The Open Microscopy Environment:

9th Annual User's Meeting

Institut Pasteur, Paris

Jason Swedlow

The OME Consortium

Centre for Gene Regulation & Expression
College of Life Sciences, University of Dundee
Dundee, Scotland, UK

Seattle, WA, USA

Talk Outline

- Thank you!
- The Problem
- This Meeting…
- Our Progress
- Future Priorities…

Thank you!!!

- *Institut Pasteur*
  - Christiane Pacaud
  - Nathalie Aulner
  - Anne Danckaert
  - Sebastien Simard
  - Sophie Gaudiard
  - Spencer Shorte
- *University of Dundee*
  - June Matthew
  - Wilma Woudenberg
- *The OME Consortium*

Thank you!!!

wellcome trust

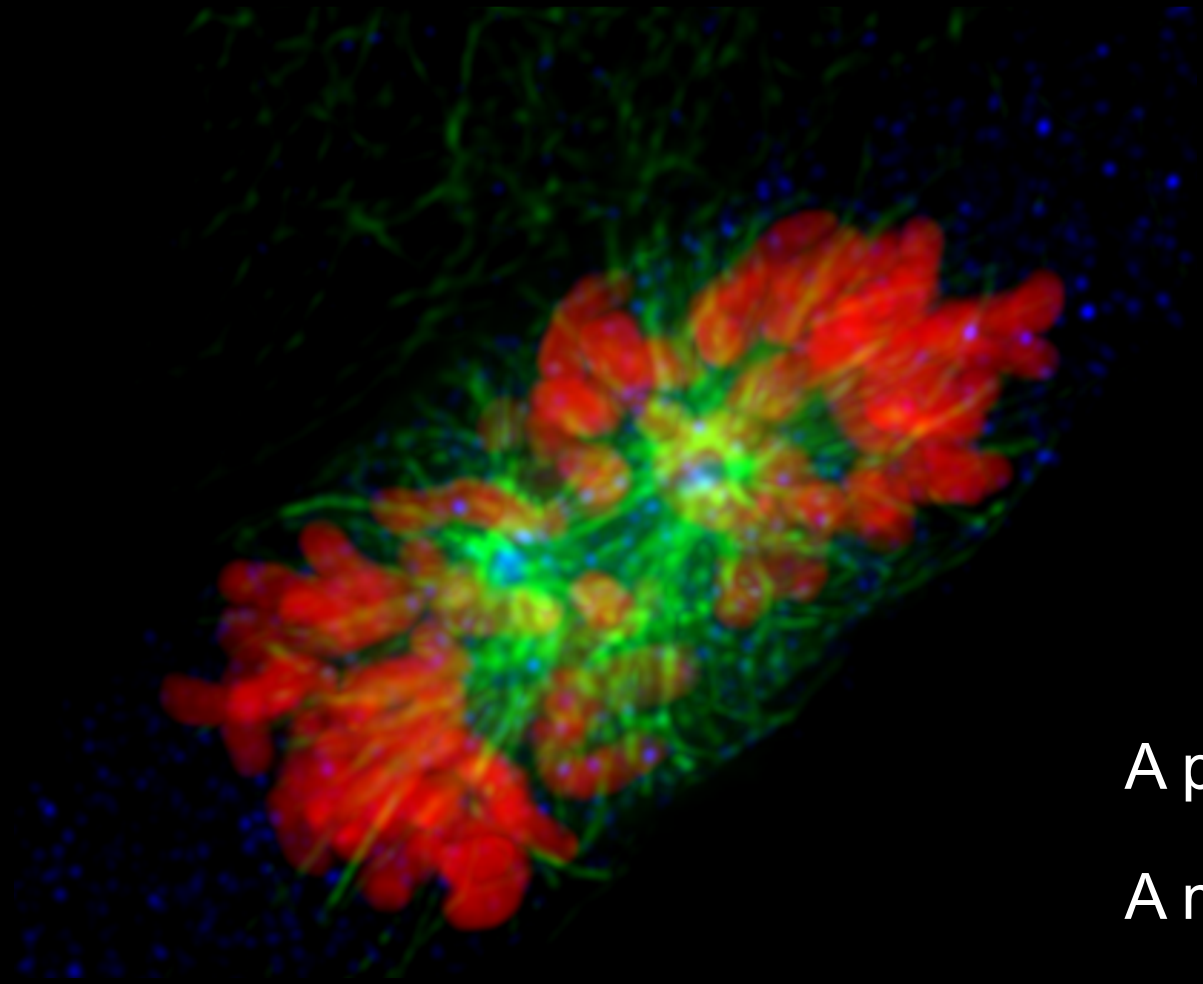
bbsrc
biotechnology and biological sciences research council

OME Consortium

- Dundee – Jason Swedlow, Colin Blackburn, Jean-Marie Burel, Mark Carroll, Gus Ferguson, Helen Flynn, Kenny Gillen, Roger Leigh, Simon Li, Dominik Lindner, June Matthew, Josh Moore, Will Moore, Andrew Patterson, Blazej Pindelski, Balaji Ramalingam, Aleksandra Tarkowska, Petr Walczysko, Wilma Woudenberg
- University of Wisconsin, Madison (LOCI) - Kevin Eliceiri, Curtis Rueden, Mark Hiner
- UT Southwestern – Gaudenz Danuser, Sebastien Besson
- Oxford – Ilan Davis, Douglas Russell
- CRS4 - Gianuigi Zanetti, Gianmauro Cucurru, Simone Leo, Luca Lianas
- Edinburgh – Richard Baldock, Bill Hill, Jianguo Rao
- Carnegie-Mellon – Robert Murphy, BK Cho, Ivan Cao-Berg
- Imperial – Paul French, Chris Dunsby, Ian Munro
- NIA, NIH – Ilya Goldberg, Chris Coletta
- Pasteur – Spencer Shorte, Sebastien Simard, Julien Jorde
- EBI – Gerard Kleywegt, Ardan Patwardhan, Ingvar Lagerstedt
- Glencoe Software – Chris Allan, Joshua Ballanco, Andreas Knab, Melissa Linkert, Chris MacLeod, Josh Moore, Carlos Neves, Liza Unson, Wilma Woudenberg

THE PROBLEM

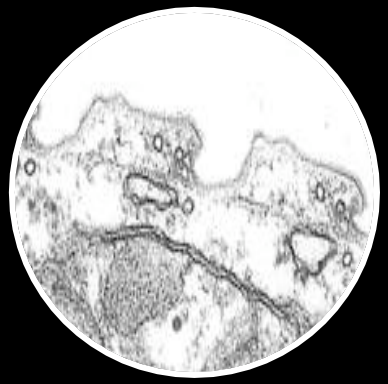
The Image Problem…



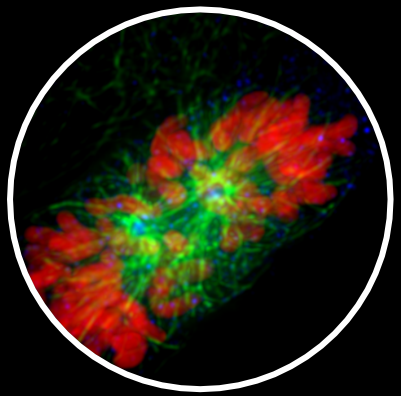
A pretty picture?

A measurement?

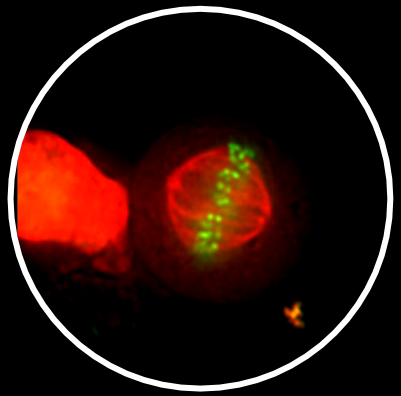
The Image Problem…
is Ubiquitous



Organelles

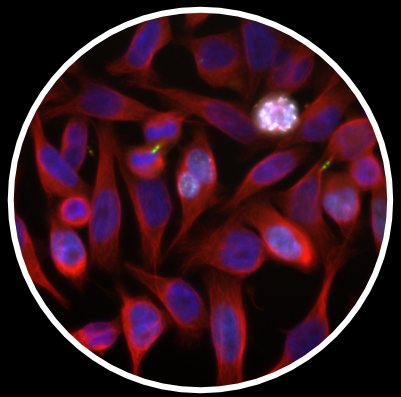


Cells

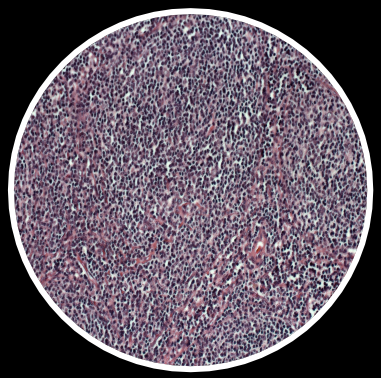


Dynamics

Physiology



Lead Discovery
Target Validation



Pathology

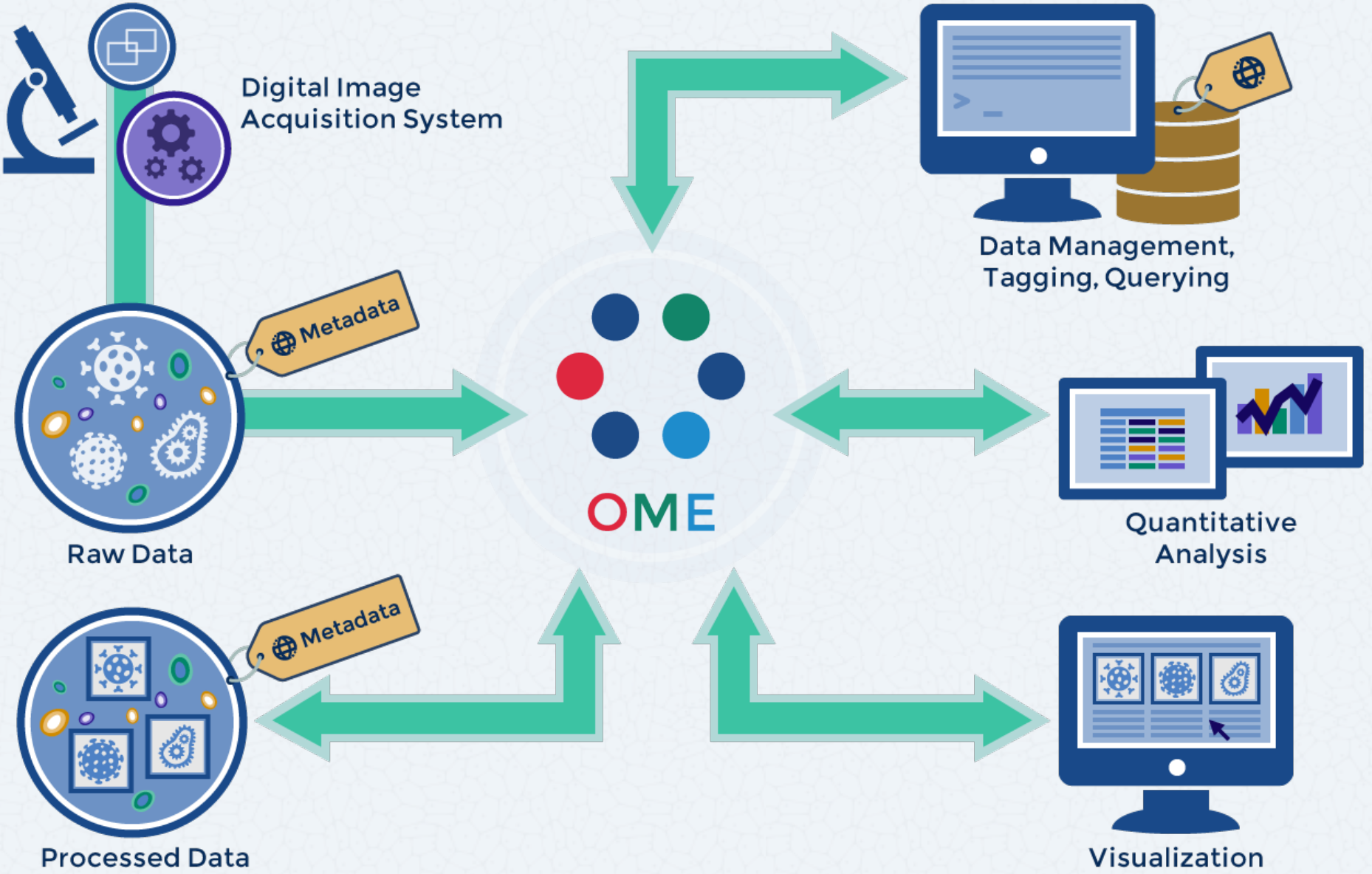
In Vivo

A pretty picture?

