OMERO.iviewer guide Documentation

Release 0.1.0

Open Microscopy Environment

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Contents

We introduce OMERO.iviewer, a 2D viewer which can open and browse multi-t, multi-z and multi-channel images and allows to draw and edit Regions of Interest (ROIs) and perform some rudimentary image analysis. It also offers the ability to view several images at the same time and synchronize the view. For more information, see https://github.com/ome/omero-iviewer.

Contents:

View images in OMERO.iviewer

We introduce OMERO.iviewer, a 2D viewer which can open and browse multi-t, multi-z and multi-channel images and allows to draw and edit Regions of Interest. It also offers the ability to view several images at the same time and synchronize the view.

1.1 Description

We will show here:

- How to open multidimensional images in OMERO.iviewer

- How to change rendering settings in OMERO.iviewer and scroll through z and t

- How to change the Lookup table and invert the displayed intensities for a particular channel

- How to use the Histogram feature

- How to zoom and rotate the image

- How to create a maximum intensity Projection and save it

- How to save a current viewport as png in OMERO.iviewer

- How to use and synchronize multiple viewer windows inside OMERO.iviewer

1.2 Resources

Example files used

- https://downloads.openmicroscopy.org/images/DV/siRNAi-HeLa/

Note: Only some of the images in this dataset are z-stacks, for example

- https://downloads.openmicroscopy.org/images/DV/siRNAi-HeLa/IN_03.r3d_D3D.dv

1.3 Setup

OMERO.iviewer installation

OMERO.iviewer is a pip installable application for OMERO.web. Follow the steps described in https://pypi.org/project/omero-iviewer/ to install it and configure the OMERO.web accordingly.

The walkthrough assumes that OMERO.iviewer has been set up as the default viewer for OMERO.web.

1.4 Step-by-Step

1. Double-click on an Image thumbnail, or click the `Full Viewer` button in the right-hand pane to open an Image in a larger viewer called OMERO.iviewer. It is a Web app developed and released independently from the webclient. The OMERO.web framework can be extended with multiple apps to view data in different ways.

2. Zoom in and out of the image by using the + and − buttons in top-left corner or by scrolling the mousewheel.

3. Rotate the image by holding `Shift` on your keyboard and then drag the image using the mouse.

4. We can adjust the rendering settings and scroll through Z or T.
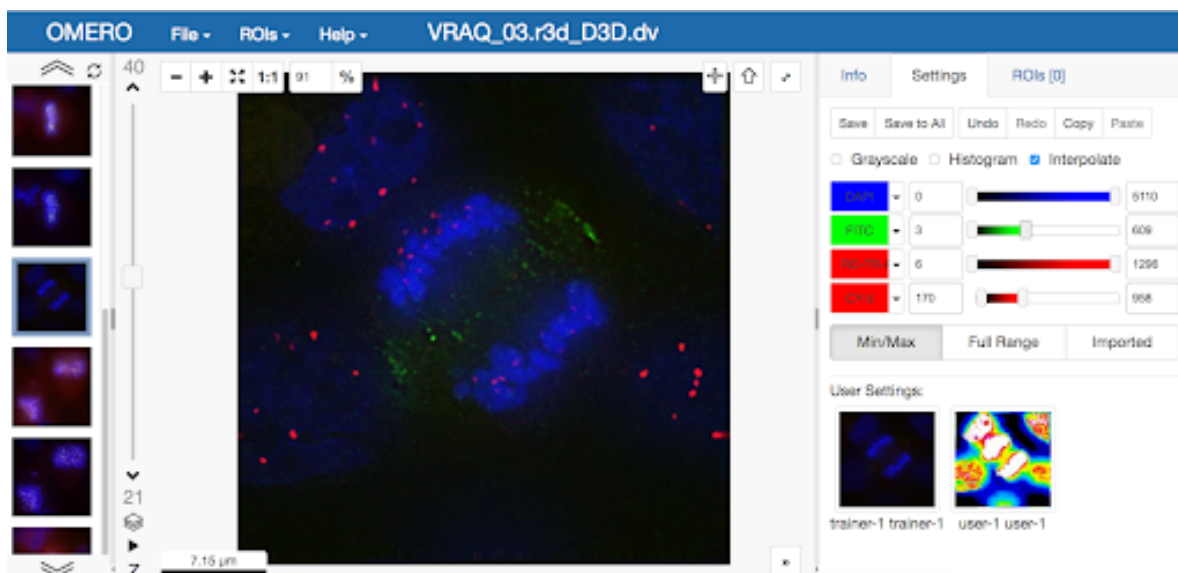
5. To change the Lookup Table (LUT) of a particular channel, click on the downward facing arrow next to the channel label .

