

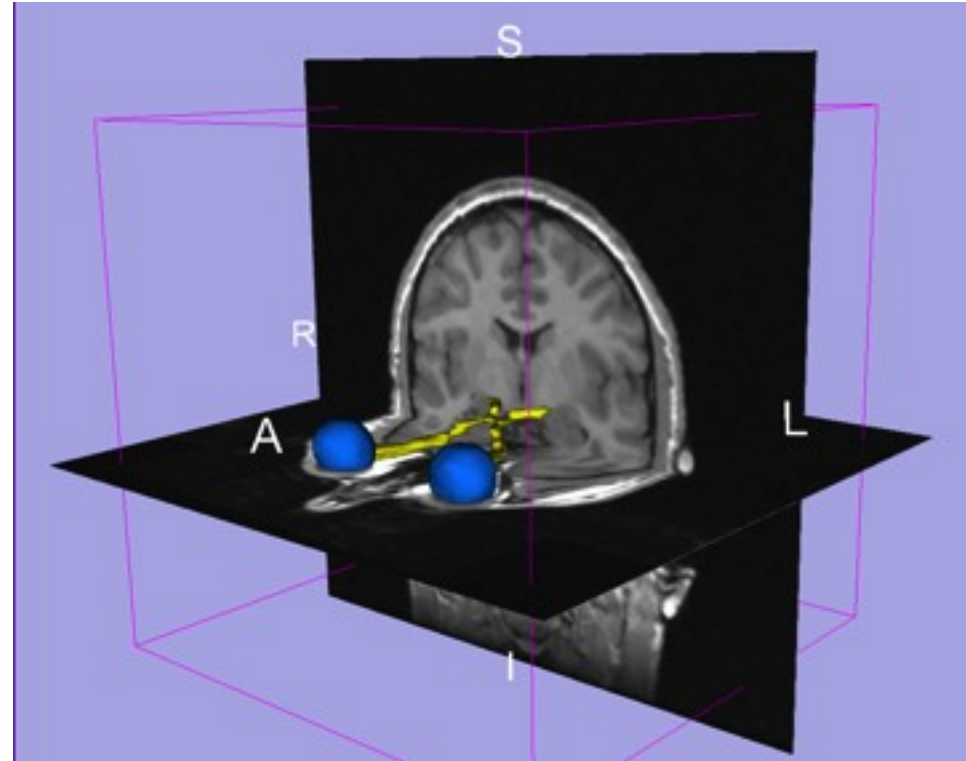
Slicer3 minute tutorial

Sonia Pujol, Ph.D.

Surgical Planning Laboratory
Harvard Medical School

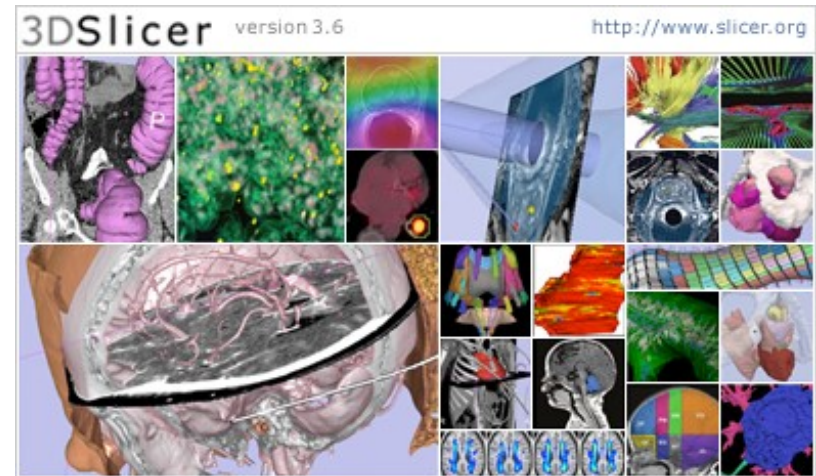
Slicer3 minute tutorial

This tutorial is a short introduction to the advanced **3D visualization** capabilities of the **Slicer3** software for medical image analysis.



The Slicer3 software

- 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





Download the material

Slicer3 is a **multi-platform** software running on **Windows, Linux, and Mac OSX.**

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

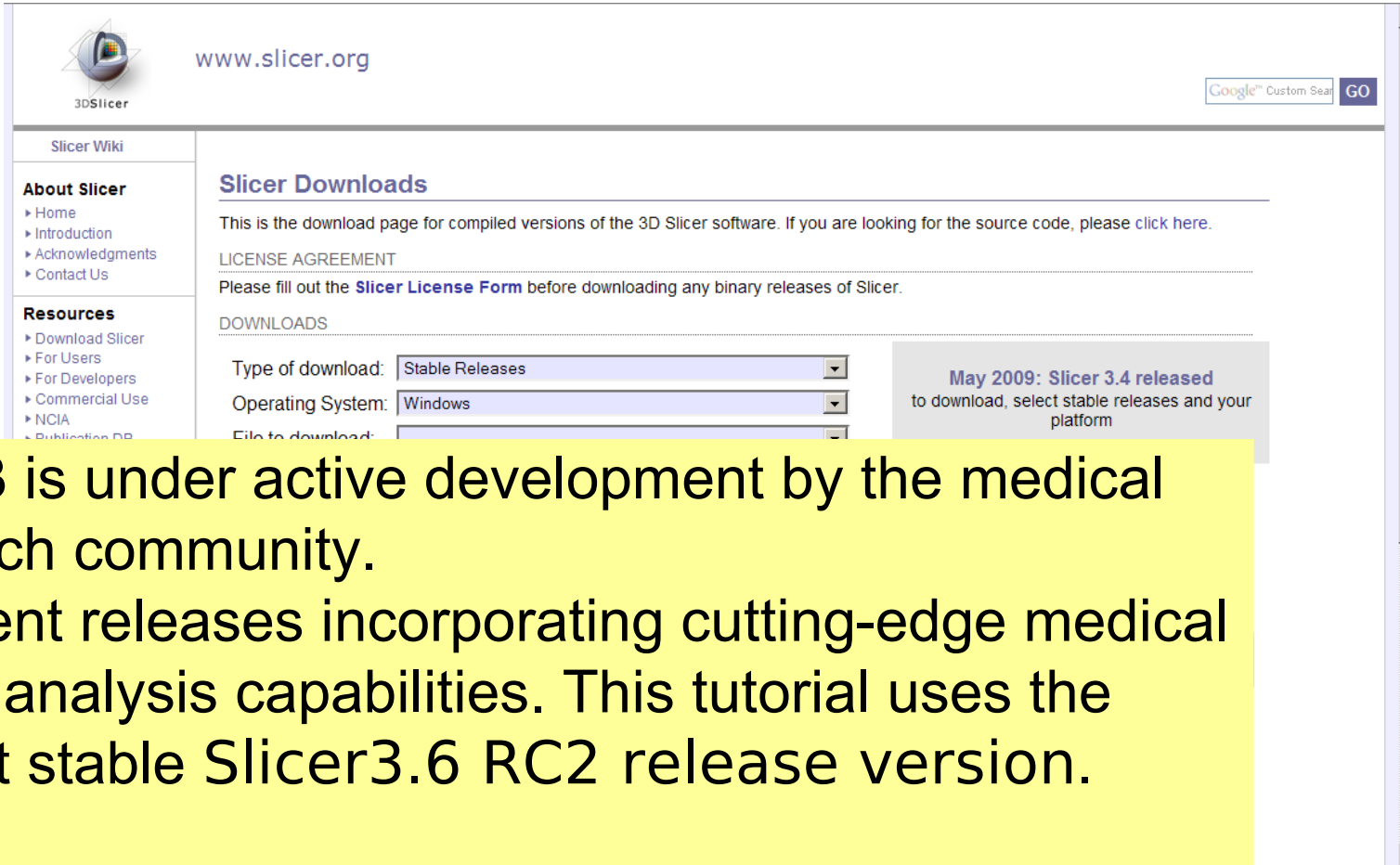
<http://www.slicer.org/pages/Special:SlicerDownloads>



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 3DSlicer website. The page header includes the 3DSlicer logo and the URL 'www.slicer.org'. A Google Custom Search bar is located in the top right. The left sidebar contains a 'Slicer Wiki' section with links to 'About Slicer' (Home, Introduction, Acknowledgments, Contact Us) and 'Resources' (Download Slicer, For Users, For Developers, Commercial Use, NCIA, Publication DB). The main content area is titled 'Slicer Downloads' and contains the following text: 'This is the download page for compiled versions of the 3D Slicer software. If you are looking for the source code, please [click here](#).' Below this is a 'LICENSE AGREEMENT' section with the text: 'Please fill out the [Slicer License Form](#) before downloading any binary releases of Slicer.' The 'DOWNLOADS' section features three dropdown menus: 'Type of download:' (set to 'Stable Releases'), 'Operating System:' (set to 'Windows'), and 'File to download:'. To the right of these menus is a grey box with the text: 'May 2009: Slicer 3.4 released to download, select stable releases and your platform'. A large yellow text box is overlaid on the bottom half of the screenshot, containing the following text: '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 RC2 release version.'

Download Slicer3.6



3DSlicer

www.slicer.org

Google™ Custom Search

Select the type of download
'Stable Releases'

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

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

DOWNLOADS

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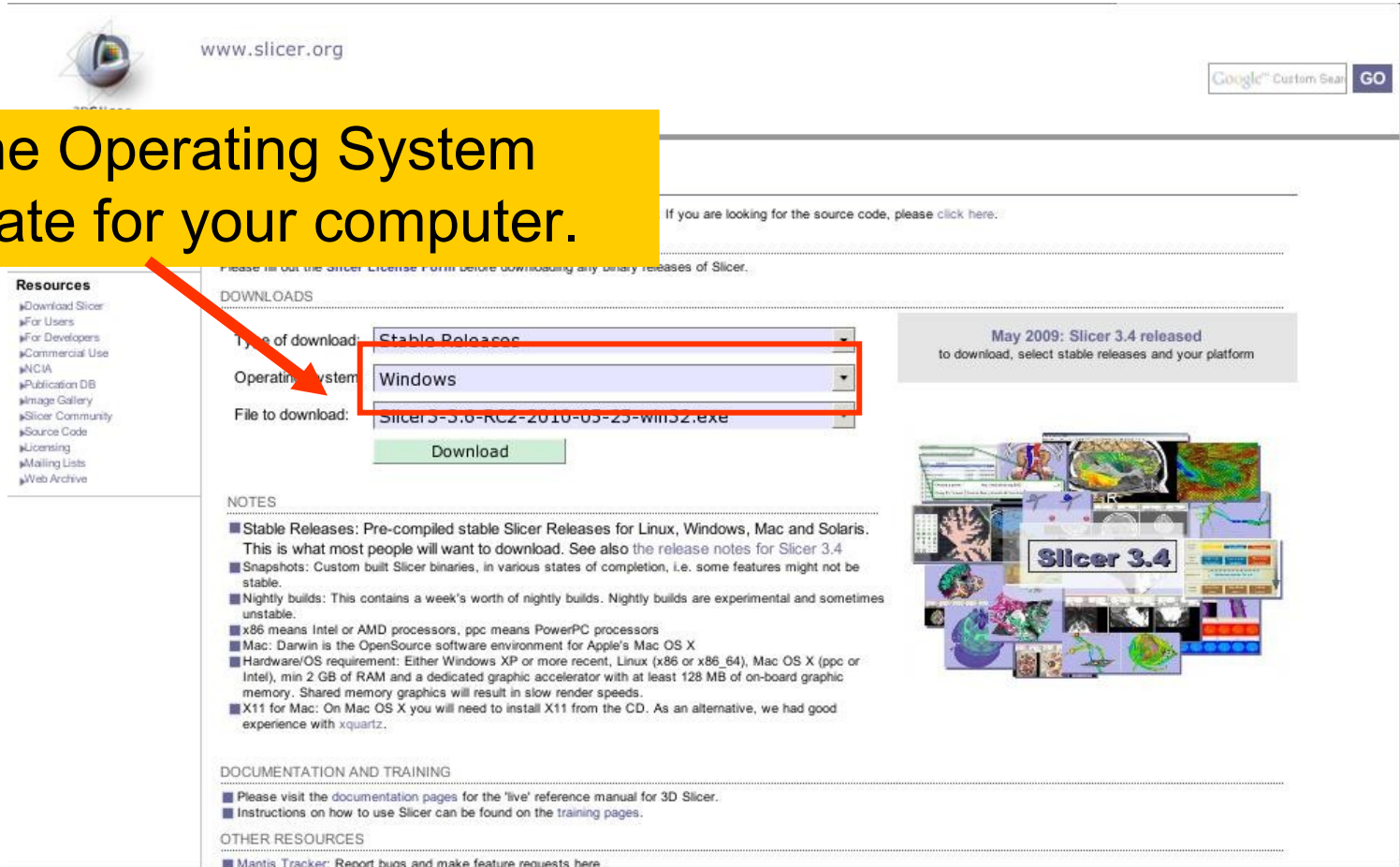
NOTES

- **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

Select the Operating System appropriate for your computer.



