

# Data Management with OMERO

Biological Image Reconstruction and Analysis,  
Berlin, 2016

Petr Walczysko, Balaji Ramalingam

University of Dundee  
The OME Consortium



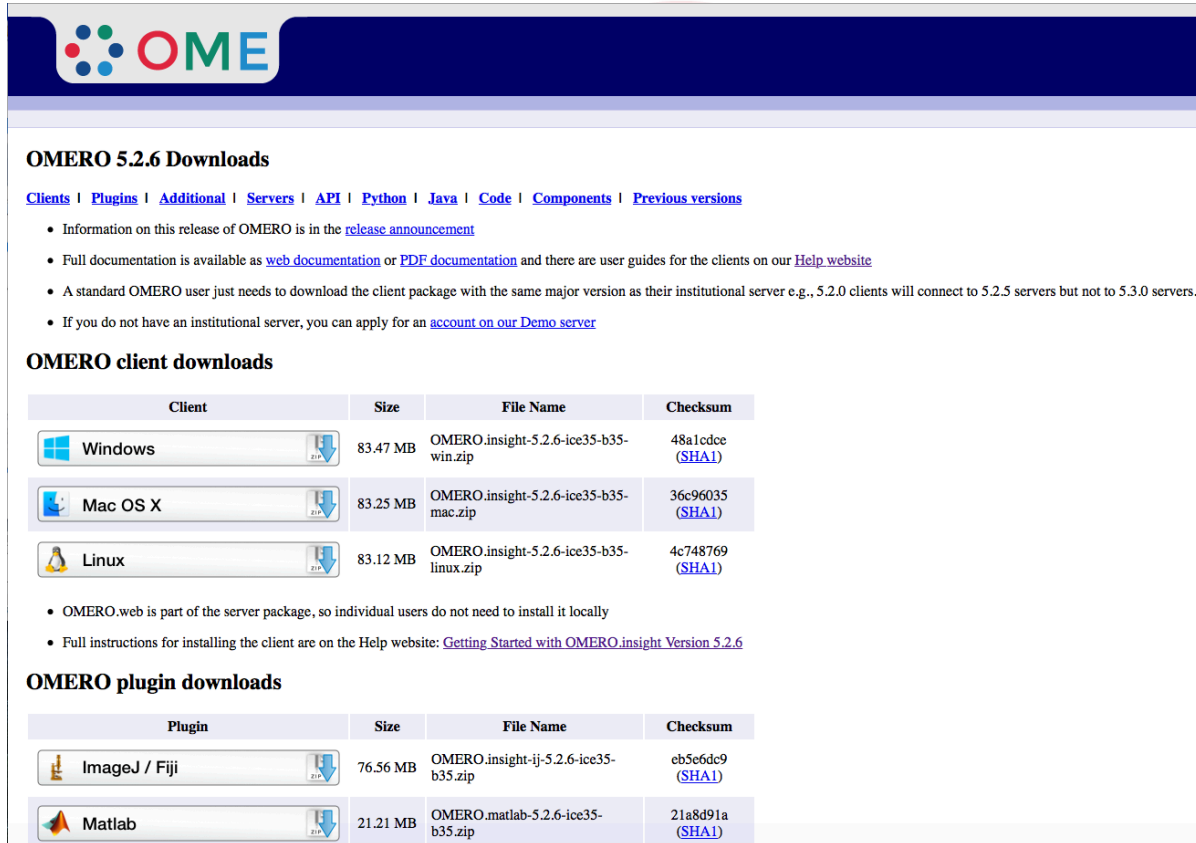
Open Microscopy Environment  
Centre for Gene Regulation & Expression  
School of Life Sciences, University of Dundee  
Dundee, Scotland, UK



# Outline

- Import Image Data into OMERO (Slides only)
- Image Data Organization with OMERO
- Image Data Annotation with OMERO
- Image Data Annotation and Search with OMERO
- Image Data Analysis with OMERO
- Batch Image Operations with OMERO
- Publishing with OMERO

# Download Desktop Client









**OME**

## OMERO 5.2.6 Downloads

[Clients](#) | [Plugins](#) | [Additional](#) | [Servers](#) | [API](#) | [Python](#) | [Java](#) | [Code](#) | [Components](#) | [Previous versions](#)





- Information on this release of OMERO is in the [release announcement](#)
- Full documentation is available as [web documentation](#) or [PDF documentation](#) and there are user guides for the clients on our [Help website](#)
- A standard OMERO user just needs to download the client package with the same major version as their institutional server e.g., 5.2.0 clients will connect to 5.2.5 servers but not to 5.3.0 servers.
- If you do not have an institutional server, you can apply for an [account on our Demo server](#)

### OMERO client downloads

Client	Size	File Name	Checksum
 Windows 	83.47 MB	OMERO.insight-5.2.6-ice35-b35-win.zip	48a1cdce ( <a href="#">SHA1</a> )
 Mac OS X 	83.25 MB	OMERO.insight-5.2.6-ice35-b35-mac.zip	36c96035 ( <a href="#">SHA1</a> )
 Linux 	83.12 MB	OMERO.insight-5.2.6-ice35-b35-linux.zip	4c748769 ( <a href="#">SHA1</a> )

