



NAC



*Leonardo da Vinci (1452-1519), Virgin and Child with St. Anne
Pinakothek, München*

Data Loading & 3D Visualization

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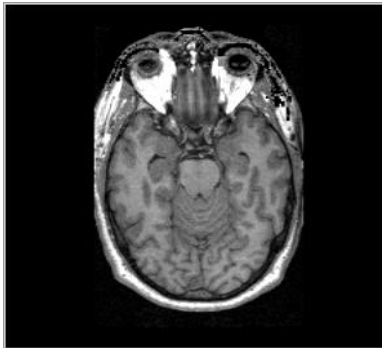
- An **end-user application** for image analysis
- An **open-source environment** for software development
- A software platform that is both **easy to use** for clinical researchers and **easy to extend** for programmers



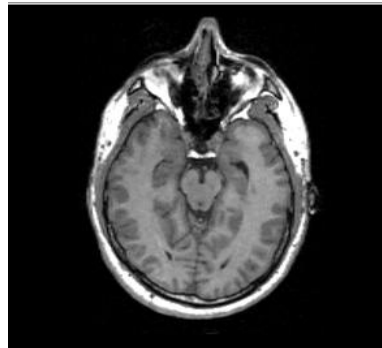
- Slicer3 is a **multi-platform** software that is developed and maintained on:
 - Windows XP
 - Linux x86_64
 - Linux x86
 - Mac OSX – Darwin x86-Intel

3D Visualization dataset

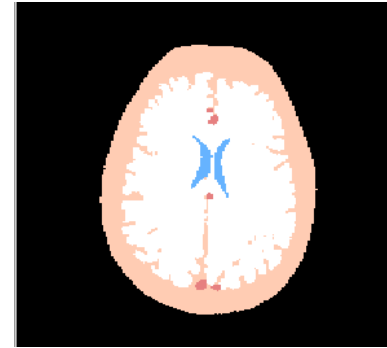
- This course is built upon three datasets of a single healthy subject brain:



MR DICOM
GRASS



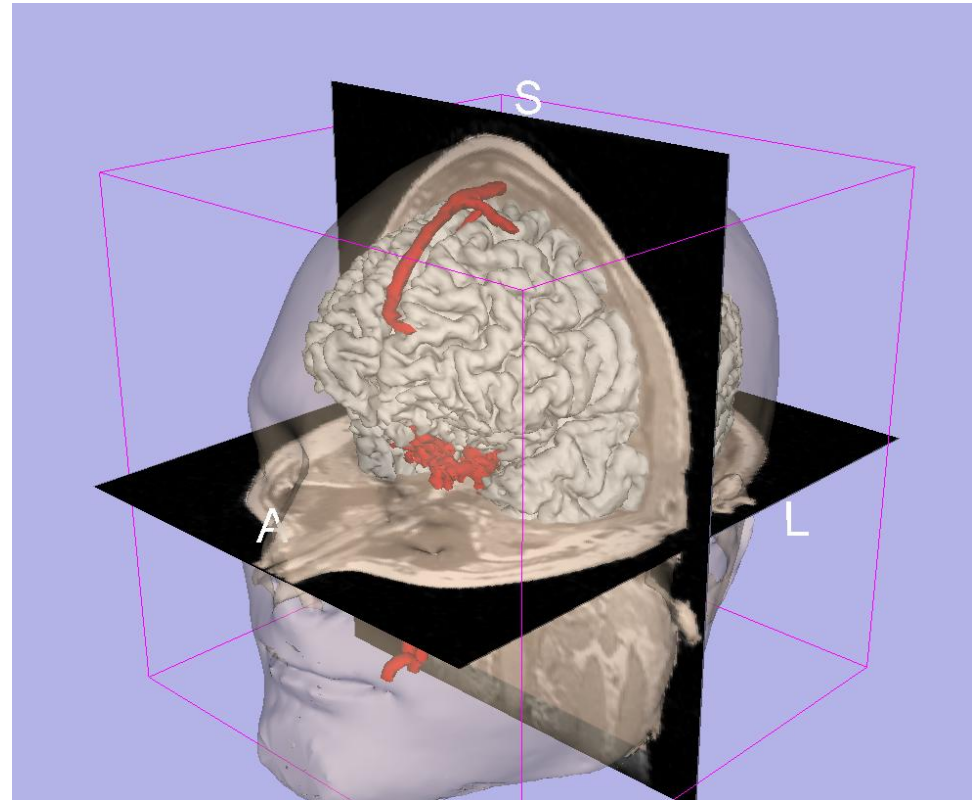
MR Nrrd
SPGR



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.





Start Slicer3

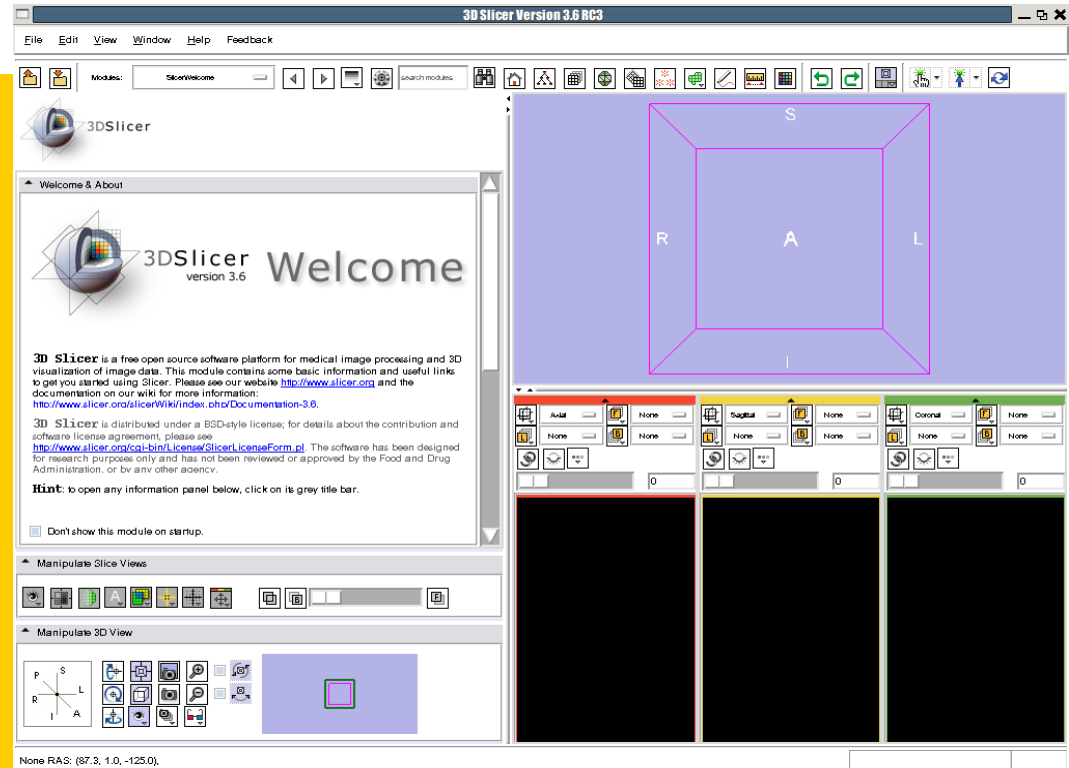
Linux/Mac users
Launch the Slicer3
executable located in
the Slicer3.6 directory

Windows users

Select

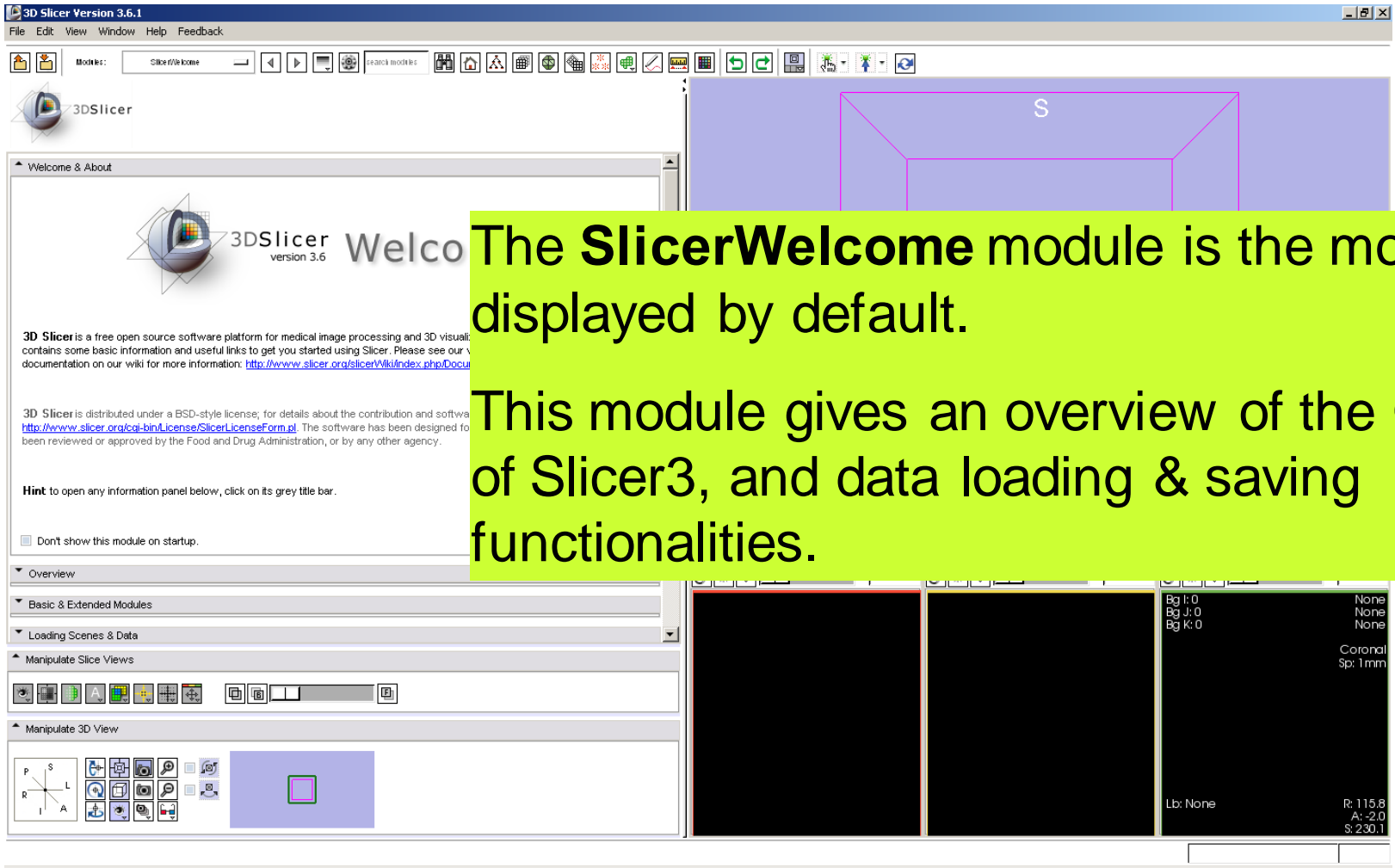
Start → All Programs

→ Slicer3-3.6-2010-08-23 → Slicer3





Slicer Welcome



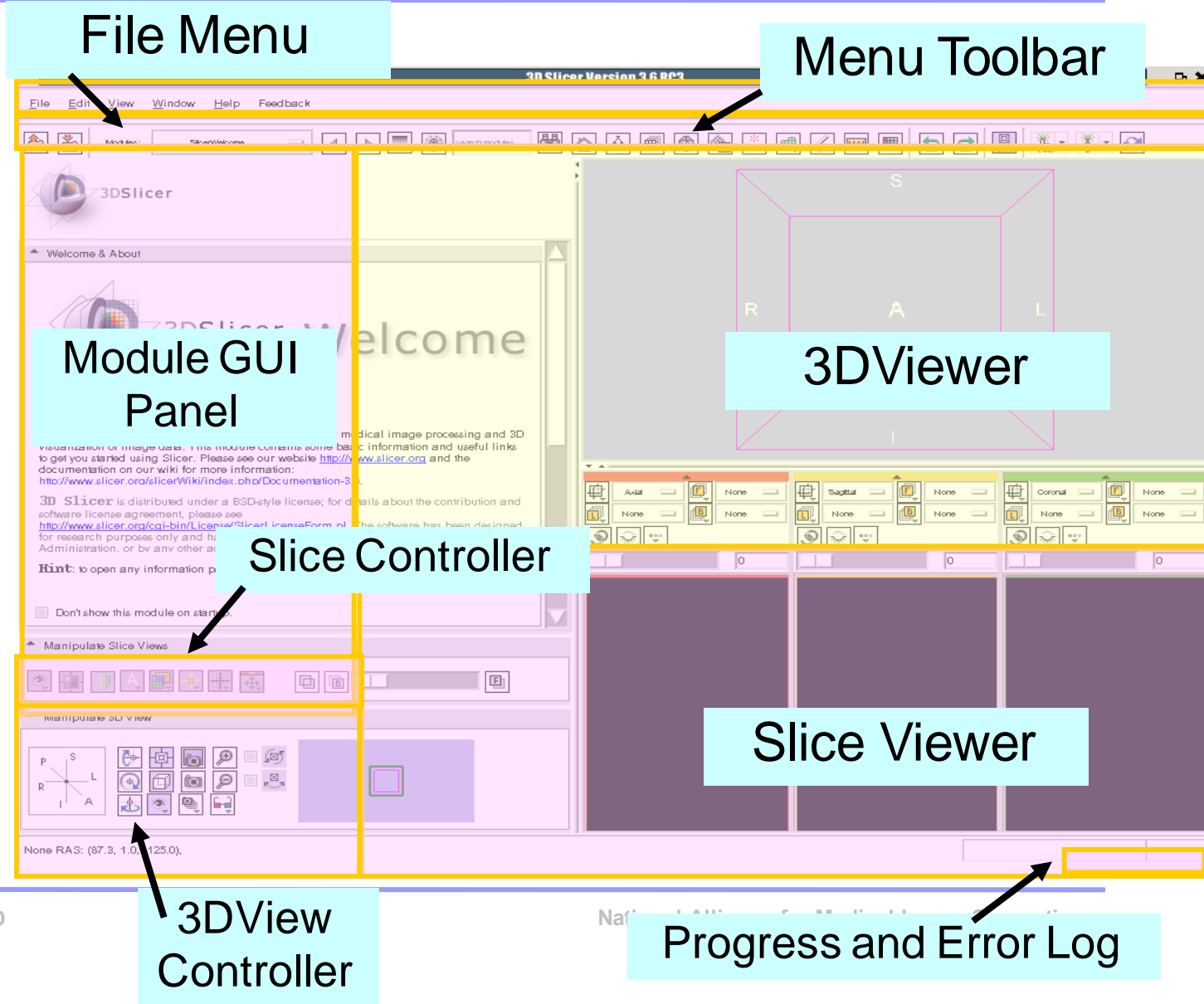
The **SlicerWelcome** module is the module displayed by default.

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

Slicer3 GUI

The Graphical User Interface (GUI) of Slicer3.6 integrates 8 main components:

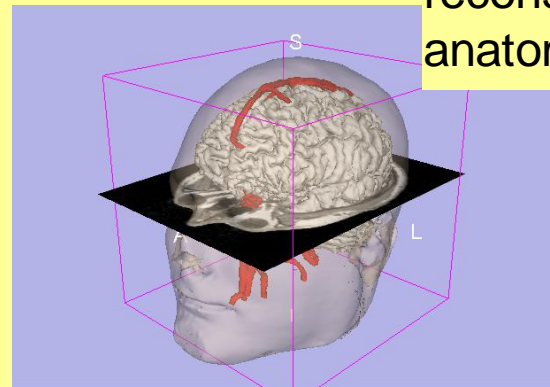
- the File Menu
- the Menu Toolbar
- the Module GUI Panel
- the 3D Viewer
- the Slice Viewer
- the Slice Controller
- the 3D View Controller



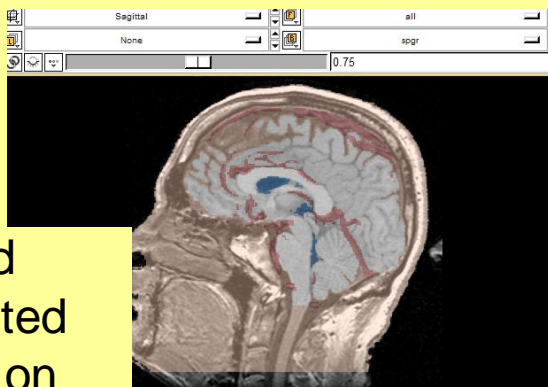
Part 1. Loading and visualizing multiple volumes simultaneously



Part 3. Visualizing 3D reconstructions of anatomical surfaces



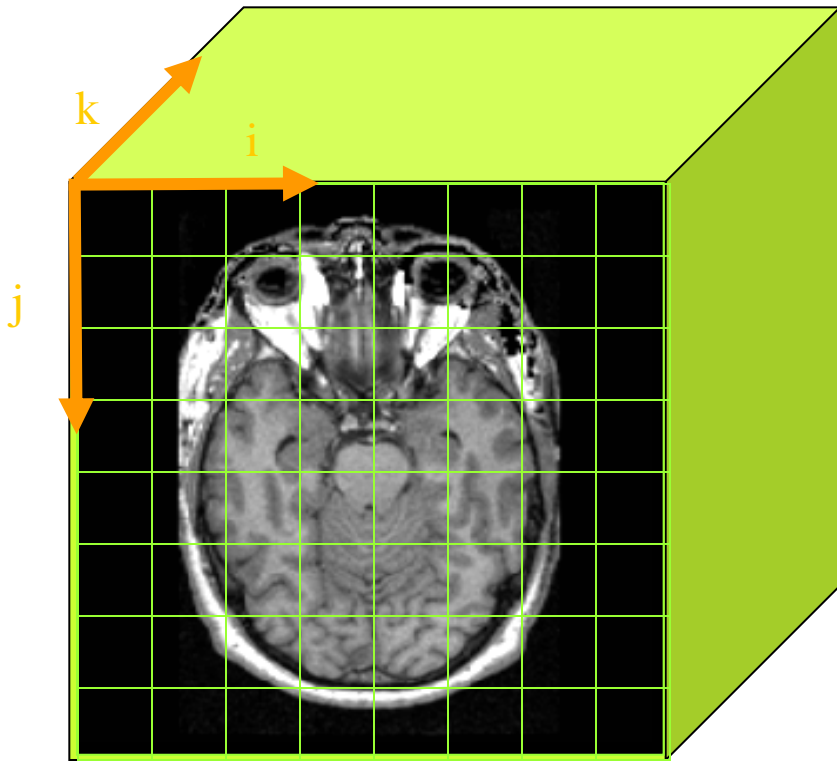
Part 2. Loading and visualizing segmented structures overlaid on grayscale images



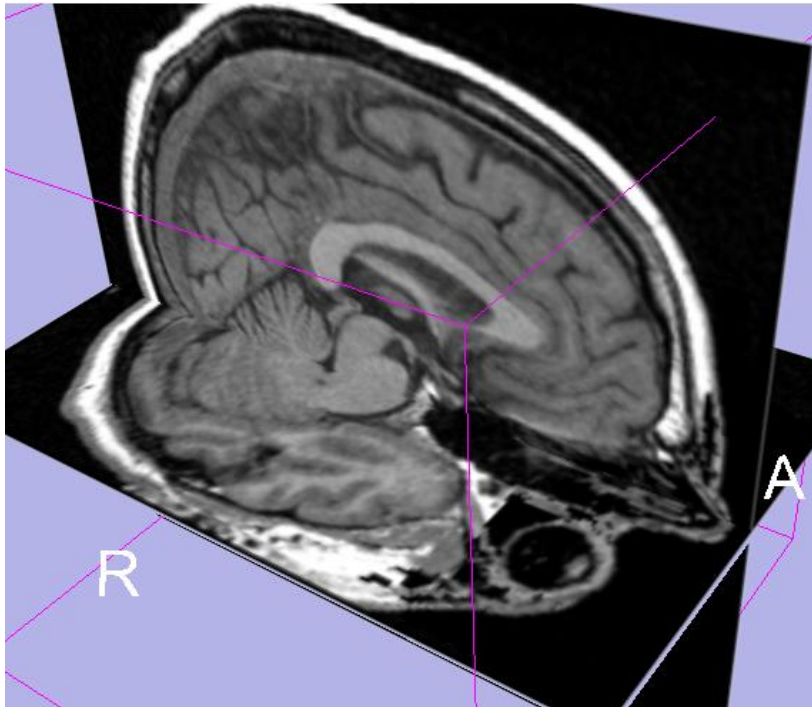
Part 4. The lightbox viewer

Part 5. Saving data

Data Representation

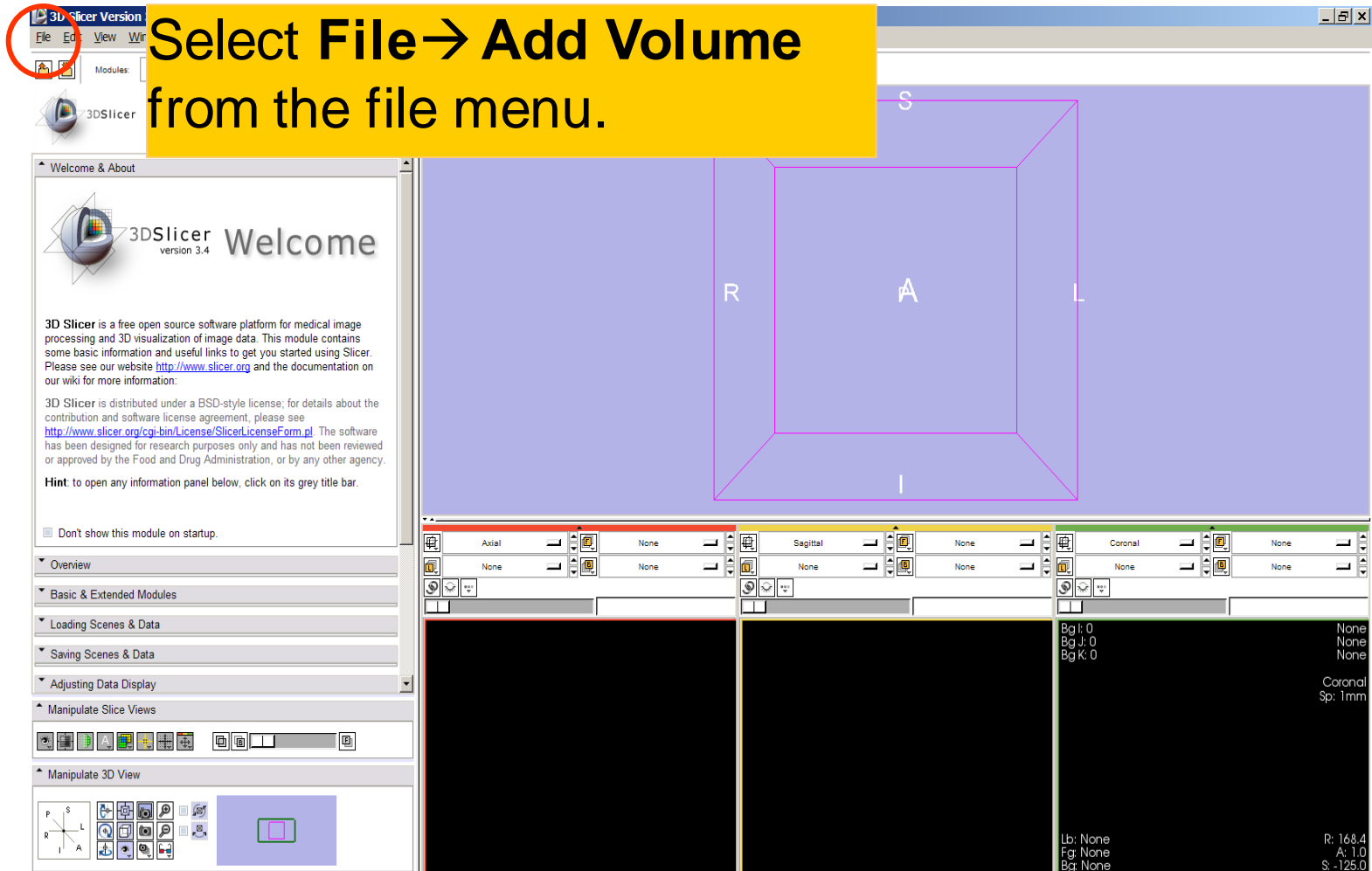


- The result of a volumetric acquisition is a **3D volume of data** related to the patient.
- The 3D raster dataset is sampled on a discrete grid with elements called **voxels** which contain the **signal intensity**.



Part 1: Loading and visualizing multiple volumes simultaneously

Loading Volumes

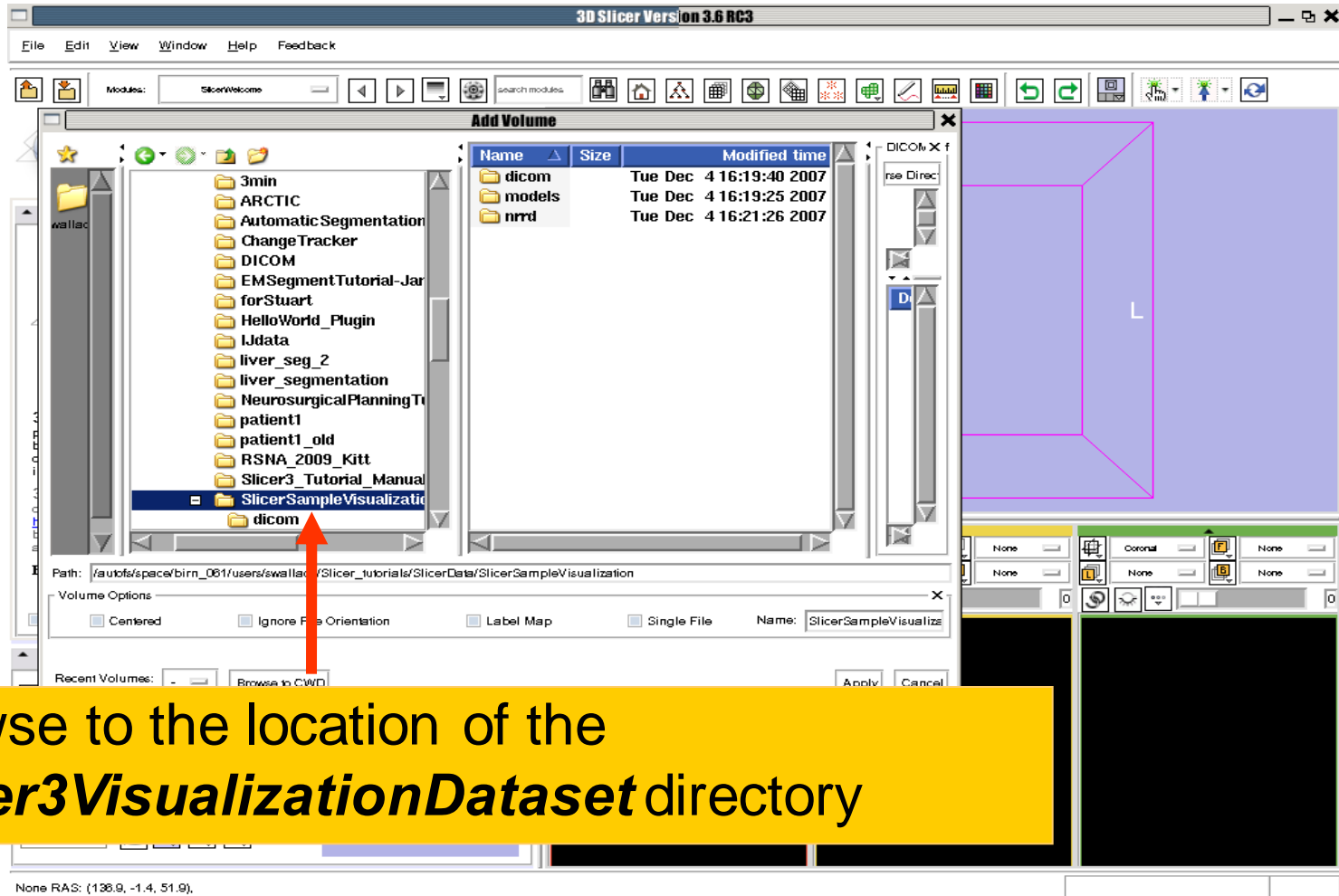


Select File → Add Volume
from the file menu.

The screenshot shows the 3DSlicer software interface. A yellow callout box highlights the 'File' menu and the 'Add Volume' option. The main window displays a 3D view of a volume with a purple bounding box and axes labeled R (Right), L (Left), A (Anterior), and P (Posterior). The interface includes a 'Welcome & About' panel on the left, a 'Modules' list, and a 'Manipulate 3D View' section. The bottom right corner shows a status bar with the following information:

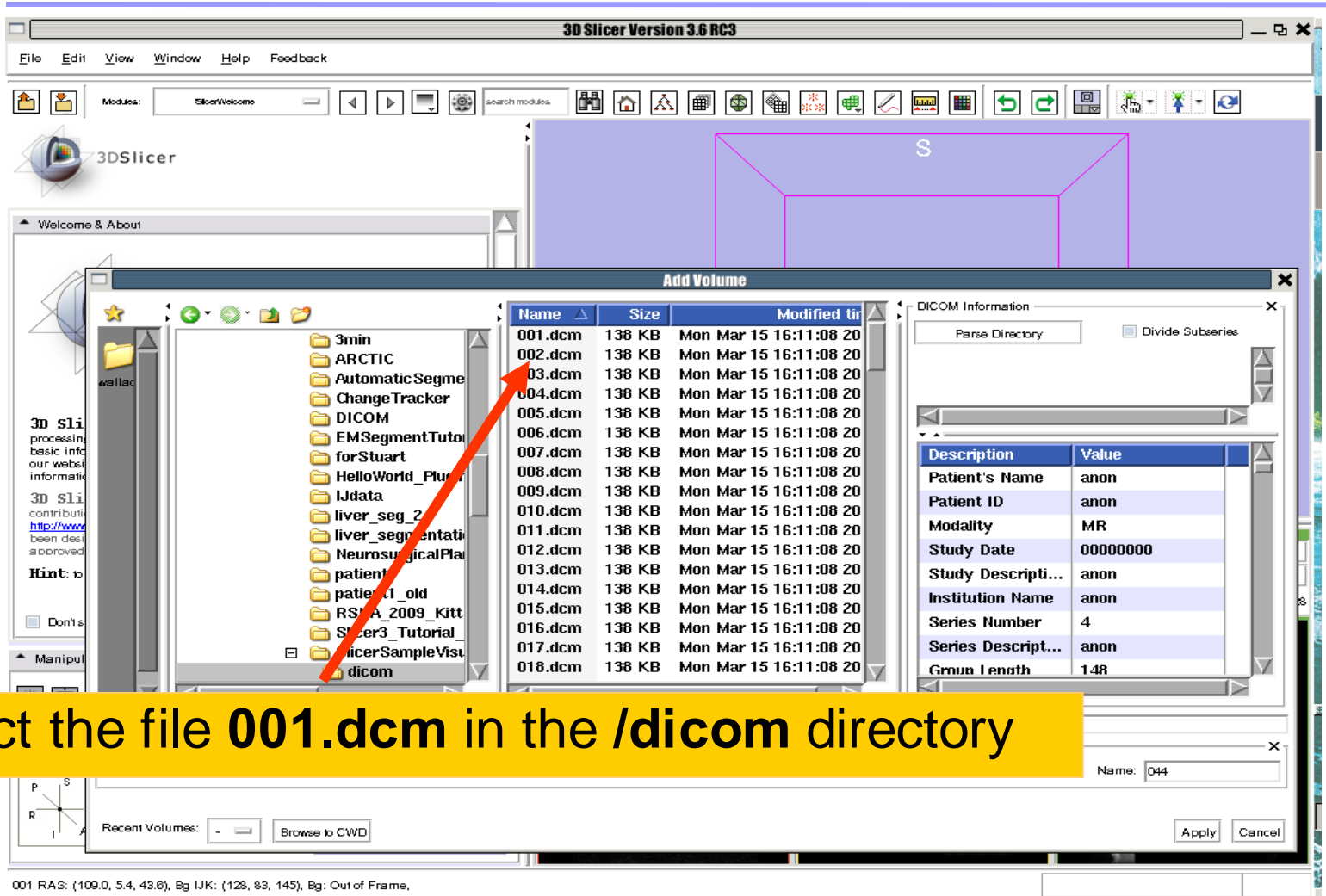
| | |
|-----------------|-----------|
| Bg I: 0 | None |
| Bg J: 0 | None |
| Bg K: 0 | None |
| Coronal Sp: 1mm | |
| Lb: None | R: 168.4 |
| Fg: None | A: 1.0 |
| Bg: None | S: -125.0 |

Loading Volumes



Browse to the location of the ***Slicer3VisualizationDataset*** directory

Loading Volumes



Add Volume

| Name | Size | Modified time |
|---------|--------|------------------------|
| 001.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 002.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 003.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 004.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 005.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 006.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 007.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 008.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 009.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 010.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 011.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 012.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 013.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 014.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 015.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 016.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 017.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 018.dcm | 138 KB | Mon Mar 15 16:11:08 20 |

DICOM Information

Parse Directory Divide Subseries

| Description | Value |
|--------------------|----------|
| Patient's Name | anon |
| Patient ID | anon |
| Modality | MR |
| Study Date | 00000000 |
| Study Descripti... | anon |
| Institution Name | anon |
| Series Number | 4 |
| Series Descript... | anon |
| Group Length | 148 |

Name: 044

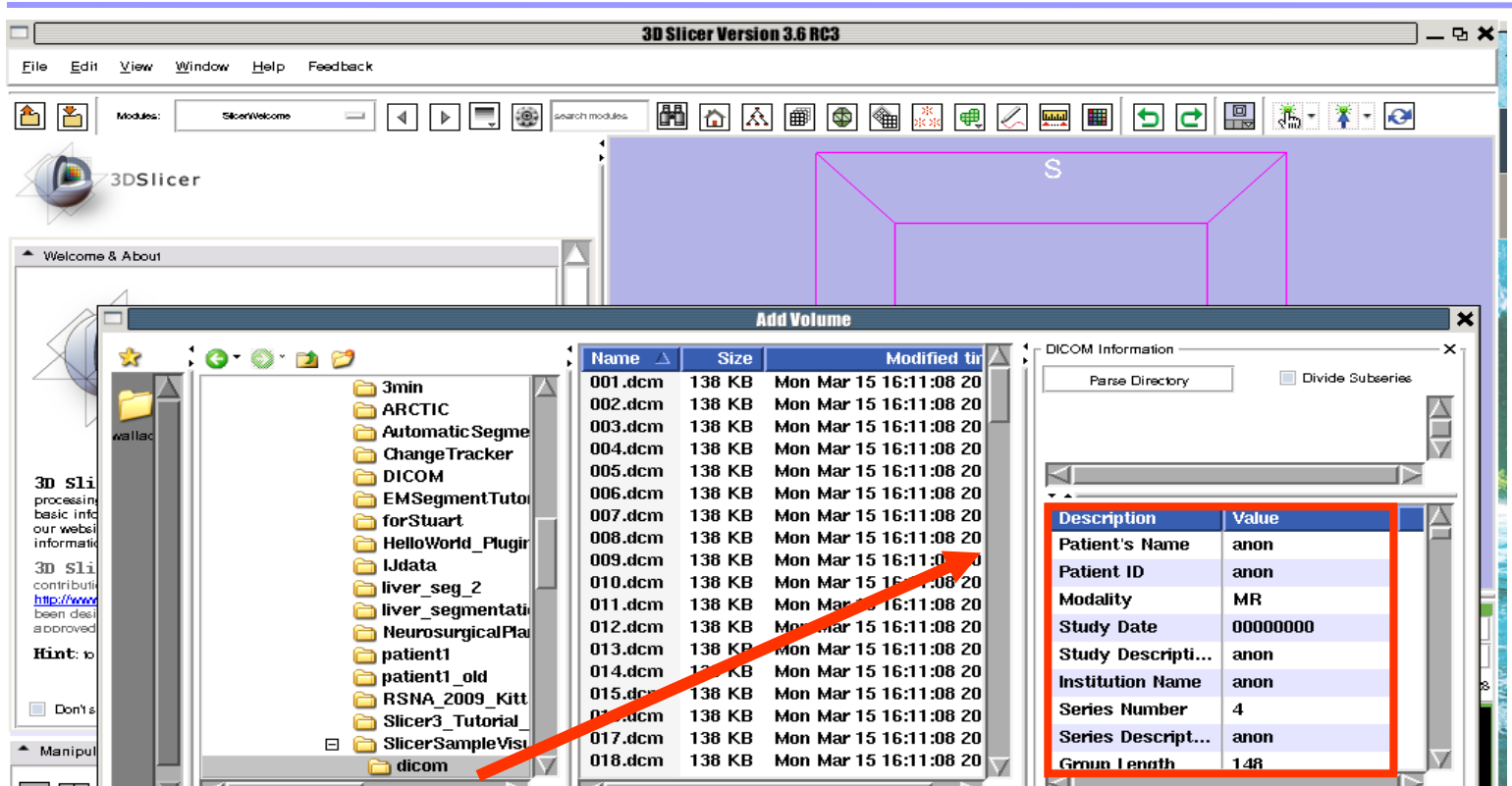
Apply Cancel

Recent Volumes: - Browse to CWD

001 RAS: (109.0, 5.4, 43.8), Bg LJK: (128, 83, 145), Bg: Out of Frame.

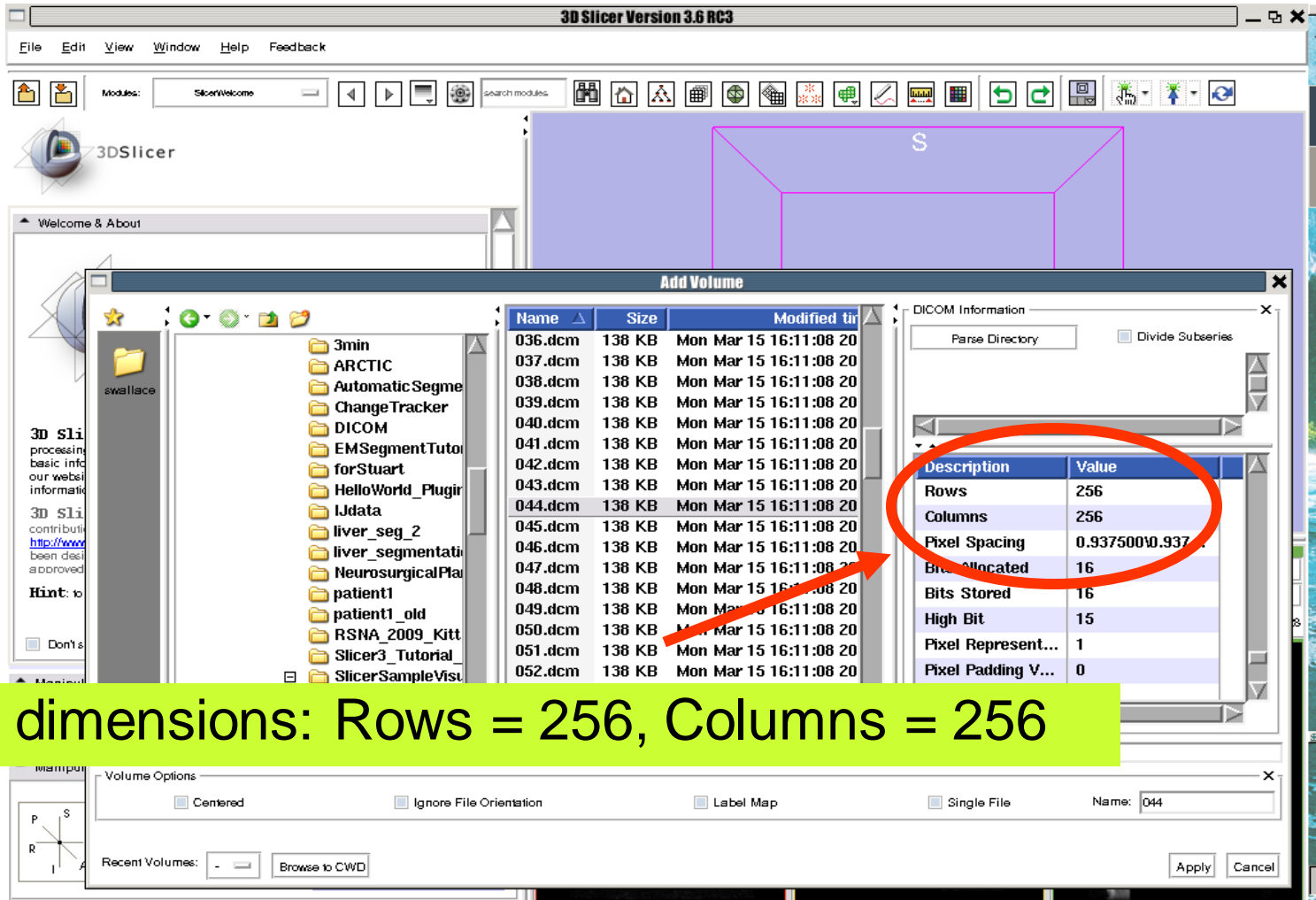
Select the file **001.dcm** in the **/dicom** directory

Loading Volumes



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 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

Welcome & About

Add Volume

| Name | Size | Modified time |
|---------|--------|------------------------|
| 036.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 037.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 038.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 039.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 040.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 041.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 042.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 043.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 044.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 045.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 046.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 047.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 048.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 049.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 050.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 051.dcm | 138 KB | Mon Mar 15 16:11:08 20 |
| 052.dcm | 138 KB | Mon Mar 15 16:11:08 20 |

DICOM Information

Parse Directory Divide Subseries

| Description | Value |
|--------------------|-------------------|
| Rows | 256 |
| Columns | 256 |
| Pixel Spacing | 0.937500 0.937500 |
| Bits Allocated | 16 |
| Bits Stored | 16 |
| High Bit | 15 |
| Pixel Represent... | 1 |
| Pixel Padding V... | 0 |

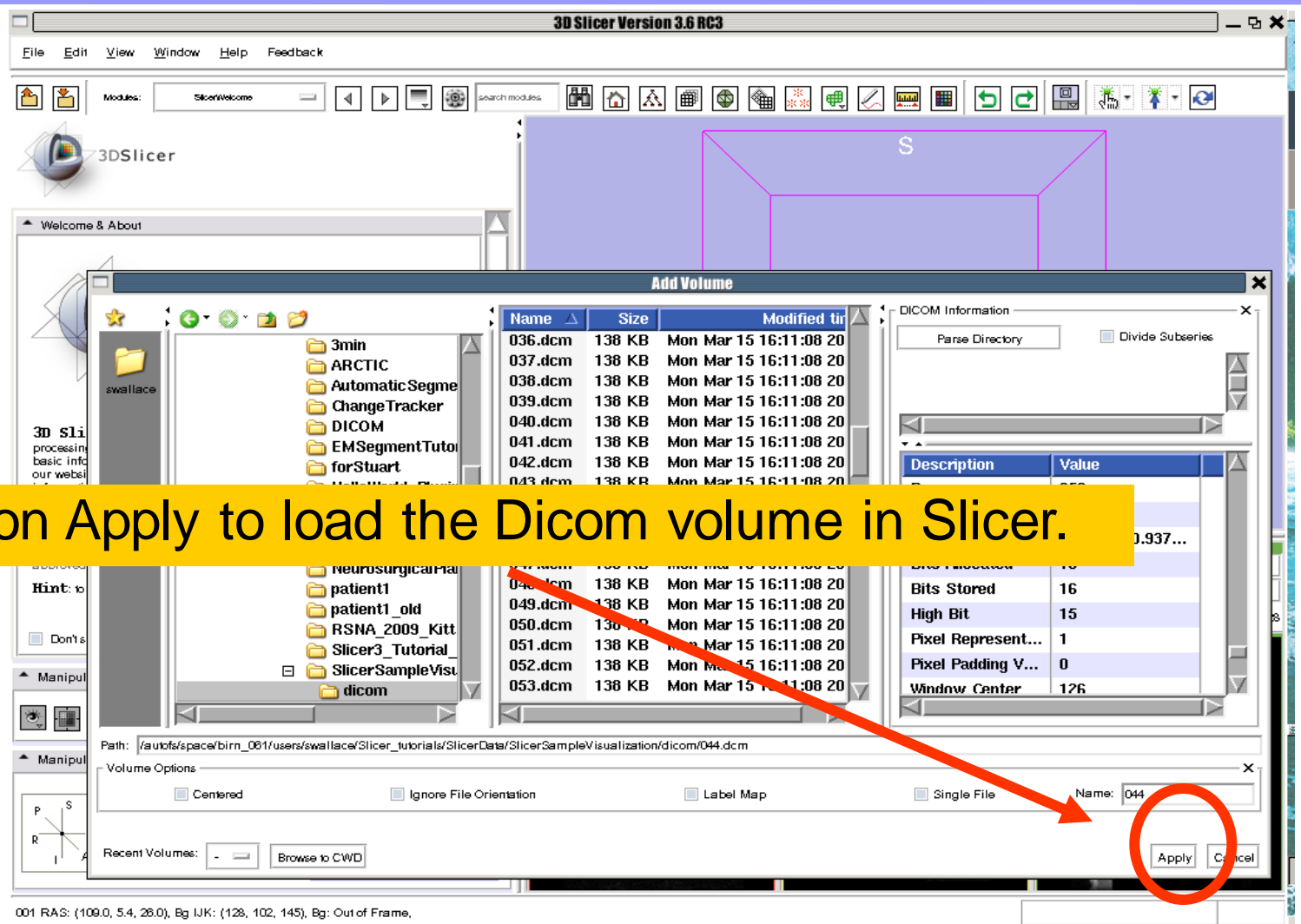
Volume Options

Centered Ignore File Orientation Label Map Single File Name: 044

Recent Volumes:

Image dimensions: Rows = 256, Columns = 256

Loading Volumes



The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The 'Add Volume' dialog box is open, displaying a file list and DICOM information. A yellow banner with the text 'Click on Apply to load the Dicom volume in Slicer.' is overlaid on the dialog. A red arrow points from the banner to the 'Apply' button, which is circled in red.

| Name | Size | Modified | Time |
|---------|--------|------------------------|------|
| 036.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 037.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 038.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 039.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 040.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 041.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 042.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 043.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 044.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 045.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 046.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 047.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 048.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 049.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 050.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 051.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 052.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |
| 053.dcm | 138 KB | Mon Mar 15 16:11:08 20 | |

DICOM Information

Parse Directory Divide Subseries

| Description | Value |
|--------------------|-------|
| Bits Stored | 16 |
| High Bit | 15 |
| Pixel Represent... | 1 |
| Pixel Padding V... | 0 |
| Window Center | 126 |

Path: /autofs/space/birn_081/users/swallace/Slicer_tutorials/SlicerData/SlicerSampleVisualization/dicom/044.dcm

