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Creating Tensor Maps

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ABSTRACT

This protocol will provide a basic guide creating Tensor maps.

Note: Steps may vary based upon data.

Introduction

1 This protocol will present the steps needed to compute multiple tensor maps on the HPC in TORTOISE. The protocol assumes that DIFFPREP and DRBUDDI have already been applied.

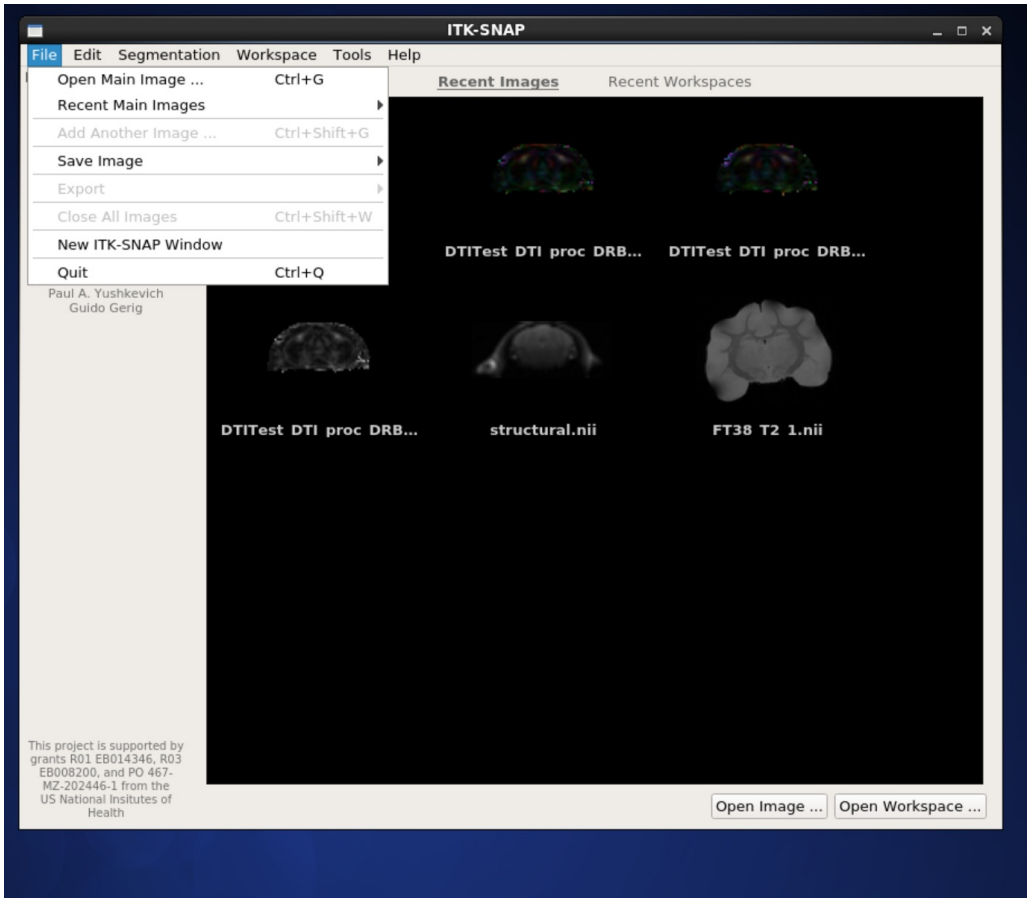
Create Mask from T2 Structural

2 Open up ITK-snap to create mask.

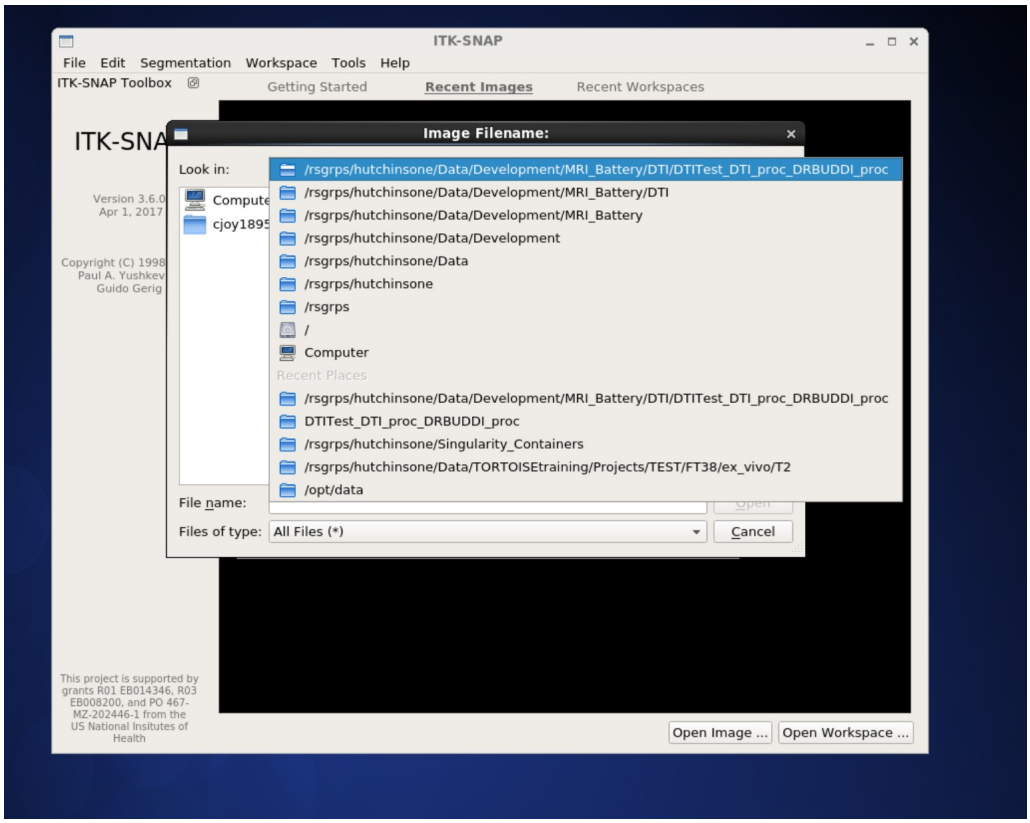
Type the following in a terminal:

```
cd /rsgrps/hutchinsone/Singularity_Containers
module load singularity
singularity run nklab-neurotools-v0.4.sif itksnap
```

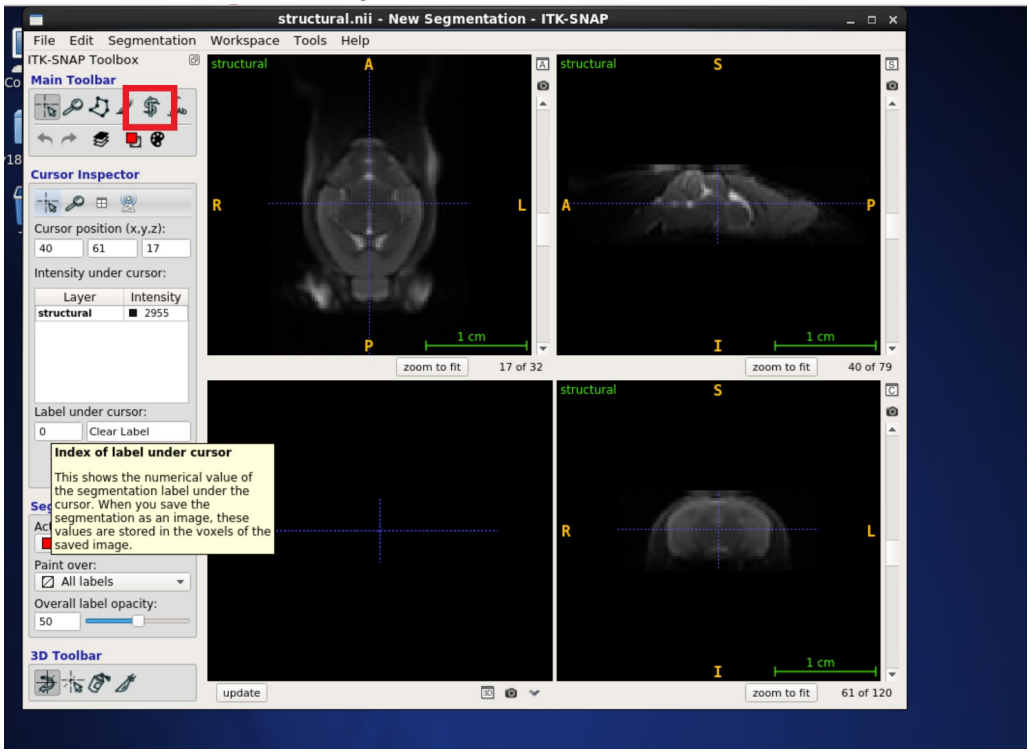
3 Once ITK-SNAP opens browse to the structural image.



