

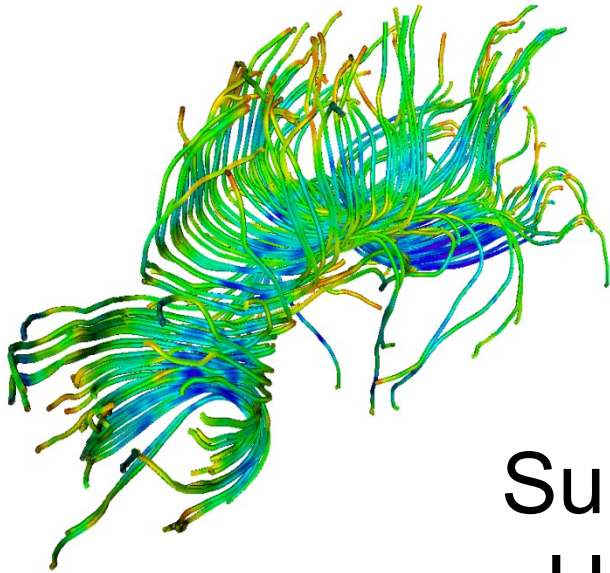


NA-MIC

National Alliance for Medical Image Computing

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

Diffusion Tensor Imaging Tutorial



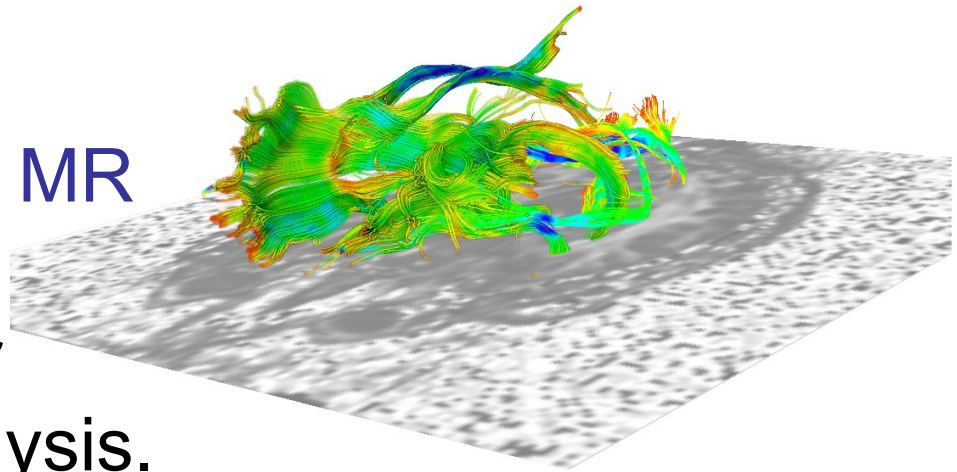
Sonia Pujol, Ph.D.

Surgical Planning Laboratory
Harvard Medical School



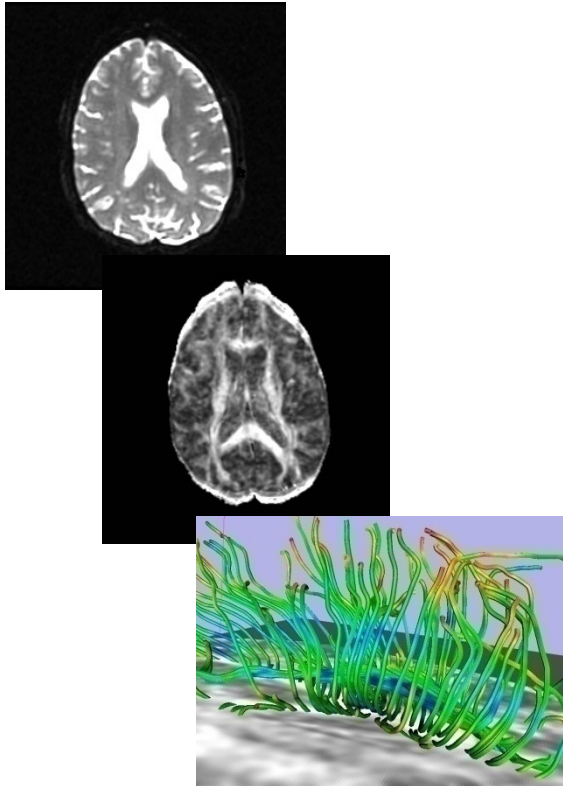
DTI tutorial

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





Outline

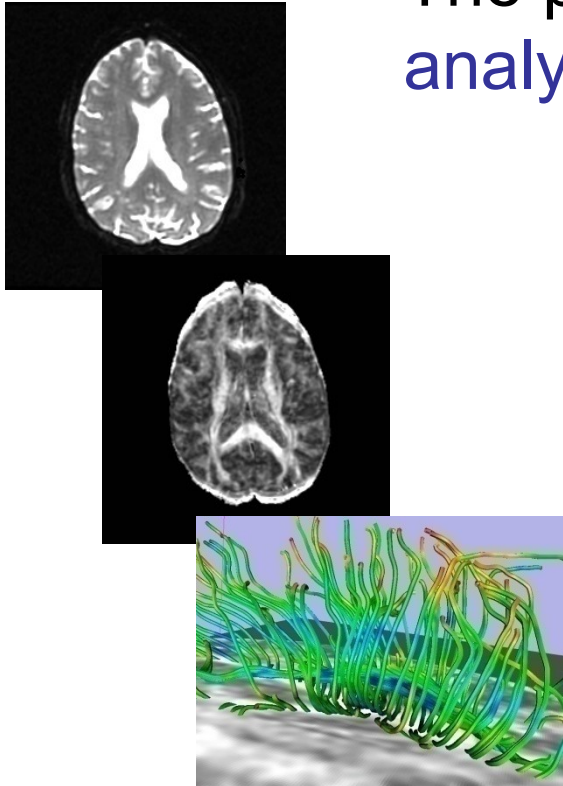


This tutorial guides you through the process of **loading diffusion MR data**, **estimating diffusion tensors**, and performing **tractography** of white matter bundles.



Outline

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

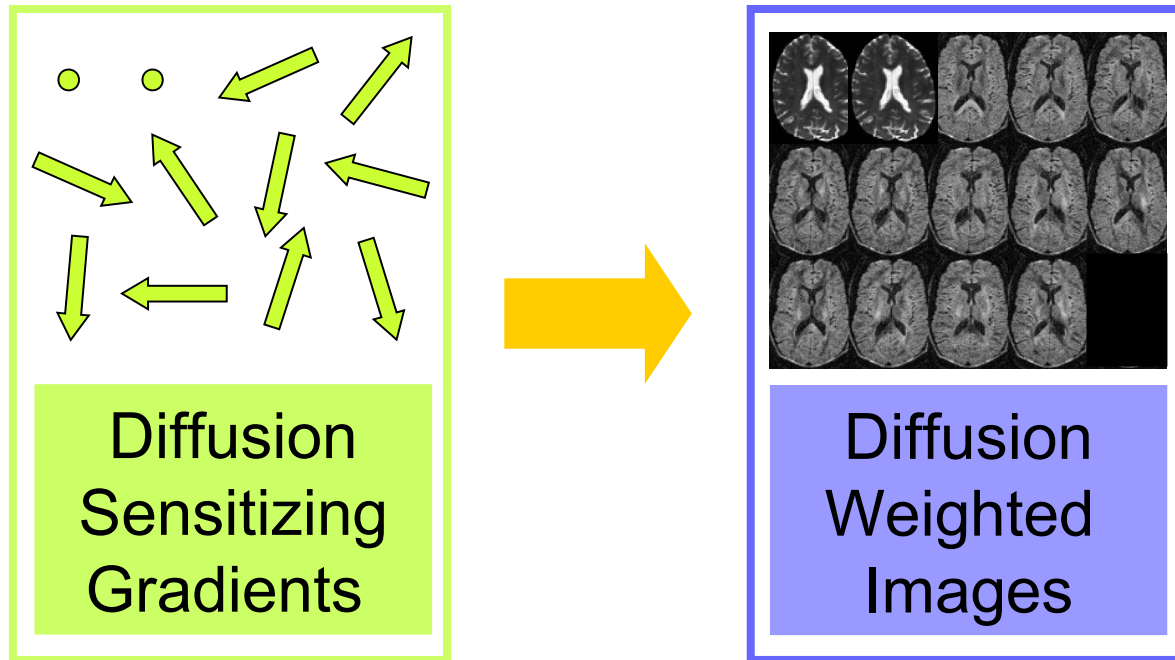


1. Data
2. Volumes
3. Diffusion Tensor Estimation
4. Diffusion Tensor Scalar Measurements
5. Editor
6. LabelMap Seeding
7. Fiber Bundles
8. Fiducials
9. Fiducial Seeding



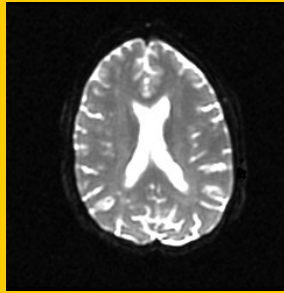
Tutorial Dataset

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

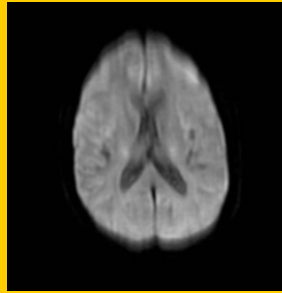




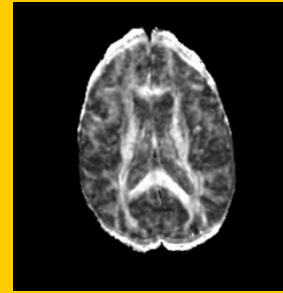
DTI Processing Pipeline



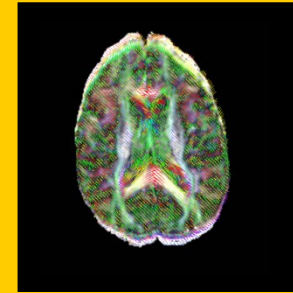
DWI
Acquisition



Tensor
Calculation



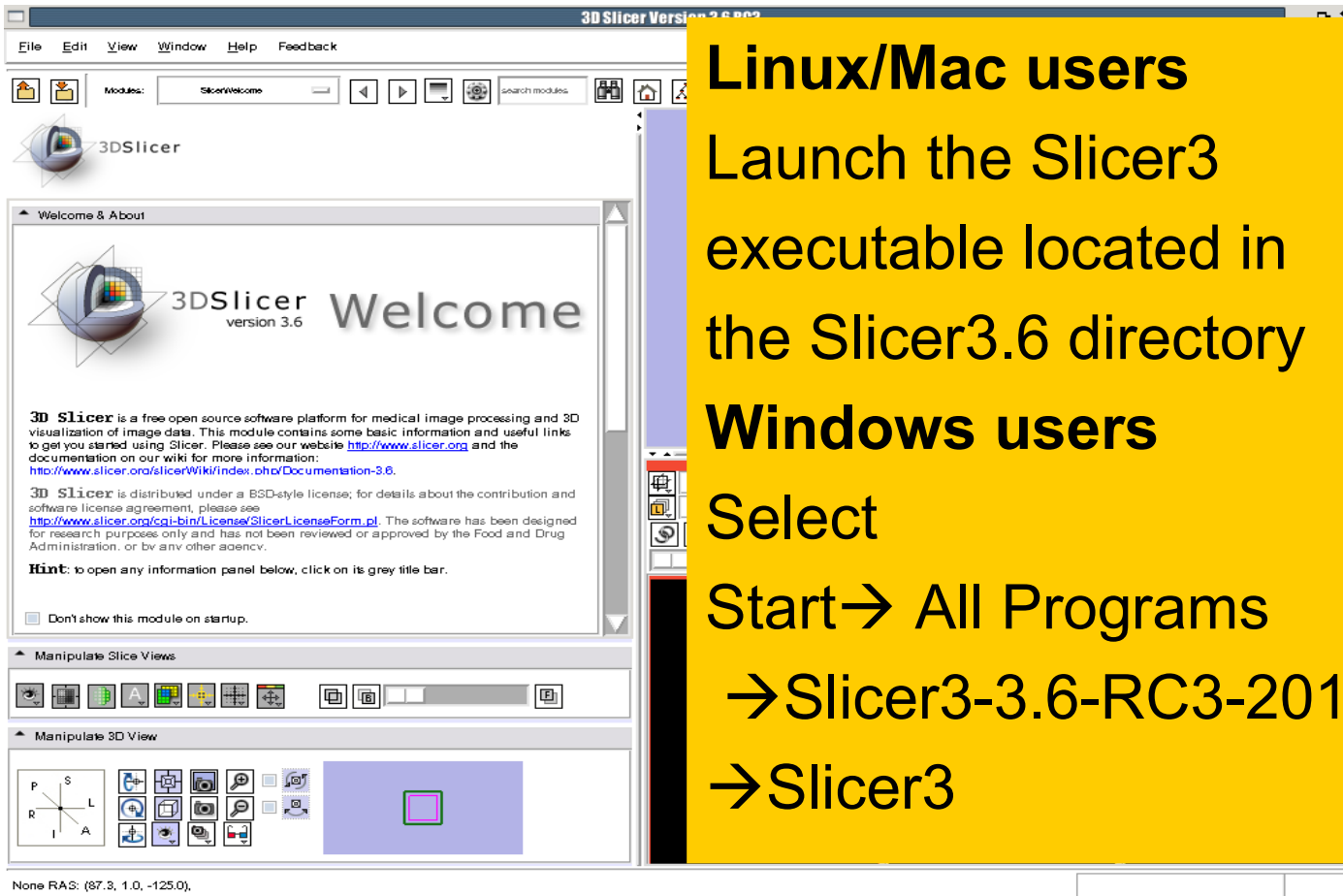
Scalar
Maps



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-RC3-2010-06-04

→ Slicer3



Slicer Welcome

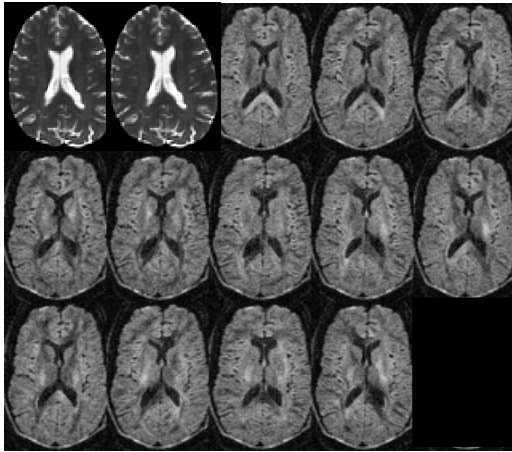
The **SlicerWelcome** module is the module displayed by default.

