

NFDI4BIOIMAGE

National Research Data Infrastructure for Microscopy and BioImage Analysis

Speaker Dr. Riccardo Massei

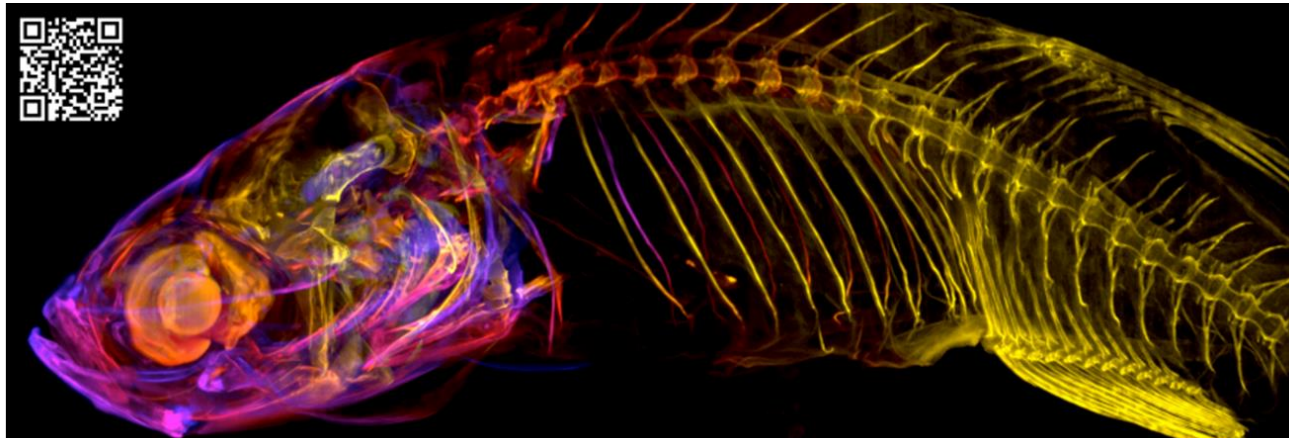
Contributions from Christian Schmidt, Stefanie Weidtkamp-Peters, Josh Moore, Janina Hanne, Katharina Schmitz

Find this presentation on Zenodo:
DOI: 10.5281/zenodo.8414319



NFDI 4
BIOIMAGE

Enable FAIR bioimage data management for German researchers, across disciplines and embedded in the international framework.



Maximum intensity projection in depth color coding of an optically cleared, one month old zebrafish, imaged in a light-sheet microscope. (Courtesy of J. Huisken and K. Weiss). The QR-code links to the image in an OMERO database.

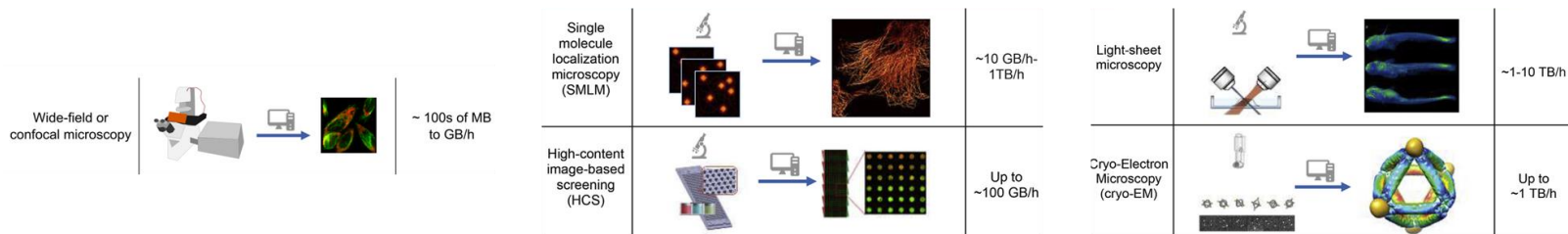
Taken from the NFDI4BIOIMAGE proposal (2021)

