



*National Alliance for Medical Image Computing
Neuroimage Analysis Center*



*Leonardo da Vinci (1452-1519), Virgin and Child
Alte Pinakothek, München*

Data Loading & 3D Visualization

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Surgical Planning Laboratory
Harvard Medical School



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June 23–26, 2010
Geneva, Switzerland

CARS 2010

Computer Assisted Radiology and Surgery
24th International Congress and Exhibition



- An **end-user application** for image analysis
- An **open-source environment** for software development
- A software platform that is both **easy to use** for clinical researchers and **easy to extend** for programmers

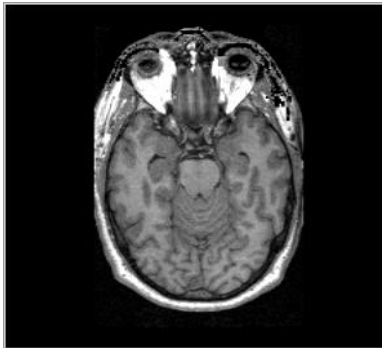


Picture courtesy Wendy Plesniak, Ph.D.

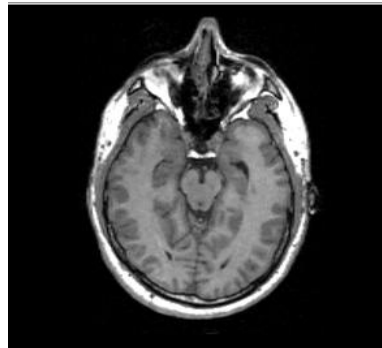
- Slicer3 is a **multi-platform** software that is developed and maintained on:
 - Windows XP
 - Linux x86_64
 - Linux x86
 - Mac OSX – Darwin x86-Intel

Download the training dataset

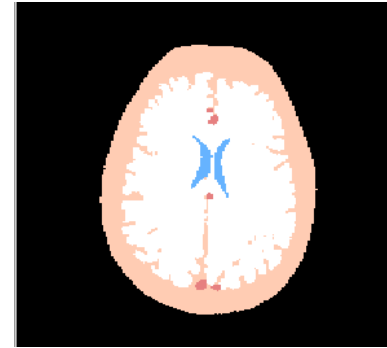
- This course is built upon three datasets of a single healthy subject brain:



MR DICOM
GRASS



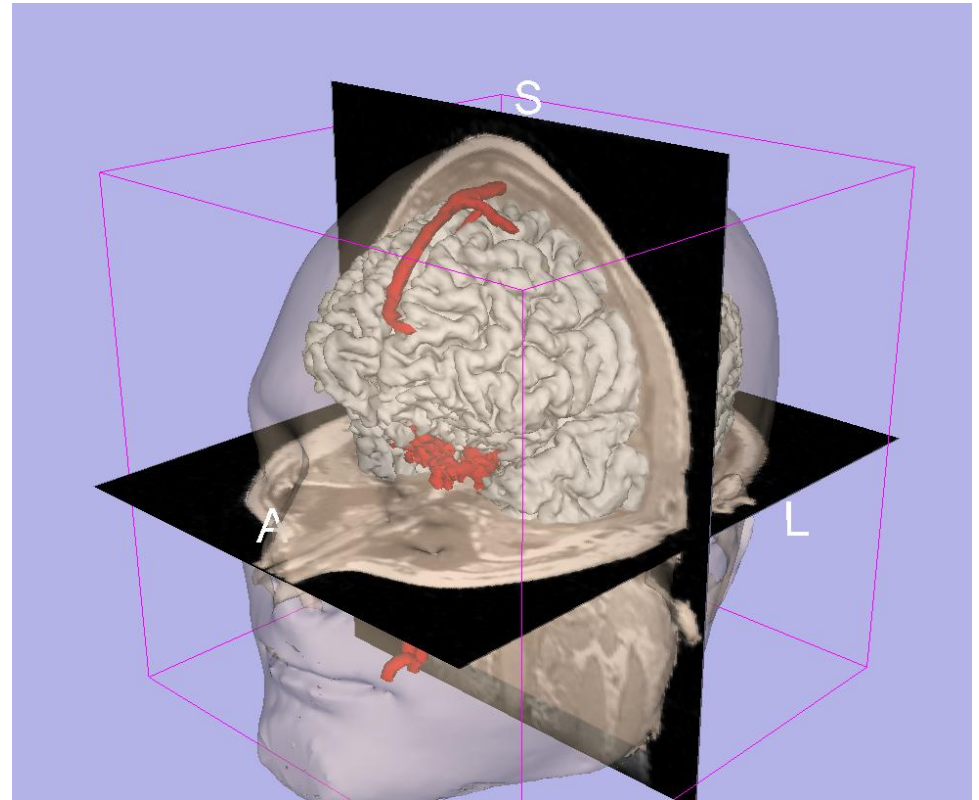
MR Nrrd
SPGR



Pre-computed
Label Map

Learning objective

Following this tutorial, you'll be able to **load and visualize volumes** within Slicer3, and to **interact in 3D** with structural images and models.



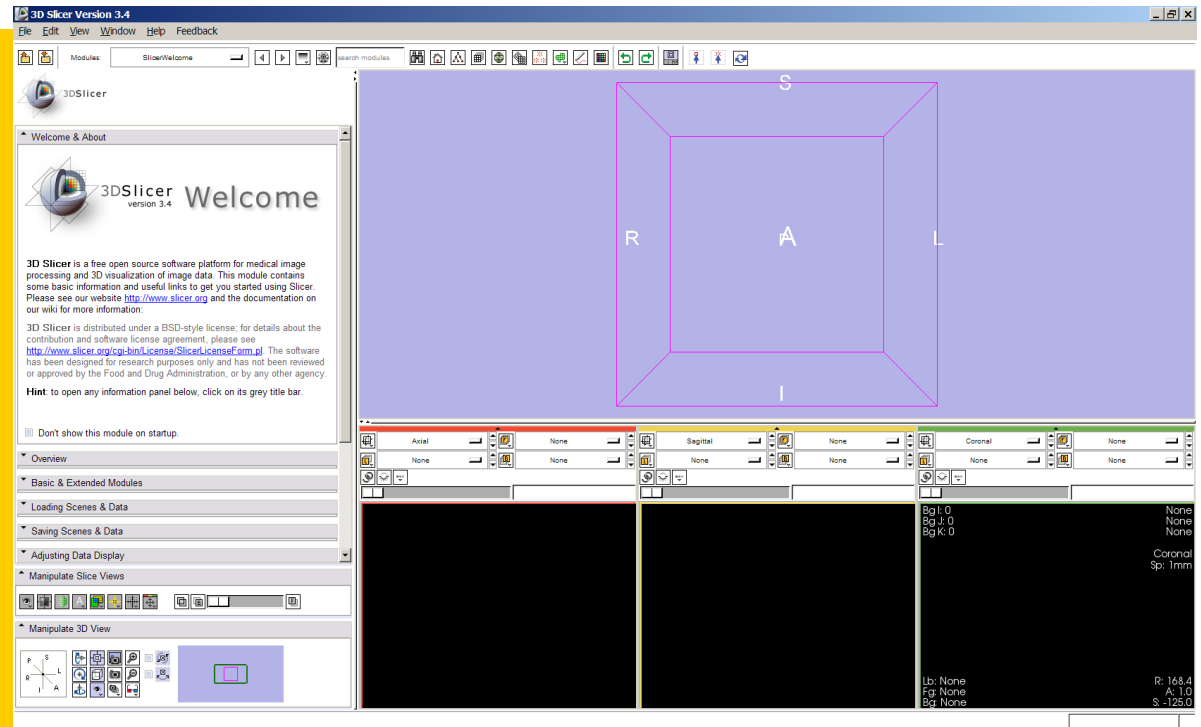
Linux/Mac users
Launch the Slicer3
executable located in
the Slicer3.4 directory

Windows users

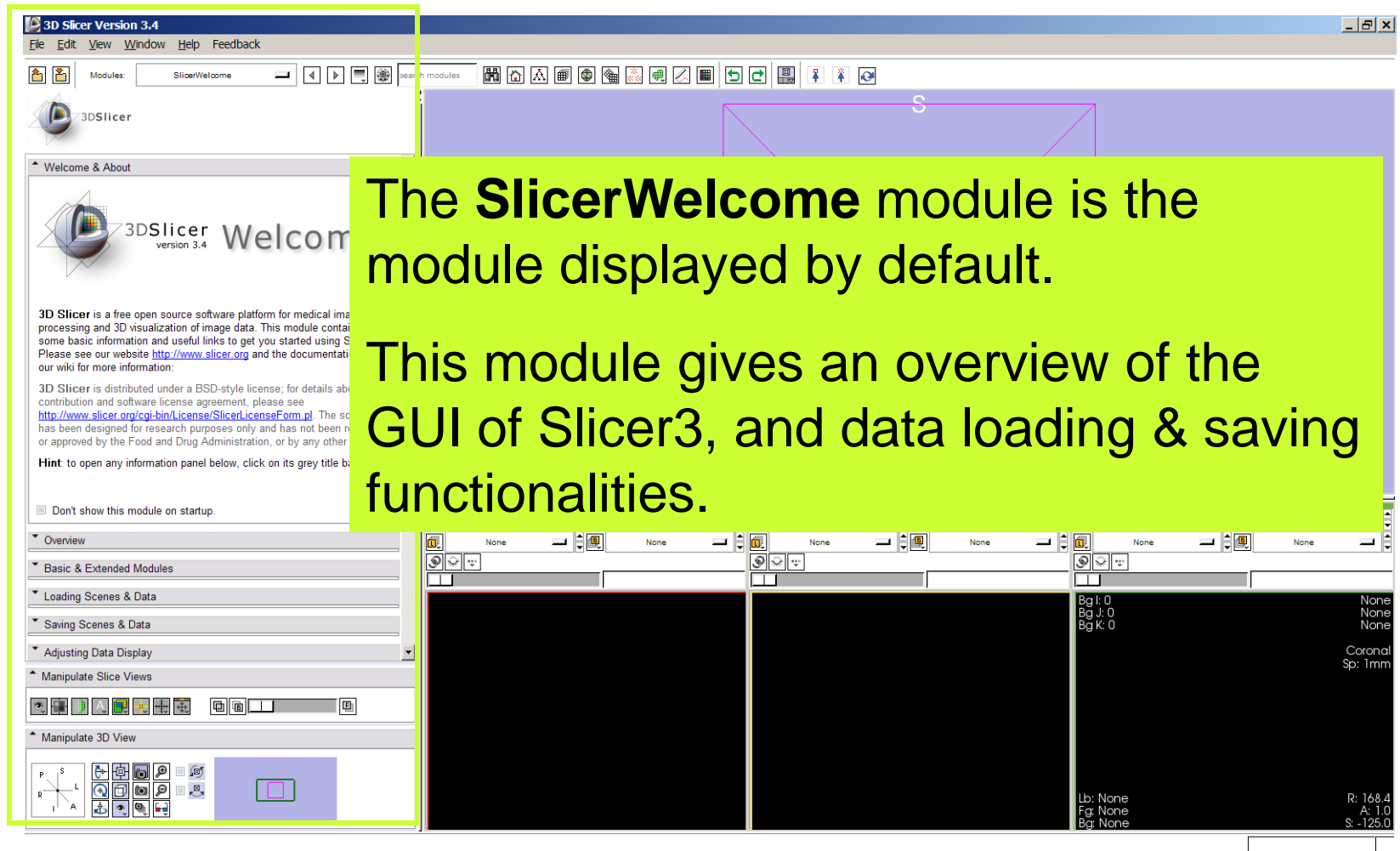
Select

Start → All Programs

→ Slicer3 3.4 2009-05-21 → 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.

3D Slicer Version 3.4
File Edit View Window Help Feedback

Modules: SlicerWelcome

Welcome & About

3DSlicer version 3.4 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:

3D Slicer is distributed under a BSD-style license; for details about 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 regulatory 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
- Saving Scenes & Data
- Adjusting Data Display
- Manipulate Slice Views
- Manipulate 3D View

None None None None None

Bg I: 0
Bg J: 0
Bg K: 0

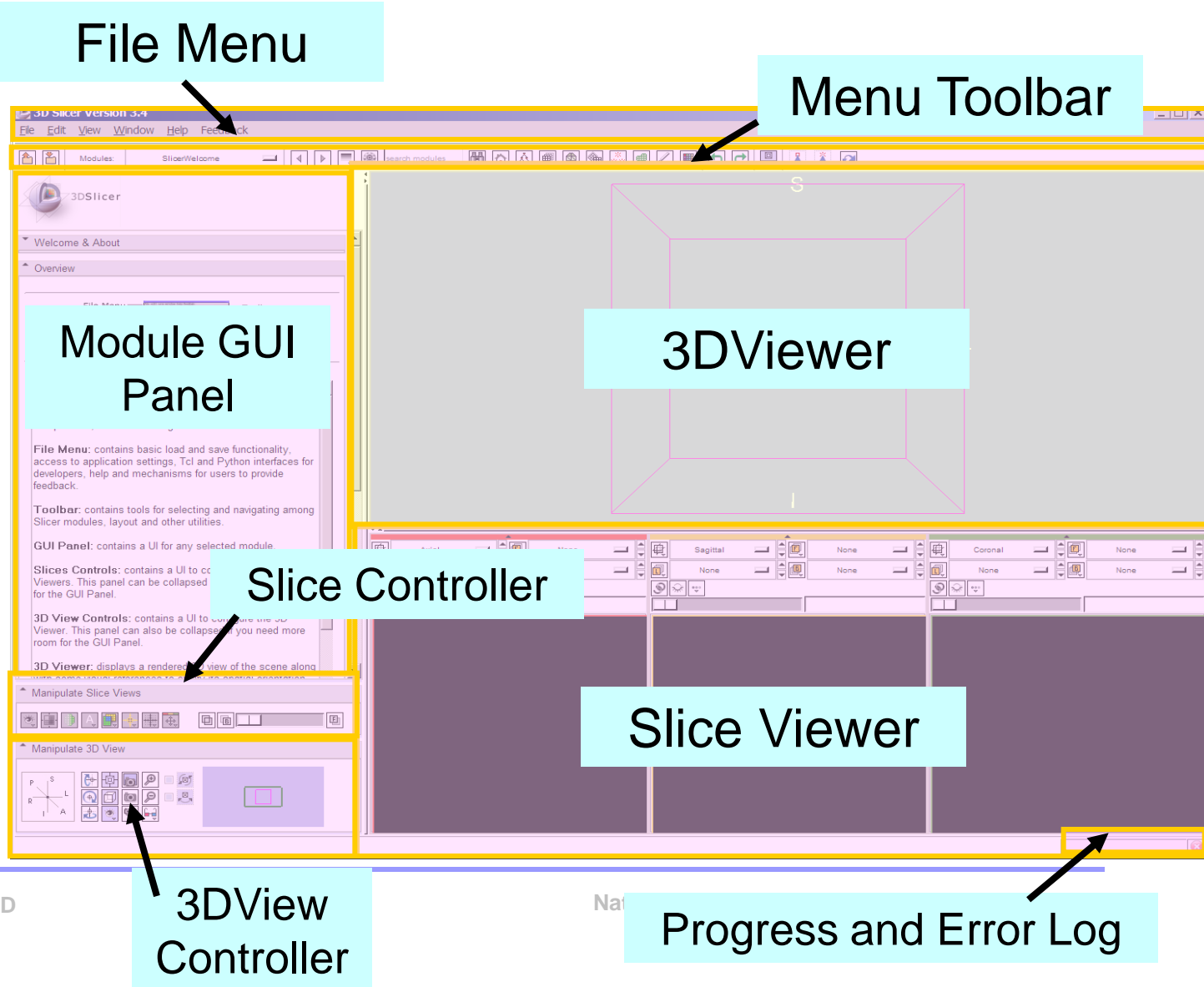
Coronal
Sp: Imm

Lb: None
Fg: None
Bg: None

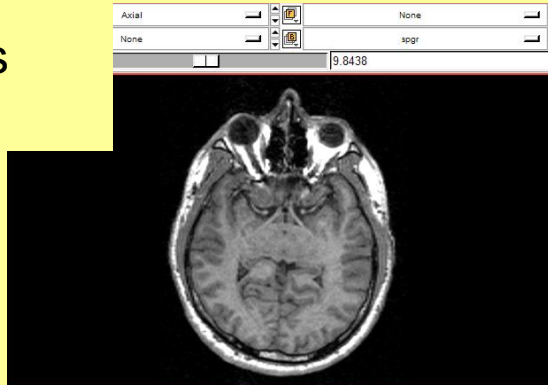
R: 168.4
A: 11.0
S: -125.0

The Graphical User Interface (GUI) of Slicer3.4 integrates 8 main components:

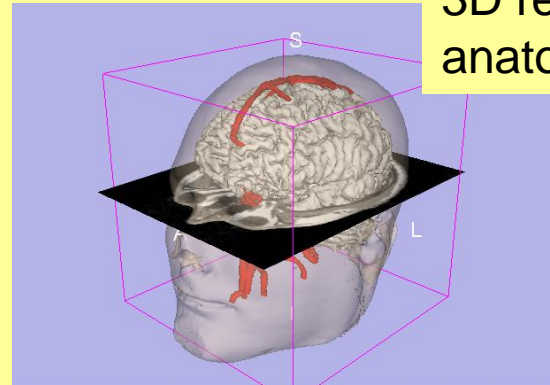
- the File Menu
- the Menu Toolbar
- the Module GUI Panel
- the 3D Viewer
- the Slice Viewer
- the Slice Controller
- the 3D View Controller



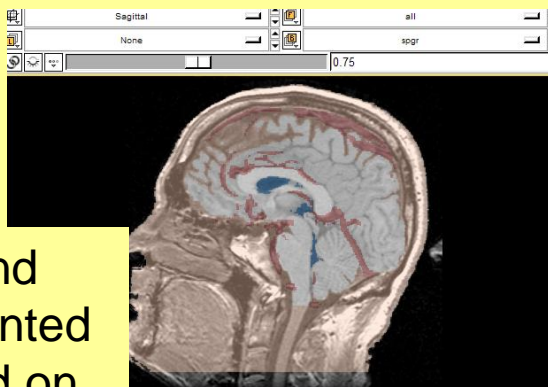
Part 1. Loading and visualizing multiple volumes simultaneously



Part 3. Visualizing 3D reconstructions of anatomical surfaces



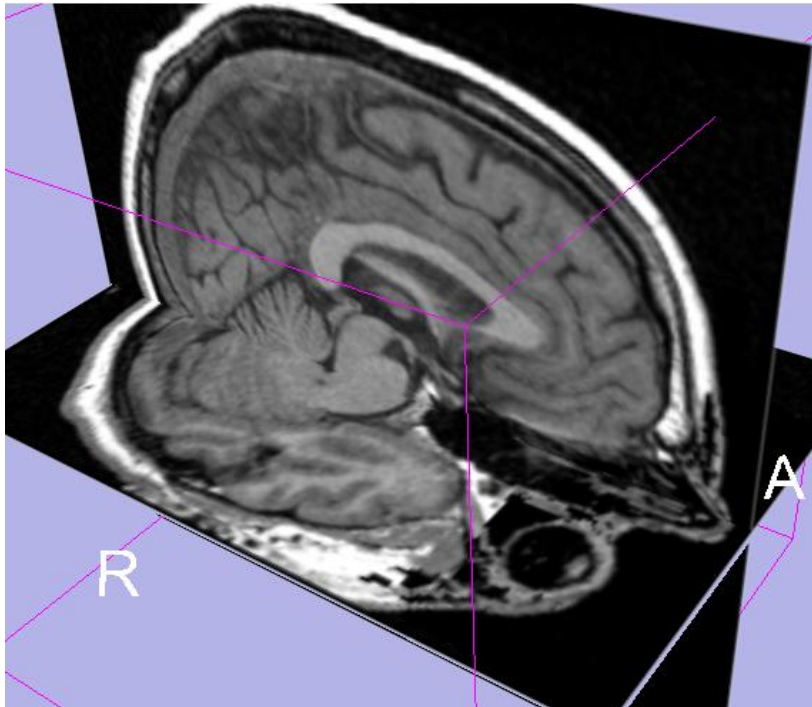
Part 2. Loading and visualizing segmented structures overlaid on grayscale images



Part 4. The lightbox viewer

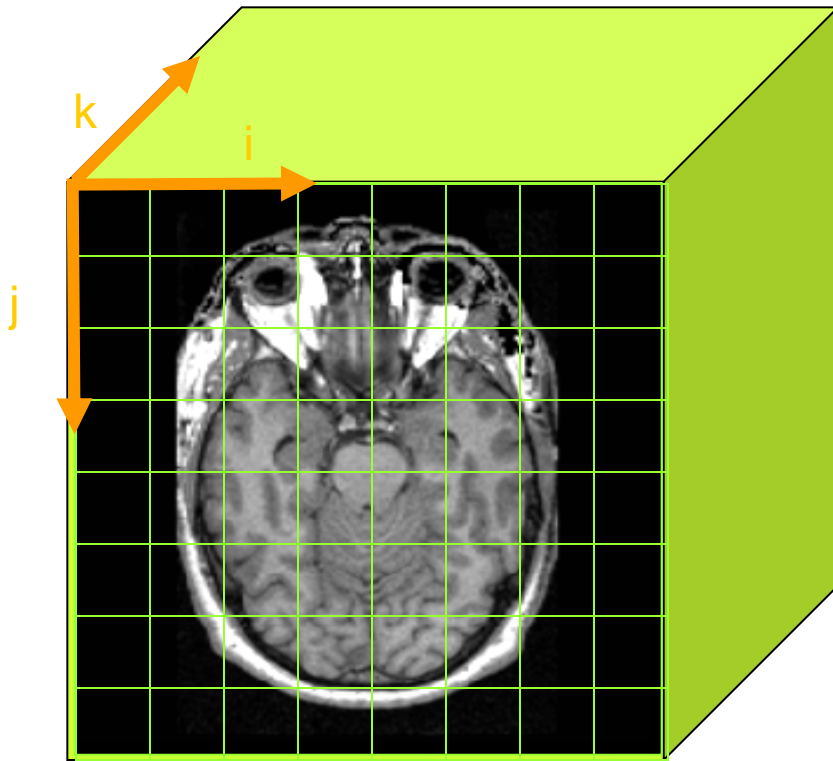


Part 5. Saving data



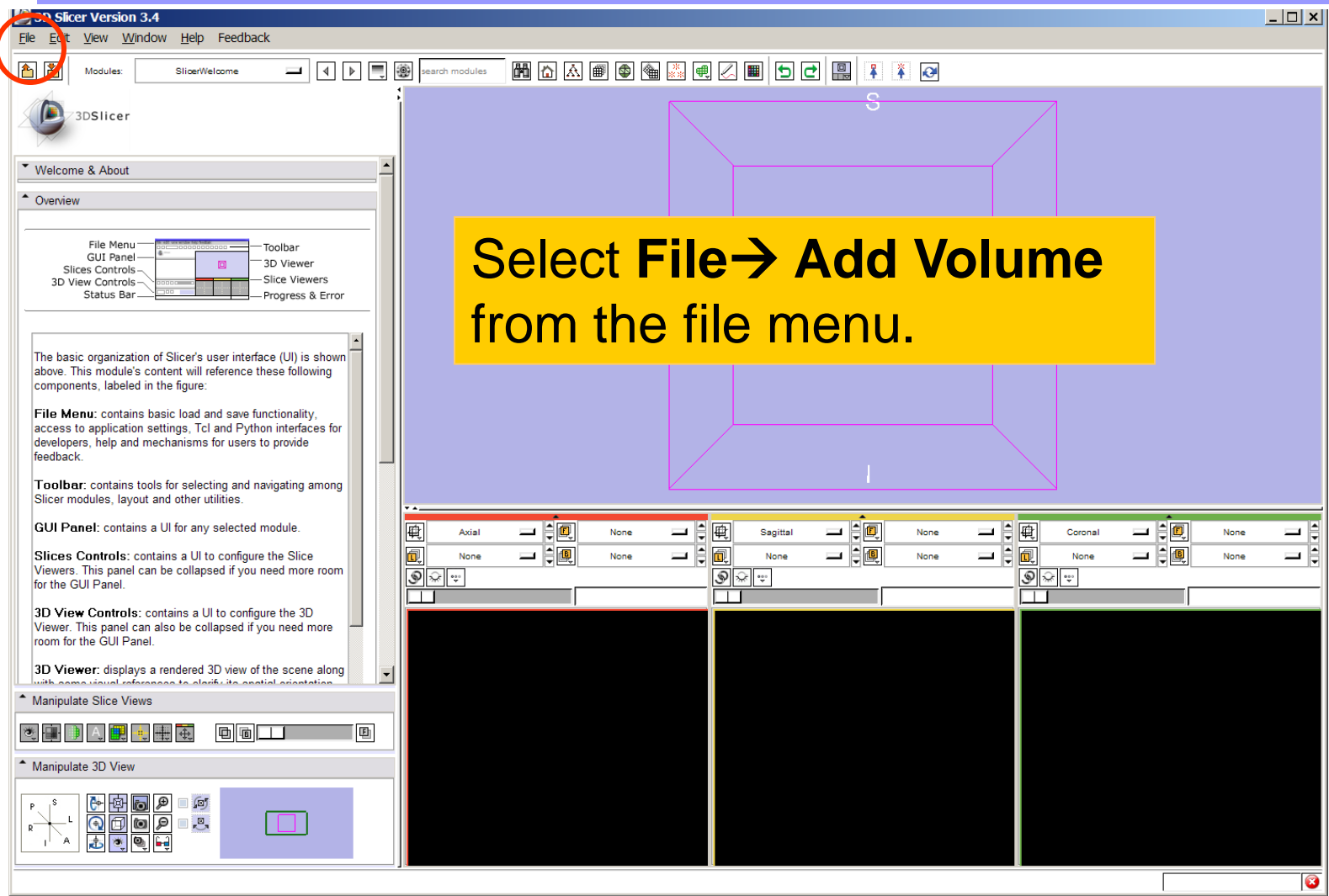
Part 1: Loading and visualizing multiple volumes simultaneously

Data Representation



- The result of a volumetric acquisition is a **3D volume of data** related to the patient.
- The 3D raster dataset is sampled on a discrete grid with elements called **voxels** which contain the **signal intensity**.

Loading Volumes



3DSlicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

Overview

File Menu
GUI Panel
Slices Controls
3D View Controls
Status Bar

Toolbar
3D Viewer
Slice Viewers
Progress & Error

The basic organization of Slicer's user interface (UI) is shown above. This module's content will reference these following components, labeled in the figure:

File Menu: contains basic load and save functionality, access to application settings, Tcl and Python interfaces for developers, help and mechanisms for users to provide feedback.

Toolbar: contains tools for selecting and navigating among Slicer modules, layout and other utilities.

GUI Panel: contains a UI for any selected module.

Slices Controls: contains a UI to configure the Slice Viewers. This panel can be collapsed if you need more room for the GUI Panel.

3D View Controls: contains a UI to configure the 3D Viewer. This panel can also be collapsed if you need more room for the GUI Panel.

3D Viewer: displays a rendered 3D view of the scene along with some visual references to clarify its spatial orientation.

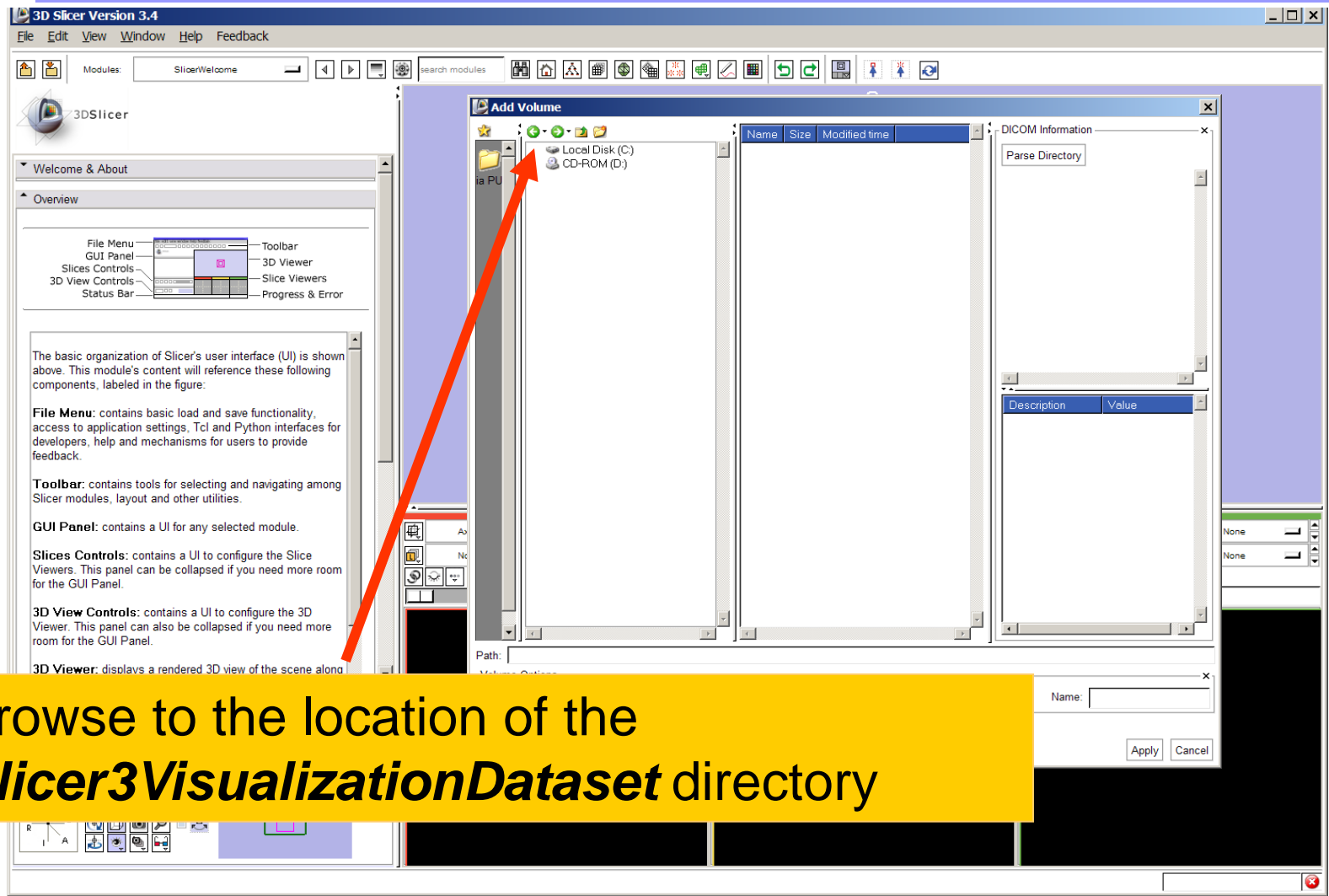
Manipulate Slice Views

Manipulate 3D View

Axial None Sagittal None Coronal None
 None None None None None None

Select File → Add Volume from the file menu.

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

Overview

File Menu GUI Panel Slices Controls 3D View Controls Status Bar

Toolbar 3D Viewer Slice Viewers Progress & Error

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3D View Controls: contains a UI to configure the 3D Viewer. This panel can also be collapsed if you need more room for the GUI Panel.

3D Viewer: displays a rendered 3D view of the scene along

Add Volume

Name	Size	Modified time
Local Disk (C:)		
CD-ROM (D:)		

DICOM Information

Parse Directory

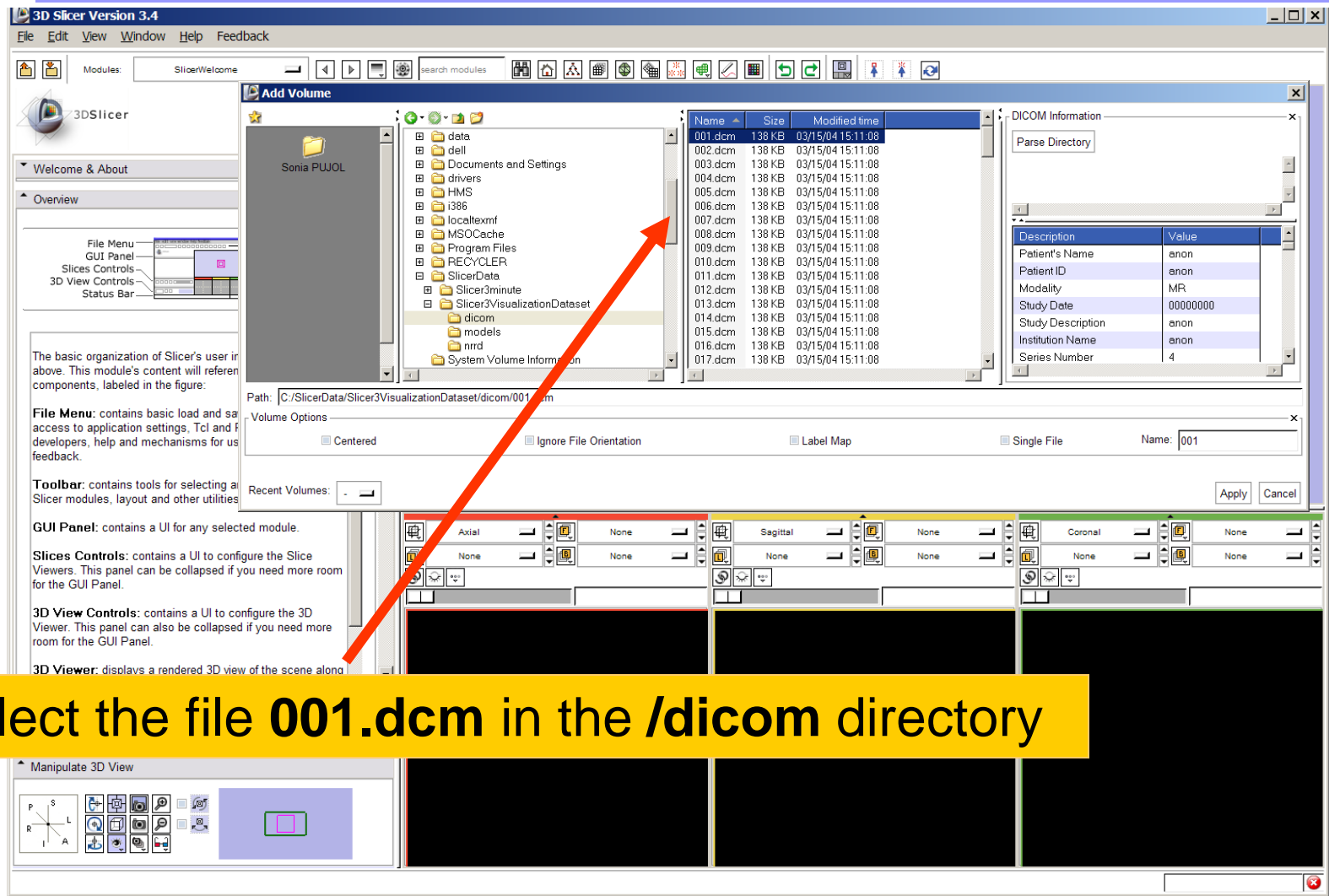
Description	Value
None	
None	

Name:

Apply Cancel

Browse to the location of the *Slicer3VisualizationDataset* directory

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

Overview

File Menu
GUI Panel
Slices Controls
3D View Controls
Status Bar

The basic organization of Slicer's user interface is shown above. This module's content will refer to the components, labeled in the figure:

File Menu: contains basic load and save operations, access to application settings, Tcl and Python console, help and mechanisms for user feedback.

Toolbar: contains tools for selecting and adding Slicer modules, layout and other utilities.

GUI Panel: contains a UI for any selected module.

Slices Controls: contains a UI to configure the Slice Viewers. This panel can be collapsed if you need more room for the GUI Panel.

3D View Controls: contains a UI to configure the 3D Viewers. This panel can also be collapsed if you need more room for the GUI Panel.

3D Viewer: displays a rendered 3D view of the scene along with the slice views.

Add Volume

Name	Size	Modified time
001.dcm	138 KB	03/15/04 15:11:08
002.dcm	138 KB	03/15/04 15:11:08
003.dcm	138 KB	03/15/04 15:11:08
004.dcm	138 KB	03/15/04 15:11:08
005.dcm	138 KB	03/15/04 15:11:08
006.dcm	138 KB	03/15/04 15:11:08
007.dcm	138 KB	03/15/04 15:11:08
008.dcm	138 KB	03/15/04 15:11:08
009.dcm	138 KB	03/15/04 15:11:08
010.dcm	138 KB	03/15/04 15:11:08
011.dcm	138 KB	03/15/04 15:11:08
012.dcm	138 KB	03/15/04 15:11:08
013.dcm	138 KB	03/15/04 15:11:08
014.dcm	138 KB	03/15/04 15:11:08
015.dcm	138 KB	03/15/04 15:11:08
016.dcm	138 KB	03/15/04 15:11:08
017.dcm	138 KB	03/15/04 15:11:08

DICOM Information

Parse Directory

Description	Value
Patient's Name	anon
PatientID	anon
Modality	MFR
Study Date	00000000
Study Description	anon
Institution Name	anon
Series Number	4

Path: C:/SlicerData/Slicer3VisualizationDataset/dicom/001.dcm

Volume Options

Centered Ignore File Orientation Label Map Single File Name: 001

Recent Volumes: -

Apply Cancel

Axial Sagittal Coronal

None None None

None None None

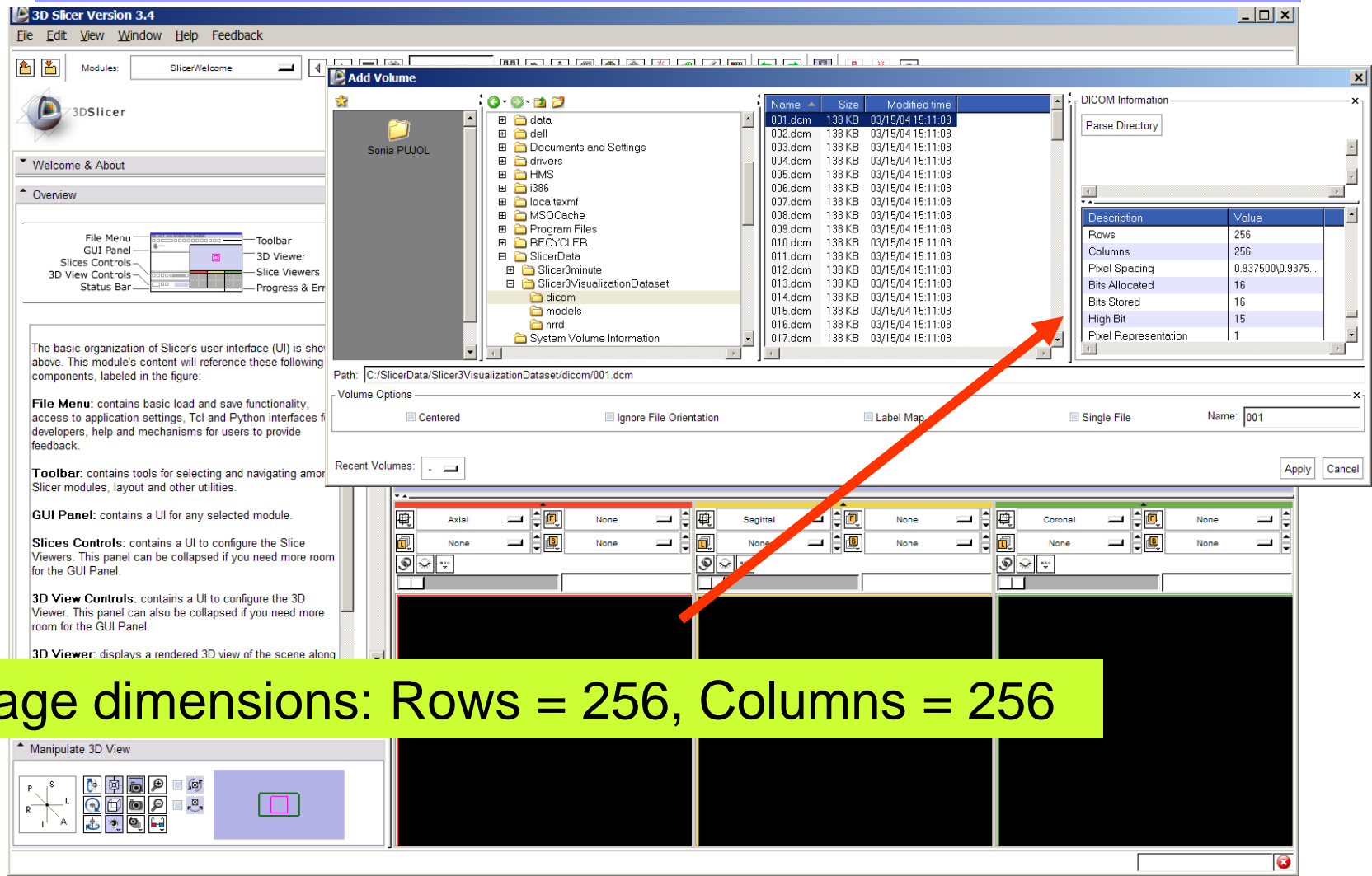
None None None

None None None

Manipulate 3D View

Select the file **001.dcm** in the **/dicom** directory

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

Overview

File Menu GUI Panel Slices Controls 3D View Controls Status Bar

Toolbar 3D Viewer Slice Viewers Progress & Err

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Toolbar: contains tools for selecting and navigating among Slicer modules, layout and other utilities.

GUI Panel: contains a UI for any selected module.

Slices Controls: contains a UI to configure the Slice Viewers. This panel can be collapsed if you need more room for the GUI Panel.

3D View Controls: contains a UI to configure the 3D Viewer. This panel can also be collapsed if you need more room for the GUI Panel.

