

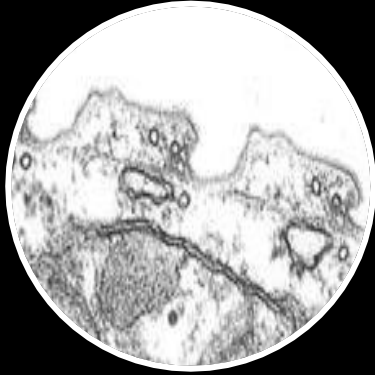
OME, IDR and Glencoe - Innovating with Imaging Data



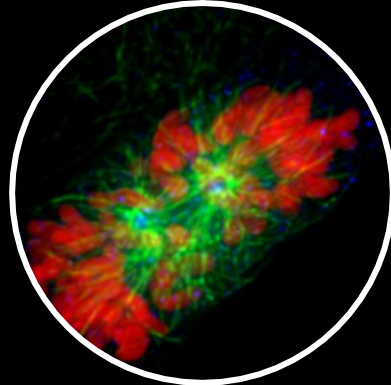
Jason Swedlow

Professor of Quantitative Cell Biology | School of Life
Sciences, University of Dundee | CEO, Glencoe Software

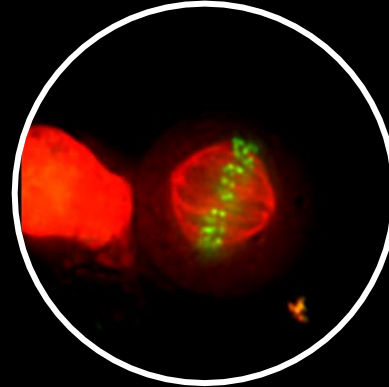
The Image Problem is Ubiquitous



Organelles



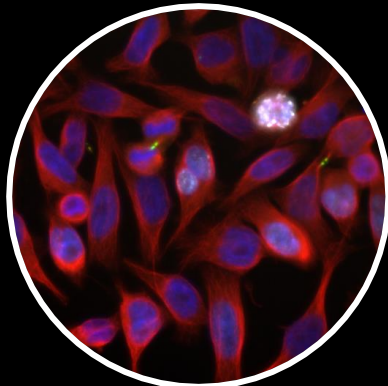
Cells



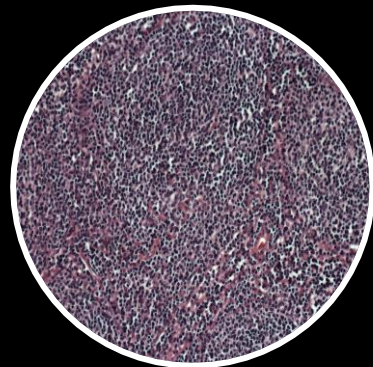
Dynamics



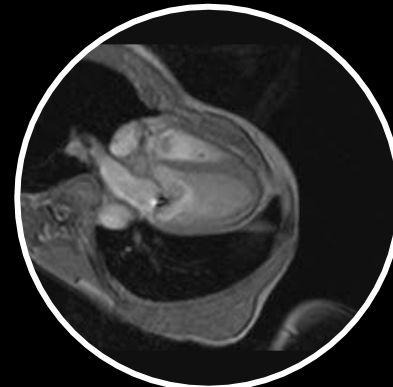
Physiology



Lead Discovery
Target Validation



Pathology



In Vivo

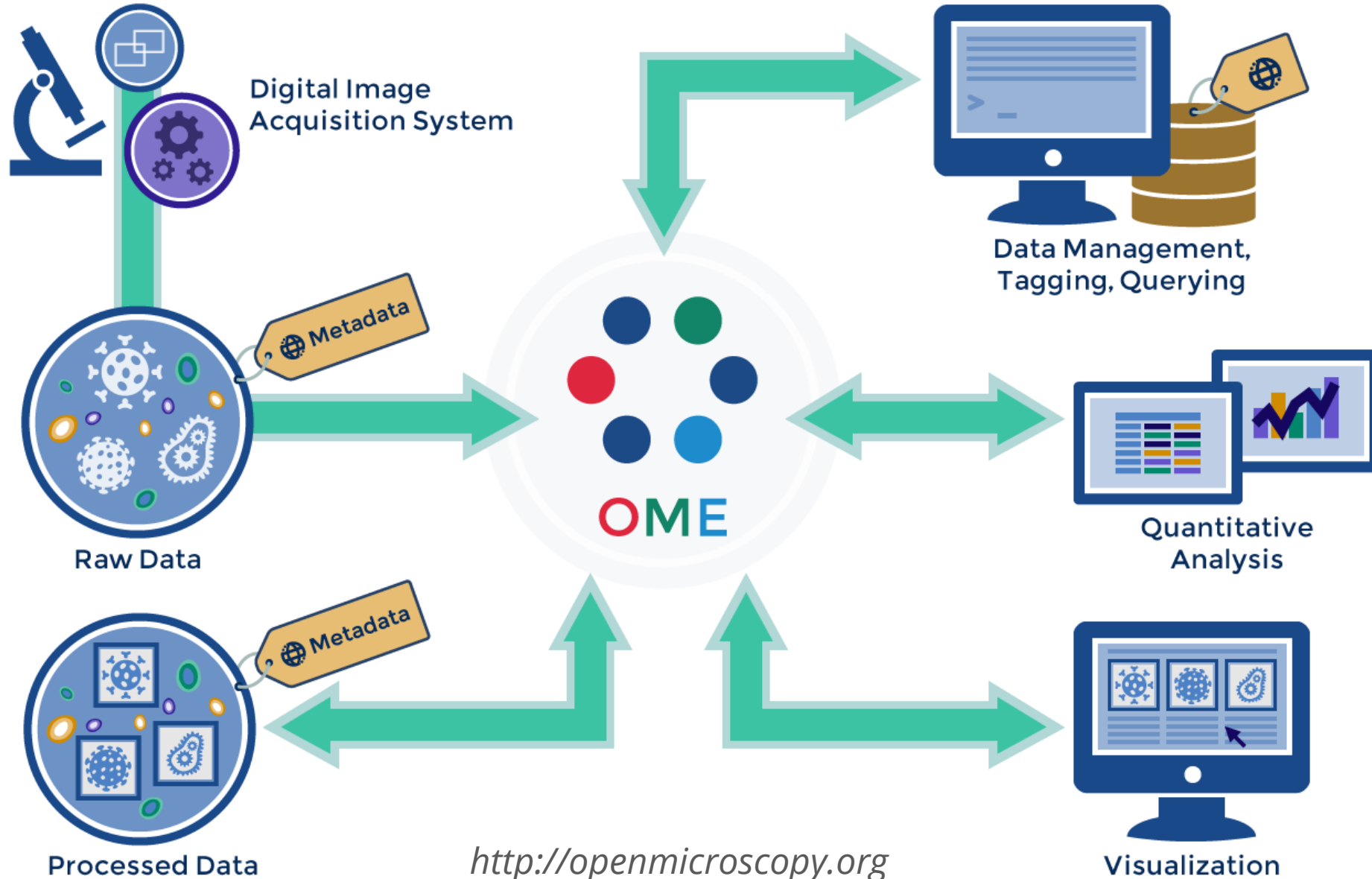
A picture?

A measurement?

A resource?



...Towards Image Informatics



What We Do

 **OME** DATA MODEL

OME-TIFF

 **OMEFILES**

 **BIO-FORMATS**

 **OMERO**

 **IDR**



EMBL-EBI



CATAPULT
Medicines Discovery



OME, Bio-Formats, OMERO, IDR: Data Access and Integration

The screenshot displays the OMERO web interface. On the left, a navigation pane shows a tree structure of studies and images. The main area contains a grid of microscopy images showing cells with green cytoplasm and blue nuclei. On the right, a metadata panel provides detailed information for the selected image.

General | Acquisition | Preview

Full viewer [icon]

D5

Well ID: 36991
Owner: Emil Rozbicki [Show all]

Tags 0 [dropdown]

Key-Value Pairs 1 [dropdown]

Tables [dropdown]

INFO

ImageNumber:	74
