Recommended **M**etadata for **B**iological **I**mages

Key-value pair annotation in OMERO

Workshop: **FAIR data handling for microscopy: Structured metadata annotation in OMERO**

April 29th & 30th, 2024

Day 1 Session 4

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REMBI provides guidelines for metadata for biological images

Metadata collected in 8 modules

See Sarkans et al., 2021,
https://doi.org/10.1038/s41592-021-01166-8

“Fig. 2: Different categories of metadata that are covered by REMBI.”

Original publication: https://doi.org/10.1038/s41592-021-01166-8
https://www.ebi.ac.uk/bioimage-archive/rembi-help-overview/

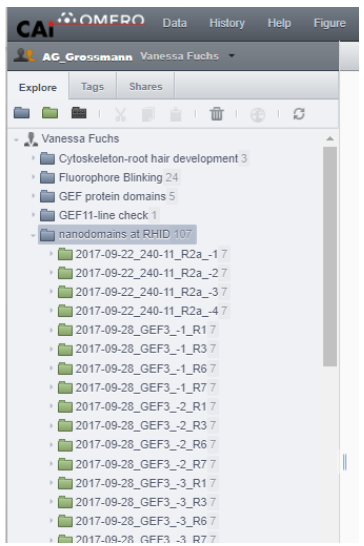
REMBI module 1: Study

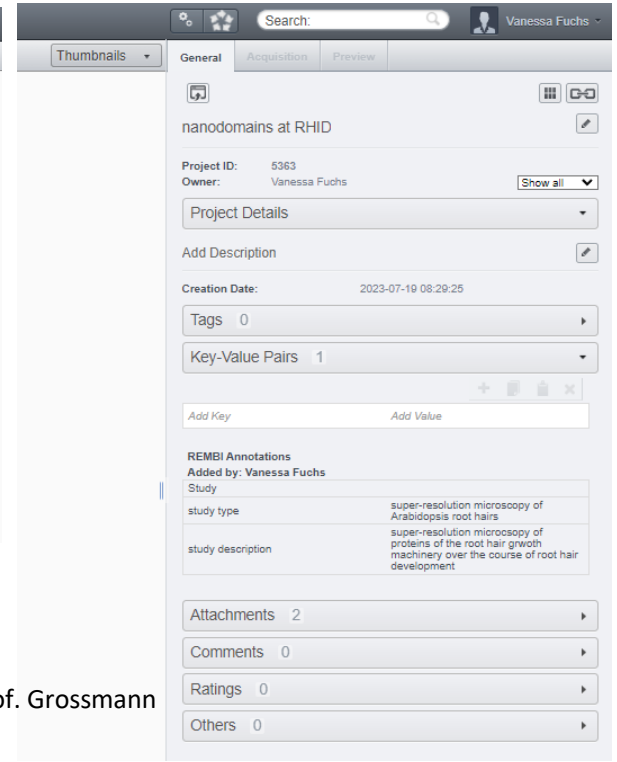
"**Study** is the highest level metadata, describing your project, including funding and publications."

Study			
(contains 1 or more	Study type	Type of the overall study, which may include	text, ontology
	Study description	Study description, e.g., title of published paper	text
	General dataset info	Authors, publications, licenses etc	misc.

Recommendation by I3D:bio:

Key-Value pairs in OMERO at the "Project"-level:





Data acquired in the lab of Prof. Grossmann
https://www.icib.hhu.de/

I3D:bio project: https://www.i3dbio.de/
Original publication: https://doi.org/10.1038/s41592-021-01166-8
https://www.ebi.ac.uk/bioimage-archive/rembi-help-overview/

REMBI module 2: Study component

Study Component acts as a container that helps you organise your data, based on experiment types or samples etc. A Study Component contains one or more of the following components: biosample, specimen, image acquisition, image correlation, image analysis (latter two are only required if relevant).

Study component			
(contains Image data	Imaging method	Technique used to acquire image data	ontology
	Study component description	Description specific to this image dataset	text

Recommendation by I3D:bio:

One per Dataset (Key-Value Pairs in OMERO at the Dataset-level)

I3D:bio

I3D:bio project: https://www.i3dbio.de/
Original publication: https://doi.org/10.1038/s41592-021-01166-8
https://www.ebi.ac.uk/bioimage-archive/rembi-help-overview/

REMBI module 3: Biosample

Biosample describes what you have imaged, for example: the species, the organism, a particular cell line, genetic background etc.

