

# **Basics of Data Loading and 3D Visualization in 3D Slicer**

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# Overall Goal

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This tutorial is an introduction to the basics of loading and viewing DICOM images and 3D models in 3D Slicer.

# Learning Objectives

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- Following this tutorial, you will be able
- to load and visualize DICOM images in Slicer
- to perform volume rendering of CT data
- to load and visualize 3D models reconstructed from MRI data

# Tutorial materials

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- 3D Slicer version 5.10
- 3D VisualizationDataSet.zip

# Tutorial dataset

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The file 3DVisualizationDataset.zip contains two directories:

- dataset1\_Thorax\_Abdomen
- dataset2\_Head

Unzip the file 3DVisualizationDataset.zip on your computer to access the datasets

# Disclaimer

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- 3D Slicer is a free open source software application distributed under a BSD style license.
- The software is not FDA approved or CE-Marked, and is for research use only.

Tutorial Outline

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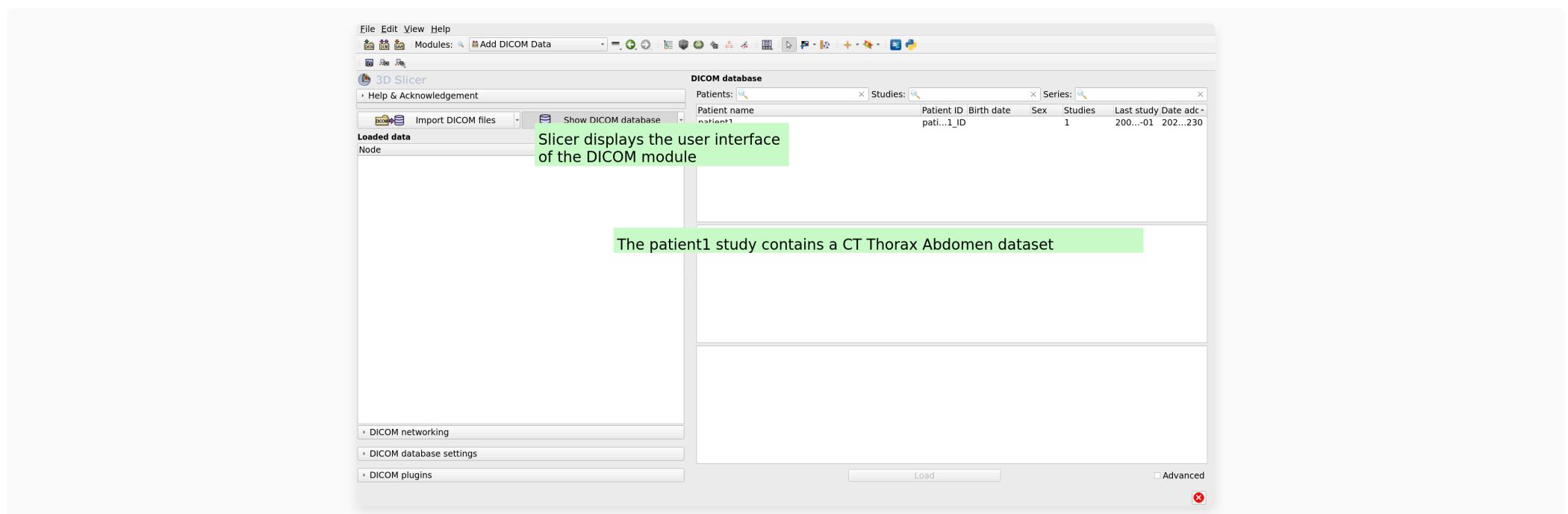
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- Part 1: Loading and Viewing DICOM data
- Part 2: Volume Rendering
- Part 3: Loading and Viewing 3D models

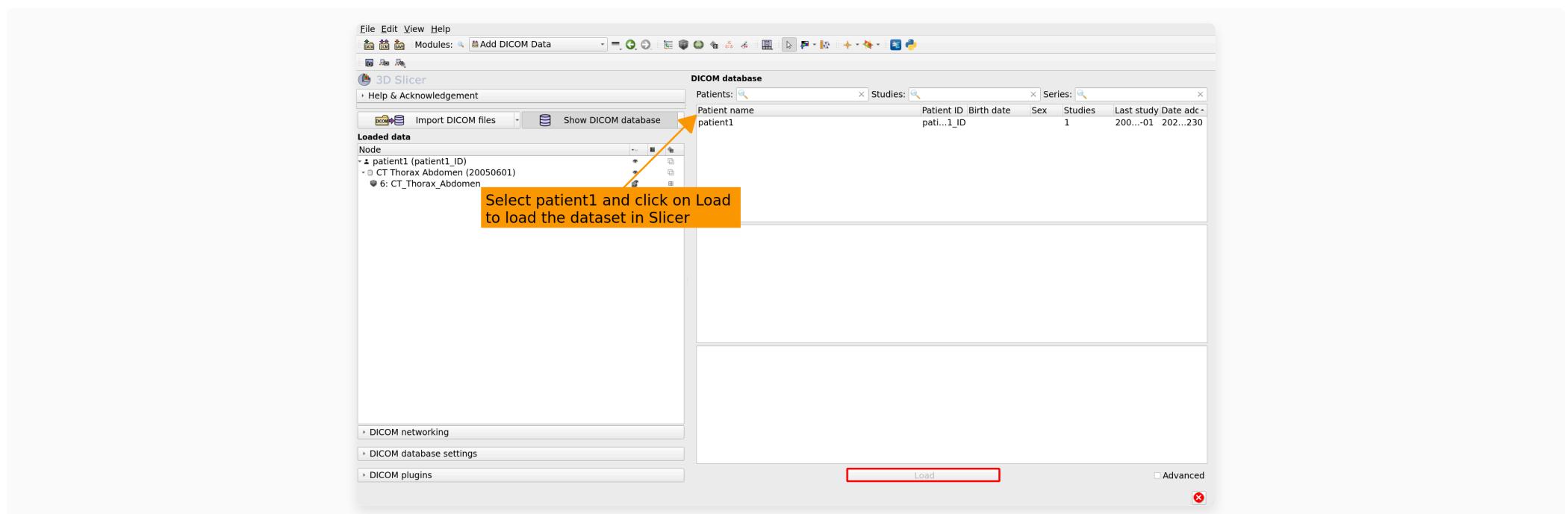
# Part 1: DICOM Data Loading

# Loading a DICOM volume

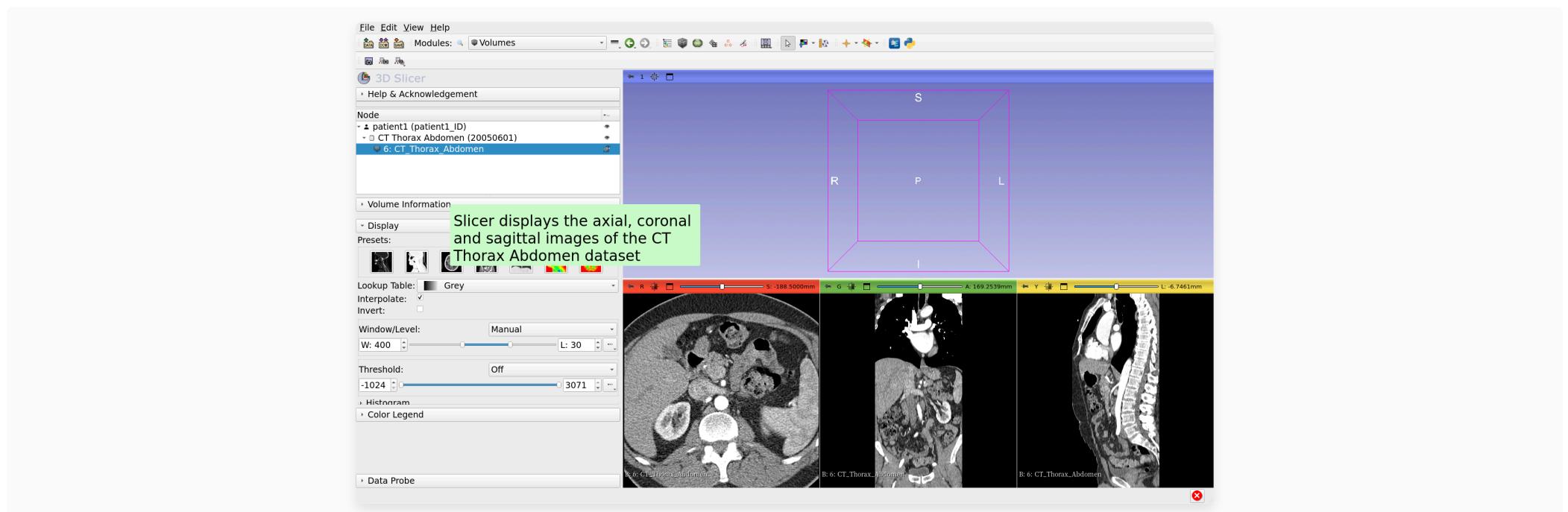
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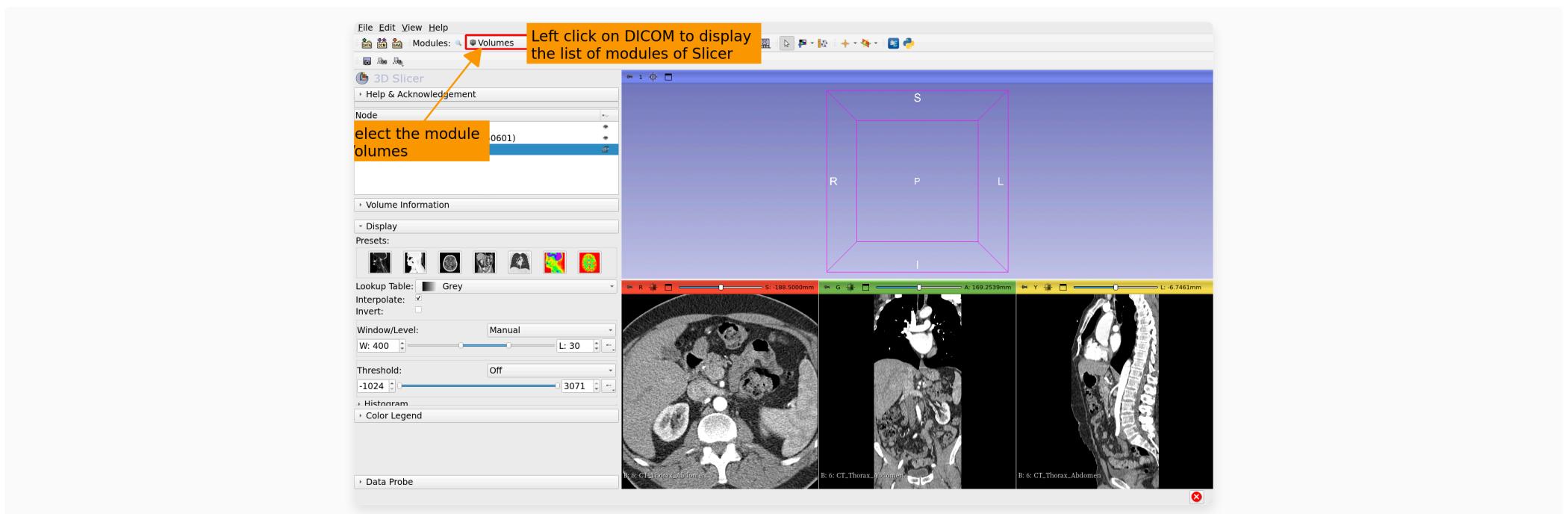
# Loading a DICOM volume



