



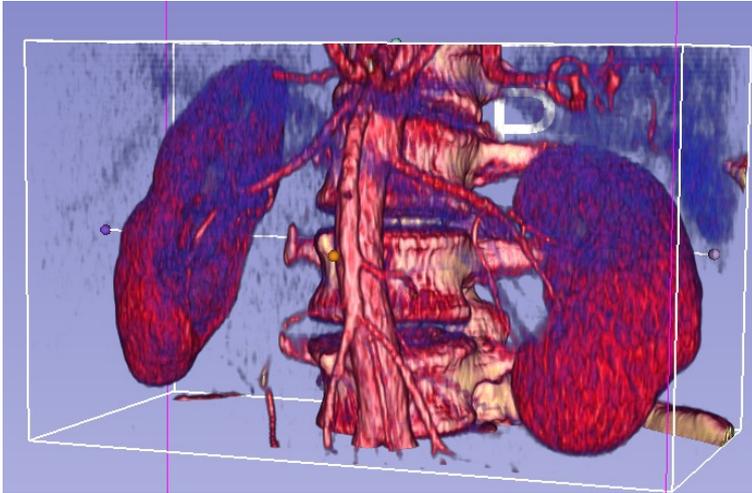
3D Visualization of DICOM Data

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Goal of the Tutorial



The tutorial guides you step-by-step through the process of loading and visualizing a DICOM CT dataset with 3D Slicer.

Tutorial Materials

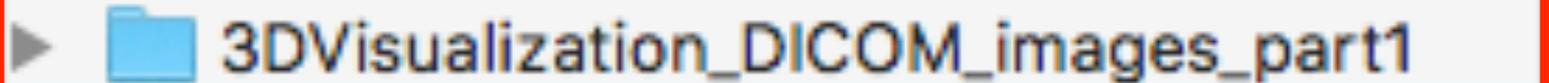
- Software:

3D Slicer version 4.8.1

- Dataset:

3D Visualization DICOM images part 1

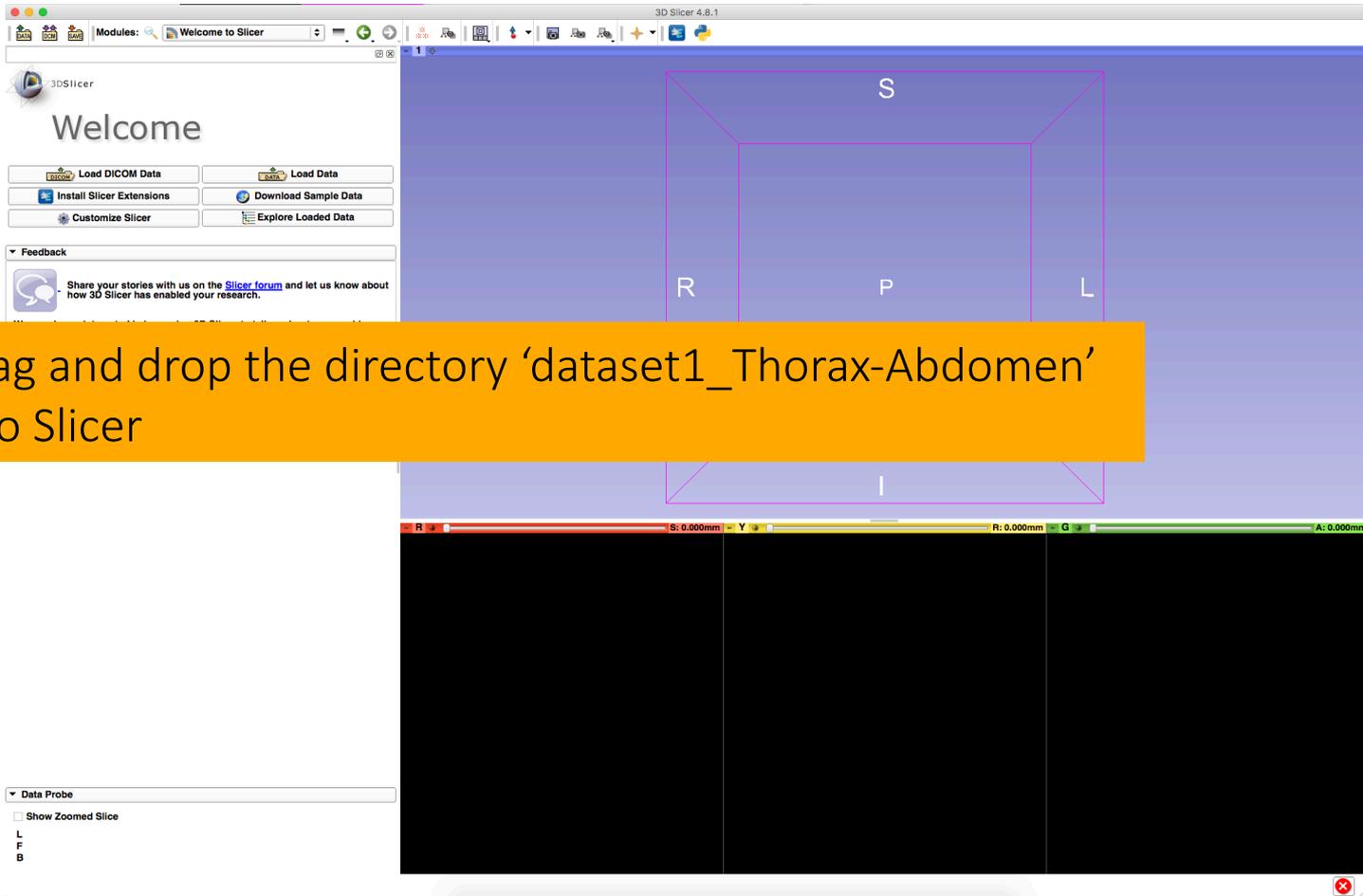
Tutorial Dataset



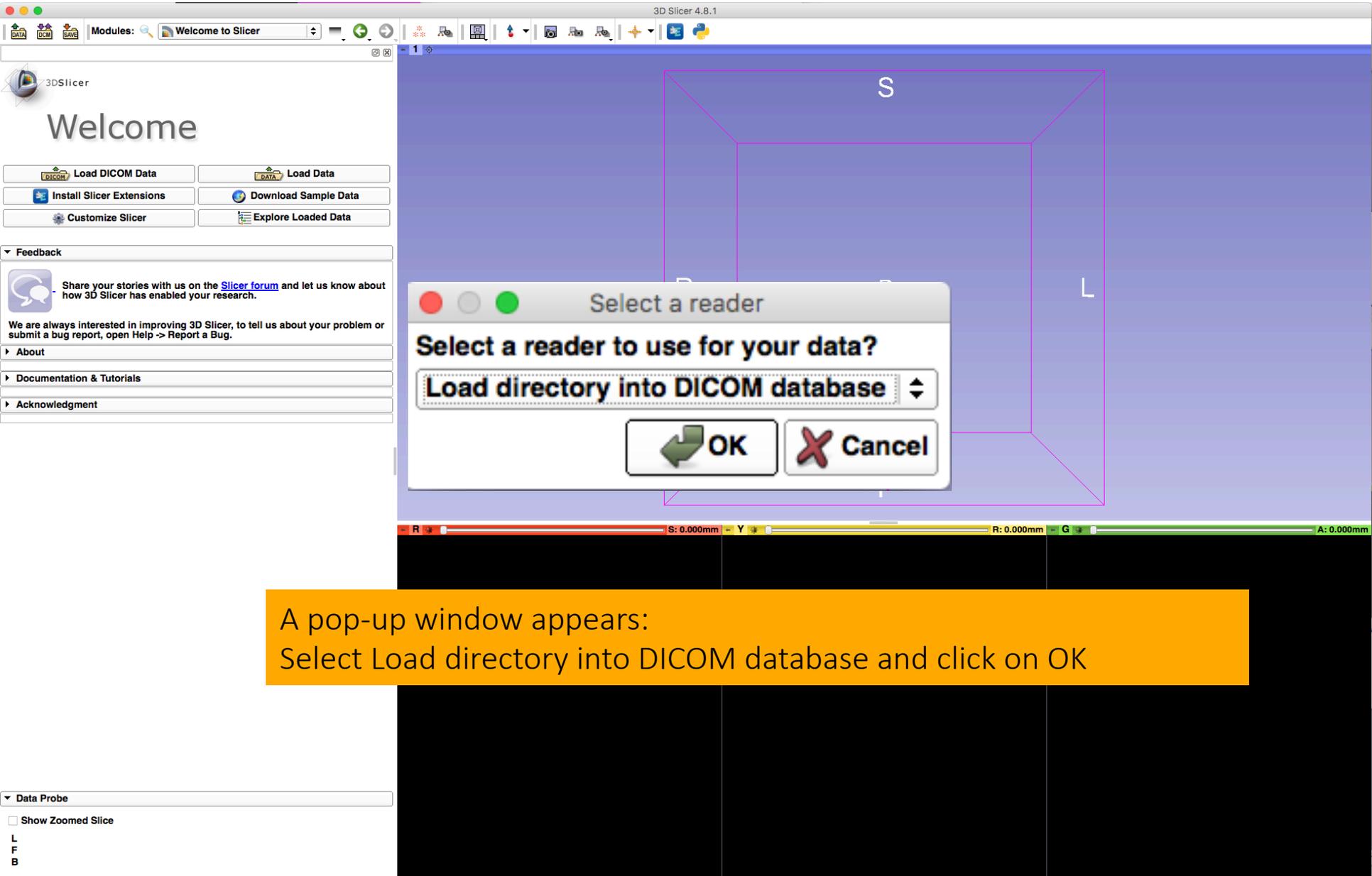
3DVisualization_DICOM_images_part1

Download and unzip the file
3DVisualization_DICOM_images_part1.zip

Loading a DICOM volume



Drag and drop the directory 'dataset1_Thorax-Abdomen' into Slicer



A pop-up window appears:
Select Load directory into DICOM database and click on OK

