

DICOM Tractography Converter

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The aim is to convert between DICOM TrackSet and Slicer-style VTK tractography.

Following this tutorial, you'll be able to:

- 1) Save DICOM format tractography files in 3D Slicer
- 2) Load DICOM format tractography files into 3D Slicer
- 3) Convert between VTK format tractography files and DICOM format using command line

For more information about Tractography Supplement DICOM standard, please visit this website: <http://www.dclunie.com>



3D Slicer

3D Slicer



The tutorial uses the 3D Slicer (Version 4.7.0 Nightly Build) software available at:

<http://download.slicer.org>

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. Slicer is a tool for research, and is not FDA approved.

An open-source project to improve and extend diffusion magnetic resonance imaging software in 3D Slicer:

<http://dmri.slicer.org>

Please visit the following website to install Slicer dMRI:

<http://dmri.slicer.org/download/>

Tutorial Data

Download sample data, at:

https://www.na-mic.org/Wiki/images/f/fc/Example_data.zip

The following data are provided:

- DICOM image
- Whole brain tractography (conducted using UKF tractography from the same data) in VTK format.

NOTE: *Both use cases require a reference diffusion-weighted MRI DICOM scan. The reference scan must be the DICOM data from which the tractography was created.*

For more information about UKF tractography, please follow this tutorial:

<https://dmri.slicer.org/docs/tutorials/UKFTractography.pdf>

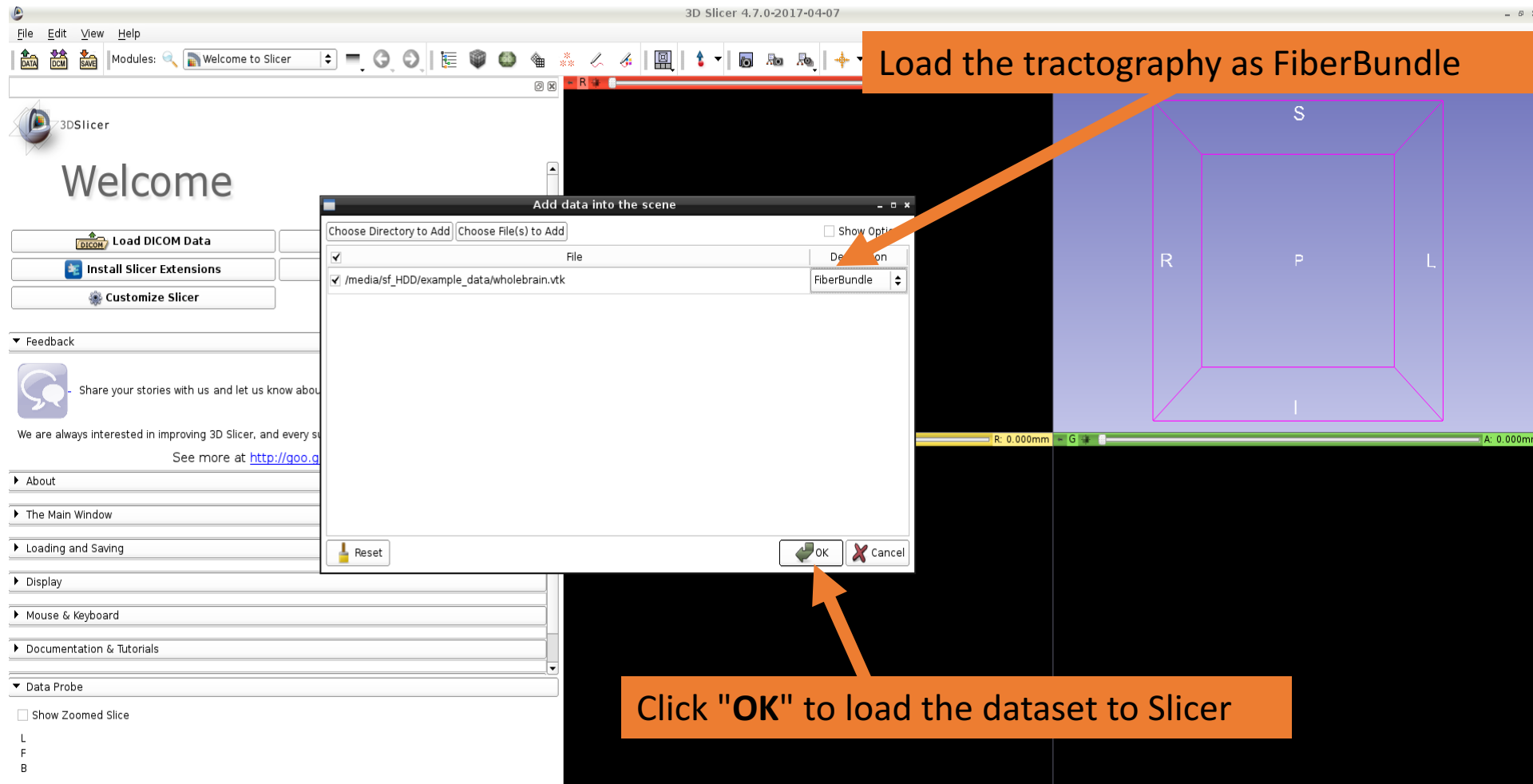
UKF

- The [UKF tutorial](#) guides through the use of the Unscented Kalman Filter (UKF) tractography module.
- Author: Pegah Kahali, Brigham and Women's Hospital
- Dataset: [UKF tutorial Dataset](#)