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

None RAS: (87.3, 1.0, -125.0)



Part 1:

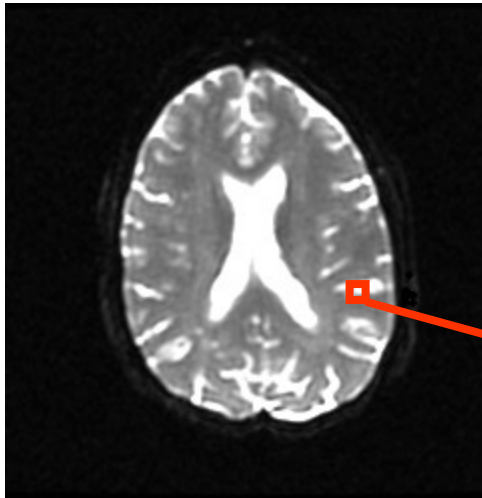


Diffusion data loading and tensor estimation



Diffusion Tensor

Stejskal-Tanner



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

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



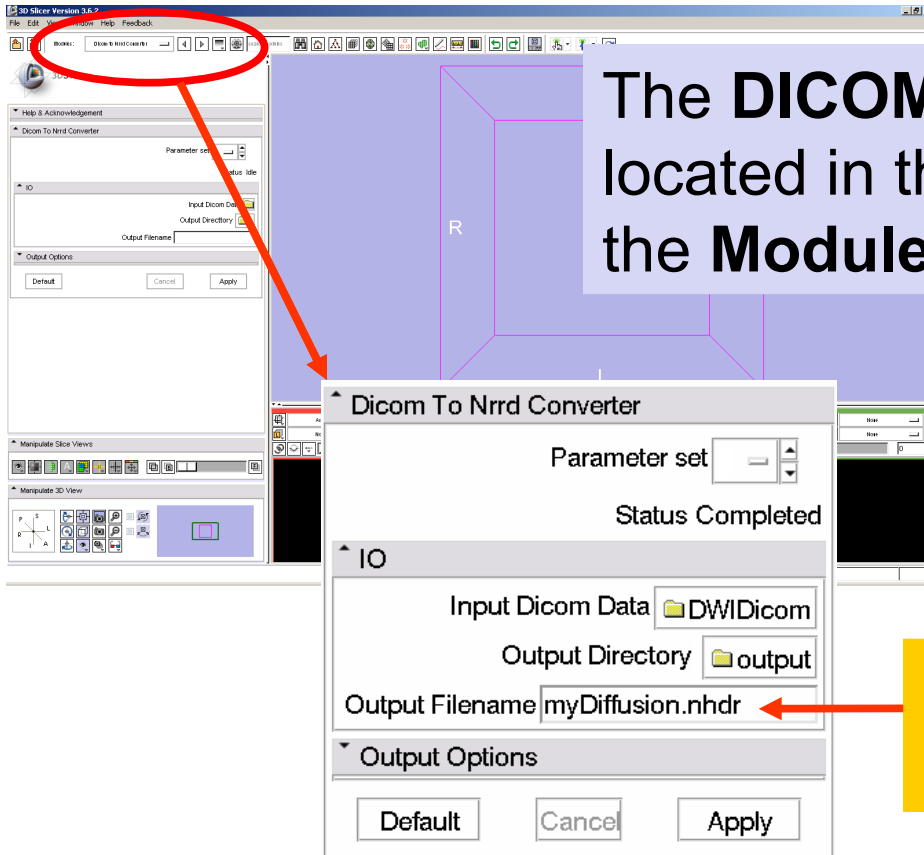
Tutorial Dataset

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 **Converters** category in the **Modules** menu

Use **.nhdr** for **Output Filename** extension



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

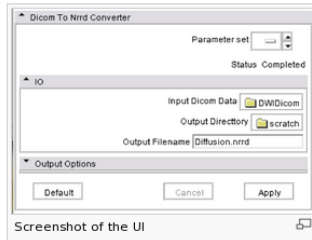
[page](#) [discussion](#) [view source](#) [history](#)

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>



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

3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

3DSlicer version 3.6 Welcome

3D Slicer is a free open source software platform for medical image processing and 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/wiki/index.php/Documentation-3.6>.

3D Slicer is distributed under a BSD-style license; for details about the contribution 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 icon.

Don't show this module on startup.

Manipulate Slice Views

Manipulate 3D View

None RAS: (87.3, 1.0, -125.0)

Add Volume

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

Path: /autofs/home/003swallace/Desktop/Diffusion_Dataset/dwiDataset.nhdr

Volume Options

Centered Ignore File Orientation Label Map Single File

Volume Name: **dwiDataset**

Volume Name: dwiDataset

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,



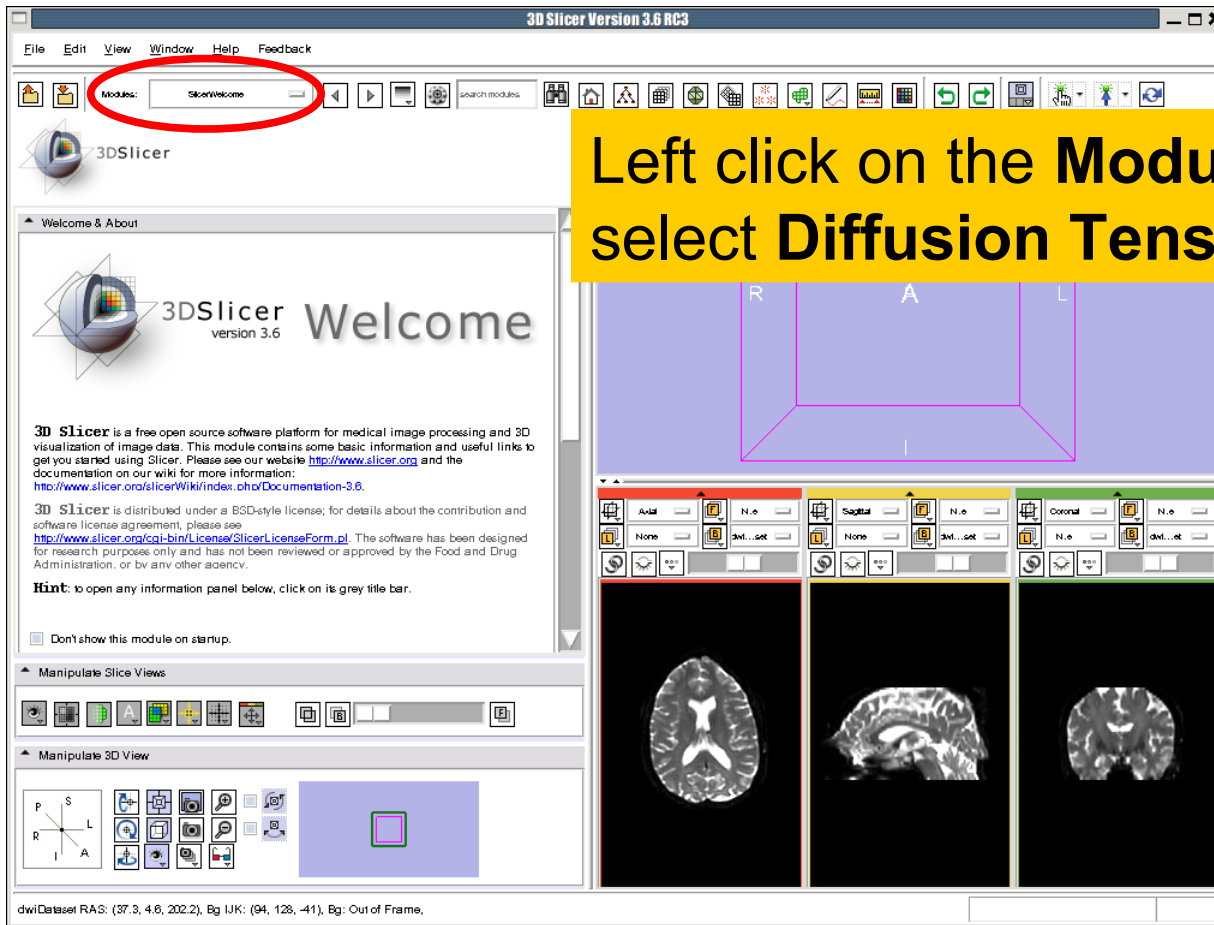
Loading the DWI Volume

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

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



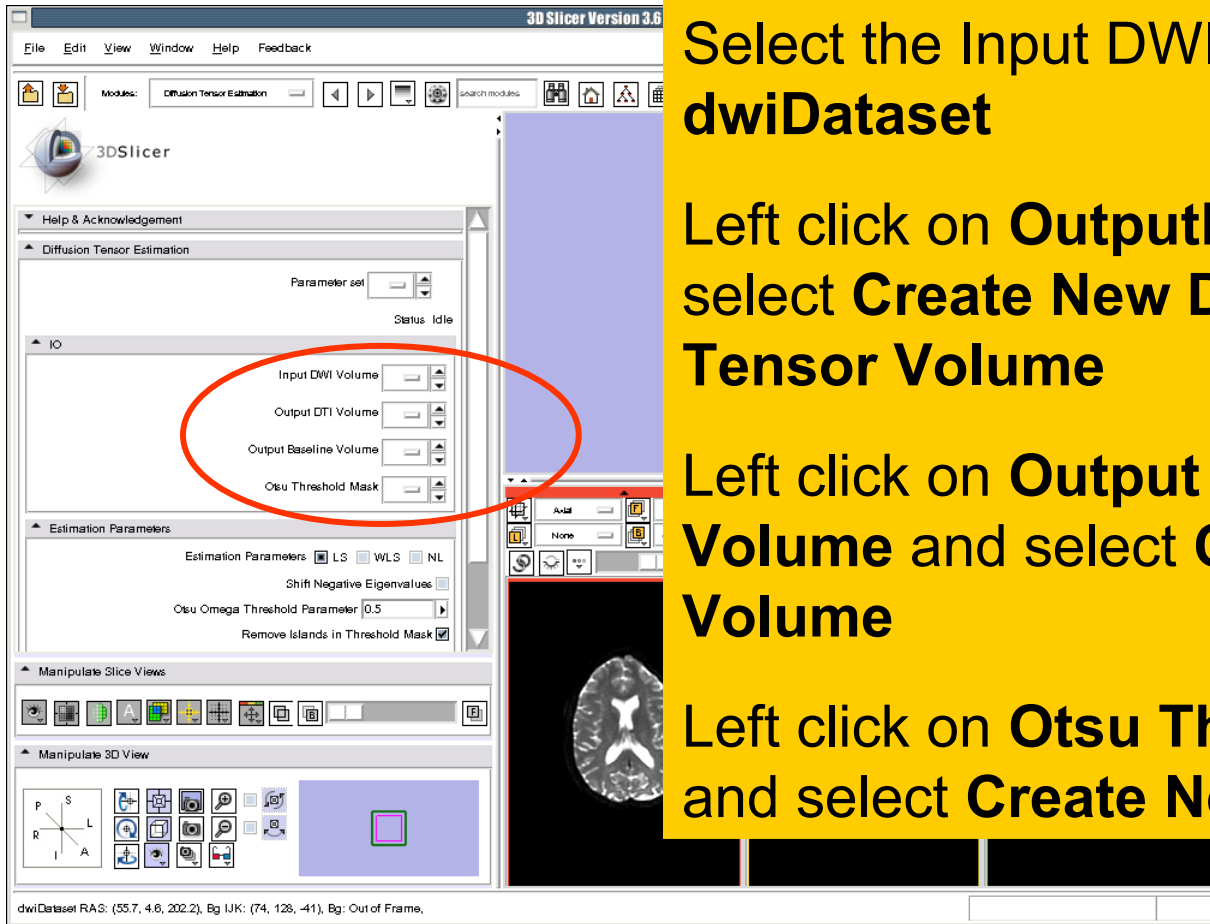
Tensor Estimation



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



Tensor Estimation



Select the Input DWI Volume
dwiDataset

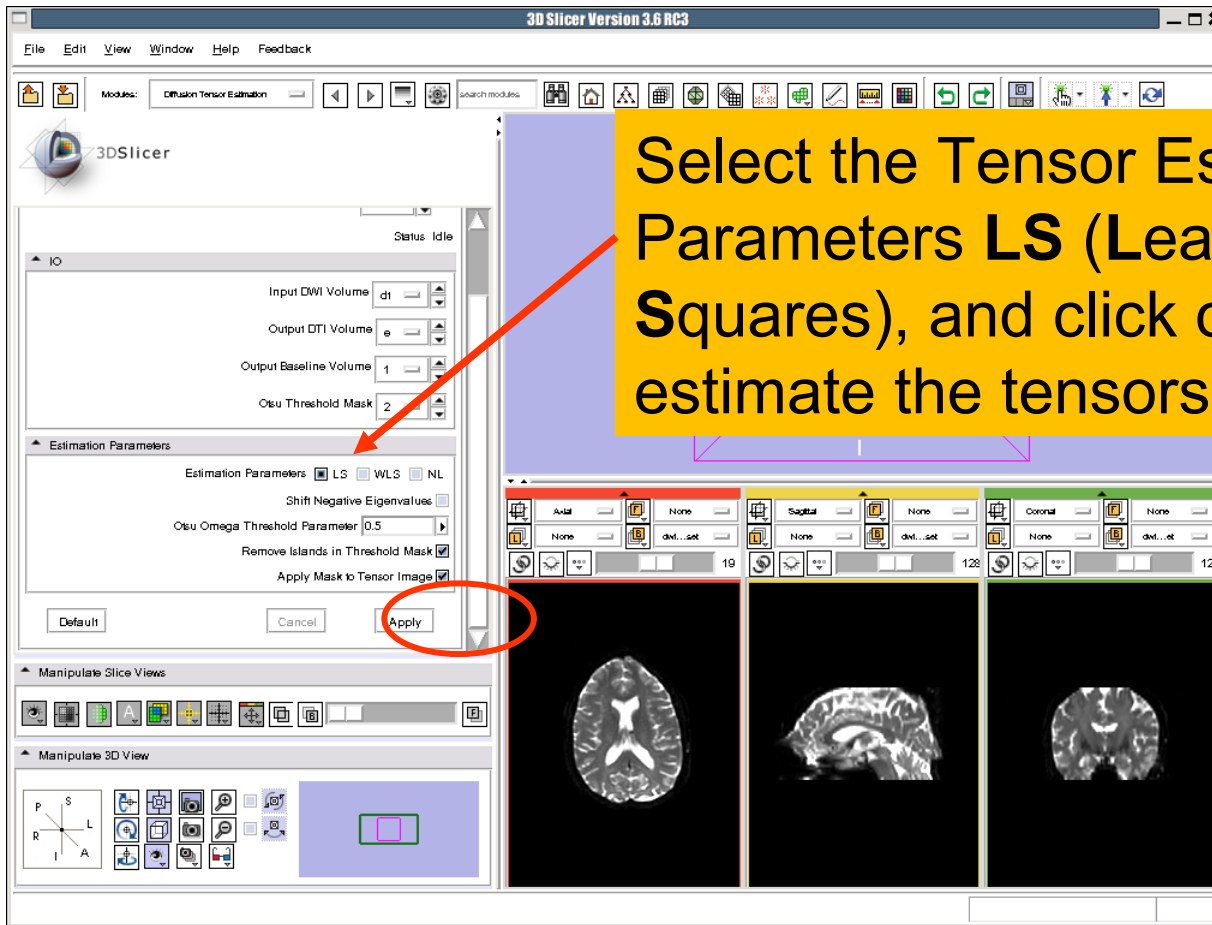
Left click on **OutputDTIVolume** and
select **Create New Diffusion
Tensor Volume**

