

10
questions
about
↓

Open Science



Recognized for « HR excellence in Research » by the European Commission since 2011, the University of Liège is an institutional leader at the implementation and integration of the European Charter & Code for Researchers and actively contributes to the advancement of research excellence within Europe.

In addition to fostering a welcoming environment, ULiège seeks to concretely improve the working conditions for researchers focusing on open and transparent recruitment, equity, diversity and inclusion and personal and professional development.

Designed to equip researchers – regardless of whether they are starting their career or are more advanced – with the necessary skills to succeed in their careers, these guides explore key themes such as ethics and scientific integrity, research funding and grants, first steps in the research environment, leadership, Open Science, gender and diversity, etc.

To learn more about the implementation of the European Charter & Code for Researchers:
<http://recherche.uliege.be/hrs4r>



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**Open
Science**

The future of science is open



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Considering the major issues facing the world today – climate change, ethics, energy, healthcare... – is it acceptable that the progress of science is being hindered by financial barriers limiting the access to knowledge? Is it admissible that publicly funded scientific data is not available to the general public? Sequestering knowledge to maximize profits is unacceptable.





The future of science requires open access for all. This is imperative for several reasons: to accelerate the circulation of information; to allow all researchers access to data regardless of their financial means; to give companies access to technological solutions which could improve the global quality of life; and to allow every citizen the opportunity to broaden their horizons, their scope of knowledge and beliefs. Open Science isn't simply for the research community, it is also a democratic concern.

This is not a superficial change, but rather a radical, structural culture shift! A shift such as this will obviously take time. It seeks to overcome long standing traditions, rooted in practices which profit a select few.

The impact factor of prestigious journals, the superiority of "so called good editors", a resistance to change, an evaluation process which reduces an author's merit... All these ways of operating (modus operandi) are finally coming to an end. This archaic model can no longer survive increasing pressures calling for openness, transparency and efficiency at all levels of operation – both top down and bottom up (EU funders and political parties). In 5-10 years, Open Science will no longer be the exception, but the new norm.

It is to this new norm that all are invited to invest – new PhD-candidates, recognized researchers or reviewers – by looking for new information and through regular interactions. How can I, in my role, increase access to knowledge for the greater good? What role can I play in making it a public good from which all can benefit?

It is these questions, among others, that this brochure will seek to address. The real response will come in the ways that each reader applies their learning and knowledge within the scientific community.

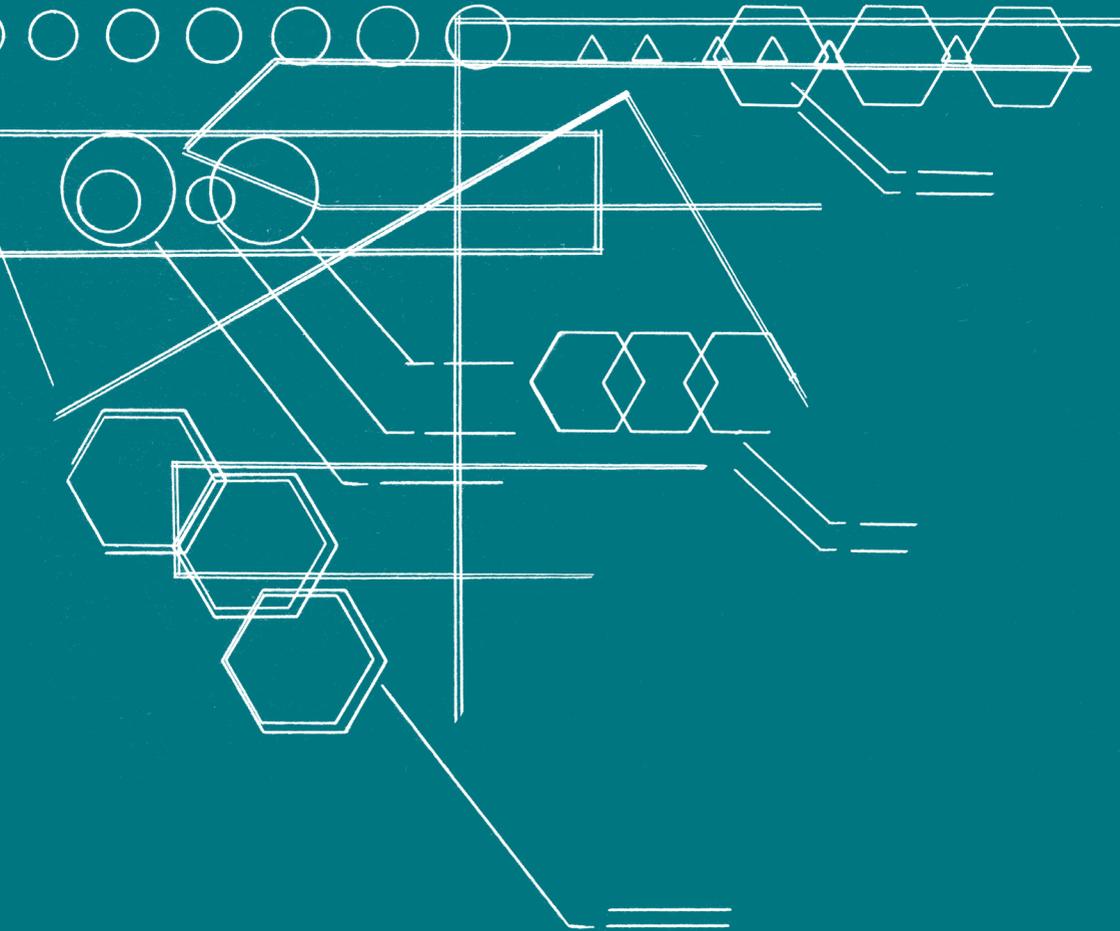
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Paul THIRION
ULiège Library Director

The future of science is open

Summary



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Open Science, Open Access, Open Data...

