



Generalist repository “coopetition” to enhance data sharing and discovery

October 26, 2023

9:30-11:00 UTC

11:30-13:00 Local



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SciDataCon 2023

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as part of

23-26 OCT

2023

SALZBURG



**International
Data Week**

A FESTIVAL OF DATA



GREI

Generalist Repository Ecosystem Initiative

SciDataCon 2023

organized by



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Meet the panelists



Ana Van Gulick

Government and
Funder Lead,
Figshare,
United States

GREI Coopetition
Year 2 Co-chair



John Chodacki

Director, University
of California
Curation Center,
United States

GREI Coopetition
Year 2 Co-chair



Lisa Federer

Acting Director,
Office of Strategic
Initiatives, National
Library of Medicine,
United States

GREI Program Team



Luca Belletti

Senior Product
Manager, Digital
Commons Data,
Mendeley Data,
United Kingdom



Sara Gonzales

Senior Data
Librarian, Feinberg
School of Medicine,
Northwestern
University,
United States



Matt Buys

Executive Director,
DataCite,
Netherlands

GREI Metrics
Co-Chair



Panel Session Agenda

- The GREI “coopetition” model of collaboration
- The NIH perspective
- Generalist repository use cases
- GREI common metadata schema
- GREI common metrics for data reuse
- Panel Q&A, Audience discussion



*Please post panelist
questions and audience
discussion points in Slido*

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The “Coopetition” Model of Collaboration

Ana Van Gulick, Figshare &

John Chodacki, University of California Curation Center





GREI

NIH National Institutes of Health
Office of Data Science Strategy

ODSS Intranet (NIH Staff) [Email] [LinkedIn] [Twitter]

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Office of Data Science Strategy » News & Events » NIH Office of Data Science Strategy Announces New Initiative to Improve Access to NIH-funded Data

Wednesday, January 26, 2022

NIH Office of Data Science Strategy Announces New Initiative to Improve Access to NIH-funded Data

Generalist Repository Ecosystem Initiative will make it easier to find and reuse NIH-funded data

GREI is intended to supplement the [domain-specific data repositories](#) that are critical components of the NIH biomedical data ecosystem for data sharing.

The GREI builds on the findings from the 2019-2020 [NIH Figshare pilot](#) and the [NIH Workshop on the Role of Generalist Repositories to Enhance Data Discoverability and Reuse](#). ODSS anticipates that this initiative will further enhance the biomedical data ecosystem and help researchers find and share data from NIH-funded studies in generalist repositories.

The GREI includes six established generalist repositories that will work together to establish consistent metadata, develop use cases for data sharing, train and educate researchers on FAIR data and the importance of data sharing, and more.

This initiative will also aim to improve discoverability of data within and across participating generalist repositories and lead to greater reproducibility and reuse of data.



NIH Awards:

3OT2DB000001-01S1
3OT2DB000002-01S1
3OT2DB000003-01S1
3OT2DB000004-01S1
3OT2DB000005-01S1
3OT2DB000006-01S1
3OT2DB000013-01S1

<https://datascience.nih.gov/data-ecosystem/generalist-repository-ecosystem-initiative>



NIH Generalist Repository Ecosystem Initiative

The mission of GREI is to establish a common set of capabilities, services, metrics, and social infrastructure; raise general awareness and facilitate researchers to adopt FAIR principles to better share and reuse data.

This initiative will further enhance the biomedical data ecosystem and help researchers find and share data from NIH-funded studies in generalist repositories.

Goals of the Generalist Repository Ecosystem Initiative



<https://doi.org/10.6084/m9.figshare.21318270>

<https://datascience.nih.gov/data-ecosystem/generalist-repository-ecosystem-initiative>



GREI Repositories



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Coopetition = Cooperation + Competition

Coopetition

- Originally coined by Brandenburger & Nalebuff, 1996
- Sayeed Choudhury keynote at February 2020 NIH Workshop on the Role of Generalist and Institutional Repositories to Enhance Data Discoverability and Reuse

Coopetition



Compete on Unique Features

VALUE LINE

*Cooperate on common features
and standards*

(metadata, PIDs, metrics, discovery, privacy)



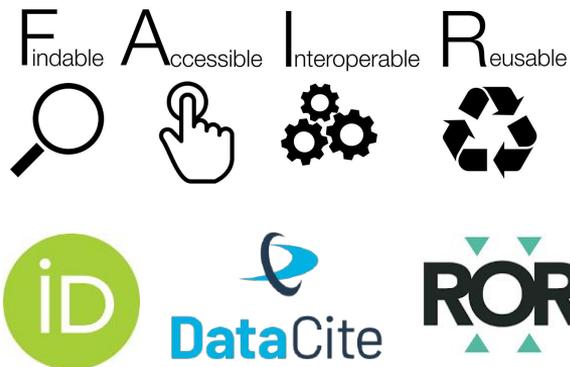
GREI Commitment to “Coopetition”

GREI Repositories are similar. They all support:

- FAIR data sharing across disciplines
- Strive to adhere to repository best practices
- Leverage community standards such as DataCite metadata and persistent identifiers like ORCID and ROR

They also differ:

- Nonprofit organizations and for-profit companies
- Repositories built with open source and proprietary infrastructures
- Offer varying features such as data visualization, file types and sizes, curation, and controlled access



GREI coopetition = *collaboration among the generalist repositories to jointly advance repository functionality to support NIH data sharing, discovery, and reuse*



Coopetition allows for:

- Development of a **cohesive and interoperable** generalist repository landscape
- Regular **communication** across repositories
- Implementation of **common best practices and standards**
- Leveraging existing **community standards** (e.g. DataCite, ORCID, ROR)
- Enhanced **flexible data sharing** for NIH funded researchers
- Shared **training and outreach** for generalist repository use cases
- Improved **data discovery and impact** tracking across repositories
- Unified **partnerships** with community stakeholders including institutions and funders
- *But still* allows repositories to offer **varying features** such as visualization and analysis, tool integrations, custom metadata, and advanced functionality for specific use cases
- *Challenges* of working across different business models, infrastructures and product road maps with globally distributed teams



Generalist Repository Comparison Chart

doi:10.5281/zenodo.3946720

This chart is designed to assist researchers in finding a generalist repository should no domain repository be available to preserve their research data. Generalist repositories accept data regardless of data type, format, content, or disciplinary focus. For this chart, we included a repository available to all researchers specific to clinical trials (Vivli) to bring awareness to those in this field.

<https://fairsharing.org/collection/GeneralRepositoryComparison>

TOPIC	HARVARD DATAVERSE	DRYAD	FIGSHARE	MENDELEY DATA	OSF	VIVLI	ZENODO
Brief Description	Harvard Dataverse is a free data repository open to all researchers from any discipline, both inside and outside of the Harvard community, where you can share, archive, cite, access, and explore research data.	Open-source, community-led data curation, publishing, and preservation platform for CC0 publicly available research data Dryad is an independent non-profit that works directly with: <ul style="list-style-type: none"> researchers to publish datasets utilizing best practices for discovery and reuse publishers to support the integration of data availability statements and data citations into their workflows institutions to enable scalable campus support for research data management best practices at low cost 	A free, open access, data repository where users can make all outputs of their research available in a discoverable, reusable, and citable manner. Users can upload files of any type and are able to share diverse research products including datasets, code, multimedia files, workflows, posters, presentations, and more. With discoverable metadata supporting FAIR principles, file visualizations, and integrations, researchers can make their work more impactful and move research further faster.	Mendeley Data is a free repository specialized for research data. Search more than 20+ million datasets indexed from 1000s of data repositories and collect and share datasets with the research community following the FAIR data principles.	OSF is a free and open source project management tool that supports researchers throughout their entire project lifecycle in open science best practices.	Vivli is an independent, non-profit organization that has developed a global data-sharing and analytics platform. Our focus is on sharing individual participant-level data from completed clinical trials to serve the international research community.	Powering Open Science, built on Open Source. Built by researchers for researchers. Run from the CERN data centre, whose purpose is long term preservation for the High Energy Physics discipline, one of the largest scientific datasets in the world
Size limits	No byte size limit per dataset. Harvard Dataverse currently sets a file size limit of 2.5GB.	300GB/dataset	Soft limit of 20GB/file for free accounts. System limit of 5000GB/file. Unlimited storage of public data but 20GB storage for private data for free accounts. Email info@figshare.com to have upload and storage limits raised.	10GB per dataset	Projects currently have not storage limit. There is a 5GB/file upload limit for native OSF Storage. There is no limit imposed by OSF for the amount of storage used across add-ons connected to a given project.	If more than 10GB per study data, reach out to us	50GB per dataset, contact us via https://zenodo.org/support for higher limits
Storage space per researcher	1 TB per researcher	No limit	No limit	No limit	No limit	No limit	No limit
Persistent, Unique Identifier Support	DOI, Handle	DOI	DOI	DOI	DOI	DOI	DOI

<https://doi.org/10.5281/zenodo.3946719>

Repository Features:

- Description
- Size Limits
- Storage Limits
- PIDs
- Licenses
- Costs
- Access Levels
- Versioning
- Metadata Schemas
- Export Formats
- Taxonomies
- Author Affiliations
- Publication Linking
- Derived Product Linking
- Grant IDs
- Software Linking
- Data Usage Metrics
- Data Citation
- Embargo
- Peer Review
- Managed Access
- Preservation Policy
- Human Subjects Data
- Business Model



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Adopt Consistent Metadata Models



DataCite

Consistent and Clear Metadata for all Generalist Repositories

- Connect digital objects
- Utilize common vocabularies
- Focus on similar Use Cases
- Act as exemplar for other repos

GREI Metadata and Search Subcommittee: Recommendations from DataCite schema version 4.4

Version 01: Last updated 2023-05-25

Overview

One goal of [GREI](#) is to establish common metadata standards for the generalist repositories that support interoperability and discovery of datasets across repositories. Having focused on an agreed standard, the [DataCite Metadata Schema 4.4](#), the GREI Metadata and Search subcommittee has set its Year 2 goal for repositories to build on their existing work on metadata for research datasets. Focusing on a few high-level use cases for data sharing and searching allowed the group to move forward to identify specific metadata beyond the DataCite required properties metadata that would meet the needs of those use cases.

