

Mutimage UCA : Facilitating the management of life sciences imaging data



S. Ben Aïcha - F. Bekkouche - R. Arkowitz - F. Brau



Project Goals

Facilitate the management, sharing and analysis of biological images on the life sciences community

Organize, coordinate, structure and share resources and expertise to promote and stimulate quantitative image analysis in biology

The real goal



Building the project



Opening the database for all teams

2019

Pilots teams & omero referents

- Relocation of the Cloud IFB : Online speed tests
- Migration of the LBDV database to IFB
- Form of tags
- Tests of image analysis scripts
- Database update
- Omero public account



MAI-OCT
2018



S. Benaicha



AVRIL
2018

Database Administrator

- Support documents - Recruitment of pilots team
- Training - Database tests - Website

Validation of all options

Omero, IFB, Support staff



FEV
2018



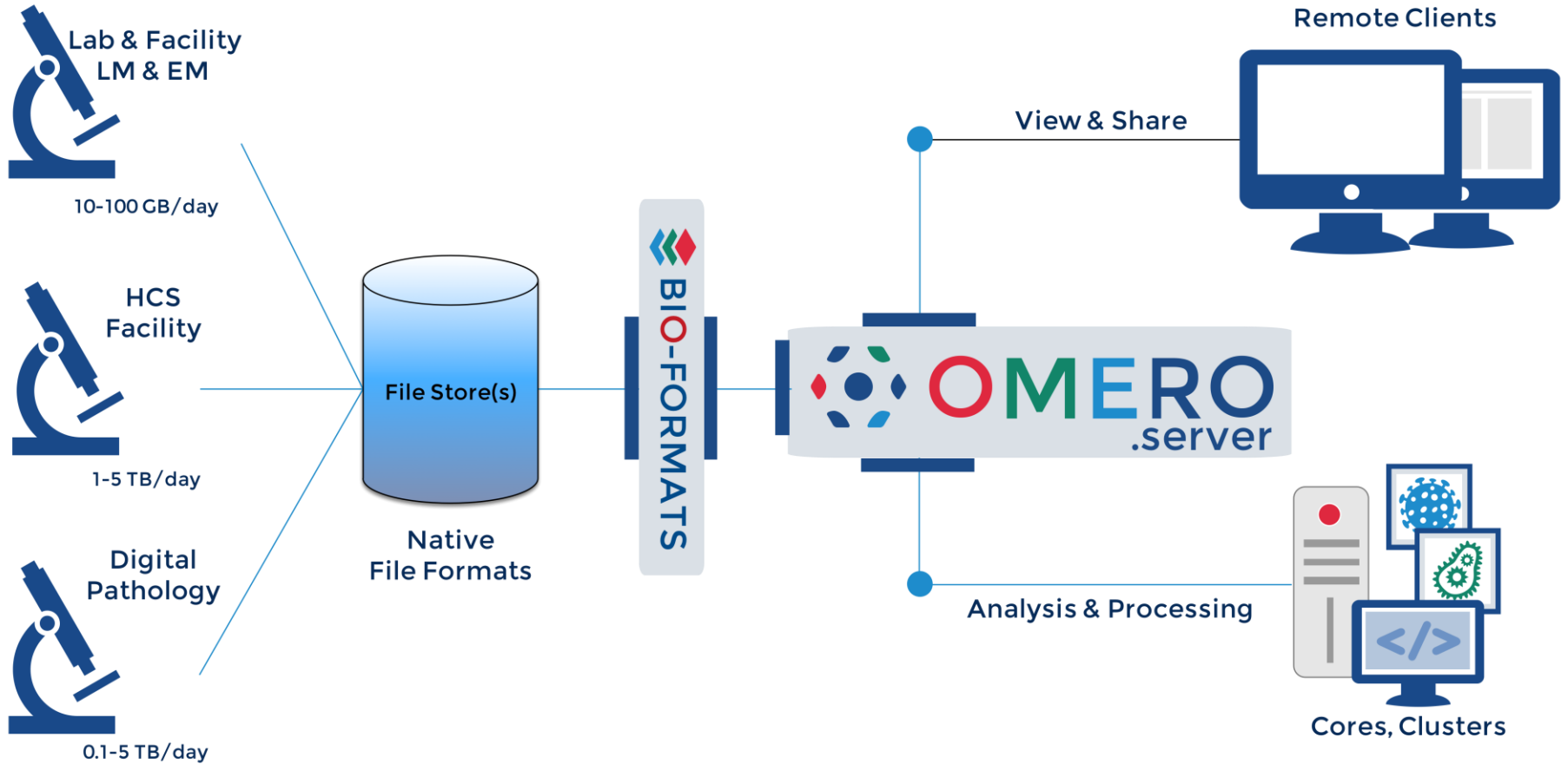
Identification of needs

Storage, Software and Hardware



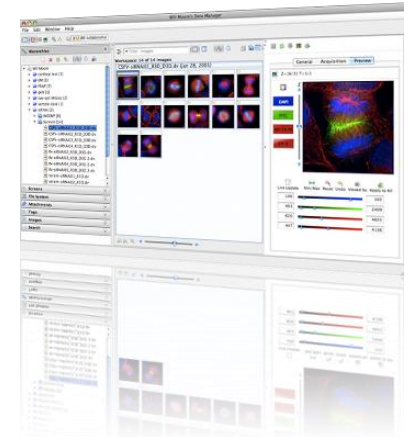
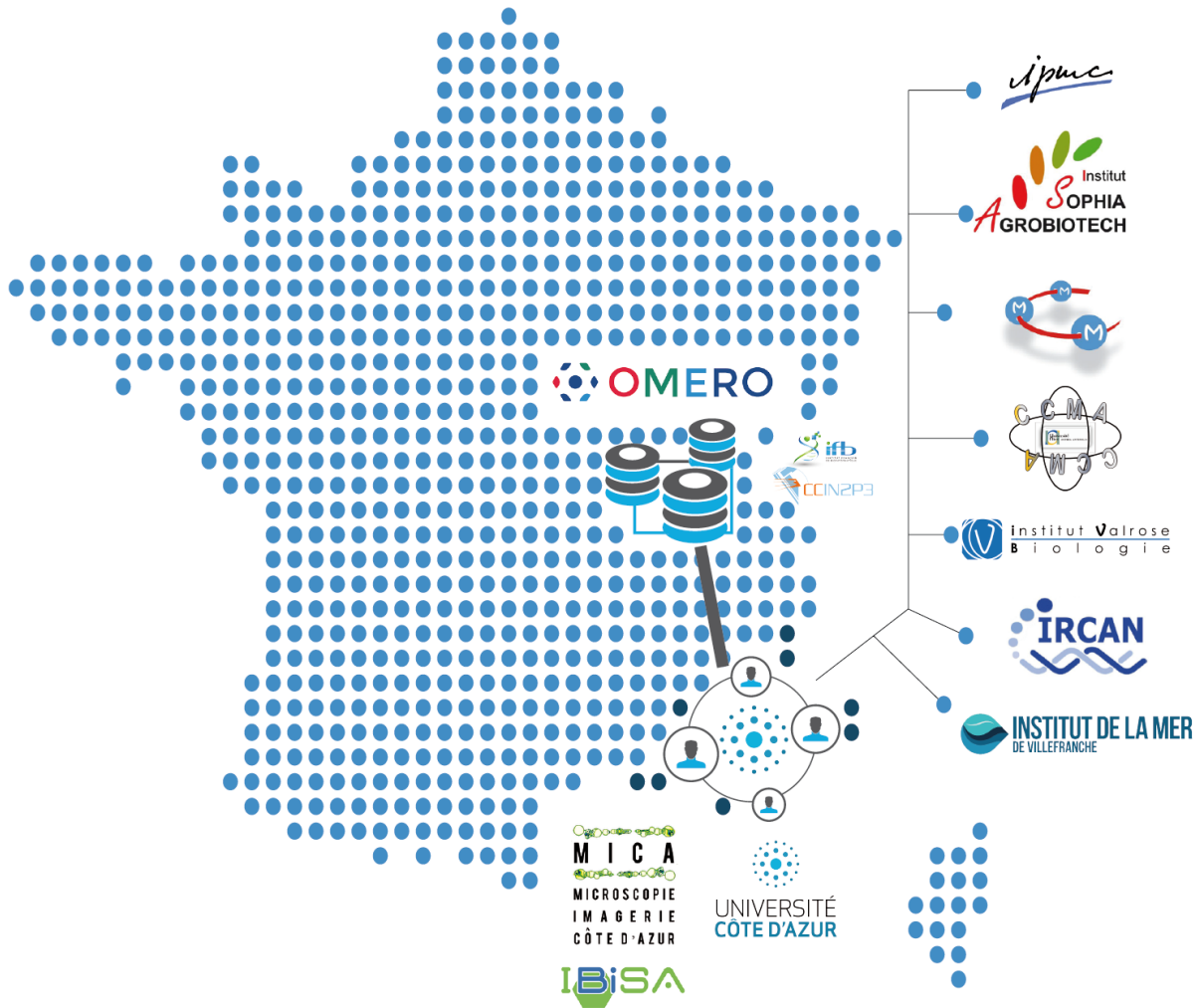
NOV-DEC
2017

