Research Data Management and Sharing and Research Visibility

Sara Mannheimer, Associate Professor, Data Librarian
Jason Clark, Professor, Head of Digital Library Initiatives
Outline

● Data management planning (Sara)
● Storing, archiving, and sharing data (Sara)
● Metadata basics (Sara)
● Benefits of metadata and identifiers (Jason)
● Research(er) visibility (Jason)
Data are...
Data management & sharing requirements

- 2013 OSTP memo required funding agencies with $100 million in expenditures to require researchers to make data public
- 2022 OSTP memo expands requirement to all funding agencies
  - Notably, NIH will implement an updated data management and sharing policy, starting in January 2023.

NIH data sharing resources | NIH policy FAQs
Expectations for Data and Research sharing and dissemination

National Endowment for the Humanities (NEH)

- Dissemination of Project Results [grant policy]

National Science Foundation (NSF)

- Dissemination and Sharing of Research Results [grant policy]
Private funders

- Gates Foundation, Mellon

Journals are requiring data sharing

- PLOS, JAMA
Data management planning
Ask the Library
Have a question? Find an answer!

Ask Us
Sorry, chat is offline but you can still get help using the contact information below.

Contact Us
Schedule an Appointment
Email Us!

Faculty: How can I integrate library resources into my online course?
Last Updated: Aug 16, 2022 | Topics: Articles and Research Databases, ebooks, General, Technology | Views: 84

How do I place a hold?
Last Updated: Aug 03, 2022 | Views: 54

How can I print if I don’t have my CatCard?
Last Updated: Jul 26, 2022 | Topics: Printing | Views: 627

Can I mail my items back to the library?
Last Updated: Jul 18, 2022 | Topics: Books and Media, Borrowing | Views: 130

Master of Science in Science Education (MSSE) library access
Last Updated: Apr 06, 2022 | Views: 24

How do I use Montana Library 2 Go?
Last Updated: Mar 31, 2022 | Topics: Books and Media, Borrowing, Technology | Views: 601
Data Management Resources

Library can help you create and implement a data management strategy.
When your research data is ready to be published, we can facilitate data publishing and promote discovery.

- Contact the Data Librarian
- Schedule a Data Consultation
FAIR Principles

Findable
Accessible
Interoperable
Reusable

www.go-fair.org/fair-principles
Data Management Resources

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Contact the Data Librarian
Schedule a Data Consultation
Data Management Planning Toolkit

The resources below can help you write data management plans to comply with funder requirements. For basic guidance on data management, we recommend reading Good Enough Practices for Scientific Computing (Wilson et al., 2016). Or contact us for one-on-one help.

lib.montana.edu/services/services/data/toolkit

Data Management Plan Template
Shape and structure your data management plan.

Cut-and-Paste Language
Use in your data management plan.

Metadata Guidance
Help your data be machine readable and understood by others.

DMP Tool
Create data management plans that meet institutional and funder requirements. Review public DMPs.
DMP Tool Tutorial from ASU
Create a new plan

Before you get started, we need some information about your research project to set you up with the best DMP template for your needs.

* What research project are you planning?

- or -

* Select the primary research organization

Research organization

Montana State University (MSU) (montana.edu)

- or -

* Select the primary funding organization

Funder

Begin typing to see a list of suggestions.

- or -

mock project for testing, practice, or educational purposes

No research organization associated with this plan or my research organization is not listed

No funder associated with this plan or my funder is not listed

Create plan  Cancel
Cut-and-Paste Language

Provided by MSU Library Data Services
Last updated: 21 February 2021

Storage, Backup, and Security

Microsoft OneDrive/SharePoint
MSU researchers and affiliates have access to the Microsoft OneDrive/SharePoint cloud storage system. This service is an institutional resource and fully compliant with all data policies, and it enables collaboration between teams within MSU and across institutions by allowing users to edit, download, and share files. It can also function as a cloud backup system by syncing content between local machines and the cloud. Data stored in OneDrive will be stored in the PI's account and shared as appropriate with other researchers.

Note: Any questions related to the storage of personally identifiable information and applicable security standards may be directed to MSU's Legal Counsel.

Knox
Knox is a server managed by the MSU IT Center that utilizes encryption to safeguard student data or other information that MSU has a legal obligation to protect.

Data Transfer
The MSU Research Cyberinfrastructure Storae Cloud platform offers a Globus Endpoint that researchers can use to...
Data Storage
UIT provides support for OneDrive and High-Performance Computing.

