

# Maximizing research impact via practicing openness

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-  Practicing Openness As One Of The Best Solutions
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# History of Sharing Information:



Writing and the Alphabet:  
(~3000 BCE)

- ✓ Recording of knowledge



The Printing Press:  
(1440 CE)

- ✓ Birth of books & peer-reviewed journals



The Industrial Revolution  
(1760–1840 CE)

- ✓ Improved printing & access to global libraries



The Computer Revolution  
(1940s–present)

- ✓ Enable Digital Data sharing despite high cost



The Internet and Digital Connectivity  
(1990s–Present)

- ✓ Revolutionized scholarly communications
- ✓ Enabled instant connection
- ✓ Enhanced Global collaborations
- ✓ Broadening publications

# Any Problem? Many!

## Overemphasis on paper, but lack of Reproducibility

- Many studies could not be replicated due to lack of detailed info

## Competitive citation index

- citation-driven culture, lead to manipulations and biased reviews.

## Quantity Over Quality

- Institutions prioritize publication counts for rankings, reducing research care.

## Positive Result Bias

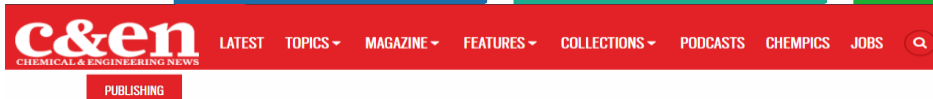
- Negative or unexpected results was ignored or leads to change the pintail Plan!

## Limited Access

- Paywalls restrict research access, especially in low-income regions.

## Rise of Science Denial

- Lack of transparency and accessibility fuels skepticism and mistrust in science.



### Elsevier journal under fire for rejecting paper that didn't cite enough of its old papers

Publisher says it has policies against artificially increasing journal metrics

### NETHERLANDS University rector defends decision to quit ranking system



October 19, 2023

Liz Newmark



## Is there a reproducibility crisis in science?

nature

Explore content About the journal

nature > nature.video > article

Nature Video | 25 May 2016

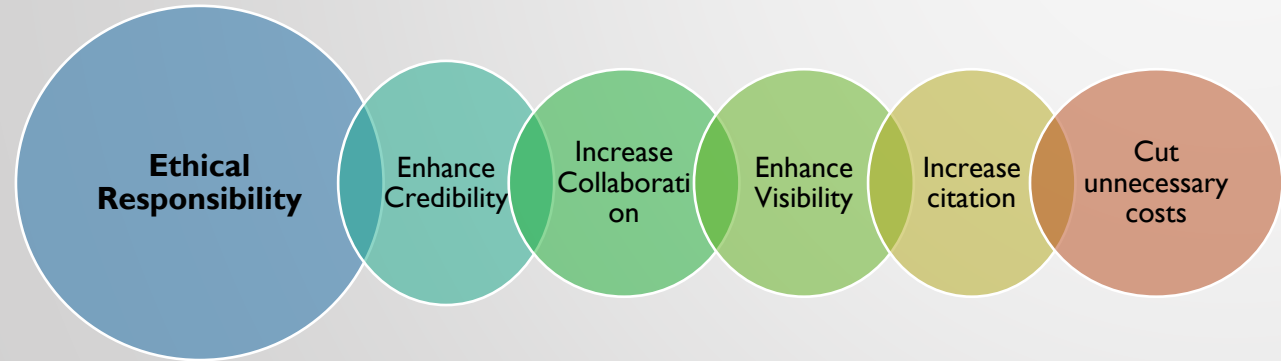
### Why Most Published Research Findings Are False

John P. A. Ioannidis

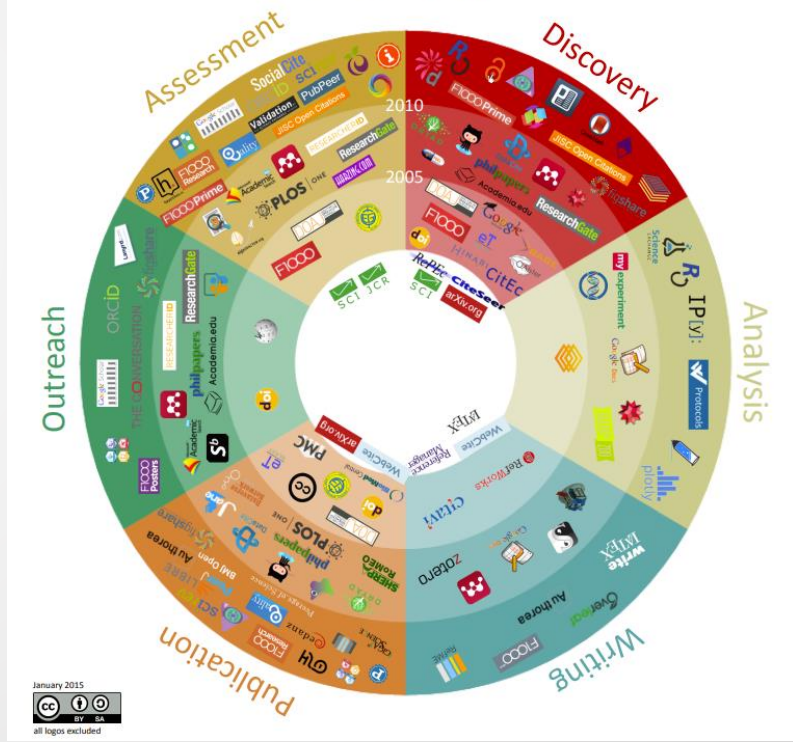
As strongly requested by the reviewers, here we cite some references [[35], [36], [37], [38], [39], [40], [41], [42], [43], [44], [45], [46], [47]] although they are completely irrelevant to the present work.

