



*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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Harvard Medical School



- 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



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



Download Slicer3.4

- Download and install the Slicer3.4 software from the Slicer web site

<http://www.slicer.org/pages/Special:SlicerDownloads>

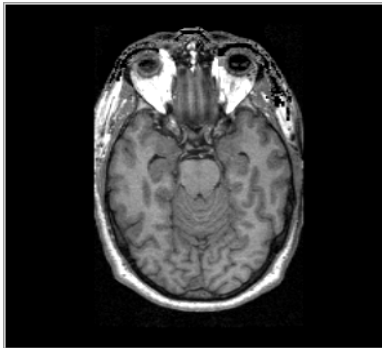


Disclaimer

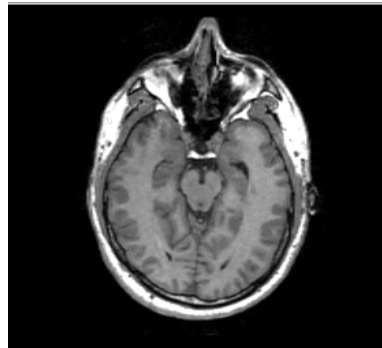
It is the responsibility of the user of 3DSlicer to comply with both the terms of the license and with the applicable laws, regulations and rules.

Download the training dataset

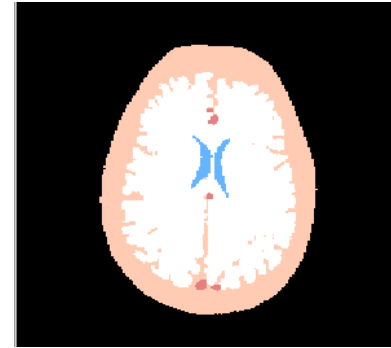
- This course is built upon three datasets of a single healthy subject brain:



MR DICOM
GRASS



MR Nrrd
SPGR



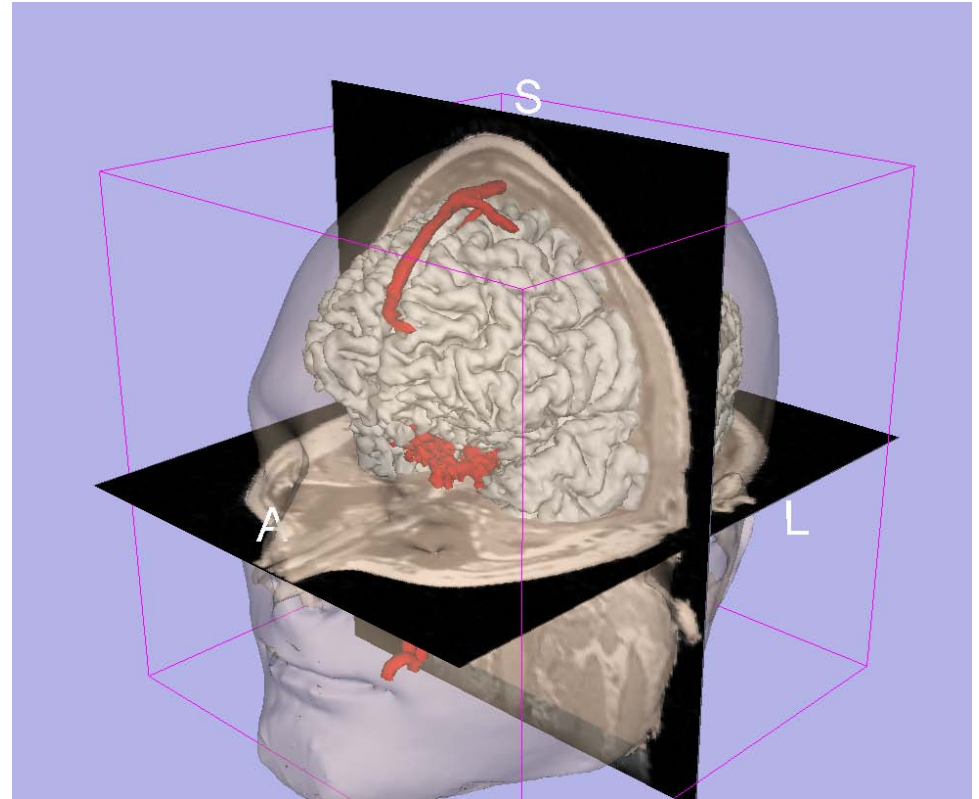
Pre-computed
Label Map

- Download and unzip the training dataset
Slicer3VisualizationDataset.zip

<http://www.slicer.org/slicerWiki/index.php/Slicer3.4:Training>

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.



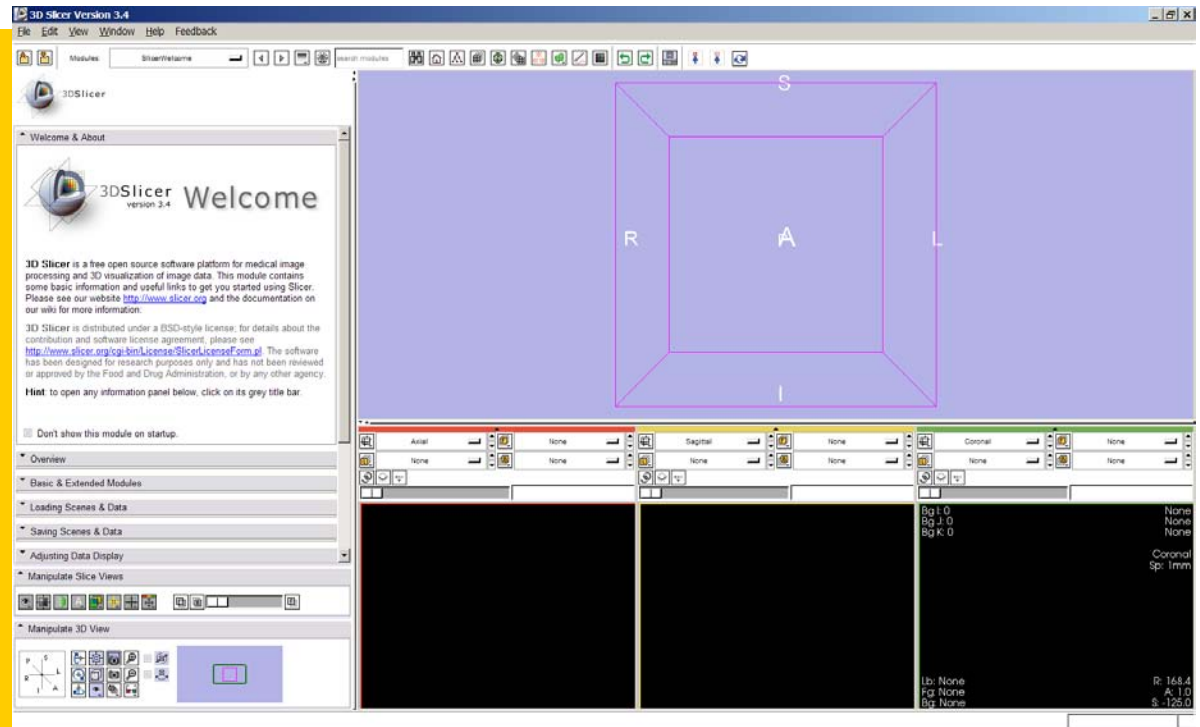
Linux/Mac users
Launch the Slicer3
executable located in
the Slicer3.4 directory

Windows users

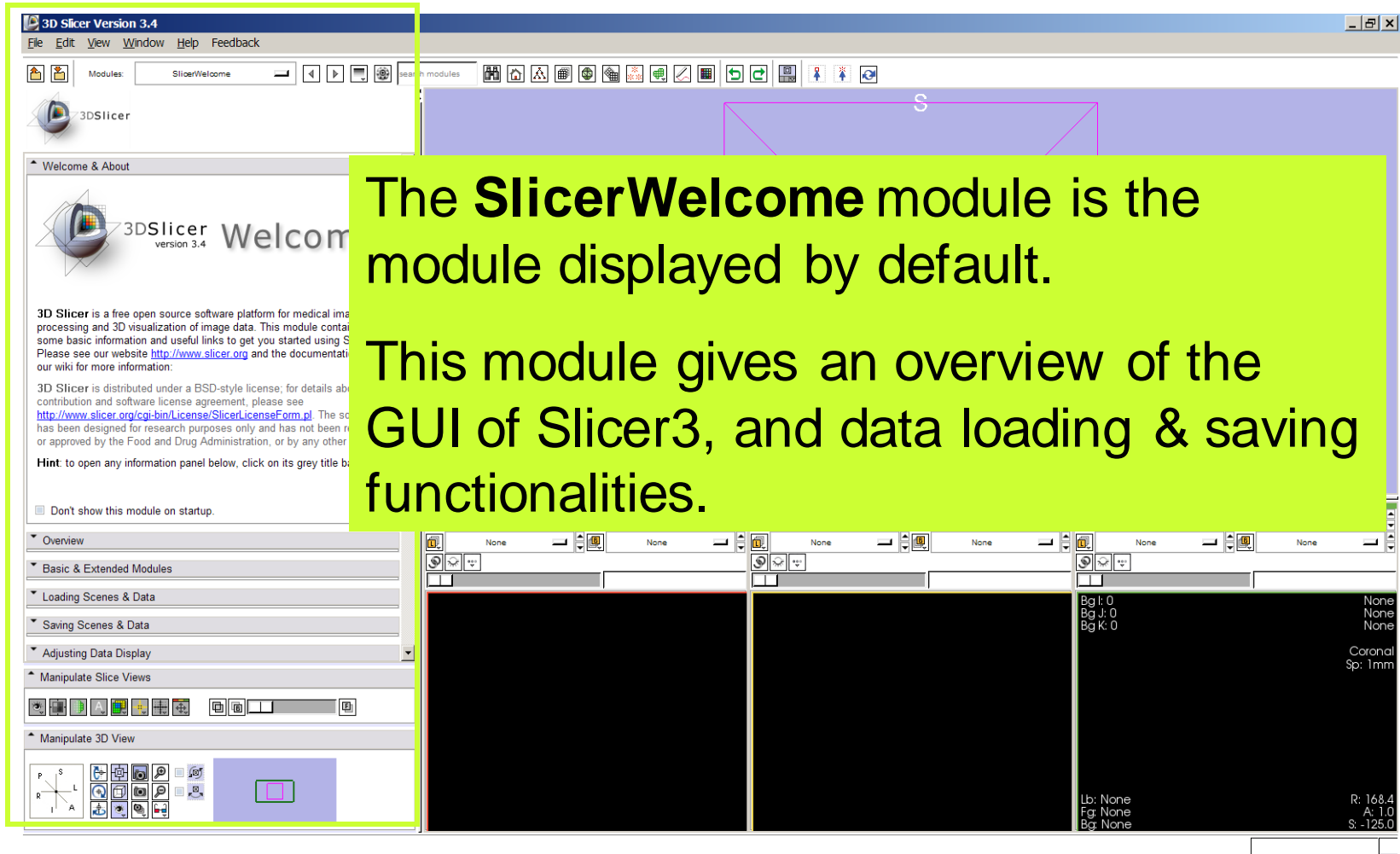
Select

Start → All Programs

→ Slicer3 3.4 2009-05-21 → Slicer3

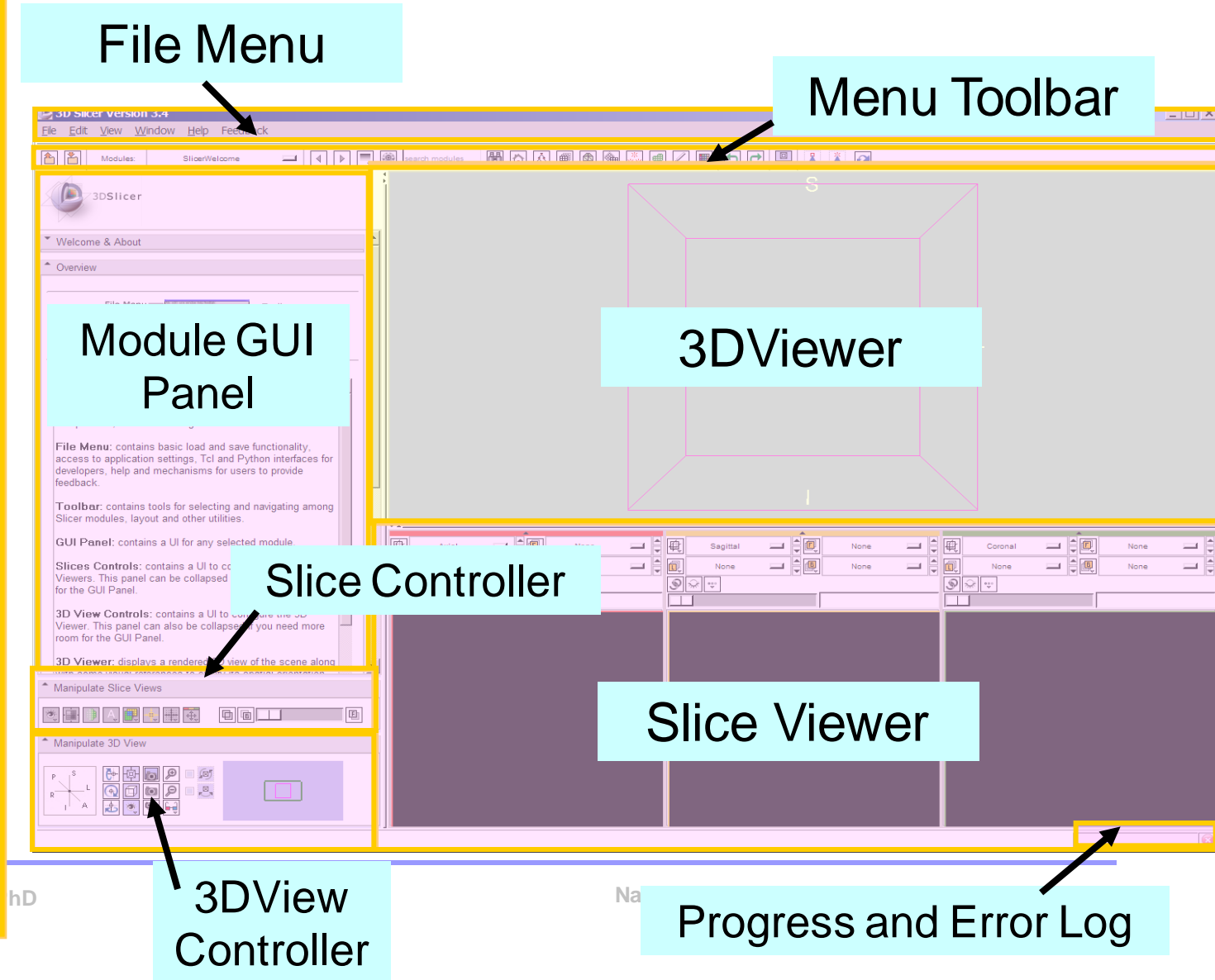


Slicer Welcome



The 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



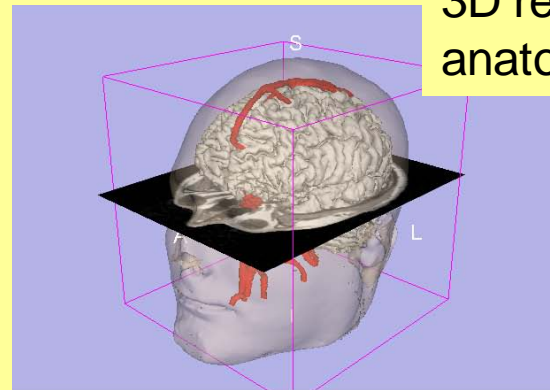
Part 1. Loading and visualizing multiple volumes simultaneously



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



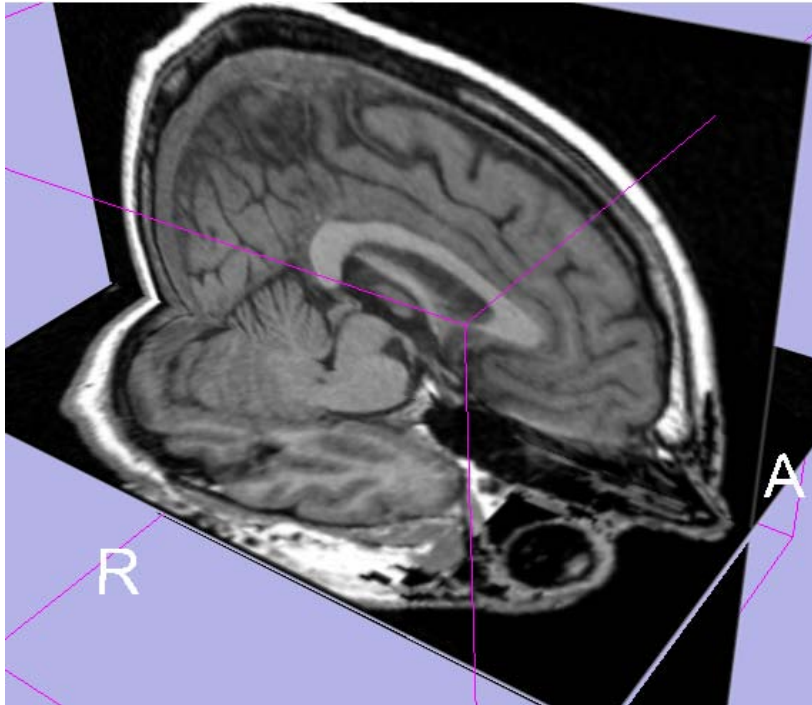
Part 3. Visualizing 3D reconstructions of anatomical surfaces



Part 4. The lightbox viewer

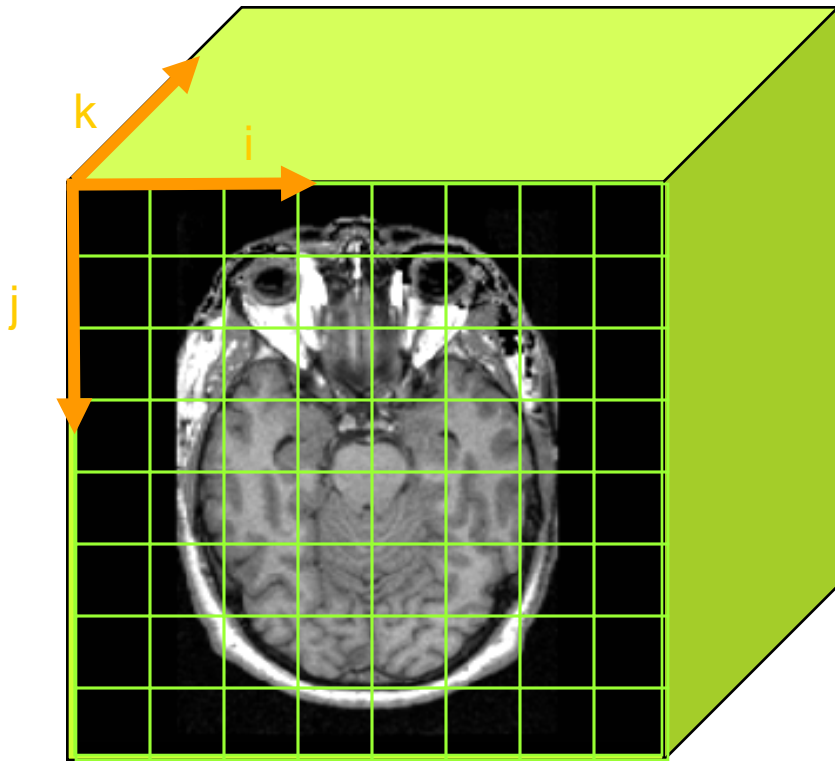


Part 5. Saving data



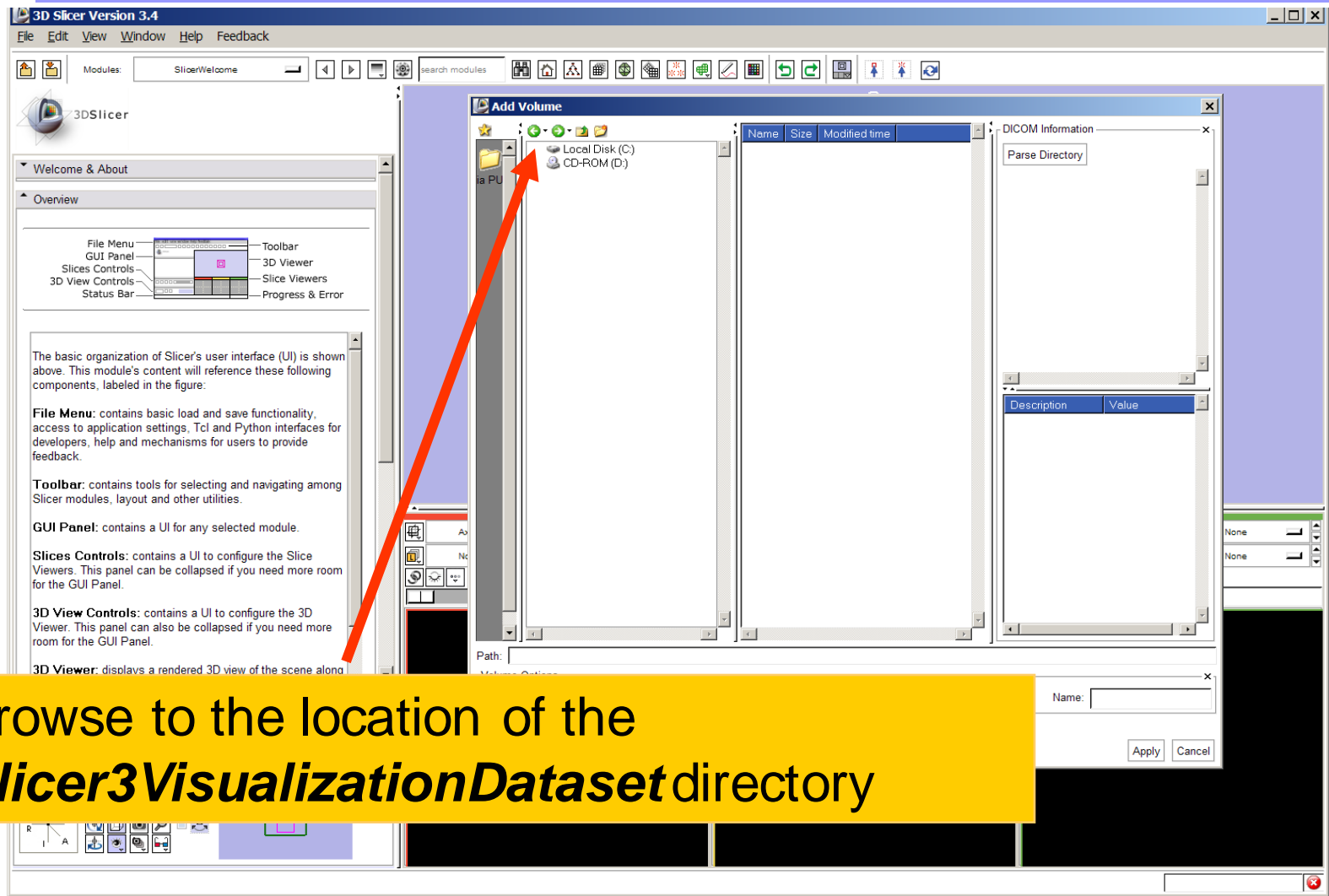
Part 1: Loading and visualizing multiple volumes simultaneously

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**.

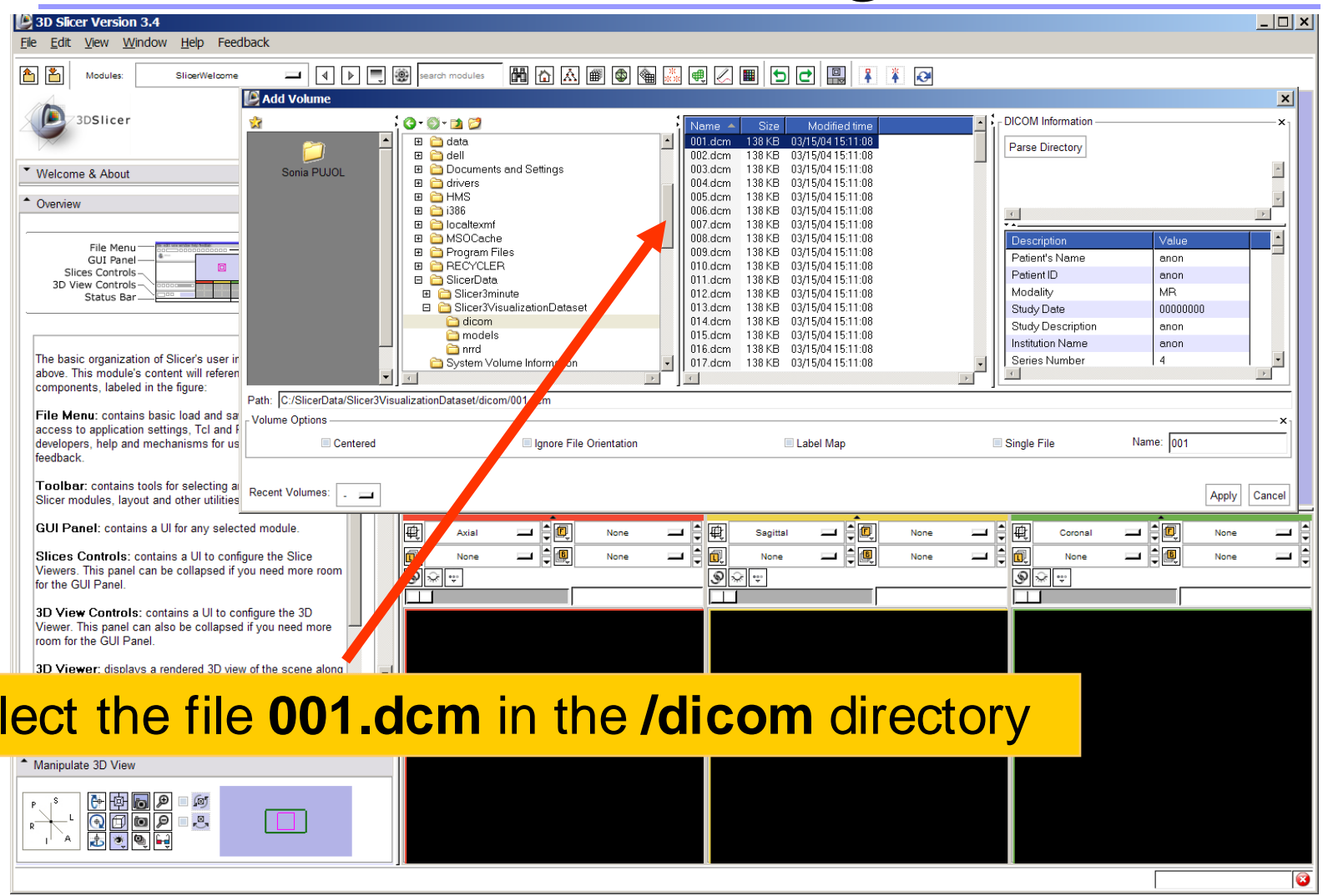
Loading Volumes



The screenshot shows the 3D Slicer 3.4 application window. The 'Add Volume' dialog box is open, displaying a file browser view of the local disk (C:). A red arrow points to the 'Local Disk (C:)' directory. The dialog box also includes a table for 'DICOM Information' and a 'Parse Directory' button. The main application window shows the 'Welcome & About' section with an overview of the user interface components.

Browse to the location of the *Slicer3VisualizationDataset* directory

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

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

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

Volume Options: Centered Ignore File Orientation Label Map Single File Name: 001

Recent Volumes: -

Apply Cancel

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

3D Slicer

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 Fortran scripts, help and mechanisms for user feedback.

Toolbar: contains tools for selecting and configuring 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 the slice views.

Axial Sagittal Coronal

None None None

None None None

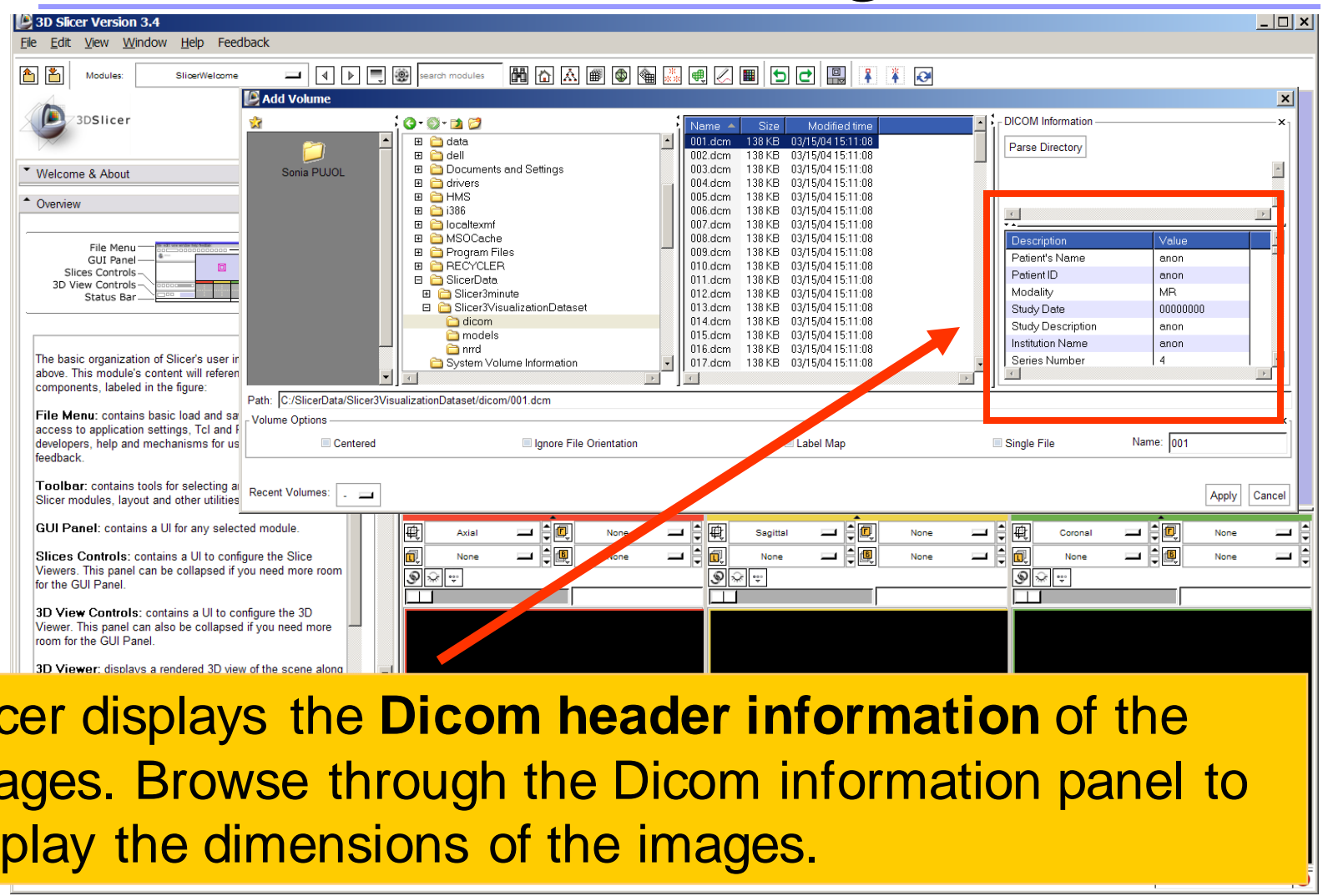
None None None

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

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, and feedback mechanisms for users and developers.

Toolbar: contains tools for selecting and manipulating 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.

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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

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

Volume Options

Centered Ignore File Orientation Label Map Single File Name: 001

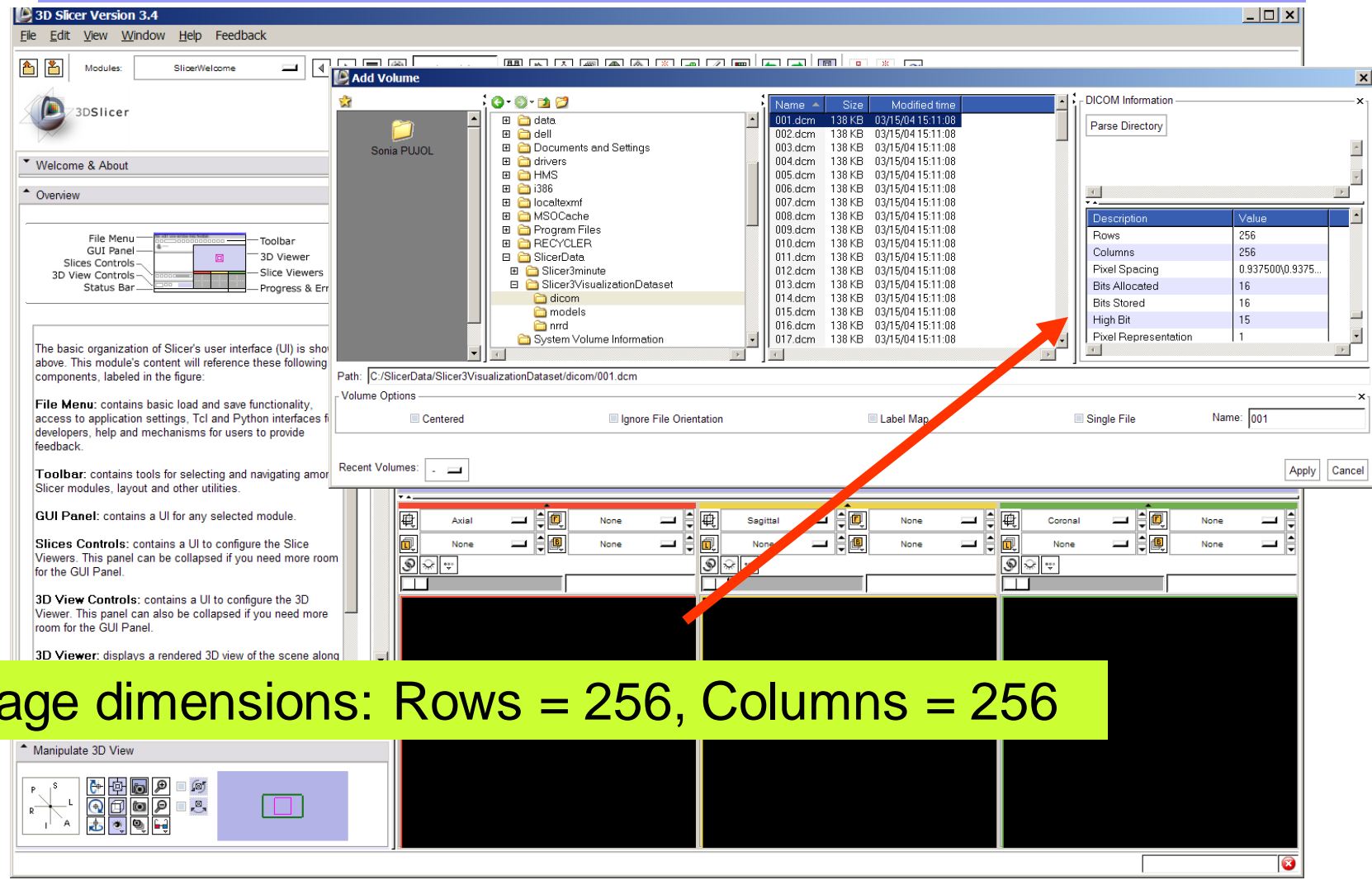
Recent Volumes: -

Apply Cancel

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

Slicer displays the **Dicom header information** of the images. Browse through the Dicom information panel to display the dimensions of the images.

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

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

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

None None None

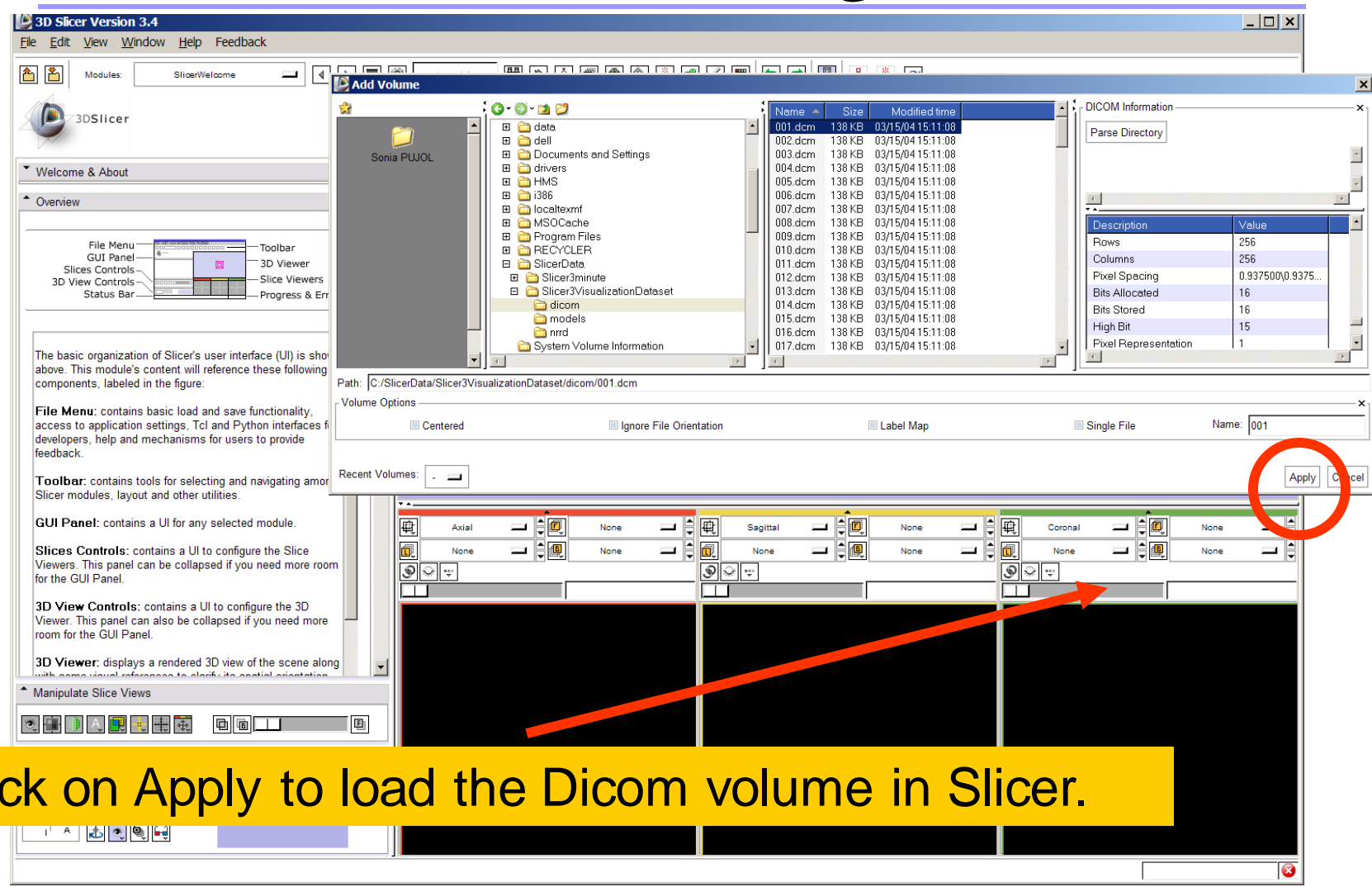
None None None

Manipulate 3D View

P S L R I A

Image dimensions: Rows = 256, Columns = 256

Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

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

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

Volume Options

Centered Ignore File Orientation Label Map Single File Name: 001

Recent Volumes: [Dropdown]

DICOM Information

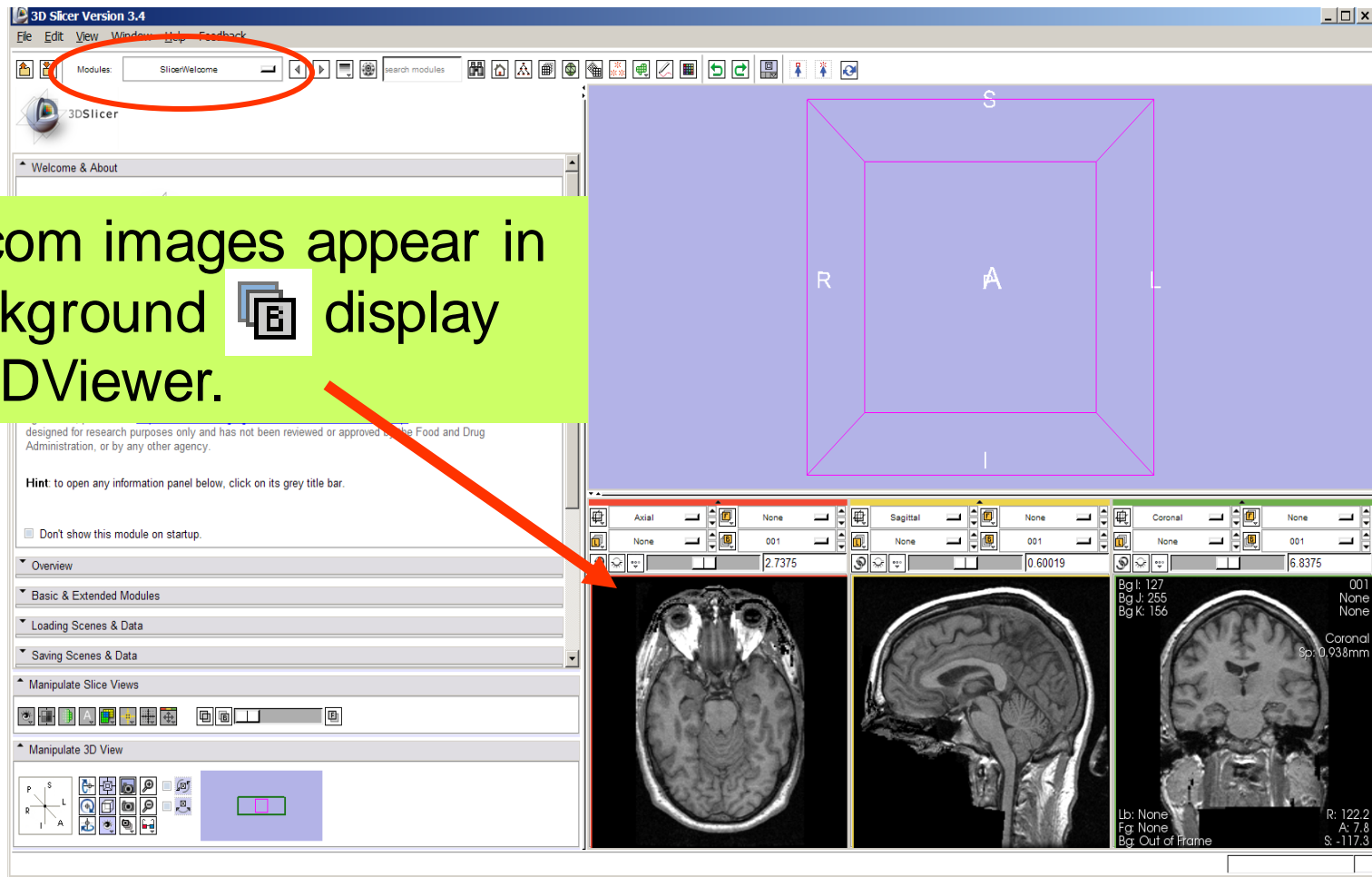
Parse Directory


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

Apply Cancel

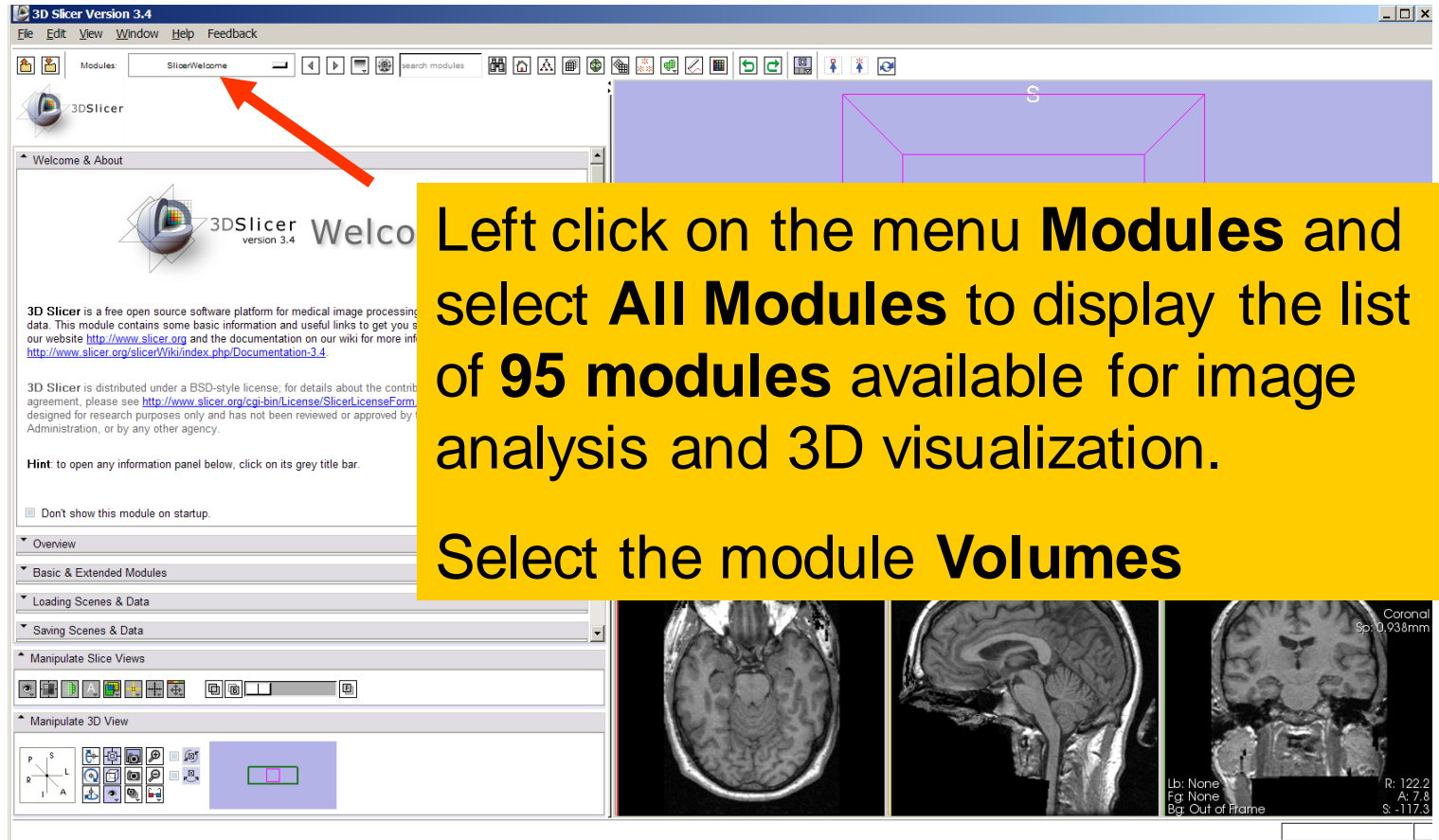
Click on Apply to load the Dicom volume in Slicer.

