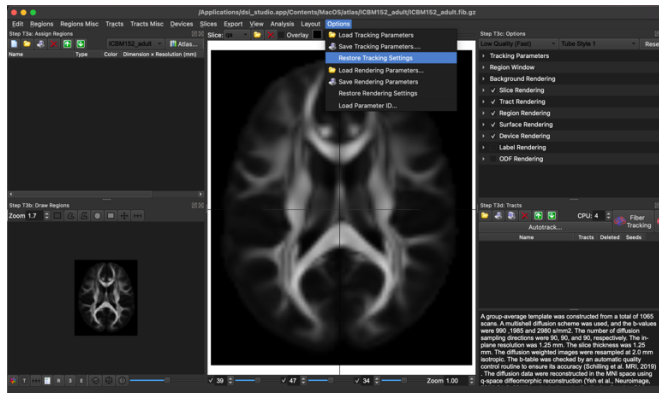
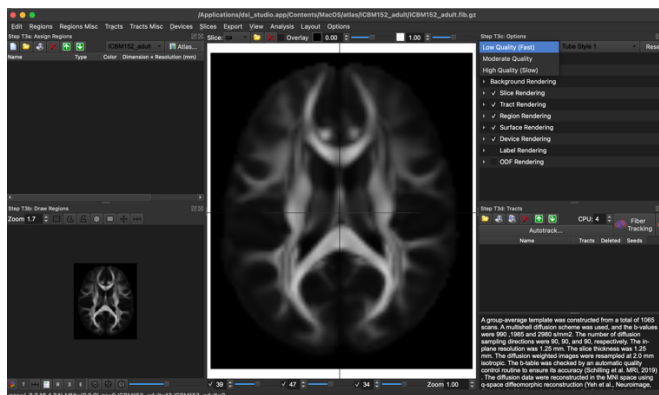


## General tips to prevent technical problems:

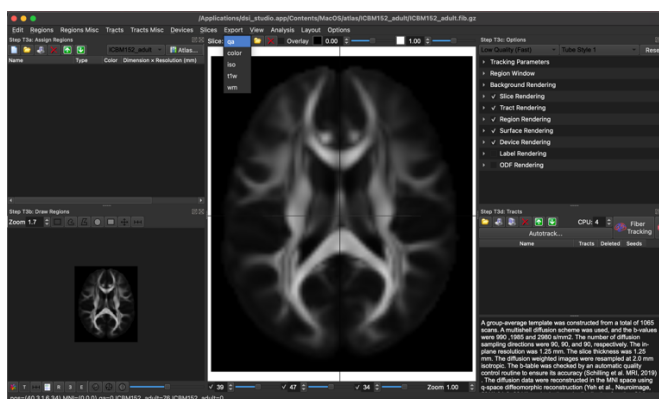
-Click on *Options* found on the right side of the top menu bar → click on *restore tracking settings*



-switch to moderate or low quality found on the top of the “Step T3c Options” window. The Step T3c Options window is the box occupying the right upper corner of the DSI studio screen



-when adding “isosurface” to appreciate the anatomy of tracts with the volume of a hemisphere (top menu bar *slices* → *isosurface* ) make sure the slice “qa” is selected.

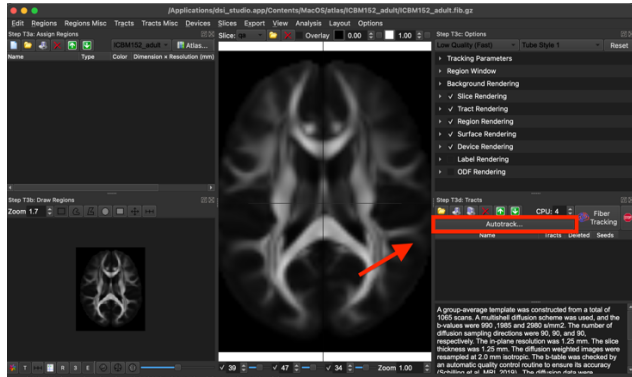


## Corticospinal Tract:

### A) Autotrack reconstruction

To reconstruct the tract using the autotrack tool:

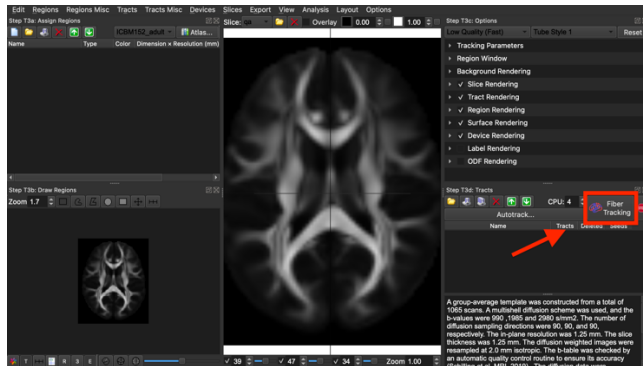
1)left click on *autotrack* found below the “Step T3c Options” window



2)left click on projection pathways

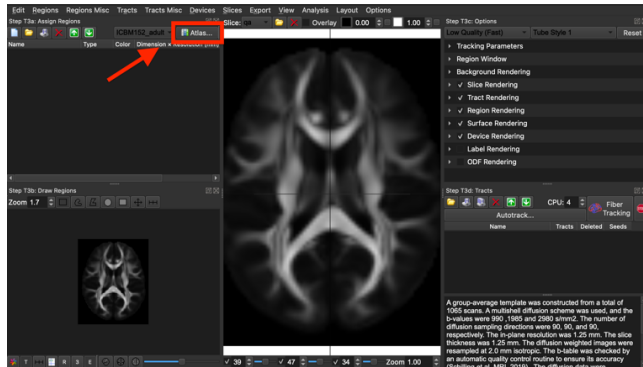
3)left click on corticospinal tract

4)left click on the “*fiber tracking*” DSI studio logo button found below the “Step T3c Options” window



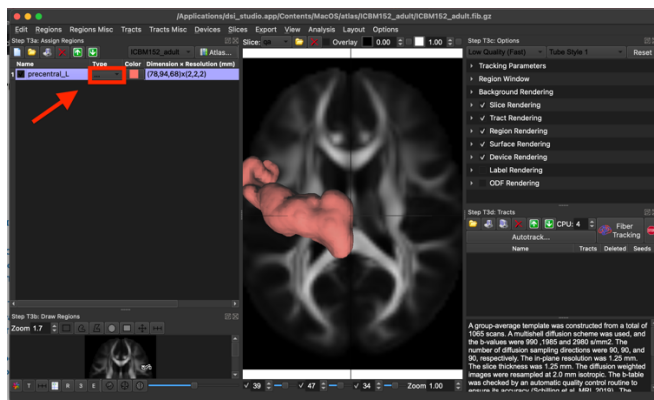
B) Two ROI method reconstruction (for more illustrated steps visit [https://dsi-studio.labsolver.org/doc/gui\\_t3\\_roi\\_tracking.html](https://dsi-studio.labsolver.org/doc/gui_t3_roi_tracking.html))

1) Left click on *atlas* found on the top right corner of Step 3C Assign regions window (the Step 3C Assign regions window occupies the left upper corner of DSI studio screen)



2) select the precentral gyrus as a region and the precentral gyrus will appear as new region at the “Step 3C Assign regions” window

3) left click on the arrow next to “type” and select this region as “ROI”



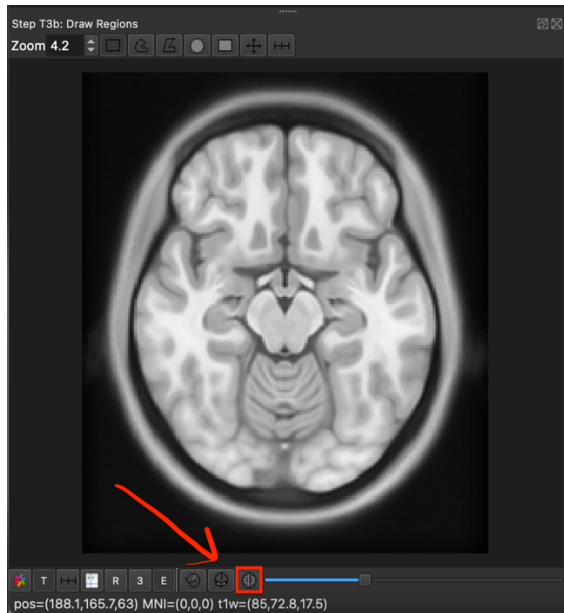
4) manually assign the ipsilateral cerebral peduncle as a second ROI by completing the following steps:

5) left click on *Regions* found on the left side of the top bar menu.