The folder you should be pulling the **structural.nii** image from is in DTITest_DTI_proc_DRBUDDI_proc

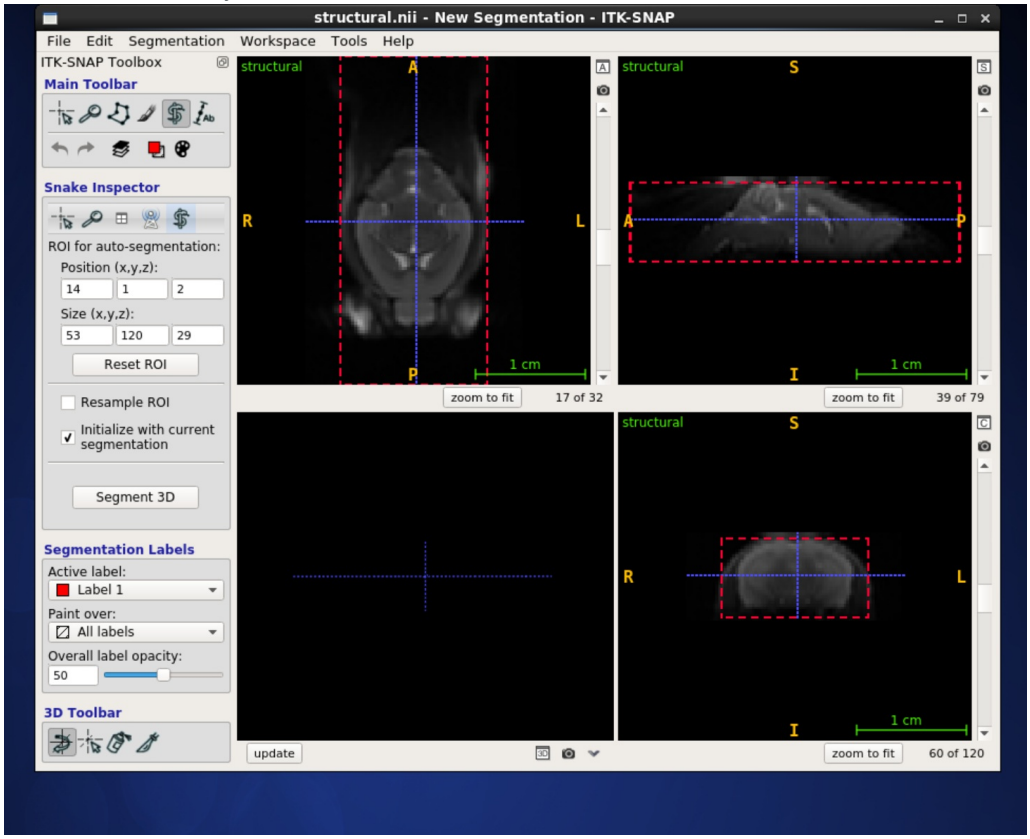


4 Click on the snake tool to start making the mask.



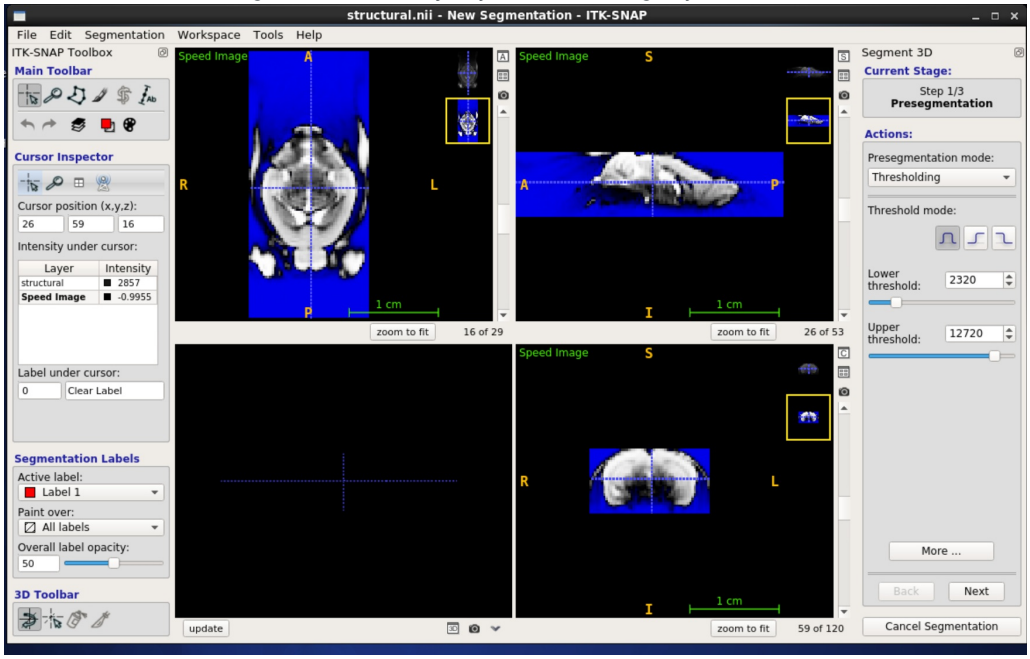
5

