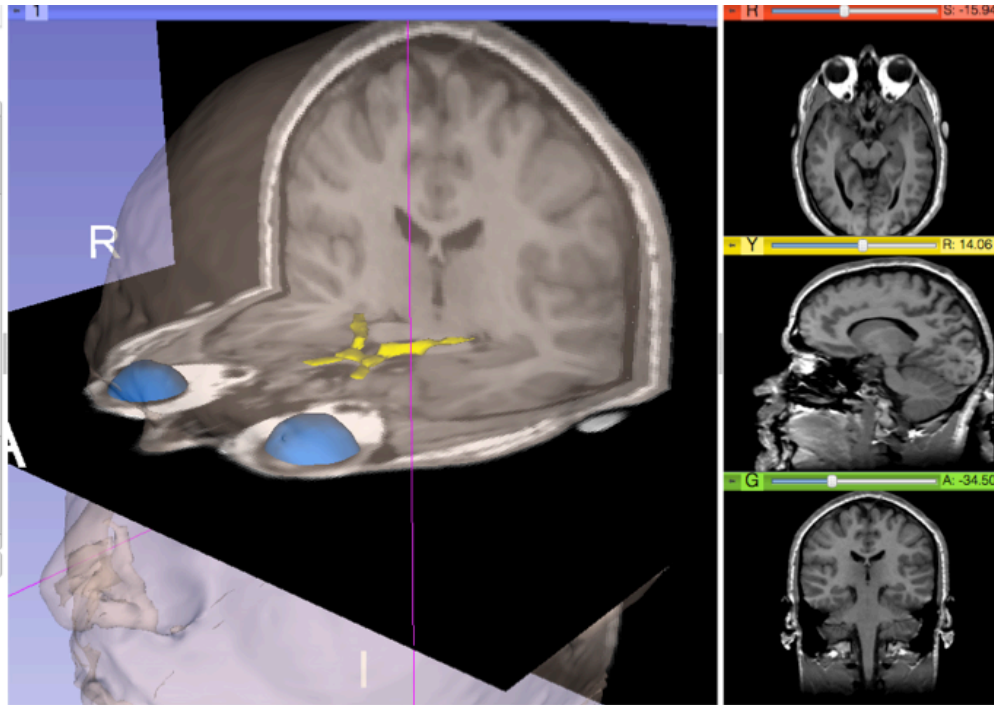


Slicer4 Minute

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Slicer4 minute tutorial

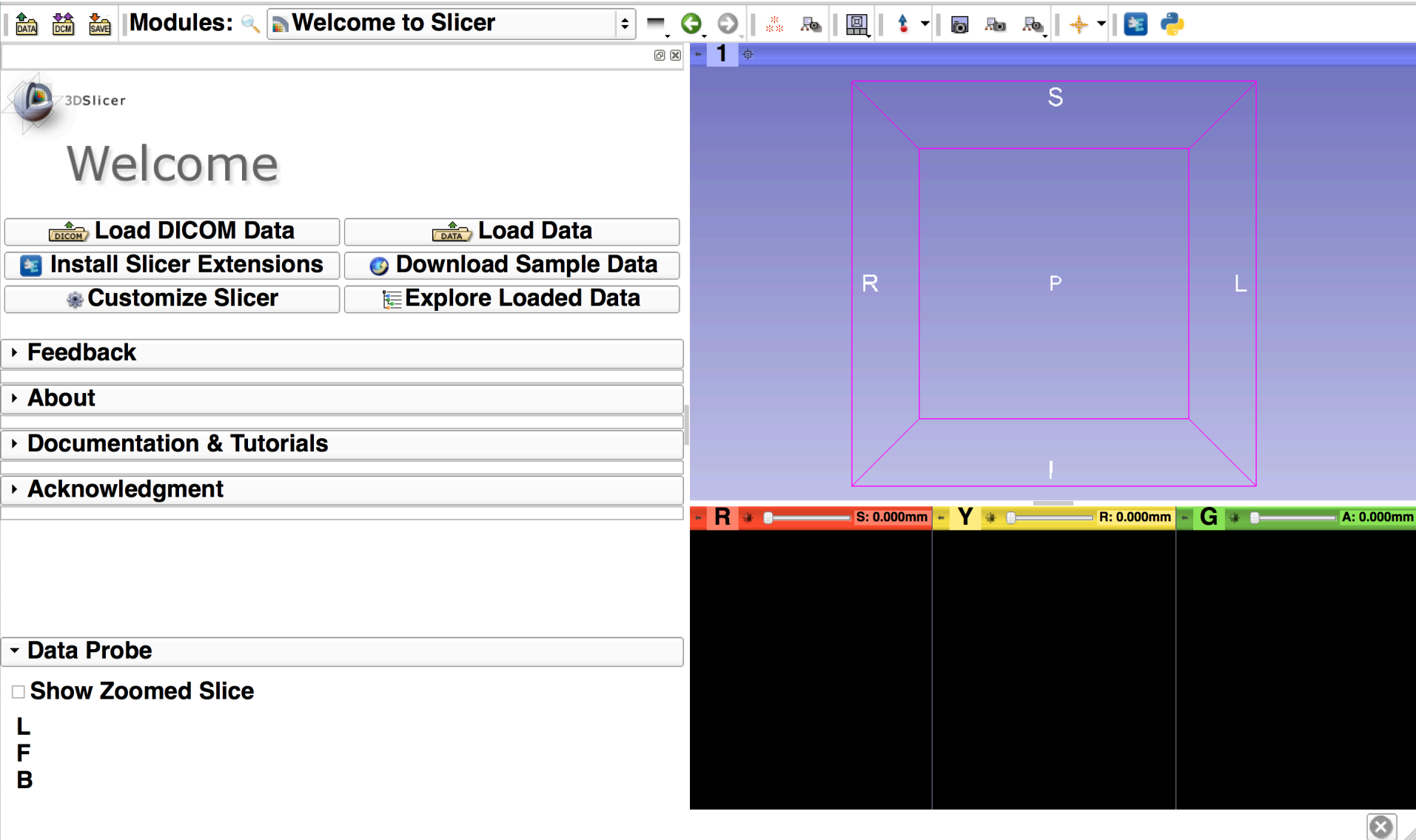


This tutorial is a 4-minute introduction to the 3D visualization capabilities of the Slicer3 software for medical image analysis.

Slicer4 software & dataset

- Download the Slicer4 software available at <http://download.slicer.org/>
- Download the Slicer4minute dataset available at <https://www.slicer.org/wiki/Documentation/4.10/Training>

3D Slicer version 4



3D Slicer Scene

- A Slicer scene is a **MRML (Medical Reality Modeling Language)** file that 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 a **MRB** (Medical Reality Bundle) file.
- The MRB file format is Slicer's archive file format.

