MIC-MAQ

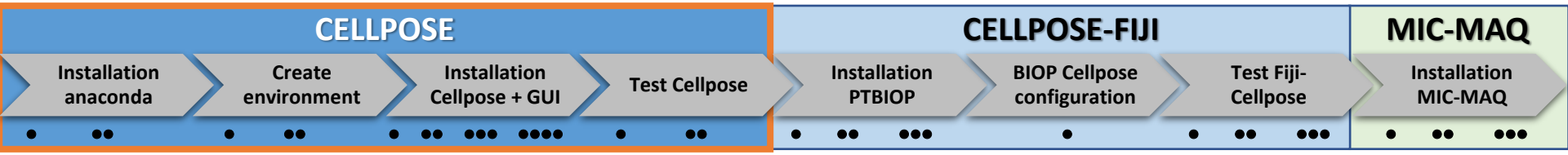
Microscopy Images of Cells-Multi Analysis and Quantifications

Installation

For MIC-MAQ

- Installation of Cellpose
  - Configuration of Fiji to run Cellpose from Fiji
- Installation of the plugin MIC-MAQ

Installation of Cellpose



● Download a python distribution

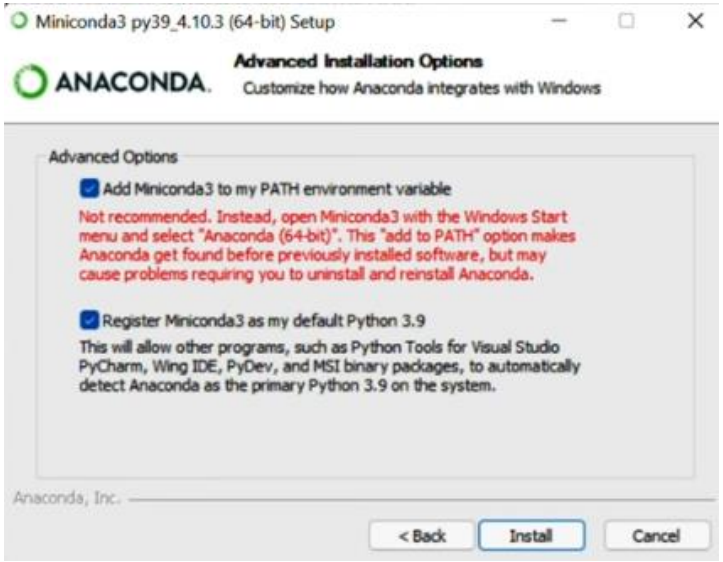
You have the possibility to download Miniconda (small version) or Anaconda (full version) :

- Miniconda : https://docs.conda.io/en/main/miniconda.html
- Anaconda : https://www.anaconda.com/download

●● Installation of Miniconda/Anaconda

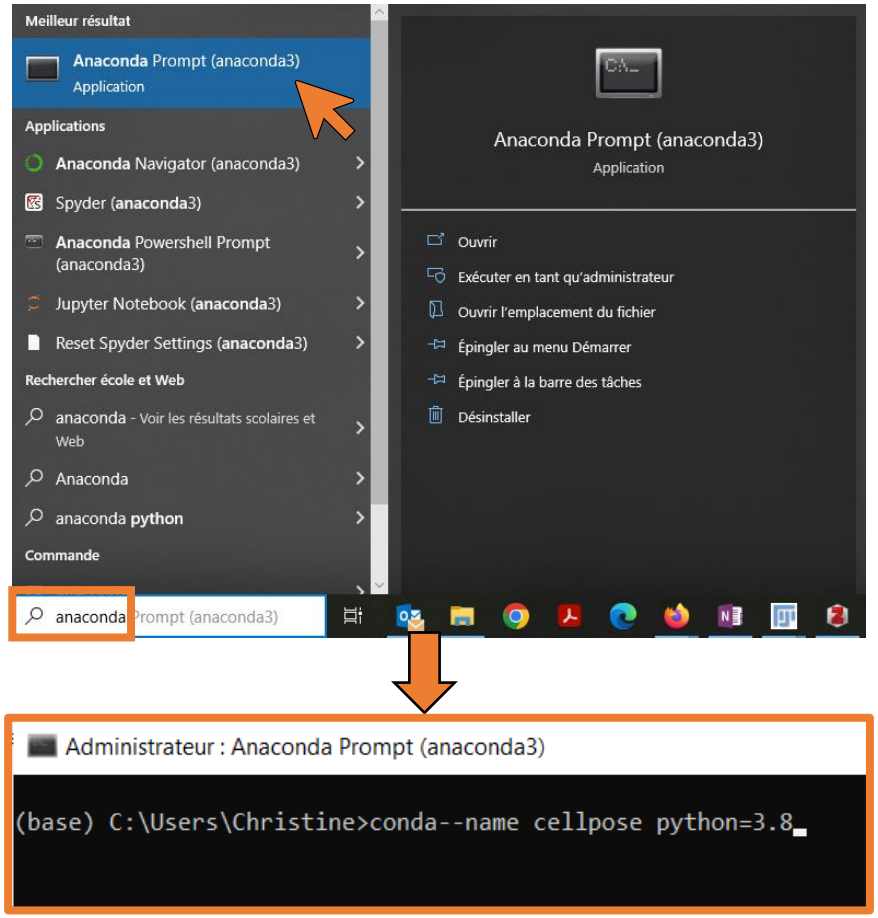
Install the software in **C:\Users\YourSessionName\anaconda3**

During the installation, please tick the box **"add anaconda/miniconda to my PATH environment variable »** .



- **Open the Anaconda Prompt application**

In the Windows search toolbar, enter **anaconda** and open the **« Anaconda Prompt application »**.



- **Create a new anaconda environment**

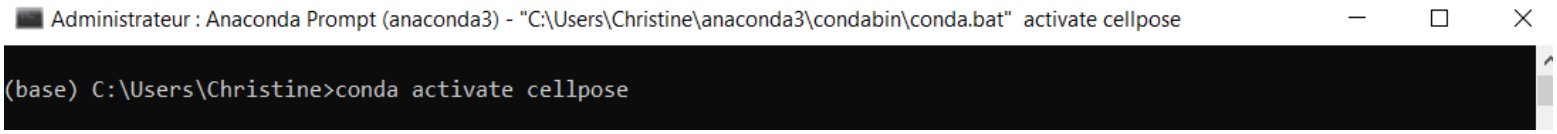
In the Anaconda Prompt window, write this command line and validate by pressing Enter key:

conda create --name cellpose python=3.8

!! Lot of packages will be downloaded and you need to press the « y » key to launch the installation !!

