



Practical tips to make your research more open and reproducible

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www.nicebread.de
www.researchtransparency.org
 [@nicebread303](https://twitter.com/nicebread303)

Why open and reproducible research?

Why should we trust your claims?



Snake oil salesman

Uses a method which produces anecdotal evidence and false positive results in the desired direction.

Has a predetermined attitude about „what works“.

Hides data and methods; nobody can check or reconstruct what has been done.

Commercial interests/conflicts of interest.

„Believe me! I have the greatest snake oil.“



Researcher

Uses a sound scientific method which, in the long run, arguably arrives at an increasingly correct account of the world.

Changes his/her mind in the light of new evidence.

Is transparent about the primary data, methods, and analyses.

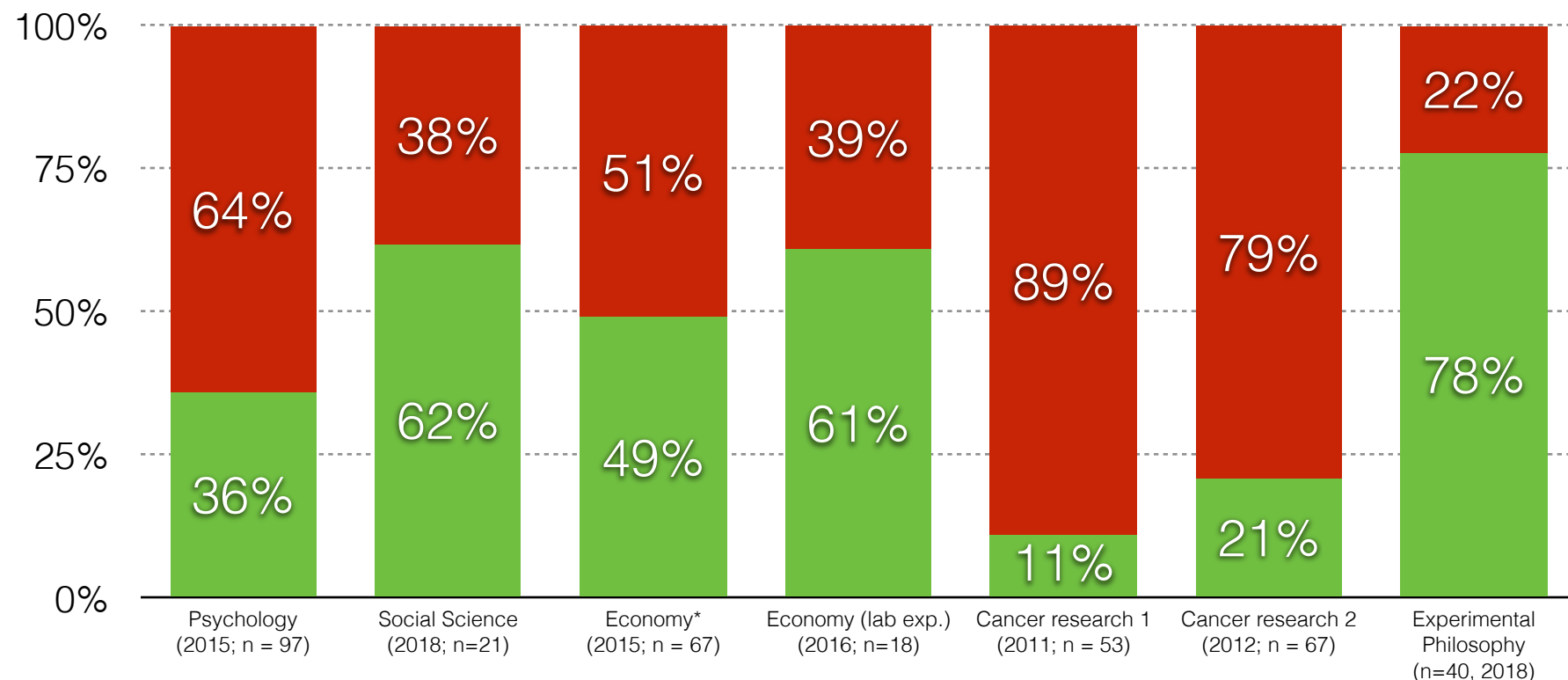
No commercial interests / COIs, or discloses them.

„Nullius in verba“ - motto of the Royal Society, world's oldest scientific society: „Don't trust my words“



Which part of published findings can be independently replicated?

■ Successful replication ■ Not replicated

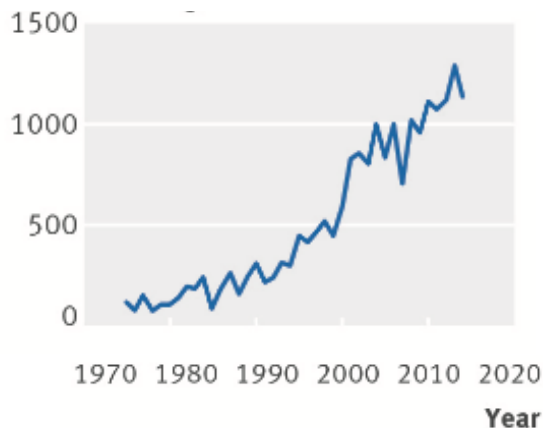


*The data on economics is about *reproducibility*; i.e. the attempt to get the same results if you apply the original data analysis on the original data set.

Buzzwords in scientific abstracts +880% from 1974- 2014



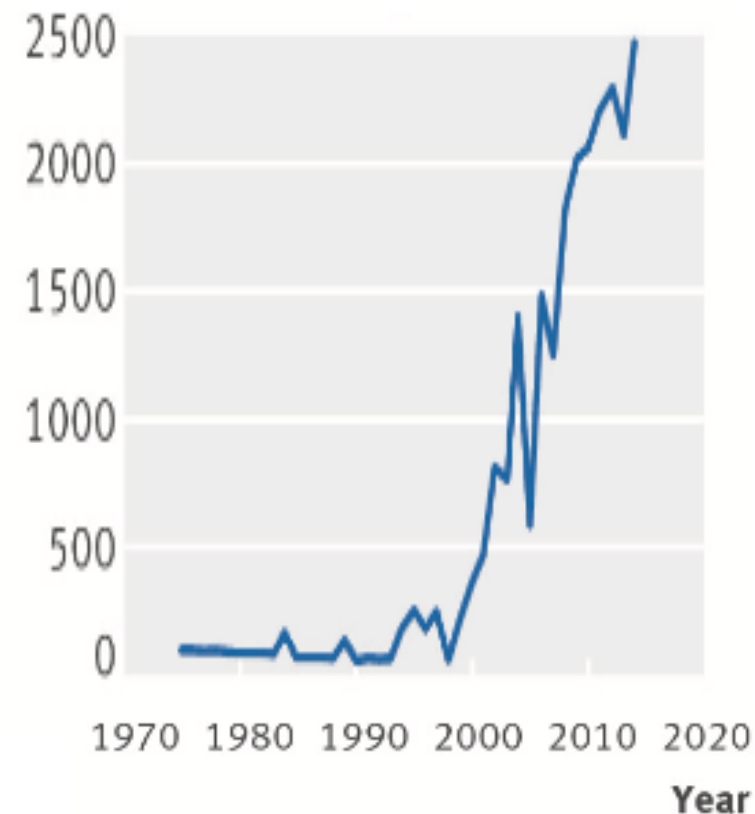
Amazing!!



