

Using Galaxy to interact with OMERO for image analysis

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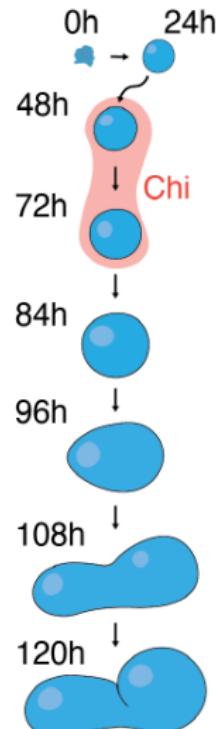
2023-10-03

Outline

- Introduction
 - Scientific context
 - OMERO
- Our current setup (not optimal)

Scientific context

- Study early mouse embryo development with gastruloids
 - Study impact of different treatments (genetic rearrangement, chemical, mechanical) on development and elongation
 - Need an automated 'quantitative' pipeline
 - Beginning of image analysis
 - Get Area of Gastruloids
 - Elongation index
 - Localisation of fluorescent proteins



from Rekaik et al. 2022

OMERO server at EPFL



uplub Pierre Ostell

Explore Tags Shares

Add filter

EXP044 1 EXP045 1 EXP045 2 EXP048 1 EXP049 1 EXP050 1 EXP051 2 EXP054 2 LS1 4 TC 384

Image_18915.tif Image_18916.tif Image_18917.tif Image_18918.tif Image_18919.tif Image_18920.tif Image_18921.tif Image_18922.tif Image_18923.tif Image_18924.tif Image_18925.tif Image_18926.tif Image_18927.tif

Thumbnails General Acquisition Preview

Full viewer

Z: 1/1 T: 1/1

Save Save to All Undo Redo Copy Paste

Grayscale Active Show Histogram

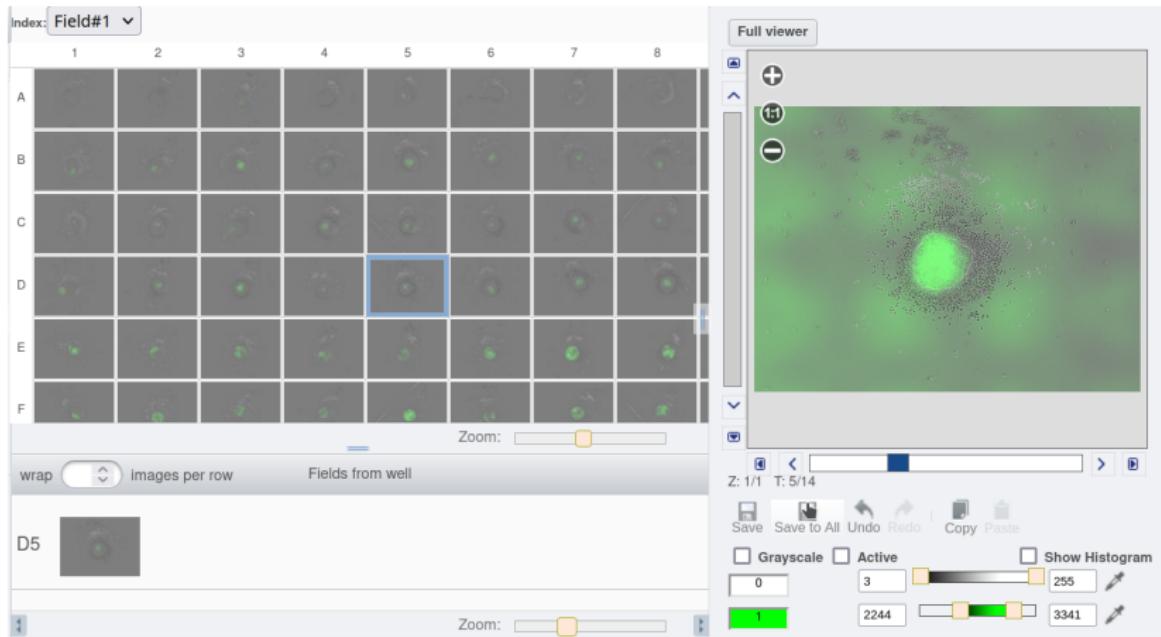
0 255 0 255 1 8

The screenshot shows the OMERO software interface. On the left, there's a sidebar with user information and navigation tabs for Explore, Tags, and Shares. Below that is a list of experiment folders (EXP044-054, LS1 4, TC 384) and their corresponding image files (e.g., Image_18915.tif). The main area has three panels: 'Thumbnails' (a grid of small images), 'General' (with tabs for Acquisition and Preview), and 'Preview' (a larger window showing a single image of a cell with a prominent nucleus). At the bottom, there are controls for saving, undoing, redoing, and copying/pasting images, along with grayscale/active checkboxes and histogram settings.