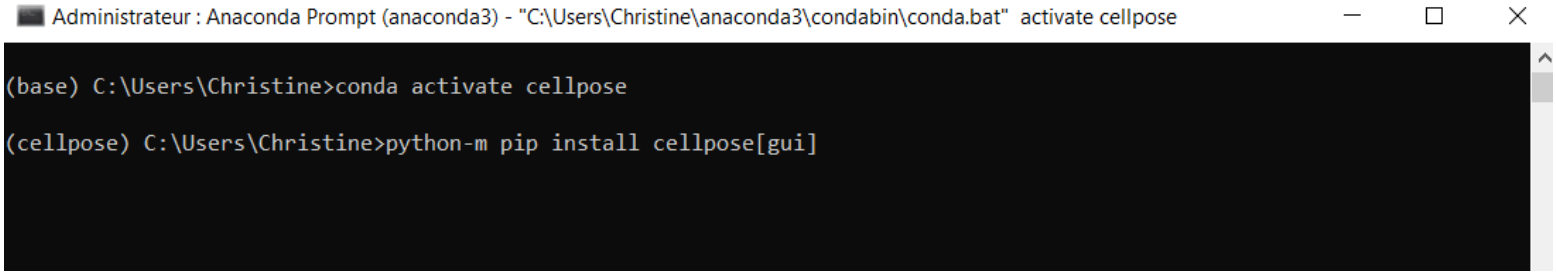
• Activate the cellpose anaconda environment

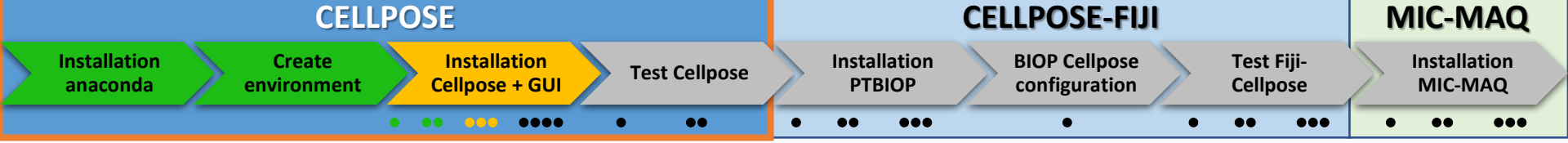
In the Anaconda Prompt window, write this command line : *conda activate cellpose*



• • Cellpose installation in anaconda (CPU installation)

In the Anaconda prompt window, write this command line : *python -m pip install cellpose[gui]*





● ● ● Optional: GPU activation for Cellpose

We recommend to use the GPU installation version to speed up the segmentation process.
At least 8GB of RAM is required to run the Graphical User Interface (GUI) of Cellpose.

In the Anaconda prompt window, write this first command line :

conda uninstall pytorch

In the Anaconda prompt window, write this second command line :

conda install pytorch pytorch-cuda=11.3 -c pytorch -c nvidia

Complete installation instructions at these websites:

- https://github.com/MouseLand/cellpose#gpu-version-cuda-on-windows-or-linux
- https://github.com/BIOP/ijl-utilities-wrappers#conda-cellpose-gpu

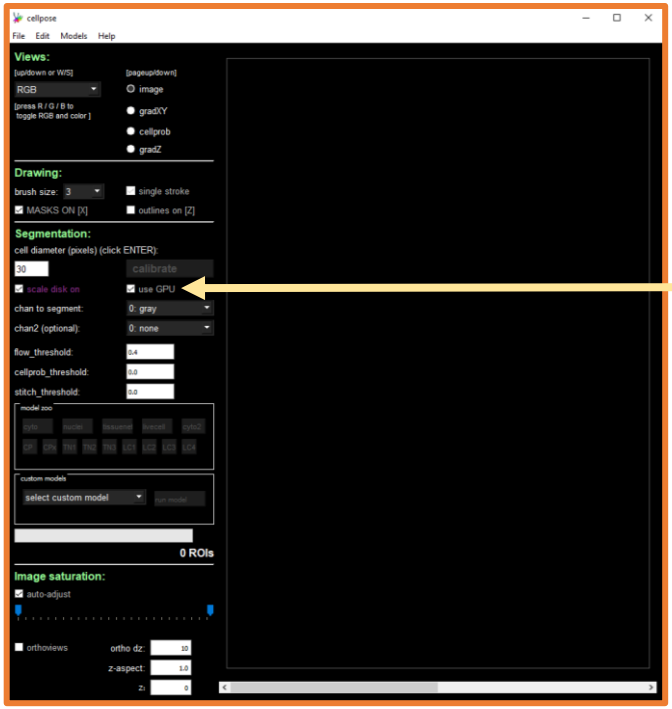
●●●● Start Cellpose in Anaconda

In the Anaconda Prompt window, write this command line : *python –m cellpose*

Administrateur : Anaconda Prompt (anaconda3) - "C:\Users\Christine\anaconda3\condabin\conda.bat" activate cellpose

```
(base) C:\Users\Christine>conda activate cellpose

(cellpose) C:\Users\Christine>python -m cellpose
2023-06-27 14:33:53,544 [INFO] WRITING LOG OUTPUT TO C:\Users\Christine\.cellpose\run.log
2023-06-27 14:33:55,955 [INFO] ** TORCH CUDA version installed and working. **
```

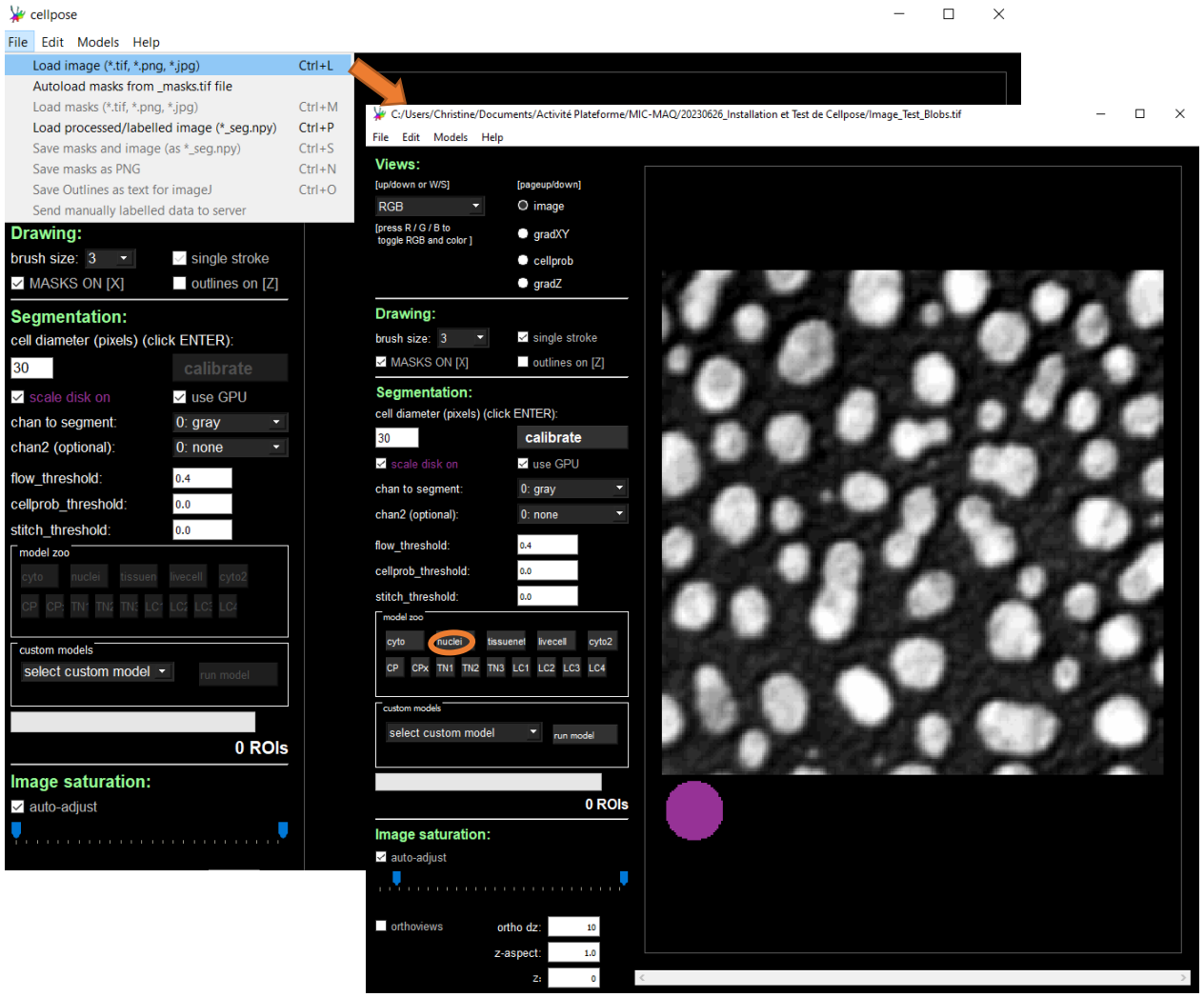


For GPU installation :

If the GPU is recognize by Cellpose the option « use GPU » is activated.

