

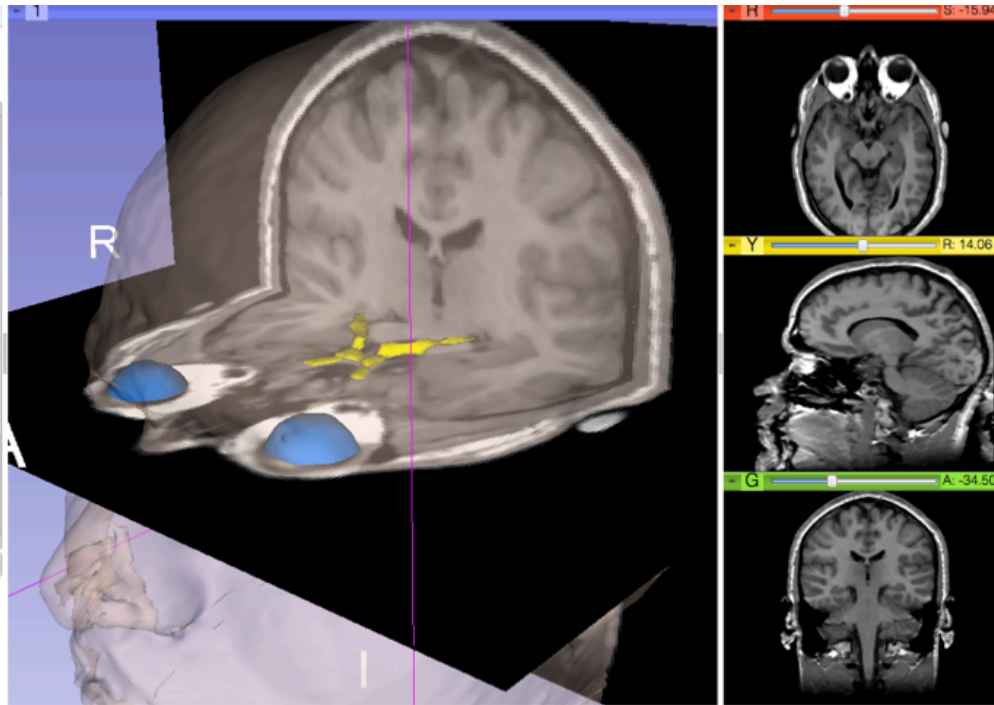
# Slicer4 Minute

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# Slicer4 minute tutorial

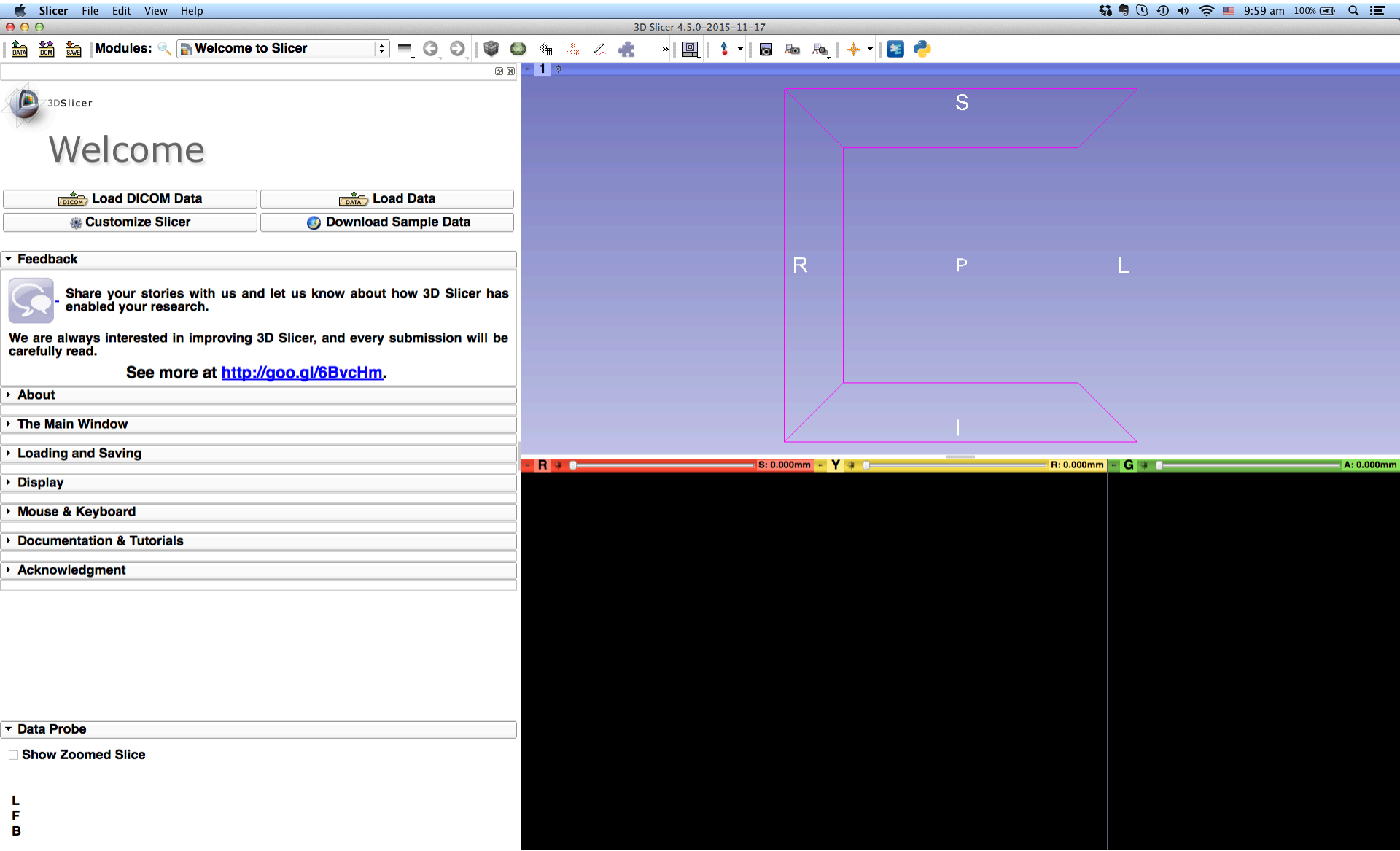


This tutorial is a 4-minute introduction to the 3D visualization capabilities of the Slicer3 software for medical image analysis.

