Best Practices for Managing Data in your Research

Sherman Centre for Digital Scholarship

Wednesday, October 1, 2025

10:30am - 11:30am **(Online)**

Land Acknowledgement

McMaster University is located on the traditional territories of the Mississauga and Haudenosaunee Nations. Settlers have responsibilities under the Silver Covenant Chain Wampum, part of the 1764 Treaty of Niagara.

Georgia Kirkos, “Cootes Trail,” October 29, 2021, McMaster University, Hamilton, Ontario, Canada
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Certificate Programs

The Sherman Centre for Digital Scholarship Certificate of Attendance

The Sherman Centre's certificate program recognizes attendance at our workshops. It complements degree training, supports the development of critical competencies in data analysis, research data management, and digital scholarship, and formalizes core skills fostered by our workshops.

Participants are invited to collect **seven** workshop points to receive a certificate of attendance. To verify your participation in today's workshop, we will provide a code and additional instructions at the end of the session.

You can learn more about the certificate program at **scds.ca/certificate-program**

The Canadian Certificate for Digital Humanities

This workshop is also eligible for the Canadian Certificate for Digital Humanities. To learn more about the certificate, visit **ccdhhn.ca**. You can also contact local liaison Alexis-Carlota Cochrane at scds@mcmaster.ca.

Fall 2025: Upcoming Workshops

Data Analysis Support Hub

September 24: Create Simple Maps using Google Maps and Microsoft Excel

October 9: Getting Started with Linear Regression in R

Digital Research

October 21: Establishing and Maintaining Researcher Profiles

November 19: Creating Compelling Research Impact Visualizations

Research Data Management

November 19: Data Management Plan Bootcamp (Virtual)

November 25: Data Management Plan Bootcamp (In-Person)

January 27: Streamline Your Research Materials Photos with Tropy

Do More with Digital Scholarship

October 8: Visions of Generative AI: Historical and Ethical Dimensions of Visual Media Literacy in the Era of AI

October 23: Creating High-Quality Documents with LaTeX

November 26: Making and Querying Databases in SQL with DuckDB

Register for Upcoming Workshops: https://u.mcmaster.ca/scds-workshops

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Research Data Management Services

PhD in Anatomy and Cell Biology, member of MREB - can help with data management for sensitive data

Isaac Pratt, PhD

MA in Media Studies, excited about data justice, community research, + connecting with curious disciplines!

Danica Evering, MA

Let us know where you're from and one thing you're hoping to learn!

Shout it out! Get in the comments!

Outline

~~Best~~ Good Enough Practices for Managing Data in Your Research

- Everyone has data (even if you don't think you do!)
- Don't be like Dave or Alice

1. **Make a plan**
2. **Organize & document what you're doing consistently**
3. **Store & back up data securely**
4. **Get ready for archiving & sharing**

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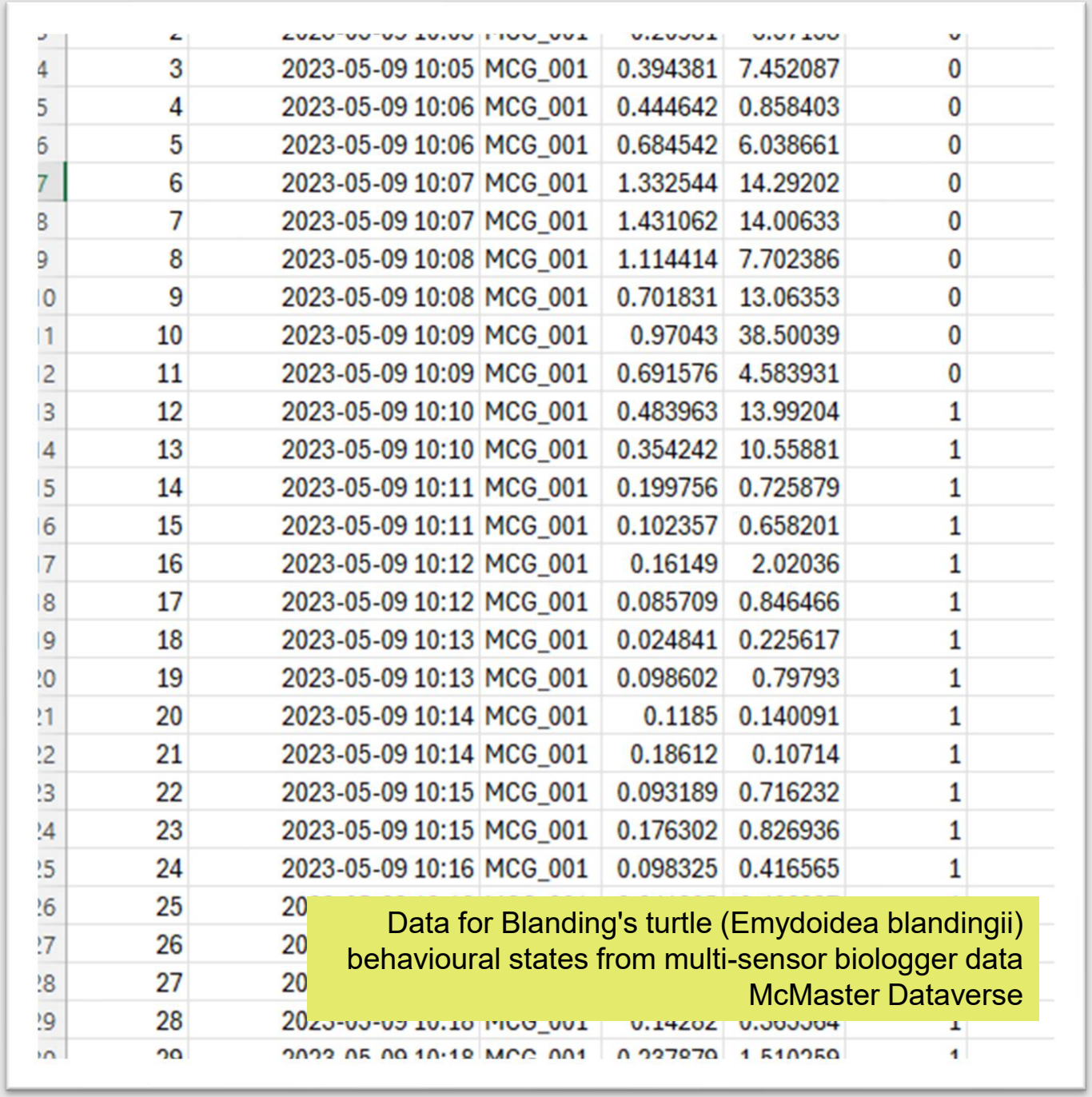
Everyone has data (even if you don’t think you do!)

What counts as “research data”?

Information or materials that are used as evidence in research and scholarly work.



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Data for Blanding's turtle (Emydoidea blandingii) behavioural states from multi-sensor biologger data
McMaster Dataverse

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What counts as “research data”?

Information or materials that are used as evidence in research and scholarly work.

Clockwise: Christina WOC in Tech via Unsplash; Rachel Glaves, "Collage party at Million Fishes," CC-BY 2.0, Microsoft Stock Images.

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r/GradSchool • 4 yr. ago
[deleted]

I lost 2 years' worth

The title says it all..

I don't know how to process this rig

I've been doing astronomy research
on the computer in my office, until

At the time I thought it was just a m
and I actually used this time to take

Yesterday they got back to me, and
campus, and somehow something w
scared" mode, and they told me the
do a clean restart.

They haven't done it yet, because th
do it, because I'd lose 2 years' worth

I already know people are gonna sa
but it just never crossed my mind (fu
scheduled for next Wednesday). I ha
large chunk of my work will definite

