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Dose accumulation for adaptive radiation therapy

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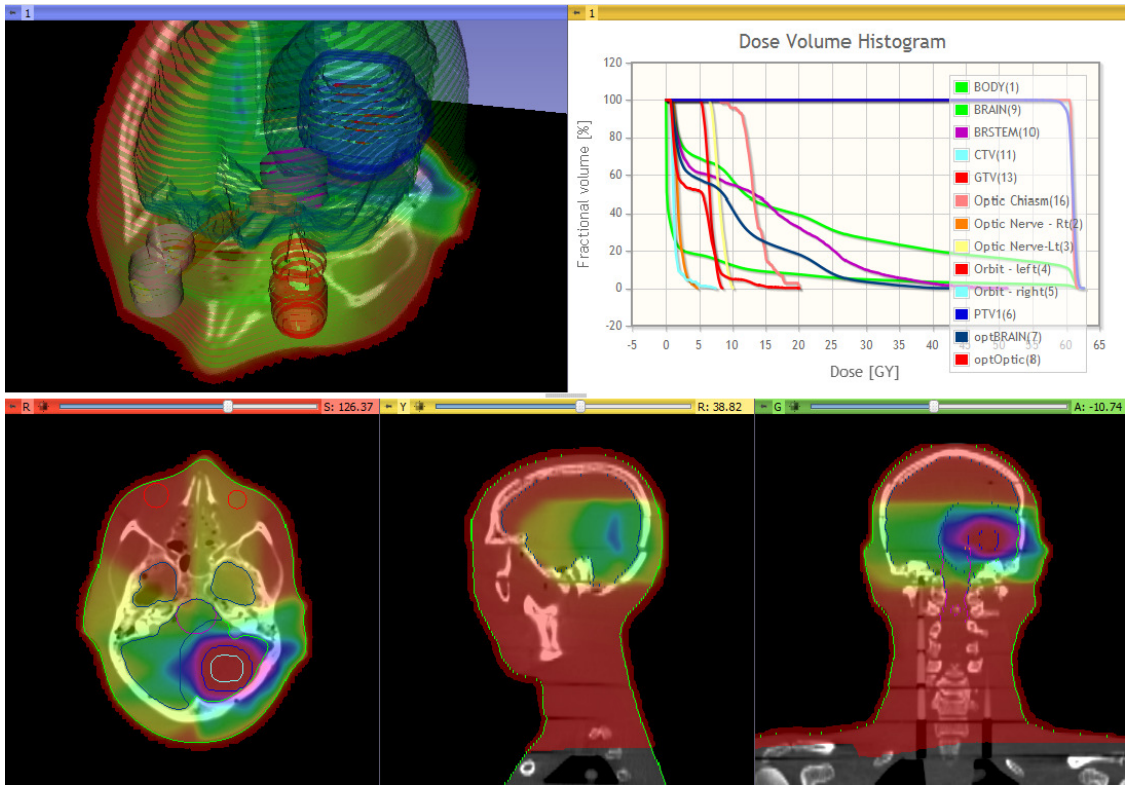
Learning Objective

This tutorial demonstrates how to perform dose accumulation for adaptive radiation therapy



Pre-requisite

This tutorial assumes that you have completed the following tutorial:

Data Loading and 3D Visualization

Sonia Pujol

http://www.slicer.org/slicerWiki/index.php/Documetation/4.1/Training#Slicer4_Data_Loading_and_3D_Visualization

Material

This tutorial requires the installation of the Slicer 4.1 with RT extension 0.3 release and the tutorial dataset. They are available at the following locations:

Slicer4.1 RT extension 0.3 download page:

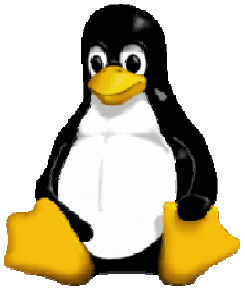
https://www.assembla.com/spaces/slicerrt/wiki/Download

Tutorial dataset:

https://www.assembla.com/spaces/slicerrt/documents/bMuwgYTKur4yP-acwqjQWU/download/bMuwgYTKur4yP-acwqjQWU

Platforms

Currently only tested on Windows Platform



Work in progress …

Overview

- Part 1: Loading and visualization
- Part 2: Rigid registration
- Part 3: Bspline deformable registration
- Part 4: Dose accumulation
- Part 5: DVH comparison

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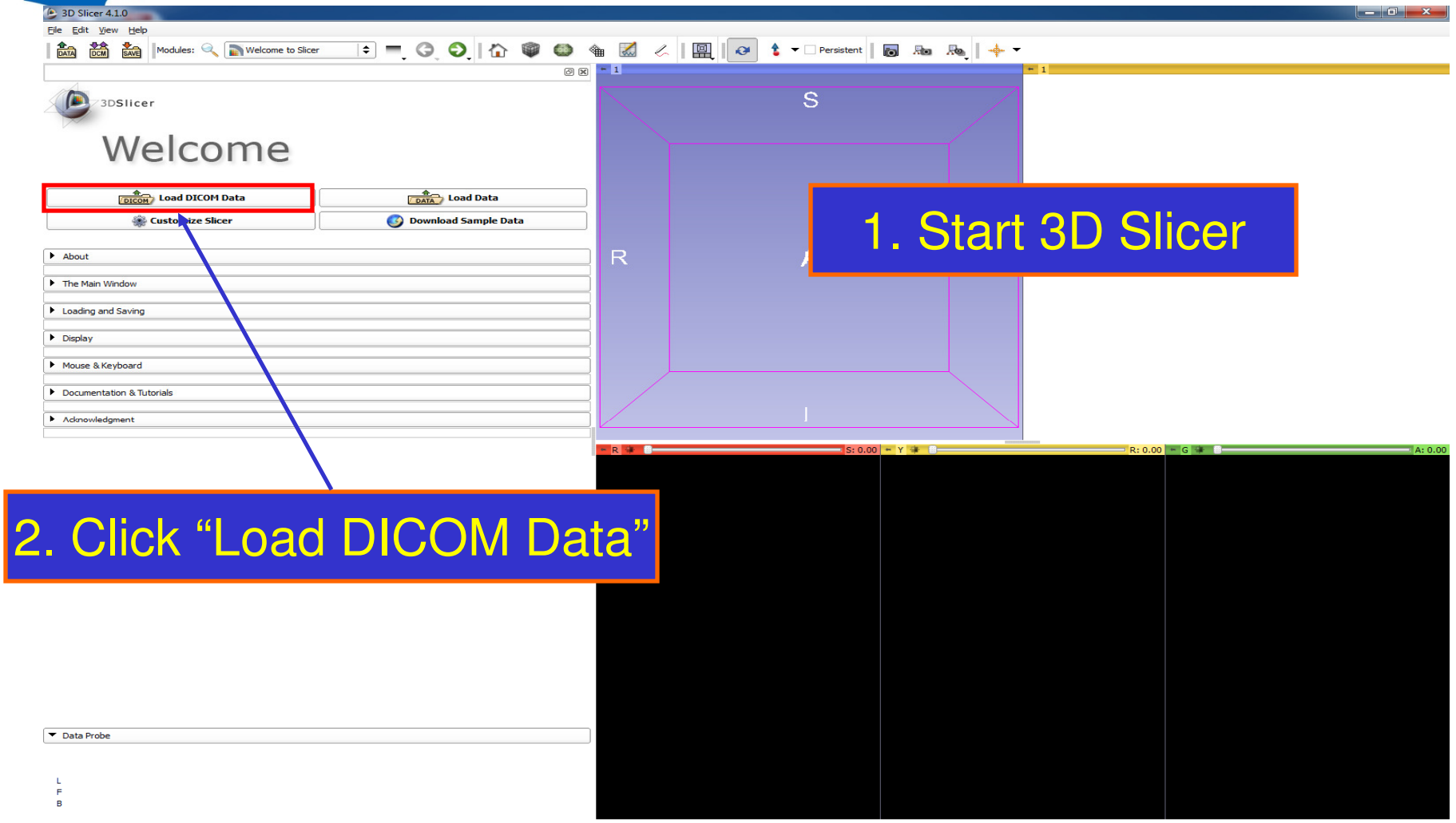
Loading DICOM-RT data



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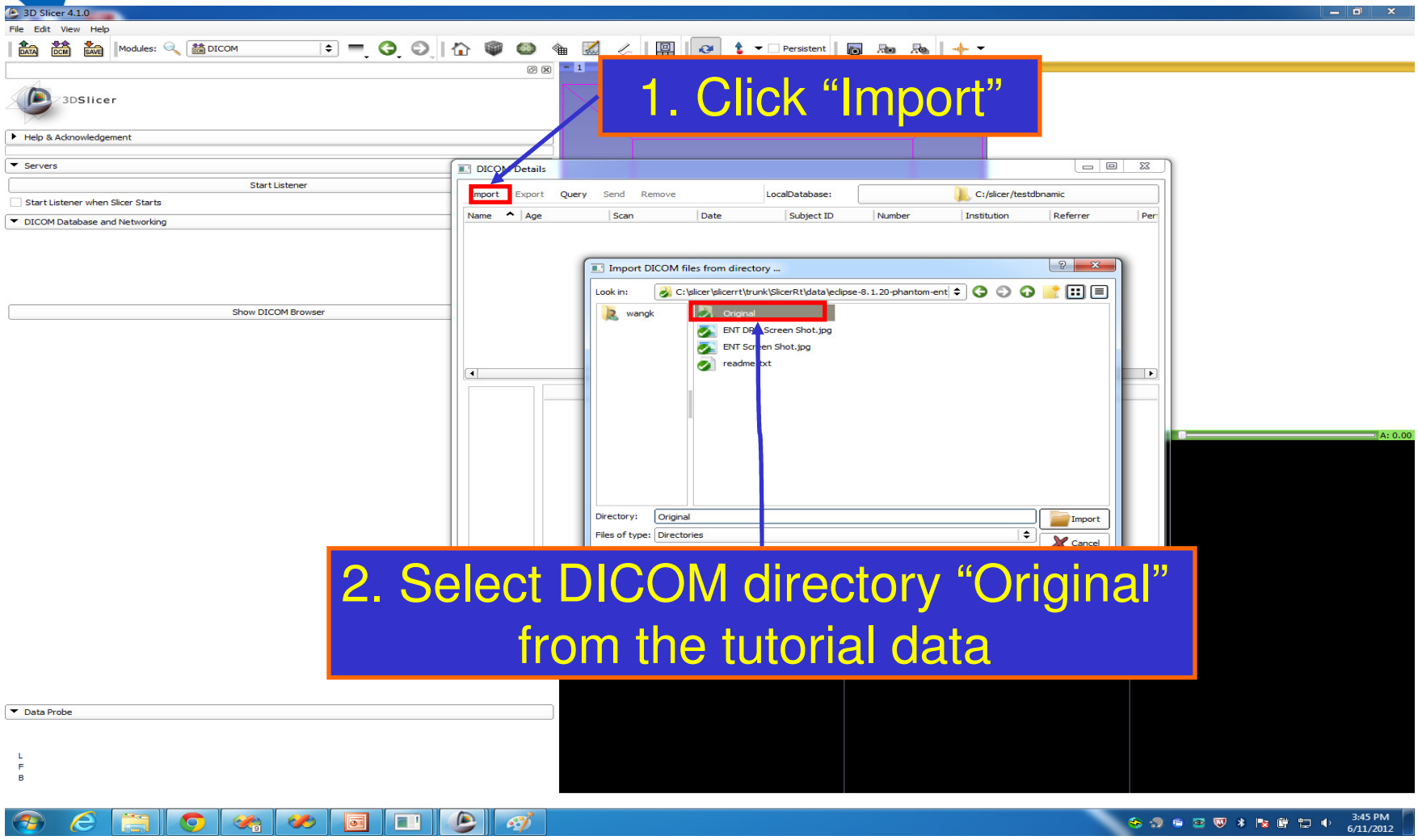

