

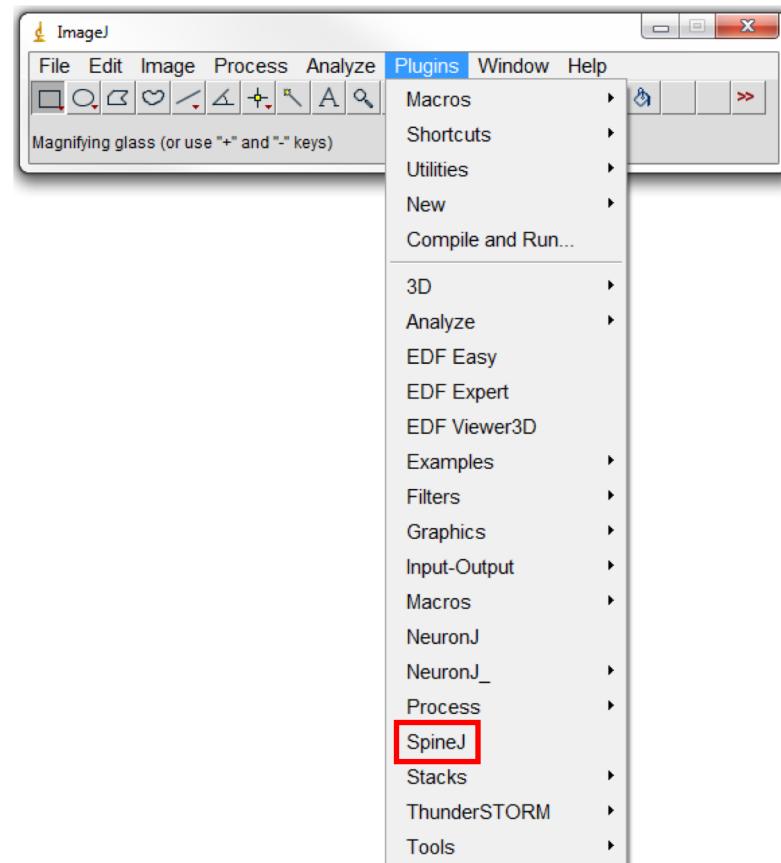
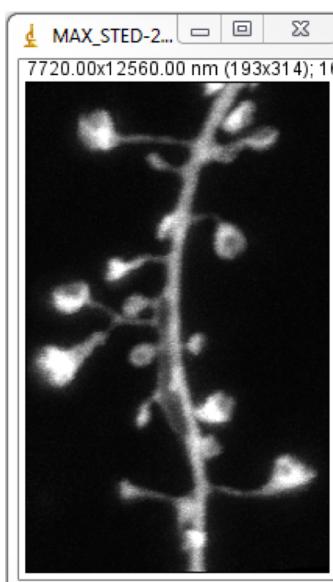
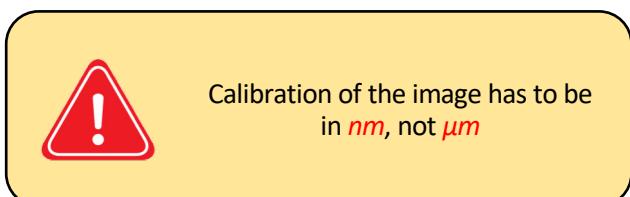
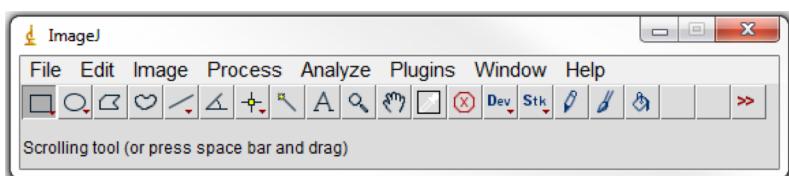
SpineJ manual

By F. Levet et al.

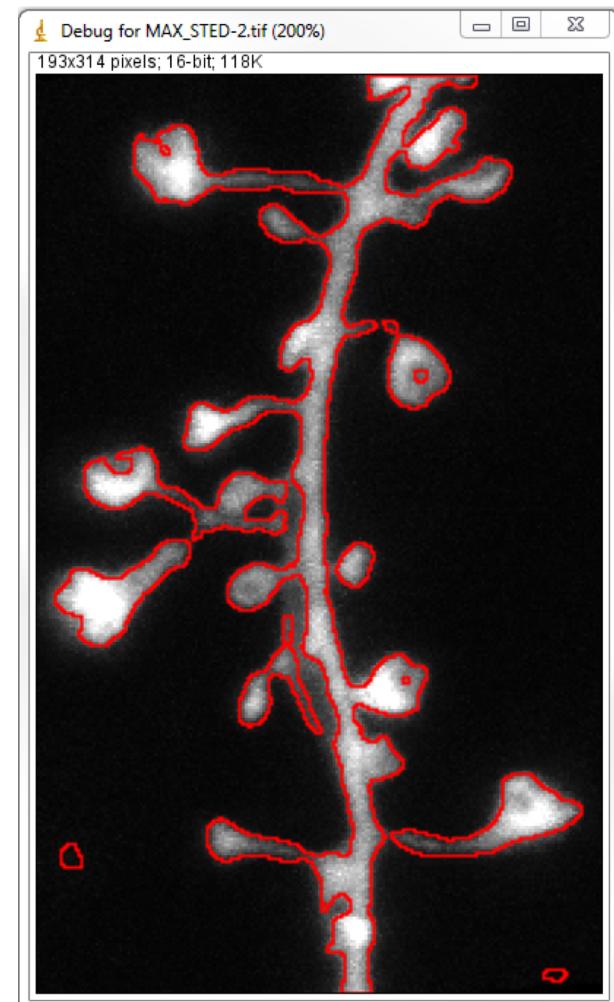
Team Quantitative Imaging of the Cell
Interdisciplinary Institute for Neuroscience
CNRS UMR5297, Univ. Bordeaux

Quick start

- Download « SpineJ.jar » and place it in the plugins folder of ImageJ
- Open an image in ImageJ
- Click on « SpineJ » in the plugin tab



Filtering



Generate image stacks of the different wavelets components (1 frame = 1 level)