The projects that I was working on w

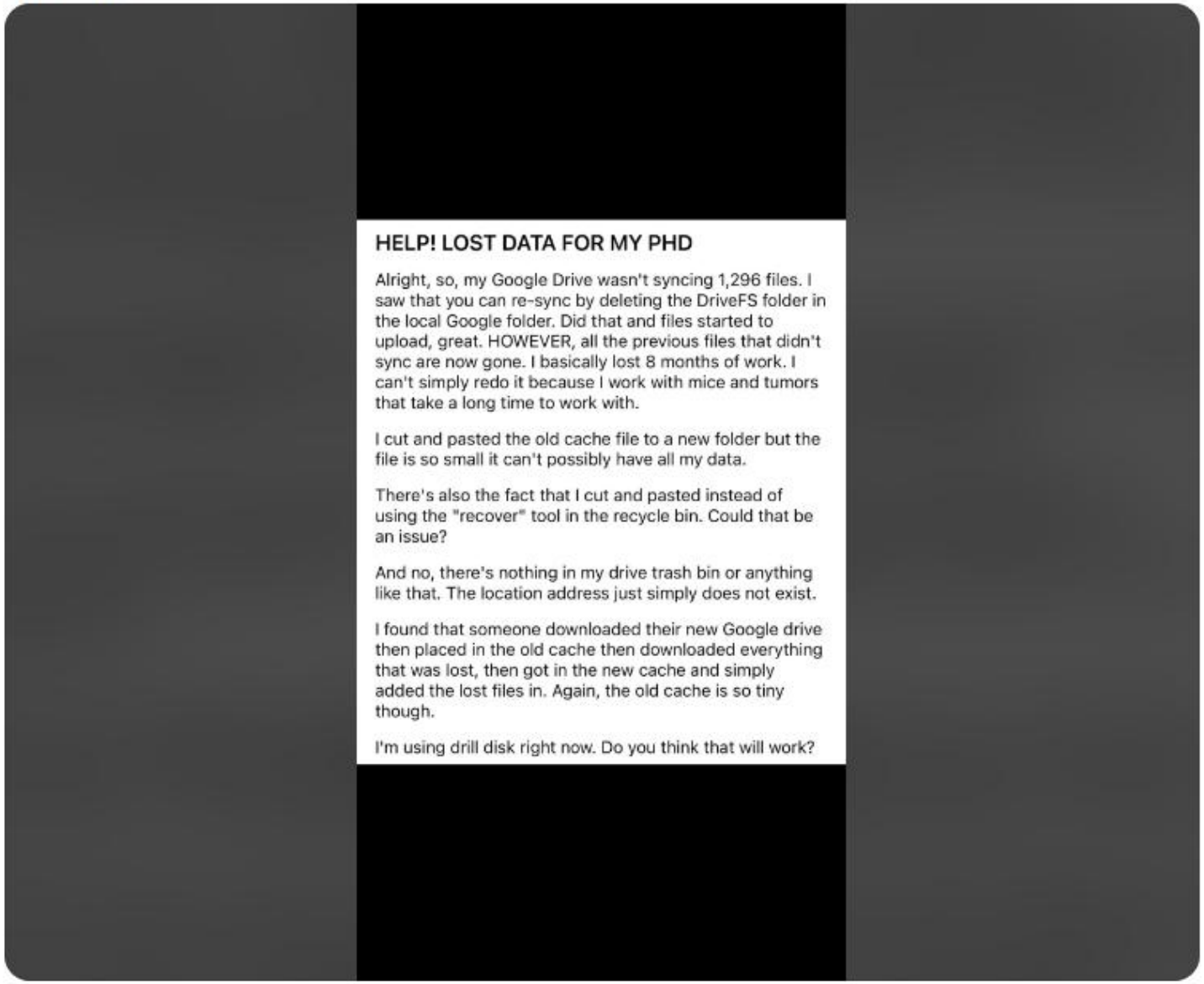
Read more

475 80

r/PhD • 1 yr. ago
JuriPlz

Lost a TON of data for my PhD and my PI is pissed. Does anyone have advice?

Need Advice



oy not checking if the

nce I just defended my PhD today

data, wrote the code, did all the

l so they had to take my PC and wipe it
l the files back.

d send to me quickly.

cup is done, and then I give it to them.

). I just saw the tick mark, and in my
handful of small files did get backed up,

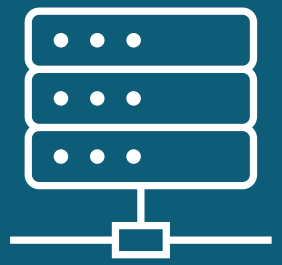
had a mini heart attack once I realized
blished works, they were lost too.

t wasn't published yet. Also, I actually
rom memory, and thankfully I
y work, but managed to replicate the

it.

Is your data vulnerable?

researcher/
research team



research data

publication/thesis

?

Research Data Management activities

Planning

- Creating a **data management plan**
- **Finding** existing data
- Obtaining systems and software for managing data

Data collection and analysis ★

- **De-identification** of information
- **Organizing** data efficiently
- **Documenting** data effectively
- **Storing** data securely

Knowledge Sharing

- Preparing data for **archival** and sharing
- **Publishing** data and providing access to participants and other researchers

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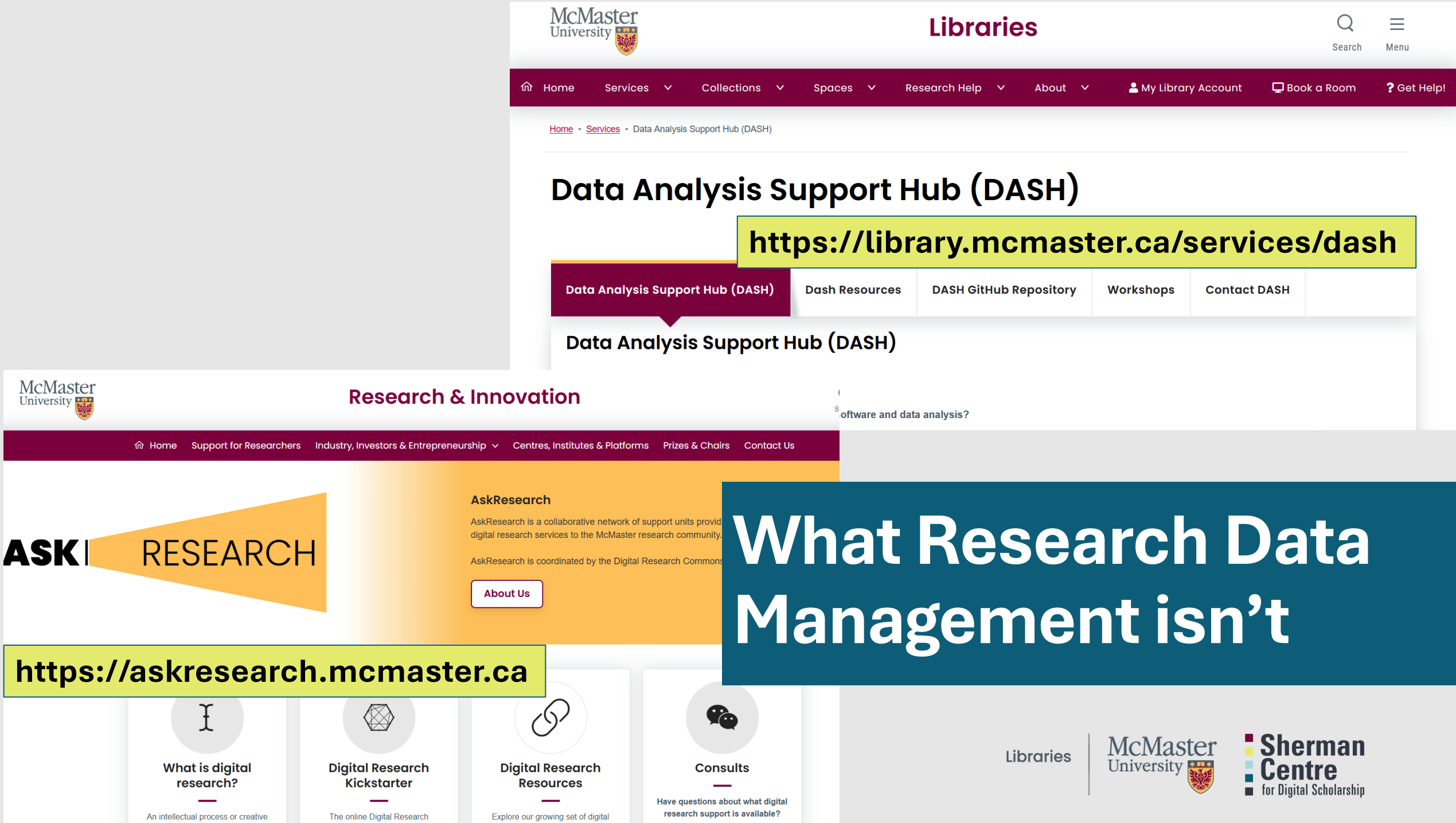
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Have questions about what digital research support is available?
What Research Data Management isn't
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Don’t be like “Dave” and “Alice”

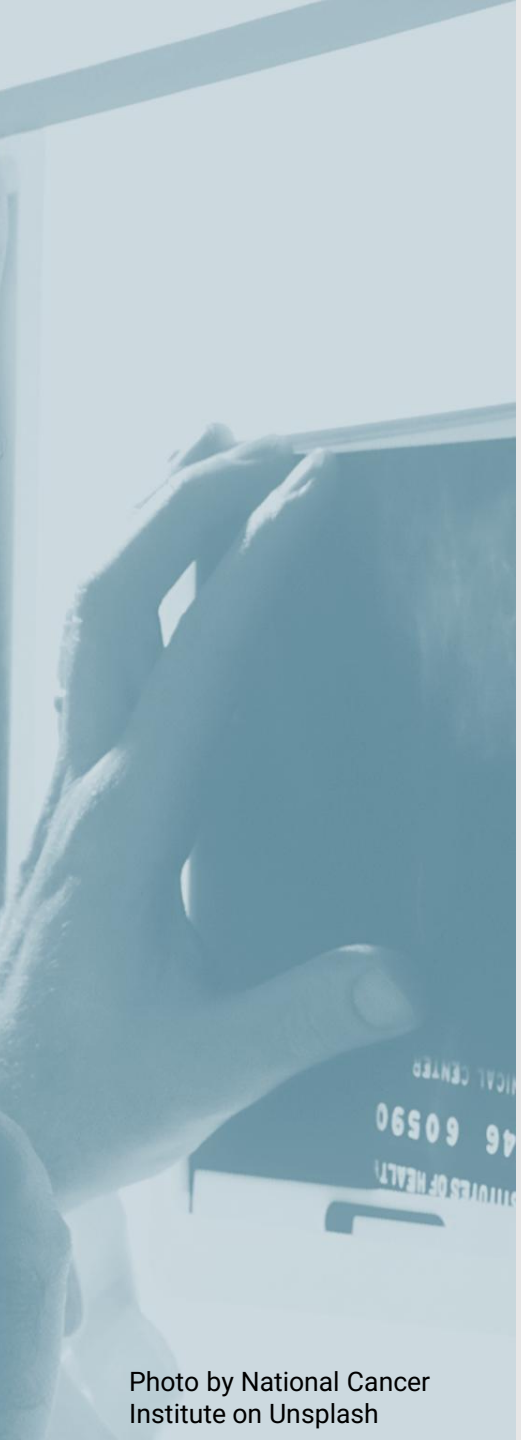

Photo by National Cancer Institute on Unsplash

Let's look at an example:

"Dave" is a graduate student working in Biomedical Science, using x-ray imaging. Dave's data has 3 parts:

- **Image files** – x-ray scan images, microscope images.
- **Experiment files** – instrument metadata, records, scripts, etc
- **Measurement data files** – spreadsheet files

Dave's data is stored in a few places:

- Image files are large (~10 TB) and stored wherever there is space - on lab computers and miscellaneous external hard drives
- The other files are smaller (~10 GB) and stored on a personal laptop backed up in the cloud
- Data is not consistently documented.

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What went wrong

One of the external drives fails and is unrecoverable. A segment of the data that had yet to be analysed was only stored on that drive.

- The data loss is not discovered for several weeks.
- **There is no back up of this data** because there was no documentation on where data was stored

This leaves Dave with two choices:

- Recollect that data which would add several months of delay to the degree
- Publish what he can, even though the power of the study has been reduced

Photo by Maxim Ilyahov on Unsplash

Let's look at an example:

"Alice" is a graduate student working in Media Studies studying the practices of artist-researchers.

Alice's data is made up of:

- **Audio Files** – Recorded interviews with artists.
  - Some interviews are in a studio, one is in a **café**. Interviews are recorded on a Zoom device with notes added into a notebook. These are eventually moved from the recorder to her **hard drive**.
- **Handwritten Notes** – Written during work at a socially engaged arts organization.
  - On a desk in Alice's apartment.
- **References** – Scholarly writings for context
  - PDFs on hard drive, books are on bookshelf.

What went wrong for Alice

- When Alice finally sits down to listen to her interviews, one of them is unusable. Instead of the responses, she instead hears the chaos of the coffee shop, the steamer hissing, the portafilter slamming, people catching up.

- This leaves Alice with two choices:
  - Reach out to the artist to rearrange an interview, knowing the time involved and their responses will be trying to approximate something they've already said.
  - Publish the other interviews without that participant's contribution.

Photo by Benjamin Riot on Unsplash

What could you do to be better?

Make a plan for data	Prepare for future challenges and problems.
Organize and document data consistently	Save time and resources in the future.
Store and back-up data securely	Avoid loss of data from theft, corruption, or failure of storage devices.
Ensure data is ready for archival and sharing	Increase the accessibility of research and allow others to reproduce and use results.

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1. Make a plan

- A **Data Management Plan (DMP)** is your plan for how you will create, store, organize, document, secure, preserve, and share your research data.

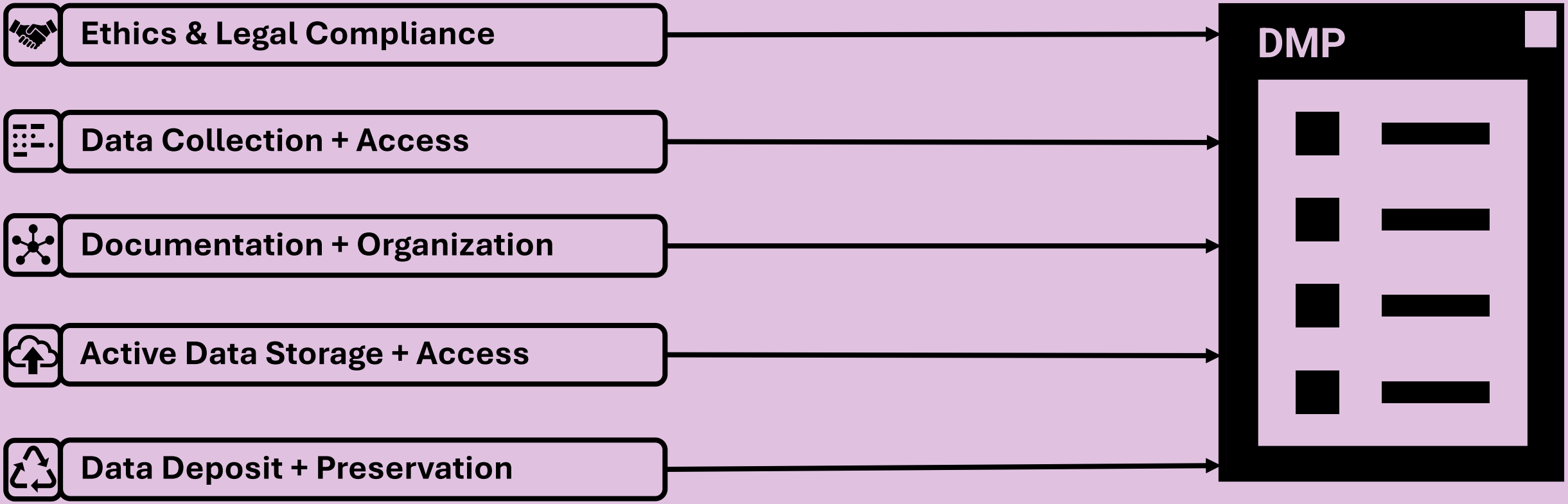
- A document which speaks to the management of data both **during** the active phases of your research and **after** the completion of the research project.


Gates
Portes
Oversized Baggage
Bagages hors format
Check-in
Enregistrement
3
4
OS7

Why create a DMP?

- A **living document –** something you'll work with, adapt, and change through your research.
- Create it at the **start** of your research - avoid pitfalls and problems before they occur.
- Prepare for **future** stages of research including potential data sharing (if desired).
- Research is a **team** effort – collaborate on your DMP.
- Many research **funders** require grant applicants to submit a DMP – including the Tri-Agencies (NSERC, CIHR, SSHRC – started 2022), NIH, and others.

What goes in a Data Management Plan?



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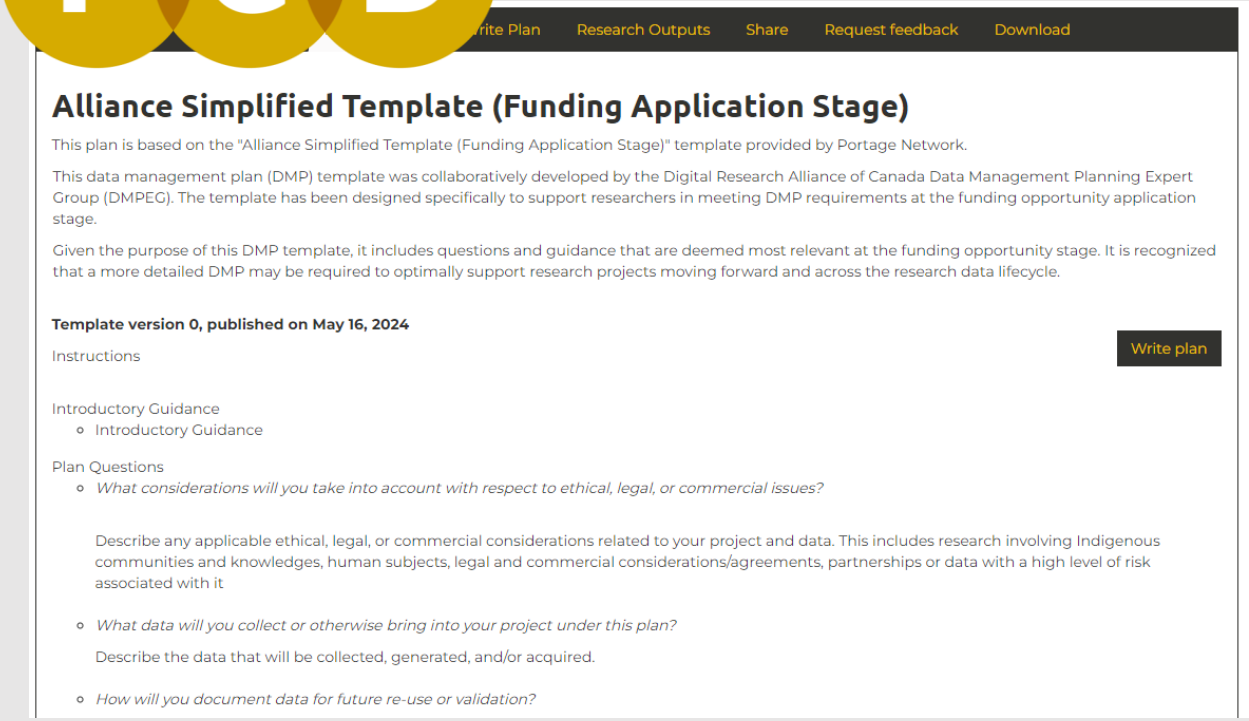
DMP Assistant

