

**Generalist Repository Ecosystem Initiative** 

# **Data Sharing in Generalist Repositories**

A Workshop by the NIH GREI repositories

September 19, 2023 1-3pm ET NIH Research Festival 2023

# Meet your workshop hosts



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# Workshop Outline

- About GREI
- Introduction to Generalist Repositories in the NIH Data Landscape
- Best Practices for Sharing Data
- Best Practices for Finding Data
- Common Metadata Elements Across Repositories
- Examples of NIH Intramural Research Shared in Generalist Repositories
- Resources
- Feedback and Questions



# Introduction to the Generalist Repository Ecosystem Initiative (GREI)



### **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 Inititative

### https://doi.org/10.6084/m9.figshare.21318270



# **Generalist Repository Ecosystem Initiative (GREI)**









https://datascience.nih.gov/data-ecosystem/exploring-a-generalist-repository-for-nih-funded-data

# **Discussion Question**

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# Getting to know you



# Introduction to Generalist Data Repositories



# **NIH Research Data Ecosystem**





### **Considerations When Selecting a Repository**

Repository Selection Considerations Tool (NIDDK) is intended to assist investigators to align the data types to be generated with appropriate repositories for submission and sharing.

After repository selection, investigators should confirm repository eligibility criteria and data requirements(e.g., data access type, preservation duration, storage capacity, possible data linkage strategies, acceptable file format)



## **NIH Desirable Characteristics of Data Repositories**

When choosing a repository to manage and share data resulting from Federally funded research, here are some desirable characteristics to look for:



<u>Guidance set forth by NIH</u> And by <u>The National Science</u>

and Technology Council, cited

in OSTP guidance





See Accessing Scientific Data for more

supported repositories.

information about accessing data from NIH-

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#### **Repositories for Sharing Scientific Data**

In general, NIH does not endorse or require sharing data in any particular repository, although some initiatives and funding opportunities will have individual requirements. **Overall, NIH encourages researchers to select the repository** that is most appropriate for their data type and discipline. See Selecting a **Data Repository**.

Browse through this listing of NIH-supported repositories to learn more about some places to share scientific data. Note that this list is not exhaustive. Select the link provided in the "Data Submission Policy" column to find data submission instructions for each repository.

Can't find a repository that suits your data? Here are several more resources:

- A listing of generalist repositories that accepts all data types
- Nature's Data Repository Guidance<sup>™</sup>
- The Registry of Research Data Repositories <sup>™</sup>

#### NIH-supported Scientific Data Repositories\*

Institute or Center 🔶	Repository Name 🛛 🌲	Repository Description ¢ Keyword Filter	Open Data 🚯 🛊 Submission	Data Submission 🚯 🛊 Policy	Open Time Frame for Data Deposit
Common Fund	Metabolomics Workbench (MetWB)	The Metabolomics Program's Data Repository and Coordinating Center (DRCC), housed at the San Diego Supercomputer Center (SDSC), University of California, San Diego, has developed the Metabolomics Workbench. MetWB will serve as a national and international repository for metabolomics data and metadata and will provide analysis tools and access to metabolite standards, protocols, tutorials, training, and more.	Yes	<u>How to submit data to</u> <u>MetWB</u>	Yes
Common Fund	<u>Stimulating Peripheral</u> <u>Activity to Relieve</u> <u>Conditions Portal (SPARC)</u>	The SPARC Portal provides interactive access to a growing collection of data, maps, and computational studies that focus on the role of the autonomic nervous system in controlling organ function. These resources are made available to the public with the intent of advancing bioelectronic medicine towards more precise treatment of diseases and conditions.	Yes	<u>How to submit data to</u> <u>SPARC</u>	Yes

#### https://sharing.nih.gov/data-management-and-sharing-policy/sharing-scientific-data/repositories-for-sharing-scientific-data



DATA MANAGEMENT AND SHARING POLICY

**GENOMIC D** 

Home > Data Management and Sharing Policy > Sharing Scientific Data >

### **Generalist Repositories**

While NIH encourages the use of domain-specific repositories where discipline or the type of data they generate, a generalist repository cardisciplinary focus. NIH does not recommend a specific generalist repo

- Dataverse <sup>™</sup>
- Dryad <sup>™</sup>
- Figshare<sup>™</sup>
- IEEE Dataport<sup>™</sup>
- Mendeley Data <sup>™</sup>
- Open Science Framework<sup>™</sup>
- Synapse <sup>™</sup>
- Vivli 🗹
- Zenodo <sup>™</sup>

While NIH encourages the use of domain-specific repositories where possible, such repositories are not available for all datasets. When investigators cannot locate a repository for their discipline or the type of data they generate, a generalist repository can be a useful place to share data.

Generalist repositories accept data regardless of data type, format, content, or disciplinary focus. NIH does not recommend a specific generalist repository and the list below, which is not exhaustive, is provided as a guide for locating generalist repositories.







## Is this repository a good fit for my data?

- Data from any discipline (and interdisciplinary data)
- Data that has an appropriate home in a disciplinary or specialist repository
- Data in any format (and multiple formats)
- Data that should be shared in conjunction with software/code required for analysis
- Data that should be shared in conjunction with data in a disciplinary repository
- Data ready and intended for broad sharing and reuse
- Data and metadata that can benefit from quality control (curation)
- Data that requires a long-term embargo or managed access
- Data containing personally identifiable information (PII) or other sensitive content



### 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 (VivII) to bring awareness to those in this field.

https://fairsharing.org/collection/GeneralRepositoryComparison

торіс	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 CCO publicly available research data Dryad is an independent non-profit that works directly with: • 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 mangement best	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.	Vivii 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 CENN 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 05F Storage. There is no limit imposed by 05F 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	SOGB per dataset, contact us via https:// zenodo.org/support for higher limits
Storage space per researcher	1 TB per researcher	No limit	No limit	Nolimit	Nolimit	No limit	No limit
Persistent, Unique Identifier Support	DOI, Handle	DOI	DOI	DOI	DOI	DOI	DOI

### https://doi.org/10.5281/zenodo.3946719

Common features and unique features

**Common:** Core Metadata Persistent Identifiers (PIDs) Discoverable Flexibility Open access, FAIR Metrics

Unique: Output types Storage, size limits Licenses Review Controlled Access Visualization Costs





Home > Other Sharing Policies > NIH Institute and Center Data Sharing Policies

#### NIH Institute and Center Data Sharing Policies

Data sharing is a priority across NIH. To this end, many institutes, centers, and research programs have instituted specific data sharing policies in addition to the trans-NIH policies. These policies are listed in the table below. Note that individual funding opportunities may specify other requirements or expectations, so be sure to read all instructions carefully.

