



# **OPEN SCIENCE**

Roadmap

2023-2028

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Since its beginnings in the early 2000s, the **Open Science** movement has undergone major developments. Today, it is part of a global evolution in society, marked by the digital transition, the need for joint responses to major societal challenges and the desire for transparency in the sharing of scientific research results.

The number of initiatives aimed at structuring or encouraging Open Science approaches is increasing, whether at the level of public authorities, research supervisory bodies or scientific institutions themselves, for example the European Union, with its framework programmes and its EOSC initiative, or more recently UNESCO. Whatever the name given to these initiatives - policy, roadmap, recommendations<sup>1</sup>, agenda<sup>2</sup> - they share fundamental principles whose benefits, whether for scientists or for citizens, have been widely discussed and are now well documented.

These recurring principles include the following:

- Open Science can only be relevant if it complies with the recommendation of being "*as open as possible, as closed as necessary*", i.e., it cannot be achieved without taking account of the fundamental principles of ethics, integrity, respect for personal data and consideration of the potential economic value of the results;
- FAIR management of research, and more specifically of data, has established itself as a standard for the openness of science<sup>3</sup>; the FAIR principles define the practical way of making scientific data Easy to Find, Accessible, Interoperable and Reusable.

**The University of Liège** has played a decisive and structuring role in this movement for a very long time. It is recognised as a benchmark at international level, thanks, in particular, to both ORBi and its strong institutional policy which have served as a model for many institutions around the world. In recent years, it has extended its activities by developing specific tools dedicated to Open Education and Open Electronic Publishing, for example. Finally, in many scientific disciplines, its researchers are involved in concrete actions relating to the sharing of research data, the creation and management of open source software and the implementation of Citizen Science projects.

As a public institution that has long been concerned about the quality of its research, and one which is strongly attached to its values in the service of the common good, the University of Liège intends to consolidate its commitment to Open Science by defining an ambitious roadmap. Structured around a series of actions, organised according to the different strands of Open Science, it aims to affirm the University's commitment in these areas and help its researchers to position themselves in the international context, by providing them with the necessary tools and support.

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<sup>1</sup> See <https://unesdoc.unesco.org/ark:/48223/pf0000383328.locale=fr>

<sup>2</sup> See [https://www.eua.eu/resources/publications/1003:the-eua-open-science-agenda-2025.html?utm\\_source=linkedin&utm\\_medium=social&utm\\_campaign=03-02-2022](https://www.eua.eu/resources/publications/1003:the-eua-open-science-agenda-2025.html?utm_source=linkedin&utm_medium=social&utm_campaign=03-02-2022)

<sup>3</sup> Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, 3, 160018. <https://doi.org/10.1038/sdata.2016.18>

## A. Supporting Researchers in Developing an Open Science Culture

While international and/or local Open Science policies generate opportunities for researchers, through the proliferation of initiatives developed specifically for these practices, they also generate expectations, insofar as dictating that researchers' day-to-day work must be aligned with the demands of institutions and research funding bodies. In order to support its scientific community, the University of Liège wants to set up and strengthen support services tailored to the different levels of involvement and knowledge of researchers. The University aims to provide an adequate understanding of the Open Science landscape in order to both provide reassurance and help researchers master the tools and procedures involved. **Providing information** is therefore the first step in providing support. The culture of Open Science, developed and encouraged at international level, is based on the observations made by many people in the scientific and/or political world. These observations, as well as the arguments, reflections and sometimes debates that accompany them, need to be known by everyone, in order to understand the scientific and societal issues that justify the implementation of specific policies. Over and above this basic information, the aim is **to support** researchers when they are actually involved in processes relating to one of the aspects of Open Science. The aim here is to organise not the tools themselves, but the resources available to support their use.