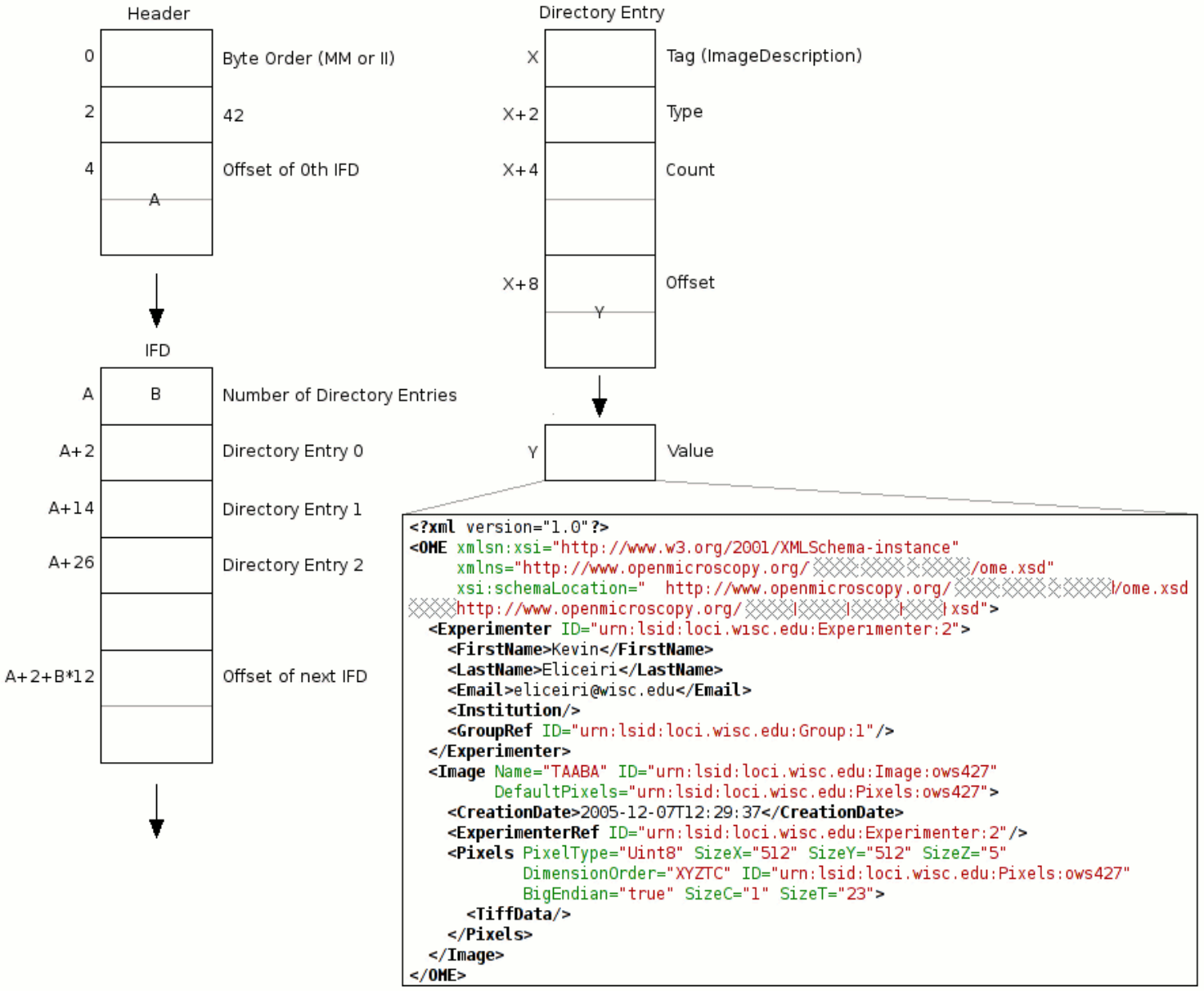
A measurement?

A resource?

