OMERO

Users Training day

Cambridge, December 2017

Petr Walczysko, Will Moore, Balaji Ramalingam

University of Dundee

The OME Consortium

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

Programme of the day

- Short introduction to OMERO
- Managing images (Workflow 1 – z stacks)
- **Coffee**
- Viewing, analyzing and publishing images using OMERO plugins (OMERO.iviewer, FPBioimage, OMERO.figure Workflow 1 – z stacks continued)
- **Lunch**
- Filtering and data search, analysis using Fiji features (OMERO.insight plugin for Fiji, Workflow 2 – timelapse images)
- **Coffee**
- Publishing with OMERO (OMERO.figure – in depth, Workflow 2 – timelapse continued)

Outline

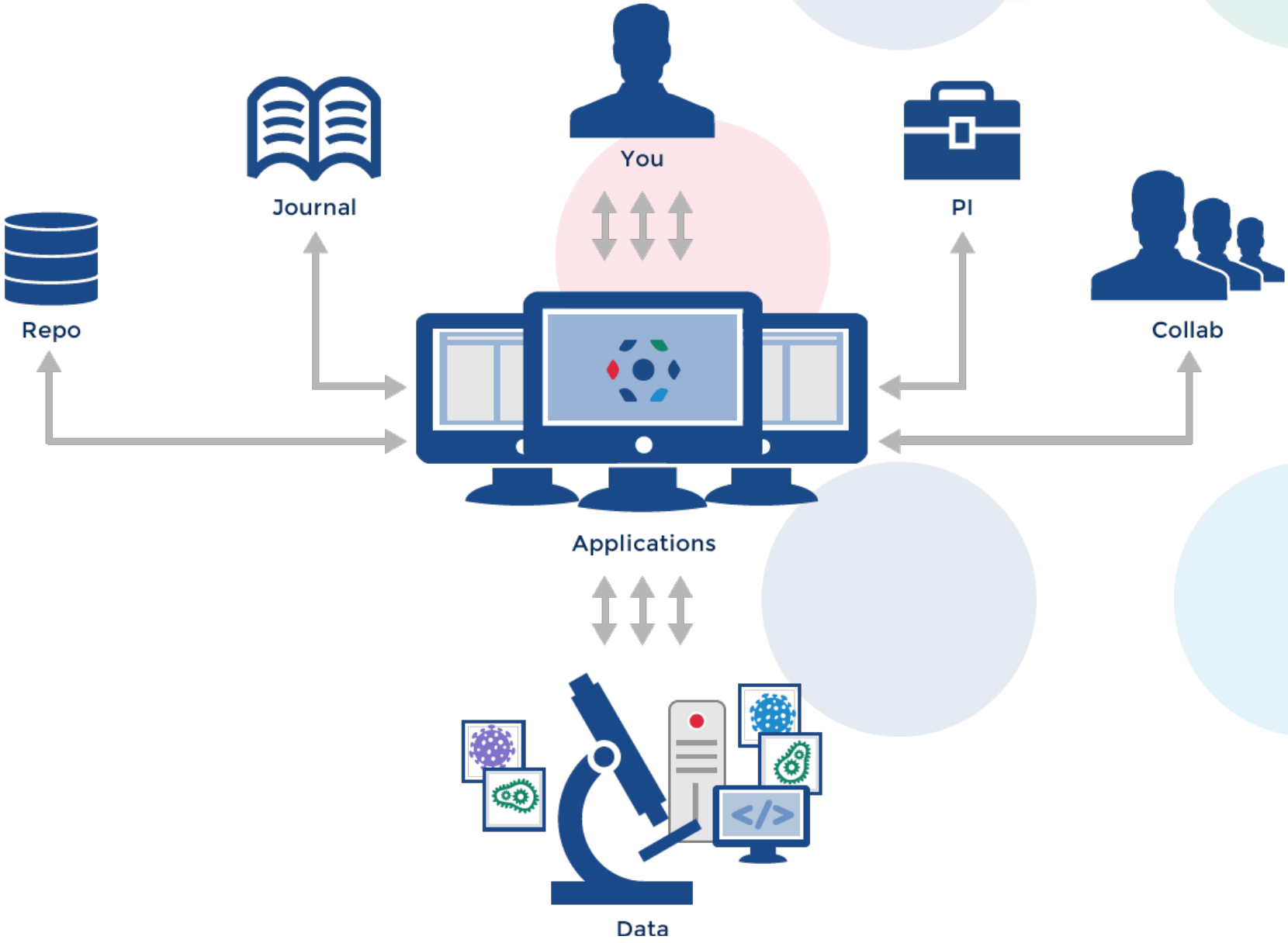
- Scientific Data paradigm
- What is OMERO
- Analyzing with OMERO
- Sharing data with OMERO
- Publishing with OMERO
- Questions

The Standard Paradigm

What about

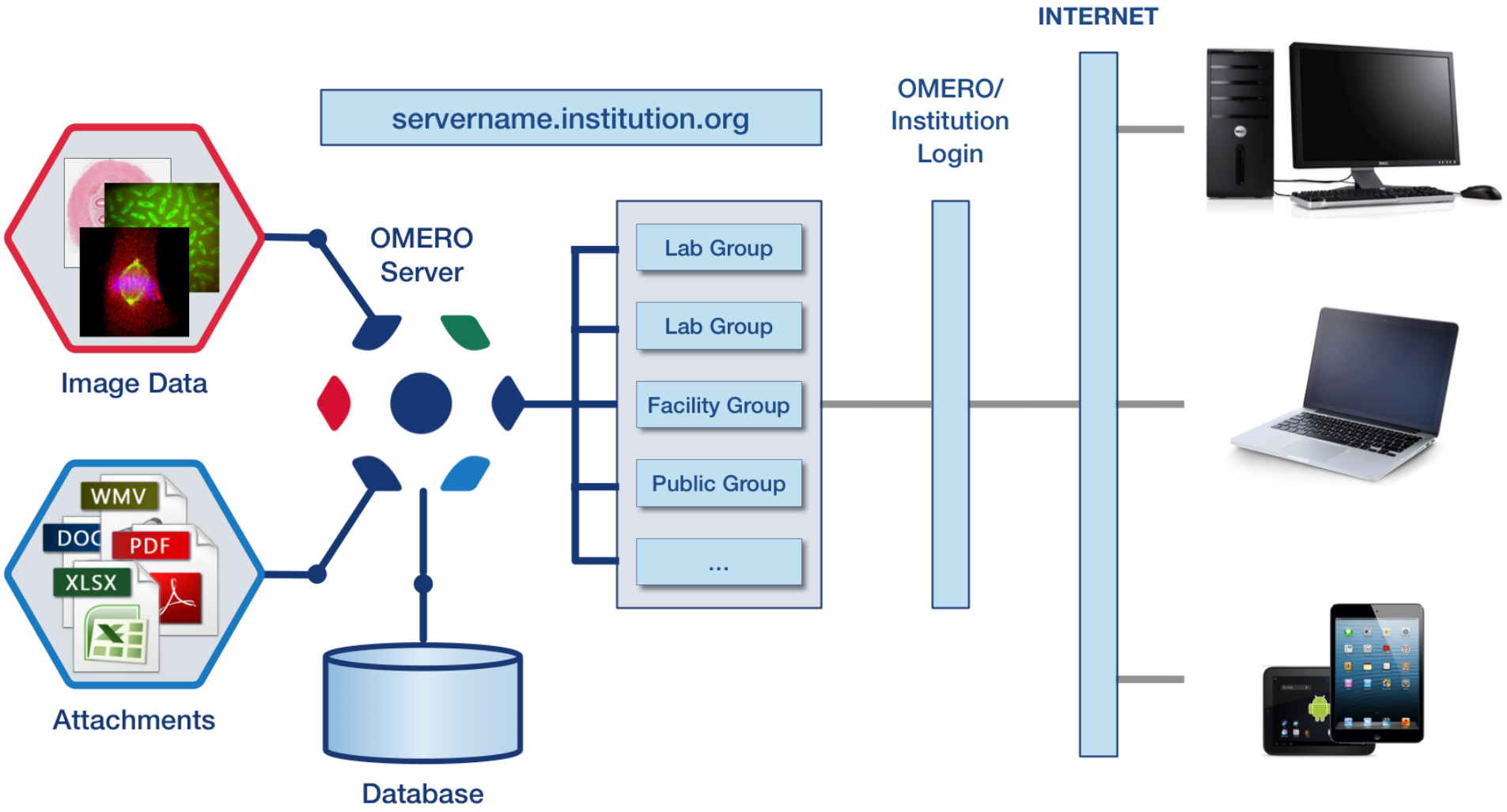
- Organizing your data?
- Sharing data with coworkers and colleagues?
- Analyzing data?
- Publishing data?

