMap Seeding

Slicer displays the computed tracts as tubes colored with FA values.





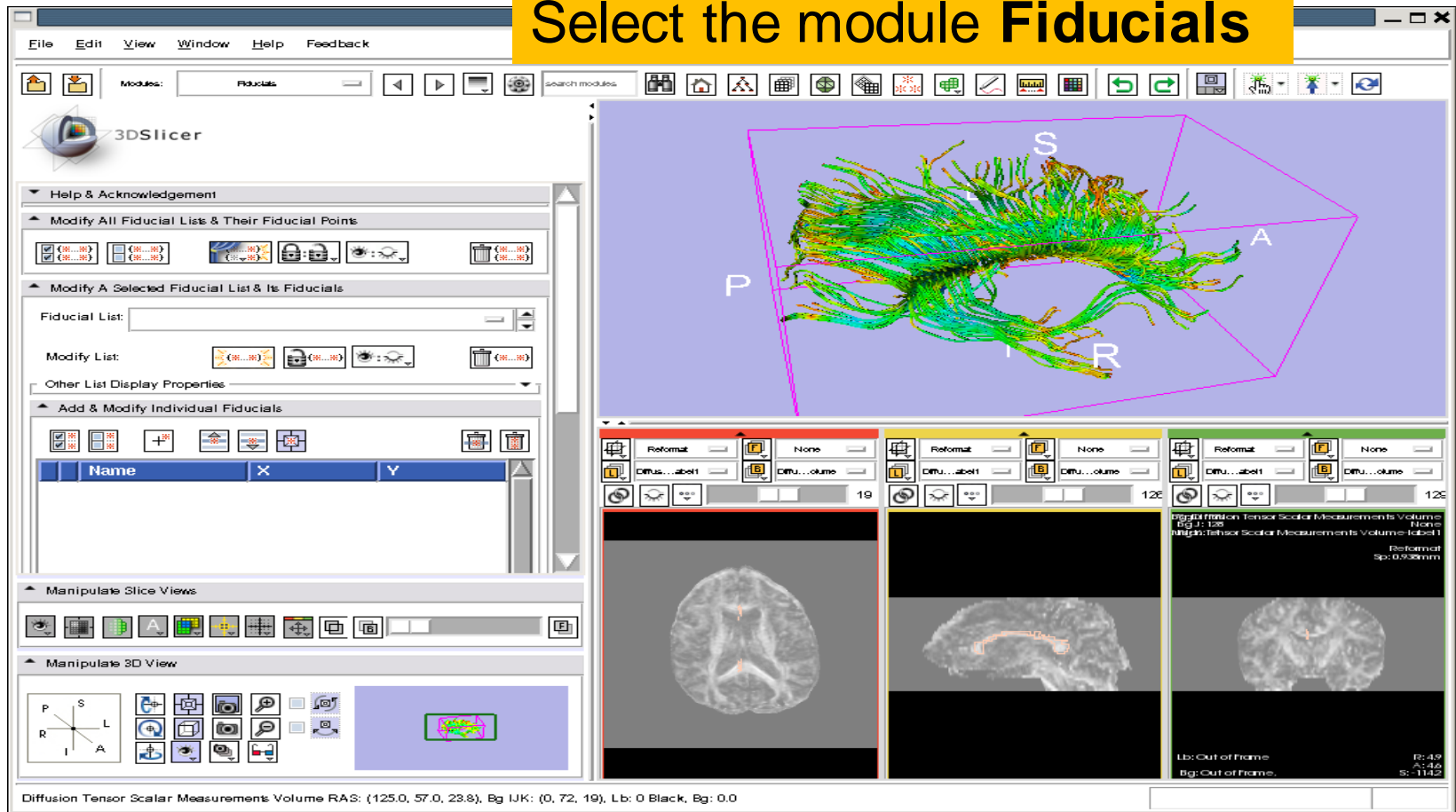
Part 4:

**Tractography
on-the-fly**



Fiducial Seeding

Select the module **Fiducials**





Fiducial Seeding

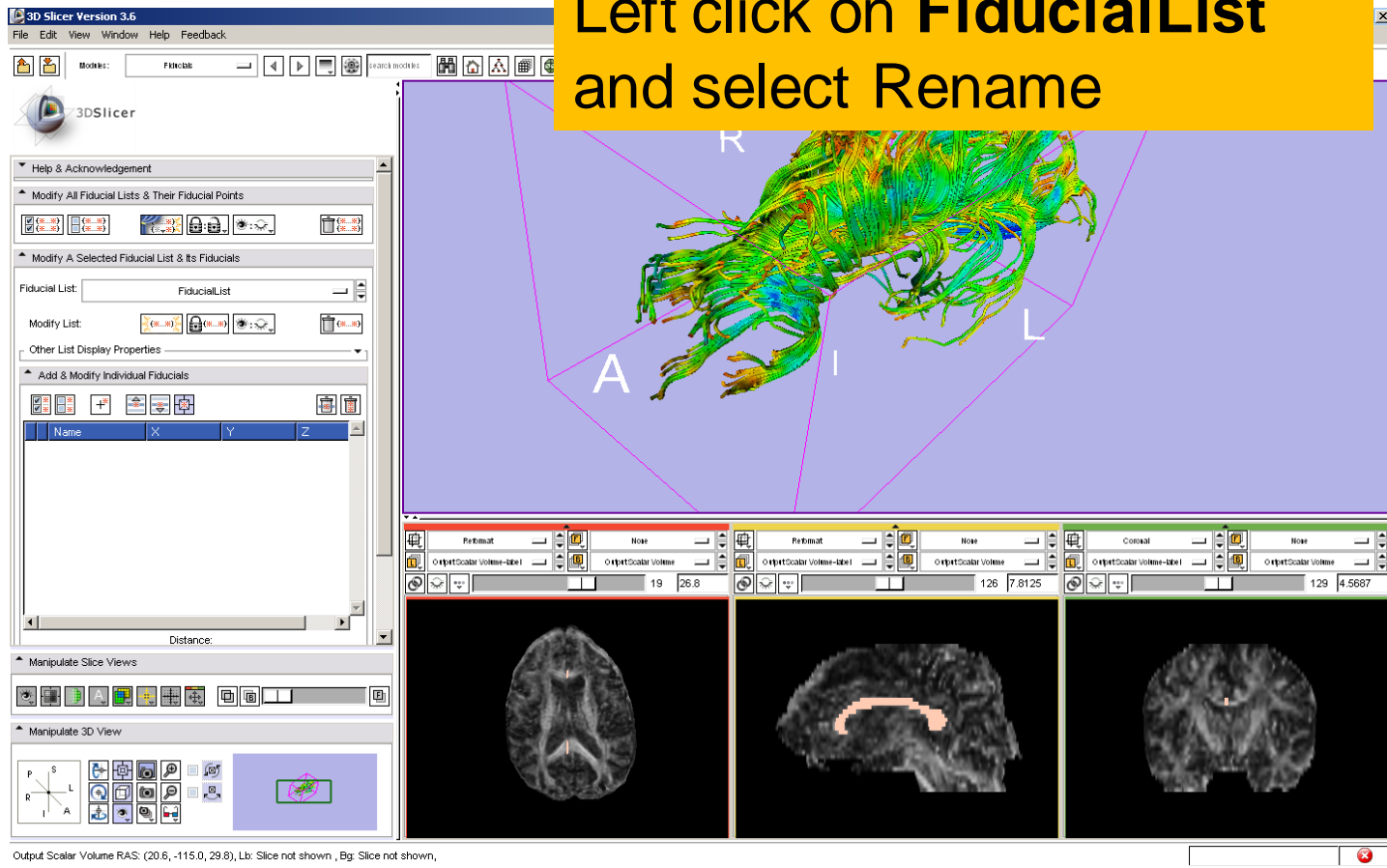
Set Fiducial List to Create New FiducialList

The screenshot displays the 3DSlicer software interface. The top toolbar shows the 'Fiducials' module selected. A red arrow points from the text 'Set Fiducial List to Create New FiducialList' to the 'Fiducials' module icon. The main 3D view shows a brain with a green and blue fiber bundle and a purple wireframe box with axes labeled P, S, I, R, A. The bottom panel shows three orthogonal slice views (axial, sagittal, coronal) of the brain with the fiber bundle overlaid. The status bar at the bottom indicates the current volume and slice information.



Fiducial Seeding

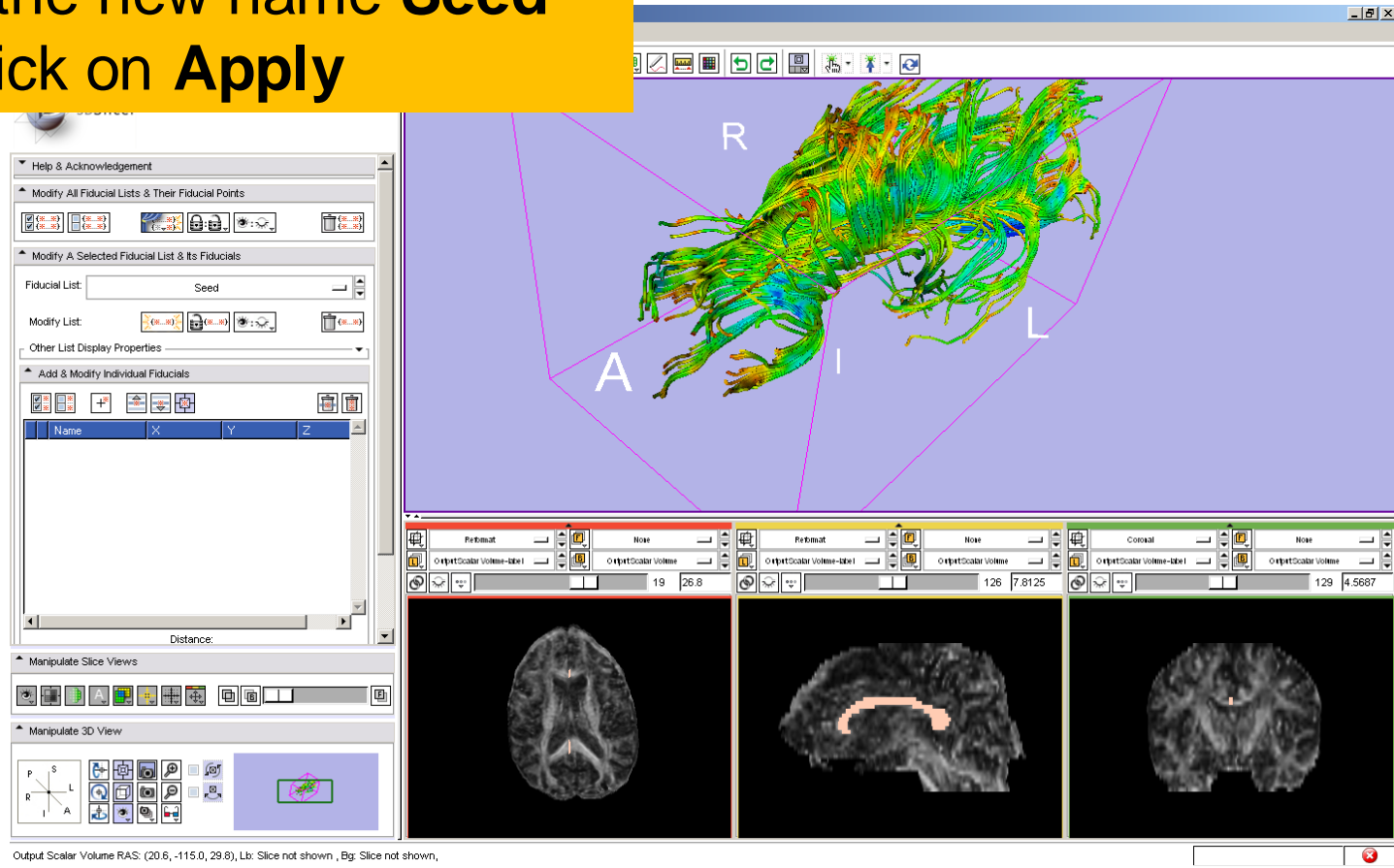
Left click on **FiducialList**
and select **Rename**