Toggle display of the debug image

Minimum area (in pix²) of objects

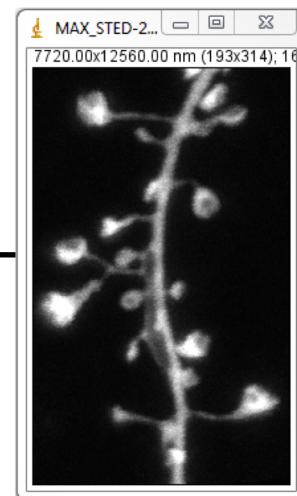
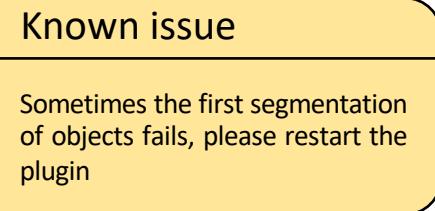
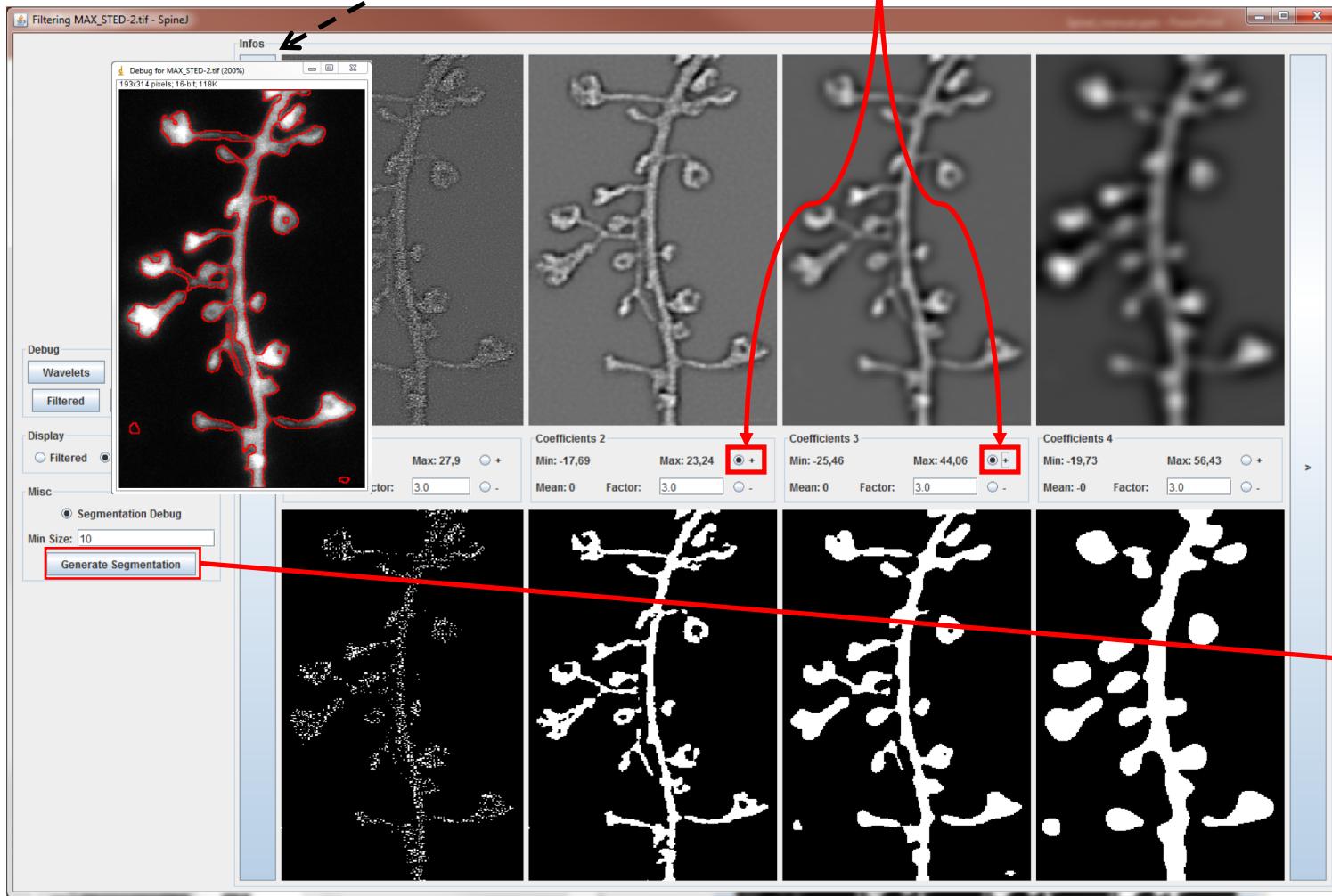
Generate the binarized image for the reconnection step

Filtering

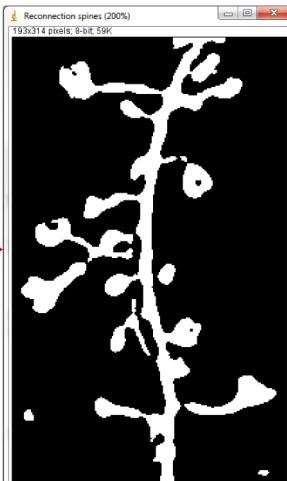


Filtering

Select Coefficients 2 & 3
with factor 3

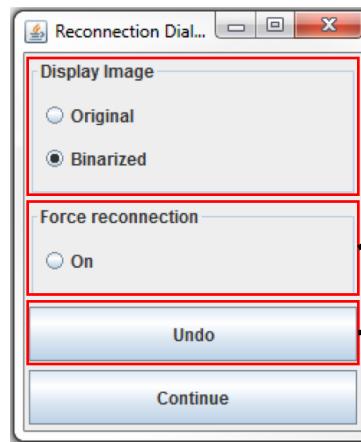
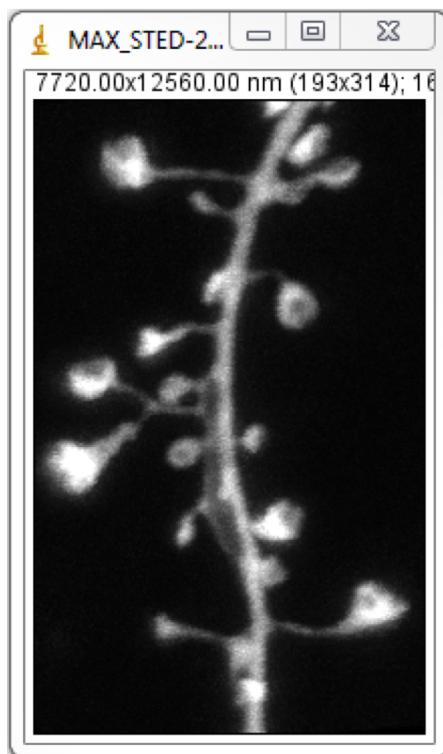
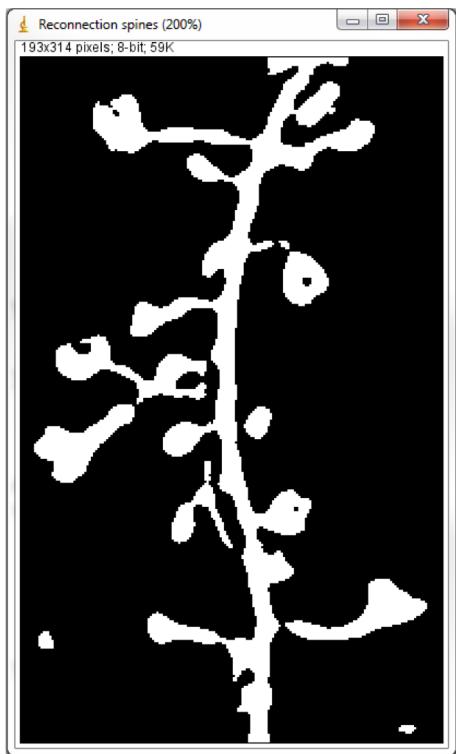