The “Scientific Data” Paradigm

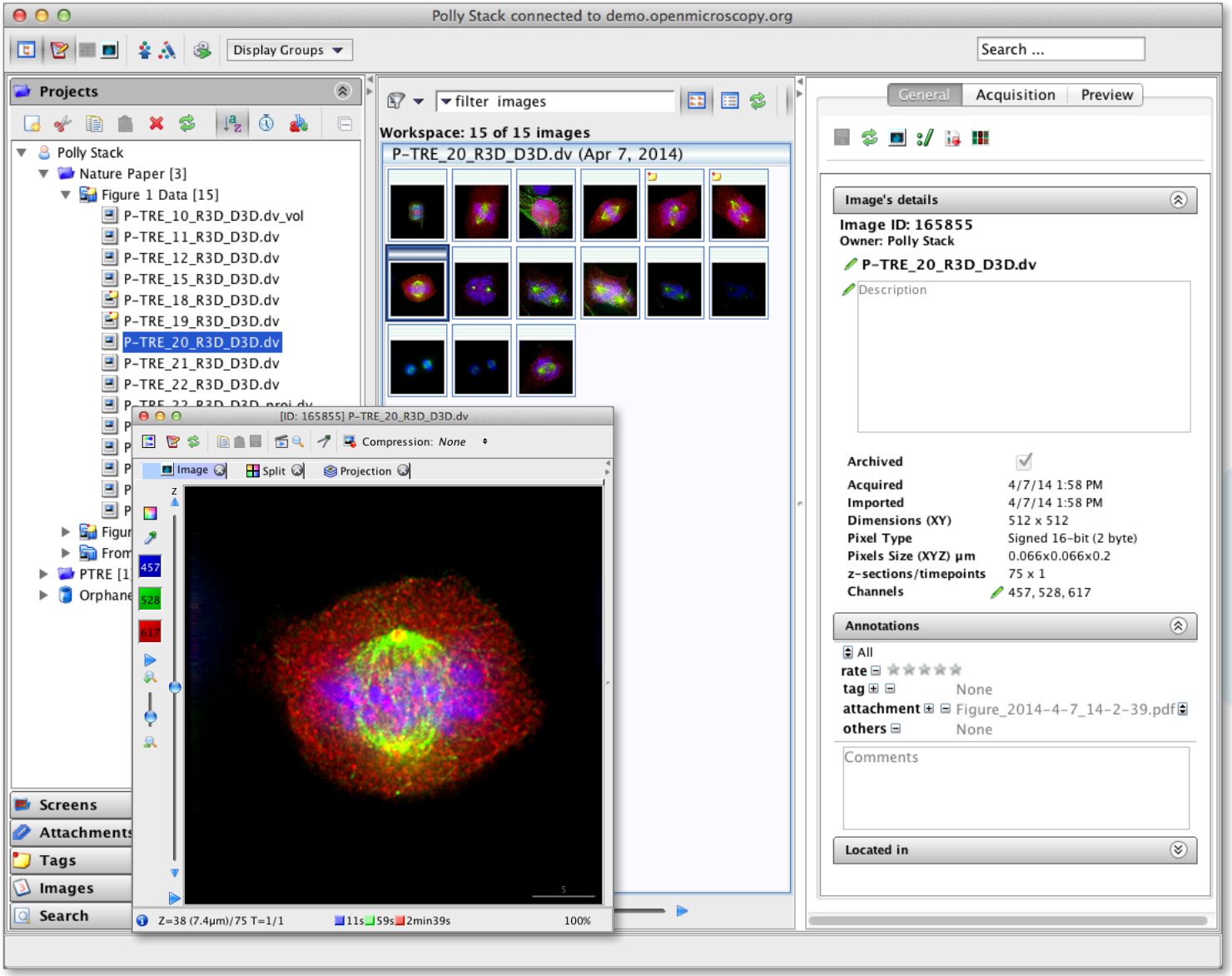


- *Gray et al, 2005, Scientific Data Management in the Coming Decade, Microsoft Research*

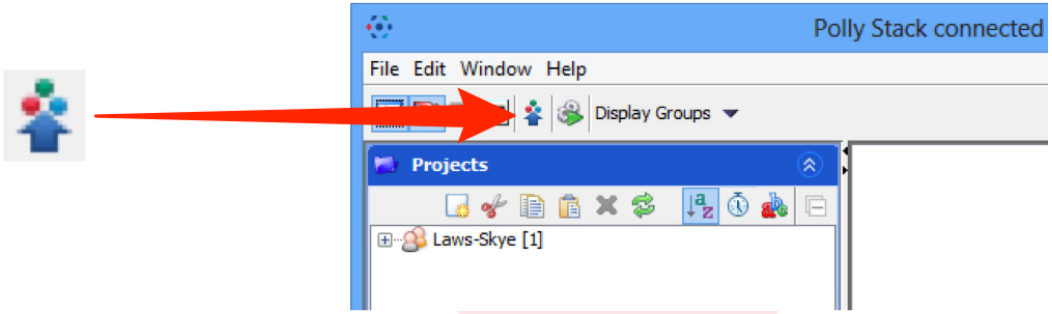
OMERO setup

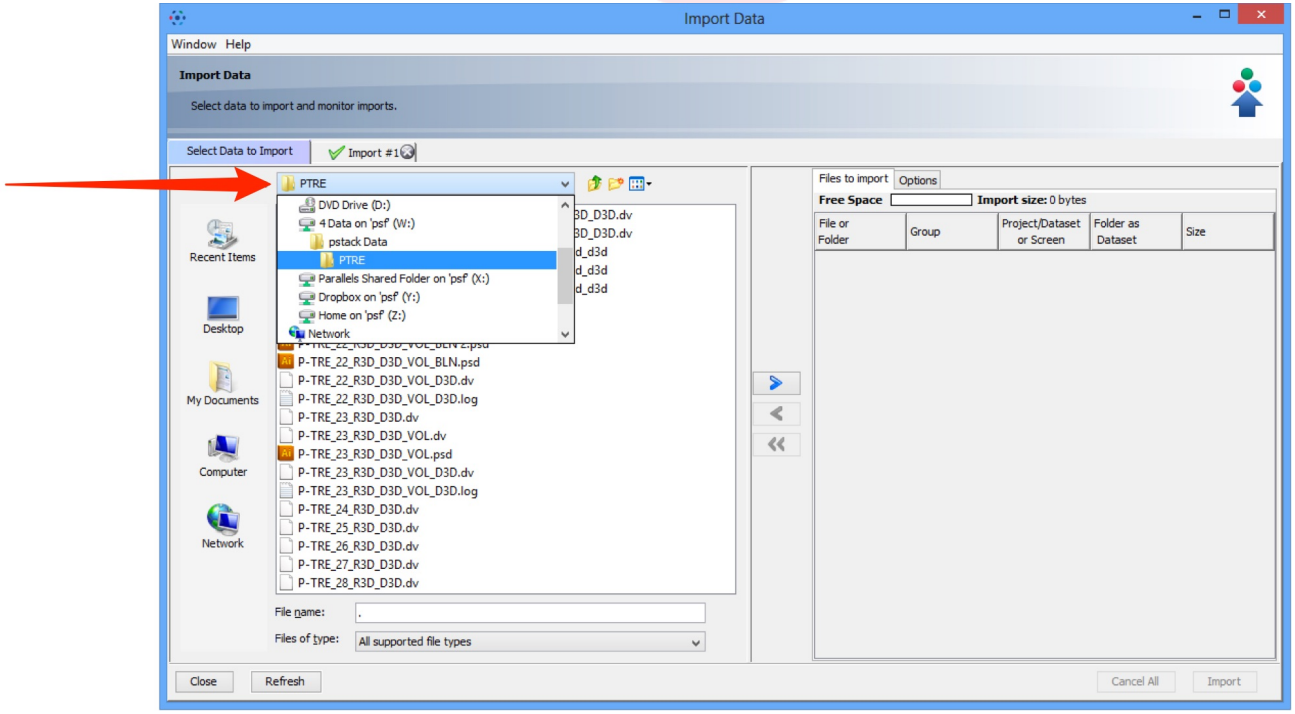

INTERNET
servername.institution.org
OMERO/
Institution
Login
OMERO
Server
Image Data
Attachments
WMV
DOC
PDF
XLSX
Lab Group
Lab Group
Facility Group
Public Group
...
Database