# Any Solution? Practicing Openness!

Practice preparing and sharing other type of research outputs, applying an Open access license and ensuring alignment with the principles of Transparency, Accessibility, and Collaboration.



101 Innovative tools and sites in 6 research workflow phases (< 2000 - 2015)



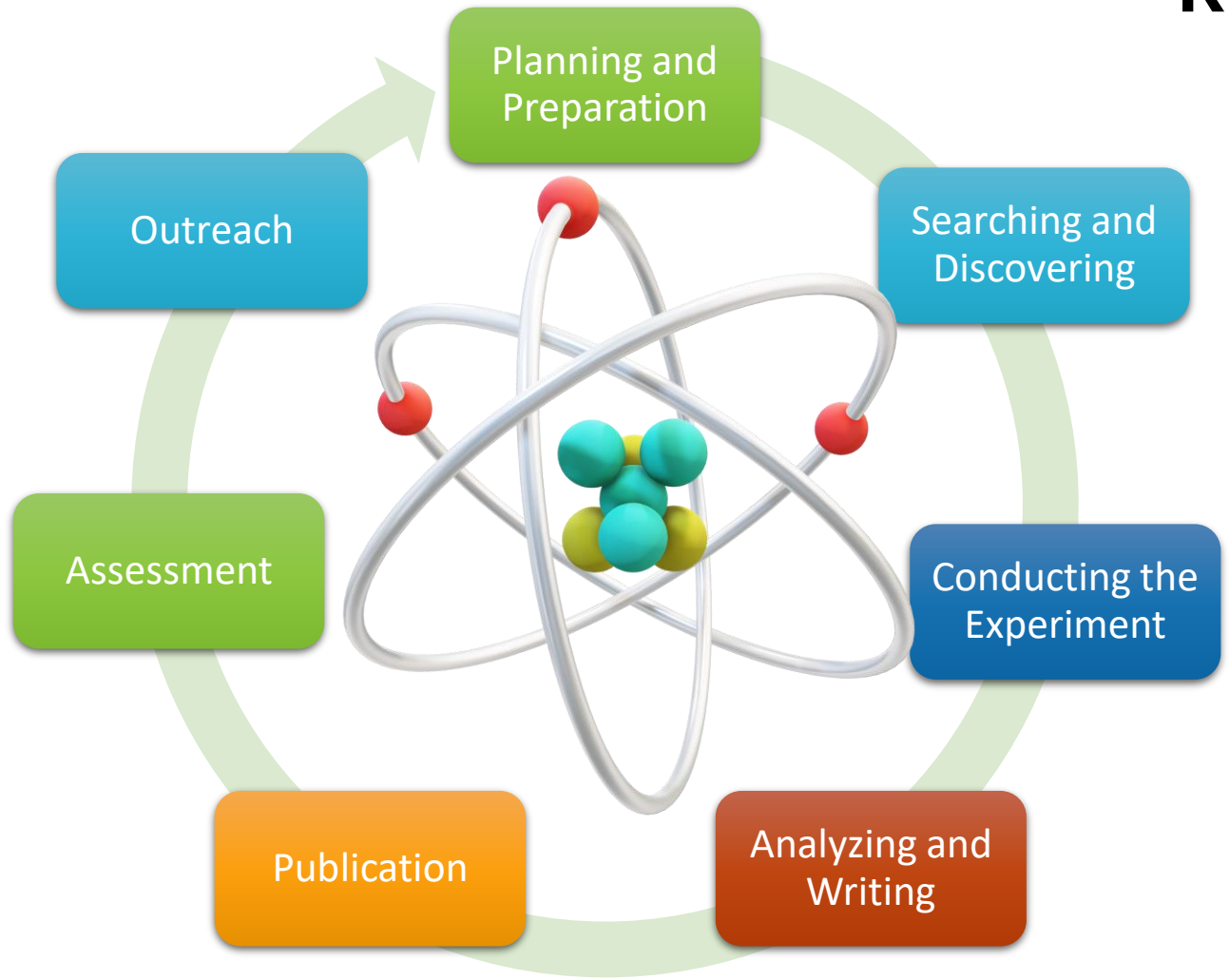
Various tools to practice openness thorough out your research!

