



Open Science / Open Access / Open Source



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Outline

- Scope of this training
- What is Open Science
- Open Access
- Open Peer Review
- Open Data
- Open Source
- Q&A

Scope of this training

- Make you familiar with the concepts of Open Science
- Provide you some tips and tricks for your scientific contributions
- Provide you resources to help you gain visibility

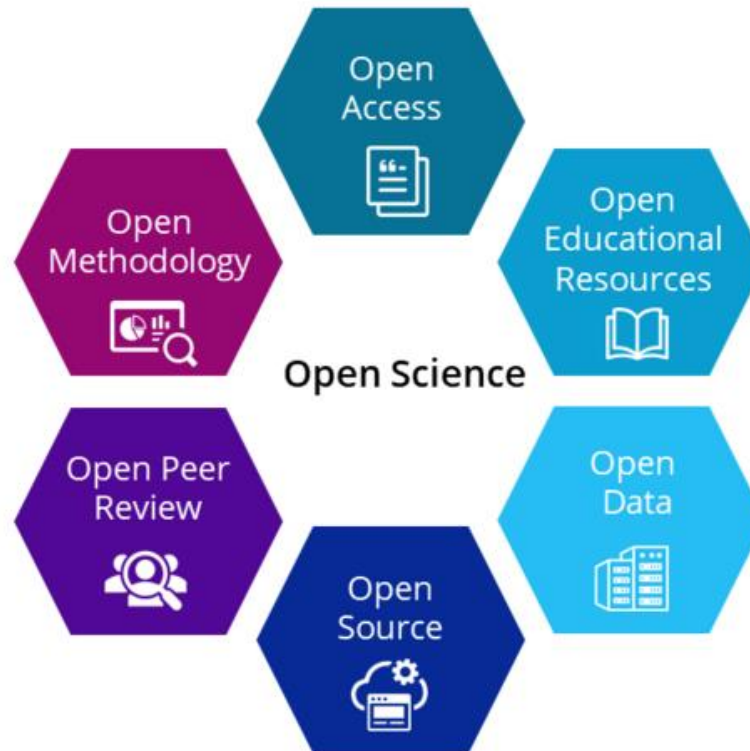
What is Open Science ?

What is “Open Science”?

- **Broad definition:** approach to make research/data/science accessible to **ANYONE**
- Relies on several **core principles**
 - **Scientific progress:** accelerate scientific research
 - **Transparency, integrity:** share methods, data, errors to strengthen reliability
 - **Collaboration:** expand the pool of expertise and bring diverse perspectives to scientific problems
 - **Access to knowledge:** ensure that progress is not locked behind paywalls (rising of subscription fees)

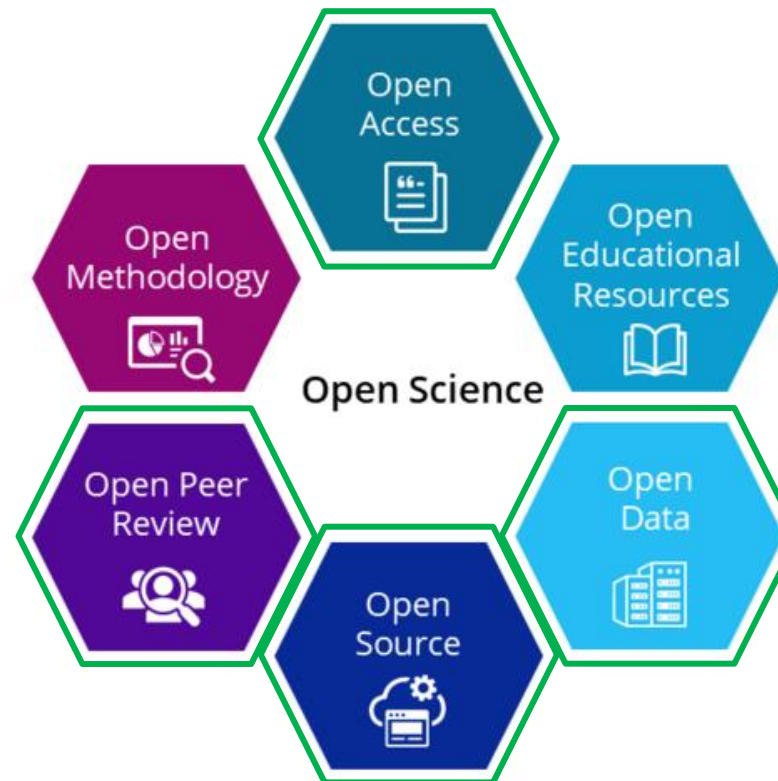
What is “Open Science”?

