

Using OMERO

Dundee, 2017

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University of Dundee
The OME Consortium

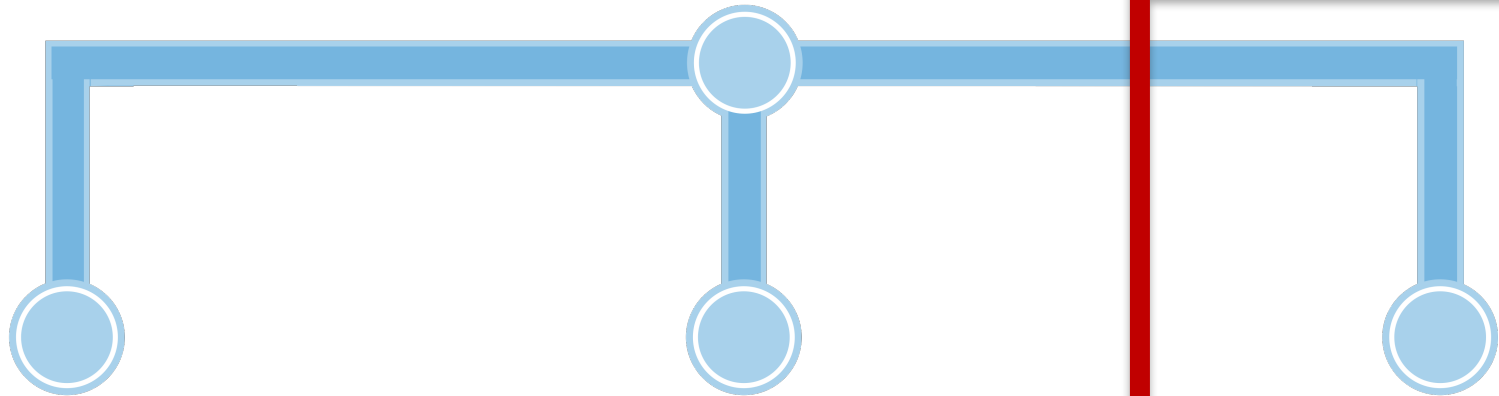


Open Microscopy Environment
Centre for Gene Regulation & Expression
School of Life Sciences, University of Dundee
Dundee, Scotland, UK

Talk Outline

- What is OMERO
- Use case
 - Typical workflow
 - **Viewing (new features, apps)**
 - **Analysis (new extensions)**
 - Publishing
- Practical Use case (demo)