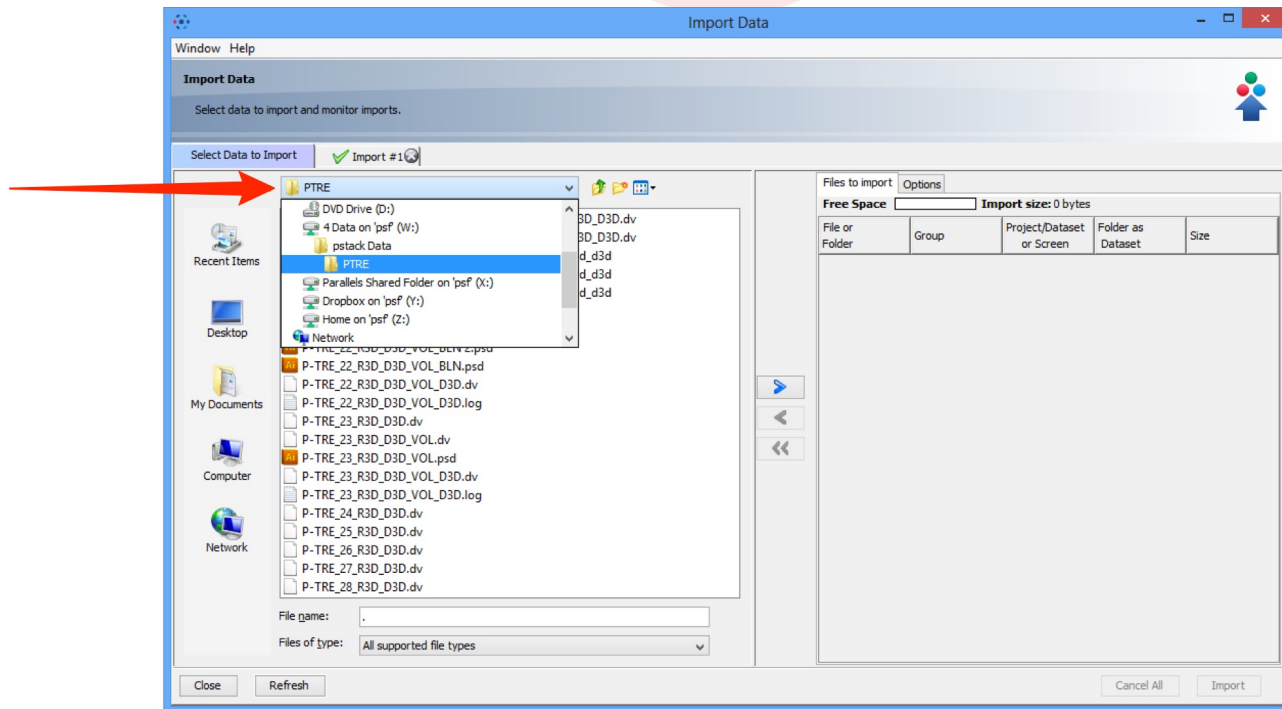
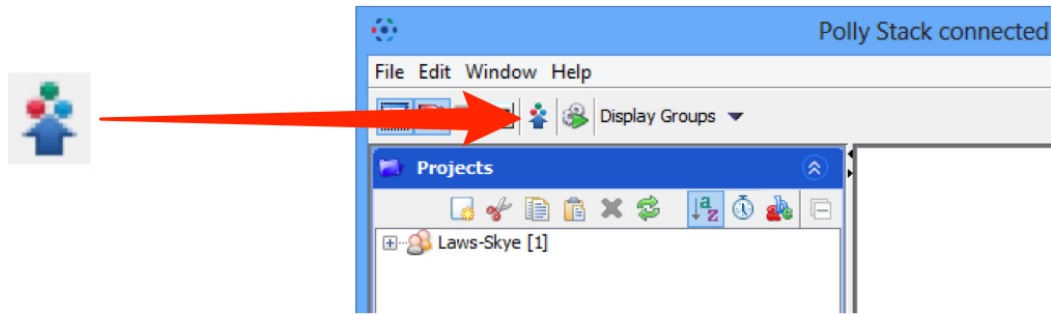
- OMERO.web is part of the server package, so individual users do not need to install it locally
- Full instructions for installing the client are on the Help website: [Getting Started with OMERO.insight Version 5.2.6](#)

### OMERO plugin downloads

Plugin	Size	File Name	Checksum
 ImageJ / Fiji 	76.56 MB	OMERO.insight-ij-5.2.6-ice35-b35.zip	eb5e6dc9 ( <a href="#">SHA1</a> )
 Matlab 	21.21 MB	OMERO.matlab-5.2.6-ice35-b35.zip	21a8d91a ( <a href="#">SHA1</a> )

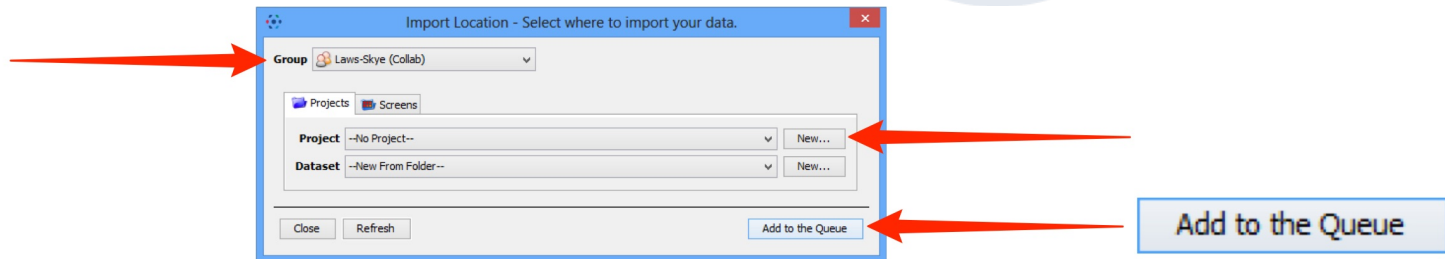
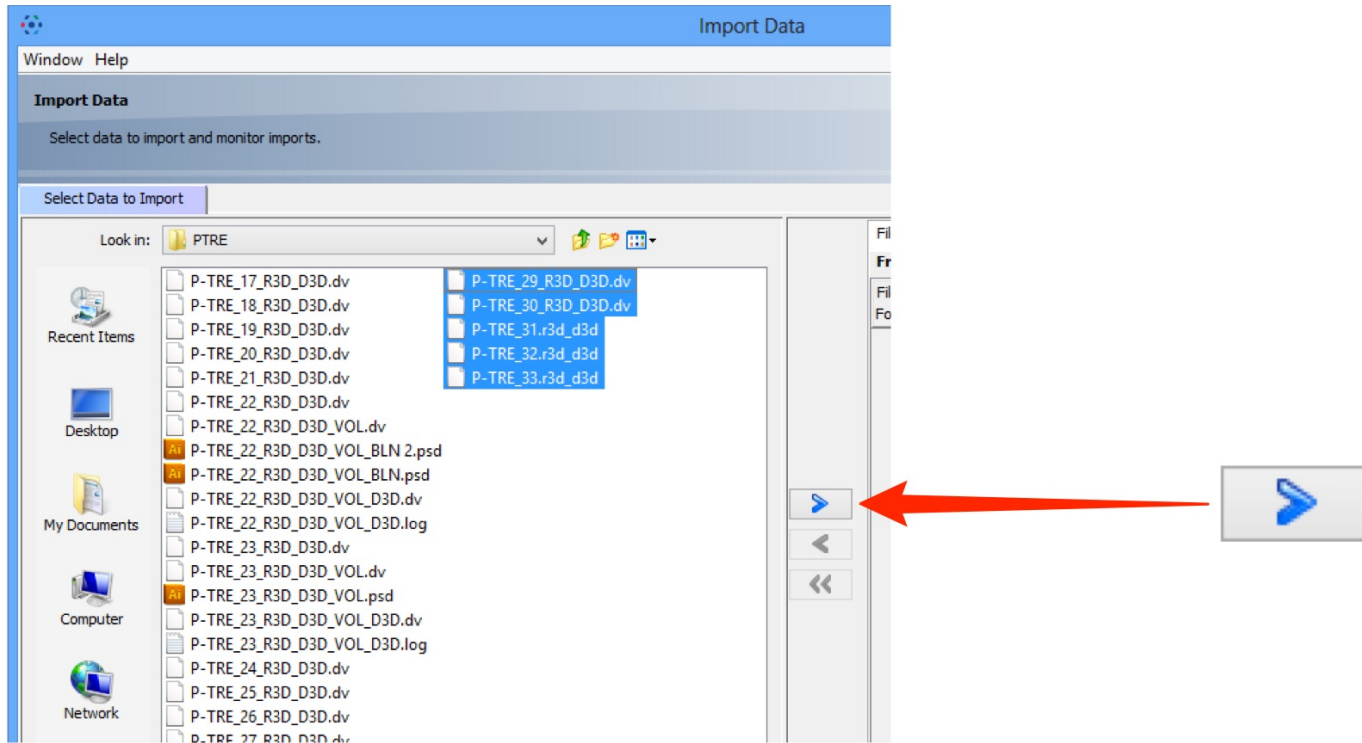