OMERO.insight: Desktop Based Application

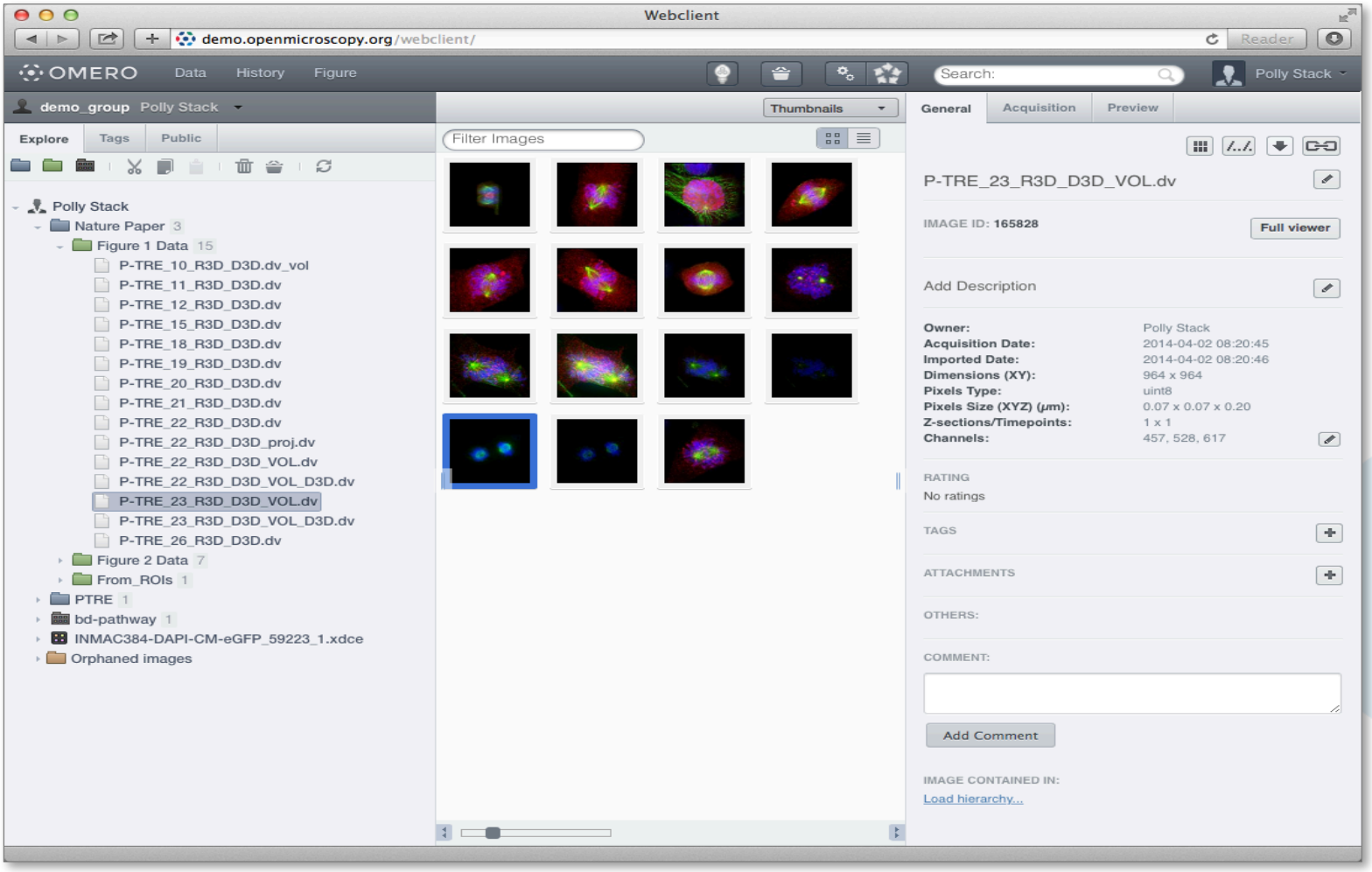


Import Image Data into OMERO



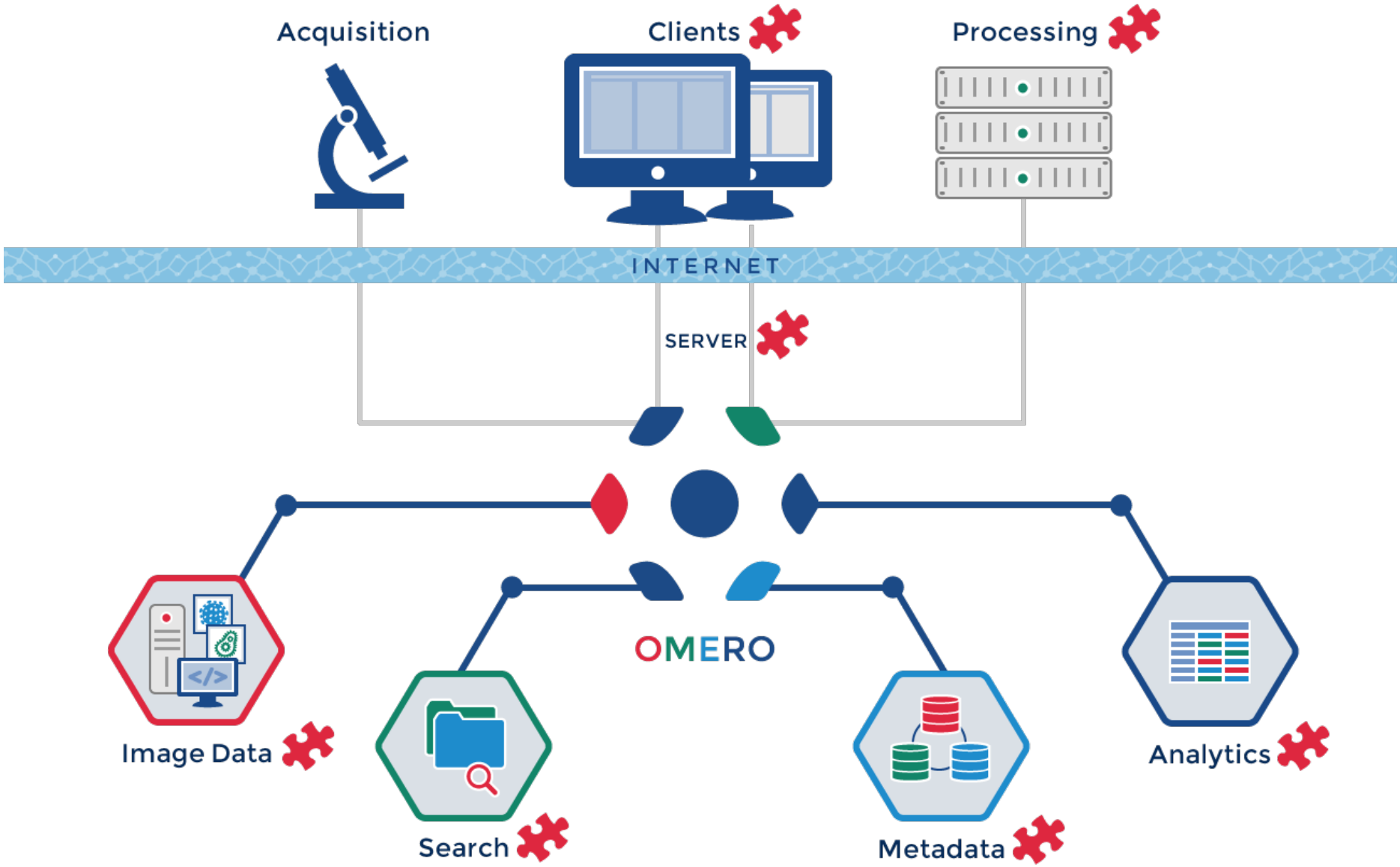


OMERO.web: Web Based Application



ANALYSIS WITH OMERO

The *Extensible* OMERO Platform

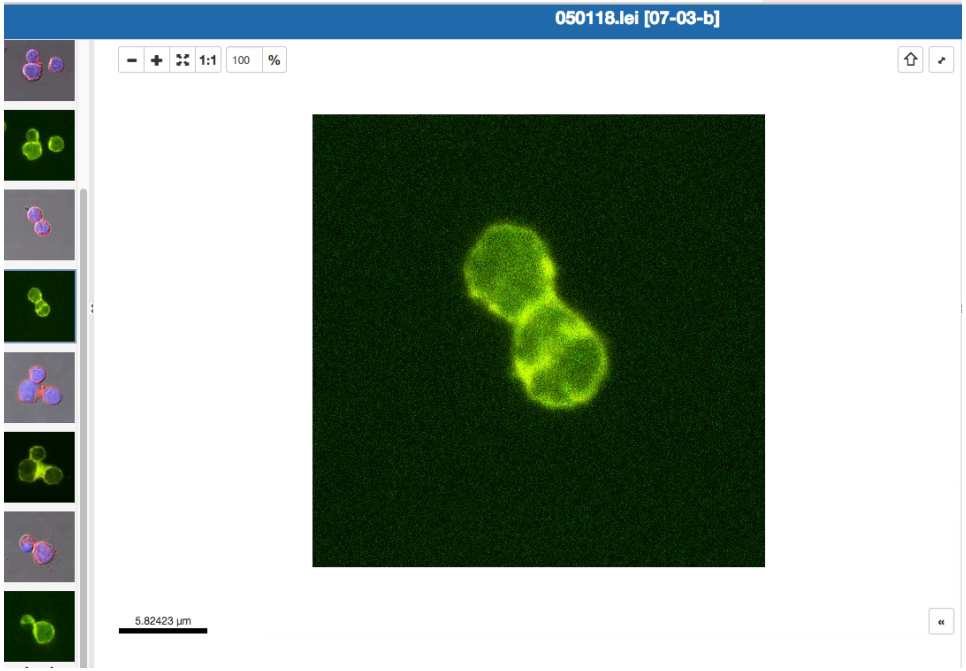


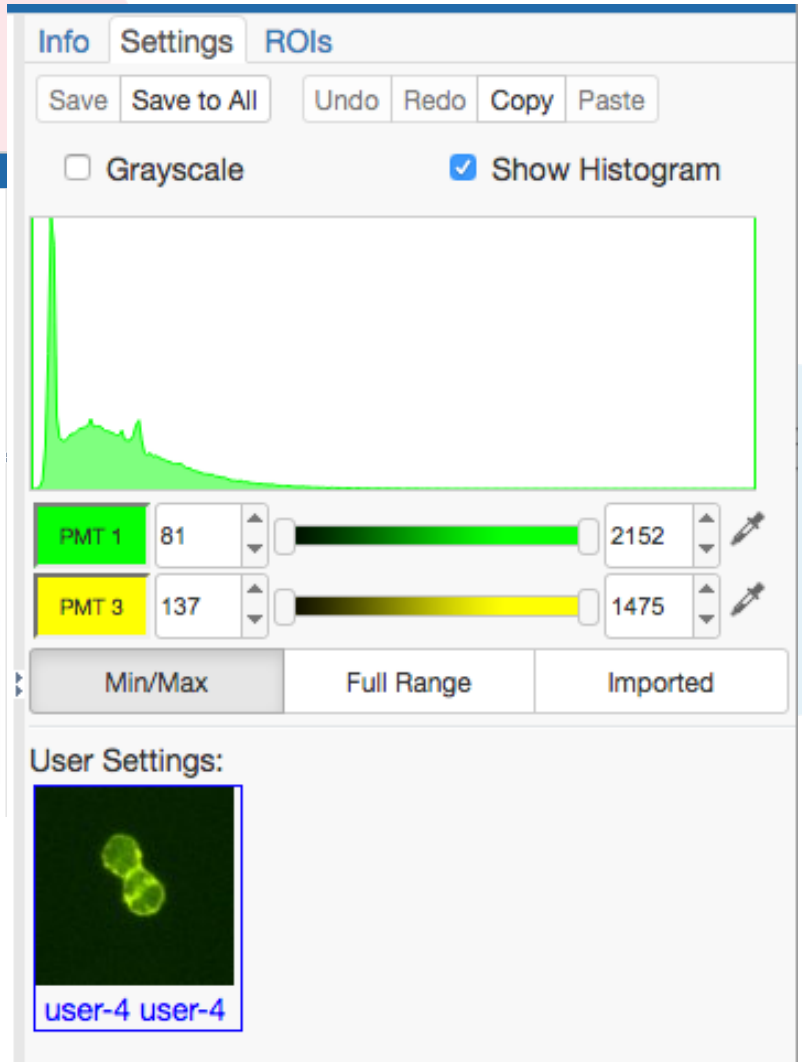
Examples of Analysis Integration

- **OMERO.iviewer –** plugin for viewing and
- **ImageJ/Fiji**, Icy– Pluggable, desktop Image processing tools (Java)
- **FPBioimage** – 3D viewer from **Cambridge**
- **R** – statistical analysis software
- **CellProfiler–** HCS segmentation and features (Python)
- mTools– Otsu, basic segmentation (Matlab)
- ORBIT – Image analysis, specialized on pathology images
- WND-CHRM-- weighted nearest neighbor machine learning (Python)
- ThunderSTORM and PALMSiever– Localisation SRM (ImageJ, Matlab)
- OMERO2CV– LSFM Multi-View Reconstruction (C++, OpenCV, ITK)
- Columbus Acapella®-- commercial Big Data processing…