The Six Principles of Open Science



What is “Open Science”?

The Six Principles of Open Science



Benefits of Open Science

For everyone:

- Making science and its progress accessible (open source, open data, open education)
- Making scientific publications more ethical (open access)
- Fair return to the society that indirectly funds researchers (public good)

For you:

- Better dissemination of scientific productions (independent of publishers)
- Very often, the impact and citation count of articles/data increases thanks to their ease of access and increased visibility (4x more downloaded, automatically made visible on Google Scholar, etc.)



Open Access

Open Access

Scientific Publishing Models

- **Traditional paid mode:** researchers submit their work to journals that charge readers or institutions for access to articles on article-by-article basis or subscription
- **Free access to the user:** researchers/universities submit their work and pay so that **ANY** readers can freely access the article

Open Access

Different roads to publish in Open Access:

(Diamond), Gold and Green

- Free of charge for researchers who want to publish and for users to access
- Relies on institutional support, grants, donations, or volunteer efforts from scholars and experts in the field

Open Access: Gold vs. Green

Gold road

- Research articles published in open access journals
- Authors or their institutions often cover publication costs (typically between 1000 and 10000\$ APC – Author Processing Charge)
- F.N.R.S. covers 500€ (if CRD, PDR, mandats)
- Institut Matériaux covers 50%
- Prices are slowly rising...
- Some journals do not have fees at all!



APC =
Article Processing Charge

Open Access: Gold vs. Green

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APC =
Article Processing Charge

<https://www.scienceeurope.org/our-priorities/open-access/diamond-open-access/>
<https://www.unige.ch/biblio/en/openaccess/understand/roads/>
[FAQ Open Access \(frs-fnrs.be\)](https://www.frs-fnrs.be/FAQ-Open-Access)

Useful links

- Directory of Open Access Journals (DOAJ) → 13000+ journals without fees
<https://doaj.org/>
- Directory of Open Access Books (DOAB)
<https://www.doabooks.org/>
- Directory of Open Access Repositories (OpenDOAR)
<http://v2.sherpa.ac.uk/opensoar/>
- Open Access Directory (OAD)
http://oad.simmons.edu/oadwiki/Disciplinary_repositories
- Directory of Open Access Scholarly Resources (ROAD)
<https://road.issn.org/advancedsearch>

DOAJ OPEN GLOBAL TRUSTED

SUPPORT ▾ APPLY ▾ SEARCH 🔍

SEARCH ▾ DOCUMENTATION ▾ ABOUT ▾ LOGIN →

Computational and Experimental Research in Materials and Renewable Energy

CERiMRE

2747-173X (ONLINE)

Website ISSN Portal

About Articles

PUBLISHING WITH THIS JOURNAL

\$ There are **NO PUBLICATION FEES** (article processing charges or APCs) to publish with this journal.

BEST PRACTICE

This journal began publishing in open access in 2018. ⓘ

This journal uses a CC BY-SA license.