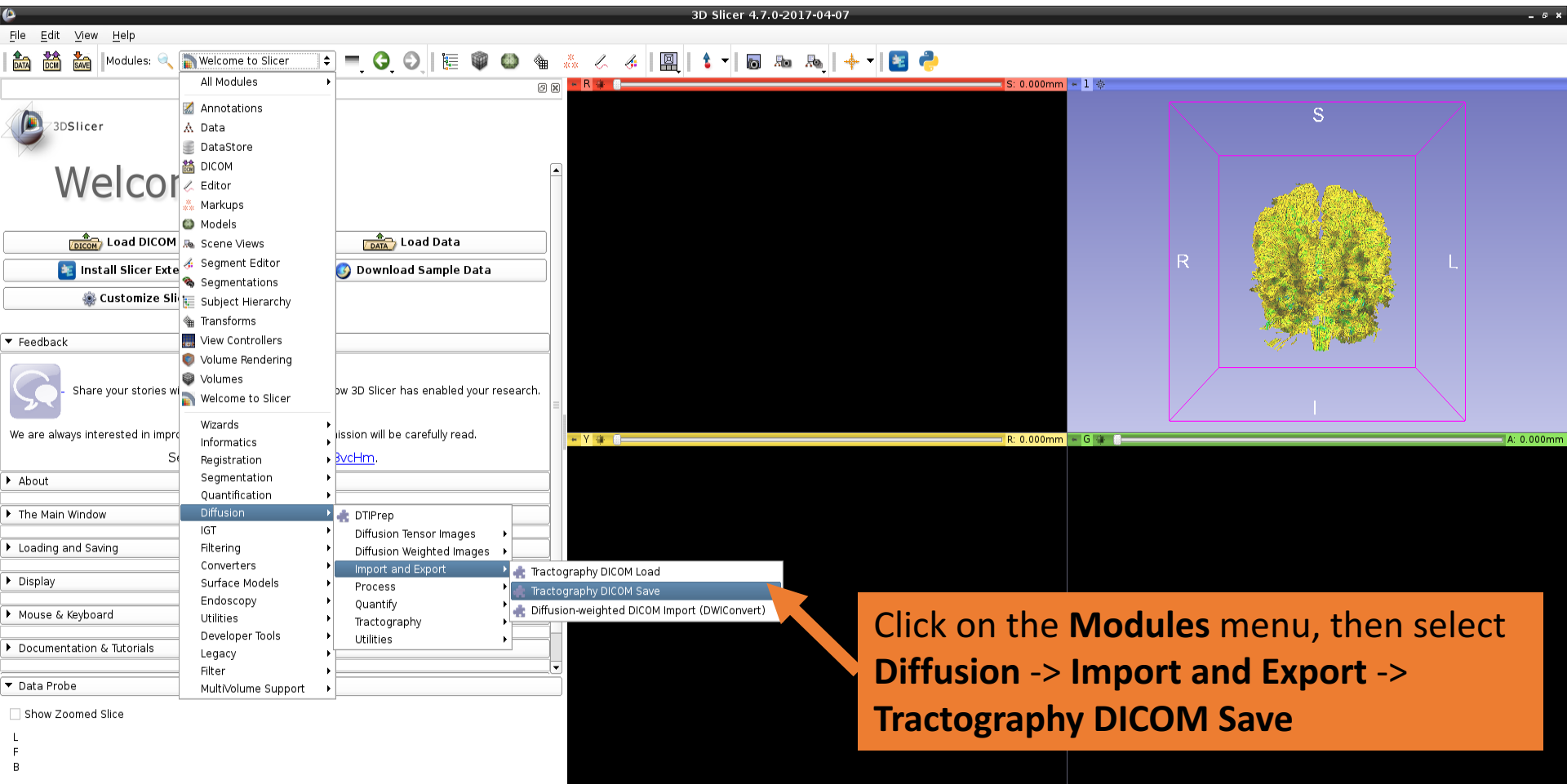
Tractography DICOM Save

Load VTK file



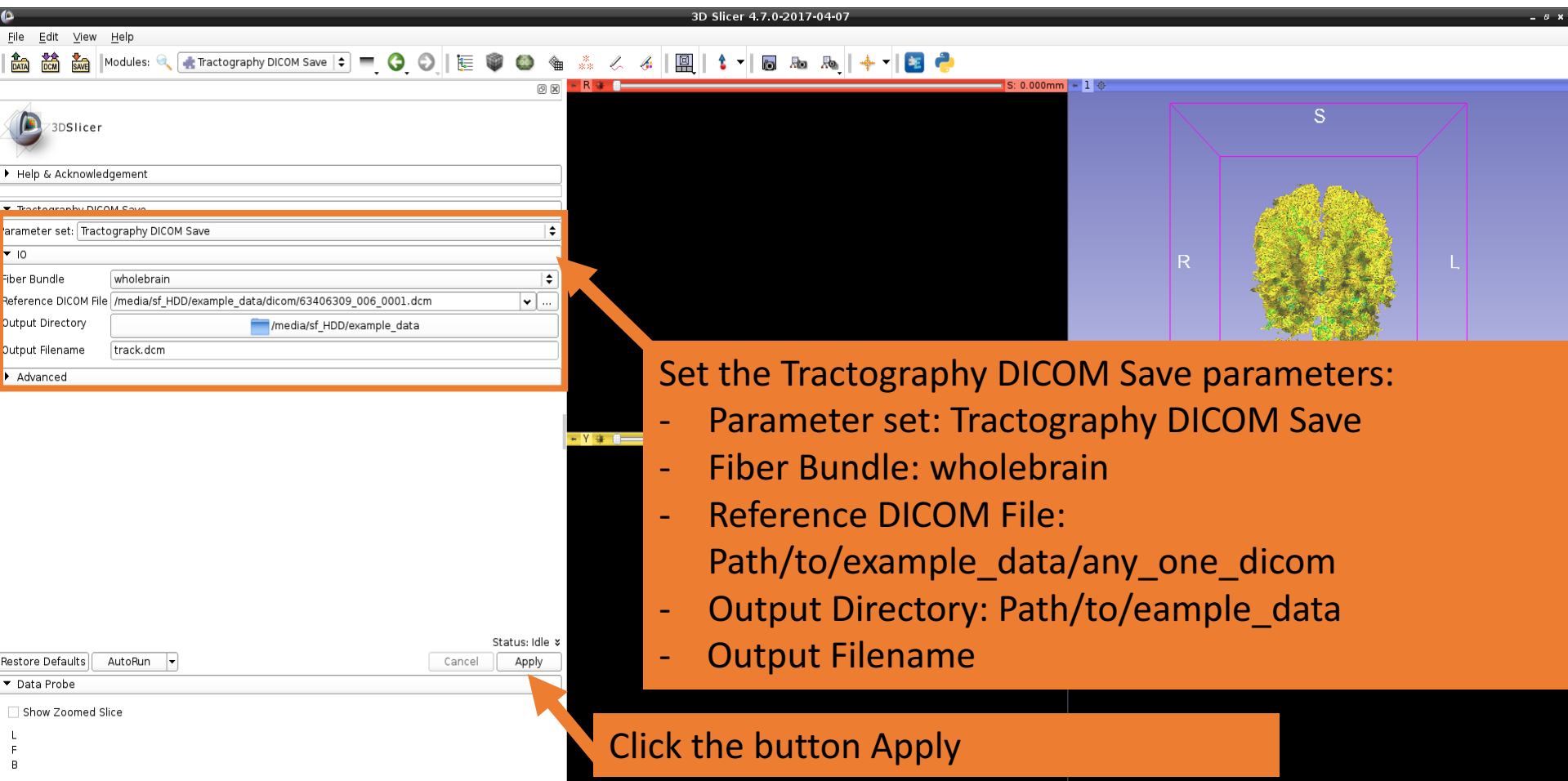
Tractography DICOM Save

Select the module



Tractography DICOM Save

Set parameters



3D Slicer 4.7.0-2017-04-07

File Edit View Help

Modules: Tractography DICOM Save

Parameter set: Tractography DICOM Save

Fiber Bundle: wholebrain

Reference DICOM File: /media/sf_HDD/example_data/dicom/63406309_006_0001.dcm

Output Directory: /media/sf_HDD/example_data

Output Filename: track.dcm

Apply

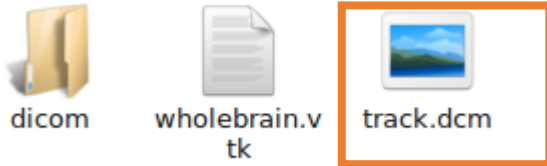
Set the Tractography DICOM Save parameters:

- Parameter set: Tractography DICOM Save
- Fiber Bundle: wholebrain
- Reference DICOM File:
Path/to/example_data/any_one_dicom
- Output Directory: Path/to/eample_data
- Output Filename