Institute or Center	Data Sharing Policy Name \$	Description of Data Sharing Policy	Repositories \$
~			
HEAL	HEAL Public Access and Data Sharing	Through the NIH HEAL Initiative Public Access and Data Sharing Policy (the Policy), NIH seeks to create an infrastructure that addresses the need for researchers, clinicians, and patients to collaborate on sharing their collective data and knowledge about opioid missue and pain to provide scientific solutions to the opioid crisis. Under the Policy, applicants for entramural research funding (grants, cooperative agreements, contracts, and other transactions; "Applicants") for NIH HEAL Initiative Research Projects are required to submit a Public Access and Data Sharing Plan that [1] describes their proposed process for making resulting Publications and, to the extent possible, the Inderly(ing Primary Data immediately and breadly wallable to the public ([2], if applicable; provides a justification to NIH if such sharing is not possible. Underlying Primary Data should be made as widely and freely available as possible while safeguarding the privacy of participants and protecting confidential and proprietary data.	Various <u>HEAL-Compliant repositories</u>
NCI	Cancer Moonshot <sup>™</sup> Public Access and Data Sharing Policy	The primary goal of NCI's Cancer Moonshot <sup>®</sup> is to significantly accelerate cancer research discovery and meaningful implementation. The Cancer Moonshot Public Access and Data Sharing Policy addresses the recommendation of the Blue Ribbon Panel's Enhanced Data Sharing working group to the National Cancer Advisory Board that researchers, clinicians, and patients should collaborate in sharing their collective data and knowledge about cancer to accelerate progress towards improving cancer outcomes. Under this policy, applicants for Cancer Moonshot Research Projects are required to submit a "Public Access and Data Sharing Pan" that describes their proposed process for making, the texternt possible, resulting Publications and the Underlying Primary Data immediately and broadly available to the public, Investigators applying for Cancer Moonshot funds must provide a justification to NCI if such sharing is not possible.	Genomic Data Commons. dbGaP. TCIA
NCI	NCI Clinical Trial Access Policy	NCI believes that the full value of NCI-supported Interventional Clinical Trials can be realized only if the results of clinical trials are published as rapidly as possible. The Clinical Trial Access Policy aims at ensuring public availability of results from NCI-supported Interventional Clinical Trials can be realized only if the results of clinical trials are published as rapidly as possible. The Clinical Trial Access Policy aims at ensuring public availability of results from NCI-supported Interventional Clinical Trials. Review the NCI Clinical Trial Access Policy for expectations of the policy. Final Trial Results are expected to be reported in a publicly accessible manner within twelve (12) months of the Trial's Primary Completion Date regardless of whether the clinical trial was completed as planned or terminated earlier. Accordingly, data from incomplete trials are also expected to be reported in a publicly accessible manner within twelve (12) months of the data that the last subject had data collected or was examined even if the Trial Gens not achieve its primary aim. To comply with the Policy, Final Trial Results may be reported in a publicly accessible manner in various ways, which include but are not limited to publishing trial results in a peer-reviewed sidentific journal, submitting study reports to publicly accessible negatives devicated to the dissemition of clinical trial information (such as ClinicalTrials.gov), or any other formalized reporting format that may become available (e.g., abbreviated reports submitted to specific journals via simplified posting procedures).	Various
NHGRI	ENCODE Consortia Data Release, Data Use, and Publication Policies	Requires resource producers to release primary data along with an initial interpretation, in the form of genome features, to the appropriate public databases as soon as the data is verified. Consortia members will also identify validation standards that will be applied in subsequent analyses of the data or with additional experimentation where appropriate. All data will be deposited to public databases, such as GenBank or the ENCODE/modENCODE Data Coordination Centers (DCCs) and these pre-publication data will be available for all to use.	ENCODE, GenBank or other public databases
NHGRI	Genomic Data Sharing Policy	Broad data sharing promotes maximum public benefit from federally funded genomics research. NHGRI supports the broadest appropriate genomic data sharing with timely data release through widely accessible data repositories. These repositories may be open access (unvesticized) or, if more appropriate, controlled access. NHGRI encourages sharing of all data types. However, at this time the NHI GDS Policy and NHGRI implementation plans apply particularly to single nucleotide polymorphism (SNP) array data, genome sequence data, transcriptomic data, epigenomic data, or other molecular data produced by array-based technologies or high-throughput sequencing technologies. Data pertinent to the interpretation of genomic data – such as associated phenotype data (e.g., clinical information relevant to the disease under study), exposure data, and descriptive information (e.g., protocels or methodologies used) — are expected to be shared.	Widely accessible data repositories, including: <u>dbGaP</u> . <u>AnVIL 58A</u> . <u>GEO. Clinkva</u> , <u>National Cancer Institute</u> <u>Genomic Data commons</u> . UniPot. FlyBase. Database at the European Bioinformatics
NHLBI	NHLBI Policy for Data Sharing from Clinical Trials and Epidemiological Studies	Encourages all applicants to include a plan to address data sharing or to state why data sharing is not possible. For studies that meet the the following criteria, applicants are required to provide a data sharing plan, which will be reviewed and approved by the relevant NHLBI program official: a) research applications/proposals requesting \$500000 direct costs: b) research studies that have 500 or more participants c) ancillary studies based on NHLBI-funded parent studies d) applications/proposals submitted in response to FOAs that specify inclusion of data sharing plans; or e) other research studies deemed appropriate for data sharing by NHLBI program official investigators.	NHLBI data repository through NHLBI and other repositories
NHLBI	NHLBI Supplement to the NIH Policy for Data Management and Sharing	Defers to the NIH DMS Policy scope and definitions in general but explicitly indicates scientific data include human and non-human data. This policy also sets additional NHLBI-specific expectations for compliance timelines, NIH-supported data repositories, and ancillary studies to NHLBI-funded parent studies.	NHLBI-supported researchers are expected to share scientific data through existing NIH-supported data reportories, such as NHLBI (Bocha Catahyst& RDC). Generally discourages but allows for the deposition of the same data in multiple repositories with justification in the DMS Plan.

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#### https://sharing.nih.gov/other-sharing-policies/nih-institute-and-center-data-sharing-policies

	Home > Other Sharing Policies > NIH Institute and Center Data Sharing Policies			
DATA MANAGEMENT AND SHARING POLICY	GENOMIC DATA SHARING POLICY	OTHER SHARING POLICIES	ACCESSING DATA	ABOUT
SCIENTING DATA SHAKING				NIH Staff 🚔   FAQ   Contacts & Help
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#### NIH Institute and Center Data Sharing Policies

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Institute or Center	Data Sharing Policy Name \$	Description of Da										
~			NIH Policy on the Dis	semination of NIH-	Funded Clinica	I Trial Infor	mation					
HEAL	HEAL Public Access and Data Sharing	Through the NIH I collective data and other transactions the extent possible made as widely and	The NIH Policy on the Dissemination of N	e NIH Policy on the Dissemination of NIH-Funded Clinical Trial Information sets the expectation that all NIH-funded awardees and investigators conducting								
NCI	Cancer Moonshot <sup>™</sup> Public Access and Data Sharing Policy	Ine primary goat recommendation ( knowledge about that describes the Moonshot funds m	ust provide a justification to NCI if such sharing is not possible.	ical trials will register and report results of their trial in Clinicaltrials.gov. Read the details of the policy below.								
		NCI believes that the availability of result Access Policy for ea	he full value of NCI-supported interventional Clinical Trials can be realized only it ts from NCI-supported clinical trials from all NCI-funded research grants, cooper spectations of the policy.	NIH SCIENTIFIC DATA SHARING		Search	NIH Staff 🔒   FAQ	Q Contacts & Help				
NCI	NCI Clinical Trial Access Policy terminate earlies achieve its primar scientific journal, available (e.g. abi available (e.g. abi		rere expected to be reported in a publicly accessible manner within twelve (12) m Accordingly, data from incomplete trials are also expected to be reported within aim. To comply with the Policy, Final Trial Results may be reported in a publicly bimitting study reports to publicly accessible registries dedicated to the dissemit withat emports building accellence and the angle of the content of the second without provide provide a simplified posting procedures). If	DATA MANAGEMENT AND SHARING POLICY	GENOMIC DATA SHARING POLICY	OTHER SHARING POLICIES	ACCESSING DATA	ABOUT				
NHGRI	ENCODE Consortia Data Release, Data Use, and Publication Policies	Requires resource p identify validation s ENCODE/modENCO	vroducers to release primary data along with an initial interpretation, in the form tandards that will be applied in subsequent analyses of the data or with addition DDE Data Coordination Centers (DCCs) and these pre-publication data will be av	Home > Genomic Data Sharing Policy > About Genomic Data	Sharing > Genomic Data Sharing Policy Overview							
NHGRI	Genomic Data Sharing Policy	Broad data sharing repositories. These NHGRI encourages transcriptomic data	promotes maximum public benefit from federally funded genomics research. NF repositories may be open access (unrestricted) or, if more appropriate, controllec sharing of all data types. However, at this time the NIH GDS Policy and NH-GRI epigenomic data, or other molecular data produced by array-based technologie	NIH expects the broad and responsible sharing of hun resulting from NIH-funded research because the timel discoveries that improve our ability to diagnose, treat,	nan as well as non-human genomic data ly sharing of research results can accelerate and prevent disease.	Other data sharing p research. Learn More	policies may also apply to y	/our				
		Data pertinent to the interpretation of genomic data — such as associated phenotype data (e.g., clin methodologies used) — are expected to be shared.		Io comply with the NIH Genomic Data Sharing Policy®, NIH expects that investigators and institutions:  Develop and provide a plan for sharing genomic data as a part of the Data Management and Sharing Plan								
NHLBI	NHLBI Policy for Data Sharing from Clinical Triats and Epidemiological Studies	Encourages all app which will be revie studies based on N NHLBI program off	ets to include a plan to address data sharing or to state why data abaring is n a und approved by the relevant NH:BI program officia: a) reasons application BI-funded parent studies a) applications/proposals submitted in response to T inversignators.									
NHLBI	NHLBI Supplement to the NIH Policy for Data Management and Sharing	Defers to the NIH E timelines, NIH-supj	MS Policy scope and definitions in general but explicitly indicates scientific data sorted data repositories, and ancillary studies to NHLBI-funded parent studies.	Appropriately cite controlled-access data in publi Individual NIH Institutes, Centers, or Offices may have Select each step below to learn more. BEFORE SUBMITTING CENOMIC DATA	ications and presentations e additional expectations (see GDS Policy Expect SUBMITTING GENOMI	ations by NIH Institute & Center).	ACCESSING GENOMIC DAT	A				