# Slicer4 software & dataset

- Download the Slicer4 software available at <http://download.slicer.org/>
- Download the Slicer4minute dataset available at <http://www.slicer.org/slicerWiki/index.php/Documentation/4.5/Training>

# 3D Slicer version 4.5



# 3D Slicer Scene

- A Slicer scene is a MRML (Medical Reality Modeling Language) file which contains a list of elements loaded into Slicer (volumes, models, fiducials, transforms, etc.)
- In the following example, we use a scene 'Slicer4minute.mrml' composed of an MRI scan and 3D models of the head.
- The scene file and datasets have been saved as an '.mrb' (Medical Reality Bundle) file.
- The MRB file format is Slicer's archive file format.

# 3D Slicer version 4.5

The screenshot displays the 3D Slicer 4.5.0-2015-11-17 interface. The top menu bar includes 'Slicer', 'File', 'Edit', 'View', and 'Help'. The main window is divided into a left sidebar and a central 3D view.

**Left Sidebar:**

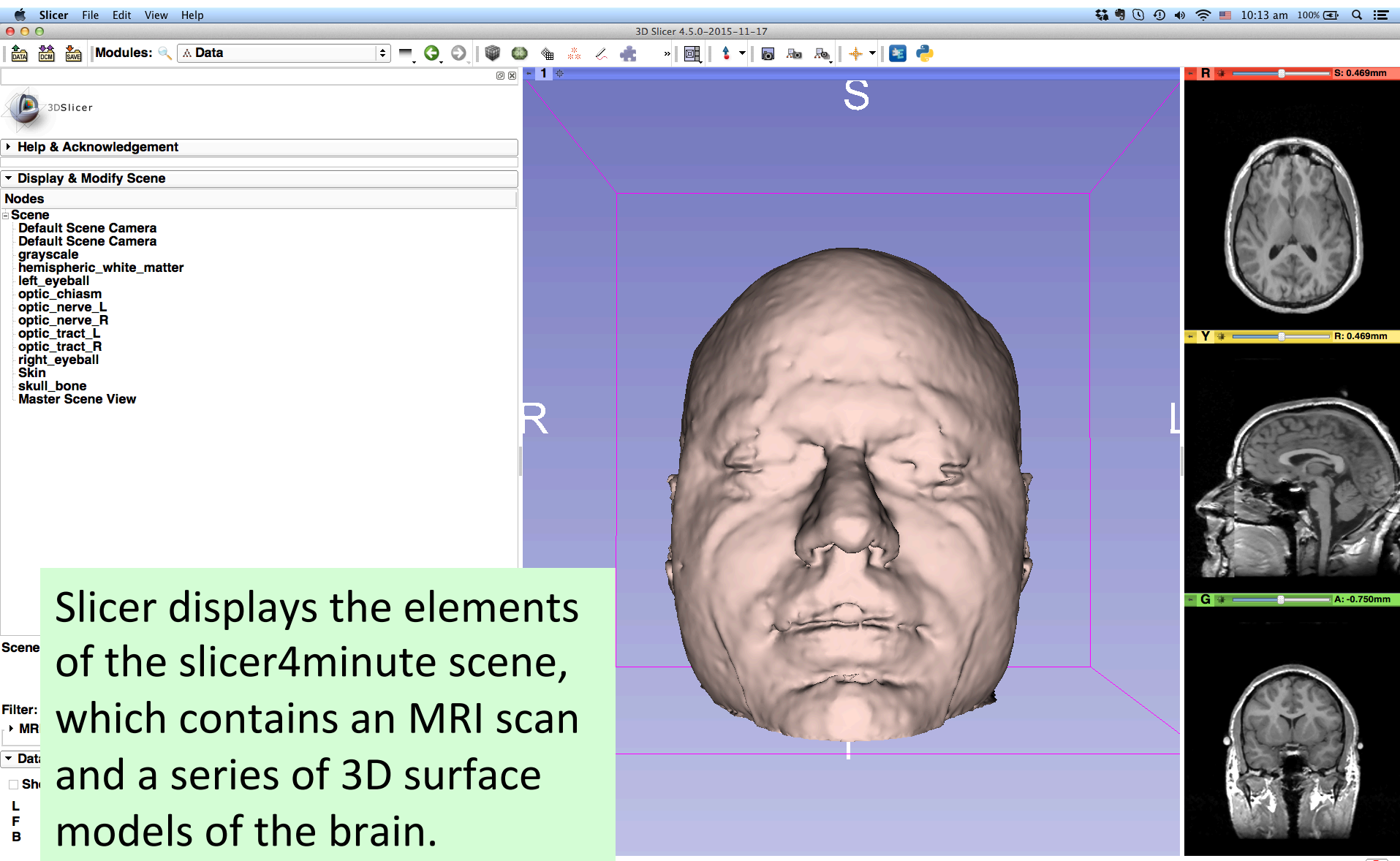
- Welcome to Slicer** section with buttons: 'Load DICOM Data', 'Load Data', 'Customize Slicer', and 'Download Sample Data'.
- Feedback** section with a message: 'Share your stories with us and let us know about how 3D Slicer has enabled your research. We are always interested in improving 3D Slicer, and every submission will be carefully read. See more at <http://goo.gl/6BvCHm>.'
- Navigation menu:** About, The Main Window, Loading and Saving, Display, Mouse & Keyboard, Documentation & Tutorials, Acknowledgment.
- File Browser:** Shows a folder named 'mrb' containing a file 'slicer4minute.mrb' (21,2 MB, Document). This file name is circled in red.