Fiducial Seeding

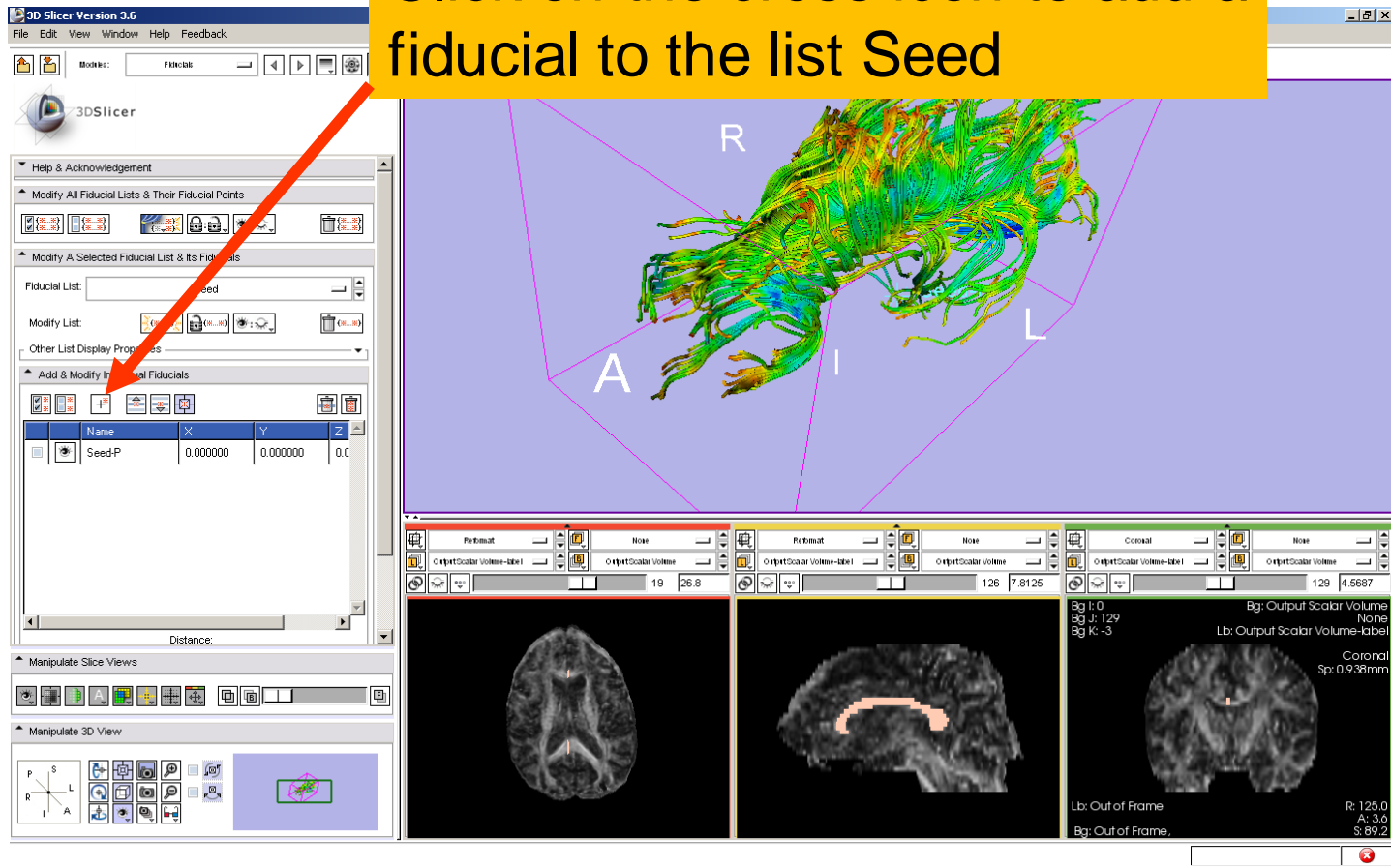
Enter the new name **Seed**
and click on **Apply**





Fiducial Seeding

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





Fiducial Seeding

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

The screenshot shows the 3D Slicer software interface. The main 3D viewer displays a brain model with a red arrow pointing to a fiducial point labeled 'Seed-P' circled in red. The interface includes a left sidebar with 'Fiducial List' and 'Add & Modify Individual Fiducials' sections, and a bottom panel with slice views and a table of coordinates.