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Home / HEAL Public Access and Data Sharing

### **HEAL Public Access and Data Sharing**



Generally, HEAL investigators who have access to a repository managed by their administering NIH Institute or Center (IC) should explore that option first. For further information, please read the NIH IC Section below. If this is not applicable, investigators should review the list to identify a repository well suited to the organism they are studying, the type of data they are producing, and/or a repository they have used in the past. Investigators should submit data to a discipline-specific repository, where possible, but may submit to a generalist repository if their data do not fit naturally into one of the compliant domain-specific repositories. If you feel the best repository for your data is not on the HEAL-compliant list, please contact the HEAL Stewards.

With HEAL investigator input, the Stewards will continue to work together with NIH to evaluate and update the list based on HEAL's needs.





### **HEAL Data Repository Selection Guide**

#### **HEAL-Compliant Repository List**

The repositories below represent the most up-to-date list of compliant destinations for HEAL data. For more information about each repository, we provide direct links to repositories and re3data/FAIRsharing entries. Re3data is a global registry of research data repositories, providing objective summaries of repository attributes. FAIRsharing is a similar resource, providing curated and crowd-sourced descriptions and evaluations of repository features.

The HEAL Stewards ordered this list loosely by preference. In many cases, you should go down the list and select the first repository to which you are eligible to submit data and that accepts your data type.

Some NIH Institutes or Centers (ICs) require their HEAL investigators, or a subset of their HEAL investigators, to deposit their data in a repository managed by the IC. Be sure to check your Notice of Award language to see if your administering IC has a supporting repository.

III COLUMNS = FILTERS = DENSITY	EXPORT				
Repository	Descriptive Tags	Organism	IC/Program	Get Started Here	Overview
Vivli	Clinical Trial, Generalist	Human	N/A	Vivli Guidance	View re3data entry
MassIVE	Mass spectrometry	Unrestricted	N/A	MassIVE Guidance	View re3data entry
National Sleep Research Resource (NSRR)	Sleep recordings and r	Human	N/A	NSRR Guidance	View re3data entry
Figshare	Generalist	Unrestricted	N/A	Figshare Guidance	View re3data entry
Dryad	Generalist	Unrestricted	N/A	Dryad Guidance	View re3data entry
Dataverse	Generalist	Unrestricted	N/A	Dataverse Guidance	View re3data entry
Mendeley Data	Generalist	Unrestricted	N/A	Mendeley Data Workflow and Guidance	View re3data entry
OpenScience Framework	Generalist	Unrestricted	N/A	Open Science Framework Guidance	View re3data entry
Qualitative Data Repository at Syracuse Universit	Qualitative	Unrestricted	N/A	Qualitative Data Repository Guidance	View re3data entry 1-26 of 26 < >

Vivli Figshare Dryad Dataverse Mendeley Data Open Science Framework Zemodo





News

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Search

Home \ Research & Funding \ Research Resources \ NIDDK Data Management & Sharing

#### Research Resources

NIDDK Data Management & Sharing

- NIDDK Guidance for Writing a DMS Plan
- NIDDK DMS Tools & Resources

### NIDDK Data Management & Sharing

The goal of the NIH Data Management and Sharing (DMS) policy is to maximize the availability of data from NIH-supported research to advance NIH's mission to enhance health, lengthen life, and reduce illness and disability. The DMS policy provides a consistent, minimum expectation of data management and sharing for all research supported by the agency. To help investigators implementing the NIH DMS policy, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) offers Institute-specific guidance for drafting a DMS Plan, as well as tools and examples to supplement the NIH DMS policy and resources NIHC.

#### **Guidance for Writing a DMS Plan**

Access NIDDK specific guidance for the DMS plan elements.

• Data Type

- Related Tools, Software, and/or Code
- Standards
- · Data Preservation, Access, and Associated Timelines
- Access, Distribution, or Reuse Considerations
- Oversight of Data Management and Sharing

#### **DMS Tools and Resources**

Access NIDDK resources for completing a DMS Plan.

- DMS Plan Worksheet
- DMS Plan Examples
- Data and Metadata Standards
- Selecting a Data Repository
- NIDDK DMS Webinar Series
- Frequently Asked Questions (FAQ)
- Glossary of DMS Terms



https://www.niddk.nih.gov/research-funding/research-resources/data-management-sharing





#### Selecting a Data Repository

Using an appropriate data repository generally improves the FAIRness (Findability, Accessibility, Interoperability, and Reusability) of the data. Selection of an appropriate data repository is essential to maximize data sharing. NIDDK affirms the desired repository characteristics NHC2 established by NIH, and strongly encourages the use of existing repositories to the extent possible for preserving and sharing scientific data.

News V

Investigators need to consider the type of data they will be submitting when selecting a repository. A short justification of the repository selected for each data type must be included.

NIDDK strongly encourages investigators to consider the factors below **in order** when selecting a repository:

- 1. NOFO requirement (e.g., NIDDK-funded, large, multi-site clinical studies should submit data to the NIDDK Central Repository).
- 2. Organism, domain, or data type-specific repositories.
- 3. Whether controlled access to data is required (e.g., for protection of human subjects' privacy).

**Repository Selection Aides** 

- The Repository Selection Considerations Tool (NIDDK) (PDF, 293.45 KB)  $\searrow$  is intended to assist investigators to align the data types to be generated with appropriate repositories for submission and sharing.
- dkNET C<sup>2</sup> lists available data repositories used by NIDDK supported researchers and provides tools to help comply with data sharing requirements.
- NIH Repositories for Sharing Scientific Data NHC, NIH-supported repositories and generalist repositories NHC for a wide range of data types and disciplines.
- The NIDDK DMS webinar "Finding a Repository for Your Data" provided additional information about NIDDK-research relevant repositories. The webinar videos linked below provides:
  - an overview of the tools and resources available on the NIDDK Information Network (dkNET) through Dr. Grethe's presentation ☞ ■.
  - o data eligibility and acceptance criteria as summarized in a presentation by Dr. Rodriguez ☞ ■ on the NIDDK Central Repository.
  - how generalist repositories can be leveraged when a domain or data-type specific repository is not available, as reviewed in the presentation by Mr. Chandramouliswaran C D.



#### https://www.niddk.nih.gov/research-funding/research-resources/data-management-sharing/dms-tools-resources#datarepository



Health Information



### Selecting a Data Repository

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**Repository Selection Aides** 

- The Repository Selection Considerations Tool (N intended to assist investigators to align the data appropriate repositories for submission and share
- dkNET C lists available data repositories used by provides tools to help comply with data sharing
- NIH Repositories for Sharing Scientific Data NIHC generalist repositories NIHC? for a wide range of d
- The NIDDK DMS webinar "Finding a Repository information about NIDDK-research relevant rep below provides:
  - an overview of the tools and resources avail Network (dkNET) through Dr. Grethe's pres
  - data eligibility and acceptance criteria as su Rodriguez C D on the NIDDK Central Report
  - how generalist repositories can be leverage specific repository is not available, as review Mr. Chandramouliswaran C D.





Health Information



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#### **Repository Selection Aides**

• The Repository Selection Considerations Tool (N

# Generalist repository

e.g., <u>NIH Generalist</u> <u>Repository Ecosystem</u> <u>Initiative (GREI)</u> (Vivli, Figshare, etc.)



