The OMERO Platform

An open source solution for microscope metadata management, visualization and analysis

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ome
open microscopy environment

Abstract

The OMERO Platform aims to provide a complete solution for image data management. Both cross-platform and cross-language, OMERO provides highly-scalable remote access to your raw data and metadata from anywhere in the world, even over a wireless connection. In the latest release, we have added directory import functionality, export to OME-TIFF and movies (QuickTime/AVI/MPEG), along with substantially improved support for metadata, especially for confocal microscopy.

OMERO is an open source development project and we welcome input, advice, comments, and help. Go to http://www.openmicroscopy.org and see what we are up to!

google: OMERO http://www.openmicroscopy.org/

OMERO.importer

OMERO.importer is our desktop tool for importing images onto the OMERO.server and supports over 70 different file formats. Its import queue enables you to browse and select files for import, organise them into projects and datasets, and provide brief annotations. The import queue's fire & forget operation lets you set up your import and then continue with your day. It is ideally suited for use at the workstation where image data is collected.

OMERO.importer is cross-platform compatible with all major operating systems and makes use of Bio-Formats, OME's imaging package.

Bio-Formats is a standalone Java library for reading and writing image file formats. It is capable of parsing both pixels and metadata for a large number of formats, as well as writing to several formats. Other software packages interoperate with it including ImageJ and MATLAB.

Bio-Formats

		read	write
Adobe Photoshop PSD	.psd	✓	
Alicona 3D	.al3d	✓	
Amersham Biosciences GEL	.gel	✓	
Amira Mesh	.am, .amiramesh, .grey, .hx, .labels	✓	
Analyze 7.5	.img, .hdr	✓	
Andor Bio-Imaging Division (ABD) TIFF	.tif	✓	
Animated PNG	.png	✓	✓
Aperio SVS TIFF	.svs	✓	
AVI (Audio Video Interleave)	.avi	✓	✓
Axon Raw Format	.arf	✓	
Becker & Hickl SPCImage	.sdt	✓	
Bio-Rad PIC	.pic	✓	
Bitplane Imaris	.ims	✓	
BMP (Windows Bitmap)	.bmp	✓	
Cellomics	.c01	✓	
DeltaVision	.dv, .r3d	✓	
DICOM	.dcm, .dicom	✓	
EPS (Encapsulated PostScript)	.eps	✓	✓
Evotec/PerkinElmer Opera Flex	.flex	✓	
FEI	.img	✓	
FITS (Flexible Image Transport System)	.fits	✓	
Gatan Digital Micrograph	.dm3	✓	
GIF (Graphics Interchange Format)	.gif	✓	
Hamamatsu Aquacosmos NAF	.naf	✓	
ICS (Image Cytometry Standard)	.ics	✓	✓
Image-Pro Sequence	.seq	✓	
Image-Pro Workspace	.ipw	✓	
Improvision Openlab LIFF	.liff	✓	
Improvision Openlab Raw	.raw	✓	
Improvision TIFF	.tif	✓	
InCell 1000	.xdce, .tif	✓	
IPLab	.ipl	✓	
IPLab-Mac	.ipm	✓	
JPEG	.jpg	✓	✓
JPEG 2000	.jp2	✓	✓
Khoros VIFF (Visualization Image File Format) Bitmap	.xv	✓	
Lambert Instruments FLIM	.fli	✓	
Leica LAS AF LIF (Leica Image File Format)	.lif	✓	
Leica LCS LEI	.lei, .tif	✓	
Li-Cor L2D	.l2d, .tif, .scn	✓	
LIM (Laboratory Imaging/Nikon)	.lim	✓	
MetaMorph 7.5 TIFF	.tiff	✓	
MetaMorph Stack (STK)	.stk	✓	
MIAS (Maia Scientific)	.tif	✓	
µManager	.tif, .txt	✓	
MINC MRI	.mnc	✓	
Minolta MRW	.mrw	✓	
MNG (Multiple-image Network Graphics)	.mng	✓	
MRC (Medical Research Council)	.mrc	✓	
NEF (Nikon Electronic Format)	.nef, .tif	✓	
Nikon EZ-C1 TIFF	.tiff	✓	
Nikon NIS-Elements ND2	.nd2	✓	
nrrd (Nearly Raw Raster Data)	.nrrd	✓	
Olympus 3i SlideBook	.sld	✓	
Olympus CellR/APL	.apl, .mtb, .tnb	✓	
Olympus FluoView FV1000	.oib, .oif	✓	
Olympus FluoView TIFF	.tif	✓	
Olympus ScanR	.xml, .dat, .tif	✓	
OME-TIFF	.ome.tif	✓	✓
OME-XML	.ome	✓	✓
Openlab TIFF	.tif	✓	
PCX (PC Paintbrush)	.pcx	✓	
PerkinElmer UltraView	.tif, .2, .3, .4, ...	✓	
PICT (Macintosh Picture)	.pict	✓	
PGM (Portable Gray Map)	.pgm	✓	
PNG (Portable Network Graphics)	.png	✓	✓
Prairie Technologies TIFF	.tif, .xml	✓	
QuickTime Movie	.mov	✓	✓
SimplePCI	.cxd	✓	
TillPhotonics TillVision	.vws	✓	
TIFF (Tagged Image File Format)	.tif	✓	✓
VisiTech XYS	.xys, .html	✓	
Zeiss AxioVision ZVI (Zeiss Vision Image)	.zvi	✓	
Zeiss LSM (Laser Scanning Microscope) 510	.lsm	✓	

