Data Management & The Open Science Framework

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RRROBOTS Course
Scripps Institution of Oceanography
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Introduction

Part 1:

A. Why is data management important?

B. Best practices to Consider

Part 2:

Open Science Framework Demo

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Part 1a

Why Manage Data?

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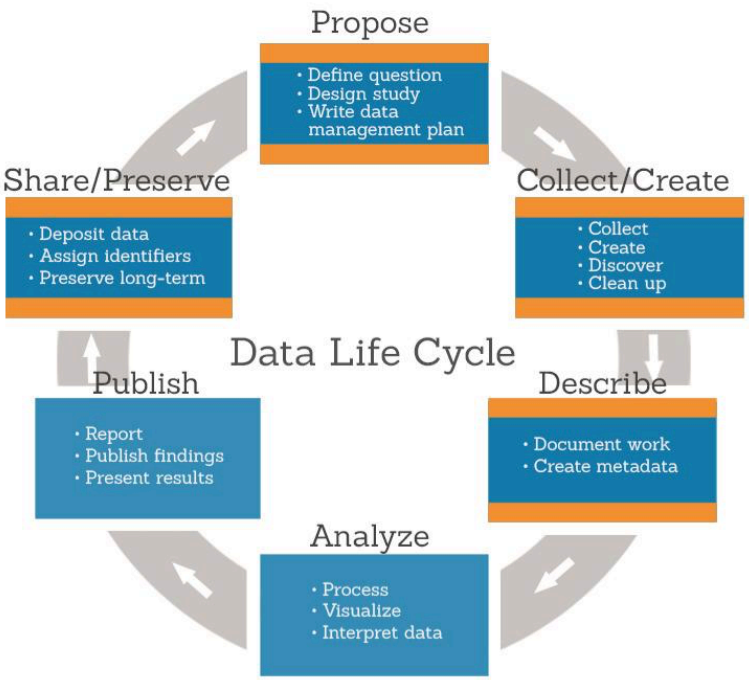
Data Life Cycle



Managing data in the Data Life Cycle:

- Data management planning
- Documenting project/file details
- Choosing file formats
- File organization & naming conventions
- Access control & security
- Backup & Storage
- Sharing and Preservation

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Data Management Strategy

A good data management strategy:

- Establish best practices for your data management
- Plan to share well-documented data
- Well prepared data saves time
- Create a concise data management plan for your grant proposal
- Reduces cost of creating, protecting and storing data

Ensures your data will be available to future generations to enable reproducible research

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Benefits

Benefits of good data management:

- Promotes successful data collection.
- Ease of using and sharing data.
- Helps to increase research impact and visibility.
- Standardize data management practices and policies in your research lab.

Saves you time, effort and resources during the research project.

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Best Practices

- Organization
- TIER Protocol v3
- Documentation and Description
- Metadata
- Data Clean-up
- Basic Storage
- Backup
- Preservation

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Organization

File and Folder organization
Choose a consistent filing system that will make sense to you or someone else five years from now.

Choose a logical directory hierarchy. For example: TIER Documentation Protocol.
http://www.projecttier.org/tier-protocol/specifications/

Assign descriptive file names. E.g. DOLInterview_DoeJane_20061207

//Project001/SiteB/SiteB_2010_rawdata.txt

Is better than . . .

//Project001/SiteB/2010/rawdata.txt

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TIER Protocol

Developed by Haverford College –

The **Teaching Integrity in Empirical Research** or TIER protocol, is a recommended protocol for comprehensively documenting all the steps of data management and analysis that go into an empirical research paper.

All documentation, do-files, scripts, raw data, metadata, that are presented in a paper are organized in a specific file structure.

This file structure keeps your data organized and offers easy replication of results reported in a paper.

http://www.projecttier.org/tier-protocol/specifications/

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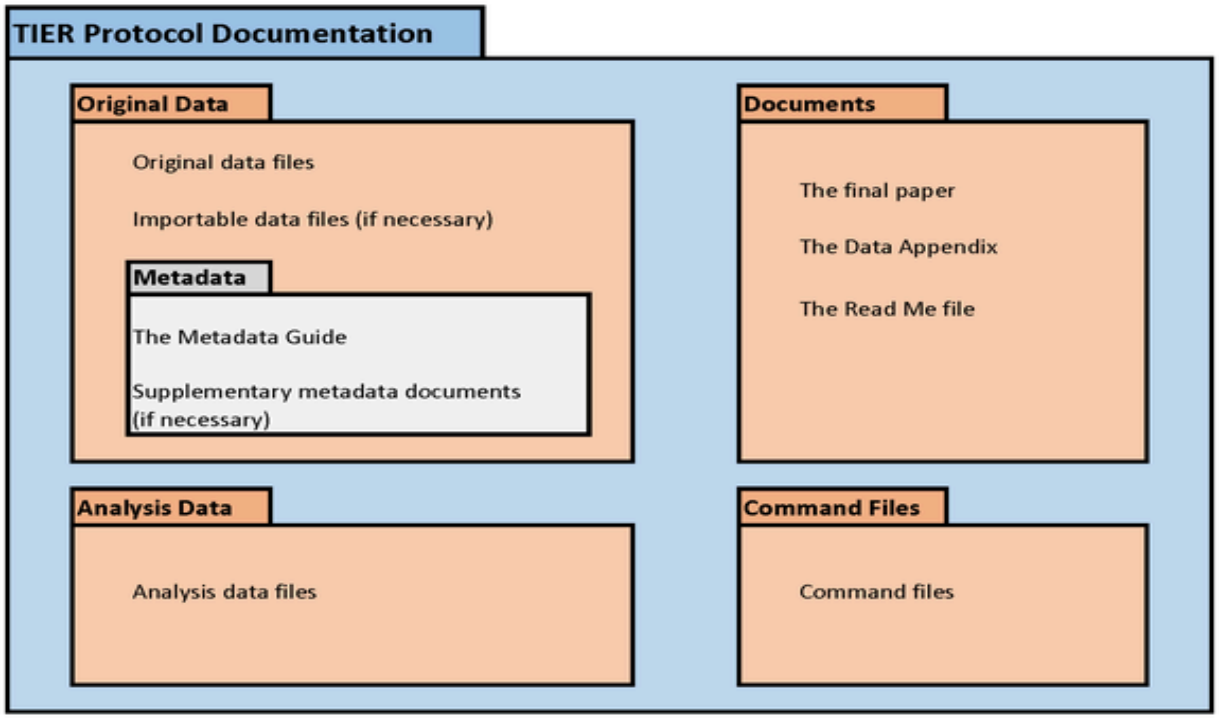
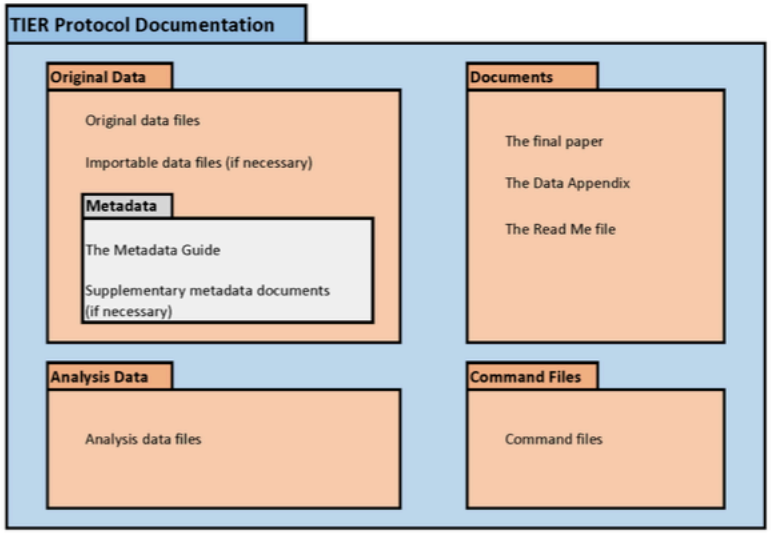
TIER File Structure