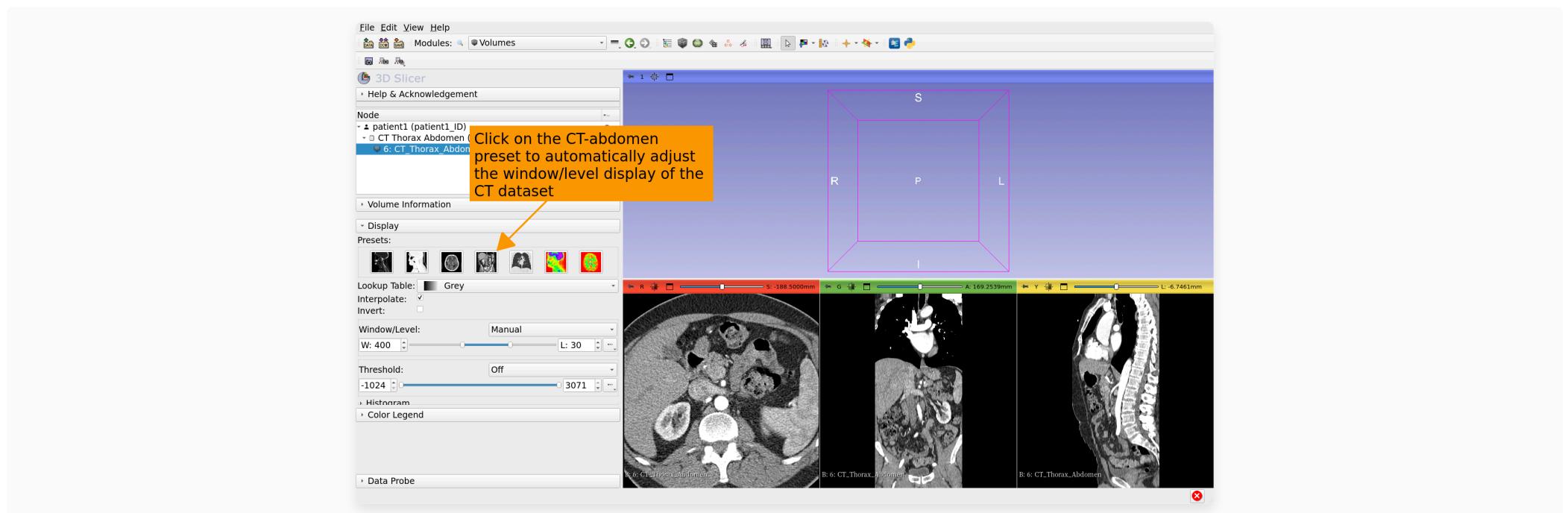
# Visualizing DICOM images



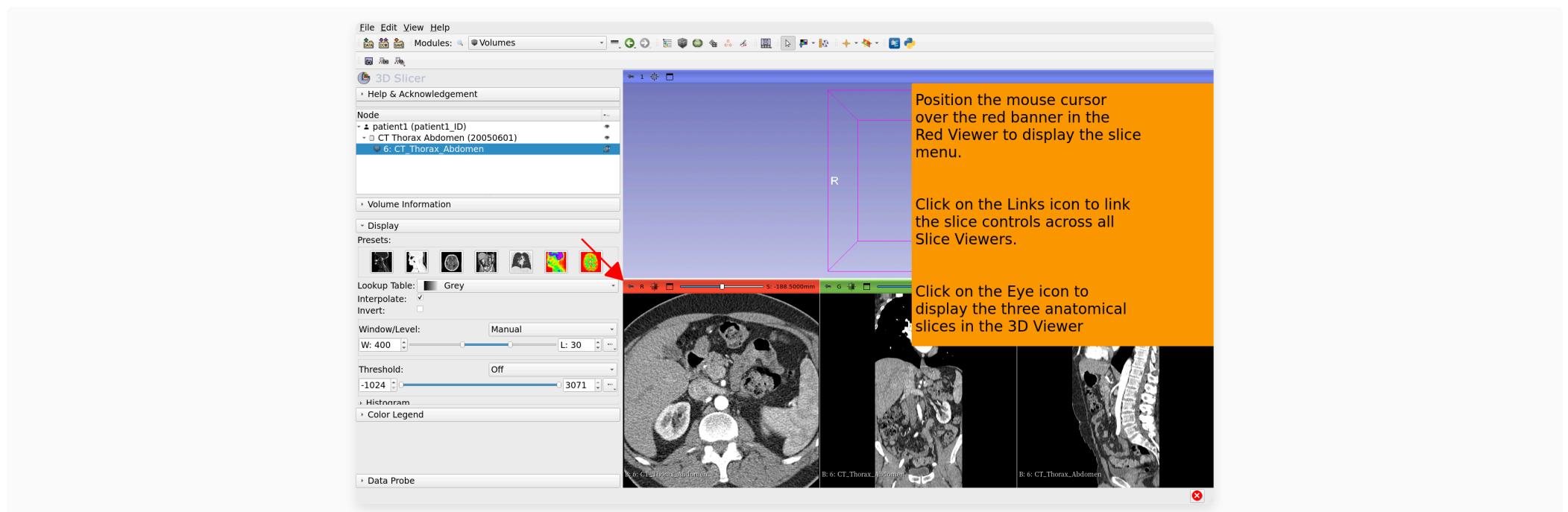
# Visualizing DICOM images



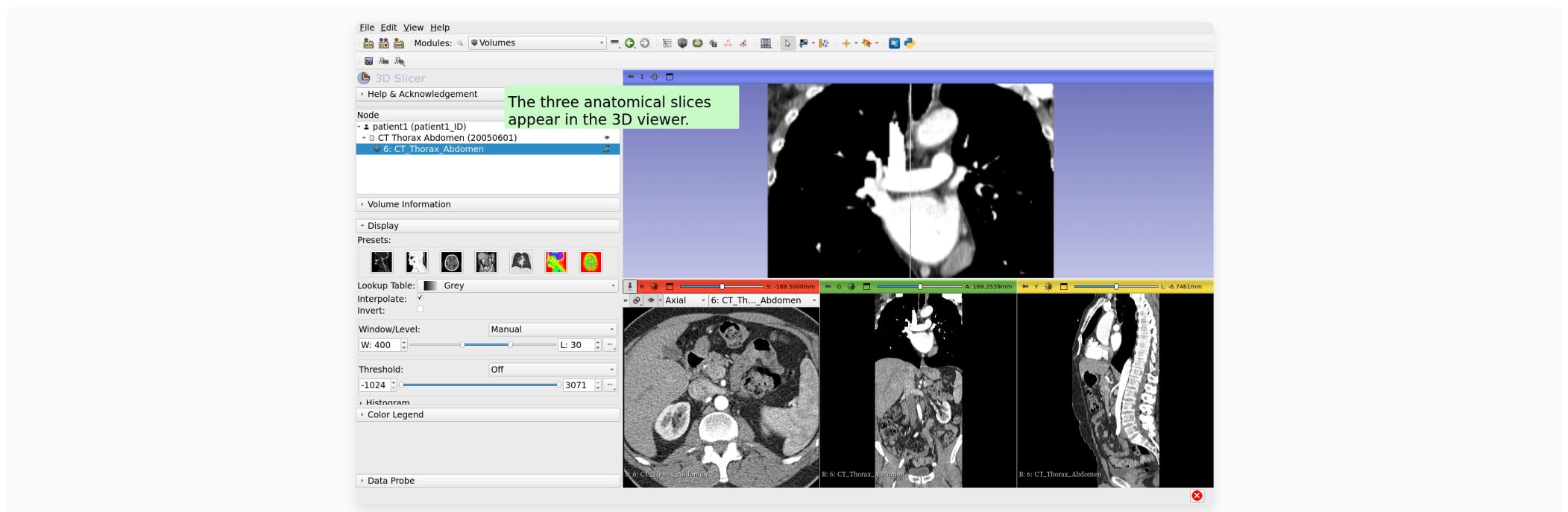
# Visualizing DICOM images



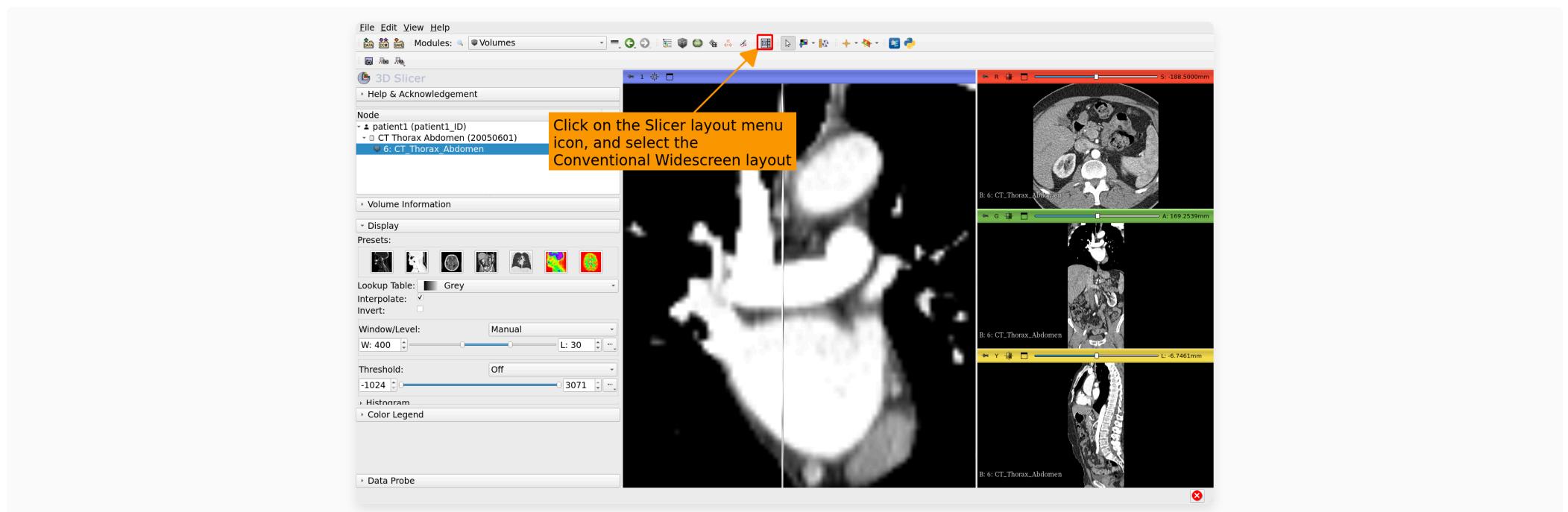
# Visualizing DICOM images



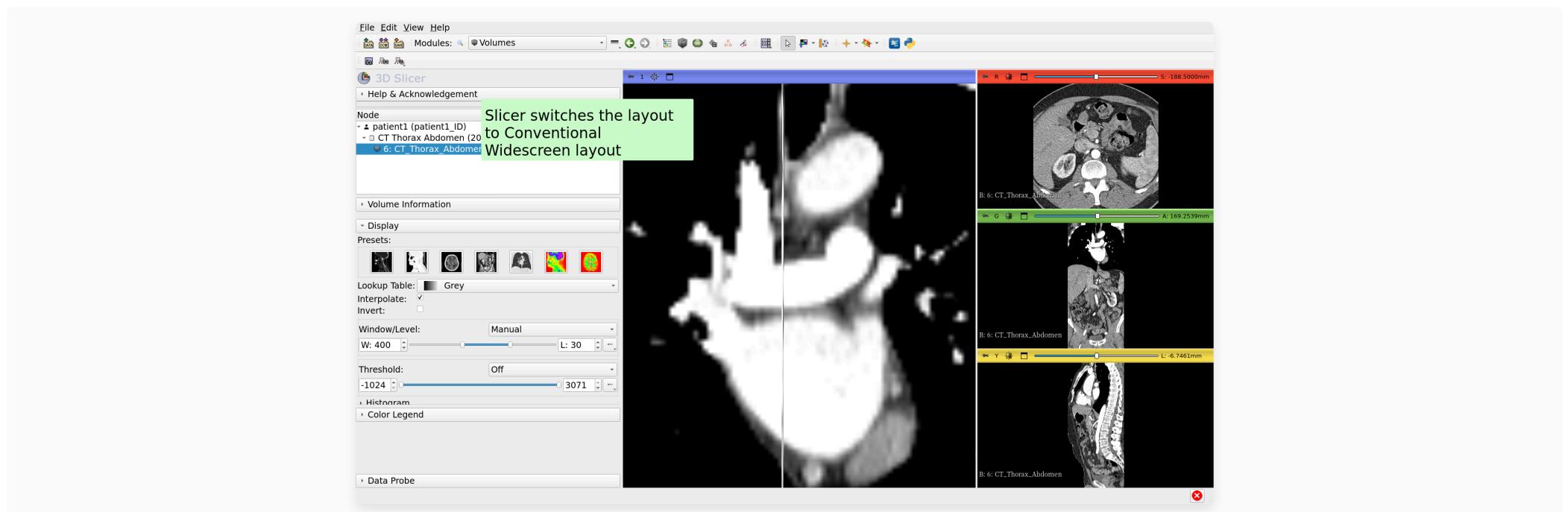