# Import Image Data into OMERO





# Import Image Data into OMERO



# Import Image Data into OMERO

✓ Import #1

The screenshot shows the 'Import Data' window in OMERO. At the top, it says 'Import Data' and 'Select data to import and monitor imports.' Below this, there is a tab labeled 'Import #1'. A red arrow points from the 'Import #1' label in the top-left to this tab. The window displays a progress report: 'Report: 3 out of 5 uploaded' and 'Import Size: 470 MB'. A 'Show Failed' button is visible. A message on the right states: 'When upload is complete, the import window and OMERO session can be closed. Reading will continue on the server.' The main area contains a table of import items:

File Name	Upload Progress	Processing Status	Action
P-TRE_29_R3D_D3D.dv	130 MB	Complete	View
P-TRE_30_R3D_D3D.dv	140 MB	Complete	View
P-TRE_31.r3d_d3d	200 MB	Loading Pixels	Cancel
P-TRE_32.r3d_d3d	38/125 MB 2s Left	Pending...	Cancel
P-TRE_33.r3d_d3d	Pending...		Cancel

At the bottom of the window, there are buttons for 'Retry All', 'Submit All', 'Cancel All', and 'Close'.

This smaller window shows a status message: '5 Imported' with a green checkmark. A red arrow points from this message to the 'Import #1' tab in the larger window above.

# Image Data Organization with OMERO

The screenshot displays the OMERO web interface. At the top, the navigation bar includes 'OMERO', 'Data', 'History', 'Help', 'Tag Search', and 'Figure'. A search bar and a user profile for 'Polly Stack' are also visible. The main interface is divided into three panels:

- Left Panel (Explore):** Shows a hierarchical tree structure under 'Polly Stack'. The 'Nature Paper 2' folder is expanded to show 'Figure 1 10', which contains a list of image files: P-TRE\_17\_R3D\_D3D.dv, P-TRE\_19\_R3D\_D3D.dv, P-TRE\_22\_R3D\_D3D.dv (highlighted), P-TRE\_24\_R3D\_D3D.dv, P-TRE\_25\_R3D\_D3D.dv, P-TRE\_29\_R3D\_D3D.dv, P-TRE\_30\_R3D\_D3D.dv, P-TRE\_31.r3d\_d3d, P-TRE\_32.r3d\_d3d, and P-TRE\_33.r3d\_d3d. Other folders include 'Figure 2 5', 'Porter 2', 'PTRE 11', 'HCS 1', and 'Orphaned Images'.
- Middle Panel (Thumbnails):** Displays a grid of image thumbnails. A 'Filter Images' search bar is at the top. The top-right thumbnail is selected with a blue border.
- Right Panel (General):** Shows details for the selected image, 'P-TRE\_22\_R3D\_D3D.dv'. It includes a 'Full viewer' button, 'Image ID: 25763', 'Owner: Polly Stack', and a 'Show all' button. Below this is a 'Key-Value Pairs' section with the following data:

Import Date:	2015-10-27 13:48:34
Dimensions (XY):	512 x 512
Pixels Type:	int16
Pixels Size (XYZ) (μm):	0.07 x 0.07 x 0.20
Z-sections/Timepoints:	40 x 1
Channels:	457.0, 528.0, 617.0
ROI Count:	0

The right panel also features sections for 'Tags' (with a tag 'Nature - Figure 1'), 'Attachments', 'Ratings' (displaying 4 stars out of 5), and 'Comments'.

# Image Data Organization with OMERO

The screenshot displays the OMERO web interface. At the top, the navigation bar includes 'Data', 'History', and 'Help'. The main content area is divided into three sections:

- Explore:** A tree view on the left showing a hierarchy of data. The selected path is 'Demo data' > 'idr0001-grami-sysgro/screenA\_46' > 'JL\_121214\_J1\_1'. Below this, a list of measurement files (Meas\_01 to Meas\_06) and timepoint files (JL\_121214\_J1\_2 to JL\_130122\_J10\_2) is visible.
- Image Grid:** A central grid of 8x8 microscopy images. The grid is labeled with 'Index: Field#1' and 'Field#1'. The rows are labeled A through H, and the columns are labeled 1 through 8.
- Metadata Panel:** A panel on the right showing details for the selected image 'JL\_121214\_J1\_1 [Well F-6; Field #1]'. It includes fields for Image ID (706266), Well ID (476542), Owner (Demo User), Acquisition Date (2012-12-14 17:20:07), Import Date (2015-10-01 11:07:05), Dimensions (XY: 1376 x 1040), Pixels Type (uint16), Pixels Size (XYZ) (0.11 x 0.11), Z-sections/Timepoints (16 x 1), Channels (GFP, CasBlue), ROI Count (0), and Status (None).