google: Bio-Formats http://www.loci.wisc.edu/ome/

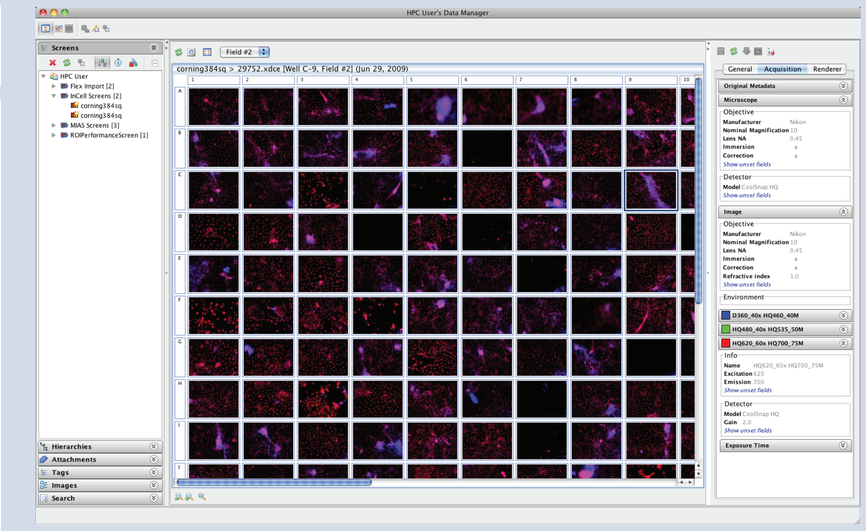
OMERO.insight

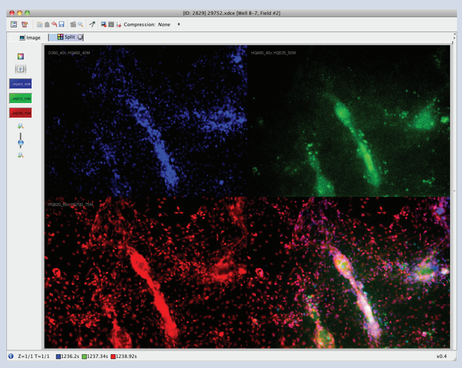
OMERO.insight is a desktop tool for accessing, manipulating, collaborating, viewing and performing basic measurement on data stored in an installation of OMERO.server.

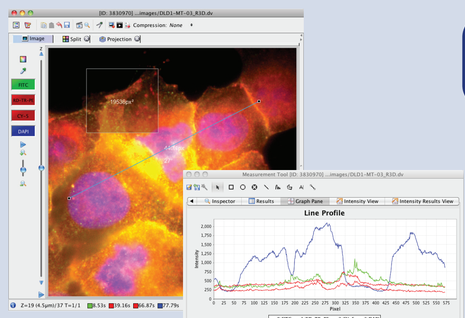
Data Management
- In the left-hand pane is a traditional tree-based view of the data hierarchies in your OMERO.server.
- In the middle pane is a working area used to select and filter data to work on.
- In the right-hand pane is a tool to work on the selection i.e. rate, tag, annotate, etc.

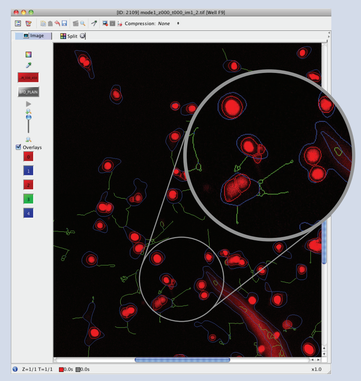
Viewing
- Allow visualization of 5D images (space, channel, time).
- Make use of the OMERO.server's Rendering Engine.
- Provide high-performance viewing of multidimensional images on standard workstations, without requiring installation of high-powered graphics cards.

Measurement
- Draw Regions Of Interest (ROI) on the image: Squares, Ellipses, Polygons, Lines, etc.
- Create and measure ROIs across space and time.
- Measure intensity values of pixels under the ROI.
- View histograms of the intensity values under the ROI.
- Export results to a spreadsheet.









Annotate
Search
Collaborate
Rate
Measure
Tag

Manage
View
Attach

Display of Plates of HCS data, shown above, is currently in preview and we hope to include it in the next release.