• Load image in Cellpose GUI

In the Cellpose GUI, load the image called « *Image_Test_Blobs* »: **File > Load image**

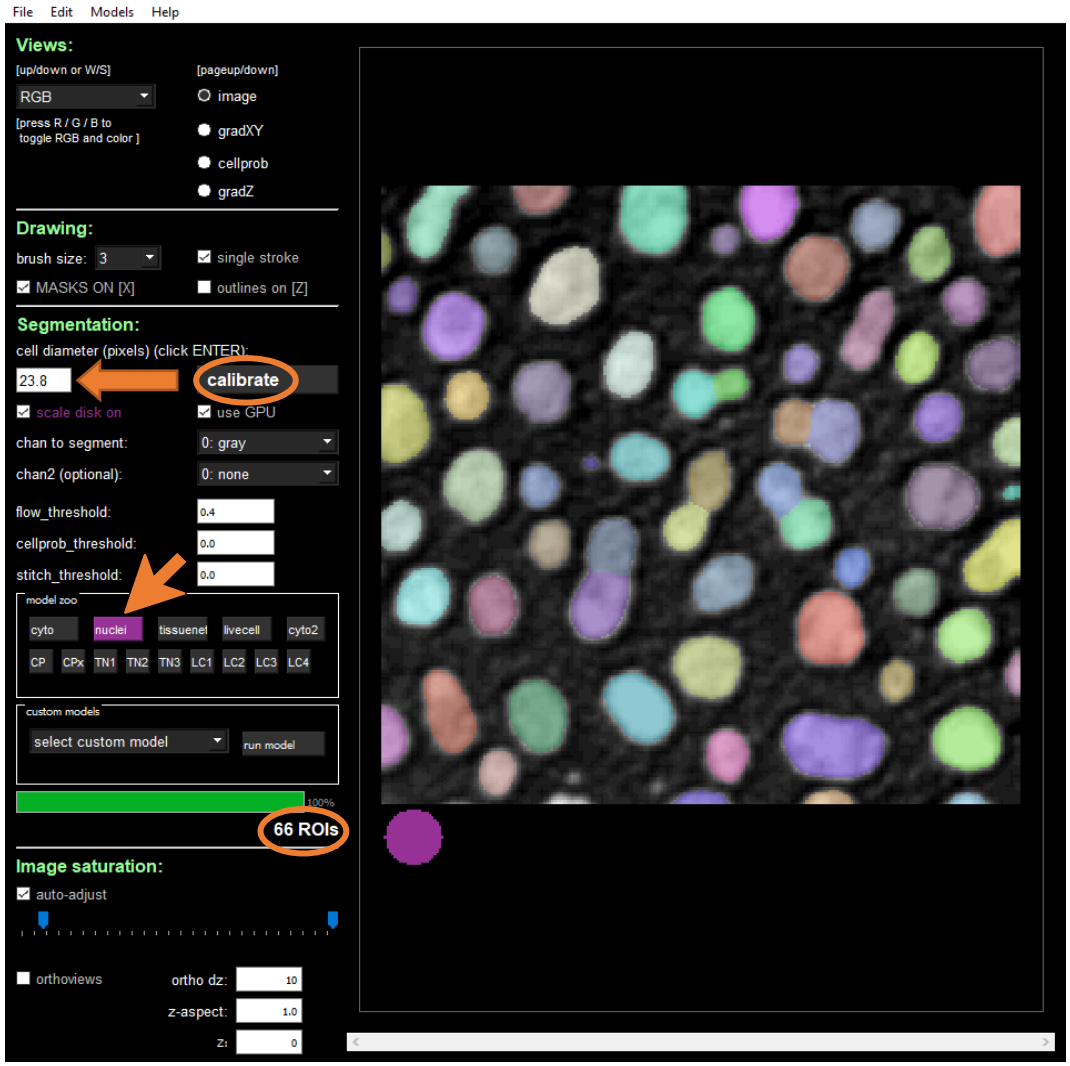


● ● Run Cellpose

In the Cellpose GUI:

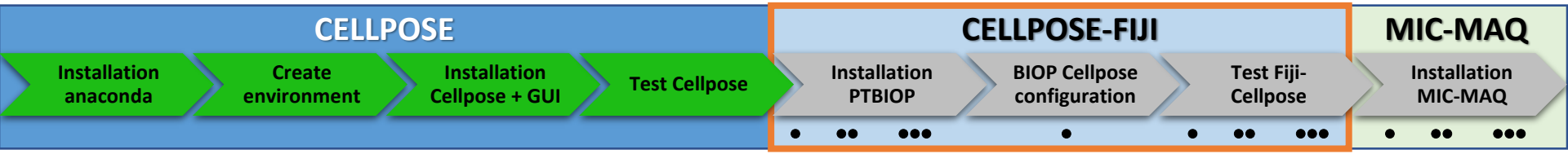
- Click on « **calibrate** » to define automatically the **object's diameter** (the value should be at 23.8 pixels)
- Select the **« nuclei » cellpose model zoo** (the segmentation will start automatically when you click on the model zoo)

As results, the number of segmentation regions will appear on the GUI (66 ROIs) and a mask of segmented objects will be created with random color rendering.