What exactly is it?

1. https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy_en

Open Science is one of the three main goals outlined by the European Commission's 2015 Research & Innovation policy. This approach to research places priority on the immediate distribution of knowledge using digital and collaborative technology without waiting until the final results are published. Participation in Open Science is removing barriers, allowing for a collaborative and global process where each person can positively contribute to sharing data and knowledge to ameliorate the research available.

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Open Science encompasses all aspects of research, notably:

- Open Access which consists of scientific literature,
- Open Data which consists of raw research data,
- Open Source which consists of source codes for software development,
- Open Educational Resources which consist of educational and course materials.

Open Science also offers the opportunity for peer reviewing which differs from the traditional model by publishing the reviewer's name and report.

« Open », « Free », « Open Access », what is the difference?

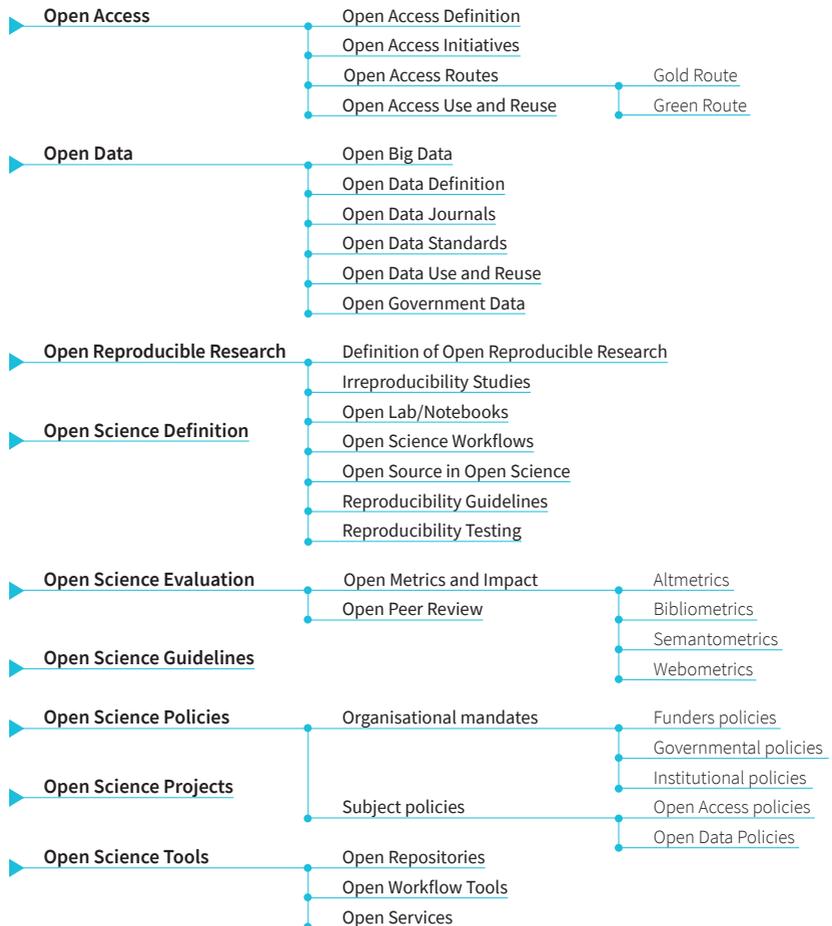
The slight nuances reflected in the terminology used distinguishes the realities that each reflect:

« Open »: published under an « open » license which allows the work to be used without the permission of the author.

« Free »: freely available for everyone, without legal, technical or financial restrictions. However, it is not always available with an open license and consequently is not immediately reusable.

What falls into the category of Open Science?

Open Science



Why « open » science?



Open Science allows people around the world to benefit from research opportunities and scientific progress, regardless of background.

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- **Open Science is more efficient.** Research is published at every stage of the process (including the negative results) which allows for new research to be conducted on the basis of what has already been done, without starting from zero.

- **Open Science improves the quality and integrity of scientific research.** Increased readership facilitates the identification of plagiarism and errors; therefore using natural societal controls to self-regulate the scientific data.

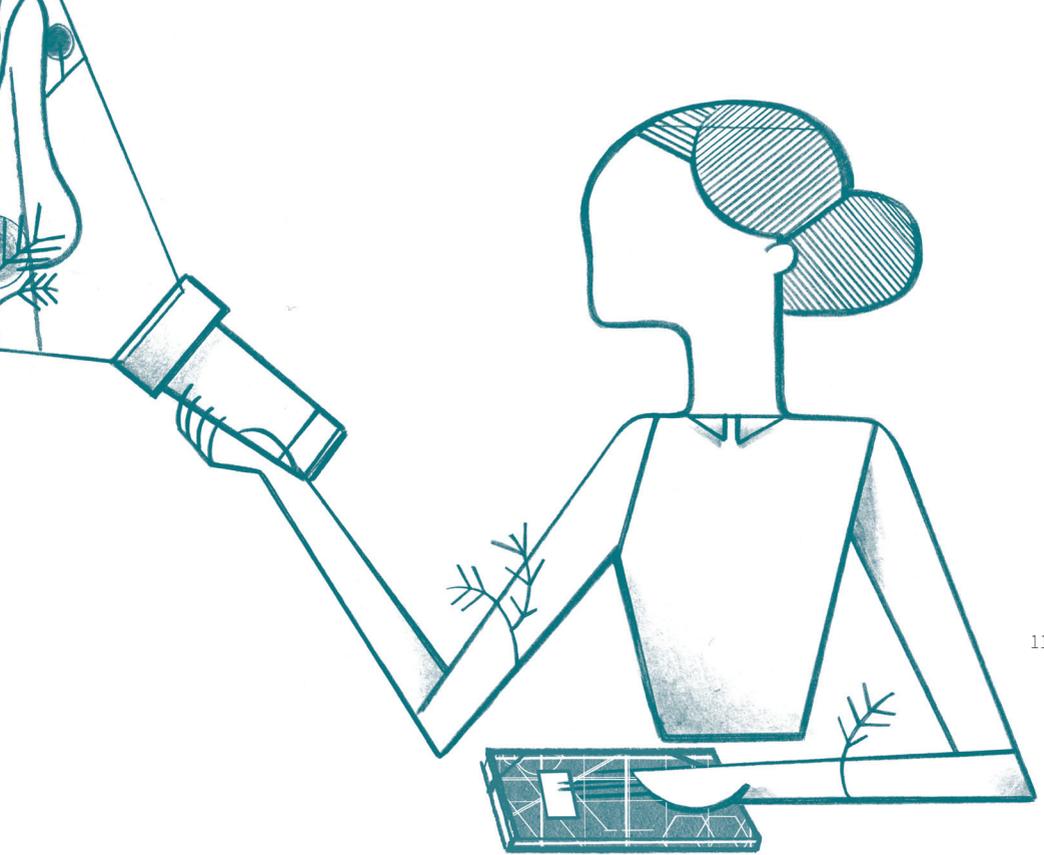
- **Open Science increases readership offering people access to research,** regardless of where they live, their financial means or those of their institution's, ensuring the free flow of information and knowledge.