Ⓢ ⓘ ⓘ

JOURNAL METADATA

📍 Publisher
Physics Department, Faculty of Mathematics and Natural Sciences University of Jember, Indonesia

Manuscripts accepted in English

Open Access: Gold vs. Green

APC =
Article Processing Charge

Gold road	Green road (more common)
<ul style="list-style-type: none">• Research articles published in open access journals• Authors or their institutions often cover publication costs (typically between 1000 and 10000\$ APC – Author Processing Charge)• F.N.R.S. covers 500€ (if CRD, PDR, mandats)• Institut Matériaux covers 50%• Prices are slowly rising...• Some journals do not have fees at all!	<ul style="list-style-type: none">• Publication in traditional subscription-based journals <p>+ deposit a copy in open access repositories like institutional websites or subject-specific repositories (see ORBi section)</p> <ul style="list-style-type: none">• Access is restricted for a specific period before becoming open

Open Access: Gold vs. Green

Subject-specific deposits

- Pubmed central (biomedical and life sciences):
<https://www.ncbi.nlm.nih.gov/pmc/>
- Kulture (applied arts):
<https://web-archive.southampton.ac.uk/kultur.eprints.org/>
- African Higher Education Research Online (Ahero):
<http://ahero.uwc.ac.za/>
- Zenodo (anything):
<https://zenodo.org/>

Green road (more common)

- Publication in traditional subscription-based journals
- + deposit a copy in open access repositories like institutional websites or subject-specific repositories (see [ORBi](#) section)
- Access is restricted for a specific period before becoming open

Open Access in Belgium

Belgique CFWB: since 2018-2019, any researcher financed by public sources (at least 50%) **MUST** publish its results in an open access institutional repository

https://gallilex.cfwb.be/document/pdf/45142_000.pdf

Check if allowed by the editor: <https://v2.sherpa.ac.uk/romeo/>

Depending on the editor:

- author pre-print/post-print or editor post-print
- embargo from 6 to 24 months
- possible link to the editor's article