Loading a DICOM volume

DICOM Browser

Import Export Query Send Remove Repair >>

Patients: Studies: Series:

PatientsName	PatientID	PatientsBirthDate	PatientsBirthTime	PatientsSex	PatientsAge	PatientsComments
patient1	patient1_ID					

StudyID	StudyDate	StudyTime	AccessionNumber	ModalitiesInStudy	InstitutionName	ReferringPhysician	PerformingPhysiciansName	StudyDescription
6936864	2005-06-01	120000.000000	6936864		oEzQhRFYjQw.2f0J^zla1dx			CT Thorax Abdomen

SeriesNumber	SeriesDate	SeriesTime	SeriesDescription	Modality	BodyPartExamined	AcquisitionNumber	ContrastAgent	ScanningSequence	EchoNumber	TemporalResolution
6	2005-06-01	120000.000000	CT_Thorax_Abdomen	CT	HEART	14	APPLIED		0	0

DICOMScalarVolumePlugin
 MultiVolumeImporterPlugin
 DICOMSlicerDataBundlePlugin

Load Metadata **Examine** Uncheck All Advanced Horizontal Browser Persistent

The **patient1** DICOM dataset appears in the DICOM browser.
Select **patient1**, click on **Examine** and then click **Load** to import the data into Slicer

Loading a DICOM volume

The screenshot shows the 3DSlicer interface. The 'Modules' menu at the top left has 'Volumes' selected. The 'Active Volume' dropdown is set to '6: CT_Thorax_Abdomen'. The 'Display' section shows the 'Window/Level' preset 'CT-abdomen' selected, with 'W: 1690' and 'L: -154' displayed. The 'Threshold' is set to 'Off'. The main view shows a 3D volume rendering of the CT scan. The bottom right shows a 2D view of the CT scan with 'R: 7.254mm' and 'A: 169.254mm' displayed.

Select the **Volumes** module from the modules menu

Select the Active Volume **6:CT_Thorax_Abdomen**

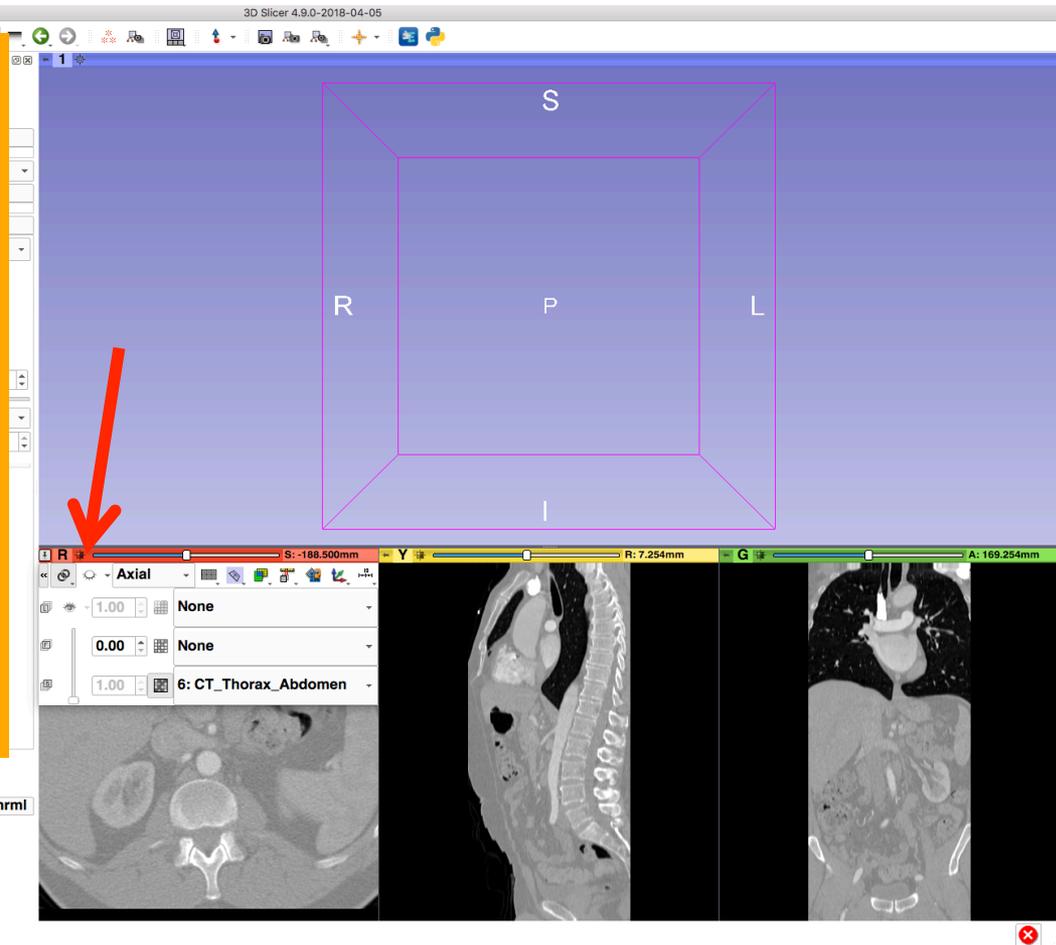
Click on the Window Level Preset **CT-abdomen** to automatically adjust the window/level display of the CT scan

Loading a DICOM volume

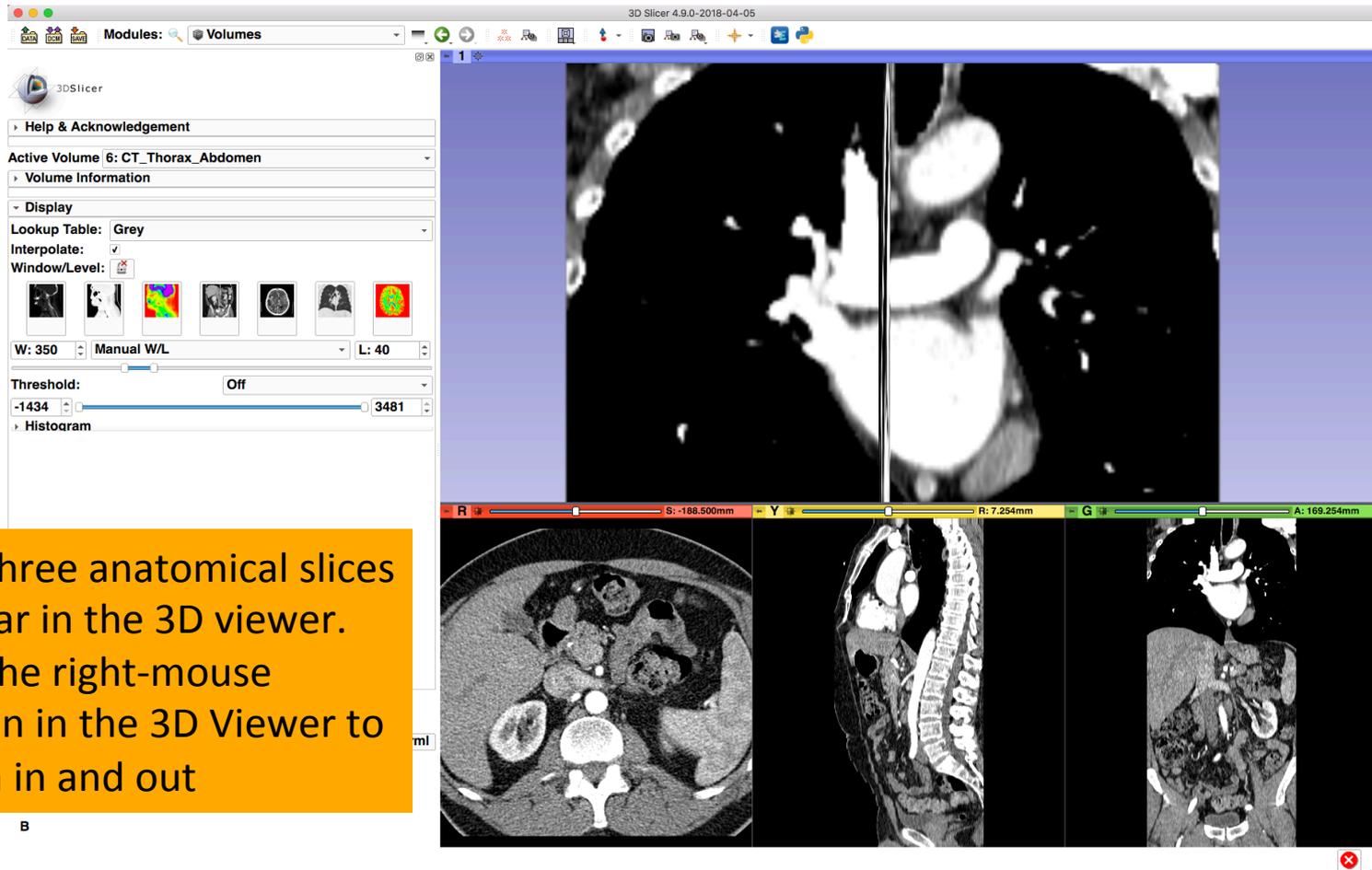
Position the mouse cursor over the red banner in the Red Viewer to display the slice menu.

Click on the **Links icon** to link the slice controls across all Slice Viewers.