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 search modules

3DSlicer

Welcome & About

3DSlicer version 3.4 Welcome

3D Slicer is a free open source software platform for medical image processing and visualization. This module contains some basic information and useful links to get you started. For more information, 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-3.4>.

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/SlicerLicenseForm>. 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

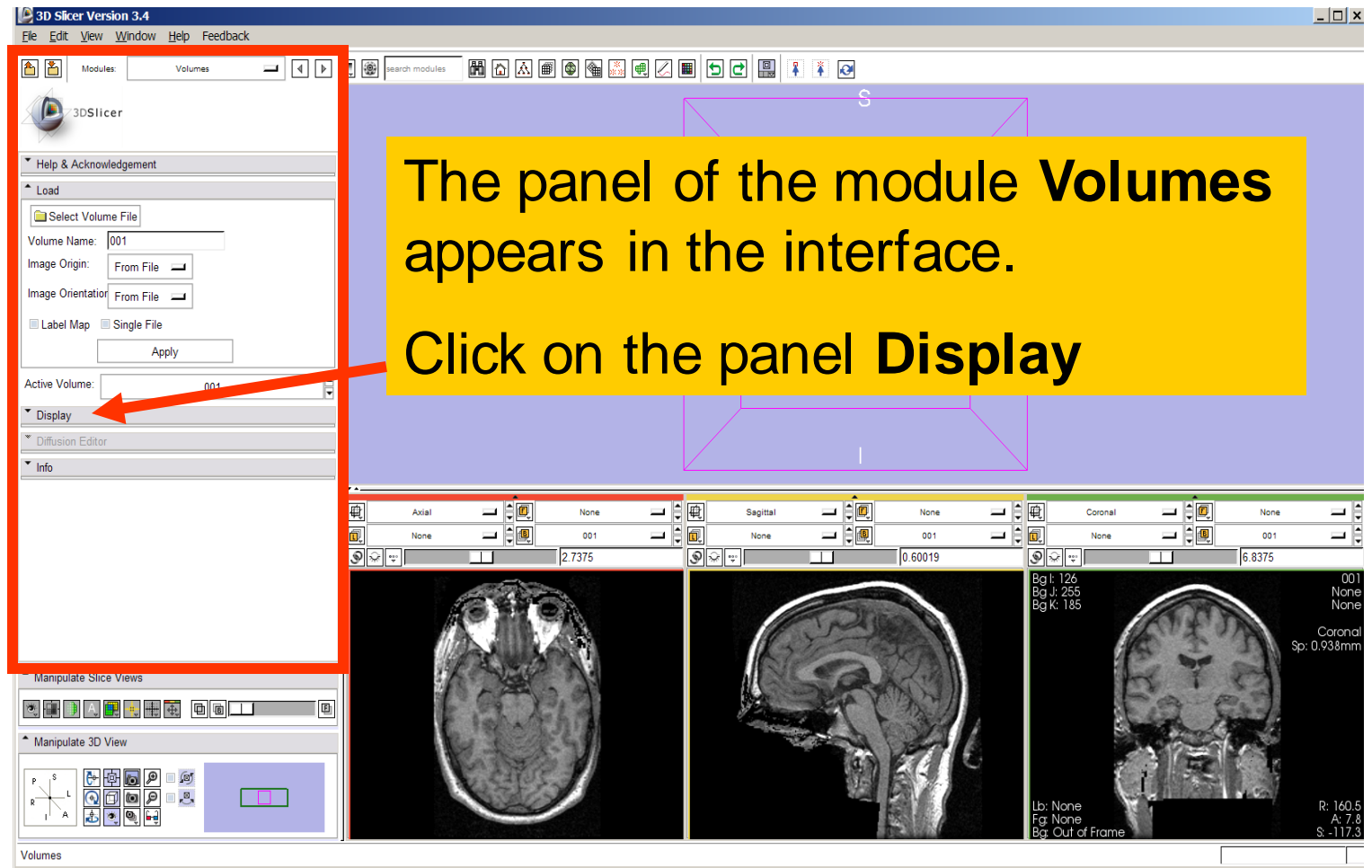
Coronal Sp: 0.93mm

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

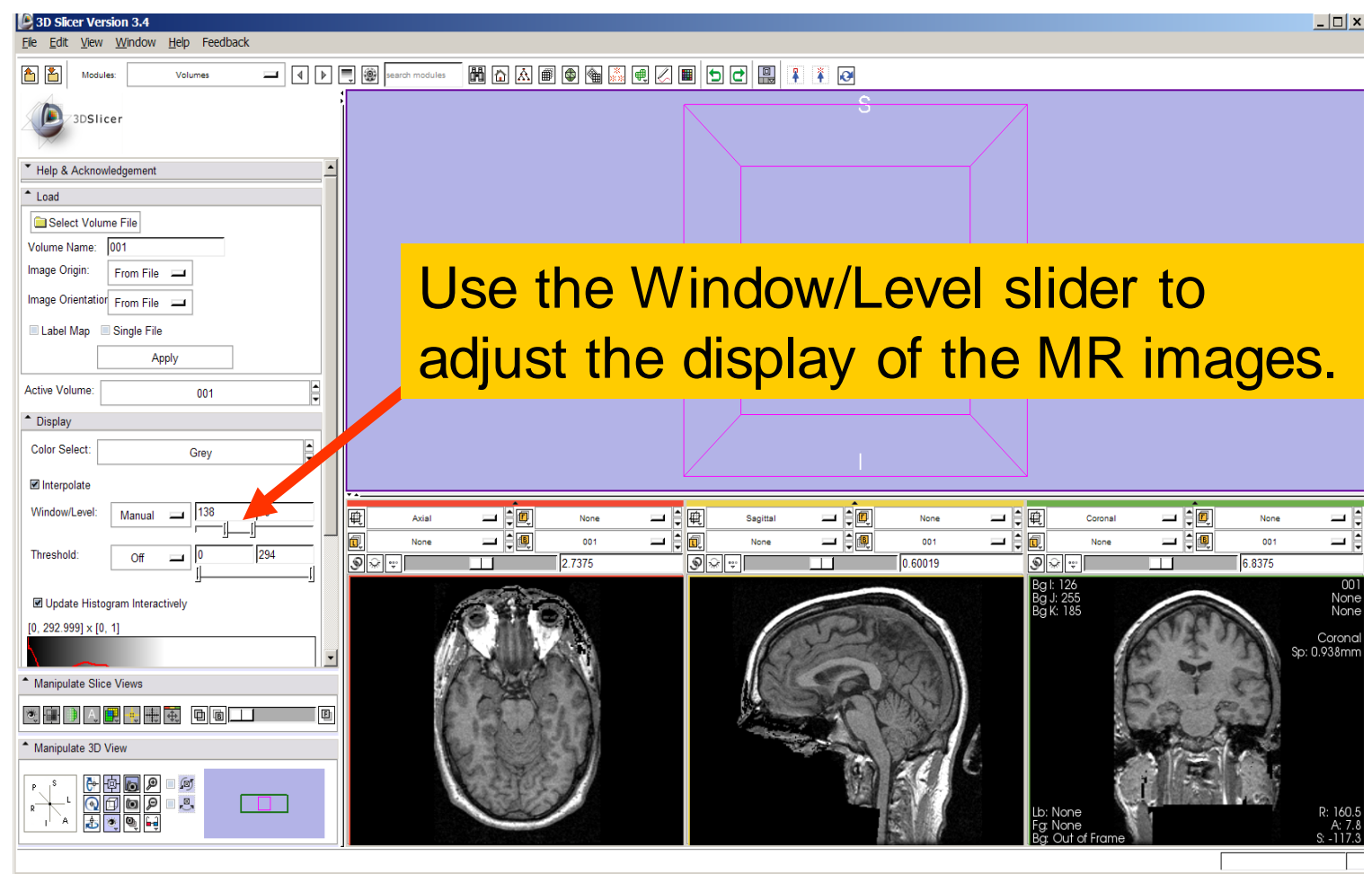


The panel of the module **Volumes** appears in the interface.

Click on the panel **Display**

The screenshot shows the 3D Slicer 3.4 interface. The 'Volumes' module is selected in the top toolbar. The left sidebar shows the 'Volumes' module panel with the 'Display' section expanded. A red arrow points to the 'Display' section. The main window displays three slice views: Axial, Sagittal, and Coronal. The Axial view shows a brain slice at 2.7375. The Sagittal view shows a brain slice at 0.60019. The Coronal view shows a brain slice at 6.8375. The Coronal view also displays technical data: Bg I: 126, Bg J: 255, Bg K: 185, R: 160.5, A: 7.8, S: -117.3.

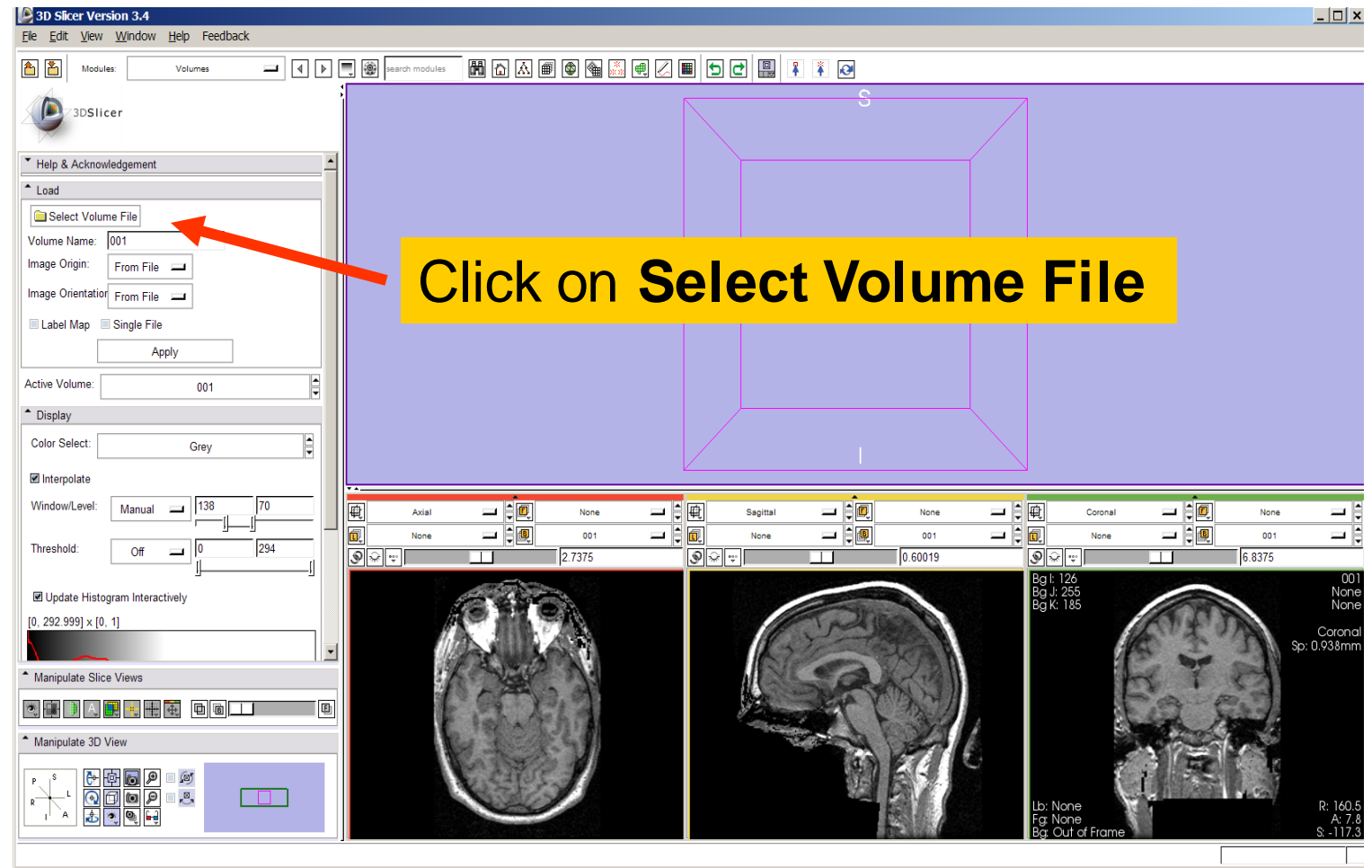
Loading Volumes



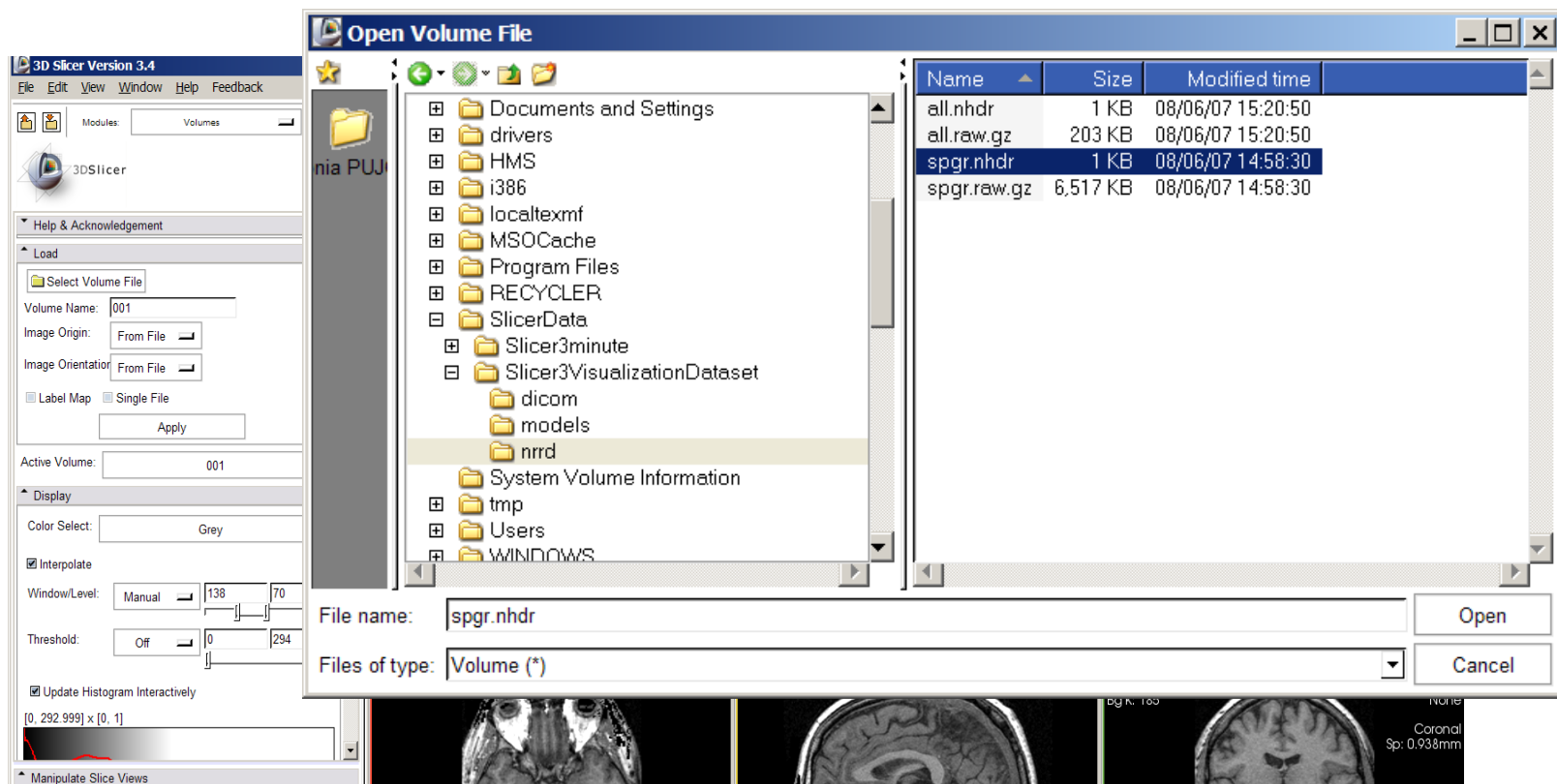
The screenshot shows the 3D Slicer 3.4 interface. On the left, the 'Load' panel is active, showing 'Volume Name: 001', 'Image Origin: From File', and 'Image Orientation: From File'. Below this, the 'Display' panel is visible, featuring a 'Color Select' dropdown set to 'Grey', an 'Interpolate' checkbox checked, and a 'Window/Level' slider set to 138. A red arrow points from the 'Window/Level' slider to a yellow text box. The 'Threshold' is set to 'Off' with a range of 0 to 294. The 'Update Histogram Interactively' checkbox is also checked. The main 3D view area is currently empty, with a purple wireframe box overlaid. Below the 3D view, three slice views are displayed: Axial, Sagittal, and Coronal. The Axial view shows a brain slice with a value of 2.7375. The Sagittal view shows a brain slice with a value of 0.60019. The Coronal view shows a brain slice with a value of 6.8375. The Coronal view also displays technical details: 'Bg I: 126', 'Bg J: 255', 'Bg K: 185', '001', 'None', 'None', 'None', 'Coronal Sp: 0.938mm', 'R: 160.5', 'A: 7.8', 'S: -117.3', and 'Lb: None', 'Fg: None', 'Bg: Out of Frame'.

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

Loading Volumes

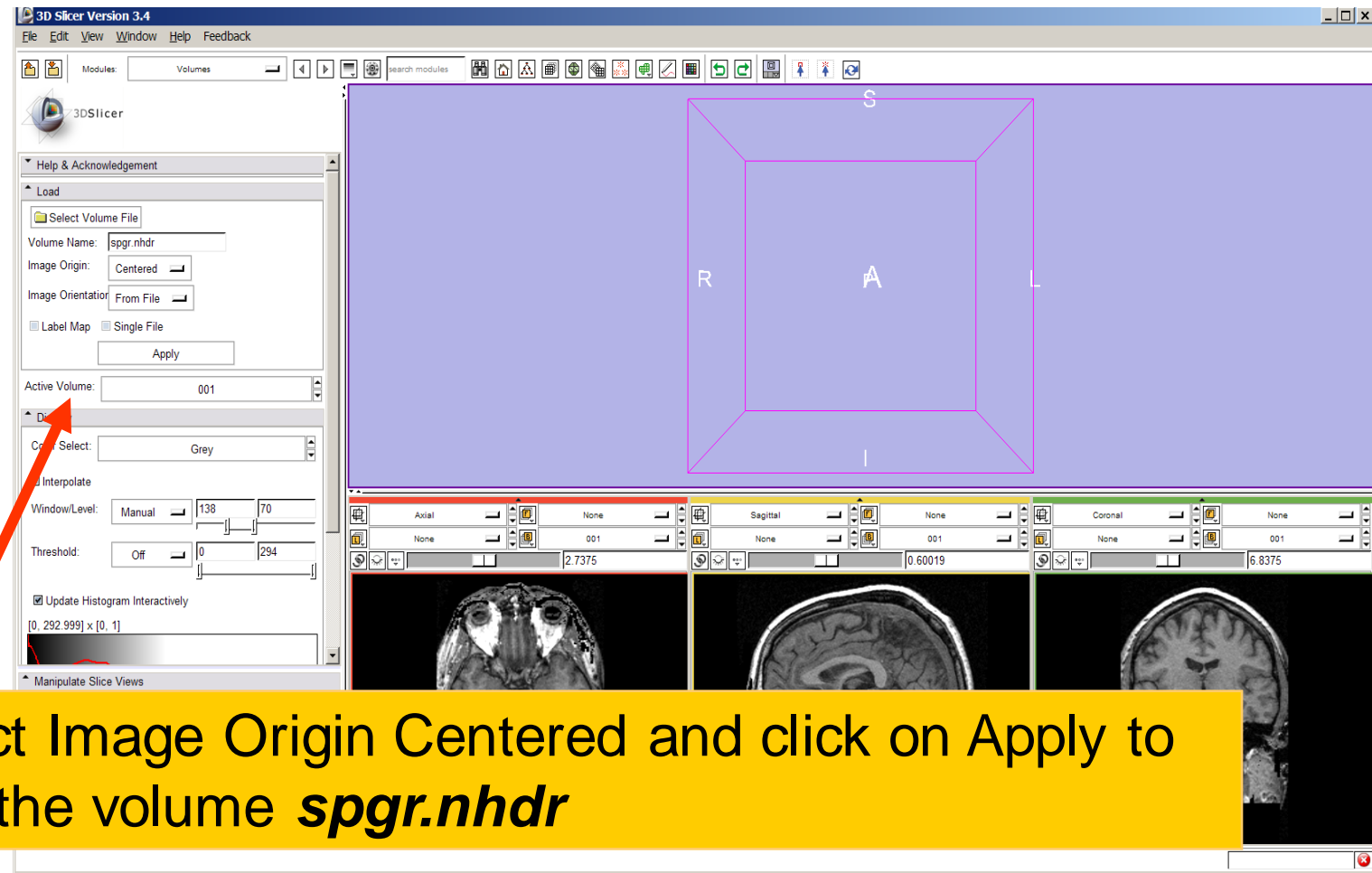


Loading Volumes



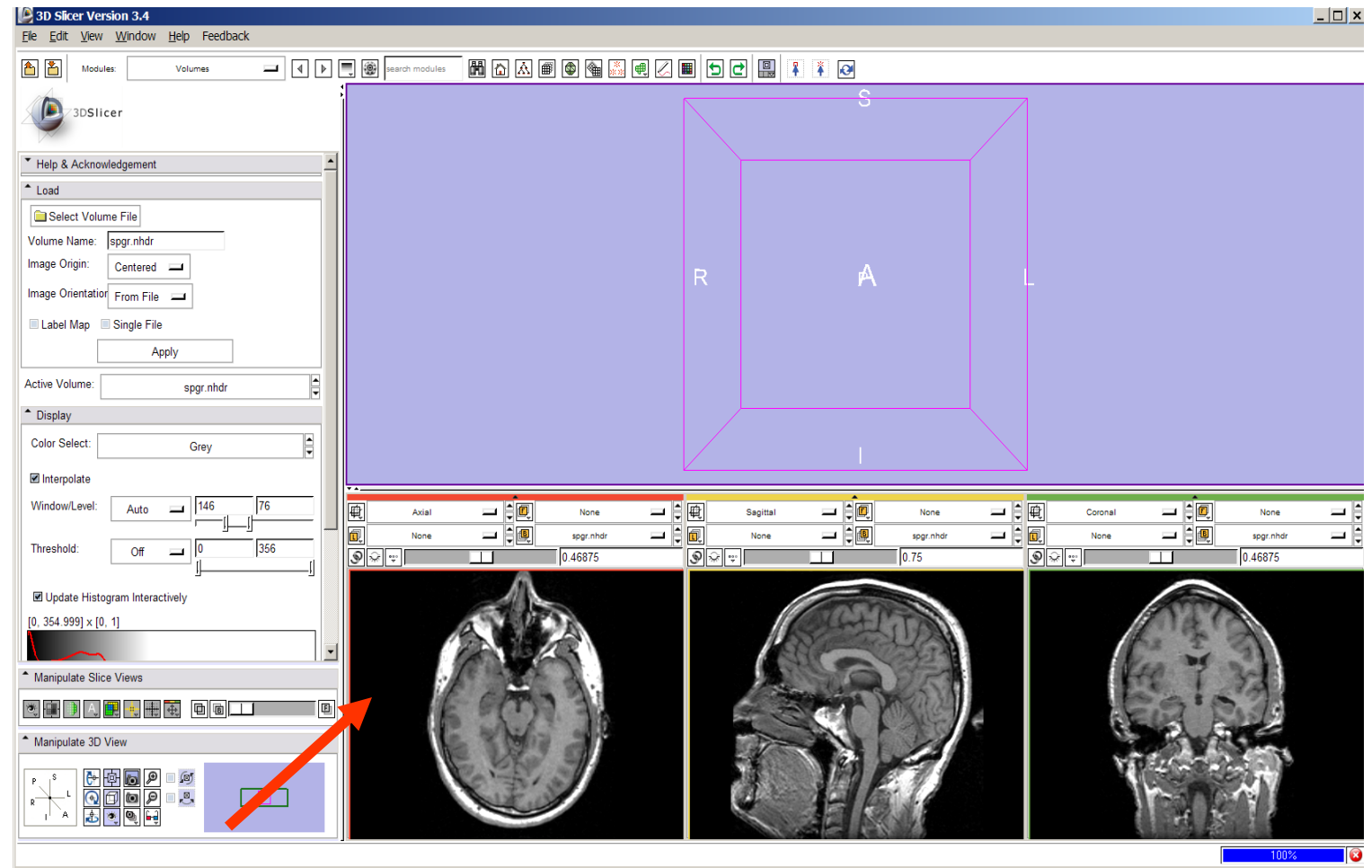
Browse to find the header file of the spgr volume ***spgr.nhdr*** located in the directory ***Slicer3VisualizationDataset/nrrd*** and click on **Open**.

Loading Volumes



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

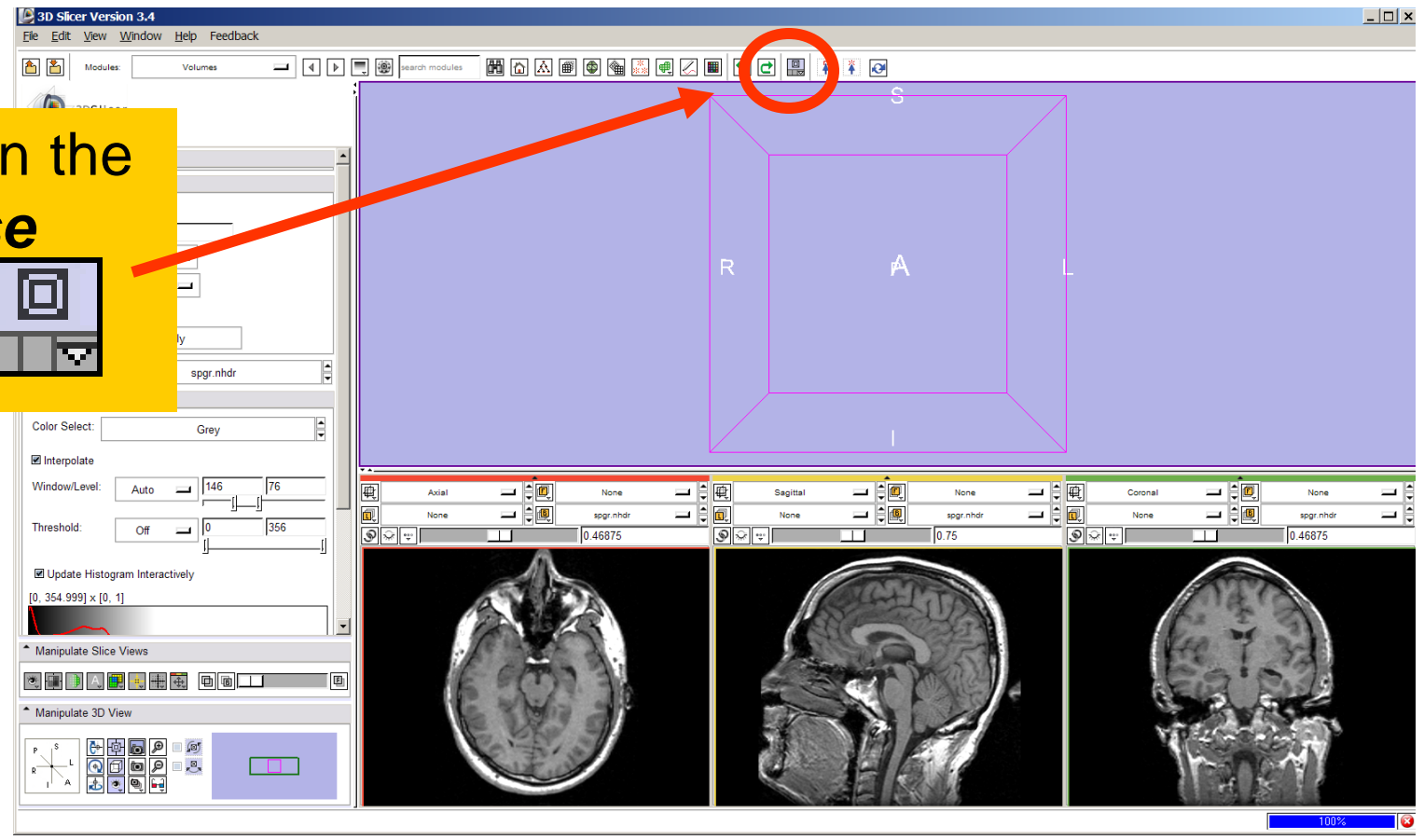
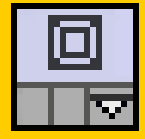
Loading Volumes



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

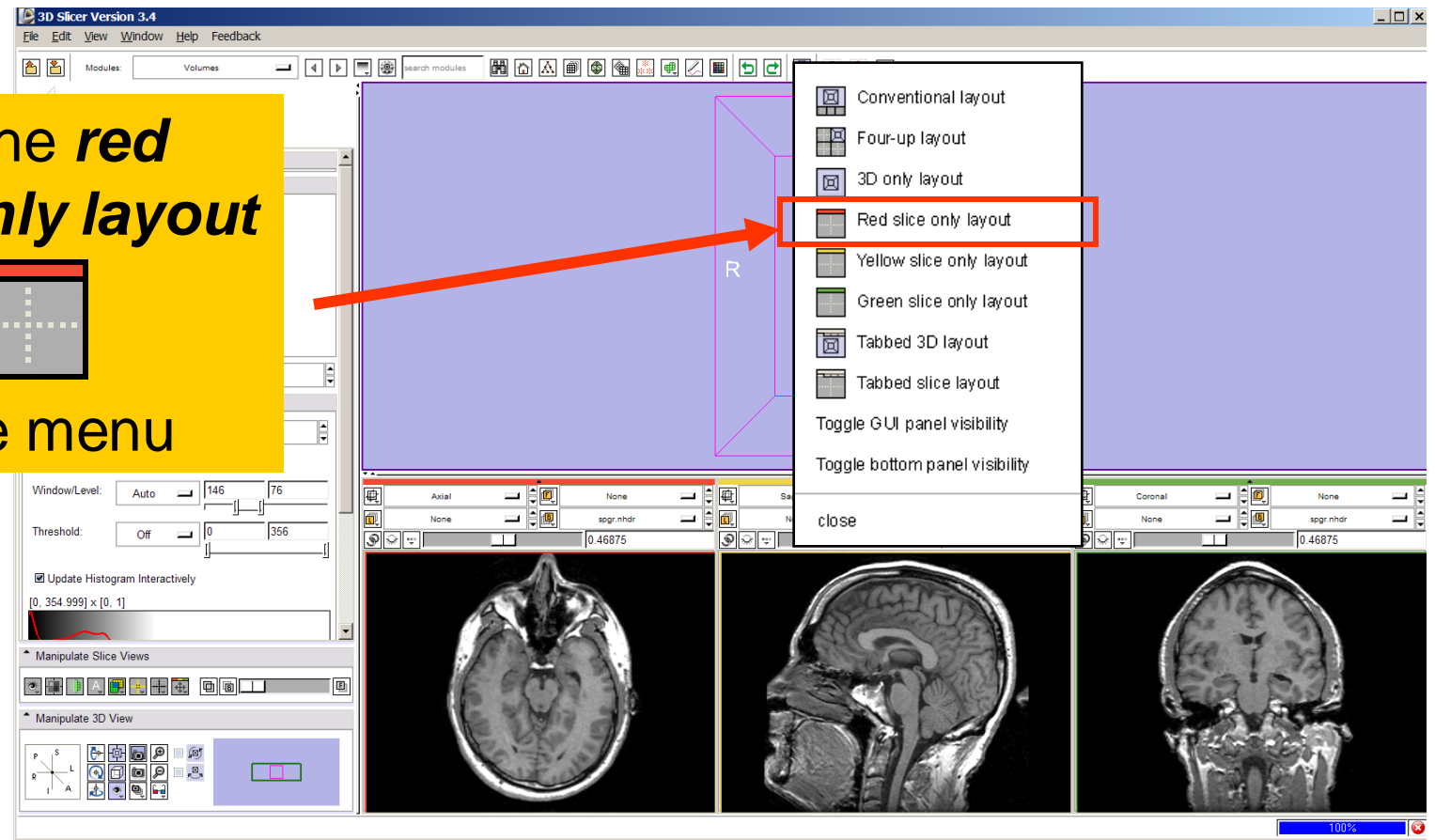
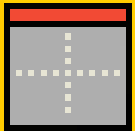
Exploring the data

Click on the **choose view icon**



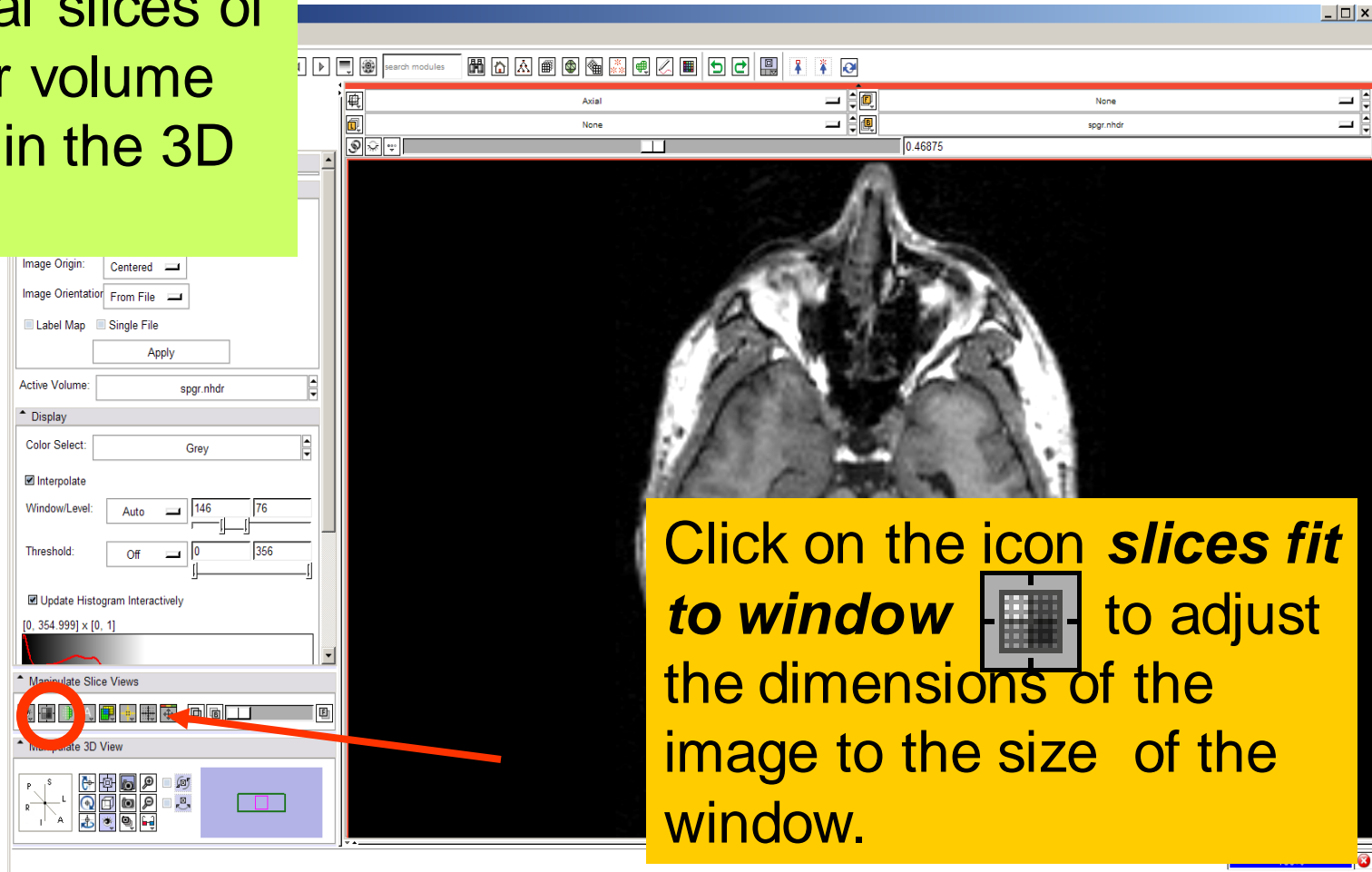
Exploring the data

Select the *red slice only layout* from the menu




Exploring the data

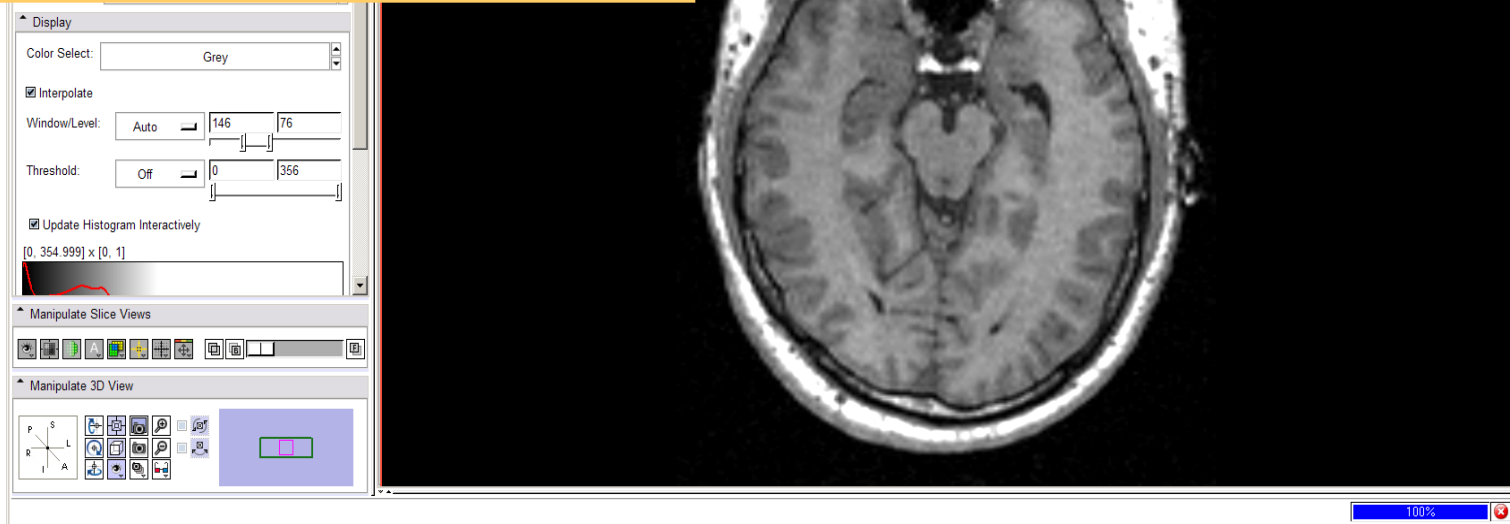
The axial slices of the spgr volume appear in the 3D viewer.