*The Library can connect you to solutions from UIT, or you can reach out to them directly.*
High Performance Computing

- Access to computer processing

Storage Clusters

- Access to data storage and transfer

Research CyberInfrastructure (RCI) - https://www.montana.edu/uit/rci/
Data archiving and sharing
Potential ask from a partner:

“I have a series of video recordings that I’d like to share. How can I deidentify this type of material? How would I license and share it as data that can be reused?”
Data curation

Help with human subjects considerations when sharing data, including deidentification guidance

Guidance on metadata and contextual information

Help with data repository selection and deposit
Data Publication and Discovery

MSU Library recommends that datasets be published in trustworthy data repositories, especially those that are commonly used in your discipline. Our research suggests that publishing data in a disciplinary repository promotes discovery and reuse of research data.

The library provides a search tool for datasets published by MSU researchers. Click the button below to explore MSU research datasets.

[MSU Dataset Search]

Recommended general repositories

Data publishing is provided to MSU affiliates for free via an MSU Library membership.

Log in with your NetID and password to deposit data

General purpose repository appropriate for any type of data

Non-profit organization

Provides lightweight data curation
Metadata basics
ORCID Account

Dryad uses ORCID as its primary login method. Please use, or create, your ORCID login credentials to login to Dryad.

Login or create your ORCID ID

Dryad's Commitment to You

Curation

All datasets are curated to ensure they are Findable, Accessible, Interoperable, and Reusable

Compliance

Enabling adherence to funder and publisher open data mandates

Community Supported

Dryad is researcher-led and supported by our institutional and publisher members
**Names**

<table>
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<tr>
<td>Sara Mannheimer</td>
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**Biography**

As Associate Professor and Data Librarian at Montana State University, I help shape practices and theories for curation, publication, and preservation of data. My research examines the social, ethical, and technical issues of a data-driven world.
Dataset: Basic Information

Dataset Title *

Author(s)

First Name *
Sara

Last Name *
Mannheimer

Institutional Affiliation: *
Montana State University Bozeman*

Author Email *

https://orcid.org/0000-0002-1433-6782

Corresponding Author

+ Add Author

Research Domain *

Research Facility:

Funding

Granting Organization: *
National Science Foundation

N/A

National Science Foundation

National Science Foundation of Sri Lanka

Award Number

remove
Keywords: Adding keywords improves the findability of your dataset. E.g. scientific names, method type

- qualitative
- qualitative data
- qualitative study
- qualitative studies
- qualitative mapping
- qualitative research
- qualitative interviews
- qualitative metasummary

Related Works

Are there any preprints, articles, datasets, software packages, or supplemental information that have resulted from or are related to this Data Publication?

Work Type: Article
Identifier or external url: example: https://doi.org/10.1594/PANGAEA.726855
Upload Your Files

You may upload data via two mechanisms: directly from your computer, or from a URL on an external server (e.g., Box, Dropbox, AWS, lab server). We do not recommend using Google Drive.

We require that you include a README.md file based on our template in order to provide key information for understanding and reuse of your data.

If you prefer, you can edit the Markdown online at hackmd.io.

- Open the link (above)
- Copy and paste the text into a new note (create new by clicking the plus sign)
- When you’re done, save into a README.md and upload the file under the Data category

Software and Supplemental Information can be uploaded for publication at Zenodo. You will have the opportunity to choose a separate license for your software on the review page.
Metadata

Metadata helps future users find and understand published datasets. Please contact the Library to discuss metadata standards in your field.

Readme files and codebooks

A common way to provide metadata to your research dataset is through a readme file and/or a codebook.

- Readme checklist from Mozilla Science.
- Readme template, adapted from Cornell University.
- Guide to codebooks from ICPSR.