Below the main interface, a detailed view of a single image is shown in a separate window titled 'idr-demo.openmicroscopy.org/webclient/img\_detail/706266/'. This window includes:

- Viewing Options:** A sidebar with controls for 'Normal' view, 'Max Intensity', 'Split Channel', 'Quality' (Normal), 'Zoom (%)' (45), 'Line Plot', 'Channels' (GFP, CasBlue), 'Grayscale', 'Rendering Settings' (Copy, Paste), 'Interpolate' (checked), 'Current Image' (Z: 7/16 | T: 1/1), 'Scale bar', 'Image Information', 'Image Link', and 'ROI Count: 0'.
- Image View:** A large central image showing a field of cells with green and blue fluorescence. The image is overlaid with a grid and has a 'Z-sections' slider on the left and a 'Timepoints' slider at the bottom.

At the bottom of the detailed view, there is a 'TABLES' section with a table of metadata:

TABLES	
Plate:	JL_121214_J1_1
Well Number:	86
Well:	476542
Gene Identifier:	SPAC22H10.07
Strain Name:	scd2
Gene Symbol:	scd2
Replicate Group:	3
Reproducibility of Shape Hits:	5/8
Conservation in S. cerevisiae:	yes
Conservation in Vertebrates:	yes
Conservation in H. sapiens:	yes

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# Image Data Organization in OMERO

The screenshot displays the OMERO web interface. At the top, there is a navigation bar with the OMERO logo and menu items: Data, History, Help, Tag Search, and Figure. Below this, a user profile bar shows 'Laws-Skye (Collab)' and a dropdown menu for 'Polly Stack'. A large red arrow points to this dropdown menu. The dropdown menu is open, showing a list of groups and their members:

- Laws Lab (Private) ▶ All Members
- Laws-Skye (Collab) ▶ **Owners**
- Public Group ▶ Isla Skye
- Polly Stack
- Members**
- Ben Becula
- Ross Cromarty
- Ben Laws
- Sid Laws
- Ben Nevis

# Image Data Annotation with OMERO

General Acquisition Preview

Full viewer

P-TRE\_22\_R3D\_D3D.dv

Image ID: 25763  
Owner: Polly Stack

Image Details

collected with critical illumination

Import Date: 2015-10-27 13:48:34  
Dimensions (XY): 512 x 512  
Pixels Type: int16  
Pixels Size (XYZ) (µm): 0.07 x 0.07 x 0.20  
Z-sections/Timepoints: 40 x 1  
Channels: 457.0, 528.0, 617.0  
ROI Count: 0

Tags

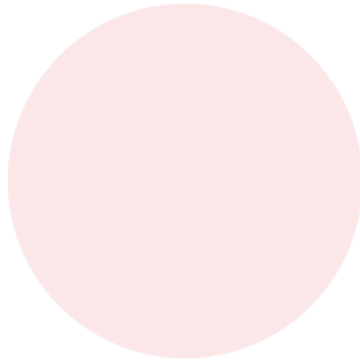
Nature - Figure 1

Key-Value Pairs

Attachments

Ratings

Comments



Key-Value Pairs

Added by: Polly Stack

Key	Value
Temperature	37.5
pH	7.4
Incubation	1 hr

Added by: Isia Skye

Date	15-02-20
Experiment	3
Run	2

+

Tags

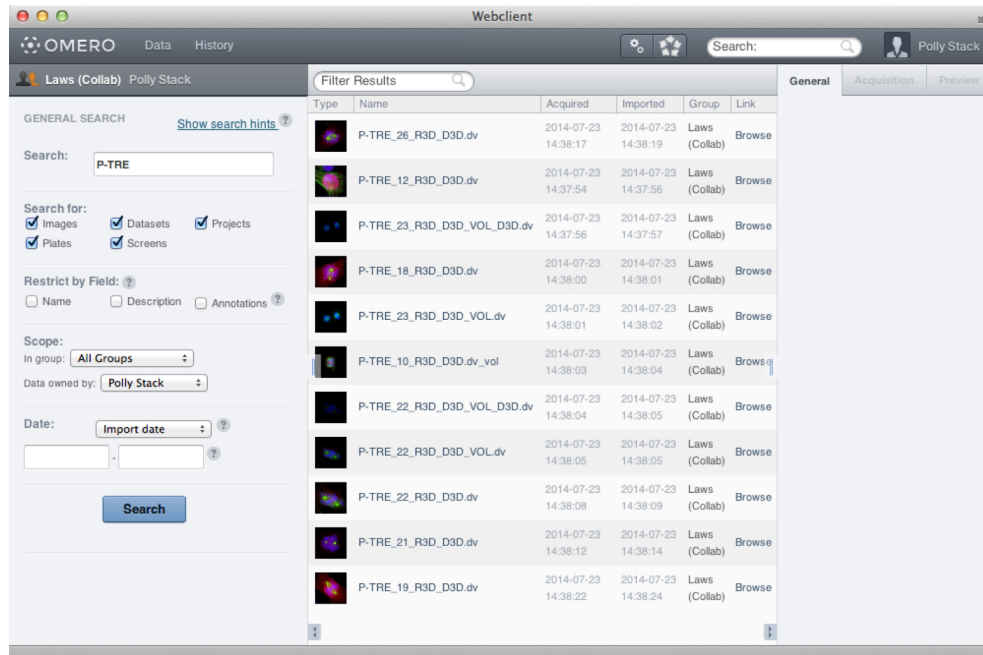
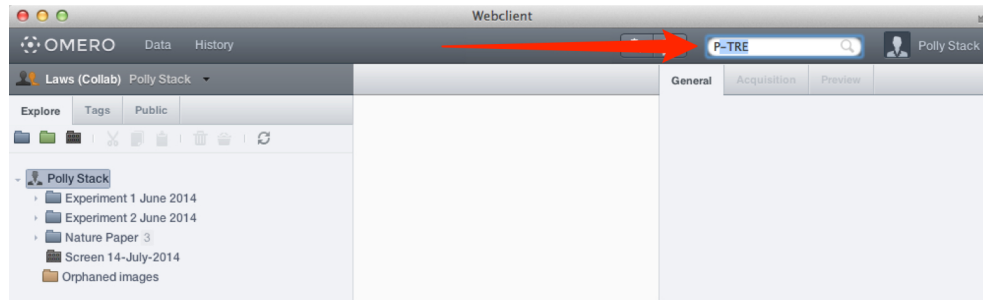
Key-Value Pairs

