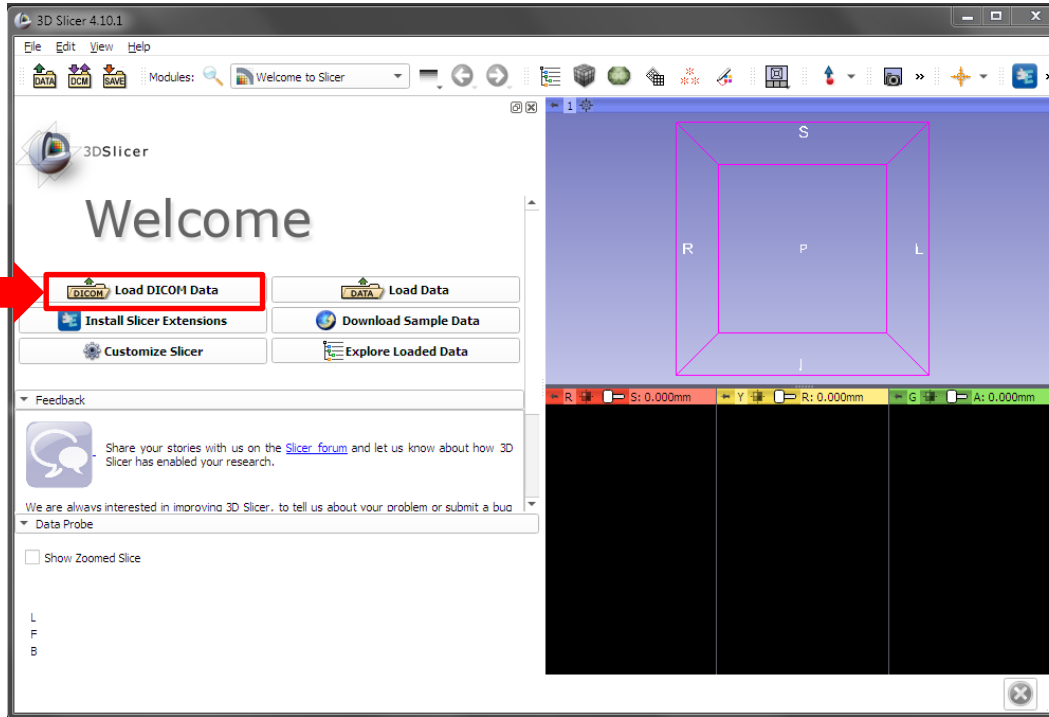


3D Slicer
www.slicer.org

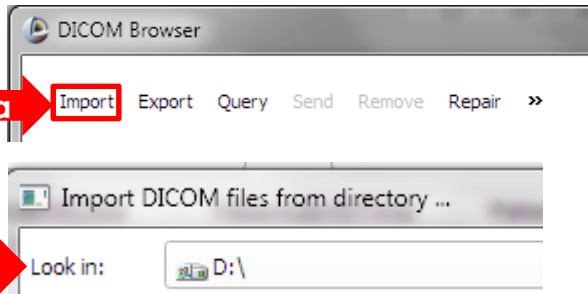
Olfactory bulb volumetry

Import DICOM-Date



DICOM data for olfactory bulb volumetry, e.g. training data VPB_03

1. Load DICOM Data
2. in DICOM browser
 - a) Import
 - b) select folder
3. select t2_tse_cor_256_tse23_2mm...



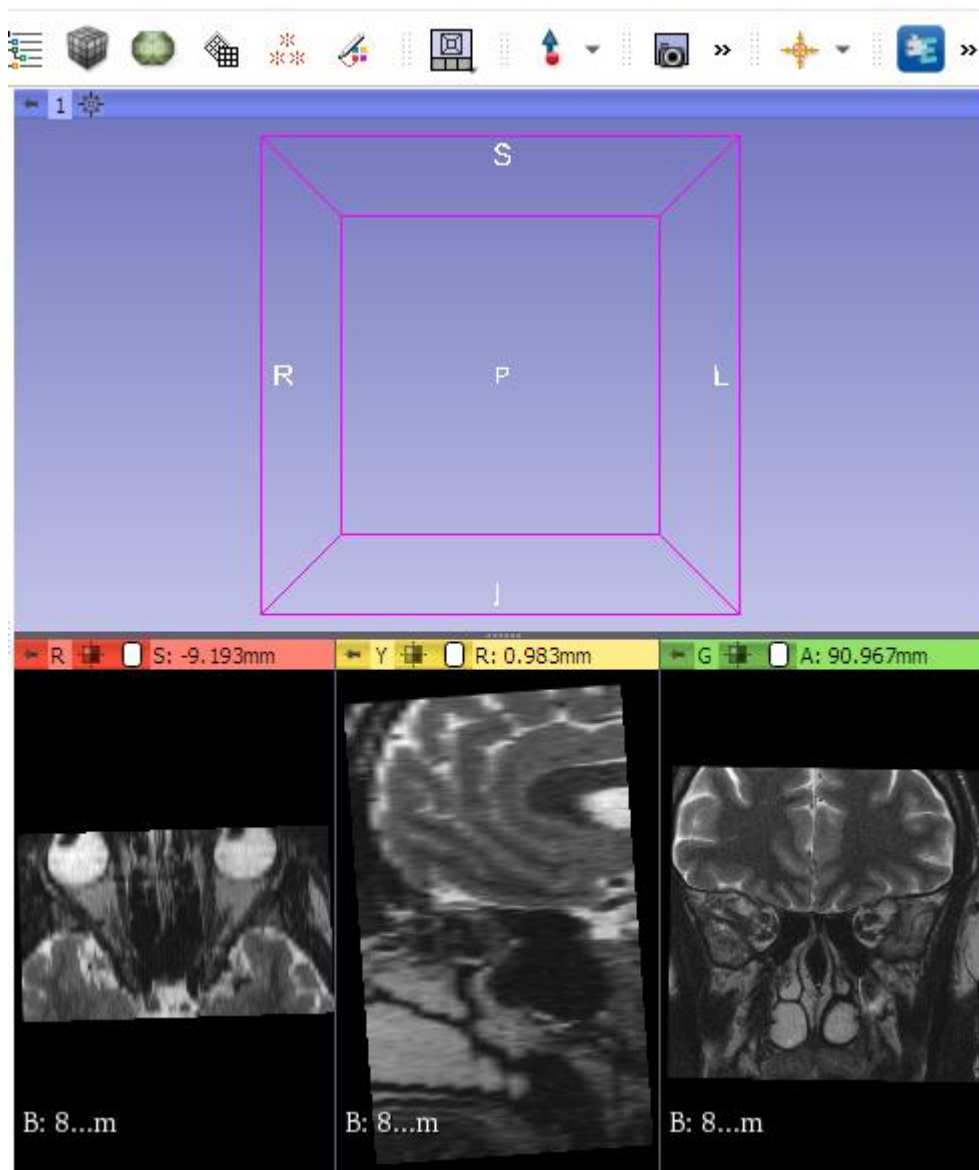
PatientsName	PatientID	PatientsBirthDate	PatientsBirthTime	PatientsSex
VPB_03_1970_m	VPB_03_1970_m	1970-01-18		M

StudyID	StudyDate	StudyTime	AccessionNumber	ModalitiesInStudy
1	2010-11-07	095910.109000		Univer

SeriesNumber	SeriesDate	SeriesTime	SeriesDescription	Modality
0	2010-11-07	104841.781000	t1_mpr_sag_1mm_o_Interpol	MR
8	2010-11-07	102850.953000	t2_tse_cor_256_tse23_2mm	MR
7	2010-11-07	102045.656000	ep2d_fmRT_HNO_04	MR
6	2010-11-07	101549.312000	en2d_fmRT_HNO_03	MR