### **Considerations When Selecting a Repository**



## How is GREI making data sharing easier for intramural researchers?

- Flexible data sharing of many different output types
- Easy deposit workflows
- Combine with other repositories
- Interoperable common metadata and persistent identifiers
- Product enhancements for NIH data sharing and discovery
- Tool integrations

# How is GREI improving discoverability of datasets across ALL repositories?



- Good discoverability across search engines and indexes
- Metadata for discovery and reuse
- Product enhancements for tracking and reuse of NIH data
- Common metrics
- Data Citations
- Credit for your work



# **Experience using Generalist Repositories**



# **Best Practices for Sharing Data**



# Best practices for sharing data

### GATHER all stages of data needed for reanalysis

- Consider including the following:
- Unprocessed raw data in recommended file types
- Prepared and organized numerical data
- (tables, spreadsheets, etc.)
- Code used to process and analyze data
- Output (statistics and visualizations)



### **VERIFY** files can be shared publicly

Remove restricted materials such as:

Copyrighted or Licensed documents or software (CC0)

· Content from published articles, grants, or patents

· Data from third party with restricted terms-of-use

- Identifiable human subjects data
- Locations of endangered and vulnerable species

### **CHOOSE open file formats**

- · Use non-proprietary open file formats when possible to enable easy access, better preservation and interoperability.
- If you include proprietary files, consider also providing the data in an open format.
- Plain text formats are preferred.



### **ORGANIZE** files logically

- Check files for errors or omissions.
- Name files descriptively and consistently.
- Omit needless files.
- Create a clear and logical file structure.
- Bundle organized files into compressed file archives.
- Try to keep individual files or archives smaller than 10GB.
- Verify file archives open and are not corrupted.

### **DESCRIBE your dataset in a README**

- Write clearly for a broad audience.
- Describe processing pipeline and analysis steps.
- Define variables and allowable values.
- Describe software used to process, visualize, analyze, and compress your data (add open source recommendations if possible).

### **SHARE your data**

- Identify a suitable data repository
- Review submission instructions
- Prepare your data following best practices
- Cite your published data package and share it on professional websites and/or social media









### Gather all data needed for reanalysis

# •••••

### For ease of reuse and understanding include:

- Unprocessed, raw data
- Prepared & organized numerical data (spreadsheets, tables, etc.)
- Code, scripts, or software used to process and analyze data
- Output (statistics & visualizations)



# Verify that files *can* be shared publicly



2

Remove restricted materials such as:

Copyrighted or licensed documents or software (non-CCO)

Content from published articles, grants, or patents

Data from 3rd party with restricted terms-of-use

Identifiable human subjects data

\_ocation information for species at risk (declining, threatened, endangered, or vulnerable status)





## Choose open file formats



• Use non-proprietary, open file formats when possible to enable easy access, better preservation, and interoperability (commonly used in research community, unencrypted, uncompressed)

If you *do* include proprietary files, consider <u>also</u> providing the data in an open format

- Plain text formats are preferred (.csv)
- **License**: Ideally, CCO. This allows reuse without any restrictions, requirements





# Organize files logically



- Check files for errors or omissions
- Name files descriptively and consistently
- Remove unnecessary files
- Create a clear and logical file structure
- Bundle organized files into compressed file archives
- Keep individual files or archives less than 10GB in size
- Verify file archives open and are not corrupted





# Prepare a comprehensive README file

- Write clearly for a broad audience
- Describe processing pipeline and analysis steps
- Define all variables, abbreviations, missing data codes, and units and allowable values
- Dates and locations of data collection (use standardized date formats)
- Provide description of file structure and contents
- Describe code, scripts, or software used to process, visualize, analyze, and compress the data

#### Title of Dataset:

Brief summary of dataset contents, contextualized in experimental procedures and results.

## Description of the Data and file structure

This is a freeform section for you to describe how the data are structured and how a potential consumer might use them. Be as descriptive as necessary. Keep in mind that users of your data might be new to the field and unfamiliar with common terminology, metrics, etc.

Describe relationship between data files, missing data codes, other abbreviations used. Be as descriptive as possible.

## Sharing/access Information

Links to other publicly accessible locations of the data:

Was data derived from another source? If yes, list source(s):



# Decide where to share your data!

### https://doi.org/10.5281/zenodo.3946719

### Generalist Repository Comparison Chart

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 (Vivil) to bring awareness to those in this field.

doi: 10.5281/zenodo.3946720

https://fairsharing.org/collection/GeneralRepositoryComparison

торіс	HARVARD DATAVERSE	DRYAD	FIGSHARE	MENDELEY DATA	OSF	VIVLI	ZENODO
<b>Brief Description</b>	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 CCO publicy available research data Dryad is an independent non-profit that works directly with: • 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 manament 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, researchers can make their work more impactful and more 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 FAR 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.	Vivii 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 CFRM data centre, whose purpose is long term preservation for the High Energy Physics discipline, one of the largest cicentific 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 05F Storage. There is no limit imposed by 0SF 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	Nolimit	No limit	No limit	No limit
Persistent, Unique Identifier Support	DOI, Handle	DOI	DOI	DOI	DOI	DOI	DOI

### **Repository Features**

### <u>Common:</u> Core Metadata Persistent Identifiers Discoverable Flexibility Open access, FAIR Metrics

<u>Unique</u>: Output types Storage, size limits Licenses Evaluation Controlled Access Visualization Costs

# In Review: Best practices for sharing data

1 Gather all data needed for reanalysis

2 Verify files can be shared publicly

3 Choose open file formats

4 Organize files logically

5 Describe your dataset in a detailed README file

6 Choose a suitable repository to share your data




#### Data preparation:

Additional considerations for human subjects data

- What level of data transformation does the repository require for reducing risk of re-identification?
- What privacy services or support does your institution offer?
- Governance: Do data requests go through a managed approval process or can anyone get at the data without restriction?
- Technical: Is the data accessible only in a secure enclave or workspace or can users download the data to their own computers?



#### Example of de-identified human subjects data shared in Harvard Dataverse

#### Terms of use and application form for data requests

Special Permissions



Submission of the following Application For The Use Of Data is required to access the data from this study

#### Leveraging persistent identifiers

- A persistent identifier is a long-lasting reference to a resource.
- Aiming to solve for lost and broken links to important information through both technical and human failures.
- Enables access to a resource even if it is moved to different locations or owners.
- Creates opportunities for interoperability with many kinds of infrastructure and systems.
- Key element in making data FAIR (Findable, Accessible, Interoperable, Reproducible)!

# Here's what you can do: - Get and use PIDs - Register for an ORCID iD! → <u>https://orcid.org</u> - Include relevant related PIDs in the metadata for your software, dataset, and paper PIDs, even if your repository or publisher says they're optional. - Use repositories that provide PIDs



There are PIDs for people, places, and things

PIDs for **people** (researchers) include ISNIs and ORCID iDs

RCID Connecting Research and Researchers Example: <u>https://orcid.org/0000-0002-5989-8244</u>

PIDs for **places** (research organizations) include ROR and Funder IDs

ROR

Example: https://ror.org/05d5mza29

PIDs for **things** (research outputs/inputs like grants, papers, projects, etc.) include Crossref and DataCite DOIs, IGSNs, and more!



Example: https://doi.org/10.17605/osf.io/jzu37



## **Best Practices for Finding Data**



## Best practices for FINDING data in a generalist repository

#### Describing data for discovery and reuse

All GREI repositories support the DataCite metadata schema and may support others

Repositories will typically have some fields with built-in controlled vocabularies and others that are free-text

- Title: Be descriptive, include data type, location, timeframe, and subject\*
- **Abstract**: Describe the data and context of its collection, not the results of a study\*
- Author name(s) and affiliation(s)
- Research domain
- Funding information, award number
- **Keyword**(s): Add synonyms, broader or more specific terms, use standardized vocabularies where possible
- **Related works**: Link to supplemental info, data management plans, preprint, related article, links to other publicly accessible locations of the data, etc.



## Google search for finding data

#### Example: Harvard Dataverse Abstract



sources for a single dataset



#### By author and title yields ample citations

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Randy Buckner received his BA in Psychology and his PhD in Neurosciences from Washingto	
University in St. Louis. He is a member of the Center for Brain	
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by AJ Holmes - 2015 - Cited by 339 — The present data fully cover the striatum, thalamus, and cerebellum allowing for analyses that extend beyond the <b>cerebral</b> cortex (see <b>Buckner</b> et	
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with structural, functional, and behavioral measures ... Randy L Buckner, Affiliations, <sup>1</sup> Center Simons Foundation Autism Research Initiative

https://www.sfari.org > funded-project > the-brain-ge...

Leverage search & browse via Google Dataset Search!