6. In the menu, select the LUT you wish to use. You can find here all the LUTs which are supported in ImageJ.
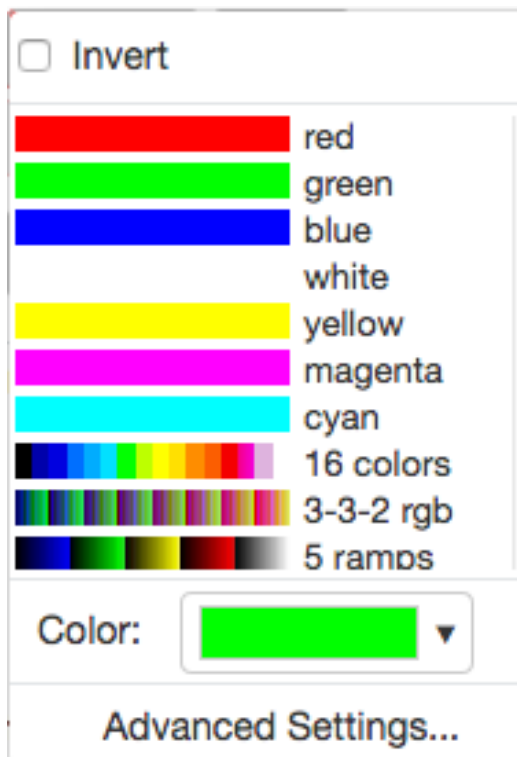
7. In the same menu, you can also invert the intensity of the channel by checking the checkbox on the top.

8. Still staying in the `Settings` tab in the right-hand side of OMERO.iviewer, click on the checkbox next to the `Histogram` word ☑ Histogram near the top.

9. A histogram of the first channel which is on will appear. Note that when you move the rendering settings sliders beneath the histogram, the histogram updates to showing the channel you just manipulated.
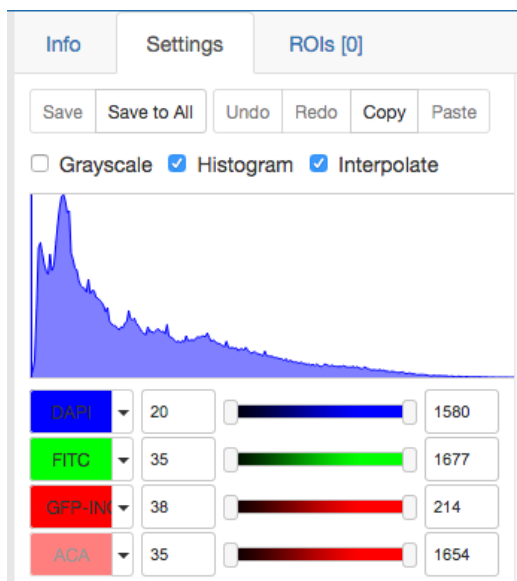
10. The `Interpolate` option provides a smoother rendering of the image in the viewer. Unchecking this will show the pixels at the same resolution as the original data. This option has no effect on the underlying pixel intensity values.

11. Make a maximum intensity Projection of a z-stack by clicking the `stack` icon in the bottom-left corner of the central pane, just under the z-slider.

12. Note that on the vertical z-slider, there are now two knobs. Adjust the knobs to select the desired portion of the z-stack to be projected. The central pane will show a preview of your Projection.

13. Save the Projection by selecting `File > Save Projection as new image`. In the following dialog, click either `Navigate to Image in Webclient` or `Open Image in iviewer`.