Bosman, J., & Kramer, ofB. (2016). Innovations in scholarly communication - data the global 2015-2016 survey [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.49583>

Ref: McKiernan, Erin C., et al. "How open science helps researchers succeed." eLife 5 (2016): e16800. DOI: <https://doi.org/10.7554/eLife.16800>

## Boost Your Research Impact Throughout The Research Lifecycle:

Plan for sharing the other research outputs at any time of the research lifecycle to boost visibility, foster collaboration, and enhance your overall credibility.



Seven stages in a research lifecycle



# 1) Planning & Preparation:

Before starting your research: Check the open policies set by your funder to ensure compliance. Pre-register your research plan and protocol, choosing the level of access that suits your needs. Develop a DMP to structure your data lifecycle. Integrate the FAIR principles into your data and metadata by identifying best practices within your field. (If you find this process challenging, refer to the cheat sheet provided later in the presentation for guidance.)



Check requirements for Open policies

Many funders and institutions, especially public ones, strongly support open access policies for various research outputs.

Create a Detailed Study Plan & Protocol

Open tools for documenting design and methods (e.g., [protocols.io](https://protocols.io) , [osf.io](https://osf.io)).



Share the Plan & Protocol by pre-registering it!

Register research edit but of your study to prevent hypothesis changes (e.g., [aspredicted.org](https://aspredicted.org) , [osf.io](https://osf.io)). The registered plan can not be edit but can be private until the process is completed and then can be link to the published outputs.



Develop a Data Management Plan (DMP)

DMP cover entire lifecycle of data, from planning to conducting and back up, long term preservation. Tools to create DMP ([dmponline.dcc.ac.uk](https://dmponline.dcc.ac.uk) , [argos.openaire.eu/splash/](https://argos.openaire.eu/splash/))



Plan to apply FAIR principle  
(Findable, Accusable, Interoperable, Reusable)

A case study on implementation of FAIR principles in the field of material science (<https://zenodo.org/records/14224160>)

There is a “cheat sheet” in the post-publication phase that outlines key considerations for publishing data in alignment with the FAIR principle.



## 2) Searching And Discovering:

In addition to using institutional subscription databases, explore open-access repositories for literature, datasets, code, and software. Use tools like Zotero to organize and share literature collections and leverage Open Educational Resources. Ensure proper citation for any resources you use.



Use Open-repositories Database

Use open-access databases and repositories alongside your institution's databases (e.g., OpenAIRE Explore, CORE, arXiv).

\* Share your own collection of literature at [zotero.org](https://www.zotero.org)

\*Lithuanian National Repository: [elaba.lt](https://elaba.lt) ,Search open literature: [www.eLABa.lt](https://www.eLABa.lt)

Use Open pre-registered Methods and Protocols

Access shared methodologies and protocols e.g., [protocols.io/](https://www.protocols.io/) , OSF: [osf.io/](https://www.osf.io/).

Use Open Educational Resources

Use open lectures, tutorials, and materials (e.g., [zenodo.Org/communities/eu/](https://www.zenodo.org/communities/eu/)).

