

HOW TO USE THE SLIDE TEMPLATES

- To use your institution's slide design and logo, adjust the slides of this presentation using the „slide master“

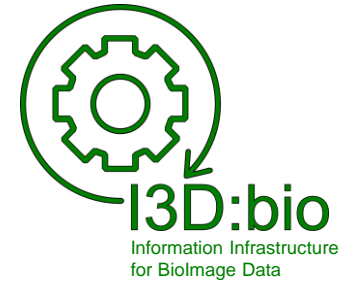
Note that these slides are optimized for 16:9 screen presentation layout

- Check the slides for **yellow-marked text** and insert the information according to your own institute's infrastructure.
- Feel free to use this material for videos, teaching, guidelines, etc., at your institute
- Please cite us (e.g., on page 1) when re-using this material or derivatives of it:

Adapted from: Schmidt C., Bortolomeazzi M., Boissonnet T., Fortmann-Grote C. *et al.* (2023). I3D:bio's OMERO training material: Re-usable, adjustable, multi-purpose slides for local user training. Zenodo. DOI: 10.5281/zenodo.8323588. If not stated otherwise, the content of this material (except for logos and the slide design) is published under Creative Commons Attribution 4.0 license.

- If not stated otherwise, the content of this material (except for logos) is published under a Creative Commons Attribution 4.0 license.
- This work is funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – 462231789 (Information Infrastructure for BioImage Data, I3D:bio)

Disclaimer



<https://www.i3dbio.de>

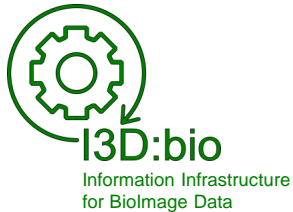
- The following slides are intended for reuse after substituting yellow-marked text with the relevant information at your institute.
- Some content may not apply to the specific setup of the OMERO installation at your institute.

The content reflects solely the authors' opinions and does not speak on behalf of the original software, its developers, or other cited community resources.

Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), project I3D:bio, grant number 462231789

Research Data Management for Bioimage Data at the **ADD INSTITUTE HERE**

How to connect Fiji and OMERO?



ADD AUTHOR / RESPONSIBLE PERSON FROM YOUR INSTITUTE

Adapted from: Schmidt C., Bortolomeazzi M., Boissonnet T., Fortmann-Grote C. *et al.* (2023). I3D:bio's OMERO training material: Re-usable, adjustable, multi-purpose slides for local user training. Zenodo. DOI: 10.5281/zenodo.8323588
If not stated otherwise, the content of this material (except for logos and the slide design) is published under a [Creative Commons Attribution 4.0 license](https://creativecommons.org/licenses/by/4.0/).

**ADD LOGO
BIG**

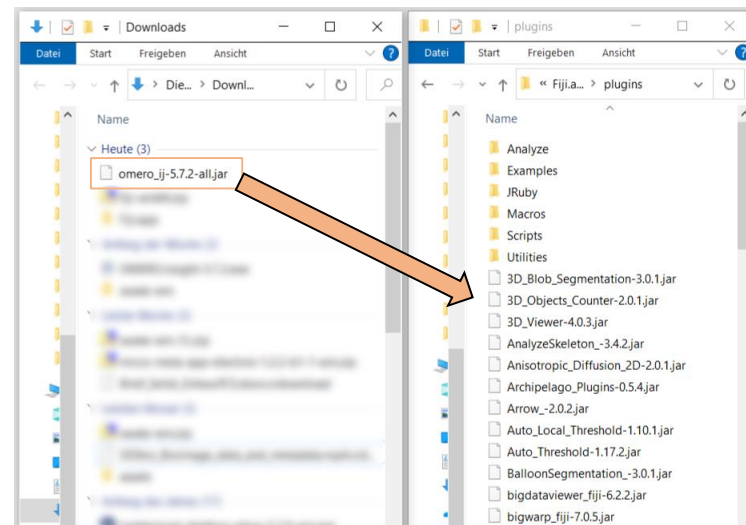
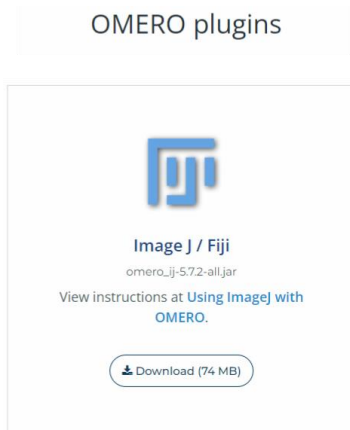


Connect Fiji and OMERO (1/2)

Prerequisite:

You have downloaded Fiji (<https://fiji.sc>) and have access to the OMERO instance (direct or VPN)

1. Download the OMERO plugin for Fiji from the OME downloads website:
<https://www.openmicroscopy.org/omero/downloads>
2. Move the *omero-ij-x.x.x-all.jar* file to the *Plugins* folder of your Fiji application

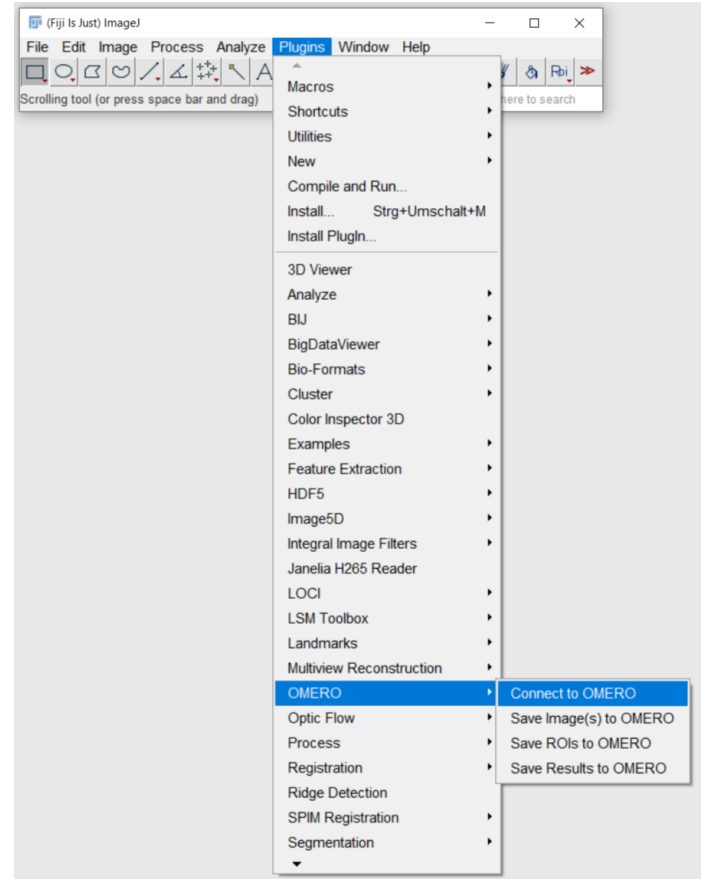


Connect Fiji and OMERO (2/2)