Search functionalities in generalist repositories

- Keyword, Advanced & Faceted Search
- Search by Funding Agency, Content Type, Geographic Location, Journal, Institution
- Browse by Category, Featured Datasets, Collections
- Sort, Filter or Refine by Publication Year, Newest, Most Relevant, Field, File Extension, Funder





DRYAD

## Examples of search functionalities in generalist repositories



MENDELEY DATA







## **PRYAD** Search & browse

#### Free-text field to search & explore



Or, initiate a search by geographic location, subject keywords, journal, or institution



Find by...

#### Placename North America, Europe, Australia, USA, Canada, United States, California, South America, Africa, more »



#### Journal

Ecology and Evolution, PLOS ONE, Molecular Ecology, Evolution, Royal Society Open Science, Proceedings of the Royal Society B: Biological Sciences, Proceedings of the Royal Society B, Journal of Evolutionary Biology, The American Naturalist, more »



#### Subject keyword

Holocene, Anthropocene, Coevolution, Life History Evolution, trade-offs, Inbreeding, Mate choice, present, Homo Sapiens, more »



#### Institution

University of California, Davis, French National Centre for Scientific Research, University of California, Berkeley, University of Oxford, Cornell University, University of British Columbia, Chinese Academy of Sciences, University of Florida, University of Washington, more »





#### Search & browse

Additional options available to further refine search results by **file extension** and **funder** 

limit your search	
Subject keyword	>
Geographical Location	>
Journal	>
Institution	~
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University of California, Davis	48
University of California System	30
Cornell University	20
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#### Improvements in planning:

- Provide more **robust search** options on Dryad site, include additional filters
- Offer search option **by date,** sort option
- Clean-up: remove ISSNs as titles, etc.
- Allow discoverability of **Research Areas** from metadata drop-down
- Boolean search functionality







#### Search & browse: publication year faceted search

Figshare is adding **publication year** faceted search in August 2023. https://figshare.com/search/new

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#### 🌼 fig**share**

#### Search & browse: Filtering by funder

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health sciences			XQ
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Funder (1/20 selected)	2,485 results found		sort by: Relevance $\checkmark$ 🗮 🏭
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Figshare added funder as a search facet in May 2023.



#### **MENDELEY DATA** Search, browse, and sort

Users can filter by **Publication Year** using the slider feature *or* manual date entry



Publication date may also be sorted in order by newest to oldest, or based on relevance

Sort by	Most relevant 🗸
	Newest
	Oldest
	Most relevant



#### Rendeley data Search & browse: filter by content type

Filter by **content type** by checking the desired check-box. Number in parentheses (#) indicates number of items identified for each type based upon the search criteria.

This feature was incorporated into Mendeley prior to the GREI project.

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	Slides (3)		
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Dataset

Export: APA BibTeX DataCite RIS

#### Hearing loss assessment in primary and secondary acquired cholesteatoma,

Olsen, Julia Maria, Ribeiro, Fernando de Andrade Quintanilha, Yasui, Mariana Mieko Me Published 1 January 2022 | figshare Academic Research System

ABSTRACT INTRODUCTION: Acquired middle ear cholesteatoma can be classified as pr is still controversial whether there is an association between the type of cholesteatoma ar association between hearing loss and the type of acquired cholesteatoma, and the status historical cohort study involving patients diagnosed with acquired cholesteatoma who w bone gaps and the status of the ossicular chain were analyzed for both types of cholestea

Dataset

Export: APA BibTeX DataCite RIS



### Search & browse: Coming soon!

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## New search experience releasing mid-August!

## Learn more at: https://help.osf.io/



#### Search & browse-ability to search via NIH



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Search and browse with the sponsor type allowing for NIH studies (metadata provided by clinicaltrials.gov)

## **Wivli** Search & browse —filters-start and end date and by sponsor

Phase IB/II Open-label Single /	Arm Study to Evaluate Safety	and Efficacy of Tucatinib in Combination With Palbociclib and Letrozole in Subjects With Hormone Receptor Positive and HER2-positive Metastatic Breast Cancer	CL
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### Zenodo Search & browse — access right, file type, keyword, and other fields

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	April 6, 2021 (r1) Dataset Restricted Access	□ Video (4)
	Dataset related to case report article "Gabapentin treatment in a patient with KCNQ2 developmental	

Refinement available across a wide range of fields <u>https://help.zenodo.org/guides/search/</u>, including all fields (e.g. funder, ORCID, datetime and ranges, and affiliation) identifier schemes, relations, and contributor types.



## **Zendo** Search & browse — search guide

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You can require <i>absence</i> of one or more terms using either the – or <b>NOT</b> operator:		contributors.affiliatio	on string string	
Examples: -open +science or NOT open AND science		contributors.orcid	string (ex	kact)
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Example: "open science"		creators.affiliation	string	
Results will match records with the <i>phrase open science</i> in <i>any field</i> .		creators.name	string	
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Refinement available across a wide range of fields <u>https://help.zenodo.org/guides/search/</u>, including all fields (e.g. funder, ORCID, datetime and ranges, and affiliation) identifier schemes, relations, and contributor types.



## **Common Metadata Elements Across Repositories**



#### Common metadata elements across repositories

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

Version 01: Last updated 2023-06-29

#### Overview

One goal of <u>GREI</u> 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 <u>DataCite Metadata Schema 4.4</u>, 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 subcompilton 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



#### Common metadata elements across repositories

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do





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.





## A persistent identifier (PID) is a unique, long-lasting reference to an entity.

https://doi.org/10.5061/dryad.708gr



Special URL that is registered in a known system, like DOI, ORCID or ROR

Always points to the same resource (or a metadata representation)

https://datadryad.org/stash/dataset/

doi:10.5061/dryad.708gr



#### Example: Dataset DOI - Harvard Dataverse



https://doi.org/10.7910/DVN/DEAZAQ



https://dataverse.harvard.edu/dataset.xhtml?p ersistentId=doi:10.7910/DVN/DEAZAQ Bataverse Adi

Cite Dataset -

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Harvard Dataverse >

#### Replication Data for: The profile of research on Long-Covid: A survey

Version 2.0



Ren, Feng, 2022, 'Replication Data for: The profile of research on Long-Covid: A survey", https://doi.org/10.7910/DVN/DEAZAQ, Harvard Dataverse, V2

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0 Downloads 😡

#### Description 😡

The file contains raw data,data processing results, various data inspection results and a variety of estimation results. (2022-12-28)

Subject	9
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Social Sciences

License/Data Use Agreement



Files Metadata Terms Versions

🚨 Export Metadata -

Citation Metadata 🔺	
Persistent Identifier 😡	doi:10.7910/DVN/DEAZAQ
Publication Date 📀	2022-12-27
Title 🕢	Replication Data for: The profile of research on Long-Covid: A survey
Author	Ren, Feng (China University of Petroleum (East China))
Point of Contact 😡	Use email button above to contact.
	Ren, Feng (China University of Petroleum (East China))
Description 📀	The file contains raw data,data processing results, various data inspection results and a variety of estimation results. (2022-12-28)
Subject 😡	Social Sciences
Depositor 😧	Ren, Feng
Deposit Date 🕢	2022-12-27



#### 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

- 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	funderldentifier	Use IDs from the <u>CrossRef's Funder Registry</u> or from ROR.
19.2.a	funderldentifierType	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	



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.