The bioimaging data challenge



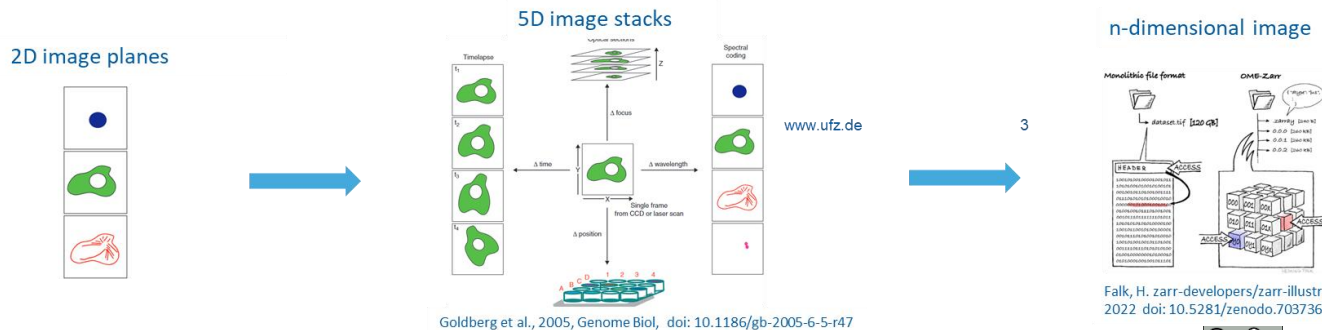
NFDI4
BIOIMAGE

Increase in data(set) size per experiment



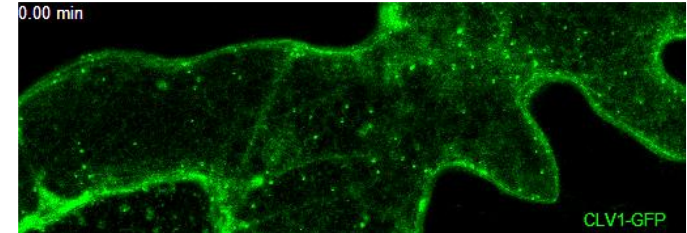
Adapted after: Ouyang and Zimmer, Curr Op Sys Biol, 2017, doi: 10.1016/j.coisb.2017.07.011

Increase in complexity of data structures



Biological Images / Light Microscopy Data

- Formats: heterogenous, proprietary (*Bio-Formats OME-TIFF*)
- High-dimensional (5-D bzw. N-D), storage intensive (GB – TB)
- Cloud compatibility (e.g., object storage) insufficient
- Metadata schema and formats with little standardization



Y. Stahl, S. Weidtkamp-Peters, HHU Düsseldorf

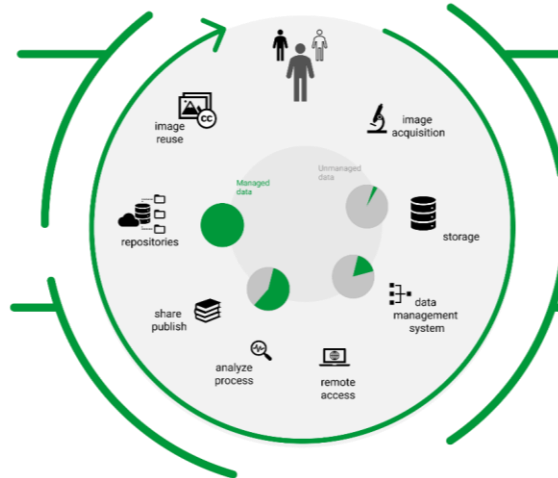
Special, method-specific challenges require a dedicated consortium focusing on biological imaging

(not in scope: Medical imaging)



Objective 4
Capacitate researchers for FAIR
image data management

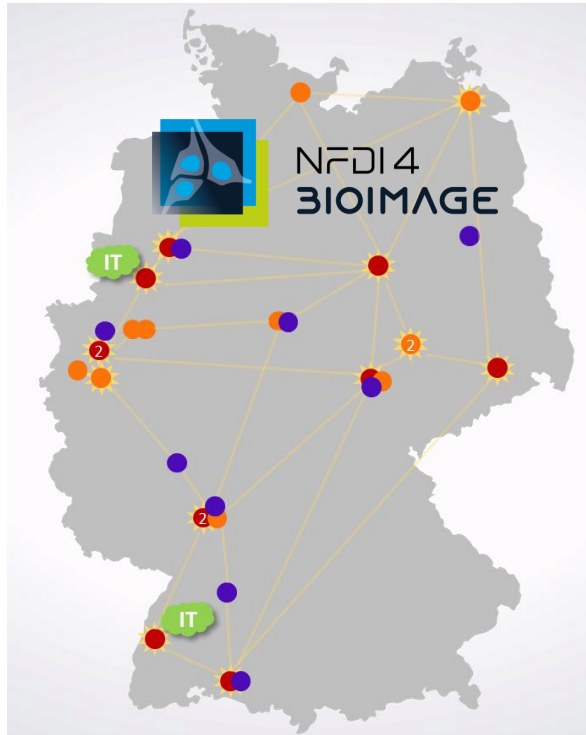
Objective 3
Maximize the reach of
reproducible image analysis
workflows in the community