3. Open Fiji and go to
Plugins → OMERO → Connect to OMERO
4. Log in to OMERO with your user credentials.

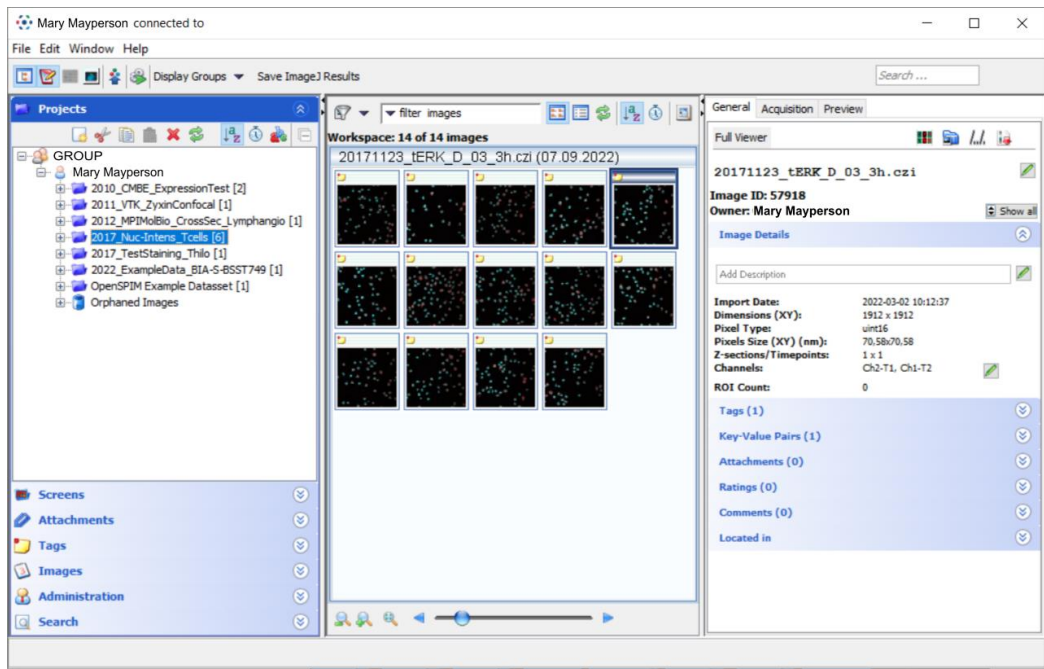


The Fiji-OMERO plugin looks almost precisely like OMERO.insight, but is, in fact, part of the open Fiji application

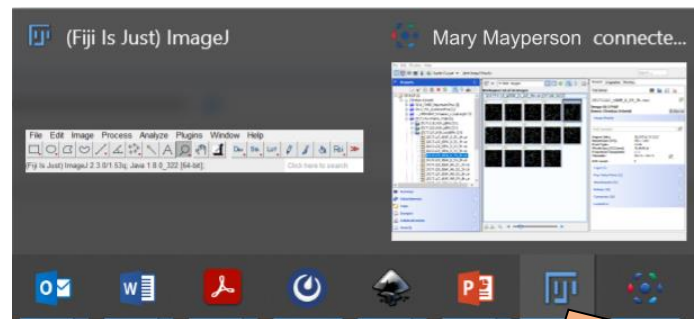


OMERO plugin for Fiji versus OMERO.insight

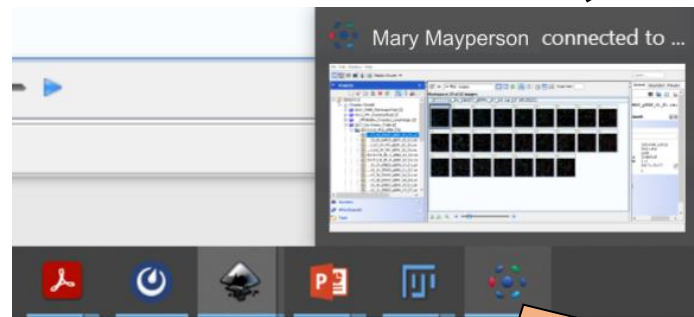
NOTE: The window looks similar to OMERO.insight, but it is a different application. For example, OMERO.insight has no View in ImageJ function nor allows Save ImageJ Results.



You can distinguish the applications by their appearance in the task bar.



