

Managing FAIR microscopy data at scale for universities and research institutions: an introduction for non-imaging stakeholders

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Introduction

Ksenia Krooß:

- Center for Advanced Imaging at the Heinrich Heine University Düsseldorf
- Biologist (plant science)
- Data Steward in NFDI4BIOIMAGE

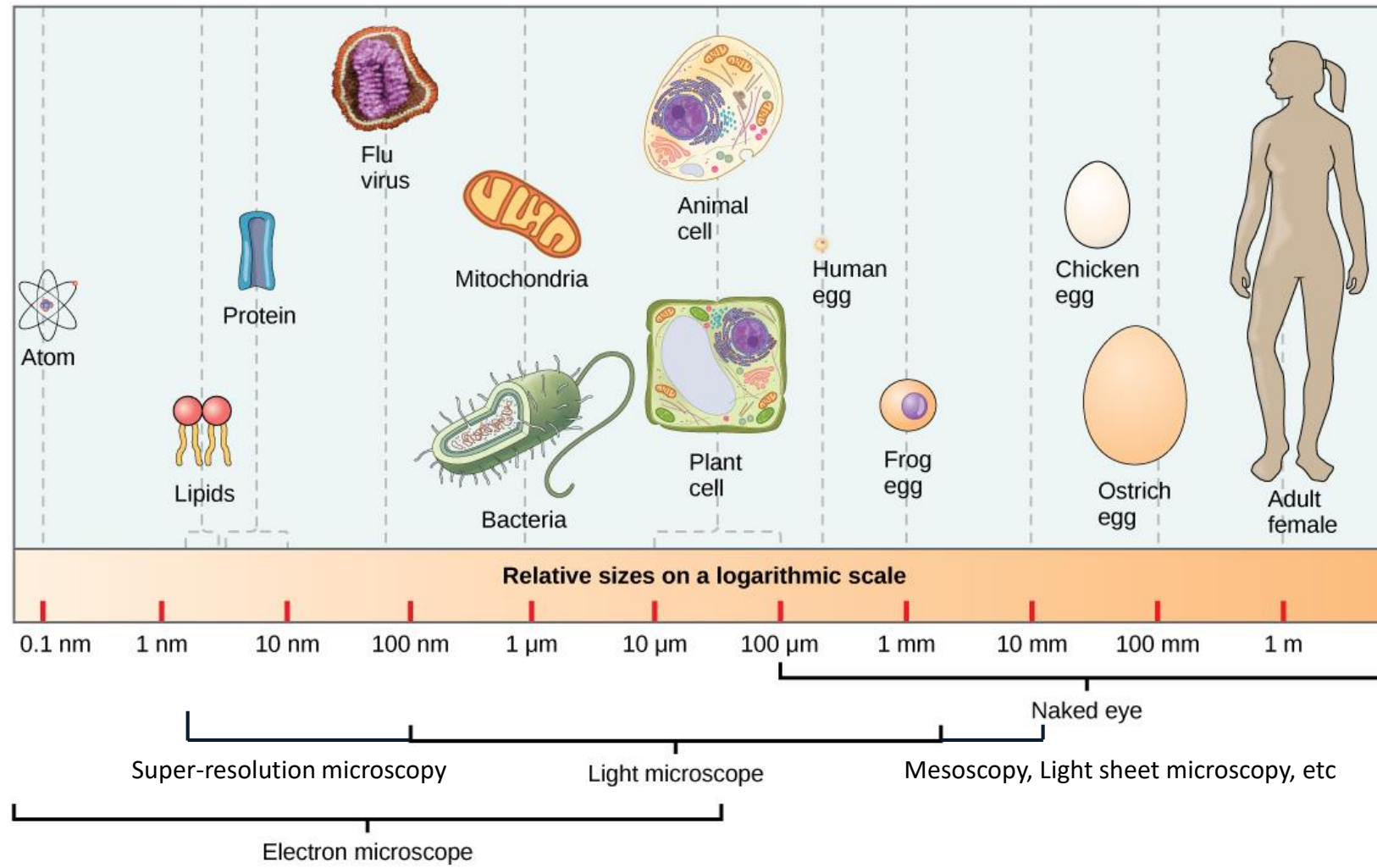
Michele Bortolomeazzi:

- DKFZ German Cancer Research Center, Heidelberg
- Biologist/bioinformatician (cancer research)
- Staff member of NFDI4BIOIMAGE, OMERO administrator at the DKFZ

Christian Schmidt:

- DKFZ German Cancer Research Center, Heidelberg
- Biologist (immunology, cell biology, biochemistry), science manager
- Project coordinator of NFDI4BIOIMAGE and I3D:bio

