

# OMERO

## Users Training day

### Cambridge, July 2016

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# Programme of the day

- Short introduction to OMERO
- Getting Started, Importing, Managing, Viewing Data
- **Coffee**
- Exporting Data, Scripts and Batch Actions, Sharing
- OMERO.figure
- **Lunch**
- Basic analysis, Sharing and Permissions
- **Coffee**
- Using ImageJ/Fiji for analysis of your OMERO data

# Outline

- Scientific Data paradigm
- What is OMERO
- Sharing data with OMERO
- Publishing with OMERO
- Analyzing with OMERO
- Questions

# The Standard Paradigm

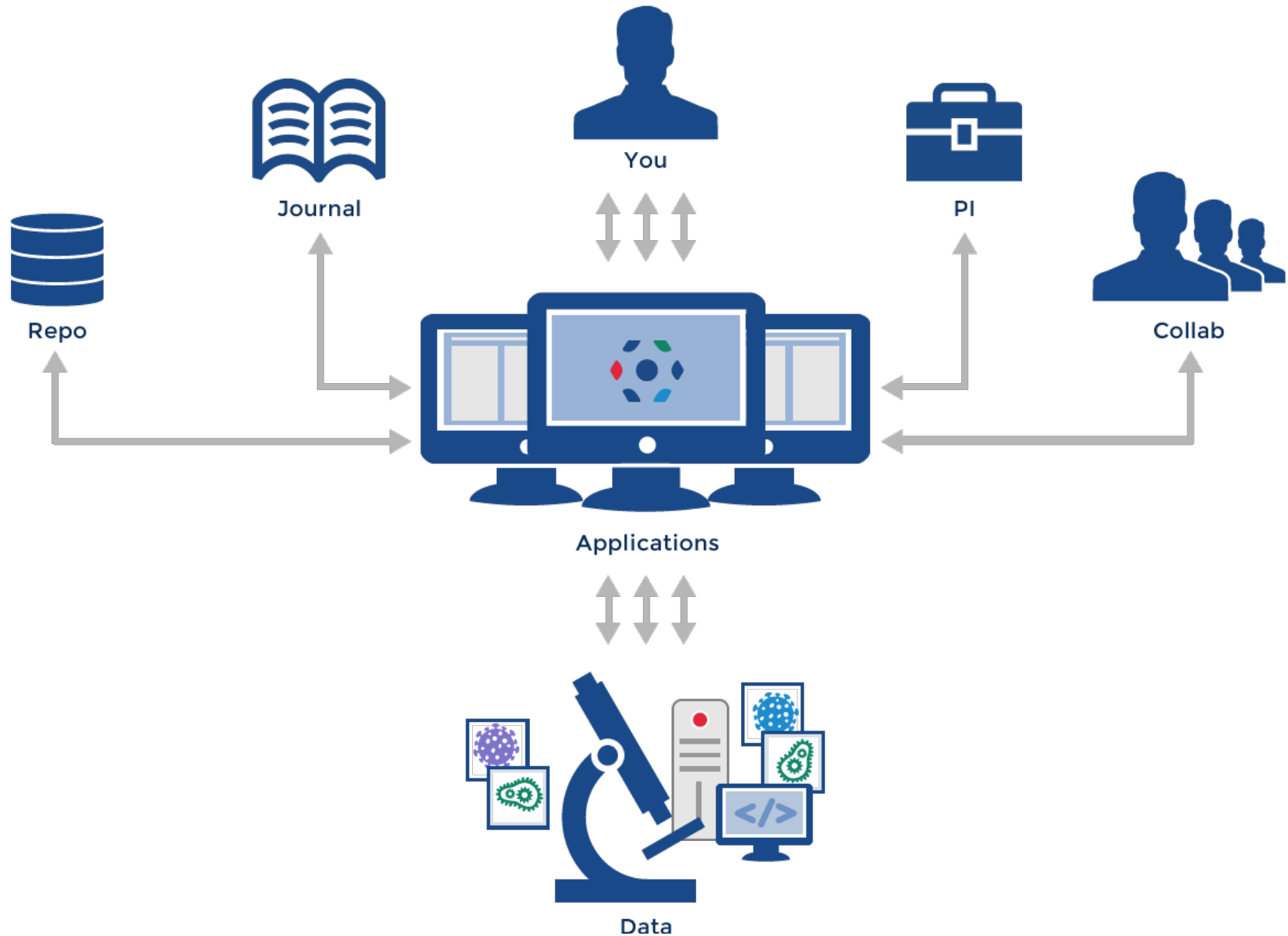




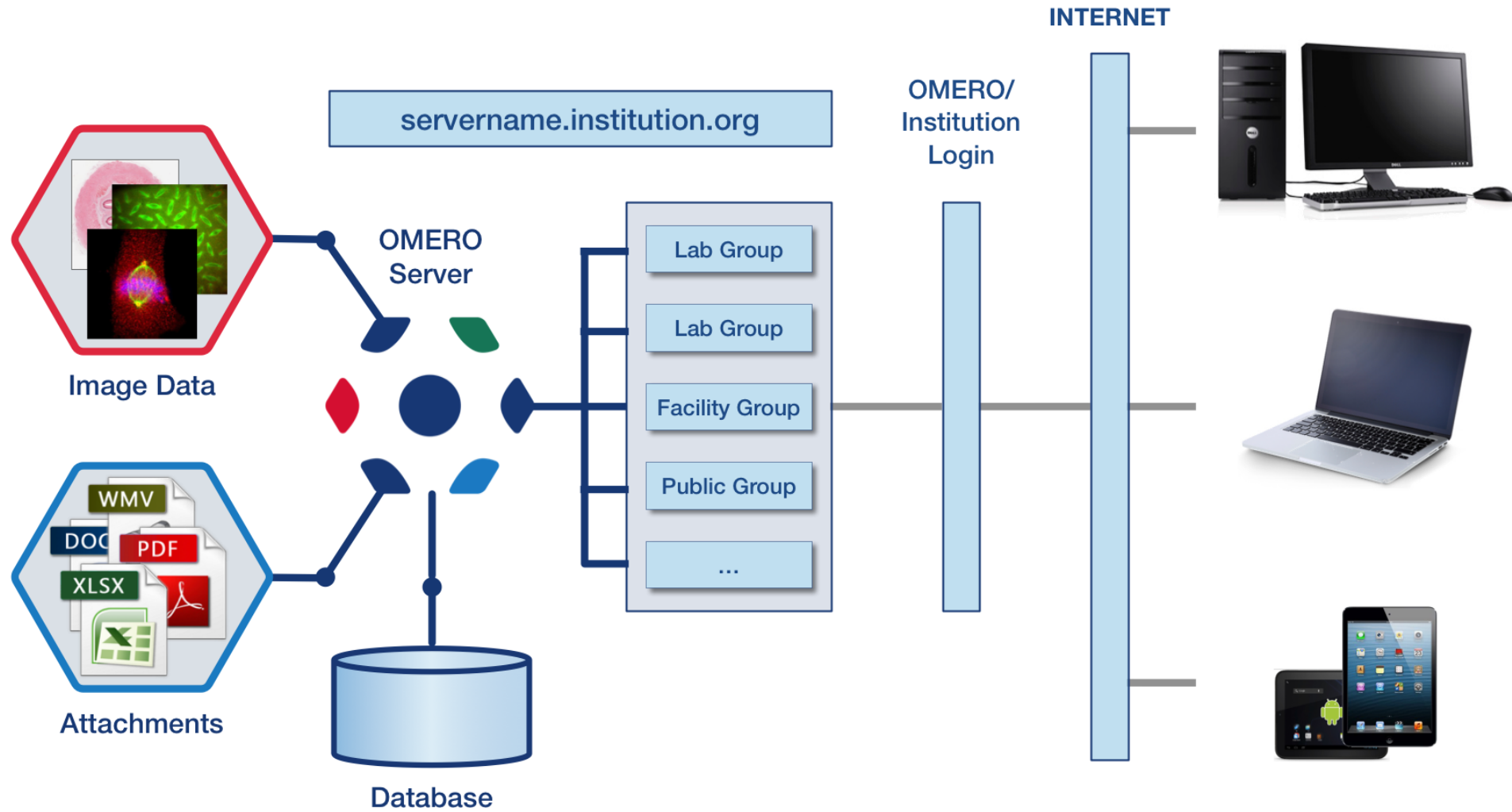
# What about

- Organizing your data?
- Sharing data with coworkers and colleagues?
- Analyzing data?
- Publishing data?