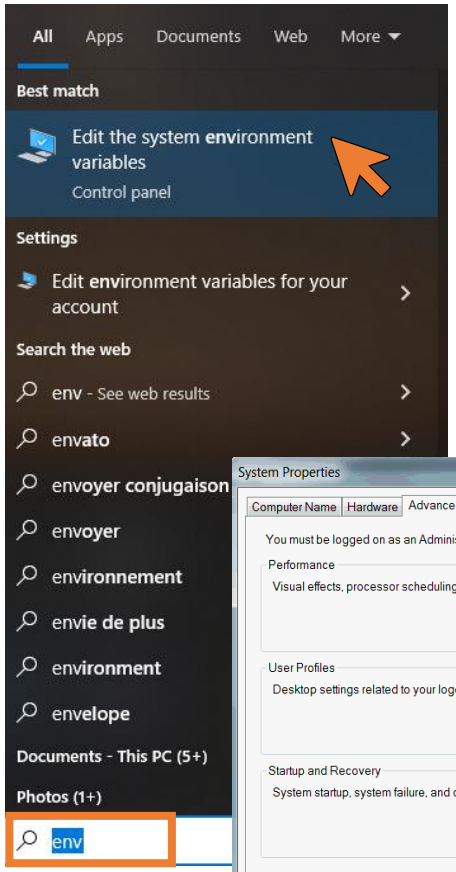
Installation of Cellpose

Configuration to run from Fiji

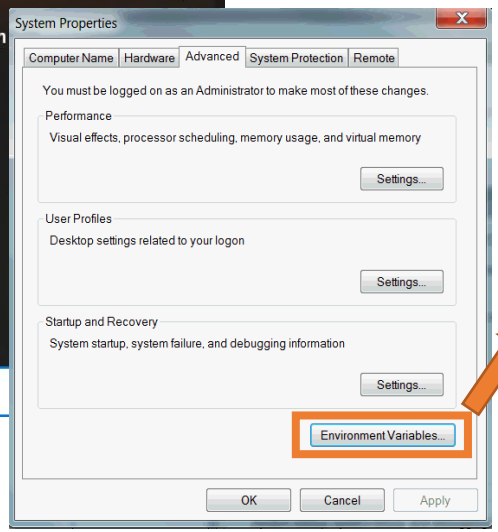


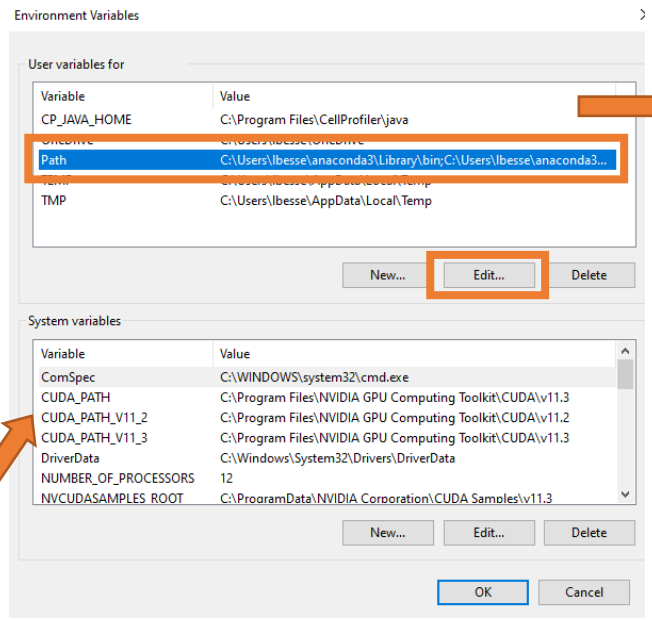
• Modify the Environment Variables

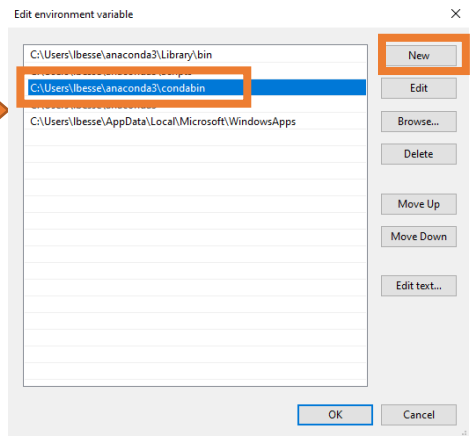
In the Windows search toolbar, enter « **env** » and open **« edit the system environment variables »** pannel.



- Click on « Environment Variables » to open a new window.
- Select Path variables and click on Edit
- Select New and paste the folder directory of your condabin for anaconda
  As example: *C:\Users\YourSessionName\anaconda3\condabin*
- Validate by clicking OK





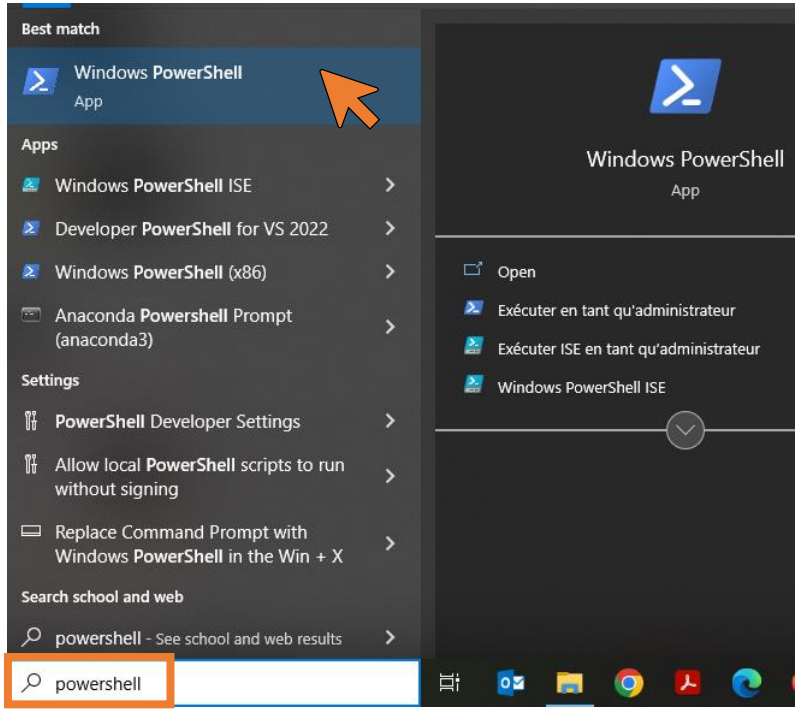


● ● Initialize Conda for Windows

In the Windows search toolbar, enter **powershell** and open the **« Windows Powershell »** application.

In the **Powershell** window, write this command line :

conda init



Check the initialization:

In the Windows search toolbar, enter **[cmd]** and open the **« Command Prompt »** application.

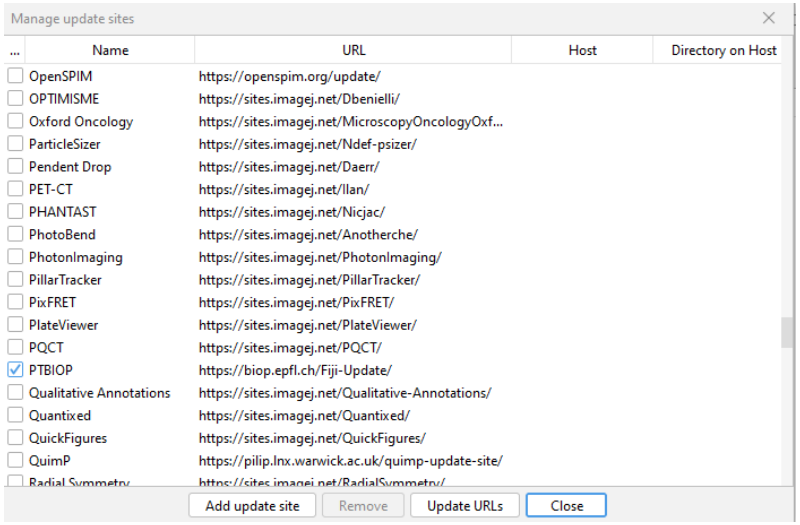
In the **Command Prompt** window, write this command line : *conda env list*

As results, the list of the conda environment is displayed.

