

# Reproducible Research with the Open Science Framework

*DataFest 2020*

*Ceilyn Boyd & Julie Goldman*

*cos.io | osf.io*

# Workshop Objectives

- Describe benefits of open and reproducible research
- Understand how OSF supports sharing data and materials
- Create a collaborative project on the OSF & customize it
  - Explore project management features
  - Connect applications across multiple environments
  - Identify options for online publishing of projects and data

# Agenda

1. OSF Overview (10 minutes)
  - Background
  - Use Cases
2. OSF Project Example (5 minutes)
  - 10 Key Features Checklist
3. Hands-on Activity (30 minutes)
  - Utilize Example Project & 10 Key Feature Checklist
4. Wrap up (10 minutes)
  - Activity Report Out
  - Q&A

# OSF Overview Background

“You can't have any sort of reproducibility without good data and project management”

— Vicky Steeves, New York University  
*Librarian for Research Data Management and Reproducibility*

# "FINAL".doc



FINAL.doc!



FINAL\_rev.2.doc



FINAL\_rev.6.COMMENTS.doc



FINAL\_rev.8.comments5.  
CORRECTIONS.doc



FINAL\_rev.18.comments7.  
corrections9.MORE.30.doc



FINAL\_rev.22.comments49.  
corrections.10. #@\$%WHYDID  
ICOMETOGRADSCHOOL????.doc

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## THE AUTHOR LIST: GIVING CREDIT WHERE CREDIT IS DUE

**The first author**  
Senior grad student on the project. Made the figures.

**The third author**  
First year student who actually did the experiments, performed the analysis and wrote the whole paper. Thinks being third author is "fair".

**The second-to-last author**  
Ambitious assistant professor or post-doc who instigated the paper.

Michaels, C., Lee, E. F., Sap, P. S., Nichols, S. T., Oliveira, L., Smith, B. S.

**The second author**  
Grad student in the lab that has nothing to do with this project, but was included because he/she hung around the group meetings (usually for the food).

**The middle authors**  
Author names nobody really reads. Reserved for undergrads and technical staff.

**The last author**  
The head honcho. Hasn't even read the paper but, hey, he/she got the funding, and their famous name will get the paper accepted.

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**Free, open-source** web app that  
**manages** research projects at all  
stages of the **research lifecycle** and  
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Planning

Execution

Reporting

Archiving

Discovery



# How OSF supports your research



## Search and Discover

Find papers, data, and materials to inspire your next research project. Search public projects to build on the work of others and find new collaborators.

## Design Your Study

Start a project and add collaborators, giving them access to protocols and other research materials. Built-in version control tracks the evolution of your study.

## Collect and Analyze Data

Store data, code, and other materials in OSF Storage, or connect your Dropbox or other third-party account. Every file gets a unique, persistent URL for citing and sharing.

## Publish Your Reports

Share papers in OSF Preprints or a community-based preprint provider, so others can find and cite your work. Track impact with metrics like downloads and view counts.

# How OSF supports your research



## Search and Discover

Find papers, data, and materials to inspire your next research project. Search public projects, build on the work of others and find new collaborators.