OMERO plugin for Fiji

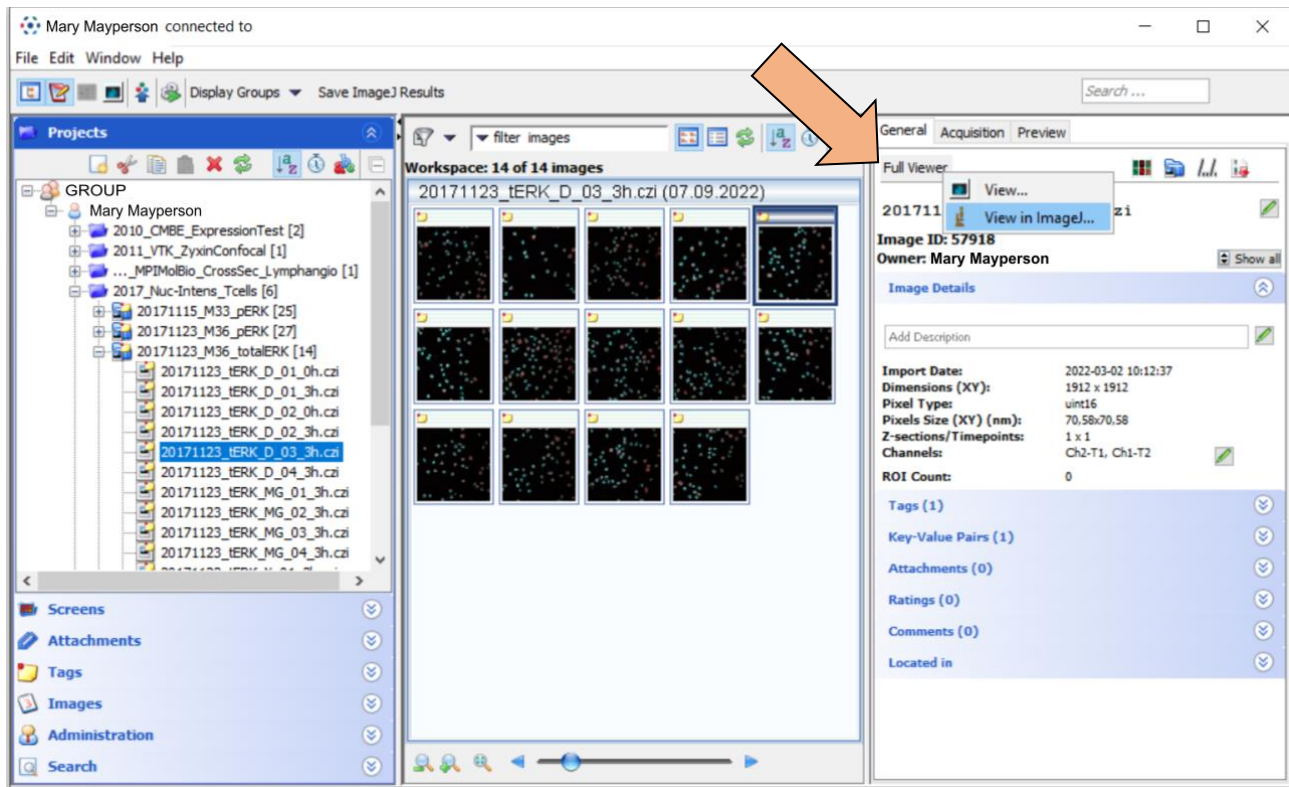


OMERO.insight

ADD LOGO SMALL

Select image(s) to open in Fiji (1/2)

1. Select image(s) from the file tree
2. Open in Fiji by clicking Full Viewer and then View in ImageJ...

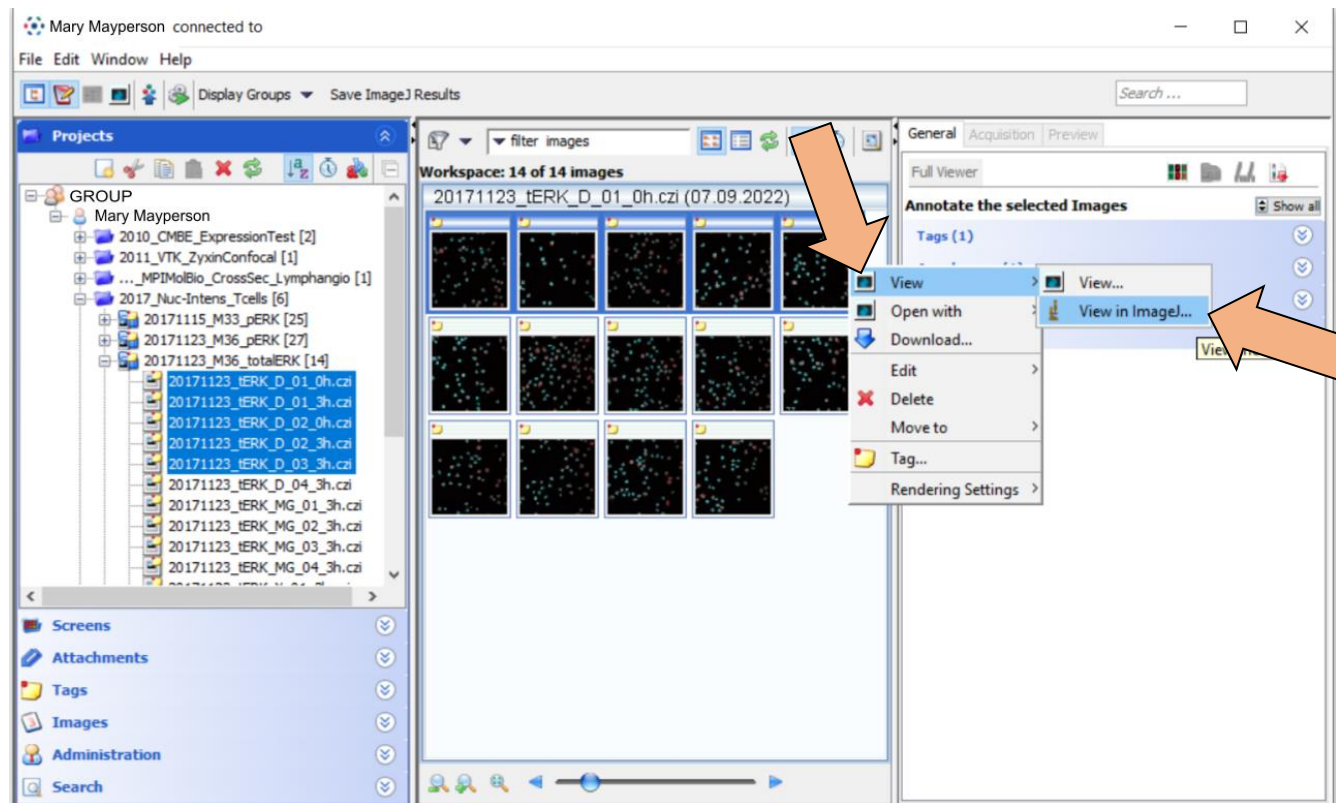


Select image(s) to open in Fiji (2/2)