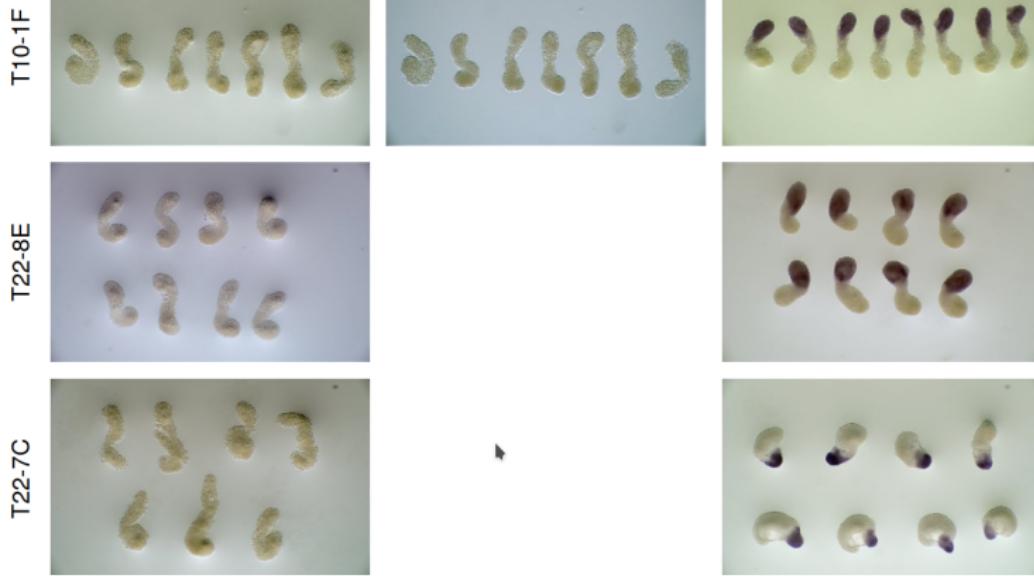
OMERO server at EPFL



OMERO server at EPFL



OMERO server at EPFL



Duboule's lab setup

1. Backup and put to OMERO



High throughput images

(whole plates, time-course)

A lot of metadata are in filename

One file per channel per time-point

Duboule's lab setup

1. Backup and put to OMERO



High throughput images

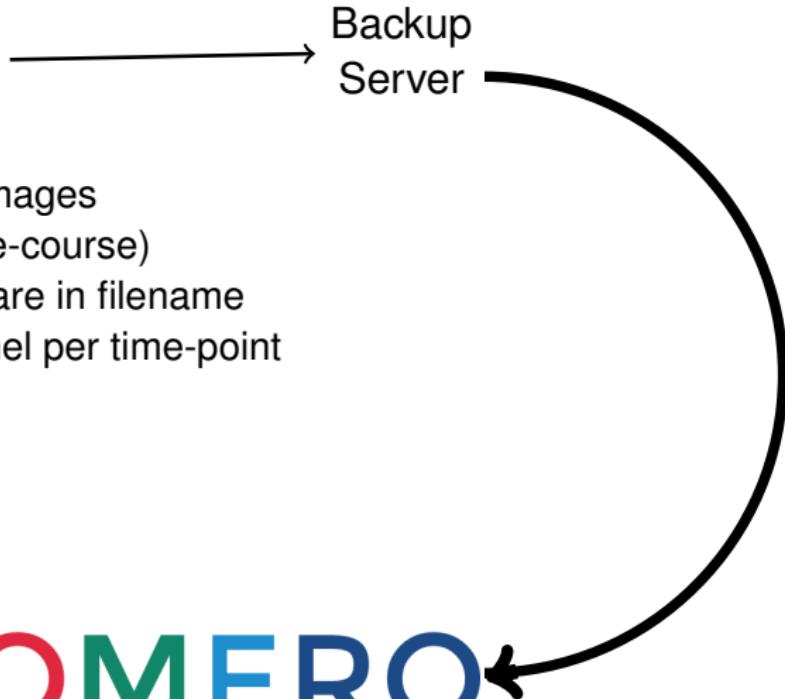
(whole plates, time-course)