→ And check if there is no confidentiality issue ←

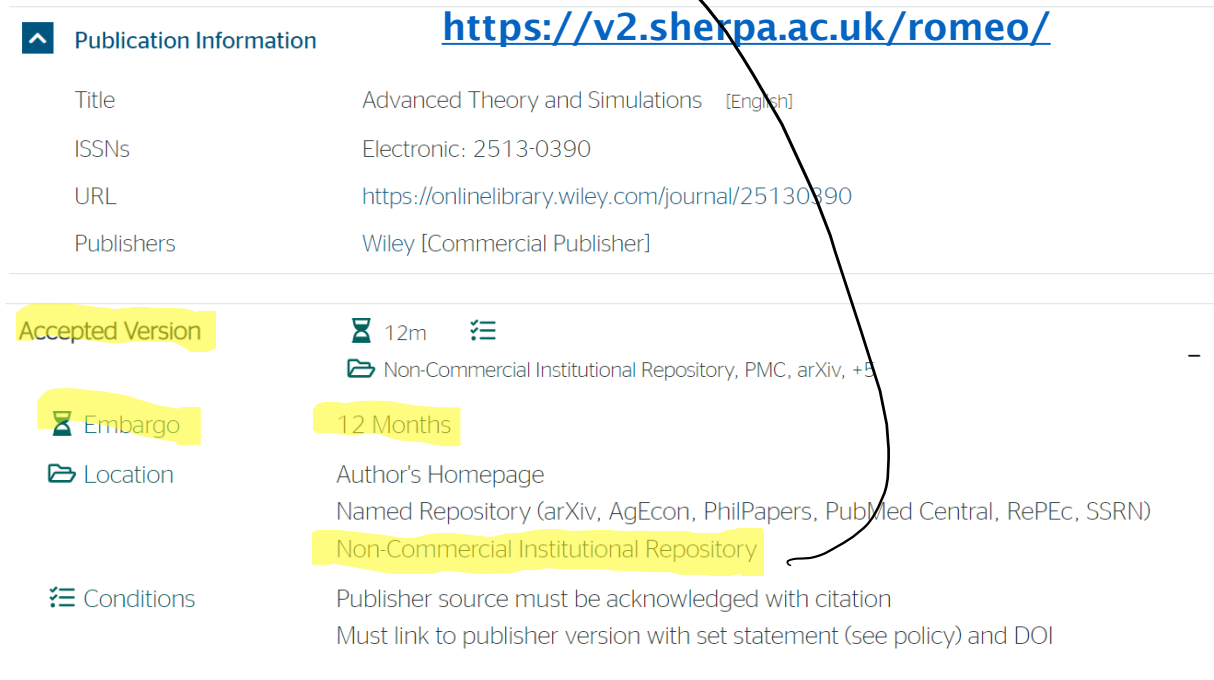
Open Access in Belgium

Own example:

Paper published in 2018 in *Advanced Theory and Simulations*

Uploaded to ORBi with restricted access

Advanced Theory and Simulations



Publication Information <https://v2.sherpa.ac.uk/romeo/>

Title	Advanced Theory and Simulations [English]
ISSNs	Electronic: 2513-0390
URL	https://onlinelibrary.wiley.com/journal/25130390
Publishers	Wiley [Commercial Publisher]

Accepted Version 12m

Embargo 12 Months

Location Author's Homepage
Named Repository (arXiv, AgEcon, PhilPapers, PubMed Central, RePEc, SSRN)
Non-Commercial Institutional Repository

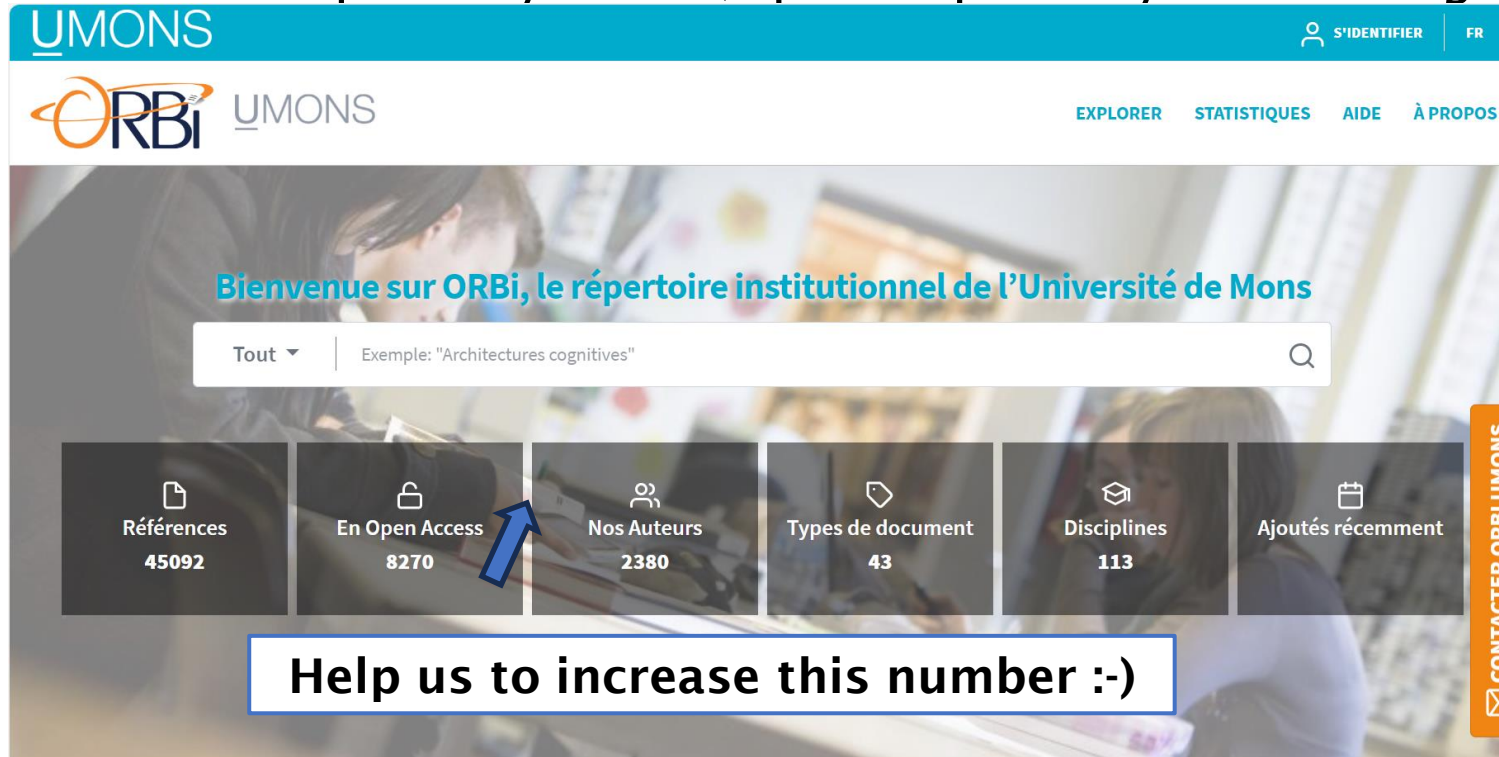
Conditions Publisher source must be acknowledged with citation
Must link to publisher version with set statement (see policy) and DOI