OR

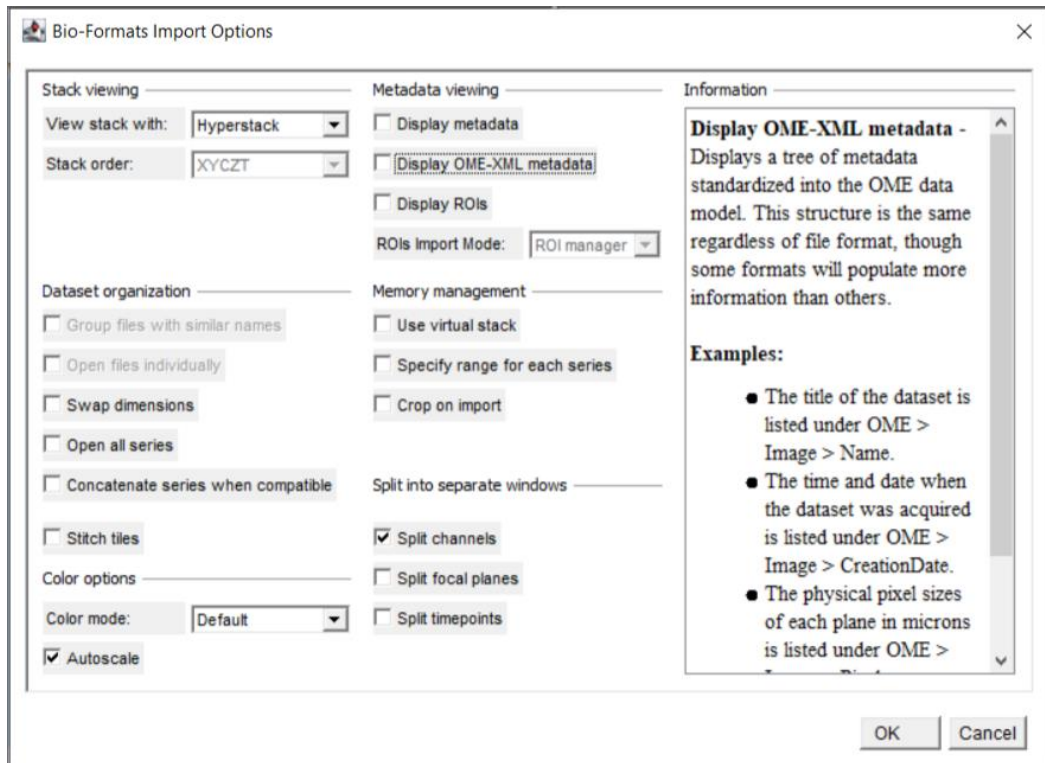
3. Open image(s) by right-click
View
and then
View in ImageJ...

(or double-click)

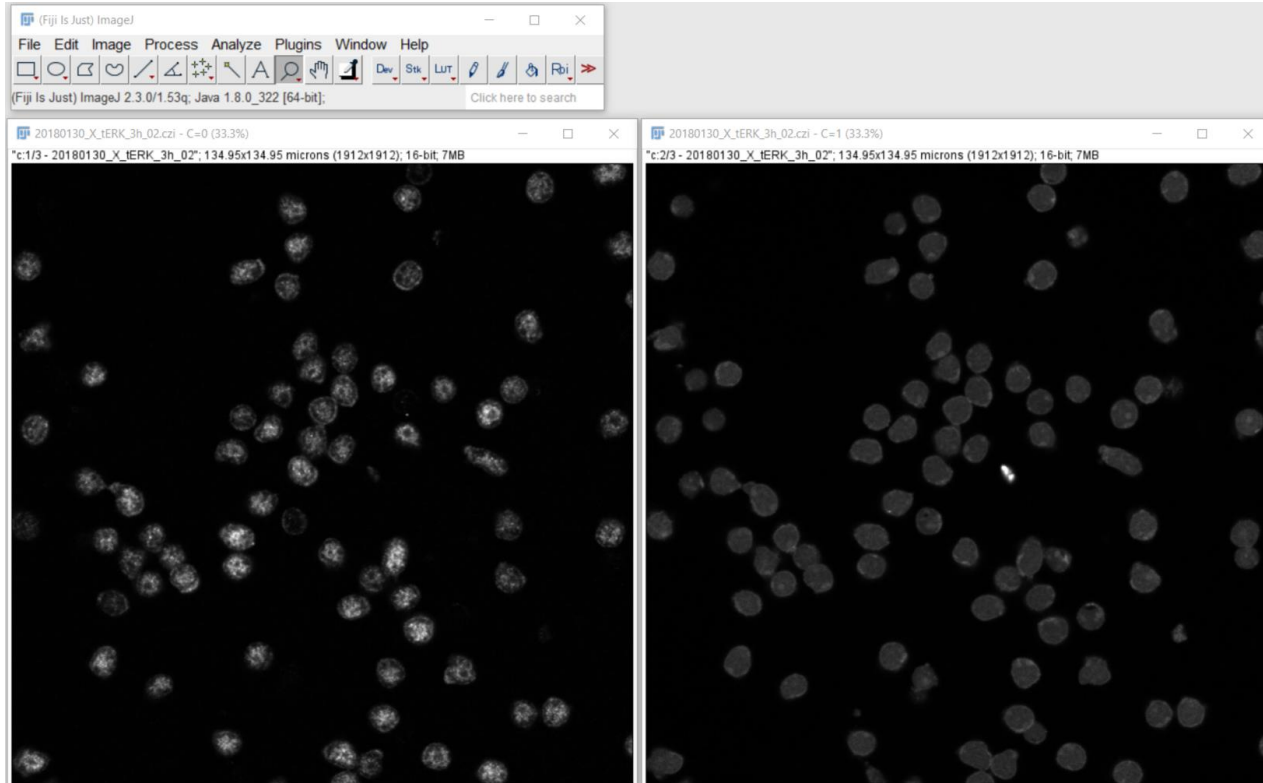


Choose settings for loading the image(s) in Fiji

Use your preferred settings to open the image(s) as required for your work



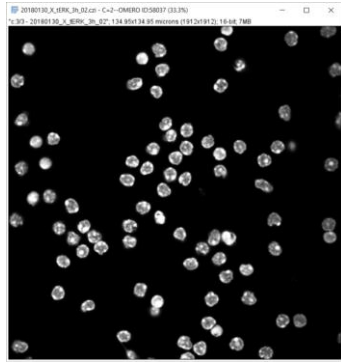
View your images in Fiji and work with the image for processing and analysis