OMERO Technology

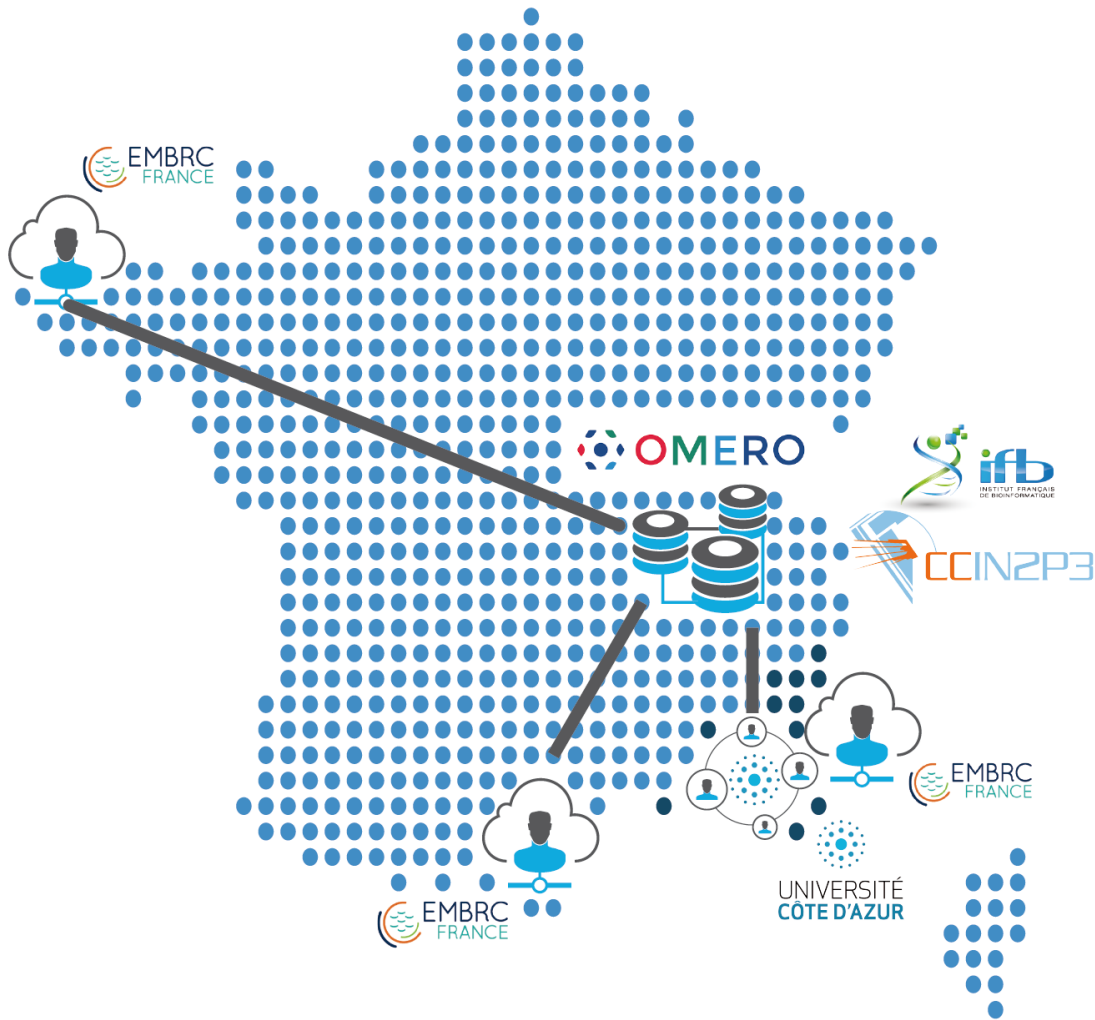


<https://openmicroscopy.org/omero>

Mutimage_UCA



Mutualisation UCA EMBRC-Fr



Functional organization

C. Blanchet
Data base – Storage – Data Security

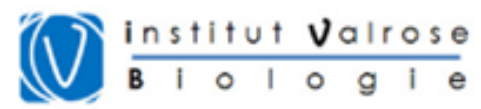


F. Bekkouche
Technical referent Omero



- S. Pisano
IRCAN
- M. Irodelle
C3M
- O. Pierre
ISA
- S. Lachambre
iBV
- G. Carles
TIRO-MATOS
- F. Brau/S. Abelanet
IPMC
- Sameh. Ben Aicha
LBDV
- E. Debreuve
MorpHEME

Manage groups and users access
Training & Support



User accounts management



Team 1

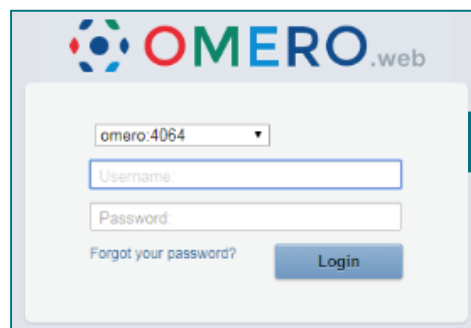
Team 2

Team 3

...


M I C A
MICROSCOPIE
IMAGERIE
CÔTE D'AZUR

Website



OMERO.web

omero:4064

Username:

Password:

Forgot your password? Login

<https://omero.france-bioinformatique.fr/omero/webclient/login/>



OMERO.web

PUBLIC

omero:4064

Username:

Password:

Forgot your password? Login

OMERO TEAM 1 GROUP



OMERO TEAM 1
COLLABORATIONS



OMERO TEAM 2 GROUP



OMERO TEAM 2
COLLABORATIONS



Galleries

Training

Teaching

Bio-Formats: support for >150 file formats

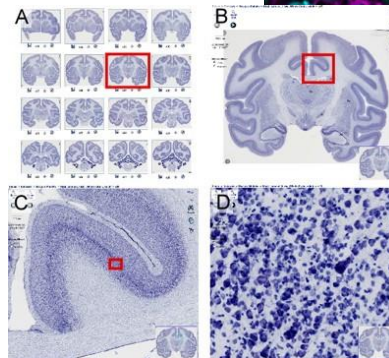
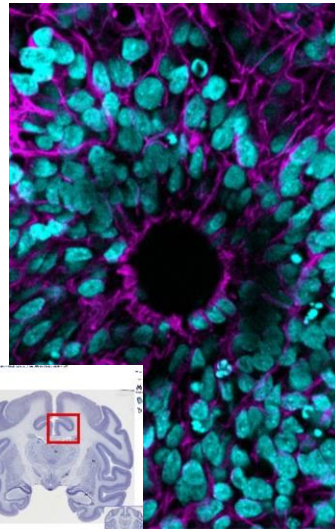
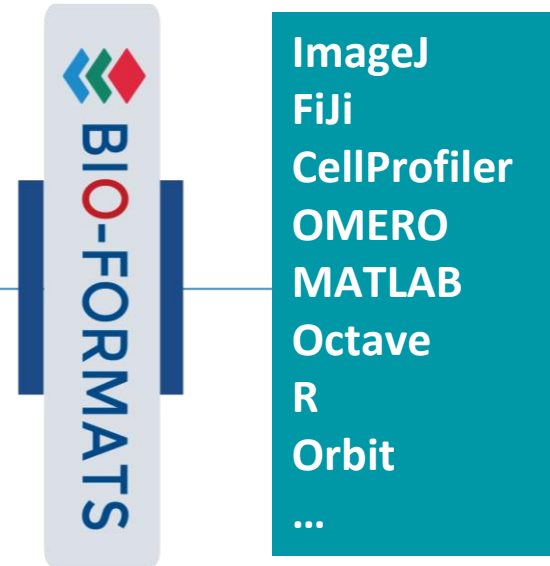


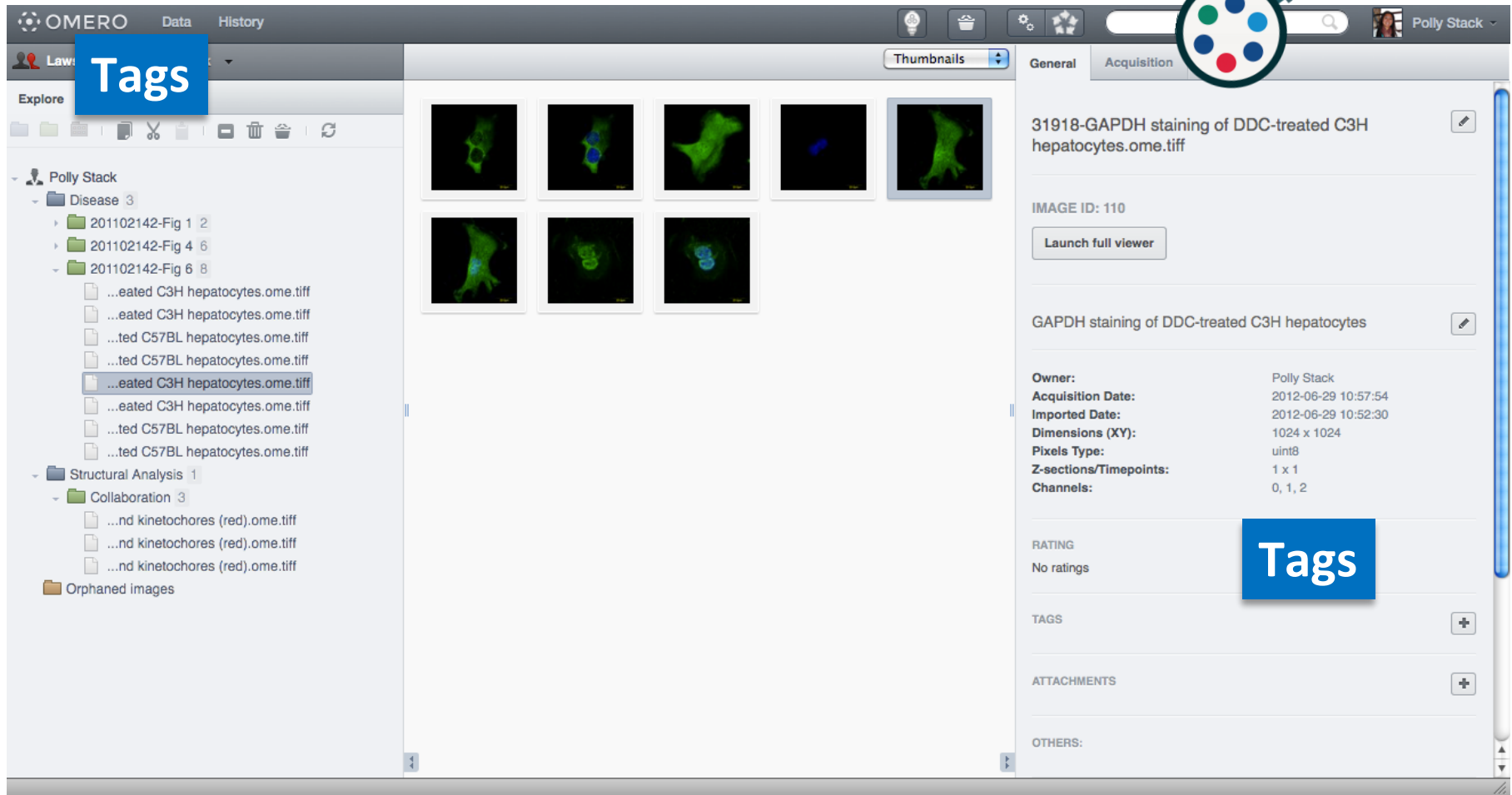
Image pyramids



<https://www.openmicroscopy.org/bio-formats>

Image management

Search engine



The screenshot displays the OMERO web interface. On the left, a file explorer shows a tree structure under 'Polly Stack' with folders for 'Disease' and 'Structural Analysis'. A blue 'Tags' box is overlaid on the 'Explore' section. The main area shows a grid of image thumbnails. On the right, a detailed view of an image is shown, including its title, image ID, and metadata. A blue 'Tags' box is overlaid on the 'TAGS' section of the metadata panel.

OMERO Data History

Tags

Explore

Polly Stack

- Disease 3
 - 201102142-Fig 1 2
 - 201102142-Fig 4 6
 - 201102142-Fig 6 8
 - ...eated C3H hepatocytes.ome.tiff
 - ...eated C3H hepatocytes.ome.tiff
 - ...ted C57BL hepatocytes.ome.tiff
 - ...ted C57BL hepatocytes.ome.tiff
 - ...eated C3H hepatocytes.ome.tiff
 - ...ted C57BL hepatocytes.ome.tiff
 - ...ted C57BL hepatocytes.ome.tiff
- Structural Analysis 1
 - Collaboration 3
 - ...nd kinetochores (red).ome.tiff
 - ...nd kinetochores (red).ome.tiff
 - ...nd kinetochores (red).ome.tiff
- Orphaned images

Thumbnails

General Acquisition

31918-GAPDH staining of DDC-treated C3H hepatocytes.ome.tiff

IMAGE ID: 110

Launch full viewer

GAPDH staining of DDC-treated C3H hepatocytes

Owner: Polly Stack

Acquisition Date: 2012-06-29 10:57:54

Imported Date: 2012-06-29 10:52:30

Dimensions (XY): 1024 x 1024

Pixels Type: uint8

Z-sections/Timepoints: 1 x 1

Channels: 0, 1, 2

RATING

No ratings

TAGS

ATTACHMENTS

OTHERS:

Tags

Image management

Search engine

The screenshot displays the OMERO web interface. On the left, the 'Explore' sidebar shows a tree view of data under 'Polly Stack', including folders for 'Disease' and 'Structural Analysis'. A blue box labeled 'Tags' is overlaid on the sidebar. The main area shows a grid of image thumbnails. On the right, the 'General' tab is active, displaying metadata for a selected image: '31918-GAPDH staining of DDC-treated C3H hepatocytes.ome.tiff'. A blue box labeled 'Metadata' is overlaid on this section. Below the metadata, there are sections for 'RATING' (No ratings), 'TAGS', 'ATTACHMENTS', and 'OTHERS'. A blue box labeled 'Tags' is overlaid on the 'TAGS' section, and another blue box labeled 'Attach files' is overlaid on the 'ATTACHMENTS' section. A magnifying glass icon is positioned over the search bar at the top right of the interface.