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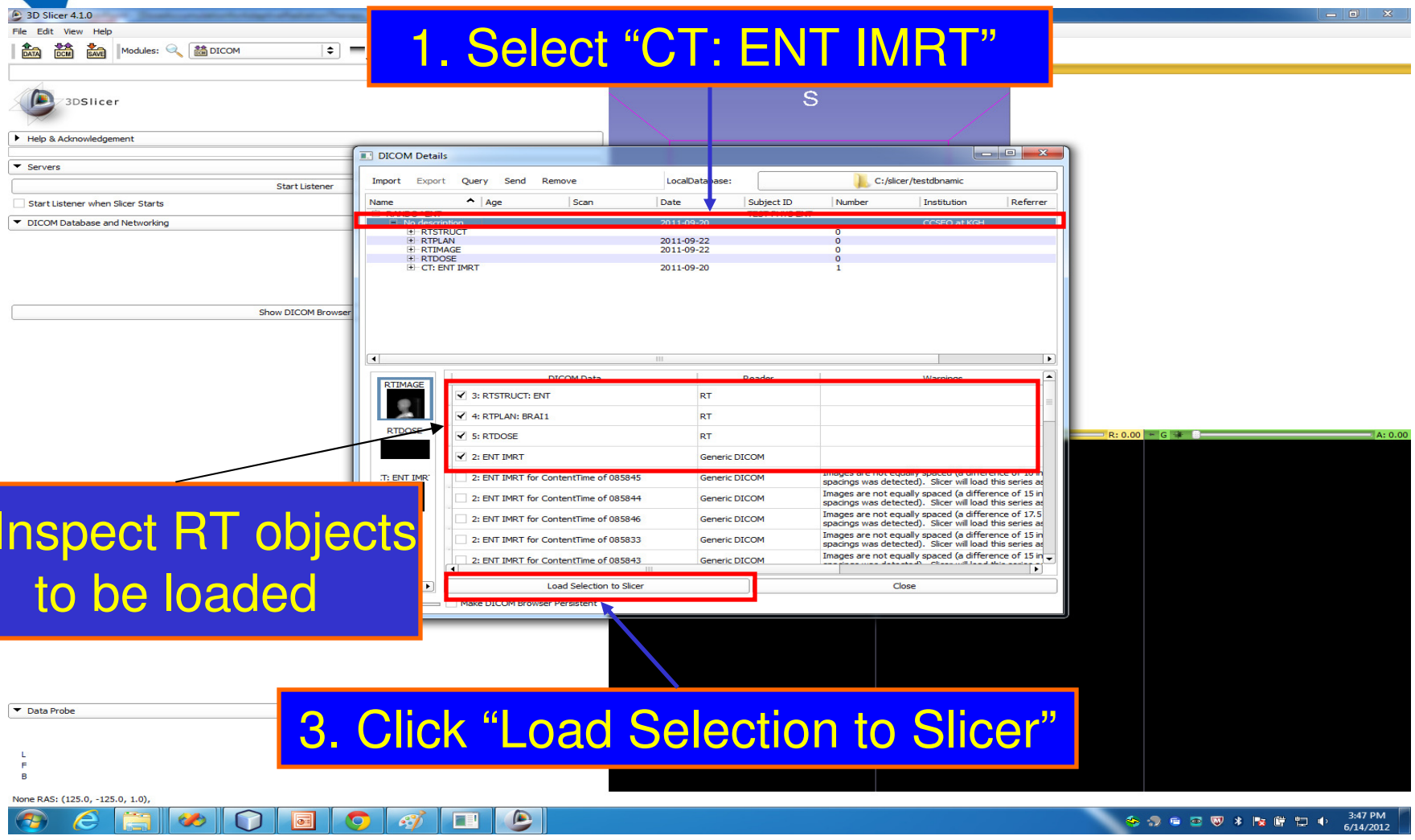

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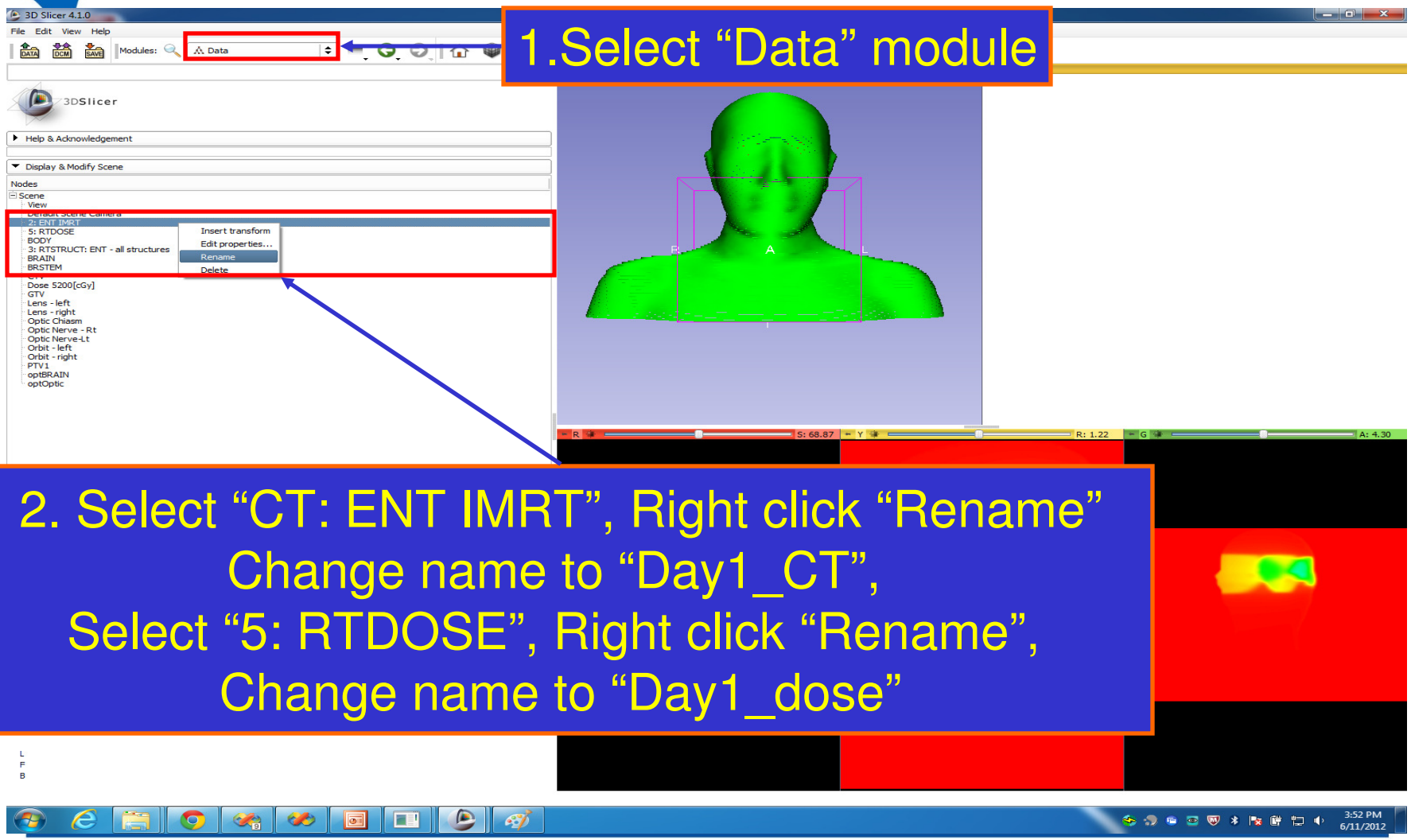
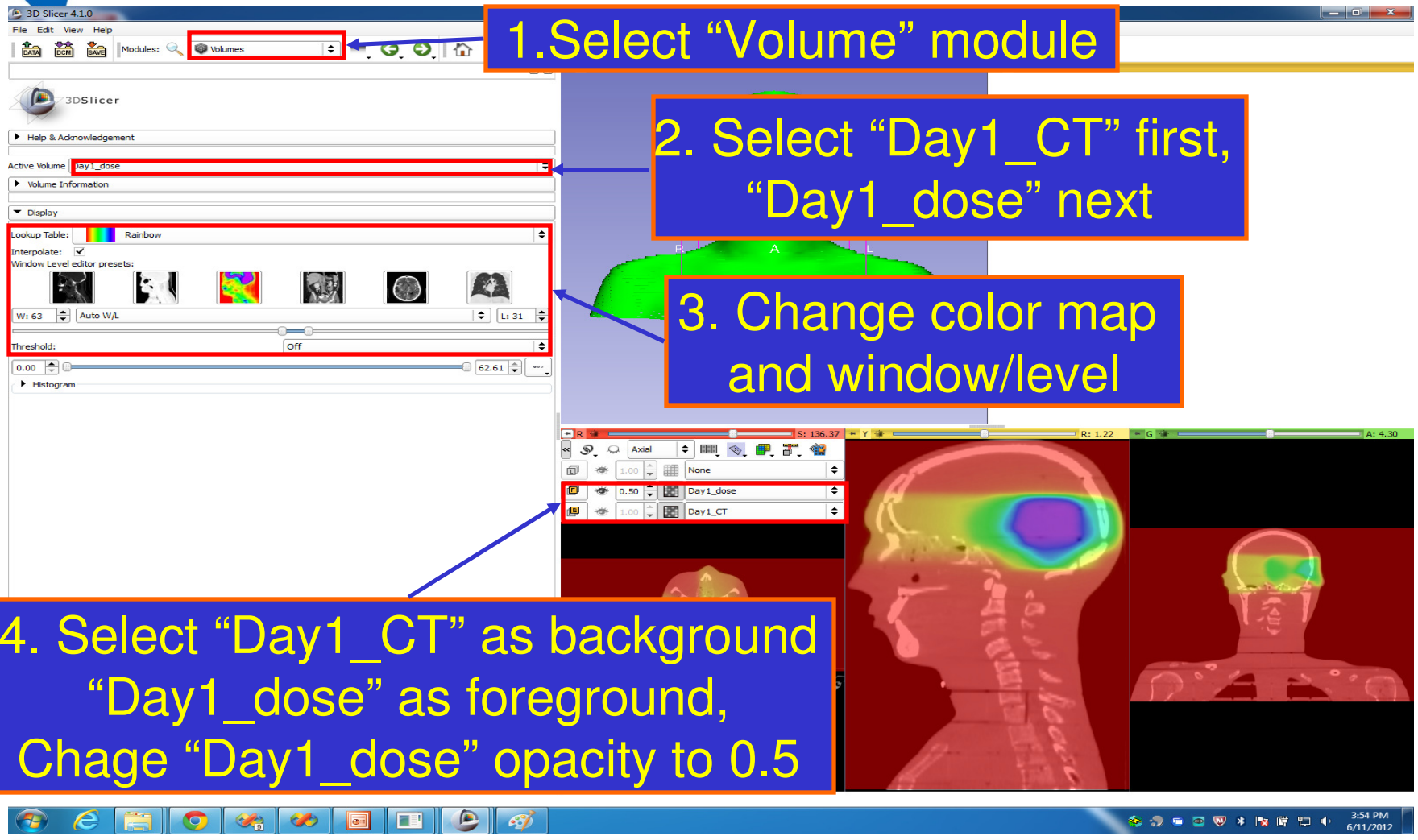
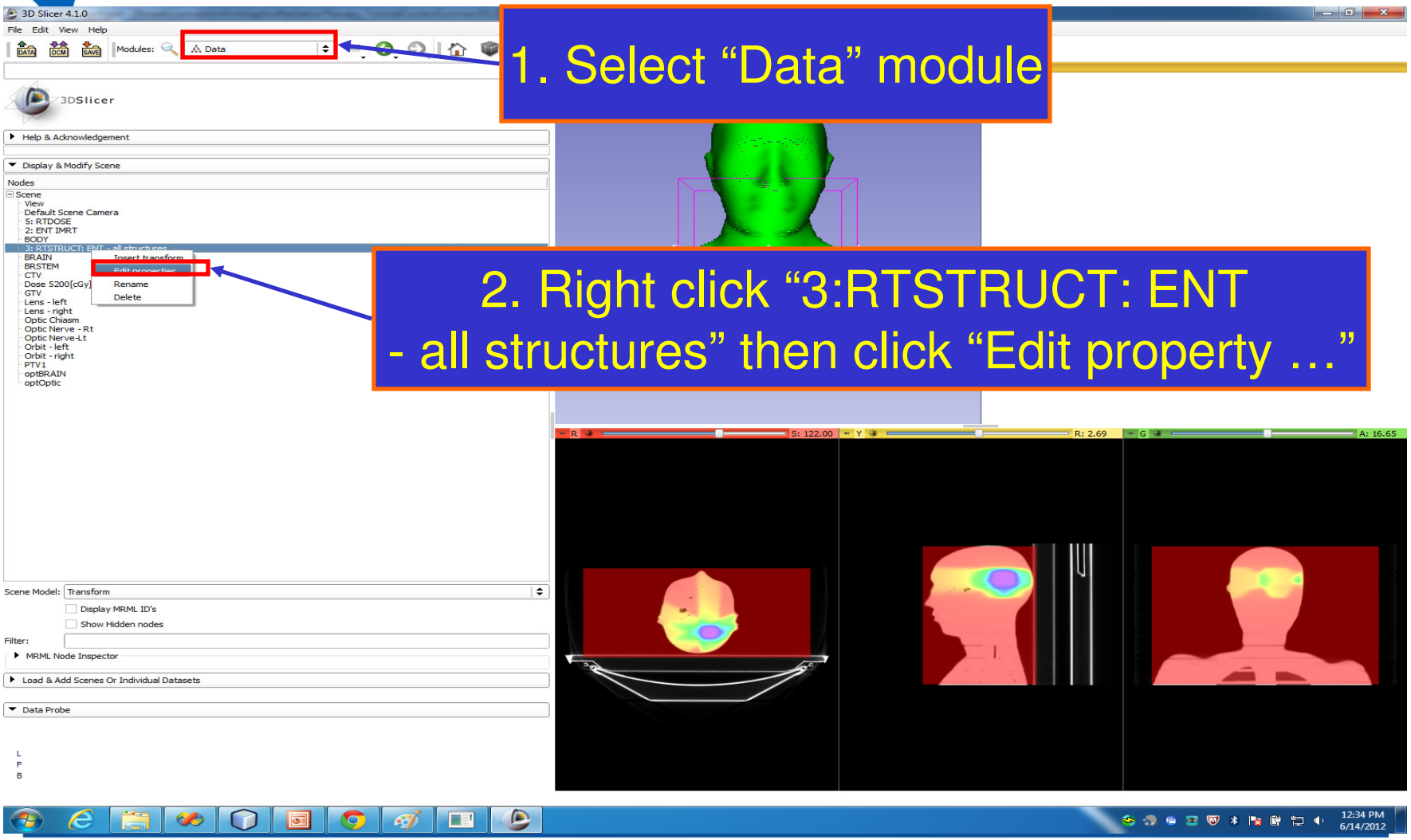
Loading DICOM-RT data