14. Save the viewport by selecting in the top-left corner `File > Save Viewport as PNG`.

15. Compare the two channels of one of the Images in multi-image view:

    • Double-click on the thumbnail of the already opened Image in the left-hand pane of the viewer. This will open the Image again in a new window.

    • Select one of the windows and in the right-hand pane switch the green channel off.

    • On the other window, switch the blue channel off.
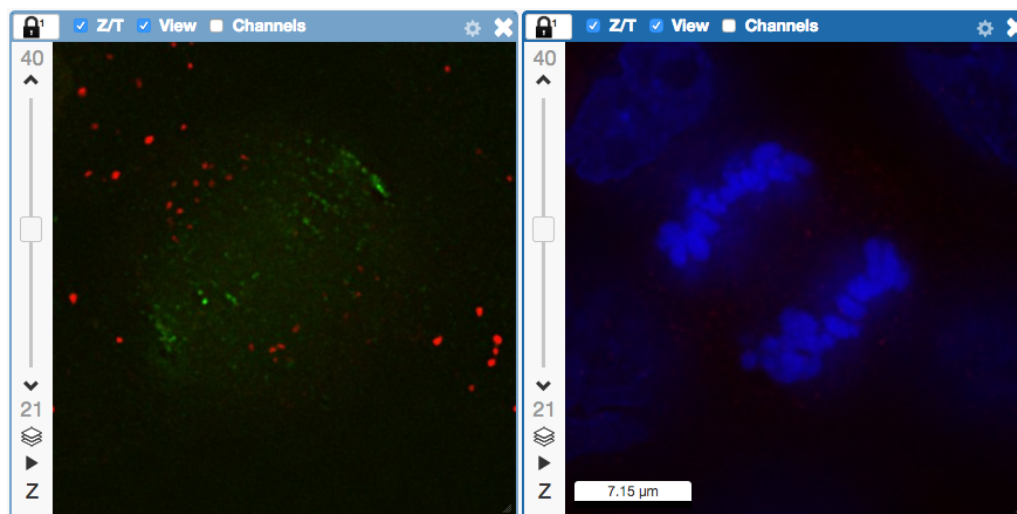
16. Work with images in the multi-view mode. There are several ways to get full views of the images from the thumbnails in the left-hand column.

    • `Click` on a thumbnail to open the corresponding image in the currently active central pane viewer window, replacing the image in that viewer window.

    • `Double-click` on a thumbnail to open a new central pane viewer window with the double-clicked thumbnail image.

    • `Drag and drop` a thumbnail into an existing central pane viewer window to replace the image in that window with the image corresponding to the thumbnail which you just dropped into it.

    • `Drag and drop` a thumbnail onto the white canvas area in the central pane to create a new viewer window.

17. We can synchronize the central pane viewers by adding them both to the same `sync Group`.

    • Click the `sync` icon in the top-left corner and select the first option in the dropdown menu.

    • Repeat for the other viewer.

    • Now both Images have the `Z/T` and `View` (zoom and position of viewport) synchronized.

18. Click on `Info` tab in iviewer now, and find, in the right-hand pane, the link to `Dataset`:

. Click on that link. This will bring you back to the webclient.

CHAPTER 2

Work with ROIs in OMERO.iviewer

In this section, we cover the ability of OMERO.iviewer to work with ROIs, to draw, edit, annotate and evaluate ROIs in the images is shown. In this way, a simple image analysis can be achieved, such as getting the intensity measurements inside the pixels of the ROIs and sizes of the ROIs, such as areas for polygons and lengths for lines and polylines.

2.1 Description

We will show:

- How to inspect the intensities
- How to draw ROIs on the image
- How to view ROIs associated with different z or t planes
- How to use the `Planes` tab in OMERO.iviewer to see the spread of ROIs in multi-z, t images
- How to create comments on ROIs and enable and disable the ROI popups
- How to produce simple analysis results from the ROIs and and export the results locally

2.2 Resources

New features video (ROI popups, ROIs on multi-z or multi-t images)

- https://youtu.be/yDW5Sg0I1GU

Example files used

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2.3 Setup

OMERO.iviewer installation

OMERO.iviewer is a pip installable application for OMERO.web. Follow the steps described in https://pypi.org/project/omero-iviewer/ to install it and configure the OMERO.web accordingly.
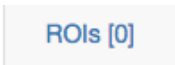
The walkthrough assumes that OMERO.iviewer has been set up as the default viewer for OMERO.web.