Biosample			
	Identity	Internal unique ID	
	Biological entity	What is being imaged	text and/or ontology entry (multiple possible)
	Organism	Species (multiple possible)	taxonomy
	Intrinsic variable	Intrinsic (e.g. genetic) alteration if applicable	text and/or ontology entry (multiple possible)
	Extrinsic variable	External biosample treatment (e.g. reagent) if applicable	text and/or ontology entry (multiple possible) or associated file
	Experimental variables	What is intentionally varied (e.g. time) between multiple entries in this study component	text and/or ontology entry (multiple possible)

Recommendation by I3D:bio:

One per Dataset (Key-Value Pairs in OMERO at the Dataset-level)

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Original publication: https://doi.org/10.1038/s41592-021-01166-8
https://www.ebi.ac.uk/bioimage-archive/rembi-help-overview/

REMBI module 4: Specimen

Specimen metadata describes how your sample was prepared for imaging.

Specimen *(linked to Biosample)*	Experimental status	Test/ control	
	Location within Biosample	Plate/dish coordinate or tissue location	text or associated file
	Preparation method	Sample preparation protocol	text, file, ontology, or widget for specific method types
	Signal/contrast mechanism	How is the signal generated by this sample	text, ontology
	Channel - content	Specific specimen staining (e.g. IEM, DAB)	text
	Channel - biological entity	What molecule is stained	text, ontology entries

Recommendation by I3D:bio:
One per Dataset (Key-Value Pairs in OMERO at the Dataset-level)