Click on the **Eye icon** to display the three anatomical slices in the 3D viewer



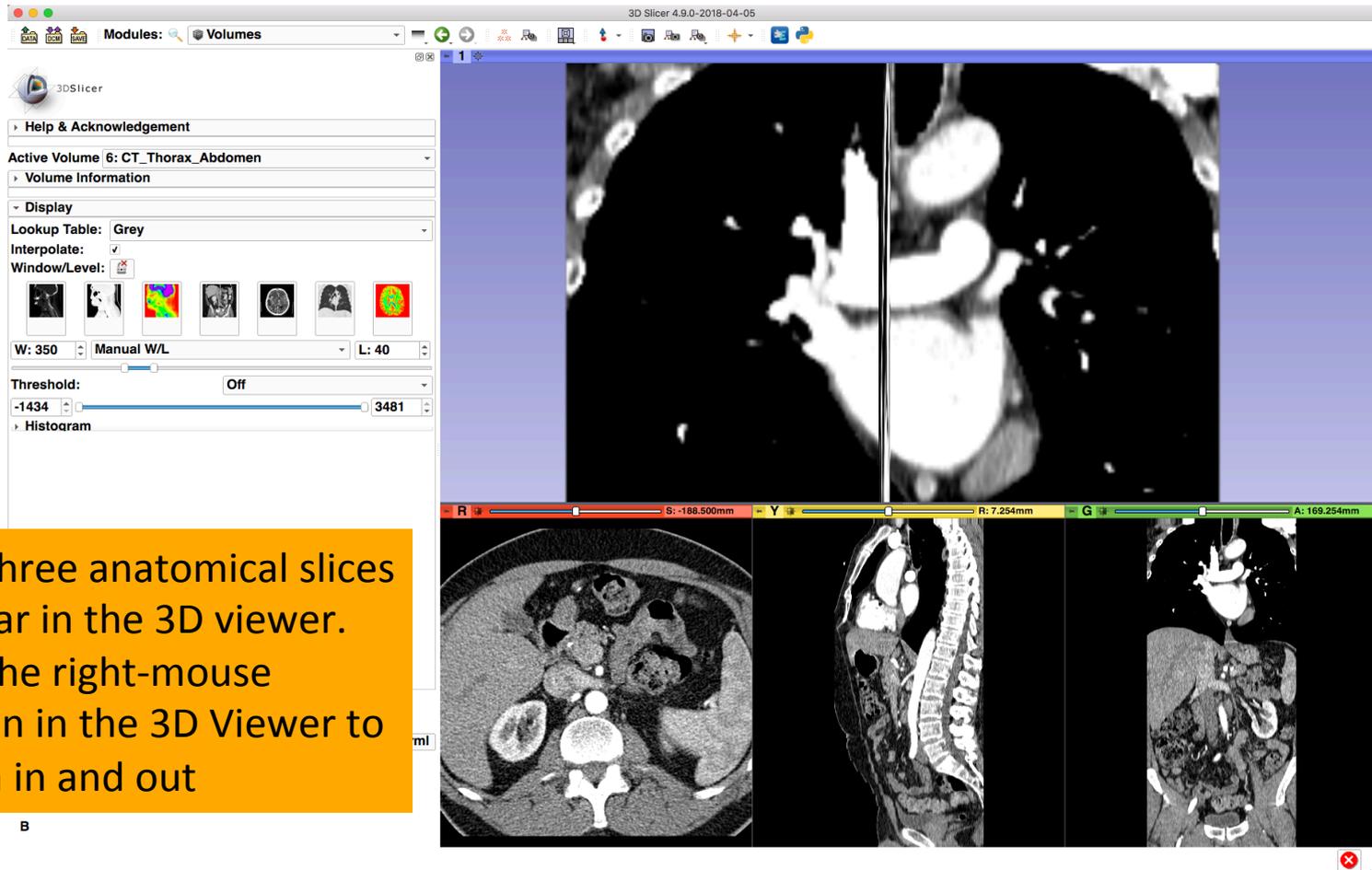
Loading a DICOM volume



The three anatomical slices appear in the 3D viewer. Use the right-mouse button in the 3D Viewer to zoom in and out

B

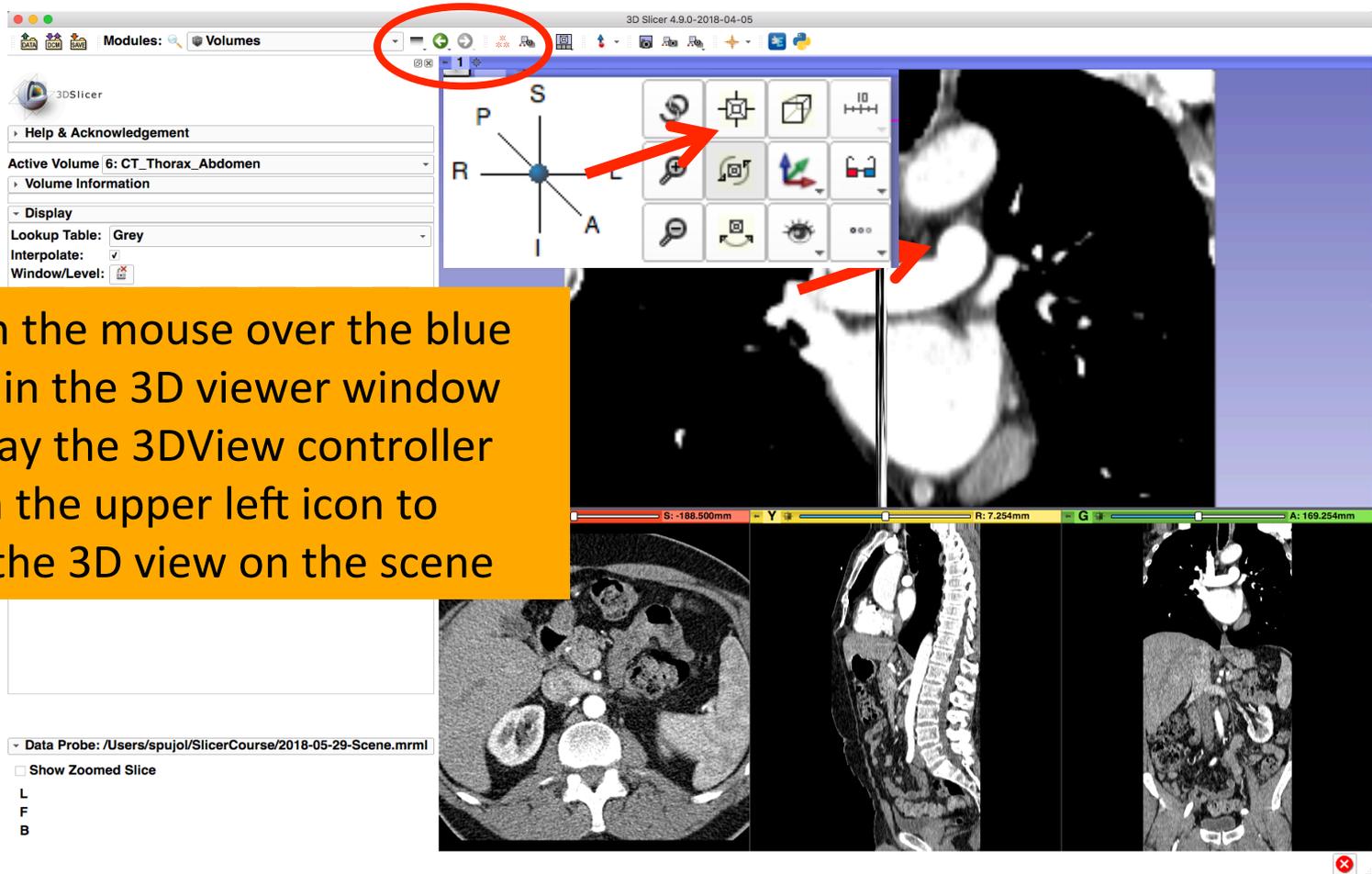
Loading a DICOM volume



The three anatomical slices appear in the 3D viewer. Use the right-mouse button in the 3D Viewer to zoom in and out