With the inclusion of DataCite as a GREI stakeholder, more opportunities have been reviewed to now provide a recommendation to the GREI repositories to add additional metadata fields and enhance the quality of the metadata being provided. The subcommittee has continued having detailed discussions ensuring that GREI repositories collect and provide metadata in a



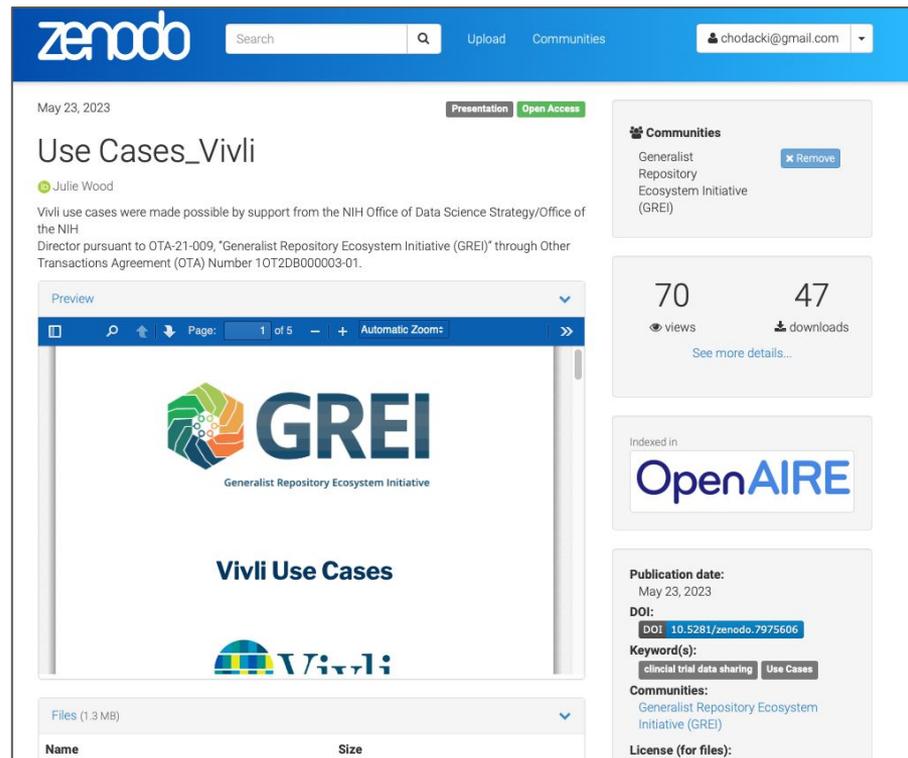
Catalog Use Cases Supported

Support Discovery for NIH-funded Data

- Focus on similar Use Cases
- Act as exemplar for other repos
- Spark conversations with other stakeholders

Use Case documents can be found on Zenodo:

<https://zenodo.org/communities/grei/search?page=1&size=20&keywords=Use%20Cases>



The screenshot shows a Zenodo repository page for a document titled "Use Cases_Vivli". The page is dated May 23, 2023, and is associated with the "Generalist Repository Ecosystem Initiative (GREI)" community. The document is by Julie Wood and is described as "Vivli use cases were made possible by support from the NIH Office of Data Science Strategy/Office of the NIH Director pursuant to OTA-21-009, 'Generalist Repository Ecosystem Initiative (GREI)' through Other Transactions Agreement (OTA) Number 10T2DB000003-01." The document is available in PDF format (1.3 MB) and has 70 views and 47 downloads. It is indexed in OpenAIRE and has a DOI of 10.5281/zenodo.7975606. The keywords are "clinical trial data sharing" and "Use Cases".

zenodo Search Upload Communities chodacki@gmail.com

May 23, 2023 Presentation Open Access

Use Cases_Vivli

Julie Wood

Vivli use cases were made possible by support from the NIH Office of Data Science Strategy/Office of the NIH Director pursuant to OTA-21-009, "Generalist Repository Ecosystem Initiative (GREI)" through Other Transactions Agreement (OTA) Number 10T2DB000003-01.

Preview

Page: 1 of 5 Automatic Zoom:

 **GREI**
Generalist Repository Ecosystem Initiative

Vivli Use Cases



Files (1.3 MB)

Name	Size
------	------

Communities
Generalist Repository Ecosystem Initiative (GREI) Remove

70 views 47 downloads
See more details...

Indexed in


Publication date:
May 23, 2023

DOI:
DOI: 10.5281/zenodo.7975606

Keyword(s):
clinical trial data sharing Use Cases

Communities:
Generalist Repository Ecosystem Initiative (GREI)

License (for files):



Implement Open Metrics

Support Common Approaches to data metrics:

- Focus on rationalizing and normalizing
- Rely on existing best practices
- Spark conversations with other stakeholders
- Build context from:
 - Data Usage (views, downloads)
 - Data Citations



More information can be found at:

<https://makedatacount.org/>



Conduct Outreach

Define Priority Audiences. Starting with NIH researchers and looking outward from there: data librarians, other researchers, etc.

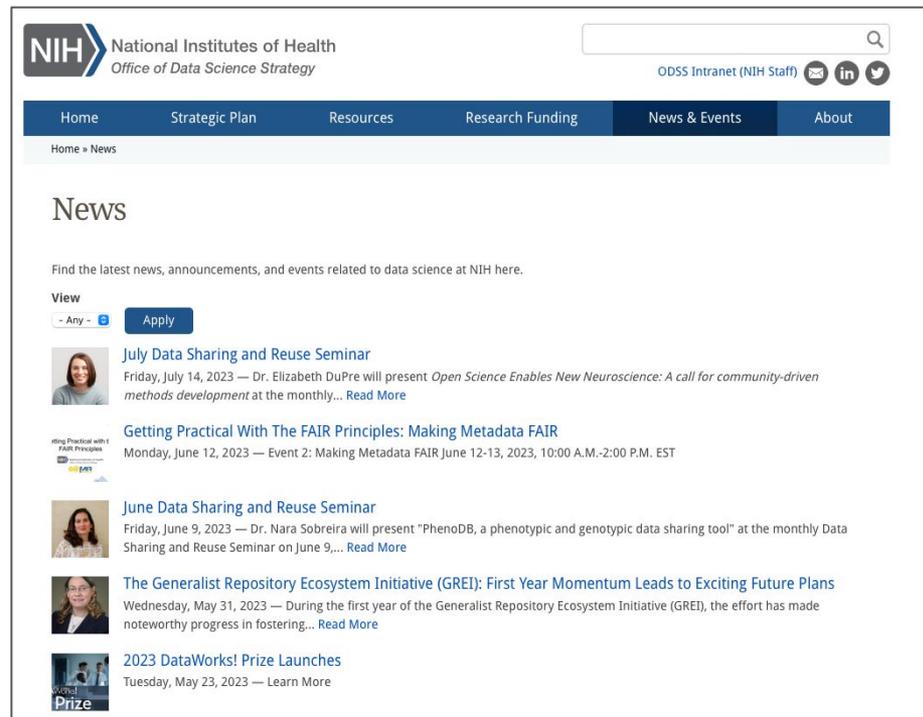
Partnerships with community groups (FASEB, DCN, etc.)

Key tactics for outreach:

- Webinars
- Conferences
- Provide Training Materials

More information can be found at:

<https://datascience.nih.gov/news>



The screenshot shows the NIH Office of Data Science Strategy website. The header includes the NIH logo, the text "National Institutes of Health Office of Data Science Strategy", a search bar, and social media icons for email, LinkedIn, and Twitter. The navigation menu has tabs for Home, Strategic Plan, Resources, Research Funding, News & Events, and About. The "News & Events" tab is selected, and the page title is "News". Below the title, there is a search bar and a "View" filter set to "Any". The main content area lists several news items:

- July Data Sharing and Reuse Seminar**: Friday, July 14, 2023 — Dr. Elizabeth DuPre will present *Open Science Enables New Neuroscience: A call for community-driven methods development* at the monthly... [Read More](#)
- Getting Practical With The FAIR Principles: Making Metadata FAIR**: Monday, June 12, 2023 — Event 2: Making Metadata FAIR June 12-13, 2023, 10:00 A.M.-2:00 P.M. EST
- June Data Sharing and Reuse Seminar**: Friday, June 9, 2023 — Dr. Nara Sobreira will present "PhenoDB, a phenotypic and genotypic data sharing tool" at the monthly Data Sharing and Reuse Seminar on June 9,... [Read More](#)
- The Generalist Repository Ecosystem Initiative (GREI): First Year Momentum Leads to Exciting Future Plans**: Wednesday, May 31, 2023 — During the first year of the Generalist Repository Ecosystem Initiative (GREI), the effort has made noteworthy progress in fostering... [Read More](#)
- 2023 DataWorks! Prize Launches**: Tuesday, May 23, 2023 — [Learn More](#)



Implications for the Larger Data Landscape

As the NIH data repository landscape grows with the adoption of the new NIH Data Management and Sharing Policy, there are **benefits and opportunities to global repositories working together** in this way to **meet the needs of research communities, funders, and institutions.**

In the future, discipline-specific data repositories and other research infrastructure providers may also wish to **adopt some of the common GREI capabilities to reduce the barriers to data sharing and support greater interoperability** across the repository landscape.