Creation of the binarized image after clicking
on « Generate Segmentation »



Spine reconnection

Toggle between binarized and original images



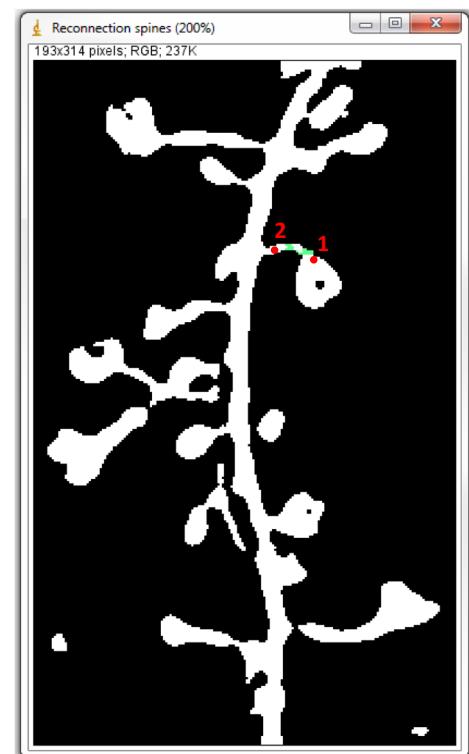
If Crtl + left click doesn't work, « Force reconnection » allows performing selection by a simple left click. The current ImageJ command defined on left click won't work.

Undo the last reconnection

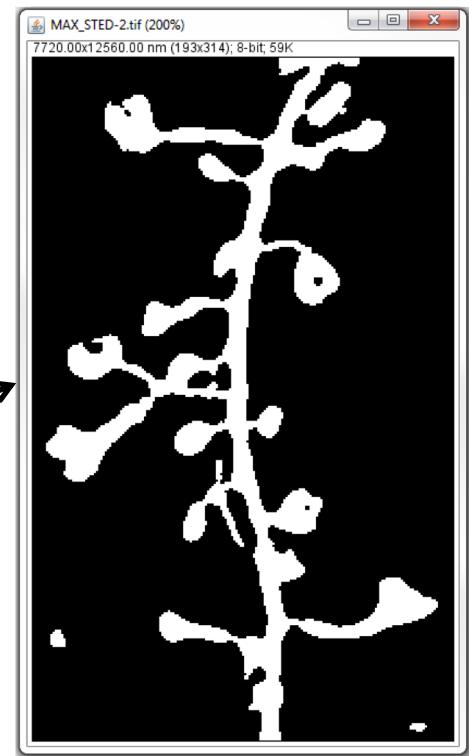
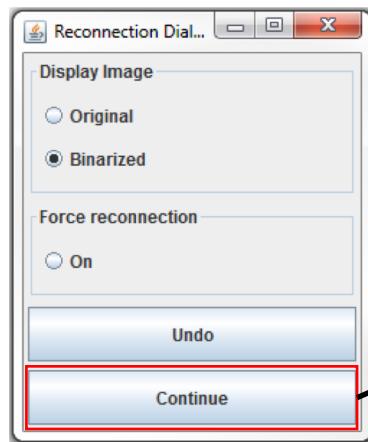
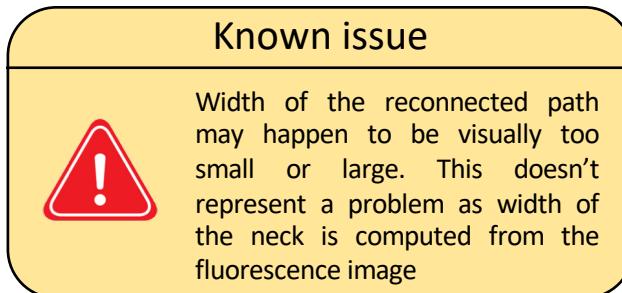
Reconnection is done by selecting the spine and the dendrite. Selection is done by **Crtl + left click**:

- Crtl + left click on the spine (or dendrite)
- Crtl + left click on the dendrite (or spine)