# Visualizing DICOM images



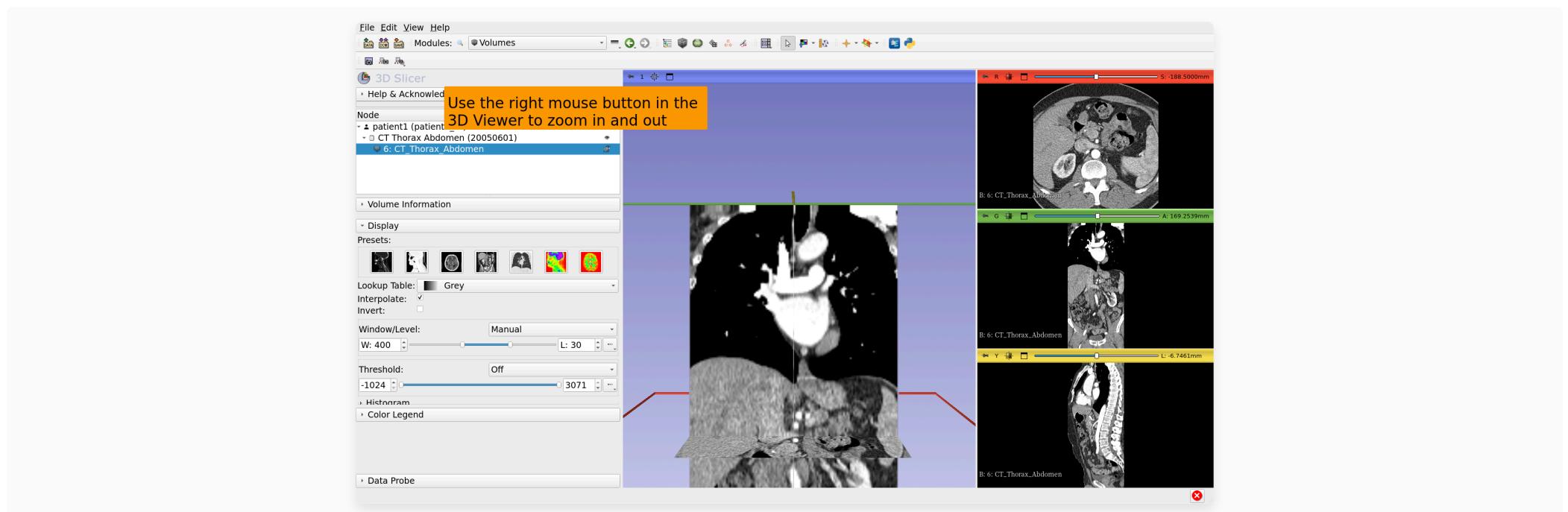
# Visualizing DICOM images



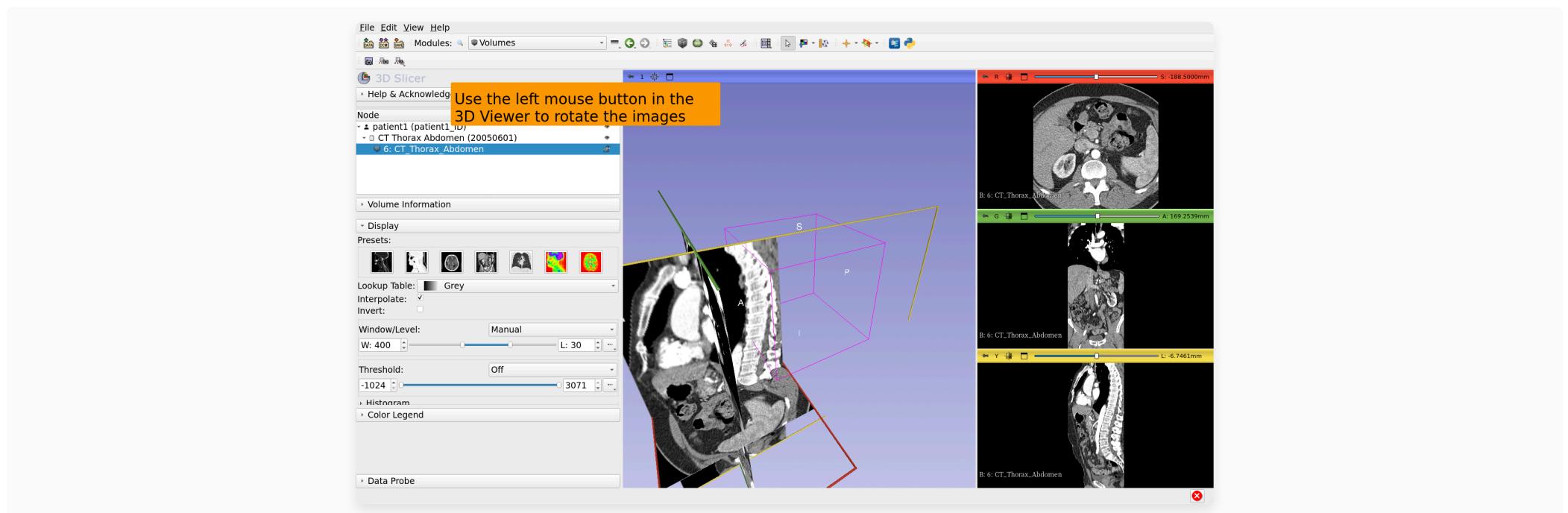
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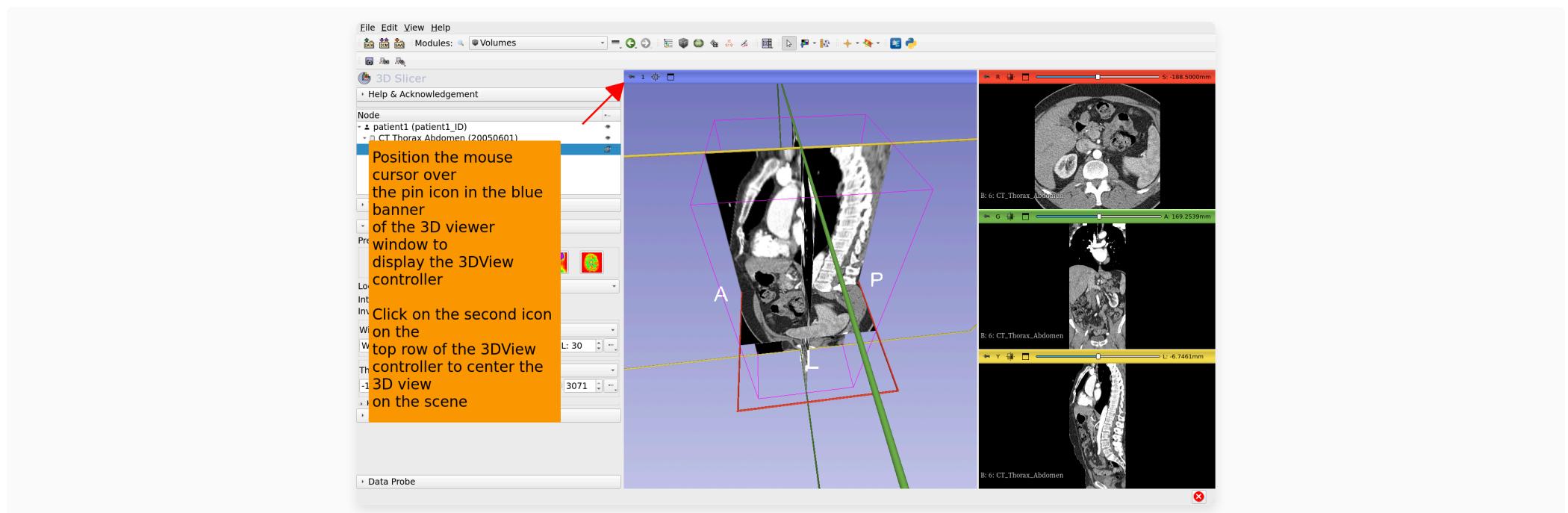
# Visualizing DICOM images