Viewing and analyzing Images – OMERO.iviewer

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





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

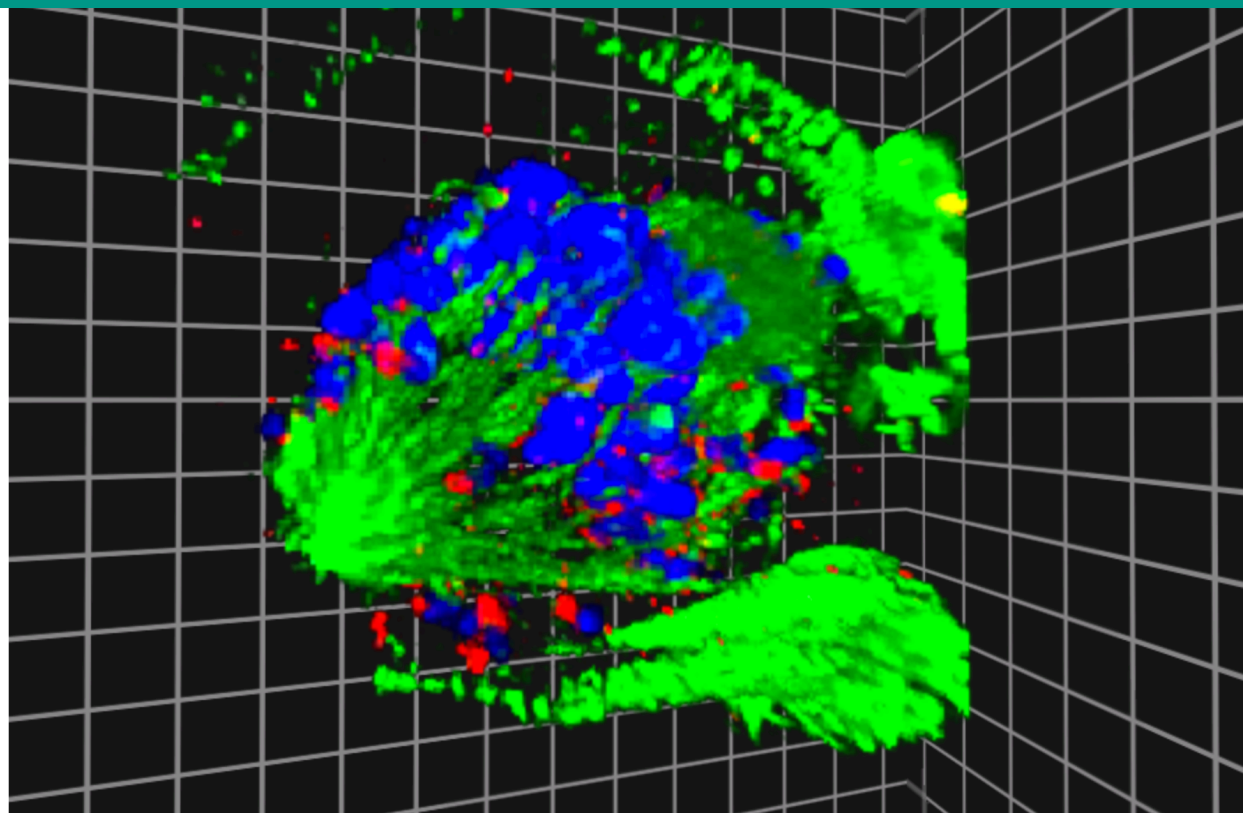
© Marcus Fantham

See the paper in Nature Photonics

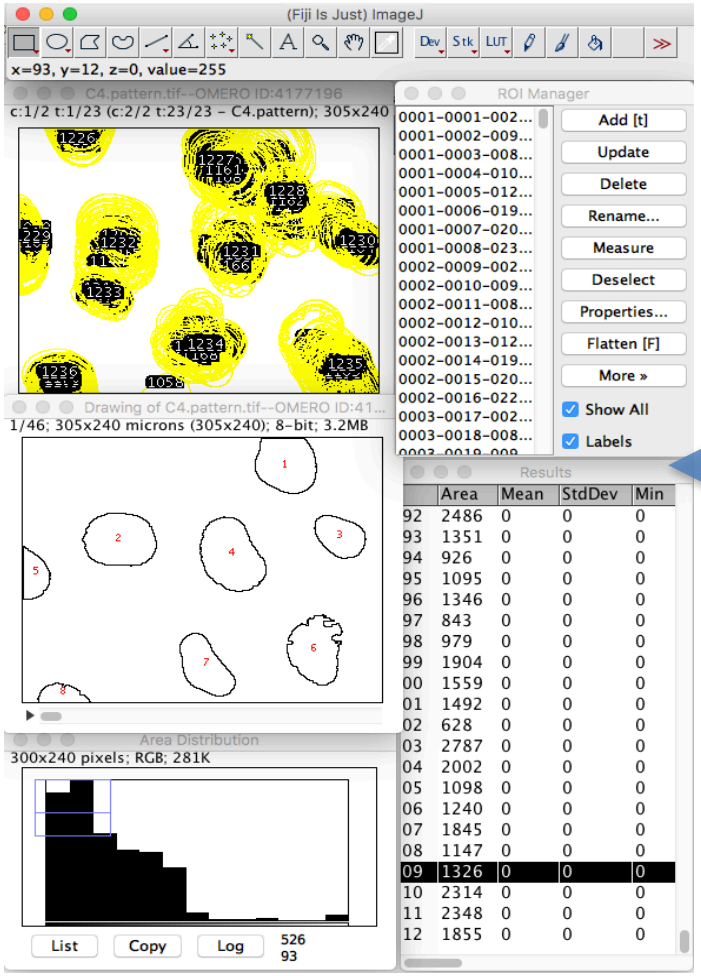
THE LASER ANALYTICS GROUP

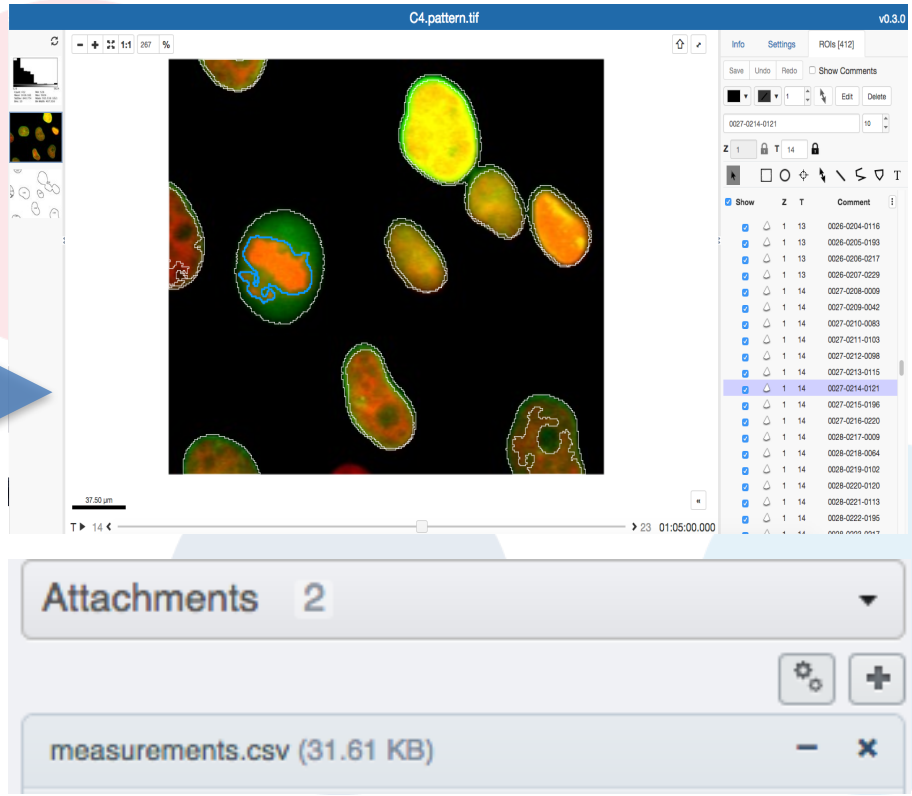