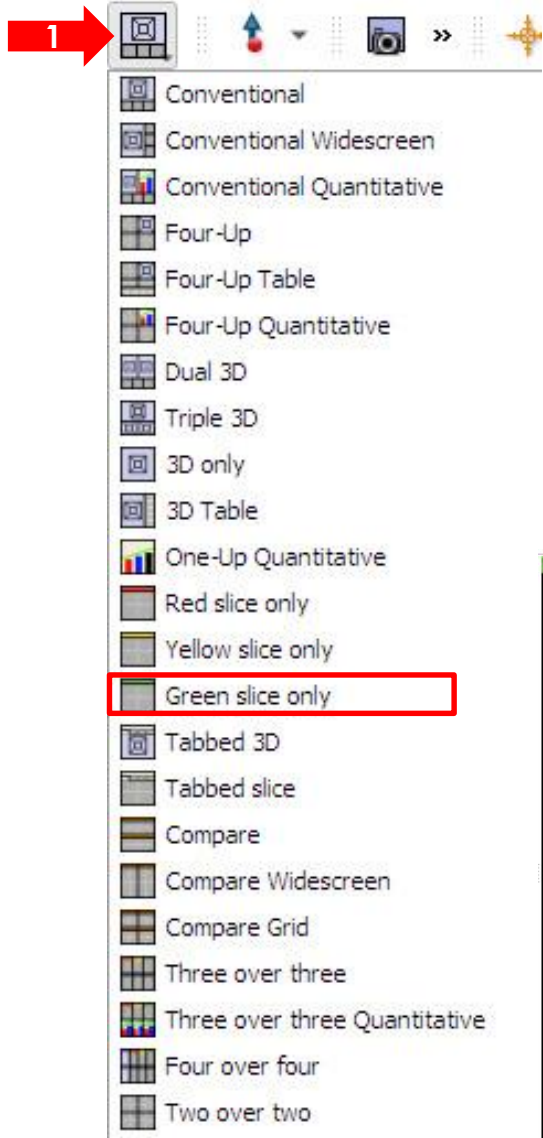
3

Display „Conventional“



- 4 sections
- above: 3D (initially empty)
- below
 - R = Red, axial
 - Y = Yellow, sagittal
 - G = Green, coronal = frontal, in this case high resolution target view

Select optimal display




select coronal view only and optimize

1. „Green slice only“
2. „Adjust the Slice Viewer's field of view“



Display is mirrored

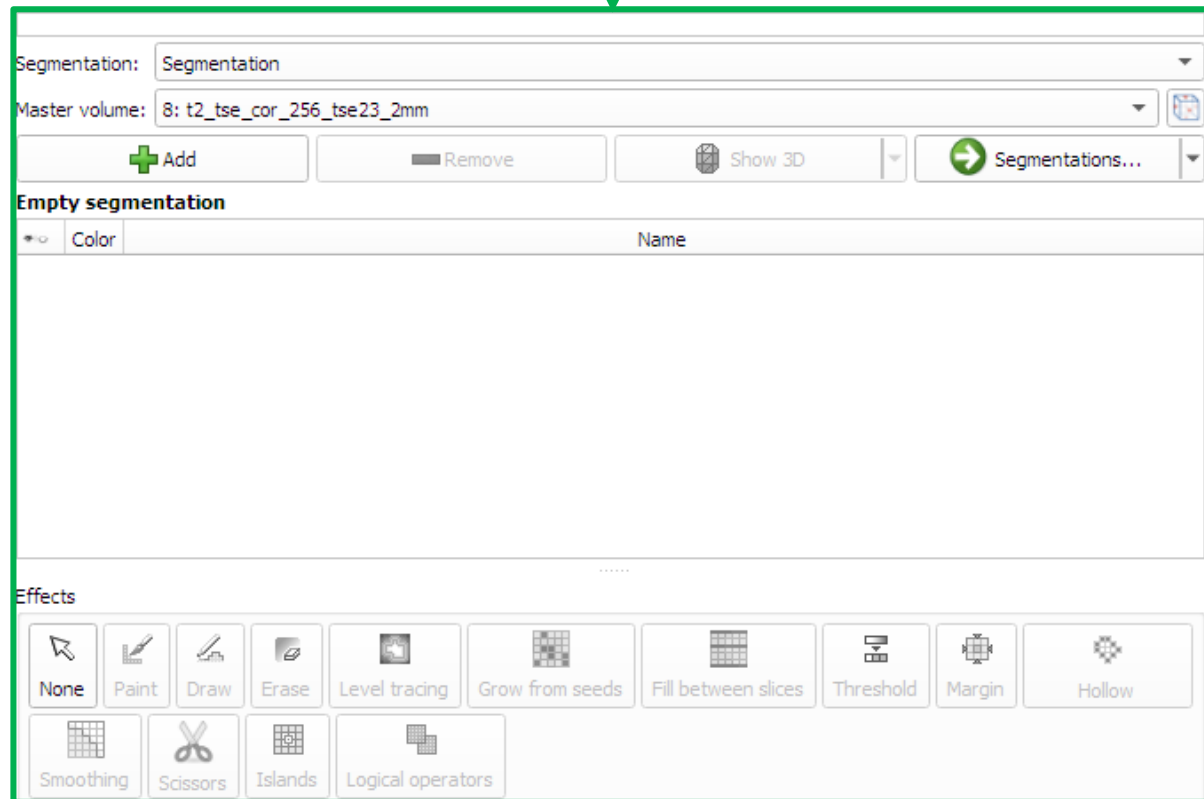
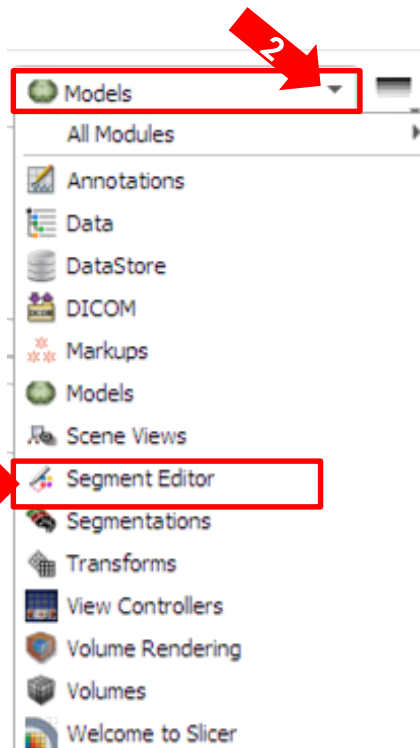
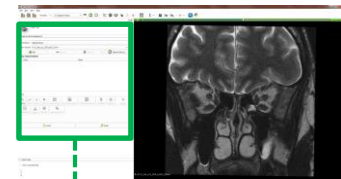
Open Segment Editor