Volume Options


Centered Ignore File Orientation Label Map Single File

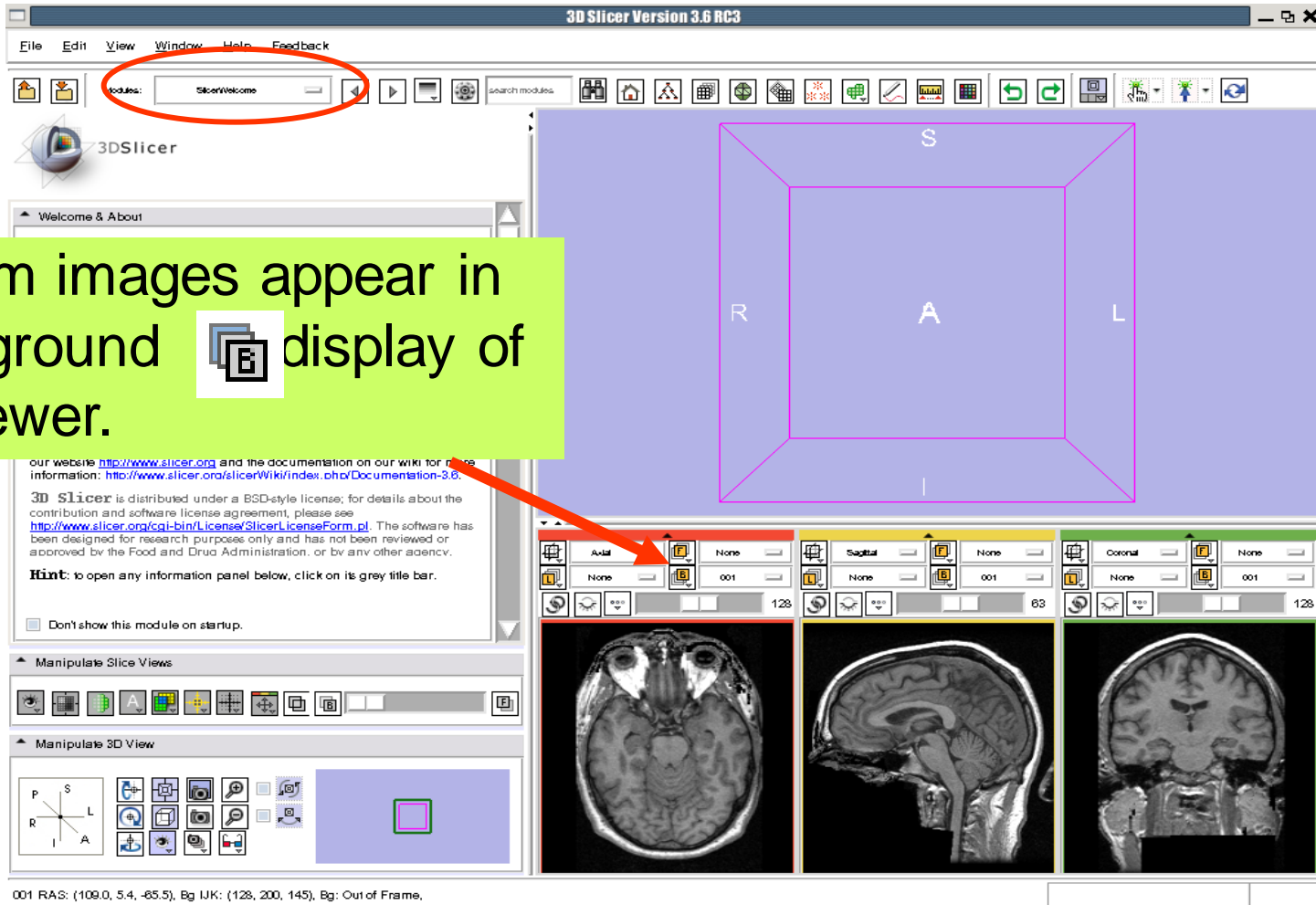
Name: 044

Recent Volumes: - Browse to CWD

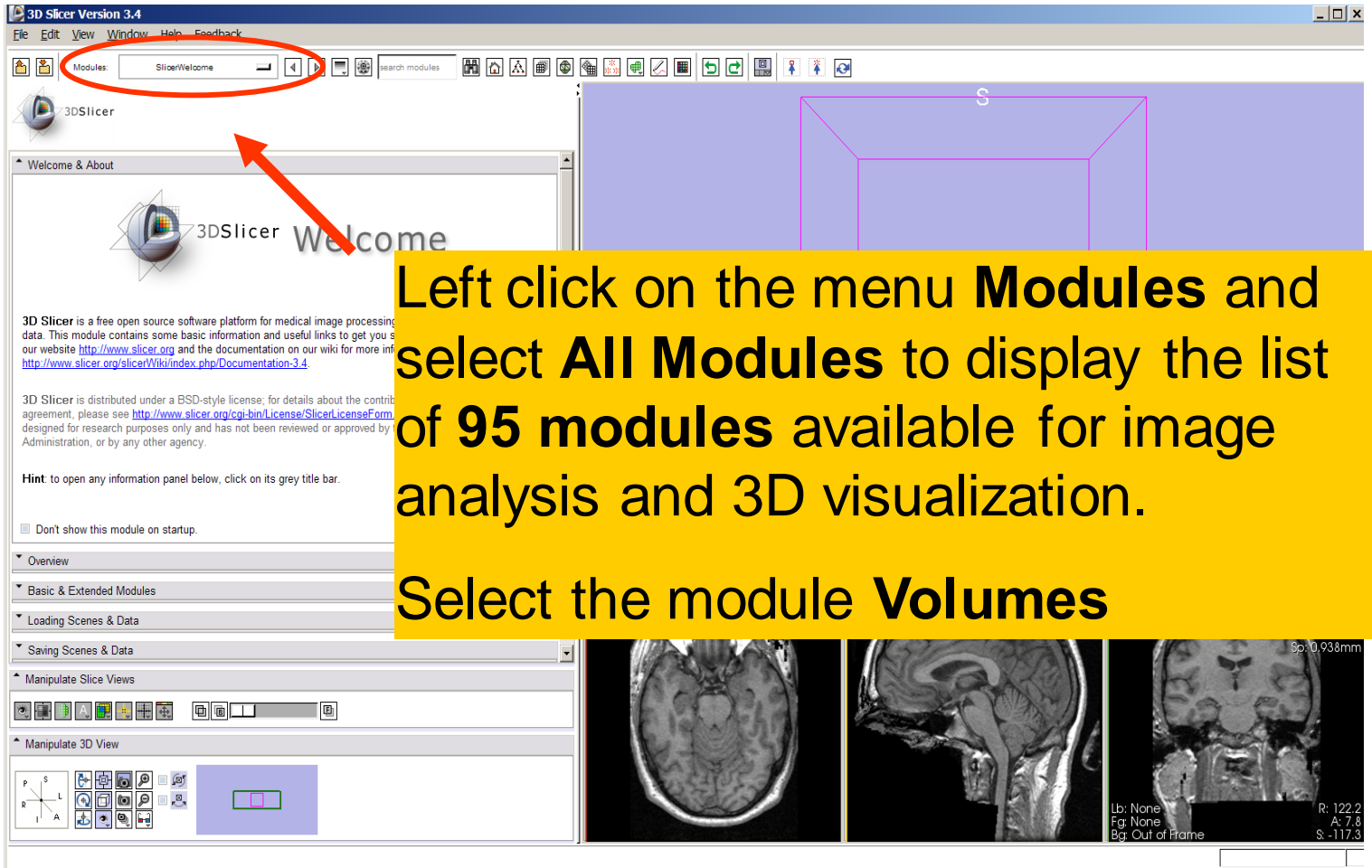
Apply Cancel

Loading Volumes

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



Loading Volumes



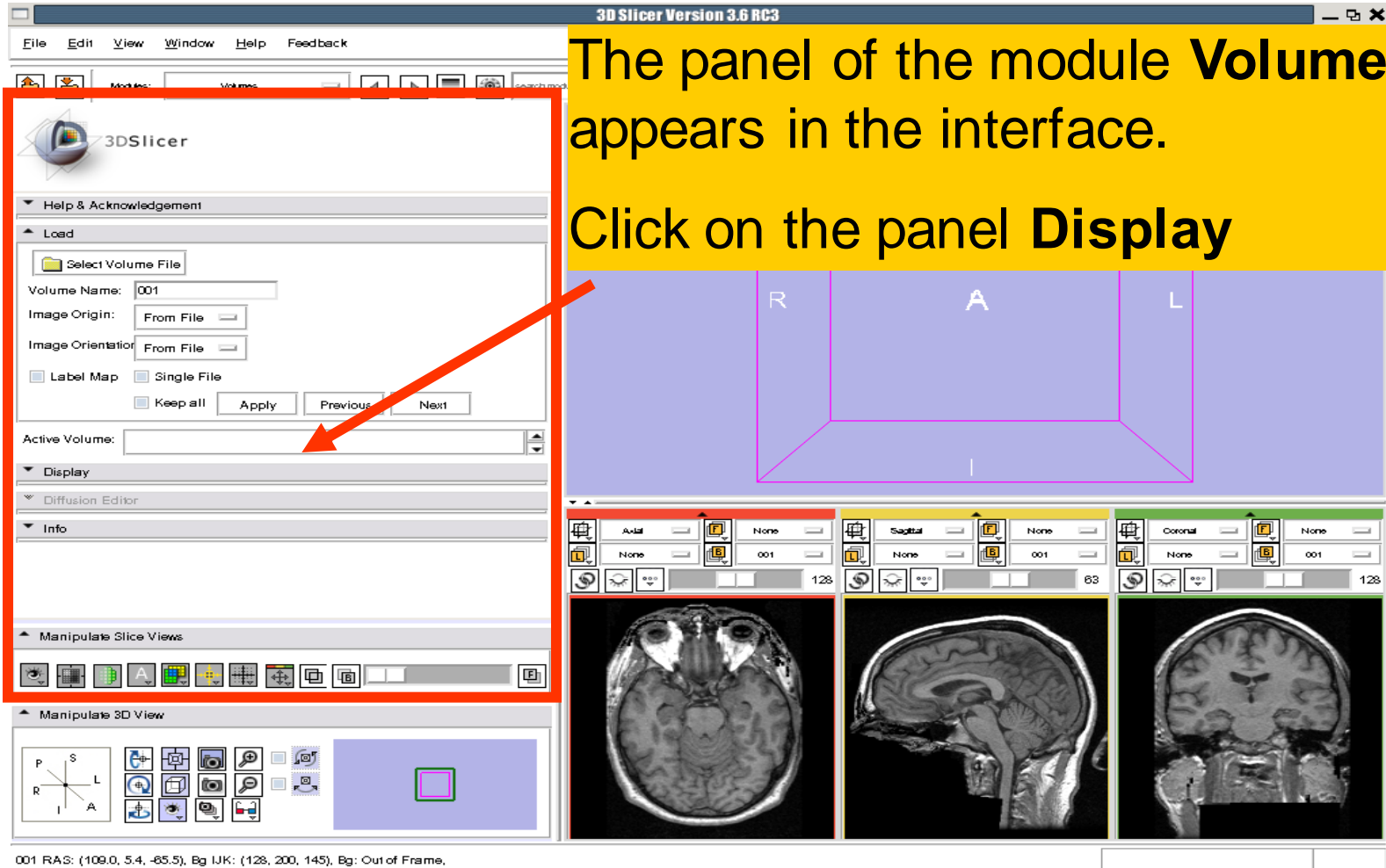
Left click on the menu **Modules** and select **All Modules** to display the list of **95 modules** available for image analysis and 3D visualization.

Select the module **Volumes**

Loading Volumes

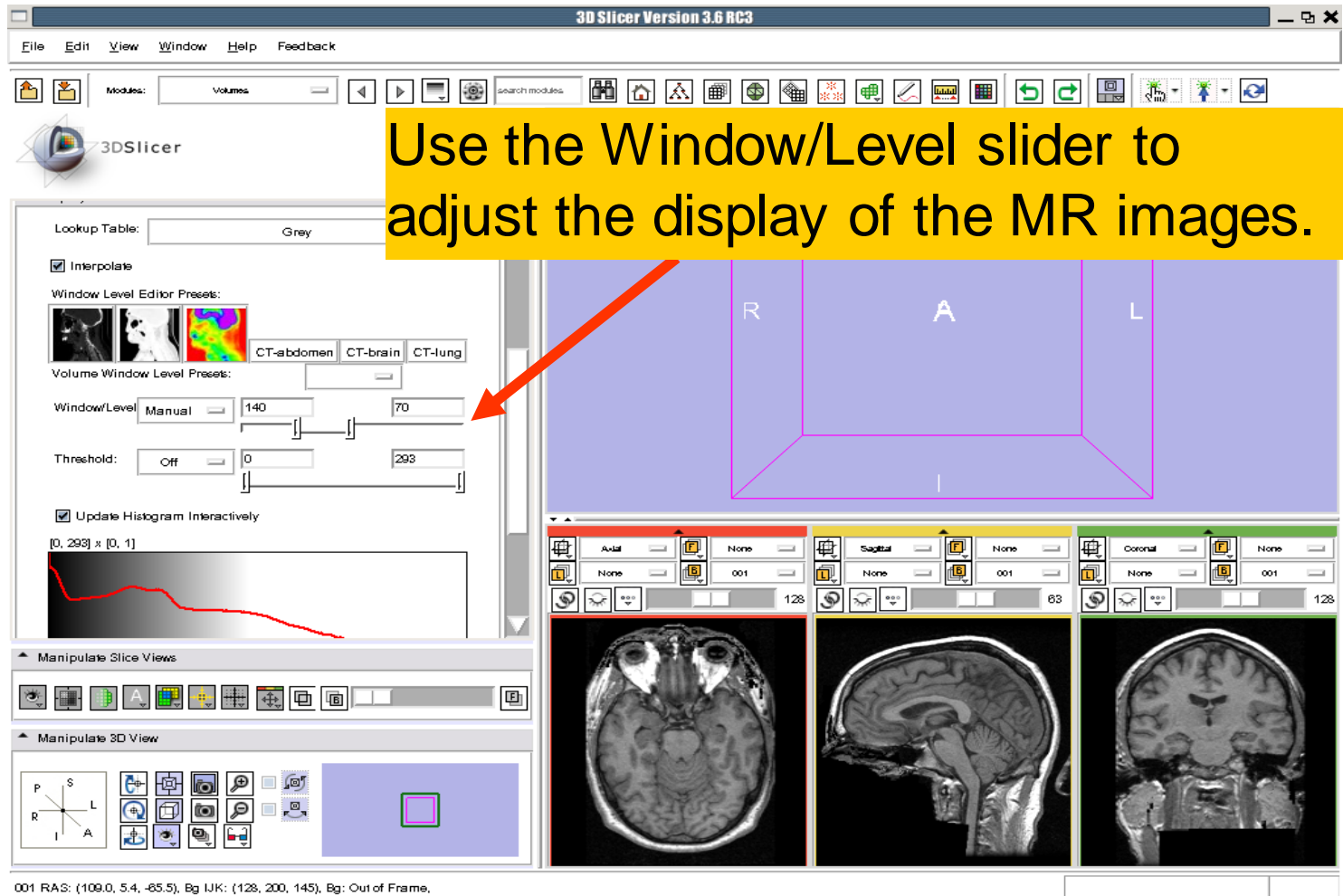
The panel of the module **Volumes** appears in the interface.

Click on the panel **Display**



The screenshot displays the 3D Slicer interface. The 'Volumes' module is active, and its 'Display' panel is highlighted with a red box. A red arrow points from the 'Display' panel to the 'Display' section of the interface. The interface shows the 'Load' section with 'Volume Name: 001' and 'Image Origin: From File'. The 'Display' section is expanded, showing 'Diffusion Editor' and 'Info'. The 'Manipulate Slice Views' section contains icons for 'Axial', 'Sagittal', and 'Coronal' views. The 'Manipulate 3D View' section contains icons for '3D View', '2D View', and '2D View'. The 'Display' section shows three slice views: Axial, Sagittal, and Coronal. The Axial view is selected, and the Sagittal and Coronal views are also visible. The status bar at the bottom shows '001 RAS: (109.0, 5.4, -65.5), Bg IJK: (128, 200, 145), Bg: Out of Frame'.

Loading Volumes



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Volumes

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

Lookup Table: Grey

Interpolate

Window Level Editor Presets:

Volume Window Level Presets:

Window/Level: Manual 140 70

Threshold: Off 0 293

Update Histogram Interactively

[0, 293] x [0, 1]

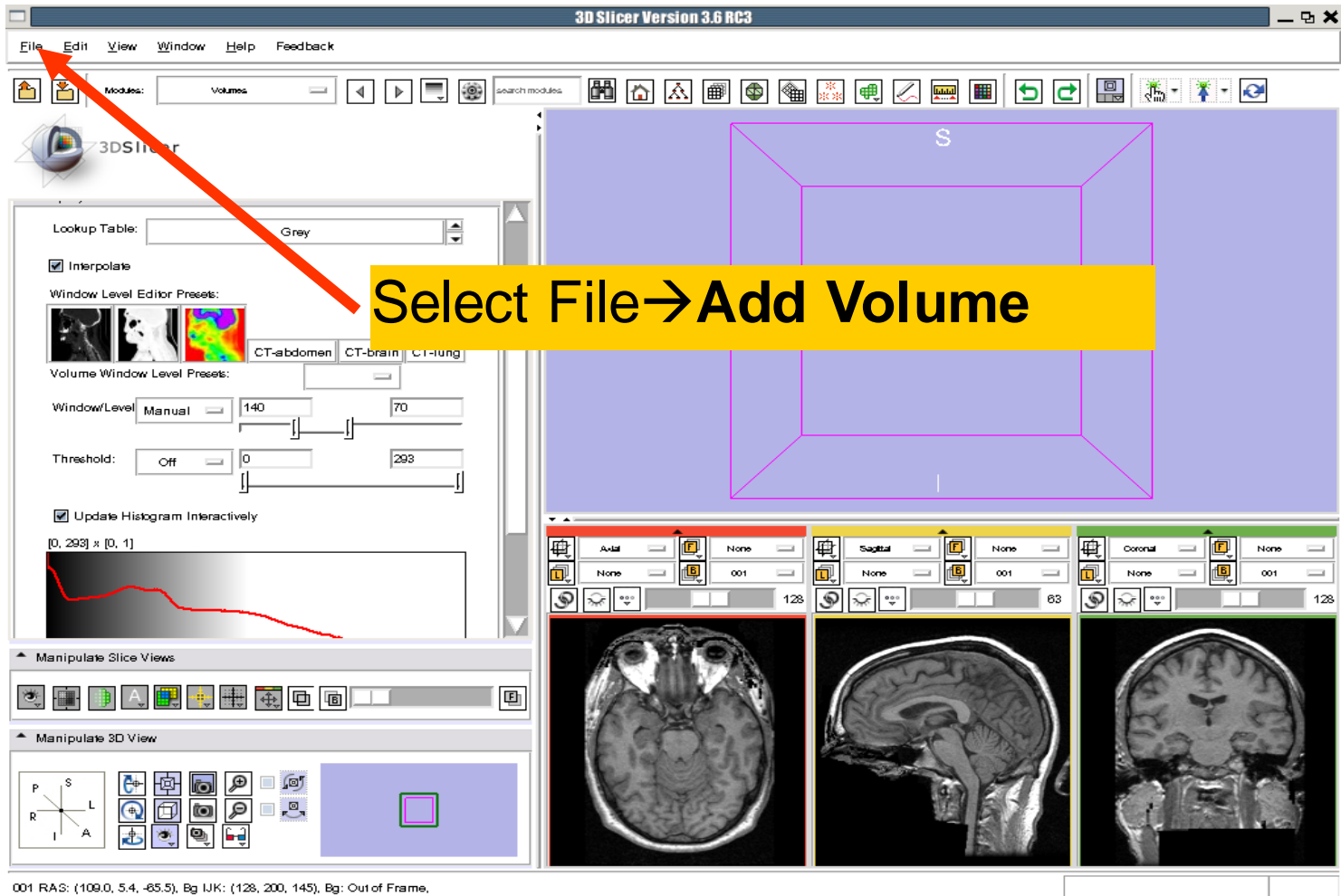
Manipulate Slice Views

Manipulate 3D View

001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

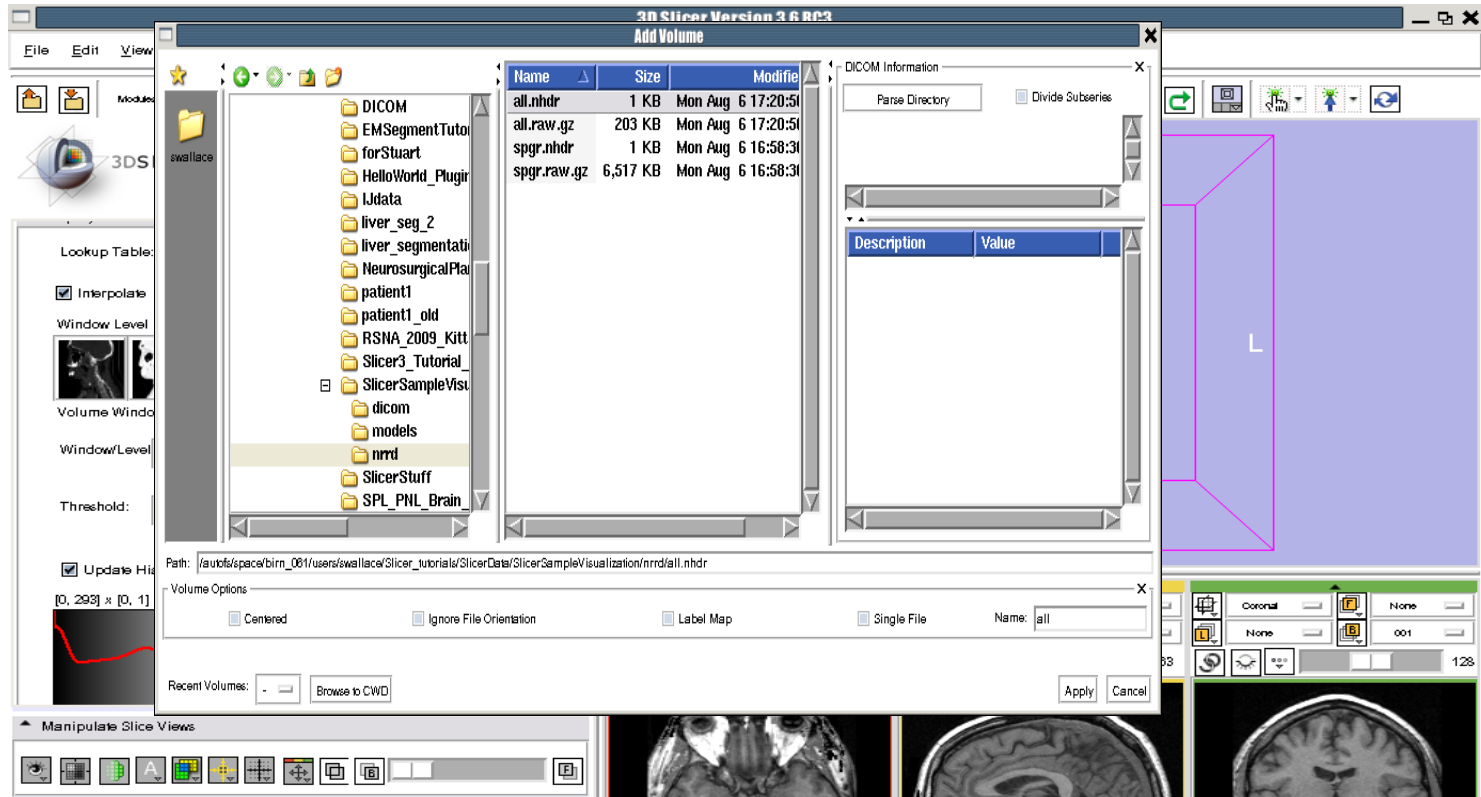
The screenshot displays the 3D Slicer interface. A yellow callout box with a red arrow points to the 'Window/Level' slider in the 'Volume Window Level Presets' section. The slider is set to 'Manual' with a window width of 140 and a level of 70. Below the slider is a histogram showing the intensity distribution of the MR image. The main 3D view shows three orthogonal slice views: Axial, Sagittal, and Coronal. The Axial view is selected, and the slice is labeled '001'. The Sagittal and Coronal views are also labeled '001'. The 3D view shows a brain slice with a purple box indicating the current slice position. The status bar at the bottom shows the coordinates of the current slice: '001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.'

Loading Volumes



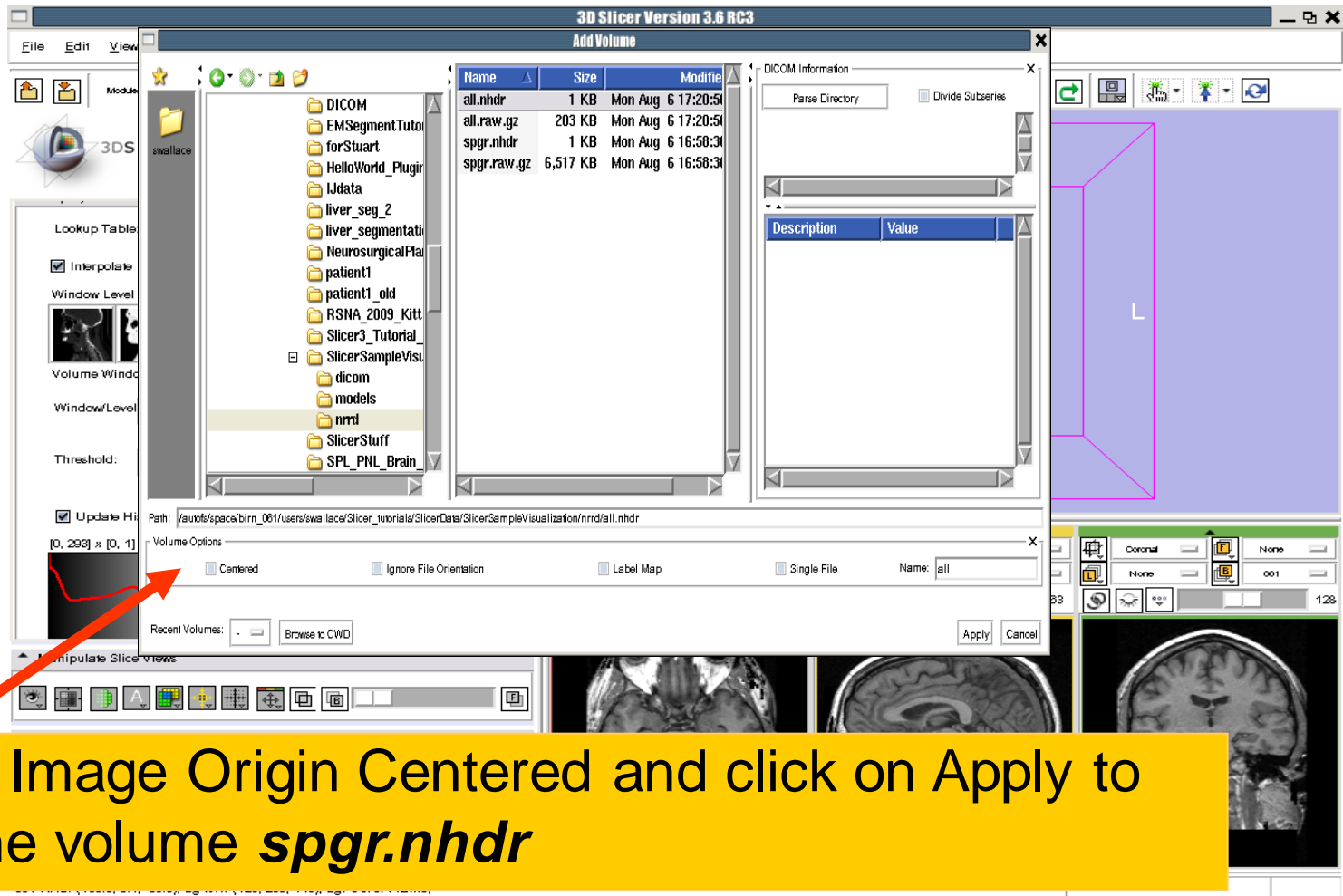
The screenshot displays the 3D Slicer software interface. The title bar reads "3D Slicer Version 3.6 RC3". The menu bar includes "File", "Edit", "View", "Window", "Help", and "Feedback". A red arrow points from the "File" menu to a yellow callout box that says "Select File → Add Volume". The main 3D view area shows a purple volume with a white wireframe box labeled 'S'. Below the 3D view are three slice view panels: Axial, Sagittal, and Coronal. The status bar at the bottom shows coordinates: "001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame."

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



3D Slicer Version 3.6 RC3

Add Volume

| Name | Size | Modified |
|-------------|----------|--------------------|
| all.nhdr | 1 KB | Mon Aug 6 17:20:51 |
| all.raw.gz | 203 KB | Mon Aug 6 17:20:51 |
| spgr.nhdr | 1 KB | Mon Aug 6 16:58:31 |
| spgr.raw.gz | 6,517 KB | Mon Aug 6 16:58:31 |

Path: /autofs/pace/birn_081/users/swallace/Slicer_tutorials/SlicerData/SlicerSampleVisualization/nrrd/all.nhdr

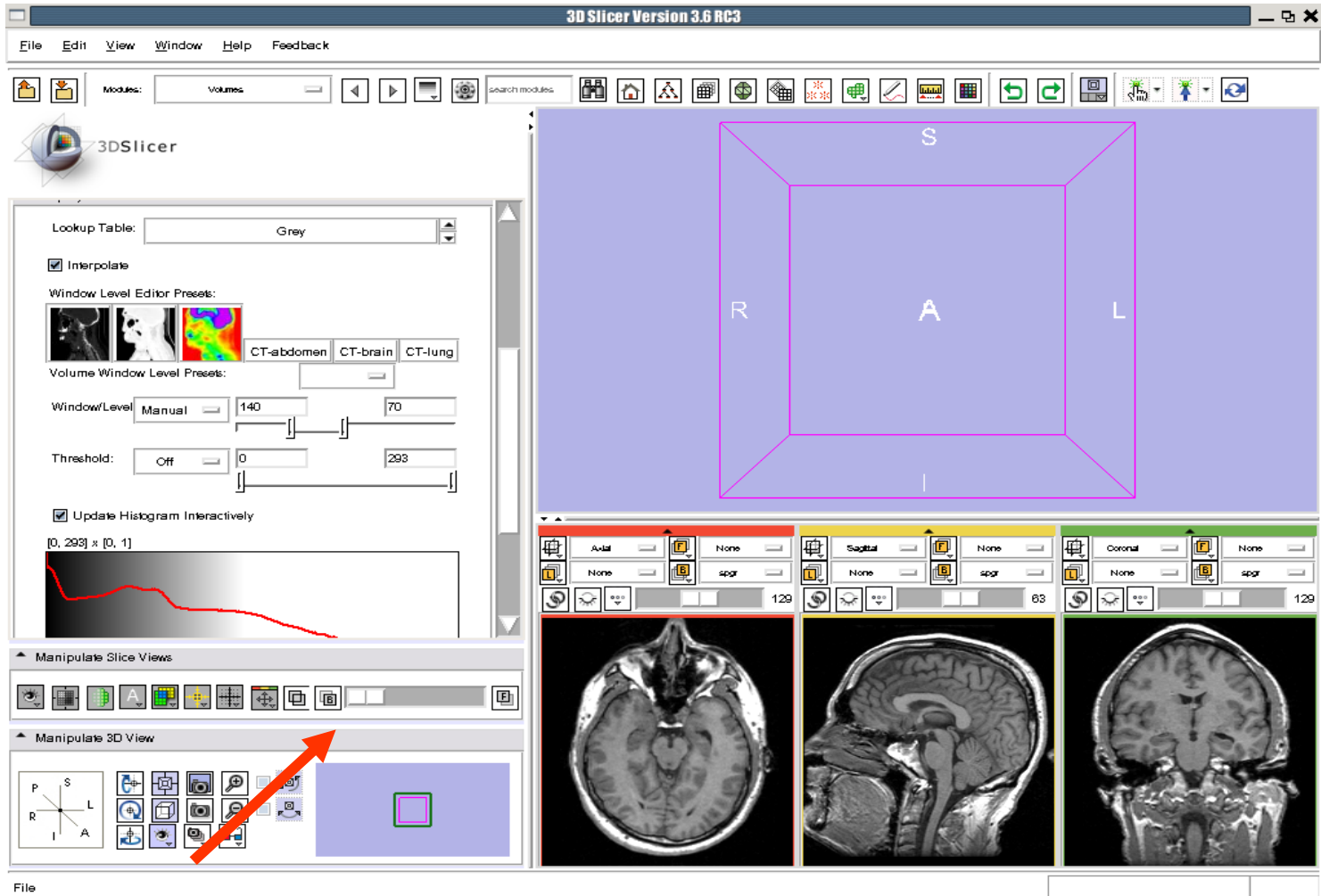
Volume Options

Centered Ignore File Orientation Label Map Single File Name: all

Recent Volumes: - Browse to CWD Apply Cancel

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

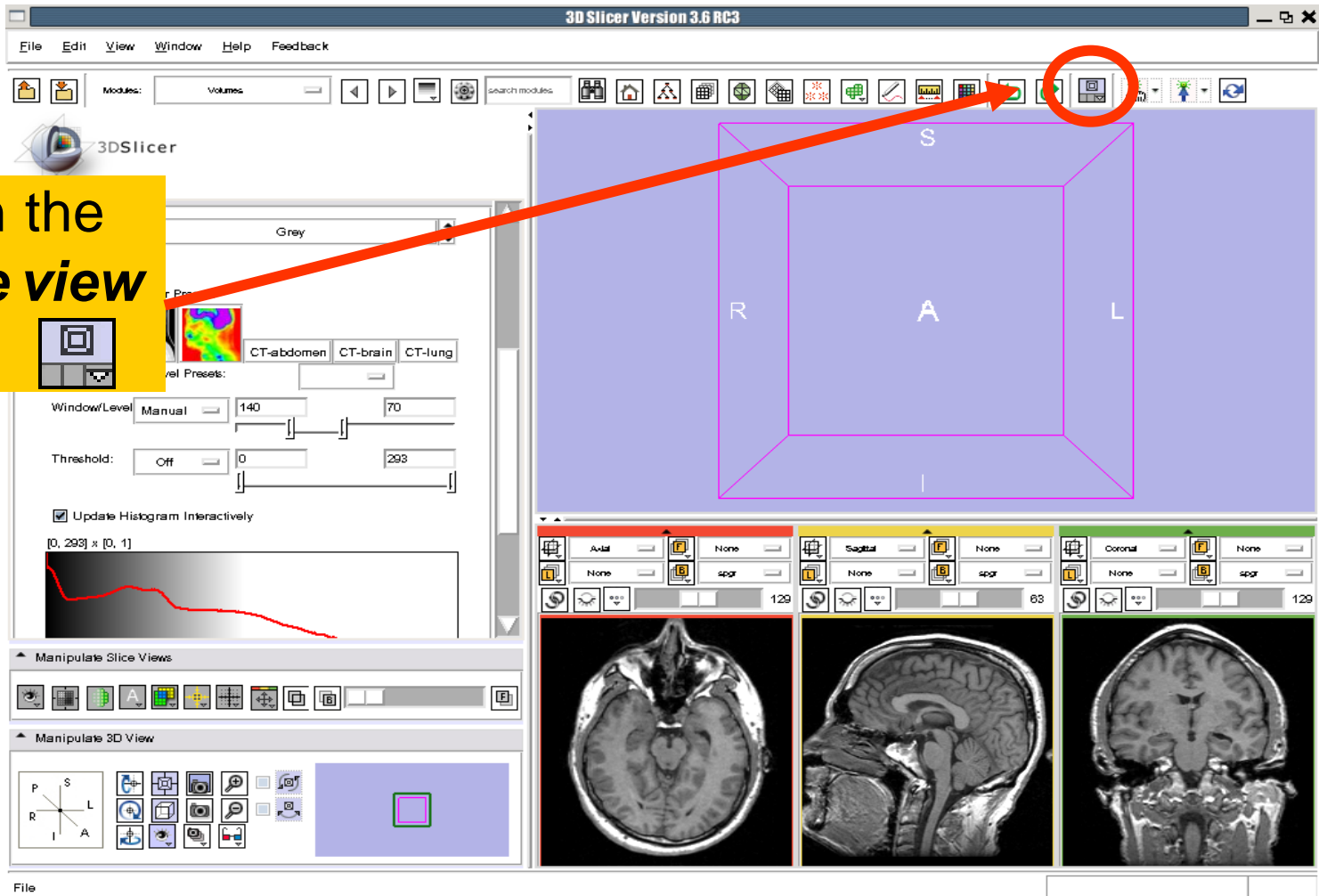
Loading Volumes



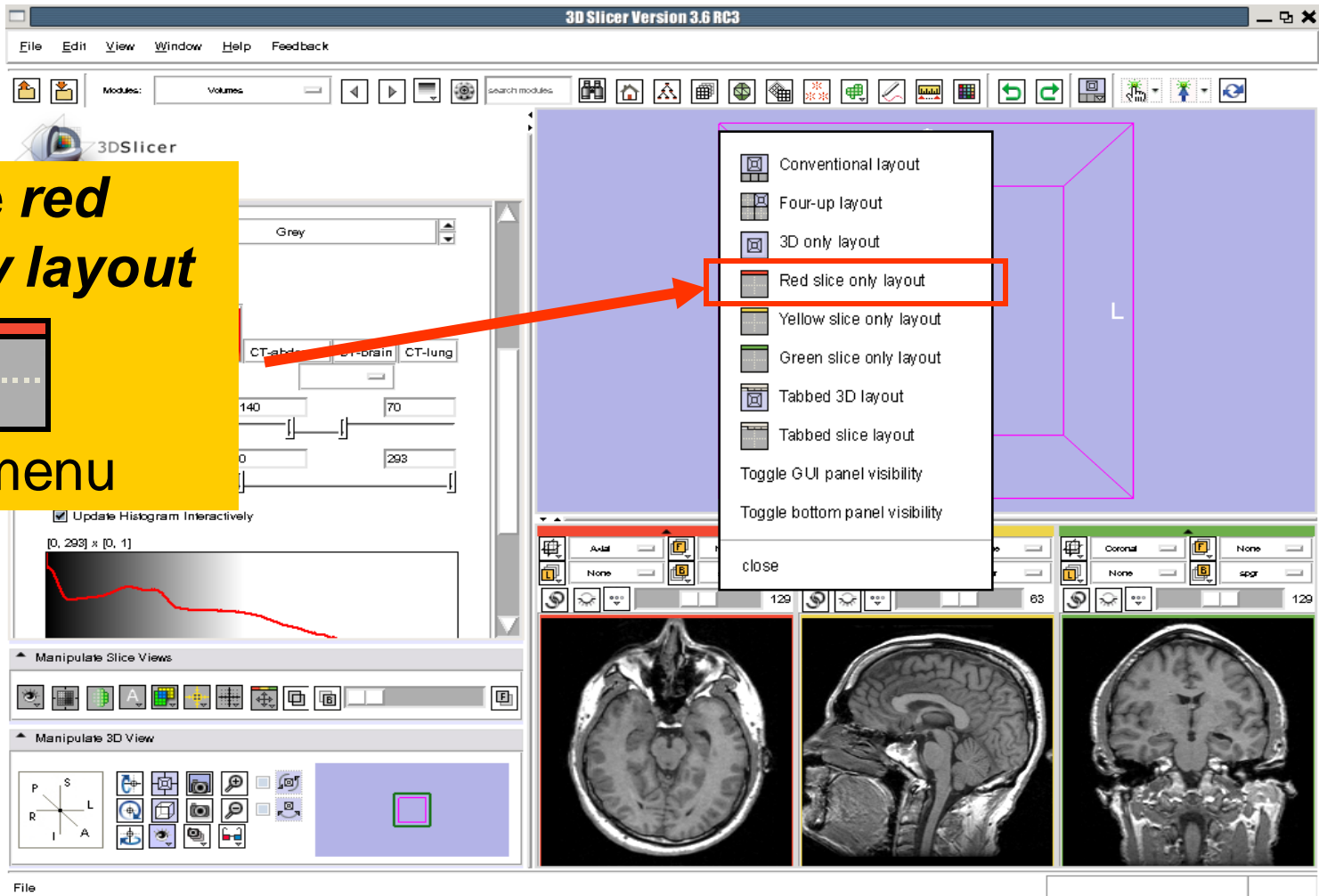
The spgr volume appears in the Background display of the 2D Viewer.

Exploring the data

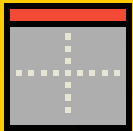
Click on the **choose view** icon



Exploring the data



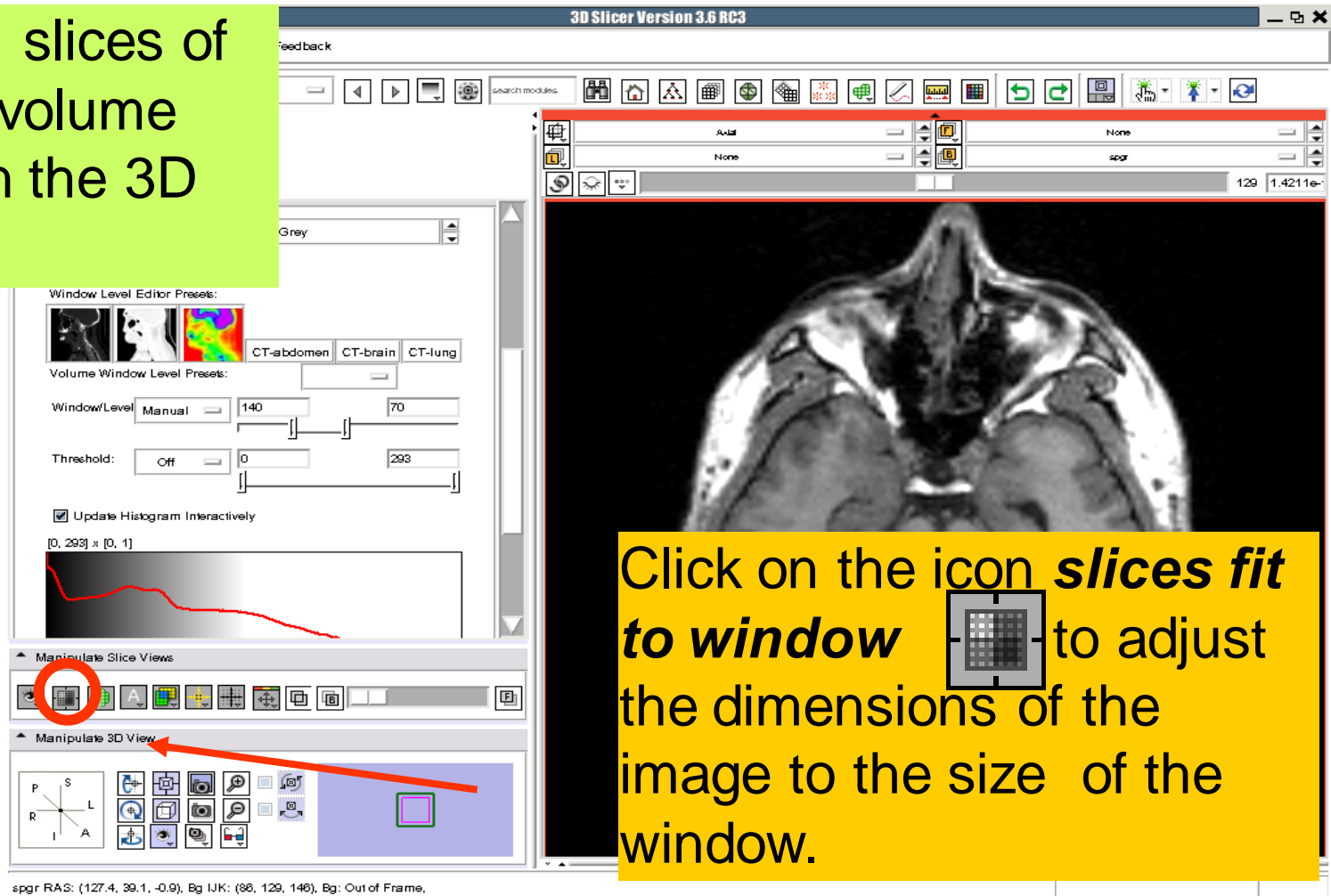
Select the *red slice only layout*



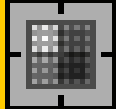
from the menu

Exploring the data

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




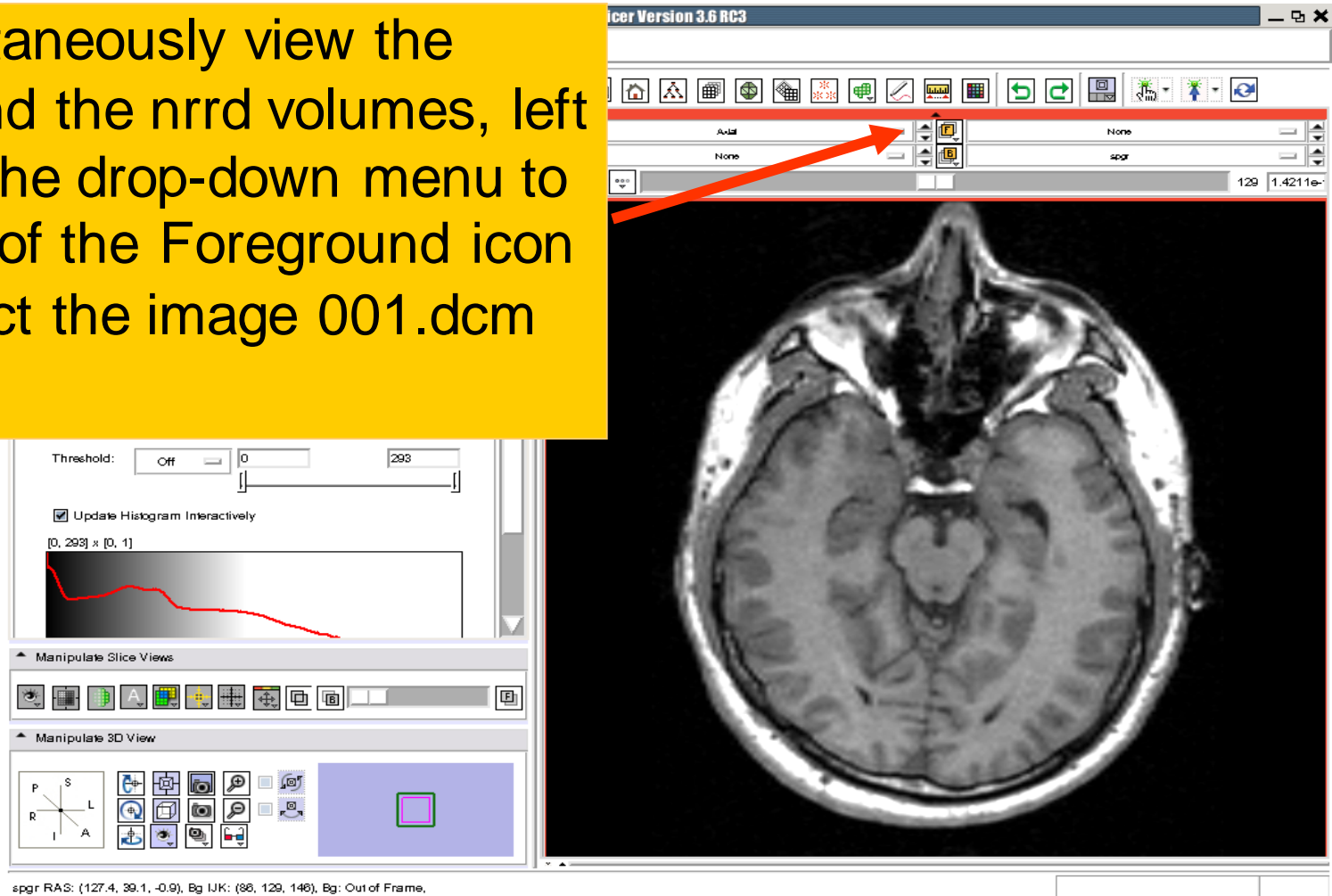
The screenshot shows the 3D Slicer interface. On the left, the 'Window Level Editor' is open, displaying 'Window Level Presets' (CT-abdomen, CT-brain, CT-lung), 'Volume Window Level Presets', and a 'Window/Level' slider set to 140/70. Below this is a histogram for the 'spgr' volume. In the bottom-left 'Manipulate Slice Views' panel, the 'Slices Fit to Window' icon (a grid) is circled in red, with a red arrow pointing to the 3D viewer. The 3D viewer on the right shows an axial MRI slice of a head. A yellow callout box is overlaid on the 3D viewer with the following text:

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

At the bottom of the interface, the status bar reads: spgr RAS: (127.4, 39.1, -0.9), Bg IJK: (86, 129, 146), Bg: Out of Frame.