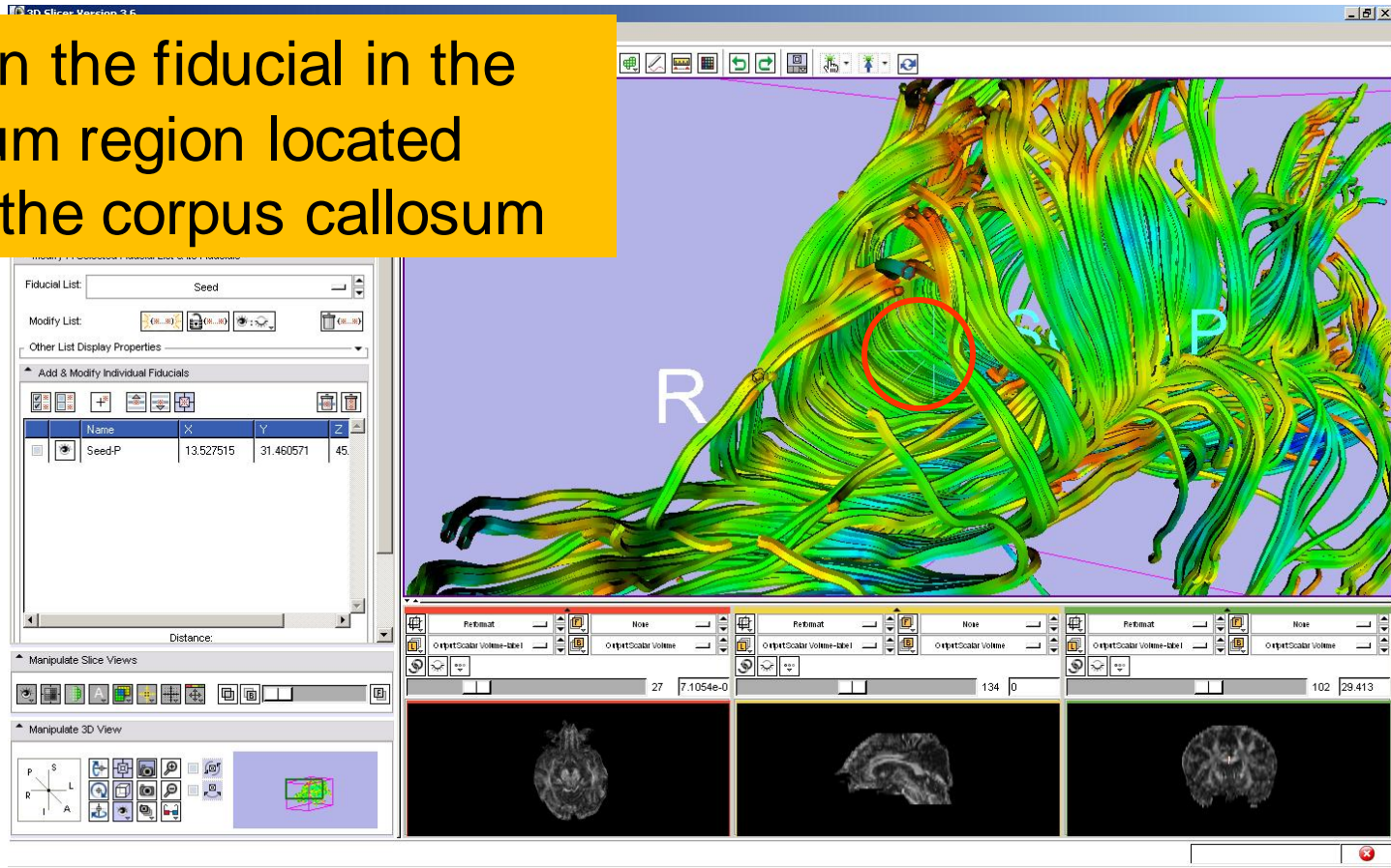
Name	X	Y	Z
Seed-P	0.000000	0.000000	0.0

Output Scalar Volume RAS: (-84.3, 233.7, 23.8), Bg L/R: (223, -117, 19), L/R: Out of Frame, Bg: Out of Frame,



Fiducial Seeding

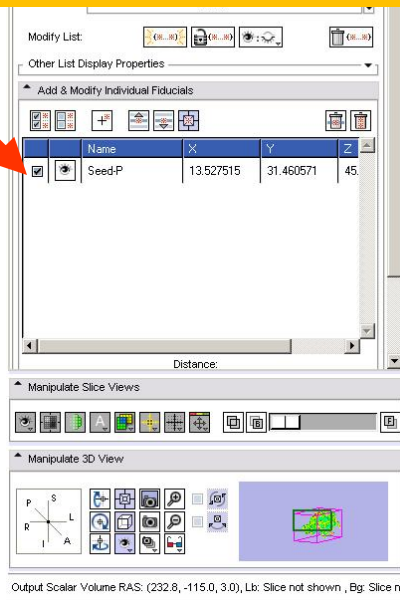
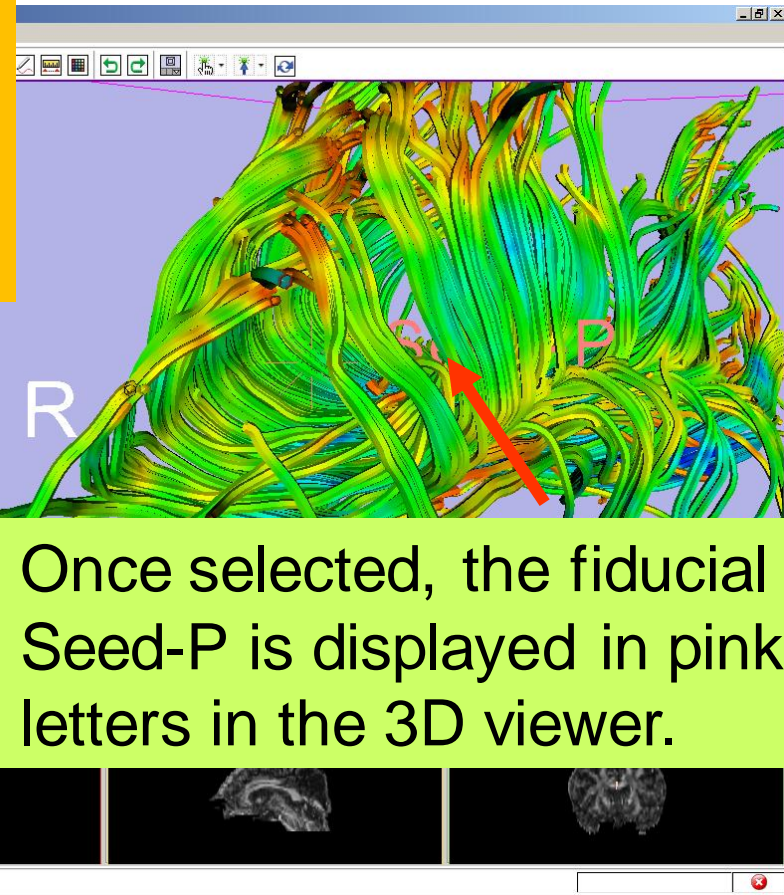
Position the fiducial in the cingulum region located above the corpus callosum





