

# DICOM Tractography Converter

**Ye Wu<sup>1,2</sup>, Fan Zhang<sup>1</sup>, Isaiah Norton<sup>1</sup>, Lauren J. O'Donnell<sup>1</sup>**

<sup>1</sup> Brigham and Women's Hospital, Harvard Medical School, USA

<sup>2</sup> Zhejiang University of Technology, China

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>*



3DSlicer

# 3D Slicer



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The tutorial uses the 3D Slicer (Version 4.10, Stable Release) 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](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>

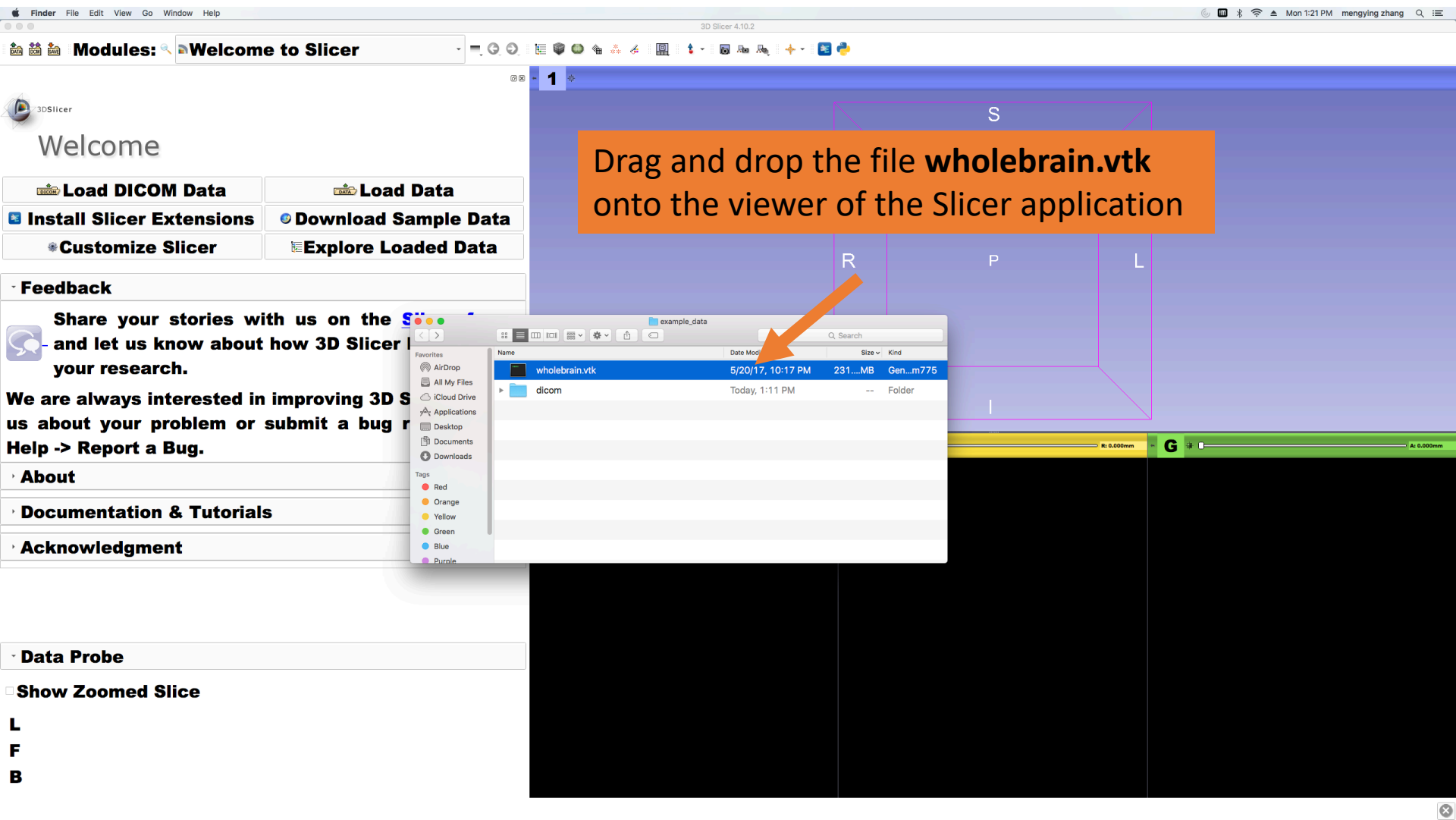
## UKF

- 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](#)



