

Open research: Why it's important, how to make research more open and how to drive change

Iryna Kuchma, Open Access Programme Manager



<https://eifl.net/where-we-work>

<https://www.amicalnet.org/members>



Note: some institutions overlap each other on the map, so they are not visible.

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Immediate open access 'should be EU default', says presidency

By Andrew Silver

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Press release

8 February 2023 | 15:53

Research ministers discussed research infrastructures and open science

Implementing FAIR (Findable, Accessible, Interoperable and Reusable) principles in all research outputs and across disciplines is a significant undertaking for Europe, and requires changes in research culture and infrastructure. These changes must also align with international partners in like-minded regions and countries, and the ministers exchanged views on whether the EU should take action to accelerate this work.



“There is room for improvement when it comes to the share of research data that can be accessed and reused, so we can accelerate scientific progress and increase societal impact.”

Mats Persson. Swedish Minister for Education

<https://swedish-presidency.consilium.europa.eu/en/news/research-ministers-discussed-research-infrastructures-and-open-science/>

Press release

8 February 2023 | 15:53

Research ministers discussed research infrastructures and open science

Benefits and challenges of open science

The second policy debate of the day focused on open access to scientific publications, and how the digital revolution creates new opportunities for more efficient and effective scholarly publishing.

For almost 20 years, open access and open science have been priorities in the European Commission's strategies, guidelines and recommendations, and a standard method of working under its research and innovation funding programmes.

Making scholarly publications rapidly accessible to all contributes to high-quality research. Therefore, providing immediate open access to peer-reviewed research publications under open licences should be the default. The ministers discussed the main challenges to achieving this goal, and the challenges to ensuring excellence and supporting diversity with open science as the norm.

"For many years, there has been intensive work on making publications openly published on the Internet, and the share of articles published openly has gradually

<https://swedish-presidency.consilium.europa.eu/en/news/research-ministers-discussed-research-infrastructures-and-open-science/>

🕒 FEBRUARY 13, 2023

African researchers are ready to share more work openly—now policy must make it possible

by Lara Skelly and Elisha Chiware, The Conversation

<https://phys.org/news/2023-02-african-ready-openlynnow-policy.html>





1



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Policy readiness

[Our second study](#), a [systematic review](#), found there was no shortage of examples of open science policies, nor was there a lack of implementation frameworks that could guide African open science stakeholders to develop their own policies, that would set out the open science intent and delineate the roles and responsibilities of stakeholders and researchers.

Some African countries are already doing well in open science. [Botswana](#) is one; stakeholders are working on a national policy to support open data activities. Botswana shows that all stakeholders must be included in policy development. Another is [South Africa](#). The country's National Research Foundation is working towards an African open science platform. This is a collaboration of several national and international entities.

However, the lack of policy synergies appears to be holding back the African open science environment. Other researchers have [put it like this](#): "African science systems largely operate independently of each other, creating silos of incompatible

<https://phys.org/news/2023-02-african-ready-openlynow-policy.html>

Open Science

Making science more accessible, inclusive and equitable for the benefit of all

UNESCO

[Home](#)[Implementation](#)[Toolkit](#)[Global Open Science Partnership](#) [Development of the Recommendation](#) 

<https://www.unesco.org/en/open-science>

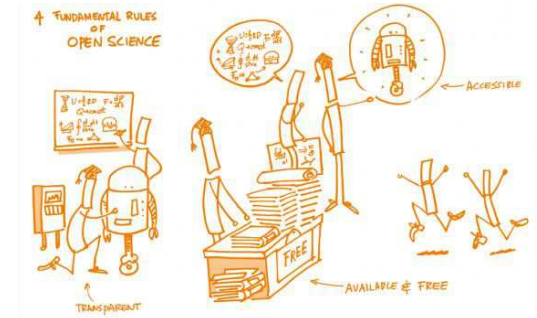
Definition of Open Science

Open Science:

- ❖ makes multilingual scientific knowledge openly available, accessible and reusable for everyone,
- ❖ increases scientific collaborations and sharing of information for the benefits of science and society,
- ❖ opens the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community.



Talking points



- Why open science is an issue that researchers can't afford to ignore
- How to go about making research more open
- What funders/institutions expect to see about open access, data sharing and open science when applying for new grants
- How to progress research career through practicing open science
- What reproducibility and replication is and how to practice them; improvement science initiatives on statistics, measurement, teaching, data sharing, code sharing, pre-registration, replication
- Questionable research practices and suggested improvements, good practice advice to early career researchers



Iryna, three small actions that could give your next paper an extra boost

At PLOS we want your next research paper to maximize its reach, find its audience, and make a difference within its field and to wider society.

Read on to discover the relatively small additions you can build into your publishing process that could have big benefits for your research, the wider scientific community, and society as a whole.



[Deposit your research data in a repository](#)

Depositing your data in a repository is a great way to make your research more discoverable, reusable, and easier to cite. Research shows it can boost your papers citation rate by up to 25% compared with articles which do not utilize a data repository*.

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[Post a preprint](#)

A preprint is a version of a scientific manuscript posted on a public server prior to formal peer review. Posting a preprint gets your research into the public domain early, opening your work up at a time when it would otherwise be inaccessible, making it available for your peers to use, reference and build upon.

[Learn More](#)



[Publish your methods](#)

Methods help readers gain an increased respect for the integrity of your work, and have broad reuse potential, ensuring that those based on his findings will be well informed.

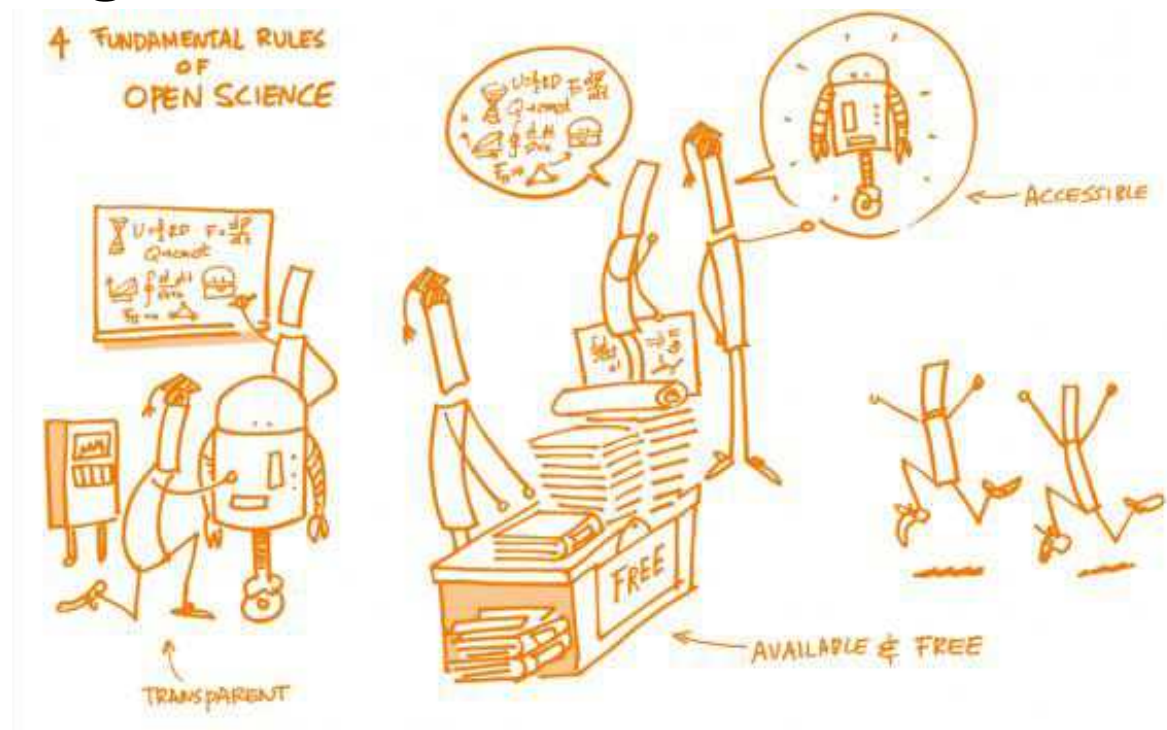
Worries about doing Open Science

“How do I sell this to my advisor?”

“Won’t it make it harder to publish my research?”

“What if I get it wrong?”

Kathawalla, U.K., Silverstein, P. and Syed, M., 2021. Easing into open science: A guide for graduate students and their advisors. *Collabra: Psychology*, 7(1).
<https://doi.org/10.1525/collabra.18684>



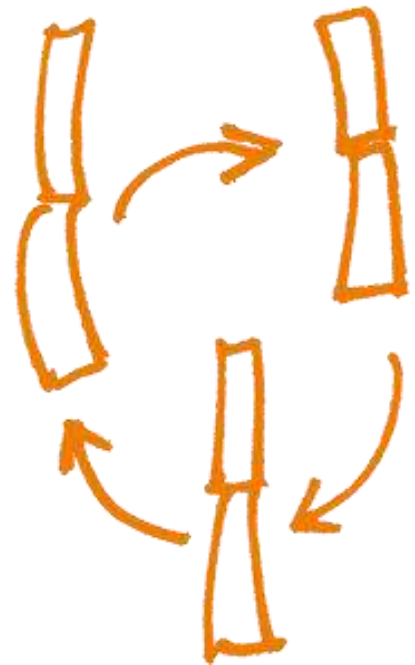


Discuss with other students/staff issues surrounding reproducibility and open science



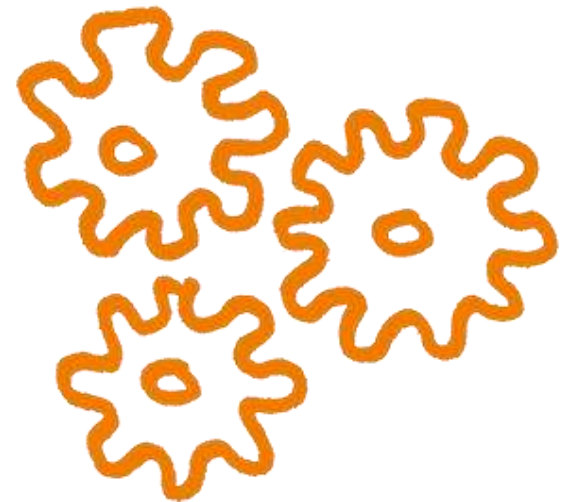
<https://reproducibiliatea.org>

Project workflow

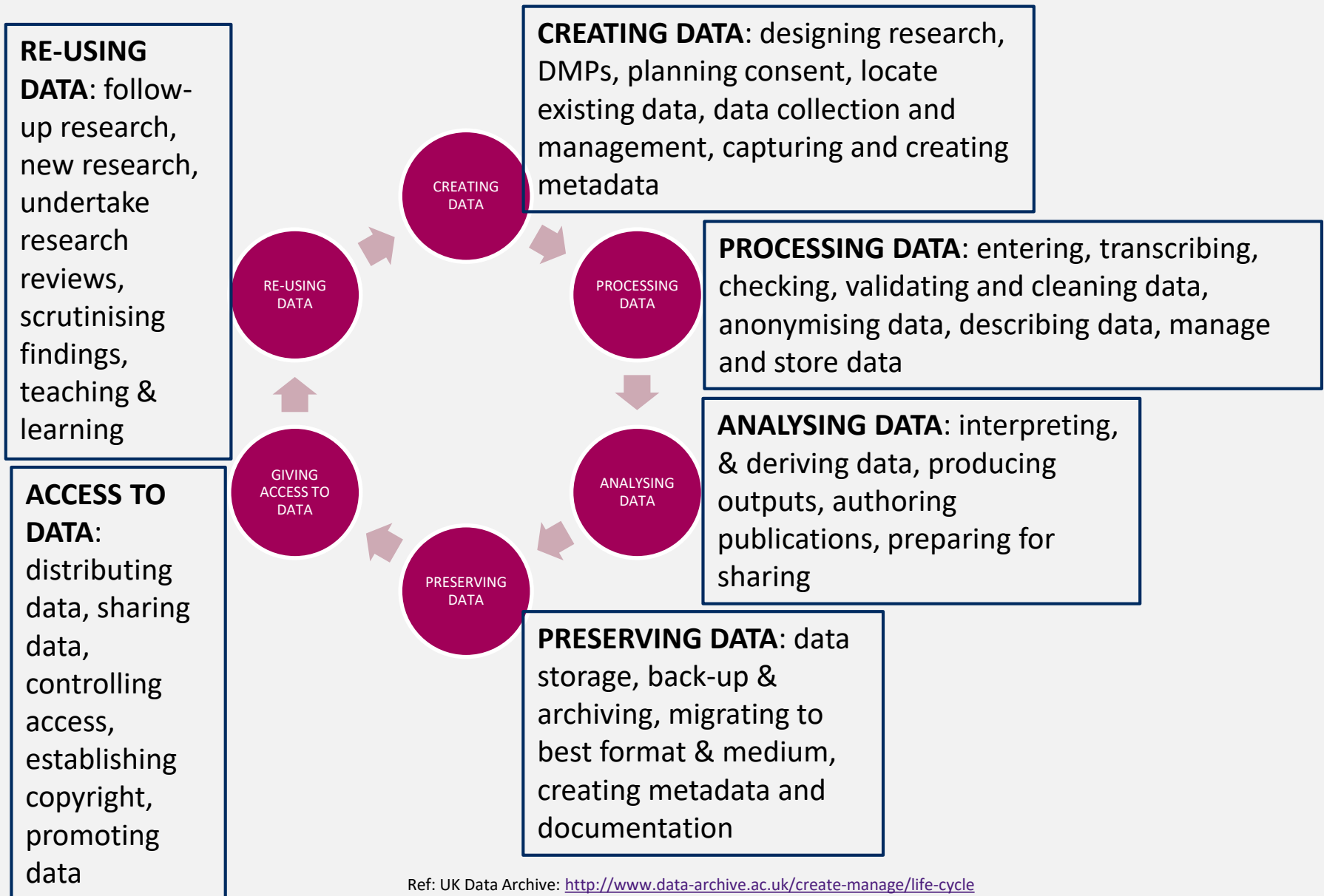


How you organize projects and move through the various stages of your research cycle: your **file folder structure, document naming conventions, version control, cloud storage,** and other details.

The choice of **who has access to the project** (e.g., collaborators, the public) and **when in the process they have access** (e.g., at all times, upon publication).

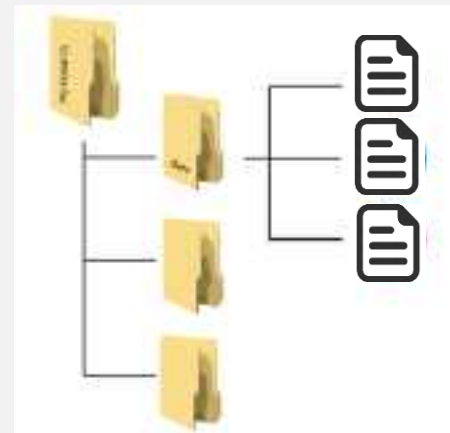
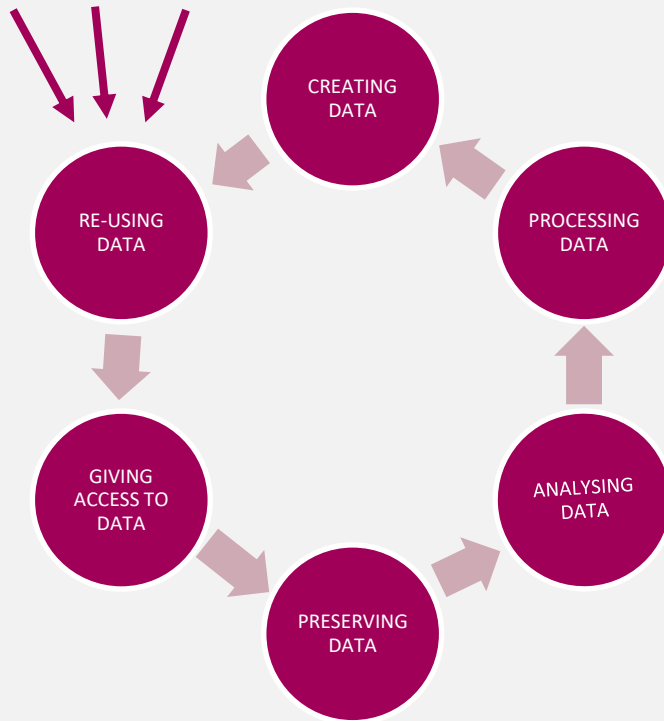


Research data lifecycle



Planning trick: think backwards

What data organisation would a re-user like?



Data organisation

Meaningful file names

Below are tips on meaningful and consistent file names. Read more in ['Choosing a file name'](#).⁽²⁾

- ❑ Make sure to use consistent file names. When you use a date in the file name, choose a notation (for instance, YYYYMMDD or yymmdd).
- ❑ Do not use strange characters like ?\!@*%[(<> in the file name.
- ❑ Use traceable file names, such as Project_Instrument_location_YYYYMMDD.ext.
- ❑ Make sure to only use each file once in the folder structure. If you store a file in more than one place, several versions of the same file can unwillingly be created.
- ❑ See also [version management](#).

It is good practice to note the file naming and its meaning in a readme.txt.