The screenshot shows the 'www.slicer.org' website. A yellow box with the text 'Select the Operating System appropriate for your computer.' has a red arrow pointing to the 'Operating system' dropdown menu in the 'DOWNLOADS' section. The dropdown menu is open, showing 'Windows' selected. Below it, the 'File to download:' field shows 'Slicer 3-3.6-RC2-2010-05-25-win32.exe' and a 'Download' button is visible. The 'Resources' sidebar on the left lists various links like 'Download Slicer', 'For Users', 'For Developers', etc. The 'NOTES' section contains information about stable releases, snapshots, and nightly builds. The 'DOCUMENTATION AND TRAINING' section provides links to manuals and training pages. The 'OTHER RESOURCES' section includes a link to the Mantis Tracker. A banner on the right mentions 'May 2009: Slicer 3.4 released'.

www.slicer.org

Google™ Custom Search GO

If you are looking for the source code, please click here:

Please fill out the Slicer License Form before downloading any binary releases of Slicer.

DOWNLOADS

Type of download: Stable Releases

Operating system: Windows

File to download: Slicer 3-3.6-RC2-2010-05-25-win32.exe

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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

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

Slicer 3.4

Download Slicer3.6

Select the Slicer3.6 release and click on Download.



The screenshot shows the 3DSlicer website's download page. A red arrow points from the yellow instruction box to the 'Download' button. The page includes a Google Custom Search bar, a 'Contact Us' link, and a 'Resources' sidebar with links like 'Download Slicer', 'For Users', 'For Developers', 'Commercial Use', 'NCIA', 'Publication DB', 'Image Gallery', 'Slicer Community', 'Source Code', 'Licensing', 'Mailing Lists', and 'Web Archive'. The main content area has a 'DOWNLOADS' section with a license form, a 'Type of download' dropdown set to 'Stable Releases', an 'Operating system' dropdown set to 'Windows', and a 'File to download' dropdown set to 'Slicer3-3.6-RC2-2010-05-25-win32.exe'. A 'Download' button is below these. To the right, a grey box announces 'May 2009: Slicer 3.4 released to download, select stable releases and your platform'. Below this is a collage of images labeled 'Slicer 3.4'. The 'NOTES' section provides details about stable releases, snapshots, nightly builds, and hardware requirements. The 'DOCUMENTATION AND TRAINING' section links to the live reference manual and training pages. The 'OTHER RESOURCES' section links to the Mantis Tracker for bug reports and feature requests.

Google™ Custom Search GO

looking for the source code, please click here:

[Contact Us](#)

Resources

- [Download Slicer](#)
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- [For Developers](#)
- [Commercial Use](#)
- [NCIA](#)
- [Publication DB](#)
- [Image Gallery](#)
- [Slicer Community](#)
- [Source Code](#)
- [Licensing](#)
- [Mailing Lists](#)
- [Web Archive](#)

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Slicer 3.4

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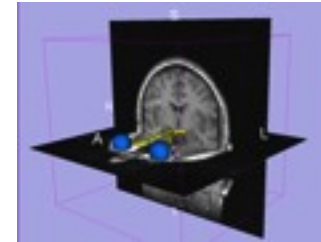
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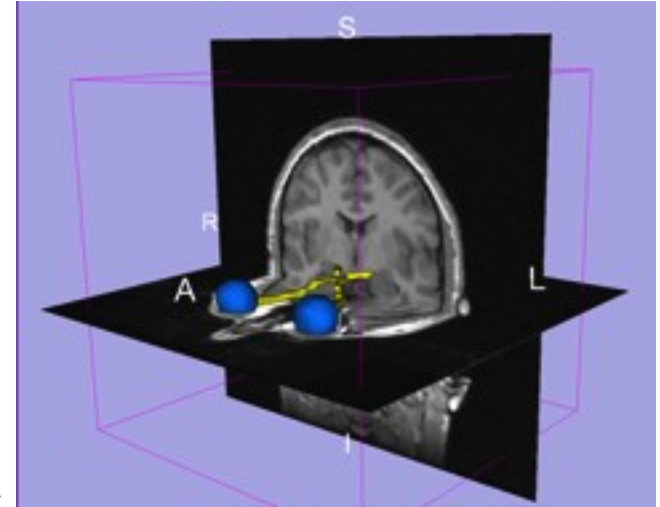
- Download the training dataset:
Slicer3minuteDataset.zip



<http://www.slicer.org/slicerWiki/index.php/Slicer3.6:Training>

Tutorial Dataset

- The Slicer3minute dataset is composed of an **MR scan** of the brain and **3D surface reconstructions** of anatomical structures.
- The data are part of the SPL Brain Atlas developed by Talos et al. The atlas is available at:
<http://www.spl.harvard.edu/publications/item/view/1265>

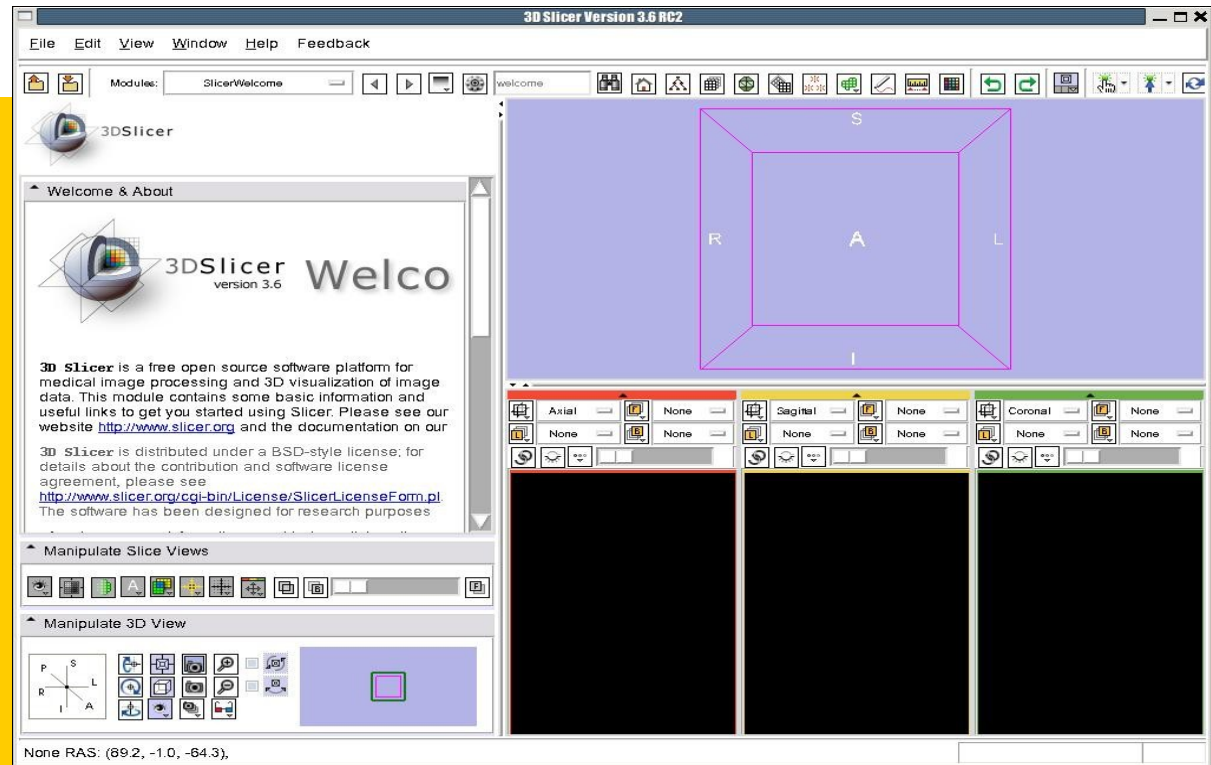




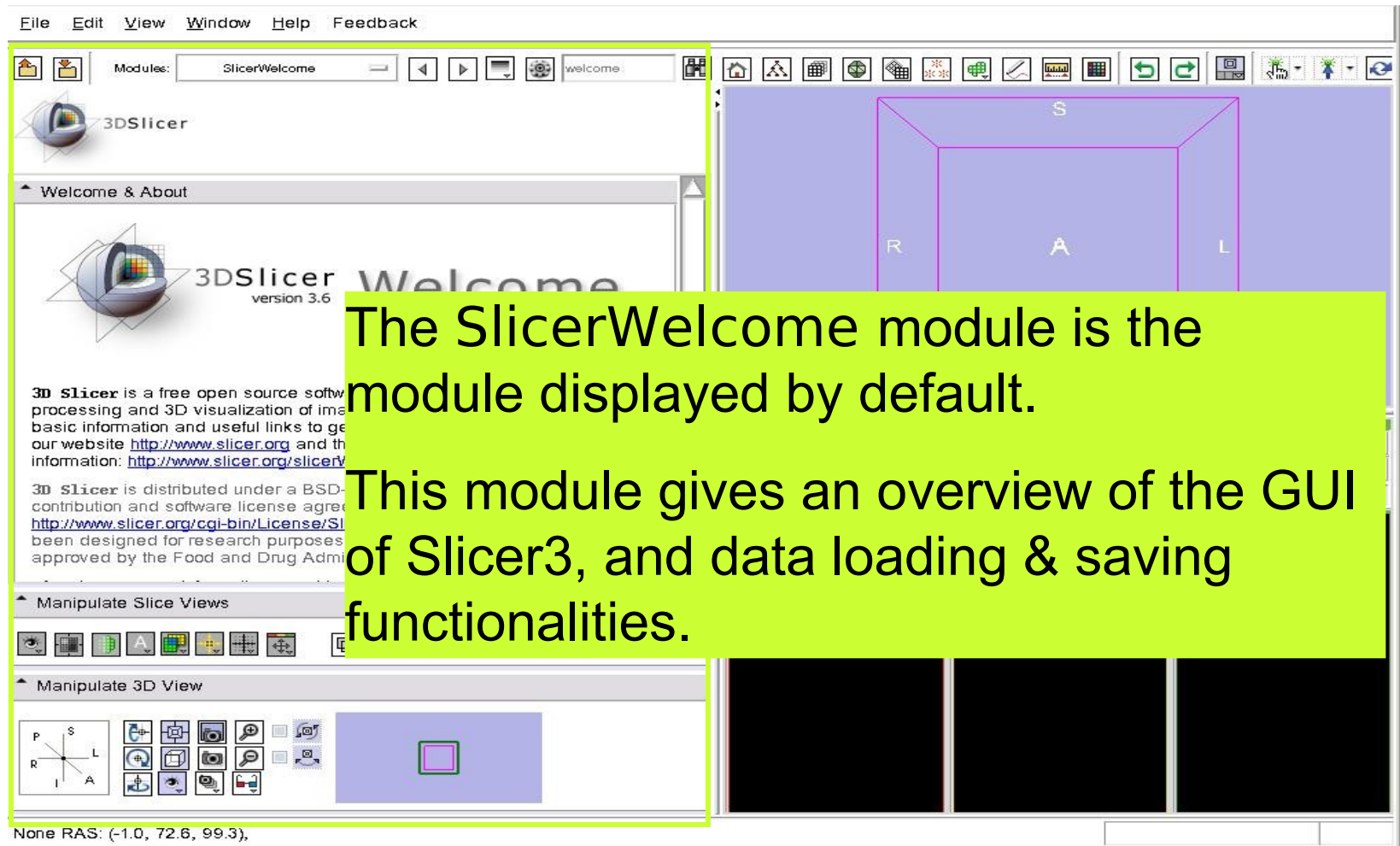
Start Slicer3

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

Windows users
Select
Start → All Programs
→ Slicer3 3.6-RC2 2010-05-
25 → Slicer3

