Essential Metadata for 3D BRAIN Microscopy

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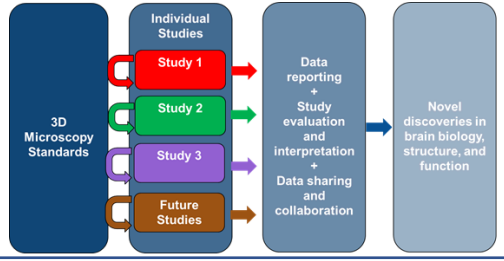
Goal and Rationale

Our goal is to provide the neuroscience research community with a set of standards for 3D microscopy of intact brains. The proposed standards can help facilitate:

- Consistency of data collection and reporting,
- Evaluation, validation, and interpretation of microscopy experiments,
- Development of data repositories and computational tools
- Leveraging multiple datasets to gain novel insights into brain biology



3D Microscopy Working Group

We established an agile Working Group (WG) of experts, co-chaired by Dr. Jan Huisken and Dr. Alex Ropelewski, to develop the standards using a dynamic, collaborative consensus process.

Working Group Members

Jan Huisken, PhD, Co-Chair Morgridge Institute for Research	**Alex Ropelewski, Co-Chair** Pittsburgh Supercomputing Center
Hong-Wei Dong, PhD University of Southern California	**Lydia Ng, PhD** Allen Institute for Brain Science
Megan Rizzo, PhD University of Maryland	**Jason Swedlow, PhD, FRSE** University of Dundee
Carol Thompson, PhD Allen Institute for Brain Science	**Pavel Osten, MD, PhD** Cold Spring Harbor Laboratory

Technical Experts

Neda Khanjani University of Southern California	**Kurt Weiss, PhD** Morgridge Institute for Research

National Institutes of Mental Health

Ming Zhan, PhD BRAIN Initiative Informatics Program Officer	**Yong Yao, PhD** Cell Census Network Program Officer

Metadata Specification

The Essential Metadata for 3D BRAIN Microscopy includes 91 fields across seven categories: Contributors, Funders, Publication, Instrument, Dataset, Specimen, and Image. To encourage adoption and reduce burden, only 31 of the fields are required for submission to the BRAIN Image Library (https://www.brainimagelibrary.org/, see below). The complete specification is available from https://doryworkspace.org/metadata.

Field Name	Definition	Allowable Values
Contributor Name	Person (last name, first name) or organization (e.g., research group, department, institution) contributing to or responsible for the project.	Free text
Creator	Main researchers involved in producing the data.	Yes No
Contributor Type	Categorization of the role of the contributor. Recommended: ProjectLeader (for principal investigator), ResearchGroup (for lab, department, or division).	ContactPerson; DataCollector DataCurator; ProjectLeader; ProjectManager; ProjectMember; RelatedPerson; Researcher; ResearchGroup; Other
Name Type	Type of contributorName.	Organizational Personal
Name Identifier	Alphanumeric code that uniquely identifies an individual or legal entity, (listed in the contributorName field). Accepted identifiers include GRID, ISNI, ORCID, ROR, and RRID.	Free Text
Name Identifier Scheme	Identifying scheme used in nameIdentifier. Required for Personal nameType.	GRID*; ISNI*; ORCID*; ROR*; RRID*
Affiliation	Organizational or institutional affiliation of the contributor.	Free text
Affiliation Identifier	Unique identifier for the organizational or institutional affiliation of the contributor.	Free text
Affiliation Identifier Scheme	Identifying scheme used in affiliationIdentifier.	GRID*; ISNI*; ORCID*; ROR*; RRID*
Title	Short phrase by which the specific dataset is known (e.g., title of a book).	Free text
Rights	Any rights information for the dataset. May be the name of the license and can include embargo or other use restrictions on data.	Free text
Rights URI	If using a common license, provide a link to the license.	Free text
Rights Identifier	If using a common license, provide the Software Package Data Exchange (SPDX) code.	Free text
Abstract	Additional descriptive information about the dataset.	Free text

Metadata Specification (continued)

Field Name	Definition	Allowable Values
Microscope Type	Type of microscope used to capture the image (e.g., inverted, upright, light sheet, confocal, two photon).	Free text
Microscope Manufacturer And Model	Manufacturer and model of the microscope used.	Free text
xAxis	Predominant tissue direction as one moves from the left side of the image to the right side of the image.	Left to right; Right to left; Anterior to posterior; Posterior to anterior; Inferior to superior; Superior to inferior; Oblique
yAxis	Predominant tissue direction as one moves from the top of the image to the bottom of the image.	Same as xAxis
zAxis	Predominant tissue direction as one follows a given pixel position through the stack of images from the first image to the last image.	Same as xAxis
Number	Number assigned to each channel.	Free text
Display Color	Display color of each channel in triplet (red, green, blue) format.	Free text
Species	Common organism classification name for the donor organism (e.g., mouse, human).	Free text
NCBI Taxonomy	National Center for Biotechnology Information (NCBI) taxonomy code for species of the donor organism.	Free text
Age	Age of the donor (or unknown).	Free text
Age Unit	Unit for the age of the donor.	Days; Months; Years
Sex	Sex of the donor.	Male; Female; Unknown
Funder Name	The name of the funder.	Free text
Funding Reference Identifier	Alphanumeric code that uniquely identifies an individual or legal entity. Preferred identifier is ROR.	Free text (or URL)
Funding Reference Identifier Type	Identifying scheme used in fundingReferenceIdentifier.	GRID*; ISNI*; ORCID*; ROR*; RRID*
Award Number	Funding code or project number assigned to the grant.	Free text
Award Title	Title of the grant award.	Free text

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