The NIH Perspective

Lisa Federer, National Library of Medicine, U.S. National Institutes of Health



A Year of Open Science

Activities include:

- Updating or developing plans for increasing public access to federally funded research
- Funding opportunities
- Infrastructure enhancements
- Training and capacity building
- Broadening participation in open science
- Community engagement



[Home](#) [About](#) [STEM Opportunities](#)

Open Science Announcements from Federal Agencies

Open Science is the principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility, and equity.

Federal agencies are celebrating 2023 as a Year of Open Science, a multi-agency initiative across the federal government to spur change and inspire open science engagement through events and activities that will advance adoption of open, equitable, and secure science.

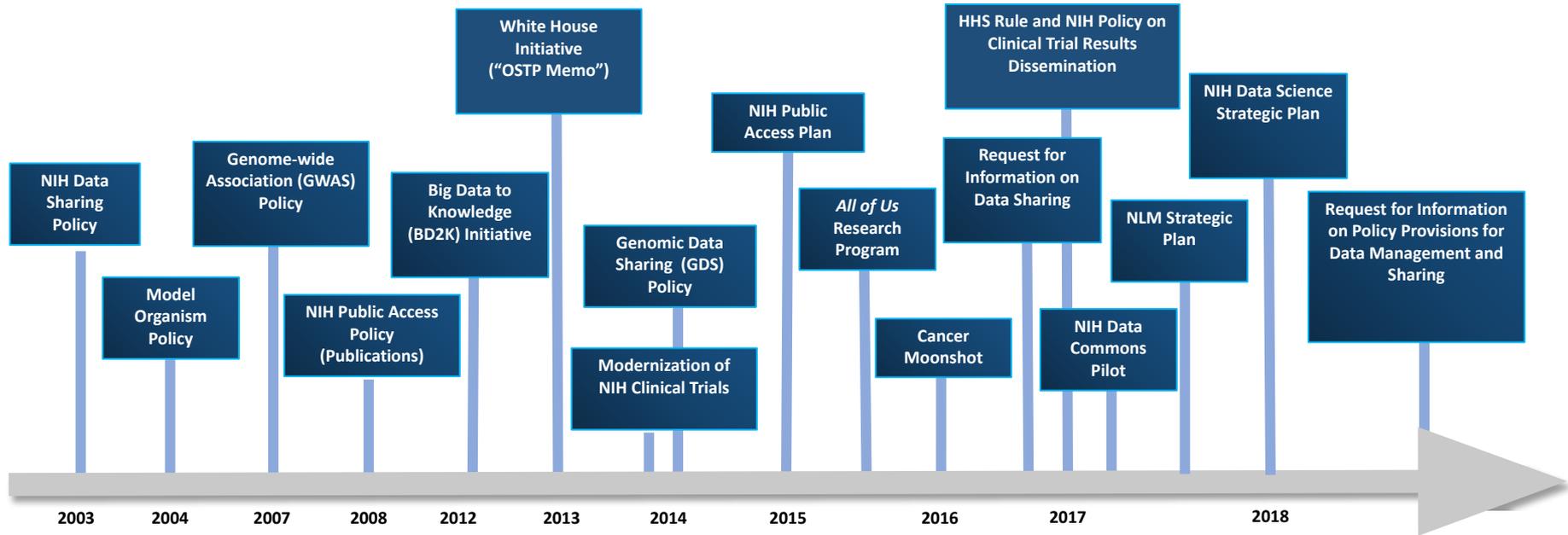
Help spotlight the value of open science by checking out this [toolkit](#): choose and use images for social media, presentations, posters and virtual backgrounds—agency partners may even co-brand. #YearofOpenScience.

Centers for Disease Control and Prevention
Department of Agriculture
Department of Commerce
Department of Energy
Department of State
Department of Transportation
Environmental Protection Agency
National Aeronautics and Space Administration
National Endowment for the Humanities

National Institutes of Health
National Institute of Standards and Technology
National Oceanic and Atmospheric Administration
National Science Foundation
Smithsonian Institution
U.S. Geological Survey
U.S. General Services Administration
White House Office of Science and Technology Policy



NIH's Culture of Data Sharing





NIH Policy for Data Management and Sharing (DMS)

- **Submission of Data Management & Sharing Plan for all NIH-funded research**
- **Compliance with the ICO-approved Plan** (*may affect future funding*)
- **Effective January 25, 2023** (*replaces 2003 Data Sharing Policy*)

Selecting a repository: the NIH data sharing landscape

NIH strongly encourages
subject-specific, open access Data Sharing Repositories
as a first choice.

https://www.nlm.nih.gov/NIHbmic/nih_data_sharing_repositories.html

Datasets up to **2 gigabytes**

PubMed Central

Stores publication-related supplemental materials and datasets directly associated publications.



Datasets up to **20 gigabytes**

Generalist Repositories

Datasets associated with publications or otherwise and links to PubMed.



High priority datasets, **petabyte-scale**

Cloud Partners (STRIDES Program)

Store and manage large scale, high priority NIH datasets.



Desirable Characteristics for Data Repositories

Persistent Unique Identifiers	Assigns datasets to a citable PUID to support data discovery and reporting
Long-term sustainability	Long-term plan for managing data; builds on stable technical infrastructure & funding; contingency plans for unforeseen events
Metadata	Ensures datasets are accompanied by metadata sufficient to enable discovery, reuse, and citation
Curation & Quality Assurance	Provides expertise to improve the accuracy and integrity of datasets and metadata
Access	Provides maximally open access, consistent with legal and ethical limits
Free & Easy	Datasets and metadata accessible free of charge and with broadest possible terms of reuse
Reuse	Enables tracking of data reuse
Secure	Documentation of meeting accepted criteria for security to prevent unauthorized access or release of data
Privacy	Documentation of safeguards in compliance with applicable privacy, risk management & continuous monitoring requirements
Common Format	Datasets and metadata can be downloaded, accessed, or exported in a standards-compliant format
Provenance	Maintains a detailed logfile of changes to datasets and metadata to ensure integrity

Additional Considerations for Human Data

Fidelity to Consent	Restricts dataset access to appropriate uses consistent with original consent
Restricted Use Compliant	Enforces submitters' data use restrictions
Privacy	Documentation & implementation of security techniques for human subjects' data to protect from inappropriate access
Plan for Breach	Has security measures that include data breach response plan
Download Control	Controls and audits access to and download of datasets
Clear Use Guidance	Provides documentation describing restrictions on dataset access and use
Retention Guidelines	Provides documentation on guidelines for data retention
Violations	Has plans for addressing violations of terms-of-use and data mismanagement by the repository
Request Review	Established data access review or oversight group responsible for reviewing data use requests

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Generalist Repository Use Cases

Sara Gonzales, Northwestern University & Zenodo



The GREI Zenodo community: <https://zenodo.org/communities/grei/>

zenodo

Zenodo.org will be unavailable for 2 hours on September 29th from 06:00-08:00 UTC. See [announcement](#).

Generalist Repository Ecosystem Initiative (GREI)

Recent uploads

September 19, 2023 (v1)

Data Sharing in Generalist Repositories

Ana Van Gulick; Sonia Barbosa; Traci Snowden; Jessica Herzog; Lisa Curtin; Kristi Holmes; Rebecca Li; Julie Wood; Ishwar Chandramouliswaran;

Workshop presented at NIH Research Festival 2023 by the repositories of the NIH Generalist Repository Ecosystem Initiative, Generalist repositories offer NIH researchers a flexible, trusted resource to share data for which there is no appropriate discipline specific repository as well as to share m

Uploaded on September 18, 2023

September 18, 2023 (v1)

GREI Collaborative Webinar: Metadata Recommendations

David Scherer; Julian Gautier; Gretchen Gueguen; Ryan Scherle; Ana Van Gulick;

Metadata Recommendations | Friday, September 15 at 2 pm ET Researchers and academic staff who support them, representatives from data repositories, and NIH staff interested in how metadata can make NIH-funded research more findable are invited to watch the GREI Metadata and Search subcommittee

Uploaded on September 18, 2023

Community



Generalist Repository Ecosystem Initiative (GREI)

GREI is an initiative funded by NIH Office of Data Science Strategy to further enhance the biomedical data ecosystem and help researchers find and share data from NIH-funded studies in generalist repositories.

The long-term vision for GREI is to develop collaborative approaches for data management and sharing through inclusion of the generalist





As an NIH-funded researcher, I want to USE Mendeley Data to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.

As an NIH-funded researcher, I want to USE Zenodo to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.

UseCases_Figshare.pdf x + Create



As a researcher, I want to FIND research data of interest in Figshare so that I can validate findings, reuse data, and build on work within my discipline.

Use Cases_Harvard Da... x + Create



As an institution, I want to REPORT on all datasets from my institution in the Harvard Dataverse Repository, so that I can ensure compliance of research data sharing and management plan commitments by our researchers.

Use Cases_Vivli v2.0.pdf x + Create



As a funder from a specific NIH institute or in general, I want to find datasets we have funded in Vivli, so that I can REPORT on compliance with policies, and TRACK impact of research funding and usage of data.

This use case highlights ways research teams can leverage generalist repositories to share project data.