The accepted version (= author preprint)
can be added to ORBi

→ **Increases the visibility of your research**

Open Access @ UMONS

Institutional repository **ORBi** (Open Repository and Bibliography)



When you upload your publication in Open Access on ORBi, you follow the green road




More details here: <https://alumniumontsac.sharepoint.com/sites/DAVRE/SitePages/ORBi.aspx>


Open Access @ UMONS


Add Full-Text File


Add here only the **complete** publication described in the previous steps according to the type of document you have chosen (article, part of a book, work...).


If you wish to upload only a part of the described publication (table of contents, introduction...), please cancel and upload your file in the category "Parts of full text".

File  5.-presentation-of-datago.pdf CHANGE FILE

Version  Author postprint

Access  Author postprint


License  Author preprint


Comments  Publisher postprint


Add Full-Text File


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If you wish to upload only a part of the described publication (table of contents, introduction...), please cancel and upload your file in the category "Parts of full text".

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Version  Author preprint

Access  Open Access after embargo


Embargo Until  2025 January 1


License  - no free license -


Add Full-Text File


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
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File  5.-presentation-of-datago.pdf CHANGE FILE

Version  Author postprint

Access  Open Access

License  Open Access

Comments  Open Access after embargo

Restricted access

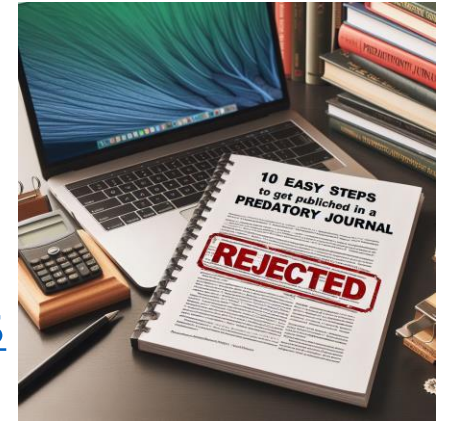
Remain restricted until embargo ends
then become open automatically!

Open Access: watch out

Predatory open access:

pseudo-journals/publishers **making profit on the backs of researchers**

- More info on: <https://scienceouverte.univ-rennes1.fr/les-revues-pedatrices>
 - List of "predatory" journals: [Beall's List – of Potential Predatory Journals and Publishers \(beallslist.net\)](http://beallslist.net)
 - Checklist (B. Pochet, ULiège): <http://infolit.be/wordpress/ressources/identifier-une-pseudo-revue>
-
- Situation is getting better thanks to global awareness so spread the word!