**Central 3D View:**

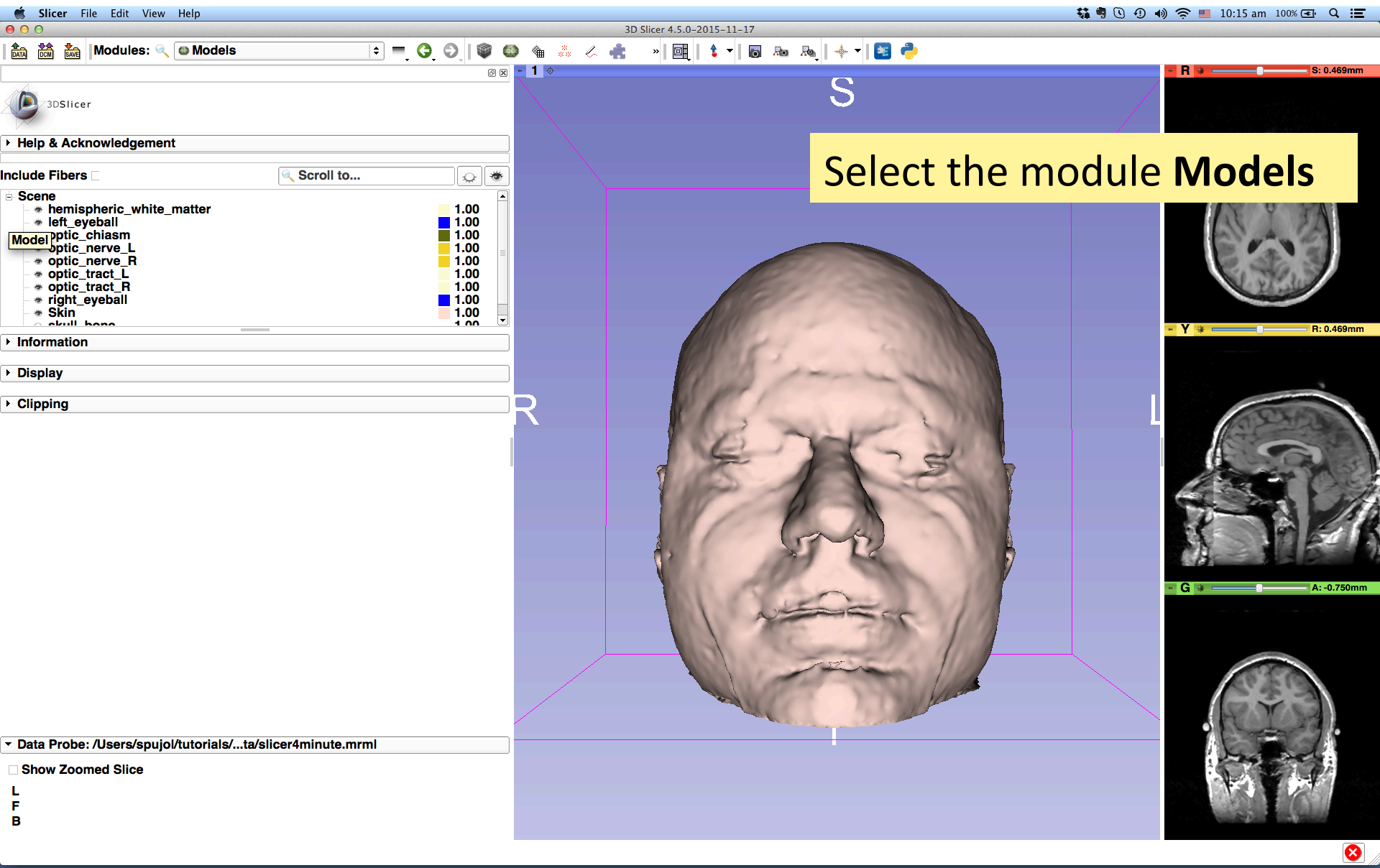
- Contains a yellow callout box with the text: 'Drag and drop the **slicer4minute.mrb** to load the scene in Slicer'.
- Below the 3D view is a status bar with sliders for 'R' (0.000mm), 'Y' (0.000mm), 'G' (0.000mm), and 'A' (0.000mm).

A red arrow points from the circled file name in the file browser to the 3D view area.

# Slicer4minute Scene

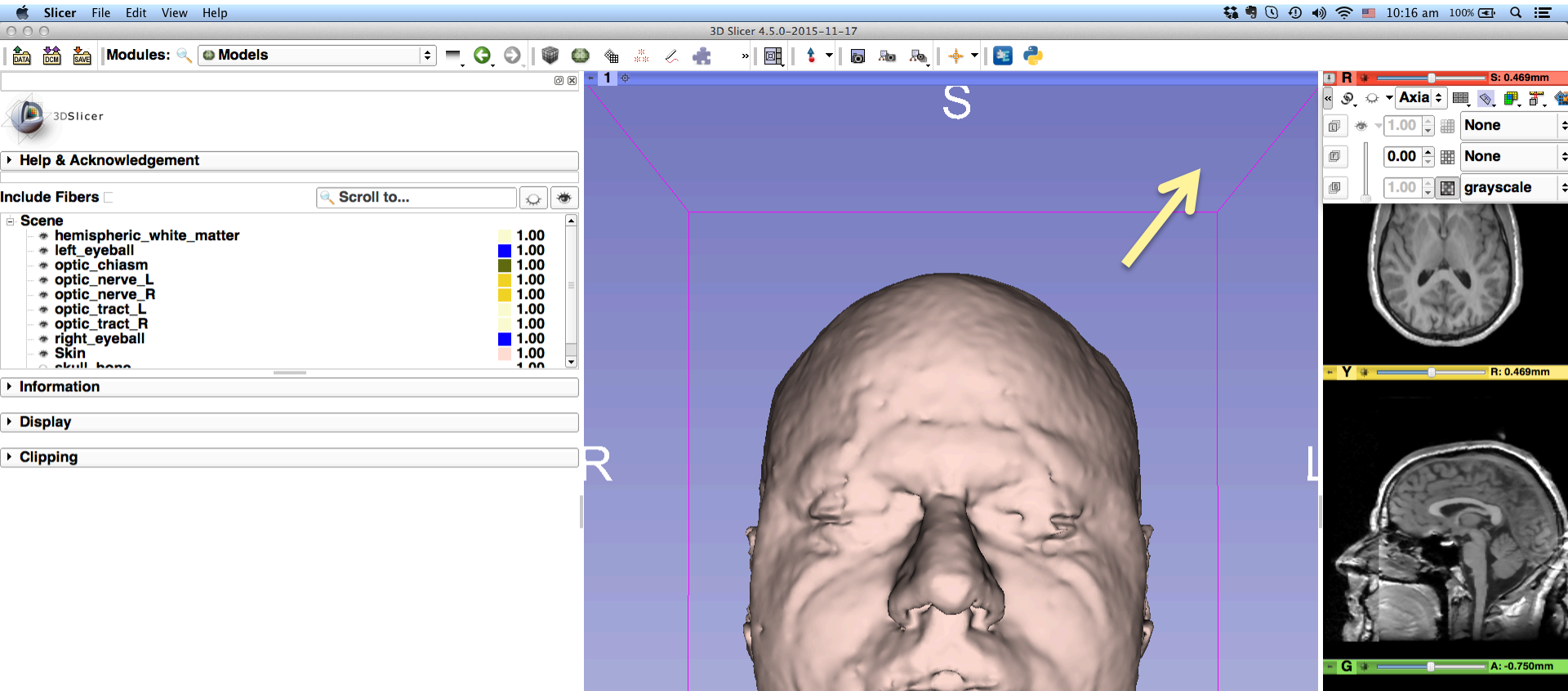


# 3D Visualization





# 3D Visualization



Click on the pin icon on the top left corner of the red slice to display the slice viewer menu.