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

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



Tensor Estimation



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



Tensor Estimation

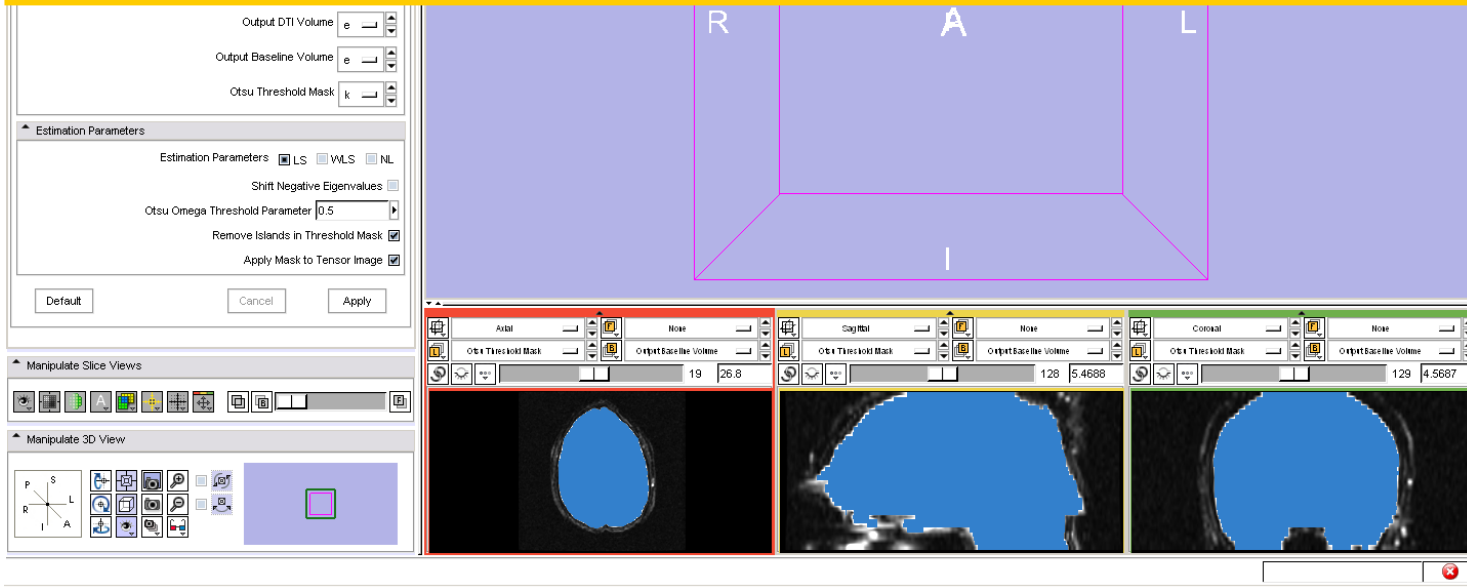
Left click on **Output Baseline Volume to display the list of volumes that have been computed by Slicer**

The screenshot shows the 3D Slicer Version 3.6 interface. The 'Diffusion Tensor Estimation' module is active, with the 'IO' section expanded. The 'Output Baseline Volume' is highlighted in the list. A red arrow points from the yellow callout box to this volume. Below the IO section, the 'Estimation Parameters' are visible, including 'LS', 'VLS', and 'NL' options, and a 'Status: Completed' indicator. The main 3D view shows a brain slice with a purple bounding box, and the bottom panel displays three different views of the brain slice, including a blue mask and a grayscale image.



Tensor Estimation

Output DTI Volume is the volume of estimated tensors
Output Baseline Volume is the Baseline volume
Otsu 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 DTI 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 I

Axial Coronal Sagittal

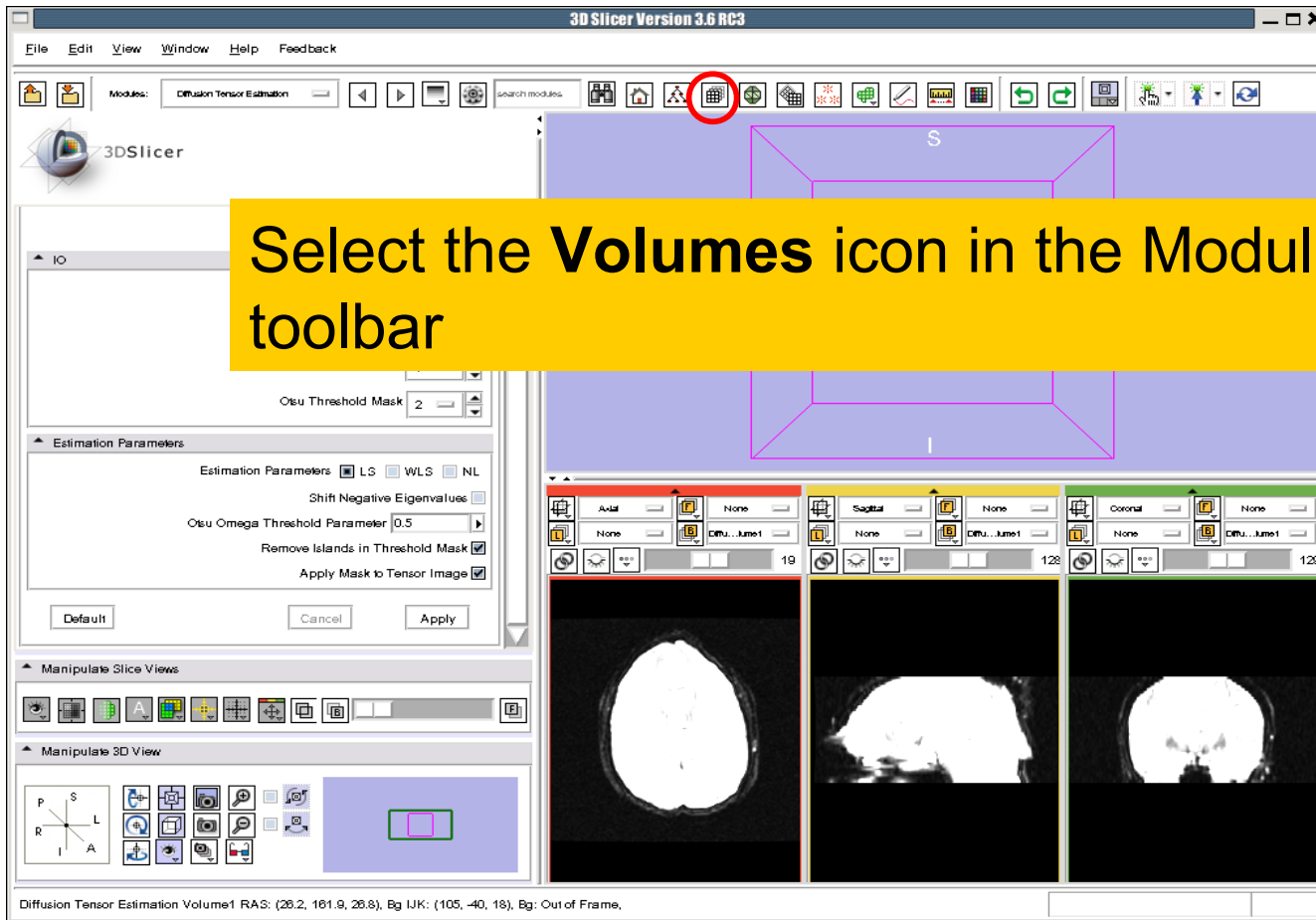
None Output Threshold Mask 19 26.8

None Output Threshold Mask 128 5.4688

None Output Threshold Mask 129 4.5687



Tensor Estimation





Tensor Estimation

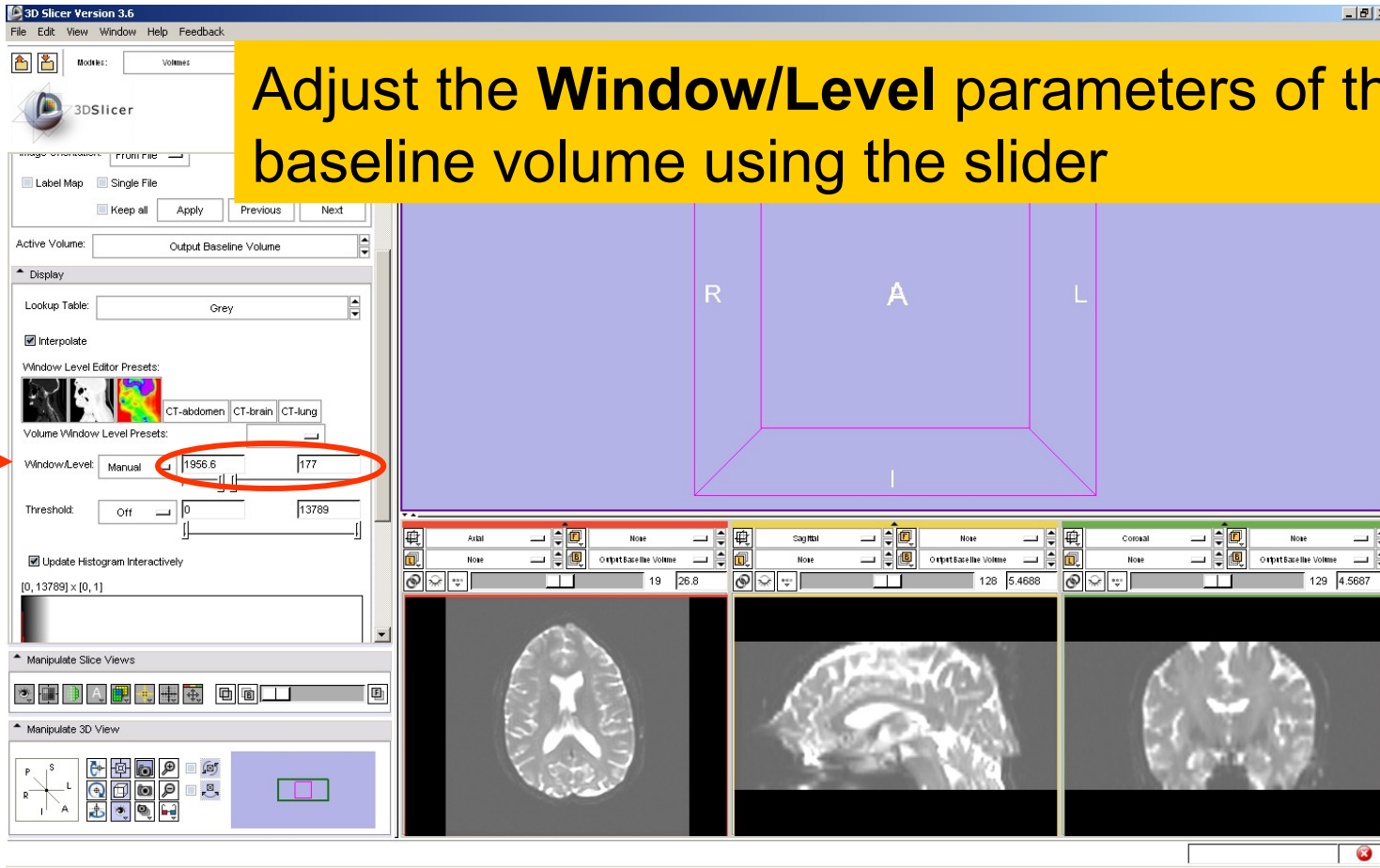
Set the Active Volume to Output Baseline Volume and click on the Display tab

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



Tensor Estimation

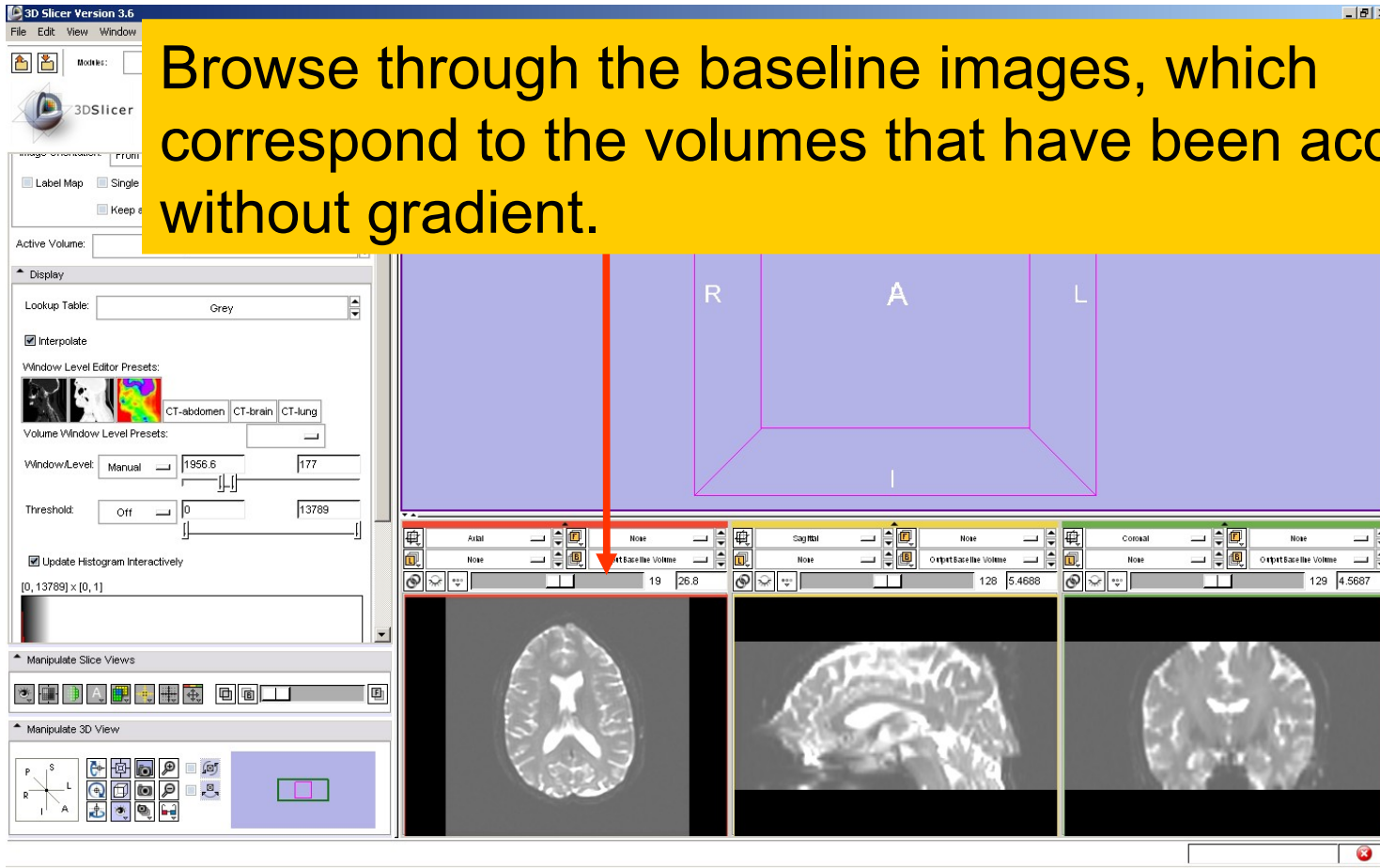
Adjust the **Window/Level** parameters of the baseline volume using the slider