What We Do



OME-XML
OME-TIFF
OMEFILES

Open
File Formats

BIO-FORMATS

Proprietary
File Format
Translation

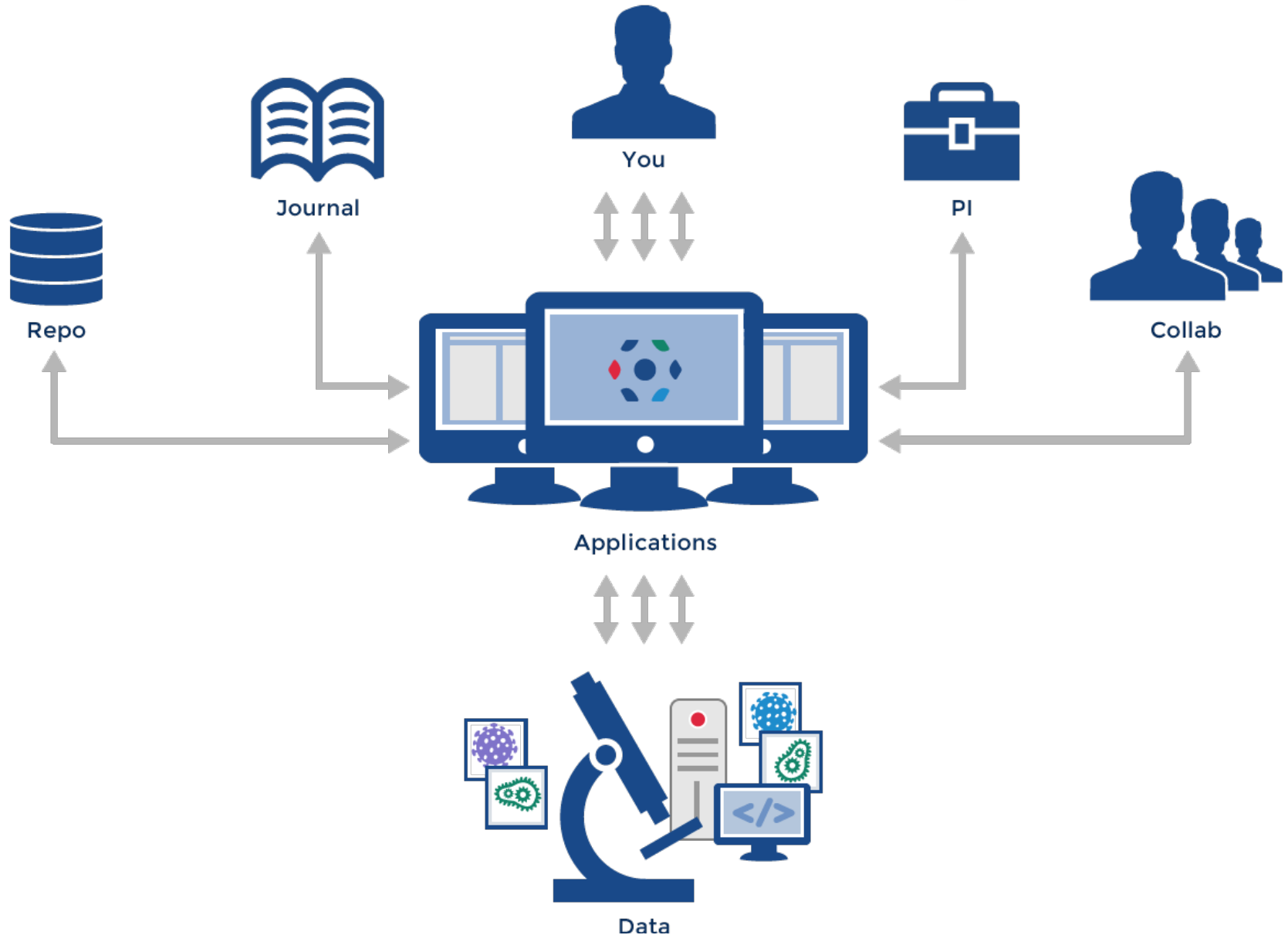
OMERO

Image Data
Management

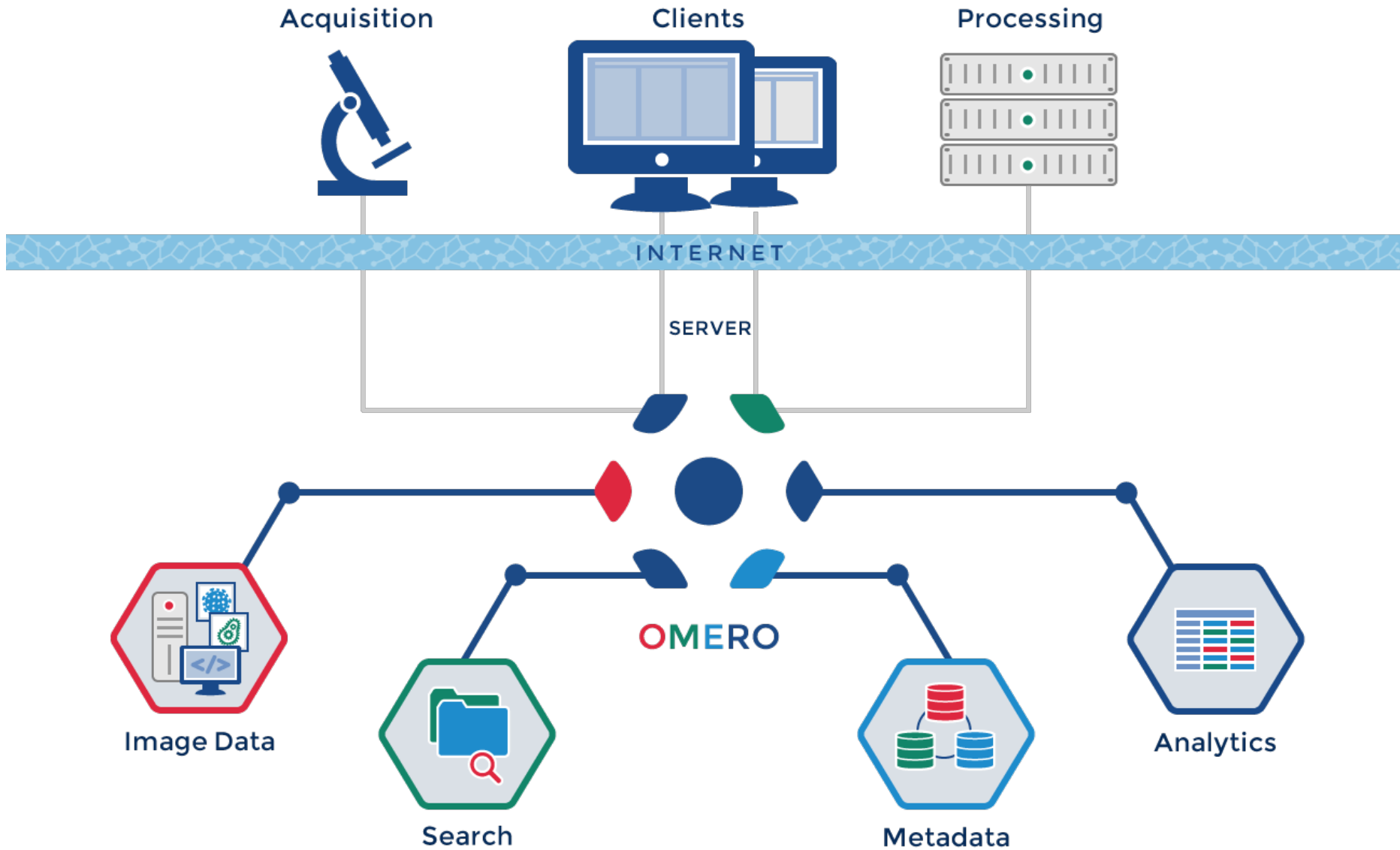
Typical tasks of an imaging scientist

- Store and organize original data
- Present the data to others
- Prepare poster and presentation
- Publish the data
- Cooperate on the data
- Analyze data with different tools
- Leave the data in a manageable state after a person left
- Re-use knowledge

The “Scientific Data” Paradigm



The OMERO Platform





USE CASE: ORGANIZE, VIEW, ANALYZE, PUBLISH

Data import - OMERO.insight, CLI

→ *See Workshop Import CLI, also Smuggler*

Import Data

Select data to import and monitor imports.

Select Data to Import

POTN2017

Name	Date Modified
Hoechst_ND_-_n000001.tif	Wednesday, 24 May 2017 18:11
nuclear_fig-5.jpeg	Wednesday, 24 May 2017 18:28
OMERO-Introduction.pptx	Wednesday, 24 May 2017 16:46
viewingDataColorPicker.png	Thursday, 4 May 2017 11:51
Workshop.pptx	Wednesday, 24 May 2017 16:46
~\$OMERO-Introduction.pptx	Thursday, 25 May 2017 09:54
~\$Workshop.pptx	Wednesday, 24 May 2017 17:44

Files to import Options

Free Space Import size: 193 KB

File or Folder	Group	Owner	Project/Data Folder as or Screen Dataset	Size
viewin...	read-only-1	user-4	POTN... <input checked="" type="checkbox"/>	193 KB

File Format: All supported file types

Close Refresh Cancel All Import