A lot of metadata are in filename

One file per channel per time-point

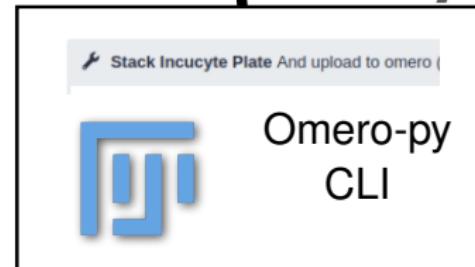
Duboule's lab setup

1. Backup and put to OMERO



Duboule's lab setup

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Duboule's lab setup

1. Backup and put to OMERO

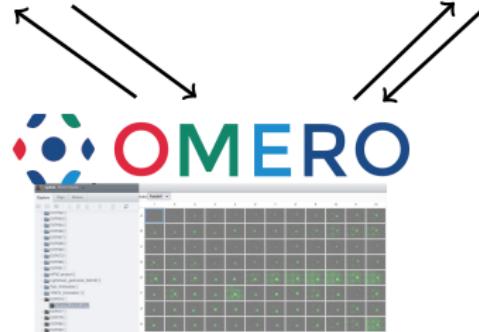


OMERO

Duboule's lab setup

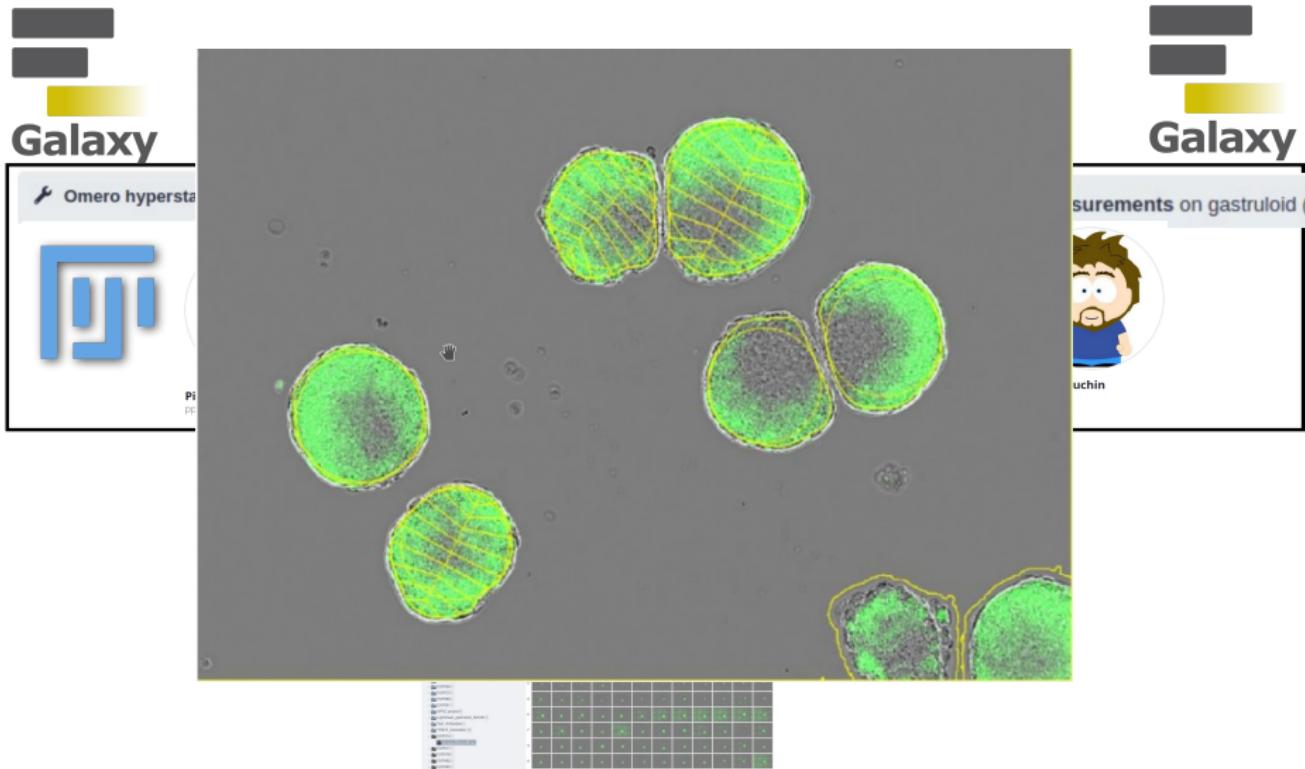
2. Analysis (segmentation + measurement)

Galaxy



Duboule's lab setup

2. Analysis (segmentation + measurement)



Conclusion

- Galaxy enables to run the macros without GUI, keeping trace of what have been done.
- Ildelisle-tools do not follow the 'galaxy spirit' (cut a pipeline into very small pieces)
 - To avoid read and write
 - To make sure what is sent back to OMERO comes from the same image.
- Everything is available on my github, tools are available on testtoolshed (unless you think they can be used by more people than my lab).

Acknowledgements

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