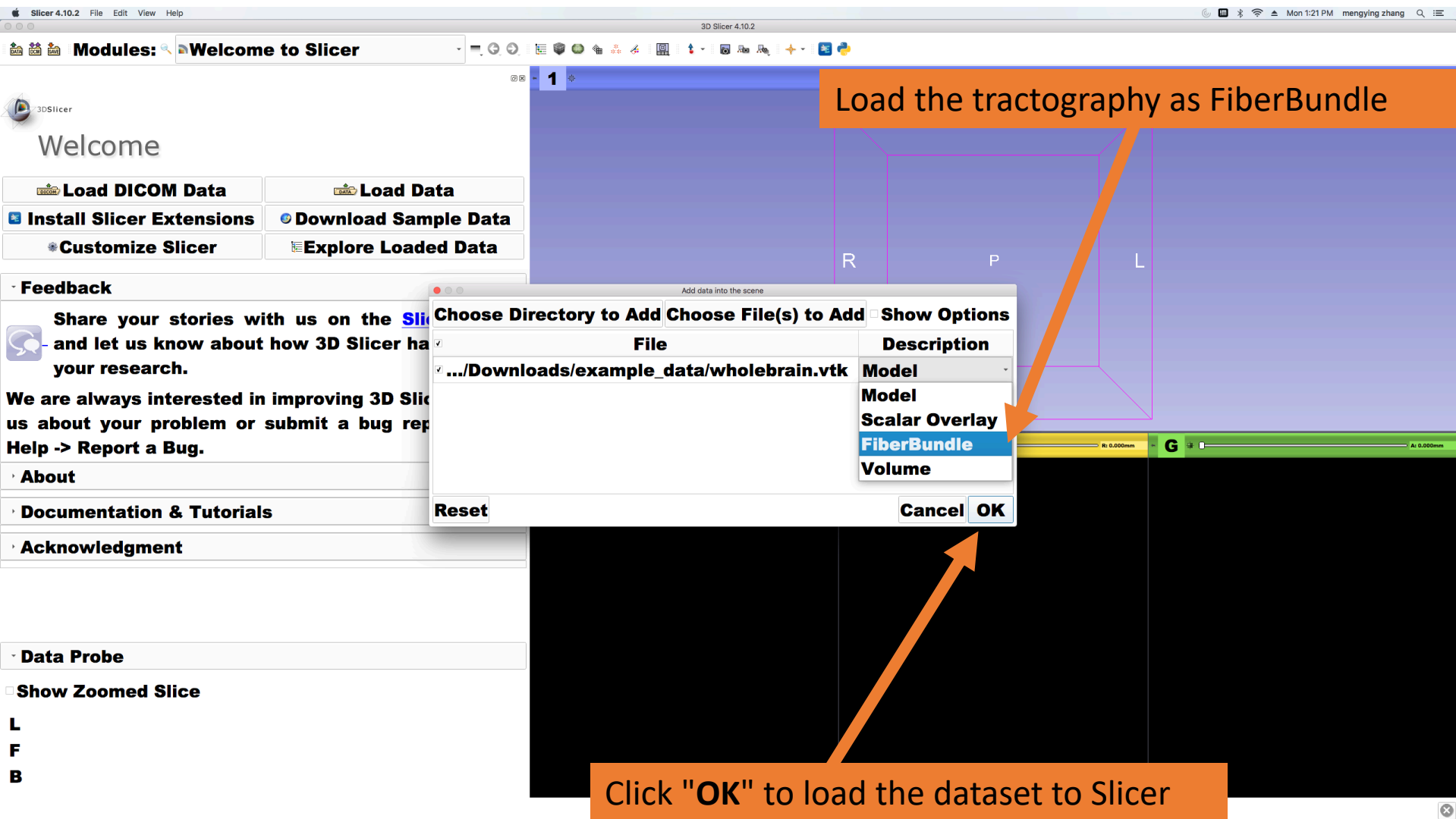
# Tractography DICOM Save

## Load VTK file



# Tractography DICOM Save

## Load VTK file



Load the tractography as FiberBundle

Click "OK" to load the dataset to Slicer

3D Slicer 4.10.2

File Edit View Help

3D Slicer 4.10.2

Modules: Welcome to Slicer

Welcome

Load DICOM Data

Load Data

Install Slicer Extensions

Download Sample Data

Customize Slicer

Explore Loaded Data

Feedback

Share your stories with us on the Slicer website and let us know about how 3D Slicer has helped your research.

We are always interested in improving 3D Slicer. Please let us know about your problem or submit a bug report. Help -> Report a Bug.