Fiducial Seeding

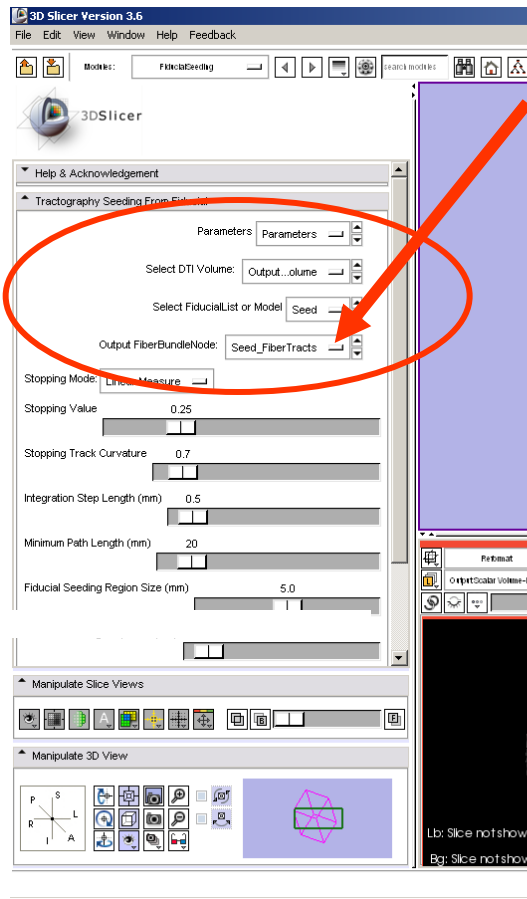
Check the box to select the 'Seed-P' fiducial: we will use this fiducial to drive the tractography



