

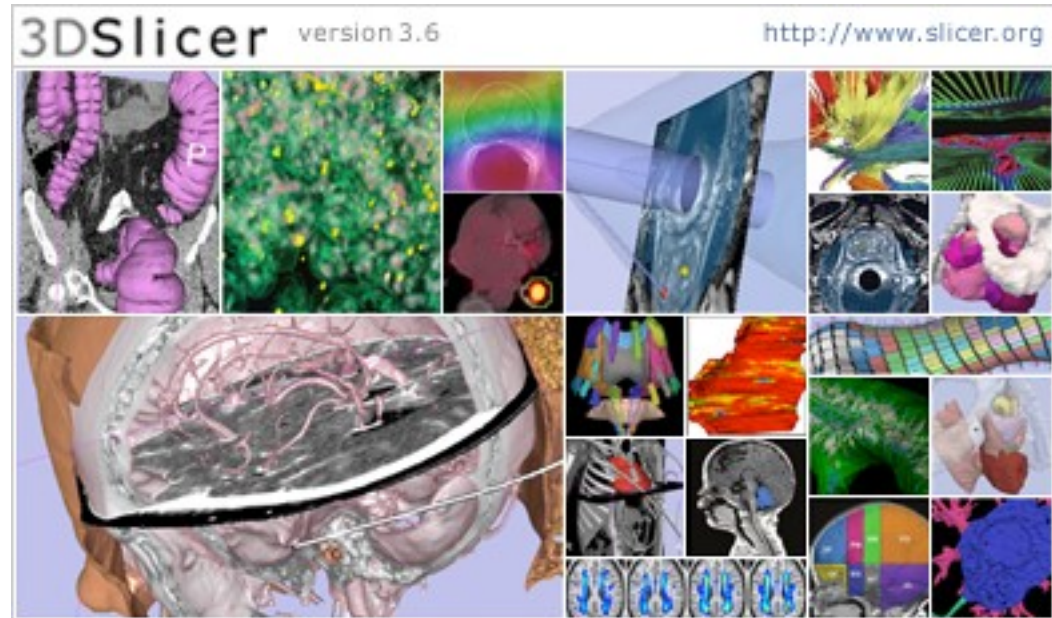


Slicer3 Data Loading and Visualization

Sonia Pujol, Ph.D.

Surgical Planning Laboratory
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 Slicer 3.6

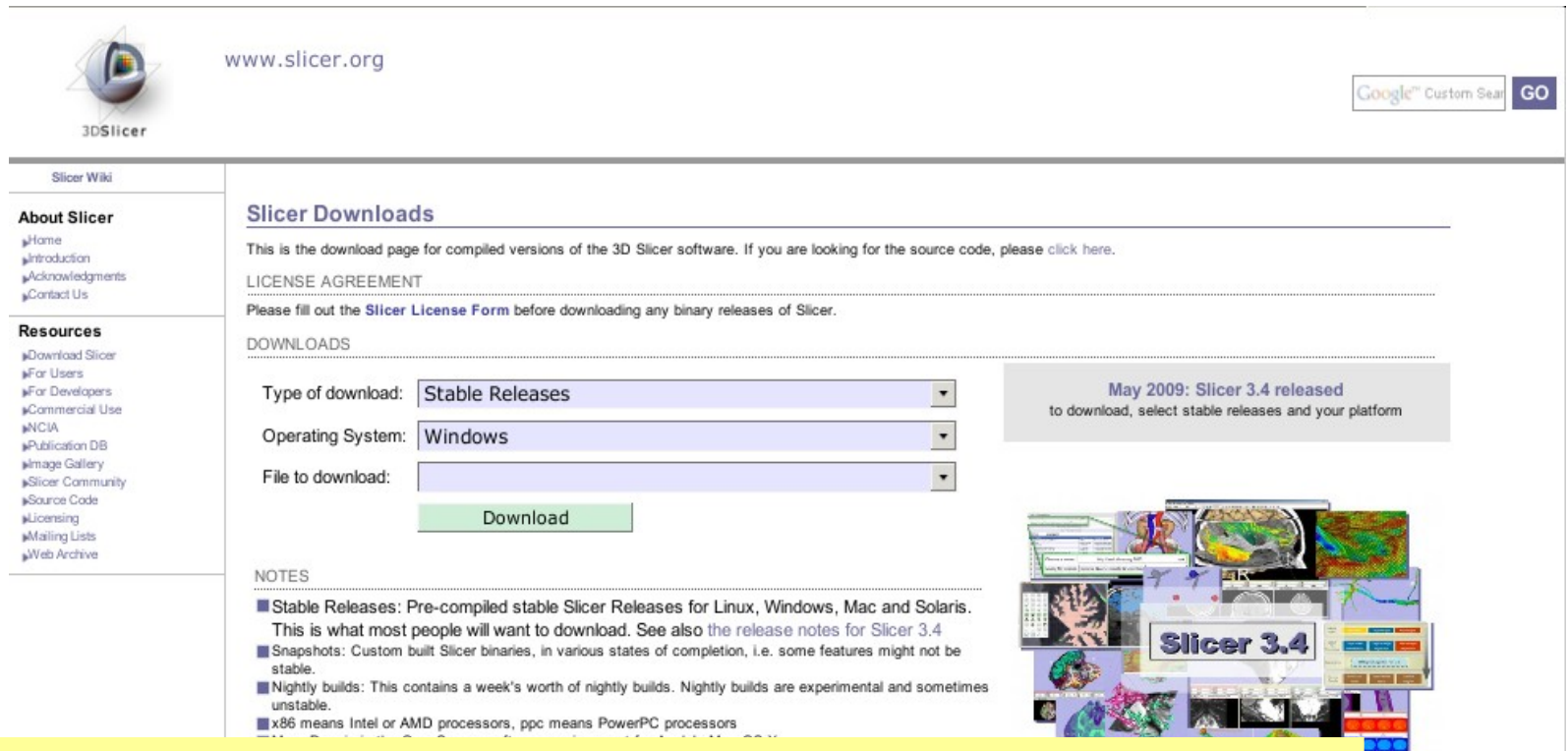
- Download and install the Slicer3.6 software from the Slicer web site

<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 Slicer3.6



The screenshot shows the Slicer Downloads page on the website www.slicer.org. The page features a navigation menu on the left with sections for 'About Slicer' and 'Resources'. The main content area is titled 'Slicer Downloads' and includes a 'LICENSE AGREEMENT' section with a link to the license form. Below this is a 'DOWNLOADS' section with three dropdown menus: 'Type of download' set to 'Stable Releases', 'Operating System' set to 'Windows', and 'File to download'. A green 'Download' button is positioned below these menus. To the right of the download form is a grey box with the text 'May 2009: Slicer 3.4 released to download, select stable releases and your platform'. Below this box is a collage of images showing various 3D medical models and software interfaces, with a central image labeled 'Slicer 3.4'. At the bottom of the page, there is a 'NOTES' section with several bullet points providing information about stable releases, snapshots, nightly builds, and processor compatibility (x86 and ppc).

Slicer3 is under active development by the medical research community. Frequent releases incorporating cutting-edge medical image analysis capabilities. This tutorial uses the current stable **Slicer3.6** release version.



www.slicer.org

Google™ Custom Search

Select the type of download
‘Stable Releases’

Download Slicer software. If you are looking for the source code, please [click here](#).

- ▶ Contact Us
- Resources**
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- ▶ For Developers
- ▶ Commercial Use
- ▶ NCIA
- ▶ Publication DB
- ▶ Image Gallery
- ▶ Slicer Community
- ▶ Source Code
- ▶ Licensing
- ▶ Mailing Lists
- ▶ Web Archive

LICENSE AGREEMENT

Please fill out the [Slicer License Form](#) before downloading any binary releases of Slicer.

DOWNLOADS

Type of download:

Operating System:

File to download:

May 2009: Slicer 3.4 released
to download, select stable releases and your platform

NOTES

- **Stable Releases:** Pre-compiled stable Slicer Releases for Linux, Windows, Mac and Solaris. This is what most people will want to download.
- **Snapshots:** Custom built Slicer binaries, in various states of completion, i.e. some features might not be stable.
- **Nightly builds:** This contains a week's worth of nightly builds. Nightly builds are experimental and sometimes unstable.
- **x86** means Intel or AMD processors, **ppc** means PowerPC processors
- **Mac:** Darwin is the OpenSource software environment for Apple's Mac OS X
- **Hardware/OS requirement:** Either Windows XP or more recent, Linux (x86 or x86_64), Mac OS X (ppc or Intel), min 2 GB of RAM and a dedicated graphic accelerator with at least 128 MB of on-board graphic memory. Shared memory graphics will result in slow render speeds.
- **X11 for Mac:** On Mac OS X you will need to install X11 from the CD. As an alternative, we had good experience with [xquartz](#).



Download Slicer3.6



www.slicer.org

Google™ Custom Search **GO**

Select the Operating System appropriate for your computer.

- » Knowledge Base
- » Contact Us
- Resources**
- » Download Slicer
- » For Users
- » For Developers
- » Commercial Use
- » NCI
- » Publication DB
- » Image Gallery
- » Slicer Community
- » Source Code
- » Licensing
- » Mailing Lists
- » Web Archive

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May 2009: Slicer 3.4 released
to download, select stable releases and your platform



NOTES

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- **Snapshots:** Custom built Slicer binaries, in various states of completion, i.e. some features might not be stable.
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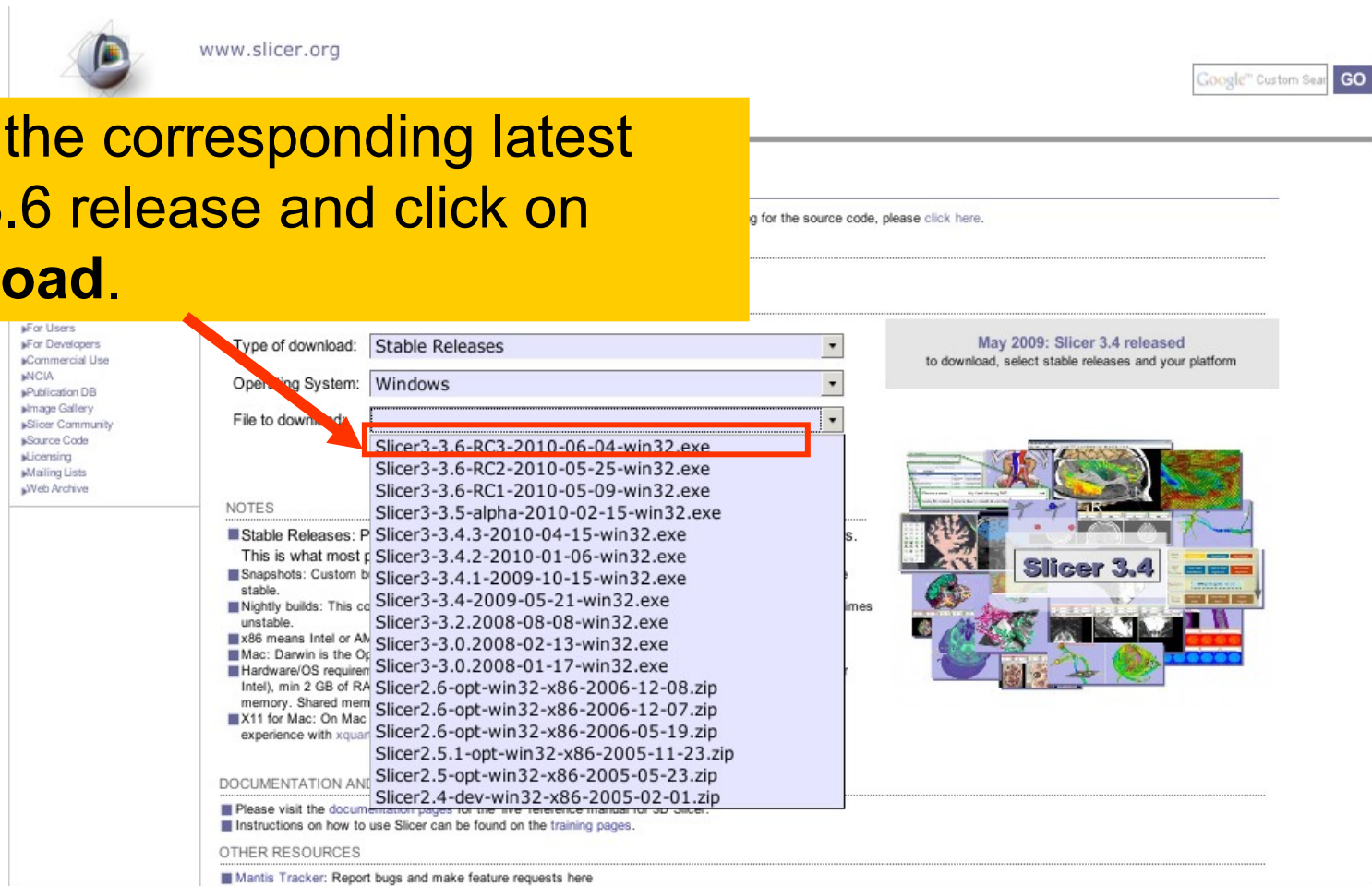
DOCUMENTATION AND TRAINING

- Please visit the [documentation pages](#) for the 'live' reference manual for 3D Slicer.
- Instructions on how to use Slicer can be found on the [training pages](#).

OTHER RESOURCES

- [Mantis Tracker:](#) Report bugs and make feature requests here

Select the corresponding latest Slicer3.6 release and click on **Download**.



The screenshot shows the Slicer3.6 download page. The page header includes the Slicer logo, the URL www.slicer.org, and a Google Custom Search bar. A yellow callout box with a red arrow points to the 'File to download' dropdown menu, which is open and shows a list of release files. The top file, 'Slicer3-3.6-RC3-2010-06-04-win32.exe', is highlighted with a red box. Below the dropdown, there are sections for 'NOTES', 'DOCUMENTATION AND TRAINING', and 'OTHER RESOURCES'. A grey box on the right side of the page contains the text: 'May 2009: Slicer 3.4 released to download, select stable releases and your platform'. Below this text is a collage of images showing various Slicer 3.4 applications and interfaces.

www.slicer.org

Google Custom Search GO

Type of download: Stable Releases

Operating System: Windows

File to download: Slicer3-3.6-RC3-2010-06-04-win32.exe

- Slicer3-3.6-RC2-2010-05-25-win32.exe
- Slicer3-3.6-RC1-2010-05-09-win32.exe
- Slicer3-3.5-alpha-2010-02-15-win32.exe
- Slicer3-3.4.3-2010-04-15-win32.exe
- Slicer3-3.4.2-2010-01-06-win32.exe
- Slicer3-3.4.1-2009-10-15-win32.exe
- Slicer3-3.4-2009-05-21-win32.exe
- Slicer3-3.2.2008-08-08-win32.exe
- Slicer3-3.0.2008-02-13-win32.exe
- Slicer3-3.0.2008-01-17-win32.exe
- Slicer2.6-opt-win32-x86-2006-12-08.zip
- Slicer2.6-opt-win32-x86-2006-12-07.zip
- Slicer2.6-opt-win32-x86-2006-05-19.zip
- Slicer2.5.1-opt-win32-x86-2005-11-23.zip
- Slicer2.5-opt-win32-x86-2005-05-23.zip
- Slicer2.4-dev-win32-x86-2005-02-01.zip

NOTES

- Stable Releases: This is what most people use.
- Snapshots: Custom builds of the software.
- Nightly builds: This is the most up-to-date version of the software, but it is unstable.
- x86 means Intel or AMD.
- Mac: Darwin is the operating system.
- Hardware/OS requirements: Intel (or AMD), min 2 GB of RAM, 10 GB of free disk space. Shared memory for Mac: On Mac OS X, you may need to increase the shared memory.
- X11 for Mac: On Mac OS X, you may need to install X11.

DOCUMENTATION AND TRAINING

- Please visit the documentation pages for the software reference manual for 3D Slicer.
- Instructions on how to use Slicer can be found on the training pages.

OTHER RESOURCES

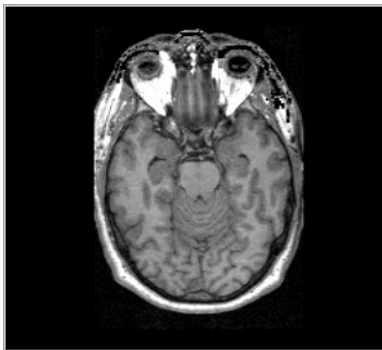
- Mantis Tracker: Report bugs and make feature requests here

May 2009: Slicer 3.4 released to download, select stable releases and your platform

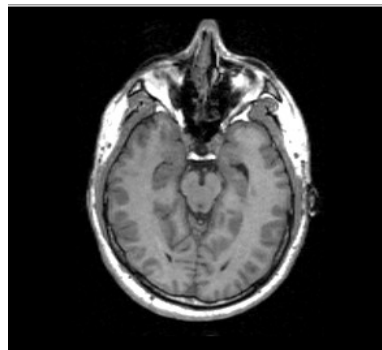
Slicer 3.4

Download the training dataset

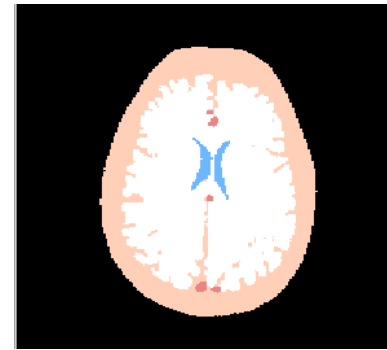
- This course is built upon three datasets of a single healthy subject brain:



MR DICOM
GRASS



MR Nrrd
SPGR

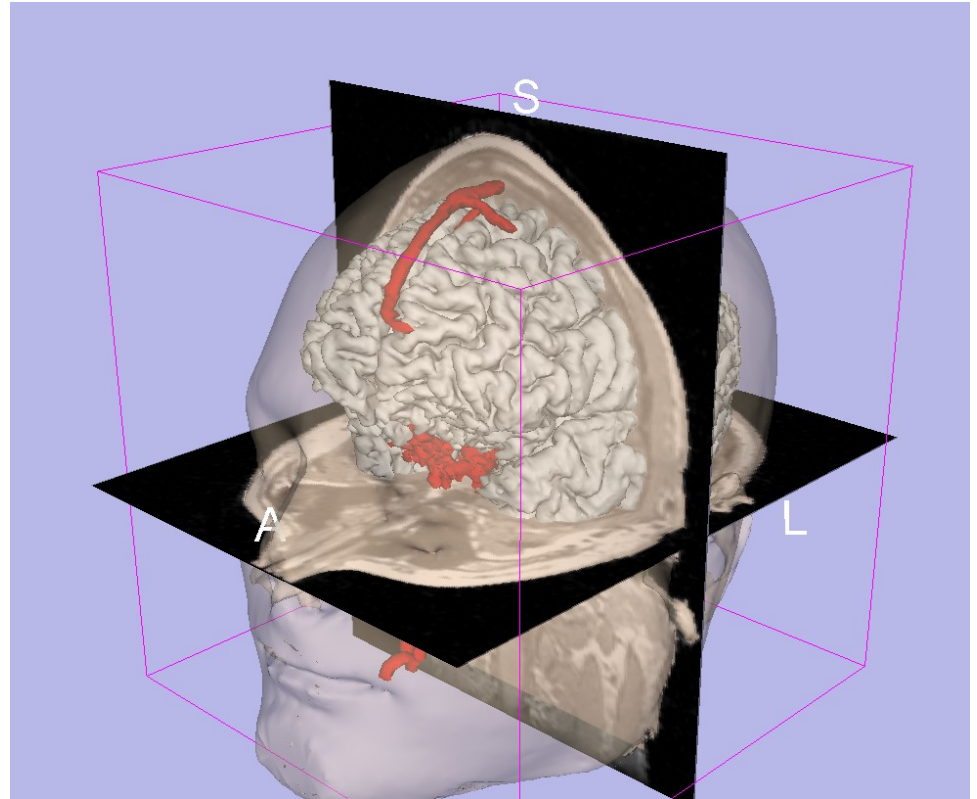


Pre-computed
Label Map

- Download and unzip the training dataset
Slicer3VisualizationDataset.zip
<http://www.slicer.org/slicerWiki/index.php/Slicer3.6: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.



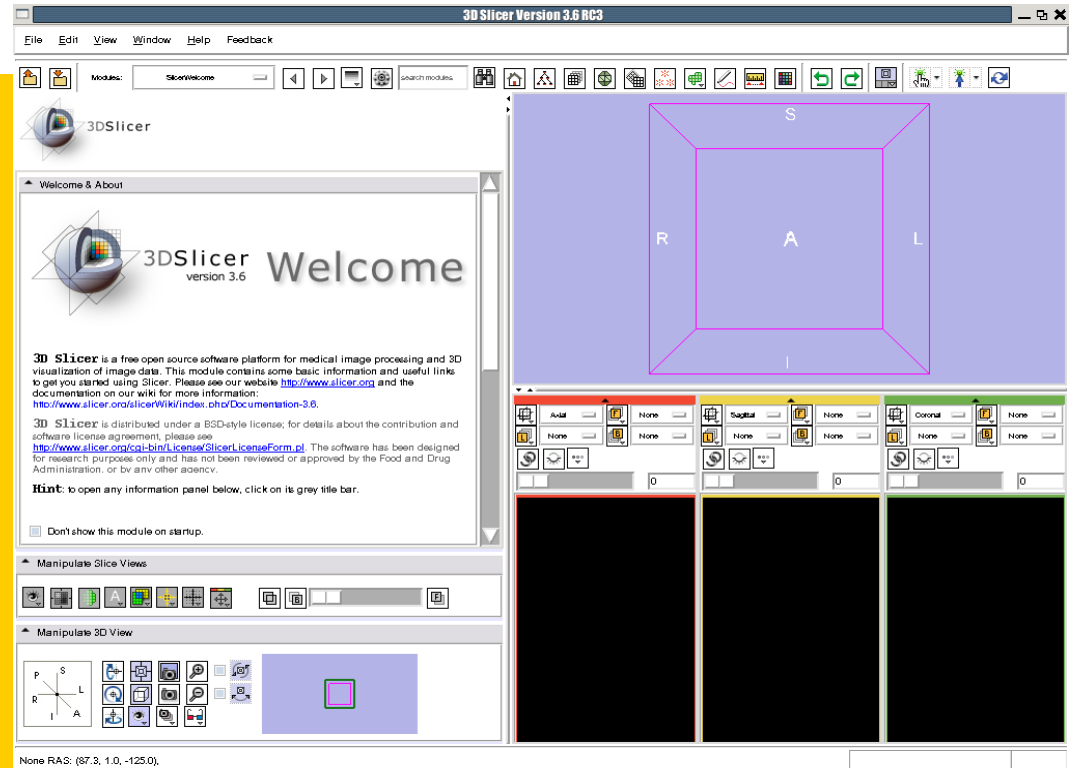
Linux/Mac users
Launch the Slicer3
executable located in
the Slicer3.6 directory

Windows users

Select

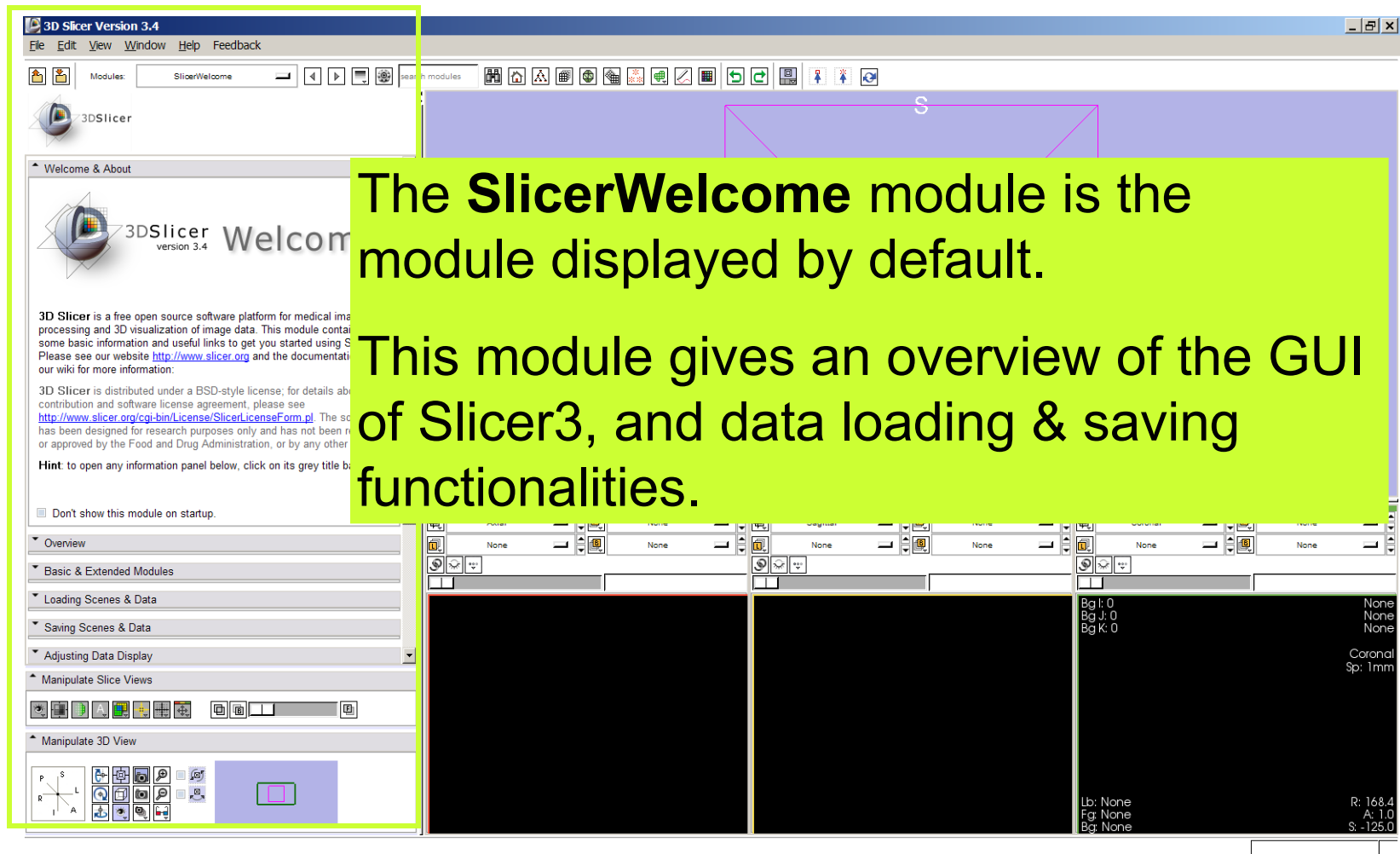
Start → All Programs

→ Slicer3-3.6-2010-08-05 → Slicer3





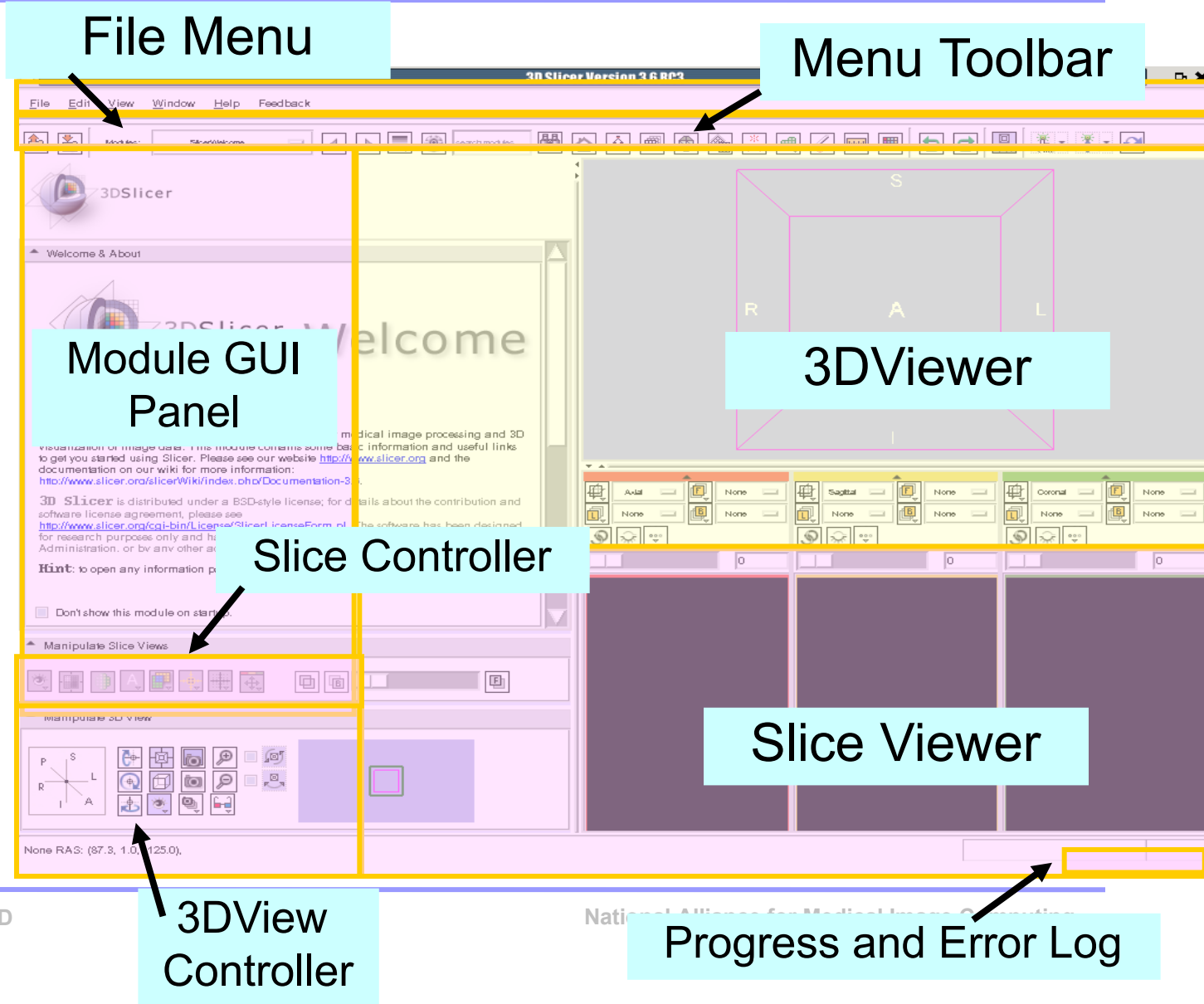
Slicer Welcome



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

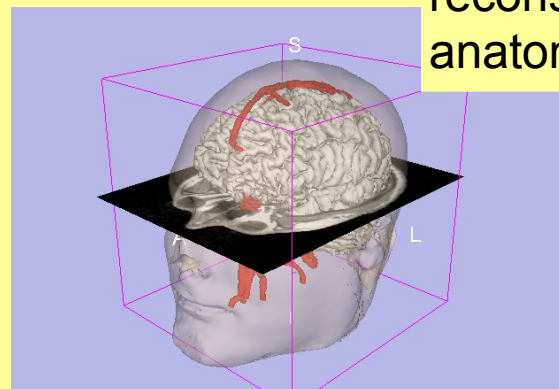


Overview

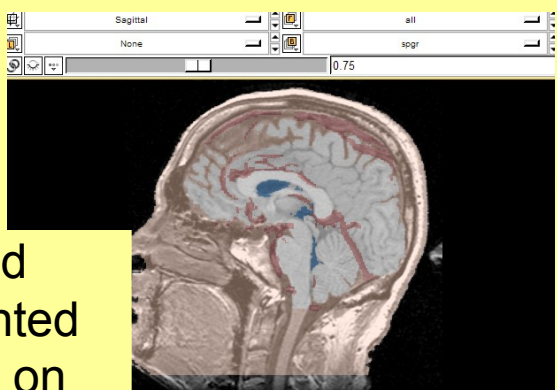
Part 1. Loading and visualizing multiple volumes simultaneously



Part 3. Visualizing 3D reconstructions of anatomical surfaces



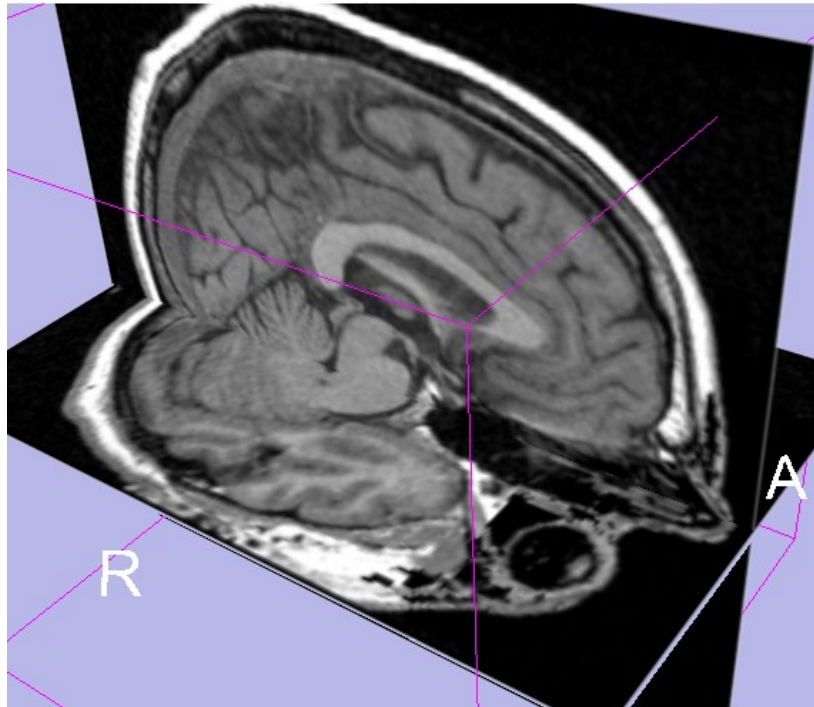
Part 2. Loading and visualizing segmented structures overlaid on grayscale images



Part 4. The lightbox viewer

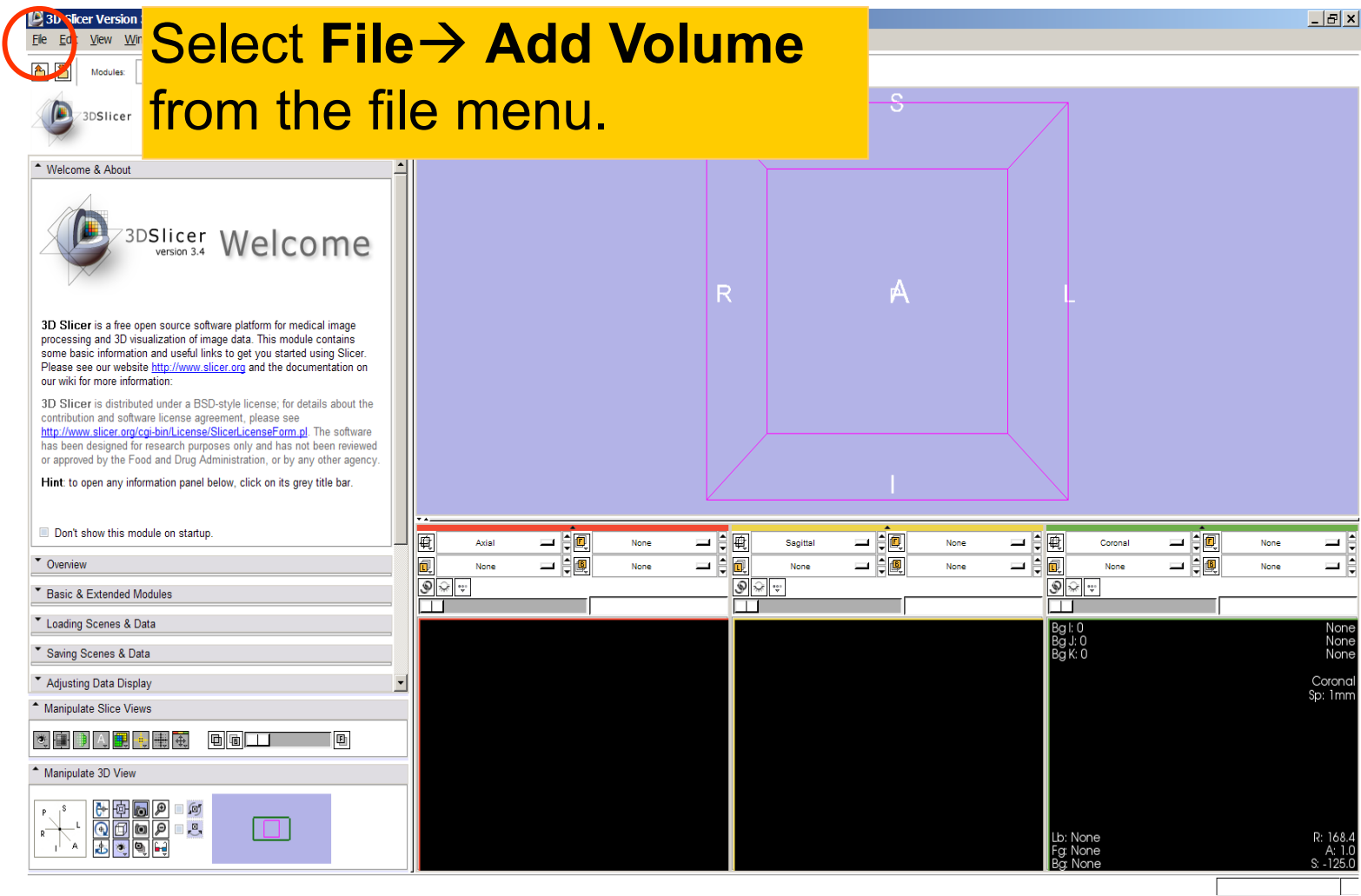


Part 5. Saving data



Part 1: Loading and visualizing multiple volumes simultaneously

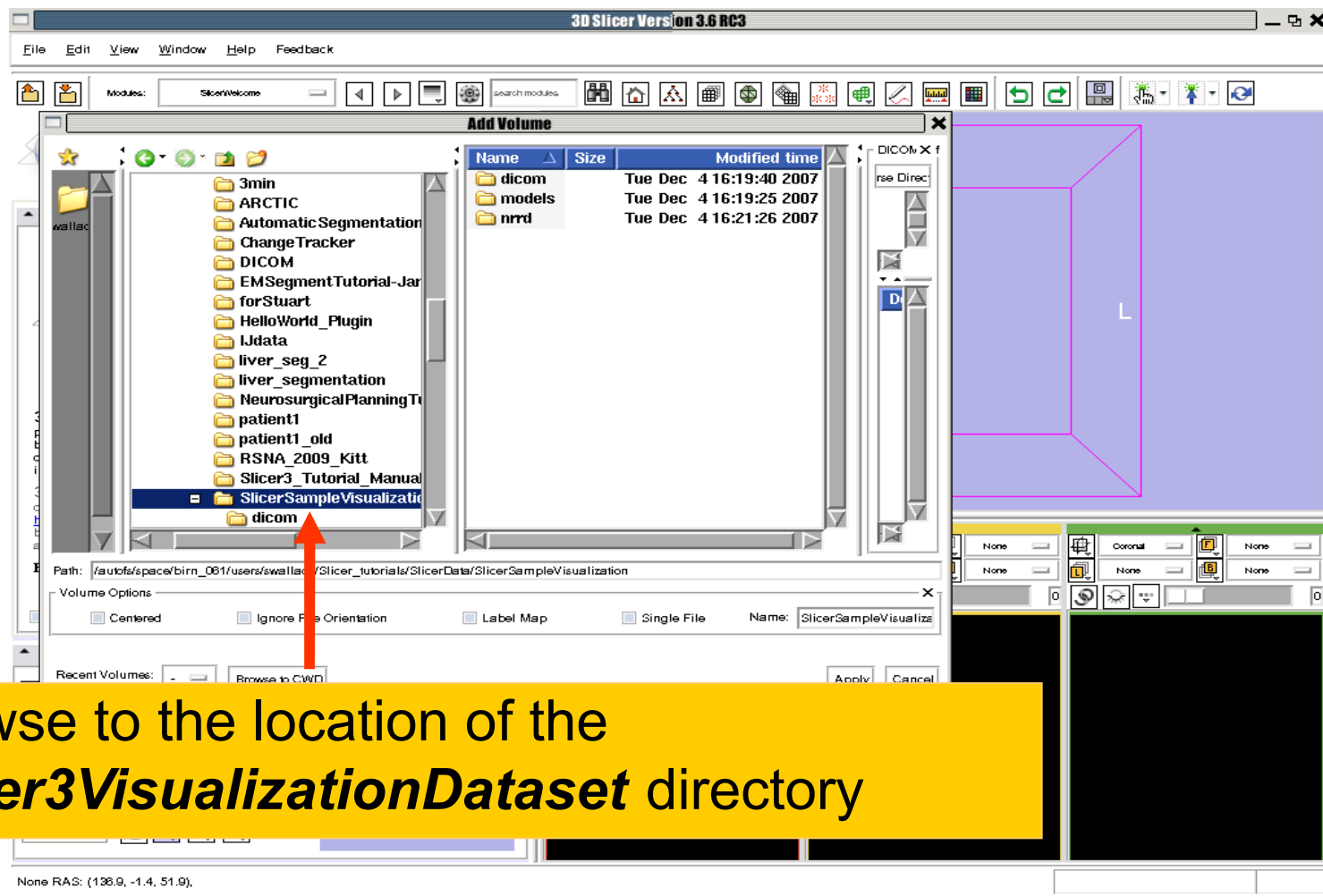
Loading Volumes



Select File → Add Volume from the file menu.