About

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Data Probe

Show Zoomed Slice

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F

B

Add data into the scene

Choose Directory to Add

Choose File(s) to Add

Show Options

File

Description

Model

Model Scalar Overlay

FiberBundle

Volume

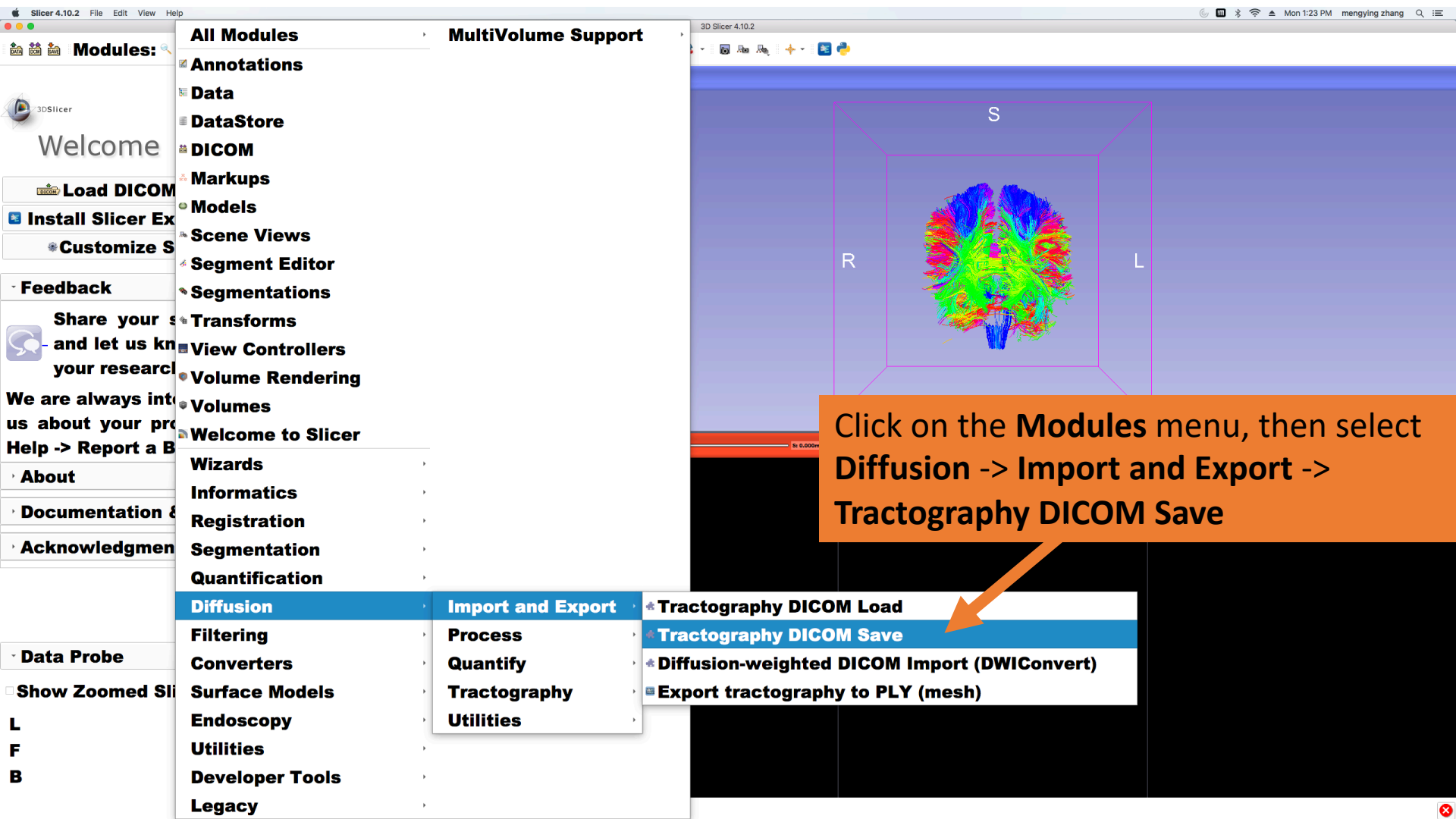
Reset

Cancel

OK

# Tractography DICOM Save

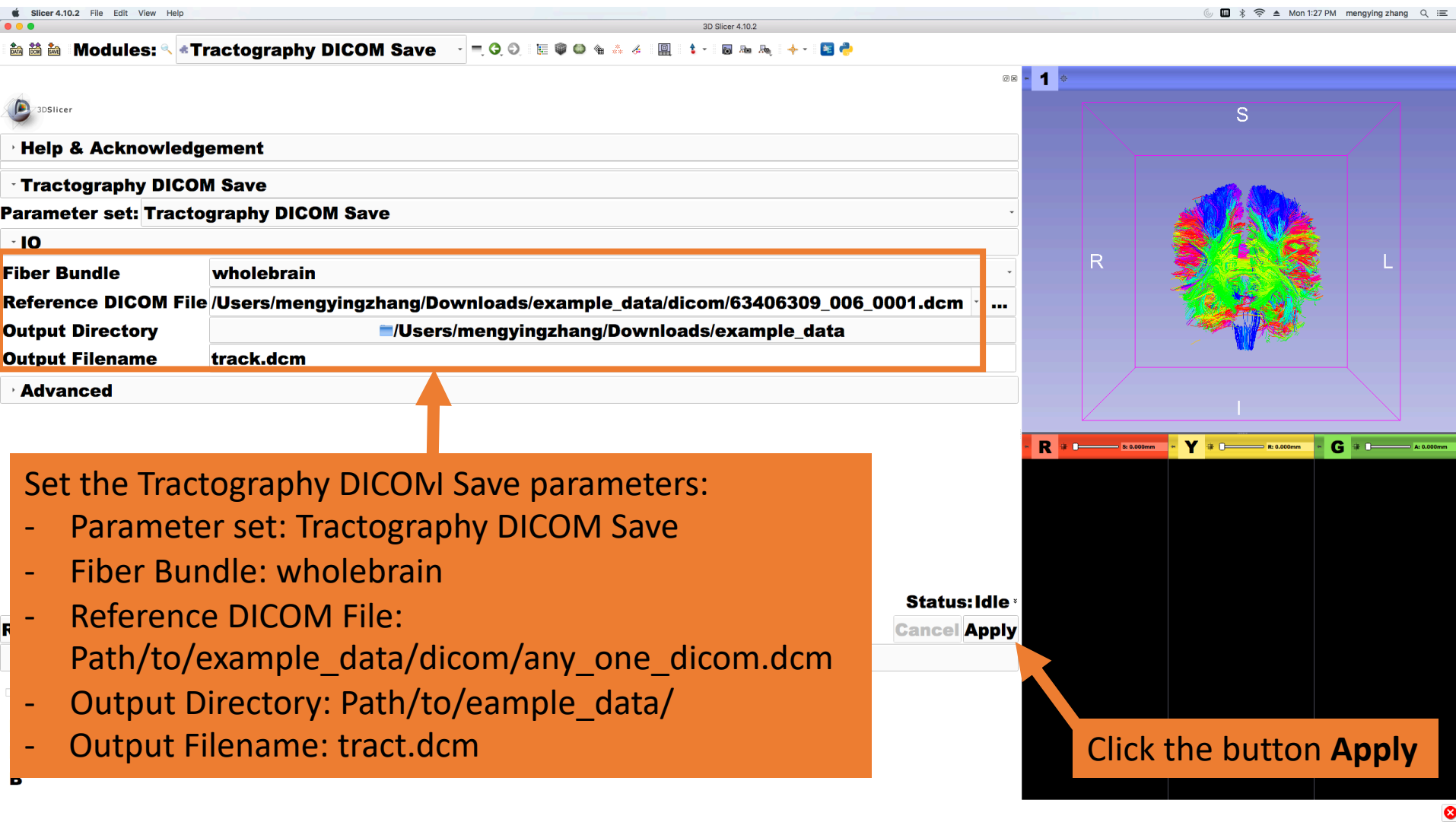
