

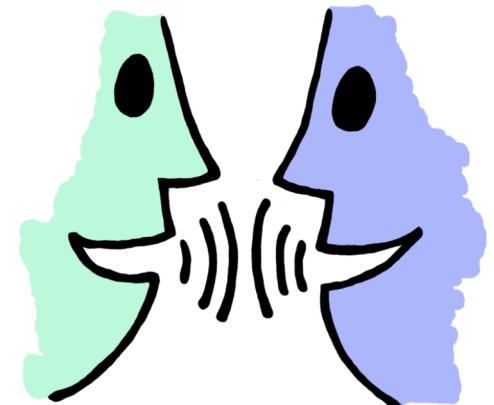
Data sharing and Backup

Anne Pajon 26th February 2019

Mark Fernandes (Updated Nov 2019)

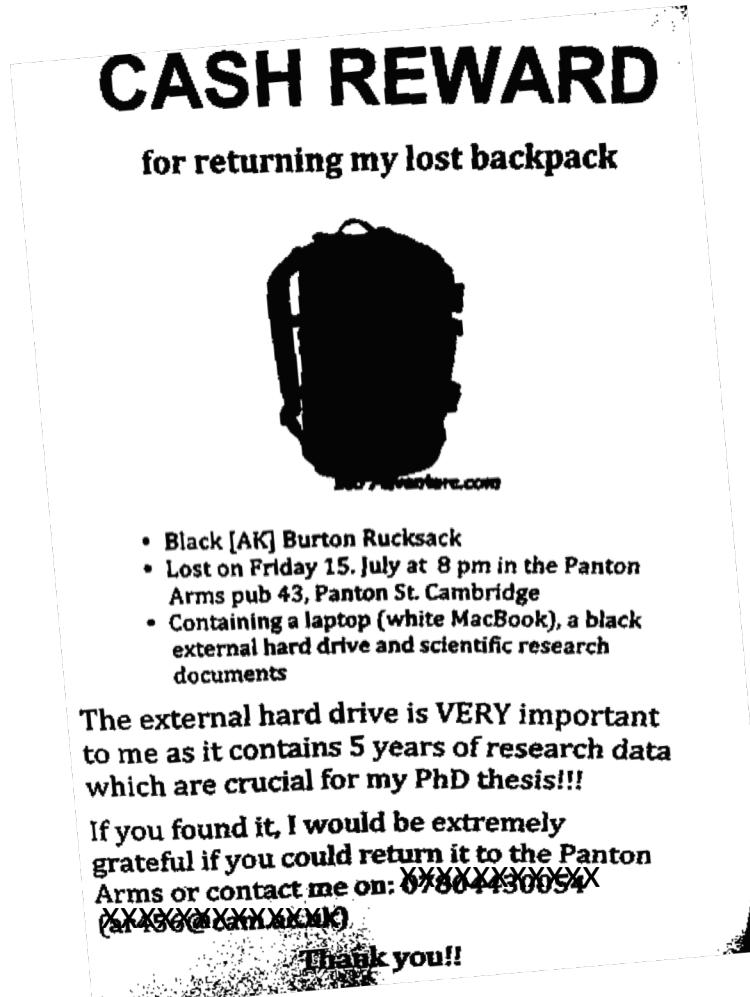
How do you **manage** your research data?

- What kind of research data do you have?
- Do you do any data **backup**?
- How **often**?
- How do you **share** files/data with collaborators?



To avoid data *disasters* ...

What would you do if you'd lose your data tomorrow?