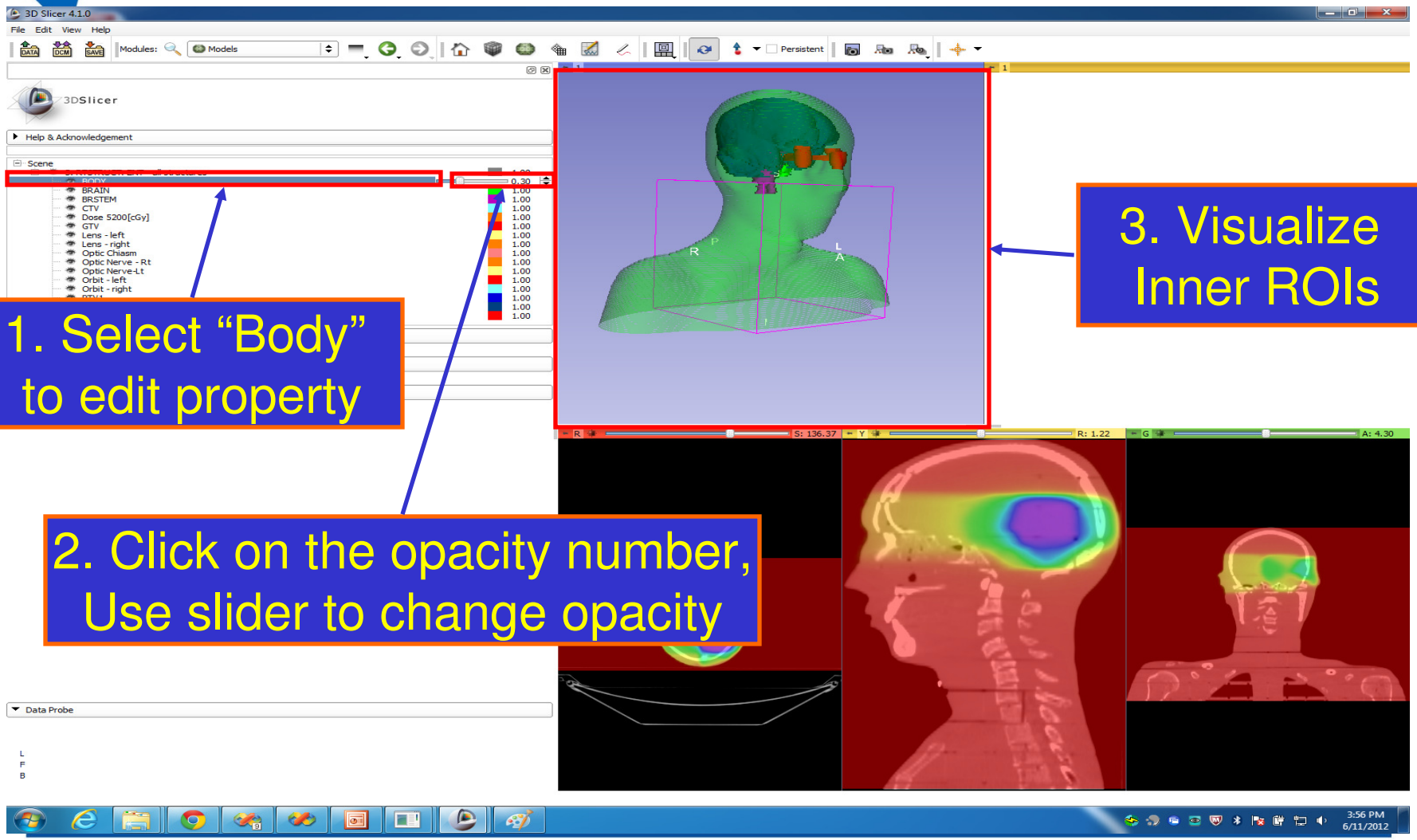
Visualization of DICOM-RT data



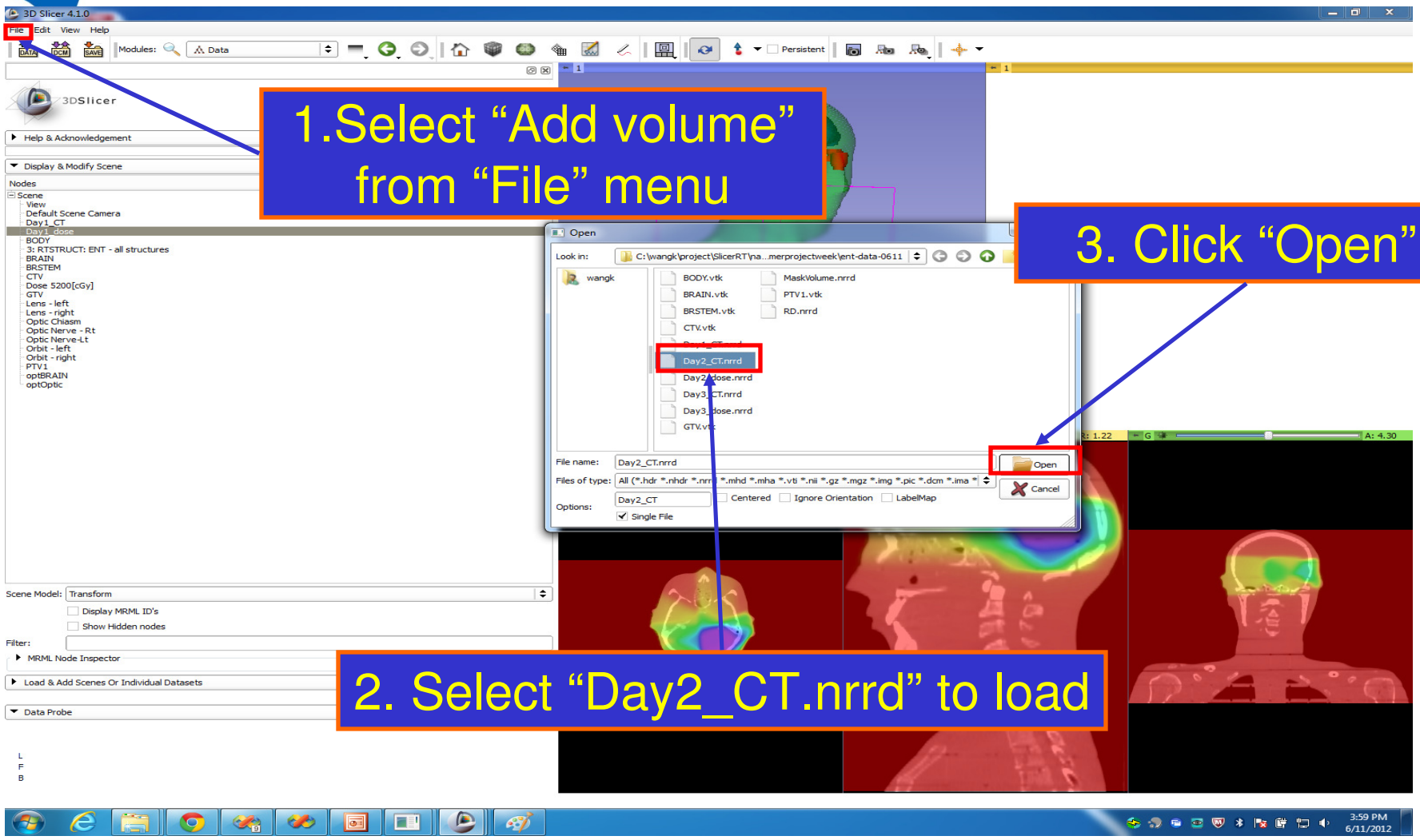
Visualization of DICOM-RT data



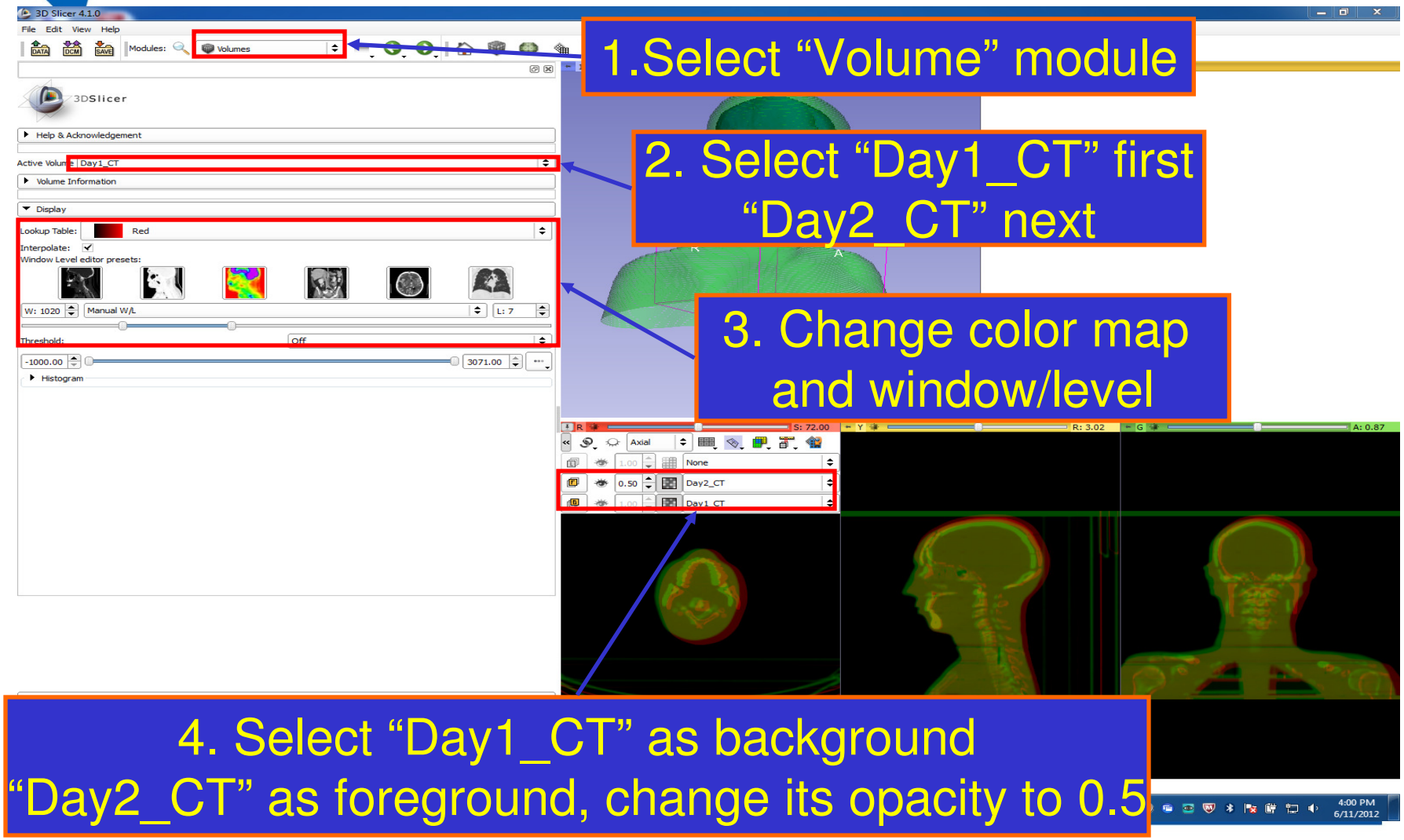
Visualization of DICOM-RT data