Folder Contents



Documentation folder: Readme file, data appendix, copy of final paper

Original Data folder: all original data, importable data files

Metadata sub folder: metadata guide, supplementary metadata documentation

Analysis Data: analysis data files

Command files folder: do-files or scripts used for data processing and analysis to reproduce results

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http://www.projecttier.org/tier-protocol/specifications/

Documentation & Description

- Describe the method used to create derived data products.
- Consider creating templates for data collection.
- At the file level: Take consistent notes on file changes, name changes, dates of changes, etc.
- Include critical information, such as date or location, in the data table, not just as metadata embedded in the file name.

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Metadata

Metadata is data about your data.

Creating metadata, i.e., information about your data's contents, structure, and permissions, makes it possible for others to find and use your data properly.

Without good metadata, you might not be able to reuse your own data five years from now!

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Data Clean-up

OpenRefine (http://openrefine.org/), for making sure records and variables are consistently coded, filling in known blanks, replacing text selectively, transforming data, and more.

Basic Storage

- Computers and shared servers can be good places for **temporary** storage of your working files.
- Store copies of data in open, **stable formats** (e.g., ascii, .txt, .csv, .pdf) for long term accessibility. . .
- Use flash drives **only for file transfer.**
- Cloud storage can be a convenient way to store and share temporary working files.
- For long-term storage, data should be put into well-managed **preservation system.**

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Backup

- Rule of 3: Keep 2 copies onsite, 1 offsite.

  LOCKSS concept – Lots Of Copies Keeps Stuff Safe

- Backup regularly and frequently - automate the process if possible.

Have a backup plan!

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Preservation

- Preservation is the act of making sure your data are secure and accessible for future generations.
- Long-term preservation is not merely storage or backing up of your data.
- Identify data with long-term value. Preserve the raw data and any intermediate/derived/time consuming products that are expensive to reproduce or can be directly used for analysis.
- Preserve any scripted code and data that was used to clean and transform the raw data.
- Example:

Save tabular data in a delimited text format.

Save data in uncompressed and unencrypted formats, where possible.

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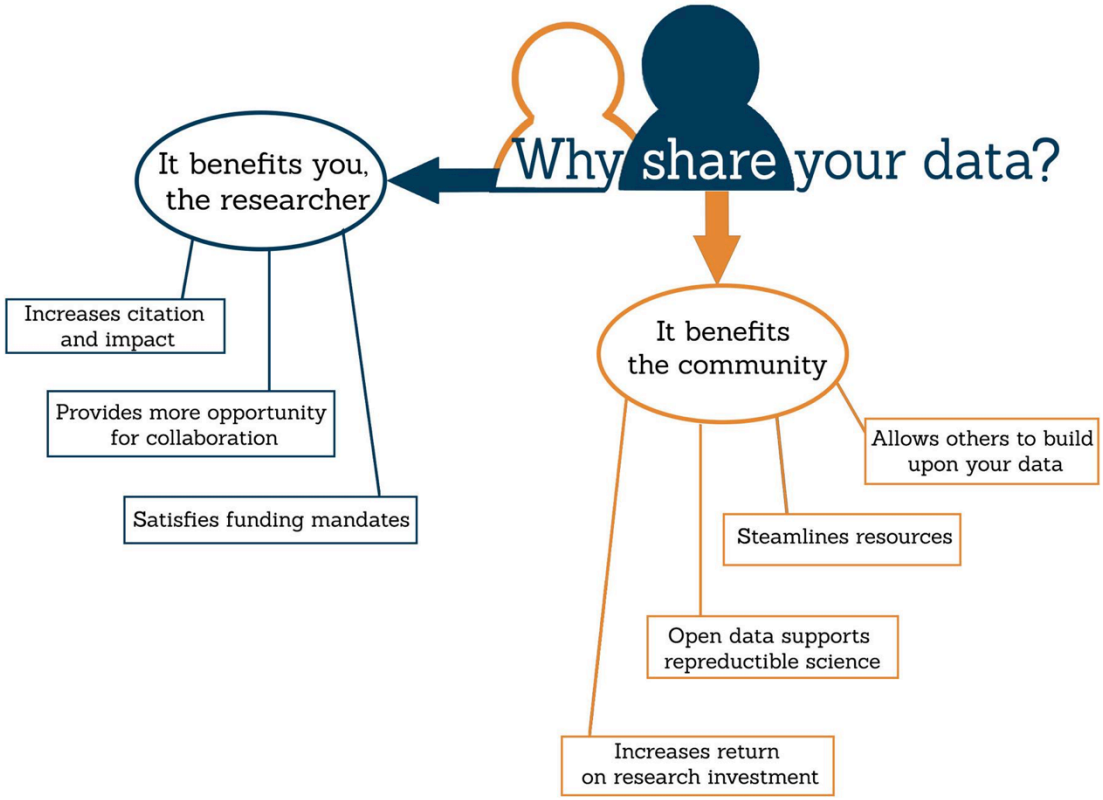
Data Sharing