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

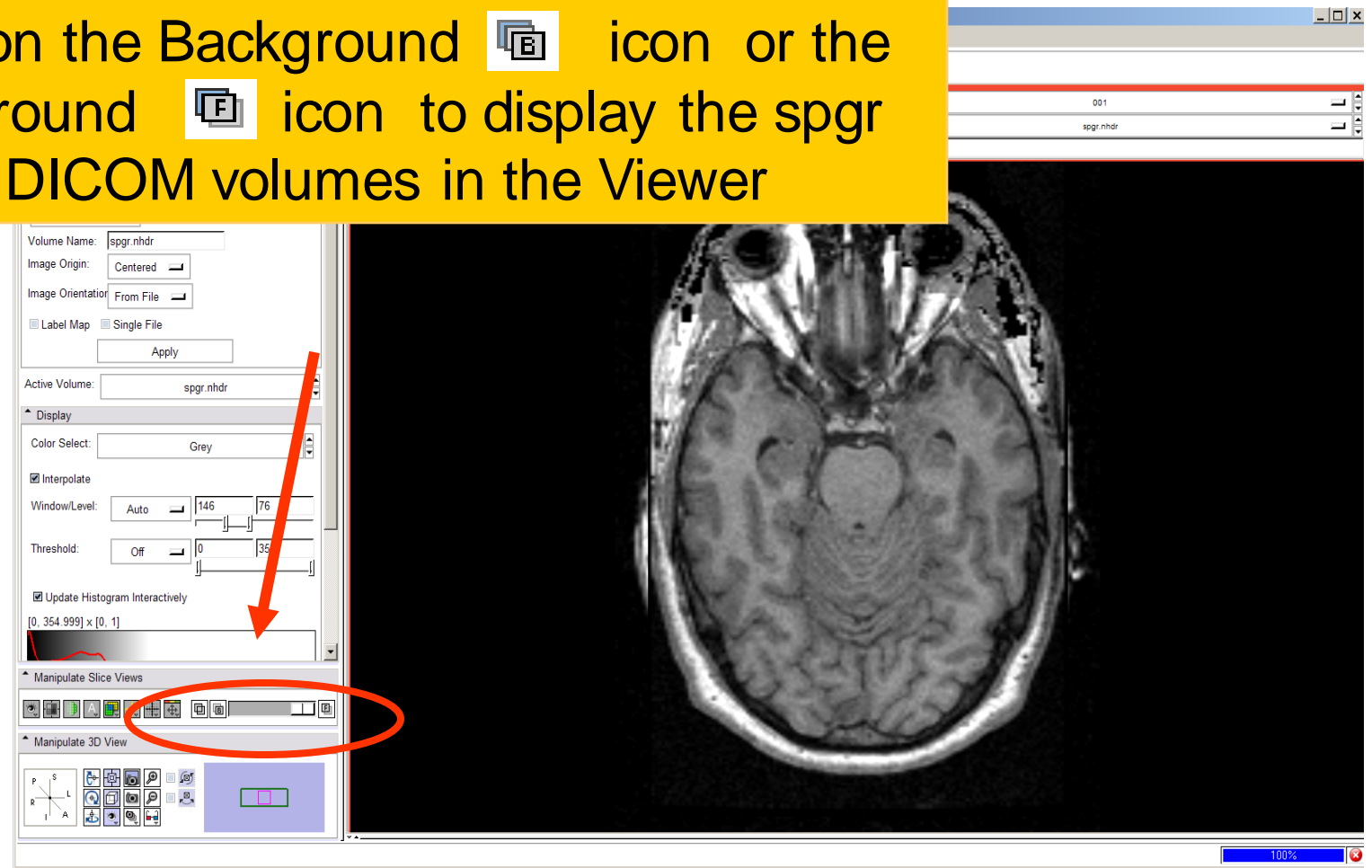
Exploring the data

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



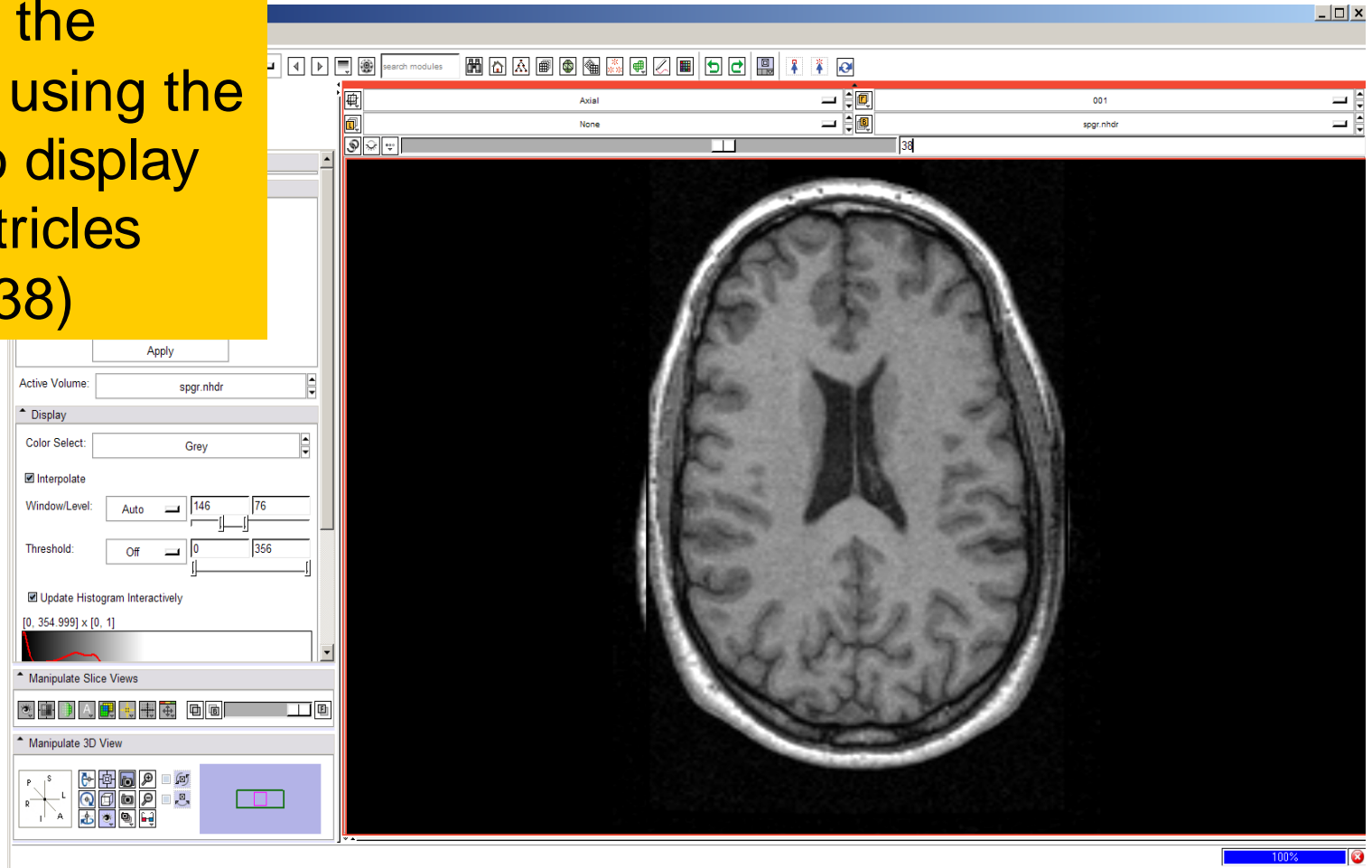
Exploring the data

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



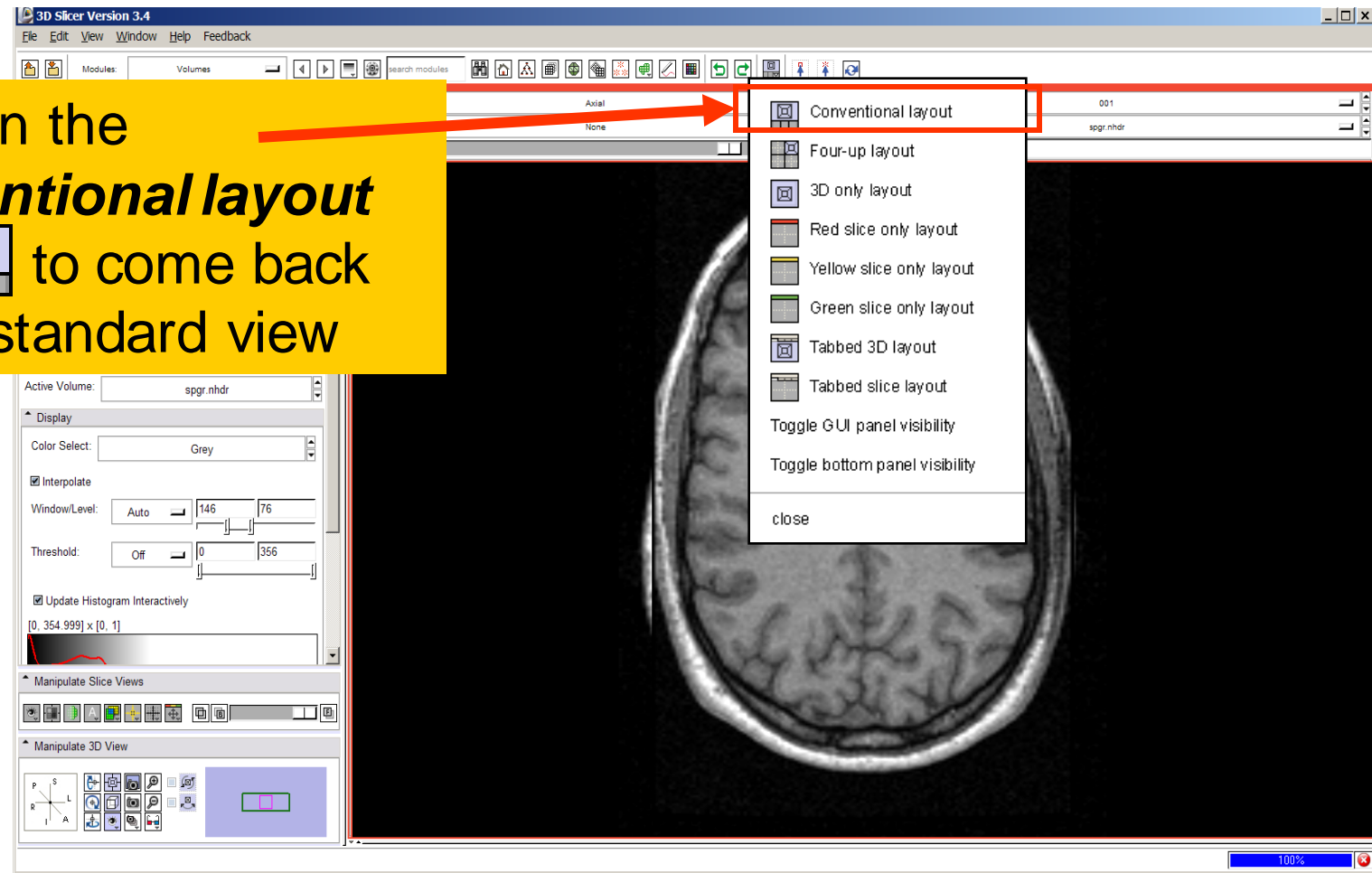
Exploring the data

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




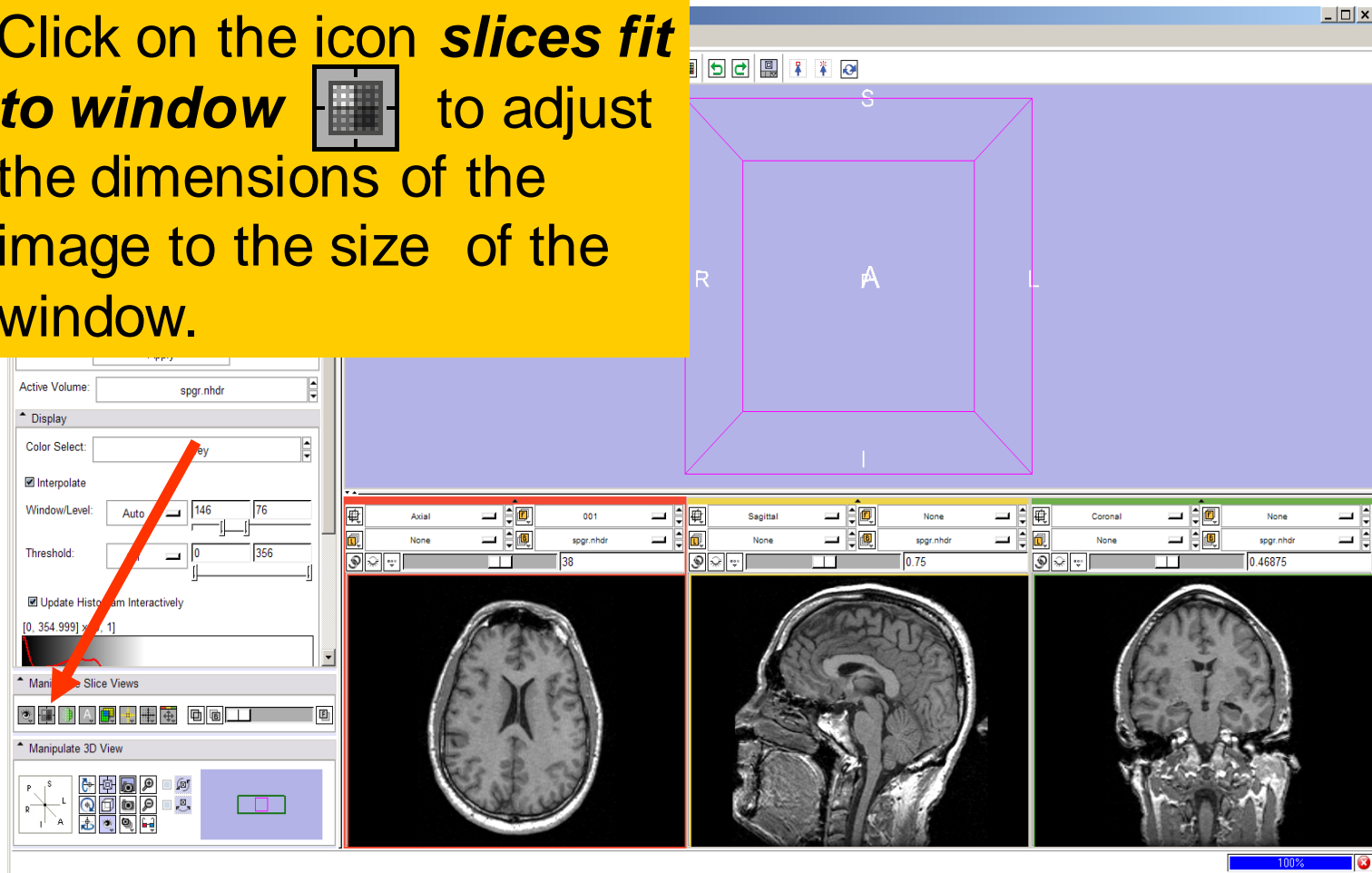
Exploring the data

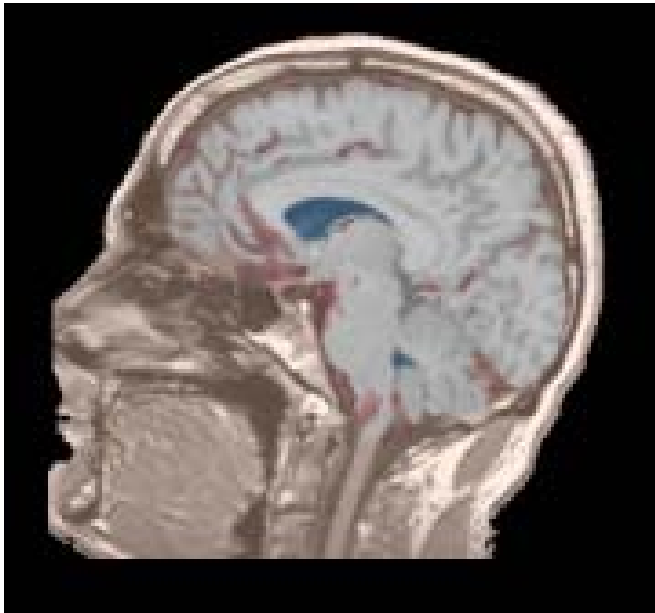
Click on the **conventional layout icon** to come back to the standard view



Loading Volumes

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





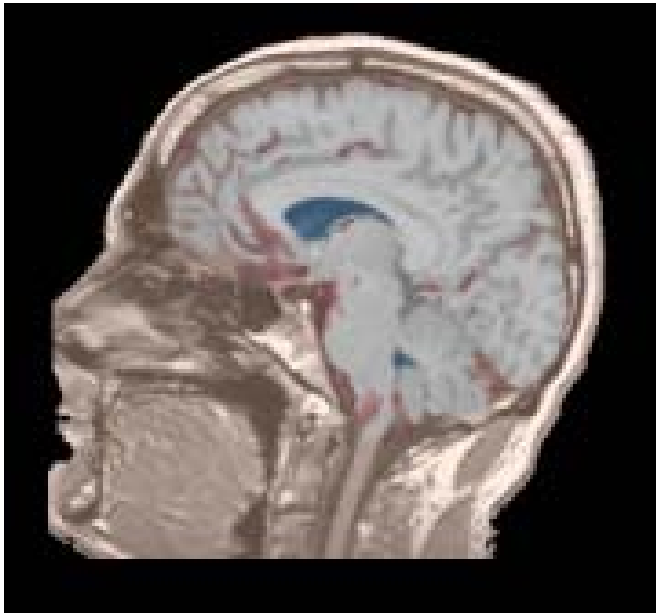
Part 2: Loading and visualizing segmented structures overlaid on grayscale images

Label map

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

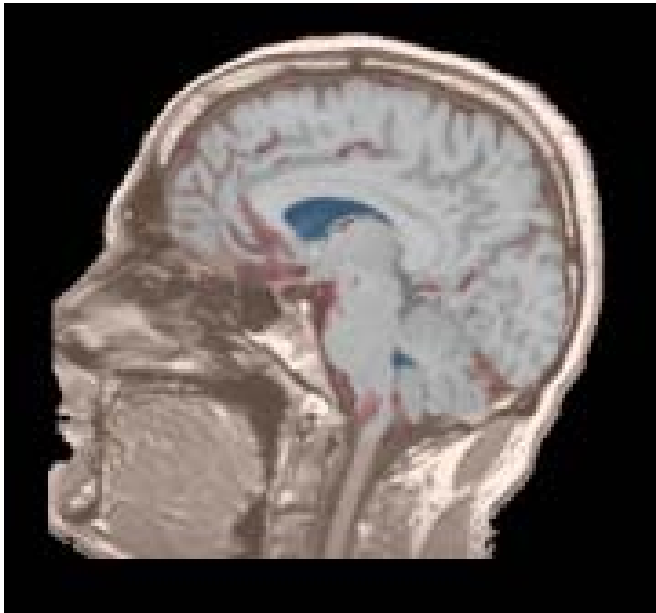


Label map



- **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.

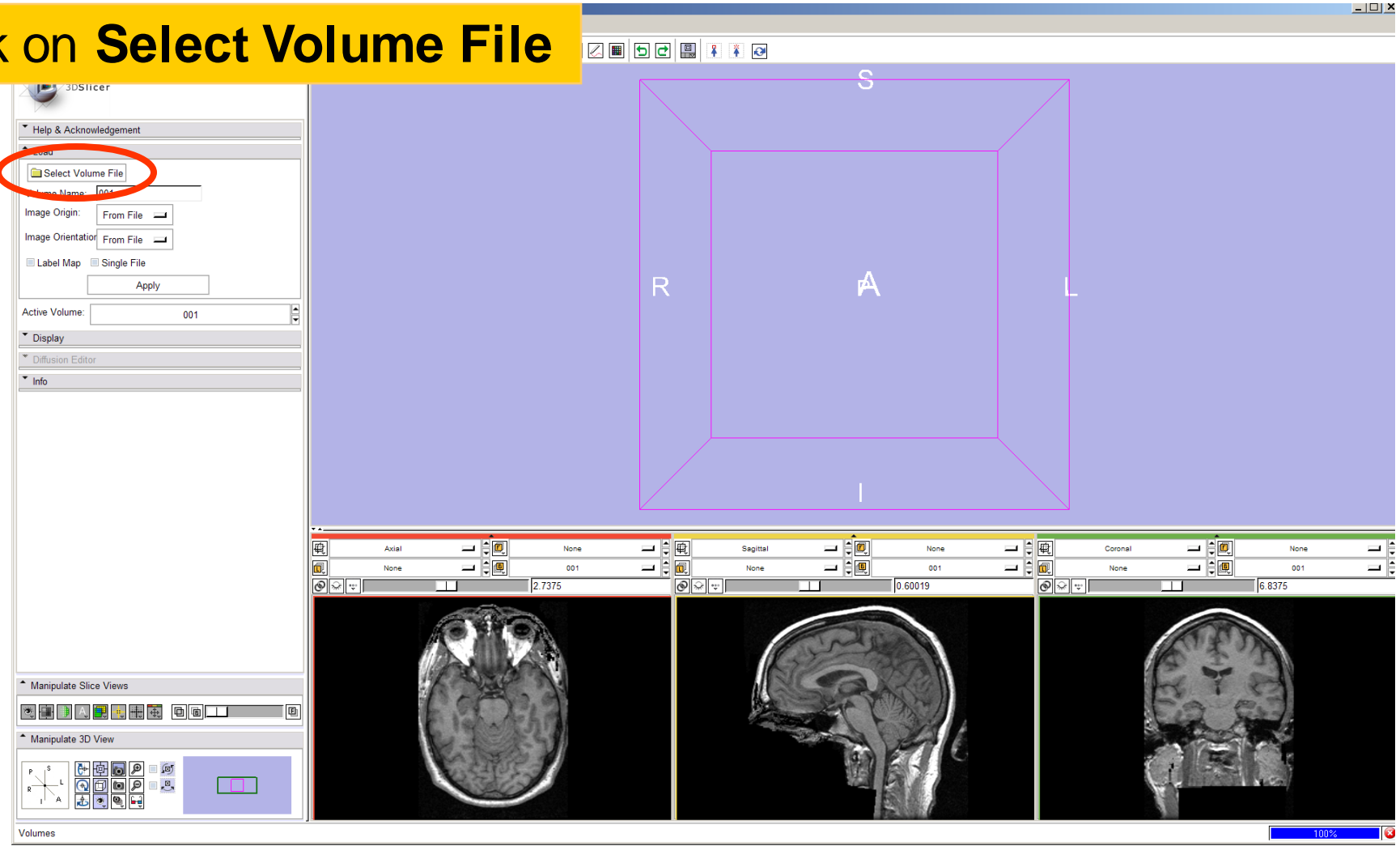
Label map



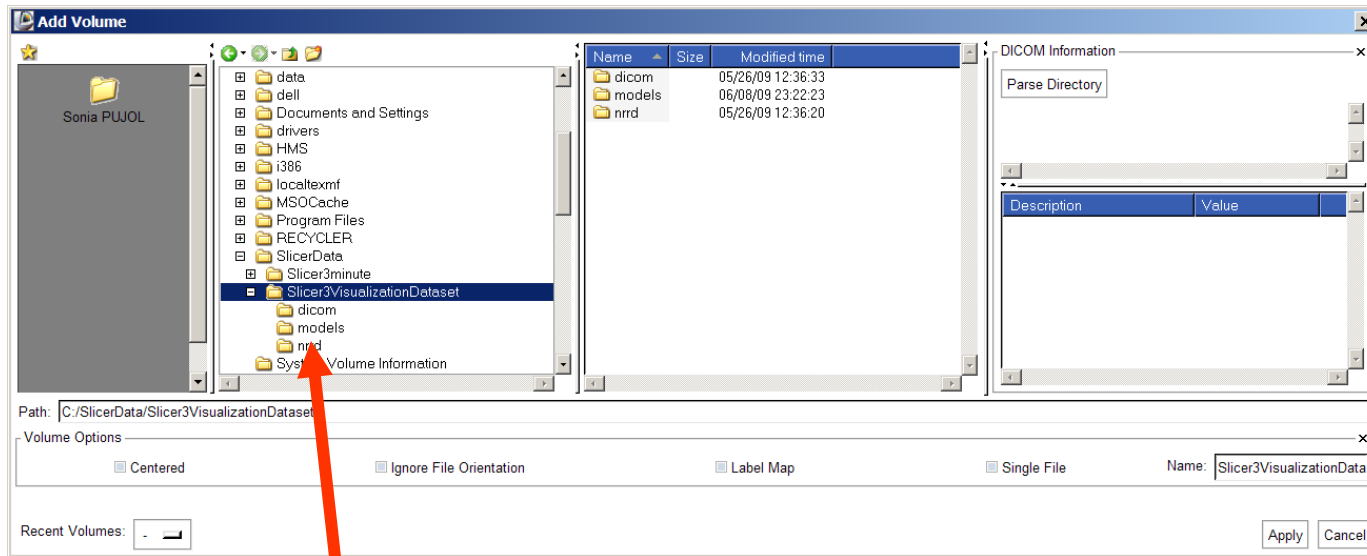
- **Image segmentation** is the extraction of structural information of particular interest from surrounding image.
- Each pixel is assigned a specific **label value** which corresponds to the anatomical structure that it belongs to.
- The three-dimensional result of the segmentation is a binary array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

Loading a label map

Click on **Select Volume File**

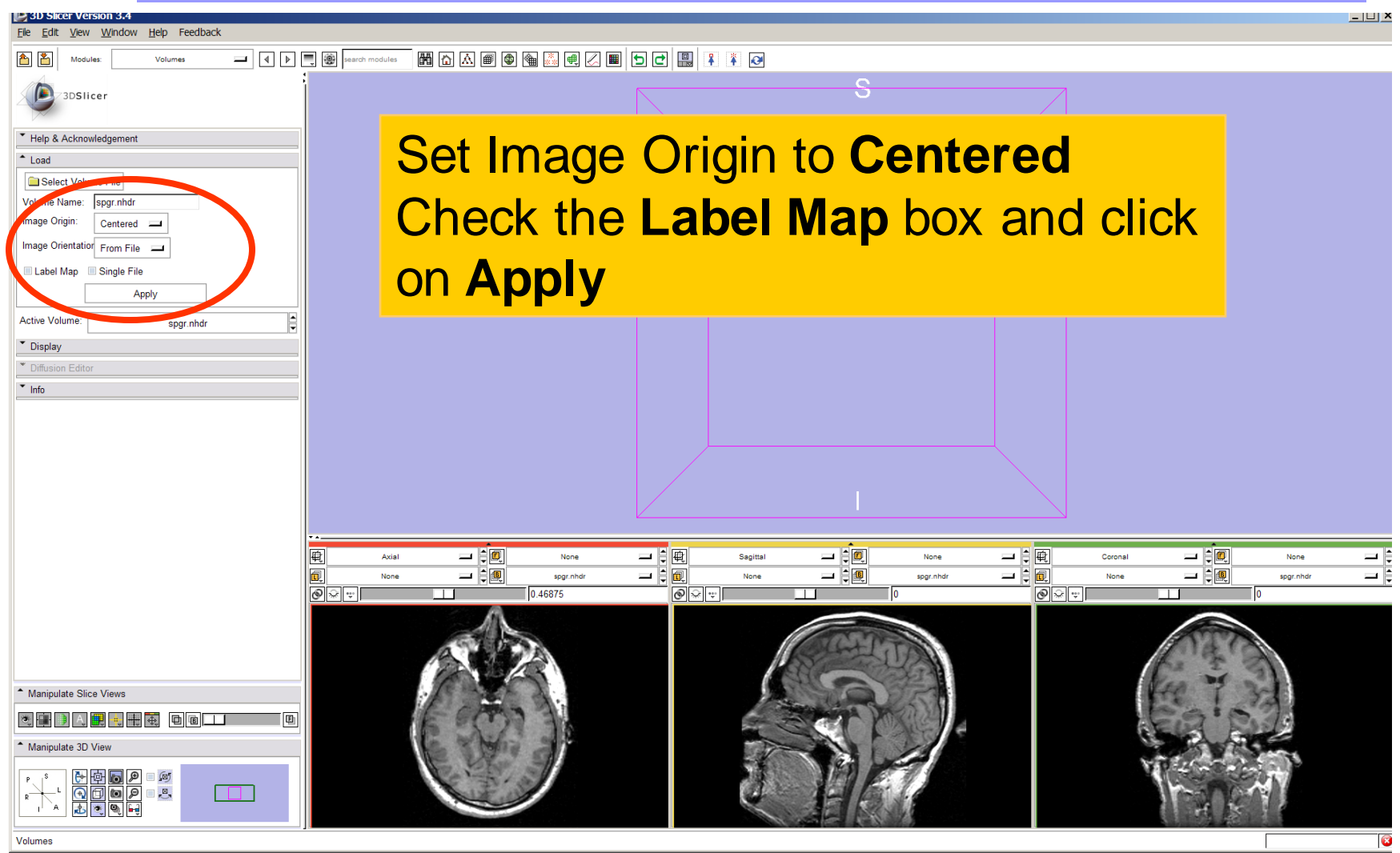


Loading a label map



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



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: Volumes

3DSlicer

Help & Acknowledgement

Load

Select Volume

Volume Name: spgr.nhdr

Image Origin: Centered

Image Orientation: From File

Label Map Single File

Apply

Active Volume: spgr.nhdr

Display

Diffusion Editor

Info

Axial Sagittal Coronal

None None None

spgr.nhdr spgr.nhdr spgr.nhdr

0.46875 0 0

Manipulate Slice Views

Manipulate 3D View

Volumes

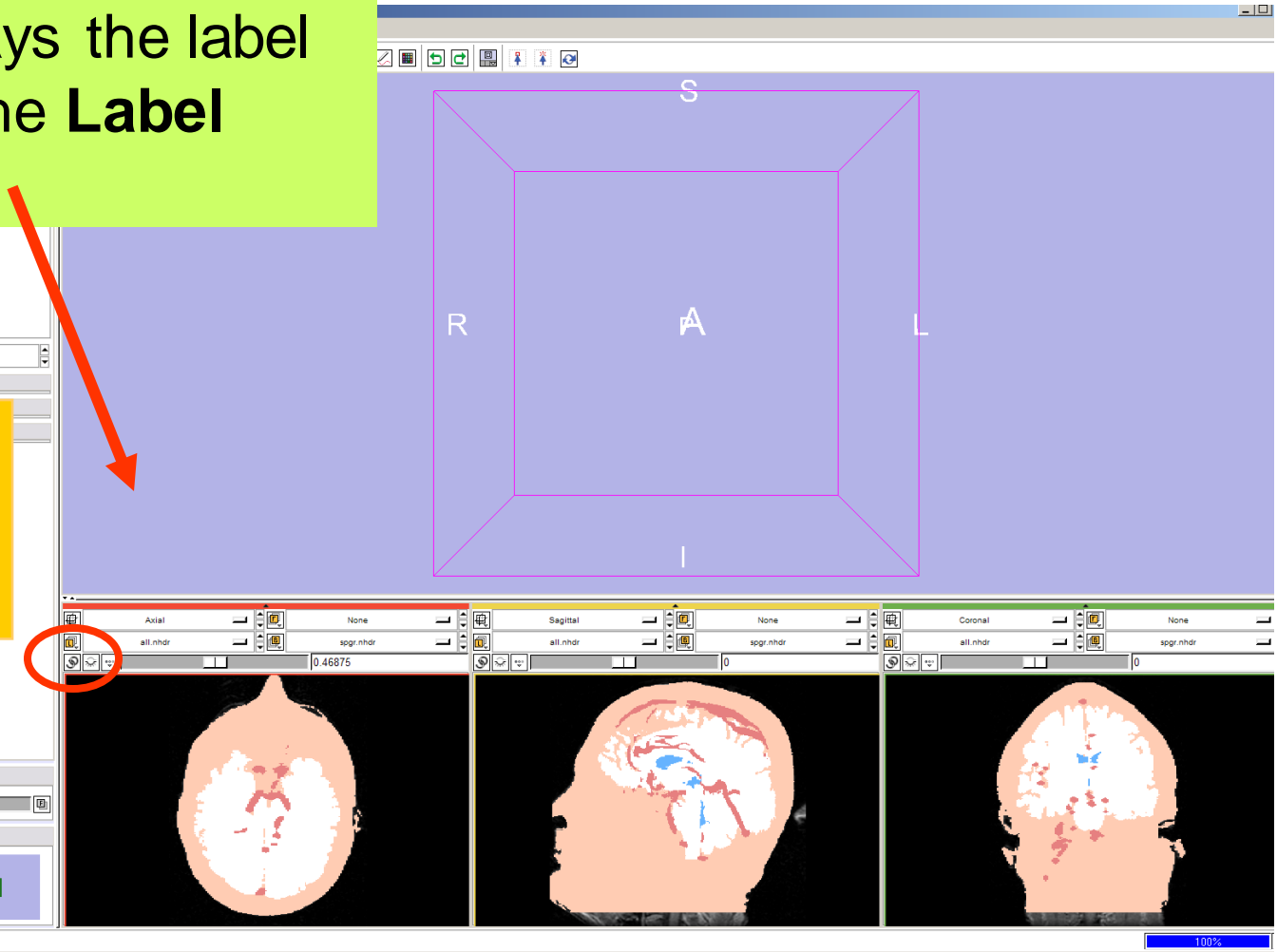
Set Image Origin to **Centered**
Check the **Label Map** box and click on **Apply**

Visualizing a label map

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



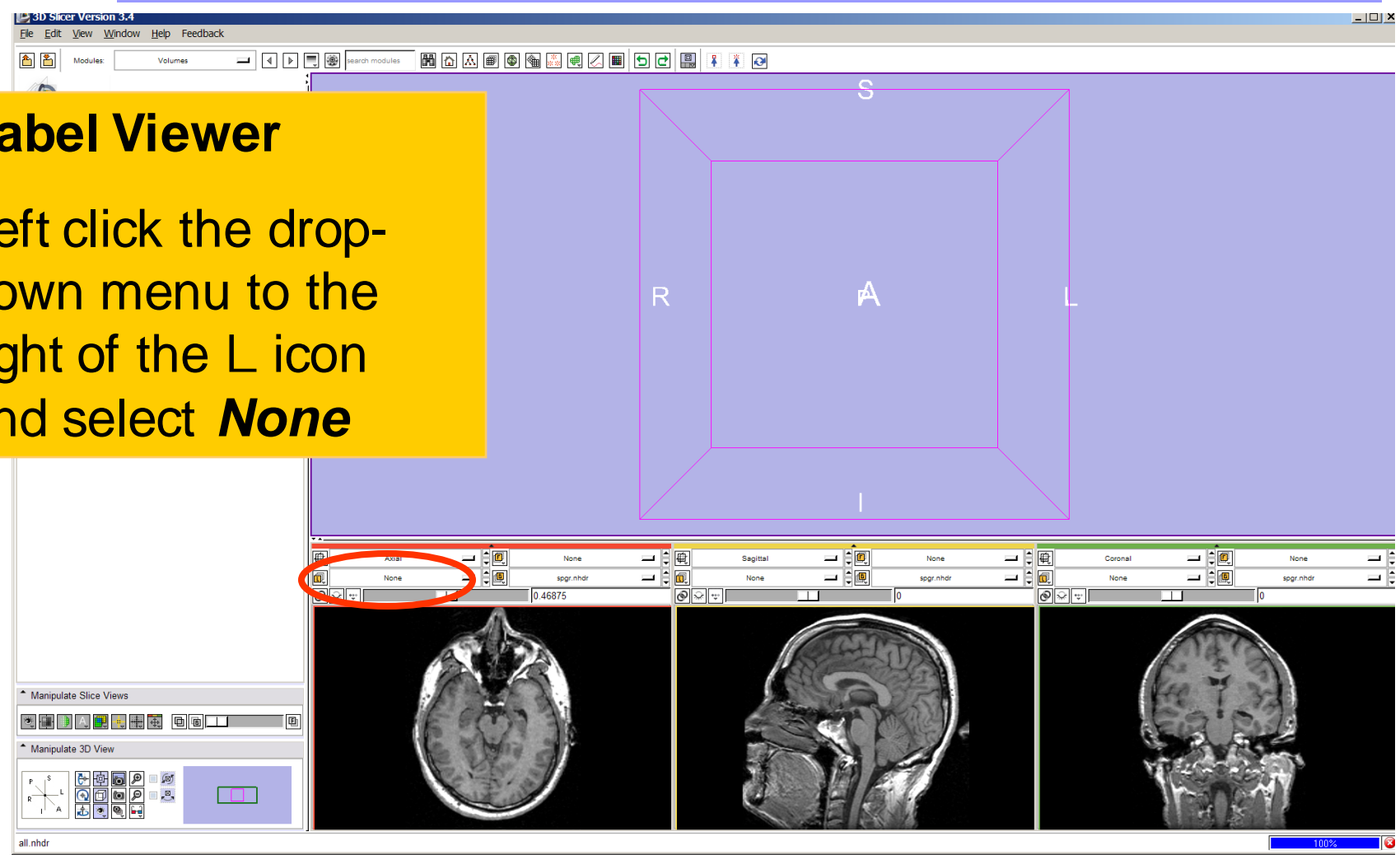
Click on the *links* icon.