- **Open Science accelerates the communication and sharing of data** and knowledge among researchers throughout the world, therefore allowing it to evolve in a more rapid, coordinated and collaborative manner.

- **Open Science opens minds worldwide,** offering high quality scientific information, avoiding regression or extremism.

- **Open Science allows everyone the opportunity to experience scientific research** and explore the data at all stages of the research process (data collection, collaborative experiments...).

- **Open Science allows researchers at all institutions access to share and enhance information,** regardless of their institution's ranking or finances.



Will Open Science devalue my research on the market?

Absolutely not! Once research results have been obtained, there are two possible next steps:

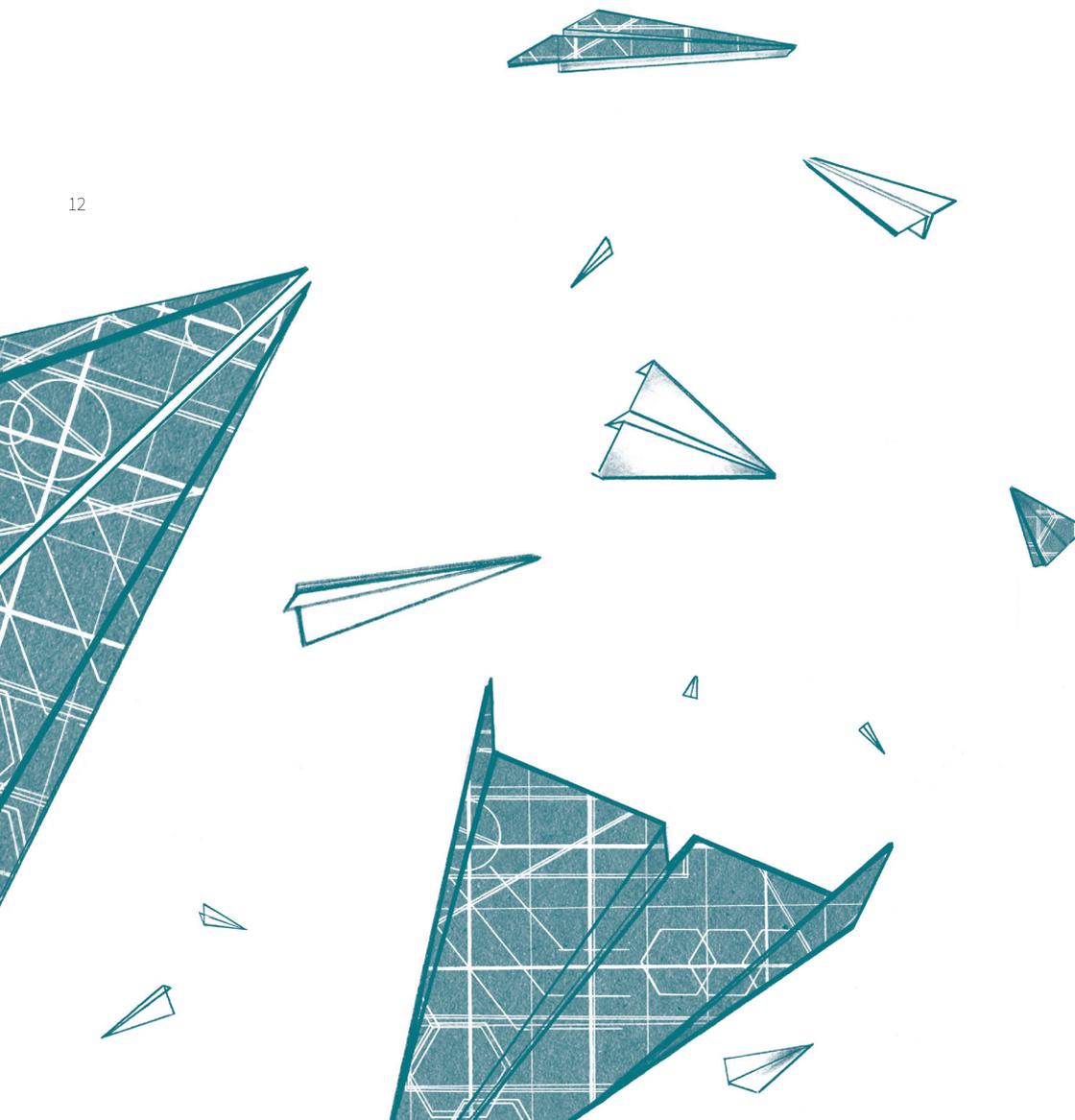
- A patent valuation can be obtained, at which point the research cannot be published.