PlateName:	Human U2OS cells cytoplasm nucleus translocation [BBBC013]
Well:	36991
Drug:	Wortmannin
Dose:	3.91
log(Dose):	0.59
Control:	0
Count_Cells:	196
Count_Cytoplasm:	196
Count_Nuclei:	196
Mean_Cells_AreaShape_Area:	1103.71
Mean_Cells_AreaShape_Center_X:	292.12
Mean_Cells_AreaShape_Center_Y:	305.78
Mean_Cells_AreaShape_Compactness:	1.31
Mean_Cells_AreaShape_Eccentricity:	0.76
Mean_Cells_AreaShape_Orientation:	3.36
Mean_Cells_Intensity_IntegratedIntensity_GFP:	163.79
Mean_Cells_Intensity_MaxIntensity_GFP:	0.38
Mean_Cells_Intensity_MeanIntensity_GFP:	0.15
Mean_Cells_Intensity_MinIntensity_GFP:	0.03
Mean_Cells_Location_CenterMassIntensity_X_GFP:	292.15
Mean_Cells_Location_CenterMassIntensity_Y_GFP:	306.44
Mean_Cells_Location_Center_X:	292.51
Mean_Cells_Location_Center_Y:	306.38
Mean_Cells_Location_MaxIntensity_X_GFP:	292.14
Mean_Cells_Location_MaxIntensity_Y_GFP:	305.1
Mean_Cytoplasm_Location_Center_X:	292.51
Mean_Cytoplasm_Location_Center_Y:	306.36
Mean_Nuclei_AreaShape_Area:	231.58
Mean_Nuclei_AreaShape_Center_X:	292.26
Mean_Nuclei_AreaShape_Center_Y:	306.52
Mean_Nuclei_AreaShape_Compactness:	1.16
Mean_Nuclei_AreaShape_Eccentricity:	0.75
Mean_Nuclei_AreaShape_Orientation:	-0.27
Mean_Nuclei_Intensity_IntegratedIntensity_DNA:	70.26
Mean_Nuclei_Intensity_MaxIntensity_DNA:	0.48
Mean_Nuclei_Intensity_MeanIntensity_DNA:	0.3
Mean_Nuclei_Intensity_MinIntensity_DNA:	0.08