● ● ● Installation of Wrapper BIOP plugin under Fiji

Use the built-in update manager : **Help > Update...**

- Click on the button “Manage update sites”
- Install PTBIOP
  - ❑ Scroll down the list and tick the checkbox for update sites “PTBIOP”
  - ❑ Click the “Close” button
- Click the “Apply changes” button
- Restart Fiji

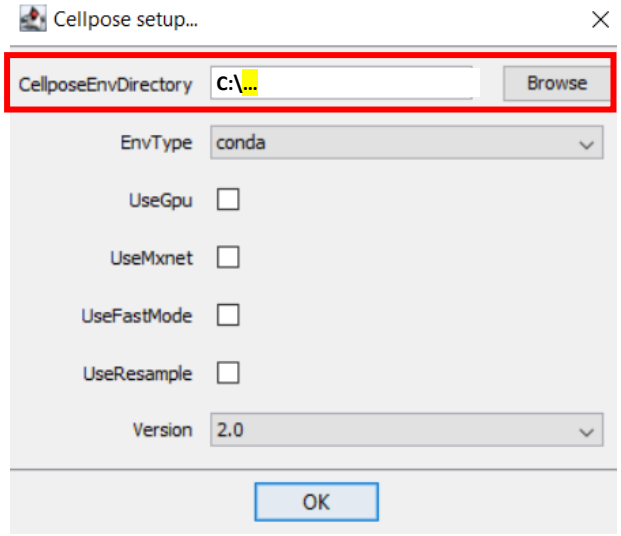


- **BIOP Cellpose configuration under Fiji**

Define the folder containing the virtual anaconda environment

- Go to Fiji's Menu : **Plugins > BIOP > Cellpose > Cellpose setup**
- Fill the information's:
  - ❑ Select the path to your working Cellpose virtual environment:
  - ❑ Select EnvType : **conda**
  - ❑ Select version : **2.0**

As example: *C:\Users\UsersFolder\anaconda3\envs\cellpose*

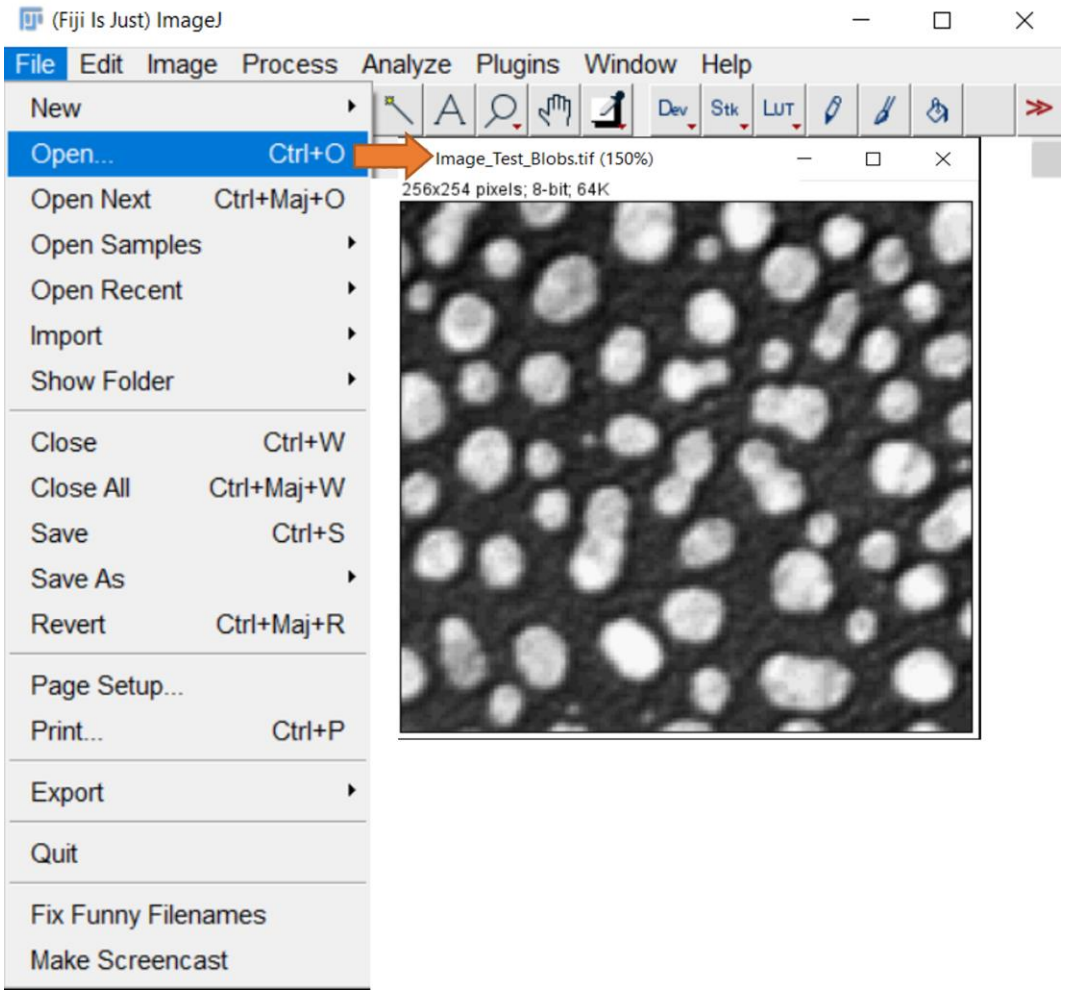


Optional:
Tick the checkboxes :

- « UseGpu » if the environment is compatible with the graphic card present on your computer (to speed up the segmentation process)
- « UseResample » to smooth the border of regions of interest (recommanded to use it for big images as 2048*2048 pixels²).