UNIVERSITY OF CAMBRIDGE

First Person Bioimage



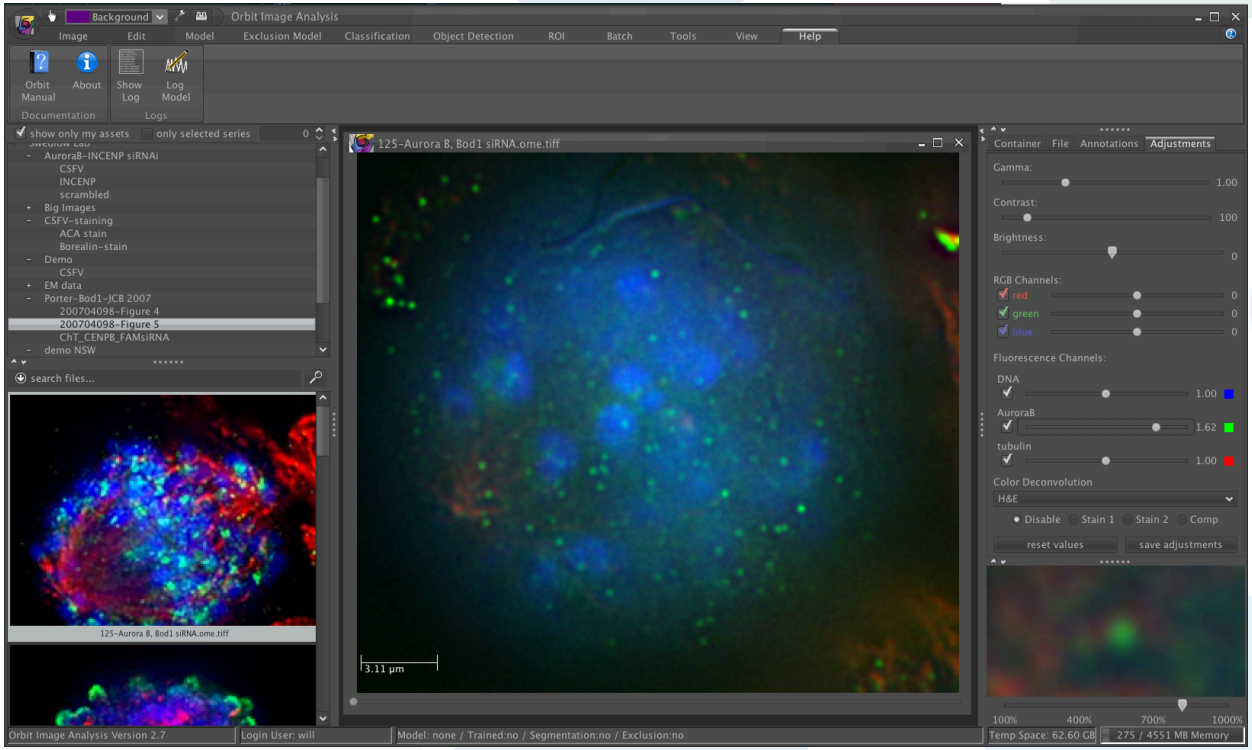
ImageJ and OMERO

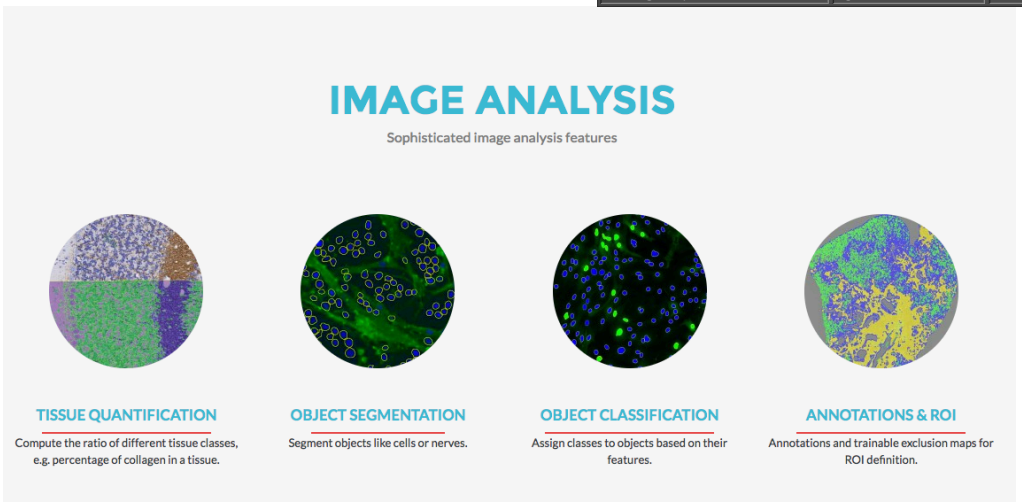




ORBIT

- *ORBIT IMAGE ANALYSIS*
- *http://www.orbit.bio/*
- *Compatible with OMERO 5.4.0*





OMERO.scripts: Kymographs example

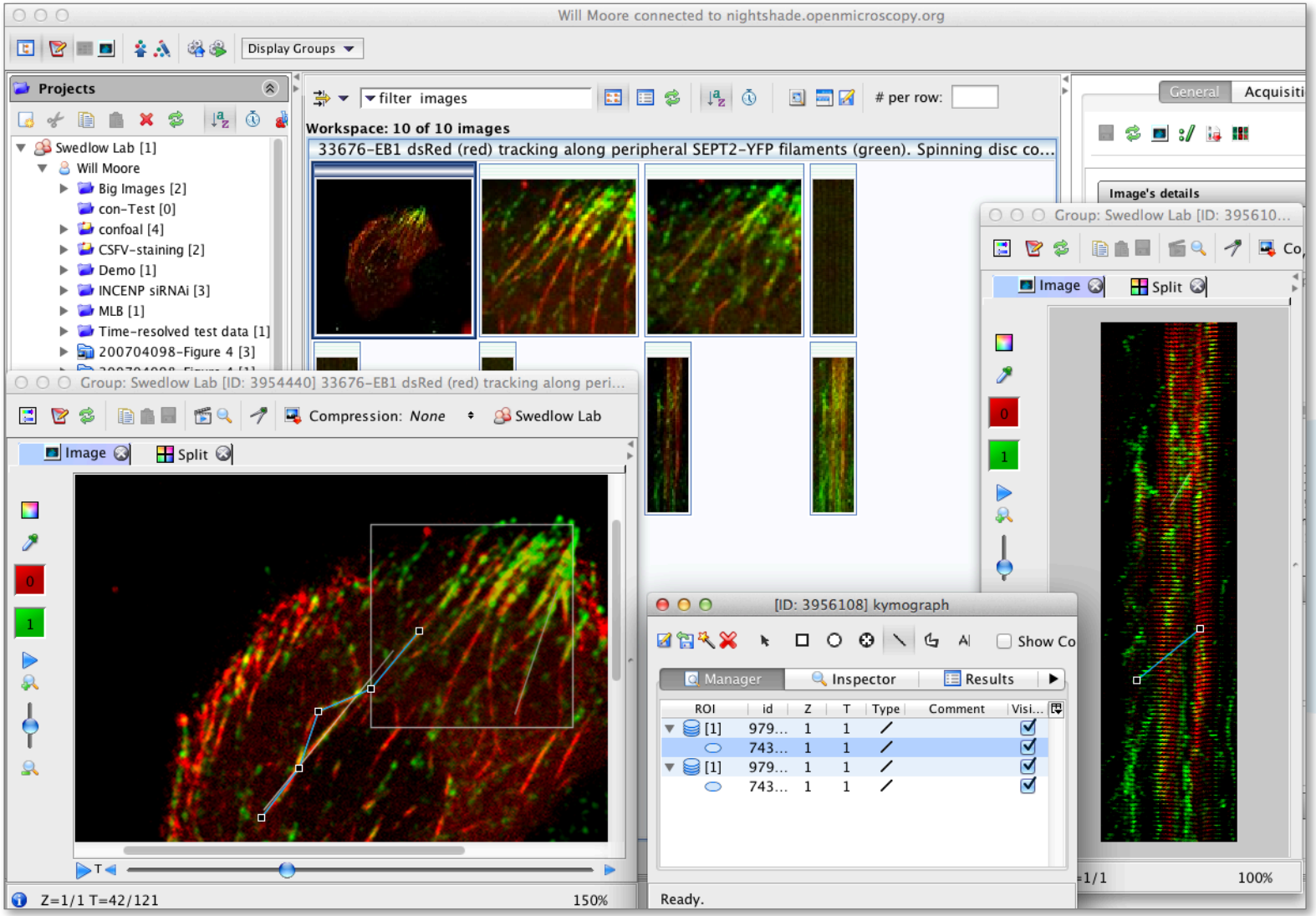
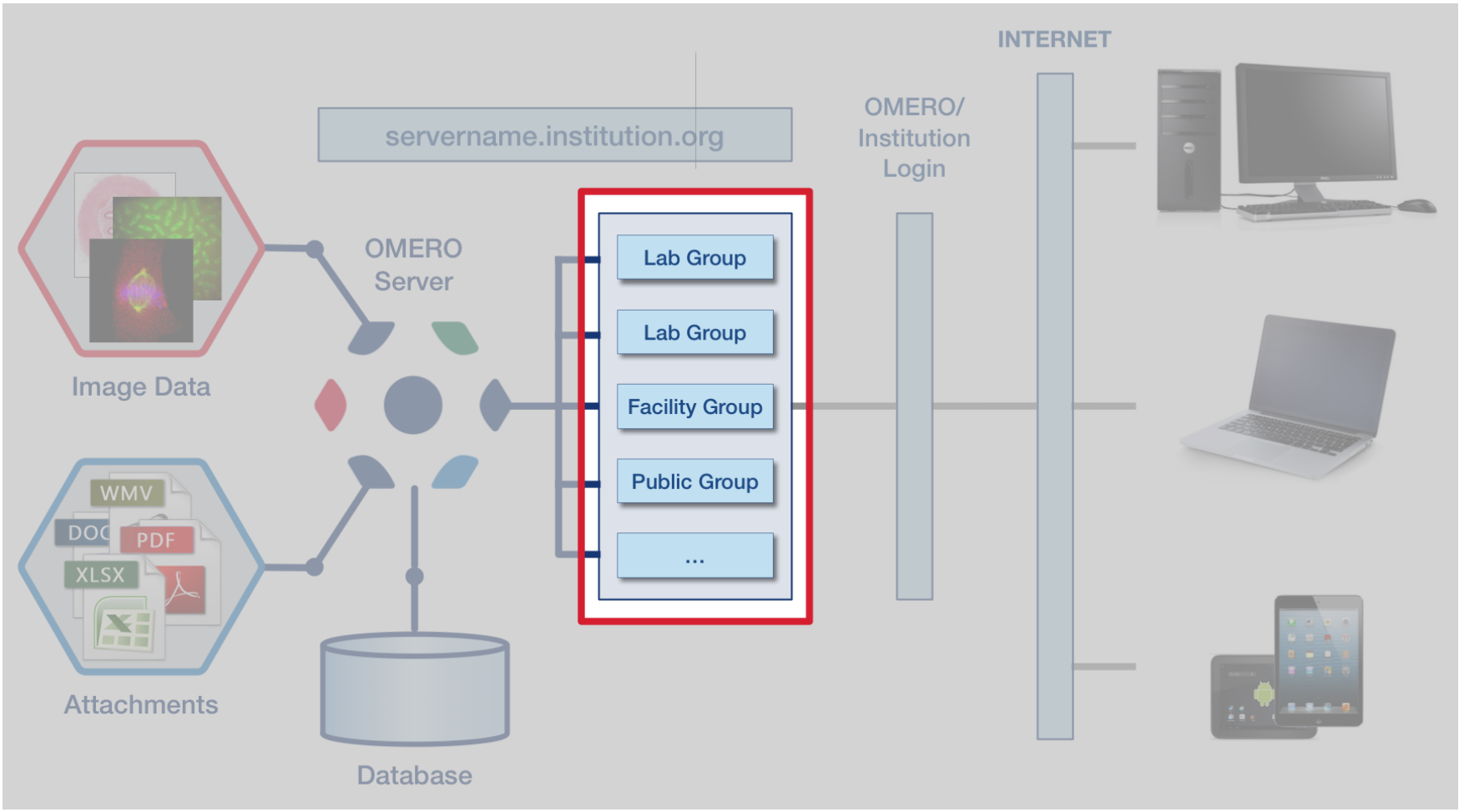