Open Peer Review

Open Peer Review

A broad term for adapting peer review models to the objectives of open science, including making the identities of reviewers and authors public, publishing evaluation reports, and allowing for greater participation in the peer review process.

→ Open Research Europe: <https://open-research-europe.ec.europa.eu/>

Open Peer Review



Open Data

Open Data

- Involves making research data and findings openly accessible to the global community (not only outputs, but also inputs, methods, etc.)
- Plays a vital role in open science, enhancing transparency and collaboration
- Helps the reproducibility of research, see [Belgian Reproducibility Network](#) started in 2022 and more events to come
- **As open as possible, as closed as necessary** (commercially exploit their research results, or if it is against any obligations mentioned in the Grant Agreement)

Open Data: FAIR principles

Metadata =

set of data that describes and gives information about other data

F: Findable

Data and **metadata** should be easy to find for both humans and computers. This principle emphasizes the importance of discoverability.

Key considerations:

- **Unique Identifiers:** Assign a unique and persistent identifier (such as a Digital Object Identifier - DOI) to each dataset to ensure it can be found easily.
- **Metadata Standards:** Use standardized metadata and descriptive information to make data searchable and comprehensible.
- **Searchable Repositories:** Store data in repositories or databases with robust search capabilities.

Open Data: FAIR principles

A bit of advertisement for us:

[Les Tutos de l'AVRE : Tout sur l'Open Science](#) (FR only) by Céline Thillou

Open Data: FAIR principles

F: Findable

Standardized Metadata: Use standardized metadata to describe your data.

Example:

- | | |
|---------------------------|--------------------------------|
| 1.Title | 9. Data Collection Methodology |
| 2.Description | 10.Quality Control |
| 3.Author(s) | 11.Data Usage License |
| 4.Institution | 12.Related Publications |
| 5.Date of Data Collection | 13.Citation Information |
| 6.Geographic Coverage | 14.Keywords |
| 7.Data Format | 15.Data Repository |
| 8.Data Structure | |

→ Example of standards:

- RDA standards catalog : <https://rdamsc.bath.ac.uk/>
- Human and Medical Sciences: [DDI](#)
- Astrophysics: [FITS](#)
- Geography: [ISO 19115](#)
- The standards AND the metadata generation **usually comes with the chosen directory** as an XML file (or other computing language) and looks [something like this](#)

Open Data: FAIR principles

A: Accessible

Once data is found, it should be readily accessible to users. This principle focuses on ensuring that data is available and obtainable → **data repository** (more on that later)

Key considerations:

- **Open Access:** Provide unrestricted access to data without barriers like paywalls, subscriptions, or logins.
- **Clear Licensing:** Specify the terms of use and licensing for data, allowing users to understand how they can use it.
- **Data Preservation:** Ensure data remains accessible over time, including archived versions if updates occur.

Open Data: FAIR principles

I: Interoperable

Interoperability means (meta)data can be used and integrated with other data seamlessly, regardless of the systems or tools being used.

Key considerations:

- **Data Formats:** Use standardized and widely accepted data formats to enable data exchange between systems (**ditch proprietary format like .docx, .xlsx, .opj, etc.**).
- **Language:** write in English whenever it is possible.
- **Metadata Standards:** Adhere to common metadata standards to ensure data compatibility (see Findable).
- **Application Programming Interfaces (APIs):** Provide APIs to enable software and systems to interact with the data.

Open Data: **FAIR** principles

R: Reusable

Data should be well-documented and in a format that allows it to be reused for various purposes, including validation and replication.

Key considerations:

- **Documentation:** Provide comprehensive (meta)data, data dictionaries, and context to help users understand and utilize the data effectively (and write in English when possible).
- **Data Quality:** Ensure data is of high quality, clean, and well-maintained.
- **Origin:** Track the history of data changes, transformations, and who contributed to it.
- **Licenses:** as open as possible as closed as necessary.