Objective 1
Champion the **standardization** of
the „bioimage data“ type

Objective 2
Provide scalable
infrastructure for FAIR
image data

Figure: Josh Moore



- co-applicant institutions (Task Area Leaders)
 - IT IT infrastructure (*storage & playground: @WWU & @ALU-FR*)
But not: a central data archive for all bioimaging data
- participating institutions
- ☀ **data stewards (DaSts) & research software engineers**
- community use cases
- ~ 20 FTE: work on practical RDM solutions & training
- Help Desk
- Collaborate
 - with other NFDI consortia
 - with industry (via Quarep-LiMi, GerBI & others)
 - internationally



Task Area 1



Stefanie Weidtkamp-Peters
GerBI-GMB



Josh Moore
GerBI-GMB



Susanne Kunis
Uni Osnabrück

**Image (meta)data,
formats & standardization**

Task Area 2



Markus Blank-Burian
WWU Münster



Björn Grüning
Uni Freiburg

**Technical infrastructure &
cloud resources**

Task Area 5



Robert Haase
TU Dresden



Thomas Zobel
WWU Münster

**Training &
community integration**

Task Area 3



Philipp Mallm
DKFZ Heidelberg



Werner Zuschratter
LIN Magdeburg



Torsten Stöter
LIN Magdeburg

**Multimodal data
linking & integration**

Task Area 4



Marc-Thilo Figge
Leibniz HKI Jena



Anna Kreshuk
EMBL Heidelberg

**Bioimage
informatics & analysis**

Task Area 6



Stefanie Weidtkamp-Peters
HHU Düsseldorf



Elisa May
DKFZ Heidelberg
Uni Konstanz

**Coordination,
governance & networking**

Technical Task Areas

Organizational Task Areas



Participating institutions

1. University Heidelberg (UHD)
2. University of Cologne (UoC)
3. Georg-August-University of Göttingen (UGOE)
4. Leibniz Institute for Plasma Science and Technology (INP)
5. Helmholtz-Center for Environmental Research (UFZ)
6. Leibniz Institute of Photonic Technology (IPHT)
7. Leibniz Institute for Analytical Sciences (ISAS)
8. Forschungszentrum Jülich (FZJ)
9. Max Planck Institute for Evolutionary Biology (MPIEB)
10. Hochschule für angewandte Wissenschaft und Kunst (HAWK)
11. Johannes Gutenberg University of Mainz (JGU)

Location

Heidelberg
Köln
Göttingen
Greifswald
Leipzig
Jena
Dortmund
Jülich
Plön
Göttingen
Mainz

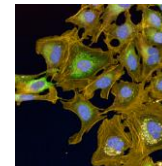


UFZ is participant in three different task area (TA 1, 3, 4):

- Apply and advise on **FAIR-IO** concepts for **HCS data** (aka data stewardship)
- Provide semi(automated) integrative workflows for transferring analytical HCS into cloud based systems (i.e. **OMERO**)
- Test and provide tools for automated sample tracking and naming to facilitate data linkage and synchronization
- Provide workflows to link between laboratory sample management systems and analytical instrumentations and for automatic transfer to an image repository