It's not just for  
**SCIENCE!!**



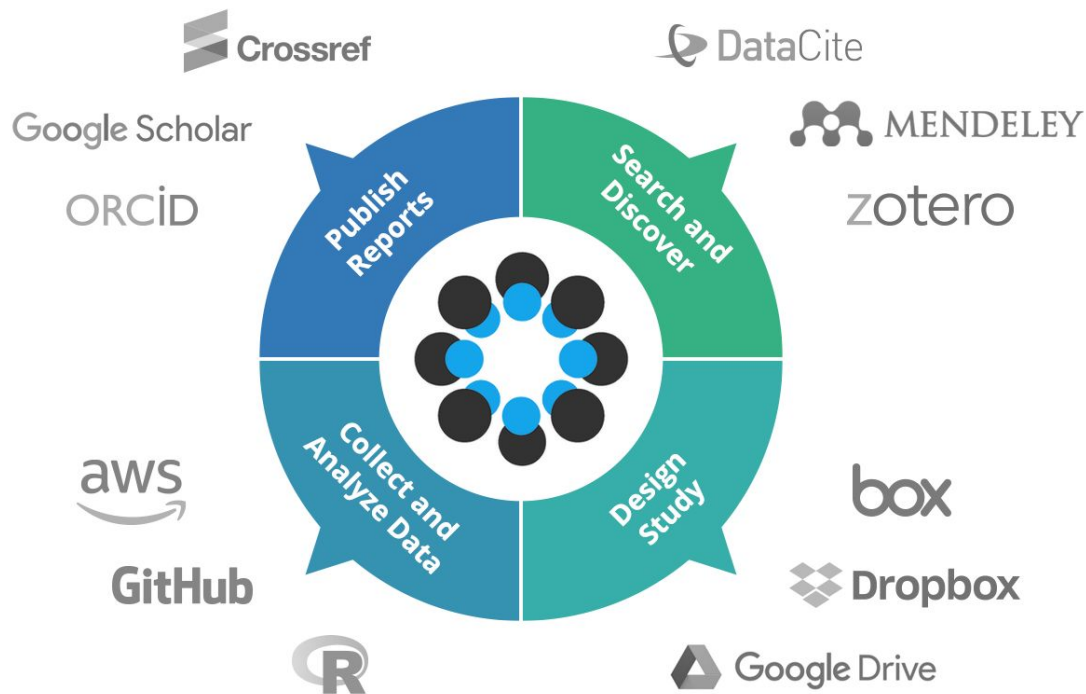
## Publish Your Reports

research materials. Built-in version control tracks the evolution of your study.

third-party account. Every file gets a unique, persistent URL for citing and sharing.

are papers in OSF Preprints or a community-based preprint provider, so others can find and cite your work. Track impact with metrics like downloads and view counts.

# Tools Throughout the Lifecycle

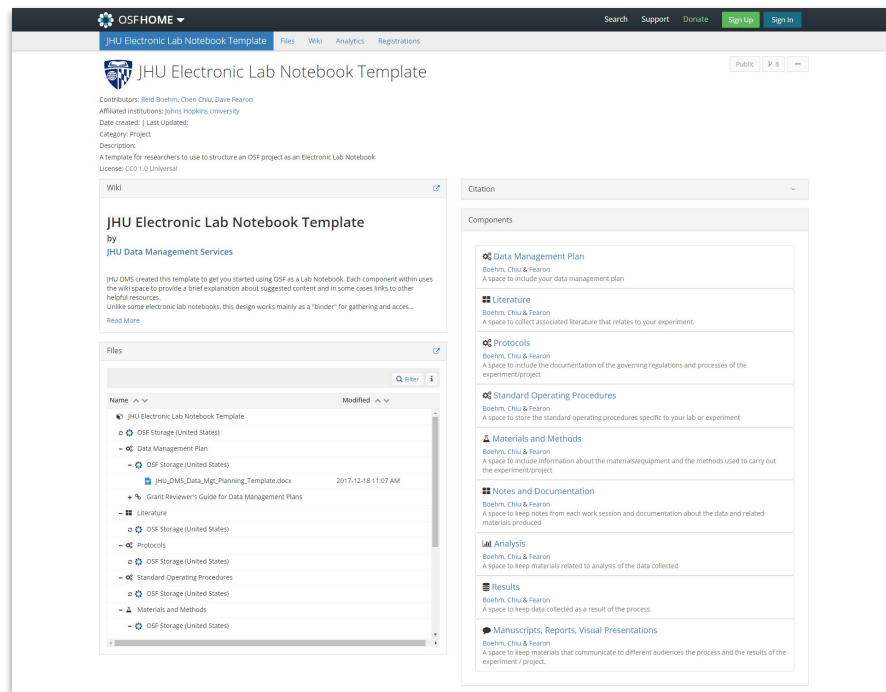


# OSF Overview Use Cases

# Electronic Lab Notebook

OSF supports fundamental features of an ELN:

- record daily activity
- store images or arbitrary data files
- invite collaborators
- view old versions of files
- connect to more complex structures that support the full work of a lab across multiple projects and experiments



# Feature: Robust component organization

## Components

### Data Management Plan

Boehm, Chiu & Fearon

A space to include your data management plan

### Literature

Boehm, Chiu & Fearon

A space to collect associated literature that relates to your experiment.