Exploring the data

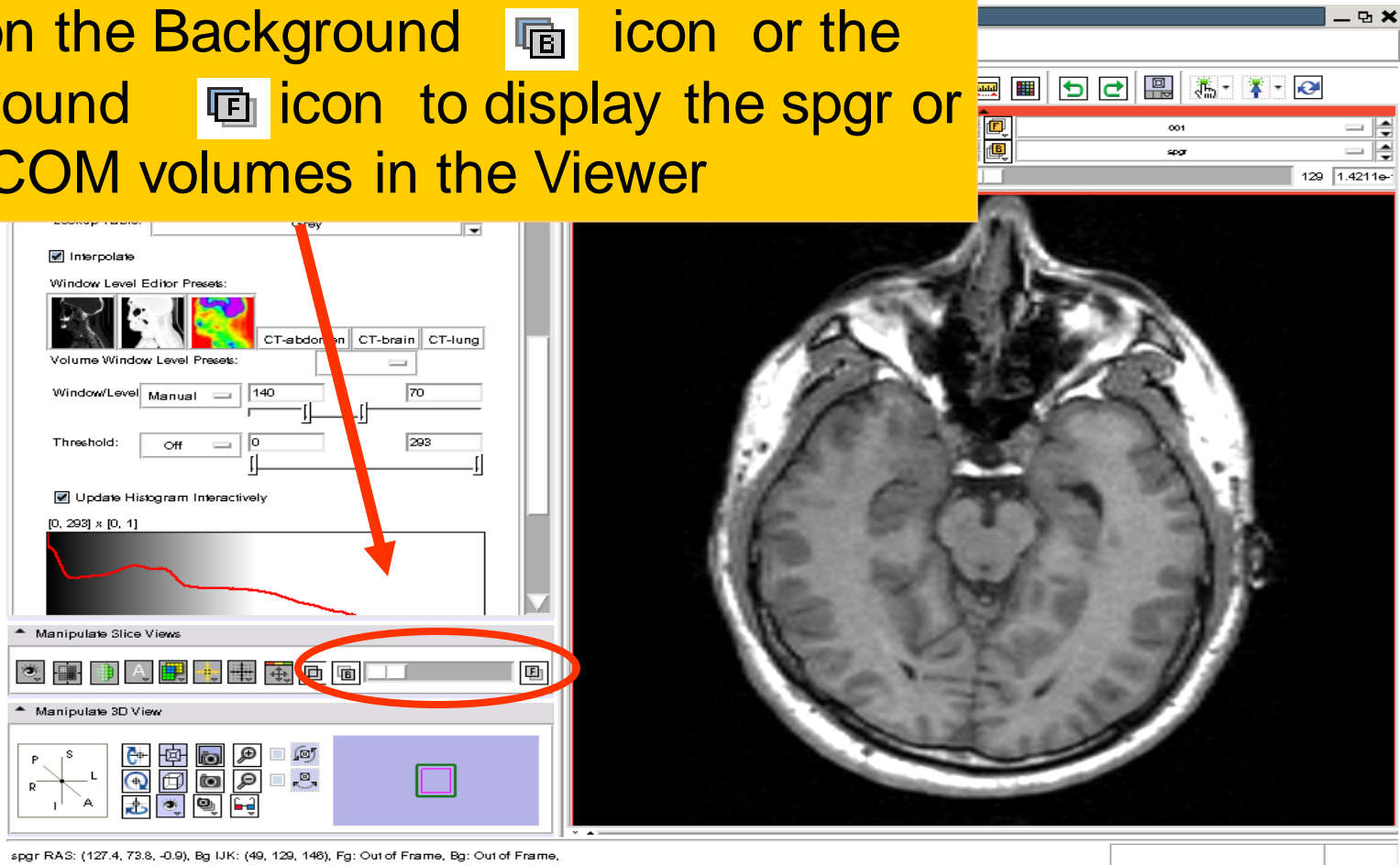
To simultaneously view the dicom and the nrrd volumes, left click on the drop-down menu to the right of the Foreground icon  select the image 001.dcm



The screenshot shows the 3DSlicer Version 3.6 RC3 interface. The main window displays an axial MRI slice of a brain. The top toolbar includes icons for home, view, grid, and other functions. Below the toolbar, there are two drop-down menus: the first is set to 'Acid' and the second to 'None'. A red arrow points to the second drop-down menu. The bottom left panel shows a histogram with a red curve and a threshold slider set to 0. Below the histogram are two sections: 'Manipulate Slice Views' and 'Manipulate 3D View'. The 'Manipulate 3D View' section includes a 3D orientation diagram with P (Posterior), S (Superior), L (Left), R (Right), I (Inferior), and A (Anterior) labels, and a 3D view of a cube. At the bottom of the interface, the status bar displays: 'spgr RAS: (127.4, 39.1, -0.9), Bg IJK: (86, 129, 146), Bg: Out of Frame.'

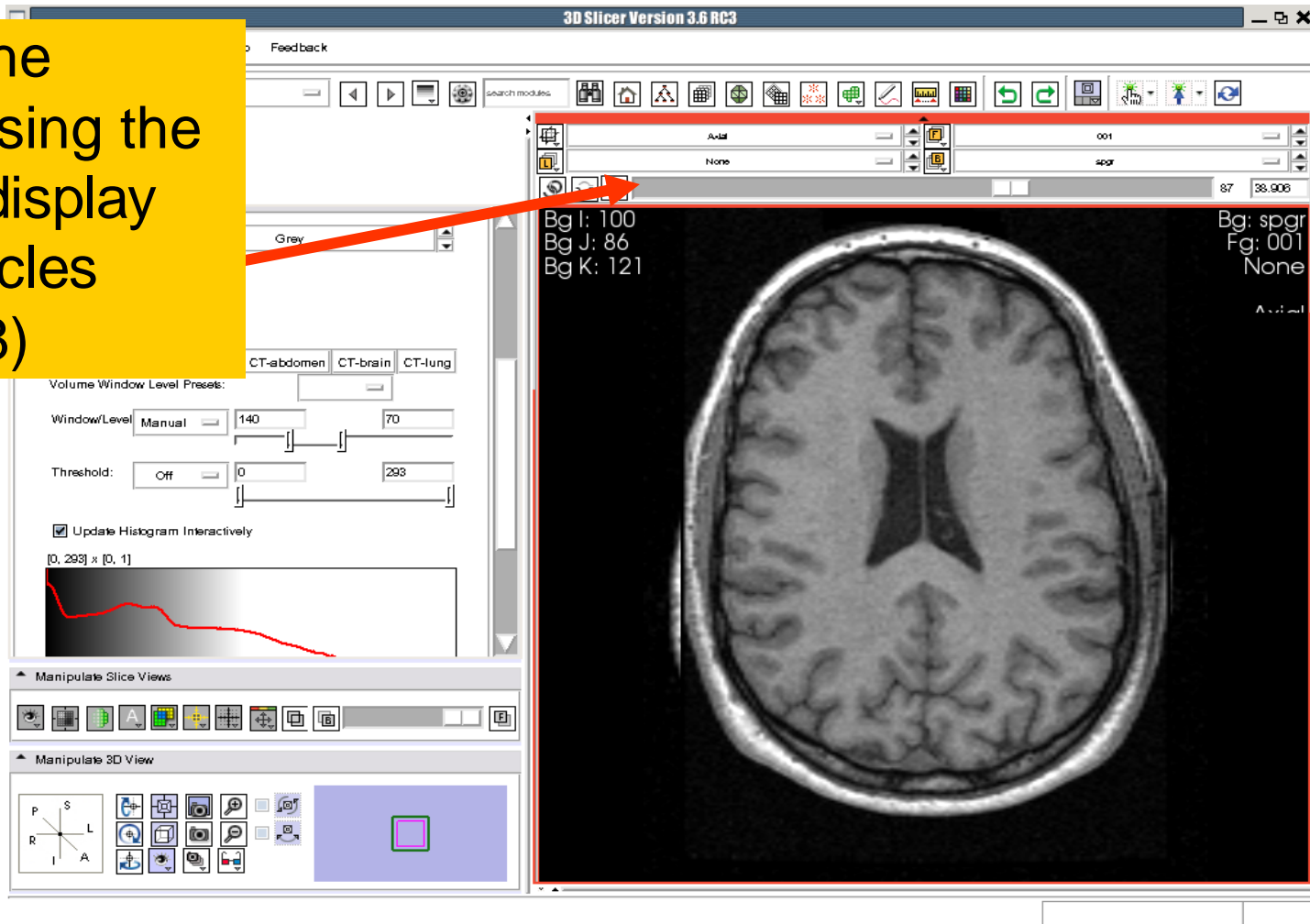
Exploring the data

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

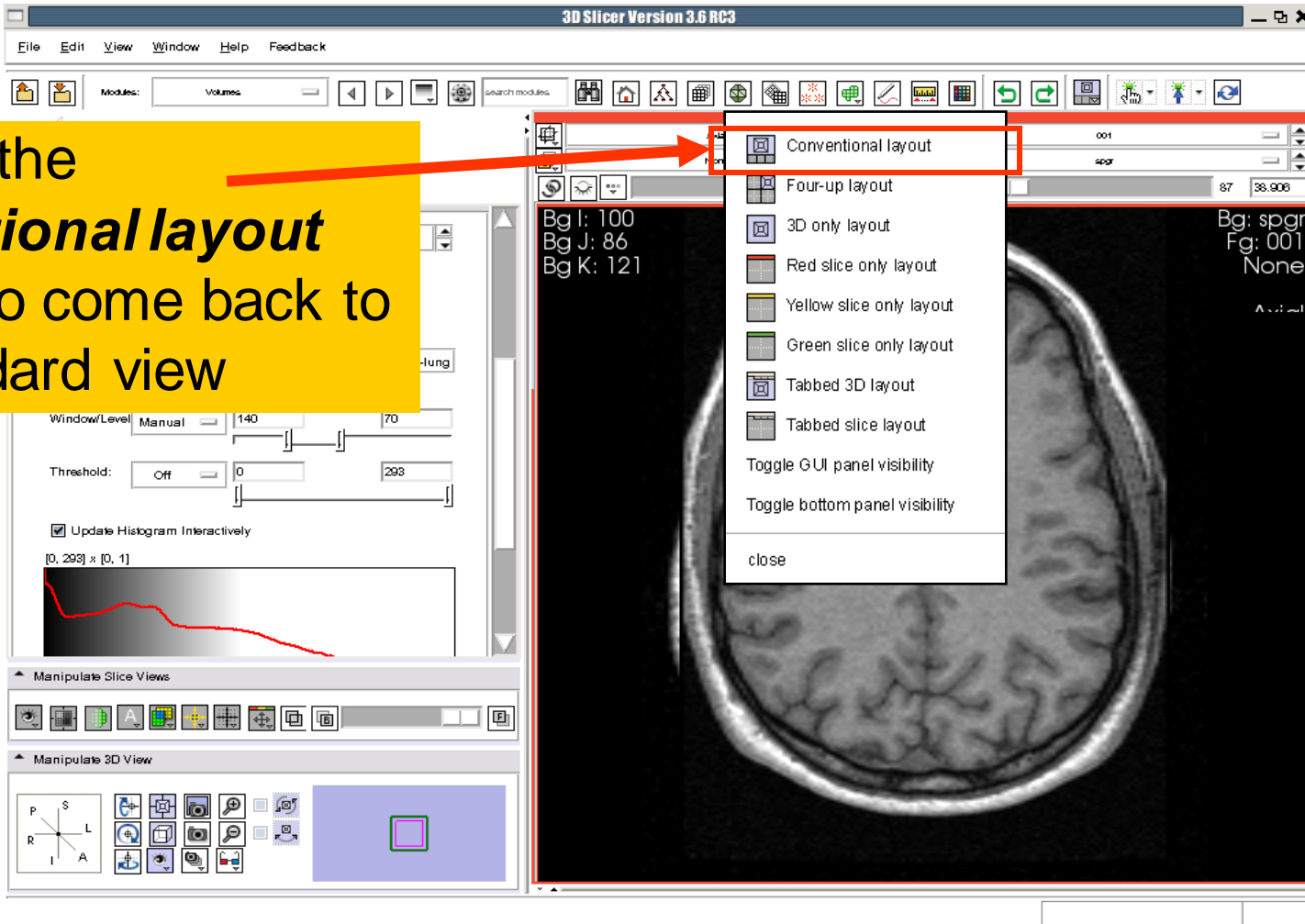


Exploring the data

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




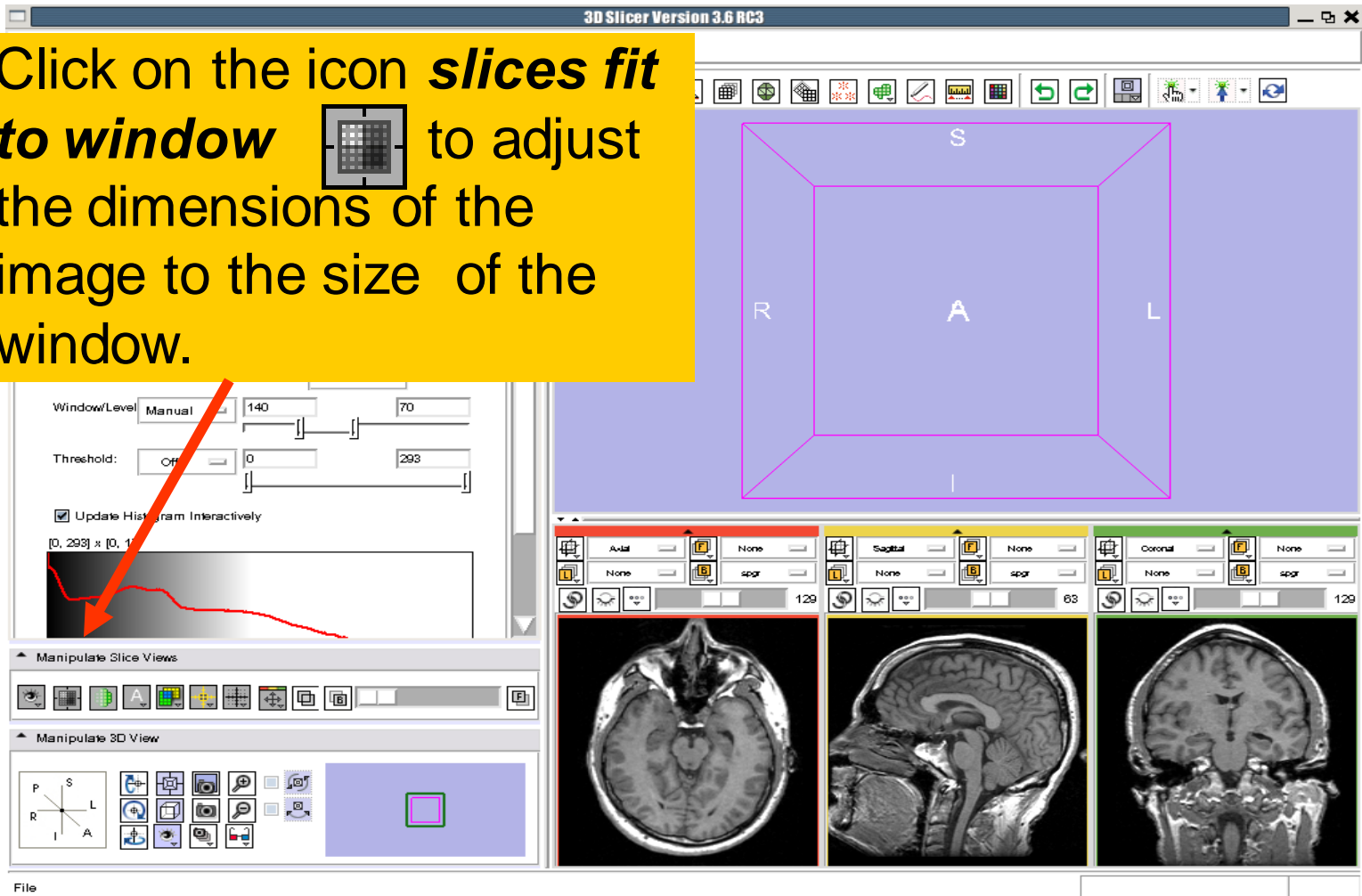
Exploring the data

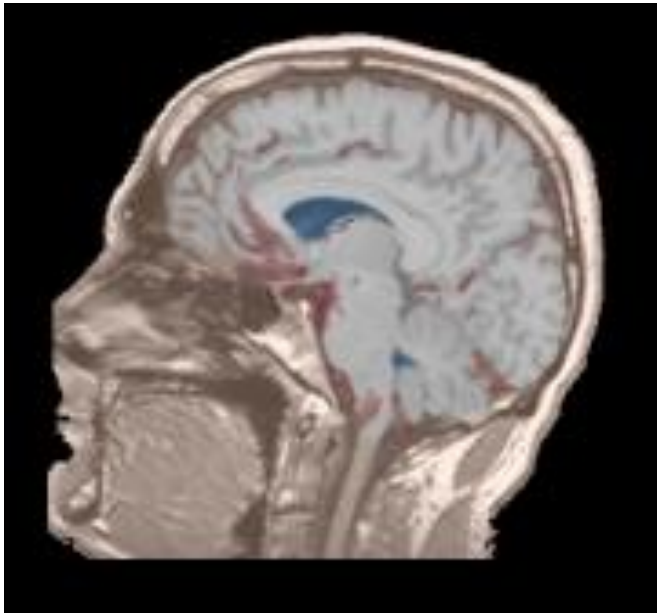


Click on the **conventional layout icon**  to come back to the standard view

Loading Volumes

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

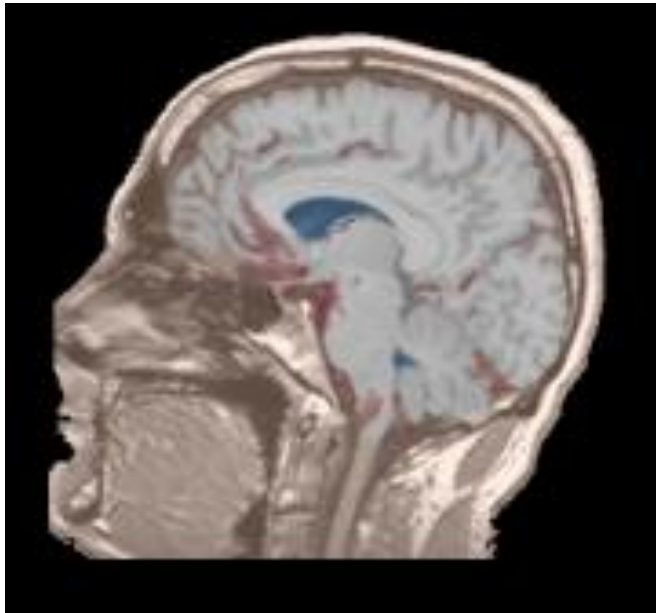




Part 2: Loading and visualizing segmented structures overlaid on grayscale images

Label map

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

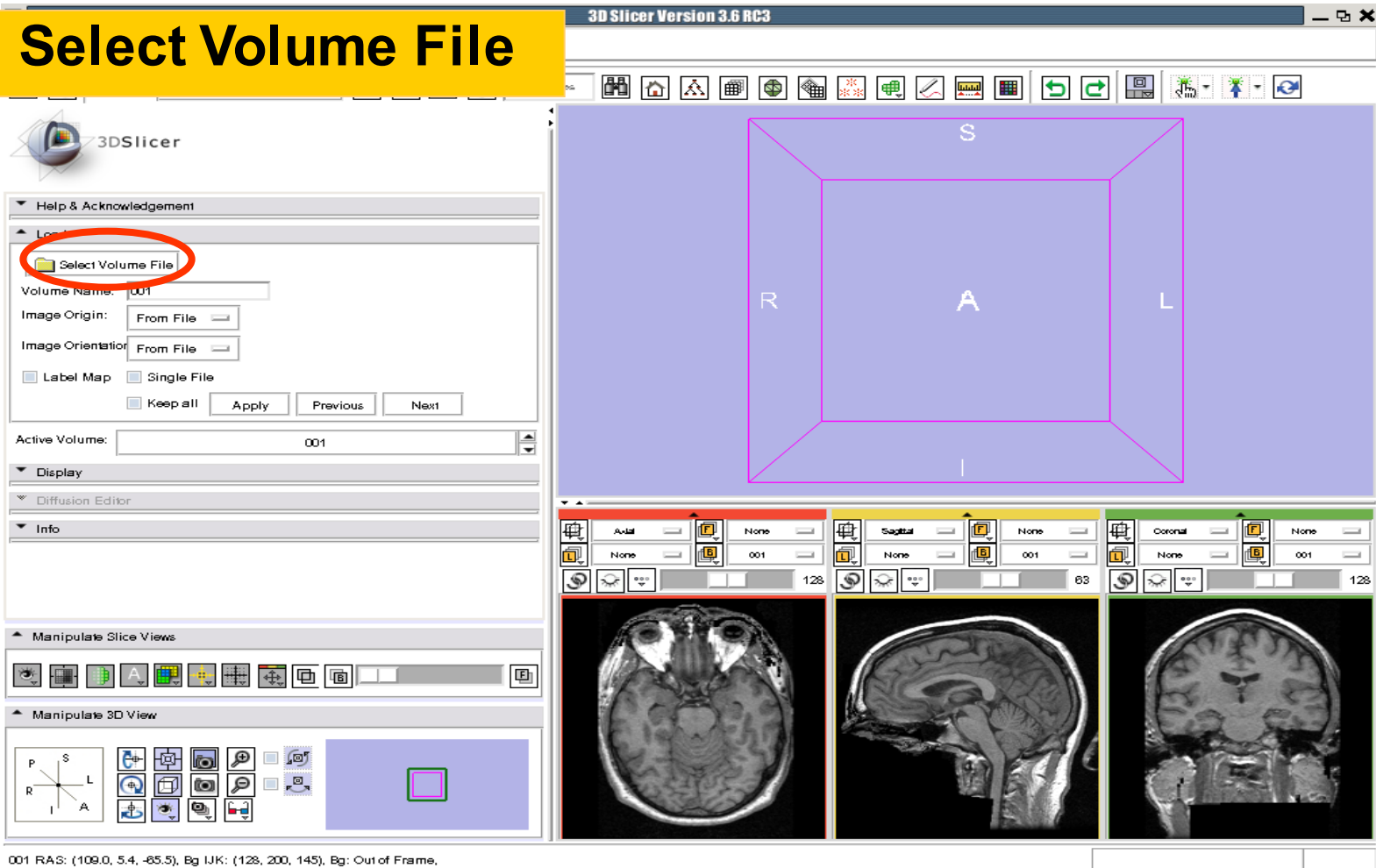


Each pixel is assigned a specific **label value** which corresponds to the anatomical structure that it belongs to.

The three-dimensional result of the segmentation is a binary array called a **label map**.

Loading a label map

Click on **Select Volume File**



3D Slicer Version 3.6 RC3

3DSlicer

Help & Acknowledgement

Load

Select Volume File

Volume Name: 001

Image Origin: From File

Image Orientation: From File

Label Map Single File

Keep all

Active Volume: 001

Display

Diffusion Editor

Info

Manipulate Slice Views

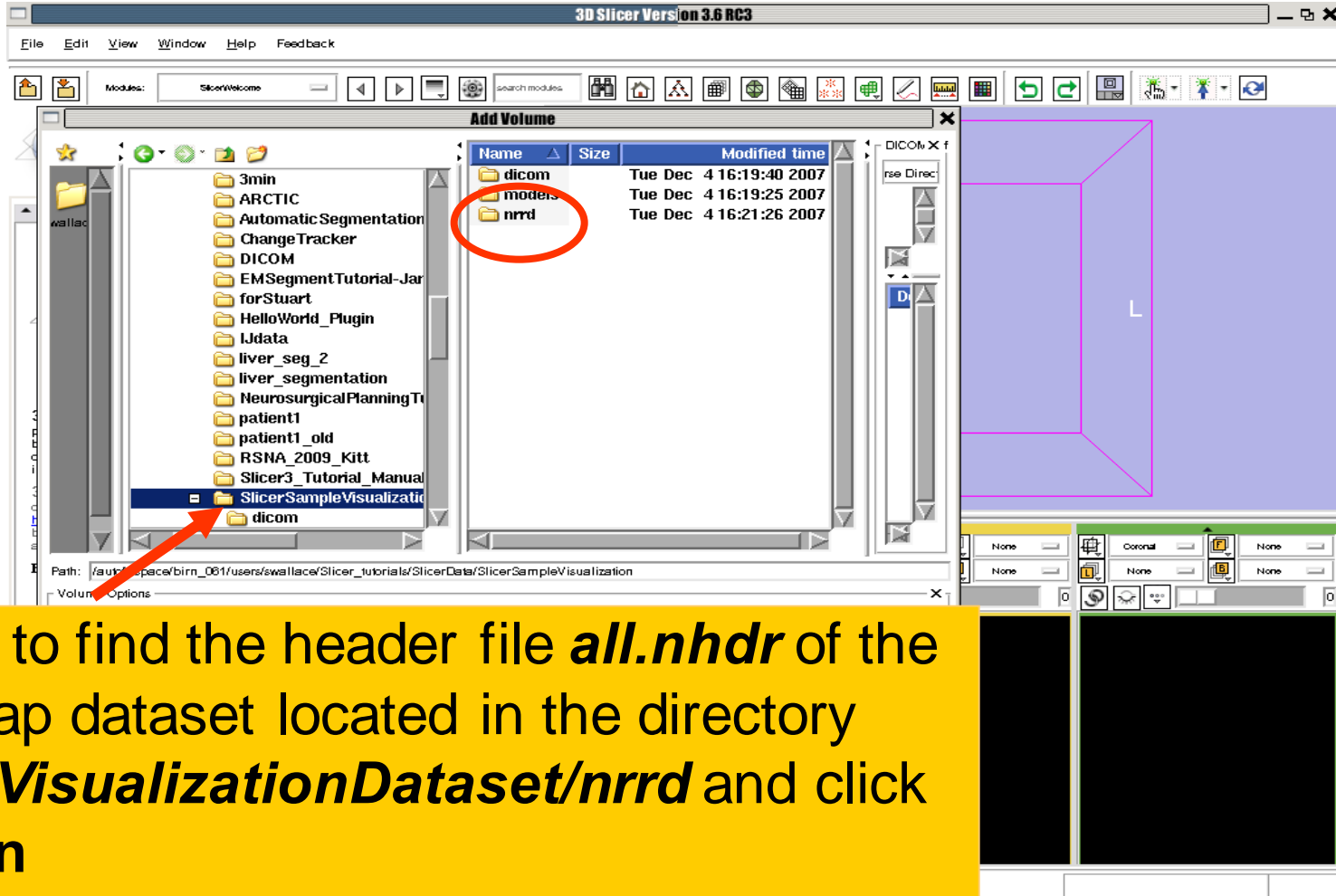
Manipulate 3D View

001 RAS: (109.0, 5.4, -65.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

001 RAS: (109.0, 5.4, -65.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

001 RAS: (109.0, 5.4, -65.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

Loading a label map



The screenshot shows the 3D Slicer interface. The 'Add Volume' dialog box is open, displaying a file tree on the left and a table of files in the center. The 'nrrd' folder is circled in red. A red arrow points to the 'SlicerSampleVisualization' folder in the file tree. The main window shows a 3D view of a brain slice with a purple bounding box.

| Name | Size | Modified time |
|--------|------|-------------------------|
| dicom | | Tue Dec 4 16:19:40 2007 |
| models | | Tue Dec 4 16:19:25 2007 |
| nrrd | | Tue Dec 4 16:21:26 2007 |

Path: /aunt/Space/birn_061/users/swallace/Slicer_tutorials/SlicerData/SlicerSampleVisualization

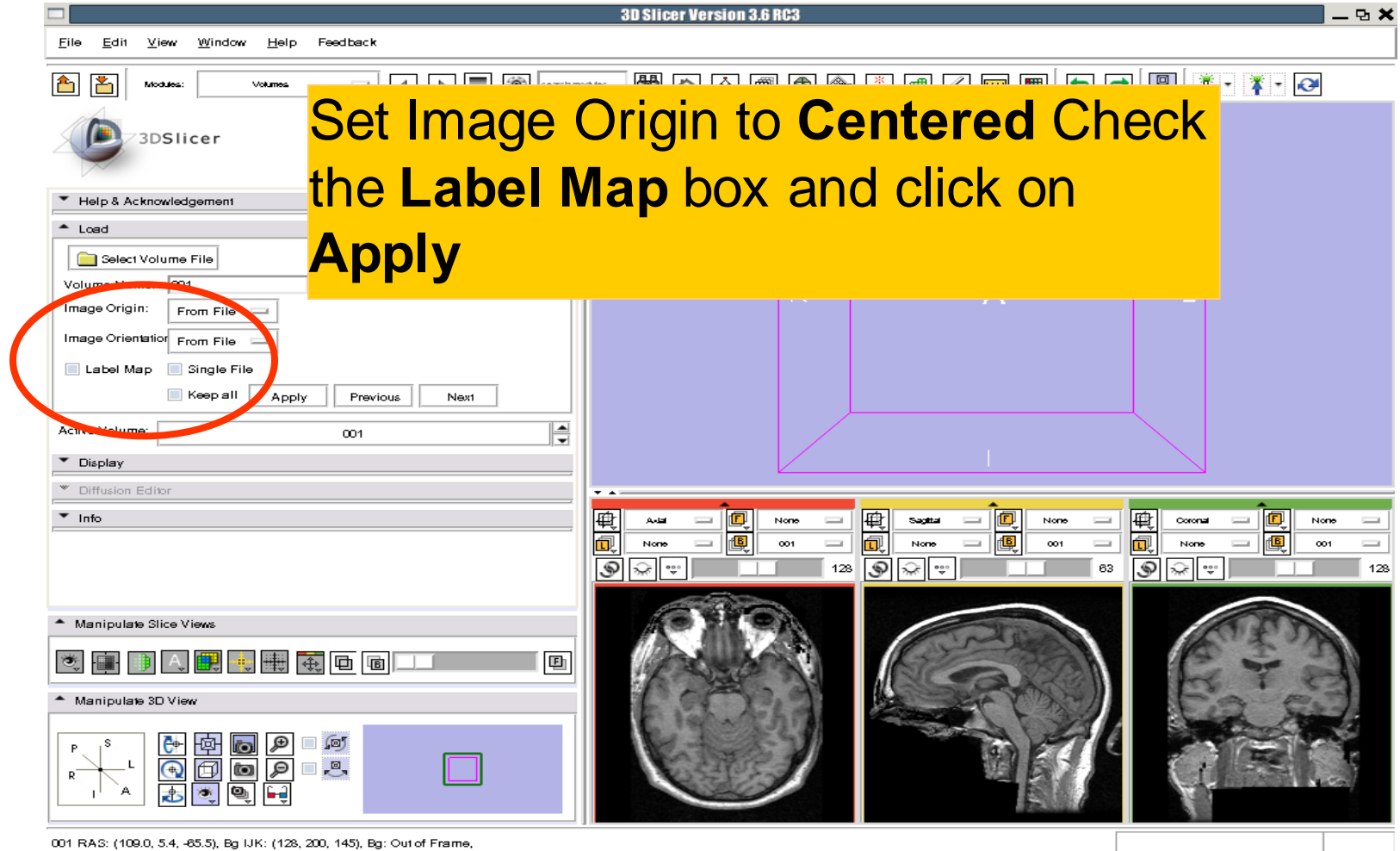
Volume Options

None None None None

Coronal None None None

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 3.6 RC3

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

Keep all Apply Previous Next

Active Volume: 001

Display

Diffusion Editor

Info

Manipulate Slice Views

Manipulate 3D View

001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

001

001

001

128 63 128

Axial Sagittal Coronal

None None None

None 001 None

None 001 None

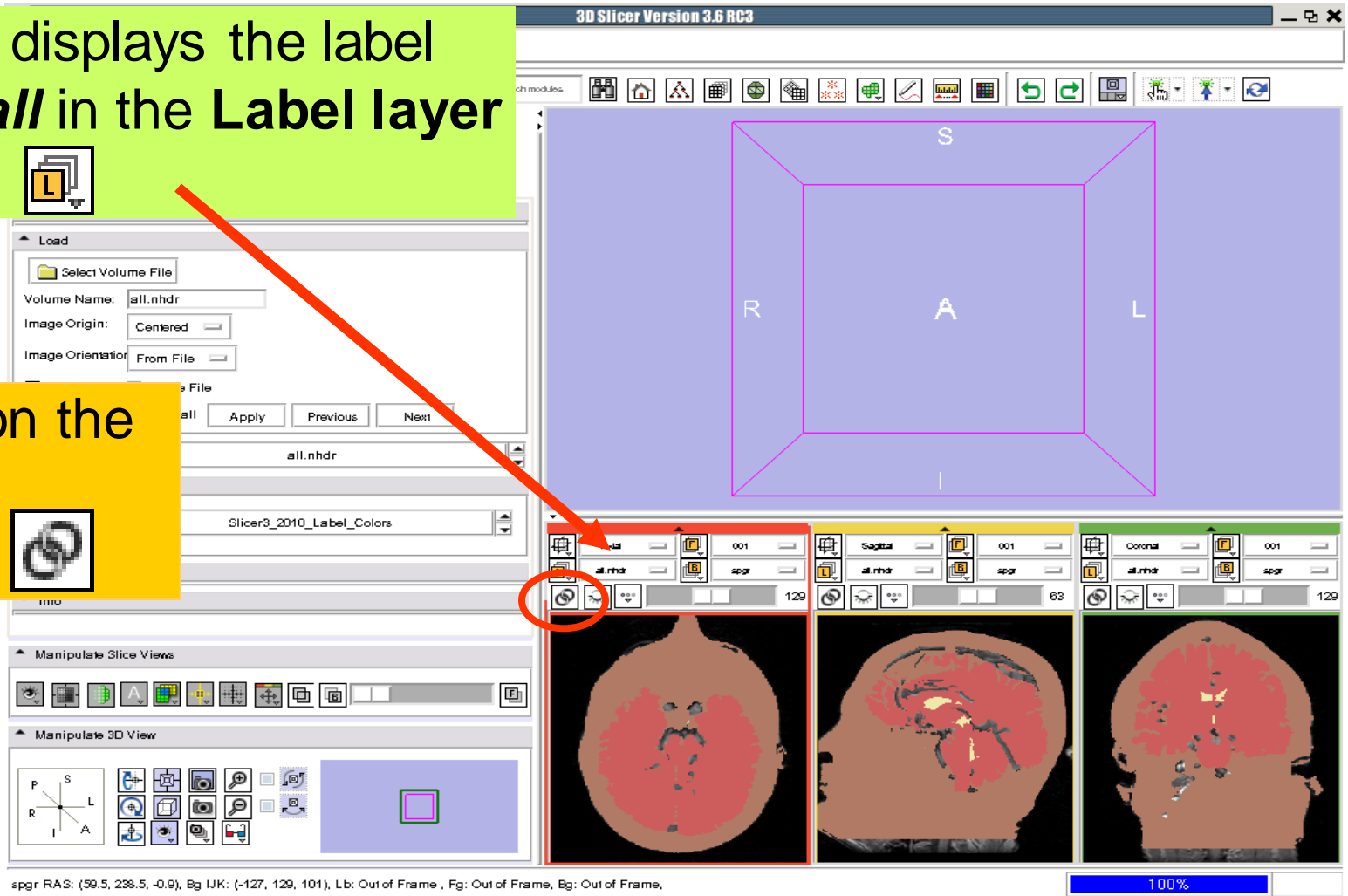
None 001 None

Visualizing a label map

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



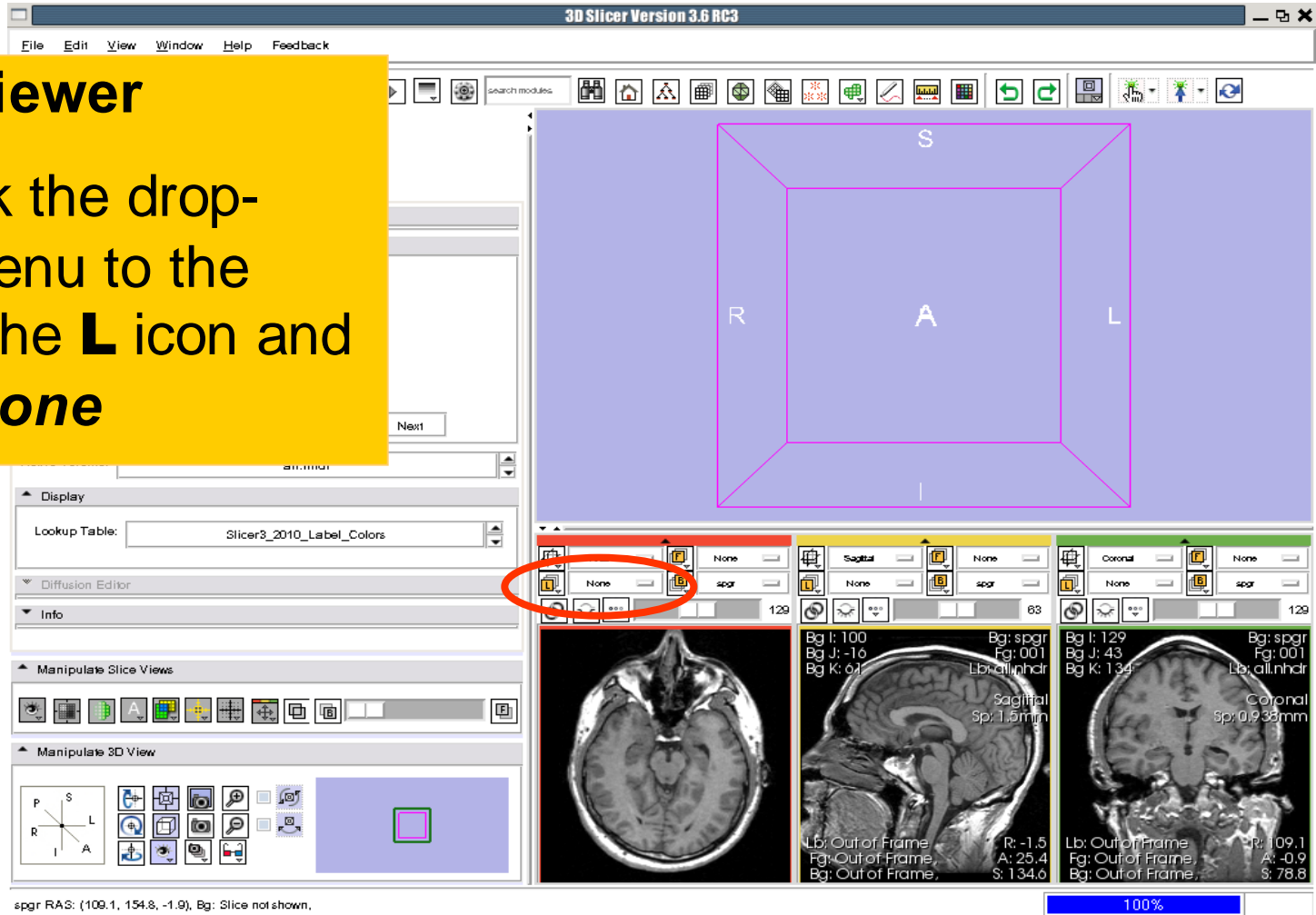
Click on the *links* icon.



Visualizing Multiple Volumes

Label Viewer

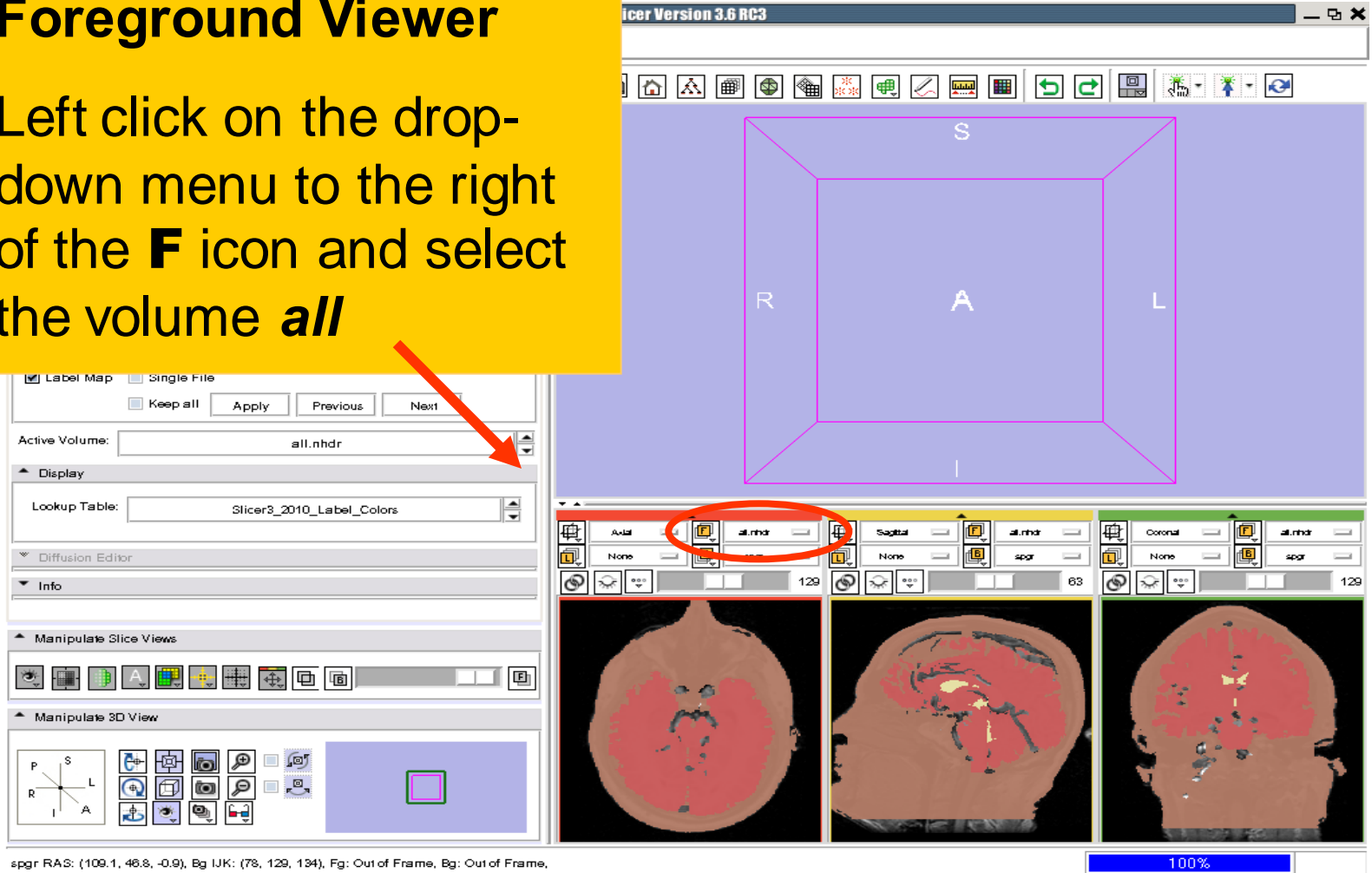
Left click the drop-down menu to the right of the **L** icon and select **None**



Visualizing Multiple Volumes

Foreground Viewer

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

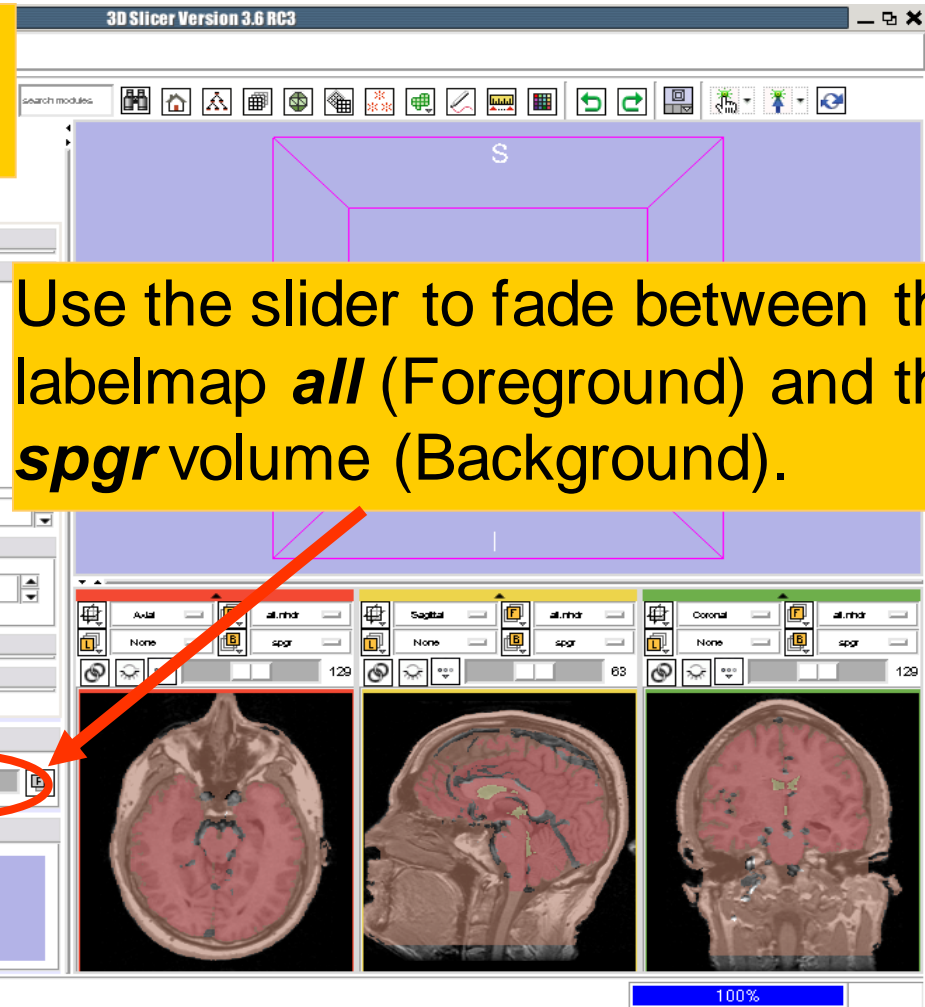


The screenshot displays the 3DSlicer interface. The main 3D view shows a brain volume with a purple bounding box and axes labeled S (Superior), I (Inferior), R (Right), L (Left), and A (Anterior). The foreground viewer panel on the left shows the 'Active Volume' set to 'all.nhdr' and the 'Lookup Table' set to 'Slicer3_2010_Label_Colors'. A red arrow points to the drop-down menu next to the 'F' icon in the foreground viewer, which is circled in red. The foreground viewer also shows three slice views: Axial, Sagittal, and Coronal, each with a volume selection dropdown set to 'all.nhdr'. The status bar at the bottom indicates the current volume is 'all.nhdr' and shows a 100% zoom level.