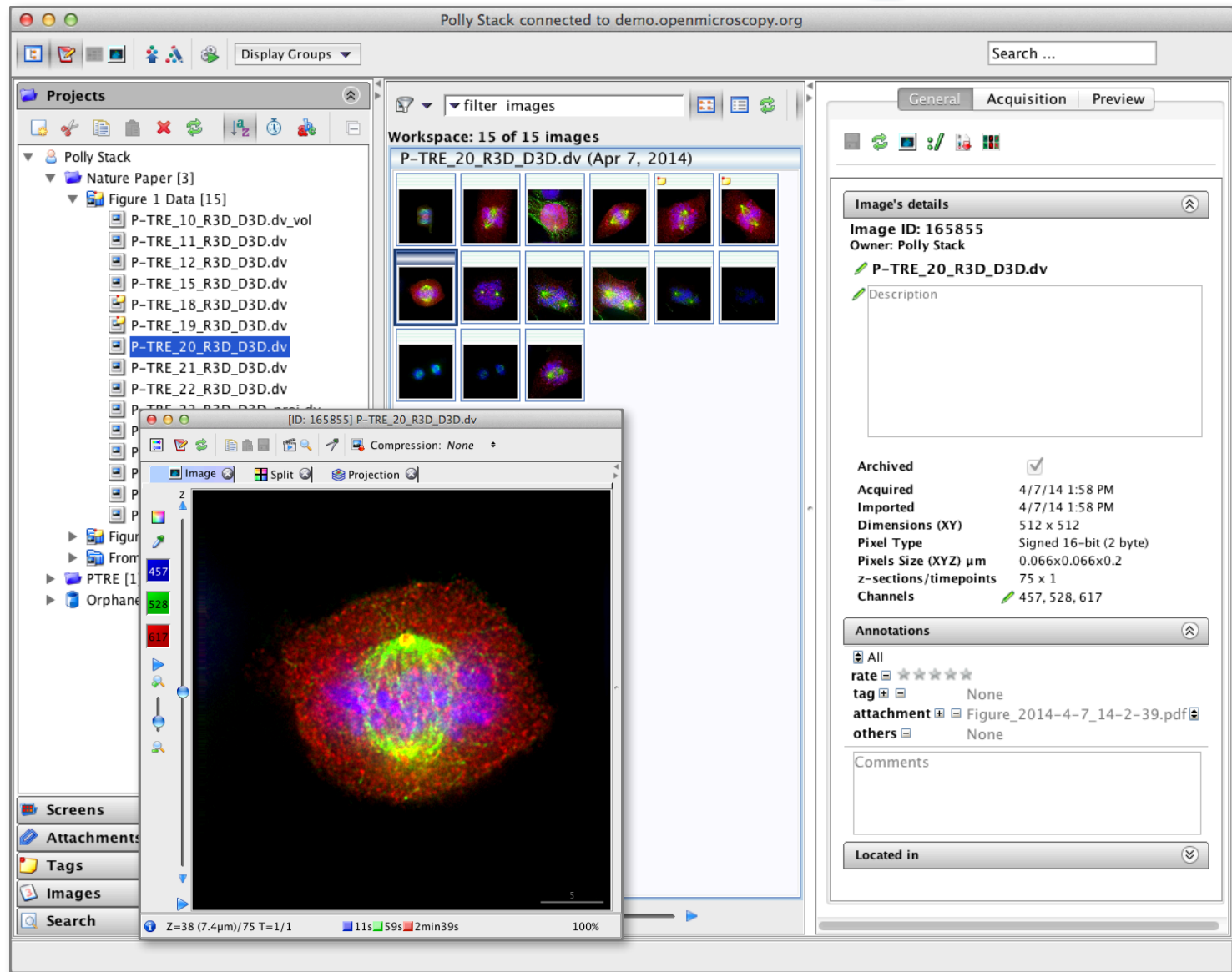
# The “Scientific Data” Paradigm



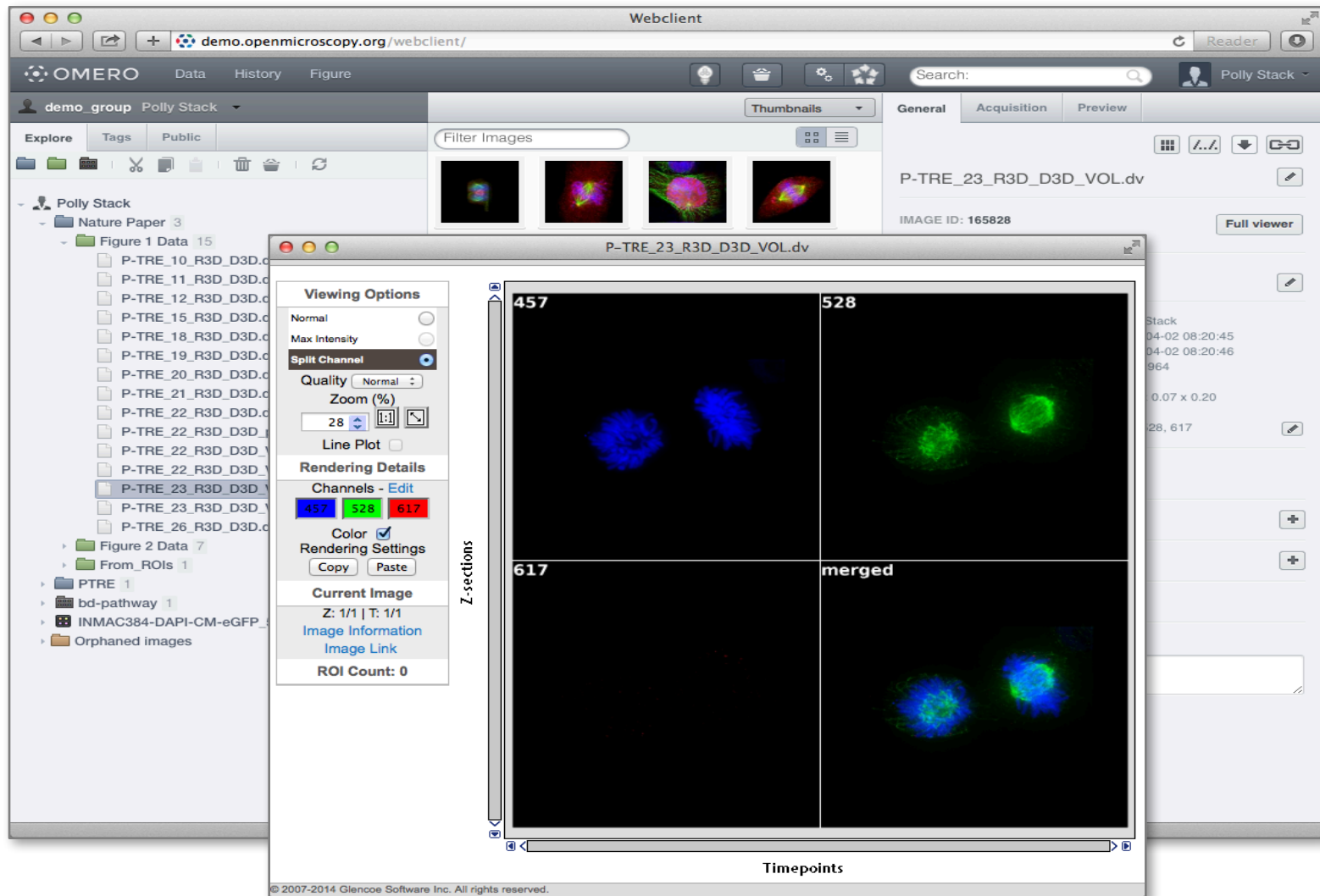
# OMERO setup



# OMERO.insight: Desktop Based Application



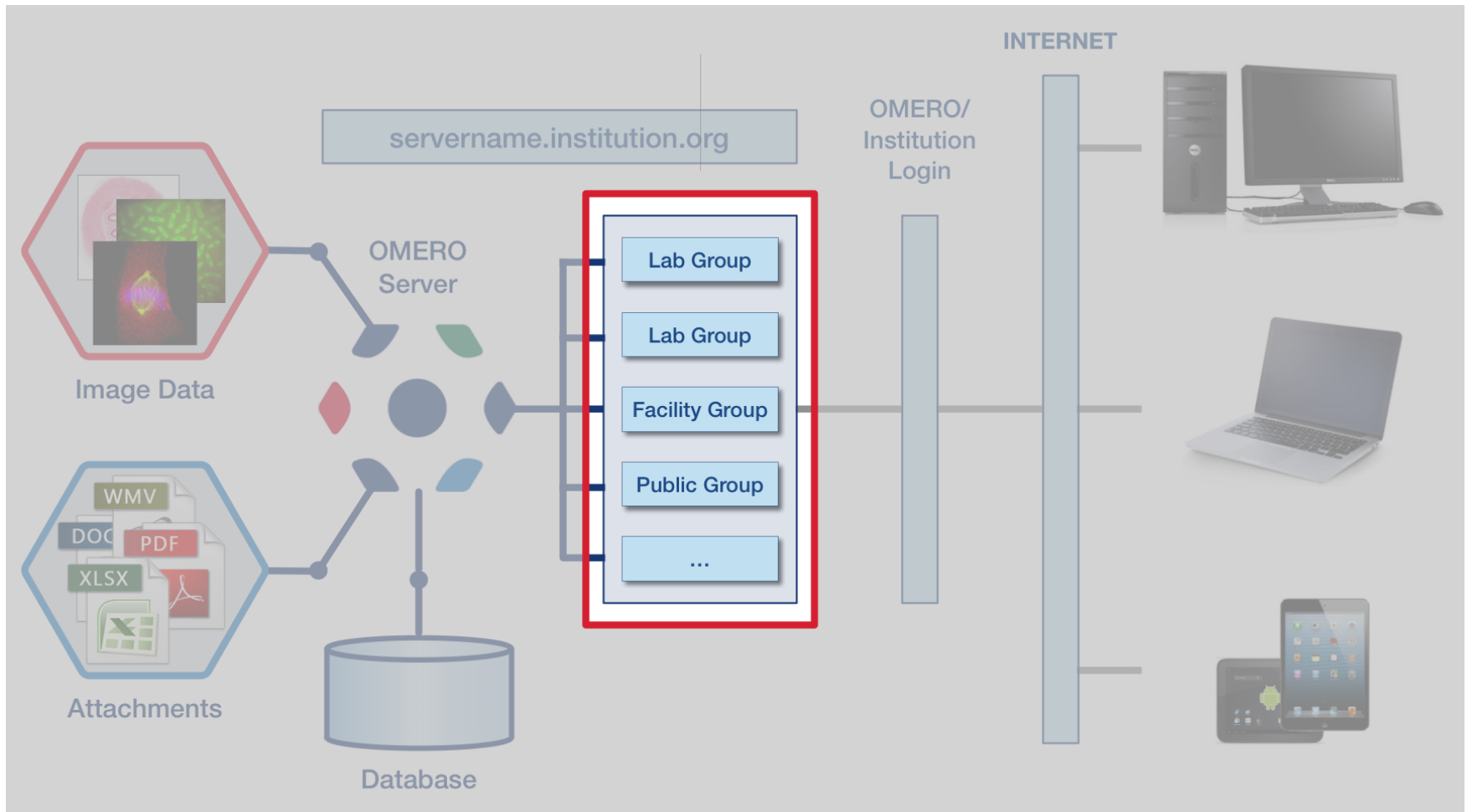
# OMERO.web: Web Based Application





# SHARING DATA WITH OMERO

# OMERO group and user system



# Security Model


PERMISSIONS	 Read	 Annotate	 Write	 Privacy
 Private	✓	✓	✓	 You
 Group-Read	✓	✗	✗	 Your Group
 Group-Annotate	✓	✓	✗	
 Group-Write	✓	✓	✓	
 Public-Read	✓	✗	✗	 Anyone
 Public-Annotate	✓	✓	✗	