- A web-based, bilingual data management planning tool
- Walks you through relevant questions for data management
- McMaster-specific guidance
- Exportable data management plans
- Send to RDM Services through the “Request feedback” tab!
- Access at **dmp-pgd.ca/plans**



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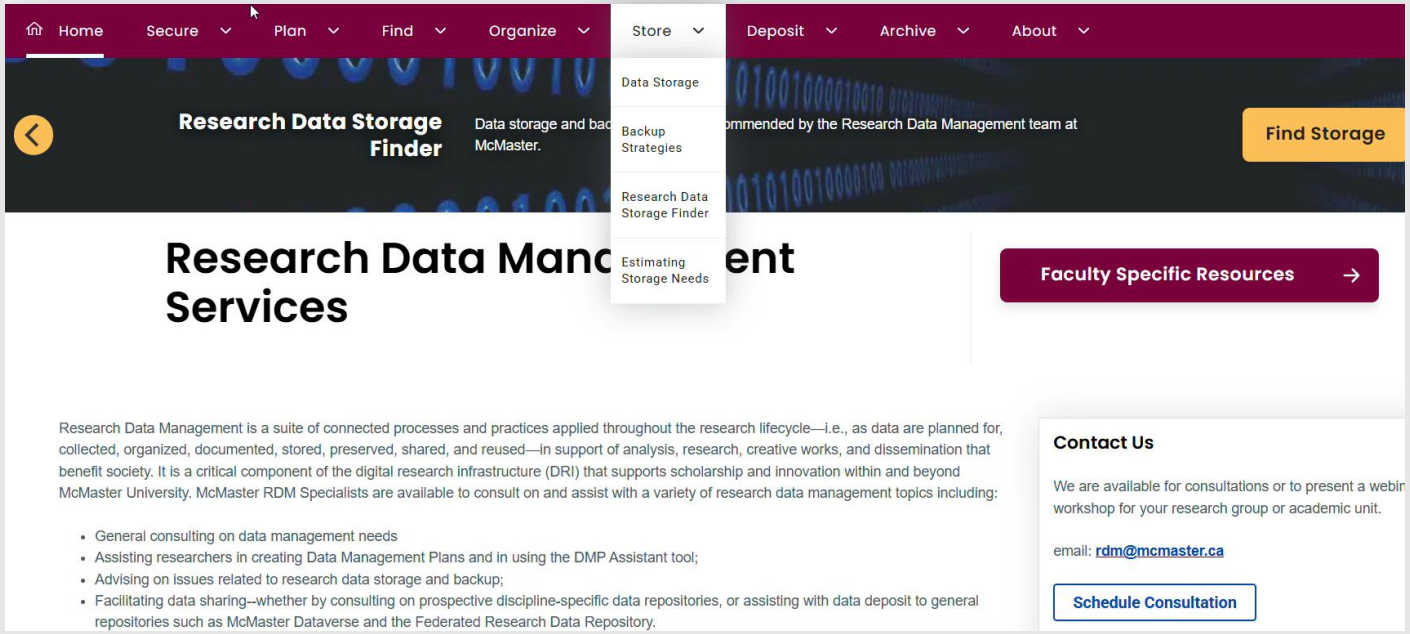
DMP Database

- DMPs can vary across disciplines, methodologies, and data types.
- 450+ example DMPs from resources across the world.
- Filters by McMaster Department for selected plans
- Search by field, location, funder, keyword, and more.
- Link to our database at **rdm.mcmaster.ca/dmps**



How and where will your data be stored and backed up during your research project?

It is expected that the study will generate, at most, a terabyte of digital data for one complete copy of the dataset. This digital data volume is well within the existing storage capacities of this research group. Similarly, the paper documents generated (consent forms, CRFs, PHINs) are expected to fill 3 large, locked filing cabinets, which the PI already has…Approximately 210 boxes, or less than 13 cubic feet, will be required to store the biological samples in the freezer (-80ºC).

Hay, J. L., Ducas, J., & Duhamel, T. (2023). Women's Advanced Risk-Assessment in Manitoba (WARM) Hearts. Zenodo. https://doi.org/10.5281/zenodo.11074529

Learn more:

Building a Data Management Plan for your research project.
https://learn.scds.ca/intro-rdm/dmp.html

What help is available

- **Before Writing:** Review our Data Management Plan Database for examples in your discipline.
- **Writing:** Data Management Plan Bootcamps
  - November 19: Data Management Plan Bootcamp (Virtual – no snacks)
  - November 25: Data Management Plan Bootcamp (In-Person – snacks!)
- **Writing:** Data Management Plan Assistant is always available!
- **After Writing:** Submit for feedback through the Assistant or reach out for a consultation with us: **rdm@mcmaster.ca or u.mcmaster.ca/rdm-appointments**

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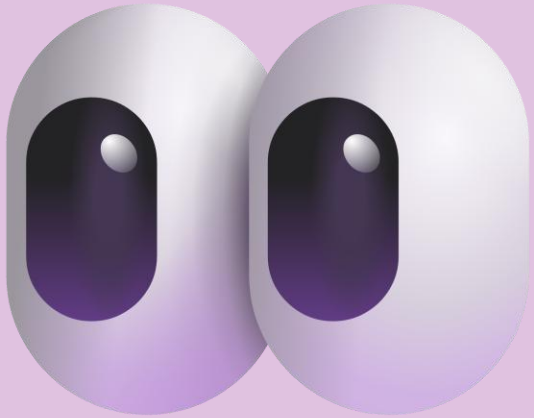
Who do you think could potentially be involved in reviewing a DMP?



2. Organize & document what you’re doing consistently

- **Raw data are complicated.**
- Documentation and organization make data easier to understand and reuse—for you and others
- Whether you're working solo or collaborating across teams, documenting your data will reduce confusion and increase efficiency

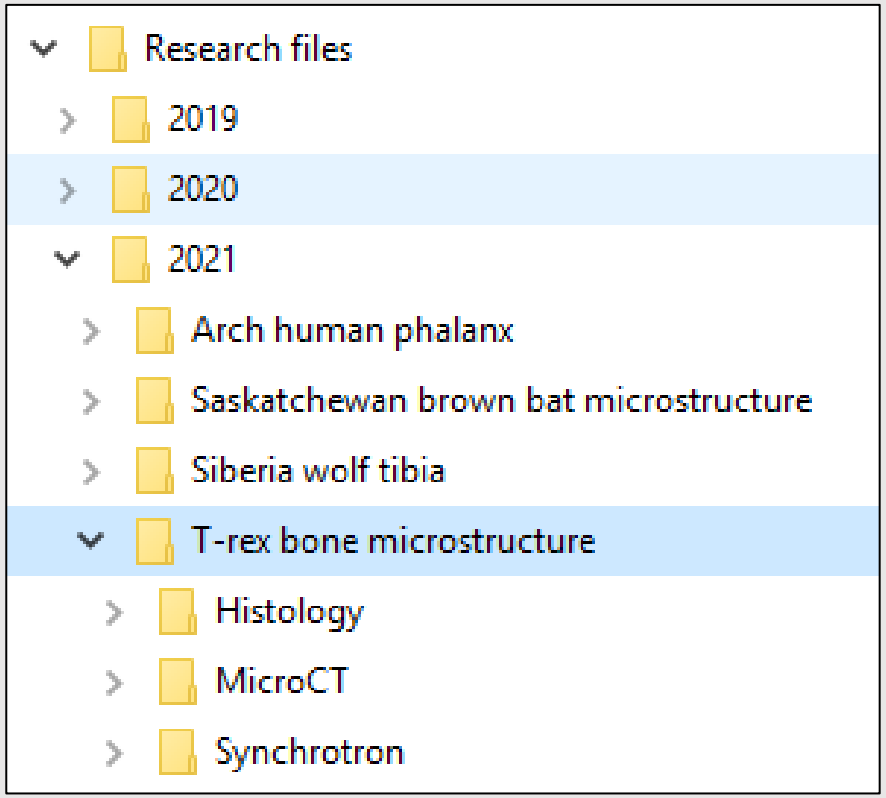
Keeping folders organized makes it easier to find things.

Make organizing files and folders a habit – that way, it's easy to know where things go.