Enormous!!



Groundbreaking!!!



Why transparency?



Increase trust in science, don't waste public resources



Get constructive feedback



Be international and inclusive

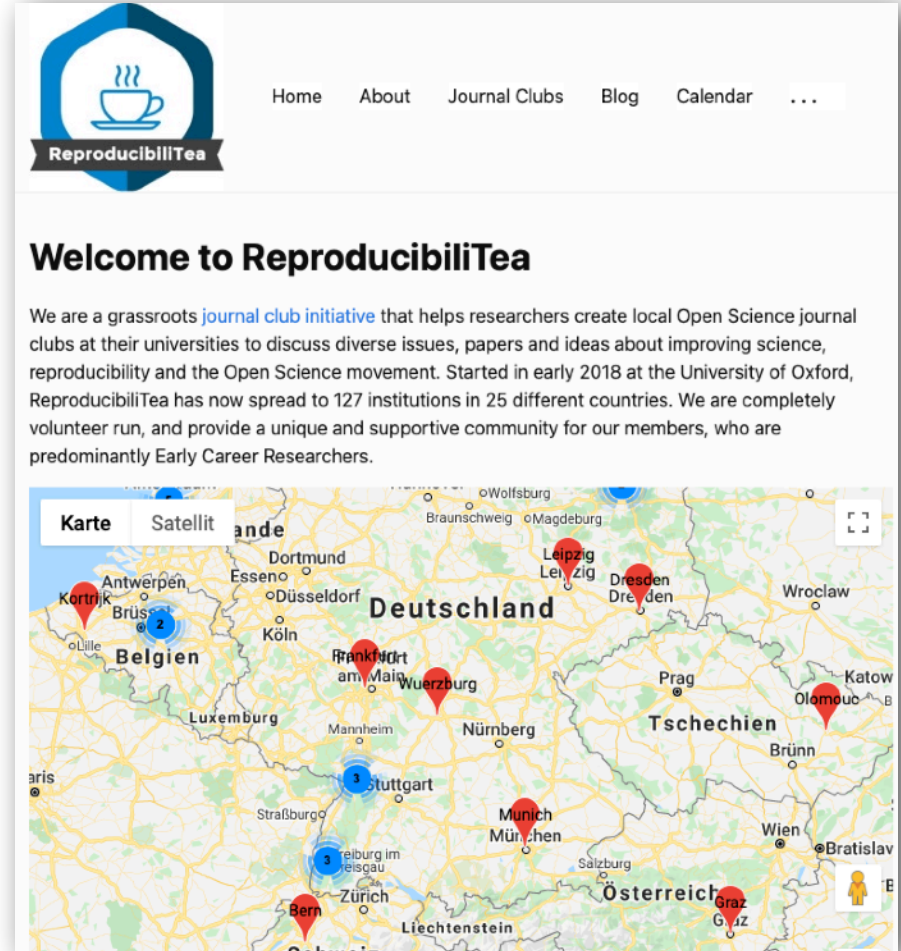


Increase the speed of discovery

EASY STEPS TOWARDS MORE OPENNESS

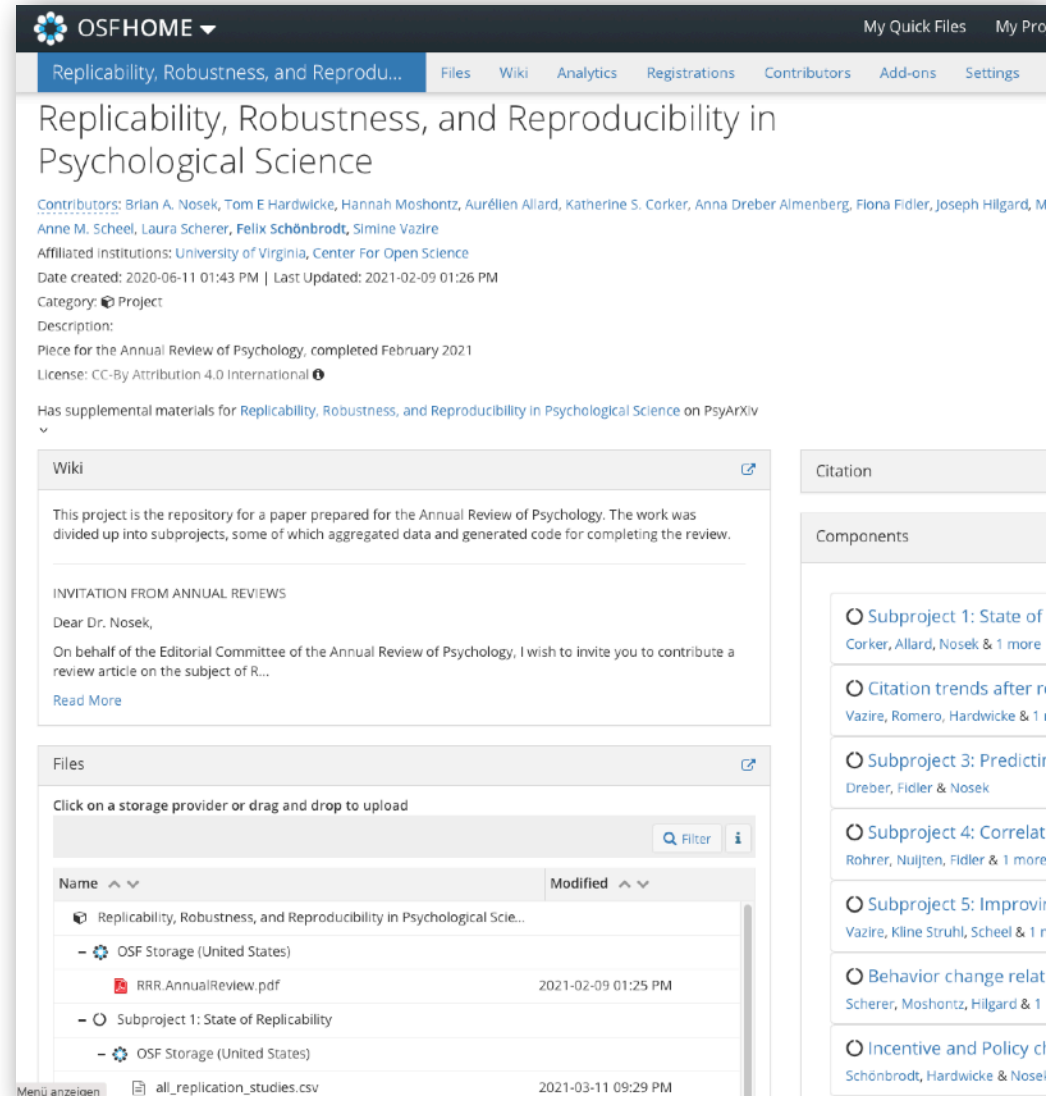
Step 1: Join/Start a journal club

- Mostly interdisciplinary topics about open science, reproducibility, statistics, p-hacking, ...
- Join the ReproducibiliTea of the LMU Department Psychology (contact: osip@psy.lmu.de)
- Or: Establish your own journal club
 - Send an email round to your department
 - Reading list suggestions and more tips at <https://reproducibilitea.org>



Step 2: Provide open material for an existing project (first steps)

- Create free account on the *Open Science Framework* (OSF; <https://osf.io>)
 - OSF = non-profit organization; has preservation fund that ensures availability of the uploaded material for at least 50 (?) years
- Publish open data, open material, reproducible analysis code, preprints, postprints, supplemental material
- Get a persistent URL (add that to your paper!) and even a doi.
- Easy start (example for psychology): Upload ...
 - the questionnaire items that you used in your study
 - The pictures you used as stimuli
 - your R scripts for data analysis



The screenshot shows the OSFHOME interface for a project titled "Replicability, Robustness, and Reproducibility in Psychological Science". The project is managed by Brian A. Nosek, Tom E. Hardwicke, Hannah Moshontz, Aurélien Allard, Katherine S. Corker, Anna Dreber Almenberg, Fiona Fidler, Joseph Hilgard, Anne M. Scheel, Laura Scherer, Felix Schönbrodt, and Simine Vazire. It is affiliated with the University of Virginia and the Center for Open Science. The project was created on 2020-06-11 01:43 PM and last updated on 2021-02-09 01:26 PM. The category is "Project" and the license is "CC-BY Attribution 4.0 International".