### The University of Liège undertakes to:

1. organise and supervise the awareness-raising, training and support initiatives by setting up a **permanent Open Science** institutional **steering body**, based on the central support services for researchers already involved in these initiatives (RISE, ULiège Library, etc.);
2. develop indirect internal communication ("inform"), in particular through the development of **intranet pages** dedicated to researchers, which are constant sources of reference and which relay information from quality sources concerning Open Science;
3. develop and/or consolidate direct communication via a comprehensive range of training courses covering the different facets of Open Science, presented in a **structured portfolio** to improve visibility and readability. This structured portfolio will cover Open Access (incl. ORBi), FAIR Data Management, Open Source, Open Education, Citizen Science, etc ;
4. develop a **ULiège Open Science network**, with players on the ground, built on the model of the "*Data Ambassadors*" initiative to complement the overall institutional support;
5. Strengthen and institutionalise external communication (website, social networks, science dissemination events, etc.) in order to develop an **Open Science culture** among citizens, the international scientific community, the non-academic sector and public authorities;
6. more specifically, encourage researchers to create an **ORCID** identifier. This unique identifier, which is recognised in many international contexts, has recurring applications in Open Science tools (publication and/or data directories, data management plans, etc.), including those developed by/with the University of Liège.

## B. Increasing the Visibility and Accessibility of the Scientific Output of Researchers at the University of Liège

Scientific research at the University of Liège is diverse and of high quality. When it is not intended to be economically exploited through patents, for example, it is expressed through traditional publications (articles in periodicals, chapters, monographs, etc.) as well as through scientific communications at colloquia and congresses, research reports, conferences, etc. In all cases, it deserves to be made more visible and accessible to researchers from all over the world as well as to other players in society (citizens, SMEs, etc.) in order to make a useful contribution to the development of humanity's common knowledge. The University of Liège is aware of its social responsibilities in this area and of the limitations of traditional publication systems. Drawing on its values of equality, respect and transparency, the University refuses to allow itself to be trapped in a constrained publication system designed primarily to generate profits for a few players. It intends to play an active role in disseminating the scientific output of its researchers and making it more widely known. Consequently, it intends to develop and support internal and external initiatives likely to open up its scientific output. Its strategy for open publication is threefold: preprint servers, the green route and the golden route.

### 2.1. Preprint Servers

Based on the pioneering ArXiv model, numerous *Open Access preprint* server initiatives have been developed in recent years (agriRxiv, bioRxiv, ChemRxiv, medRxiv, PsyArXiv, SocArxiv, etc.), significantly speeding up the dissemination of knowledge and increasing its visibility. These models for disseminating scientific production contribute to the bibliodiversity of scientific production (see below).

**Aware of the value of these solutions, the University of Liège is committed to:**

7. encouraging researchers to deposit their preprints on non-commercial preprint servers, provided that they comply with the FAIR (Findable, Accessible, Interoperable and Reusable) principles and are recognised as high quality in their discipline (see <https://doapr.coar-repositories.org/>);
8. taking this work into account when assessing the scientific output of researchers through ORBi, while recognising that this work has not yet been peer-reviewed.

In particular, it confirms its support for the *Peer Community In* initiative and encourages its researchers to collaborate in its specific communities.

## 2.2. Green Route

### Strengthening the repository in the ORBi institutional directory

The University of Liège's institutional repository, ORBi, has been collecting the scientific output of its researchers since 2008. While a very large number of researchers systematically submit their publications and communications, making ORBi one of the world leaders in terms of completion rates, a small proportion of this output (around 10%) is still not submitted to ORBi.

#### The University of Liège undertakes to:

9. halve the proportion of scientific publications by its researchers that are not available on ORBi over the next 5 years, by strengthening its institutional communication and incentives;
10. systematically include a link to the ORBi version of any of its researchers' publications in its institutional communications to encourage access to the version of the document available on ORBi rather than the publisher's version;
11. draw up an ORBi repository charter incorporating the depositor's ethical commitments and make them aware of them.

### Strict application of the FWB decree

In 2018, the Fédération Wallonie-Bruxelles (FWB) announced a decree aimed at establishing an *Open Access* policy for scientific publications in the FWB. This decree stipulates that all scientific journal articles accepted for publication and resulting from research funded in whole or in part by the FWB must be deposited in Open Access in their final version (without the publisher's layout) in an institutional repository immediately after acceptance by the publisher or following a maximum embargo of 6 months (STM) or 12 months (SHS) if required by the publisher. This decree is supplemented by a 2018 amendment to the Belgian Copyright Act, which also gives the right to deposit open access journal articles in an institutional repository if they are the result of research financed to the tune of at least 50% by public funds, as long as an attachment point is located in Belgium, regardless of the contract signed with the publisher. The text submitted may be the final version of the article but without the publisher's layout, with the same embargo periods as those stipulated by the FWB's Open Access decree.