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



Fiducial Seeding



Select the module **Fiducial Seeding**

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

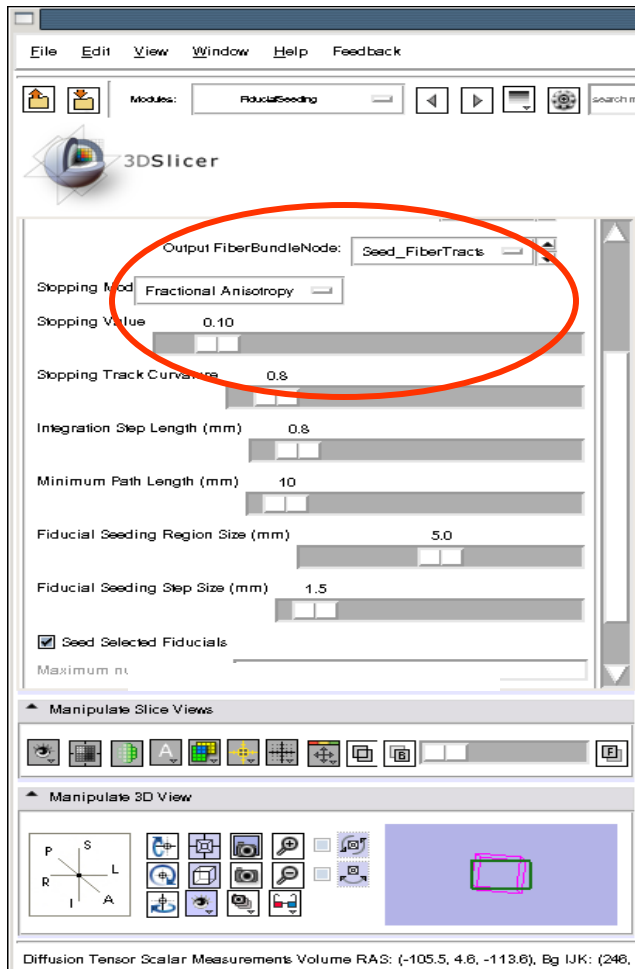
Important: this step must be done first

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

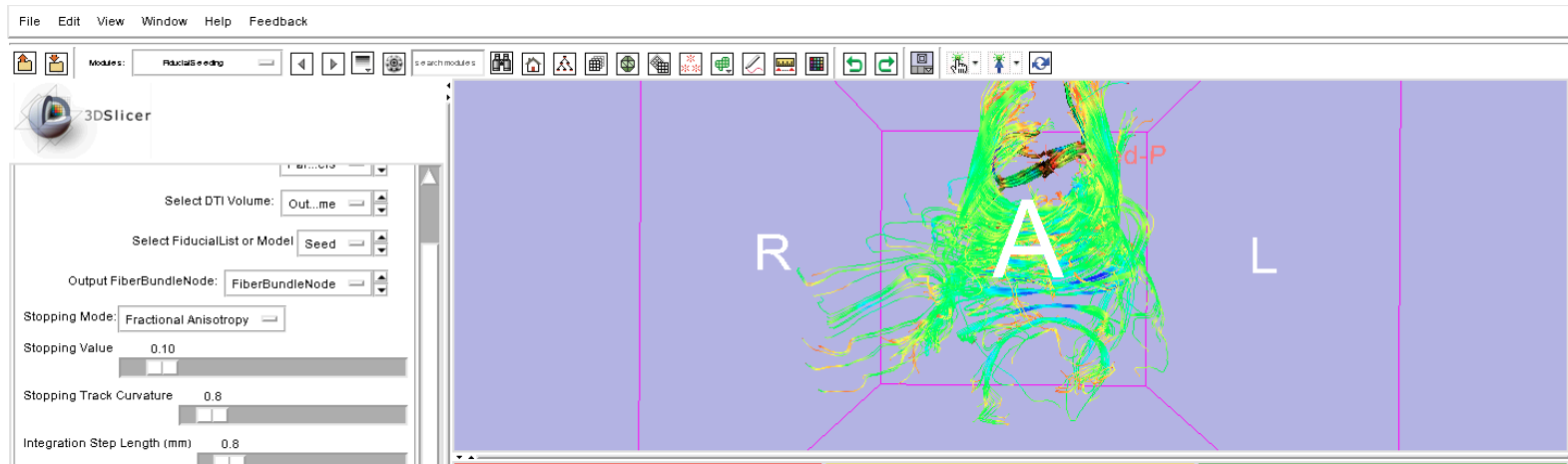
Step Length: 0.8 mm

Minimum Path Length: 10 mm

Fiducial Stepping 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

Books: FiducialSeeding

Tractography Seeding From Fiducial

Select DTI Volume

Select Fiducial

Output FiberBundleNodes

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

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

Output Scalar Volume-label: None

Output Scalar Volume: None

Output Scalar Volume-label: None

Output Scalar Volume: None

Output Scalar Volume-label: None