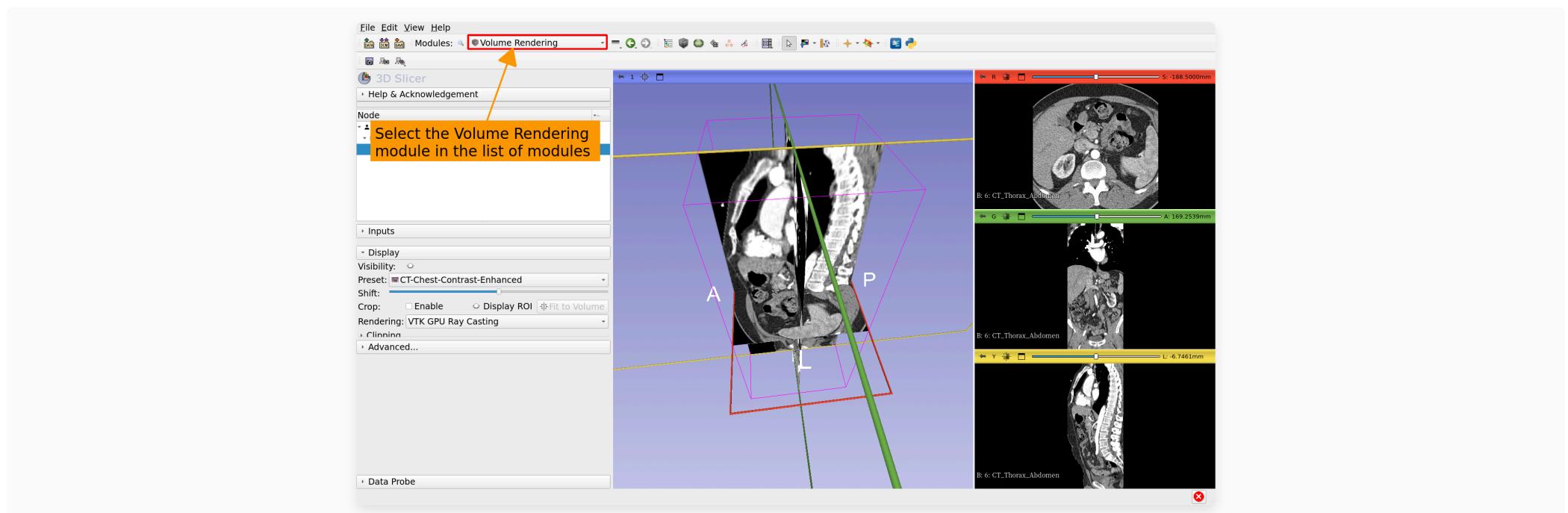
# Visualizing DICOM images



# 3D Viewer Controller



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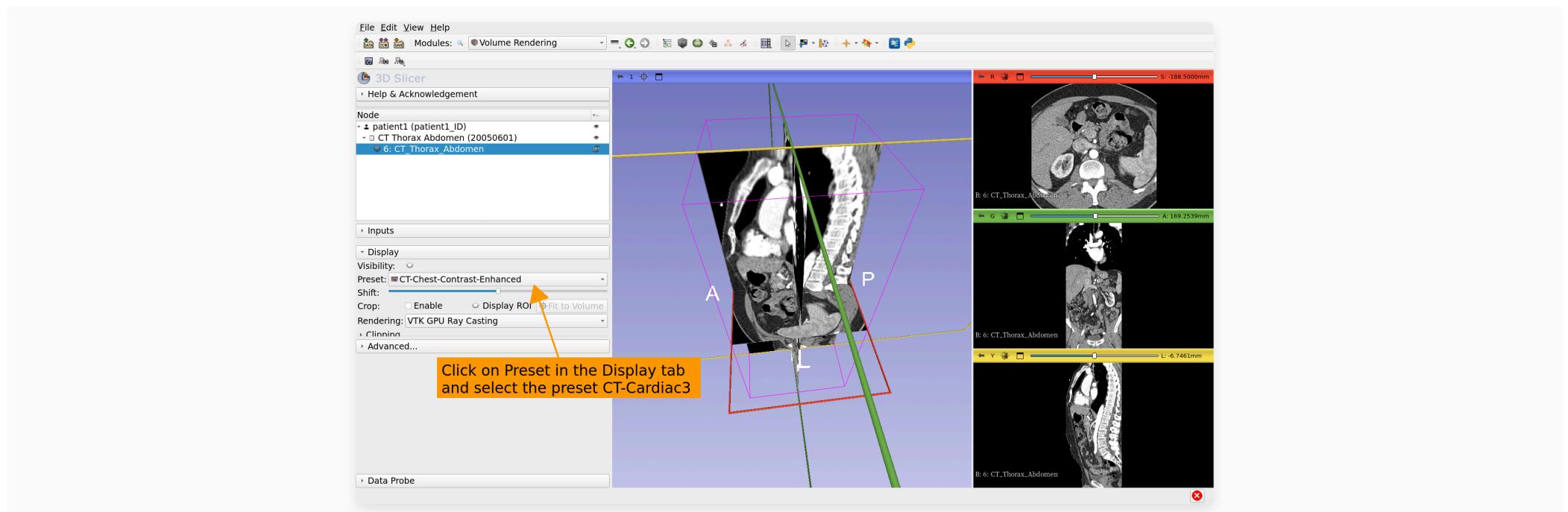
# Part 2: Volume Rendering

# Volume Rendering

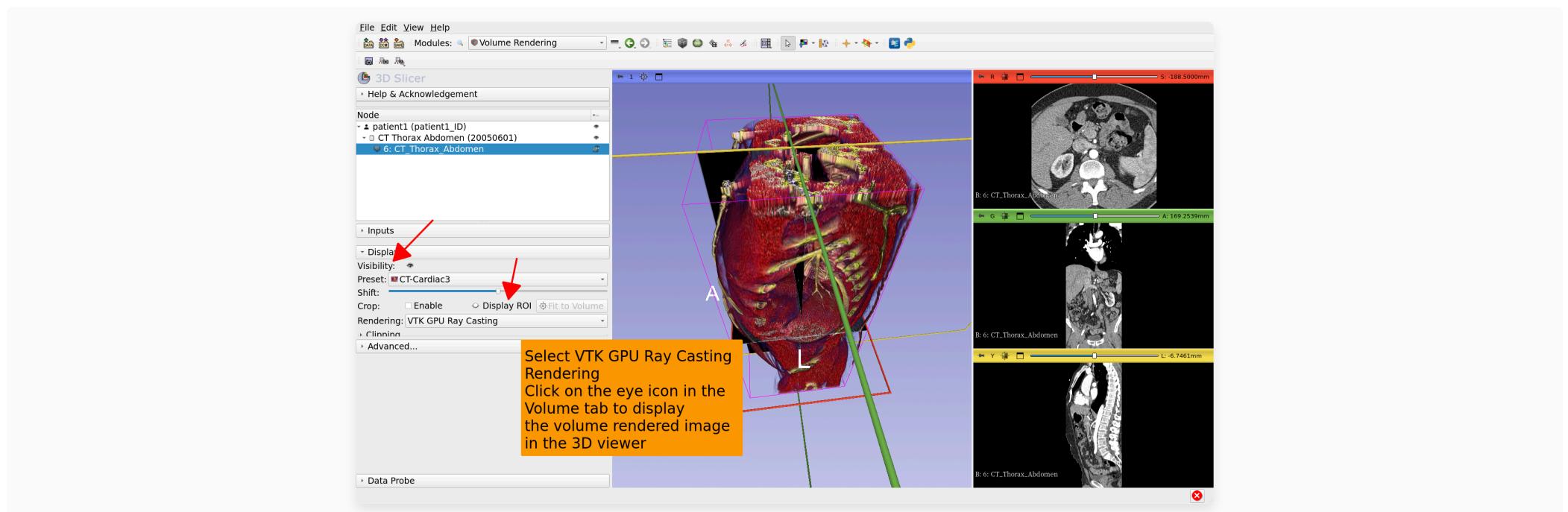
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- Volume rendering techniques enable 3D visualization of 3D datasets
- The Volume Rendering module in Slicer enables interactive 3D visualization of DICOM images