Although the University of Liège has been a forerunner, in terms of the institutional mandate for its publications, since 2007, it notes that a proportion of the articles published and deposited in ORBi by its researchers are not currently available in open access.

#### The University of Liège undertakes to:

12. remind its researchers of their obligation under the decree and to put in place the technical means necessary to prevent the deposit of these articles in restricted access. It intends to achieve a rate of deposit of Open Access or embargoed journal articles as provided for by the decree equal to, or very close to, 100% within 3 years;
13. examine the feasibility of inviting the legislator to broaden the types of publications covered by the decree, in particular book chapters (or even to reduce the embargo periods).

**This same FWB Open Access decree** also stipulates that in any evaluation procedure within the FWB, the only lists of publications that can be taken into account under penalty of nullity are those generated from the institutional directories, thus including, for journal articles, only those available in Open Access or under 6 month/12 month embargo. This requirement reinforces the Open Access mandate given to the University of Liège by its Board of Directors in 2007.

**Consequently, the University of Liège undertakes to:**

14. remind its evaluation committees and juries of this requirement, and to put in place, within one year, the technical devices limiting the list of articles in publication reports generated from ORBi to those that comply with the requirements of the FWB's OA decree;
15. ensure that this decree requirement is respected in any other evaluation of scientific dossiers within any body linked to the FWB and in which it participates.

## Doctoral theses

In 2006, the University created the BICTEL/e directory to organise the electronic deposit of doctoral theses defended within the institution as part of its policy to support open access to scientific information. BICTEL/e was subsequently integrated into the ORBi institutional repository.

**The University of Liège undertakes to:**

16. encourage the deposit on ORBi of the full text of theses defended within the institution, with the sole exception of theses that are confidential for ethical, contractual or economic reasons.

## MatheO

Since 2014-2015, the University of Liège has deployed MatheO, its institutional dissertation/thesis directory. Most of the University's study programmes have now adopted it for all their students. Despite its very high international profile, only a third of the dissertations/theses deposited on MatheO are currently available in open access.

**The University of Liège undertakes to:**

17. encourage students and dissertation/thesis boards to give preference to Open Access versions for all, or at least a large part, of their dissertations/theses (for dissertations/theses that are not confidential for ethical, contractual or economic reasons). The objective is that within 5 years, at least 50% of dissertations/theses should be submitted in open access on MatheO.

## 2.2. The Golden Route

Aware of the abuses caused by the almost complete transfer of scientific publishing activities to private economic players (whose priority is to generate profits) and taking advantage of the opportunities offered by the development of digital technology, the scientific community is increasingly developing so-called "diamond" initiatives aimed at regaining control of this publishing activity through open access publication portals at no cost to the author. At the University of Liège, this movement has taken concrete form in the development, since 2005, of PoPuPS for scientific journals and conference proceedings and, since 2020, of e-Publish for monographs, as well as in support for and active participation in external initiatives (Operas, indexes, the network of incubators of open access scientific journals, etc.). The University of Liège has also

signed the Jussieu Call, which aims to support bibliodiversity and the development of innovative models for scientific publication. In addition, given the spectacular development of *predatory journals* <sup>(4)</sup>, the University of Liège has also made Compass to Publish, a tool available to the scientific community to help them assess the legitimacy of a scientific journal before publishing in it.

#### The University of Liège undertakes to:

##### → e-Publish

18. continue to develop the e-Publish portal for open publication of monographs (manuals, books, reports, collective works);
19. set up a production chain and a team to support authors and publishers of open access digital works;
20. integrate works produced via e-Publish into the international ecosystem of open access monographs to ensure their visibility;
21. produce 3 to 5 open access monographs per year via this platform.

#### The University of Liège undertakes to:

##### → PoPuPS

22. support and assist “diamond” journals and conference proceedings distributed via PoPuPs, in particular, so as to improve their quality, ensure that these journals are all recognised by the DOAJ (<https://doaj.org/>), and make PoPuPs a benchmark in this area;
23. commit these journals and conference proceedings published on PoPuPS to improving the quality of processes and communication and to respect an ethical charter for scientific communication in accordance with COPE standards (<https://publicationethics.org/>);
24. create a scientific journal open to students and managed by them, so that they can experience first-hand the characteristics of scientific publication and practise publishing for the first time;
25. open up this platform to any other non-commercial scientific player, providing they are committed to the platform's scientific, qualitative and ethical criteria;
26. strengthen the integration of PoPuPS into international networks of platforms and incubators for publicly supported scientific journals;
27. further increase the visibility of these journals by improving their search engine optimisation and harvesting tools.