OME, Bio-Formats, OMERO, IDR: Data Access and Integration

The screenshot displays the OMERO web interface. The top navigation bar includes 'Data', 'History', and 'Help'. The user is logged in as 'Jason Swedlow'. The main area is divided into three sections:

- Left Panel (Explore):** Shows a tree view of folders under 'Study B (ra)'. The 'ACC 231' folder is expanded, listing various .svs files such as '...231-4880-83AB-D17520D1AC95.svs'.
- Center Panel (Image Grid):** Displays a grid of microscopy images. The top-left image is highlighted with a blue border. The grid is labeled 'ACC'.
- Right Panel (Image Details):** Shows metadata for the selected image. The title is 'Aperio Image Library vFS90 a asd'. The metadata includes:
 - Acquisition Date: 2013-01-22 02:23:31
 - Import Date: 2015-11-24 05:40:14
 - Dimensions (XY): 113287 x 40455
 - Pixels Type: uint8
 - Pixels Size (XYZ) (µm): 0.25 x 0.25 x -
 - Z-sections/Timepoints: 1 x 1
 - Channels: Channel1, Channel2, Channel3
 - ROI Count: 0



OME, Bio-Formats, OMERO, IDR: Data Access and Integration

The screenshot displays the OMERO web interface. The top navigation bar includes 'Data', 'History', 'Help', 'Figure', 'Tag Search', 'Genes', 'Key-Value', and 'Admin'. A search bar and user profile 'trainer-1 trainer-1' are on the right. The left sidebar shows a file tree under 'trainer-1 trainer-1' with folders like 'CellProfiler images 3', 'condensation 32', and 'DICOM 15'. The main area shows a grid of MRI brain scan thumbnails. The right panel, titled 'Original Metadata', displays 'Series Metadata' for a selected image, including fields like 'Station Name', 'Study Description #1', 'Series Description #1', 'Institutional Department Name #1', 'Manufacturer's Model Name #1', 'Referenced SOP Class UID #1', and 'Referenced'.

Lionheart, W. R. B. (2015). <http://doi.org/10.5281/zenodo.16956>





The screenshot displays the OMERO Virtual Microscope interface. On the left is a sidebar with a file tree under 'Virtual Microscope'. The main area shows a grid of 14 histology images. On the right is a metadata panel for the selected dataset.

Virtual Microscope | Virtual Microscope | HELP

Search: [] | Jason Swedlow

General | Acquisition

Epithelium, Connective Tissue, Muscle

Dataset ID: 2
Owner: Anulony [Show all]

Dataset Details

Creation Date: 2013.07.30 14:13:46

Tags: 0

Key-Value Pairs: 0

Attachments: 0

Comments: 0

Ratings: 0

Others: 0

File Tree (Left):

- All courses
- BDS 1.15
- CA21007/CA21001.2
 - Epithelium, Connective Tissue, Muscle 13
 - 14_Tendon.svs
 - 15_Breast non lactating.svs
 - 16_Ebetic artery.svs
 - 18_Mesentery.svs
 - 1_Lung.svs
 - 25_Heart.svs
 - 2_Kidney.svs
 - 3_Gall bladder.svs
 - 4_Trachea.svs
 - 5_Urinary bladder.svs
 - 6_Tongue.svs
 - 7_Oesophagus.svs
 - 8_Skin.svs
- Nervous System 6
- CA31002 Histology 18
 - CA31002 Histol 1 Practical 1.7
 - CA31002 Histol 1 Practical 2.6
 - CA31002 Histol 1 Practical 3.7
 - CA31002 Histol 1 Practical 4.4
 - CA31002 Histol 1 Practical 5.6
 - CA31002 Histol 1 Practical 6.6
 - CA31002 Histol 1 Practical 7.5
 - CA31002 Histol 1 Practical 8.5
- CA32001 Histology 2.0
- CA42003/52002 Neuroanatomy 1
- DS6.17.1
- haem slides
- MBCHB-1.6
- MBCHB-2.2
- MBCHB-2.2
- MBCHB1 Test Images 1
- Module 3.1
- Modules 1 & 2.4
- Term 1.1
- DDG 2.20
- Slides 19
- Orphaned Images 576