Loading the Slicer4minute dataset

3DSlicer

Welcome

Load DICOM Data Load Data

Install Slicer Extensions Download Sample Data

Customize Slicer Explore Loaded Data

Feedback

About

Documentation & Tutorials

Acknowledgment

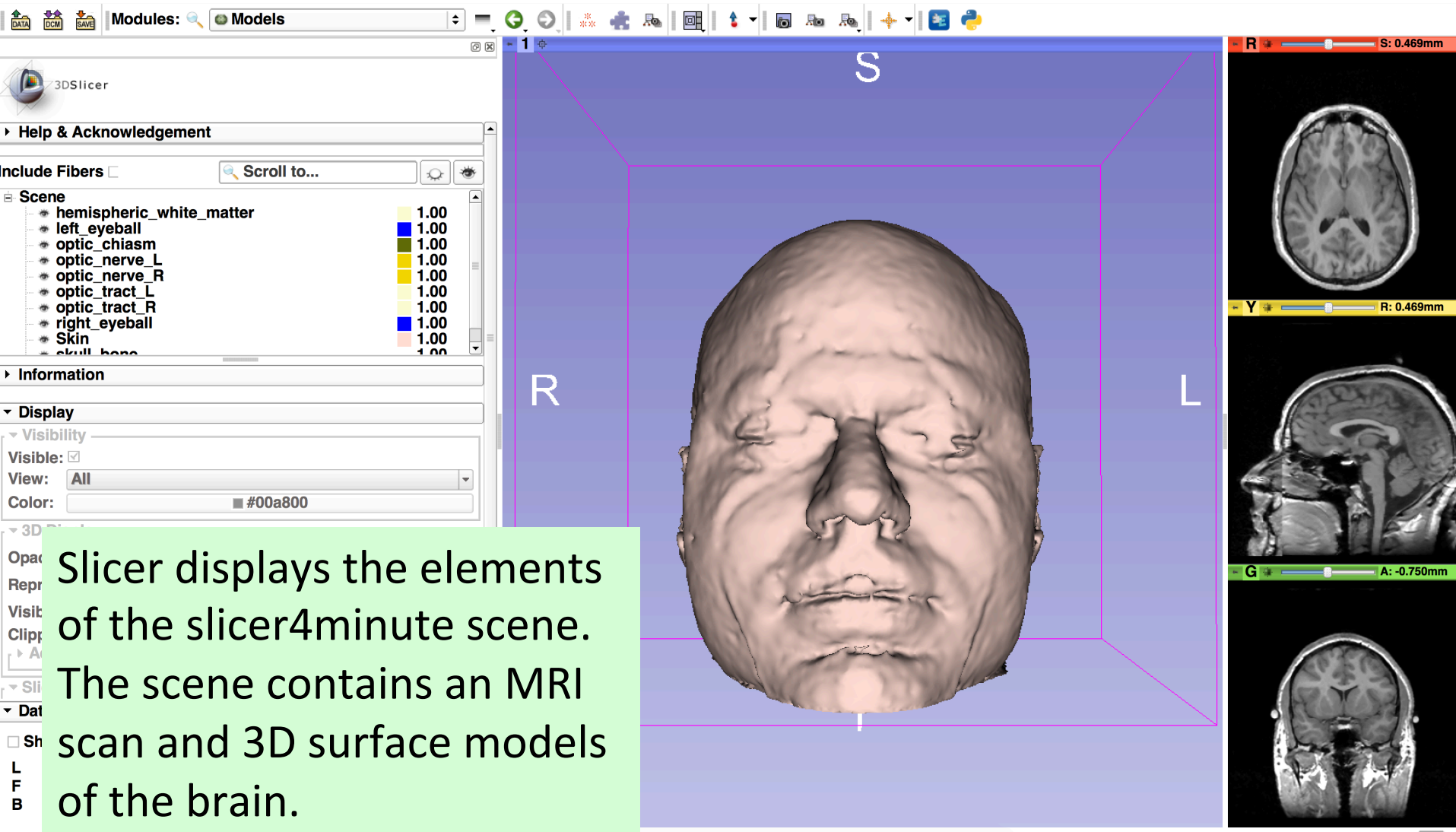
1

Drag and drop the **slicer4minute.mrb** to load the scene in Slicer

R S: 0.000mm Y R: 0.000mm G A: 0.000mm

Name	Modified	Size	Kind
slicer4minute.mrb	Today	21,2 MB	Documen

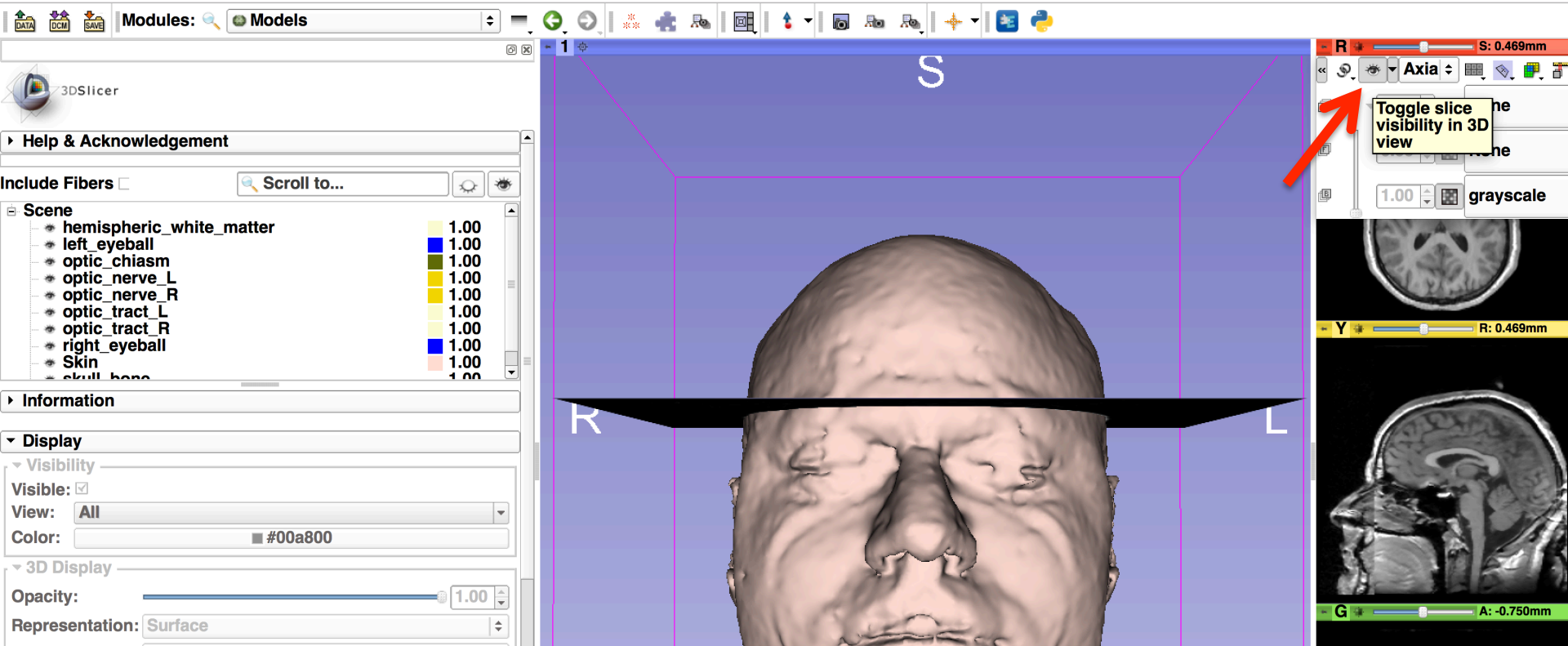
Slicer4minute Scene



3D Visualization

The image shows a screenshot of the 3D Slicer software interface. The main window displays a 3D model of a human face, rendered in a light brown color, centered within a purple rectangular frame. The frame is labeled with 'R' on the left, 'L' on the right, and 'S' at the top. A yellow callout box with the text "Select the module Models" is positioned over the top right of the 3D view. To the left of the 3D view is a sidebar containing several panels: "Help & Acknowledgement", "Include Fibers" (with a "Scroll to..." search field), "Scene" (listing various anatomical