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<sup>4</sup> Journals that seek to give the appearance of a genuine scientific journal but offer none of the expected guarantees of quality and rigour. They are created with the sole aim of attracting authors who are prepared to pay APCs to be published, and are often considered to be a legal scam.



### The University of Liège also undertakes to:

28. support the bibliodiversity of scientific production, in particular by promoting and participating in the development of infrastructures and sustainable economic models;
29. provide structural support for researchers throughout the scientific publication process, in particular by informing them about the conservation of their rights and their *Open Access* obligations;
30. support external non-commercial initiatives for the development of quality scientific journals in the OA diamond field and to promote these among its researchers (for example through memberships);
31. pursue and strengthen the policy initiated by its libraries of promoting open access to international scientific literature for its researchers and students;
32. promote the diversity of types of publications, in particular through evaluation processes;
33. experiment with *open peer reviewing* systems, in particular as part of the PoPuPS portal;
34. continue to systematically identify the amounts of APC<sup>5</sup> paid by its researchers and to make this information available via the Bielefeld University [OpenAPC](#) portal;
35. refuse to pay APCs for articles published in hybrid journals<sup>6</sup>;
36. not provide financial support at institutional level for the payment of APCs in journals requiring "unfair" APCs (in excess of €750);
37. not enter into transforming or *Read&Publish* agreements<sup>7</sup> but to organise, within 3 years, an in-depth analysis and reflection on the evolution of scientific communication business models, including these transforming models;
38. continue to develop and update *Compass to Publish* and develop initiatives to help researchers avoid predatory journals and determine the quality of the journals to which they submit their articles;
39. encourage the publication of *pre-registrations*<sup>8</sup> and make them available in *open access*;

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<sup>5</sup> *Articles or Author Processing Charges*. The amount charged to authors by certain open access (gold) journals in order to publish an article according to the reverse model, where it is no longer the reader who pays to read but the author who pays to be published.

<sup>6</sup> Journals that require readers to pay a subscription fee but also ask authors to pay APCs to make their articles available in open access.

<sup>7</sup> Agreement between commercial publishers and institutions or consortia allowing them to pay a subscription fee for a set of journals but including a share covering a certain number of APC opportunities for their researchers in these journals.

<sup>8</sup> The practice of publishing the hypotheses and methodology of a research study before collecting the data in order to improve the integrity of the research by reducing the bias of reformulating hypotheses or selecting data after the fact.

## C. Research Data

Excellence in scientific research is based, among other things, on the values of ethics and transparency, which promote scientific reproducibility. The verifiability of published results implies the traceability of research data, and is greatly facilitated by making such data available in open access. Many Belgian and European research funders, as well as publishers, already require the sharing of datasets used in publications when no legal or ethical considerations apply<sup>9</sup>. Making data available in this way improves the perceived reliability of published results<sup>10</sup>. Beyond these obligations, *open data* and FAIR data accelerate<sup>11,12</sup> research and innovation, by optimising the re-use of data and the visibility of researchers. These approaches also make it possible to combine complementary datasets to take full advantage of the benefits of Big Data, such as the possibility of very large-scale temporal or geographical studies<sup>13</sup> or meta-analyses. The scientific, economic and societal value of this research data must not be overlooked. It is up to the University of Liège to ensure that it is preserved and used in a way that reflects its values and commitments.

Tools for preserving archived data are already in place at the University of Liège, but these do not allow open data to be shared. To enable researchers to respond adequately to these obligations of openness, the University of Liège intends to create an environment conducive to the management and FAIR and relevant sharing of research data. It is not simply a question of depositing data online, but of guaranteeing its reusability, visibility and durability, by offering researchers the appropriate tools, advice and resources, for example in the choice of repository, format or the drafting of documentation.