The interface includes a "Wiki" section with an invitation from the Annual Review of Psychology, a "Files" section with a list of files, and a "Components" section with a list of subprojects.

Wiki

This project is the repository for a paper prepared for the Annual Review of Psychology. The work was divided up into subprojects, some of which aggregated data and generated code for completing the review.

INVITATION FROM ANNUAL REVIEWS

Dear Dr. Nosek,

On behalf of the Editorial Committee of the Annual Review of Psychology, I wish to invite you to contribute a review article on the subject of R...

[Read More](#)

Files

Click on a storage provider or drag and drop to upload

Name	Modified
Replicability, Robustness, and Reproducibility in Psychological Scie...	
OSF Storage (United States)	
RRR AnnualReview.pdf	2021-02-09 01:25 PM
Subproject 1: State of Replicability	
OSF Storage (United States)	
all_replication_studies.csv	2021-03-11 09:29 PM

Components

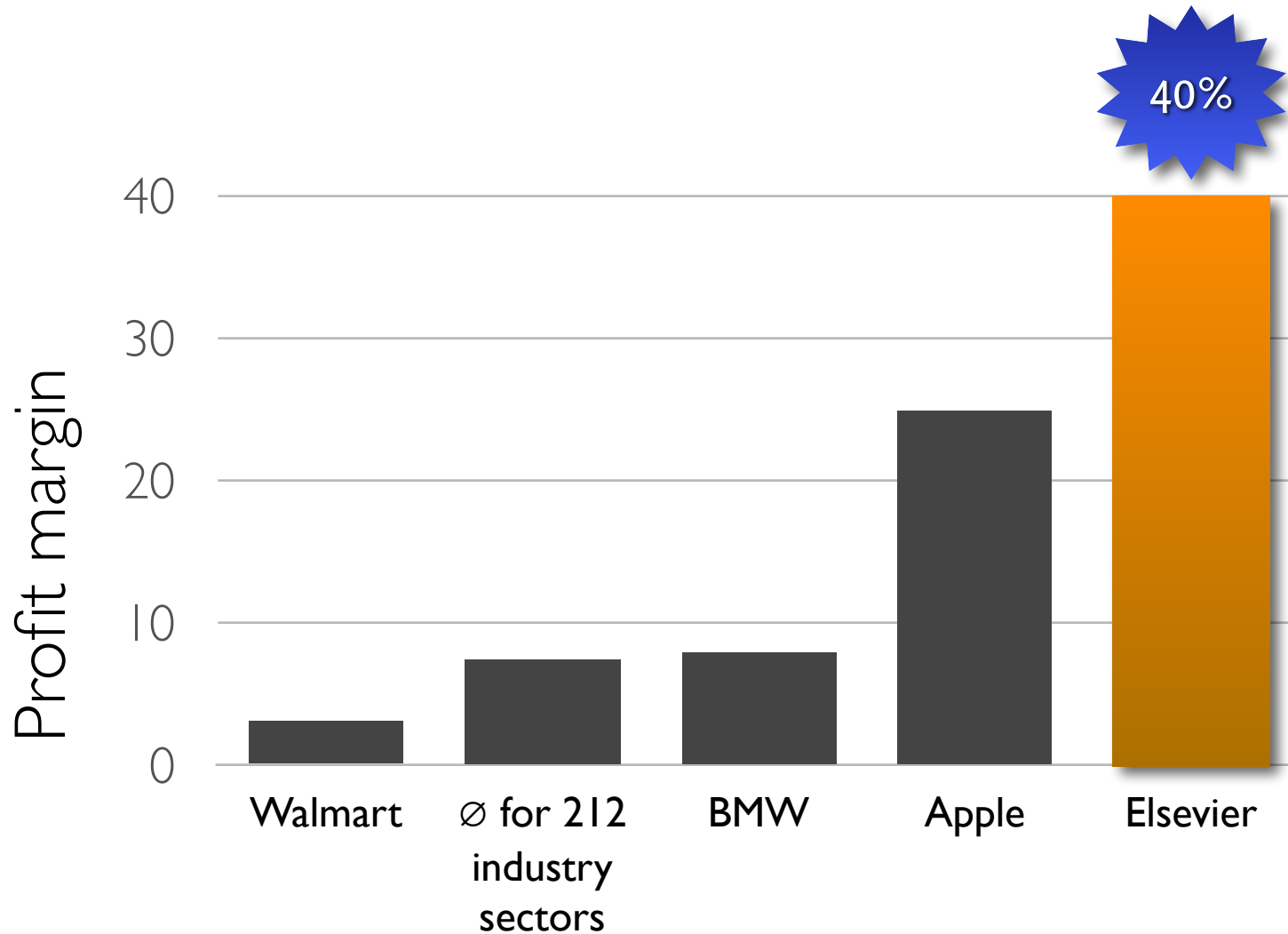
- Subproject 1: State of Replicability (Corker, Allard, Nosek & 1 more)
- Citation trends after replication (Vazire, Romero, Hardwicke & 1 more)
- Subproject 3: Predicting Replicability (Dreber, Fidler & Nosek)
- Subproject 4: Correlates of Replicability (Rohrer, Nijssen, Fidler & 1 more)
- Subproject 5: Improving Replicability (Vazire, Kline Struhl, Scheel & 1 more)
- Behavior change related to replication (Scherer, Moshontz, Hilgard & 1 more)
- Incentive and Policy changes (Schönbrodt, Hardwicke & Nosek)