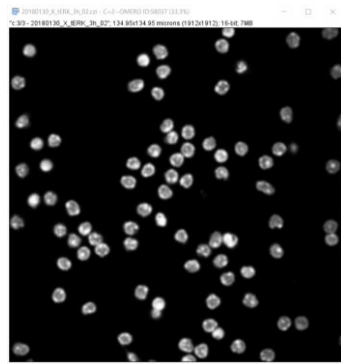
Example – processing & analysis workflow to segment and count nuclei

Perform your workflow in Fiji

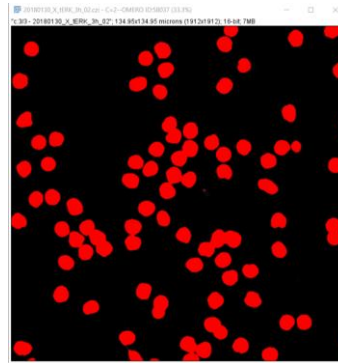
(here: segmentation and cell counting based on nuclear staining with DAPI)



Gaussian blur



Thresholding
(Huang)



Watershed

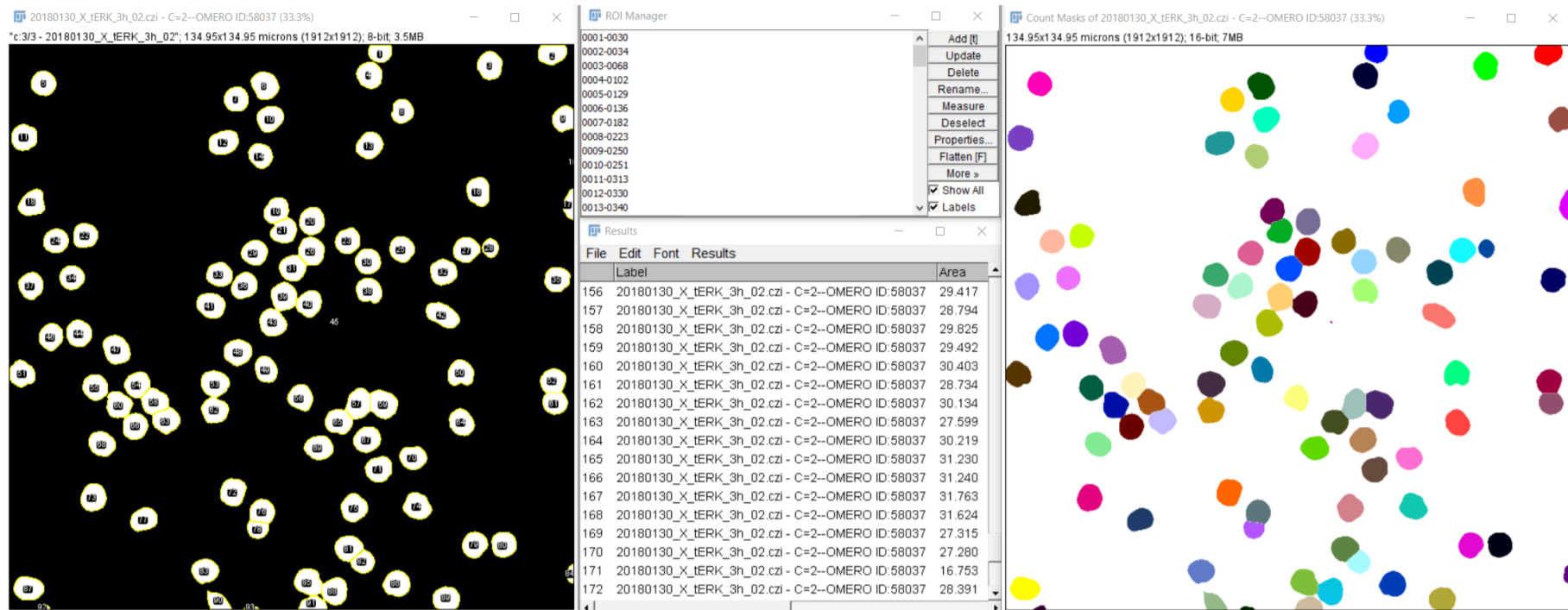


Analyze
Particles

Example – processing & analysis workflow to segment and count nuclei

Perform your workflow in Fiji

(here: segmentation and cell counting based on nuclear staining with DAPI)



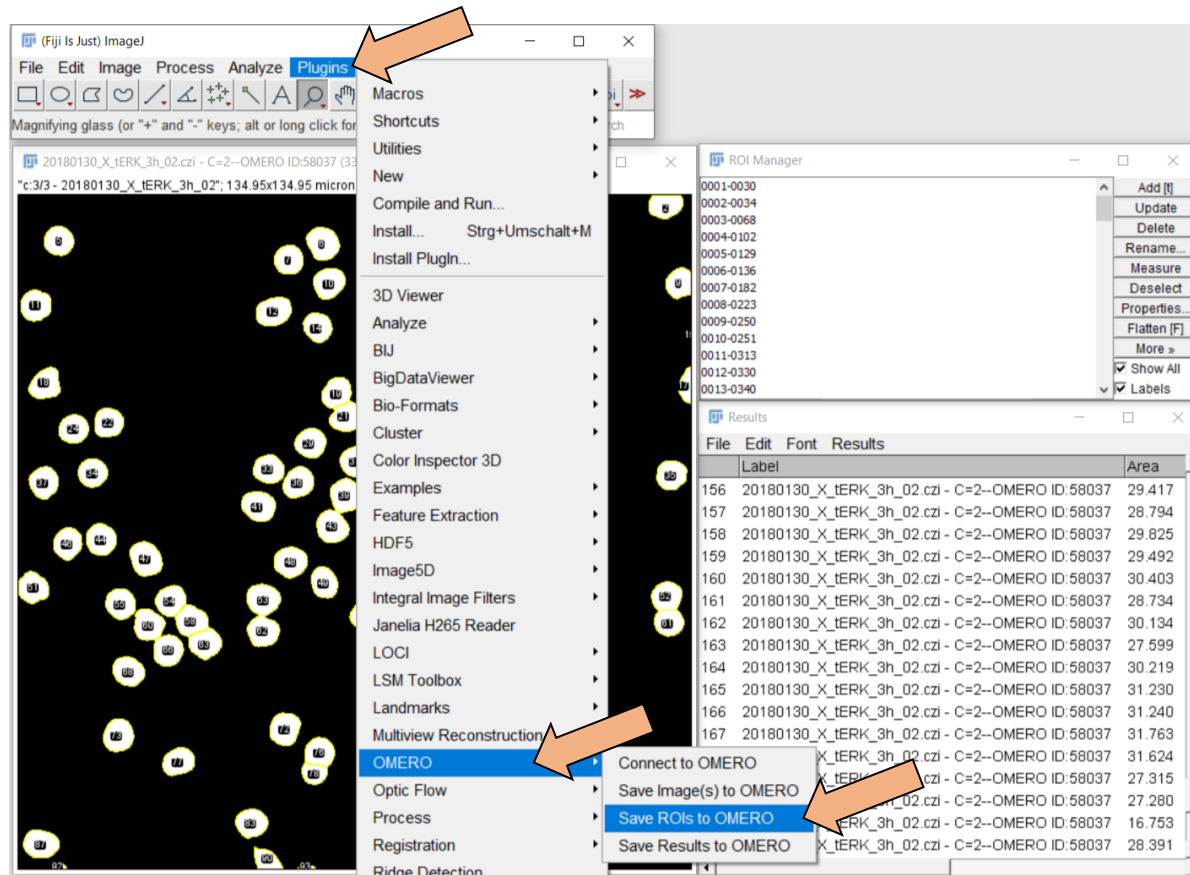
Save Regions of Interest (ROIs) and Measurement Results to OMERO