### The University of Liège also undertakes to:

40. make a Dataverse directory available to researchers, enabling data to be shared, complete with structured metadata, permanent identifiers and licences, and offering extensive possibilities for interoperability with other tools (institutional directories, *harvesting* tools, etc.) so as to ensure that this data is widely visible;
41. open up this data-sharing directory to the outside world, in particular by facilitating the harvesting of metadata;
42. provide researchers with technical support and advice on how to make the best use of these tools (formats, licences, documentation);
43. encourage the use of open and durable formats that improve the portability of data, for example by favouring tools that allow this, from the earliest stages of research, including the drafting of specifications and the submission of Master's dissertations in Matheo.

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<sup>9</sup> Schofield, P., Bubela, T., Weaver, T. et al. (2009). Post-publication sharing of data and tools. *Nature* 461, 171-173. <https://doi.org/10.1038/461171a>

<sup>10</sup> Popkin, G. (2019). Data sharing and how it can benefit your scientific career. *Nature* 569: 445-447. <https://doi.org/10.1038/d41586-019-01506-x>

<sup>11</sup> Milham, M.P., Craddock, R.C., Son, J.J. et al. (2018). Assessment of the impact of shared brain imaging data on the scientific literature. *Nature Communications*, 9, article 2018. <https://doi.org/10.1038/s41467-018-04976-1>

<sup>12</sup> Longo, D.L. and Drazen, J.M. (2016). Data sharing. *New England Journal of Medicine*, 374, 276-277. <https://doi.org/10.1056/NEJMe1516564>

<sup>13</sup> See <https://researchdata.springernature.com/posts/43799-how-should-findable-accessible-interoperable-and-reusable-fair-data-work-in-practice>

#### The University of Liège also undertakes to:

46. establish a culture favourable to the opening up of research data through systematic information and training initiatives, and by putting in place systematic procedures to minimise the workload associated with this process.

To do this, upstream of publication, the management of the data collection, processing, storage and archiving stages must be facilitated and these different stages integrated into a coherent, monitored and relevant system. In 2018, in its roadmap for *Open Science* in the FWB, the European Research Area Monitoring Group stressed the importance of the FAIR principles of data management plans for the implementation of an open science culture. Drawing up a data management plan at the start of a research project helps to define a data sharing strategy as early as possible, and to anticipate decisions in terms of format, volume, documentation and other tasks linked to open data management.

The University of Liège intends to facilitate and systematise the drafting of data management plans, particularly for doctoral projects, through the use of the DMPonline.be tool, accompanied by guidance and support on request. In addition, the University of Liège intends to locally develop the skills needed for FAIR data management, in particular by encouraging *peer-to-peer support*, for example by supporting the FWB network of *Data Ambassadors*.

#### The University of Liège undertakes to:

47. include the drafting of a data management plan in the first year of any new thesis project as part of doctoral training;
48. systematically suggest that a data management plan be drawn up for all new research projects at the University of Liège;
49. provide a single entry point for data management resources, with the widespread use of a decision tree enabling any researcher to identify the various resources available at the start of a project, depending on the specific features of the project;
50. make available a system for storing work data to facilitate the traceability of research results, including versioning facilities, electronic laboratory notebooks, backup plans and collaborations.

## D. Free Software

The source codes and digital tools developed by researchers are an integral part of the research results, and these too can be opened up. Via collaborative development platforms, they can be made available to all for use and modification. This practice of *open source software* greatly facilitates cooperation between researchers, including doctoral students, and even between researchers and the general public. Since 2019, two GitLab facilities have been available to members of the university community for this purpose. In addition, the University of Liège and the CHU are behind several landmark initiatives <sup>1415</sup> in this field.

The use of free and open software can also support sustainable development. By integrating users into a community that collectively improves products and services, it frees them from the sometimes monopolistic yoke of proprietary publishers and reduces the threat of foreseeable obsolescence due to lack of medium-term support. In many cases, it also promotes digital sobriety, by avoiding the use of technologies that require ever more power and shorten the lifespan of hardware, which remains in the hands of industry. Finally, the use of open source software alongside proprietary software can facilitate the interoperability of data, source code and other files between operating systems and digital environments. The University of Liège intends to provide practical support for *open source* development by making the *appropriate* tools available.

To increase their use, awareness-raising and promotion initiatives are needed, bearing in mind that the choice of the software used depends on many parameters, including functionality, security, stability, ergonomics, maintenance, etc., with each 'solution' having its advantages and disadvantages. Barriers to the use of these software forges need to be identified and removed as far as possible, whether they are technical, legal or cultural.