Recommended descriptive elements for your dataset

When publishing data in a repository, we recommend that you provide the following descriptive elements:

- **Title** of the dataset (unique from associated articles)
- **Author** (the person/people who collected the data)
- **Institution** (Montana State University)
- **Date** last modified
- **Version**, if applicable
- **Short description** of the dataset
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README Template

lib.montana.edu/services/data/toolkit/readme/

This DATSETNAME readme.txt file was generated on YYYY-MM-DD by NAME
<help text is included in angle brackets, and can be deleted before saving>

GENERAL INFORMATION

1. Title of Dataset:

2. Author Information
   A. Principal Investigator Contact Information
      Name:
      Institution:
      Address:
      Email:

   B. Associate or Co-investigator Contact Information
      Name:
      Institution:
      Address:
      Email:
Metadata + Identifiers

Benefits
a) Collect and make publicly available appropriate metadata associated with scholarly publications and data resulting from federally funded research, to the extent possible at the time of deposit in a public access repository. Such metadata should include at minimum:

i) all author and co-author names, affiliations, and sources of funding, referencing digital persistent identifiers, as appropriate;
ii) the date of publication; and,
iii) a unique digital persistent identifier for the research output;

Office of Science and Technology Policy (OSTP) Memo on Ensuring Free, Immediate, and Equitable Access to Federally Funded Research (August 2022)
In standardized description and identification, we gain:

- Keywords
- Search/Browse
- Aggregation
- Indexability
- Analysis
Identifiers

Creating permanent links for your research data.

● Useful in citation

● Useful as a permanent location

A **persistent identifier (PID)** is a long-lasting reference to a document, file, web page, or other object.
Identifiers - Types

Article Identifiers

- DOI, Digital Object Identifier

Researcher Identifiers

- ORCID, Open Researcher and Contributor ID

Organizational Identifiers

- Dissemination and Sharing of Research Results [grant policy]
Identifiers - Why?

CUI BONO?

- Recognition
- New forms of impact and analysis
Research data visibility - Dataset Search

arc.lib.montana.edu/msu-dataset-search
MSU Dataset Search

Access datasets from creators affiliated with Montana State University (MSU)

Search

Advanced Search

2013-11-09
Suspended sediment transport in Proglacial Linnåelva, Spitsbergen, 2007
Carr, Christina

2016-01-01
AmeriFlux US-MSR Montana Sun River winter wheat
Stoy, Paul C.

2010-06-12
Data from: Does local adaptation to resources explain genetic differentiation among Daphnia populations?
Allen, Michael R., Ryan Thum, and Cecile Câiceres

2014-11-04
McMurdo Dry Valleys particulate organic carbon and nitrogen concentrations in lakes
Priscu, John C.
Metadata + Identifiers - Benefits

**MSU Dataset Search** as an example of this metadata and identifier work

- Index of research data shared by MSU researchers
- Refined metadata for broad findability
- Permanent identifiers built into the system
MSU Dataset Dashboard

Last updated: 2022-09-27 11:09:52 am

Contributors by Department

Total Datasets by Department

116 total datasets
176 total contributors

MSU Library  |  Data Lunch & Learn 2022  41
Analytics

Total Datasets by External Partners

Total Datasets by Year

Year: 2020, Datasets: 17
Research(er) Visibility + Analytics
Visibility - Library Services and Expertise

- Consultation work
- Technical SEO and Semantic Web Optimization work
- Analysis and Data Science work
Visibility - Consultation

Research and data sharing strategies
Metadata consults and automation
Data management planning
Visibility - Consultation Scenario

- Connect with Project Investigator.
- Work through goals for project data management, sharing, and research dissemination.
- Advise and draft sections of grant narrative.
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Dissemination and Sharing of Research Results

Our goal for this project is to build a collaborative research team within a scientific focus area that is consistent with the NSF priorities of Engineering Living Systems (ELIS). We have defined four areas in our approach to sharing the project outcomes with the research community and the public at large. Our objectives are to distribute our research results by: Area 1- Disseminating research findings through peer-reviewed publications and presentations; Area 2- Communicating with researchers and the public at large; Area 3- Sharing designs/models of 3-D printed objects (biofilms and structural elements); and Area 4- Sharing method resources.

Publications and scientific presentations

The scientific community depends on peer reviewed publications to gauge the quality and impact of scientific research. As a team, we have a compelling commitment to maximize the use of our research dollars and share our findings through publications in peer-reviewed journals. Moreover, we have partnered with the research and data service units within the Montana State University Library to ensure best practices in data management, data archiving, and research findability using metadata are in place. Knowing that there is a fine line between balancing the completeness of datasets and analysis with the timeliness of reporting project outcomes, we have developed a series of target performance metrics (Table S1) to guide our production of high-quality, high-impact, and high-volume research throughout the duration of the proposed project. We intend to embrace open access journals (e.g., PLoS journals, Nature publications, Frontiers journals) when submitting our research for peer review publication, so that the scientific community can have immediate and free access to our findings. We will leverage institutional funding for open access journals, along with funds in the budget (included in Other Direct Costs category in budget justification). We will also strive to take advantage of options to publish supplementary materials to increase accessibility of datasets. In addition, our team will make use of other mechanisms to increase access to our publications (i.e., ResearchGate, Data in Brief, Zenodo – c.f., Data Management Plan). Similarly, our team will be very active in sharing our science with the broader research community by presenting our work at local, regional, national, and international meetings. Our expectation is that all
Visibility - Optimization