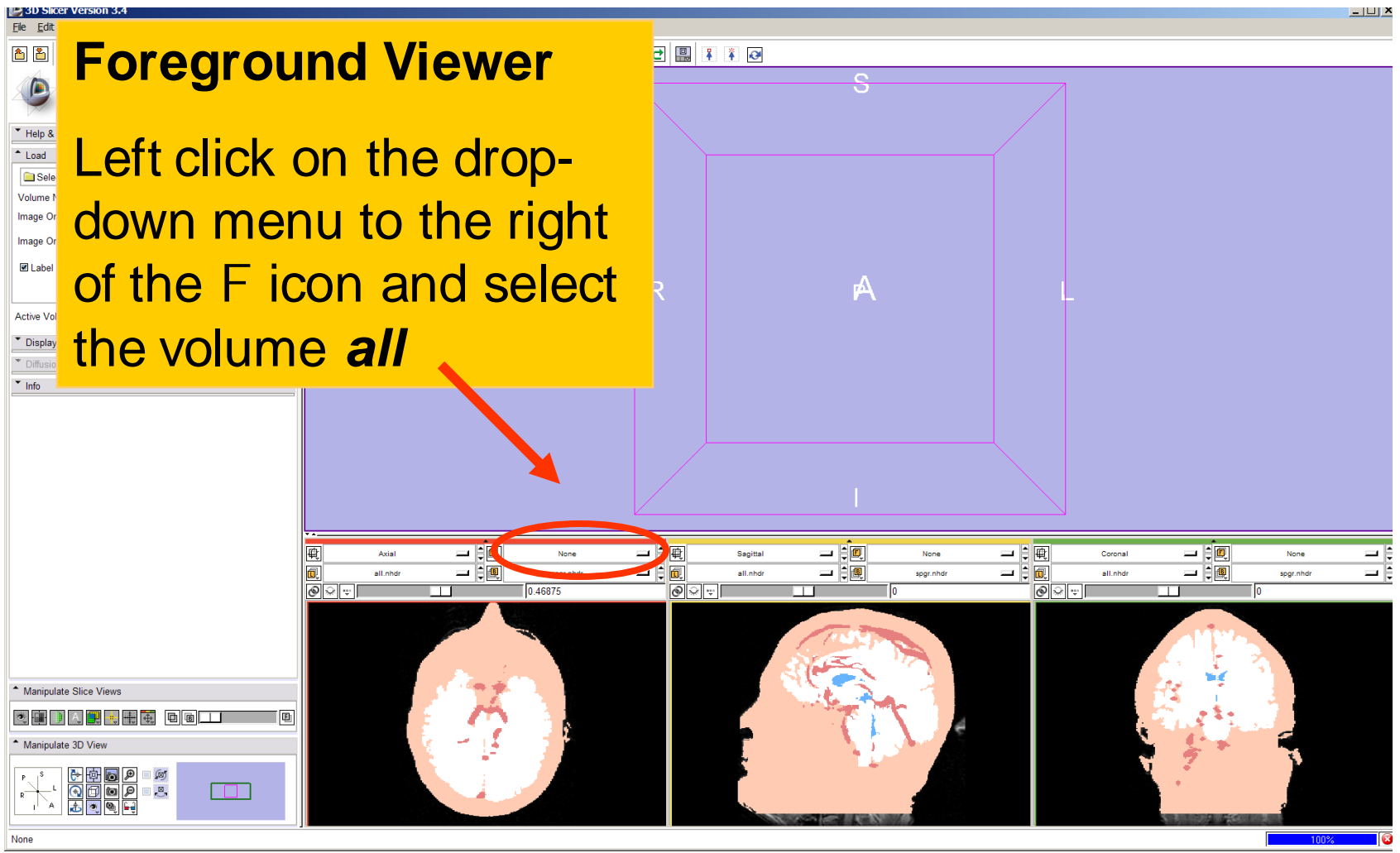
Visualizing Multiple Volumes

Label Viewer

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



Visualizing Multiple Volumes

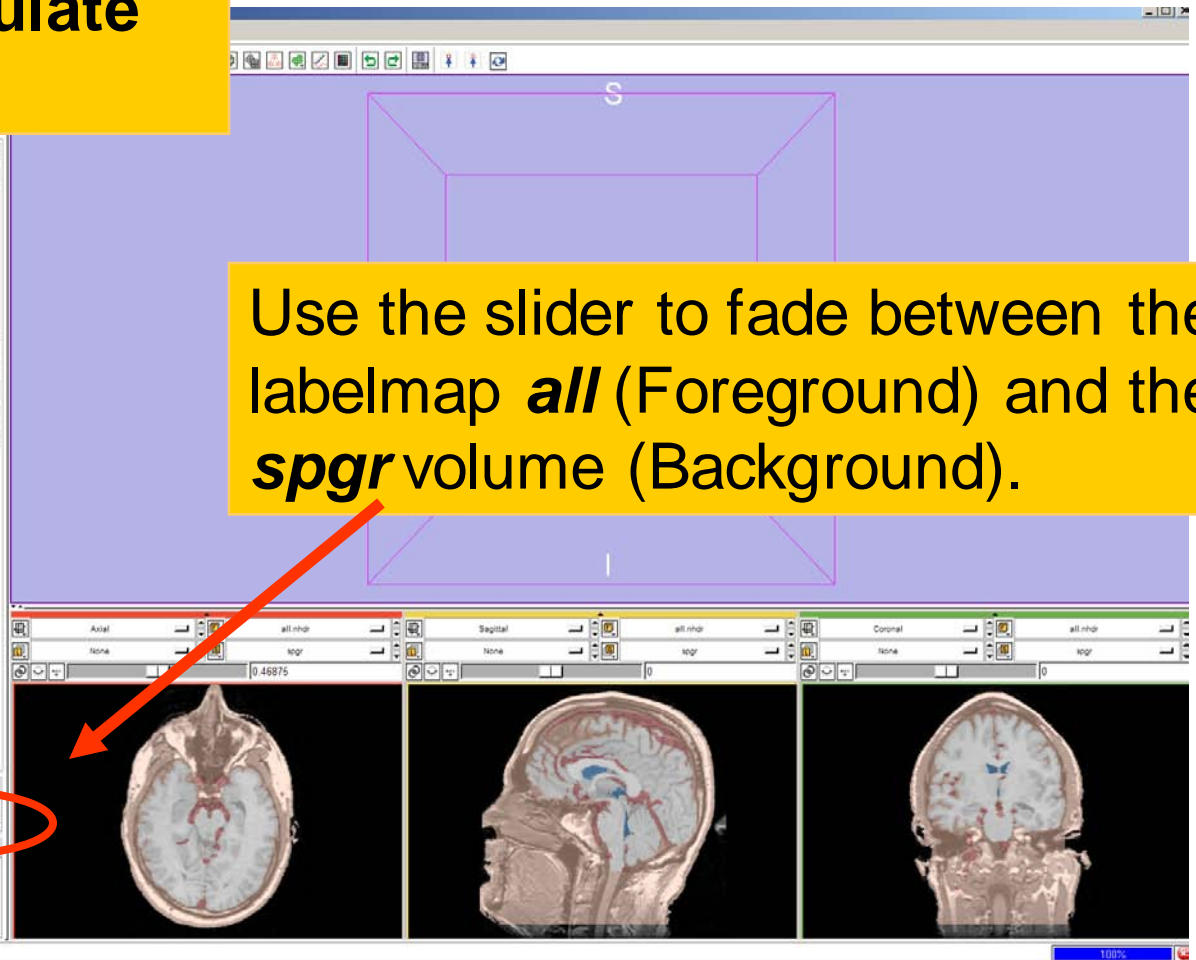


Visualizing Multiple Volumes

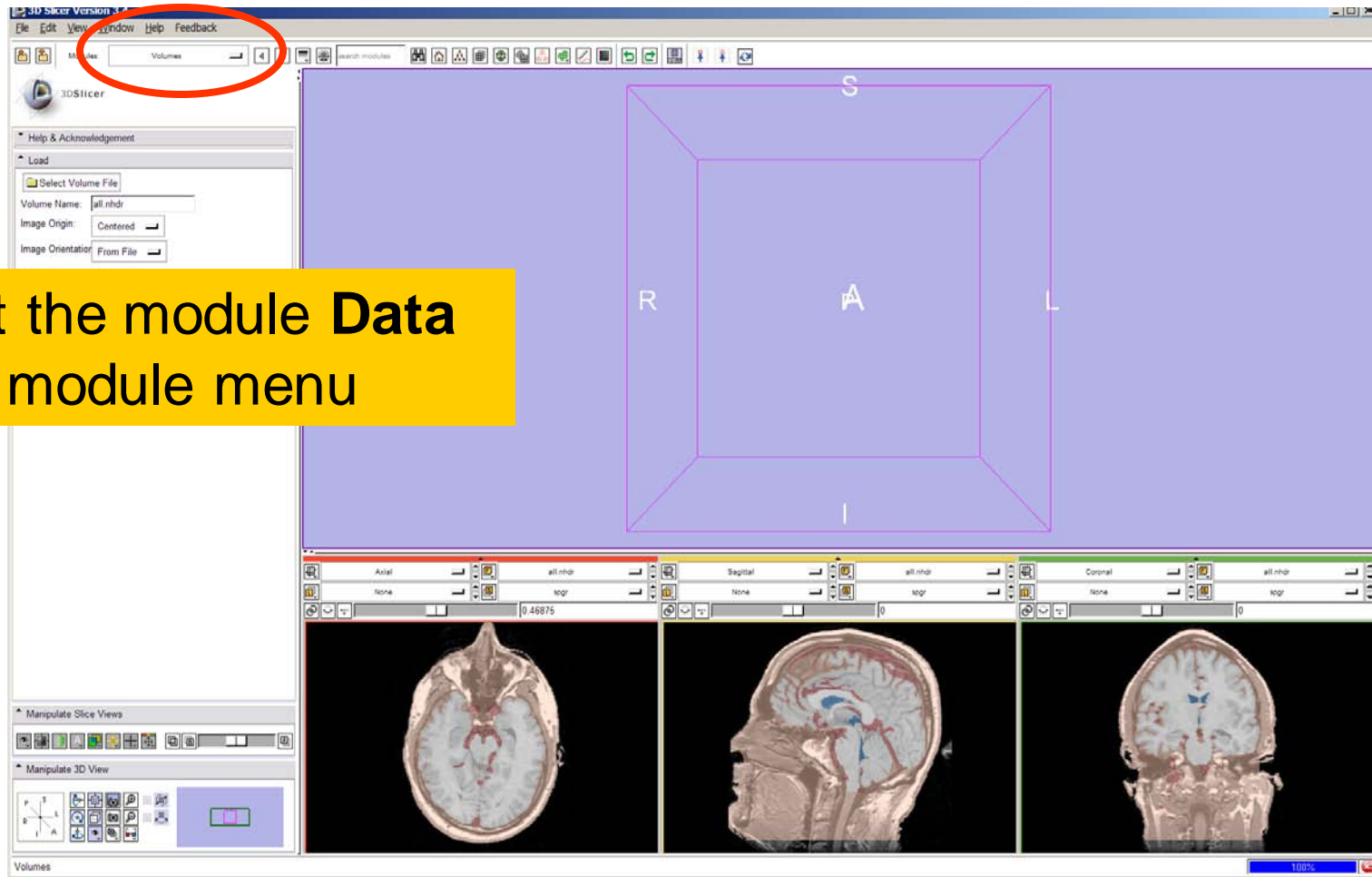
Select Manipulate
Slice Views



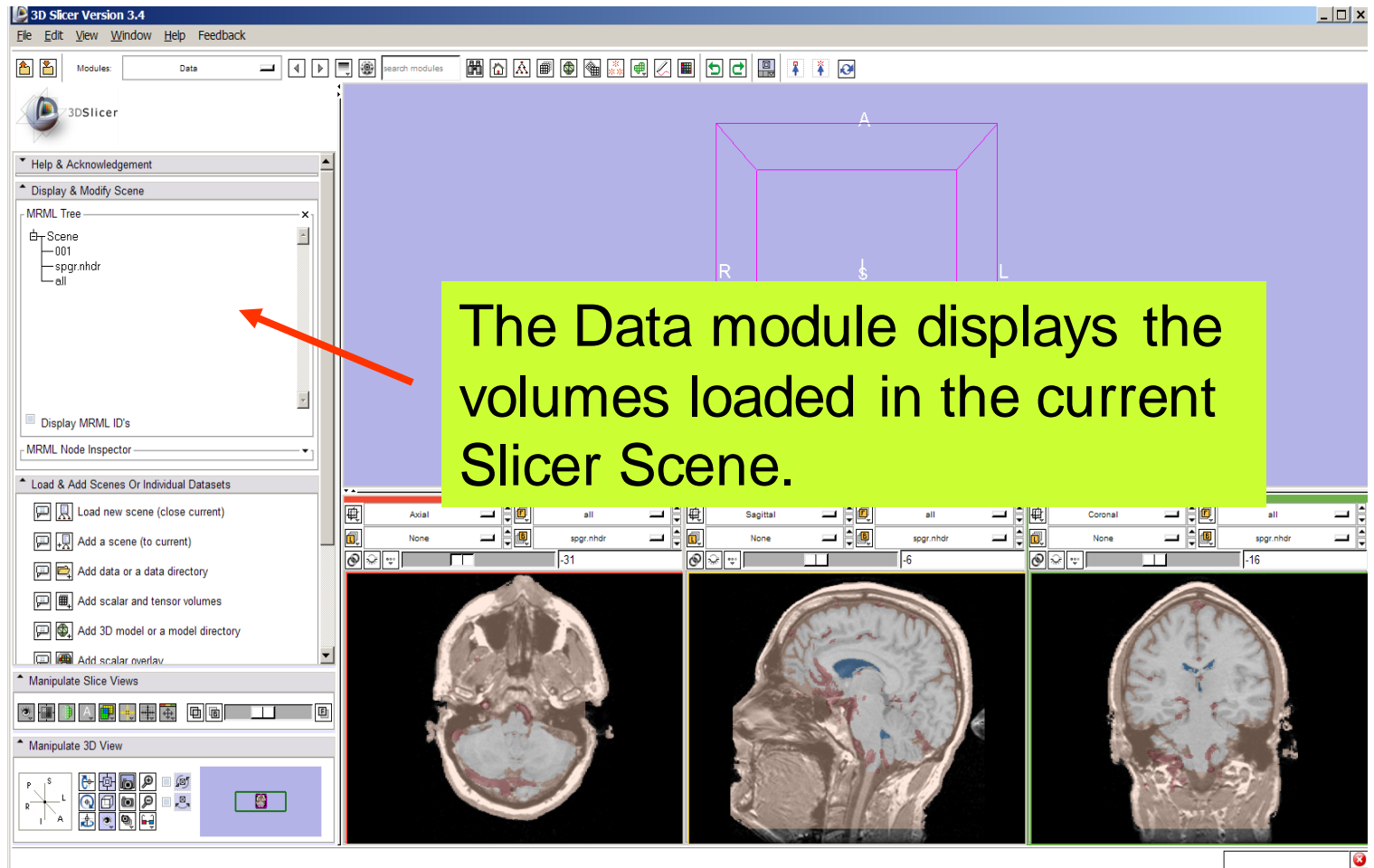
Use the slider to fade between the labelmap *all* (Foreground) and the *spgr* volume (Background).

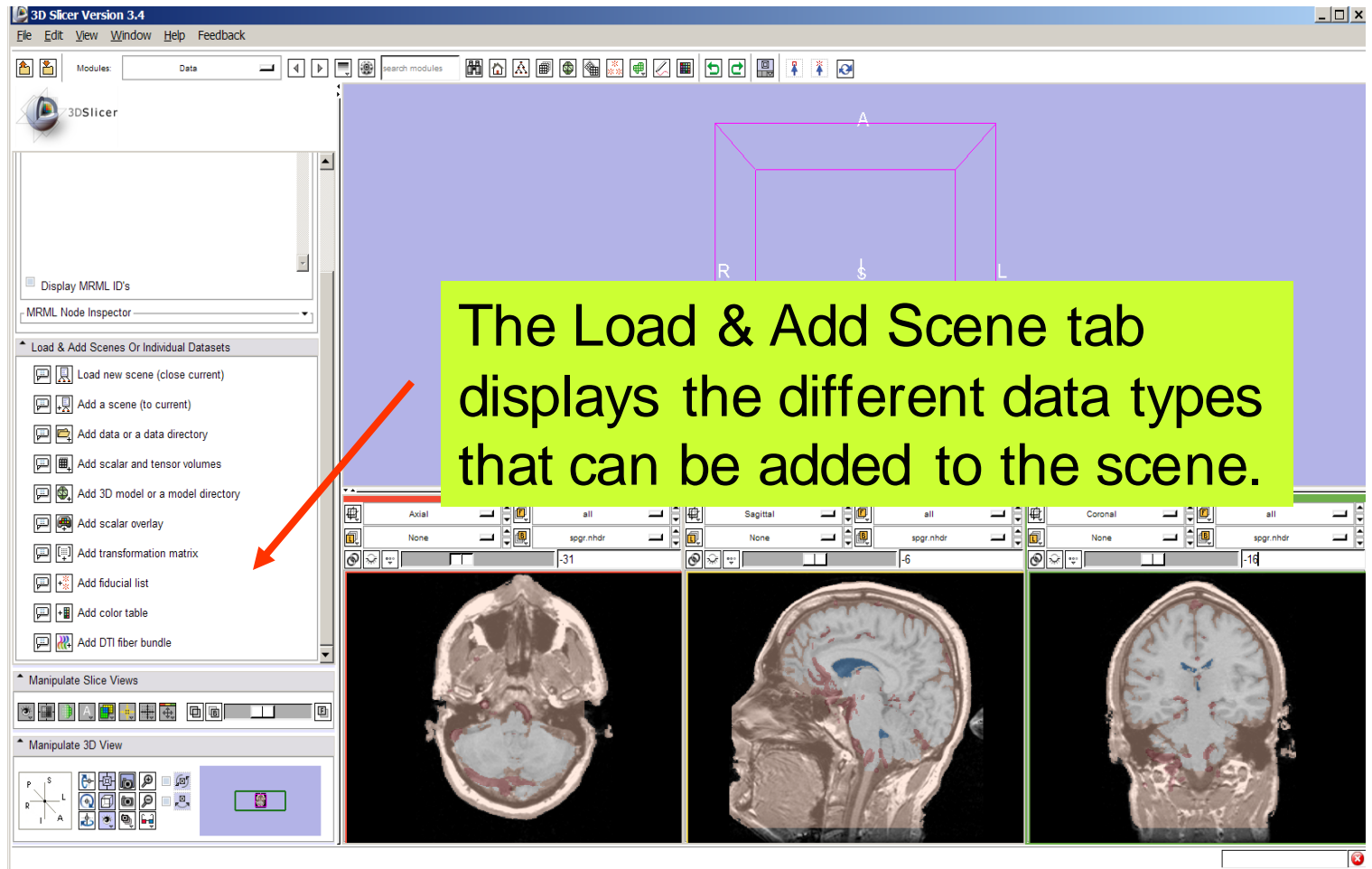


3D Visualization

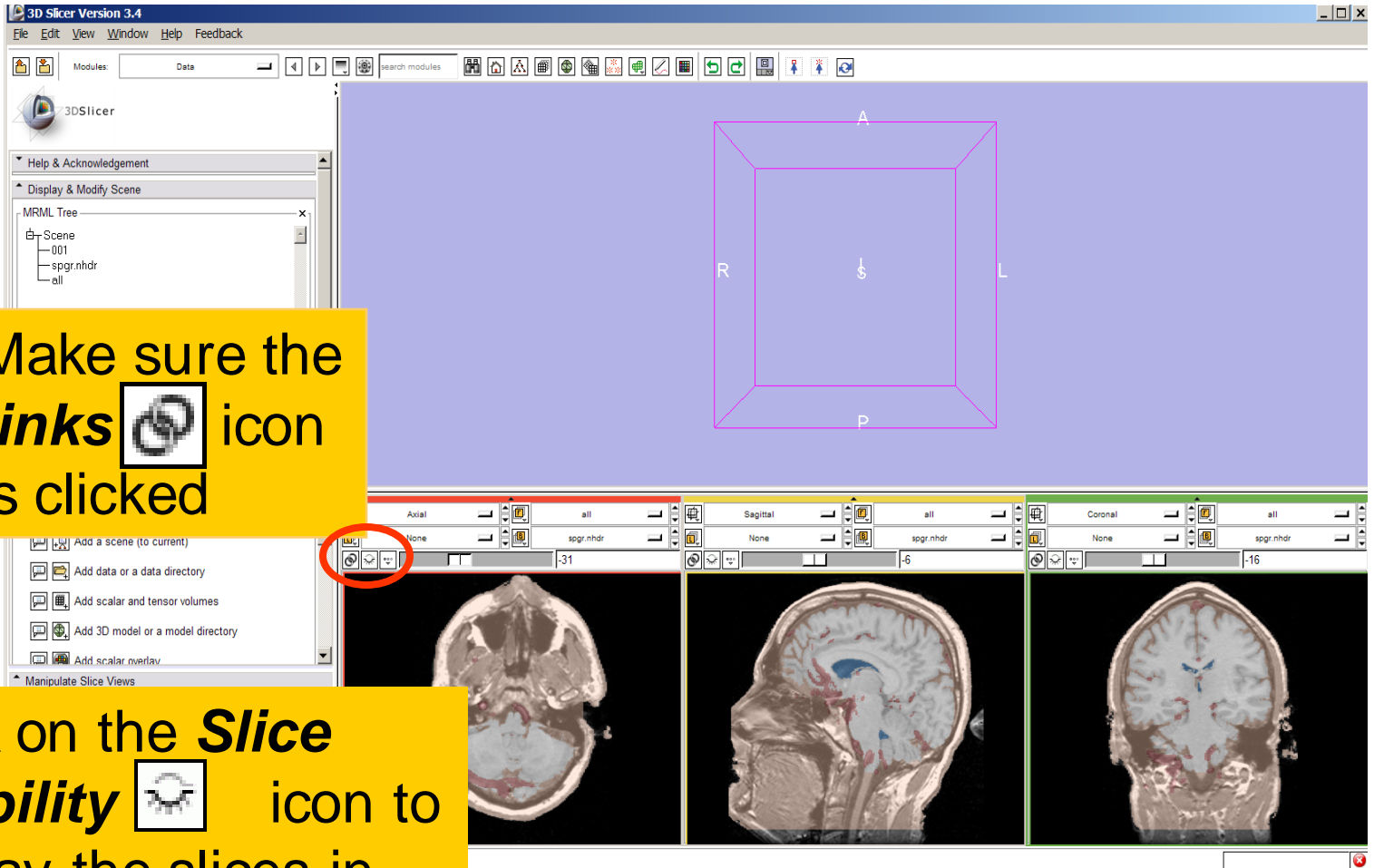


Select the module **Data** in the module menu




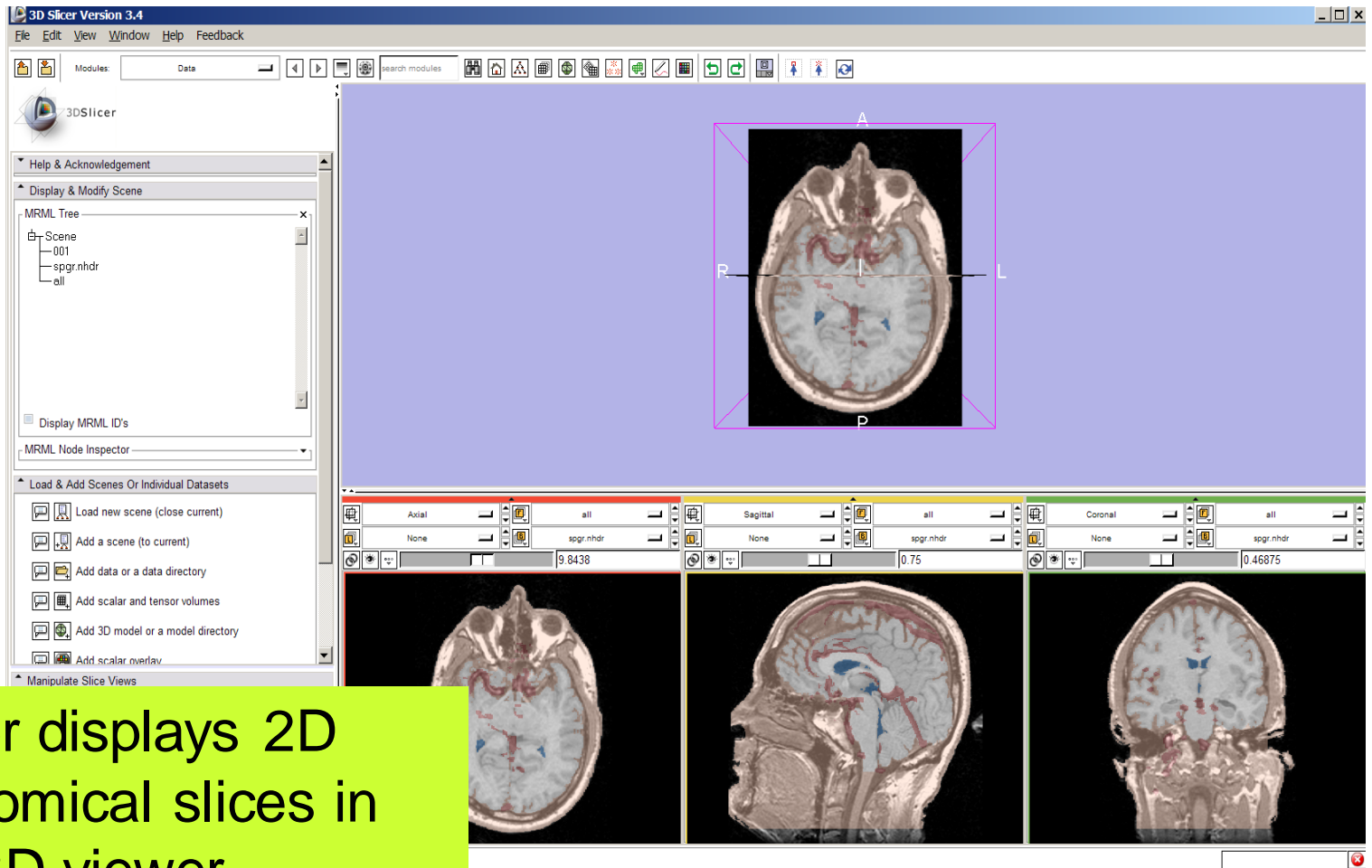


3D Visualization



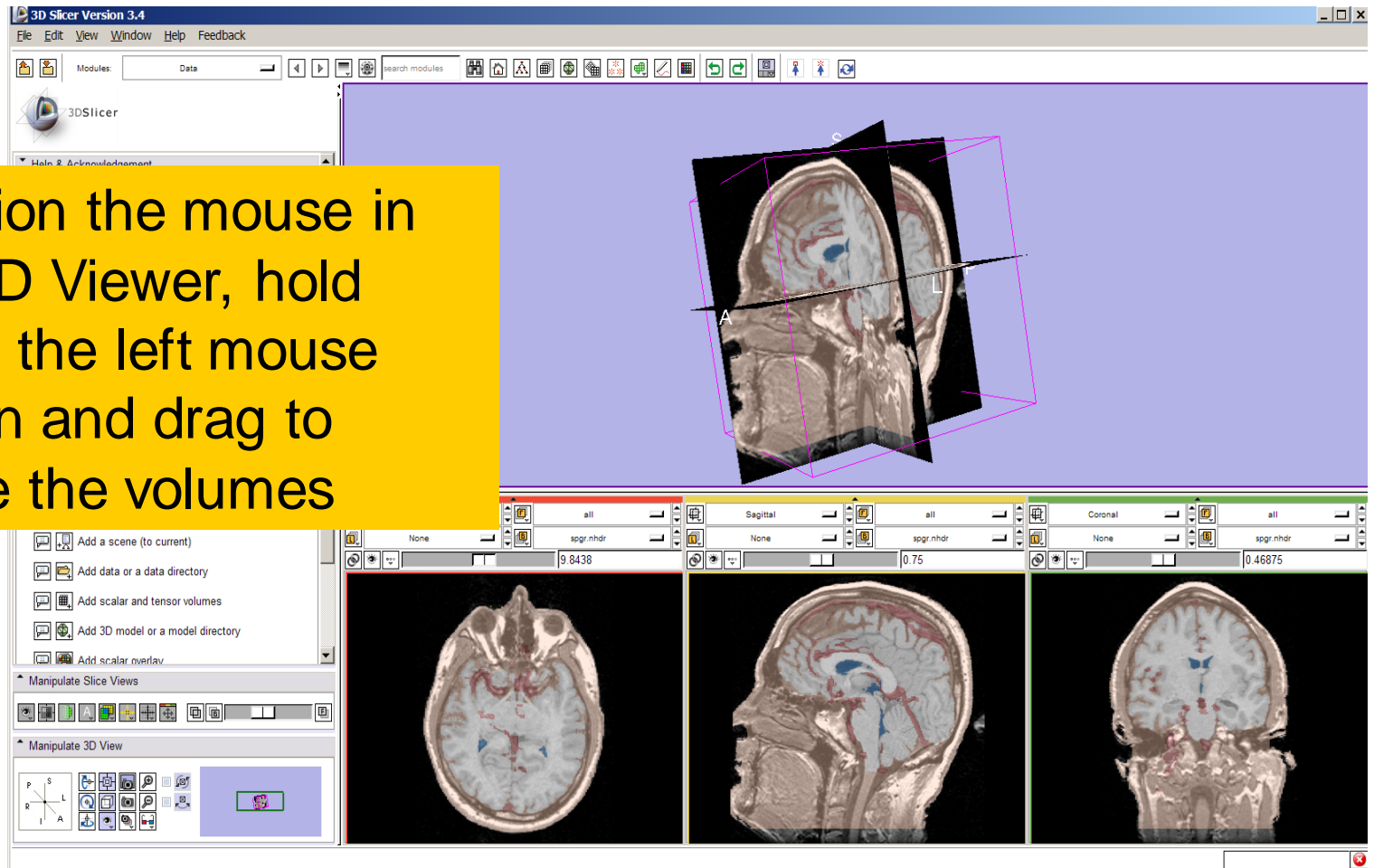
Make sure the **links**  icon is clicked

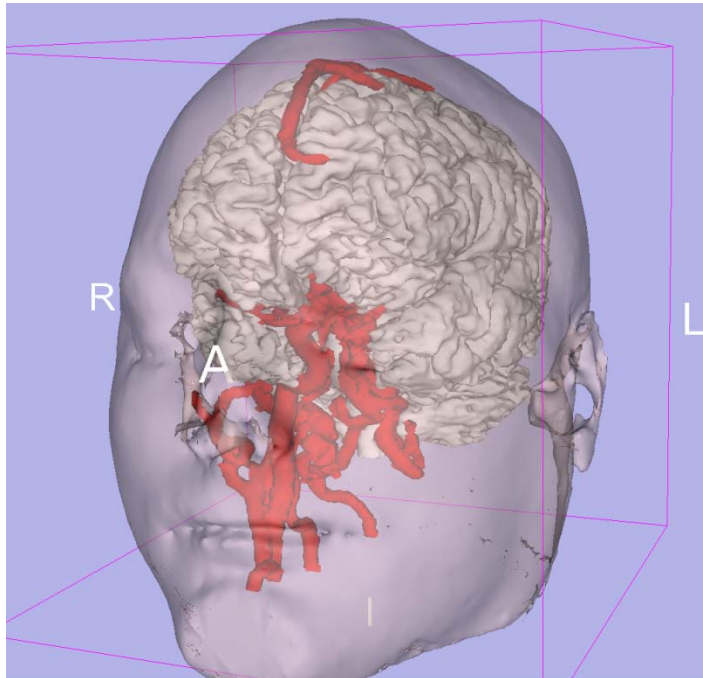
Click on the **Slice Visibility**  icon to display the slices in the 3D Viewer



Slicer displays 2D anatomical slices in the 3D viewer

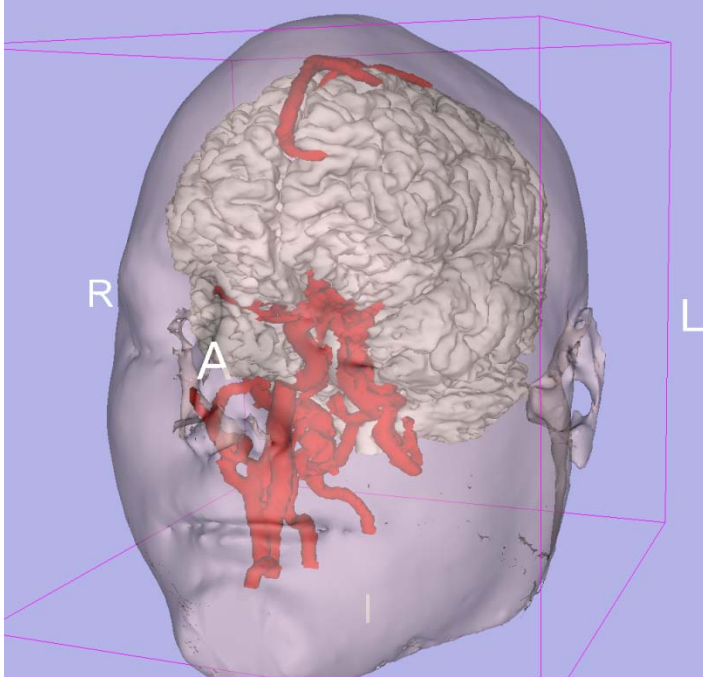
Position the mouse in the 3D Viewer, hold down the left mouse button and drag to rotate the volumes





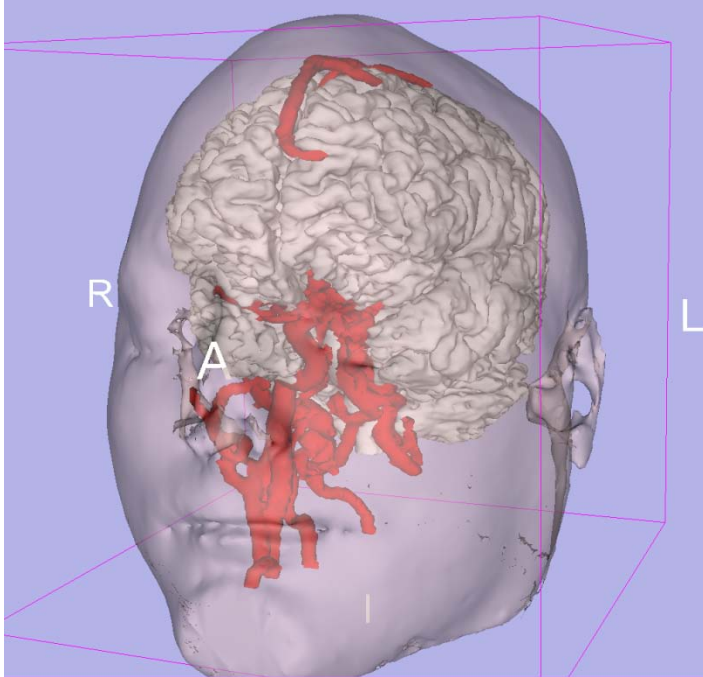
Part 3: Loading and visualizing 3D models of the anatomy

3D models

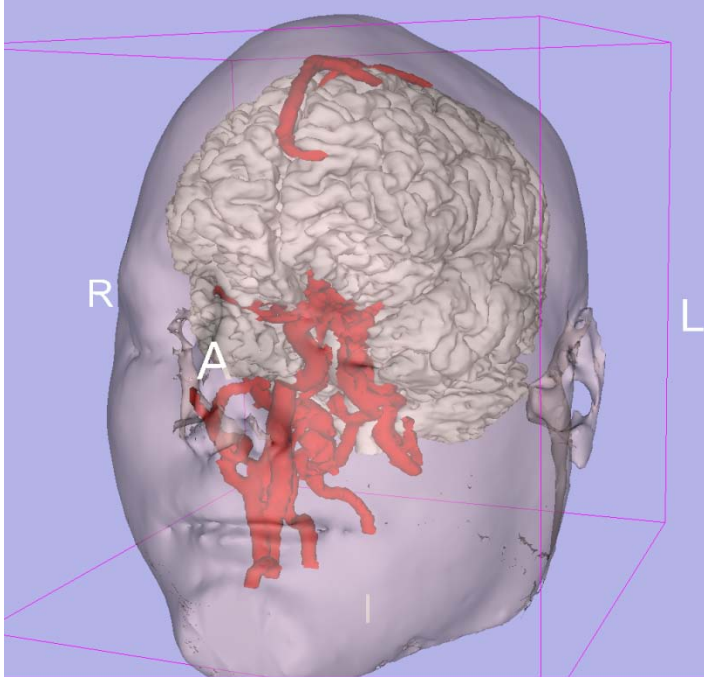


- A **3D model** is a surface reconstruction of an anatomical structure.

3D models

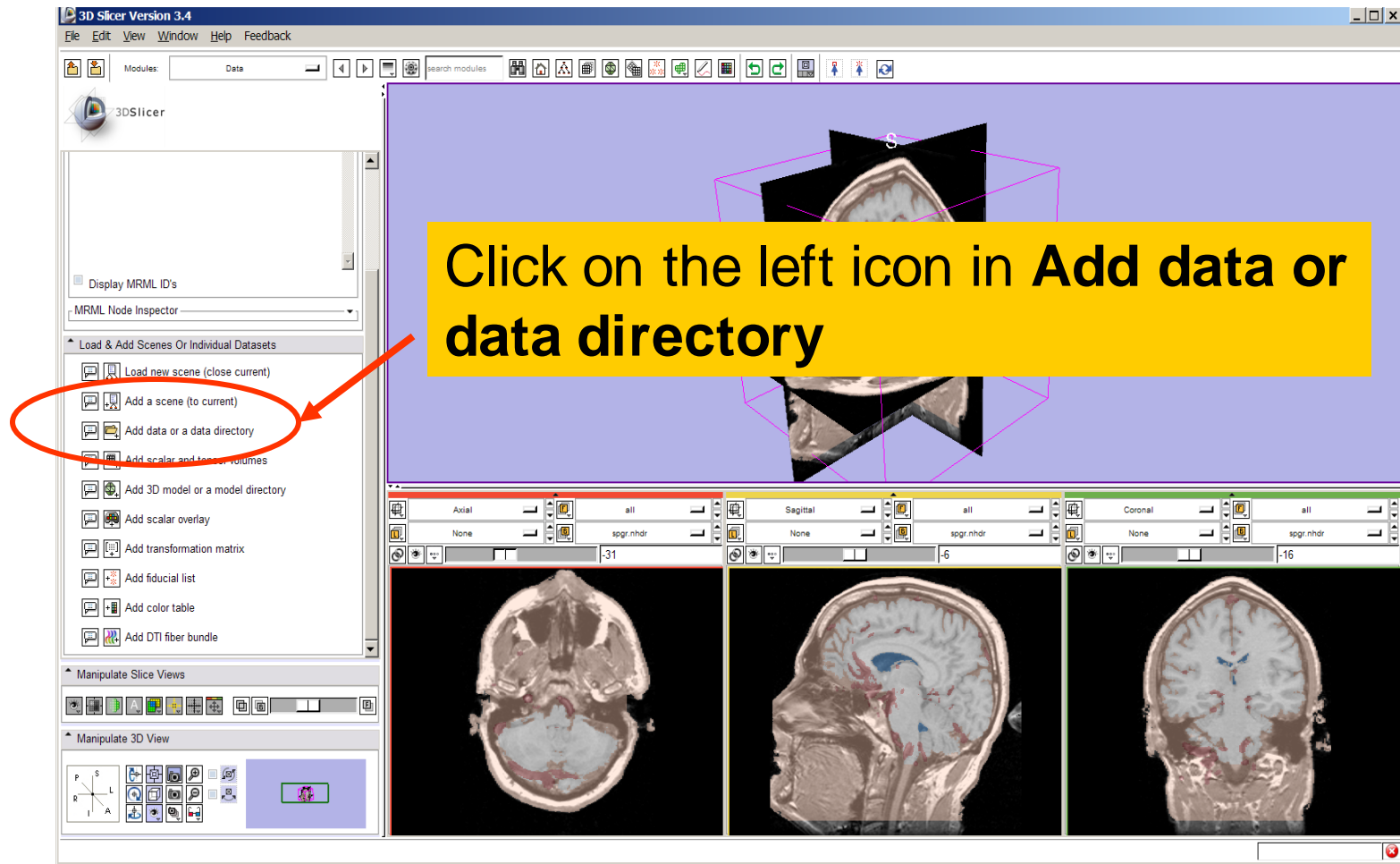


- A **3D model** is a surface reconstruction of an anatomical structure.
- The model is a **triangular mesh** that approximates a surface from a 3D label map.



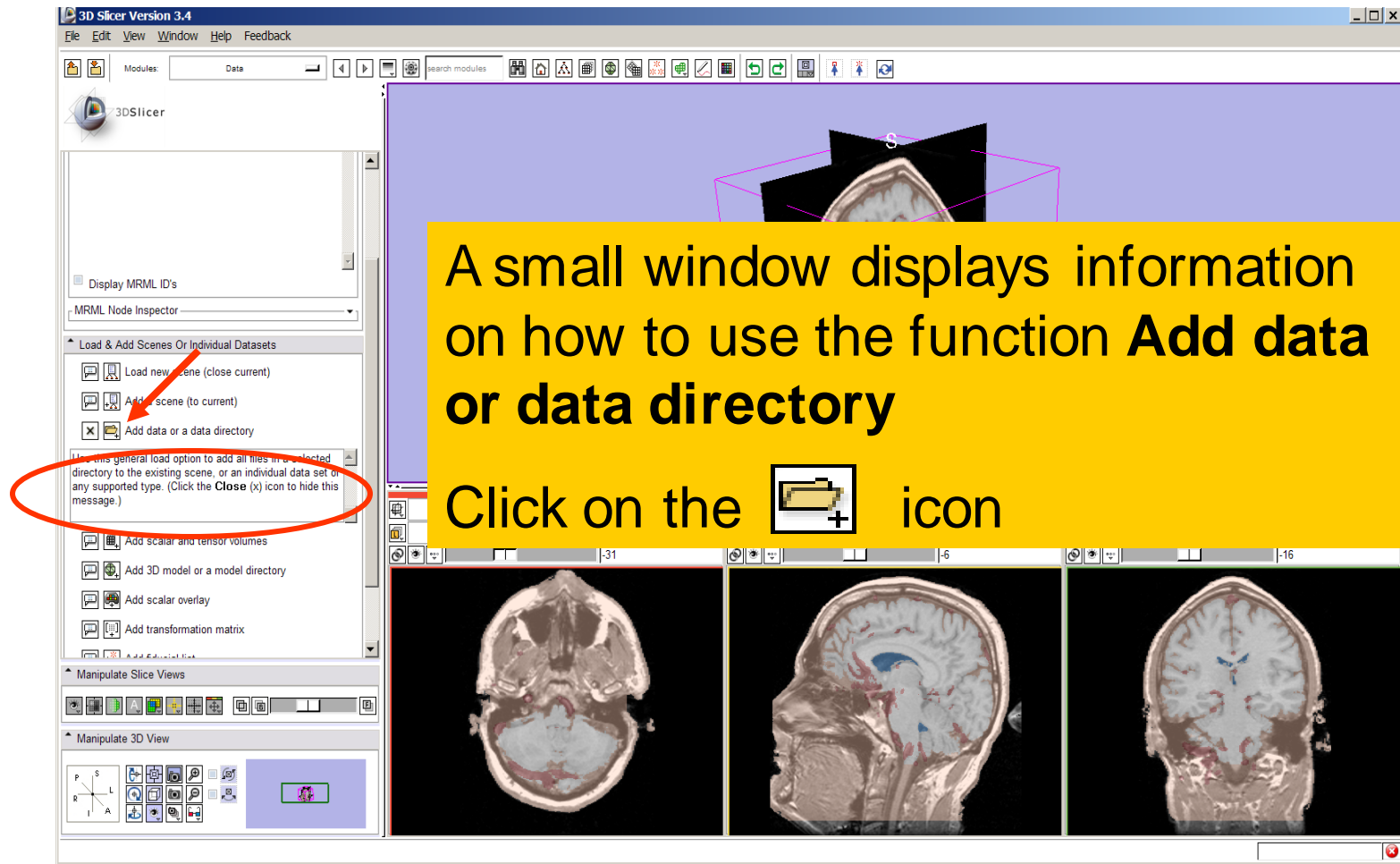
- A **3D model** is a surface reconstruction of an anatomical structure.
- The model is a **triangular mesh** that approximates a surface from a 3D label map.
- The scalar values for surface models are integers which correspond to the **label** that had been assigned in the segmentation process.

3D Visualization




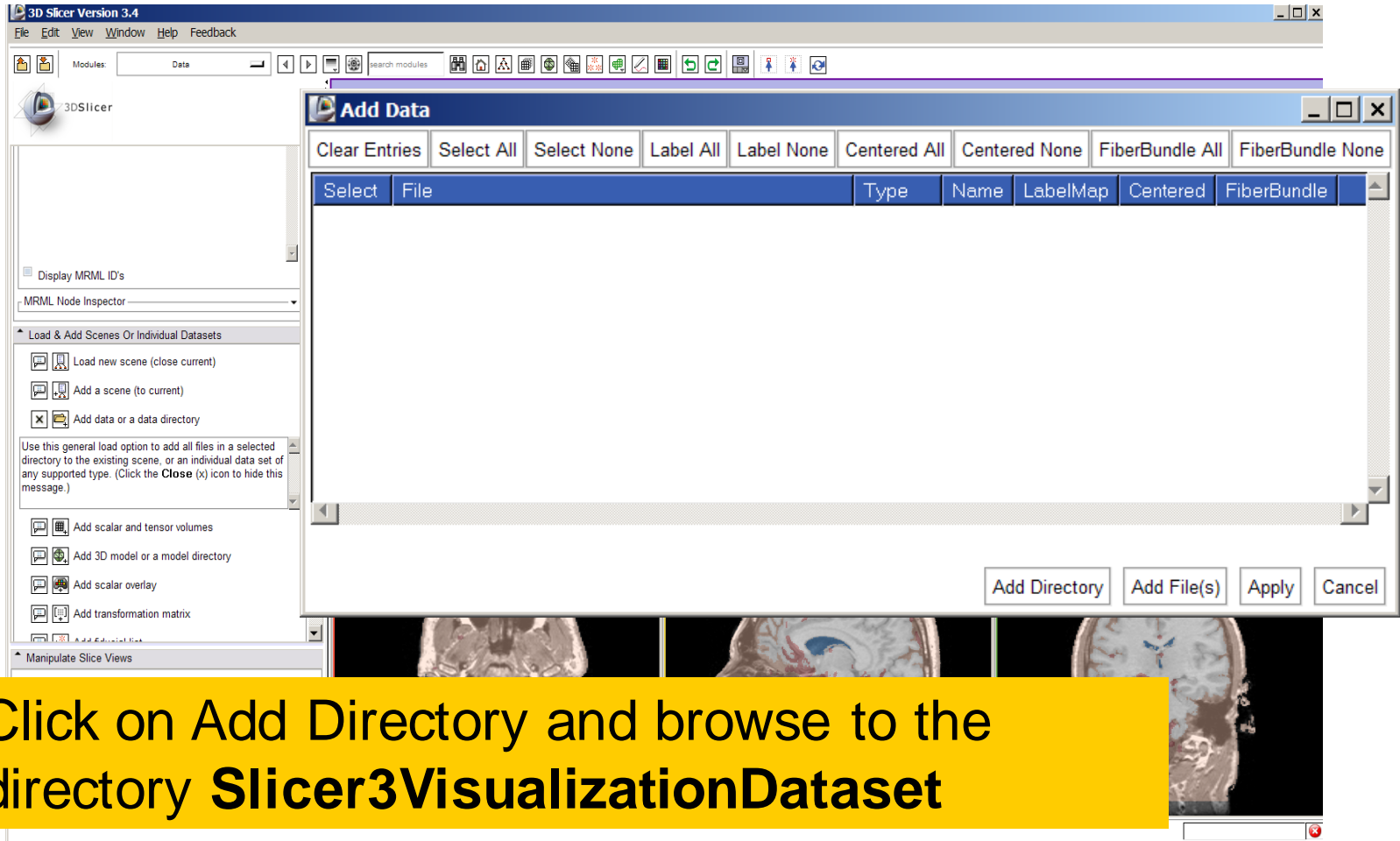
The screenshot shows the 3D Slicer 3.4 software interface. On the left, the 'Load & Add Scenes Or Individual Datasets' panel is visible. The 'Add data or a data directory' button is circled in red, and a yellow callout box with the text 'Click on the left icon in Add data or data directory' points to it. The main 3D view shows a brain scan with a yellow box overlaid. Below the 3D view are three slice views: Axial, Sagittal, and Coronal. The interface includes a menu bar (File, Edit, View, Window, Help, Feedback), a toolbar, and various control panels for scene manipulation and slice viewing.

