3DCT correlation and transformation example

This example shows how to:

1. Establish a correlation between a 3D confocal and a 2D ion beam images using 3DCT.

2. Transform these images by applying the coordinate transformation obtained by the correlation (uses Pyto package).

The emphasis here is on the transformation part. The correlation part allows users to independently obtain the correlation results that are (almost) the same as those provided in this example.

To make it easier to visualize the transformation, this example uses small confocal-like (3D) and ion beam-like (2D) images that were artificially generated to contain clear features.

1 Correlation

- Start main 3DCT GUI by one of the following ways:

  - Execute '3D Correlation Toolbox' from a OS-specific build
  - From source:

    ```
    > python 3DCT/TDCT_main.py
    ```

- Proceed as explained in ../USERGUIDE, using cf_small.tif (confocal-like) and ib_small.tif or ib_small_rgb.tif (ion beam-like) images. Note that cf_small.tif does not need to be resliced because it at already has cubic voxels (same pixel size in all three dimensions)

- Start correlation procedure from the main GUI and select marker points in the correlation GUI (as explained in ../USERGUIDE) to obtain the following:
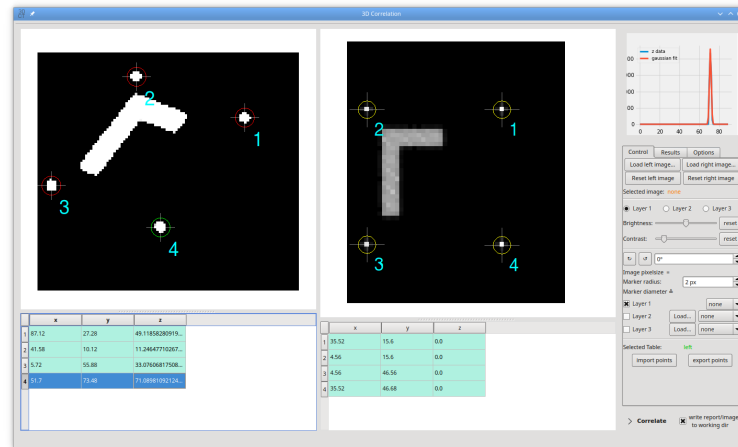
Figure 1: Selection of marker points

- Run correlation. This will generate a correlation results file (file name date_time_correlation.txt). The results file provided with this example is 2020-04-24_15-03-41_correlation.txt .

- In some future version of 3DCT, a pickle file containing the transformation object will also be generated (file name date_time_correlation.pkl)

2   Image transformations

- Make sure you have Pyto package installed (https://github.com/vladanl/Pyto.git) in Python3 environment

- Follow the instructions given in Python notebook transform.ipynb (also saved as transform.pdf)

- Note that the same procedure can be used to transform the images by applying any other coordinate transformation (for example generated by Pyto).

Author: Vladan Lucic (vladan@biochem.mpg.de), Max Planck Institute of Biochemistry

Last modified: 24.04.2020