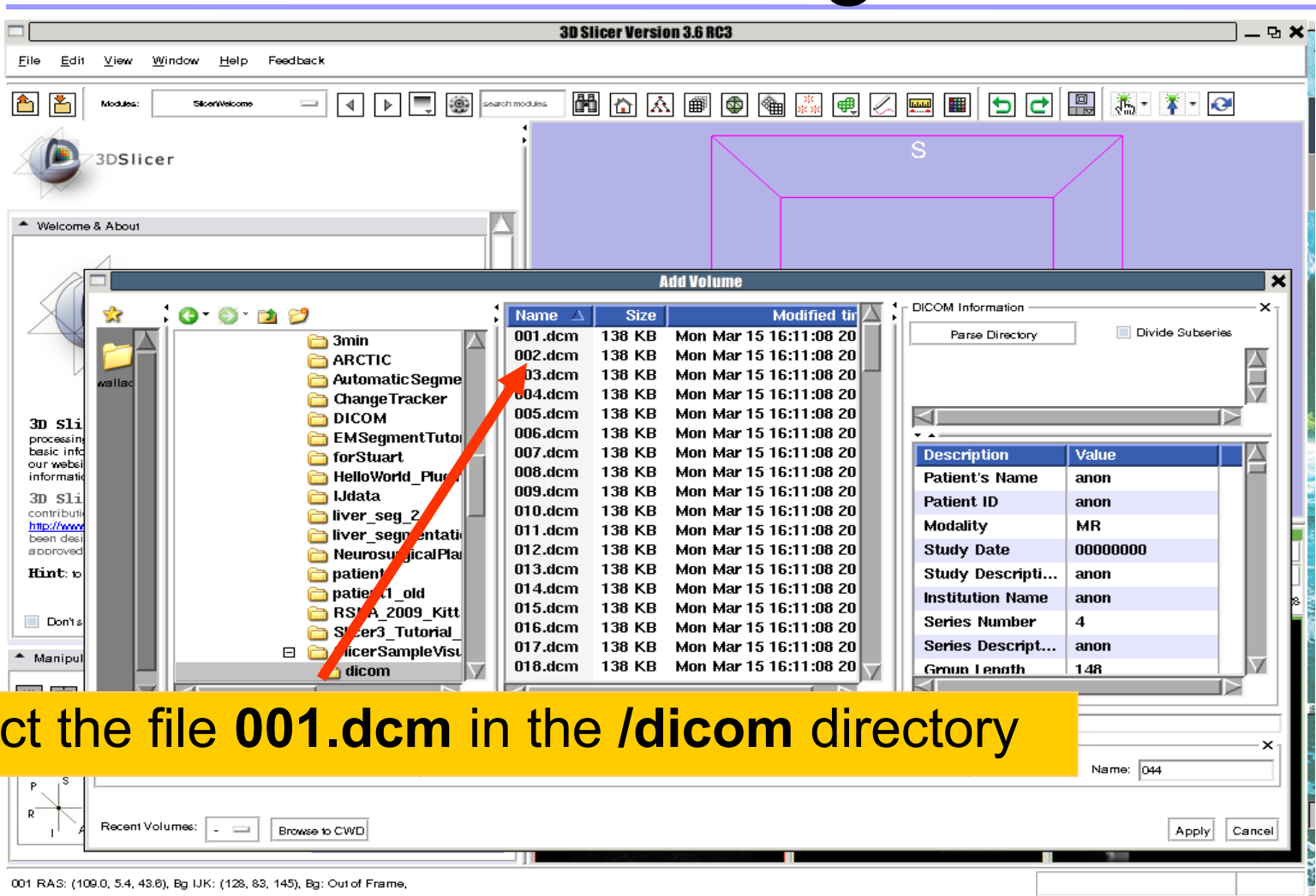
The screenshot shows the 3DSlicer software interface. A yellow callout box highlights the 'File' menu and the 'Add Volume' option. The main 3D view area is a purple cube with anatomical labels: 'S' for Superior, 'I' for Inferior, 'R' for Right, and 'L' for Left. Below the 3D view are three slice view panels: Axial, Sagittal, and Coronal. The Coronal panel shows a small volume and some parameters: Bg I: 0, Bg J: 0, Bg K: 0, None, None, None, Coronal Sp: 1mm, Lb: None, Fg: None, Bg: None, R: 168.4, A: 1.0, 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	1.48

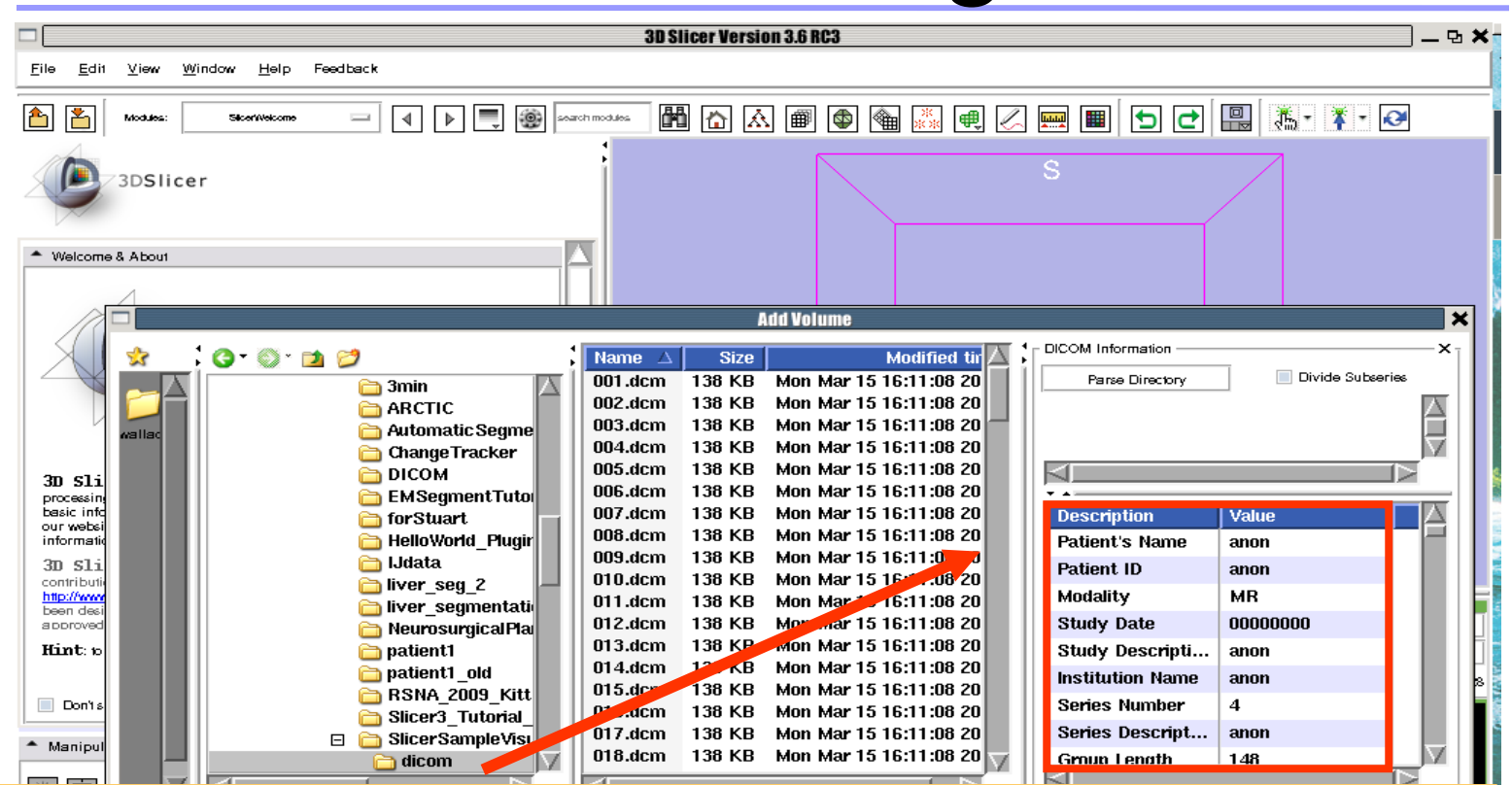
Name: 044

Apply Cancel

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

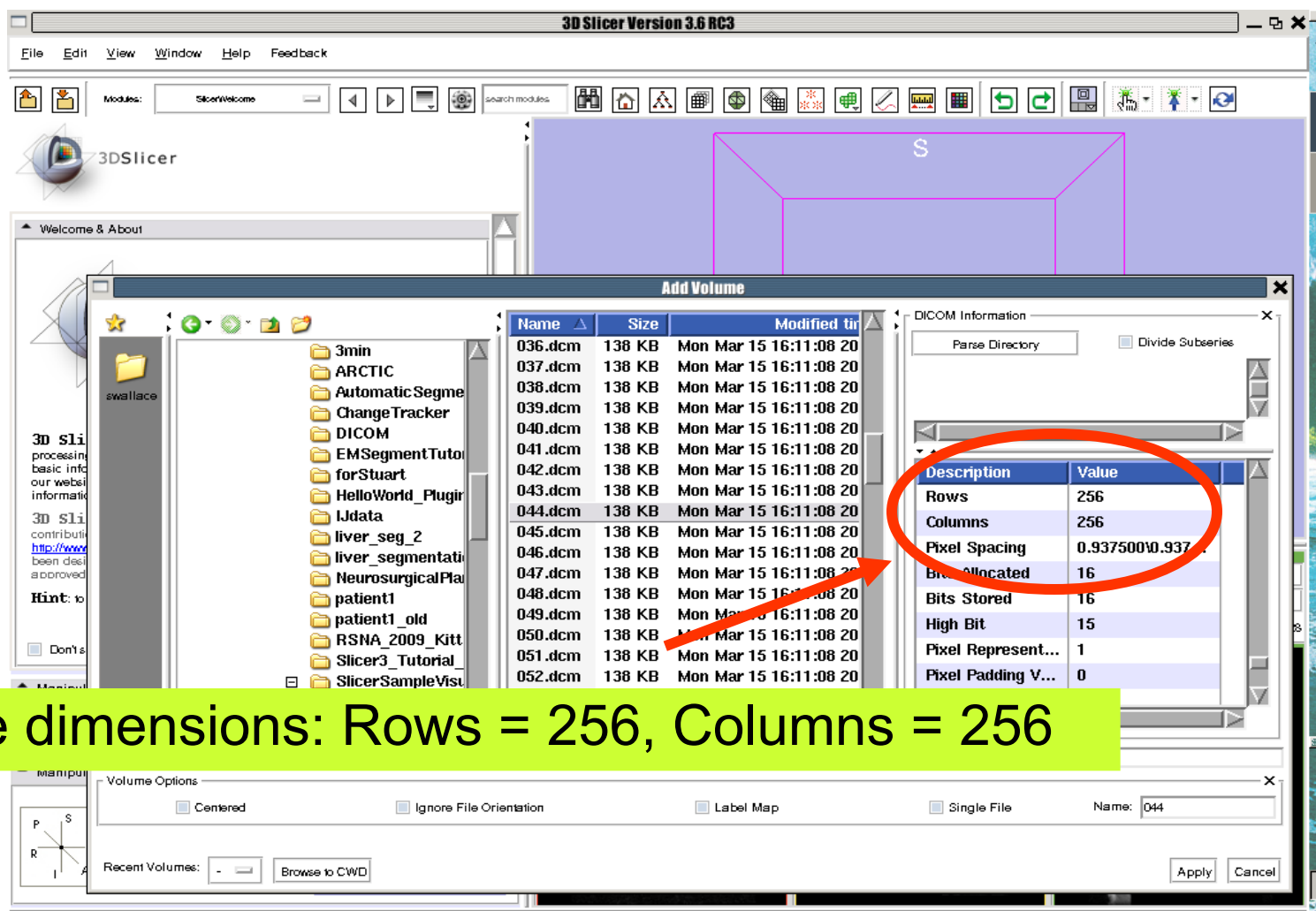
001 RAS: (109.0, 5.4, 43.6), Bg IJK: (128, 83, 145), Bg: Out of Frame.

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

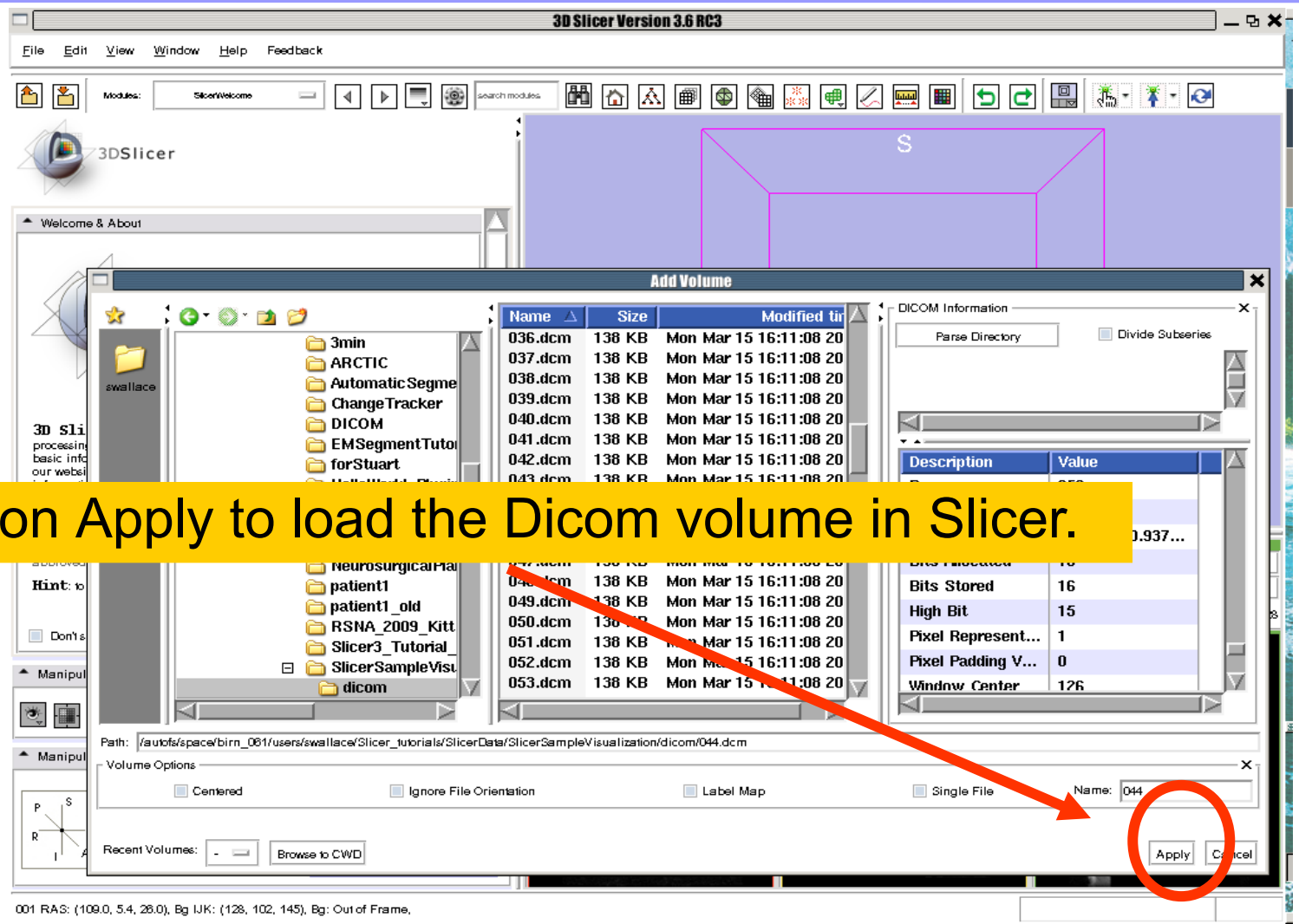
Centered Ignore File Orientation Label Map Single File

Name: 044

Recent Volumes:

Image dimensions: Rows = 256, Columns = 256

Loading Volumes



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

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	
053.dcm	138 KB	Mon Mar 15 16:11:08 20	

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

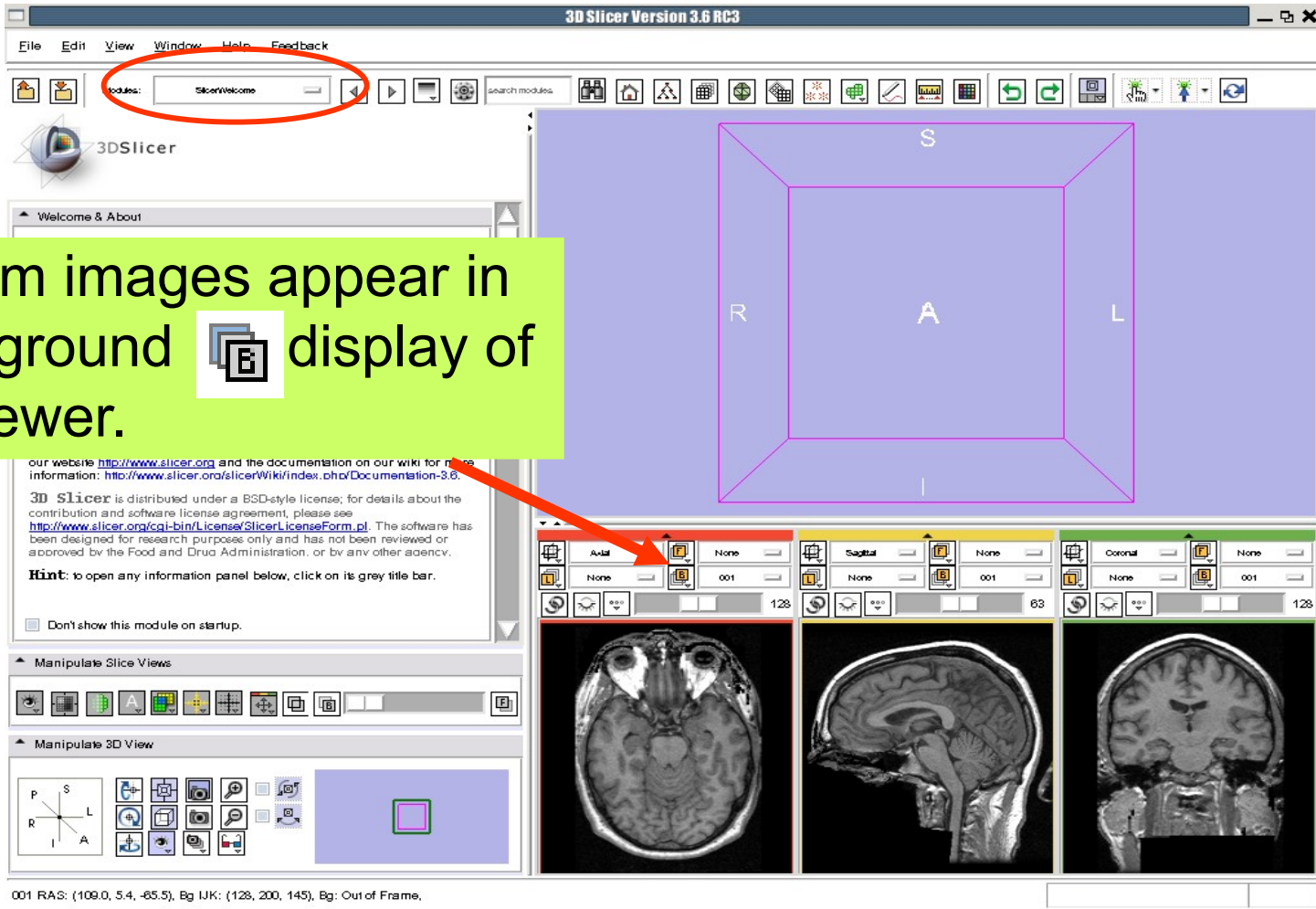
Apply Cancel

001 RAS: (109.0, 5.4, 28.0), Bg IJK: (128, 102, 145), Bg: Out of Frame.

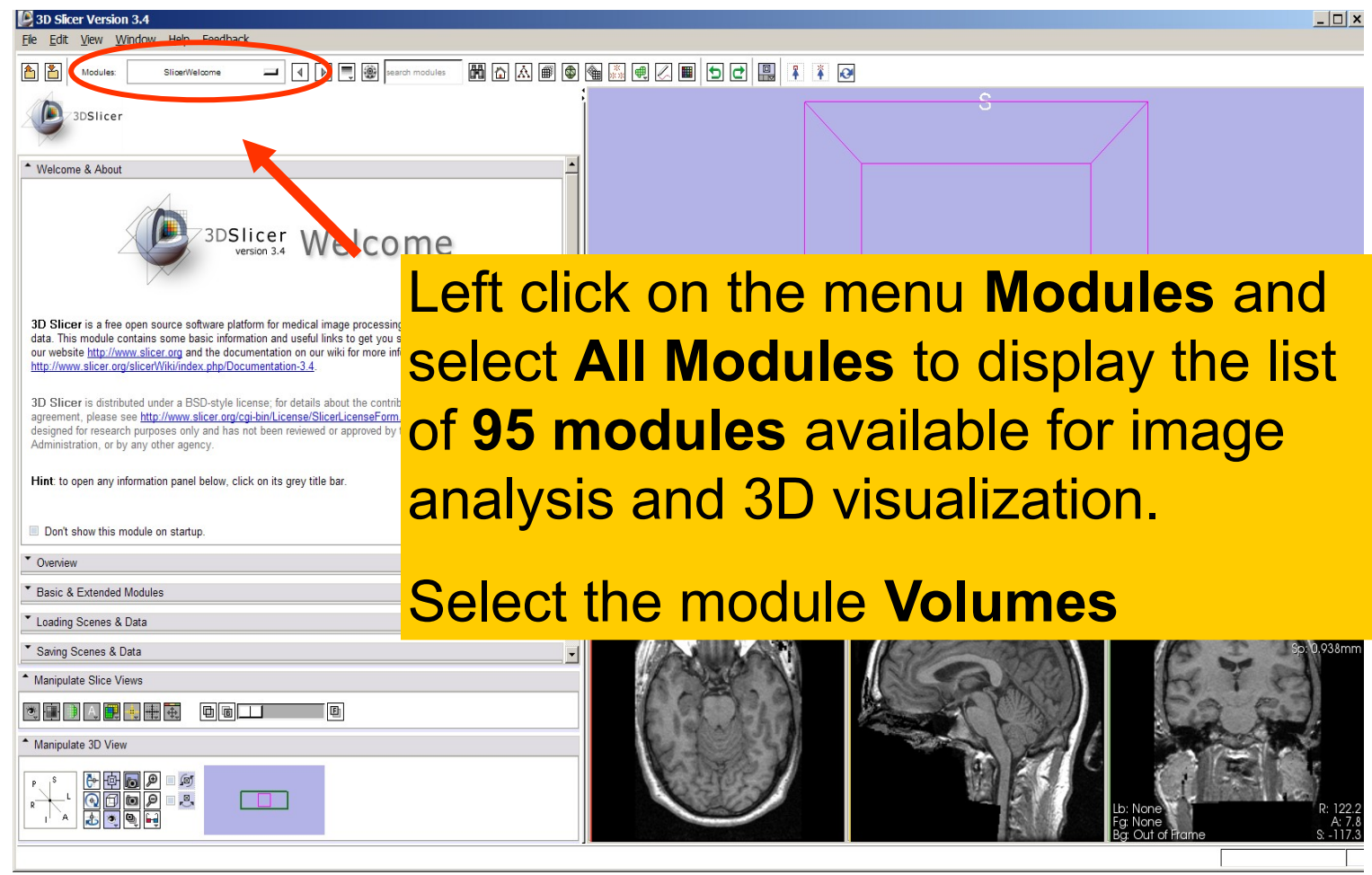
Click on Apply to load the Dicom volume in Slicer.

Loading Volumes

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



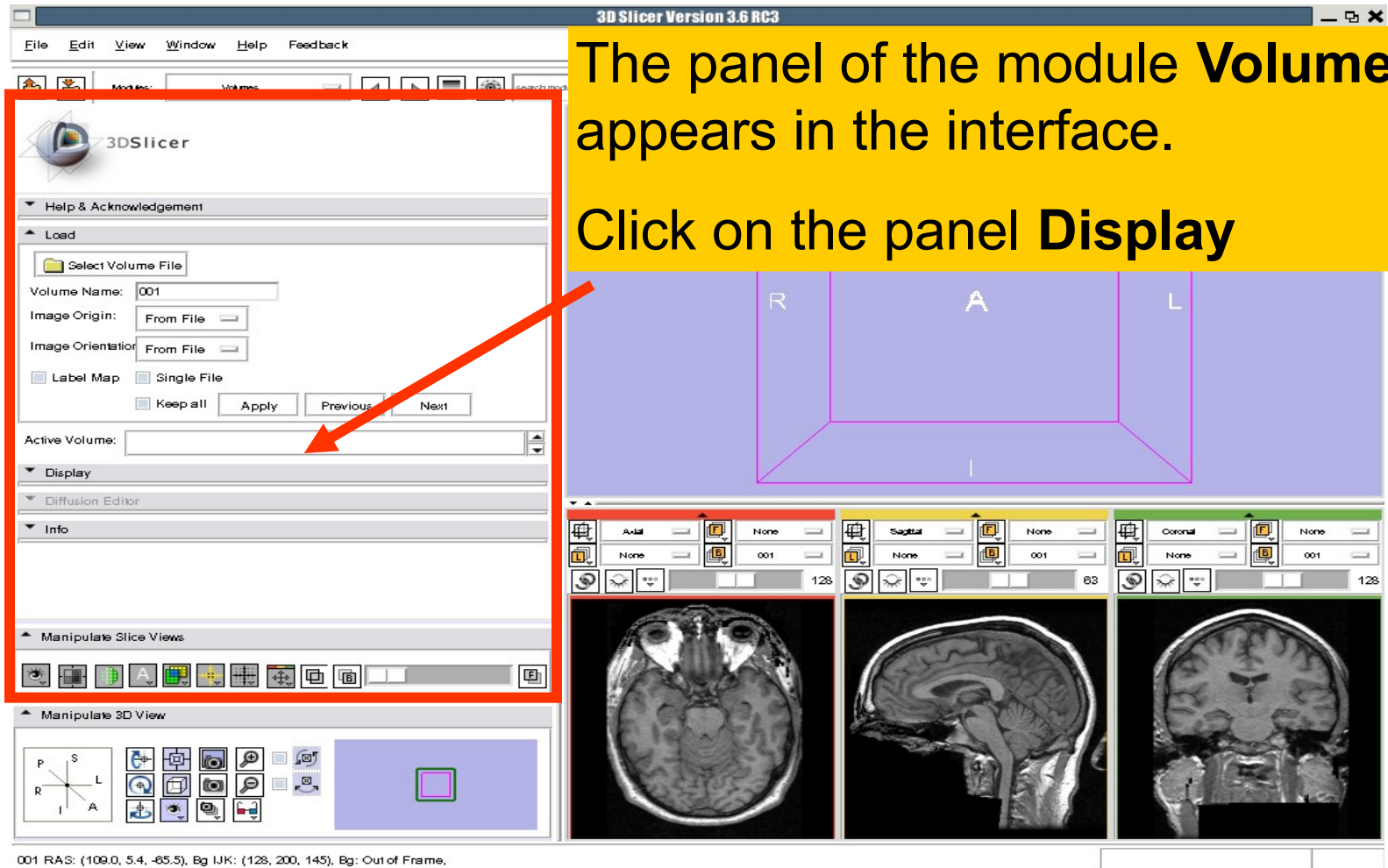
Loading Volumes



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



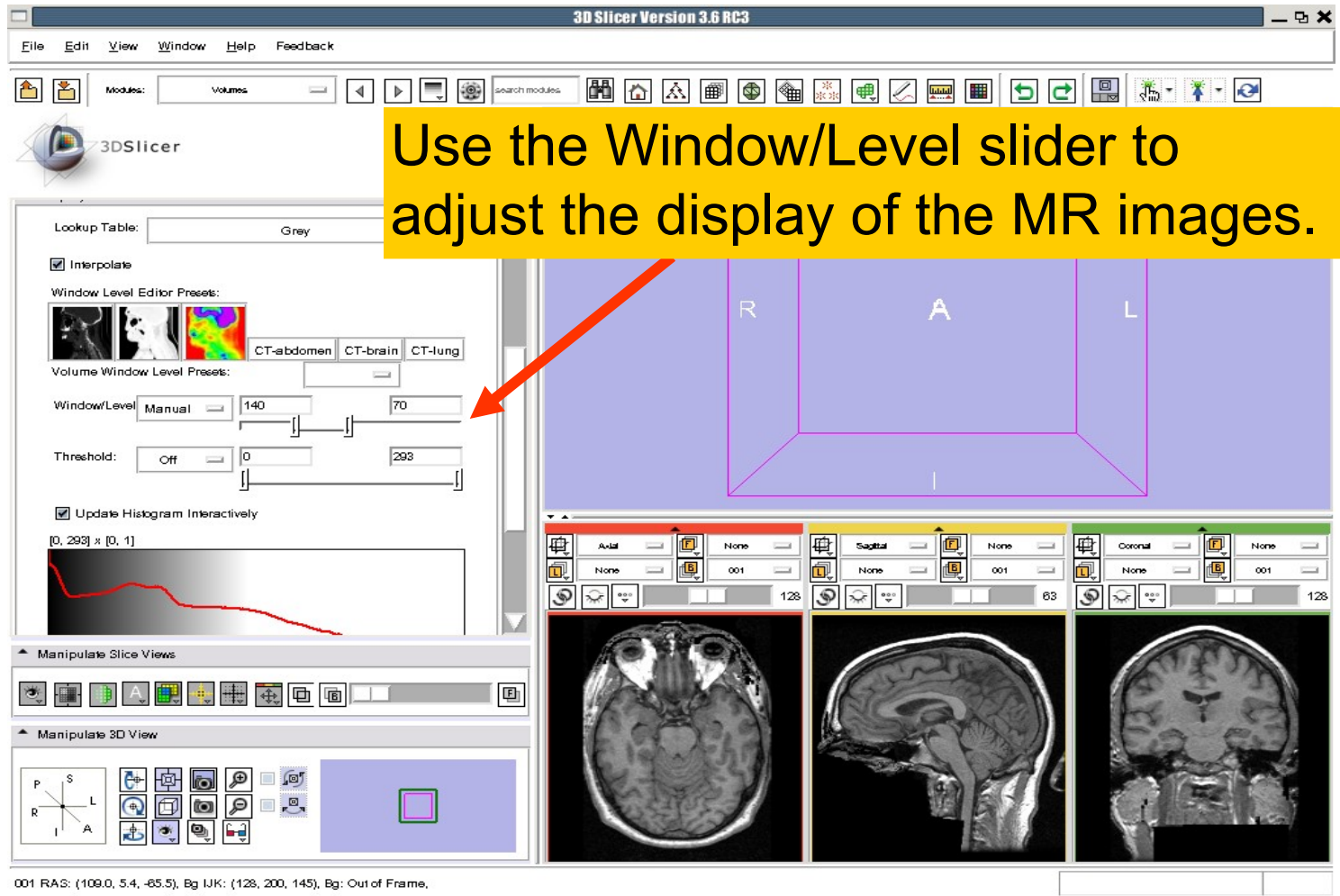
The panel of the module **Volumes** appears in the interface.

Click on the panel **Display**

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

The screenshot shows the 3D Slicer interface with the Volumes module selected. A red box highlights the 'Load' and 'Display' sections of the module. A red arrow points from the 'Display' section to the 'Display' panel in the 3D view. The 3D view shows a brain volume with a purple wireframe bounding box and labels R, A, L, I. Below the 3D view are three slice views: Axial, Sagittal, and Coronal. The status bar at the bottom shows the volume name '001' and its bounding box coordinates.

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]

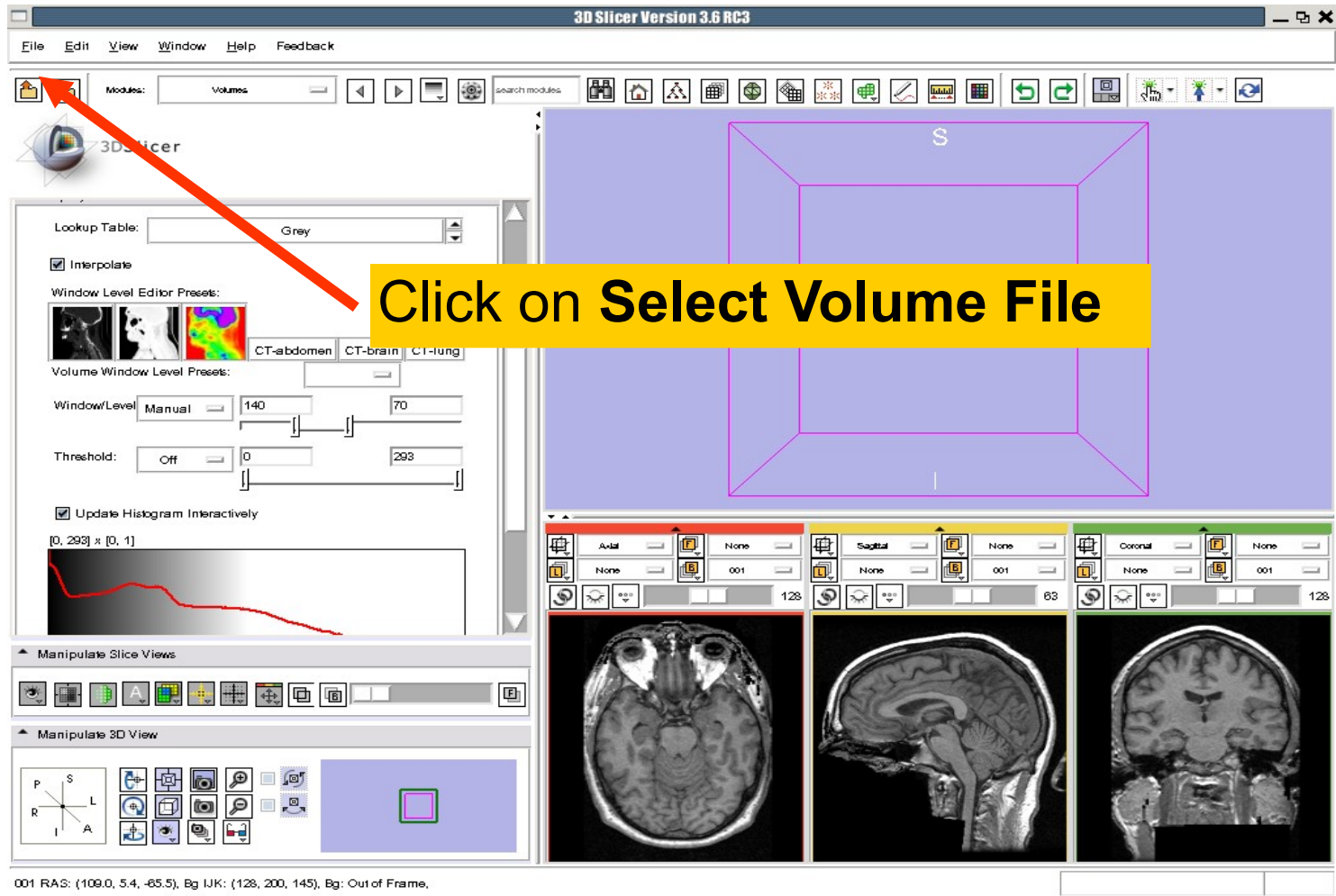
Manipulate Slice Views

Manipulate 3D View

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

The screenshot shows the 3D Slicer interface with a yellow callout box pointing to the 'Window/Level' slider in the 'Volume Window Level Presets' section. The slider is set to 'Manual' with values of 140 and 70. Below the slider is a histogram showing the intensity distribution of the MR image. The main 3D view shows three orthogonal slices (Axial, Sagittal, Coronal) of a brain MRI volume. The 'Manipulate Slice Views' and 'Manipulate 3D View' panels are also visible.

Loading Volumes



3D Slicer Version 3.6 RC3

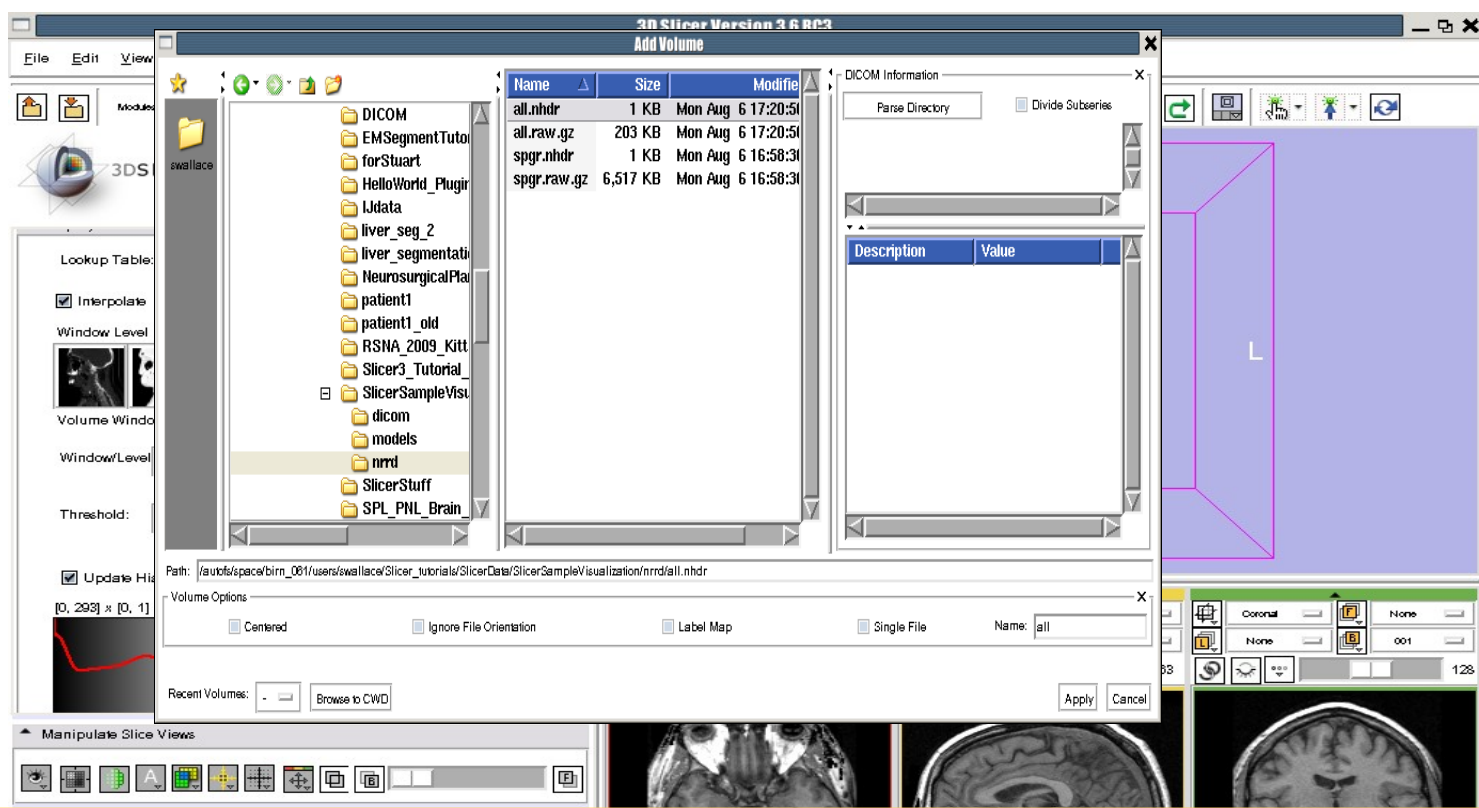
File Edit View Window Help Feedback

Modules: Volumes

Click on **Select Volume File**

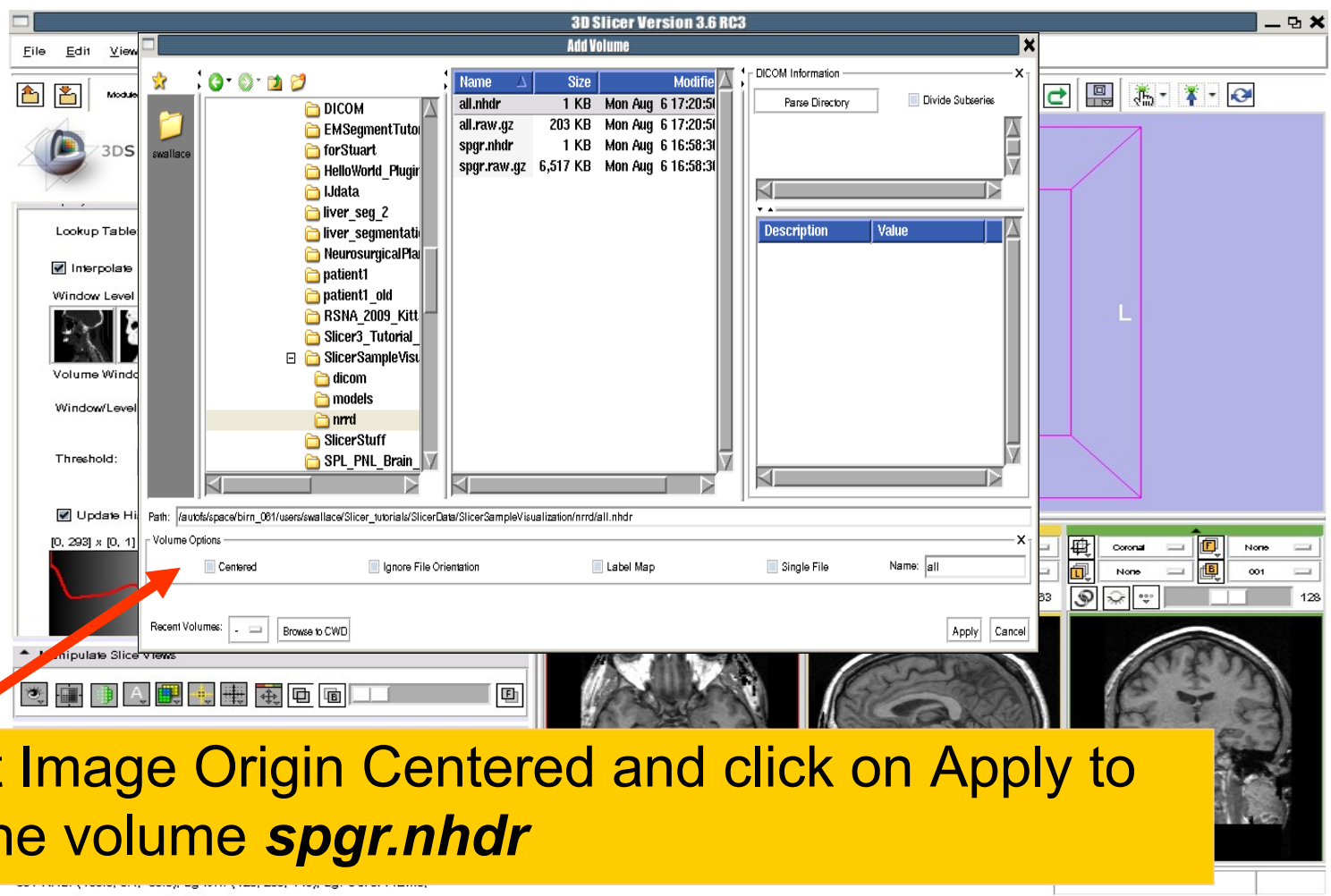
001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

Loading Volumes



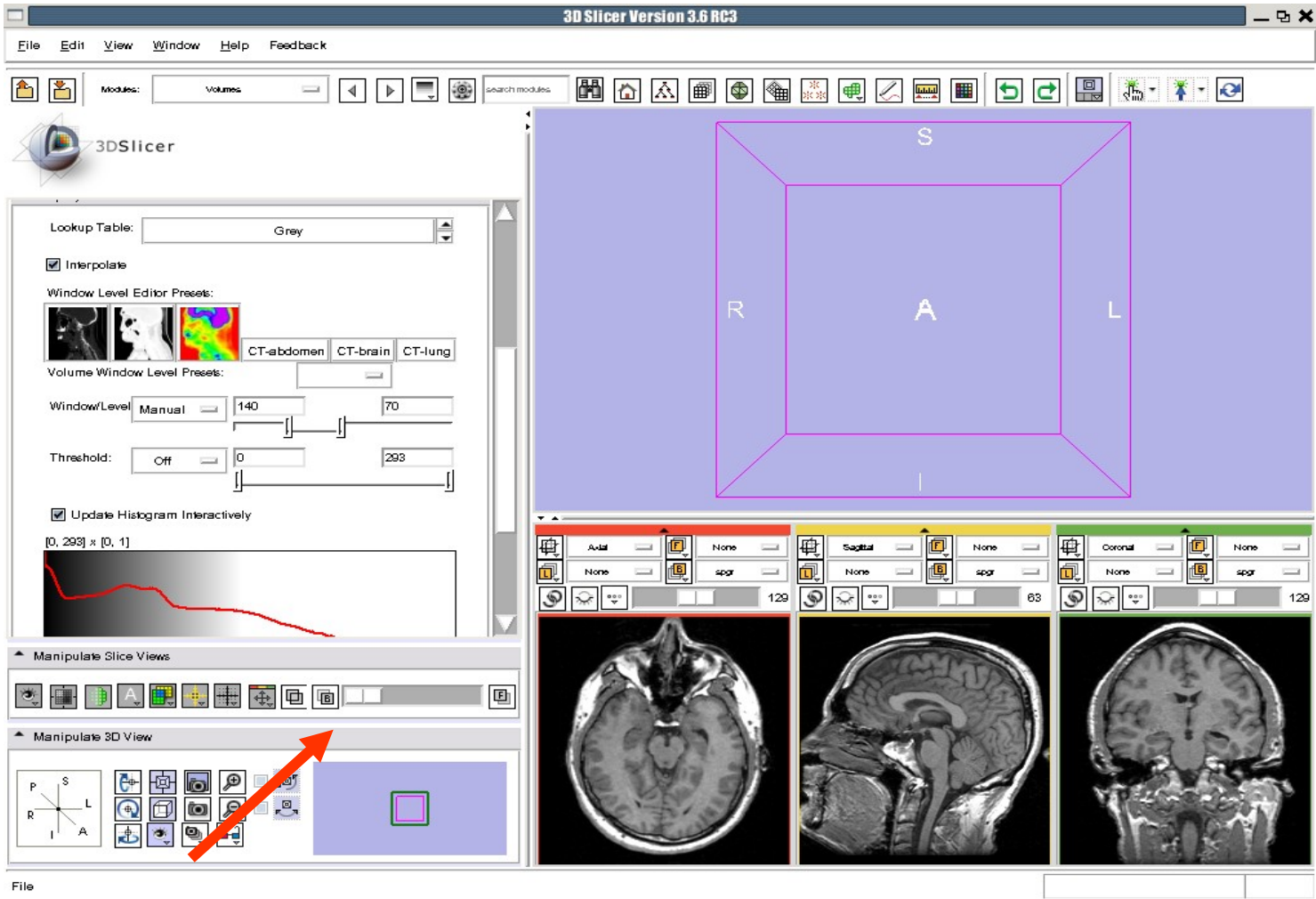
Browse to find the header file of the spgr volume ***spgr.nhdr*** located in the directory ***Slicer3VisualizationDataset/nrrd*** and click on **Open**.

Loading Volumes



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

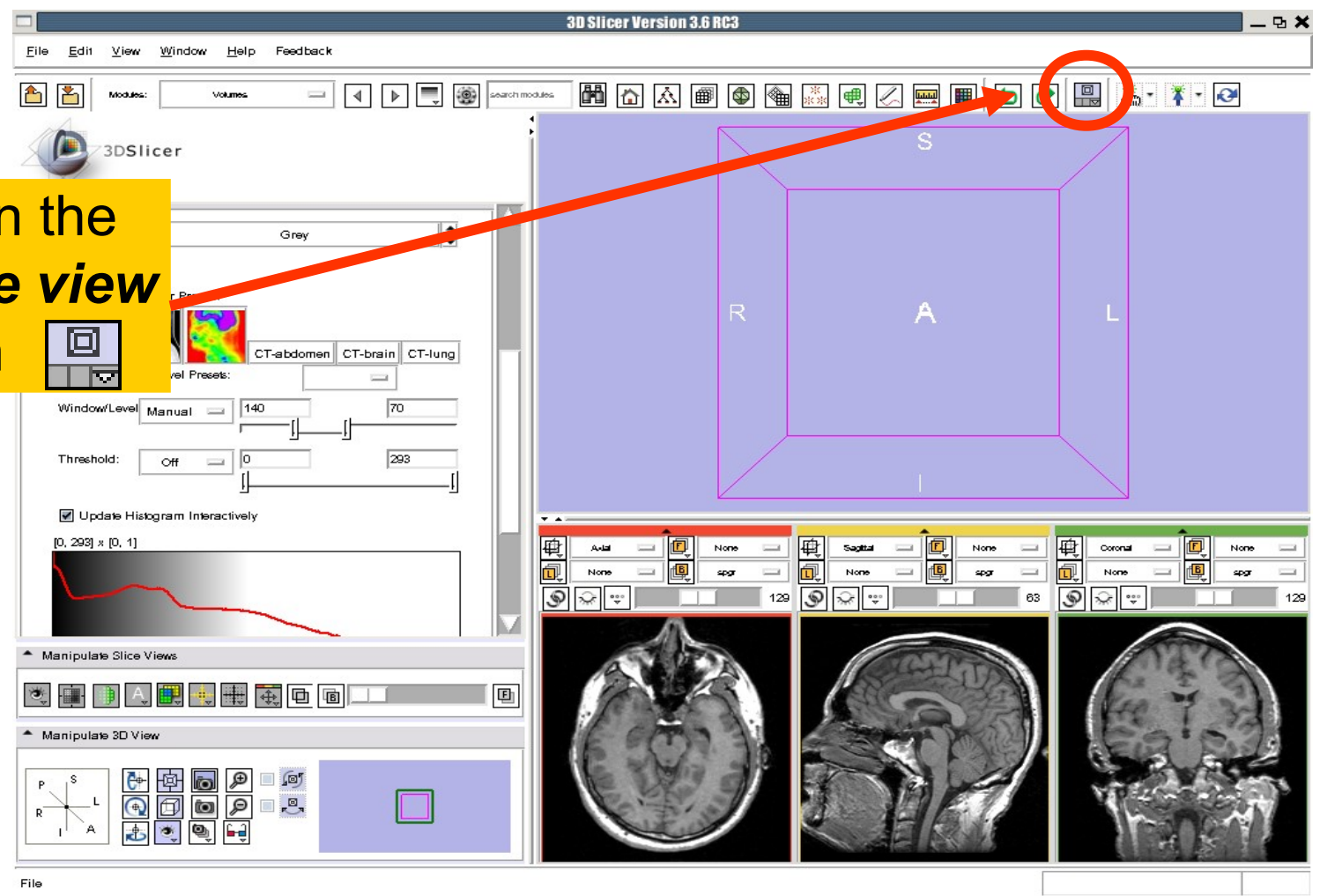
Loading Volumes



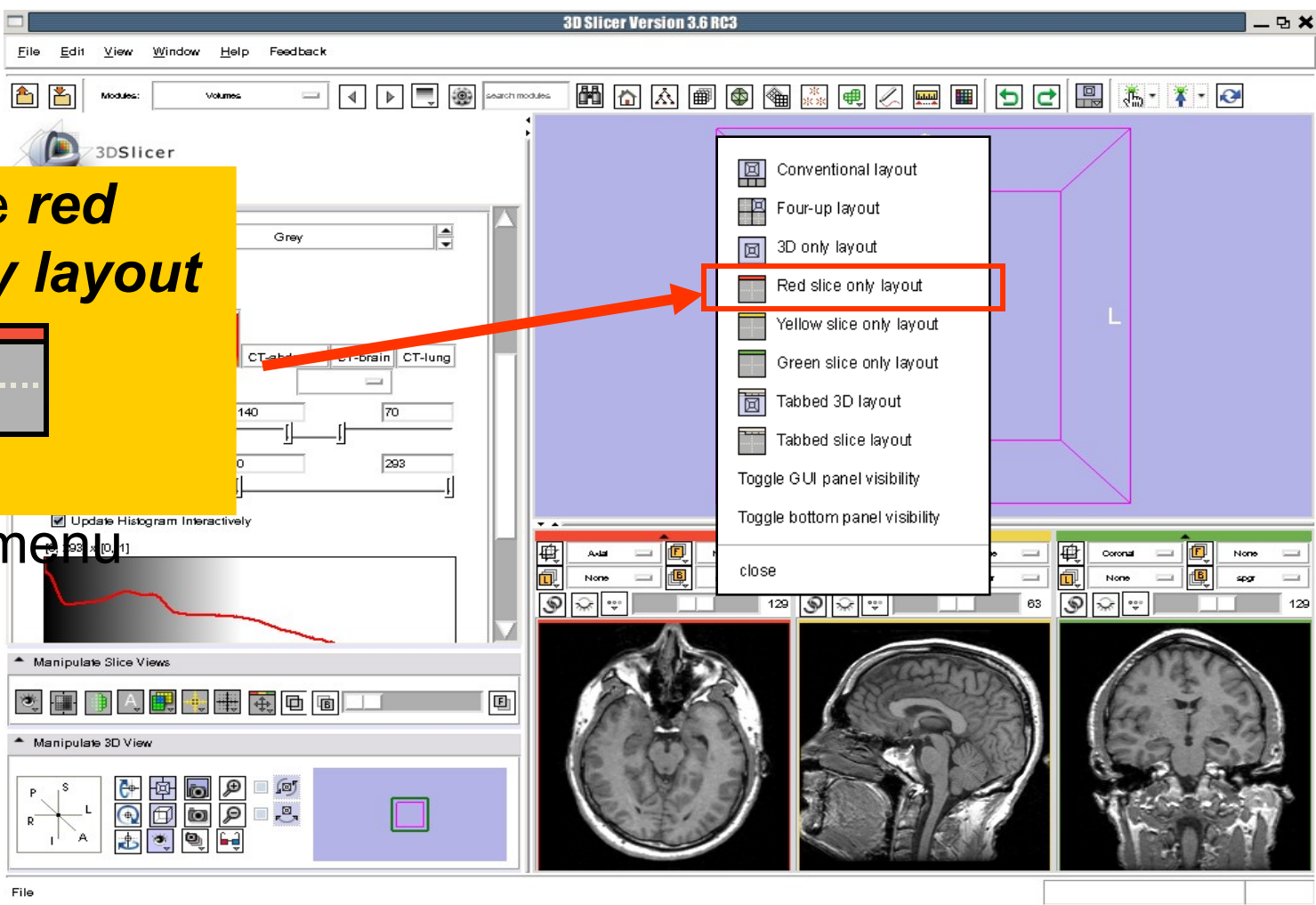
Soni The spgr volume appears in the Background display of the 2D Viewer.