## Select the module





# Tractography DICOM Save

## Set parameters



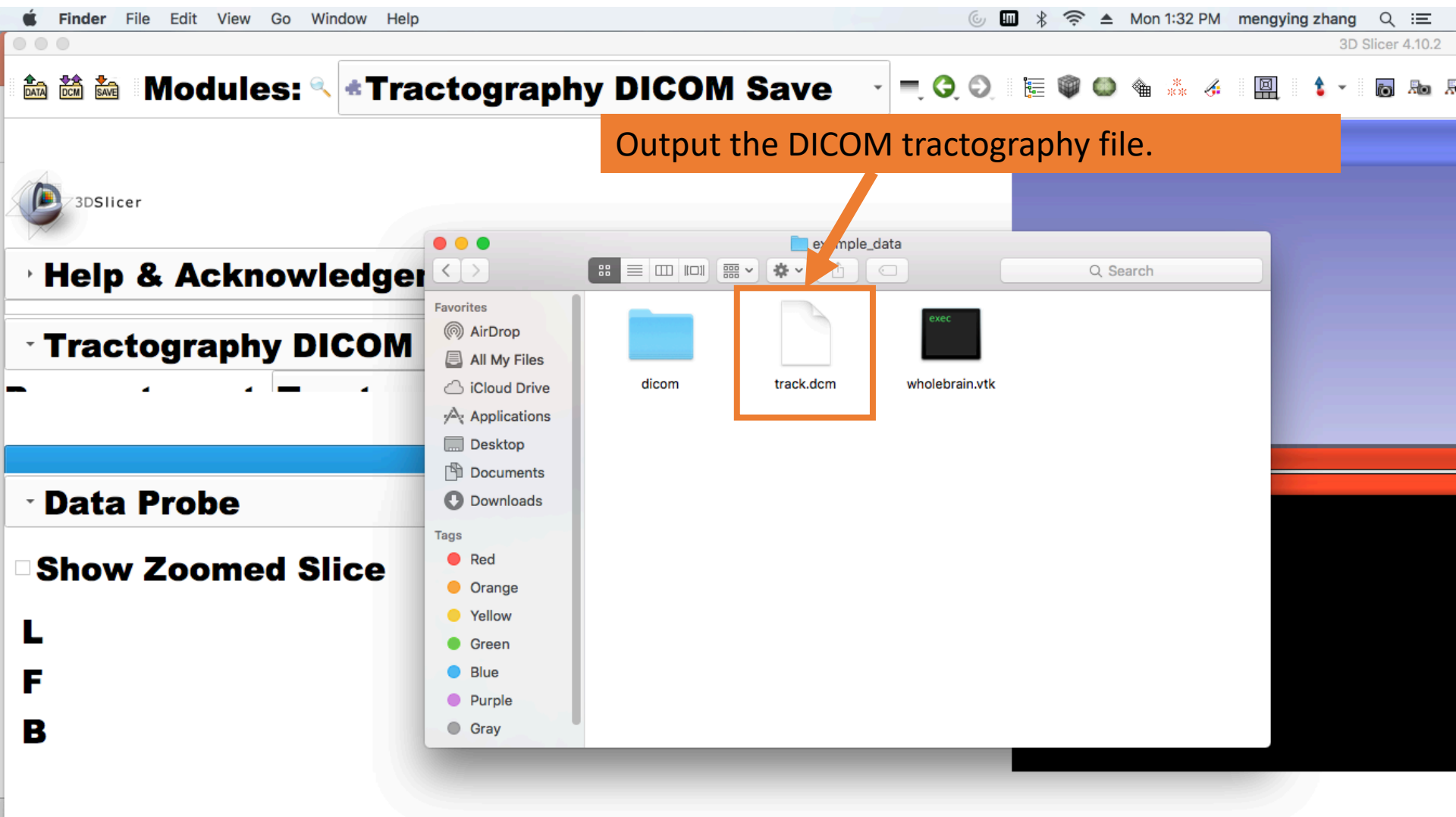
Set the Tractography DICOM Save parameters:

- Parameter set: Tractography DICOM Save
- Fiber Bundle: wholebrain
- Reference DICOM File: Path/to/example\_data/dicom/any\_one\_dicom.dcm
- Output Directory: Path/to/eample\_data/
- Output Filename: tract.dcm