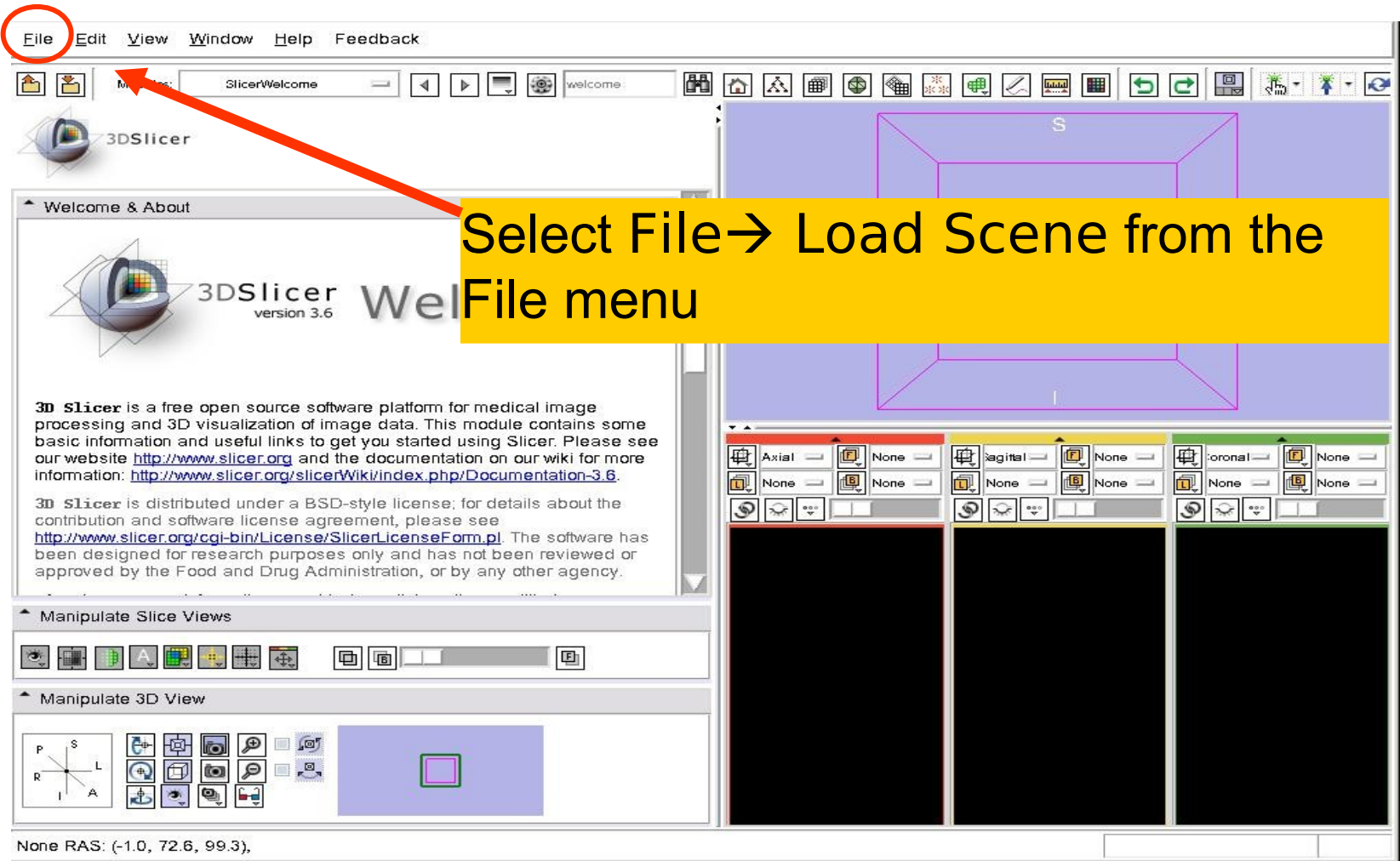


Slicer Welcome

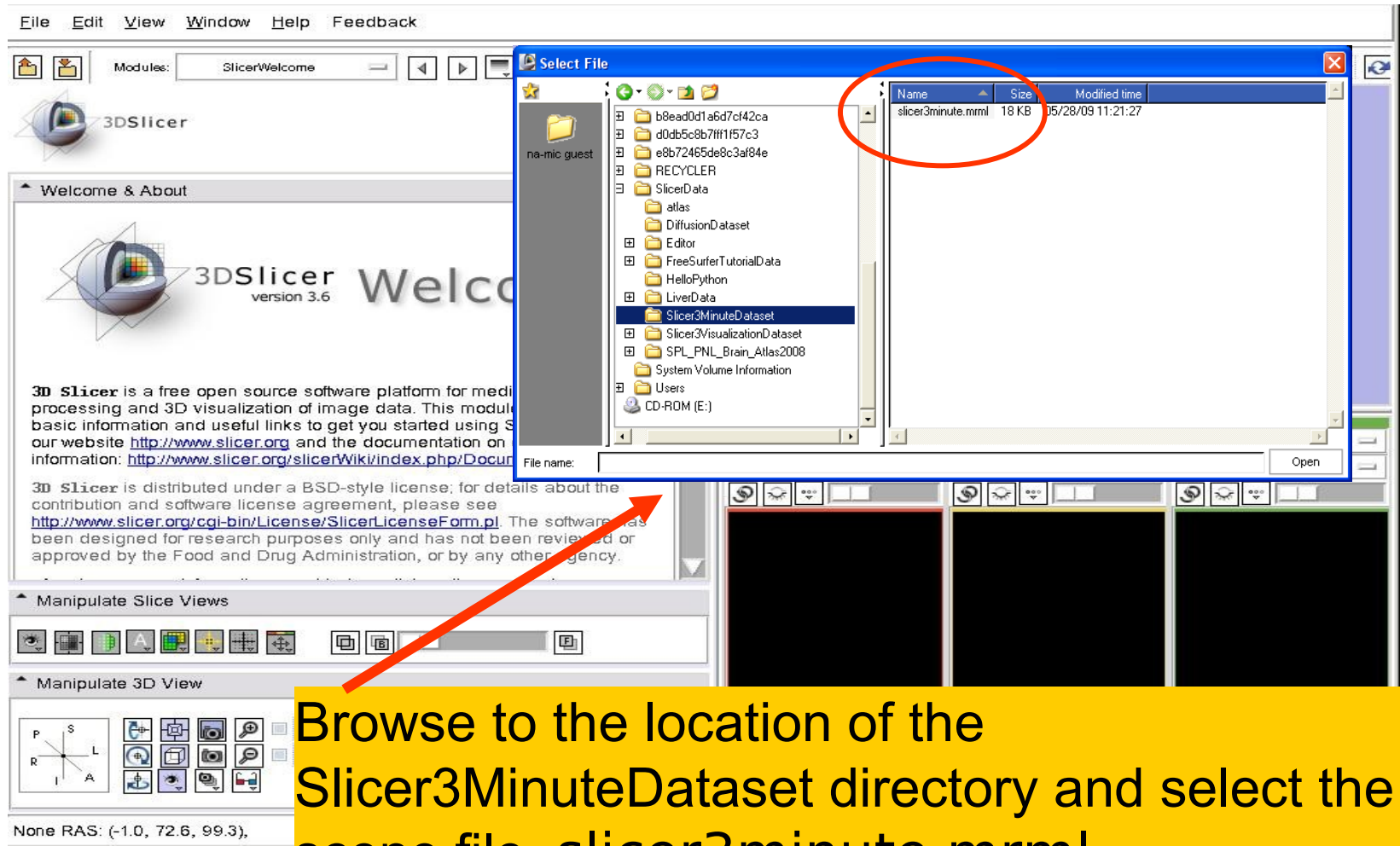




Loading a 3D Scene



Loading a 3D Scene

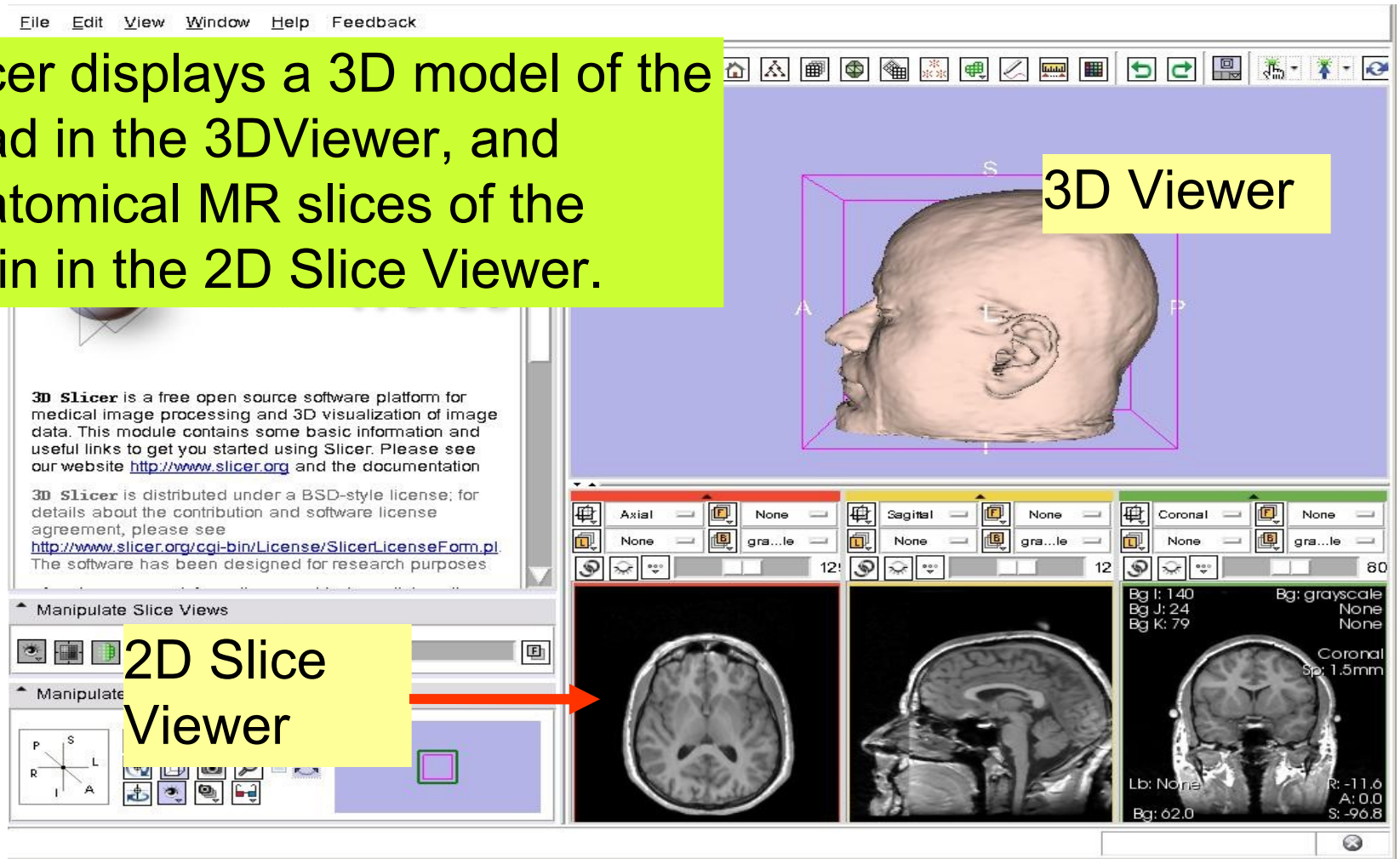


Browse to the location of the Slicer3MinuteDataset directory and select the scene file `slicer3minute.mrml`