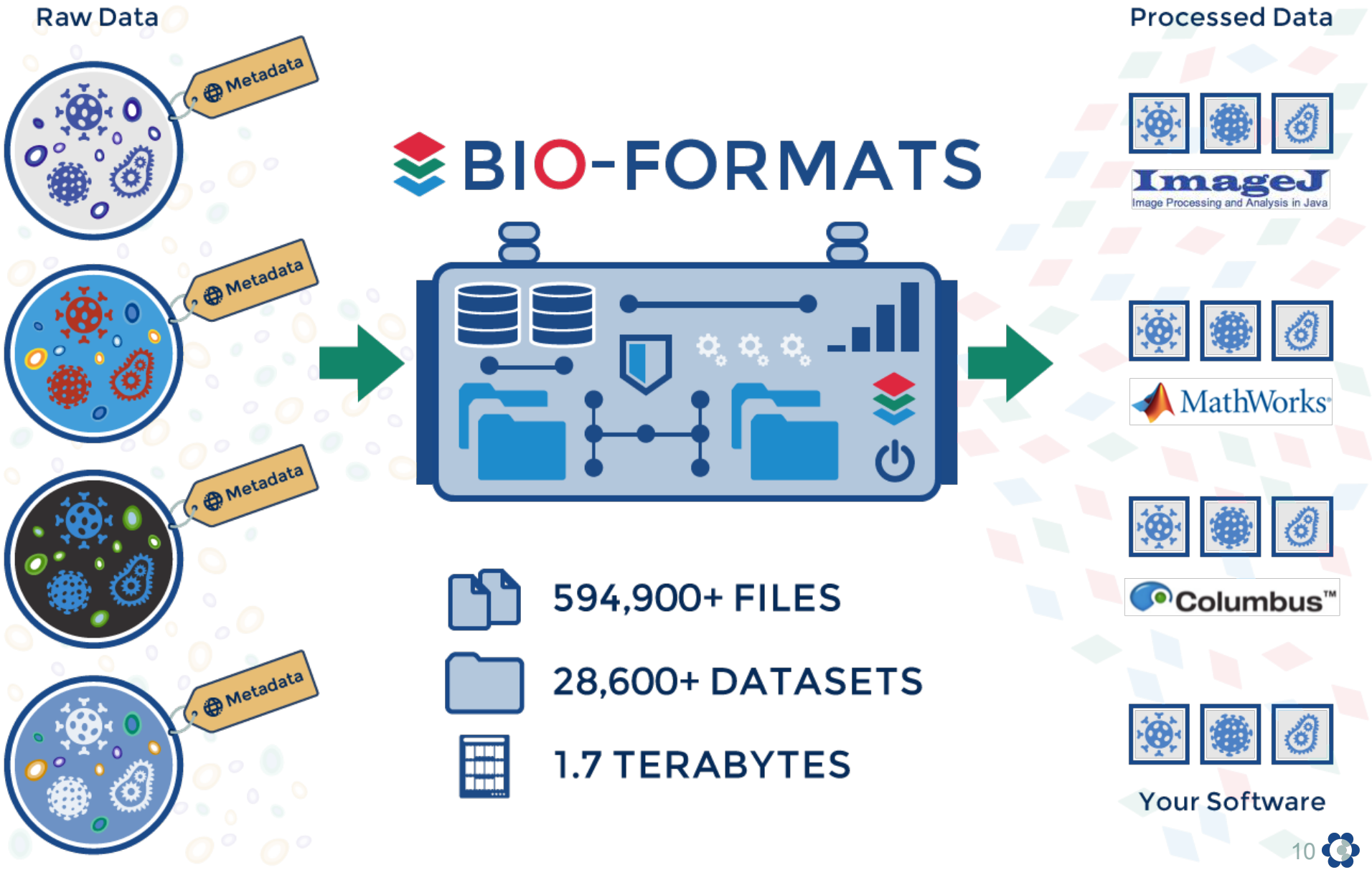
…Towards Image Informatics



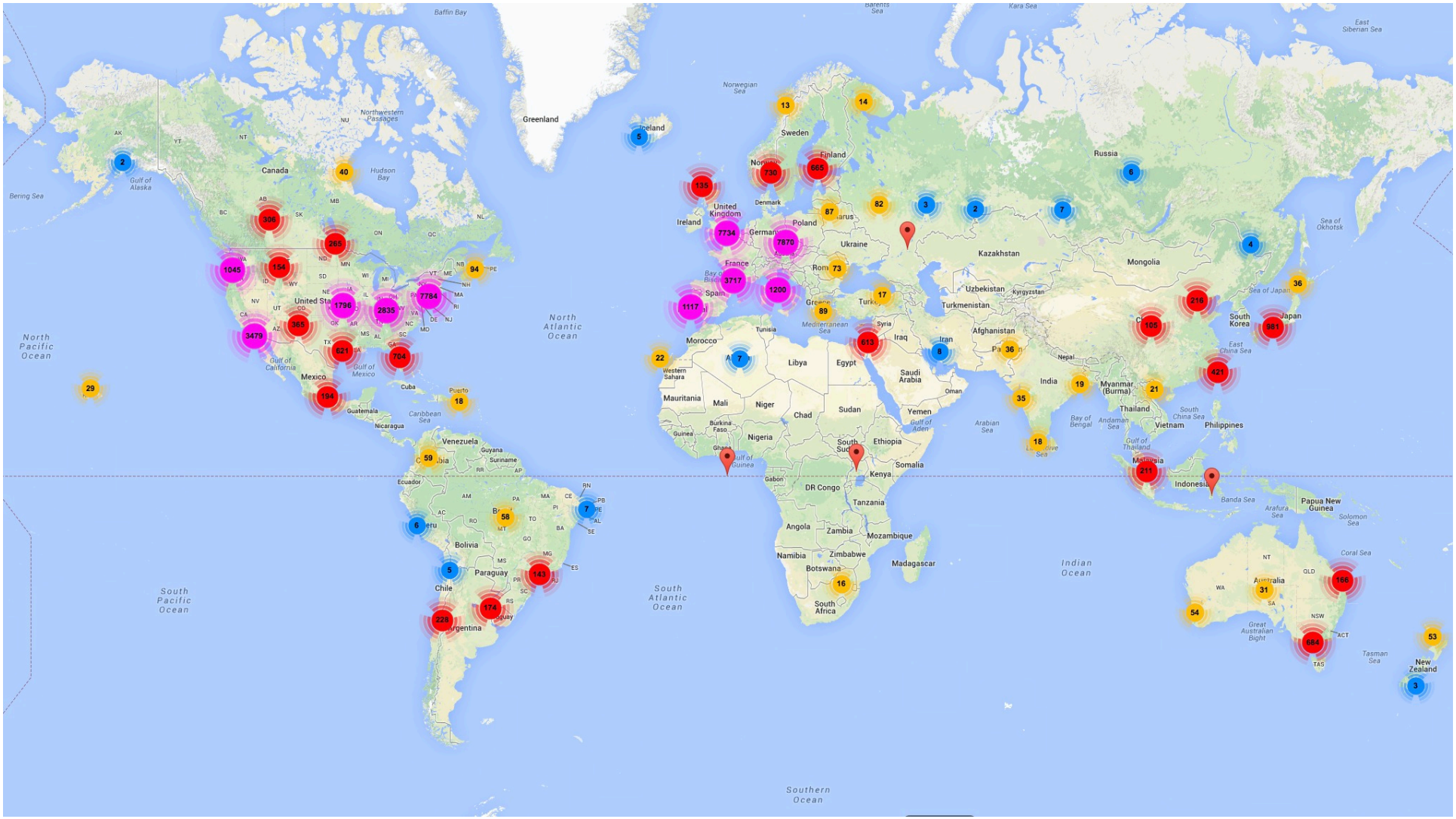
OME-TIFF:
Common, Open Image File



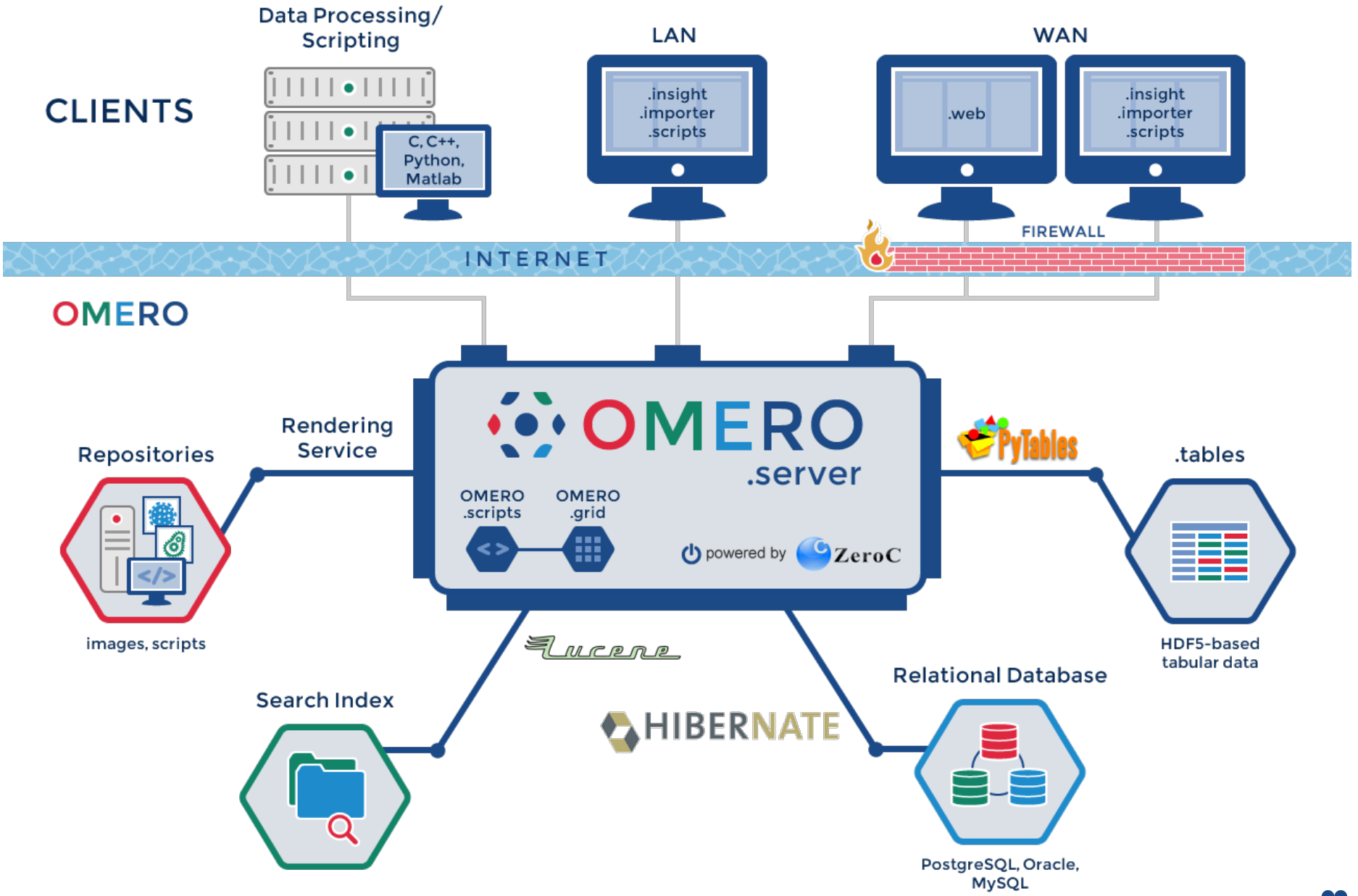
BIO-FORMATS:
Proprietary File Conversion