SpineJ then compute the path from the first click position to the second one



Spine reconnection



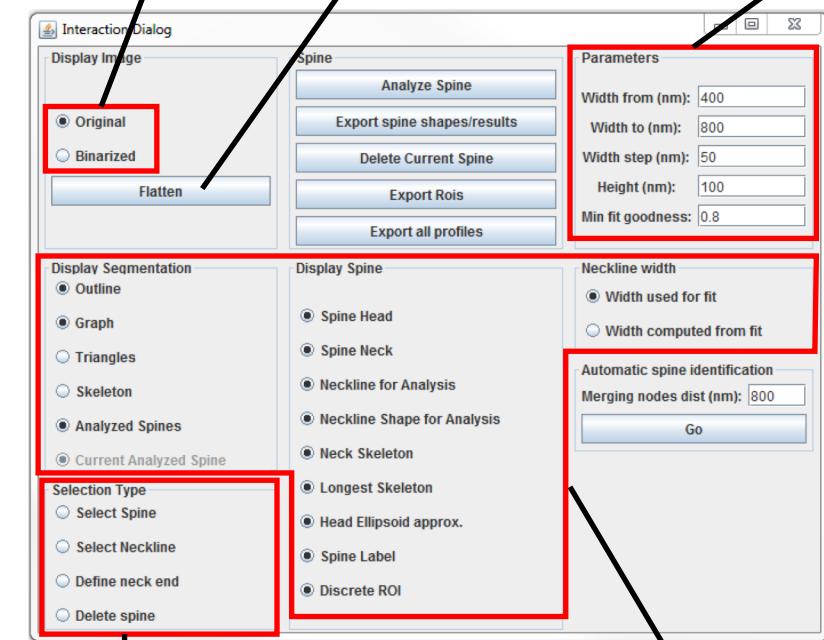
Spine analysis - widgets

Toggle between binarized and original images

Flatten the current image view

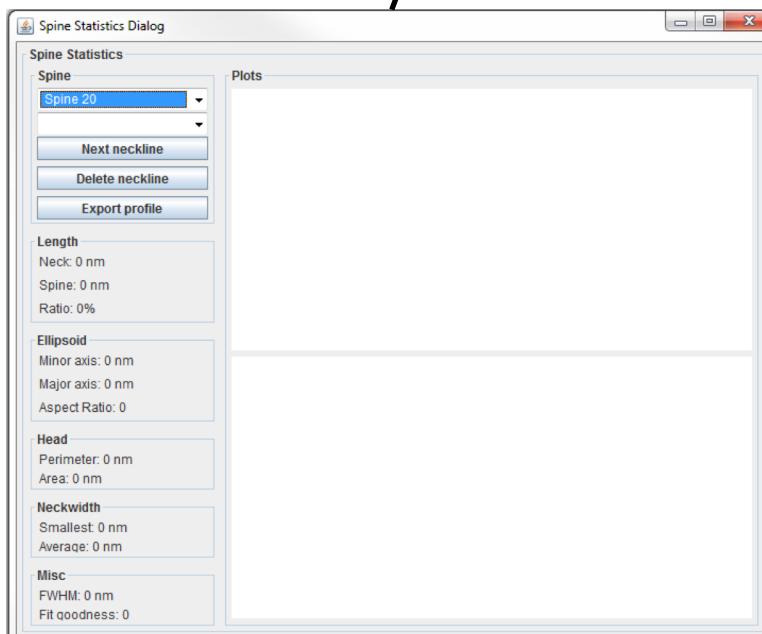
Fit parameters

Filled when the separation between neck and heads are defined

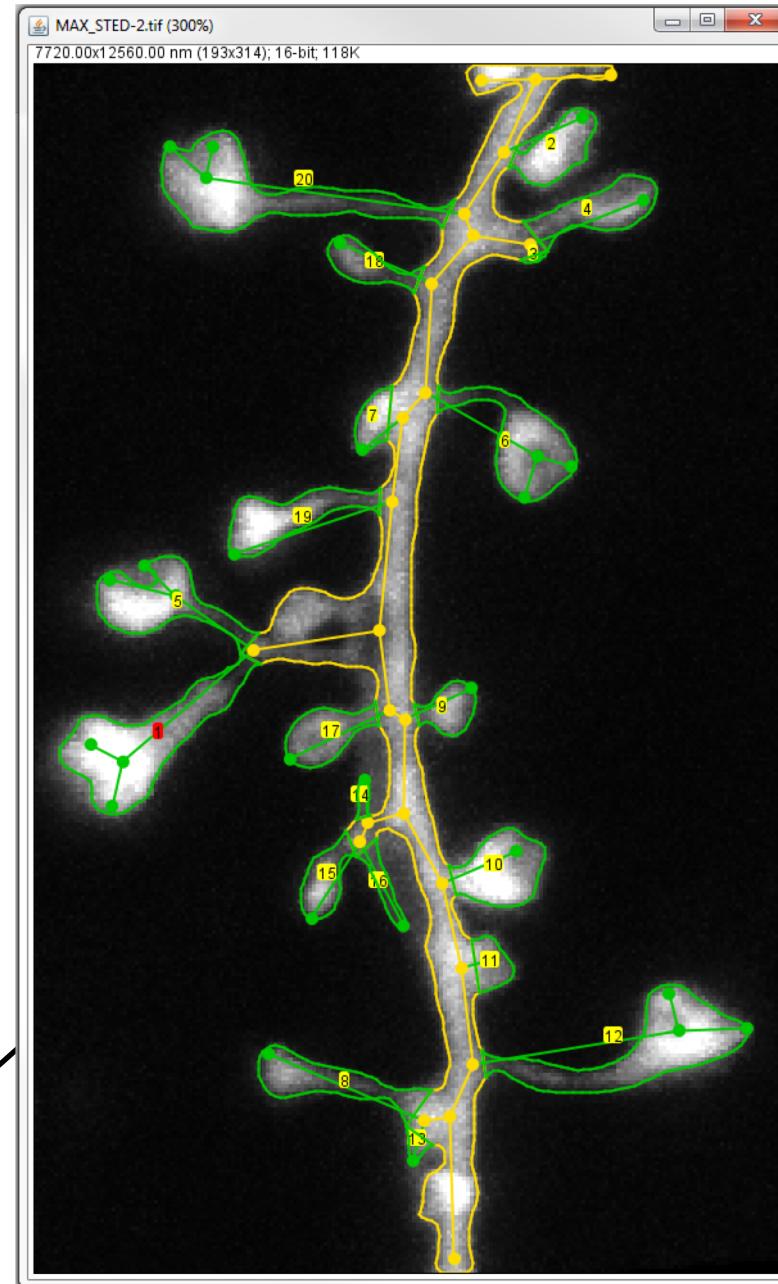


If shortcut doesn't work, this allows to hijack the Image1 command to perform the command selected with a left click.
Select Spine → Maj + left click
Select Neckline → Maj + right click
Define neck end → Ctrl + right click
Delete spine → Alt + left click