Image from Bowen et al. JCB 2011

SHARING DATA WITH OMERO

OMERO group and user system



Security Model

Can only read your own data

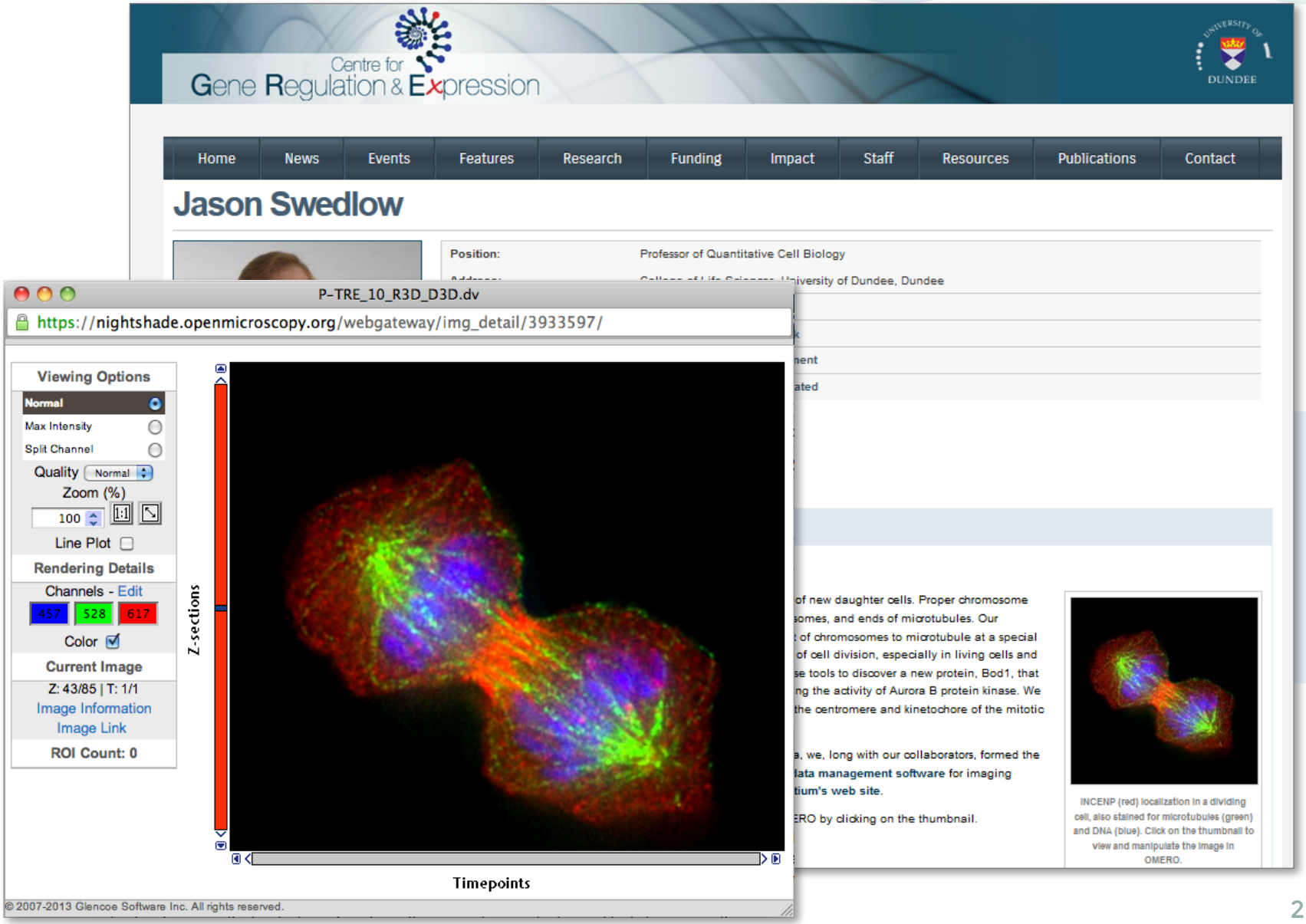
Can read but not annotate others' data

Can read and annotate others' data

Can read and edit others' data

PUBLISHING WITH OMERO

OMERO:
Data Publication – images on website



OMERO:
Data Publication – raw data

OPEN BIOLOGY

search

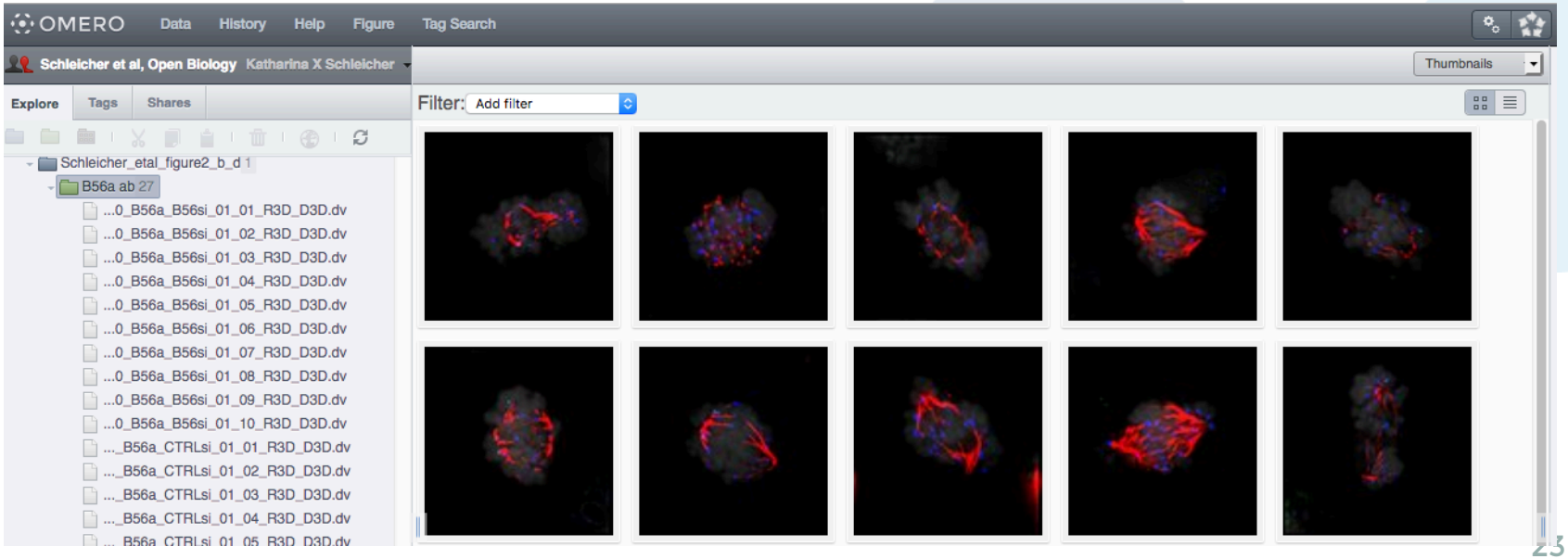
Advanced

Home Content Information for About us Sign up Submit

The Ndc80 complex targets Bod1 to human mitotic kinetochores

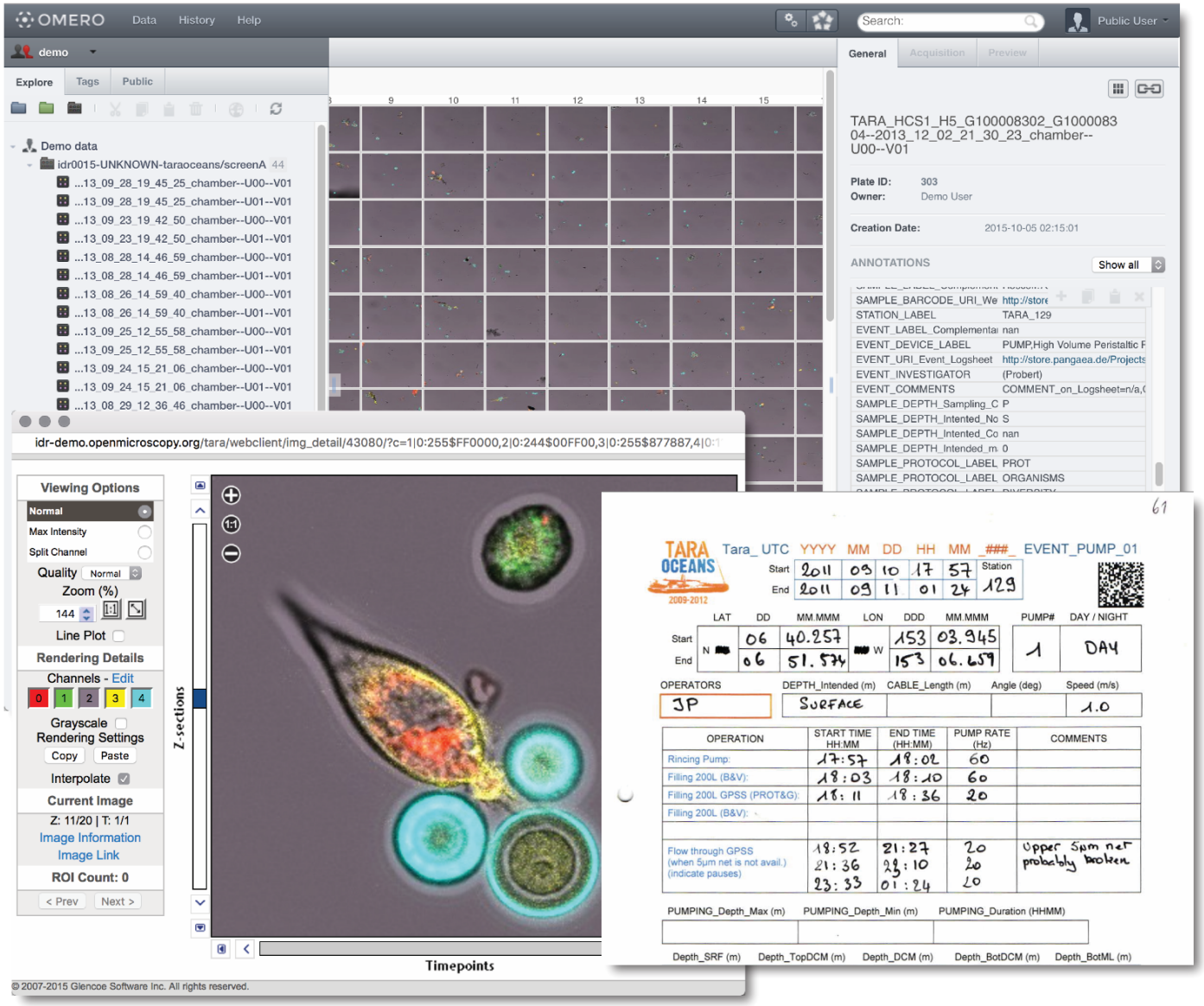
Katharina Schleicher, Michael Porter, Sara ten Have, Ramasubramanian Sundaramoorthy, Iain M. Porter, Jason R. Swedlow

Published 15 November 2017. DOI: 10.1098/rsob.170099

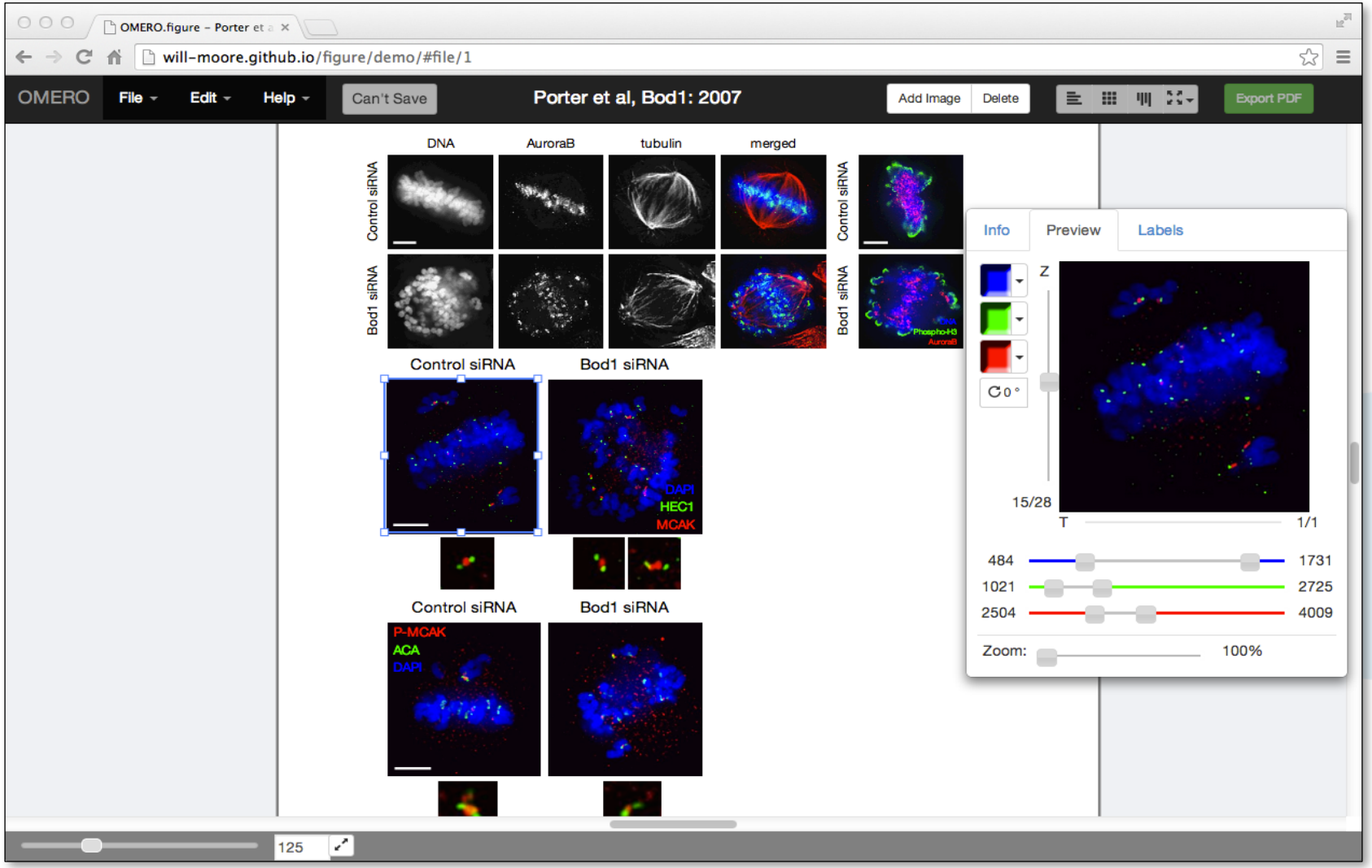


OMERO