Image management

BIO-FORMATS

Search engine

Scripts



Tags

The screenshot displays the OMERO web interface. On the left is a file explorer showing a tree structure under 'Polly Stack' with folders like 'Disease' and 'Structural Analysis', and various image files. The main area shows a grid of image thumbnails. On the right is a metadata panel for a selected image, showing details like 'IMAGE ID: 110', 'Owner: Polly Stack', and 'Acquisition Date: 2012-06-29 10:57:54'. The interface includes a top navigation bar with 'OMERO', 'Data', and 'History' tabs, and a search bar with a magnifying glass icon.

Metadata

Tags

Attach files

OMERO iViewer

Open multi-selected images

The screenshot displays the OMERO iViewer interface for a file named 'scram_06.r3d'. It features two side-by-side image windows, each showing a Z-projection of a multi-channel image. The left window shows a blue channel with a white outline and two white arrows pointing to specific features. The right window shows a green channel with a white outline and two white arrows pointing to the same features. A red box highlights the 'Multi-D Scroll Z projection' callout in the left window. The interface includes a menu bar (File, ROIs, Help), a toolbar with various icons, and a right-hand panel with 'Info', 'Settings', and 'ROIs [3]' tabs. The 'ROIs [3]' tab is active, showing a table of ROIs.

Show	Z	T	C	Comment
<input checked="" type="checkbox"/>		21	1	
<input checked="" type="checkbox"/>		1		
<input checked="" type="checkbox"/>		1		

OMERO iViewer

Open multi-selected images

The screenshot displays the OMERO iViewer interface for a file named 'scram_06.r3d'. It features two side-by-side image windows. The left window shows a blue fluorescence image with a white ROI outline and a blue text box that reads 'Multi-D Scroll Z projection'. The right window shows a multi-color fluorescence image (green, yellow, red) with a white ROI outline and a scale bar of 5.04 μm. A vertical scroll bar on the left of the first window is highlighted with a red box. On the right side, a control panel is also highlighted with a red box, containing buttons for 'Save', 'Undo', 'Redo', 'Show Comments', 'Edit', and 'Delete', along with a table of ROIs.

Show	Z	T	C	Comment
<input checked="" type="checkbox"/>	△	21	1	
<input checked="" type="checkbox"/>	↖		1	
<input checked="" type="checkbox"/>	↖		1	

Draw and customize ROIs
Measure
Extract new images

OMERO iViewer

Open multi-selected images

The screenshot displays the OMERO iViewer interface with two image windows side-by-side. The left window shows a blue fluorescence image with a white ROI outline and a blue text box labeled "Multi-D Scroll Z projection". The right window shows a green and red fluorescence image with a white ROI outline and a scale bar of 5.04 μm. A red box highlights the right-hand control panel, which includes buttons for Save, Undo, Redo, Show Comments, Edit, and Delete, as well as a table of ROIs.

<input checked="" type="checkbox"/>	Show	Z	T	C	Comment	
<input checked="" type="checkbox"/>		21	1			
<input checked="" type="checkbox"/>		↖	1			
<input checked="" type="checkbox"/>		↖	1			

Zoom and rotate
Global contrast adjustments

Draw and customize ROIs
Measure
Extract new images

OMERO Figure : forget the other softwares

Legends

The screenshot displays the OMERO software interface with a multi-channel microscopy figure. The main window shows a grid of images for DNA, AuroraB, tubulin, and merged channels, comparing Control siRNA and Bod1 siRNA conditions. A large blue box with the text "Easy alignment to grid" is overlaid on the grid. To the right, a "Multi-channel display" panel shows a zoomed-in view of a cell with a "Zoom" label. Below this, a "Zoom" control panel shows sliders for channels 190, 337, and 298, with a zoom level of 100%. At the bottom, a text box states "MCAK is not efficiently phosphorylated in Bod1siRNA cells. Data from JCB". The interface includes a menu bar (File, Edit, Help), a toolbar (Add Image, Delete, Export PDF), and a status bar (125, Edit Figure Legend).