### Consequently, the University of Liège undertakes to:

51. train staff and students involved in IT development in the use of software forges, including good technical and legal (licensing) practices in the creation and re-use of *open source software*;
52. raise awareness of the added value of *open source software* for researchers' careers and promote the use of software forges in professional assessments;
53. develop a *peer-to-peer* support system via local and inter-university initiatives, and mobilise these systems to identify and remove obstacles to *open source software*;
54. offer all staff and students the opportunity to use open-source software, taking into account the institutional digital environment;
55. make members of the University of Liège aware of the differences between open, proprietary and free formats, and the possibilities offered by the use of such formats.

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<sup>14</sup> "Geeks Anonymous" conferences: [https://www.recherche.uliege.be/cms/c\\_9463913/en/geek-anonymes](https://www.recherche.uliege.be/cms/c_9463913/en/geek-anonymes)

<sup>15</sup> ORTHANC software: <https://www.orthanc-server.com/>

## E. Open Education

While digital technology is a driving force behind the dissemination of research, it also offers opportunities for teaching. The use of digital technology for teaching overcomes physical and temporal barriers and makes the content of certain courses accessible to as many people as possible, thereby contributing to the objective of sustainable development<sup>16</sup>. In addition, certain forms of distance learning make these resources more accessible to students with disabilities. The University of Liège has set up Digital Tools CARE to provide the institution with a structure for pooling human and material resources and facilitating the sharing of good practices, thereby feeding into an institutional strategy for teaching.

Since 2017, the University has been producing MOOCs, which are free and open to all, as well as SPOCs (Small Private Online Courses). Twenty-five MOOCs are available in the dedicated<sup>17</sup> catalogue. The University is also producing critical literature on the use of MOOCs in education<sup>18</sup>.

The University of Liège is currently producing 3 types of MOOCs: 'general public' content, integrated into Baccalauréat teaching materials or used as remedial tools; 'specialised' content, requiring prerequisites and integrated into Master's courses and/or university certificates; and 'mixed' content, integrated into teaching materials at different levels, with differentiated pathways and/or optional modules. One of the University of Liège's priorities is to produce MOOCs that are systematically used by Bachelor's and Master's students as part of their regular course programme<sup>19</sup>. In addition, the content of MOOCs and SPOCs can also be isolated and hosted separately in order to enhance them or reintegrate them into new teaching systems.

At the same time, the University of Liège is working on the creation of a more global platform to host all its potentially free educational resources (OER). For several years now, many teachers have been making their teaching resources available on ORBi. The creation of a 'repository'-type platform entirely dedicated to, and designed for, the needs of this content, specific to each faculty or discipline, is the logical next step. In doing so, the University of Liège is endeavouring to make the various educational systems and content produced within it easily identifiable and manipulable by an internal and/or external audience (civil society, international academic community and higher education).

With this platform, every producer of educational content at ULiège will be able to upload 4 types of resources on a voluntary basis: entire course content ("open courses"), syllabuses and course notes ("*open textbooks*"), courseware and teaching programmes ("*open courseware*"), as well as practical information for setting up teaching activities ("*open course frameworks*")<sup>20</sup>. The platform will also host audiovisual and software resources.

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<sup>16</sup> See <https://www.un.org/sustainabledevelopment/fr/education/>

<sup>17</sup> See [https://www.digital.uliege.be/cms/c\\_4856738/fr/moocs](https://www.digital.uliege.be/cms/c_4856738/fr/moocs)

<sup>18</sup> See [https://www.digital.uliege.be/cms/c\\_6318024/fr/digital-recherche](https://www.digital.uliege.be/cms/c_6318024/fr/digital-recherche)

<sup>19</sup> See [https://www.digital.uliege.be/cms/c\\_6826805/fr/digital-les-moocs-en-chiffres](https://www.digital.uliege.be/cms/c_6826805/fr/digital-les-moocs-en-chiffres)

<sup>20</sup> Boytchev, P., Boutcheva, S. (2019). Innovation eLearning Technologies in the Open Education Era. *CompSysTech '19: Proceedings of the 20th International Conference on Computer Systems and Technologies*, 324-331. <https://doi.org/10.1145/3345252.3345300>

