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The Open Science Framework & Reproducible Research: A New Space for Scholars & Librarians

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The Open Science Framework and Reproducible Research: A New Space for Scholars and Librarians

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University of Rhode Island
NELA/RILA Joint 2018 Conference
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The Reproducibility Crisis
“It can be proven that most claimed research findings are false.”

– John P. A. Ioannidis, 2005
“Reproducibility crisis” (aka “replication crisis”)

“A methodological crisis in science in which scientists have found that the results of many scientific experiments are difficult or impossible to replicate on subsequent investigation, either by independent researchers or by the original researchers themselves.”

— Wikipedia
91.5% of all published studies in psychology found positive results.

“EEG Experiment” from Dr. Hirt’s Psychology Lab, Indiana University
Economics

“...We assert that economics research is usually not replicable.”

– Andrew C. Chang and Phillip Li, 2015
Biomedical research
Researchers do not bother to write up experiments with negative or null results. Instead of submitting them to journals, they file them away.

“Filing” by Jeff Youngstrom is licensed under CC BY-NC 2.0
Why? *Publication bias*

“...the small proportion of results chosen for publication are unrepresentative of scientists’ repeated samplings of the real world.”

– Neal S. Young, John P. A. Ioannidis, and Omar Al-Ubaydli, 2008

[Cover of Science v. 332, no. 6034](https://www.sciencemag.org) by the American Association for the Advancement of Science. Image by Stephen R. White.
Why? Bad experimental design & analysis

“If you torture the data long enough, it will confess.”

– Ronald Coase, recipient of the 1991 Nobel Prize in Economics

“The Relationship Between Sample Size and Power” by Online Statistics Education: A Multimedia Course of Study is in the public domain.
Why? Incentive structure

“Today I wouldn’t get an academic job. It’s as simple as that. I don’t think I would be regarded as productive enough.”

– Peter Higgs, 2013 (winner of the 2013 Nobel Prize in Physics)
What about peer review?

“We need to get away from the notion, proven wrong on a daily basis, that peer review of any kind at any journal means that a work of science is correct.”

— Michael Eisen, 2014

“Peer Review Monster” by Gideon Burton is licensed under CC BY-SA 2.0
Proposed solutions: Registered reports

Image source: Center for Open Science, https://cos.io/rr/
Proposed solutions: Funding & publishing replications, publishing negative results
Proposed solutions: Open data

Proposed solutions: *Better study designs & statistical methods*
Proposed solutions: *Slow science*

“Scrupulous research on difficult problems may require years of intense work before yielding coherent, publishable results.”


“Weinbergschnecke 01” by Jürgen Schoner is licensed under CC BY-SA 3.0 via Wikimedia Commons.
New Spaces for Scholars and Librarians
Why?
Increases Transparency at All Stages

Making all elements of research available for review, as well as preprints and final manuscripts, allow us to more critically evaluate what we’re seeing.

Public domain image from https://www.maxpixel.net/Underwater-Clear-Sea-Sand-Sunlight-Transparent-1956615
For Scholars and Librarians

Open science increases availability of information that can benefit your patrons.

Data can be accessed directly - a huge boon for researchers, but also citizen scientists and students undertaking advanced school science projects.

Data Manipulation Tools and More

Use of open source programming and data manipulation tools, such as Python and R, also means exploring data doesn’t entail a hefty cost.

Screenshots of the Python Software Foundation and the The R Project pages, accessed October 21, 2018
Academic librarians can:

● Raise awareness of these tools in instruction for grad students and consultations with faculty

● Use these tools to support and share their own research

“Carothers Library” by University of Rhode Island
Public librarians can:

- Raise awareness of these tools as appropriate
- Explore them on your own - you may have data to work with!

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Worcester Public Library: Adult Classes and Programs page, accessed October 10, 2018
Introduction to
The Open Science Framework
Why the Open Science Framework?

Project of the Center for Open Science, a nonprofit based in Charlottesville, VA

Funded by a variety of grants and sponsors, including DARPA, the NSF, NIH, and others.

https://osf.io/
What it does

Connects various parts of your workflow, wherever they are
  ○ Google Drive
  ○ Dropbox
  ○ Mendeley
  ○ FigShare
  ○ GitHub...

Share other non-project files individually as well (relatively new feature)
What it does

Supports versioning

Allows date-stamped registration of research projects

Provides an additional backup of research materials
What it does

Centralizes access to research information

Provides granular sharing of elements with collaborators

Provides access for others who can provide feedback at any stage of the research process
Search others' projects

Feminism and the Future of Library Discovery

Description: This paper discusses the various ways in which the practices of libraries and librarians influence the diversity (or lack thereof) of scholarship and information access. We examine some of the cultural biases inherent in both library classification systems and newer forms of information access like Google search algorithms, and propose ways of recognizing bias and applying feminist principles in the design of information services for scholars, particularly as libraries reinvent themselves.

Contributors: Chris Bourg

Tags: Preprint, code4lib, critlib, socarxiv, feminist HCI, information sciences

Jump to: Preprint - Wiki - Files

Culture of Assessment in Academic Libraries

Description: Record for an OA article.

Contributors: Lisa Janice Hinchliffe - Meredith Gorran Farkas - Amy Harris Houk

Tags: academic libraries, socarxiv, assessment, survey
Additional Related Project - OSF Preprints
Additional Related Project - OSF Preprints

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“Unlock File” icon by I Putu Kharismayadi from thenounproject.com.
Closing thoughts

“As readers of scientific work, all we can do is be more skeptical of everything that is published.”

– Cristobal Young, Assistant Professor of Sociology, Stanford University, 2015

“I want to adopt a stance of humility and assume that there are errors and that’s why I need to be cautious in my conclusions.”

– Brian Nosek, Professor of Psychology, University of Virginia and co-founder and director of the Center for Open Science, 2016
Thank you!
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