Technical Search Engine + Semantic Web Optimization

● Findability and Aggregation
● Creating your researcher profile and data profile
● Defining your research cohort or a center
Visibility - Optimization, how?

- Metadata and Identifier work
- Intentional Website Architectures
- Building Signals for Indexing Agents (crawlers)
Visibility - Optimization Techniques

Technical Search Engine + Semantic Web Optimization

- Research Unit or Cohort
  - Define and Optimize for Findability
  - New Website Architectures and Tagging
  - Create Metadata sources for Indexing (Wikimedia)
Visibility - Optimization Scenario

Example: Center for American Indian and Rural Health Equity (CAIRHE)

● Work includes:
  ○ New Sitemap and Audit of Website Architecture
  ○ Google Business Registration
  ○ [Entity Creation](#) (Wikidata as a new data source)
Center for American Indian and Rural Health Equity (CAIRHE)

As a research center for the people of Montana, CAIRHE epitomizes the service mission of our state's land-grant university. Our investigators and their partners...

About
Based at Montana State University, the Center for American Indian...

Research Projects
Native and rural communities in Montana suffer from severe...

Administration
The CAIRHE Administrative Core, led by Director and Principal...

Community Engagement
CAIRHE relies on a strong Community Engagement Core...

More results from montana.edu »

CAIRHE (@cairhe) • Instagram photos and videos
We reduce significant health disparities in Native and rural communities through research that is considerate of and consistent with cultural beliefs.

https://www.instagram.com/cairhe

Center for American Indian and Rural Health Equity - Facebook
Visibility - Analytics

Defining our institutions and university expertise

Increasing reach and impact of scholarship and data

*Insights and data visualization*
Analytics - Insights and Visualization

Analysis of research patterns and metadata

Could lead to:

- New insights about how your work is received.
- Community detection to help you find new collaborators.
Expertise Search [beta]
Montana State University
Type: education

- Biology
- Physics
- Chemistry
- Medicine
- Engineering
- Computer science
- Geology
- Ecology
- Quantum mechanics
- Genetics
- Biochemistry
- Mathematics
- Organic chemistry
- Geography
- Materials science
- Paleontology

Identifiers
- openalex: https://openalex.org/23732399
- ror: https://ror.org/02w0tx84
- mag: 23732399
- grid: grid.41891.35
- wikipedia: https://en.wikipedia.org/wiki/Montana%20State%20University
- wikidata: https://www.wikidata.org/wiki/Q1861687

22,817 affiliated works
Click to view in API: https://api.openalex.org/works?filter=institutions.id:23732399
## Analytics + Insights - Benefits

### SQL Query

```sql
SELECT * FROM authors WHERE `institution_name` LIKE "*montana*";
```

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Analytics + Insights - Routine

Metadata + Identifier harvest ->
Aggregation and indexing ->

*Expertise Search user interface*
Search for **technology ethics**

Filter **All**

Sort **Relevance Date**

Popular Searches: semantic web, machine learning, precision agriculture

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**Dr. Kristen Intemann**

https://www.montana.edu/history/directory/1524204/kristen-intemann

Dr. Kristen Intemann. Professor. Center for Science, **Technology, Ethics & Society. Ethics, Philosophy of Science, Feminist Philosophy.**

[+ more]
Summary

The library can partner with you to support:

- Data management planning
- Data curation - deidentification, metadata/description
- Data sharing
- Findability and visibility for research and research data
- Contact us: ask.lib.montana.edu
Questions
Resources, Services, and Tools

- **Data Management Resources - MSU Library**
- **Research(er) Visibility Services - MSU Library**
- **Data Storage and High Performance Computing - RCI**
- **Office of Research Development**

**Tools**
- MSU Dataset Search
- README template (for research data)
- README creator (for code)
- DMP Tool
Thanks!