2.4 Step-by-Step

1. Double-click on an Image thumbnail, or click the `Full Viewer` `Full viewer` button in the right-hand pane to open an Image in a larger viewer called OMERO.iviewer. It is a Web app developed and released independently from the webclient. The OMERO.web framework can be extended with multiple apps to view data in different ways.

2. Click the `Crosshairs` icon at the top-right of the viewer to enable the pixel intensity display for the mouse pointer. Then mouse over the Image to see the pixel intensities for the channels turned on.
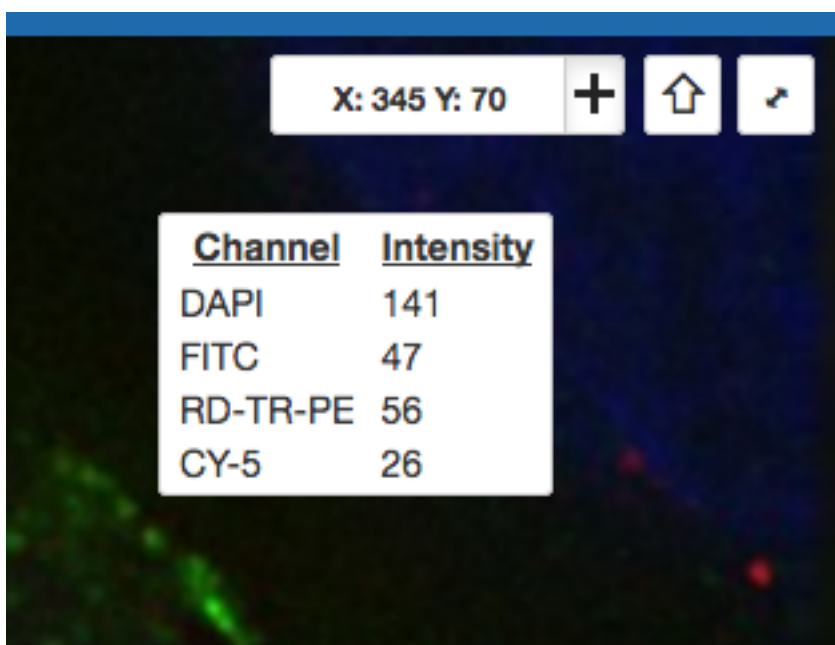
3. The `ROIs` tab `ROIs [0]` includes tools for viewing and drawing ROIs on the Image. These are saved back to the OMERO server. Select the `arrow tool` in the right-hand pane and draw an arrow on the Image, using Click-Move-Click (not drag), pointing to a feature in the Image and save it using the `Save` button located in the upper part of the right-hand pane. Draw also a couple of other ROIs on different Z planes.

   - Dragging on the Image is used for panning the image.