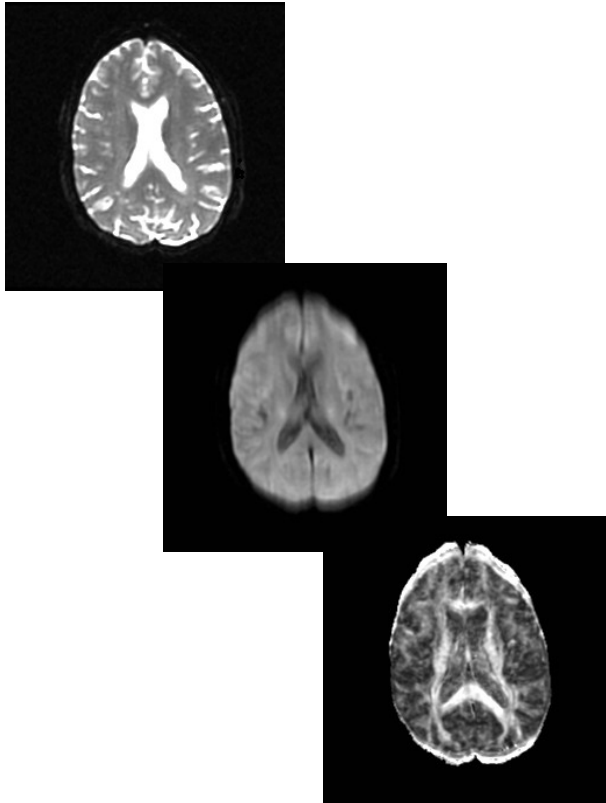




Tensor Estimation

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





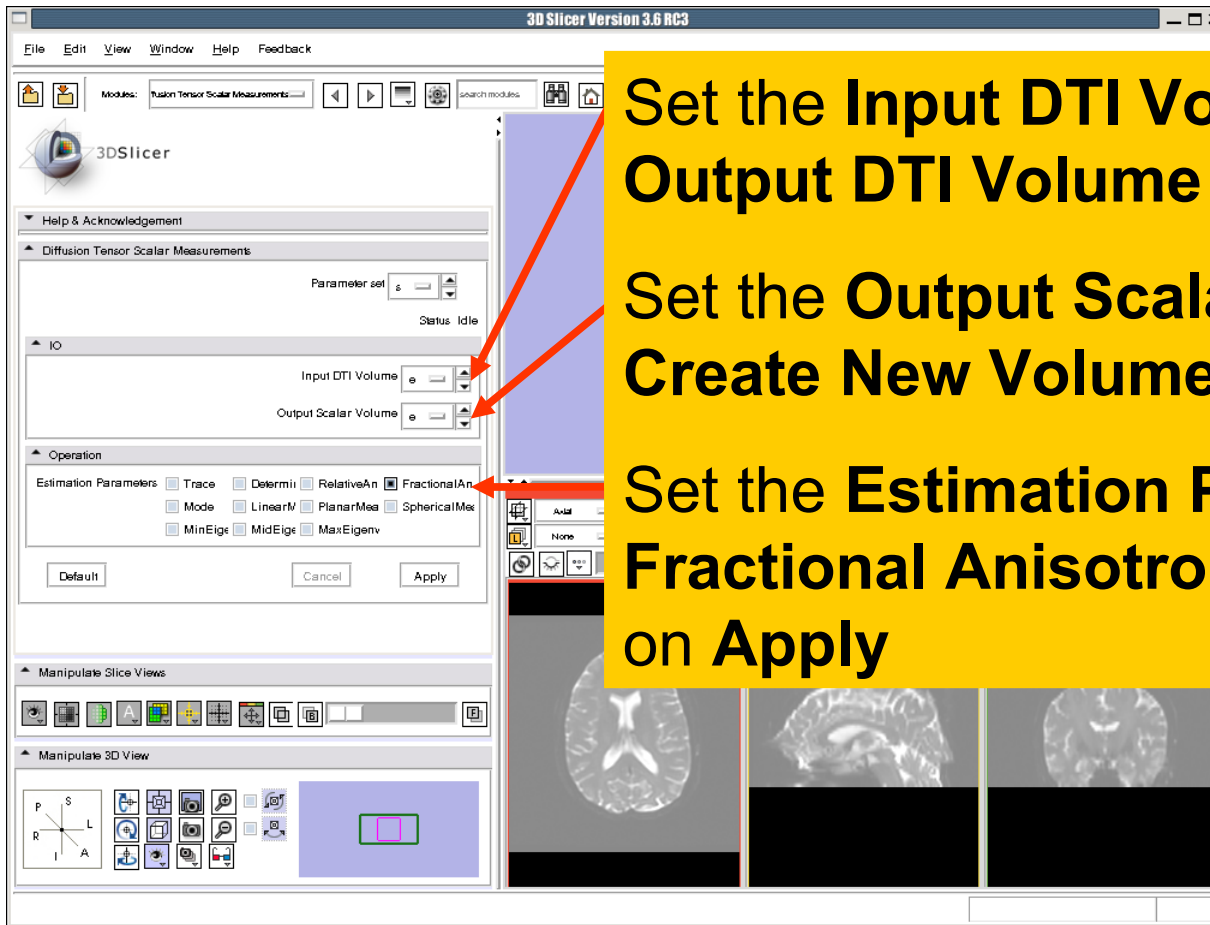
Part 2:

Scalar

Measurements



Scalar Measurements



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

Set the **Output Scalar Volume** to **Create New Volume**

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



Fractional Anisotropy Volume

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

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



Fractional Anisotropy Volume

3D Slicer Version 3.6

File Edit View Window Help Feedback

Module: **Tensor To 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 Relk Fractional/
 Mode LinearMea Plan SphericalM
 MinEigenv MidEigenv Max MaxEigenv
 MaxEigenv MaxEigenv RAI RAIMaxEig
 RAIMaxEig D11 D22 D33
 ParallelDiff Perpendic

Default Cancel Apply

Manipulate Slice Views

Manipulate 3D View

Output Scalar Volume RAS: (-157.1, -115.0, 32.8), Lb: Slice not shown, Bg: Slice not shown.

Slicer displays the outline of the tensor mask overlaid on the Fractional Anisotropy volume



Fractional Anisotropy Volume

3D Slicer Version 3.6

File Edit View Window Help Feedback

Mode: Vector Tensor 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 Rnk Fractional Anisotropy

Mode Linear Measure Planar Spherical Measure

Min Eigenvector Mid Eigenvector Max Max Eigenvector

Max Eigenvector Max Eigenvector RAI RAI Max Eigenvector

RAI Max Eigenvector D11 D22 D33

Parallel Diffusion Perpendicular

Default Cancel Apply

Manipulate Slice Views

Manipulate 3D View

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

Start 3D Slicer Version 3.6 Diffusion/MRTutorial_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.



Part 3:

**Region of
Interest Based
Tractography**



LabelMap Generation

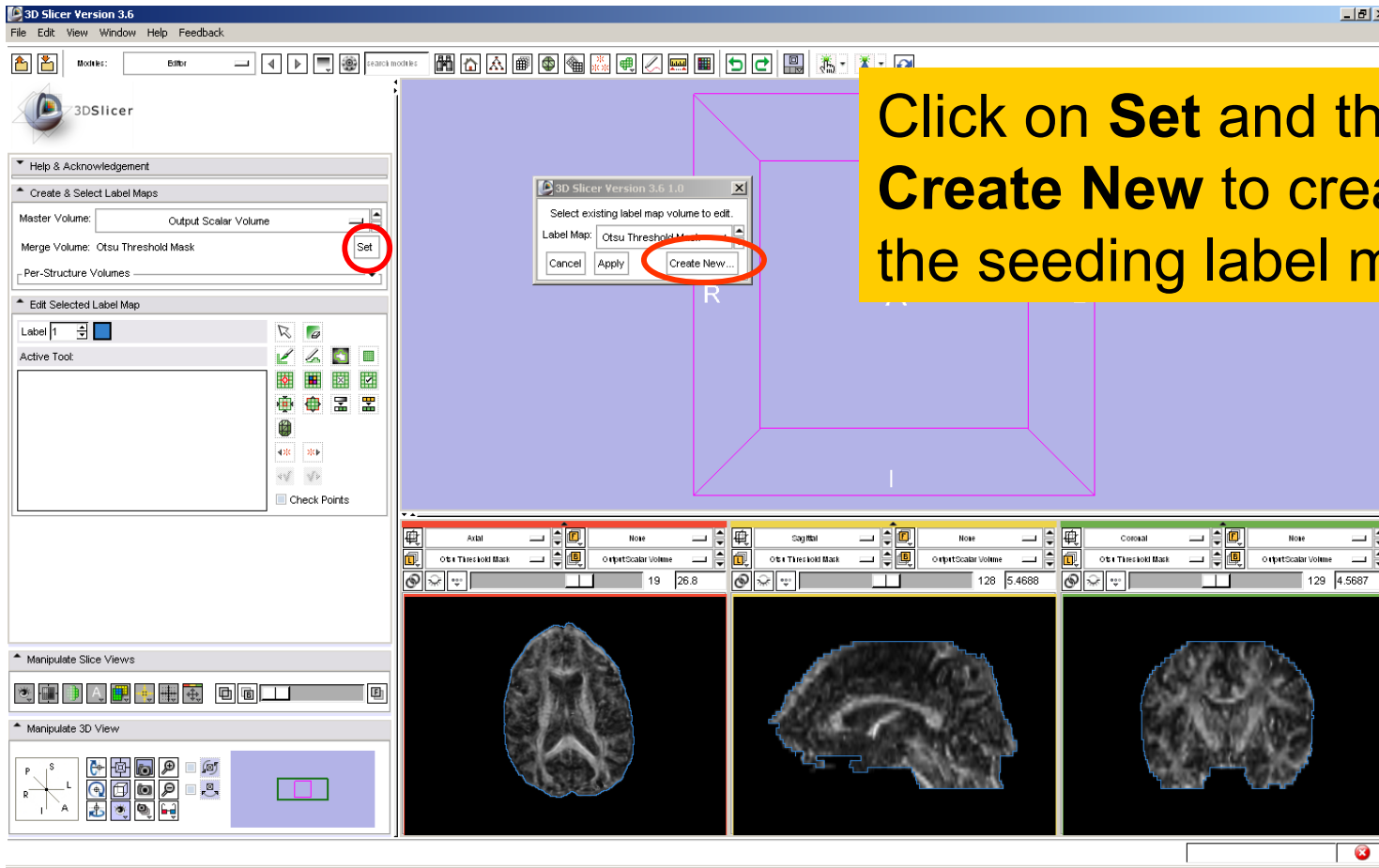
Select the Editor module in the Modules menu.

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

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 Slice Views

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

Models: Editor

3DSlicer

Help & Acknowledgement

Create & Select Label Maps

Master Volume: Output Scalar Volume

Merge Volume: Output Scalar Volume-label Set

Per-Structure Volumes

Edit Selected Label Map

Label 1

Active Tool:

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: []

3DSlicer

Help & Acknowledgement

Create & Select Label Maps

Master Volume: Output Scalar Volume

Merge Volume: Output Scalar Volume-label [Set]