3D Visualization

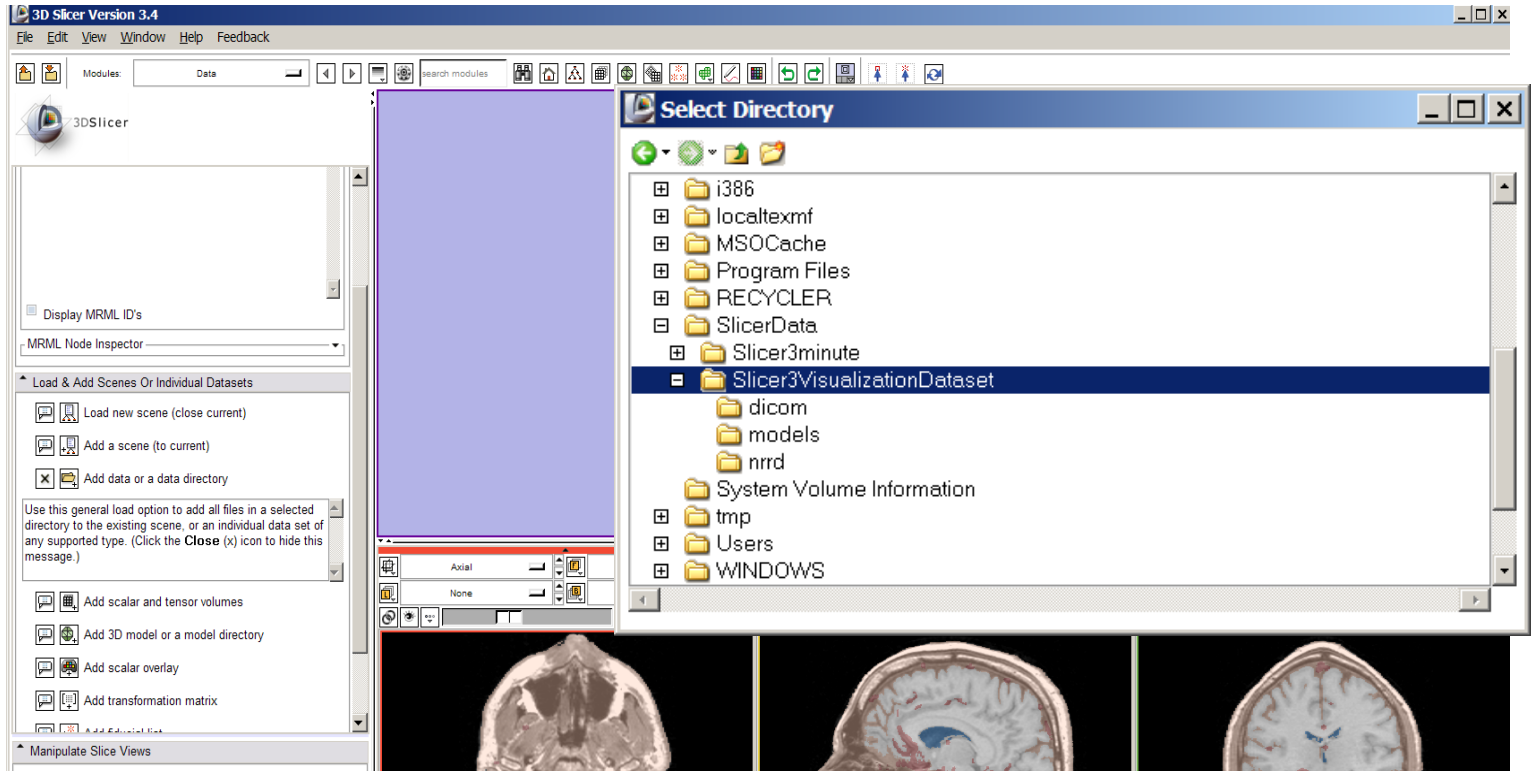


A small window displays information on how to use the function **Add data or data directory**

Click on the  icon

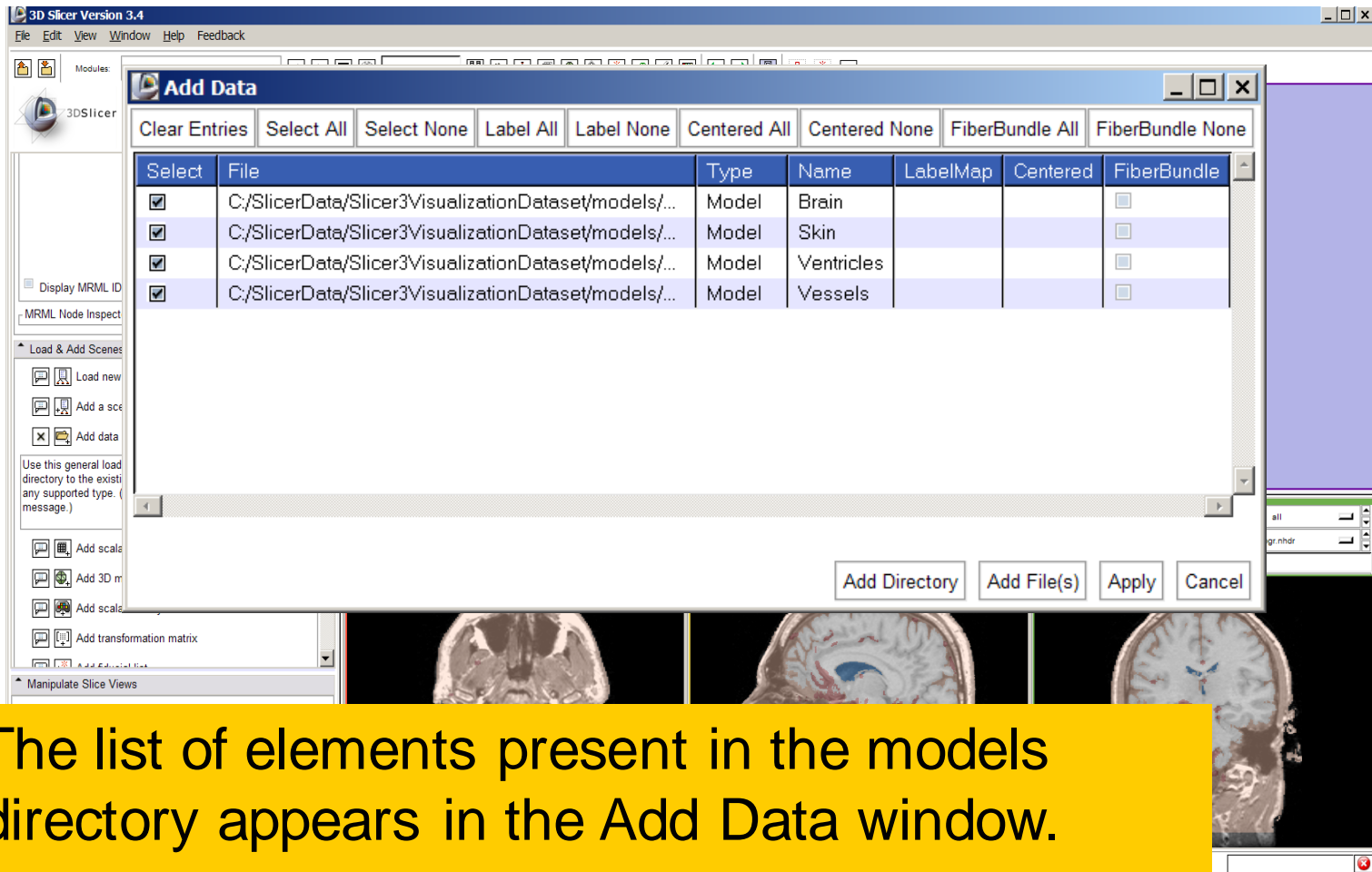


Loading 3D models



Select the directory
Slicer3VisualizationDataset/models and click on OK

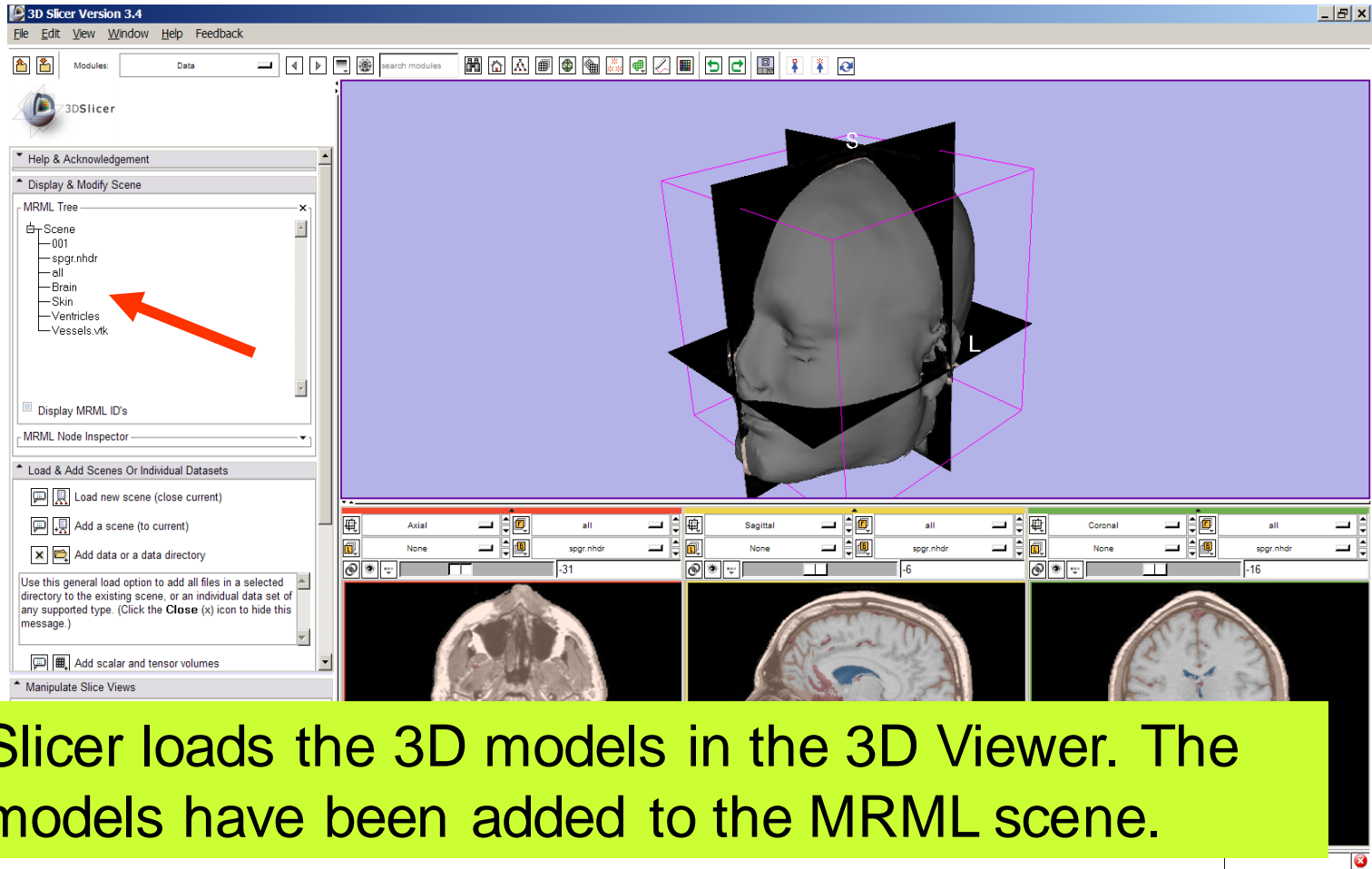
Loading 3D models



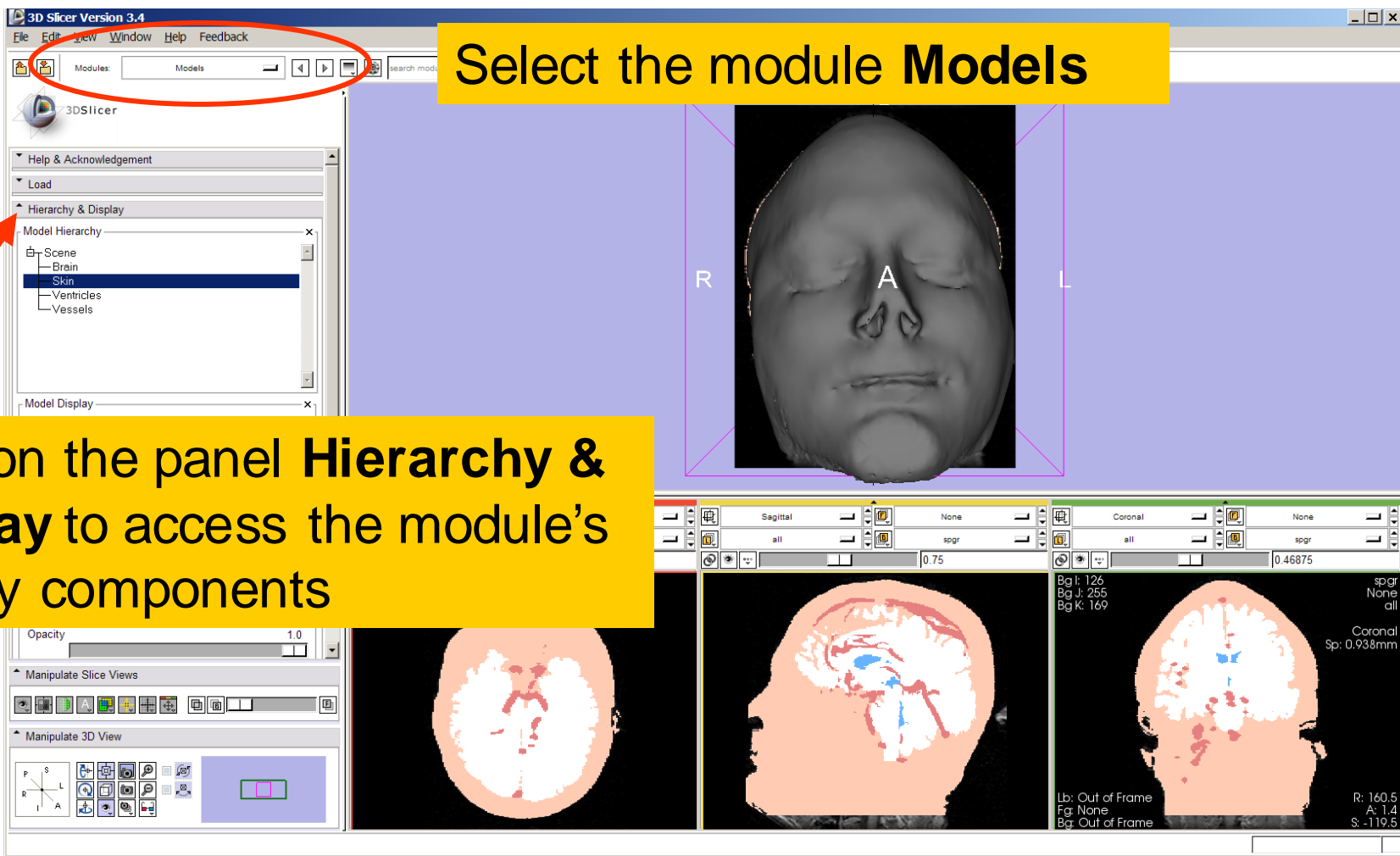
The list of elements present in the models directory appears in the Add Data window.

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

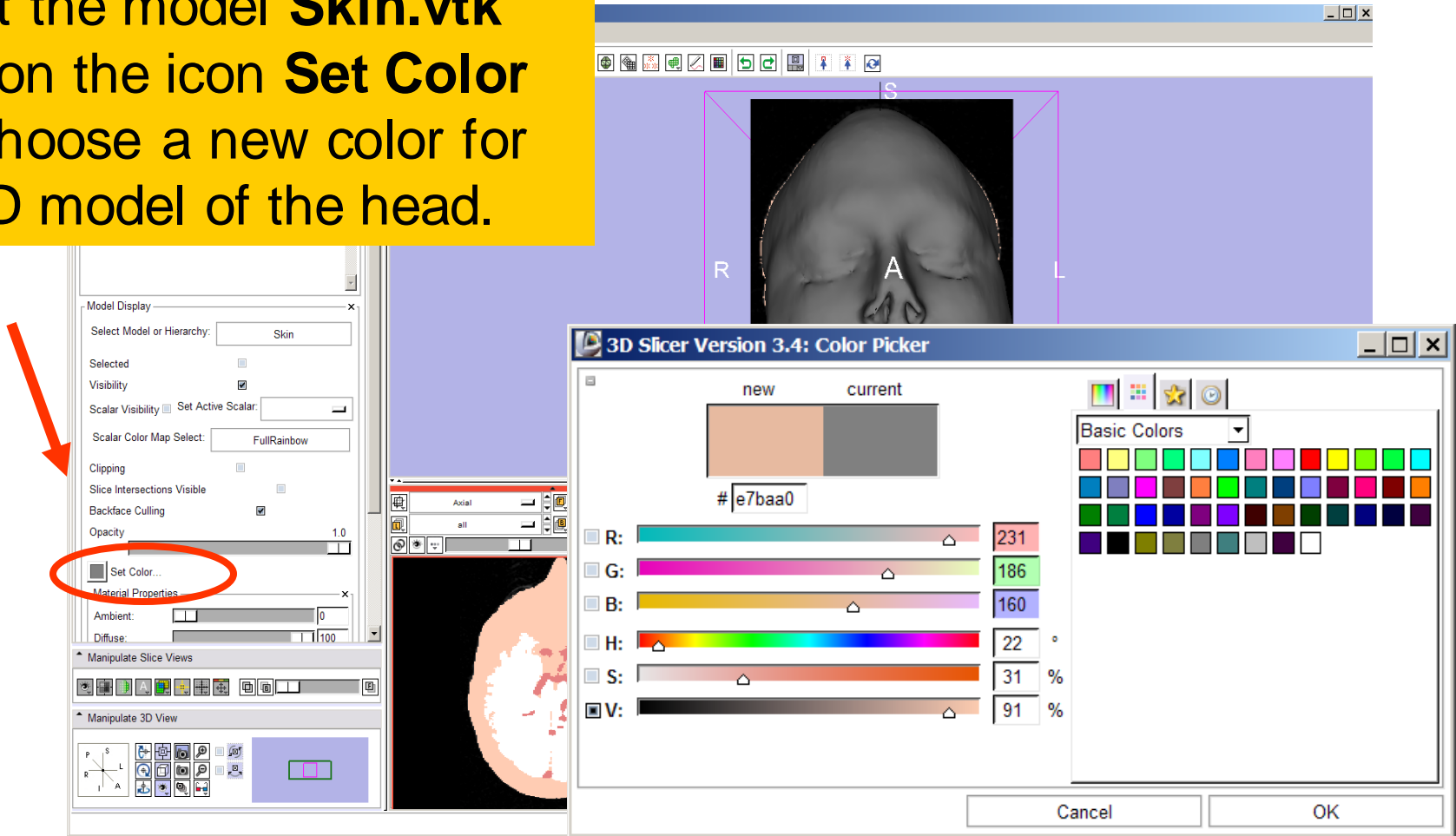
Coronal
Sp: 0.938mm

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.



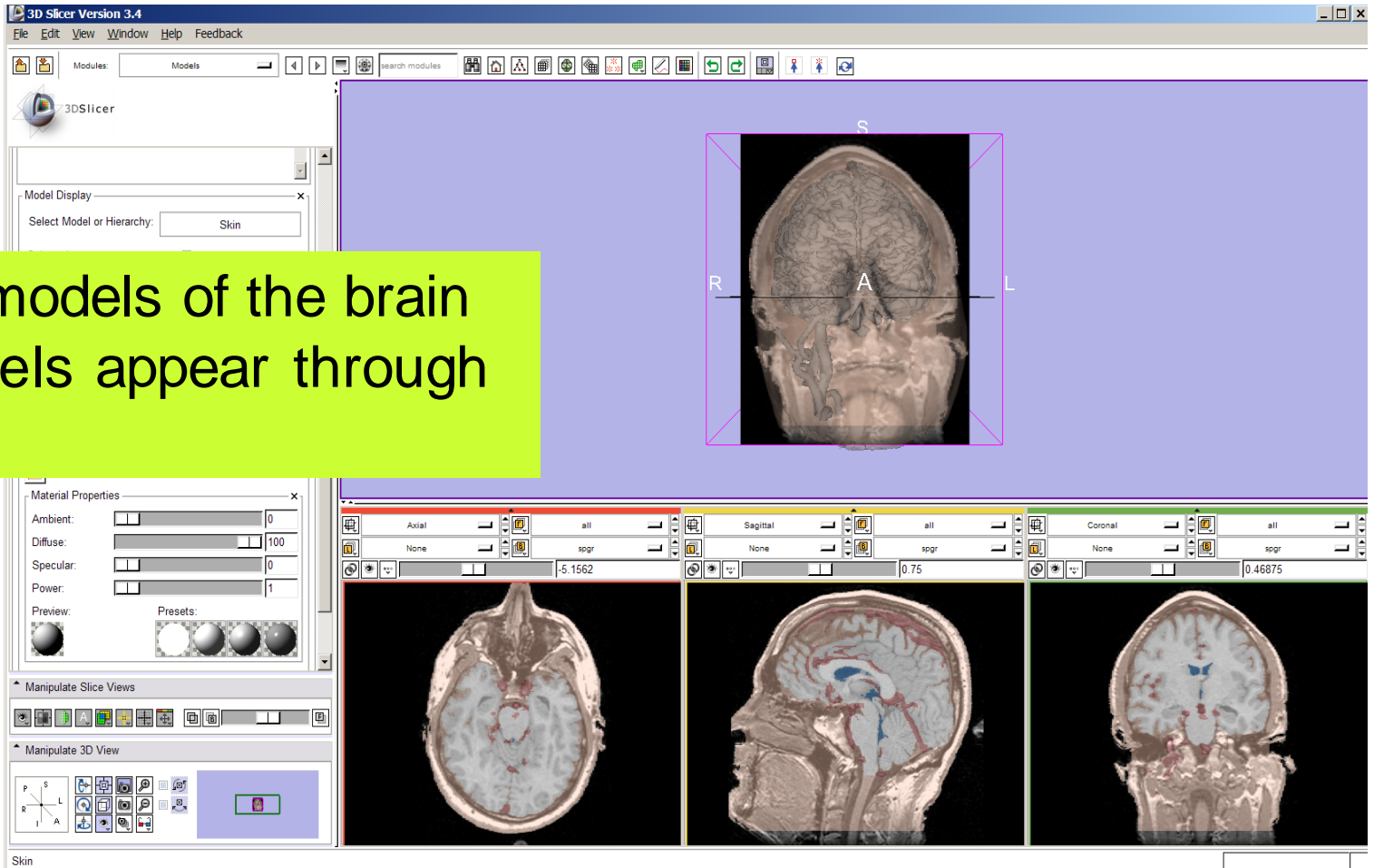
The image shows a screenshot of the 3D Slicer software interface. On the left, the 'Model Display' panel is visible, with the 'Set Color...' button circled in red. A red arrow points to this button. The main 3D view shows a grayscale model of a head with axes labeled R (Right), L (Left), S (Superior), and A (Anterior). Below the 3D view, a 'Color Picker' dialog box is open, titled '3D Slicer Version 3.4: Color Picker'. The dialog shows a 'new' color swatch (orange) and a 'current' color swatch (gray). The hex code for the new color is '#e7baa0'. Below the swatches, there are sliders for color components: R (231), G (186), B (160), H (22 degrees), S (31%), and V (91%). A 'Basic Colors' palette is also visible on the right side of the dialog. The 'Cancel' and 'OK' buttons are at the bottom of the dialog.

Visualizing a 3D model

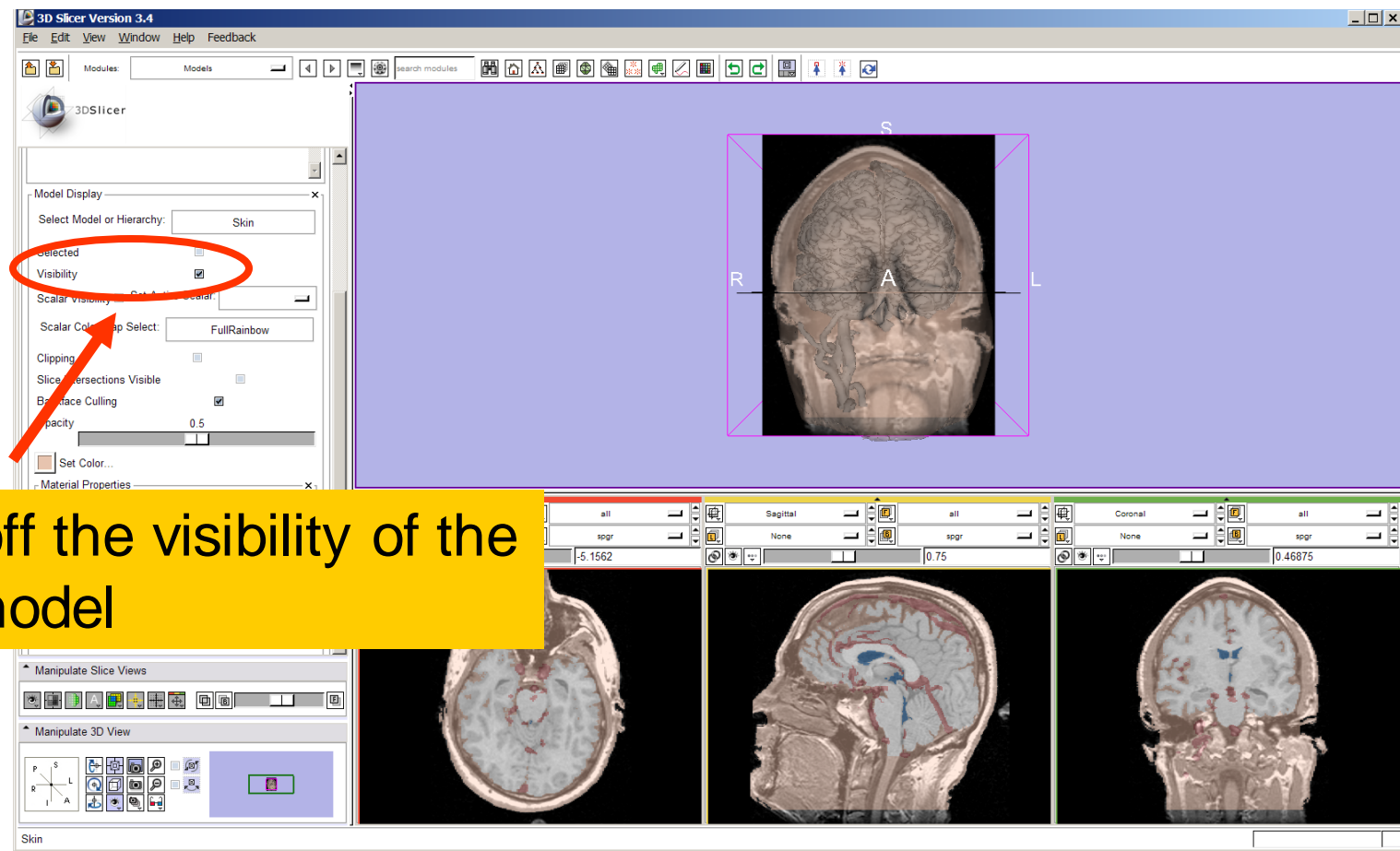
Change the opacity of the skin model from 1.0 to 0.5 using the opacity slider:



Visualizing a 3D model

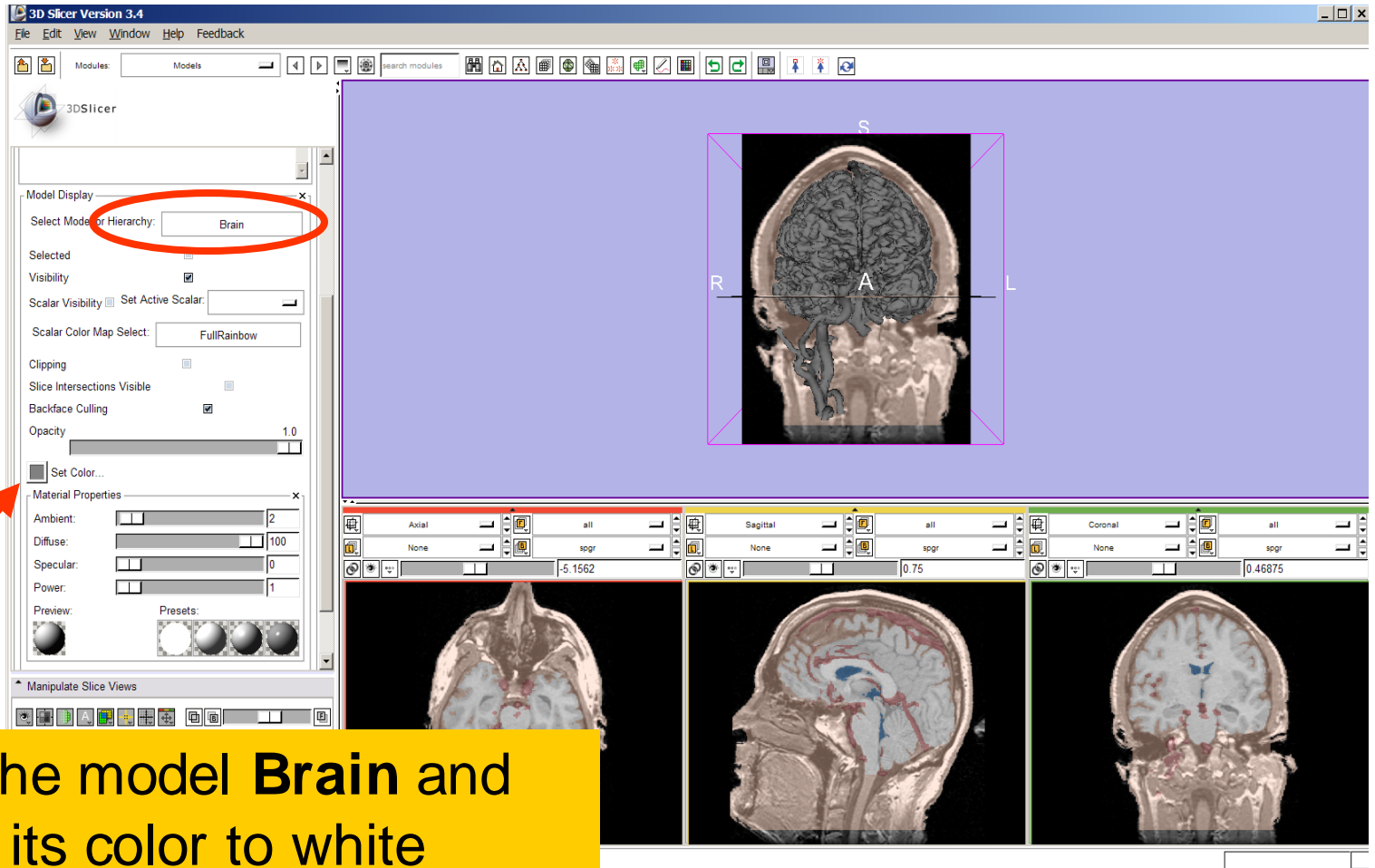


Visualizing a 3D model

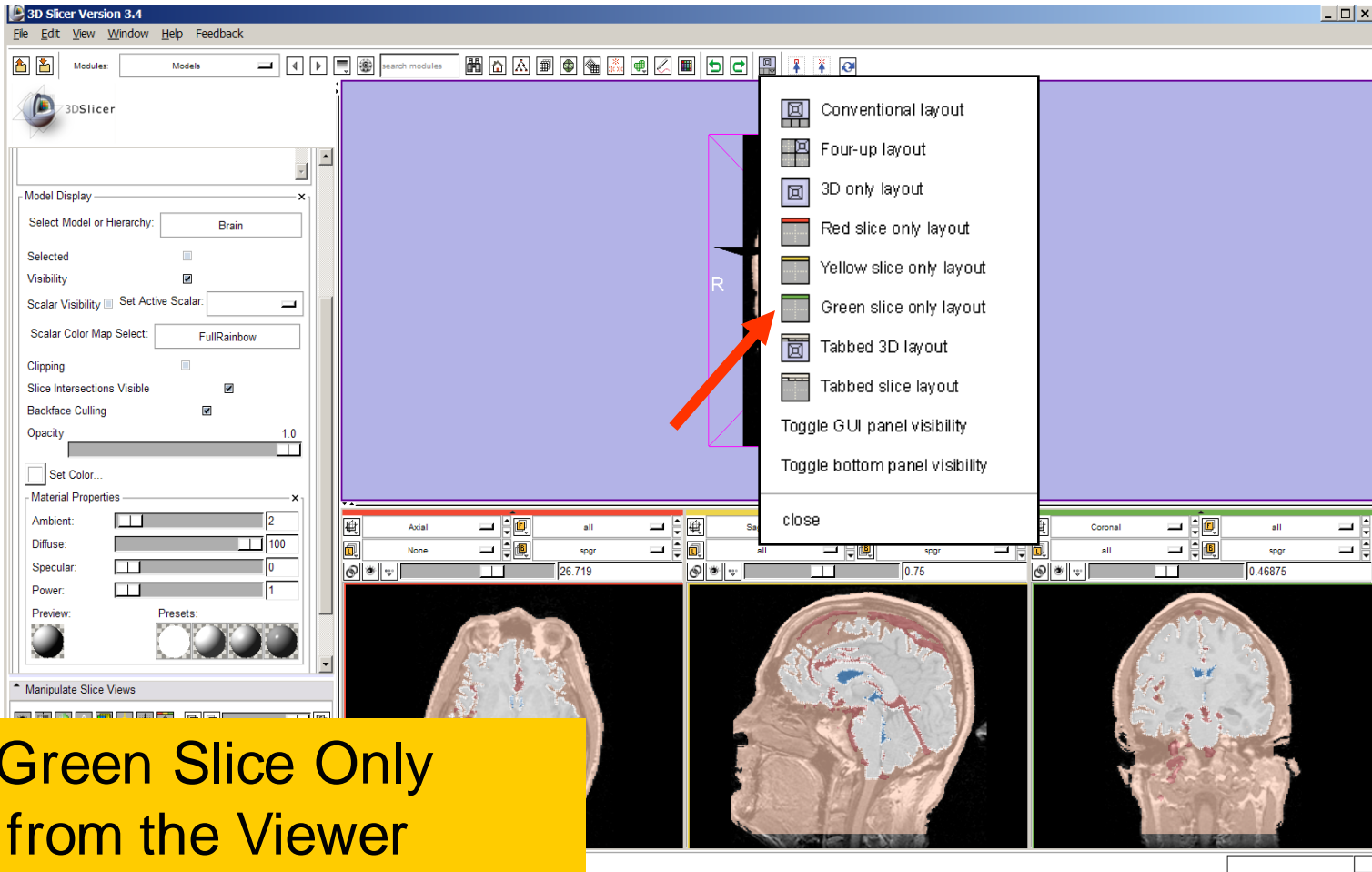


Turn off the visibility of the skin model

Visualizing a 3D model

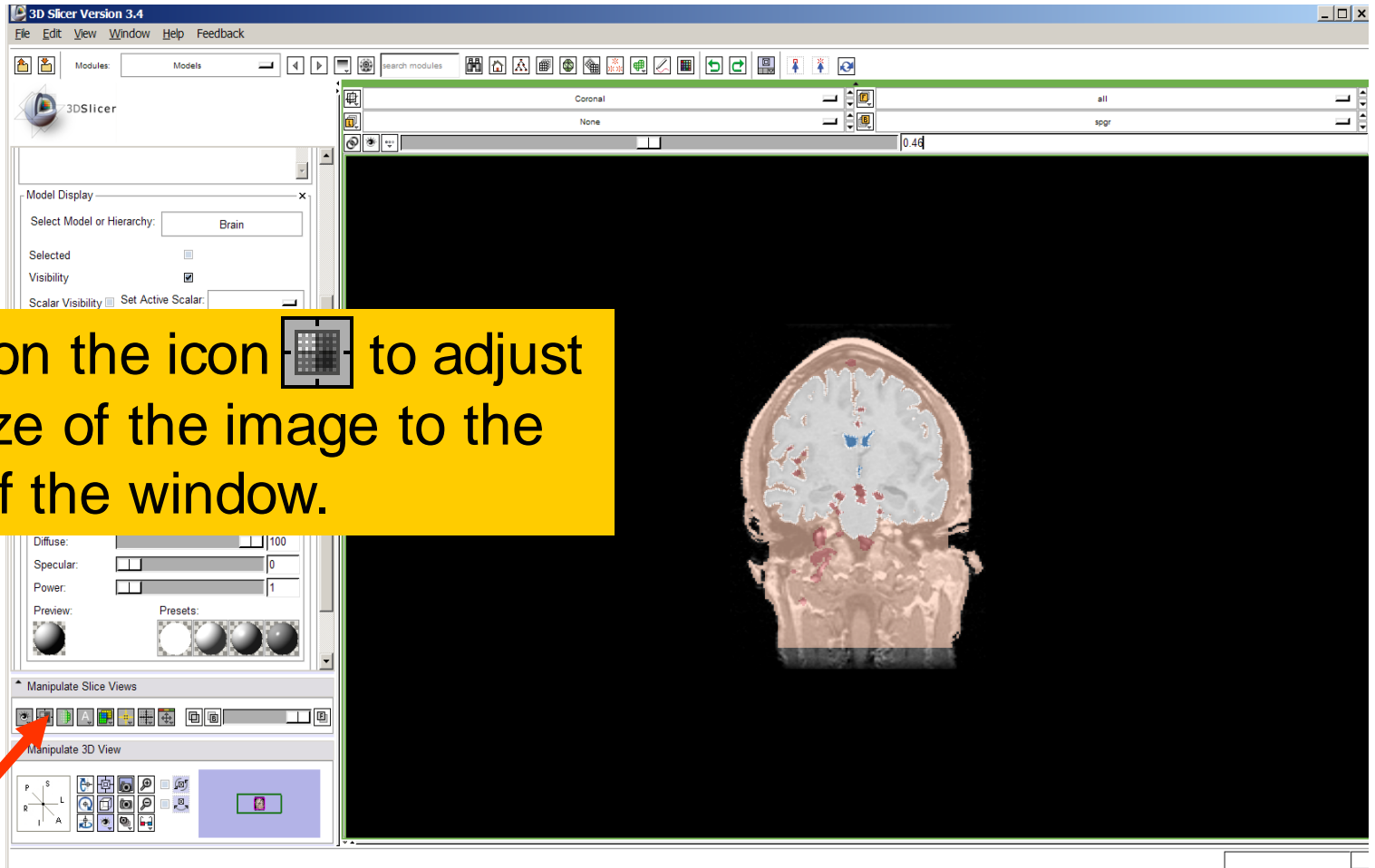


Visualizing a 3D model

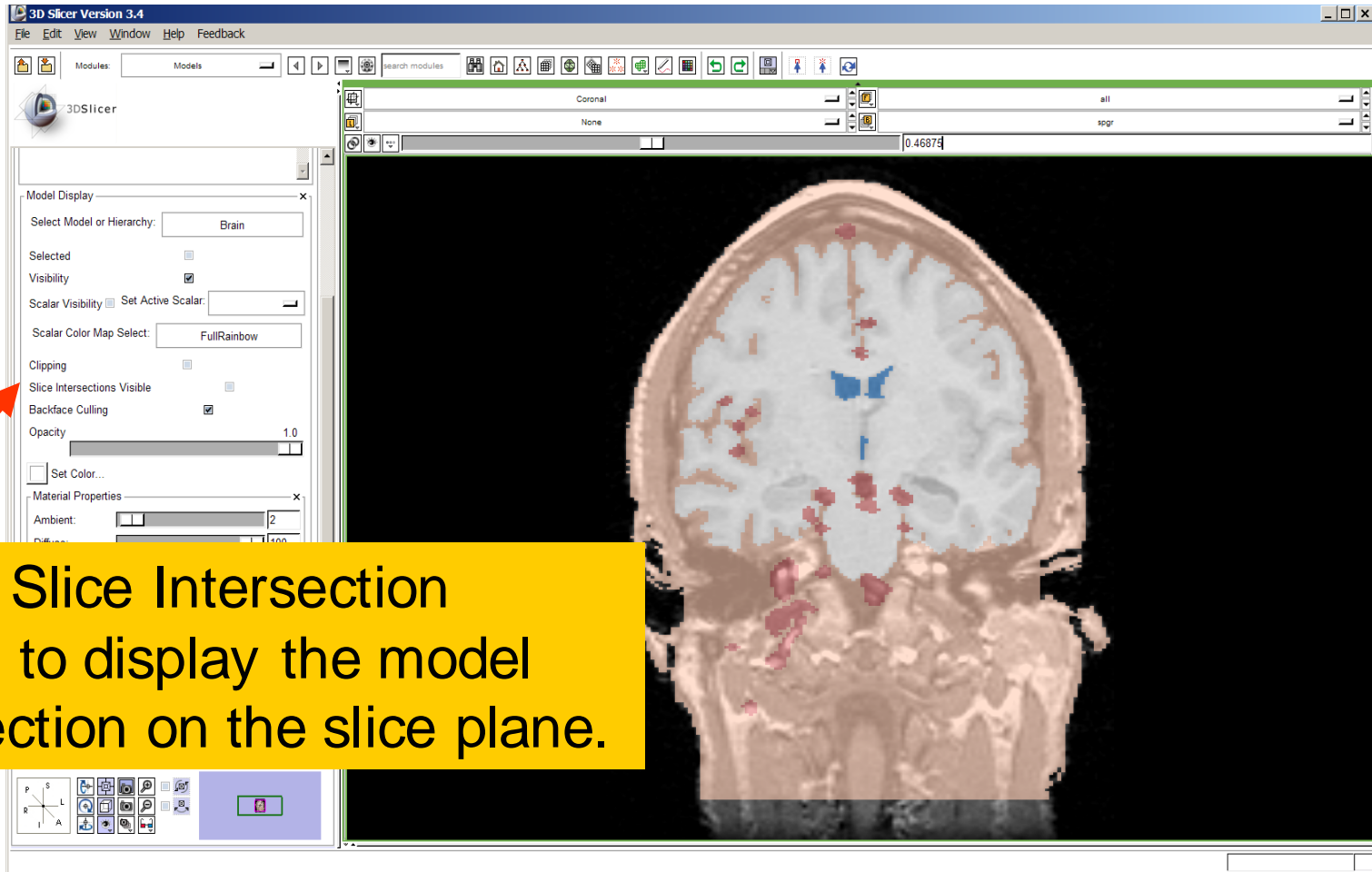


Select Green Slice Only
Layout from the Viewer
menu

Visualizing a 3D model

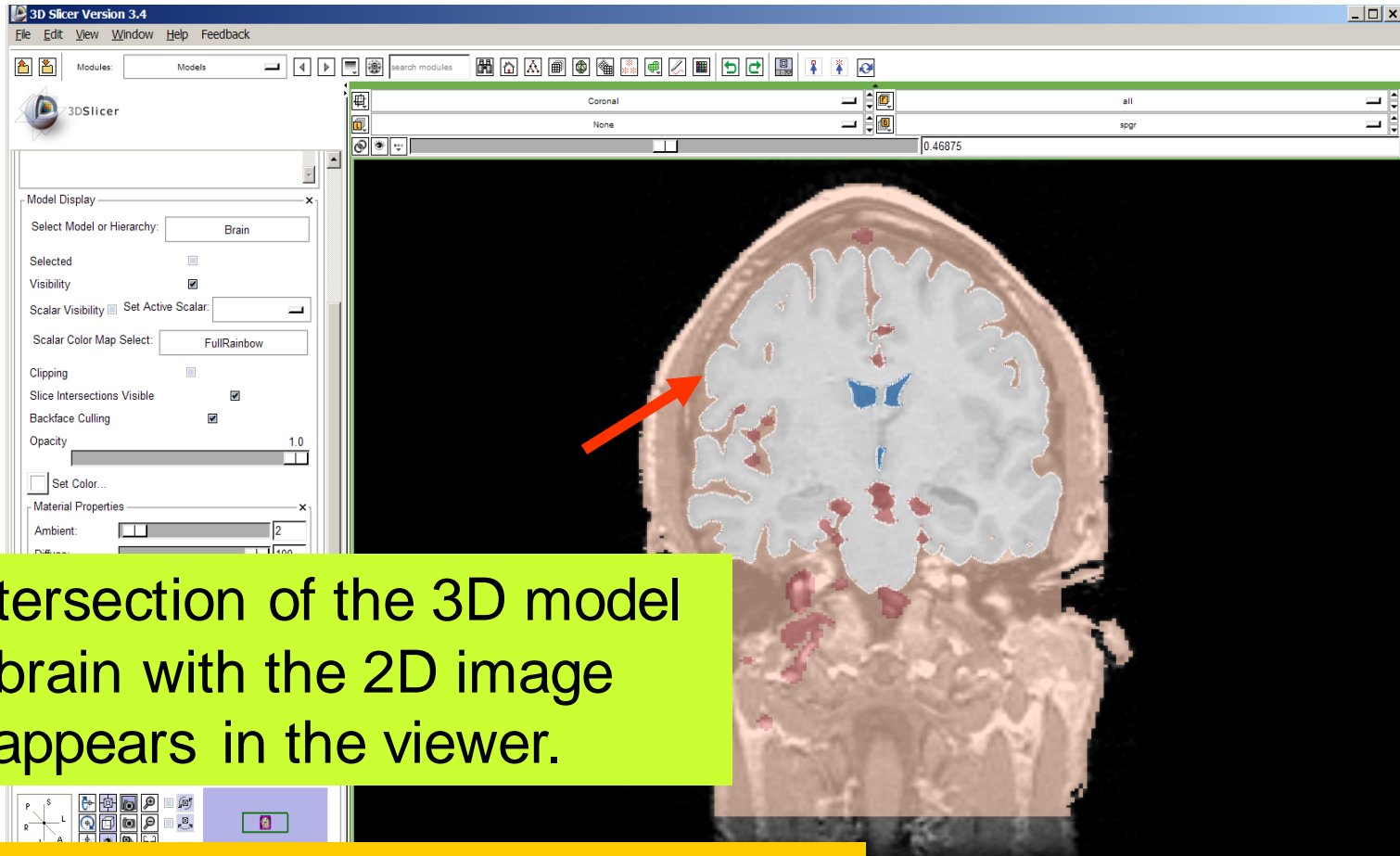


Visualizing a 3D model



Select Slice Intersection Visible to display the model intersection on the slice plane.