structures like "hemispheric_white_matter", "left_eyeball", "optic_chiasm", etc., each with a color swatch and a value of 1.00), "Information", "Display" (with sub-sections for "Visibility", "3D Display", and "Slice Display"), and "Data Probe: /Users/spujol/Dropbox/or...tomy_SceneFigure.mrml". The "Display" panel is currently expanded, showing "Visible: [checked]", "View: All", "Color: #00a800", "Opacity: 1.00", "Representation: Surface", "Visible Sides: All", and "Clipping: [unchecked]". On the right side of the 3D view, there are three vertical panels showing axial, sagittal, and coronal MRI slices of the brain. Each slice panel has a color scale and a numerical value: the top panel shows "R: 0.469mm", the middle panel shows "R: 0.469mm", and the bottom panel shows "A: -0.750mm". The top of the 3D view has a toolbar with various icons for navigation and manipulation. The bottom right corner of the 3D view has a red 'X' icon.

3D Visualization



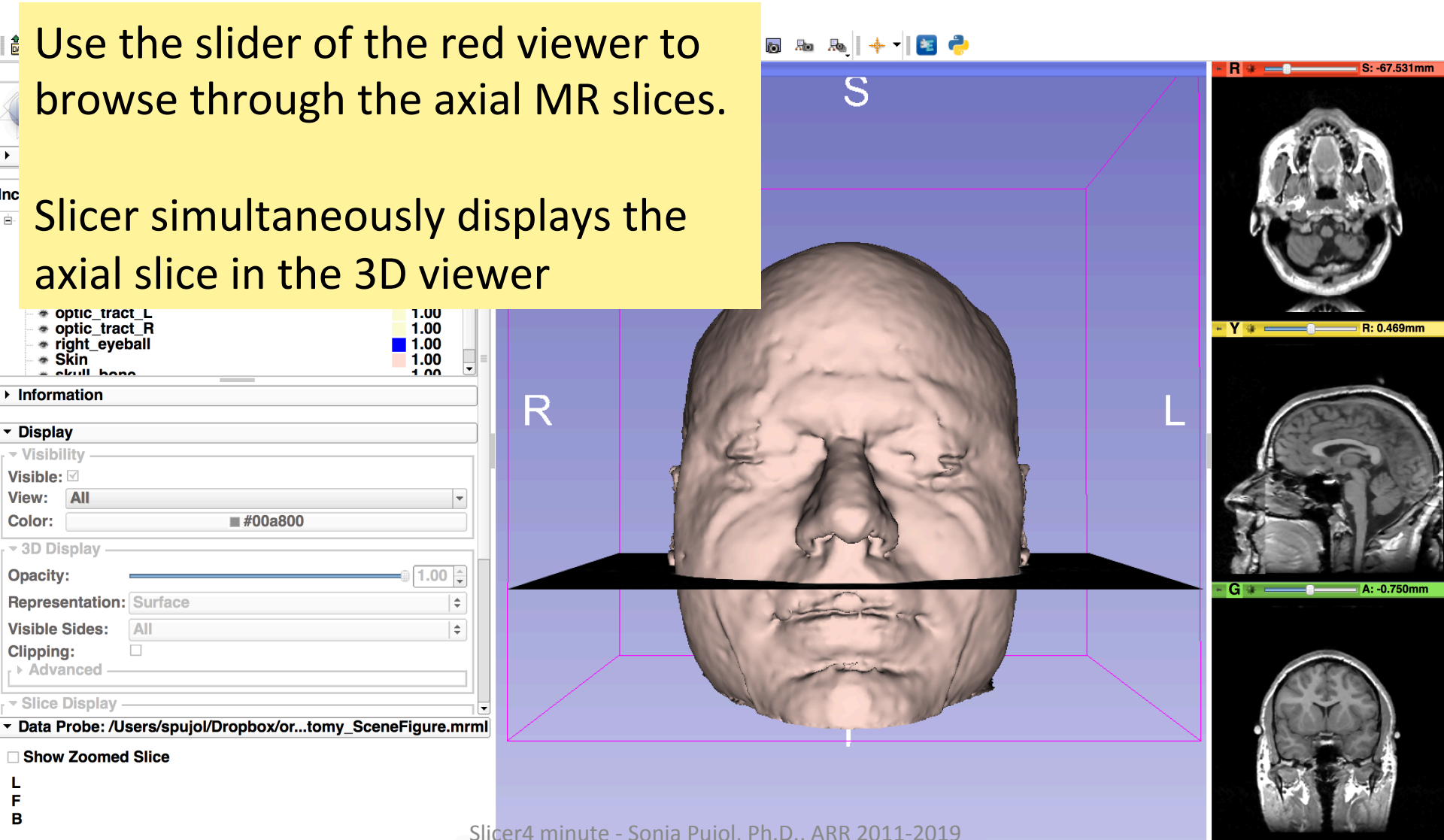
Click on the pin icon on the top left corner of the red slice to display the slice viewer menu.