Click the button **Apply**

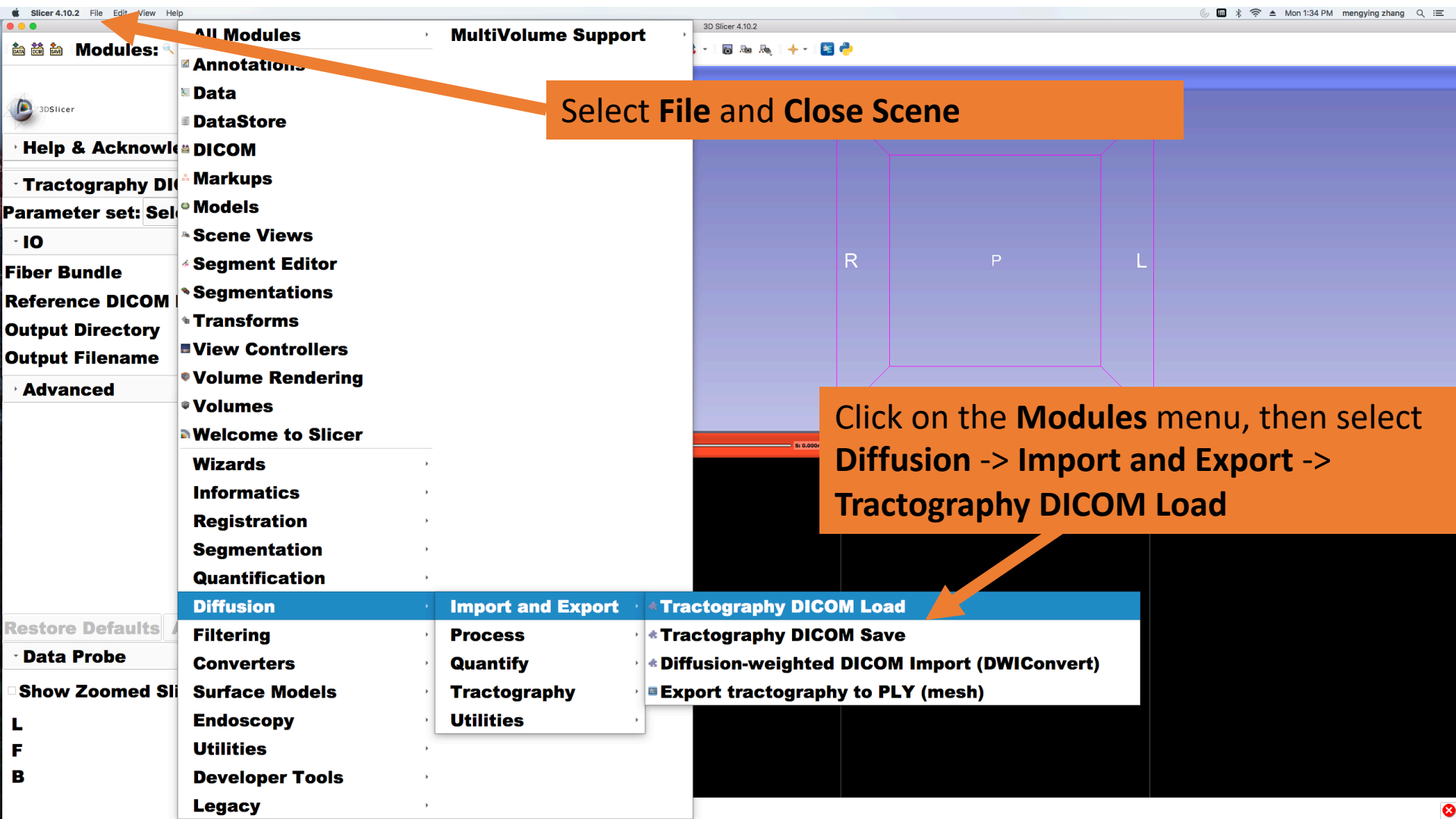
# Tractography DICOM Save

## Output



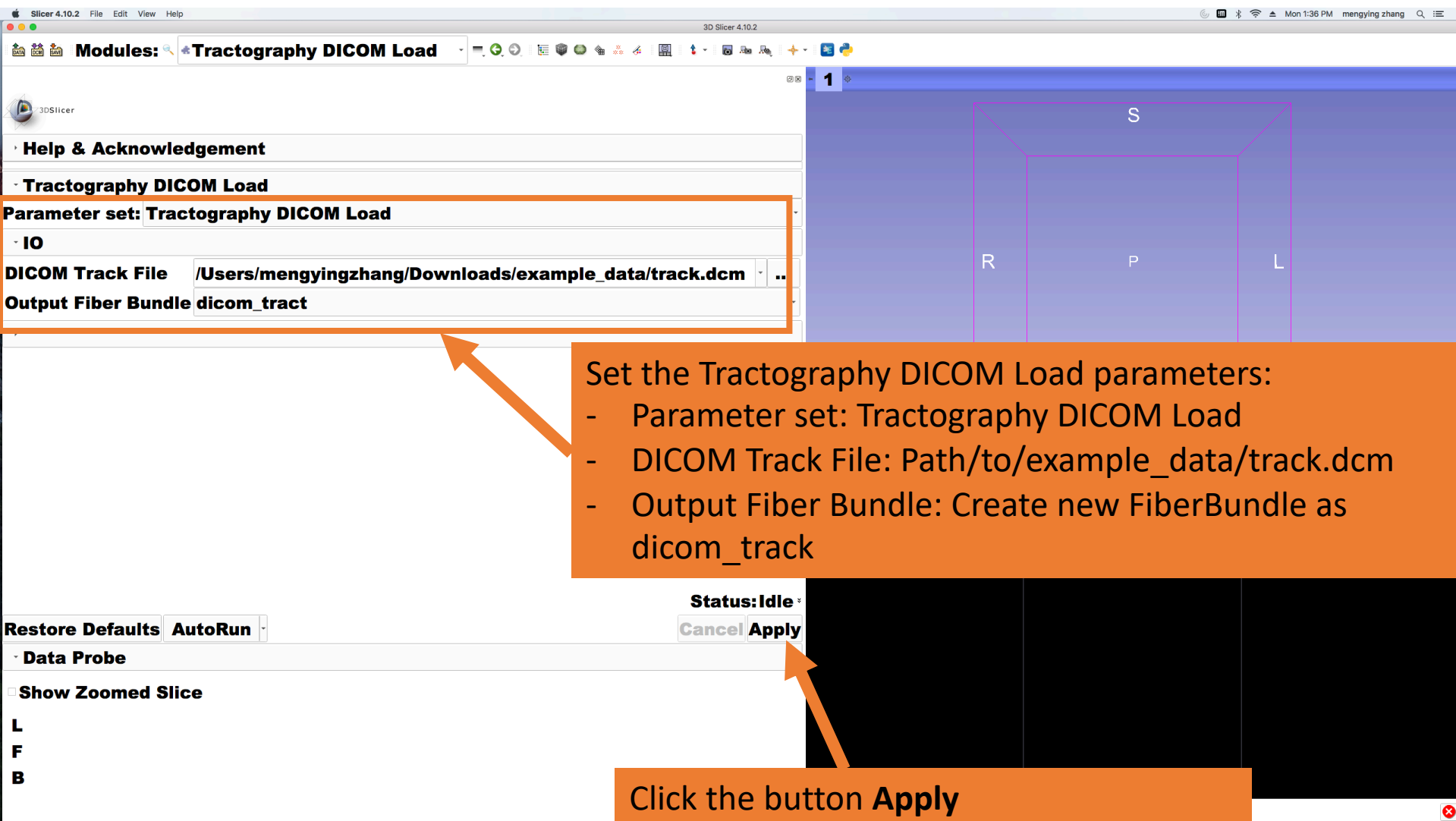
# Tractography DICOM Load

## Select the module



# Tractography DICOM Load

## Set parameters



The screenshot shows the 3D Slicer 4.10.2 interface. The 'Modules' panel on the left has 'Tractography DICOM Load' selected. The 'Parameter set' dropdown is set to 'Tractography DICOM Load'. The 'DICOM Track File' is set to '/Users/mengyingzhang/Downloads/example\_data/track.dcm'. The 'Output Fiber Bundle' is set to 'dicom\_tract'. The 'Status' is 'Idle'. The 'Apply' button is highlighted with an orange arrow pointing to it from the text 'Click the button Apply'.