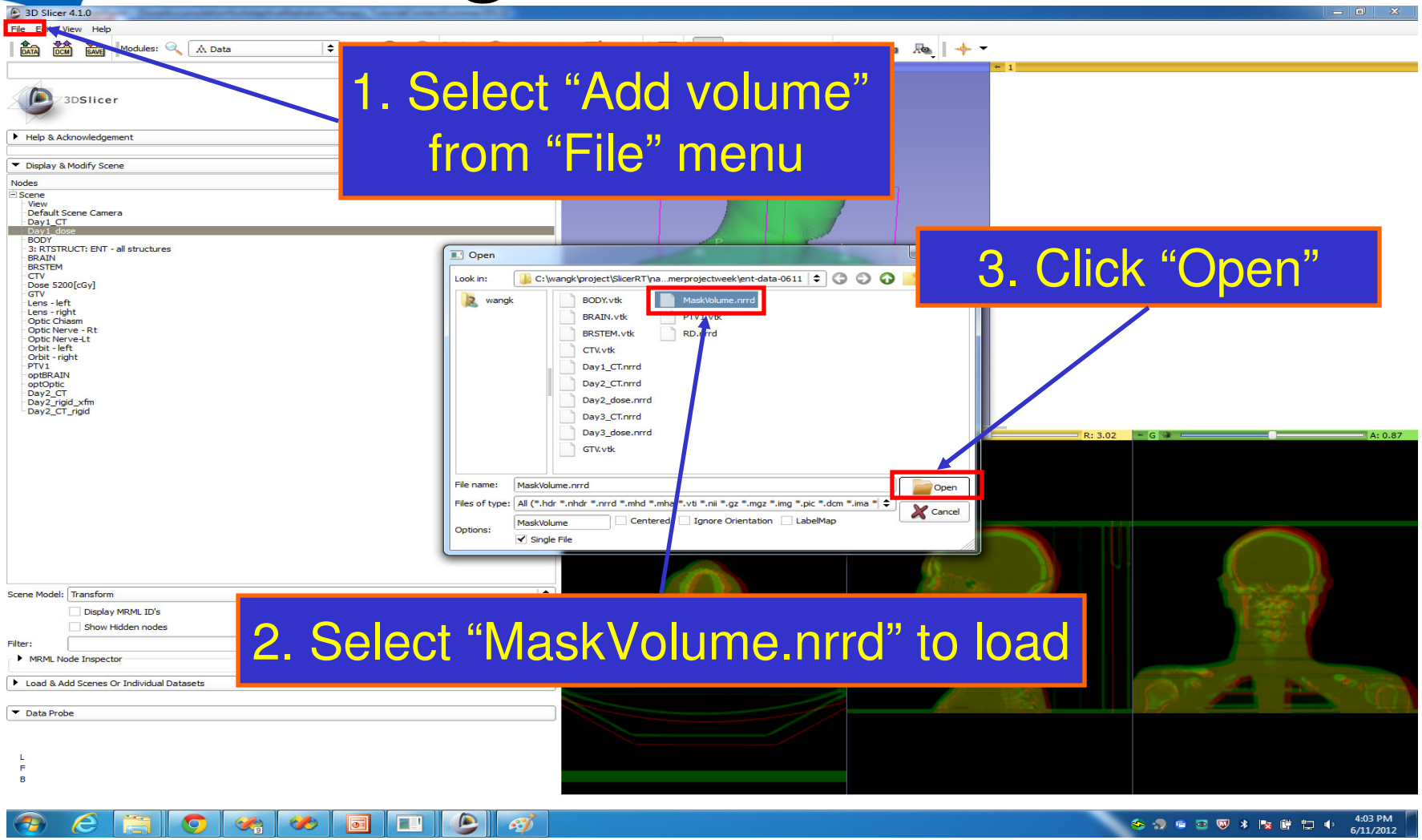
Loading Day2 data



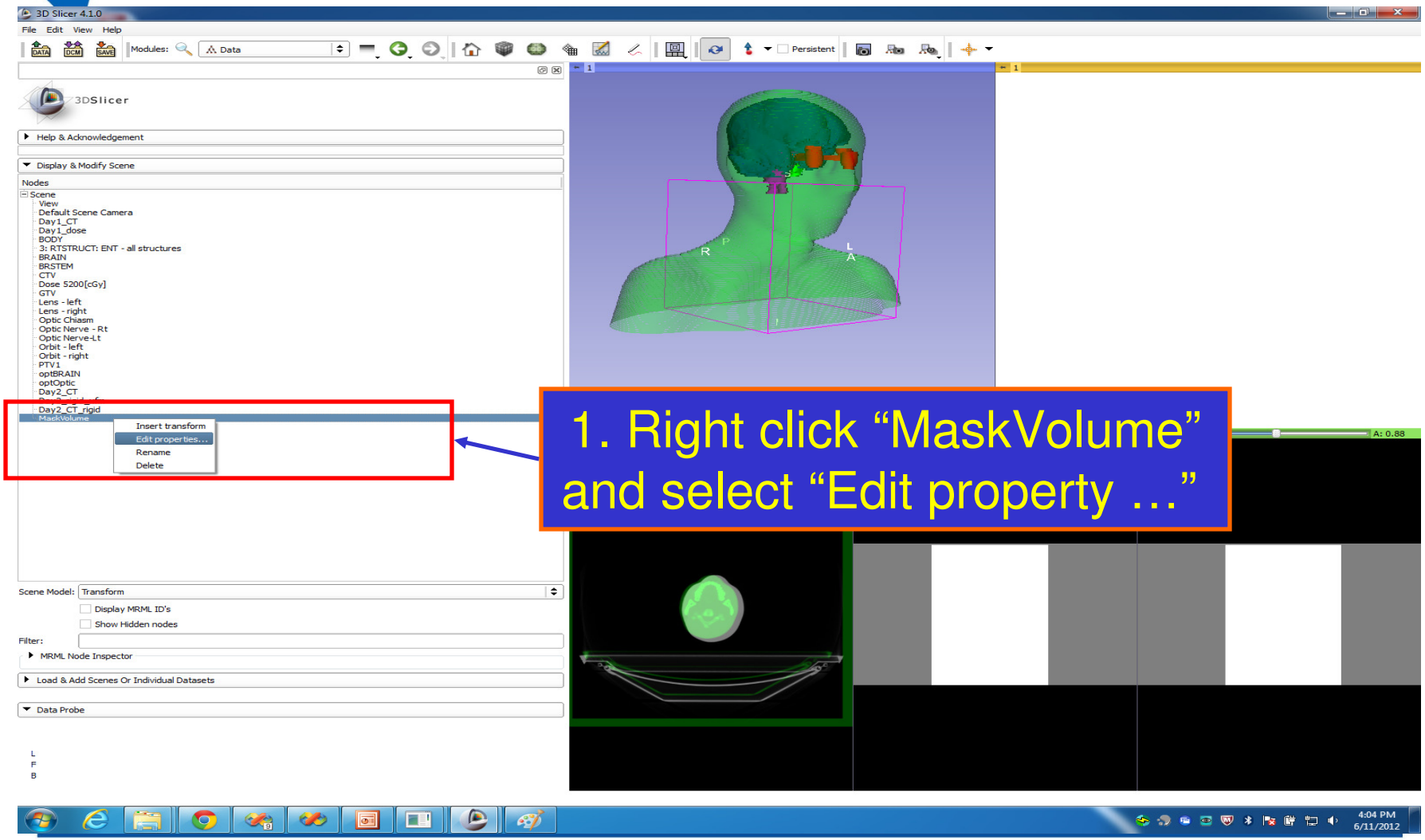
Visualizing deformation



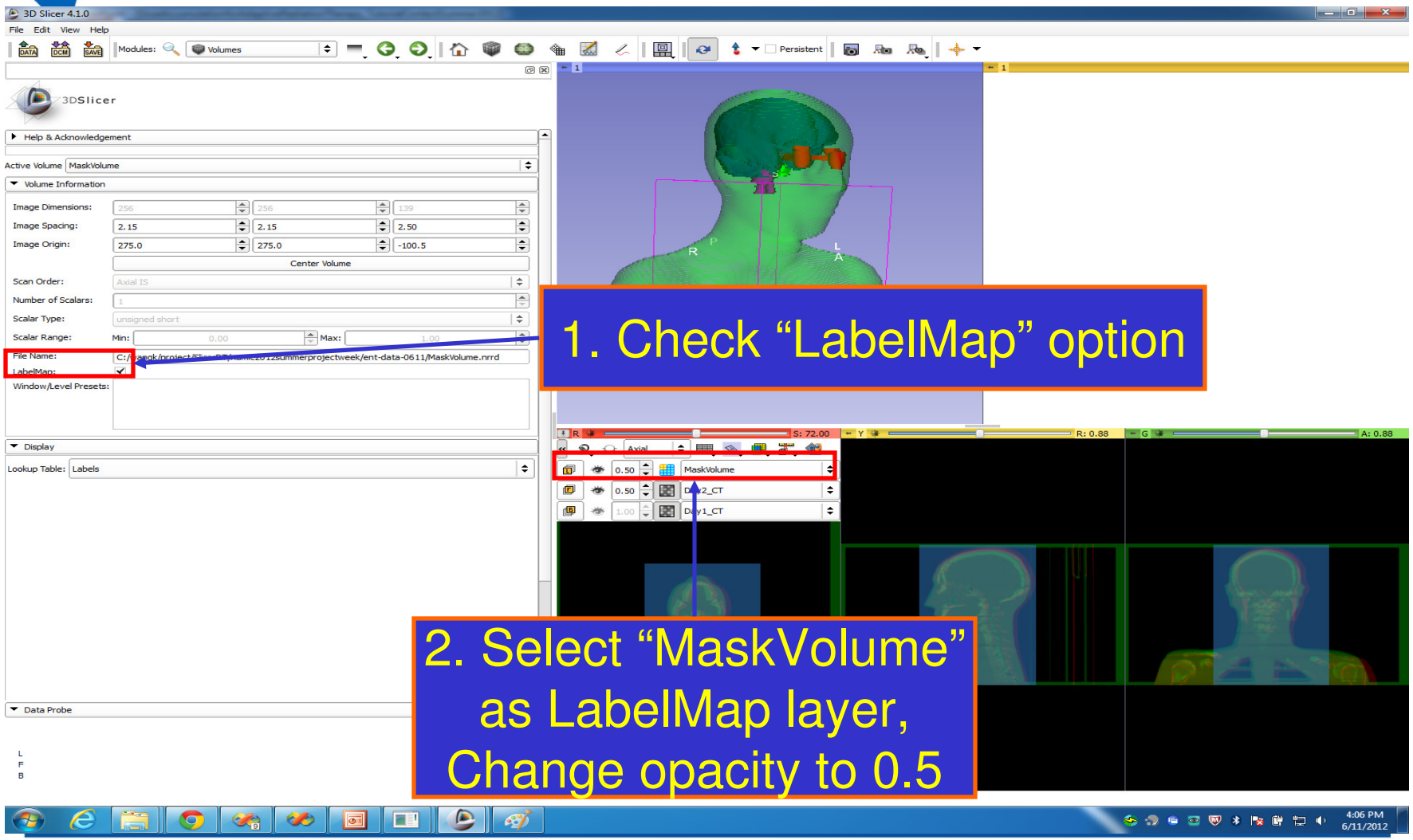
Loading Mask volume