Share project data:

1. Log in via GitHub or ORCID, or create a new Zenodo user account.

Log in with GitHub
 Log in with ORCID
 — OR —
 Email Address
 Password
 Log In
 New to Zenodo? Sign Up
 Privacy notice

Navigate across to top menu bar to "Upload". Click and select "New Upload" on the top of the next page.

zenodo Search Upload Communities
 New Upload

Upload your files > Add required metadata > Save metadata or other additional metadata. Add DOI with your research community and funders



What are 4 key use cases identified by GREI?



As an **NIH-funded researcher**, I want to select a repository to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.



As a **researcher**, I want to find research data of interest so that I can validate findings, reuse data, and build on work within my discipline. *(Example use case from: figshare)*



As an **institution**, I want to report on all datasets from my institution, so that I can ensure compliance of research data sharing and management plan commitments by our researchers. *(Example use case from: OSF)*



As a **funder** from a specific NIH institute or in general, I want to find datasets we have funded, so that I can report on compliance with policies, and track impact of research funding and usage of data. *(Example use case from: Dataverse)*



Use Case 1:

As an **NIH-funded researcher**, I want to **select a repository** to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.

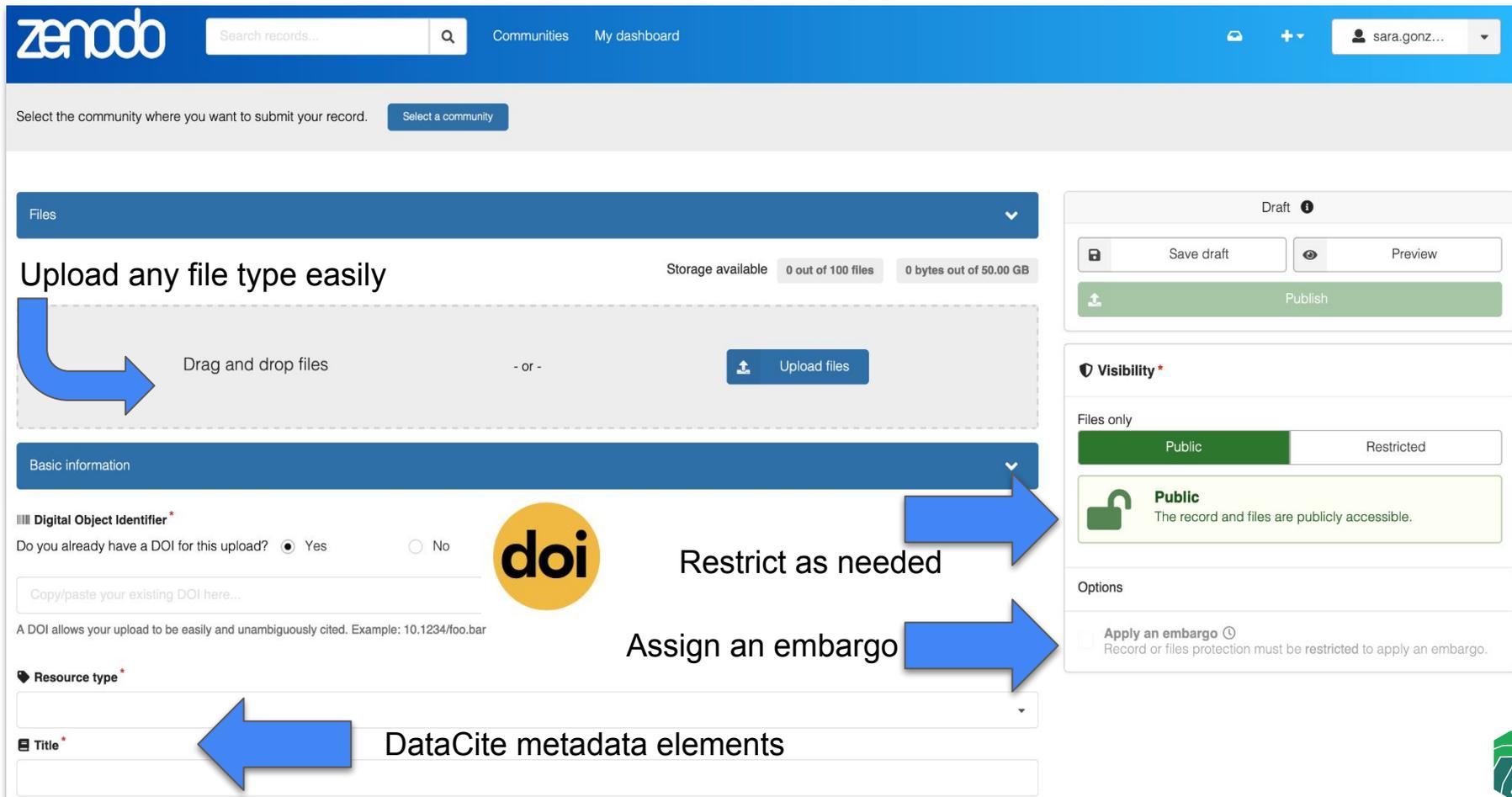
Aspects of the GREI repositories compliant with data sharing mandates:

- Mint DOIs for data deposits, supporting discoverability, citeability, and allowing resource linking
- User-friendly deposit forms with metadata enhancing findability
- Supports upload and/or linking of software/code, supporting reproducibility
- Allow users to assign licenses outlining appropriate data reuse
- Robust metrics to track impact
- Incorporation of PIDs and ontologies, such as ORCID for sign-in, ROR, and CRediT roles
- Support upload of files in any format
- Support controls over public/private aspects of a project or deposit; support embargo
- Dedicated long-term preservation mechanism and/or policy



Use Case 1:

As an **NIH-funded researcher**, I want to **select a repository** to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.



The screenshot shows the Zenodo upload page. At the top, there is a search bar and navigation links for 'Communities' and 'My dashboard'. Below the navigation, a prompt asks to 'Select the community where you want to submit your record.' with a 'Select a community' button.

The main content area is divided into sections. The 'Files' section has a header 'Upload any file type easily' and a storage status 'Storage available 0 out of 100 files 0 bytes out of 50.00 GB'. A large blue arrow points to a dashed box containing the text 'Drag and drop files' and an 'Upload files' button.

The 'Basic information' section is expanded. It includes a 'Digital Object Identifier' section with a 'doi' logo and the text 'Restrict as needed'. Below this is a text input field for a DOI and a note: 'A DOI allows your upload to be easily and unambiguously cited. Example: 10.1234/foo.bar'. A blue arrow points from the 'Restrict as needed' text to the 'Public' option in the 'Visibility' section.

The 'Visibility' section shows 'Files only' with 'Public' selected over 'Restricted'. Below this, a 'Public' status is shown with a lock icon and the text 'The record and files are publicly accessible.'.

The 'Options' section includes an 'Apply an embargo' checkbox with a note: 'Record or files protection must be restricted to apply an embargo.' A blue arrow points from the text 'Assign an embargo' to this checkbox.

At the bottom, the 'Resource type' and 'Title' fields are visible. A blue arrow points from the text 'DataCite metadata elements' to the 'Title' field.



Use Case 2:



As a **researcher**, I want to **find research data of interest** so that I can validate findings, reuse data, and build on work within my discipline.

The GREI repositories' robust search features include:

- Keyword search, advanced search, and state-of-the-art built-in search engines
- Sorting/filtering features: subject, affiliation, resource type, funders, date
- Browse feature: by place name, subject, journal, institution
- Preview of file on record landing page
- Open APIs for downloading record metadata
- Make data findable in search aggregators like Google Dataset Search, DataCite Commons, etc.
- Enable relations between digital objects (e.g., link deposited datasets and publications)
- Enable export of record citations to EndNote and other ref. mgmt tools, and in variety of formats (e.g. JSON)
- PID-enhanced search
- Clear licenses to define what secondary users can do with the data



Use Case 2:



As a researcher, I want to find research data of interest so that I can validate findings, reuse data, and build on work within my discipline.

On figshare.com, users can also search using specific terms and then filter the search results using facets.

The GREI use cases have and will continue to inform the development of Figsare's search and browse capabilities.

The screenshot displays the Figshare search interface with several filter facets highlighted by orange boxes:

- Content Type:** item (5,993,069), collection (1,419,464), project (5,883)
- Category:** Biological Sciences not else... (2,229,3), Biochemistry (1,932,571), Chemical Sciences not else... (1,893,2), Biotechnology (1,852,065), Medicine (1,847,588)
- Publication date:** Last week, Last month, Last year
- Item Type:** figure (1,980,170), dataset (1,778,805), journal contribution (1,656,698), media (128,541), thesis (105,756)
- Licence:** CC BY 4.0 (3,839,678), CC BY-NC 4.0 (962,808), CC BY + CC0 (399,959), In Copyright (259,668), All Rights Reserved (174,128)
- Funder:** Economic and Social Research ... (16,154), Arts and Humanities Research ... (11,164), European Research Council (7,563), United States Department of Hea... (2,520), Engineering and Physical Scienc... (2,085)
- Source:** publisher (6,323,406), institution (722,357), figshare.com (349,886), preprint (12,284), funder (3,623)
- Publication years:** 2029, 2028, 2027, 2026, 2025, 2024, 2023, 2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014

Search Figshare content at <https://figshare.com/search/new>



Use Case 3:

As an **institution**, I want to **report on all datasets from my institution**, so that I can ensure compliance of research data sharing and management plan commitments by our researchers.