### Protocols

Boehm, Chiu & Fearon

A space to include the documentation of the governing regulations and processes of the experiment/project

### Standard Operating Procedures

Boehm, Chiu & Fearon

A space to store the standard operating procedures specific to your lab or experiment

### Materials and Methods

Boehm, Chiu & Fearon

A space to include information about the materials/equipment and the methods used to carry out the experiment/project

### Notes and Documentation

Boehm, Chiu & Fearon

A space to keep notes from each work session and documentation about the data and related materials produced

### Analysis

Boehm, Chiu & Fearon

A space to keep materials related to analysis of the data collected

### Results

Boehm, Chiu & Fearon

A space to keep data collected as a result of the process.

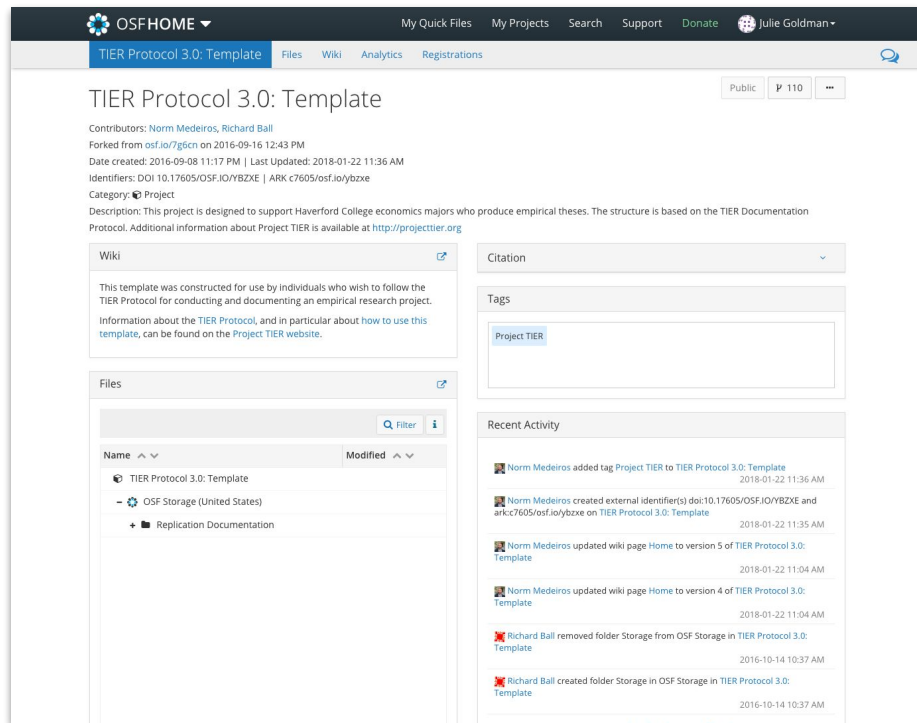
### Manuscripts, Reports, Visual Presentations

Boehm, Chiu & Fearon

A space to keep materials that communicate to different audiences the process and the results of the experiment / project.

# Provide Teaching Templates

- Project TIER: Teaching Integrity in Empirical Research
- Created a clonable template on OSF that students can use to create a new hierarchy of folders that matches the TIER Protocol Specifications
- Students can modify the structure of the folders in any way they see fit



# Feature: Forking a template for standardize use

TIER Protocol 3.0: Template

FilesWikiAnalyticsRegistrations

## TIER Protocol 3.0: Template

Public118...

