

Community-driven FAIR data management and reproducibility for the entire imagedata life cycle

Caterina Strambio-De-Castillia (caterina.strambio@umassmed.edu), The University of Massachusetts Medical School, **Caterina Strambio-De-Castillia**, University of Massachusetts Chan Medical School, **Joel Ryan**, Advanced BioImaging Facility - Department of Physiology, McGill University, Montreal, QC, CANADA, **Alessandro Rigano**, University of Massachusetts Chan Medical School, **Alice Kang**, MIA Cellavie, **Stephen C. Ogg**, IMAGING AND CHARACTERIZATION CORE LAB, King Abdullah University of Science and Technology, Thuwal,, **Gabriel Pelletier**, Neurology & Neurosurgery, McGill University, Montreal, QC, CANADA, **Thomas Stroh**, MNI Microscopy Unit, Neurology & Neurosurgery, McGill University, Montreal, QC, CANADA, **Judith Lacoste**, MIA Cellavie, Montreal, QC, CANADA, **Claire M. Brown**, Advanced BioImaging Facility - Department of Physiology, McGill University, Montreal, QC, CANADA

Significant advances in spatiotemporal resolution have led to ever-expanding microscopy datasets which, without agreed-upon community guidelines, are challenging to reproduce, quantitatively analyze (including AI-assisted strategies), and re-use (10.1038/nrd3439-c1; 10.1038/483531a; 10.7554/eLife.67995; 10.7554/eLife.45120/).

As such, biomedical advances crucially depend on the generation of high-quality FAIR (10.1038/sdata.2016.18) datasets. This, in turn, requires the seamless integration of community-specified image documentation practices within the Research Data Management (RDM) pipelines required to ensure the execution, tracking, and documentation of the entire life cycle of data from sample preparation to publication (i.e., data provenance).

To illustrate these points concrete examples will be provided that include the use of open-source standards and tools (<https://www.nature.com/collections/djicjihhjh>) developed by an international consortium of community initiatives led by QQuality Assessment and REProducibility in Light Microscopy (<https://quarep.org/>).

Practical use cases will center around work being carried out in the context of Canada Bioimaging (<https://www.canadabioimaging.org/>) and BioImaging North America (<https://www.bioimagingnorthamerica.org/>) to support both pre- and post-publication imaging RDM through the automated capture, storage, and reporting of the necessary image metadata to support the reproducibility and reusability of imaging data.