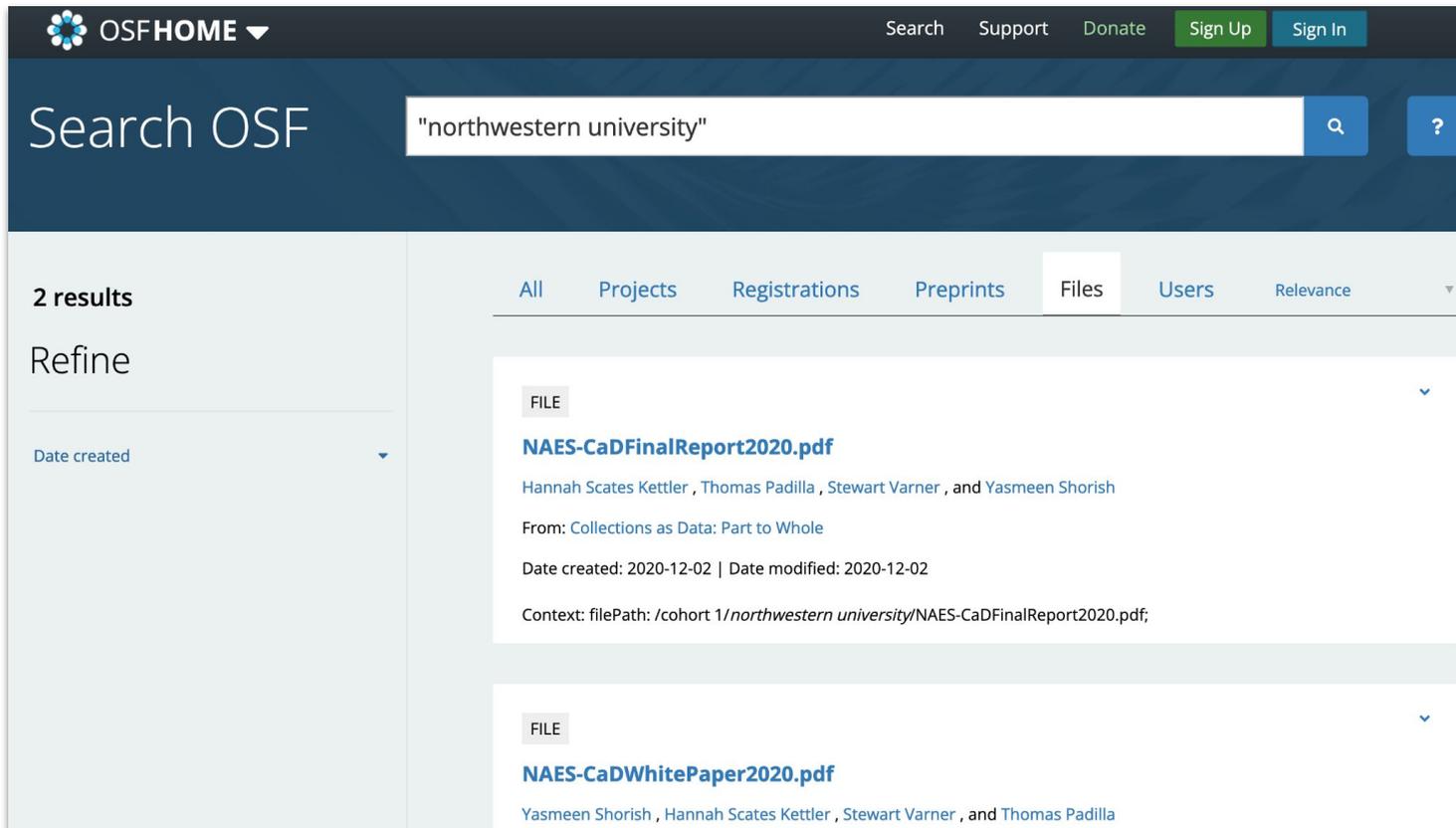
The GREI repositories' features to find data by institution include:

- ❑ Advanced search by institution name, in many cases enhanced by ROR-tagging of institutions
- ❑ Facet/filter searches by institution, and by particular funders
- ❑ Frequent incorporation of popular protocols to pull record metadata such as OAI-PMH, open APIs
- ❑ Administrative dashboards with usage metrics, enabling download of info about shared data as CSV
- ❑ Record metadata shared with DataCite and other aggregators; and available via APIs like CrossRef's



Use Case 3:

As an **institution**, I want to **report on all datasets from my institution**, so that I can ensure compliance of research data sharing and management plan commitments by our researchers.



The screenshot shows the OSFHOME search interface. At the top, the OSFHOME logo is on the left, and navigation links for Search, Support, Donate, Sign Up, and Sign In are on the right. The search bar contains the query "northwestern university". Below the search bar, there are tabs for All, Projects, Registrations, Preprints, Files, Users, and Relevance. The 'Files' tab is selected. On the left side, there are sections for '2 results' and 'Refine', with a dropdown menu for 'Date created'. The main content area displays two search results, both labeled as 'FILE'.

2 results

Refine

Date created ▾

All Projects Registrations Preprints **Files** Users Relevance ▾

FILE ▾

NAES-CaDFinalReport2020.pdf

Hannah Scates Kettler , Thomas Padilla , Stewart Varner , and Yasmeen Shorish

From: [Collections as Data: Part to Whole](#)

Date created: 2020-12-02 | Date modified: 2020-12-02

Context: filePath: /cohort 1/northwestern university/NAES-CaDFinalReport2020.pdf;

FILE ▾

NAES-CaDWhitePaper2020.pdf

Yasmeen Shorish , Hannah Scates Kettler , Stewart Varner , and Thomas Padilla



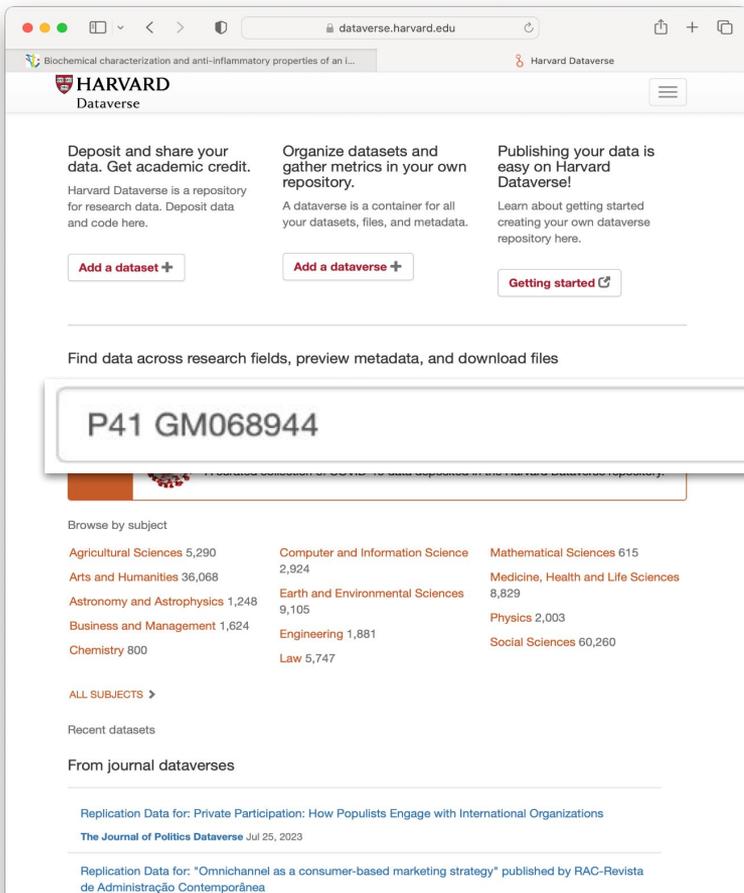
Use Case 4:  As a **funder** from a specific NIH institute or in general, I want to **find datasets we have funded**, so that I can report on compliance with policies, and track impact of research funding and usage of data.

The GREI repositories' features to find data by funder include:

- ❑ Integration with CrossRef Funder Registry for machine readable data; plus the Funder API lookup
- ❑ Dashboards to see dataset metadata and usage metrics (views, downloads, public disclosures)
- ❑ Altmetric Attention Data and Citation Data of deposited datasets
- ❑ Metadata Fields for funder, grant identifier, award title, award URL; Funder ID included in DOI - and thereby advanced search and filter searches by each of these
- ❑ Sort search results by Grant number
- ❑ PI name and ORCiD contained in records confirms data is connected with a particular grant
- ❑ Grant tracking software can track deposited data from the publication, using related identifiers
- ❑ Reach out to the repository's support contact for a report customized by NIH institute



Use Case 4: As a **funder** from a specific NIH institute or in general, I want to **find datasets we have funded**, so that I can report on compliance with policies, and track impact of research funding and usage of data.



Harvard Dataverse

Deposit and share your data. Get academic credit. Harvard Dataverse is a repository for research data. Deposit data and code here.

Organize datasets and gather metrics in your own repository. A dataverse is a container for all your datasets, files, and metadata.

Publishing your data is easy on Harvard Dataverse! Learn about getting started creating your own dataverse repository here.