Fork this Project

Duplicate template

View Forks (118)

Contributors: Norm Medeiros, Richard Ball

Forked from [osf.io/7g6cn](https://osf.io/7g6cn) on 2016-09-16 12:43 PM

Date created: 2016-09-08 11:17 PM | Last Updated: 2018-01-22 11:36 AM

Identifiers: DOI 10.17605/OSF.IO/YBZXE | ARK c7605/osf.io/ybzx

Category: Project

Description: This project is designed to support Haverford College economics majors who produce empirical theses. The structure is based on the TIER Documentation Protocol. Additional information about Project TIER is available at <http://projecttier.org>

Wiki

This template was constructed for use by individuals who wish to follow the TIER Protocol for conducting and documenting an empirical research project.

Information about the TIER Protocol, and in particular about [how to use this template](#), can be found on the Project TIER website.

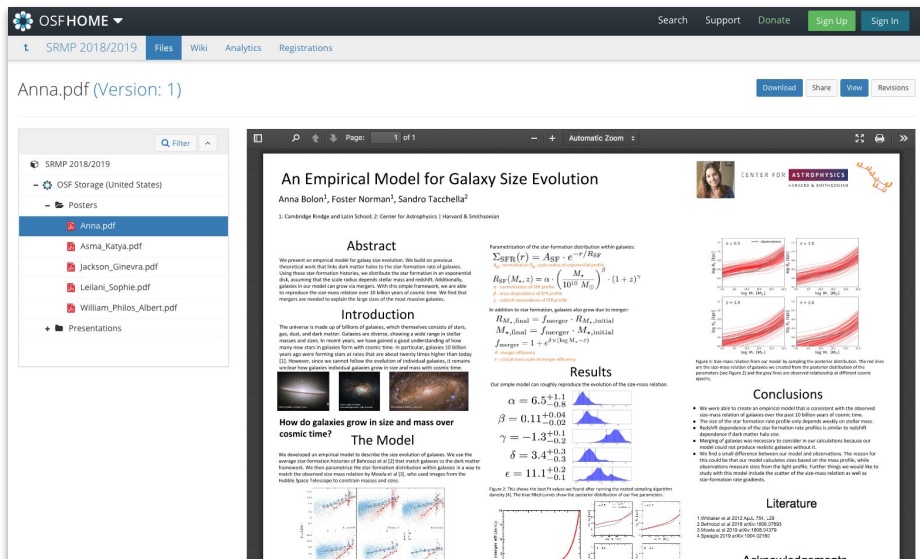
Citation

Tags

Project TIER



# Share Program Outputs



- Science Research Mentoring Program
- Center for Astrophysics, Harvard & Smithsonian (CfA) and Massachusetts Institute of Technology (MIT)
- High-school juniors and seniors work on a year-long independent research project
- Students learn what it is actually like to conduct real, cutting-edge research
- Students talks and posters are archived and shared via the OSF

# Feature: Provide descriptive documentation and information

The screenshot shows the OSFHOME interface for the Science Research Mentoring Program. The top navigation bar includes links for My Quick Files, My Projects, Search, Support, Donate, and a user profile for Julie Goldman. Below this, a secondary navigation bar highlights the Wiki section, with other options like Files, Analytics, and Registrations. The main content area is titled 'Home' and features a left-hand menu with a 'Menu' toggle. The menu lists 'Project Wiki Pages' (with 'Home' selected) and 'Component Wiki Pages' (including SRMP 2017/2018, SRMP 2018/2019, and Hands-on lecture series). The main content area displays the 'View' page for the Wiki, showing the current version as '(Current)' and a timestamp. The text describes the SRMP at the Center for Astrophysics | Harvard & Smithsonian (CfA), highlighting its purpose for high-school juniors and seniors. It includes an 'Outline of the program' with a bulleted list of details such as real science with Harvard astrophysicists, student pairing, program duration, meeting frequency, advisory meetings, student meetings, research presentation, provided laptops, stipends, and cost. A link to a Harvard Gazette article is provided, along with a note about setting up an SRMP.