Can't Save Porter et al, Bod1: 2007

Easy alignment to grid

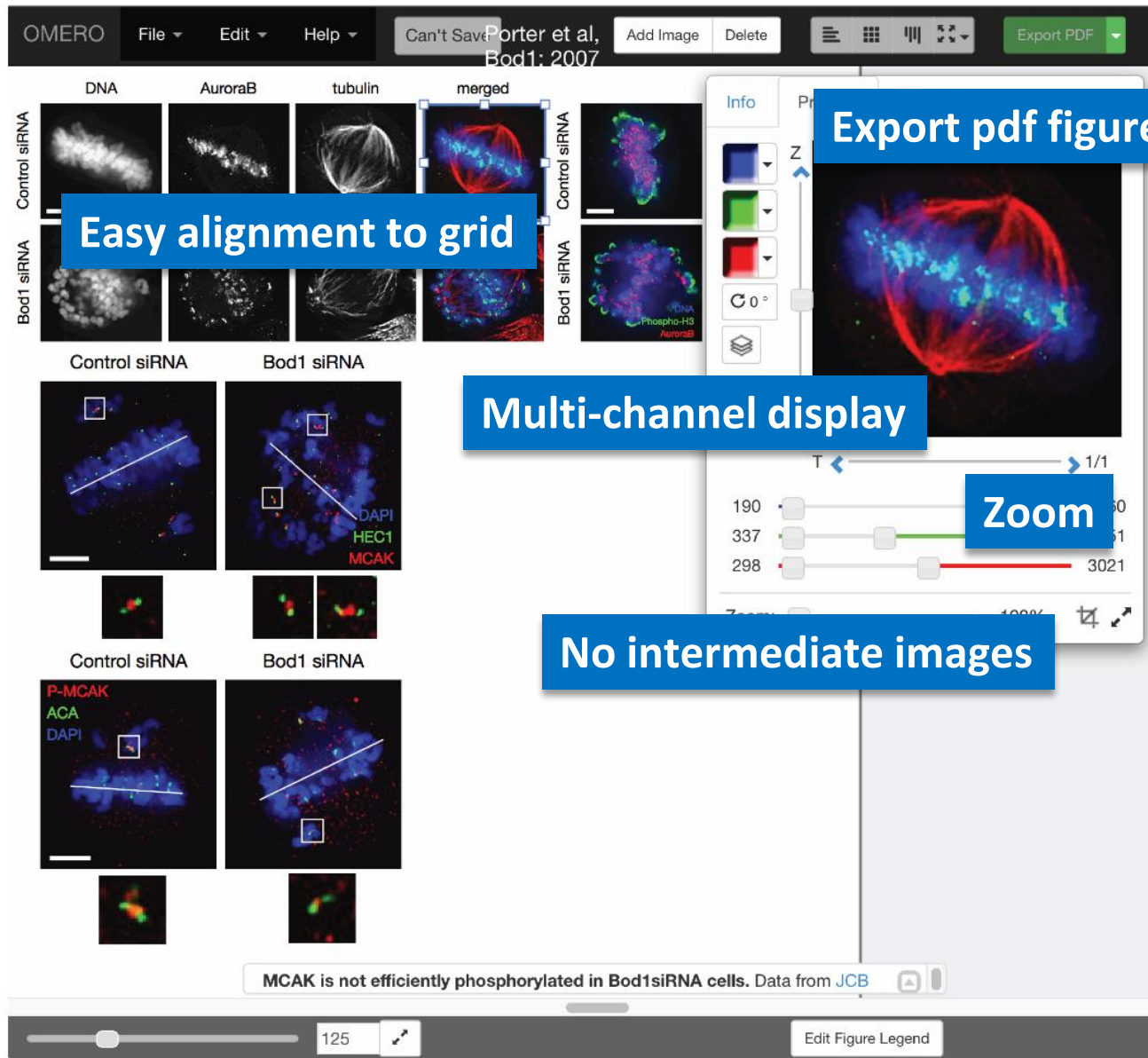
Multi-channel display

Zoom

MCAK is not efficiently phosphorylated in Bod1siRNA cells. Data from JCB

OMERO Figure : forget the other softwares

Legends



Easy alignment to grid

Export pdf figures & images

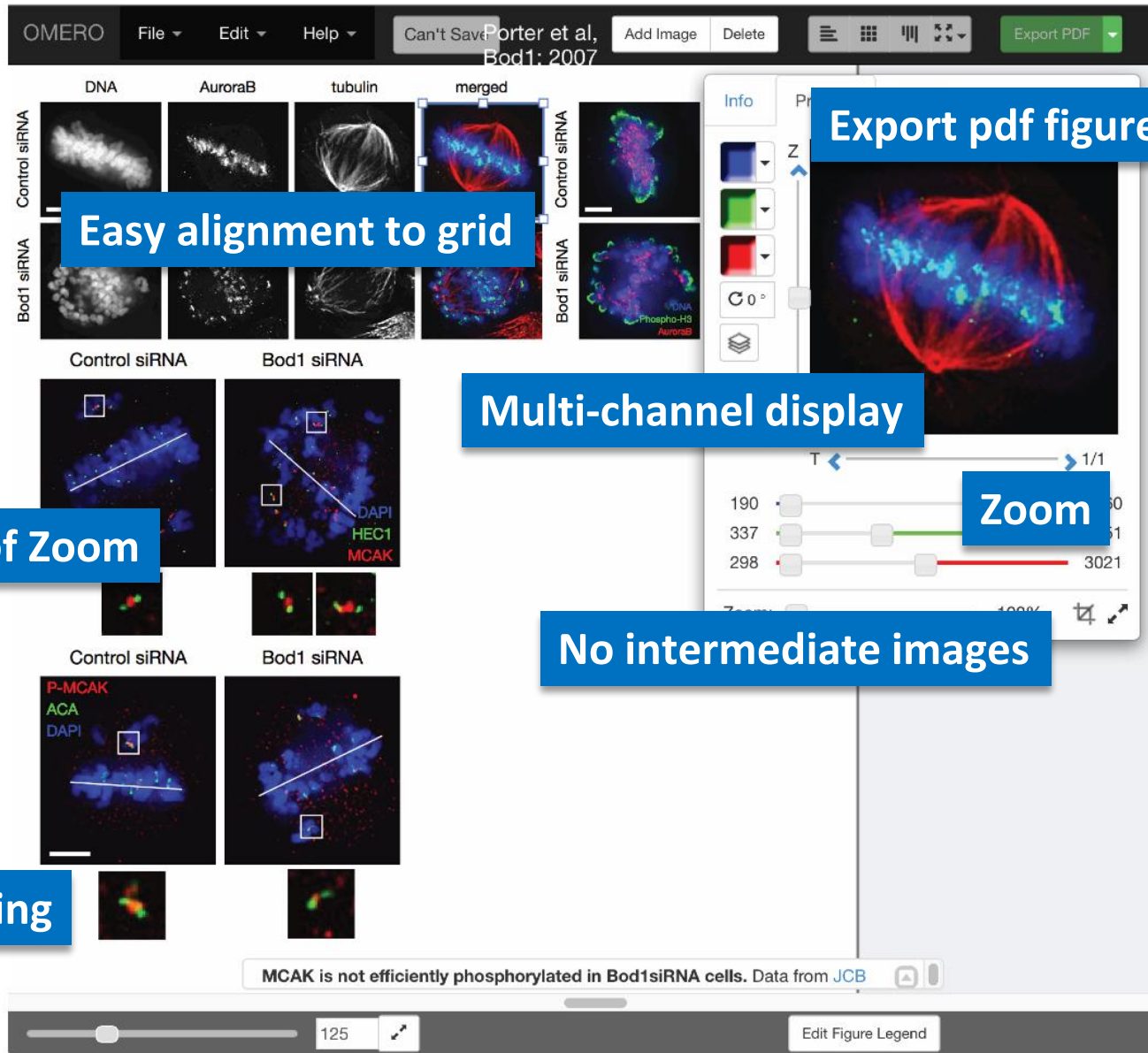
Multi-channel display

Zoom

No intermediate images

OMERO Figure : forget the other softwares

Legends



Easy alignment to grid

Export pdf figures & images

Multi-channel display

Get ROIs of Zoom

Zoom

No intermediate images

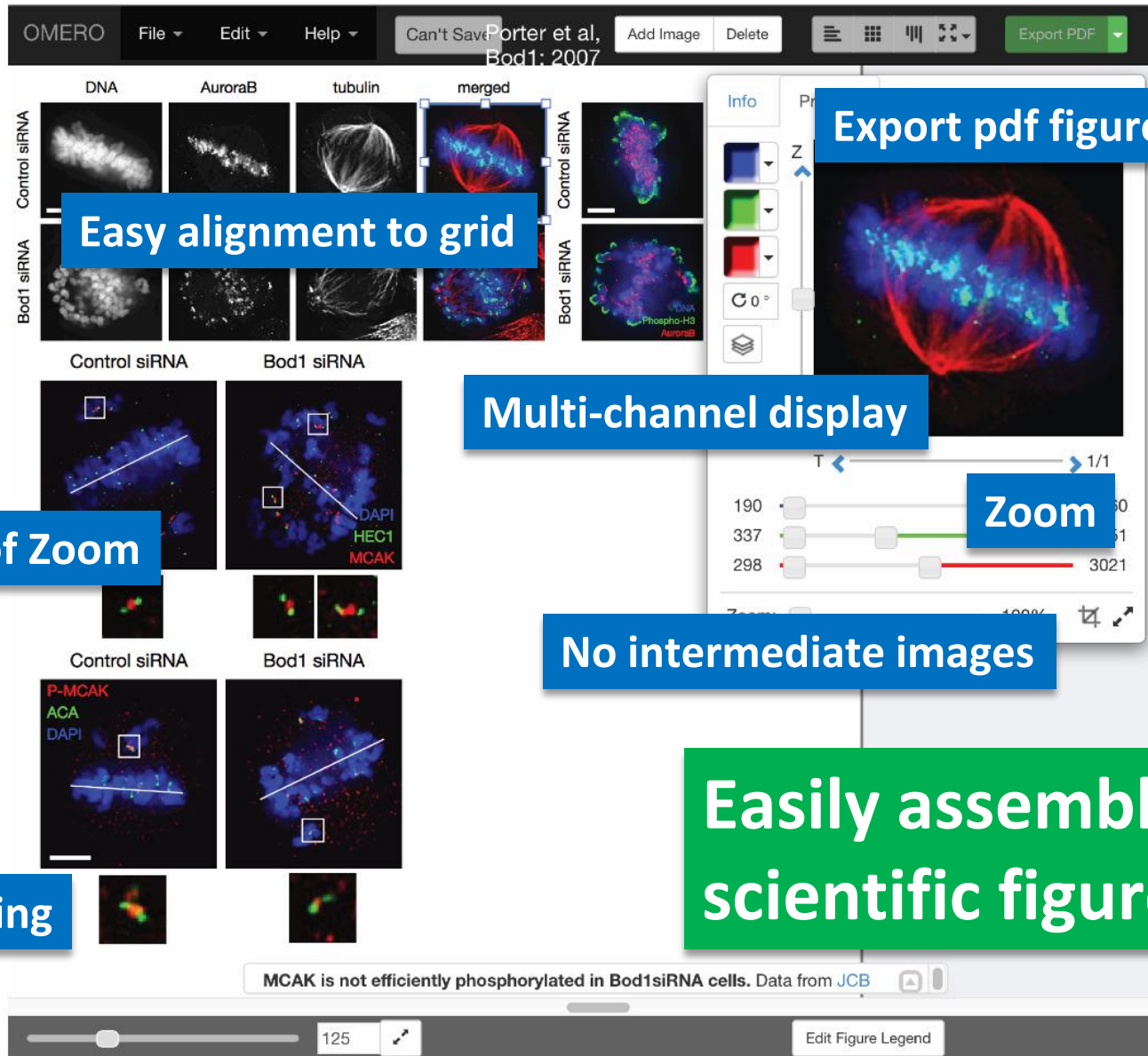
Easy scaling

MCAK is not efficiently phosphorylated in Bod1siRNA cells. Data from JCB

Edit Figure Legend

OMERO Figure : forget the other softwares

Legends



Easy alignment to grid

Export pdf figures & images

Multi-channel display

Zoom

Get ROIs of Zoom

No intermediate images