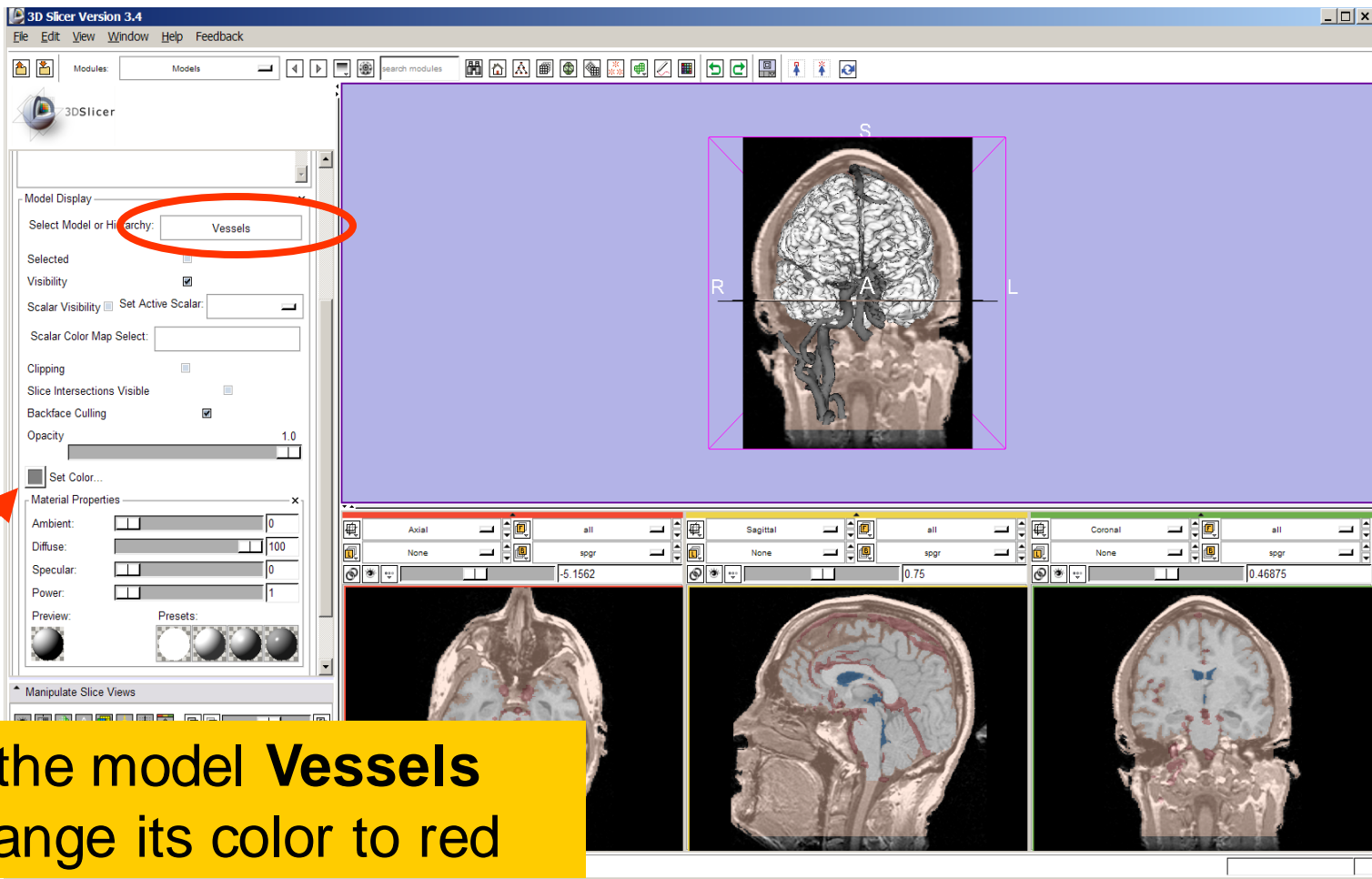
Visualizing a 3D model



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

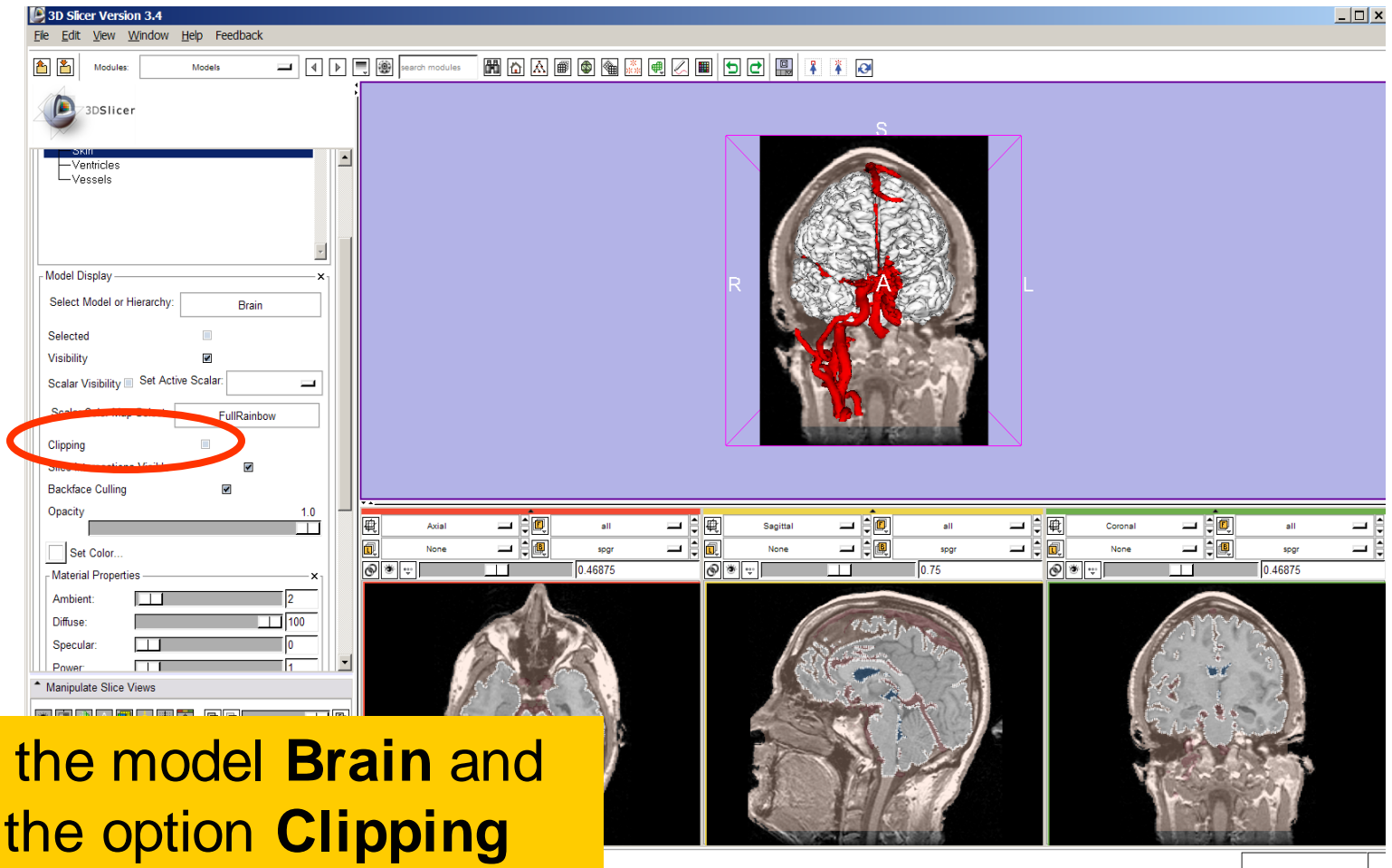
Go back to the conventional layout

Visualizing a 3D model

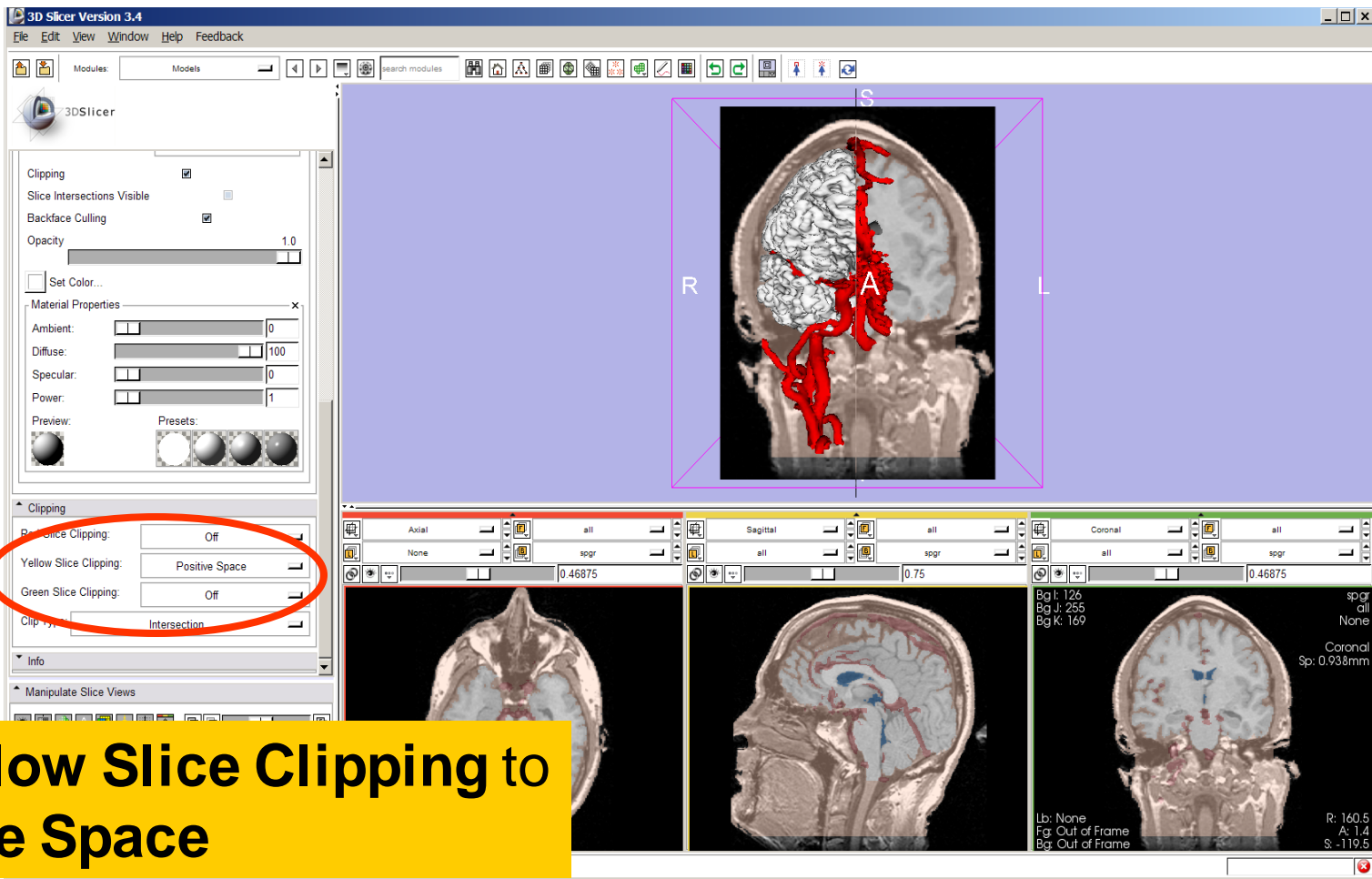


Select the model **Vessels** and change its color to red

Visualizing a 3D model

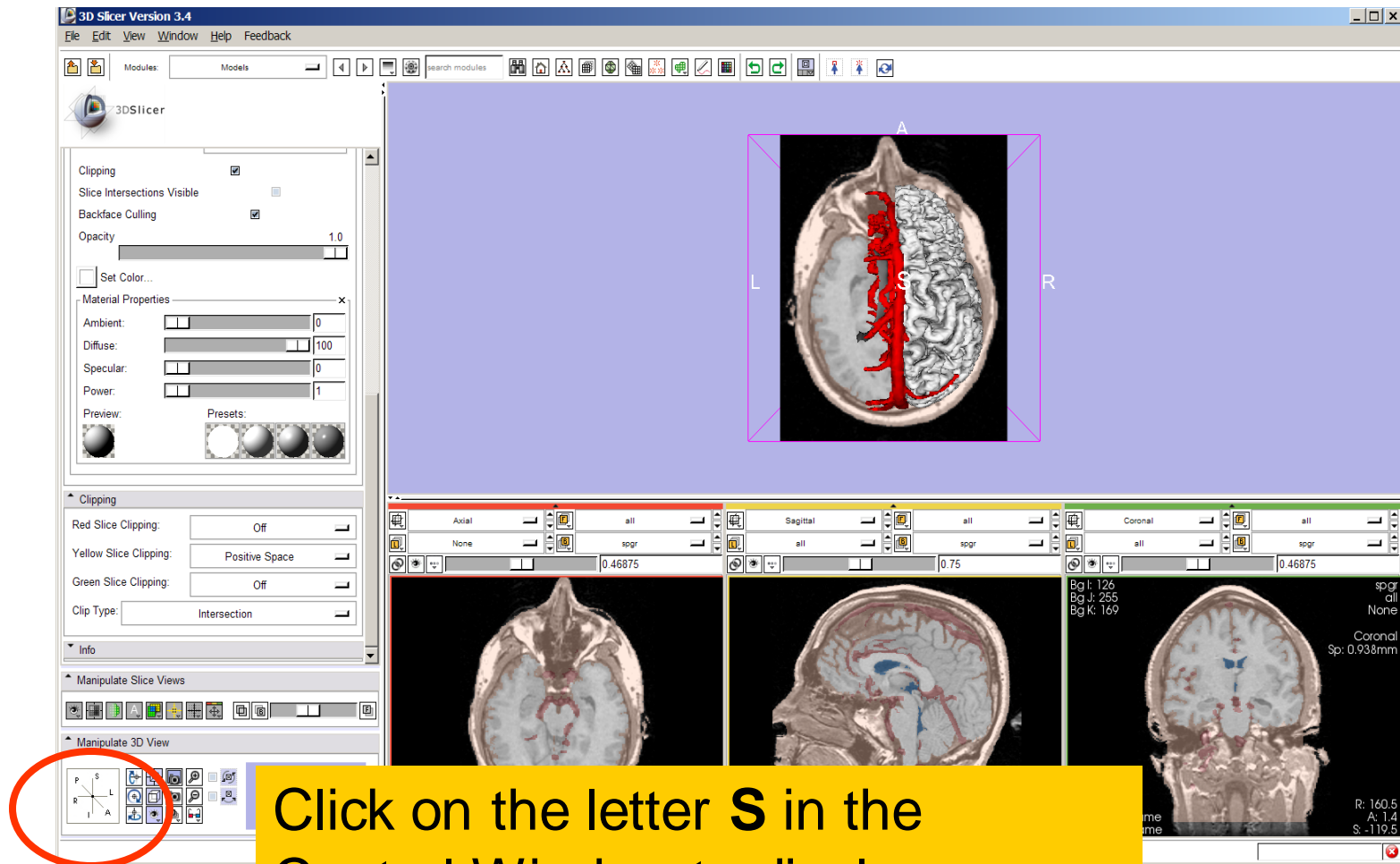


Visualizing a 3D model



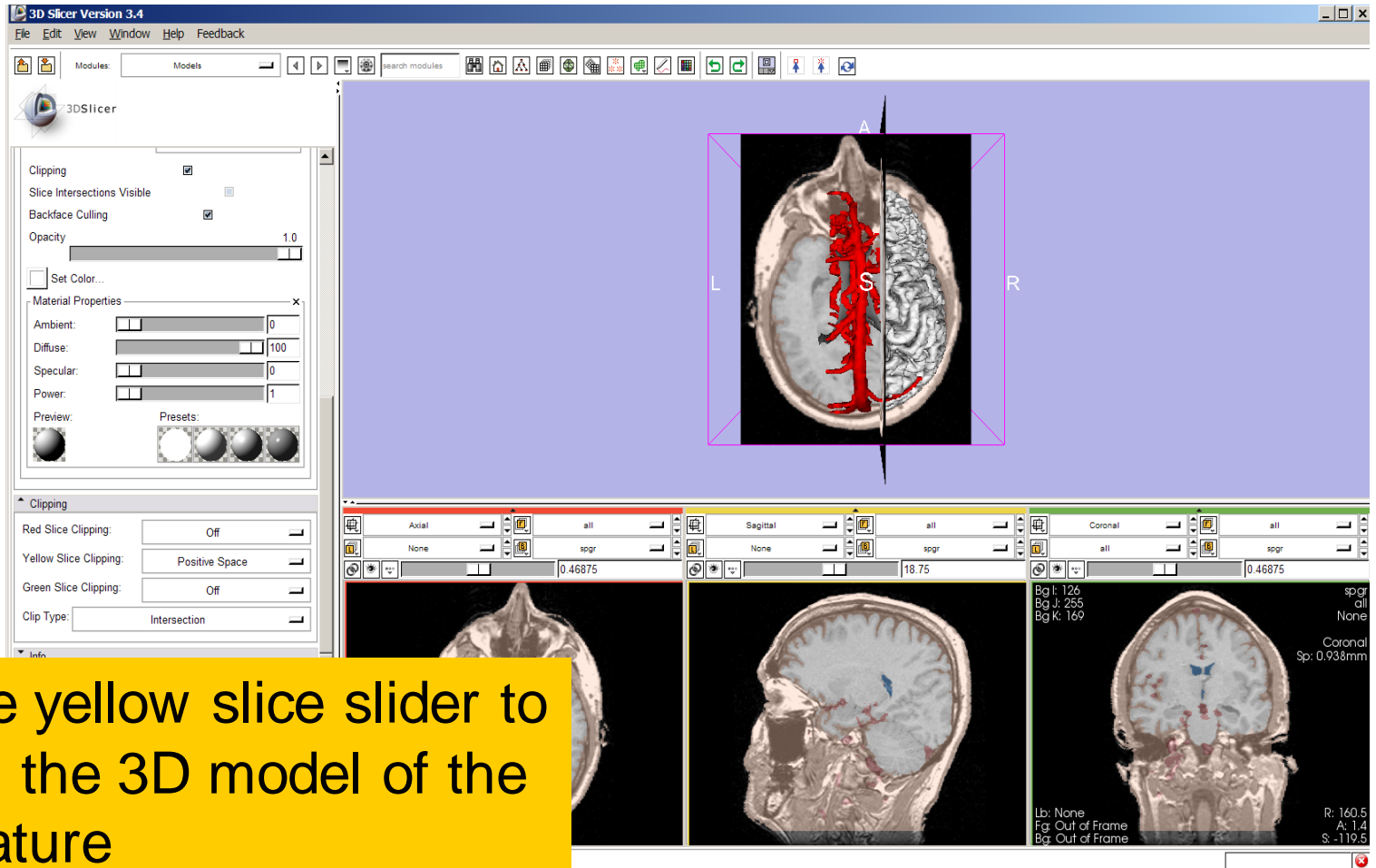
Set Yellow Slice Clipping to Positive Space

Visualizing a 3D model

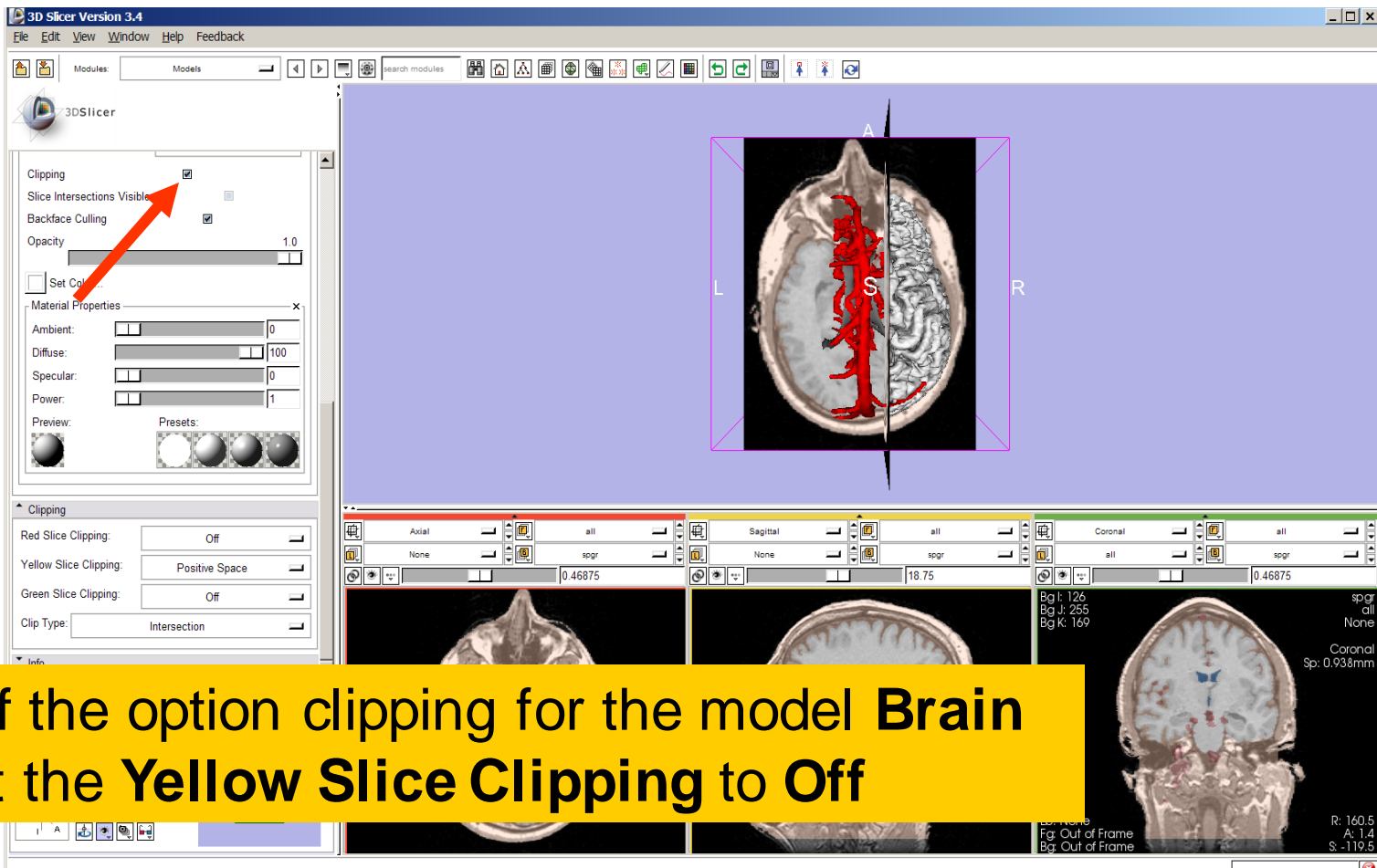


Click on the letter **S** in the Control Window to display a superior view of the 3D models

Visualizing a 3D model



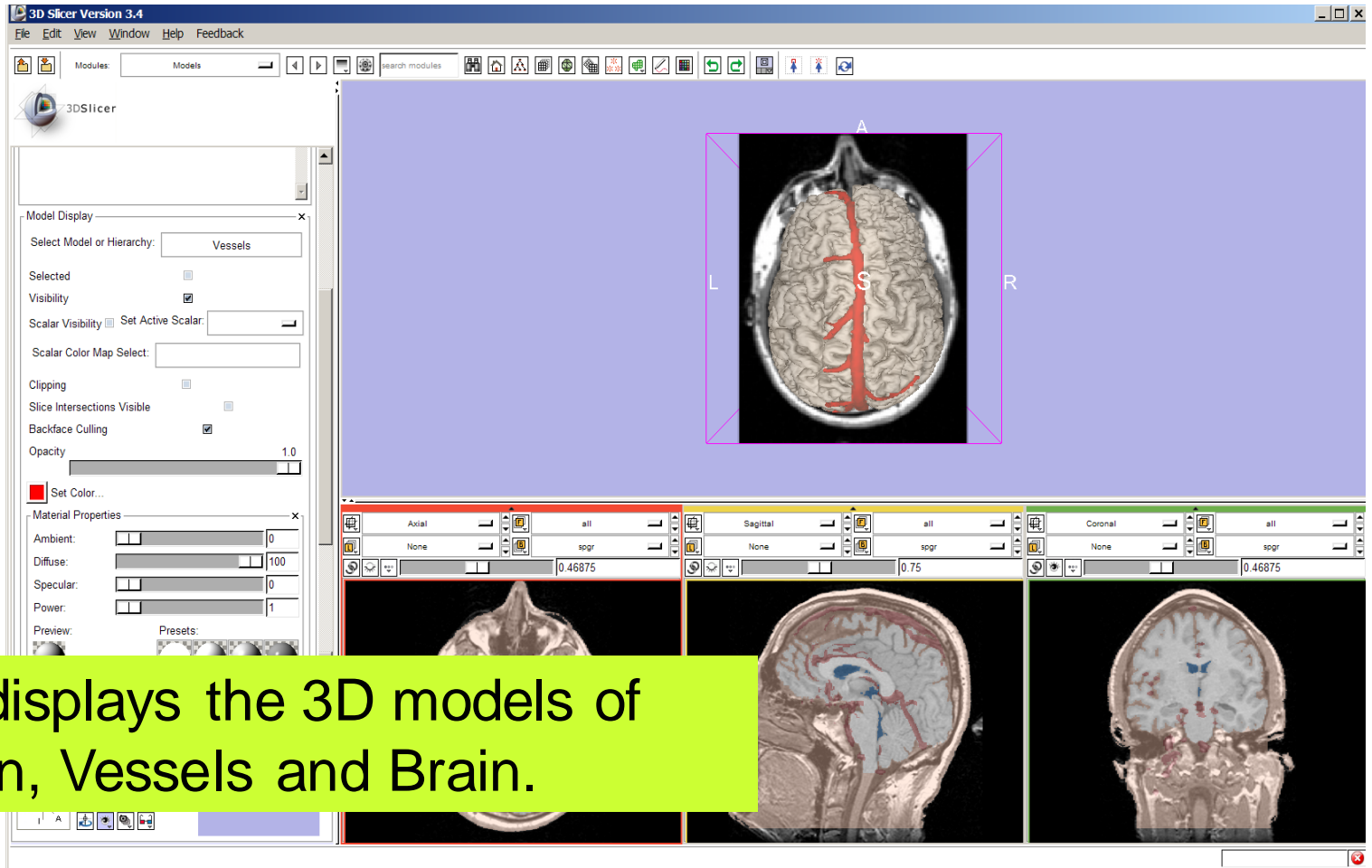
Visualizing a 3D model



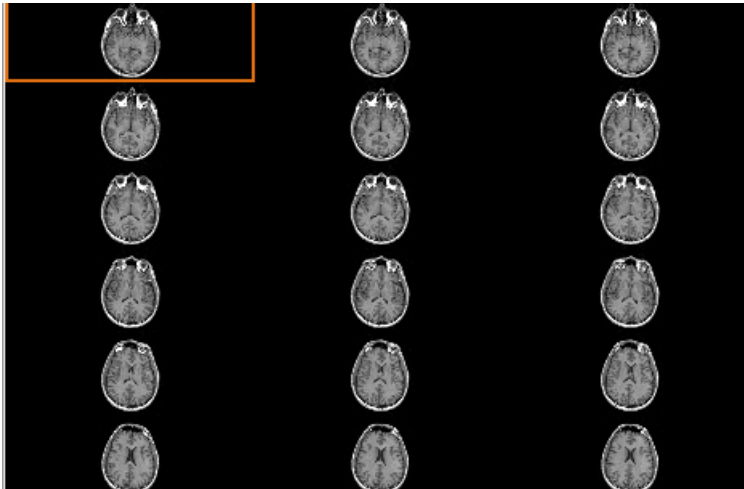
Turn off the option clipping for the model **Brain** and set the **Yellow Slice Clipping** to **Off**

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

Visualizing a 3D model

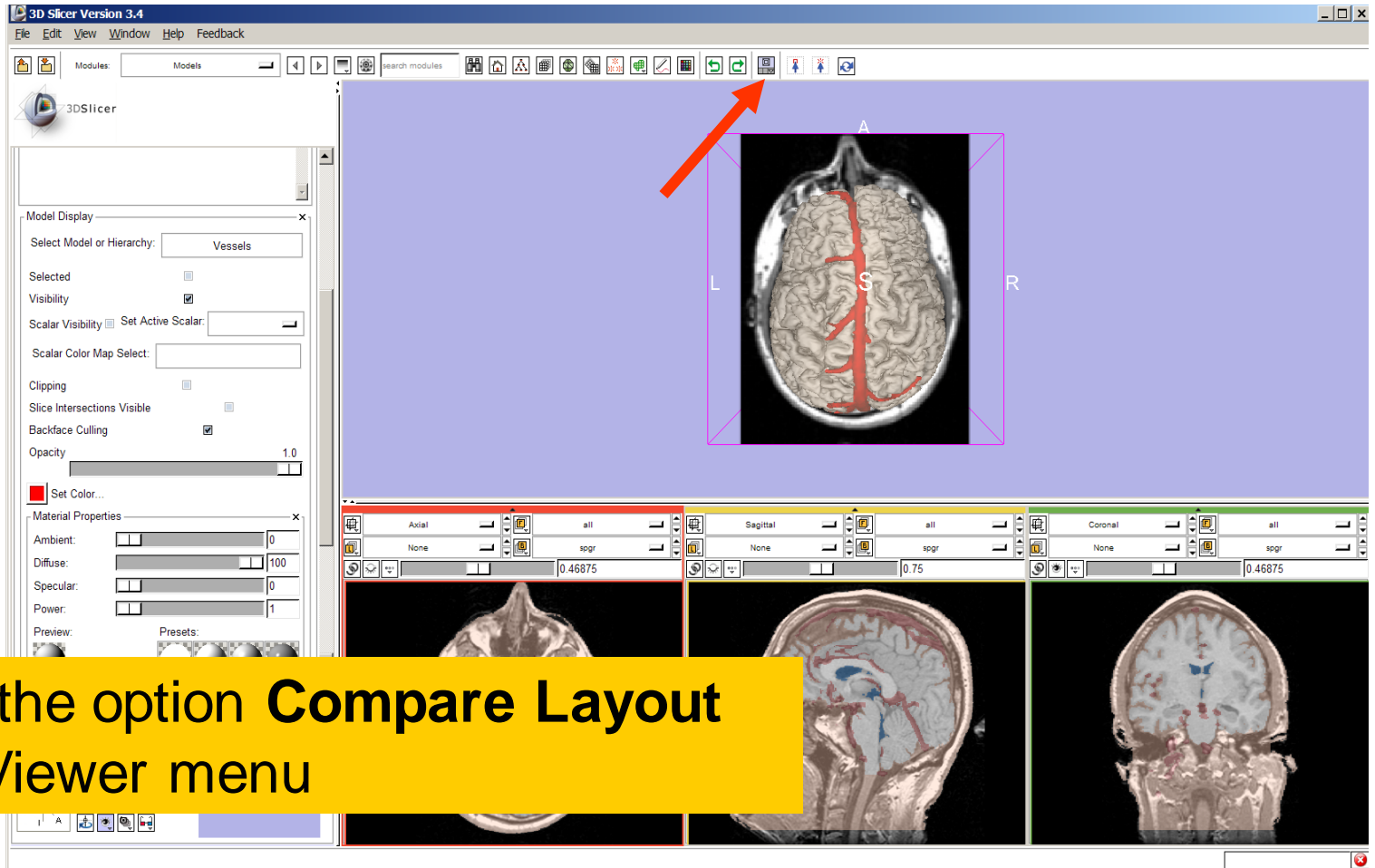


Slicer displays the 3D models of the Skin, Vessels and Brain.