Image Data Organization with OMERO

The screenshot displays the OMERO web interface. At the top, there is a navigation bar with 'OMERO' and menu items: 'Data', 'History', 'Help', 'Tag Search', and 'Figure'. A search bar and a user profile icon labeled 'Polly Stack' are also present. Below the navigation bar, the left sidebar shows a file tree under 'Laws-Skye Polly Stack'. The tree includes folders like 'Nature Paper 2' and 'Figure 1 10', with files such as 'P-TRE_17_R3D_D3D.dv' through 'P-TRE_33.r3d_d3d'. The main area shows a grid of image thumbnails, with one selected and highlighted in blue. The right panel provides details for the selected image, 'P-TRE_22_R3D_D3D.dv', including its ID (25763), owner (Polly Stack), and various acquisition parameters like 'Import Date', 'Dimensions (XY)', 'Pixels Type', 'Pixels Size (XYZ) (µm)', 'Z-sections/Timepoints', 'Channels', and 'ROI Count'. It also features sections for 'Tags', 'Key-Value Pairs', 'Attachments', 'Ratings' (displaying 4 stars), and 'Comments'.

OMERO Data History Help Tag Search Figure

Search: Polly Stack

Laws-Skye Polly Stack

Explore Tags Shares

Filter Images

General Acquisition Preview

Full viewer

P-TRE_22_R3D_D3D.dv

Image ID: 25763
Owner: Polly Stack Show all

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

★★★★★
(avg: 4 / 1 votes)

Comments

Viewing Images - LUTs, Histogram (new features)

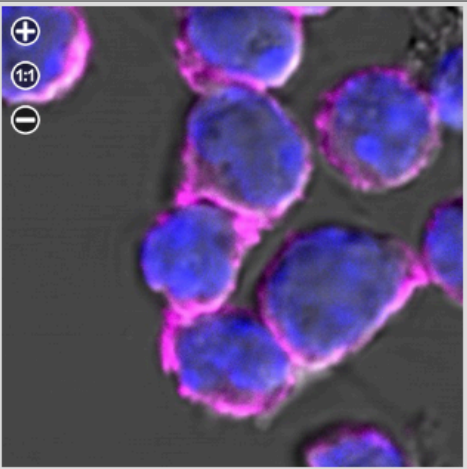
Choose color [X]