Even if a researcher is well underway with his project consistent file naming is still an option by using a [bulk file rename utility](#).⁽³⁾ It is important, however, to check if this bulk renamer delivers on its promises.



white_data_20140708.csv



blue_data_20140708.docx



red_data_20140708.R



red_data_20140708_v02.R

File naming and version management

OSF | Easing Into Open Science: X

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Easing Into Open Science: A Guide for Graduate Students and Their Advisors

Contributors: Ummul-Kiram Kathawalla, Priya Silverstein, Moin Syed
Date created: 2020-04-29 05:09 PM | Last Updated: 2021-06-28 10:50 PM
Category: Project
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Has supplemental materials for [Easing Into Open Science: A Guide for Graduate Students and Their Advisors](#) on PsyArXiv

Wiki

Introduction

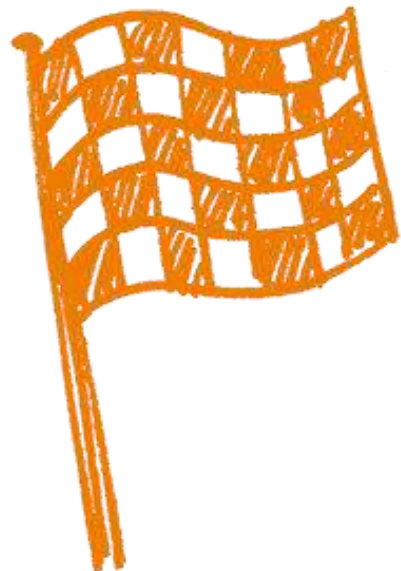
This wiki accompanies the paper "Easing Into Open Science: A Tutorial for Graduate Students" (accepted for publication). The purpose of this tutorial is

Citation

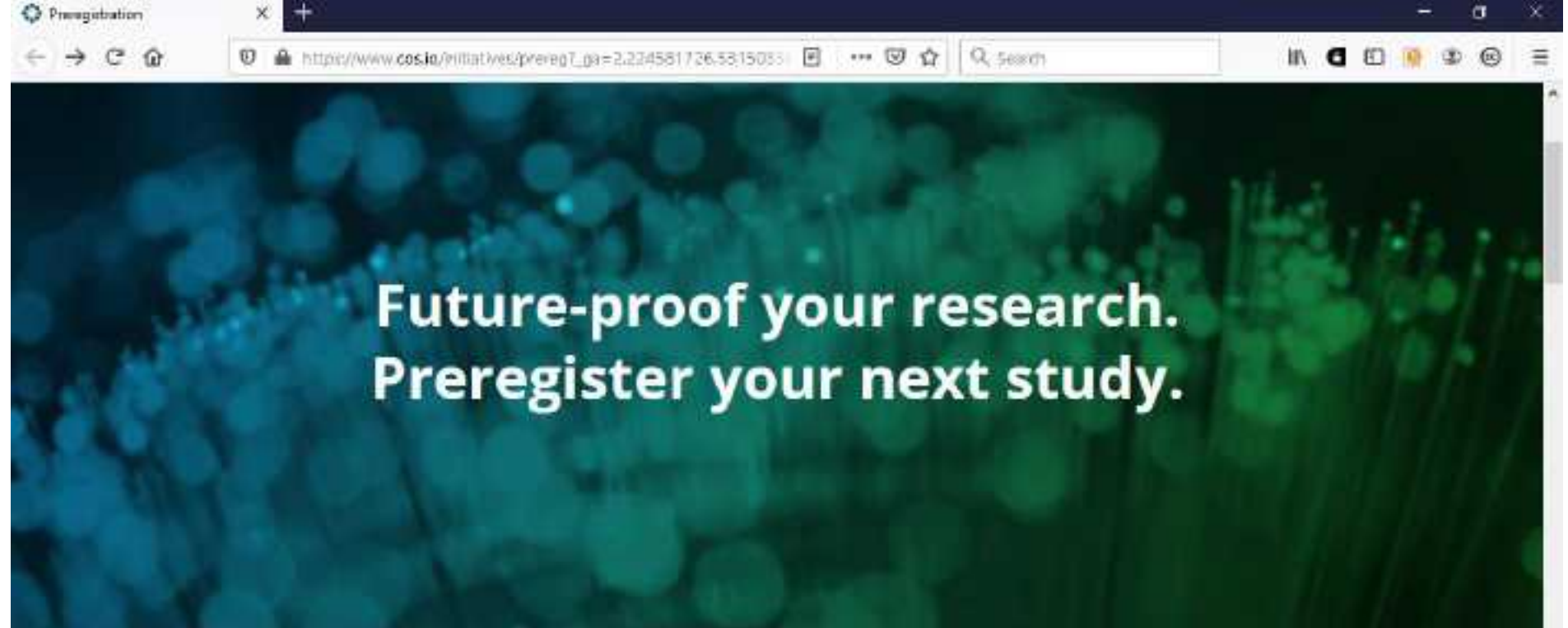
Tags

Data sharing Graduate Student How To Open Science PhD Preprints

<https://osf.io/w5mbp>



Preregistration



Future-proof your research. Preregister your next study.

What is Preregistration?

When you preregister your research, you're simply specifying your research plan in advance of your study and submitting it to a registry.

Preregistration separates *hypothesis-generating* (exploratory) from *hypothesis-testing* (confirmatory) research. Both are important. But the same data cannot be used to generate *and* test a hypothesis, which can happen unintentionally and reduce the credibility of your results. Addressing this problem through planning improves the quality and transparency of your research. This helps you clearly report your study and helps others who may wish to build on it.

For additional insight and context, you can read [The Preregistration Revolution](#). ([preprint](#))



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Registered Reports

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are known to align scientific values and
practices.**

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Registered Reports

https://www.cos.io/initiatives/registered-reports

Registered Reports Participating Journals Details & Workflow Resources for Editors For Funders FAQ Allied Initiatives

Registered Reports is a publishing format that emphasizes the importance of the research question and the quality of methodology by conducting peer review prior to data collection. High quality protocols are then provisionally accepted for publication if the authors follow through with the registered methodology.

This format is designed to reward best practices in adhering to the hypothetico-deductive model of the scientific method. It eliminates a variety of questionable research practices, including low statistical power, selective reporting of results, and publication bias, while allowing complete flexibility to report serendipitous findings.

```
graph LR; A[DEVELOP IDEA] --> B[DESIGN STUDY]; B --> C[COLLECT & ANALYZE DATA]; C --> D[WRITE REPORT]; D --> E[PUBLISH REPORT];
```

Stage 1 Peer Review

Stage 2 Peer Review

"Registered Reports eliminates the bias against negative results in publishing because the results are not known at the time of review."

"Because the study is accepted in advance, the incentives for authors change from producing the most beautiful story to the most accurate one."

<https://www.cos.io/initiatives/registered-reports>

Preprints



Why should I care?



Priority claim

By posting a preprint researchers can disclose their completed study immediately and without access barriers.¹



Increase citations

Articles get 36% more citations if they have a prior associated preprint.²



Receive feedback

Improve your manuscript by getting valuable comments on your research prior to publication.³



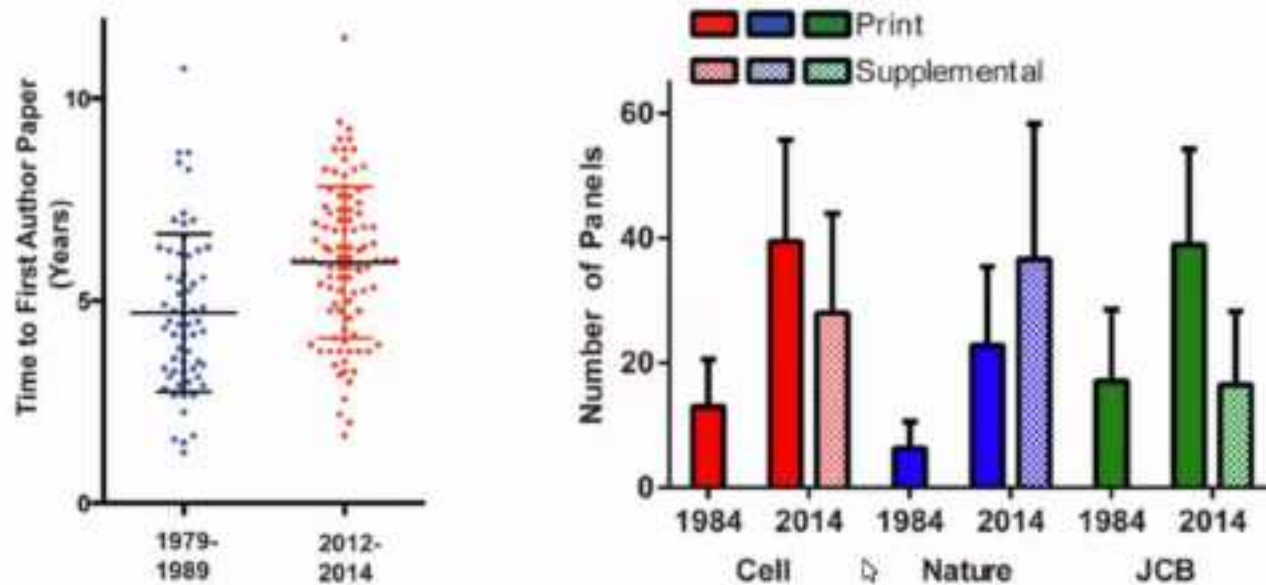
Proof of productivity

A preprint provides funders and hiring committees with public evidence of your work.⁴

Infographics by ASAPHio Fellows:

Ana Dorrego-Rivas (@adorrego_r), Carrie Iwema
and Mafalda Pimentel (@Maf_Pimentel)

Creating a publishable unit is slower than ever



Accelerating scientific publication in biology. Ronald D. Vale

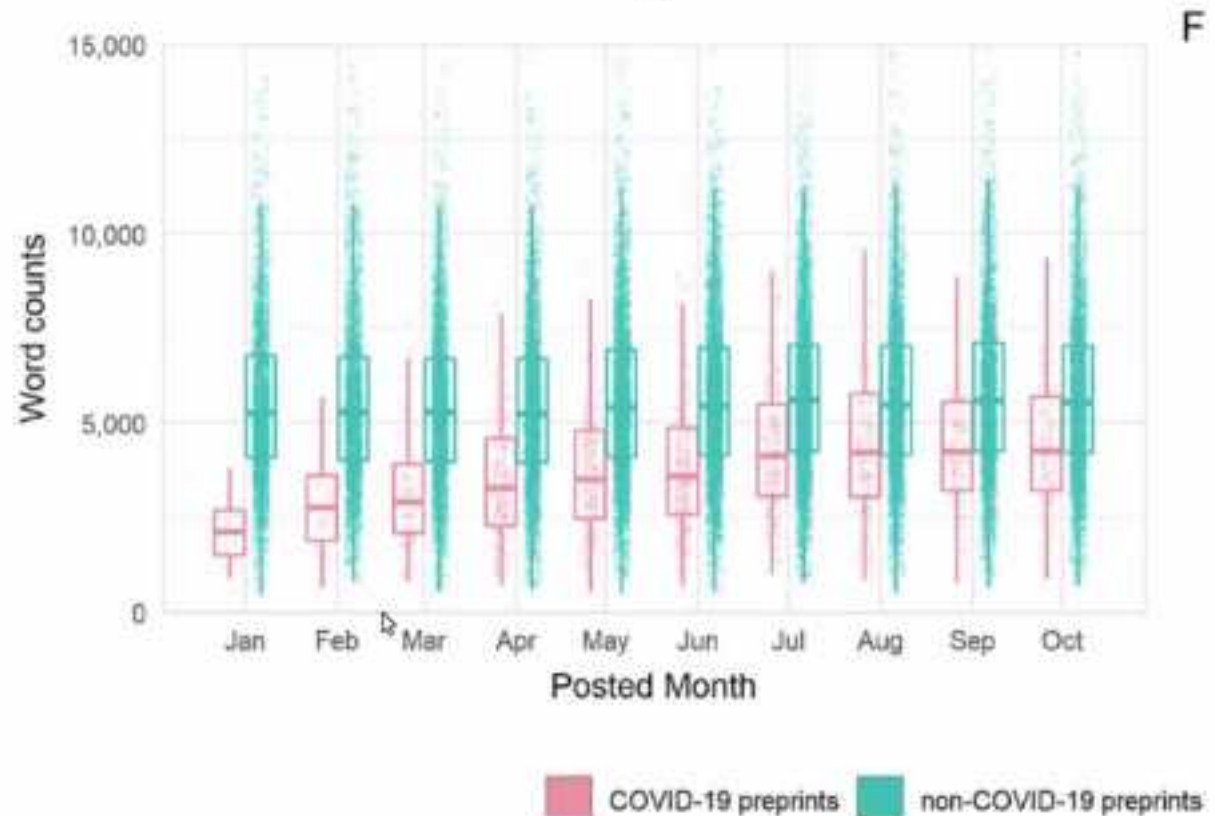
Proceedings of the National Academy of Sciences Nov 2015, 112 (44) 13439-13446; DOI: 10.1073/pnas.1511912112

[Iratxe Puebla](#) @ASAPbio Community Call: Preprints in Progress

Preprints of different forms in the response to COVID-19

COVID preprints were short (early on, <50% of length of other preprints) and were revised more often

Fraser N, Brierley L, Dey G, Polka JK, Pálfi M, Nanni F, et al. (2021) The evolving role of preprints in the dissemination of COVID-19 research and their impact on the science communication landscape. PLoS Biol 19(4): e3000959. <https://doi.org/10.1371/journal.pbio.3000959>



➤ Preprint fact checking



Scoop protection

Preprints allow you to establish priority for your discoveries. 99.3% of preprint authors reported no scoop problems.¹



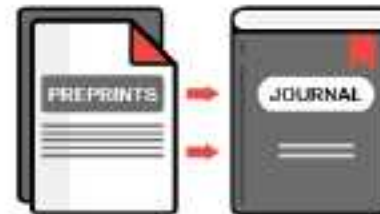
Preprints are journal compatible

Over 1,200 journals operate policies compatible with preprints.²



Preprints are good quality

Two thirds of bioRxiv preprints appear in a journal within two years.³
Quality of reporting is within a similar range as that of peer-reviewed articles.⁴



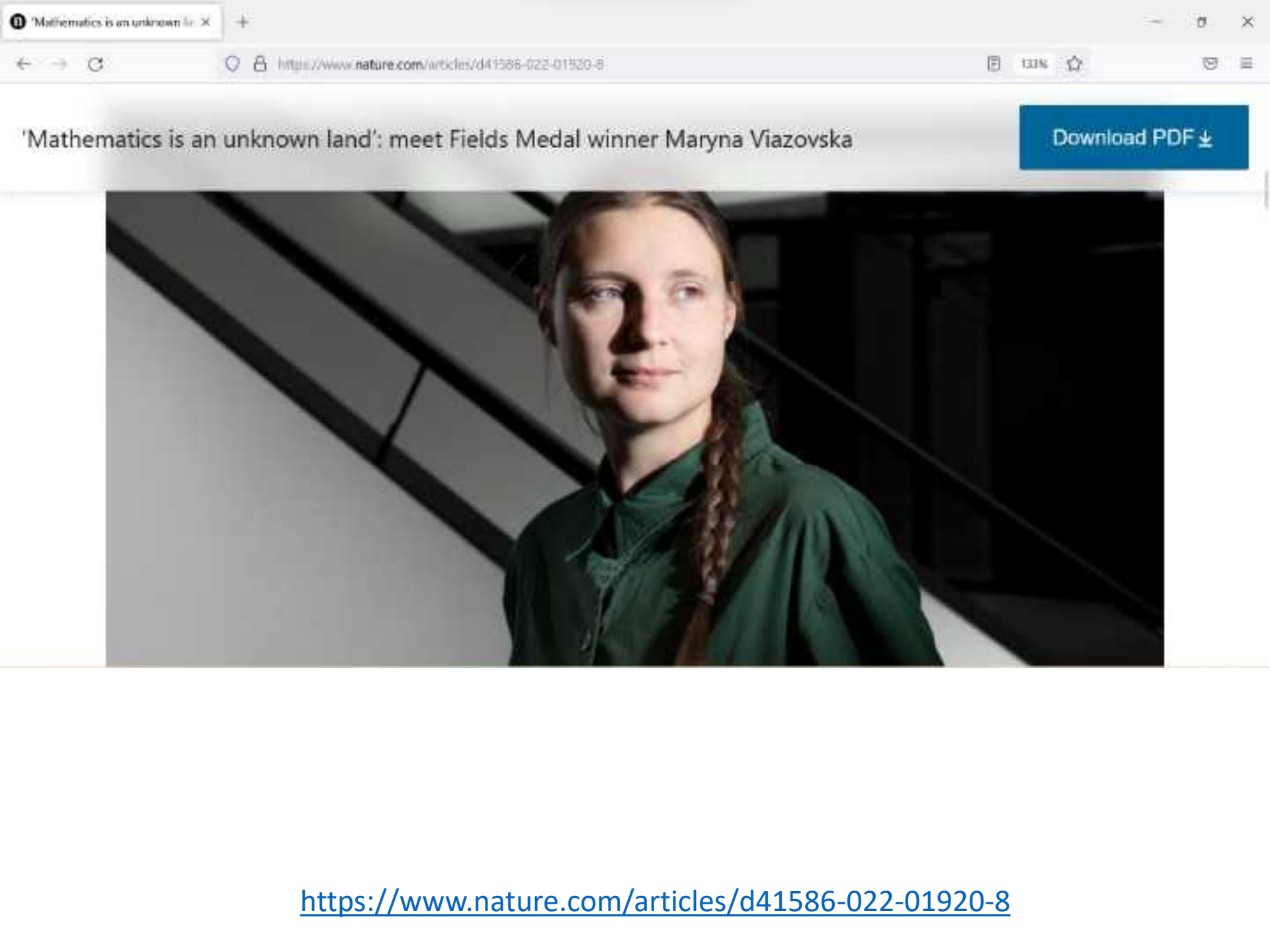
Smoother path to publication

Many journals allow preprint transfers directly from servers.¹ Some editors scout preprints and invite submissions to their journal.