#### Example - search for datasets - DRYAD

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<u>Title</u> †↓ β-cell-specific	Authors †↓ Attie; Cardone; de Klerk;	DOI †↓ 10.5061/dryad.bcc2fqzcw	<u>Funder</u> ↑↓ National	Award †↓ R01DK101573	Submitted 11	Embargoed ↑↓	Published 1								
deletion of Ztp148 improves nutrient- stimulated β-cell Ca2+ responses	Emfinger, Foster, Gygi; Hebrok; Keller; Kendziorski; Kibbey; Lewandowski; Liu; Merrins; Mitok; Paulo; Perales; Rabaglia; Schueler; Simonett; Stapleton; Wang; Yu		Institute of Diabetes and Digestive and Kidney Diseases	Home Inse Get External Data	rt Page Layout Page Layout Queries & C Properties resh J Sooft 365 to Create	Formulas	Data Review	View s A ↓ Z ↓ Z ↓ ce and Edit	Az Filter	23-07-21_fund Clear Reapply Advanced	der_report	(1) Flash Fill	Data Validatio	N ¥ Unat-If Analysis ₪	Group Ungrou Subtote
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				1 Title 2 Data from: Age-a 3 Data from: Use or 4 Quantitative anal 5 Quantitative anal 6 Quantitative anal 7 Trans-specific pol 8 Data from: Total : 9 Summary statisti 10 Summary statisti	Authors t-injury Green; Murphy fan exe Bowers; Carpei ysis of ± Lerit; Ryder ysis of ± Lerit; Ryder ymorph Lively; Million ymthes Adamson; Darz cs from Ambati; Faracc cs from Ambati: Faracc	DOI           ; Ortiz; Ro 10.5061/dry;           ;; Muchoni 10.5061/dry;           +Jallmay 10.5061/dry;           +Jallmay 10.5061/dry;	Funder Ad.5tb2rtp4r National Ins Ad.7pvmcvdx National Ins Ad.7pvmcvdx National Ins Ad.h70rxwdg National Ins Ad.h70rxwdg National He- Ad.75dh782F Eunice Kenn National Ins Ad.851c5b9l National Ins Ad.851c5b9l National Ins	Fur stitute of Neu http stitute of Gen http stitute of Hen http stitutes of Hen http	nder id p://dx.doi.org/10.1 p://dx.doi.org/10.1 p://dx.doi.org/10.1 p://dx.doi.org/10.1 p://dx.doi.org/10.1 p://dx.doi.org/10.1 p://dx.doi.org/10.1	Award           30:         R21NS120022           30:         GM103440           30:         5K12GM00068           30:         IF32GM12840           30:         SK22HL126922           30:         SK22HL126922           30:30/100000057         30:30/10000057           30:         NIH-23724           30:         SK22HL126922	Firs 08/ 12/ 0007/ 7707/ 7707/ 12/ 10/ 10/ 6 10/	t submitted 25/2021 06:01:03 U 26/2022 20:25:59 U 06/2020 21:30:03 U 06/2020 21:30:03 U 06/2020 21:30:03 U 09/2021 01:41:04 U 19/2022 00:32:04 U 29/2022 01:06:04 U 29/2022 01:06:04 U	Embargoed TC TC TC TC TC TC TC TC TC TC TC	Published 01/01/2022 00:00:00 UT 01/01/2023 00:00:00 UT 01/02/2021 00:00:00 UT 01/02/2021 00:00:00 UT 01/02/2023 00:00:00 UT 01/03/2023 00:00 UT 01/03/2	JTC JTC JTC JTC JTC JTC JTC UTC UTC

#### Example - search for datasets - Figshare



DataCite Commons	tuberculosis     ×     Q     Pages -     Support
	■ Works © People
	4 Works
Publication Year	Accuracy of the InnowaveDX MTB/RIF test for detection of <i>Mycobacterium tuberculosis</i> and rifempicin resistance: a prospective multicentre study
2023	<ul> <li>Yunfeng Deng, Zichun Ma, Biyi Su, Guanghong Bai, Jianhua Pan, Quan Wang, Long Cai, Yanhua Song, Yuanyuan Shang, Pinyun Ma, Jing Li, Qianxuan Zhou, Gulibike Mulati, Dapeng Fan, Shanshan Li, Yaoju Tan &amp; Yu Pang</li> </ul>
Work Type	Dataset published 2023 in figshare Academic Research System
🗹 Dataset	Early and accurate diagnosis of tuberculosis (TB) is necessary to initiate proper therapy for the benefit of the patients and to prevent disease transmission in the community. In this study, we developed the InnowaveDX MTB/RIF (InnowaveDX) to detect <i>Mycobacterium</i> <i>tuberculosis</i> (MTB) and rifampicin resistance simultaneously. A prospective multicentre study was conducted to evaluate the diagnostic
License	performance of InnowaveDX for the detection MTB in sputum samples as compared with Xpert and culture. The calculated limit of detection (LOD) for InnowaveDX was 9.6 CEU/mI for TB detection and 374.9 CEU/mI for RIF susceptibility. None of the other bacteria
CC-BY-4.0	4 tested produced signals that fulfilled the positive TB criteria, demonstrating a species-specificity of InnovaveDX. Then 951 individuals were enrolled at 7 hospitals, of which 607 were definite TB cases with positive culture and/or Xpert results, including 354 smear- positive and 253 smear-negative cases. InnovaveDX sensitivity was 92 7% versus hactoriologically TB standard. Further follow-up.
Field of Science	revealed that 61 (91.0%) out of 67 false-positive patients with no bacteriological evidence met the criteria of clinically diagnosed TB.
<ul> <li>Biological sciences</li> <li>Health sciences</li> <li>Chemical sciences</li> <li>Mathematics</li> </ul>	Among 125 RIF-resistant TB patients diagnosed by Xpert, 108 cases were correctly identified by InnowaveDX, yielding a sensitivity of 86.4%. Additionally, the proportion of very low bacterial load in the discordant susceptibility group was significantly higher than in the concordant susceptibility group ( <i>P</i> = 0.029). To conclude, we have developed a novel molecular diagnostic with promising detection capabilities of TB and RIF susceptibility. In addition, the discordant RIF susceptibility results between InnowaveDX and Xpert are more frequently observed in samples with very low bacterial load.
	DOI registered January 2, 2023 via DataCite.
Registration Agency	$(\mathbf{G})$
DataCite	4 Dataset Biological sciences Mathematics Health sciences



https://doi.org/10.6084/m9.figshare.21804085

#### Example - search for datasets - OSF



## **Discussion Question**

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What types of data are you sharing? What are your data repository needs?



## Examples of NIH Intramural Research Shared in GREI Repositories


# 🏶 DRYAD

10

#### Repository features that meet NIH requirements

- 1 All authors can connect their ORCID iDs
- 2 DOI assigned upon submission, does not change
- 3 Optional usage notes to help ensure ease of access & understanding
- 4 Funder & award details, searchable on the site
- 5 Search, browse, & explore datasets
- 6 Data package available for download with option to upload new versions, README is required
- 7 Links to preprint and supplemental info hosted on Zenodo; can also link to Data Mgmt Plan, related research, etc.
- 8 Metrics! Track views, downloads, and citations
- 9 Subject keywords (aid in discoverability); minimum 3 keywords required

CCO license required for all data hosted by Dryad permits unrestricted reuse, alternate license can be selected for Zenodo software files, supplemental files are CCBY



## Zenodo Use case: supplemental data



#### zenodo Q € Log in Zenodo.org will be unavailable for 2 hours on September 29th from 06:00-08:00 UTC. See announcement August 22, 2023 Other Open Access 3 0 Data from: An adaptive biomolecular @ views ★ downloads condensation response is conserved across See more details. environmentally divergent species 6 Keyport Kik, Samantha; Christopher, Dana; Glauninger, Hendrik; Wong Hickernell, Caitlin; Bard, Jared; Ford, Michael; Sosnick Tobin: Drummond D Allan Cells must sense and respond to sudden maladaptive environmental changes-stresses-to survive and thrive. Across eukarvotes, stresses such as heat shock trigger conserved responses; growth arrest, a specific transcriptional response. and biomolecular condensation of protein and mRNA into structures known as stress granules under severe stress. The composition, formation mechanism, adaptive significance, and even evolutionary conservation of these condensed

DRYAD

**OpenAIRE** 

Publication date: August 22, 2023

DOI 10.5281/2

Related identifiers

Derived from

Communities:

License (for files):

Dryad

10.5061/drvad w3r2280w6

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Keyword(s)

Cited by 10.1101/2023.07.28.551061

eukaryotes, stresses such as heat shock trigger conserved responses growth arrest, a specific transcriptional response, and bioinceloualize condensition of provide and mRNA trans torturuser sknown as stress granules under server stress. The composition, formation mechanism, adaptive significance, and even evolutionary conservation of these condensed structures remain eliminatic. Here very orivide an unprecedented view into stress fragered condensition, it is a structure stress and the service stress and evolution and the structure stress and the stress transpect conservation and turing, and its integration into other well-studied aspects of the stress response. Using three morphologically environment and the stress stress and the stress response. Using three morphologically may environ the stress stress stress provides an unprecedent of with other stress in the stress and diverged by up to 100 million years, we show that proteome scale biometeular condensation is tured to species specific thermal incidence, does stress granules-condenses in isolation at species specific temperatures, with conserved molecular features and conformational changes modulatings condensation. From the ecological to the melocular stack, or results reveal previously unapprecisated levels of evolutionary selection in the eukaryotic stress response, while establishing a rich, catazable system for further inciru).