 Public-Write	✓	✓	✓	





# PUBLISHING WITH OMERO

# OMERO: Data Publication



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Jason Swedlow



Position:

Professor of Quantitative Cell Biology

Address:

College of Life Sciences, University of Dundee, Dundee

P-TRE\_10\_R3D\_D3D.dv

[https://nightshade.openmicroscopy.org/webgateway/img\\_detail/3933597/](https://nightshade.openmicroscopy.org/webgateway/img_detail/3933597/)

Viewing Options

Normal

Max Intensity

Split Channel

Quality: Normal

Zoom (%)

100

Line Plot

Rendering Details

Channels - Edit

452 528 612

Color

Current Image

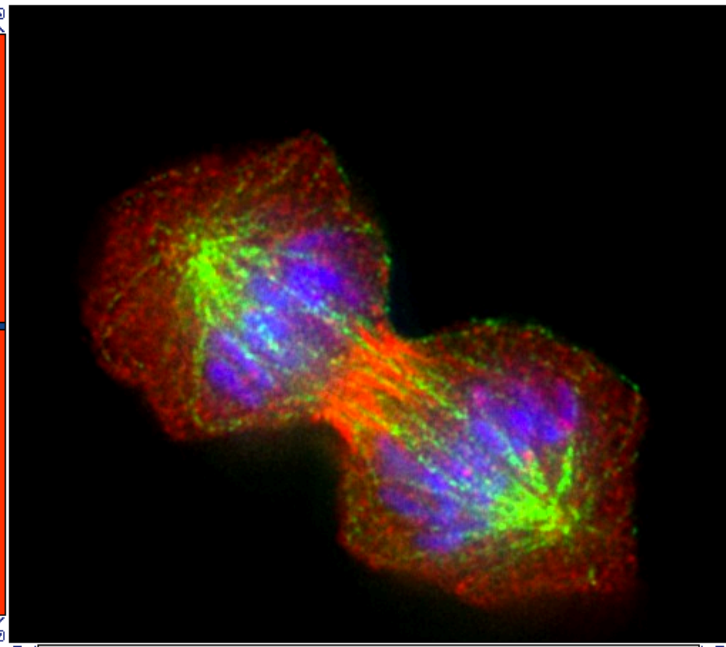
Z: 43/85 | T: 1/1

Image Information

Image Link

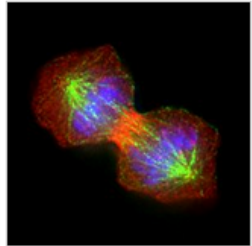
ROI Count: 0

Z-sections



Timepoints

of new daughter cells. Proper chromosome somes, and ends of microtubules. Our t of chromosomes to microtubule at a special of cell division, especially in living cells and se tools to discover a new protein, Bod1, that ng the activity of Aurora B protein kinase. We the centromere and kinetochore of the mitotic