BIO-FORMATS:
Unique IPs: 2013

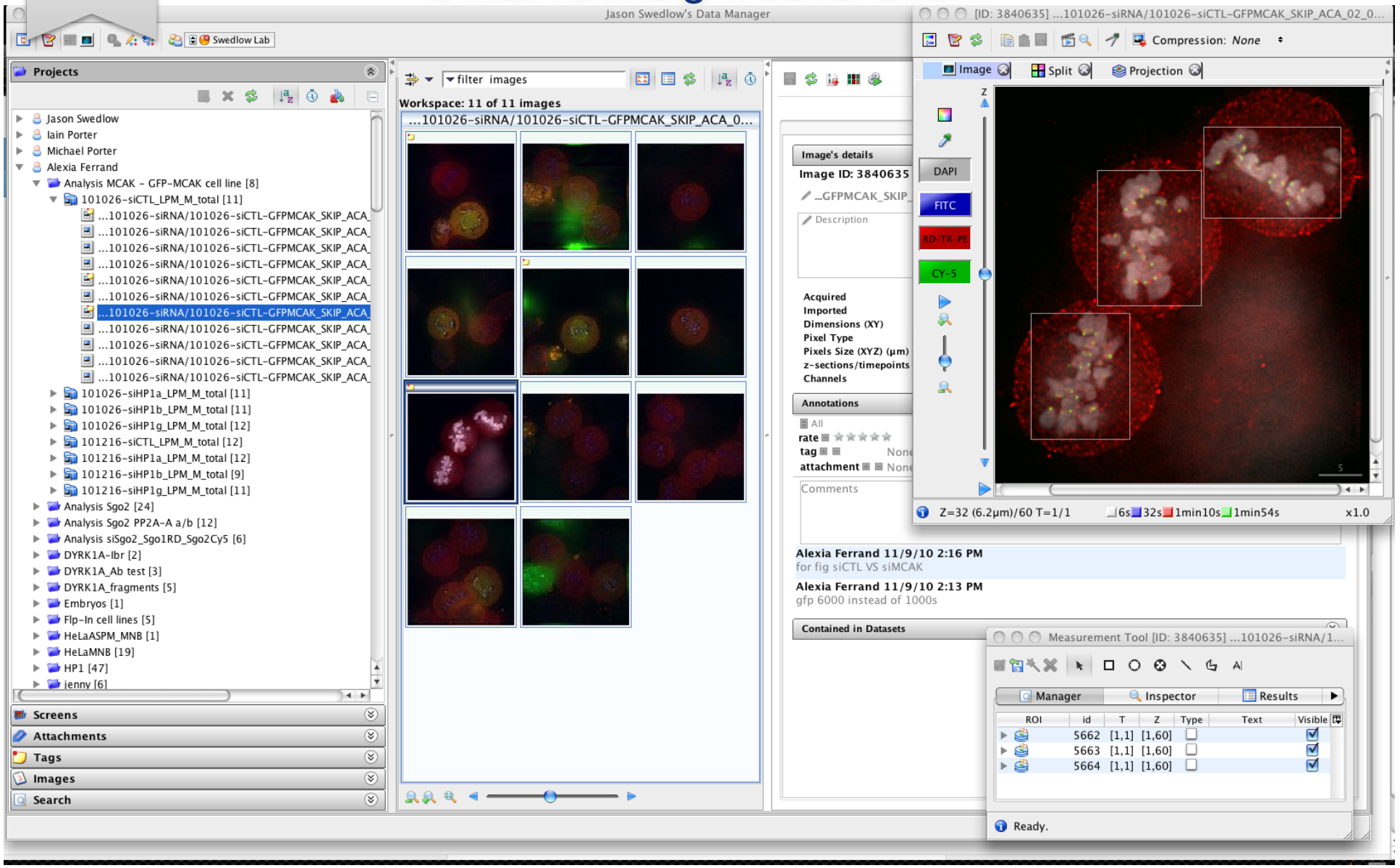


The OMERO Platform



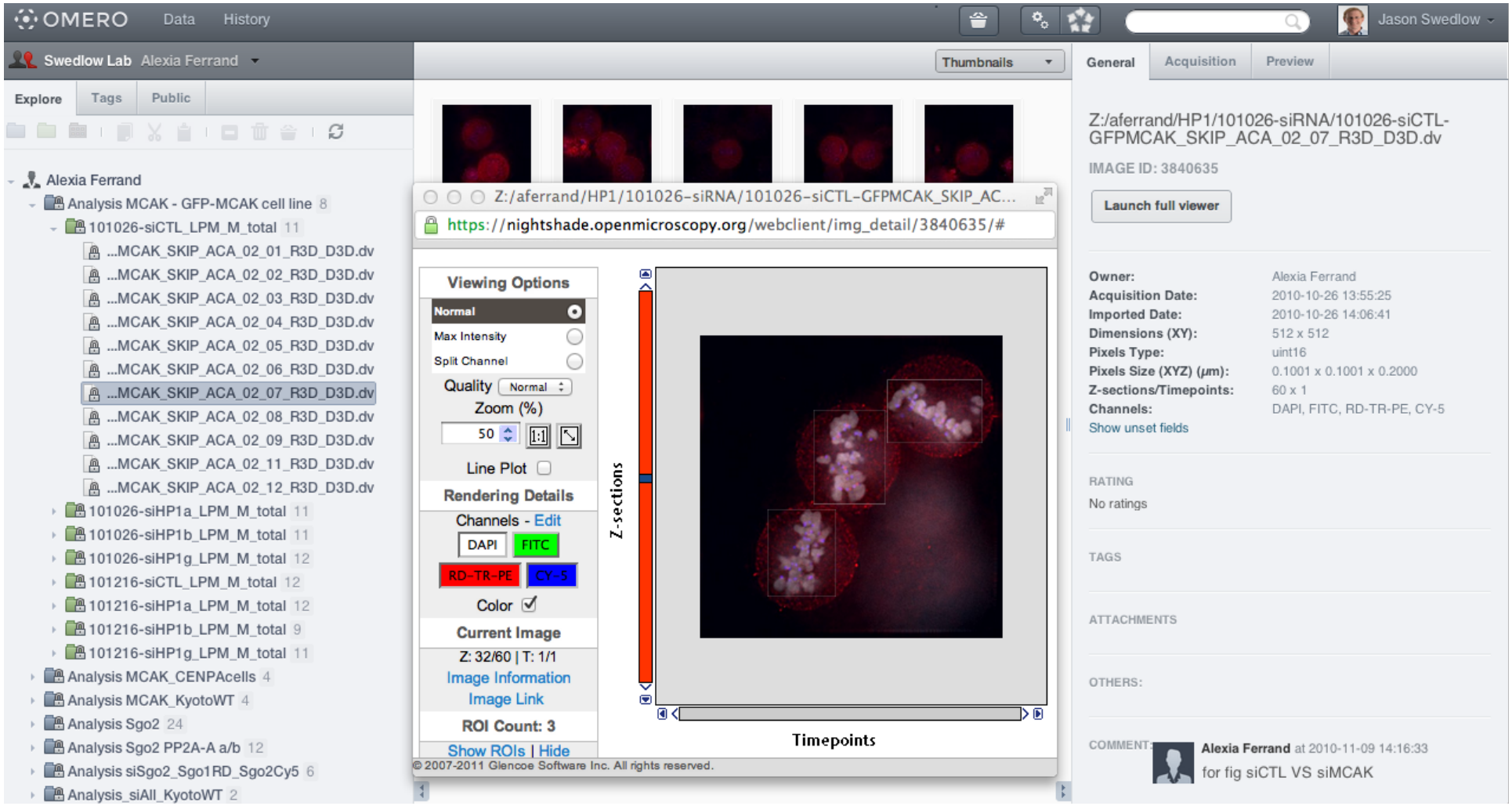
Allan et al, 2012, Nature Methods

OMERO & BIO-FORMATS: OMERO.insight Java Client



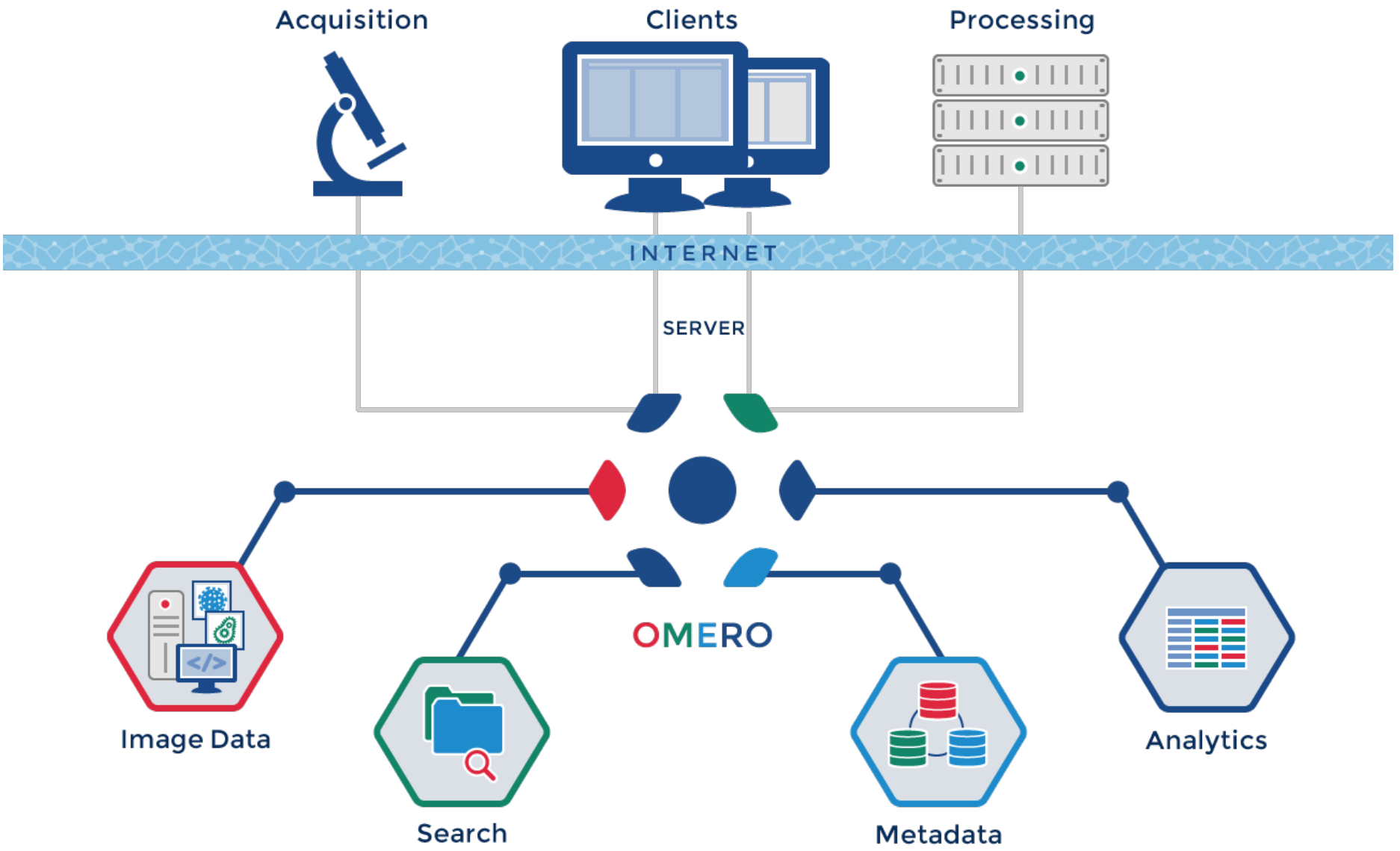
Allan et al, 2012, Nature Methods

OMERO & BIO-FORMATS: OMERO.web Client

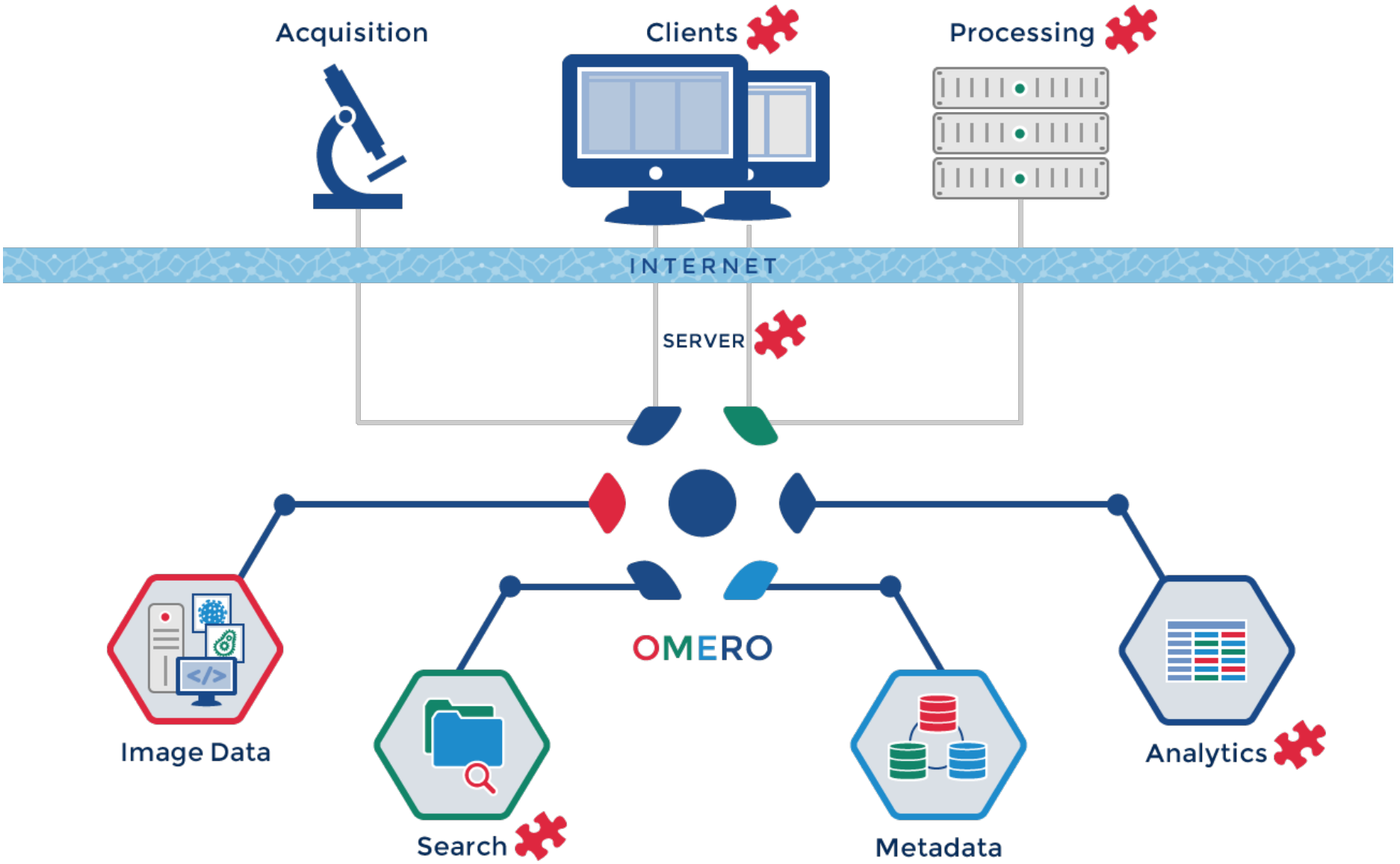


Allan et al, 2012, Nature Methods

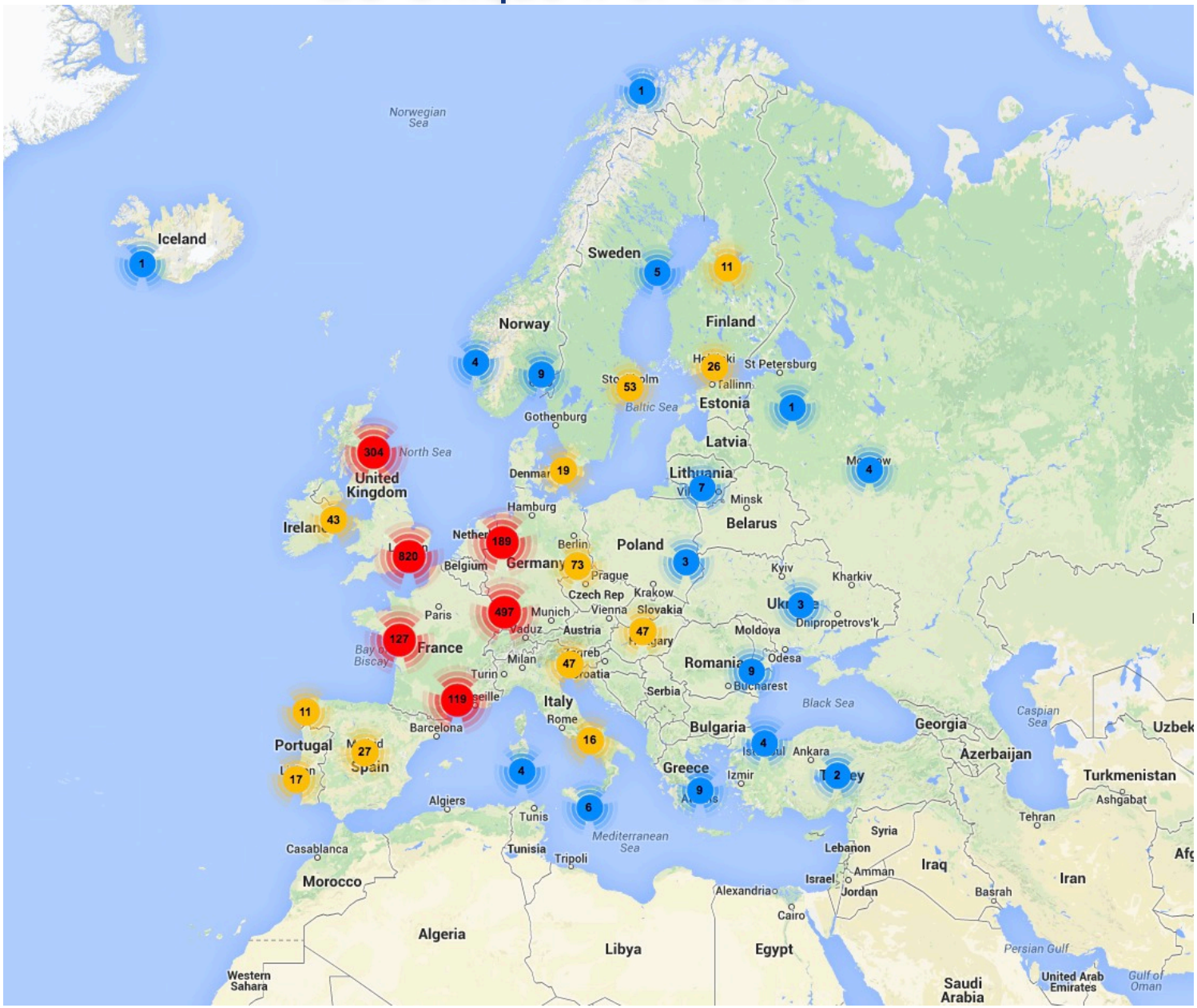
The OMERO Platform



The *Extensible* OMERO Platform



OMERO:
EU Unique IPs: 2013



THIS MEETING…..

Meeting Purpose

9th Annual User's Mtg

- Attendees
  - OME Consortium
  - Invited Speakers
  - Broad cross-section of users
- *Day 1:* Presentations
  - Project Overview
  - Users & Guests
- *Day 2:* Workshops & demos

- Progress Report
- Future development priorities & planning

OUR PROGRESS

OME : 2011-2015

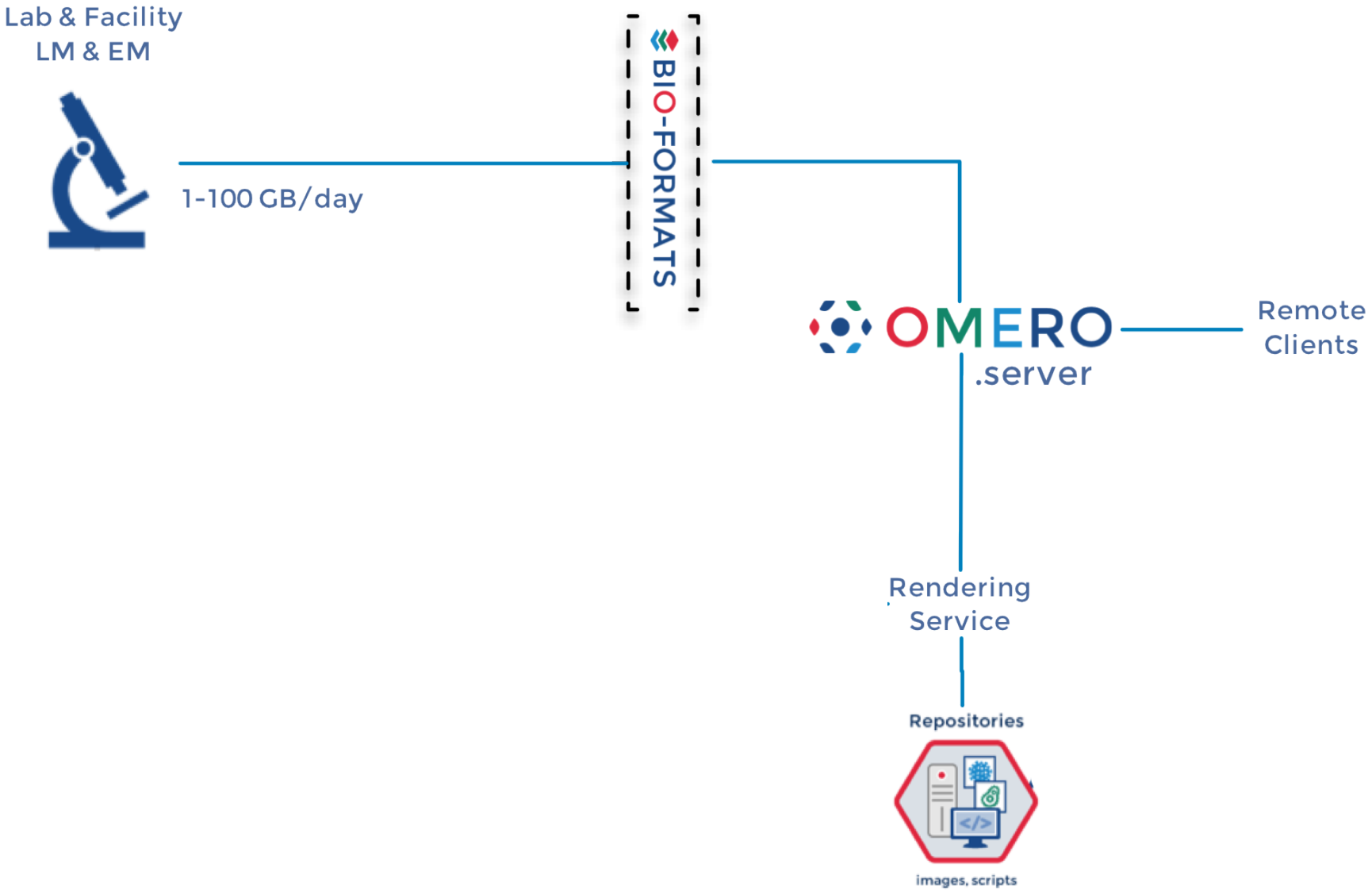
- More data types (FLIM, LSFM, 3DEM)
- Support complex, multi-dimensional, heterogeneous data
- Alternative image data storage methods (e.g., HDF5…)
- Validation of interfaces for analysis (esp. Matlab, Python, etc.)
- Integration of multi-parameter image-based search
- Analysis repositories
- Data sharing & publication