Save to OMERO using the plugin

Plugins

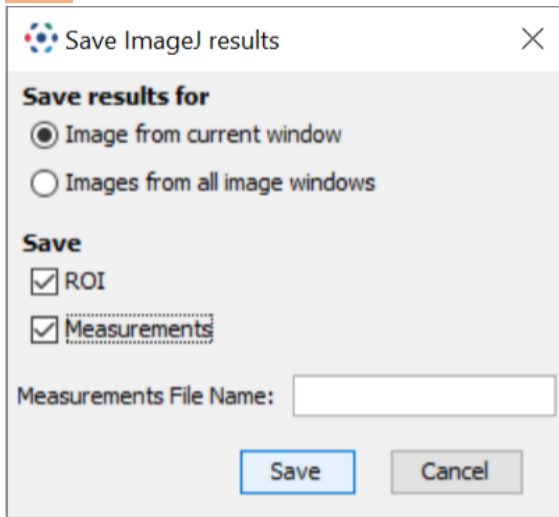
→ OMERO

→ Save ROIs to OMERO

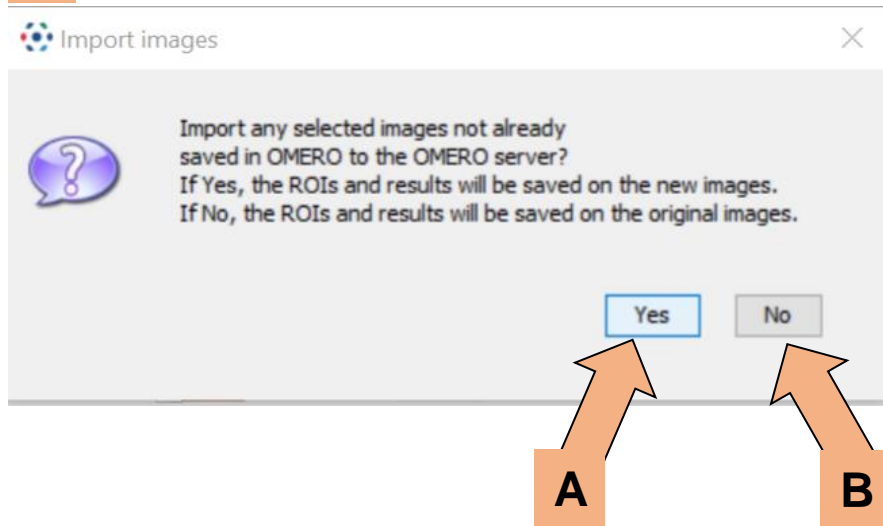


Choose settings for saving in OMERO

1



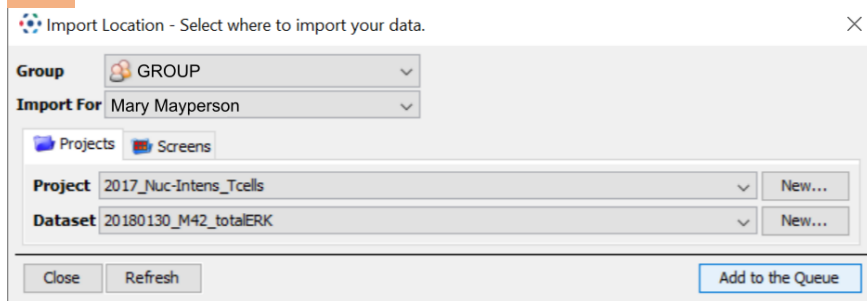
2



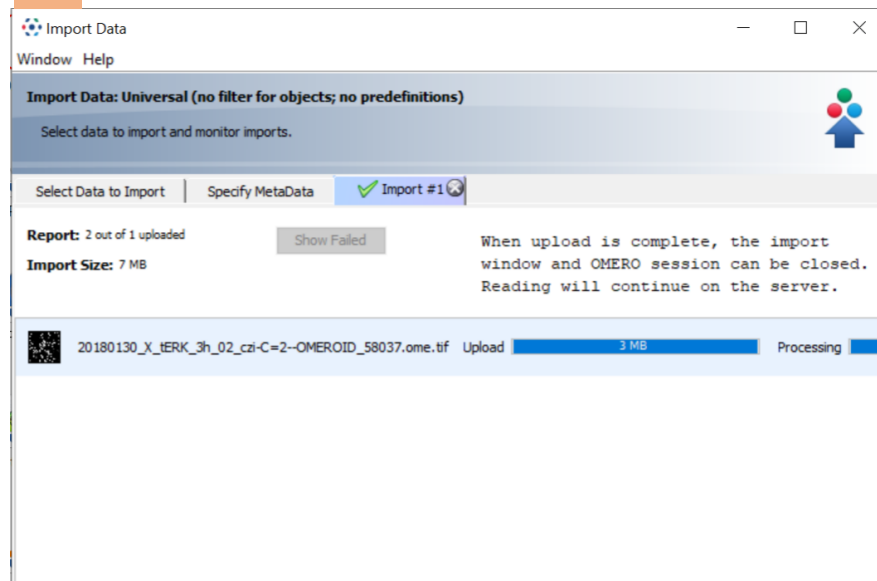
A – Upload the mask image to OMERO as a new image