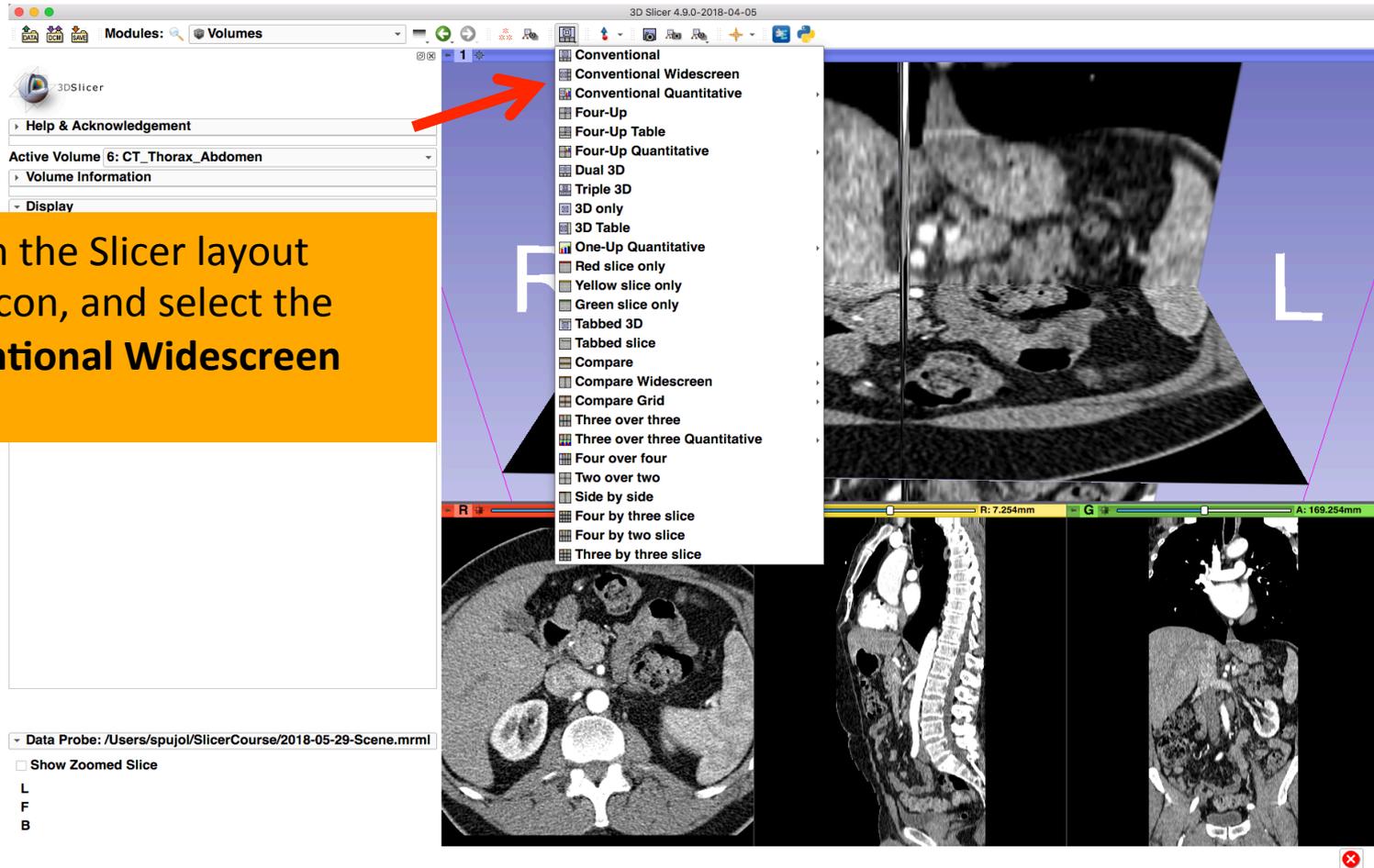
B

Loading a DICOM volume



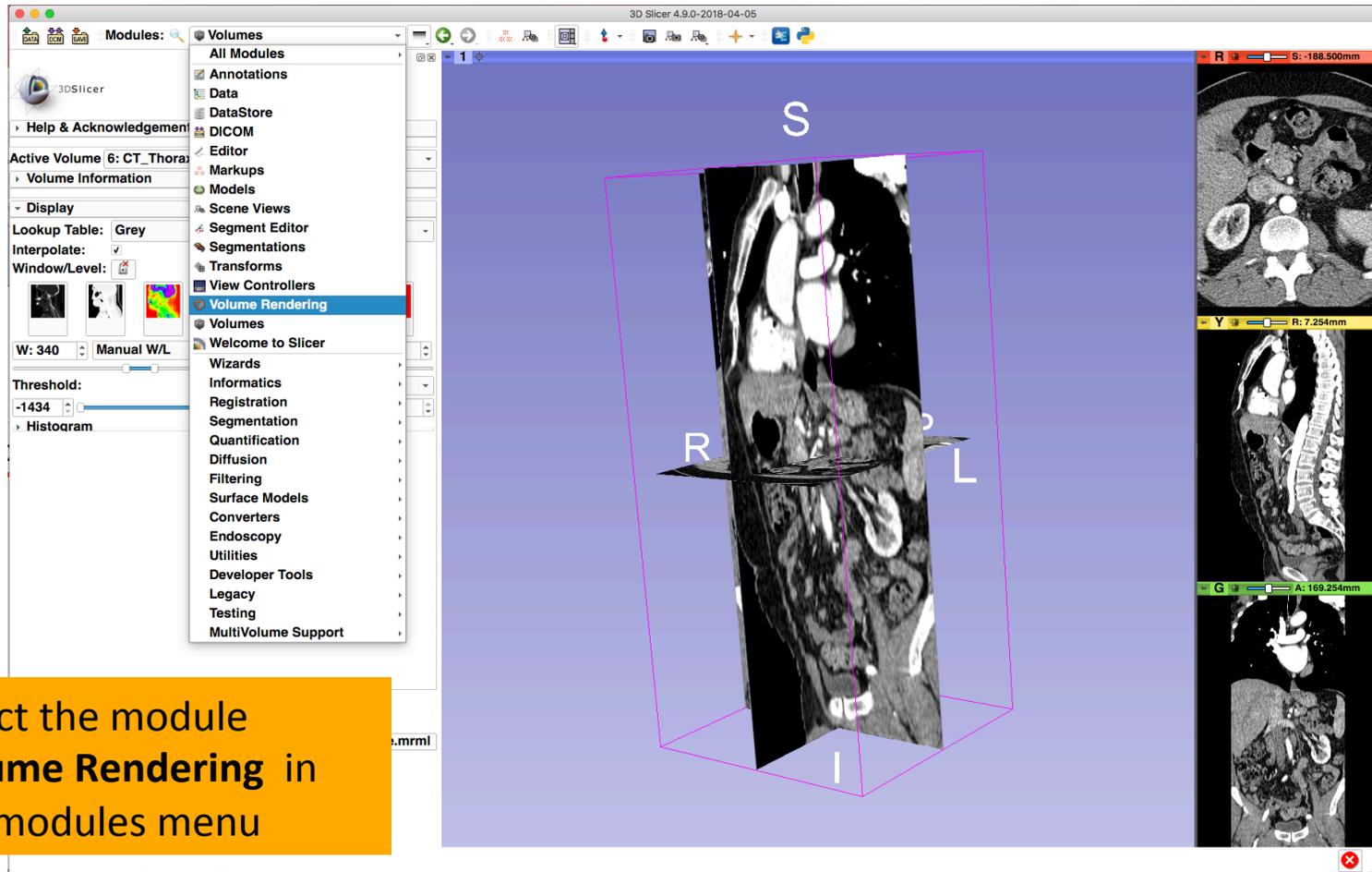
Position the mouse over the blue banner in the 3D viewer window to display the 3DView controller
Click on the upper left icon to center the 3D view on the scene

Loading a DICOM volume

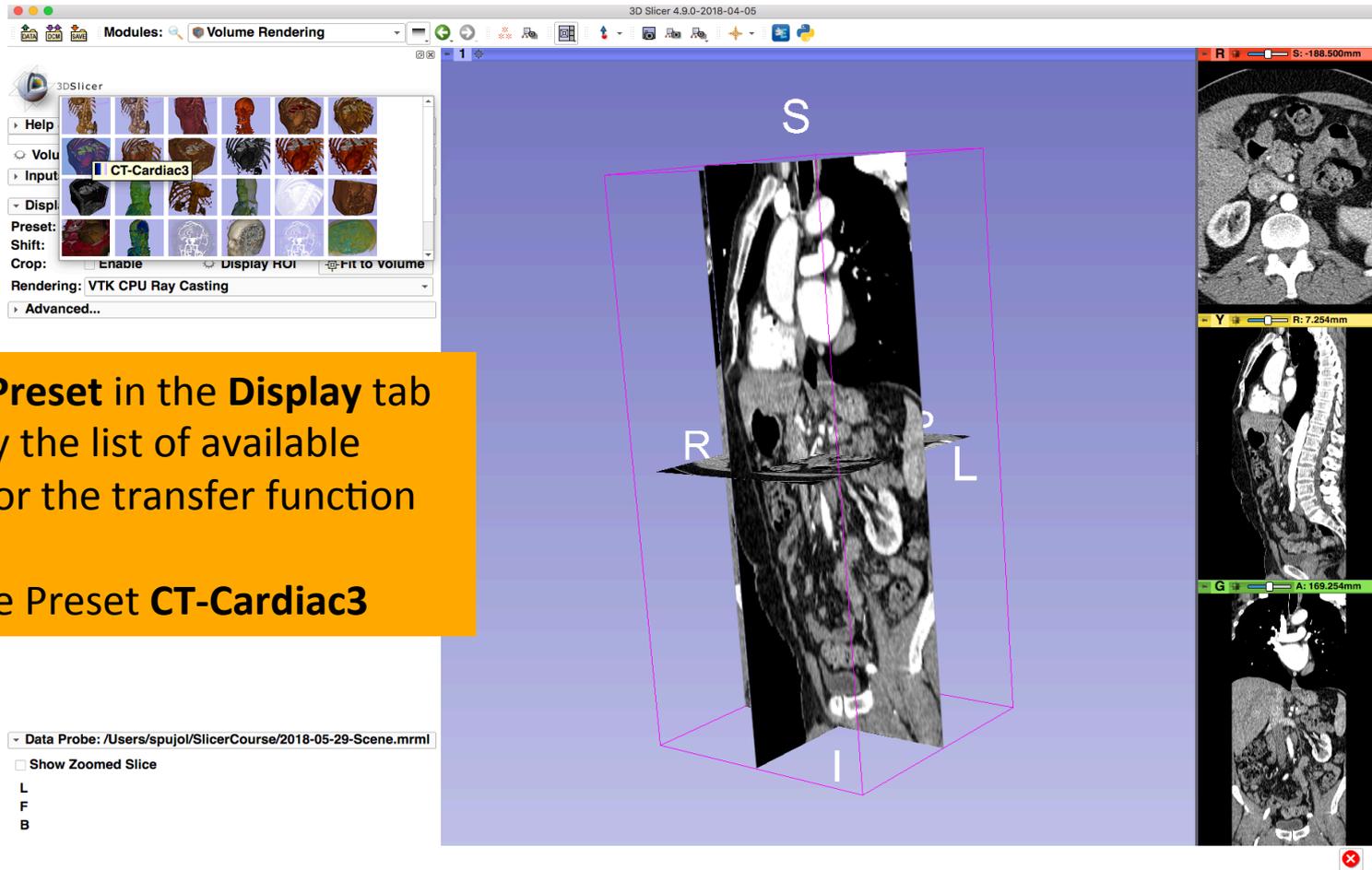


Click on the Slicer layout menu icon, and select the **Conventional Widescreen** layout