Seven folders contain raw and processed data as well as R or Python scripts to produce the figures in the paper. Funding provided by: National institute of General Medical Sciences Crosser Funder Registry ID: http://dx.doi.org/10.10309/100000057

Award Number: GM144278 Funding provided by: National Institute of General Medical Sciences Crossref Funder Registry ID: http://dx.doi.org/10.18039/100000057 Award Number: GM127406

Funding provided by: National Institute of General Medical Sciences



#### DRYAD Who we are | What we do | Join us | Help + | Datasets + | Logout Data from: An adaptive biomolecular condensation Data files response is conserved across environmentally divergent Download dataset species Keyport Kik, Samantha, University of Chicago, @ https://orcid.org/0000-0003-4095-9526 Aug 22, 2023 Christopher, Dana, University of Chicago \* changes not displayed to the public Glauninger, Hendrik, University of Chicago Wong Hickernell, Caitlin, University of Chicago Related works Bard, Jared, University of Chicago Ford Michael MS Bioworks Preprint Sosnick, Tobin, University of Chicago https://doi.org/10.11\_01/2023.07.28.551061 Drummond, D. Allan, University of Chicago Supplemental information smkevport@gmail.com.dchristopher3@uchicago.edu https://doi.org/10.5281/zenodo.8192760 Hendrik.Glauninger@uchicagomedicine.org, caltlinwong@uchicago.edu, jbard@uchicago.edu, mford@msbioworks.com, trsosnici@uchicago.edu, dadrummond@uchicago.edu Published Aug 22, 2023 on Dryad. https://doi.org/10.5061/dryad.w3r2280w6 Cite this dataset 🛅 🖬 💟 🔂 🖸 🗖 Keyport Kik, Samantha et al. (2023). Data from: An adaptive biomplecular condensation response is conserved across environmentally divergent species [Dataset]. Dryad. https://doi.org/10.5061/drvad.w3r2280w6 **Netrics** Abstract 5 views Cells must sense and respond to sudden maladaptive environmental changes-stresses-to survive A 0 downloads and thrive. Across eukaryotes, stresses such as heat shock trigger conserved responses: growth arrest, a specific transcriptional response, and biomolecular condensation of protein and mRNA into structures known as stress granules under severe stress. The composition, formation mechanism 5 0 citations adaptive significance, and even evolutionary conservation of these condensed structures remain enigmatic. Here we provide an unprecedented view into stress-triggered condensation, its evolutionary conservation and tuning, and its integration into other well-studied aspects of the stress ubject keywords response. Using three morphologically near-identical budding yeast species adapted to different thermal environments and diverged by up to 100 million years, we show that proteome-scale biomolecular condensation is tuned to species-specific thermal niches, closely tracking corresponding low cytometry growth and transcriptional responses. In each species, poly(A)-binding protein-a core marker of stress Mass spectrometry granules-condenses in isolation at species-specific temperatures, with conserved molecular features Biological sciences and conformational changes modulating condensation. From the ecological to the molecular scale, our dynamic light scattering results reveal previously unappreciated levels of evolutionary selection in the eukaryotic stress response, while establishing a rich, tractable system for further inquiry. hydrogen-deuterium exchange marxianu Usage notes RNA-seq Seven folders contain raw and processed data as well as R or Python scripts to produce the figures in the paper. S, kudriavzevil Funding icense National Institute of General Medical Sciences, Award: GM144278 National Institute of General Medical Sciences, Award: GM127406 This work is licensed under a CC0 1.0 Universa CC0 1.0) Public Domain Dedication license National Institute of General Medical Sciences, Award: R01 GM055694 (C) Portation National Institute of General Medical Sciences, Award: R35 GM14833 National Institute of General Medical Sciences, Award: T32 GM007197-4 National Institute of Environmental Health Sciences. Award: F31 ES03233 Helen Hay Whitney Foundatio Data from: An adaptive biomolecular condensation response is conserved across

environmentally divergent species. Zenodo. https://doi.org/10.5281/zenodo.8192760

# Mendeley Data Case Study 1:

Providing Steps to Reproduce a Dataset



### Whole genome sequence data of Leptospira weilii and Leptospira Leptospira kirschneri isolated from human subjects Sri Lanka

Published: 13 June 2023 | Version 1 | DOI: 10.17632/3f8tvpw348.1 Contributors: Indika Rathnabahu, Dinesha Jayasundara, Janith Warnasekara, Micheal Matthias, Joseph M. Vinetz, Suneth Agampodi

#### Steps to reproduce

Cultures were isolated using EMJH media

DNA extraction was performed using the DNeasy Blood & Tissue Kit, following a Gram-negative bacteria protocol, with an RNase cleanup step included.

The quantity of extracted DNA was measured using a Qubit 4 fluorometer.

High-quality genomic DNA (gDNA) was utilized to construct multiplexed PacBio SMRTbell libraries using the SMRTbell Express Template Prep Kit.

Shearing of 1 g of genomic DNA was achieved using Covaris g-tubes, and DNA concentration was enhanced using AMPure PB beads.

The DNA underwent repair and ligation to a barcoded 8A adaptor, followed by adherence to size selection instructions for Blue Pippin TM 4 kb or more,

Whole genome sequencing was conducted using the PacBio Single Molecule Real-Time (SMRT) platform

Raw data were processing and genome assembly using Canu 2.1 and Circlator and then circularized.

Genome annotation was conducted using RAST (Rapid Annotation Using Subsystem Technology ) and NCBI Prokaryotic Genome Annotation Pipeline.

## https://data.mendeley.com/datasets/3f8tvpw348/1



## Step 1: Create New Draft DataSet and Add Title

Draft autosaved 14 September 2023 14:10 You can close and resume the draft whenever you want.

Draft (Version 1)

 $\star$  Indicated fields which must be completed before publishing

Title \*



Contributors \*

 $\equiv$  Traci Snowden  $\times$  + Add contributor



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Additional metadata for Elsevier datasets bate the data was collected *	Outline how you arrived at your ata, to help others understand ow the data was gathered and ow to reproduce your research. For instance, which methods and protocols were used, and nstruments, reagents, software or workflows if any?
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# Mendeley Data: Case Study 2

Assigning an Embargo Date

Mendeley Data

## DNA-TFAM smFRET

Published: 15 August 2023 | Version 1 | DOI: 10.17632/4whngps32r.1 Contributors: Hyun Huh, Jiayu Shen, Aparna Ramachandran, Yogeeshwar Ajjugal, Smita Patel, Sang-Hyuk Lee

Embargo: 13 February 2024, 12:00 AM UTC This dataset will be made public in 153 days

#### What does under embargo mean?

When publishing a dataset, a user may choose to defer the date at which the data becomes available (for example, so that it is available at the same time as an associated article). This means that the description and files of that dataset are not publicly available until the embargo date is reached. Meanwhile, some other information about the dataset - such as the contributors, title, citation and associated articles become available immediately, prior to the embargo.

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Version 1

Embargo date:

Published: DOI: 13 February 2024 (153 days)

15 Aug 2023 10.17632/4whngps32r.1

Cite this dataset

Huh, Hyun; Shen, Jiayu; Ramachandran, Aparna; Ajjugal, Yogeeshwar ; Patel, Smita; Lee, Sang-Hyuk (2023), "DNA-TFAM smFRET", Mendeley Data, V1, doi: 10.17632/4whngps32r.1

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## Step 1: Click on the "Set embargo" link in the dataset draft

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There are currently no files in your dataset

If you publish, a metadata only dataset will be created







# **Step 2: Click the "Embargo Date" radio button**

Select a time period or a calendar date by/on which your dataset will become public.

Set embargo / Restrict access				× Remove
🔒 Set embargo				X Remove
Embargo date The files will be hidden until the e	mbargo date. En	nbarg	gos are made public at 12ar	n UTC.
Select time period			Select date	
3 Months 6 Months	l Year	or	dd/mm/yyyy	

with specific requesters.