- The research can be published, making it public, at which point a patent cannot be obtained.

The decision of publishing research on Open Access does not impact its value on the market.

Why should researchers engage with Open Science?

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→ Higher visibility rates

Open Data, Open Access, Open Source Open Science increases the visibility of your research. Nowadays, 99,5 % of the world's population doesn't have access to publicly funded research.

→ Networking

Through increased communication and information sharing, global scientific connections are made, benefiting all who participate.

→ Authorship

By making the publication available on Open Science the author of the research is more easily and rapidly determined.

→ Plagiarism detection

By making results more accessible, plagiarism cases can more rapidly be identified. Anti-plagiarism software can be used, an option which is more difficult with paid publication sites.

→ Other stakeholders

Universities and financial organizations

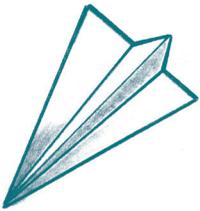
- Strategic decisions made on the basis of better information
- Higher financial impact
- Higher and more efficient cost-effectiveness

Public Audience

- Improved understanding and level of education
- Opportunity to participate

Government

- Strategic decisions made on the basis of better information



What impact will Open Science have on a researcher's assessment?

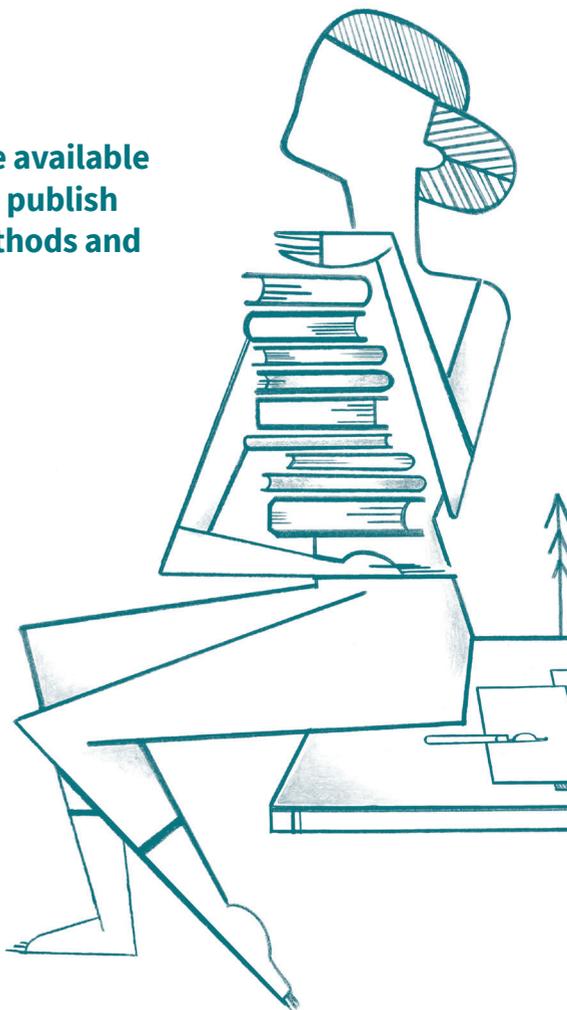
New evaluation methods are available when Open Access is used to publish research, data, research methods and publications.

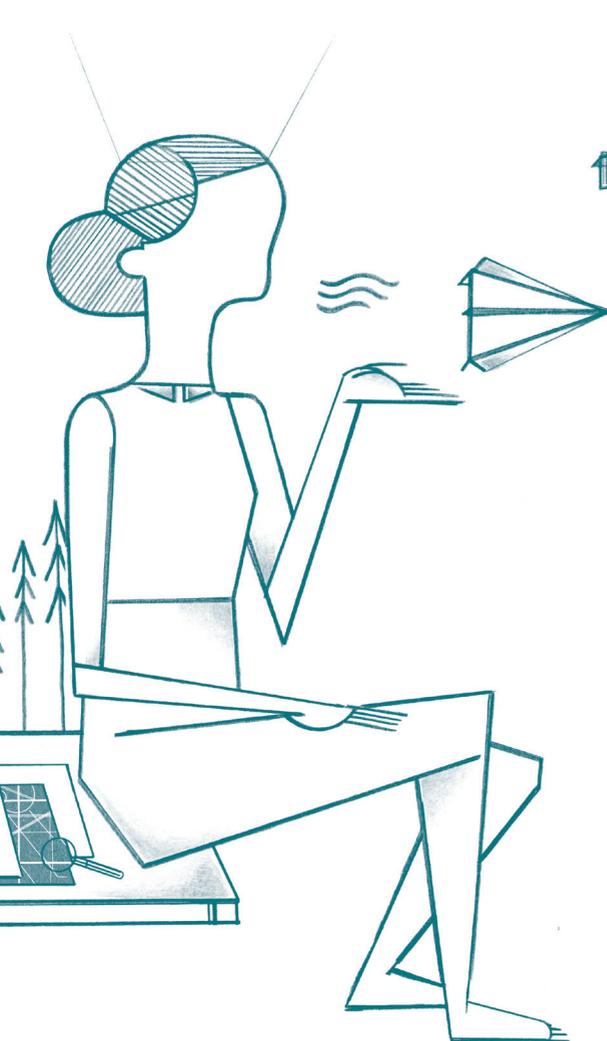
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These indicators aim to measure the use of the online publications by the scientific community and in turn their global impact. They can also extend to other kinds of publications, in addition to journals.

These new evaluation methods allows for new indicators to be identified, including the use of statistical information, next-generation metrics, etc.

Access to scientific publications increases the opportunity to evaluate the quality of the results in addition to the quantitative aspects (number of publications, impact factors, etc.).





Open Peer reviewing ?