INCENP (red) localization in a dividing cell, also stained for microtubules (green) and DNA (blue). Click on the thumbnail to view and manipulate the image in OMERO.

a, we, long with our collaborators, formed the data management software for imaging tium's web site.

ERO by clicking on the thumbnail.

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# OMERO

## Data Publication: Image Data Repository

The screenshot displays the OMERO web interface. The top navigation bar includes 'Data', 'History', and 'Help'. The left sidebar shows a tree view of 'Demo data' with a list of image sets. The main area shows a grid of microscopy images. Below the grid, a detailed view of a single image is shown, with 'Viewing Options' on the left and 'Timepoints' at the bottom. The 'Viewing Options' panel includes settings for 'Normal', 'Max Intensity', 'Split Channel', 'Quality', 'Zoom (%)', 'Line Plot', 'Rendering Details', 'Channels', 'Grayscale', 'Rendering Settings', 'Current Image', 'Z: 11/20 | T: 1/1', 'Image Information', 'Image Link', and 'ROI Count: 0'. The 'Timepoints' panel shows a detailed view of a single image with a 'Z-sections' slider and a 'Timepoints' slider.

On the right, the 'General' tab shows metadata for the selected image:

TARA\_HCS1\_H5\_G100008302\_G1000083  
04--2013\_12\_02\_21\_30\_23\_chamber--U00--V01

Plate ID: 303  
Owner: Demo User

Creation Date: 2015-10-05 02:15:01

ANNOTATIONS

Sample\_BARCODE\_URI\_We <http://store>  
STATION\_LABEL TARA\_129  
EVENT\_LABEL Complementar nan  
EVENT\_DEVICE\_LABEL PUMP.High Volume Peristaltic F  
EVENT\_URL Event\_Logsheet <http://store.pangaea.de/Projects>  
EVENT\_INVESTIGATOR (Probert)  
EVENT\_COMMENTS COMMENT\_on\_Logsheet=nan  
SAMPLE\_DEPTH\_Sampling\_C P  
SAMPLE\_DEPTH\_Intended\_No S  
SAMPLE\_DEPTH\_Intended\_No nan  
SAMPLE\_DEPTH\_Intended\_m 0  
SAMPLE\_PROTOCOL\_LABEL PROT  
SAMPLE\_PROTOCOL\_LABEL ORGANISMS

Below the OMERO interface, a data table for TARA OCEANS is shown:

TARA OCEANS Tara UTC YYYY MM DD HH MM ### EVENT\_PUMP\_01

Start	End	LAT	DD	MM	MMM	LON	DDD	MM	MMM	PUMP#	DAY / NIGHT
2011	2011	06	40.257	153	03.945	1	DAY				
2011	2011	06	51.534	153	06.659	1	DAY				

OPERATORS: JP DEPTH\_Intended (m): SURFACE CABLE\_Length (m): Angle (deg): Speed (m/s): 1.0