Use segment editor button 

or:

1. click „models“ (typo: ought to be „modules“)
2. open menu
3. choose Segment Editor

in left window, segment editor is opened, with “empty segmentation”: effects are disabled

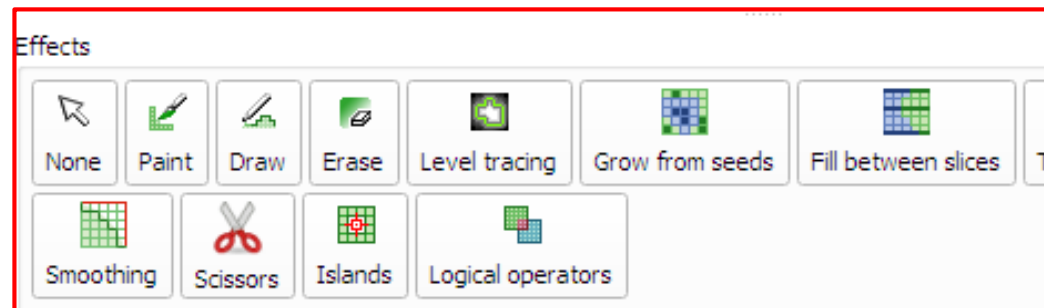
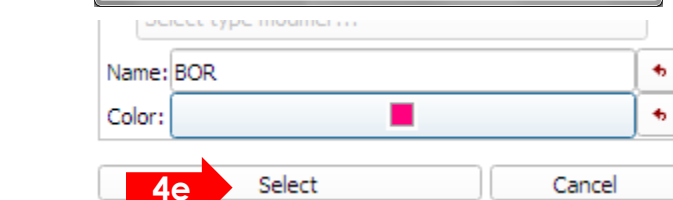
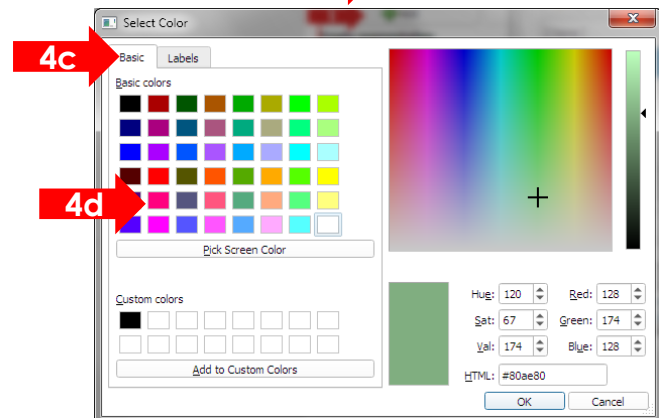
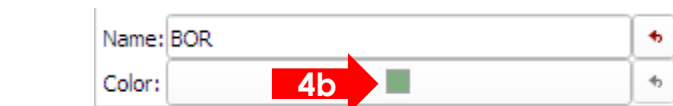
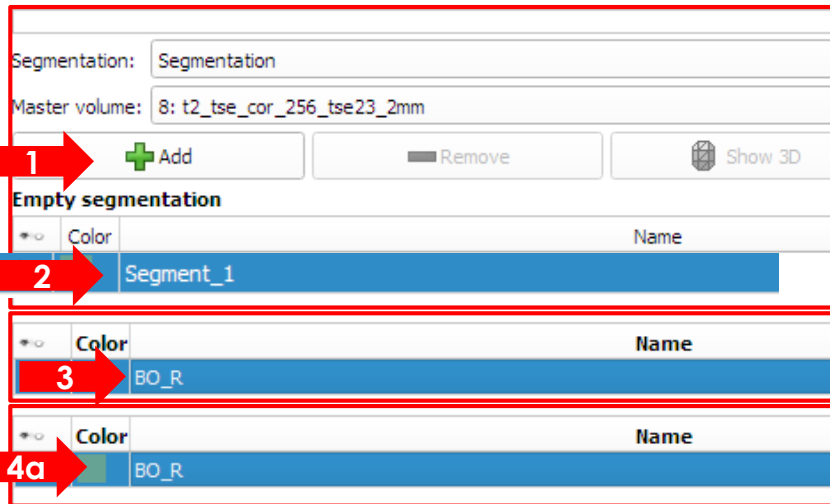