3D Viewer: displays a rendered 3D view of the scene along

Add Volume

Name	Size	Modified time
001.dcm	138 KB	03/15/04 15:11:08
002.dcm	138 KB	03/15/04 15:11:08
003.dcm	138 KB	03/15/04 15:11:08
004.dcm	138 KB	03/15/04 15:11:08
005.dcm	138 KB	03/15/04 15:11:08
006.dcm	138 KB	03/15/04 15:11:08
007.dcm	138 KB	03/15/04 15:11:08
008.dcm	138 KB	03/15/04 15:11:08
009.dcm	138 KB	03/15/04 15:11:08
010.dcm	138 KB	03/15/04 15:11:08
011.dcm	138 KB	03/15/04 15:11:08
012.dcm	138 KB	03/15/04 15:11:08
013.dcm	138 KB	03/15/04 15:11:08
014.dcm	138 KB	03/15/04 15:11:08
015.dcm	138 KB	03/15/04 15:11:08
016.dcm	138 KB	03/15/04 15:11:08
017.dcm	138 KB	03/15/04 15:11:08

DICOM Information

Parse Directory

Description	Value
Rows	256
Columns	256
Pixel Spacing	0.937500,0.9375...
Bits Allocated	16
Bits Stored	16
High Bit	15
Pixel Representation	1

Path: C:/SlicerData/Slicer3VisualizationDataset/dicom/001.dcm

Volume Options

Centered Ignore File Orientation Label Map Single File Name: 001

Recent Volumes: -

Apply Cancel

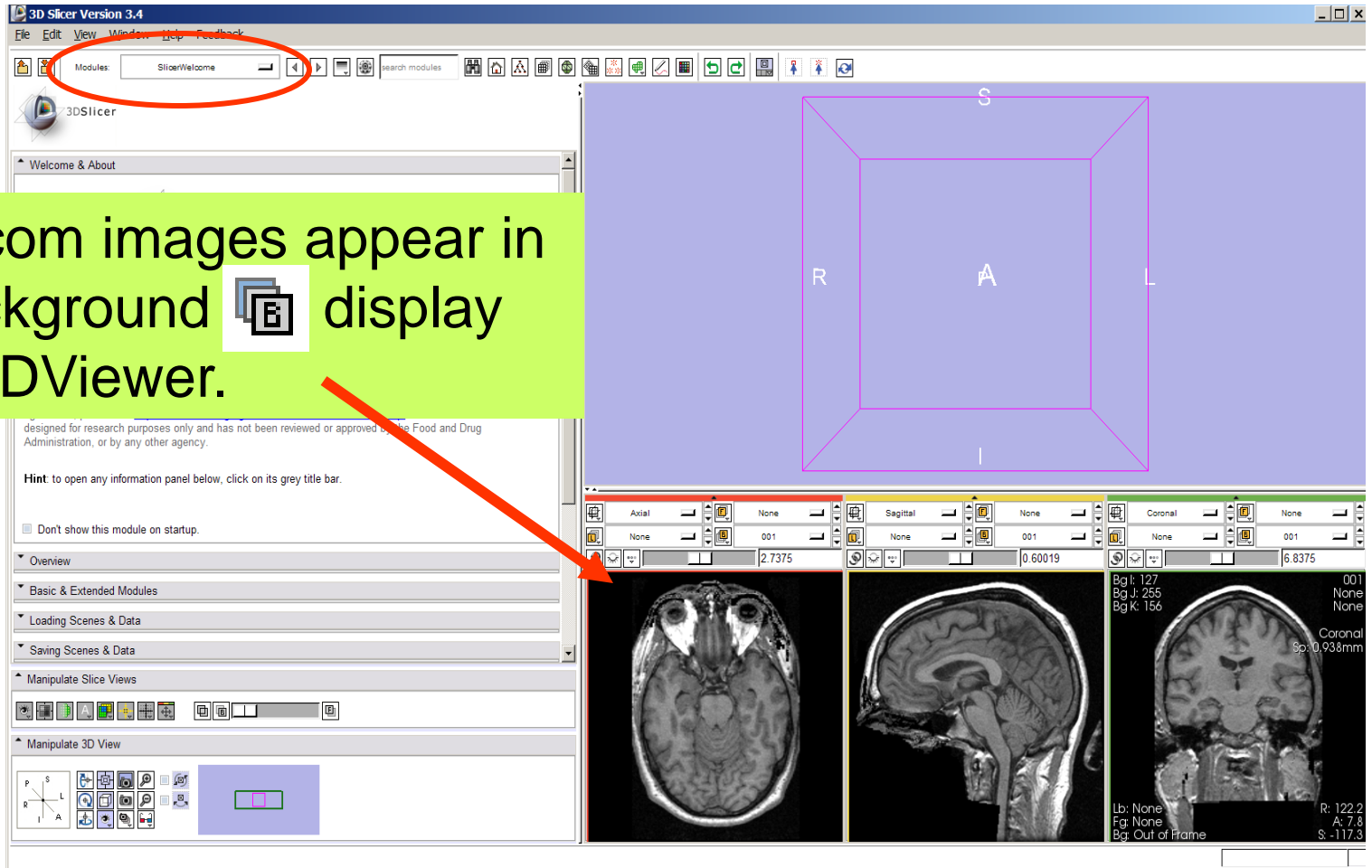
Axial Sagittal Coronal


None None None

Manipulate 3D View

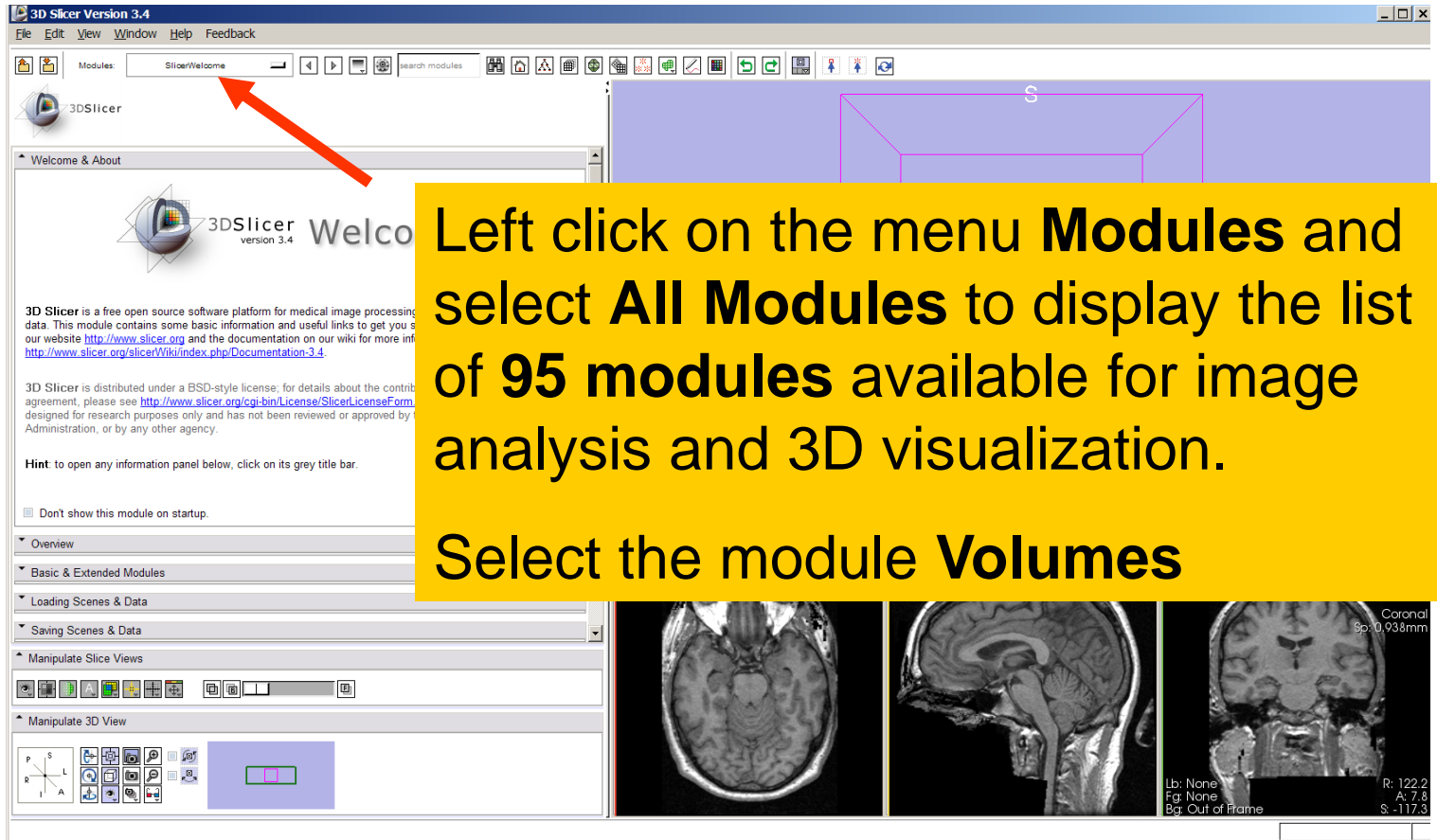
Image dimensions: Rows = 256, Columns = 256

Loading Volumes



The Dicom images appear in the Background  display of the 2DViewer.

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

3DSlicer version 3.4 Welco

3D Slicer is a free open source software platform for medical image processing and visualization of medical image data. This module contains some basic information and useful links to get you started. For more information, visit our website <http://www.slicer.org> and the documentation on our wiki for more information <http://www.slicer.org/slicerWiki/index.php/Documentation-3.4>.

3D Slicer is distributed under a BSD-style license; for details about the contribution license agreement, please see <http://www.slicer.org/cgi-bin/License/Slicer-licenseForm>. This software is designed for research purposes only and has not been reviewed or approved by the FDA, the 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

Saving Scenes & Data

Manipulate Slice Views

Manipulate 3D View

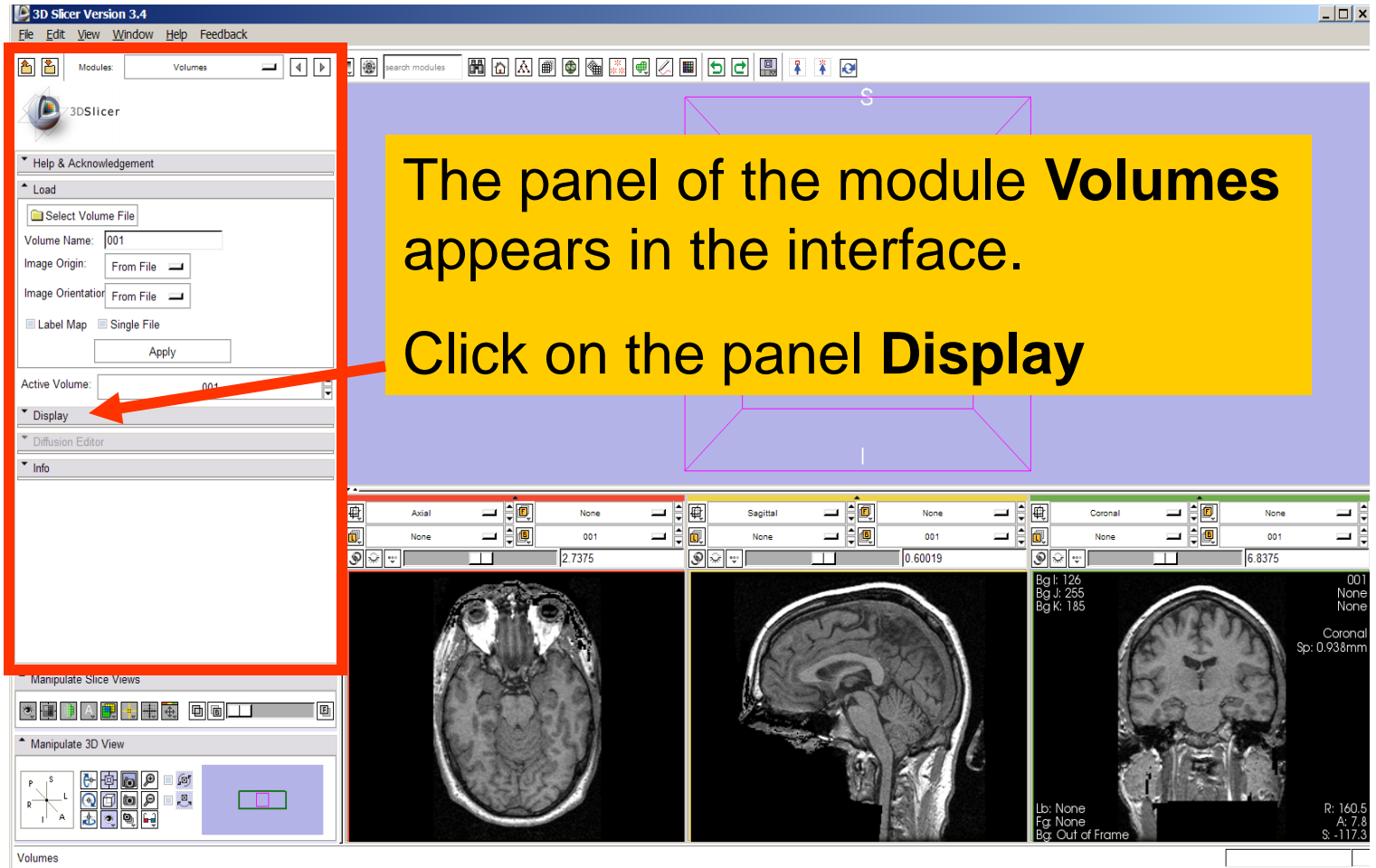
Coronal Sp: 0.93mm

Lb: None R: 122.2
Fg: None A: 7.8
Bg: Out of Frame S: -117.3

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 Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: Volumes

3DSlicer

Help & Acknowledgement

Load

Select Volume File

Volume Name: 001

Image Origin: From File

Image Orientation: From File

Label Map Single File

Apply

Active Volume: 001

Display

Diffusion Editor

Info

Manipulate Slice Views

Manipulate 3D View

Volumes

Axial None 001 2.7375

Sagittal None 001 0.60019

Coronal None 001 6.8375

Bg I: 126
Bg J: 255
Bg K: 185

001
None
None

Coronal
Sp: 0.938mm

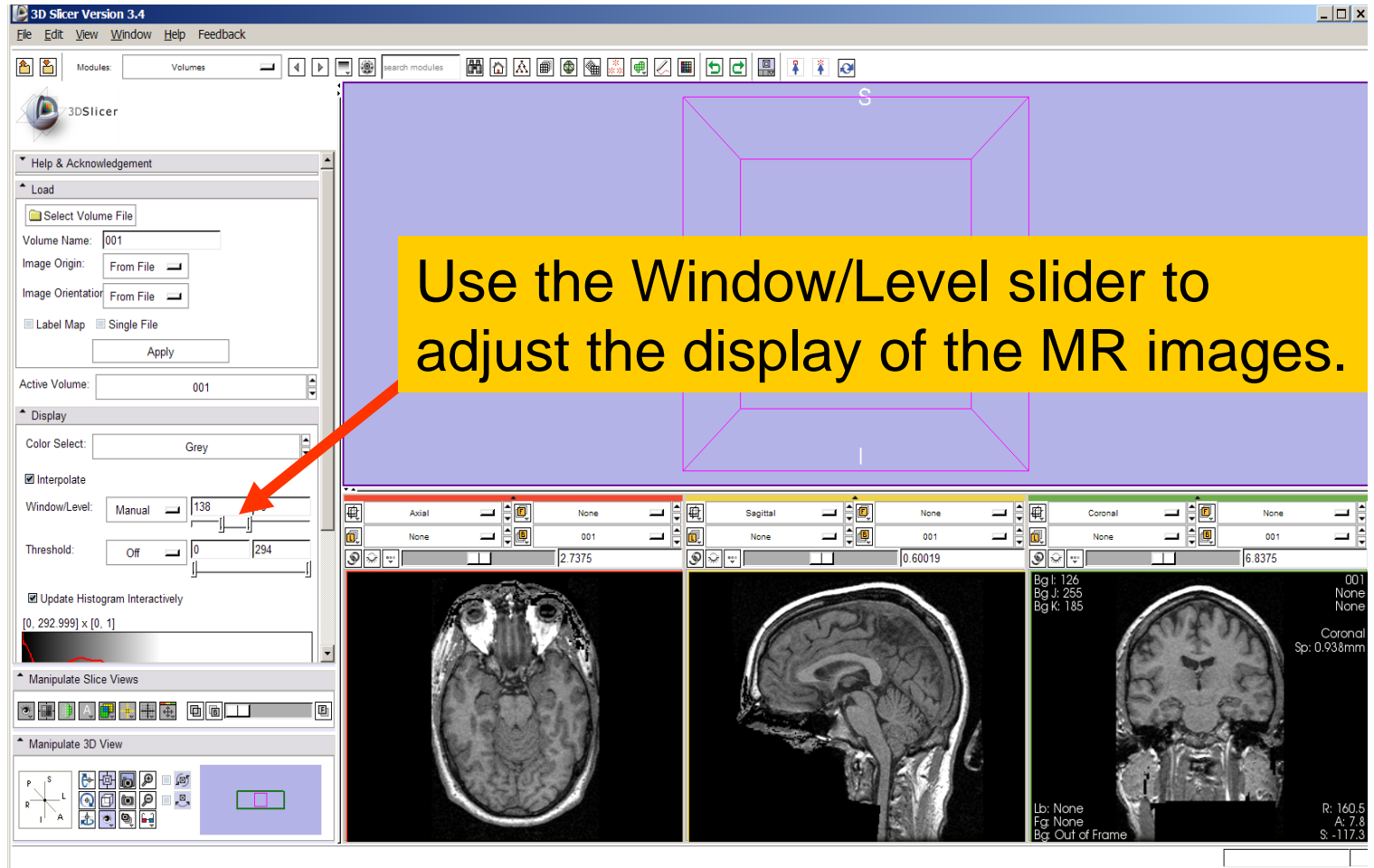
Lb: None
Fg: None
Bg: Out of Frame

R: 160.5
A: 7.8
S: -117.3

The panel of the module **Volumes** appears in the interface.

Click on the panel **Display**

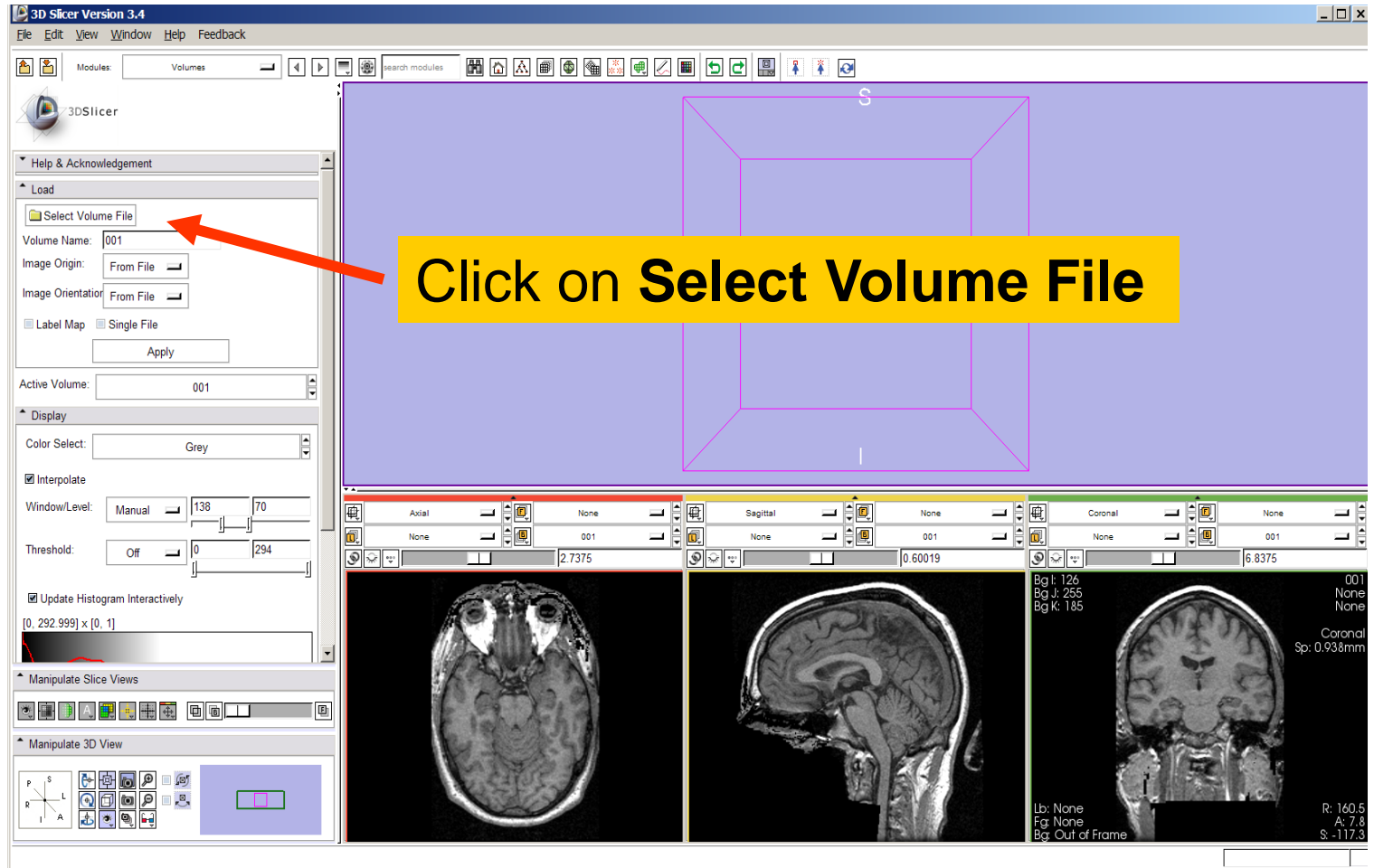
Loading Volumes



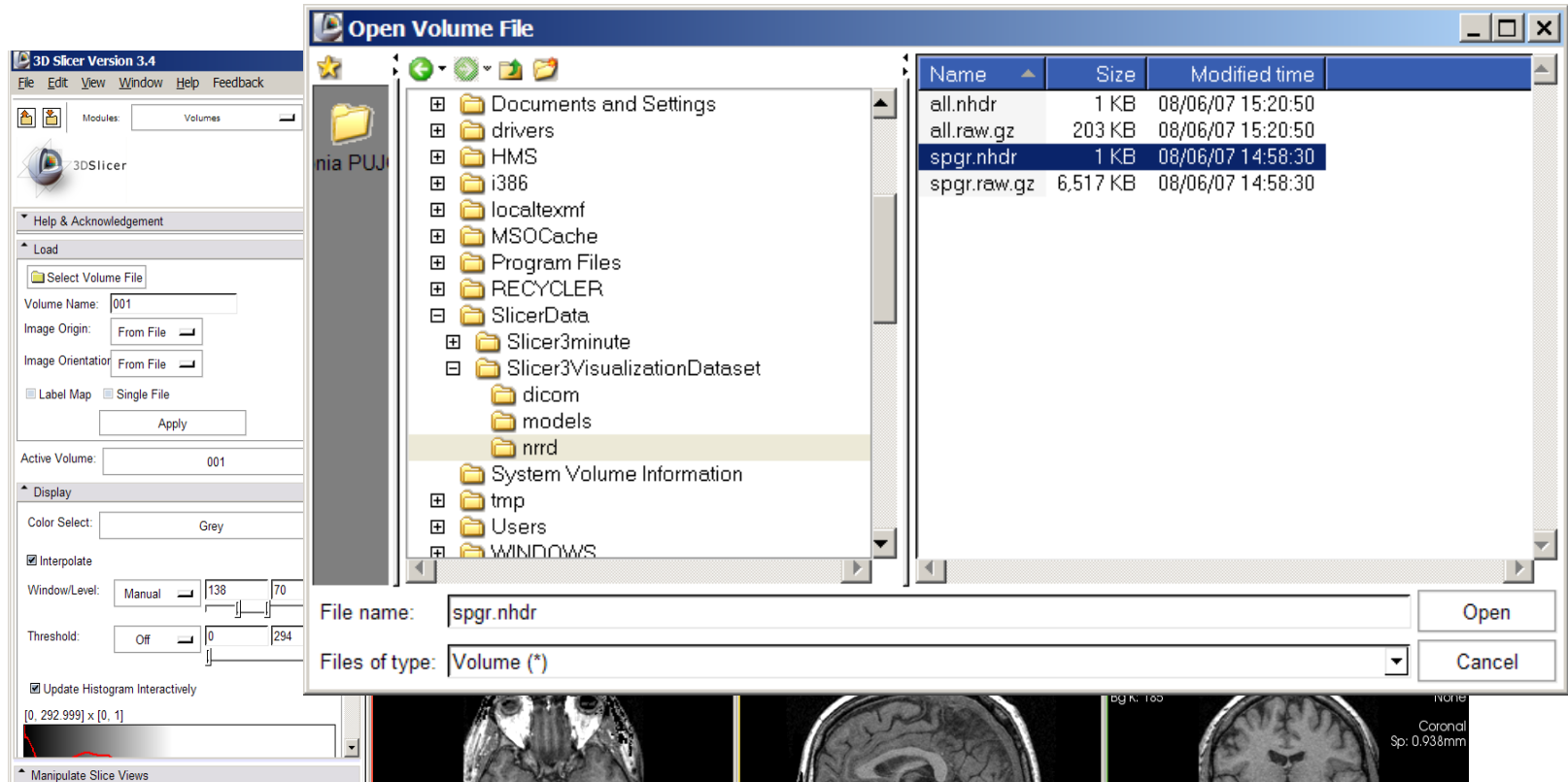
The screenshot displays the 3D Slicer 3.4 interface. On the left, the 'Load' panel is active, showing 'Volume Name: 001', 'Image Origin: From File', and 'Image Orientation: From File'. Below this, the 'Display' panel shows 'Color Select: Grey', 'Interpolate' checked, and 'Window/Level: Manual' with a slider set to 138. A red arrow points from the 'Window/Level' slider to a yellow text box. The main 3D view area is currently empty, with a purple wireframe box and a yellow text box overlaid. The bottom of the interface shows three slice views: Axial, Sagittal, and Coronal. The Axial view shows a brain slice with a window level of 2.7375. The Sagittal view shows a brain slice with a window level of 0.60019. The Coronal view shows a brain slice with a window level of 6.8375. The Coronal view also displays technical data: '001', 'None', 'None', 'None', 'Coronal Sp: 0.938mm', 'R: 160.5', 'A: 7.8', 'S: -117.3', 'Lb: None', 'Fg: None', and 'Bg: Out of Frame'.

Use the Window/Level slider to adjust the display of the MR images.

Loading Volumes

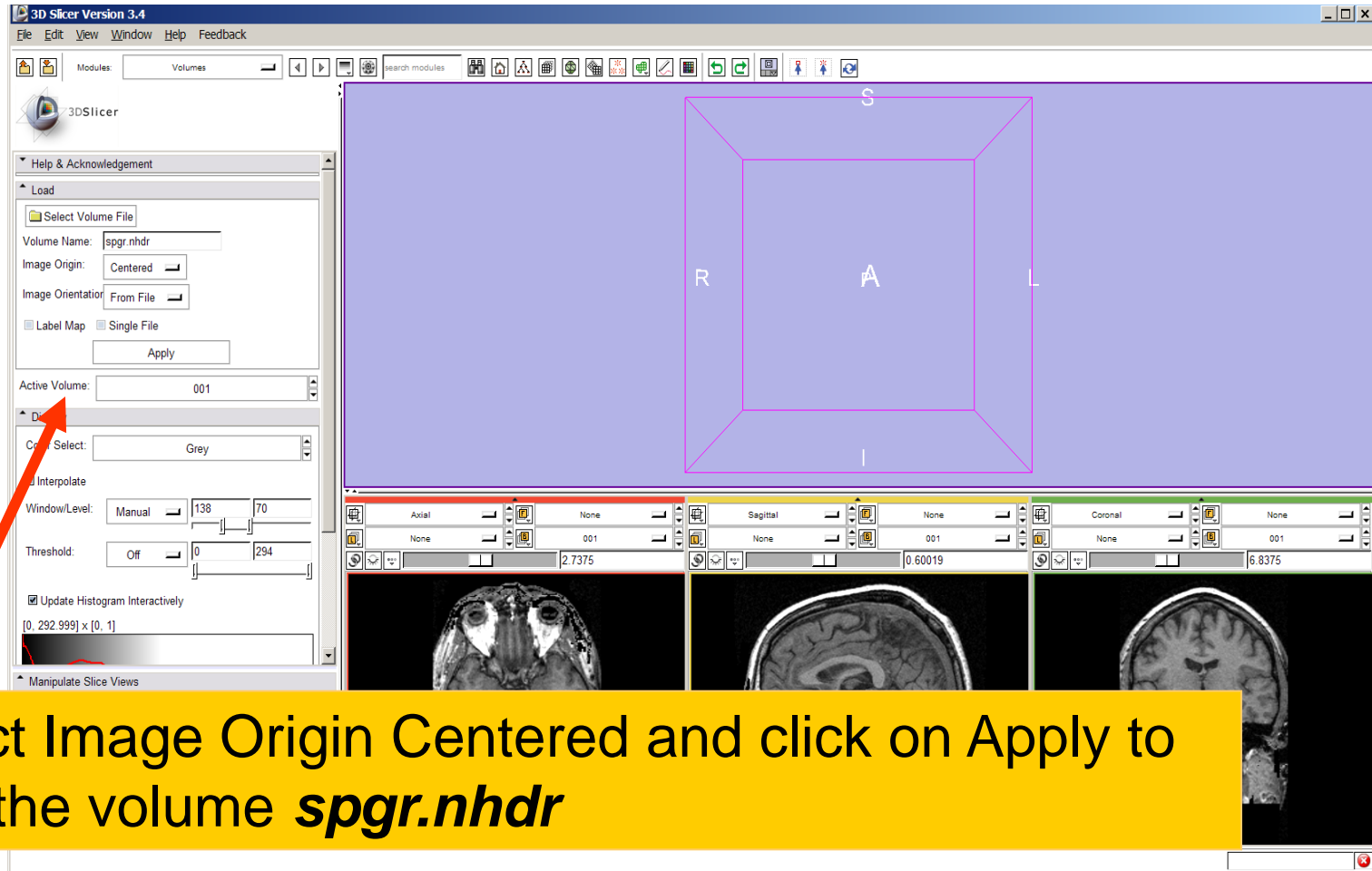


Loading Volumes



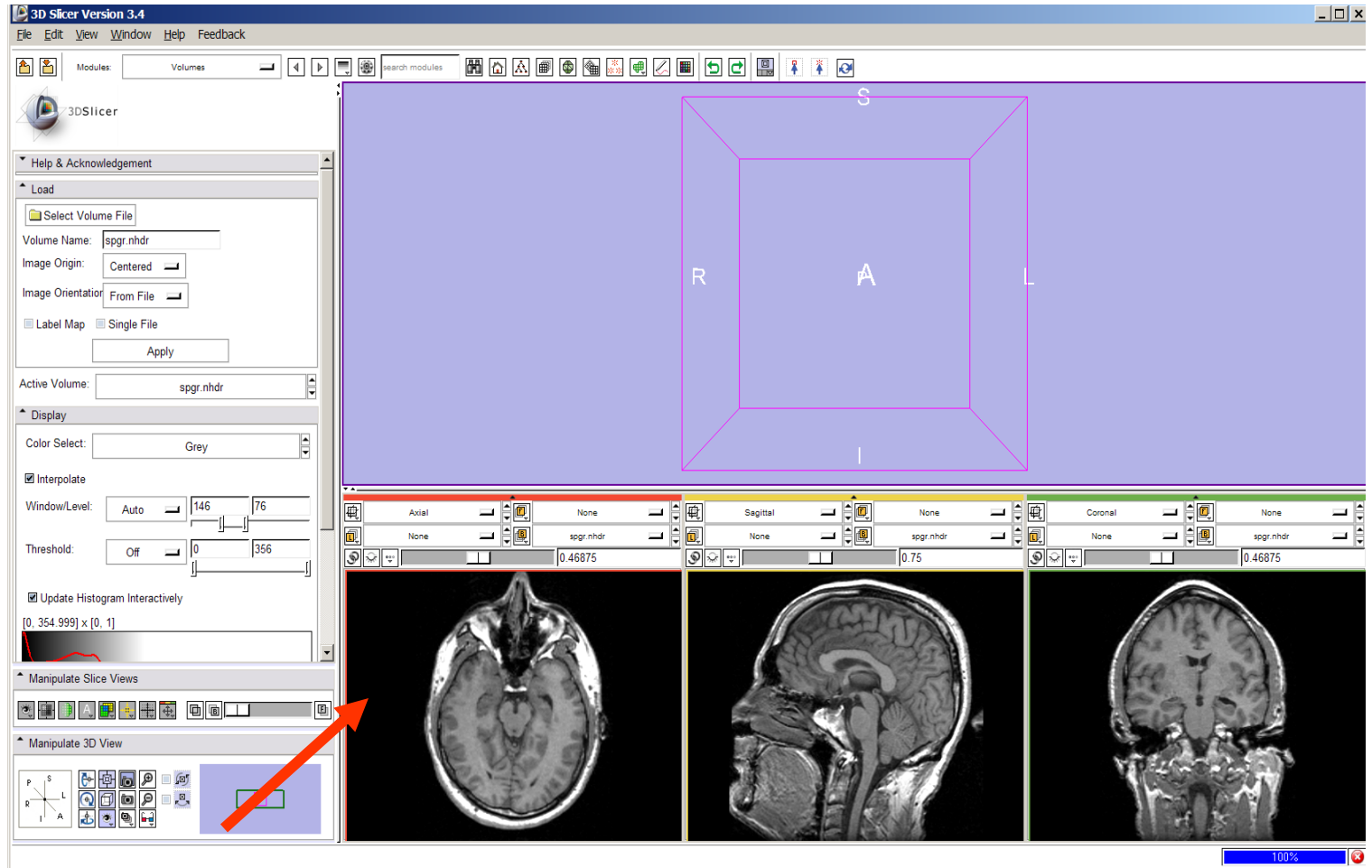
Browse to find the header file of the spgr volume *spgr.nhdr* located in the directory *Slicer3VisualizationDataset/nrrd* and click on **Open**.

Loading Volumes



Select Image Origin Centered and click on Apply to load the volume *spgr.nhdr*

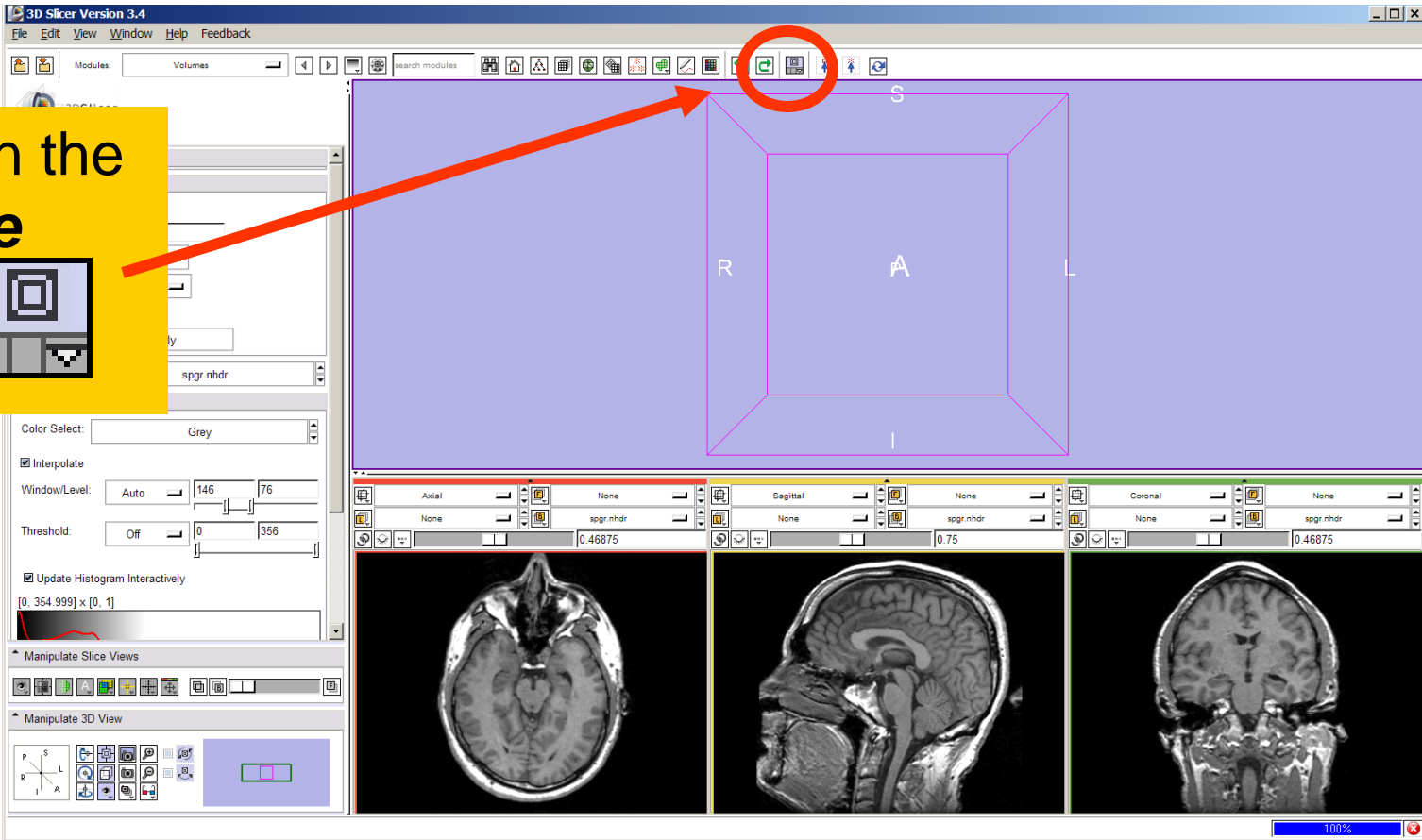
Loading Volumes



Source: The spgr volume appears in the Background display  of the 2D Viewer.

Exploring the data

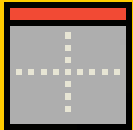
Click on the **choose view** icon



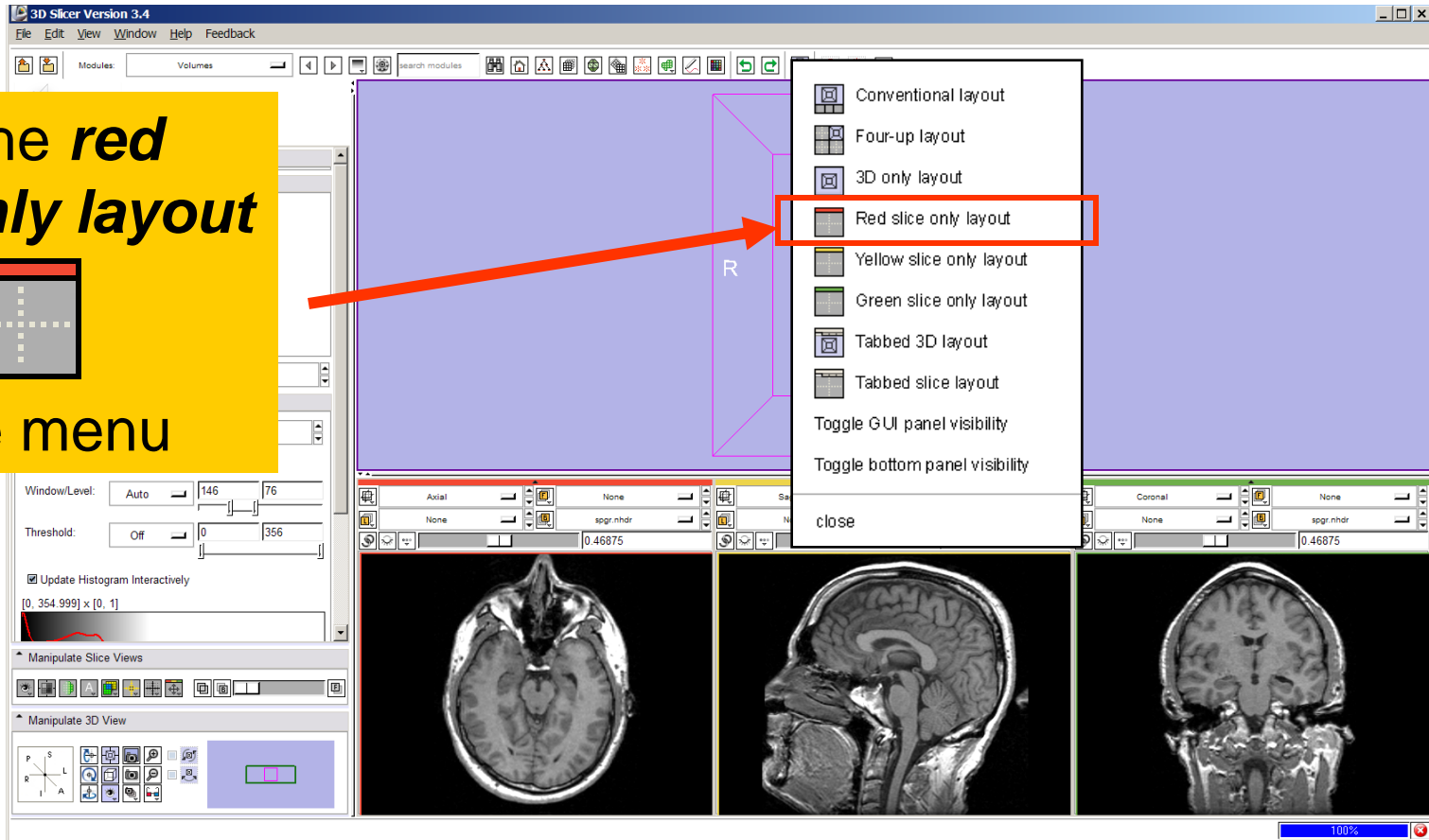
The screenshot displays the 3D Slicer 3.4 interface. The main window shows a 3D view of a brain slice with axes labeled R (Right), A (Anterior), L (Left), and S (Superior). A red circle highlights the 'Choose View' icon in the toolbar. A red arrow points from a yellow callout box to this icon. The callout box contains the text 'Click on the **choose view** icon'. Below the 3D view, there are three 2D slice views: Axial, Sagittal, and Coronal. The Axial view shows a cross-section of the brain, the Sagittal view shows a side view, and the Coronal view shows a front view. The interface also includes a menu bar (File, Edit, View, Window, Help, Feedback), a toolbar with various icons, and a sidebar with various panels like Color Select, Window/Level, Threshold, and Manipulate Slice Views.

Exploring the data

Select the **red slice only layout**

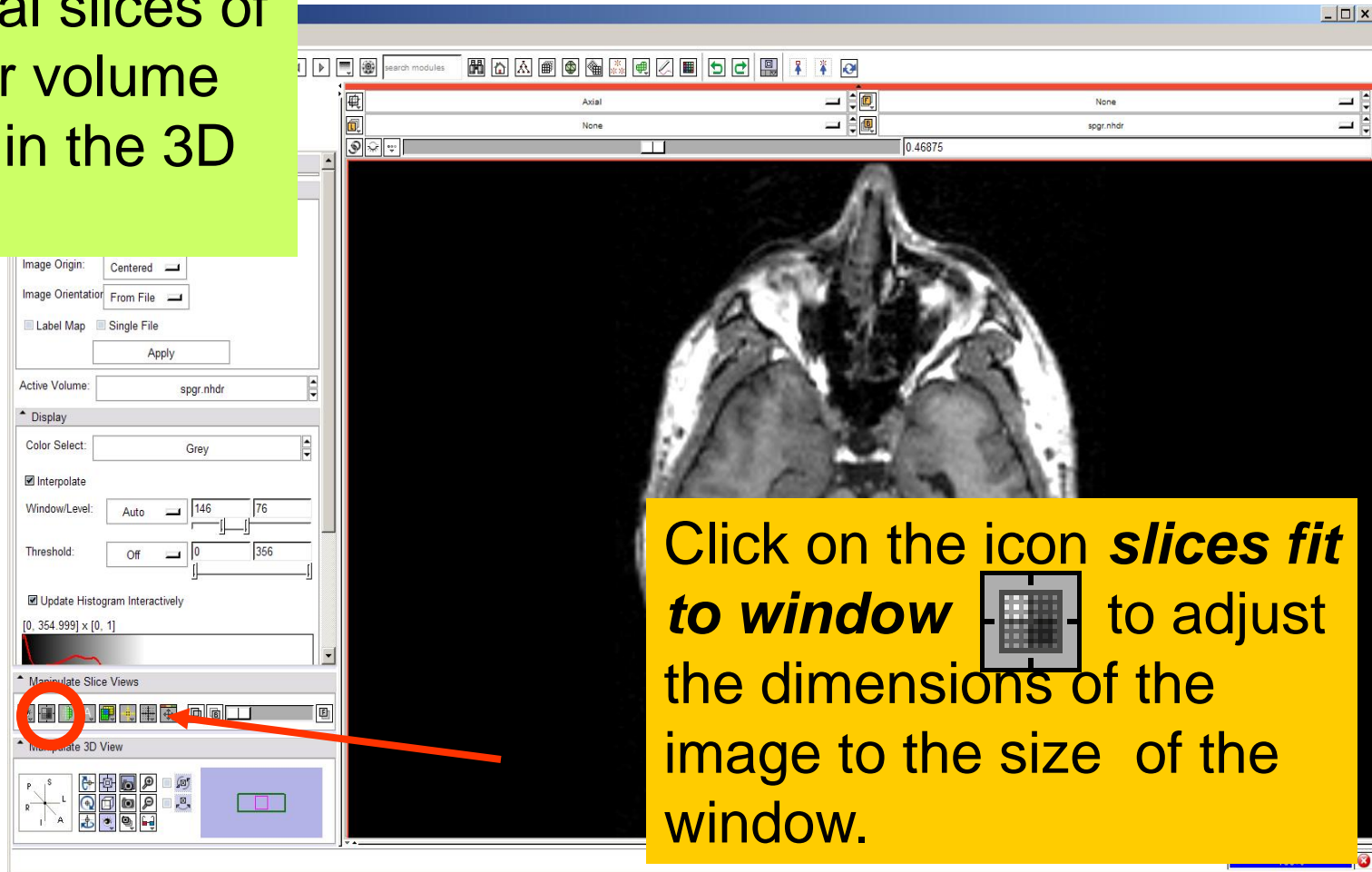


from the menu




Exploring the data

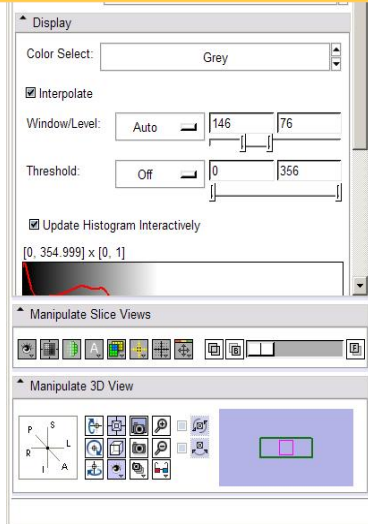
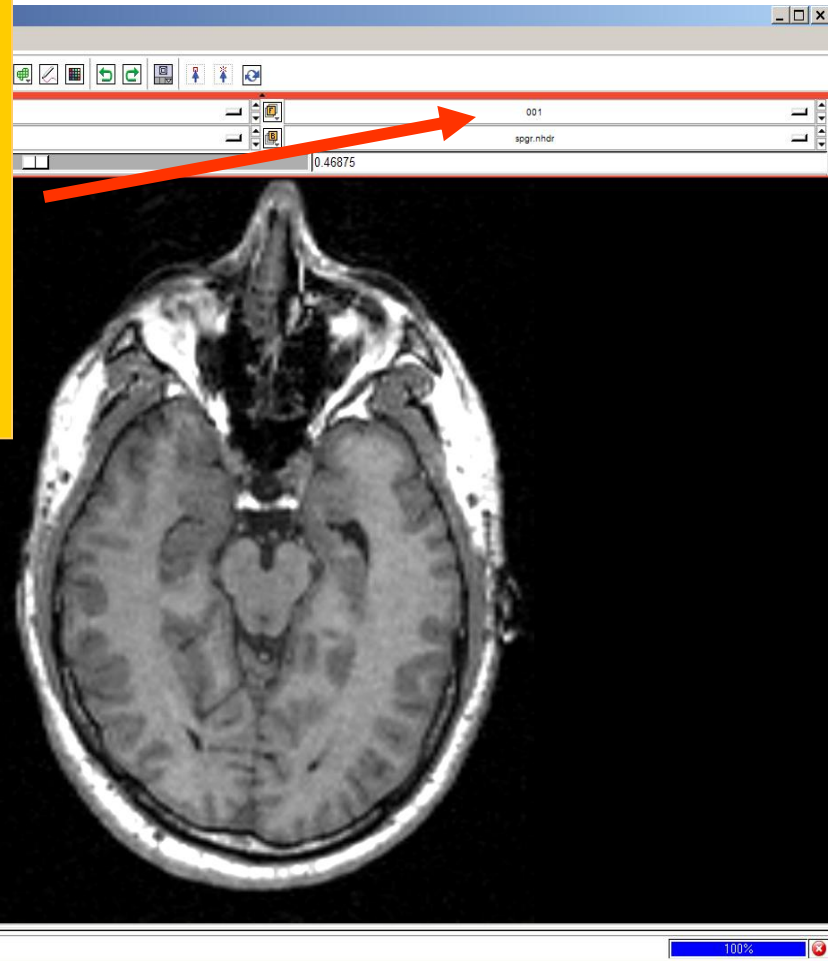
The axial slices of the spgr volume appear in the 3D viewer.