Output Scalar Volume: None

Bg: 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

A: 519.1

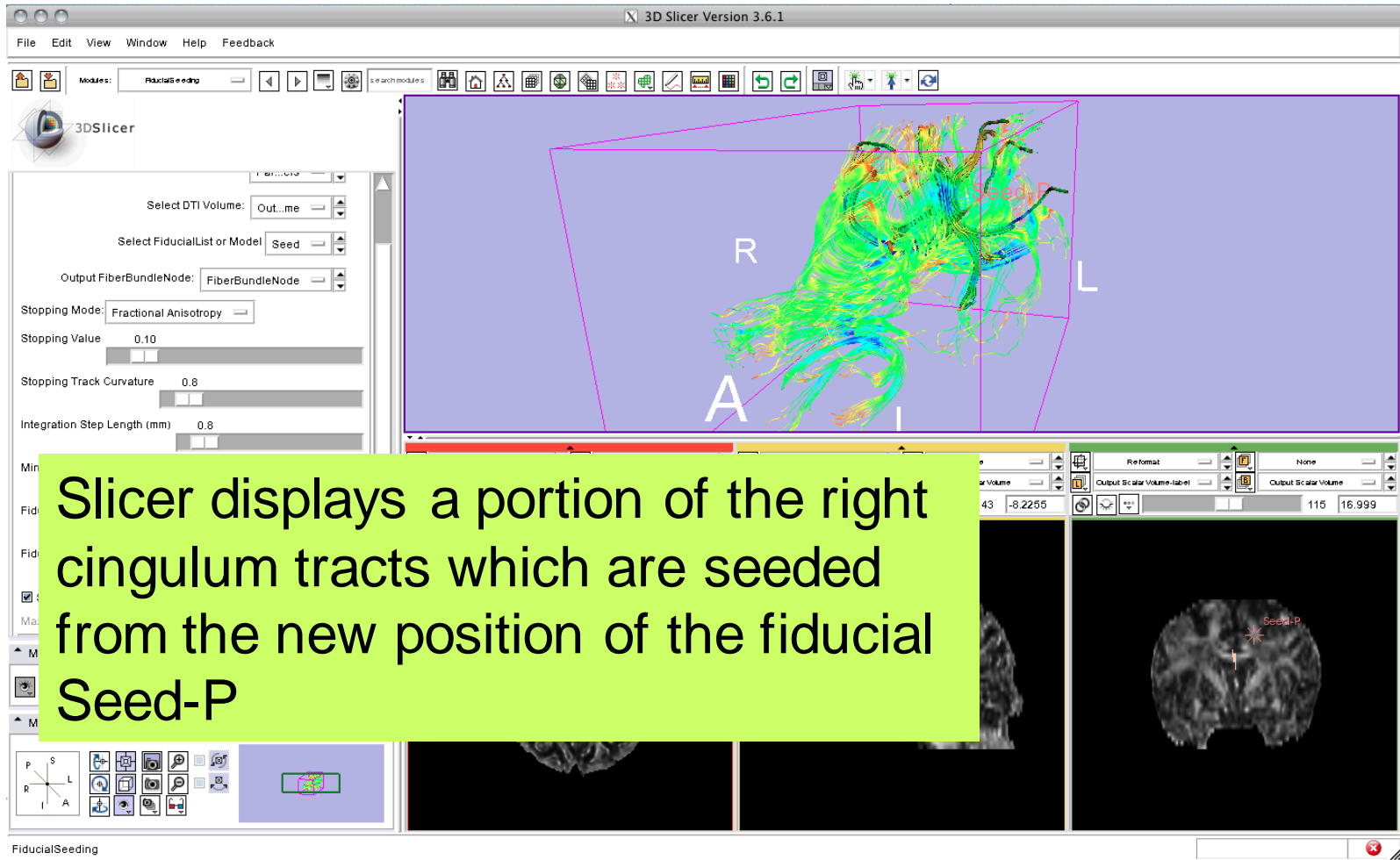
S: 40.6

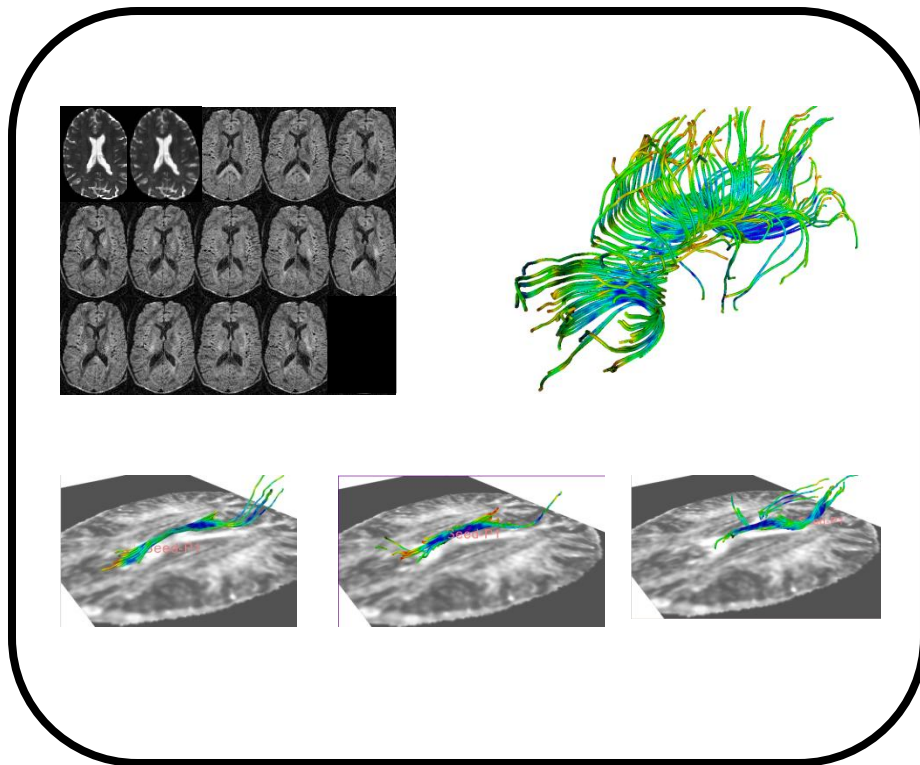
Seed-P

FiducialSeeding



Fiducial Seeding





Part 5:

Saving a DTI Scene



DTI Scene

Select the module Data

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

3D Slicer Version 3.6.1

File Edit View Window Help Feedback

Modules: Data

Help & Acknowledgement

Display & Modify Scene

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 MRML ID'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

Reformat None Reformat None Reformat None

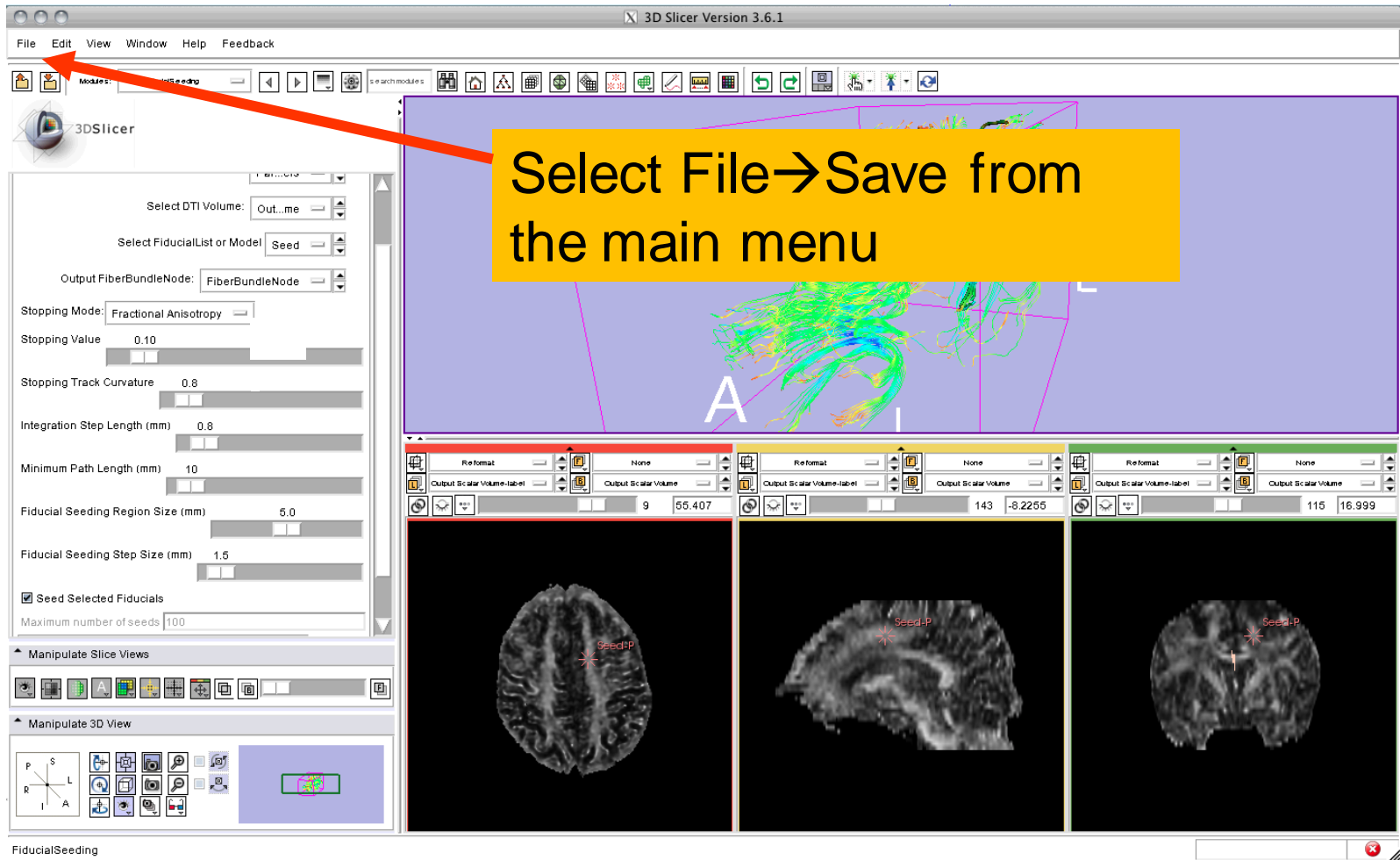
Output Scalar Volume-label Output Scalar Volume Output Scalar Volume-label Output Scalar Volume Output Scalar Volume-label Output Scalar Volume