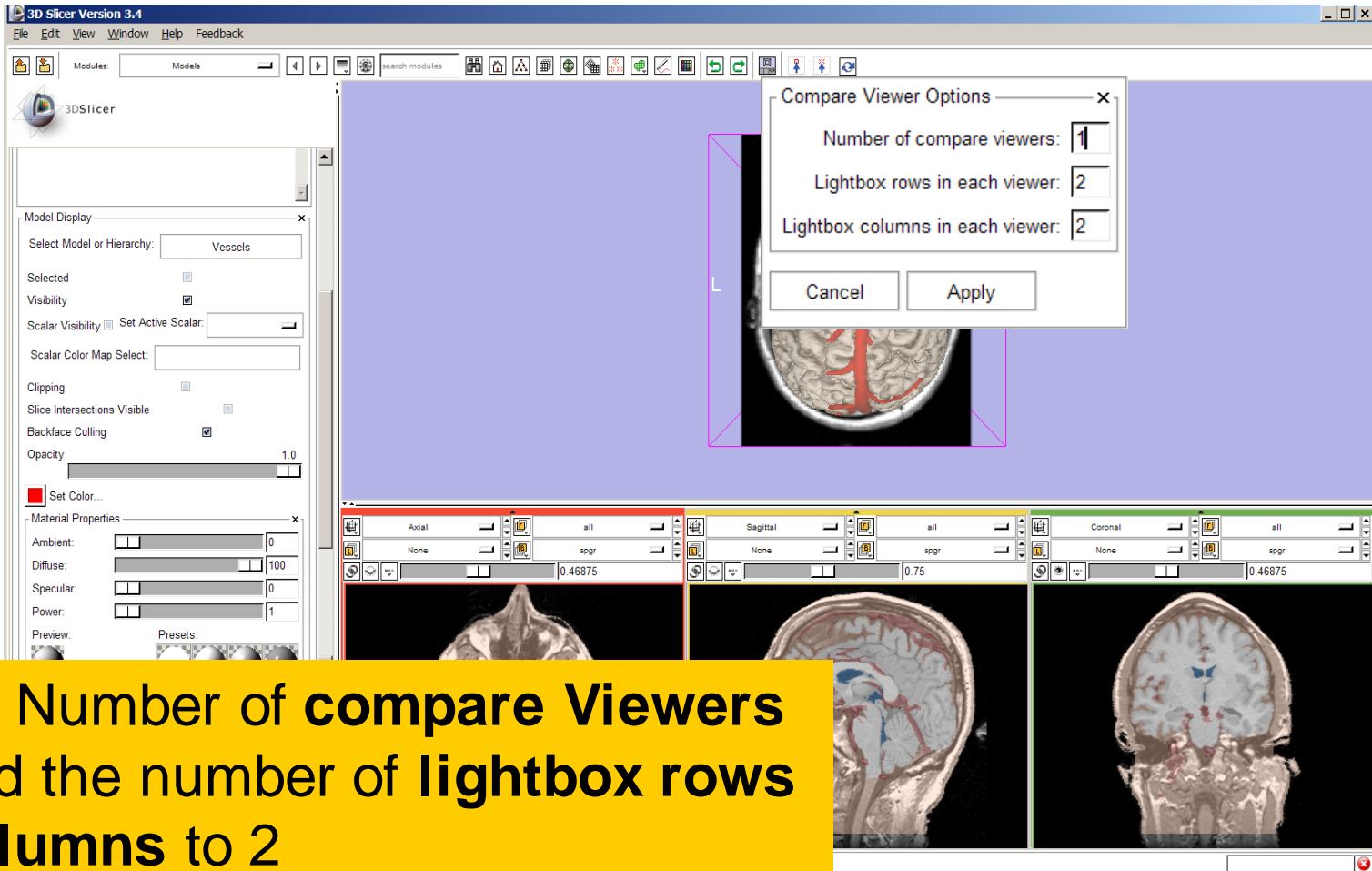


Part 4: Lightbox viewer

Visualizing a 3D model



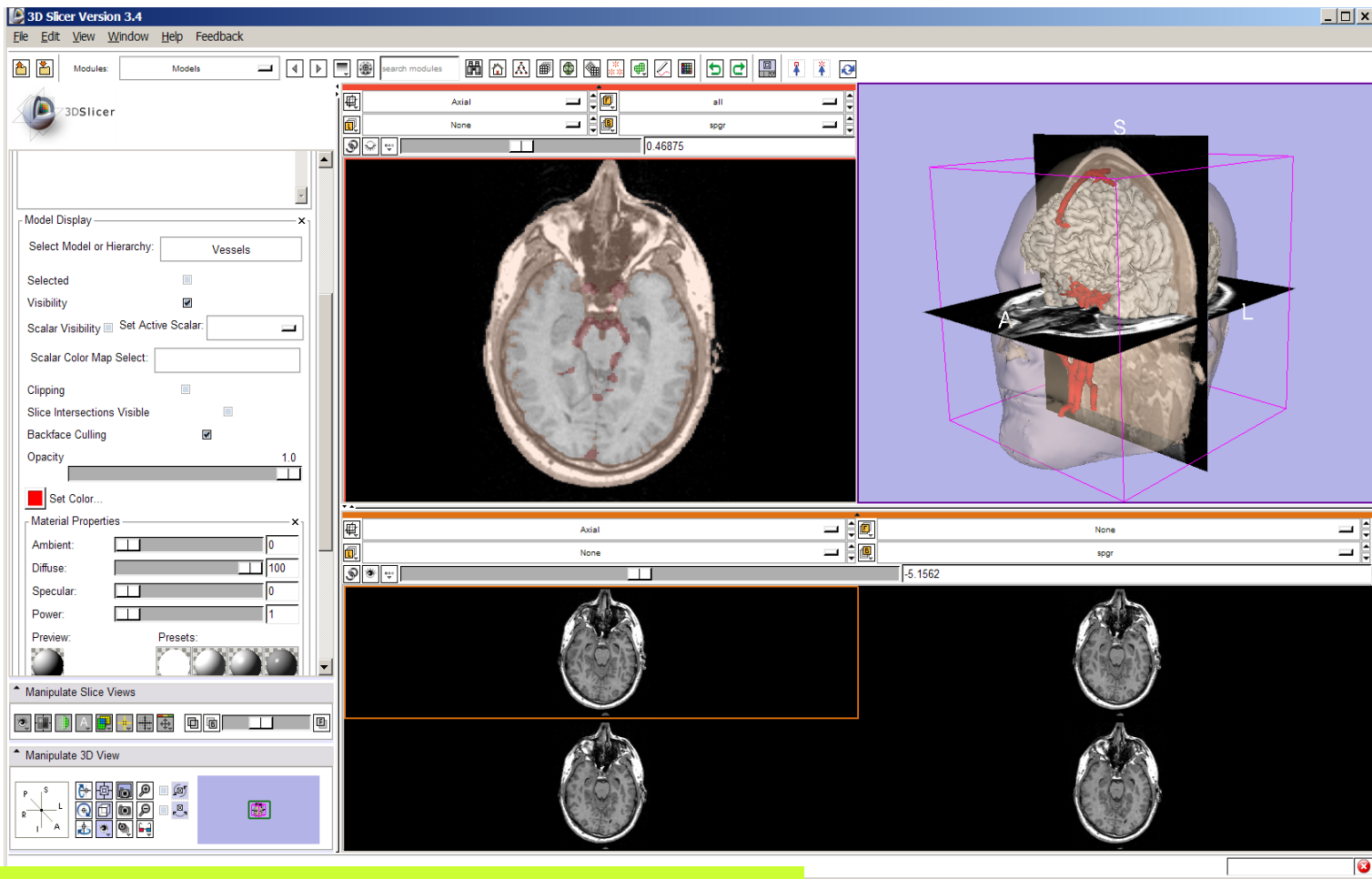
Visualizing a 3D model



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

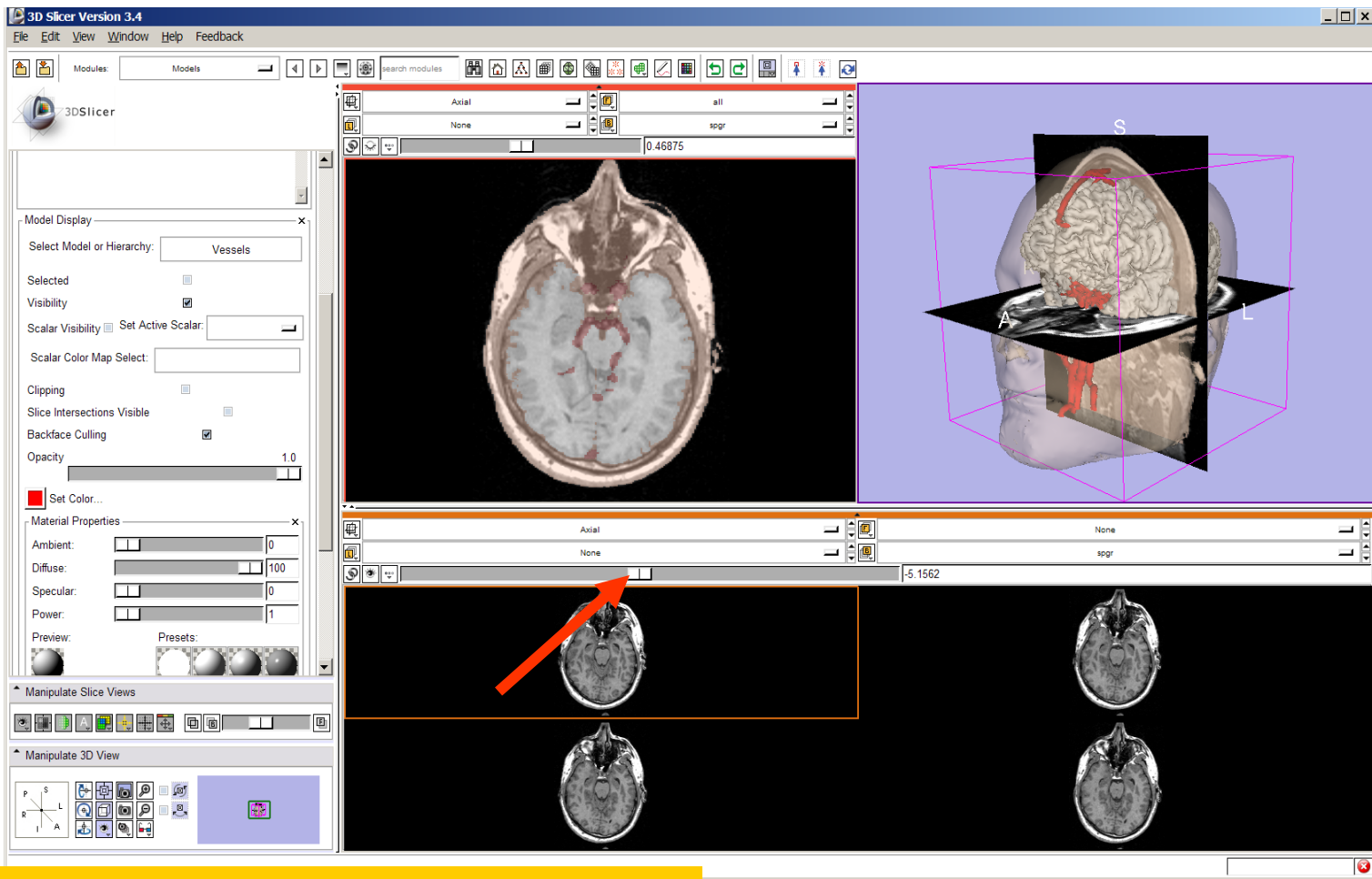
Click on **Apply**

Lightbox viewer



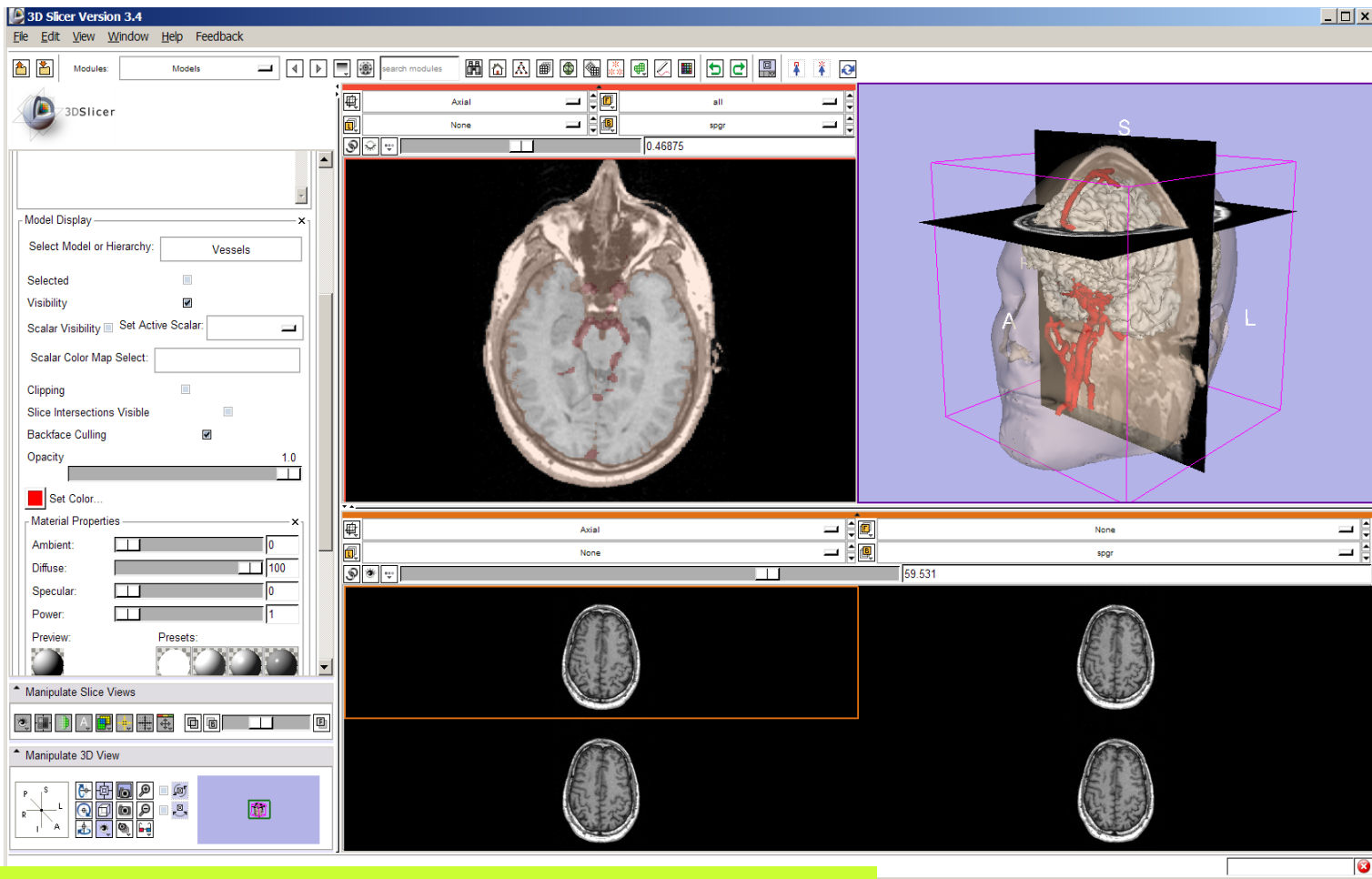
Slicer displays a lightbox view of the Background dataset.

Lightbox viewer



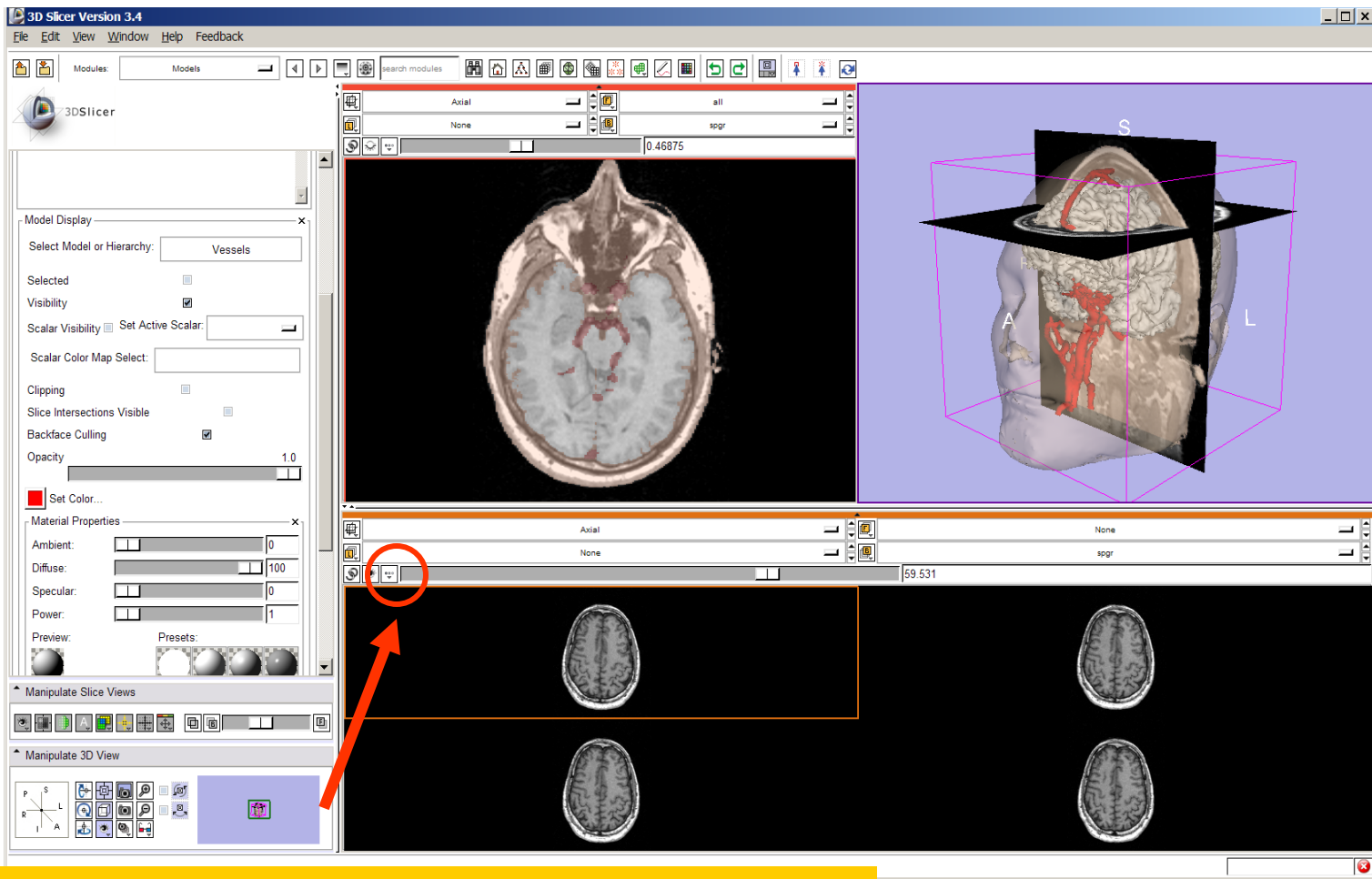
Browse through the spgr volume using the lightbox slider

Lightbox viewer



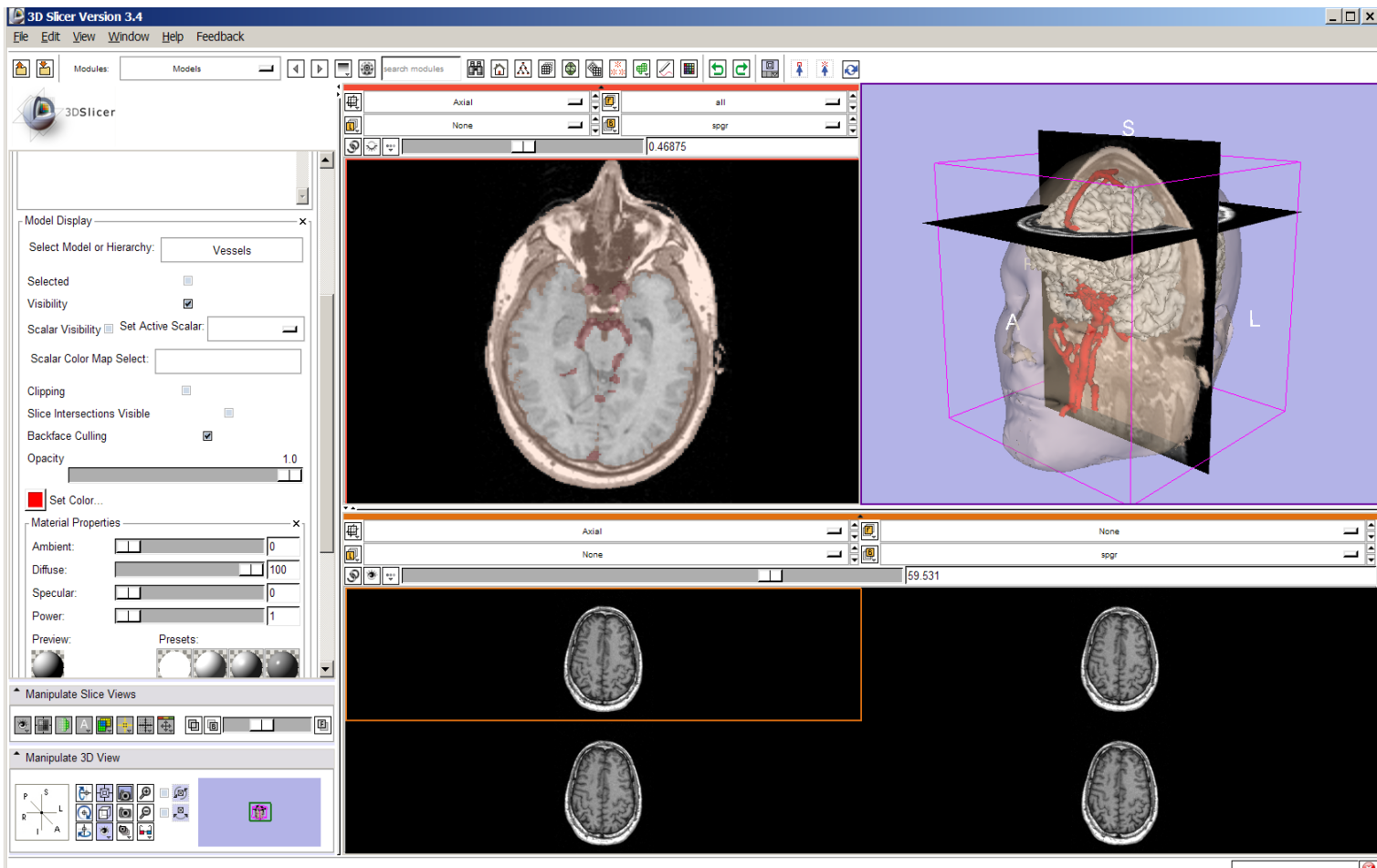
Slicer displays 4 adjacent axial slices of the spgr volume simultaneously

Lightbox viewer



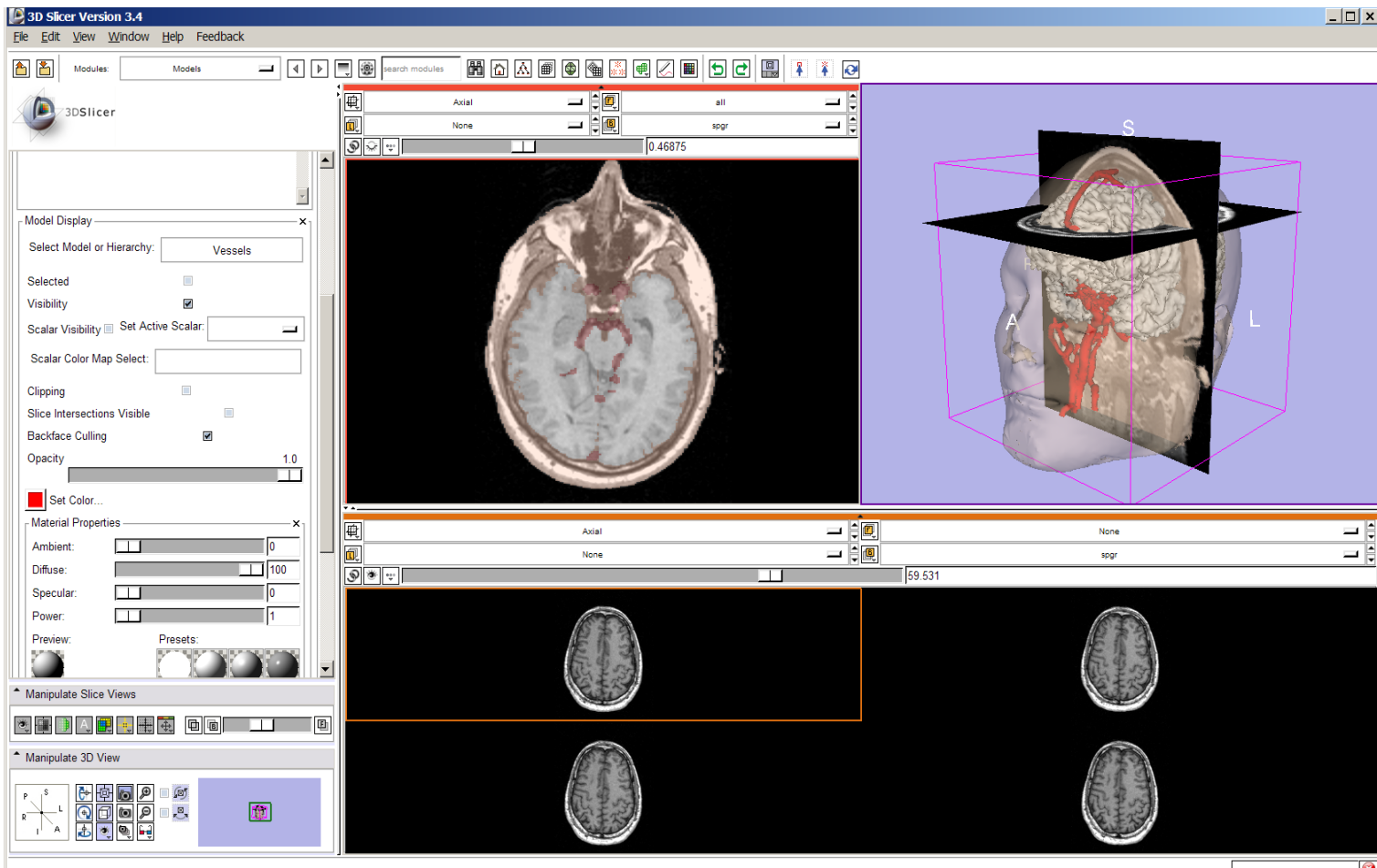
Left click on the Slice Viewer menu of the Compare Layout viewer

Lightbox viewer



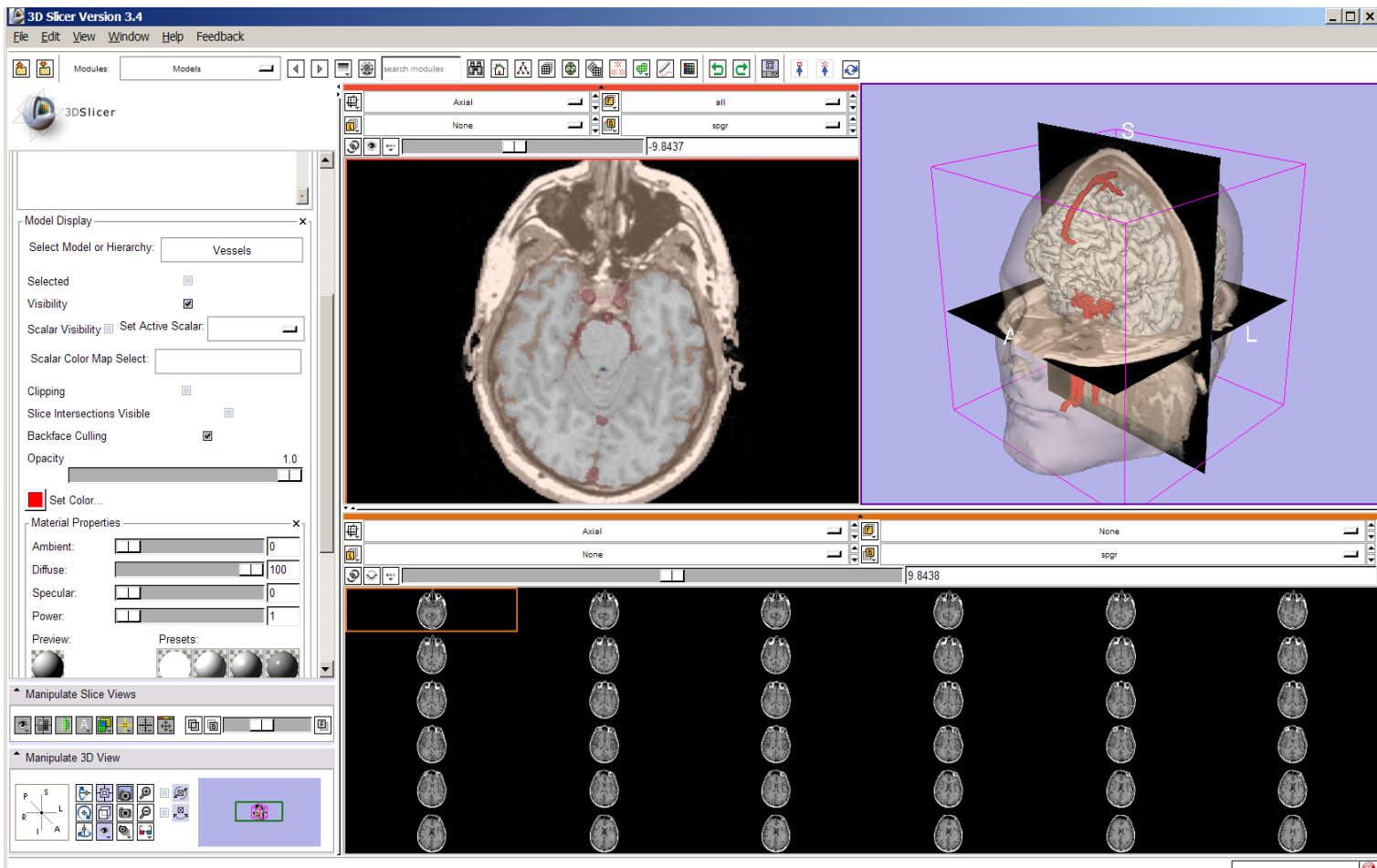
Select the **lightbox view** option 

Lightbox viewer



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

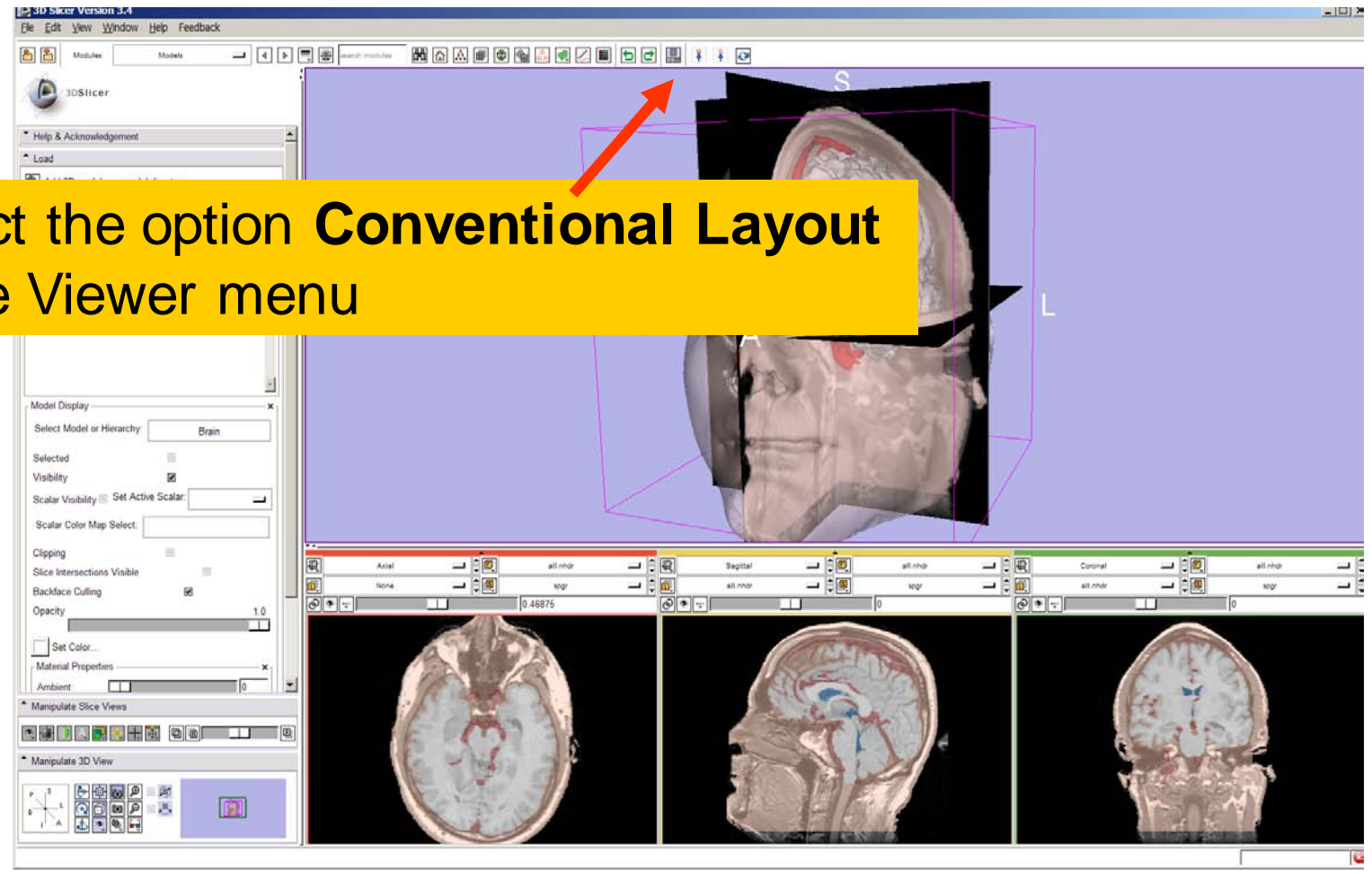
Lightbox viewer

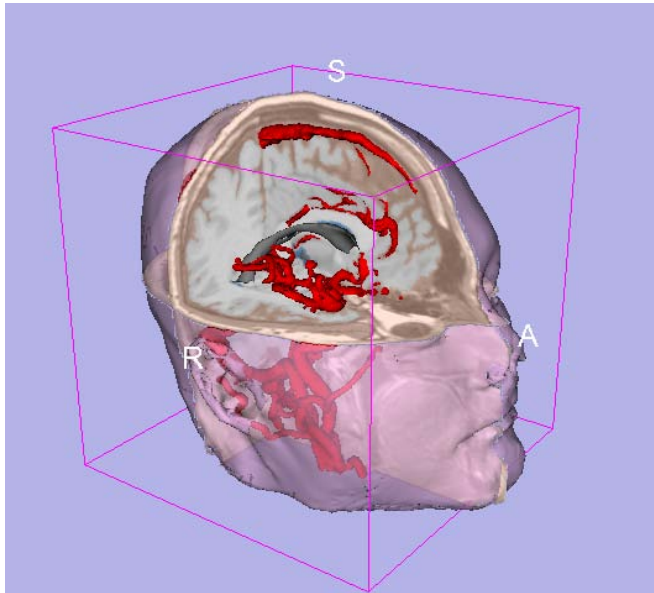


Slicer displays a matrix of 36 adjacent axial slices of the spgr volume.

Lightbox viewer

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

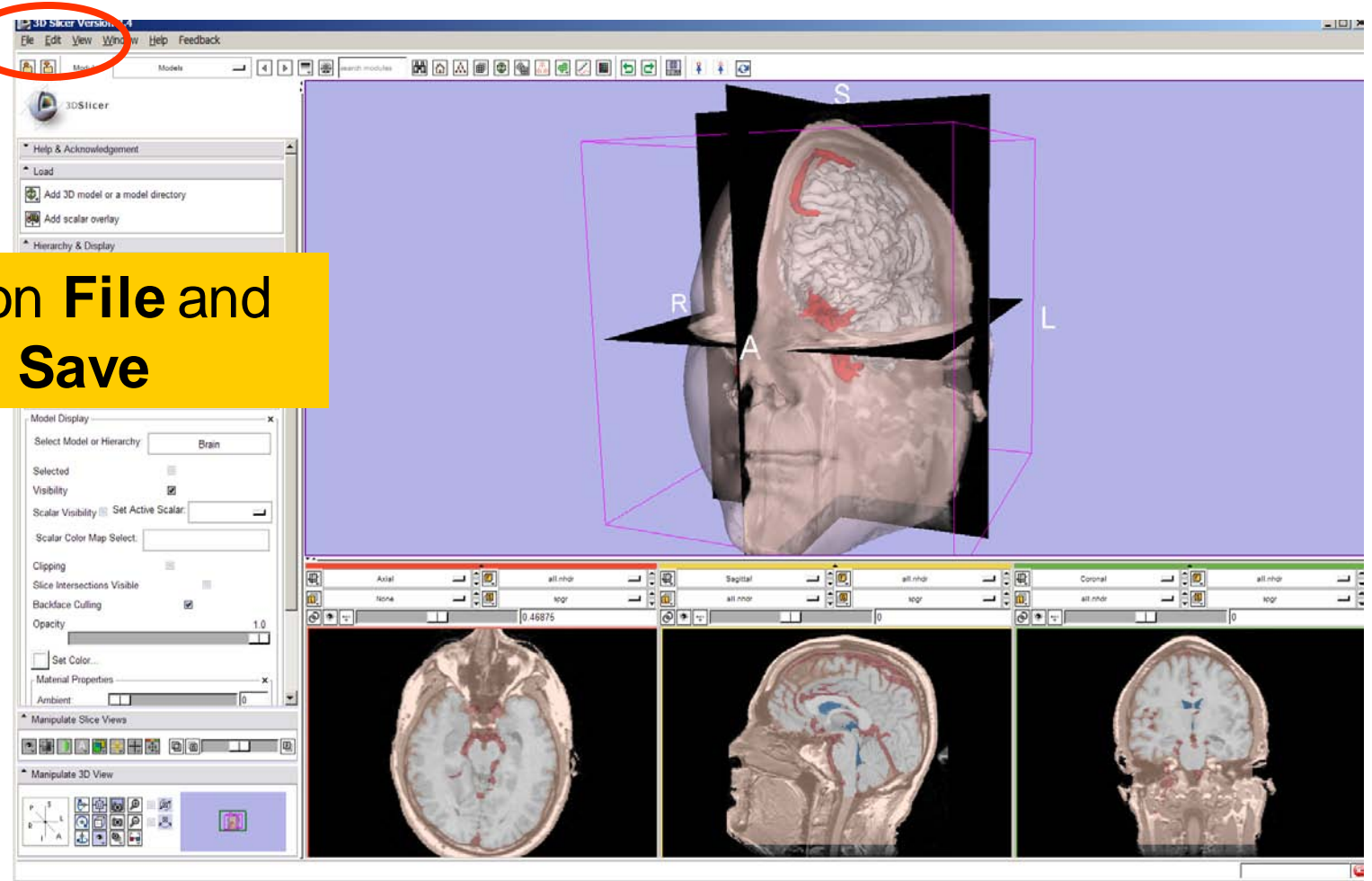




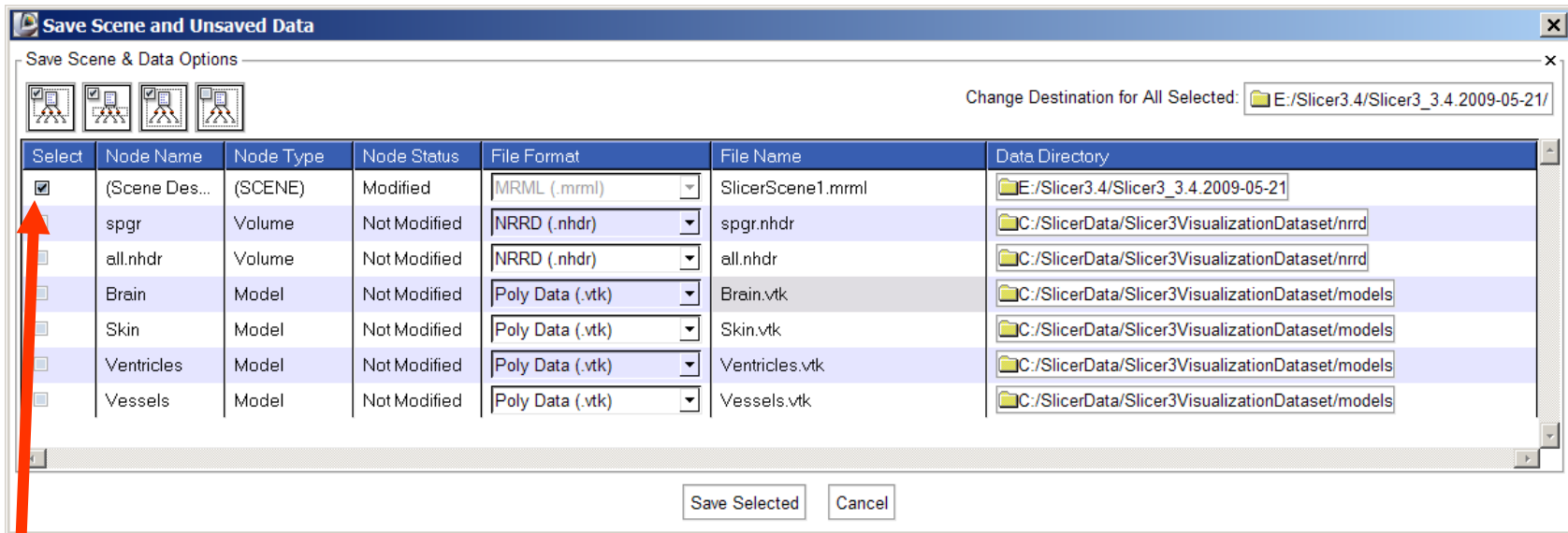
Part 5: Loading and saving a Scene

Saving Data

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

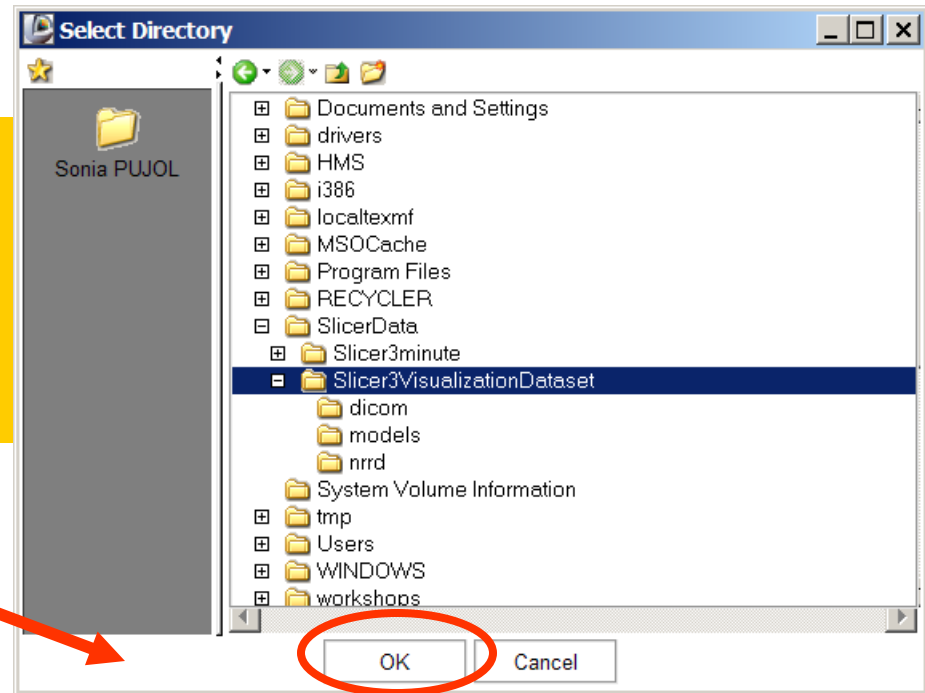
Change Destination for All Selected: E:/Slicer3.4/Slicer3_3.4.2009-05-21/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mrm)	Slicer3DScene.mrm	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

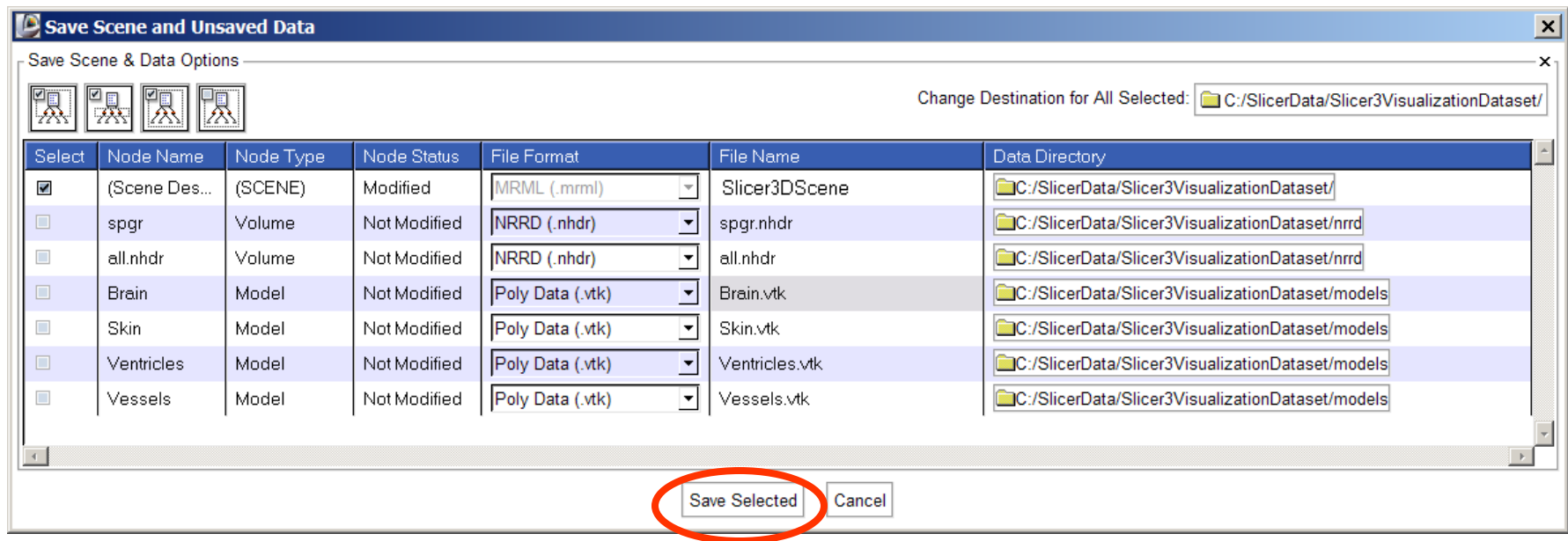
Save Scene & Data Options

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



Save Scene and Unsaved Data

Save Scene & Data Options

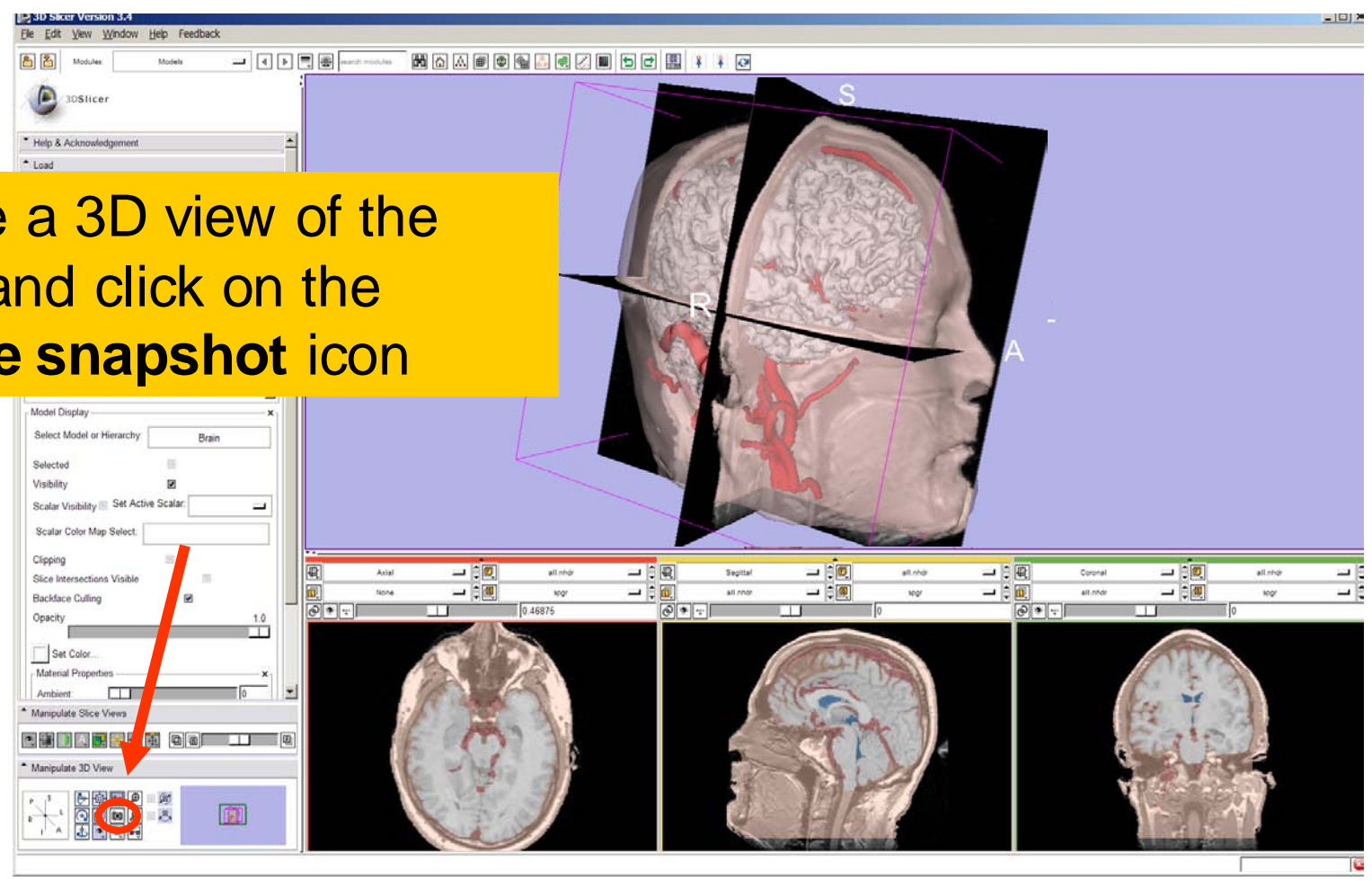
Change Destination for All Selected: C:/SlicerData/Slicer3VisualizationDataset/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mml)	Slicer3DScene	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