Click on the icon **slices fit to window** to adjust the dimensions of the image to the size of the window.

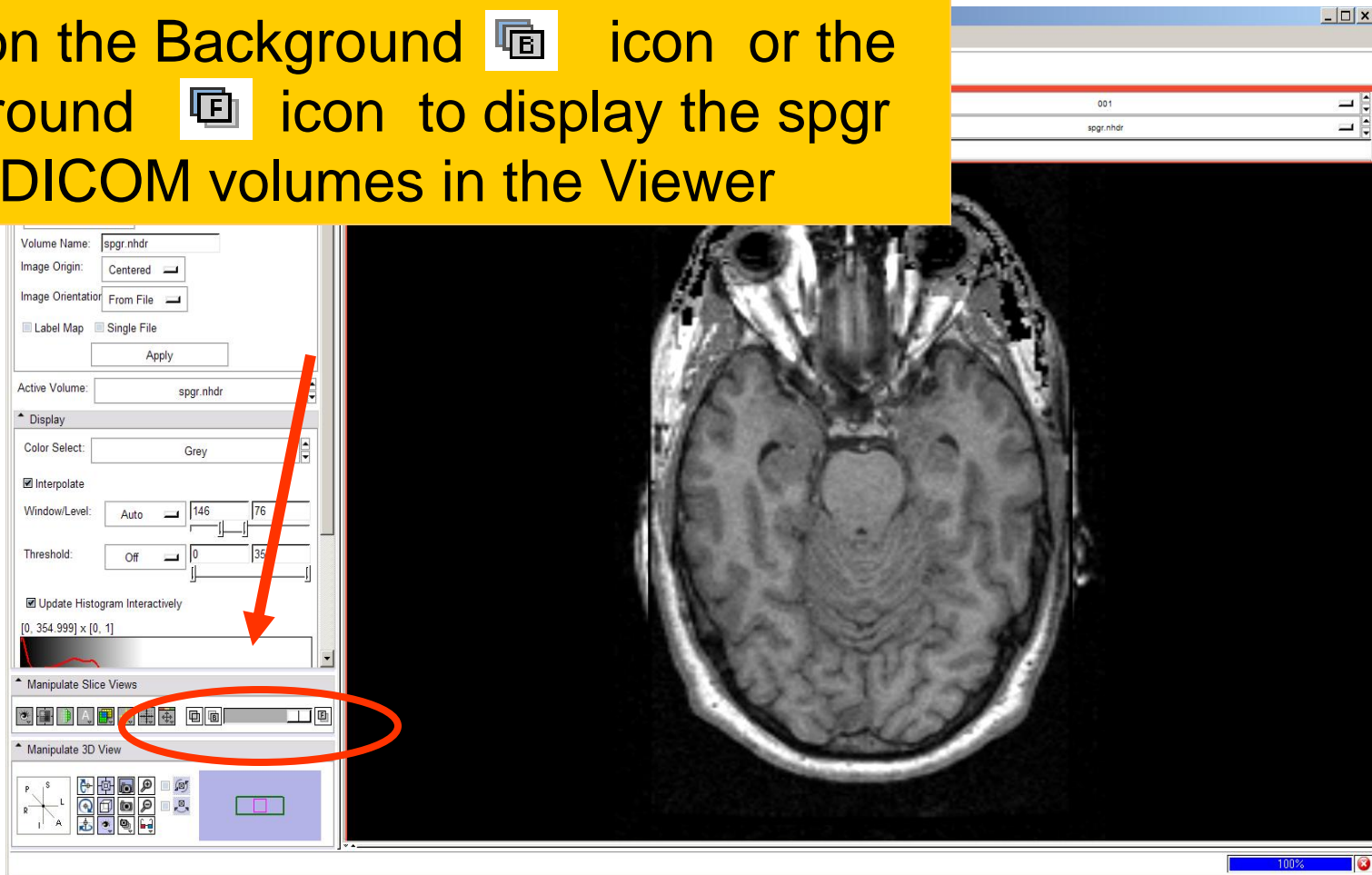
Exploring the data

To simultaneously view the dicom and the nrrd volumes, left click on the drop-down menu to the right of the Foreground icon  and select the image 001.dcm



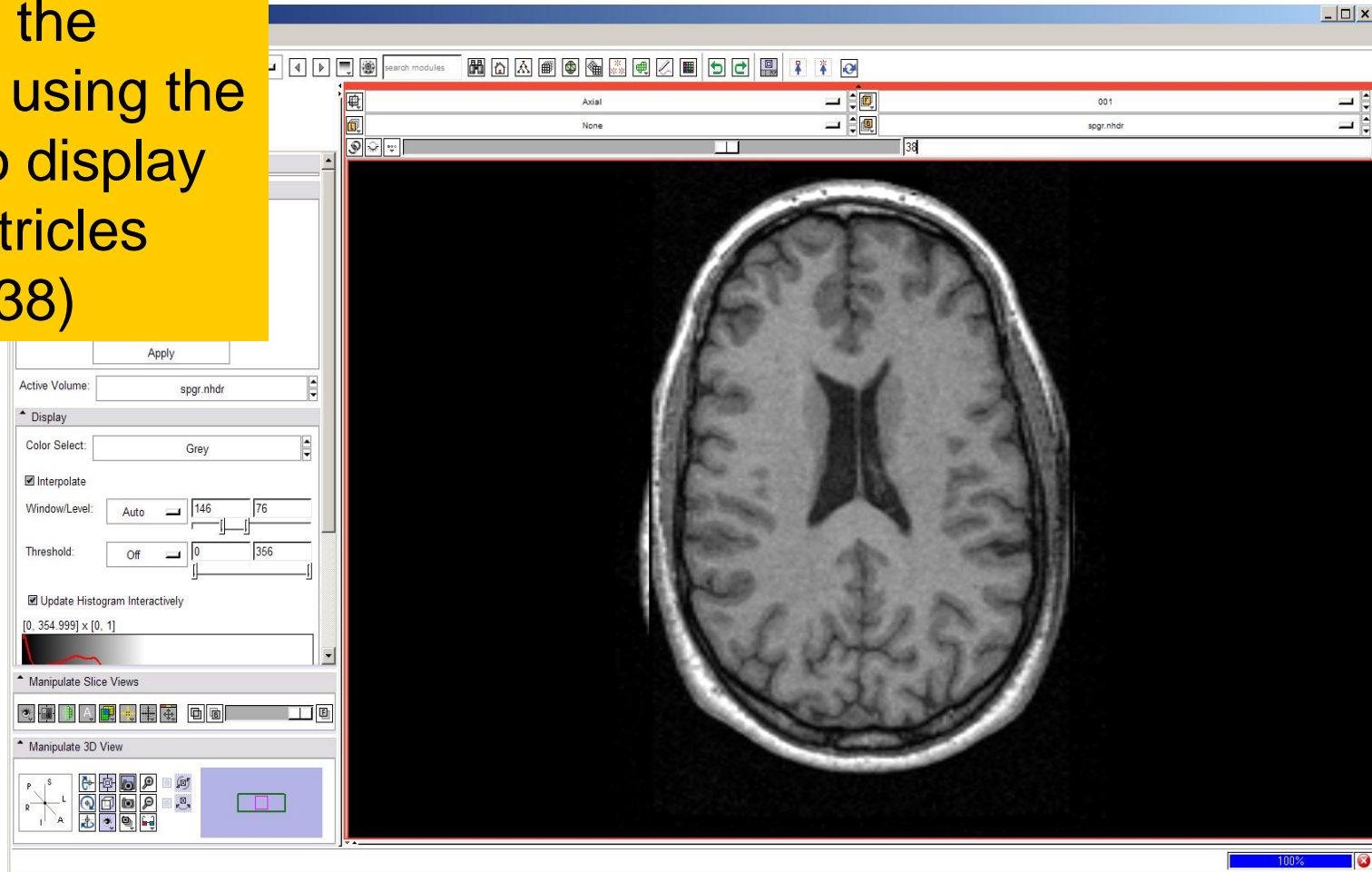
Exploring the data

Click on the Background  icon or the Foreground  icon to display the spgr or the DICOM volumes in the Viewer



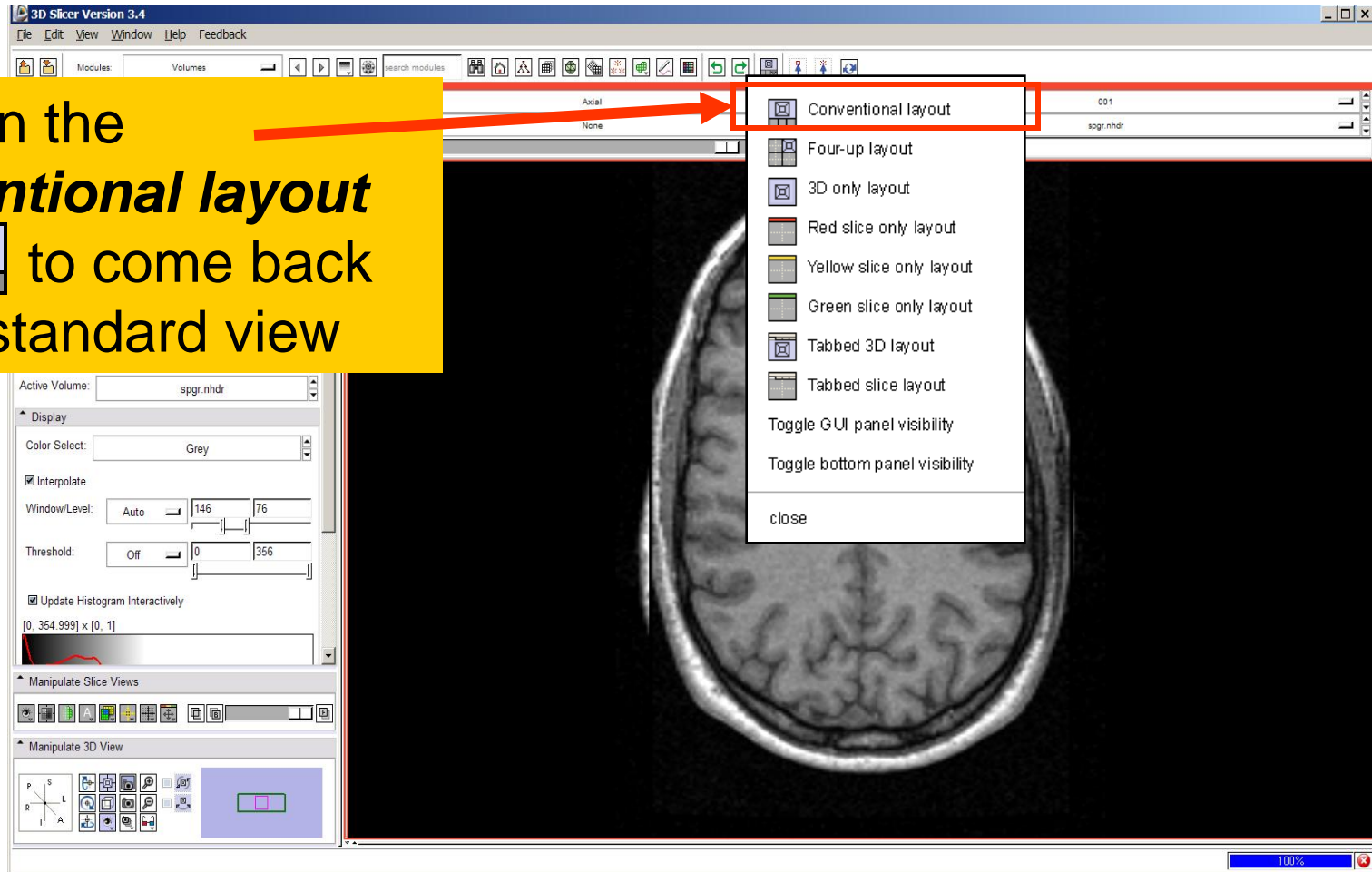
Exploring the data

Browse the images using the slider to display the ventricles (~slice 38)




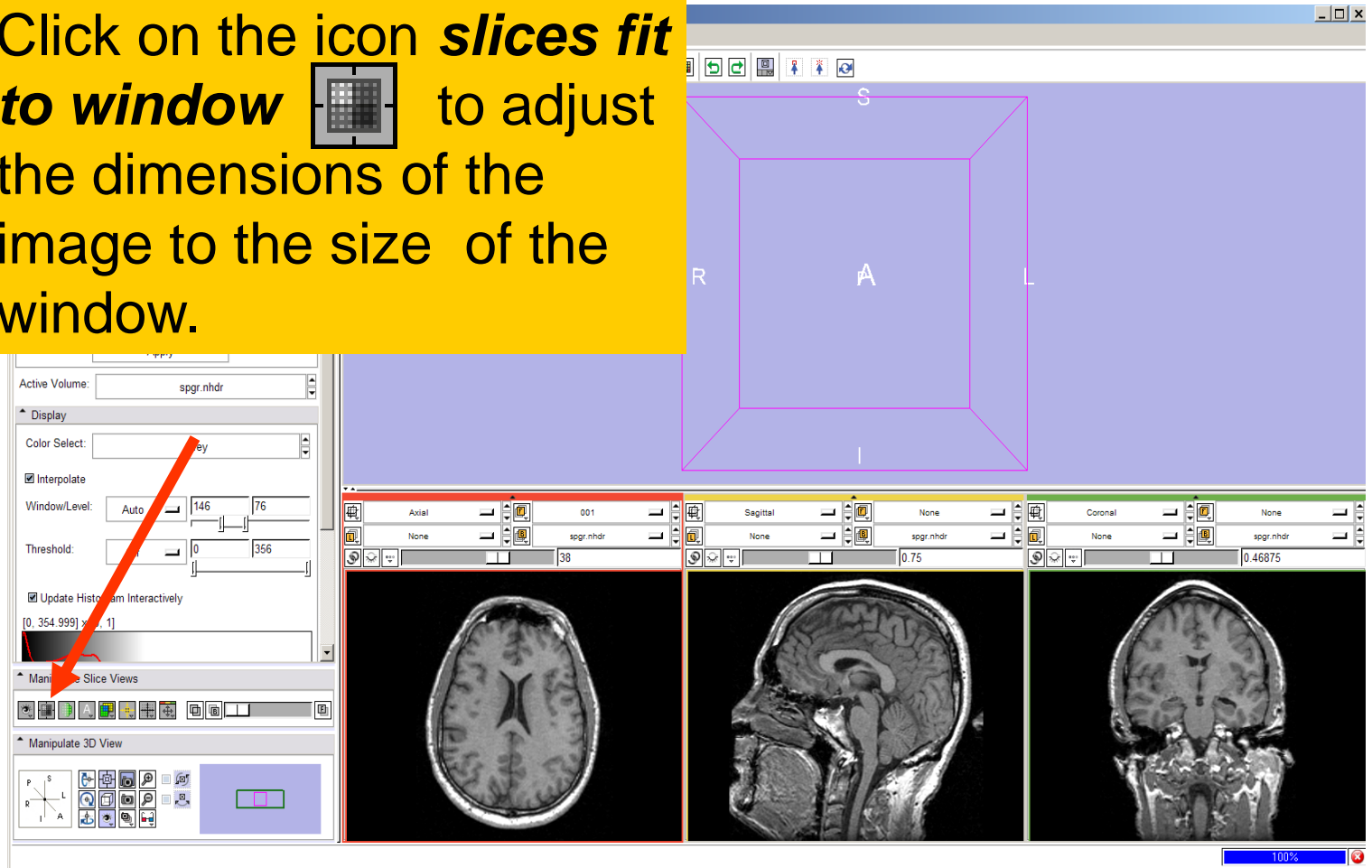
Exploring the data

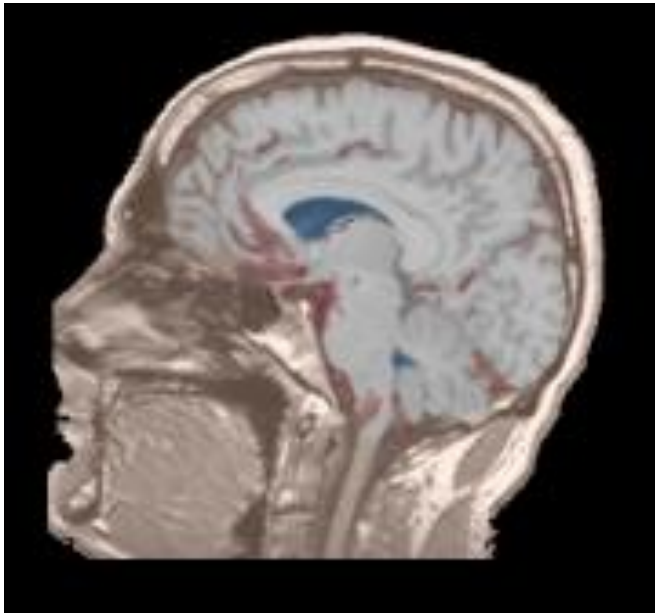
Click on the **conventional layout icon** to come back to the standard view



Loading Volumes

Click on the icon **slices fit to window**  to adjust the dimensions of the image to the size of the window.

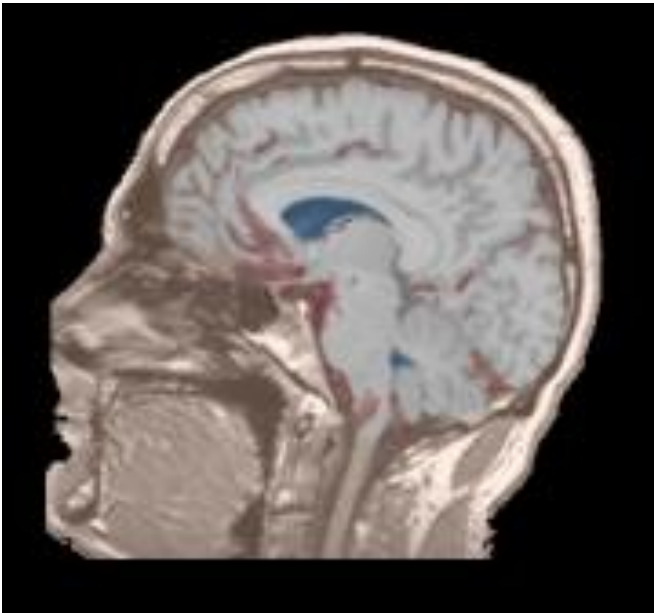




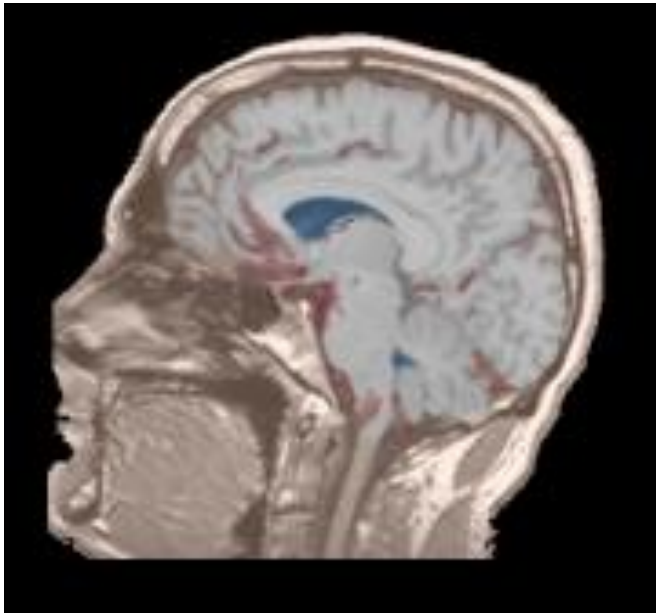
Part 2: Loading and visualizing segmented structures overlaid on grayscale images

Label map

- **Image segmentation** is the extraction of structural information of particular interest from surrounding image.

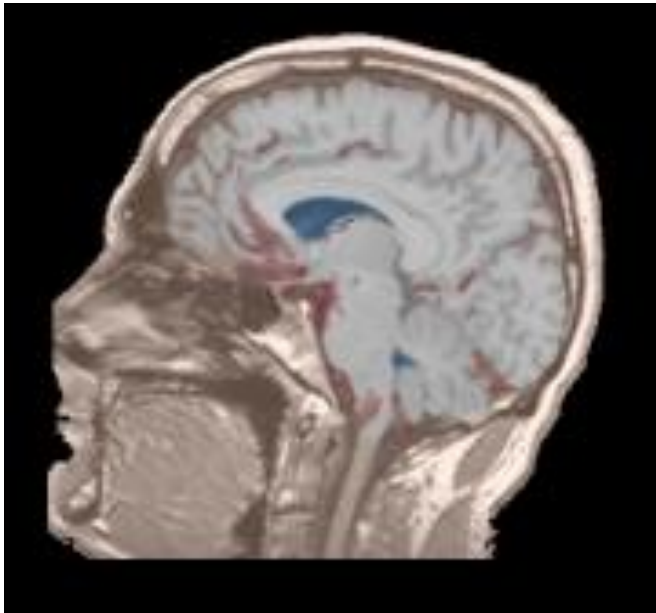


Label map



- **Image segmentation** is the extraction of structural information of particular interest from surrounding image.
- Each pixel is assigned a specific **label value** which corresponds to the anatomical structure that it belongs to.

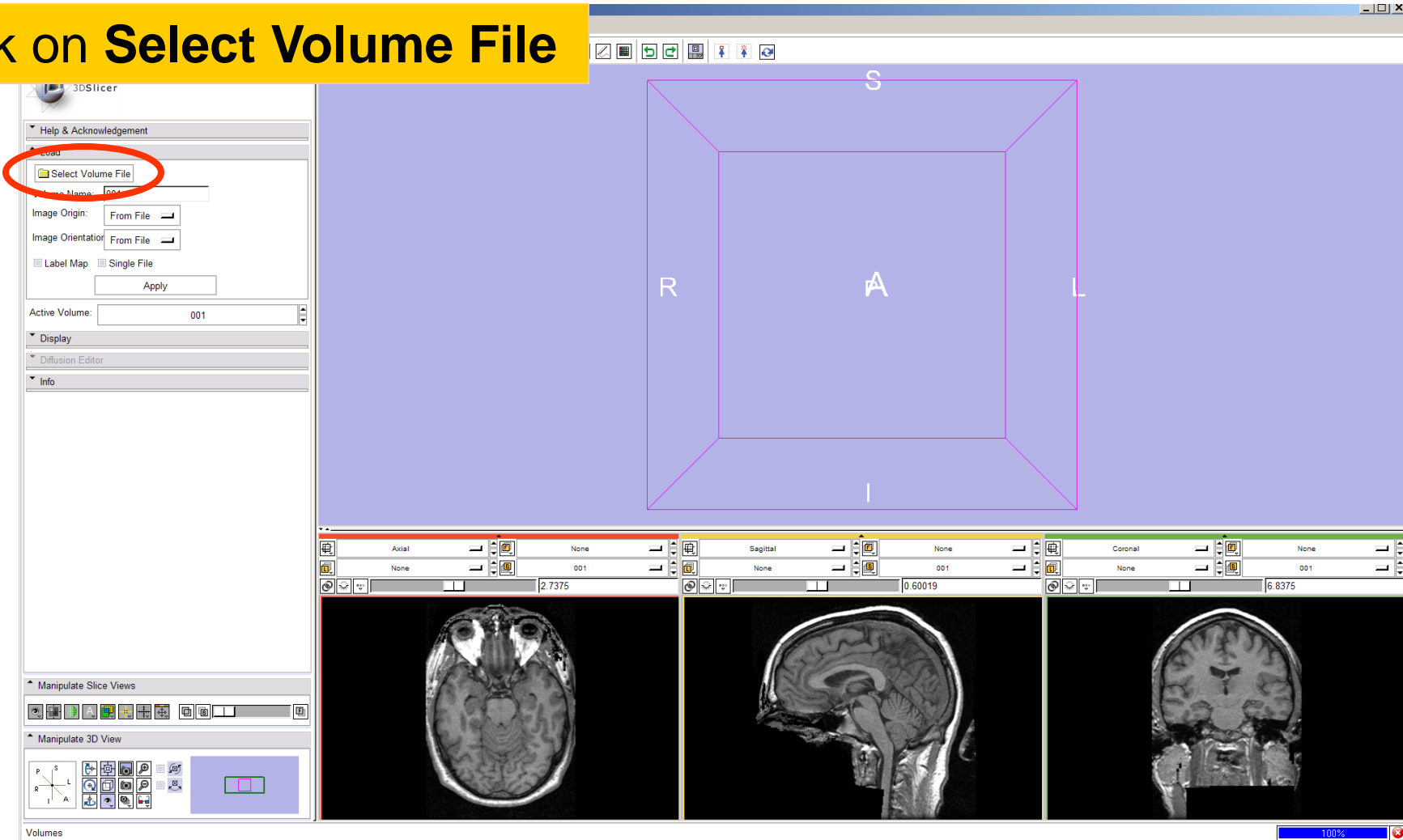
Label map



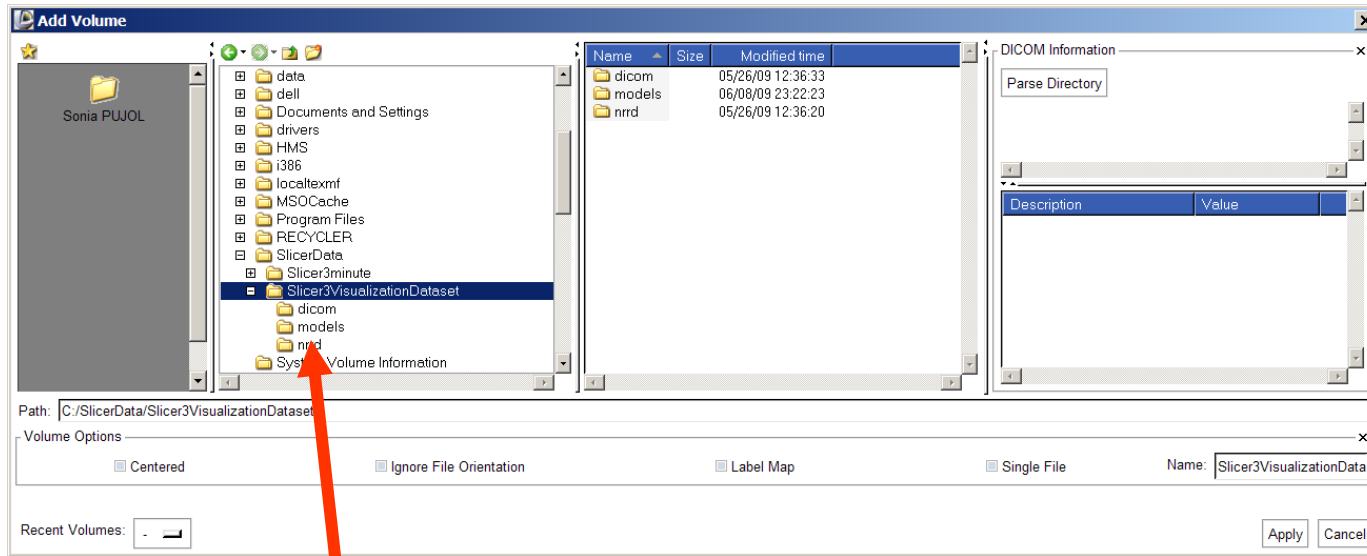
- **Image segmentation** is the extraction of structural information of particular interest from surrounding image.
- Each pixel is assigned a specific **label value** which corresponds to the anatomical structure that it belongs to.
- The three-dimensional result of the segmentation is a binary array called a **label map**.

Loading a label map

Click on **Select Volume File**

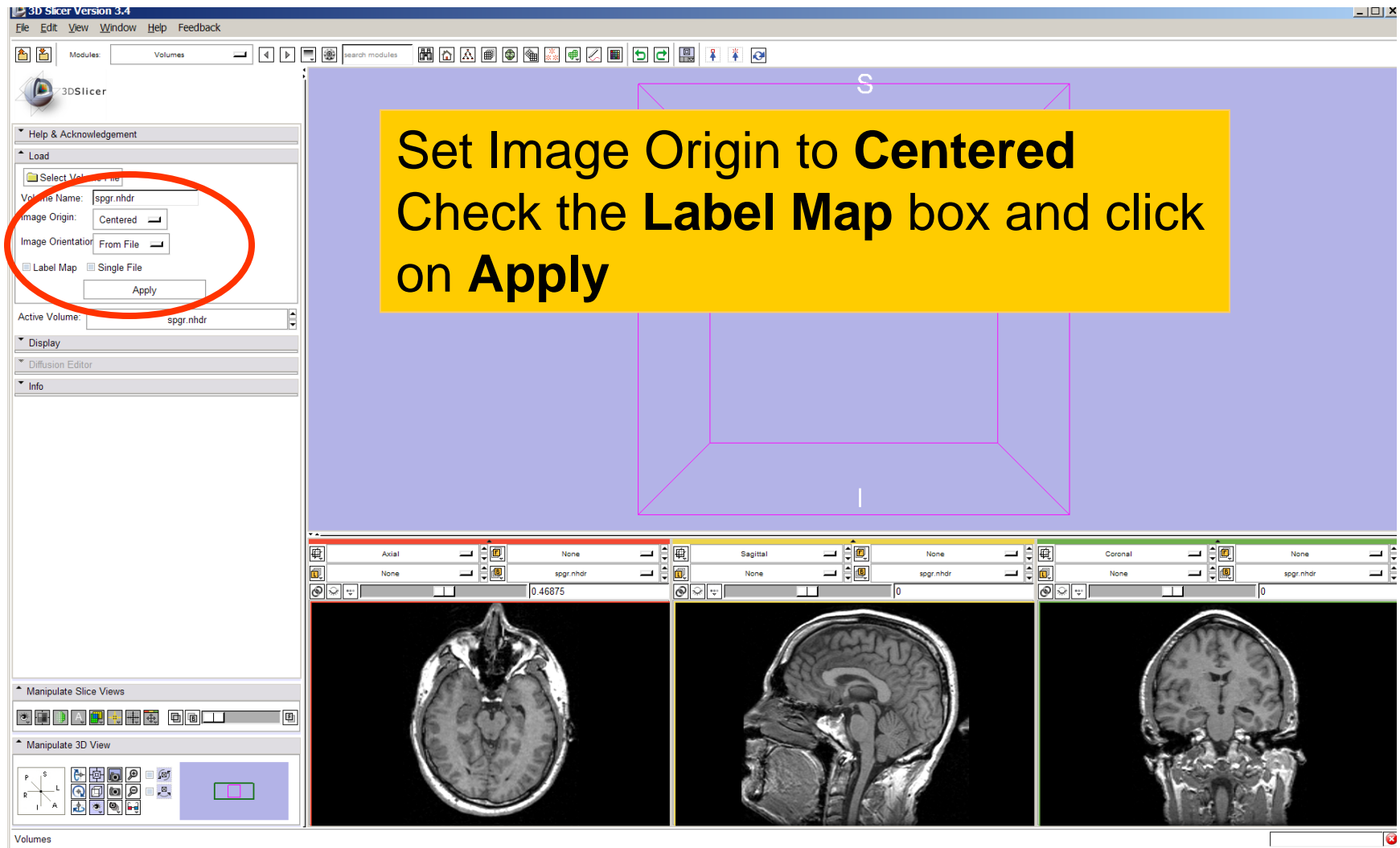


Loading a label map



Browse to find the header file ***all.nhdr*** of the label map dataset located in the directory ***Slicer3VisualizationDataset/nrrd*** and click on **Open**

Visualizing a label map

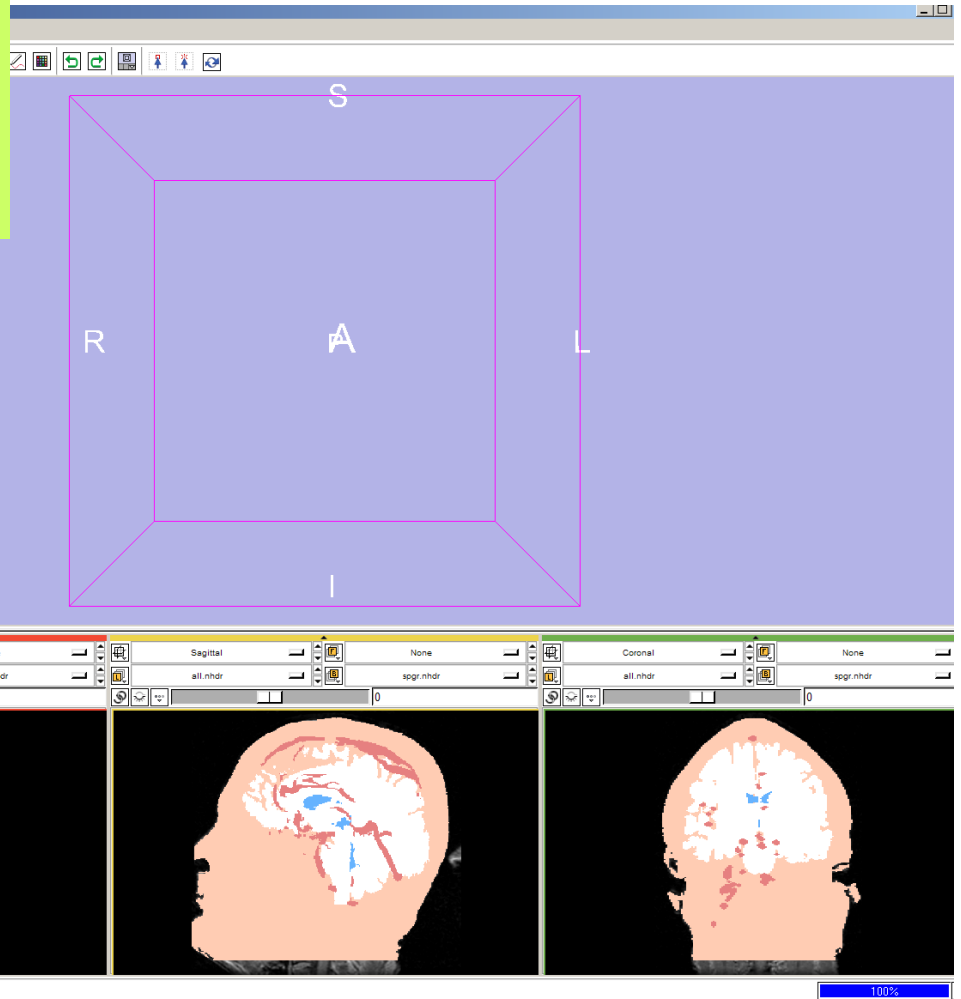


Set Image Origin to **Centered**
Check the **Label Map box and click on **Apply****

The screenshot shows the 3D Slicer Version 3.4 interface. The 'Load' panel on the left is highlighted with a red circle, showing 'Image Origin' set to 'Centered' and the 'Label Map' checkbox checked. The 'Apply' button is also visible. The main 3D view area is a light blue plane with a purple wireframe box. Below the 3D view are three slice views: Axial, Sagittal, and Coronal, each showing a brain MRI slice. The 'Volumes' panel at the bottom shows the loaded volume 'spgr.nhdr'.

Visualizing a label map

Slicer displays the label map *all* in the **Label** layer



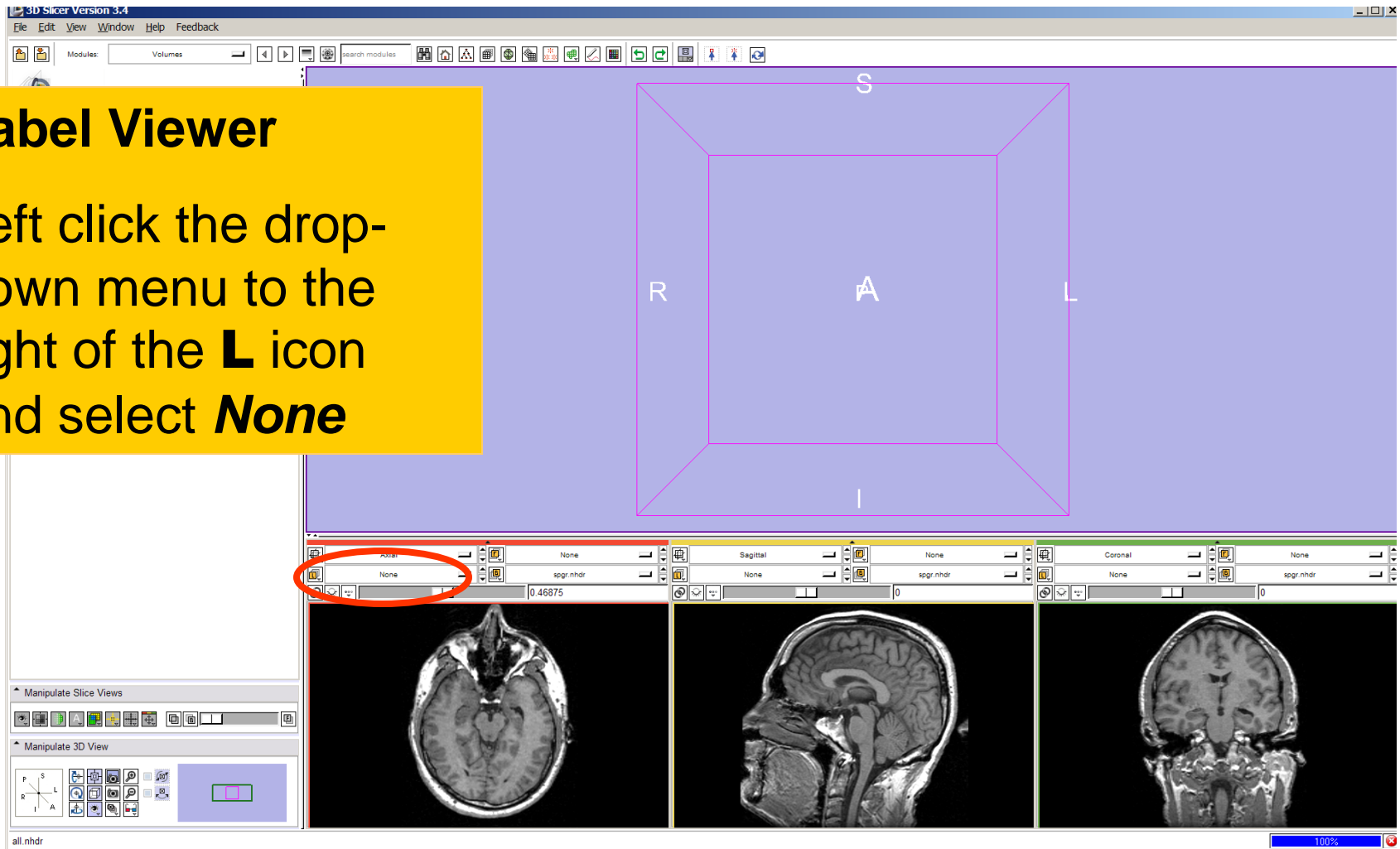
Click on the *links* icon.



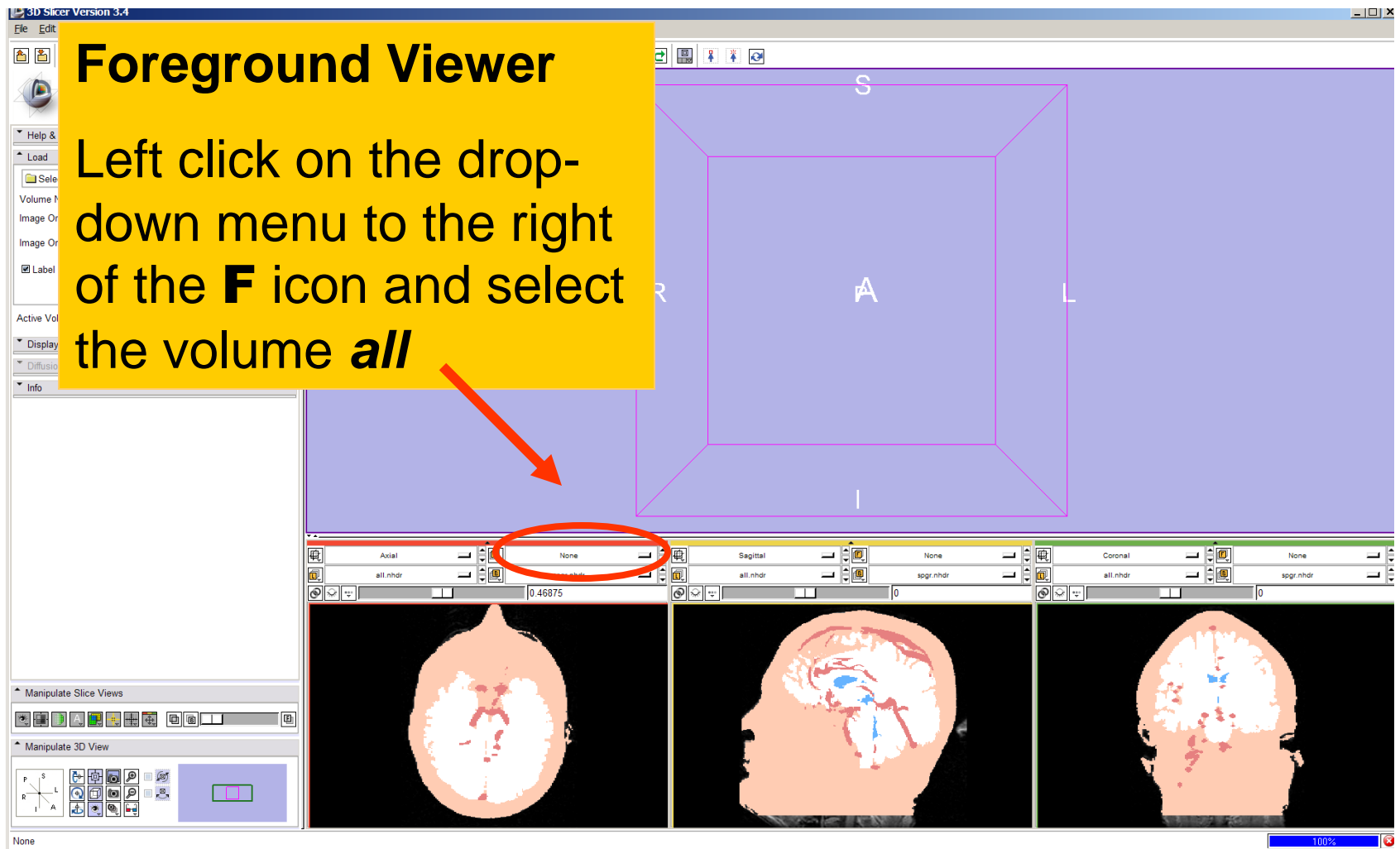
Visualizing Multiple Volumes

Label Viewer

Left click the drop-down menu to the right of the **L** icon and select **None**



Visualizing Multiple Volumes



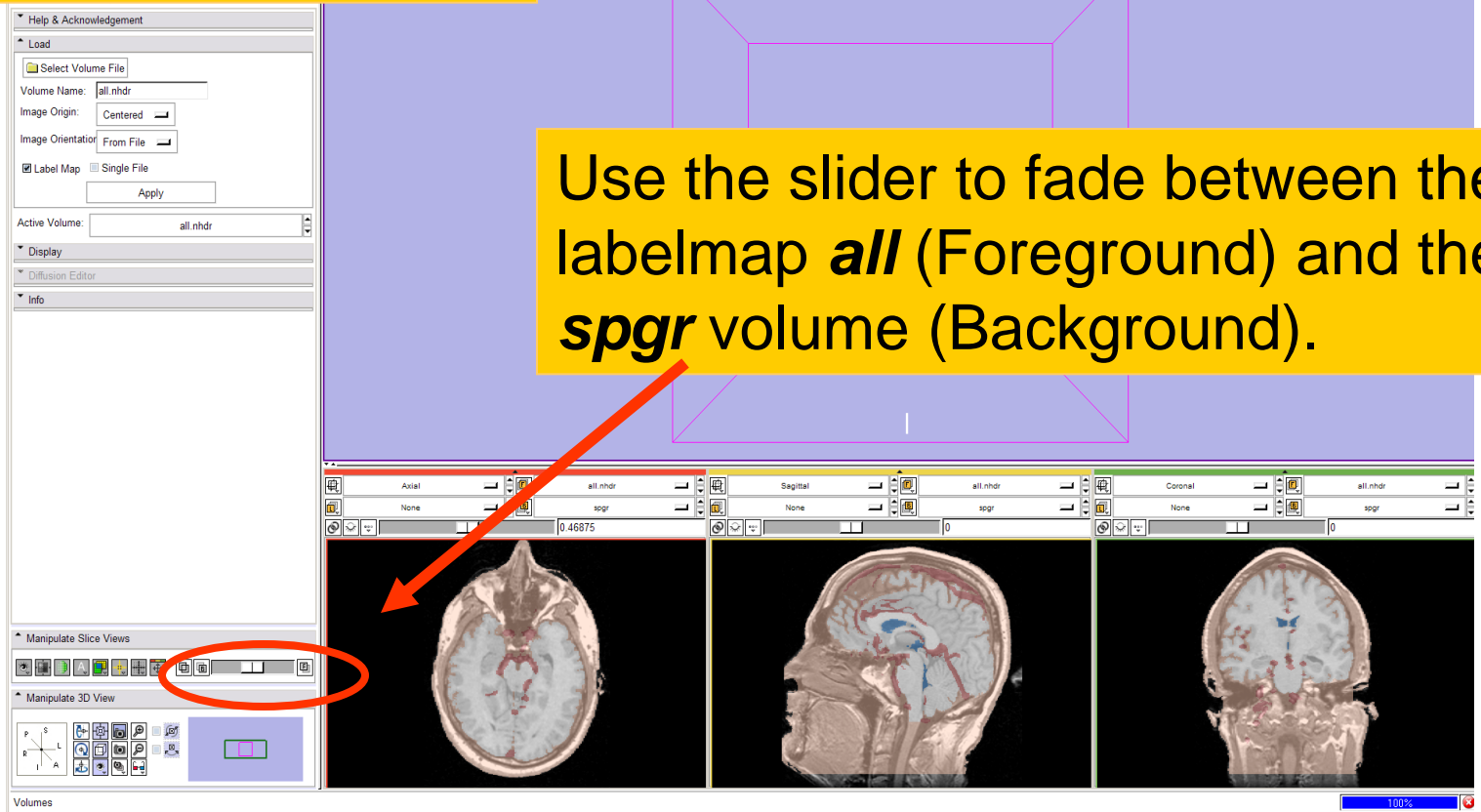
Foreground Viewer

Left click on the drop-down menu to the right of the **F** icon and select the volume *all*

The screenshot shows the 3D Slicer 3.4 interface. A yellow text box with a red arrow points to the foreground viewer's volume selection menu, which is currently set to 'None'. Below the foreground viewer are three slice views: Axial, Sagittal, and Coronal. The Axial slice view shows a brain slice with a value of 0.46875. The Sagittal slice view shows a brain slice with a value of 0. The Coronal slice view shows a brain slice with a value of 0. The foreground viewer shows a 3D view of the brain with a purple wireframe box indicating the current slice plane. The slice views are labeled with 'A', 'S', and 'C' respectively.