   - Shift-drag rotates the image (using selection tool) or draws `freehand` (polygon, polyline, rectangle and ellipse).
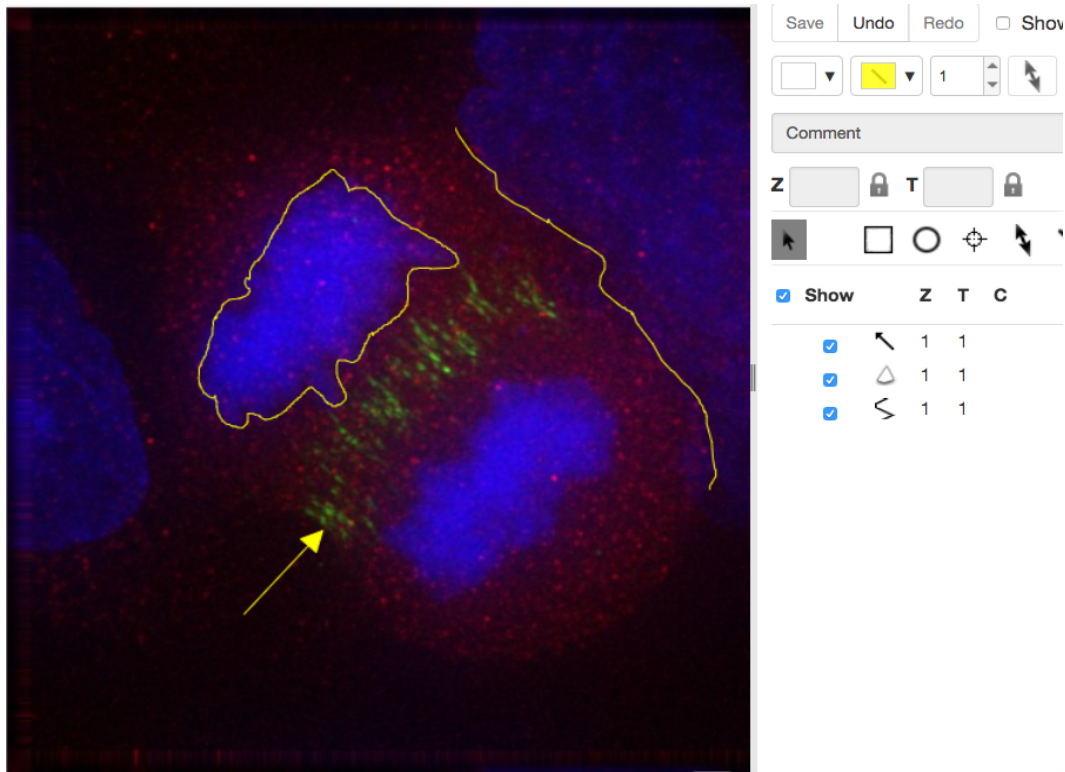
4. Clicking onto the ROIs in the right-hand pane table brings the viewport to the position where the selected ROI is in the middle of it and navigates the viewport to the timepoint the ROI is associated with.


5. Select the `Planes` tab above the ROI table.
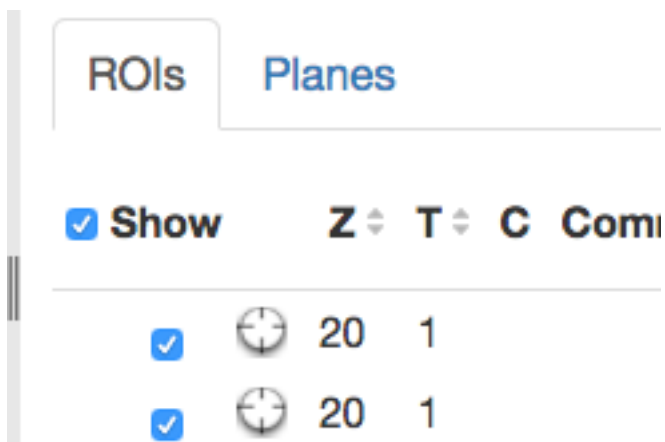
6. The `Planes` tab gives you an overview of the ROIs distribution over the z or t sections. The boxes in the schema in the `Planes` tab represent single z or t planes and are selectable.
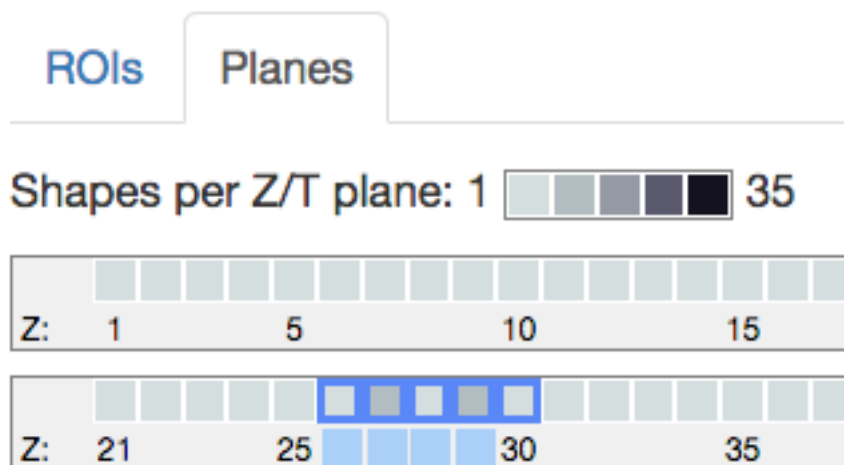
7. You can select one box, this will navigate to the corresponding plane in the image viewer. Alternatively, select a range of boxes, which will display a projection of the range of the selected planes (in case of multi-z image) in the main viewer.