Data sharing allows for reproducibility, transparency, and data re-use in research.

Sharing is easier if data are managed well from the start of a project.



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Part 2: Center for Open Science

Open Science Framework

http://cos.io/ | http://osf.io

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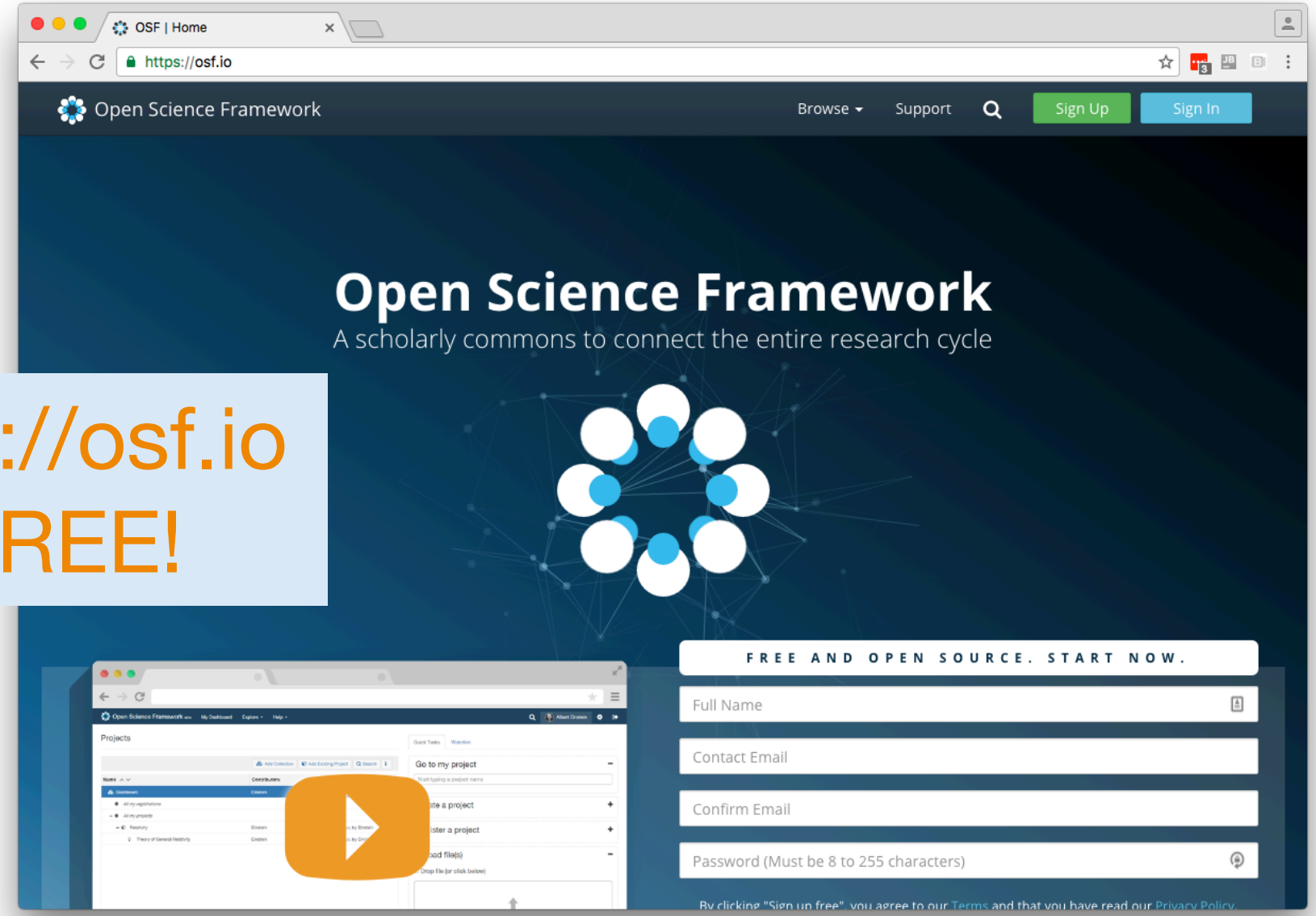
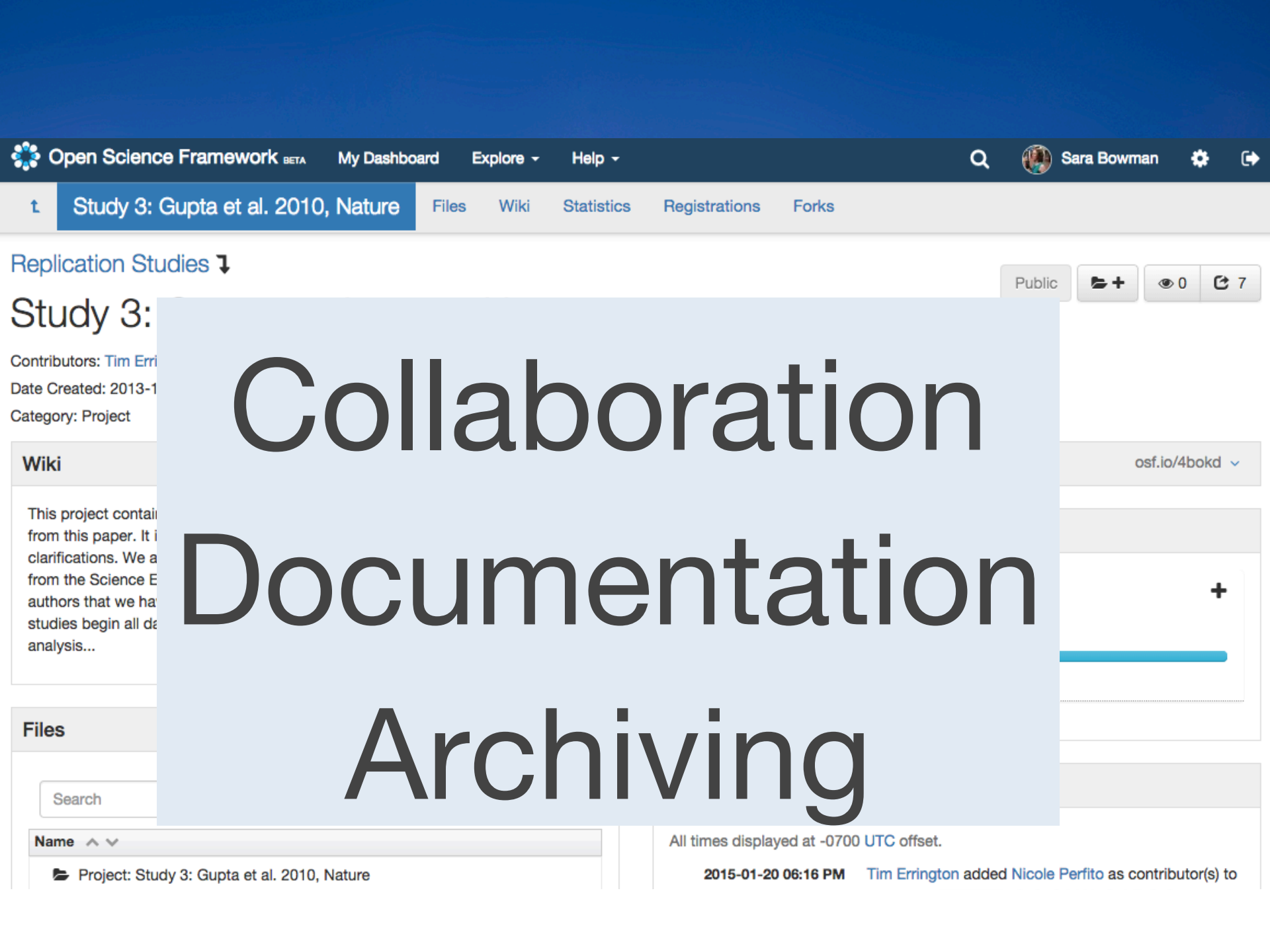
Open Science Framework