Visualizing Multiple Volumes

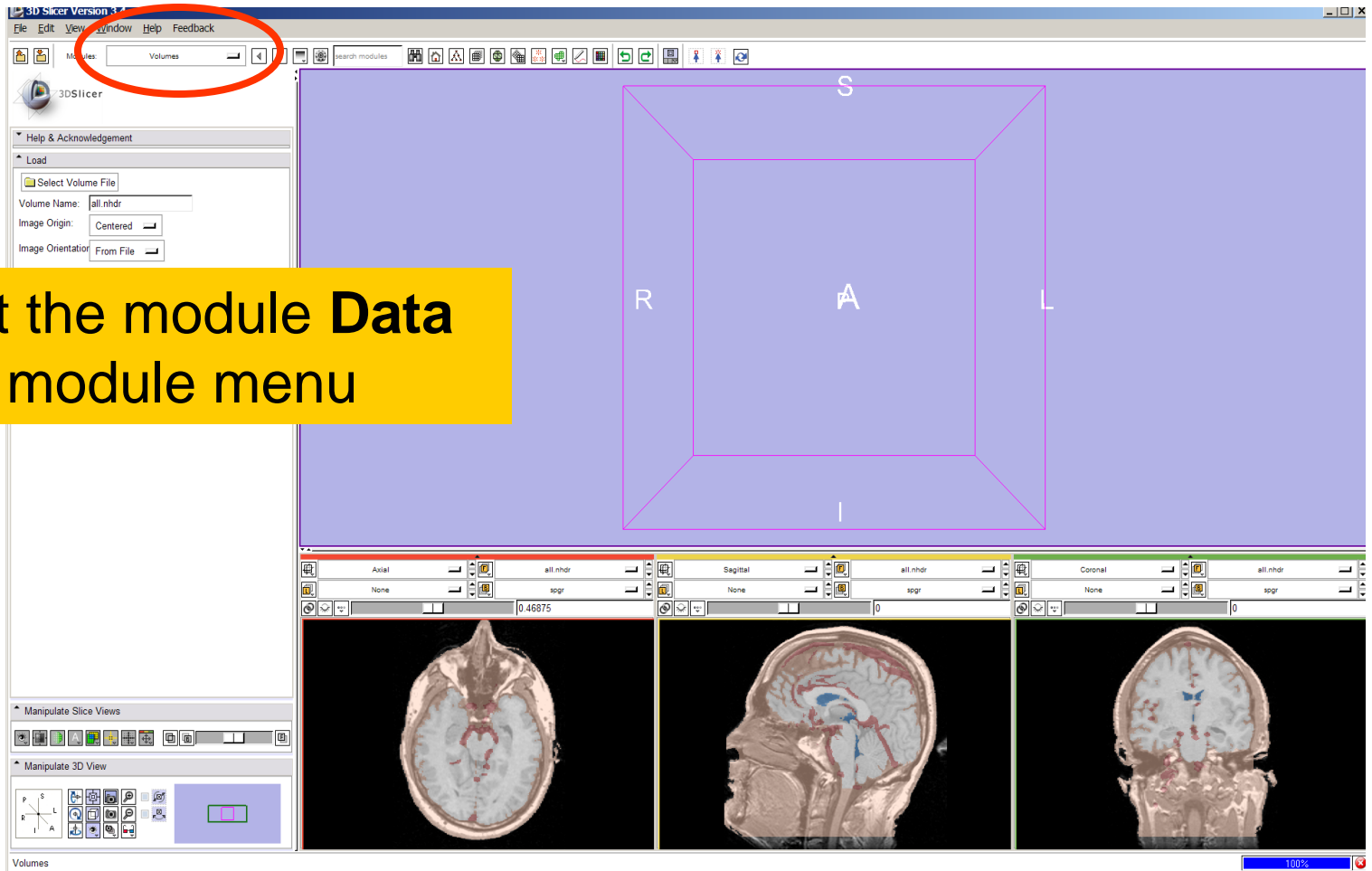
Select Manipulate
Slice Views

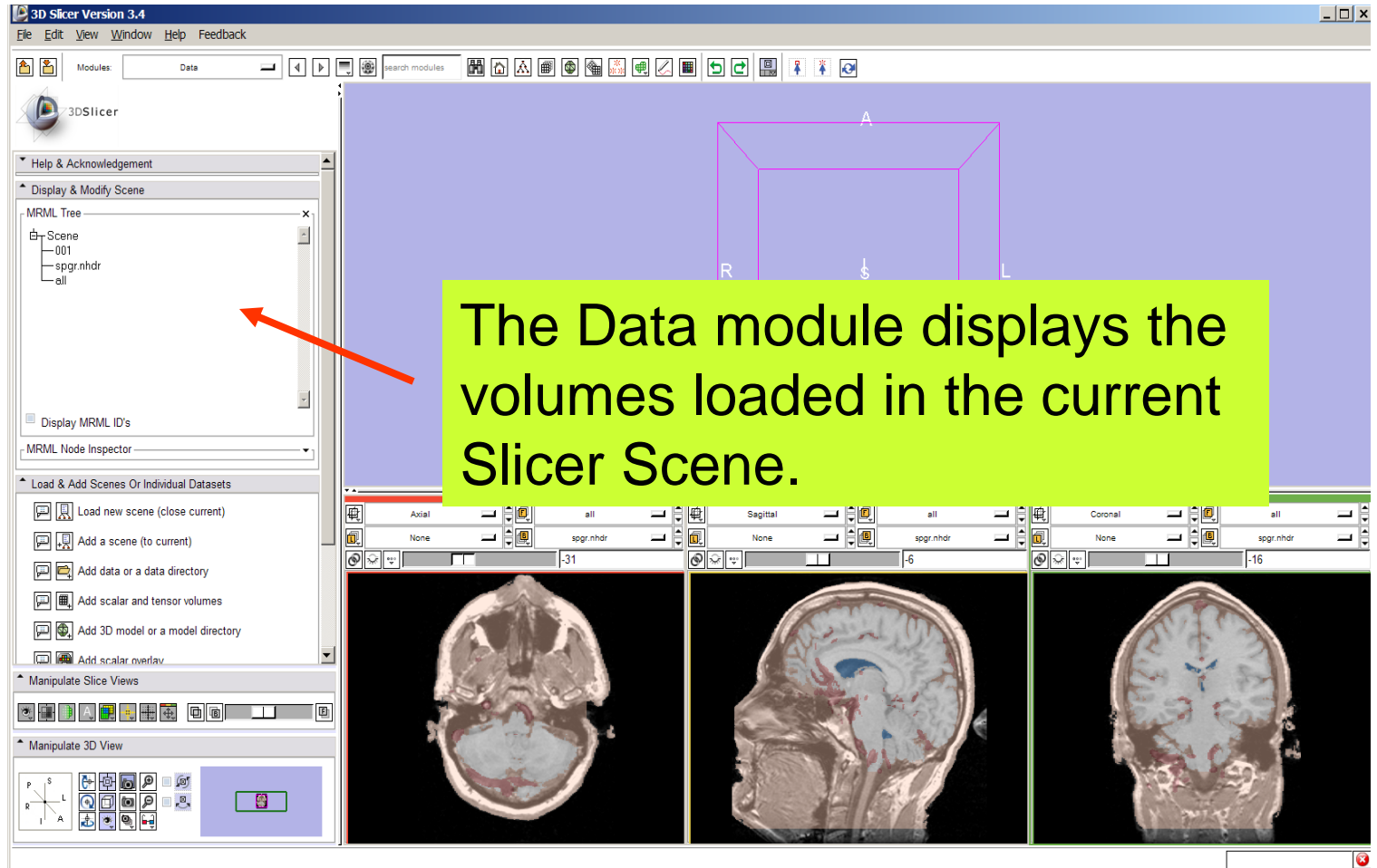


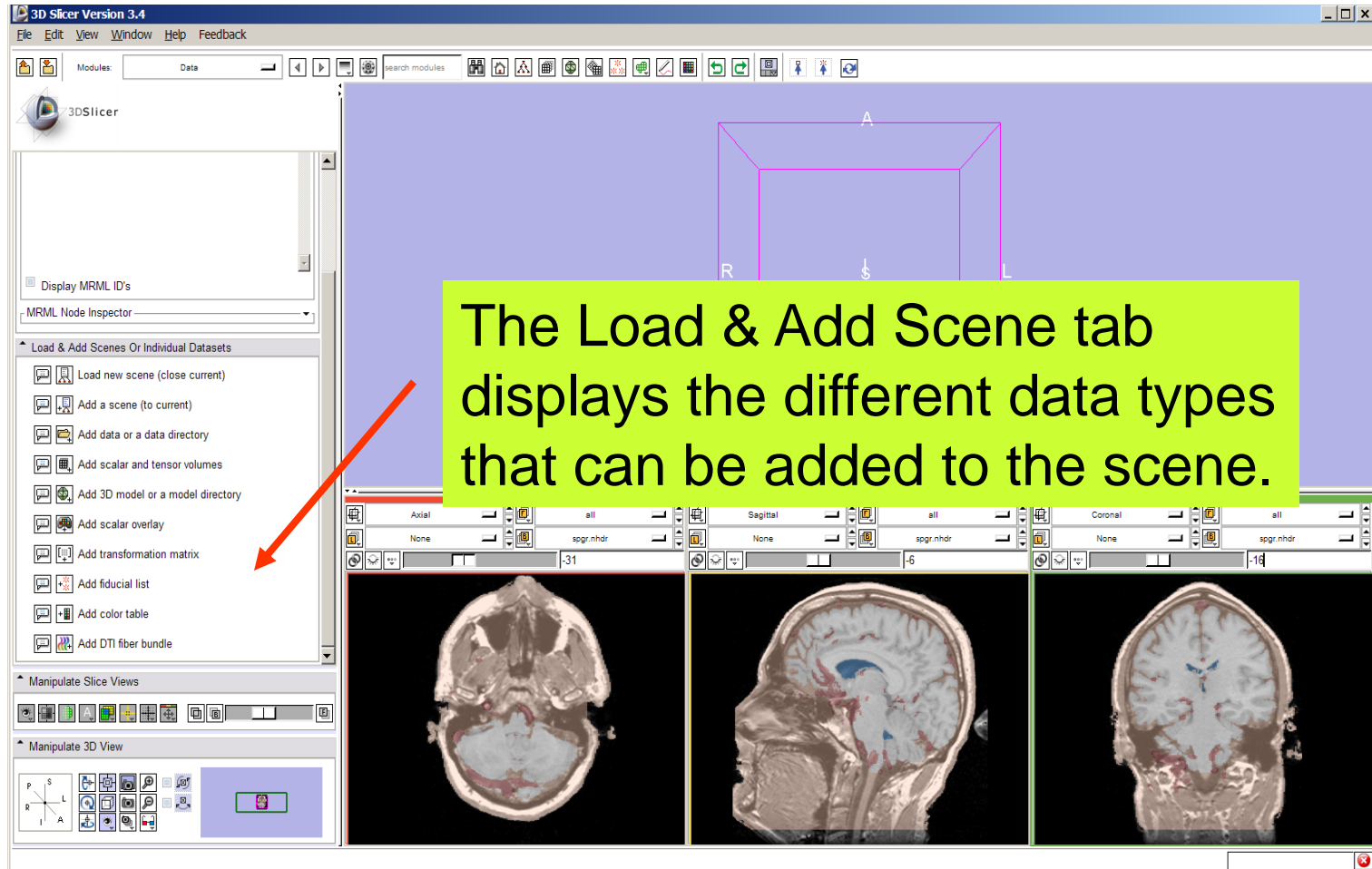
The screenshot displays the 3DSlicer software interface. On the left, the 'Load' panel shows 'Volume Name: all nhdr' and 'Image Orientation: From File'. Below it, the 'Display' and 'Info' panels are visible. The main 3D view area shows a brain volume with a purple wireframe bounding box. At the bottom, three slice views are shown: Axial, Sagittal, and Coronal. The 'Manipulate Slice Views' panel at the bottom left contains a slider, which is circled in red. An orange arrow points from a text box to this slider. The 'Volumes' panel at the bottom right shows 'all nhdr' and 'spgr' volumes.

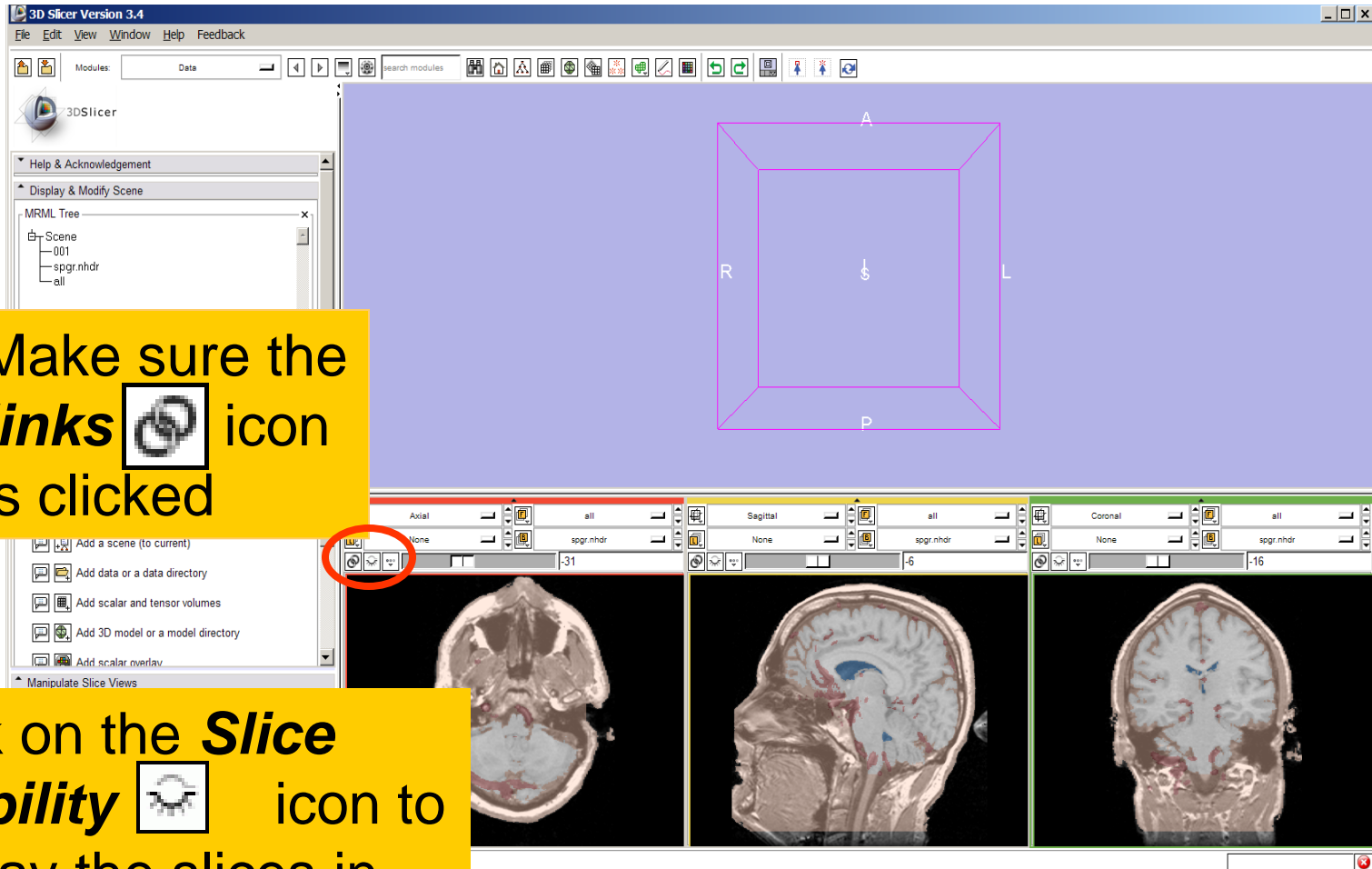
Use the slider to fade between the labelmap *all* (Foreground) and the *spgr* volume (Background).

Select the module **Data**
in the module menu



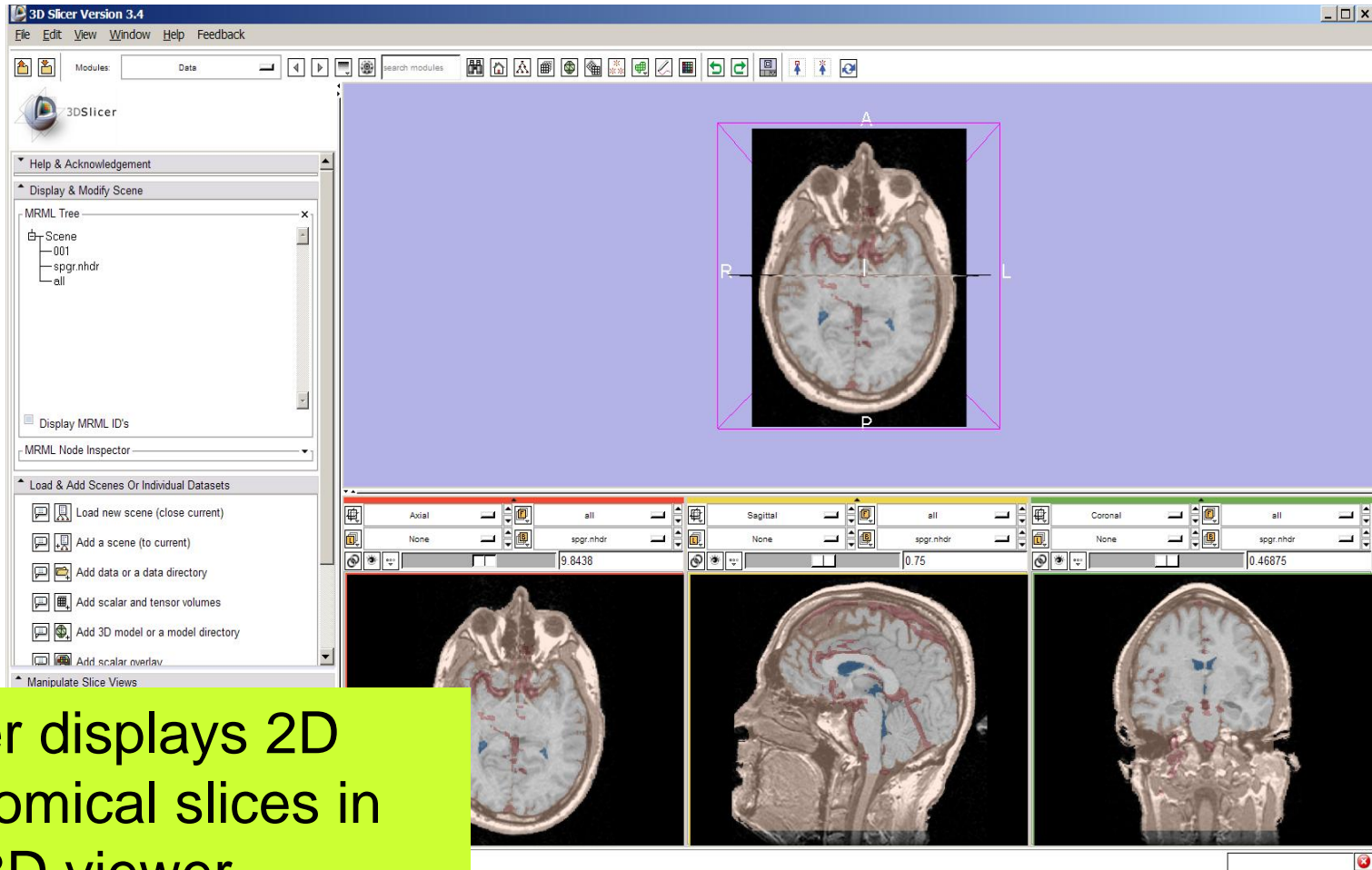






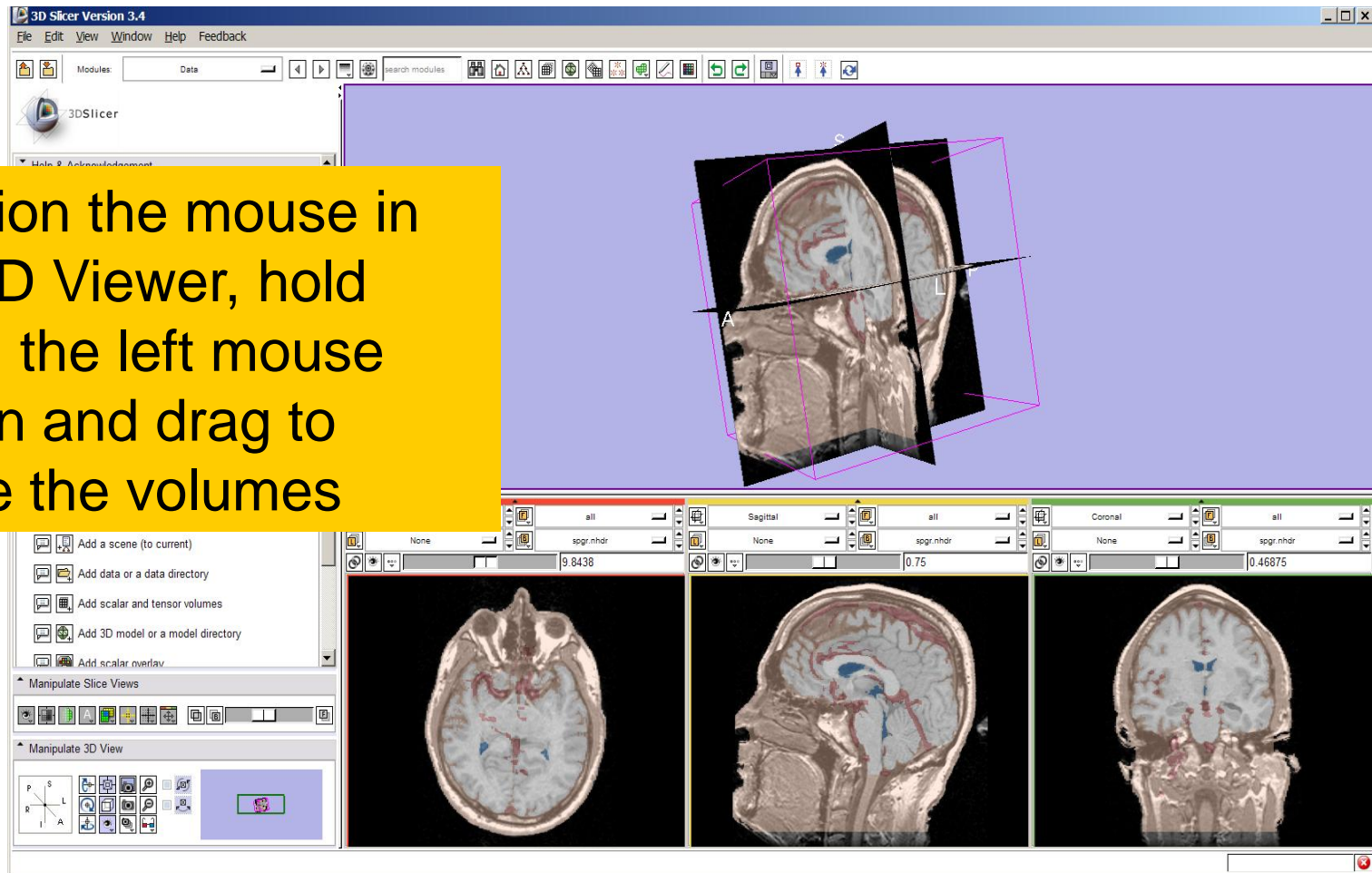
Make sure the **links**  icon is clicked

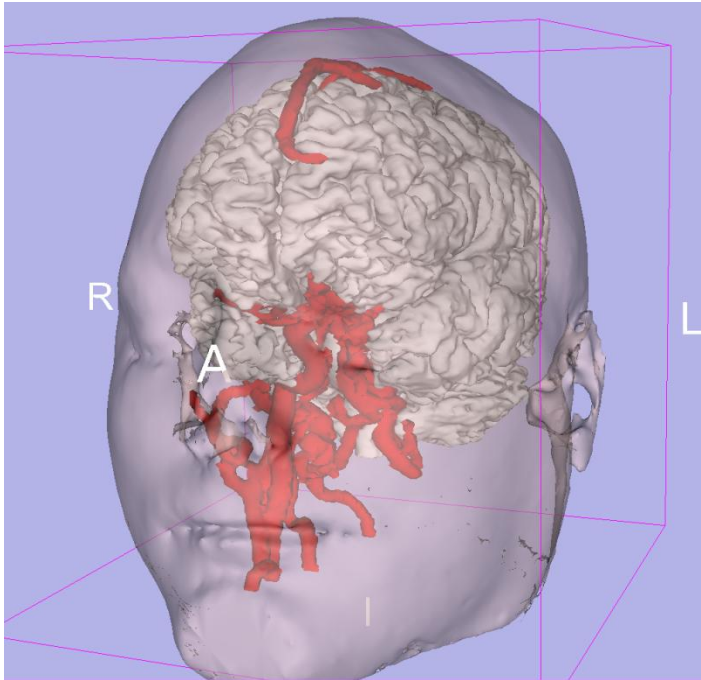
Click on the **Slice Visibility**  icon to display the slices in the 3D Viewer



Slicer displays 2D anatomical slices in the 3D viewer

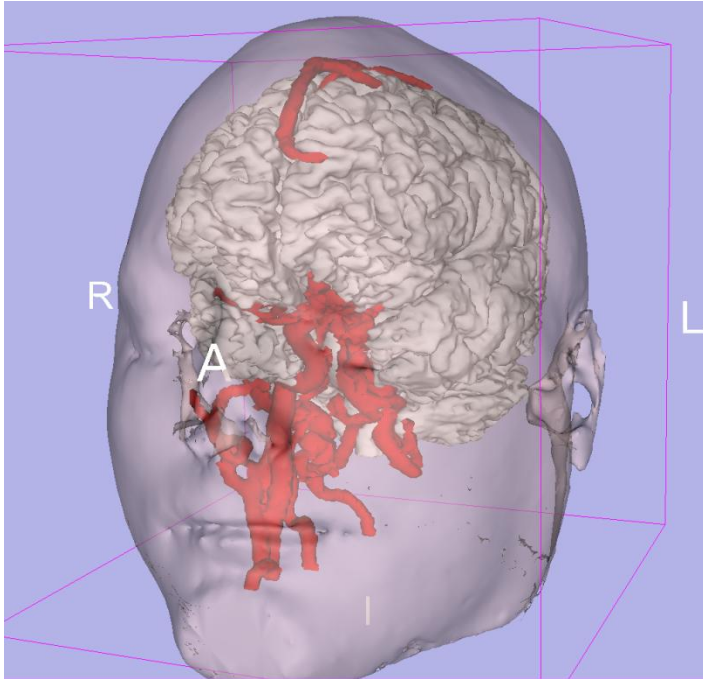
Position the mouse in the 3D Viewer, hold down the left mouse button and drag to rotate the volumes





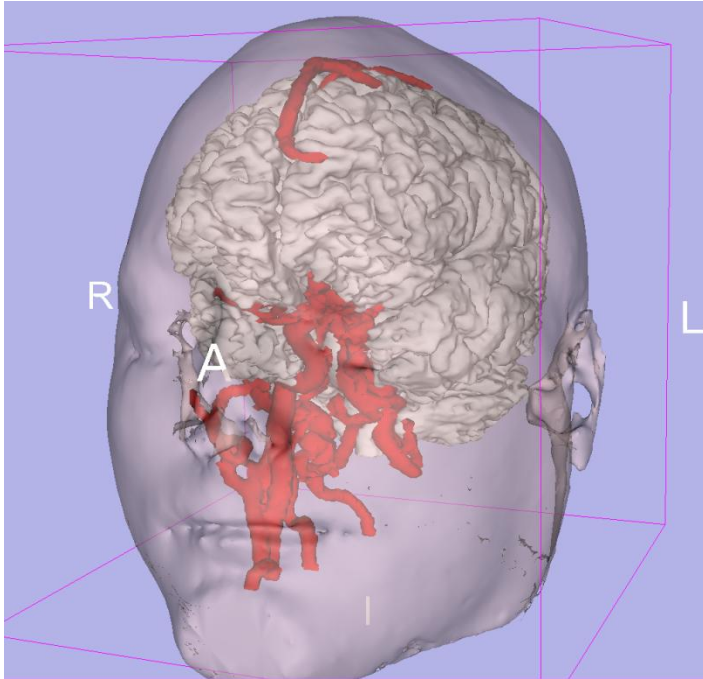
Part 3: Loading and visualizing 3D models of the anatomy

3D models



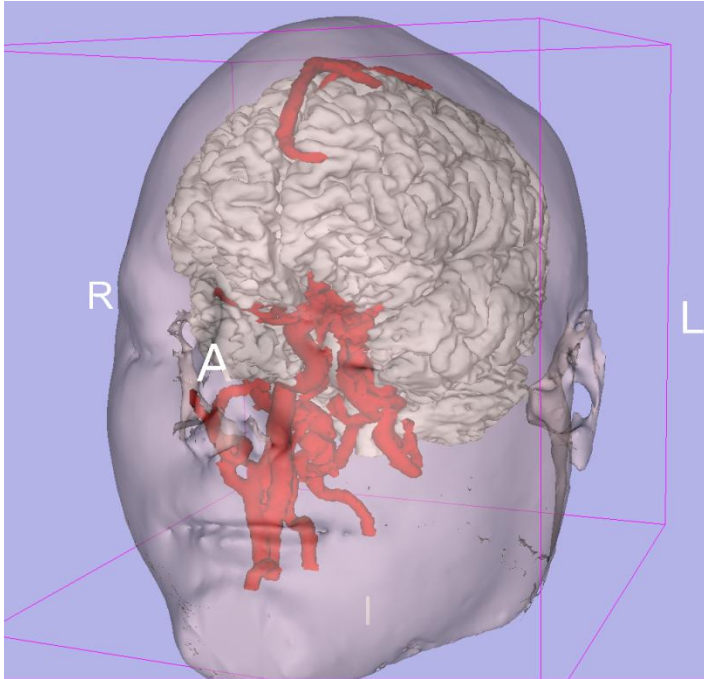
- A **3D model** is a surface reconstruction of an anatomical structure.

3D models

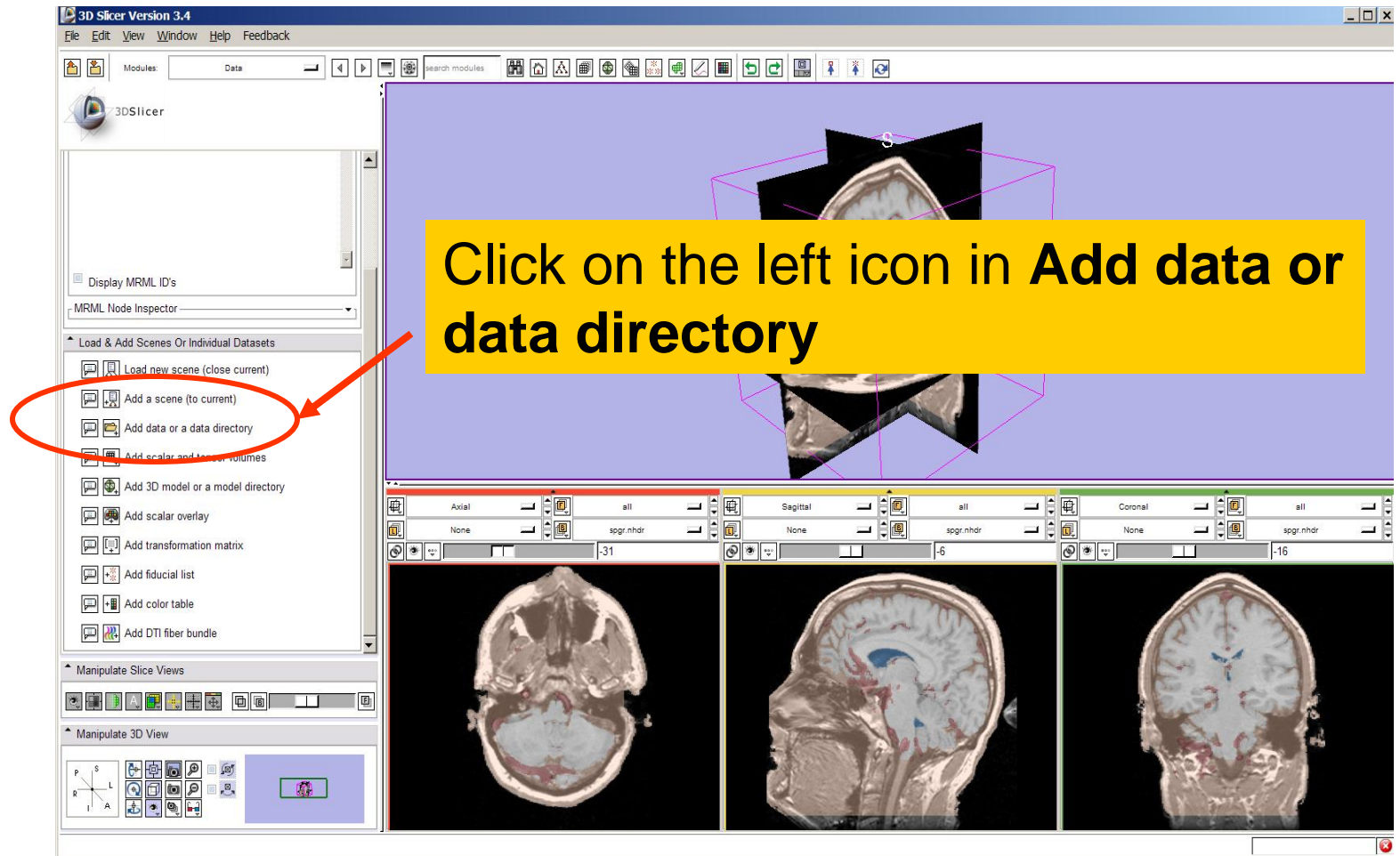


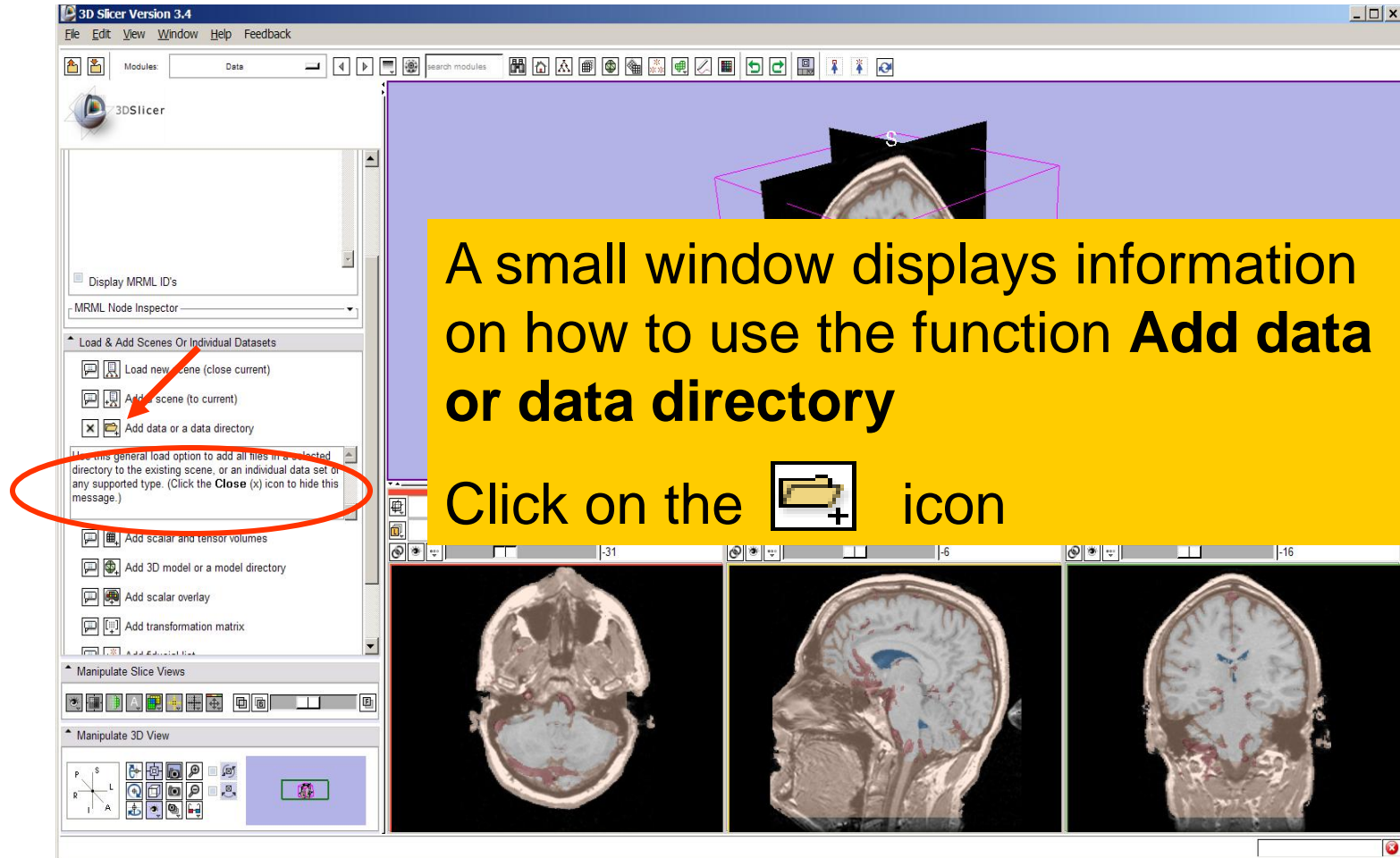
- A **3D model** is a surface reconstruction of an anatomical structure.
- The model is a **triangular mesh** that approximates a surface from a 3D label map.

3D models




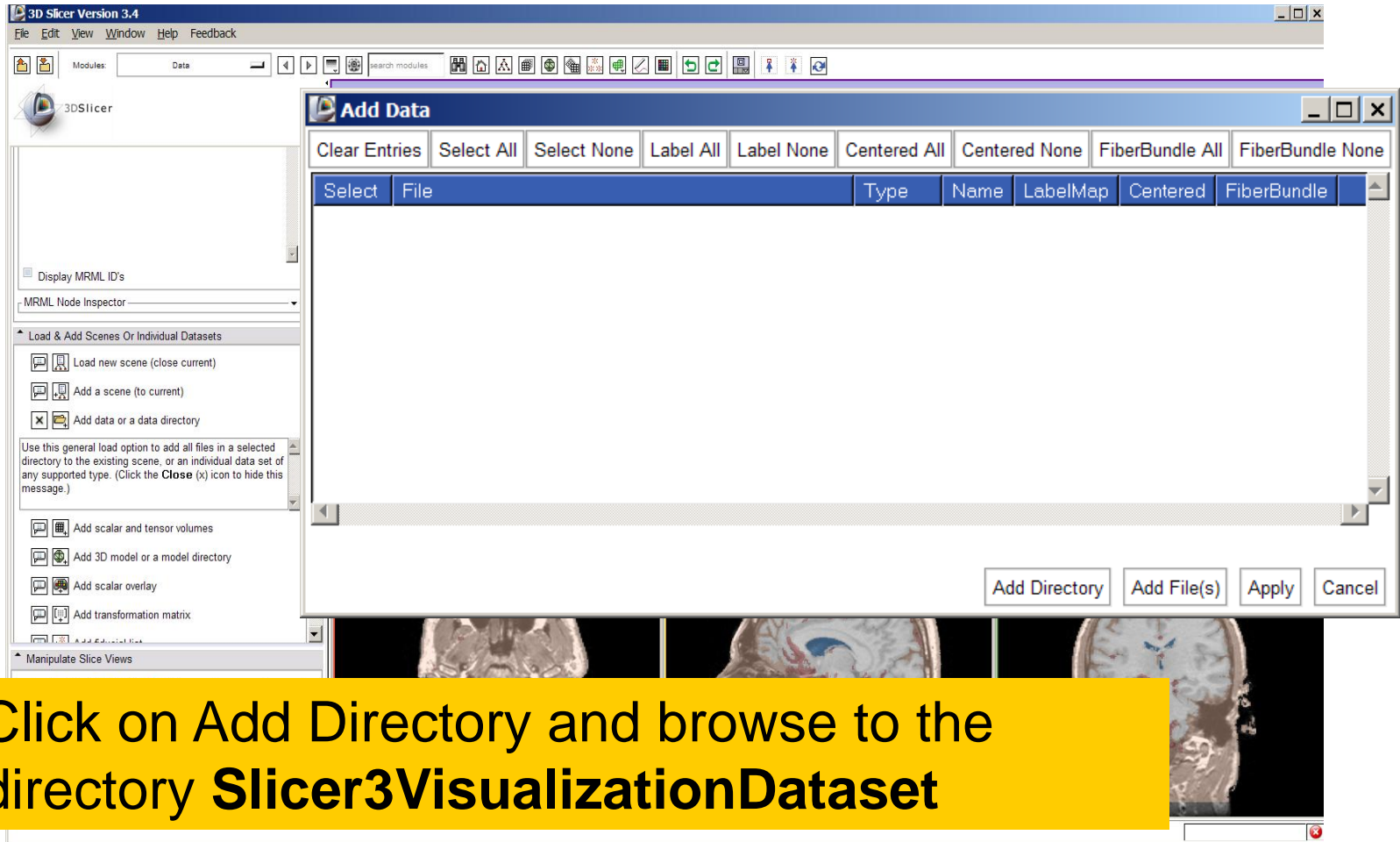
- A **3D model** is a surface reconstruction of an anatomical structure.
- The model is a **triangular mesh** that approximates a surface from a 3D label map.
- The scalar values for surface models are integers which correspond to the **label** that had been assigned in the segmentation process.