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

3D Visualization

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

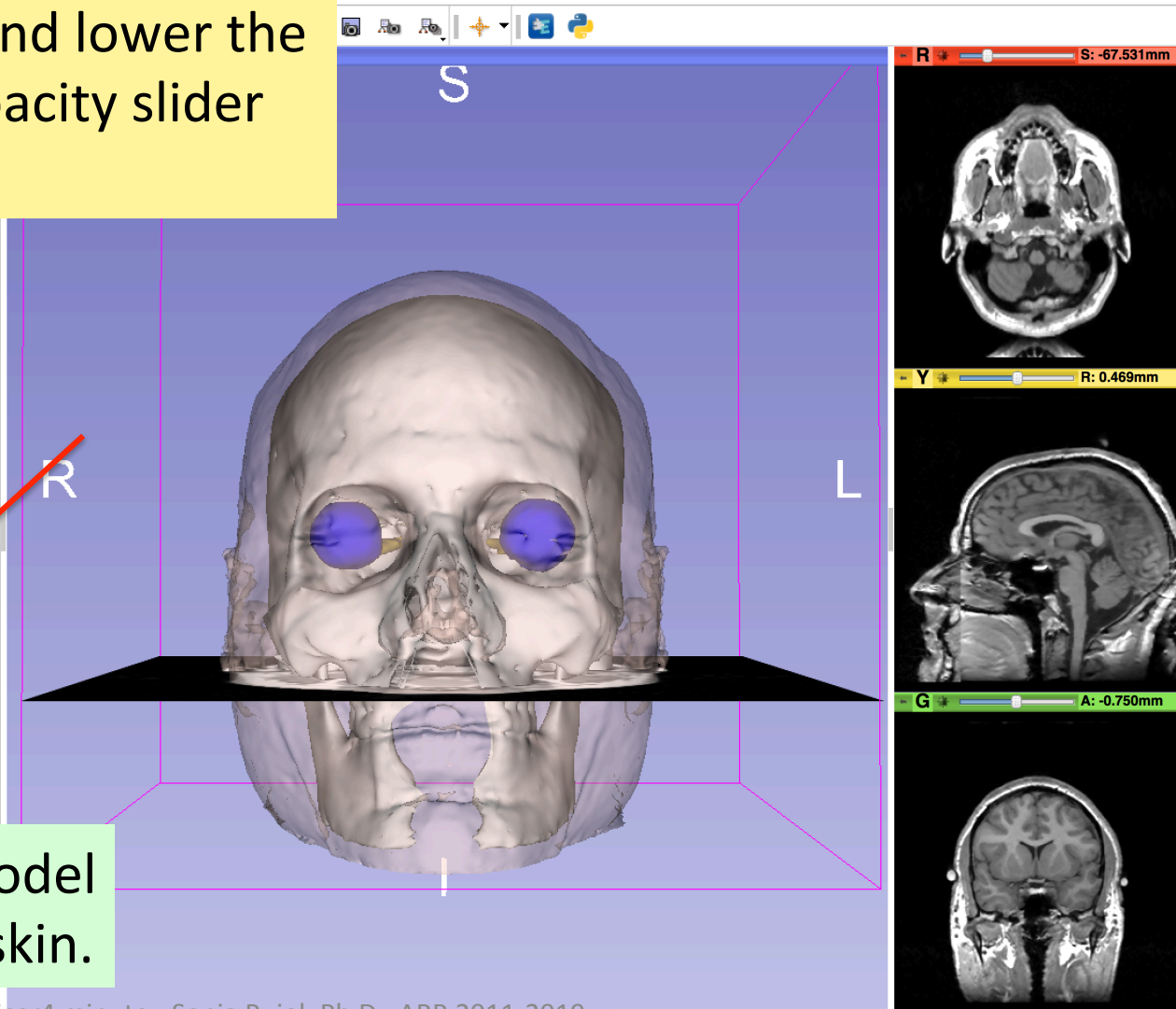
Slicer simultaneously displays the axial slice in the 3D viewer



3D Visualization

Select the Skin model and lower the its opacity using the Opacity slider in the 3D Display tab

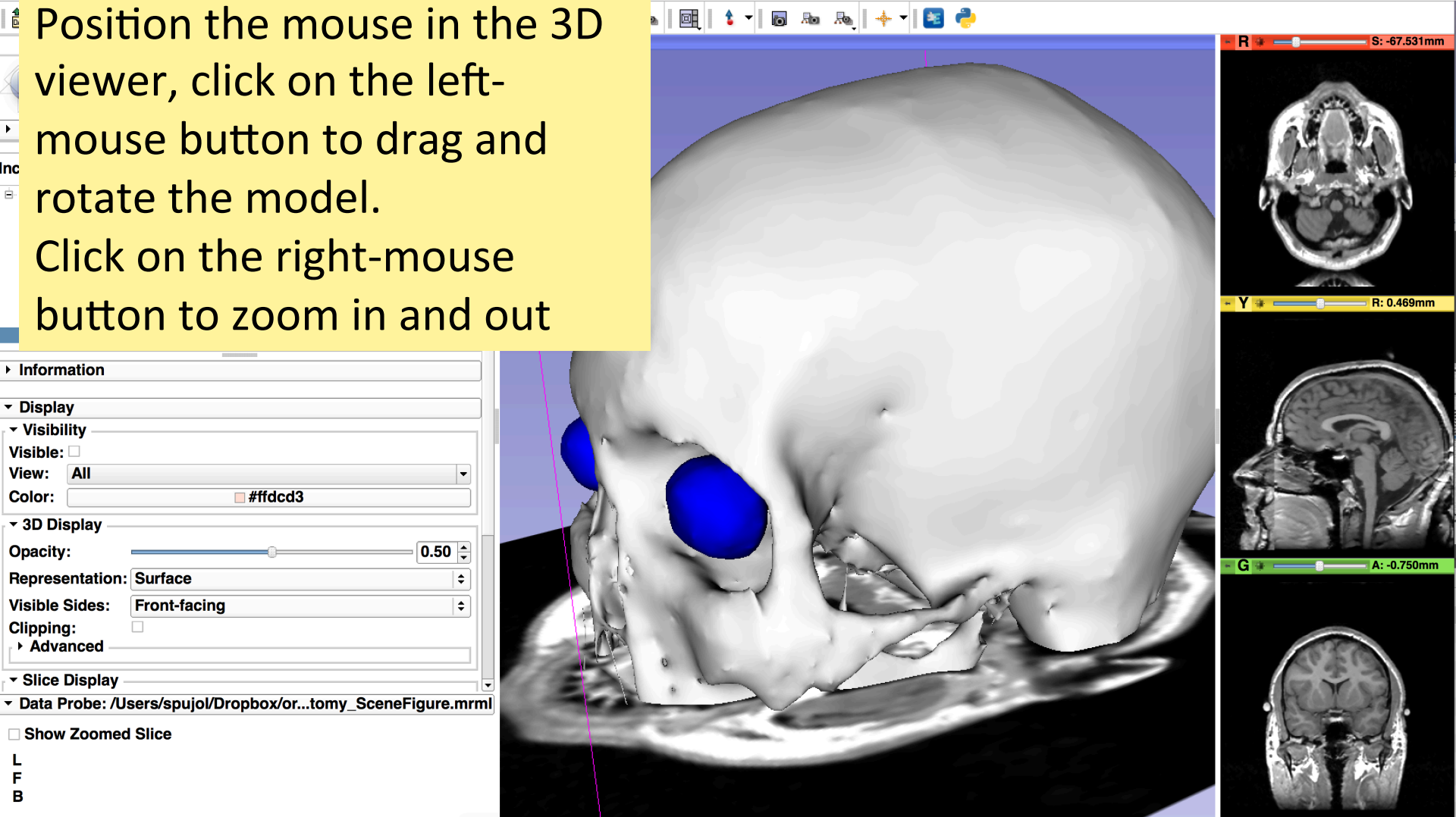
The screenshot shows the Slicer software interface. On the left, the 'Scene' panel lists various anatomical models with their respective colors and opacities. The 'Skin' model is highlighted in blue and has an opacity of 0.50. Below the scene panel, the '3D Display' tab is active, showing the 'Opacity' slider set to 0.50. A red arrow points from the text box to this slider. Other settings in the 3D Display tab include 'Representation: Surface', 'Visible Sides: Front-facing', and 'Clipping:'. The 'Color' field is set to '#ffdc3'.