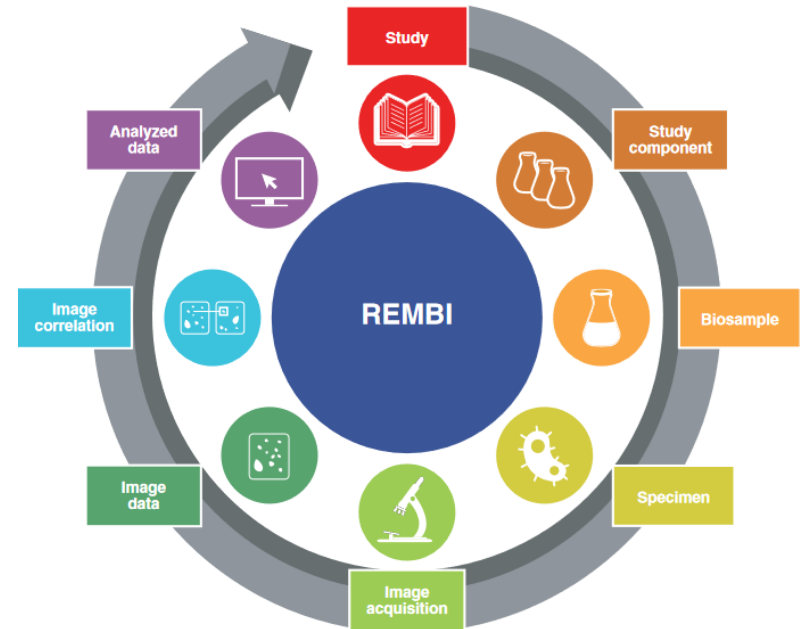
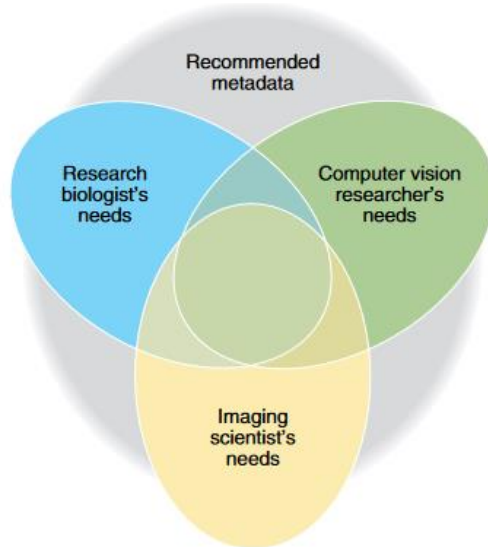
Integration at UFZ in CITEPro (TB CITE) and iCyt platform (TB Ecosystems):

- Human cell lines
- The zebrafish embryos
- Phytoplankton, particulate matter and pollen



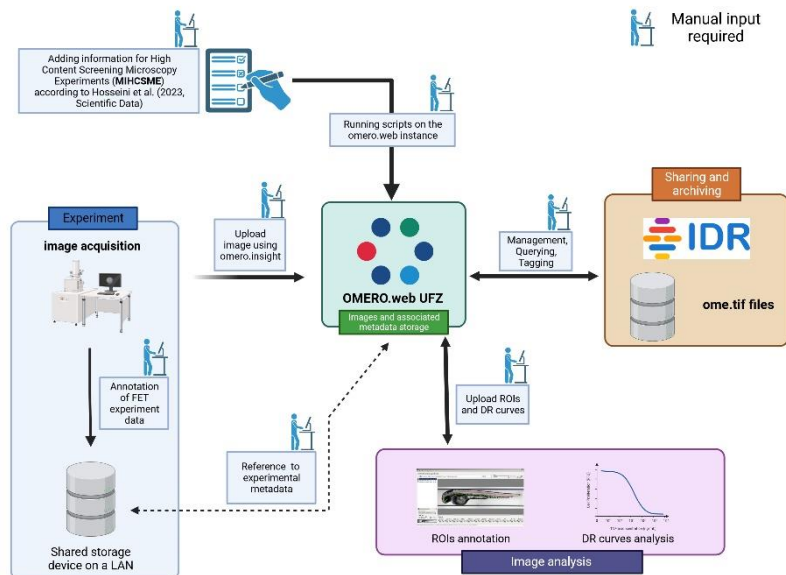


REMBI: Recommended Metadata for Biological Images—enabling reuse of microscopy data in biology