I3D:bio project: https://www.i3dbio.de/
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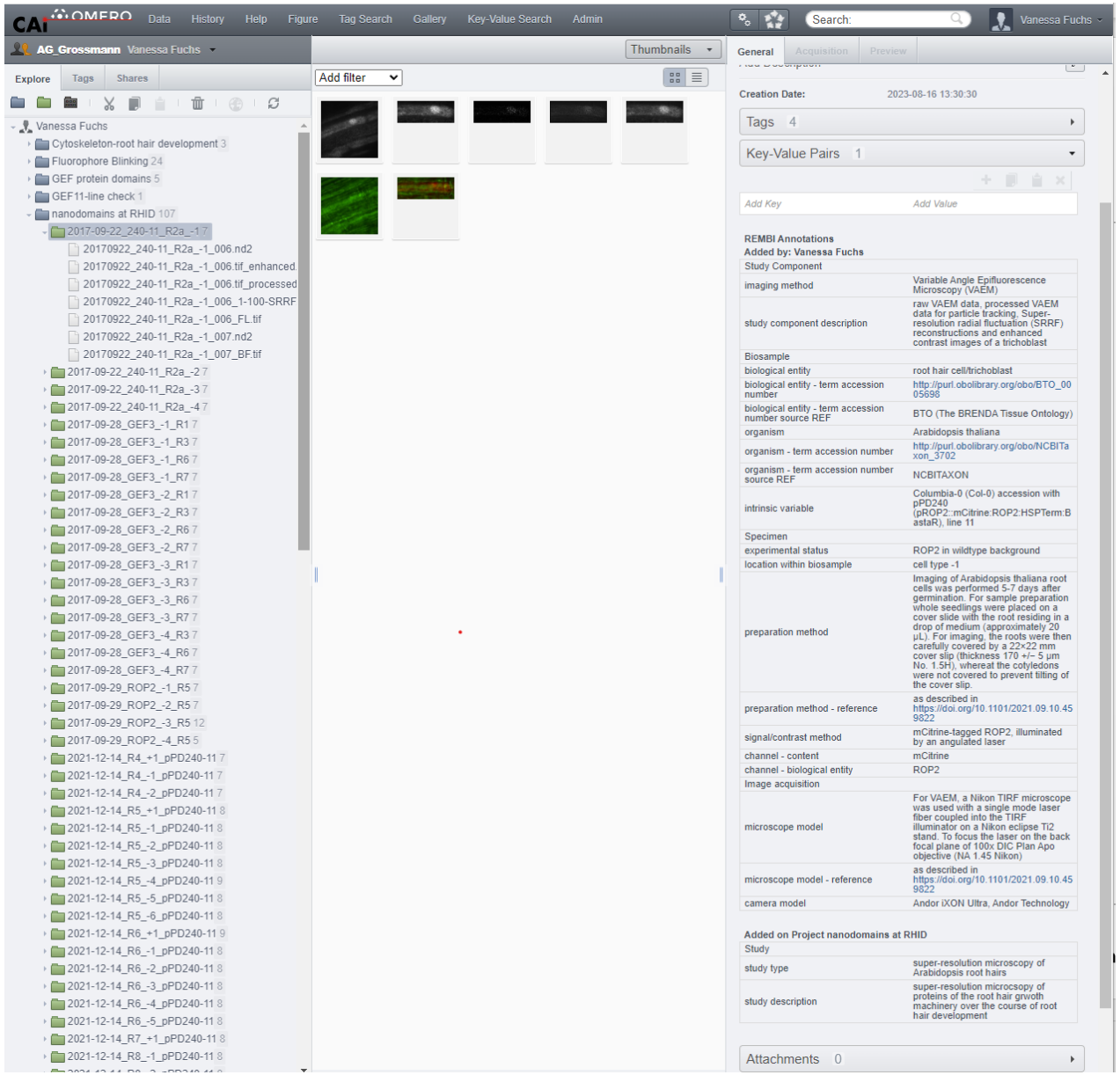
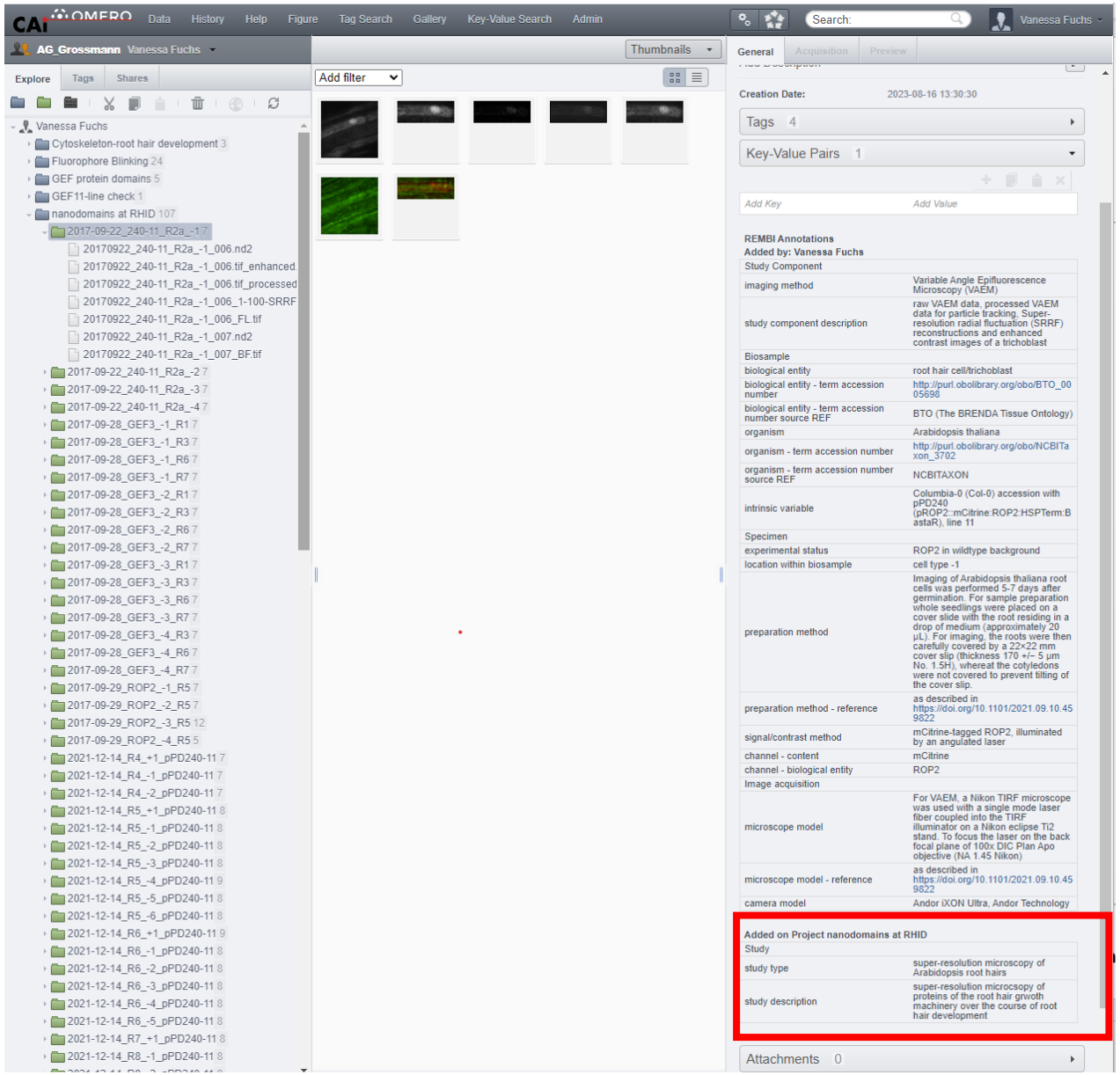
REMBI at CAi