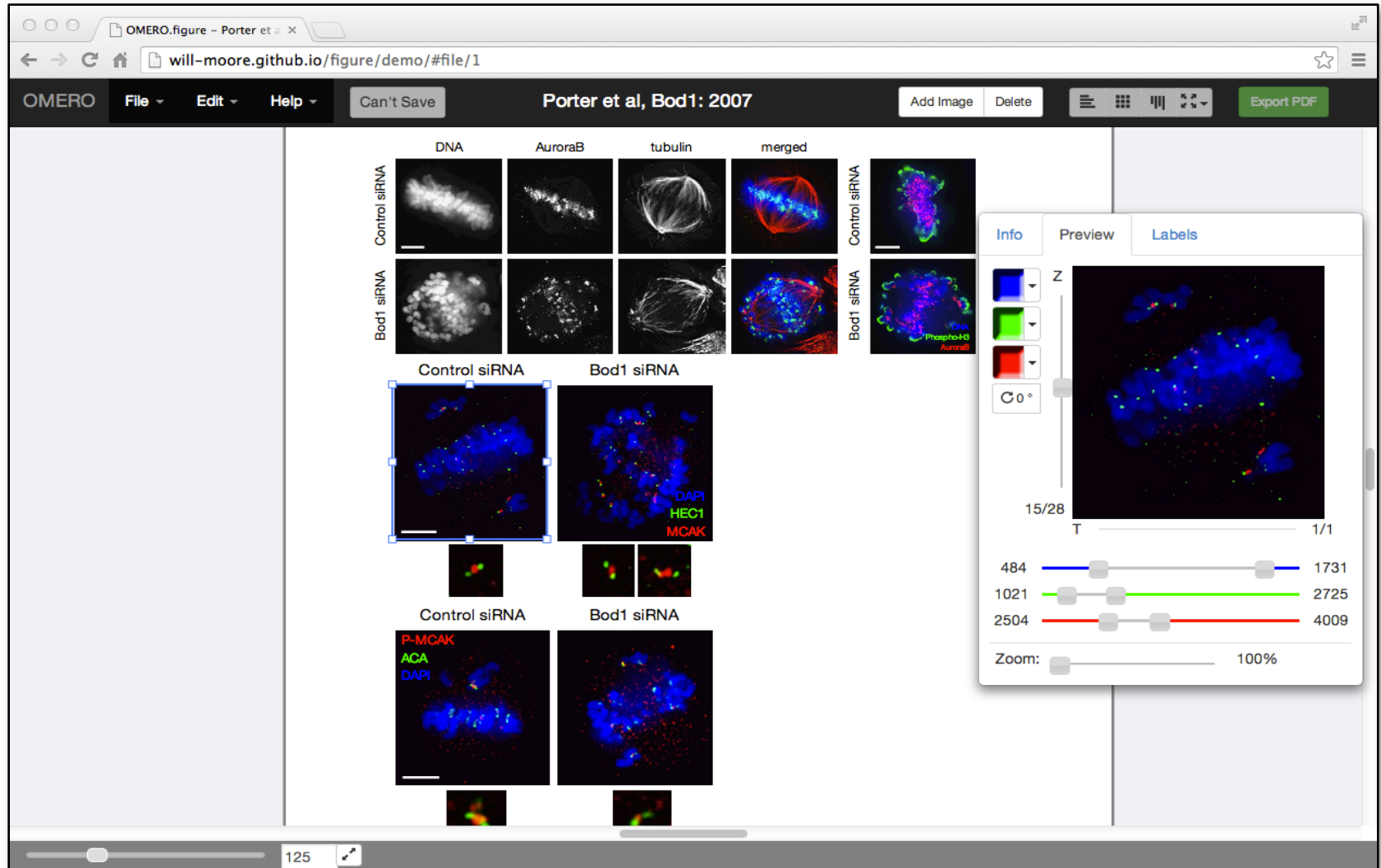
OPERATION	START TIME HH:MM	END TIME (HH:MM)	PUMP RATE (Hz)	COMMENTS
Rinsing Pump:	17:57	18:02	60	
Filling 200L (B&V):	18:03	18:10	60	
Filling 200L GPSS (PROT&G):	18:11	18:36	20	
Filling 200L (B&V):				
Flow through GPSS (when 5um net is not avail.) (indicate pauses)	18:52	21:27	20	Upper 5um net probably broken
	21:36	23:10	20	
	23:33	01:24	20	

PUMPING\_Depth\_Max (m) PUMPING\_Depth\_Min (m) PUMPING\_Duration (HHMM)

Depth\_SRF (m) Depth\_TopDCM (m) Depth\_DCM (m) Depth\_BotDCM (m) Depth\_BotML (m)