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

Output Scalar Volume-label 19 26.8

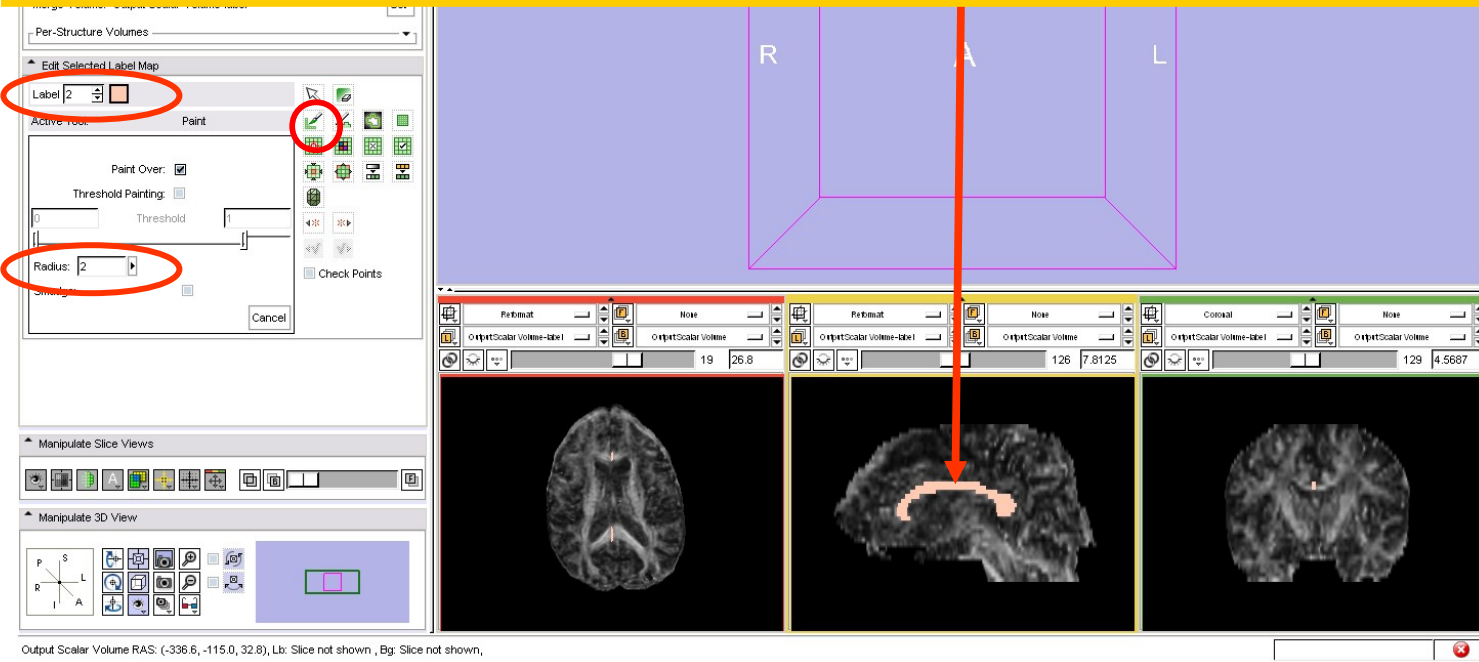
Output Scalar Volume-label 128 5.4688

Output Scalar Volume-label 129 4.5687



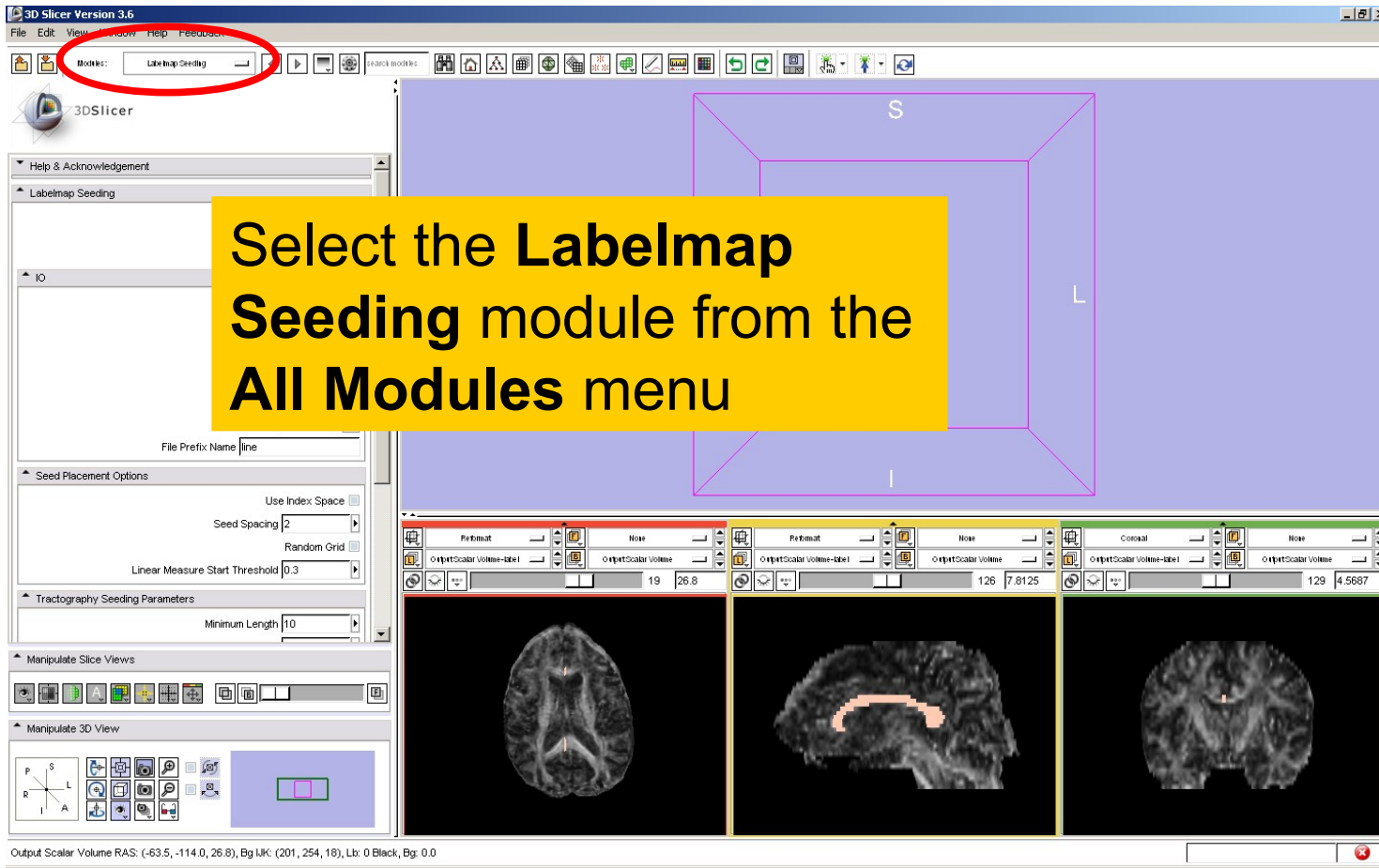
LabelMap Generation

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

Set the Input DTI volume
Output DTI Volume

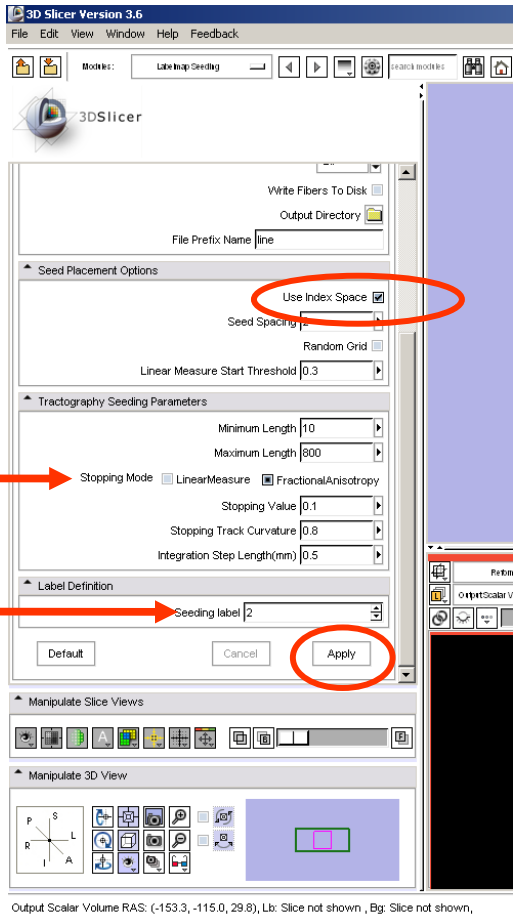
Select the Input Label Map
Output Scalar Volume-label

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), Lt: Slice not shown, Bg: Slice not shown



LabelMap Seeding



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

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

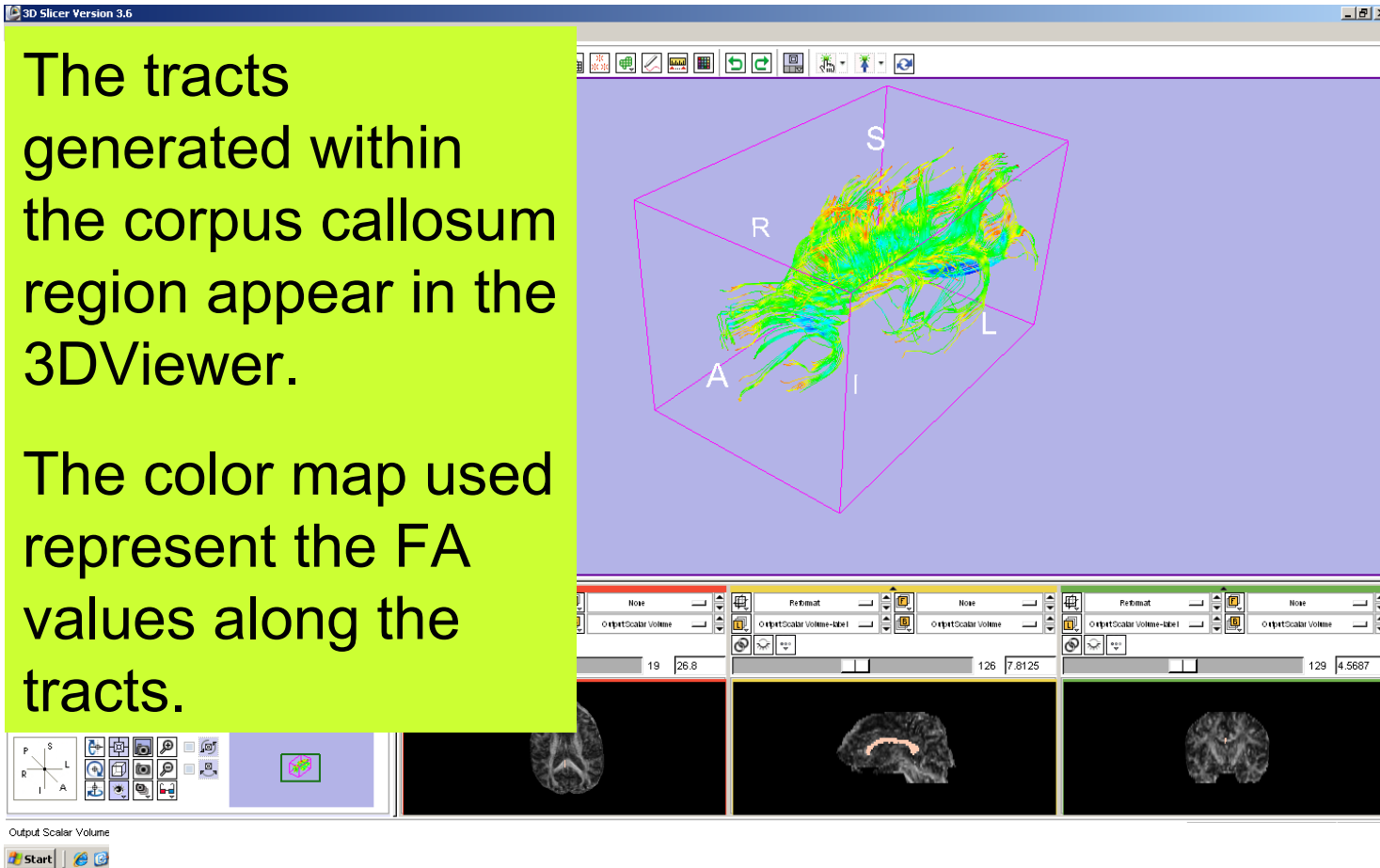
In the **Label Definition** tab, set Seeding label to label 2, and click on **Apply**.



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

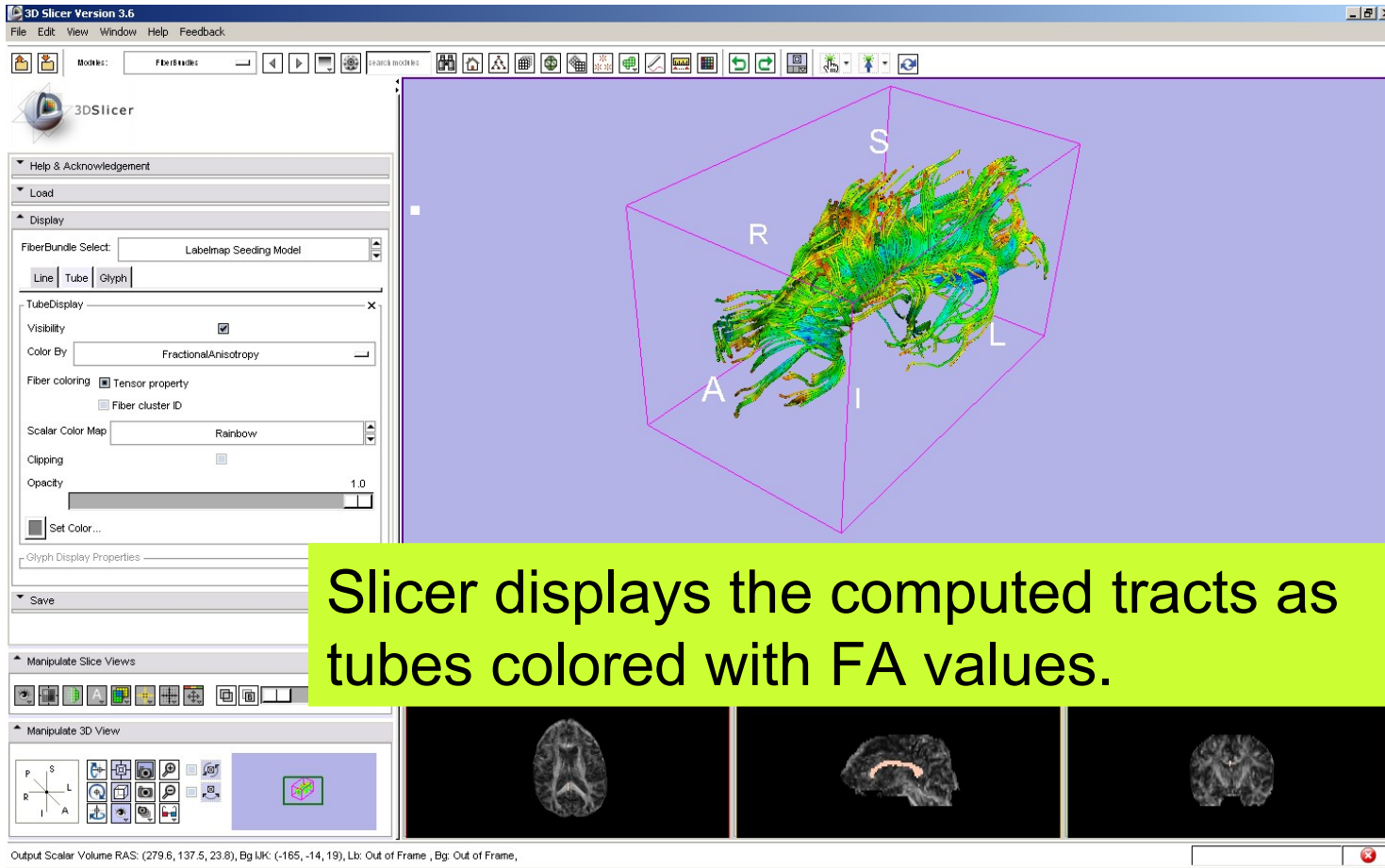
Select the **FiberBundles** module, and click on the **Tube** tab in the **Display** panel

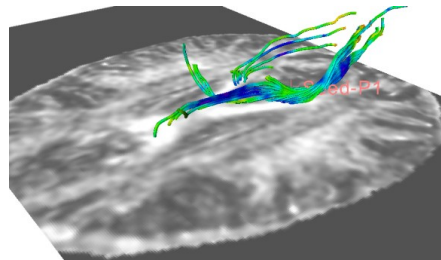
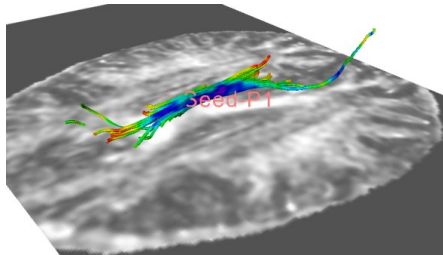
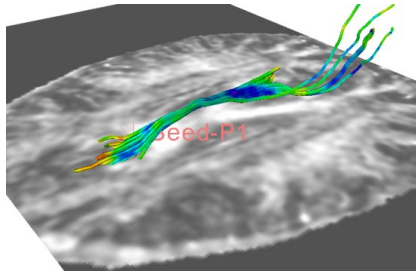
Check the visibility box to display the tubes.