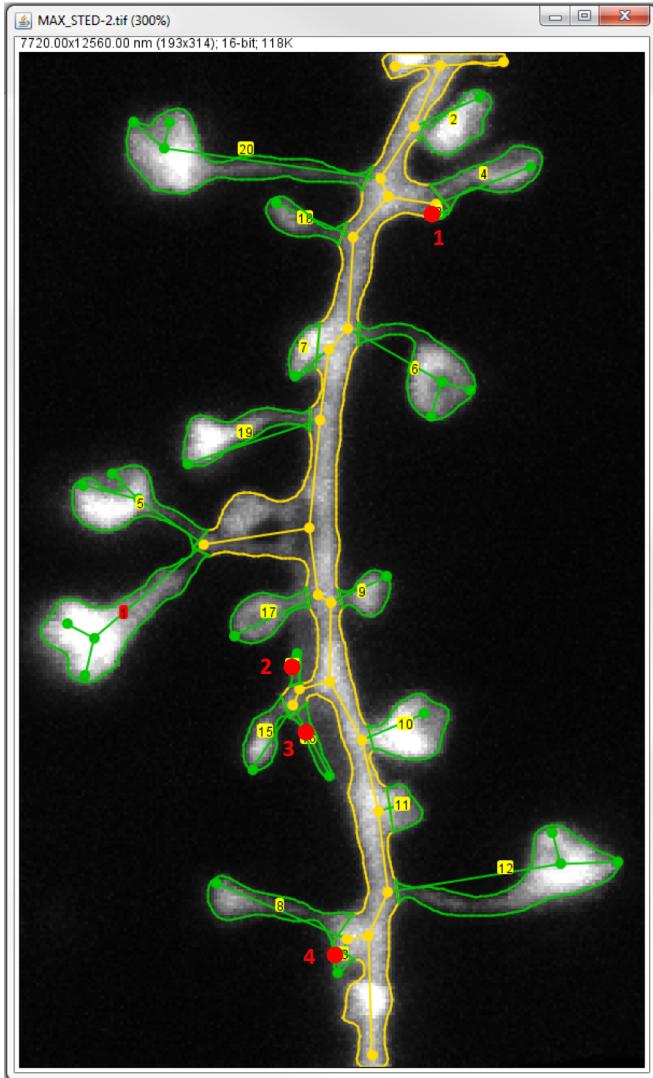
Display options



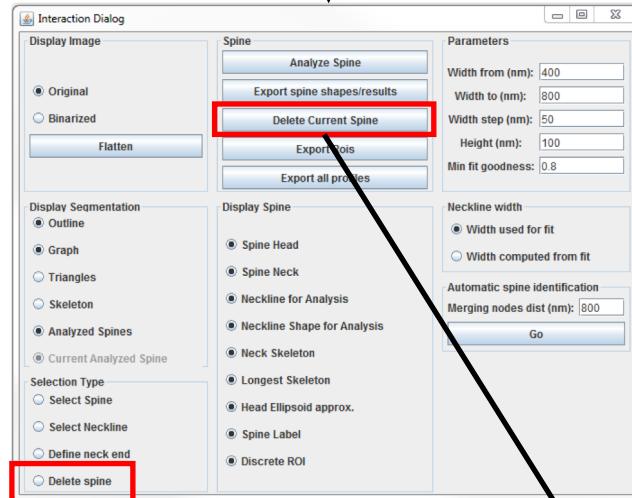
Automatic identification of spines



Spine analysis – spine deletion

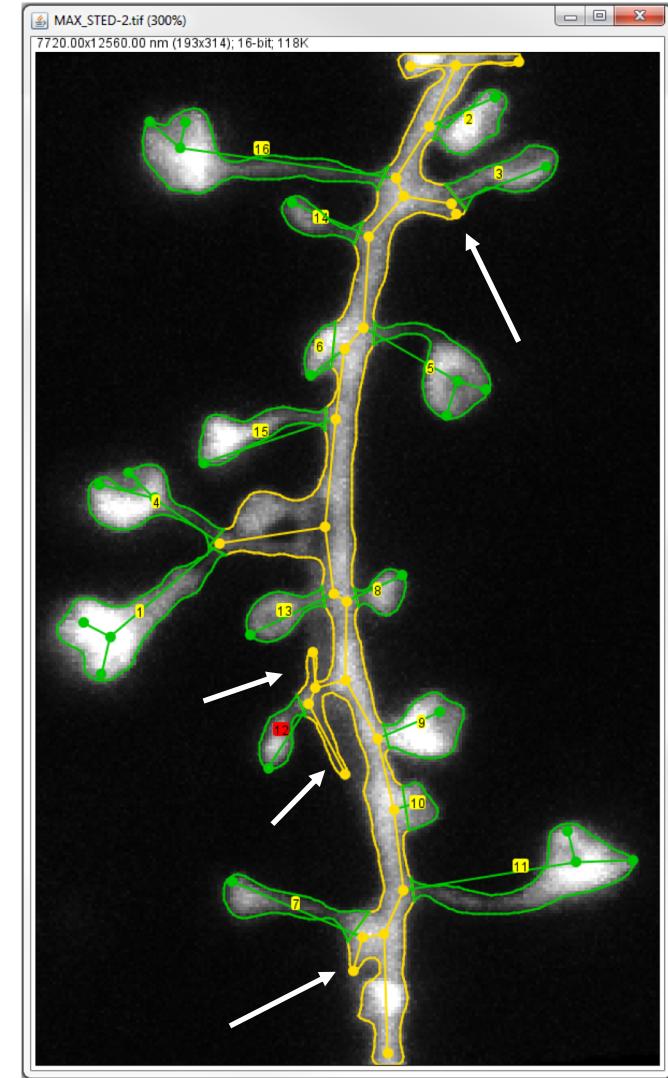


As identification is done by graph theory, some dendrite parts can be misidentified as spines. It is necessary to delete them.