Open Data: FAIR principles

FAIR data are becoming a requirement for some funders (Europe HORIZON, etc.)

→ Careful planning through a ***data management plan*** → training on January 30th 2024

(contact emerance.delacenserie@umons.ac.be)

[Welcome to DMPonline.be](https://www.dmponline.be)





















Open Data: a word about licenses

Creative Commons in a Nutshell!

MOST FREE



LEAST FREE

 PUBLIC DOMAIN		Can someone use it commercially?	Can someone create new versions of it?
 	Attribution BY	YES	YES
  	Share Alike BY SA	YES	YES with same license
  	No Derivatives BY ND	YES	NO
  	Non-Commercial BY NC	NO	YES under any NC license
   	Non-Commercial Share Alike BY NC SA	NO	YES with same license
   	Non-Commercial No Derivatives BY NC ND	NO	NO

Guide for licenses :

[SPDX](#)

Typical licenses for open datasets:

- [CC0 Public Domain Dedication](#)
- Open Database License (ODbL)
- Open Licence Etalab
- Open Data Commons Public Domain Dedication and License ([PDDL](#))
- Open Data Commons Attribution License ([ODC-By](#))

Need help?

Contact avre@umons.ac.be

Open Data: how to choose a data repository?

A trusted digital repository provides reliable long-term access to managed digital resources to its designated community, now and in the future!

Only completed datasets with the purpose to publish, share and/or preserve them should be uploaded (**not all research data**).

- Dataverse: the future on-going data repository of UMONS
- Zenodo: <http://zenodo.org>
- SODHA: <https://www.sodha.be/> (the federal Belgian data archive for social sciences and the digital humanities)

Open Data: personal data and General Data Protection Regulation

The only situation in which the **GDPR** directly affects Open Data is when Open Data includes **personal data**.

According to the GDPR, European citizens must give their clear and explicit consent to the processing of their data. Therefore, **no personal data can be published for reuse without the consent of the party concerned**.

There are some exceptions, when personal data may be published:

- If there are legitimate reasons to publish the data. For example, in the case of a court decision. This rule restricts privacy rights in general.
- When the data has been anonymized (removal of any personally identifiable information from data).

>Webinar from the Data Ambassadors (FR) about anonymization [available upon request to me](#)<

Resources from the Data Ambassadors Network

- The [Data Ambassadors Network](#): share tips and tricks about data management through (online) events
- UMONS Ambassadors are here to guide and help you:

WISEUR	Robert	Business and Economics	Robert.VISEUR@umons.ac.be
GALLAS	Mohamed-Anis	Architecture	Mohamed-Anis.GALLAS@umons.ac.be
COPPEE	Frédérique	Medicine	Frederique.COPPEE@umons.ac.be
GROSJEAN	Philippe	Sciences	Philippe.GROSJEAN@umons.ac.be
DUPONT	Nicolas	Applied Sciences	Nicolas.DUPONT@umons.ac.be
MEYERS	Charlène	Languages	Charlene.MEYERS@umons.ac.be
RIVIERE LORPHEVRE	Edouard	Applied Sciences	Edouard.RIVIERELORPHEVRE@umons.ac.be
SIMOEES LOUREIRO	Isabelle	Psychology	Isabelle.SIMOEESLOUREIRO@umons.ac.be

- Webinars available in French (on demand):
 - [Anonymization, good and bad techniques](#)
 - [Open source, open data, same fight?](#)
 - [Social network data](#)
 - [Archiving data](#)

Open Source

Open Source: quick history

1998: Beginning of a free software movement

1998: Creation of the Open Source Initiative

FOSS = Free Open Source Software

2010: Obligation in France to use FOSS in public administrations (including state universities)

2012: In Wallonia, Minister P. Furlan similarly proposes to municipalities to use free solutions, but no obligation (and neither in Flanders, nor in Brussels nor at federal level)

Around 2015: for research projects Walloon Region or FRS-FNRS, justification on the choice of proprietary solutions as opposed to free solutions

Open Source: philosophy and principles

- **Free usage and redistribution:** liberty to use, distribute, share without monetary constraints
- **Access to source code:** anyone can access, examine, modify the code → transparency
- **Ability to modify and customize:** innovation, evolution of the software
- **Encourage collaboration**

Open Source: license

Open Source license: What remains of the license after use or modification?