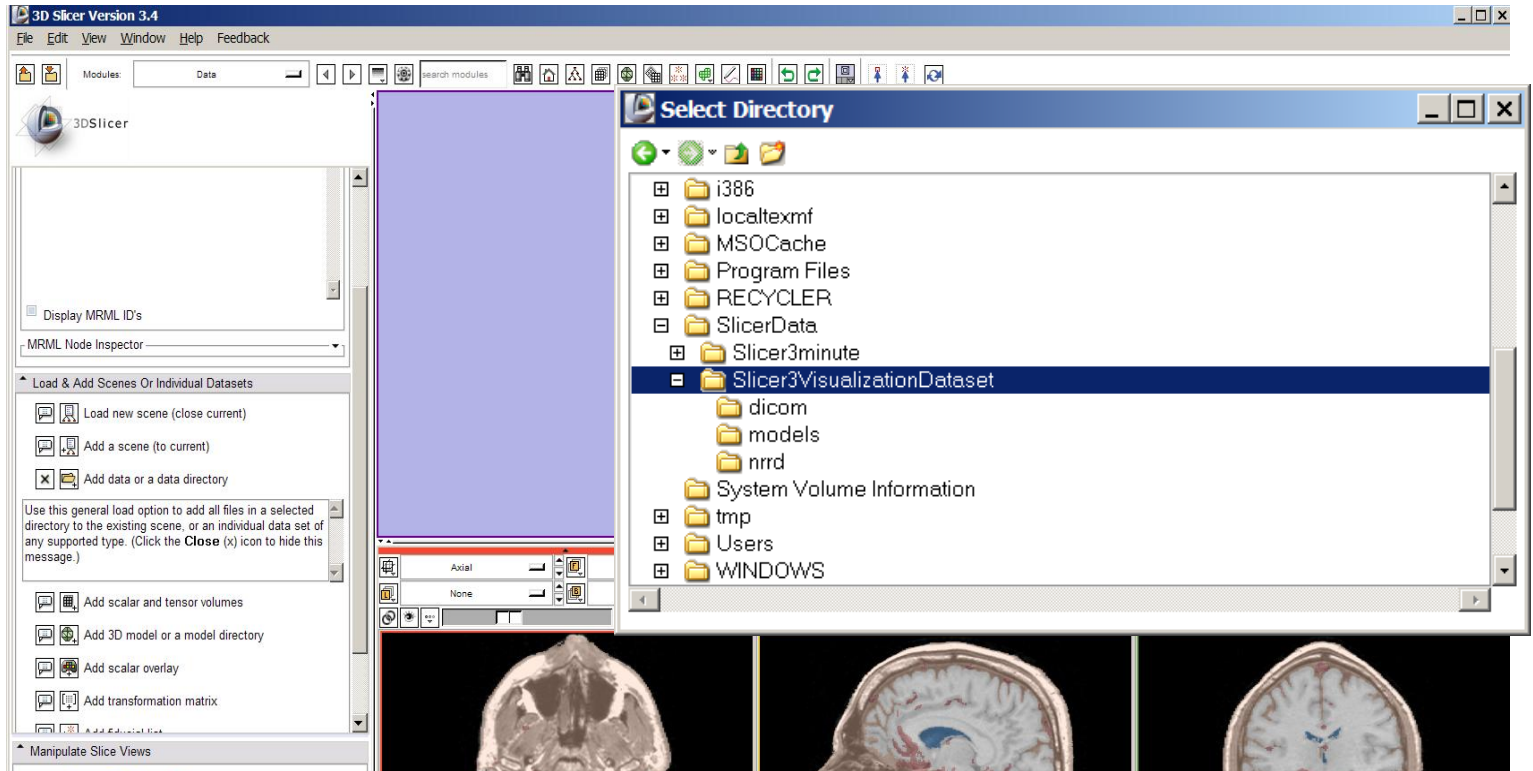


A small window displays information on how to use the function **Add data or data directory**

Click on the  icon

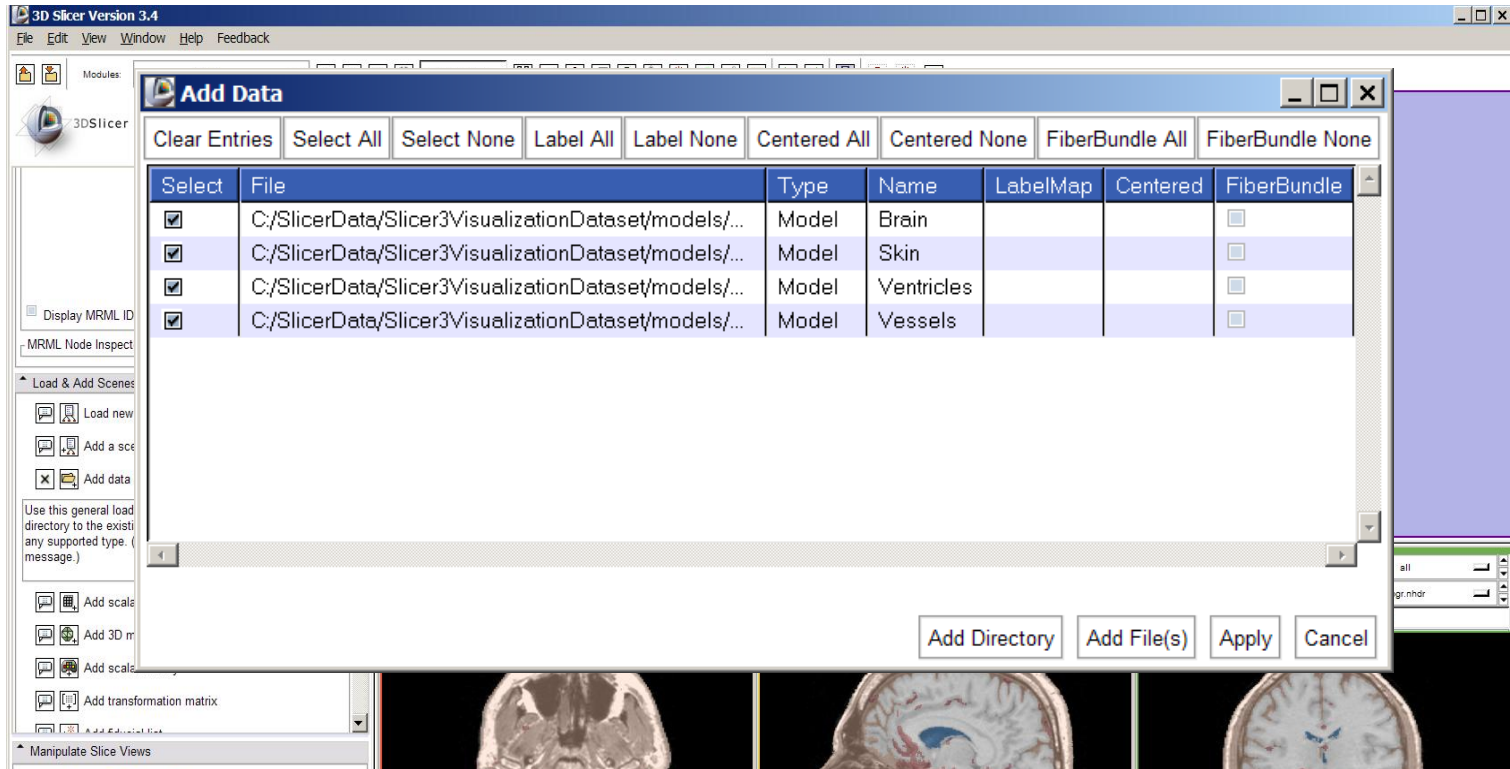


Loading 3D models



Select the directory
Slicer3VisualizationDataset/models and click on OK

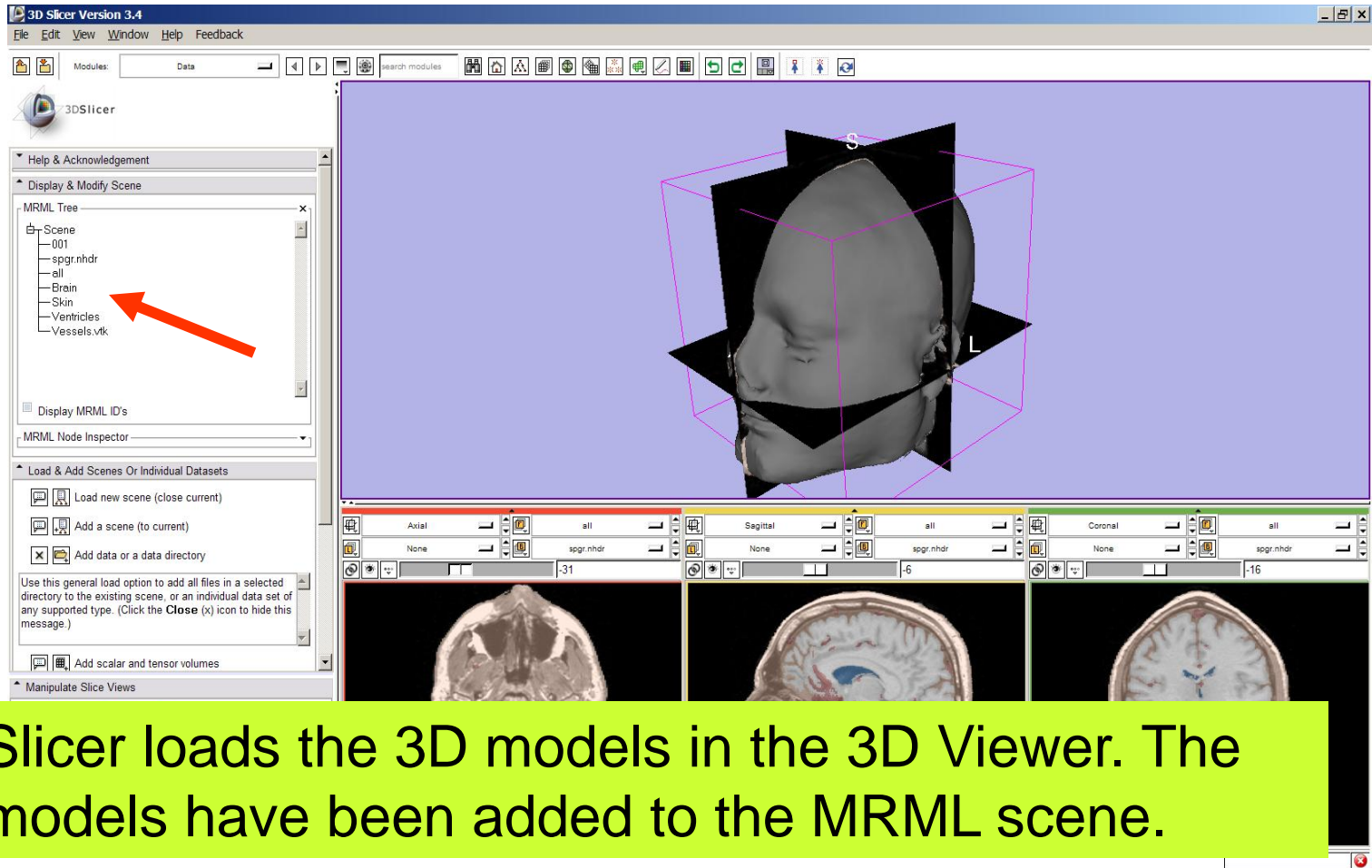
Loading 3D models



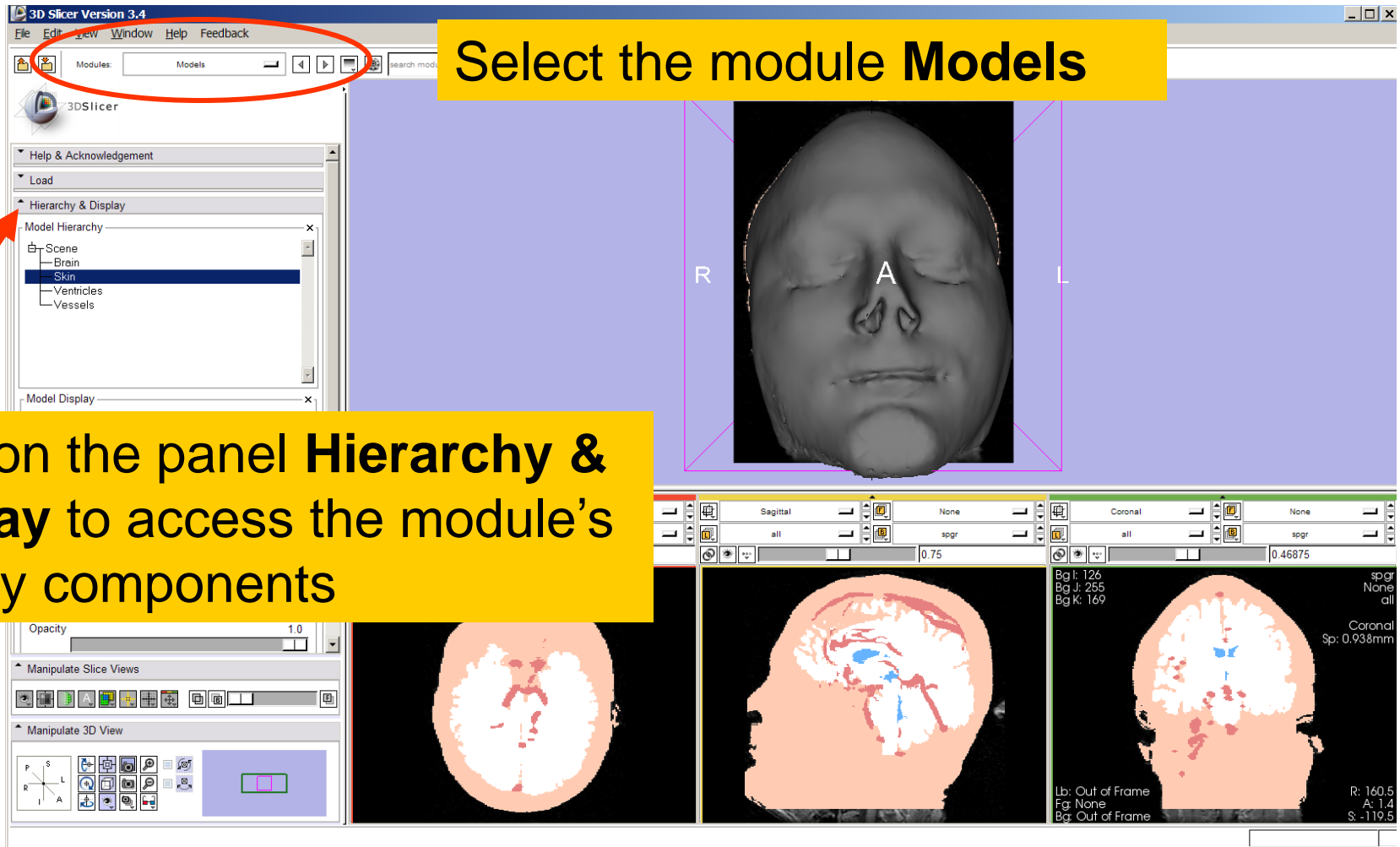
The list of elements present in the models directory appears in the Add Data window.

Click on **Apply** to load all the **3D models**.

Loading 3D models



Loading a 3D model



Select the module Models

Click on the panel Hierarchy & Display to access the module's display components

Model Hierarchy

- Scene
 - Brain
 - Skin**
 - Ventricles
 - Vessels

Manipulate Slice Views

Manipulate 3D View

Sagittal | None | Coronal | None

all | spgr | all | spgr

0.75 | 0.46875

Bg I: 126
Bg J: 255
Bg K: 169

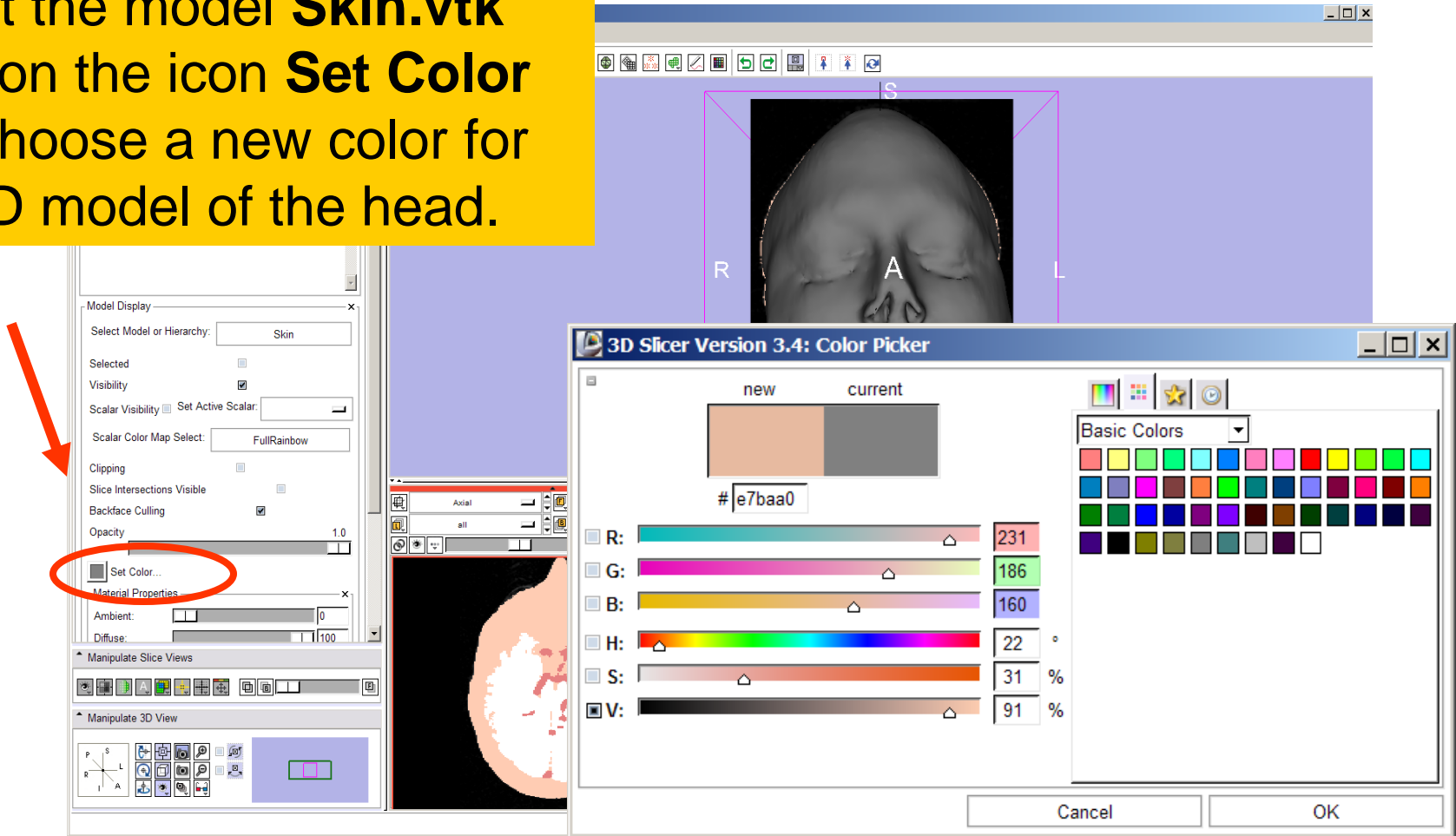
Coronal
Sp: 0.938mm

Lb: Out of Frame
Fg: None
Bg: Out of Frame

R: 160.5
A: 1.4
S: -119.5

Visualizing a 3D model

Select the model **Skin.vtk**
 Click on the icon **Set Color**
 and choose a new color for
 the 3D model of the head.

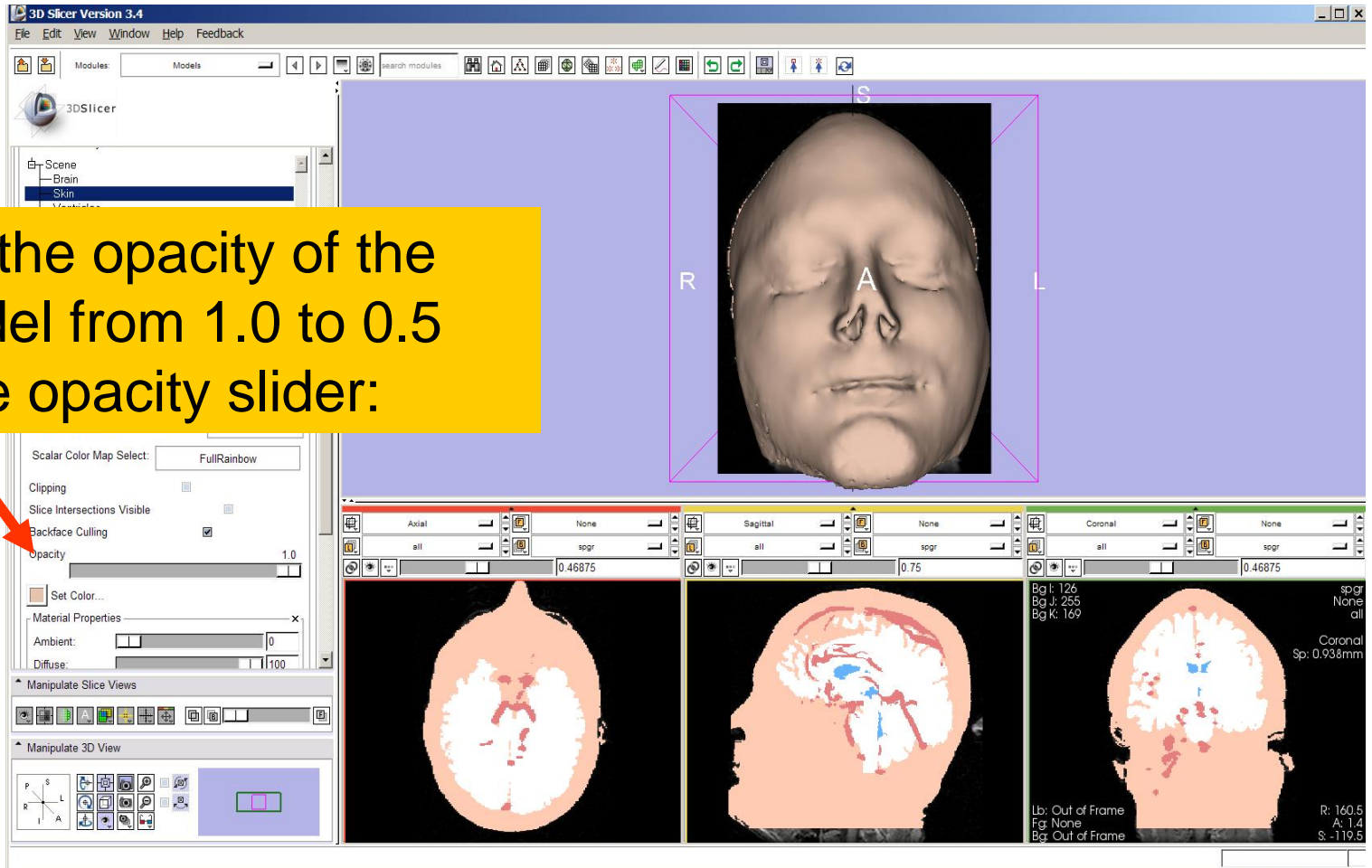


The screenshot shows the 3D Slicer interface. The 3D view displays a head model with axes labeled R (Right), L (Left), S (Superior), and A (Anterior). The Model Display panel on the left shows the 'Skin' model selected. A red arrow points to the 'Set Color...' button in the Material Properties section. The Color Picker dialog is open, showing the current color as #e7baa0 and the new color as #e7baa0. The dialog also displays the RGB and HSV values for the selected color.

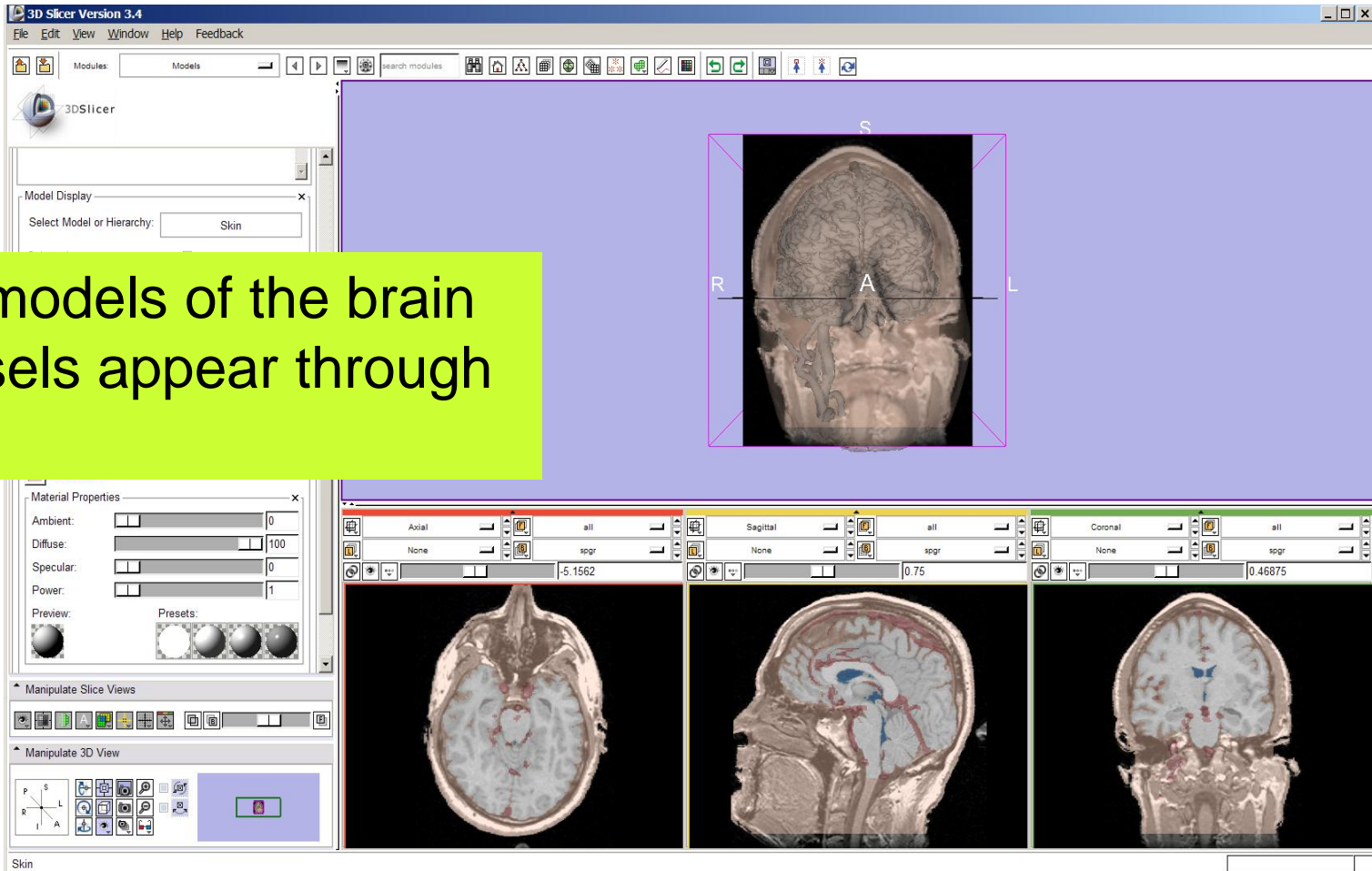
Property	Value	Unit
R	231	
G	186	
B	160	
H	22	°
S	31	%
V	91	%

Visualizing a 3D model

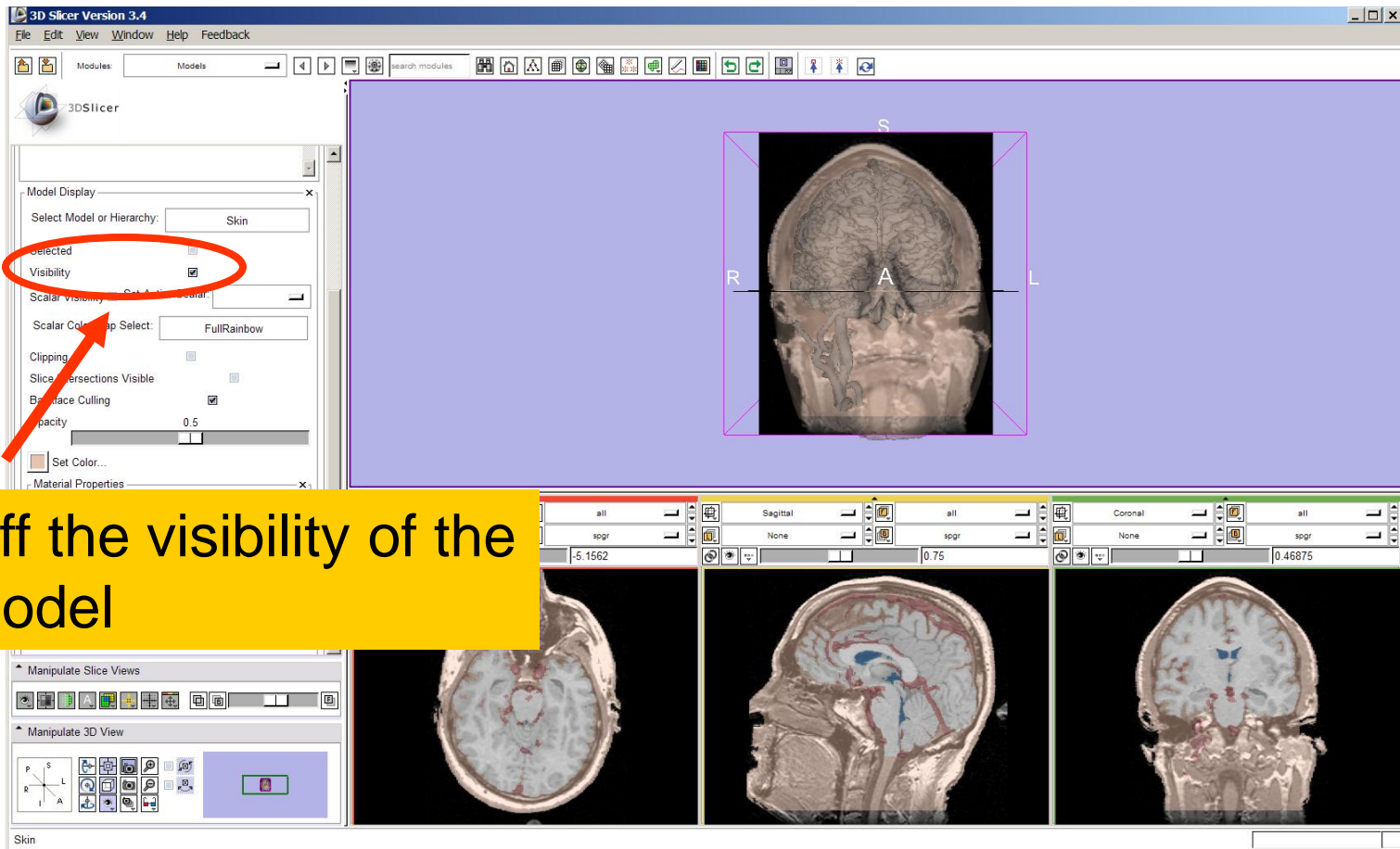
Change the opacity of the skin model from 1.0 to 0.5 using the opacity slider:



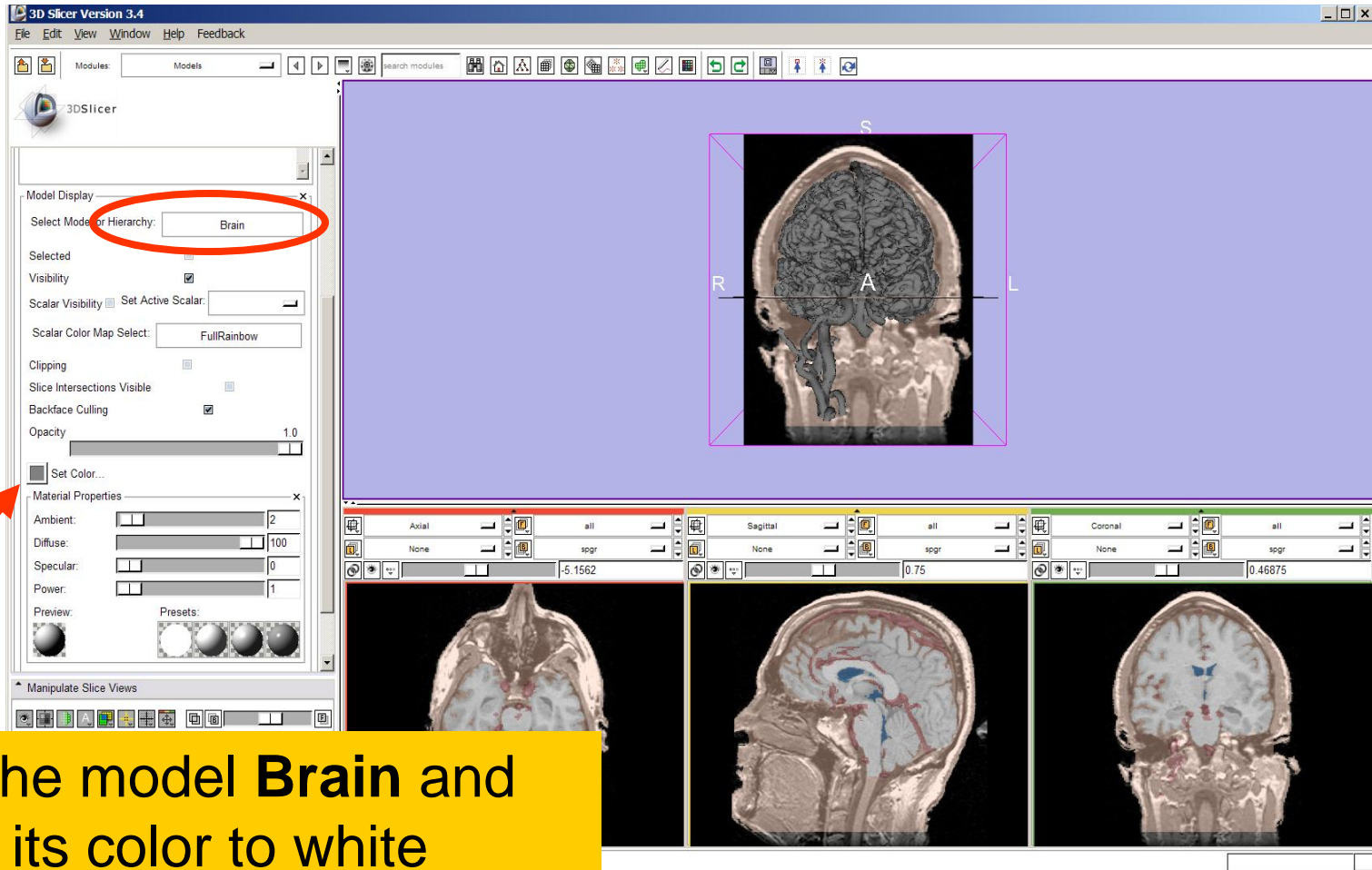
Visualizing a 3D model



Visualizing a 3D model

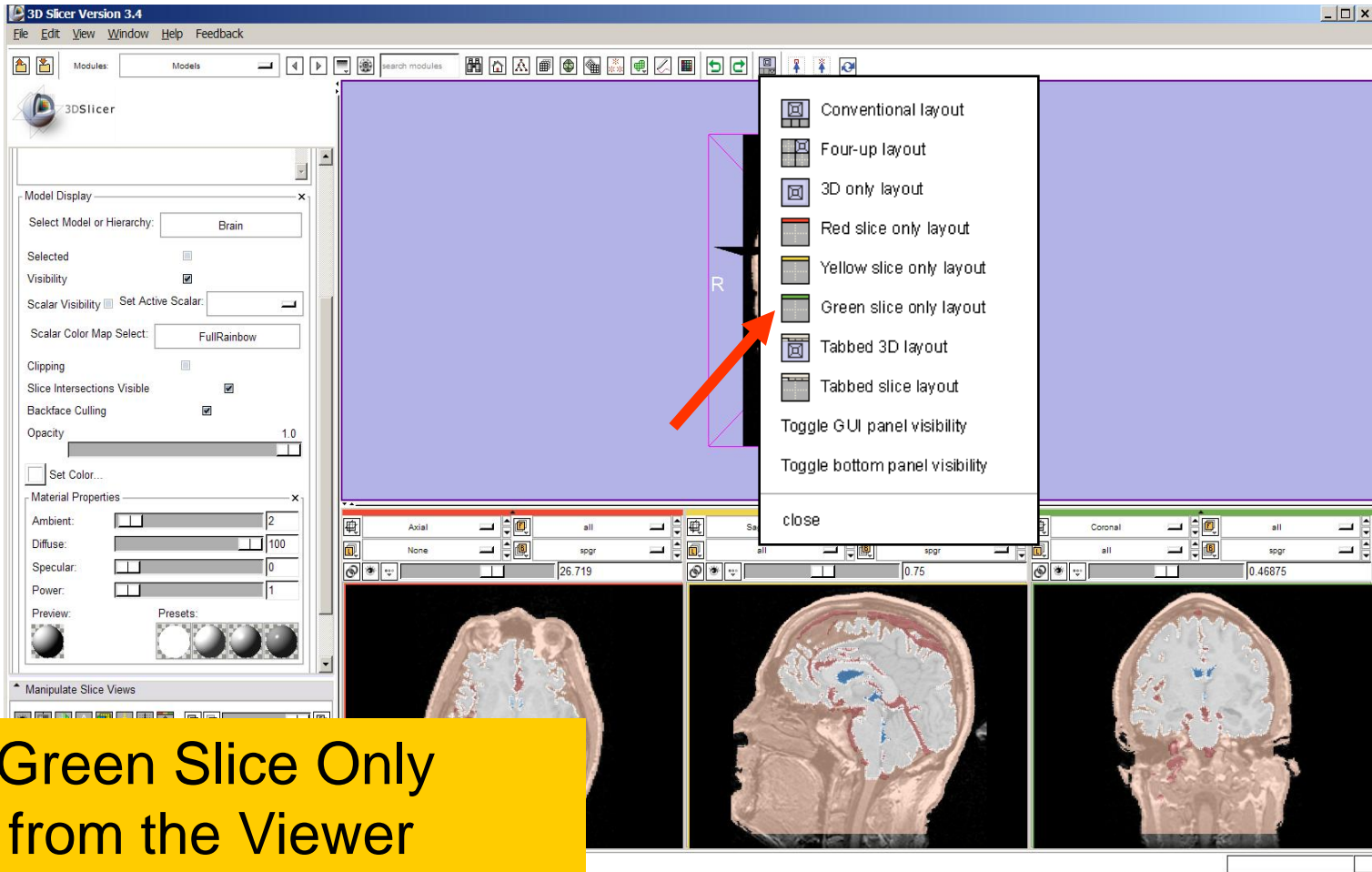


Visualizing a 3D model



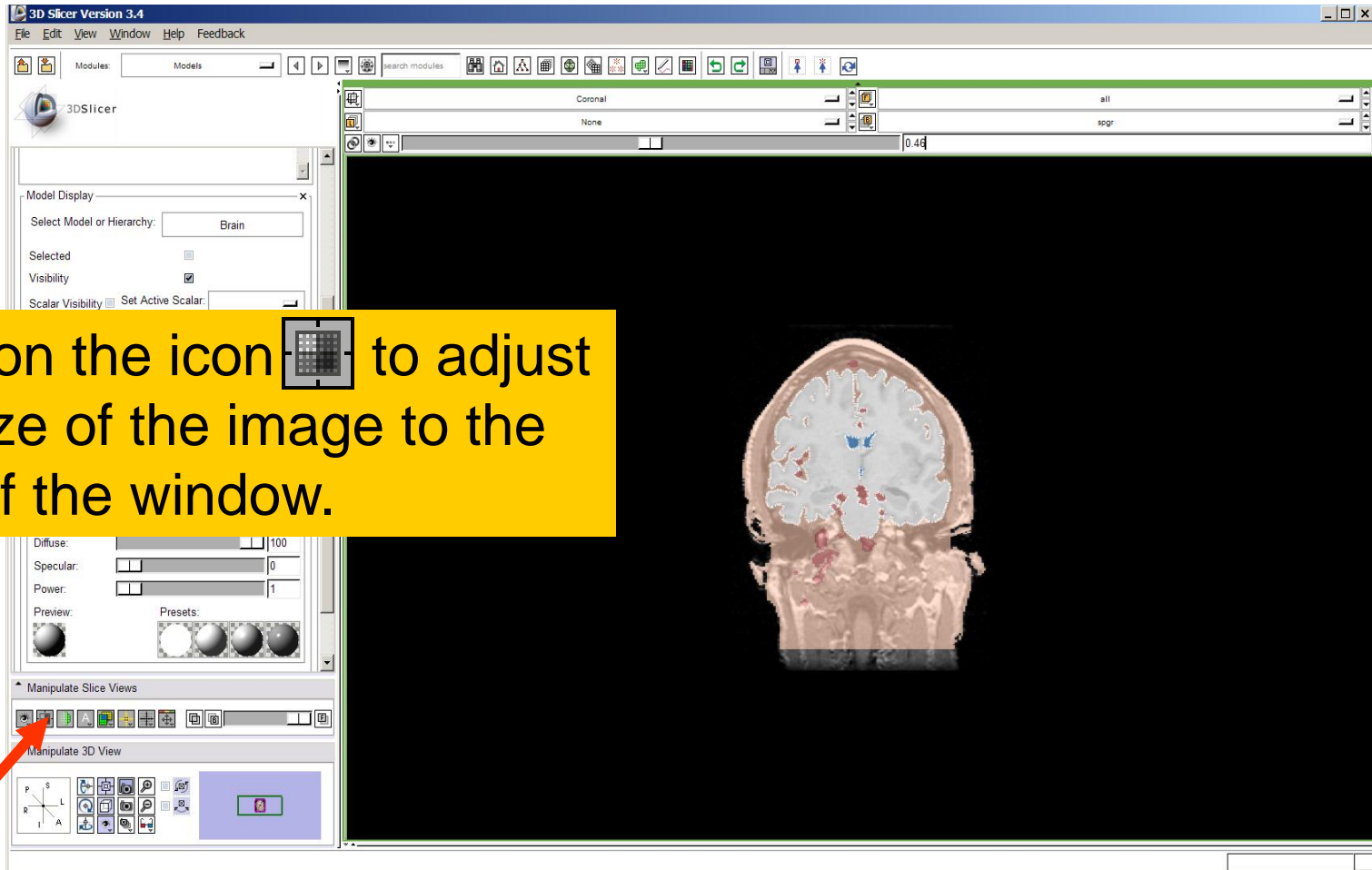
Select the model **Brain** and change its color to white