When communicating about their work in social media, blogs or with journalists, researchers should be mindful of the potential for misinterpretation of their findings and:

- 1 Label the research as a preprint (where that is the case).
- 2 Prominently state whether or not it has undergone peer review.
- 3 Prominently highlight the limitations of the work.
- 4 Provide narrow interpretations that are unlikely to be exaggerated or misconstrued when communicating research findings to a lay audience.
- 5 Make every effort to ensure that the research is presented so that non-experts can understand it with minimal room for misinterpretation.
- 6 Make every effort to anticipate the potential for their research to be propagated in ways that are far from the original intent.
- 7 Avoid overhyping the significance of the research findings.
- 8 Consider using a structured format, similar to that recommended by the [UK Academy of Medical Sciences](#) for press releases. For example, in biomedical fields, structured information to be included in social media post(s) might include the following.
 - a) Brief lay summary
 - b) Type of research: [Observational/interventional etc]
 - c) Model system: [Humans/mice/in vitro biochemistry]
 - d) Sample size: [Number of patients, etc]
 - e) Peer review status [Preprint/(open) peer review etc]
 - f) Other caveats/limitations
- 9 Be familiar with any guidelines provided by their institution on the responsible use of social media. Guiding principles for institutions to aid the responsible media reporting of research can be found at asapbio.org/public.
- 10 Work in collaboration with their institutional press office if approached by the media to comment on research they have carried out at the institution, regardless of whether or not the research is actively promoted by the institution.





Mathematics is an unknown land: X

https://www.nature.com/articles/d41586-022-01920-8

'Mathematics is an unknown land': meet Fields Medal winner Maryna Viazovska

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Fields Medals 2022 | International Mathematical Union


<https://www.mathunion.org/imu-awards/fields-medal/fields-medals-2022>

International Mathematical Union IMU

<https://www.mathunion.org/imu-awards/fields-medal/fields-medals-2022>

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Fields Medals 2022



The Fields Medal is awarded to recognize outstanding mathematical achievement for existing work and for the promise of future achievement.

The medals and cash prize are awarded by the International Mathematical Union, which is based at the University of Toronto, where it is underfunded. In 2022, the prize was supplemented by generous donations from the Fields Foundation/Klaus Tschira Foundation.

On this page

- Hugo Duminil-Copin
- June Huh
- James Maynard

Fields Medals 2022 | International Mathematical Union

<https://www.mathunion.org/imu-awards/fields-medal/fields-medals-2022>

Organization • Membership • IMU Awards • ICM • Activities • Outreach

On this page

- Hugo Duminil-Copin
- June Huh
- James Maynard
- Maryna Viazovska

Maryna Viazovska

For the proof that the A_3 lattice provides the densest packing of identical spheres in 8 dimensions, and further contributions to related extremal problems and interpolation problems in Fourier analysis.

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Photo credit: Sergey Ponomarev

Immediate acclaim after the preprint appeared on March 14, 2016 <https://arxiv.org/abs/1603.04246>

[1603.04246] The sphere packin...

← → ↺ https://arxiv.org/abs/1603.04246

 Cornell University

We gratefully acknowledge support from the Simons Foundation and member institutions.

arXiv > math > arXiv:1603.04246

Search... All fields Search

Help | Advanced Search

Mathematics > Number Theory

[Submitted on 14 Mar 2016 (v1), last revised 4 Apr 2017 (this version, v2)]

The sphere packing problem in dimension 8

Maryna Viazovska

In this paper we prove that no packing of unit balls in Euclidean space \mathbb{R}^8 has density greater than that of the E_8 -lattice packing.

Comments: 22 pages, 2 figures

Subjects: Number Theory (math.NT); Metric Geometry (math.MG)

Cite as: arXiv:1603.04246 [math.NT]

(or arXiv:1603.04246v2 [math.NT] for this version)

https://doi.org/10.48550/arXiv.1603.04246

Journal reference: Annals of Mathematics, Pages 981-1015 from Volume 185 (2017), Issue 3

Related DOI: https://doi.org/10.4007/annals.2017.185.3.7

Submission history

From: Maryna Viazovska [view email]

[v1] Mon, 14 Mar 2016 13:00:36 UTC (357 KB)

[v2] Tue, 4 Apr 2017 02:03:32 UTC (358 KB)

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Statement on peer reviewed publications

https://www.coalition-s.org/statement-on-peer-reviewed-publications/

Plan S Principles & Implementation Services cOAlition S News Resources FAQ Blog

Statement on peer reviewed publications

2019/05/2022

The key principle of Plan S states that *"from 2021, scientific publications that result from research funded by public grants must be published in compliant Open Access journals or platforms"*. The [Guidance document](#) defines "scientific publications" further as "peer-reviewed scholarly publications". These are generally interpreted as peer reviewed articles published in scholarly journals or on platforms (see [FAQs](#) for the current description of a platform). As a result, particular prominence is given to journals and platforms as privileged venues for research outputs.

Scientific publishing is evolving rapidly. A number of initiatives have moved away from the notion that peer-reviewed articles must be published in traditional Open Access journals or platforms. They provide peer review services that are entirely independent from such journals or platforms. These include [Peer Community in \(PCI\)](#), [Society](#), [Next Generation Repositories](#), [Notify Project](#), [PREReview](#), and [Review Commons](#), to name a few. These initiatives give the author the freedom to decide how and when to disseminate their peer-reviewed article.

In light of the accelerating development of these journal-independent peer-review services, cOAlition S would like to explicitly state that 'peer reviewed publications' – defined here as scholarly papers that have been subject to a journal-independent standard peer review process with an implicit or explicit validation^[1] – are considered by most cOAlition S organisations to be of equivalent merit and status as

<https://www.coalition-s.org/statement-on-peer-reviewed-publications/>

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"I can't risk delaying the release of my research."

"Preprints let scientists set the release schedule for their research. I can't risk having my research's availability delayed for years by the journal publication process. By preprinting, we get our ideas out there, so others can build off of them. In return, we get valuable feedback and attention for our research."

Daniel Himmelstein
Postdoc, University of Pennsylvania

ASAPbio.org

A screenshot of the ASAPbio website. The browser's address bar shows the URL https://asapbio.org/preprint-info#action. The ASAPbio logo is in the top left, and a search bar is in the top right. The main content area features a testimonial from Daniel Himmelstein, a postdoc at the University of Pennsylvania. The testimonial is overlaid on a video frame showing a man in a green t-shirt with a "#LIFE" logo. Navigation arrows are visible on the left and right sides of the video player.

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"Preprinting saved me from scooping myself."

"While I was working to resubmit a manuscript, collaborators of mine decided it was time to submit a second paper related to the work. We had no way to reference my manuscript which laid the foundations for the second paper. Being able to submit a preprint saved me because within 48 hours I could submit my primary manuscript to bioRxiv and get a DOI for the second paper to reference."

Steph Hays
PhD student, Harvard Medical School

Photo by Alina Chan

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"I don't have to shop around."

"Soon after my manuscript appeared (on bioRxiv), an editor from an open access journal group contacted me saying that she would like to consider it for potential publication. [During the review process] I received another invitation letter from another open access journal editor for the same manuscript asking for the submission. So I don't have to shop around so to speak."

Baki Agbas
Associate Professor of Biochemistry
Kansas City University

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**"Preprints move science
along faster!"**

"People started using our software, we got
citations, and fellowship applications in a new
area had credibility faster!"

James Fraser
Associate Professor, UCSF

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“Preprints democratize knowledge.”

“Preprints let researchers take control of the publishing system. Preprints are one of the best ways to engage with diverse scholarly audiences on new results that challenge existing dogmas. My mentor and collaborators are convinced to post our next manuscript as a preprint.”

Vinodh Ilangoan, Research Fellow
Max Planck Institute for Biophysical Chemistry

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"Knowledge now"

"We were able to receive instant feedback on our paper & learned of other projects/resources we had missed in our original analysis. It gave us breathing room before submitting the article for peer review. And the media reported on our preprint, which was very exciting and didn't require waiting for publication."

Ashley Farley, Librarian
Gates Foundation & University of Washington



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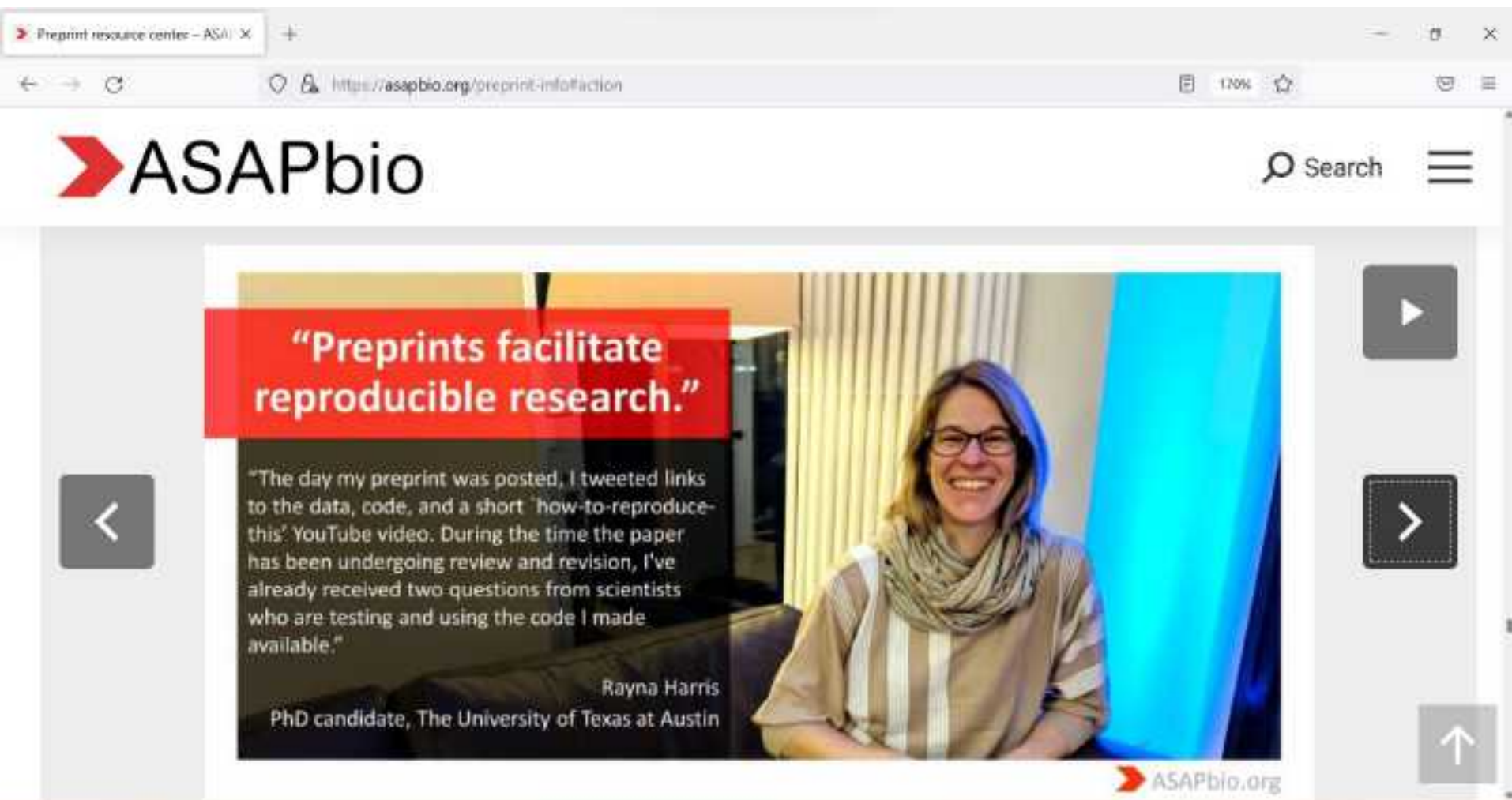
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“Preprints facilitate reproducible research.”

“The day my preprint was posted, I tweeted links to the data, code, and a short ‘how-to-reproduce-this’ YouTube video. During the time the paper has been undergoing review and revision, I’ve already received two questions from scientists who are testing and using the code I made available.”

Rayna Harris
PhD candidate, The University of Texas at Austin

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"It's motivating to see interest in my work."

"I uploaded my master's thesis to thesisoncommons.org, a preprint server for student dissertations. I did not do a perfect job on the thesis and was not 100% proud, but I decided to upload it and include the marker comments anyway. I just checked it the other day and it has been downloaded over a hundred times. As an ECR, it is motivating to see that someone cares about the work I produce."

Peder M Isager
PhD student, Eindhoven University of Technology



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"My preprint got me a faculty job."

"My preprint was the deciding factor when the UT Southwestern hiring committee was deciding whether to give me an interview or not. Once they saw my latest paper on bioRxiv, then they gave me the invitation. I'll be starting as an Assistant Professor in January."

Jeffrey Woodruff
Postdoc, MPI-CBG

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Repositories

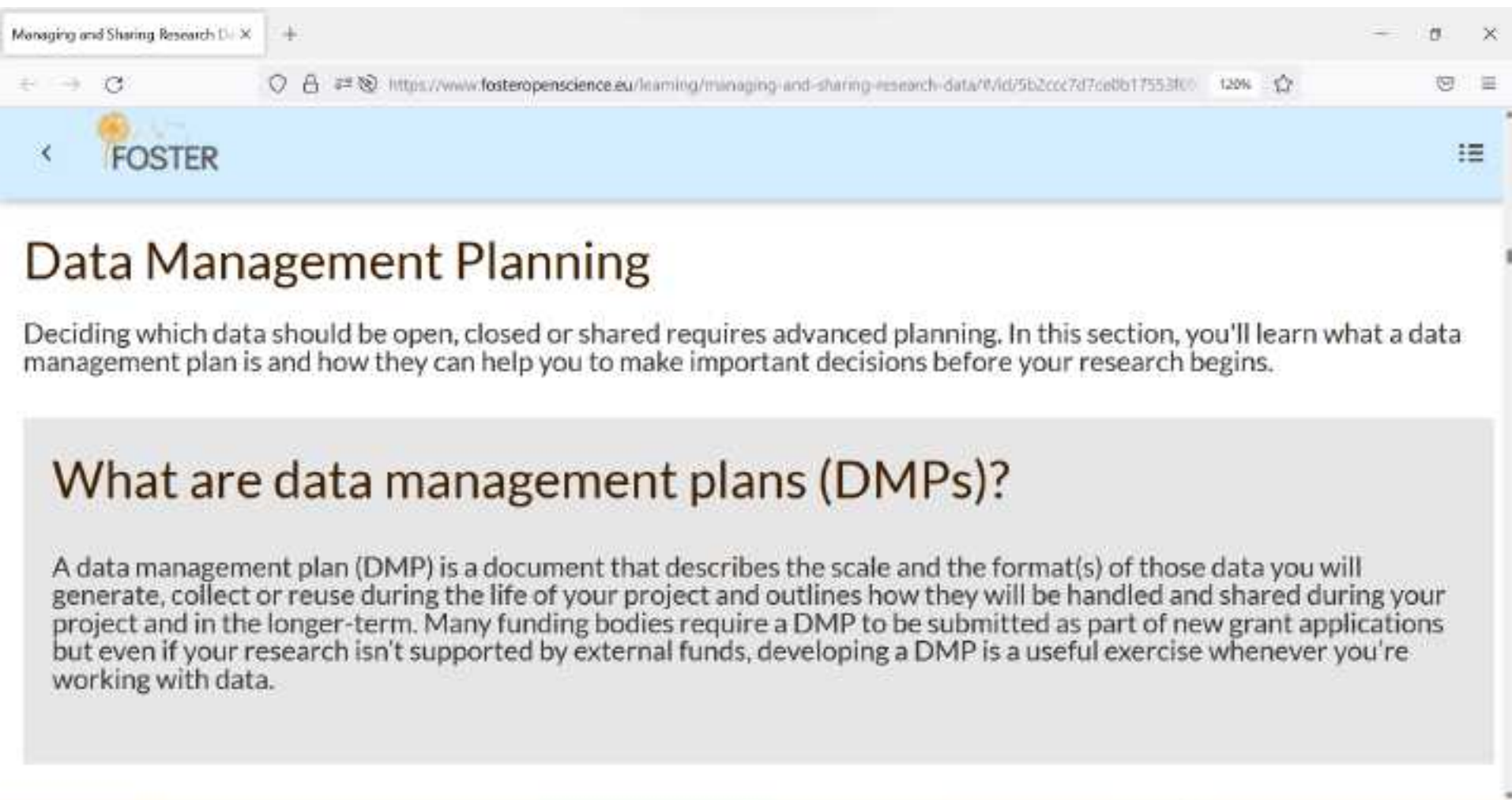
[Suggest a new repository](#)

General Properties	By Function	Support for Open Science
Name	Status	Description
AAS Open Research	Open	AAS Open Research is a platform for rapid publication and open peer review for researchers supported by the AAS and programs supported through its funding platform, AESA.
Advance (Sage preprint)	Open	Advance: a SAGE preprints community allows researchers within the fields of humanities and social sciences to post their work online and free of charge.
AfricArXiv	Open	AfricArXiv is a community-led digital archive for African research, working towards building an African-owned open scholarly repository, a knowledge commons of African scholarly works to catalyze the African Renaissance.
AgEcon Search	Open	AgEcon Search is a free-to-user Web site that contains the full text of working papers, conference papers and journal articles in applied economics, including the subtopics of agricultural, consumer, energy, environmental, and resource economics.
AgriRxiv	Open	agriRxiv (pronounced 'agri-archive') is a free, open access source of unpublished preprints across the agricultural sciences.
AMRC Open Research	Open	A platform for rapid author-led publication and open peer review of research funded by AMRC member charities.

<https://doapr.coar-repositories.org/repositories/>

Research Data Management





Managing and Sharing Research Data

https://www.fosteropenscience.eu/learning/managing-and-sharing-research-data/4/ld/5b2ccc7d7ceb17553f00

FOSTER

Data Management Planning

Deciding which data should be open, closed or shared requires advanced planning. In this section, you'll learn what a data management plan is and how they can help you to make important decisions before your research begins.