OME : 2013/2014 Progress

- *Software*:
  - OME Consortium: Ten teams
  - Bio-Formats & OMERO 4.4.x & 5.0.x releases
  - Good adoption
    - >60k Bio-Formats, ~2K server, ~4K client, ~1K web server
  - Consortium releases: FLIMfit, U-Track, Searcher, ImageJ2, Figure, mtools, csvtools, webtagging, biobank, WND-CHRM, …
  - Search…
  - QA
  - Community & Documentation

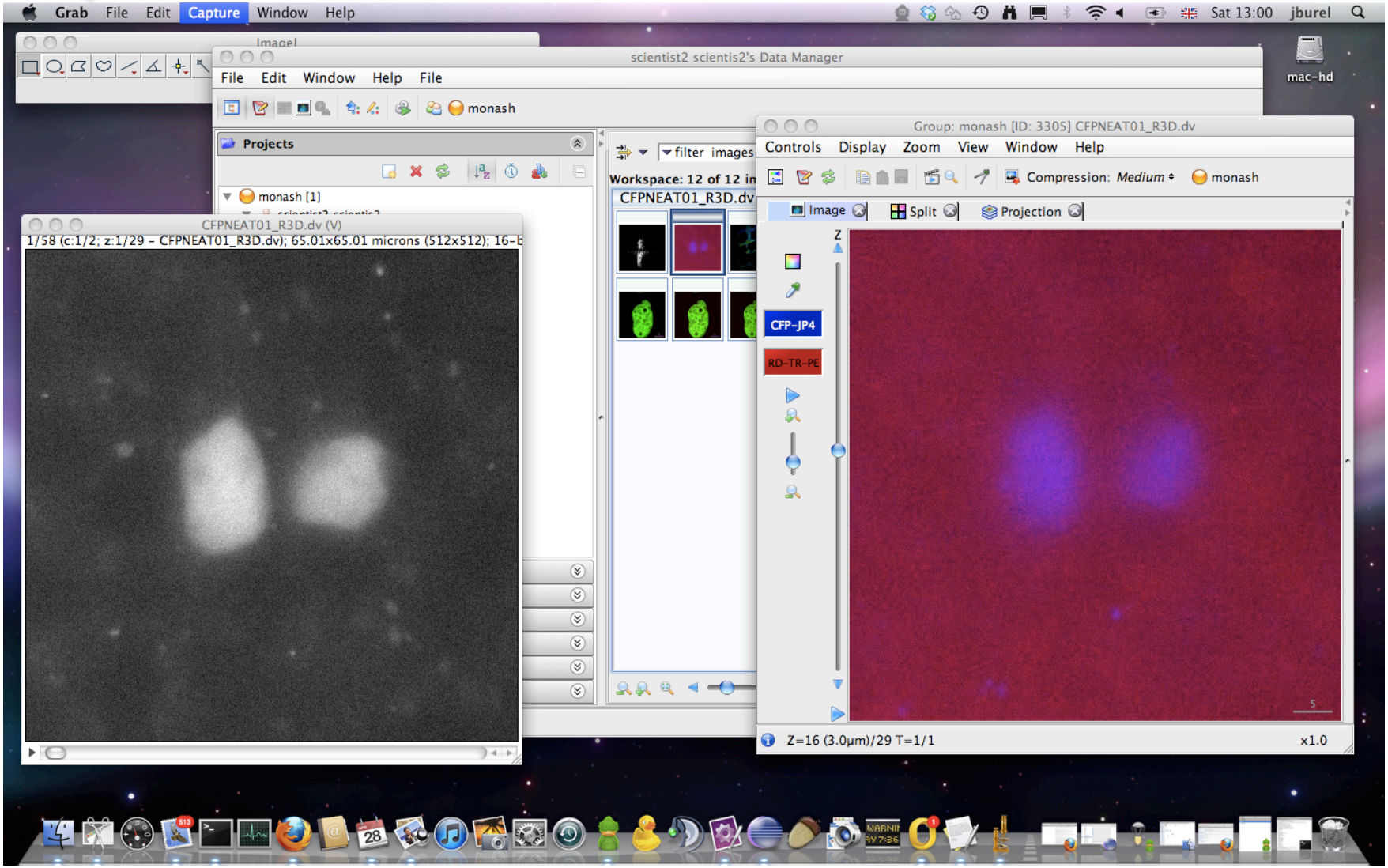
- Several external examples of our work
  - Harvard LINCS
  - JCB DataViewer
  - Stowers ODR
  - SSBD, Riken
  - EMDataBank– 134 3D tomograms
  - Dundee Virtual Microscope
  - ….

OMERO & BIO-FORMATS:
Data Import & Access

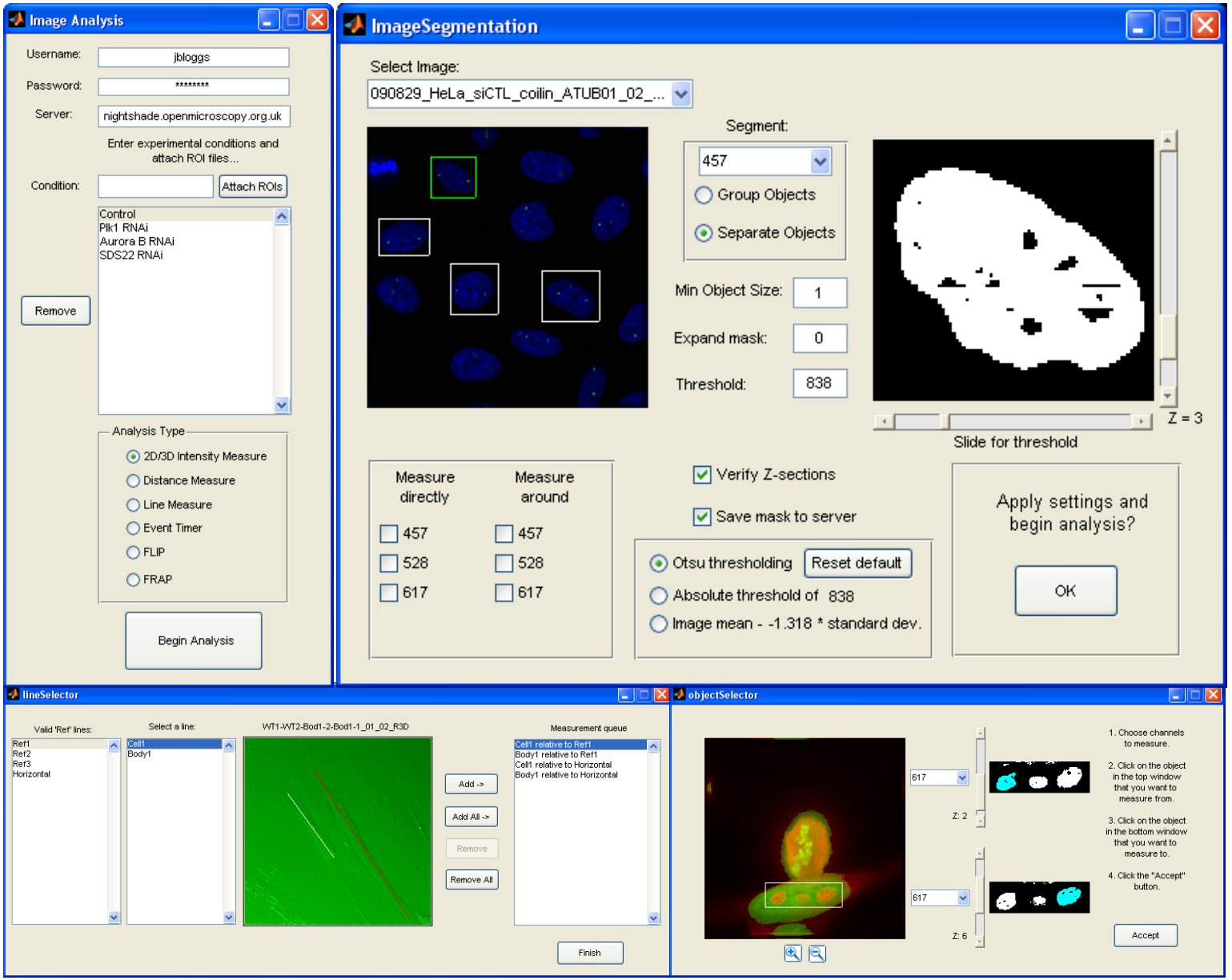


OMERO-5.0 includes OMERO.fs, released Feb/2014 (Google: “OMERO 5.0”)