Loading Mask Volume



Visualizing Mask Volume



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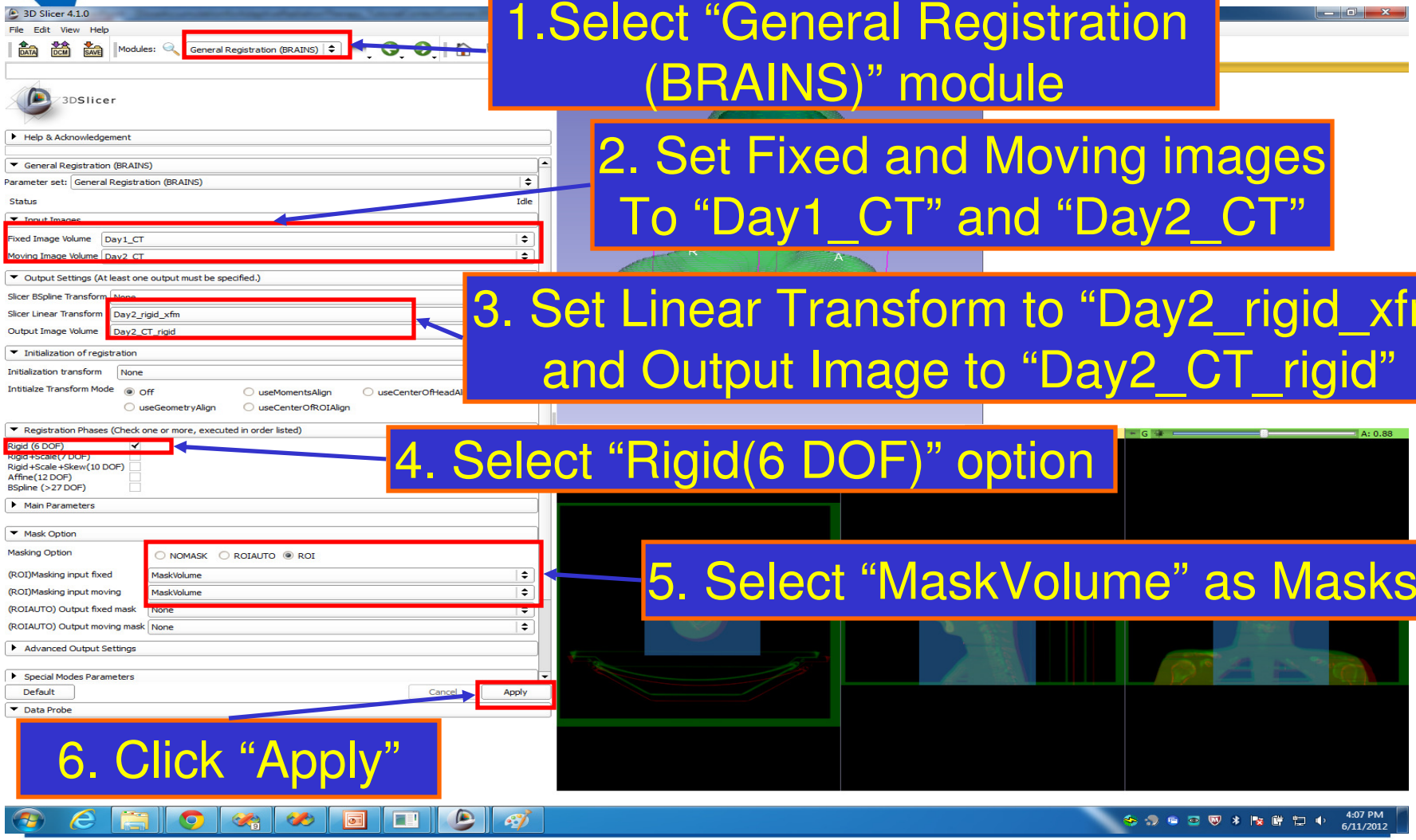
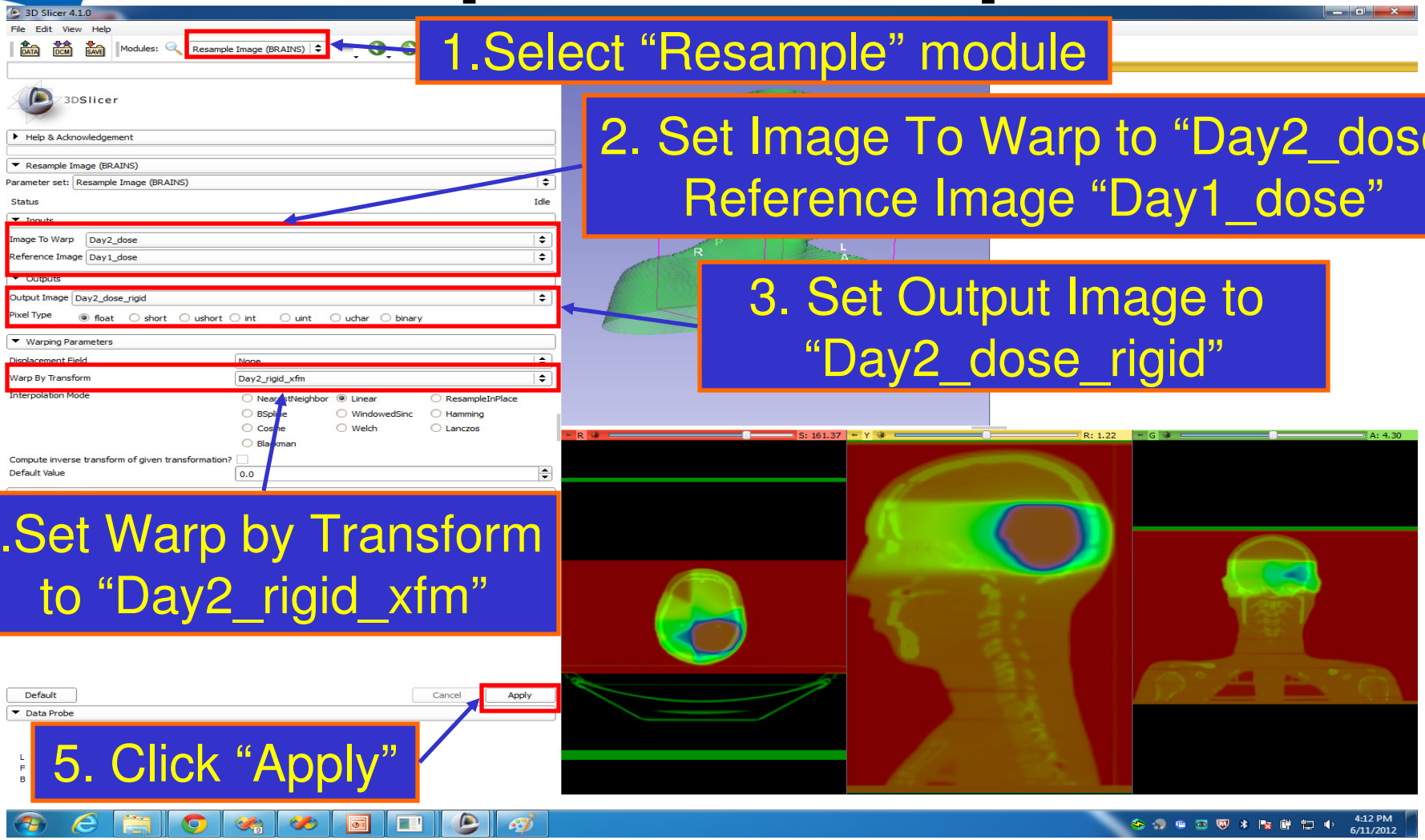
Rigid registration