What are data management plans (DMPs)?

A data management plan (DMP) is a document that describes the scale and the format(s) of those data you will generate, collect or reuse during the life of your project and outlines how they will be handled and shared during your project and in the longer-term. Many funding bodies require a DMP to be submitted as part of new grant applications but even if your research isn't supported by external funds, developing a DMP is a useful exercise whenever you're working with data.

<https://www.fosteropenscience.eu/learning/managing-and-sharing-research-data>

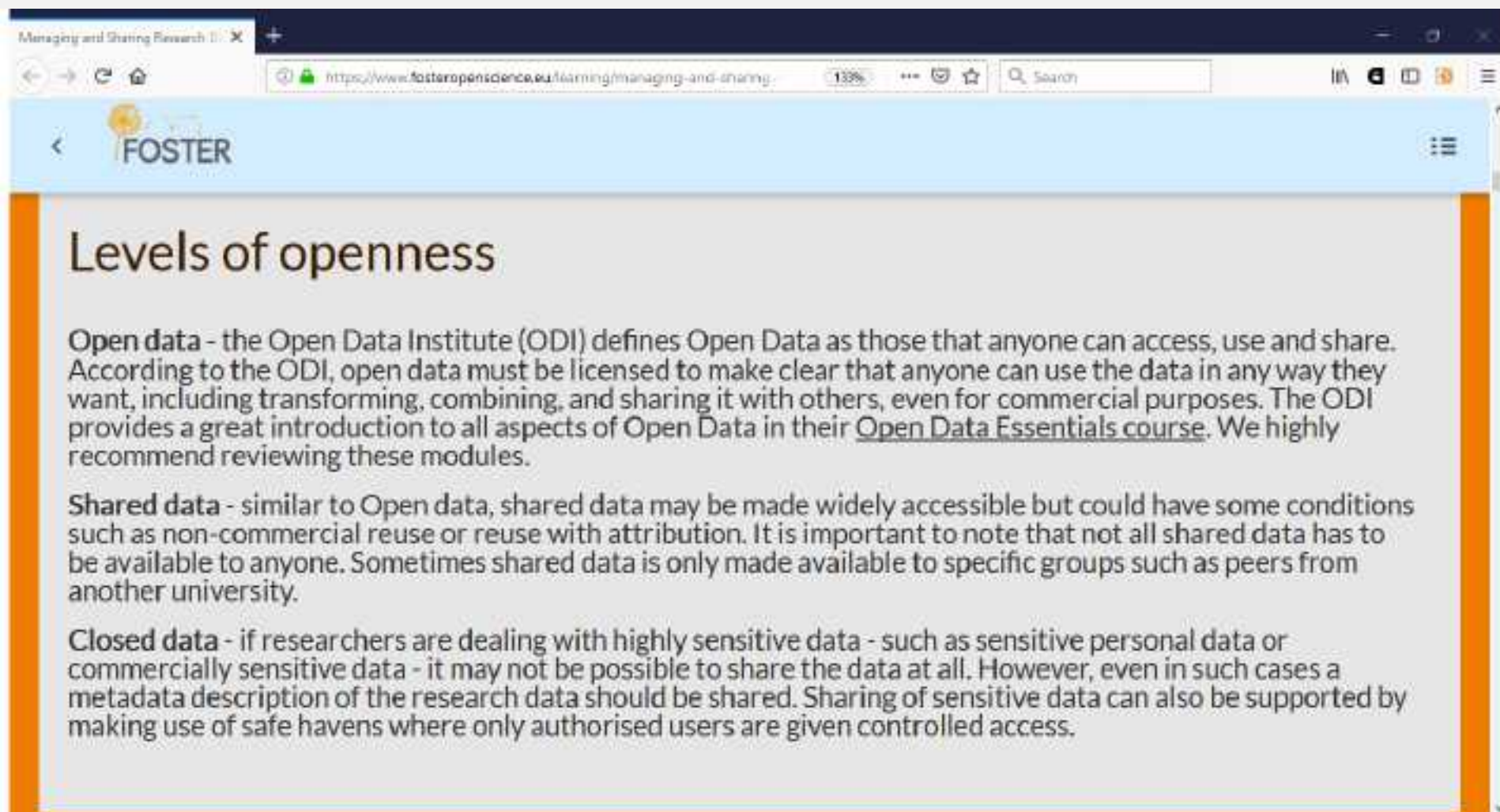


Assistance: tools

- Wizards
 - Usually free for individual researchers
 - Inbuilt templates
 - Customizable (for institutions)
 - Machine readable DMPs
 - Integration with repositories
- Checklists
 - [Swedish National Data Service DMP checklist](#)
 - Customized versions are often found on the websites of academic libraries



DataWiz



Managing and Sharing Research 1

https://www.fosteropenscience.eu/learning/managing-and-sharing- 133% Search

FOSTER

Levels of openness

Open data - the Open Data Institute (ODI) defines Open Data as those that anyone can access, use and share. According to the ODI, open data must be licensed to make clear that anyone can use the data in any way they want, including transforming, combining, and sharing it with others, even for commercial purposes. The ODI provides a great introduction to all aspects of Open Data in their [Open Data Essentials course](#). We highly recommend reviewing these modules.

Shared data - similar to Open data, shared data may be made widely accessible but could have some conditions such as non-commercial reuse or reuse with attribution. It is important to note that not all shared data has to be available to anyone. Sometimes shared data is only made available to specific groups such as peers from another university.

Closed data - if researchers are dealing with highly sensitive data - such as sensitive personal data or commercially sensitive data - it may not be possible to share the data at all. However, even in such cases a metadata description of the research data should be shared. Sharing of sensitive data can also be supported by making use of safe havens where only authorised users are given controlled access.

<https://www.fosteropenscience.eu/learning/managing-and-sharing-research-data>

Tip – use 5 Star Open Data Model to explain FAIR



make your stuff available on the Web (whatever format) under an open license



make it available as structured data (e.g., Excel instead of image scan of a table)



make it available in a non-proprietary open format (e.g., CSV instead of Excel)



use URIs to denote things, so that people can point at your stuff



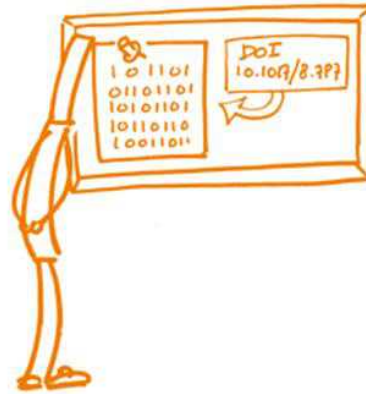
link your data to other data to provide context

FAIR DATA PRINCIPLES



AH!

FINDABLE

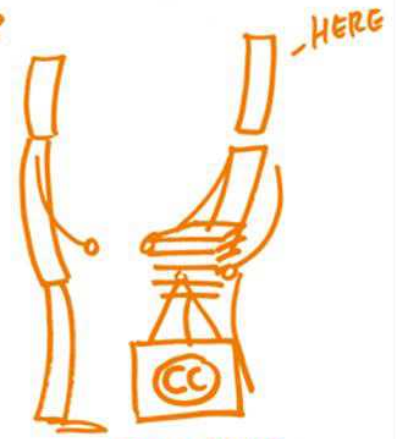


ACCESSIBLE



HOW DO YOU
OPEN A .XZQ FILE?

INTEROPERABLE



HERE

REUSABLE

#BeFAIRandCARE

<https://www.gida-global.org/care>



FAIR Guiding Principles for scientific data management and stewardship can be accessed [here](https://www.gida-global.org/care)

What should be preserved and shared?

- The **data** needed to validate results in scientific publications (minimally!).
- The associated **metadata**: the dataset's creator, title, year of publication, repository, identifier etc.
 - Follow a metadata standard in your line of work, or a generic standard, e.g. Dublin Core or DataCite, and be FAIR.
 - The repository will assign a persistent ID to the dataset: important for discovering and citing the data.

What should be preserved and shared?

(2)

- **Documentation:** code books, lab journals, informed consent forms – domain-dependent, and important for understanding the data and combining them with other data sources.
- **Software,** hardware, tools, syntax queries, machine configurations – domain-dependent, and important for using the data. (Alternative: information about the software etc.)

Basically, everything that is needed to replicate a study should be available. Plus everything that is potentially useful for others.

Tip – link data to other outputs for context (reuse)

Open Data



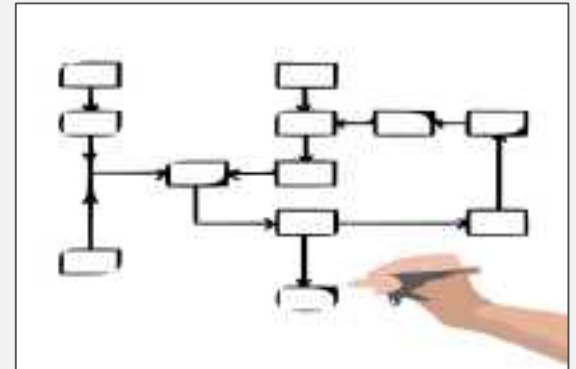
To support
validation and
facilitate reuse

Open Code



Software created
to analyse and/or
visualise the data

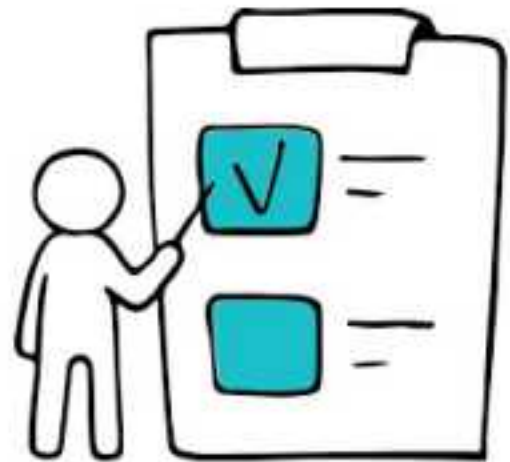
Open Workflows



What steps were taken and in what order?

PLAN FOR SHARING

- Desireably at data creation
- Identify which bits of personal data will be collected
- Do you really need to collect personal data?
 - (eg. irrelevant questions in questionnaires)
- Consider how will anonymization costs be covered



“As Open as possible, as closed as necessary”
SHARING AND PUBLISHING IS ALSO RELATED WITH...

ETHICS AND RESEARCH

- Any recorded **interviews** (either video or audio)
- Surveys or **questionnaires** that collect personal information (date/place of birth or anything else that could identify the participant).
- Research where the participant is asked to **reveal or reflect on instances from their past** (e.g. oral histories...)
- Anything that involves the participation of minors
- Anything in which the participant is asked to **reveal something** that might cause them or others physical or mental harm or embarrassment if made public.
- Any research in which the participant is asked to **complete tests**, or test-like scenarios.

INFORMED CONSENT

- **Informed consent is the process by which a researcher discloses appropriate information** about the research so that a participant may make a voluntary, informed choice to accept or refuse to cooperate.” (CESSDA Expert Tour Guide RDM)
- **When creating consent forms, researchers should make sure to:**
 - inform participants about their rights
 - introduce relevant aspects of the research in an understandable, transparent, and precise way
 - explain data protection measures that will be taken
 - be clear about plans for data sharing in the consent form

Consider who else has a say about sharing data

Collaborators

Research participants

Commercial partners

Data repository

Publishers

Institutions, funders



Where to find a repository?

1

Use an external data archive or repository already established for your research domain to preserve the data according to recognised standards in your discipline.
More information for **selecting a data repository.**

2

If available, use an institutional research data repository, or your research group's established data management facilities.

3

Use a cost-free data repository such as Zenodo.



4

Search for other research data repositories in <http://re3data.org/>



Zenodo: <http://www.zenodo.org>

Re3data.org: <http://www.re3data.org>

The screenshot shows a web browser window with the URL <https://open-research-europe.ec.europa.eu/for-authors/data-guidelines/#addstatement>. The left sidebar contains a navigation menu with the following items: 'Submit your Research', 'My Submissions', 'Article Guidelines', 'Article Guidelines (New Versions)', 'Data Guidelines' (which is highlighted with a blue bar), 'Article Processing Charges', and 'Finding Article Reviewers'. The main content area is titled '1.1 Open Data Policy' and contains the following text:

Open Research Europe requires open access to research data supporting articles under the principle 'as open as possible, as closed as necessary', according to the policy of Horizon Europe. Data should be deposited in trusted data repositories.

All articles should include citations to repositories that host the data underlying the results, together with any information needed to replicate, validate, and/or reuse the results/ your study and analysis of the data – as part of the Data Availability Statement. This includes details of any software, instrument or other tool used to process results and, where relevant, the raw data. Importantly, publishing your data will allow you to track its provenance and ensure that those responsible for its generation are adequately credited for their work. Others who then reuse your data for their own studies can cite your data (which can be cited separately from your article if appropriate). Failure to openly provide data for publication without good justification will result in your article being rejected.

Exceptions: We recognize that openly sharing data may not always be feasible. Exceptions to open access to research data underlying publications in the Open Research Europe are permitted according to the relevant policy of Horizon Europe. These consider the obligation to protect results, confidentiality obligations, security obligations, the obligation to protect personal data and other legitimate constraints. For Horizon Europe grants, these exceptions should be noted in the associated Data Management Plan. Where open access is not provided to the data needed to validate the conclusions of a publication that reports original results, authors should provide the relevant access needed to validate the conclusions to the extent their legitimate interests or constraints are safeguarded (see [Add a Data Availability Statement to Your Article](#)).

In the bottom right corner, there is a yellow button labeled 'Stay informed' with a plus icon.

<https://open-research-europe.ec.europa.eu/for-authors/data-guidelines/#addstatement>

Data Guidelines | Open Research Europe

Submit your Research

My Submissions

Article Guidelines

Article Guidelines (New Versions)

Data Guidelines

Article Processing Charges

Finding Article Reviewers

2.3 Add a Data Availability Statement to Your Article

All articles must include a Data Availability statement, even where there is no data associated with the article. **This statement should be added to the end of the article *prior to submission*.** The Data Availability statement should not refer readers or reviewers to contact an author to obtain the data, but should instead include the applicable details listed below.

No associated or additional data

For articles which have no associated data, the statement should read:

"No data are associated with this article."

For articles where all associated data are presented in the article itself, please include the statement:

"All data underlying the results are available as part of the article and no additional source data are required."

Repository-hosted data

Where underlying and/or extended data are hosted in a repository, please include the name of the repository used and the license along with details indicated in the 'What to include in the data availability section of your article' column in the [tables](#) above. This should be done in the style of, for example:

Repository: Manually annotated miRNA-disease and miRNA-gene interaction corpora.
<https://doi.org/10.5256/repository.4591.d34639>.

This project contains the following underlying data:

- Data file 1. (Description of data.)
- Data file 2. (Description of data.)

Stay informed +

<https://open-research-europe.ec.europa.eu/for-authors/data-guidelines/#addstatement>

Data Guidelines | Open Research: X

Submit your Research

My Submissions

Article Guidelines

Article Guidelines (New Versions)

Data Guidelines

Article Processing Charges

Finding Article Reviewers

https://open-research-europe.ec.europa.eu/for-authors/data-guidelines/#addstatement

90%

Data that cannot be shared

Exceptions

In these instances, an extensive metadata record describing the research, where it is stored, and how to access it should be deposited openly in a repository and cited in the Data Availability statement (please see [Repository-hosted data](#) above). Metadata records must adhere to any legal or ethical requirements. Metadata records must not contain data that is protected, confidential, secure, or personal.

An obligation to protect results because of legitimate interests or other constraints

Where data cannot be open because of legitimate interest, such as for example because of industrial exploitation, or constraints such as confidentiality, trade secrets, security rules, Union competitive interests or Intellectual property Rights including patents and trade secrets, authors may be asked to provide evidence of this. The article must include a description of the restrictions on the data and all necessary information required for a reader or reviewer to apply for access to the data and the conditions under which access will be granted – or the PID of an open and FAIR metadata record containing this information.

For more information on this exception, please see [Horizon Europe Model Grant Agreement](#) – Articles 13 (confidentiality and security), 16 (intellectual property rights) and 17 (open science).

An obligation to protect personal data

Personal data must be processed in compliance with applicable EU and national law on data protection. Where human data cannot be sufficiently de-identified, please include: an explanation of the data protection concern; what, if anything, the relevant institutional Review Board (IRB) or equivalent said about data sharing; and, where applicable, all necessary information required for a reader or reviewer to apply for access to the data and the conditions under which access will be granted – or the PID of an open and FAIR metadata record containing this information.

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<https://open-research-europe.ec.europa.eu/for-authors/data-guidelines/#addstatement>

Data reuse

stories & use cases

<https://www.openaire.eu/data-reuse-use-cases>



In OpenAIRE we are collecting a series of stories, use cases and other relevant resources that report the process of data reuse, trying to demonstrate and describe experiences (successful or not) of reuse of a variety of research data, as well as associated assumptions and implications. This work is being developed by the *RDM Task Force - Data Reuse Working Group*. The number of use cases will expand over time.



Sensitive data: FAIR4Health

Data reuse use case



Enabling data reuse:
Edinburgh DataShare

Data reuse use case



IZTECH University's view on
Research Data

Data reuse use case



Evidence of data reuse:
Binder + Zenodo



Data Reuse Stories involving
several institutions and
consortia in Europe



Stay tuned!