Use Open-Published DataSets

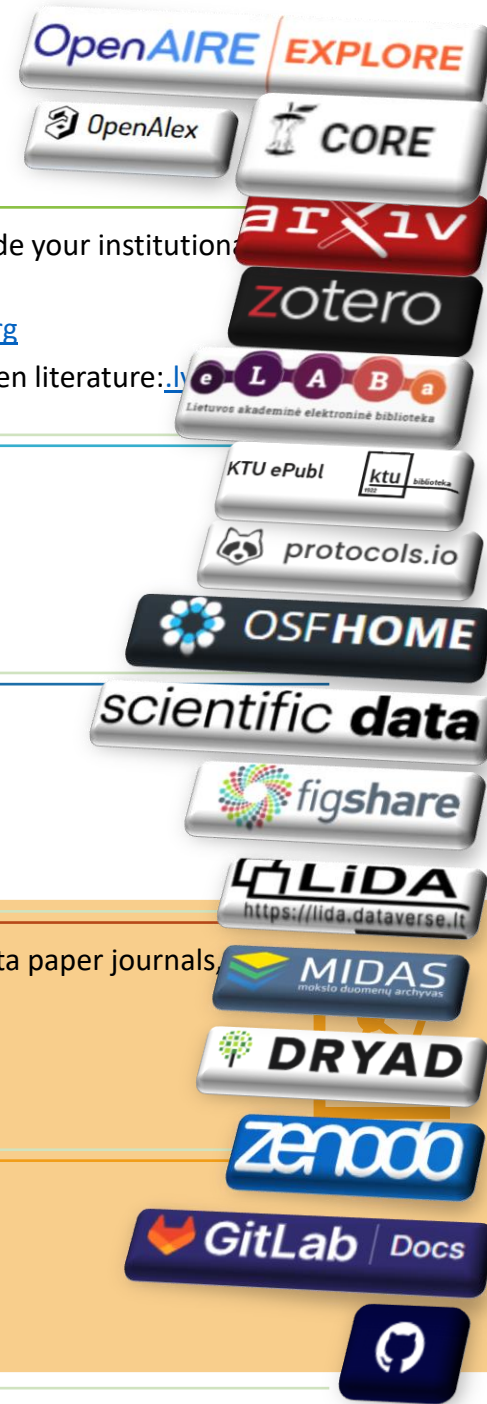
Use National repositories, google dataset search, data paper journals generic repository, disciplinary repositories.

Lithuanian Data archive - Biomedicine: [midas.lt](https://midas.lt)

Lithuanian Data archive -SSH: [lida.dataverse.lt/](https://lida.dataverse.lt/)

Use Open-Source code, Software

Leverage platforms e.g [github.com/](https://github.com/) or [gitlab.com](https://gitlab.com/) for code and tools.





### 3) Conducting the Experiment:

Use an electronic lab notebook to document your entire research process, making it easier to publish and share later. Properly organize and name your files and folders, ensuring detailed metadata to describe collected data. Store all data securely while keeping it accessible to your research team. If working with code or software, use open platforms to track changes throughout the process.



Well Documented Notes

Record procedures and deviations in electronic lab notebook system (e.g., <https://www.elabftw.net/> , <https://www.elabnext.com/we-are-now-elabnext> Guide: <https://doi.org/10.5281/zenodo.14224159>



Well Documented Data

Organize and document data systematically following DMP standards For more info: [how to name file and folders](#), [What to include in Metadata \(data about data\)](#), [readme file](#). [Standard formats](#).



Ensure Data Security

Use secure, backed-up systems for data storage (e.g., OneDrive)



Use tools for tracking changes

Employ version control for code changes (e.g., <https://github.com/> , <https://docs.gitlab.com/ee/user/search/> , <https://bitbucket.org/product/version-control-software> )



## 4) Analyzing and Writing:

For data analysis, use free and open-source tools to enhance transparency and allow others to reproduce your work while contributing to open-source sustainability. Utilize open tools for visualization and writing to collaborate effectively with your team.



Use Collaborative Writing Tools

Google Docs, Microsoft 365, OneDrive for real-time collaborative document editing.

[GitHub](#), for code sharing, version control, and project management for developers

More info: [github.com/topics/writing-tool](https://github.com/topics/writing-tool)



Use Open-Source softwares

By using free and open-source tools you improve their sustainability.

Open software: <https://open-science-cloud.ec.europa.eu/resources/software>

Alternatives by Category: [opensourcealternative.to/categories](https://opensourcealternative.to/categories)

Free coeres for software use: [zenodo.org/](https://zenodo.org/)

Open Source Alternatives by Category

European Open Science Cloud - EU No



Awesome Dataviz

Use Open-Source For Data Visualization

Data visualization tools, with or without programming language can be find in [github.com/hal9ai/awesome-dataviz](https://github.com/hal9ai/awesome-dataviz)



## 5) Publication

At this stage, for scholarly publication, choose a diamond open-access journal from DOAJ and consider those with an open peer review policy for transparency. Publish your raw data as supplementary material, in a data journal, or an open repository, ensuring it has a unique identifier and is referenced in your manuscript before submission. Apply appropriate licenses to facilitate proper attribution and reuse.



Publish your Notebook and Workflow

Notebooks share e.g. [openlabnotebooks.org/](https://openlabnotebooks.org/)  
Share workflows on platforms like Protocols.io



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Find the right journal & walk the Diamond Path!

Search for Diamond Open Access journals (~platinum~non APC~no fee) in [Directory of Open Access publishing](#)



Select Journal with Open Peer Review policy

Choose journals with open peer review policies to share and publish review history for transparency.

Publish your Data

Data can be shared through supplemental materials in research articles, public websites, specialized repositories or as data papers in Data journals. (Dataverse, Dryad, figshare, Zenodo..)



Publish Code and Software

Share software for reproducibility on platforms like GitHub, GitLab, or Bitbucket.