Visualizing a 3D model

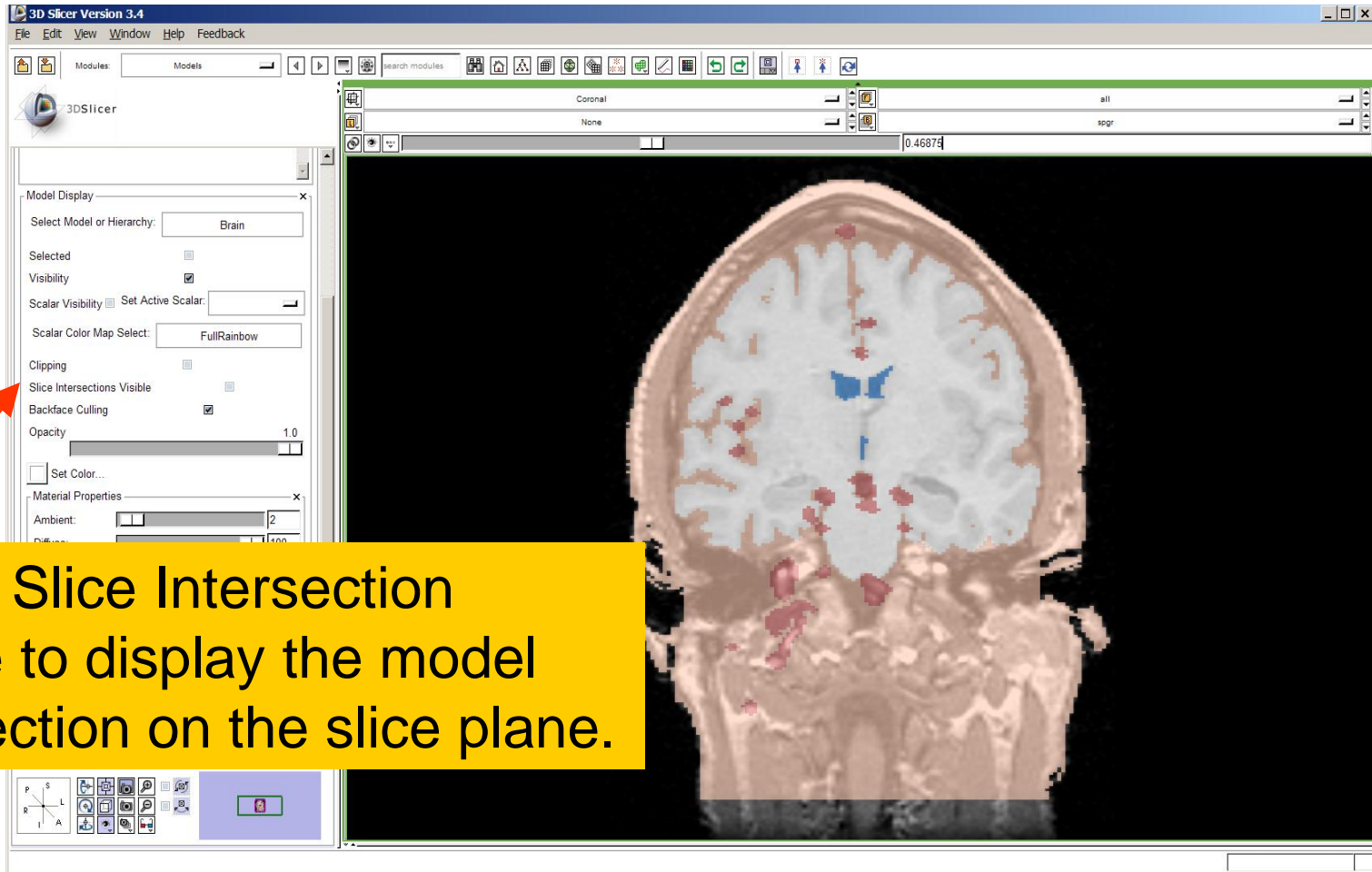


Select Green Slice Only
Layout from the Viewer
menu

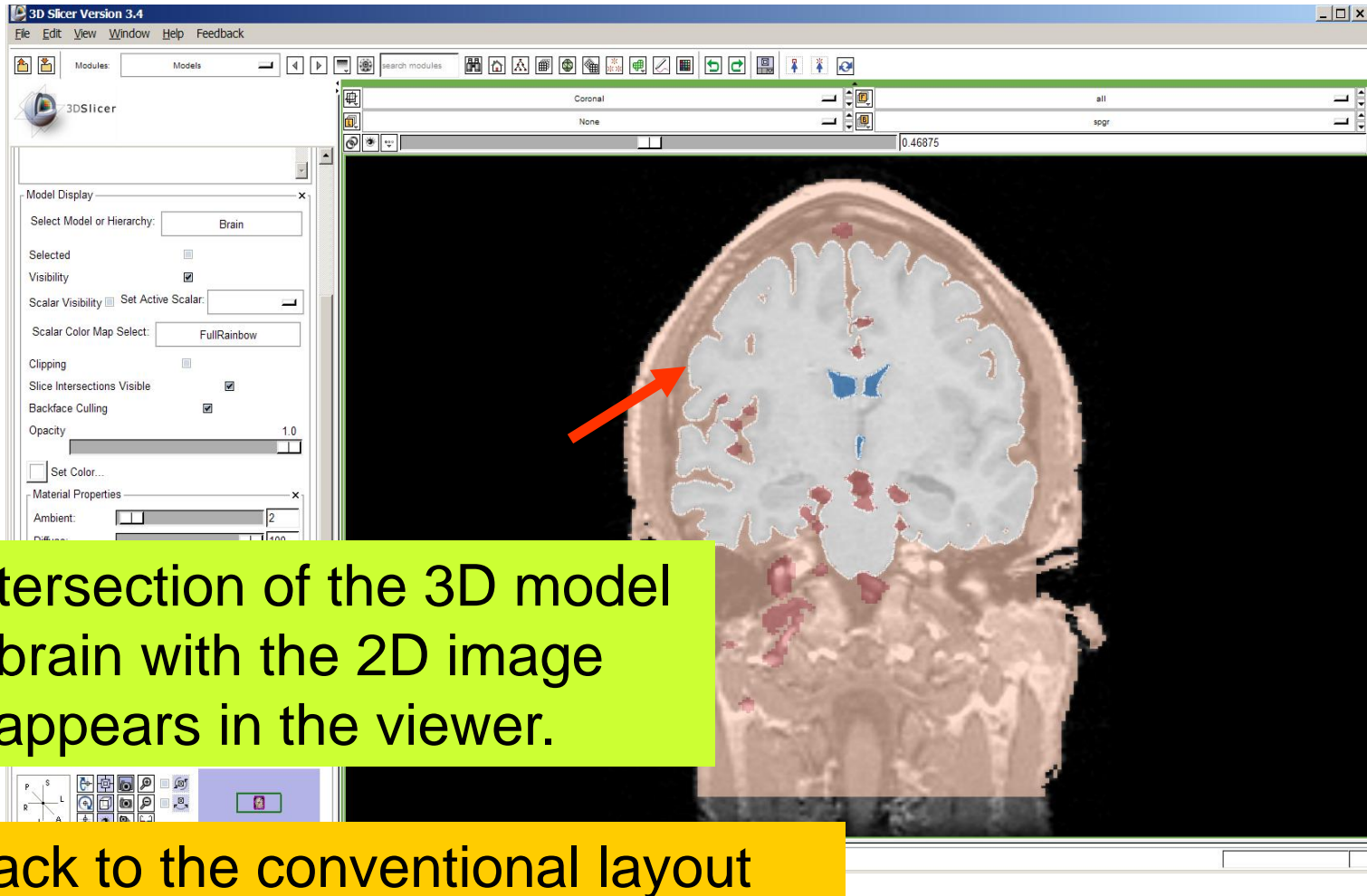
Visualizing a 3D model



Visualizing a 3D model



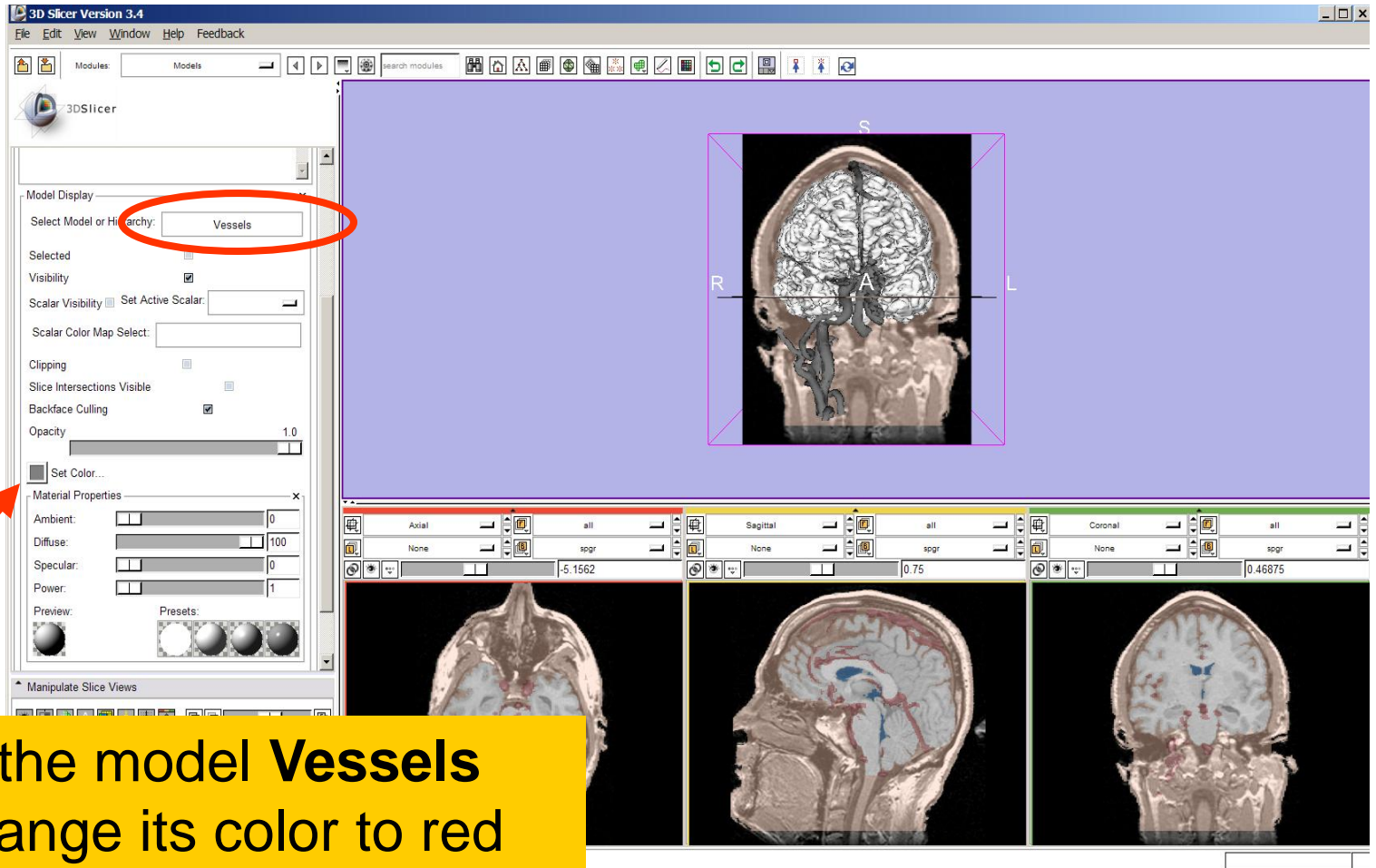
Visualizing a 3D model



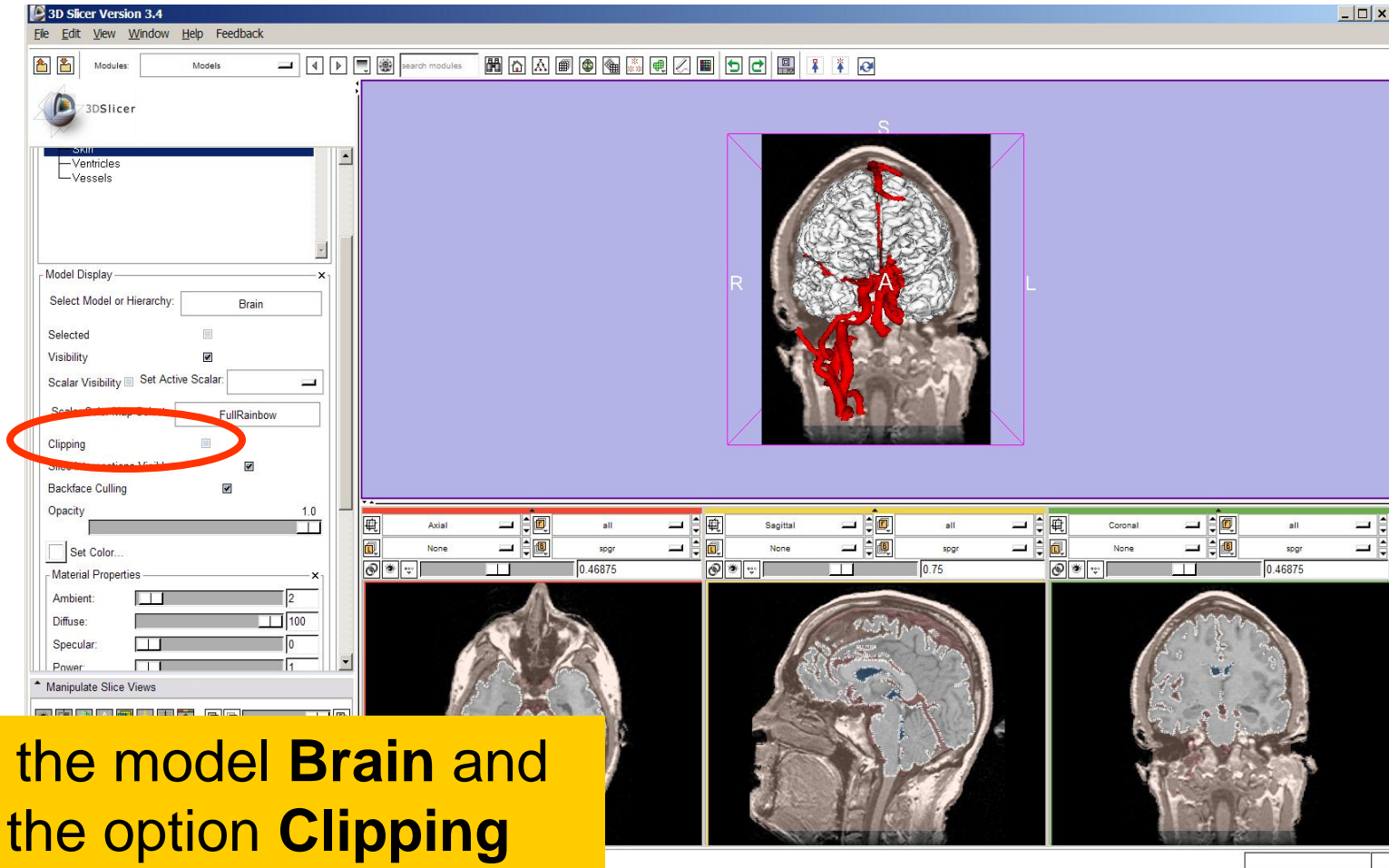
The intersection of the 3D model of the brain with the 2D image plane appears in the viewer.

Go back to the conventional layout

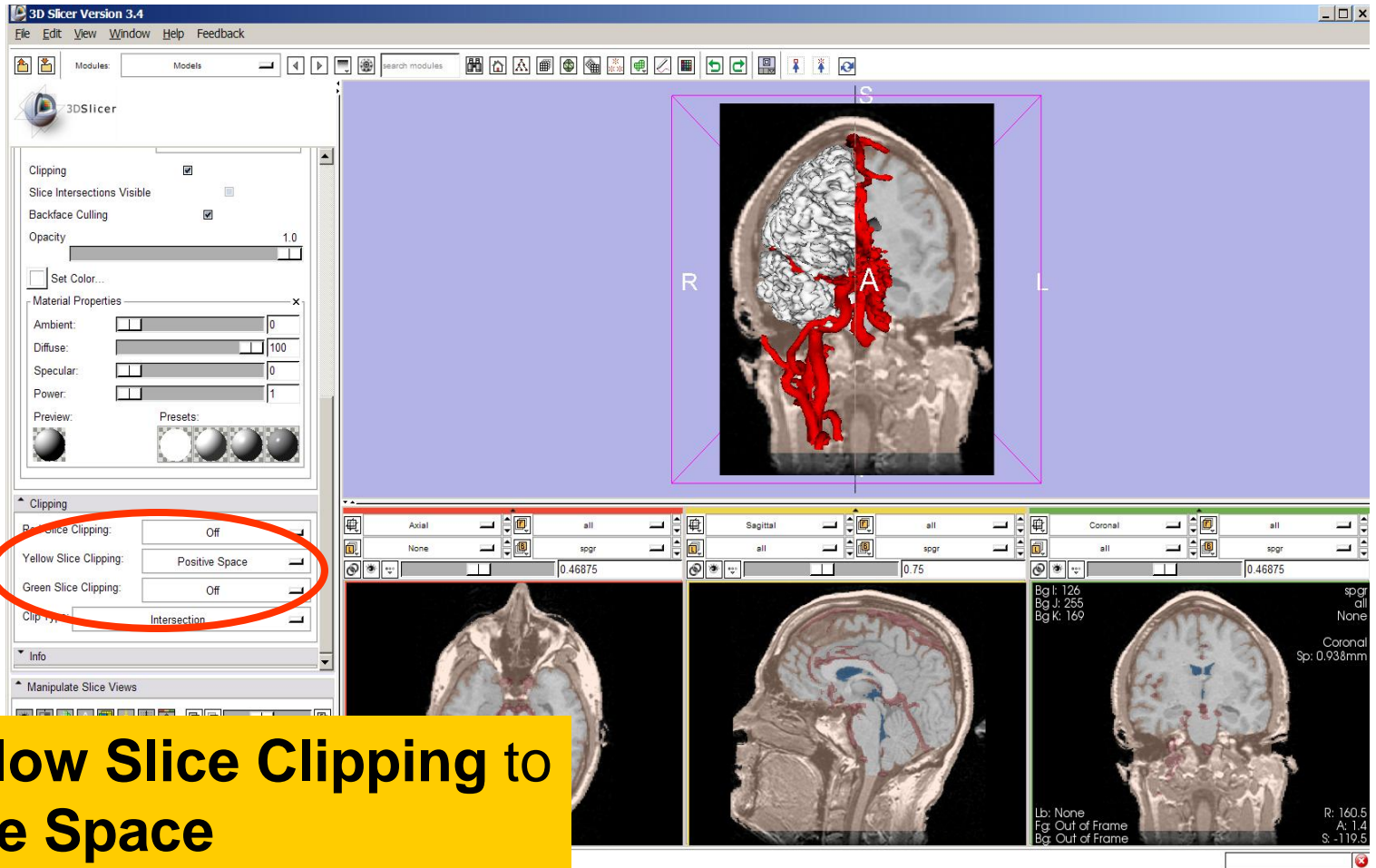
Visualizing a 3D model



Visualizing a 3D model

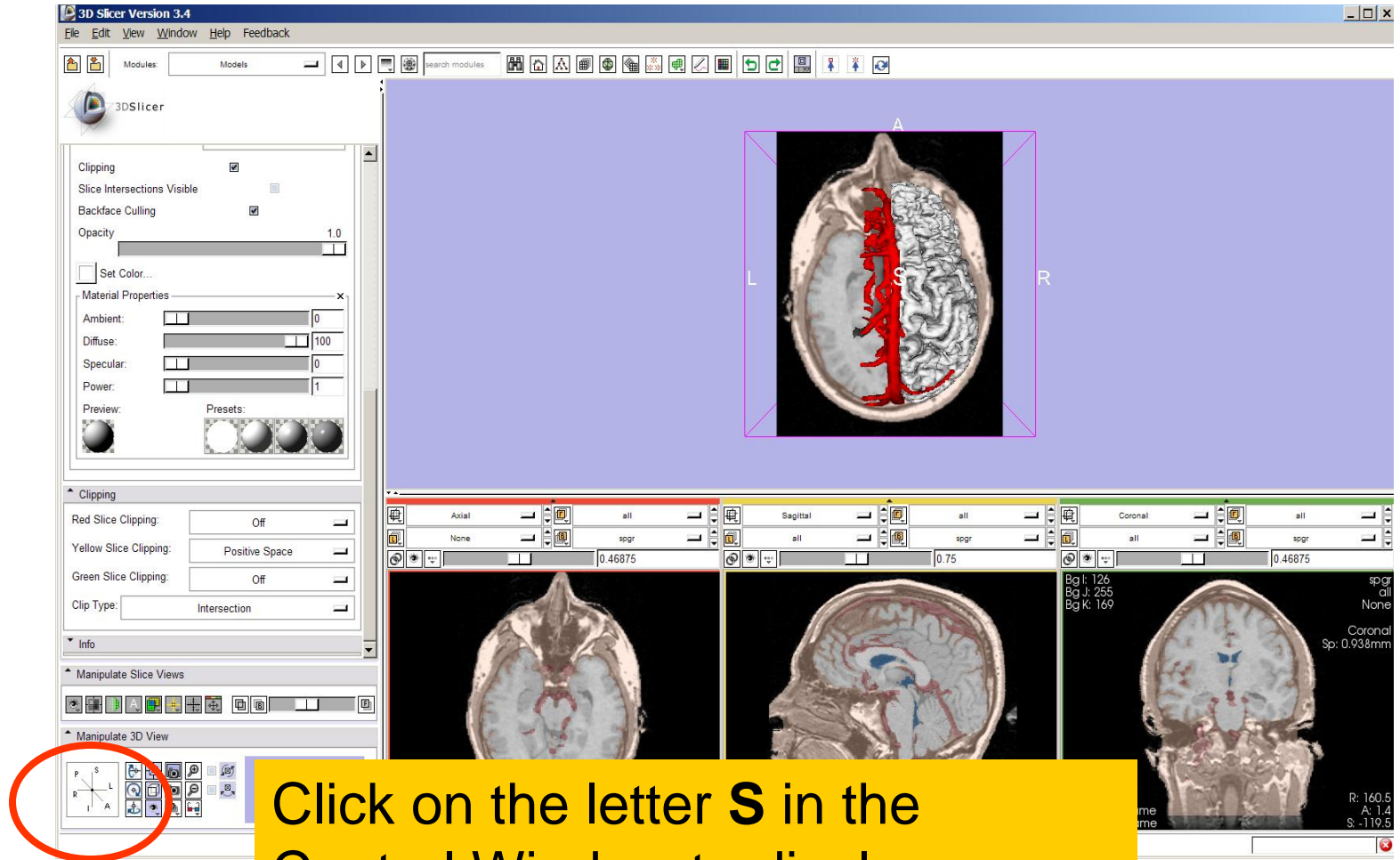


Visualizing a 3D model



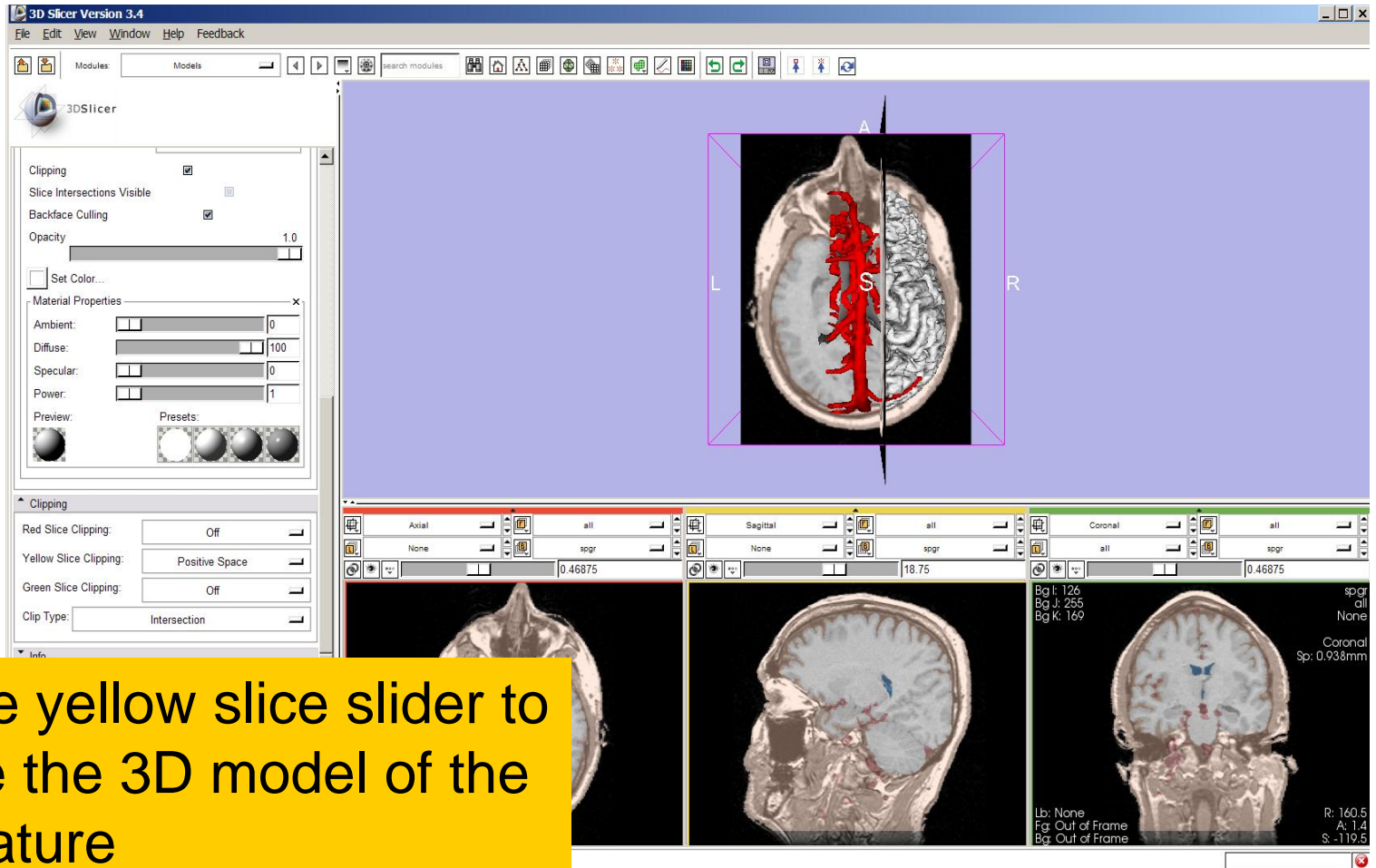
Set Yellow Slice Clipping to Positive Space

Visualizing a 3D model



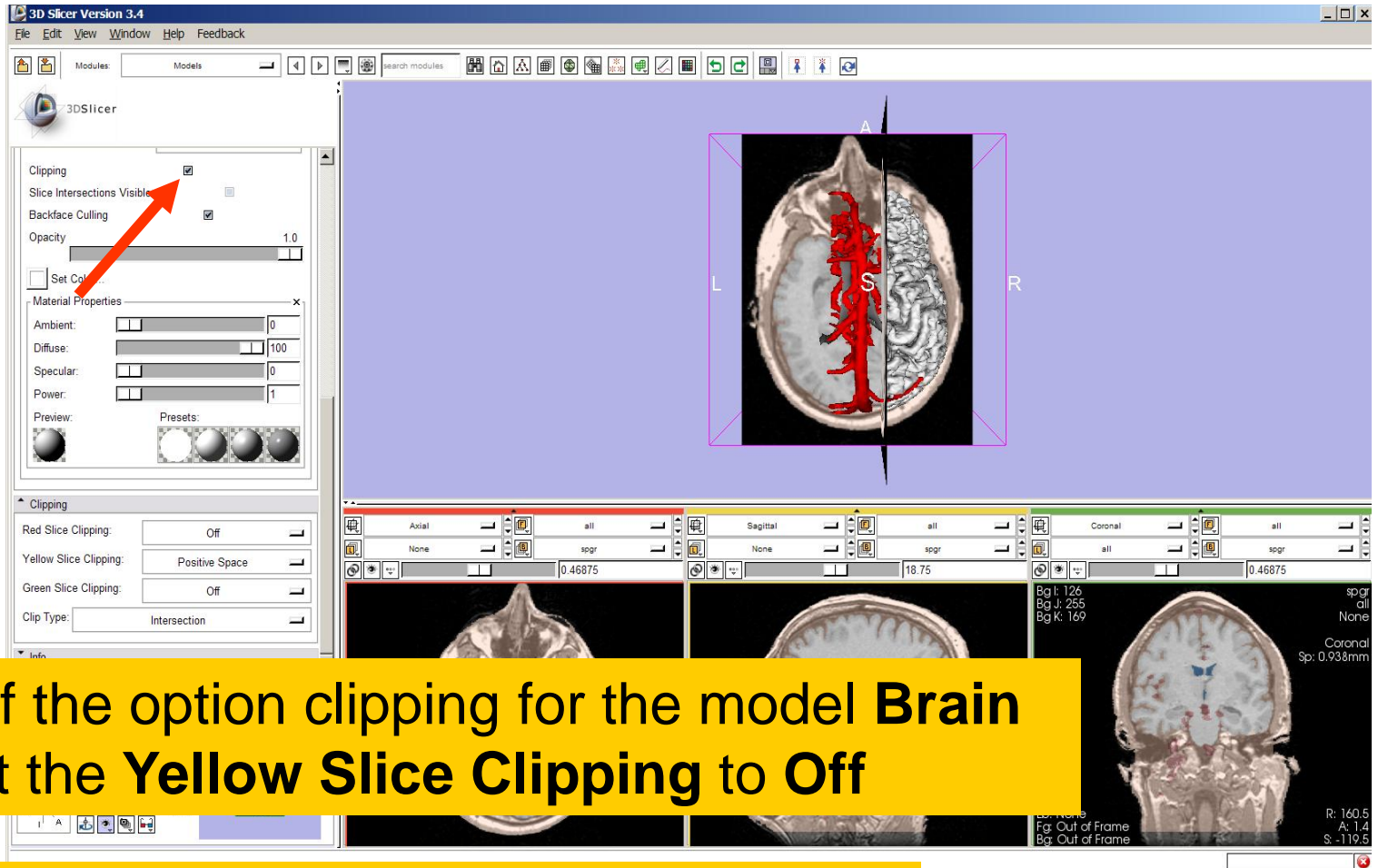
Click on the letter **S** in the Control Window to display a superior view of the 3D models

Visualizing a 3D model



Use the yellow slice slider to expose the 3D model of the vasculature

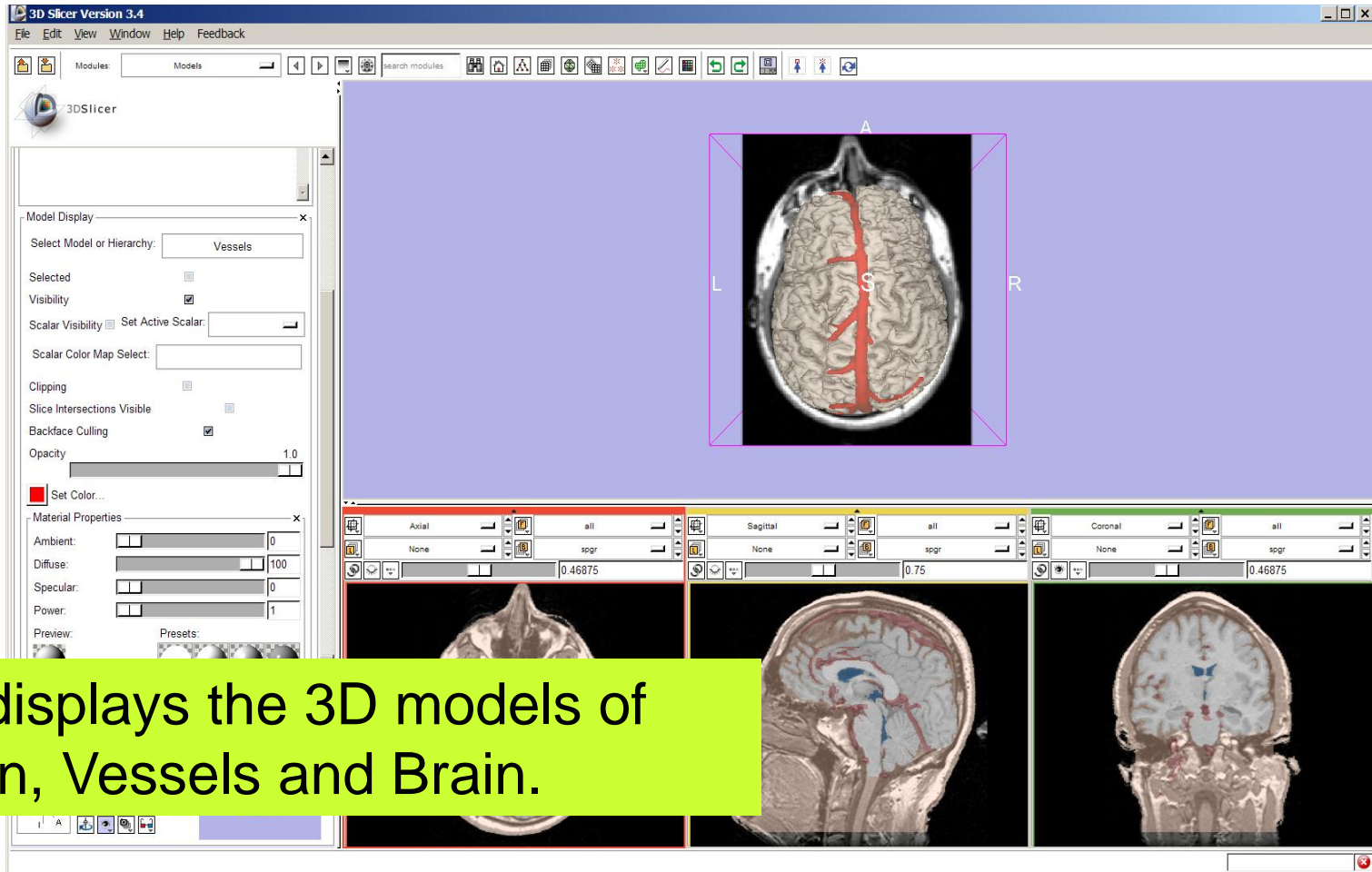
Visualizing a 3D model



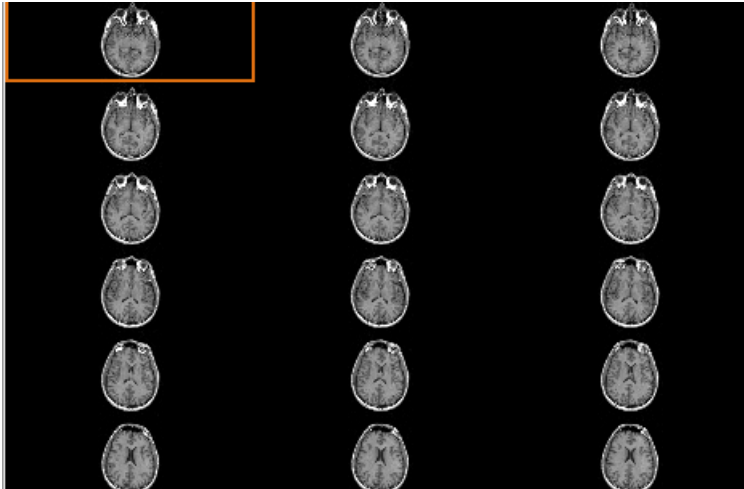
Turn off the option clipping for the model **Brain** and set the **Yellow Slice Clipping** to **Off**

Turn on the visibility of the model **Skin**

Visualizing a 3D model

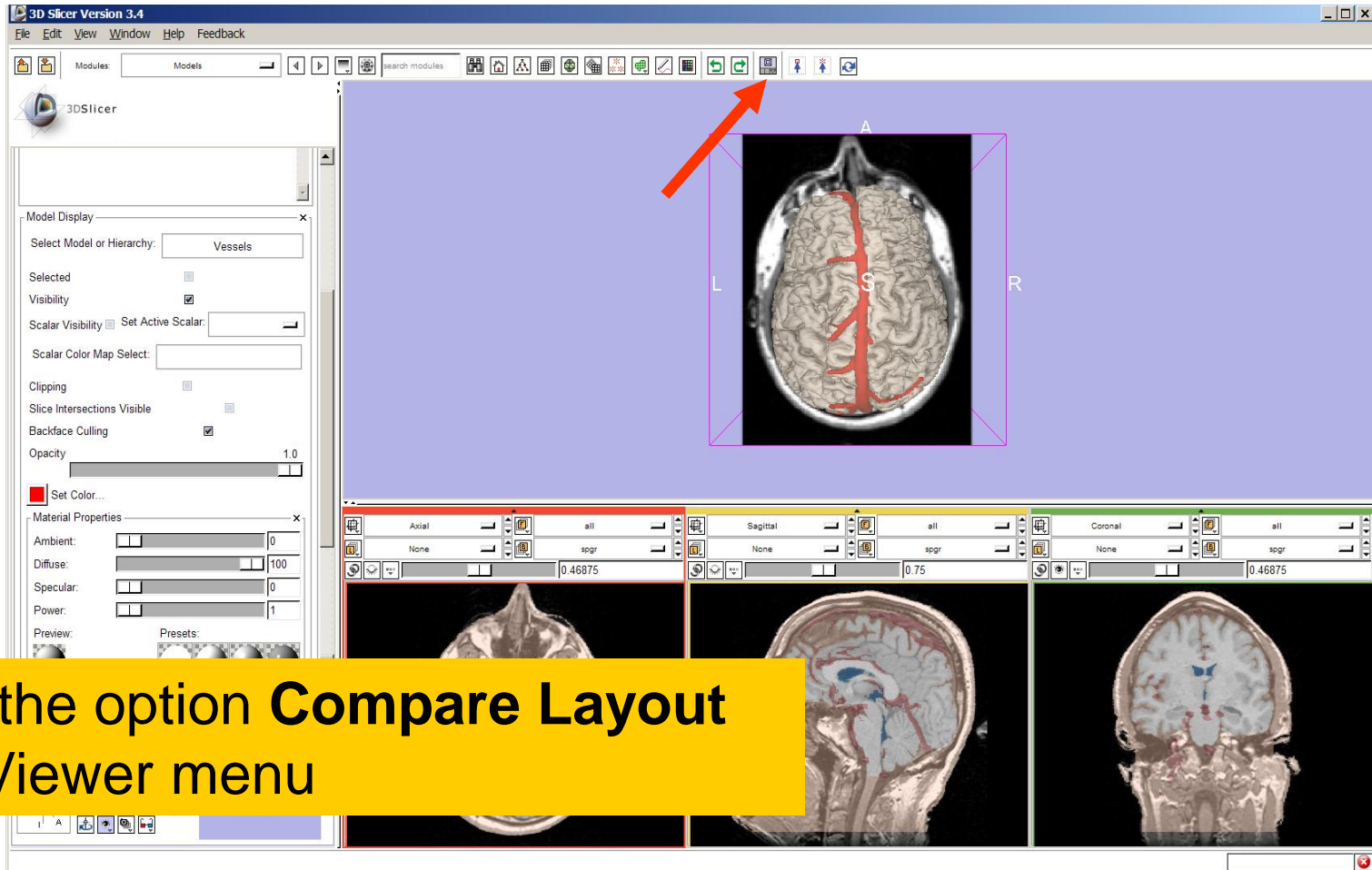


Slicer displays the 3D models of the Skin, Vessels and Brain.



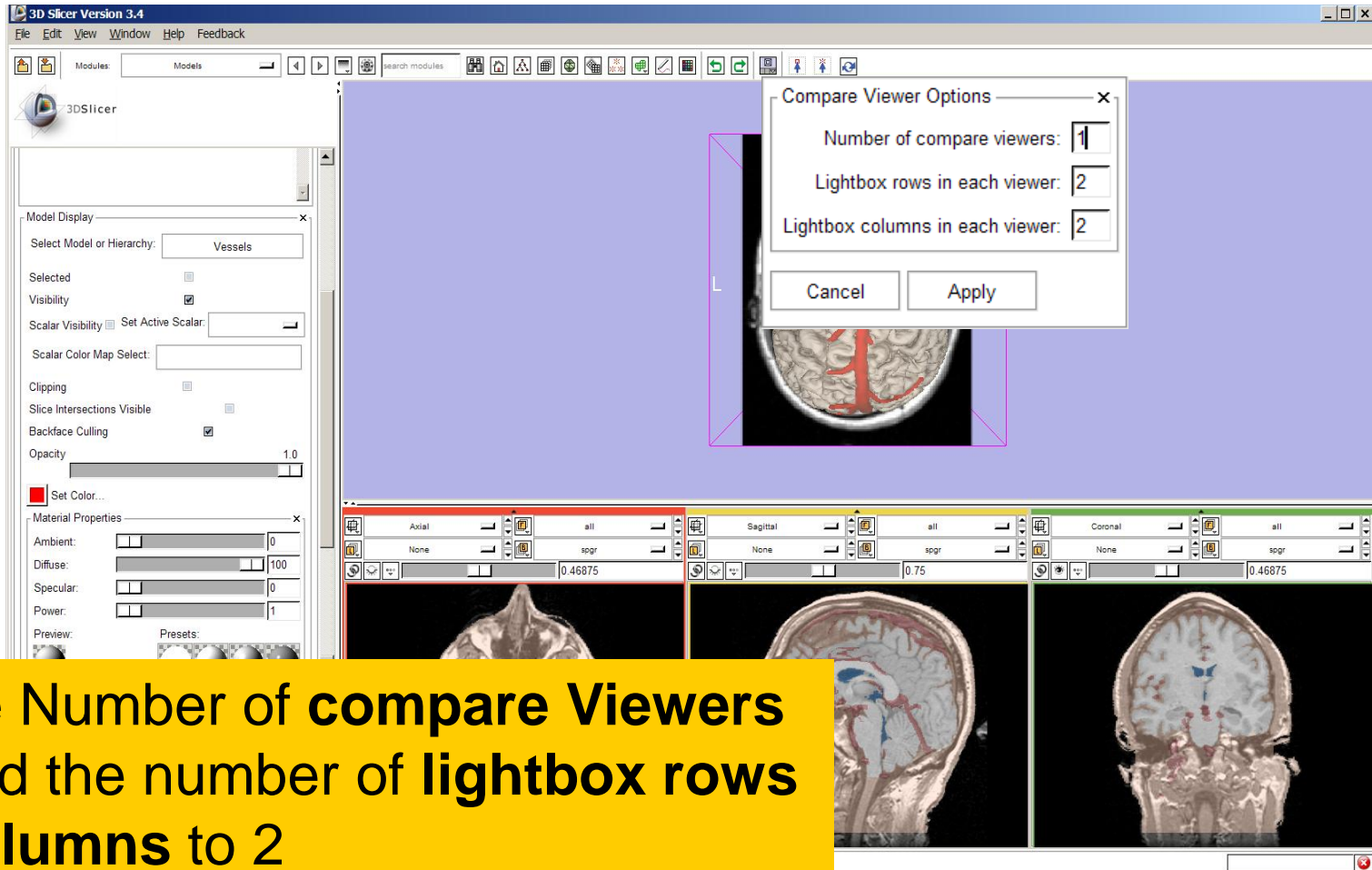
Part 4: Lightbox viewer

Visualizing a 3D model



Select the option **Compare Layout** in the Viewer menu

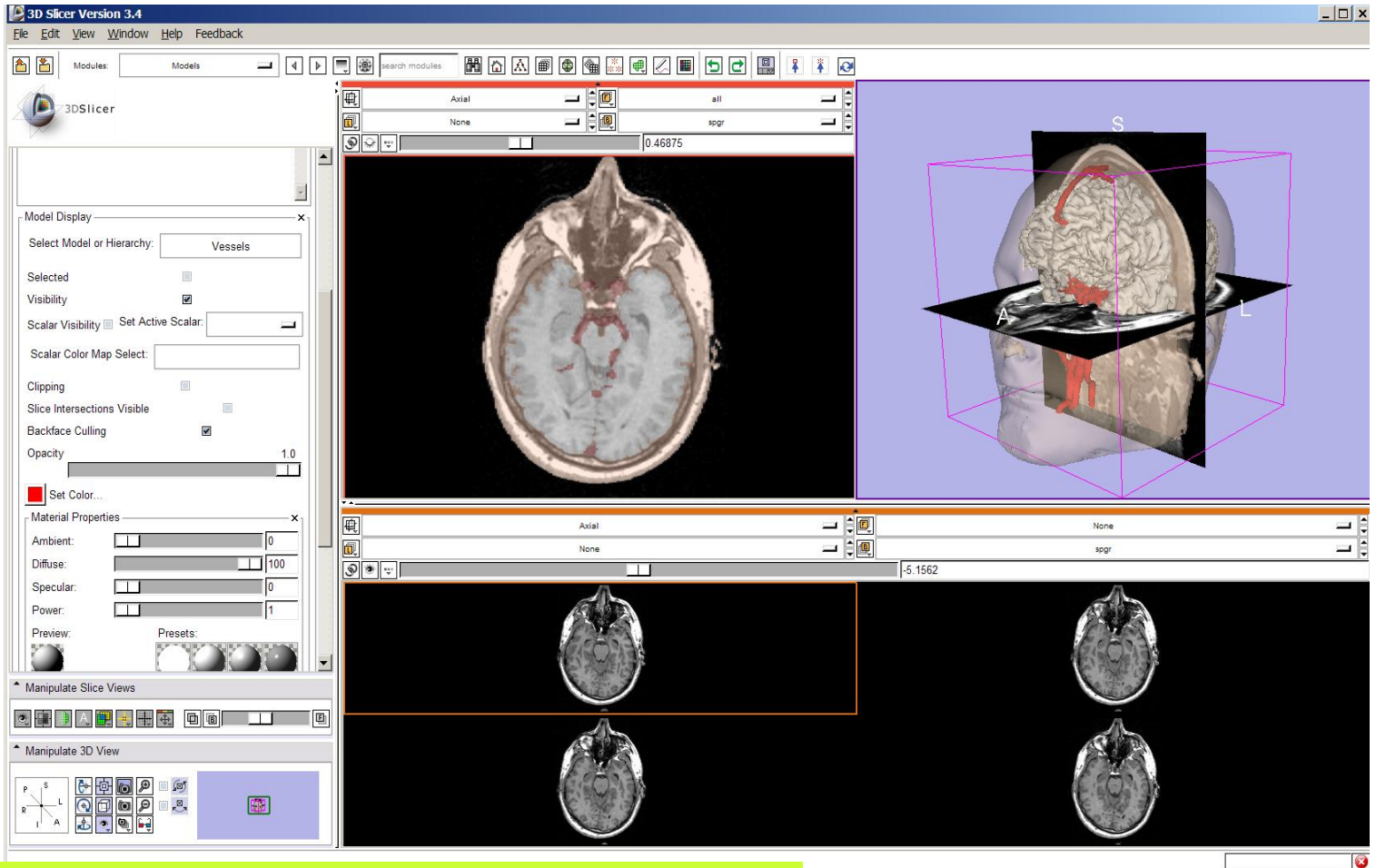
Visualizing a 3D model



Set the Number of **compare Viewers** to 1 and the number of **lightbox rows** and **columns** to 2

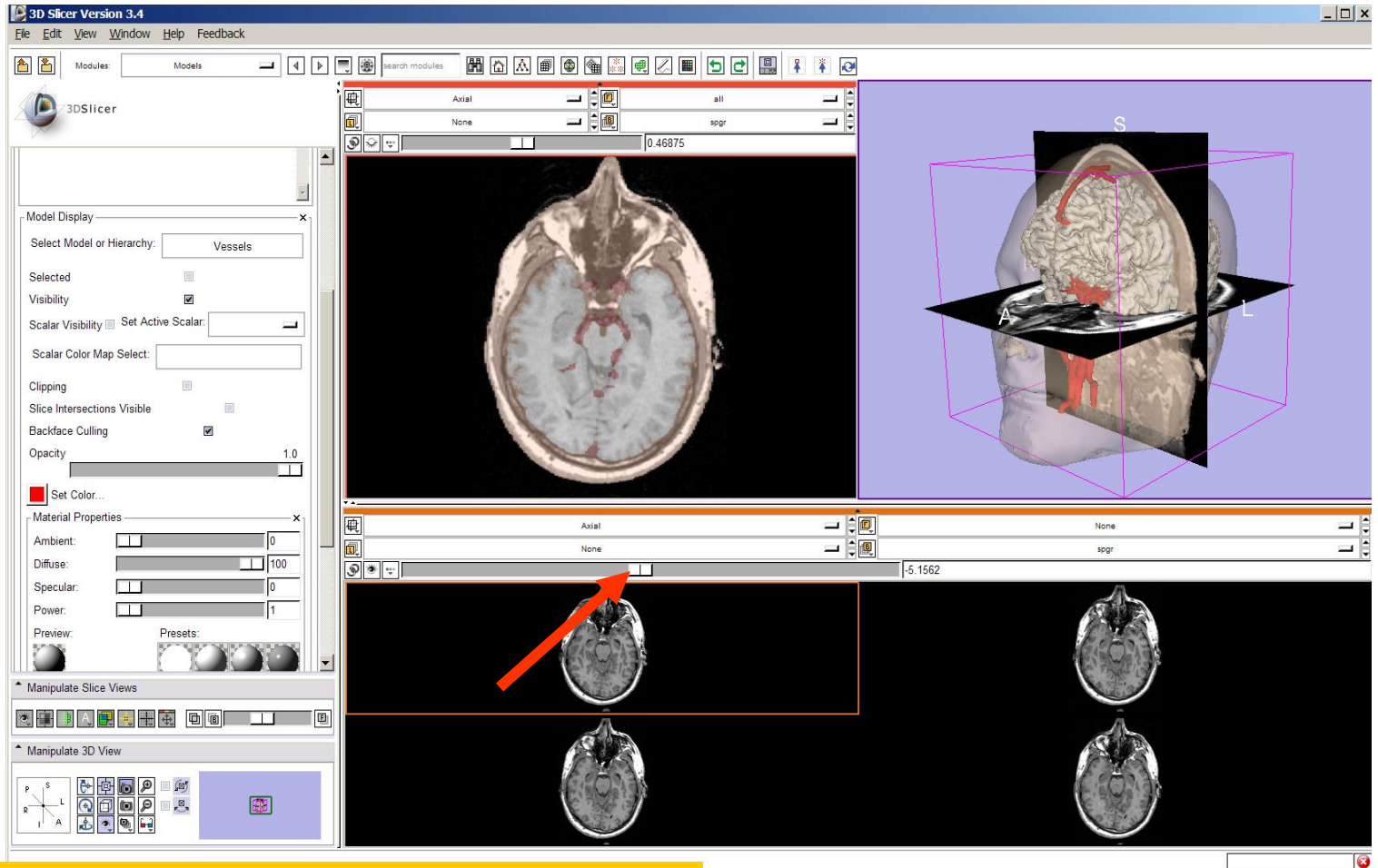
Click on **Apply**

Lightbox viewer



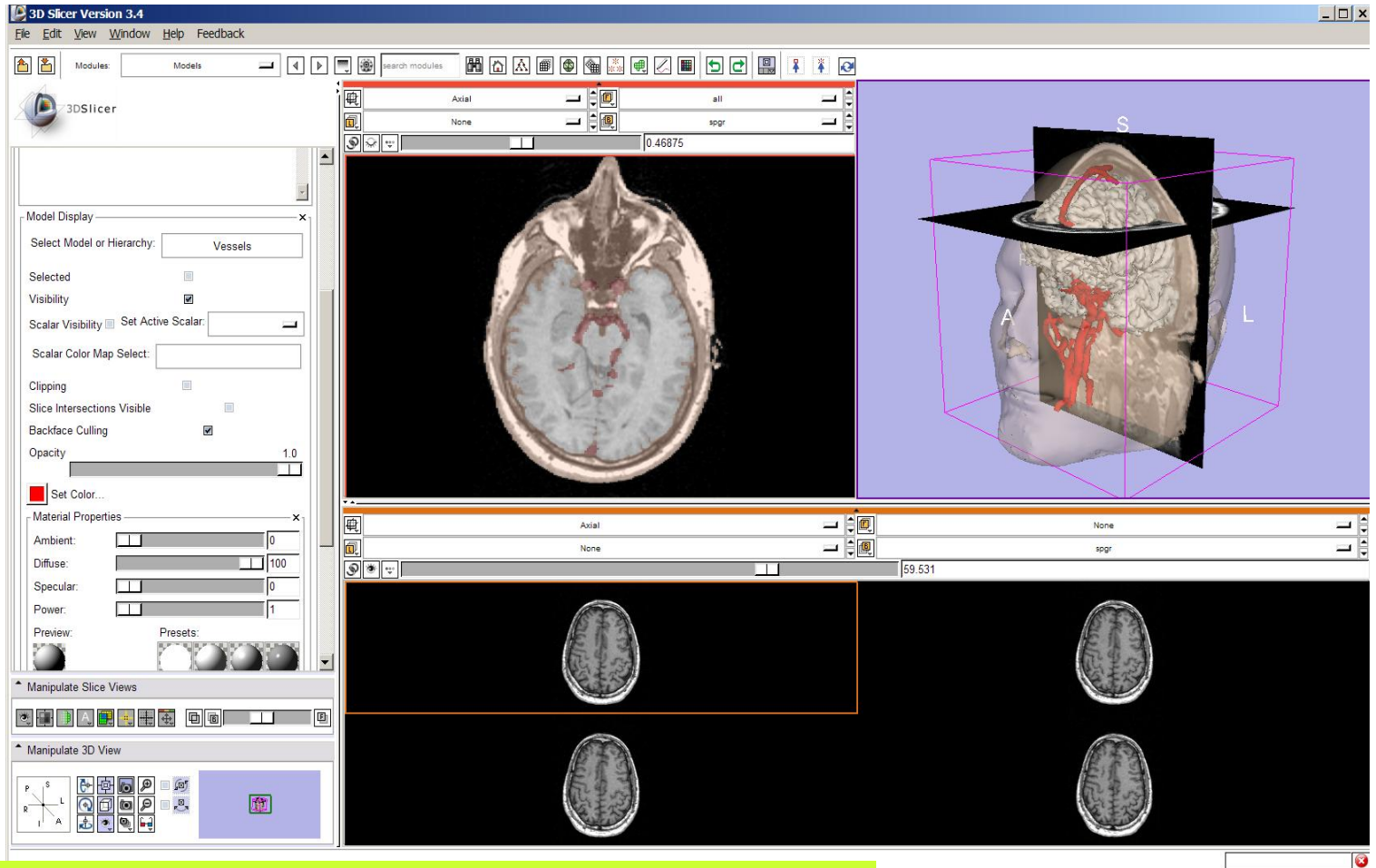
Slicer displays a lightbox view of the Background dataset.