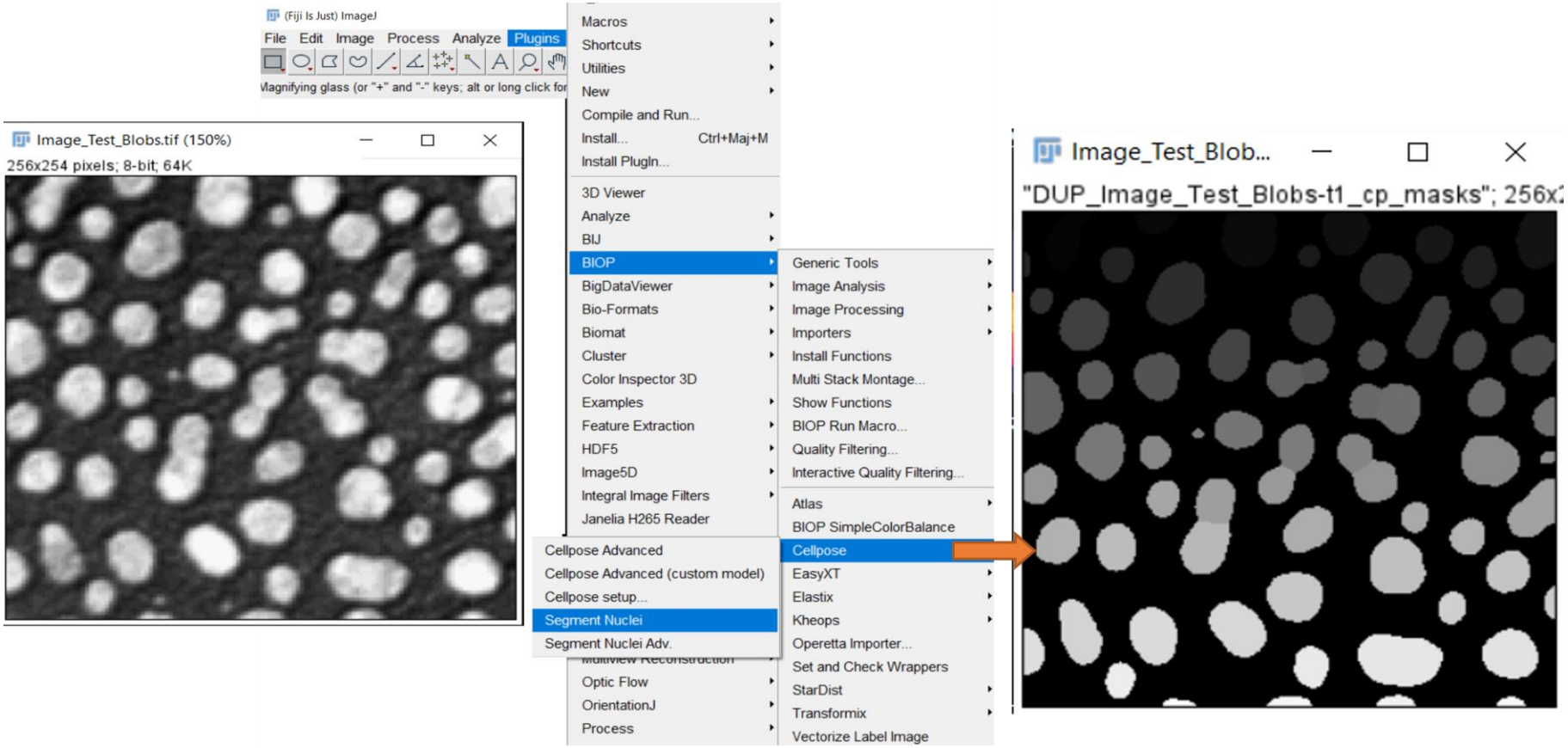
• Load image in Fiji

In Fiji, load the image called « *Image_Test_Blobs* »: **File > Open**



● ● Run Cellpose under Fiji

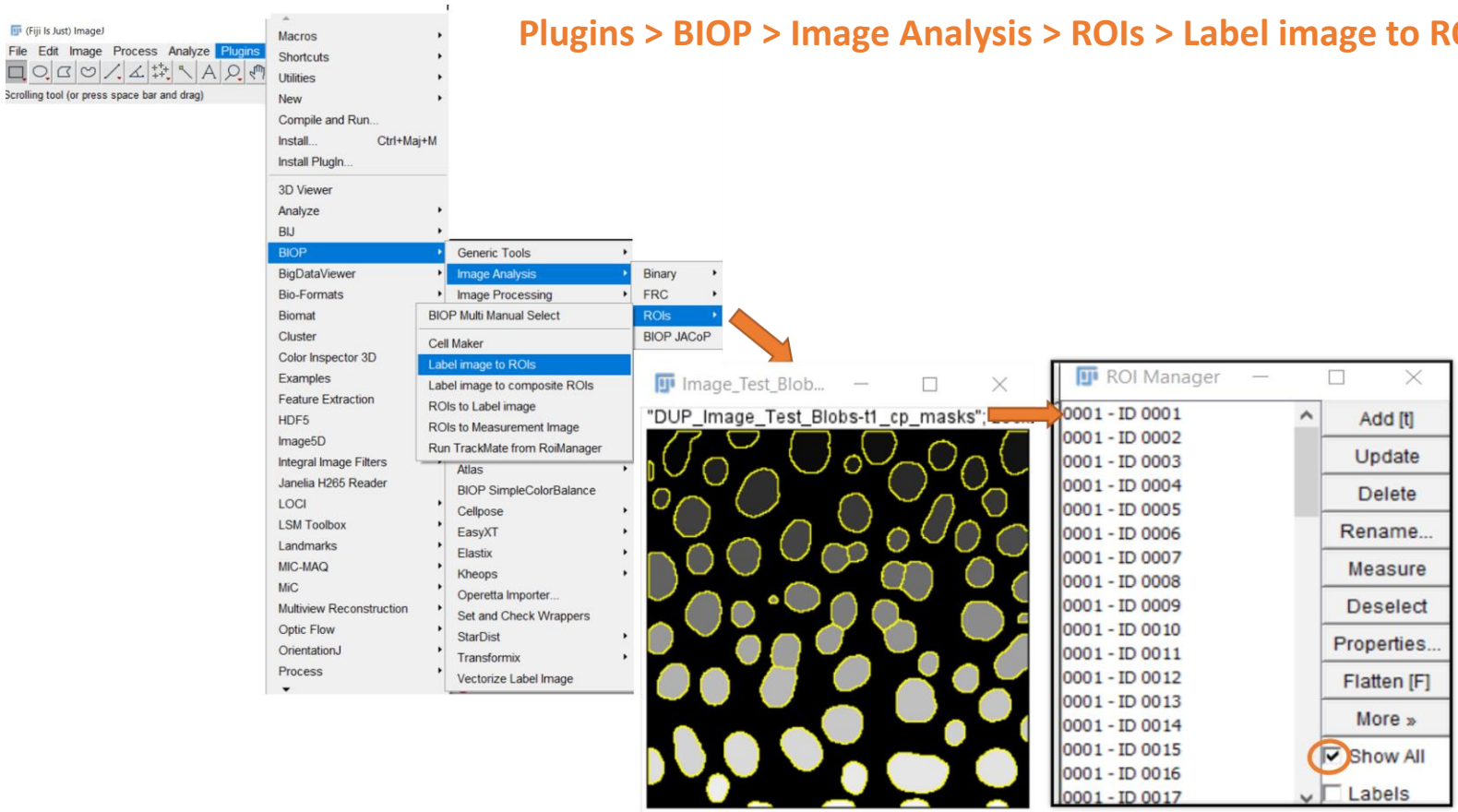
In Fiji, run cellpose with the wrapper BIOP on the test image: **Plugins > BIOP > Cellpose > Segment Nuclei**



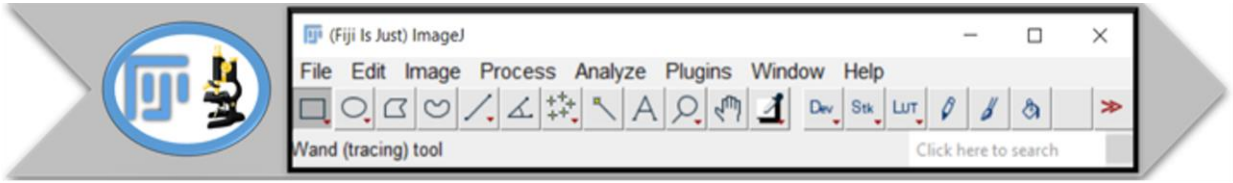
As results, a new mask of segmentation will appeared.