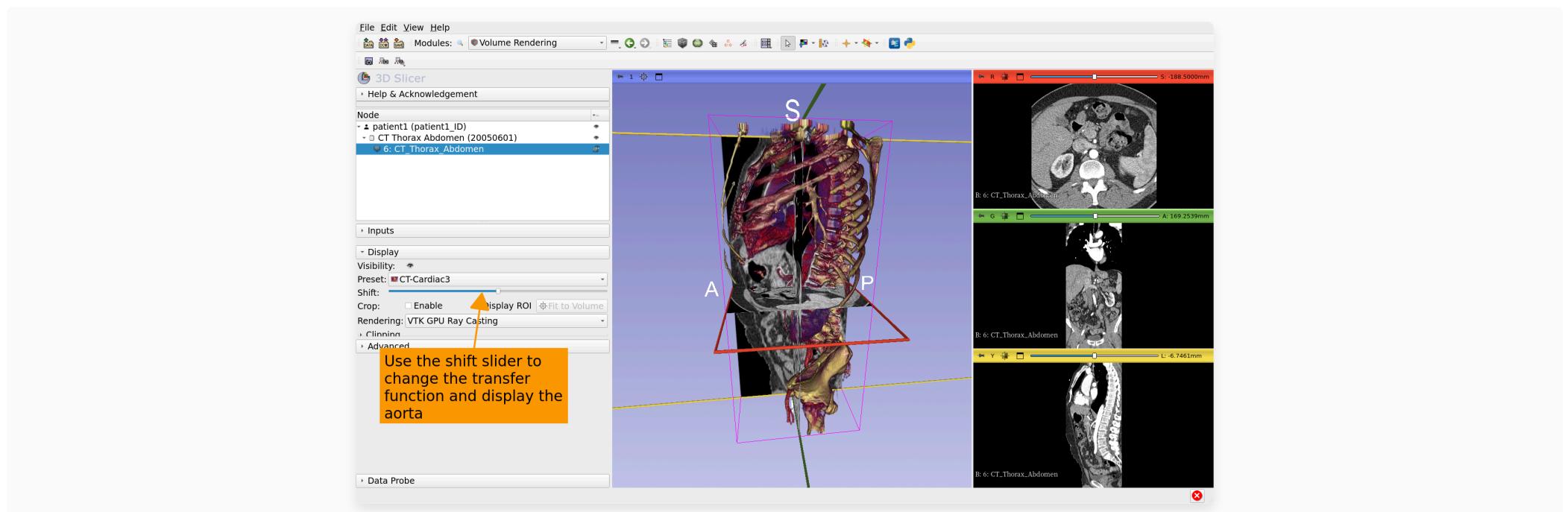
# Volume Rendering



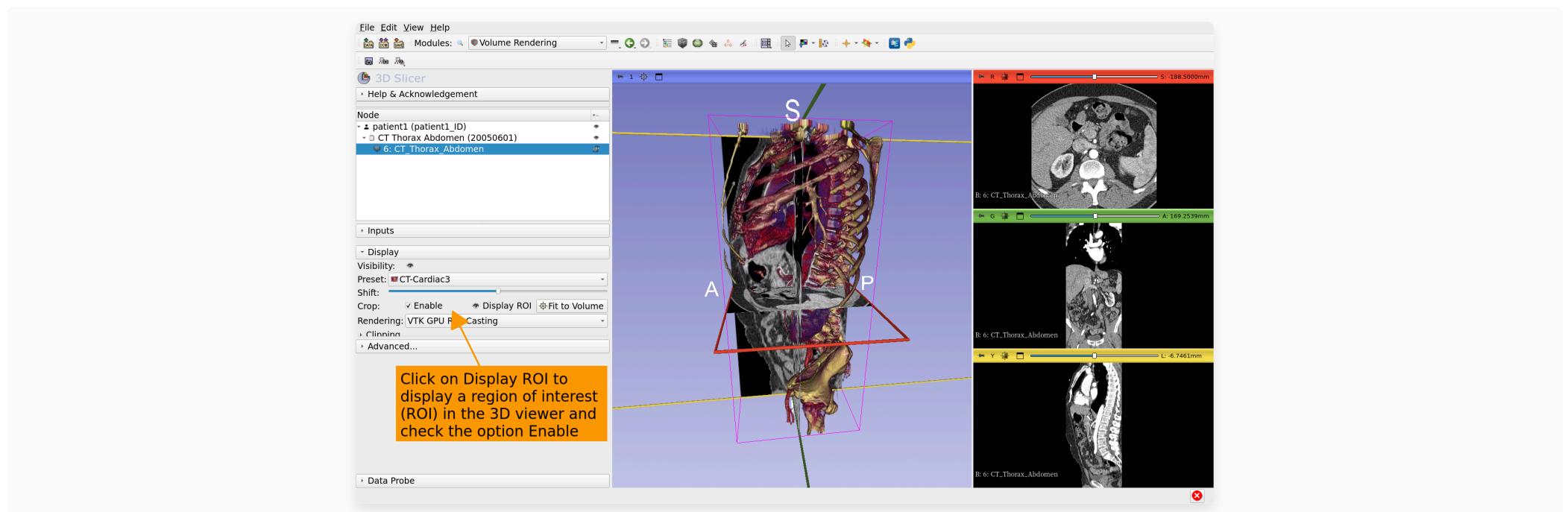
# Volume Rendering



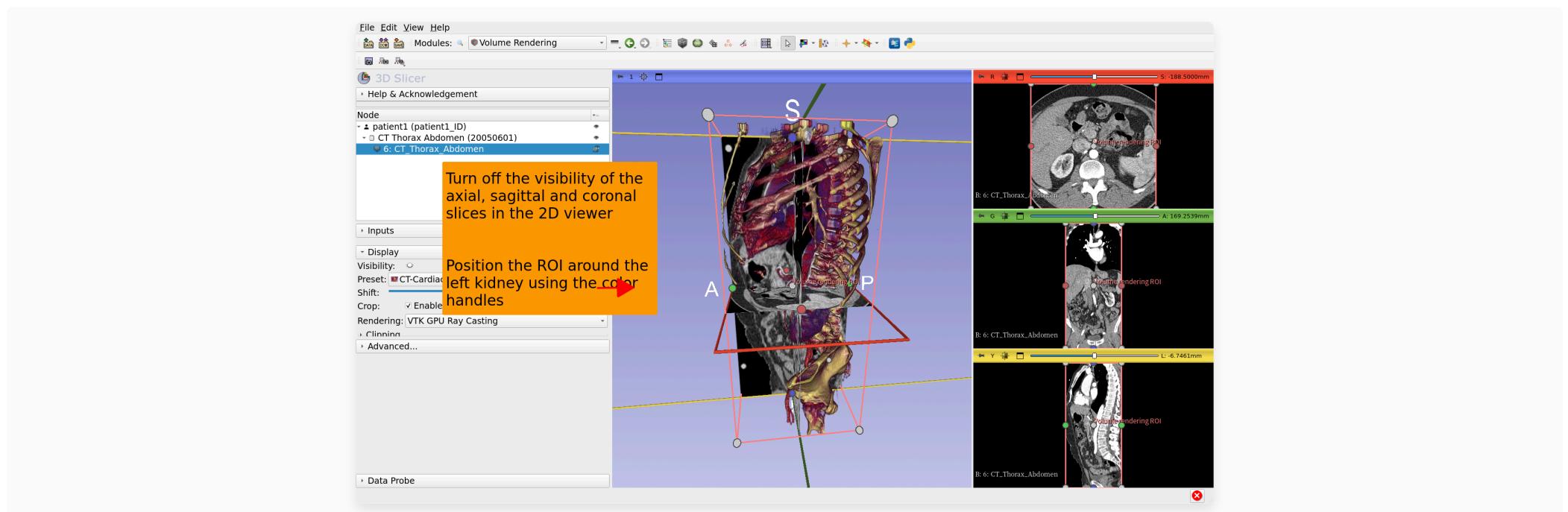
# Volume Rendering



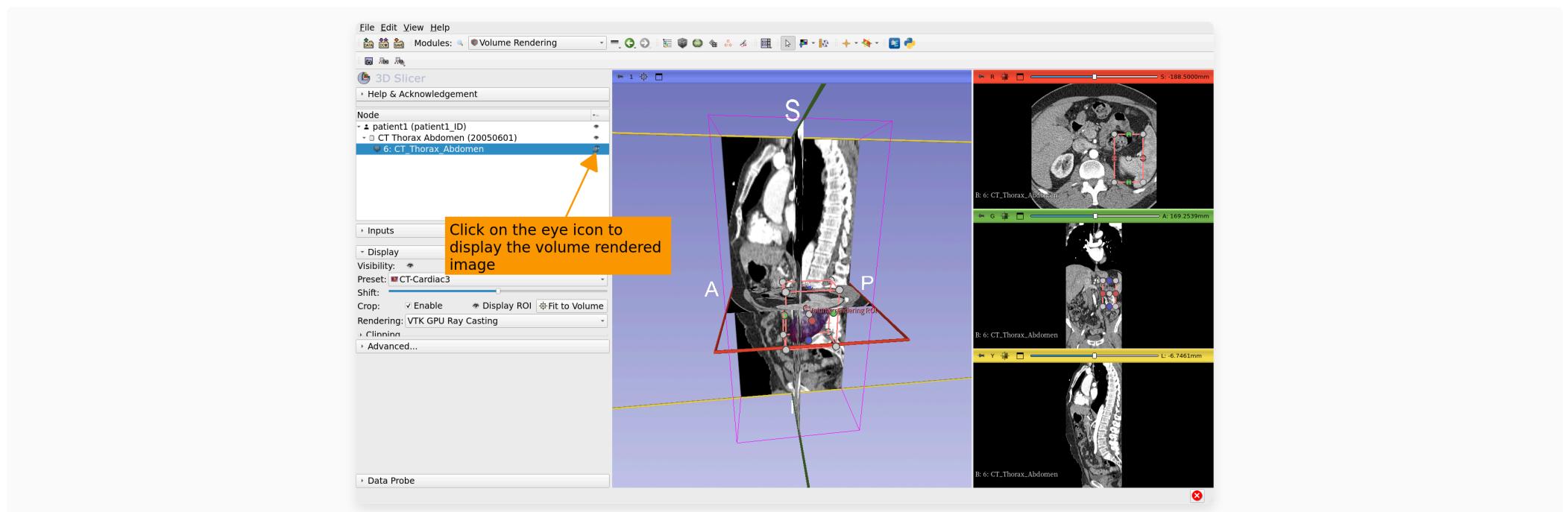
# Volume Rendering



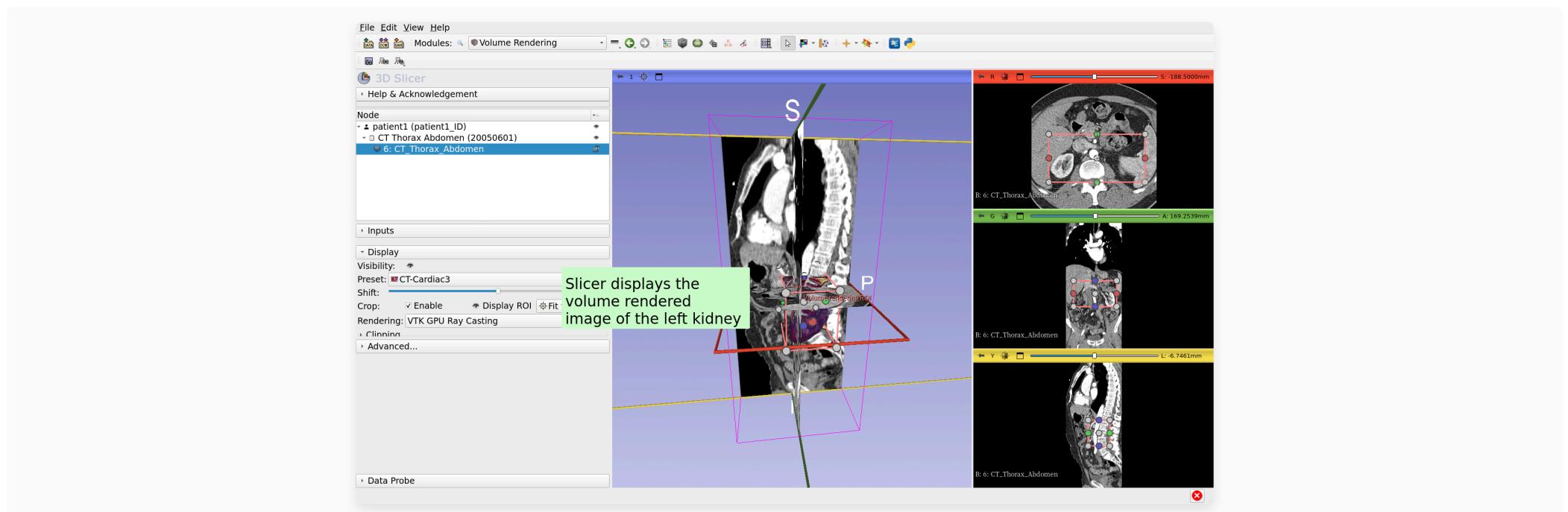
# Volume Rendering



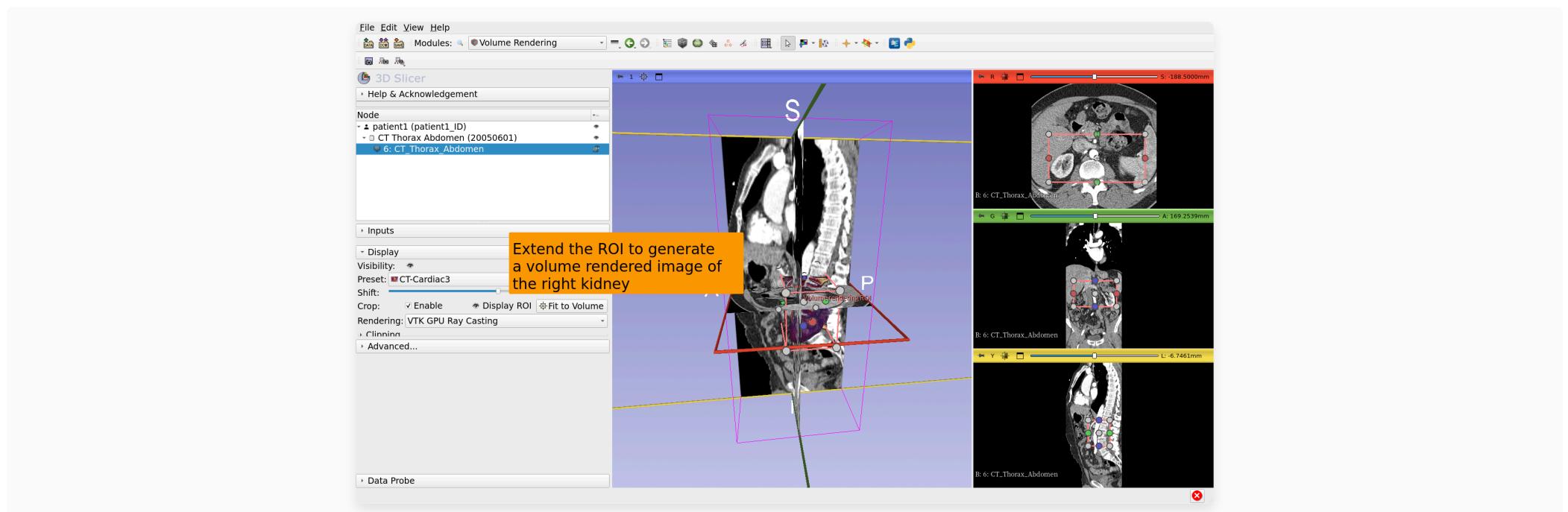
# Volume Rendering



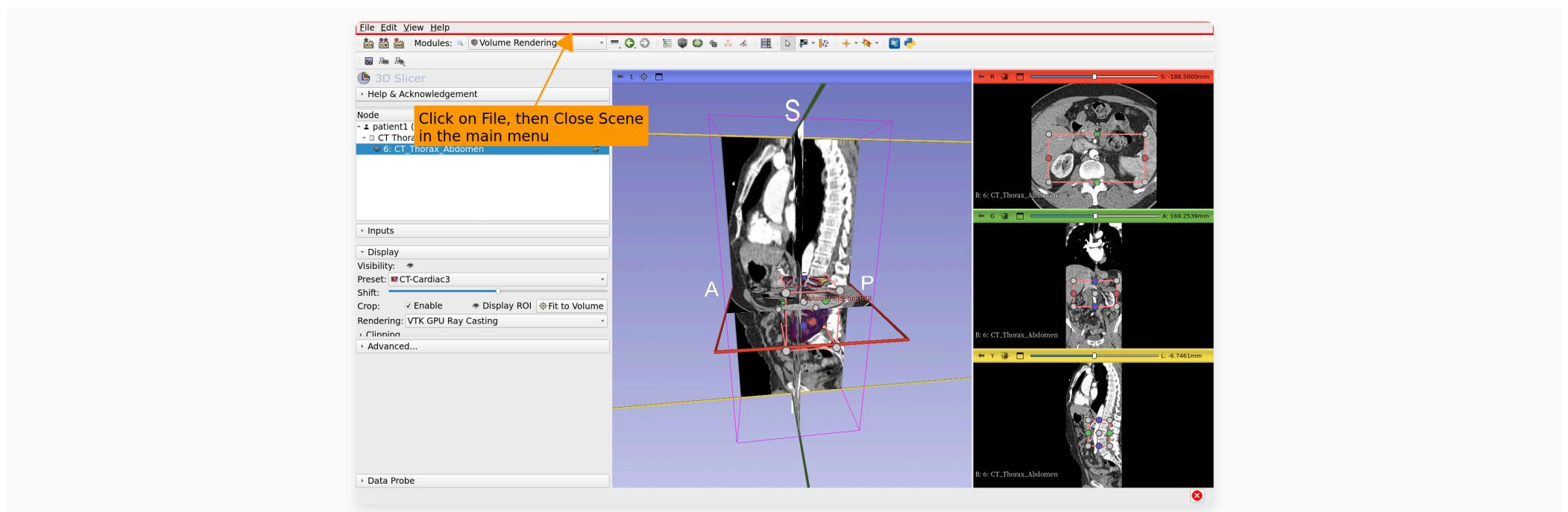
# Volume Rendering



# Volume Rendering



# Volume Rendering



# Part 3: Loading and viewing 3D models

# Tutorial dataset

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- The directory dataset2\_Head contains the Slicer scene called Head\_scene.mrb