Bioimaging and its role in research



Modified after: Samantha Fowler, Rebecca Roush, James Wise, OpenStax, Concepts of Biology, Apr 25, 2013, Houston, Texas

Access for free at <https://openstax.org/books/concepts-biology/pages/1-introduction>

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Bioimaging and its role in research

Preparation, staining, etc



~ μm to mm scale



A laser scanning confocal microscope

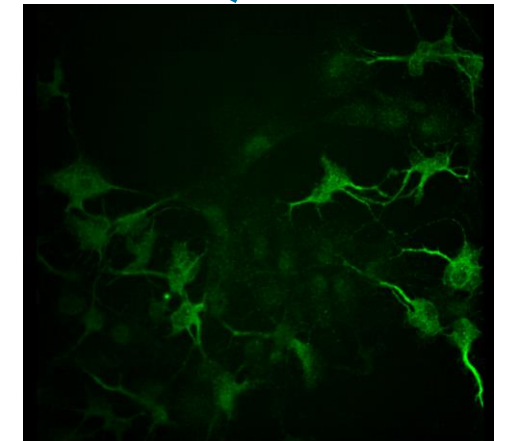
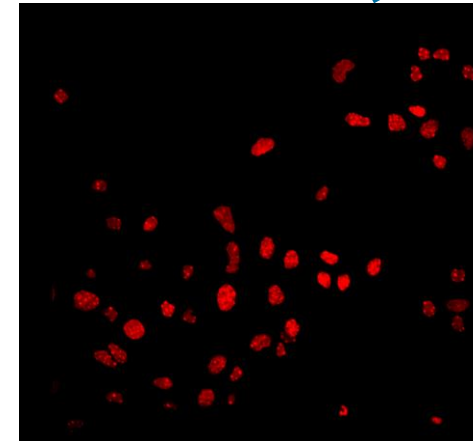
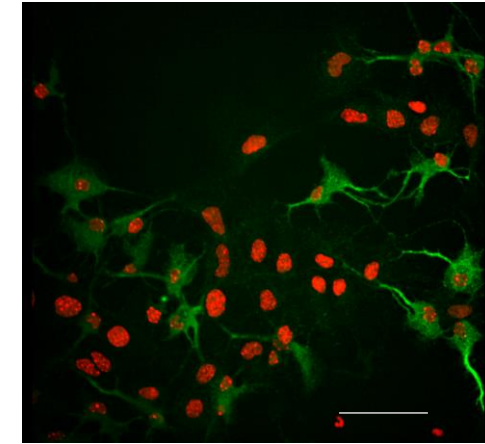


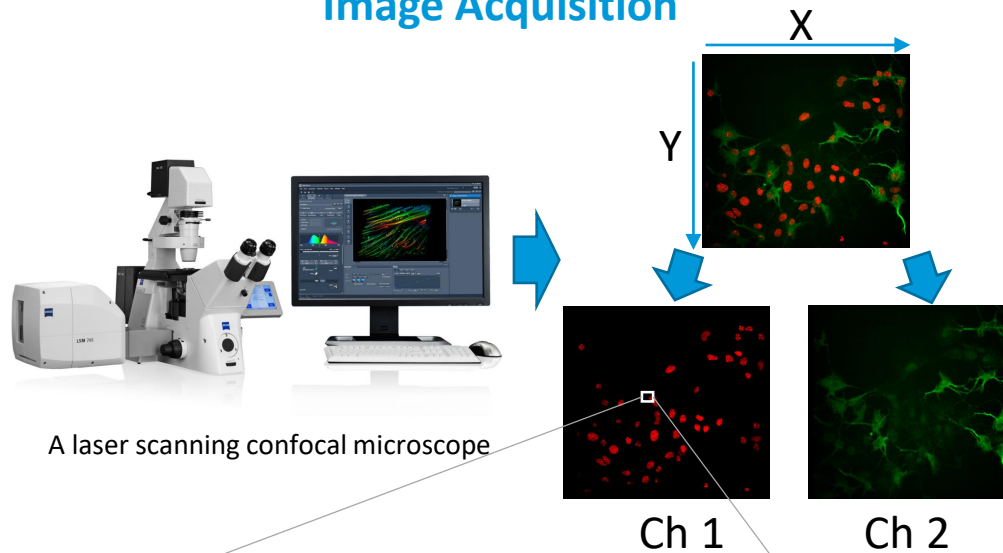
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De Vos, 2019, BioImage Archive, <https://www.ebi.ac.uk/biostudies/BiolImages/studies/S-BIAD7>