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

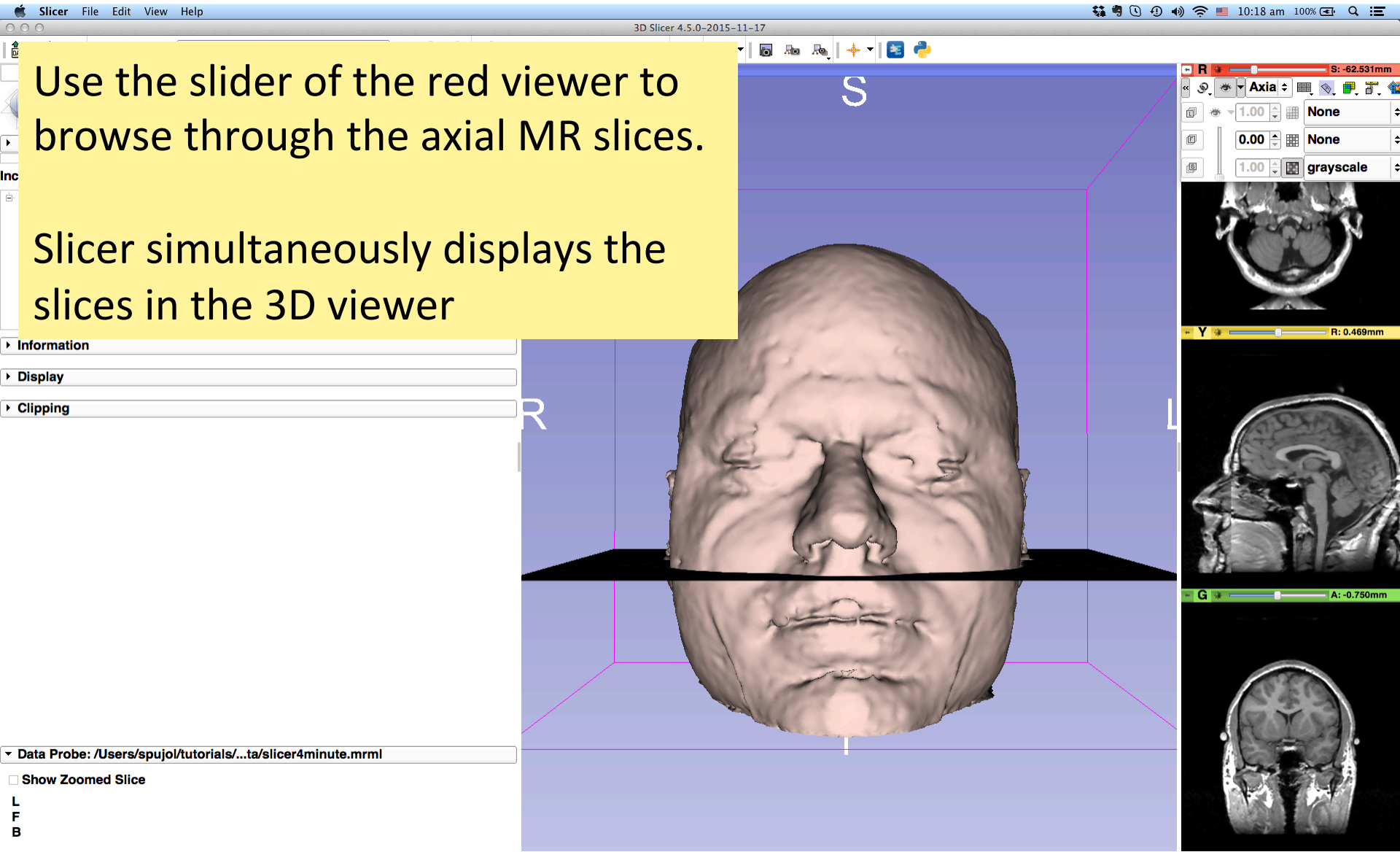
▼ Data  
☐ Show  
L  
F  
B



# 3D Visualization

Use the slider of the red viewer to browse through the axial MR slices.

Slicer simultaneously displays the slices in the 3D viewer



# 3D Visualization

Lower the opacity of the Skin.vtk model in the Display tab

Include Fibers  Scroll to...

- hemispheric\_white\_matter 1.00
- left\_eyeball 1.00
- optic\_chiasm 1.00
- optic\_nerve\_L 1.00
- optic\_nerve\_R 1.00
- optic\_tract\_L 1.00
- optic\_tract\_R 1.00
- right\_eyeball 1.00
- Skin** 0.60
- skull\_bone 1.00

Information

Display

Visibility

Visible:

View: All

Clip:

Slice Intersections Visible:

Slice Intersections Thickness: 1 px

Representation

Color

Color: #ffdcd3

Opacity: 0.60

Edge Visibility:

Edge Color: #000000

Lighting

Material

Scalars

Clipp

Data

Show

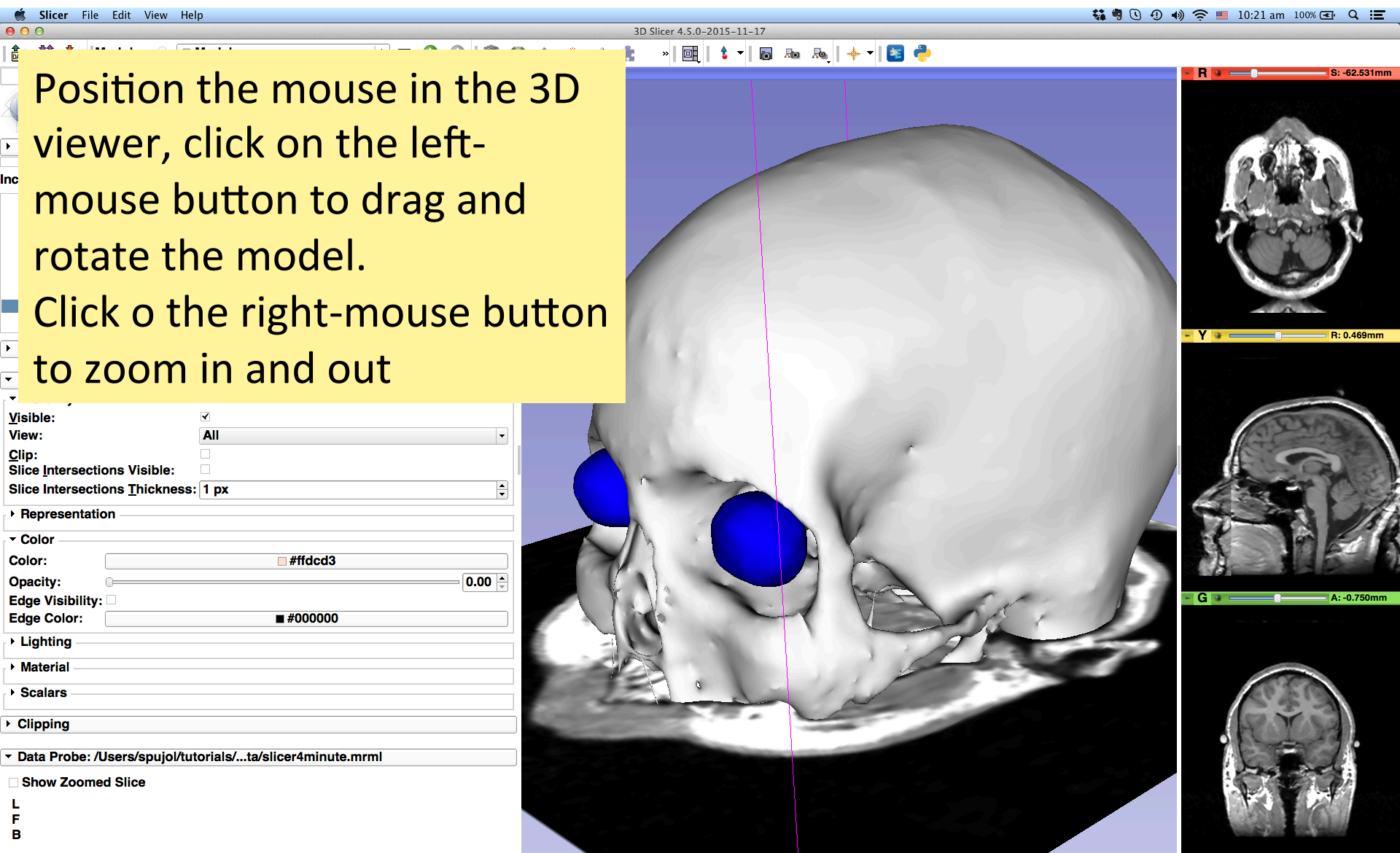
L  
F  
B

Slicer4 minute - Sonia Pujol, Ph.D., NA-MIC  
ARR 2011-2012

R: -62.531mm  
Y: R: 0.469mm  
G: A: -0.750mm

# 3D Visualization

Position the mouse in the 3D viewer, click on the left-mouse button to drag and rotate the model.  
Click on the right-mouse button to zoom in and out



Visible:

View: All

Clip:

Slice Intersections Visible:

Slice Intersections Thickness: 1 px

Representation

Color

Color: #ffdc3

Opacity: 0.00

Edge Visibility:

Edge Color: #000000

Lighting

Material

Scalars

Clipping

Data Probe: /Users/spujol/tutorials/...ta/slicer4minute.mrml

Show Zoomed Slice

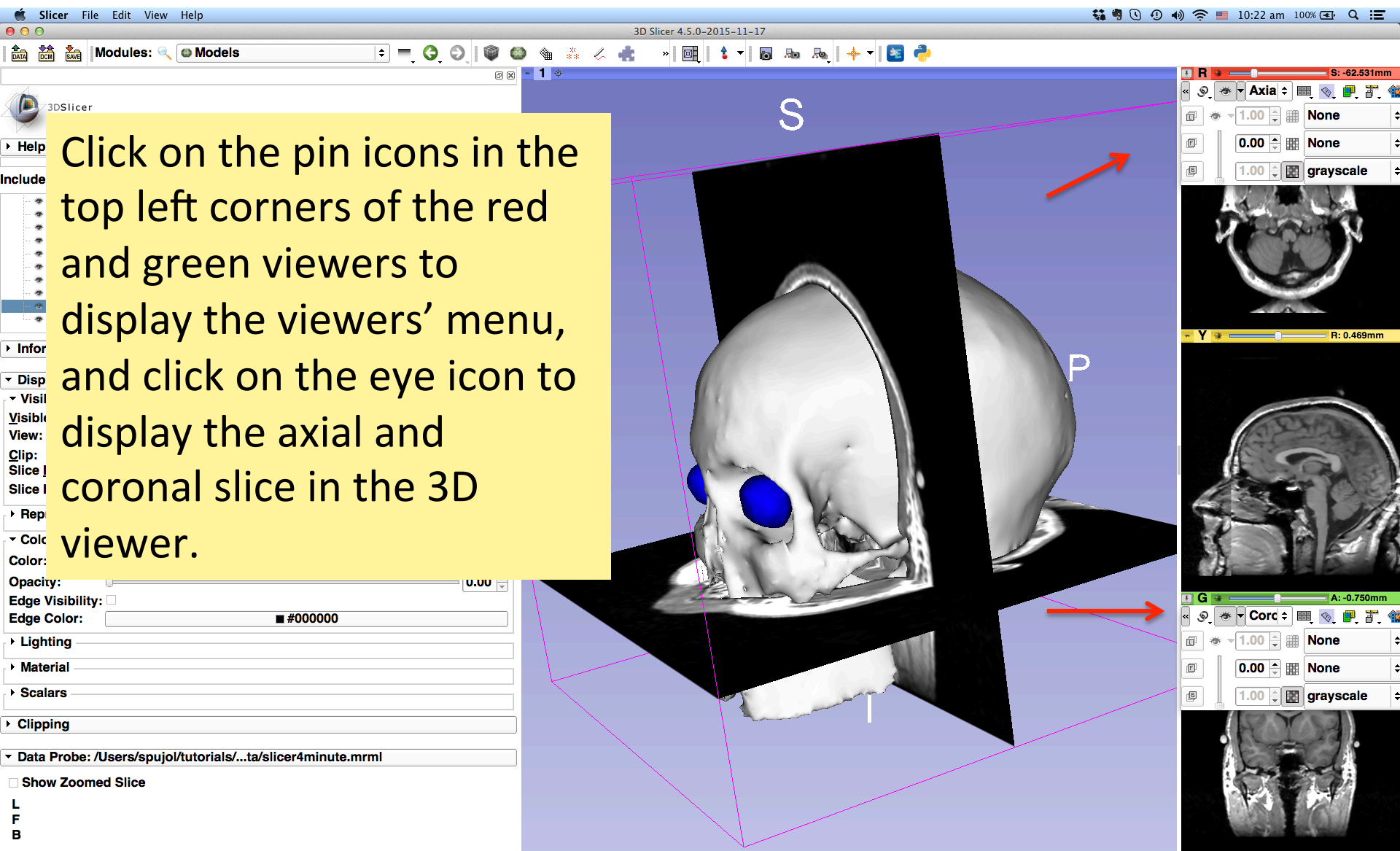
L

F

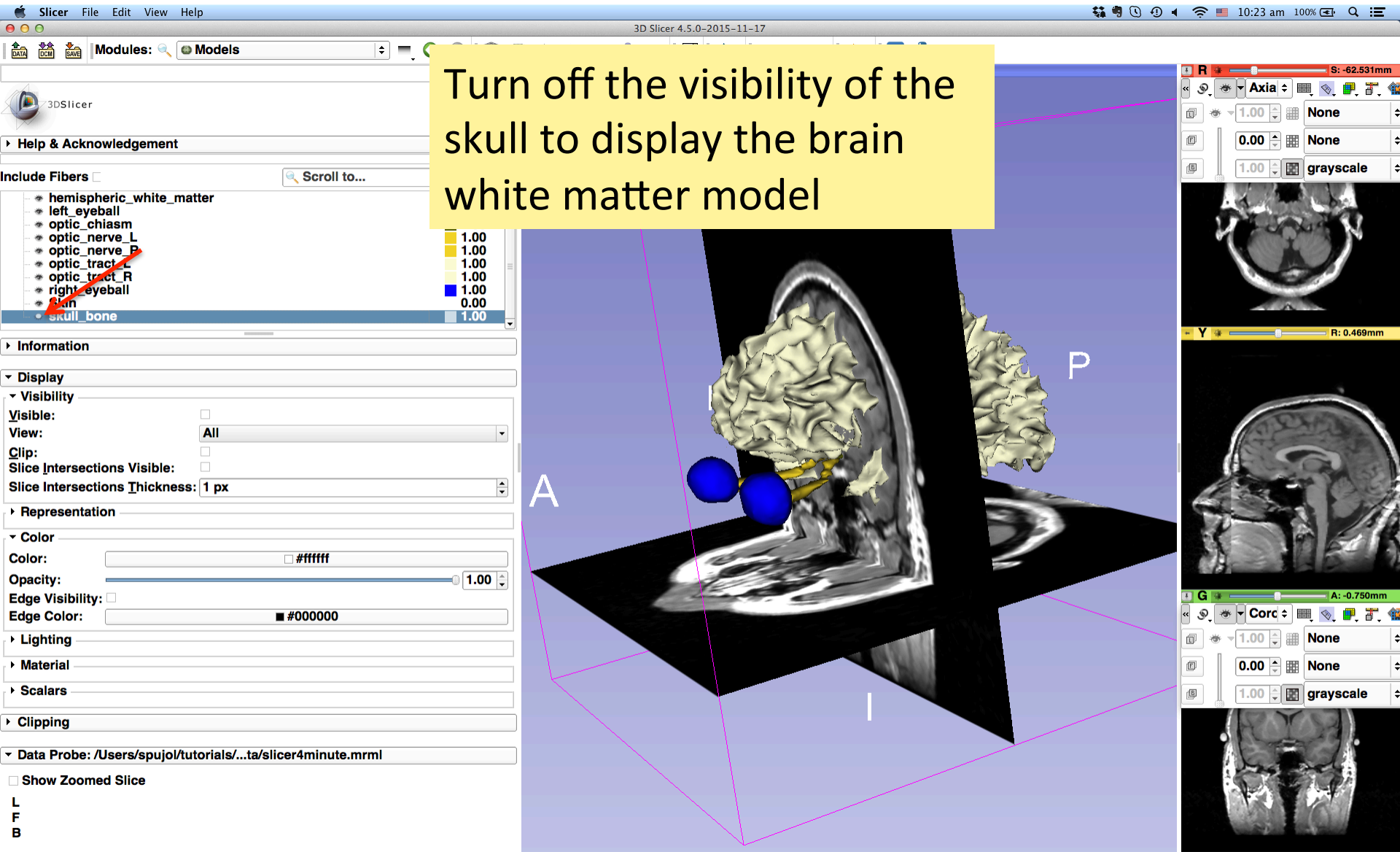
B

# Anatomical Views

Click on the pin icons in the top left corners of the red and green viewers to display the viewers' menu, and click on the eye icon to display the axial and coronal slice in the 3D viewer.