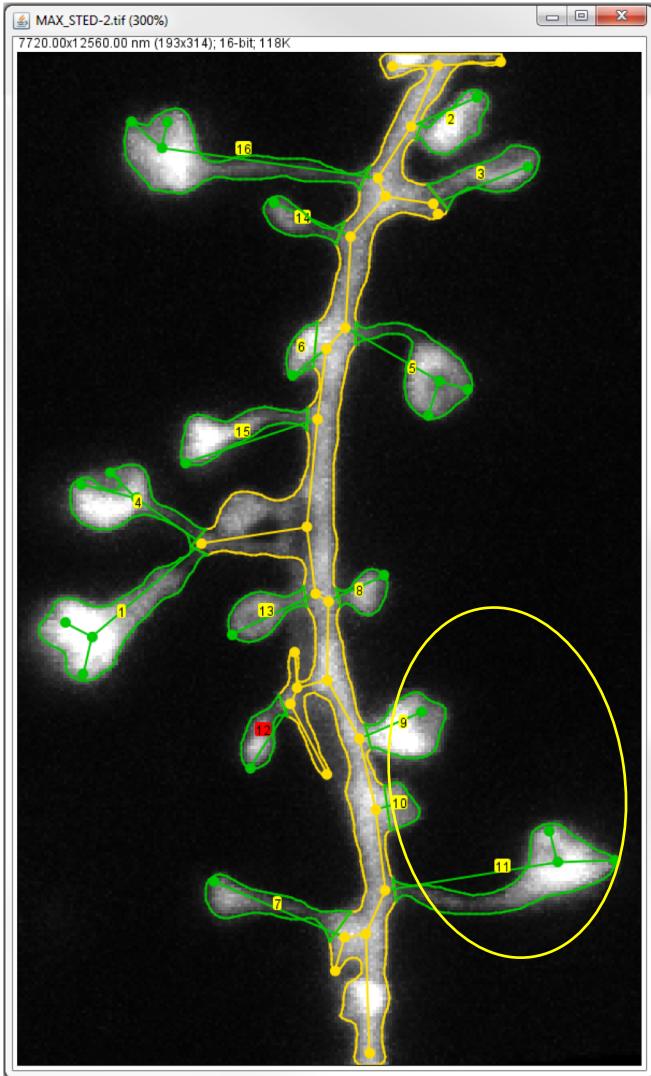


Check option and left click or Alt + left click inside the spine

Delete the currently selected spine



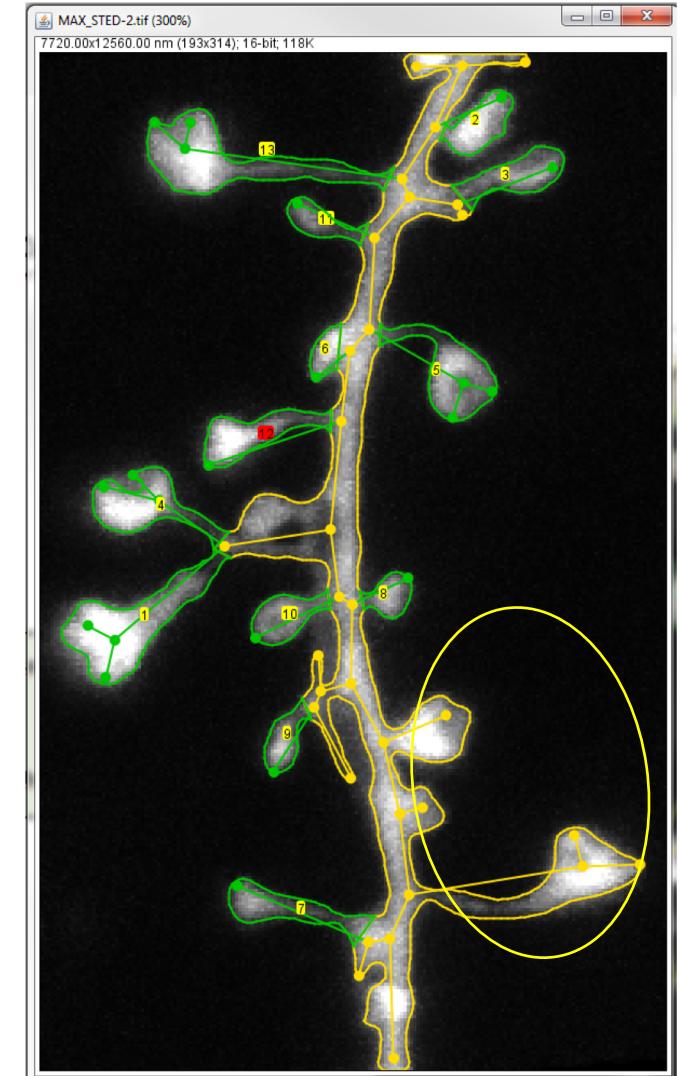
Spine analysis – spine deletion in ROI



Deletion is done by using any kind of ImageJ ROI.

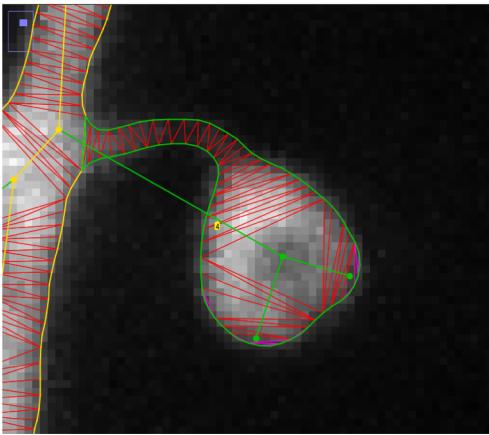
- Define the ROI
- Press « d »

Any spine which graph intersects the ROI is deleted.

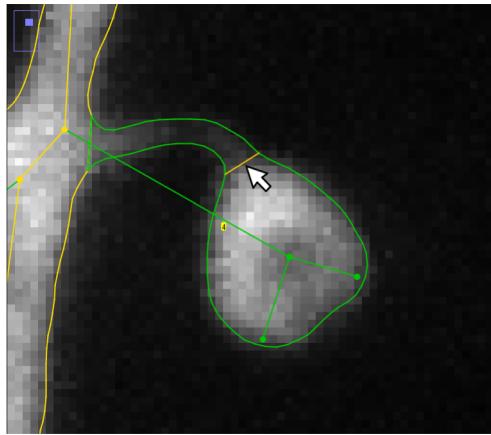


Spine analysis – neck definition

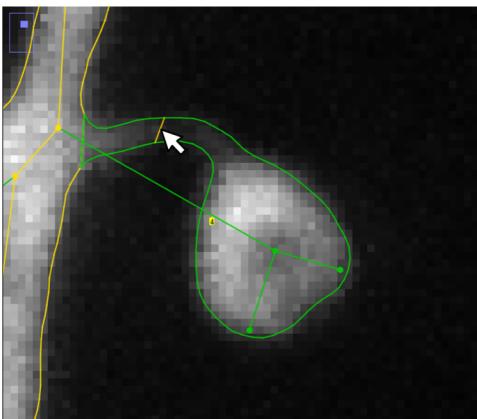
Neck/head definition is facilitated by the Delaunay triangulation