Paul Felts, University of Dundee, learning.openmicroscopy.org





EMPIAR/EMDataBank / PDBe

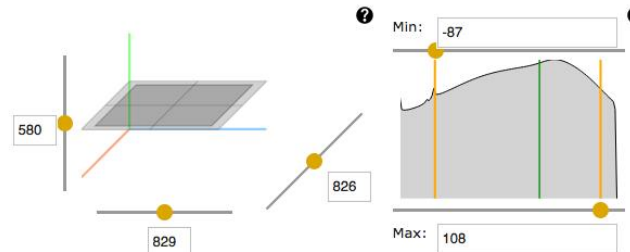
 Protein Data Bank in Europe
Bringing Structure to Biology

Share Feedback

EMD-2363 > Volume slicer

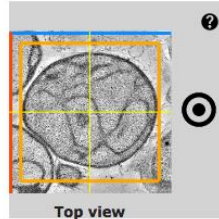
Electron tomogram through a *Gemmata obscuriglobus* cell

Sample name: Gemmata obscuriglobus cell
Method: Tomography
Resolution: N/A

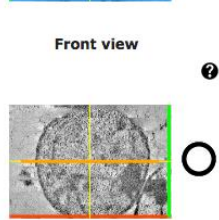
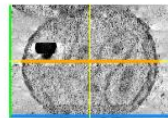


Quick links

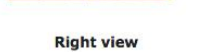
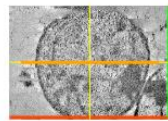
- [EMD-2363 overview](#)
- [Function and Biology](#)
- [Experiments and Validation](#)
- [View](#)
- [Downloads](#)
- [Volume viewer](#)
- [Volume slicer](#)**
- [Visual analysis](#)



Top view



Front view



Right view



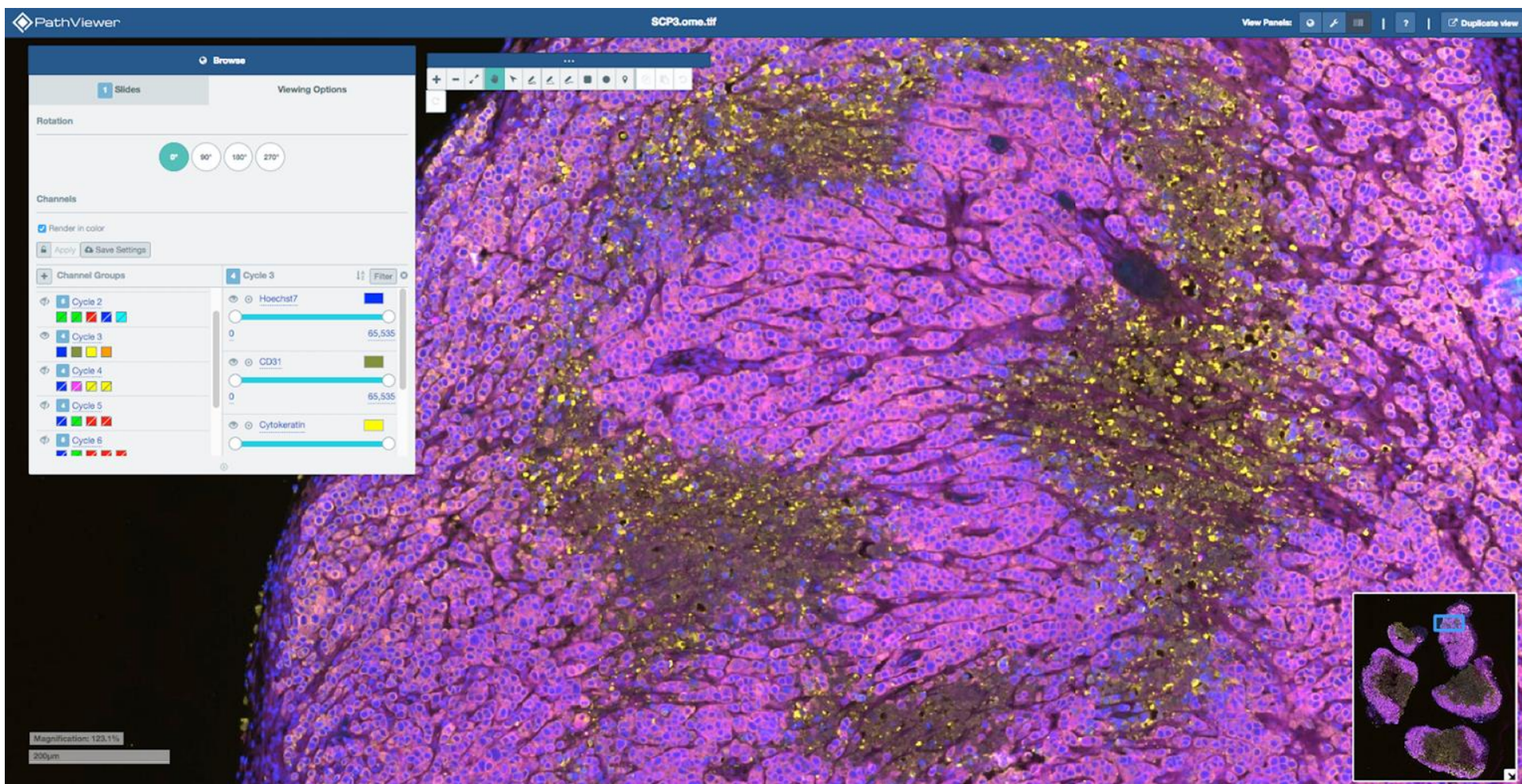
Ardan Patwardhan,
Ingvar Lagerstadt &
Gerard Kleywegt, EBI