Output Scalar Volume RAS: (279.6, 137.5, 23.8), Bg IJK: (-165, -14, 19), Lb: Out of Frame, Bg: Out of Frame,



LabelMap Seeding





Part 4:

Tractography on-the-fly



Fiducial Seeding

File Edit View Window Help Feedback

Modules: **Fiducials**

3DSlicer

Help & Acknowledgement

Modify All Fiducial Lists & Their Fiducial Points

Modify A Selected Fiducial List & Its Fiducials

Fiducial List:

Modify List:

Other List Display Properties

Add & Modify Individual Fiducials

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

Manipulate Slice Views

Manipulate 3D View

Diffusion Tensor Scalar Measurements Volume RAS: (125.0, 57.0, 23.8), Bg IJK: (0, 72, 19), Lb: 0 Black, Bg: 0.0

Reformat None Reformat None Reformat None

Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume

19 125 125

Diffusion Tensor Scalar Measurements Volume RAS: (125.0, 57.0, 23.8), Bg IJK: (0, 72, 19), Lb: 0 Black, Bg: 0.0

Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume

19 125 125

Diffusion Tensor Scalar Measurements Volume RAS: (125.0, 57.0, 23.8), Bg IJK: (0, 72, 19), Lb: 0 Black, Bg: 0.0

Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume Diffu...abel1 Diffu...olume

19 125 125

Lb: Out of frame R: 49 A: 46 S: 1142

Select the **Fiducials** module in the **All Modules** menu



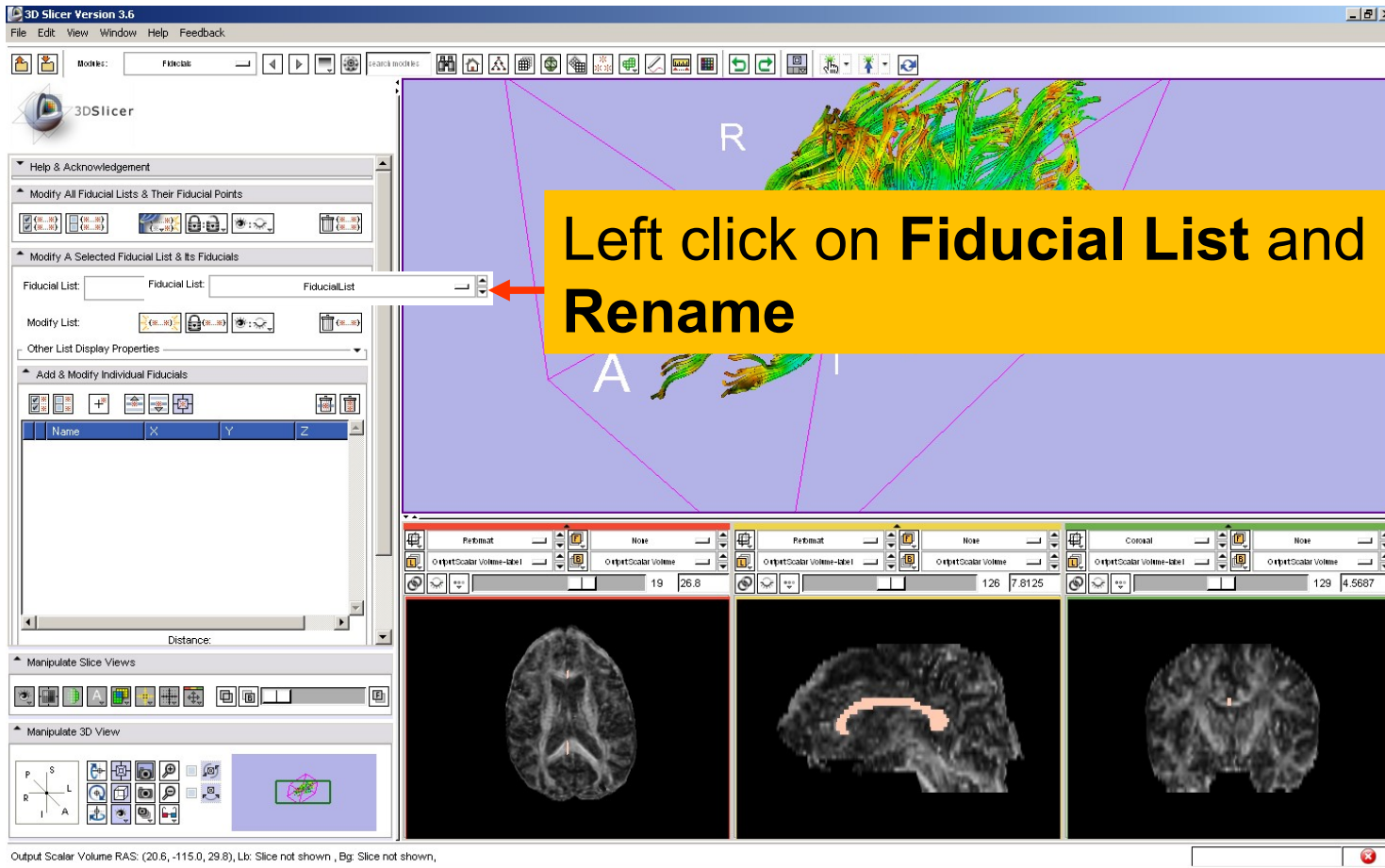
Fiducial Seeding

Set Fiducial List to Create New Fiducial List

The screenshot displays the 3D Slicer 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 with technical data.



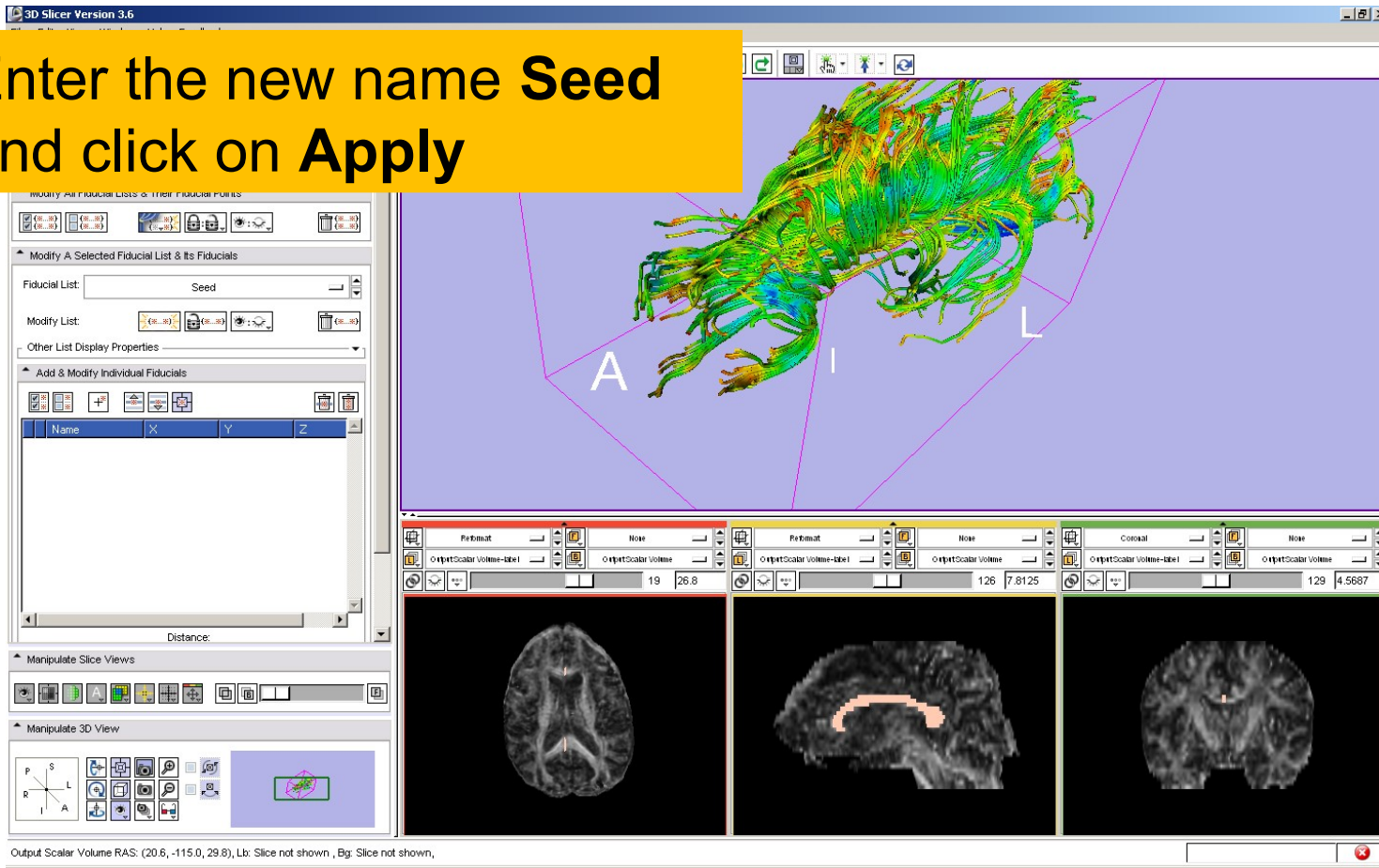
Fiducial Seeding





Fiducial Seeding

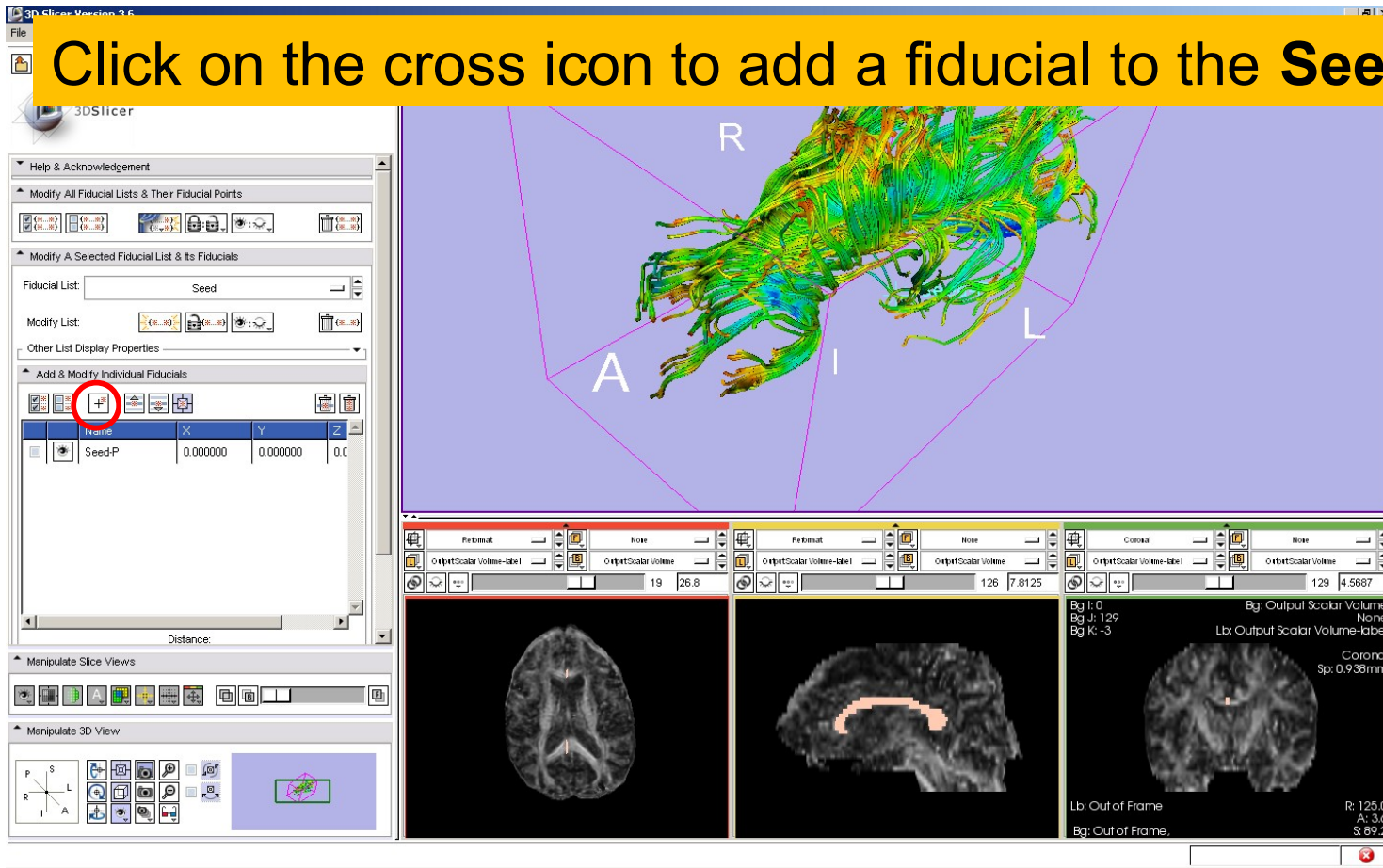
Enter the new name **Seed**
and click on **Apply**





Fiducial Seeding

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





Fiducial Seeding

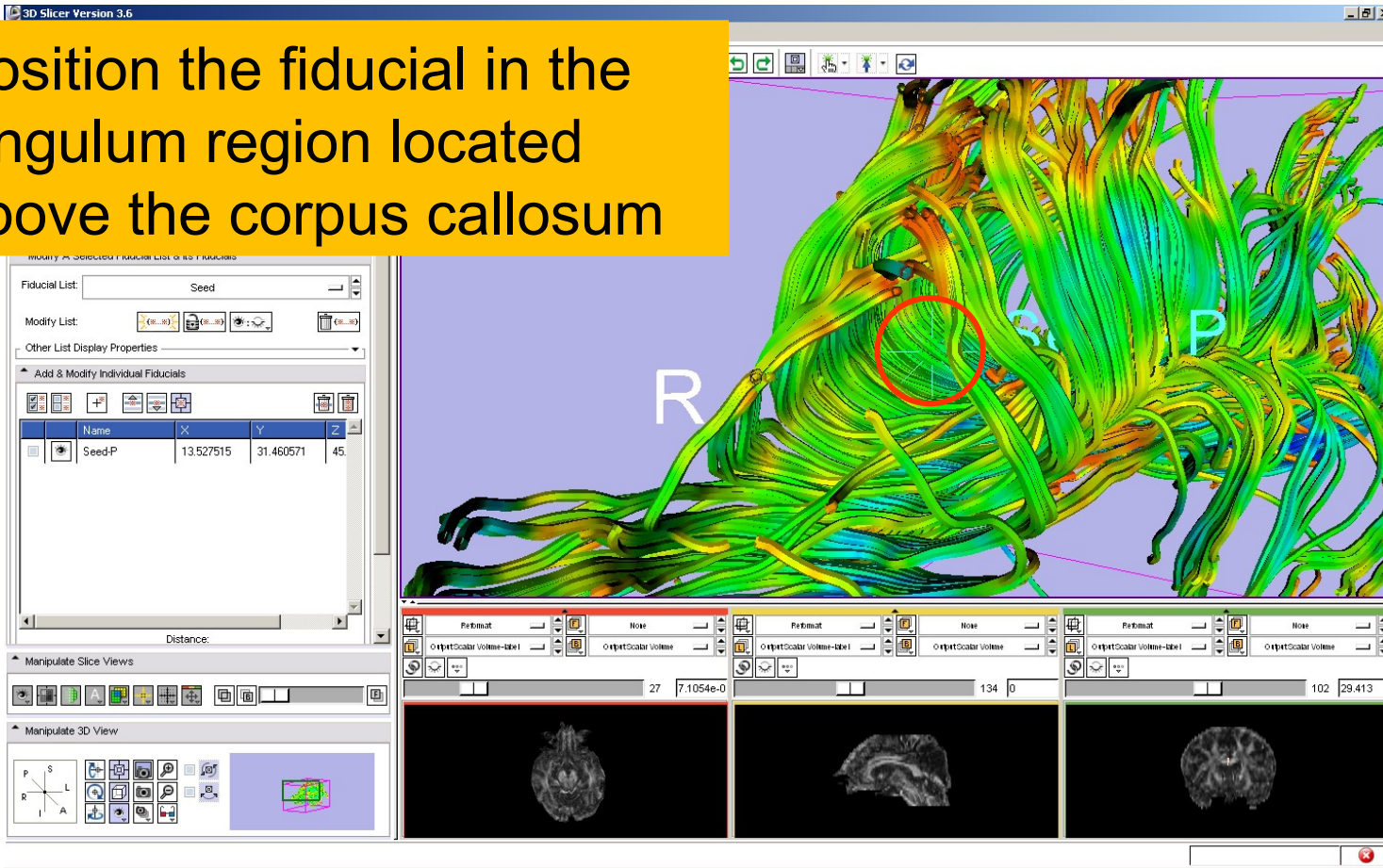
The fiducial **Seed-P** appears in the 3D Viewer

Output Scalar Volume RAS: (-84.3, 233.7, 23.8), 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 in green and yellow. A pink 'P' is placed on one of the tracts, with a red arrow pointing to it. On the left, a 'Modify List' panel shows a table of fiducials. The 'Seed-P' fiducial is selected, indicated by a red circle around its checkbox. Below the table are sections for 'Manipulate Slice Views' and 'Manipulate 3D View'. At the bottom, there are three small 2D slice views of the brain.