- The scene contains 3D models from the SPL brain atlas developed by the department of Radiology at Brigham and Women's Hospital, Harvard Medical School (NIH P41 RR013218, NIH R01 MH05074)

# Slicer Scene

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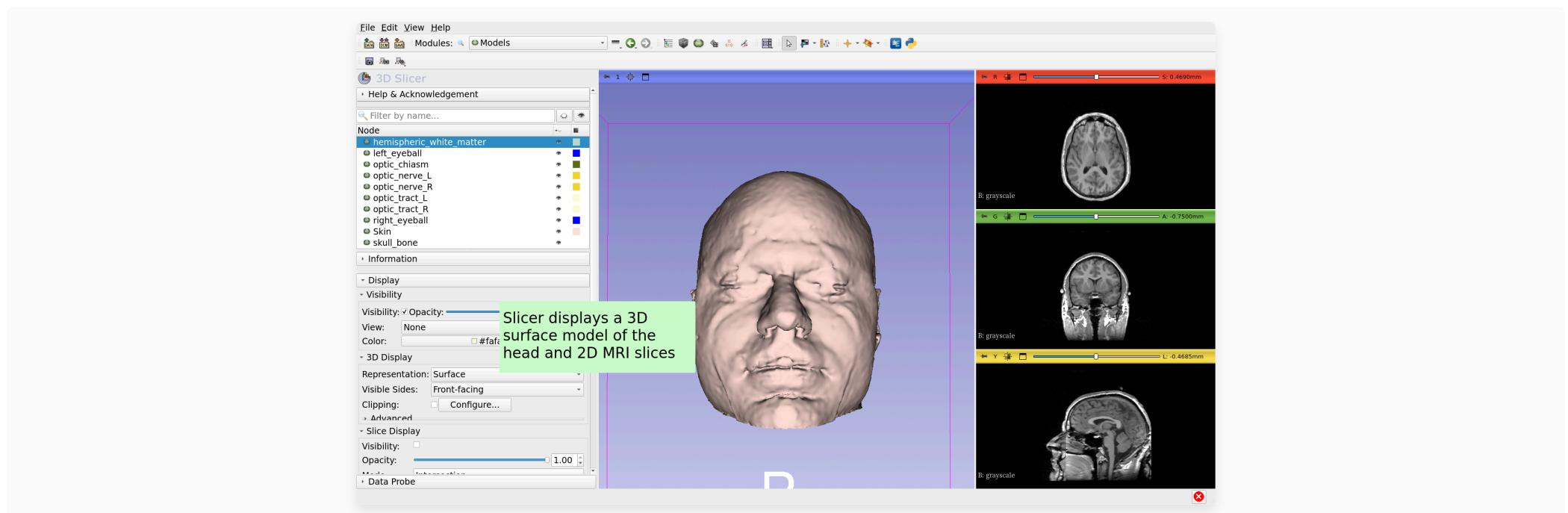
Slicer stores all loaded data in a repository called a scene

Each data set, such as an image volume, surface model, or point set, is represented as a node in a Slicer scene.

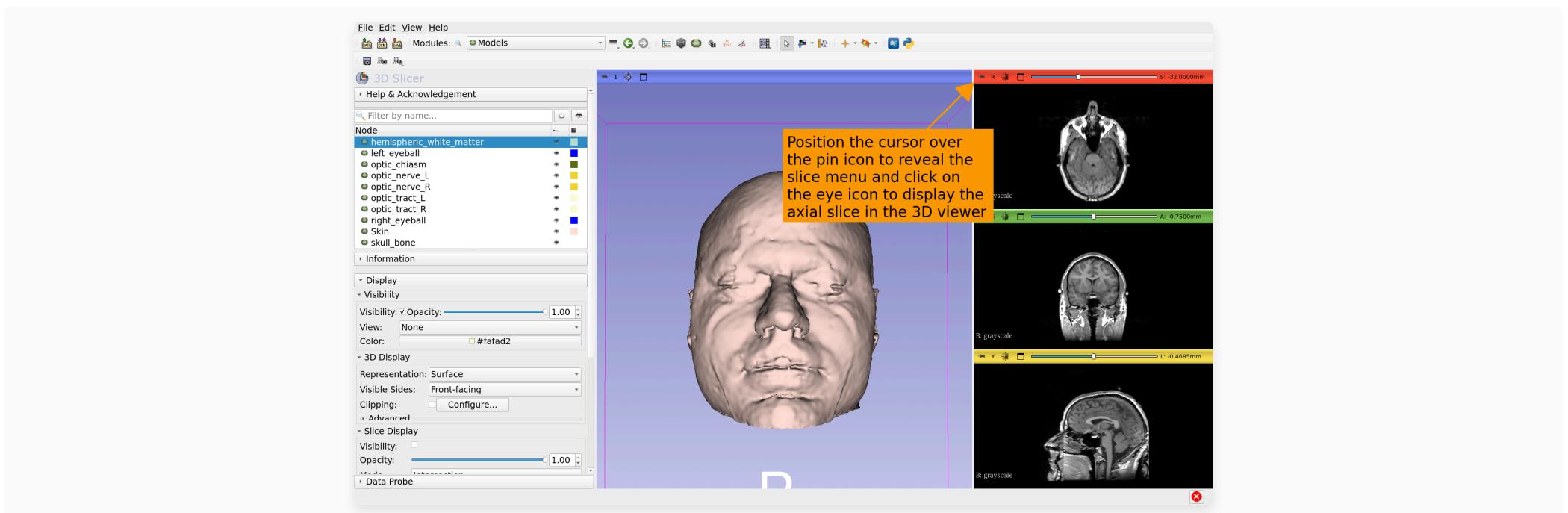
All Slicer modules operate on the data stored in a Slicer scene.