19 26.8 128 5.4688 129 4.5687

Data



Saving a DTI Scene





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**

Save Scene & Data Options

Change Destination for All Selected: D:/SlicerData/DiffusionDataset/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	[Scene Description]	[SCENE]	Modified	MRML (.mrm)	SlicerScene1	D:/SlicerData/DiffusionDataset/
<input type="checkbox"/>	dwiDataset	DiffusionWei...	Not Modified	NRRD (.nhdr)	dwiDataset.nhdr	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Output DTI Volume	DiffusionTen...	Not Modified	NRRD (.nhdr)	Output DTI Volume.nhdr	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Output Baseline Volume	Volume	Modified	NRRD (.nrrd)	Output Baseline Volum...	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Otsu Threshold Mask	Volume	Modified	NRRD (.nrrd)	Otsu Threshold Mask.n...	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Output Scalar Volume	Volume	Modified	NRRD (.nrrd)	Output Scalar Volume...	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Output Scalar Volume-label	Volume	Modified	NRRD (.nrrd)	Output Scalar Volume-l...	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Labelmap Seeding Model	FiberBundle	Modified	Poly Data (.vtk)	Labelmap Seeding Mo...	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Seed	FiducialList	Modified	Fiducial List CSV (.fcsv)	Seed.fcsv	D:/SlicerData/DiffusionDataset/
<input checked="" type="checkbox"/>	Seed_FiberTracts	FiberBundle	Modified	Poly Data (.vtk)	Seed_FiberTracts.vtk	D:/SlicerData/DiffusionDataset/

Save Selected Cancel



Saving a DTI Scene

Select File → Close Scene to close the current DTI Scene

3D Slicer Version 3.6 RC3

File Edit View Window Help

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)



Loading a DTI Scene

3D Slicer Version 3.6 RC3

File Edit View Window Help

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



Loading a DTI Scene

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

3D Slicer Version 3.6 RC3

File Edit View Window Help

Modules: SlicerWelcome

3DSlicer

Welcome & About

3D Slicer is a free open source visualization of image data. This to get you started using Slicer. Please documentation on our wiki for more info: <http://www.slicer.org/slicerWiki/index.php/Documentation:101>

3D Slicer is distributed under the terms of the [Software License Agreement](http://www.slicer.org/copyright/copyright.html), please see <http://www.slicer.org/copyright/copyright.html> for research purposes only and its Administration, or by any other means.

Hint: to open any information page, click on the **?** icon.

Don't show this module on start

Manipulate Slice Views

Manipulate 3D View

None RAS: (87.3, 1.0, -125.0)

Select File

Name	Size	Modified time
SlicerScene1.mrml	28 KB	07/31/10 16:13:36

File name: SlicerScene1.mrml

Files of type: Scenes (.mrml;.xml;.xcat)

Open

Cancel



Loading a DTI Scene

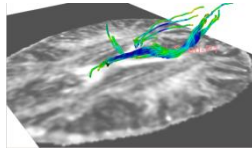
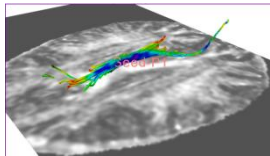
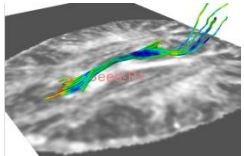
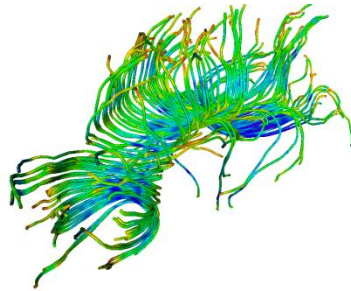
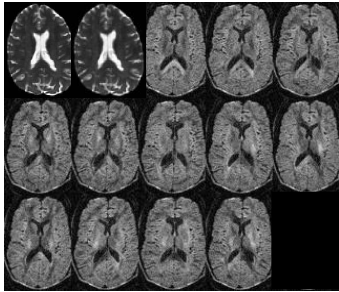
3D Slicer Version 3.6.1

Select the module **Data**

The screenshot displays the 3D Slicer interface. The top toolbar shows the 'Data' module selected and circled in red. A yellow text box above the 3D view reads 'Select the module Data'. The 3D view shows a fiber bundle reconstruction of a brain with axes R (Right), L (Left), A (Anterior), and I (Inferior). Below the 3D view are three orthogonal slice views: Axial, Sagittal, and Coronal. The MRML Tree on the left lists various scene nodes, including 'dwiDataset', 'Output DTI Volume', and 'FiberBundleNode'. The bottom status bar shows 'Data' as the active module.



Conclusion



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

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Neuroimage Analysis Center

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Slicer Community

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