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

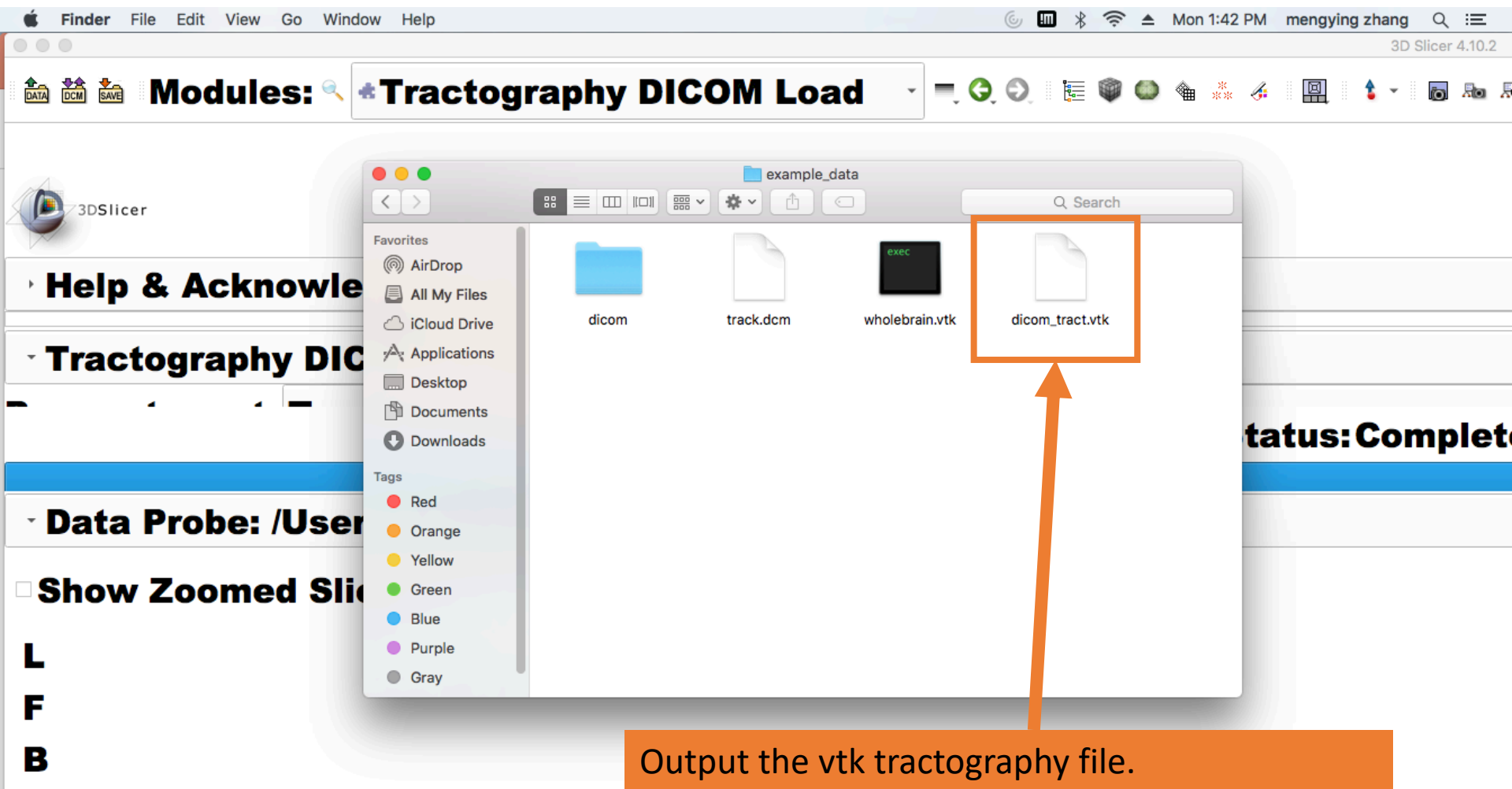
Click the button **Apply**

## Save tractography as VTK



# Tractography DICOM Save

## Output



# Command Line Interface (CLI)



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

```
SlicerDMRI_CLI_FOLDER=/Applications/Slicer.app/Contents/Extensions-26813/SlicerDMRI/lib/Slicer-4.8/cli-modules/
```

```
EXAMPLE_DATA_FOLDER=/Users/fan/Desktop/example_data/
```

```
# help information
```

```
${SlicerDMRI_CLI_FOLDER}/VTK_to_DICOMTract -h
```

Command for Tractography DICOM Save:

```
# Tractography DICOM Save
```

```
${SlicerDMRI_CLI_FOLDER}/VTK_to_DICOMTract --vtk_fiberbundle ${EXAMPLE_DATA_FOLDER}/dicom_tract.vtk -  