<https://blogs.ch.cam.ac.uk/pmr/2011/08/01/why-you-need-a-data-management-plan/>

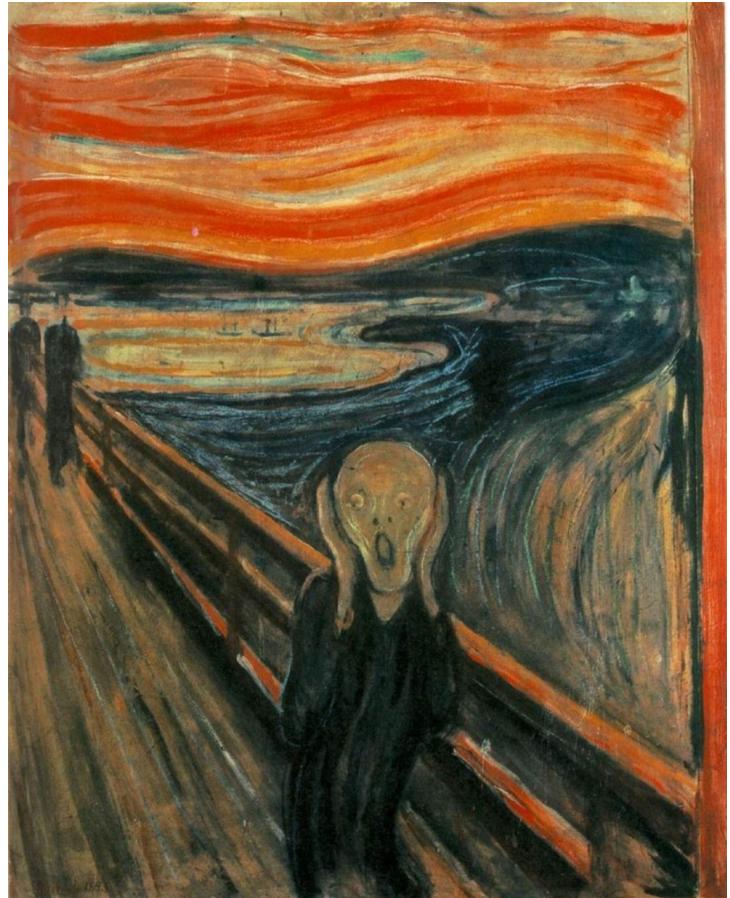
What if?



Cancer Research UK – University of Manchester – 27 April 2017

What would you do if you'd lose your data tomorrow?

- Your laptop got stolen
- Your office/house burnt
- Your USB stick is lost
- Your portable hard disk is damaged
- Your data in Dropbox disappeared



https://en.wikipedia.org/wiki/The_Scream

As stated in the first talk:

Never work directly on the raw data

Leave it intact

Always make a copy, and work on the copy

Data backup

At least 2 backups at 2 different locations

External disks



Online backup



Servers

Department
College
IT



Cheap
£10-15 / TB (1024GB)



Failure rate
1.5%/year

Accessibility
Free (limit)

Personal data
Hacking

Managed by
experts

Moving between
institutions

Data backup



Manual

Copying files to relevant folders



Automated

- Install software
 - e.g. Time machine (Mac users)
 - Syncback(Windows)
 - <https://www.2brightsparks.com>
- RAID technology
- Checksums



Copying files to relevant folders

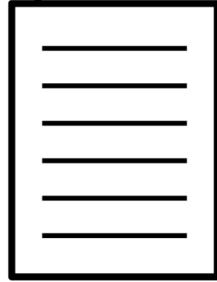
Automatically upload files to the cloud when any changes are saved

If manual ... how often?



How much would you be willing to lose?

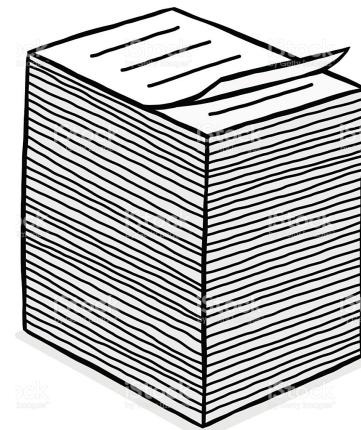
1 day



1 week



1 month-year



*Software allows you to set up **backup time** automatically*

Data backup and file sharing



Space/price	2 GB (free) 2 TB (£96/year)	15 GB (free) 2 TB (£80/year)	5 GB (free) 1 TB (£60)
File history and recovery	Yes, unlimited	Yes	Last 90 days
File size limit	None	Up to 5 TB	15 GB
Support	UIS	UIS	UIS
OS	Windows, Mac, Linux, Android, iOS	Windows, Mac, Android, iOS	Windows, Mac, Android, iOS
Accessibility	Sync anywhere on any devices	Live editing	Integration with Microsoft Office

Beware of the cloud...

reliability

Is the cloud storage supplier reliable?



security

Have you lost control over your data?

cost

Is there hidden cost?



Why data sharing is important?



CC-BY Danny Kingsley & Sarah Brown

Data should be shared to move our knowledge forward.

Research Data Policies



Most research funders have also introduced **policies** on research data management.

The general expectation is that publicly funded research data are a **public good**, and should be made **openly available** with as few restrictions as possible.