OSFHOME ▾

My Quick Files My Projects Search Support Donate Julie Goldman ▾

Science Research Mentoring Program Files **Wiki** Analytics Registrations

Home

Toggle view: **View** Compare

Menu <

- Project Wiki Pages
  - Home**
- Component Wiki Pages
  - SRMP 2017/2018
  - SRMP 2018/2019
  - Hands-on lecture series

View

Wiki Version: (Current) Or Graur: 2019-03-21 17:01:44+00:00 UTC ▾

The Science Research Mentoring Program (SRMP) at the Center for Astrophysics | Harvard & Smithsonian (CfA) provides an opportunity for high-school juniors and seniors to work on a year-long Independent research project in astrophysics under the guidance of a CfA astrophysicist. Students learn what it is actually like to conduct real, cutting-edge research and work closely with living scientists from diverse backgrounds.

Outline of the program

- Do real science with a Harvard astrophysicist.
- Ten students, paired up with five mentors.
- Program runs throughout the school year: September - end of May.
- Two meetings a week, 2 hours each time.
- Monthly advisory meetings with the director and all students.
- Students meet with their mentors at the CfA.
- At the end of the year, students will present their research in talks and posters as part of a symposium at Harvard.
- Laptops provided.
- Stipends provided by the City of Cambridge.
- Free.

SRMP has been featured in the Harvard Gazette: [Space to learn \ Nina Livingstone](#)

Interested in setting up your own SRMP? Check out [Graur \(2018\)](#).

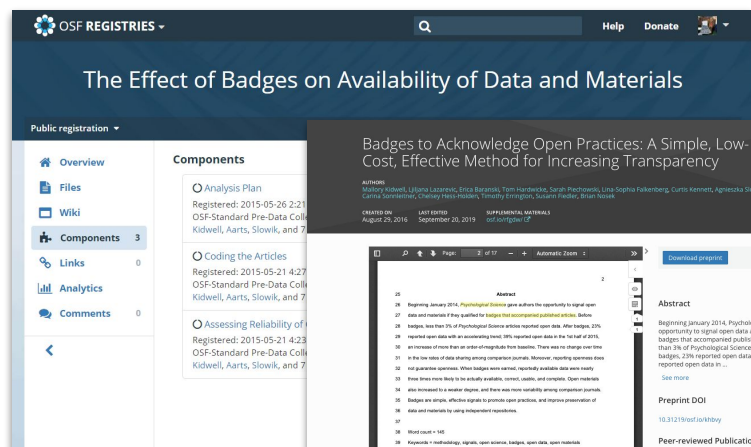
# Preprint Service

- Share your research quickly, receive feedback from the community, and gain a wider audience for your work
- OSF Preprints receive a DOI and persistent URL to allow your preprint to be cited
- Option to add supplemental files, data or analysis scripts