Click the button Apply

Tractography DICOM Save

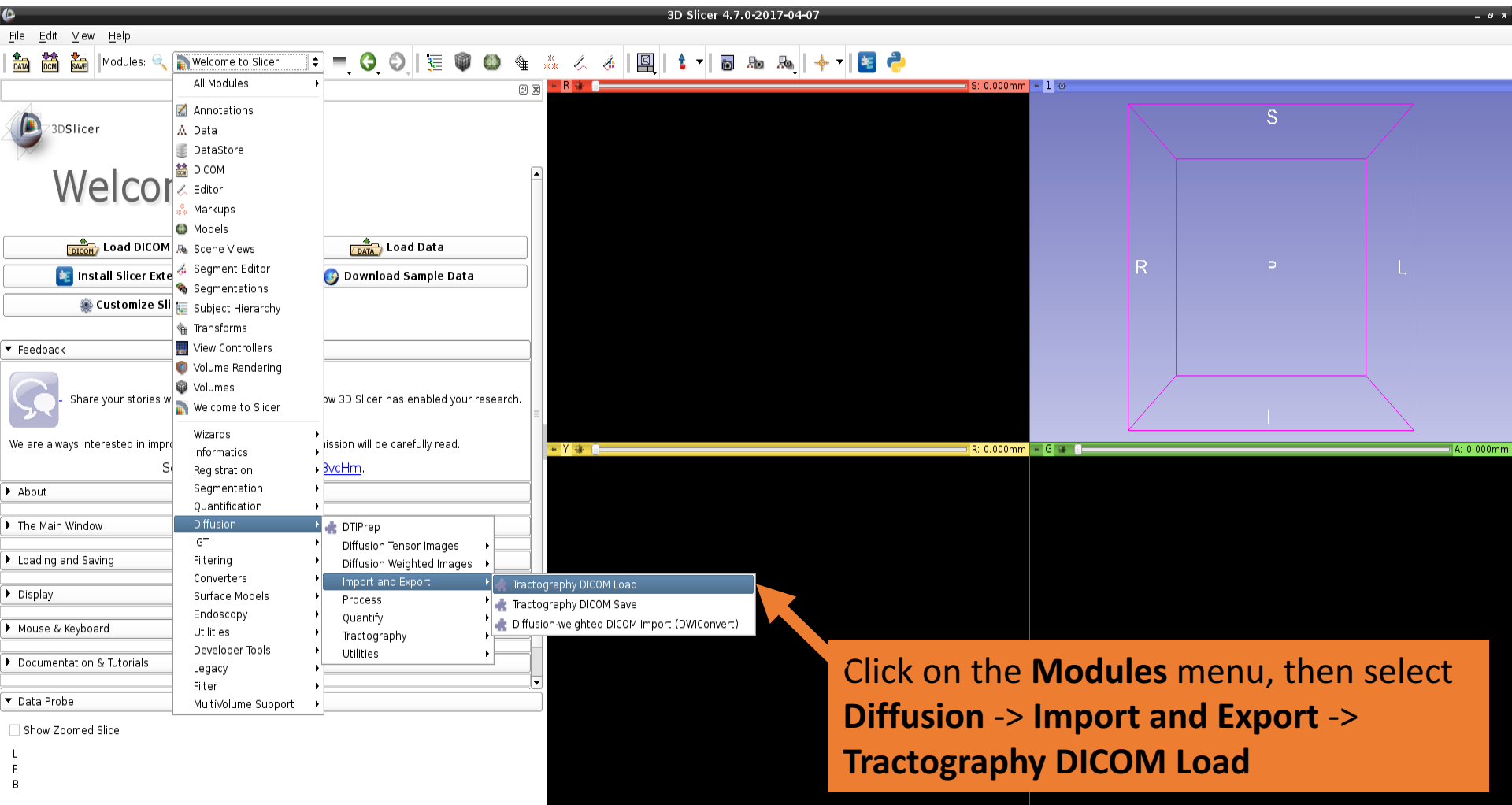
Output



Output the DICOM TrackSet file.