Assign Appropriate Licenses

Apply licenses Use Open Data, Shared Data, or Closed Data licenses as needed. (e.g. [chooser-beta.creativecommons.org/](https://chooser-beta.creativecommons.org/))





# Cheat sheets designed to assist in enhancing the FAIRness of research DATA and CODE!

ktu

<https://github.com/UtrechtUniversity/FAIR-Cheatsheets.git>

**FAIR DATA CHEATSHEET**  
uu.nl/rdm-cheatsheets

**Start here**

1. Select a suitable data repository. You can find one with the UI repository finder: [tools.uu.nl/repository-decision-tool/](https://tools.uu.nl/repository-decision-tool/).
2. Create a dataset at the data repository.
3. Upload your data.

**Findability**

- Provide as much descriptive metadata about your dataset as possible.
- Write an abstract that describes both your dataset and the research topic.
- Use keywords common in your research domain.
- If possible, add your ORCID ID to the author field.
- You don't have an ORCID? Yet? Go to [orcid.org/](https://orcid.org/) and sign up.
- ADONIS will be provided by the data repository. Use this DOI to share your dataset.
- Check if a controlled vocabulary is available for your domain. Use this if applicable or contact your research data manager.
- Promote your dataset in social media and your research community.

**Accessibility**

- Does your dataset consist of privacy sensitive data or other data that cannot be disclosed?
- No: Publish your data openly and freely if possible.
- Yes: Publish your dataset under restricted or closed access.
- and clearly delineate how access will be granted to the data upon their request. You can contact details on our data transfer agreement, send data request form.
- Identify: Contact RDM Support or a privacy officer, or check out the Data Privacy Handbook.

**Interoperability**

- Store your data in a format that is:
  - Open
  - Commonly used
  - Supported by open software
- Add the following information to the dataset:
  - An overview of the file formats.
  - Describe what kind of format.
  - Describe file naming conventions.
  - Describe required software to open or process the data.
- Add a codebook with metadata. This involves your variables and their meaning.

**Reusability**

- Publish your dataset under a license. Do you need to publish your data fully open or with restrictions?

**README.md**

**# Title of your dataset**

In this section, provide an overview of your dataset and describe the project and research questions in which the dataset was collected. Explain the data collection methods, the purpose, scope, and potential use of your dataset.

**## Prerequisites**

Include any necessary prerequisites for using your code, such as specific software or hardware requirements. Provide clear instructions for how to access or download your data files.

**## Contents**

Describe the organization of your data package, including the contents of each folder and the files it contains. Provide and explain the naming convention used for the files in your dataset. Also describe the file format(s) used in your dataset and the software required to open them.

**## Codebook**

Provide a codebook that explains the variables in your dataset. This is particularly important for tabular data, but it is useful for any other type of file as well. Include at least the variable name, a brief description, and the data type.

**## License**

Include a license that allows others to use and share your work. Consider using an open data license, such as a Creative Commons License.

For example: This work is licensed under a CC BY 4.0.

**## Citation (optional)**

Provide clear instructions on how to cite your dataset or related publications in a research paper or publication.

**## Contact**

Include contact information for questions, feedback and suggestions about your dataset.

**Let's work on the README together!**  
Visit [uu.nl/rdm](https://uu.nl/rdm) for guides, workshops, and walk-in hours. Or contact our experts at [info.rdm@uu.nl](mailto:info.rdm@uu.nl).

**Check out the extended version:**  
<https://bit.ly/FAIR-Data-Readme>

**FAIR CODE CHEATSHEET**  
uu.nl/rdm-cheatsheets

**Start here**

1. Make a GitHub Account and connect to Utrecht University. See <https://github.com/UtrechtUniversity/getting-started>.
2. Create a new repository.
3. Upload your code and/or scripts.

**Findability**

- Create a README in Github that introduces your code and analysis. See the [codebook](#).
- Get a DOI for your repository by uploading a persistent copy to archiving tool Zenodo.
- Manually:
  1. Create a Zenodo account or log in.
  2. Link to new upload.
  3. Upload the files and fill in the metadata.
- Technically: Follow the Github tutorial on [DOI creation and linking](#).
- Use ORCID identifiers in your Zenodo metadata. You don't have one yet? Go to [orcid.org/](https://orcid.org/) and sign up.

**Accessibility**

- Does your code contain privacy sensitive data or other information that cannot be disclosed?
- No: Upload your code to Github and make it publicly accessible.
- Or: Upload it as supplementary material.
- Yes: Remove parts that cannot be disclosed and upload to Github.
- Or: Upload your code to Github and keep it private. The same holds for Zenodo. See ["Privacy"](#).
- Identify: Contact RDM Support or a research engineer.