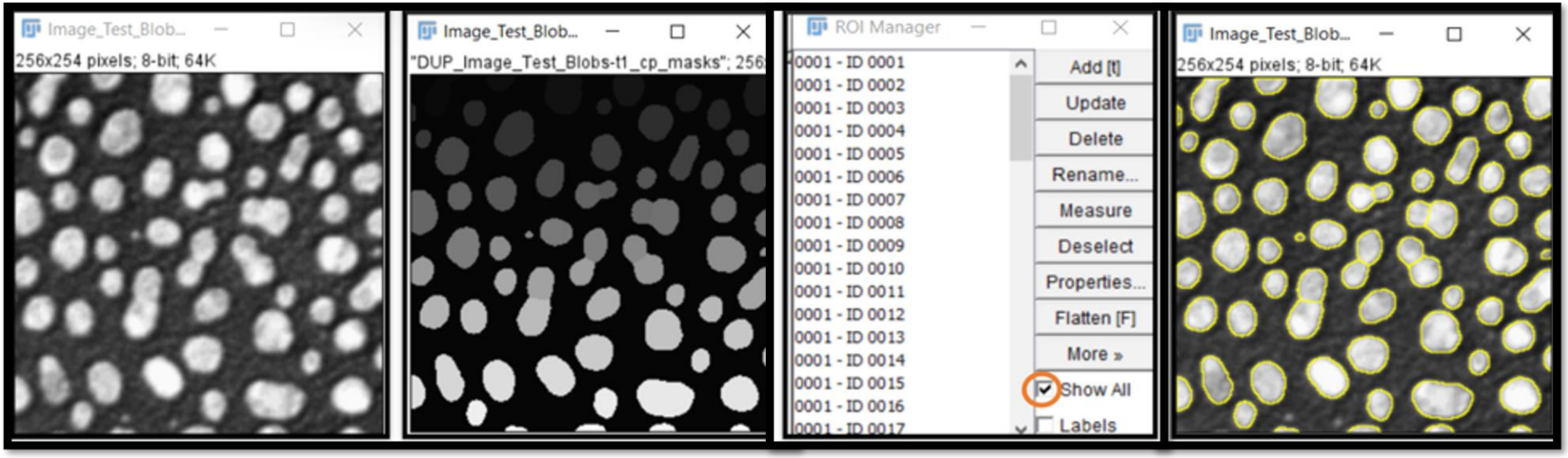
● ● ● Create ROIs from the cellpose mask

In Fiji, select the cellpose mask and create ROIs from the cellpose mask:



Summary of the Cellpose test under Fiji





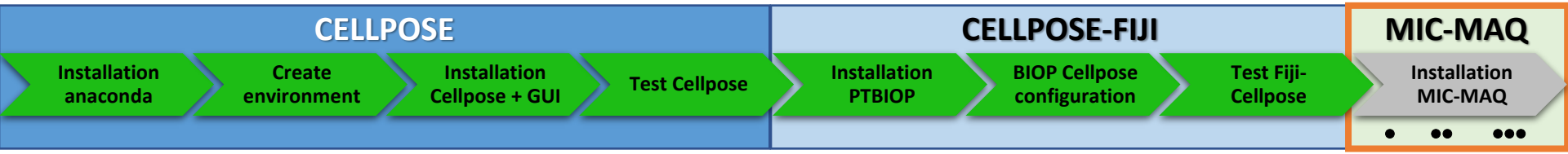
Raw image

Cellpose segmentation mask

List of ROIs obtained with Cellpose segmentation

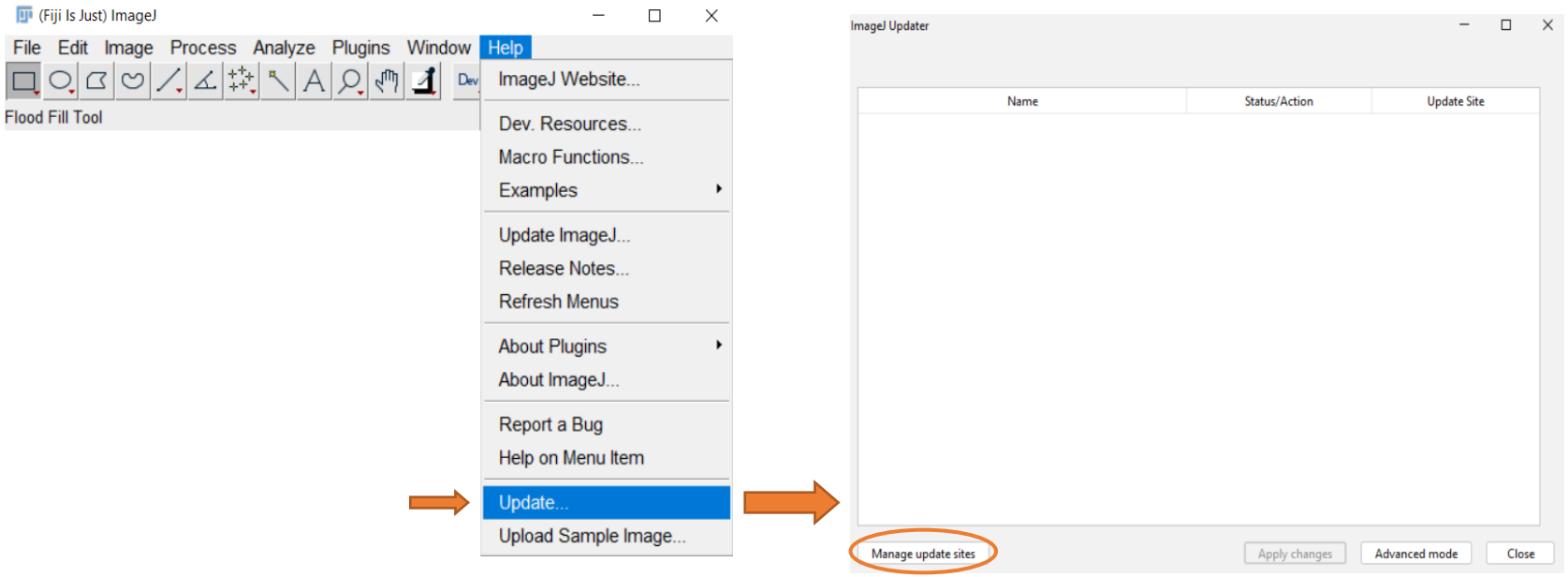
Raw image + ROIs obtained with Cellpose segmentation