Reverse Intensity

- 3-3-2_rgb
- 5_ramps
- 6_shades
- blue_orange_icb
- brgbcmyw
- cool
- cyan_hot
- edges
- fire
- gem
- glasbey
- glasbey_inverted
- glow
- grays

Show Color Picker

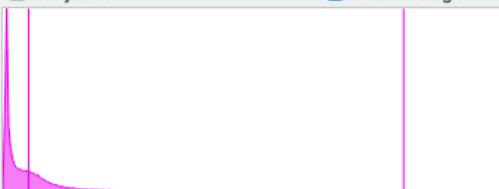
Full viewer



Z: 1/1 T: 1/1

Save Save to All Undo Redo Copy Paste

Grayscale Show Histogram



PMT 1 245 2723

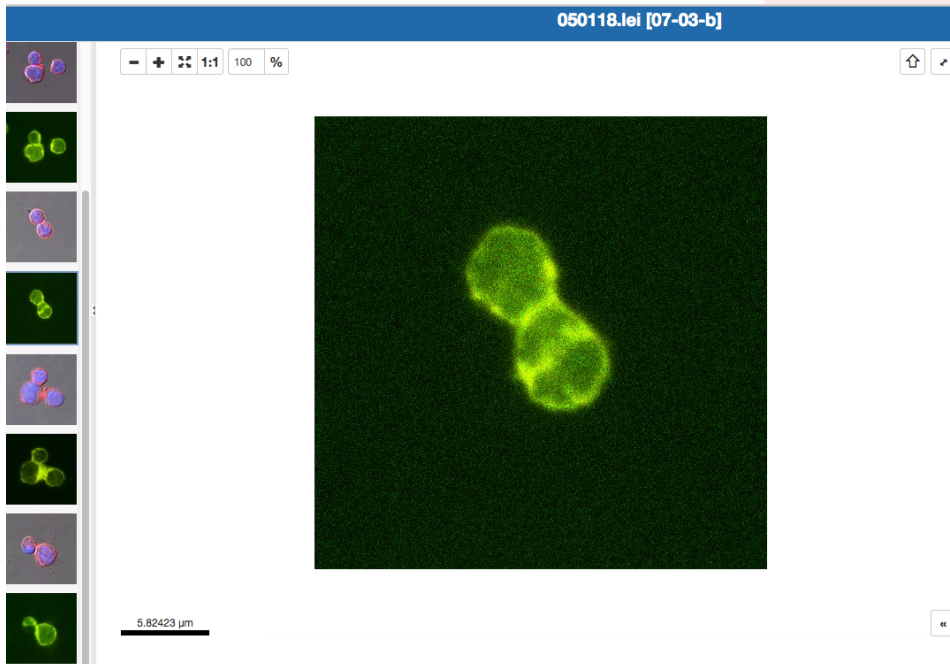
PMT 2 277 3163

PMT T... 760 3613 max: 3951

Min/Max Full Range Imported

Viewing Images – OMERO.iviewer (new viewer)

- *Google for OMERO.iviewer*
- *Go to YouTube and search for OMERO.iviewer*
- *See also Workshop OMERO.web*



The settings panel is titled "Info Settings ROIs" and includes a toolbar with "Save", "Save to All", "Undo", "Redo", "Copy", and "Paste" buttons. It has checkboxes for "Grayscale" (unchecked) and "Show Histogram" (checked). A histogram plot is visible. Below the plot are two PMT (Photomultiplier Tube) settings:

PMT	Value	Range
PMT 1	81	0 to 2152
PMT 3	137	0 to 1475

Below the PMT settings are three buttons: "Min/Max", "Full Range", and "Imported". At the bottom, the "User Settings:" section shows a small thumbnail of the image with the text "user-4 user-4" below it.