**Interoperability**

- Add the following information to your README file:
  - Include any necessary prerequisites for using your code, such as required datasets, specific (open) software, dependencies or hardware requirements.
  - If applicable, provide clear instructions how to get the input data.
  - Use an open programming language that is common or rising in your research domain.
  - Use input and output formats for data if open protocols, for example, the CSV format.

**Reusability**

- Publish your code under an accessible license. Do you want to publish your code openly or with restrictions?

**README.md**

**# Title of your code or analysis**

In this section, provide an overview of your code and describe the project in which the code was developed. Highlight the purpose, scope, and potential uses of your code.

**## Prerequisites**

Include any necessary prerequisites for using your code, such as requirements, specific software, dependencies or hardware requirements. For example: This project requires Python 3.8 or later and install the dependencies with 'pip install -r requirements.txt'.

**## Contents**

Describe the organization of your package, including the contents of each folder and the files it contains. Describe where results and figures are stored if not added to the project folder.

**## Usage**

Provide clear and concise instructions on how to use your code. Include examples of how to execute the code. If your work consists of multiple execution steps, provide detailed step-by-step instructions.

**## License**

With an open-source license, such as MIT, GPL3, and Apache 2.0, you grant permission to use your work. Choose a license that aligns with your goals for your code.

For example: This work is licensed under the MIT License.

**## Citation (optional)**

Provide clear instructions on how to cite your code or related publications in a research paper or publication. You can also add a separate CITATION.cff file.

**## Contact**

Include contact information for questions or comments about your project. You can also provide clear instructions for how users can provide feedback, contribute, or suggest improvements.

**Let's work on the README together!**  
Visit [uu.nl/rdm](https://uu.nl/rdm) for guides, workshops, and walk-in hours. Or contact our experts at [info.rdm@uu.nl](mailto:info.rdm@uu.nl).

**Check out the extended version:**  
<https://bit.ly/FAIR-Code-Readme>

**FAIR CHEATSHEET**  
PUBLISHING EYE TRACKING DATA & CODE  
uu.nl/rdm-cheatsheets

**Start here**

1. Consult the Data & Code cheatsheet: [uu.nl/rdm-cheatsheets](https://uu.nl/rdm-cheatsheets)
2. Use the Eye Tracking cheatsheet for further guidance to publish your eye tracking data & code.
3. Familiarise yourself with reporting guidelines in the field of eye tracking. A preferred reading is: Minimal Reporting Guideline for Research Involving Eye Tracking (2023 edition), DOI: 10.3758/s13428-023-02192-3.

**Findability**

- Describe at least the following points in your metadata and README:
  - Specify the research domain, subdomain or task (e.g. visual world paradigm, driving simulation, searching behaviour)
  - Eye tracking hardware & software
  - Data processing software
  - Calibration procedure
- Use a repository that is specific to your field of research, since there is no data repository specific for eye tracking data.
- Use a general repository: [tools.uu.nl/repository-decision-tool/](https://tools.uu.nl/repository-decision-tool/), if cannot find a field specific repository.

**Interoperability**

**HARDWARE**

- Are you using a scene camera that captures sensitive images? For instance, if the camera is directed at another person, it risks their privacy.
- Yes: Be careful about the usage of scene cameras and their captured images.
- No: Preferably, use this kind of hardware for eye tracking as only the X and Y coordinates are recorded, with no visual data of the person's face or eye.

Recent developments involve online webcams, albeit with low resolution and in uncontrolled environments. However, usage of online eye tracking software that stores webcam images is strongly discouraged.

**SOFTWARE**

- Eye tracking hardware largely comes with third software. The software can be differentiated between:
  - Acquisition software: Responsible for capturing and processing data from eye-tracking services, such as eye movements and gaze coordinates (usually not open).
  - Presentation software: Used to display stimuli to participants during eye-tracking experiments, such as images or videos (can be open).
- Opt for open-source alternatives such as Octave, Python and R. Distance yourself from proprietary programming languages such as MATLAB where possible.
- Free and Open-Source Eye Tracking Toolboxes that can be run on such software are for example:
  - Psychophysics toolbox (Octave)
  - Psycho (Python)
  - Pygaze (Python)
  - eyeTrackingR (R)
- If possible, configure your data in a format that is preferably open and commonly used.
- It is recommended to use the ASC file format and to include calibration/validation data.