Resample dose map



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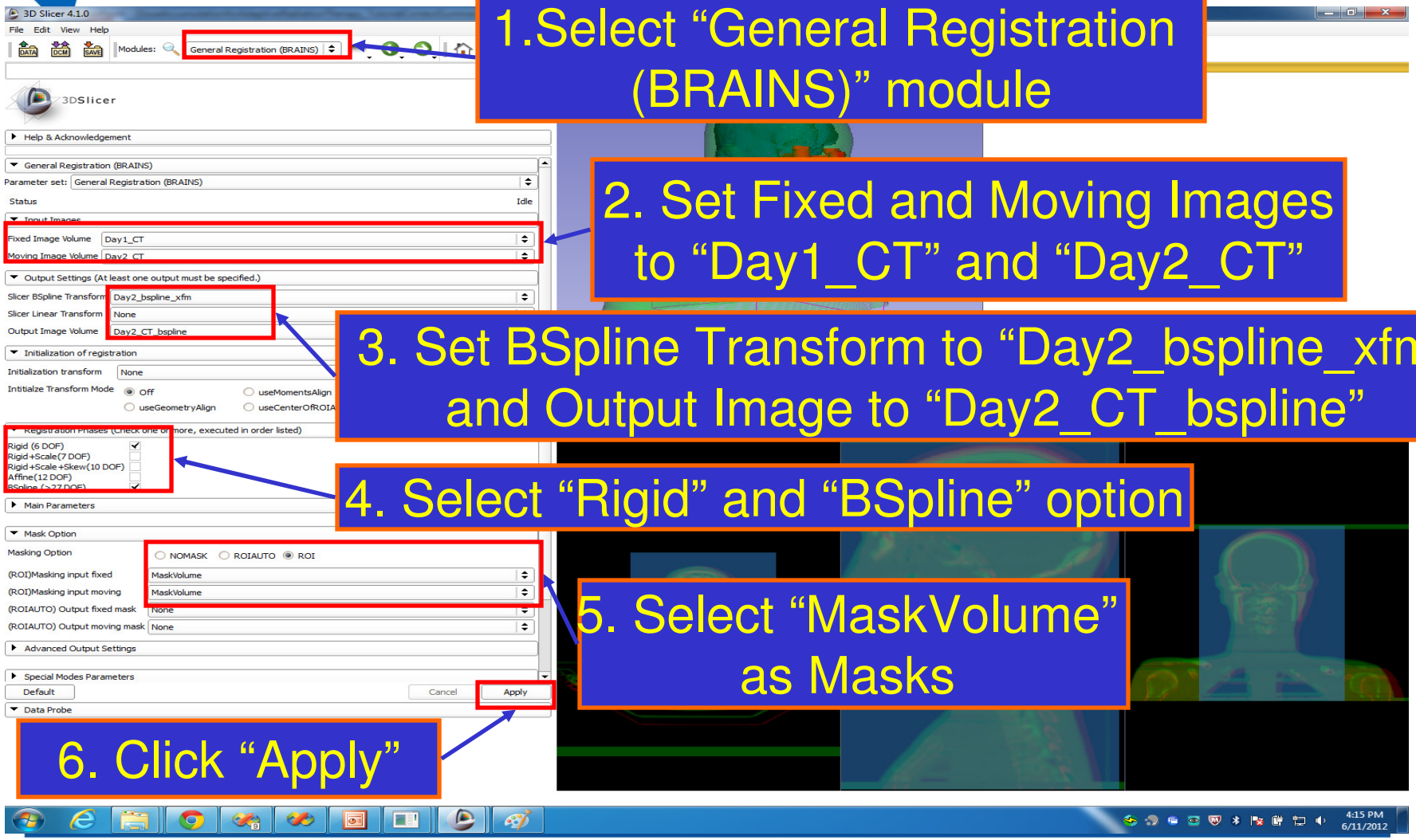
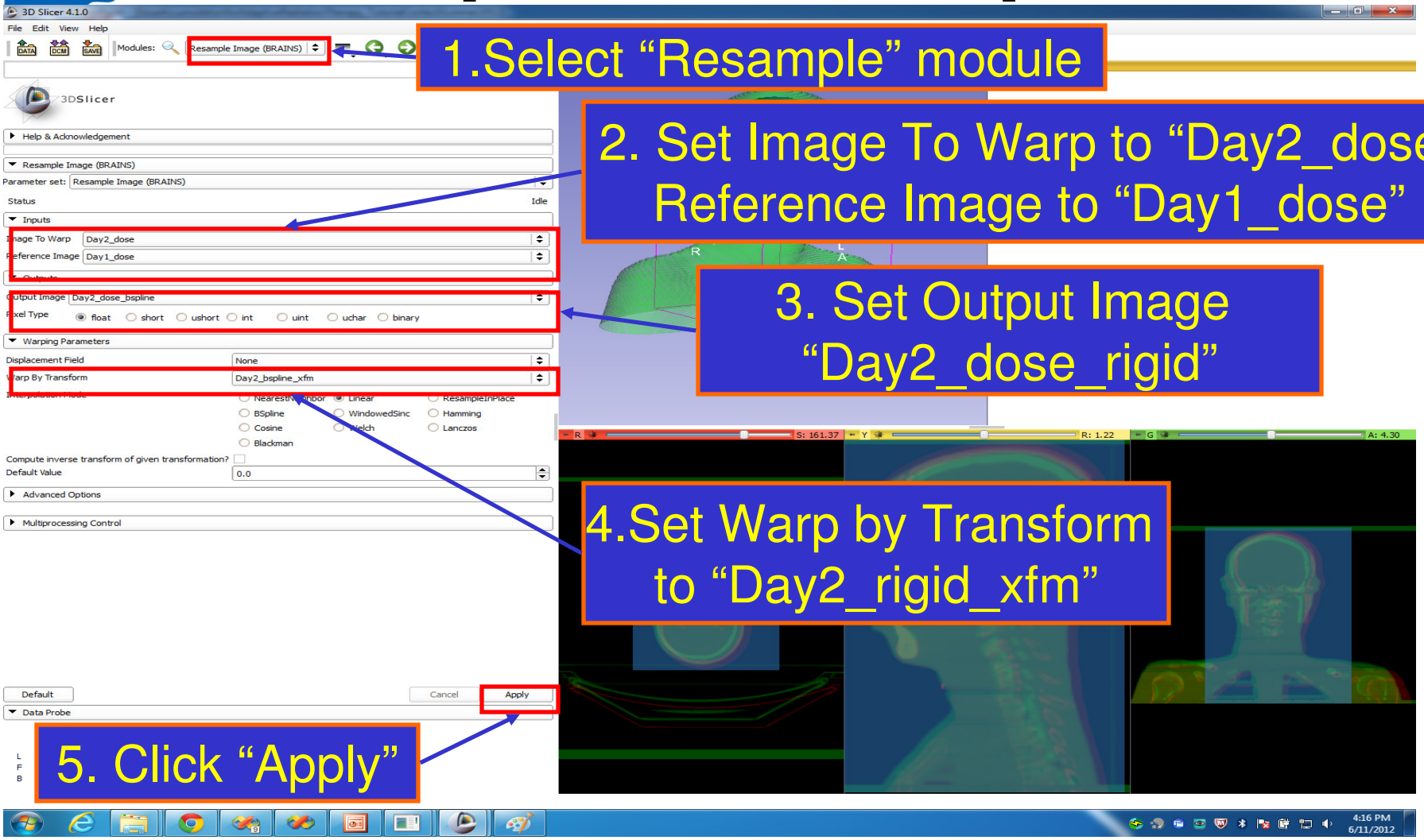
Deformable Registration



Resample dose (BSpline)