The skull_bone.vtk model appears through the skin.

3D Visualization

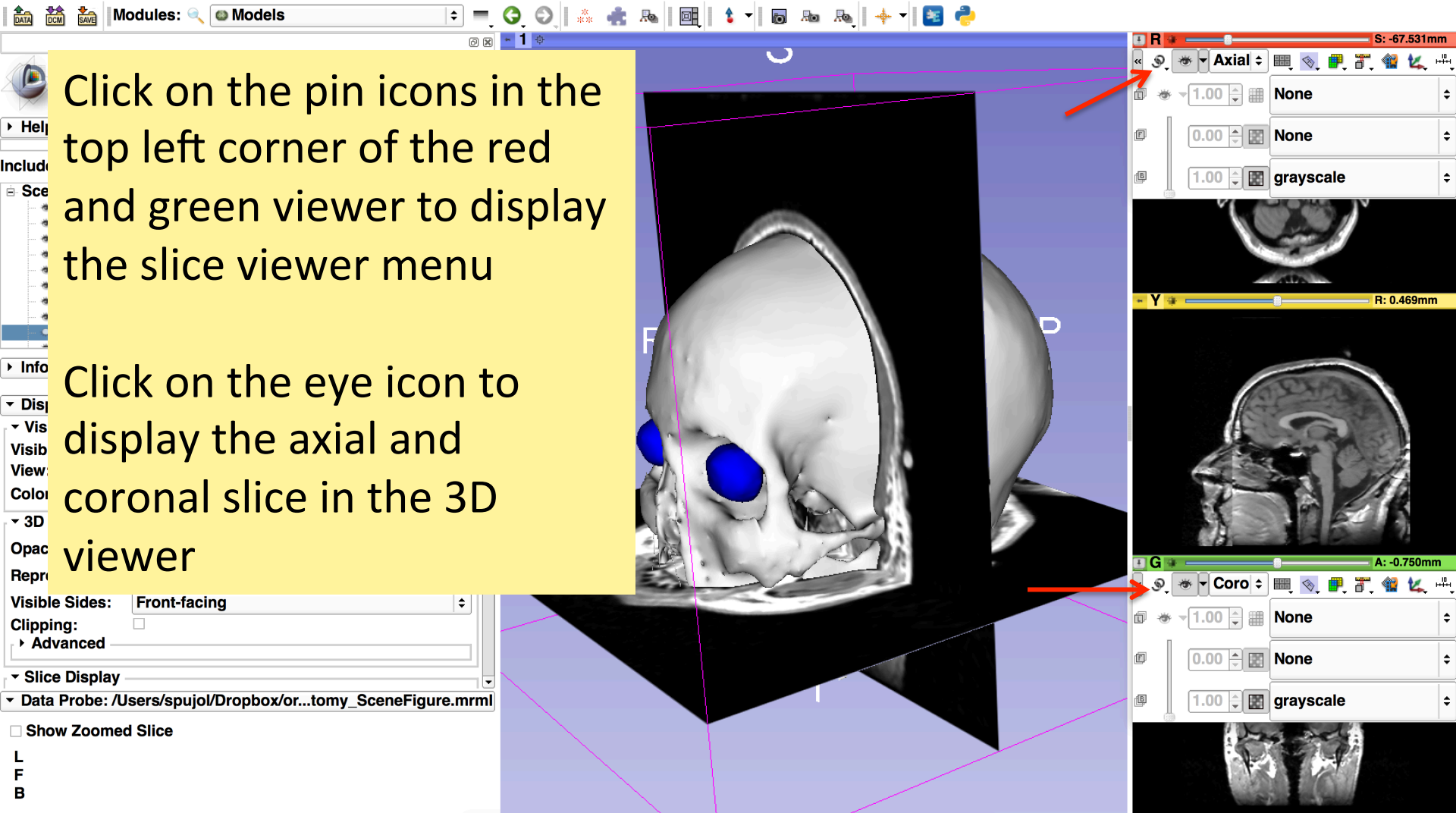
Position the mouse in the 3D viewer, click on the left-mouse button to drag and rotate the model. Click on the right-mouse button to zoom in and out



Anatomical Views

Click on the pin icons in the top left corner of the red and green viewer to display the slice viewer menu

Click on the eye icon to display the axial and coronal slice in the 3D viewer

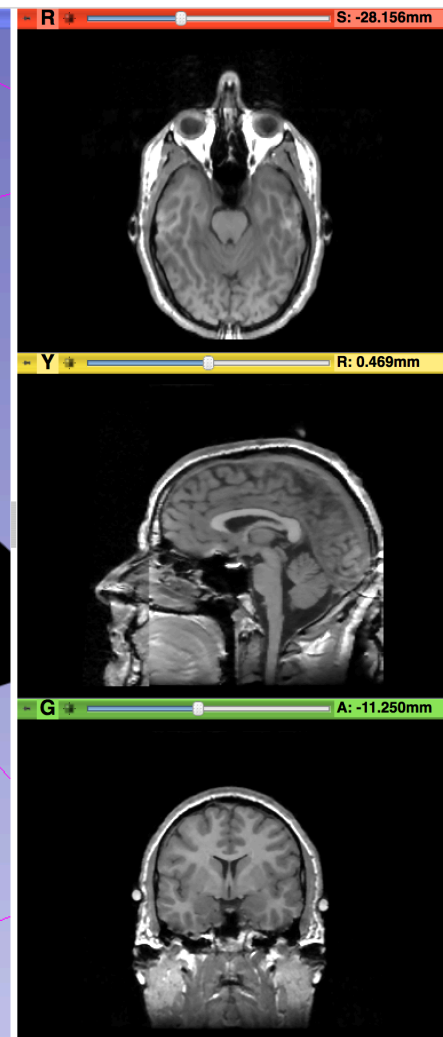
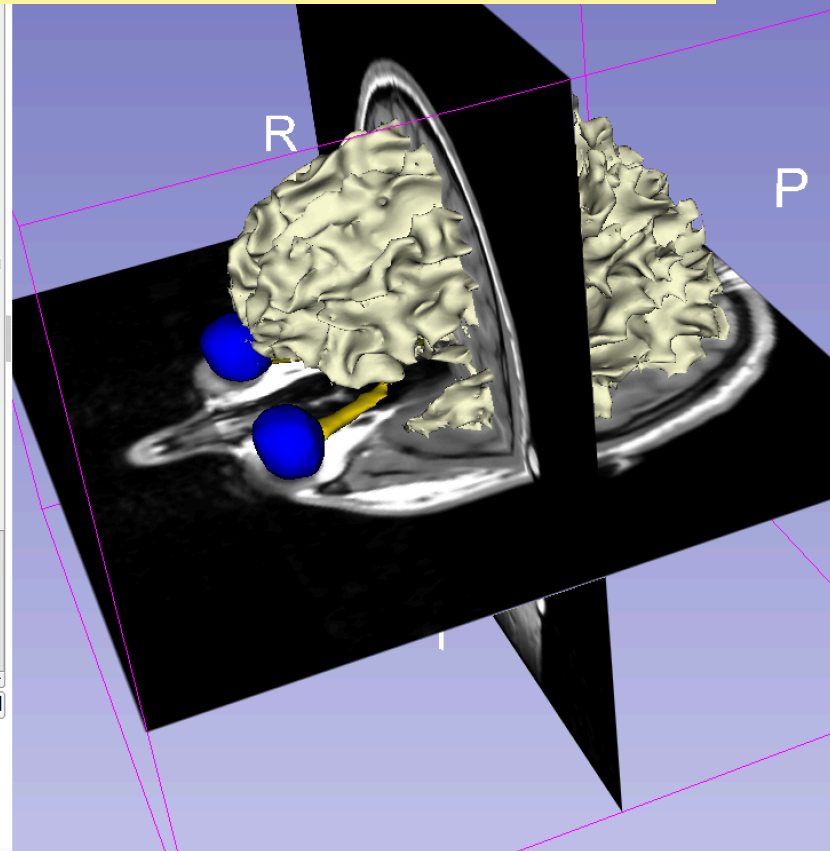