First Person Bioimage – 3D viewer from Cambridge, now in OMERO.web

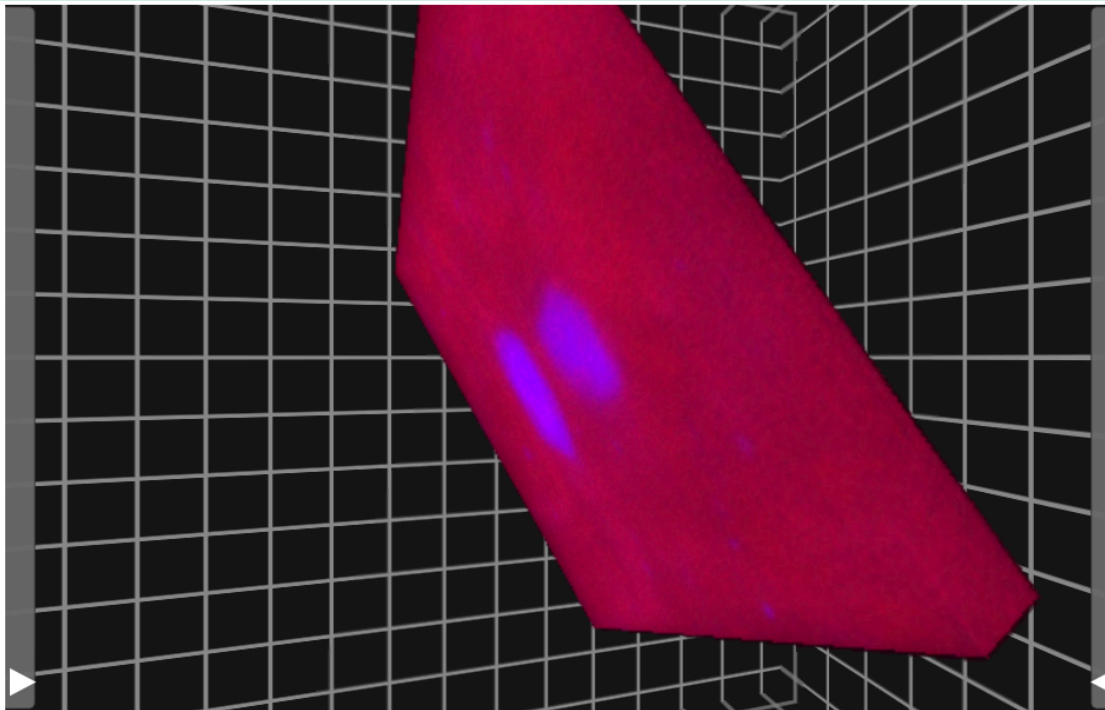
© [Marcus Fantham](#)

See the paper in [Nature Photonics](#)



UNIVERSITY OF
CAMBRIDGE

First Person Bioimage



Images generated in OMERO.



Screening data - new improved viewing layout

The screenshot displays the OMERO web interface. On the left, a file explorer shows a tree structure under 'Demo data' with folders like 'Meas_01' through 'Meas_06' and 'JL_121214_J1_1' through 'JL_130120_J6_7'. The main area shows a grid of 8x8 images labeled 'Field#1' with axes A-H and 1-8. A zoomed-in view of a single image is shown below the grid. On the right, a sidebar contains metadata for 'Experiment.exp [F06 Field #24]', including 'Image ID: 81589', 'Owner: user-4 user-4', and 'Image Details' such as 'Dimensions (XY): 1344 x 1024' and 'Channels: DAPI, GFP, Cy3, Trans'. A red arrow points from the 'Image Details' section to a larger, highlighted image at the bottom of the page.

OMERO Data History Help Search: Public User

demo

Explore Tags Public

Index: Field#1

General Acquisition Preview

Full viewer

Experiment.exp [F06 Field #24]

Image ID: 81589
Owner: user-4 user-4 Show all

Image Details

Add Description

Image ID: 81589
Dimensions (XY): 1344 x 1024
Pixels: uint16
Dimensions (XYZ) (µm): 0.65 x 0.65 x -
Z-sections: 1 x 1
Channels: DAPI, GFP, Cy3, Trans
ROI Count: 0