[Add a dataset +](#) [Add a dataverse +](#) [Getting started](#)

Find data across research fields, preview metadata, and download files

P41 GM068944 

Browse by subject

Agricultural Sciences 5,290	Computer and Information Science 2,924	Mathematical Sciences 615
Arts and Humanities 36,068	Medicine, Health and Life Sciences 8,829	
Astronomy and Astrophysics 1,248	Earth and Environmental Sciences 9,105	Physics 2,003
Business and Management 1,624	Engineering 1,881	Social Sciences 60,260
Chemistry 800	Law 5,747	

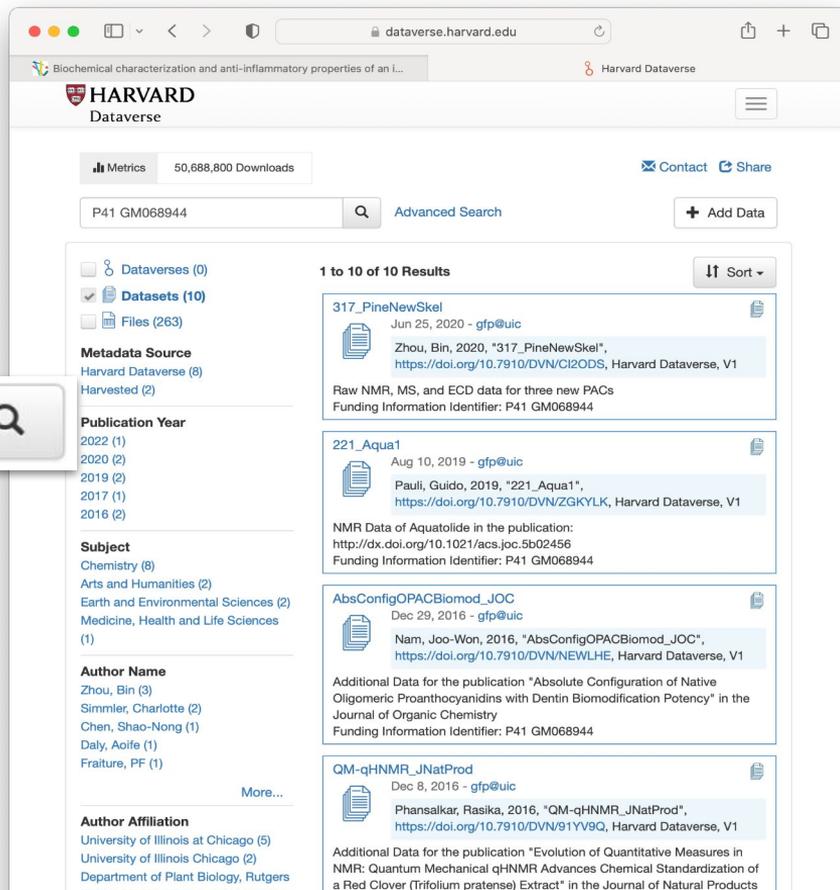
ALL SUBJECTS >

Recent datasets

From journal dataverses

Replication Data for: Private Participation: How Populists Engage with International Organizations
[The Journal of Politics Dataverse](#) Jul 25, 2023

Replication Data for: "Omnicannel as a consumer-based marketing strategy" published by RAC-Revista de Administração Contemporânea



Harvard Dataverse

Metrics 50,688,800 Downloads [Contact](#) [Share](#)

P41 GM068944 [Advanced Search](#) [Add Data](#)

Dataverses (0)
 Datasets (10)
 Files (263)

Metadata Source
Harvard Dataverse (8)
Harvested (2)

Publication Year
2022 (1)
2020 (2)
2019 (2)
2017 (1)
2016 (2)

Subject
Chemistry (8)
Arts and Humanities (2)
Earth and Environmental Sciences (2)
Medicine, Health and Life Sciences (1)

Author Name
Zhou, Bin (3)
Simmier, Charlotte (2)
Chen, Shao-Nong (1)
Daly, Aoife (1)
Fraiture, PF (1)

Author Affiliation
University of Illinois at Chicago (5)
University of Illinois Chicago (2)
Department of Plant Biology, Rutgers University, New Brunswick, New Jer-

1 to 10 of 10 Results [Sort](#)

317_PineNewSkel
Jun 25, 2020 - gfp@uic
Zhou, Bin, 2020, "317_PineNewSkel", <https://doi.org/10.7910/DVN/Ci2ODS>, Harvard Dataverse, V1
Raw NMR, MS, and ECD data for three new PACs
Funding Information Identifier: P41 GM068944

221_Aqua1
Aug 10, 2019 - gfp@uic
Pauli, Guido, 2019, "221_Aqua1", <https://doi.org/10.7910/DVN/ZGKYLK>, Harvard Dataverse, V1
NMR Data of Aquatolide in the publication: <http://dx.doi.org/10.1021/acs.jpc.5b02456>
Funding Information Identifier: P41 GM068944

AbsConfigOPACBiomod_JOC
Dec 29, 2016 - gfp@uic
Nam, Joo-Won, 2016, "AbsConfigOPACBiomod_JOC", <https://doi.org/10.7910/DVN/NEWLHE>, Harvard Dataverse, V1
Additional Data for the publication "Absolute Configuration of Native Oligomeric Proanthocyanidins with Dentin Biomodification Potency" in the Journal of Organic Chemistry
Funding Information Identifier: P41 GM068944

QM-qHNMR_JNatProd
Dec 8, 2016 - gfp@uic
Phansalkar, Rasika, 2016, "QM-qHNMR_JNatProd", <https://doi.org/10.7910/DVN/91YV9Q>, Harvard Dataverse, V1
Additional Data for the publication "Evolution of Quantitative Measures in NMR: Quantum Mechanical qHNMR Advances Chemical Standardization of a Red Clover (Trifolium pratense) Extract" in the Journal of Natural Products



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GREI Common Metadata Schema

Luca Belletti, Mendeley Data



Overview of Metadata Recommendations and Relation to Use Cases

GREI Metadata and Search Subcommittee: Recommendations from DataCite schema version 4.4

Version 01: Last updated 2023-06-29

Overview

One goal of [GREI](#) is to support interoperability and discovery of datasets across repositories by establishing common metadata standards for the generalist repositories. Having focused on an agreed standard, the [DataCite Metadata Schema 4.4](#), the GREI Metadata and Search subcommittee has set its Year 2 goal for repositories to build on their existing work on metadata for research datasets. Focusing on a few high-level use cases for data sharing and searching allowed the group to move forward to identify specific metadata beyond the DataCite required properties metadata that would meet the needs of those use cases.

With the inclusion of DataCite as a GREI stakeholder, more opportunities have been reviewed to now provide a recommendation to the GREI repositories to add additional metadata fields and enhance the quality of the metadata being provided. The subcommittee has continued having detailed discussions ensuring that GREI repositories collect and provide metadata in a way that is useful to all stakeholders.

With this in mind, the GREI Metadata and Search subcommittee has created this recommendation to strongly encourage that each repository member collect the following metadata to support the generalist repository use cases for sharing, discovering and tracking the impact of data.

We also hope this common metadata schema will be useful for data repositories beyond GREI to improve interoperability across data repositories and across the NIH data landscape.

Recommendation

The document lists strongly encouraged metadata to be collected by each GREI repository in alignment with the metadata collected by DataCite's optional metadata properties. Where applicable, the values and vocabularies that repositories are encouraged to use have also been reviewed by the subcommittee and included in the recommendations.

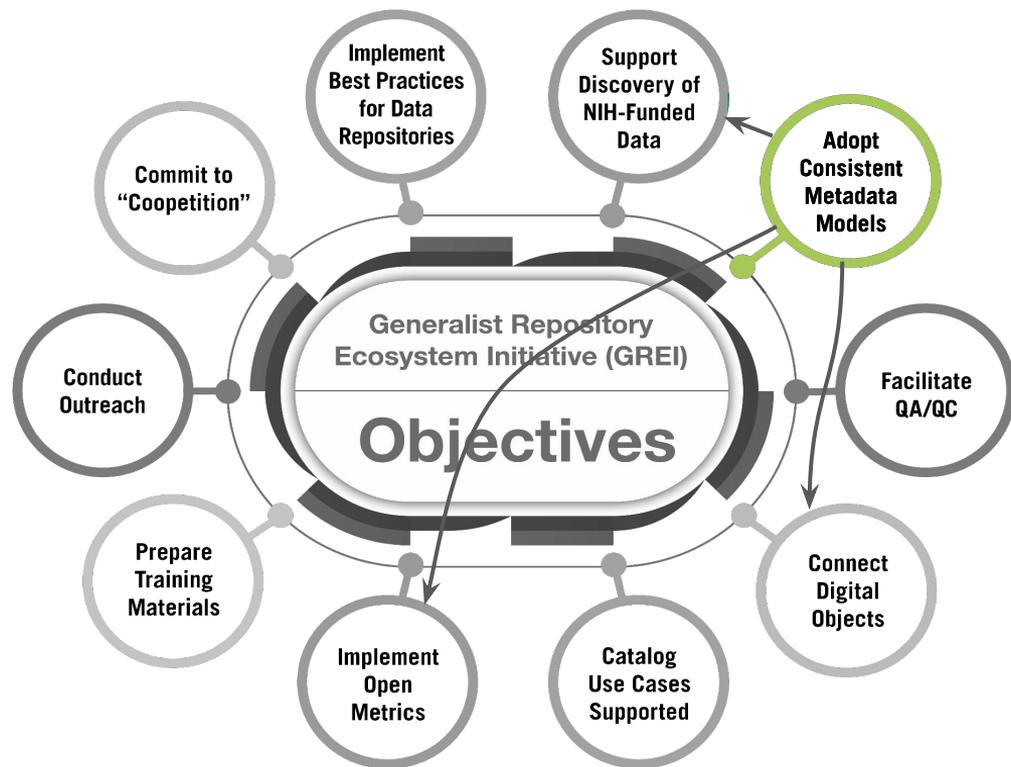
Curtin, Lisa; Feri, Lorenzo; Gautier, Julian; Gonzales, Sara; Gueguen, Gretchen; Scherer, David; Scherle, Ryan; Stathis, Kelly; Van Gulick, Ana, & Wood, Julie. (2023).