Tractography DICOM Load

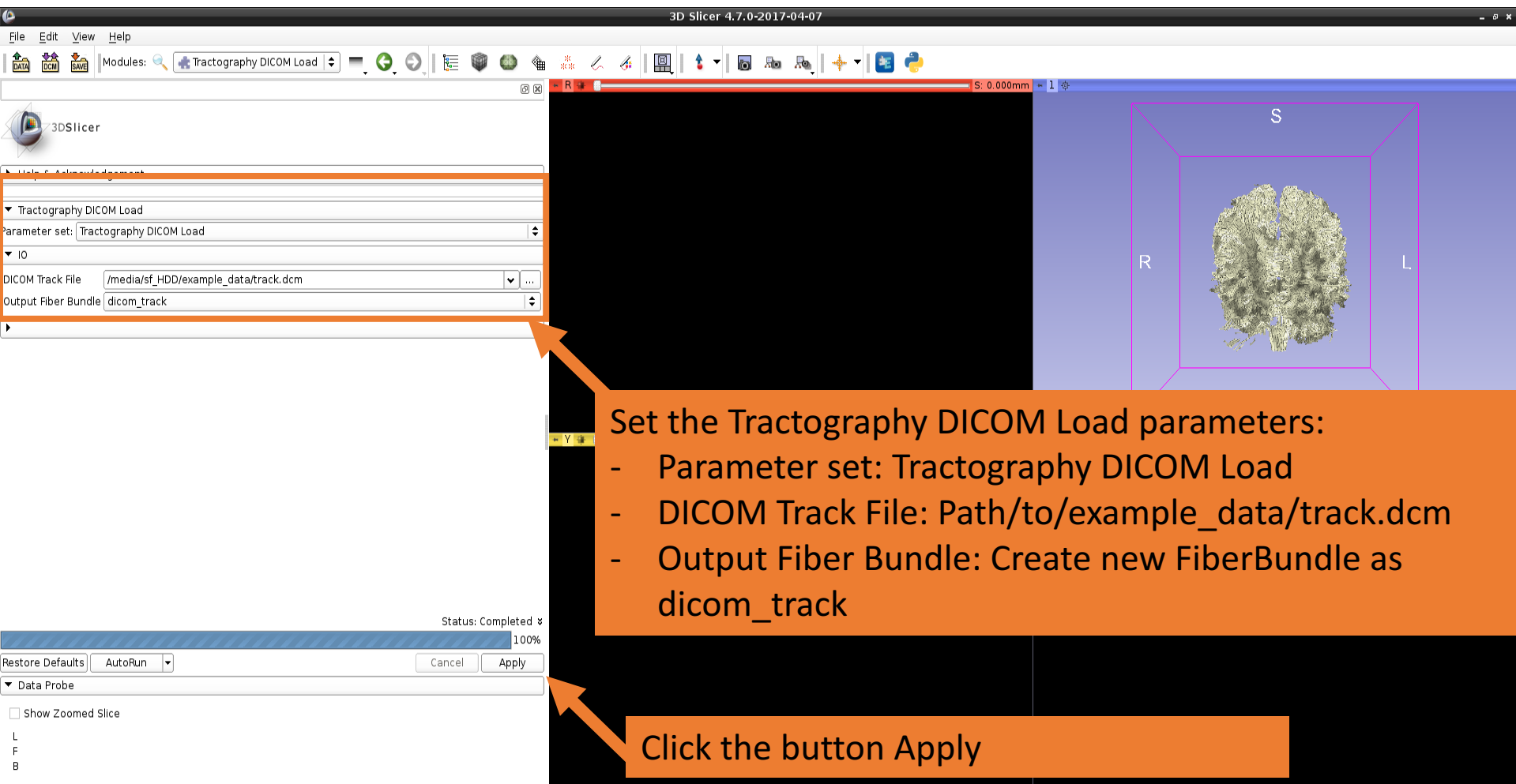
Select the module



Click on the **Modules** menu, then select **Diffusion** -> **Import and Export** -> **Tractography DICOM Load**

Tractography DICOM Load

Set parameters



The screenshot shows the 3D Slicer 4.7.0-2017-04-07 interface. The 'Tractography DICOM Load' module is selected in the Modules panel. The parameter set is 'Tractography DICOM Load'. The 'DICOM Track File' is set to '/media/sf_HDD/example_data/track.dcm' and the 'Output Fiber Bundle' is set to 'dicom_track'. The 'Apply' button is highlighted in the bottom right corner of the module panel. An orange callout box points to the 'Apply' button with the text 'Click the button Apply'. Another orange callout box points to the parameter settings with the text 'Set the Tractography DICOM Load parameters:'. The main 3D view shows a brain model with a green fiber bundle and a blue bounding box labeled 'S', 'R', and 'L'.

3D Slicer 4.7.0-2017-04-07

File Edit View Help

Modules: Tractography DICOM Load

Tractography DICOM Load

Parameter set: Tractography DICOM Load

IO

DICOM Track File /media/sf_HDD/example_data/track.dcm

Output Fiber Bundle dicom_track

Status: Completed 100%

Restore Defaults AutoRun Cancel Apply

Data Probe

Show Zoomed Slice

L
F
B

Set the Tractography DICOM Load parameters:

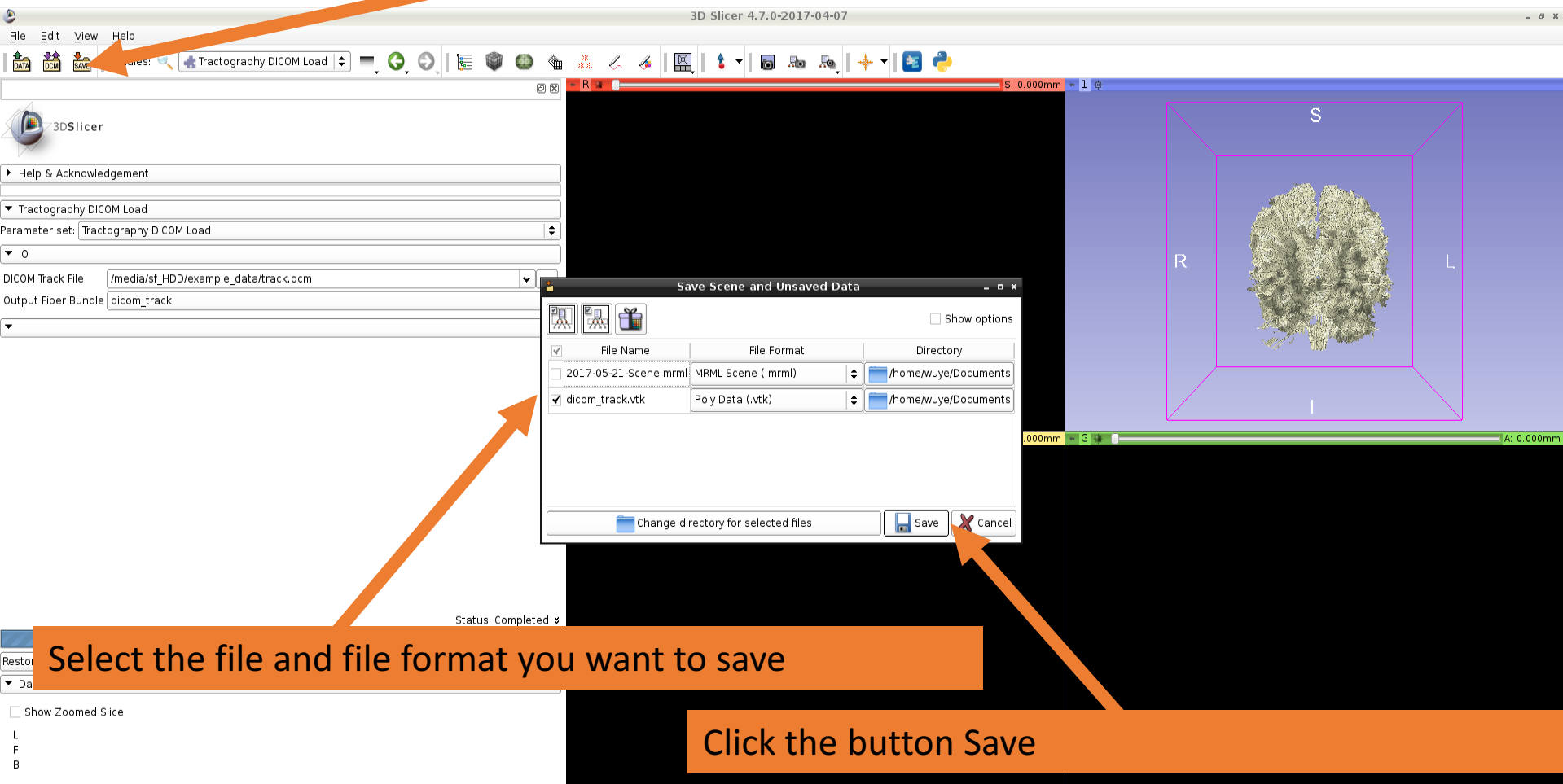
- Parameter set: Tractography DICOM Load
- DICOM Track File: Path/to/example_data/track.dcm
- Output Fiber Bundle: Create new FiberBundle as dicom_track

Click the button Apply

Tractography DICOM Load

Save tractography as VTK

Click the button Save



The screenshot shows the 3D Slicer interface with the Tractography DICOM Load module active. The left sidebar shows the module's parameter set. The main window displays a 3D brain model with a green fiber tract. A dialog box titled "Save Scene and Unsaved Data" is open, showing a table of files to be saved.

File Name	File Format	Directory
<input type="checkbox"/> 2017-05-21-Scene.mrml	MRML Scene (.mrml)	/home/wuye/Documents
<input checked="" type="checkbox"/> dicom_track.vtk	Poly Data (.vtk)	/home/wuye/Documents

At the bottom of the dialog, there is a "Save" button and a "Cancel" button. An orange arrow points to the "Save" button.