# Loading a Scene

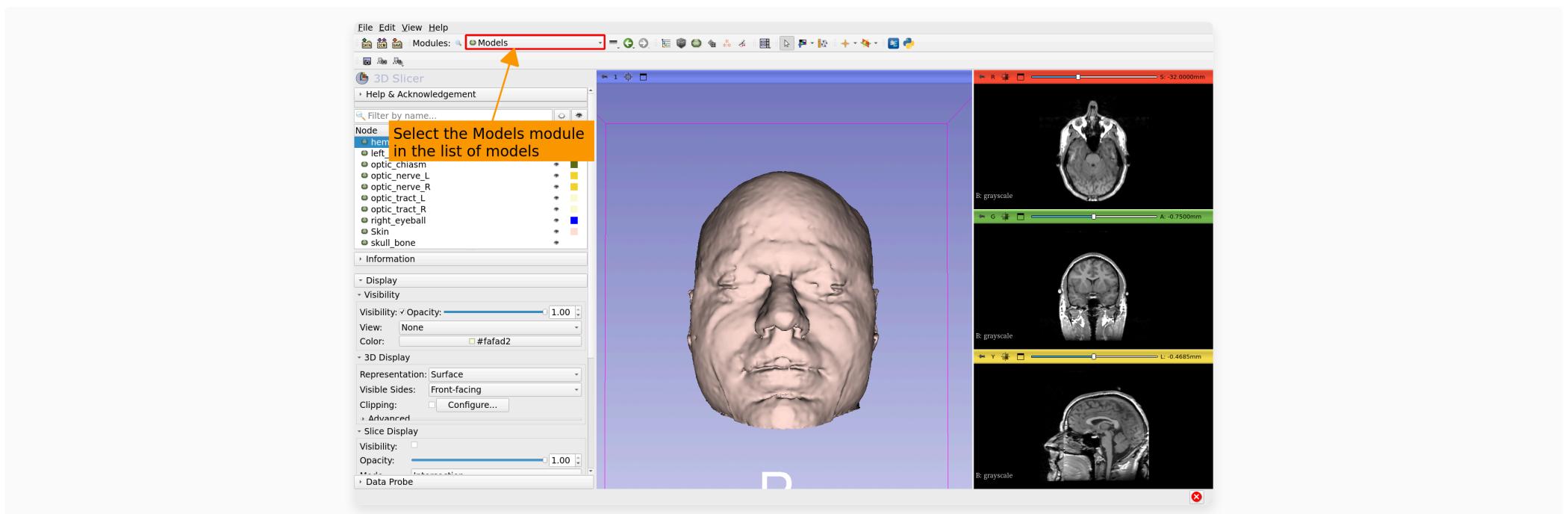
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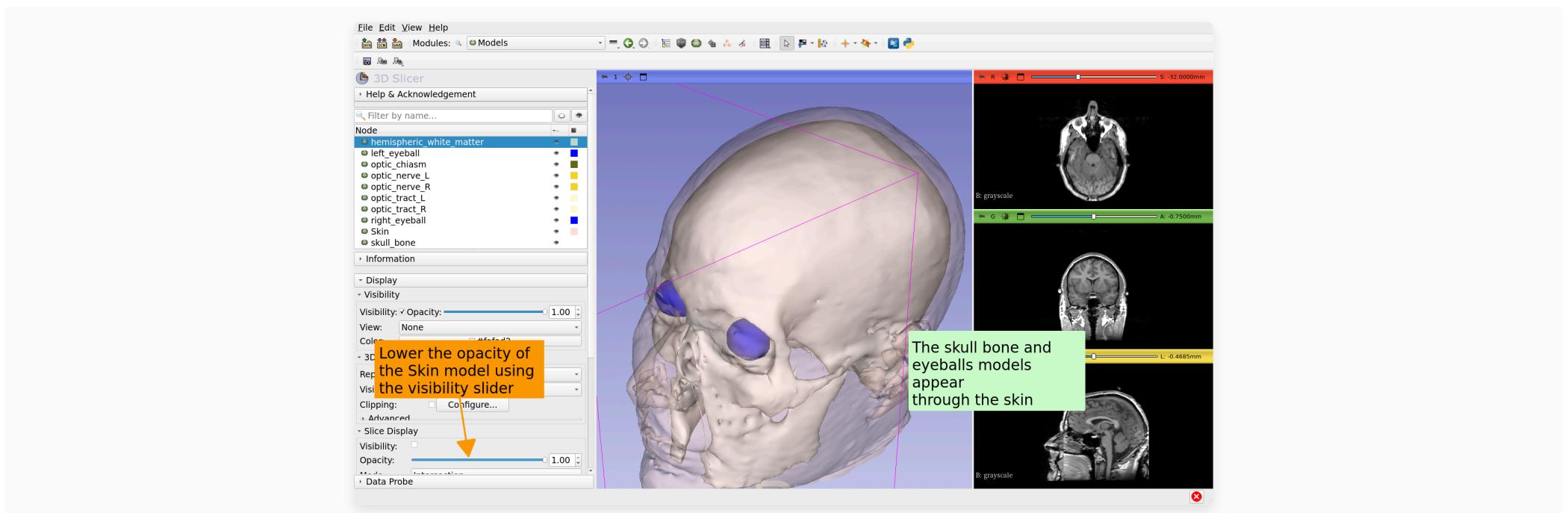
# Viewing 3D models