GREI Metadata and Search Subcommittee
Recommendations_V01_2023-06-29. Zenodo.
<https://doi.org/10.5281/zenodo.8101957>

DOI [10.5281/zenodo.8101957](https://doi.org/10.5281/zenodo.8101957)



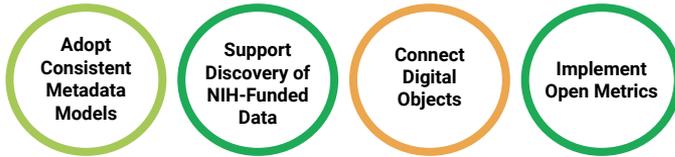
Overview of Metadata Recommendations and Relation to Use Cases



Overview of Metadata Recommendations and Relation to Use Cases

We discussed what kind of information each repository should collect and distribute in order to support:

- The GREI objectives and goals of the Metrics subcommittee



- The following four use cases from the Use Cases subcommittee



Overview of Metadata Recommendations and Relation to Use Cases



As an **NIH-funded researcher**, I want to select a repository to share my data, so that I can comply with my data management and sharing plan and the conditions of my grant.



As a **researcher**, I want to find research data of interest so that I can validate findings, reuse data, and build on work within my discipline.



As an **institution**, I want to report on all datasets from my institution, so that I can ensure compliance of research data sharing and management plan commitments by our researchers.



As a **funder** from a specific NIH institute or in general, I want to find datasets we have funded, so that I can report on compliance with policies, and track impact of research funding and usage of data.



Overview of Metadata Recommendations and Relation to Use Cases



As a funder from a specific NIH institute or in general, I want to find **datasets we have funded**, so that I can report on compliance with policies, and track impact of research funding and usage of data.



So repositories need to collect information about who funded the research that produced the dataset



Overview of Metadata Recommendations and Relation to Use Cases



As a funder from a specific NIH institute or in general, I want to find datasets we have funded, so that I can report on compliance with policies, and **track impact of research funding and usage of data.**



So repositories need to collect information about other research objects that cited and used the data



How Recommendations Align to DataCite Metadata

We chose the DataCite metadata schema because:

- All GREI repositories already use it to register DOIs
- It's domain agnostic
- DataCite already collaborates closely with GREI
- Other services rely on metadata expressed in DataCite's schema, including metadata aggregators and DataCite's own Event Data service



How Recommendations Align to DataCite Metadata

- The GREI Metadata Recommendations highlight specific properties from the DataCite Metadata Schema (v4.4), beyond the minimum required fields.
- Repositories are encouraged to incorporate these properties in their metadata or identify a local equivalent field.
 - For example, an “Author Identifier” field may be mapped to the DataCite “nameIdentifier” sub-property of “Creator”.
- When registering a DOI with DataCite, recommended properties should be included in the DataCite DOI metadata.



How Recommendations Align to DataCite Metadata



As a funder from a specific NIH institute or in general, I want to find **datasets we have funded**, so that I can report on compliance with policies, and track impact of research funding and usage of data.



So repositories need to collect information about who funded the research that produced the dataset

19	FundingReference	
19.1	funderName	
19.2	funderIdentifier	Use IDs from the CrossRef's Funder Registry or from ROR.
19.2.a	funderIdentifierType	Select "Crossref Funder ID" or "ROR" from DataCite's controlled list.
19.2.b	schemeURI	Use https://www.crossref.org/services/funder-registry/ or https://ror.org/
19.3	awardNumber	
19.3.a	awardURI	



How Recommendations Align to DataCite Metadata



As a funder from a specific NIH institute or in general, I want to find datasets we have funded, so that I can report on compliance with policies, and **track impact of research funding and usage of data.**



So repositories need to collect information about other research that cited and used the data



12	RelatedIdentifier	
12.a	relatedIdentifierType	Use controlled list values from DataCite.
12.b	relationType	Use controlled list values from DataCite.
12.f	resourceTypeGeneral	Use controlled list values from DataCite.



**Implementations and Use Cases:
Mendeley Data – Funding Metadata
Mendeley Data – ROR IDs for Affiliation**



Capturing Funding Information in a Dataset using Mendeley Data

Funding

+ Add funder

Add funder

Funder *

Search funders

Other (please specify)

Grant ID

Add funder

Funder *

National Institutes

National Institutes for Water Resources

National Health Research Institutes

Okazaki National Research Institutes

National Institutes of Health

National Institutes of Health, Pakistan

National Institutes of Biotechnology Malaysia

European Association of National Metrology Ins

Office of Extramural Research, National Institut

Add funder

Funder *

National Institutes of Health

Other (please specify)

Grant ID

1234-ABCD

Cancel

Add

Funding

National Institutes of Health

1234-ABCD

Delete

+ Add funder



Funder Information Displayed on Published Dataset and DataCite XML

Funding

National Institutes of Health
1234-ABCD

Directorate for Geosciences

Funding

National Institute of Environmental Health Sciences
P30ES019776

U.S. Environmental Protection Agency
84019801

<https://doi.org/10.17632/wm7p38cnwf>

```
<fundingReferences>
  <fundingReference>
    <funderName>U.S. Environmental Protection Agency</funderName>
    <funderIdentifier funderIdentifierType="Crossref Funder ID">http://dx.doi.org/10.13039/100000139</funderIdentifier>
  </fundingReference>
  <fundingReference>
    <funderName>National Institute of Environmental Health Sciences</funderName>
    <funderIdentifier funderIdentifierType="Crossref Funder ID">http://dx.doi.org/10.13039/100000066</funderIdentifier>
  </fundingReference>
</fundingReferences>
```



Filter Results by Funder

FUNDERS

Type to find funder 

- Agencia Estatal de Investigación (1850)
- National Natural Science Foundation of China (414)
- National Institutes of Health (154)
- Japan Society for the Promotion of Science (121)
- National Science Foundation (119)
- Fundação para a Ciência e a Tecnologia (117)
- Fundação de Amparo à Pesquisa do Estado de São Paulo (115)
- Conselho Nacional de Desenvolvimento Científico e Tecnológico (110)
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (78)
- Narodowe Centrum Nauki (75)

SOURCE TYPES

- Data Repositories (16316367)

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T:

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Ri:

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Ex

FUNDERS

Eu| 

- European Commission (5)
- Euro funders (1)
- Eurovision (1)

SOURCE TYPES



Capturing Affiliation in a Dataset using Mendeley Data

Institutions

Salzburg

Universität Salzburg Universitätsbibliothek Salzburg

Unfallkrankenhaus Salzburg

Erzdiözese Salzburg

inlingua Salzburg

Wirtschaftskammer Salzburg

Tourismusschulen Salzburg

Universität Salzburg Fachbereich Geschichte

Universität Mozarteum Salzburg Universitätsbibliothek

Link your dataset to one or more institutions, if the contributors or the data files were associated with any academic institutions. Your dataset will then be associated to your institution in indexes such as DataCite and OpenAIRE.

Institutions

The name of a University

Unfallkrankenhaus Salzburg ×

Universität Wien Universitätsbibliothek Wien ×



Institution Affiliation Displayed on Published Dataset and DataCite XML

Institutions

Unfallkrankenhaus Salzburg, Universitat Wien Universitätsbibliothek Wien

Institutions

Stanford University

<https://doi.org/10.17632/btchxktzyw>

```
<contributor contributorType="Other">  
  <contributorName nameType="Organizational">Stanford University</contributorName>  
  <nameIdentifier xsi:type="nameIdentifier" nameIdentifierScheme="ROR" schemeURI="https://ror.org/">https://ror.org/00f54p054</nameIdentifier>  
</contributor>
```



Lessons Learnt by Implementing Metadata within the GREI Coopetition Working Group

Clear Recommendations
Comprehensive Documentation
Support Availability



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Common Metrics for Reuse

Matt Buys, DataCite



Data sharing is valuable, but do we understand the value of data sharing?

To nurture and incentivize data sharing we need to assign value to it

We need to understand how data are found, accessed, analyzed and utilized as part of policy development and research activities

- Who uses data & for what purposes?
- What is the impact of open data, for policy making, scientific discovery and societal benefit?
- What is the return on investment on open data?

**Understanding the impact of open data requires
transparent and responsible data metrics**



GREI and Make Data Count

GREI repositories are aligning with Make Data Count is an initiative that **promotes open data metrics** to enable **evaluation and reward of research data** usage and impact.

Community effort to ensure that data are used and cited in open, transparent, and responsible ways.

- **Build** open infrastructure and community-based standards.
- **Advocate** through outreach and adoption campaigns.
- **Contextualize** with evidence-based bibliometric studies.

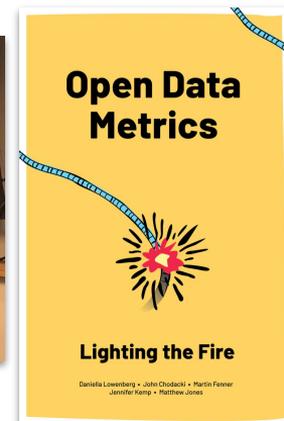
makedatacount.org/about-us/



The COUNTER Code of Practice for Research Data

The Code of Practice for Research Data Usage Metrics standardizes the generation and distribution of usage metrics for research data, enabling for the first time the consistent and credible reporting of research data usage. COUNTER welcomes input and feedback from the community on this first iteration, so that it can be further developed and refined.