OMERO and ImageJ2

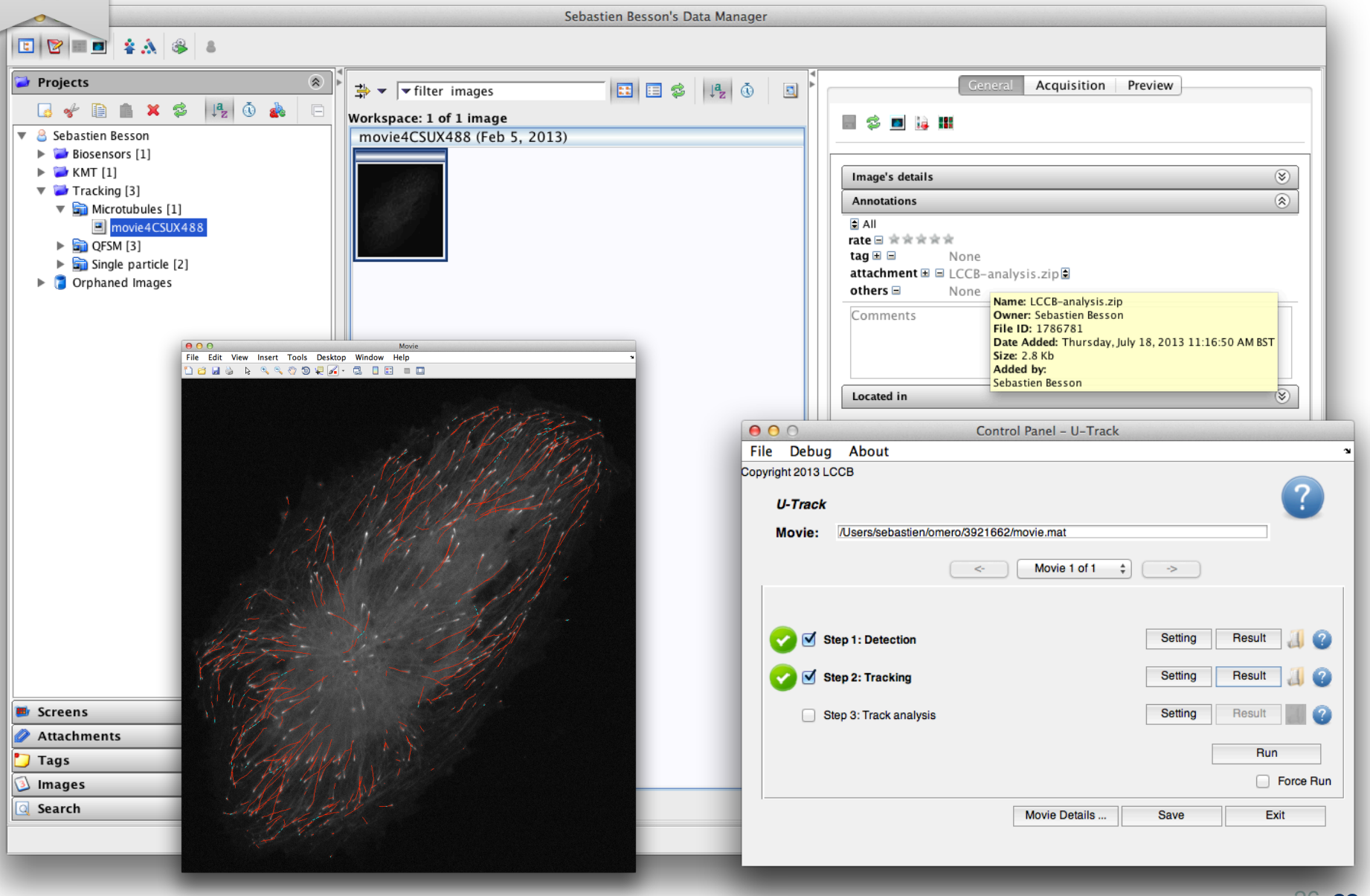


OMERO & mtools

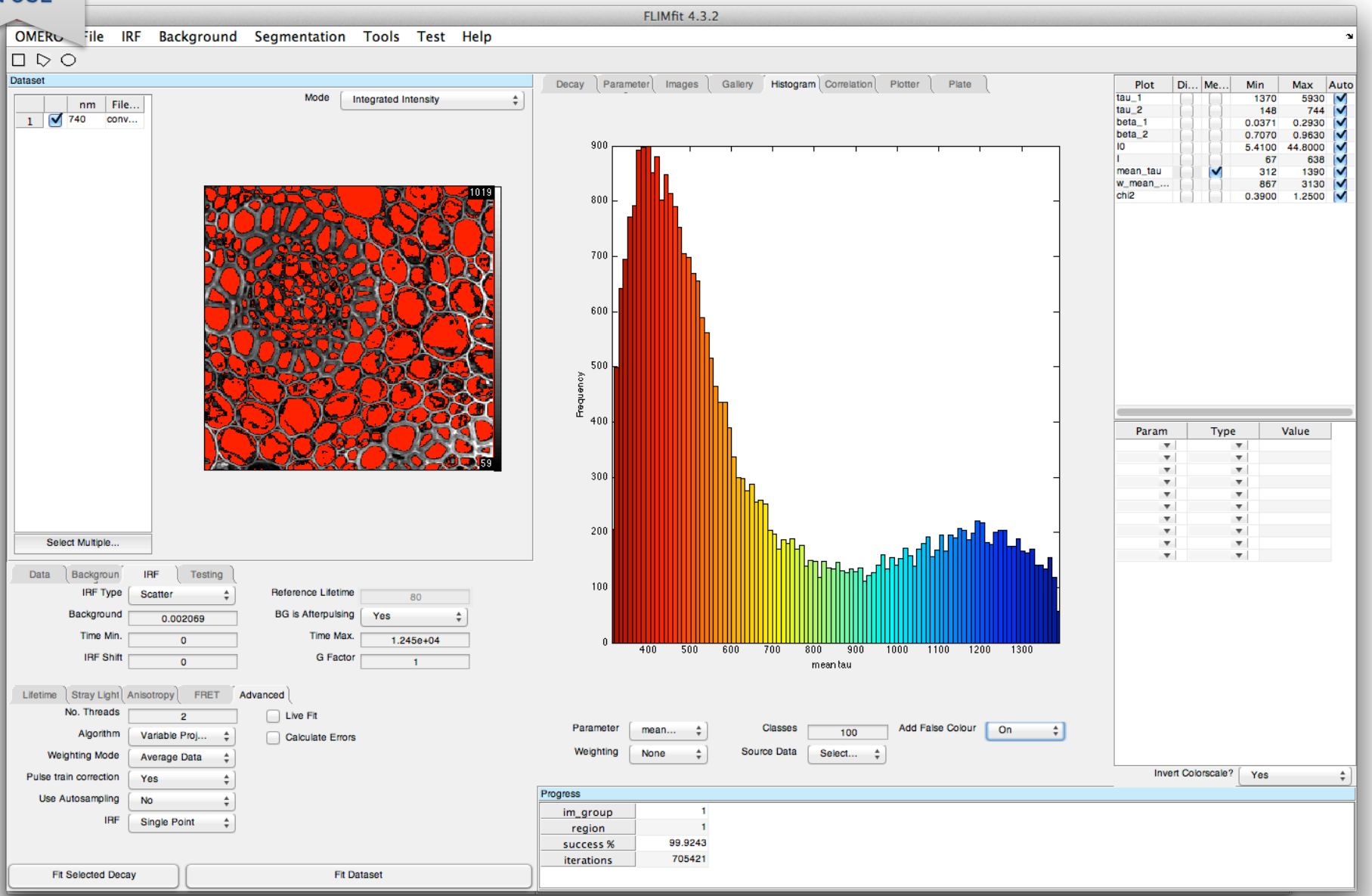


Michael Porter, Univ of Dundee

OMERO & u-track

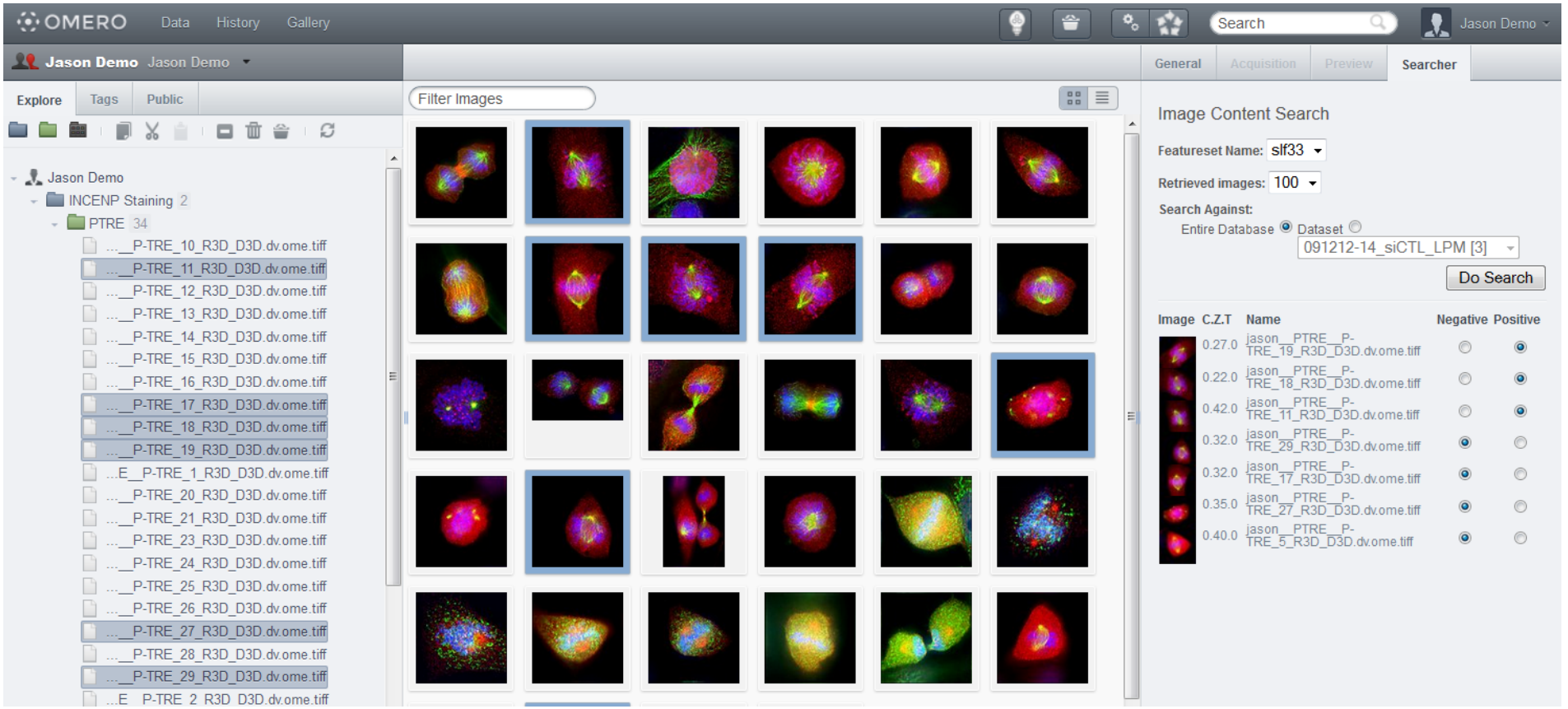


OMERO & FLIMfit



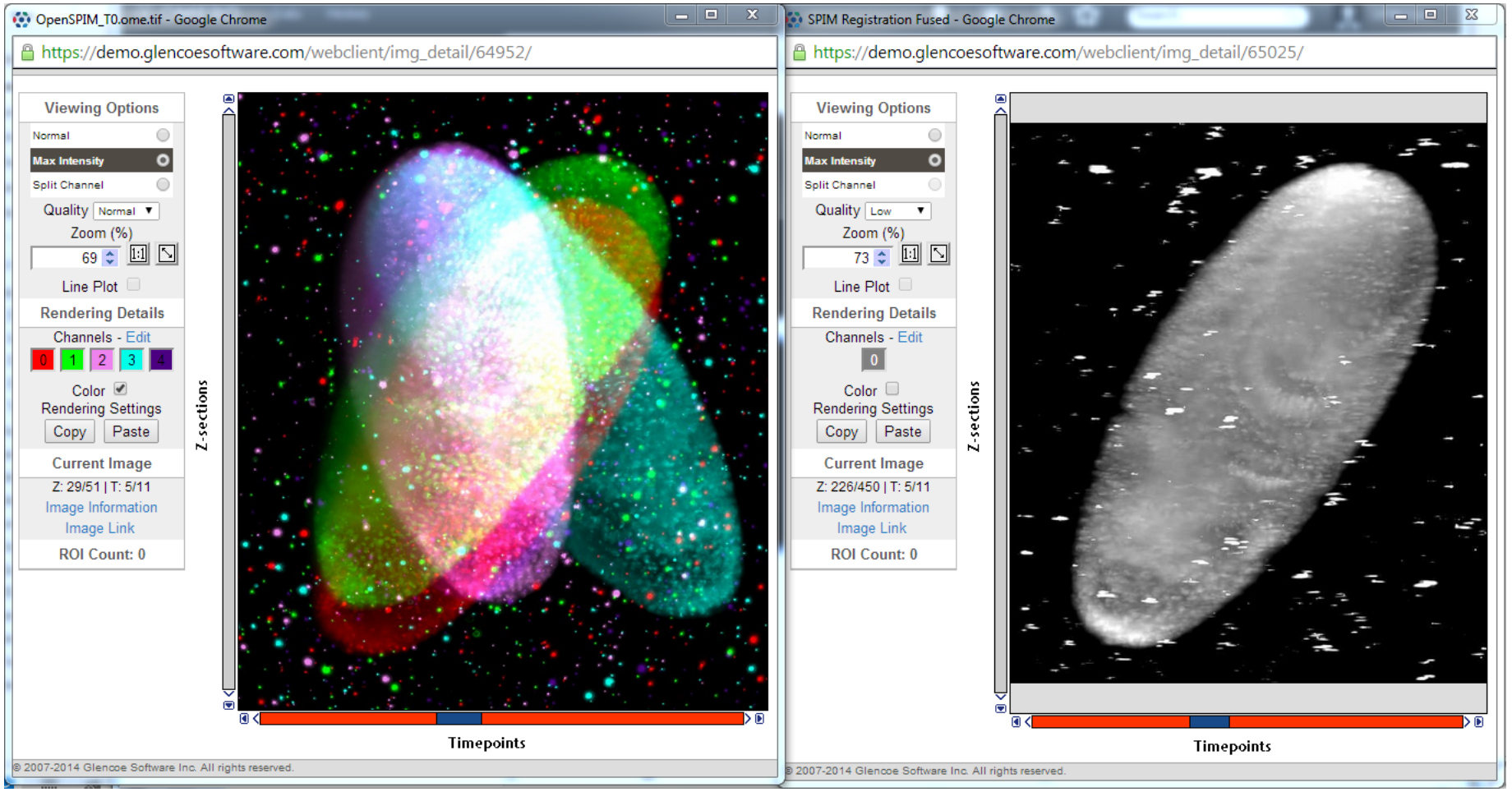
Ian Munro, Yuriy Alexandrov, Chris Dunsby, Paul French, Imperial College London

OMERO.searcher



BK Cho, Ivan Cao-Berg, Robert Murphy, CMU; Nature Meth, 9: 633-634
Simon Li, Univ Dundee