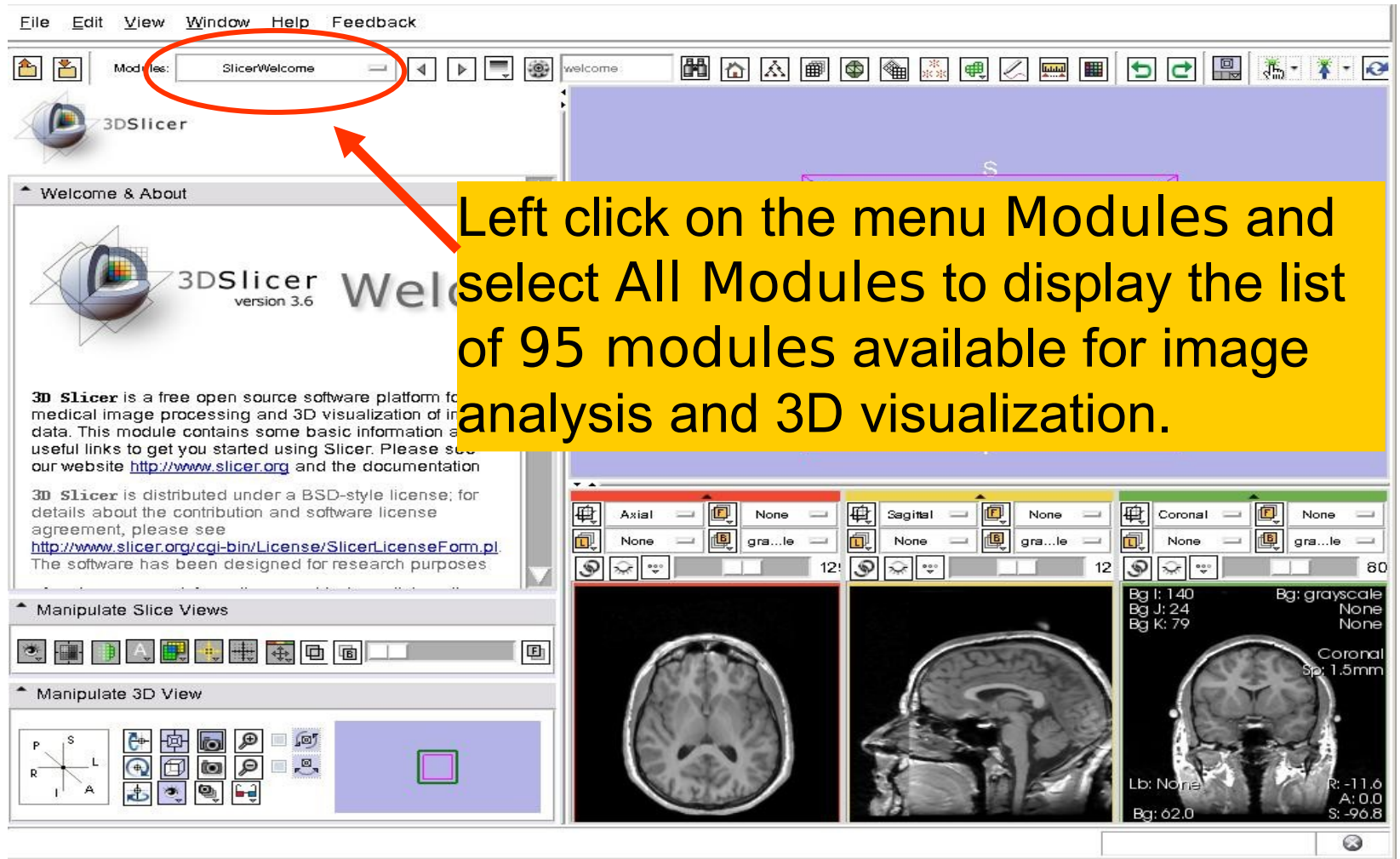
Click on Open to load the scene

Loading a 3D Scene

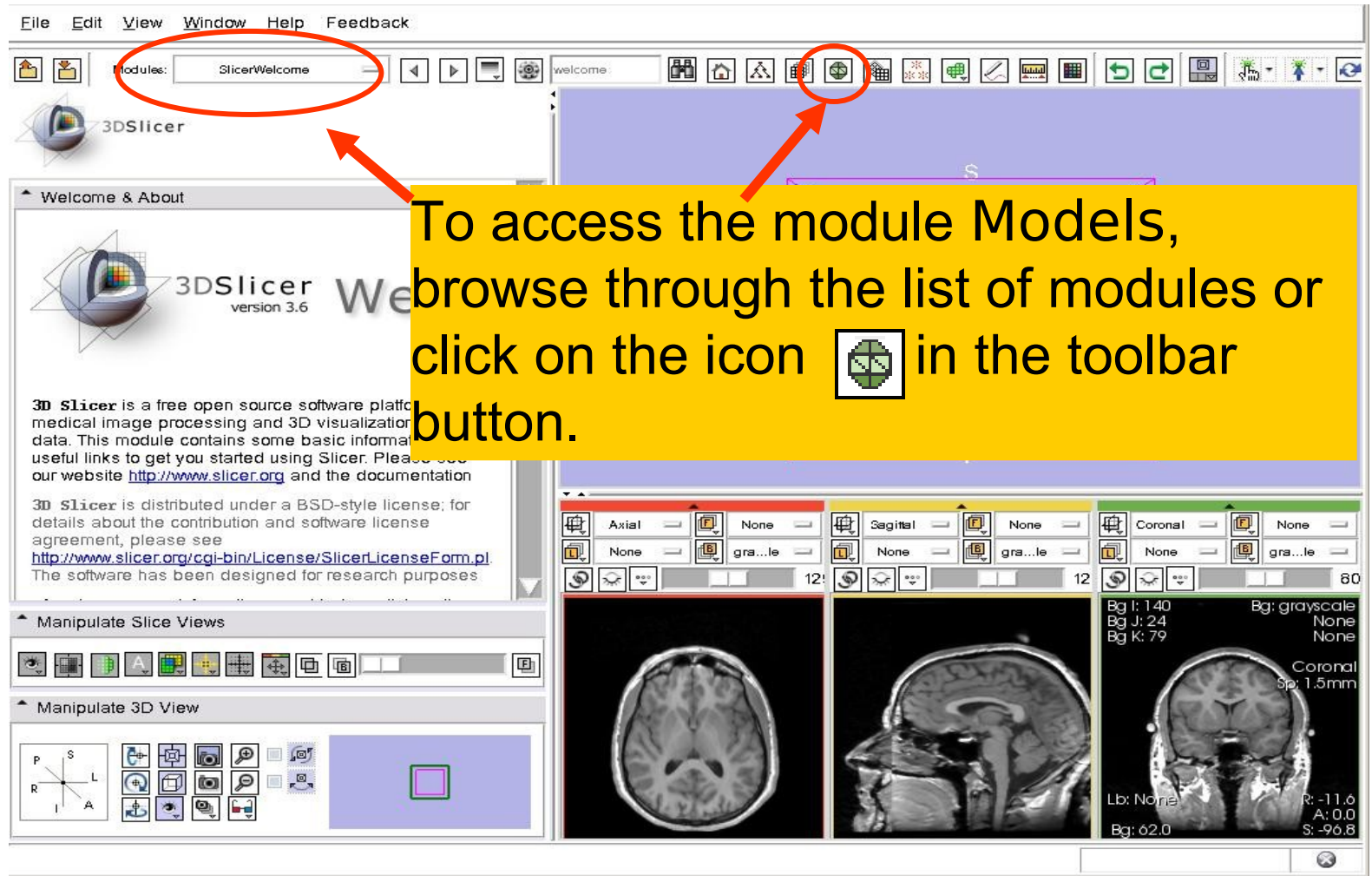
Slicer displays a 3D model of the head in the 3D Viewer, and anatomical MR slices of the brain in the 2D Slice Viewer.