Tags

Key-Value Pairs 0

Table

Attachments 0

Comments 0

Rating 0

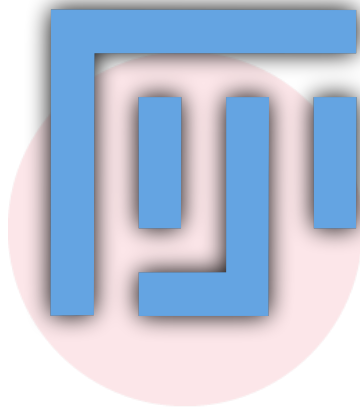
Other 0

Image Details

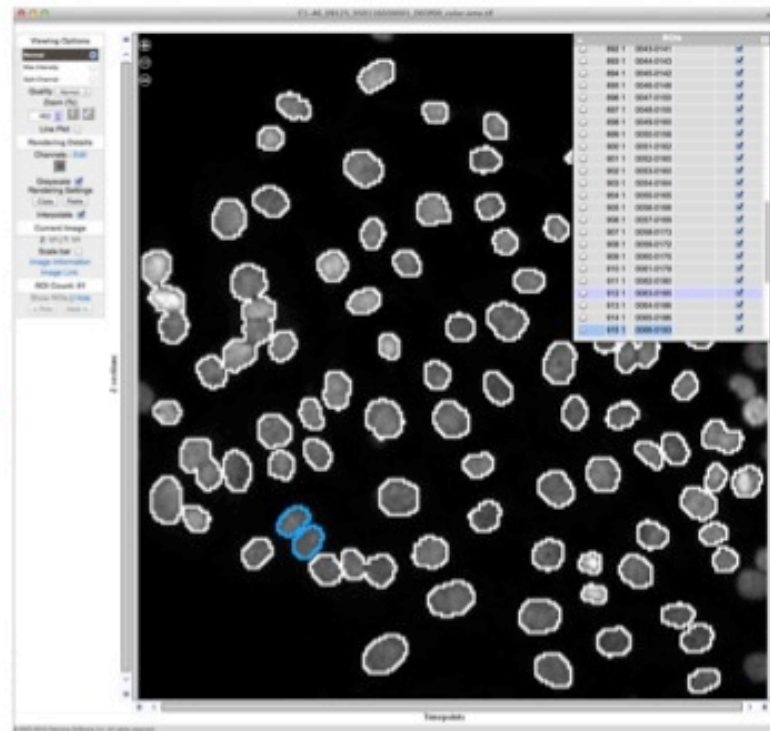
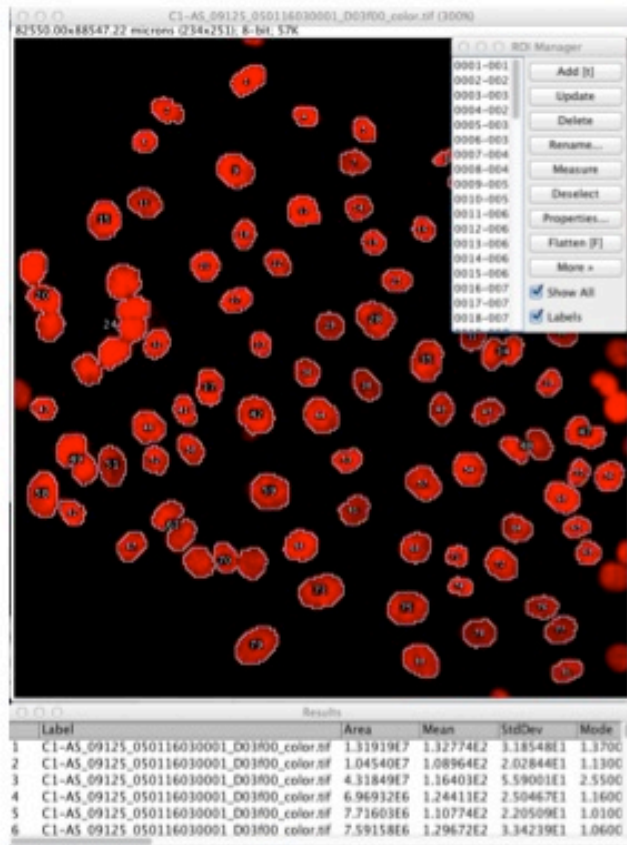
Examples of Analysis Integration

- *See Workshop(s) Analyzing data in OMERO (R and Matlab)*
- *See Workshop IDR Annotations tour (coinciding with this one)*
- *See Webinars at glencoesoftware.com for Matlab, Jupyter example*
- FLIMfit– fluorescence lifetime fitting (Matlab)
- WND-CHRM-- weighted nearest neighbor machine learning (Python)
- ThunderSTORM and PALMSiever– Localisation SRM (ImageJ, Matlab)
- OMERO2CV– LSFM Multi-View Reconstruction (C++, OpenCV, ITK)
- uTrack– Globally optimised object tracking (Matlab)
- CellProfiler– HCS segmentation and features (Python)
- mTools– Otsu, basic segmentation (Matlab)
- **ImageJ/Fiji**, Icy– Pluggable, desktop Image processing tools (Java)
- Columbus Acapella[®]-- commercial Big Data processing...

Users Can Develop Too!