Move the red lines to adjust boundaries for the fill function.



5.1 Select Segment 3D after you finish adjusting the red lines.

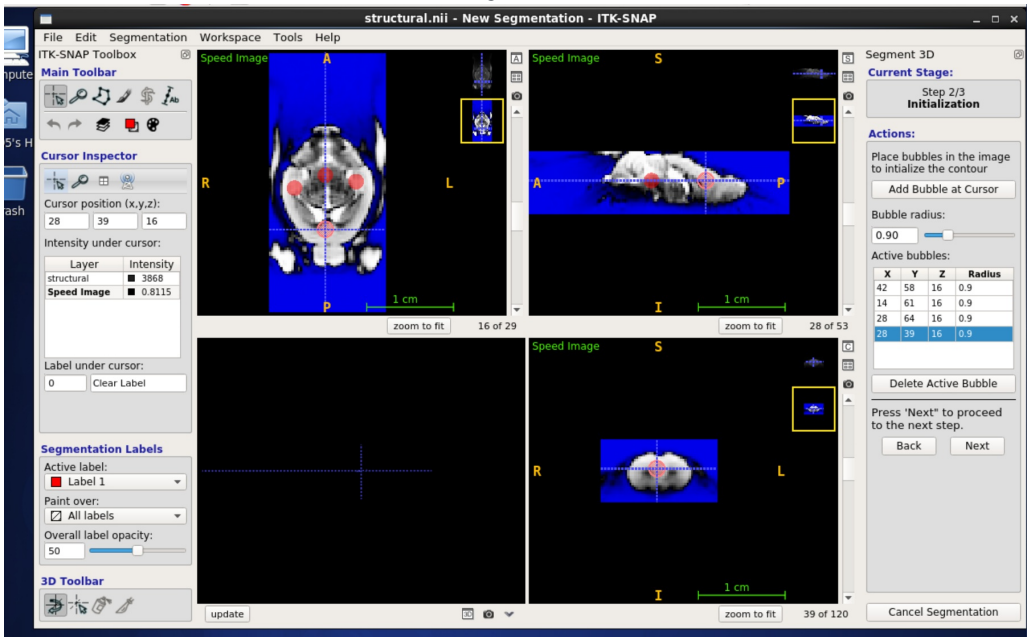
6 Select the blue thresholding view and then adjust your thresholding till you are satisfied.