Choose upload destination (Group, User, Project, Dataset) and upload

1



2



A – View the imported mask image and the analysis results (e.g., in OMERO.web)

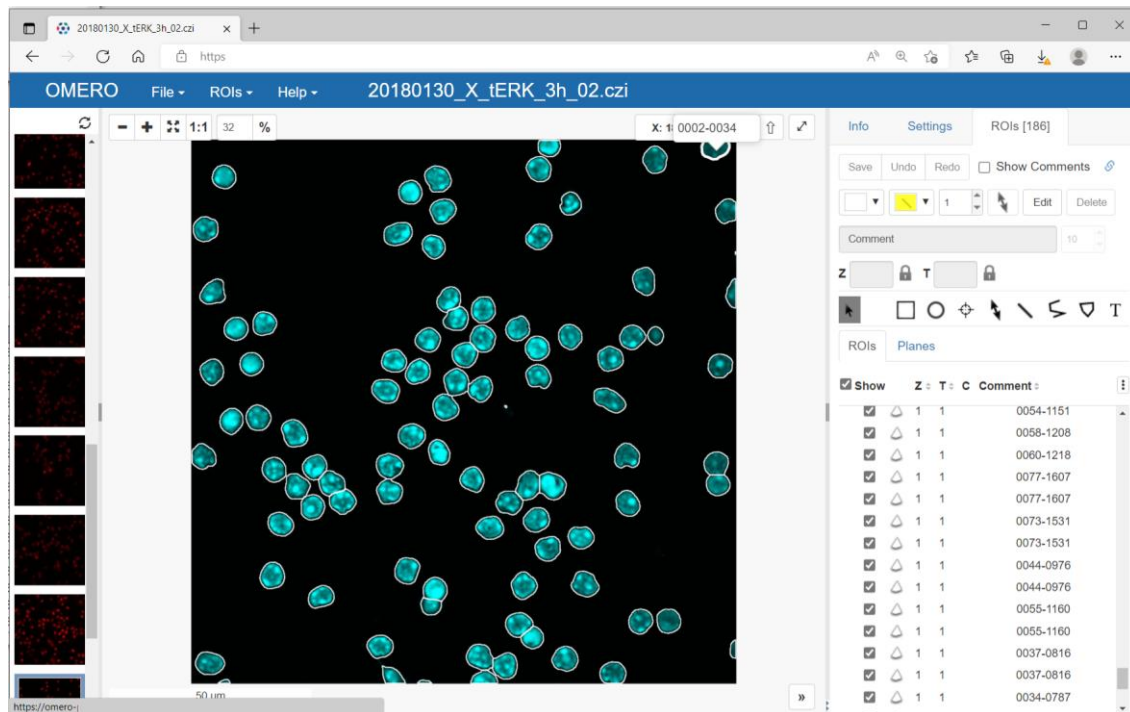
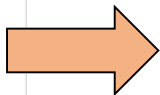
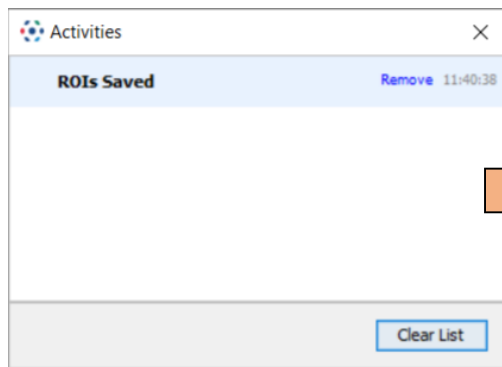
The screenshot displays the OMERO.web webclient interface. On the left, the 'Explore' panel shows a file tree for the group 'Mary Mayperson'. A file named '20180130_X_tERK_3h_02_czi-OMERO' is highlighted. An orange arrow points from this file to a thumbnail in the central grid. The grid contains a 5x5 array of image thumbnails, mostly showing red fluorescence, with one thumbnail in the bottom right corner showing a white mask on a black background. An orange arrow points from this mask thumbnail to the 'Attachments' section of the right-hand metadata panel. The metadata panel shows details for 'Image ID: 68712' and lists an attachment: 'ImageJ-20180130_X_tERK_3h_02_czi-C=2--OMEROID_58037-Results-2022-09-07.csv (18.30 KB)'.

ROI image uploaded as new file (new ID!)