Step 3: Make your paper available

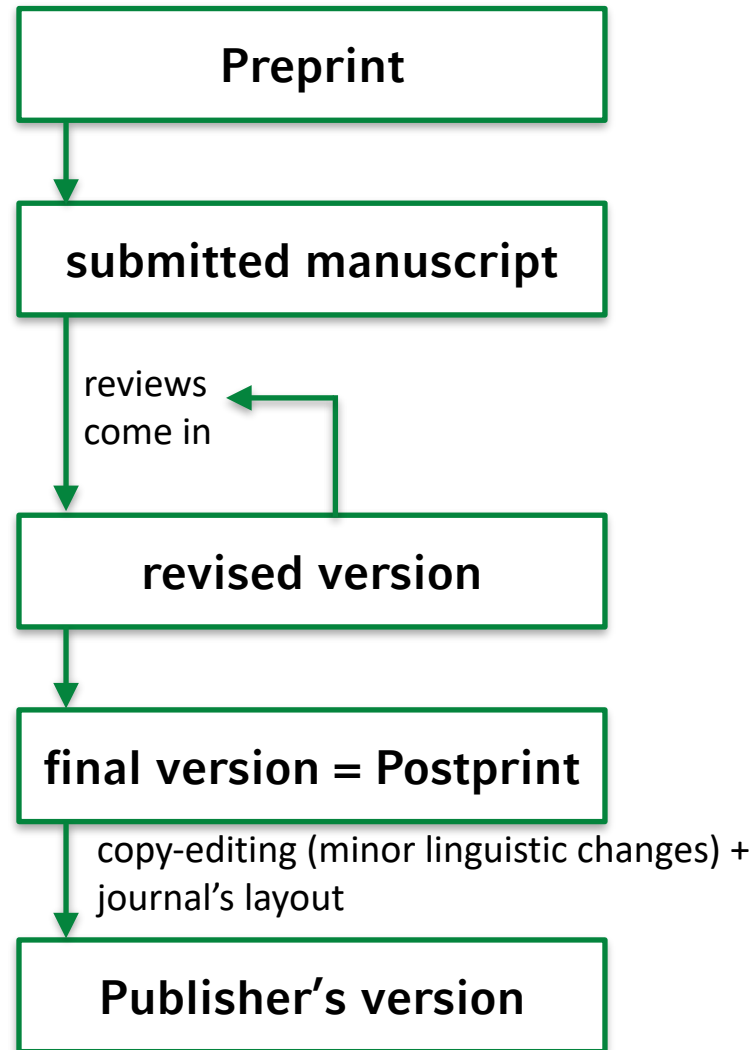
- The Budapest Open Access Initiative (BOAI) Declaration:
Open access is the “free availability [of scholarly literature] on the public internet permitting any users to read, download, copy, [...] full texts of these articles”
- Types of Open Access:
 - Gold OA: Pay €€€ to publisher
 - Green OA: Publish the final version of a paper as a postprint (will not be in the layout of the journal, but same content)
- Open Access does *not* imply **PREDATORY PUBLISHERS!**
- Open Access does *not* imply paying exorbitant APCs (article processing charges) to Elsevier and other publishers

Further resources: See our workshop material (video + slides) about “Open Access at LMU: Options, Requirements and Funding Possibilities” (<https://www.osc.uni-muenchen.de/toolbox/index.html>)