To ensure the quality of a scientific article, to ensure the quality of a scientific article, Open Peer reviewing aims to make the peer review process more transparent. The names of the experts who reviewed the article and their evaluators are publicly known.

The removal of the anonymity limits the risk of positive or negative evaluation which is motivated by elements other than the intrinsic quality of the work.

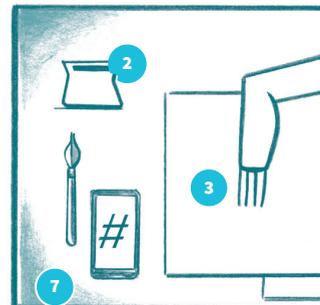
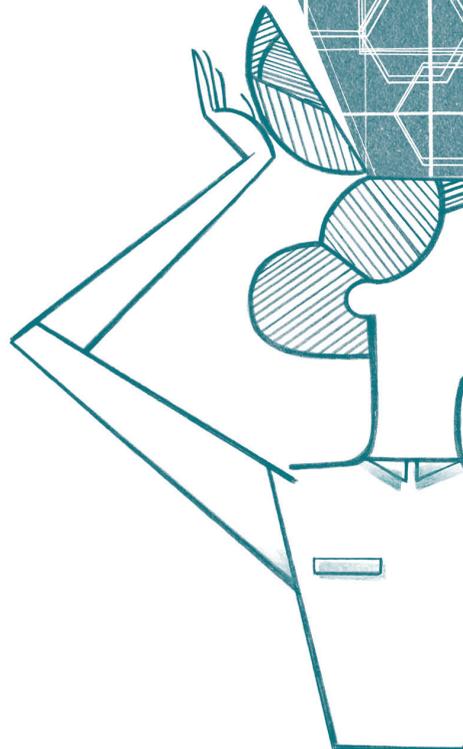
How to create an Open Culture and promote Open Science?

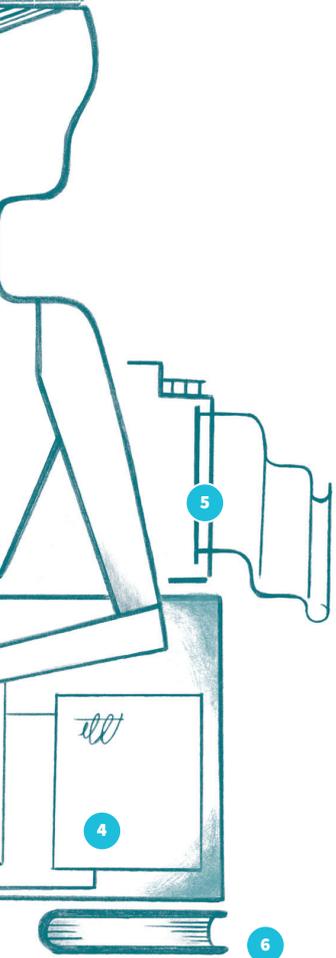
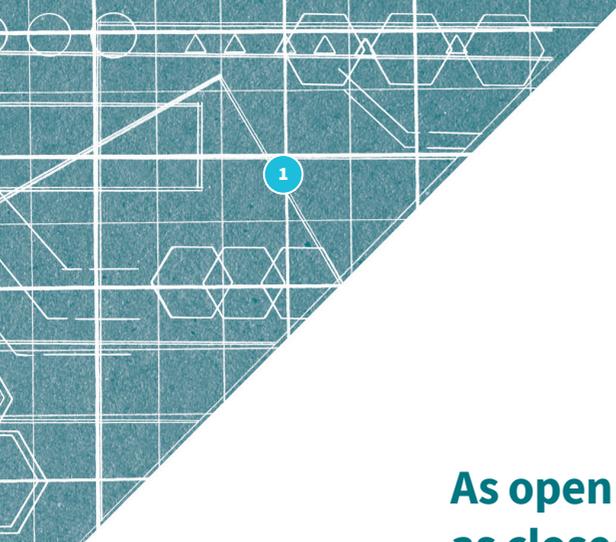
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A few tips for success:

- 1 Prepare a clear data management plan that you can refer to during and after the completion of your project.
- 2 Use free software for data collection and processing as well as for your office tools - (word processing, presentation software, etc).
- 3 Publish in quality Open Access journals. Ensure that they do not charge fees (APC) or that they are reasonably priced (approximately 500 euros). A list of reputable Open Access journals can be found in the Directory of Open Access Journals (doaj.org).
- 4 Publish your raw data using Open Access. Upload your data into a recognized archive, a thematic repository or another public repository such as zenodo.org, Open Science Framework (osf.io), figshare.com or b2share.eudat.eu

2. Article
Processing Charge





As open as possible, as closed as necessary

5 Upload all approved Open Access research on to the institutional server (ORBi) as soon as possible. With the passing of a new Belgian copyright law, this is now mandatory for all accepted scientific journals and articles written by members of the Federation Wallonia-Brussels. More details on this can be found on pages 20-21.

3. At the ULiège, deposit on ORBi is required since 2007.

6 Use free educational resources and freely share yours with others through institutional networks and open archives.

7 Stay up to date with information by reading relevant websites and by connecting with resource persons within your university. Participate in the Open Science movement: talk about it with colleagues and identify yourself as part of the community.

What are the implications of the Open Access decree in the Federation Wallonia-Brussels?

On May 2, 2018 the Parliament of the Federation Wallonia-Brussels adopted an Open Access decree aimed at establishing a policy of Open Access for all scientific publications. This was an important step forward for the Open Access landscape in French-speaking Belgium. It reinforced the policy put in place by the University of Liège in 2007.