Exploring the data

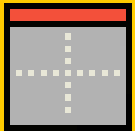
Click on the **choose view** icon



Exploring the data



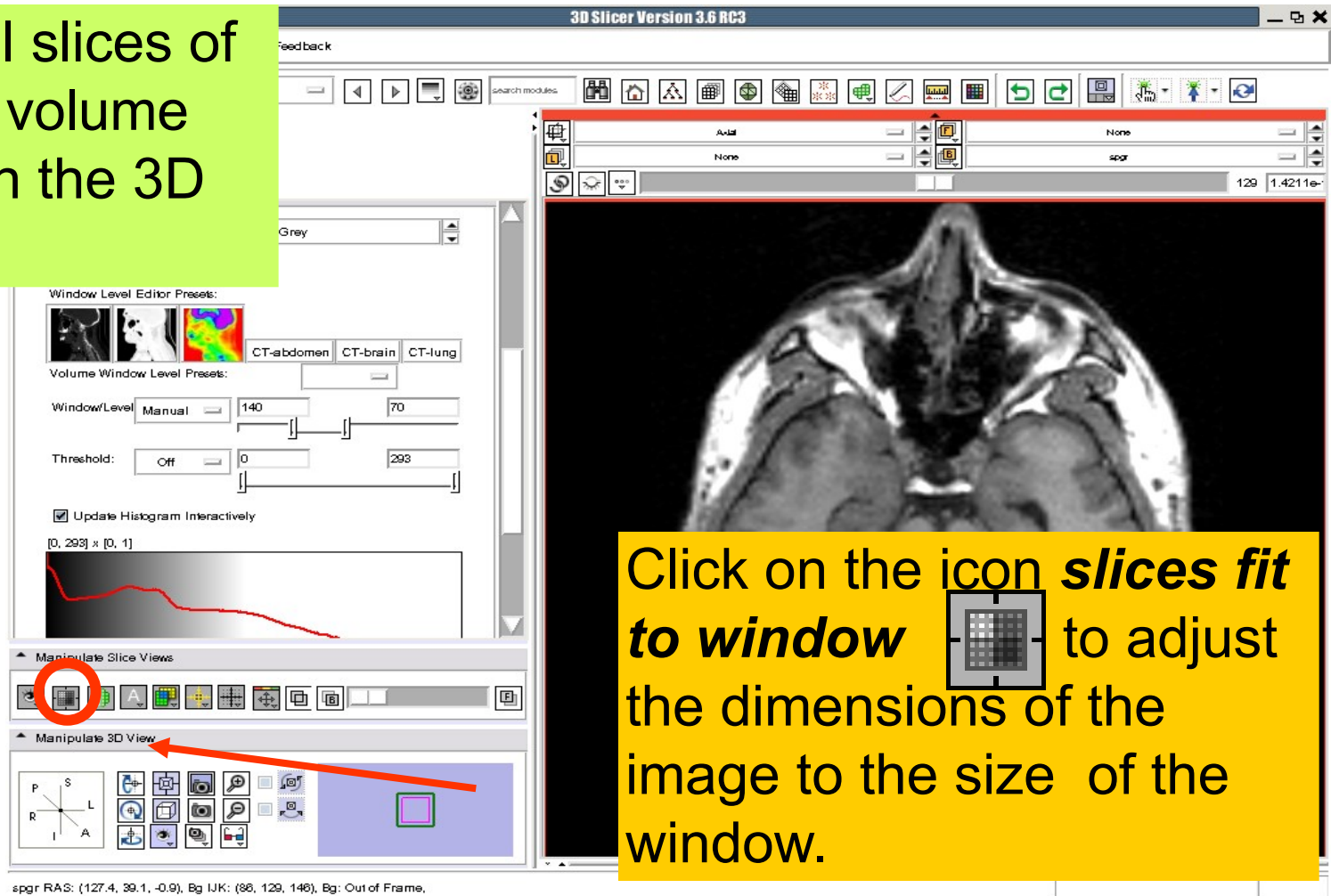
Select the *red slice only layout*



from the menu


Exploring the data

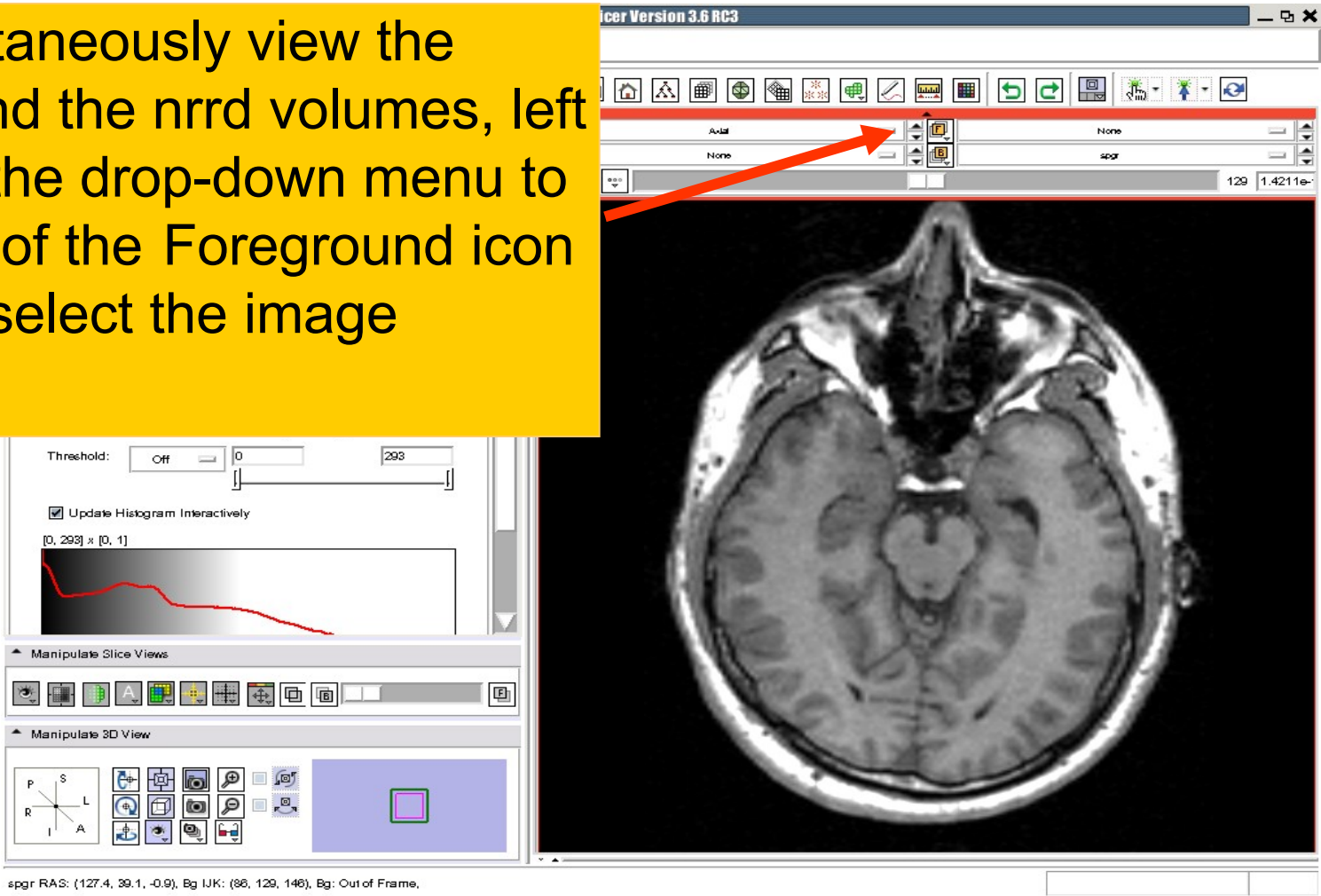
The axial slices of the spgr volume appear in the 3D viewer.





The screenshot shows the 3D Slicer Version 3.6 RC3 interface. On the left, the 'Window Level Editor' panel is visible, showing 'Window/Level' set to 'Manual' with values 140 and 70, and a 'Threshold' of 0 to 293. Below this is a histogram. In the 'Manipulate Slice Views' section, the 'Slices Fit to Window' icon (a grid) is circled in red, with a red arrow pointing to it. The 'Manipulate 3D View' section contains various navigation icons. The main 3D viewer on the right displays an axial MRI slice of a head. A yellow callout box with black text is overlaid on the 3D viewer, containing the instruction: 'Click on the icon *slices fit to window* to adjust the dimensions of the image to the size of the window.'

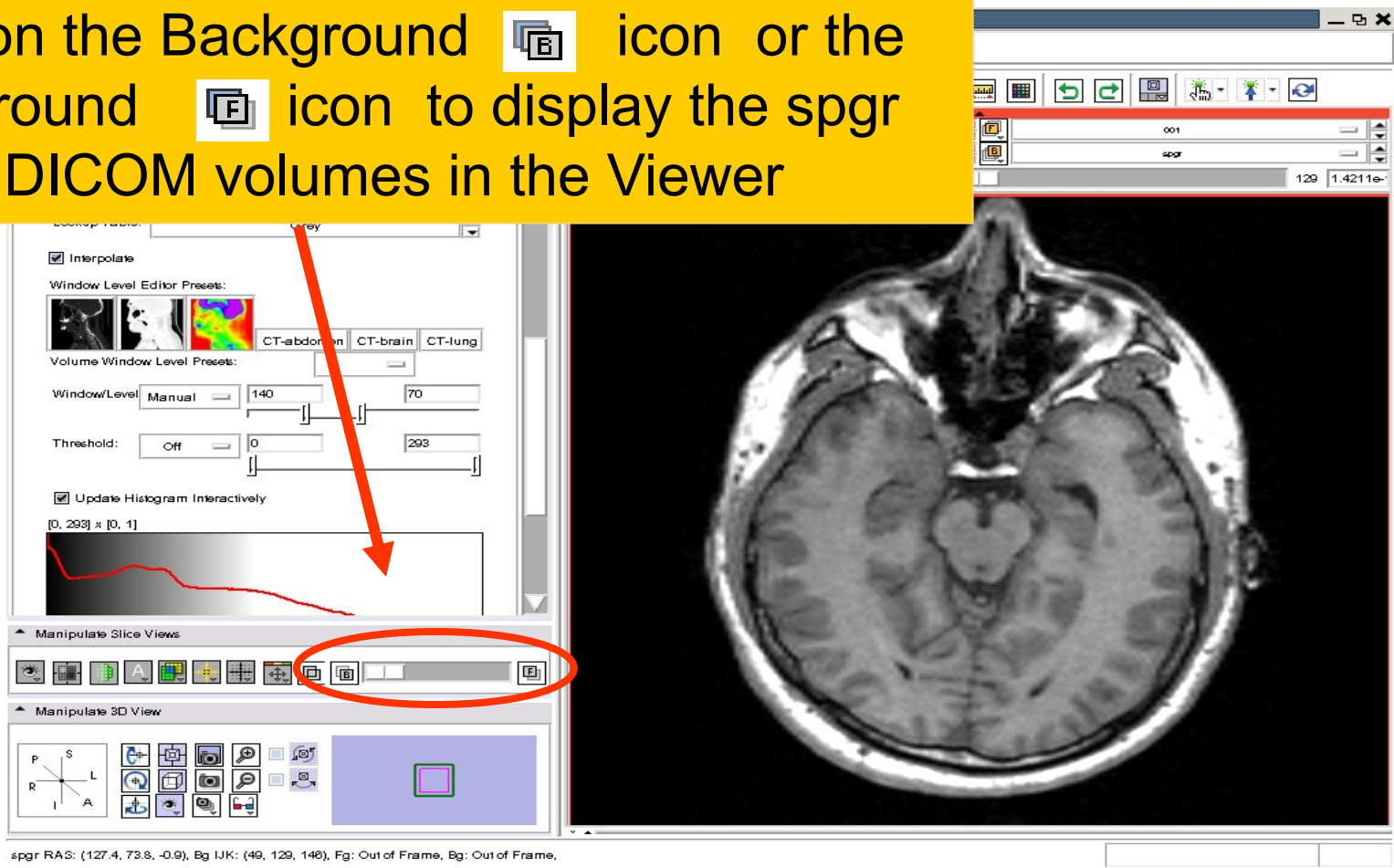
Exploring the data

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

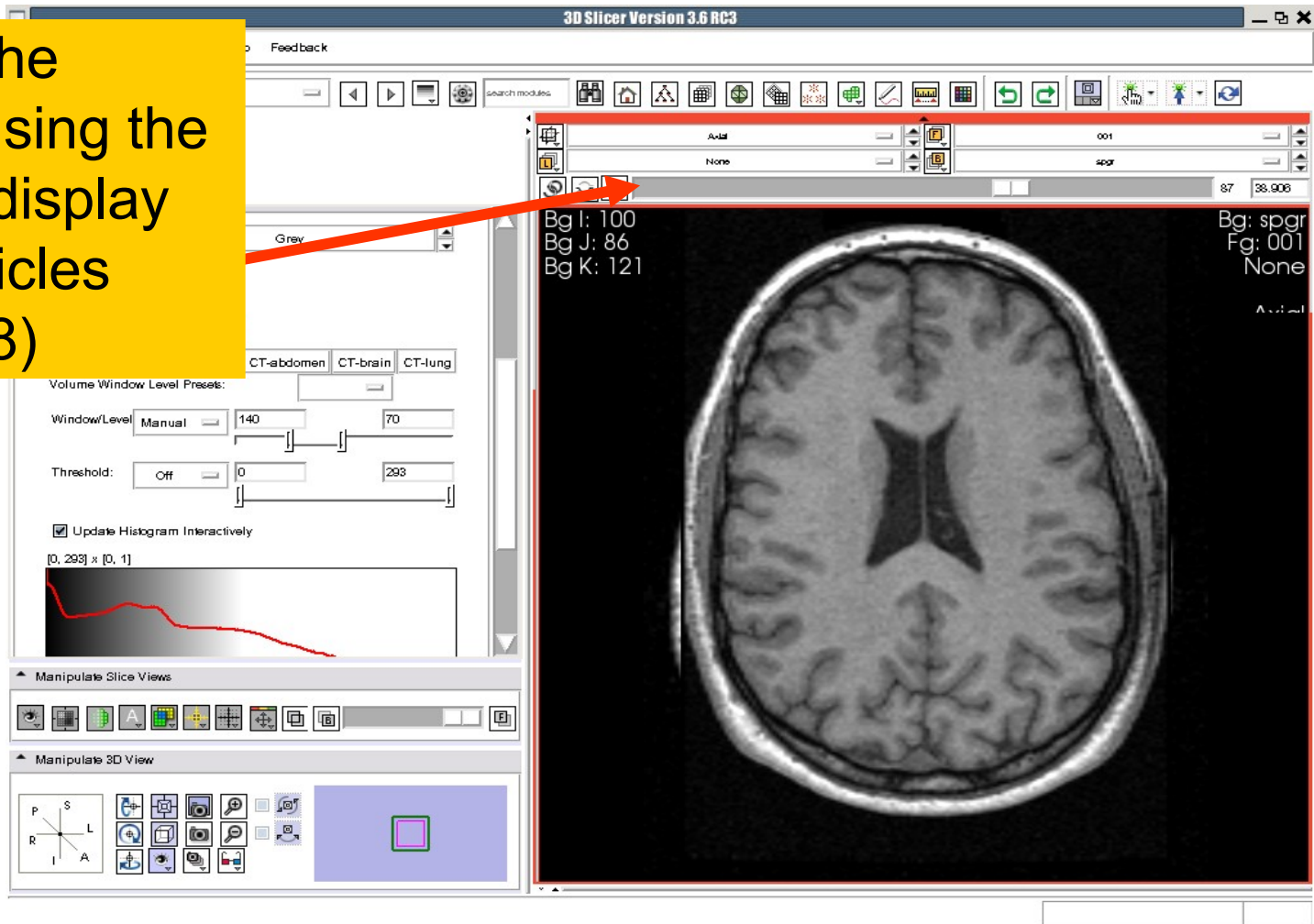
Click on the Background  icon or the Foreground  icon to display the spgr or the DICOM volumes in the Viewer



The screenshot shows the 3DSlicer interface. On the right, a large window displays an axial MRI slice of a brain. On the left, there are several control panels. The 'Window Level Editor' panel includes a histogram with a red curve and a red arrow pointing to the 'Background' icon in the 'Manipulate Slice Views' toolbar. The 'Manipulate 3D View' panel is also visible. At the bottom, a status bar displays coordinates: 'spgr RAS: (127.4, 73.8, -0.9), Bg IJK: (49, 129, 146), Fg: Out of Frame, Bg: Out of Frame.'

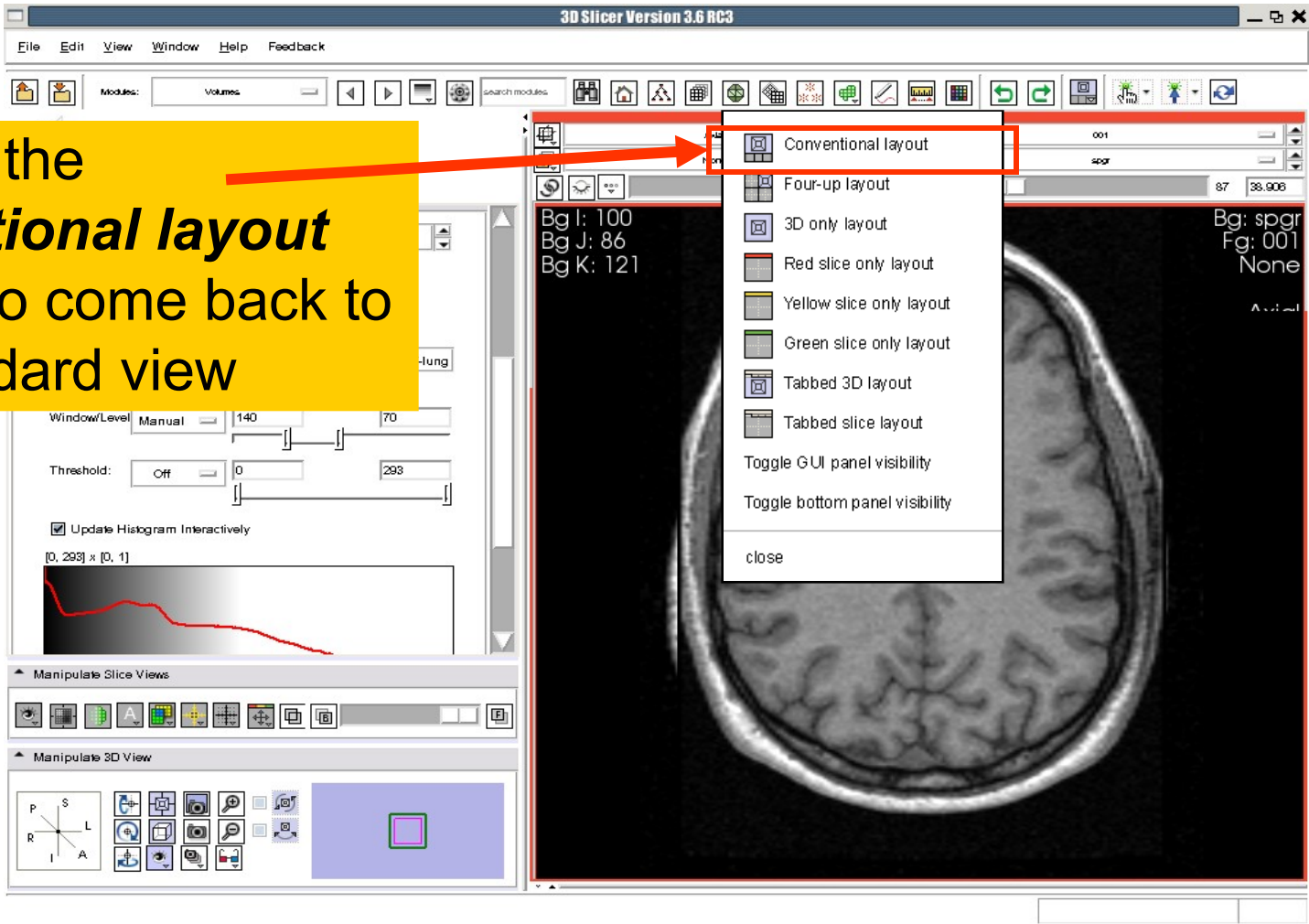
Exploring the data

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




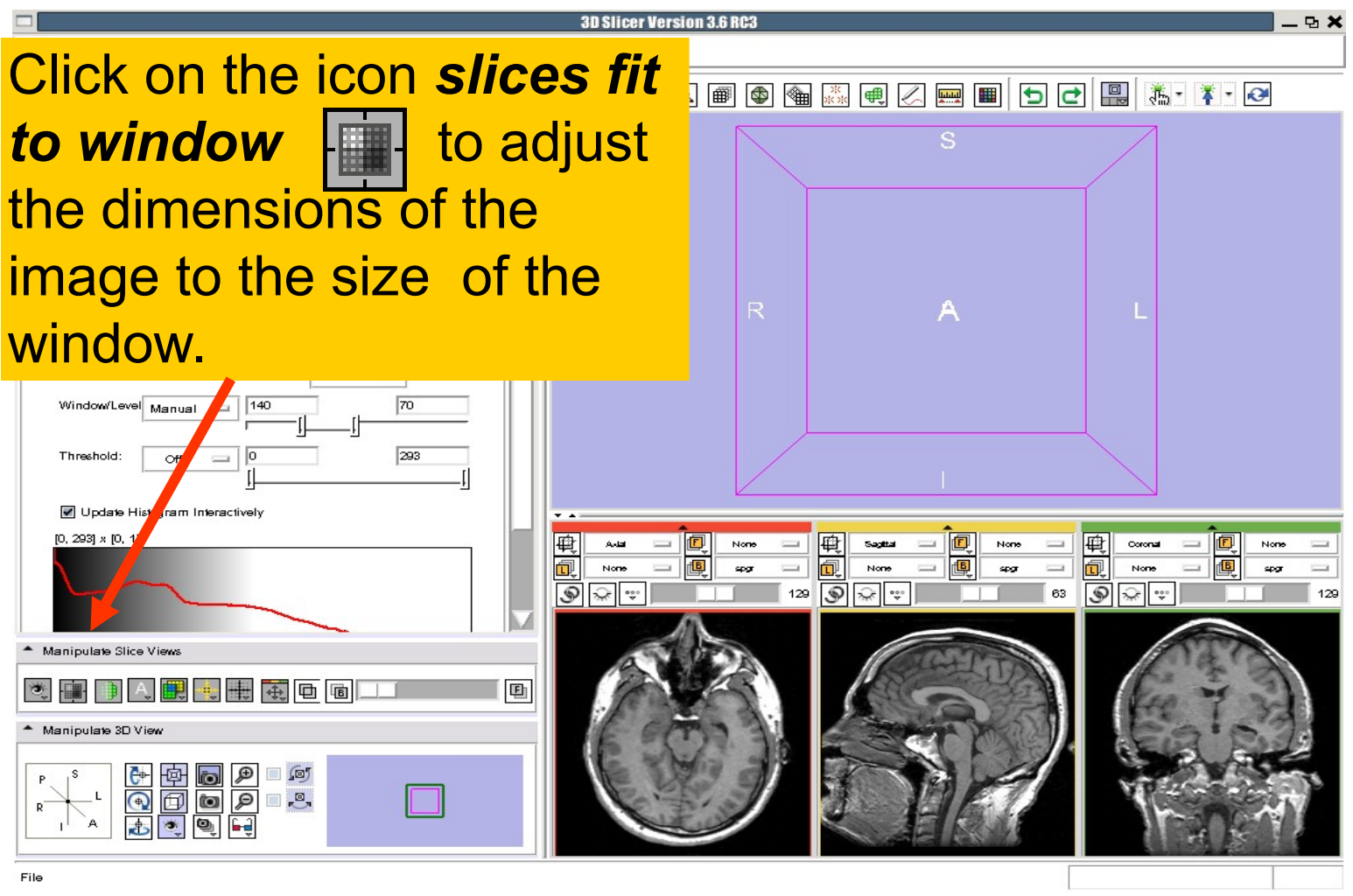
Exploring the data

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.

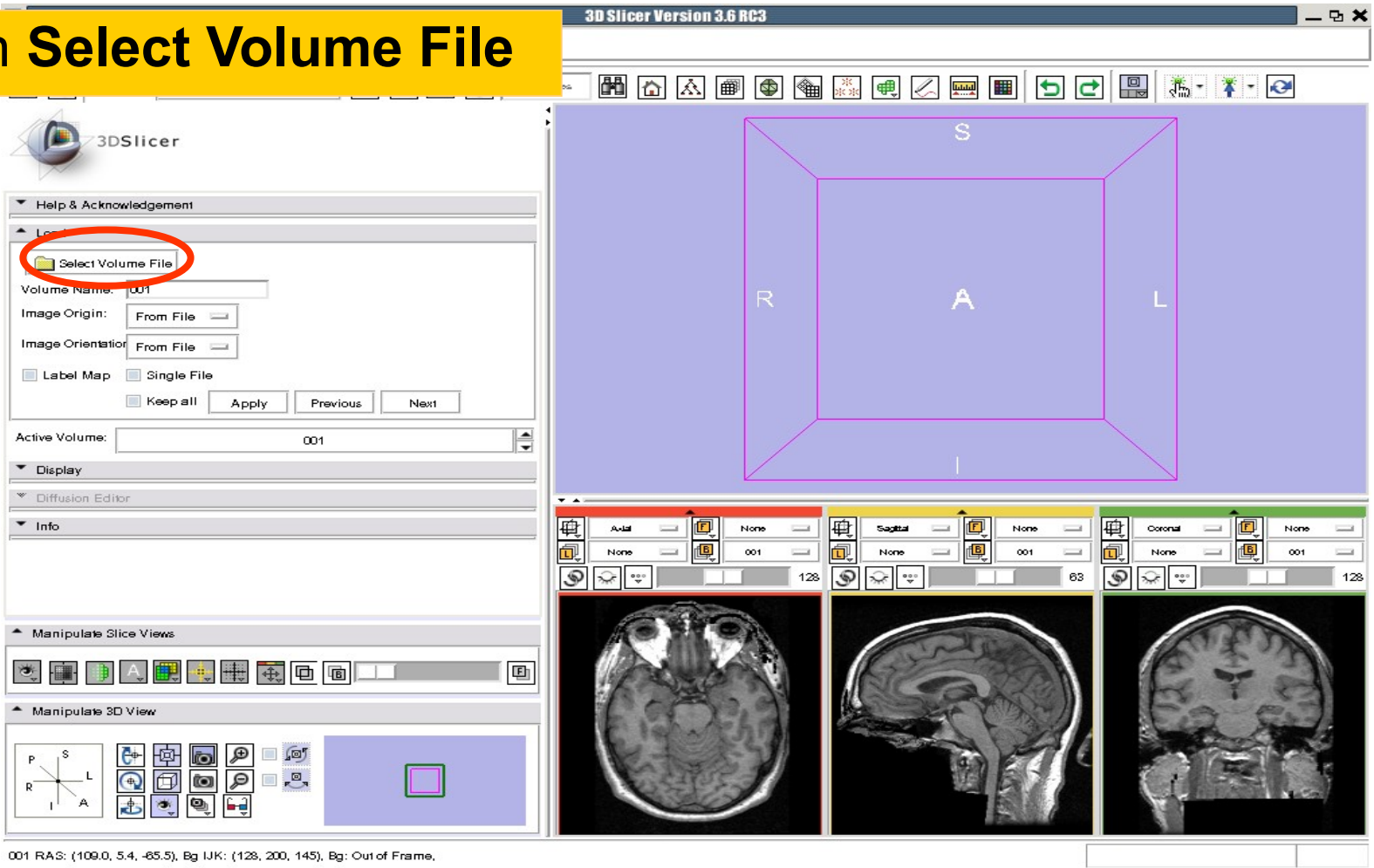




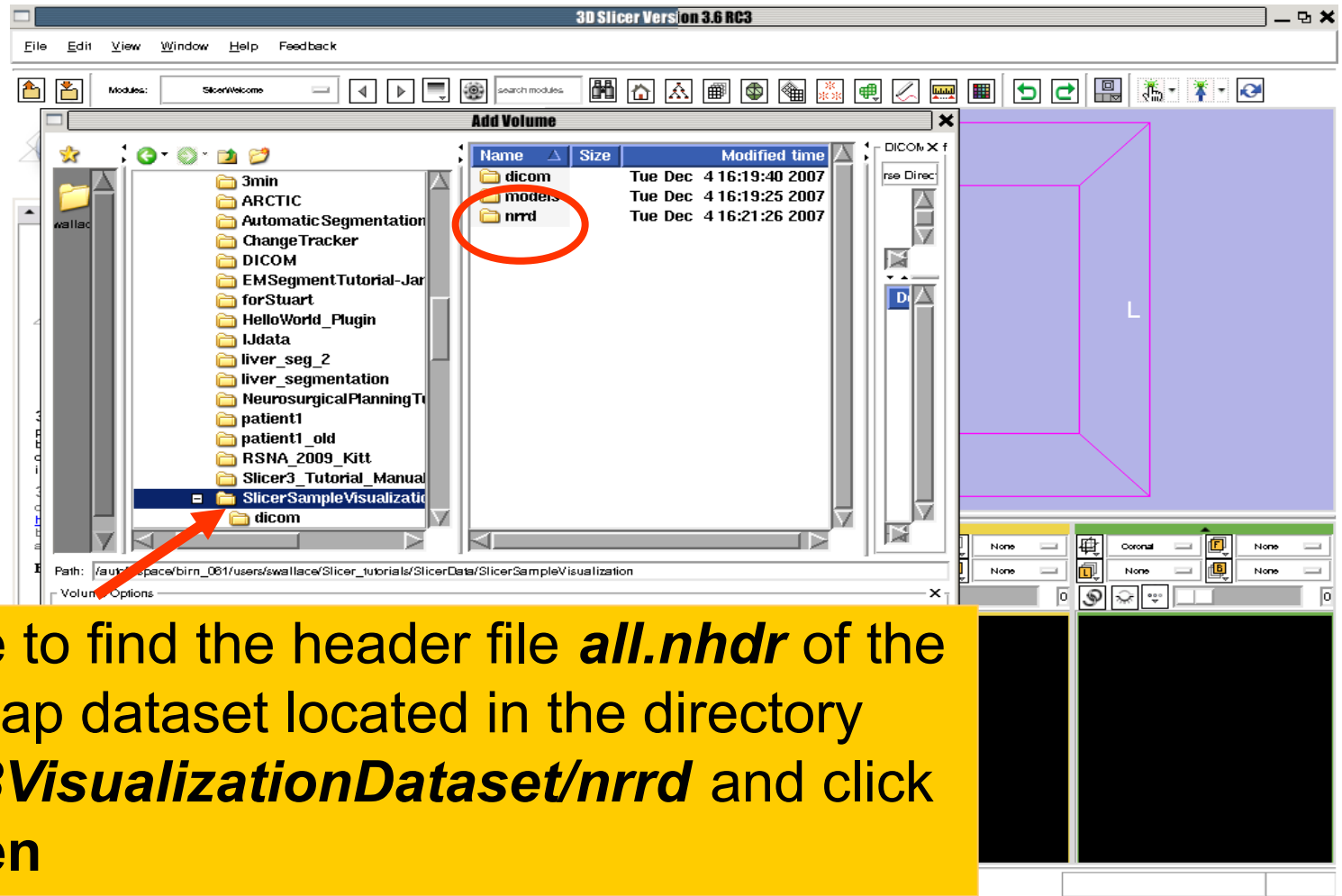
Part 2: Loading and visualizing segmented structures overlaid on grayscale images

Loading a label map

Click on **Select Volume File**

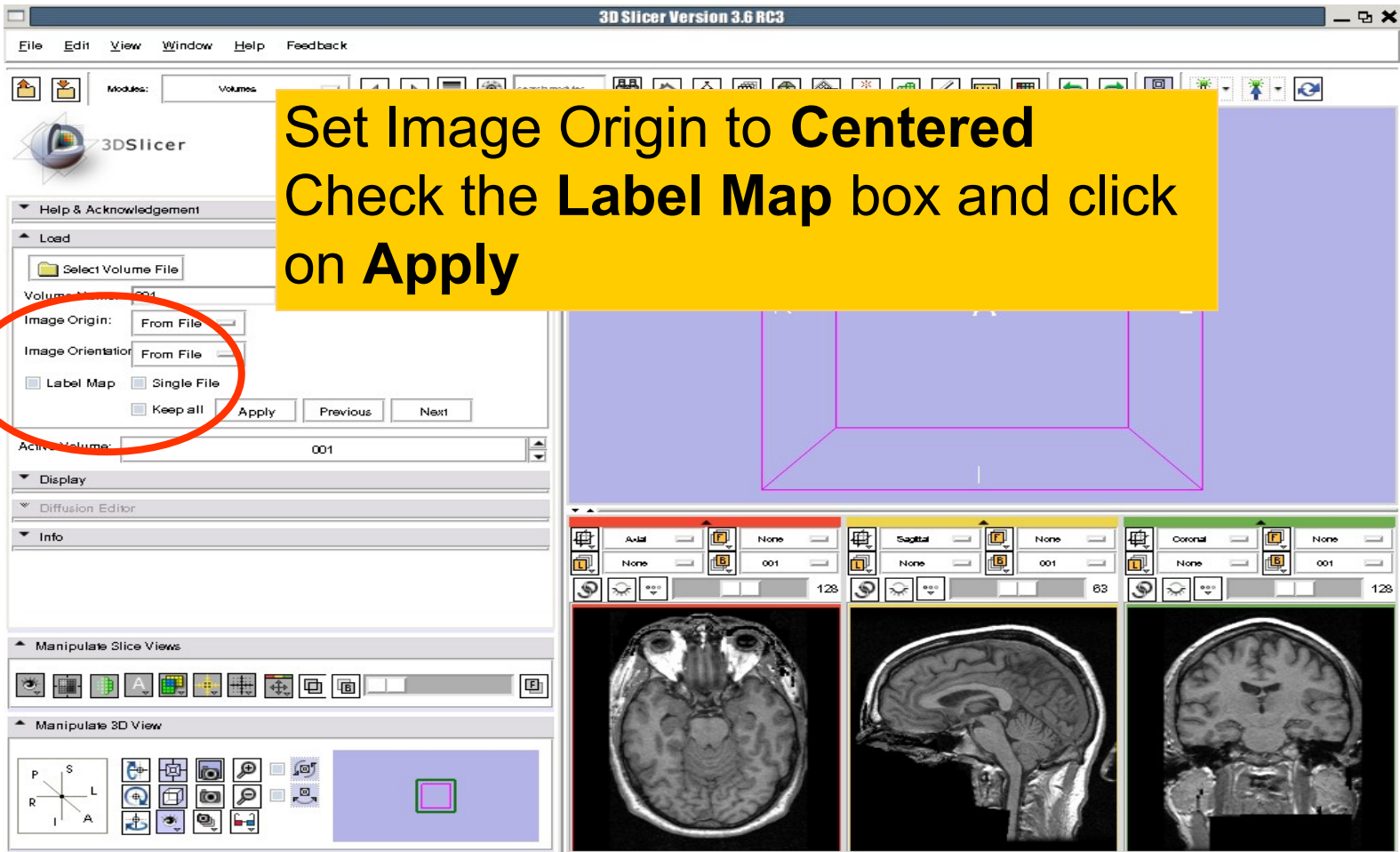


Loading a label map



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


Visualizing a label map



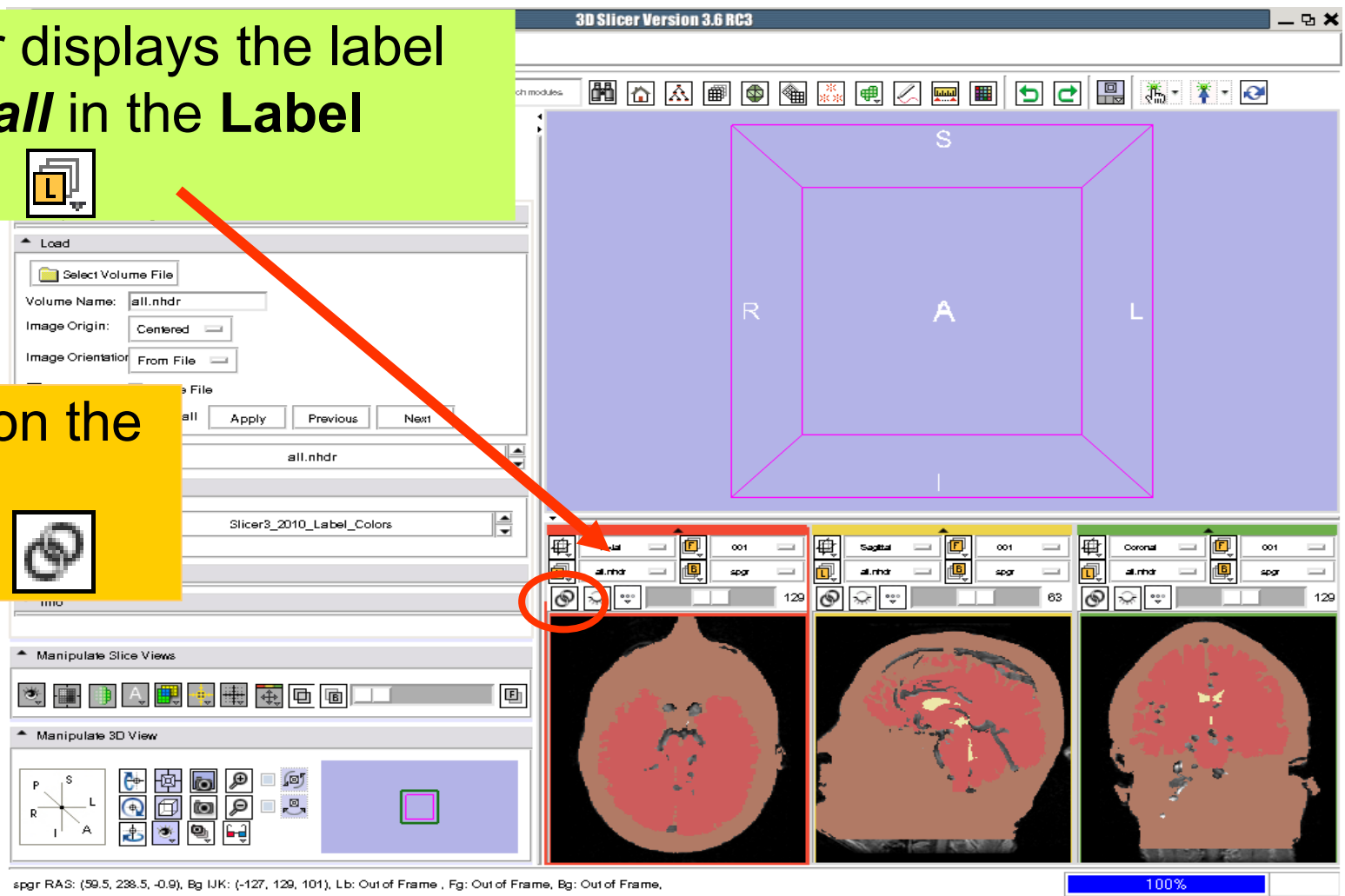
Set Image Origin to Centered
Check the Label Map box and click on Apply

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

Visualizing a label map

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

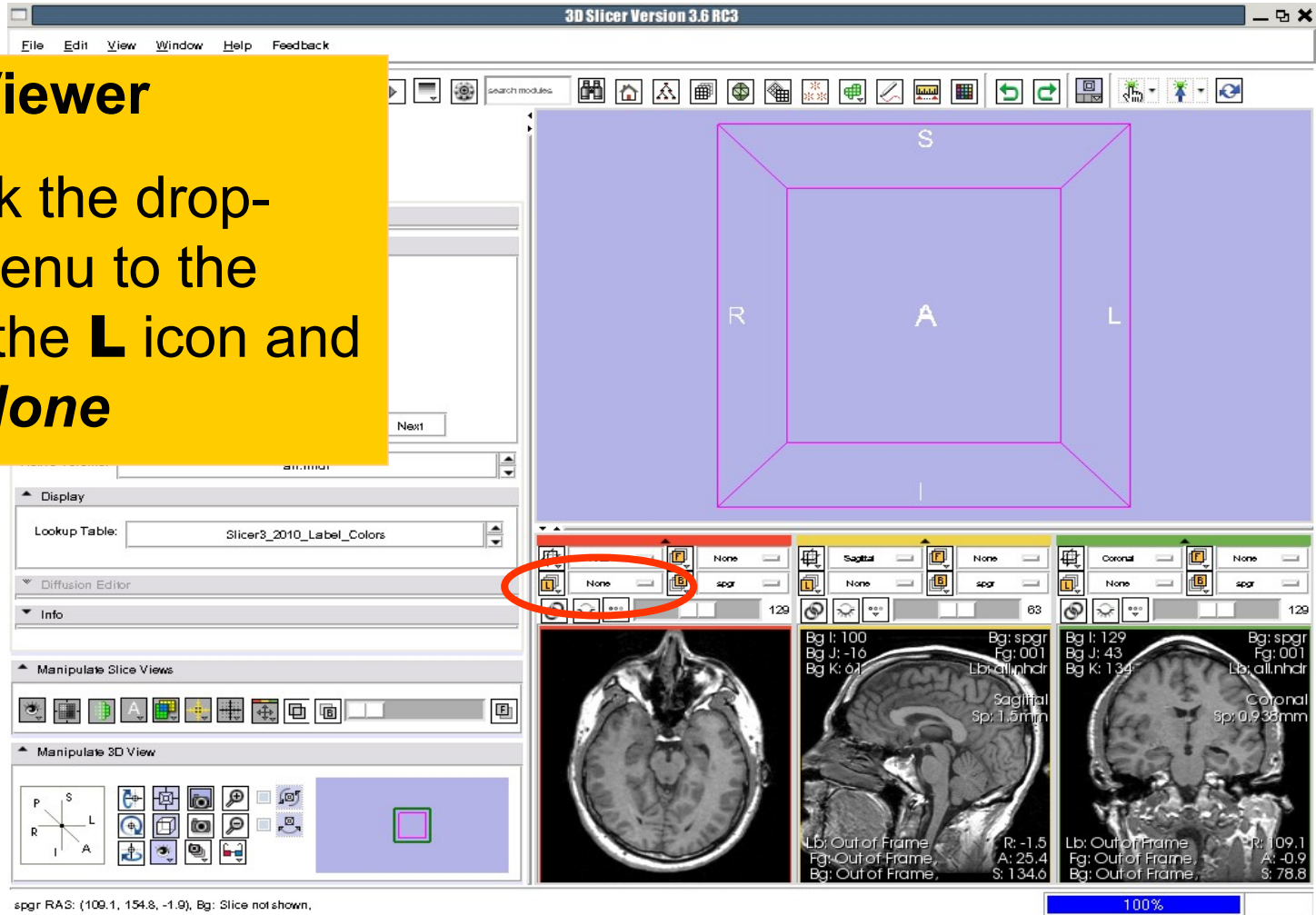
Click on the *links* icon. 



