

Australian Neuroscience Microscopy Data Sharing Platform

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Our goal is to develop the Australian Neuroscience Microscopy Data Sharing (ANMDS) platform, a national open-source microscopy data repository

We have:

1. Formed an ANMDS organising committee
2. Organized the “Data Sharing: Neuroscience, Microscopy and Experiments Symposium” and “The Australian Neuroscience Microscopy Data Sharing, Standards and Best-Practice Workshop”
3. Conducted a survey whose purpose was to identify practical challenges and perceived obstacles that researchers have towards data sharing
4. Gathered information on infrastructure and data sharing capabilities in research institutions in Australia

We invited international experts to give their input on:

1. Infrastructure: Prof Jason Swedlow (Open Microscopy Environment, Glencoe Software)
2. Characterisation and standardisation in optical microscopy: AProf Claire Brown
3. Public data sharing: Prof Giorgio Ascoli and David Orloff (NeuroMorpho and Cell Image Library)
4. Nature Research: AProf Kaylene Simpson

In this project we focused on neuroscience optical microscopy images with a goal to perfect the system for one type of data but in a way that can be naturally extended to any other type.

Institutional:

Instruments: With advances in optics, computational tools and automation, a modern optical microscope now creates a wealth of new data on a daily basis.

Data: exist in pockets, poorly integrated, dependent on insecure funding and people turnover.

Infrastructure: We need a national platform for the sharing of optical microscopy images to avoid silo effects and enable sharing of data for the purpose of collaboration.

Key issues:

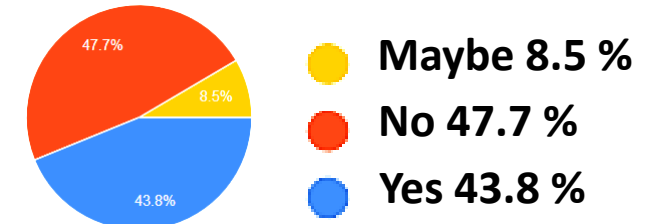
There is no middlemen to:

- Facilitate communication
- Provide training
- Do annotation and vetting of data
- Make sharing fast and easy

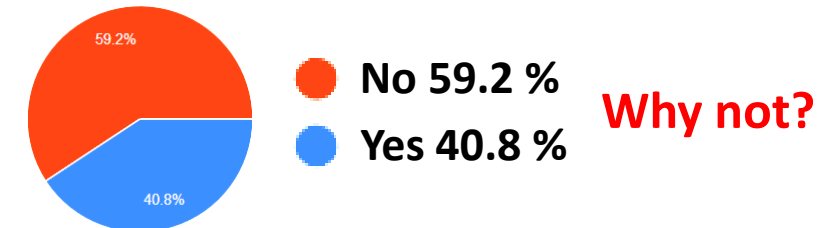
We need more cross-background experts

Education of researchers:

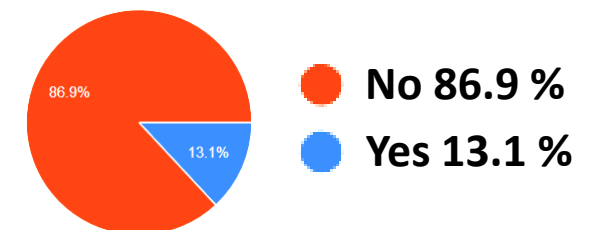
Are you aware of a platform for data sharing in your institution?



Have you ever shared your data?



Are you familiar with FAIR principles?



Lessons learnt:

Institutional:

UQ has announced new scientific instrument data sharing and management that is now used locally, nationally and globally!

MeDiCI – Metropolitan Data Caching Infrastructure, a high performance data storage fabric and UQ's data fabric of choice

Once the data is on *MeDiCI*, it is visible to supercomputing repositories and visualisation platforms. Offers at a minimum 1 TB per collection and multiple collections per user. Scales to petabytes per collection.

Working with 100G networks, multi-gigabyte per second filesystems, supercomputer integration and ultra high IO GPU workflows - but once done, it can be TEMPLATED and deployed in sustainable ways.

Research Data Manager (RDM) It allocates storage with appropriate meta-data capture for discovery, preservation, reusability and transparency, long term.

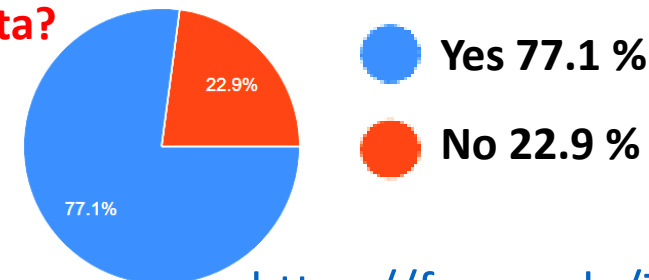
Education of researchers:

Hands-on Informatics workshops organized around the country to bring everyone on the same level and unify the Australian scientific community

Targets:

- PhD students and young scientists to help them adopt healthy habits in data collection, curation and sharing
- Research officers of every institute to encourage them to promote FAIR principles
- Facility managers to use standards to insure that the instruments run at the optimum performance level

If we had an Australian Microscopy Data Sharing Platform, would you use other researchers' microscopy data?



<https://forms.gle/7kci5fkL3UC9ocRY7>

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National collaborators who made this project possible:

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Other collaborators:

MeDiCI international and national fabric nodes: The National Institute of Advanced Industrial Science and Technology (AIST), Japan, University of California San Diego (UCSD), USA, The Pawsey Supercomputing Centre, Kensington, AU, James Cook University, Brisbane, AU

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Jason Swedlow, Professor of Quantitative Cell Biology at the School of Life Sciences, University of Dundee, founder of Open Microscopy Environment

Claire Brown, Professor and Director of Advanced BioImaging Facility, Canadian representative at Global Bioimaging, McGill University,

David Orloff, Director, Cell Image Library