3D Visualization

Turn off the visibility of the skull to display the brain white matter model

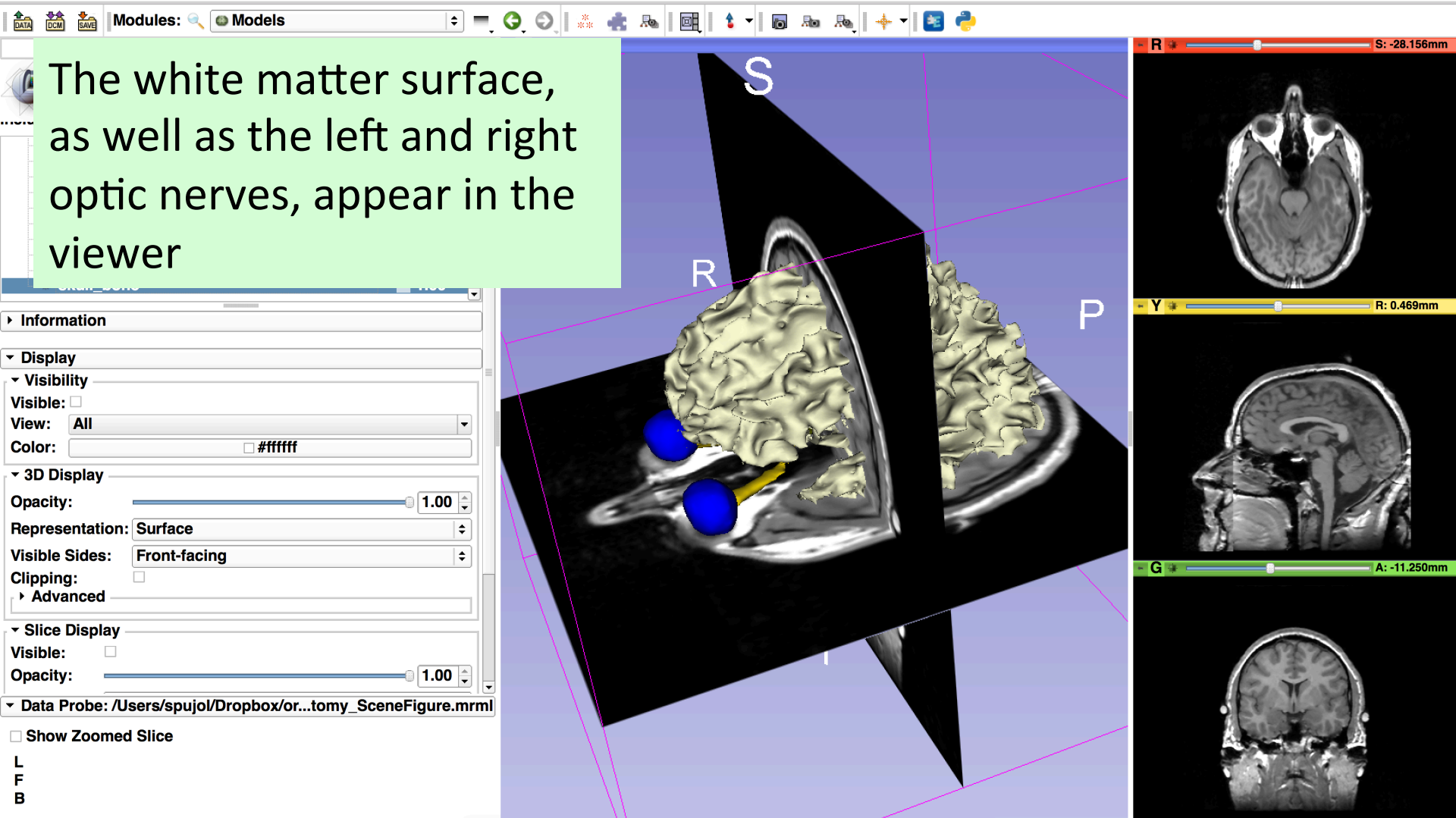
The screenshot shows the 3D Slicer software interface. The 'Models' panel on the left lists several anatomical models with their visibility and color settings. The 'skull_bone' model is selected, and its 'Visible' checkbox is unchecked. The 'Display' panel shows the 'skull_bone' model is currently set to 'Surface' representation with an opacity of 1.00. The 'Data Probe' at the bottom indicates the current scene is 'tomy_SceneFigure.mrml'.