**Reproducible
code and open
research
software**



Reproducible code

The screenshot shows a web browser window with the address bar displaying the URL: <https://online.ucpress.edu/collabra/article/7/1/18884/115927/Easing-Into-Open-Science-A-Guide-for-Graduate>. The browser interface includes a tab labeled 'Easing Into Open Science: A Guide...', navigation buttons (back, forward, refresh), and a toolbar with options like 'Split-Screen', 'Views', 'PDF', 'Share', 'Tools', and 'Search Site'. The article content is displayed in a two-column layout. The left column contains a sidebar with the year '2021', navigation links for 'Previous Article' and 'Next Article', an 'Article Contents' section listing 'Easing into Open Science', 'Eight Open Science Practices Graduate Students Can Begin Right Now', 'Conclusion: This Is Just the Beginning', 'References', and 'Supplementary data', and a '2021' label. The right column contains the main text, which begins with the heading 'How?' and discusses the importance of reproducible code, mentioning software like SPSS Statistics, JASP, and R/RStudio with their respective URLs.

2021

< Previous Article Next Article >

Article Contents

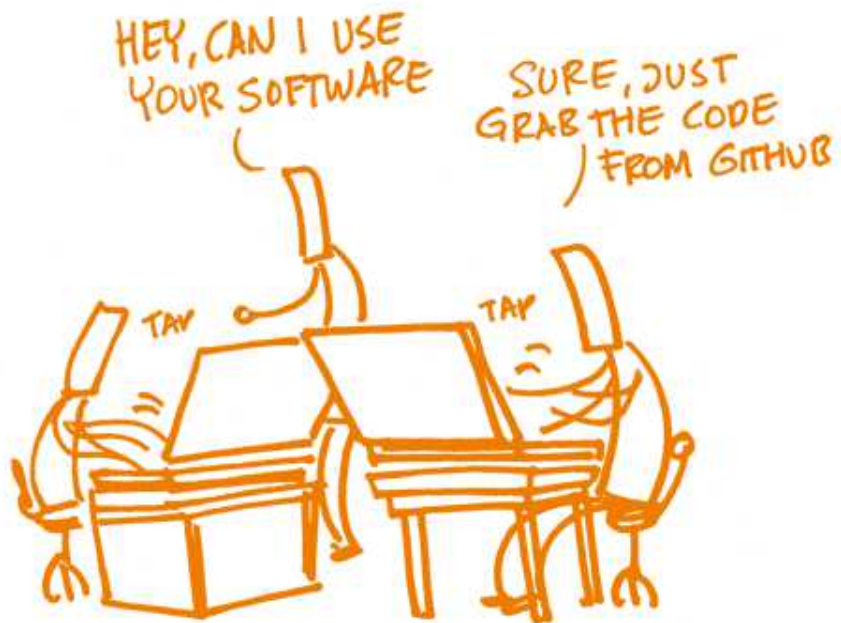
- Easing into Open Science
- Eight Open Science Practices Graduate Students Can Begin Right Now**
- Conclusion: This Is Just the Beginning
- References
- Supplementary data

How? Contrary to what seems to be popular belief, you do not need to learn to code yourself in order to create reproducible code of your analyses! Windows-based programs where the user points and clicks options for analysis (e.g. SPSS Statistics; <https://www.ibm.com/products/spss-statistics>; JASP; <https://jasp-stats.org/>) can also be used in a reproducible way. For example, in SPSS Statistics, a good starting point for beginners is to select the analysis options in the windows, then press the "paste" button rather than "OK." Doing so will paste the analysis script into a new "syntax" file that can be modified, executed, annotated, and saved for future use. Similarly, options selected via point-and-click in JASP can be exported to a reproducible script. Using R/RStudio (<https://www.r-project.org/>, <https://rstudio.com/>) is a popular choice for writing your own reproducible code, but there are also many other programming languages such as Python and Matlab. There are many helpful resources available online to help you learn to code, and although it is hard work at the beginning, it does

OPEN SOURCE

VS

CLOSED SOURCE





The Turing Way Community, & Scriberia.
(2020, November). Illustrations from the
Turing Way book dashes. Zenodo.

<http://doi.org/10.5281/zenodo.4323154>

Guide for Reproducible Research



The Turing Way

Search this book...

Welcome

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Overview

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Licensing

Research Data Management

Reproducible Environments

←

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Guide for Reproducible Research

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

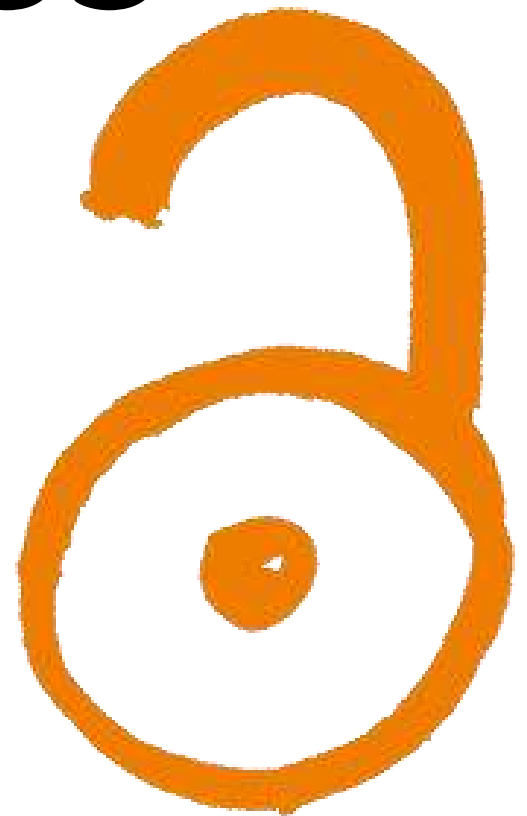
The *Turing Way* defines reproducibility in data research as data and code being available to fully rerun the analysis.

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.



<https://the-turing-way.netlify.app/reproducible-research/reproducible-research.html>

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2666-3791	Cell Reports Medicine	Open access	5,200	4,500
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YOU'RE NOT DREAMING!

* APC = "ARTICLE PROCESSING CHARGE" OR "ARTICLE PUBLISHING CHARGE".

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Christophe Dony. (2021, May 16). The Scholcomm Chronicles #1. Rambling about Misconceptions of Open Access. Zenodo. <http://doi.org/10.5281/zenodo.4765798>

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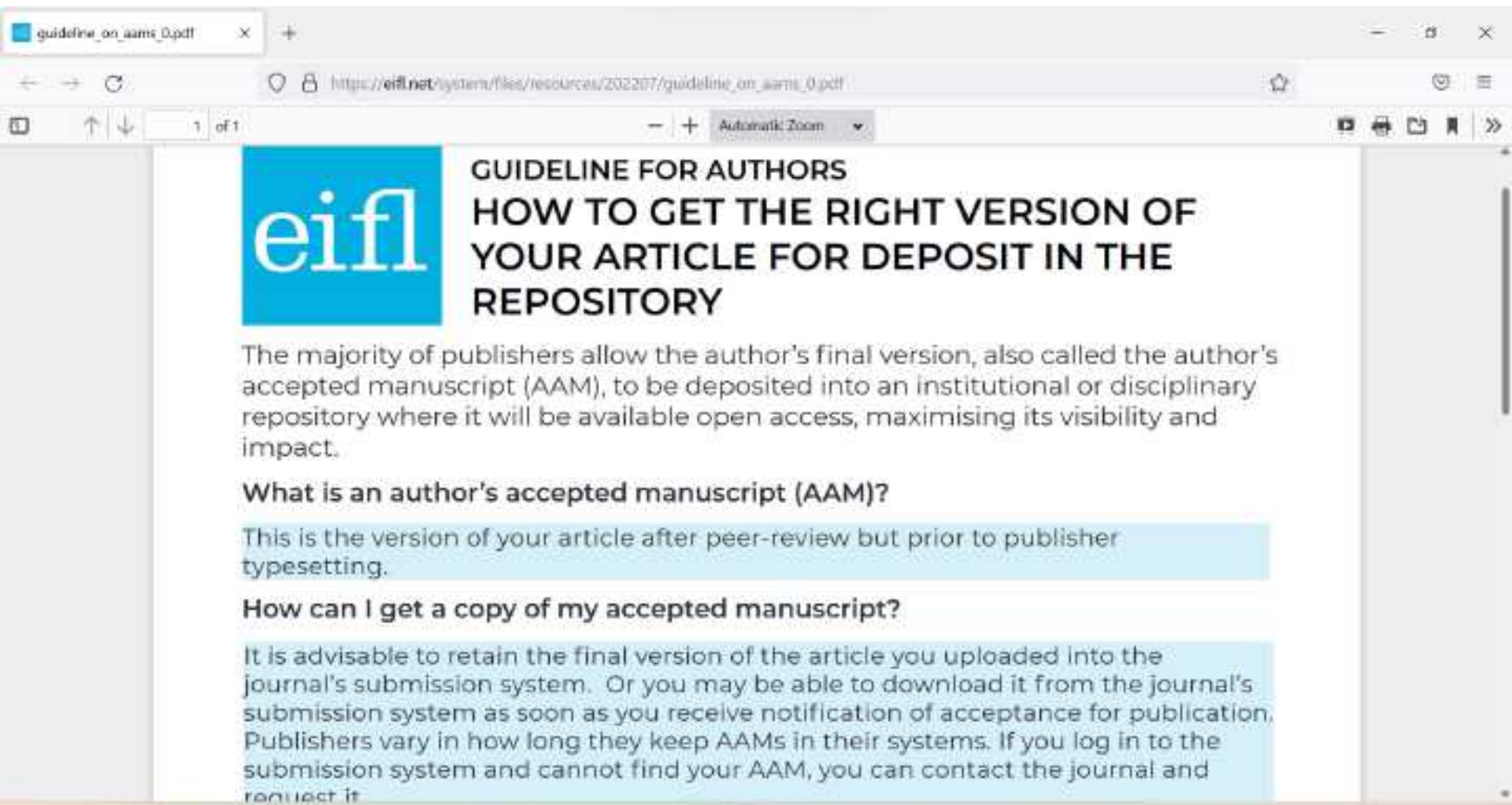
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- STEP 1:** You write an article and plan to submit it to a journal. This first version is called a **preprint** and many publishers allow this to be uploaded in a preprint repository
- STEP 2:** You submit your article to a journal
- STEP 3:** The editor and referees peer review your article
- STEP 4:** You amend your article according to the reviewer's comments and resubmit it to the journal
- STEP 5:** **Your article is accepted for publication. This is your AAM and can be retained for depositing in a repository for open access**
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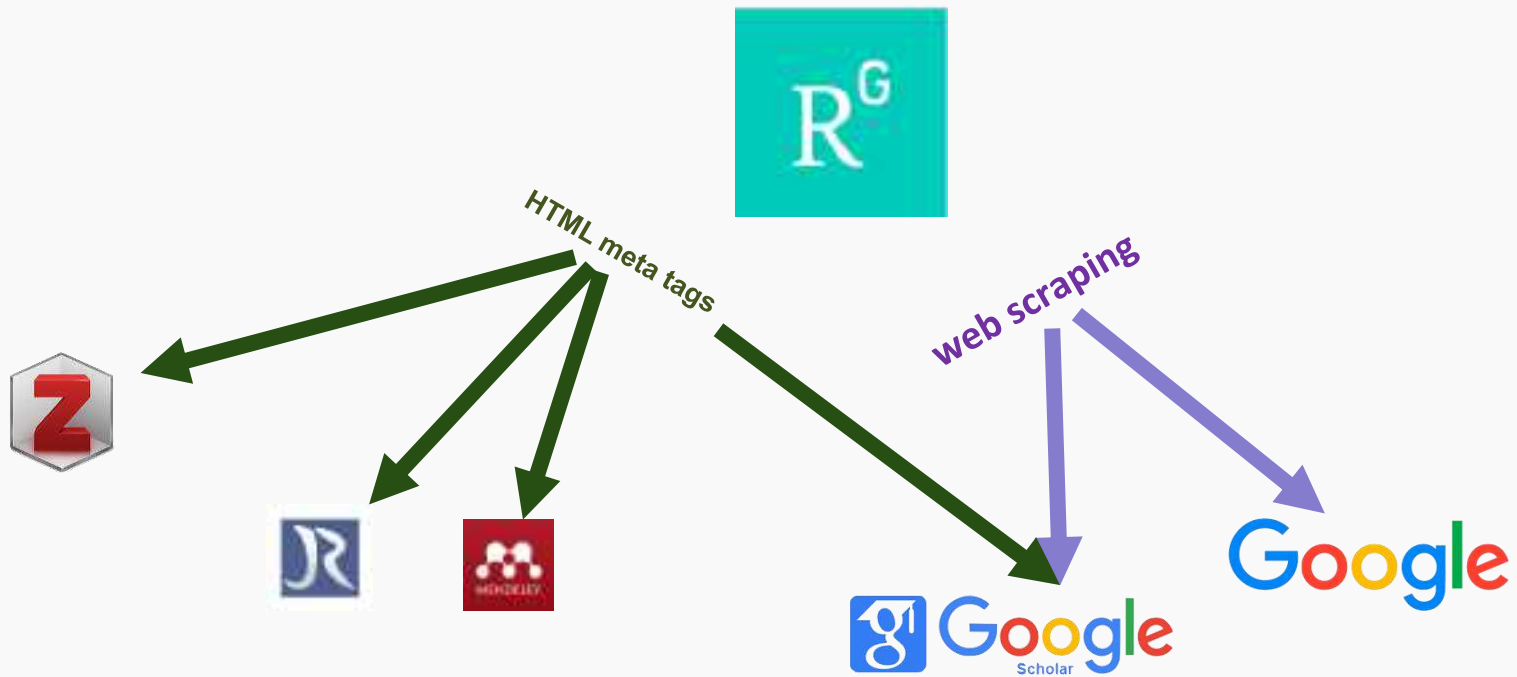
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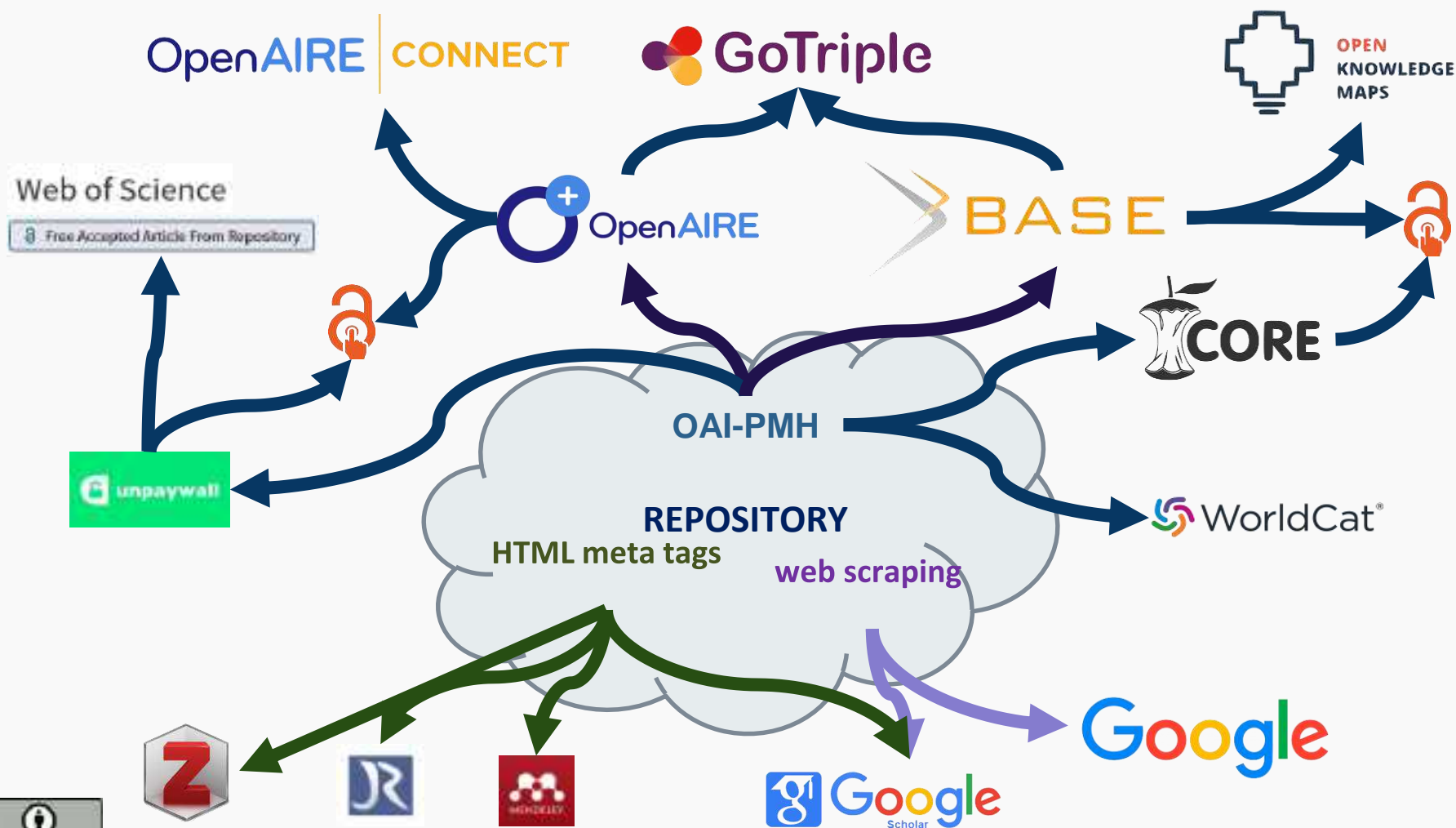
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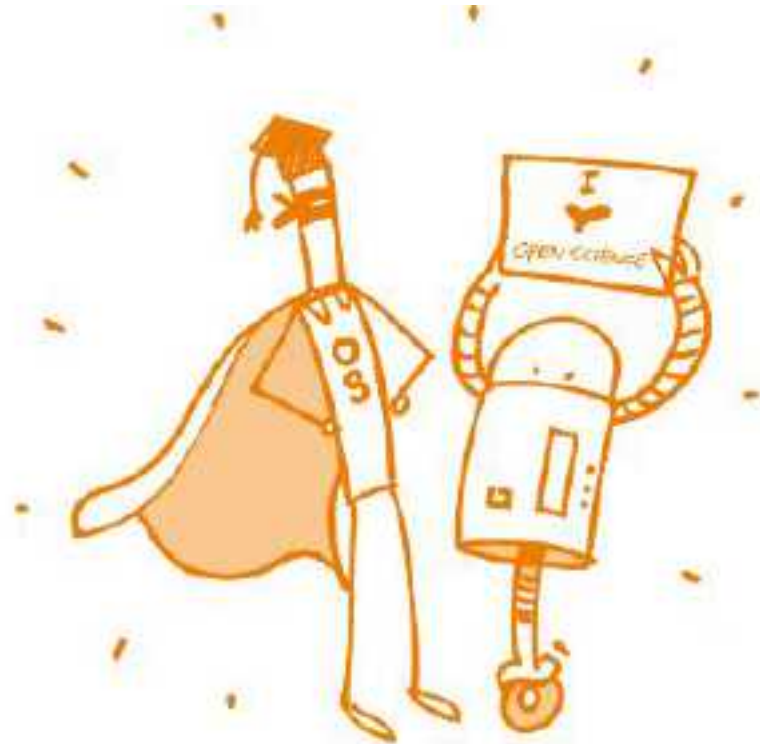
	Open access repositories	Academia.edu	ResearchGate
Supports export or harvesting	Yes	No	No
Long-term preservation	Yes	No	No
Business model	Nonprofit (usually)	Commercial. Sells job posting services, hopes to sell data	Commercial. Sells ads, job posting services
Sends you lots of emails (by default)	No	Yes	Yes
Wants your address book	No	Yes	Yes
Fulfills requirements of UC's OA policies	Yes	No	No