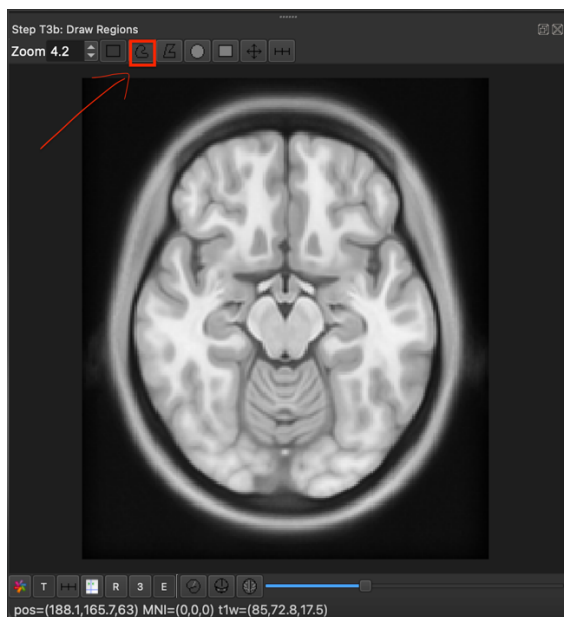
6) select new region and a new region will appear at the “Step 3C Assign regions” window

7) left click on the arrow next to “type” and select this region as “ROI”

8) On the “StepT3b: Draw Regions window” found on the bottom left part of the DSI studio screen, click on the axial slice brain icon and using the blue bar next to this icon, scroll down at the level of the midbrain. (*tip*: selecting T1 as slice will facilitate visualization of the cerebral peduncles)

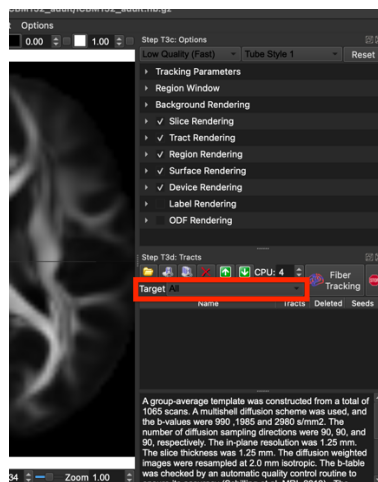


9) click on the geometric shape which allows for free hand ROI drawing



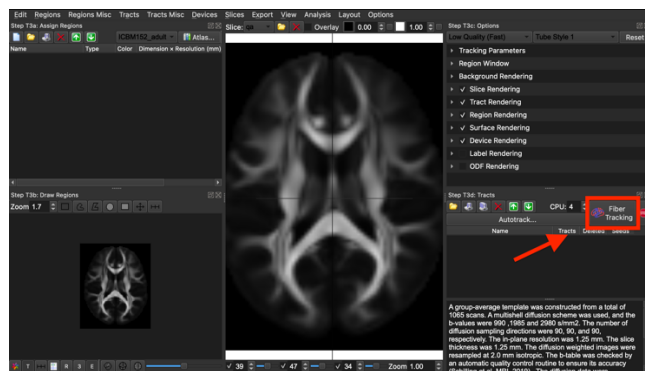
10) left click and drag along the contour of the ipsilateral cerebral peduncle to delineate the ROI. (*tip* right click and drag along a certain region to erase/remove a region from the already delineated ROI )

11) left click on the “*fiber tracking*” DSI studio logo button found below the “Step T3c Options” window once i) both ROIs are selected ii) corticospinal tract has been **unselected** from the autotrack list