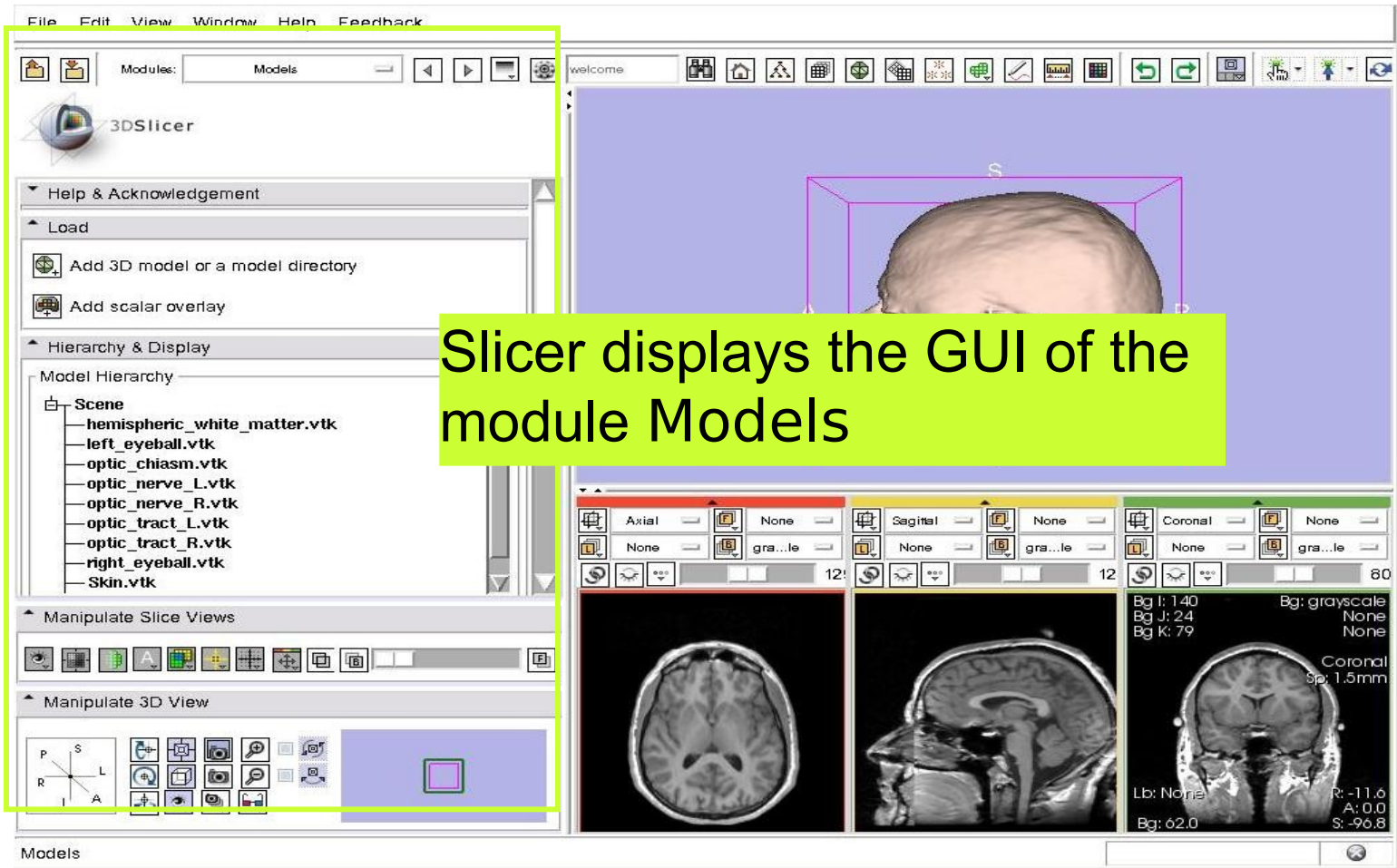
Loading a 3D Scene



Loading a 3D Scene

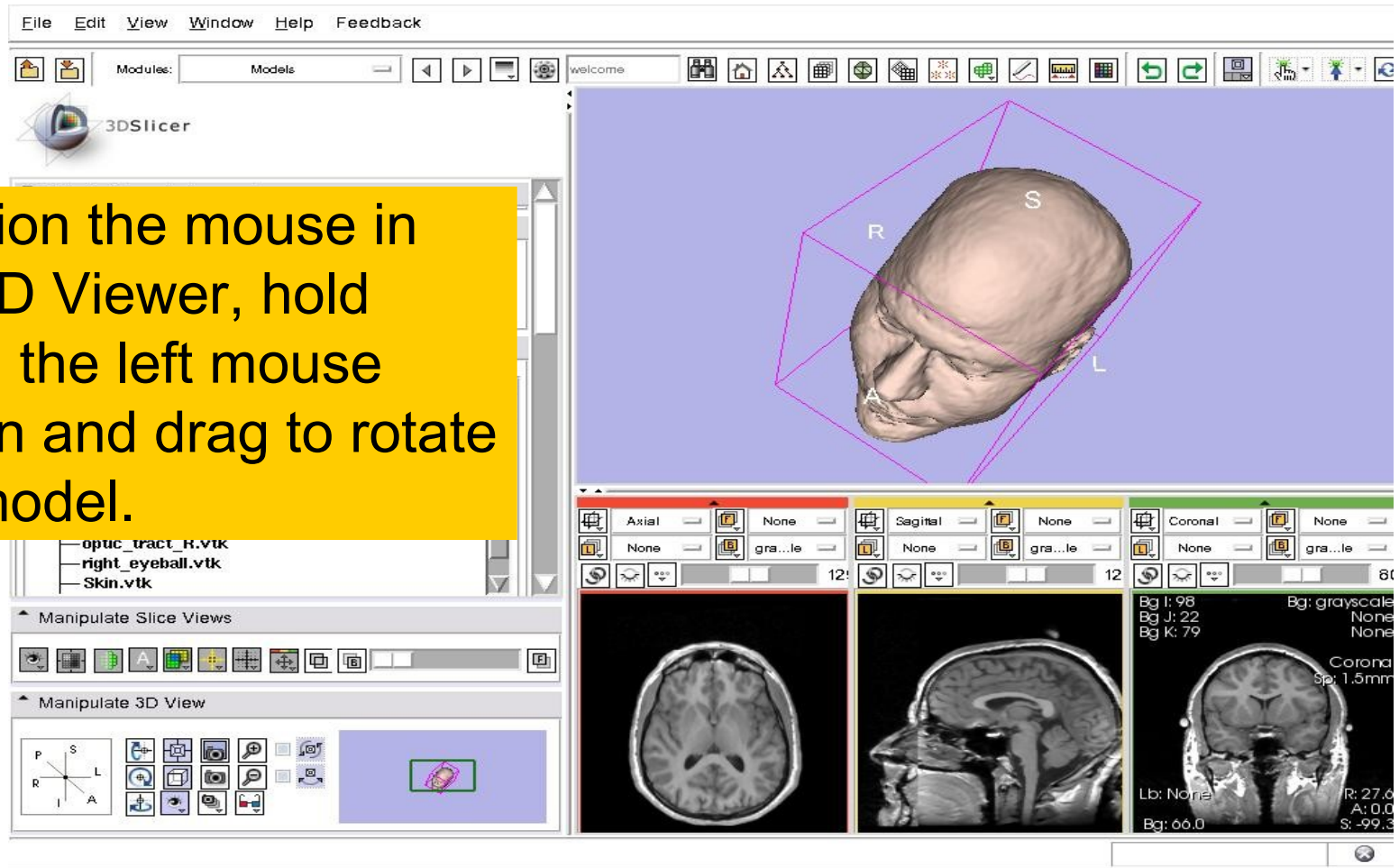


Loading a 3D Scene




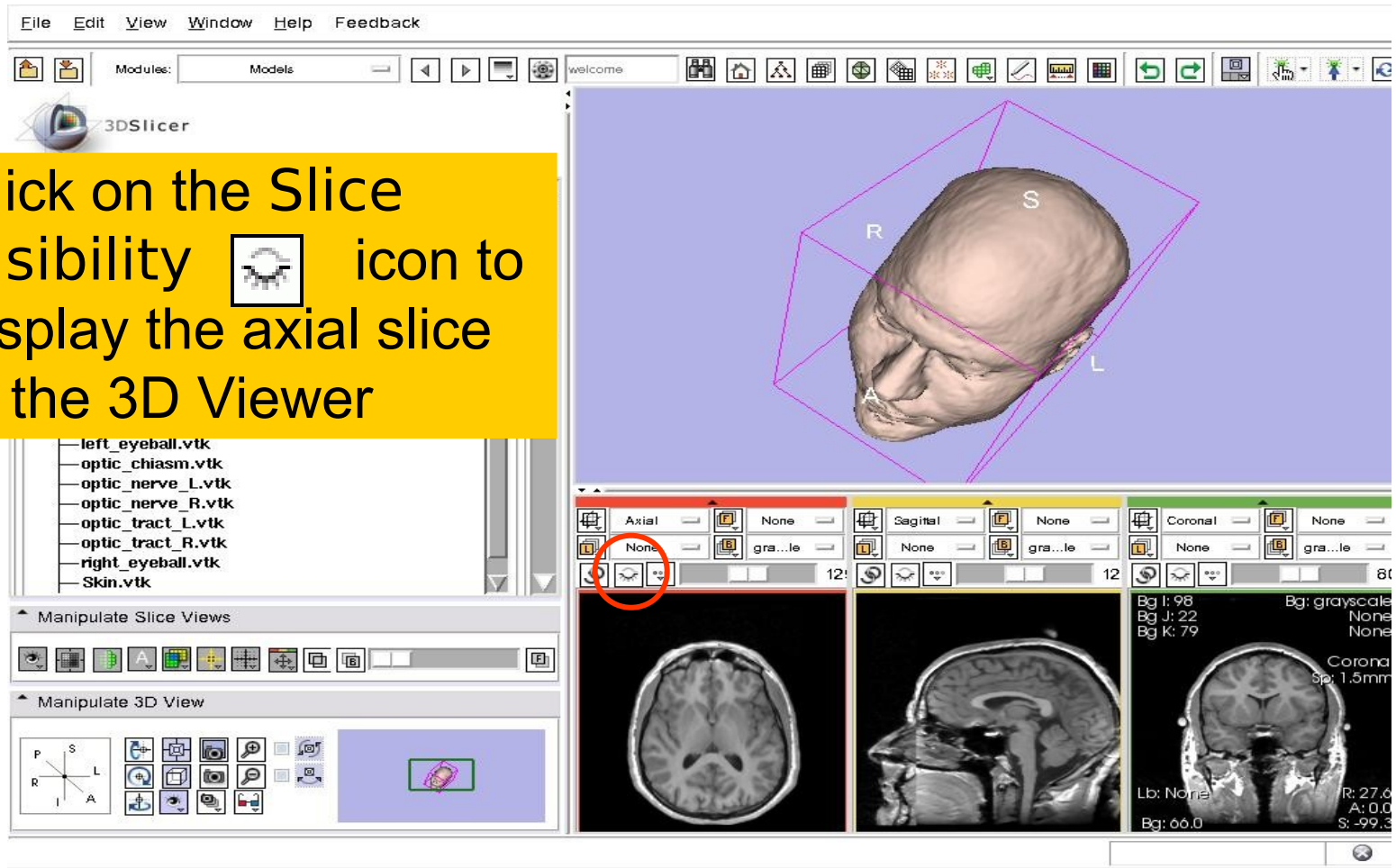
3D Visualization

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



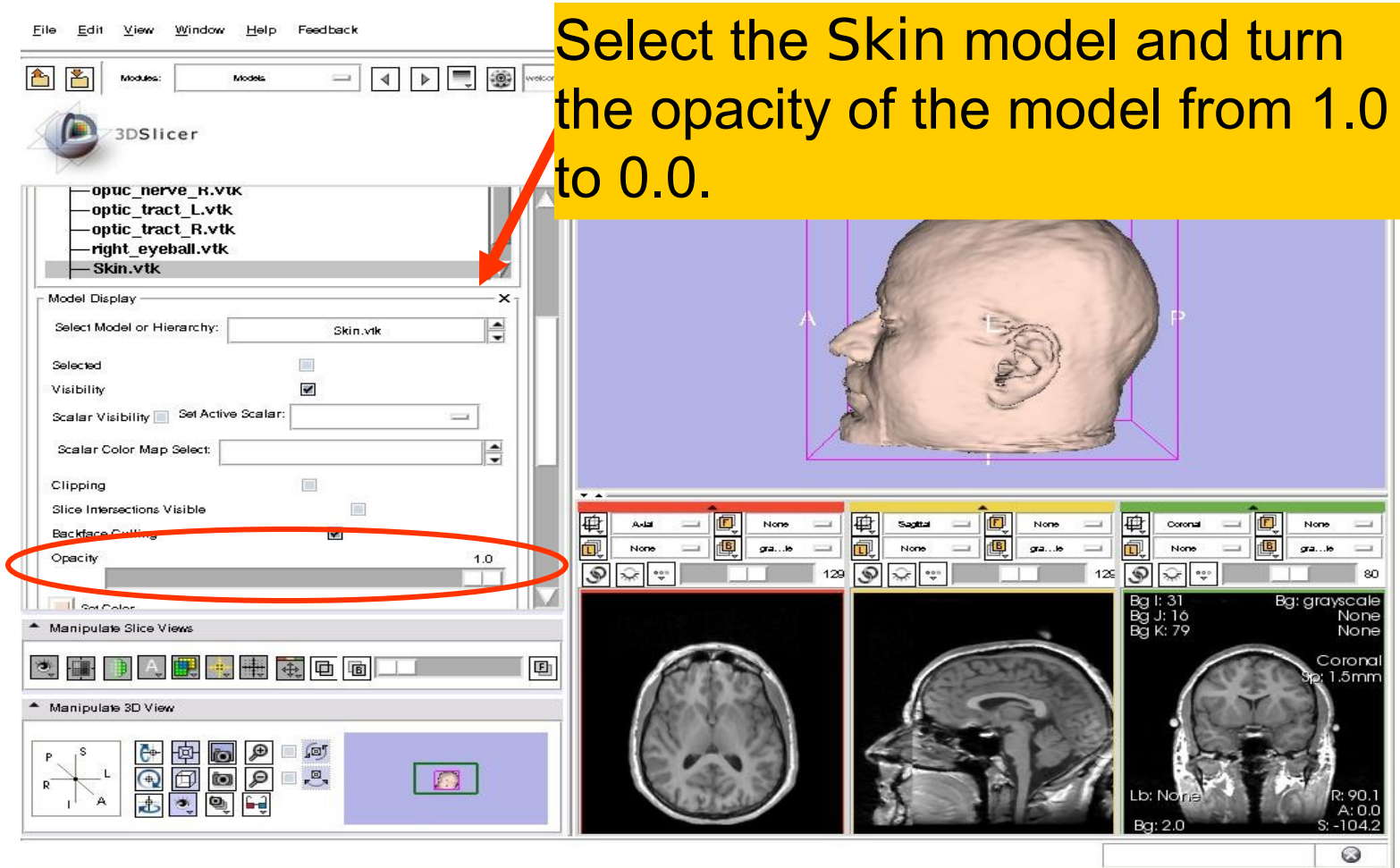
3D Visualization

Click on the Slice Visibility  icon to display the axial slice in the 3D Viewer



3D Visualization

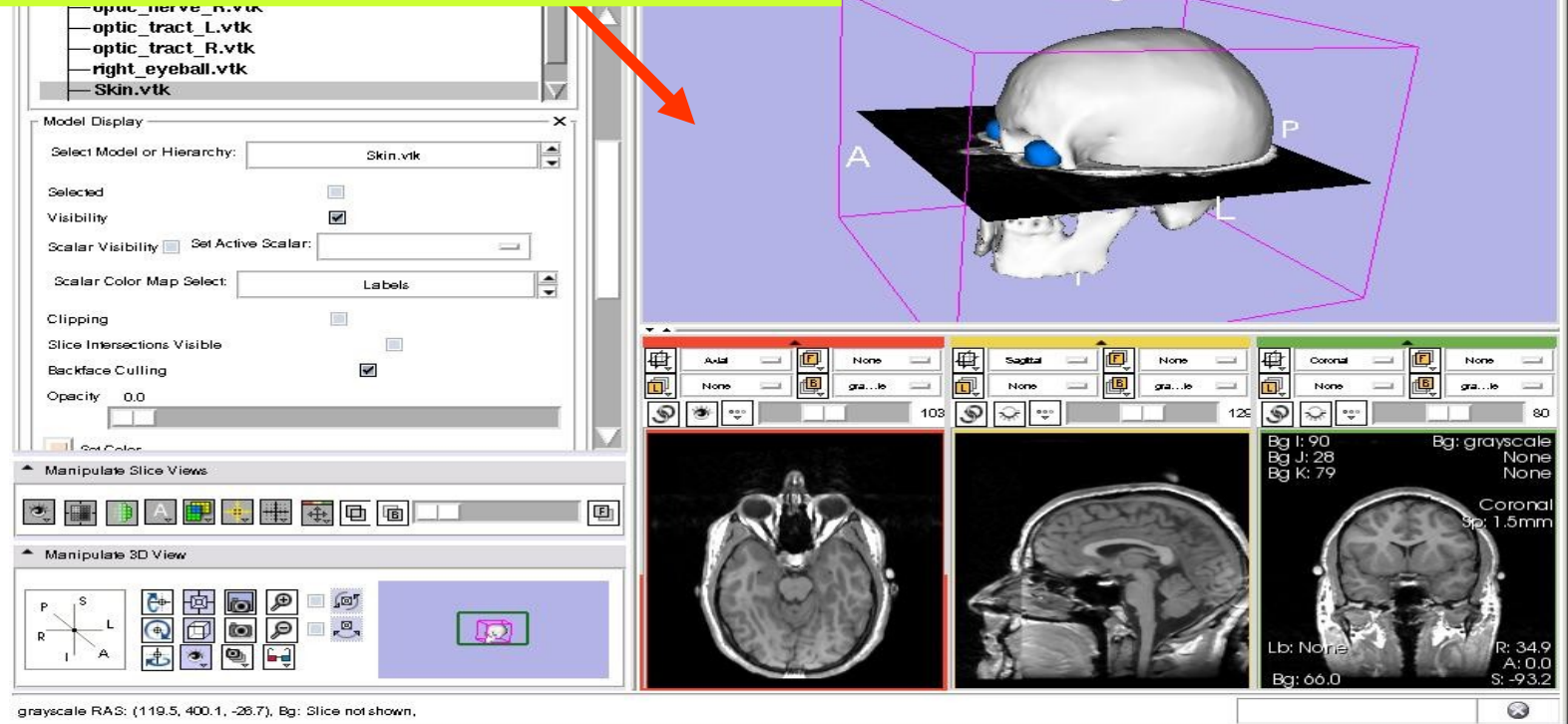
Select the Skin model and turn the opacity of the model from 1.0 to 0.0.



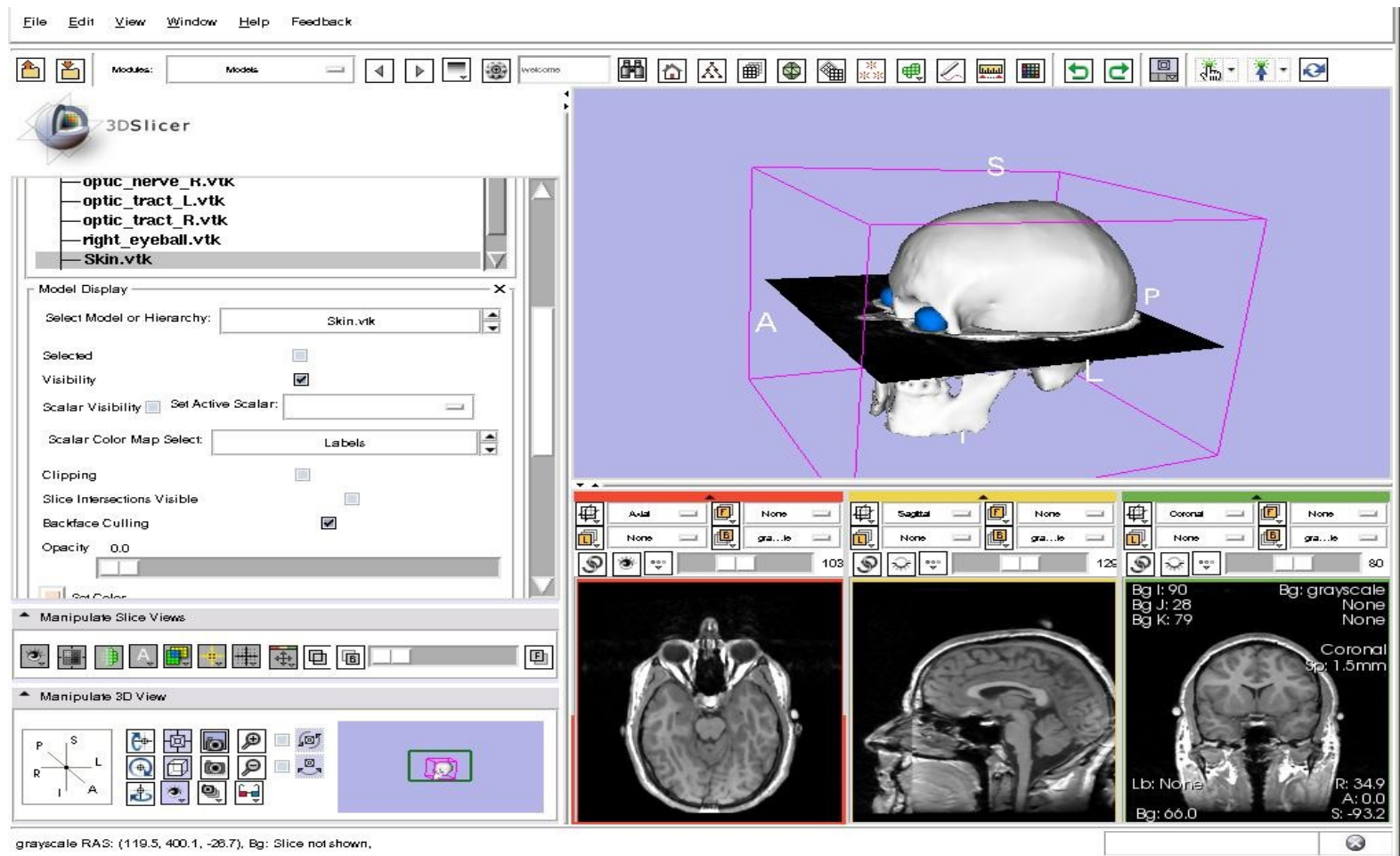
The screenshot shows the 3DSlicer interface. On the left, the 'Models' list contains several files, with 