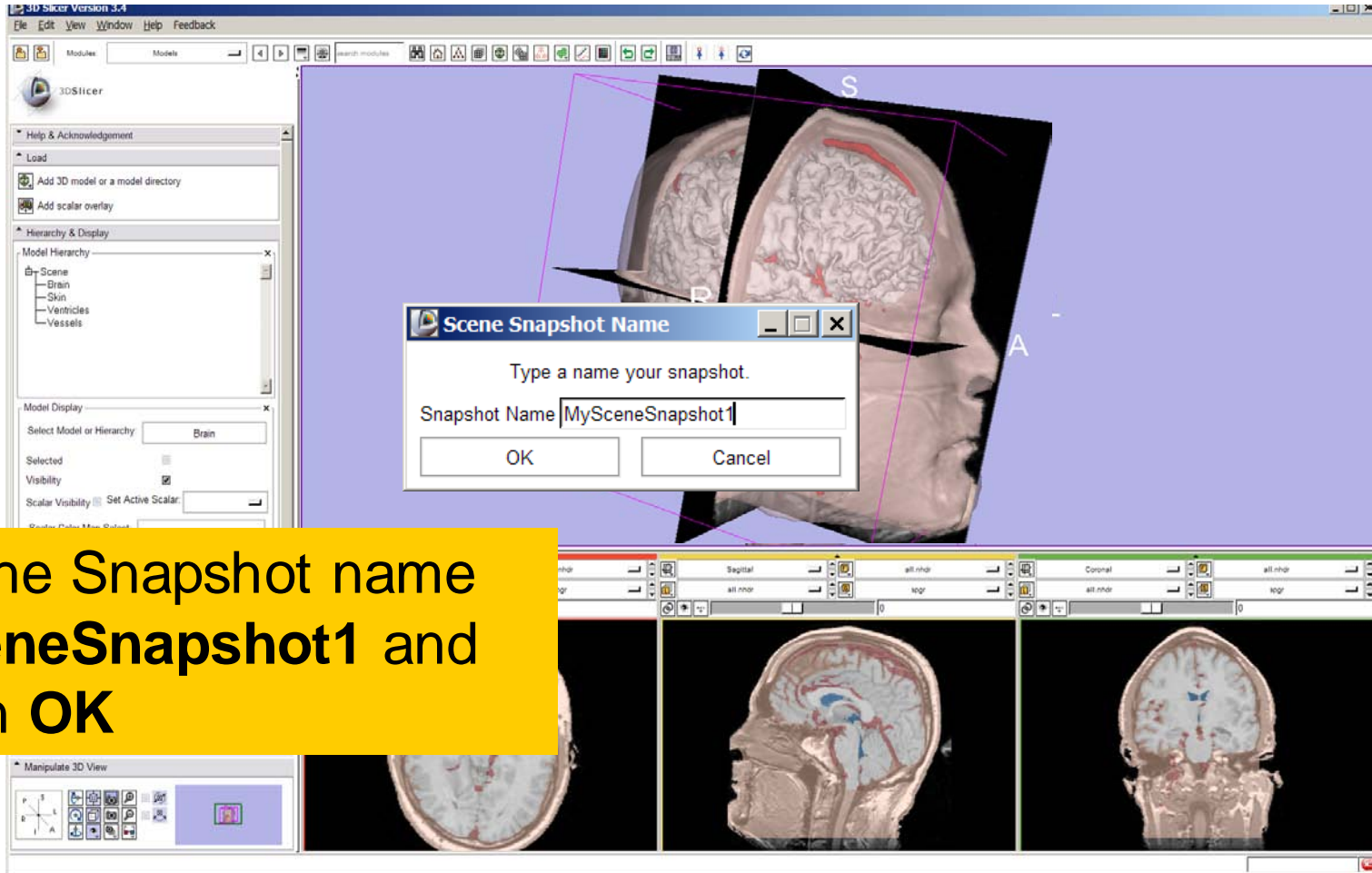
Save Selected Cancel

Creating Scene Snapshots

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



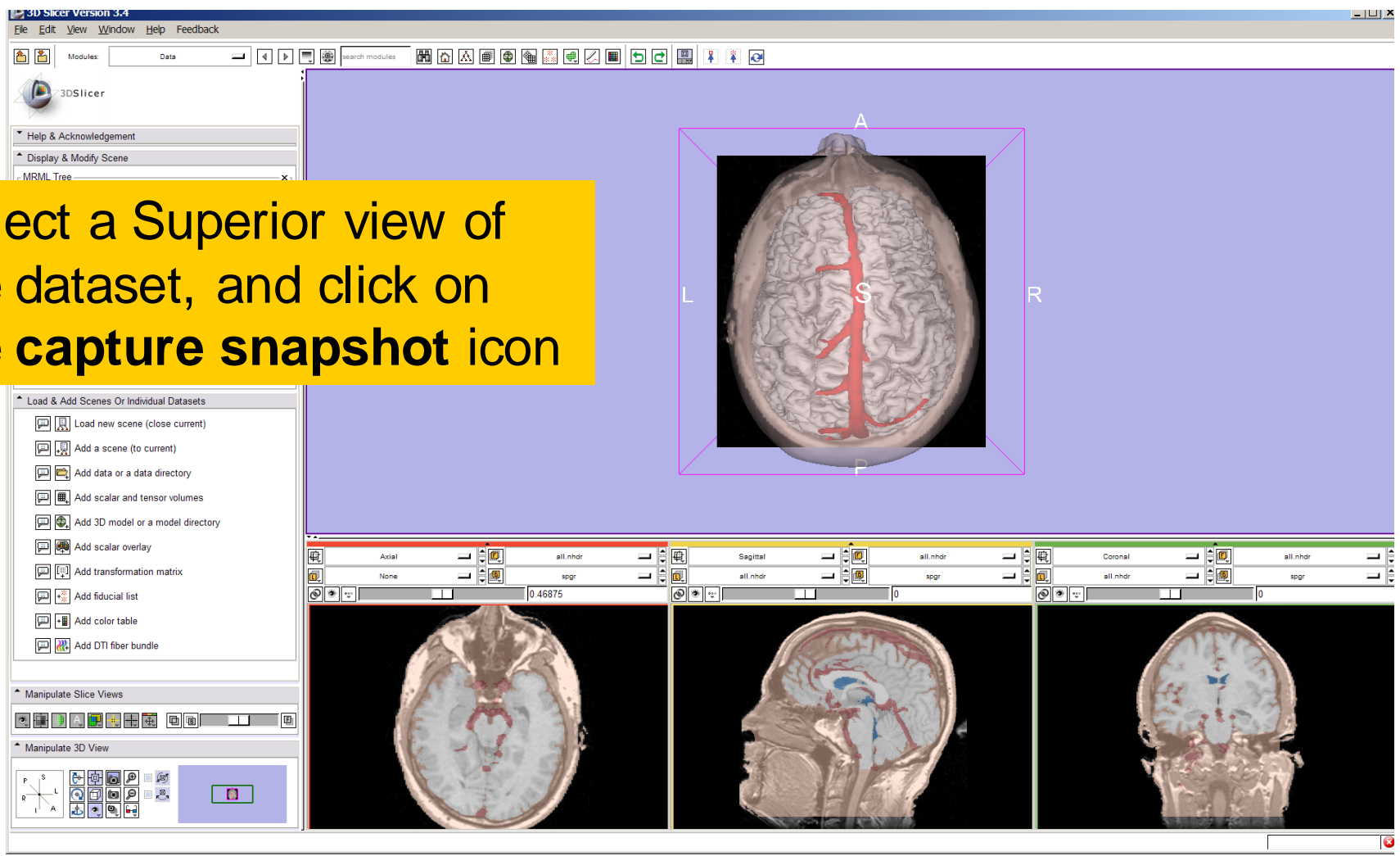
Creating Scene Snapshots



Enter the Snapshot name
MySceneSnapshot1 and
click on **OK**

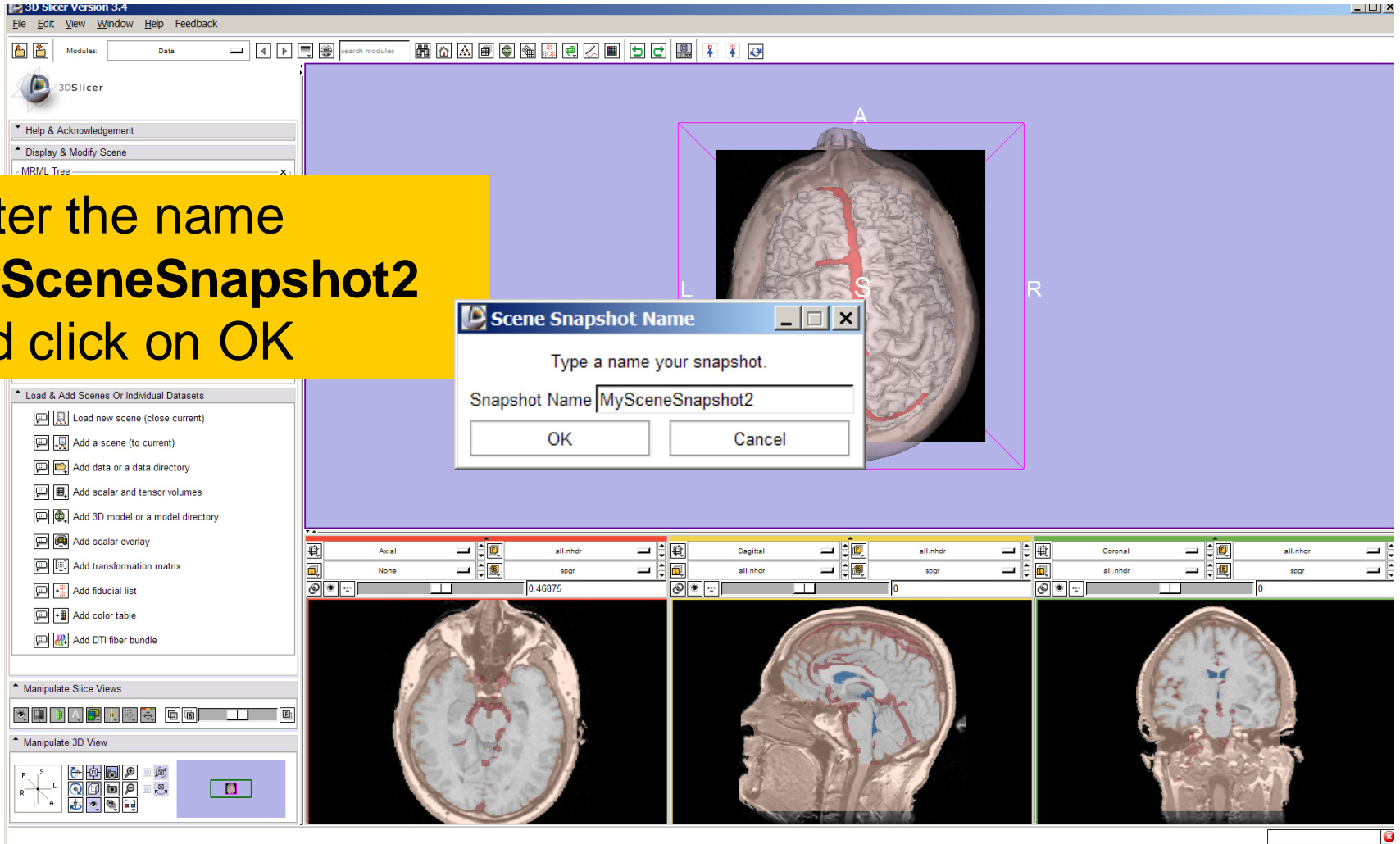
Creating Scene Snapshots

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



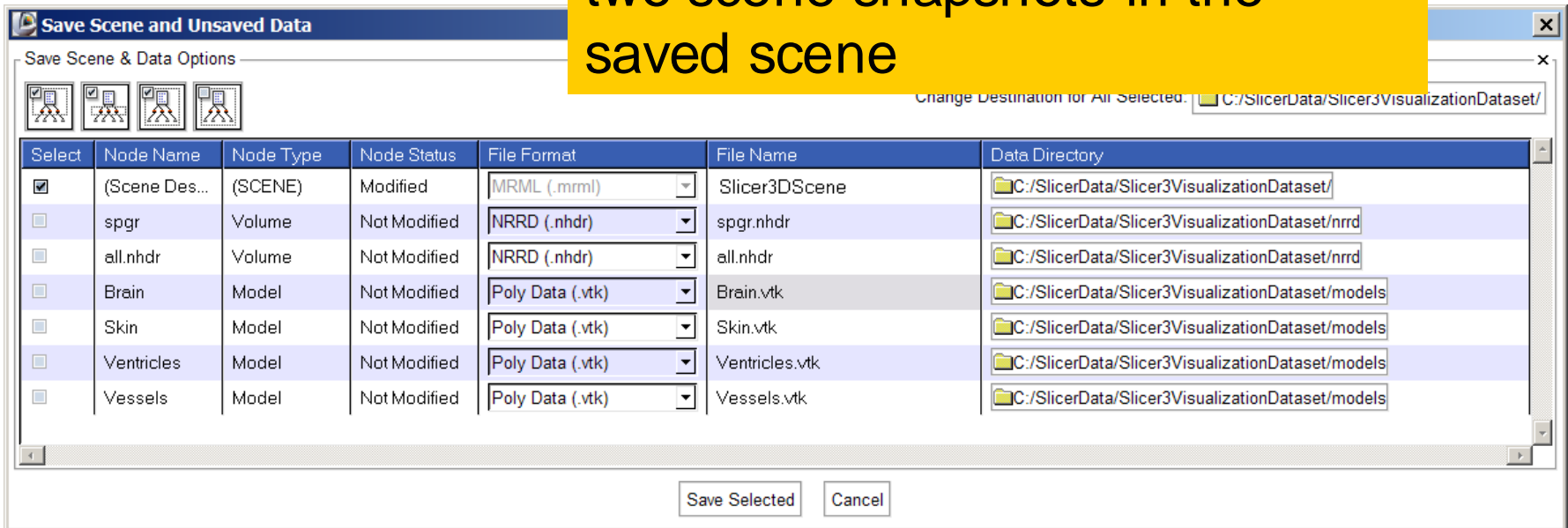
Creating Scene Snapshots

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



Save Scene and Unsaved Data

Save Scene & Data Options

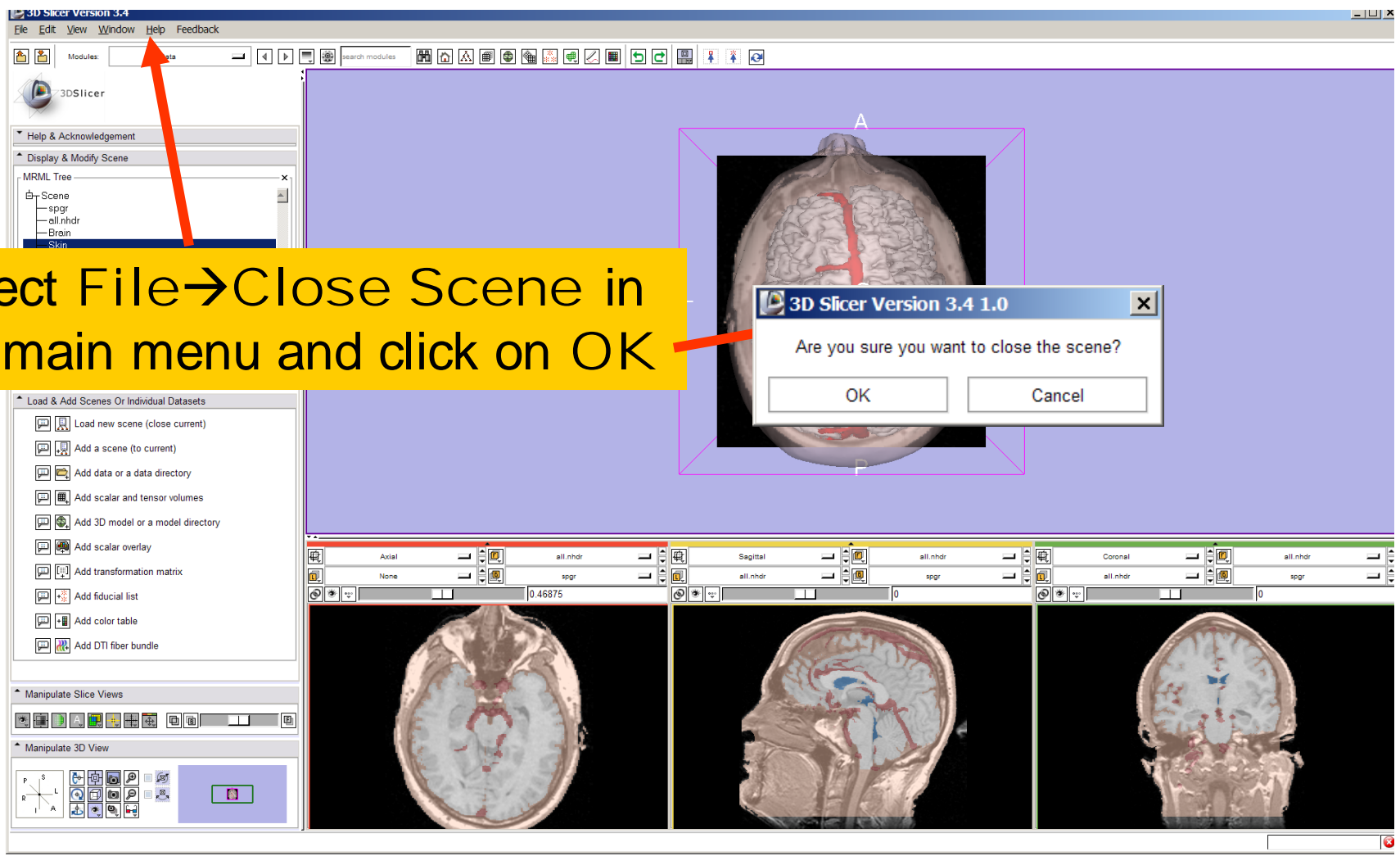
Change Destination for All Selected: C:/SlicerData/Slicer3VisualizationDataset/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mml)	Slicer3DScene	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

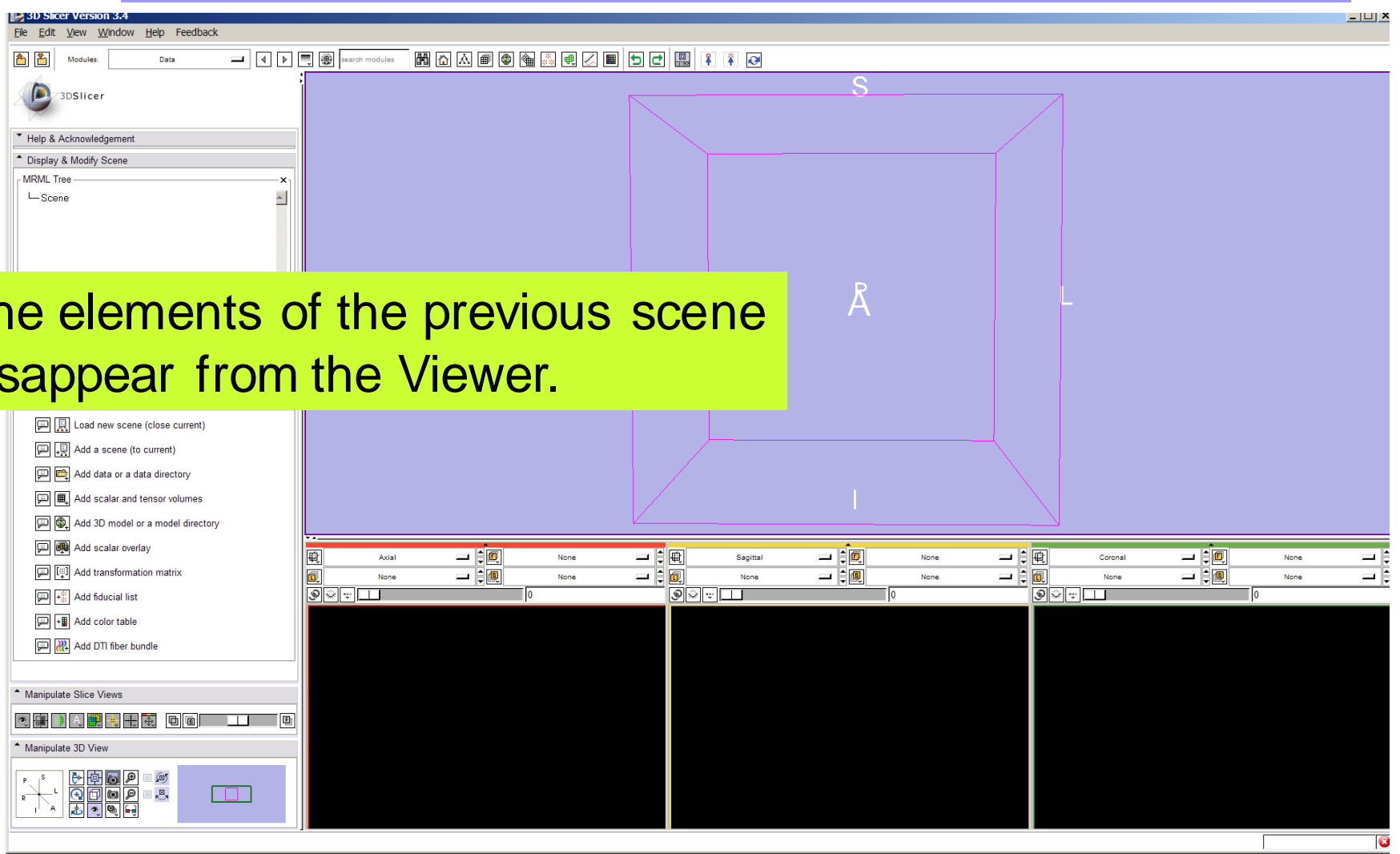
Saving Data

Select File → Close Scene in the main menu and click on OK

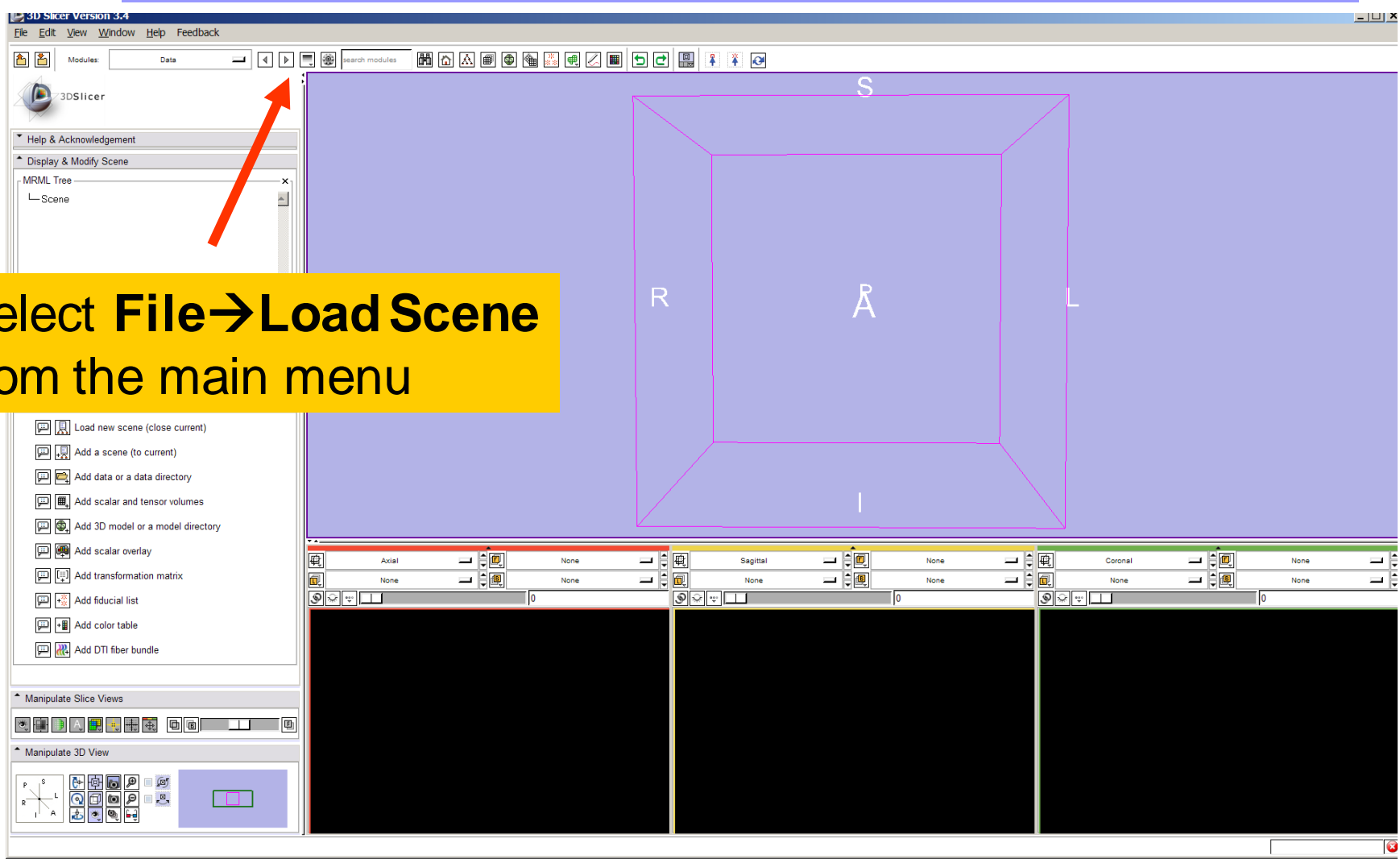


Saving Data

The elements of the previous scene disappear from the Viewer.

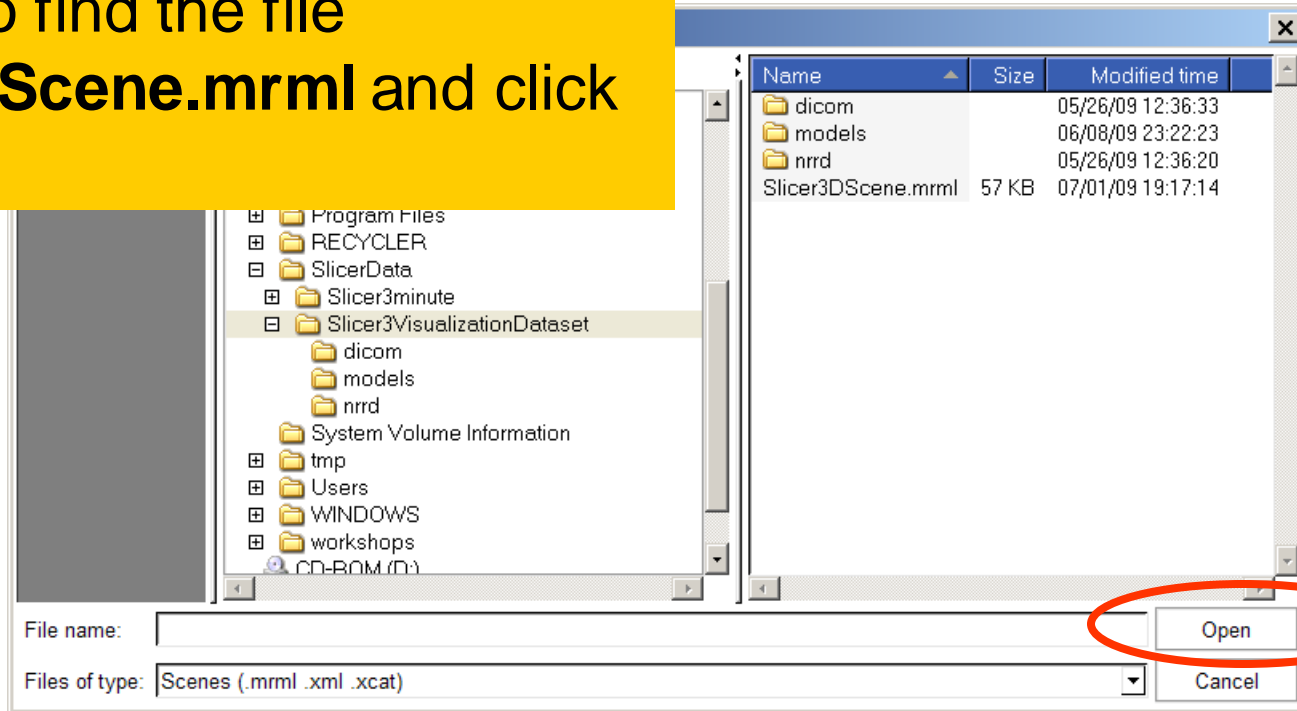


Saving Data

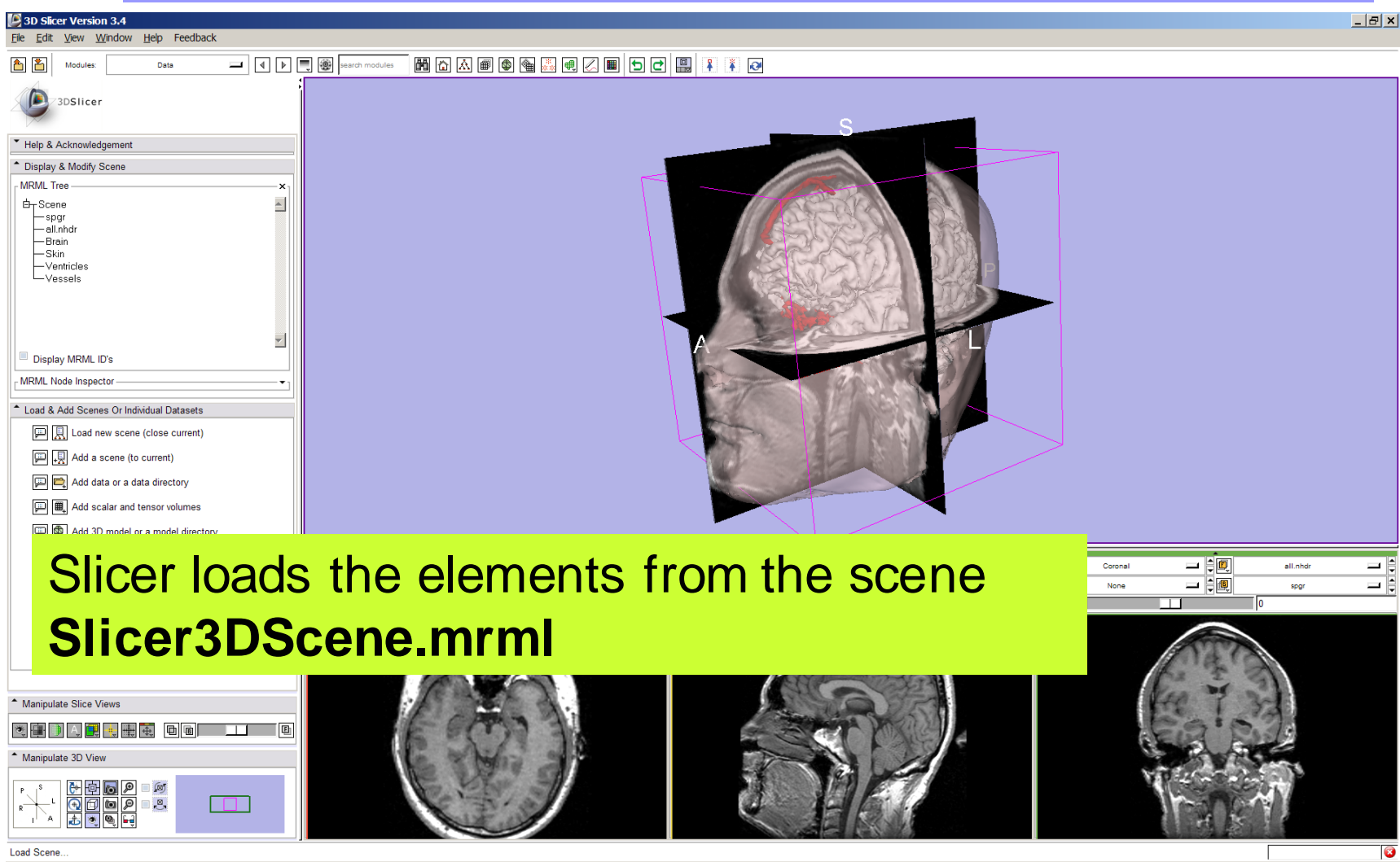


Select **File**→**Load Scene** from the main menu

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

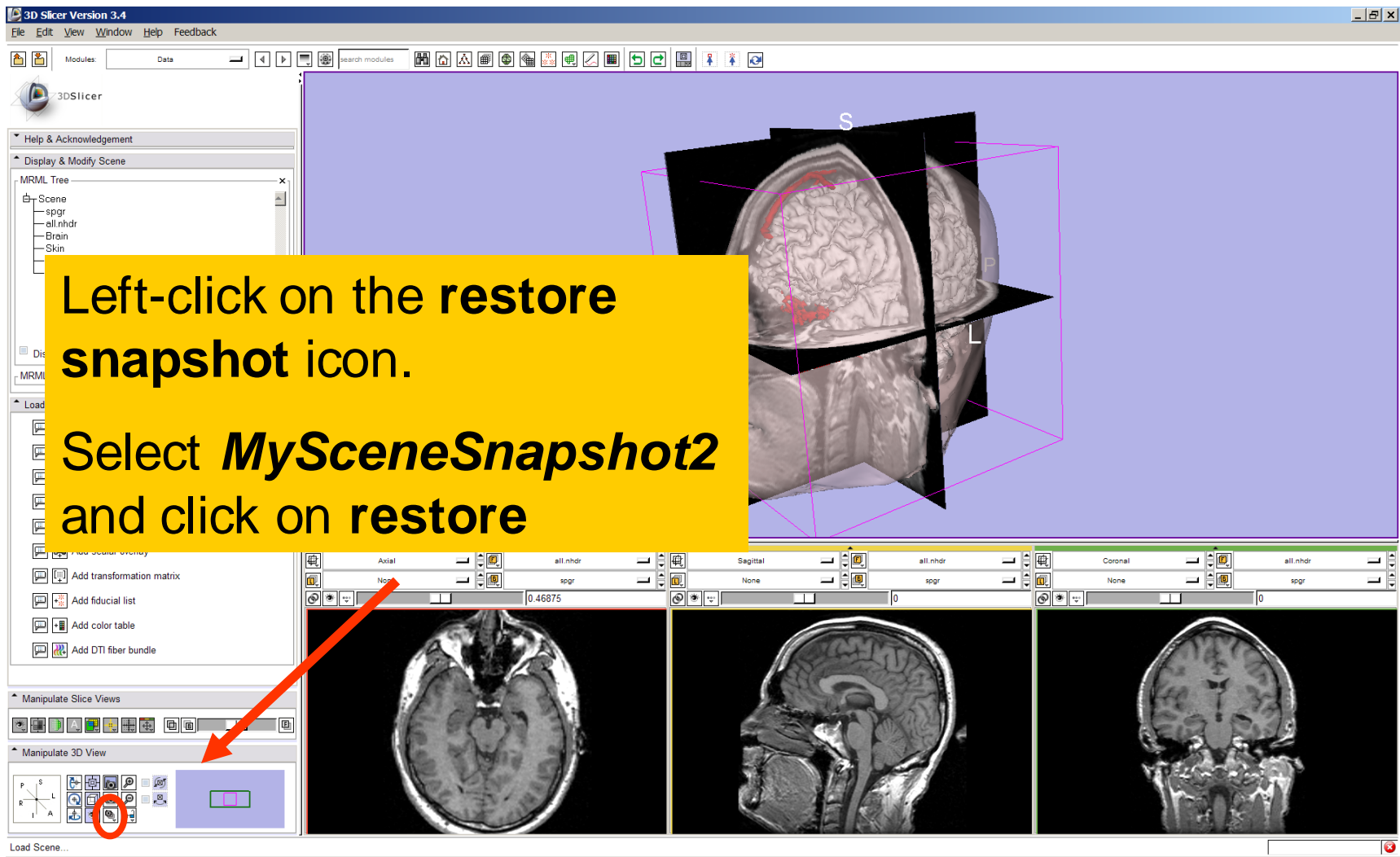


Loading a Scene



Slicer loads the elements from the scene
Slicer3DScene.mrml

Loading a Scene

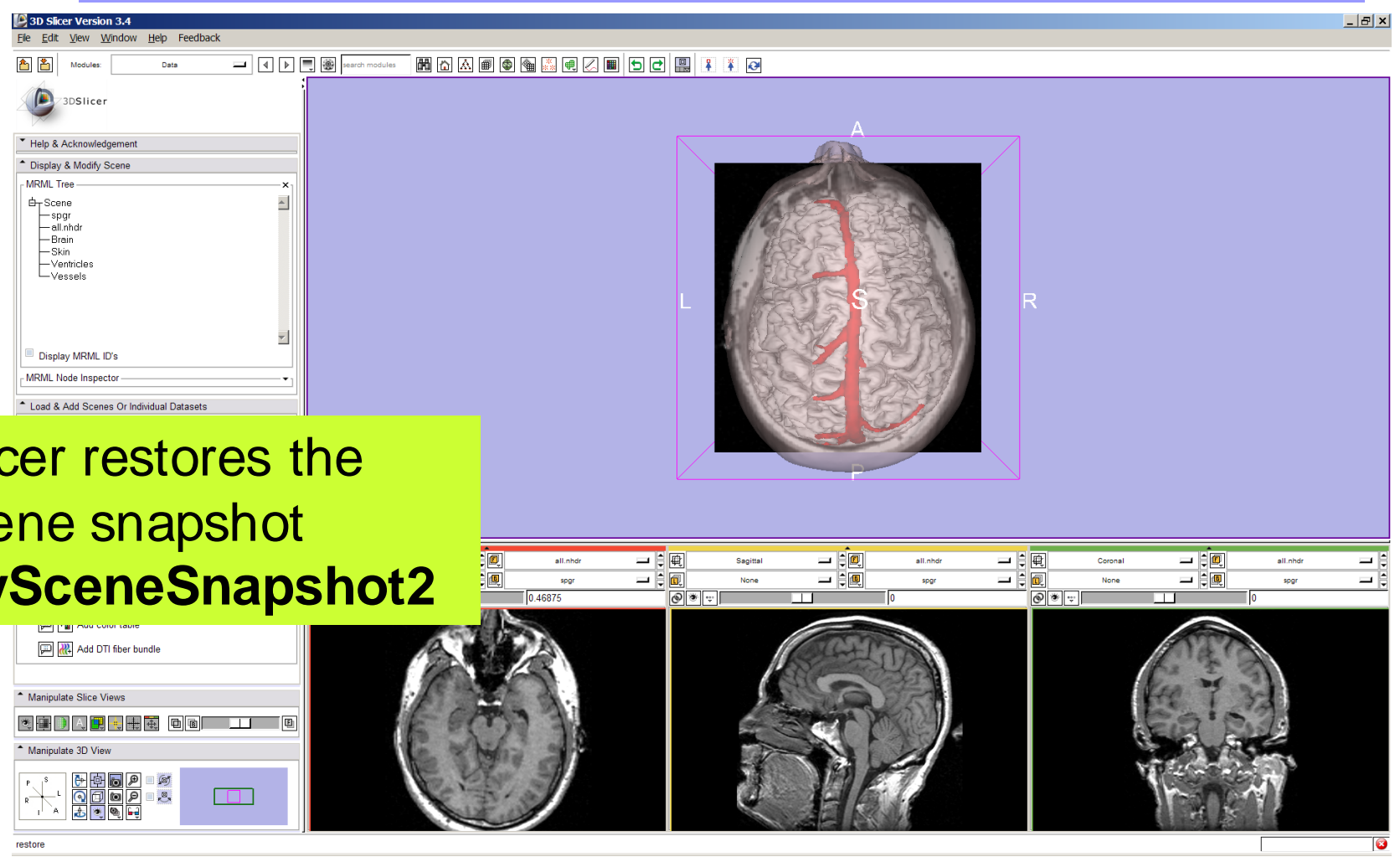


The screenshot shows the 3D Slicer Version 3.4 interface. The main window displays a 3D brain model with a red line and a purple wireframe box. The left sidebar contains the MRML Tree, Load panel, and Manipulate 3D View panel. The bottom panel shows three slice views: Axial, Sagittal, and Coronal. A red arrow points to the 'restore snapshot' icon in the Manipulate 3D View panel.

Left-click on the restore snapshot icon.

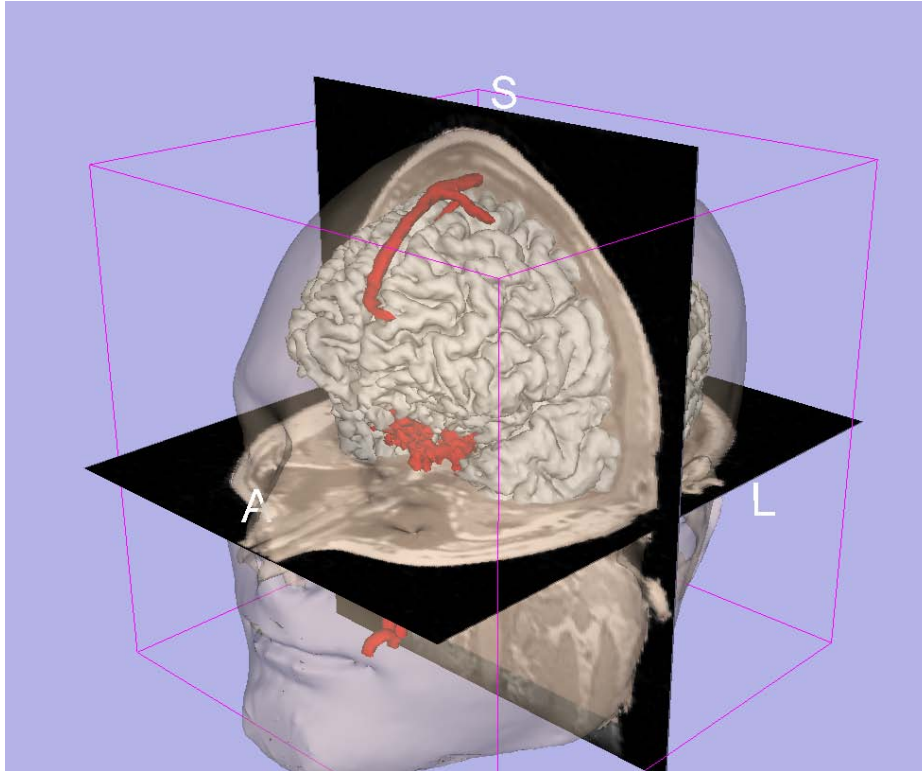
Select *MySceneSnapshot2* and click on restore

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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