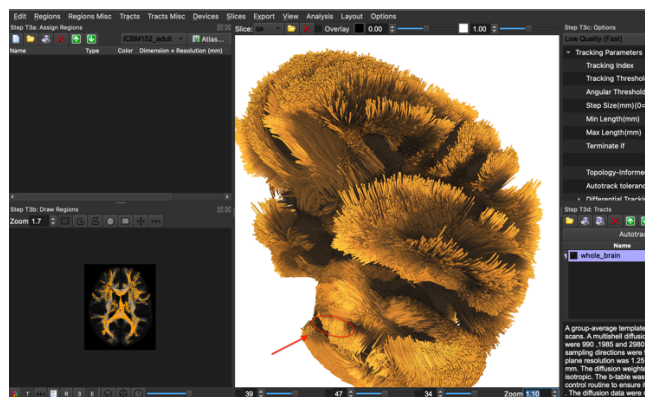


## C) manual reconstruction

1) click on the fiber tracking DSI studio button to Perform whole brain fiber tracking after ensuring that i) all ROIs in the region widow are **unselected** or deleted and ii) the *all* is selected on the autorack scroll down option list.



2) rotate the brain and identify the motor pathways which run anteriorly on a cranio-caudal direction through the base of the pons.



3) select these tracts with i) command & S (control & S if using Windows) or by going on the top bar menu click *edit* → *select* . left click over the tracts, drag over them and release.

4) repeat the same process of selecting the same tracts 2-3 times

5) remove some aberrant/false tracts using command & or by going on the top bar menu click *edit* → *delete* . left click over the tracts, drag over aberrant/false tracts them and release.

6) 4) repeat the same process of deleting aberrant/false tracts as needed

7) press on command & T or edit → pruning

### **Arcuate Fasciculus**

A) Autotrack (find the arcuate fasciculus under association tracts)

B) Two ROI method (please review steps on 2 ROI reconstruction of the corticospinal tract)

on a coronal slice delineate a first ROI that will include the ventral part of the precentral gyrus on , and a second ROI that will include the superior middle and inferior temporal gyrus

C) Manual Reconstruction (please review steps on manual reconstruction of the corticospinal tract)

1) perform whole brain fiber tracking

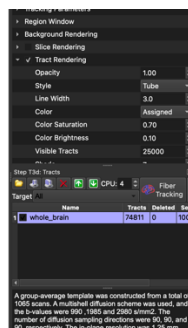
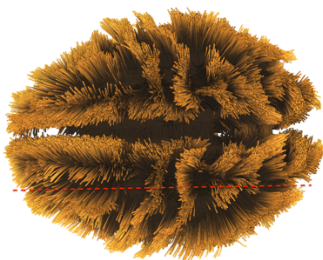
2) select the tracts along the ventral part of precentral gyrus

3) select the tracts along the temporoparietal junction

4) rotate the hemisphere to obtain a view from above

5) command & X (control & X if using Windows) or by go on the top bar menu click *edit* → *cut*

6) left click and drag along the entire length of the superior frontal sulcus/ intraparietal sulcus/intraoccipital sulcus



7) using the pruning and/or delete tools remove all aberrant/false fibers as needed

## **IFOF**

A) Autotrack (find the IFOF under association tracts)

B) Two ROI method (please review steps on 2 ROI reconstruction of the corticospinal tract)

on an axial delineate a first ROI that will include the inferior frontal gyrus and anterior part of precentral gyrus and a second ROI around the parietooccipital sulcus that will include the occipital lobe and superior parietal lobule

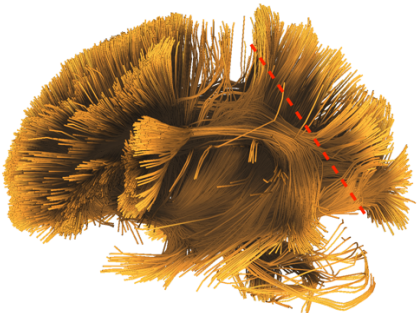
C) Manual Reconstruction (please review steps on manual reconstruction of the corticospinal tract)

1)perform whole brain fiber tracking

2)select fibers from the frontal pole all the way to the precentral sulcus at the level of the inferior frontal gyrus



3) select fibers from the pre-occipital notch all the way to the external perpendicular fissure



4) using the pruning and/or delete tools remove all aberrant/false fibers as needed

For more information explore DSI studio webpage/ DSI studio workshop videos on youtube and feel free to reach out with any questions at [gskandalakis@salud.unm.edu](mailto:gskandalakis@salud.unm.edu)

Enjoy the journey of studying the fiber pathways of the human brain and always keep in mind that what we see in tractography might not be true and should be validated by cadaveric studies.

Sincerely,  
Georgios