is a member of



Multi-Channel Whole Slide Imaging HMS Laboratory of Systems Pharmacology



Jia-Ren Lin, Zoltan Maliga, Douglas Russell, Peter Sorger, Harvard Med School



You are currently viewing **281** out of a possible **281** images
View more about this dataset [here](#).

Dataset: Neonatal Development & Early Life Pancreas (HANDEL-P)

Grid Density: **Sparse** Normal Dense

Filters:

Clear



DISEASE STATUS

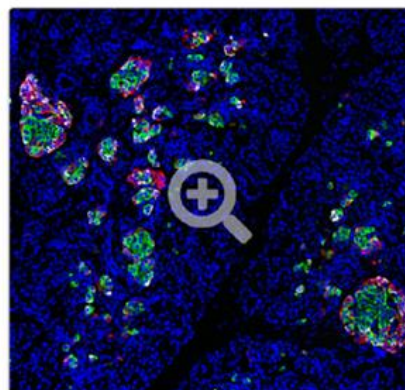
- AAB
- ND

AGE

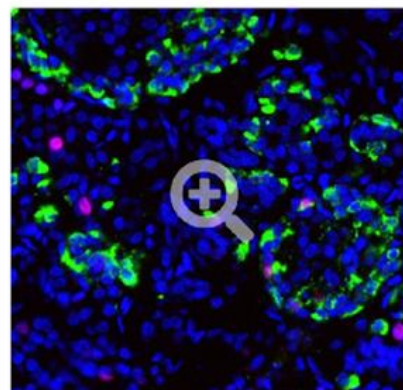
- Neonatal
- Infancy
- Childhood

SEX

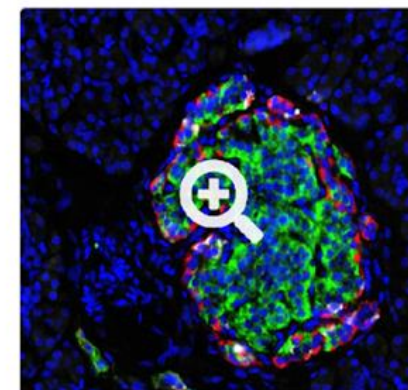
Diane Saunders, Marcela
Brissova, Alvin Powers,
Vanderbilt University
Medical Center



Age: 4d
Disease Status: ND
Sex: M
Markers:
INS **SST** **GCG** **DAPI**
Region: Sagittal, Body
Other Tags: DON22, AFI



Age: 1d
Disease Status: ND
Sex: F
Markers:
SST **Ki67** **DAPI**
Region: Sagittal, Head
Other Tags: DON66, AFI



Age: 3mo
Disease Status: ND
Sex: M
Markers:
INS **SST** **GCG** **DAPI**
Region: Sagittal, Body
Other Tags: DON2, AFI



What is OME?

- File Formats – open, validated, performant, scalable
- Bio-Formats – interoperability w/ metadata & binary data
- OMERO – image data management and integration
- IDR – image data publication and sharing
- Glencoe Software – commercial imaging data management solutions

A platform for FAIR data in bioimaging



Overview of Breakout Options | Short presentations



Glencoe Software



Chris Allan
VP Software Engineering



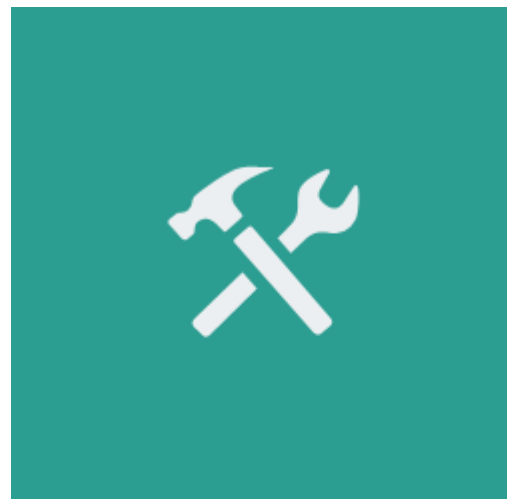
Open Source Synergy

A Powerful, Exclusive Partnership



COMMERCIAL LICENSES

Exclusive provider of robust commercial licenses for OMERO Plus and Bio-Formats



CUSTOMIZATION

Warranted and indemnified software solutions not available in the open source environment