6.1 For thresholding typically you want to remove bone, muscle tissue, and eyes if possible.

6.2 Select Next in the lower right hand corner.

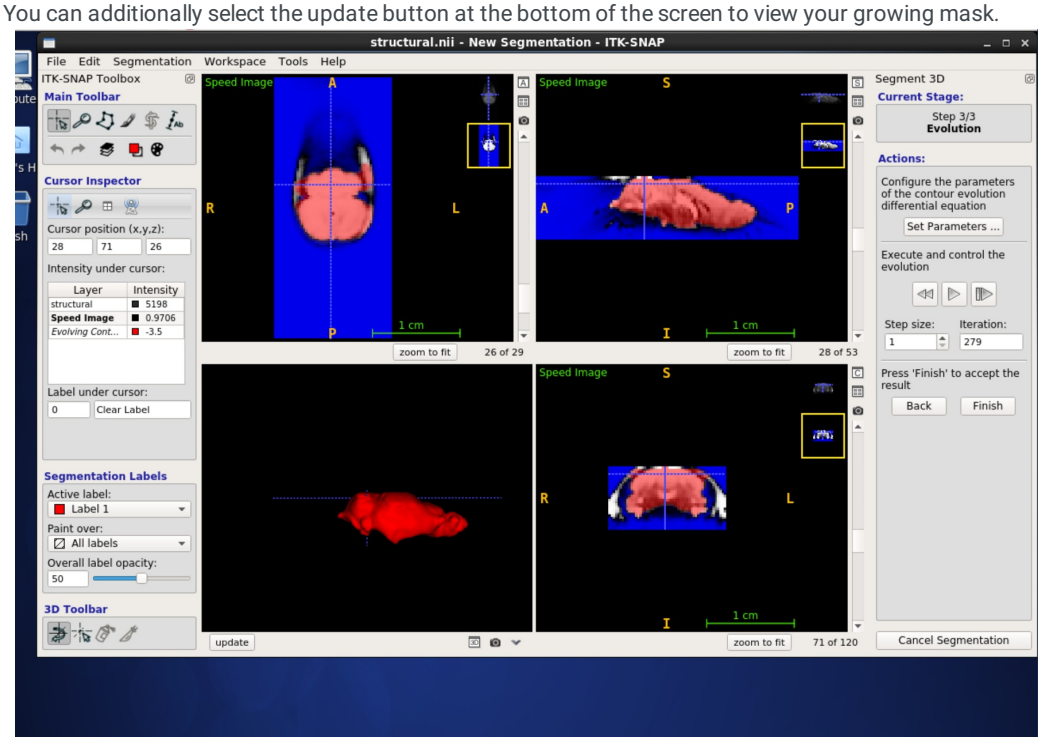
7 Click the Add Bubble at Cursor button while clicking around on all the 3 different views to move the cursor.



7.1 Once you have added enough "bubbles" select next.

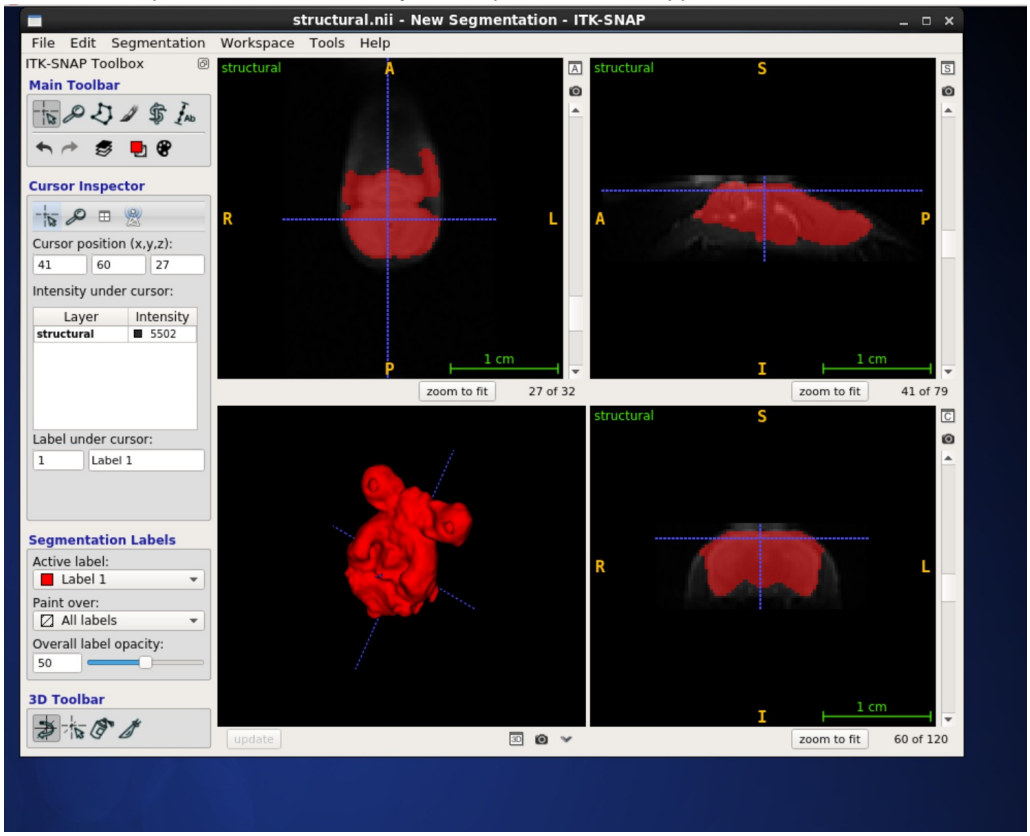
8 Select the play button to grow the bubbles.