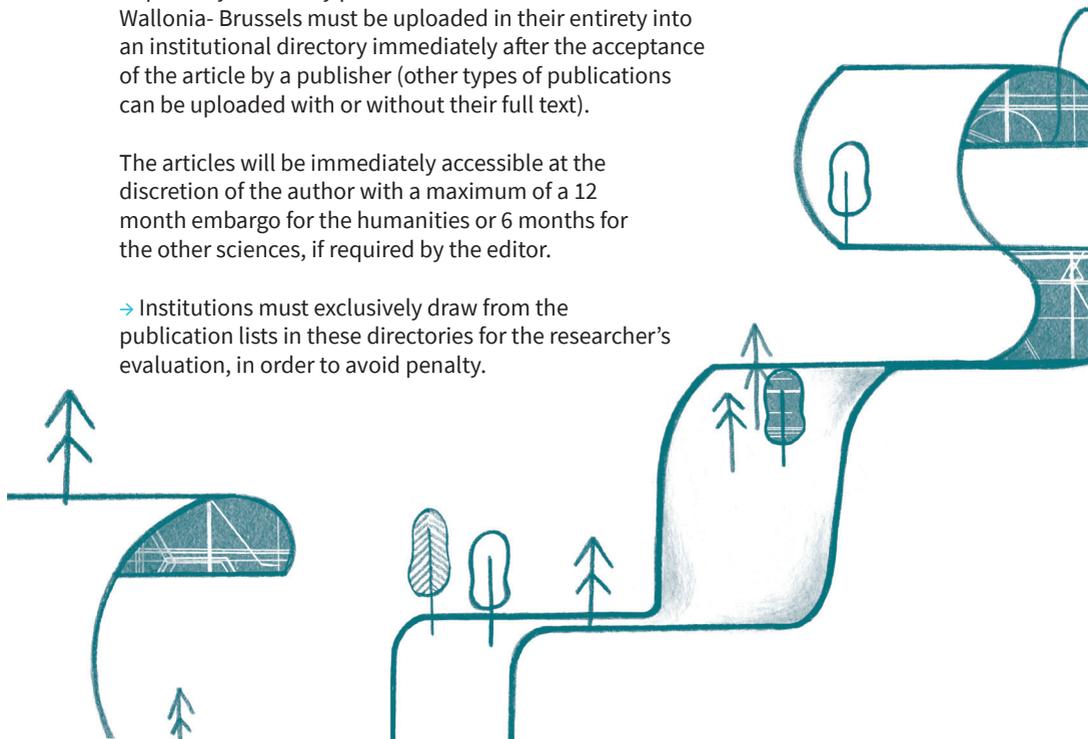
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This decree stipulates that:

→ All articles resulting from scientific research which is fully or partially funded by public funds from the Federation Wallonia- Brussels must be uploaded in their entirety into an institutional directory immediately after the acceptance of the article by a publisher (other types of publications can be uploaded with or without their full text).

The articles will be immediately accessible at the discretion of the author with a maximum of a 12 month embargo for the humanities or 6 months for the other sciences, if required by the editor.

→ Institutions must exclusively draw from the publication lists in these directories for the researcher's evaluation, in order to avoid penalty.





What about the federal requirements?

Thanks to an amendment to the Belgian Copyright Law which came into effect on September 5, 2018 (in the *Moniteur Belge*), the author retains the right to make scientific articles available in Open Access, regardless of the terms of their contract with a publisher.

- The article may be disseminated in Open Access even if the author has assigned their rights to a publisher.
- The maximum embargo period after the first publication is 12 months for the humanities and 6 months for the other sciences. A shorter time frame may be allowed by the publisher.

→ The published article must be the result of research that receives at least 50% from public funds.

→ This mandatory right applies equally to all articles published before the law was put into place.

The federal law is in line with the Federation Wallonia-Brussels decree.

Changes to the Belgian Copyright Law:
→ [moniteur Belge/Het Belgisch Staatsblad, 2018-09-05., p. 68691, Art. 29](#)

Federation Wallonia-Brussels Decree
→ <http://www.pfwb.be/le-travail-du-parlement/doc-et-pub/documents-parlementaires-et-decrets/documents/001597235>

What is the quality of Open Access publications?

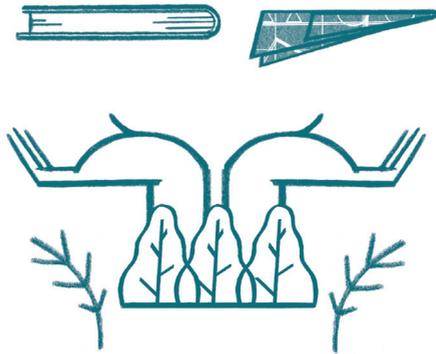
The validity of the scientific work is independent from the medium used for publication. Documents published by a traditional publishing house and by Open Access through an institutional repository, are on all accounts, the same quality of research.

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Documents that are published in true Open Access publications have the same criteria of editorial rigor and scientific integrity as a traditional editions. Open Access also contributes to making these kinds of editorial procedures more transparent.

There are also « hybrid » magazines published by commercial publishers (Elsevier, Wiley, Springer, etc.). They take advantage of the Open Access system to charge authors exorbitant fees for licensing agreements with « open choice » solutions that are anything but « open »! The APCs (Article Processing Charges) can range from \$500-\$5000. The 'hybrid' journal system is really only advantageous for the publishing house because institutions actually pay twice with fees for the magazine subscription which are not granted a discount and additional fees for each article.

Be prudent when contacting a publisher!



Unfortunately, Open Access has given way to the emergence of so-called «scientific journals» on the market. The pseudo publishers of these journals do not care about integrity or scientific quality. They are simply trying to take advantage of the ‘author-payer’ model to reap profits. Authors who succumb to these options put their own scientific credibility at stake. There are several tools available to identify these ‘predatory publishers’.

Exert a critical eye when searching for publishers and reach out to your institutional library when in doubt!