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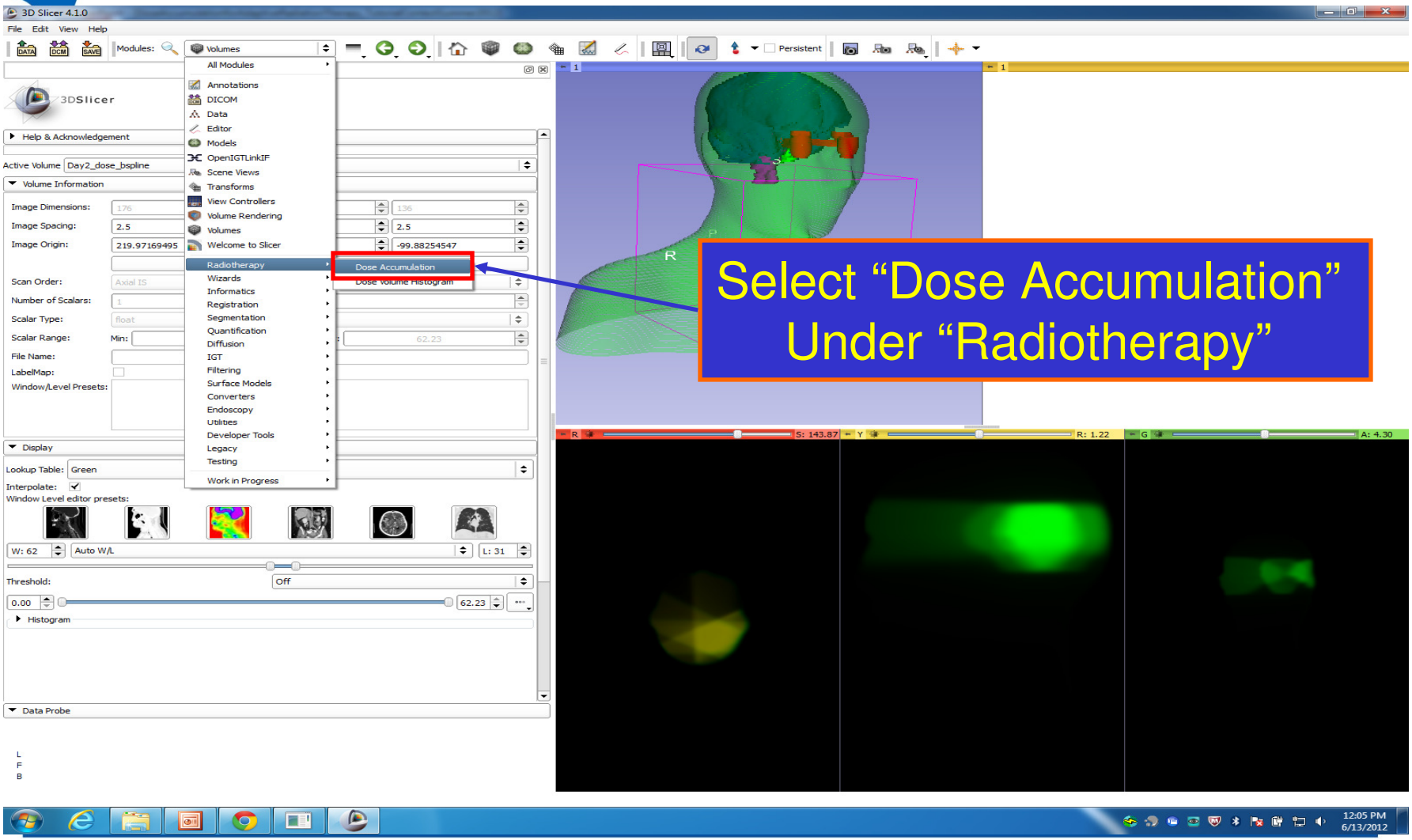
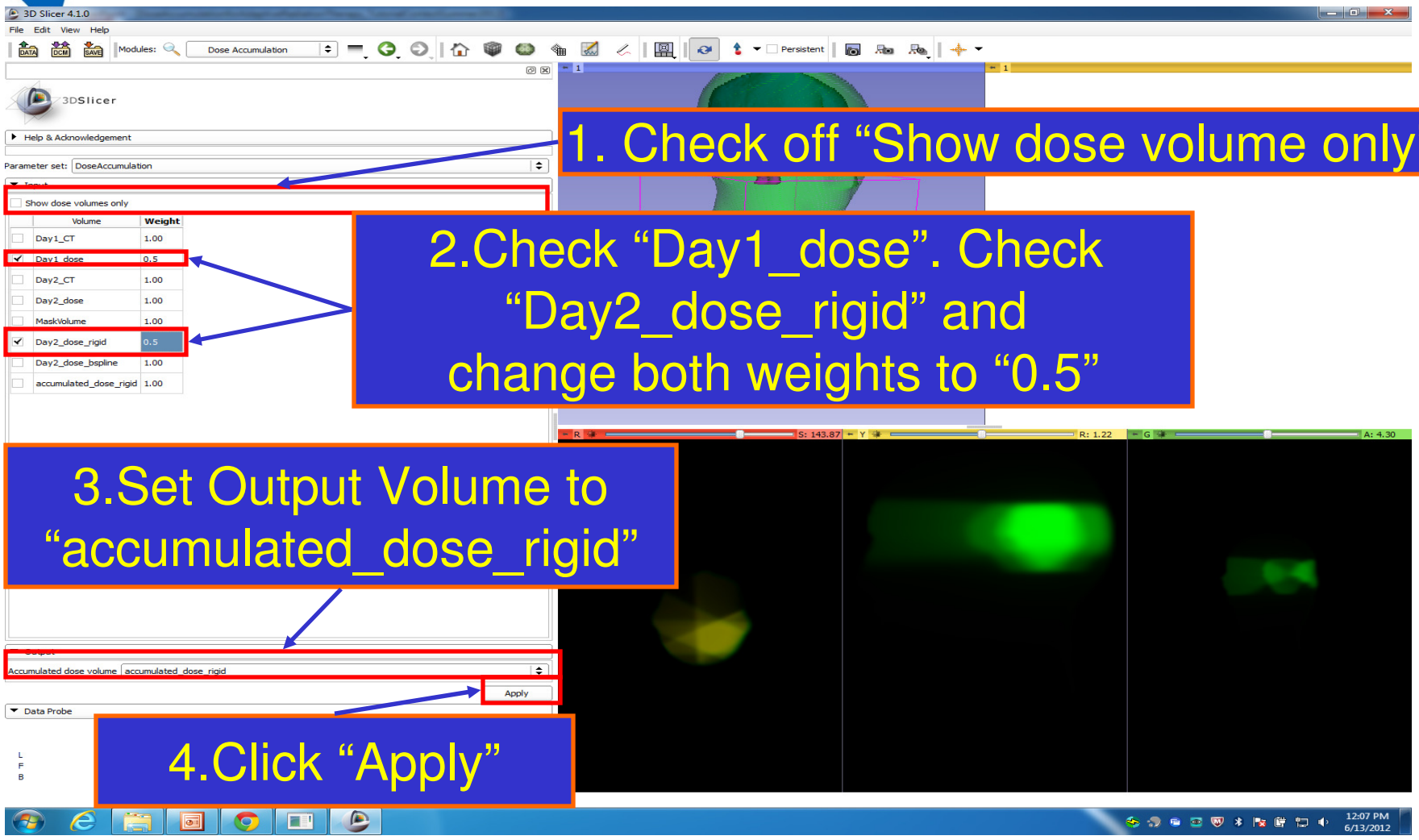
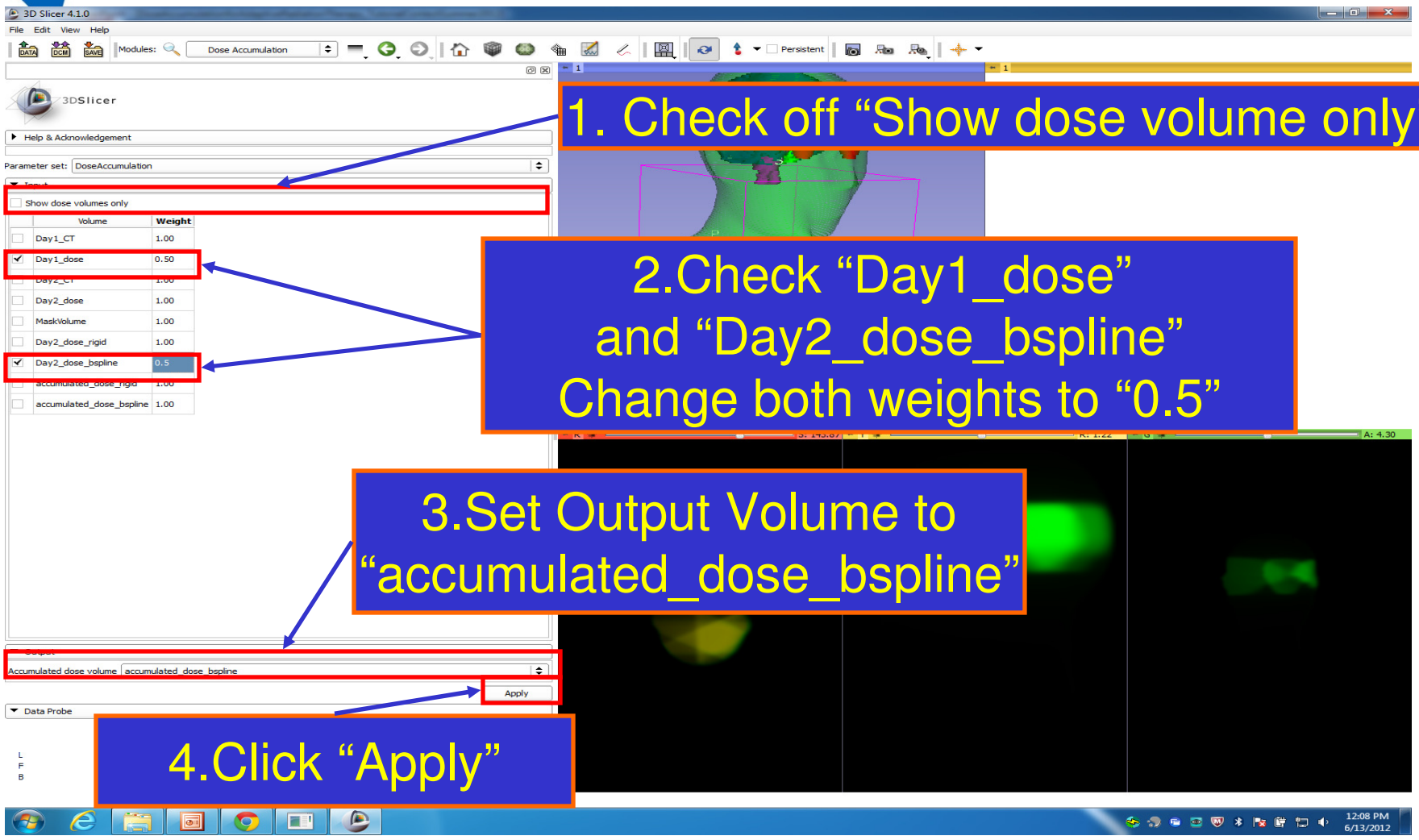
Dose Accumulation