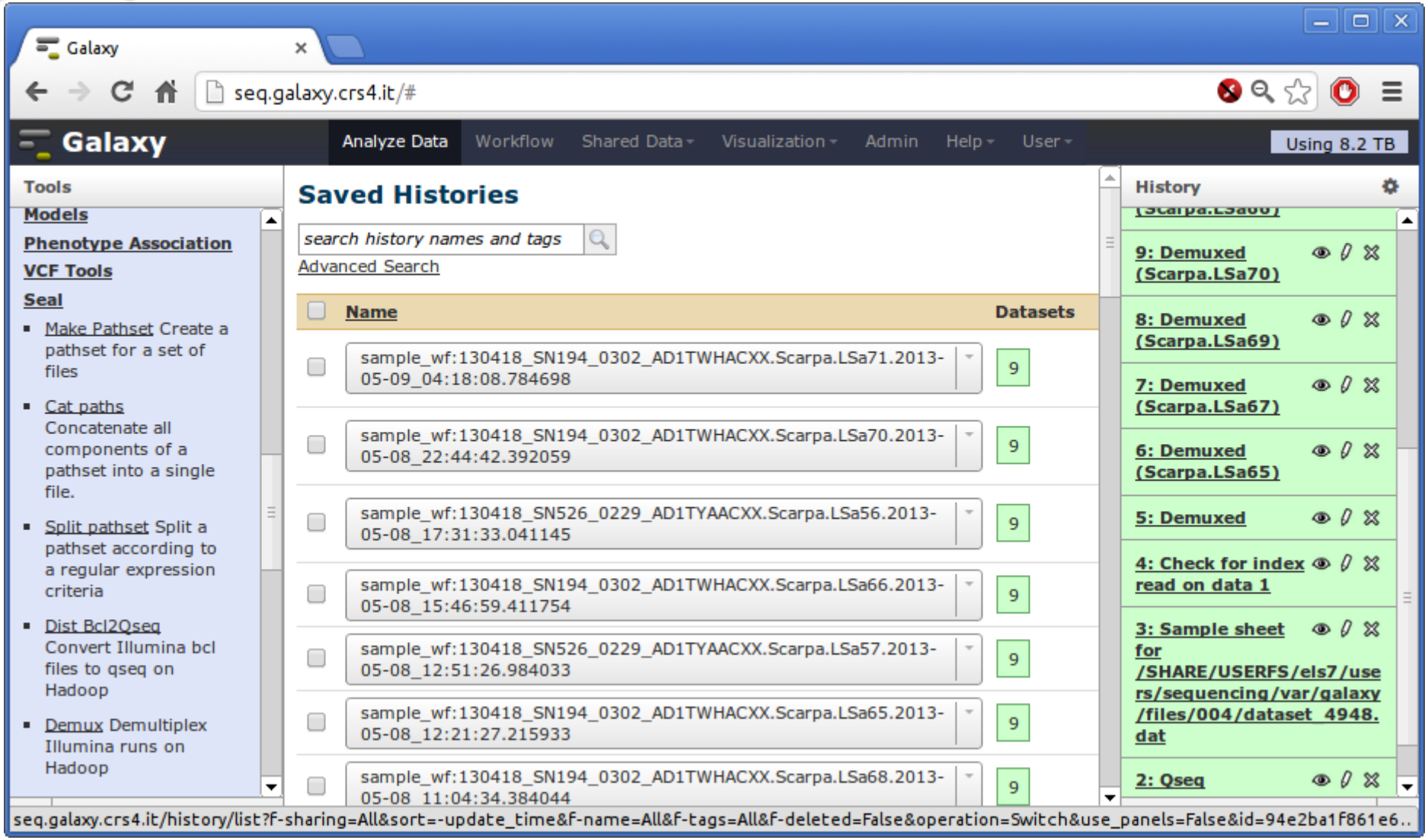
OMERO & Bio-Formats: LSFM MV Reconstruction



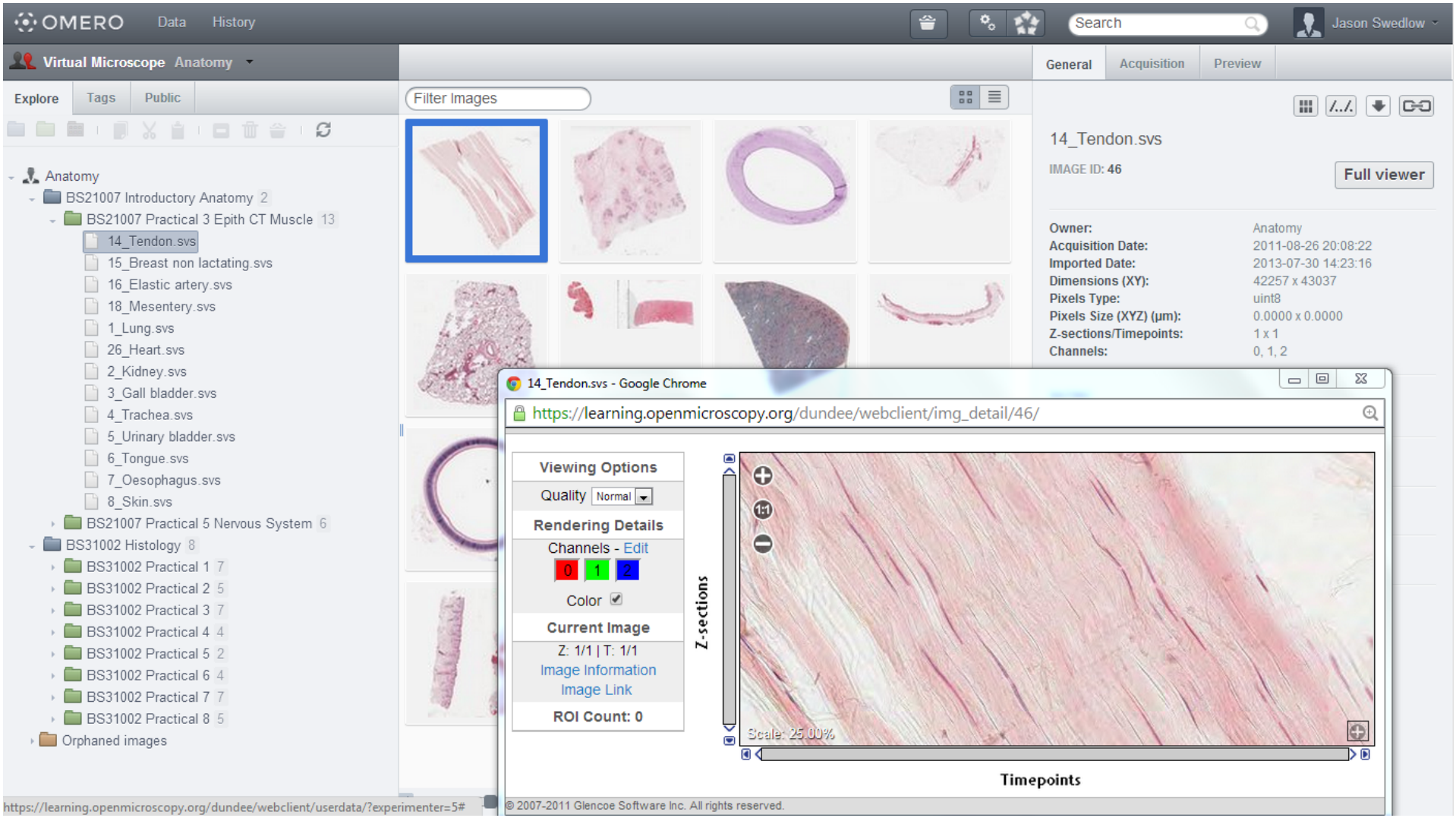
Emil Rozbicki & Chris Allan, Glencoe Software

Inspired by Preibisch et al. (2010) Nature Meth, 7: 418-419; http://fiji.sc/SPIM_Registration