File organization schemes can include:

- By project
- By researcher
- By experiment type
- By date (often year)
- By some combination of the above

(i.e. a two level structure of year -> project)

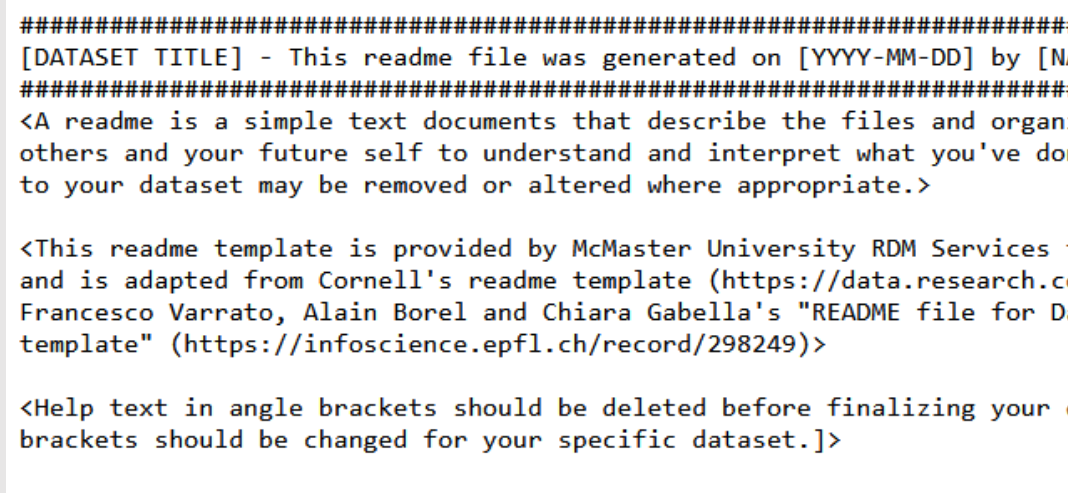


Research Data Organizing and Documenting

- Think about file and folder names and organization – *i.e.* *2025_10_22_LakeMercury_TestData1_EP.csv*

***Date**: 2025_10_22 (collection date)*
***Project Name**: LakeMercury*
***Short Description**: TestData1*
***Name**: EP (Elizabeth Phillips)*

- Think about file types and formatting
- Document your data so anyone can understand it (including future you!)
  - Proper **metadata** about who produced it, when, how, and where
  - Explanations of file and variable names and relationships
  - Add a **README** file – we have a template!



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Build a documentation scheme you will actually use!

- The most important aspect of documentation is doing it.
- Whatever file naming and organization scheme you choose, make sure it's **descriptive**, use it **consistently** and **document** it (in a readme.txt file).
- **Take advantage of the software that is out there**, including note-taking software, reference management software, and collaboration software.

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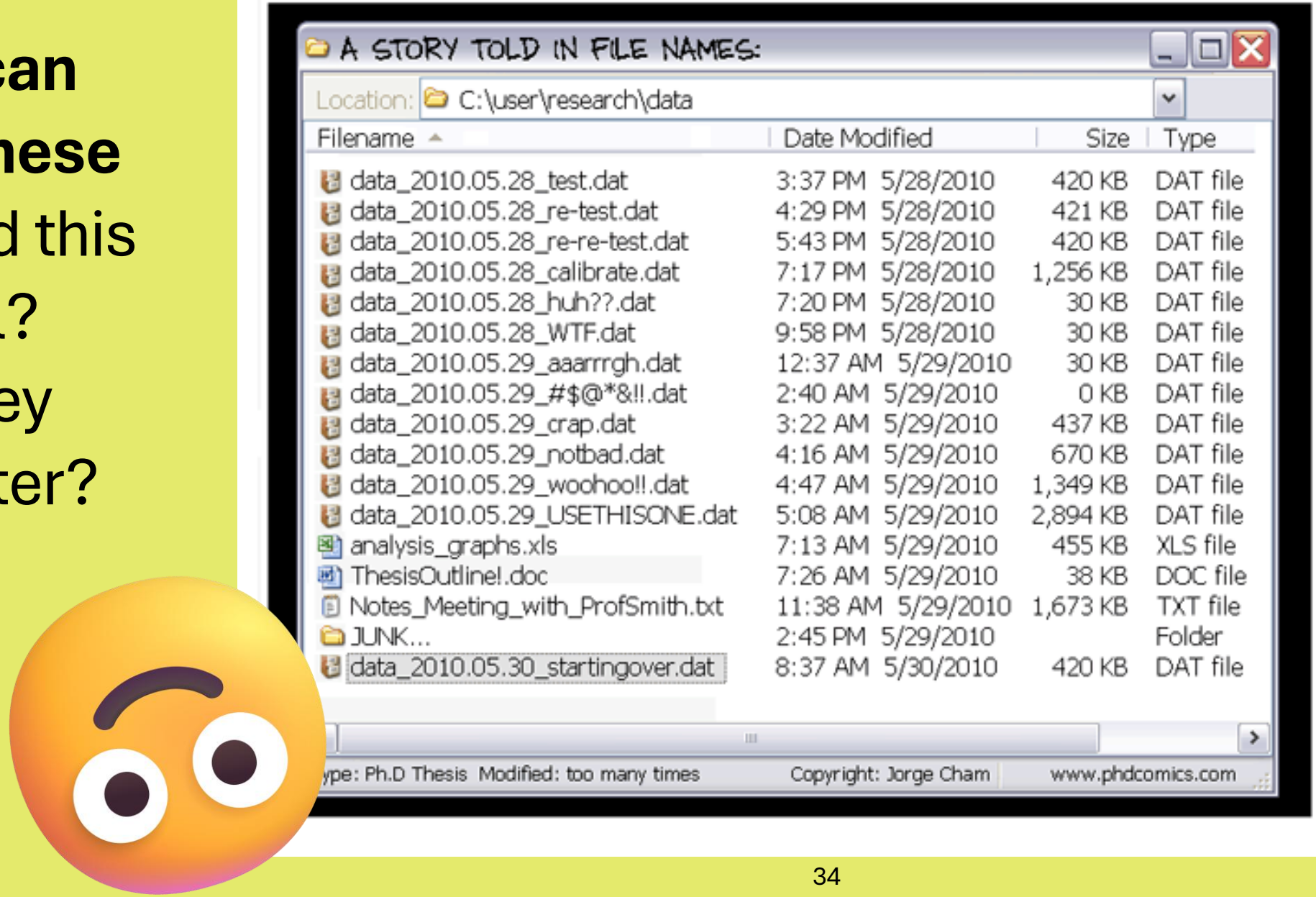
What issues can we see with these files? What did this person do well? What could they have done better?



3. Store & back up data securely

- **Data Loss**
  - Theft of devices
  - Loss of devices
  - Accidental damage or destruction
  - A USB drive is not an archive!
- **IT Security:**
  - Computer viruses, malware, ransomware.

Where should I store data?

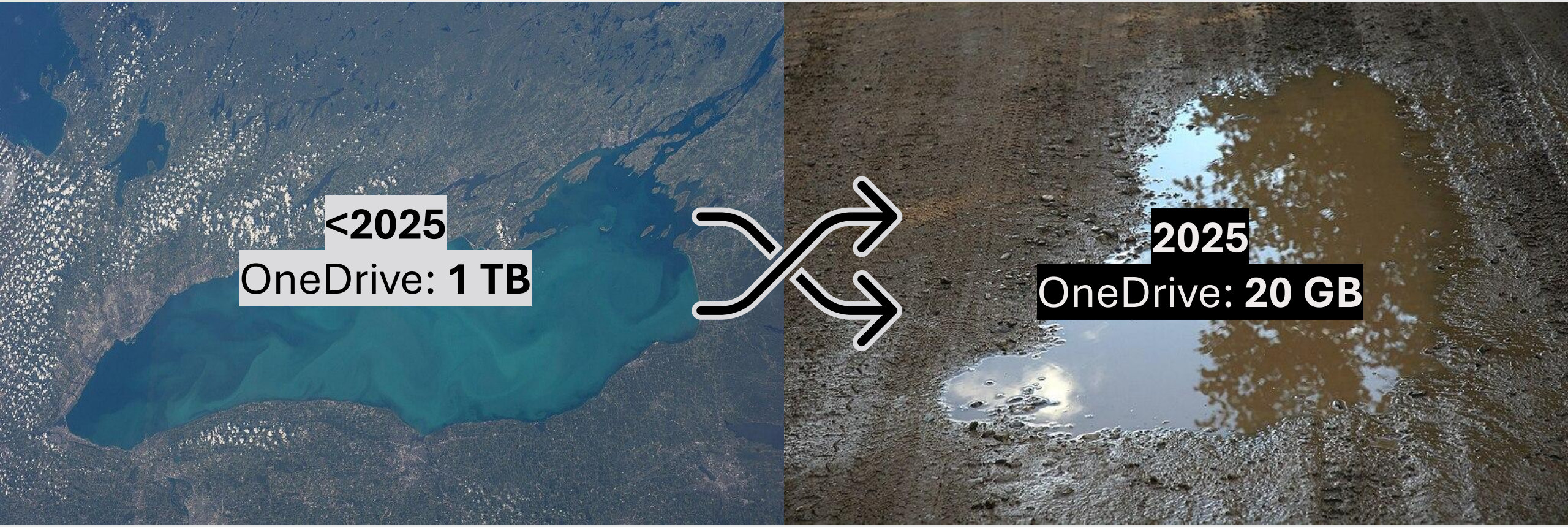
Local

- On your computer or an external drive
- **You** need to make sure that storage is backed up
- Relatively cheap
- Easy to use
- Available offline
- **Higher chance of loss**

Cloud

- On someone else's computer
- Automated backups, file versioning, and recovery
- File synchronization to your computer
- **Easy** to access and share files
- Subscription costs
- **Privacy can be opaque**