Easy scaling

Easily assemble your scientific figures !

Image Analysis

Local Desk

Galleries & Data bases

ImageJ/Fiji

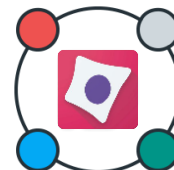
Matlab

Python

Cellprofiler

Orbit

WEB



Marimba



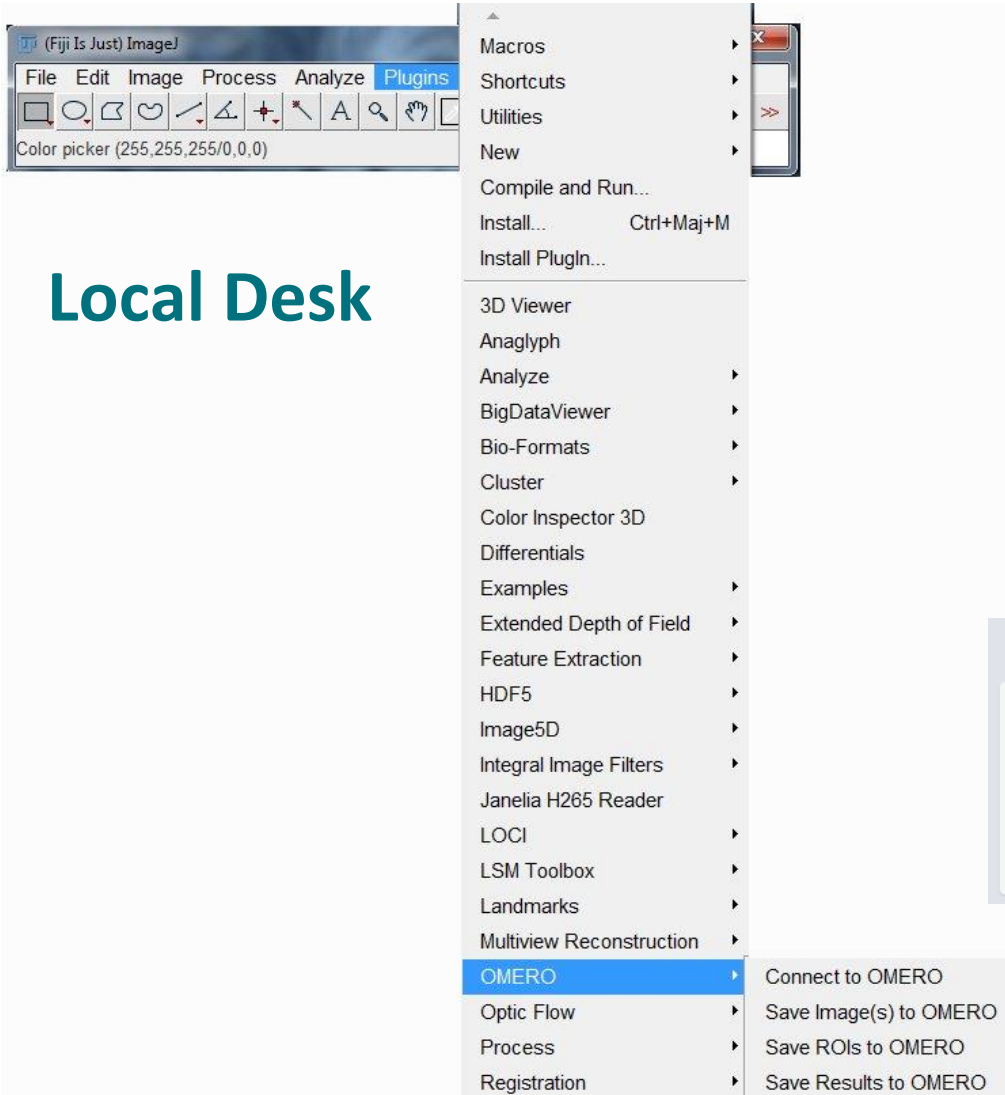
 **OMERO**



ifb
INSTITUT FRANÇAIS
DE BIOINFORMATIQUE

Image Analysis

Local Desk



The screenshot shows the Fiji software interface. The top menu bar includes File, Edit, Image, Process, Analyze, and Plugins. The Plugins menu is open, listing various tools and services. The OMERO option is highlighted in blue. To the right of the OMERO option, a sub-menu is visible with the following items:

- Connect to OMERO
- Save Image(s) to OMERO
- Save ROIs to OMERO
- Save Results to OMERO



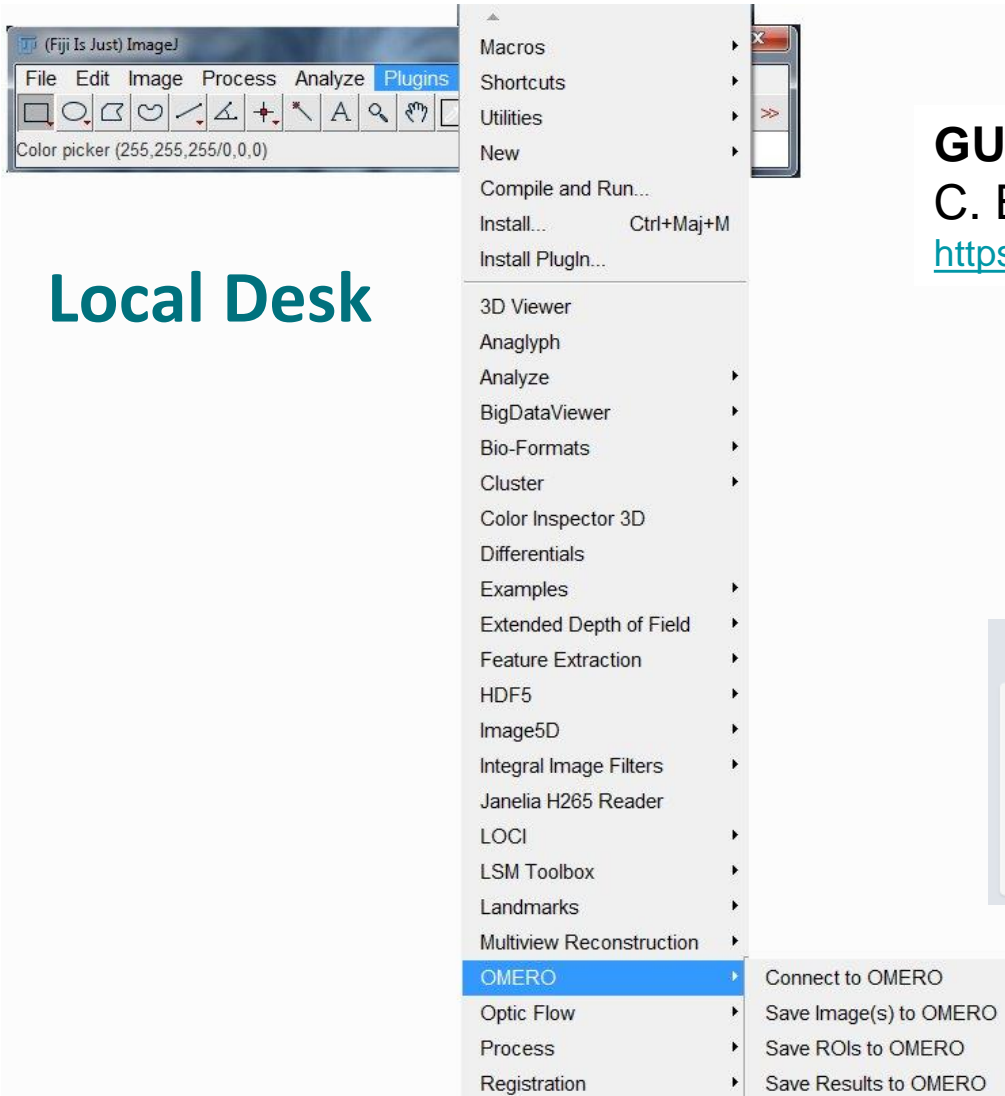
OMERO.web login form with fields for Username and Password, and a Login button. A dropdown menu shows 'omero.4064'.