SERVICE & SUPPORT

Commercial and community development synergy as your support resource

Breakout Sessions Later! (Chris Allan, Erin Diel, Emil Rozbicki)



Image Data Resource (IDR)



Frances Wong

IDR Curator, University of Dundee

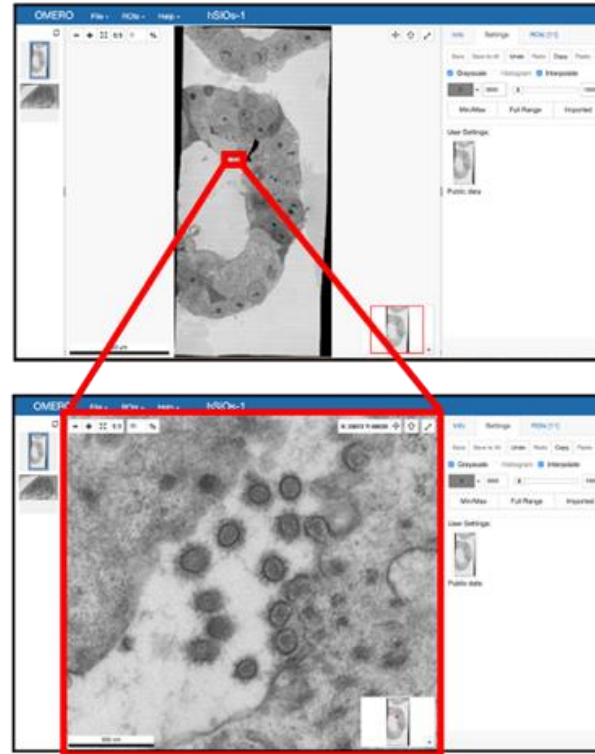
The Image Data Resource (IDR): a scalable resource for FAIR biological imaging data

- Public access
- Reference datasets - complete datasets containing molecular and functional annotations, associated with an existing or upcoming publication.
- Study integration - integrating studies or datasets with other datasets via **genes**, **compounds** or **phenotypes**.
- Curated metadata
- Cloud re-analysis

Breakout Sessions – Sebastien Besson & Frances Wong

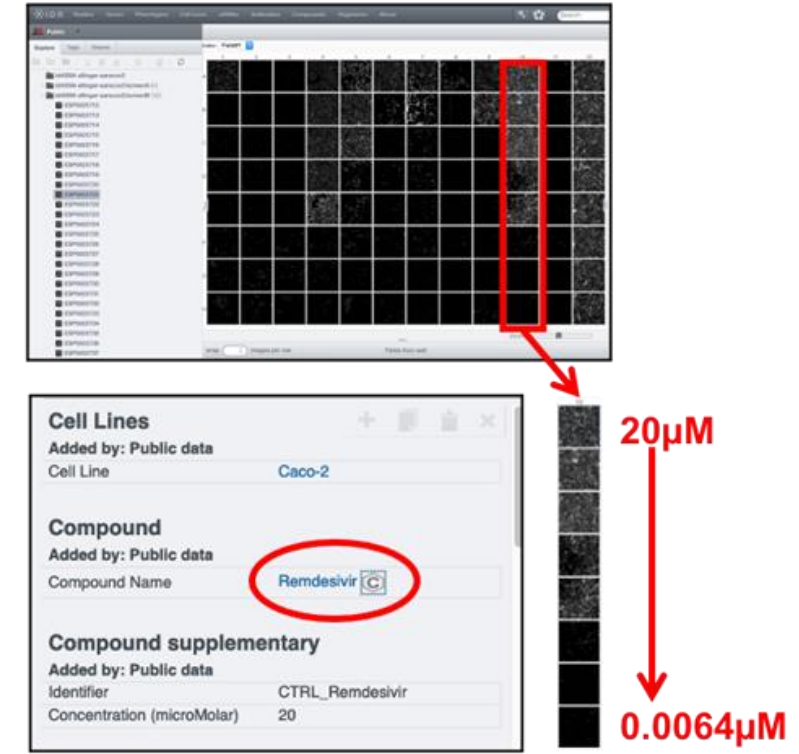
<https://www.openmicroscopy.org/events>

Tissue Data – idr0083



Lamers et al *Science* DOI:10.1126/science.abc1669

Cell Data – idr0094



Ellinger et al *Sci Data* DOI:10.1038/s41597-021-00848-4

IDR currently has:

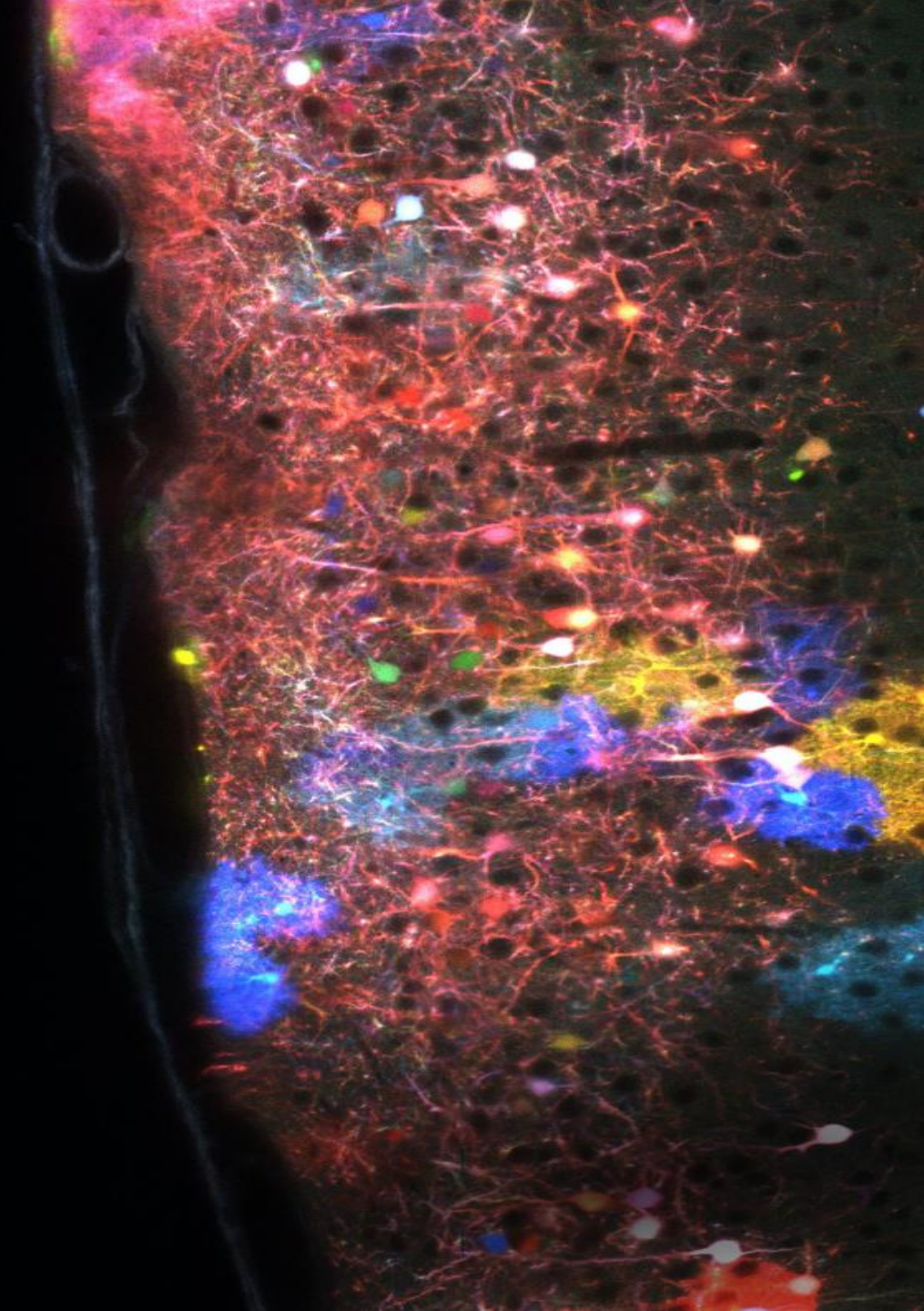
- **260TB** of public imaging data.
- **super-resolution, high content screening, time-lapse and histological whole slide imaging data.**
- **metadata** related to experimental design, image acquisition, downstream analysis and interpretation.