Create Segment

A segment is any anatomical structure; in this case, we'll create volumes for 2 segments: Olfactory bulb (OB) in the left and right hemispheres

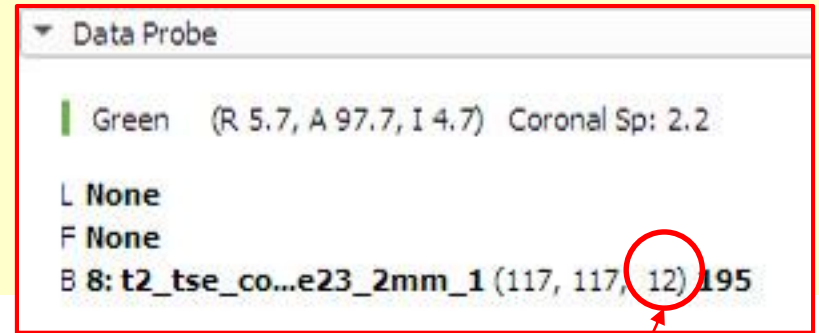
1. click „Add“
2. new segment „Segment_1“ is added
3. double click the default name and overwrite (e.g. „OB_R“)
4. select colour:
 - a) double click color field
 - b) click „color“
 - c) select Basic scheme
 - d) select colour, Add ... OK
 - e) select

Repeat the procedure to create OB_L
as soon as a segment is created, effects are enabled.



Segment Editor

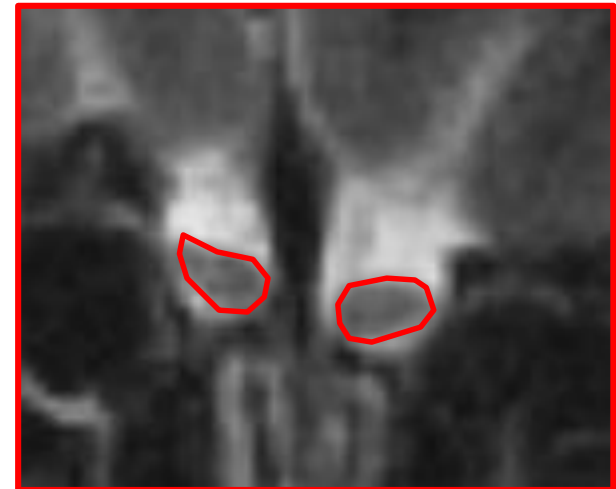
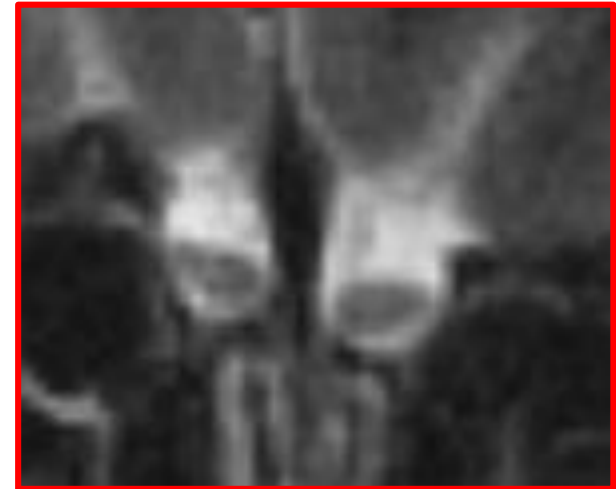
- move between slices: mouse wheel or arrow keys left/right
- zoom/unzoom: ctrl (Mac: Cmd) and mouse wheel; zoomed display is centered around mouse pointer
- Position of mouse pointer is displayed in the lower left corner: „Data probe“
- see also details in PDF file