Model Name	Visible	Color
hemispheric_white_matter	<input checked="" type="checkbox"/>	1.00
left_eyeball	<input checked="" type="checkbox"/>	1.00
optic_chiasm	<input checked="" type="checkbox"/>	1.00
optic_nerve_L	<input checked="" type="checkbox"/>	1.00
optic_nerve_R	<input checked="" type="checkbox"/>	1.00
optic_tract_L	<input checked="" type="checkbox"/>	1.00
optic_tract_R	<input checked="" type="checkbox"/>	1.00
right_eyeball	<input checked="" type="checkbox"/>	1.00
Skin	<input checked="" type="checkbox"/>	0.50
skull_bone	<input type="checkbox"/>	1.00



3D Visualization

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



3D Visualization

Select the **hemispheric_white matter.vtk** model

Check **Clipping** in the 3D Display tab

In the **Clipping Planes** tab, select the option **'Green Slice Clipping'** and check **'Negative'**

The screenshot shows the 3D Slicer interface with the following settings visible:

- Models:** hemispheric_white_matter (1.00), left_eyeball (1.00), optic_chiasm, optic_nerve_L
- 3D Display:** Clipping: (Advanced)
- Clipping Planes:**
 - Clipping Type: Intersection
 - Green Slice Clipping: Negative

3D Visualization

The image shows a screenshot of the 3D Slicer software interface. The main window displays a 3D visualization of a brain scan with a yellow callout box containing the text: "Use the coronal slider (green) to expose the optic chiasm." The callout box is highlighted in yellow. The software interface includes a top toolbar with various icons, a left sidebar with a model list (hemispheric white matter, left eyeball, optic chiasm, optic nerve L) and a properties panel with sections for Information, Display, Visibility, 3D Display, and Slice Display. The 3D view shows a brain slice with a yellow callout box pointing to the optic chiasm. The callout box contains the text: "Use the coronal slider (green) to expose the optic chiasm." The software interface also shows a right sidebar with three axial brain slices and a green coronal slider at the bottom.

3DSlicer

Models

- hemispheric white matter 1.00
- left eyeball 1.00
- optic_chiasm 1.00
- optic nerve L 1.00

Information

Display

Visibility

Visible:

View: All

Color: #fafad2

3D Display

Opacity: 1.00

Representation: Surface

Visible Sides: Front-facing

Clipping:

Advanced

Slice Display

Visible:

Opacity: 1.00

Mode: Intersection

Line Width: 1 px

Color Table:

Scalars

Clipping

Green slice Clipping: Positive Negative

Keep only whole cells when clipping

Data Probe: /Users/spujol/Dropbox/or...tomy_SceneFigure.mrml

R

P

L

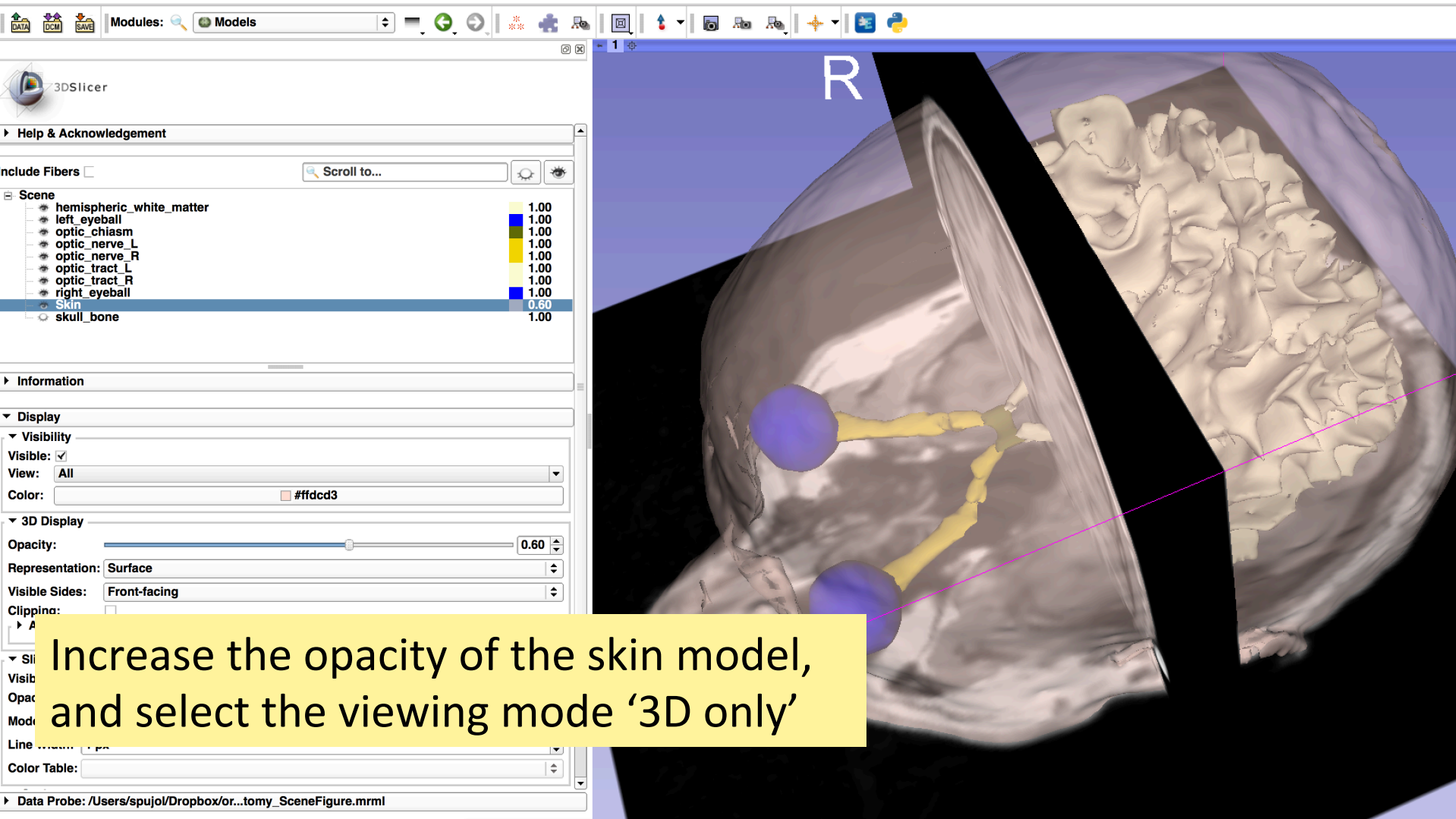
R: -35.656mm

Y: R: 0.469mm

G: A: -11.250mm

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

3D Visualization



3DSlicer

Help & Acknowledgement

include Fibers Scroll to...