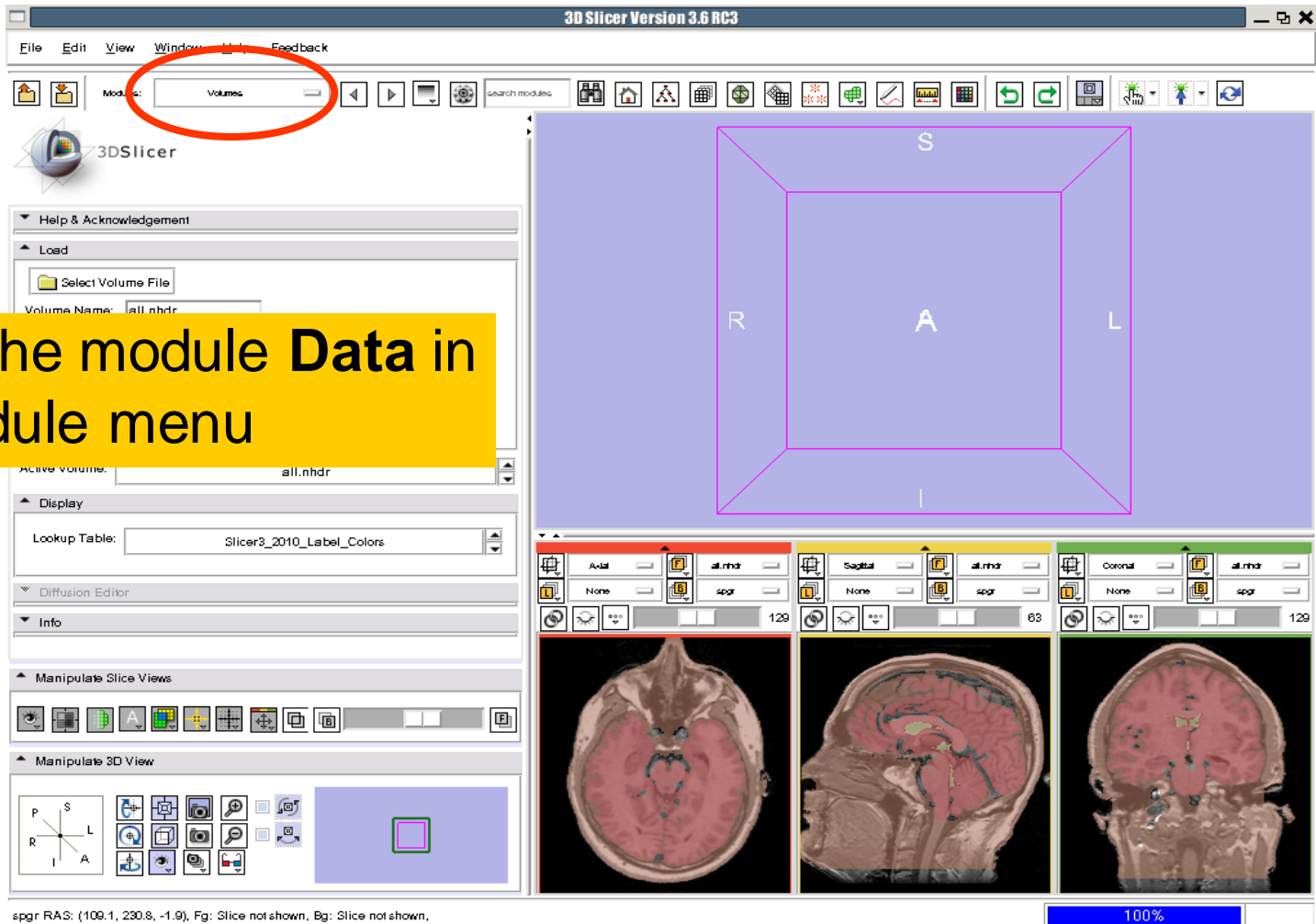


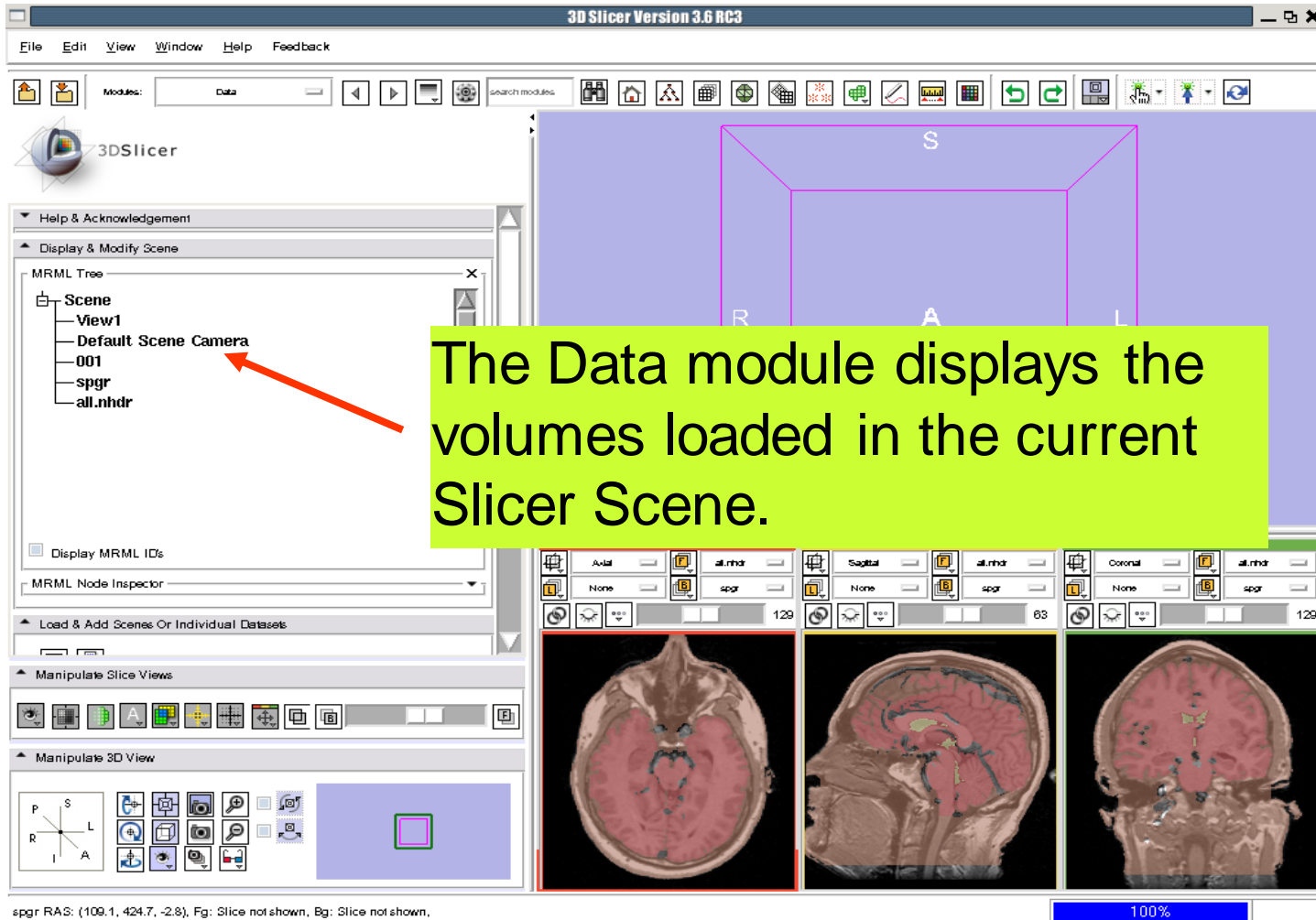
Visualizing Multiple Volumes

Select Manipulate
Slice Views

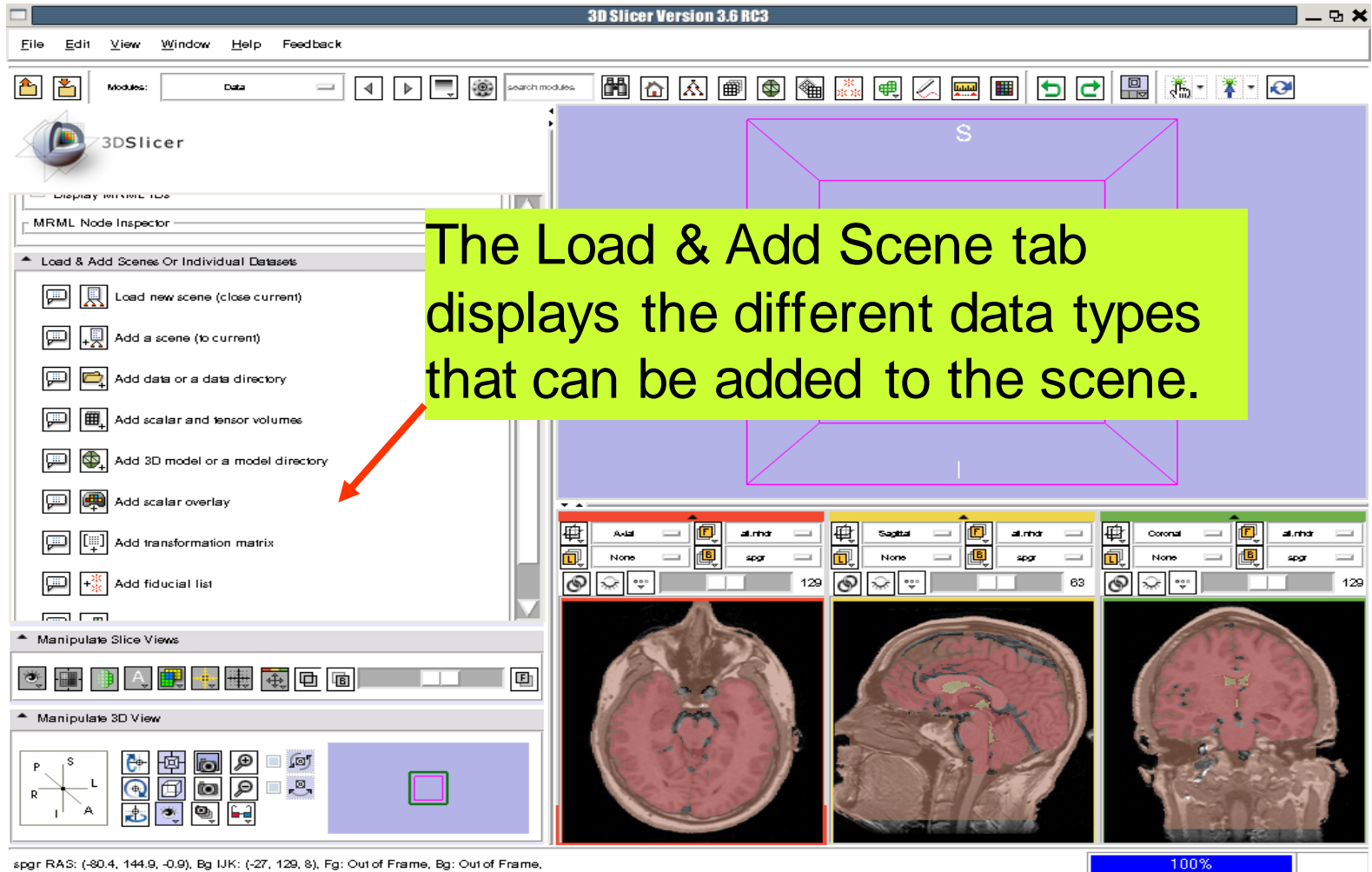


Select the module **Data** in the module menu





The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The main window displays a 3D visualization of a brain scan with a yellow callout box containing the text: "The Data module displays the volumes loaded in the current Slicer Scene." An orange arrow points from the callout box to the "Default Scene Camera" node in the MRML Tree. The MRML Tree shows a hierarchy: Scene -> View1 -> Default Scene Camera -> 001 -> spgr -> all.nhdr. The interface also includes a menu bar (File, Edit, View, Window, Help, Feedback), a toolbar, and various panels for scene manipulation and visualization.



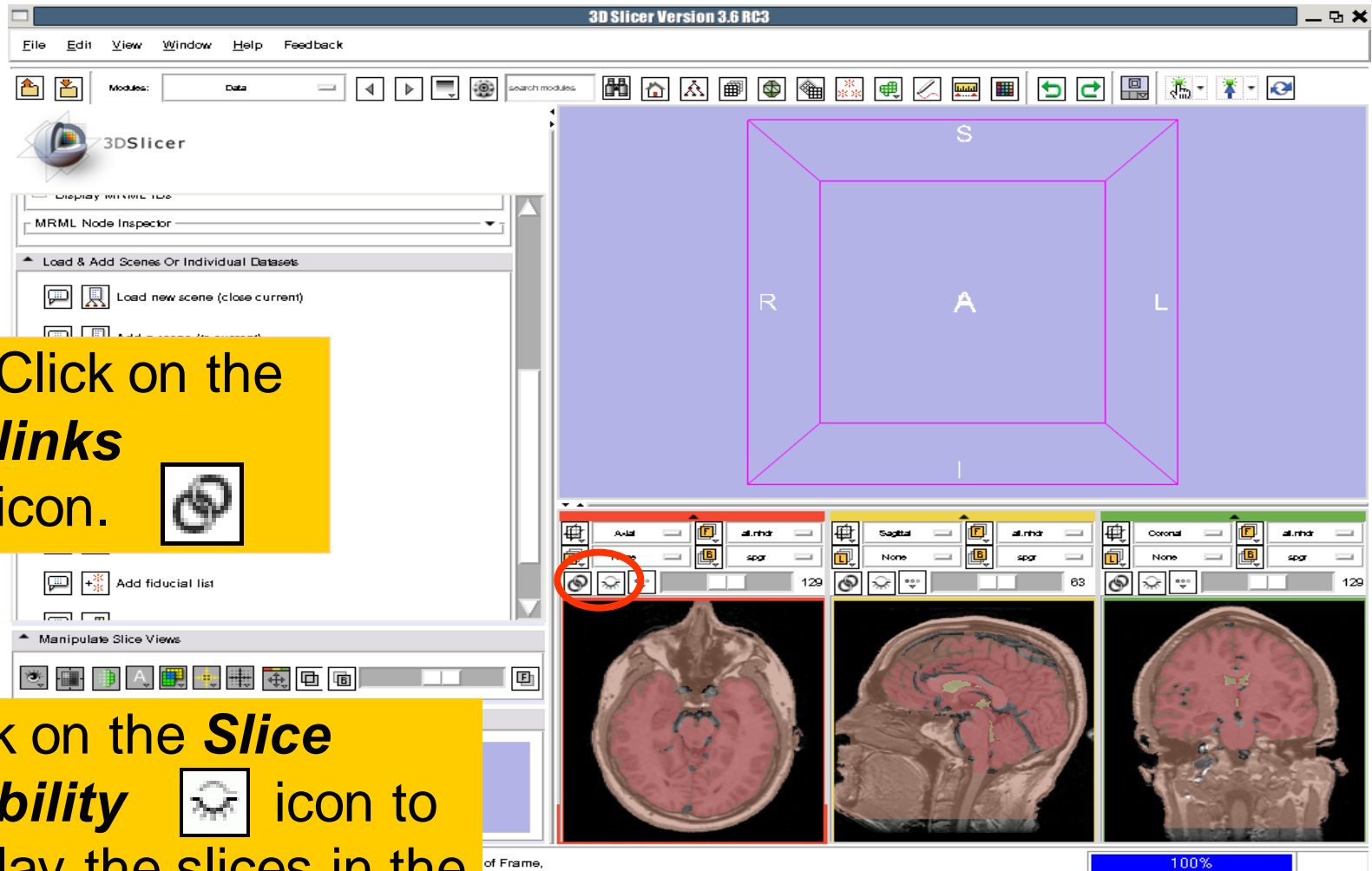
The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The 'Load & Add Scene Or Individual Datasets' panel is active, displaying various options for adding data to the scene. A red arrow points from a text box to this panel. The 3D visualization area shows a brain scan with three orthogonal views: Axial, Sagittal, and Coronal. The 'Load & Add Scene Or Individual Datasets' panel includes the following options:

- Load new scene (close current)
- Add a scene (to current)
- Add data or a data directory
- Add scalar and tensor volumes
- Add 3D model or a model directory
- Add scalar overlay
- Add transformation matrix
- Add fiducial list

The 3D visualization area shows a brain scan with three orthogonal views: Axial, Sagittal, and Coronal. The 'Load & Add Scene Or Individual Datasets' panel is highlighted in yellow. A red arrow points from the text box to the 'Load & Add Scene Or Individual Datasets' panel.

spgr RAS: (-80.4, 144.9, -0.9), Bg IJK: (-27, 129, 8), Fg: Out of Frame, Bg: Out of Frame.

100%

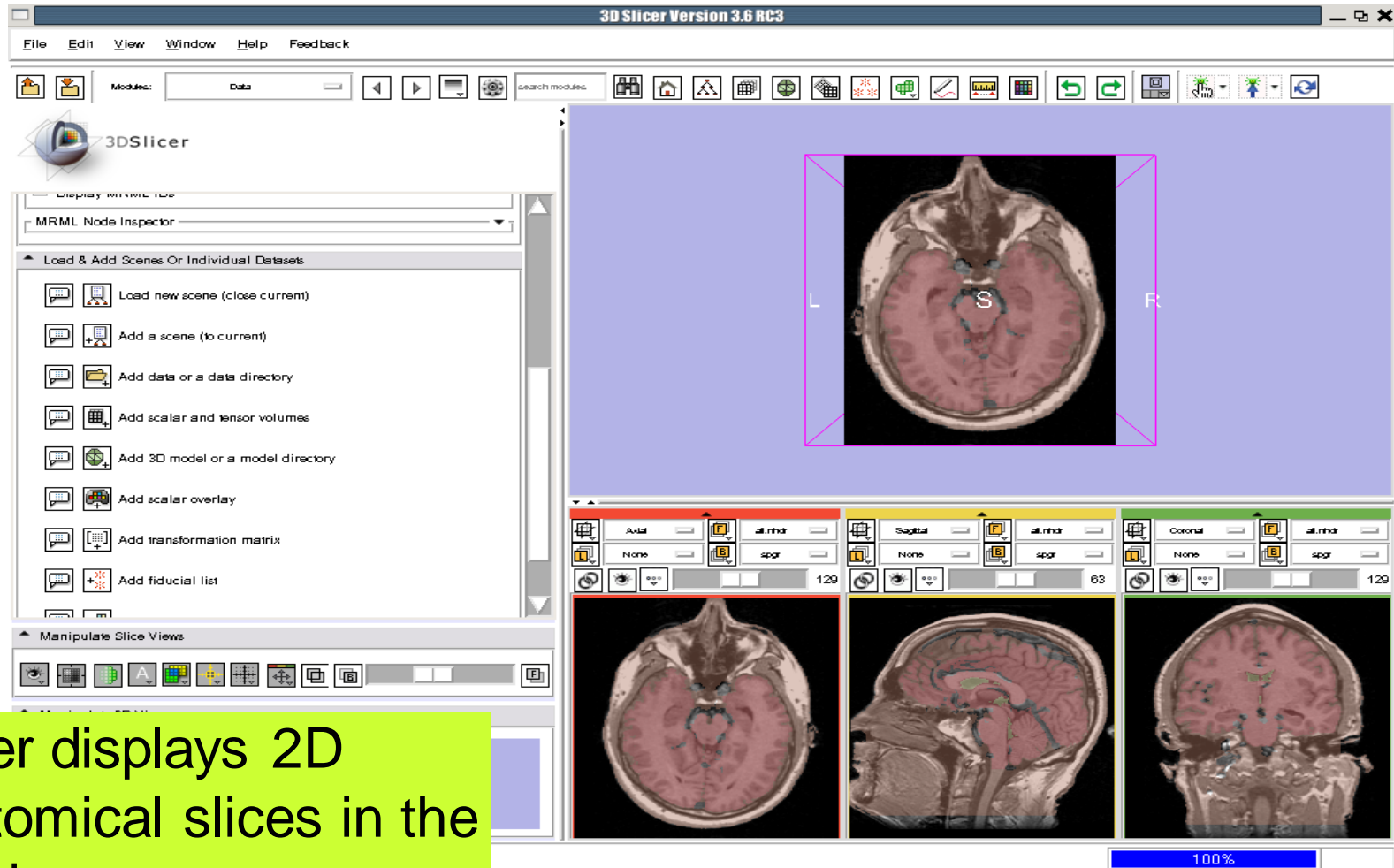


Click on the **links** icon.



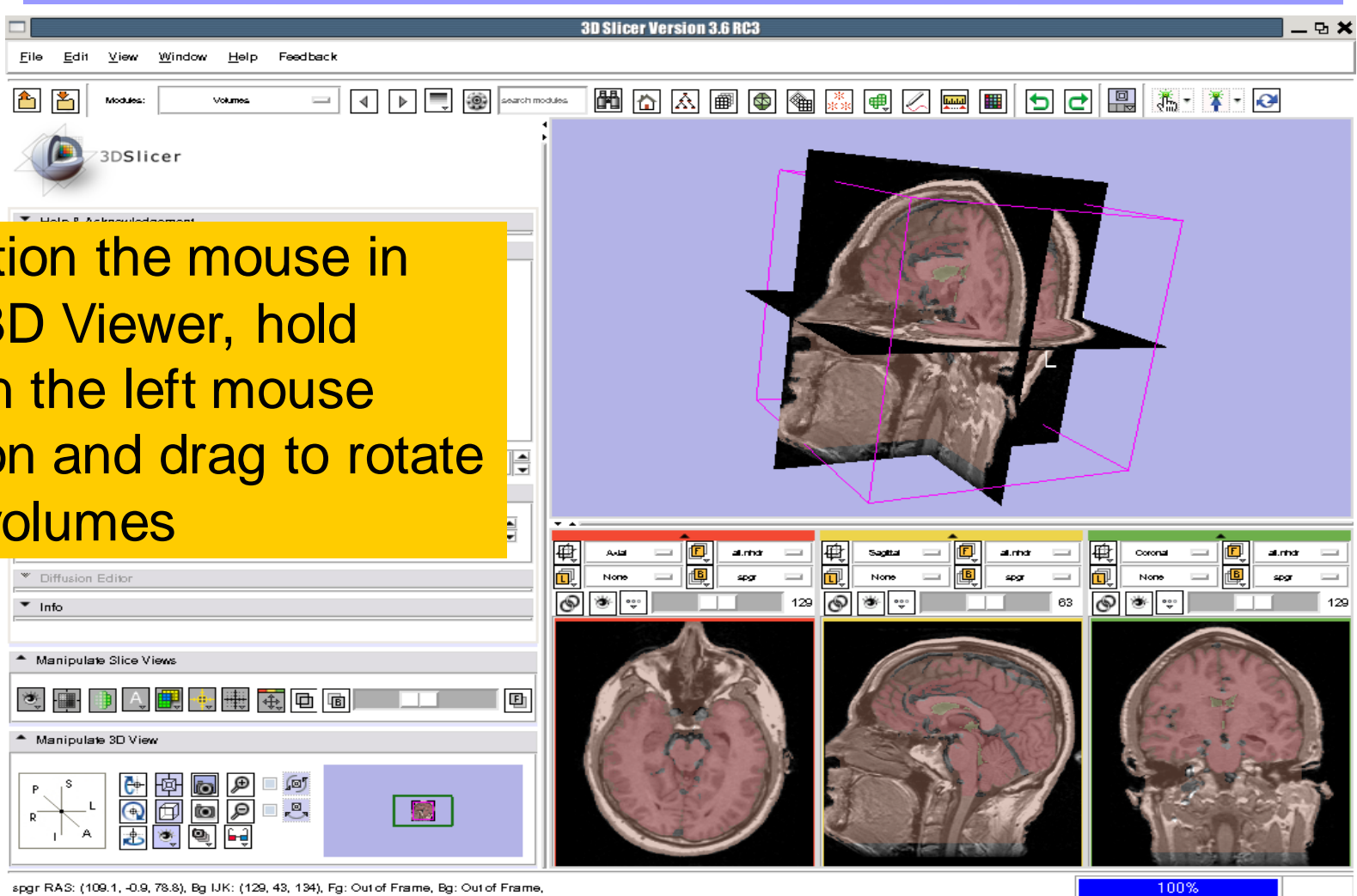
Click on the **Slice Visibility** icon to display the slices in the 3D Viewer

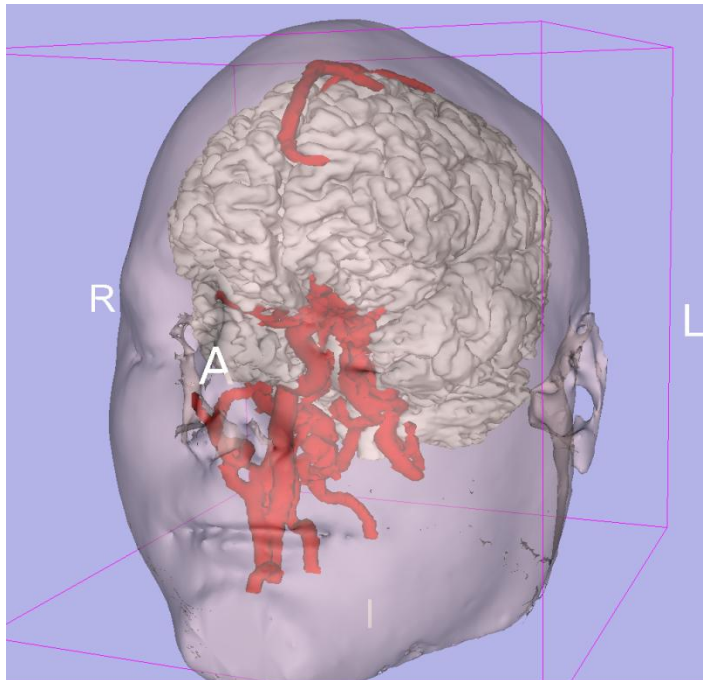




Slicer displays 2D anatomical slices in the 3D viewer

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

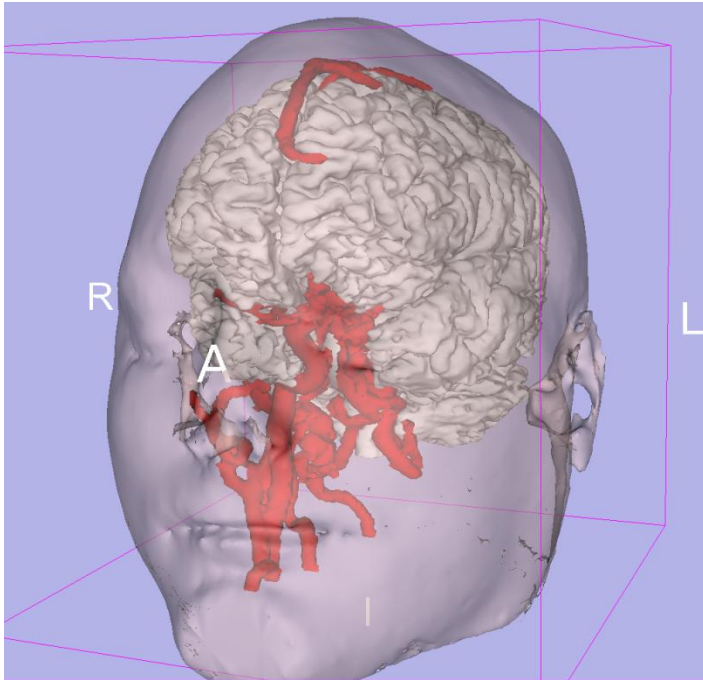




Part 3: Loading and visualizing 3D models of the anatomy

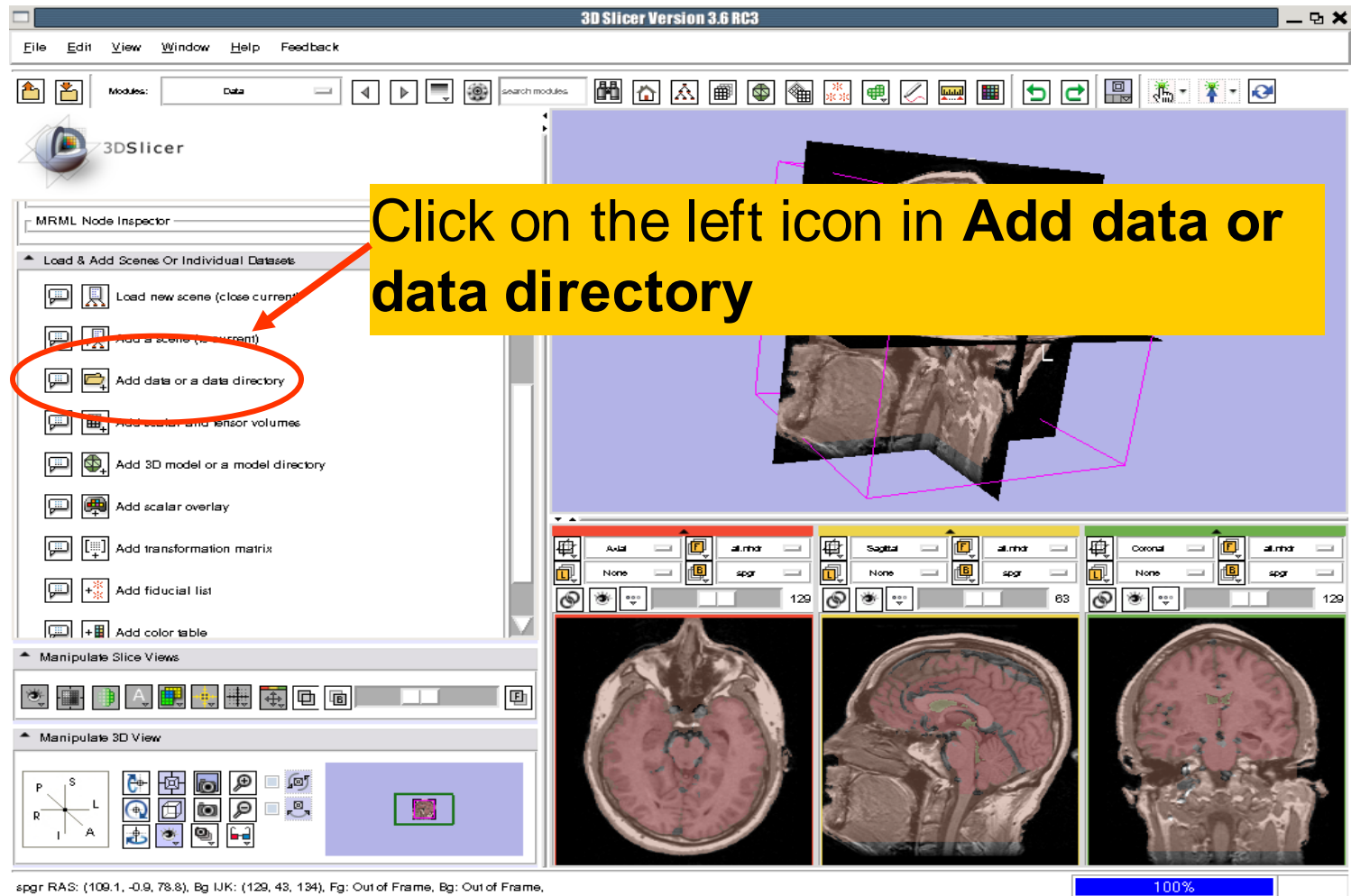
3D models

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



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 Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Data

MRML Node Inspector

Load & Add Scenes Or Individual Datasets

- Load new scene (close current)
- Add a scene (no current)
- Add data or a data directory**
- Add scalar and tensor volumes
- Add 3D model or a model directory
- Add scalar overlay
- Add transformation matrix
- Add fiducial list
- Add color table

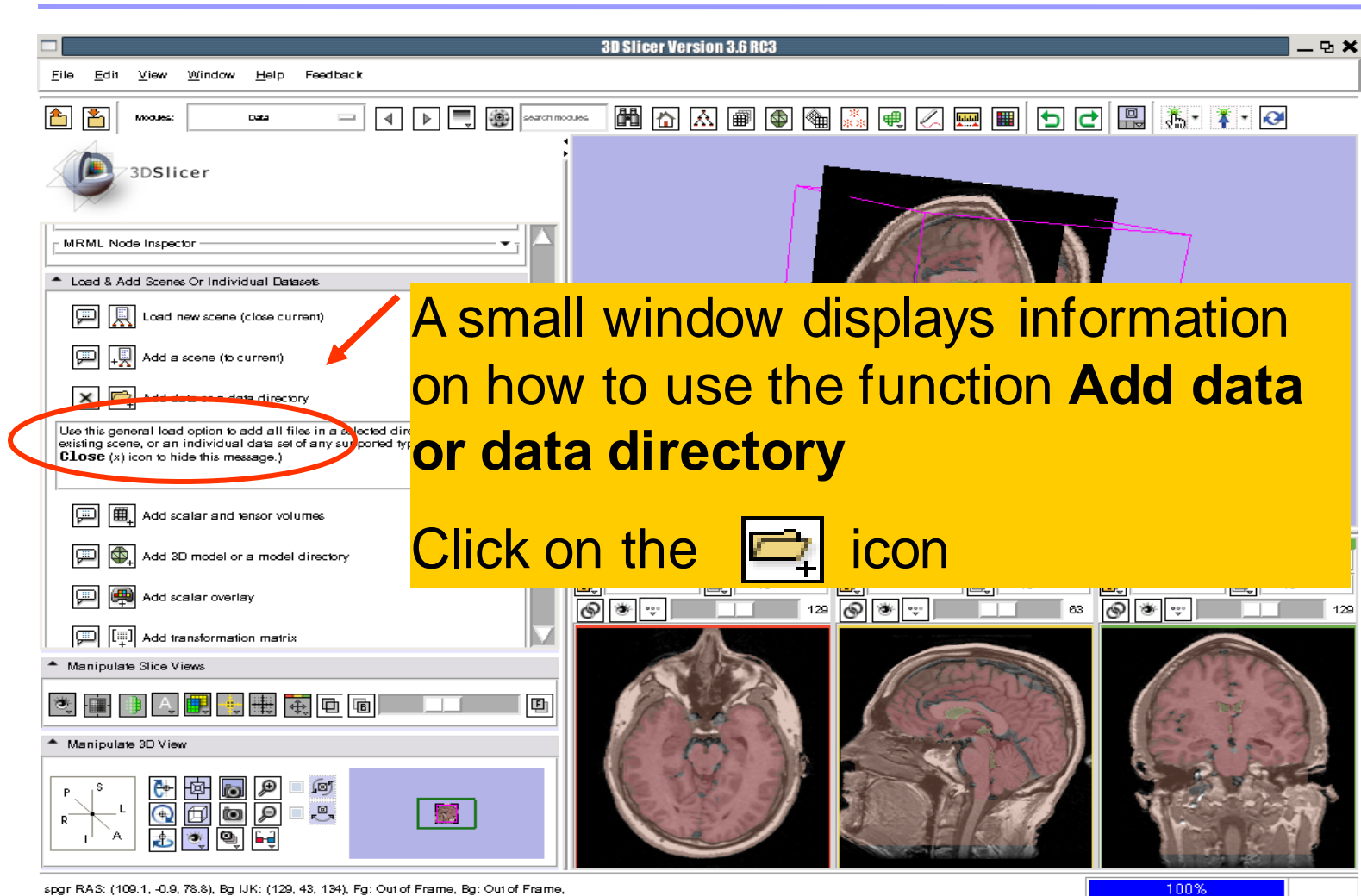
Manipulate Slice Views

Manipulate 3D View

spgr RAS: (109.1, -0.9, 78.8), Bg IJK: (129, 43, 134), Fg: Out of Frame, Bg: Out of Frame

100%

Click on the left icon in Add data or data directory



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Data

MRML Node Inspector

Load & Add Scenes Or Individual Datasets

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

Use this general load option to add all files in a selected directory to an existing scene, or an individual data set of any supported type. **Close** (x) icon to hide this message.)

Add scalar and tensor volumes

Add 3D model or a model directory

Add scalar overlay

Add transformation matrix


Manipulate Slice Views

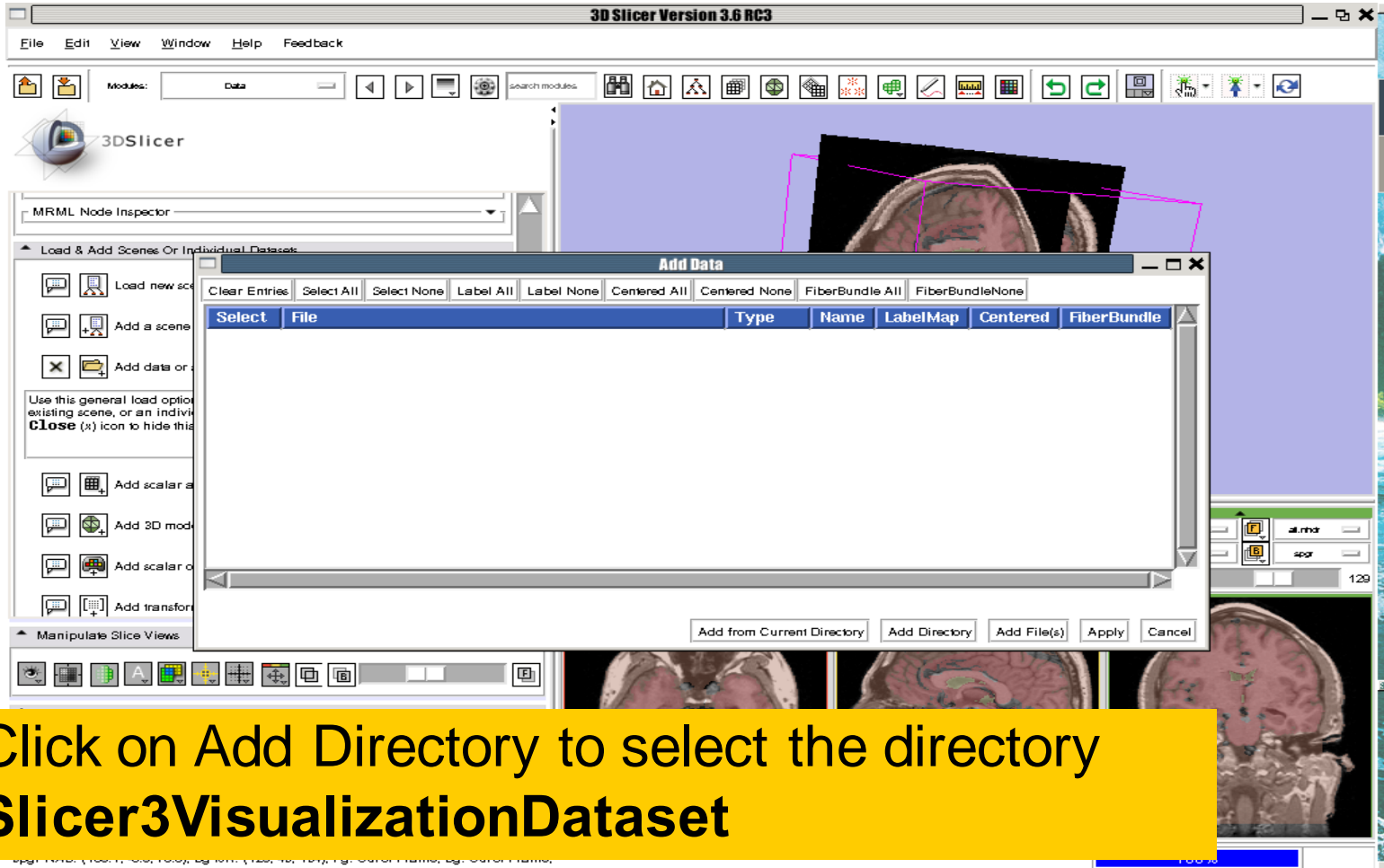
Manipulate 3D View

spgr RAS: (109.1, -0.9, 78.8), Bg IJK: (129, 43, 134), Fg: Out of Frame, Bg: Out of Frame.

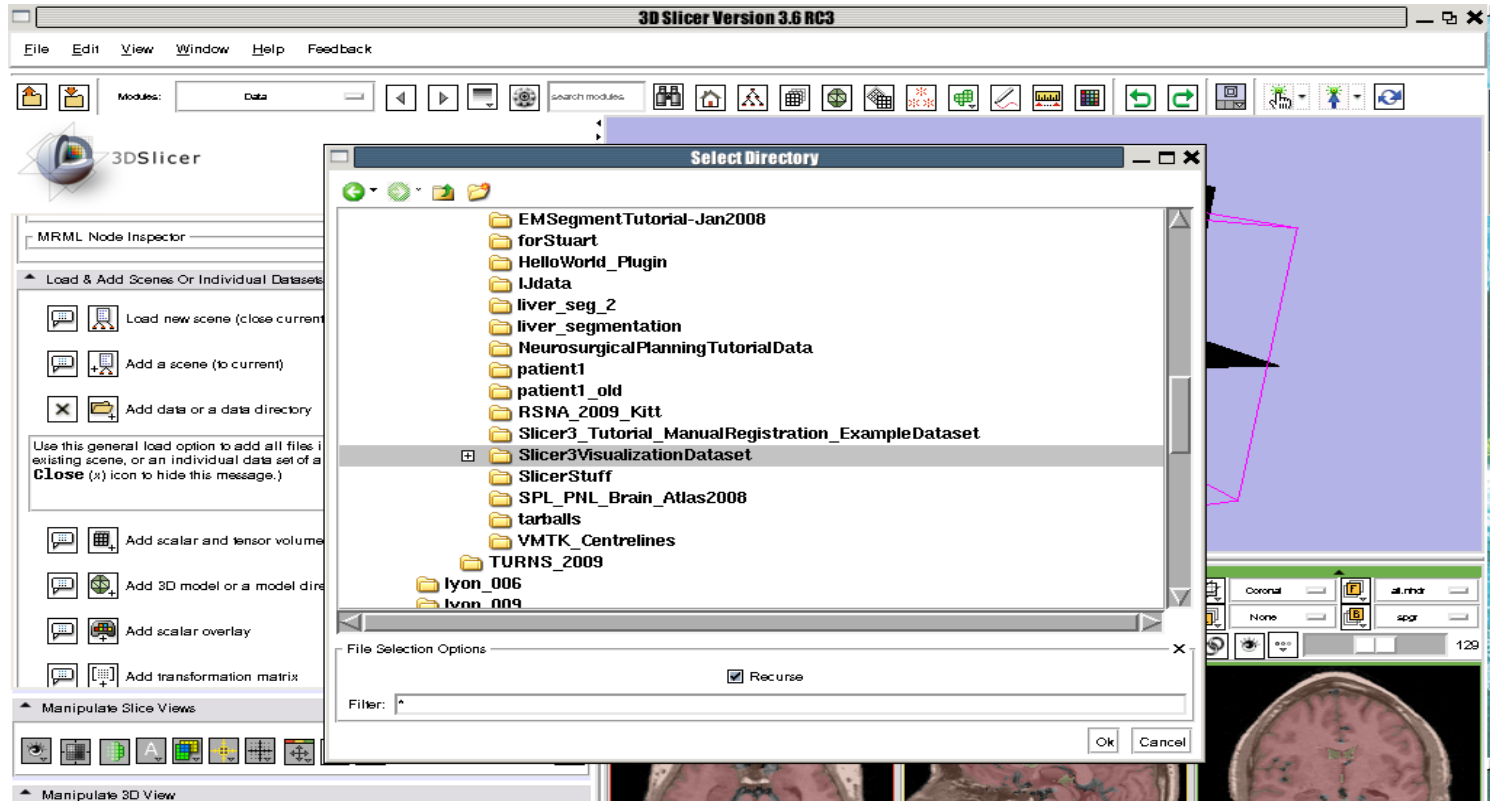
100%

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

Click on the  icon

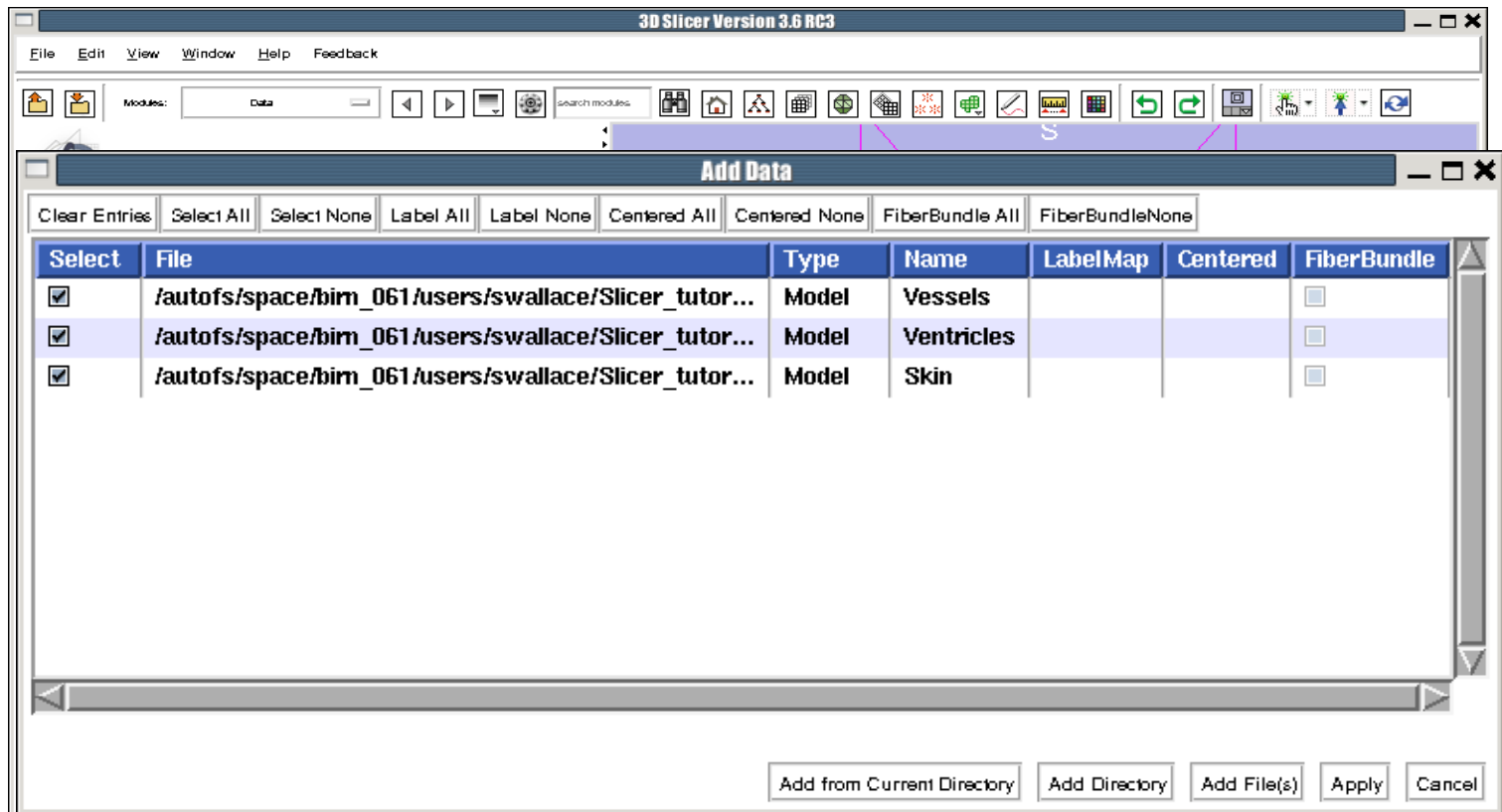


Loading 3D models



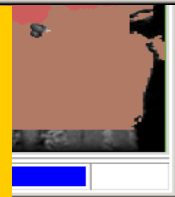
Select the directory **Slicer3VisualizationDataset/models** and click on OK

Loading 3D models

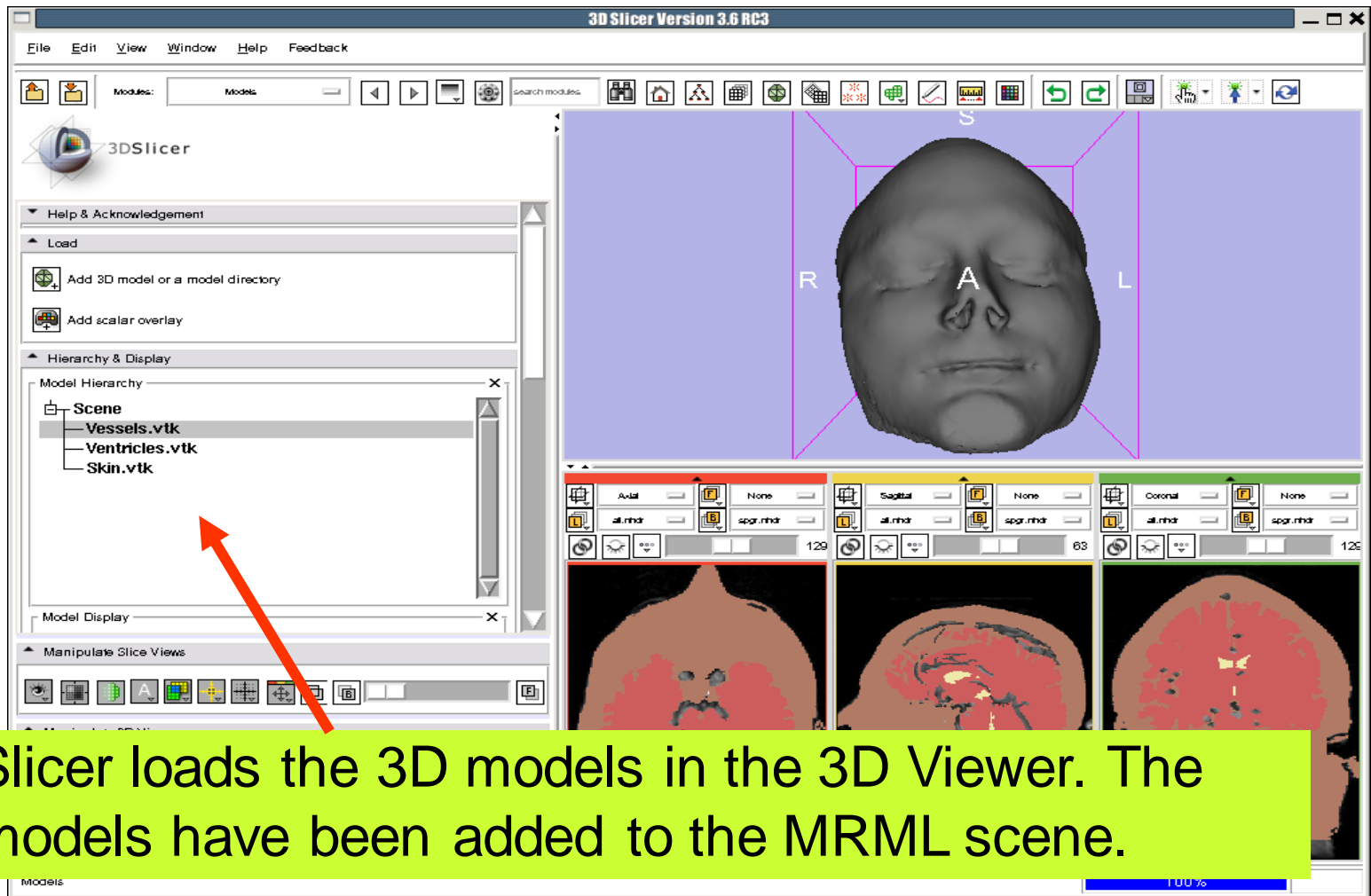


The list of elements present in the models directory appears in the Add Data window.