8. Click onto a ROI in the image. A popup will appear. You can write a comment to this ROI directly into the popup.
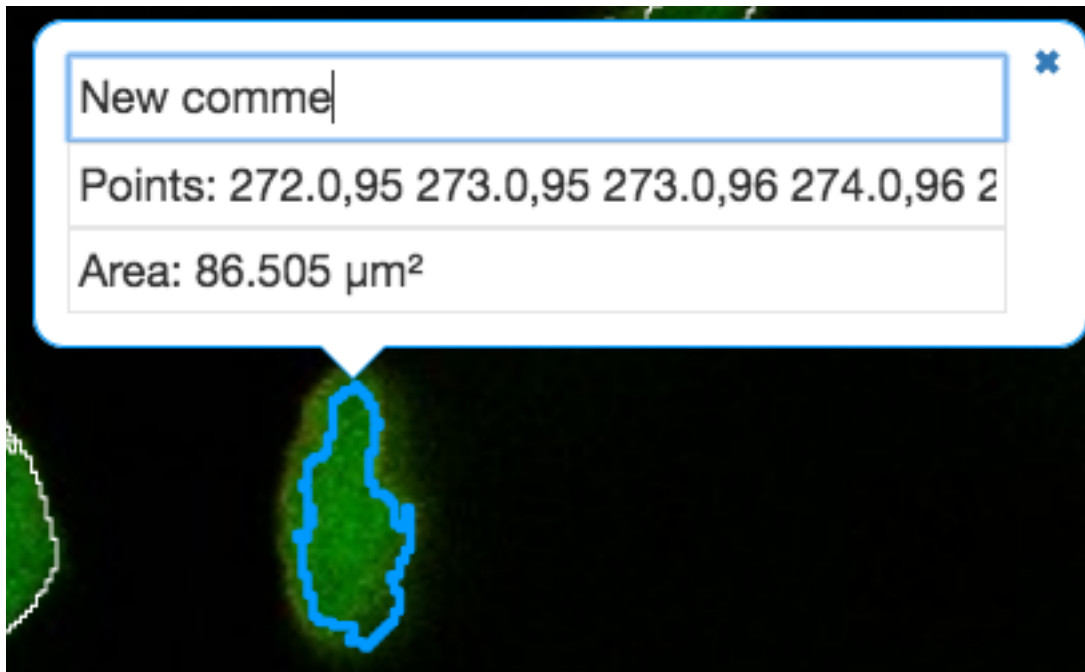
9. The popups can be disabled for all ROIs on the image by clicking onto the cross of one popup and closing it, and re-enabled by using a context menu accessed by right-clicking onto the image.

10. You can copy the values in the popup such as area (select and `Ctrl + C`) and paste them into your local documents.

11. Select several ROIs from different z planes. You can select in the table (`Shift+click` to select a range) but also in the image itself using `Ctrl+drag` (`Cmd-drag` on Mac) to select multiple ROIs.

12. Export the Intensities, areas and line lengths into Excel. Select, in the top-left corner `ROIs > Export (Excel)`. This will export the values from the selected ROIs.

13. Note: ROI intensities and coordinates from the whole image or dataset can be exported using the script `Batch ROI Export`. Draw ROIs on the image as instructed above, go to OMERO.web and select the image or dataset in the left-hand side tree. Find the cog icon above central pane. Then, select the `Export scripts > Batch ROI Export` and run the script.

Contribute

Changes to the documentation or the materials should be made directly in the omero-guide-iviewer repository.