Attachments

Ratings

Comments

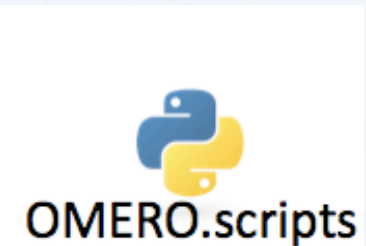
# Image Data Annotation and Search with OMERO






# Image Data Analysis with OMERO

## Analysis Within OMERO



OMERO.scripts



## 3<sup>rd</sup> Party Integrations






Image Processing



Data Processing

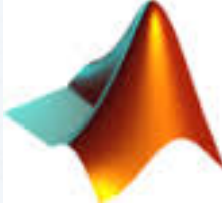



Image and Data Processing





# Image Data Analysis within OMERO

The screenshot displays the OMERO web interface. The top navigation bar shows the user is logged in as 'trainer-1' and is connected to 'tadpole.openmicroscopy.org'. A search bar is visible in the top right corner.

The left sidebar contains a 'Projects' tree view. Under 'Lab1 [1]', there is a 'trainer-1 trainer' folder containing 'Images [5]'. The 'Images' folder is expanded, showing a list of image files including 'P-TRE\_10\_R3D\_D3D.dv\_vol (20-Sep-2016)'. A context menu is open over this file, with options: 'Reload Scripts', 'analysis scripts', 'export scripts', 'figure scripts', 'import scripts', 'util scripts', 'Channel Offsets...', 'Combine Images...', 'Dataset To Plate...', and 'Images From ROIs...'. The 'util scripts' option is selected, and the 'Channel Offsets...' option is highlighted.

The main workspace area shows a grid of 48 image thumbnails. The selected image is 'P-TRE\_10\_R3D\_D3D.dv\_vol (20-Sep-2016)'. The workspace title is 'Workspace: 48 of 48 images'.

The 'Run Script' dialog box is open on the right side of the interface. It is titled 'Run Script' and contains the following information:

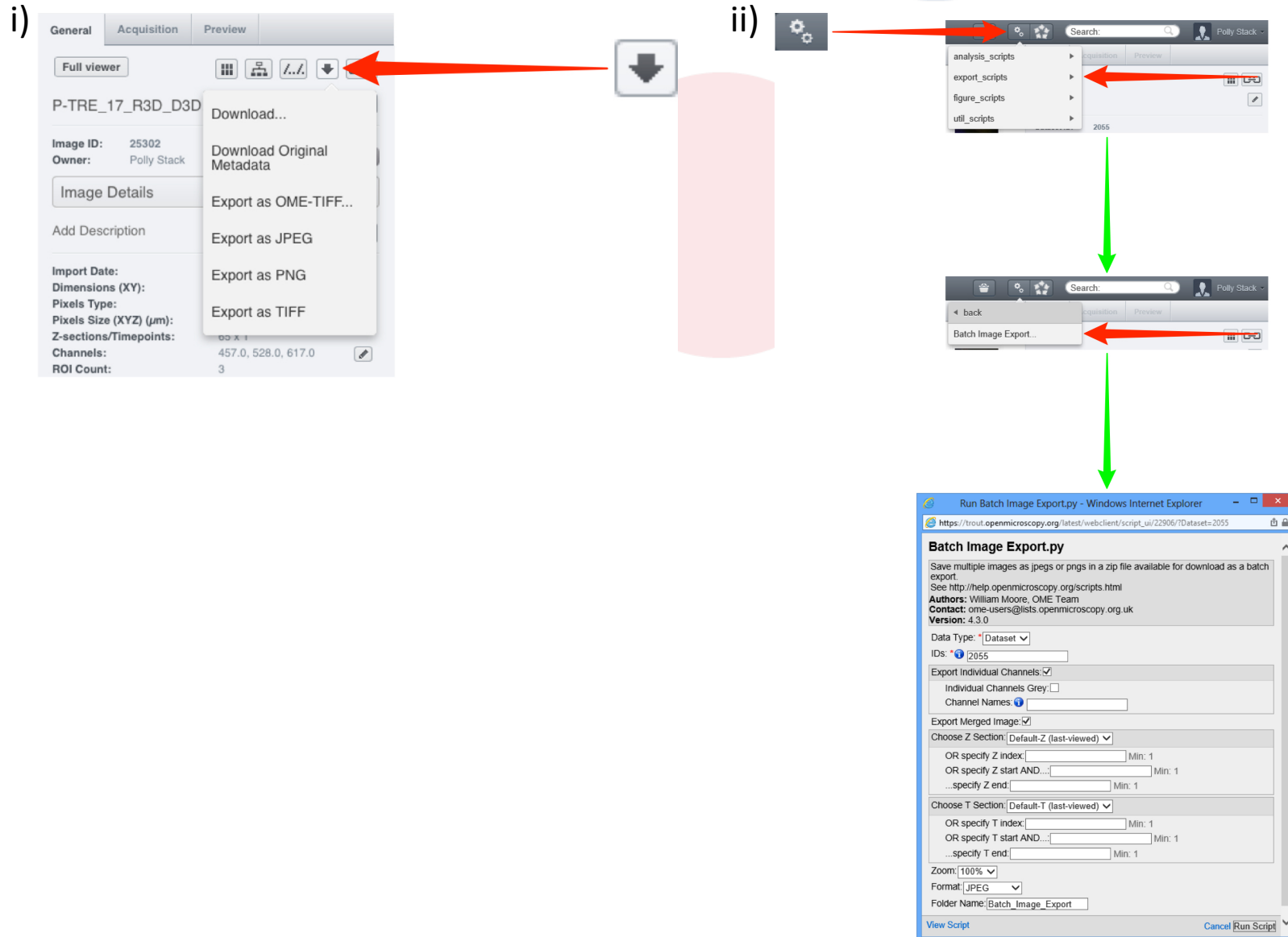
- Channel\_Offsets.py**
- Create new Images from existing images, applying an x, y and z shift to each channel independently. See <http://help.openmicroscopy.org/scripts.html>
- Authors: William Moore, OME Team
- Contact: ome-users@lists.openmicroscopy.org.uk
- Version: 4.2.0
- Data Type: Image
- IDs: 1654, 103, 1652
- New Dataset Name: [empty field]
- Channel 1:  Channel1 X shift: 0, Channel1 Y shift: 0, Channel1 Z shift: 0
- Channel 2:  Channel2 X shift: 0, Channel2 Y shift: 0, Channel2 Z shift: 0
- Channel 3:  Channel3 X shift: 0, Channel3 Y shift: 0, Channel3 Z shift: 0