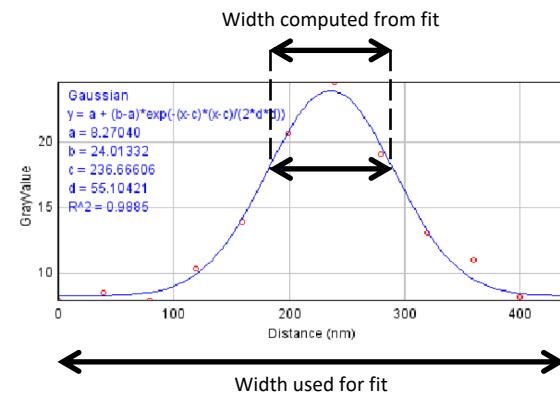
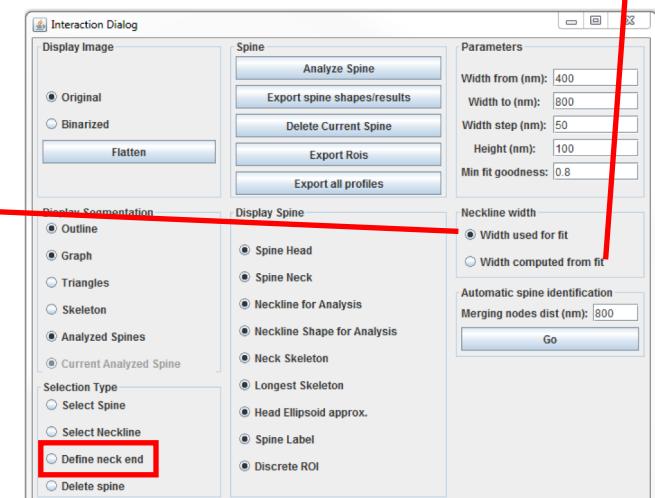
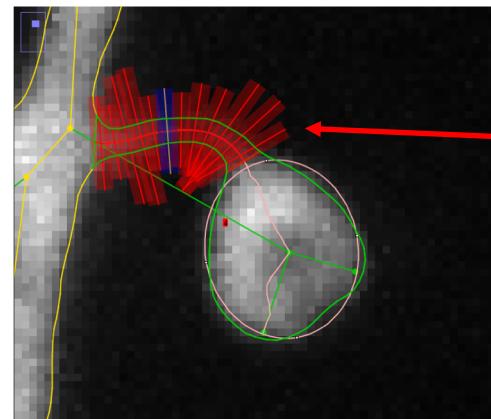
When passing inside a spine, the closest Delaunay edge to the cursor is displayed



When passing inside a spine, the closest Delaunay edge to the cursor is displayed

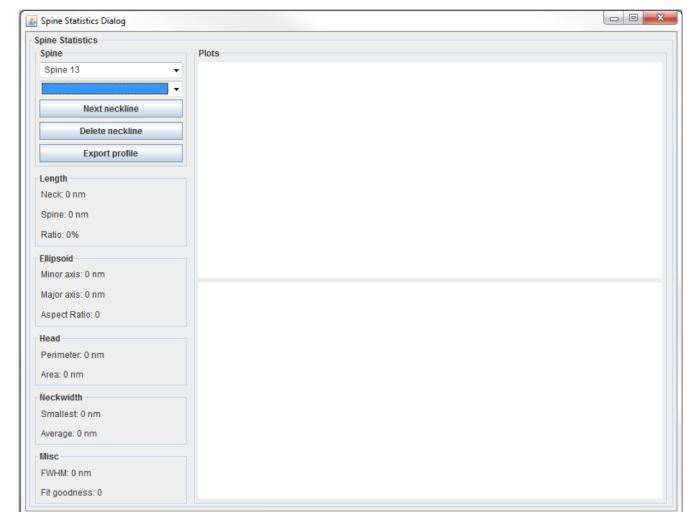
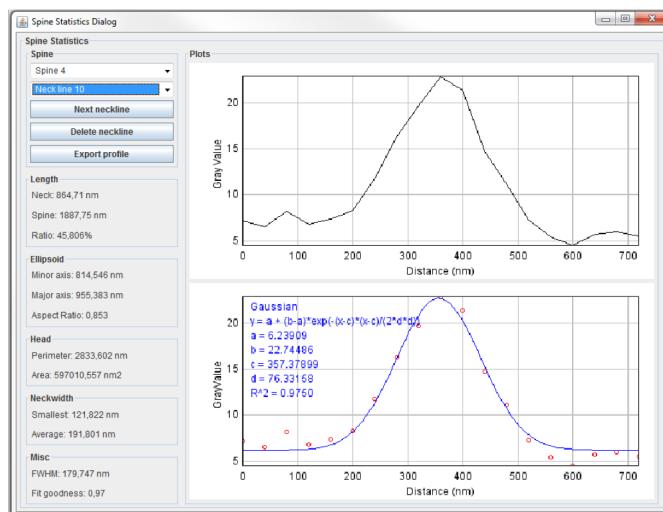
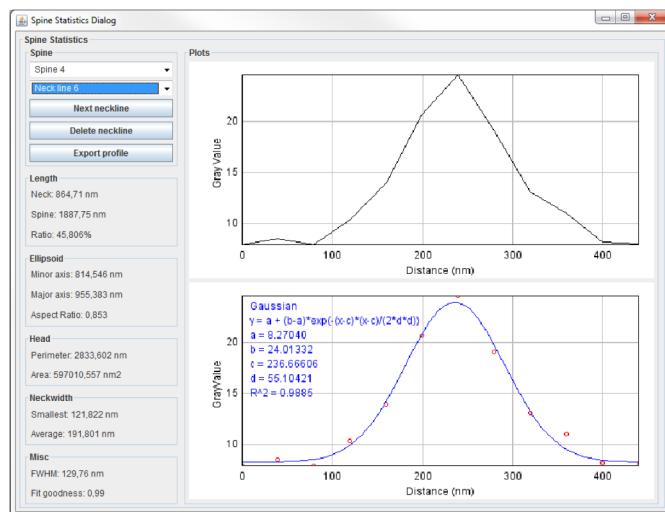
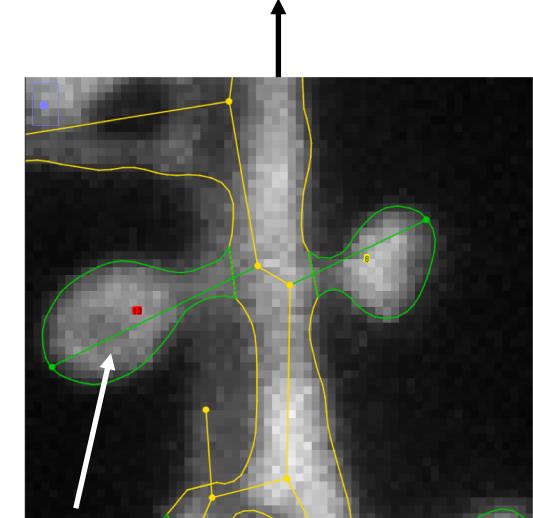
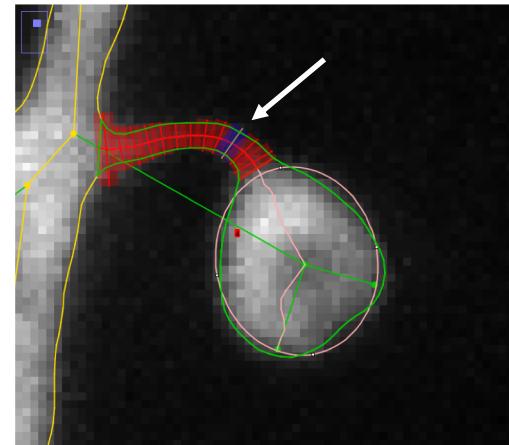
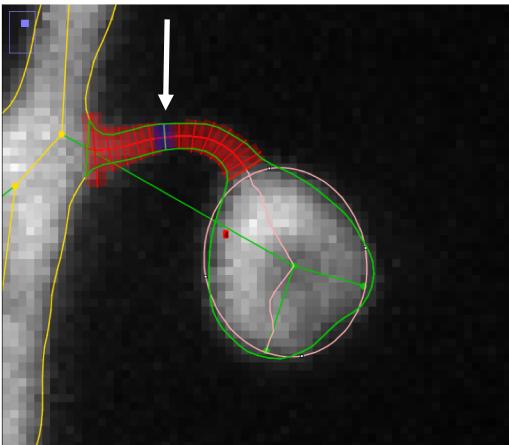