'Skin.vtk' selected. Below this, the 'Model Display' panel shows 'Skin.vtk' as the selected model. The 'Opacity' slider is set to 1.0. A red arrow points from the 'Skin.vtk' model in the list to the 'Model Display' panel. A red circle highlights the 'Opacity' slider. On the right, a 3D visualization of a head model is shown. Below the 3D view, there are three slice views: Axial, Sagittal, and Coronal. The Coronal slice view shows a brain slice with a 1.5mm thickness. The bottom right corner displays coordinates: R: 90.1, A: 0.0, S: -104.2.

3D Visualization

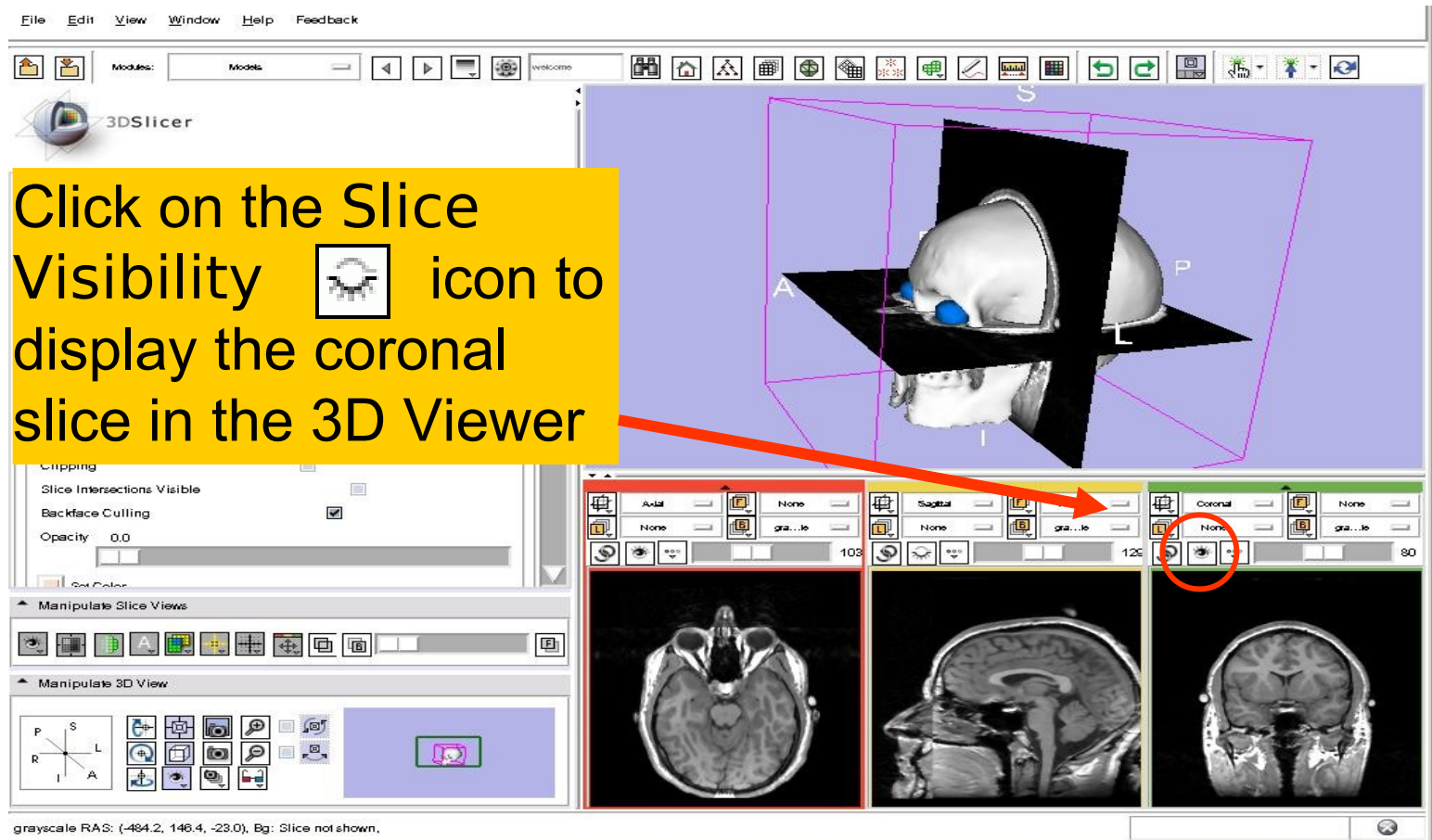
The model of the skull bone and eyeballs appear through the model of the skin in the 3D viewer.