You can additionally select the update button at the bottom of the screen to view your growing mask.



8.1 When the mask is done select the pause button and click finish.

9 You can select update a second time and your completed mask will appear in the lower left hand corner.



9.1 Save your mask as a NIFTI file, and exit out of ITK-SNAP.

Estimate Tensor

10 Type the following to get information about the command.

```
EstimateTensorNLLS
```

10.1 Type the following:

```
EstimateTensorNLSS -i directory_DRBUDDI_proc/file_name.list -m
directory/mask_name.nii
```

10.2 This creates two files a _DT.nii and a _AM.nii. You will use the _DT.nii file.

Compute Tensor Map

11 To create every tensor map type the following command:

```
ComputeAllTensorMaps.bash directory/tensor_file_name.nii
```

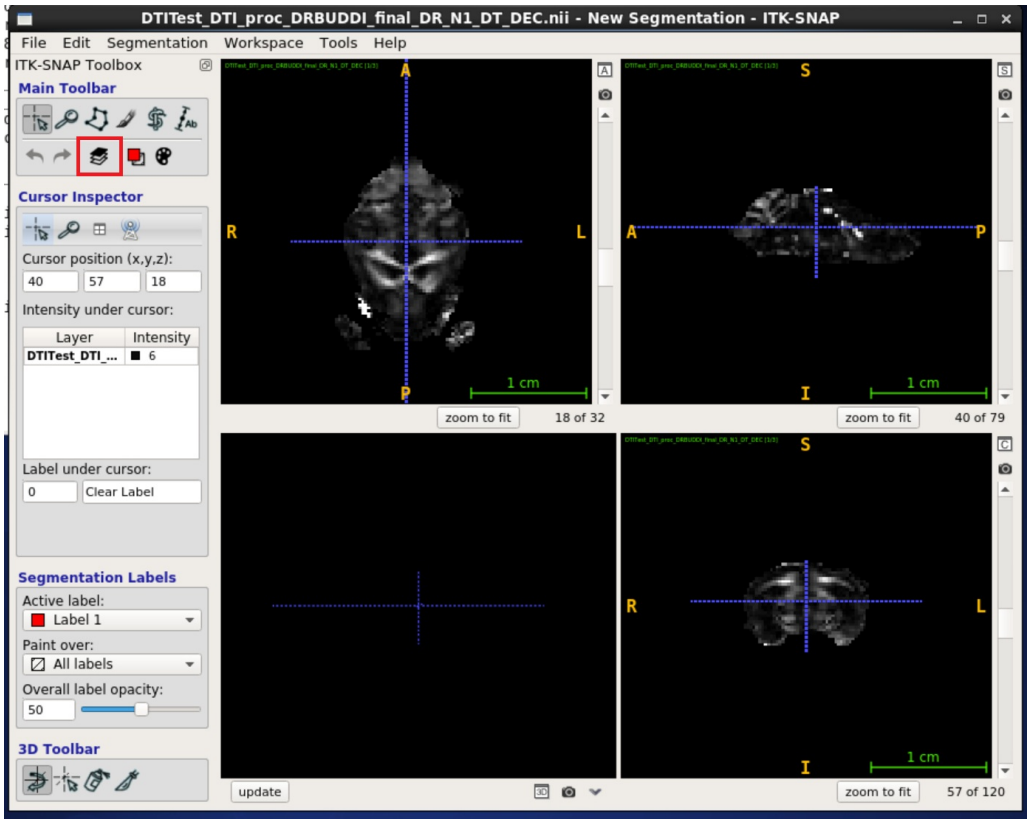
11.1 The above command runs a script to create all tensor maps available, but if you want to only create a certain tensor map you can use can just type:

```
ComputeDECMap -i directory/tensor_file_name.nii
```