Visualizing Multiple Volumes

Label Viewer

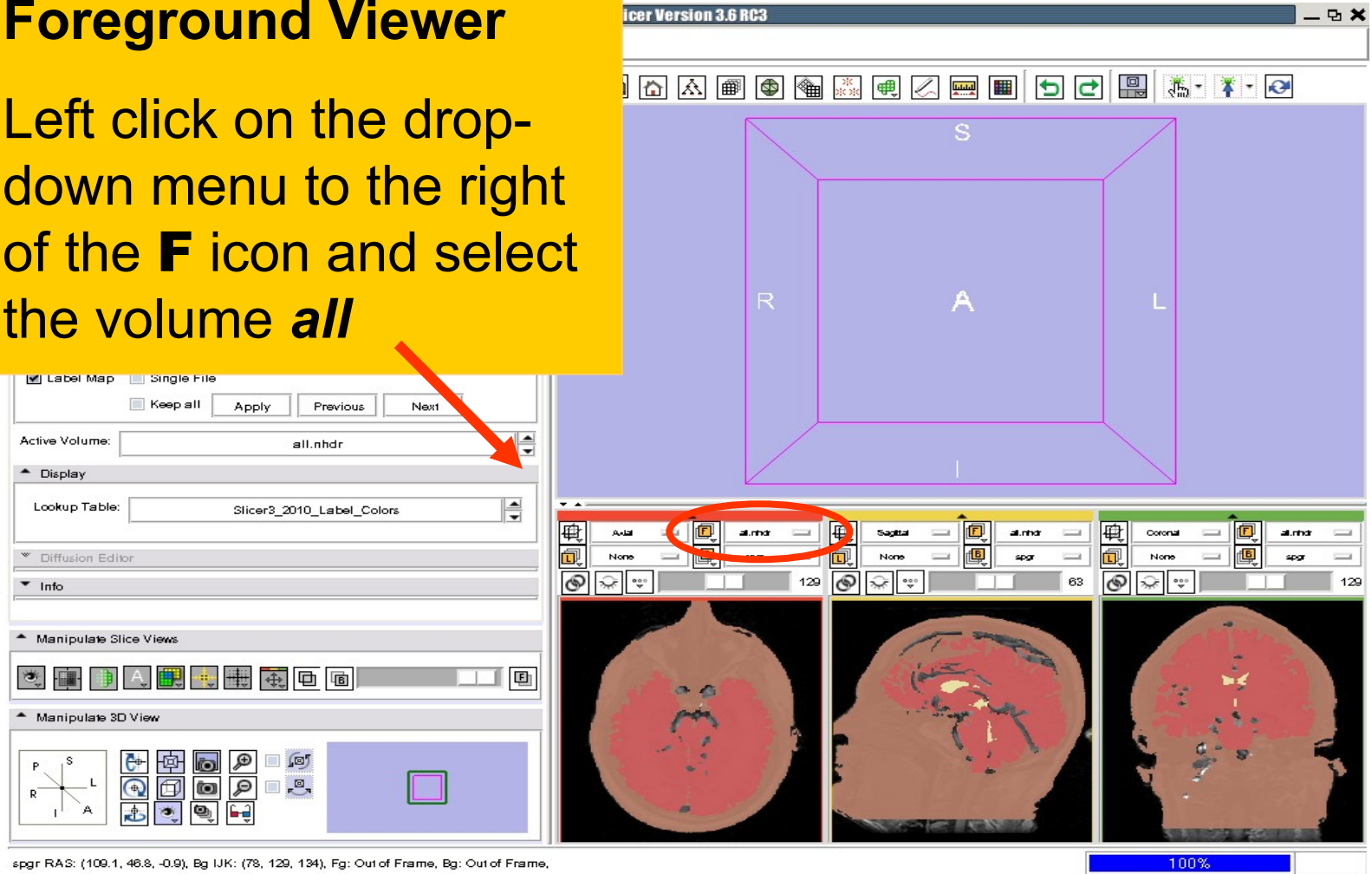
Left click the drop-down menu to the right of the **L** icon and select **None**



Visualizing Multiple Volumes

Foreground Viewer

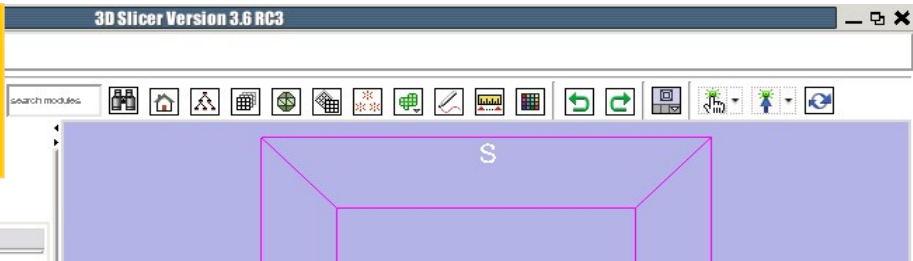
Left click on the drop-down menu to the right of the **F** icon and select the volume *all*





Visualizing Multiple Volumes

Select Manipulate
Slice Views



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

Help & Acknowledgement

Load

Select Volume File

Volume Name: all.nhdr

Image Origin: Centered

Image Orientation: From File

Label Map Single File

Keep all

Active Volume: all.nhdr

Display

Lookup Table: Slicer3_2010_Label_Colors

Diffusion Editor

Info

Manipulate Slice Views

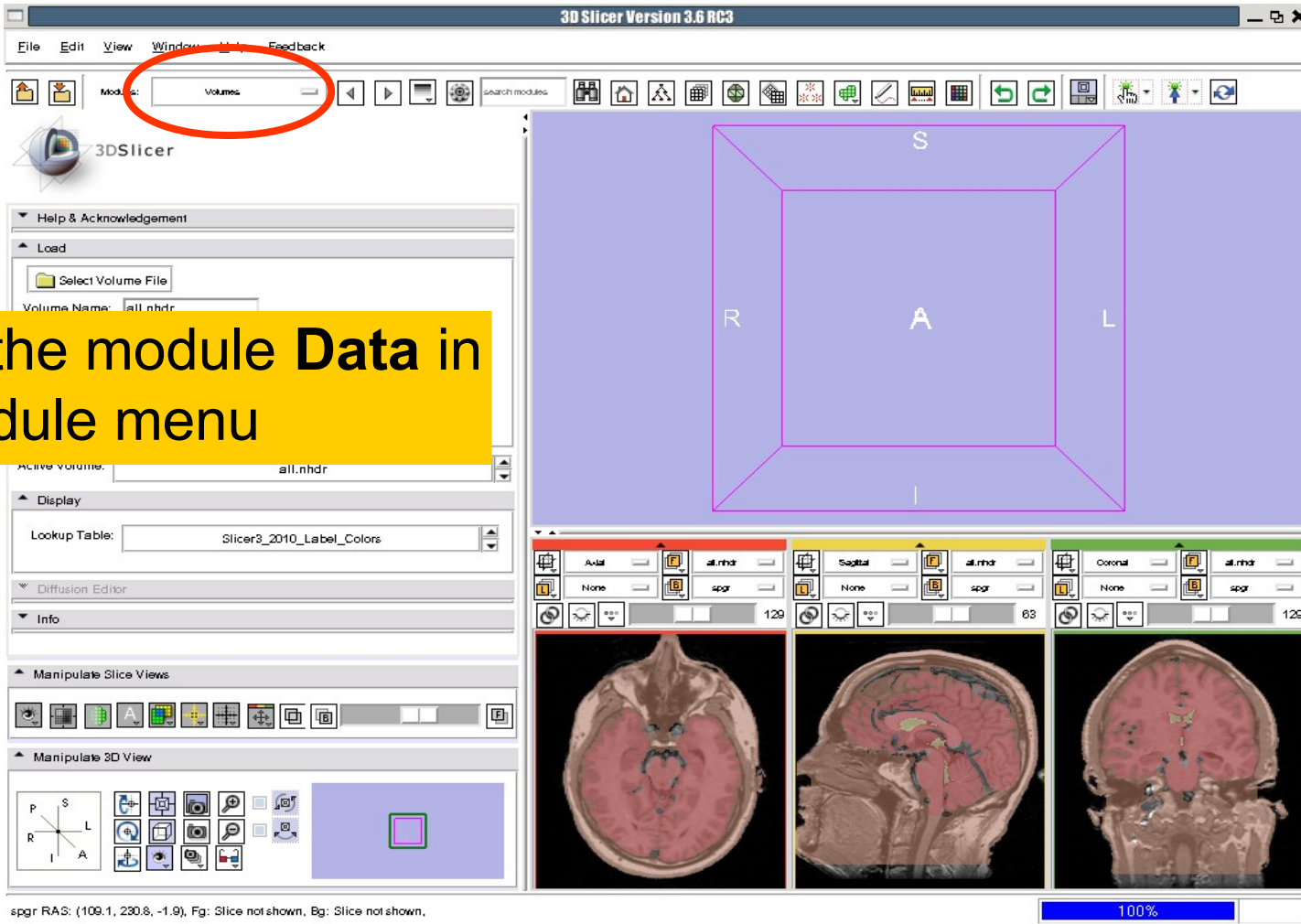
Manipulate 3D View



spgr RAS: (109.1, 230.8, -1.9), Fg: Slice not shown, Bg: Slice not shown.

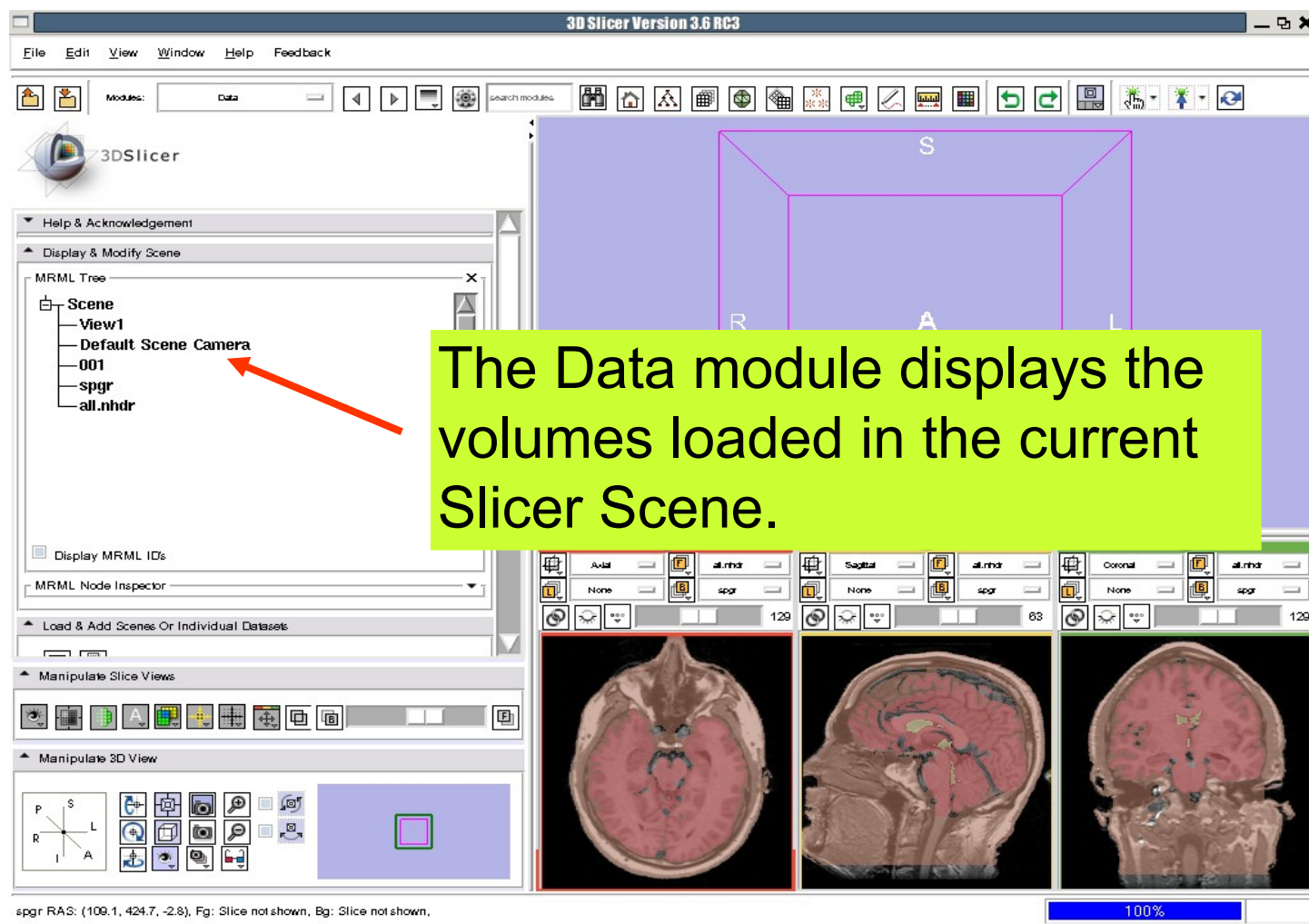
100%

3D Visualization



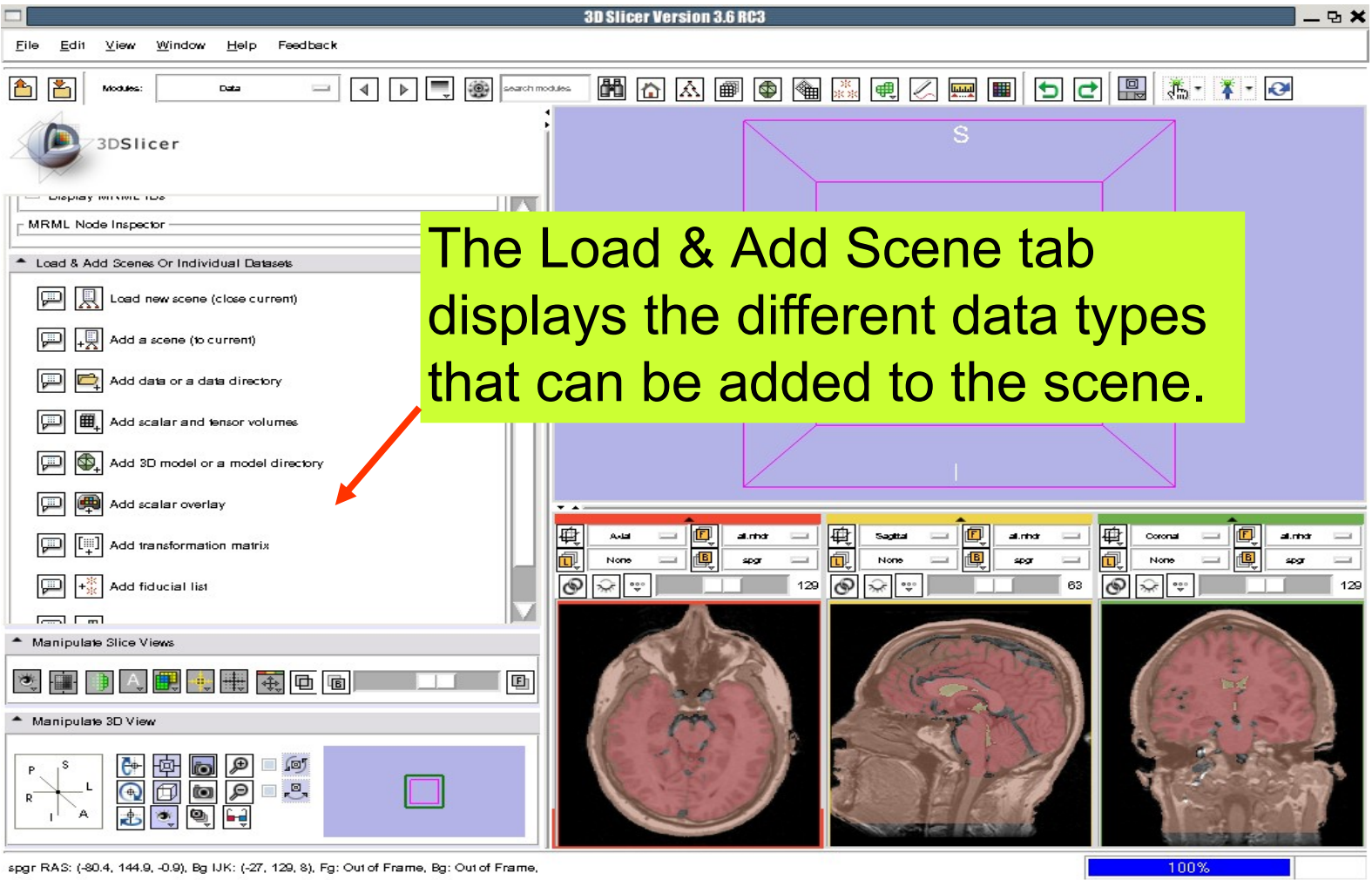
Select the module **Data** in the module menu

3D Visualization



The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The main window displays a 3D volume rendering of a brain scan. A yellow callout box with black text points to the 'Default Scene Camera' in the MRML Tree on the left. The callout text reads: 'The Data module displays the volumes loaded in the current Slicer Scene.' The interface includes a menu bar (File, Edit, View, Window, Help, Feedback), a toolbar with various icons, and several panels: 'Help & Acknowledgement', 'Display & Modify Scene' (containing the MRML Tree), 'MRML Node Inspector', 'Load & Add Scenes Or Individual Datasets', 'Manipulate Slice Views', and 'Manipulate 3D View'. The MRML Tree shows a hierarchy: Scene -> View1 -> Default Scene Camera -> 001 -> spgr -> all.nhdr. The 'Manipulate 3D View' panel shows a 3D coordinate system with axes P, S, L, R, I, A. The 'Manipulate Slice Views' panel shows three slice views: Axial, Sagittal, and Coronal. The 'MRML Node Inspector' shows the current node is 'spgr'. The 'Load & Add Scenes Or Individual Datasets' panel shows a list of loaded volumes: 'all.nhdr', 'spgr', and 'all.nhdr'. The 'Manipulate 3D View' panel shows a 3D view of the brain scan with a yellow bounding box around the volume. The status bar at the bottom shows 'spgr RAS: (109.1, 424.7, -2.8), Fg: Slice not shown, Bg: Slice not shown, 100%'.

3D Visualization



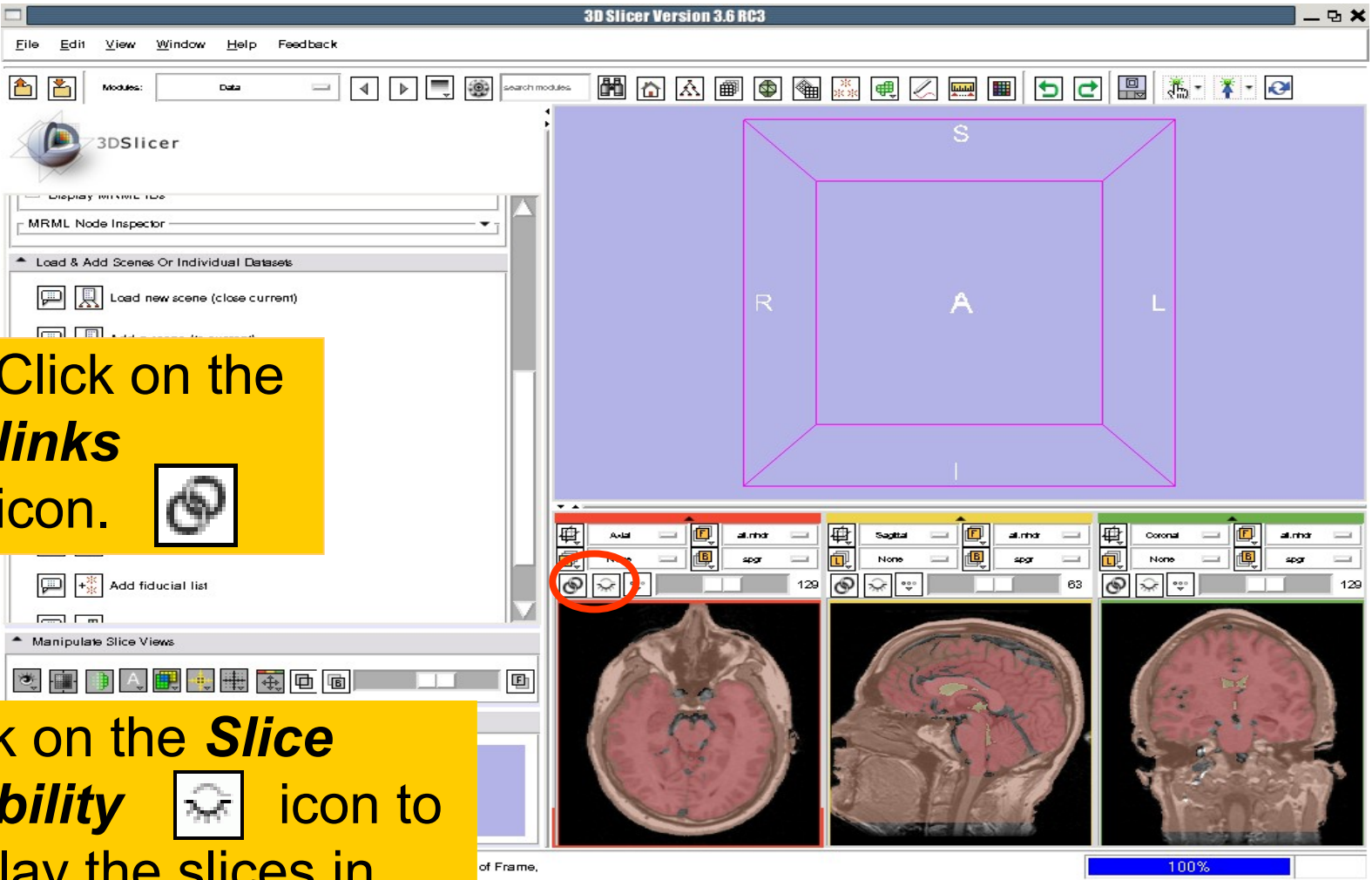
The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The 'Load & Add Scene Or Individual Datasets' panel is active, listing various options for adding data to the scene. A red arrow points from a text box to the 'Add data or a data directory' option. The main 3D view shows a brain scan with a purple bounding box labeled 'S'. Below the 3D view are three slice views: Axial, Sagittal, and Coronal. The status bar at the bottom shows the current slice position and zoom level (100%).

The Load & Add Scene tab displays the different data types that can be added to the scene.

- 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

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

3D Visualization



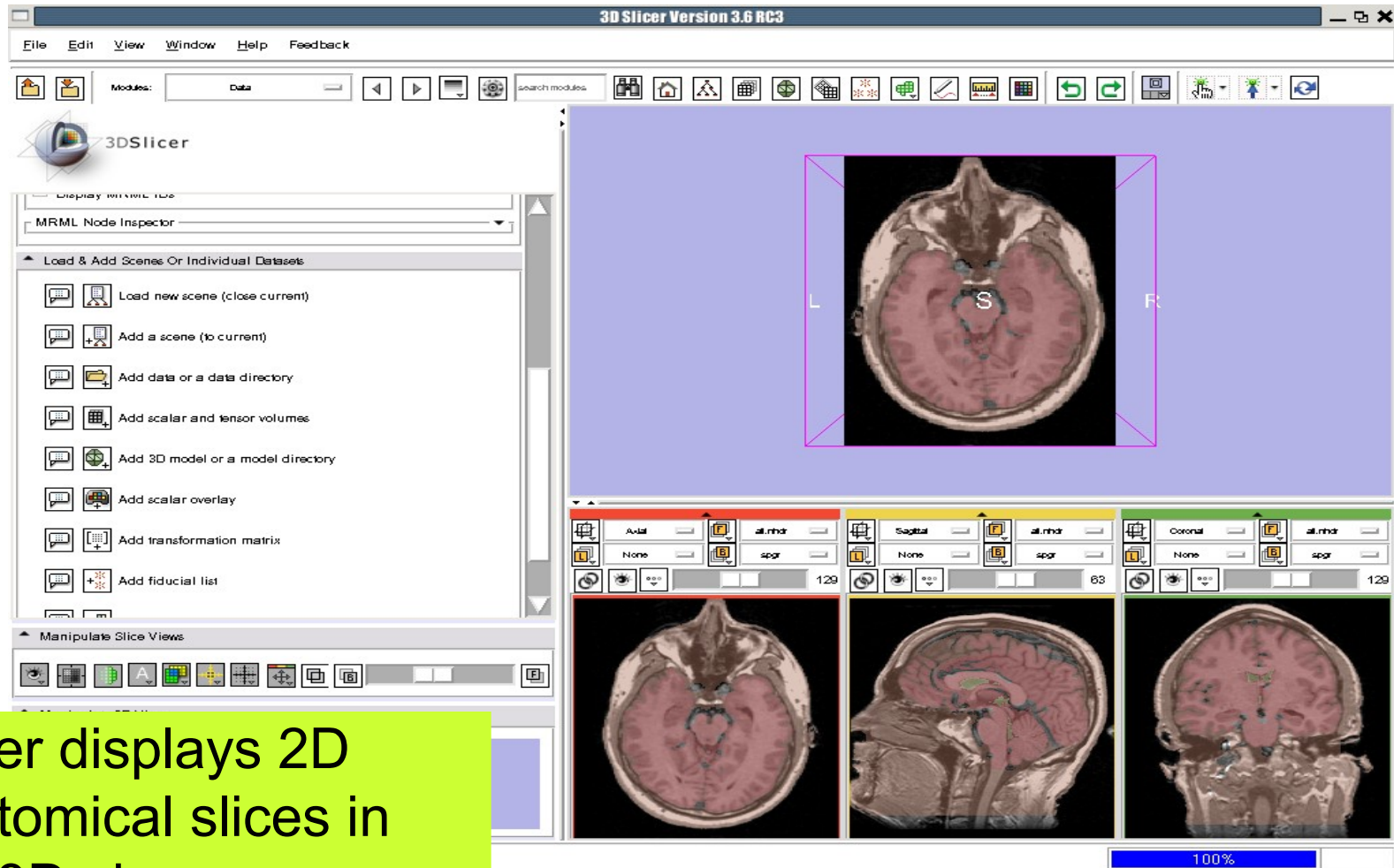
Click on the **links** icon.



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



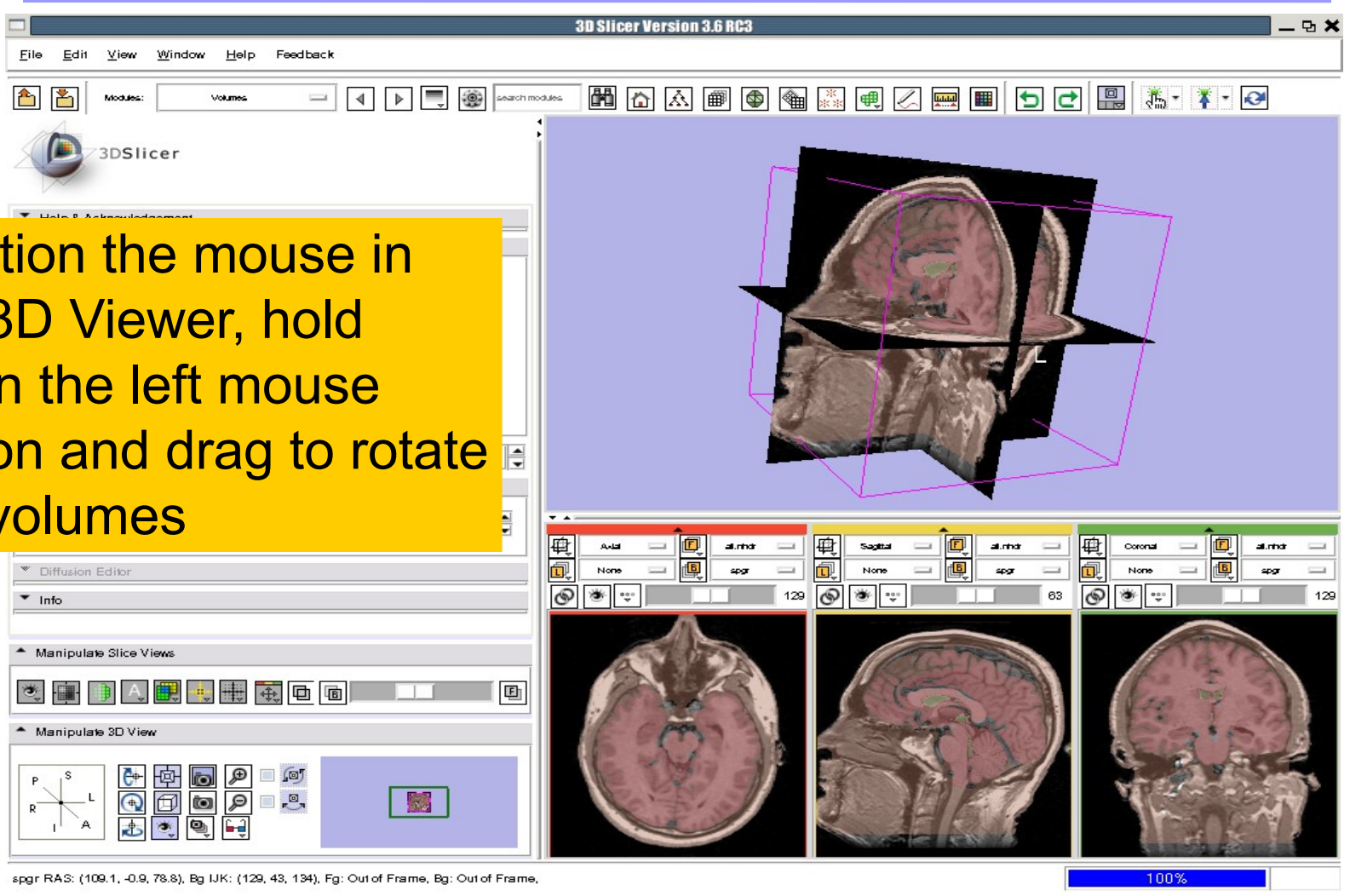
3D Visualization

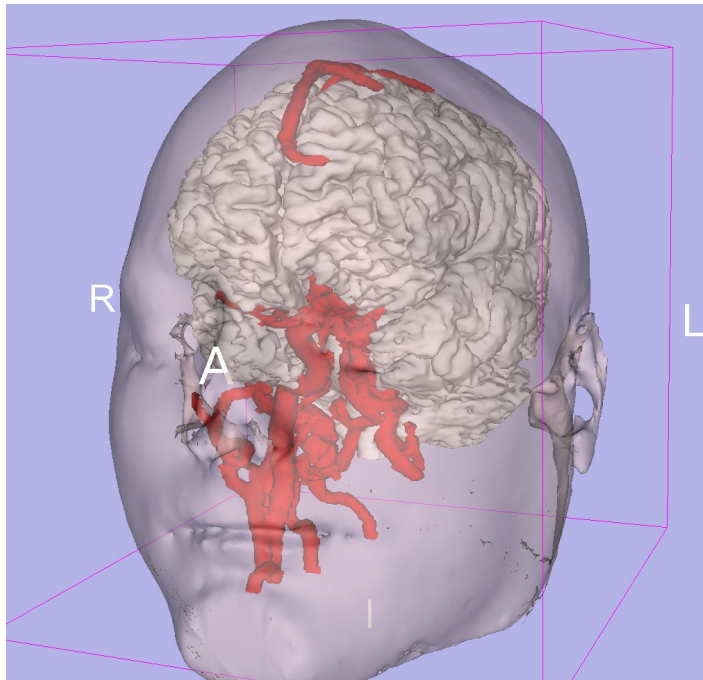


Slicer displays 2D anatomical slices in the 3D viewer

3D Visualization

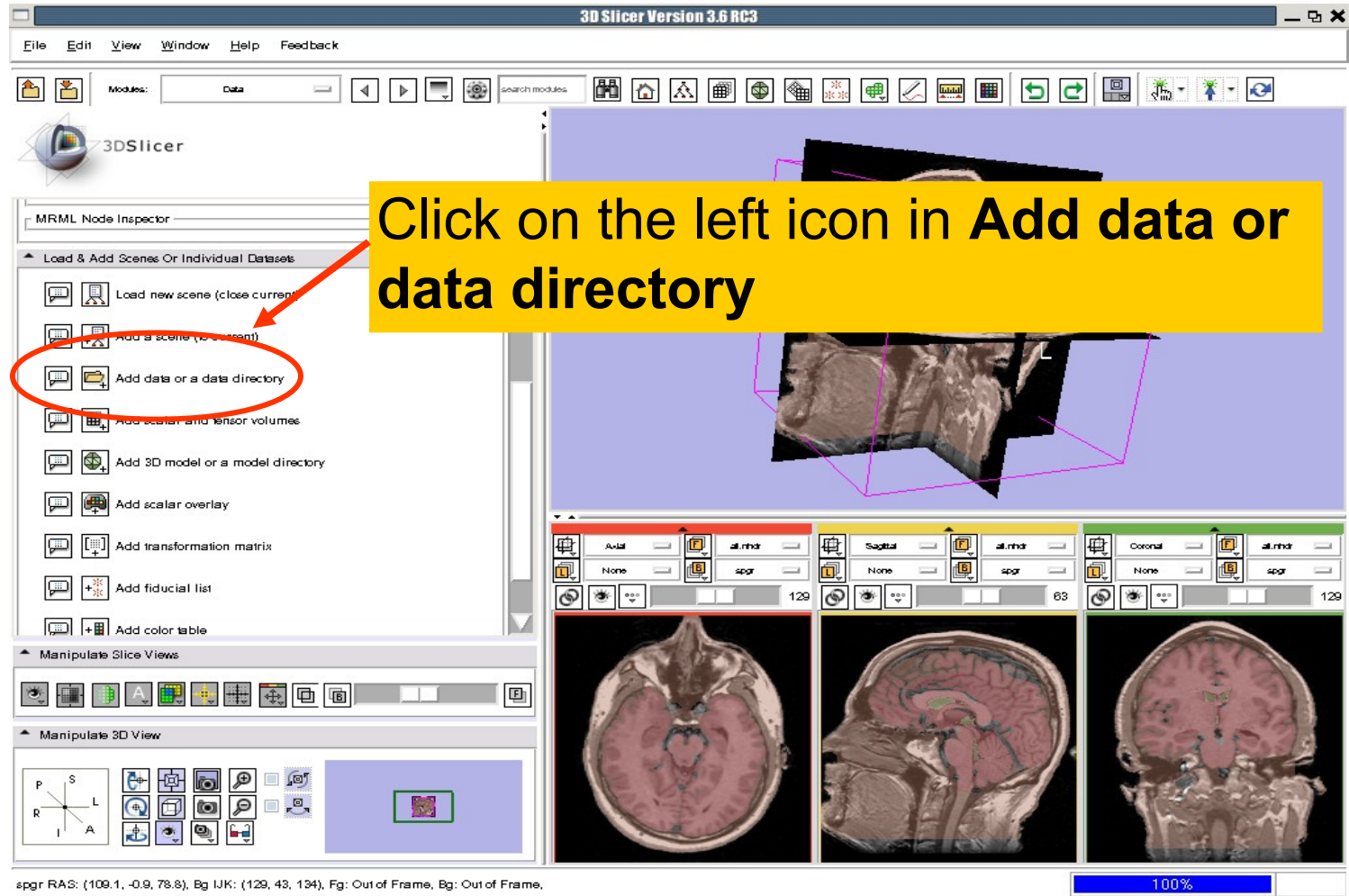
Position the mouse in the 3D Viewer, hold down the left mouse button and drag to rotate the volumes





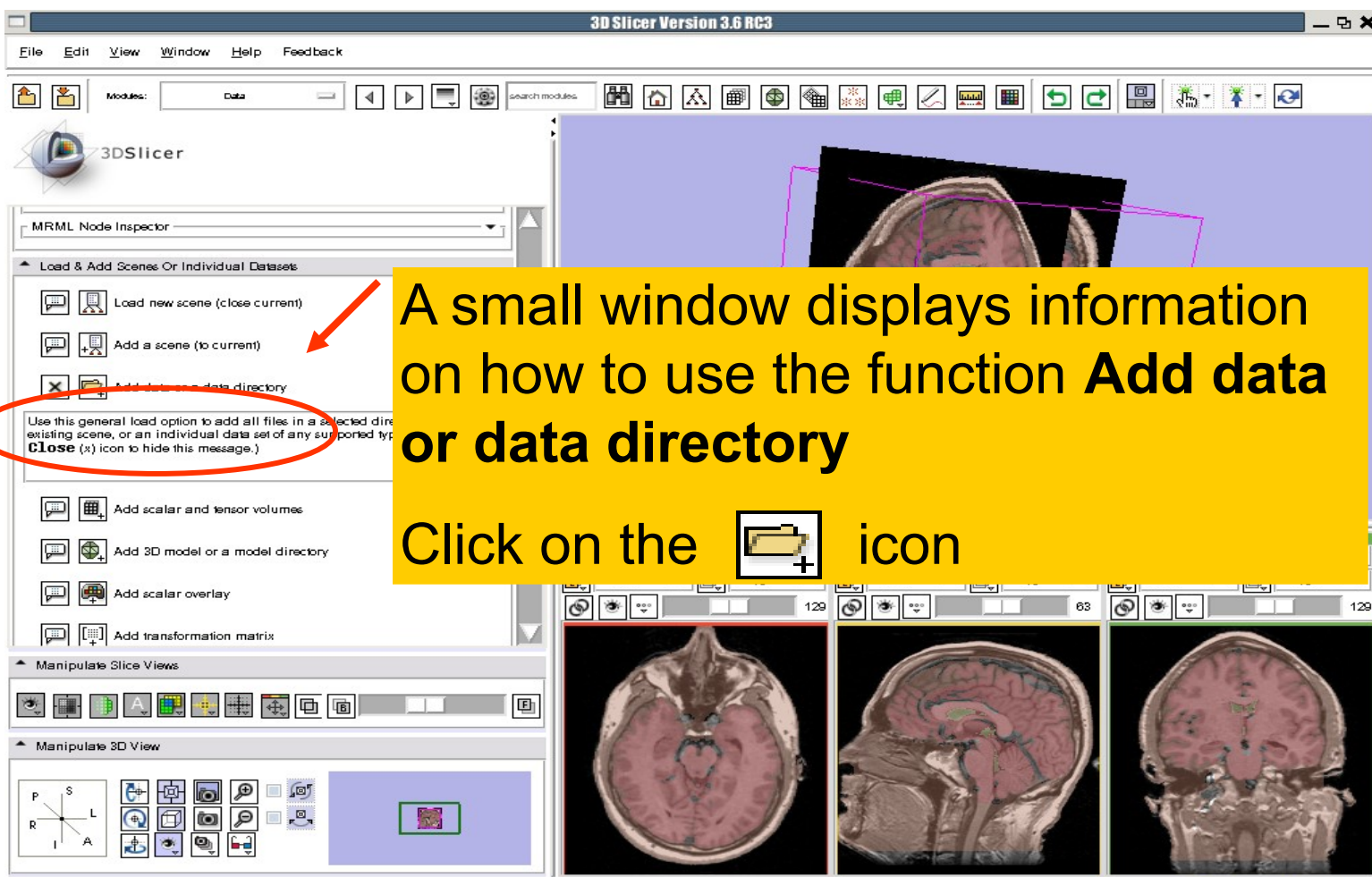
Part 3: Loading and visualizing 3D models of the anatomy

3D Visualization



The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The main window displays a 3D visualization of a brain slice. On the left, the MRML Node Inspector panel is visible, with the 'Add data or a data directory' option circled in red. A yellow callout box with a red arrow points to this option, containing the text: **Click on the left icon in Add data or data directory**. Below the callout, the 'Manipulate Slice Views' and 'Manipulate 3D View' panels are visible. At the bottom, the status bar shows coordinates: `spgr RAS: (109.1, -0.9, 78.8), Bg IJK: (129, 43, 134), Fg: Out of Frame, Bg: Out of Frame`. The bottom right corner shows a 100% zoom level.

3D Visualization



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

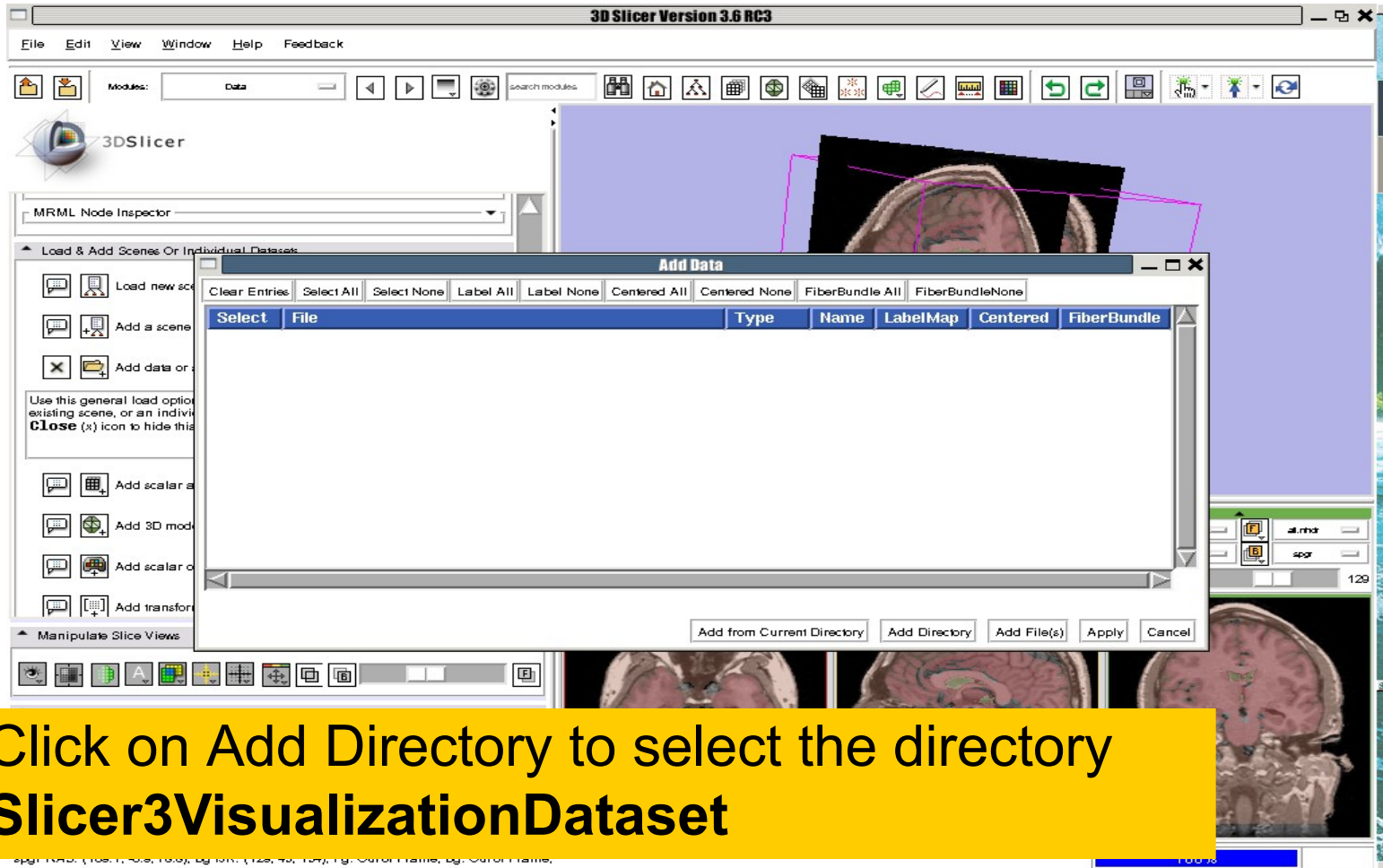
Add transformation matrix

Manipulate Slice Views

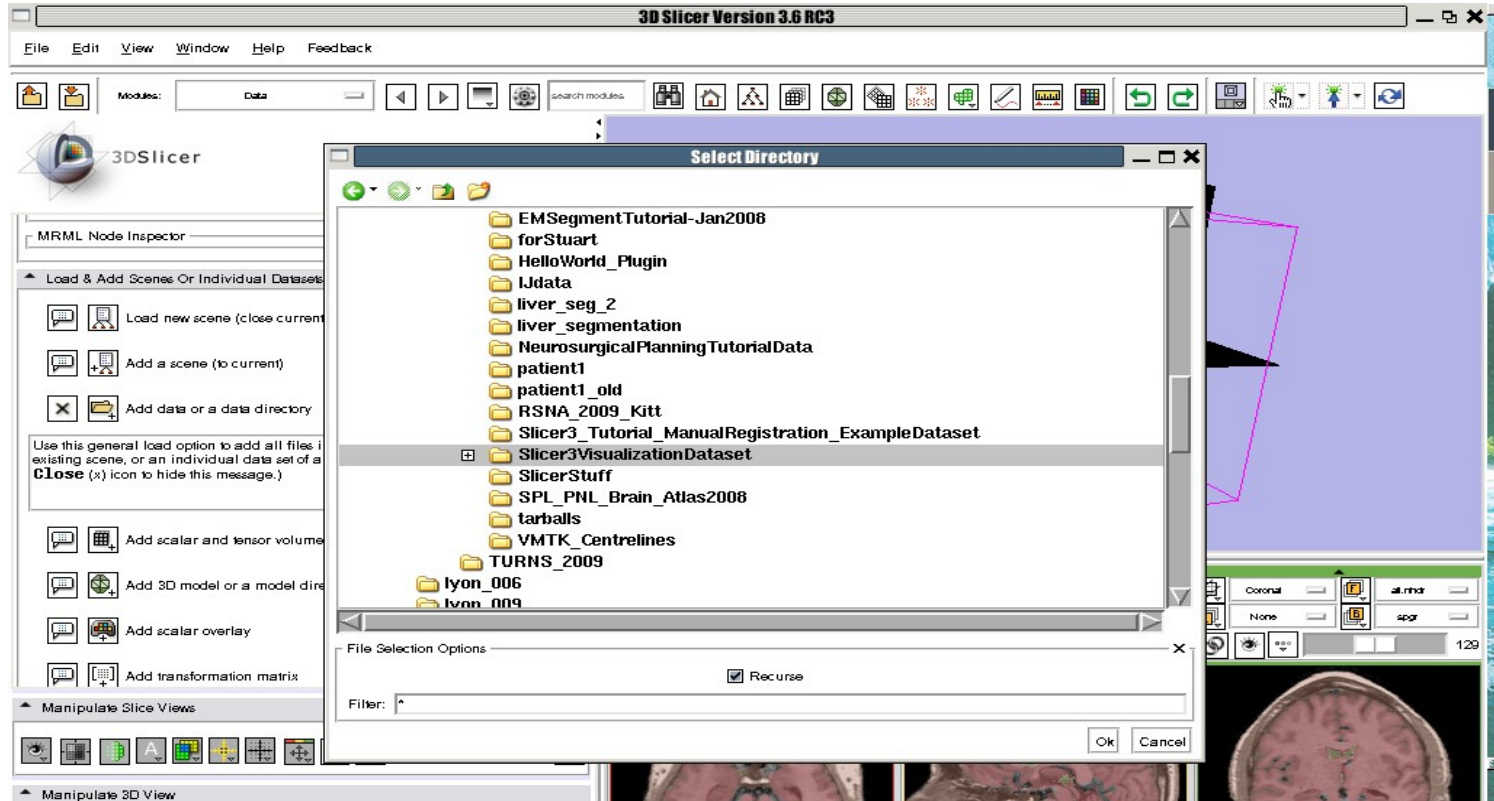
Manipulate 3D View

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

100%

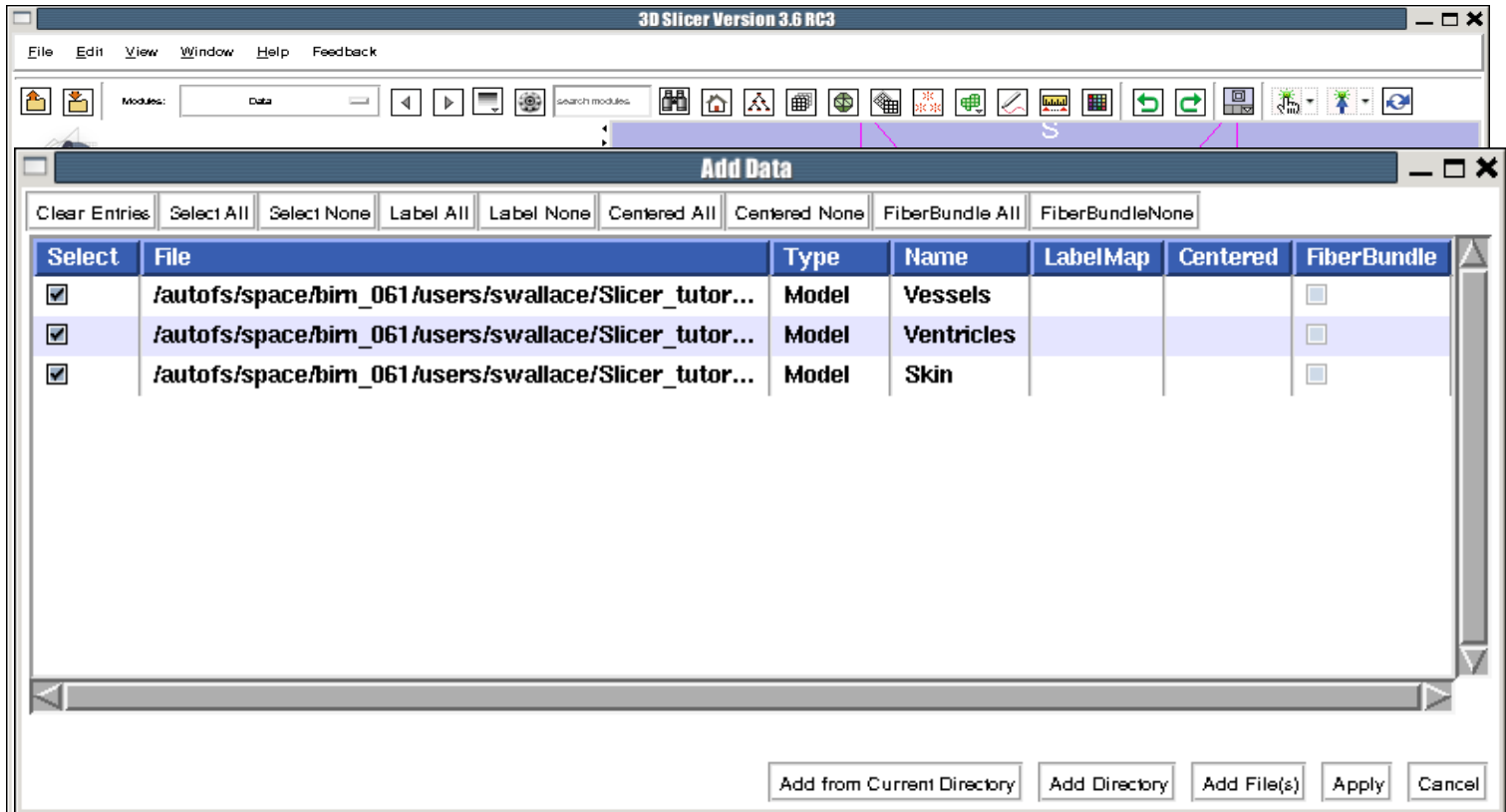


Loading 3D models



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

Loading 3D models

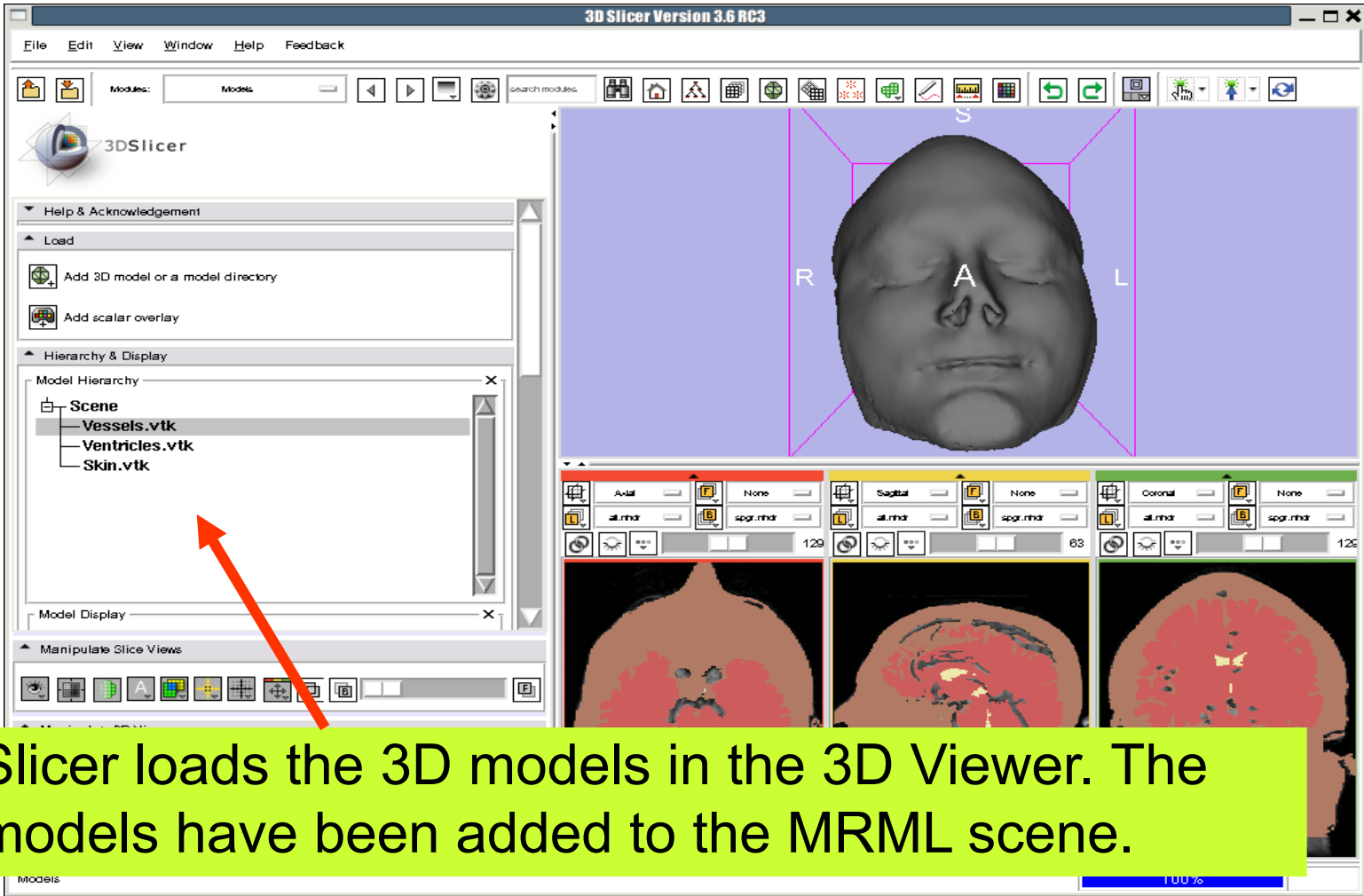


The list of elements present in the models directory appears in the Add Data window.