-reference_dicom ${EXAMPLE_DATA_FOLDER}/dicom/63406309_006_0001.dcm --output_dicom  
${EXAMPLE_DATA_FOLDER}/ --output_filename ${EXAMPLE_DATA_FOLDER}/track.com
```

```
# help information
```

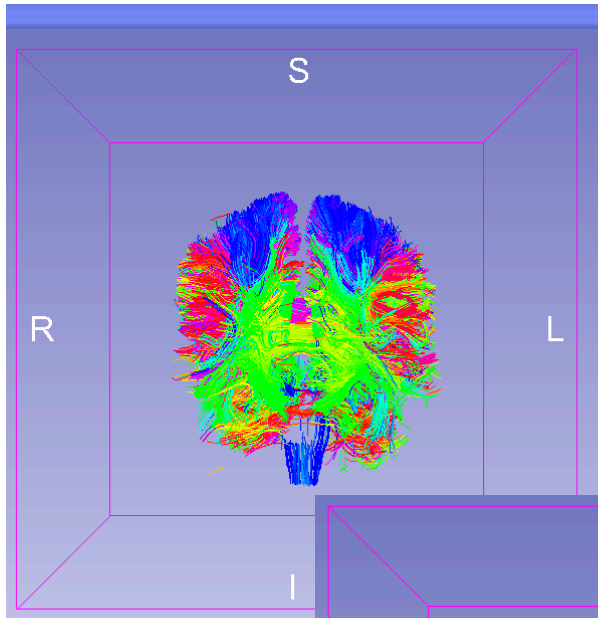
```
${SlicerDMRI_CLI_FOLDER}/DICOMTract_to_VTK -h
```

Command for Tractography DICOM Load:

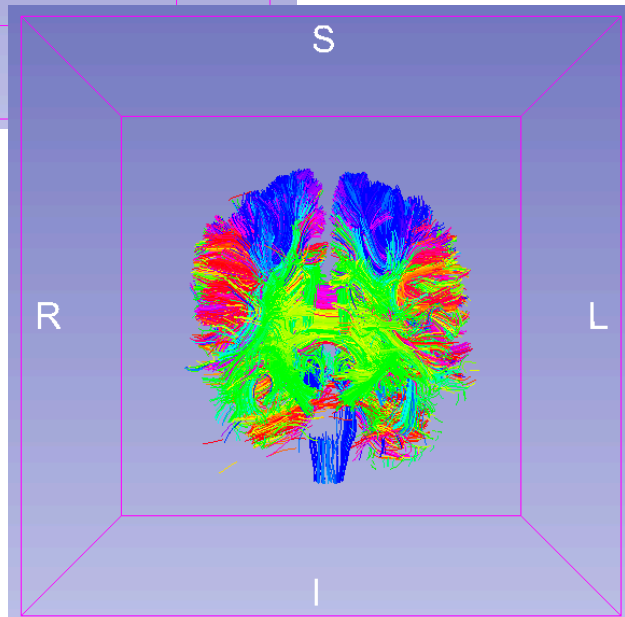
```
# Tractography DICOM Load
```

```
${SlicerDMRI_CLI_FOLDER}/DICOMTract_to_VTK --input_track_dicom ${EXAMPLE_DATA_FOLDER}/track.dcm --  
output_vtk ${EXAMPLE_DATA_FOLDER}/dicom_tract.vtk
```

# Conclusion



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





# Acknowledgments

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**Tutorial updated by**

Mengying Zhang, undergraduate, National University of Singapore