<http://www.data.cam.ac.uk/data-management-guide>

The screenshot shows a web browser displaying the 'Data Management Guide' section of the University of Cambridge's website. The URL in the address bar is <https://www.data.cam.ac.uk/data-management-guide>. The page features a dark header with the University of Cambridge logo and navigation links for 'Study at Cambridge', 'About the University', 'Research at Cambridge', 'Quick links', 'Search', and 'Contact Us'. Below the header, there is a main menu with 'Home', 'Data Management Guide', 'Support', 'Data Repository', 'Data Policies', 'FAQ', 'News', 'Data Champions', 'Events', and 'Contact Us'. A sidebar on the left contains links for 'Research Data Management' (including 'Data Management Guide', 'Support', 'Data Repository', 'Data Policies', 'FAQ', 'News', 'Data Champions', 'Events', and 'Contact Us'), 'Training and workshops on data management', and 'Where can I deposit my data?'. The main content area features a large image of hands typing on a keyboard, with the heading 'Data Management Guide' and the sub-section 'Various forms of research data'. Below this, there is a detailed description of research data management and a list of 'Research data management guidelines' (Creating your data, Organising your data, Accessing your data, Looking after and sharing your data). A sidebar on the right lists upcoming events: 'Post-publication sharing: publishing your research effectively (For PhD students in Humanities, Arts and Social Sciences)' (14 MAR), 'How FAIR is that research data?: a workshop (for research support staff including librarians and administrators in all disciplines)' (25 MAR), and 'How FAIR is your research data?: a workshop (for researchers and postgraduate students in all disciplines)' (28 MAR). At the bottom right, there is a link to 'View all events >' and a small note about the 'Open Research Newsletter sign-up'.

What data to share?

- Data & metadata
 - Raw
 - Processed
- Code (software and scripts)
- Methods
- Papers
 - results and figures
- What about non-positive results?
 - RIO - Research Ideas and Outcomes



<https://riojournal.com/>

- Would you consider Pre-Print for your draft manuscripts?



<https://www.biorxiv.org/>

DOAJ DIRECTORY OF
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JOURNALS

<https://doaj.org/>

When to share?

Close data



Initial experiments

Method optimisation

Answering biological questions

Write up story

Ideas



Paper



Tests

First scripts

Robust analysis pipeline

Figures
Tables

Document computational method

Private code

Public code

Gather information early

- Think of data submission from the start
- Collect metadata before submission
- Keep a **ReadMe** file about your project
- Consider using an **Electronic Lab Notebook**



How to share your data?

Store, describe and deposit your data in suitable and trusted public data repositories and add a link to your data in your publication.

Repositories for data

- Discipline specific
 - Registry of Research Data Repositories
<http://www.re3data.org/>
 - EMBL-EBI services
<https://www.ebi.ac.uk/services>
- General purpose
 - Zenodo <https://zenodo.org/>

Repositories for code

- GitHub <https://github.com>
- GitLab <https://gitlab.com>
- Bitbucket
<https://bitbucket.org>



Zenodo assigns a Digital Object Identifier (DOI) to make the upload easily and uniquely citable, with GitHub integration to enable tracking of each release.

How to make your publication Open Access?

The Open Access Team will check your funder and journal policies and advise on how to comply with Open Access requirements.