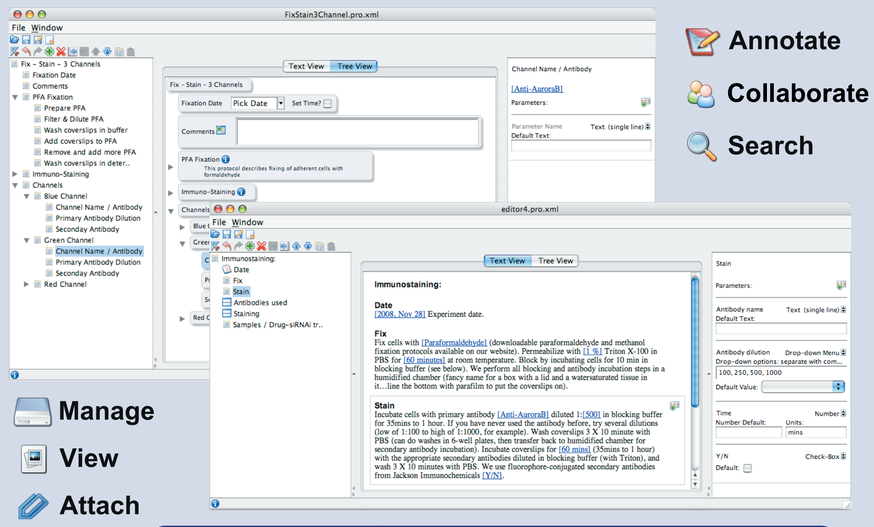
google: OMERO.insight http://www.openmicroscopy.org/info/OMERO.insight

OMERO.editor

OMERO.editor is an editing tool for recording and managing experimental metadata. It allows you to import existing text protocols, edit the experimental parameters, and view this metadata in a number of ways. OMERO.editor files describe a protocol in terms of *steps* that have a name and description. Each step may also have a number of parameters. This file format is compatible with other protocol editing tools, allowing exchange of protocols between different platforms.

OMERO.editor makes it easier to describe the data associated with an experiment and to capture it in a structured and reusable form. It supports the import and combination of multiple small protocols into a larger protocol, to describe a complete experiment.

OMERO.editor can either be used standalone or launched from within OMERO.insight allowing the storage of the OMERO.editor files in the server.



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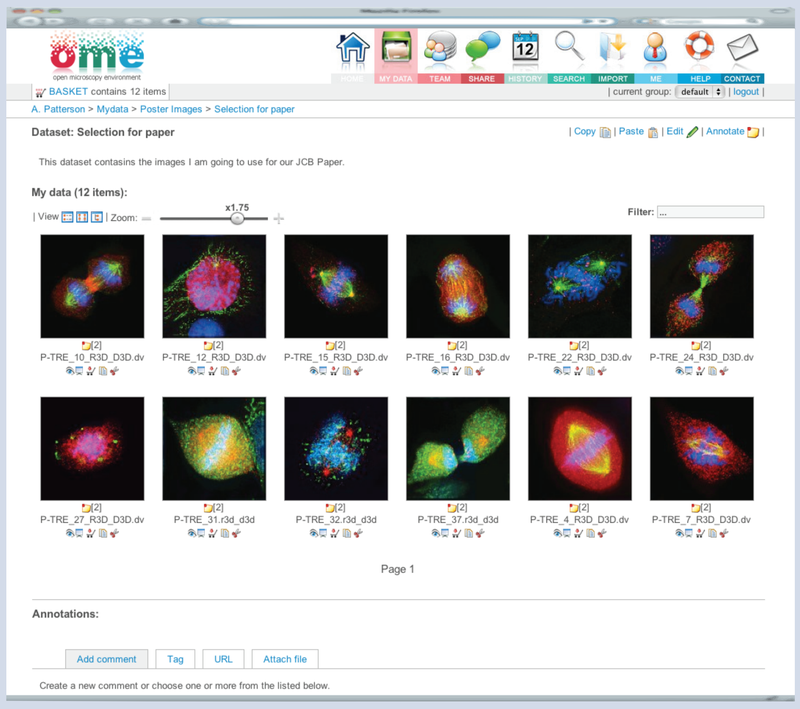
OMERO.web

OMERO.web is an internet application for the managing, viewing, and manipulating data stored in an installation of OMERO.server. This includes a fully multidimensional image viewer running inside your web browser. Searching and tagging of information is available to further organize and manage data.

The application provides a platform for collaboration between scientists, and a pathway for publishing work. It is specifically designed as a "thin" client, for remote access.

OMERO.web is a web application, that has the features and functionality of traditional desktop applications and transfers the processing necessary for the user interface to the web client but keeps the bulk of the intensive data processing back on the application server. For the user no installation is required, only a computer with an internet connection and a modern web browser.



Manage
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History
Publish
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google: OMERO.web http://www.openmicroscopy.org/info/OMERO.web

The Open Microscopy Environment is a multi-site collaborative effort among academic laboratories and a number of commercial entities that produces open tools to support data management for biological light microscopy. Our goal is to provide life scientists with open source access to sophisticated tools to support their work. Designed to interact with existing commercial software, all OME formats and software are free, and all OME source code is available under GNU public "copyleft" licenses.

OME is developed as a joint project between research-active laboratories at Dundee, NIA Baltimore, Harvard and LOCI. In addition, OME has active collaborations with many imaging and informatics groups.

We would like to thank the many commercial, academic and health organisations that have contributed to the OME development effort. A full list of the supporters is available on our web site.