Bioimaging and its role in research

Image Acquisition



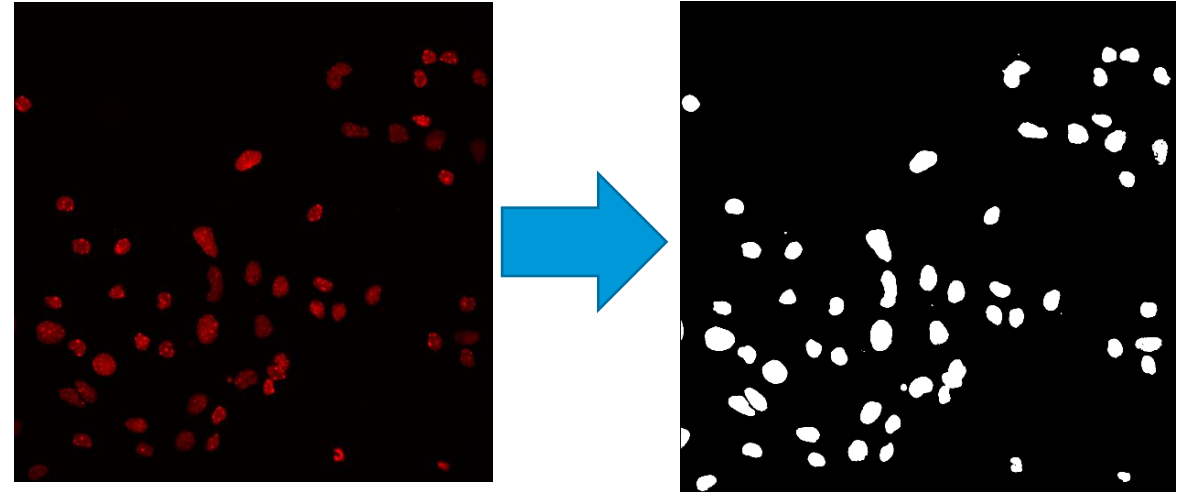
A laser scanning confocal microscope

Ch 1

Ch 2

X: 816; Y: 1037; Ch1: Intensity = 1991; 16-bit

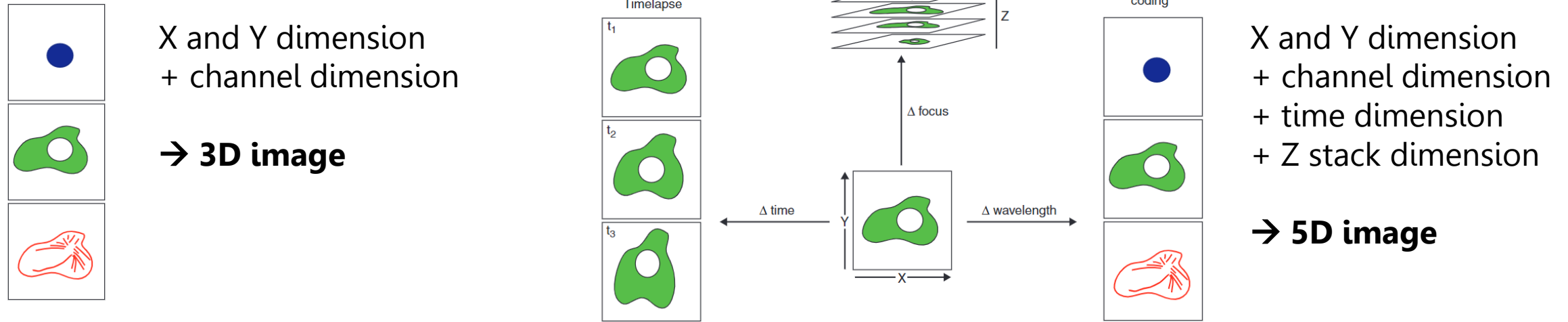
Image processing and analysis



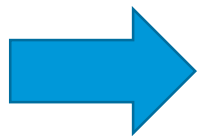
- Count the number of objects
- Quantify the area
- Measure cell shapes
- Measure the fluorescence intensity of other channels
- Etc...