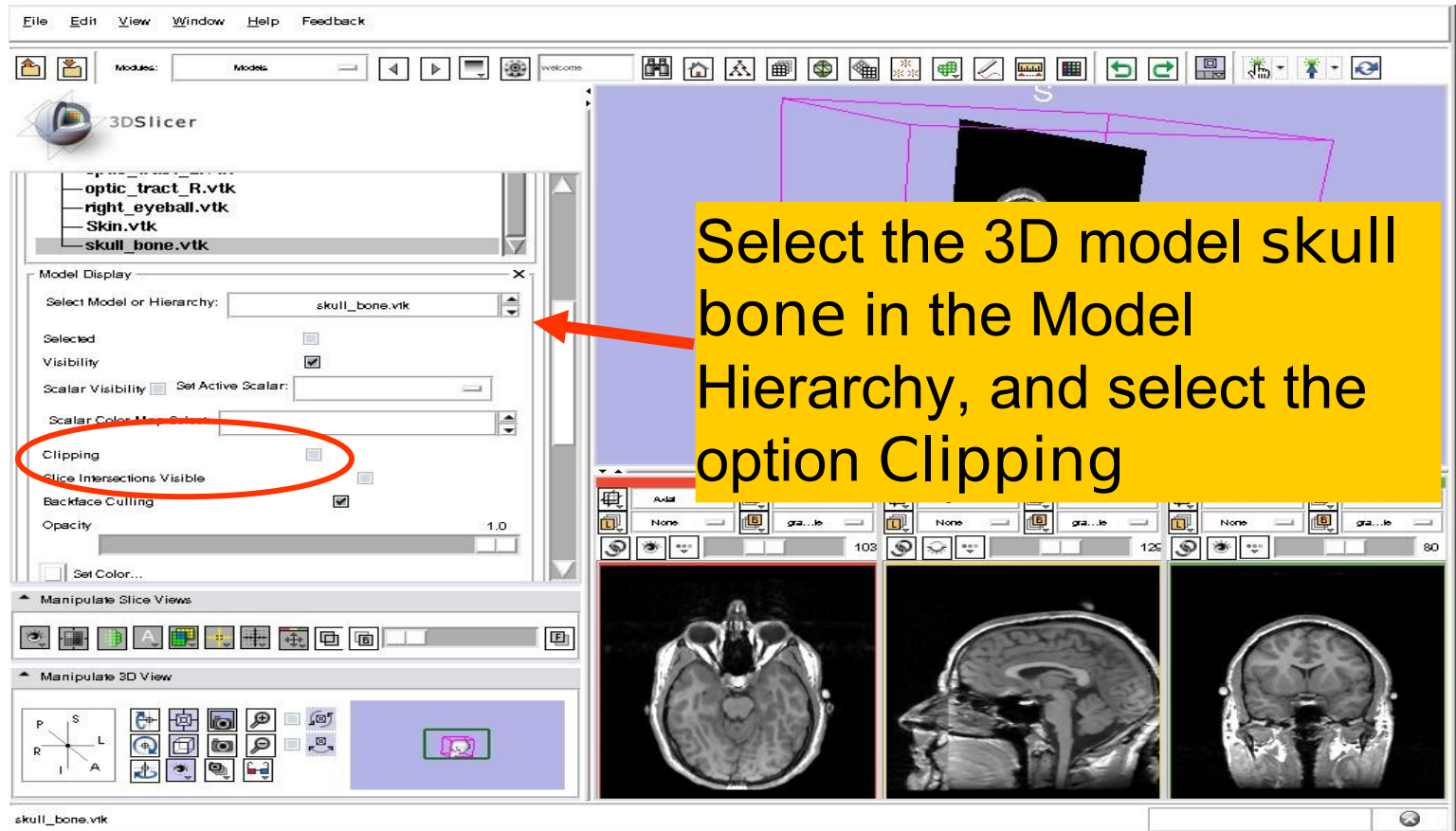
3D Visualization



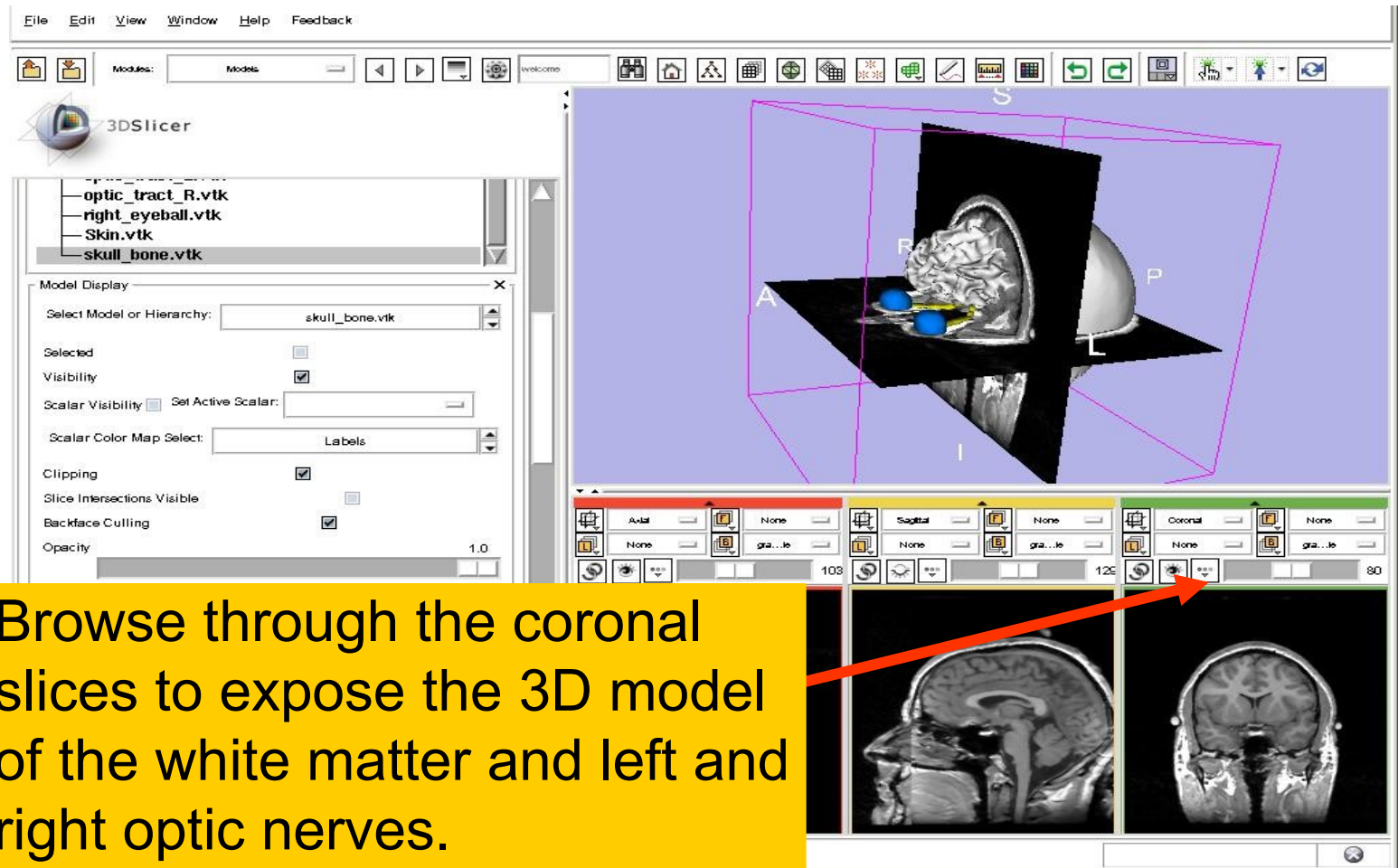
3D Visualization



3D Visualization

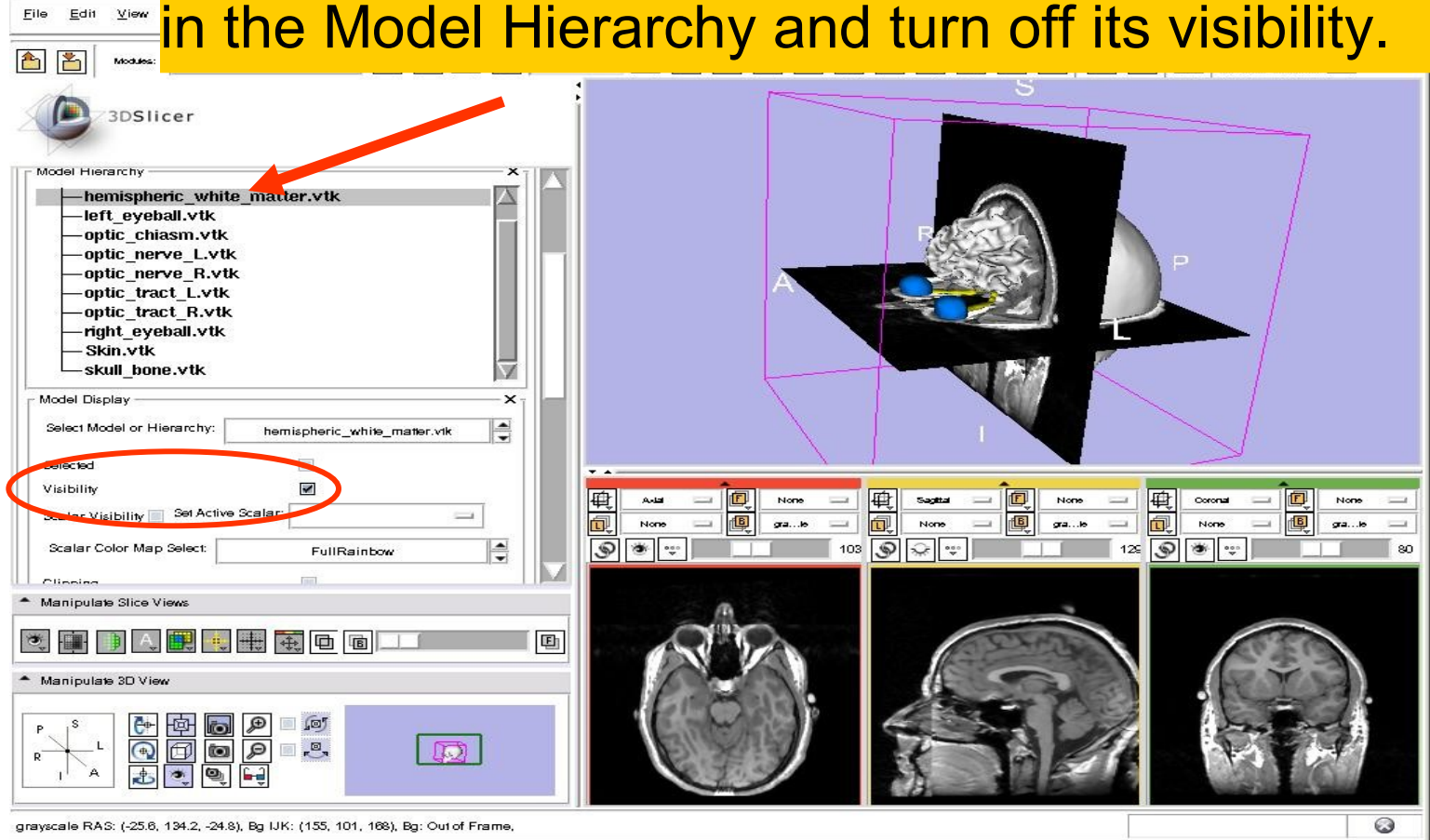


3D Visualization

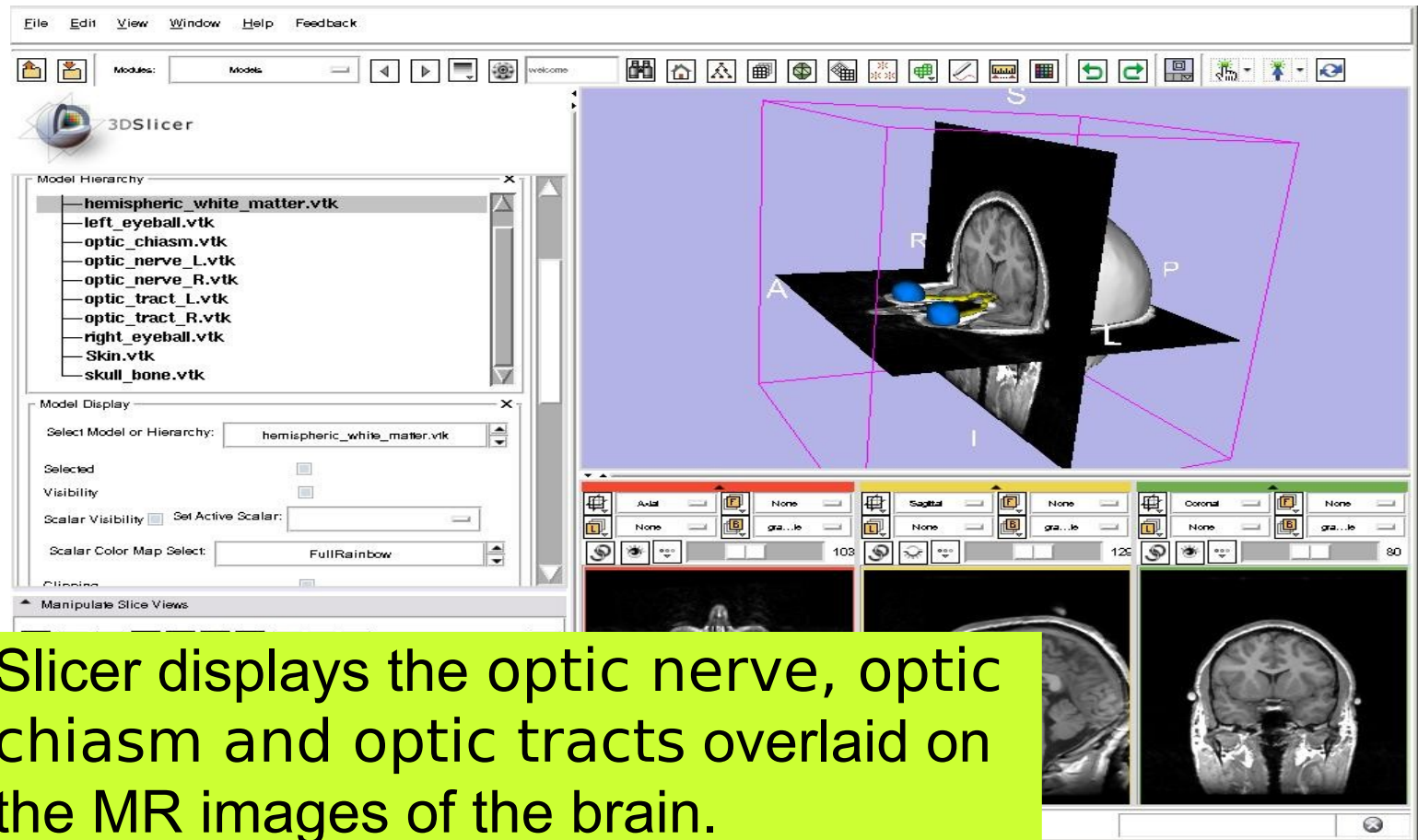


3D Visualization

Select the hemispheric white matter model in the Model Hierarchy and turn off its visibility.