Microsoft storage has shrunk for students



Above: NASA, "ISS-36 Lake Ontario (horizontal)," 2013-08-24, Wikimedia Commons, Public Domain, https://commons.wikimedia.org/wiki/File:ISS-36_Lake_Ontario_(horizontal).jpg
Below: Dmitry Makeev, "Reflections in Puddles," 2006-06-30, Wikimedia Commons, CC-BY-SA 4.0 https://commons.wikimedia.org/wiki/File:Reflections_in_puddles._img_012.jpg

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Research Data Storage

- If your data fits in the cloud, try **OneDrive**
  - Available to all campus users for free – **until you leave the institution**
  - Storage is shrinking
- If you need data to be portable, use local storage. Make sure local storage drives are encrypted with passwords.
- Use both if you can! Whatever you do, **make sure you make backups**

Example:
1 copy stored locally on **hard drive** for analysis
1 copy stored on **cloud storage** platform
1 copy stored in a **secure campus drive**

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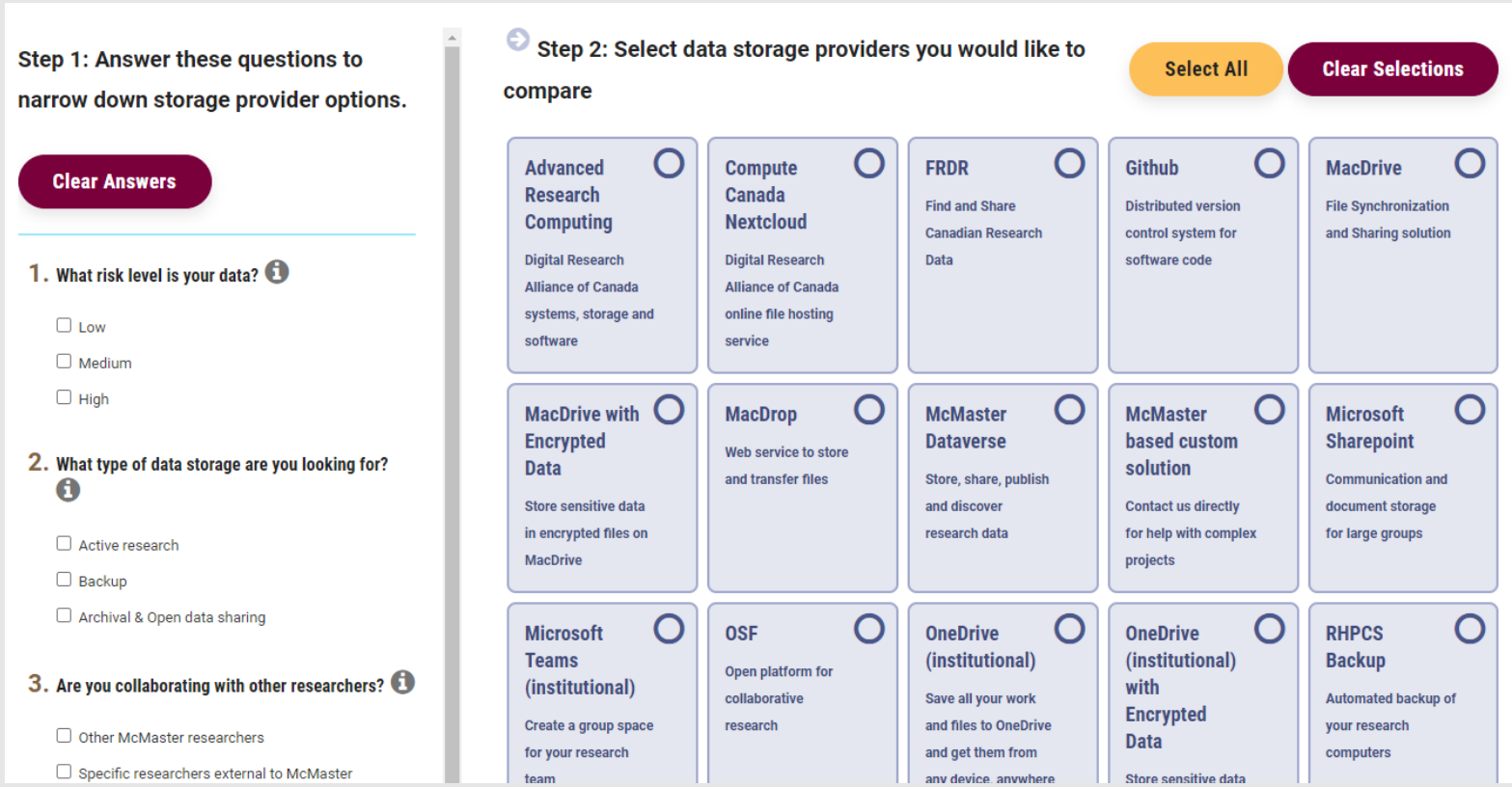
Research Data Storage Finder Tool

Find vetted storage providers depending on **risk**, **volume**, collaboration, and other needs.



https://rdm.mcmaster.ca/finder

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Webinar on data storage: **https://scds.github.io/intro-rdm/storage.html**

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Data Security (first steps!)

Passwords: Use password managers with a different complicated password for each service and device.

Update Software and Hardware: Don’t put off updates—there are often important security settings.

Multi-Factor Authentication (MFA): This added layer of security should be enabled on all platforms.

Sensitive Data: Limit collection and access. De-identify data, use encryption on storage and devices

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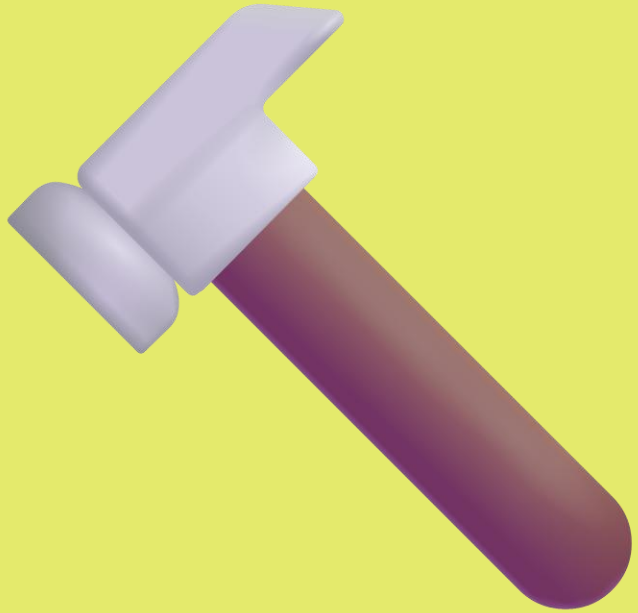
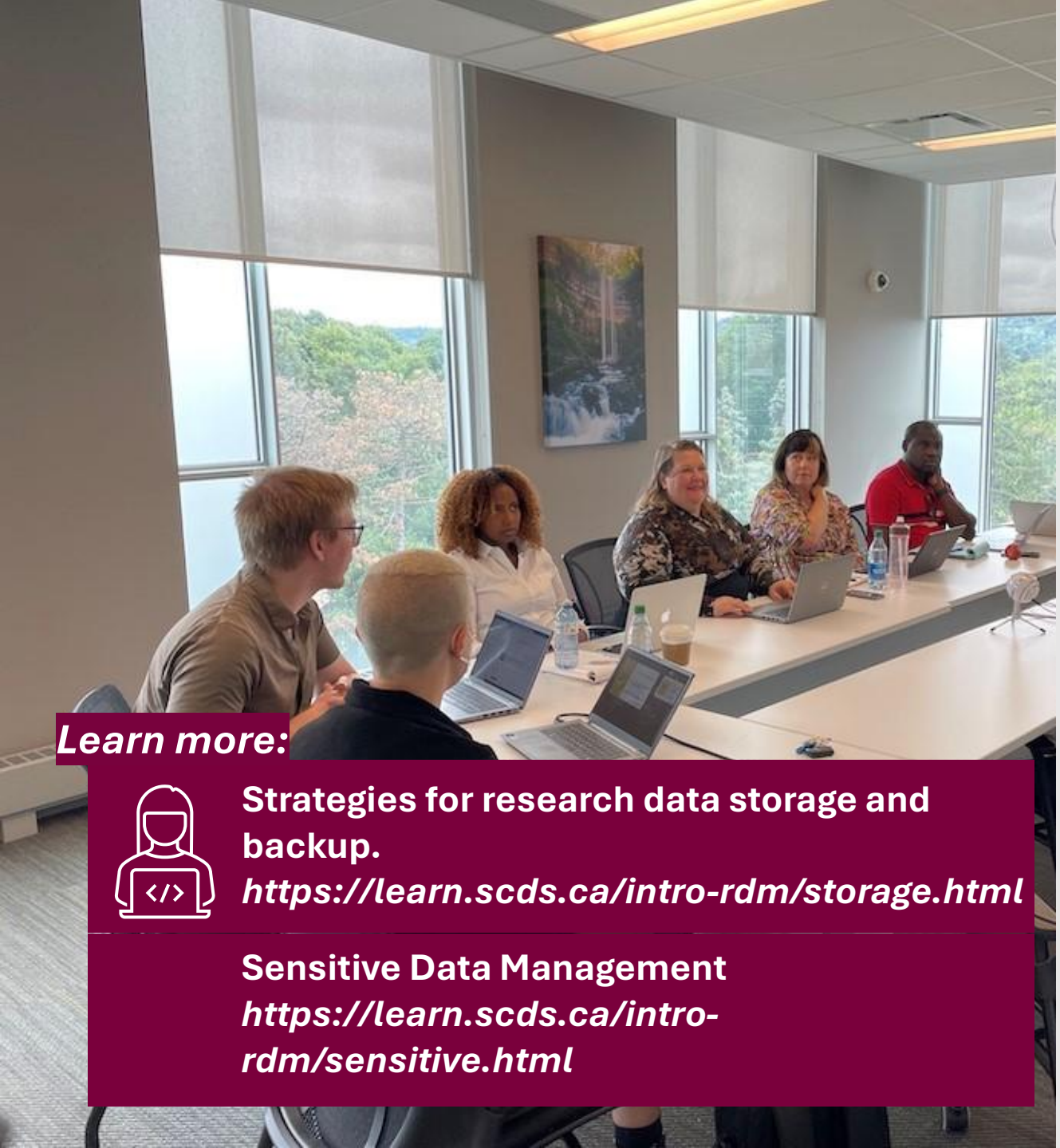
Extra credit: **What is the worst thing that has happened to your data?**