OMERO logo and ifb logo (Institut Français de Bioinformatique). The ifb logo includes a stylized DNA helix and the text 'ifb INSTITUT FRANÇAIS DE BIOINFORMATIQUE'.

Image Analysis

Local Desk



Macro / Python / Groovy

GUI to batch Macros

C. Belle, M. Carvalho, M. Delannoy

https://github.com/brau-frederic/mica_omero



OMERO

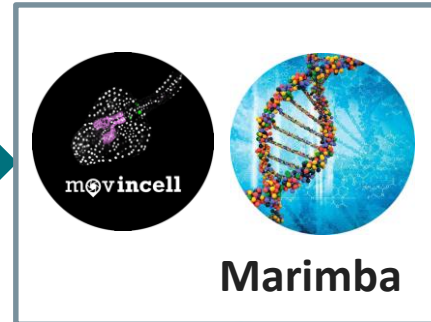
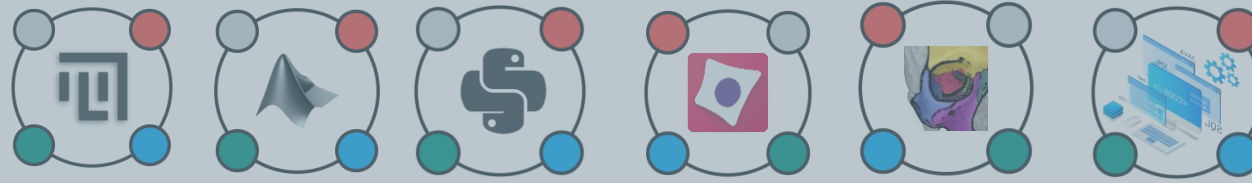


Image Analysis

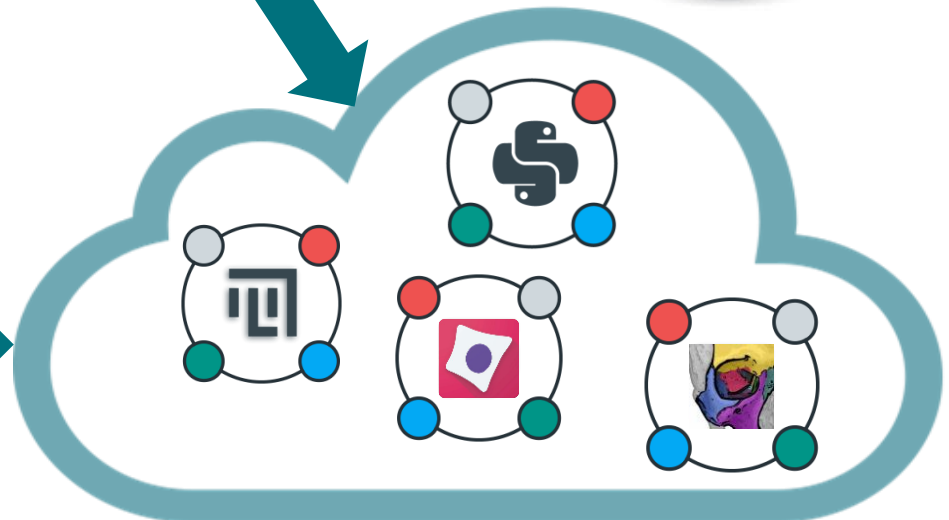
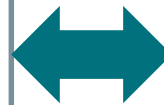
Virtual Desk

Galleries & Data bases

ImageJ/Fiji Matlab Python Cellprofiler Orbit WEB



Cloud



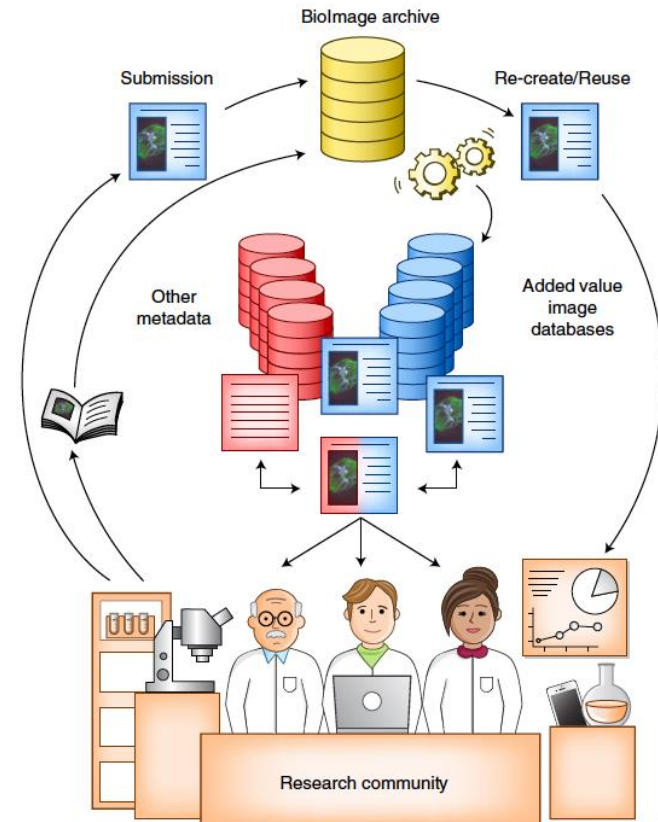
FAIR Management

Metadata integration : format compatible IDR

- **Findable**— Original Image data linked to Paper by DOI
- **Accessible**— Metadata retrievable, open API
- **Interoperable**— Uses common defined vocabularies
- **Reusable**— Licensed (CC-BY 4.0), provenance included



An online, public resource that stores, integrates and serves image datasets from published scientific studies