**A few links to stay
on track:**

Identify a so-called scientific journal in 4 steps
→ infolit.be/wordpress/ressources/identifier-une-pseudo-revue

Think-Check-Submit : Choose the right journal for your research
→ thinkchecksubmit.org/

Directory of Open Access journals
→ doaj.org

Andy Nobes. A beginner’s guide to avoiding ‘predatory’ journals
(using your critical thinking skills)
→ authoraid.info/en/news/details/1310/

What are the benefits of uploading my publications in an institutional repository?

Benefits of Open Access

- **Increased readership**, increased peer recognition and a larger impact of your ideas and research.
- **Easier and more rapid communication** between peers and increased networking opportunities to share expertise, contribute to public debate, etc.
- **Increased promotion of scientific production** with greater accessibility to not only researchers, but the general public, journalists and small start-ups, etc.
- **Increased prestige of the institution** and the influence of its researchers.
- **Active participation** in the Open Access movement and adherence to its philosophy. Publicly funded research should be available to the public.

Benefits of Institutional repositories

- You remain in **control of your digital identity** by managing your own publications online.
 - You **respect the legislation**.
 - Your publications are **stored in a reliable and more permanent manner**.
 - Once your publications are submitted, you can easily **access your reference list** (i.e. to generate your CV, etc.)
 - The **visibility of your research increases** as your findings are automatically made visible in catalogues, specialized search engines and databases.
- Your research becomes more accessible via general and specialized search engines such as Open Access resources ; European platforms such as Open AIRE, library catalogues and online tools or social networks.**

Specialized research engines

(Google scholar,
Microsoft Academic...)

Search Engines
(Google, Baidu, Bing...)

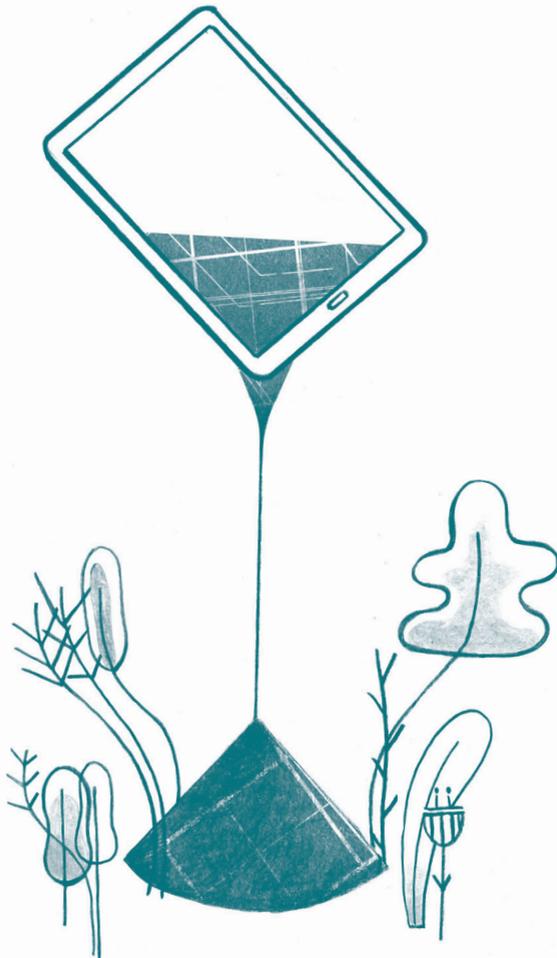
Social Media
(Twitter, LinkedIn,
Facebook...)



Harvesters
(PubMed, Base...)

Discovery tools
(PubMed, BASE,
OpenAire, PhilPapers,
Isidore, Core...)

ResearchGate, Academia.edu, ArXiv, Institutional Repositories... Which one is best?



Academic social networks like ResearchGate or Academia.edu are popular within the research community.

But be careful! Unlike institutional repositories, these are for-profit companies:

- They are only accessible via closed websites, which require registration.
- Their viability is not guaranteed as these companies can go bankrupt overnight, be sold from one day to the next or change their business model.
- They may distribute aggregate data without permission. Several have already been required by editors to retract massive amounts of online content.
- Their ethical practices may be questioned when interacting with Open Access.

These online networks are not a substitute for the institutional repository ORBi or open archives such as ArXiv.org. Should these networks be completely avoided? Of course not. Submit the full text of your publications on ORBi and on the other networks and then post only the references with a link to ORBi.

How to manage Open Data?



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Ensuring proper dissemination of your research data is now part of your responsibility as a researcher.



Your research can be submitted on the project website or on a research data site such as zenodo.org, Open Science Framework (osf.io), figshare.com, b2shjare.eudat.eu. Give preference to non-commercial sites as opposed to private sites (online publishers...) which will always seek to benefit directly or indirectly from you.

When making your data public, be sure to:

- Provide the most complete metadata possible.
- Respect the code of ethics on the disclosure of data (anonymity, etc.).
- Provide clearly documented and complete code, along with access to the methods and protocols used (see the criteria established by the Open Source Initiative opensource.org).
- Register the data under an open license which allows other researchers to use it.



Why produce a *data management plan (DMP)*?

A data management plan (DMP) is a best practice document that should accompany your research project. The first draft, written at the beginning of a project, should define what will be done with the data. The next stages of data analysis, assessment and management are defined by their attributes, composition, legal context, etc. It is important to keep this document up to date as the research evolves.

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This document is not mandatory but it is highly recommended and more and more is required by funders, including more recently:

In accordance with the research funding agencies' requirements, the Belgian universities agreed on a tool to help with the creation of DMPs.
→ dmponline.be/

→ The European Commission who proposes that data be shared in a 'FAIR' way (Findable, Accessible, Interoperable & Reusable)

→ The Wellcome Trust in the United Kingdom



It is likely that in the foreseeable future, other funders will require a data management plan for all research projects in which they invest.