# Feature: Preprint ties all the research outputs together

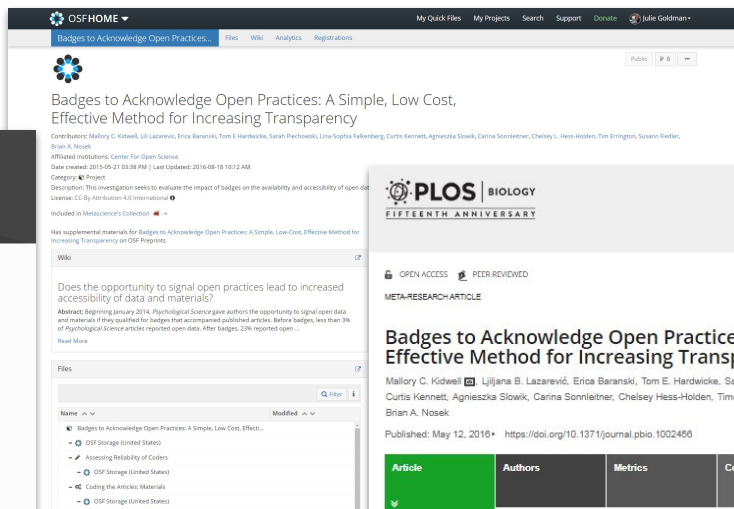
## Project data and materials



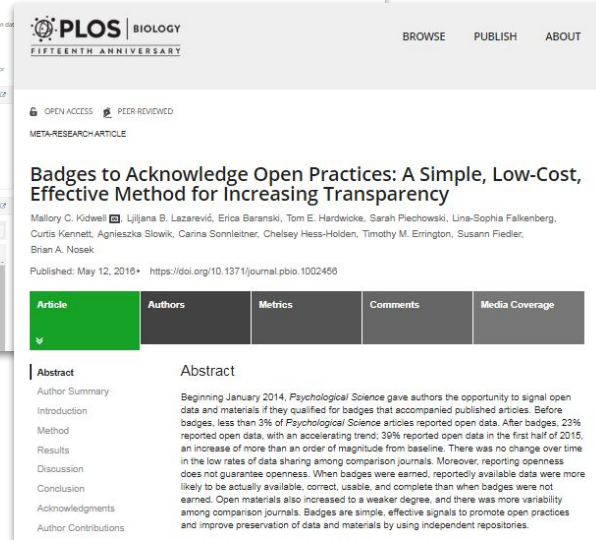
Registry



Preprint



Peer-reviewed  
Publication



Ceilyn Boyd & Julie Goldman  
Research Data Management Program

# Host Article Supplemental Materials

OSFHOME

Kline, Snedeker & Schulz (2017) - Linking Language and Events: Spatiotemporal cues drive children's expectations about the meanings of novel transitive verbs

Contributors: Melissa Kline, Laura Schulz, Jesse Snedeker  
Date created: 2016-03-16 03:26 PM | Last Updated: 2017-09-18 12:35 PM  
Category: Project  
Description: Kline, M., Snedeker, J., and Schulz, L. (2017). Linking Language and Events: Spatiotemporal Cues Drive Children's Expectations About the Meanings of Novel Transitive Verbs. *Language Learning and Development*, 1-23. <http://doi.org/10.1080/15475441.2016.1171771>

Wiki

Stimuli are available here at OSF and on youtube for easy viewing.  
A preprint is available here: the final typeset version is at <http://www.sandrine.com/doi/10.1080/15475441.2016.1171771>.

Abstract

How do children map linguistic representations onto the conceptual structures that they encode? In the present studies, we provided 3-4 year old children with minimal-pair scene contrasts in order...

Read More

Files

Name Modified

- Kline, Snedeker & Schulz (2017) - Linking Language and Events: Spatiotemporal cues drive children's expectations about the meanings of novel transitive verbs
- OSF Storage (United States)
- Linking language and events: Spatiotemporal cues drive children's expectations about the meanings of novel transitive verbs
- OSF Storage (United States)
- Stimuli
- GitHub: mekline/KlineSnedekerSchulz2016 (master)
- K55\_Spatiotemporal1
- K55\_Spatiotemporal2
- README.md
- warmup movies
- OSF Storage (United States)
- Experiment 1 Data & Analysis
- GitHub: mekline/K552016\_Analysis\_Experiment1 (master)
- JData

Citation

Components

- Linking language and events: Spatiotemporal cues drive children's expectations about the meanings of novel transitive verbs  
Kline, Snedeker & Schulz  
How do children map linguistic representations onto the conceptual structures that they encode? In the present studies, we provided 3-4 year old children...
- Stimuli  
Kline  
Experiment 1 Data & Analysis  
Kline  
Experiment 2 Data & Analysis  
Kline