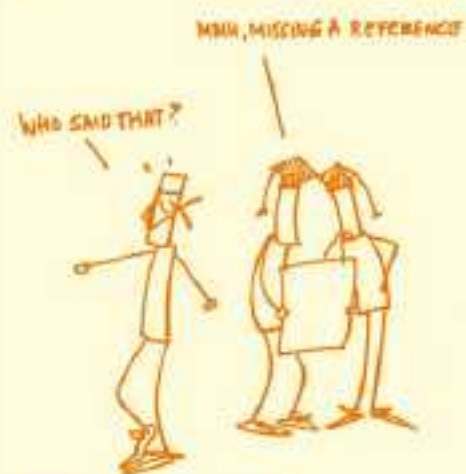
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Improve the quality of peer review



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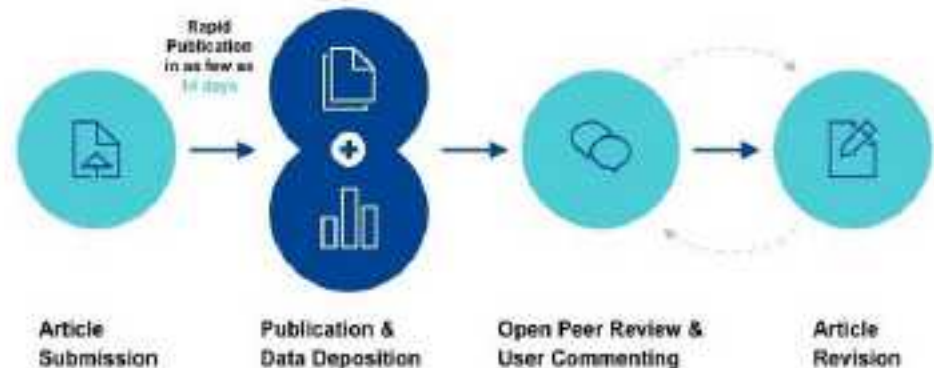
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REVIEW

Transition from monolithic to microservice-based applications. Challenges from the developer perspective [version 1; peer review: awaiting peer review]

Antonios Makris  Konstantinos Tsirpes, Theodora Varvarigou


Article

Authors

Metrics

Abstract

Microservices have taken the world of software development by storm. Application developers are struggling to understand the new concepts and make the transition by the so-called monolithic application approach to microservices. This paper touches upon this delicate issue, providing a more concrete view of the developers' concerns together with recent responses to these concerns. The objective is to place the concept of microservices in the most up-to-date context and shed some light in the challenges that puzzle the developers the most while they attempt to make use of this development and design style.

 **Corresponding Author:** Antonios Makris**Competing Interests:** No competing interests were disclosed.**Grant Information:** This work was supported by the CHARITY and ACCORDION projects that have received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement Nos. 101016609 and 671793, respectively.*The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.* **Copyright:** © 2022 Makris A et al. This is an open access work distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.**First Version Published:** 23 Feb 2022, 2:24 (<https://doi.org/10.12688/openreseurope.14505.1>)**Latest Version Published:** 23 Feb 2022, 2:24 (<https://doi.org/10.12688/openreseurope.14505.1>)

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REVISOR Hydrogen and deuterium charging of lifted-out specimens for atom probe tomography [version 2; peer review: 1 approved, 1 approved with reservations]

Heena Khanthandani , Se-Ho Kim, Rama Srinivas Varanasi, T.S. Prithvi , Leigh T. Stephenson, Baptiste Gault 

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Abstract


Hydrogen embrittlement can cause a dramatic deterioration of the mechanical properties of high-strength metallic materials. Despite decades of experimental and modelling studies, the exact underlying mechanisms behind hydrogen embrittlement remain elusive. To unlock understanding of the mechanism and thereby help mitigate the influence of hydrogen and the associated embrittlement, it is essential to examine the interactions of hydrogen with structural defects such as grain boundaries, dislocations and stacking faults. Atom probe tomography (APT) can, in principle, analyse hydrogen located specifically at such microstructural features but faces strong challenges when it comes to charging specimens with hydrogen or deuterium. Here, we describe three different workflows enabling hydrogen/deuterium charging of site-specific APT specimens: namely cathodic, plasma and gas charging. All the experiments in the current study have been performed on a model twinning induced plasticity steel alloy. We discuss in detail the caveats of the different approaches in order to help future research efforts and facilitate further studies of hydrogen in metals. Our study demonstrates successful cathodic and gas charging, with the latter being more promising for the analysis of the high-strength steels at the core of our work.

 **Corresponding Author:** Baptiste Gault

Competing Interests: No competing interests were disclosed

Grant Information: This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 771602). R.S.V. was supported by an IMPRS SurMat scholarship

Open Peer Review

Reviewer Status  

Reviewer Reports

Invited Reviewers		
	1	2
Version 2 (Revision) 21 Feb 22		
Version 1 14 Oct 21	 read	 read

1. **Maria Auger** , University of Oxford, Oxford, UK
2. **Gregory Thompson**, University of Alabama, Tuscaloosa, AL, USA

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REVISED Amendments from Version 1

The reviewers' comments have been very helpful in improving the manuscript. In response to them, the title of the manuscript is changed to emphasize that the work is focused on the lifted-out specimens. The study was conducted on a model twinning induced plasticity steel alloy. This fact has now been included in the abstract and conclusions. Figure 1 has been moved to Figure 4 as an introduction to the workflows. The first paragraph of introduction has been modified to improve its clarity.

[See the detailed response from the author\(s\) to the review by Maria Auger](#)

[See the detailed response from the author\(s\) to the review by Gregory Thompson](#)

Introduction

The ingress of hydrogen inside structural metallic materials in engineering parts in service leads to a degradation of their mechanical properties and their premature catastrophic failures¹⁻⁴. Hydrogen that freely diffuses through the material under ambient conditions⁵ can interact with crystalline defects and contributes to the deterioration of the mechanical properties^{3,5-7}. A strategy to mitigate the deleterious influence of hydrogen is to design alloys with a high number density of trapping sites to limit the deleterious influence of H on moving dislocations^{5,8}. Traps can even be irreversible traps, i.e. H is unable to re-enter the lattice under service conditions, owing to the high binding energy with H^{9,10}. Trapped hydrogen has even been reported to potentially increase the resistance to hydrogen embrittlement of some materials^{1,2,5}. In order to guide the design of hydrogen-resistant materials, it is necessary to study the details of the structure and composition of sites that can trap diffusible hydrogen, which are mostly defects such as stacking faults, dislocations and phase and grain boundaries^{1,5}. Very few techniques have the combination of high spatial resolution and compositional sensitivity.

Atom probe tomography (APT) is a time-of-flight mass spectroscopy technique, which maps the spatial distribution of specific chemical species within a three-dimensional (3D) volume with sub-nanometre resolution^{11,12}. In principle, APT is capable of detecting and quantifying hydrogen in three dimensions at near-atomic scale¹³. Yet despite some successes¹⁴⁻¹⁷, and decades of work from numerous research groups, hydrogen microanalysis remains very challenging^{1,2,13,14,17-20}. There are issues associated with the influence of residual gases from the analysis chamber of atom probe, specimen preparation and transport^{20,21}, and a strong dependence of the analytical performance on the analysis conditions²²⁻²⁵. Let us discuss these aspects in more details.

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1. **Maria Auger** University of Oxford, Oxford, UK

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Home > Articles > Optimization and parallelization of the discrete ordinate method ...

METHOD ARTICLE

Optimization and parallelization of the discrete ordinate method for radiation transport simulation in OpenFOAM: Hierarchical combination of shared and distributed memory approaches [version 1; peer review: 2 approved]

José Moreno-SanSegundo, Cintia Casado, David Concha, Antonio S. Montemayor, Javier Marugán

This article is included in Societal Challenges gateway



Article

Authors

Metrics

Abstract

This paper describes the reduction in memory and computational time for the simulation of complex radiation transport problems with the discrete ordinate method (DOM) model in the open-source computational fluid dynamics platform OpenFOAM. Finite volume models require storage of vector variables in each spatial cell, DOM introduces two additional discretizations, in direction and wavelength, making memory a limiting factor. Using specific classes for radiation sources data, changing the store of fluxes and other minor changes allowed a reduction of 75% in memory requirements. Besides, a hierarchical parallelization was developed, where each node of the standard parallelization uses several computing threads, allowing higher speed and scalability of the problem. This architecture, combined with optimization of some parts of the code, allowed a global speedup of x15. This relevant reduction in time and memory of radiation transport opens a new horizon of applications previously unaffordable.

Corresponding Author: Javier Marugán

Competing Interests: No competing interests were disclosed

Open Peer Review

Reviewer Status

Reviewer Reports

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- João Miguel Nóbrega, University of Minho, Guimarães, Portugal
- George Karpouzas, Engys Hellas, Athens, Greece
Eugene de Villiers, Engys Ltd, London, UK

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Misconception: Open Science is mainly pain with little gain

There's no denying that getting acquainted with new ways of working costs time. But at the end of the day, it will also save you time. For instance, preregistration forces you to consider issues that could otherwise have bitten you in the ass afterwards (e.g., a lack of statistical power). Moreover, a detailed plan allows for a swift analysis once the data comes in. There is an increasing number of open-source tools available that will help you make your workflow more reproducible and efficient at the same time. And there's another gain for those interested in an academic career: more and more universities and funders are seeking candidates who implement Open Science practices in their work.

<https://openscience-groningen.nl/10-open-science-myths>



Water science must be Open Science

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Comment Published: 19 January 2023

Water science must be Open Science

Emma L. Schymanski & Stanislaus J. Schymanski

Nature Water 1, 4–6 (2023) | Cite this article

819 Accesses | 15 Altmetric | Metrics

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Sections Figures References

Water research should be accessible to everybody

Open Science goes beyond Open Access publishing

How scientists and publishers can strengthen Open...

References

Since water is a common good, the outcome of water-related research should be accessible to everyone. Since Open Science is more than just open access research articles, journals must work with the research community to enable fully open and FAIR science

Schymanski, E.L., Schymanski, S.J. Water science must be Open Science. *Nat Water* 1, 4–6 (2023). <https://doi.org/10.1038/s44221-022-00014-z>

Open Science in Horizon Europe proposals

- PART A – Application form
 - List 5 publications, widely-used datasets, softwares, goods, services or any other achievements relevant to the call
- PART B – Project proposal – technical description
 - Under ‘Excellence’ – ‘1.2 Methodology’ (Open Science, RDM and management of other research outputs)
 - Under ‘Impact’ – ‘2.2 Measures to maximise impact’ (dissemination, exploitation and communication)
 - Under ‘Quality and efficiency of the implementation’ – ‘3.1 Work plan and resources’ and ‘3.2 Capacity of participants and consortium as a whole’

Jonathan England

OpenAIRE webinar | 14 June 2022



Publications

- Your publications cited should be in OA
- Your publications cited will only be evaluated qualitatively (i.e. the Impact Factor is irrelevant)
- Give insights in where you are hoping to publish (e.g. Open Research Europe, full OA journals)



Jonathan England

OpenAIRE webinar | 14 June 2022



Mandatory open science practices

- Some open science practices are **mandatory for all beneficiaries per the grant agreement**. They concern:
 - open access to scientific publications under the conditions required by the grant agreement;
 - responsible management of research data in line with the FAIR principles of 'Findability', 'Accessibility', 'Interoperability' and 'Reusability', notably through the generalised use of data management plans, and open access to research data under the principle 'as open as possible, as closed as necessary', under the conditions required by the grant agreement;
 - information about the research outputs/tools/instruments needed to validate the conclusions of scientific publications or to validate/re-use research data;
 - digital or physical access to the results needed to validate the conclusions of scientific publications, unless exceptions apply;

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

Recommended open science practices

- **Involving all relevant knowledge actors**, including citizens, civil society and end users in the co-creation of R&I agendas and contents (such as citizen science)
- **Early and open sharing of research**, for example, through preregistration, registered reports, pre-prints, or crowd-sourcing)
- **Research output management** beyond publications and research data
- **Measures to ensure reproducibility of research outputs**
- **Providing open access to research outputs beyond publications and research data** (for example software, models, algorithms, and workflows)
- **Participation in open peer review**

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/aga_en.pdf

The screenshot shows a web browser window with the URL <https://www.izm.gov.lv/en/open-science>. The page header includes the logo of the Ministry of Education and Science of the Republic of Latvia and a navigation menu with links: About us, Sectoral policy, Current events, European Union, and Contacts. On the right, there are icons for Search, Language, and Settings. A left sidebar menu lists: Education, Science (highlighted), Sport, Youth, and State language. The main content area is titled "Open Science" and features a "Published: 09.08.2022" date. The text describes the Latvian Open Science Strategy's goals and its three pillars: Open Access to Scientific Publications, FAIR research data, and Citizen Science.

Open Science

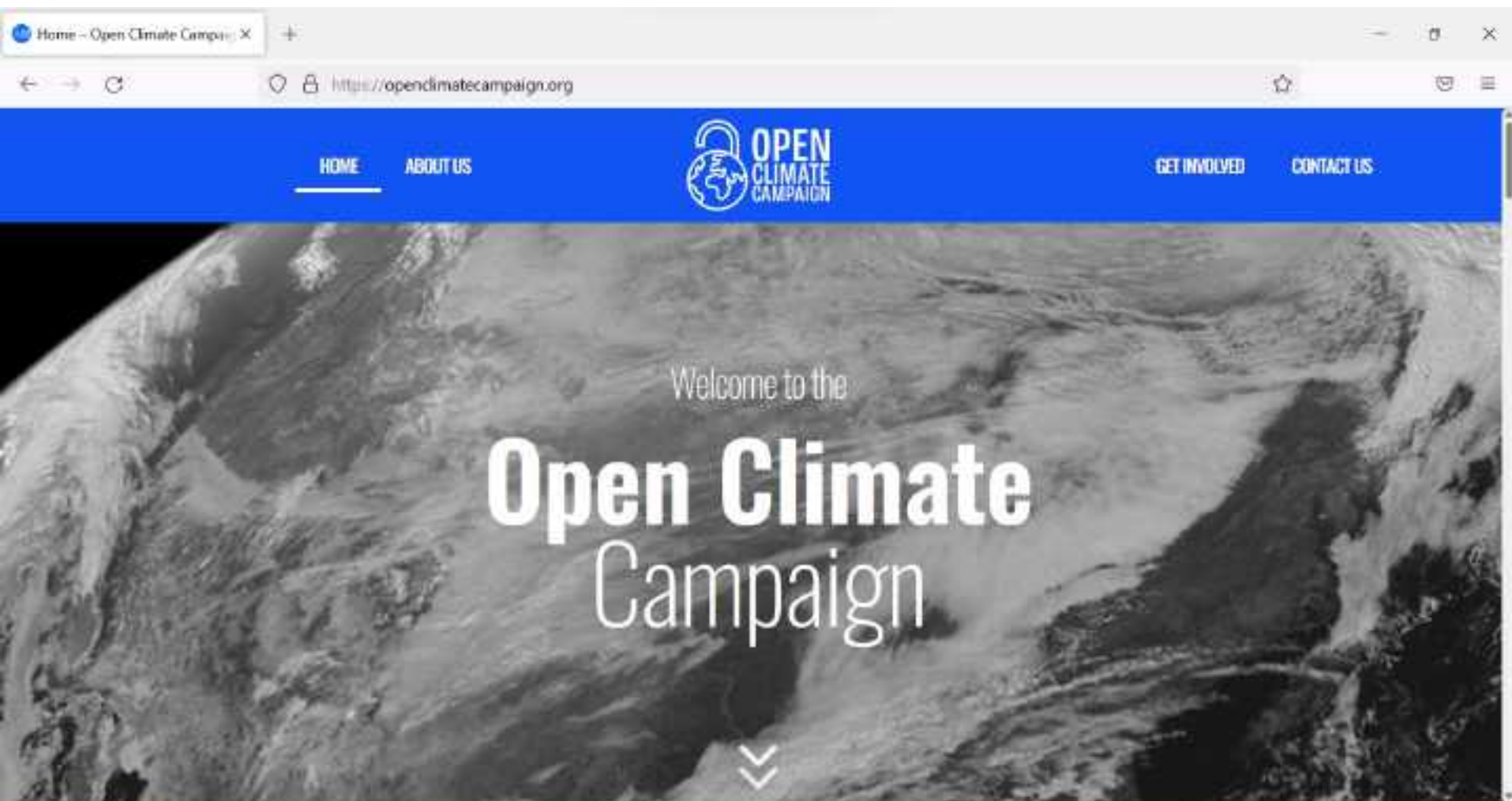
Published: 09.08.2022.