→ Statistical evaluation and presentation of the results

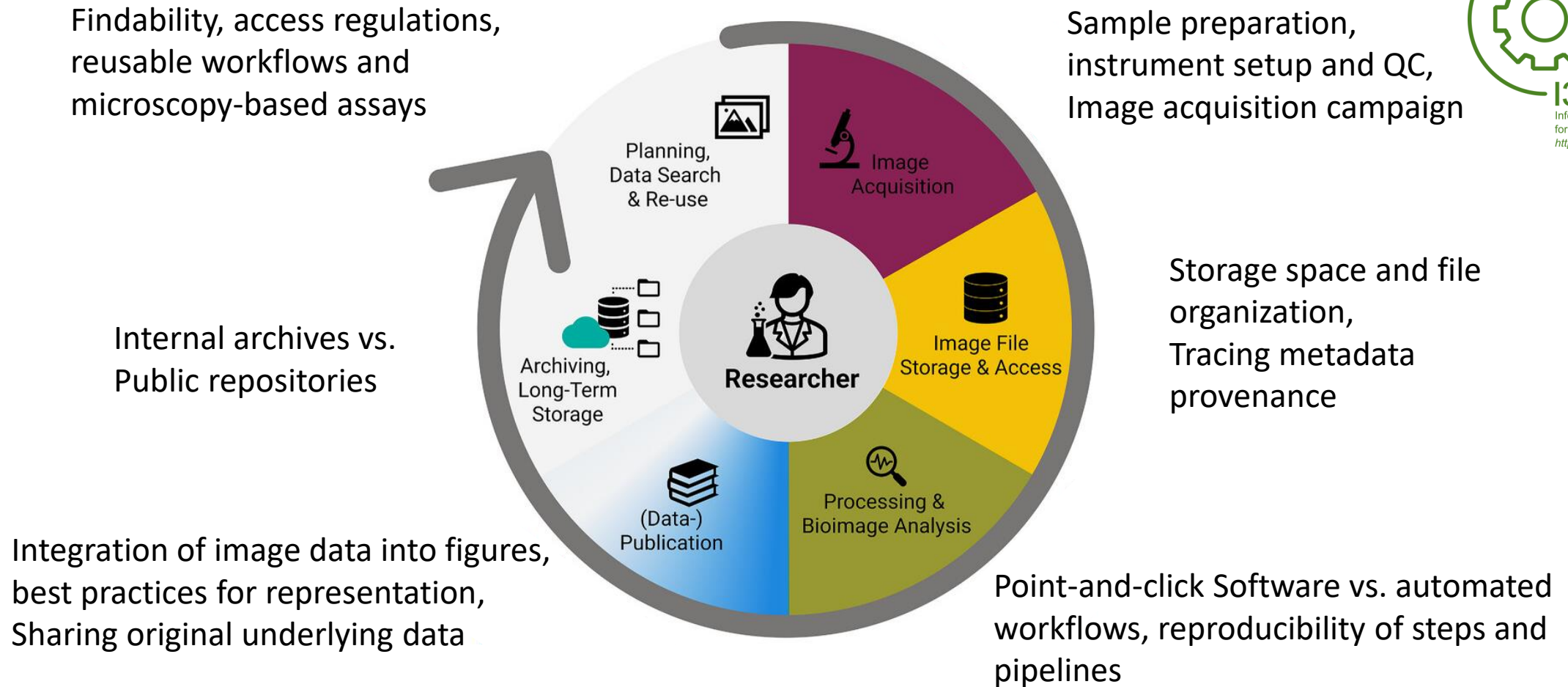
Schematic of bioimage data



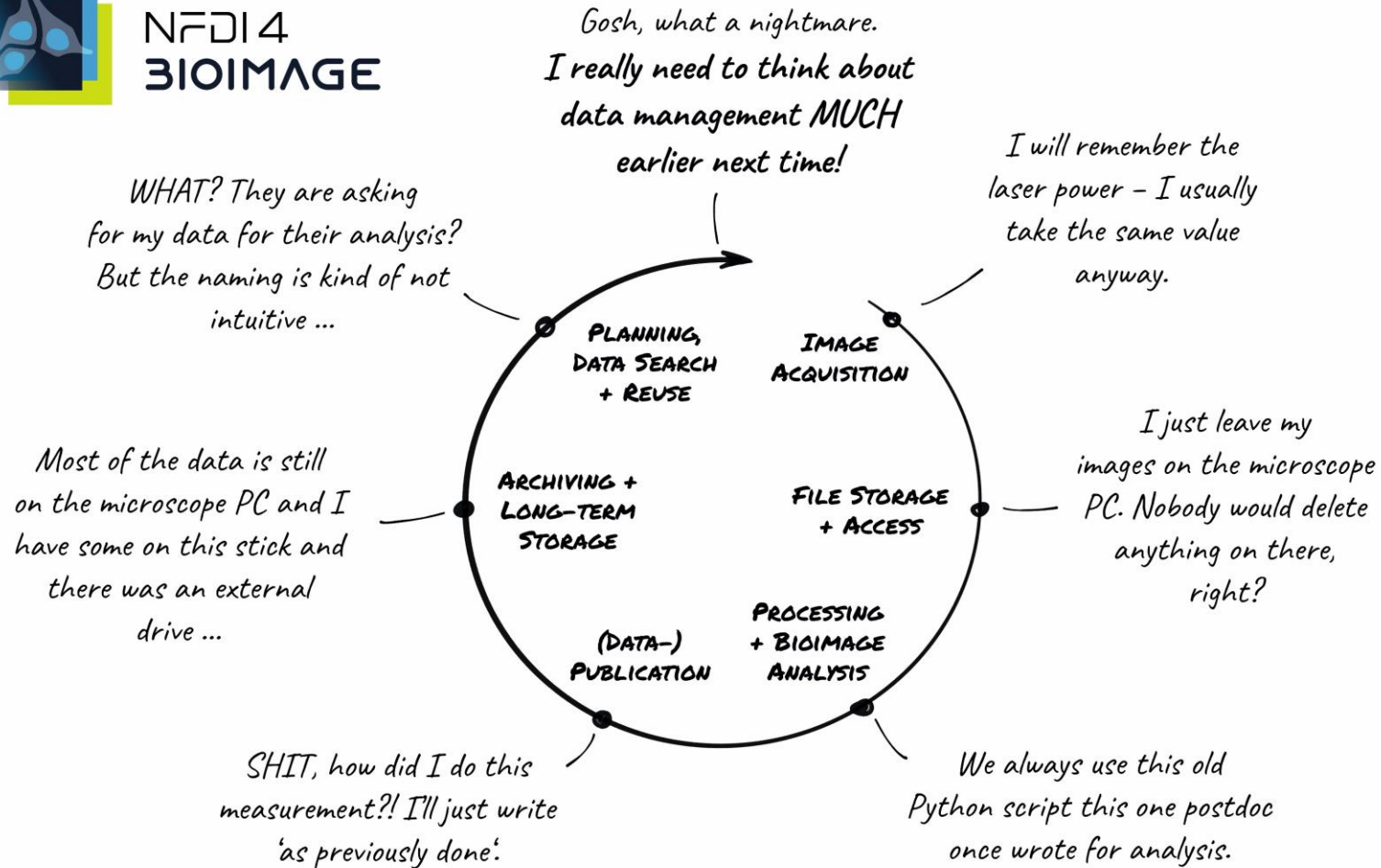
- Very complex in its structure (N-dimensional arrays)
- Often very large file sizes (GB to TB range)
- Often in proprietary, vendor-owned file formats
- No standard metadata attached



The bioimage data life cycle



The bioimage data life cycle???



BEEN THERE, DONE THAT.

HENNING FALK

(Inter)national collaboration is key to RDM



BioImage Archive



I3D:bio
Information Infrastructure
for BioImage Data
<https://www.i3dbio.de>



In cooperation with



Gesellschaft für Mikroskopie und Bildanalyse



NFDI 4
BIOIMAGE



Collaboration of different stakeholders

- Microscopists / Core Facilities
- Group leaders
- Bioimage analysts and wet-lab scientists
- Information Technology / Scientific IT
- Libraries
- RDM teams
- Open science teams
- (Data protection offices)
- Legal offices (IP-rights?)
- ...

Goal for this workshop

Bring us closer together, learn from each other

Learning goals for you

- Become familiar with the bioimaging data type and the specific challenges for microscopy data management
- Know about OMERO as a data management tool and its major assets
- Learn about Next-generation file formats for large N-dimensional array data, in particular, OME-Zarr for bioimaging
- Learn about REMBI, the minimum metadata for microscopy data.
- Findability for bioimaging: Where to deposit microscopy data?
- Discuss potential for synergies and communication gaps between different stakeholders
- Know who to contact with use cases in bioimaging RDM (NFDI4BIOIMAGE and I3D:bio)

Learning goals for us

- Learn about your perspectives, insights, and advice

Contact

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Coordination Office
Inga Mohr & Christian Schmidt
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- NFDI4BIOIMAGE partners
- I3D:bio
- Collaboration partners
- GerBI-GMB community

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In cooperation with



The NFDI4BIOIMAGE consortium comprises legally independent partners and does not act autonomously towards third parties. The authors represent the contributions from their respective affiliated institutions and work together for the project.

NFDI4BIOIMAGE Help Desk
Data Stewardship Team

<https://nfdi4bioimage.de/help-desk>

I3D:bio Help Desk

<https://gerbi-gmb.de/i3dbio/i3dbio-help-contact/>

<https://bsky.app/profile/nfdi4bioimage.bsky.social>

<https://nfdi.social/@nfdi4bioimage>

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