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

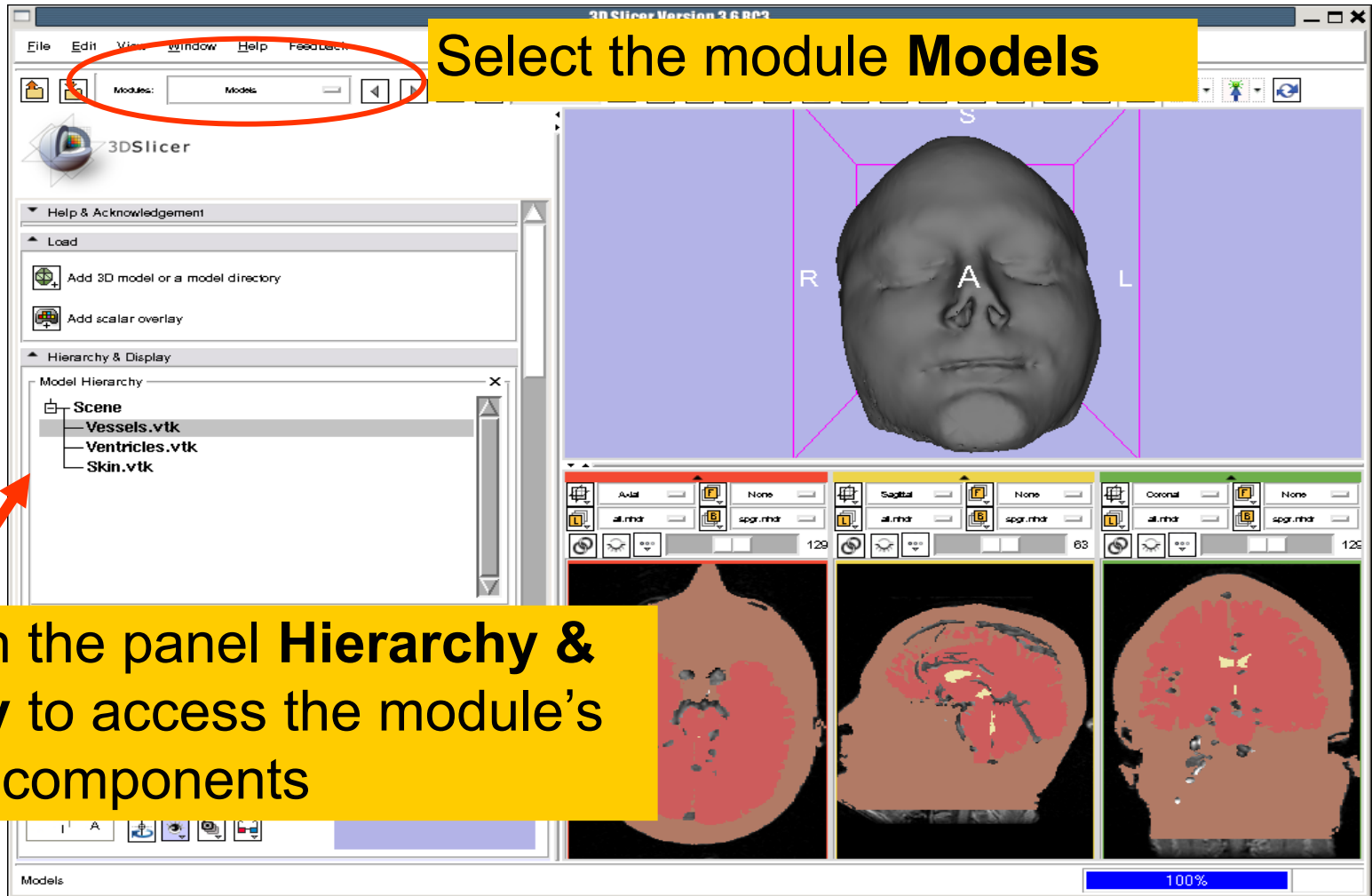


Loading 3D models



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

Loading a 3D model



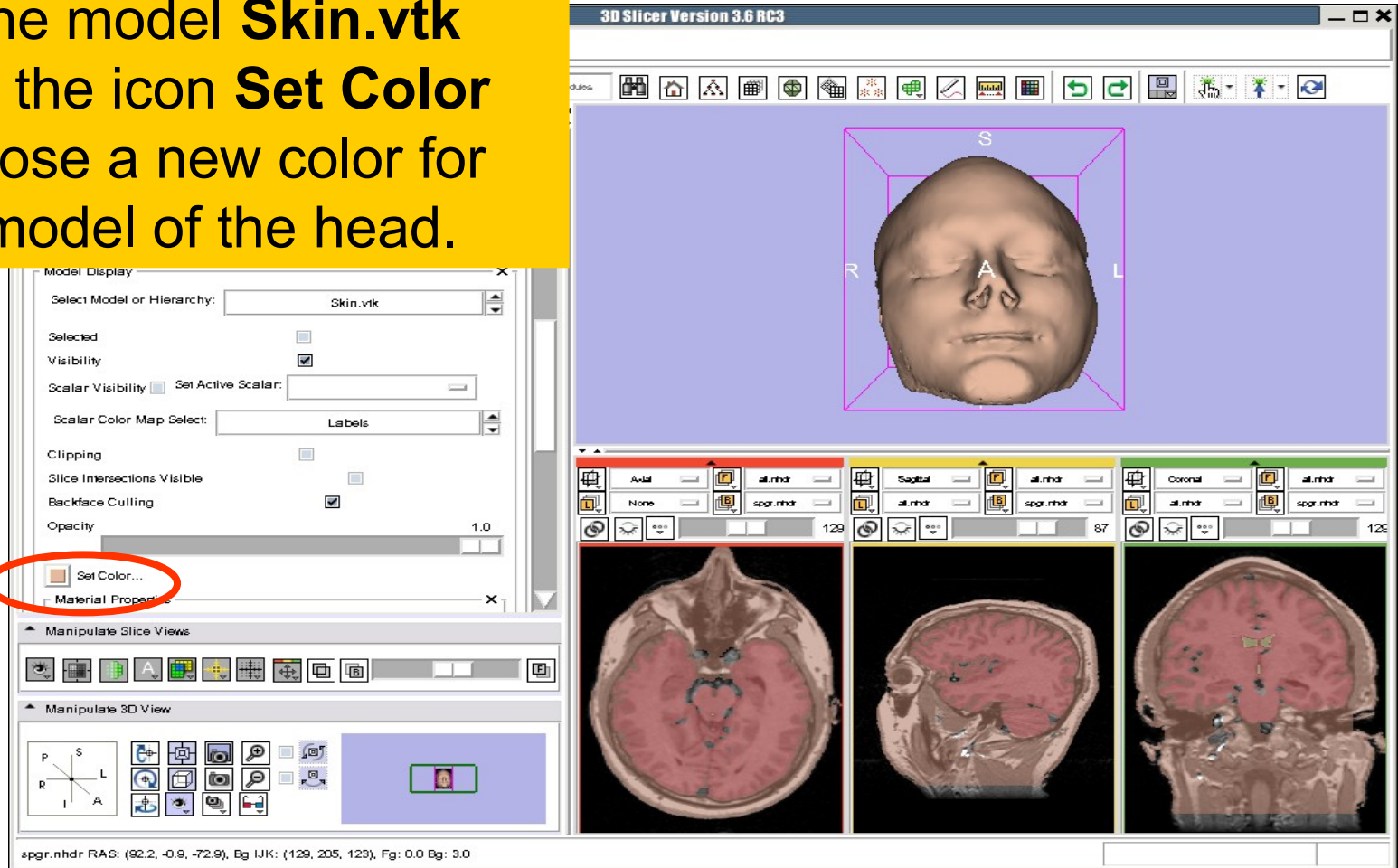
The screenshot shows the 3DSlicer interface with a 3D model of a face in the center. The 'Modules' dropdown menu is circled in red and labeled 'Select the module Models'. The 'Hierarchy & Display' panel is highlighted with a red arrow and labeled 'Click on the panel Hierarchy & Display to access the module's display components'. The 'Hierarchy & Display' panel shows a tree view with 'Scene' expanded, containing 'Vessels.vtk', 'Ventricles.vtk', and 'Skin.vtk'. The 'Vessels.vtk' item is selected. Below the 3D model, there are three viewports showing axial, sagittal, and coronal slices of the face. The 'Models' panel at the bottom right shows a '100%' zoom level.

Select the module **Models**

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

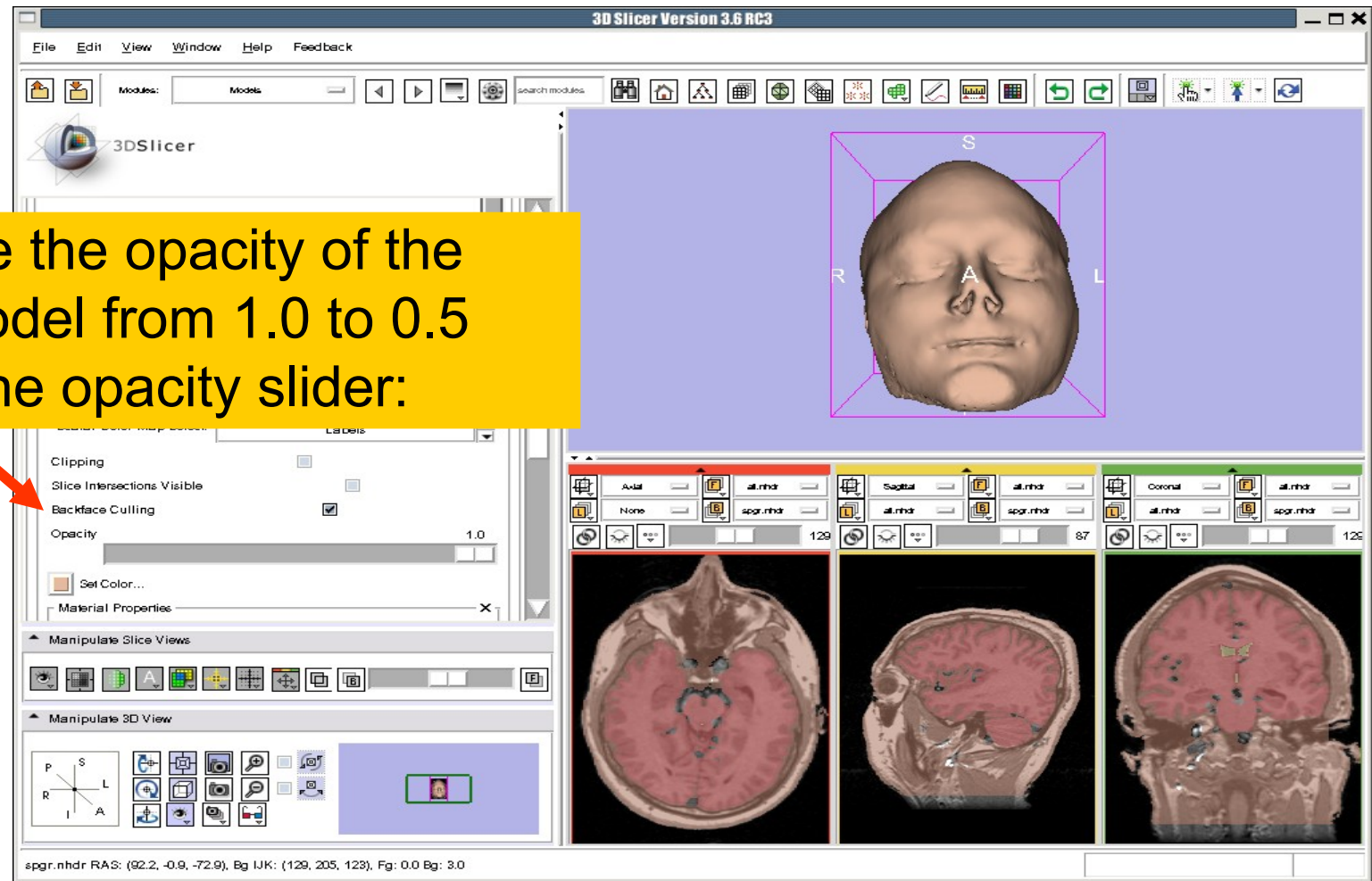
Visualizing a 3D model

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

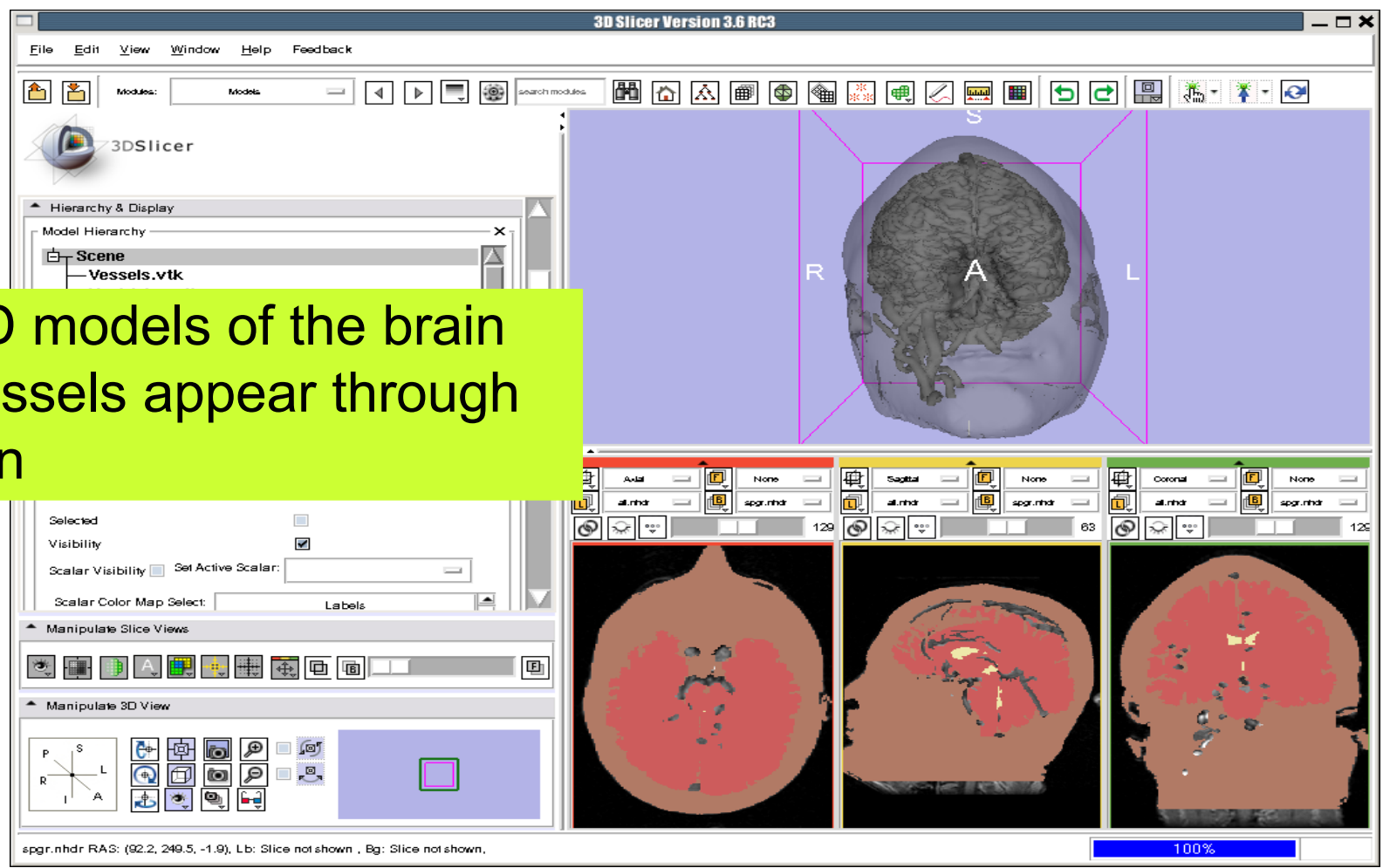


Visualizing a 3D model

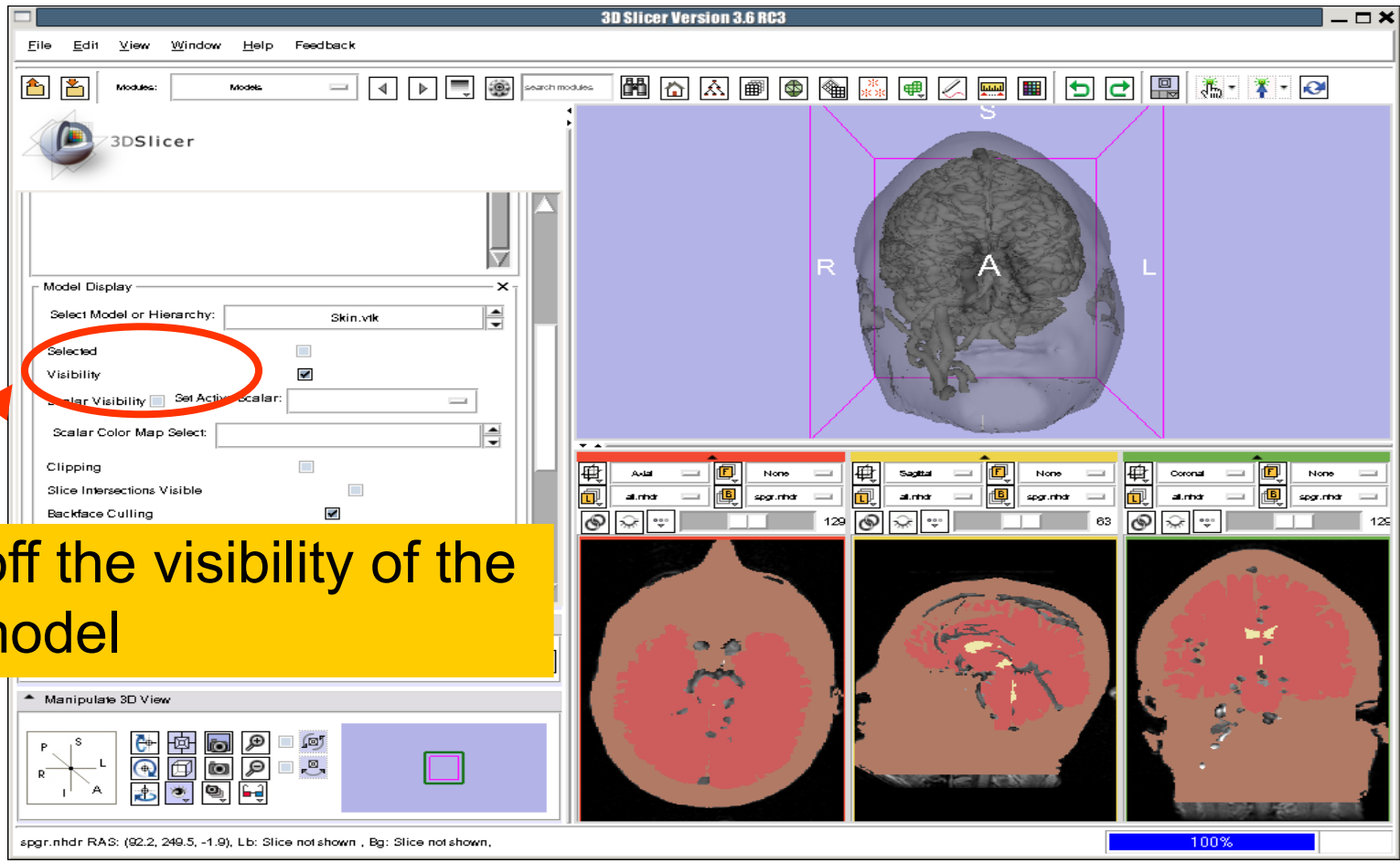
Change the opacity of the skin model from 1.0 to 0.5 using the opacity slider:



Visualizing a 3D model

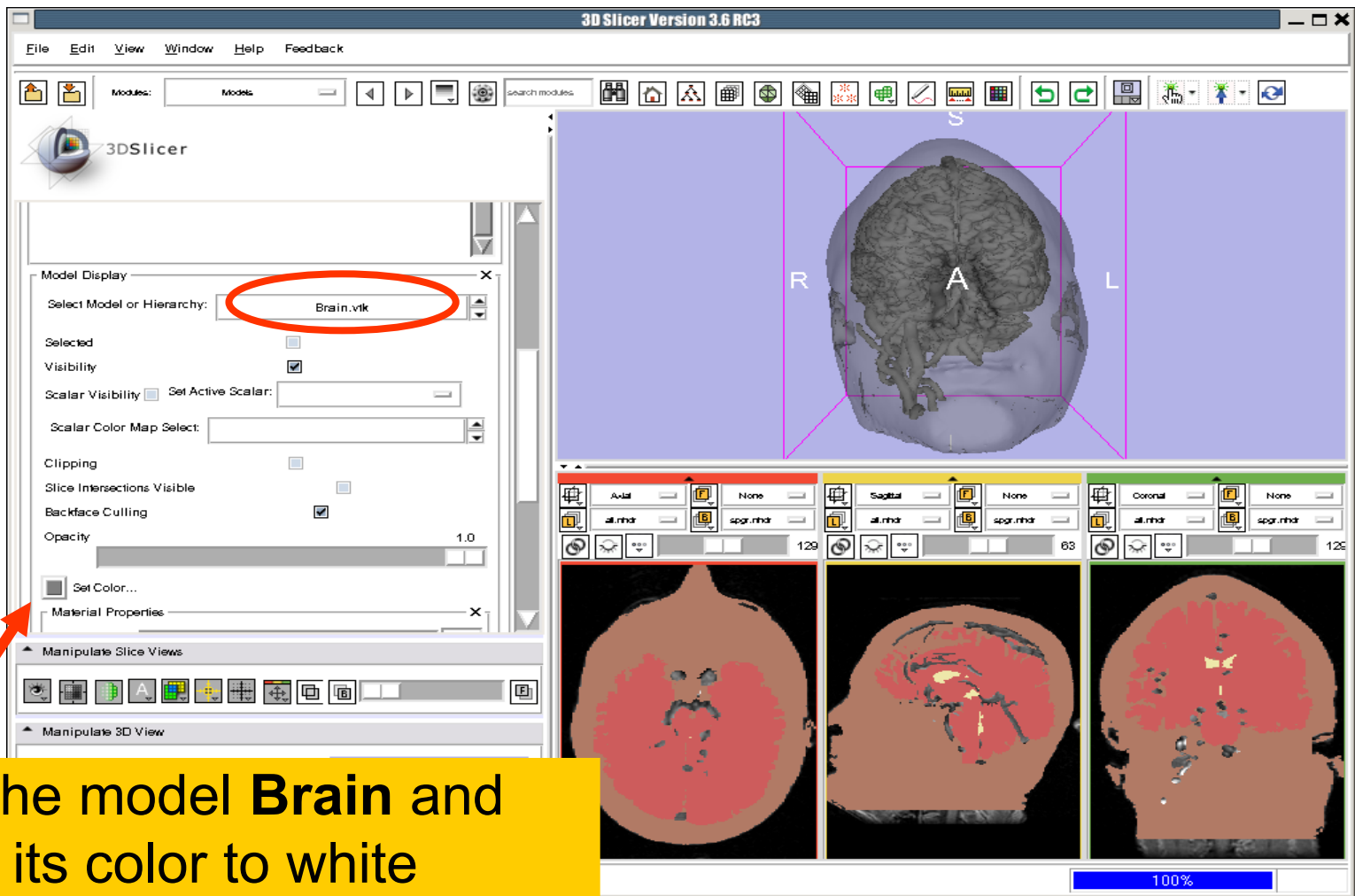


Visualizing a 3D model



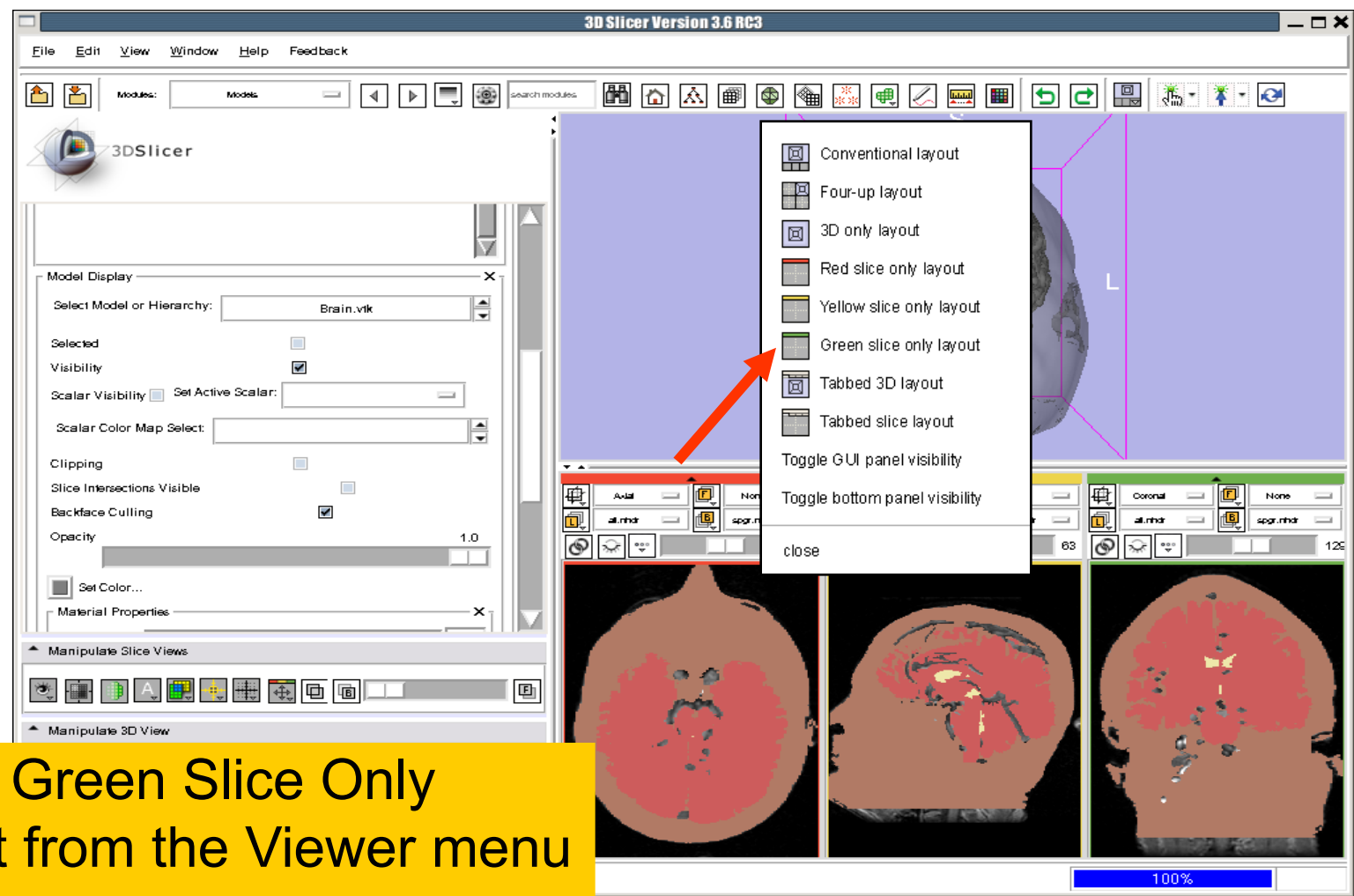
Turn off the visibility of the skin model

Visualizing a 3D model



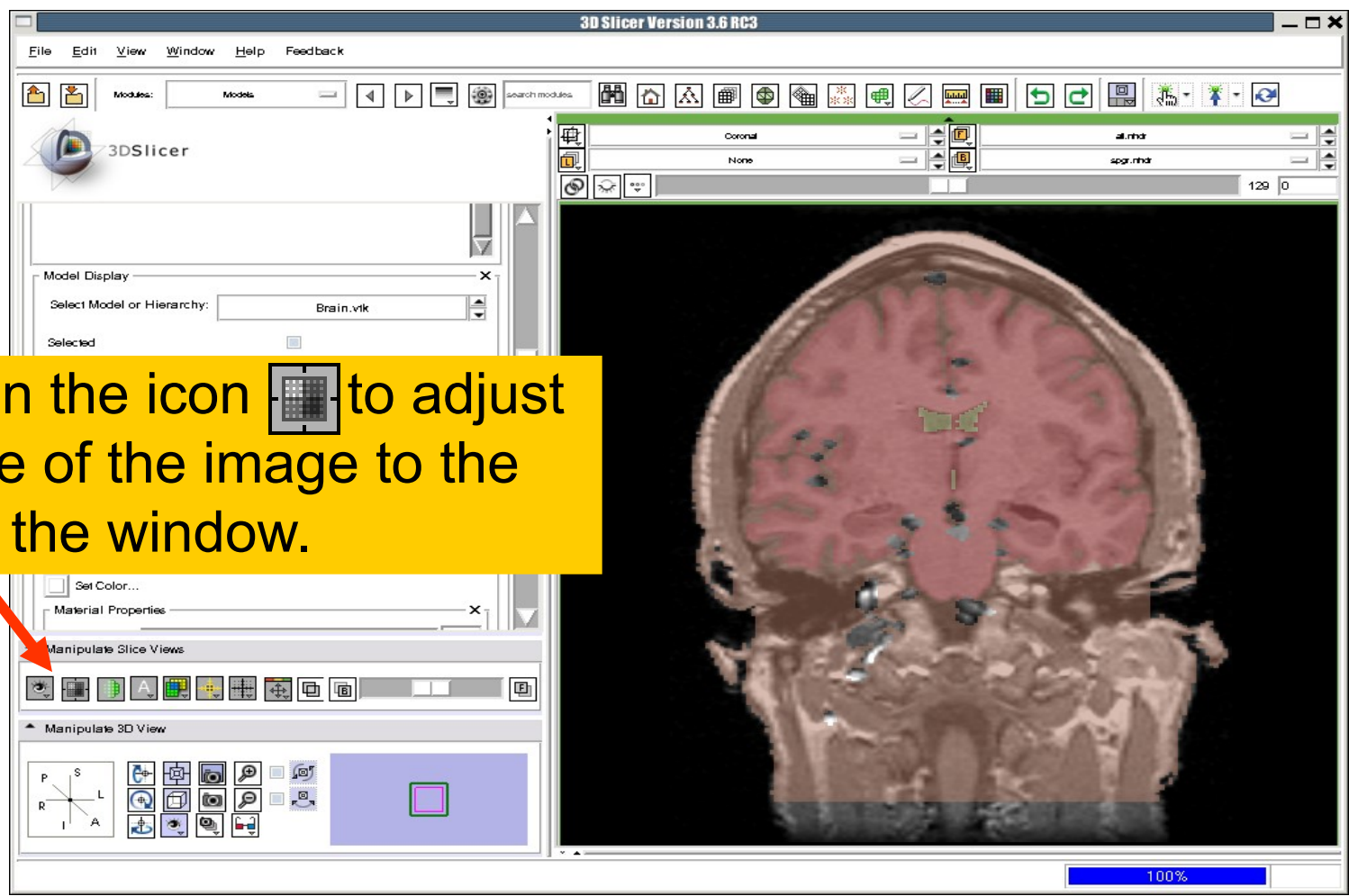
Select the model **Brain** and change its color to white

Visualizing a 3D model

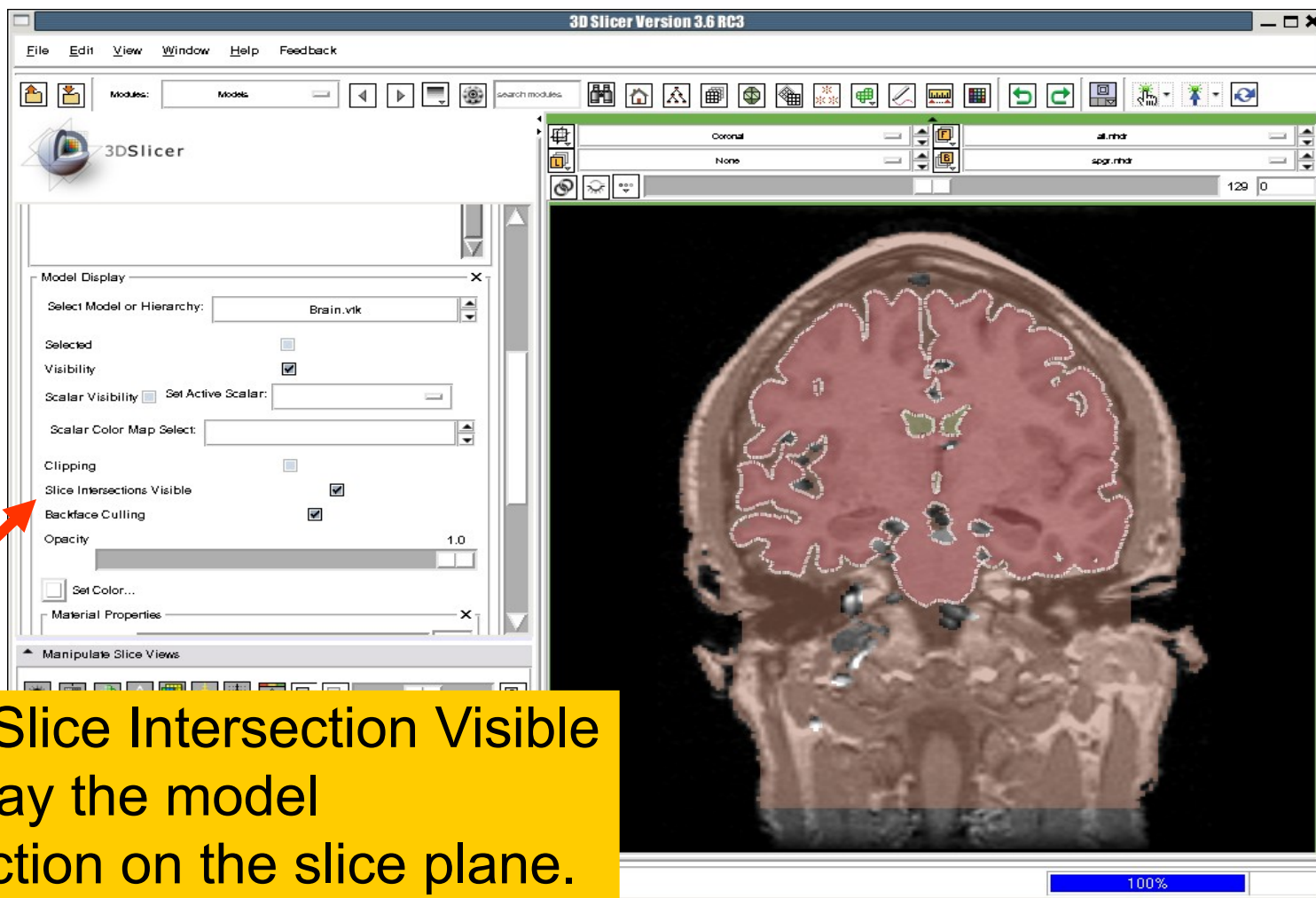


Select Green Slice Only Layout from the Viewer menu

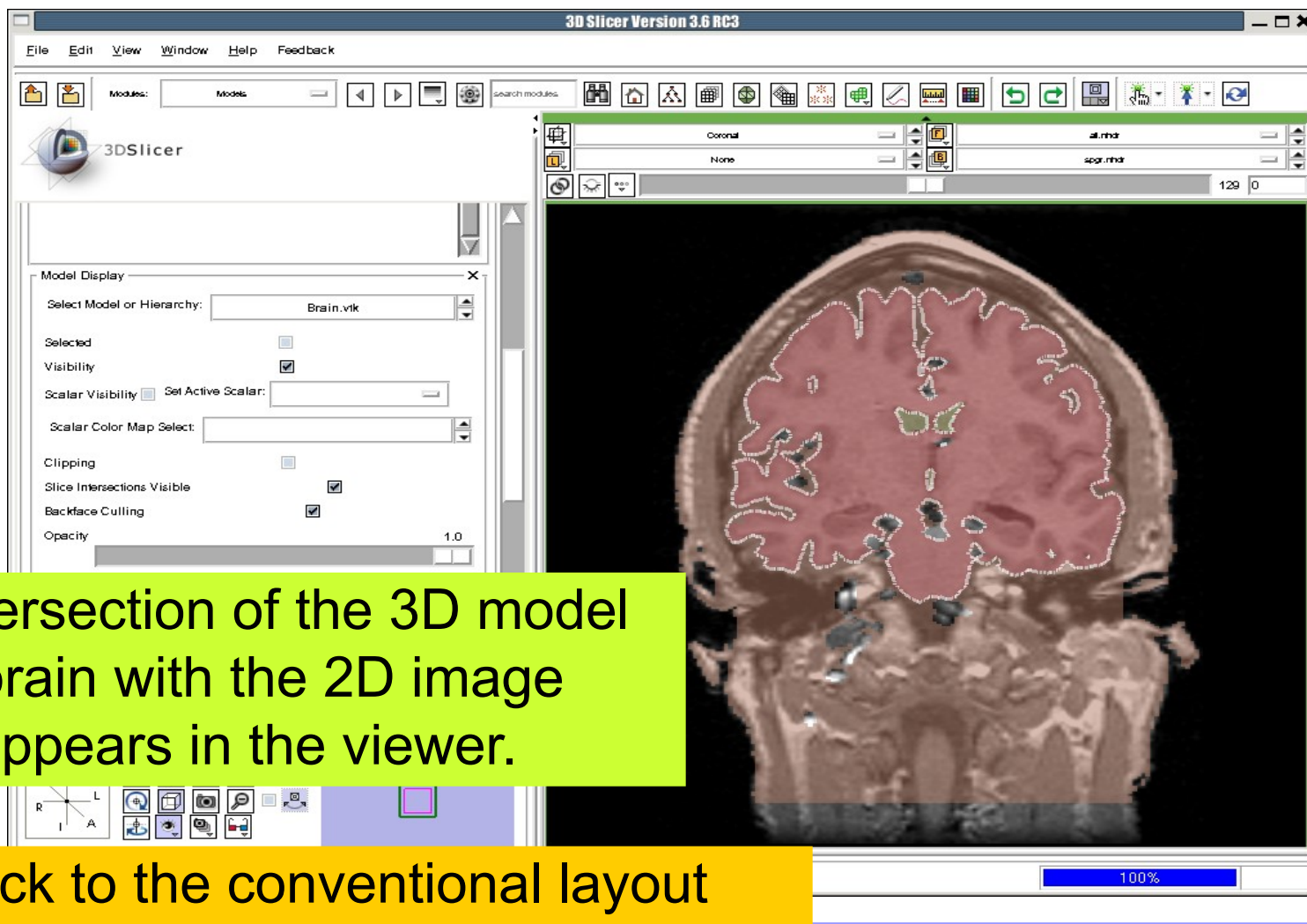
Visualizing a 3D model



Visualizing a 3D model



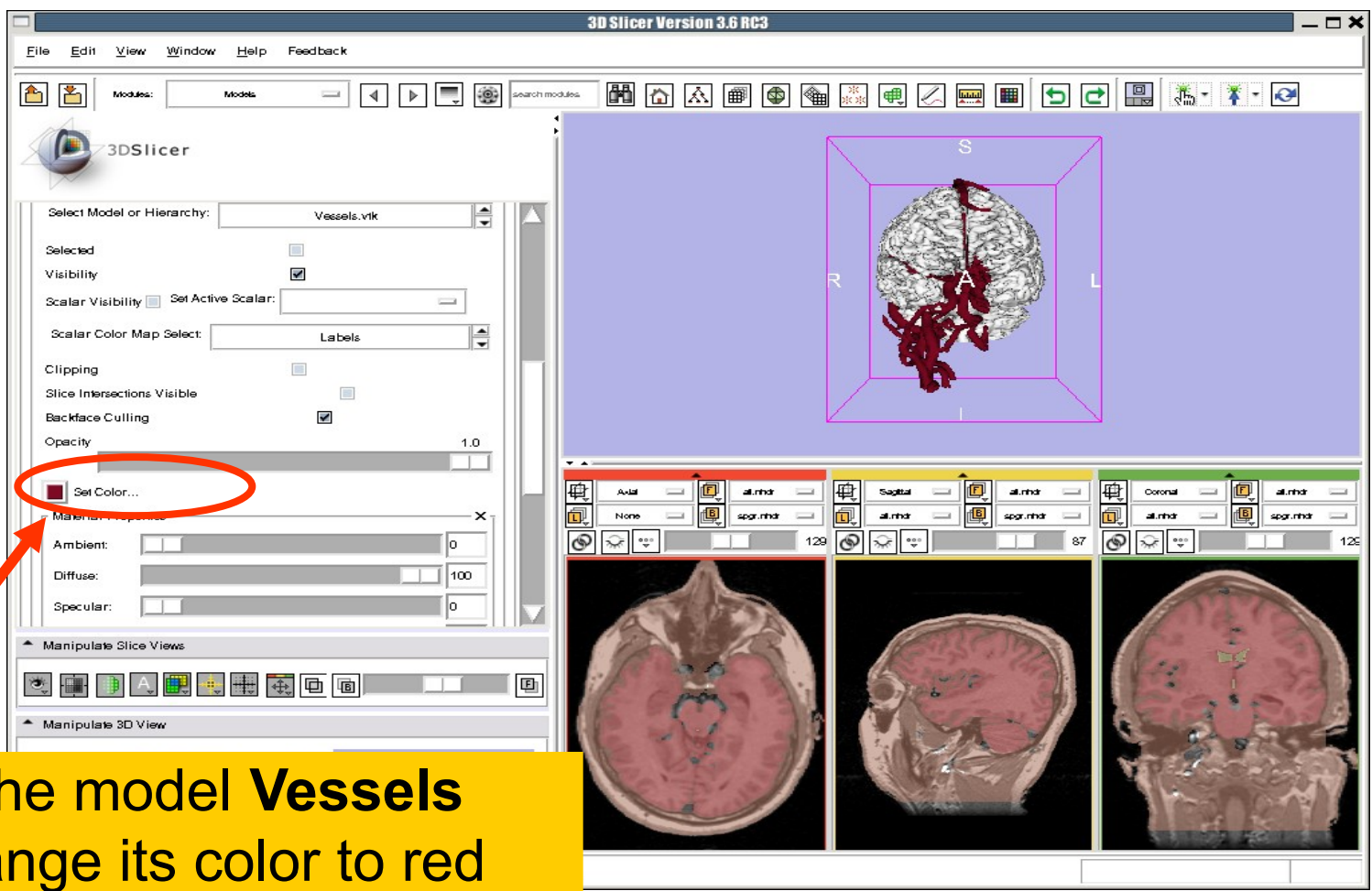
Visualizing a 3D model



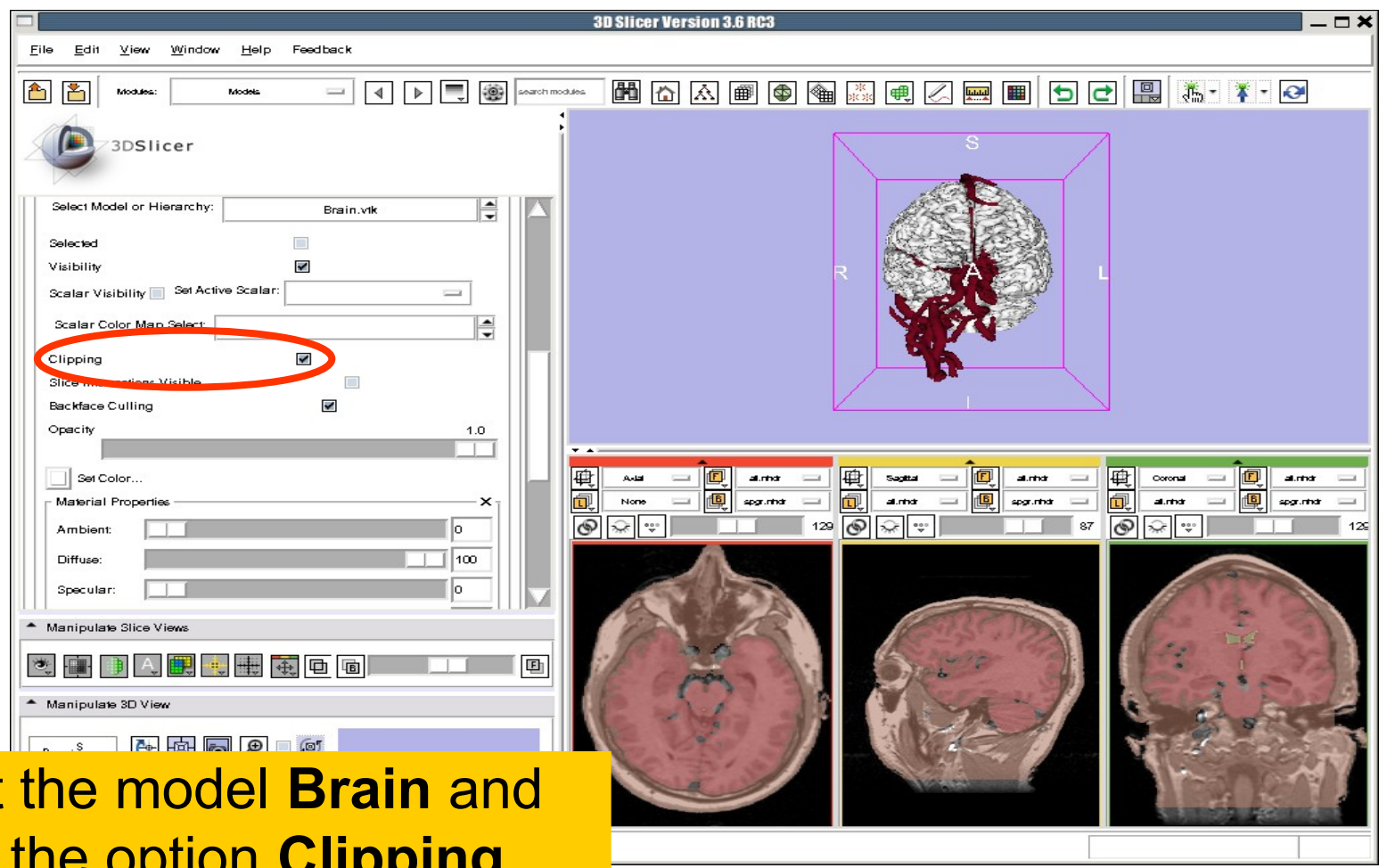
The intersection of the 3D model of the brain with the 2D image plane appears in the viewer.