The Latvian Open Science Strategy aims to provide society, researchers, businesses, policymakers and other stakeholders with freely accessible scientific information (including scientific publications and research data), as well as to promote meaningful societal engagement in the scientific research process.

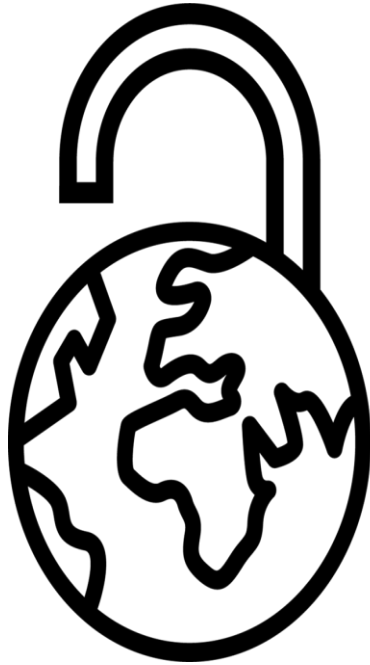
The Open Science Strategy is structured in 3 pillars:

- I. "Open Access to Scientific Publications" addresses open-access publishing practices and defines a national open-access policy – all scientific publications produced for new state-funded research projects must be openly accessible in "green" or "gold" open access, without an embargo period.
- II. "FAIR research data" foresees that research data should be open by default, and that data, metadata and e-infrastructures intended for long-term preservation and reuse must meet the FAIR (*findable, accessible, interoperable, reusable*) principles to the greatest extent possible.
- III. "Citizen Science" foresees encouraging co-creation in the context of citizen science activities, supporting citizen science initiatives by e.g. providing access to scientific e-infrastructures (i.e. research data repositories) and integrating citizen science in Latvian science communication activities. Latvian stakeholders will be encouraged to participate in international initiatives and networks related to citizen science.

<https://www.izm.gov.lv/en/open-science>



<https://openclimatecampaign.org>



OPEN CLIMATE CAMPAIGN

A four-year campaign
to make open sharing
of research outputs
the norm in climate
science

OPEN SOCIETY
FOUNDATIONS



creative
commons

SPARC*

eifl

KNOWLEDGE
WITHOUT
BOUNDARIES



ARCADIA
A CHARITABLE FUND OF
LIBRET MANAGED & PETER BALDWIN

<https://openclimatecampaign.org>

@OpenClimateCamp

OPEN
CLIMATE
CAMPAIGN

- Bringing attention to the issue of access to knowledge on climate change particularly to **researchers** who are producing the knowledge and **informing them of tools that can open their research outputs.**
- Working directly with national governments, funders and environmental organizations to identify legal and policy barriers, **help governments create, adopt, implement equitable open access policies** to overcome them, and make it easier to open and share their climate change research, data and educational resources.
- Identifying, engaging, and contributing to draft **international frameworks** to include funder open access policy recommendations, and the public benefits of open access knowledge.
- Engaging with researchers, universities and policy makers from traditionally excluded groups and in geographical regions to ensure inclusive outcomes throughout.




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ArtistsForClimate.org,
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Get involved - Open Climate Campaign

https://openclimatecampaign.org/get-involved/#researcher

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What can you as a researcher do?

- [Deposit a preprint](#) of your publication in a preprint repository.
- [Publish your papers](#) open access.
- [Deposit a postprint](#) in an OA repository.
- [Deposit your data openly](#) with the CC0 public domain dedication to a data repository.
- [Upload your scientific code / scripts/ models openly](#) in a code repository.
- [Join the Open Climate Campaign newsletter](#).
- Tell other researchers about the campaign

How can the Open Climate Campaign help?

- Find [resources](#) on how to make your research open on our website.
- Attend Open Climate Campaign events to learn more about making your research open.

RESEARCHER ACTION KIT

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 PDF	 PDF	 PDF
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 GDOC	 GDOC	 GDOC

<https://openclimatecampaign.org/get-involved/#researcher>

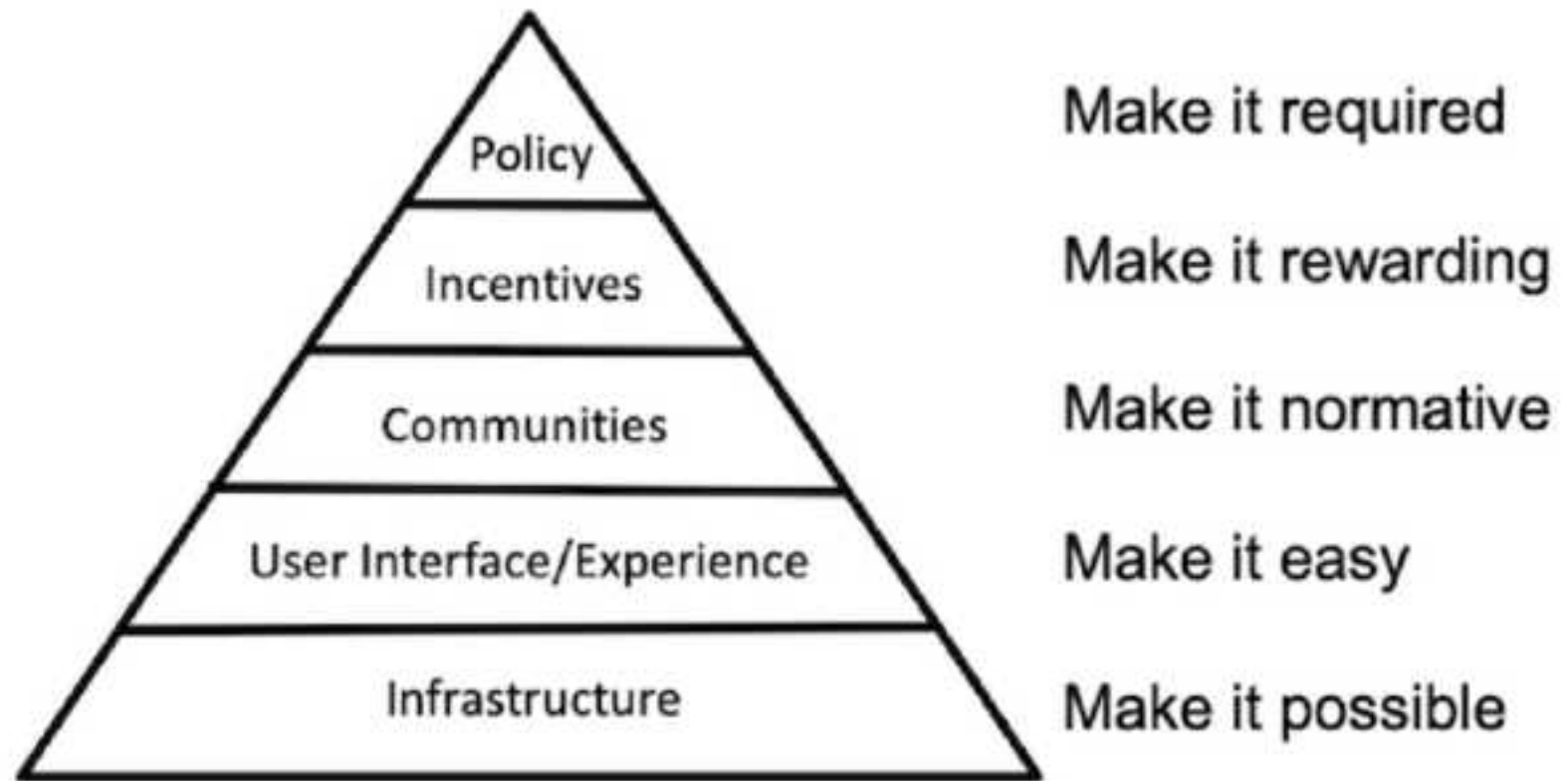
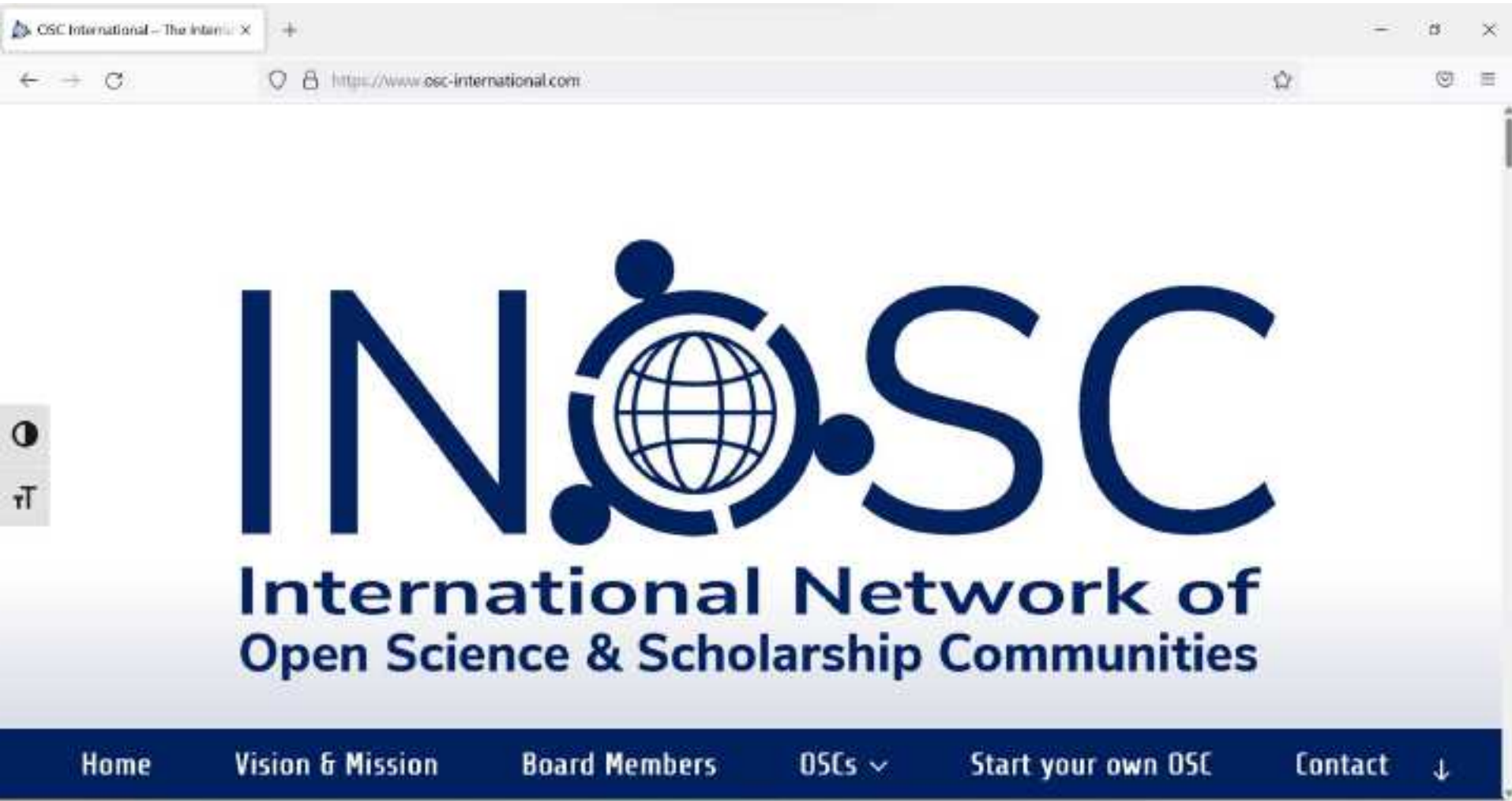


Figure 1. The pyramid of culture change. Image by Brian Nosek (licensed under [CC BY-ND 4.0](#)), reproduced from the blog post [Strategy for Culture Change](#).



<https://www.osc-international.com>





Kristijan Armeni, Loek Brinkman, Rickard Carlsson, Anita Eerland, Rianne Fijten, Robin Fondberg, Vera E Heininga, Stephan Heunis, Wei Qi Koh, Maurits Masselink, Niall Moran, Andrew Ó Baoill, Alexandra Sarafoglou, Antonio Schettino, Hardy Schwamm, Zsuzsika Sjoerds, Marta Teperek, Olmo R van den Akker, Anna van't Veer, Raul Zurita-Milla, Towards wide-scale adoption of open science practices: The role of open science communities, *Science and Public Policy*, Volume 48, Issue 5, October 2021, Pages 605–611,
<https://doi.org/10.1093/scipol/scab039>

With thanks to

Joy Davidson, University of Glasgow, DCC

Marjan Grootveld, DANS

Pedro Principe, Minho University

Librarians/research
administrators as
promoters/supporters of open
science, obstacles to advocacy,
finding space/resources for
open science training, open
science infrastructures, open
access publishing support



Partners in Library Publishing

17 February 2023

Library Publishing is part of a broader range of scholarly communication activities driven and managed by librarians in all types of libraries including national, state, academic, and public as well as learned societies. Library Publishing advances the open scholarship agenda globally via the production of journals, monographs, and other publication outputs on a predominately open access basis. Library publishing programmes have strong Equity, Diversity and Inclusion (EDI) missions while strengthening bibliodiversity in the international scholarly communication landscape.

The IFLA **Library Publishing Special Interest Group (LIBPUB)** was established in 2018 at WLIC in Kuala Lumpur with the aim of advancing the burgeoning field of library publishing through advocacy, knowledge sharing, and building connections and collaborations between librarians globally.

More news

Save the date! IFLA ARL next Webinar Series on 29 March 2023 re: Social Justice, Diversity and Inclusion

21 February 2023

Now open: applications for IFLA/SYSTEMATIC Public Library of the year Award 2023

21 February 2023

IFLA Newsletter, February 2023: Partnerships 


<https://www.ifla.org/news/partners-in-library-publishing/>

Open Science Toolkit | UNESCO X

https://www.unesco.org/en/open-science/toolkit

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Guides




Building capacity for open science

2022

UNESCO

Read



Developing policies for open science

2022

UNESCO

Read


<https://www.unesco.org/en/open-science/toolkit>

Open Science Toolkit | UNESCO X

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Open Science Toolkit | UNESCO X

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Checklists




Checklist for universities on implementing the UNESCO Recommendation on Open Science

2022

UNESCO

Read



Checklist for open access publishers on implementing the UNESCO Recommendation on Open Science

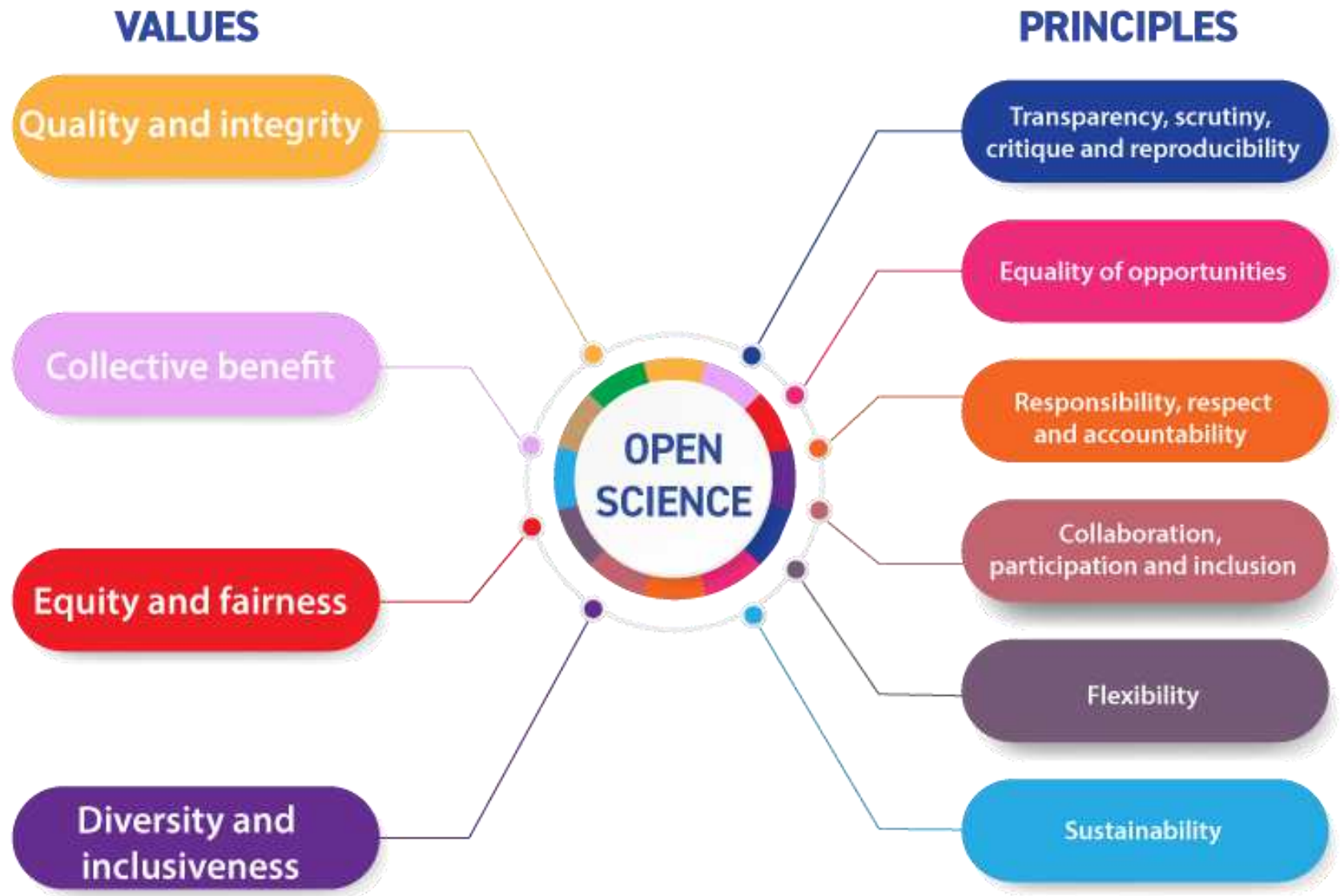
2022

UNESCO

Read

<https://www.unesco.org/en/open-science/toolkit>

Are your institutional values aligned with the core values of the UNESCO Recommendation on Open Science?