http://osf.io
FREE!

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Tim Errington added Nicole Perfito as contributor(s) to

Put data, materials, and code on the OSF

Lepadogaster.stl

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Search

Component: Lepadogaster lep…

OSF Storage

- Lepadogaster.stl
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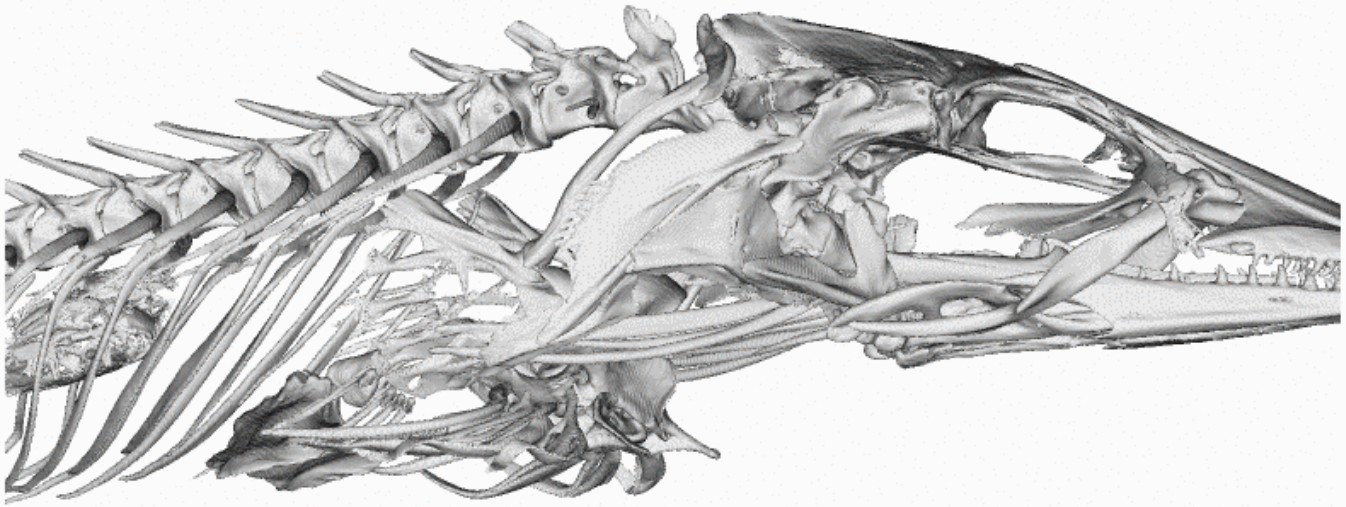
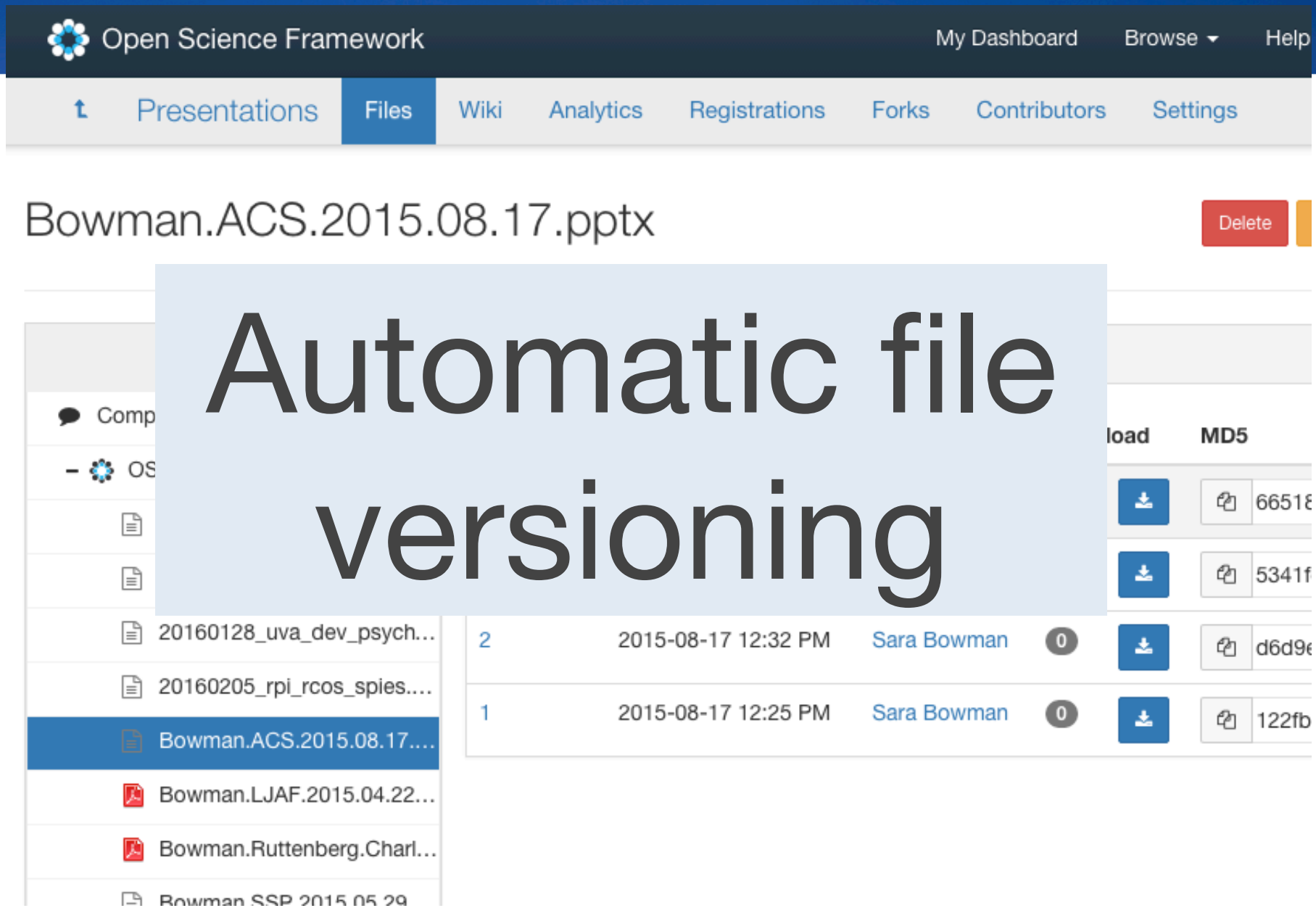
- slice data
- standard headshot.jpg
- ventral.jpg

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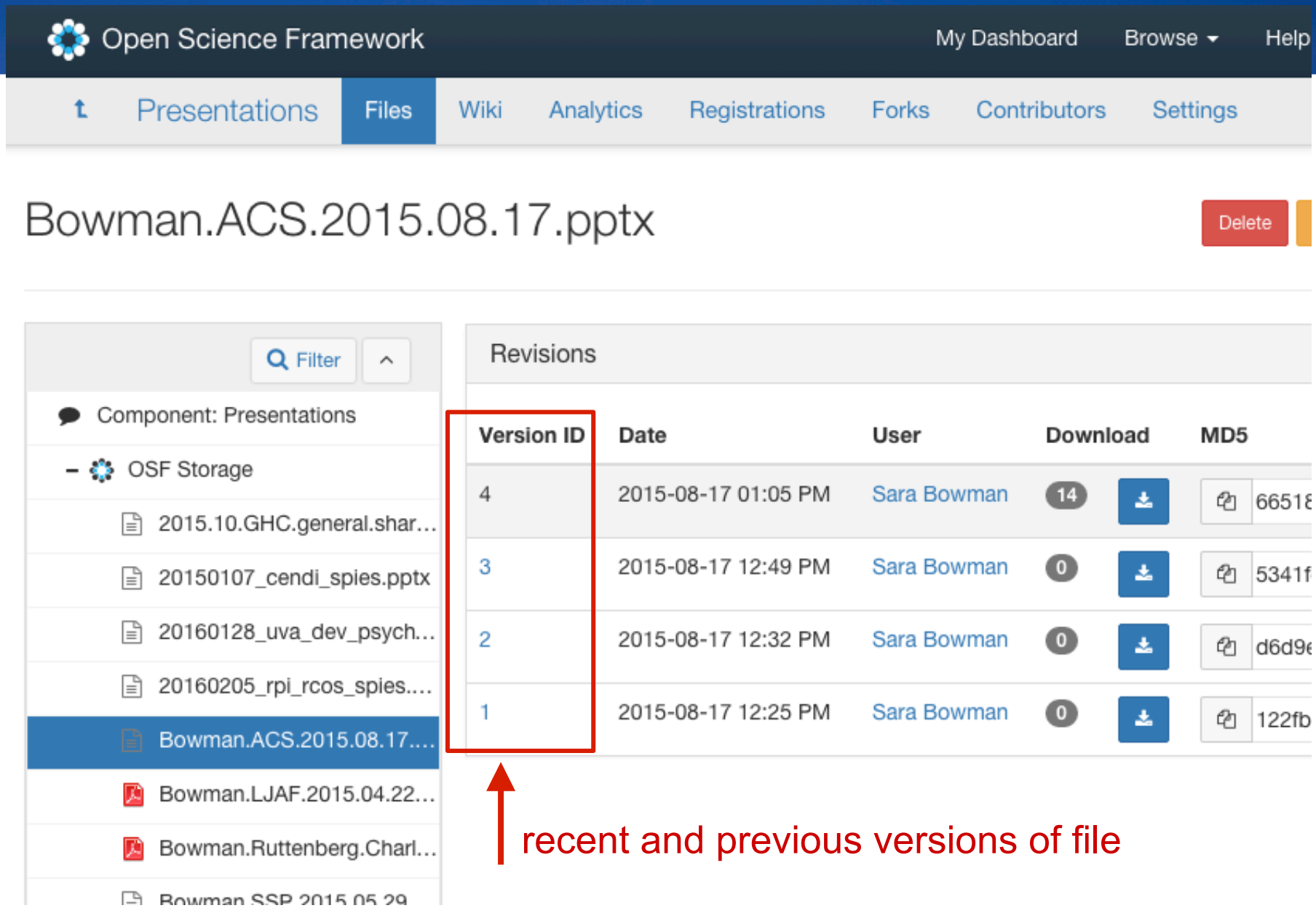
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Persistent Citable Identifiers