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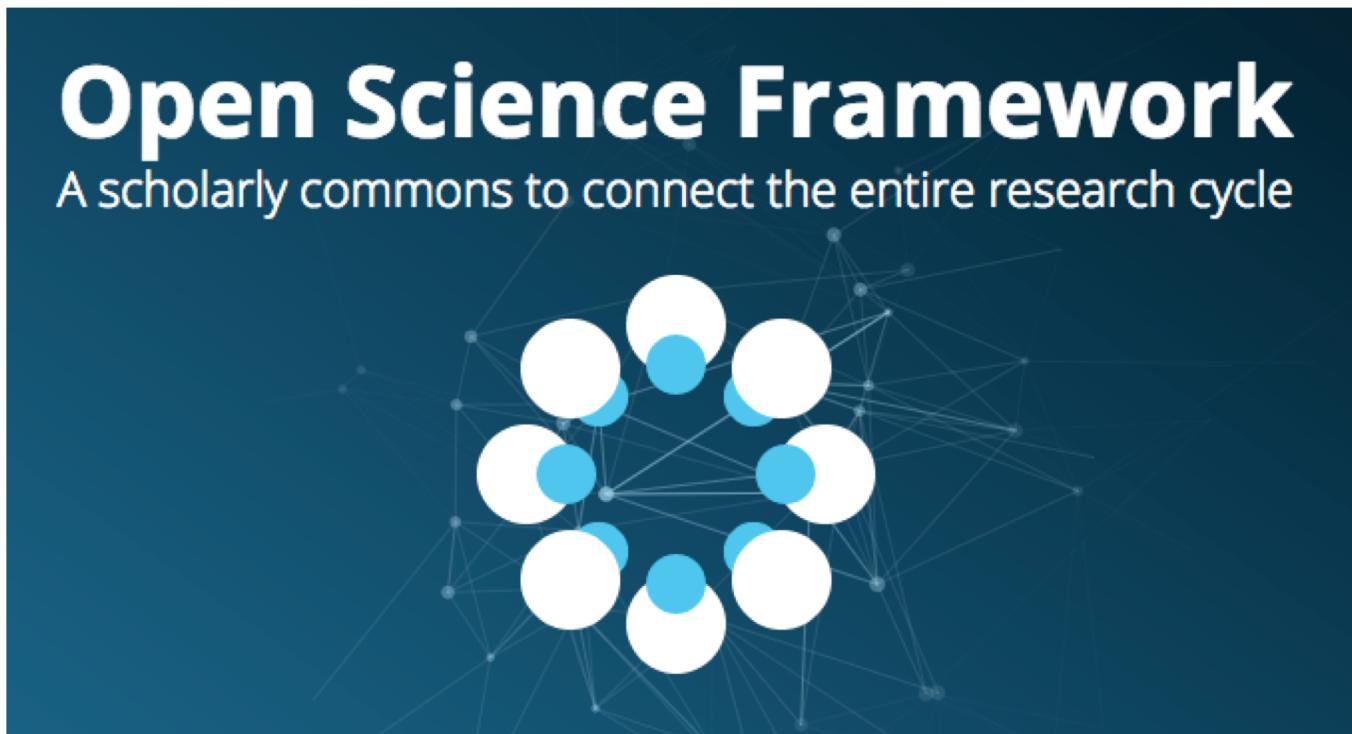
Accepted for publication?

Upload manuscript

<https://www.openaccess.cam.ac.uk/>

Open Science Framework

Cloud-based management for your projects @ <https://osf.io/>



Under which license?

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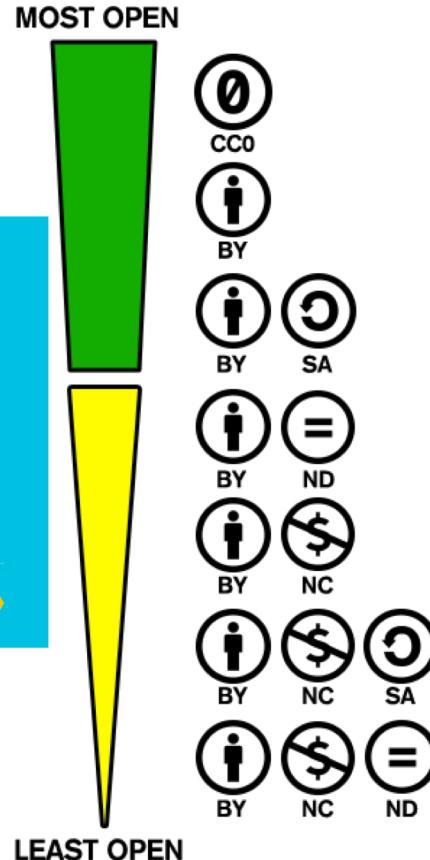
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initiative
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<https://choosealicense.com>

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https://www.cancerresearchuk.org/sites/default/files/policy_on_open_access.pdf


Quiz

<https://frama.link/manage-data-quiz>



Managing your Research data Quiz

*Required

Would you work directly on raw data or make a copy of it? *

- Work directly on raw data
- Make a copy and work on it
- Other: _____

Which file should I create to document my data and processes?

*

- License file
- ReadMe file
- ToDo file
- Other: _____

Which inconsistencies have you encounter in data? *

- Different values for similar information (e.g. female/male)



Conclusion



- Always **make a copy** of your data
- **Backup** your data at least **twice** at two different locations
- Document your process using a **ReadMe** file
- Ideally most **data should be shared**
 - Sharing is essential for all publicly funded research
 - Share as early as possible
 - Using suitable repositories and DOI
- Share your work under a Creative Commons or Open Source **license**