At the bottom of the dialog box, there is a 'Script' dropdown menu, a 'Cancel' button, and a 'Run Script' button.

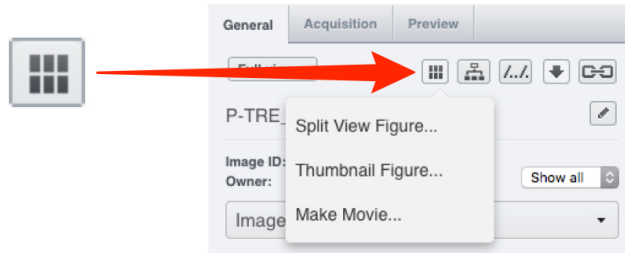
## Lets Try:

- **Images From ROIs:** Create new Images from the regions defined by Rectangle ROIs on other Images. Designed to work with single-plane images ( $Z=1$   $T=1$ ) with multiple ROIs per image.

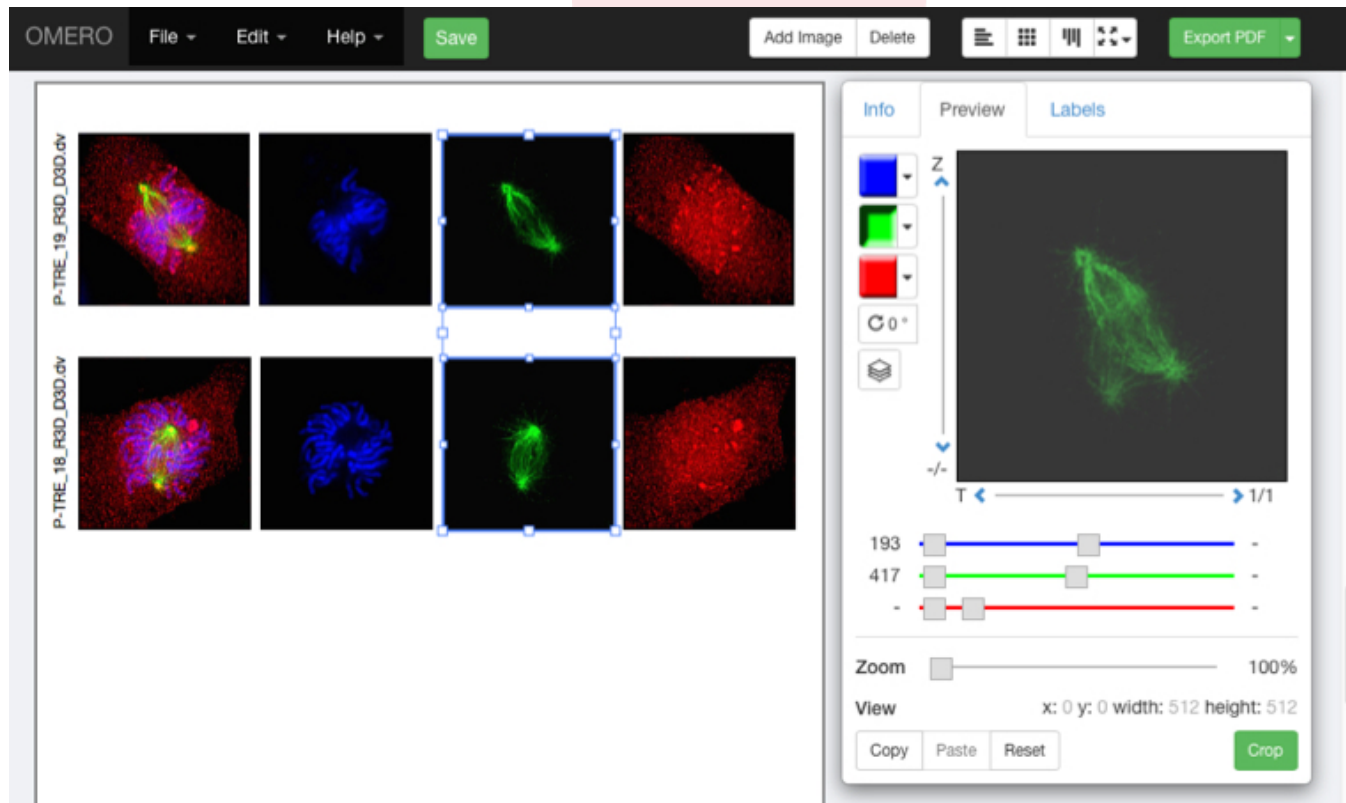
# Batch Image Operations with OMERO



# Publishing with OMERO




# Publishing with OMERO




# Image Data Analysis with OMERO


## Analysis Within OMERO



OMERO.scripts



OMERO.web



## 3<sup>rd</sup> Party Integrations





Image Processing



Data Processing

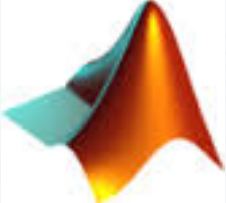

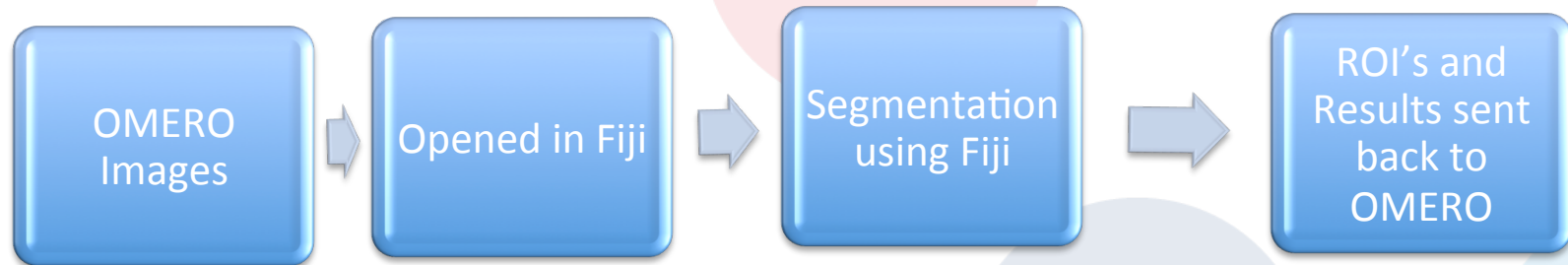


Image and Data Processing



# Fiji-OMERO Workflow Outline

- Setup OMEROIJ Plugin
- Manual Workflow:



# OMEROIJ Plugin : Setup

## Dependency : OMERO IJ Plugin



### OMERO 5.2.0 Downloads

[Clients](#) | [Plugins](#) | [Additional](#) | [Servers](#) | [API](#) | [Python](#) | [Java](#) | [Code](#) | [Components](#) | [Previous versions](#)

- Information on this release of OMERO is in the [release announcement](#)