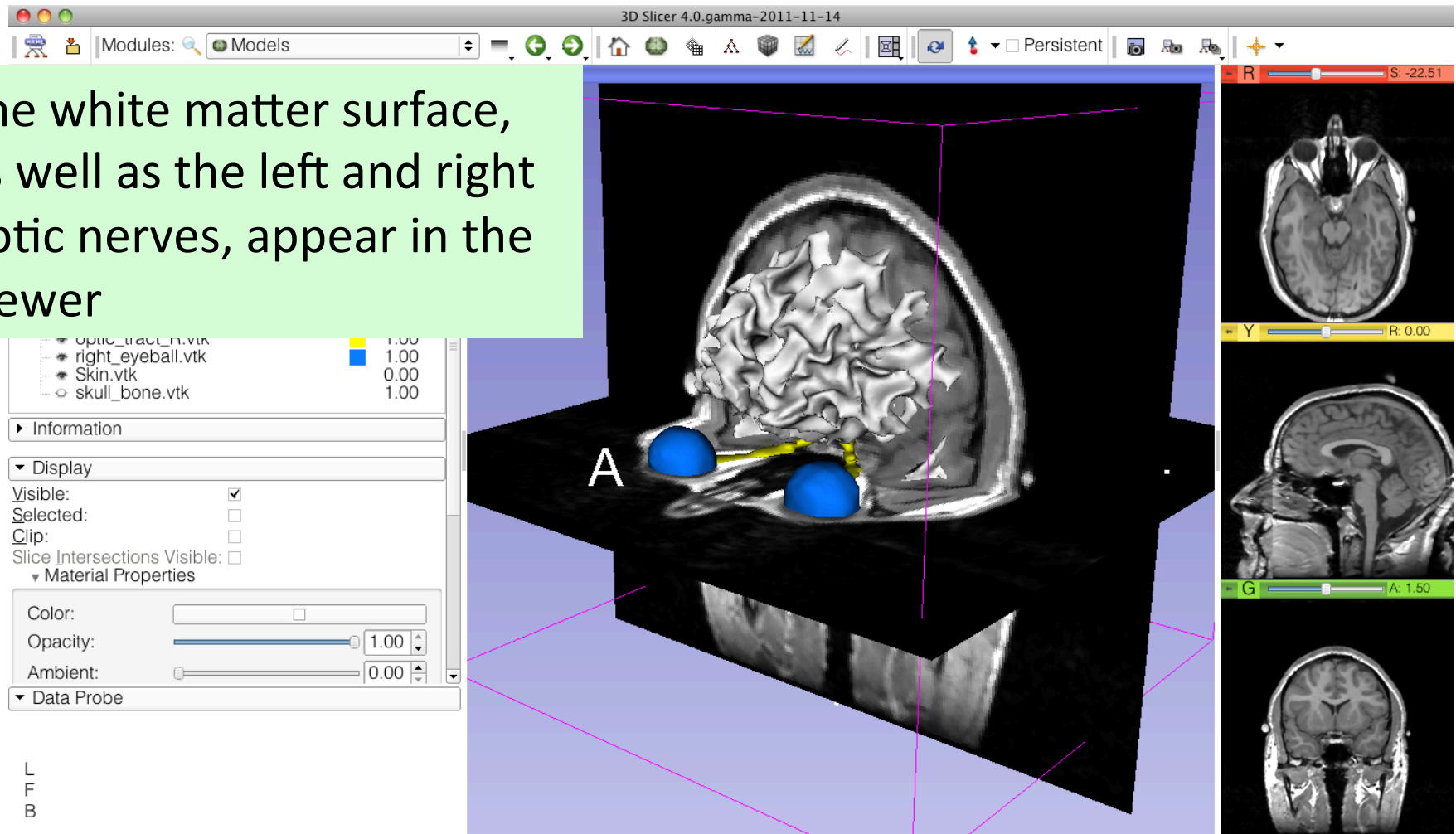


# 3D Visualization



# 3D Visualization

The white matter surface, as well as the left and right optic nerves, appear in the viewer



# 3D Visualization

The screenshot shows the 3D Slicer 4.5.0-2015-11-17 interface. The 'Models' panel on the left lists several models, with 'hemispheric\_white\_matter' selected. A red arrow points to this model. The 'Clipping' panel is expanded, showing 'Clipping Type' set to 'Intersection'. Under 'Green Slice Clipping', the 'Negative' option is selected, indicated by a red arrow. The 'Display' panel is also visible. The main 3D view shows a brain slice with a blue sphere and a white cone. The 'Data Probe' panel at the bottom shows the file path: /Users/spujol/tutorials/...ta/slicer4minute.mrml. On the right, three orthogonal views (axial, sagittal, and coronal) are shown with their respective axes (R, Y, G) and coordinates.

Select the **hemispheric\_white\_matter.vtk** model, and check **Clip** in the Display options tab.

In the **Clipping** tab, select the option '**Green Slice Clipping: Negative**'



# 3D Visualization

3D Slicer 4.5.0-2015-11-17

Modules: Models

3DSlicer

Help & Acknowledgement

Include Fibers  Scroll to...

Model	Visibility
hemispheric_white_matter	1.00
left_eyeball	1.00
optic_chiasm	1.00
optic_nerve_L	1.00
optic_nerve_R	1.00
optic_tract_L	1.00
optic_tract_R	1.00
right_eyeball	1.00
Skin	0.00
skull_bone	1.00

Information

Display

Clipping

Clipping Type:  Union  Intersection

Red Slice Clipping:  Positive  Negative

Yellow Slice Clipping:  Positive  Negative

Green Slice Clipping:  Positive  Negative

Use the coronal slider (green) to expose the optic chiasm.

Da  Show zoomed slice

L  
F  
B

# 3D Visualization

3D Slicer 4.5.0-2015-11-17

Modules: Models

3DSlicer

Help & Acknowledgement

Include Fibers  Scroll to...

hemispheric_white_matter	1.00
left_eyeball	1.00
optic_chiasm	1.00
optic_nerve_L	1.00
optic_nerve_R	1.00
optic_tract_L	1.00
optic_tract_R	1.00
right_eyeball	1.00
Skin	0.60
skull_bone	1.00

Information

Display

Visibility

Visible:

View: All

Clip:

Slice Intersections Visible:

Slice Intersections Thickness: 1 px

Representation

Color

Color: #ffdc3

Opacity: 0.60

Edge Visibility:

Edge Color: #000000

Lighting

3D only

Conventional

Conventional Widescreen

Conventional Quantitative

Four-Up

Four-Up Quantitative

Dual 3D

Triple 3D

One-Up Quantitative

Red slice only

Yellow slice only

Green slice only

Tabbed 3D

Tabbed slice

Compare

Compare Widescreen

Compare Grid

Three over three

Three Over Three Quantitative

Four over four

Two over Two

Side by side

Four by three slice

Four by two slice

Three by three slice

R S: -27.531mm

Y R: 0.469mm

G A: -20.250mm

Show Zoomed Slice

L

F

B

Increase the opacity of the skin model, and select the viewing mode '3D only'

# 3D Visualization

The screenshot displays the 3D Slicer 4.5.0-2015-11-17 interface. The main 3D viewer shows a semi-transparent skull model with internal structures like the optic chiasm and optic nerves highlighted in yellow and blue. The left sidebar contains the 'Models' panel with a list of anatomical structures and their visibility/opacity settings. The right sidebar shows three orthogonal MRI slices (axial, sagittal, and coronal) with their respective coordinate values.

Model	Value
hemispheric_white_matter	1.00
left_eyeball	1.00
optic_chiasm	1.00
optic_nerve_L	1.00
optic_nerve_R	1.00
optic_tract_L	1.00
optic_tract_R	1.00
right_eyeball	1.00
Skin	0.60
skull_bone	1.00