Volume Rendering



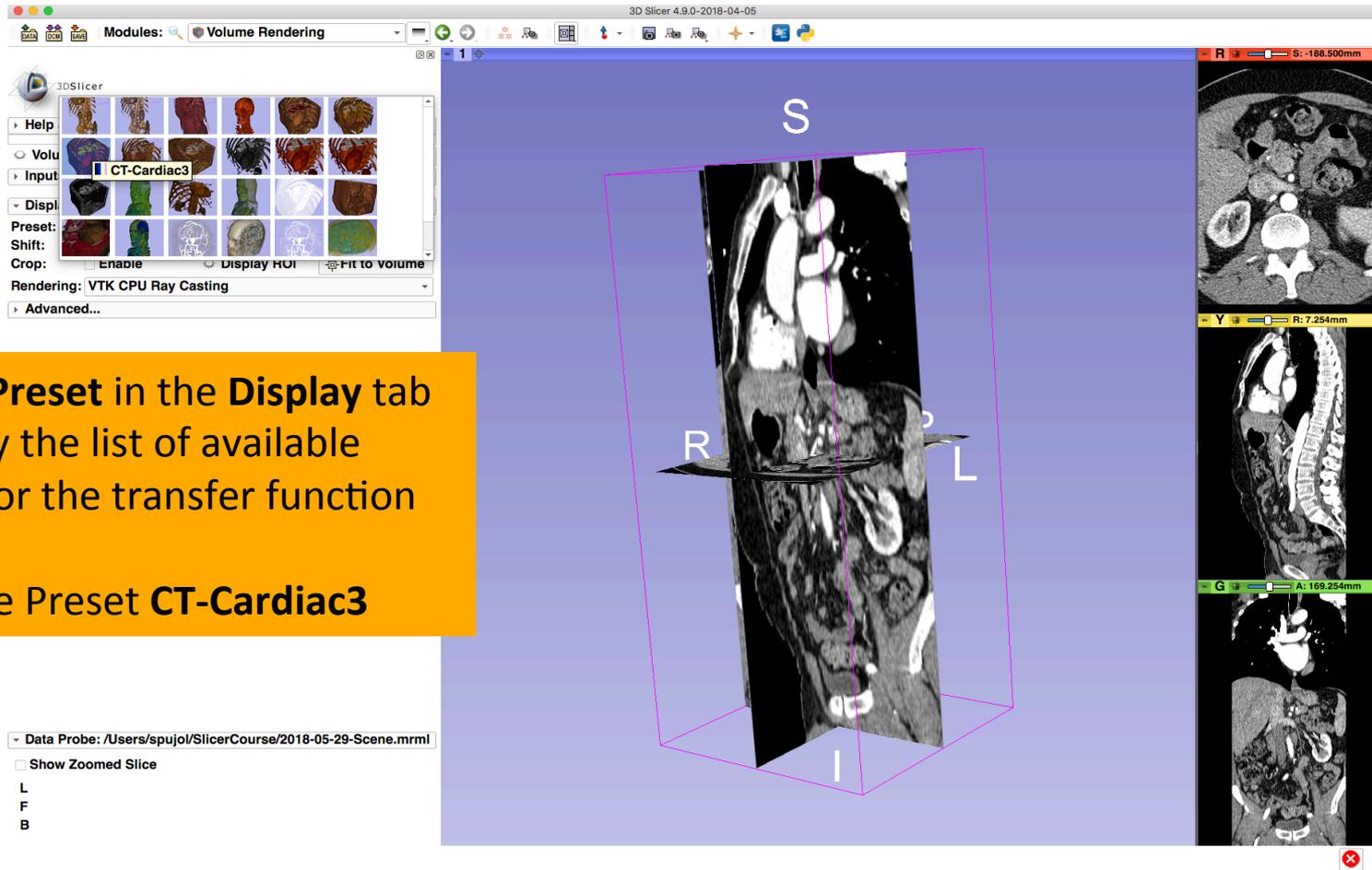
Volume Rendering



Click on **Preset** in the **Display** tab to display the list of available presets for the transfer function

Select the Preset **CT-Cardiac3**

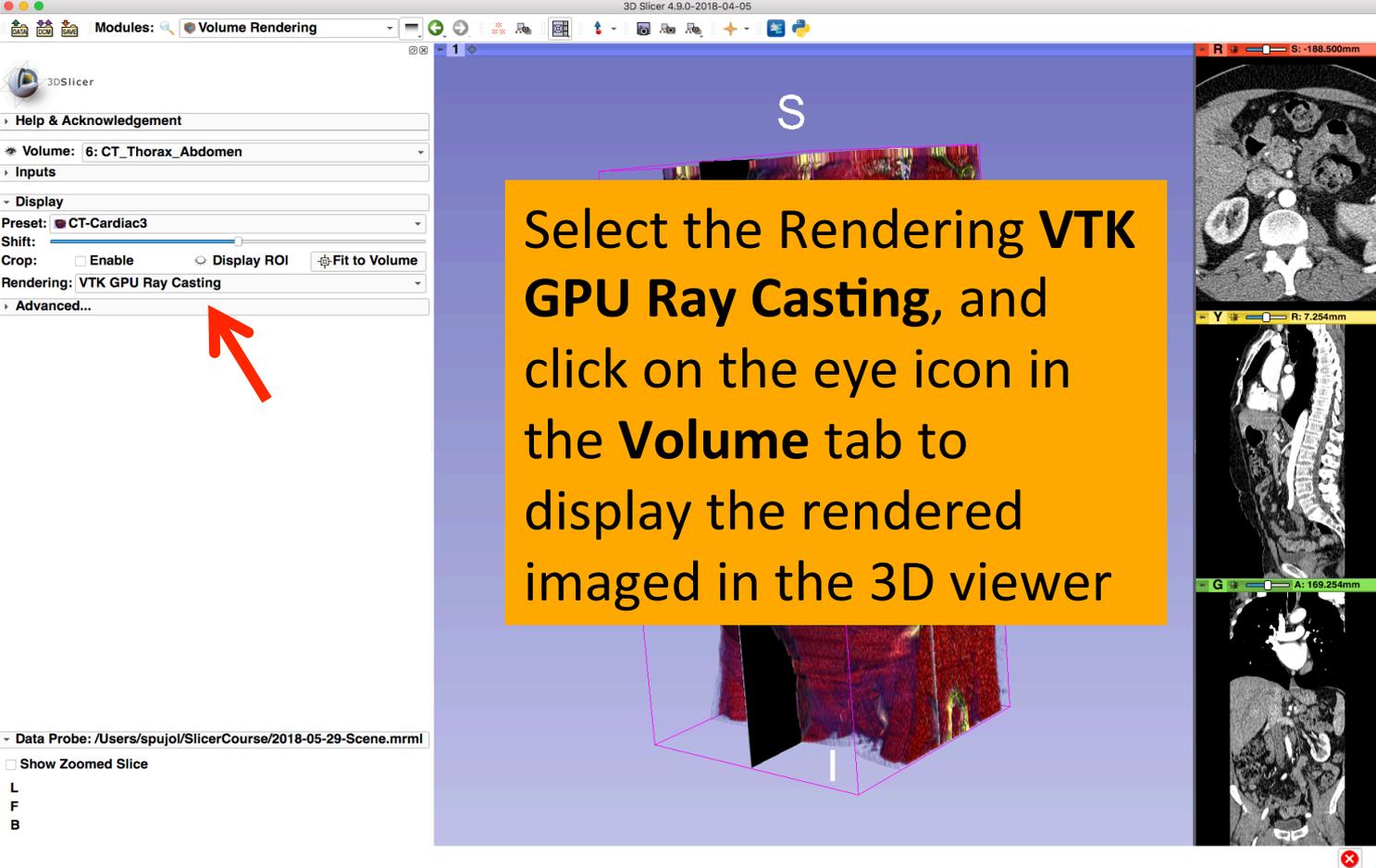
Volume Rendering



Click on **Preset** in the **Display** tab to display the list of available presets for the transfer function