OPEN SCIENCE

Promoting a
common
understanding

Developing an
Enabling policy
environment

Fostering
a culture
of Open
Science

Investing in
human
resources

Promoting
innovative
approaches

Promoting
cooperation

Investing in
infrastructures
and services

AREAS OF ACTION



As a university practicing open science, how are you...

Nurturing open methods

Are the scientific practices at your university open by default? Are the innovators in your university encouraged and incentivized to make their practices and products open? Are newcomers to your institution introduced to open science early on?

It is possible to nurture open science from the bottom-up through capacity building and from the top-down through policy changes. Combinations of these approaches, such as mandates for training in open science, may be suitable in your context.

A clear understanding of the possibilities and risks of open science practices enable students, educators and researchers to make smarter decisions in a scientific system that is as open as possible, as closed as necessary.

Mainstreaming open practices

Rather than creating separate open science policies, it may be more efficient and effective to build openness into core policies for science, data management, educational resources and more.

Open science practices can also be mainstreamed into partnerships involving the university and external actors, including international partners.

Using and creating scientific infrastructures

Are the tools used by scientists and students at your institution openly available on open platforms? Infrastructures can be both physical and virtual. The UNESCO [Recommendation on Open Science](https://unesdoc.unesco.org/ark:/48223/pf0000383328) provides guidance for ensuring that access to

Thinking beyond scientific articles

Scientific practice spans far more than the production of data or articles. The Recommendation provides guidance for opening up all stages of the scientific process, from conceptualization and co-design of research projects through to post-publication communication.

Those scientific outputs related to publications¹ that are openly licensed or dedicated to the public domain should be deposited in a suitable open repository, following appropriate technical standards properly linking to the publications.

Supporting inclusive engagement and dialogue

Open science includes all scientific disciplines and aspects of scholarly practices and builds on four key pillars: open access to scientific knowledge, open science infrastructures, open engagement of societal actors and open dialogue with other knowledge systems.

There are multiple actors and stakeholders in research and innovation systems and each of them plays a role in the operationalization of open science. Similarly, universities serve many audiences in addition to academics and scientific researchers.

In practice, inclusive engagement ranges from addressing practical aspects of accessibility through to meaningful engagement with marginalized and underrepresented groups. Engagement and dialogue can inform not only education and the practices of open science but also the co-design, creation, use and production of scientific outputs in multiple formats.

Do you incorporate the following areas of action into your university activities?

If not, have you planned a timetabled route to incorporate this area of action in the future?

The following text is from the UNESCO [Recommendation on Open Science](#), through the lens of universities.

Promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science

✓ **Promote and support the common understanding of open science** as defined in this Recommendation, within the scientific community and among the different open science actors, and strategically plan and support open science awareness raising at the institutional, national and regional levels while respecting diversity of open science approaches and practices.

✓ **Ensure that publicly funded research is undertaken based on the principles of open science** in line with the provisions of this Recommendation, and that the scientific knowledge from the publicly funded research, including scientific publications, open research data, open

✓ **Enable open multi-stakeholder discussions on open science benefits and its real and apparent challenges** as regards, for example, competition, extraction and exploitation of data by more advanced technologies links to intellectual property rights, privacy, security and inequalities between publicly and privately funded research, in order to address these challenges constructively and implement open science practices in line with the values and principles outlined in this Recommendation.

Developing an enabling policy environment for open science

✓ **Develop or encourage policy environments**, including those at the institutional, national, regional and international levels **that support operationalization of open science and effective implementation of open science practices**, including policies to incentivize open science practices among researchers. Through a transparent participatory, multi-stakeholder process that includes dialogue with the scientific community, especially early-career researchers, and other open science actors.

✓ **Develop effective institutional and national open science policies and legal frameworks** that are consistent with existing international and regional law and are in line with the definition, values and principles as well as actions outlined in this Recommendation.

software, source code and open hardware, is openly licensed or dedicated to the public domain.

✓ **Encourage bibliodiversity** through the diversity of formats and means of publications and diversity of business models, by supporting not-for-profit, academic and scientific community-driven publishing models as a common good.

✓ **Encourage multilingualism** in the practice of science, in scientific publications and in academic communications.

✓ **Ensure that the needs and rights of communities**, including the rights of indigenous peoples over their traditional knowledge, **should not be infringed on in open science practices.**

✓ **Enhance open science communication** to support the dissemination of scientific knowledge to scholars in diverse research fields, decision makers and the public at large.

✓ **Engage the private sector in the discussion** about the ways in which the scope of open science principles and priorities can be enlarged and mutually shared.

✓ **Align open science policies, strategies and actions from individual institutions to local and international levels**, while respecting the diversity of open science approaches.

✓ **Mainstream gender equality aspects** into open sciences policies, strategies and practices.

✓ **Implement policies and strategies for open science.**

✓ **Enhance the inclusion of citizen and participatory science as integral parts of open science policies and practices** at the national, institutional and funder levels.

✓ **Design models that allow co-production of knowledge with multiple actors** and establish guidelines to ensure the recognition of nonscientific collaborations.

✓ **Encourage responsible research and researcher evaluation and assessment practices**, which incentivize quality science, recognizing the diversity of research outputs, activities and missions.

Investing in human resources, training, education, digital literacy and capacity building for open science

✓ **Provide systematic and continuous capacity building on open science concepts and practices**, including broad comprehension of the open science guiding principles and core values as well as technical skills and capacities in digital literacy, digital collaboration practices, data science and stewardship, curation, long-term preservation and archiving, information and data literacy, web safety, content ownership and sharing, as well as software engineering and computer science.

✓ **Agree on a framework of open science competencies** aligned with specific disciplines for researchers at different career stages, as well as for actors active in the private and public sectors or in civil society, who need specific competences to include the use of open science products in their professional careers; and develop recognized skills and training programmes in support of the attainment of these competencies. A core set of data science and data stewardship skills, skills related to intellectual property law, as well as skills needed to ensure open access and engagement with society, as appropriate, should be regarded as part of the foundational expertise of all researchers and incorporated into higher education research skills curricula.

✓ **Support science communication accompanying open science practices** with a view to the dissemination of scientific knowledge to scholars in other research fields, decision-makers and the public at large. Dissemination of scientific information through scientific journalism and media, popularization of science, open lectures and various social media communications builds public trust in science while increasing the engagement of societal actors beyond the scientific community. To avoid misinterpretation and dissemination of misinformation, the quality and appropriate citation of original sources of information are of paramount importance to science communication as regards open science.

Fostering a culture of open science and aligning incentives for open science

✓ **Engage actively in removing the barriers for open science, particularly those relating to research and career evaluation and awards systems.** Assessment of scientific contribution and career progression rewarding good open science practices is needed for operationalization of open science. Attention should also be given to preventing and mitigating the unintended negative consequences of open science practices, such as predatory behaviours, data migration, exploitation and privatization of research data, increased costs for scientists and high article processing charges associated with certain business models in scientific

✓ **Invest in and promote advanced education and the professionalization of roles in data science and data stewardship.**

Enabling open science also requires data governors capable, in cooperation with the scientific community, of setting strategic directions for data management and openness at the national or local levels and advanced and professional data stewards who manage and curate data according to agreed principles, notably FAIR and CARE principles, within trusted institutions or services. In order to take advantage of the opportunities offered by open science, research projects, research institutions and civil society initiatives need to call on advanced data science skills including analysis, statistics, machine learning, artificial intelligence, visualization and the ability to write code and use algorithms with scientific and ethical responsibility.

✓ **Promote the use of open educational resources (OER), as an instrument for open science capacity building.** OER should therefore be used to increase access to open science educational and research resources, improve learning outcomes, maximize the impact of public funding and empower educators and learners to become co-creators of knowledge.

publishing that may be causes of inequality for the scientific communities around the world and, in some cases, the loss of intellectual property and knowledge.

✓ **Combine efforts** of many different stakeholders, including research funders, universities, research institutions, publishers and editors, and scientific societies across disciplines and countries, to change the current research culture and to recognize researchers for sharing, collaborating and engaging with other researchers and society, and to support, in particular, early-career researchers to drive this cultural change.

✓ **Review research assessment and career evaluation systems in order to align them with the principles of open science.** Considering that a commitment to open science requires time, resources and efforts that cannot be automatically converted into traditional academic output, such as publications, but which can have a significant impact on science and society, evaluation systems should take into account the wide breadth of missions within the knowledge creation environment. These missions come with different forms of knowledge creation and communication, not limited to publishing in peer reviewed international journals.

✓ **Promote the development and implementation of evaluation and assessment systems that:**

- ✓ Build on the existing efforts to improve the ways in which the scientific outputs are evaluated, such as the 2012 San Francisco Declaration on Research Assessment, with an increased focus on the quality of research outputs rather than quantity, and by fit-for-purpose use of diversified indicators and processes that forego the use of journal based metrics such as the journal impact factor;
 - ✓ Give value to all relevant research activities and scientific outputs including high-quality FAIR data and metadata, well-documented and reusable software, protocols and workflows, machine-readable summaries of findings, and teaching, outreach and engagement of societal actors;
 - ✓ Take into account evidence of research impact and knowledge exchange, such as widening participation in the research process, influence on policy and practice and engaging in open innovation with partners beyond academia;
 - ✓ Take into account the fact that diversity of disciplines requires different approaches in open science;
 - ✓ Take into account the fact that assessment of researchers against open science criteria should be fit for different stages of careers, with particular attention to researchers at the beginning of their careers.
- ✓ **Ensure that the practice of open science is well known and is taken into account as a scientific and academic recruitment and promotion criterion.**
- ✓ **Adopt policies that require and reward open access to scientific knowledge, including scientific publications, open research data, open software, source code and open hardware, in line with the provisions of this Recommendation.**

✓ **Promote materials that are in the public domain and existing open licensing schemes, copyright and other intellectual property exceptions for research and educational uses that allow distribution and re-use of a copyright work, or work subject to other intellectual property protection, including partial or derivative use, on the condition that the creator is appropriately credited, in accordance with international law.**

✓ **Promote high-quality and responsible research and explore the potential of open science practices to reduce scientific misconduct, including the fabrication and falsification of results, violation of scientific ethical norms, and plagiarism.**

Promoting innovative approaches for open science at different stages of the scientific process

✓ **Promote open science from the outset of the research process and extend the principles of openness in all stages of the scientific process to improve quality and reproducibility, including the encouragement of community-driven collaboration and other innovative models, for example preprints clearly distinguished from final peer-reviewed publications, and respecting the diversity of scientific practices, in order to accelerate dissemination and encourage rapid growth in scientific knowledge.**

✓ **Promote, as appropriate, open peer review evaluation practices including possible disclosure of the identity of the reviewers, publicly available reviews and the possibility for a broader community to provide comments and participate in the assessment process.**

✓ **Encourage and value publication and sharing of negative scientific results and those that do not conform to the results expected by the researchers who carried them out, and data associated with them, as these results also contribute to the advancement of scientific knowledge.**

EMPOWER

High-level policy/strategy

This section outlines a series of actions that university leaders can take, independently or jointly, to catalyse OA throughout the institution.



Actions

1. Discuss the benefits of OA implementation (and its challenges) with university members
2. Adopt a policy that includes a Rights Retention Statement
3. Add OA criteria in academic assessment
4. Monitor APC costs. Centralise and streamline APC reporting. Assign funding for OA publishing*
5. Support non-commercial, scholar-led publishing initiatives (Diamond OA)*
6. Advocate policy change by governments and funders

BUILD CAPACITY

Libraries and consortia

This section includes a series of actions that university libraries, consortia and publishers can take to accelerate OA output, including different types of agreements.



Actions

1. Monitor APC costs. Centralise and streamline APC reporting*
2. Enter into a publishing agreement with a pure-DA publisher
3. Enter into a transformative agreement (TA) with a smaller or society publisher
4. Enter into a transformative agreement (TA) with a large publisher

* These actions fall under more than one goal. Their description has been slightly adapted to the different goals and target groups.

REINFORCE EXISTING STRUCTURES

Academic community-driven Infrastructures

This section includes a series of actions that institutions can take to support scholarly-led initiatives on OA, to accelerate OA output.



Actions

1. Support non-commercial, scholar-led publishing initiatives (Diamond OA)*
2. Support non-commercial infrastructure for scholarly communication
3. Develop and use an institutional (or shared) OA repository

Vision

By 2025, Europe's universities will be part of a scholarly ecosystem characterised by:



Academic ownership of scholarly communication and publishing



A just scholarly publishing ecosystem (i.e. transparent, diverse, economically affordable and sustainable, technically interoperable, and steered by the research community)



FAIR research data as the norm in producing and sharing scientific knowledge



New professional profiles for data-intensive careers



An active engagement in EOSC



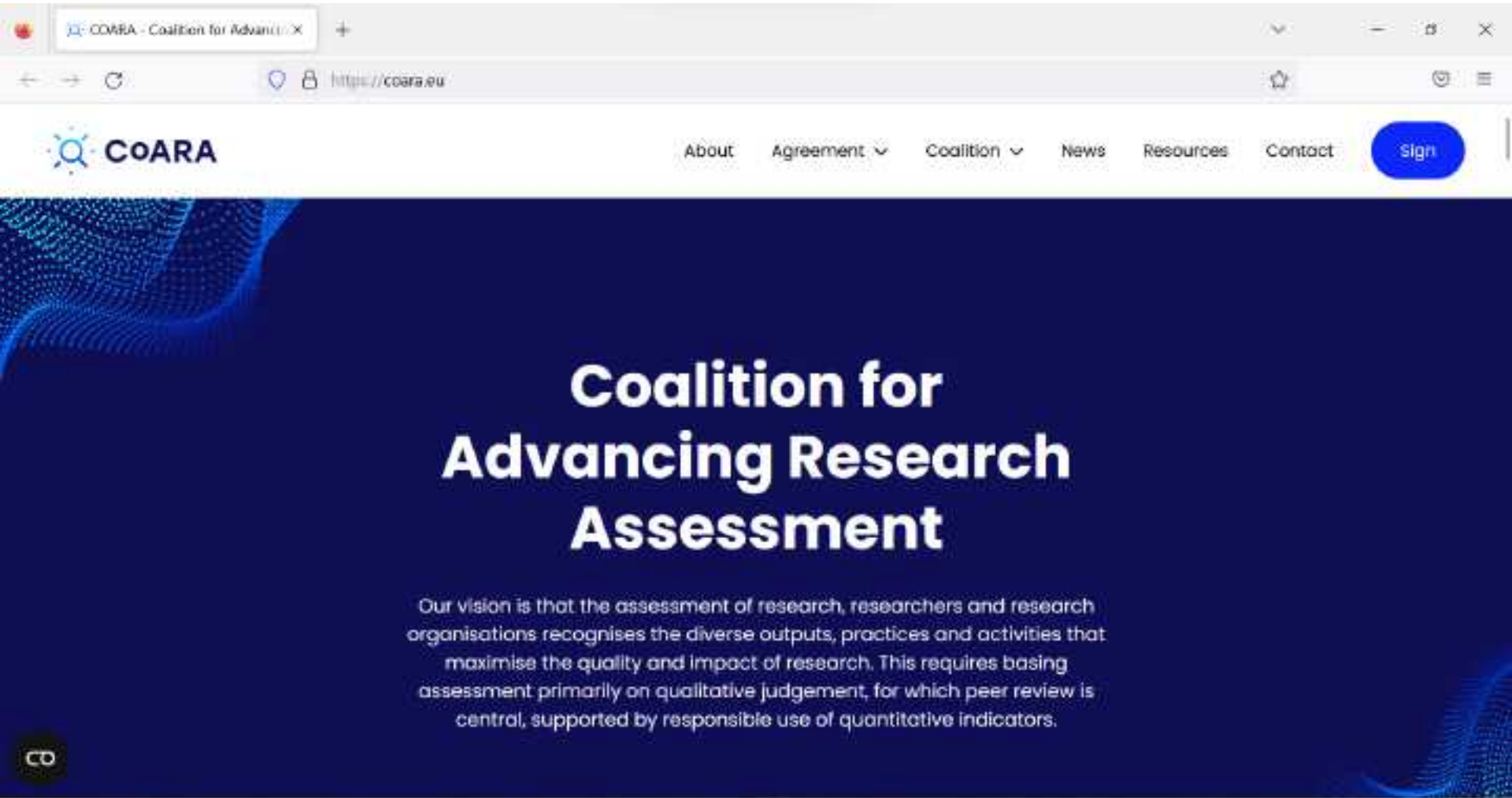
A responsible, transparent, and sustainable research assessment system



Open Science as an integral part of research assessment practices



Assessment approaches balancing qualitative and quantitative metrics



<https://coara.eu>

Thank you!

Questions?

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