# Viewing 3D models

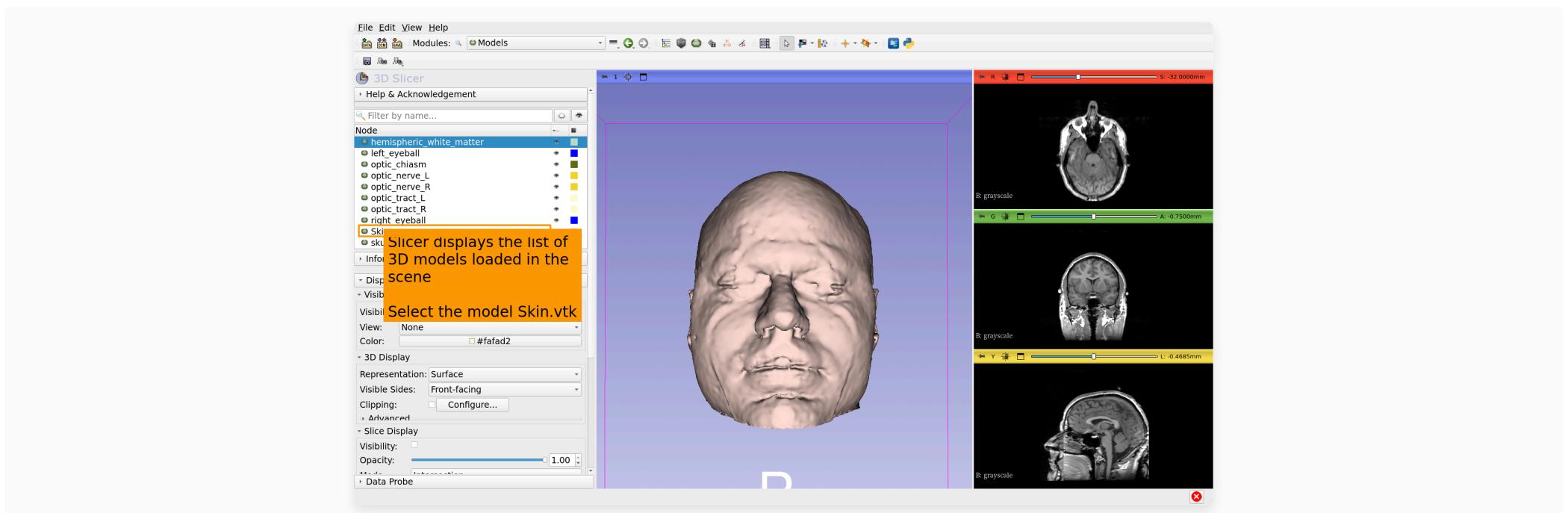


# Viewing 3D models

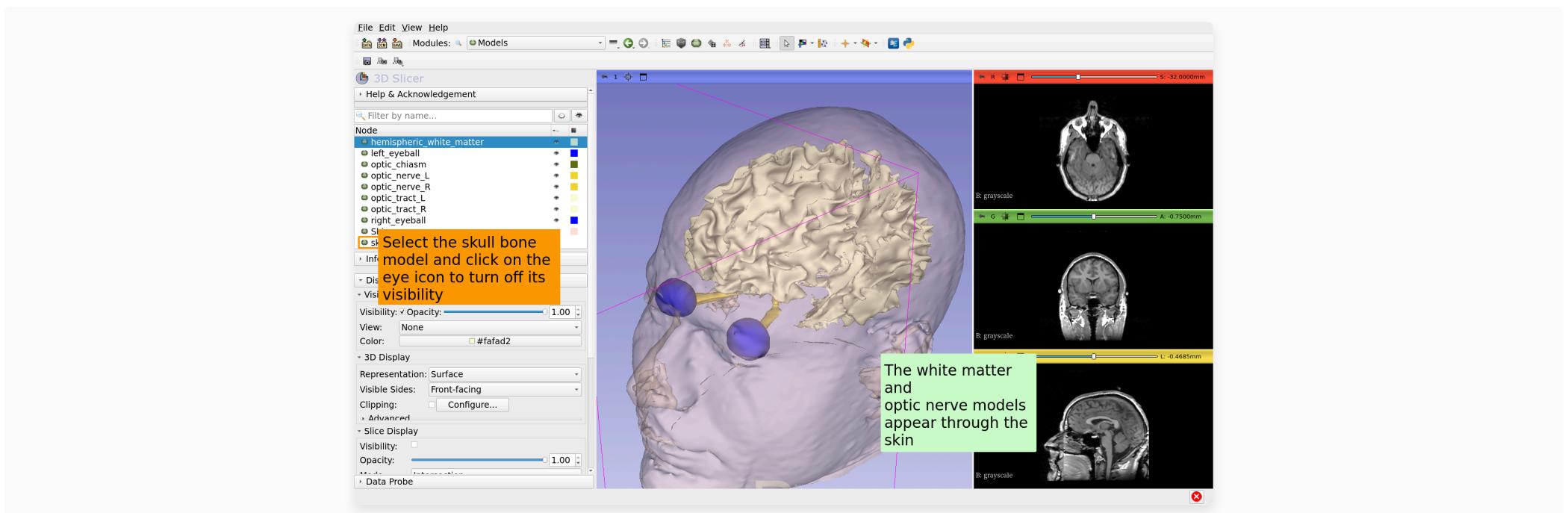


# Viewing 3D models

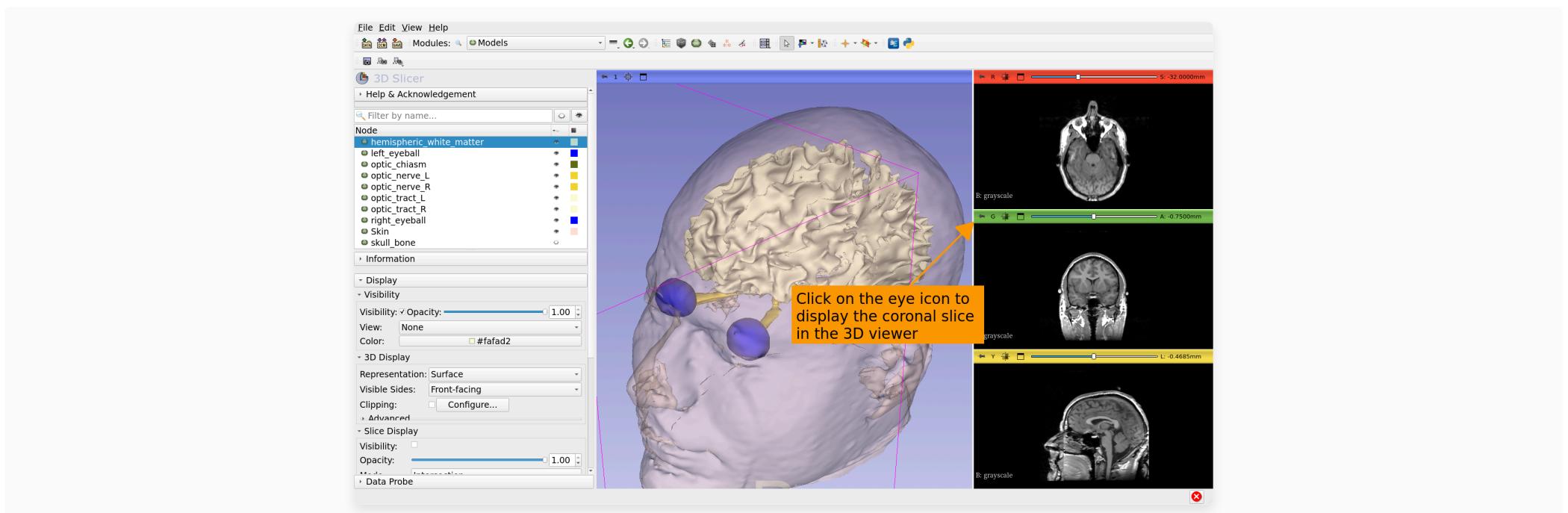
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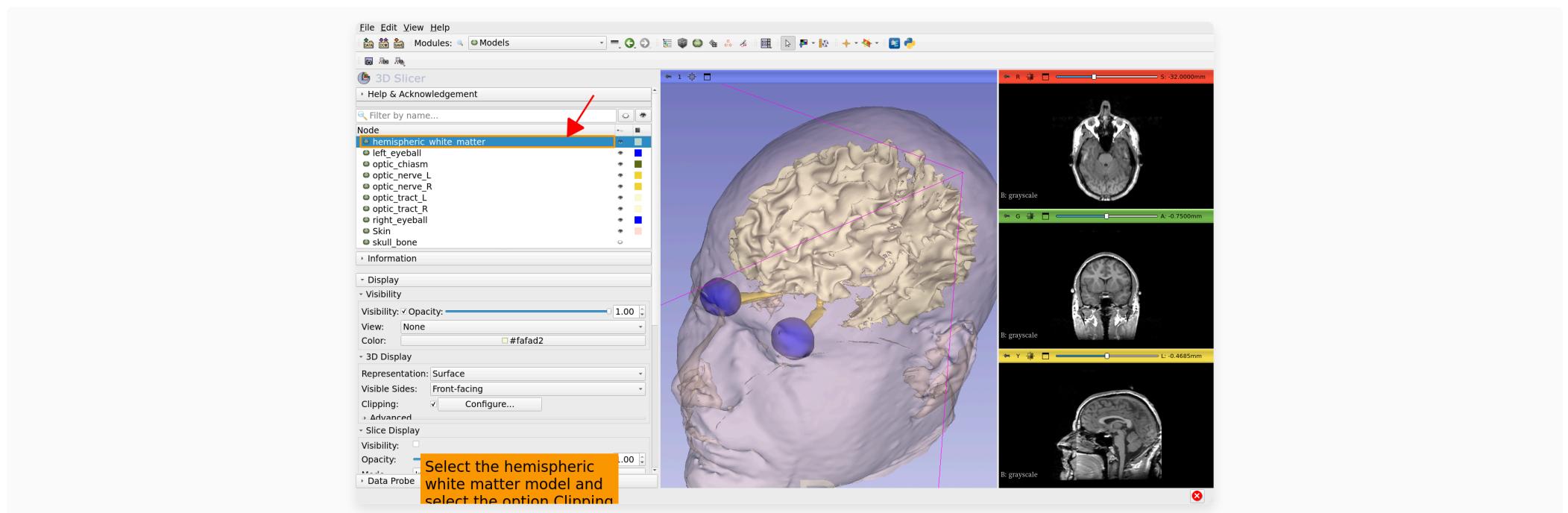
# Viewing 3D models



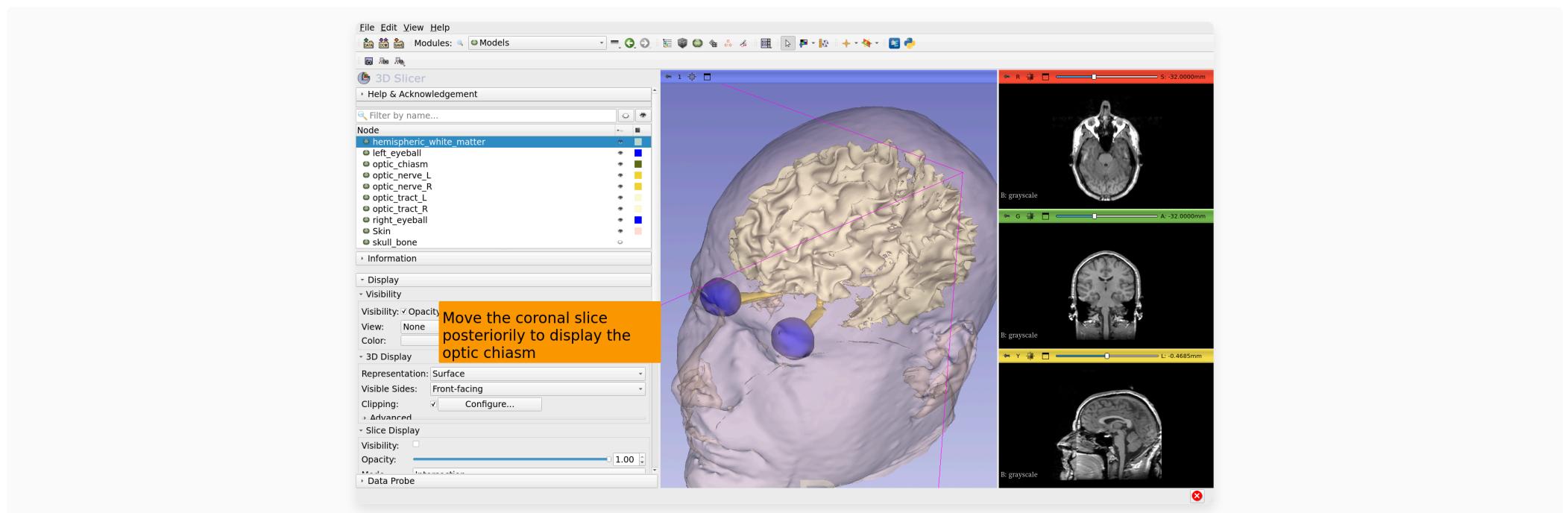
# Interacting with 3D models



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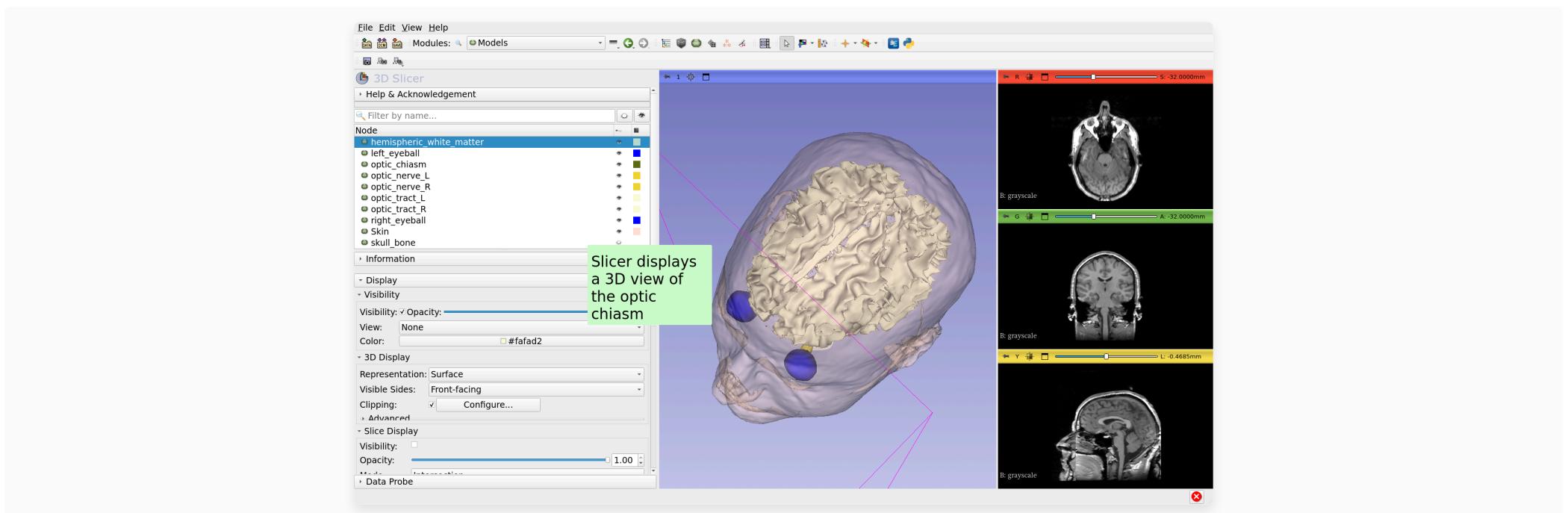


# Interacting with 3D models



# Interacting with 3D models

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# Conclusion

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- 3D Slicer provides advanced functionalities for loading and viewing 3D medical imaging data
- The tutorial demonstrates how to use volume rendering and 3D surface modeling for interactive visualization of CT and MRI data

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# Acknowledgements

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EB015902)