Go back to the conventional layout

Visualizing a 3D model

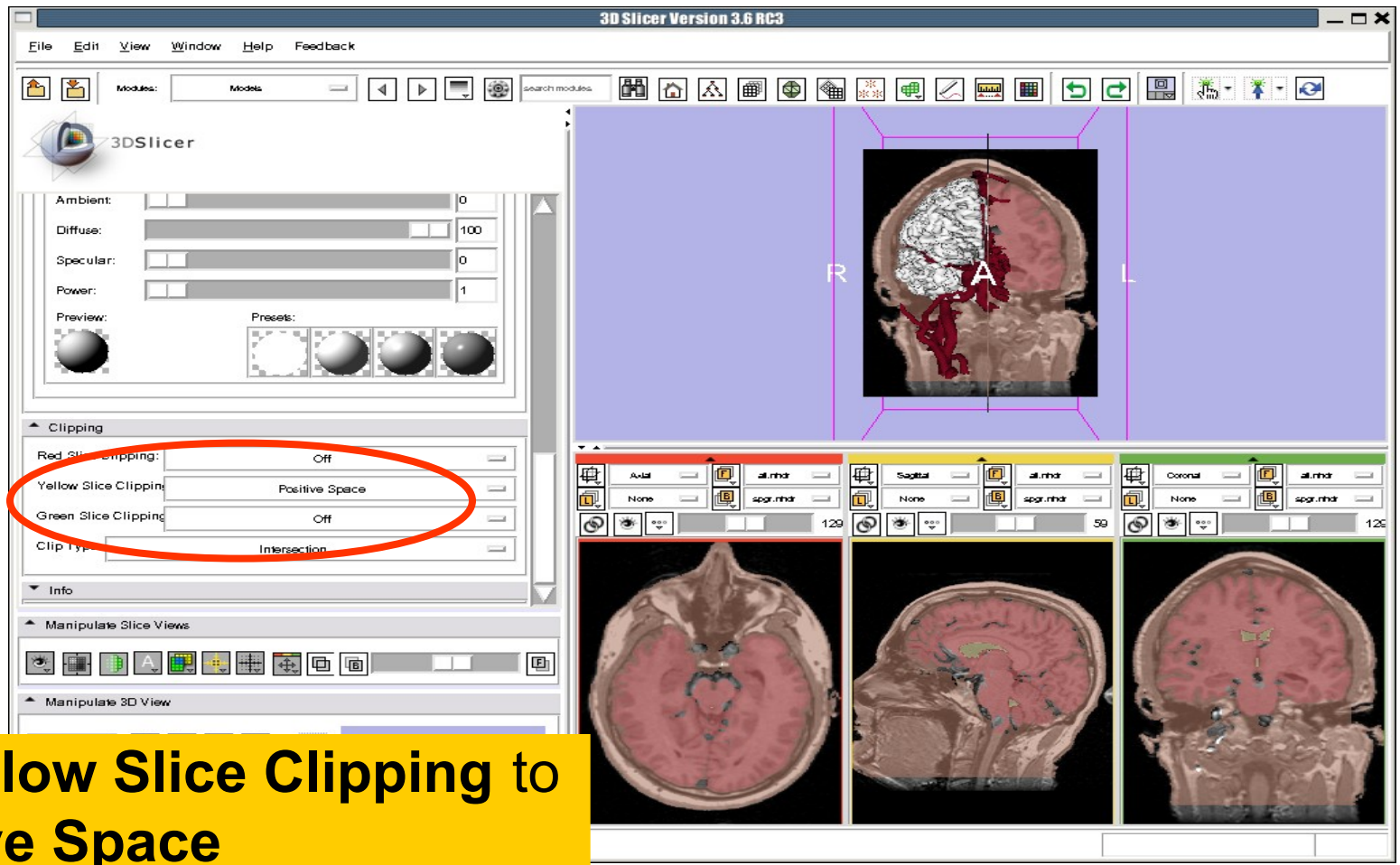


Visualizing a 3D model



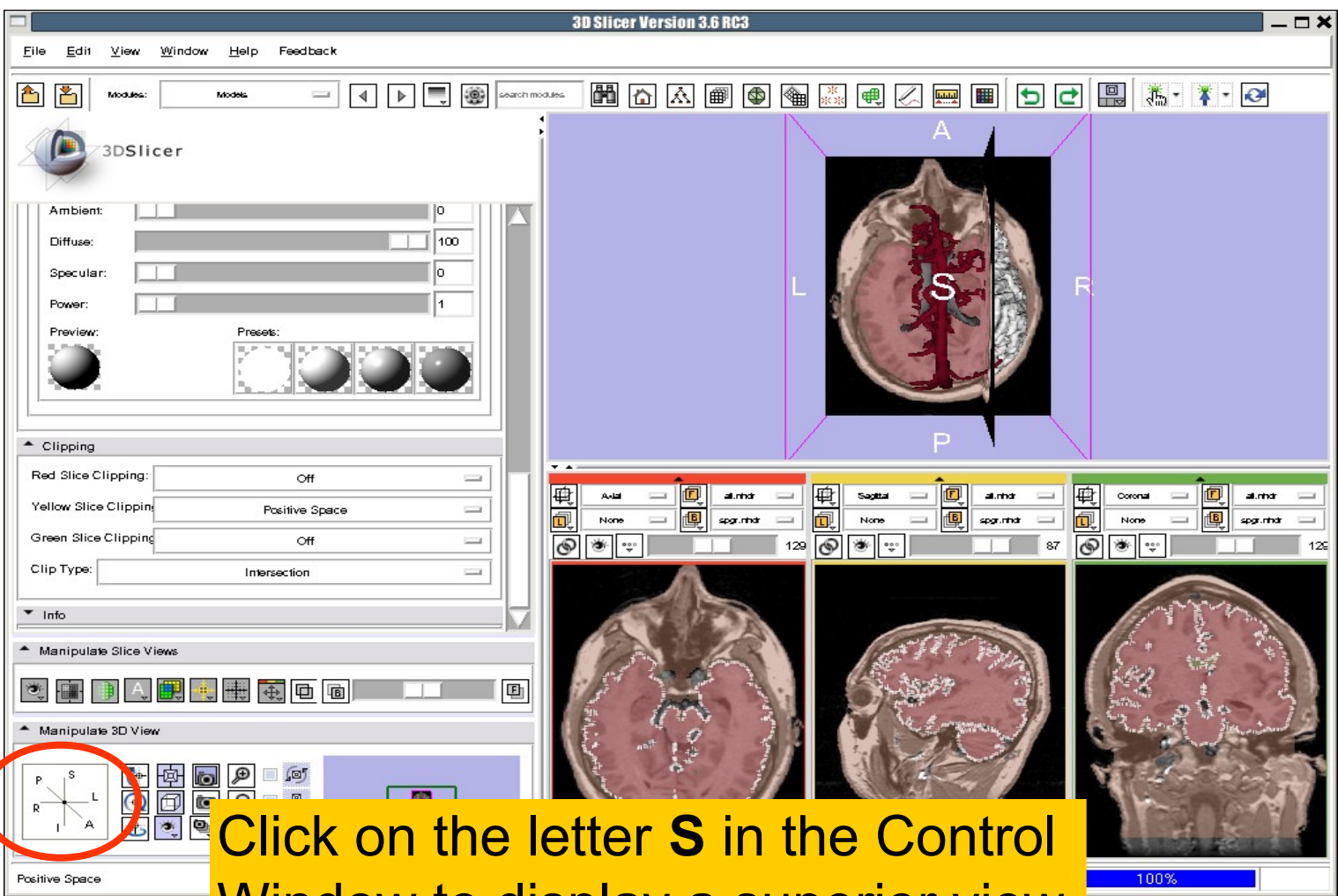
Select the model **Brain** and select the option **Clipping**

Visualizing a 3D model



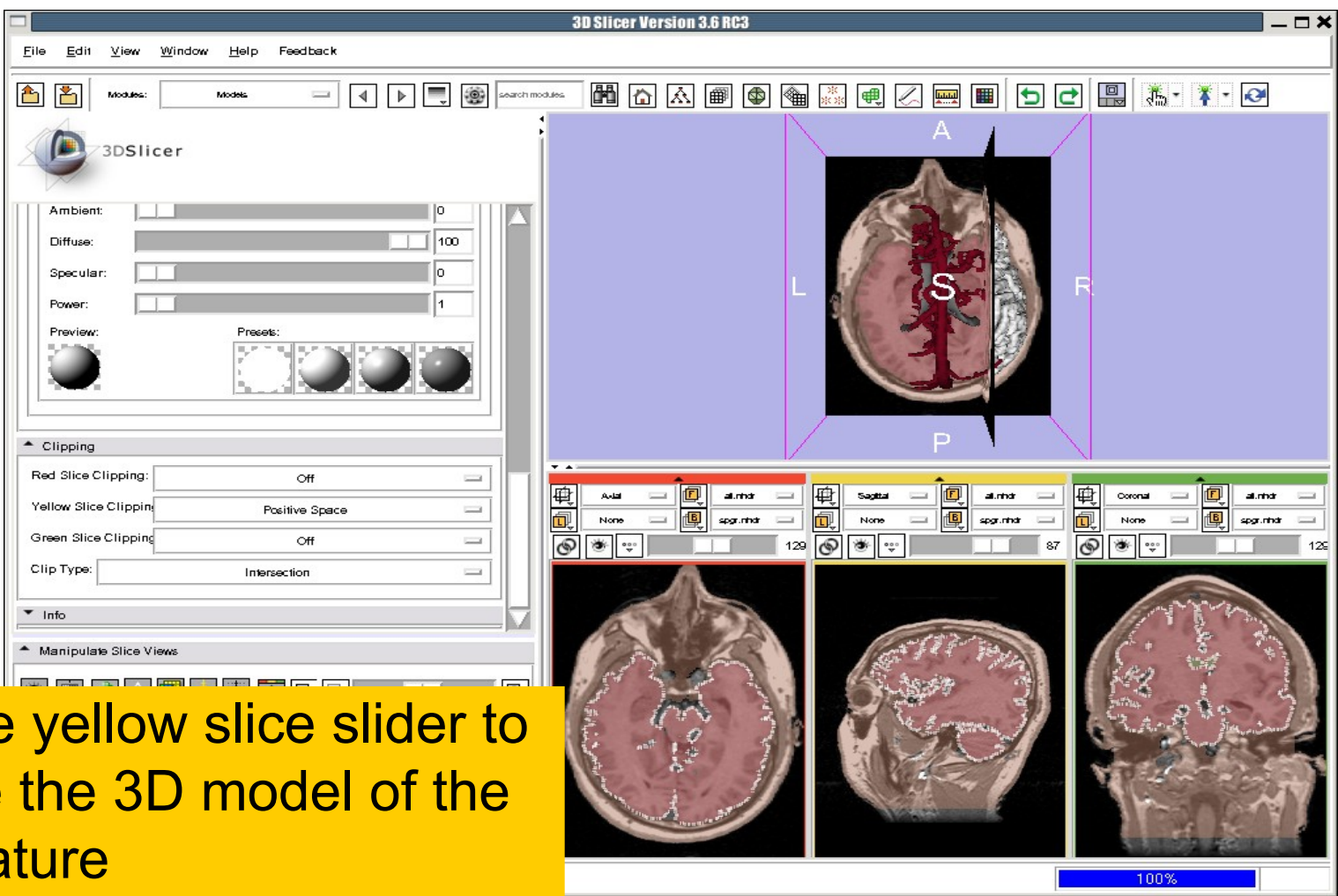
Set Yellow Slice Clipping to Positive Space

Visualizing a 3D model



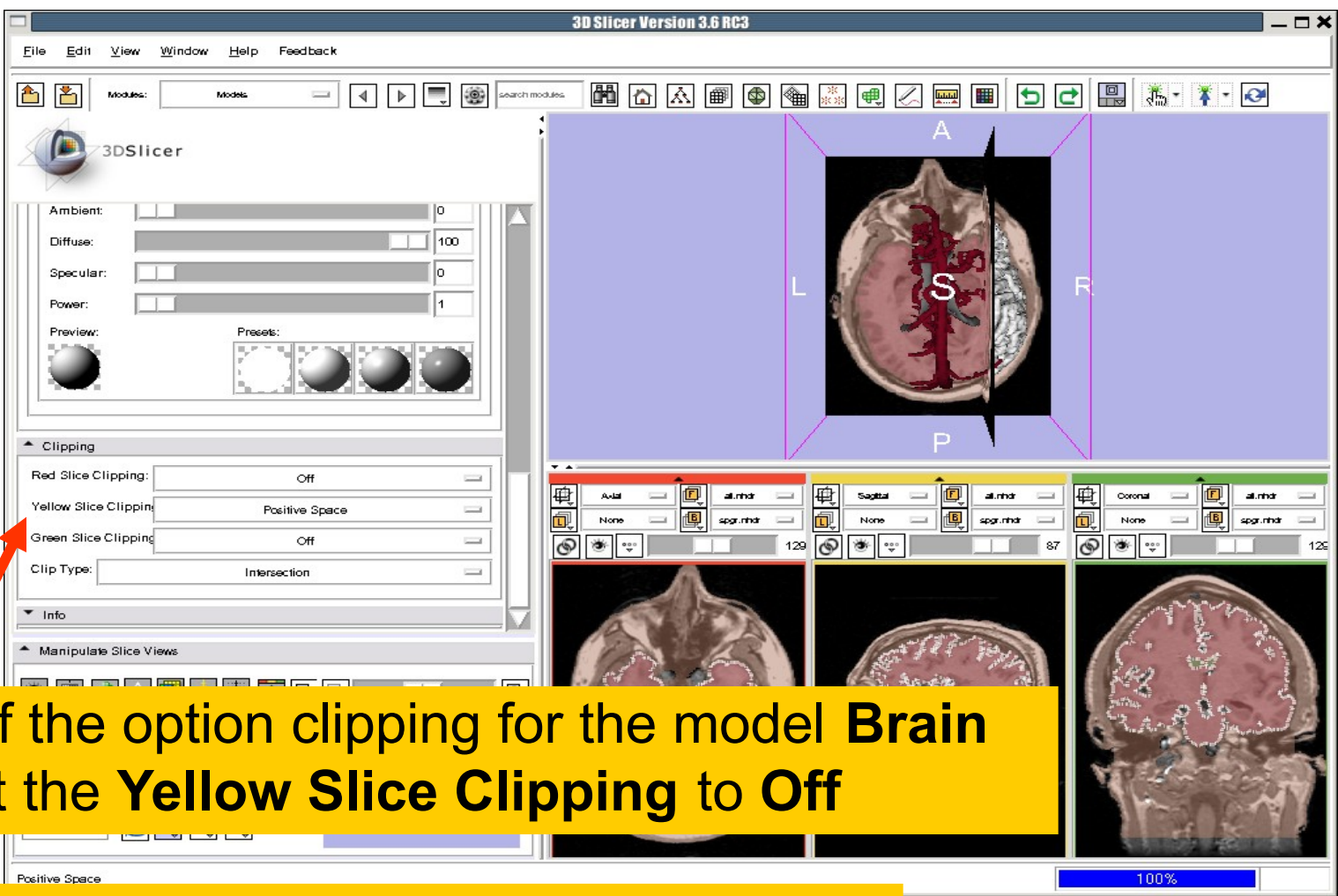
Click on the letter **S** in the Control Window to display a superior view of the 3D models

Visualizing a 3D model



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

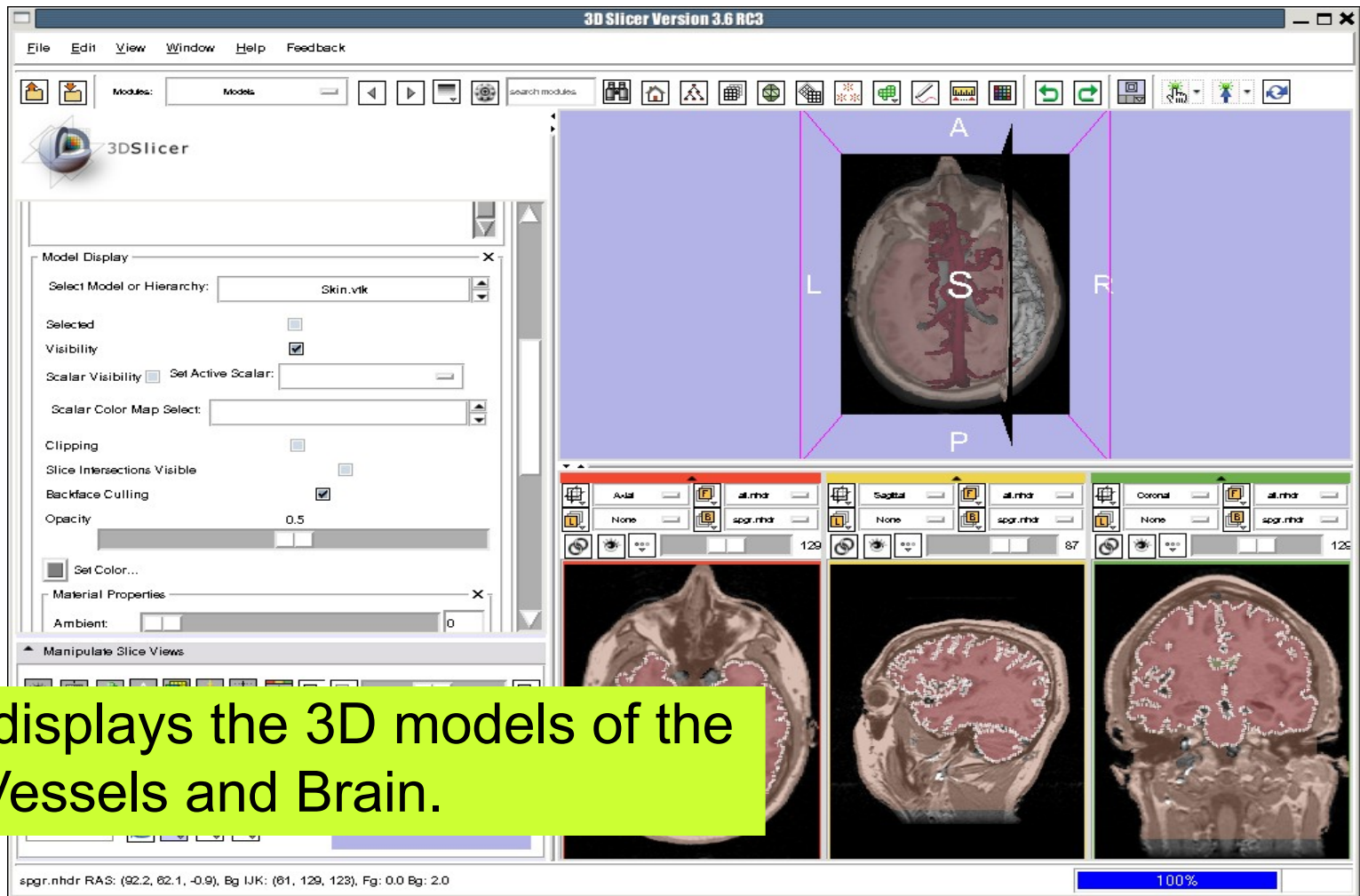
Visualizing a 3D model

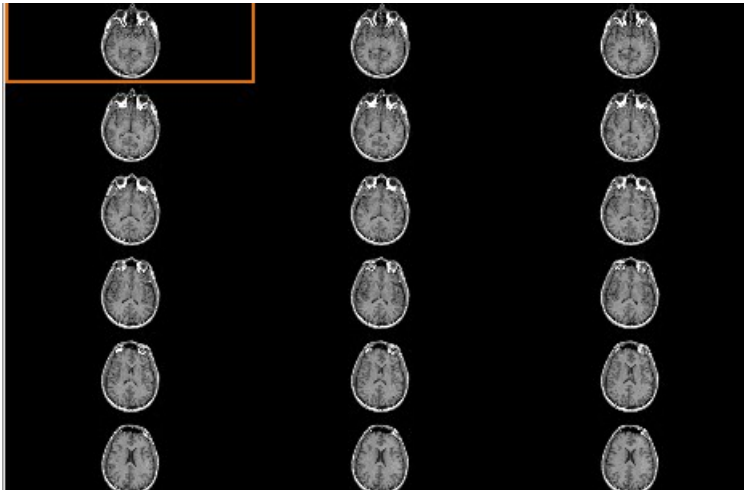


Turn off the option clipping for the model **Brain** and set the **Yellow Slice Clipping** to **Off**

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

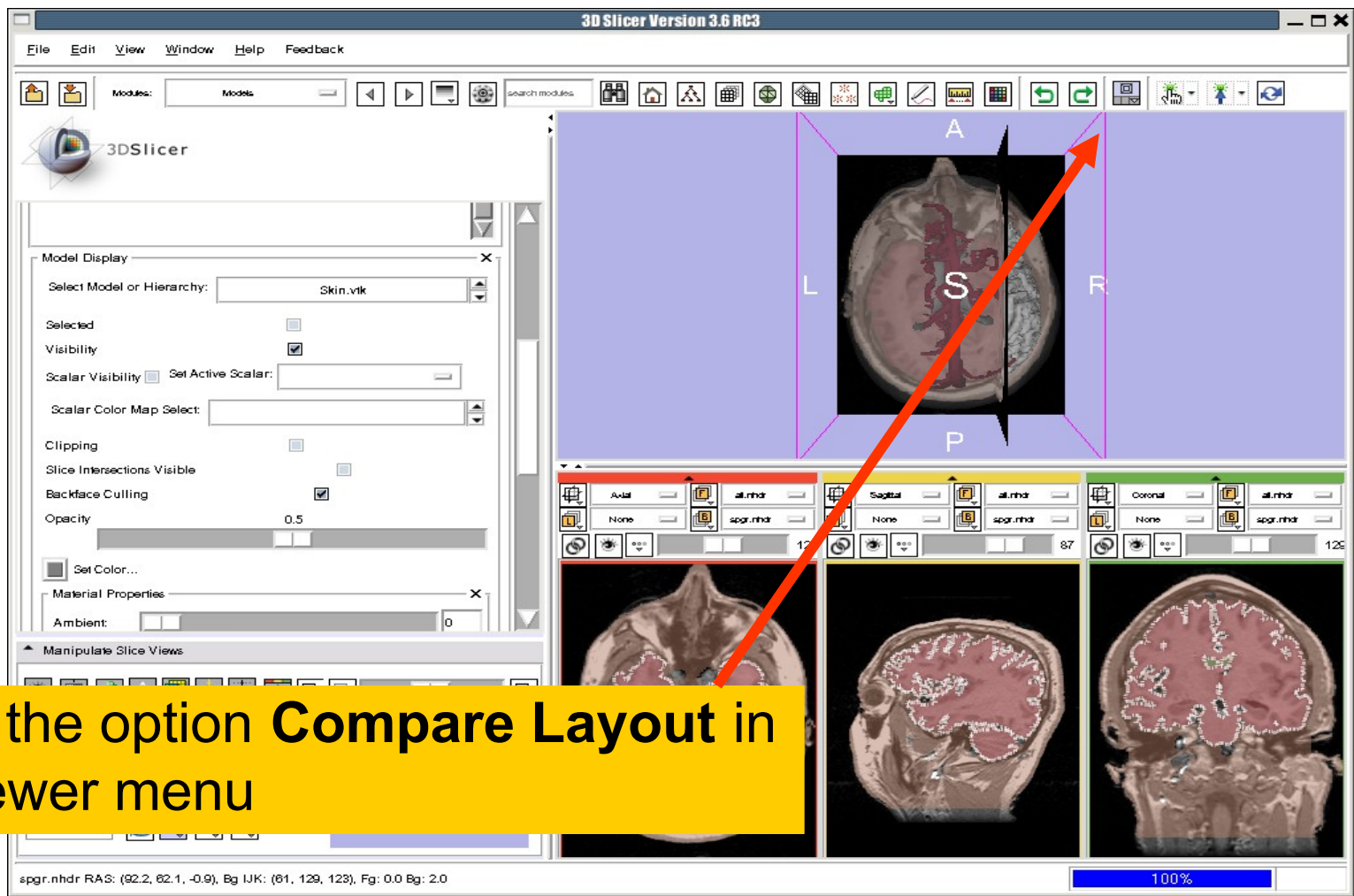
Visualizing a 3D model





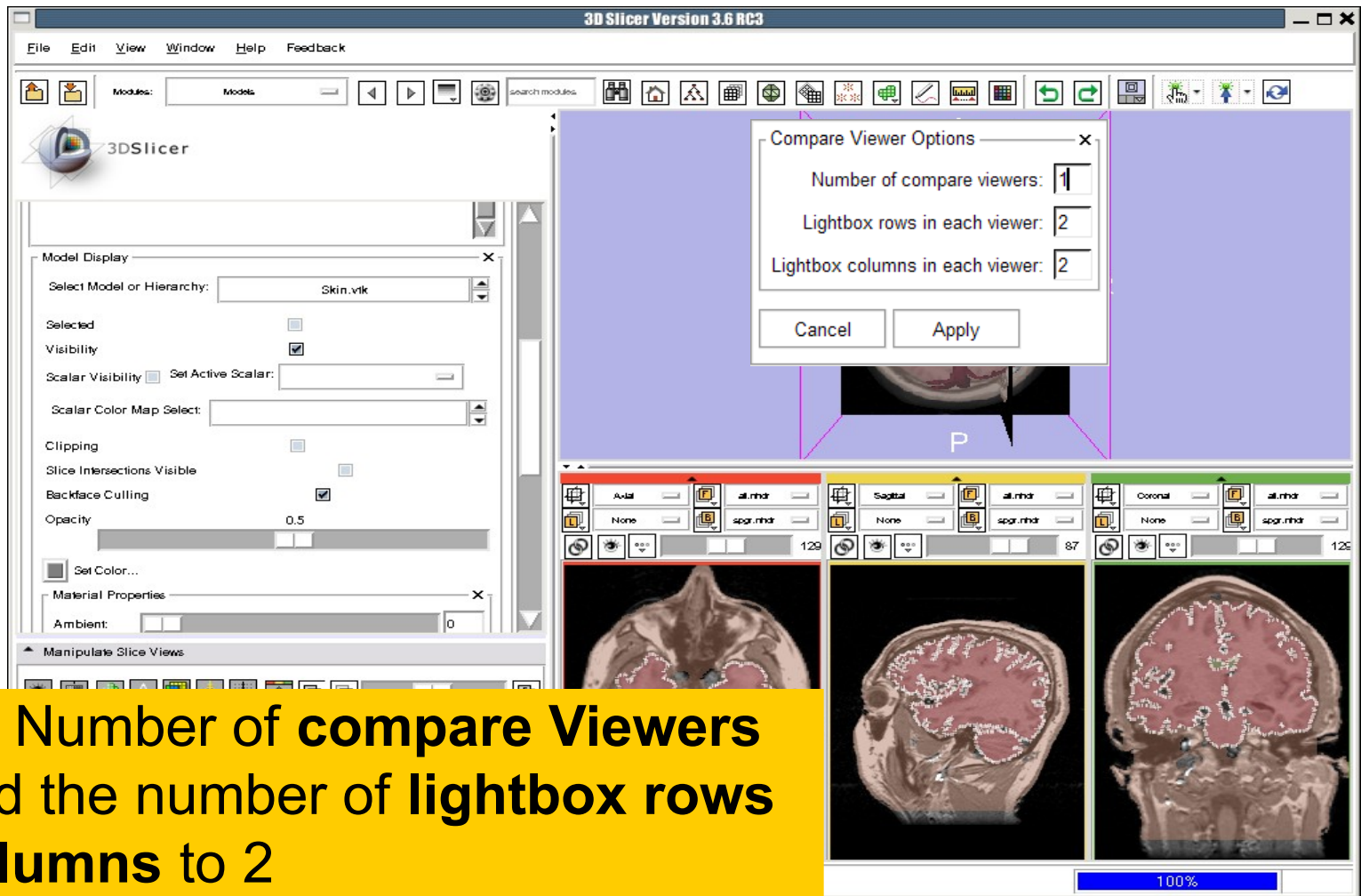
Part 4: Lightbox viewer

Visualizing a 3D model



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

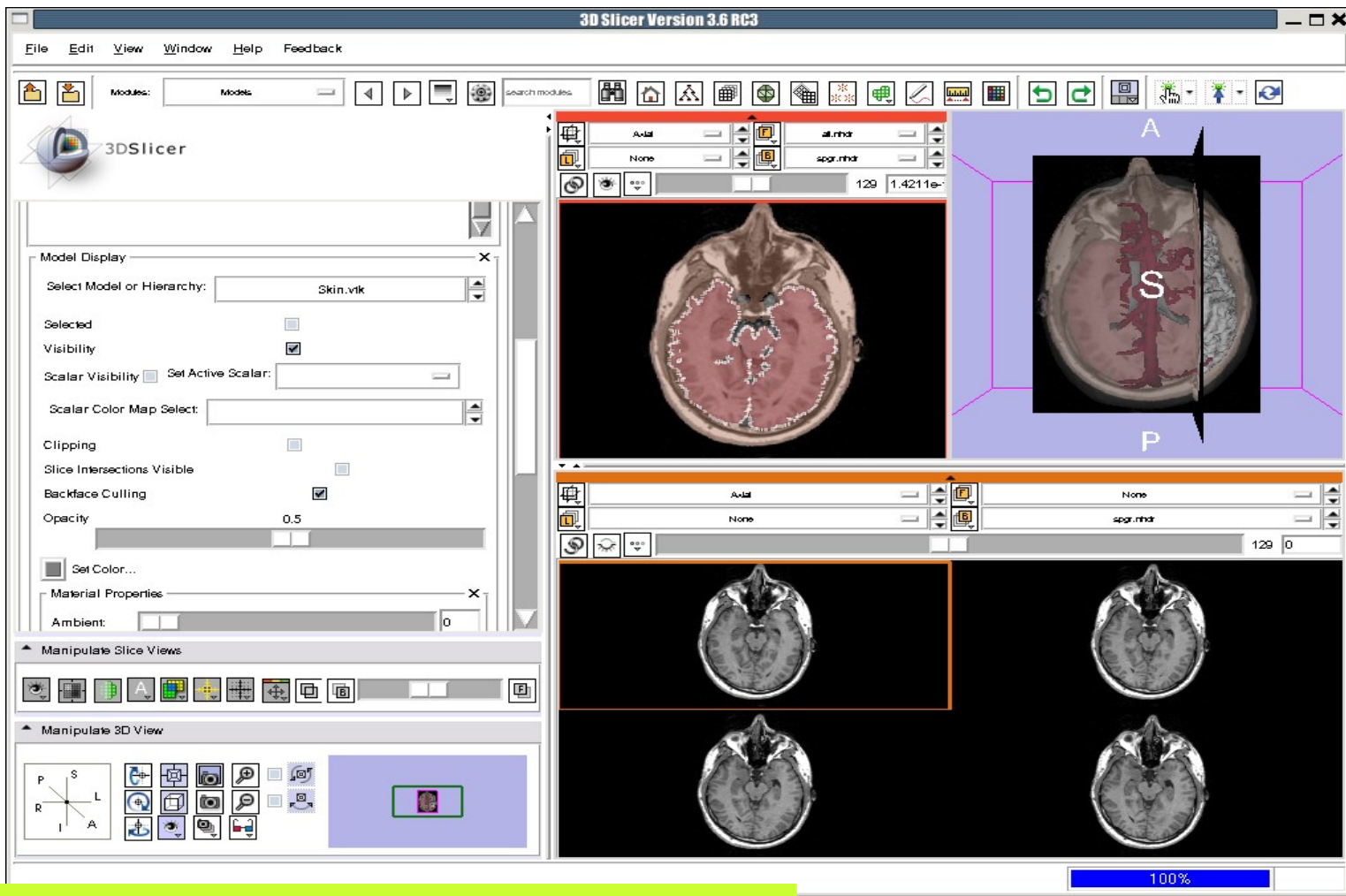
Visualizing a 3D model



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

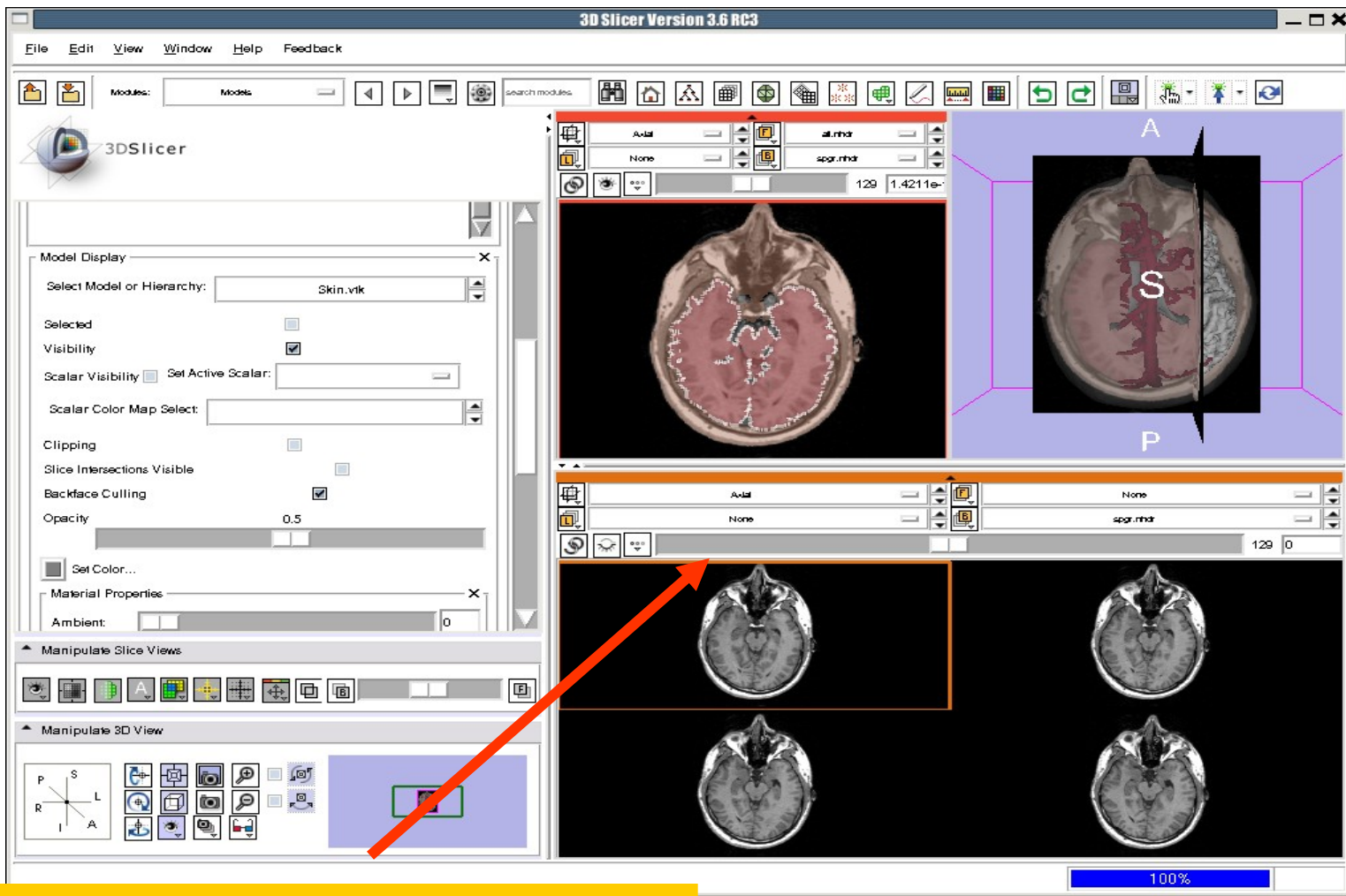
Click on **Apply**

Lightbox viewer



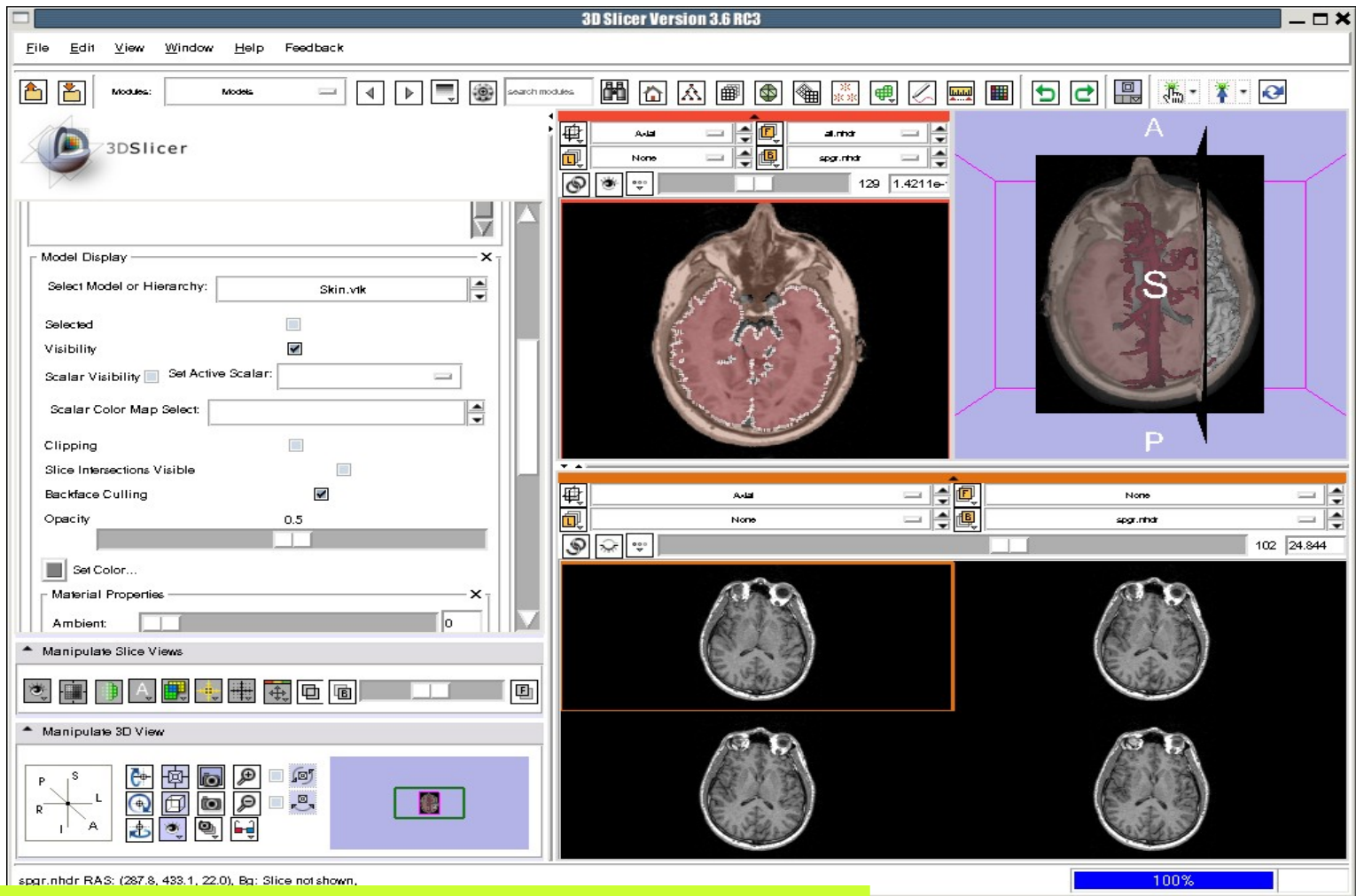
Slicer displays a lightbox view of the Background dataset.