Installation of MIC-MAQ



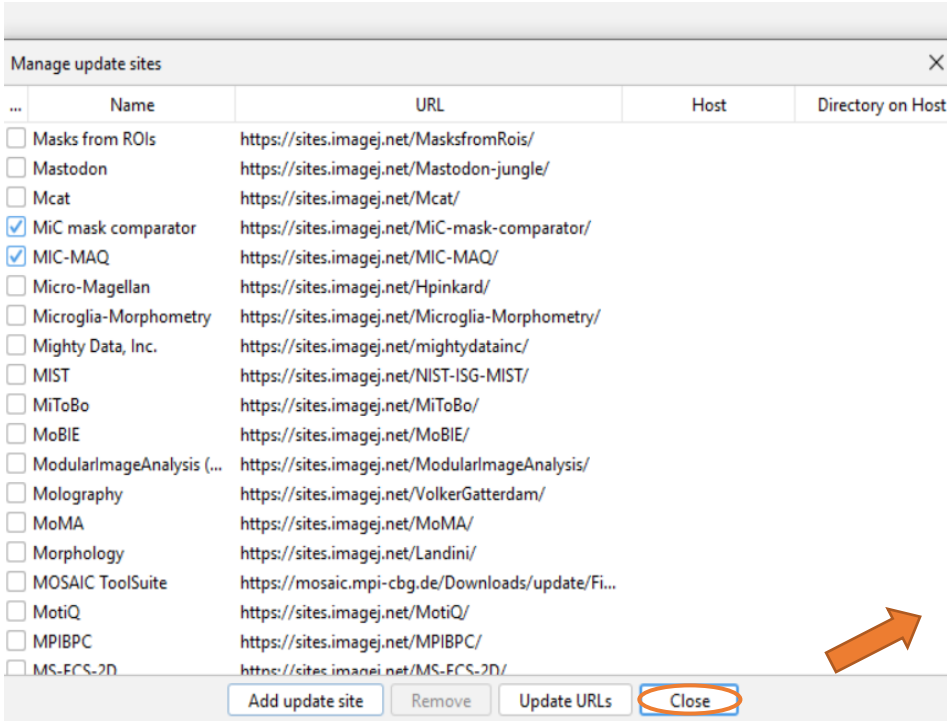
● Start the Fiji updater

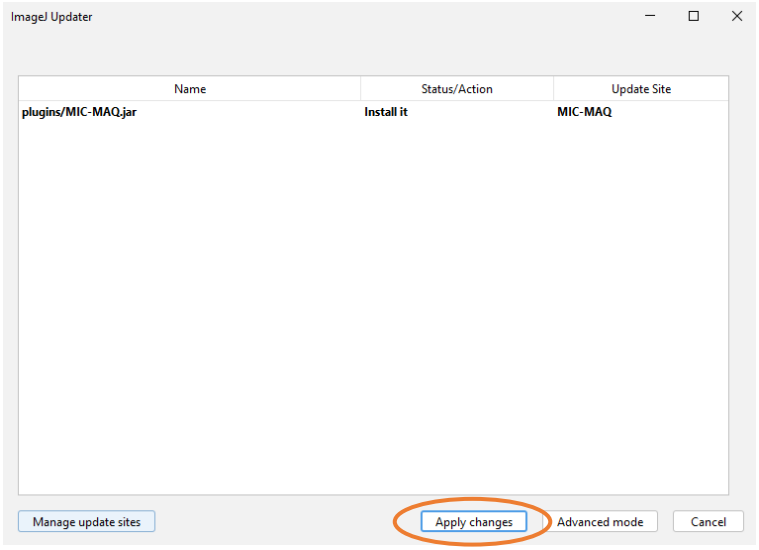
- Use the built-in update manager : **Help > Update...**
- Click on the button “Manage update sites”



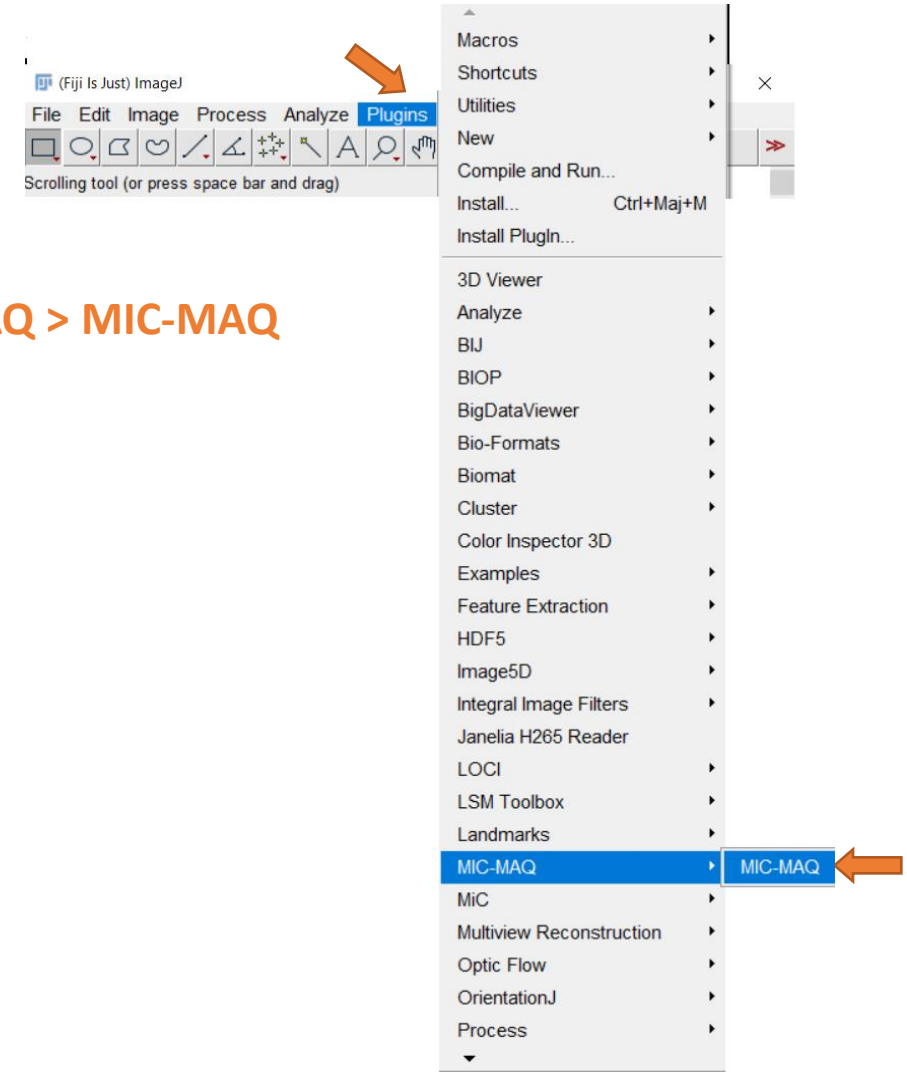
● ● Install MIC-MAQ

- Scroll down the list and tick the checkbox for update sites “MIC-MAQ”
- Click on “Close” button
- Click on “Apply changes” button
- Restart Fiji

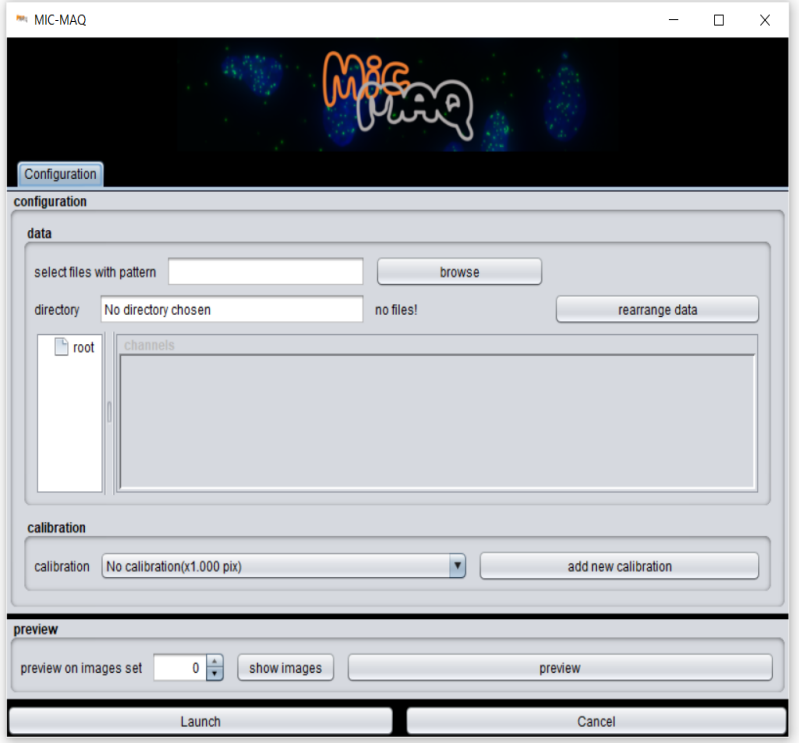




- - - **Open MIC-MAQ**



In the toolbar select: **Plugins > MIC-MAQ > MIC-MAQ**



Now open the manual for explanations of MIC-MAQ workflow