**Orthogonal Slice Coordinates:**

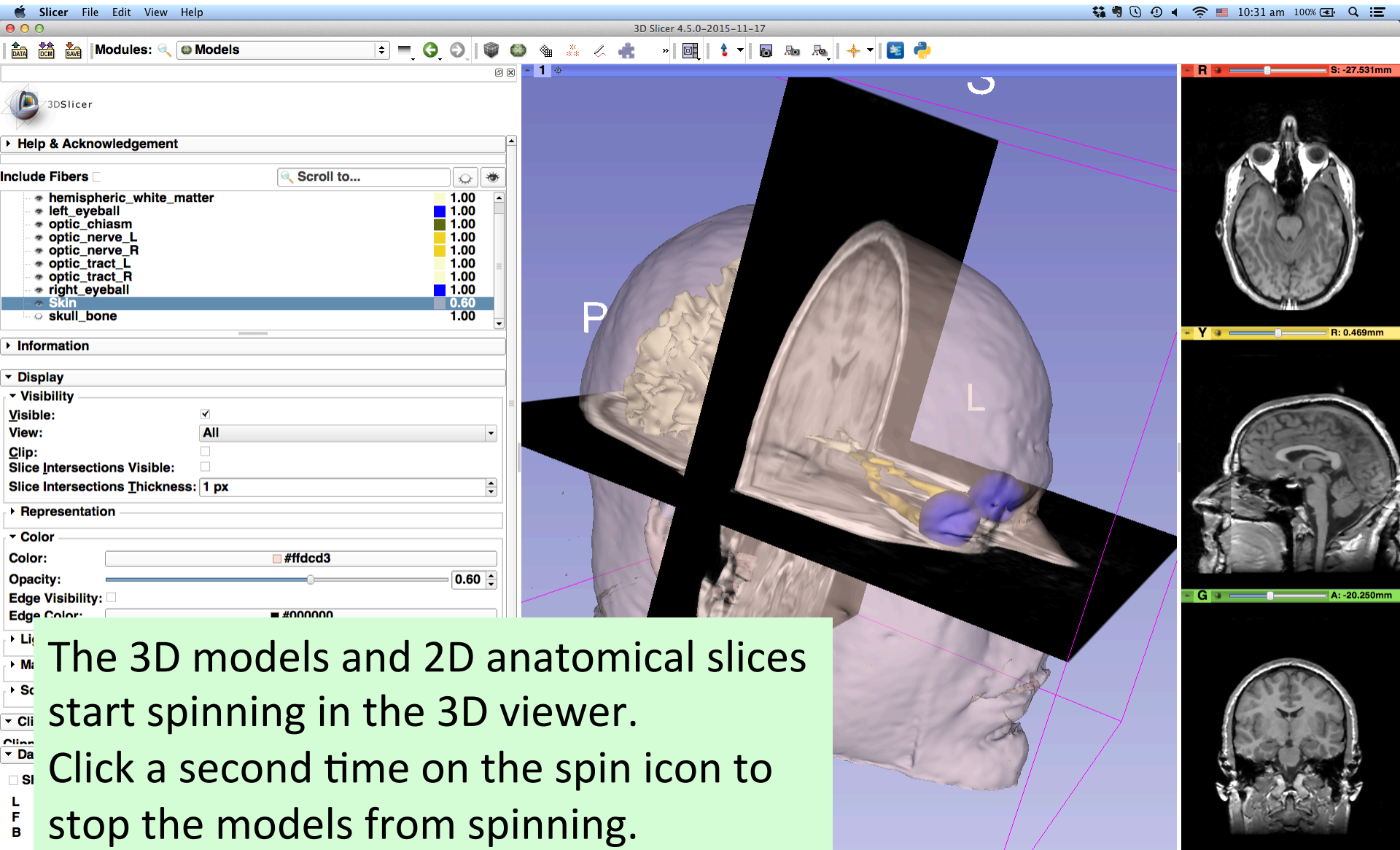
- Axial (R): -27.531mm
- Sagittal (Y): R: 0.469mm
- Coronal (G): A: -20.250mm

**3D Model Settings:**

- Visible:
- View: All
- Clip:
- Slice Intersections Visible:
- Slice Intersections Thickness: 1 px
- Color: #ffdcd3
- Opacity: 0.60
- Edge Visibility:
- Edge Color: #000000

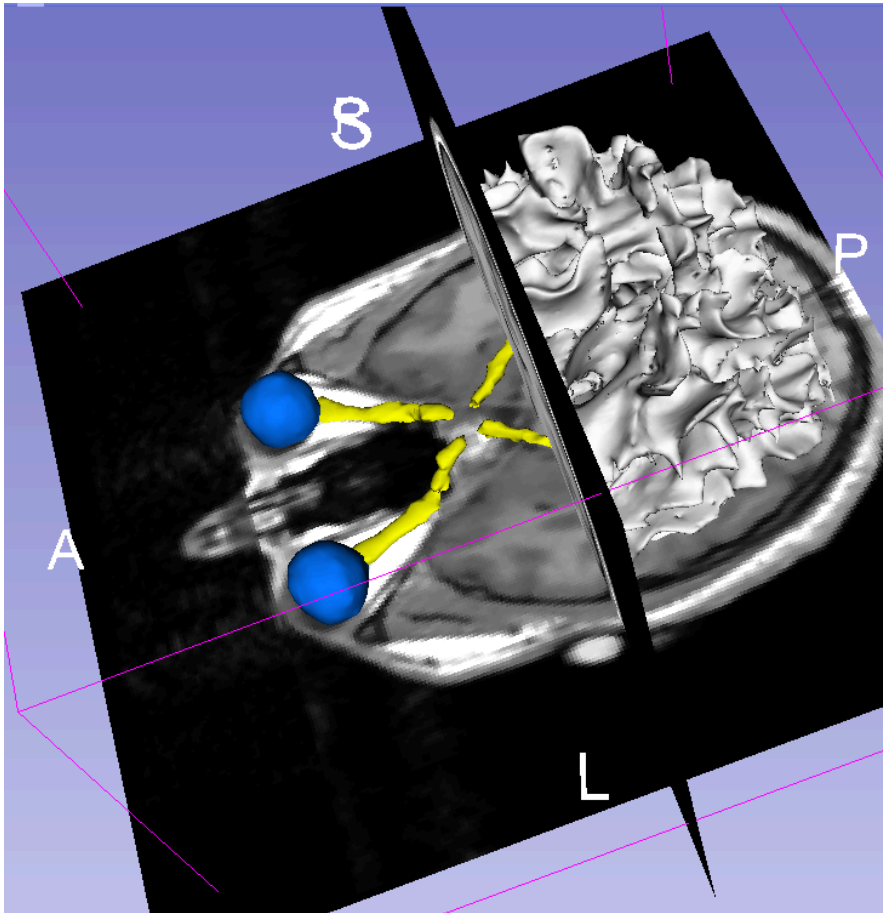
Click on the blue pin icon in the top left corner of the 3D viewer, and click on the Spin icon.

# 3D Visualization



The 3D models and 2D anatomical slices start spinning in the 3D viewer. Click a second time on the spin icon to stop the models from spinning.

# Slicer4 minute tutorial



This tutorial was a short introduction to the interactive 3D visualization functionalities of Slicer.

The Slicer4 training compendium contains a catalog of training materials on the software.