Results uploaded as attachment in csv-format

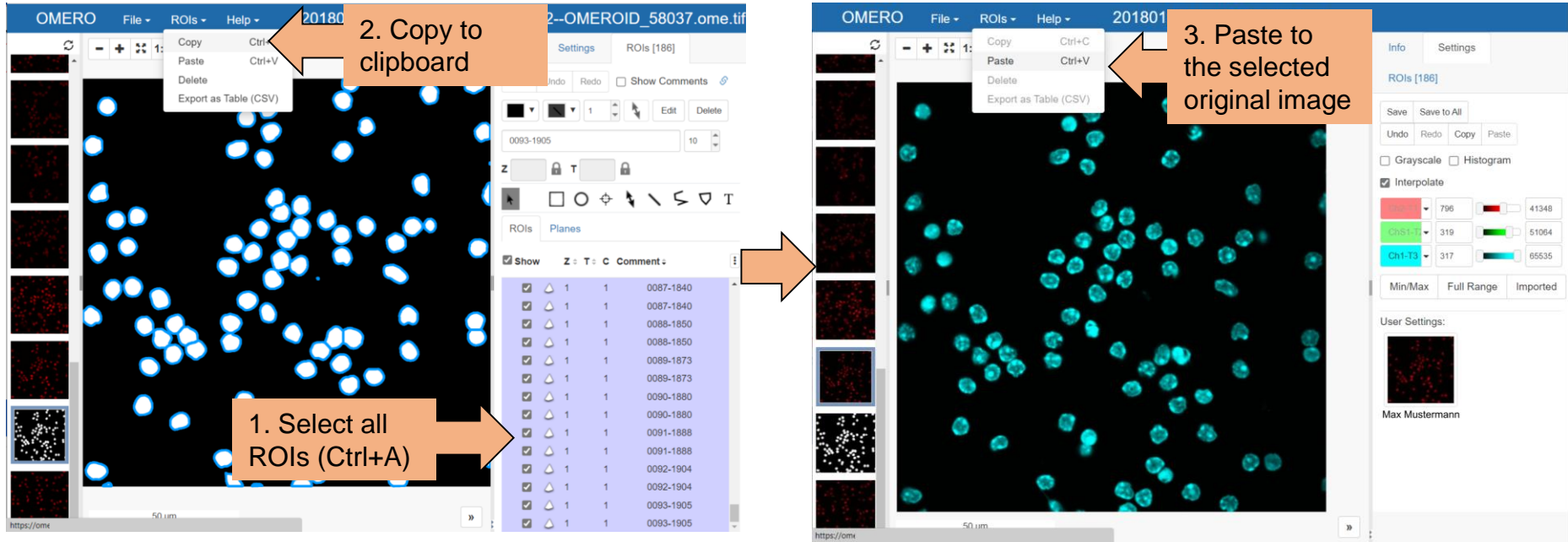
B – Add the ROI to the original image in OMERO

Review the ROIs on the original image with OMERO.iviewer



A and B combined

In the OMERO.iviewer you can copy the ROI from the segmentation image to the original image manually, too.



Batch processing, macros and scripts for Fiji and OMERO

Running image analysis pipelines with Fiji over several images from OMERO in batch is possible, too.

Recommended: OMERO Macro Extension & OMERO batch plugin

F1000Research

F1000Research 2022, 11:392 Last updated: 06 JUL 2023

Check for updates

SOFTWARE TOOL ARTICLE

Easing batch image processing from OMERO: a new toolbox for ImageJ[version 1; peer review: 2 approved]

Pierre Pouchin¹, Rayan Zoghلامي², Rémi Valarcher¹, Maxence Delannoy³, Manon Carvalho³, Clémence Belle³, Marc Mongy⁴, Sophie Desset^{1*}, Frédéric Brau^{2*}

¹GREd, CNRS, INSERM, Université Clermont Auvergne, Clermont-Ferrand, France
²Université Côte d'Azur, CNRS, IPMC, Valbonne, France
³Polytech Nice Sophia, Campus SophiaTech, Sophia Antipolis, France
⁴Univ. Lille, CNRS, Inserm, CHU Lille, Institut Pasteur de Lille, U1019 - UMS 9017 - CIL - Center for Infection and Immunity of Lille, Lille, 59000, France

<https://omero-guides.readthedocs.io/en/latest/fiji/docs/index.html>

Example:

```
File Edit Language Templates Run Tools Window Options ↵ access... - □ ×
Outline > Macro.jm accessOMERO_Christian_Try.jm
File Explorer
+ - File f
15 //This feature will enable the consecutive macro functions
16 run("OMERO Extensions");
17
18
19 //Connect to OMERO with the given variables
20 Ext.connectToOMERO(host, port, username, pwd);
21 pwd = "mockpassword"
22
23 images = Ext.list("images", "dataset", dataset_id);
24 imageIds_array = split(images, ","); //retrieves the indivi
25 // The for-Loop defines which action is performed with eac
26 // One image after another is processed with the function
27 // The last index of the array is logically one less than
28 //i<lengthOf(imageIds_array) i<2
29 for(i=0; i<lengthOf(imageIds_array); i++){
30 imageplusID = Ext.getImage(imageIds_array[i]);
31 img_nuclearintensitymeasure();
32 //save the ROI to OMERO
33 nROIS = Ext.saveROIs(imageIds_array[i]);
34 // delete the ROI manager table after the ROI was save
35 roiManager("Delete");
36 print("finished for " + imageplusID); //this is imple
37
38 }
39 Ext.disconnect()
40
```


JiPipe visual macro programming with a connection to OMERO

Batch processing in Fiji/ImageJ and the connection to OMERO can now be established with a graphical user interface (GUI) in the software JiPipe:

Correspondence

<https://doi.org/10.1038/s41592-022-01744-4>

JIPipe: visual batch processing for ImageJ

 Check for updates

The growth in microscopy adoption has led to a concomitant upsurge in the development of software tools for the automated analysis of image data. Pillars among these tools are ImageJ¹ and its Fiji² distribution, which have been serving the imaging community for decades and continue to gain public support to keep up with the quantification

needs of the newest and most-demanding microscopy techniques. The hallmark of ImageJ is its intuitive graphical user interface, which provides access to its many tools. On the other hand, the creation of reproducible batch-processing workflows is only possible using a macro language. As programming skills are uncommon among experimentalists³, the need for scripting contributes to an

already-existing communication gap between life and computer scientists. Visual programming languages that replace the writing of text commands with the design of a flowchart offer a solution. Existing tools contribute to this effort by providing a visual way to build pipelines or by simplifying the scripting procedure (Supplementary Information, section 1). Our newly developed visual programming



Extended resources on using Fiji and OMERO

Official OMERO guide:

<https://omero-guides.readthedocs.io/en/latest/fiji/docs/index.html>

A workshop on image analysis with Fiji and OMERO:

<https://learning.rc.virginia.edu/notes/fiji-omero/>

Workshop recordings by the Open Microscopy Environment Consortium on YouTube, including scripting in Fiji:

https://www.youtube.com/watch?v=W5EDx3yKA_o

(<https://www.youtube.com/watch?v=dOtnEO-nmlg>)

Image Analysis Lecture by Robert Haase (TU Dresden):

<https://www.youtube.com/playlist?list=PL5ESQNfM5lc7SAMstEu082ivW4BDMvd0U>

Help for Image Analysis or OMERO-related issues - Image.sc forum:

<https://image.sc>