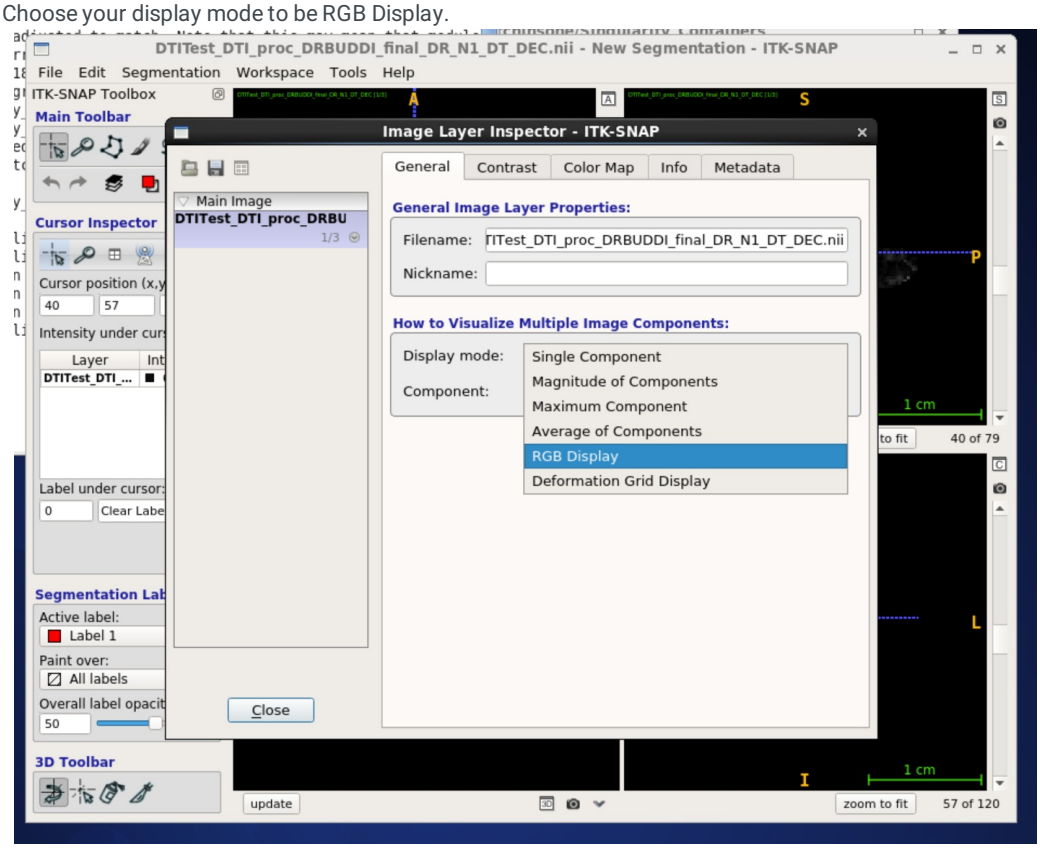
This example will only output a DEC map, but if you want to output another map just change the 'DEC' to be the name of the desired map.

12 Open your DEC map in ITK-SNAP.

12.1 Click on the Layer Inspector button:



12.2 Choose your display mode to be RGB Display.



12.3 Below is the finished RGB display of your DEC map.