Data acquired in the lab of Guido Grossmann
https://www.icib.hhu.de/

REMBI at CAi



Module1: Study – project level

Data acquired in the lab of Guido Grossmann
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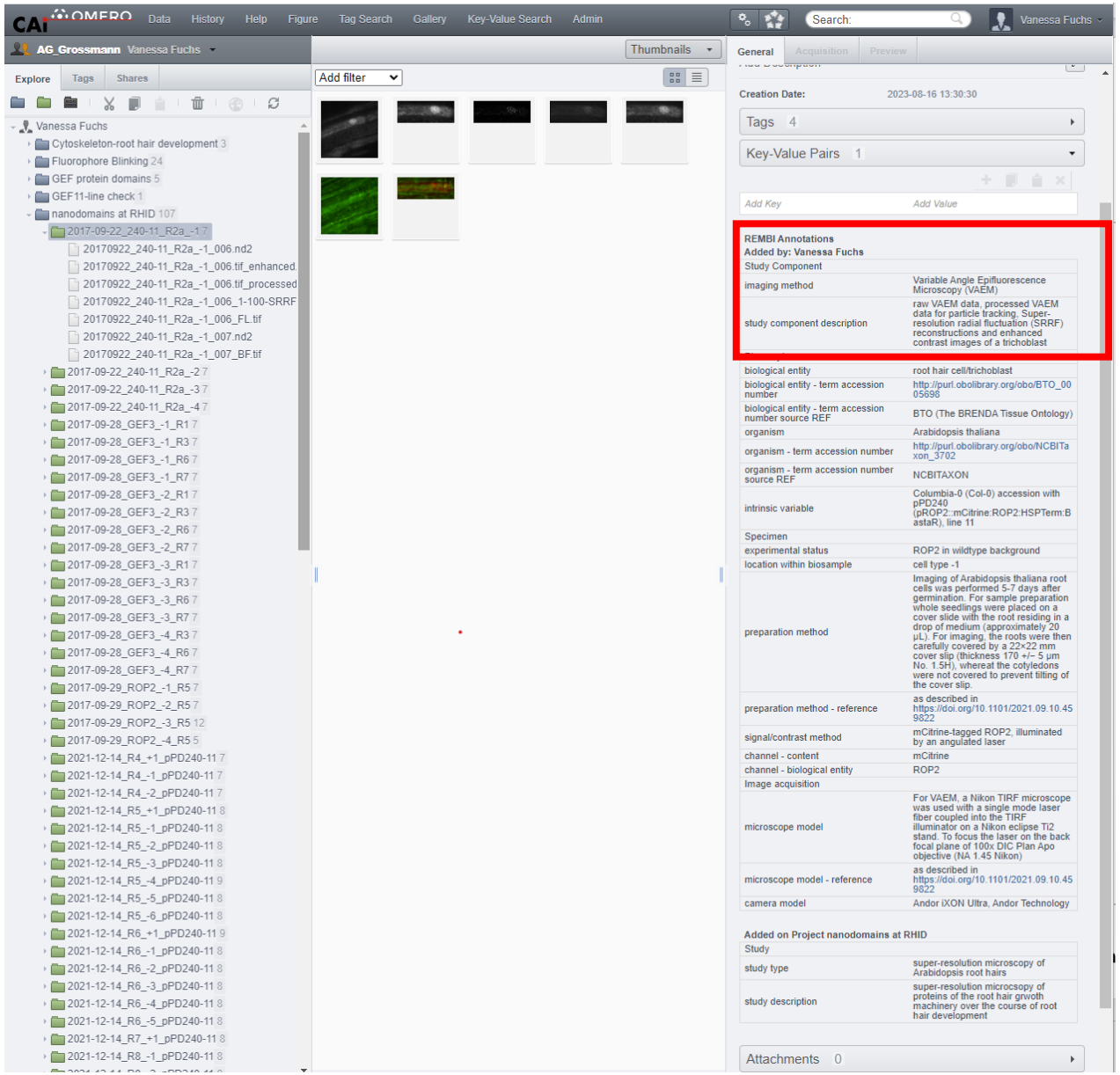
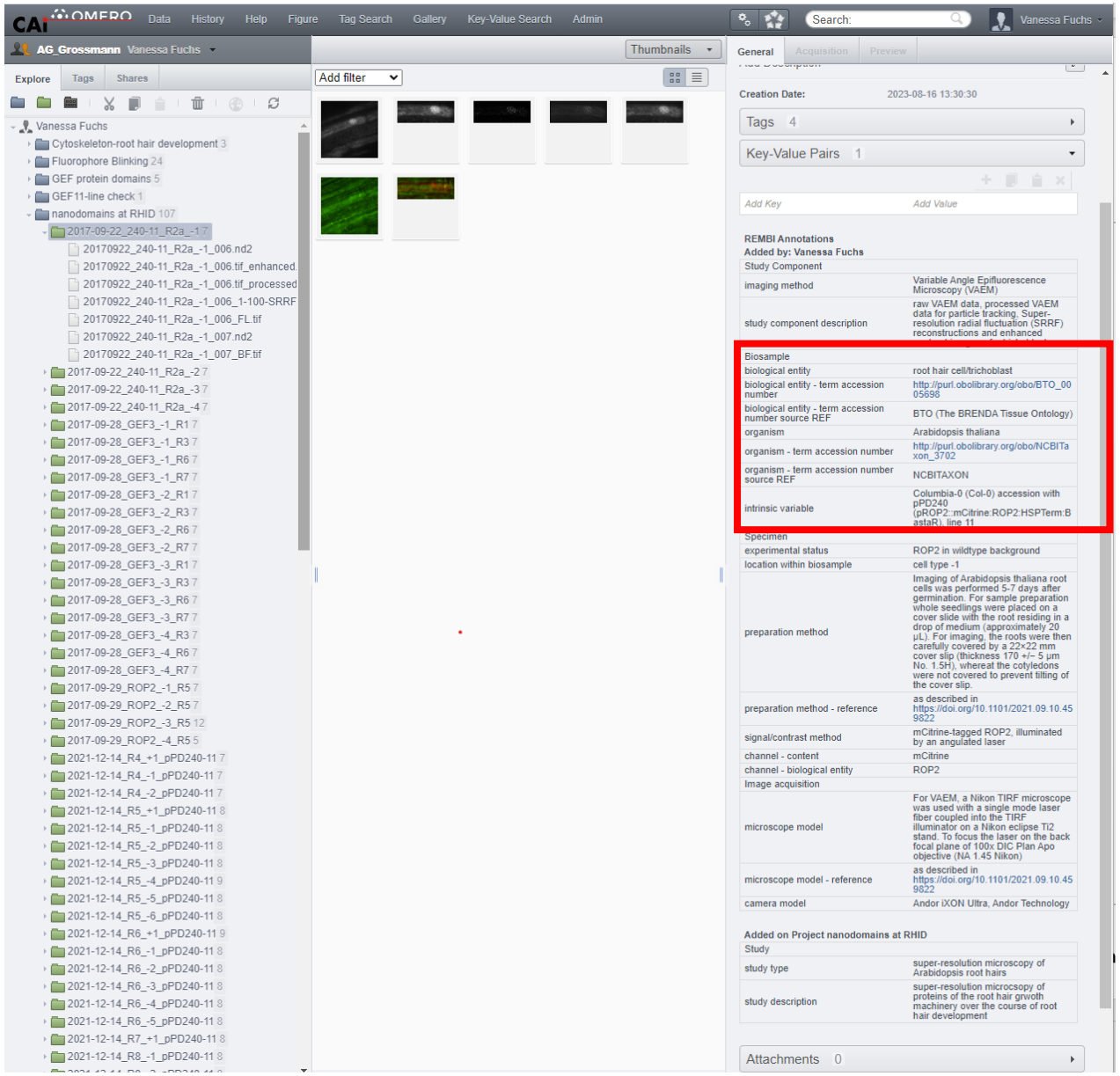
REMBI at CAi