Data Publication: Image Data Resource

OMERO
Data Publication: Image Data Resource



OMERO.figure
Winner of the SLS innovator of the Year



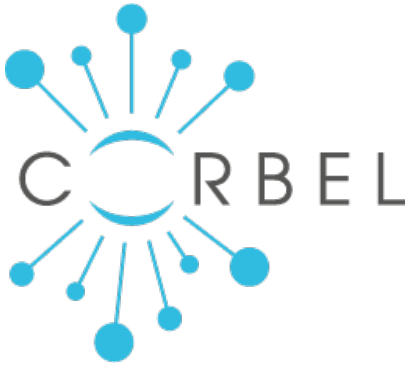
Some useful links

- OMERO Downloads:
  - https://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

bbsrc
biotechnology and biological sciences research council

MULTI MOT



GLOBAL BIOIMAGING
growing collaboration

Programme of the day

- Short introduction to OMERO
- Managing images (Workflow 1 – z stacks)
- **Coffee**
- Viewing, analyzing and publishing images using OMERO plugins (OMERO.iviewer, FPBioimage, OMERO.figure Workflow 1 – z stacks continued)
- **Lunch**
- Filtering and data search, analysis using Fiji features (OMERO.insight plugin for Fiji, Workflow 2 – timelapse images)
- **Coffee**
- Publishing with OMERO (OMERO.figure – in depth, Workflow 2 – timelapse continued)