Links

H2020 Programme. Guidelines on FAIR Data Management in Horizon 2020.
→ ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

Video : The what, why and how of data management planning
→ youtube.com/watch?v=gYDb-GP1CA4

The DCC Digital Curation Center provides advice and practical help to research organisations willing to store, manage, protect and share digital research data.
→ www.dcc.ac.uk

Re3data - Repository.... of the data repositories, with detailed references and descriptions of useful characteristics to identify the appropriate repository regarding the field, the type of data...
→ www.re3data.org

A few more Open Science myths

If I publish my research in Open Access, I will lose the rights to my copyright.

FALSE. Open Access distribution does not prohibit an author to possess the copyrights or to financially profit from their work. By signing a CTA (Copyright Transfer Agreement), the author's rights are signed over to the publisher.

However, thanks to recent modifications to the Belgian Copyright Law, even in this case, the author retains the right to publish their research in an institutional repository.

Open Access is expensive!

FALSE. Only 30% of journals published in Open Access require a financial contribution by the authors (APC).

The fee can be moderate (a few hundred euros) or excessive, especially among the big publishing houses. The hybrid model is the most expensive model (up to \$6000 per article). With this model, commercial publishers require authors to pay APCs (Article Processing Charges) for the rights to publish in Open Access (a right that was freely given to the publishers by the authors!) while at the same time, charging readers for a journal subscription.

This model should be avoided as much as possible and preference given to authentic Open Access journals, such as those found on the doaj.org website.

Open Access publications aren't always high quality!

FALSE. The peer reviewing process used in Open Access is identical to those used in traditional publication models.

There are of course, predatory journals which imitate real journals without ensuring authentic peer reviewing practices. It is important to be thorough when selecting a publisher for your research.

Scientific data is only for the academic community; the general public doesn't need to have access to it!

FALSE. Science and knowledge should be at the disposition of society. It is a public good and its development has been financed by society itself.

Access to knowledge is a critical factor in education and society's advancement; and serves as a foundation for a more collaborative, open and forward-thinking society.

There is no benefit in publishing research if it doesn't have significant results.

FALSE. Publishing negative research results has several advantages: it allows other researchers to unnecessarily reproduce unsuccessful results; it allows them to analyse the methods used, make modifications and avoid similar failures.

No one is interested in research that has already been done!

FALSE. Experience tells us that on the contrary, older publications gained new relevance and interest when published in Open Access.

Publishing my data will allow other researchers to benefit from my findings and publish them before I do.

FALSE. On one hand, you can always set an embargo period on your data, allowing enough time to finalize your research. On the other hand, the publication date officially marks your anteriority. Additionally, the more data is published in Open Access, the more reciprocity and collaboration is fostered, allowing for the research to accelerate on a global scale for all stakeholders.

Publishing my data may be unethical if it contains personal data relating to individuals.

FALSE. It's naturally important to ensure that all privacy data laws (RGPD-GDPR) are upheld before publishing any data online.

It is counterproductive to distribute research on an institutional repository if they are already available on a publisher's website.

FALSE. Only those who have a journal subscription with the publisher benefit from this access. This corresponds to a small percentage of the world's population, including few researchers due to the high costs of subscriptions.

Access to publications via an institutional repository such as ORBi is an optional outlet in addition to the publisher's sites. This is a useful tool for researchers especially when considering an institutional repository such as ORBi consists of about 10,000 downloads per day of ULIège publications.

Useful links and contact

Reference Sites

General Information

- ULiège Library
→ lib.uliege.be
- Open Access Belgium
Promoting Open Science
→ openaccess.be/
- Open Knowledge Belgium
→ be.okfn.org/
- Ouvrir la Science managed by the «
Comité pour la science ouverte (CoSo)
– France»:
→ ouvrirlascience.fr/
- Foster Open Science
→ fosteropenscience.eu/
- Open Source Initiative
→ opensource.org
- Mantra - Research Data
Management Training
→ mantra.edina.ac.uk/
- SPARC - Scholarly Publishing and
Academic Resources Coalition
→ be.okfn.org/open-data-in-belgium/
- Creative Commons
→ creativecommons.org/

Book

- «Science Ouverte, le défi de la trans-
parence» par B. Rentier (2018)
→ hdl.handle.net/2268/230014
(only available in French)

Videos

- Pour vous, l'Open Access c'est quoi ?
→ youtube.com/watch?v=DimDThNcsH4
- Open access explained
→ <https://youtu.be/L5rVH1KGBCY>
- Privés de savoir ?
(#DATAGUEULE 63)
→ youtu.be/WnxqoP-c0ZE
(only available in French)

Belgian Laws

- FAQ: Regulation of the F.R.S.-FNRS on
Open Access
→ http://fnrs.be/docs/Reglement_OPEN_ACCESS_FR.pdf
- Decree open access of the Federation
Wallonie-Brussels
→ www.pfwb.be/le-travail-du-parlement/doc-et-pub/documents-parlementaires-et-decrets/documents/001591649
- Modifications of the Belgian law on
copywriting. *Le Moniteur Belge /Het
Belgisch Staatsblad*
→ <https://lib.uliege.be/fr/news/la-loi-belge-sur-le-droit-d-auteur-modifiee-en-faveur-de-l-acces-ouvert-aux-articles>

Resource Personnel at the University of Liège

Support, advices, information and training

The ULiège Library puts several tools at your disposal to assist you with the publication and distribution of your research.

Consult lib.uliege.be to find tutorials, videos and information or contact the ORBi team or reference library directly.



→ lib.uliege.be
→ bib.direction@uliege.be
→ [@ULiegeLib](https://twitter.com/ULiegeLib)

→ orbi.uliege.be



→ popups.uliege.be



→ donum.uliege.be



→ matheo.uliege.be



Judicial Questions

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Department of Judicial Affairs ULiège
→ uliege.be/cms/c_9113381/fr/service-des-affaires-juridiques-equipe

Data Protection Officer
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Quartier Village 3,
Boulevard de Colonster 2,
4000 Liège, Belgique.

Open Data Data Management Plan

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