# OMERO.figure

## Winner of the SLS innovator of the Year

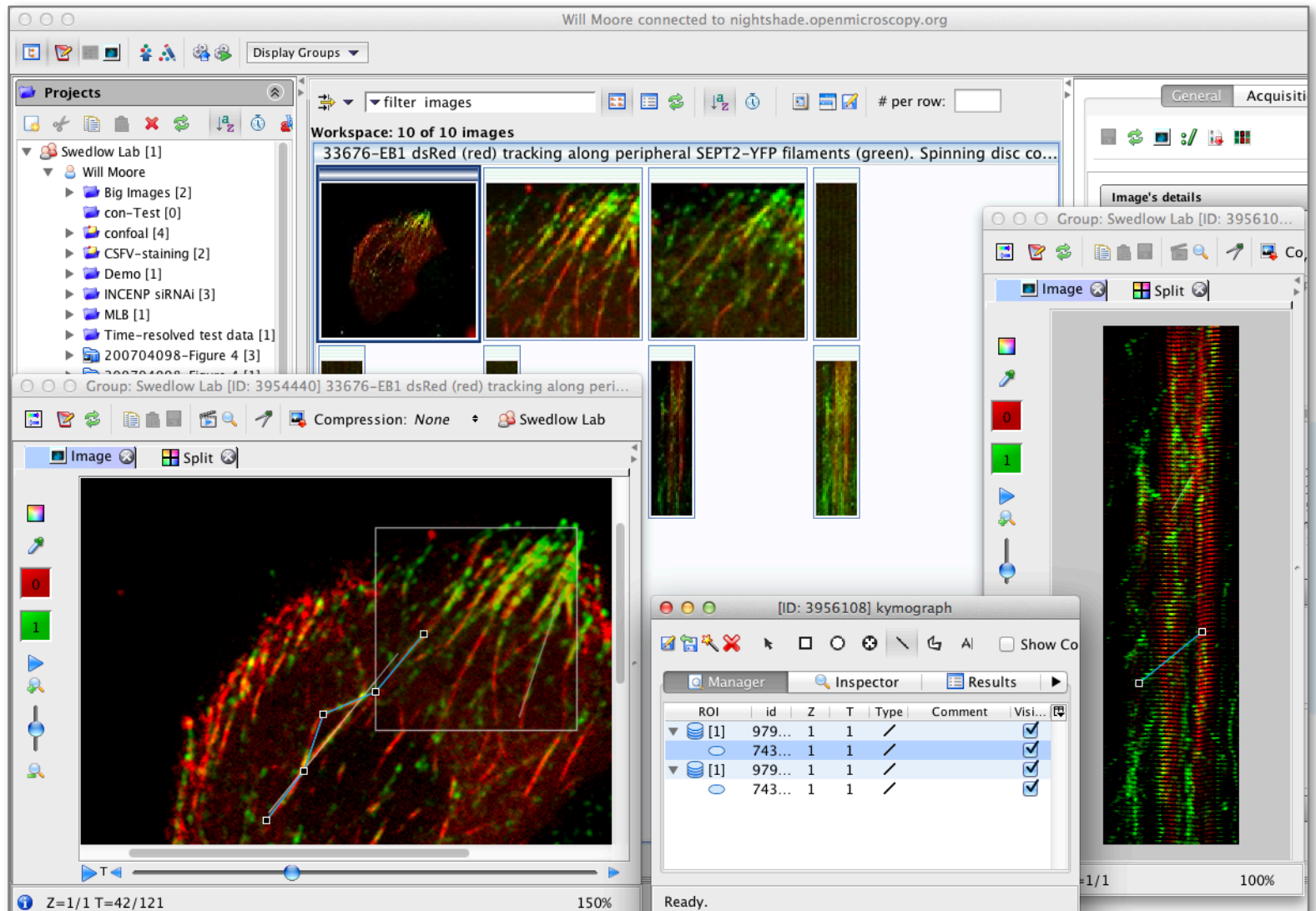




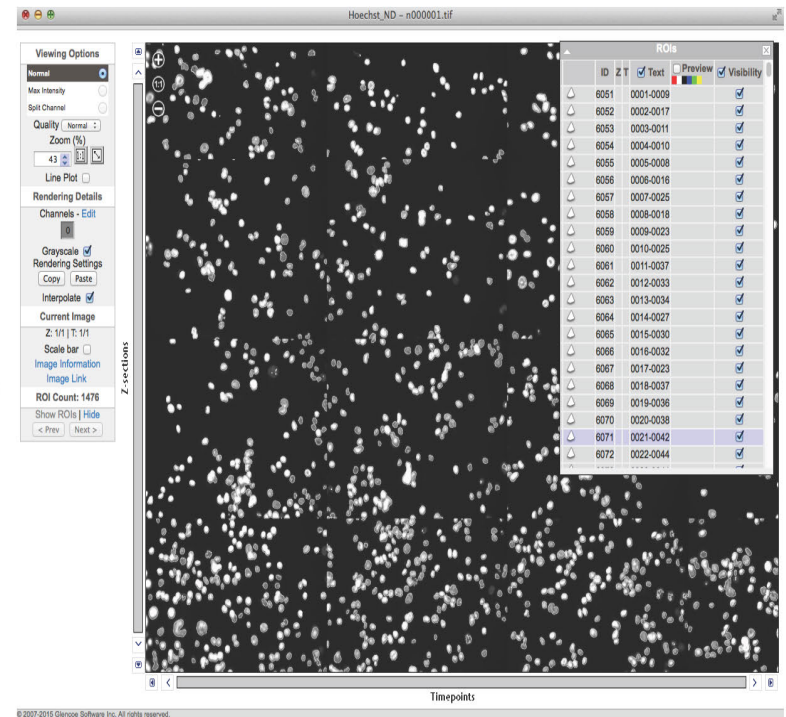
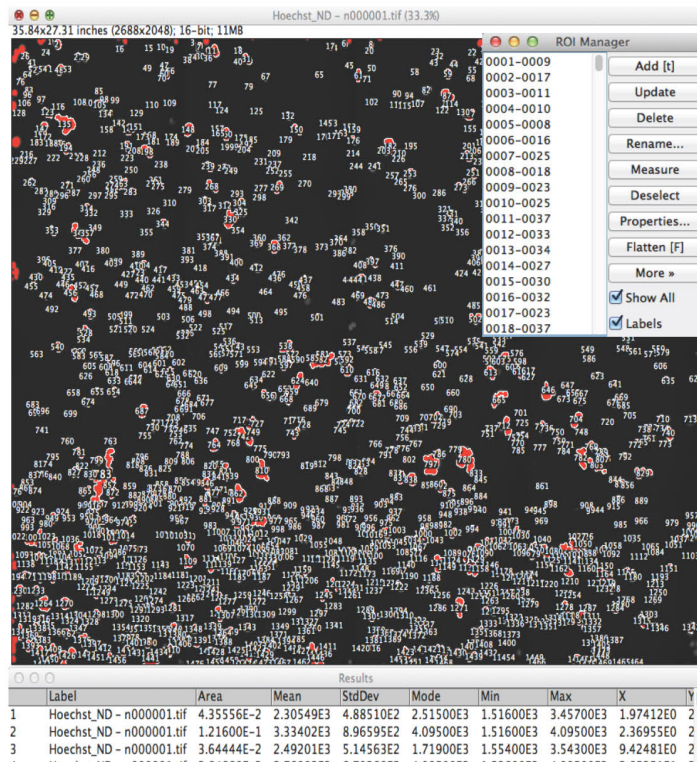
# ANALYSIS WITH OMERO

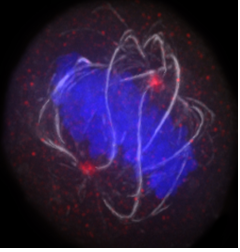


# OMERO.scripts: Kymographs example



# ImageJ and OMERO





# OMERO.mtools: Matlab-based analysis

The image displays the OMERO.mtools software interface, which is used for Matlab-based analysis of microscopy data. The interface consists of several windows:

- Top Window:** Displays two microscopy images. The top image is a kymograph showing a series of vertical tracks with red and green signals. The bottom image is a time-lapse stack of grayscale images showing a cell's movement over time.
- objectSelector Window:** This window is used for selecting objects for measurement. It features a 3D visualization of a cell on the left, a central panel with instructions, and a right panel showing a cell image with phase labels.
  - Instructions:**
    1. Choose channels to measure.
    2. Click on the object in the top window that you want to measure from.
    3. Click on the object in the bottom window that you want to measure to.
    4. Click the "Accept" button.
  - Controls:** The central panel includes dropdown menus for channel selection (both set to '617') and Z-stack selection (set to 'Z: 2' and 'Z: 6').
  - Cell Image:** The right panel shows a cell image with various phases labeled: 'Interphase', 'Prophase', 'Prometaphase', and 'Metaphase'. A red star indicates the current phase.
- Bottom Window:** Shows a cell image with a timeline at the bottom. The timeline includes a play button, a pause button, and a time indicator 'T = 1'. The Z-stack is set to 'Z = 3'.