Lightbox viewer



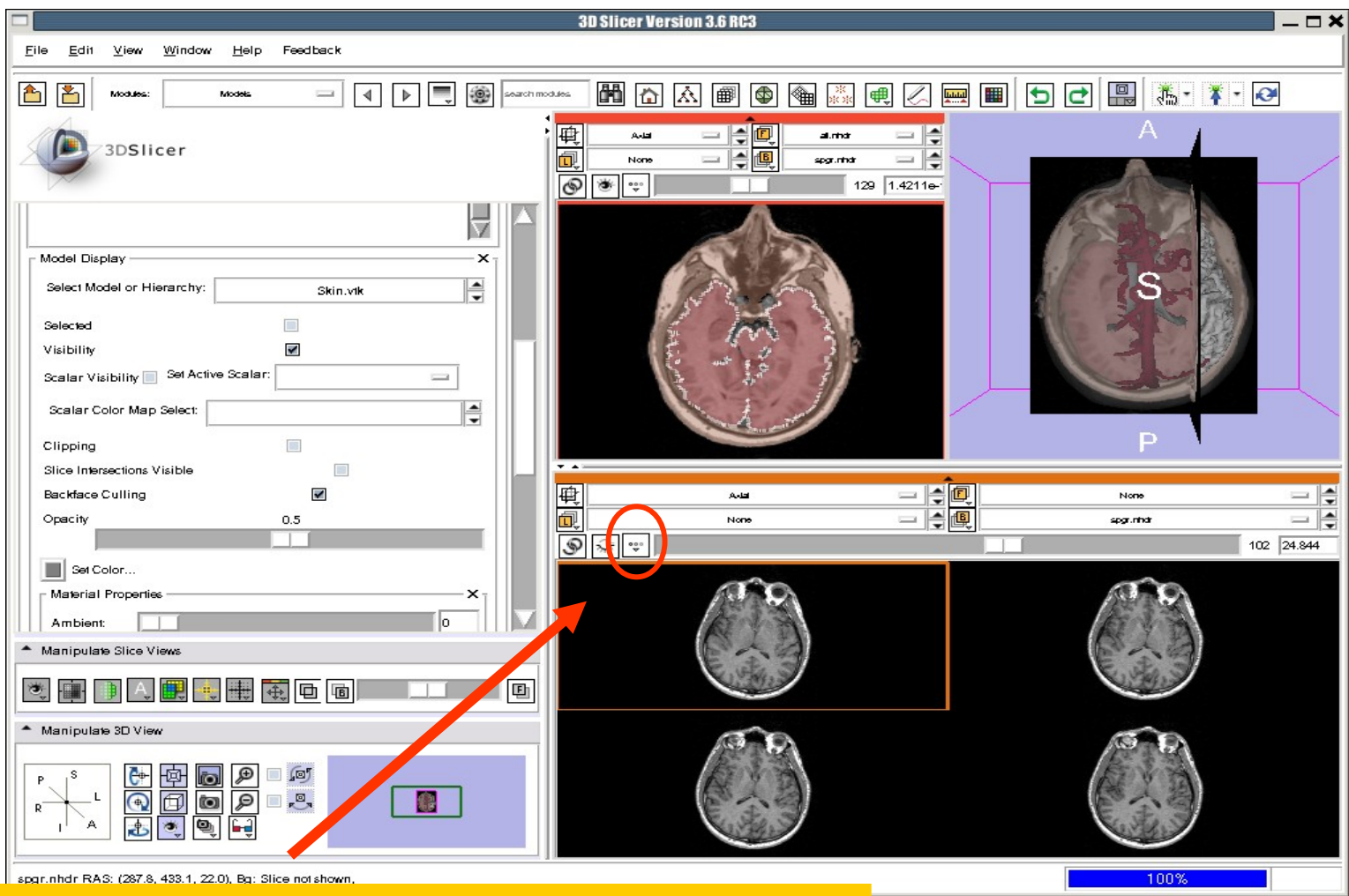
Browse through the spgr volume using the lightbox slider

Lightbox viewer



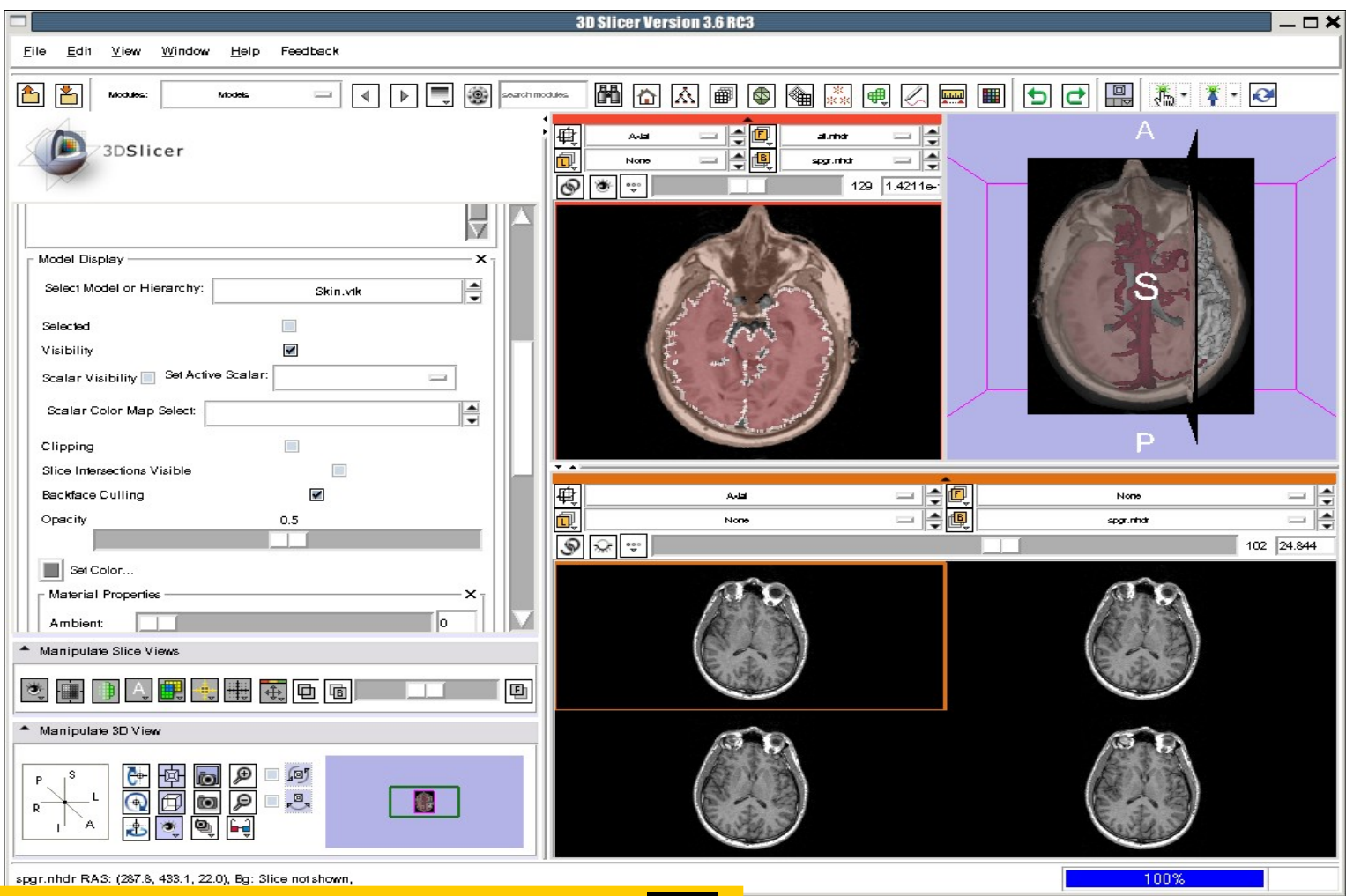
Slicer displays 4 adjacent axial slices of the spgr volume simultaneously

Lightbox viewer



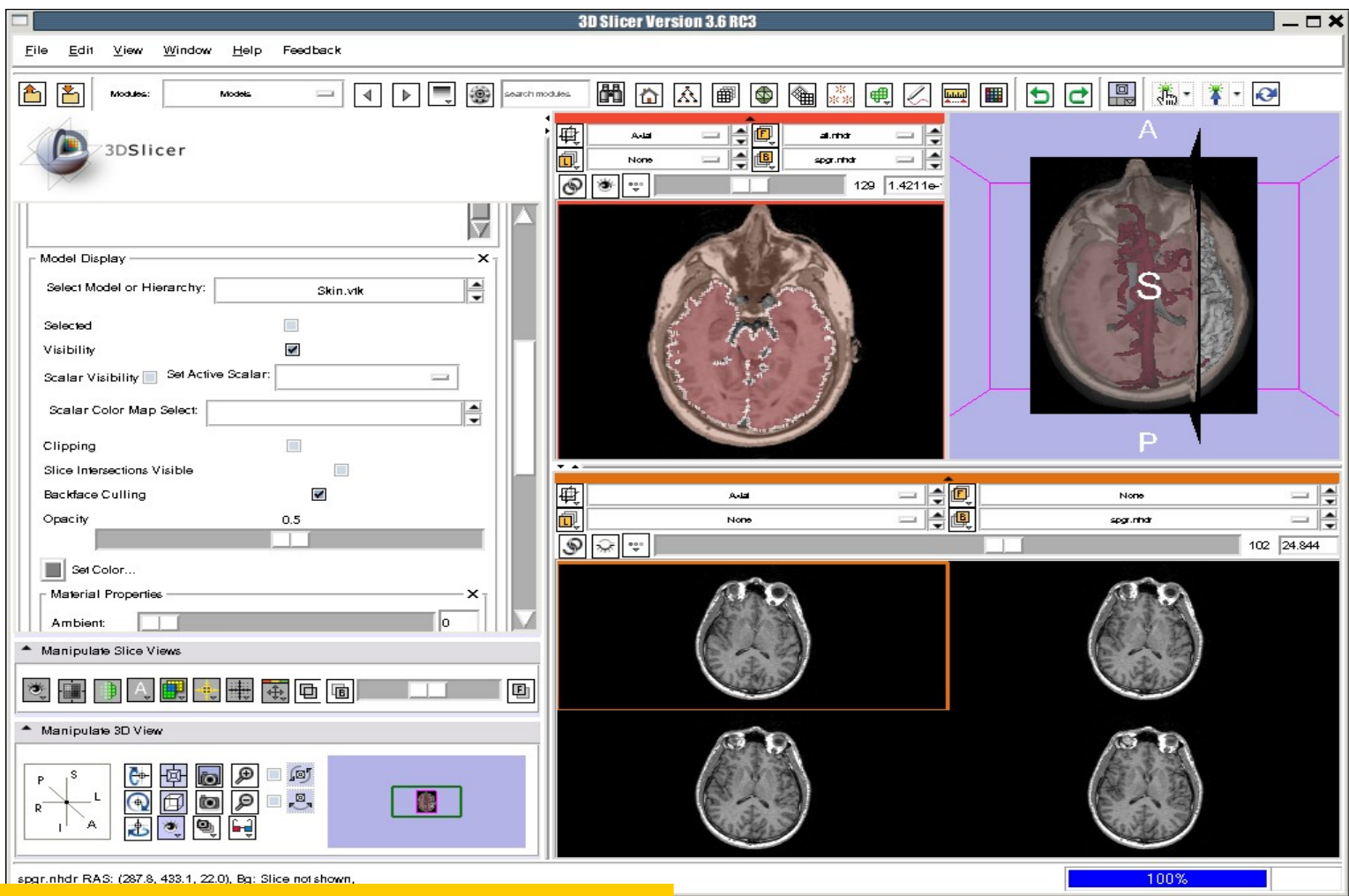
Left click on the Slice Viewer menu of the Compare Layout viewer

Lightbox viewer



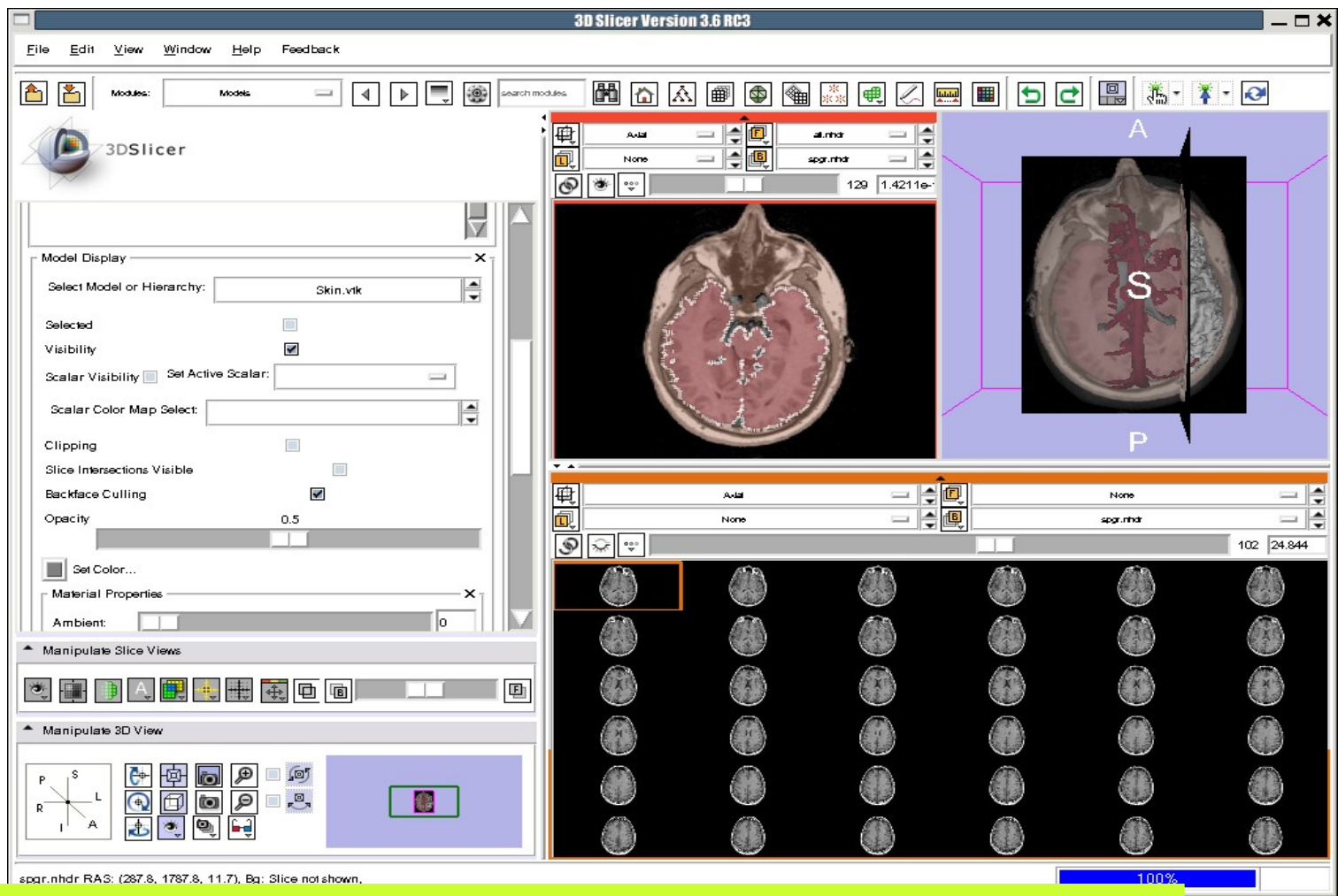
Select the **lightbox view** option 

Lightbox viewer



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

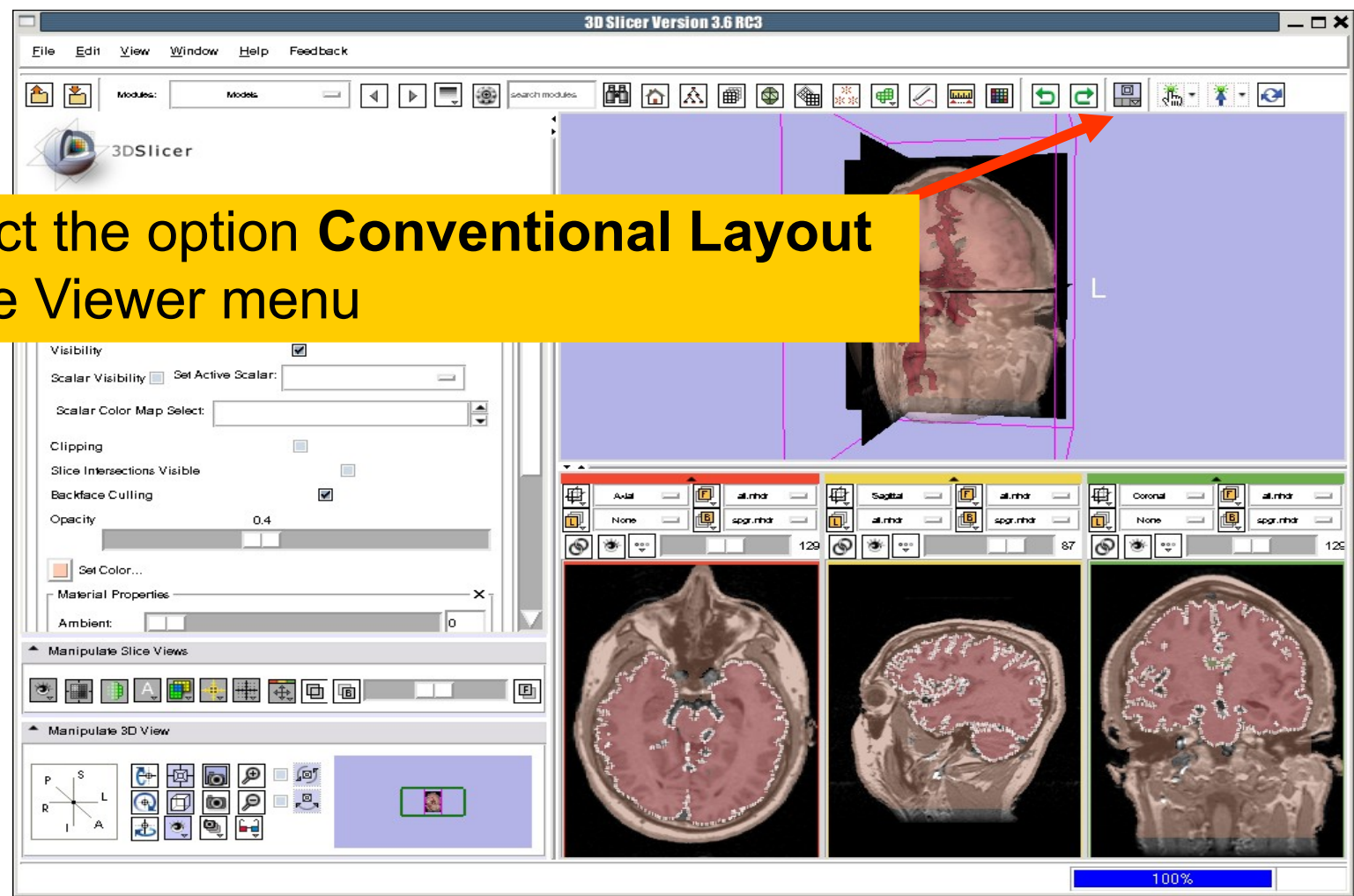
Lightbox viewer

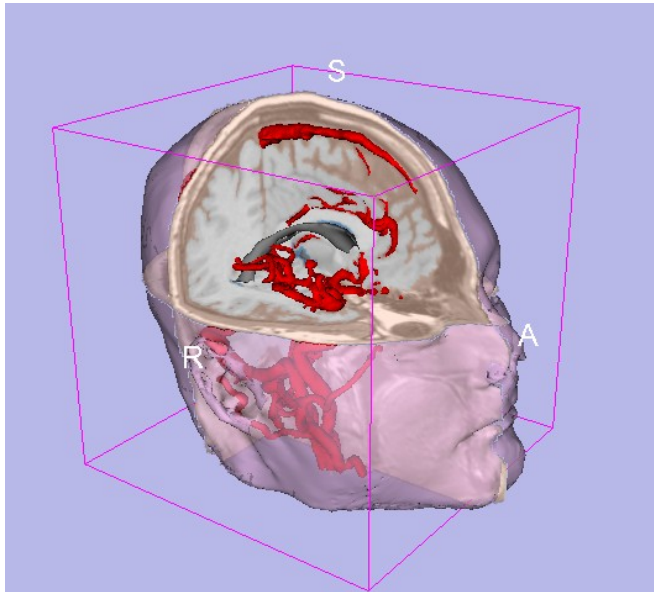


Slicer displays a matrix of 36 adjacent axial slices of the spqr volume.

Lightbox viewer

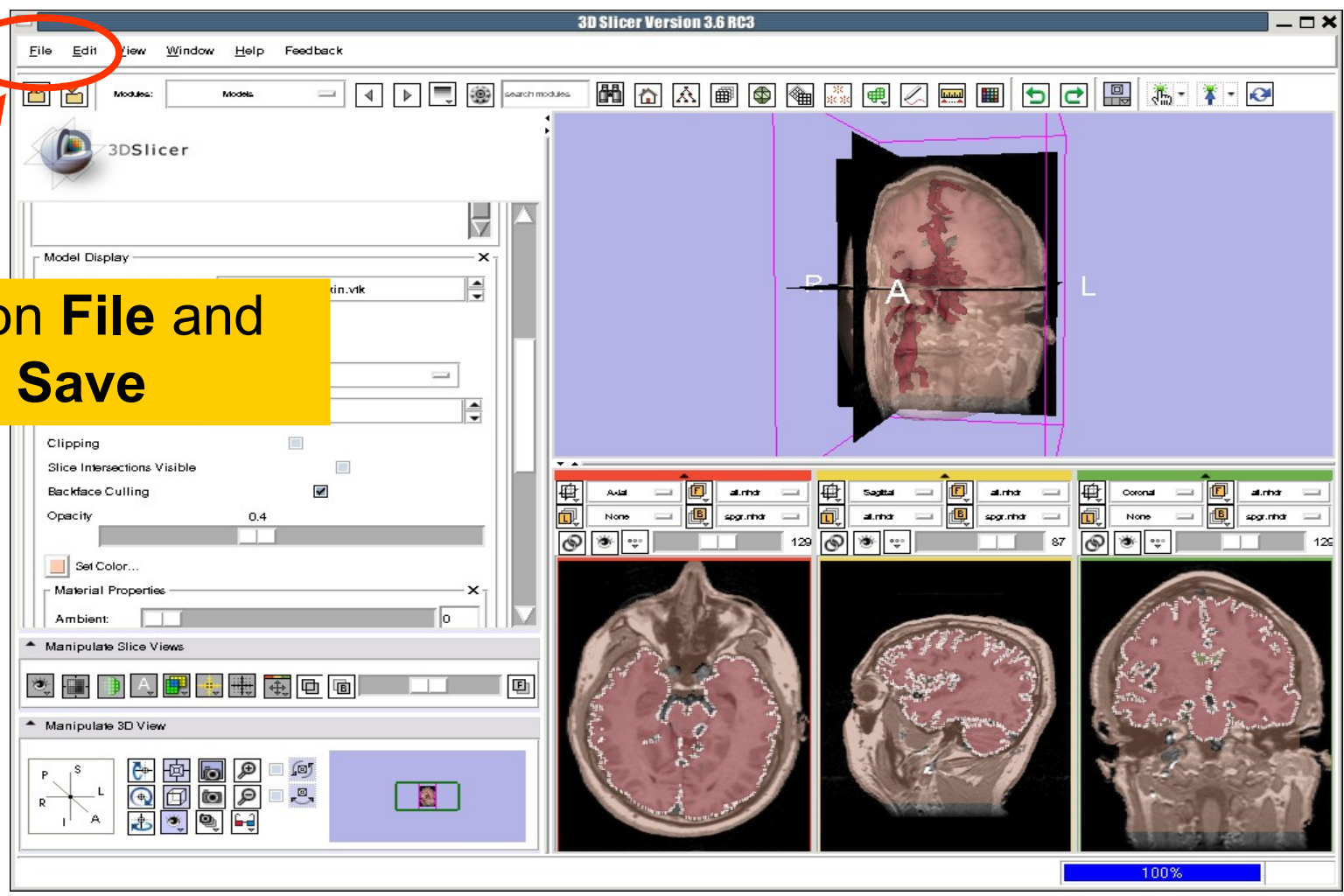
Select the option **Conventional Layout** in the Viewer menu





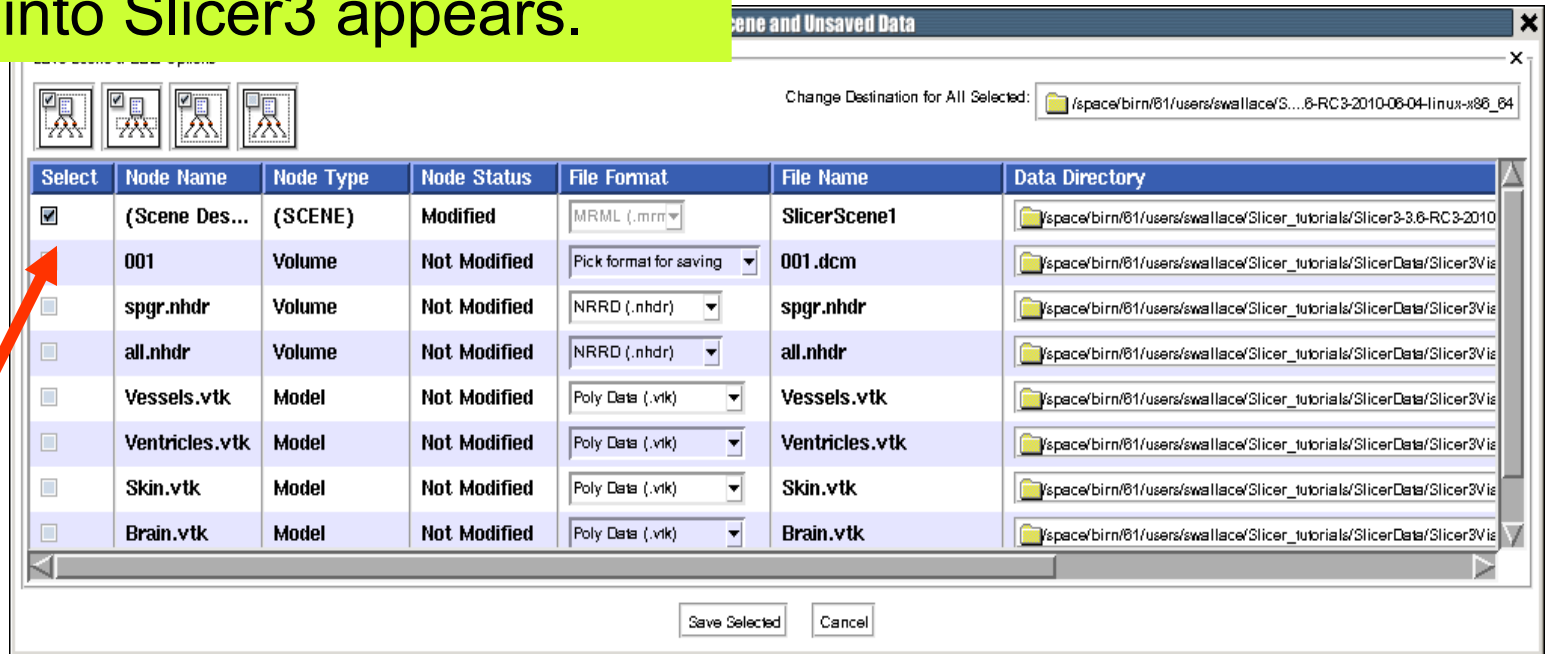
Part 5: Loading and saving a Scene

Saving Data



Saving Data

The list of elements currently loaded into Slicer3 appears.

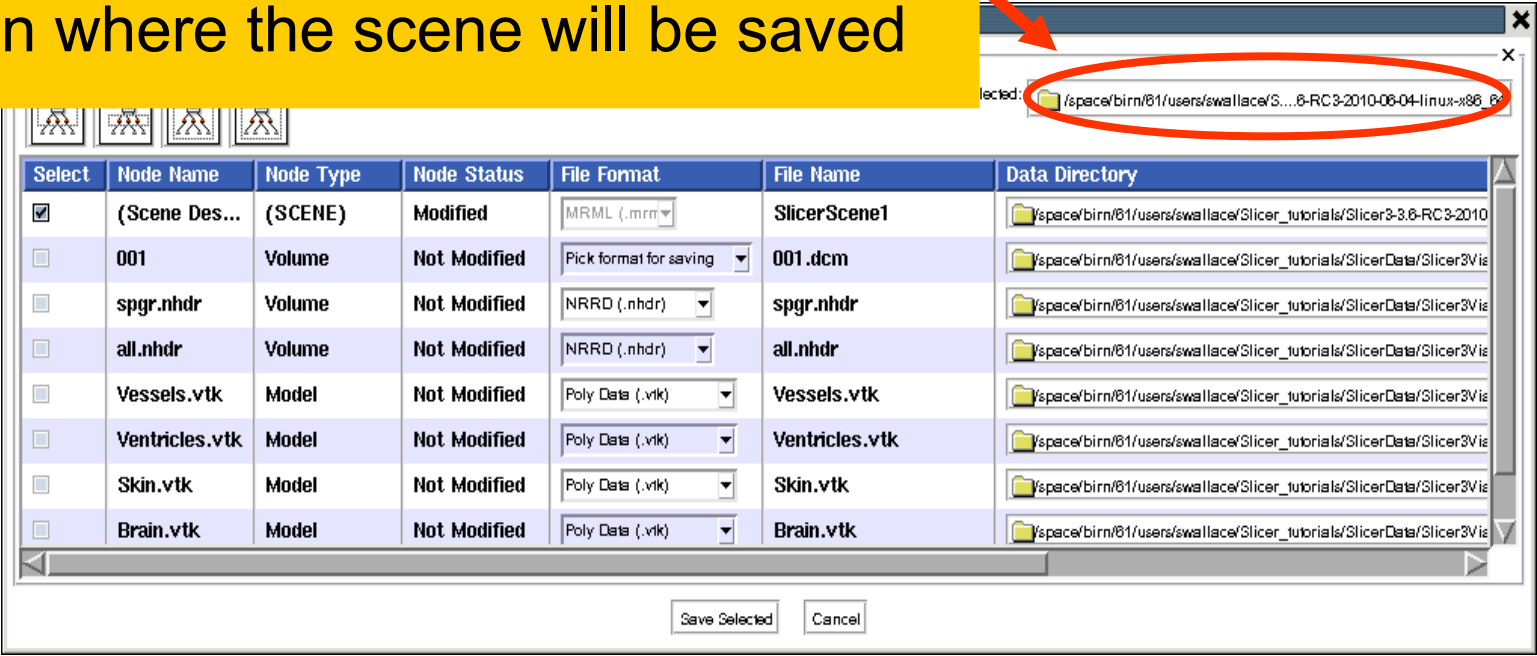


Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mrm)	SlicerScene1	/space/birn/81/users/swallace/Slicer_tutorials/Slicer3-3.8-RC3-2010
<input type="checkbox"/>	001	Volume	Not Modified	Pick format for 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

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



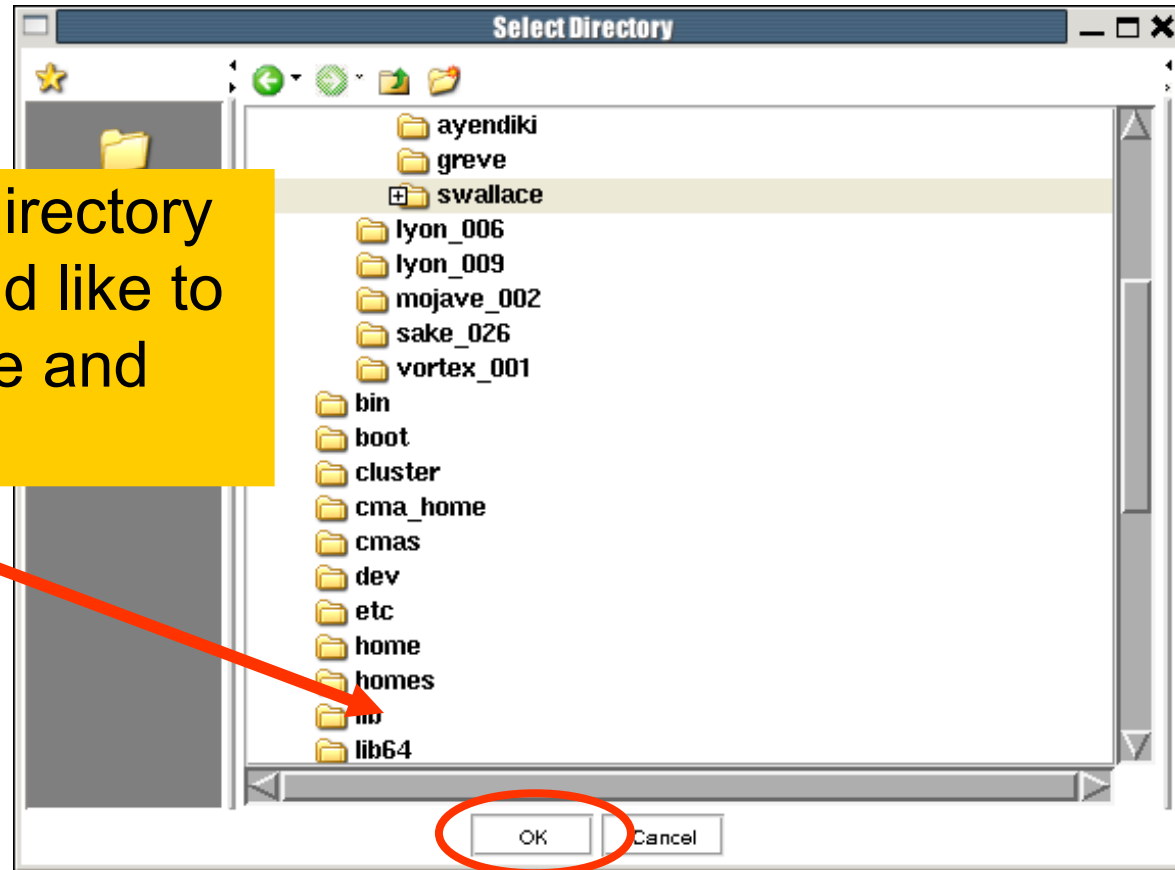
The screenshot shows the 3DSlicer save dialog. A red arrow points from the yellow instruction box to a red circle in the file browser window, which highlights the path `/space/birn/81/users/swallace/S...8-RC3-2010-06-04-linux-x86_64`. Below the file browser is a table of nodes to be saved.

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

Buttons: Save Selected, Cancel

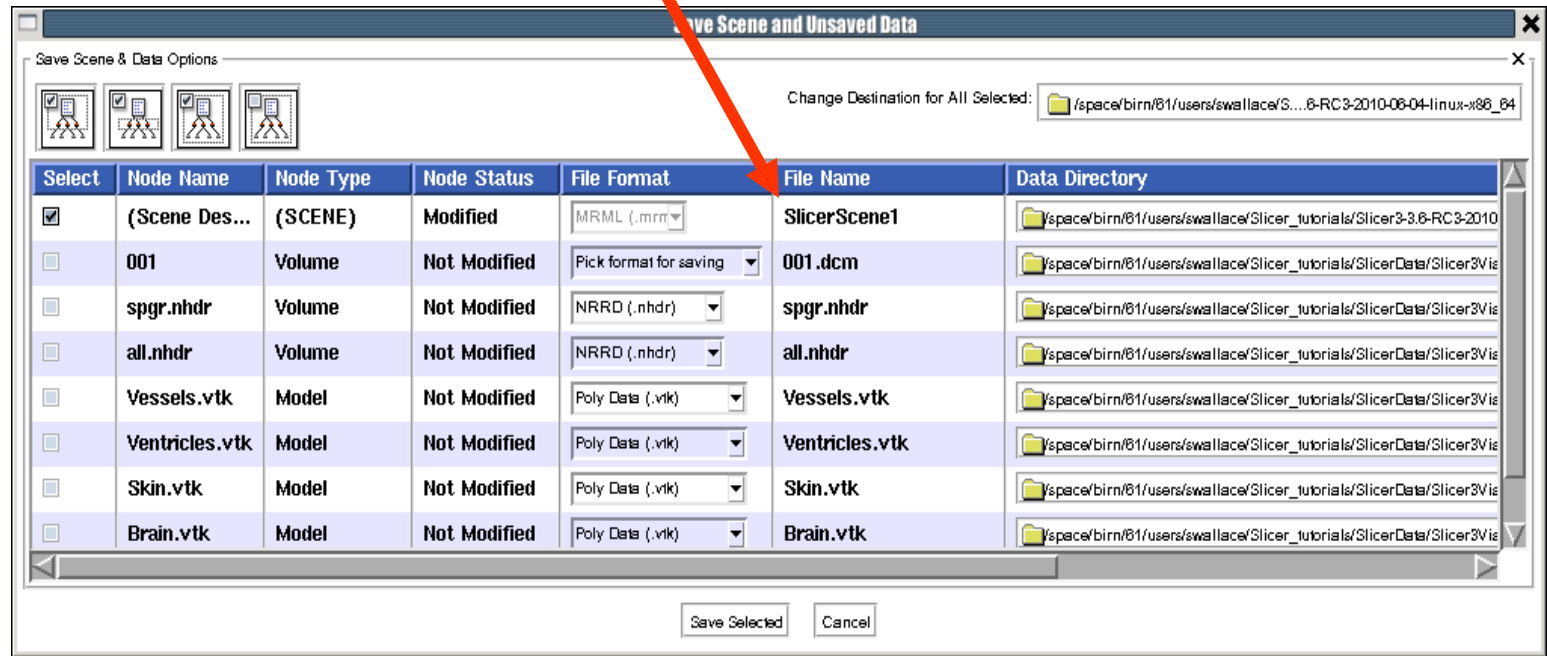
Saving Data

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**



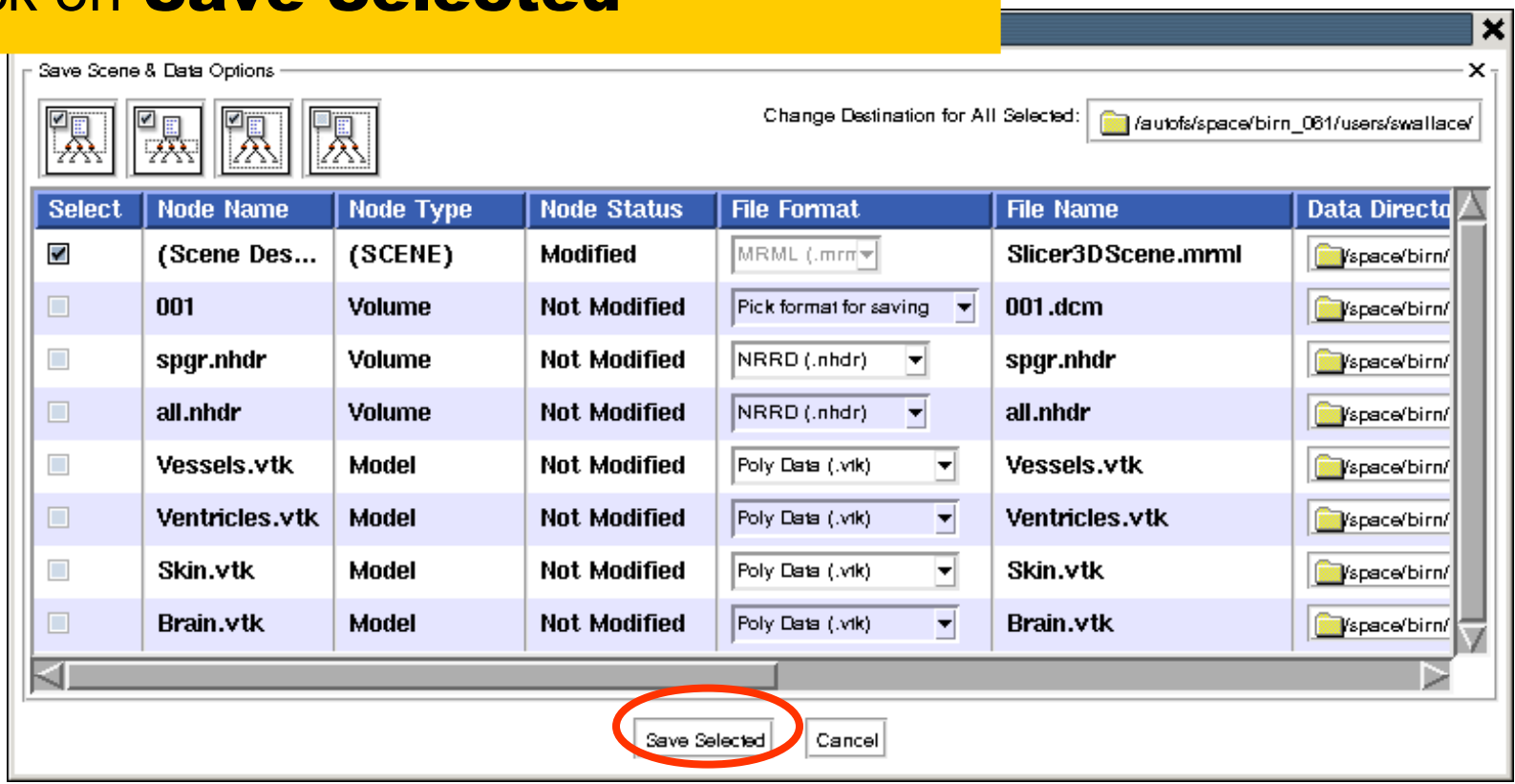
Save Scene & Data Options

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/Slicer3-8-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

Click on **Save Selected**



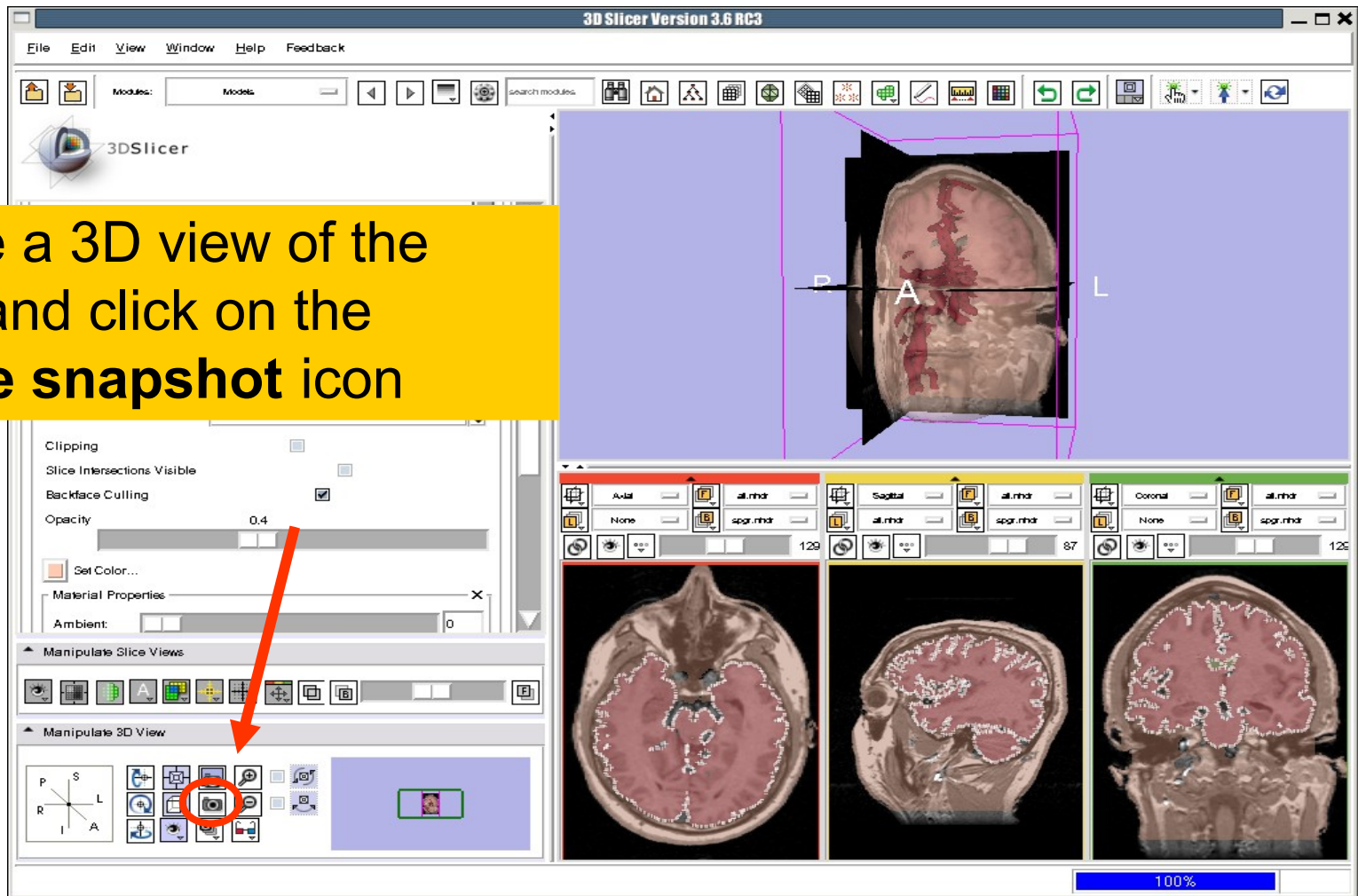
Save Scene & Data Options

Change Destination for All Selected:

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	/space/birn/
<input type="checkbox"/>	001	Volume	Not Modified	Pick format for saving	001.dcm	/space/birn/
<input type="checkbox"/>	spgr.nhdr	Volume	Not Modified	NRRD (.nhdr)	spgr.nhdr	/space/birn/
<input type="checkbox"/>	all.nhdr	Volume	Not Modified	NRRD (.nhdr)	all.nhdr	/space/birn/
<input type="checkbox"/>	Vessels.vtk	Model	Not Modified	Poly Data (.vtk)	Vessels.vtk	/space/birn/
<input type="checkbox"/>	Ventricles.vtk	Model	Not Modified	Poly Data (.vtk)	Ventricles.vtk	/space/birn/
<input type="checkbox"/>	Skin.vtk	Model	Not Modified	Poly Data (.vtk)	Skin.vtk	/space/birn/
<input type="checkbox"/>	Brain.vtk	Model	Not Modified	Poly Data (.vtk)	Brain.vtk	/space/birn/