Lightbox viewer



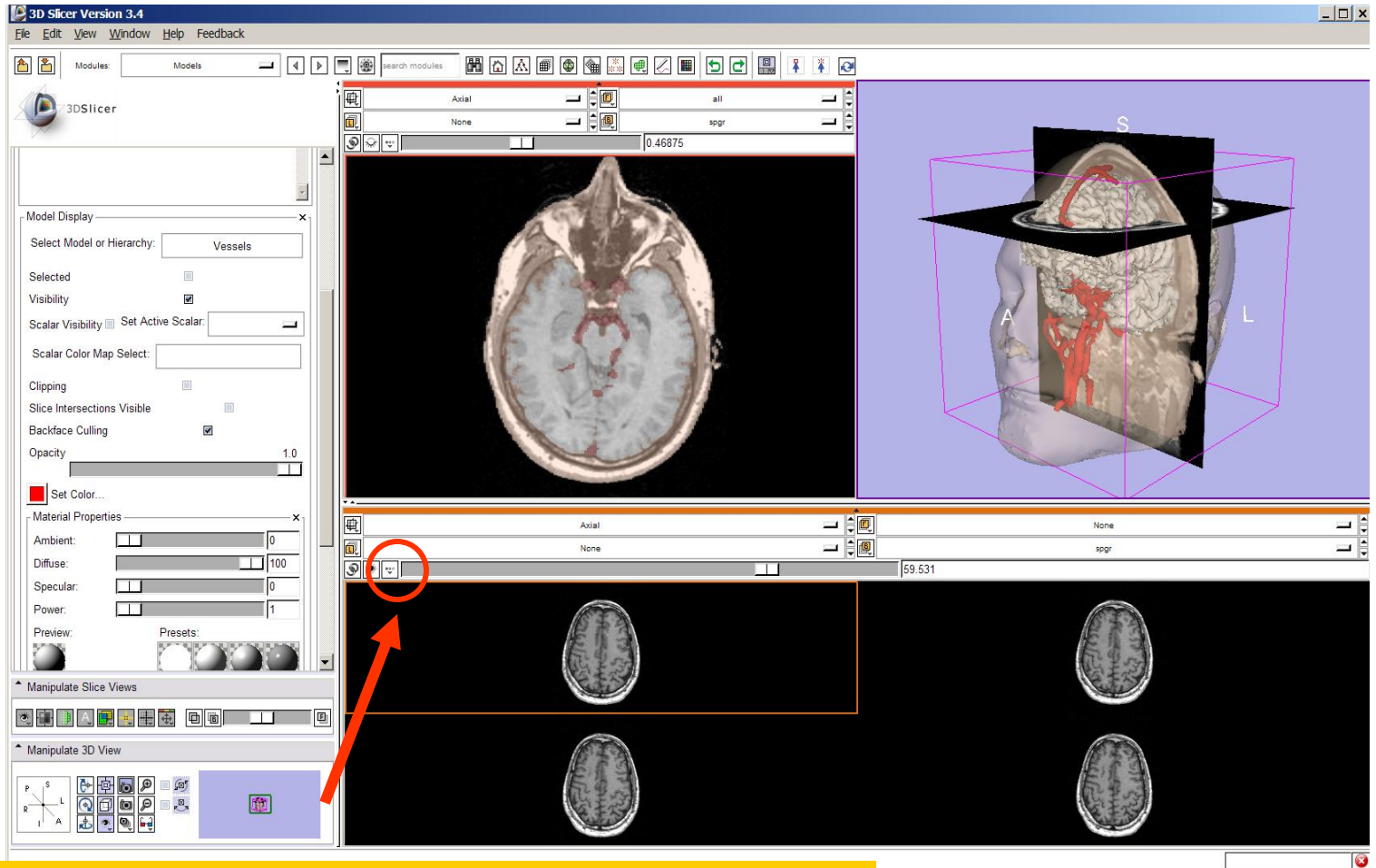
Browse through the spgr volume using the lightbox slider

Lightbox viewer



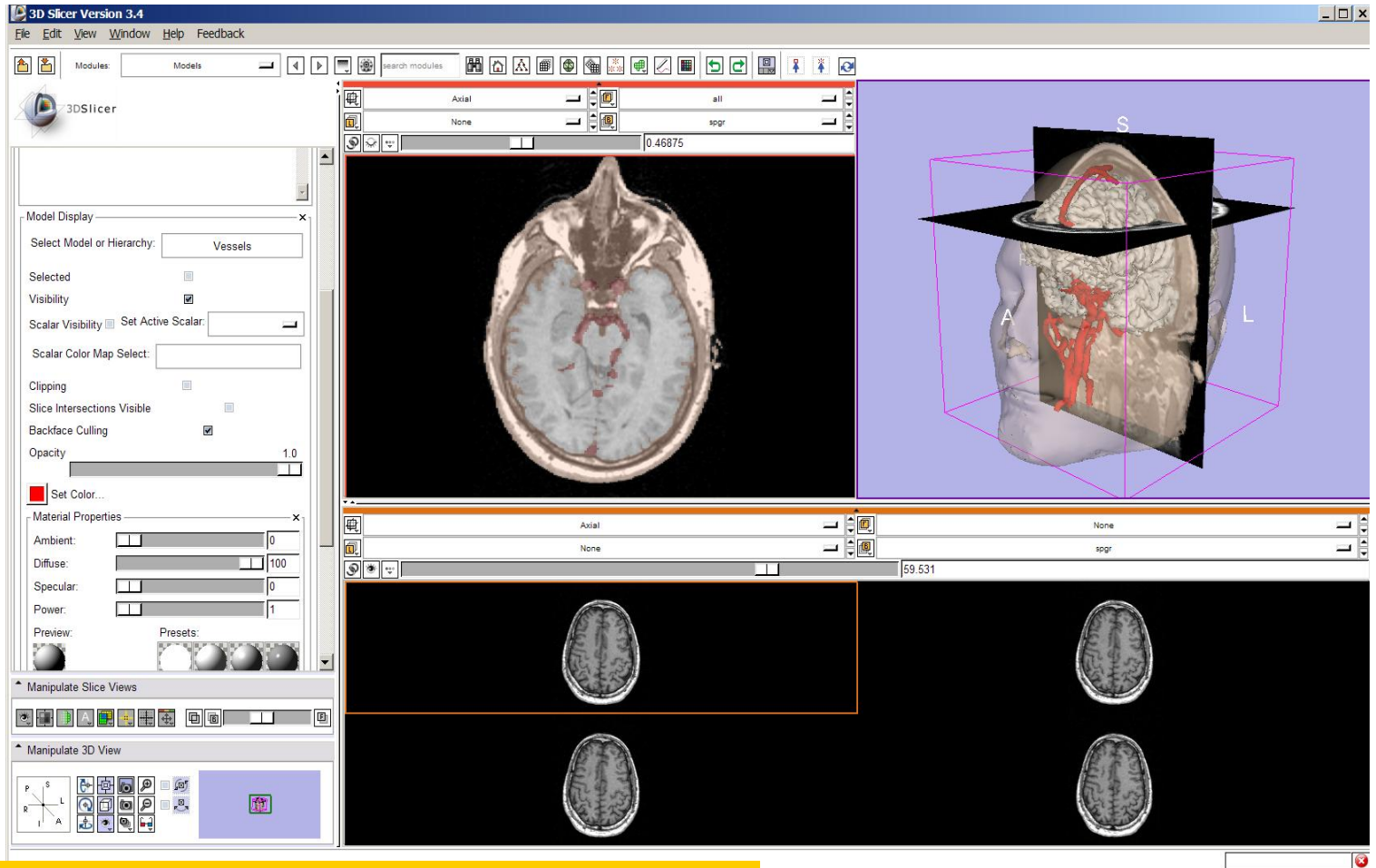
Slicer displays 4 adjacent axial slices of the spgr volume simultaneously

Lightbox viewer



Left click on the Slice Viewer menu of the Compare Layout viewer

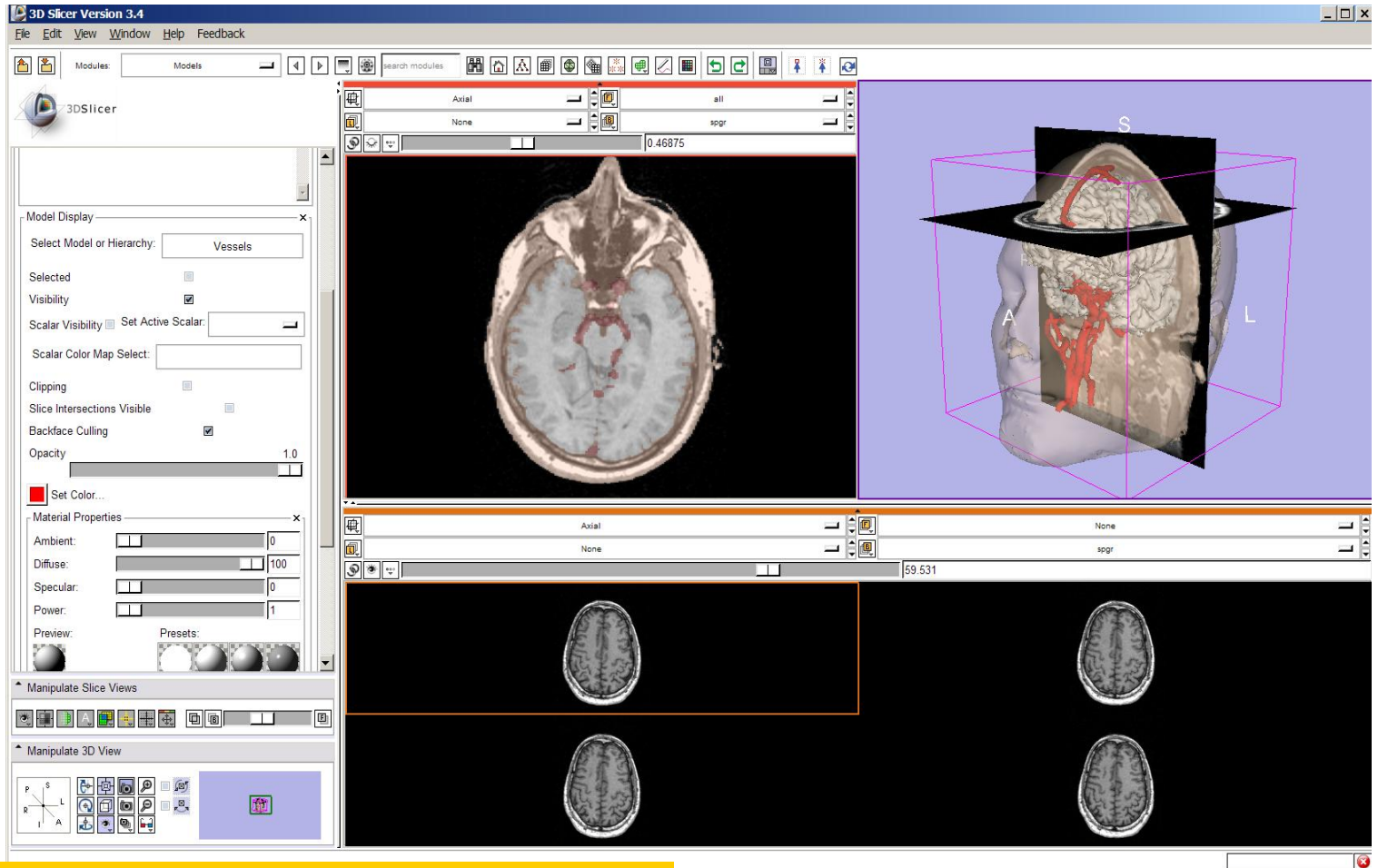
Lightbox viewer



Select the **lightbox** view option

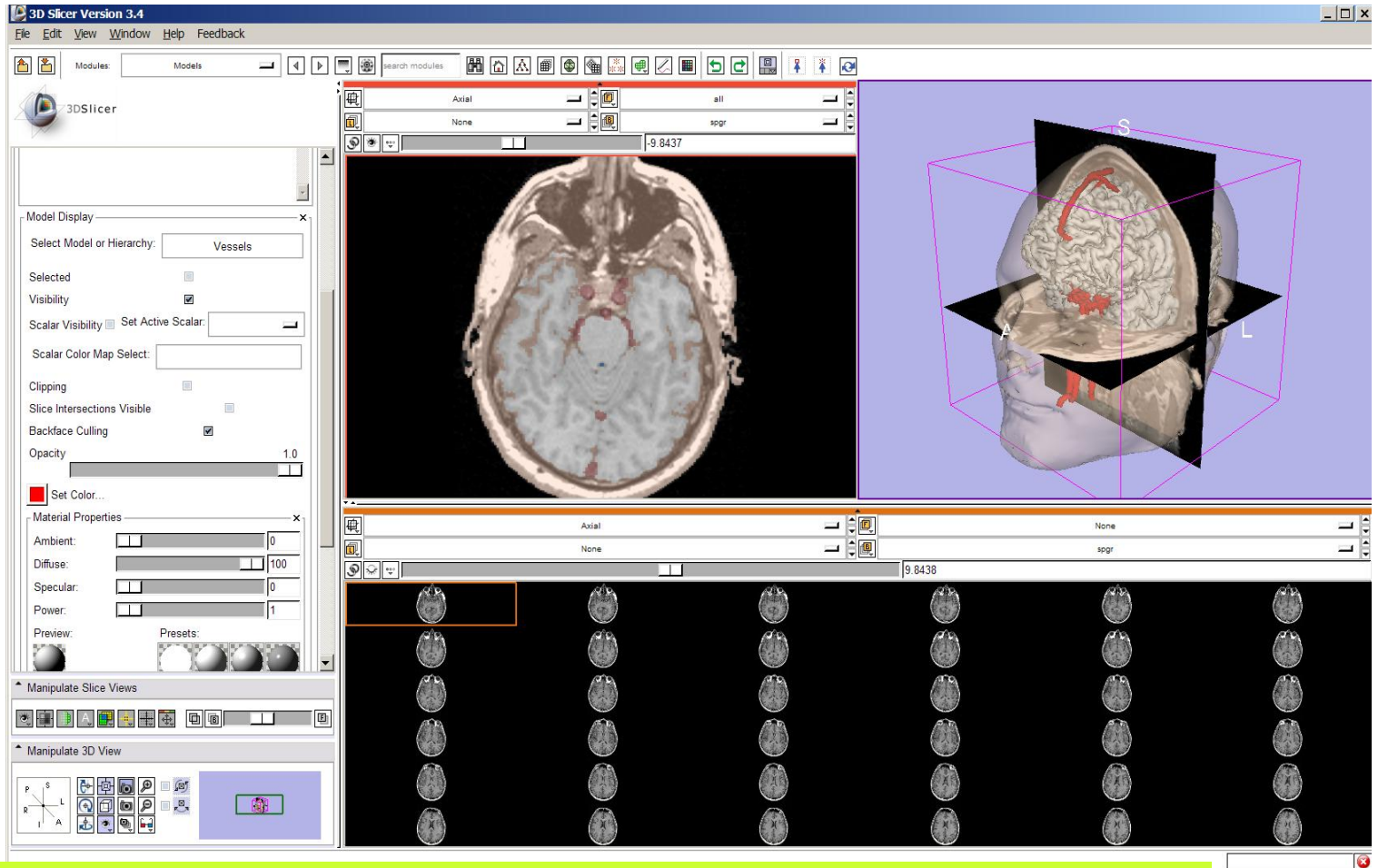


Lightbox viewer



Set the configuration of the light box view to **6x6**

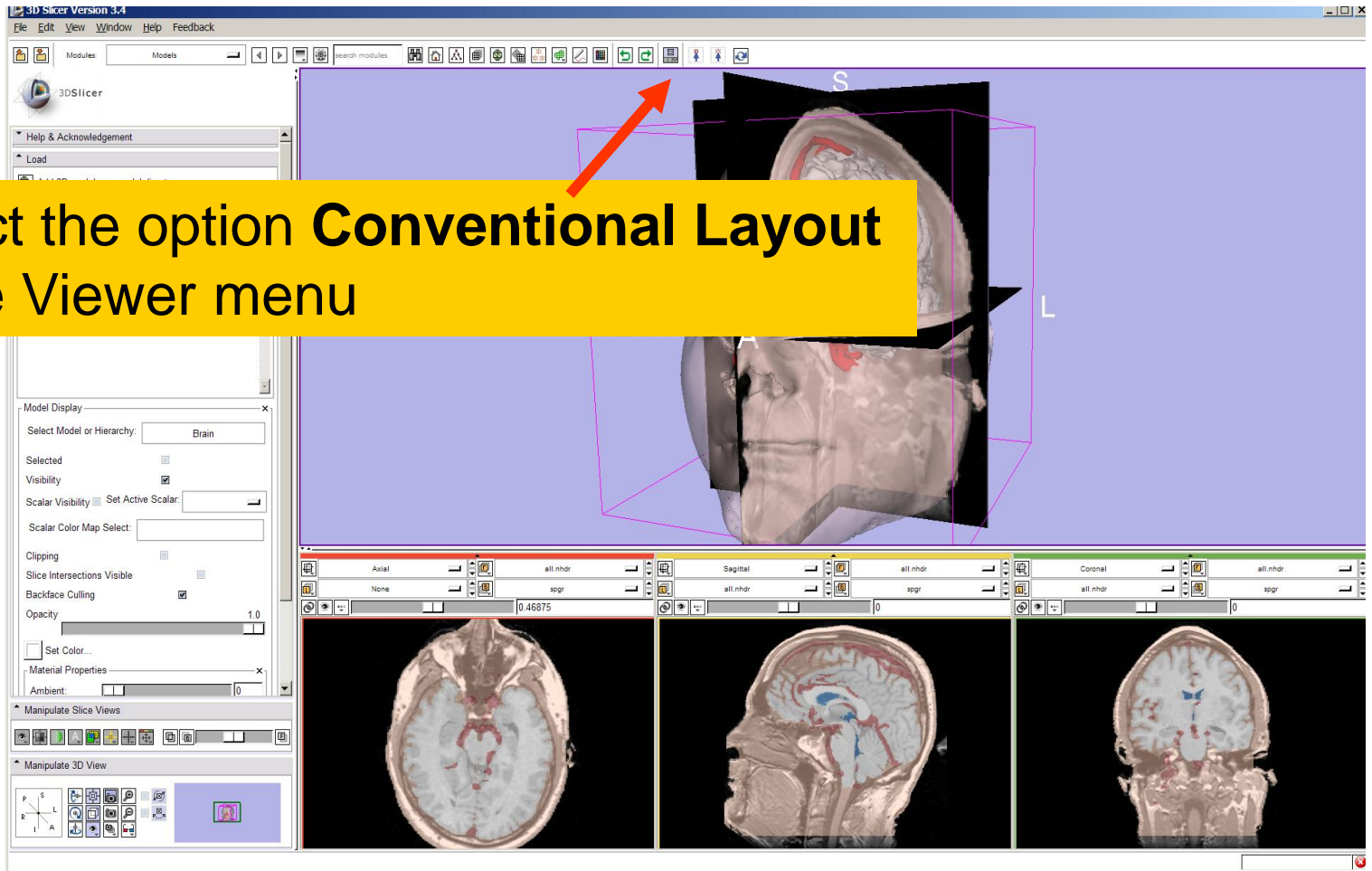
Lightbox viewer

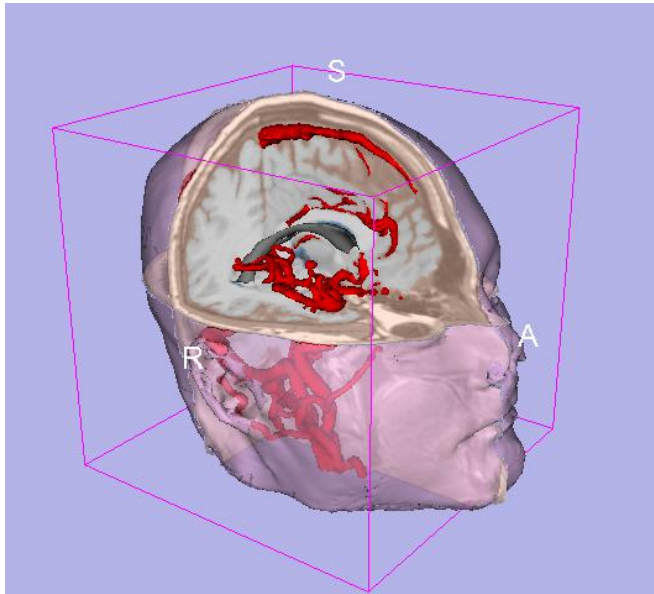


Slicer displays a matrix of 36 adjacent axial slices of the spgr volume.

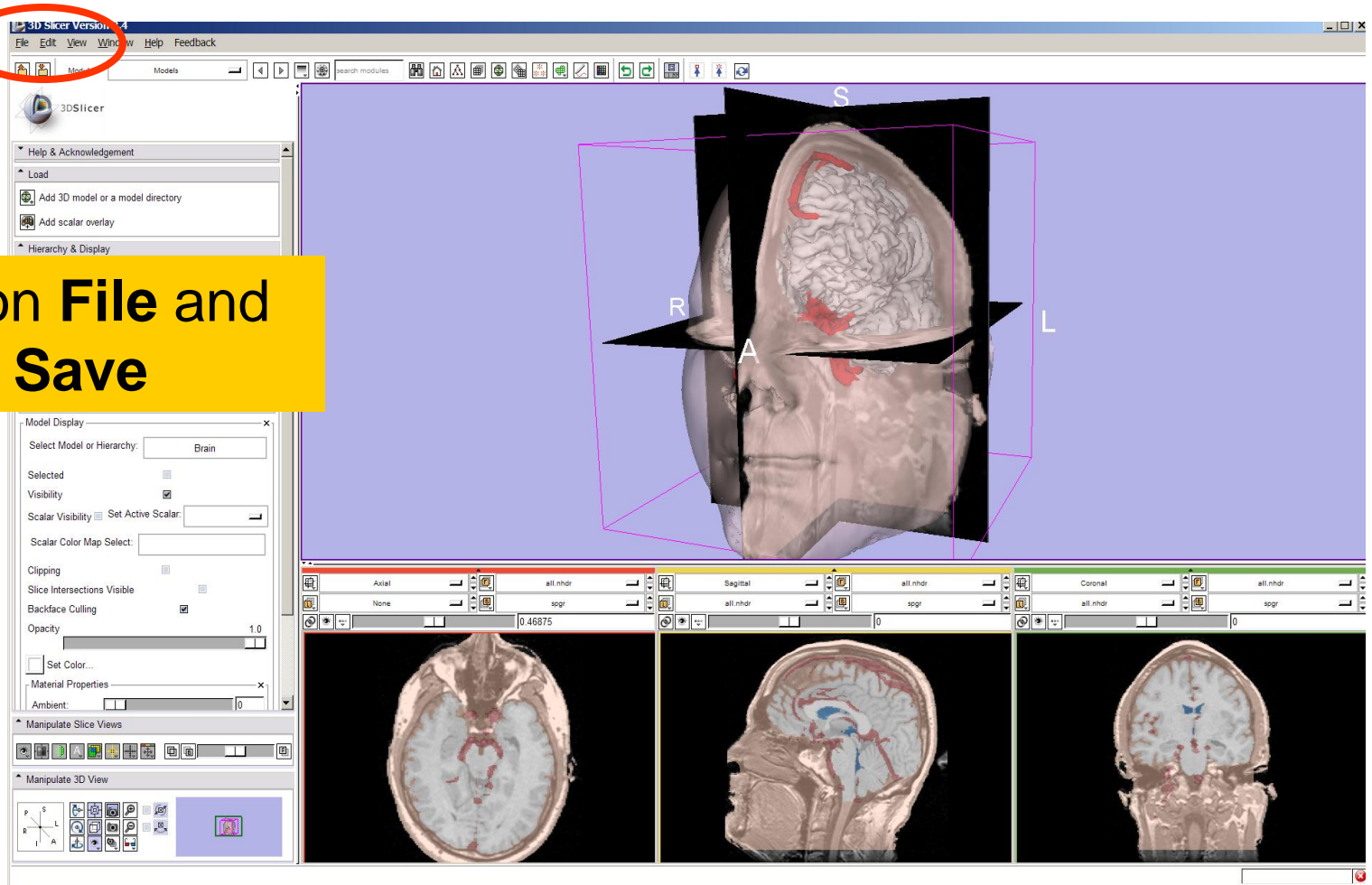
Lightbox viewer

Select the option **Conventional Layout** in the Viewer menu



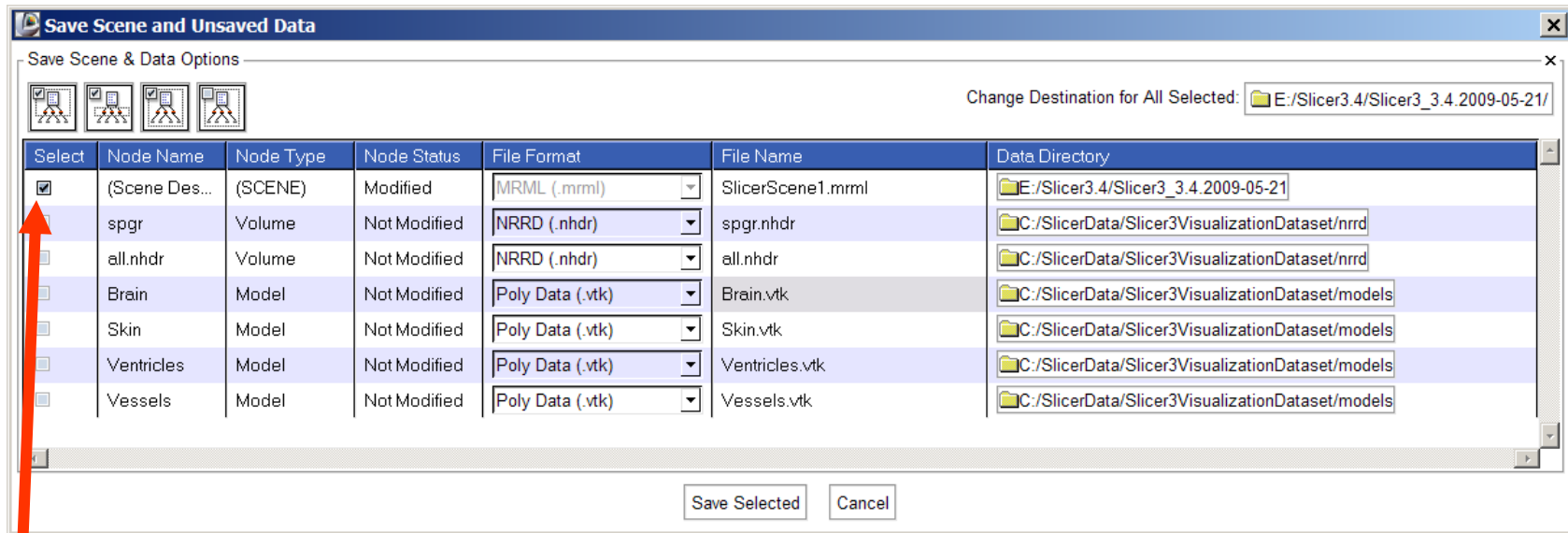


Part 5: Loading and saving a Scene



Click on **File** and
Select **Save**

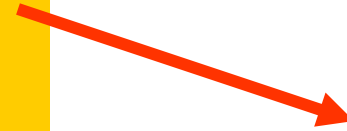
The list of elements currently loaded into Slicer3 appears.



Make sure only the first check box is selected

Saving Data

Click on **Change Destination for All Selected** and browse to the location where the scene will be saved



Save Scene and Unsaved Data

Save Scene & Data Options

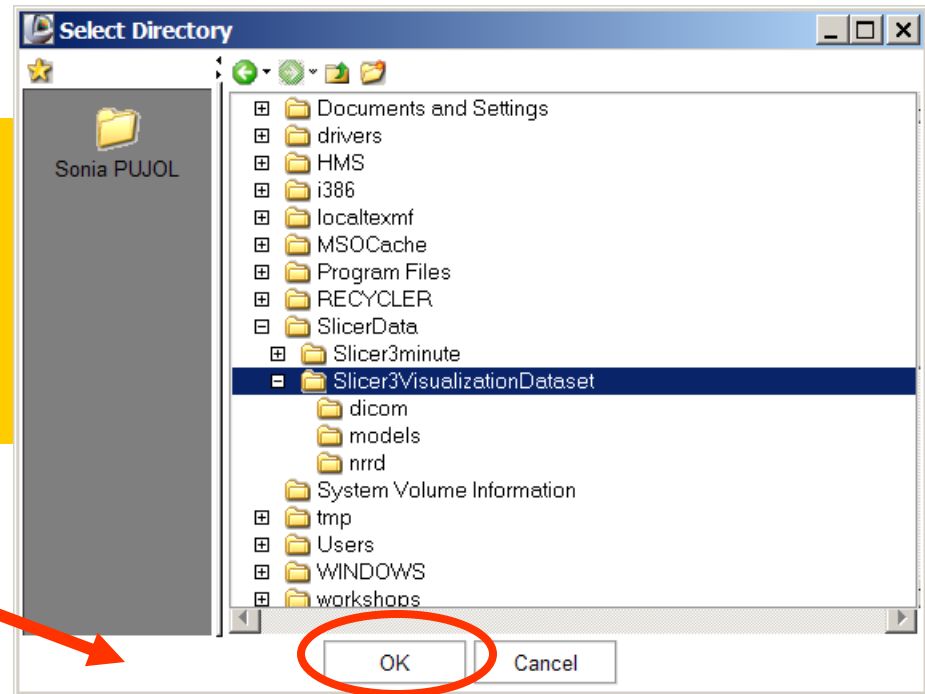
Change Destination for All Selected: E:/Slicer3.4/Slicer3_3.4.2009-05-21/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mml)	Slicer3DScene.mml	E:/Slicer3.4/Slicer3_3.4.2009-05-21
<input type="checkbox"/>	spgr	Volume	Not Modified	NRRD (.nhdr)	spgr.nhdr	C:/SlicerData/Slicer3VisualizationDataset/nrrd
<input type="checkbox"/>	all.nhdr	Volume	Not Modified	NRRD (.nhdr)	all.nhdr	C:/SlicerData/Slicer3VisualizationDataset/nrrd
<input type="checkbox"/>	Brain	Model	Not Modified	Poly Data (.vtk)	Brain.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Skin	Model	Not Modified	Poly Data (.vtk)	Skin.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Ventricles	Model	Not Modified	Poly Data (.vtk)	Ventricles.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Vessels	Model	Not Modified	Poly Data (.vtk)	Vessels.vtk	C:/SlicerData/Slicer3VisualizationDataset/models

Save Selected Cancel

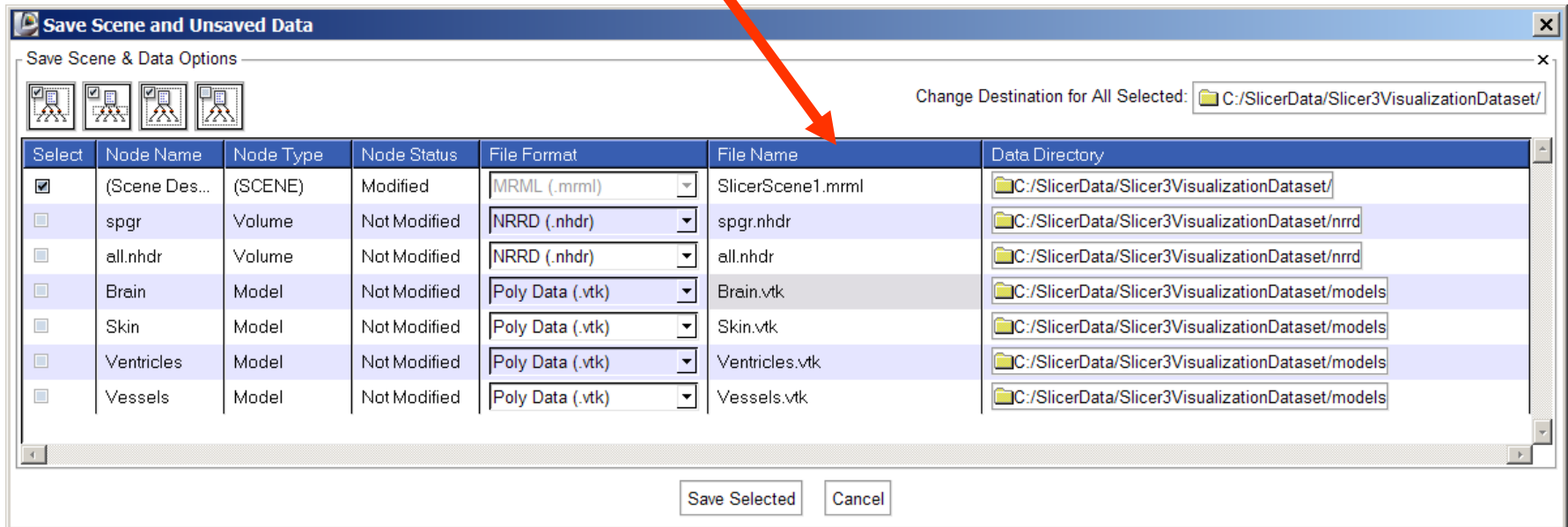
Saving Data

Browse to the directory where you would like to save your scene and click OK



Saving Data

Double click on the file name **SlicerScene1** and change it to **Slicer3DScene**



Save Scene and Unsaved Data

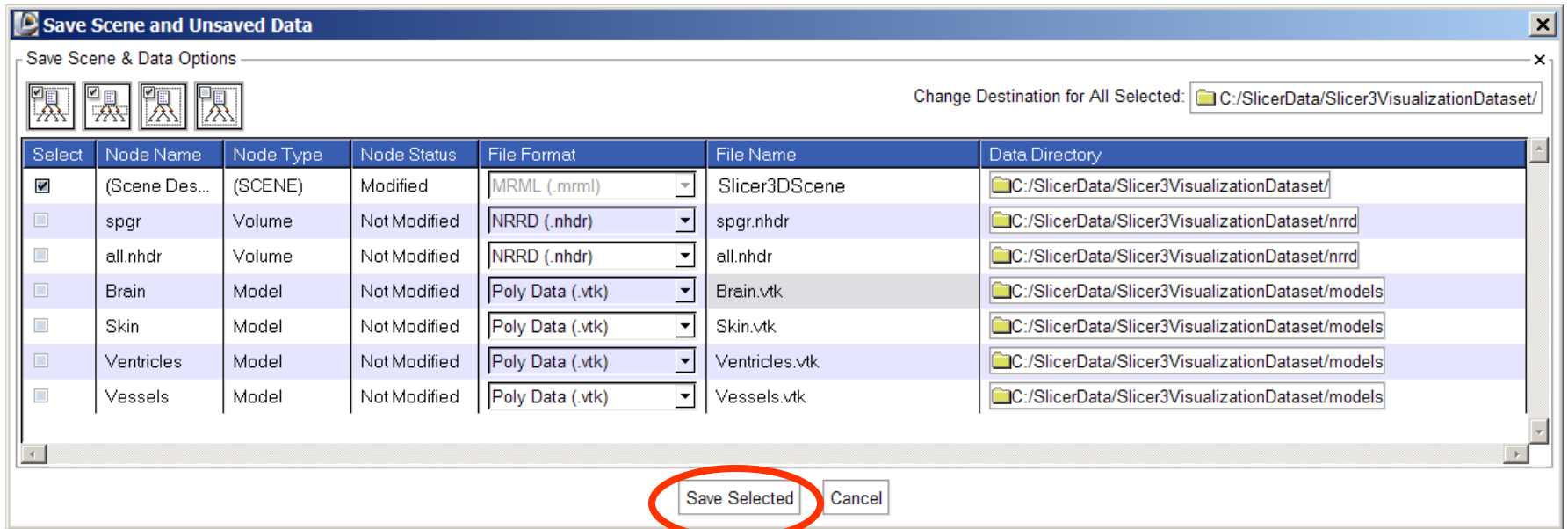
Save Scene & Data Options

Change Destination for All Selected: C:/SlicerData/Slicer3VisualizationDataset/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mrml)	SlicerScene1.mrml	C:/SlicerData/Slicer3VisualizationDataset/
<input type="checkbox"/>	spgr	Volume	Not Modified	NRRD (.nhdr)	spgr.nhdr	C:/SlicerData/Slicer3VisualizationDataset/nrrd
<input type="checkbox"/>	all.nhdr	Volume	Not Modified	NRRD (.nhdr)	all.nhdr	C:/SlicerData/Slicer3VisualizationDataset/nrrd
<input type="checkbox"/>	Brain	Model	Not Modified	Poly Data (.vtk)	Brain.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Skin	Model	Not Modified	Poly Data (.vtk)	Skin.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Ventricles	Model	Not Modified	Poly Data (.vtk)	Ventricles.vtk	C:/SlicerData/Slicer3VisualizationDataset/models
<input type="checkbox"/>	Vessels	Model	Not Modified	Poly Data (.vtk)	Vessels.vtk	C:/SlicerData/Slicer3VisualizationDataset/models