A downloadable PDF is now available in the download section below.



GREI Data Metrics

GREI repositories are implementing meaningful metrics and contextualized quantitative or qualitative measures of how open datasets are accessed or utilized. The repositories collect information on data usage via:

- Views e.g. metadata, 3D models, images displayed on the landing page
- Downloads, file level or dataset level
- Citations, references to data, in the same way researchers provide a bibliographic reference to other scholarly resources

The above does not capture all possible uses of data, but they are measures that a researcher found the dataset relevant to their work in some way (views & downloads) or that the dataset has been used or reused in research (citations).



Gisby, J, Clarke CL, Medjeral-Thomas N, Malik TH, Papadaki A, Mortimer PPM, Buang NB, Lewis S, Pereira M, Toulza F, Fagnano E, Mawhin M, Dutton EE, Fapeng L, Kirk P, Behnooras J, Sandhu E, McAdoo SP, Predecki MF, Pickering MC, Botto M, Willcombe W, Thomas DC, Peters JE (2020) Dryad Digital Repository Longitudinal proteomic profiling of high-risk patients with COVID-19 reveals markers of severity and predictors of fatal disease. <https://doi.org/10.5061/dryad.61g1jpxj>

The image shows a spreadsheet-style data table with columns for patient ID, date, and various proteomic markers. The table contains multiple rows of data, with some cells highlighted in green.

The image shows the DRYAD landing page for the article. The title is "Longitudinal proteomic profiling of high-risk patients with COVID-19 reveals markers of severity and predictors of fatal disease". Below the title, the authors are listed: Gisby, Jack, Imperial College London, [https://orcid.org/](https://orcid.org/https://orcid.org/), Clarke, Candice, Imperial College London, Medjeral-Thomas, Nicholas, Imperial College London, Malik, Talat, Imperial College London, Papadaki, Artemis, Imperial College London, Mortimer, Paige, Imperial College London. The page also displays the following metrics: 306 views, 93 downloads, and 1 citations.



Data Usage: where are we?

The COUNTER Code of Practice has not yet been implemented as broadly as we would like

- Processes for normalizing data usage can be time consuming for repositories
- Requires developer understanding of the Code of Practice
- Code to maintain: log processing and SUSHI report generation

GREI repositories are implementing usage trackers and log processing (where applicable)

DataCite usage tracker
Facilitates implementation of data usage

Currently in beta

Collects repository usage stats using a Javascript tracker—not log file processing

DataCite generates monthly reports for repositories

```
HTML
<!-- Track View -->
<script defer data-doi="10.5072/1234"
  data-repo="example.com"
  data-metric="view"
  src="https://cdn.jsdelivr.net/npm/@datacite/datacite-tracker"></script>

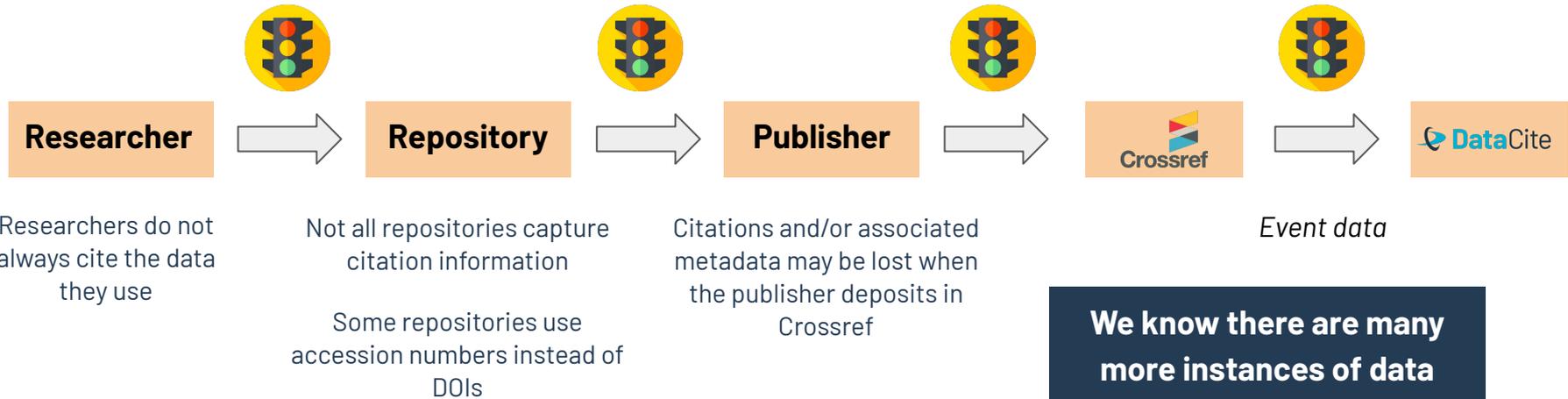
<!-- Track Download -->
<script defer data-doi="10.5072/1234"
  data-repo="example.com"
  data-metric="download"
  src="https://cdn.jsdelivr.net/npm/@datacite/datacite-tracker"></script>
```

support.datacite.org/docs/datacite-usage-tracker



Data Citations: where are we?

Data citation workflow requires several steps involving different stakeholders in order for the information to propagate. **GREI repositories are focussing on enhancing relational metadata (citations) and consuming citations downstream.**



We know there are many more instances of data usage than we are currently capturing

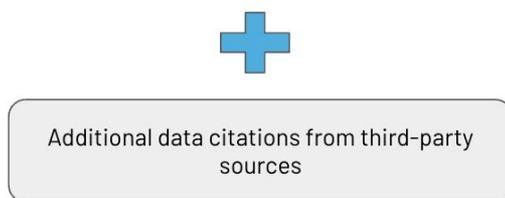
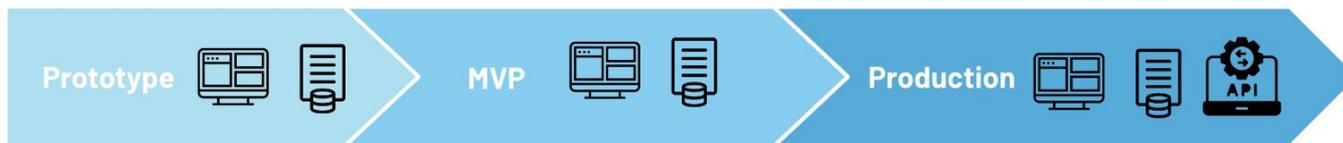
Workflow adapted from Susan Borda [‘If Data is Used in the Forest and No-one is Around to Hear it, Did it Happen? a Citation Count Investigation’](#).

Traffic light icon by Freepik via Flaticon



Global Data Citation Corpus

Goal: Develop a comprehensive corpus that incorporates data citations from different sources into a centralized, publicly accessible community resource



Incorporate data citations from diverse sources:

- Persistent Identifier (PID) authorities (e.g. Crossref, DataCite) that collect citations as part of their metadata deposit workflow.
- Additional sources that aggregate or discover citations through various techniques, such as machine learning and curation of full-text in articles.



The time is now: Make Data Count Summit

Meeting in Washington DC, September 2023 - Brought together representatives from research institutions, funders and government, researchers, publishers, and infrastructure providers for focused discussions on data evaluation & data metrics

Takeaways:

- Standards and infrastructure are available to enable adoption, we need to support those and **SCALE** the data usage information available to the community
- **Assessment frameworks** at institutions need to incorporate evaluations of data reuse, this needs engagement at all institutional levels and incremental approaches
- Data metrics must align to the principles for open data and be **complete, transparent, auditable, and contextualized.**



GREI Metrics: looking ahead

Future Initiatives:

- Repositories are committed to key milestones, including adopting MDC as a standardized practice, developing a reliable usage tracker, submitting comprehensive relational metadata to DataCite, establishing real-time repository metrics, and generating monthly metrics reports for NIH-funded research.
- Open, responsible and meaningful metrics are key to advancing our global efforts.
- Collective commitment of repositories to advance data metrics, emphasizing comprehensive and contextualized data evaluation practices.

Next Steps:

- Continue collaboration and coordination among repositories
- Implementation of usage tracker, relational metadata, real-time metrics
- Adapt strategies as needed for successful implementation
- Utilize task groups to address citations and drive standardization



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Connect with GREI

- Join the **GREI Google Group** to receive updates on GREI outputs and events
<https://groups.google.com/u/1/g/contactgrei>
- Read the latest posts on the **GREI Community blog**
<https://medium.com/@blog-grei>
- Browse the resources and published outputs in the **GREI Community** on Zenodo <https://zenodo.org/communities/grei/>
- Share your feedback To share questions or feedback, please get in touch via the **GREI Community Feedback Form** <https://forms.gle/n8uYdh4nB1LaLt497>



GREI Coopetition In Action

GREI Annual Meeting

September 2023

Oakland, CA

At the University of California Office of the President



GREI Coopetition Work - New Tasks in Progress

ROR for Authors & Funding

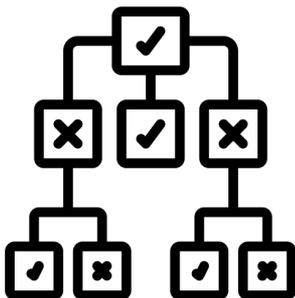


Data Citation



Data Citation Corpus

Flowchart for Generalist Repository Selection



Documentation for Carpentries Trainings



THE
CARPENTRIES



Figshare API Resources



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SciDataCon 2023

organized by



as part of

23-26 OCT

2023

SALZBURG



**International
Data Week**

A FESTIVAL OF DATA

Audience Questions & Discussion



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