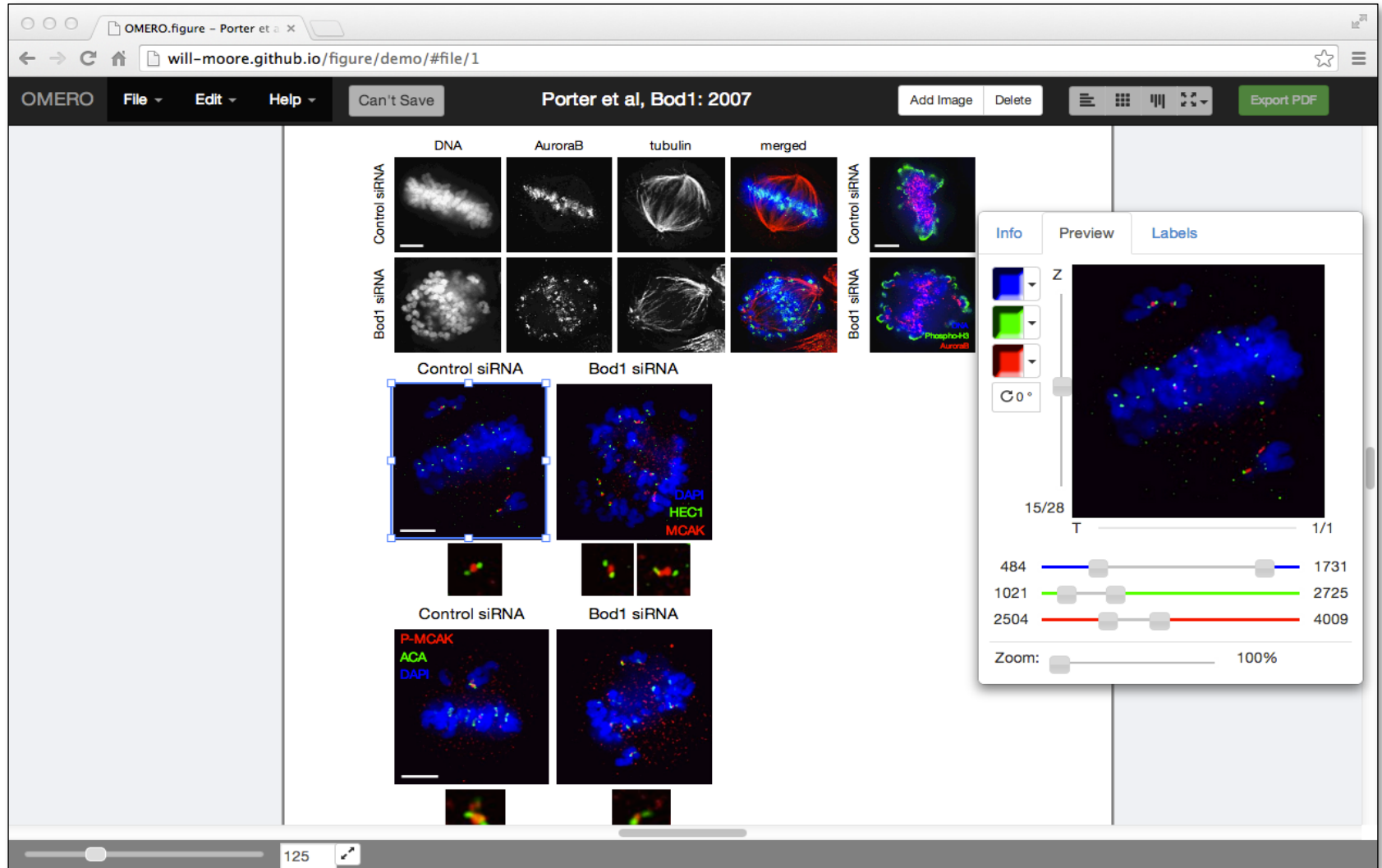


ImageJ and OMERO



OMERO.figure

→ See also Workshop *OMERO.web*



Some useful links

- OMERO Downloads:

- <http://downloads.openmicroscopy.org/omero/>

- OMERO Help Pages:

- <http://help.openmicroscopy.org/>

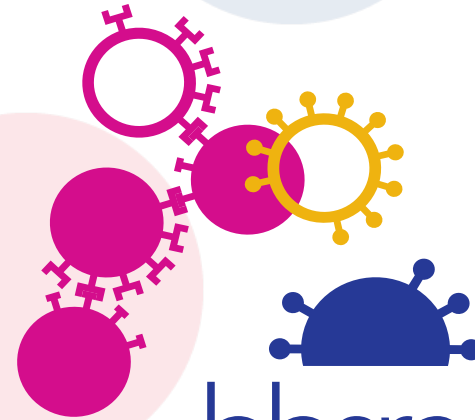
- OMERO Forums:

- <https://www.openmicroscopy.org/community/>

- OMERO demo server:

- <http://help.openmicroscopy.org/demo-server.html>

Thank to Funders

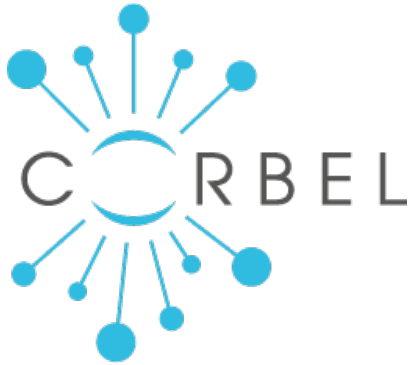


MULTI



bbsrc

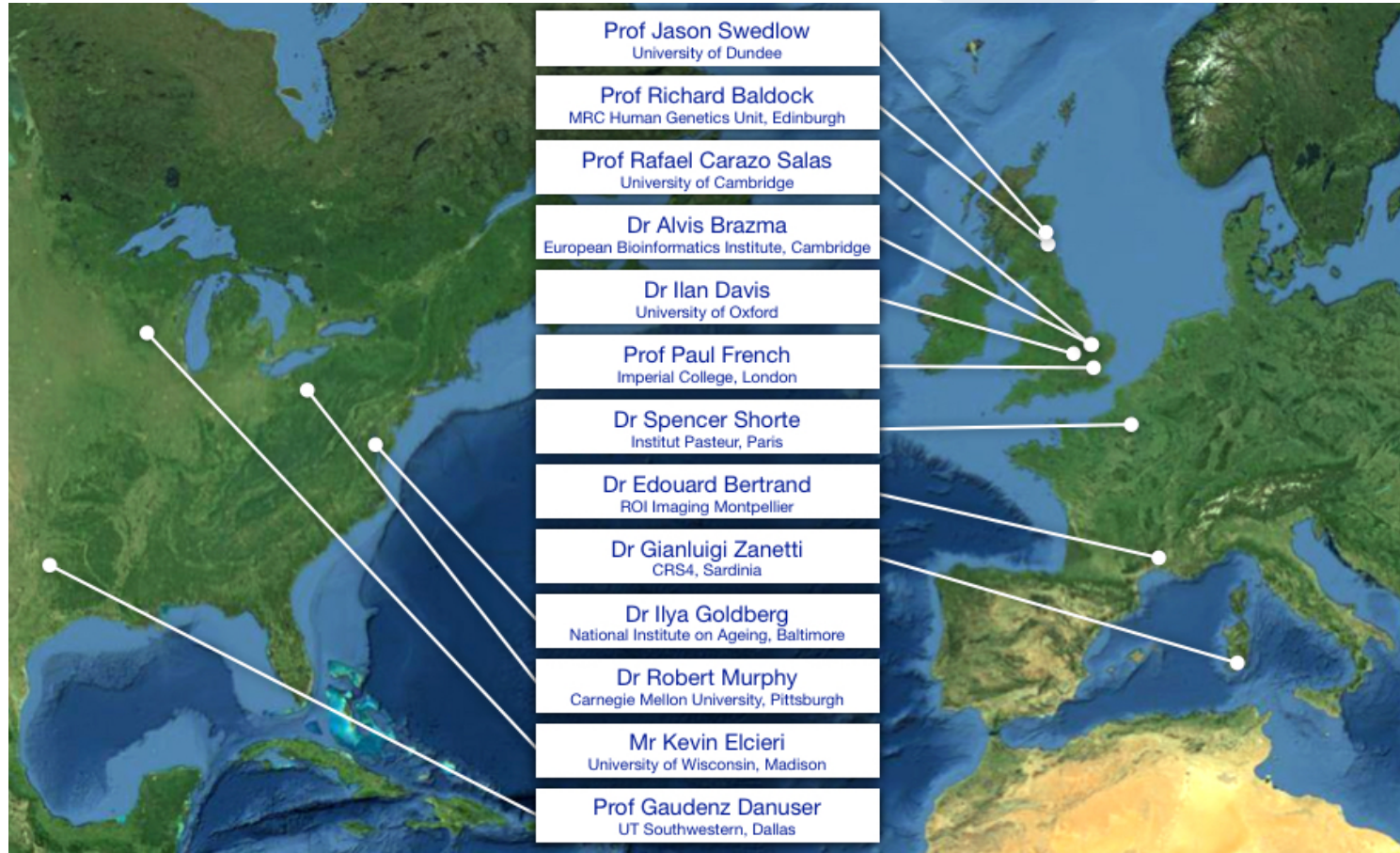
biotechnology and biological sciences
research council



GLOBAL
BIOIMAGING
growing collaboration



OME Consortium



Dundee, UW Madison, UT Southwestern, Oxford, CRS4, Montpellier, Edinburgh, CMU, Imperial, NIA, Institut Pasteur, EMBL-EBI, Glencoe Software