Select the Preset **CT-Cardiac3**

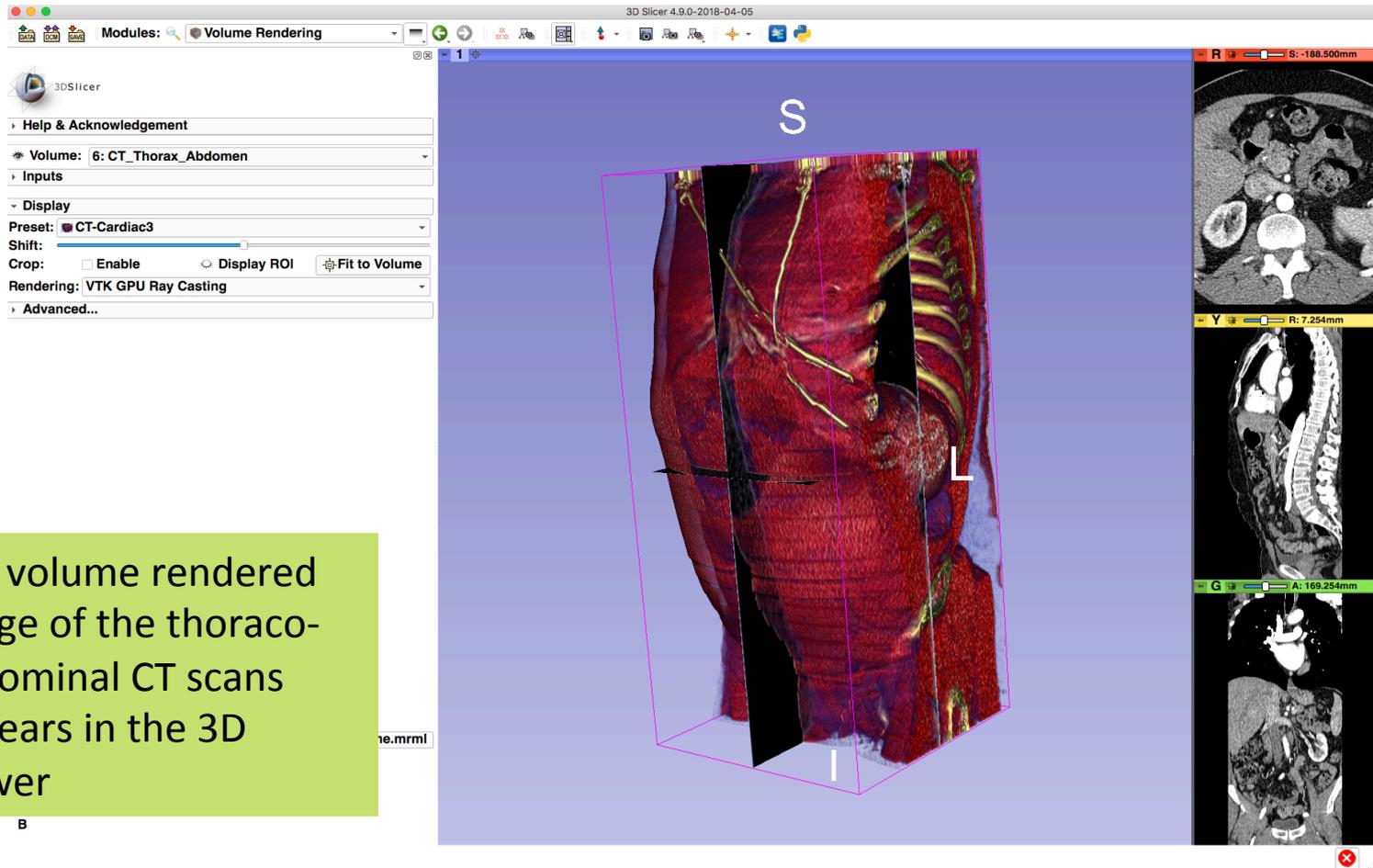
Volume Rendering



The screenshot shows the 3D Slicer software interface. The 'Volume Rendering' module is selected in the 'Modules' panel. The 'Volume' dropdown is set to '6: CT_Thorax_Abdomen'. The 'Display' section shows the 'Preset' set to 'CT-Cardiac3'. The 'Crop' section has 'Enable' checked, 'Display ROI' selected, and 'Fit to Volume' checked. The 'Rendering' dropdown is set to 'VTK GPU Ray Casting'. A red arrow points to the 'Volume' dropdown, and another red arrow points to the 'VTK GPU Ray Casting' option. The main 3D view shows a rendered CT scan volume with a white box around it. The 'S' icon is visible in the top right of the 3D view. The 'Data Probe' section at the bottom left shows the path '/Users/spujol/SlicerCourse/2018-05-29-Scene.mrml' and 'Show Zoomed Slice' is unchecked. The 'L', 'F', and 'B' checkboxes are also visible. The right sidebar shows three orthogonal views: a coronal view at the top, a sagittal view in the middle, and an axial view at the bottom. The sagittal view has a yellow bar with 'R: 7.254mm' and the axial view has a green bar with 'A: 169.254mm'. A red 'X' icon is in the bottom right corner of the sidebar.

Select the Rendering **VTK GPU Ray Casting**, and click on the eye icon in the **Volume** tab to display the rendered imaged in the 3D viewer

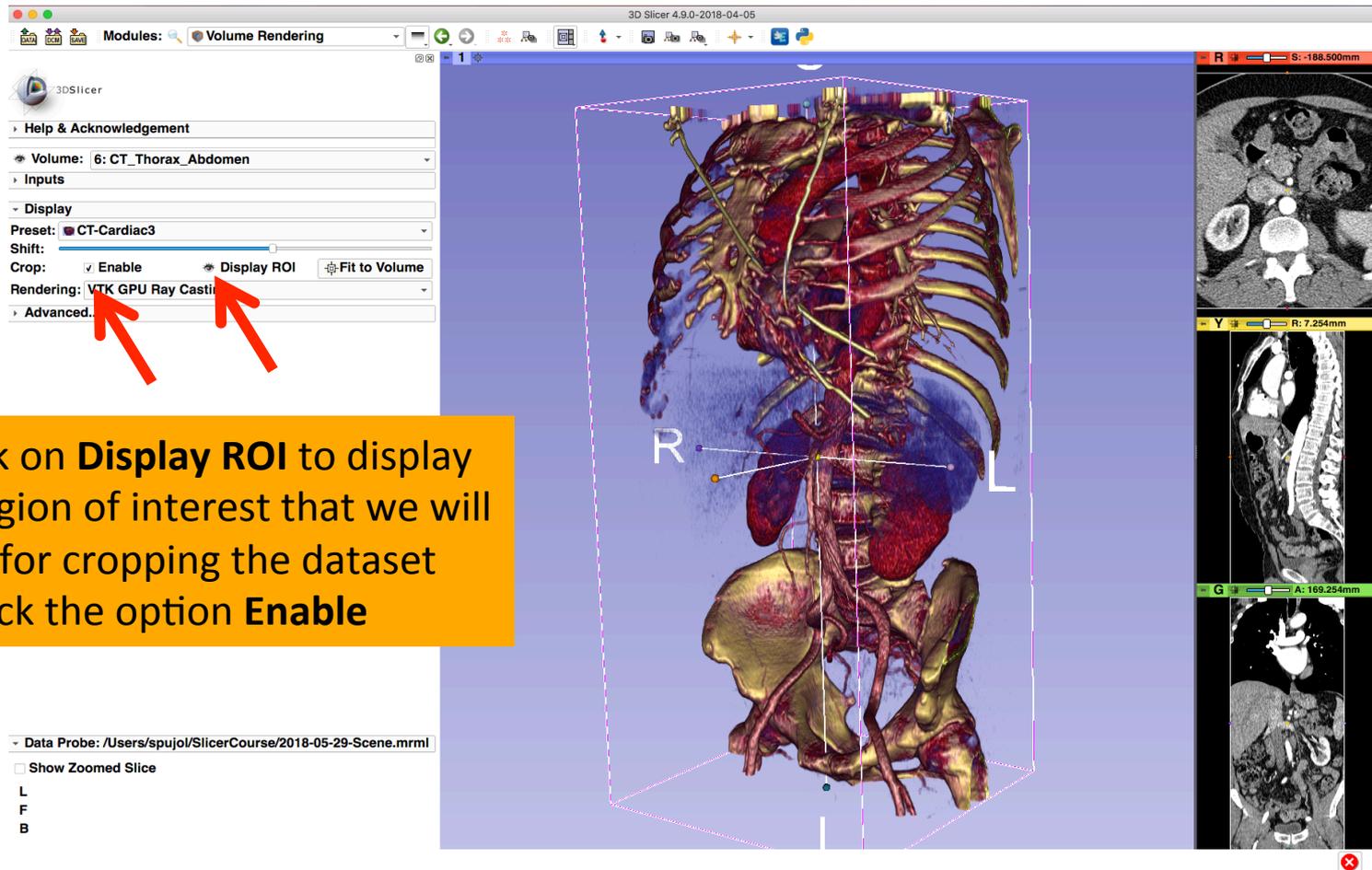
Volume Rendering



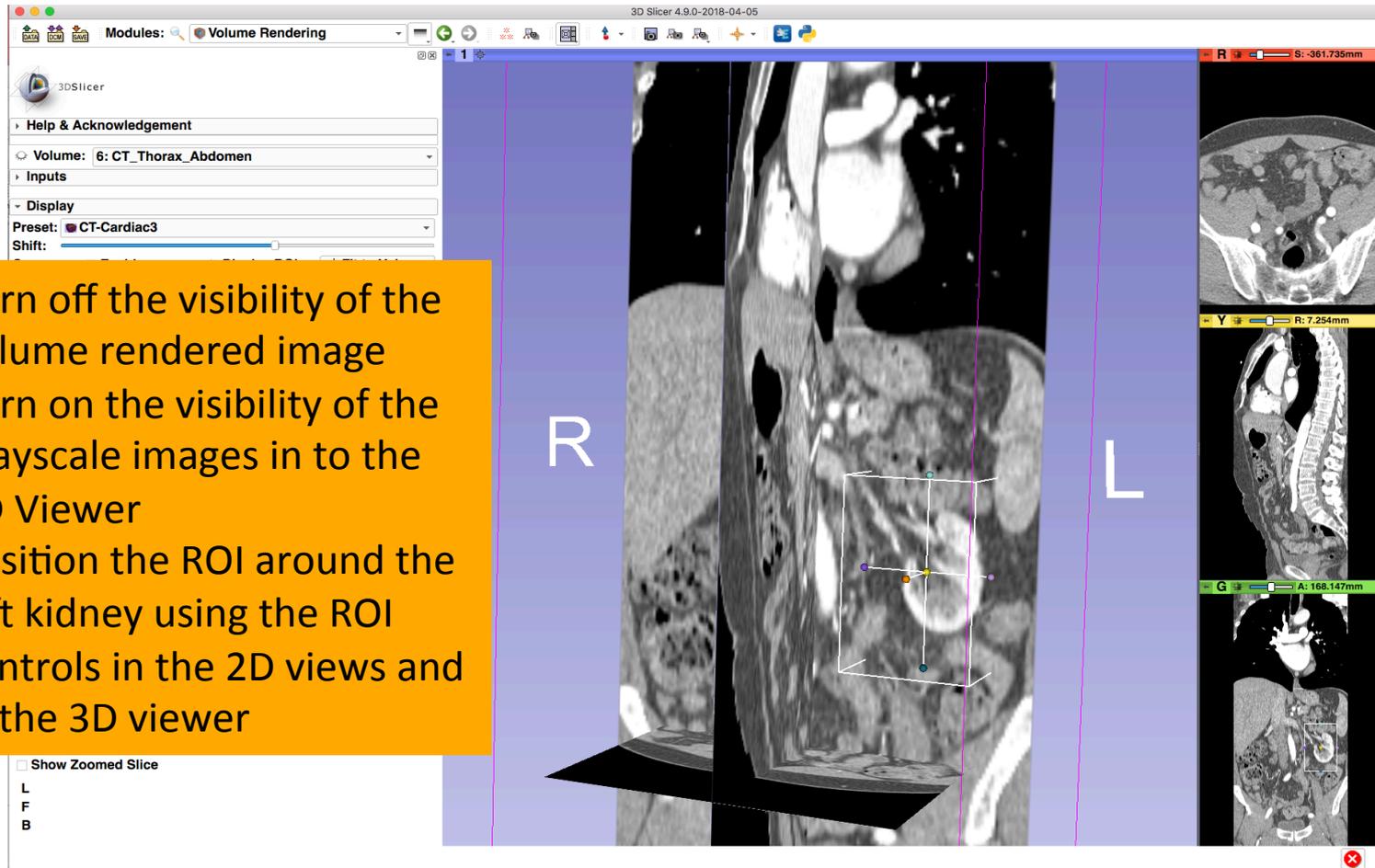
The volume rendered image of the thoraco-abdominal CT scans appears in the 3D viewer