Big \$\$\$



The lifecycle of an open paper

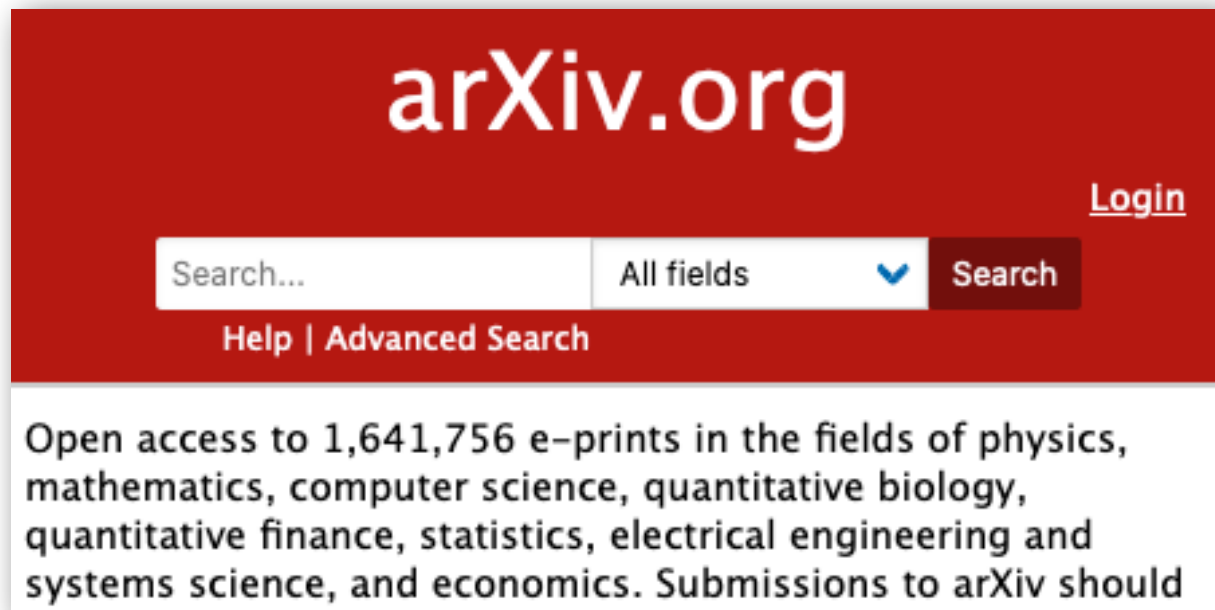


The lifecycle of an open paper



- Preprint = manuscript *before* peer review
 - a.k.a. „Author’s Original Manuscript (AOM)“
- Check if journal allows preprints (<http://sherpa.ac.uk/romeo/index.php>)
- Upload to preprint server
- Get a doi - makes preprint citable
- Clearly mark the PDF as preprint, e.g.:
DRAFT - not peer-reviewed
- Optionally: Ask for feedback on social media (external review)

Preprint servers



Preprint servers



In contrast to ResearchGate and [academia.edu](https://www.academia.edu/) these are *non-profit* services!

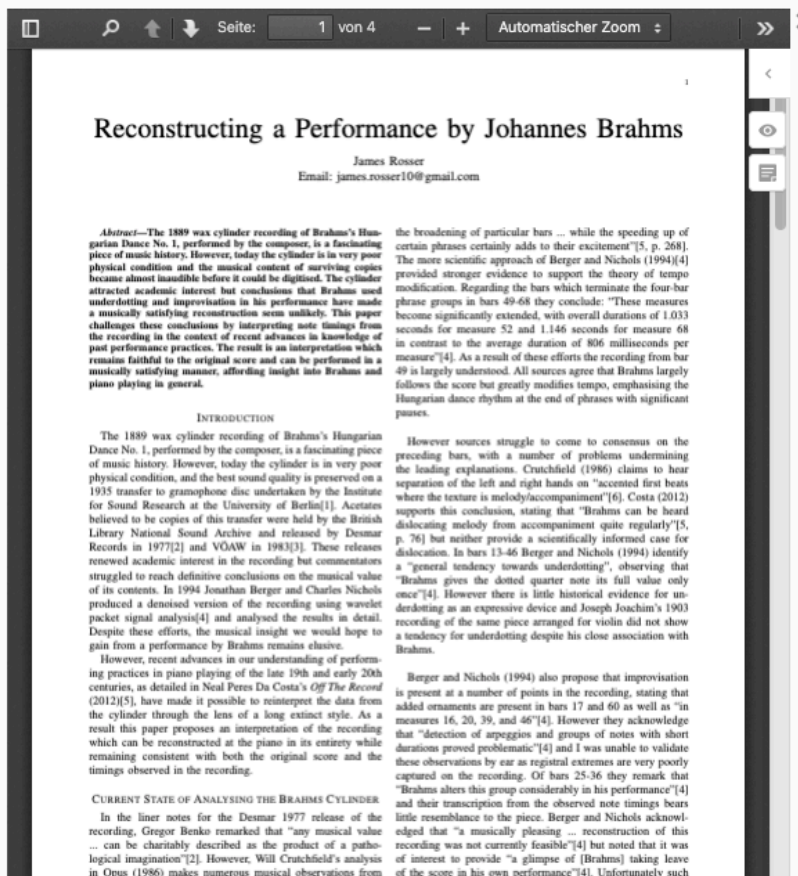
Reconstructing a Performance by Johannes Brahms

AUTHORS
James Rosser

CREATED ON
November 08, 2017

LAST EDITED
July 02, 2018

SUPPLEMENTAL MATERIALS
osf.io/6a87z/



brahmsPaper.pdf

Version: 1

Download preprint

Downloads: 332



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work



Abstract

The 1889 wax cylinder recording of Brahms's Hungarian Dance No. 1, performed by the composer, is a fascinating piece of music history. However, today the cylinder is in very poor physical condition and the musical content of surviving copies became almost inaudible before it could be digitised. The cylinder attracted academic interest but ...

[See more](#)

Preprint DOI

[10.31219/osf.io/xq835](https://doi.org/10.31219/osf.io/xq835)

License

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Disciplines

Arts and Humanities

Music

Music Performance

Musicology

Tags

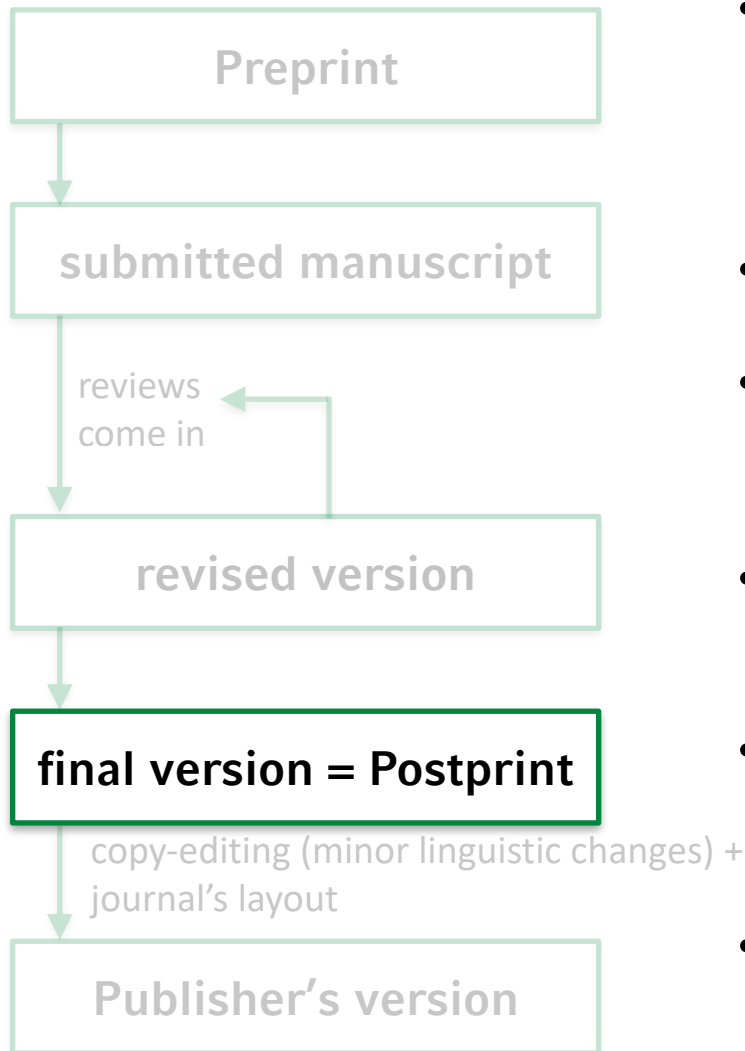
1889 brahms cylinder dislocation Hungarian Dance No. 1 music recording