OMERO.biobank: Enabling Meta-Compute

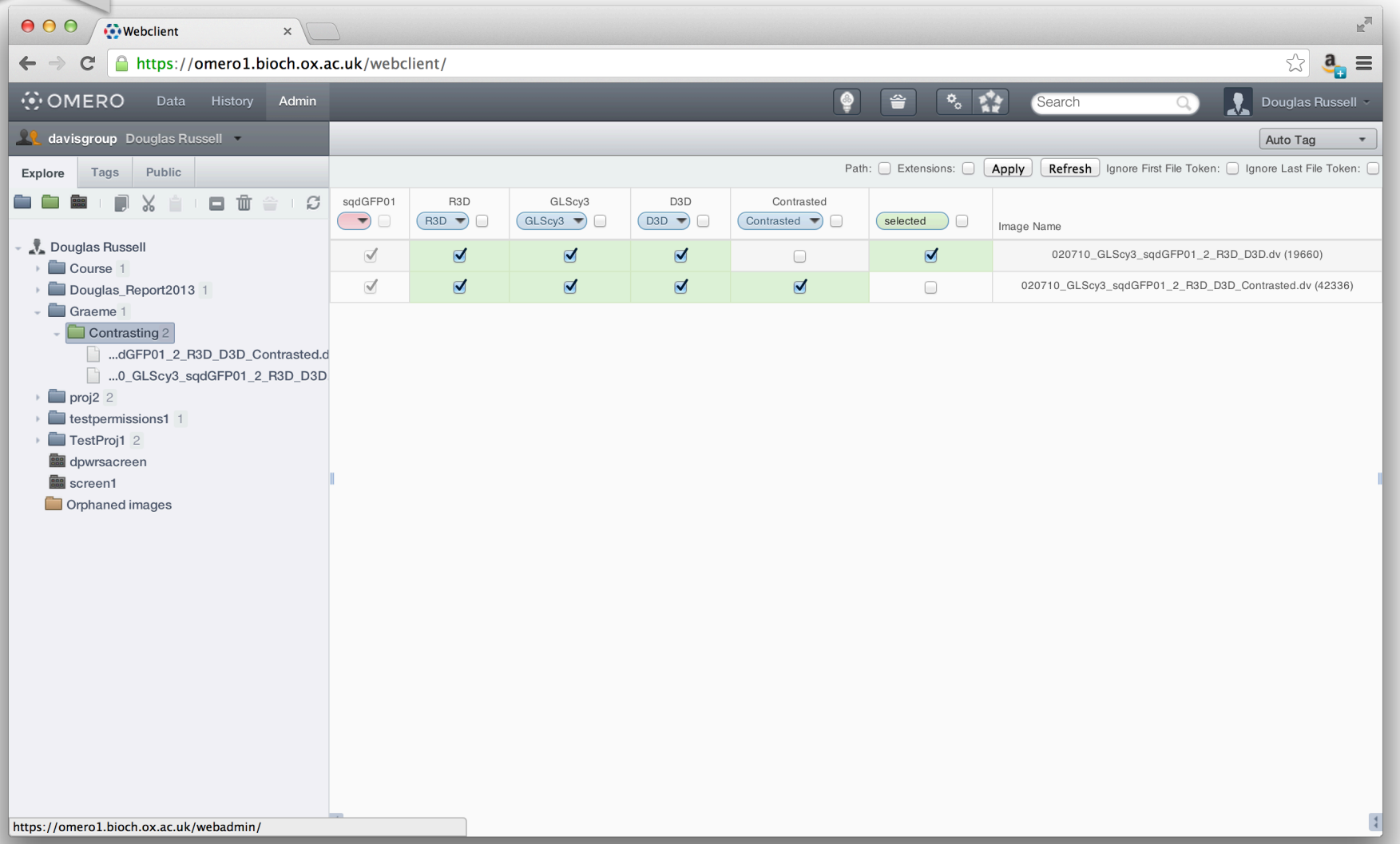


OMERO & BIO-FORMATS:
Pathology Instruction/Dundee VM

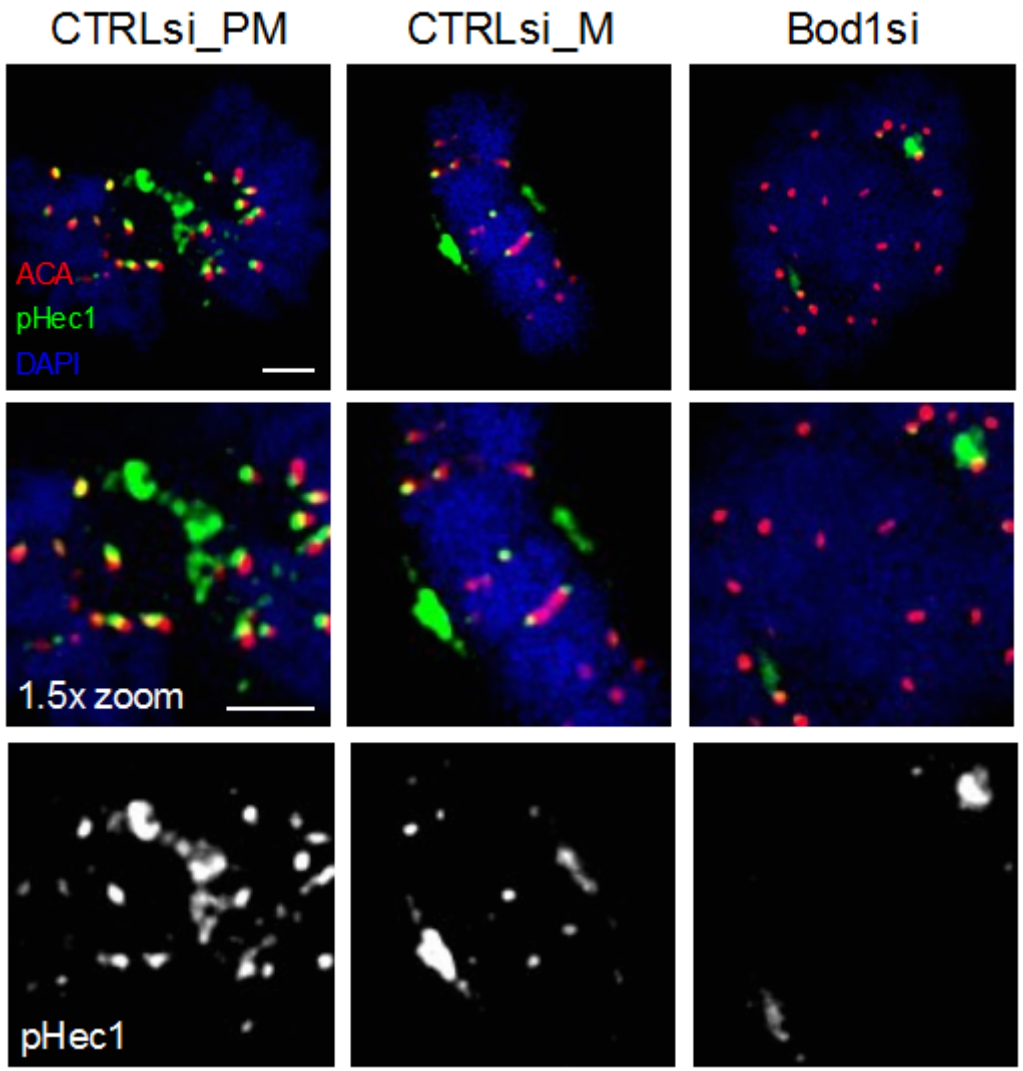


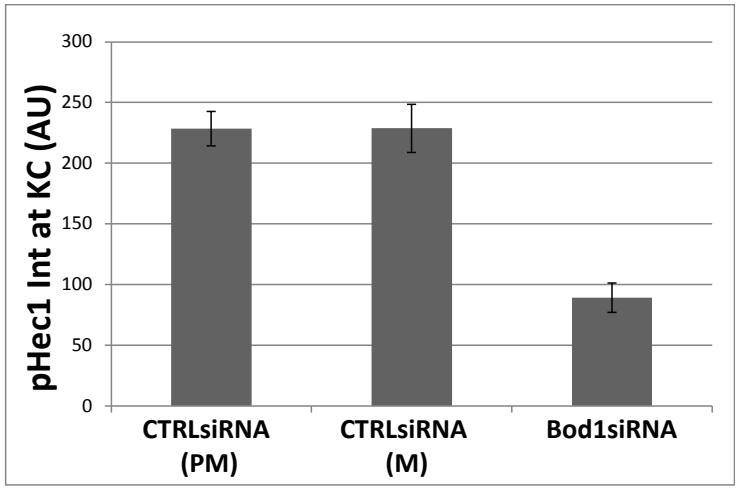
Paul Felts & Aleksandra Tarkowska, Dundee

OMERO & Auto-Tagging



od1 depletion reduces Hec1(Ser55) phosphorylation at the kinetochore

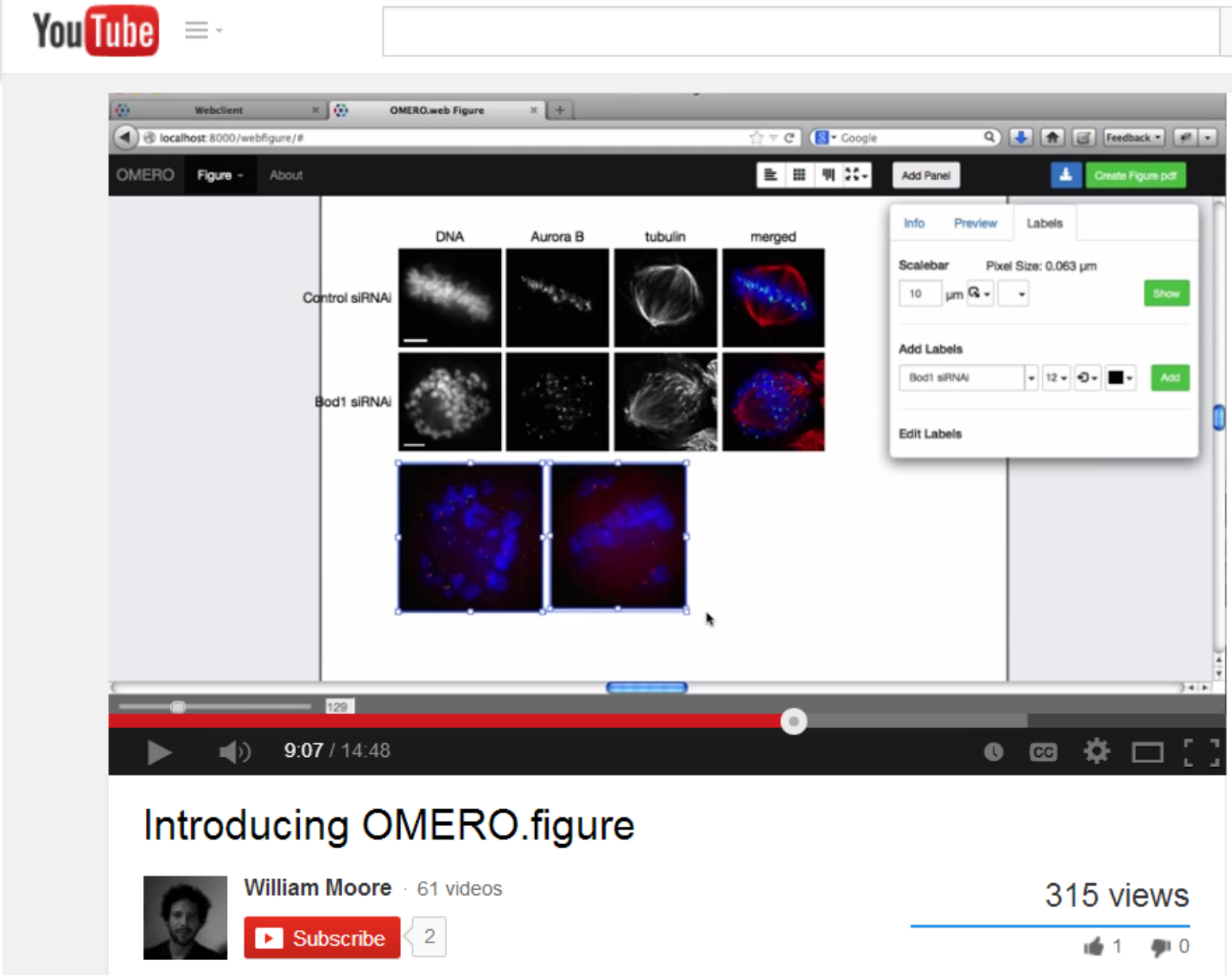




n = 10 cells per condition
(1000 kinetochores)

WebFigure Software

OMERO.figure



Will Moore, Dundee (Google: “OMERO figure”)

OME Community & Documentation

OME Community

Contact Us

You can contact us for help and advice by using the forums or mailing lists. Using these public feedback options means the whole community can take part and benefit.

Forums

Our forums allow the whole OME community to share their expertise and offer solutions.

Mailing Lists

We have two mailing lists for support-related requests and discussions.

Report a Bug

You can submit a bug report via our QA system for feedback and support.

Submit Files

Bio-Formats relies on the community to submit example files to improve support for different formats. Your data will never be shared unless you give us permission.

Sales Queries

Our commercial spin-out company, Glencoe Software, handles commercial licensing and support contracting. If you are looking for a quotation for these services, please contact them directly.

Project News

News and Events

Keep up with all the main project announcements and events via our News feed.

Meeting Minutes

As an open source project, we are dedicated to openness. You can read all our minutes to keep up-to-date on what we are working on.

OME Help

OMERO

User Help

- User Help Home Page
- **Quickstart User Guides**
  - Getting Started v. 5.0.2
  - Getting Started v. 4.4.11
  - Using ImageJ with OMERO
  - Try the OMERO Demo Server
- **Workflow User Guides**
  - Sharing Data
- **OMERO.insight**
- **OMERO.web**
- **Other OMERO Applications**
  - OMERO.figure
  - Virtual Microscope
  - OMERO.dropbox
  - OMERO.editor
- **More**
  - Guides for Previous Versions
  - Resources
  - Contact Us
  - Main OME Website

Getting Started with OMERO.insight v. 5.0.2

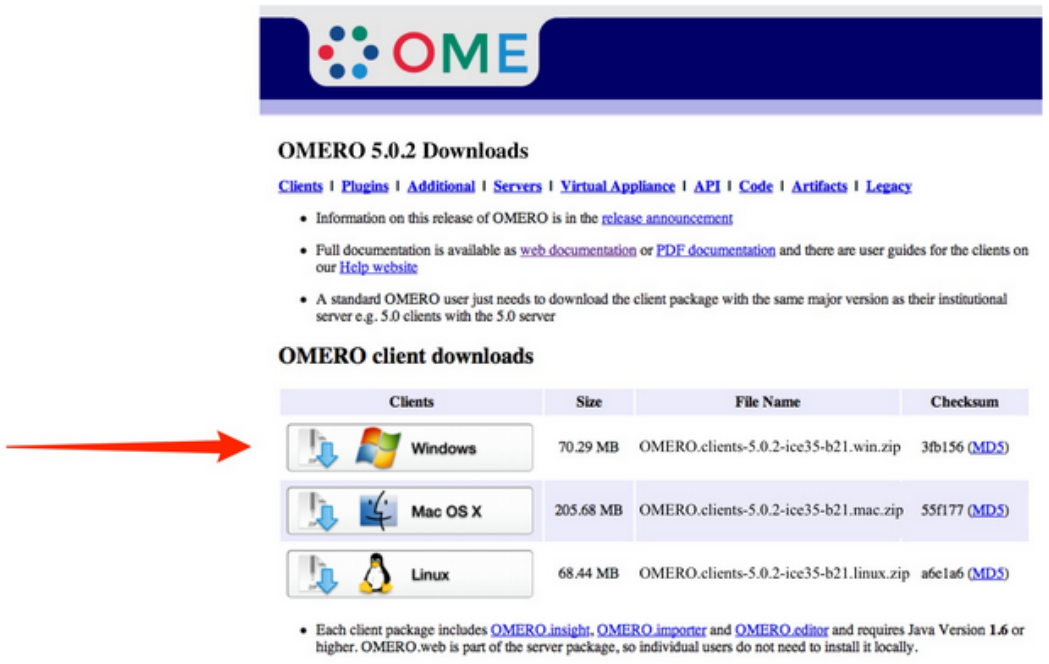
Download PDF

OMERO stores image data on a central server. You can use the OMERO.insight client to upload, view and download data from any personal computer.

Your institution's OMERO server administrator will provide you with the server address to use when connecting from OMERO.insight. They may have set up a user name and password for you too. Alternatively your username and password may be your standard login for the institution's networked computers.

Installing

1. Download OMERO.insight client at: http://downloads.openmicroscopy.org/latest/omero5



THE PRIORITIES

OME 4 & 5: 2012 -2014

OME 4.4.x & OME 5.0.x

- New UI Features
  - Permissions
  - Data Sharing & Publication
  - Tagging
- Performance….
- Analysis…
- Search…
- All bugs
- Consortium requirements
- *No API Breakage*
  - API Additions Possible
    - » OMERO.tables (for .searcher, WND-CHRM, .biobank, …)
    - » Modulo (for FLIM, LSFM, OPT…)
- Aim: Supported, maintained API to end of current project

OME 5 and beyond: 2014→…

OME 5.1.x …

- Decoupling Bio-Formats and OMERO releases
- *API Breakage*
  - Units
  - Map Annotations
  - New detectors
  - Rendering Settings
  - “New” imaging modalities (SRM, LSFM, OPT, …)
  - …
- Extended Metadata support
  - ROIs, Features, etc.
  - Graphs: (trajectories, provenance, …)
- Data Sharing & Publication
  - Lab, Institute, Resource
  - National/Worldwide Repositories

Are these correct? Tell us what you think!!!!

What OME Means to You…

It's funding time….

- Written feedback is hugely valuable
  - Lists
  - Forums
  - Email to Jason
- Used to support requests for funding
- Defines our priorities

Without your feedback, we can't justify continuing our work.

OME Consortium

- Dundee – Jason Swedlow, Colin Blackburn, Jean-Marie Burel, Mark Carroll, Gus Ferguson, Helen Flynn, Kenny Gillen, Roger Leigh, Simon Li, Dominik Lindner, June Matthew, Josh Moore, Will Moore, Andrew Patterson, Blazej Pindelski, Balaji Ramalingam, Aleksandra Tarkowska, Petr Walczysko, Wilma Woudenberg
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wellcome trust

bbsrc biotechnology and biological sciences research council