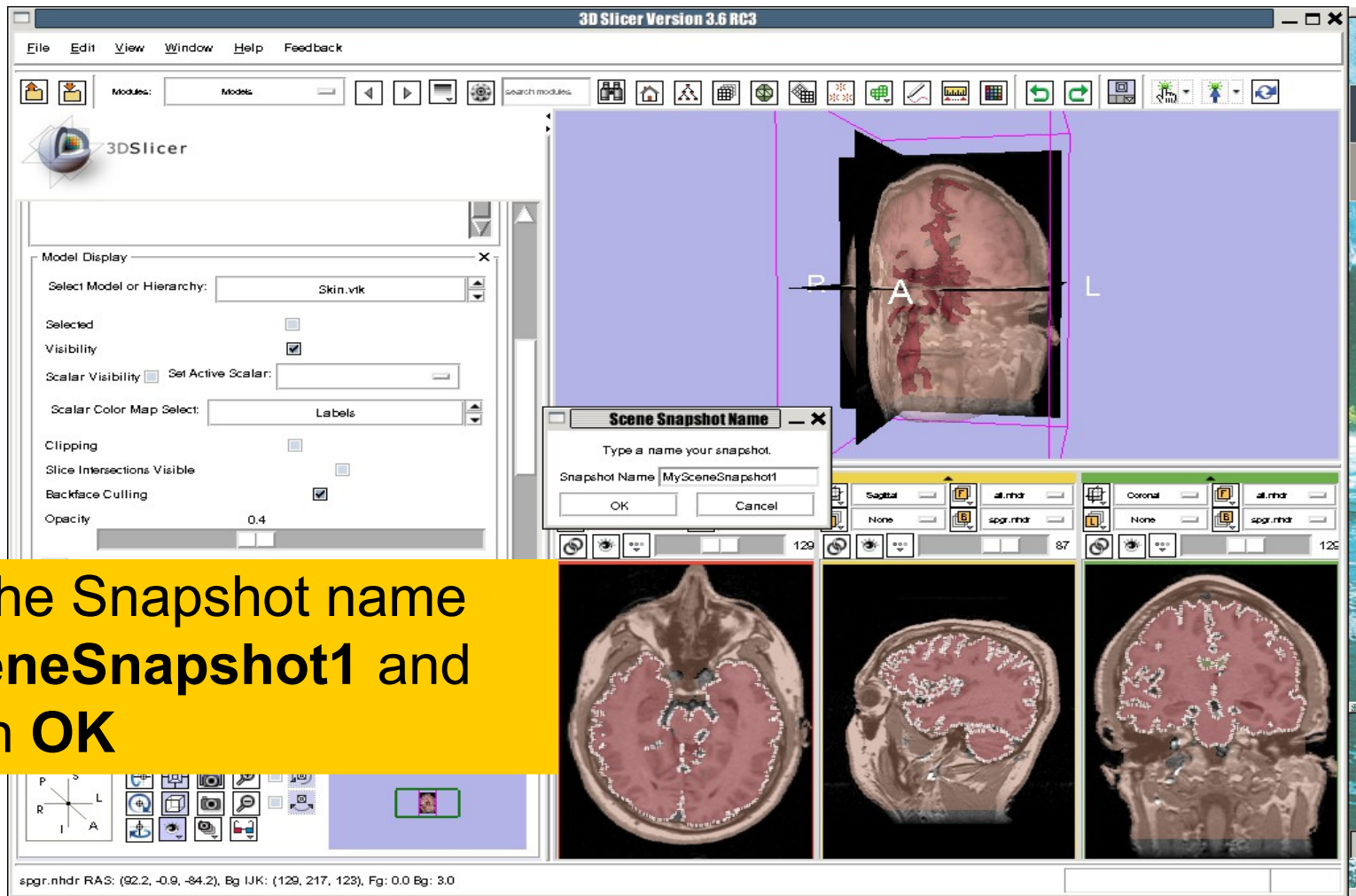
Save Selected Cancel

Creating Scene Snapshots



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

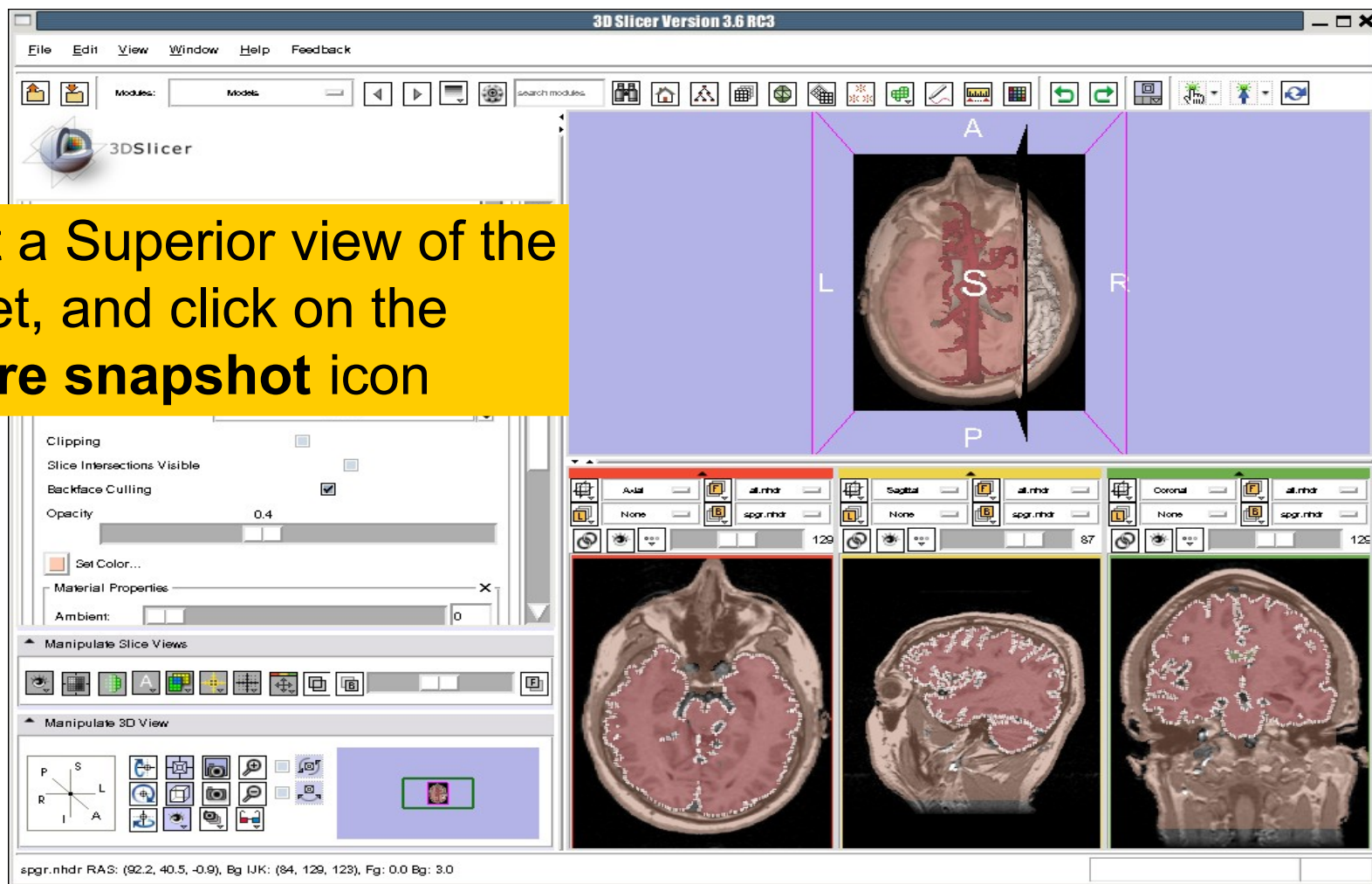
Creating Scene Snapshots



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

Creating Scene Snapshots

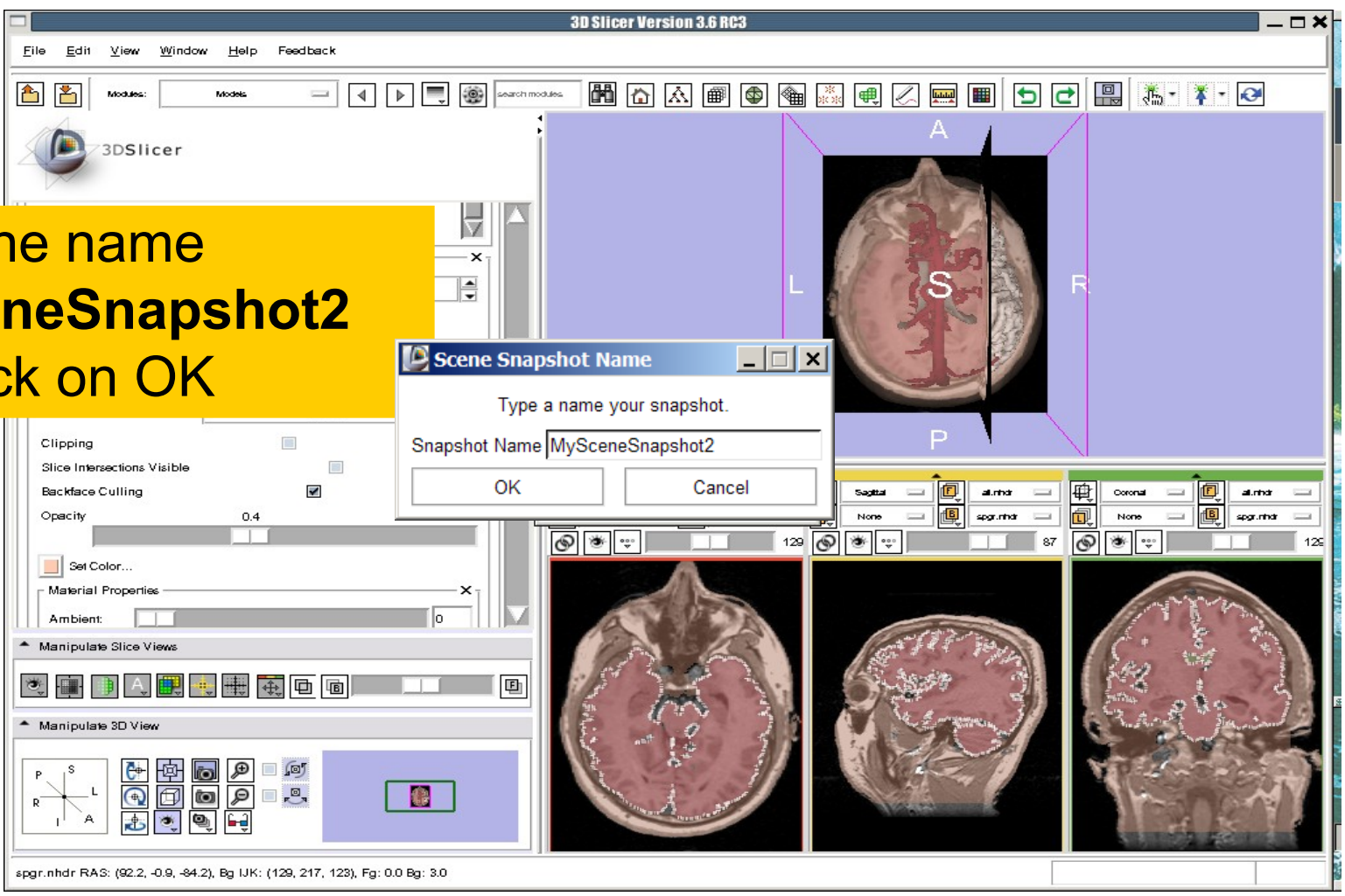
Select a Superior view of the dataset, and click on the capture snapshot icon





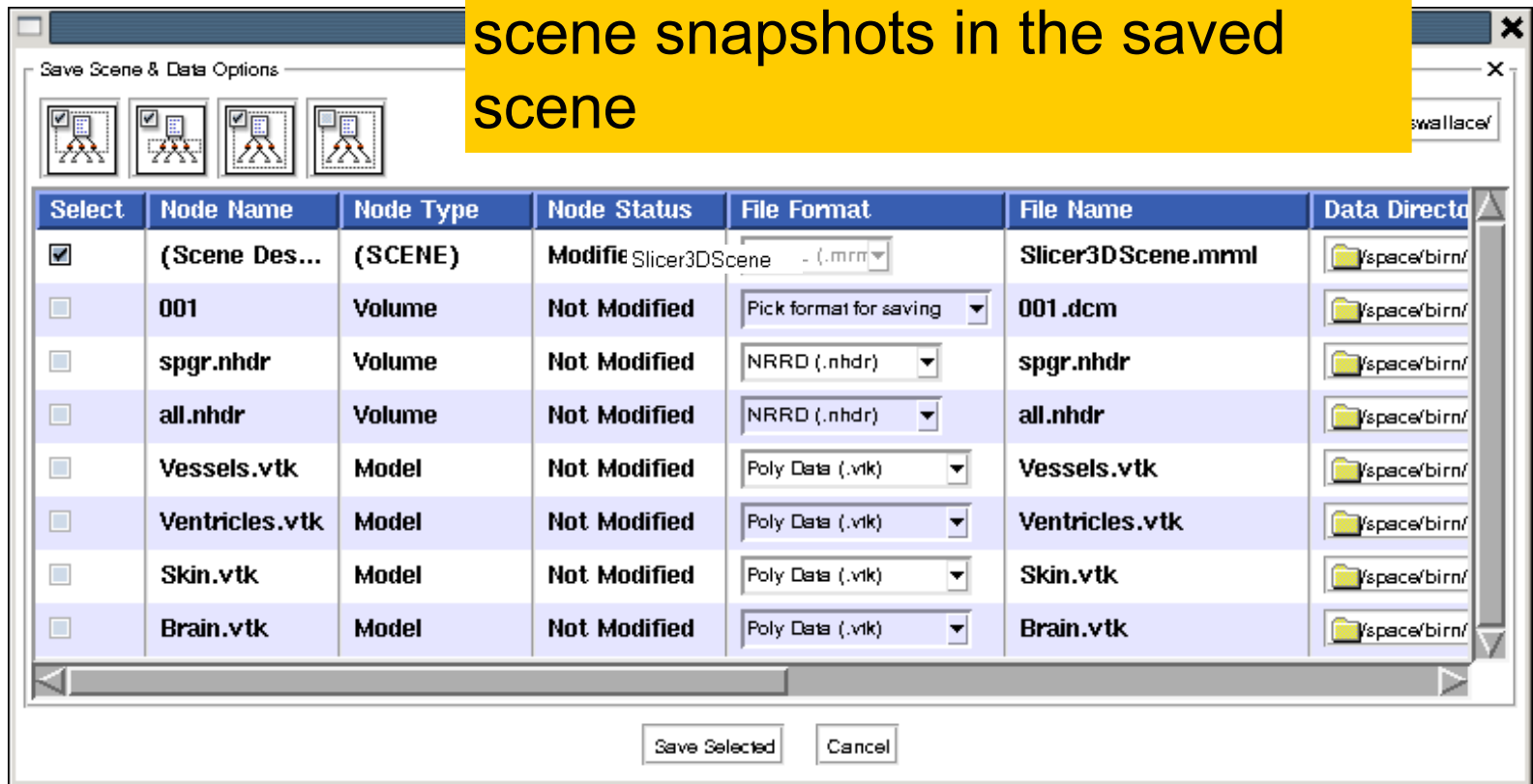
Creating Scene Snapshots

Enter the name
MySceneSnapshot2
and click on OK



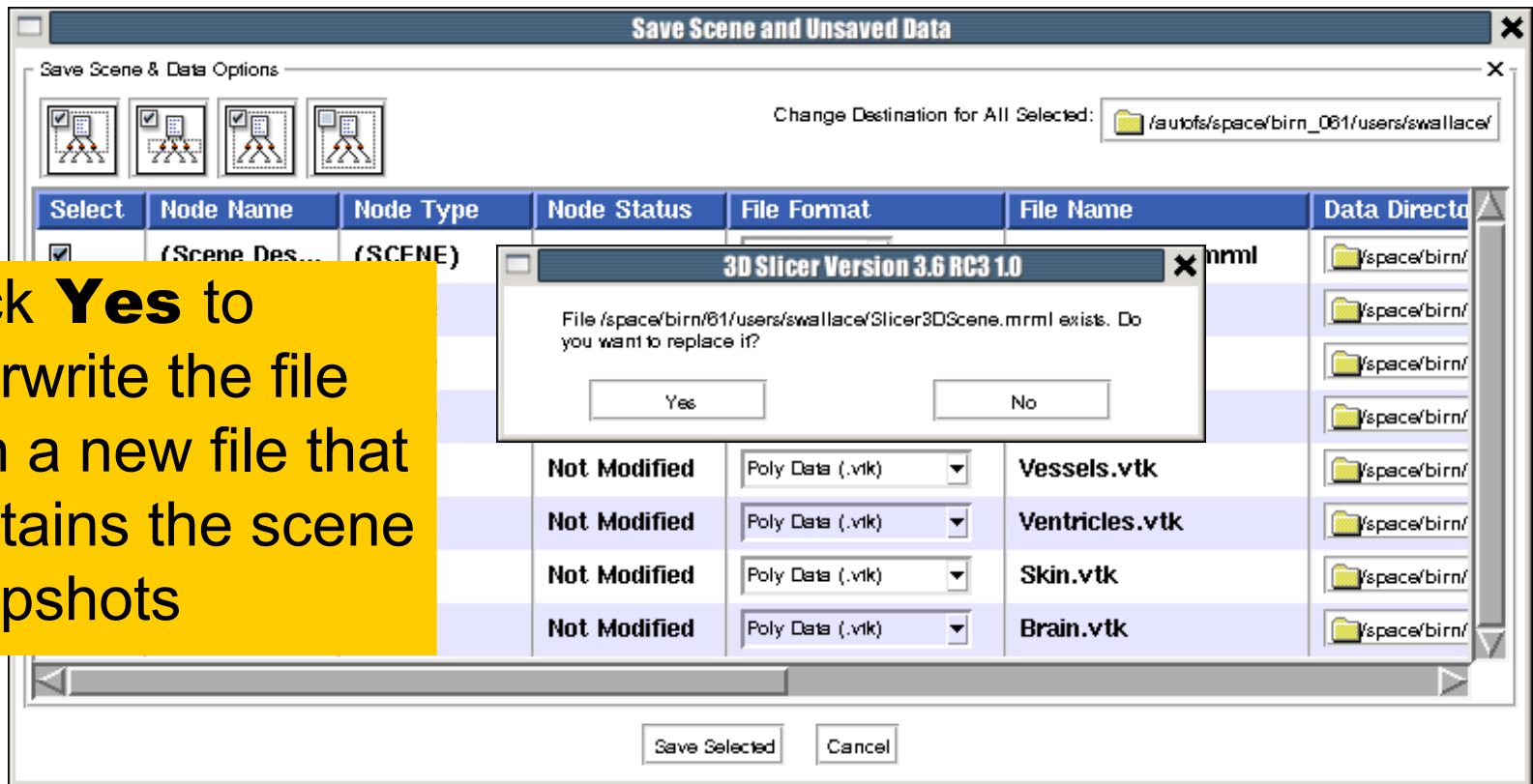
Creating Scene Snapshots

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



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_061/users/swallace/

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

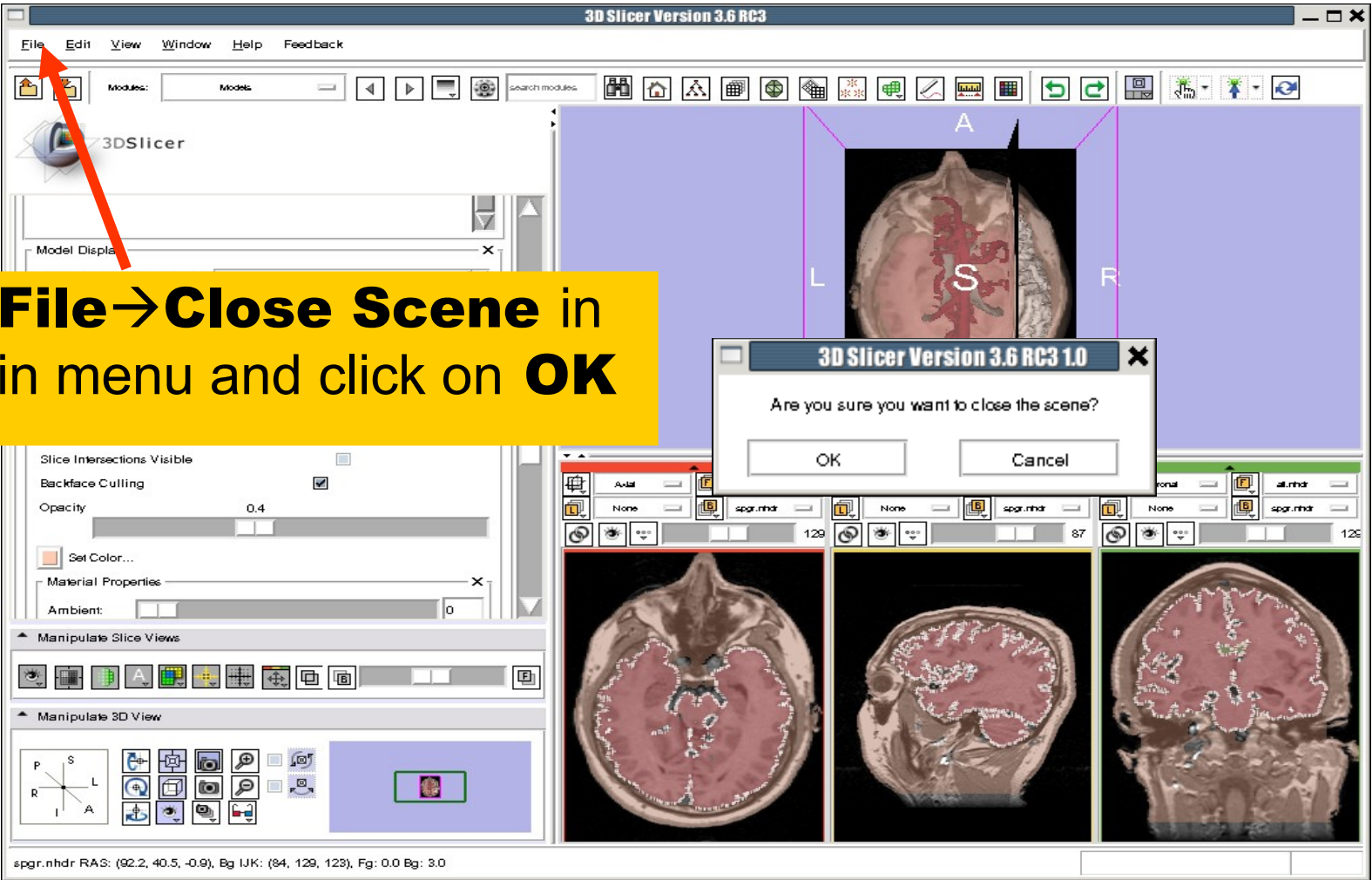
3D Slicer Version 3.6 RC3 1.0

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

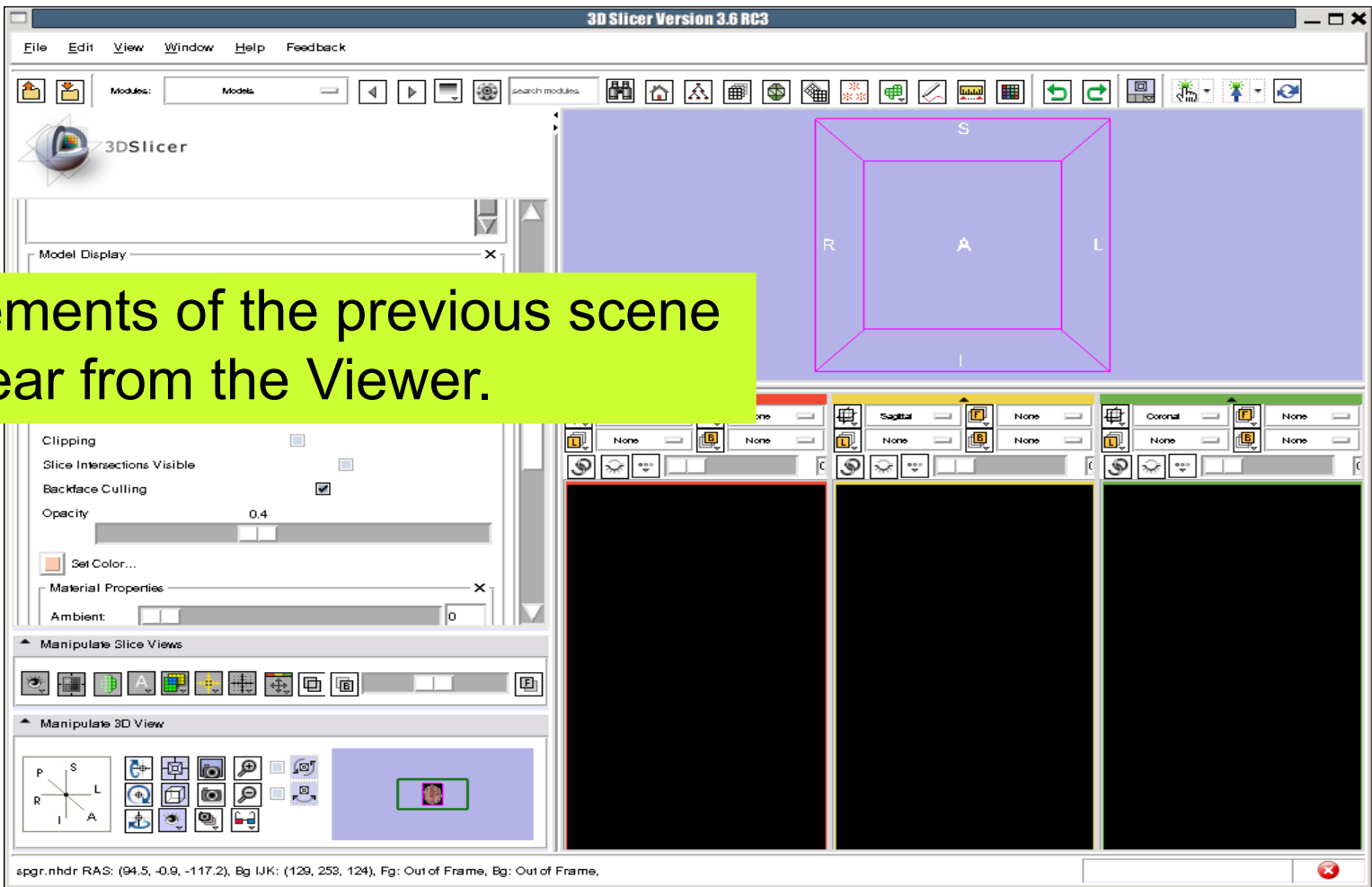
Yes No

Save Selected Cancel

Saving Data

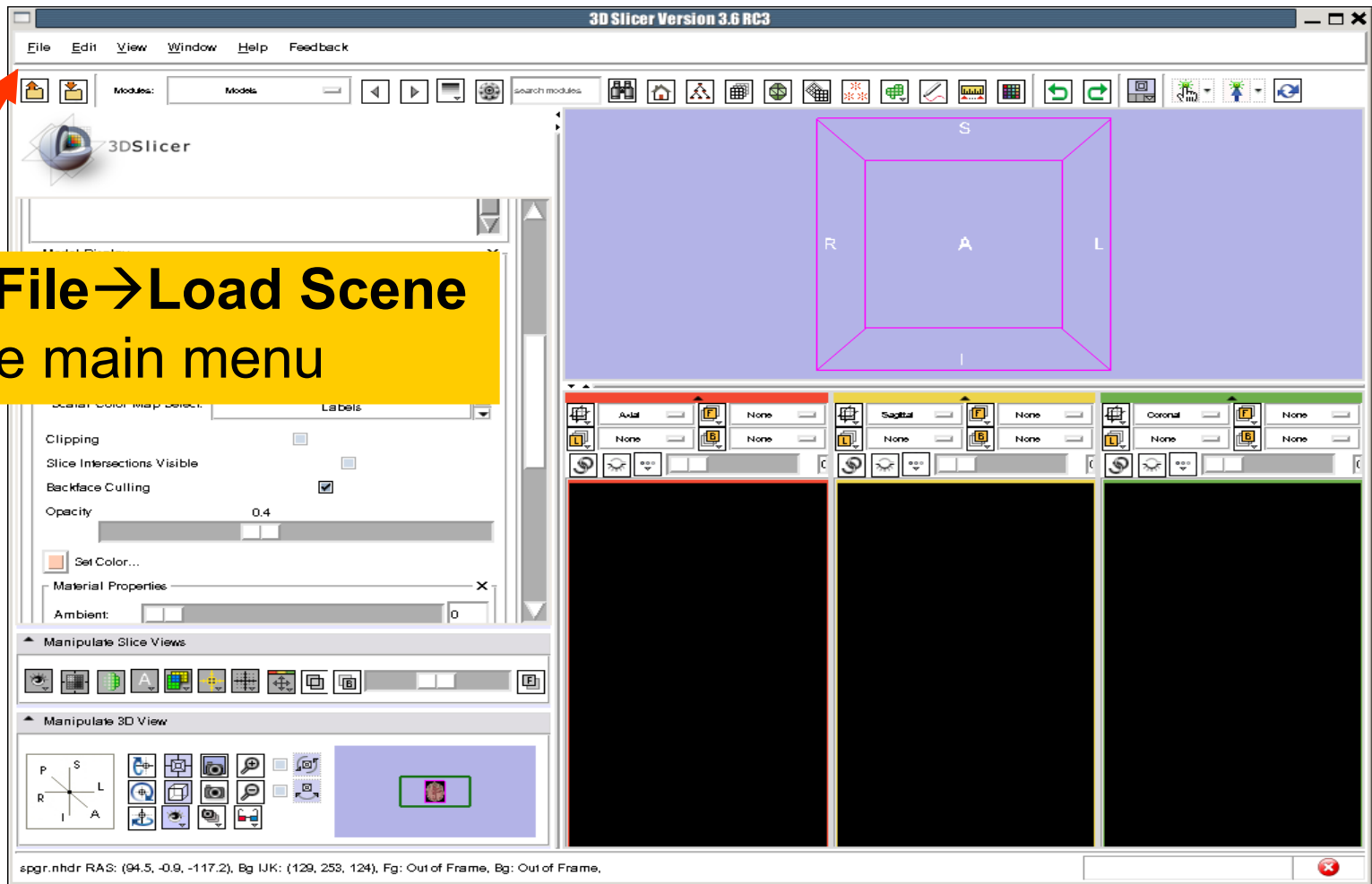


Saving Data



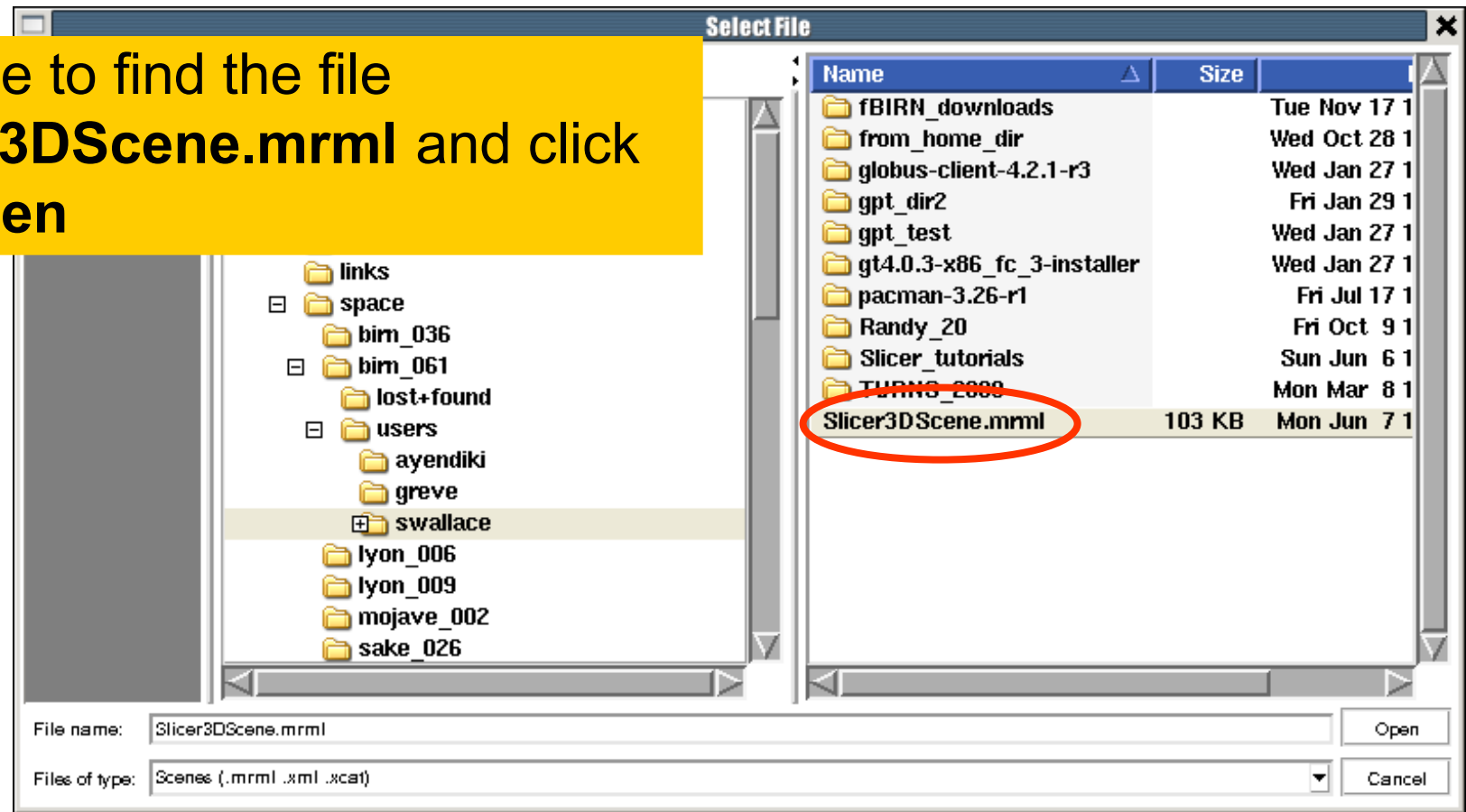
Saving Data

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

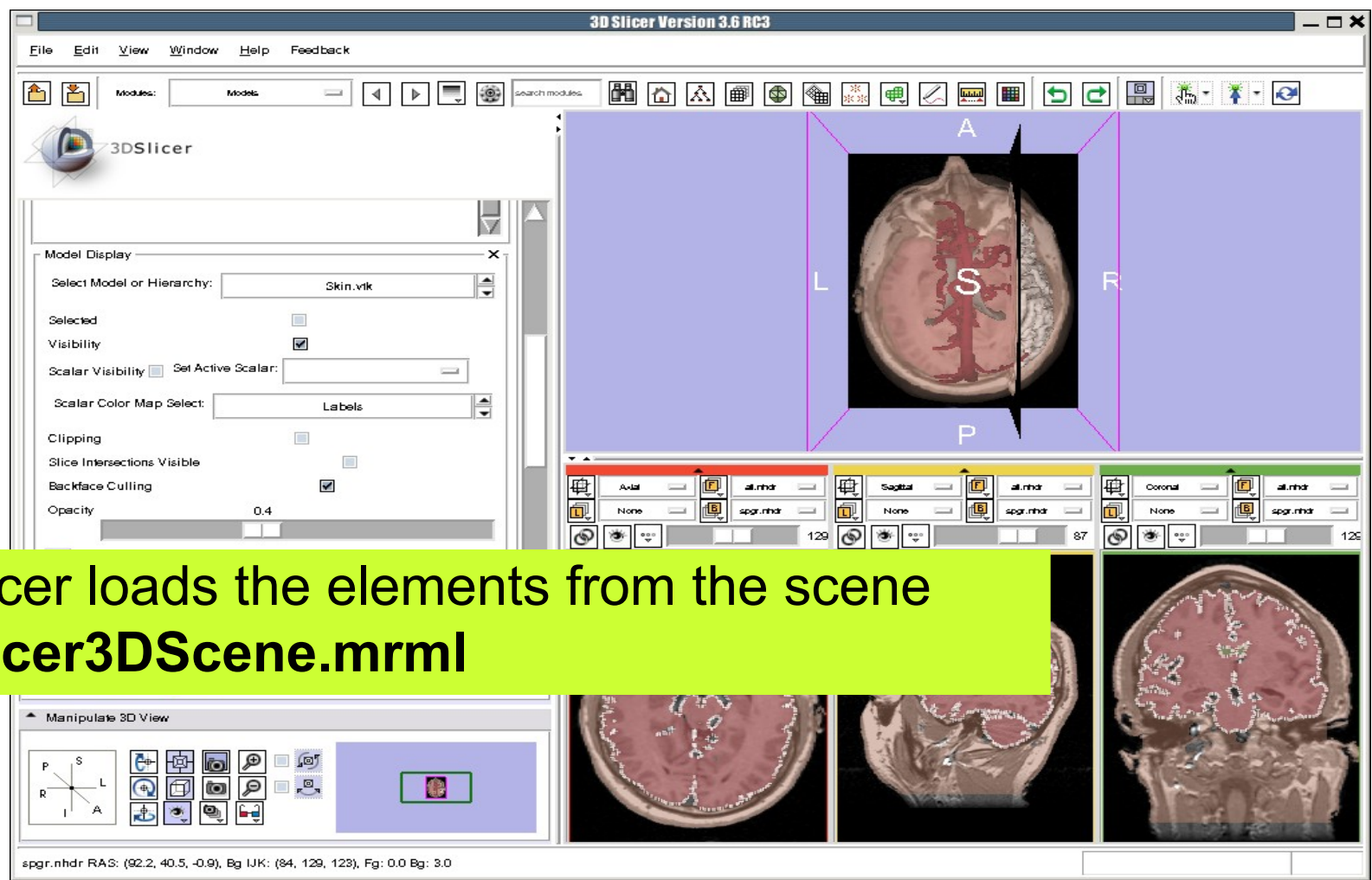


Saving Data

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

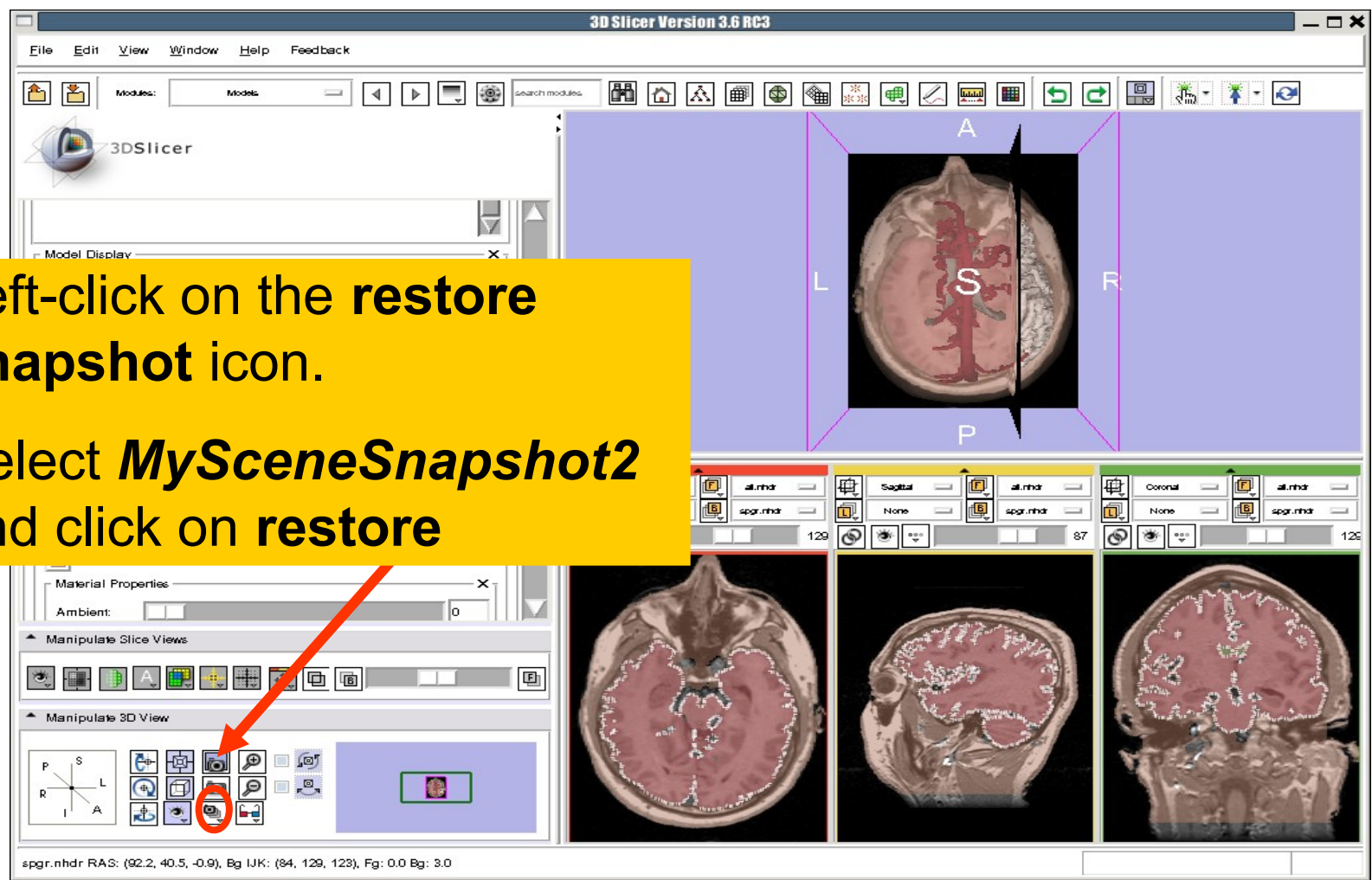


Loading a Scene



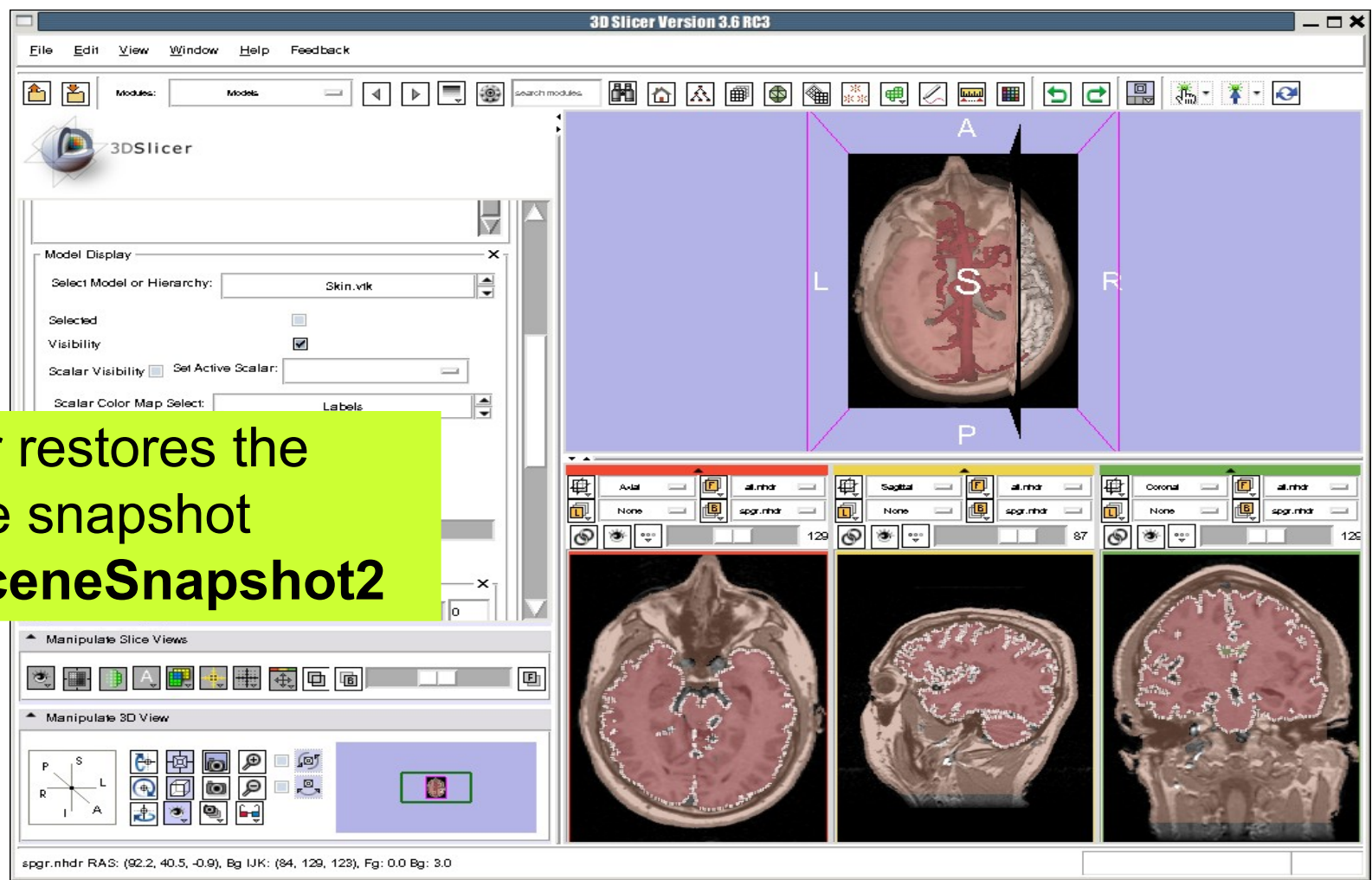
Slicer loads the elements from the scene
Slicer3DScene.mrml

Loading a Scene



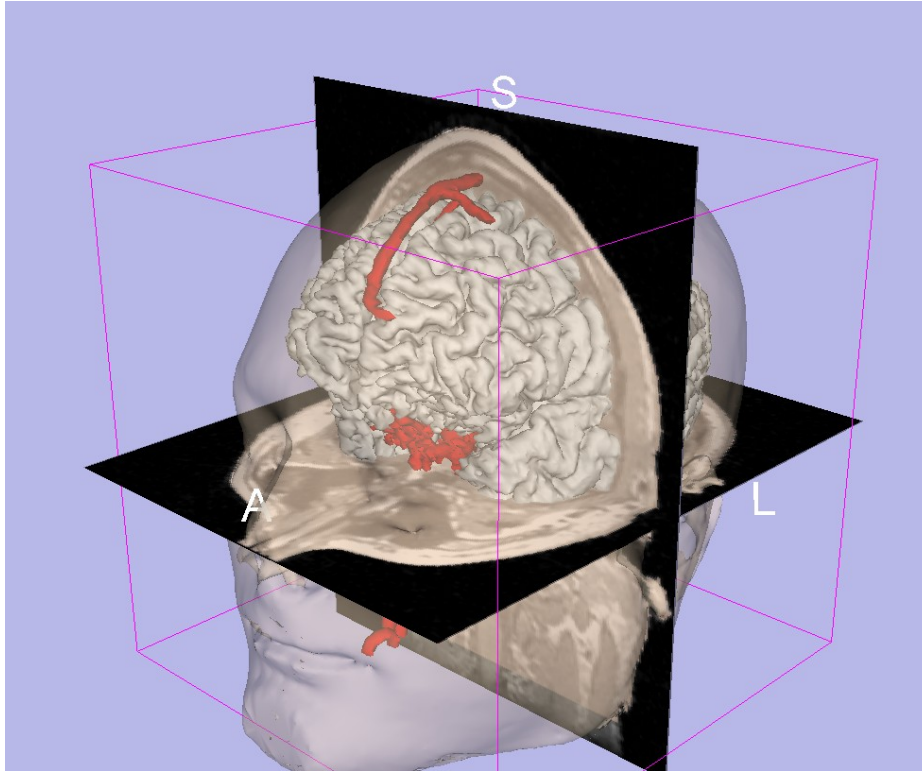
Left-click on the **restore snapshot** icon.
Select *MySceneSnapshot2* and click on **restore**

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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