Citation: osf.io/

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MLA

Klein, R. A., Rat… M. J., Bocian, K., et al. …eplication Project."

Chicago

Klein, R. A., Ratliff, K. A., Vianello, M., Adams, R. B., Bahník, , Bernstein, M. J., Bocian, K., et al. "Investigating Variation in Replicability: A "Many Labs" Replication Project." Open Science Framework (2014). osf.io/wx7ck

persistent identifier

Citation: osf.io/wx7ck more

APA

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used in a citation

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https://osf.io/wx7ck/
https://osf.io/c97pd/
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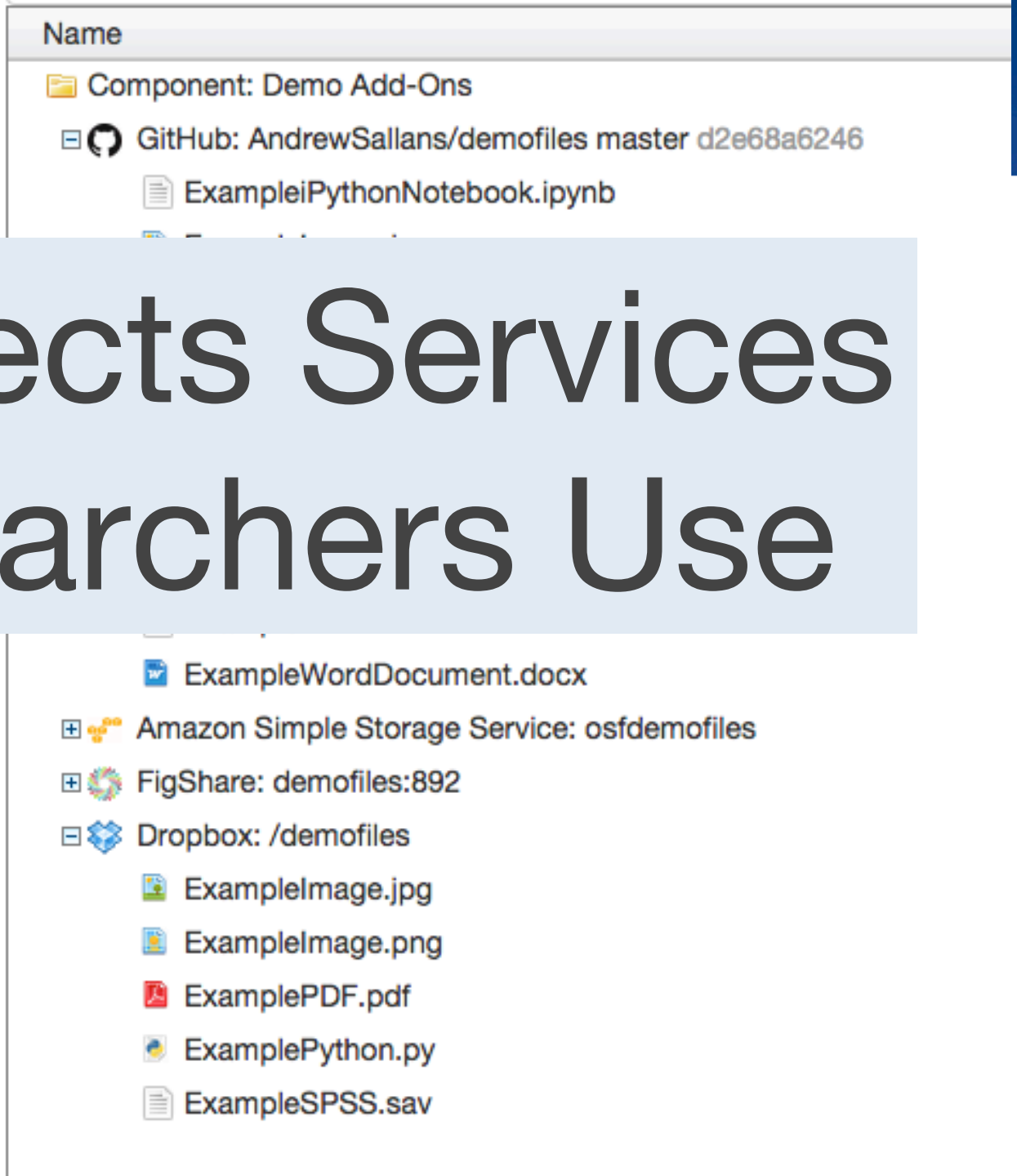
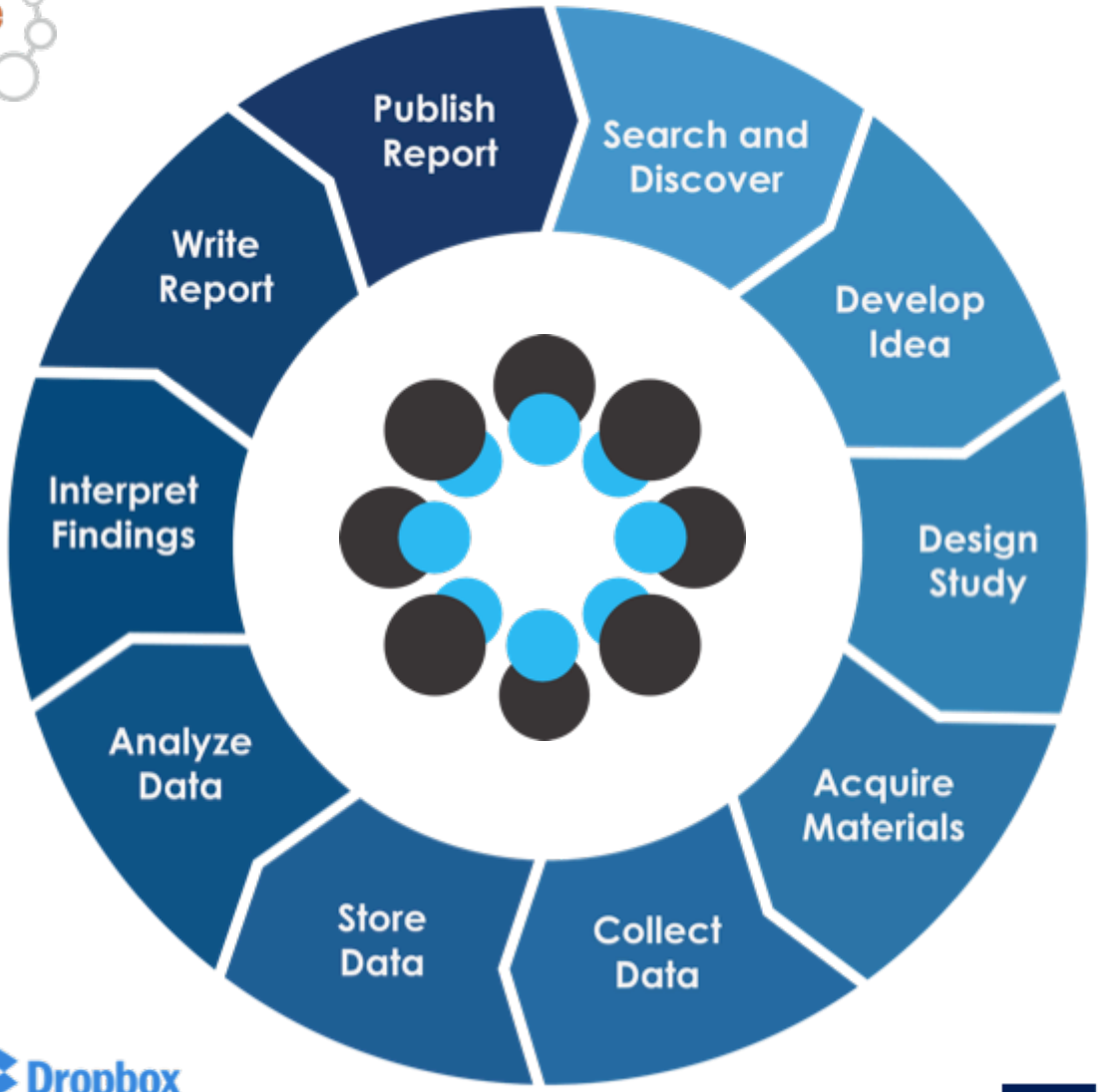
Registration