- Full documentation is available as [web documentation](#) or [PDF documentation](#) and there are user guides for the clients on our [Help website](#)
- A standard OMERO user just needs to download the client package with the same major version as their institutional server e.g. 5.0 clients with the 5.0 server
- If you do not have an institutional server, you can apply for an [account on our Demo server](#) or download the [Virtual Appliance](#) to install your own version locally.

### OMERO client downloads

Client	Size	File Name	Checksum
Windows	83.02 MB	OMERO.clients-5.1.0-ice35-b101.win.zip	5712f4bc (SHA1)
Mac OS X	82.8 MB	OMERO.clients-5.2.0-ice35-b101.mac_Java7+.zip	8dae773c (SHA1)
Linux	82.67 MB	OMERO.clients-5.2.0-ice35-b101.mac_Java6.zip	5e05fd76 (SHA1)

- OMERO.web is part of the server package, so individual users do not need to install it locally.
- Full instructions for installing the client are on the Help website: [Getting Started with OMERO insight Version 5.2.0](#)

### OMERO plugin downloads

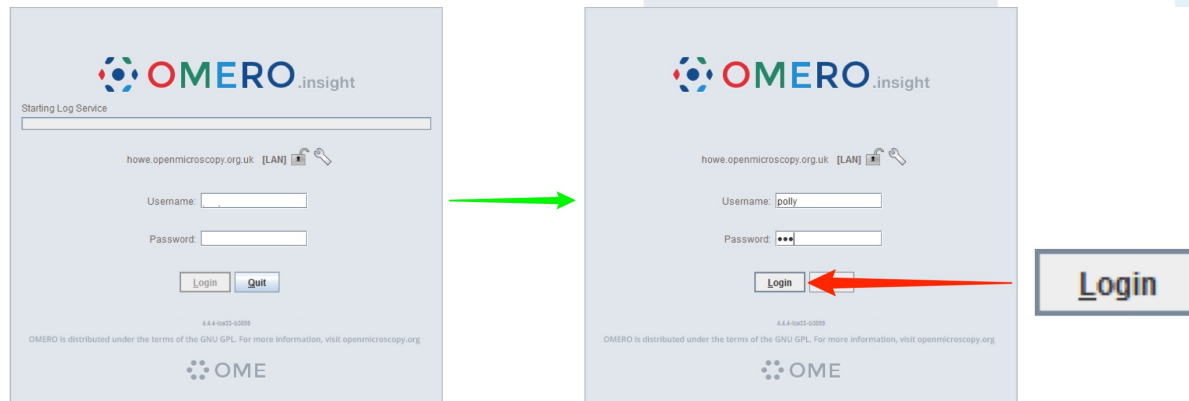
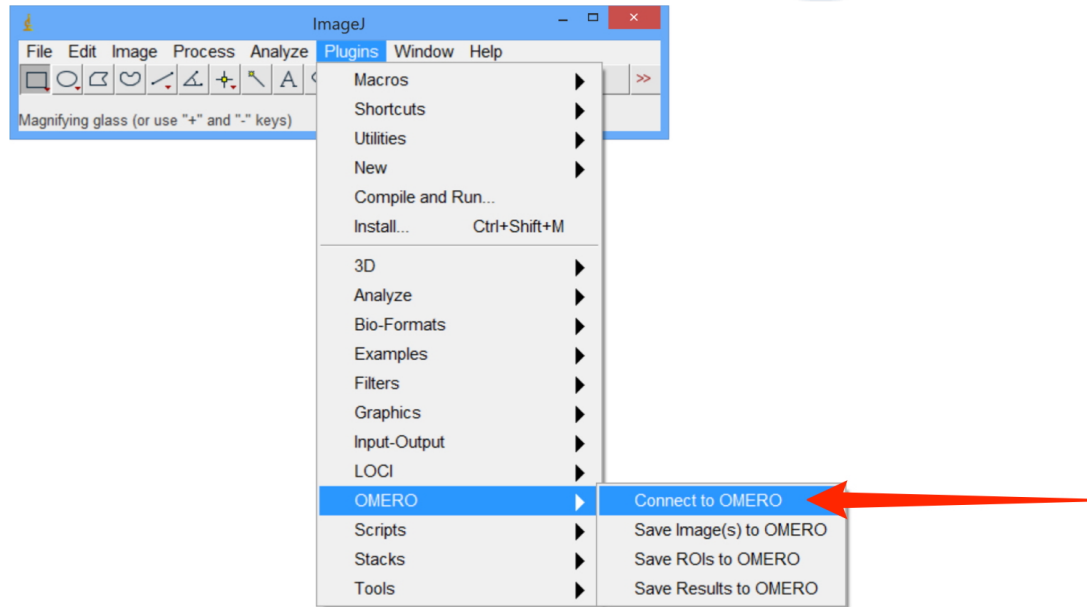
Plugins	Size	File Name	Checksum
ImageJ / Fiji	75.28 MB	OMERO.insight-ij-5.2.0-ice35-b101.zip	4ac3f188 (SHA1)
Matlab	21.14 MB	OMERO.matlab-5.1.0-ice35-b101.zip	9f9dfeef (SHA1)