Dose accumulation (rigid)



Dose accumulation (BSpline)



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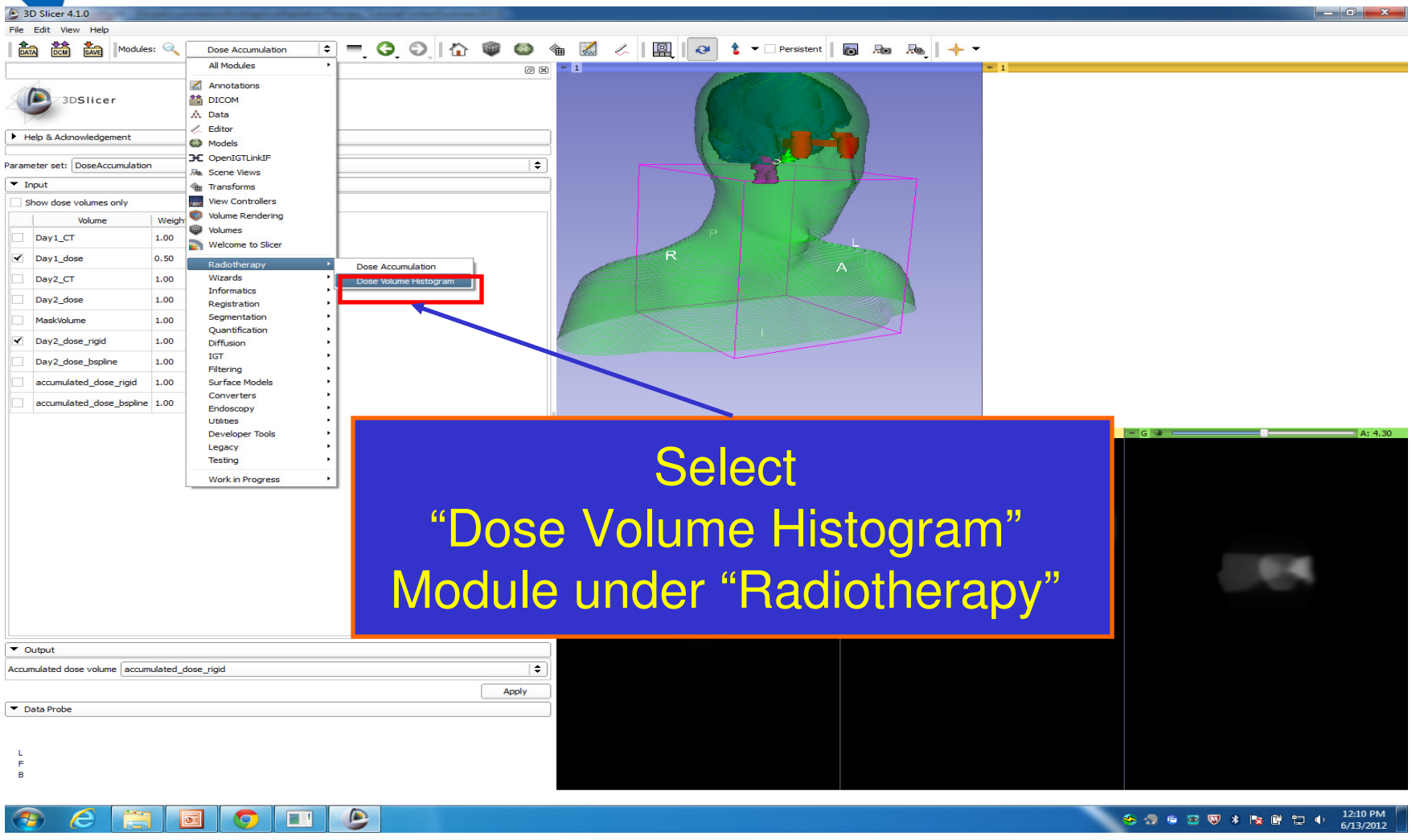
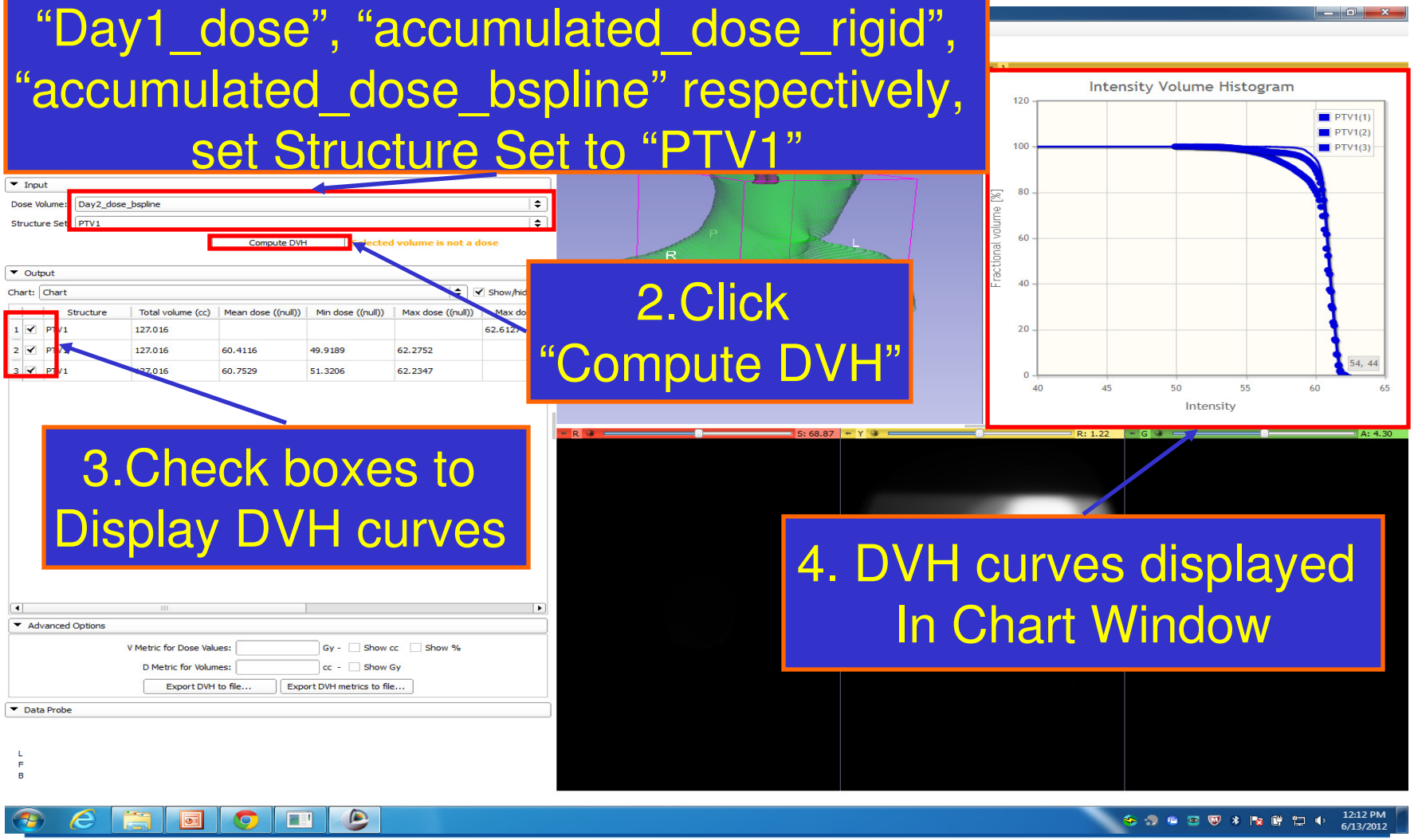
DVH comparison

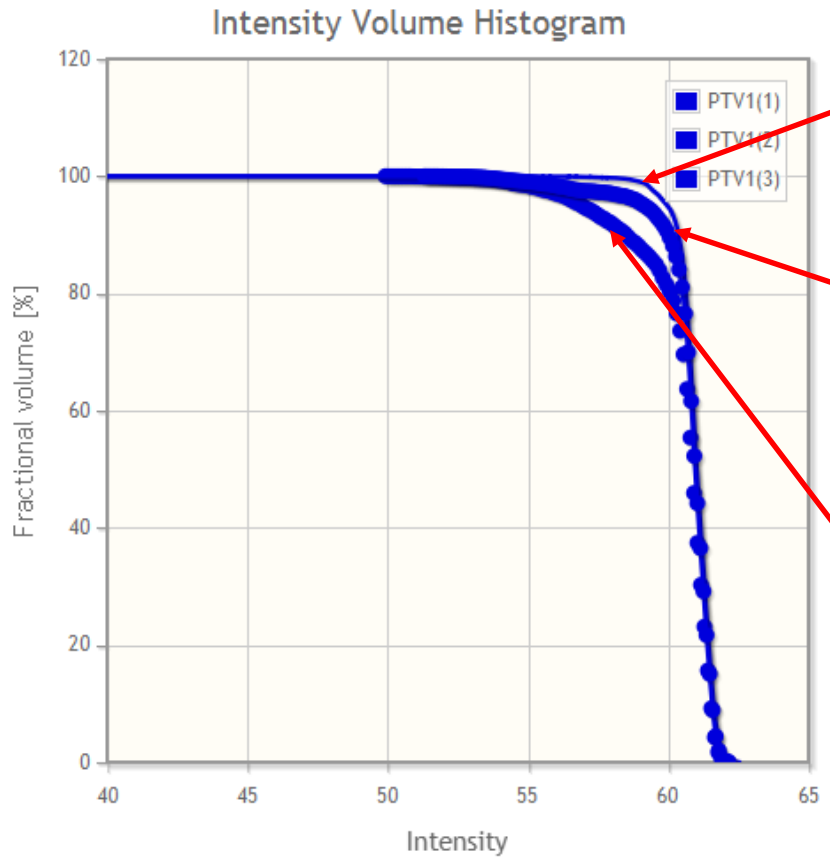


DVH comparison

1.Set Dose Volume to “Day1_dose”, “accumulated_dose_rigid”, “accumulated_dose_bspline” respectively, set Structure Set to “PTV1”



DVH comparison



Prescribed Dose DVH

Accumulated DVH (BSpline)

Accumulated DVH (Rigid)

Conclusion

In this tutorial, we have demonstrated:

1. DICOM-RT import
2. RT data visualization
3. Day to day CT/Dose volume registration
4. Dose accumulation
5. DVH computation and comparison

Acknowledgments

National Alliance for Medical Image Computing

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