→ **Copyleft:** method for making a software program free, while requiring that all modified and extended versions of the program also be free, and released under the same terms and conditions

- *Strong copyleft:* redistribution of modified or unmodified software and all associated components can only be done under the original license.
- *Standard copyleft:* redistribution of modified or unmodified software is done under the initial license but that additions of features and code can be done under other licenses or even under a proprietary license

Open Source: license

- [Apache License 2.0](#)
- [BSD 3-Clause "New" or "Revised" license](#)
- [BSD 2-Clause "Simplified" or "FreeBSD" license](#)
- [GNU General Public License \(GPL\)](#)
- [GNU Library or "Lesser" General Public License \(LGPL\)](#)
- [MIT license](#)
- [Mozilla Public License 2.0](#)
- [Common Development and Distribution License](#)
- [Eclipse Public License version 2.0](#)
- [GNU Affero General Public License \(AGPL\)](#)

WHAT EXACTLY DOES EACH LICENSE ALLOW?				
A comparison of the main open licenses:	FOSS			PD
	GPL2 GPL3	LGPL 2.1/3 MPL	BSD 2/3 MIT/X11	Dominio Público
 Disclaimer of liability	●	●	●	●
 Download and evaluation	●	●	●	●
 Use on open source software	●	●	●	●
 Use on commercial software	●	●	●	●
 Distribution of derived works without disclosing modifications	●	●	●	●
 Anyone can re-license on any terms	●	●	●	●
 Including source code	●	●	●	●

Need help?
Contact avre@umons.ac.be

Open Source: how and where to contribute?

Reminder: open source = collaboration

Typical places to collaborate on code: [GitHub](#), [GitLab](#), and [Bitbucket](#)

You can contribute by:

- fixing a bug
- improving documentation
- adding a new feature

After making your contribution, you'll need to submit it for review, usually through a pull request

After you submit your contribution, you'll likely receive feedback from other project members

Be open to this feedback and make any necessary changes!

Europe really wants science to open!

Changing the way researchers are evaluated

Hong Kong Principles:

Principle 1: Evaluate researchers on responsible research practices (research integrity and ethical conduct)

Principle 2: Value accurate and transparent reporting of all research, *regardless of the results*

Principle 3: Valuing open science practices (open research) – including the openness of methods, materials and data

Principle 4: valuing a wide range of research and studies, such as replication of key results, innovation, translation, synthesis and meta-analysis, *not just traditional publications*

Principle 5: Valuing other contributions to research and scientific activity, such as peer review of publications and projects, mentoring, outreach and knowledge exchange

Q&A

If I was not able to answer your question,
please fill in this [Microsoft Forms for Q&A](#)
and I will contact you later



Thank you for
your attention

Credits to [Céline Thillou](#) & [Judith Biernaux](#)



Additional resources

- <https://www.budapestopenaccessinitiative.org/read> : Budapest Declaration on Open Access
- Some examples of OER: - <http://www.podcasts.ox.ac.uk/open> , www.oercommons.org, www.khanacademy.org
- <https://www.openaire.eu/> : European Commission Open Science Resources
- <https://ec.europa.eu/digital-single-market/en/citizen-science> : more info about Citizen Science
- <https://eosc-portal.eu/belgium> : Open Science portal of Belgium
- [os-primers \(openaire.eu\)](#)
- [guides \(openaire.eu\)](#)
- [factsheets \(openaire.eu\)](#)