### **The University of Liège undertakes to:**

56. Strengthen and open up existing solutions and content
  - a. centralise potentially open educational resources on a dedicated OER platform, currently being designed at the University of Liège;
  - b. ensure the compatibility of centralised teaching resources with those from external platforms (edX, FutureLearn, etc.);
  - c. promote the use and creation of open learning resources as part of career evaluation;
  - d. identify the educational tools that could usefully be made available to society;
  - e. develop a policy for using this future platform to make distance learning resources available as openly as possible, for example by opening access to recorded courses to a wider audience than just the students enrolled on the course;
  - f. pursue the actions already put in place to overcome the physical and temporal boundaries of teaching, such as the production of MOOCs/SPOCs and their integration into the teaching activities and resources of the University of Liège;
57. ensure digital well-being;
  - a. identify the obstacles to the adoption of the tools by teachers and users;
  - b. check and, if possible, improve the ergonomics and accessibility of the digital resources made available on this platform;
58. encourage the use by teachers and students of high-quality open educational resources created by players from outside the University of Liège.

## F. Citizen and Participatory Science

The University of Liège makes the discoveries and new knowledge established by its scientists available to the general public, so that anyone, whether an expert or novice, can access the knowledge and know-how of our institution. The University of Liège is fully committed to the missions assigned to it, and, in this way, contributes to increasing the overall knowledge of our societies and disseminating this knowledge. By bringing together a wide range of players in a museum and cultural centre, the institution has demonstrated its desire to promote the circulation of knowledge to as many people as possible: school groups and teachers, the general public, the university community, the business world, the voluntary sector, etc. The activities developed by the various institutional partners meet fundamental objectives: raising awareness among young people and the general public of the importance of research in our societies; encouraging vocations and careers in this field; promoting access to knowledge or placing science in the cultural arena; maintaining dialogue and exchanges between the university, society and the business world.

For some years now, the expression "*Citizen Science*" has been used to describe a particular form of interaction between the academic world and society: the direct involvement of citizens and practising experts in research activities. To avoid any confusion, we prefer the term "participatory science"<sup>21</sup>. Although the best-known example is the involvement of citizens in data collection, a mechanism that is already well established in fields such as ecology, meteorology and astrophysics, participatory science goes further by including problematisation, the identification of research questions, data analysis, the production of qualitative knowledge, participation in the dissemination and appropriation of results, and so on. It therefore potentially encompasses all types of contributions to scientific production in its broadest sense<sup>22</sup>, including those classified under the heading of the "third research sector".

Whatever the fluctuations in the scope of these activities, certain principles must absolutely be respected in order to ensure that they can effectively be considered as *science* and as *participatory*:

- protocols and practices must be in line with current research standards in the fields concerned;
- citizens and experts must be actively and meaningfully involved; they are not the subjects of the research.

In the light of these factors, the link with open science seems obvious. Where ethical and legal constraints allow, the sharing of data and results from participatory science projects contributes fully to the envisaged dynamic and serves the general interest. Initiatives such as these not only serve as a reminder that science is a public good, but can also contribute to a positive perception of scientific research among the general public by encouraging them to embrace scientific method and rigour. This also contributes to a more realistic perception of the research process among the general public.

Furthermore, while European and international funding agencies have long been attentive to dissemination activities, which ensure that the work and results of funded projects are visible to the general public ('*public engagement*'), they are also increasingly sensitive to participatory science activities. In order to best meet the expectations of funding bodies and the evaluation criteria for calls for projects, the University intends to continue its scientific dissemination efforts and also to provide adequate recognition and support for participatory science initiatives.

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<sup>21</sup> On this subject, see the work of the ECSA (European Citizen Science Association): <https://ecsa.citizen-science.net/about-us/>

<sup>22</sup> For more details on these roles, please refer to the CRediT taxonomy <https://credit.niso.org/>.

### The University of Liège undertakes to:

59. **identify** the players and researchers at the University of Liège who are already involved in participatory science projects, in order to encourage an open exchange at institutional level;
60. offer a comprehensive **support service** for all questions relating to Participatory Science: reference information, contacts, expectations of external bodies, etc.;
61. more specifically, establish a **framework of** recommendations for the implementation of Participatory Science **projects** within the University of Liège, taking into account both pre-existing internal experience and the principles proposed by external bodies, such as the *European Citizen Science Association*;
62. explore the possibility for the internal bodies concerned to create specific **funding** from existing instruments (sectoral research credits, faculty research credits, etc.);
63. **communicate** internally and externally about these initiatives and projects, to encourage emulation and ensure recognition of the principles of Participatory Science.