- Instructions for downloading and installing the ImageJ plugin: [Using ImageJ with OMERO](#)

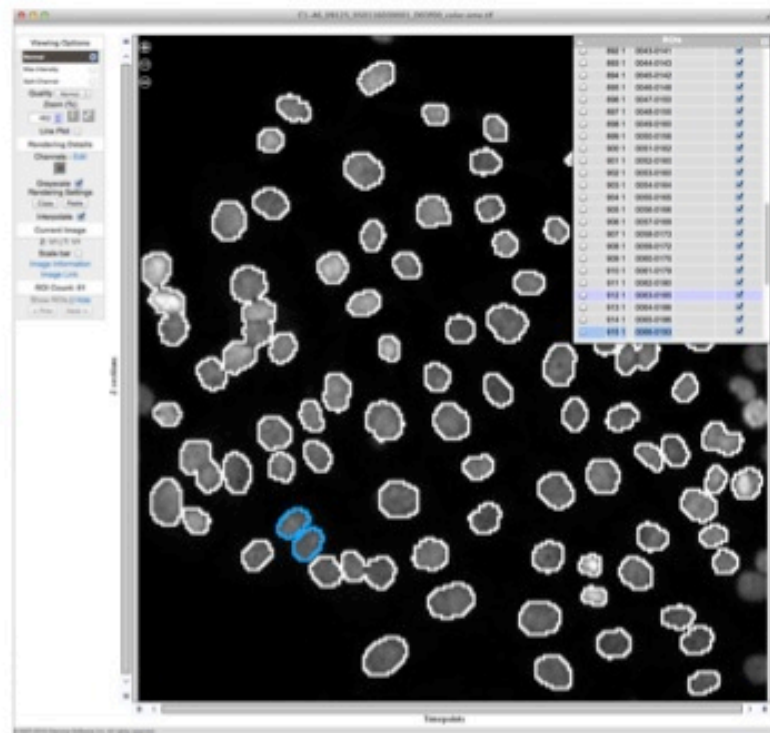
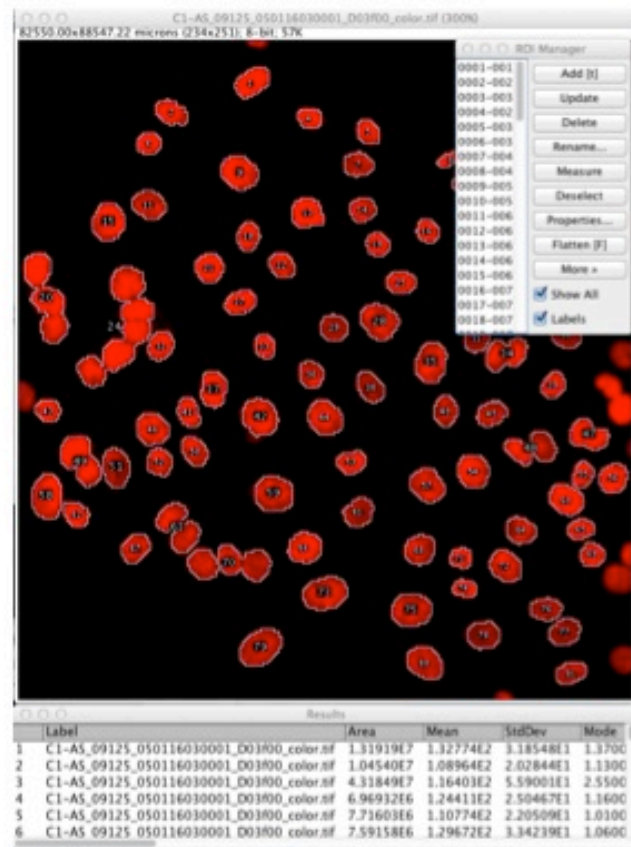
Save or move the .zip archive to the Fiji > plugins folder.



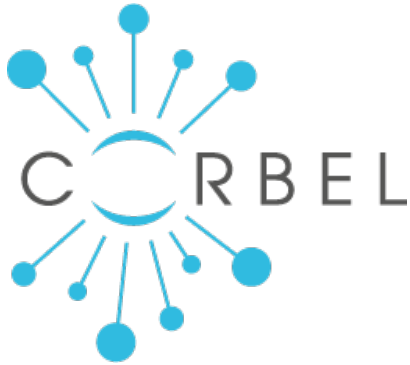
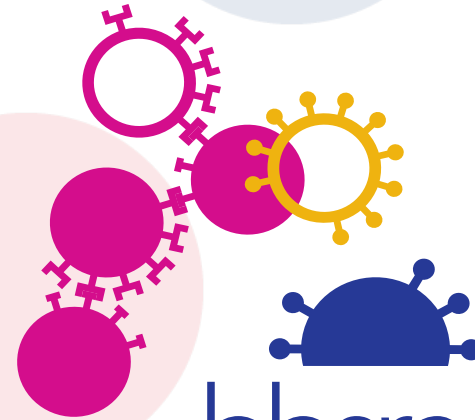
# Accessing OMERO using ImageJ and Fiji



# ImageJ/Fiji and OMERO



# Thank to Funders



# OME Consortium



Paul French

Gaudenz Danuser

Ilan Davis

Gianluigi Zanetti



Peter Sorger

Spencer Shorte

Alvis Brazma

Rafael Carazo-Salas

Edouard Bertrand