# Some useful links

- OMERO Downloads:

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

- OMERO Help Pages:

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

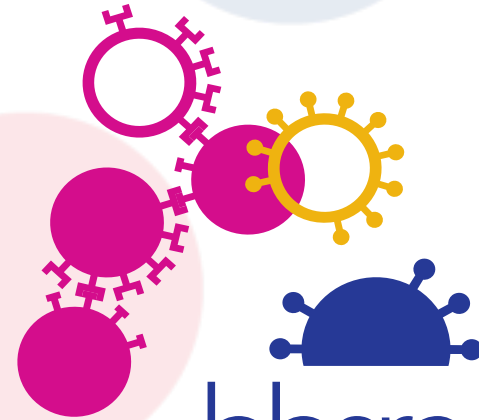
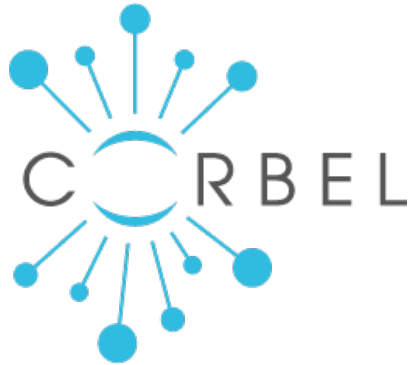
- OMERO Forums:

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

- OMERO demo server:

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

# Thank to Funders

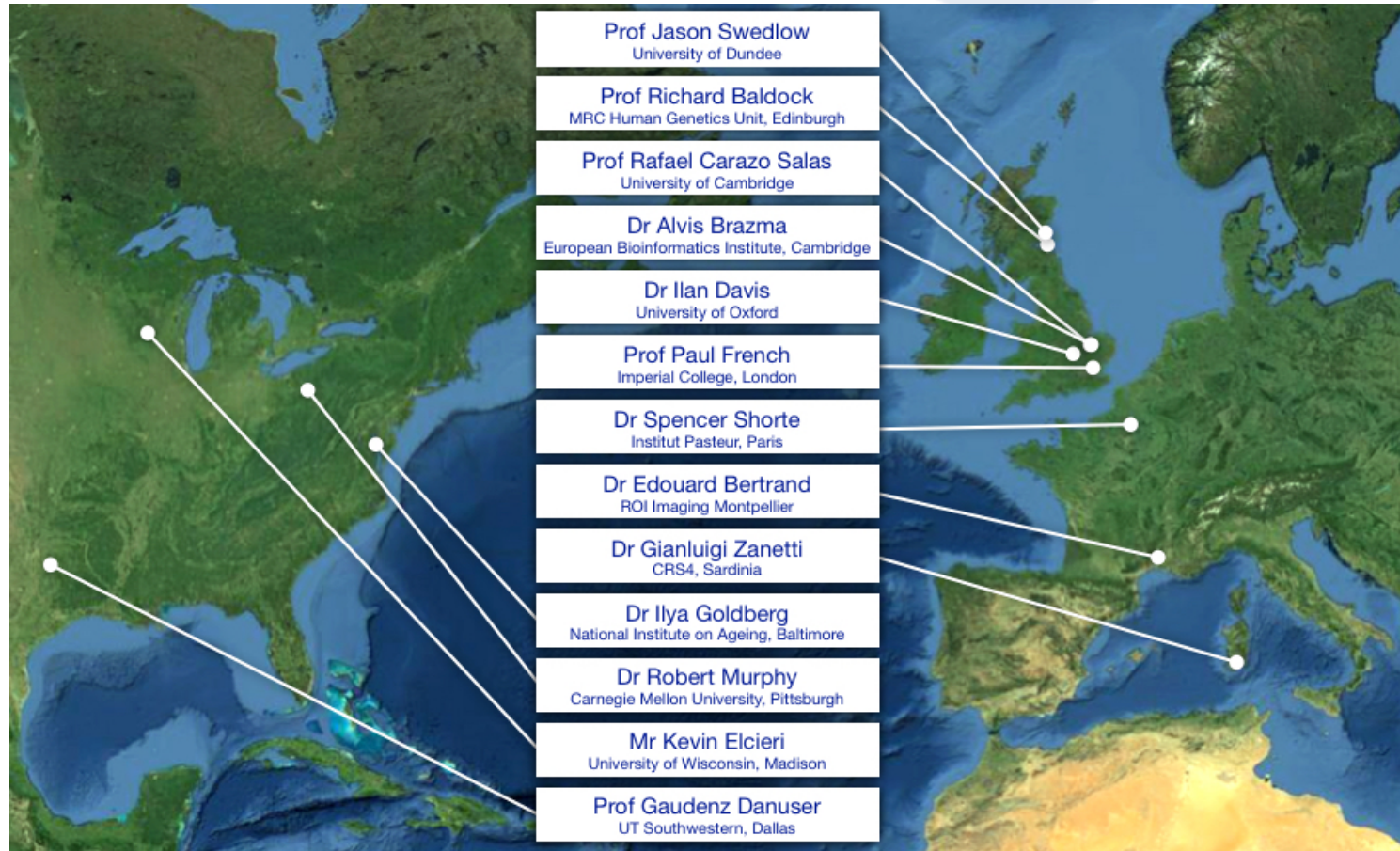


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biotechnology and biological sciences  
research council



# OME Consortium



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