Scene

- 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

Color: #ffdcd3

3D Display

Opacity: 0.60

Representation: Surface

Visible Sides: Front-facing

Clipping:

Color Table:

Data Probe: /Users/spujol/Dropbox/or...tomy_SceneFigure.mrml

R

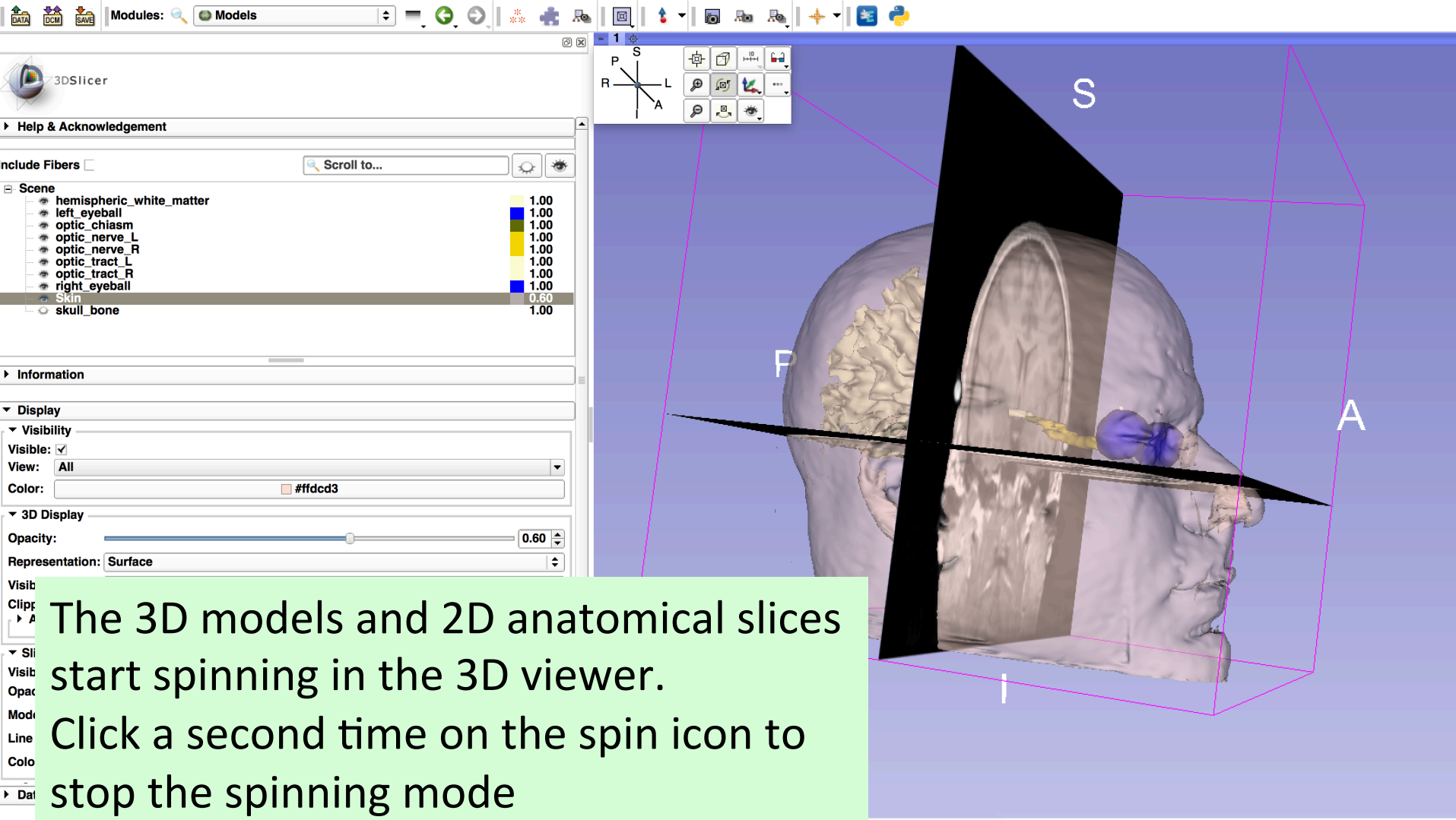
Increase the opacity of the skin model, and select the viewing mode '3D only'

3D Visualization

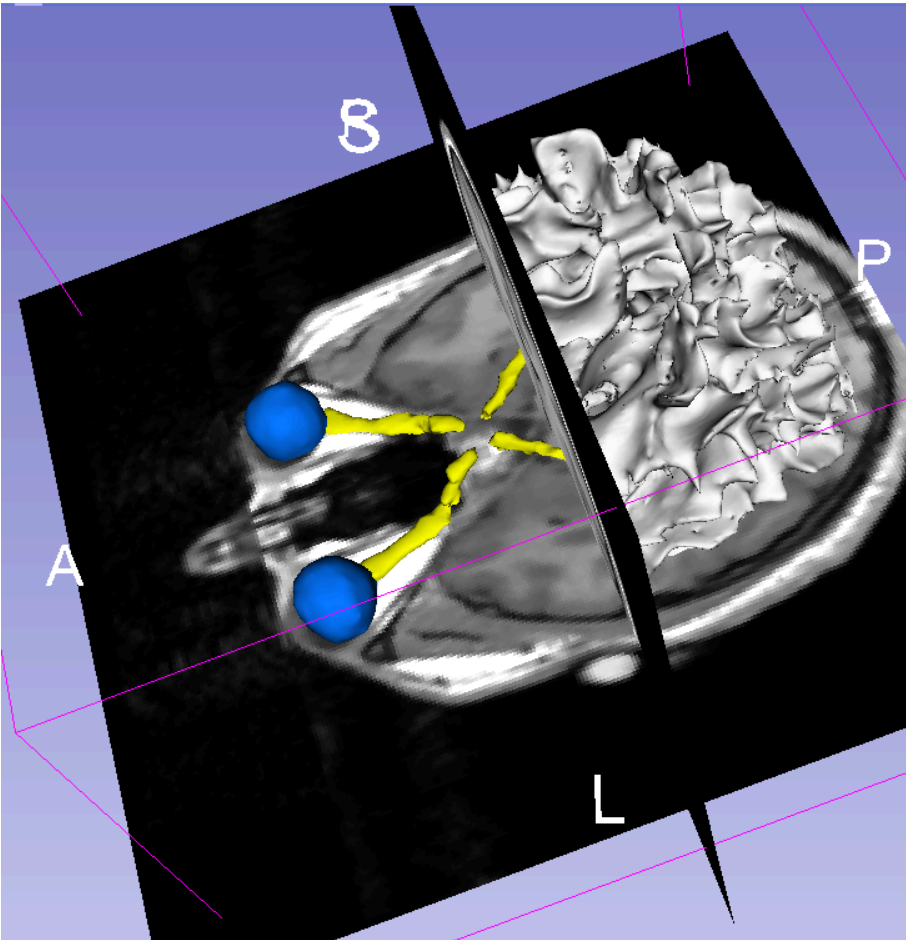
The image shows the 3D Slicer software interface. On the left, the 'Scene' panel lists various anatomical structures with their visibility and color settings. The 'Display' panel shows the current view settings, including 'Visible: All', 'Color: #ffdc3', and '3D Display' settings like 'Opacity: 0.60' and 'Representation: Surface'. The main 3D viewer displays a brain model with a yellow fiber tract and a blue pin icon. A red arrow points to the blue pin icon in the top-left corner of the 3D viewer. A yellow text box at the bottom left contains the following instructions:

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

3D Visualization



Slicer4 minute tutorial



This tutorial was a short introduction on interactive 3D visualization of MRI data and 3D models in Slicer.

The Slicer4 training compendium contains a series of tutorials and pre-computed datasets to learn how to use the software.

Acknowledgments



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