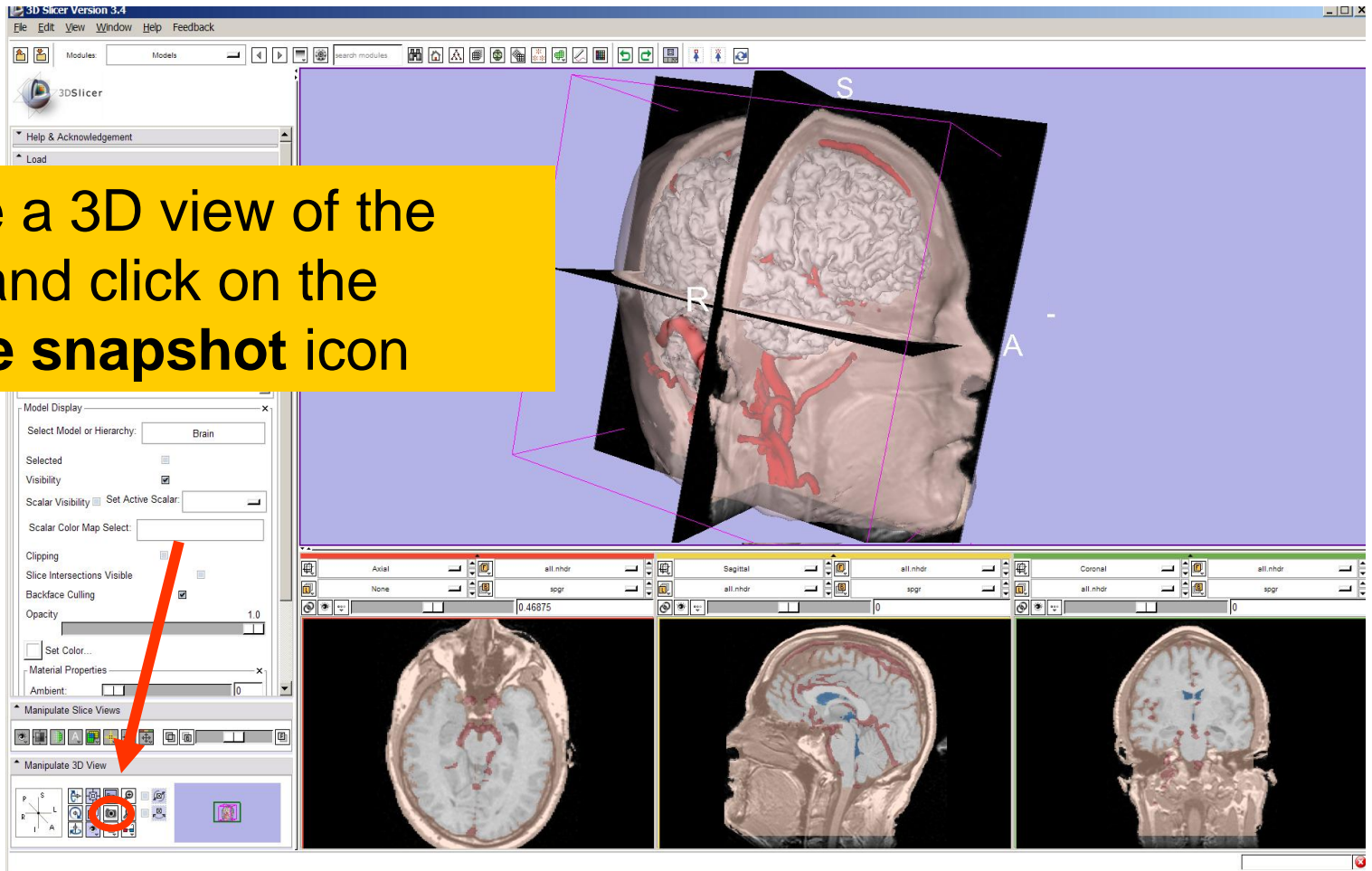
Save Selected Cancel

Click on **Save Selected**

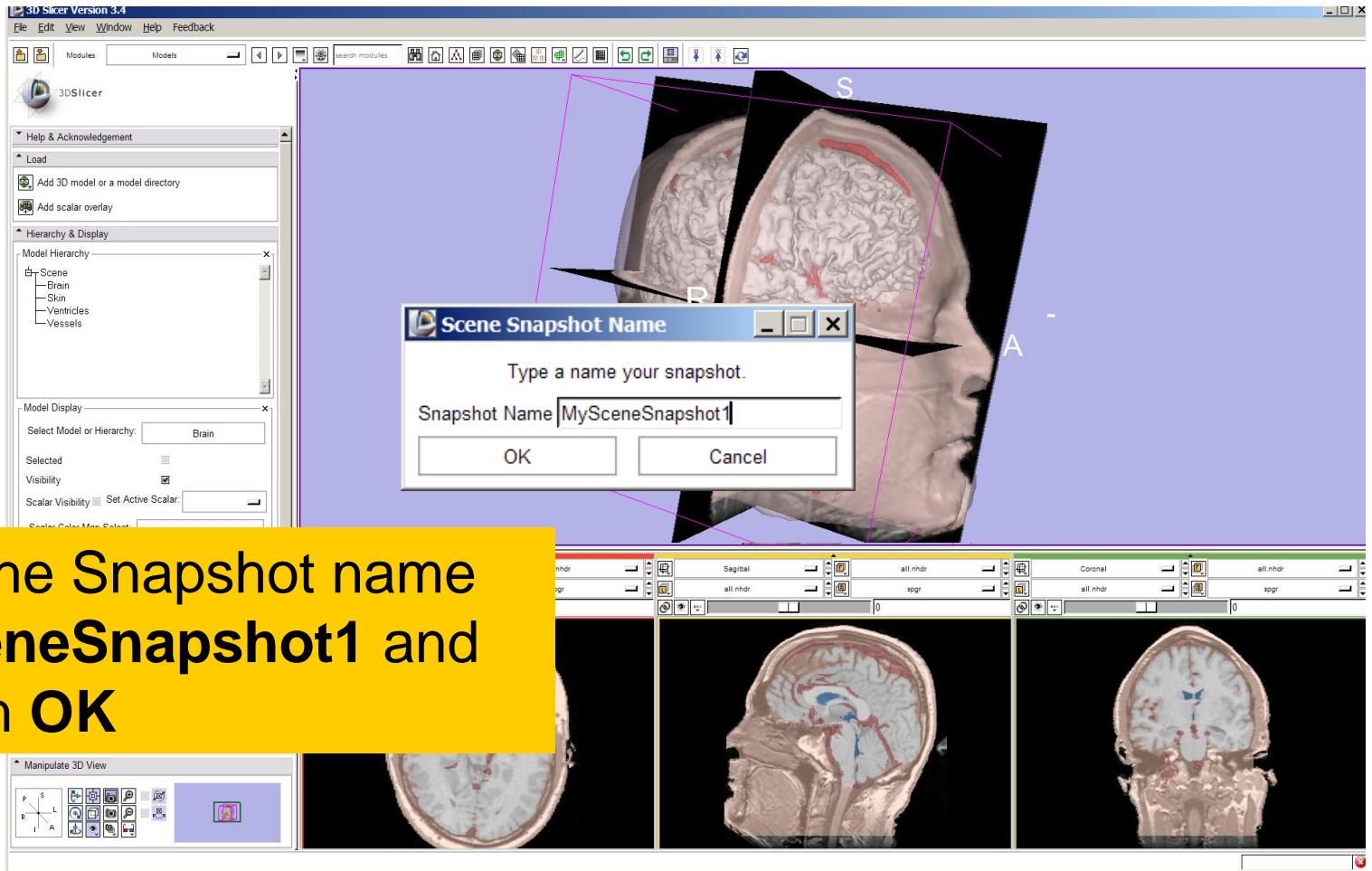


Creating Scene Snapshots

Choose a 3D view of the scene and click on the **capture snapshot icon**

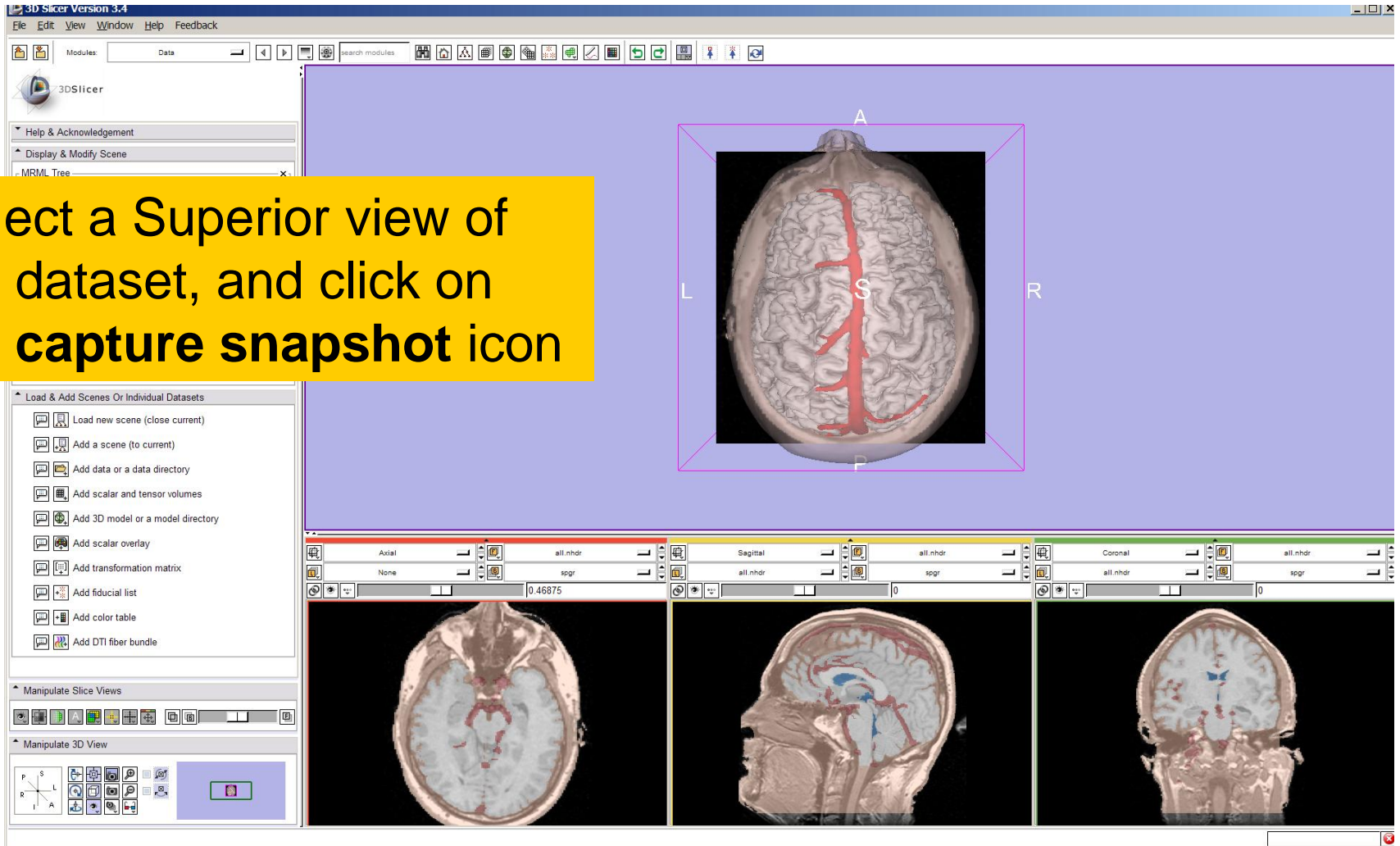


Creating Scene Snapshots



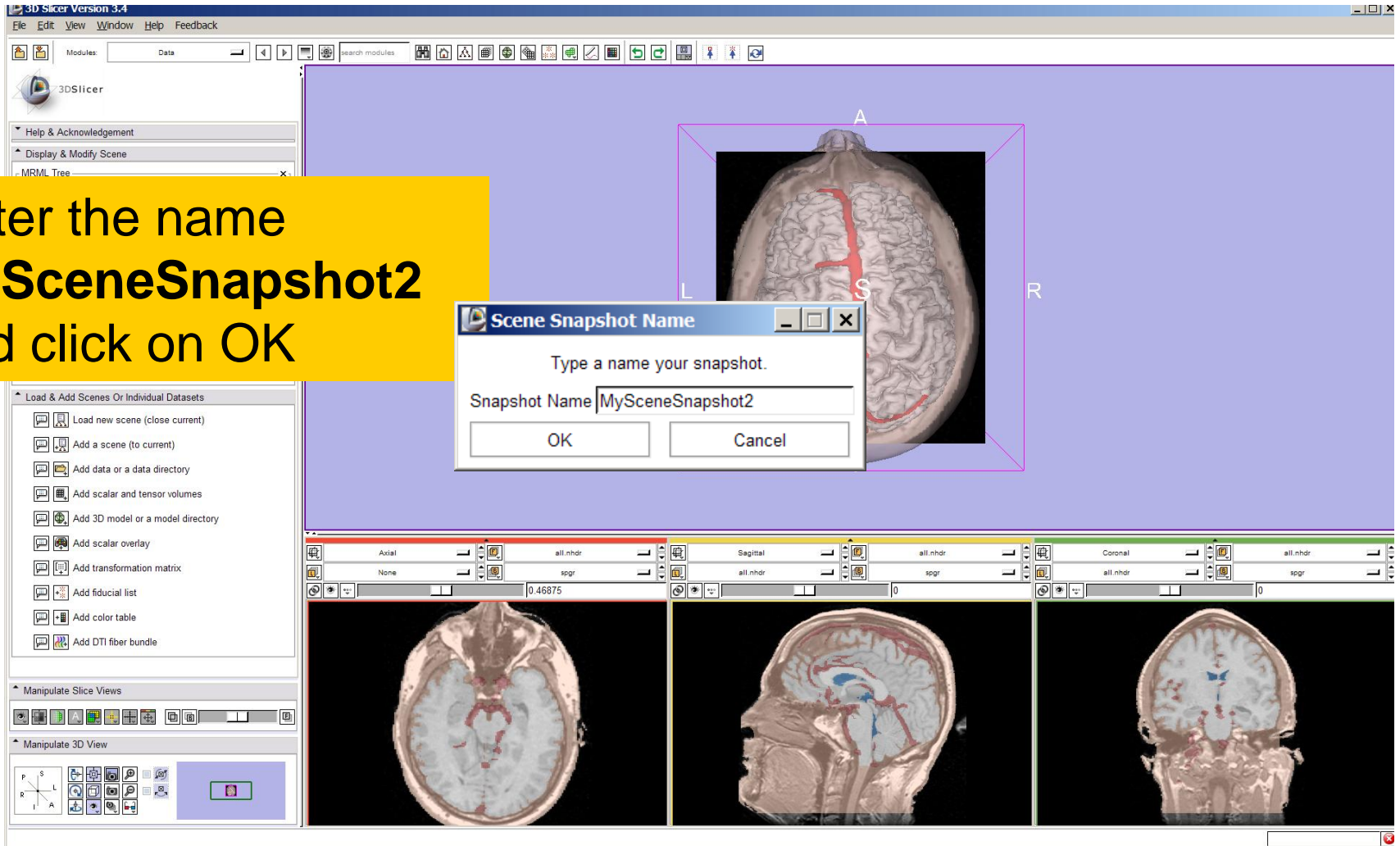
Creating Scene Snapshots

Select a Superior view of the dataset, and click on the **capture snapshot** icon



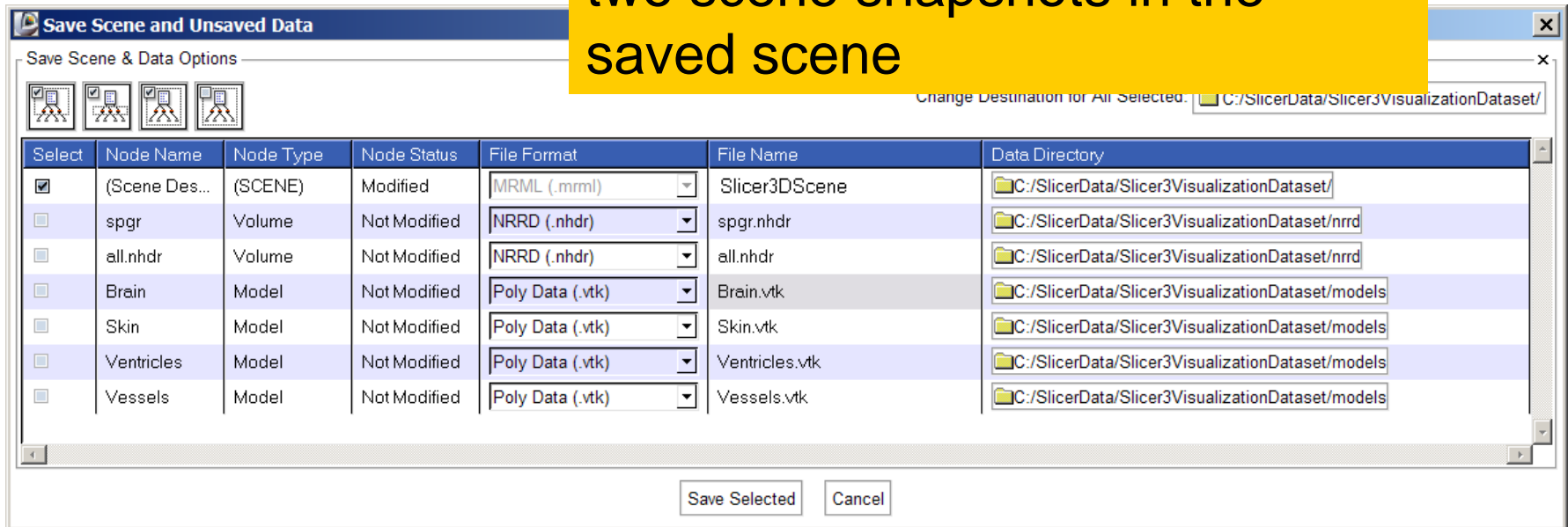
Creating Scene Snapshots

Enter the name
MySceneSnapshot2
and click on OK

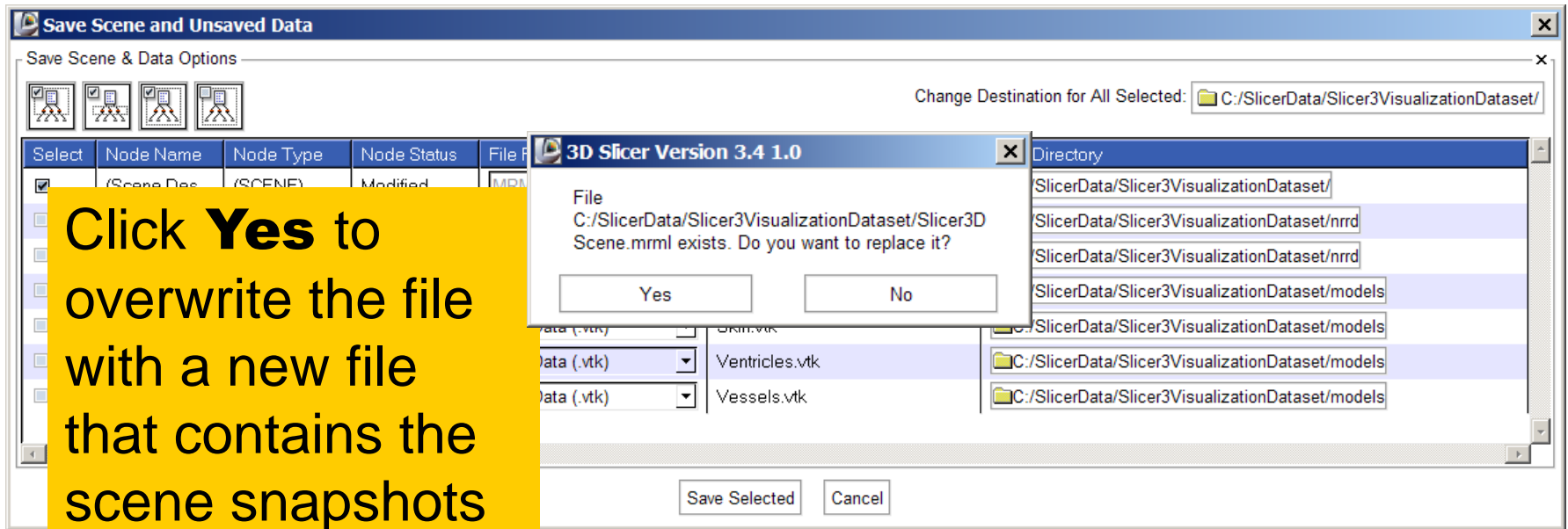


Creating Scene Snapshots

Select **File** → **Save** and click on **Save Selected** to include the two scene snapshots in the saved scene



Creating Scene Snapshots



Save Scene and Unsaved Data

Save Scene & Data Options

Change Destination for All Selected: C:/SlicerData/Slicer3VisualizationDataset/

3D Slicer Version 3.4 1.0

File
C:/SlicerData/Slicer3VisualizationDataset/Slicer3D
Scene.mrml exists. Do you want to replace it?

Yes No

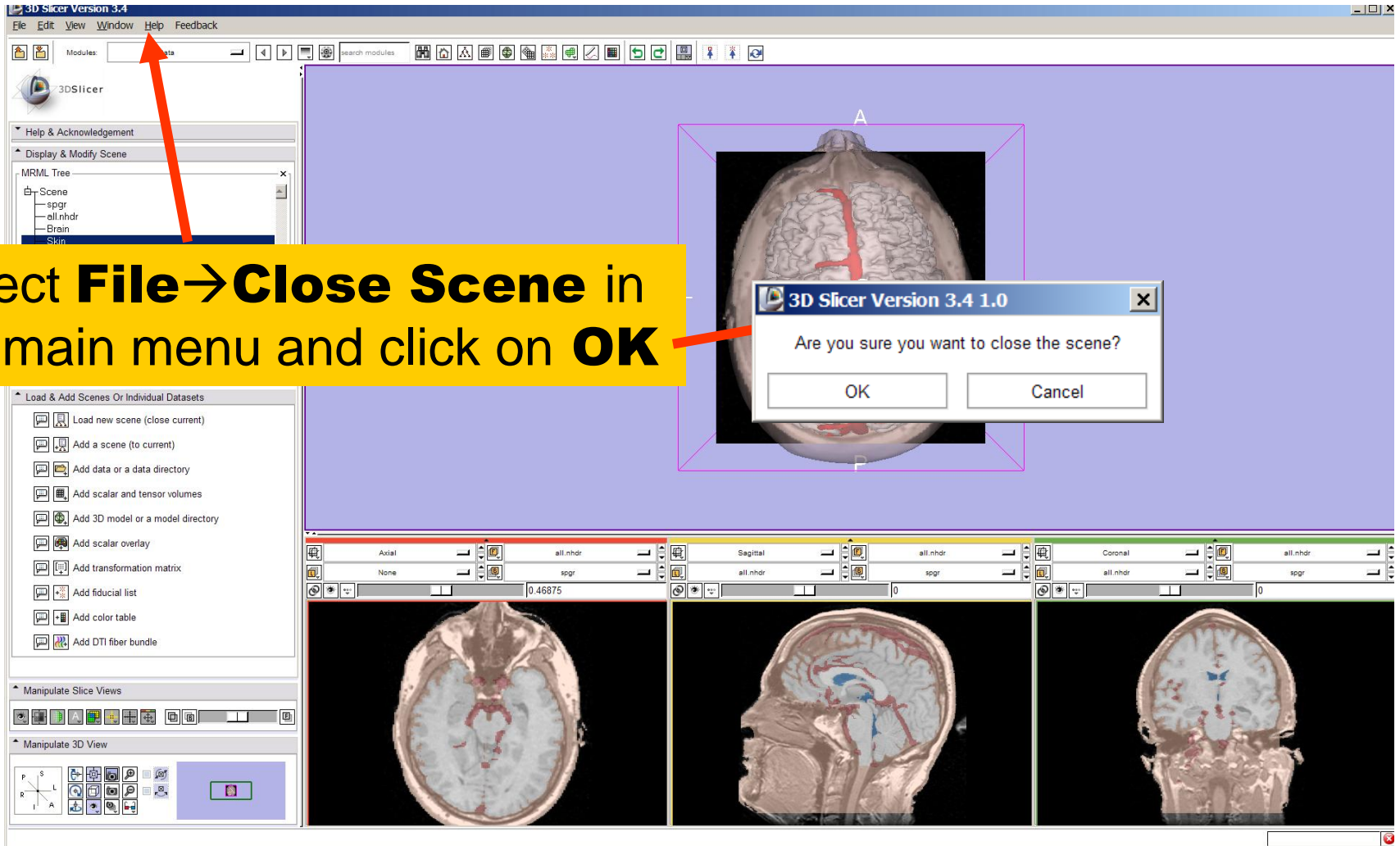
Directory

- SlicerData/Slicer3VisualizationDataset/
- SlicerData/Slicer3VisualizationDataset/nrrd
- SlicerData/Slicer3VisualizationDataset/nrrd
- SlicerData/Slicer3VisualizationDataset/models
- SlicerData/Slicer3VisualizationDataset/models
- C:/SlicerData/Slicer3VisualizationDataset/models
- C:/SlicerData/Slicer3VisualizationDataset/models

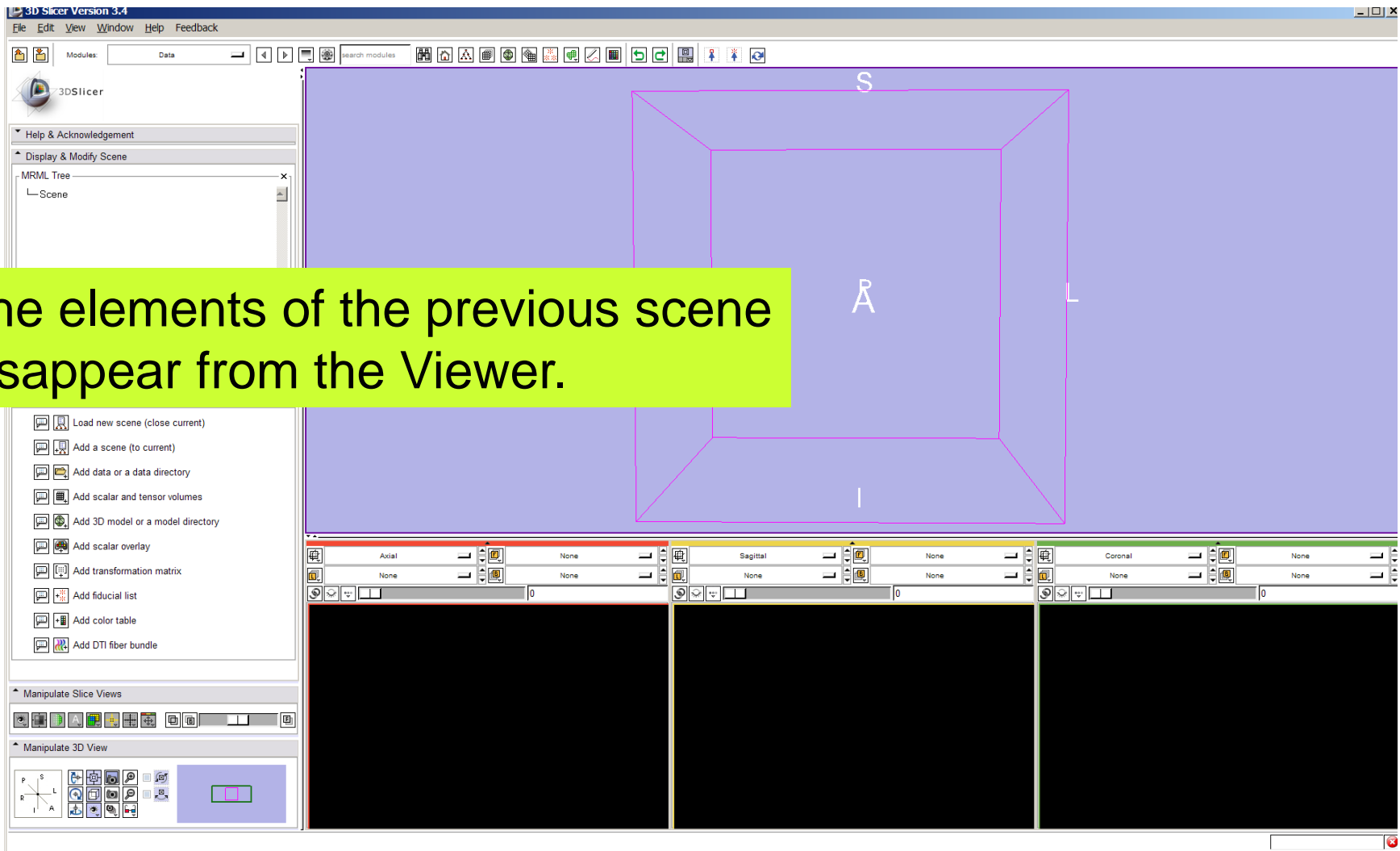
Save Selected Cancel

Click **Yes to overwrite the file with a new file that contains the scene snapshots**

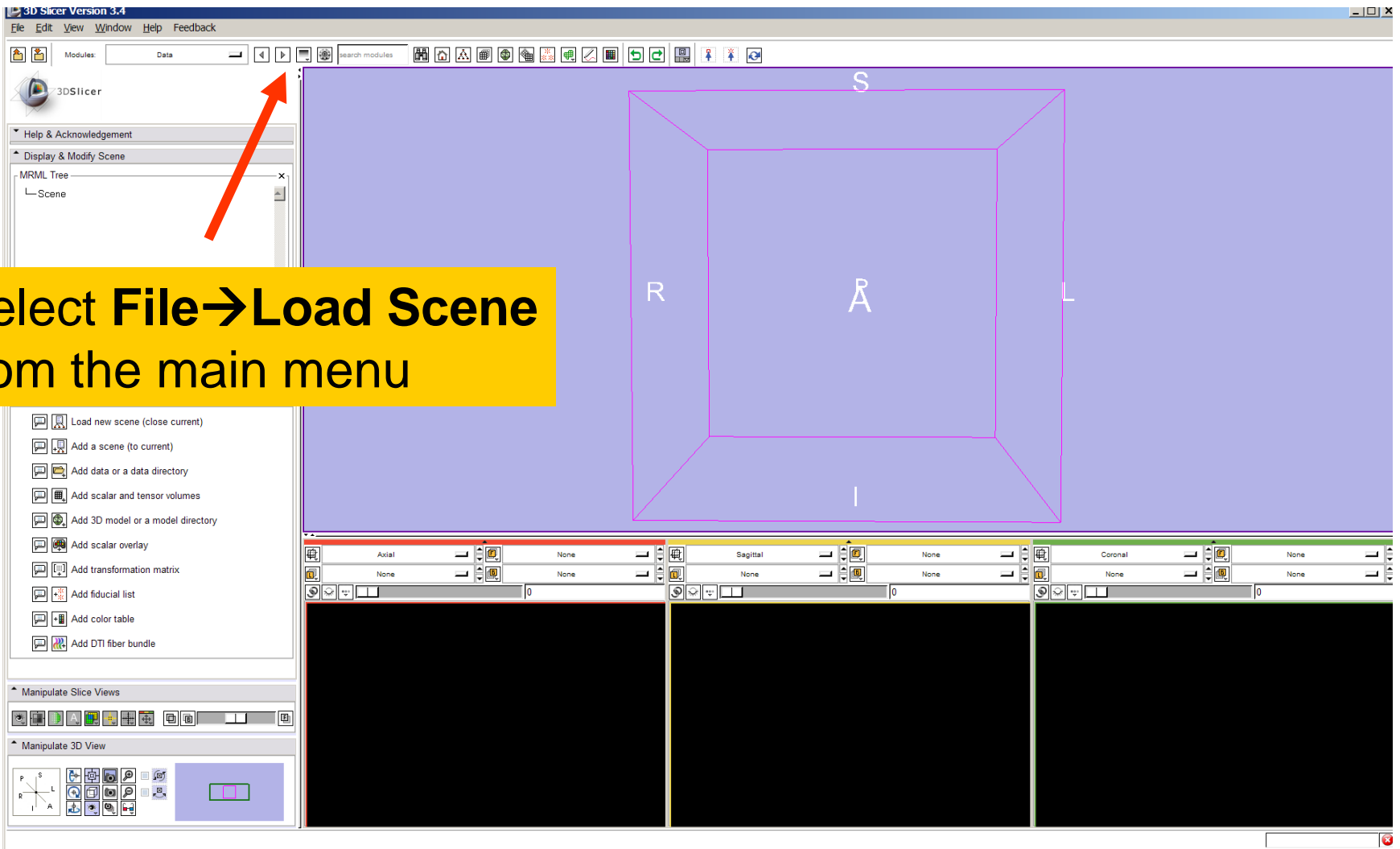
Saving Data



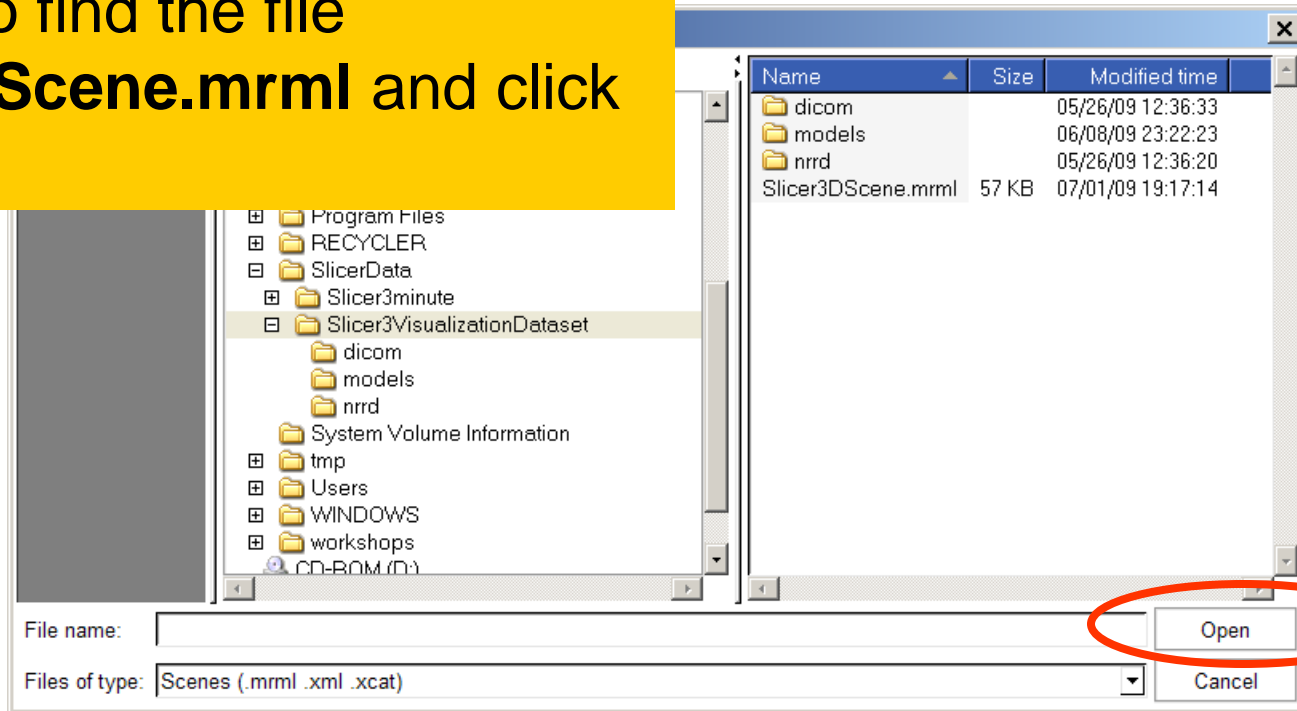
Saving Data



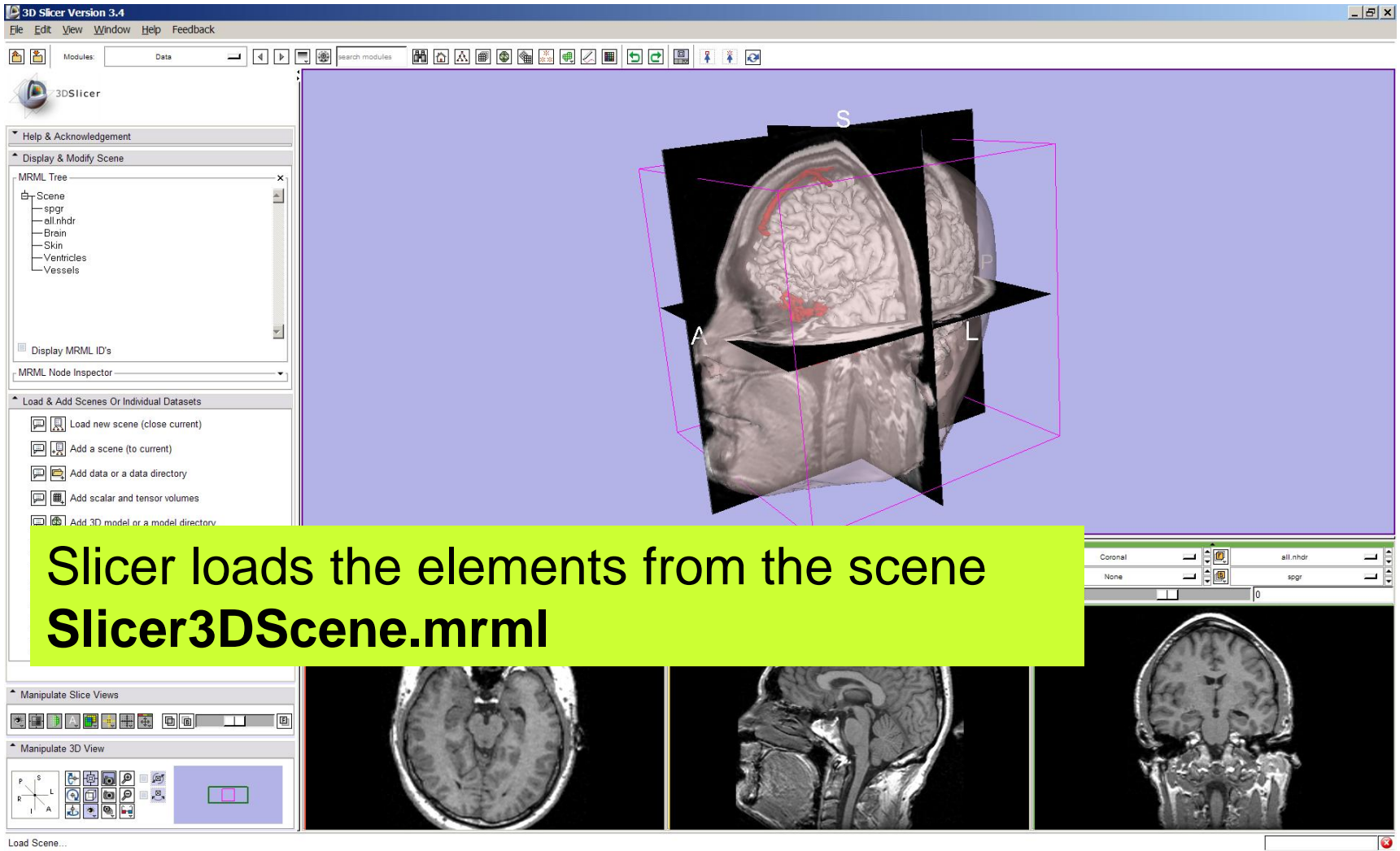
Saving Data



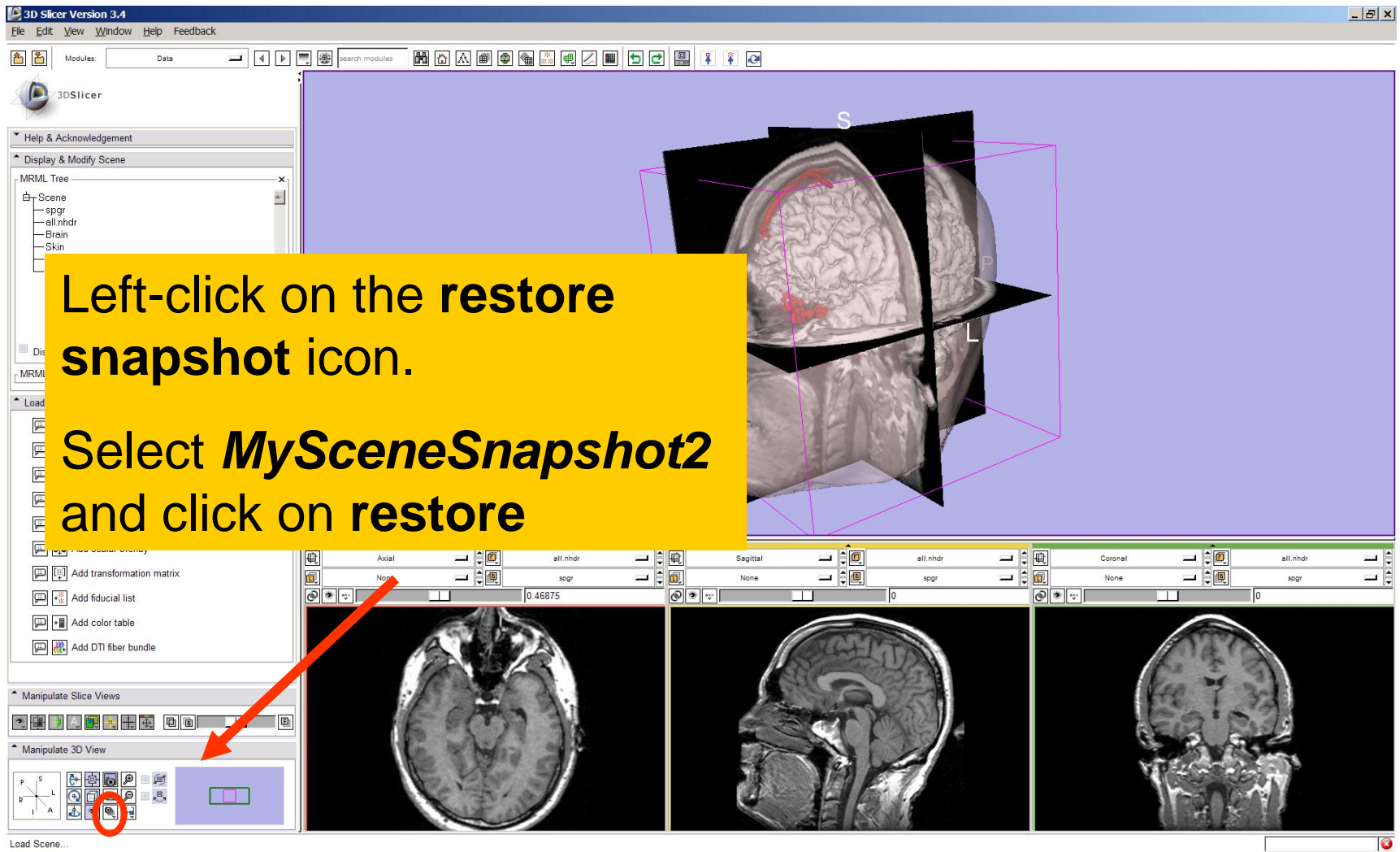
Browse to find the file
Slicer3DScene.mrml and click
on **Open**



Loading a Scene



Loading a Scene



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules Data search modules

3DSlicer

Help & Acknowledgement

Display & Modify Scene

MRML Tree

- Scene
 - spgr
 - all.nhdr
 - Brain
 - Skin

Left-click on the **restore snapshot icon**.

Select ***MySceneSnapshot2*** and click on **restore**

Load

- MySceneSnapshot2
- MySceneSnapshot1
- MySceneSnapshot0

Add transformation matrix

Add fiducial list

Add color table

Add DTI fiber bundle

Manipulate Slice Views

Manipulate 3D View

Load Scene...

Axial all.nhdr Sagittal all.nhdr Coronal all.nhdr

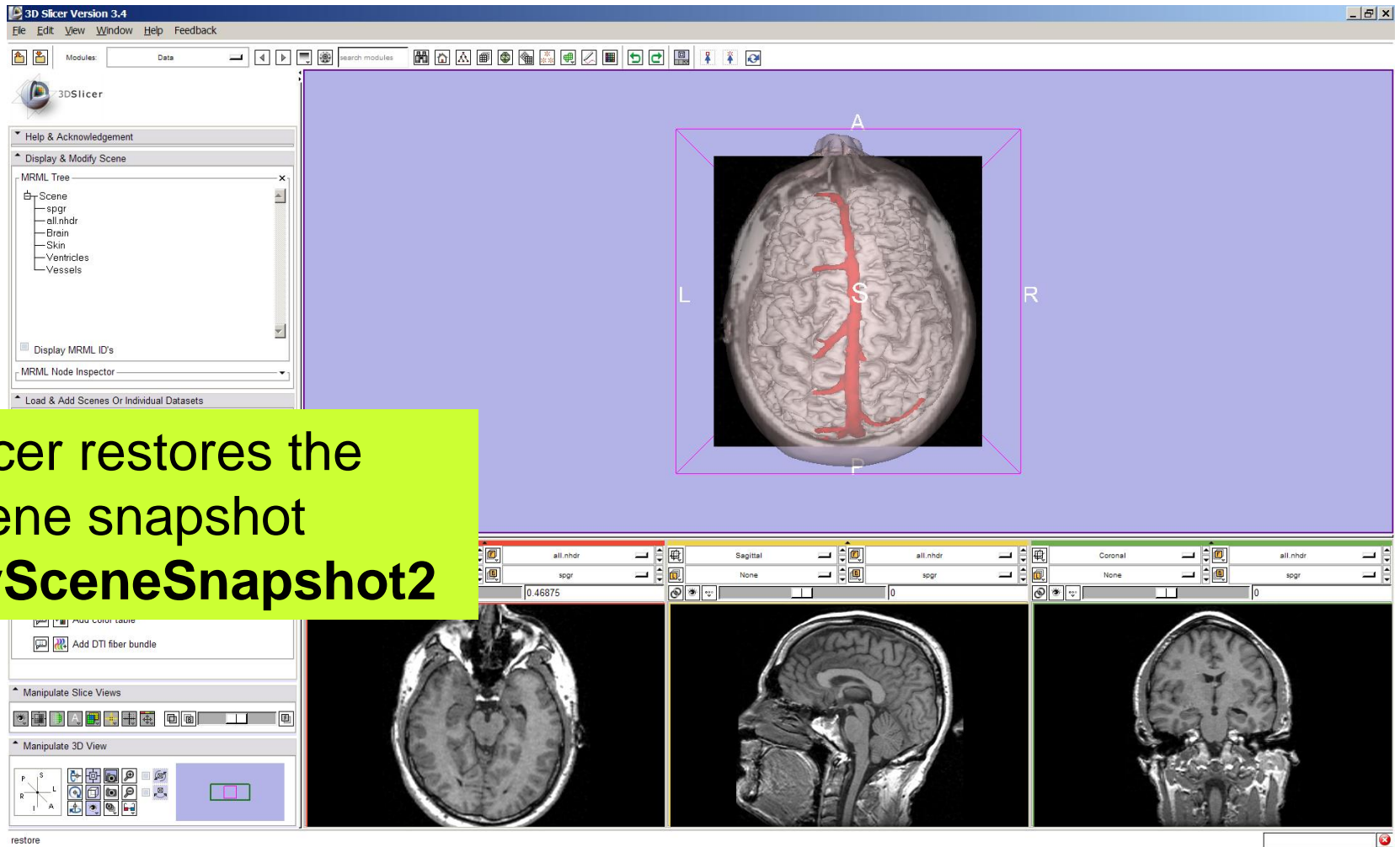
None None None

spgr spgr spgr

0.46875 0 0

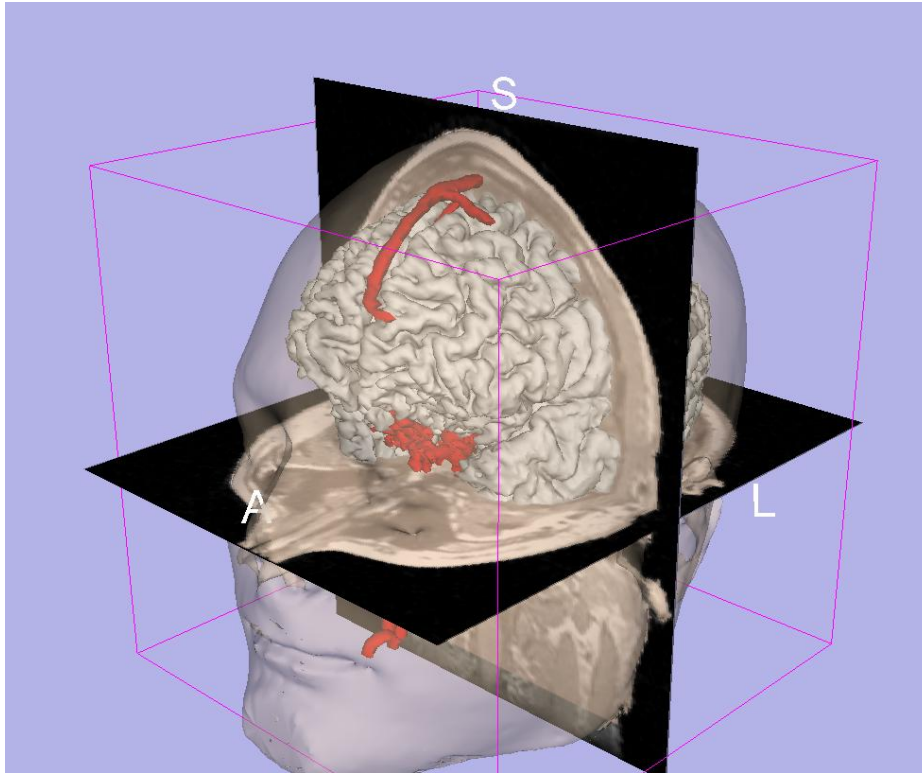
P S R L A I

Loading a Scene



Slicer restores the scene snapshot
MySceneSnapshot2

Conclusion



- 3D visualization of anatomical surface reconstructions
- 3D interaction with volumes and models
- Open-source platform



Acknowledgments



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Neuroimage Analysis Center

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