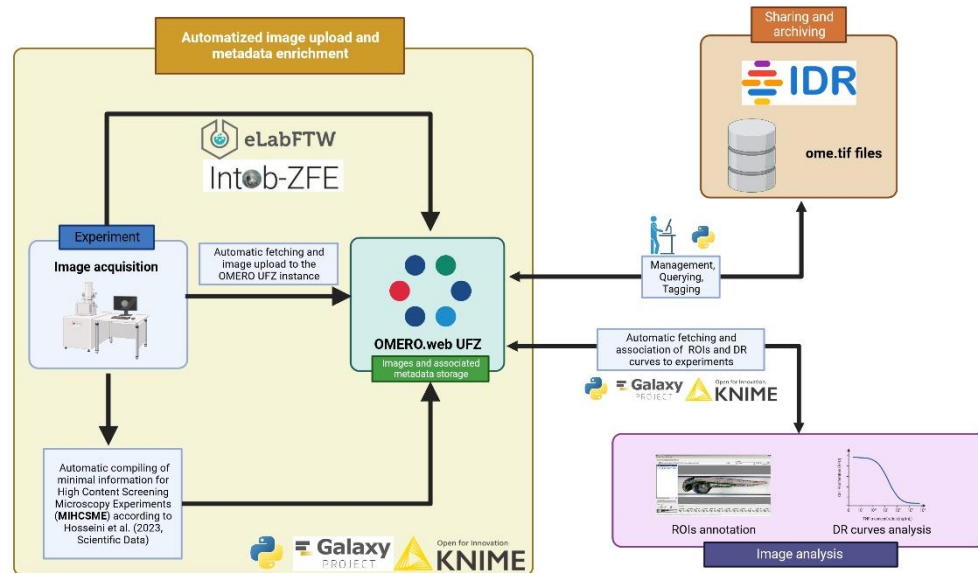




OMERO upload – Manual workflow



OMERO upload – Automatic workflow





Twitter:
@nfdi4bioimage

<https://nfdi4bioimage.de>

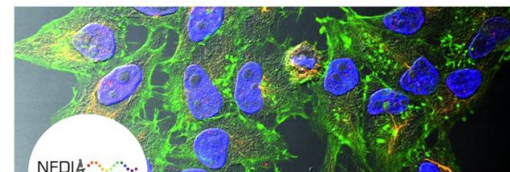
Start Aims Applicants Get involved Survey

Research Data Management for Microscopy and BioImage Analysis

Research Data Management for Microscopy and BioImage Analysis > Start

NFDI4BIOIMAGE - a consortium in the National Research Data Infrastructure

Welcome!



NFDI4BIOIMAGE

@nfdi4bioimage

NFDI4BIOIMAGE is a consortium of the German National Research Data Infrastructure @NFDI_de focussing on management of image data #microscopy #RDM #FAIR

HHU Düsseldorf nfdi4bioimage.de Joined November 2022

127 Following 190 Followers

Followed by AI4Life Team, Stephan Ferez, and 41 others you follow

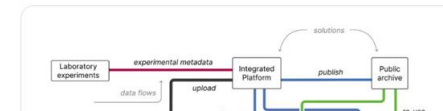
Tweets Replies Media Likes

NFDI4BIOIMAGE Retweeted

Josh Moore @notjustmoore · Jun 9

The BioImage Town #FAIR Data Metro Maps from the #DataManagement and #ImageAnalysis session of #ELMI2023 are available on @ZENODO_ORG

doi.org/10.5281/zenodo...





Align activities?

You or your group work on the same or similar topics?

Do you want to align activities and collaborate?

→ *Contact us via email to:*

stefanie.weidtkamp-peters@hhu.de (cc: office@nfdi4bioimage.de)

→ *What then?*

Let's get in touch to discuss this!



Get support?

You are in need of bioimaging RDM solutions?

→ *Contact the Consortium at support@nfdi4bioimage.de*

→ *What then?*

Your email goes to the Data Stewards Team. The team is still forming, so some time might be required still.

Follow-up actions depend on the nature of the request (from pointing at useful resources to establishing a Community Use Case collaboration)



Stay informed?

You want to stay informed about the progress, results, and events of the Consortium?

→ *Subscribe to the mailing list at:*

<https://nfdi4bioimage.de/en/get-involved/>

→ What then?

We will send you regular updates.



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Tobias Wernet

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Josh Moore

Björn Grüning

Markus Blank-Burian

Jan-Philipp Mallm

Werner Zuschratter

Torsten Stöter

Anna Kreshuk

Marc-Thilo Figge

Carl-Magnus Svensson

Robert Haase

Thomas Zobel

& participating partners
and community use cases

Collaboration Partners

Jason Swedlow

OME team

Caterina Strambio De Castellia

4DNucleome

QUAREP-LiMi

Biolmaging North America

Euro-Biolmaging ERIC

Global Biolmaging

EMBL-EBI – BIA

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www.gerbi-gmb.de

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