B

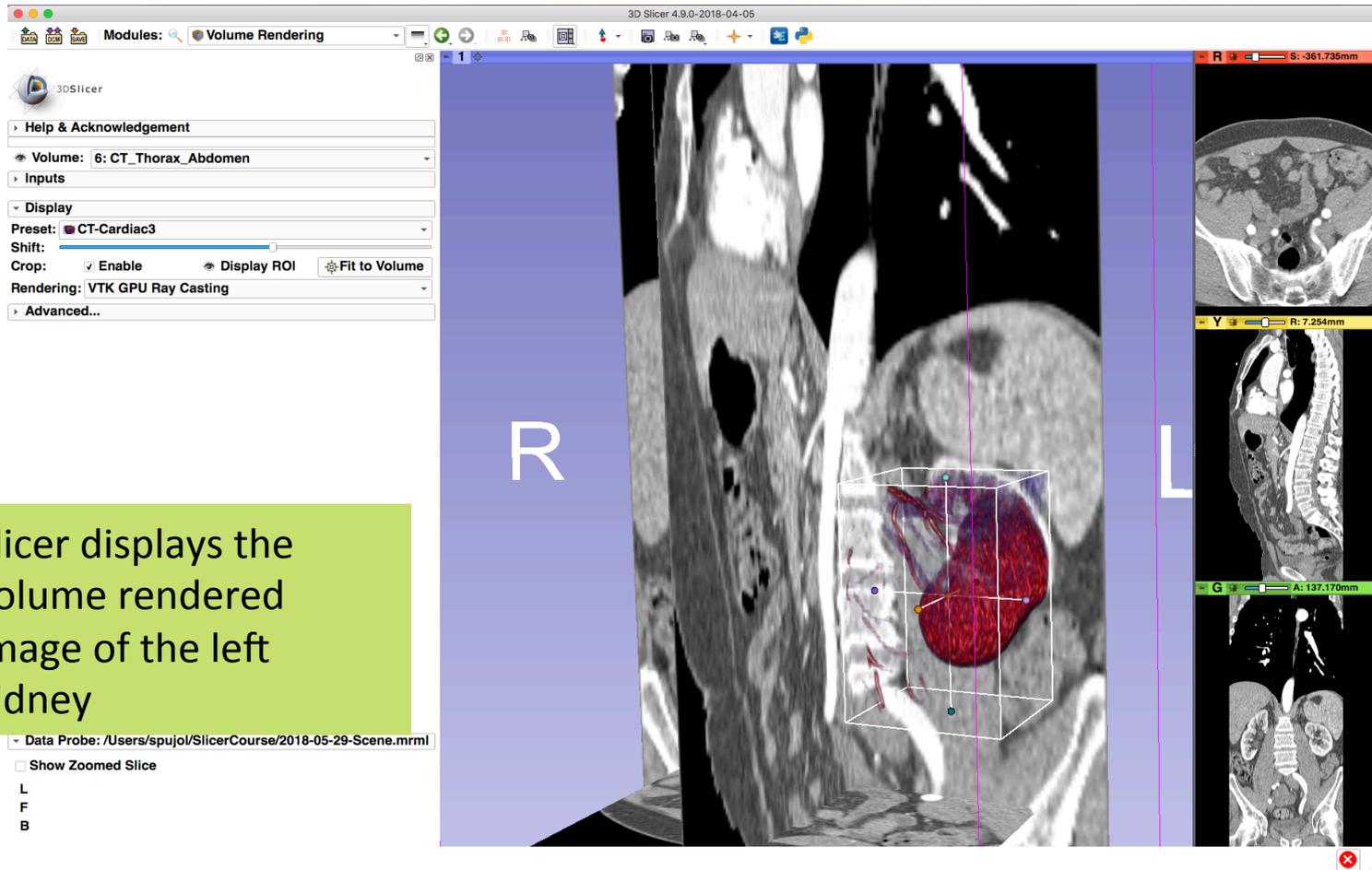
Volume Rendering



Volume Rendering

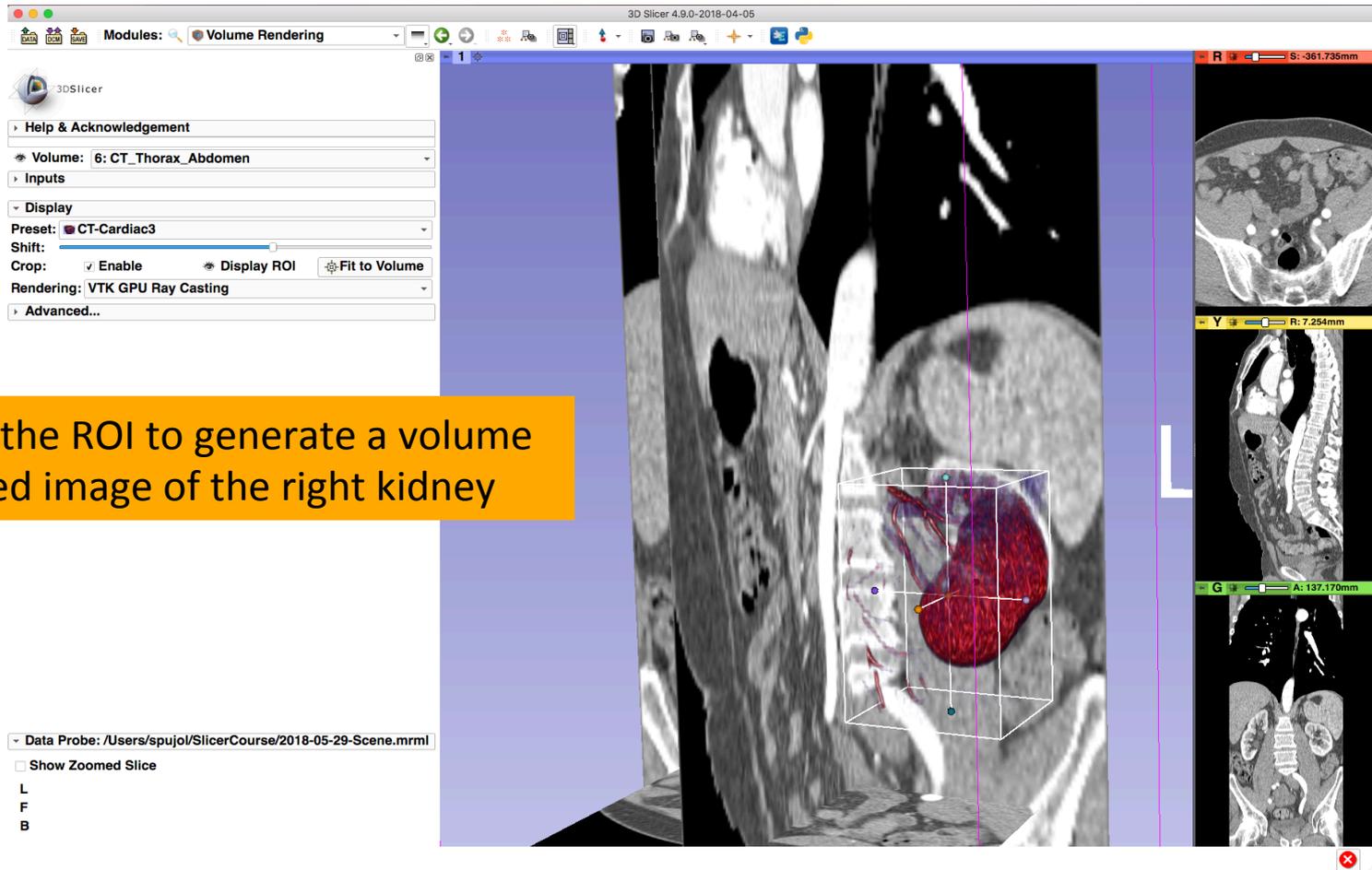


Volume Rendering



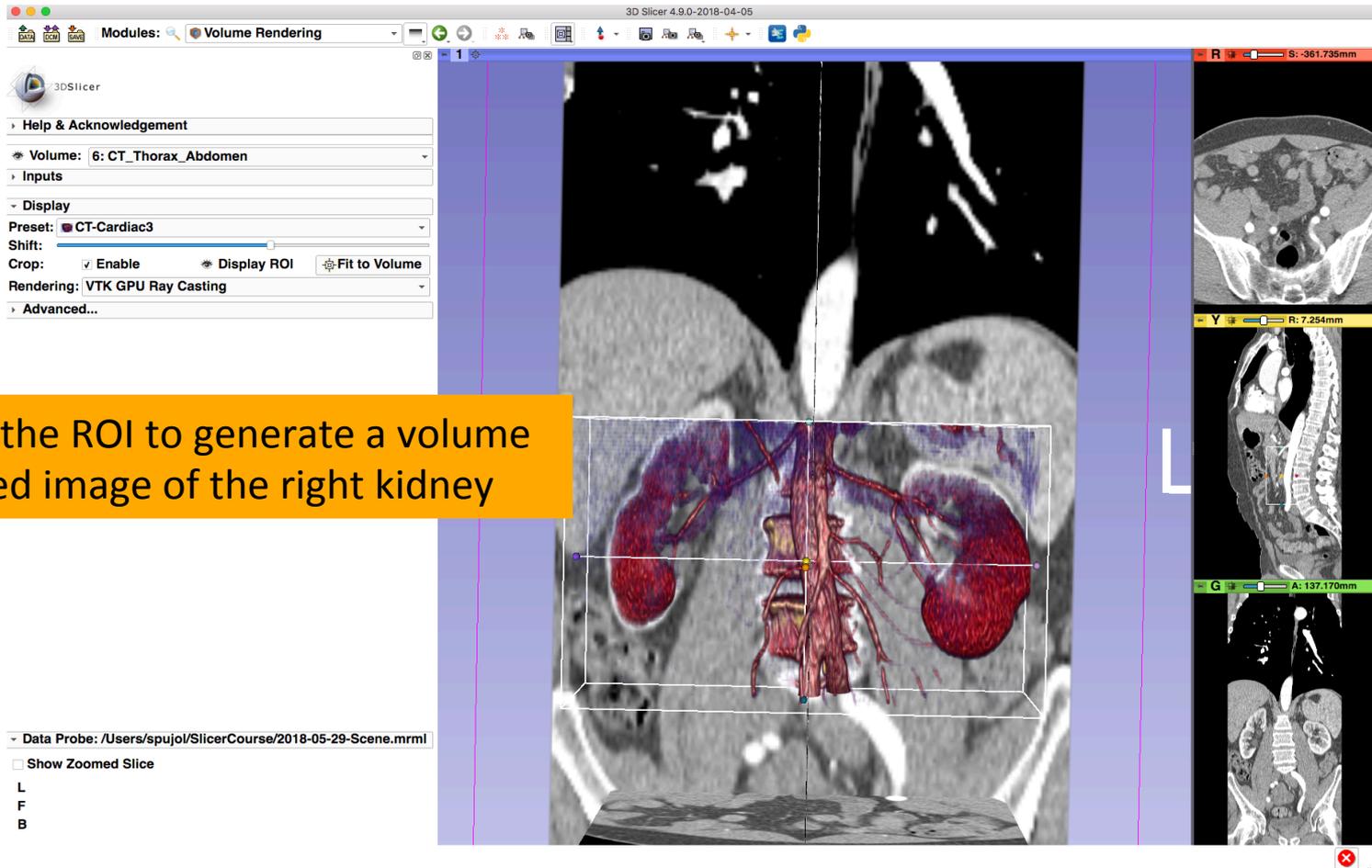
Slicer displays the volume rendered image of the left kidney

Volume Rendering



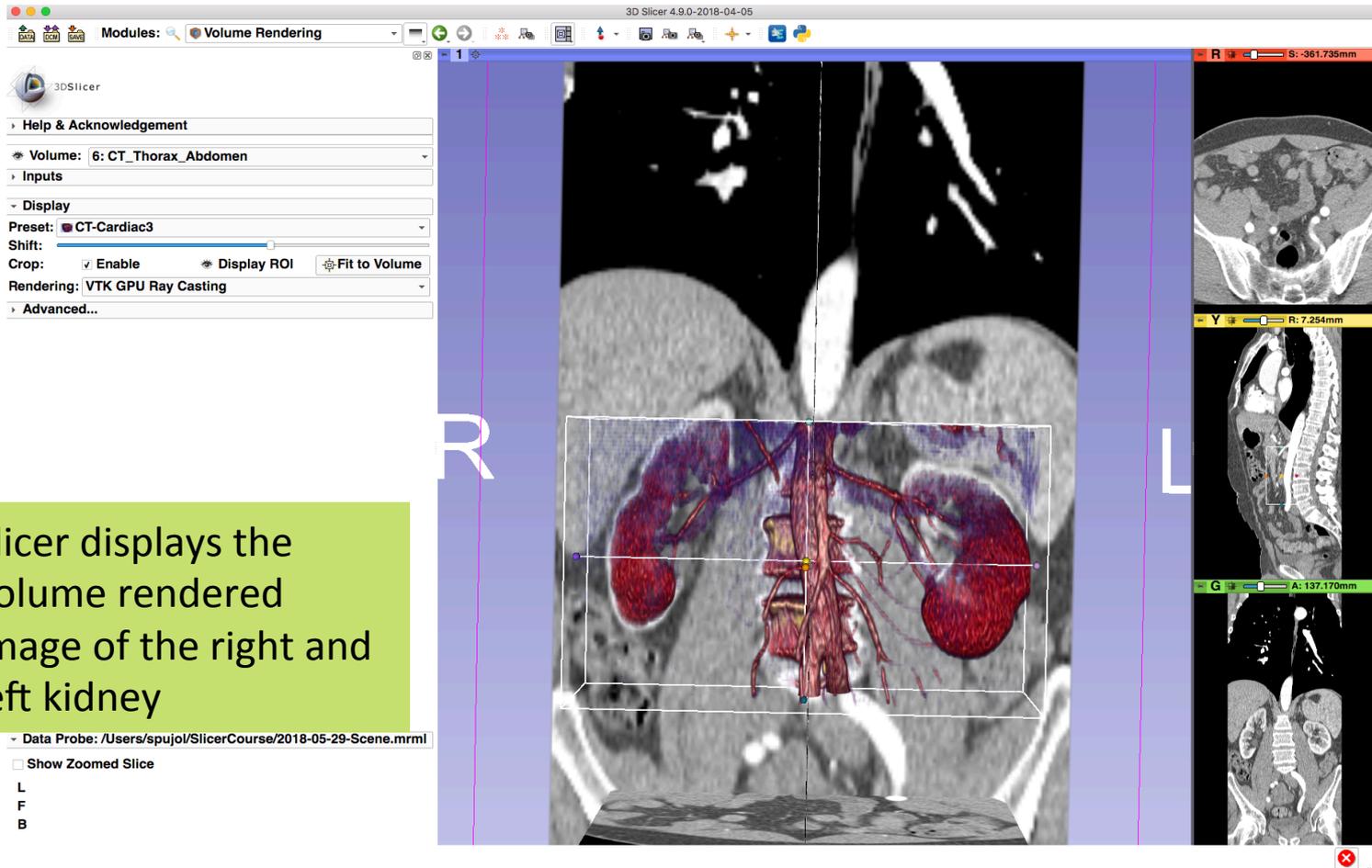
Extend the ROI to generate a volume rendered image of the right kidney