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 RC3

File Edit View Window Help Feedback

Modules: FiducialSeeding

Output FiberBundleNode: Seed_FiberTracts

Stopping Mod: 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 numt

Manipulate Slice Views

Manipulate 3D View

Diffusion Tensor Scalar Measurements Volume RAS: (-105.5, 4.8, -113.8), Bg IJK: (248, 128, 64), Lb: Out of Frame, Bg: Out of Frame.

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

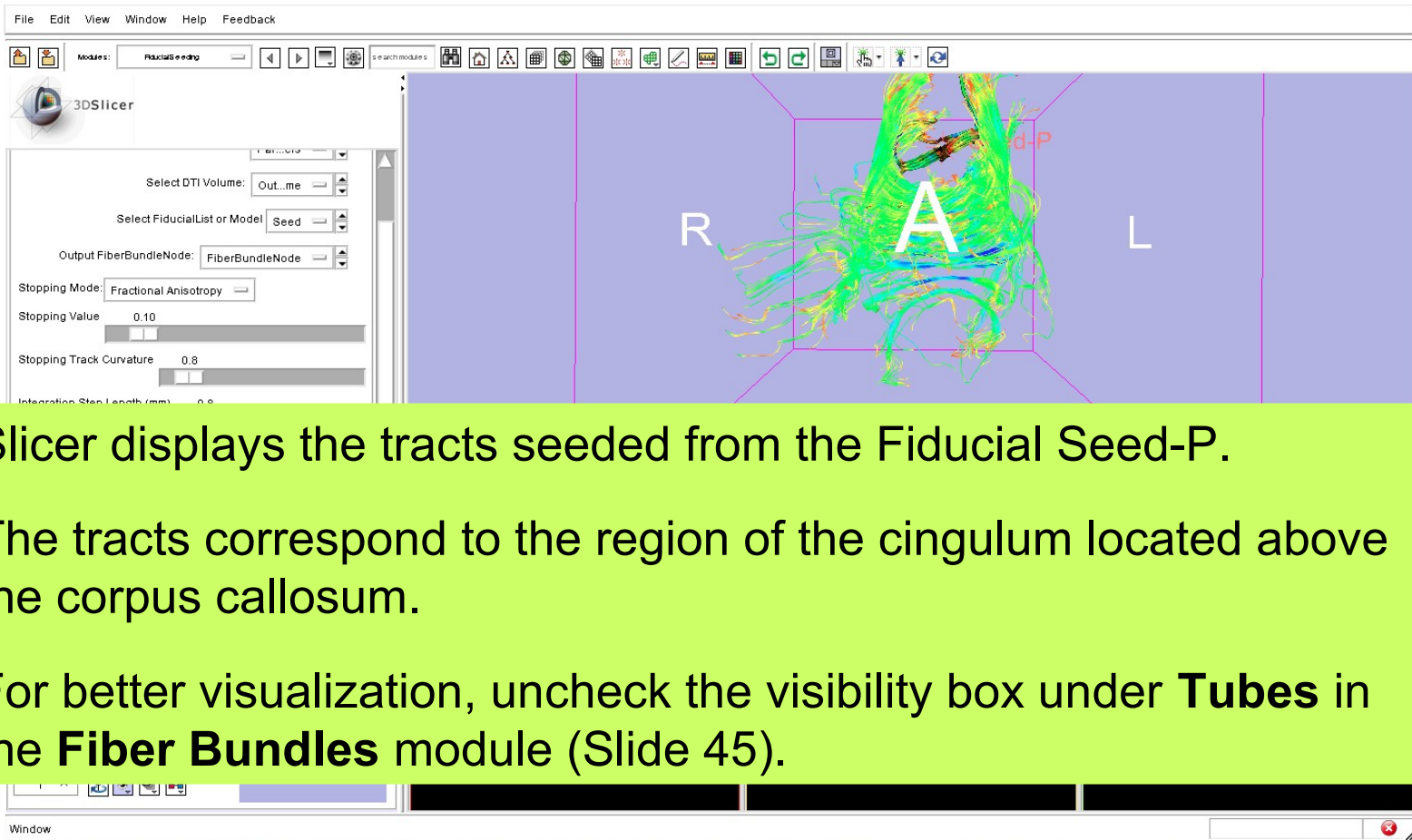
Minimum Path Length: 10 mm

Fiducial Seeding Region Size: 5 mm

Fiducial Seeding 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 45).



Fiducial Seeding

The screenshot displays the 3D Slicer 3.6 interface. The 'Fiducial Seeding' panel is active, showing various parameters for tractography seeding. A yellow text box is overlaid on the interface, containing the instruction: 'Move the fiducial **Seed-P** from the left cingulum to the corresponding region in the right cingulum in the coronal slice.' A red arrow points from the text box to a red 'Seed-P' marker on a coronal brain slice in the bottom right view. The interface also shows a 3D view of the brain and a list of fiducial points.

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

Performat None Output Scalar Volume-label 13 43.628

Performat None Output Scalar Volume-label 124 9.846

Performat None Output Scalar Volume-label 142 -8.0875

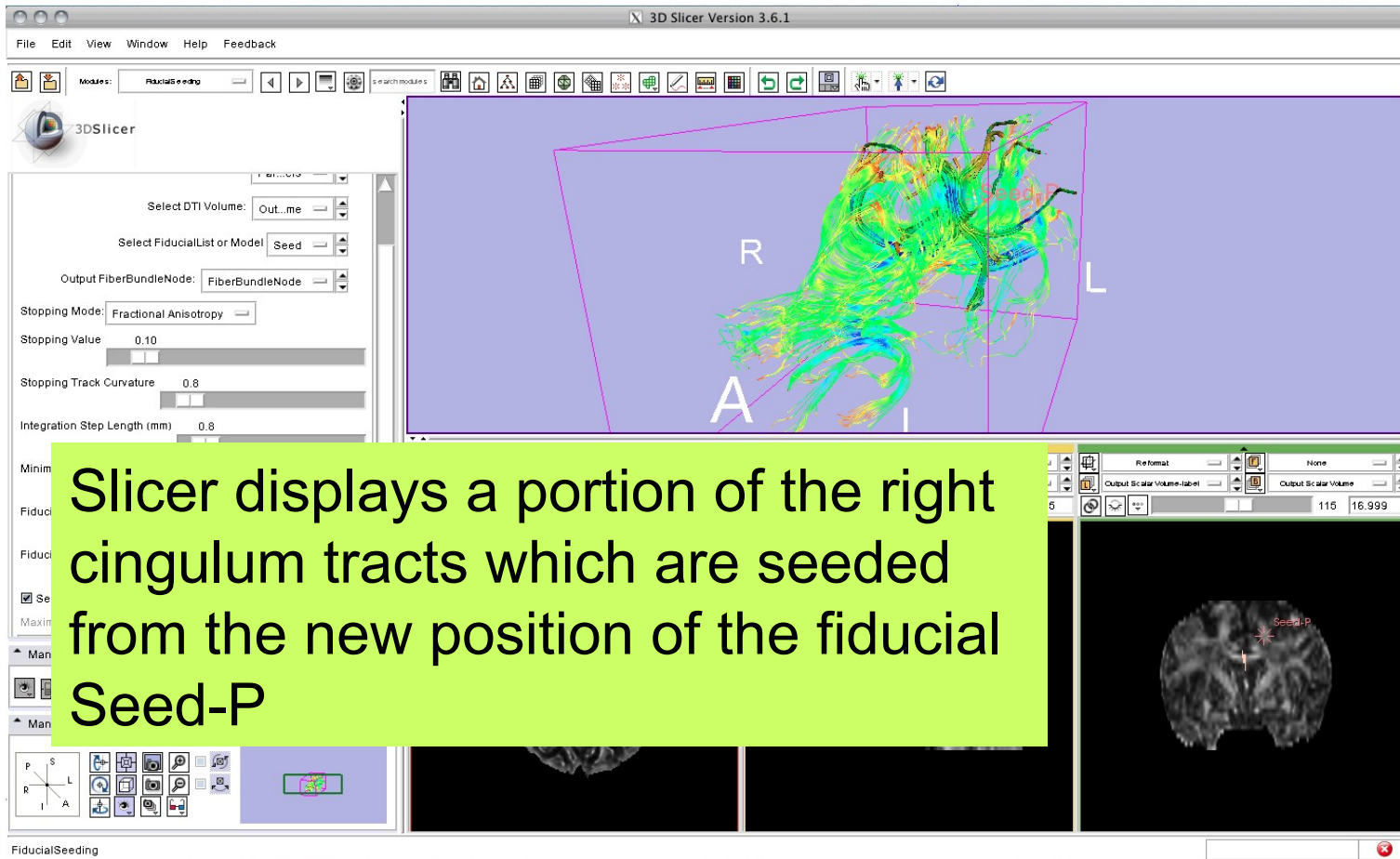
Bg I: 400 Bg: Output Scalar Volume
Bg J: -42.1 None
Bg K: 13 Lb: Output Scalar Volume-label

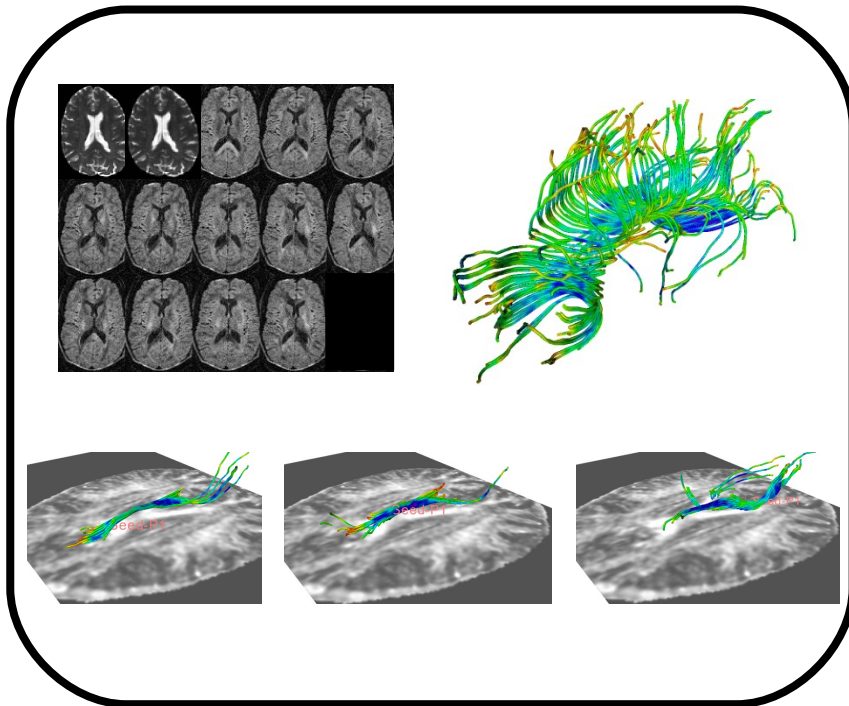
Reformat Sp: 3mm

Lb: Out of Frame R: -249.7
A: 519.1
S: 40.6



Fiducial Seeding





Part 5:

**Saving a DTI
Scene**



DTI Scene

Select the **Data** module

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

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



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

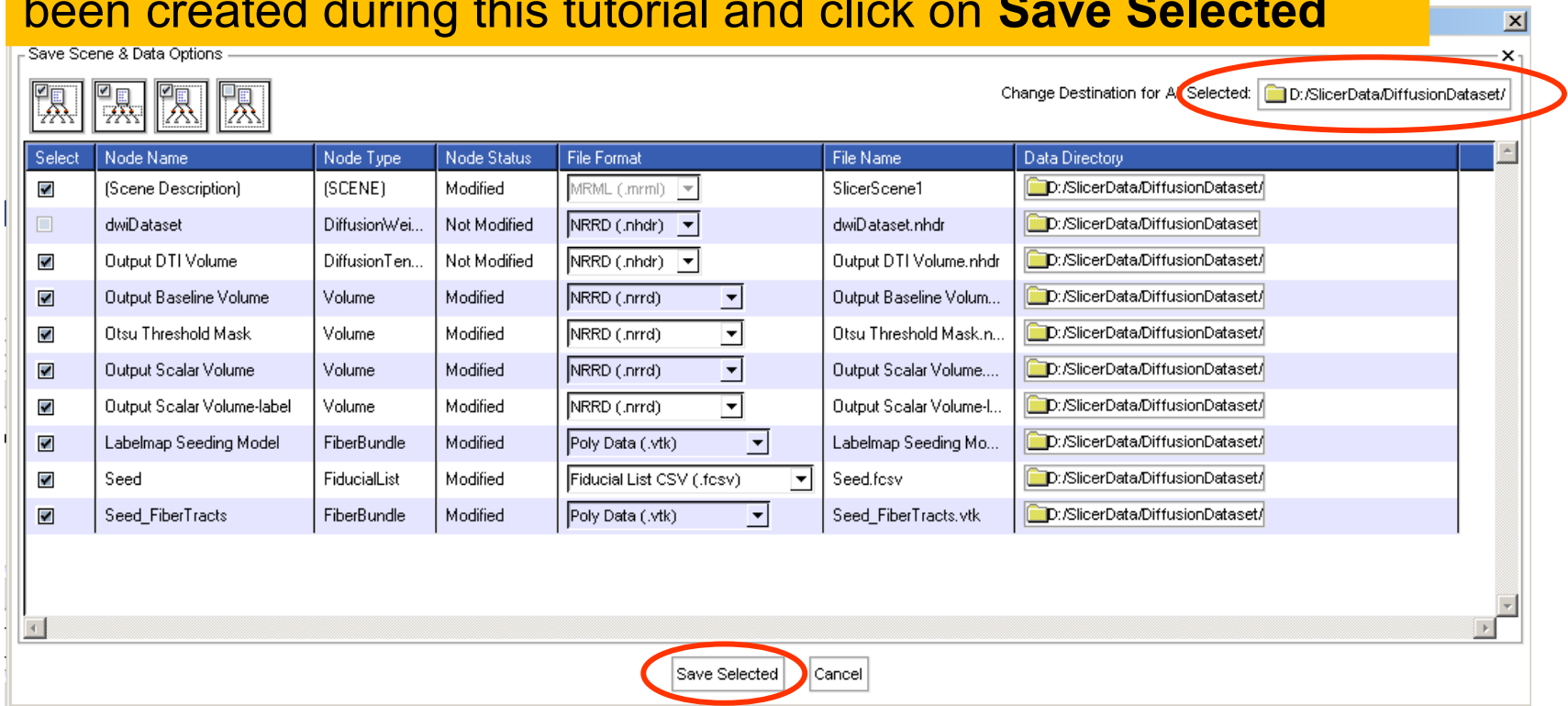
9 55.407 143 -8.2265 115 16.999

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**





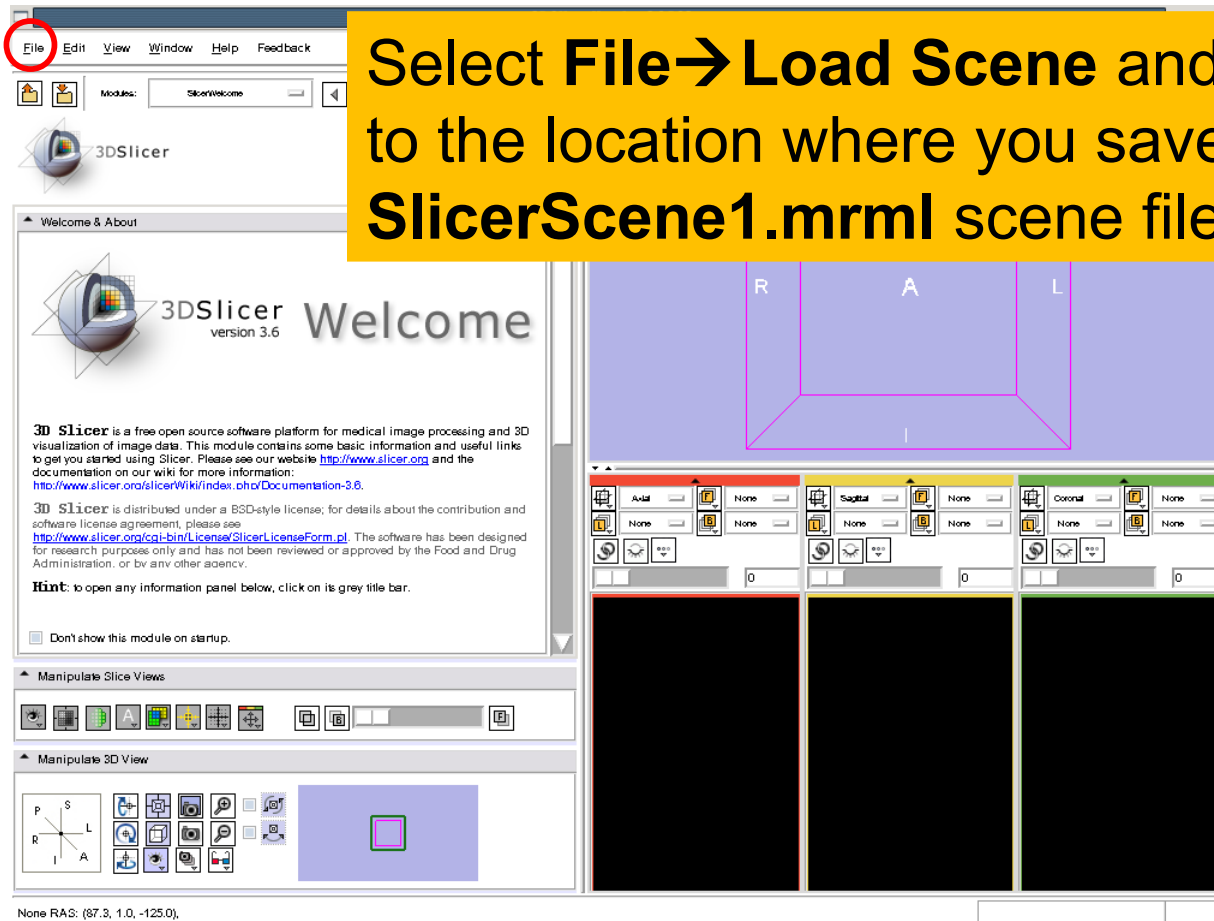
Saving a DTI Scene

Select File → Close Scene to close the current DTI Scene

The screenshot shows the 3DSlicer software interface. The 'File' menu is circled in red. The main window displays a 3D view with a purple bounding box and three slice views (Axial, Sagittal, Coronal) at the bottom. The 'Welcome & About' panel is visible on the left, containing information about 3D Slicer version 3.6 and a hint to open information panels by clicking on their grey title bars. The status bar at the bottom indicates 'None RAS: (87.3, 1.0, -125.0)'.



Loading a DTI Scene



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



Loading a DTI Scene

3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

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

3D Slicer version 3

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

3D Slicer is distributed under a BSD-style software license agreement, please see <http://www.slicer.org/ci-bin/licenses/Slicer> for research purposes only and has not been Administration, or by any other agency.

Hint: to open any information panel below

Don't show this module on startup.

Manipulate Slice Views

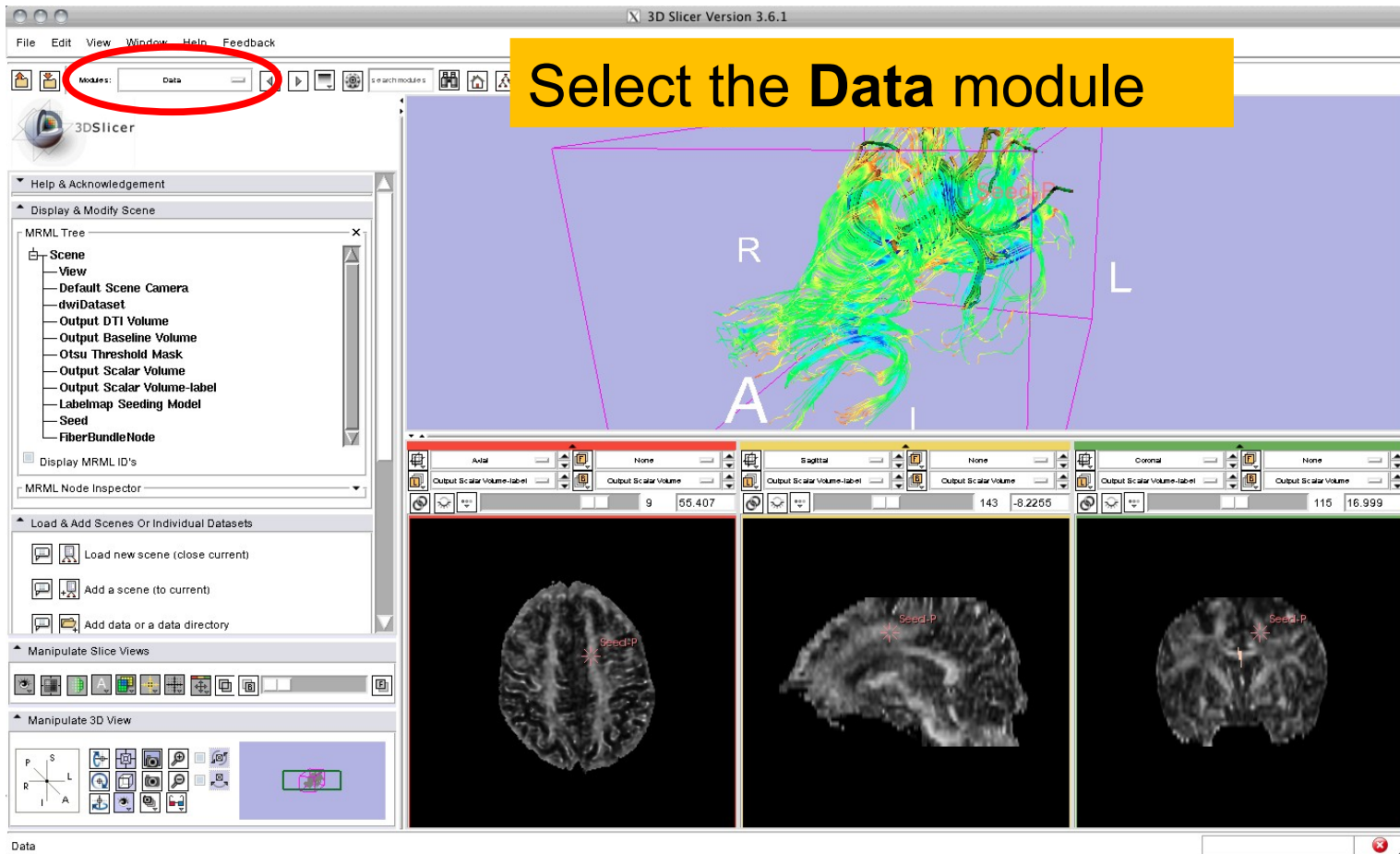
Manipulate 3D View

None RAS: (87.3, 1.0, -125.0)

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



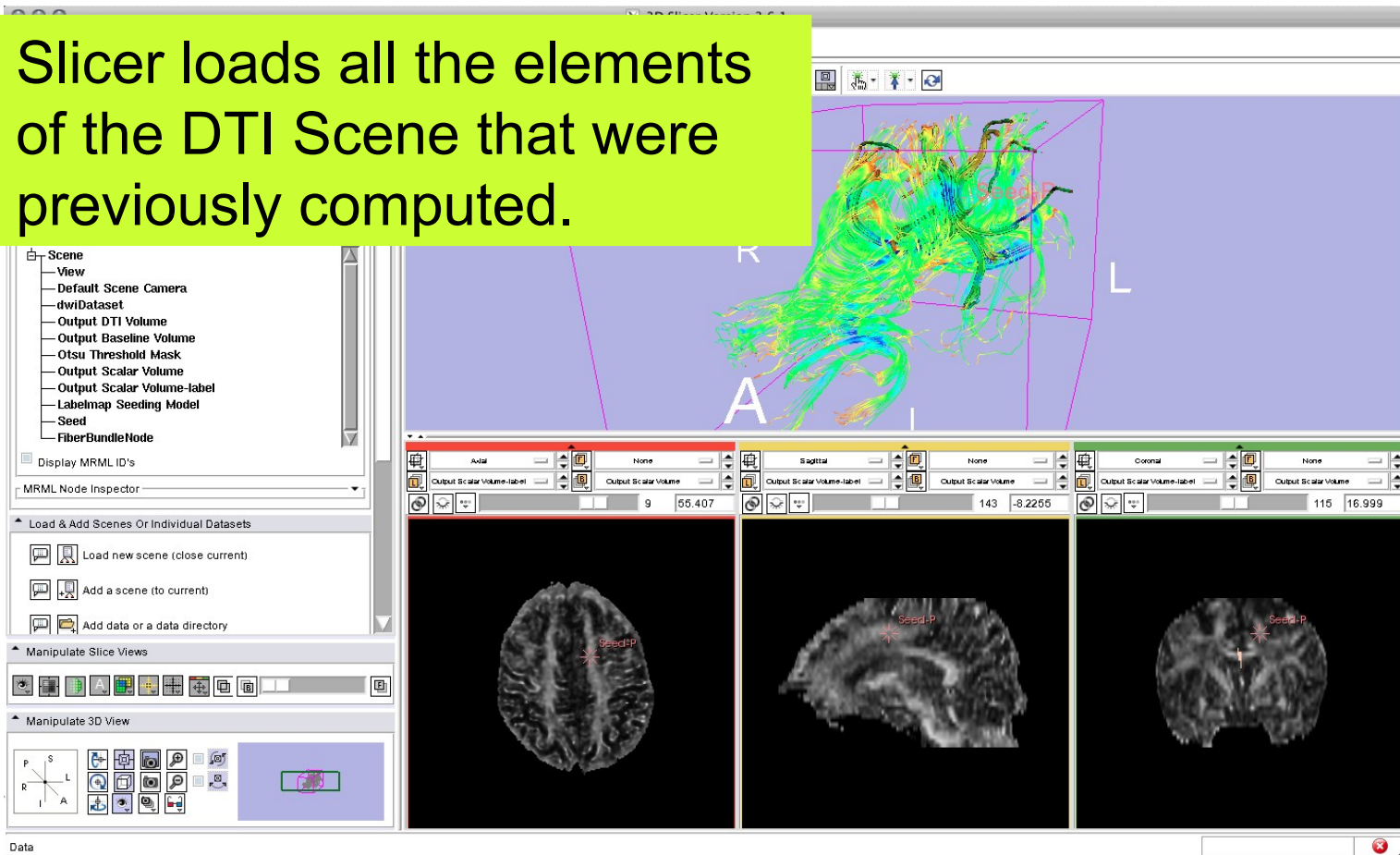
Loading a DTI Scene





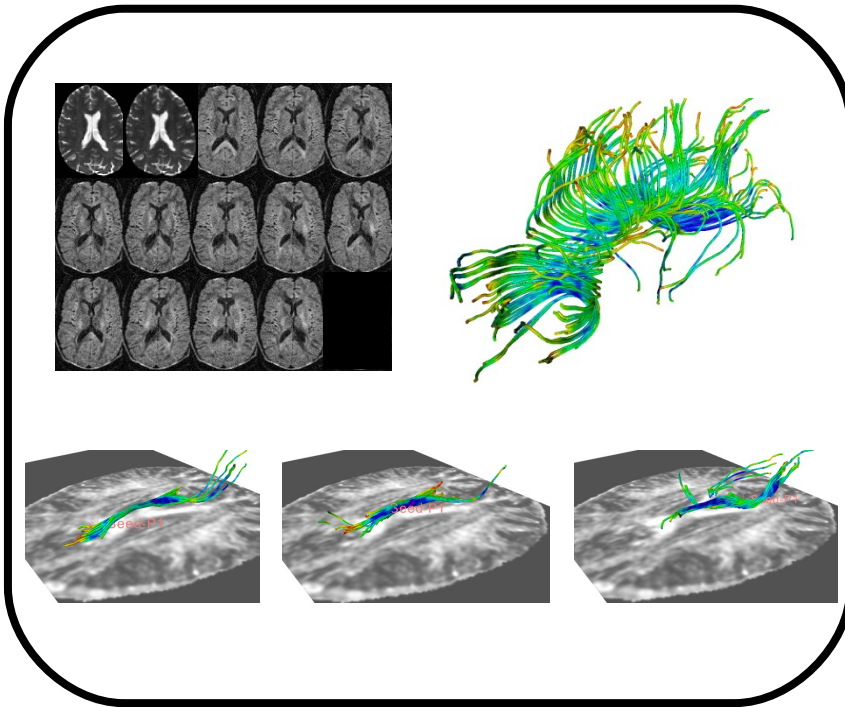
Loading a DTI Scene

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.

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