**Privacy**

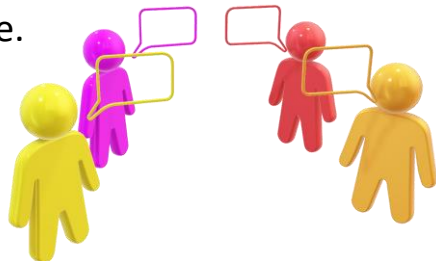
- Implement **Privacy by Design & by Default**.
- Ensure that you adhere to the informed consent signed by participants in your study. Ensure that only the eye tracking data gets published, e.g. the X and Y coordinates.
- Check if your eye tracking data includes identifiable health or demographic data:
  - Yes: Publish the output numbers along with the descriptive metadata.
  - No: Publish your anonymised data openly.
- Privacy can be challenging and context-dependent: Having any doubt? Reach out to [RDM.SUPPORT@uu.nl](mailto:RDM.SUPPORT@uu.nl) or consult the Data Privacy Handbook.
- Do not use tools that are in breach of privacy concerns, e.g. free online eye tracking webcam trackers.

**Let's work on this together!**  
Visit [uu.nl/rdm](https://uu.nl/rdm) for guides, workshops, and walk-in hours. Or contact our experts at [info.rdm@uu.nl](mailto:info.rdm@uu.nl).

Use the Eye Tracking cheat sheet for further guidance to publish your eye tracking data & code!  
<https://github.com/UtrechtUniversity/FAIR-Cheatsheets.git>

# 6) Assessment

Register for an ORCID account to link your research outputs and provide a brief description of your work there. Engage in open peer review by commenting on published research or preprints (early manuscript drafts shared before formal peer review). Preprints can be published anywhere that meets FAIR principles and reviewed on another platforms where reviews receive persistent identifiers, making them citable.



Promote Visibility with unique identifier

Use persistent identifiers for yourself (ORCID), your articles (DOI), and your data (PID).



Comment and feedback on published articles

Engage with published work to discuss and provide open feedback. [PubPeer](#).



Practice peer-review for more recognition

Review preprint drafts on platforms e.g. [prereview.org/](#), [Review Commons](#)  
Share your preprint draft in: [Review commons](#), [peercommunityin](#),  
Or find the proper pre-print repository: [doapr.coar-repositories.org/](#)



Preprint and open peer review are reshaping scholarly communication by enabling researchers to share articles, data, and findings on Diamond Open Access platforms that follow FAIR principles. Reviews can occur on separate platforms where the reviewers receive persistent identifiers, making them citable and trackable. Researchers can also curate and endorse preprints independently, fostering a decentralized and transparent review system. While not yet fully integrated into research assessments, this model offers a more accessible, flexible, and collaborative alternative to traditional peer review, accelerating scientific dialogue.

## 7) Outreach

Maximize your research impact by self-archiving in repositories, ensuring visibility and citation. Link posters and presentations with proper licensing and share findings via ResearchGate, ORCID, social media, and public talks. Engage with science deniers to address misinformation and contribute to Citizen Science projects, fostering public collaboration in research.




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Link your poster & Presentations

Include a license logo, linking it to the license's official homepage.

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Self Archive your work in a repository

Deposit your published work in institutional, generic or disciplinary and repositories  
Ensure they are discoverable, citable, and interconnected with related records.

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Share through your Public Media

Disseminate research findings through research gate, ORCID, social media, blogs, and public lectures in accessible terms.

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Stand for Science

Engage with science deniers and address misinterpretations of scientific claims, especially related to your research areas.

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Participate in Citizen Science projects

Citizen science unites educators, data managers, scientists, and volunteers to work on scientific investigations of any number of important issues, such as climate change, biodiversity, and water quality.

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# Open Practice Advantages:

- Open sharing ensures reproducibility and trust.

- Open Access makes knowledge equitable and inclusive.

- Open peer review increases transparency.

- Open Science shifts focus to impactful, transparent research.

- FAIR data principles enhance collaboration and reduce waste.

- Open Science values all results equally.

- Open Science builds trust through accessibility and citizen engagement.