## G. Assessment and Integrity

The move towards Open Science coincides with the rethinking of **research evaluation** and, in some respects, responds to expectations that have already been expressed. In recent years, the issue of evaluation has become increasingly important in the academic and political landscape. The findings concerning the systems and criteria in place for (1) the evaluation of institutions, (2) the evaluation of projects and (3) the evaluation of researchers have prompted a growing number of individuals and organisations to question the relevance of these processes. The conclusions of this work stress the need for a transition away from evaluation focused on quantitative criteria towards multi-dimensional, predominantly qualitative evaluations supported by a responsible use of quantitative indicators. The scope of evaluation and Open Science therefore overlap without being exactly the same: Open Science achievements are part of a multi-dimensional set of activities that can be taken into account for evaluation.

Internally at the University of Liège, this reflection took concrete form in an analysis specific to the human sciences sector, leading to the publication in September 2017 of a *Guide to the Evaluation of Research in the Human Sciences*, drawn up and written by the Sector Council for Research and Valorisation in the Human Sciences. In addition, the progress report and the latest action plan (2021-2024) HRS4R<sup>23</sup> mention the need to continue institutional reflection on the *definition and the implementation of the periodic evaluation of researchers, integrating the various aspects of the profession in consultation with researchers*.

At international level, in addition to well-known principles and recommendations, such as those set out in the Leiden Manifesto and the DORA (*San Francisco Declaration On Research Assessment*), the proliferation of initiatives has prompted a consortium of European stakeholders to launch a federative effort aimed at creating a *Coalition for Advancing Research Assessment* (CoARA) (<https://coara.eu/>), whose signatory institutions will align their assessment policies with the principles set out in a reference document entitled *Agreement on Reforming Research Assessment* (2022)<sup>24</sup>.

On 7<sup>th</sup> June 2023, the University of Liège strengthened its commitment to change in research evaluation by signing the CoARA agreement<sup>25</sup>.

In a similar way, the concerns of Open Science coincide with certain expectations in terms of scientific integrity. Sharing research results and data helps to demonstrate the responsible conduct of scientific work and contributes to efforts to ensure reproducibility. It is therefore logical to expect academic institutions to refer to the principles of Open Science in the codes of scientific integrity that they adopt from now on.

In these two areas - evaluation and integrity - any institutional policy must adhere to the precept "*as open as possible, as closed as necessary*". Under no circumstances should the sharing or opening up of research results and data be done in defiance of the fundamental rules relating to the protection of personal data, ethics, intellectual property rights and so on.

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<sup>23</sup> See [https://www.recherche.uliege.be/cms/c\\_11131443/fr/plan-d-action](https://www.recherche.uliege.be/cms/c_11131443/fr/plan-d-action)

<sup>24</sup> See <https://research-and-innovation.ec.europa.eu/system/files/2022-07/rra-agreement-2022.pdf>

<sup>25</sup> See [https://www.news.uliege.be/cms/c\\_18335474/fr/l-uliege-signe-l-accord-coara-pour-la-reforme-de-l-evaluation-de-la-recherche](https://www.news.uliege.be/cms/c_18335474/fr/l-uliege-signe-l-accord-coara-pour-la-reforme-de-l-evaluation-de-la-recherche)

**Consequently, the University of Liège undertakes to:**

64. take account of the contributions of Open Science in the development of an institutional policy for the evaluation of research which, in accordance with the principles upheld in the 2017 *Guide to the Evaluation of Research in the Humanities and Social Sciences* and by the *Coalition for Advancing Research Assessment (COARA)*, will go beyond quantitative criteria and promote procedures that take account of the diversity of researchers' activities and the diversity of contributions resulting from their work;
65. mention the value of the uses of Open Science in drawing up a code of scientific integrity specific to the University of Liège, which could be based on the extensive work already carried out within the institution (e.g., the "12 principles" voted on by the CEIS in 2021 ).<sup>26</sup>

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<sup>26</sup> See [https://www.recherche.uliege.be/cms/c\\_14096910/fr/douzeprincipesquality-uliege](https://www.recherche.uliege.be/cms/c_14096910/fr/douzeprincipesquality-uliege)