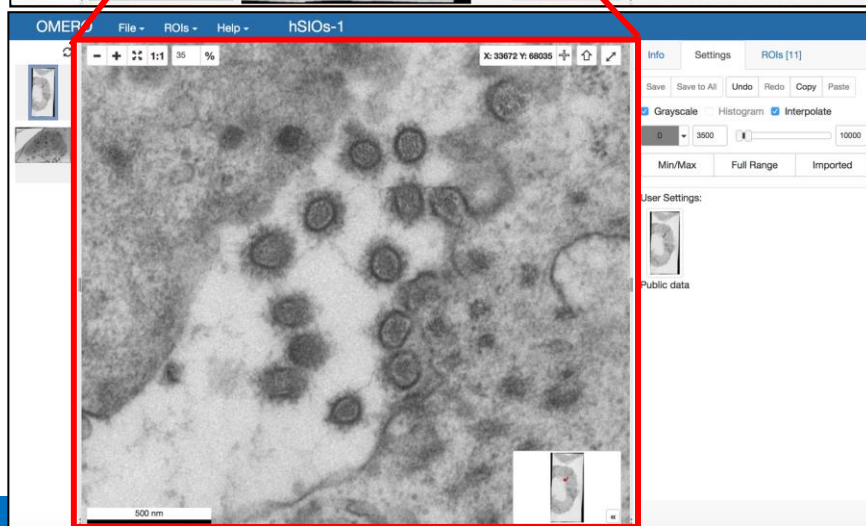
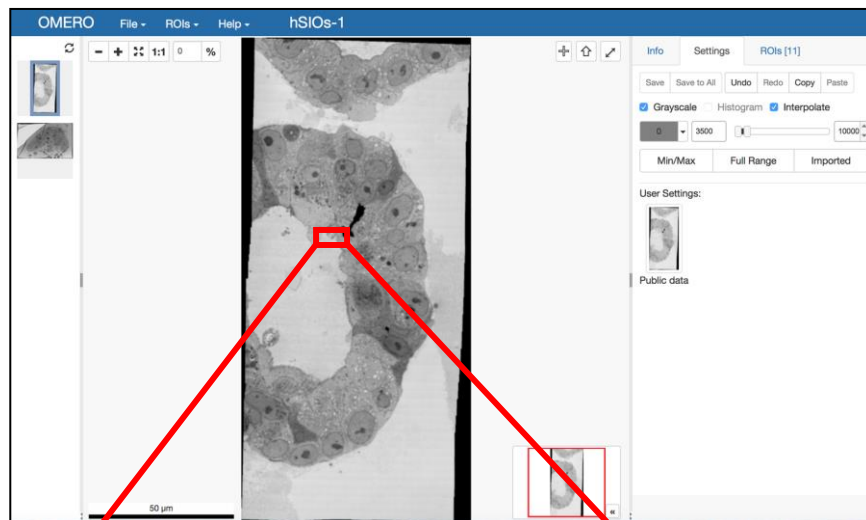


The Image Data Resource (IDR): a scalable resource for FAIR biological imaging data

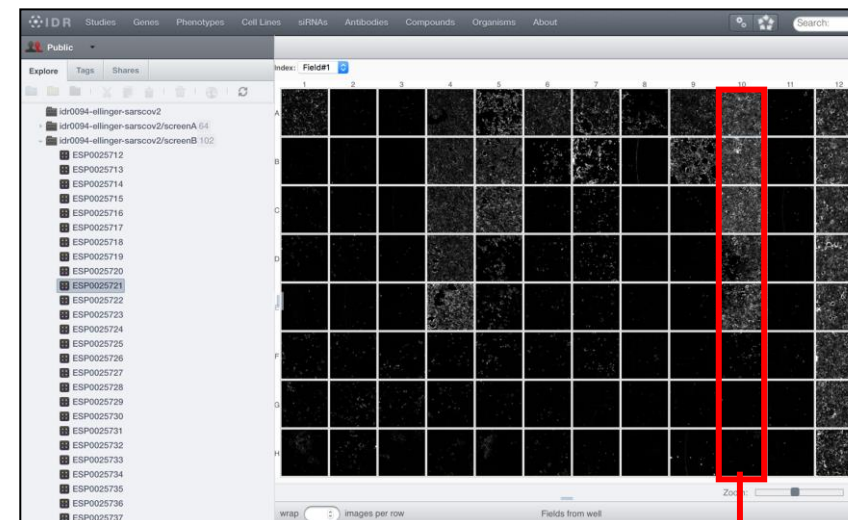
- **Public access**
- **Reference datasets** - complete datasets containing molecular and functional annotations, associated with an existing or upcoming publication.
- **Study integration** - integrating studies or datasets with other datasets via **genes, compounds** or **phenotypes**.
- **Curated metadata**
- **Cloud re-analysis**



Tissue Data idr0083



Cell Data idr0094



Cell Lines

Added by: Public data

Cell Line **Caco-2**

Compound

Added by: Public data

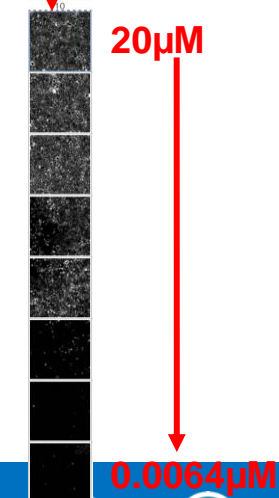
Compound Name **Remdesivir**

Compound supplementary

Added by: Public data

Identifier CTRL_Remdesivir

Concentration (microMolar) 20





<https://idr.openmicroscopy.org>

IDR currently has:

- **260TB** of public imaging data.
- **super-resolution, high content screening, time-lapse and histological whole slide imaging data.**
- **metadata** related to experimental design, image acquisition, downstream analysis and interpretation.

Breakout Sessions – Sebastien Besson & Frances Wong

2021 OME Community Meeting

Open data, advanced imaging data applications, and more

Registration Upcoming

8-11 JUNE 2021

<https://www.openmicroscopy.org/events/ome-community-meeting-2021/>