The lifecycle of an open paper



- Optionally: Update preprint on preprint server with revised version
- Make a note on the front page that this is a revised version
- (technically, a revised version is somewhere between pre- and postprint)

The lifecycle of an open paper



- Post-print = accepted version after review, but before copyediting and layouting.
 - a.k.a. „Accepted Manuscript (AM)“
- Check if journal allows post-prints. (<http://sherpa.ac.uk/romeo/index.php>)
- Update PDF on preprint server with the post-print.
(→ Green Open Access)
- Clearly mark the PDF as postprint. Link to the official journal version.
Many journals have guidelines how this note has to look like.
- Hence, in practice *preprint* servers actually host a mixture of pre- and post-prints.
- Distribute the link to the open access version to colleagues, Twitter, etc. Put OA link on your website.



... opening access to research

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Search - Publisher copyright policies & self-archiving















One journal found when searched for: **0028-0836**

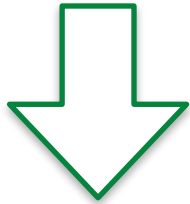
Journal:	Nature (ISSN: 0028-0836, ESSN: 1476-4687)
RoMEO:	This is a RoMEO yellow journal
Author's Pre-print:	✓ author can archive pre-print (ie pre-refereeing)
Author's Post-print:	⚡ subject to Restrictions below , author can archive post-print (ie final draft post-refereeing)
Restrictions:	<ul style="list-style-type: none"> 6 months embargo
Publisher's Version/PDF:	✗ author cannot archive publisher's version/PDF
General Conditions:	<ul style="list-style-type: none"> Research articles only On author's personal website, institutional repository and funder designated repository Publisher's version/PDF cannot be used Authors retain copyright Must link to publisher version Published source must be acknowledged and DOI cited Post-prints are subject to Springer Nature re-use terms

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Show research transparency in your CV

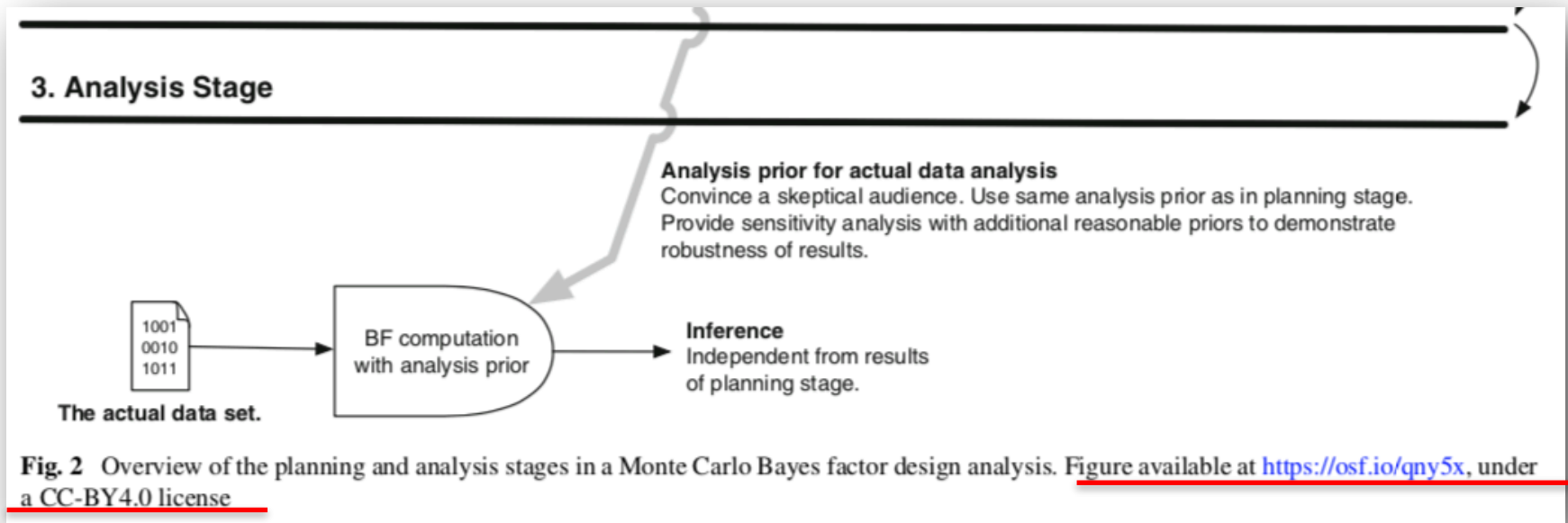
2020

-    Israel, L. S. F., & Schönbrodt, F. D. (2020). Predicting affective appraisals from facial expressions and physiology using machine learning. *Behavior Research Methods*. doi:10.3758/s13428-020-01435-y
-     Zygar-Hoffmann, C., Pusch, S., Hagemeyer, B., & Schönbrodt, F. D. (2020). Motivated Behavior in Intimate Relationships: Comparing the Predictive Value of Motivational Variables. *Social Psychological Bulletin*, 15, 1-37. <https://doi.org/10.32872/spb.2873>
-    Pusch, S., Schönbrodt, F. D., Zygar-Hoffmann, C., & Hagemeyer, B. (2020). Truth and wishful thinking: How inter-individual differences in communal motives manifest in momentary partner perceptions. *European Journal of Personality*, 34, 115-134. doi:10.1002/per.2227
-     Woll, C. F., & Schönbrodt, F. D. (2020). A series of meta-analytic tests of the efficacy of long-term psychoanalytic psychotherapy. *European Psychologist*, 25, 51-72. doi:10.1027/1016-9040/a000385



The small symbols are links to the preprint, open data, etc.