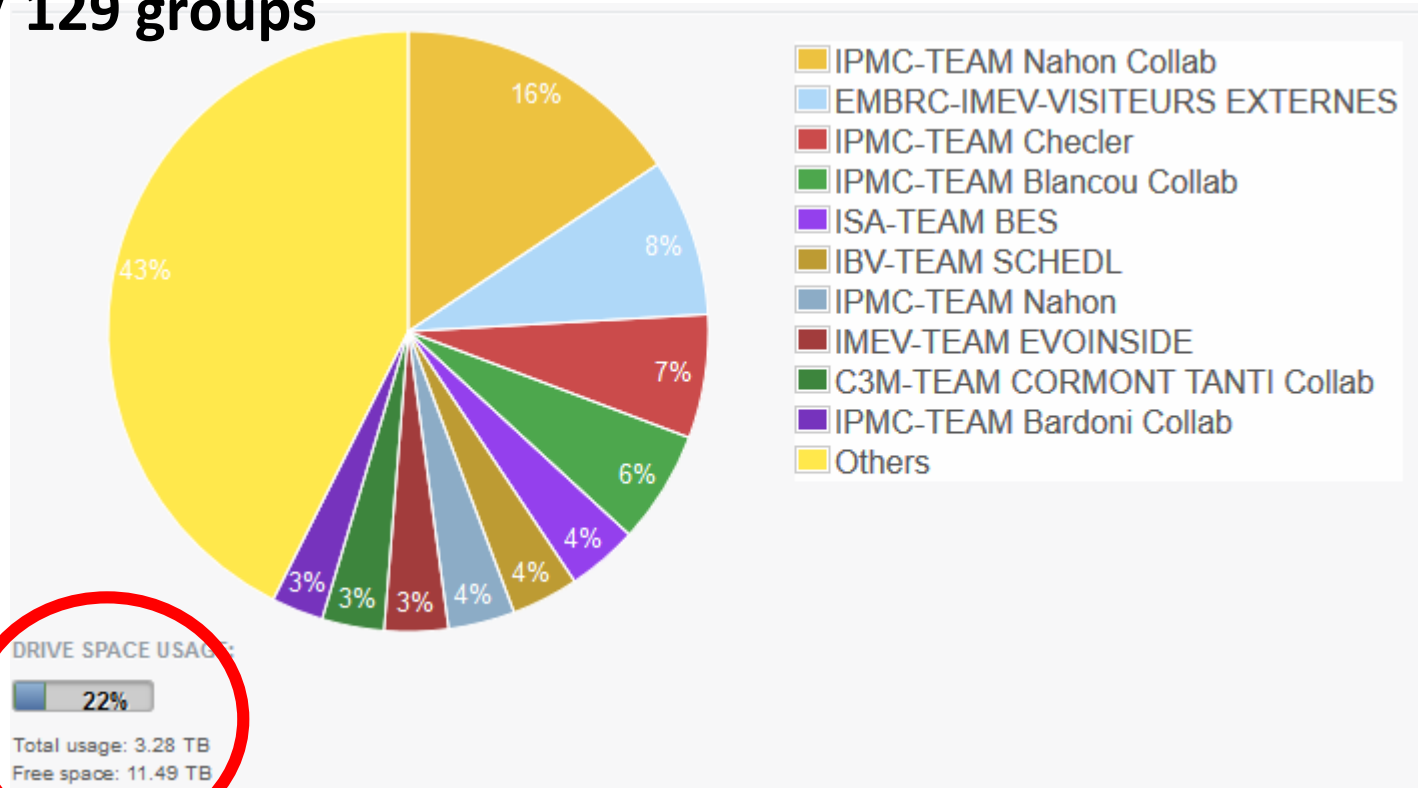
Usage report

June 2019 / today

292 / 355 users

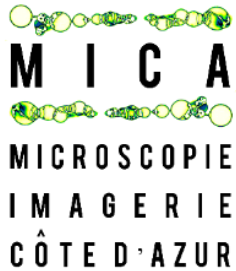
111 / 129 groups

⇒ 3,2To / 15 To ⇒ + de 21 000 images



Flexible storage volume according to needs

Communication & support



Website



Protocols
Links
FAQ
Data
Management
Plan (DMP)



Diffusion list



omero-users@univ-cotedazur.fr
Informations
Notifications
Maintenances



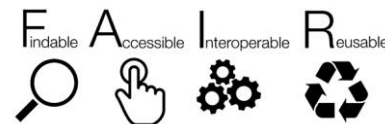
omero-support@univ-cotedazur.fr
Users
questions



Politicly



DMP
for Optimized
Sharing and
Interoperability of
Research Data



Website



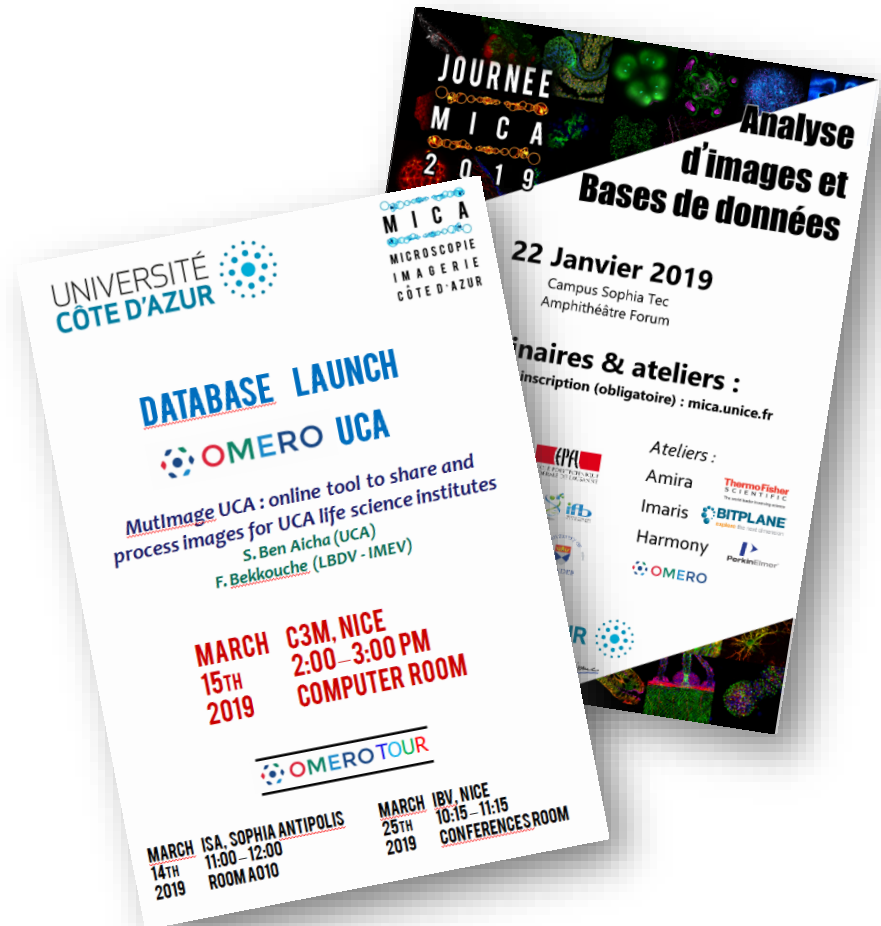
Guides
Tutorials
User Forum

Communication / trainings

Trainings 11 teams
+ > 50 people individually
1 advanced session for referents
1 CNRS session – Next in April

Lauching seminars
6 institute meetings & 1 CdE
1 Scientific day

Users workshop/ Training Omero
Dundee 2019
Montpellier 2020



April 2019 OMERO users workshop

Two days workshop on how to use OMERO held in Dundee.

Thank you for your attention



Académie 4



S. Benaïcha
C. Baron



C. Blanchet



UNIVERSITÉ
CÔTE D'AZUR

S. Ben Aïcha - F. Bekkouche - R. Arkowitz - F. Brau

DEMOCRATISONS LA SUPER-RESOLUTION

M I C A
MICROSCOPIE
IMAGERIE
CÔTE D'AZUR



Seminaries and Workshops

L. Blanc-Feraud (Valbonne)
F. Bottanelli (Berlin)
J. Dufourt (Montpellier)
P. Guichard (Geneva)
R. Laine (London)

25-26 February 2020
Valbonne - Nice

Information and registration (mandatory) : mica.unice.fr