## Dataverse

Dataverse

Brain

Genomics

Superstruct Project

- **Restricted Access**
- **Custom Terms**
- **Request Access** workflow
- NIH



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Brain Genomics Superstruct Project (GSP)

Access Dataset -

## **Case Study: NIH researcher Using Vivli to access data**



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## Predicting Treatment Response to Tumor Necrosis Factor Inhibitors in Patients with Ankylosing Spondylitis

Lead Investigator: Michael Ward NIH Title of Research Proposal: Predicting Treatment Response to Tumor Necrosis Factor Inhibitors in Patients with Ankylosing Spondylitis Vivli Data Request: 3369 Funding Source: None Potential Conflicts of Interest: I have no financial or commercial conflicts of interest in the proposed work. Summary of the Proposed Research:

Axial spondyloarthritis (axial SpA) is a group of inflammatory spine conditions that affects 0.9-1.4% of general population, and ankylosing spondylitis (AS) is the prototypic disease. Tumor Necrosis Factor inhibitors (TNFi) have been widely used as the second line treatment for patients with active AS when patients have inadequate response to non-steroidal anti-inflammatory drugs (NSAIDs) or cannot tolerate NSAIDs. The treatment response to TNFi, however, is heterogenous. In our previous systematic review of randomized control trials of TNFi in patients with AS, about one-half of the participants (39.% to 58.9%) achieved the Assessment in SpondyloArthritis international Society 40%

6 clinical trials accessed from Pfizer and AbbVie

#### **Public Disclosures:**

 Wang R, Dasgupta A, Ward M. Predicting Major Treatment Response to Tumor Necrosis Factor Inhibitors in Patients with Ankylosing Spondylitis [abstract]. *Arthritis Rheumatol.* 2020; 72 (suppl 10).

https://acrabstracts.org/abstract/predicting-majortreatment-response-to-tumor-necrosis-factor-inhi bitorsin-patients-with-ankylosing-spondylitis/.

 Wang R, Dasgupta A, Ward MM. Predicting Probability of Response to Tumor Necrosis Factor Inhibitors for Individual Patients With Ankylosing Spondylitis. JAMA Netw Open. 2022;5(3):e222312. doi: 10.1001/jamanetworkopen.2022.2312



JOURNAL CONTRIBUTION

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ALL CATEGORIES SEARCH G

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COLLECTION:

Uday Kulkarni

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	DATASET			

## **Figshare+**



## **Figshare for Institutions**





## Support for large datasets



EXPORTS

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#### https://doi.org/10.6084/m9.figshare.14582760.v1

Mechanobiology (ZIAEB000094)



## **Support for large datasets**



## Link to NIH Intramural Project Funding

#### FUNDING

**Craniofacial Developmental Dynamics** National Institute of Dental and Craniofacial Research Find out more...

https://doi.org/10.6084/m9.figshare.14582760.v1

Mechanobiology (ZIAEB000094)

Cell Fate and Tissue Dynamics in Salivary Gland Development (K99DE27982)

Ø Dimensions	Support Register
Crant Craniofacial Developmental Dynamics Fueder National Institute of Developmental Advances (NBCR) front number 2019/2019/14. Jorden developmental (NBCR)	≪∰ Share
Investigators KEINETH VAMADA - National Institute of Dental and Cranofacial Research Pl	Details Funding amount USD 12,608,315
Research organization National Institute of Dental and Cranofacial Research, United States	Funding period 2009 - 2022 1 Jan 1 Jan
Abstract This project is focused primarily on determining mechanisms of morphogonesis and maintenance of asilvary glands and other organs. We are addressing the following major operations: 1. How do embryonic salivary glands and other barchedro opens generate that characteristic barchedra draitecture during the process of barchedro morphogenesis? Specifically, how is the formation of offecth, dota, and dusts mediated and consolinated an integlation and to beyonical livel? How are very failable bioengenering for organ replacement - particularly of asilvary glands - by understanding branching morphogenesis and by promining specific stores of this process? 2. What are the contribution of absence background and other of the other of the other operation of the other operation of the other operation of the other operations of the other operations of the other operation.	Program Intramural Research (Funding Mechanism) Resulting publications 85
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Mechanobiology (ZIAEB000094)

Cell Fate and Tissue Dynamics in Salivary Gland Development (K99DE27982)

(c) (0) EXPORTS

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# Group data into Collections

Collect related materials together

Both the collection and each item within it are assigned their own DOIs.

This allows researchers the option of using either the collection level DOI to refer to all of the collected datasets, or the item level DOIs to refer to specific items within the collection.

In the THINGS-data collection, NIMH researchers have shared 12 large-scale neuro-imaging and behavioral datasets for the study of natural object representations in the brain and in behavior.

## **THINGS-**data: A multimodal collection of large-scale datasets for investigating object representations in brain and behavior





## Multi-modal Dataset Designed for Reuse

The associated <u>eLifeSciences data paper</u> provides the following overview of the complete data collection, as illustrated by the figure at right:

(A) THINGS-data comprises MEG, fMRI and behavioral responses to large samples of object images taken from the THINGS database.
(B) In the fMRI and MEG experiment, participants viewed object images while performing an oddball detection task (synthetic image).
(C) The behavioral dataset comprises human similarity judgements from an odd-one-out task where participants chose the most dissimilar object amongst three options.

(D) The fMRI dataset contains extensive additional imaging data.
(E) The MEG dataset provides high temporal resolution of neural response measurements in 272 channels. The butterfly plot shows the mean stimulus-locked response in each channel for four example sessions in one of the participants.







# Use of multiple repositories with Figshare

The THINGS-data collection was designed for reuse and extends beyond the Figshare collection alone, making use of additional open discipline specific and generalist repositories, to best share the complete data collection.

The data availability statement explains where each part of the data collection can be found:

- OpenNeuro
- Figshare
- OSF

## Data availability

All parts of the THINGS-data collection are freely available on scientific data repositories. We provide the raw MRI (https://doi.org/10.18112/openneuro.ds004192.v1.0.5) and raw MEG (https://doi.org/10.18112/openneuro.ds004212.v2.0.0) datasets in BIDS format (Gorgolewski et al., 2016) on OpenNeuro (Markiewicz et al., 2021). In addition to these raw datasets, we provide the raw and preprocessed MEG data as well as the raw and derivative MRI data on Figshare (Thelwall and Kousha, 2016) at

https://doi.org/10.25452/figshare.plus.c.6161151. The MEG data derivatives include preprocessed and epoched data that are compatible with MNEpython and CoSMoMVPA in MATLAB. The MRI data derivatives include single trial response estimates, category-selective and retinotopic regions of interest, cortical flatmaps, independent component based noise regressors, voxel-wise noise ceilings, and estimates of subject specific retinotopic parameters. In addition, we included the preprocessed and epoched eyetracking data that were recorded during the MEG experiment in the OpenNeuro repository. The behavioral triplet odd-one-out dataset can be accessed on OSF (https://osf.io/f5rn6/).



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## **Connect with the Repositories**

Dataverse: <u>NIH-DMP Guidance for Harvard Dataverse and support@dataverse.harvard.edu</u>

**Dryad**: <u>Dryad submission requirements</u>; <u>Good Data Practices</u>; <u>Dryad's role in the NIH's new</u> <u>Policy for Data Management and Sharing</u>; <u>Management and Sharing</u>; <u>Manageme</u>

**Figshare**: <u>Guide to sharing NIH-funded research</u> and <u>How to write a Data Management Plan</u> (DMP) and include Figshare in your data sharing plans <u>III</u> info@figshare.com

**OSF**: <u>Common questions and support documentation</u> and <u>Creating a data management plan</u> (DMP) document

**Mendeley Data**: <u>Elsevier sharing policy</u>, <u>Guidance on publishing for researchers</u>, and <u>Elsevier</u> <u>journal data guidelines</u>

Vivli: Data submission checklist

Zenodo: NIH Data Management and Sharing Plan Guidance and info@zenodo.org

## **Connect with GREI**

- → Join the **<u>GREI Google Group</u>** to receive updates on GREI activities. ADD EMAIL
- → Read the latest posts on the **<u>GREI Community blog</u>**.
- → Browse the resources available in the **<u>GREI Community</u>** on Zenodo.
- → Check out the <u>GREI Training & Outreach Calendar</u> for information about upcoming events from the individual GREI repositories.
- → Help us engage with *your* research communities with resources, a custom presentation, or communications.



# **Your Feedback**

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# What do you need from generalist repositories?



# **Questions?**