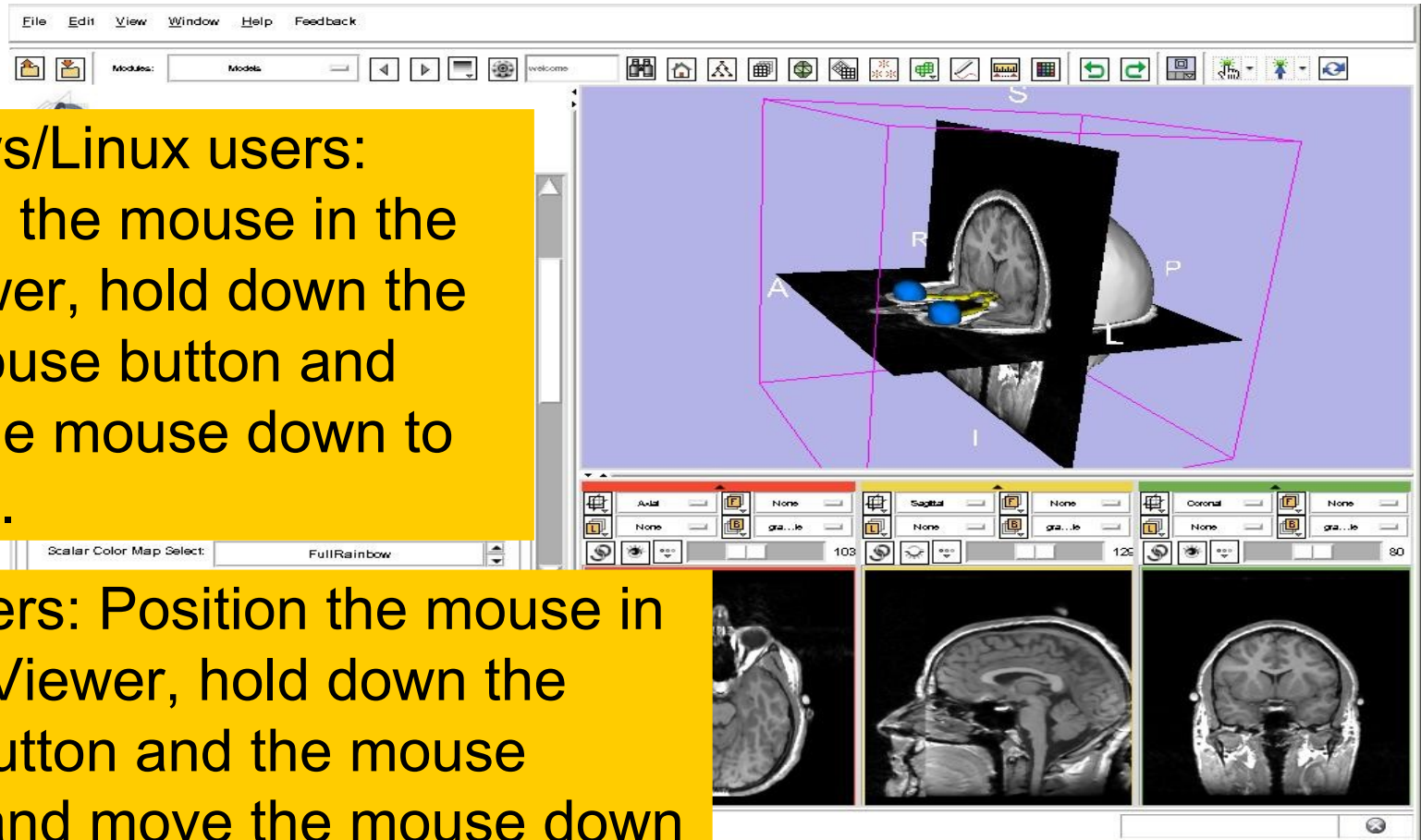
3D Visualization



3D Visualization

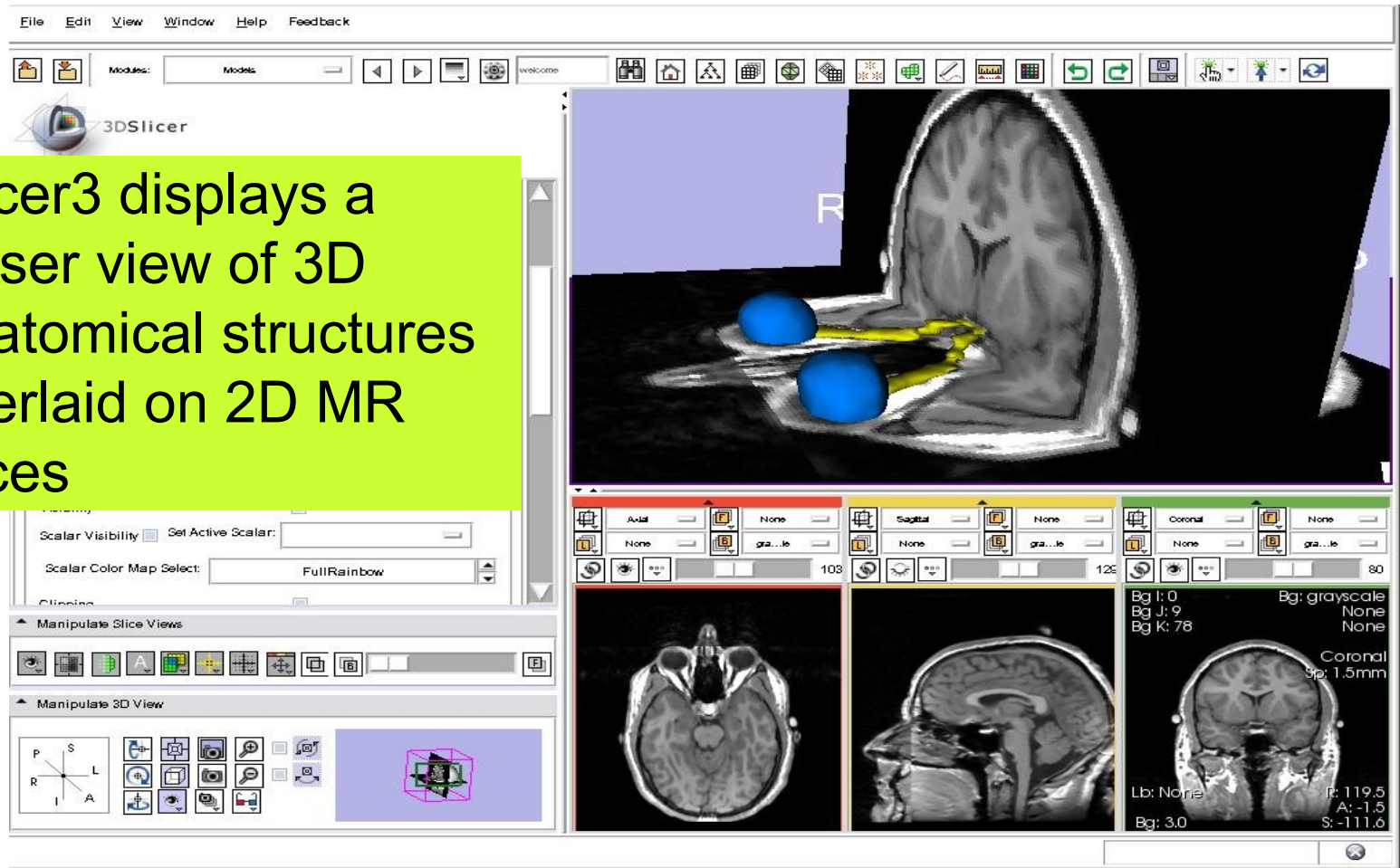
Windows/Linux users:
Position the mouse in the
3D Viewer, hold down the
right mouse button and
move the mouse down to
zoom in.

Mac users: Position the mouse in
the 3D Viewer, hold down the
apple button and the mouse
button and move the mouse down
to zoom in.



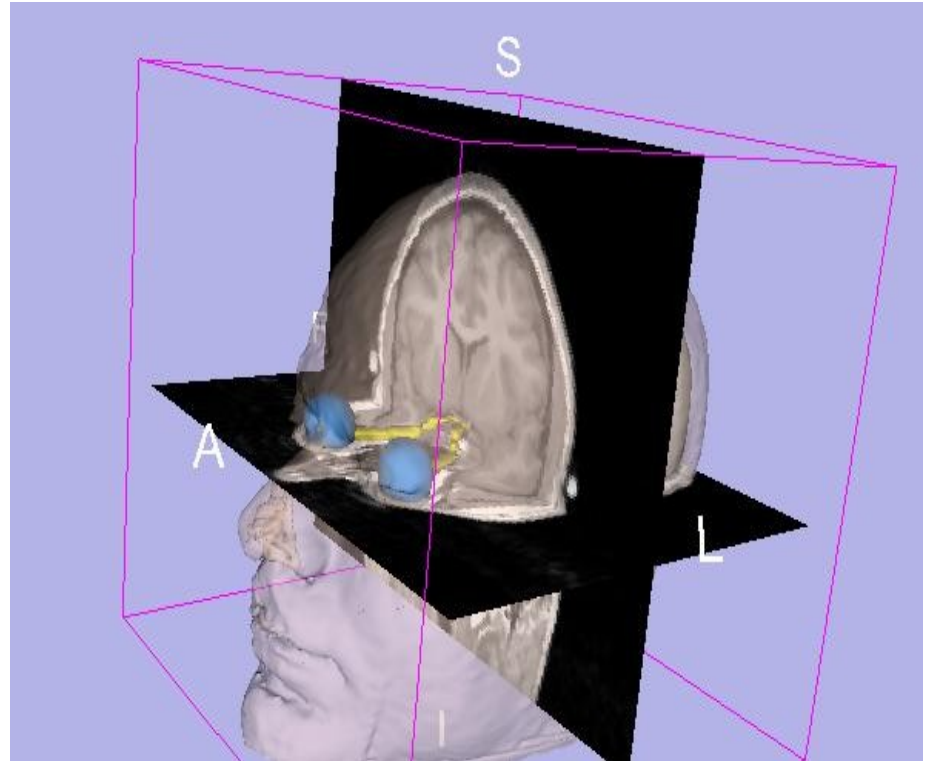
3D Visualization

Slicer3 displays a closer view of 3D anatomical structures overlaid on 2D MR slices



Slicer3 minute tutorial

- Slicer3 is an **open-source software** for image analysis and 3D visualization
- Slicer3 core functionalities, **95 available modules** and built-in libraries represent more than **2.8 million lines of code**
- Slicer3 is a **multi-institution effort** to share the latest advances in image analysis with the **scientific and clinical community**.



spujol@bwh.harvard.edu

Acknowledgments



**National Alliance for Medical
Image Computing**

NIH U54EB005149



Neuroimage Analysis Center

NIH P41RR013218