Connects Services Researchers Use





figshare

The Dataverse Network Project

MENDELEY

GitHub

ownCloud

Dropbox

amazon web services

box

Google Drive

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NeuroVault
zenodo
DRYAD
figshare
OJS Open Journal Systems
ubiquity press
VIVO connect • share • discover
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DMPTool
GitLab
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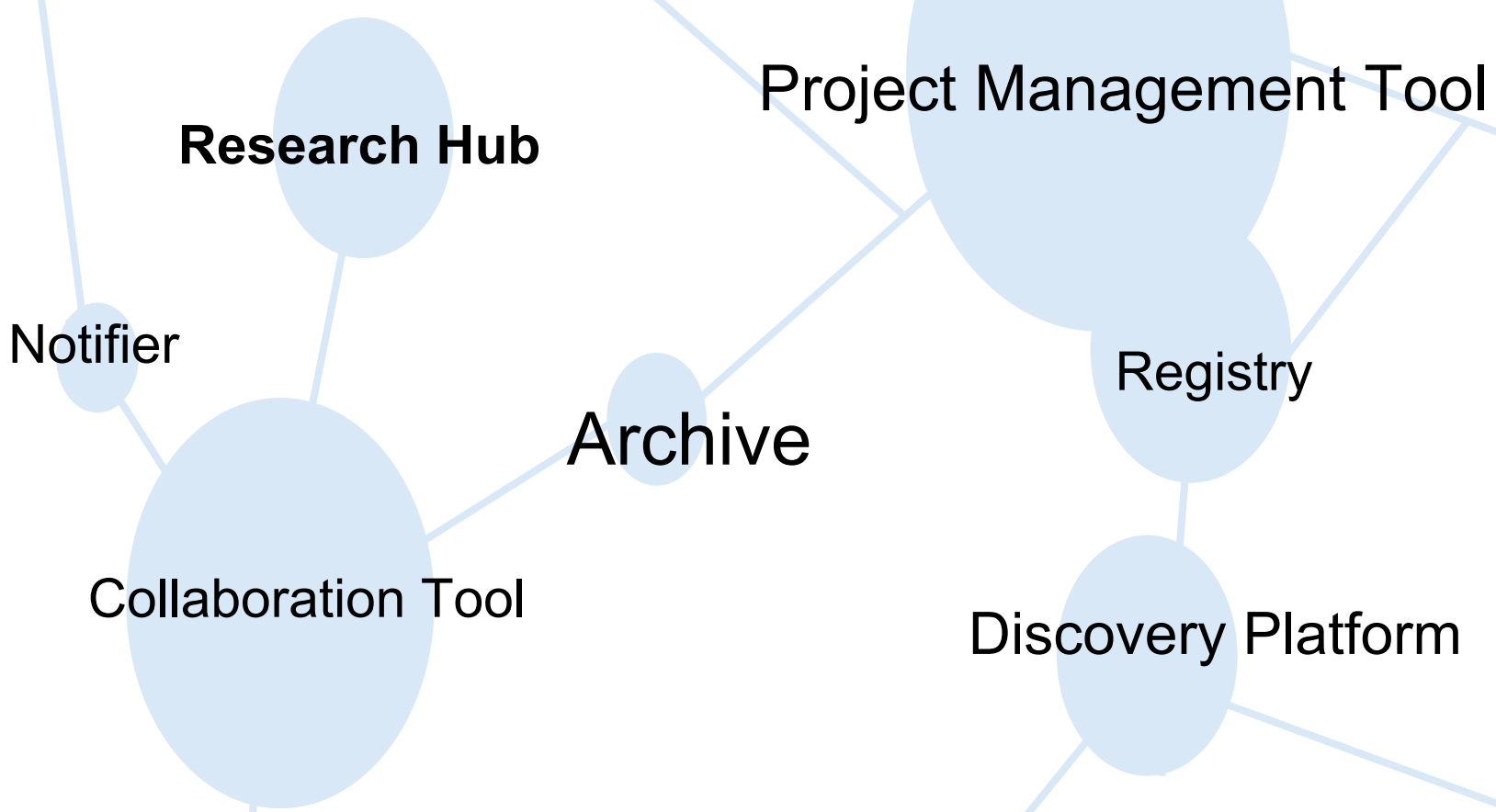
OpenSesame