Volume Rendering



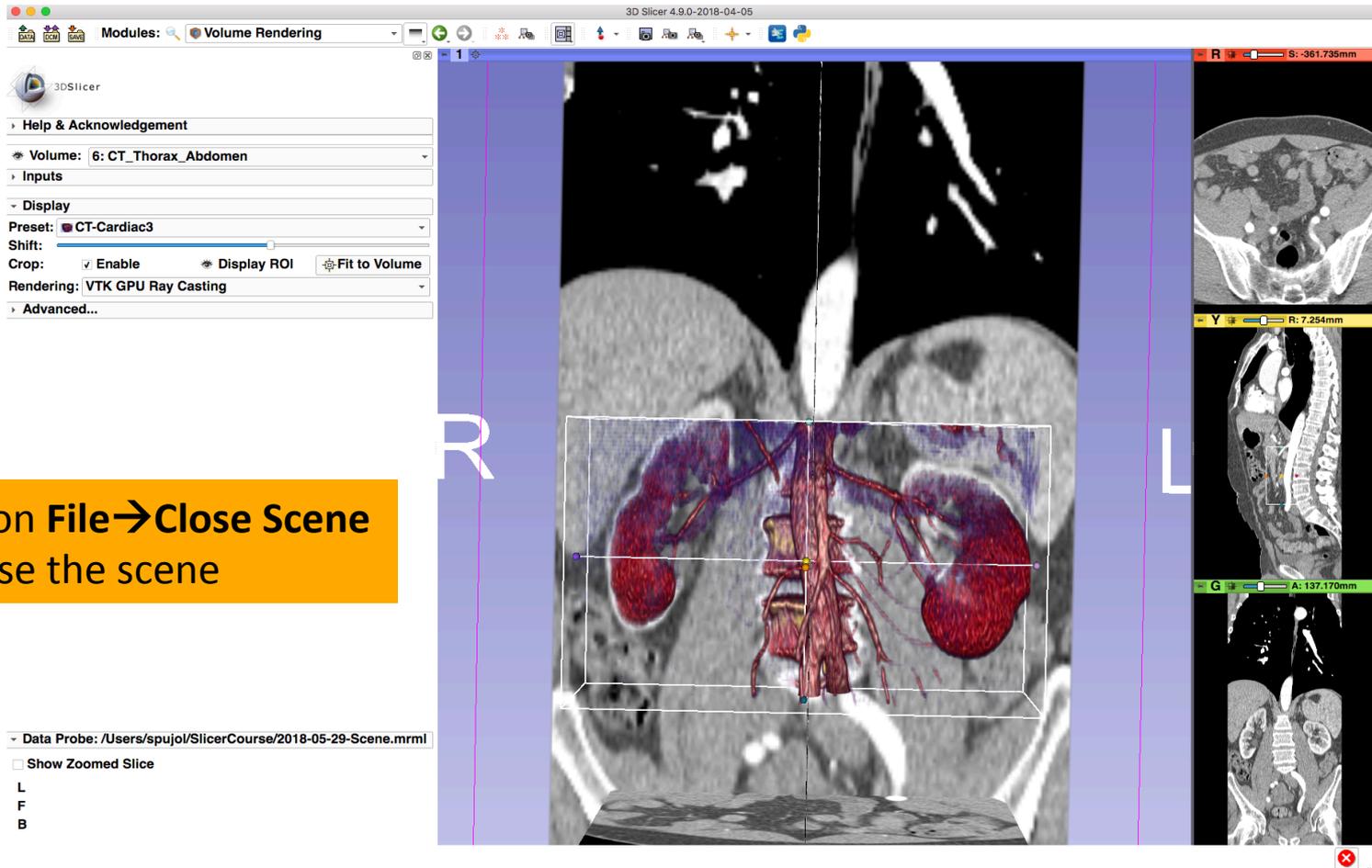
Extend the ROI to generate a volume rendered image of the right kidney

Volume Rendering



Slicer displays the volume rendered image of the right and left kidney

Volume Rendering



Acknowledgments



National Alliance for Medical Image
Computing (NA-MIC)

NIH U54EB005149



Neuroimage Analysis Center (NAC)

NIH P41EB015902