Module2: Study component – dataset level

Data acquired in the lab of Guido Grossmann
https://www.icib.hhu.de/

REMBI at CAi



Module 3: Biosample – dataset level

Data acquired in the lab of Guido Grossmann
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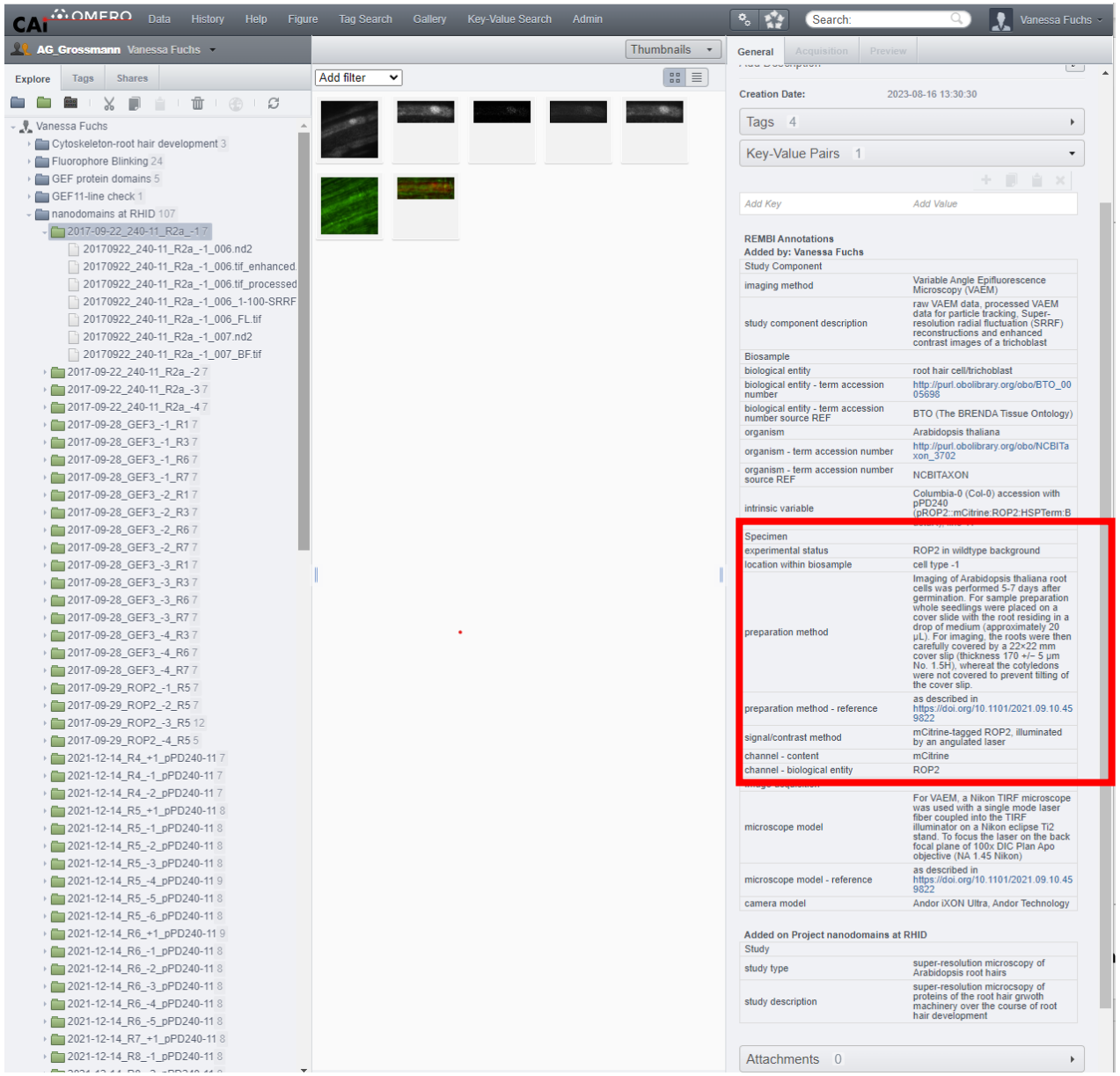
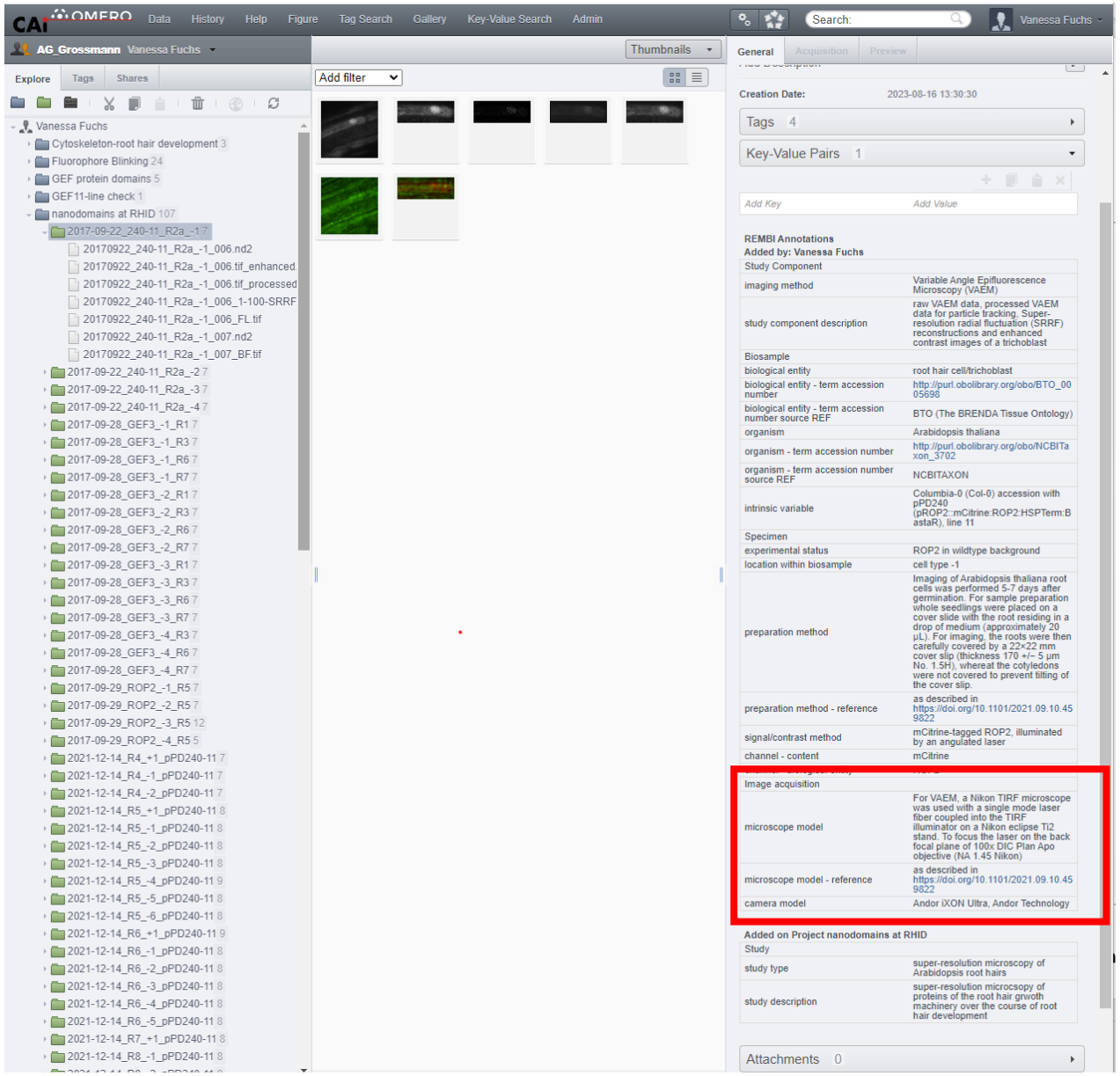
REMBI at CAi



Module 4: Specimen – dataset level

Data acquired in the lab of Guido Grossmann
https://www.icib.hhu.de/

REMBI at CAi



Module 5: Image acquisition – dataset level

Data acquired in the lab of Guido Grossmann
https://www.icib.hhu.de/

Acknowledgments

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Information **I**nfrastructure for Bio**I**mage **D**ata (I3D:bio)

https://www.i3dbio.de/

Center for **A**dvanced **i**maging (CAi) at Heinrich-Heine University Düsseldorf

https://www.cai.hhu.de/

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In cooperation with

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