What is the Open Science Framework?



Hands-On with the OSF

Let's take a look at the:
https://osf.io/

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OSF for Institutions

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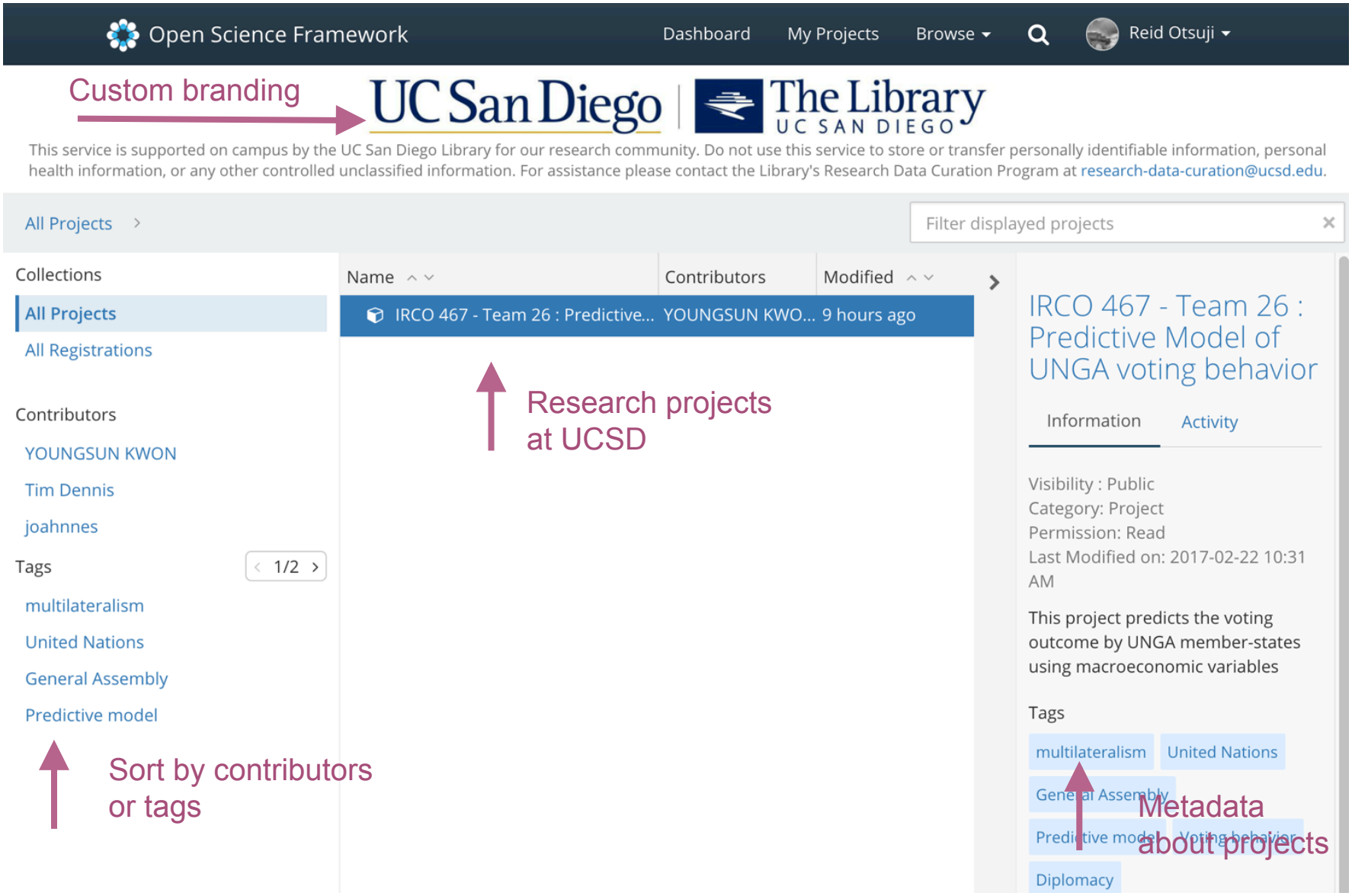

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