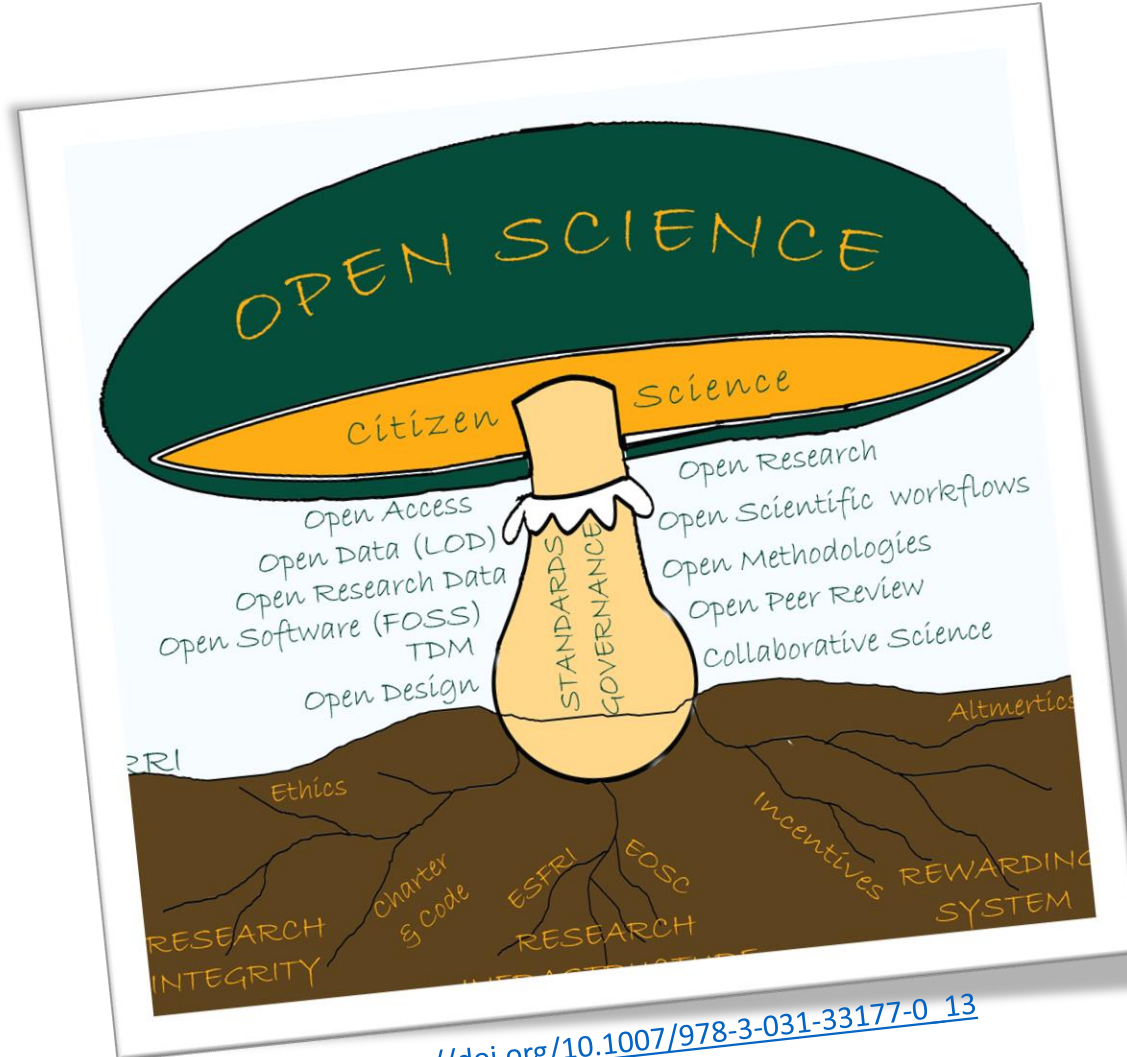
- Open results maximize public investment.

- Preprints and open platforms accelerate communication.

- Policies and rewards encourage open practices.

# Open Science Mushroom!

All these practices are under a mushroom CAP working together to build Open Science taxonomy, which the goal is to make publicly funded research benefit society as a whole 😊



[https://doi.org/10.1007/978-3-031-33177-0\\_13](https://doi.org/10.1007/978-3-031-33177-0_13)

# European Policies in Open Science

## OS practice in Horizon Europe

Horizon Europe mandates open access to publications and research data, following the principle of "as open as possible, as closed as necessary."

These practices are outlined in the [Horizon Europe Standard Application Form](#) and the [Programme Guide](#).

## Incentives and Rewards

The European Commission promotes Open Science through policies like the Agreement for Reforming Research Assessment (ARRA).

## Supportive Legislation

EU frameworks support open data, open access, and digital legislation conducive to research.

Initiatives like the [European Open Science Cloud \(EOSC\)](#) and [Open Research Europe](#) provide platforms and resources for open practices.

## National policies: 2016, 2024

The Research Council of Lithuania (the main national funder) adopted Open Access guidelines to encourage open dissemination of research.

The Research Council of Lithuania has created [guidelines for Open Access to Research and Development Results](#). By 31 December 2026, institutions need to: 1) Set up ways to monitor open access to research results; 2) Develop a plan to ensure open access.

## Institutional policies:

Kaunas University of Technology also have established Open Science policies.

## OS projects 2021-2027

Lithuania's Ministry of Education, Science and Sports launched two programs to promote Open Science practices in year 2021 to 2027.

Aim of these projects are to improve OS practices and infrastructures in line with FAIR principles.

“As Open As Possible, As Closed As Necessary.”



**Instead of “publish or perish”,  
embrace “share and flourish”!**

**Kaunas University of Technology Library**  
**[biblioteka@ktu.lt](mailto:biblioteka@ktu.lt)**