Researcher life hack: Free your images!



Publish your figures under a free license (prior to submission), and then you give the license to the journal (not the other way round).

For more details, see: <https://medium.com/@malte.elson/retaining-copyright-for-figures-in-academic-publications-to-allow-easy-citation-and-reuse-77c6e2b511fe>

Step 4: Expect openness in peer reviewing



<https://opennessinitiative.org/>

We suggest that beginning January 1, 2017, reviewers make open practices a pre-condition for more comprehensive review.

This is already in reviewers' power; to drive the change, all that is needed is for reviewers to collectively agree that the time for change has come.

Step 4: Expect openness in peer reviewing: Snippets

Dear XXX,

I embrace the values of openness and transparency in science and I am strongly convinced that open practices improve science. As a signatory of the Peer Reviewer's Openness Initiative (PRO initiative; <http://opennessinitiative.org/>), I make open practices a pre-condition for more comprehensive reviews since January 1, 2017.

That means, I will only provide a comprehensive review when authors provide open data, reproducible analysis scripts, and open material, or give a public justification in the manuscript why this is not possible. As a note: the PRO initiative does not require to evaluate the validity of this justification - it just requires that **any** justification for not being open is publicly provided in the paper.

As the current manuscript neither provides open data nor reproducible scripts for its simulations and analyses, it does not meet the minimum quality requirements for an open scientific manuscript. I would be happy to review a revision of the manuscript that provides open data and reproducible scripts, or gives a public justification in the author notes why this is not possible.

Step 4b: Escalation:

The cost of knowledge pledge

Dear editor,

traditional scientific publishers make higher profits than almost every other legal industry, using scholars' free labor and draining university library funds (see, e.g. [1][2]).

I am sure that your journal has a venerable history of publishing high-quality research, and actually all the credit for that goes to the authors, the editorial board, and the reviewers - not the publisher. Yet somehow the publisher owns the content, and hides it behind paywalls. I am not interested to further support that sort of unhealthy relationship between academia and (some) traditional publishers.

I made a pledge not to review, do editorial work, or submit papers as a first author to Elsevier journals any more [3]. Instead, I reallocate my reviewing and editorial contributions to sustainable and fair ways of publishing (see., e.g., [4]). I encourage the editorial board to end their relationship with Elsevier and think about more open and fair ways of bringing your excellent content to the scientific community and the public. I am aware that this Elsevier boycott initially hits unblameable actors, such as action editors, and I am truly sorry for that. But I think that the transition to open science, which includes a reform of the publishing system, is a vital task at the moment.

All best,
Felix

[1] [Scholarly publishers and their high profits | Alex Holcombe's blog](<https://alexholcombe.wordpress.com/2013/01/09/scholarly-publishers-and-their-high-profits/>)

[2] [Paywall: The Business of Scholarship](<https://paywallthemovie.com/>)

[3] [The Cost of Knowledge](<http://thecostofknowledge.com/>)

[4] [PsyOA – Psychology and Fair Open Access](<http://psyoa.org/>)

Next steps

- Make your analyses reproducible
 - <https://the-turing-way.netlify.app>
 - Wilson et al. (2017). Good enough practices in scientific computing. doi:10.1371/journal.pcbi.1005510
- Make your manuscripts computable
 - Jupiter notebooks, rmarkdown
 - Limited journal space? Share supplemental analyses, robustness checks, etc. on OSF
- Share your research data
 - Working with human data? Respect GDPR, add open data to your consent form
 - Go for publicly funded, non-profit repositories
 - Workshop "Research Data Management & Open Science: Trends, Funding Requirements and Services at LMU" (Thursday, April 22 2021, 15:00 - 16:30) → see <https://www.osc.lmu.de> for updates
- Preregister your research



The Turing Way

Guide for Reproducible Research

This guide covers topics related to skills, tools and best practices for research reproducibility.

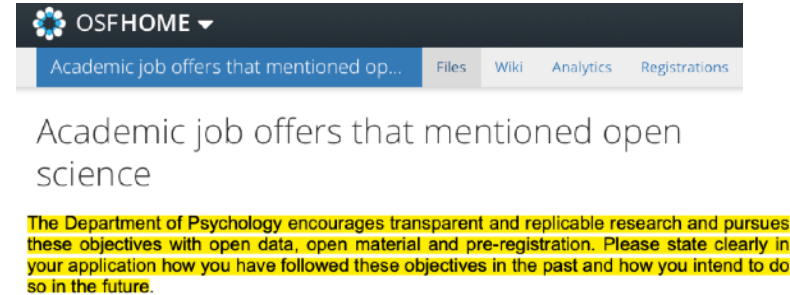
The Turing Way defines reproducibility in data research as data and code being available to fully rerun the analysis.

There are several definitions of reproducibility in use, and we discuss these in more detail in the [Definitions](#) section of this chapter. While it is absolutely fine for us each to use different words, it will be useful for you to know how The Turing Way defines reproducibility to avoid misunderstandings when reading the rest of the handbook.



Your benefit

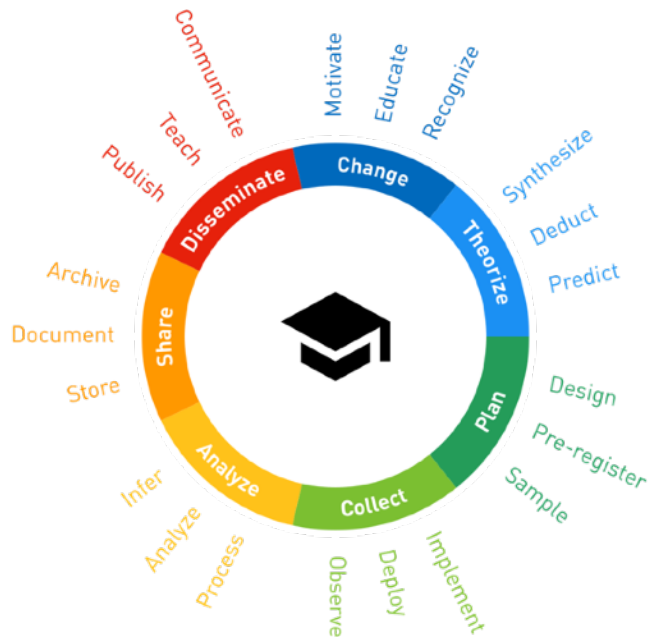
- You will be a *more competitive job candidate*: More and more job listings have open science as desirable or essential job criterion (<https://osf.io/Zjbnt/>)
- You will be a *more competitive grant applicant*: More and more funders require open science now
- More citations: Papers with open access versions get more citations (49% higher Altmetric Attention Score and 36% more citations; Fu & Hughey, 2019)
- **You will do better science!**




Open science is a policy priority for the European Commission and the standard method of working under its research and innovation funding programmes as it improves the quality, efficiency and responsiveness of research.