Learn more:

Strategies for research data storage and backup.
https://learn.scds.ca/intro-rdm/storage.html

Sensitive Data Management
https://learn.scds.ca/intro-rdm/sensitive.html

What help is available

- Check our **Research Data Storage Finder** for options
- Look at the existing **training modules** on the RDM website
- **Set up a consultation** if you have questions or particular storage or documentation considerations

rdm@mcmaster.ca or u.mcmaster.ca/rdm-appointments

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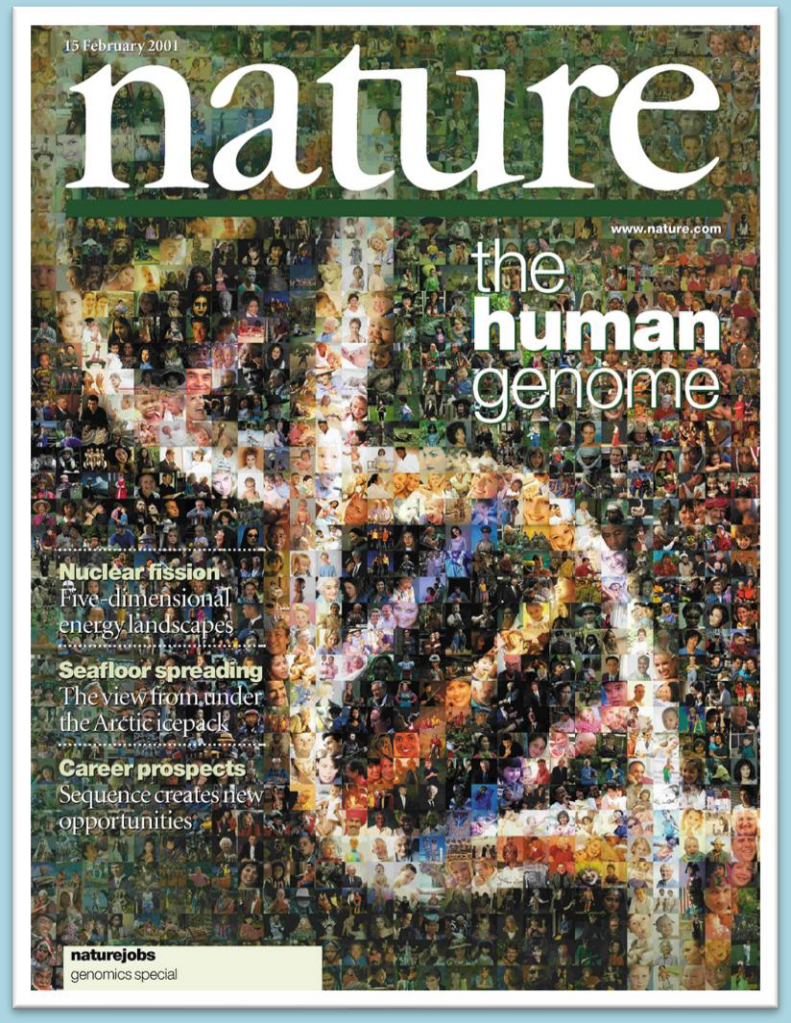
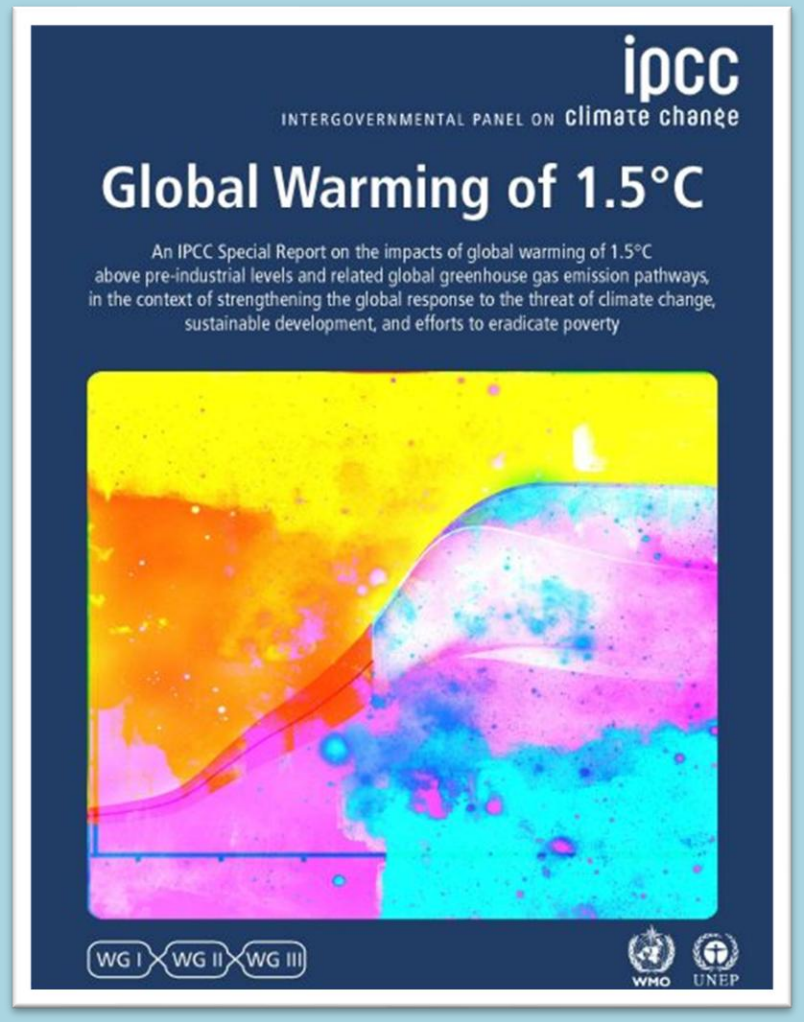
4. Get ready for archiving & sharing

- **Data Sharing**: Open and free data sharing supports research ideals like transparency, accessibility, reproducibility, collaboration, and maximizes the impact and visibility of research.

- **Data Archiving**: What do you plan to do with your data once it's been published? How will you ensure that your data remains accessible (to you and others) long-term?

Science built on the power of open data:



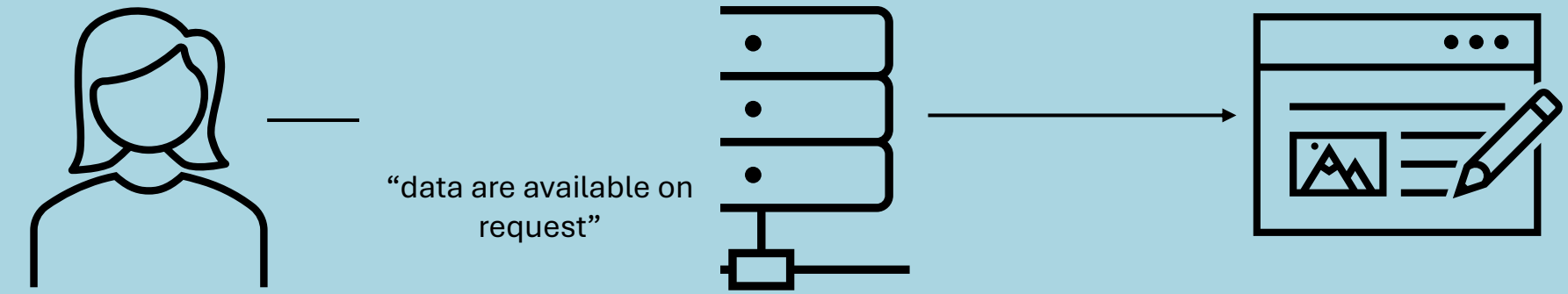


Open Research

- Sharing data openly is a critical element in pushing academia towards openness, transparency, reproducibility, and research integrity.
- Research is often publicly funded – data as a “public good” that is accessible by journalists, other researchers, etc.
- Limits over-researching communities for qualitative studies. Share datasets with community partners – value added, support long-lasting research relationships.

scds.ca
scds@mcmaster.ca

What does data deposit look like?



trusted data repository

Finding existing Research Data

- Sometimes the data you want already exists – it's only a matter of knowing about it and getting access to it.
- **Data discovery platforms**:
  - Lunaris (national, Canada-based)
  - OpenAIRE Explore (European, AI-driven)
  - DataCite Commons (European)
  - Google Dataset Search (Global)
- Secondary data (even from a data sharing agreement or industry partner) has its own difficulties
  - May need reorganizing and extra documenting
  - Need to consider data ownership vs. data stewardship, especially for sensitive, Indigenous, and/or proprietary data

Why share data?