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

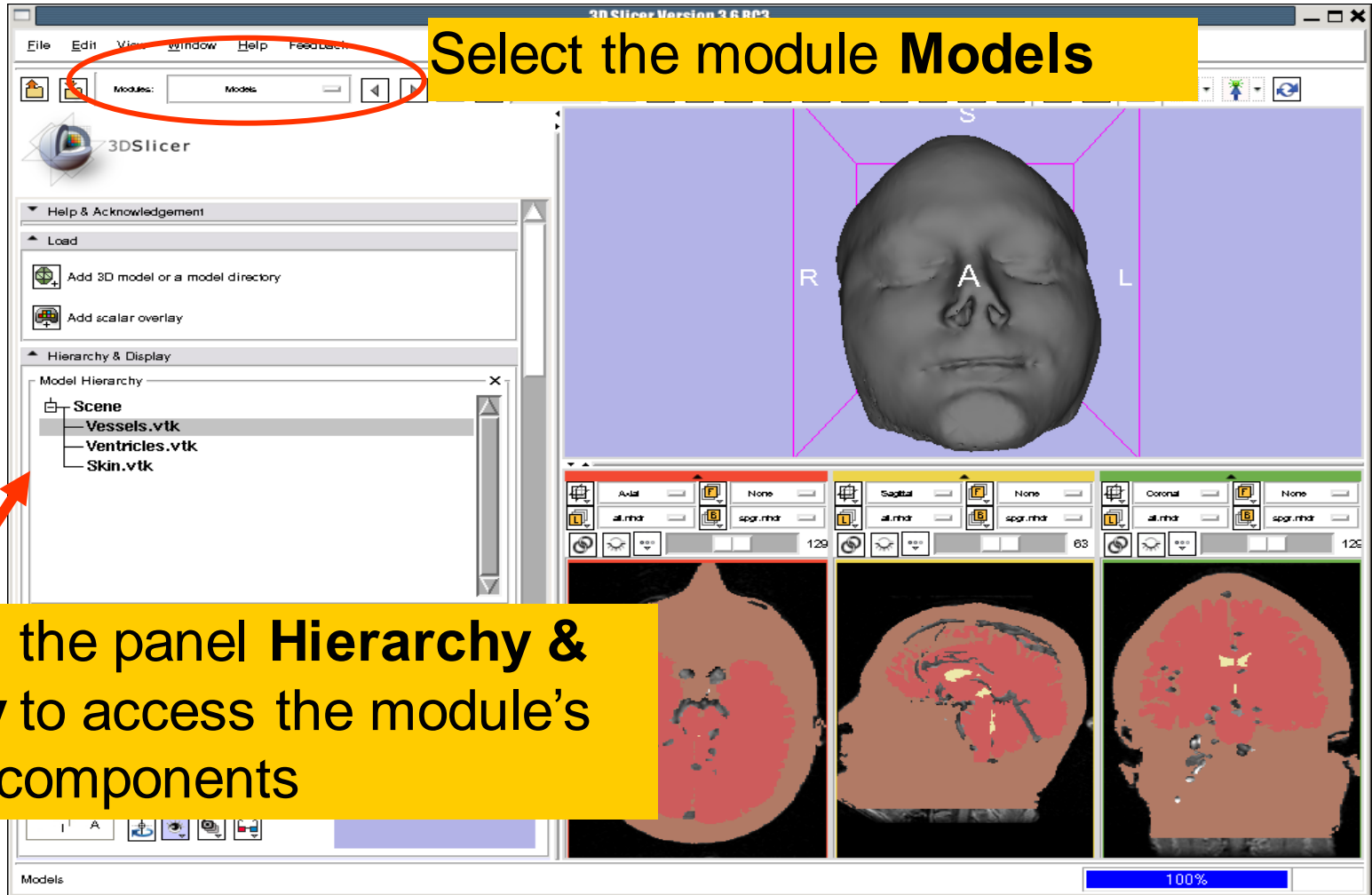


Loading 3D models



Slicer loads the 3D models in the 3D Viewer. The models have been added to the MRML scene.

Loading a 3D model



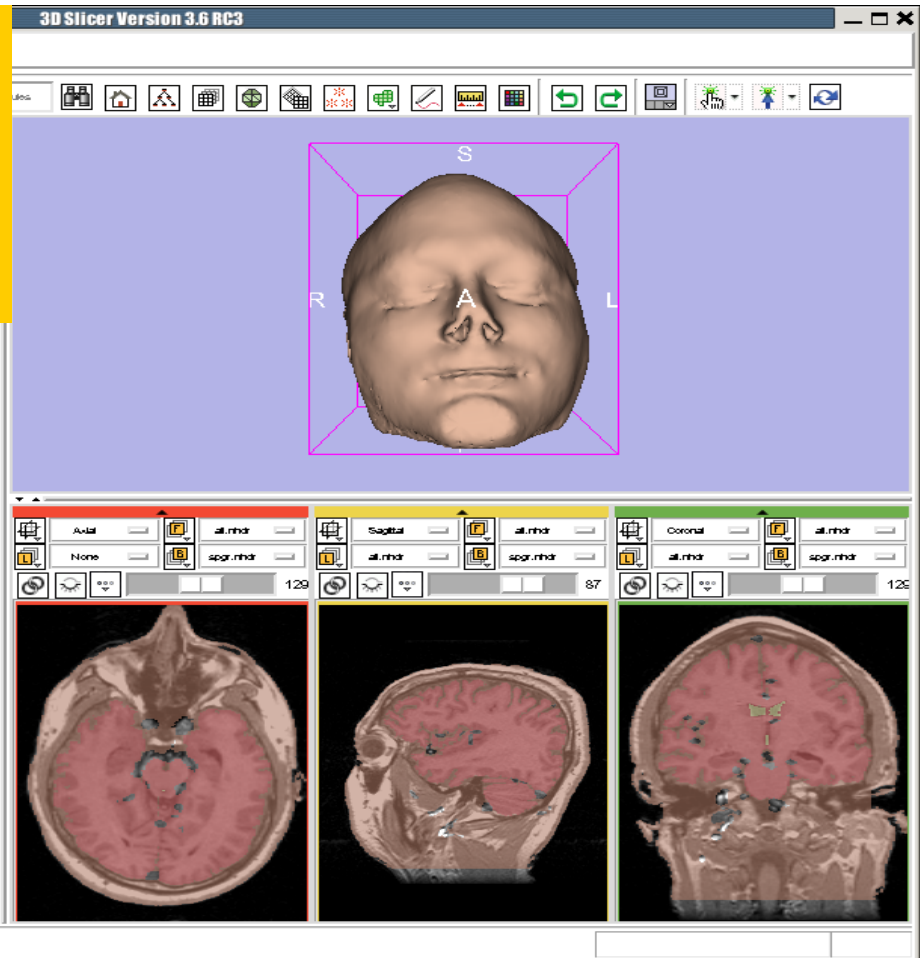
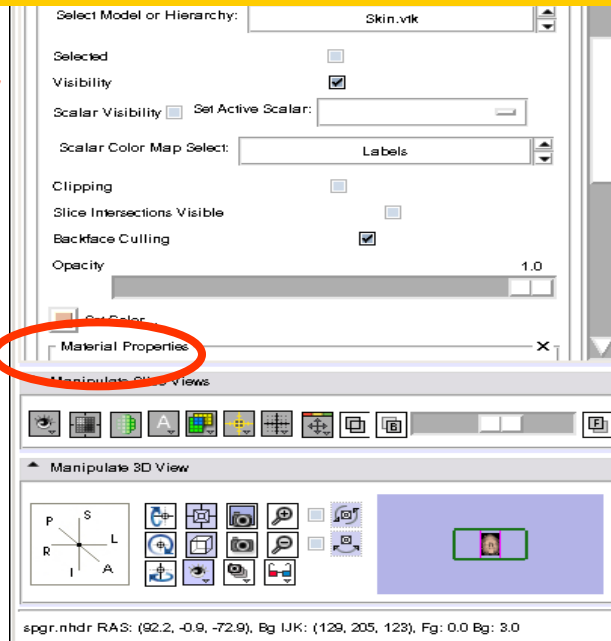
The screenshot shows the 3DSlicer software interface. The main window displays a 3D model of a human face with anatomical labels 'R' (Right), 'A' (Anterior), and 'L' (Left). The interface includes a menu bar at the top, a toolbar, and several panels. A yellow callout box highlights the 'Modules' dropdown menu, which is set to 'Models'. Another yellow callout box points to the 'Hierarchy & Display' panel, which shows a tree view of the scene containing 'Vessels.vtk', 'Ventricles.vtk', and 'Skin.vtk'. Below the main 3D view, there are three smaller views showing different slices of the model: Axial, Sagittal, and Coronal. The status bar at the bottom indicates 'Models' and '100%' zoom.

Select the module **Models**

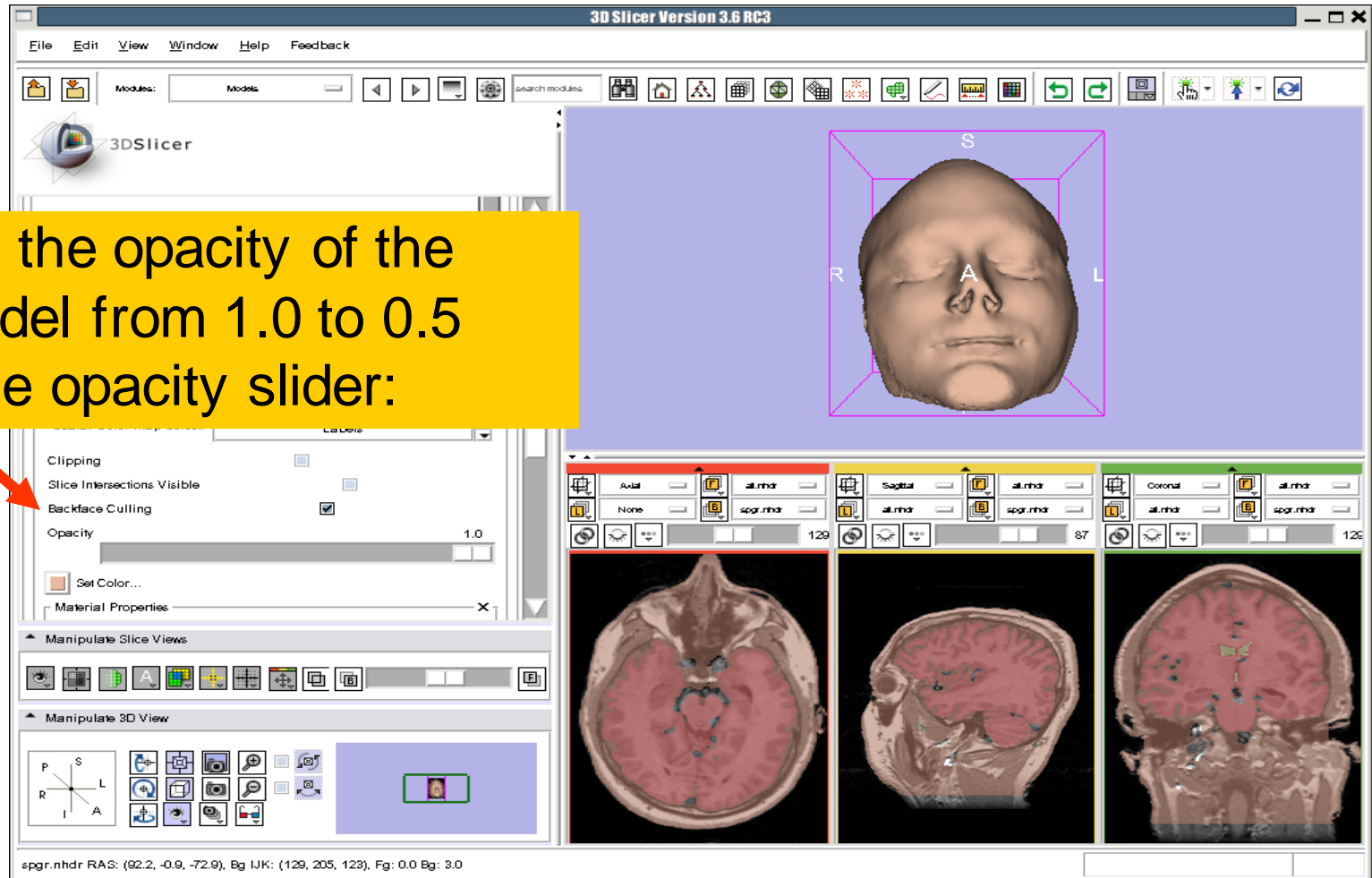
Click on the panel **Hierarchy & Display** to access the module's display components

Visualizing a 3D model

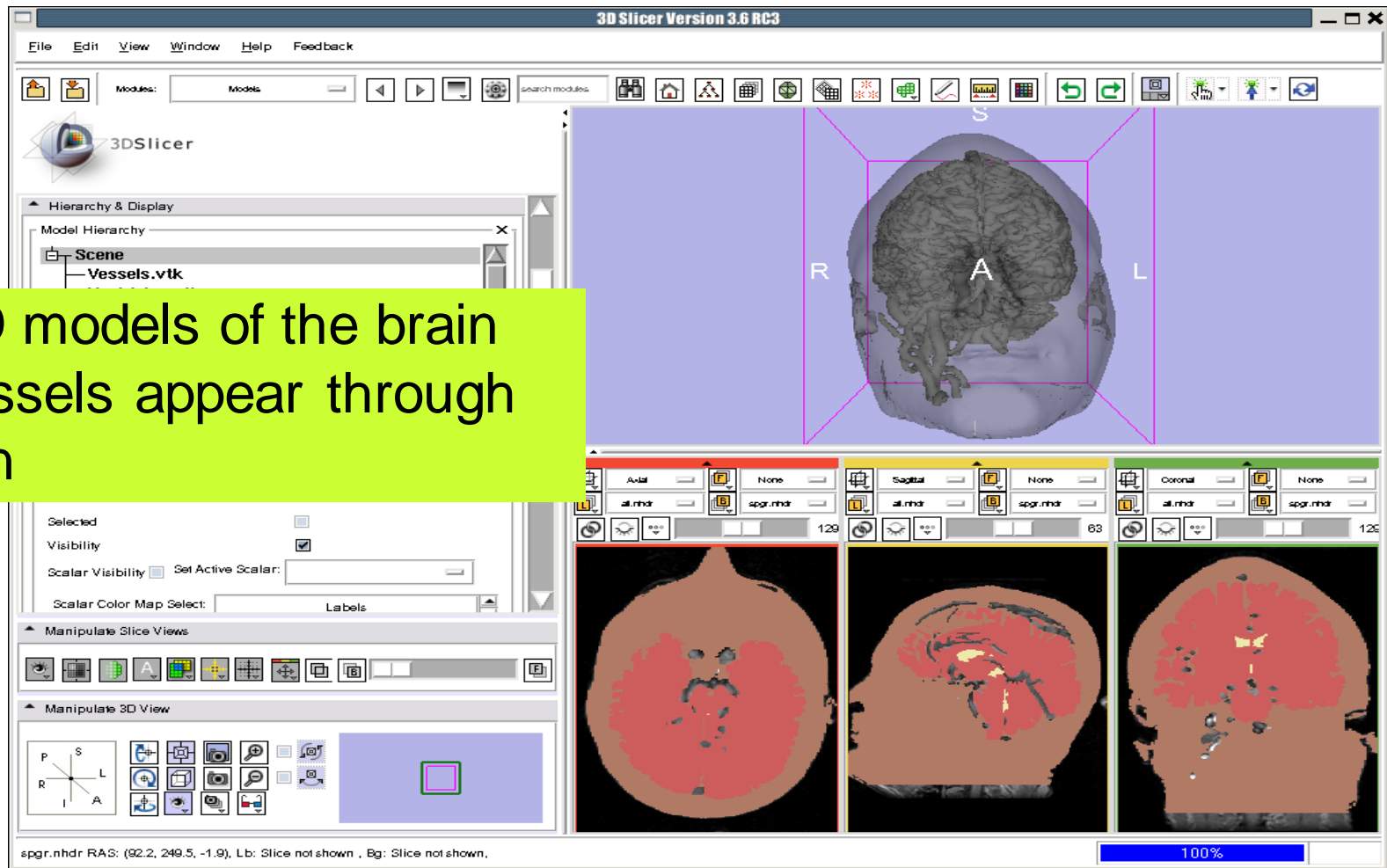
Select the model **Skin.vtk**
Click on the icon **Set Color**
and choose a new color for
the 3D model of the head.



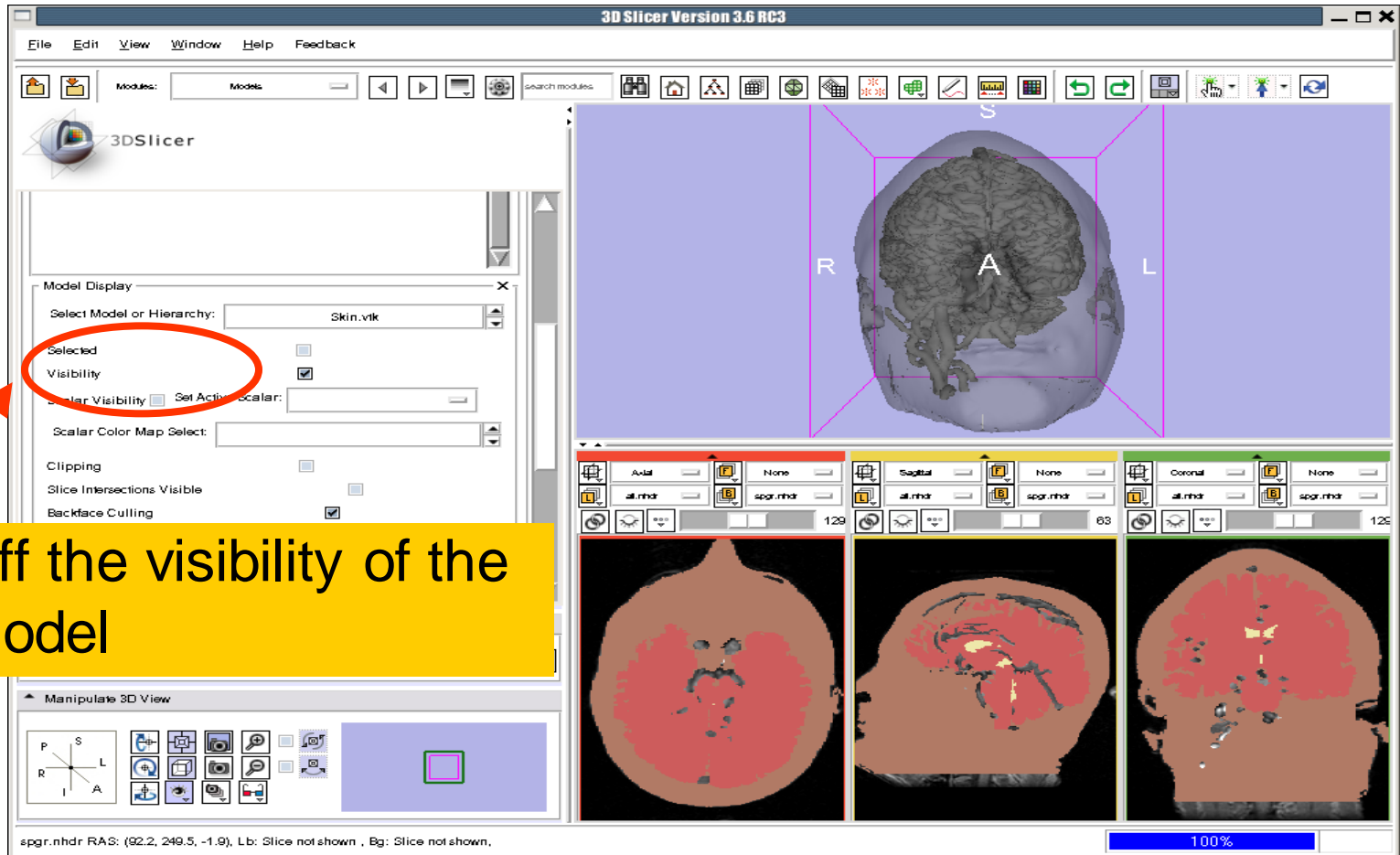
Visualizing a 3D model



Visualizing a 3D model

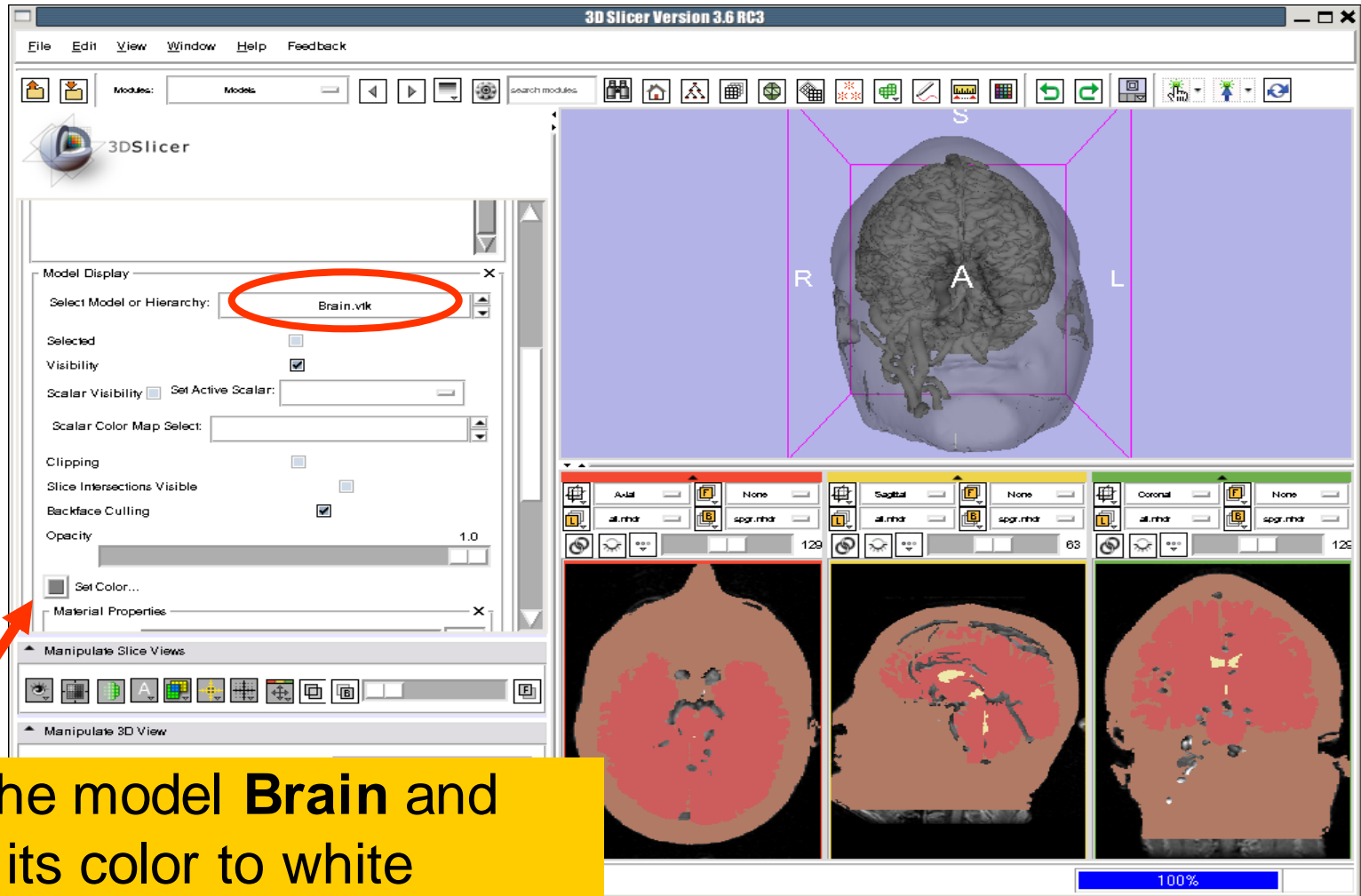


Visualizing a 3D model



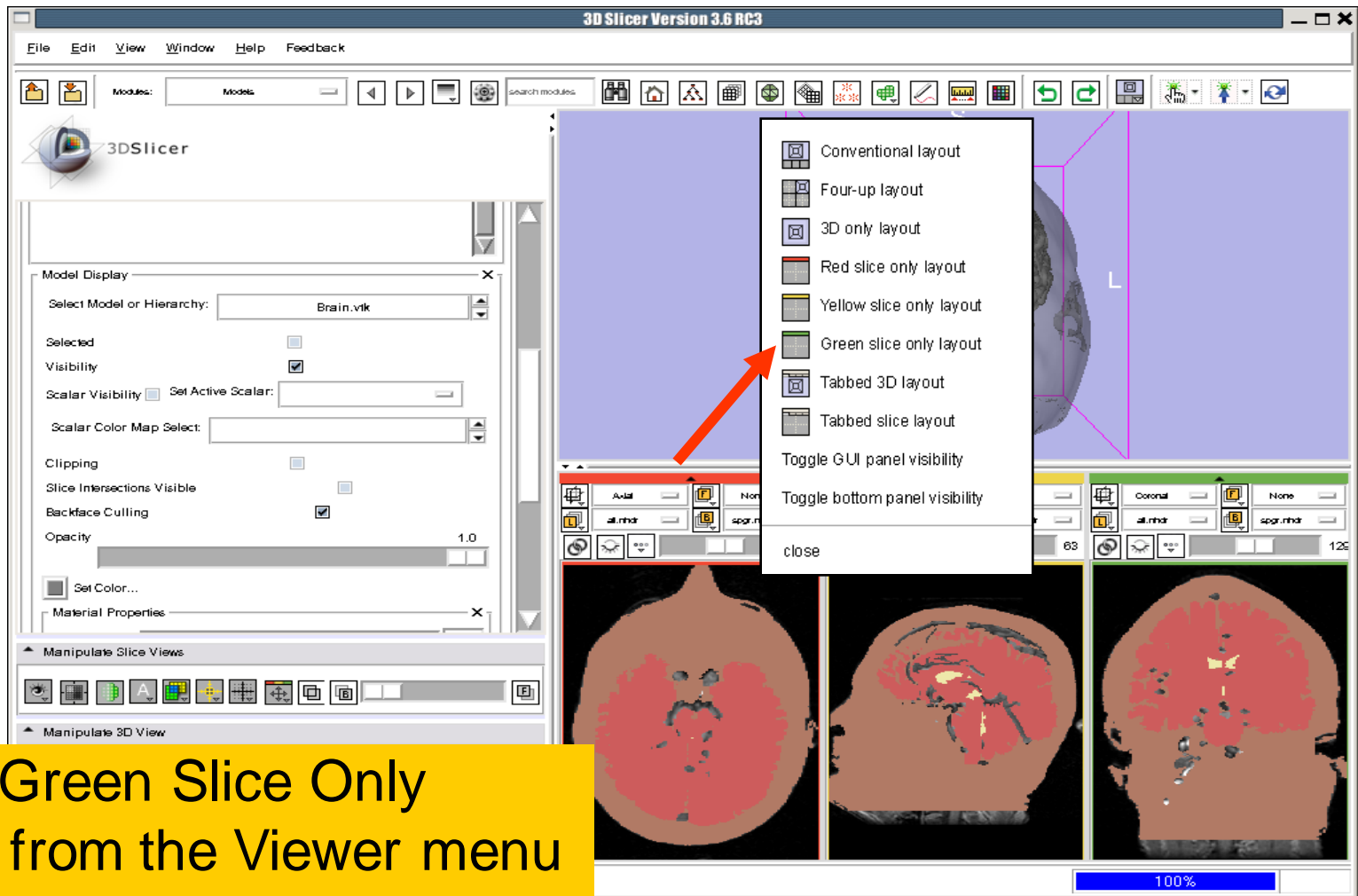
Turn off the visibility of the skin model

Visualizing a 3D model



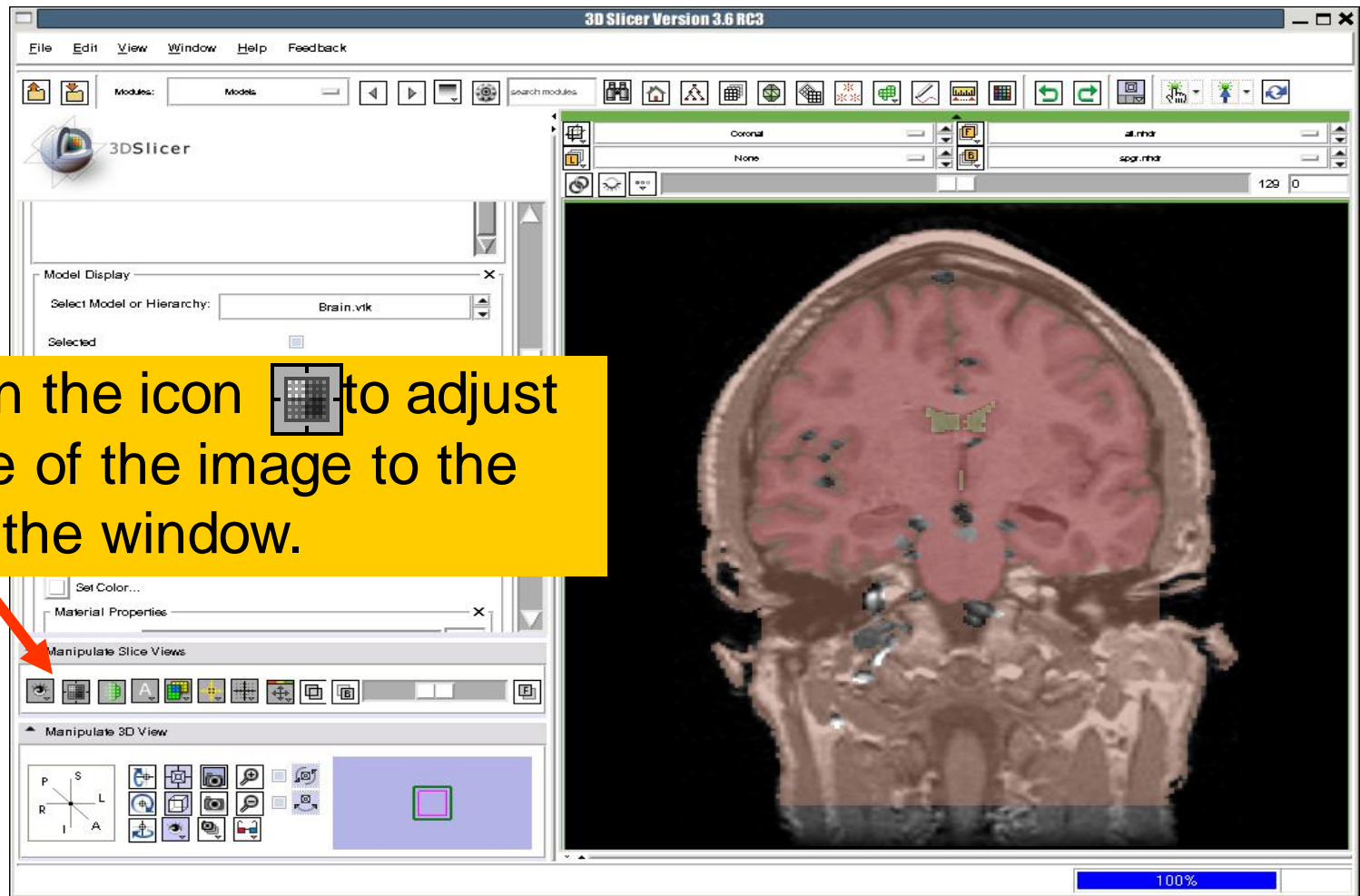
Select the model **Brain** and change its color to white

Visualizing a 3D model

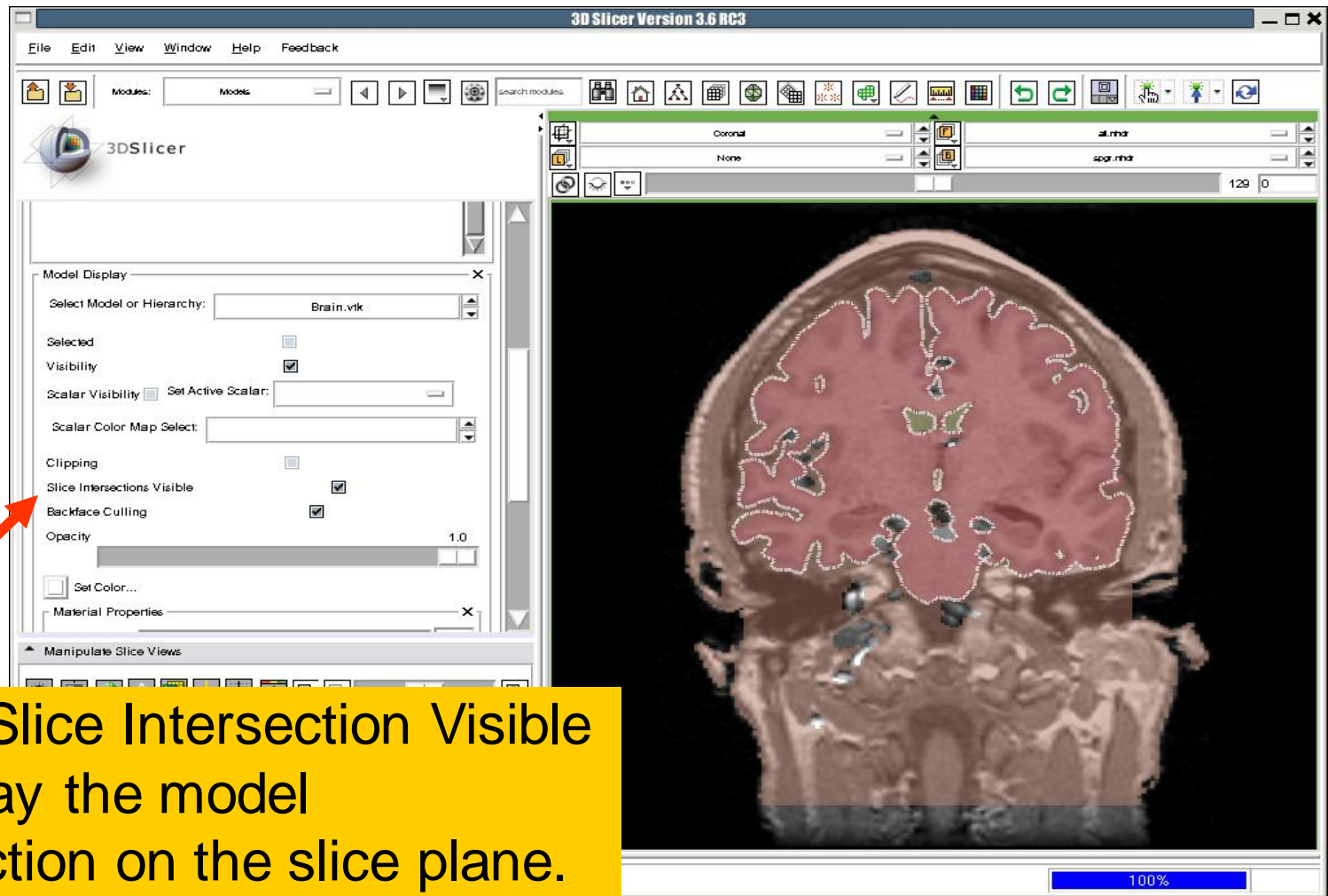


Select Green Slice Only
Layout from the Viewer menu

Visualizing a 3D model

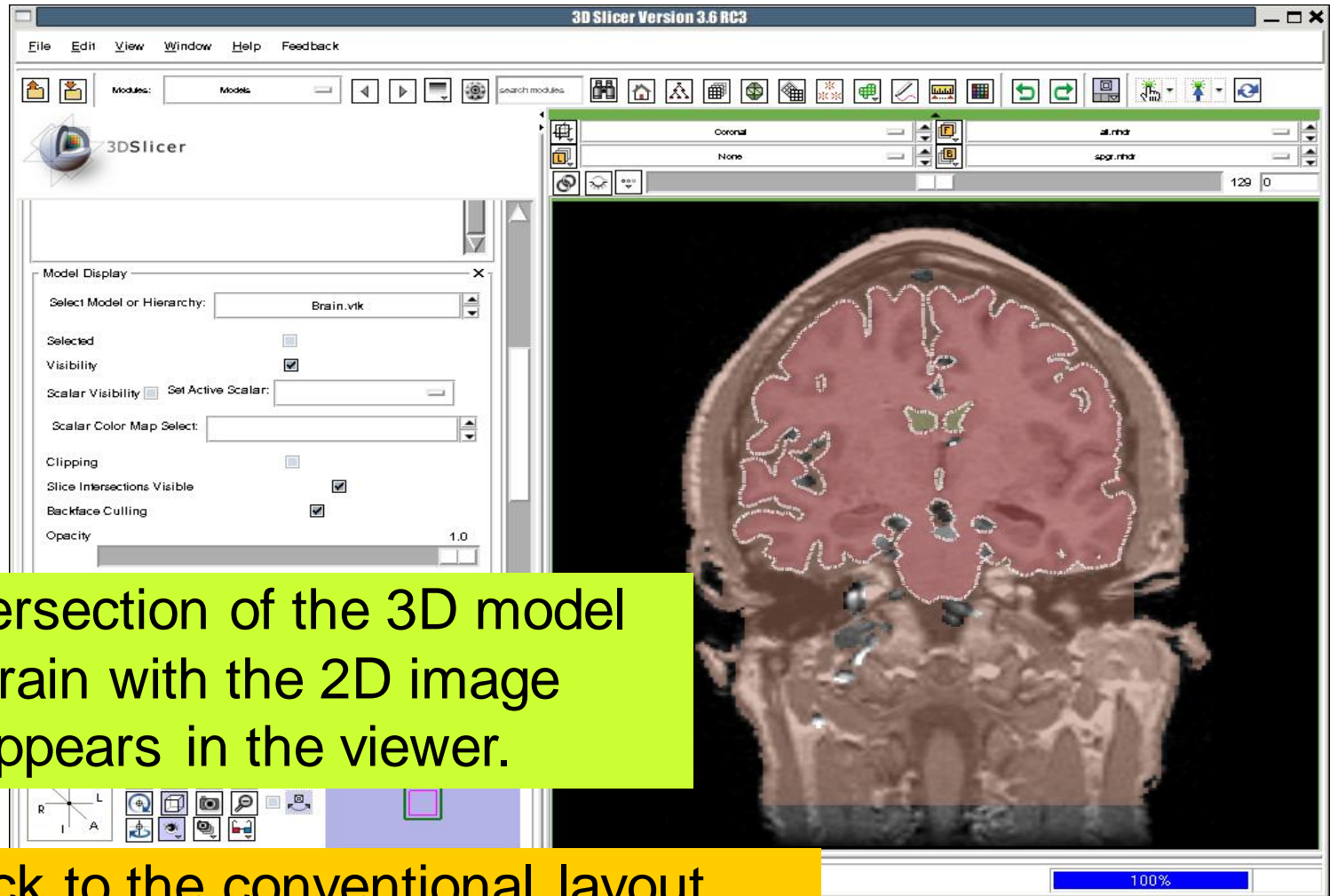


Visualizing a 3D model



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

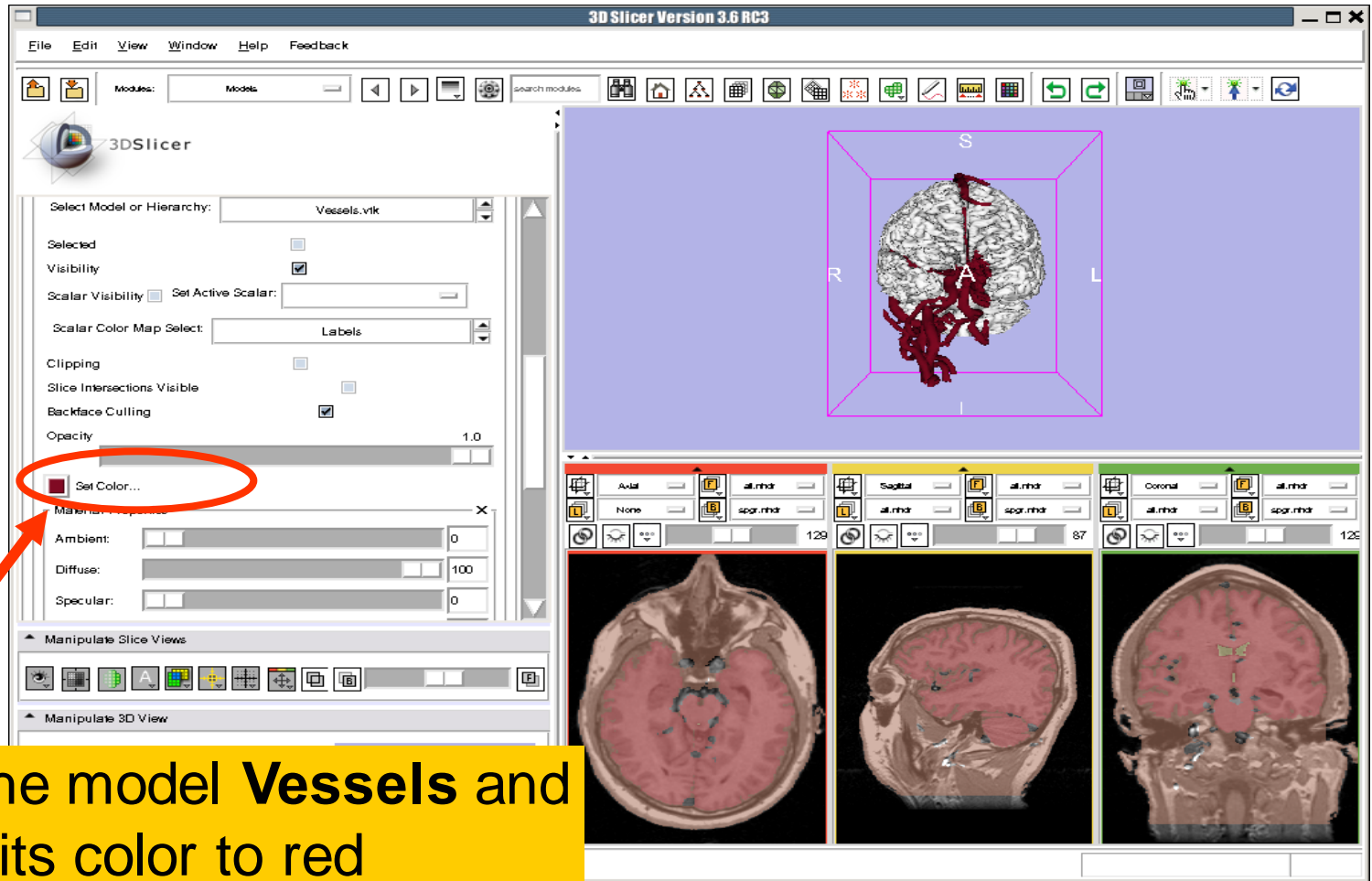
Visualizing a 3D model



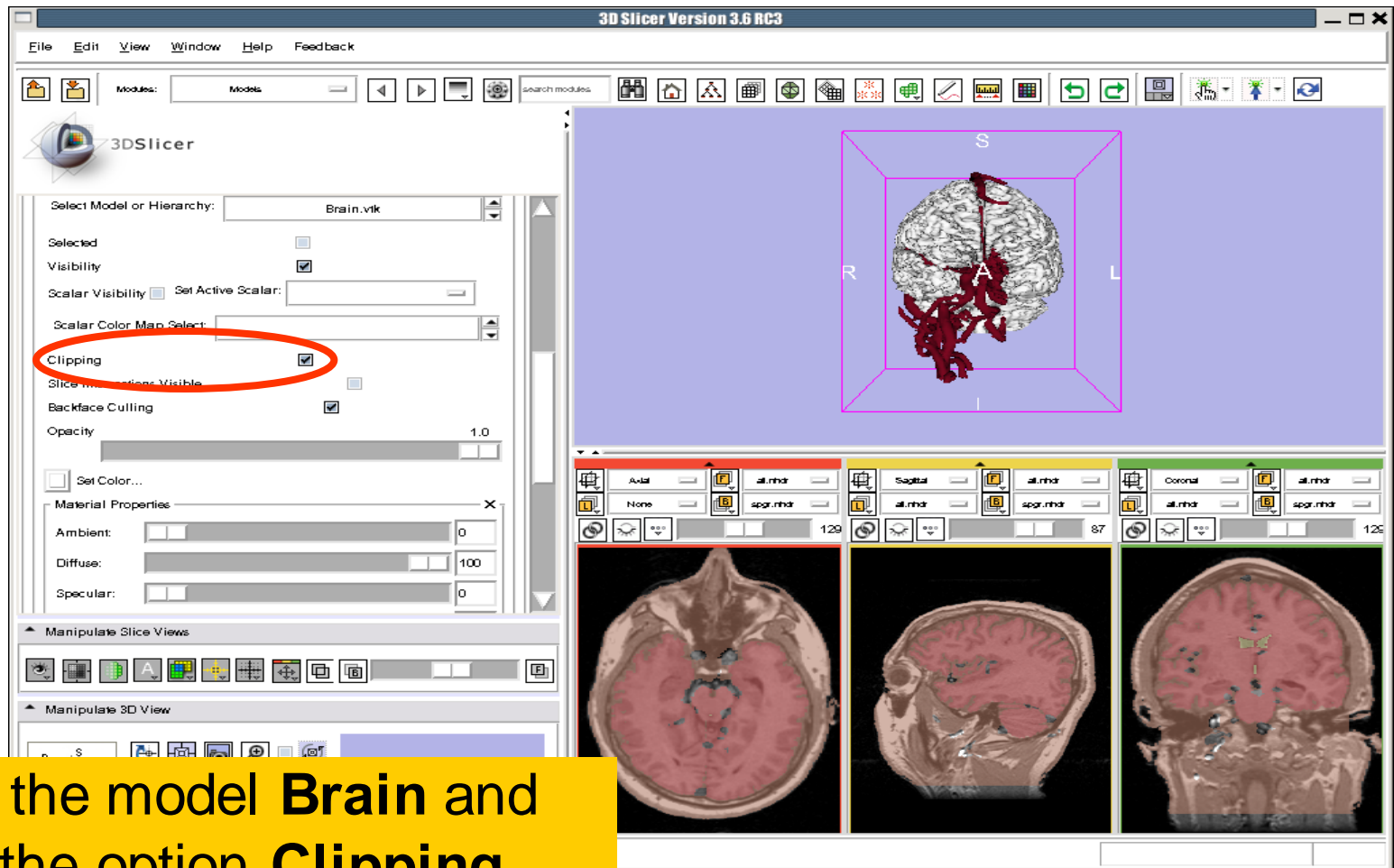
The intersection of the 3D model of the brain with the 2D image plane appears in the viewer.