Below the dialog, an orange box contains the text: "Select the file and file format you want to save".

At the bottom right, another orange box contains the text: "Click the button Save".

Command Line Interface (CLI)



Convert between DICOM TrackSet and Slicer-style VTK tractography in CLI mode.

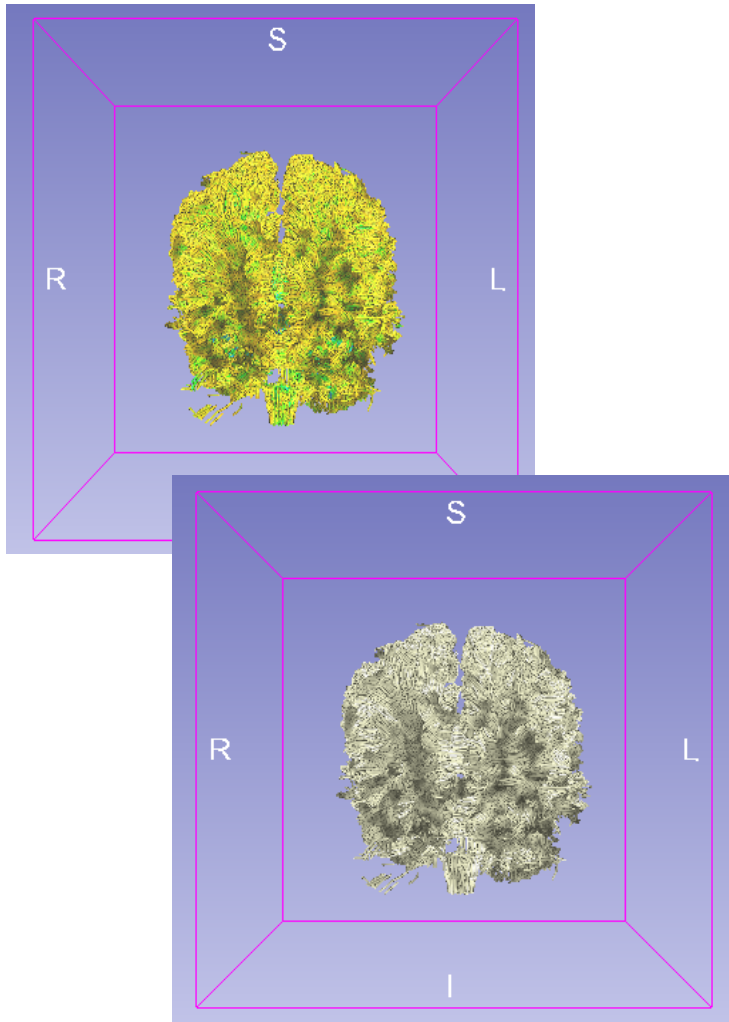
Command for Tractography DICOM Save:

```
1 Slicer=/home/wuye/usr/Slicer-4.7.0-2017-04-07-linux-amd64/Slicer
2 Path=/media/sf_HDD/example_data
3
4 # Help information
5 $Slicer --launch VTK_to_DICOMTract -h
6
7 # Step: Tractography DICOM Save=
8 $Slicer --launch VTK_to_DICOMTract --vtk_fiberbundle $Path/wholebrain.vtk --reference_dicom $Path/dicom/63406309_006_0001.dcm --output_dicom $Path/ --output_filename track.dcm
```

Command for Tractography DICOM Load:

```
1 Slicer=/home/wuye/usr/Slicer-4.7.0-2017-04-07-linux-amd64/Slicer
2 Path=/media/sf_HDD/example_data
3
4 # Help information
5 $Slicer --launch DICOMTract_to_VTK -h
6
7 # Step: Tractography DICOM Load
8 $Slicer --launch DICOMTract_to_VTK --input_track_dicom $Path/track.dcm --output_vtk $Path/dicom_track.vtk
```

Conclusion



This tutorial guided you to convert between DICOM TrackSet and Slicer-style VTK tractography.

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