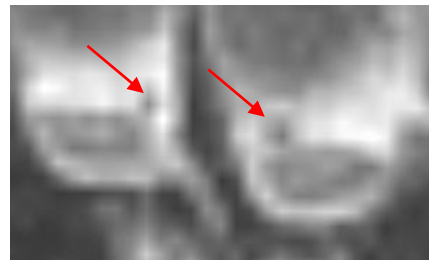
current slice

Identify OB

Move backwards and forward, zoom in and out to get an idea of the shape

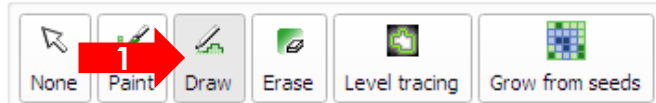


do not mistake
blood vessels
for OB tissue



Segment Editor: edit segment

Effects



Draw

Draw segment outline in slice viewers.

2, 3

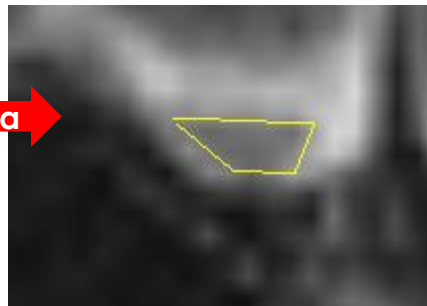
- **Left-click:** add point.
- **Left-button drag-and-drop:** add multiple points.
- **x:** delete last point.
- **Right-click or a or enter:** apply outline.

draw outlines for marked segment

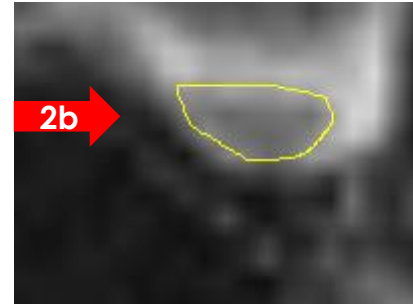
1. activate „draw“ or „paint“ (select brush diameter)
 - click „show details“
2. follow details to draw outline for first segment
3. press “a” to confirm outline in current slice and fill with pertaining color
4. you may erase voxels from the segment, or add others, at any time
5. mark remaining segment and repeat procedure
6. repeat in all slices containing OB tissue



2a



2b

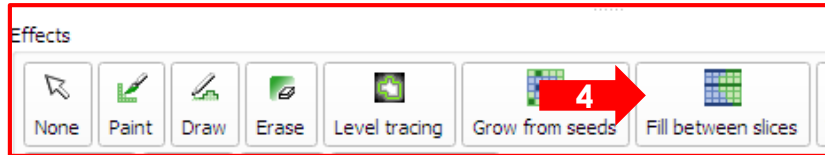


3



MRI display (above) interpolates, but filled outline shows voxel structure.

Segment Editor: fill volume – 3D display



Fill between slices - Initialize – Apply - Show 3D

Fill between slices

???

Interpolate segmentation between slices. Instructions:

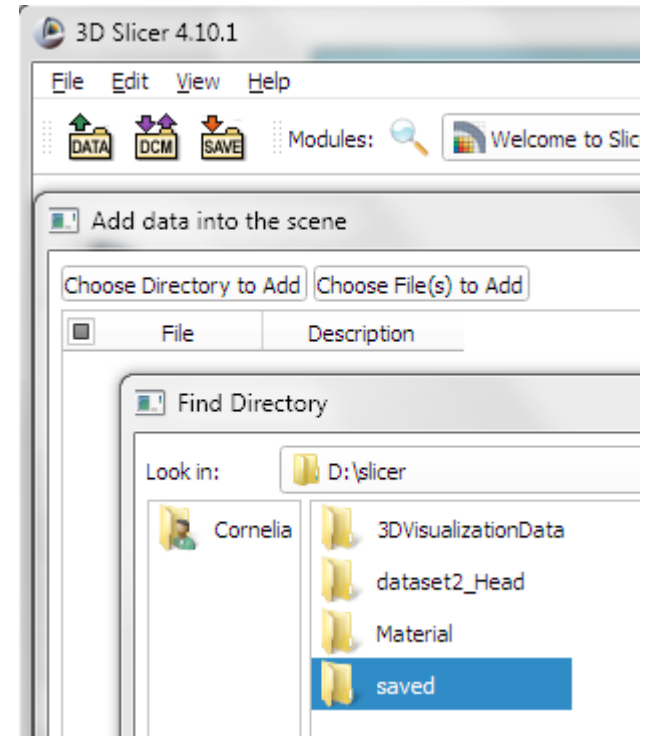
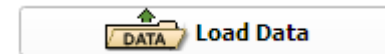
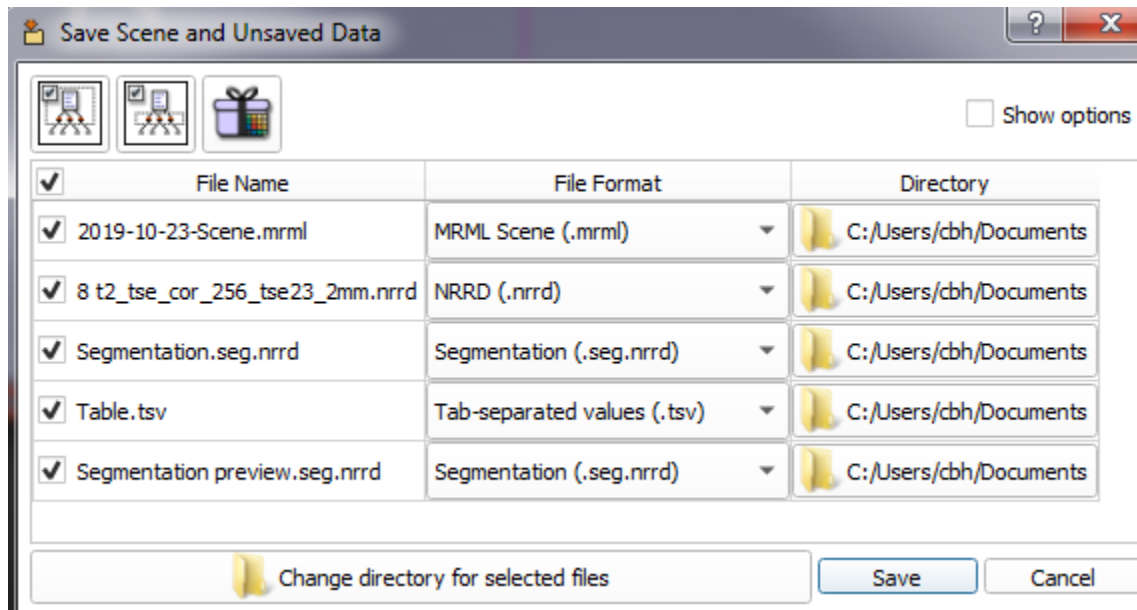
- Create complete segmentation on selected slices using any editor effect. Segmentation will only expand if a slice is segmented but none of the direct neighbors are segmented, therefore do not use sphere brush with Paint effect and always leave at least one empty slice between segmented slices.
- All visible segments will be interpolated, not just the selected segment.
- The complete segmentation will be created by interpolating segmentations in empty slices.

Calculate volume

- Models
 - Quantification
 - Segment Statistics
 - Apply
- copy/paste table into Excel (caution: decimal separator!)

Segment	Number of voxels [voxels]	Volume [mm3] (1)	Volume [cm3] (1)	Surface area [mm2]	Volume [mm3] (2)	Volume [cm3] (2)
BO_R	86	45,350	0.0453513	667.363	256.905	0.0256905

Save and Load saved data



- Load Data or File – Add
- select folder

Increase reliability

- Important:
- always evaluate volumes twice:
 - either with a colleague
 - or yourself – but do not repeat evaluations of one data set in close succession
- if both results are more than 10% apart, try to find the source of the error and repeat again
- use the mean of the repeated measurements as result