Ctrl + right click or « Define neck end » + left click to define the neck end, using the Delaunay edge

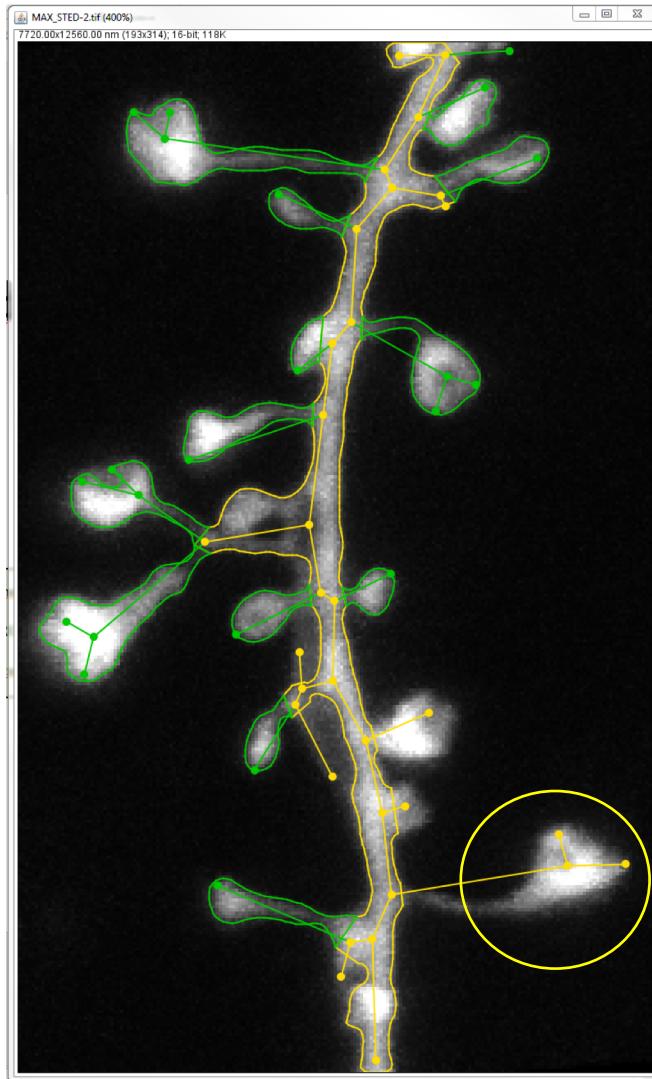


Spine analysis - infos

If a spine without neck/head separation is selected, no information is displayed.

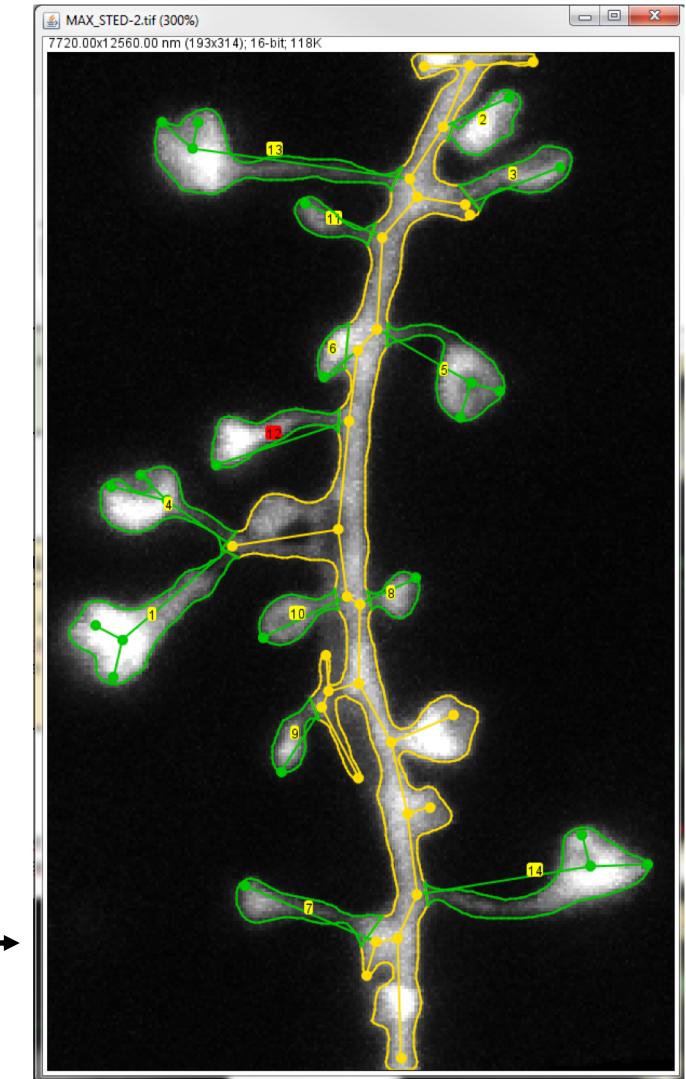
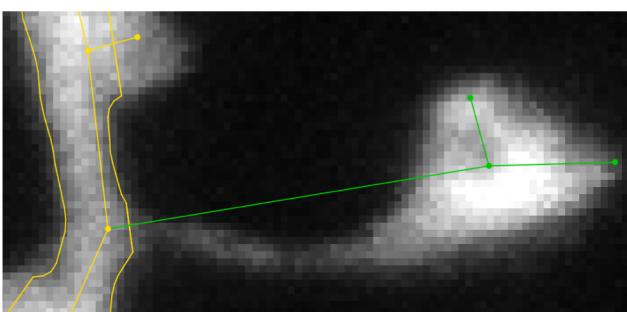


Spine analysis – manual identification



Press « a » or click on the « Analyze spine » button.

Any graph seed or edge included or intersecting the ROI is tagged as spine



Spine analysis – export results