Go back to the conventional layout

Visualizing a 3D model

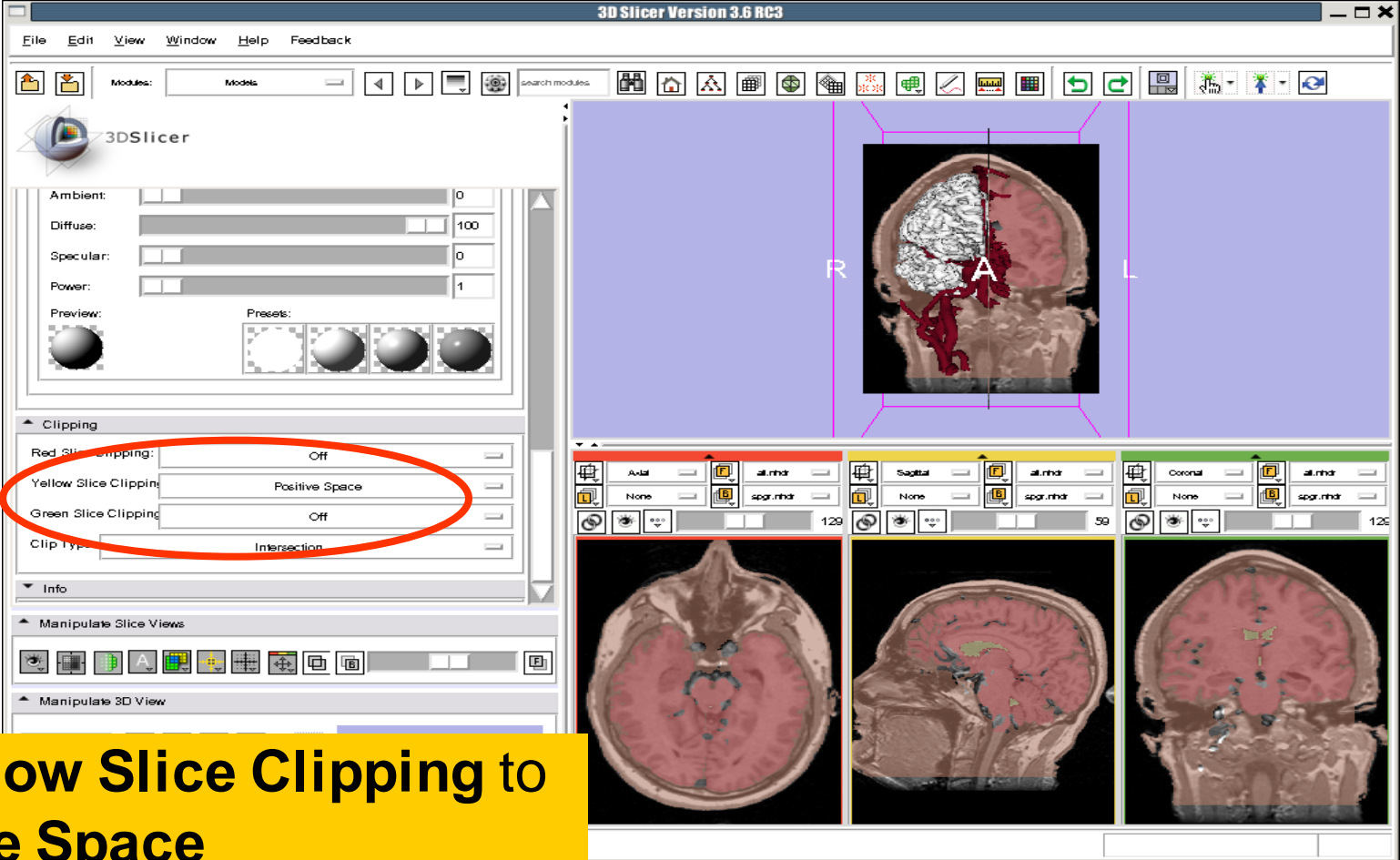


Visualizing a 3D model



Select the model **Brain** and select the option **Clipping**

Visualizing a 3D model



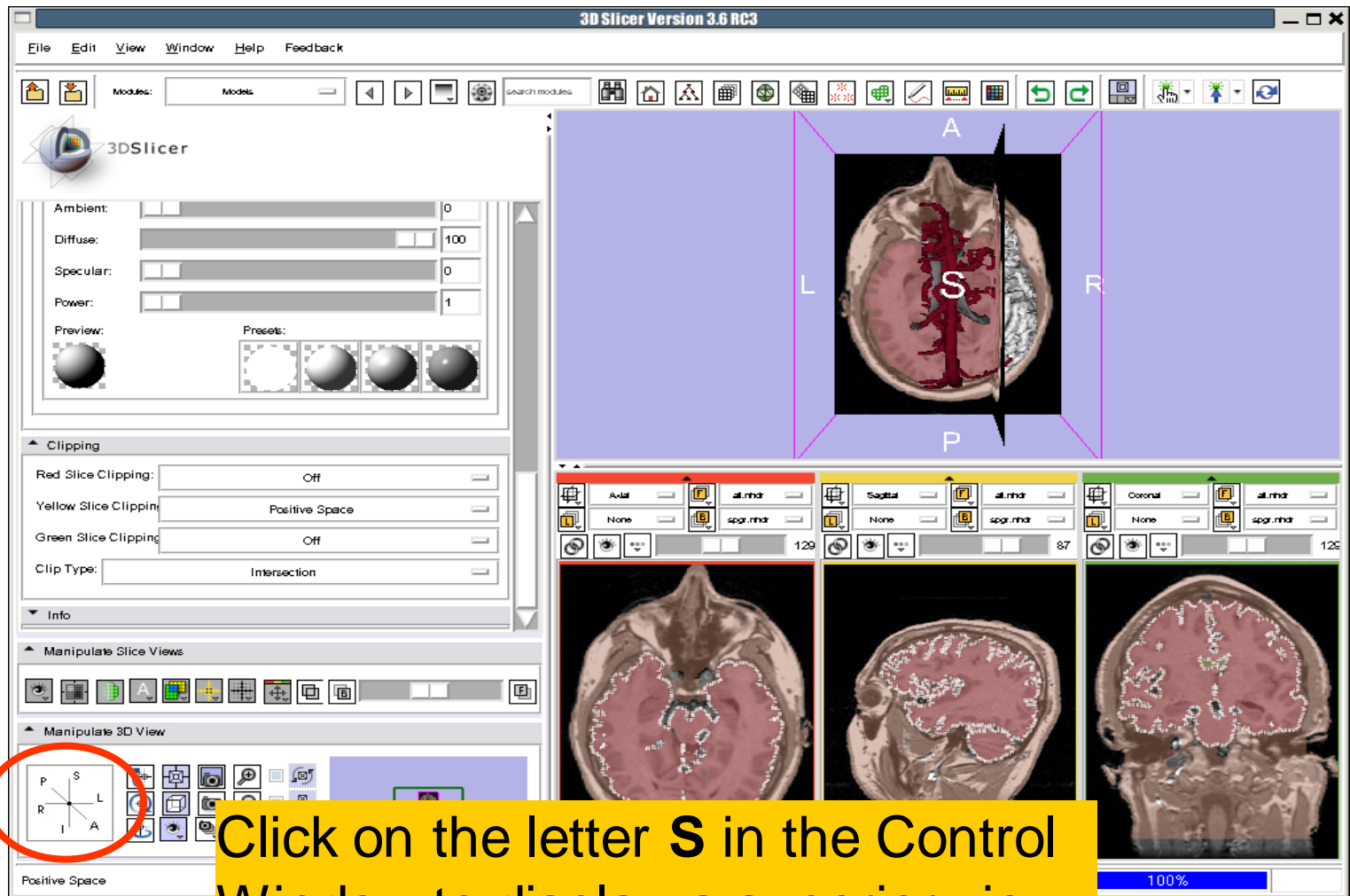
The screenshot shows the 3D Slicer software interface. The main window displays a 3D model of a brain with red vessels. The interface includes a menu bar (File, Edit, View, Window, Help, Feedback), a toolbar, and a sidebar with various settings. The 'Clipping' section is highlighted with a red circle, showing the following settings:

| Clipping Type | Setting |
|-----------------------|----------------|
| Red Slice Clipping | Off |
| Yellow Slice Clipping | Positive Space |
| Green Slice Clipping | Off |
| Clip Type | Intersection |

The bottom of the interface shows three slice views: Axial, Sagittal, and Coronal. The 'Yellow Slice Clipping' setting is highlighted in a yellow box.

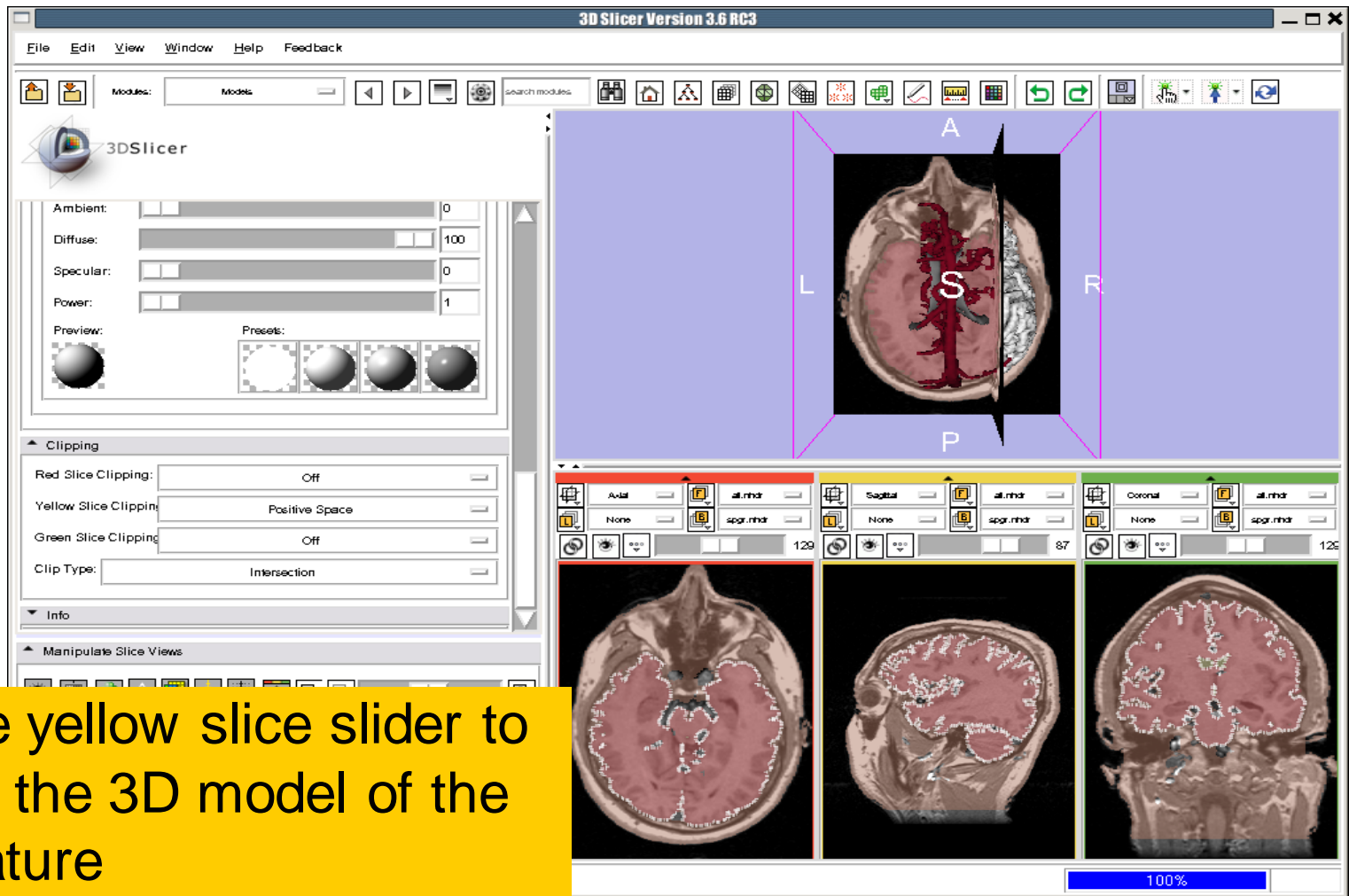
Set Yellow Slice Clipping to Positive Space

Visualizing a 3D model

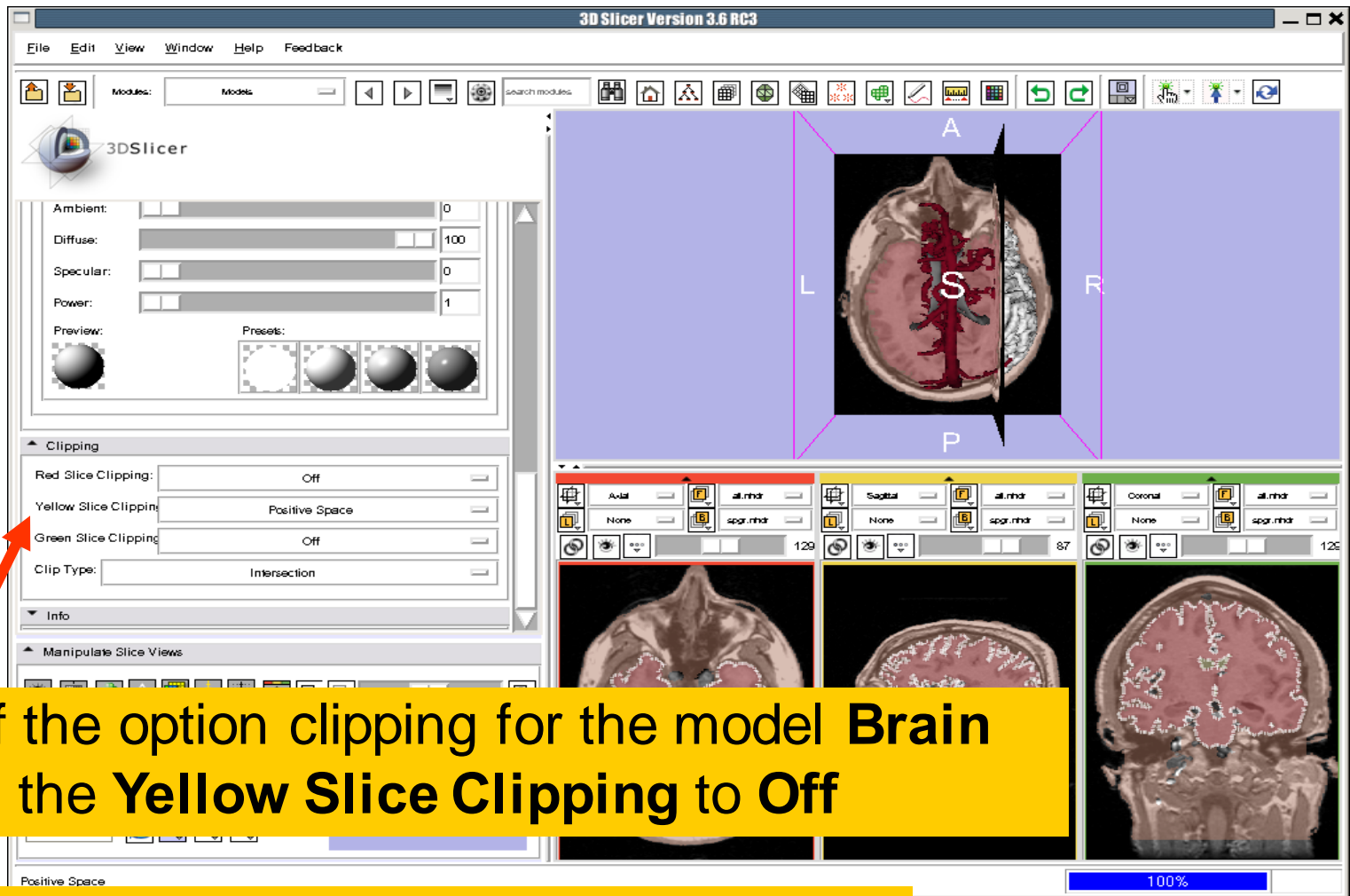


Click on the letter **S** in the Control Window to display a superior view of the 3D models

Visualizing a 3D model



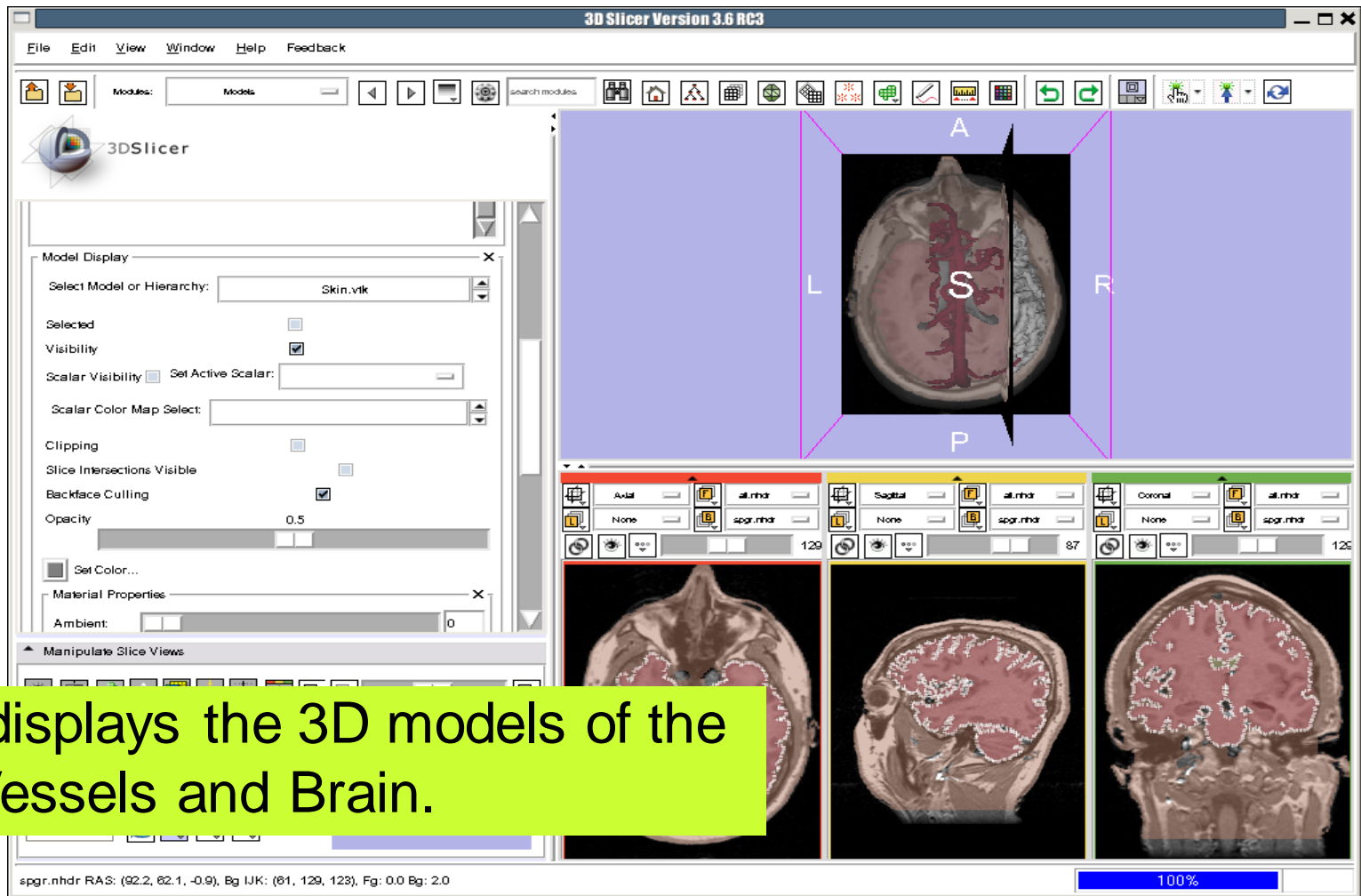
Visualizing a 3D model



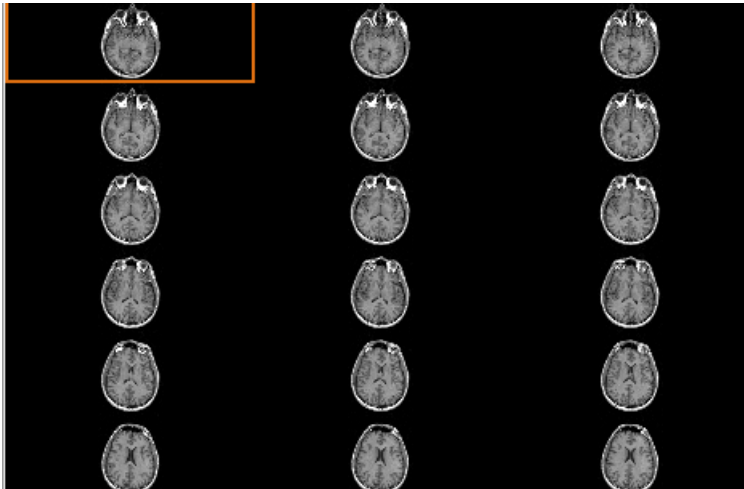
Turn off the option clipping for the model **Brain** and set the **Yellow Slice Clipping** to **Off**

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

Visualizing a 3D model

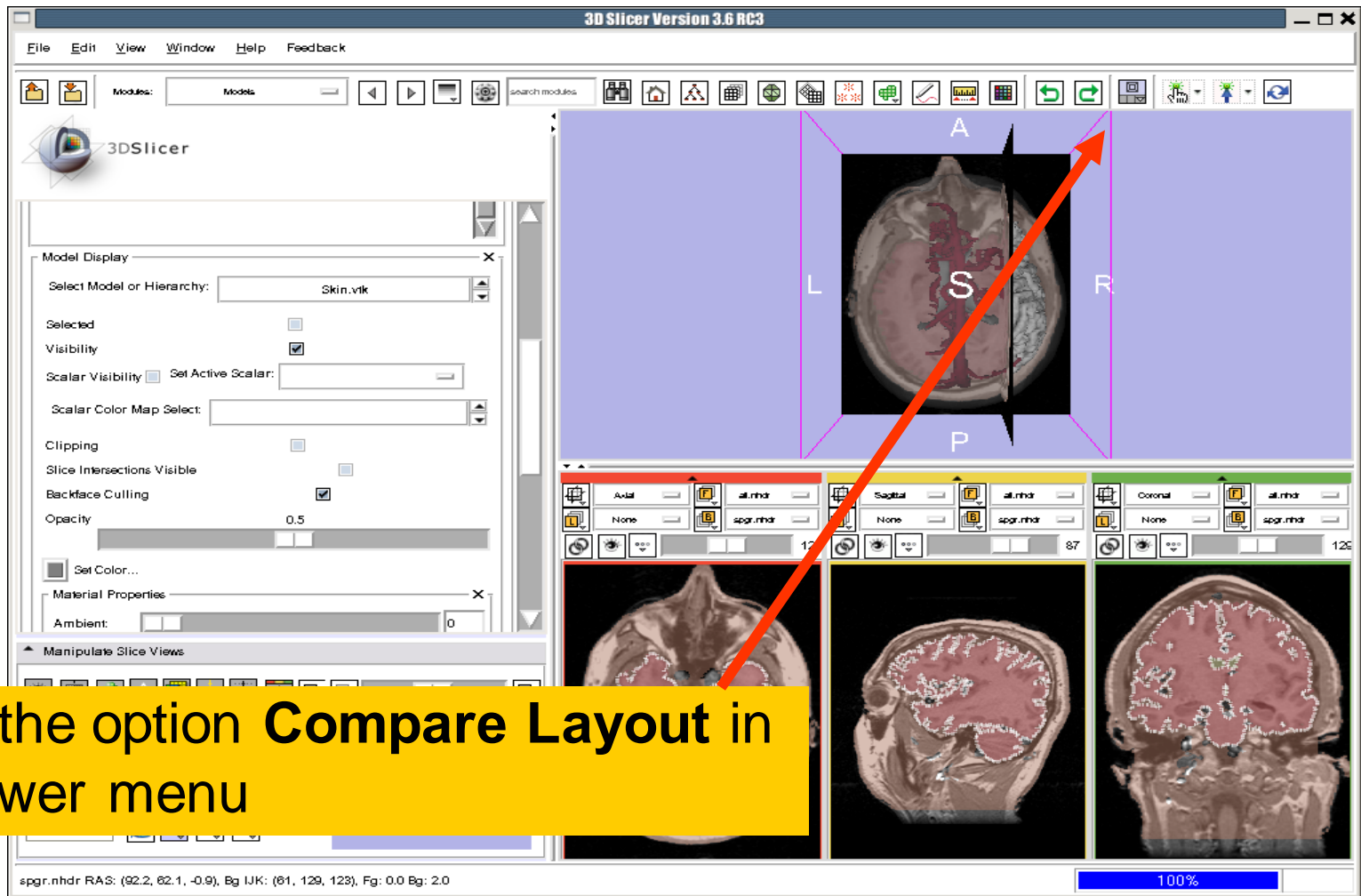


Slicer displays the 3D models of the Skin, Vessels and Brain.

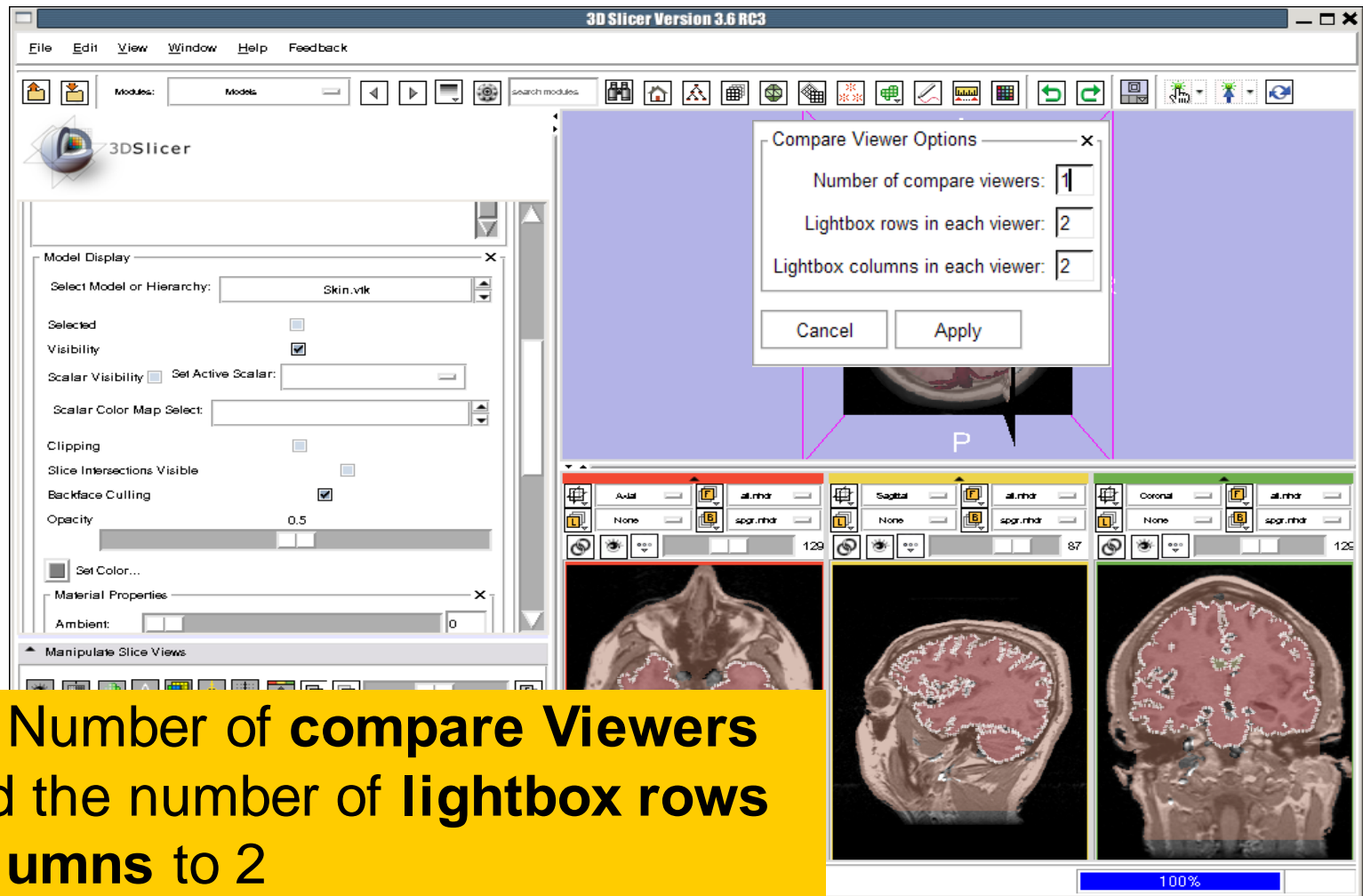


Part 4: Lightbox viewer

Visualizing a 3D model



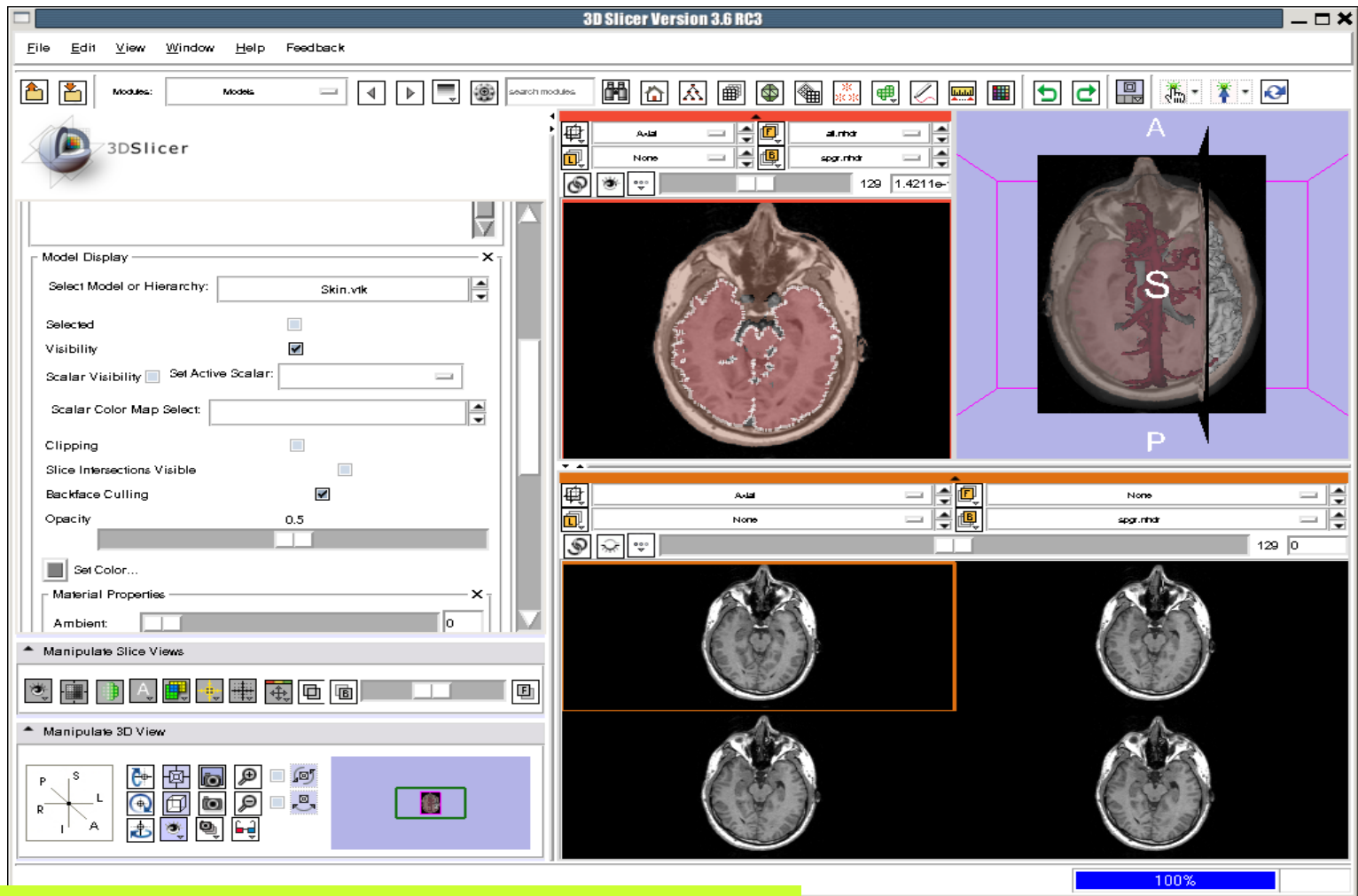
Visualizing a 3D model



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

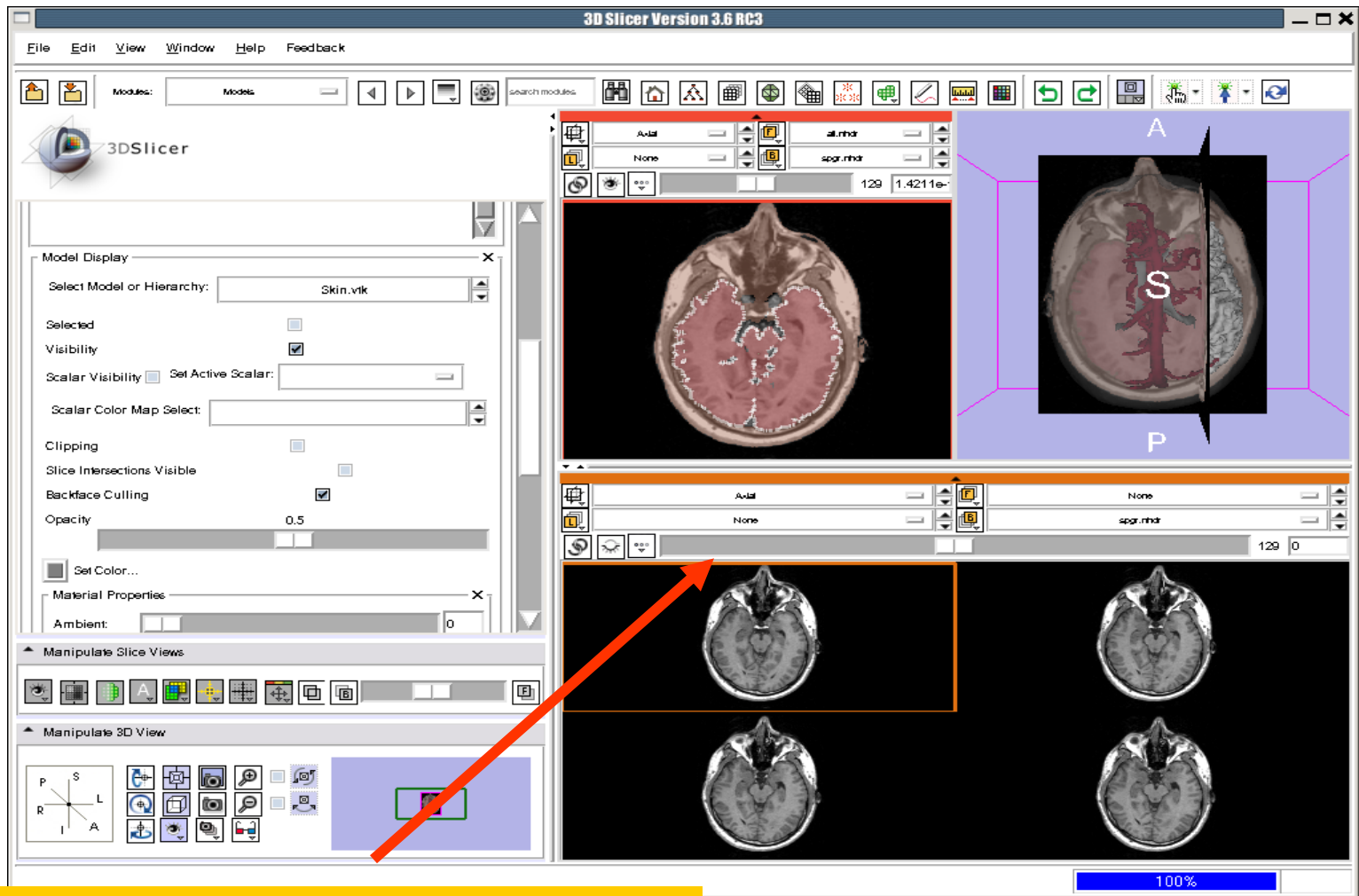
Click on **Apply**

Lightbox viewer



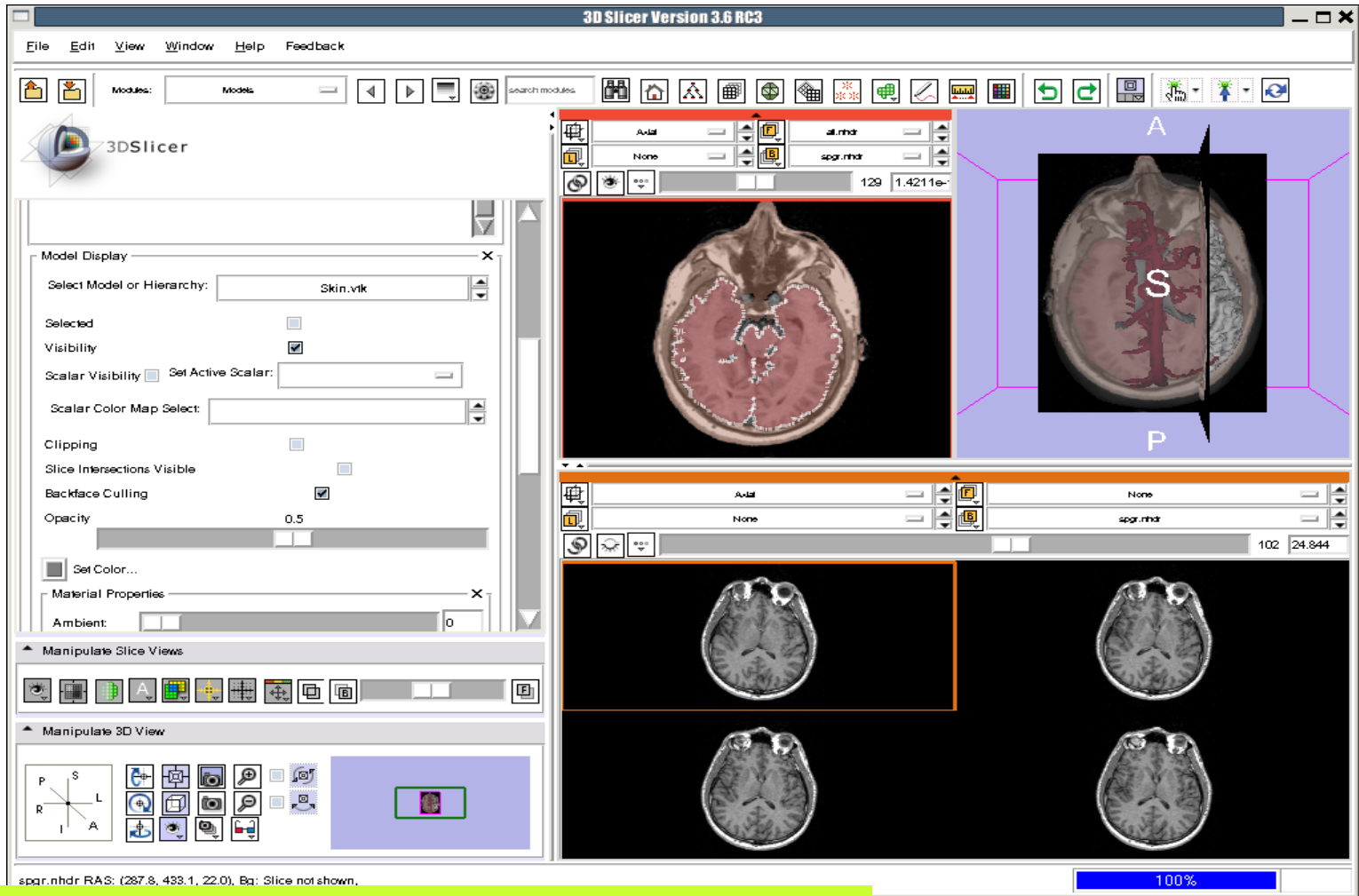
Slicer displays a lightbox view of the Background dataset.