Citation Impact

Journal Requirements

Funder Requirements

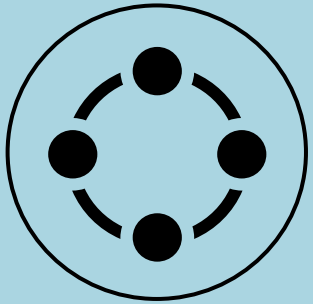
Data Preservation

Denise Elbs on unsplash

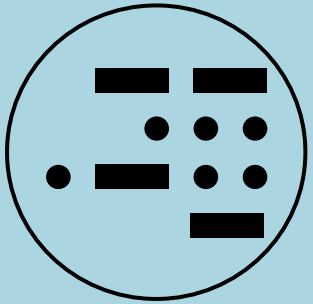
Data Repositories

Publishing data in a recognized data repository is the best way to share data. There are thousands of data repositories.

Domain Specific Repositories
Focus on certain types of data such as genomic information or astronomical information.
https://www.springernature.com/gp/authors/research-data-policy/recommended-repositories



General Repositories
Accept broader types of research data. *ex. McMaster Dataverse (part of Borealis) and Canada's Federated Research Data Repository (FRDR), Open Science Framework (OSF).*



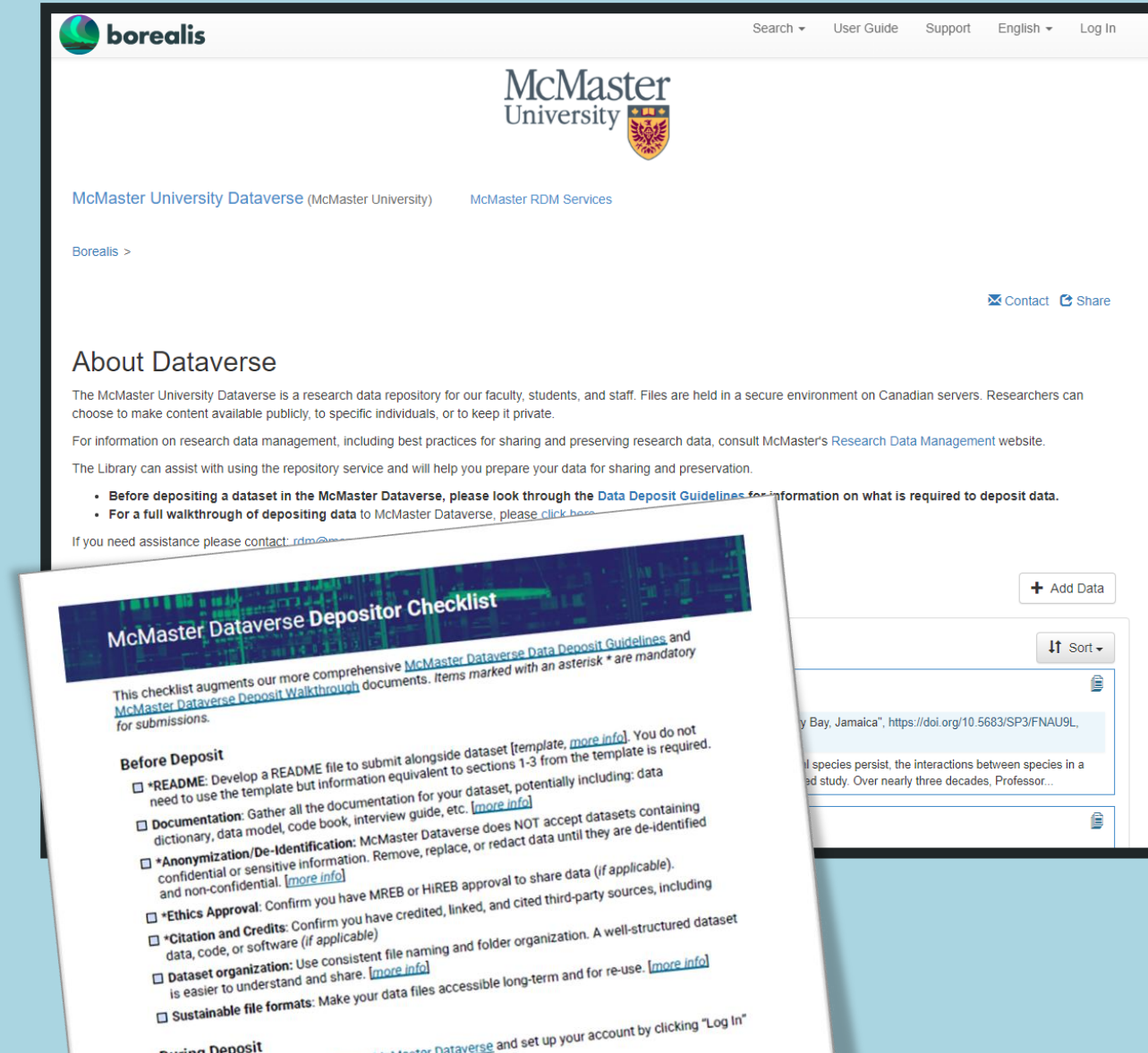
Code Repositories
There are also code-specific repositories like Github, Gitlab, BitBucket, SourceForge

Controlled Access
For sensitive or qualitative data look at Vivli (Clinical Data), Qualitative Data Repository, Inter-university Consortium for Political and Social Research (ICPSR)

McMaster Dataverse

https://borealisdata.ca/dataverse/mcmaster

- McMaster's Institutional Data Repository is a home for research data created by McMaster researchers. *(Not for sensitive data)*
- Provides basic data curation services
- Data is stewarded by professionals at McMaster
- Contains tools for tabular data exploration and analysis
- Depositor "Pre-Flight" Checklist helps you prepare for deposit



What are some opportunities you can think about with sharing data? What are some hesitations you might have?

Learn more:

Essentials of open data sharing.
https://learn.scds.ca/intro-rdm/sharing.html

What help is available

- **Before Deposit:**
  - Look at McMaster Dataverse for existing examples in your field!
  - Look at our Dataverse Deposit checklist
  - Look at our README template
  - Set up an individual consultation with us!
- **During Deposit:** Data Deposit Bootcamp – May 19, 1-4 PM (snacks)
- **After Deposit:** We will review your dataset to make sure the data are appropriate and have the right metadata and documentation to be reusable

rdm@mcmaster.ca or u.mcmaster.ca/rdm-appointments

Libraries | McMaster University | Sherman Centre for Digital Scholarship

So, where should you start?

Store your data with enough information that you will still understand it in 2 years!

1. **Clean up** your files – filenames, folders, etc.!
2. **Save** your data in multiple safe places – but **choose** what is worth saving
3. Keep documents that describe your data
4. ***Whatever you do, do it intentionally!***

A Data Management Plan can help you think through options!

scds.ca
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Sherman Centre for Digital Scholarship

Research Data Management Links

Send RDM Services an email:

rdm@mcmaster.ca

Review resources on our webpage:

https://rdm.mcmaster.ca

Join our Community of Practice:

https://u.mcmaster.ca/rdm-community

Make an appointment:

https://u.mcmaster.ca/rdm-appointments

SCDS Links

Send SCDS an Email:

scds@mcmaster.ca

Subscribe to our Newsletter:

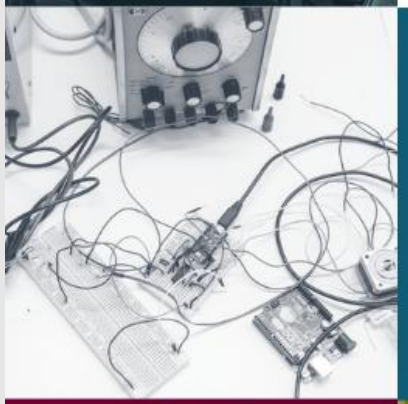
https://u.mcmaster.ca/sign-up

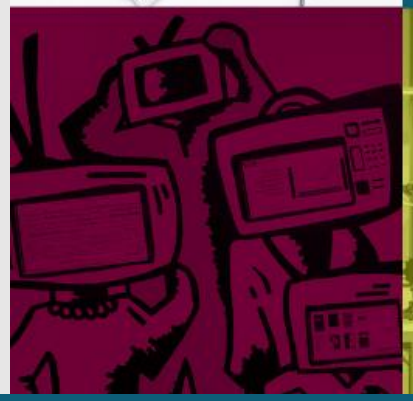
Register for a Workshop:

https://u.mcmaster.ca/scds-workshops

Schedule a Consultation:

https://libcal.mcmaster.ca/appointments





McMaster University Library