Recent Activity

- mekline removed file JData in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM
- mekline removed file \$2984300 in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM
- mekline removed file JHistory in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM
- mekline removed file JAppHistory in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM
- mekline removed file participants\_TSH.xlsx in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM
- mekline updated file participants\_TSH.csv in GitHub repo mekline/K552016\_Analysis\_Experiment2 in Experiment 2 Data & Analysis 2016-07-18 05:30 PM

Results and analyses for experiments reported on in the article are available on the Open Science Framework at <http://osf.io/u6s79/>

Melissa Kline, Jesse Snedeker & Laura Schulz (2017) “Linking Language and Events: Spatiotemporal Cues Drive Children’s Expectations About the Meanings of Novel Transitive Verbs.” *Language Learning and Development* 13(1): 1-23.  
<http://dx.doi.org/10.1080/15475441.2016.1171771>

# Feature: Link to GitHub files; view & edit right in OSF; track versions

The screenshot displays the OSF interface for a file named 'E1\_analysis.R'. The top navigation bar includes 'Experiment 1 Data & Analysis', 'Files', 'Wiki', 'Analytics', and 'Registrations'. The file name 'E1\_analysis.R' is shown at the top, with buttons for 'Download', 'Share', 'View', and 'Revisions'. A sidebar on the left lists the file's location: 'Experiment 1 Data & Analysis' > 'GitHub: mekline/KSS2016\_Analysis\_Experi...' > 'Data' > 'Data\_E1' > 'E1\_analysis.R'. The main content area shows the R code for the file, with a 'View this file on GitHub.' link. A modal window titled 'Revisions' is open, displaying a table of file versions.

Version ID	Date	User	Download
8f05fc2f	2016-03-16 03:06 PM	mekline	<a href="#">Download</a>
98755858	2016-03-16 02:46 PM	mekline	<a href="#">Download</a>

# OSF Project Example Example

# Project Management Template

<https://osf.io/meyva>



# OSF Project Example

## 10 Key Features Checklist

# OSF Key Features Checklist

1. Use components to build your project into a structured workspace
2. Incorporate documentation utilizing the Wiki (hint: add a new wiki page)
3. Add contributors to your project or individual components
4. Configure access permissions for the research team (hint: get granular!)
5. Connect storage add-on (e.g. Google Drive, Dropbox) (hint: share a folder)
6. Upload and document any type of file
7. Implement version control of a file (hint: use the same file name)
8. Edit a plain text file (e.g. R script) directly through OSF (hint: this is also version control!)
9. Add tags to your project or components to enhance discoverability
10. Share your project or components (hint: make it “public” or create a view only link to share anonymously)

# Hands-on Activity

## Get Started with OSF



Browse ▾

Support



Sign Up

Sign In



# Open Science Framework

A scholarly commons to connect the entire research cycle



FREE AND OPEN SOURCE. START NOW.

osf.io

## Create a free account

Sign up using:

	ORCID		Institution
---	-------	--	-------------

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Sign up

# Hands-on Activity

## Create a Project



# Let's try OSF!



## Find Your Research Team

Get into groups of 2-4 people and introduce yourselves



# Modify the project template to...

- reflect an Electronic Lab Notebook to support the full work of a lab across multiple projects and experiments
- reflect a collaborative project from a course you have taken
- reflect a collaborative research study that you and co-authors have undertaken
  - Mixed methods study
  - Qualitative study
  - Quantitative study



# Hands-on Activity

1. Get into groups of 2 - 4
2. Decide on your collaborative project
3. Create your project site:
  - Fork the example project template & modify, or
  - Create a project from scratch
4. Implement at least 5 of the features on the checklist
5. Report out

# Wrap up Report Out

# Wrap up Q&A

Planning

Execution

Reporting

Archiving

Discovery

## Managing your research workflow

- Collaboration
- Version Control
- Hub for Services
- Project Management

# Harvard Library RDM Program

[projects.iq.harvard.edu/hlrmd](https://projects.iq.harvard.edu/hlrmd)

[http://bit.ly/datafest\\_eval](http://bit.ly/datafest_eval)