Resources


Open Scholarship Knowledge Base (OSKB): <https://www.oercommons.org/hubs/OSKB>





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OPEN SCIENCE CENTER



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Resources for Teaching

Key Papers

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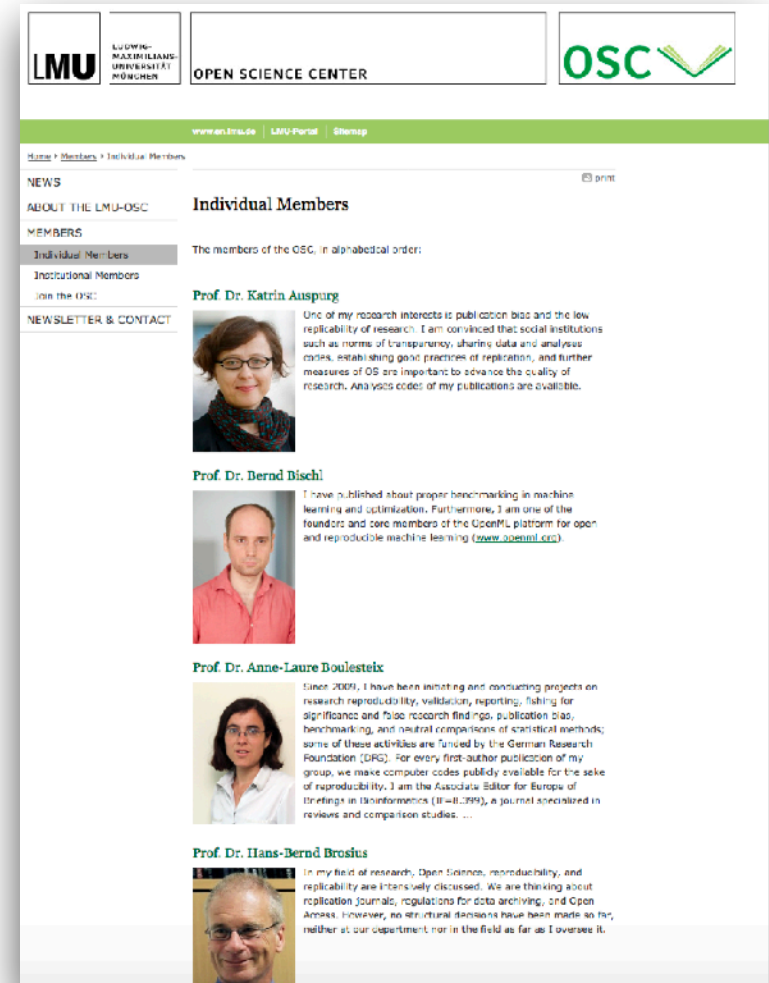
- Gilad Feldman: *Endorsing open-science and supporting a science “credibility revolution”: Challenges, benefits, and practical tools and tips for early career and experienced researchers* (https://www.dropbox.com/sh/i8hy9kfjddleupl/AAA7abj8cj1_KHcvxpFAleyaa?dl=0)
- Dan Quintana: *Five things that every researcher should know about open science* <https://www.youtube.com/watch?v=0uCG3Fl6ugE>
- Priya Silverstein: *Easing into open science: No time like the present.* <https://www.youtube.com/watch?v=owJaD3UiseQ>
- Felix Schönbrodt: *Open Science Crash Course (everything in 5 hours).* <https://osf.io/qvfp8/>

Change the system



LMU Open Science Center

- 65 members of 15 disciplines:
Psychology, sociology, computer science, statistics, geography, medicine, veterinary medicine, economics, philosophy of science, ...
- 3 entire faculties as members:
Faculty of Medicine, Faculty of Veterinary Medicine, Faculty of Psychology and Educational Science
- Mission Statement:
 - Education (from PhD students to professors)
 - Meta-science research
 - Change the incentive structure
- <http://www.osc.lmu.de>
- Join our email newsletter: <https://lists.lrz.de/mailman/listinfo/lmu-osc>





LMU Open Science Center

10 institutional members:

- Leibniz-Rechenzentrum
- Universitätsbibliothek
- Medical Faculty
- Faculty of Veterinary Medicine
- Faculty of Psychology and Educational Sciences
- Department Psychology
- Department Statistics
- LMU-ifo Economics & Business Data Center (EBDC)
- Munich Center for Neurosciences - Brain & Mind
- IT-Gruppe Geisteswissenschaften - Digital Humanities Center

65 individual members

... from 15 different disciplines

... 33 professors, 25 postdocs



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- Leibniz-Rechenzentrum
- Universitätsbibliothek
- Medical Faculty
- Faculty of Veterinary Medicine
- Faculty of Psychology and Educational Sciences
- Department Psychology
- Department Statistics
- LMU-ifo Economics & Business Data Center (EBDC)
- Munich Center for Neurosciences - Brain & Mind
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65 individual members

... from 15 different disciplines
... 33 professors, 25 postdocs

Statistics

Sociology

Medicine

Communication
Science

Psychology

Political Science

Computer
Science

Philosophy

Economics
(BWL & VWL)

Geography

Biology

Linguistics

Veterinary
Medicine

Physics

An open science initiative in your institution?

MEMBERS

Individual Members

Institutional Members

LMU Open Science Initiative
in Medicine

LMU Open Science Initiative
Psychology

Join the OSC

OSIB: LMU Open Science Initiative Biology?

OSILS: LMU Open Science Live Sciences?

OSINeuB: LMU Open Science Neurobiology?

Establish your own open science initiative - we are happy to help.

(Contact: felix.schoenbrodt@psy.lmu.de)

For a kickstart, also see <https://inosc-starter-kit.netlify.app>

Thanks for our attention!