Lightbox viewer



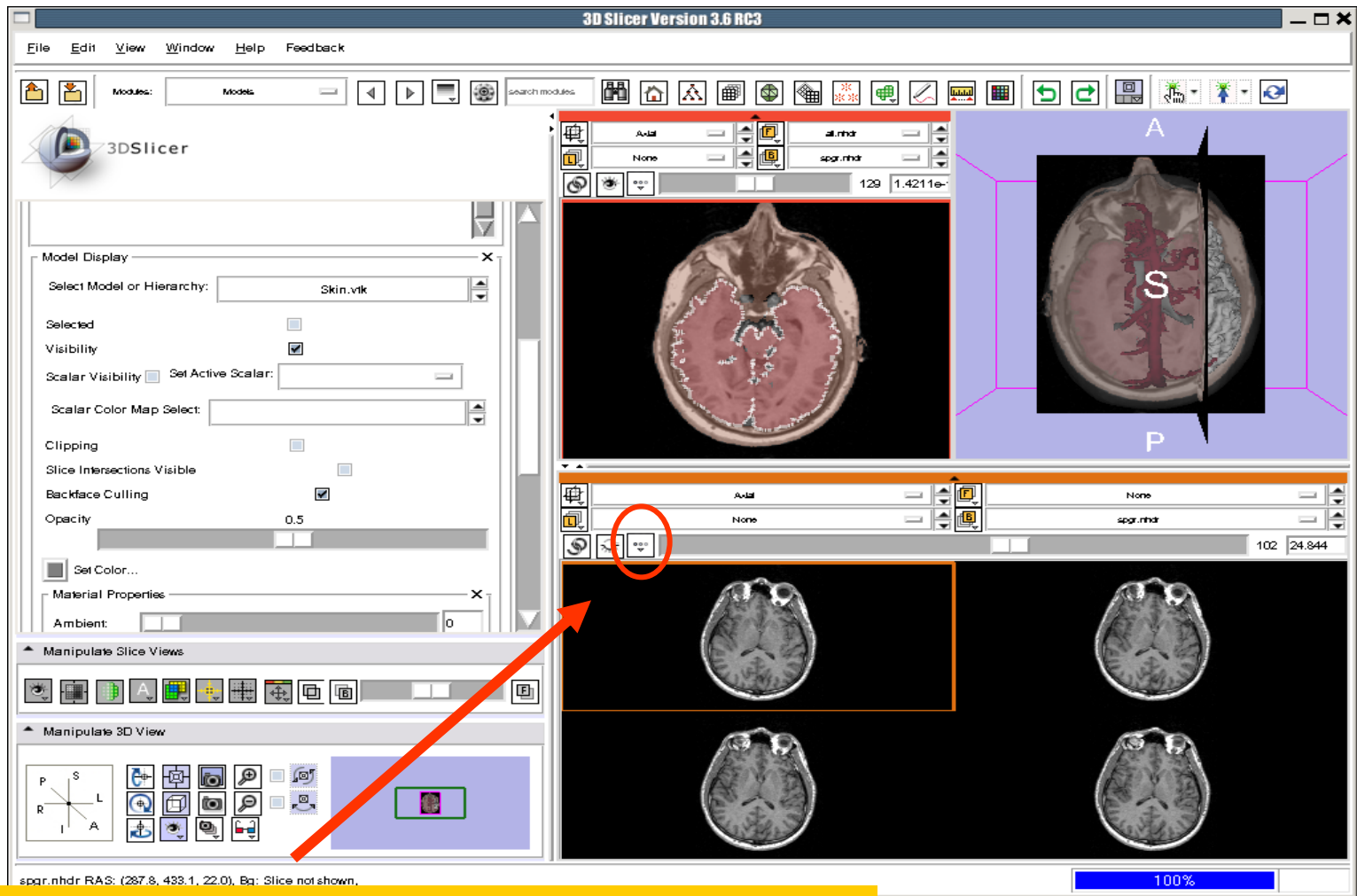
Browse through the spgr volume using the lightbox slider

Lightbox viewer



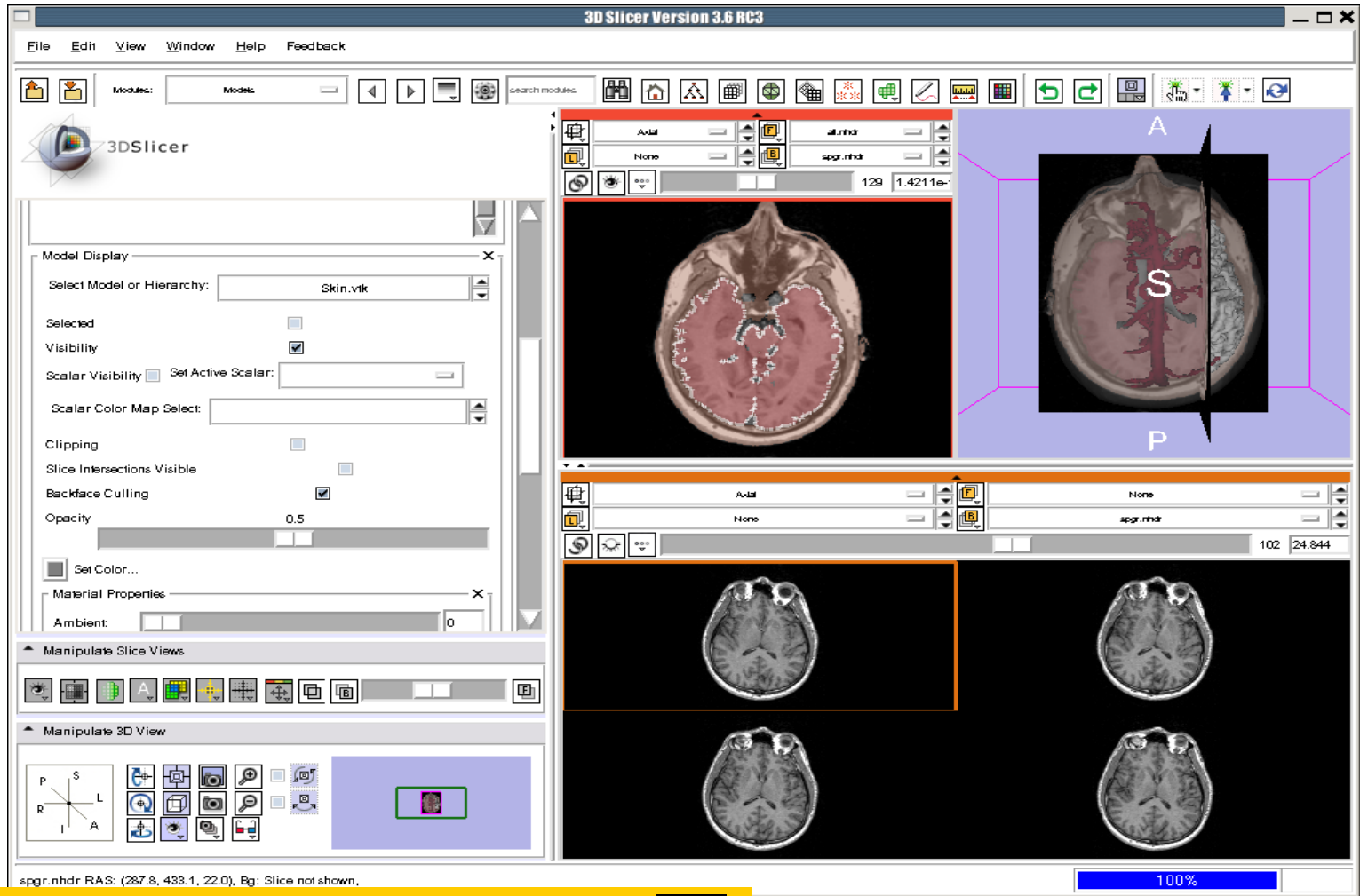
Slicer displays 4 adjacent axial slices of the spgr volume simultaneously

Lightbox viewer



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

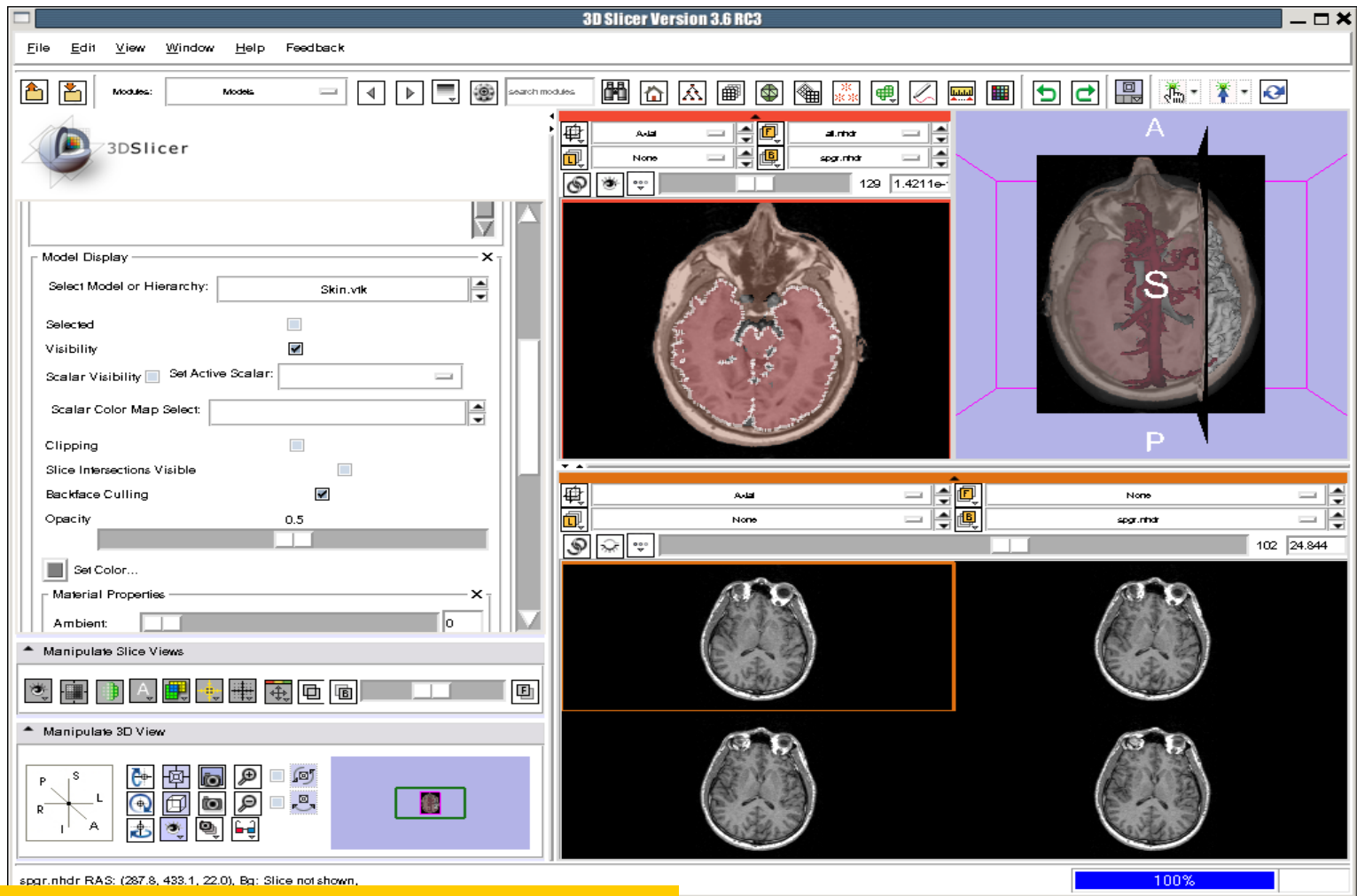
Lightbox viewer



Select the **lightbox view** option

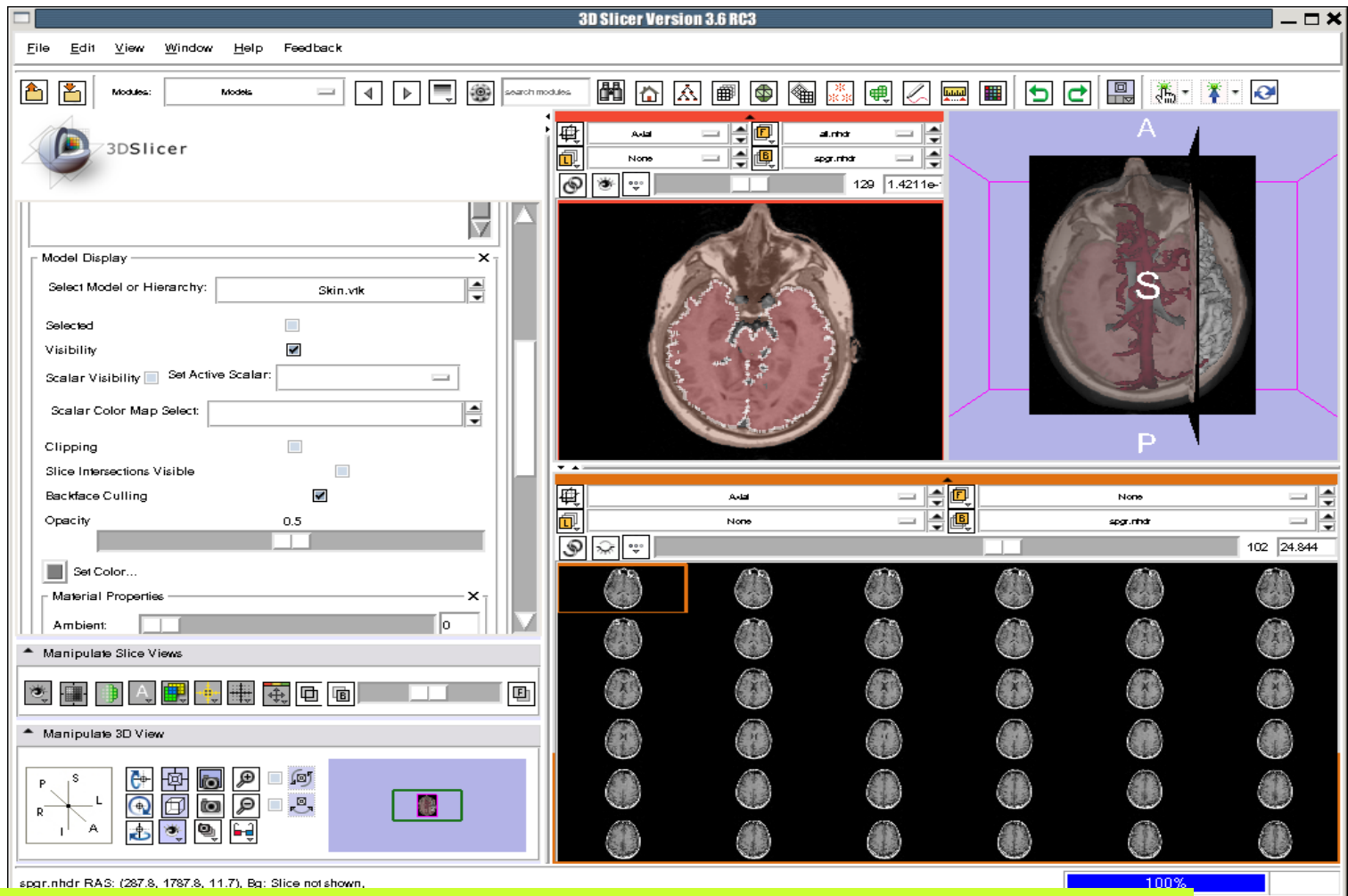


Lightbox viewer



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

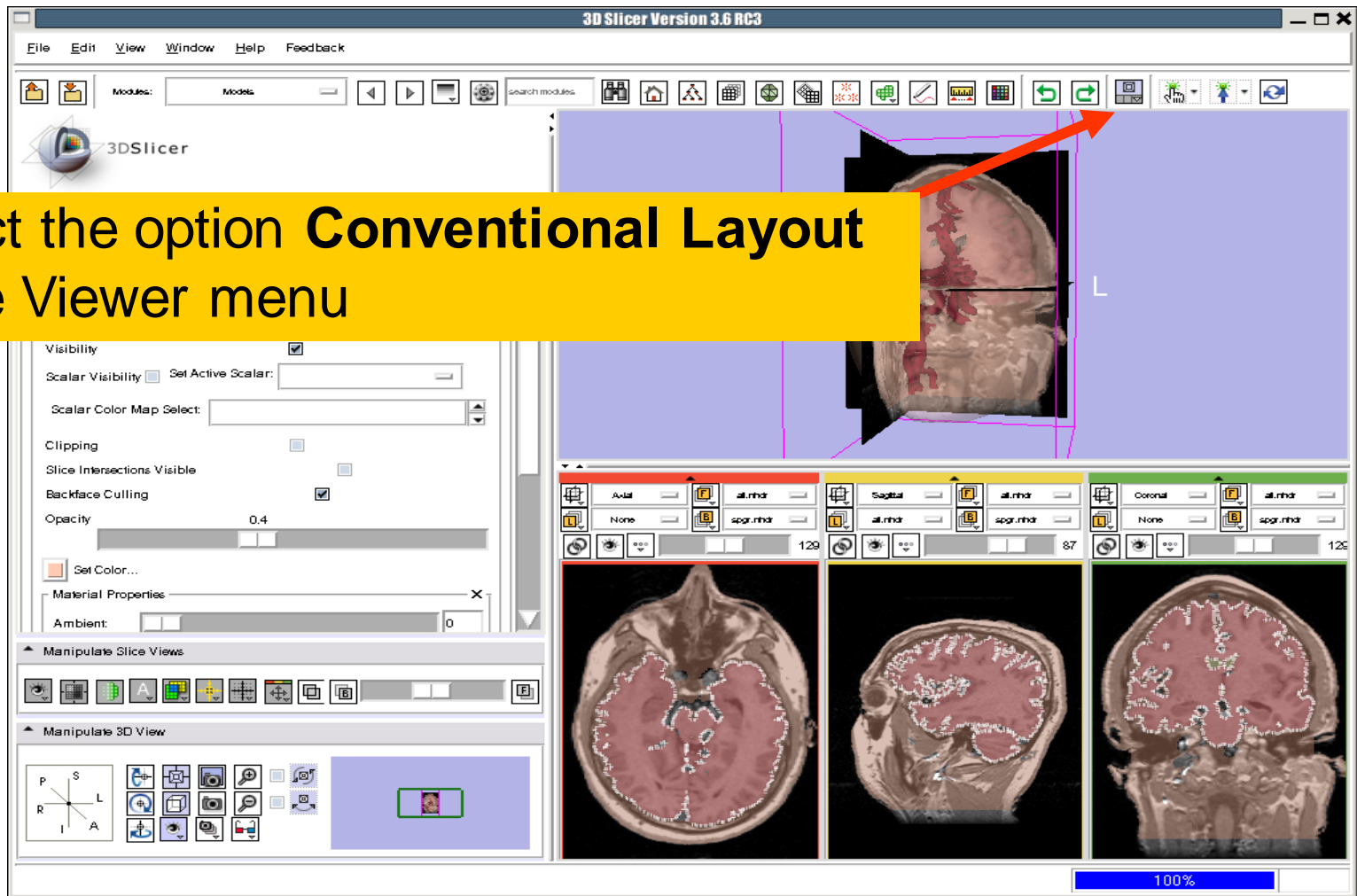
Lightbox viewer

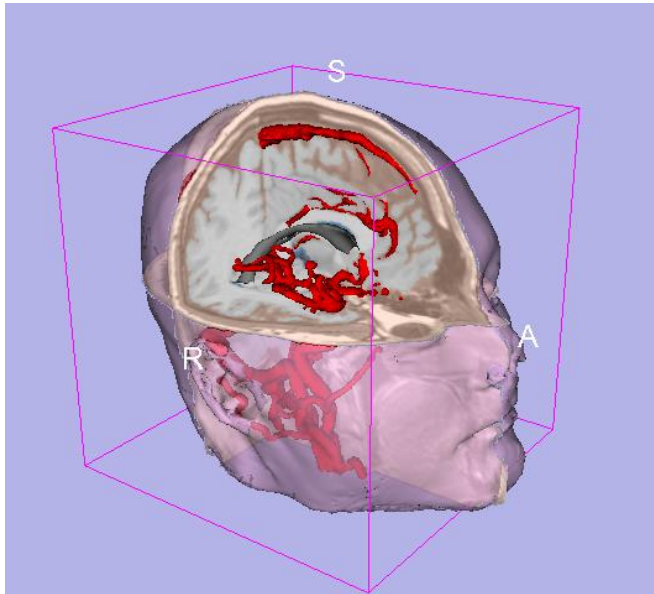


Slicer displays a matrix of 36 adjacent axial slices of the spqr volume.

Lightbox viewer

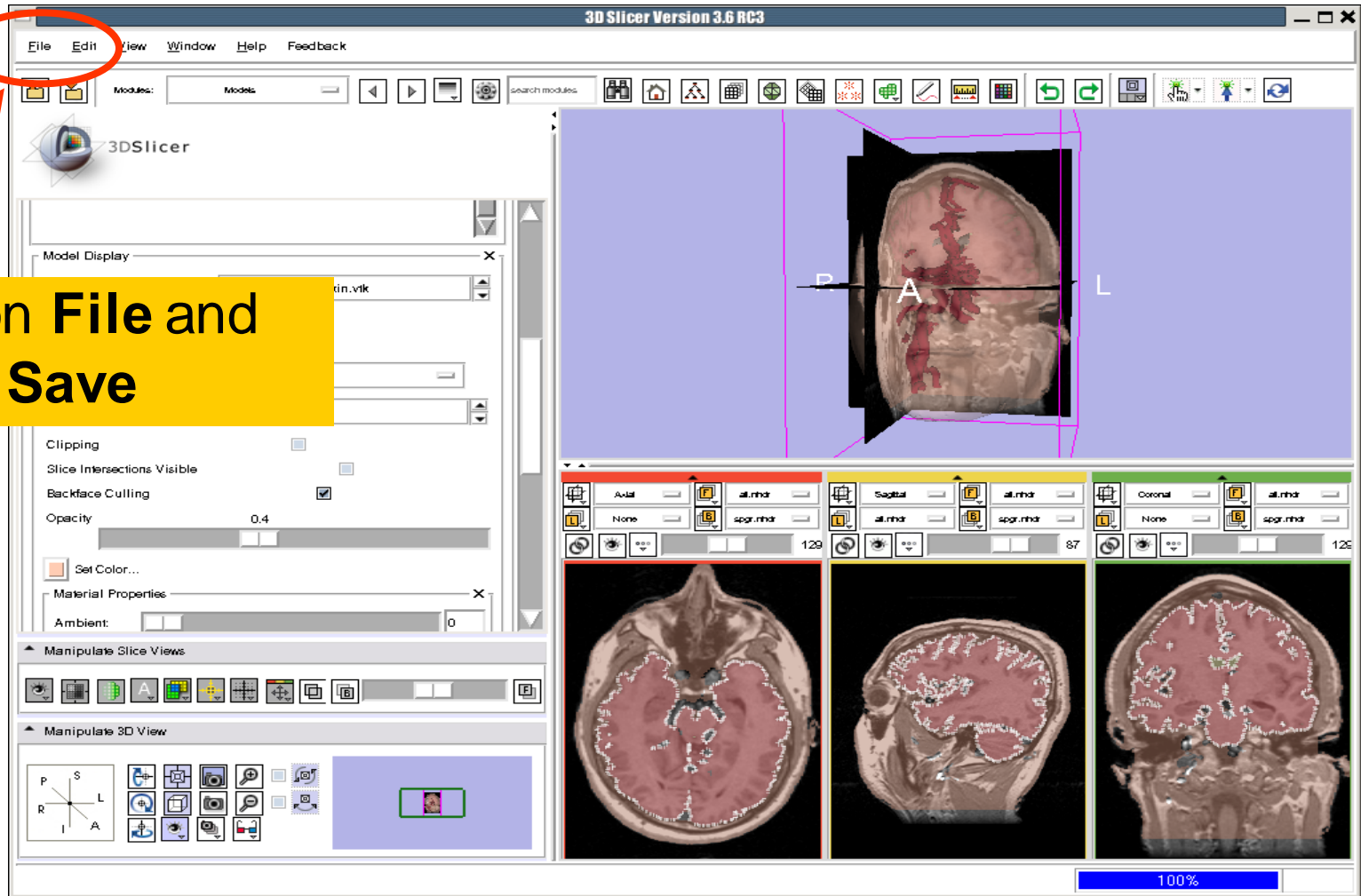
Select the option **Conventional Layout** in the Viewer menu





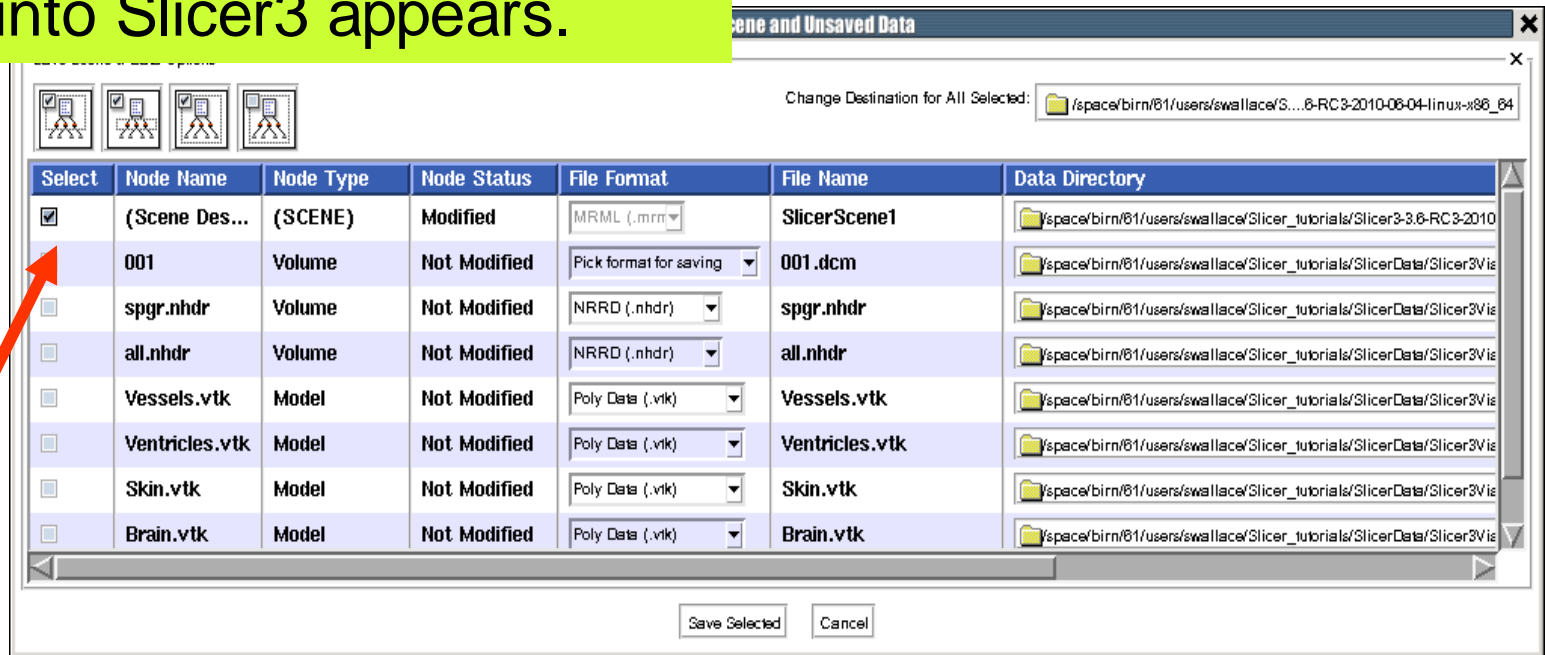
Part 5: Loading and saving a Scene

Saving Data



Saving Data

The list of elements currently loaded into Slicer3 appears.



Change Destination for All Selected: /space/birn/81/users/swallace/S...8-RC3-2010-06-04-linux-x86_64

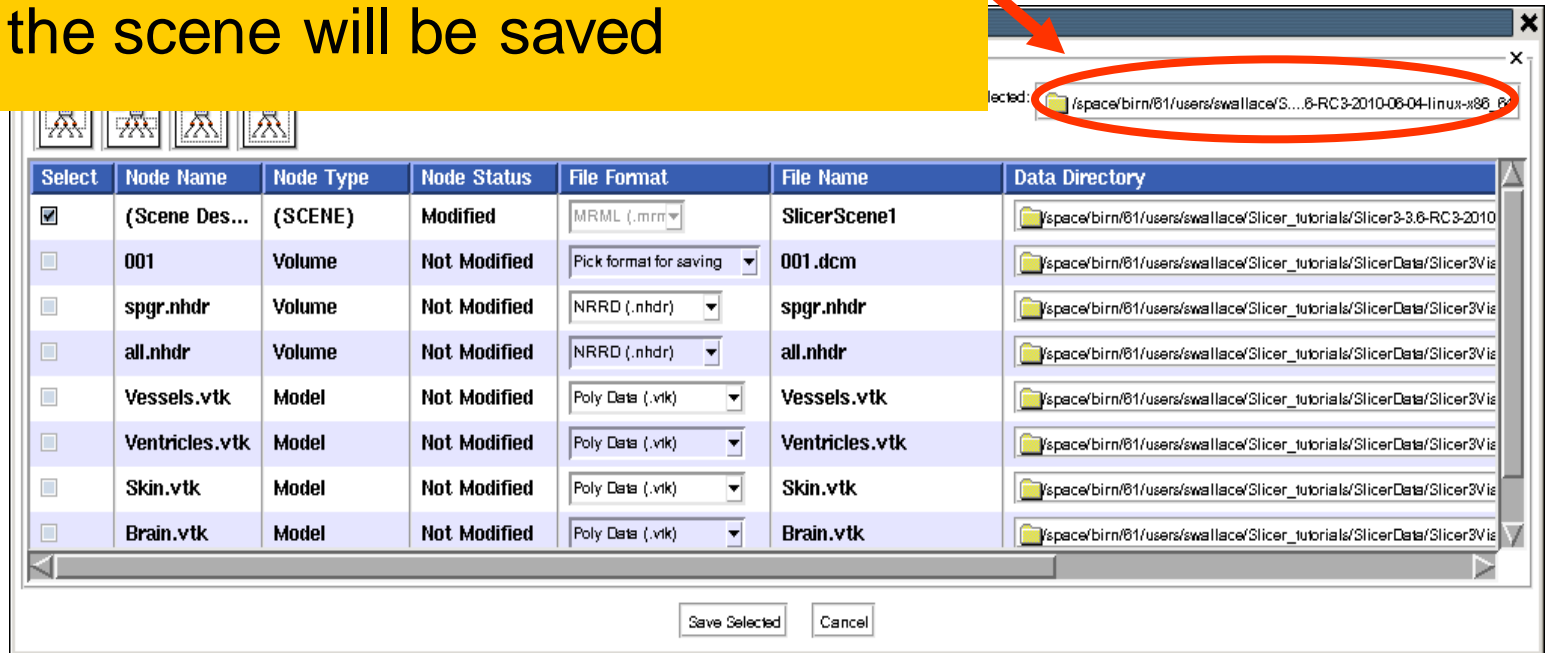
| Select | Node Name | Node Type | Node Status | File Format | File Name | Data Directory |
|-------------------------------------|----------------|-----------|--------------|------------------------|----------------|--|
| <input checked="" type="checkbox"/> | (Scene Des... | (SCENE) | Modified | MRML (.mrm) | SlicerScene1 | /space/birn/81/users/swallace/Slicer_tutorials/Slicer3-3.8-RC3-2010 |
| <input type="checkbox"/> | 001 | Volume | Not Modified | Pick format for saving | 001.dcm | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | spgr.nhdr | Volume | Not Modified | NRRD (.nhdr) | spgr.nhdr | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | all.nhdr | Volume | Not Modified | NRRD (.nhdr) | all.nhdr | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Vessels.vtk | Model | Not Modified | Poly Data (.vtk) | Vessels.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Ventricles.vtk | Model | Not Modified | Poly Data (.vtk) | Ventricles.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Skin.vtk | Model | Not Modified | Poly Data (.vtk) | Skin.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Brain.vtk | Model | Not Modified | Poly Data (.vtk) | Brain.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |

Save Selected Cancel

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

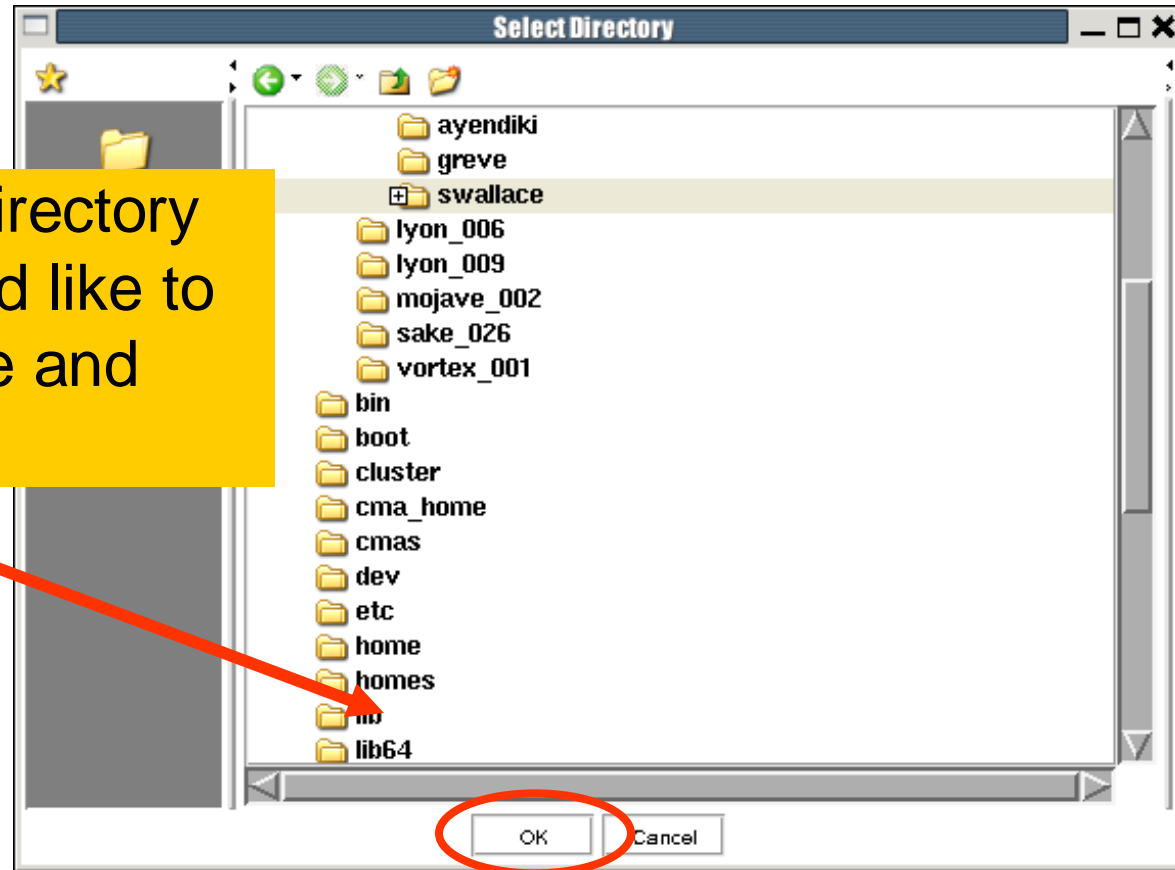


| Select | Node Name | Node Type | Node Status | File Format | File Name | Data Directory |
|-------------------------------------|----------------|-----------|--------------|------------------------|----------------|--|
| <input checked="" type="checkbox"/> | (Scene Des... | (SCENE) | Modified | MRML (.mrm) | SlicerScene1 | /space/birn/81/users/swallace/Slicer_tutorials/Slicer3-3.8-RC3-2010 |
| <input type="checkbox"/> | 001 | Volume | Not Modified | Pick format for saving | 001.dcm | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | spgr.nhdr | Volume | Not Modified | NRRD (.nhdr) | spgr.nhdr | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | all.nhdr | Volume | Not Modified | NRRD (.nhdr) | all.nhdr | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Vessels.vtk | Model | Not Modified | Poly Data (.vtk) | Vessels.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Ventricles.vtk | Model | Not Modified | Poly Data (.vtk) | Ventricles.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Skin.vtk | Model | Not Modified | Poly Data (.vtk) | Skin.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |
| <input type="checkbox"/> | Brain.vtk | Model | Not Modified | Poly Data (.vtk) | Brain.vtk | /space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis |

Save Selected Cancel

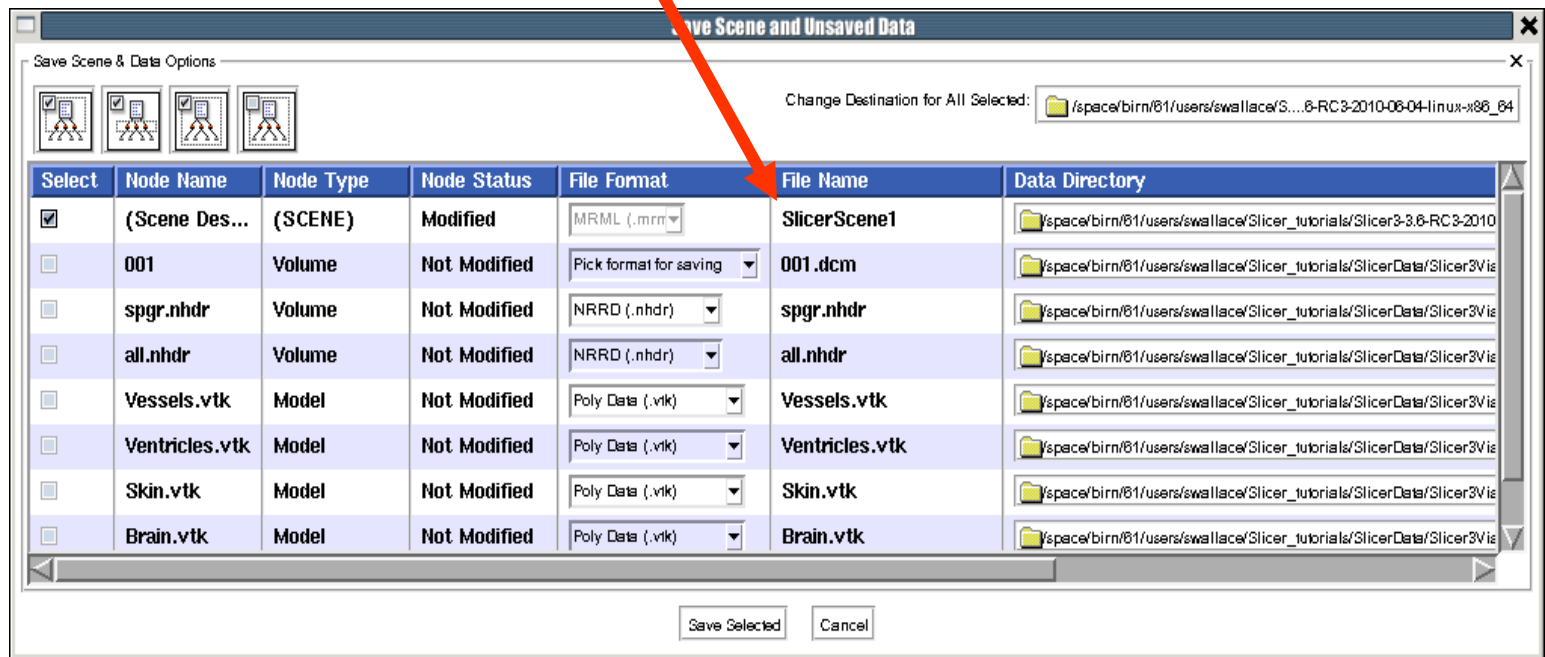
Saving Data

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

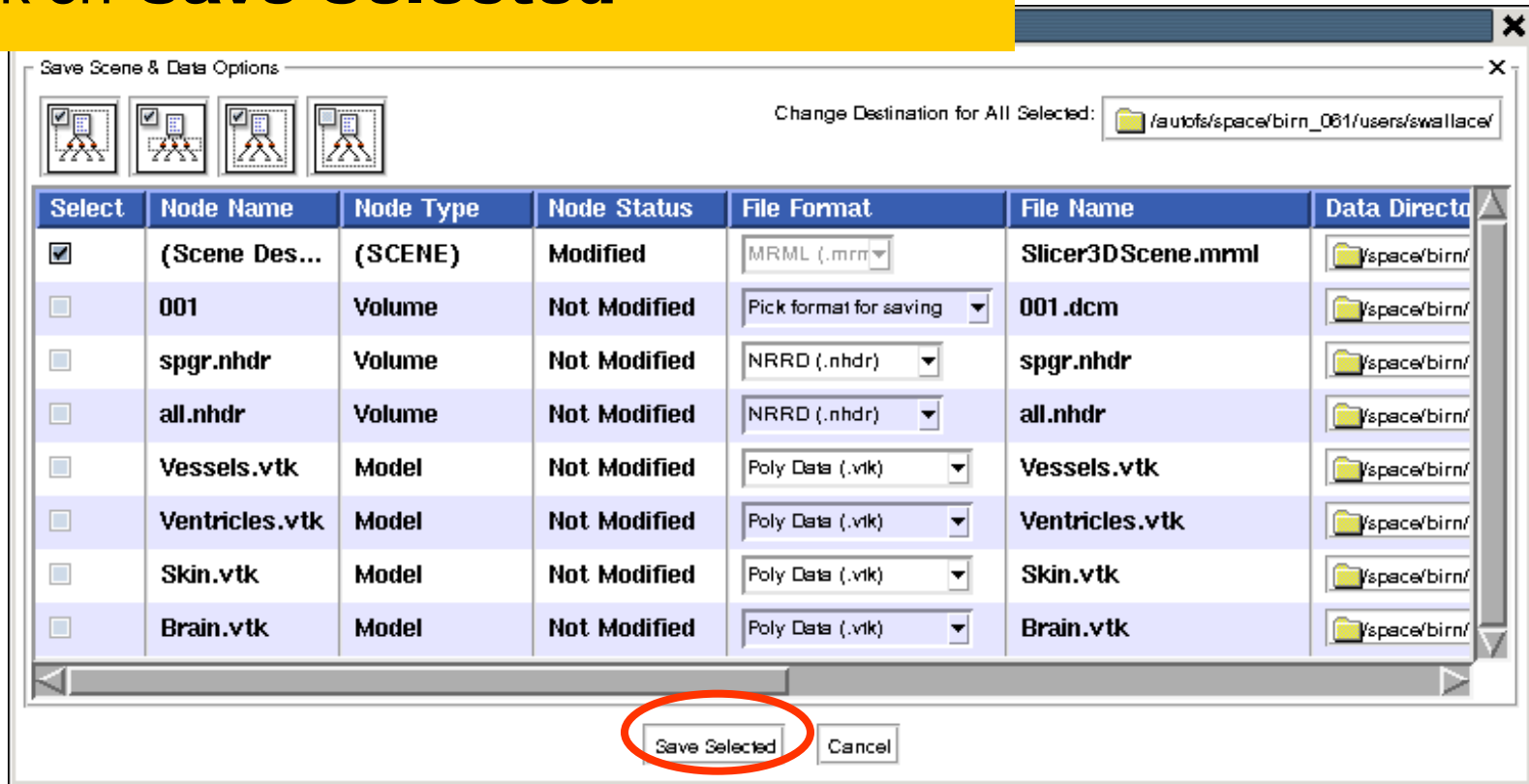


Saving Data

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

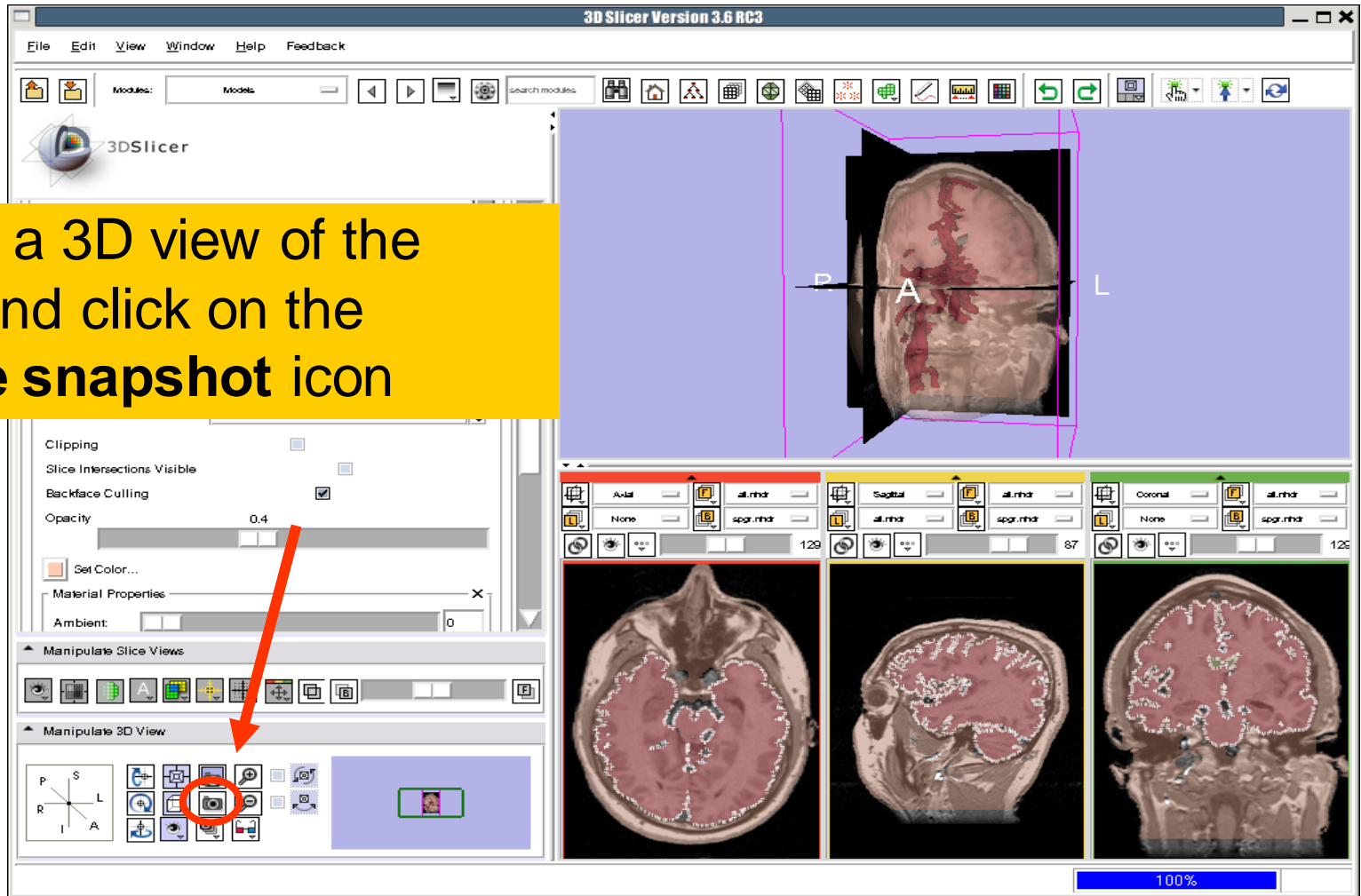


Click on **Save Selected**

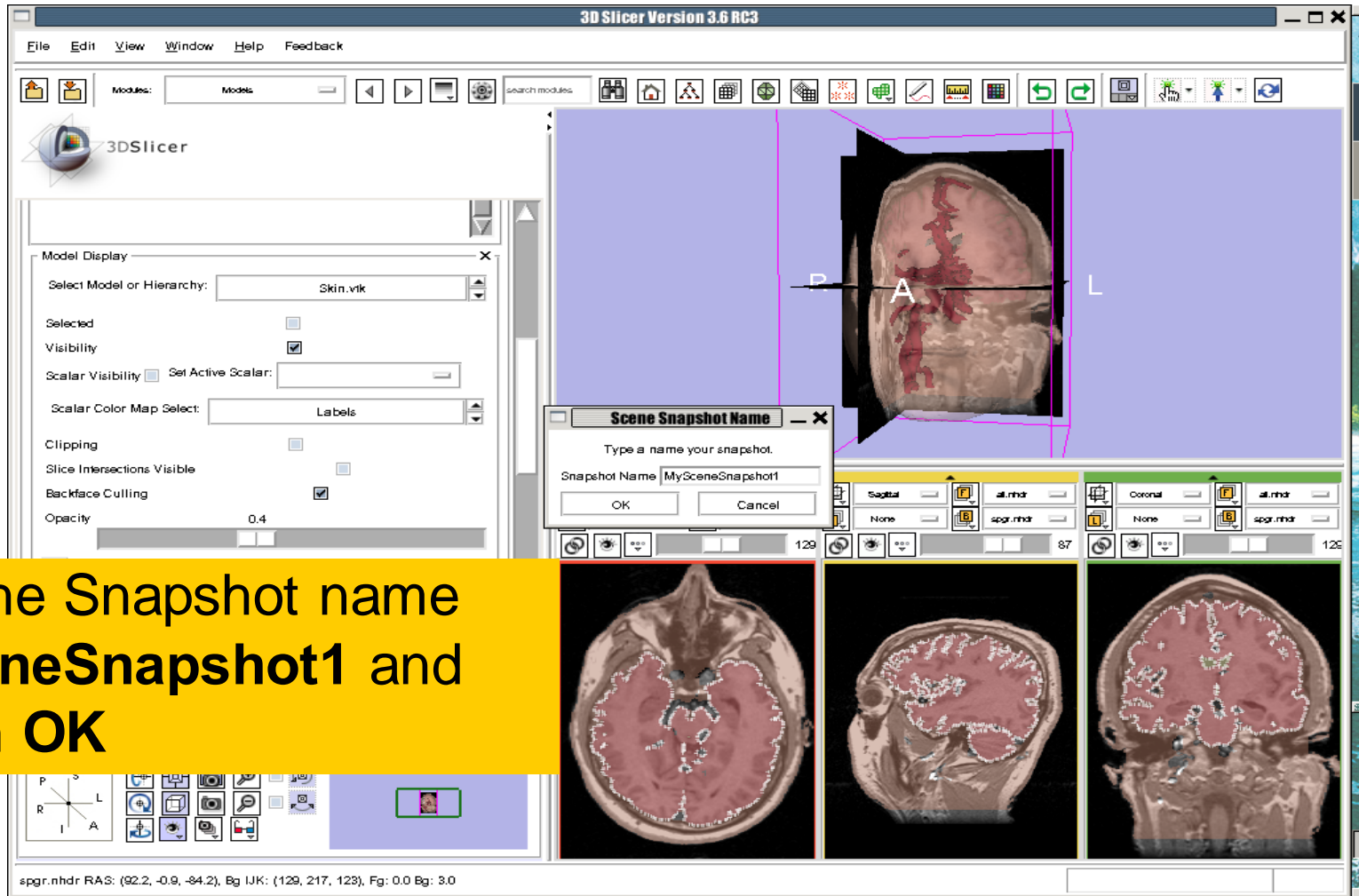


Creating Scene Snapshots

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

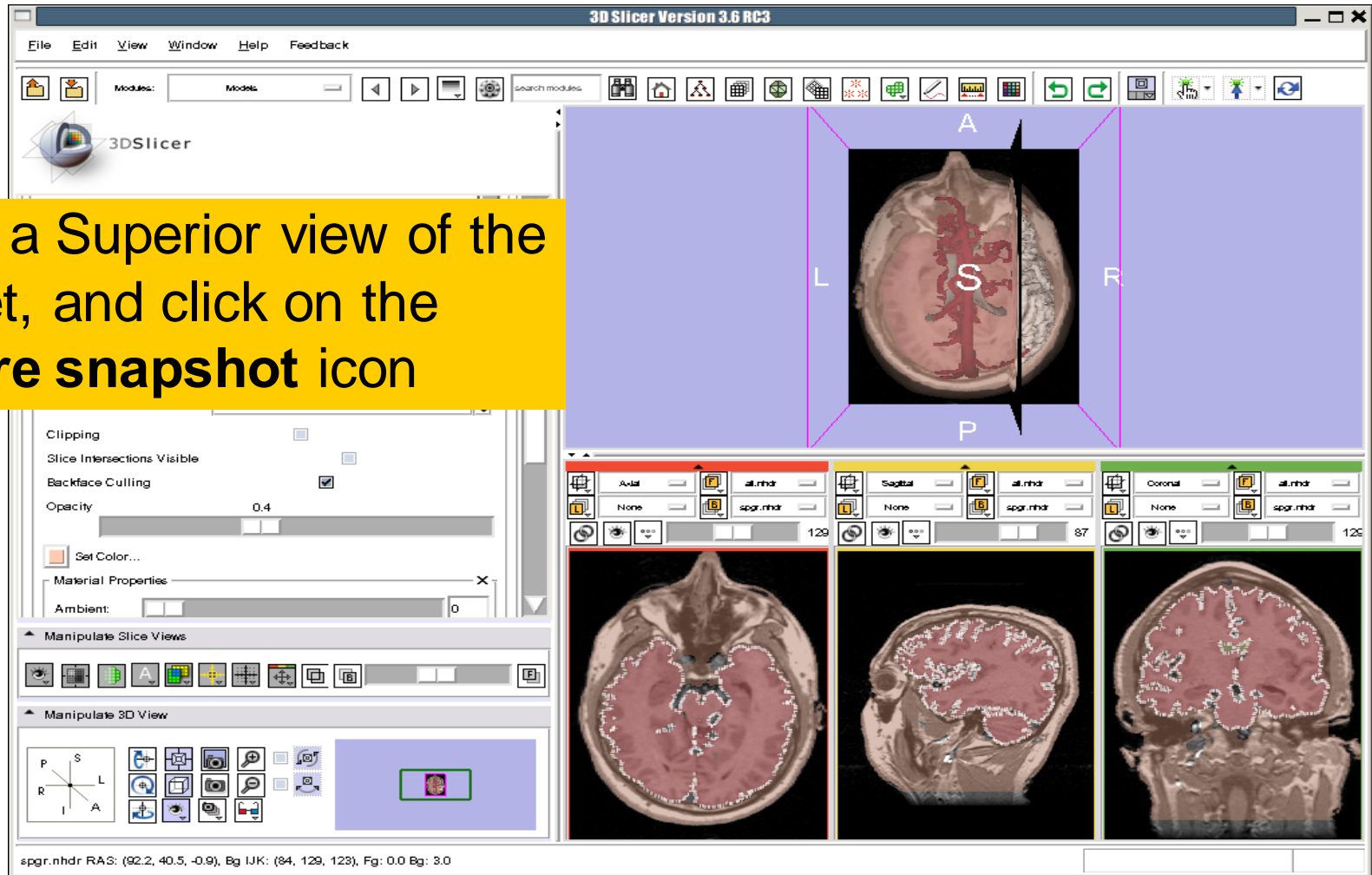


Creating Scene Snapshots



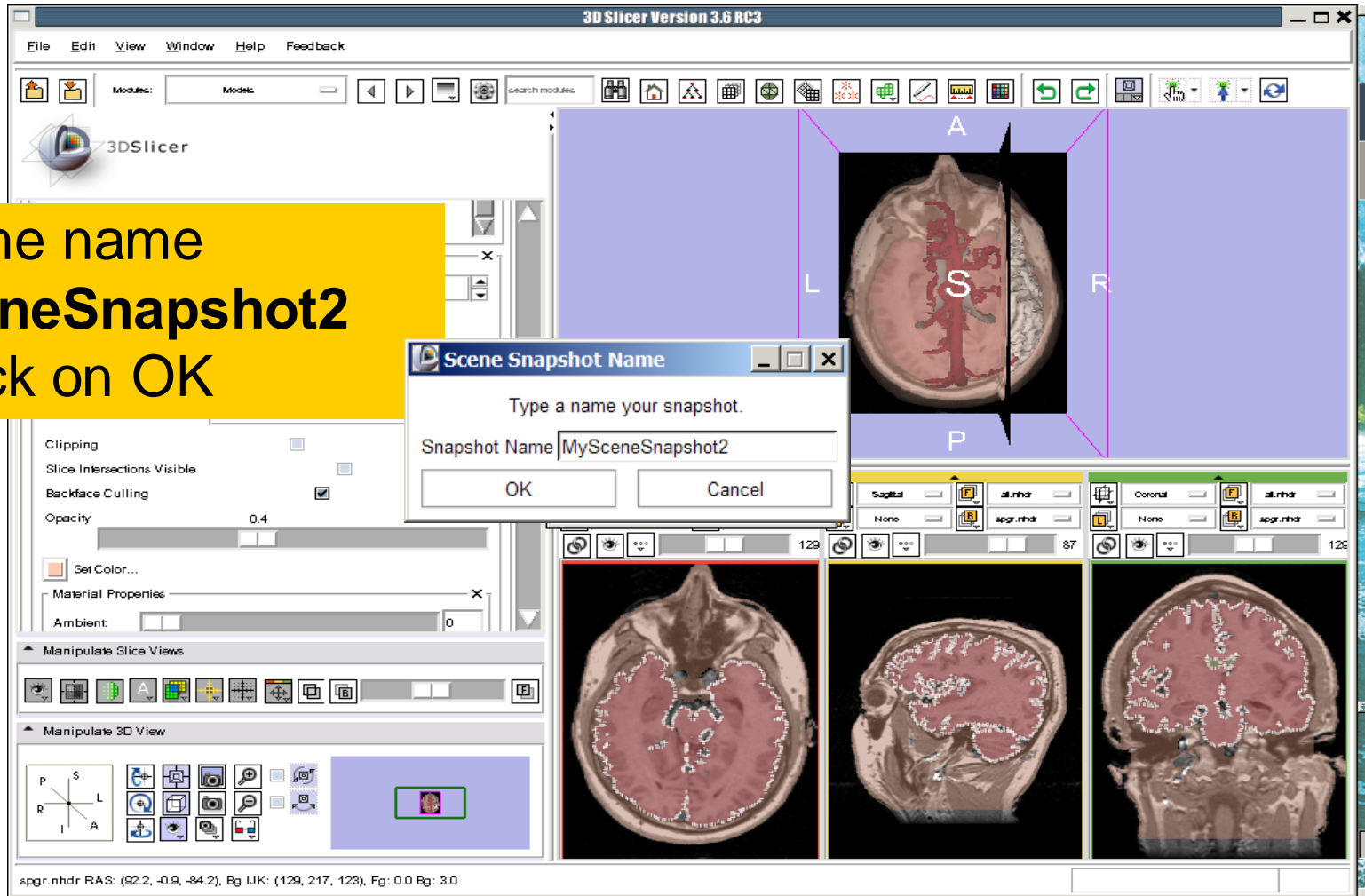
Creating Scene Snapshots

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



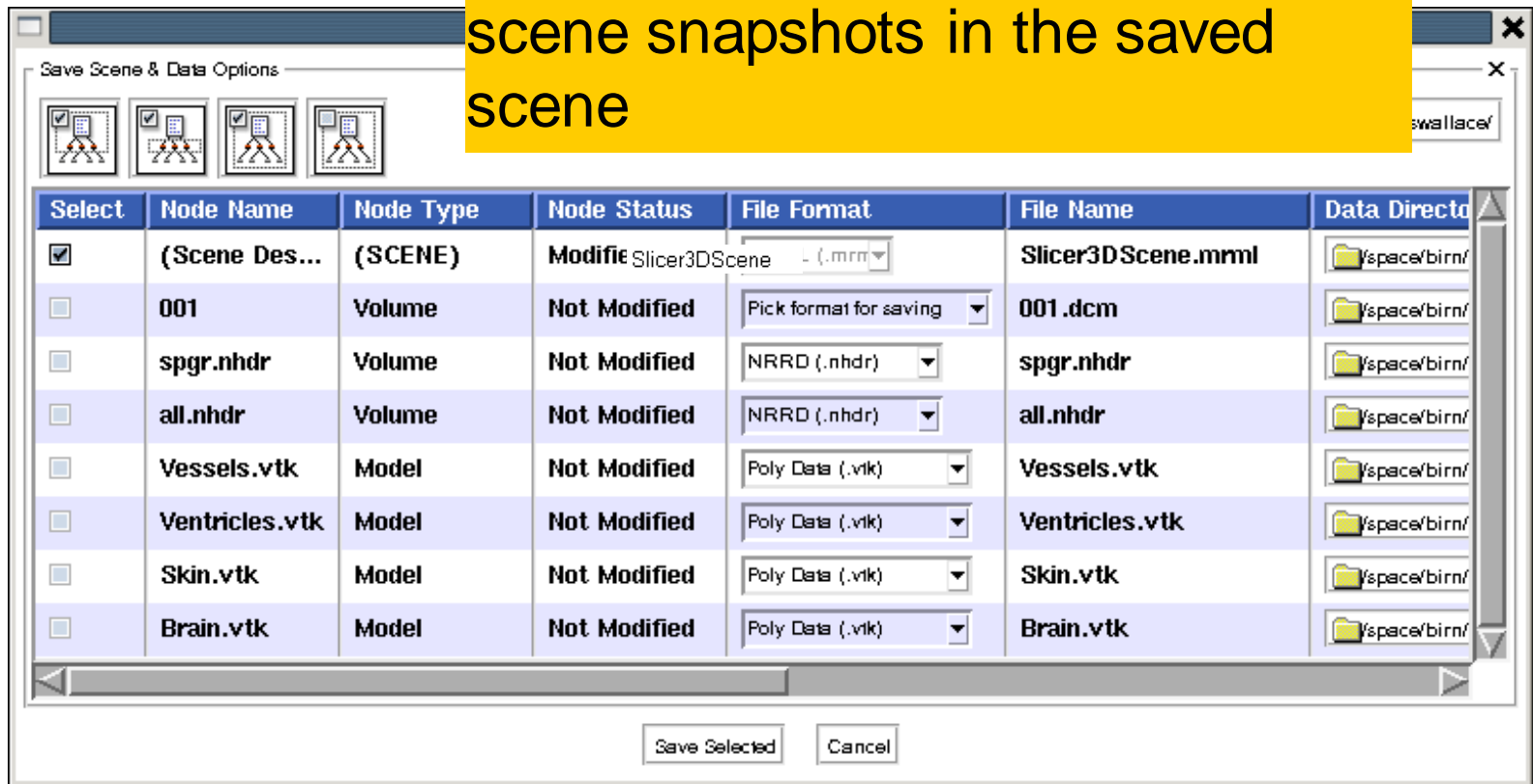
Creating Scene Snapshots

Enter the name
MySceneSnapshot2
and click on OK



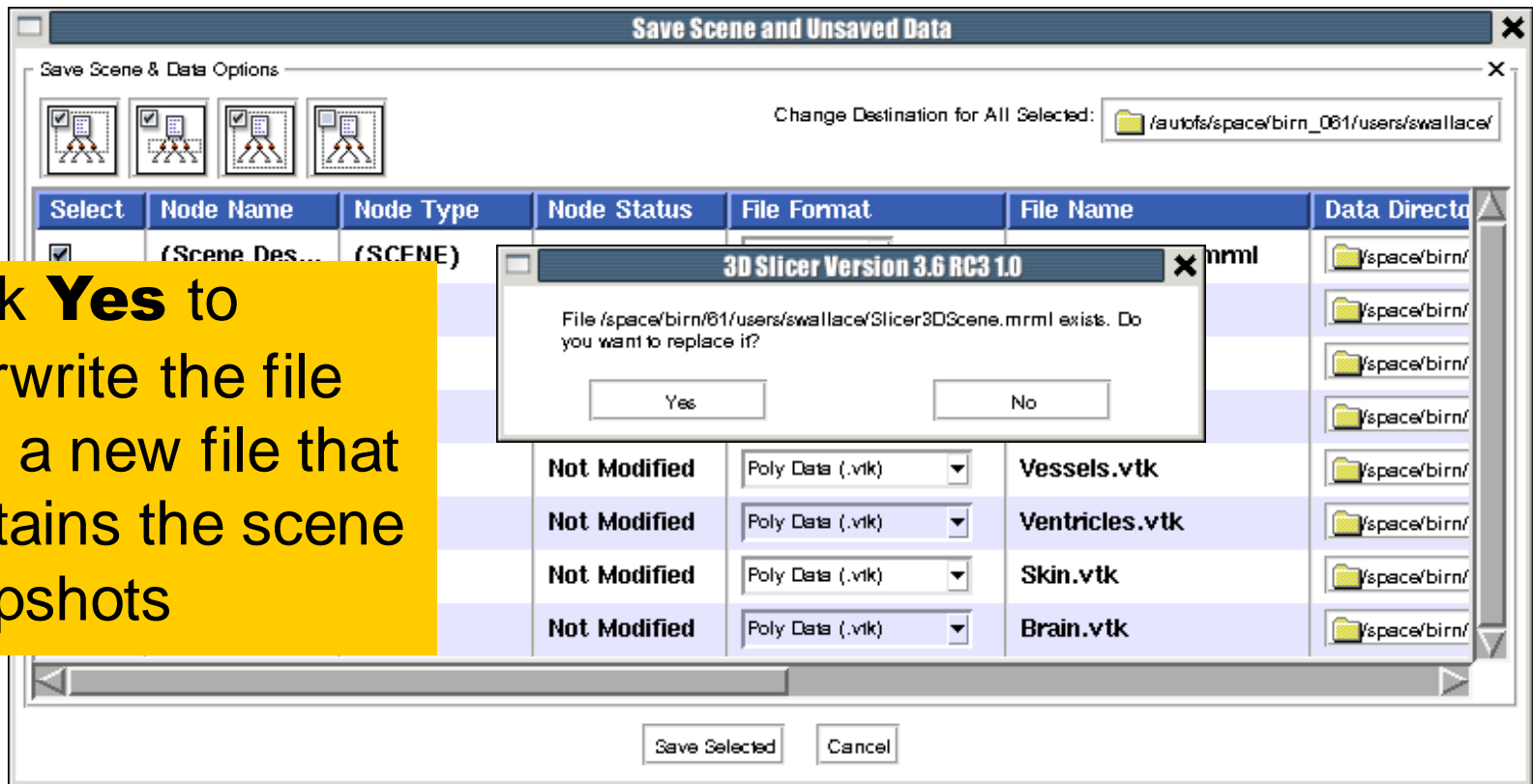
Creating Scene Snapshots

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



Creating Scene Snapshots

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



Save Scene and Unsaved Data

Save Scene & Data Options

Change Destination for All Selected: /autofs/space/birn_081/users/swallace/

| Select | Node Name | Node Type | Node Status | File Format | File Name | Data Directory |
|-------------------------------------|---------------|-----------|--------------|------------------|----------------|----------------|
| <input checked="" type="checkbox"/> | (Scene Des... | (SCENE) | | | | |
| <input type="checkbox"/> | | | Not Modified | Poly Data (.vtk) | Vessels.vtk | /space/birn/ |
| <input type="checkbox"/> | | | Not Modified | Poly Data (.vtk) | Ventricles.vtk | /space/birn/ |
| <input type="checkbox"/> | | | Not Modified | Poly Data (.vtk) | Skin.vtk | /space/birn/ |
| <input type="checkbox"/> | | | Not Modified | Poly Data (.vtk) | Brain.vtk | /space/birn/ |

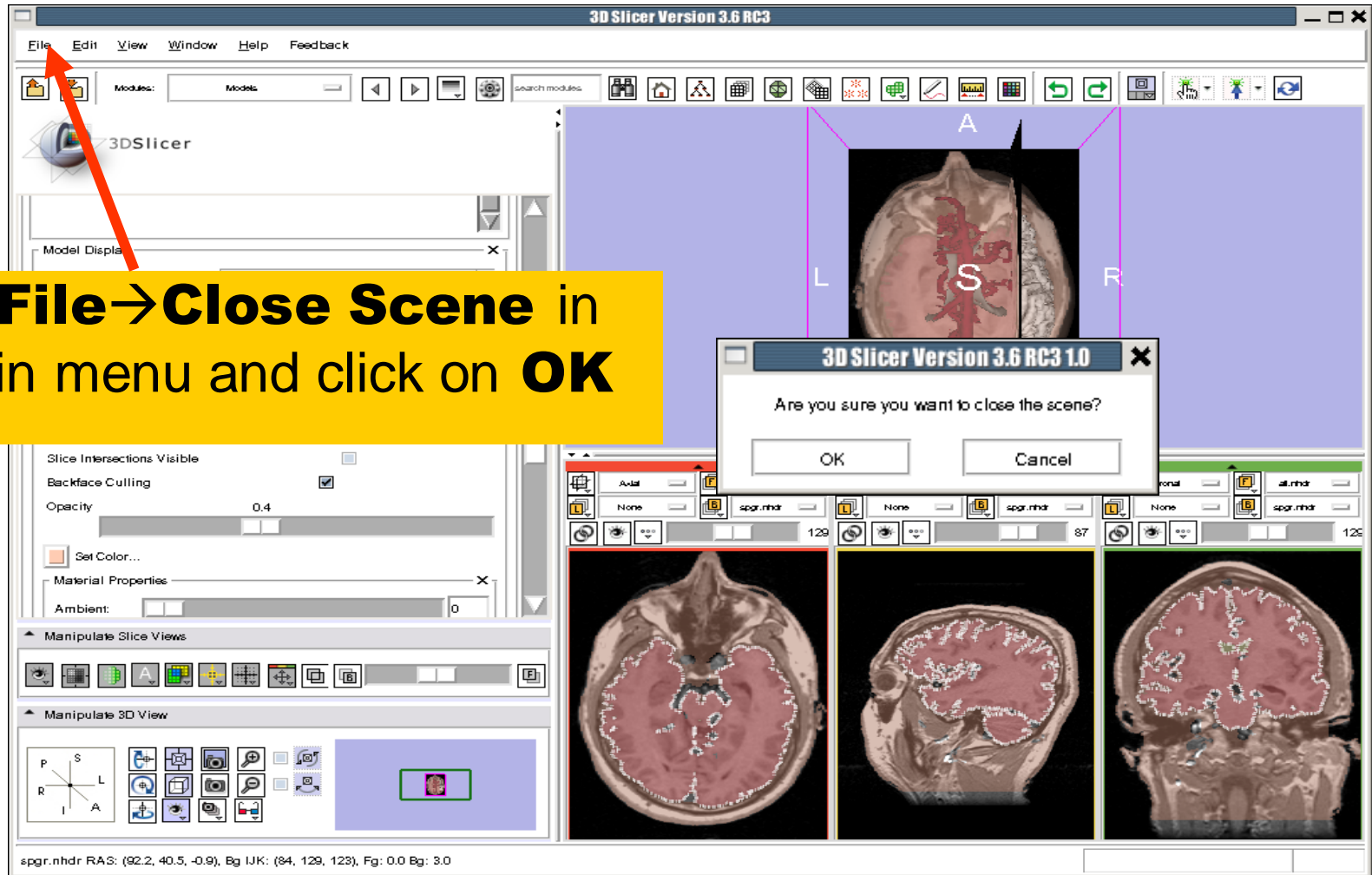
3D Slicer Version 3.6 RC3 1.0

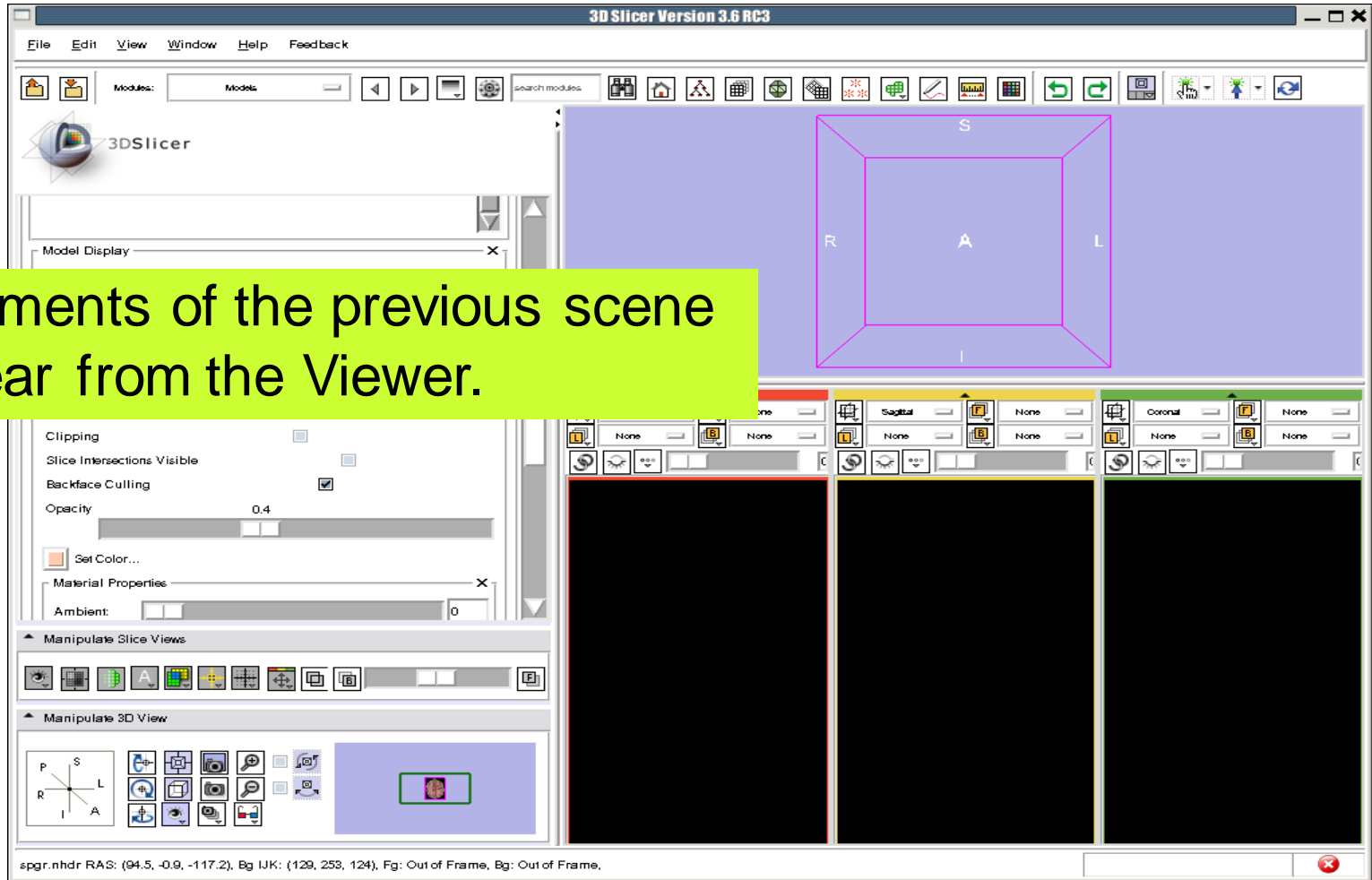
File /space/birn/81/users/swallace/Slicer3DScene.mrml exists. Do you want to replace it?

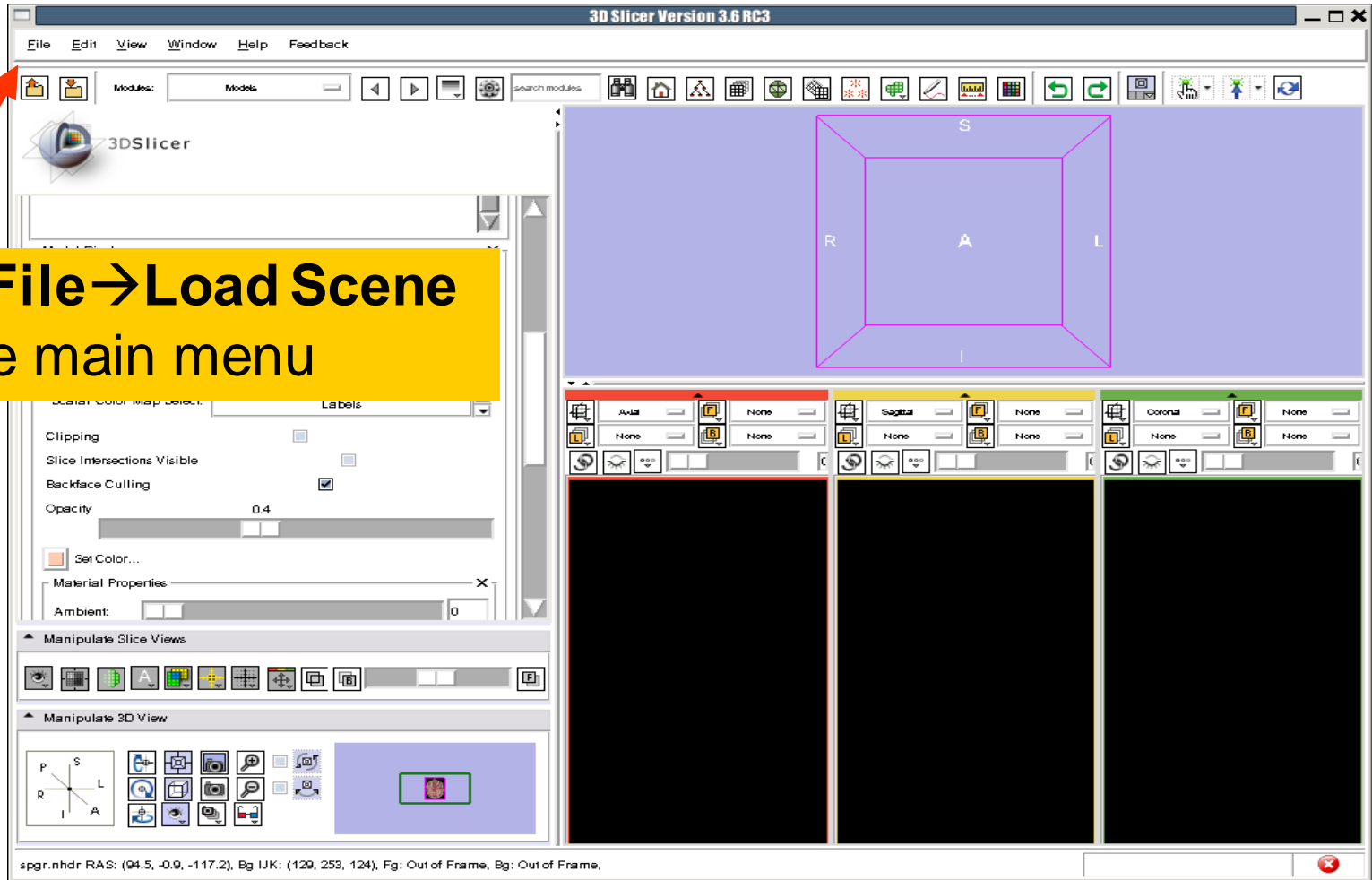
Yes No

Save Selected Cancel

Saving Data

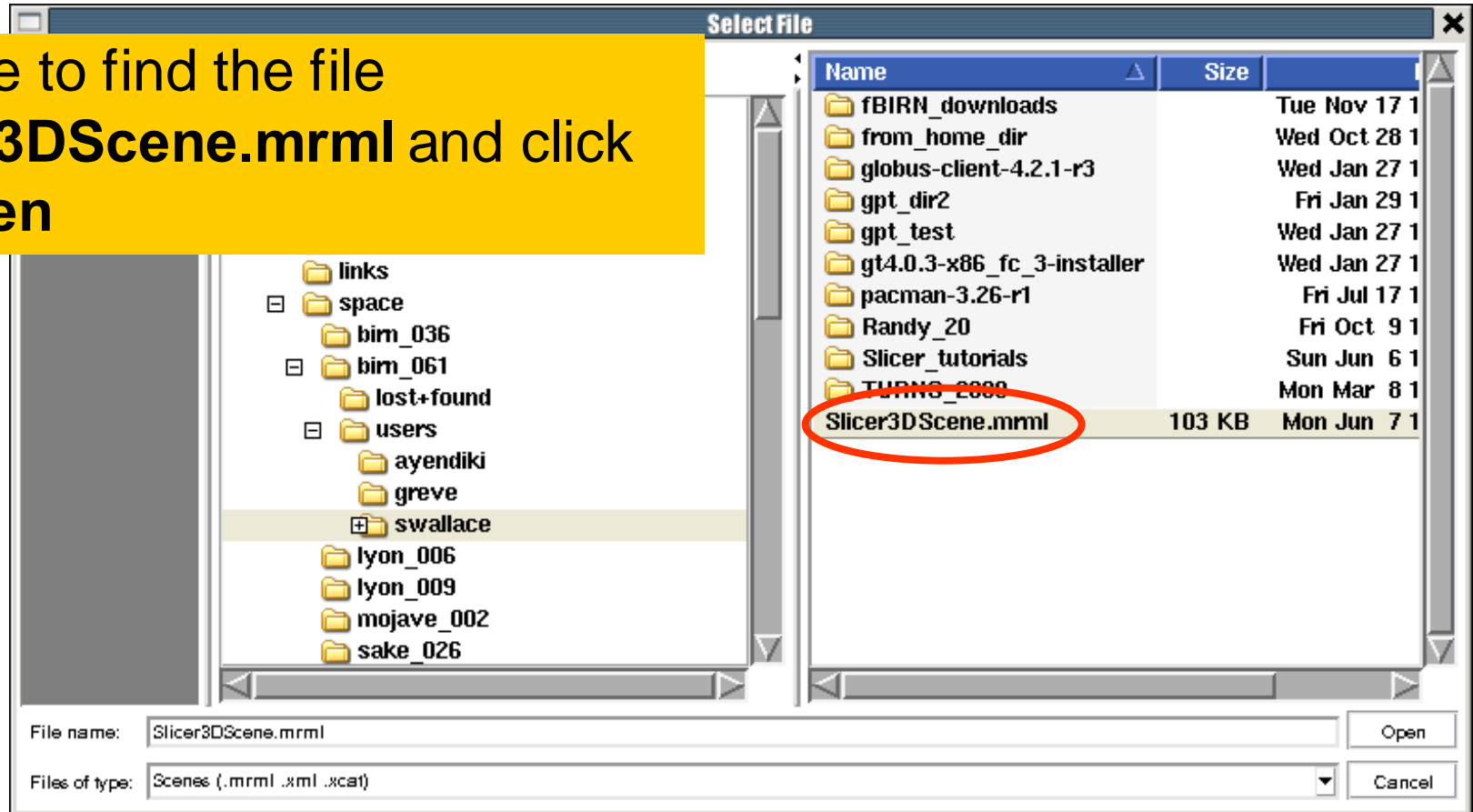




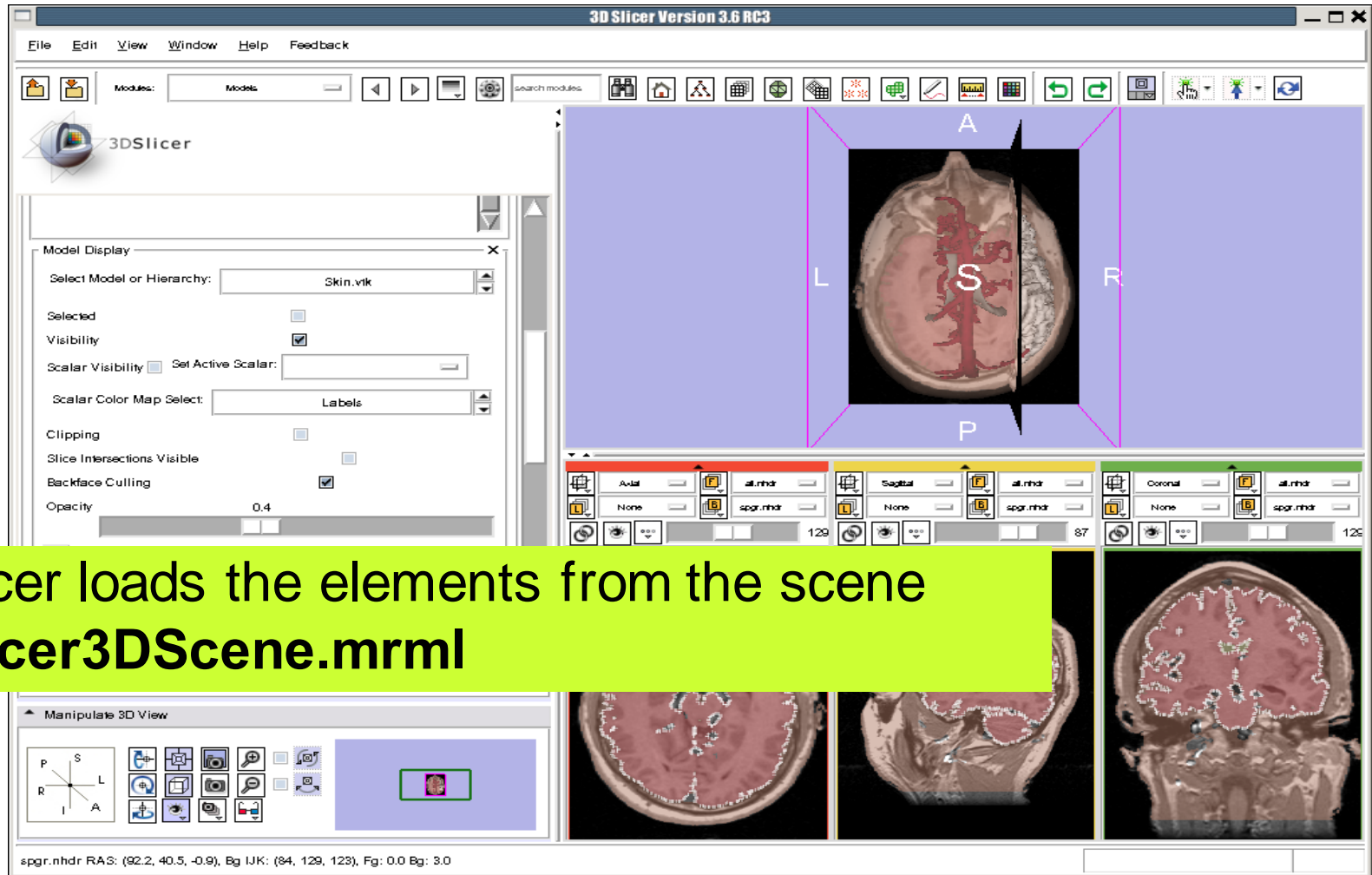


Saving Data

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



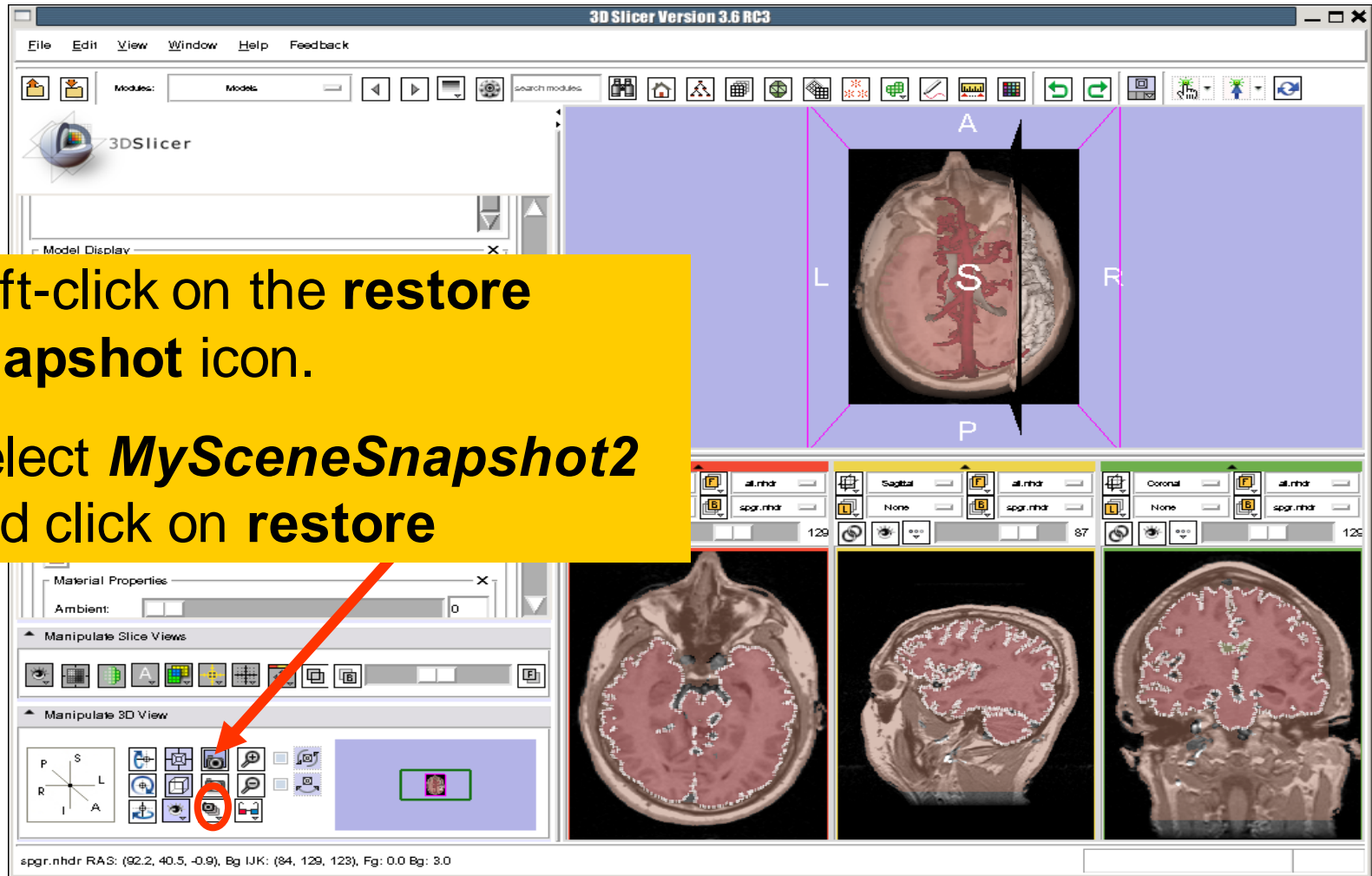
Loading a Scene



Loading a Scene

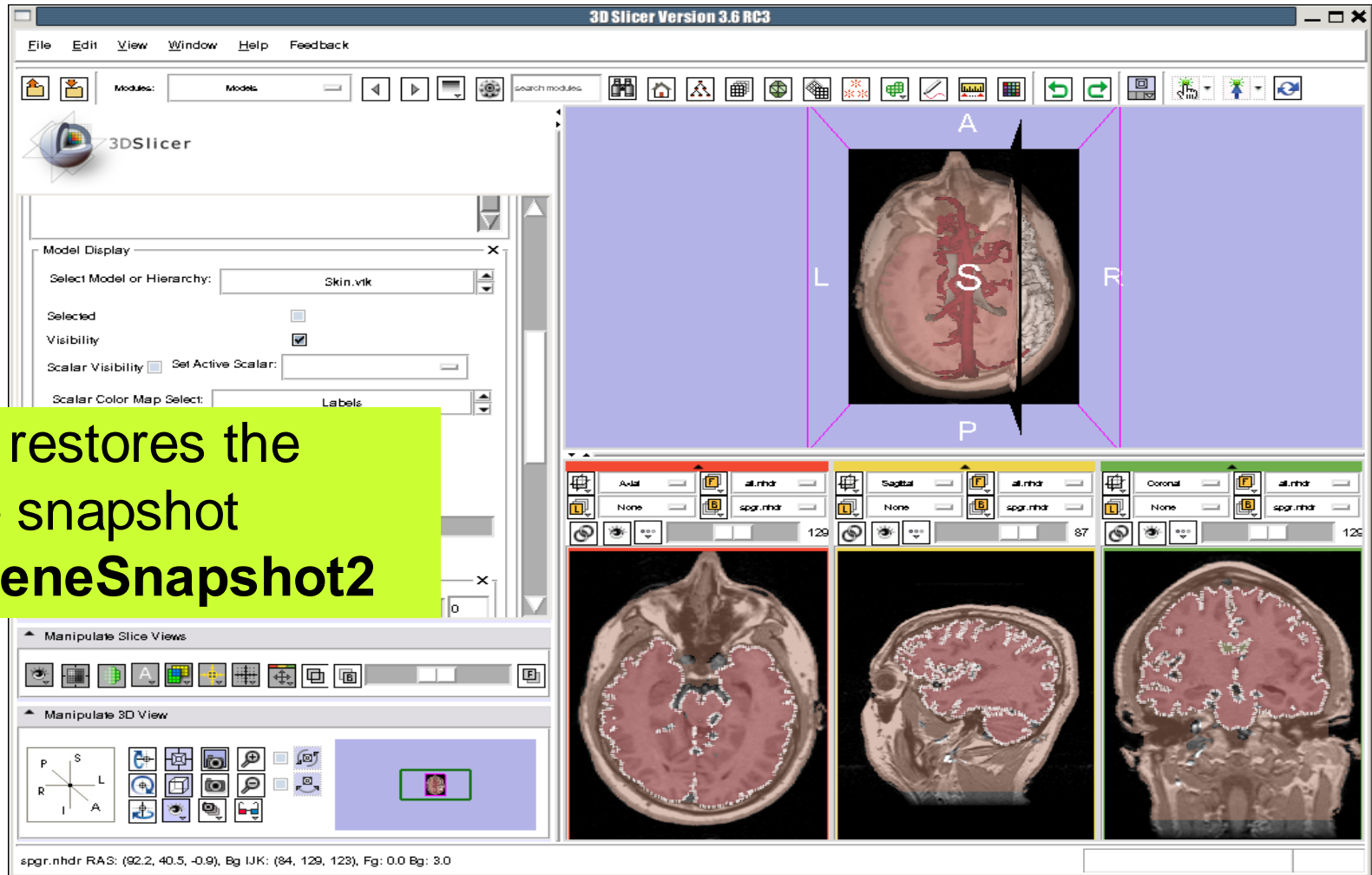
Left-click on the **restore snapshot** icon.

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

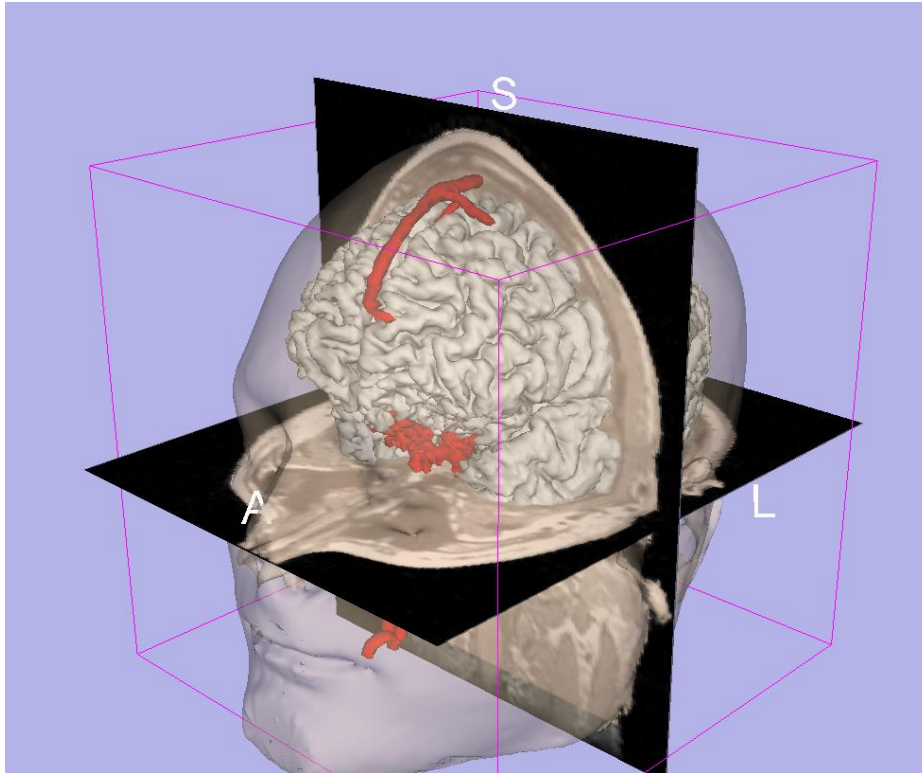


Loading a Scene

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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Neuroimage Analysis Center

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